

Please direct questions to Katie Schwaab at 303-384-8180

**AWWA Free Water Audit Software:
Worksheet**

FWAS v6.0
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Water Audit Report for: **City of Golden**

Audit Year: **2020** | **Jan 01 2020 - Dec 31 2020** | **Calendar**

To access definitions, click the [input name](#) Click 'n' to add notes Click 'g' to determine data validity grade To edit water system info: [go to start page](#)

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

WATER SUPPLIED

VOS	Volume from Own Sources:	n g 5	3,441.330	Acre-ft/Yr	n g 10	
WI	Water Imported:	n g n/a	0.000	Acre-ft/Yr		
WE	Water Exported:	n g n/a	0.000	Acre-ft/Yr		

WATER SUPPLIED: 3,439.890 Acre-ft/Yr

Water Supplied Error Adjustments

choose entry option:

acre-ft/yr

VOSEA
WIEA
WEEA

AUTHORIZED CONSUMPTION

BMAC	Billed Metered:	n g 9	3,025.730	Acre-ft/Yr	
BUAC	Billed Unmetered:	n g 5	0.410	Acre-ft/Yr	
UMAC	Unbilled Metered:	n g 4	45.520	Acre-ft/Yr	
UUAC	Unbilled Unmetered:	n g 5	90.607	Acre-ft/Yr	

AUTHORIZED CONSUMPTION: 3,162.267 Acre-ft/Yr

choose entry option:

acre-ft/yr

WATER LOSSES

WATER LOSSES: 277.623 Acre-ft/Yr

Apparent Losses

Default option selected for Systematic Data Handling Errors, with automatic data grading of 3

SDHE	Systematic Data Handling Errors:	n g 3	7.565	Acre-ft/Yr	
CMI	Customer Metering Inaccuracies:	n g 3	46.770	Acre-ft/Yr	
UC	Unauthorized Consumption:	n g 3	7.565	Acre-ft/Yr	

Default option selected for Unauthorized Consumption, with automatic data grading of 3

Apparent Losses: 61.901 Acre-ft/Yr

Real Losses

Real Losses: 215.722 Acre-ft/Yr

WATER LOSSES: 277.623 Acre-ft/Yr

choose entry option:

0.25%	default	
1.50%	percent	
0.25%	default	

NON-REVENUE WATER

NON-REVENUE WATER: 413.750 Acre-ft/Yr

SYSTEM DATA

Lm	Length of mains:	n g 10	112.7	miles	
Nc	Number of service connections:	n g 10	5,475	(including fire hydrant lead lengths)	(active and inactive)
	Service connection density:		49	conn./mile main	

Are customer meters typically located at the curbstop/property line?

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

Average Operating Pressure: psi

COST DATA

CRUC	Customer Retail Unit Charge:	n g 10	\$8.39	\$/1000 gallons (US)	
VPC	Variable Production Cost:	n g 3	\$280.23	\$/acre-ft	

Total Annual Operating Cost: \$5,968,840 \$/yr (optional input)

WATER AUDIT DATA VALIDITY TIER:

*** The Water Audit Data Validity Score is in Tier III (51-70). See Dashboard tab for additional outputs. ***

[go to dashboard](#)

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

PRIORITY AREAS FOR ATTENTION TO IMPROVE DATA VALIDITY:

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

1: Volume from Own Sources (VOS)
2: Billed Unmetered (BUAC)
3: Customer Metering Inaccuracies (CMI)

KEY PERFORMANCE INDICATOR TARGETS:

OPTIONAL: If targets exist for the operational performance indicators, they can be input below:

Unit Total Losses:	<input type="text"/>	gal/conn/day
Unit Apparent Losses:	<input type="text"/>	gal/conn/day
Unit Real Losses [^] :	<input type="text"/>	gal/conn/day
Unit Real Losses [°] :	<input type="text"/>	gal/mile/day

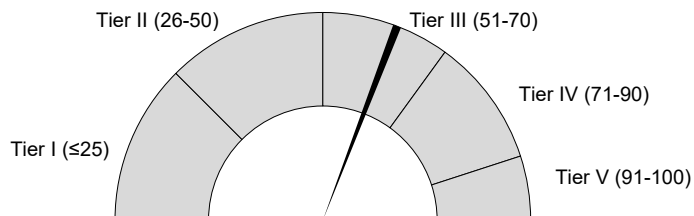
If entered above by user, targets will display on KPI gauges (see Dashboard)

AWWA Free Water Audit Software v6.0
Worksheet 1

Data Validity

Data Validity Score: **61** Data Validity Tier: **Tier III (51-70)**

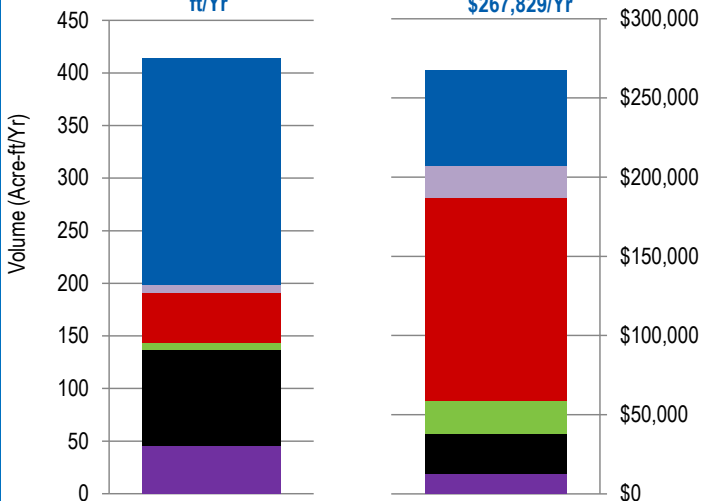
See [Loss Control Planning](#) for Tier Details



NRW Components Summary

Total Volume of NRW = 414 Acre-ft/Yr

Total Cost of NRW = \$267,829/Yr



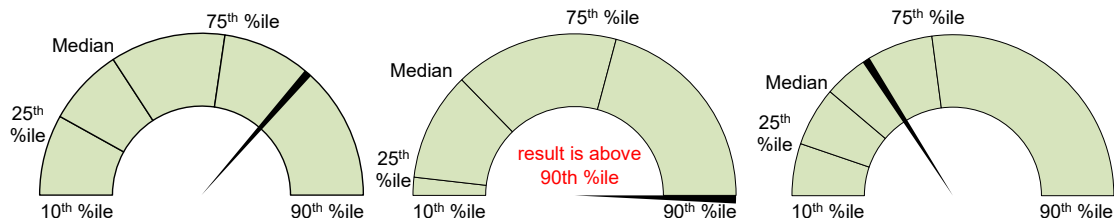
Category	Volume Acre-ft/Yr	Value \$/Yr	Basis of Valuation
Real Losses	215.7	\$60,452	VPC
Systematic Data Handling Errors	61.9	\$167,530	CRUC
Customer Metering Inaccuracies	136.1	\$38,147	VPC
Unauthorized Consumption	413.8	\$266,129	Blended
Unbilled Unmetered Auth Cons			
Unbilled Metered Authorized Cons			

Category	Volume Acre-ft/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	61.9	\$167,530	CRUC
Real Losses	215.7	\$60,452	VPC
Unbilled Authorized Cons	136.1	\$38,147	VPC
Non-Revenue Water	413.8	\$266,129	Blended

Key Performance Indicators

Actual KPI result gauge %iles per validated industry ranges²

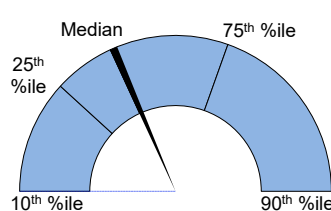
Target (see Worksheet)



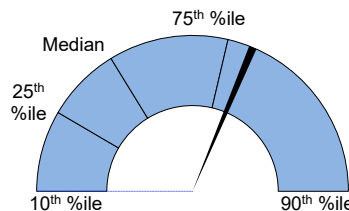
Total Loss Cost Rate
41.64 \$/conn/year

Apparent Loss Cost Rate
30.60 \$/conn/year

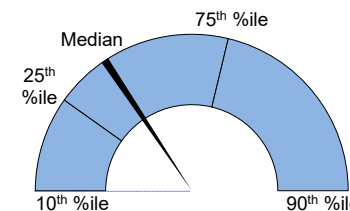
Real Loss Cost Rate
11.04 \$/conn/year



Unit Total Losses
45.3 gal/conn/day

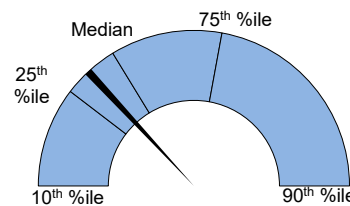
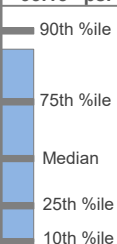


Unit Apparent Losses
10.1 gal/conn/day

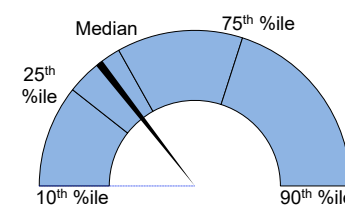


Unit Real Losses^A
35.2 gal/conn/day

Average Operating Pressure
93.15 psi



Infrastructure Leakage Index (ILI)
1.4 dimensionless



Unit Real Losses^B
1,709 gal/mile/day

See UARL definition for additional guidance on the ILI

(UARL) Unavoidable Annual Real Losses 149.3 Acre-ft/Yr 24.3 gal/conn/day

Guidance Information for Key Performance

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs¹.
- A suite of KPIs is necessary, as no single KPI can holistically communicate water loss performance for a given water system.
- See Table 1 below for Uses and Limitations for each KPI, excerpted from the AWWA Water Loss Control Committee Report (2020)¹, with naming conventions updated.
- Percentiles (%iles) shown on KPI gauges come from Level 1 validated data in the AWWA WLCC Reference Water Audit Dataset (2020)².
- KPI %iles shown above are not segregated by cohorts. Limited KPI data by cohorts may be found in WRF 4695 Guidance Manual, Appendix B (2019)³.
- Actual KPI results that fall below 10th %ile or above 90th %ile do not necessarily imply error, but should be viewed with scrutiny.
- Percentiles not intended to imply targets. Targets may be input by user for operational KPIs, if desired, on Worksheet.
- See UARL and ILI in Definitions tab for discussion of size and pressure limitations.
- Systems that fall on the extreme ends of size or connection density should use caution when interpreting Unit Losses KPIs.