WATER CONSERVATION PLAN

Tahoe Reno Industrial General Improvement District

7363.30123.01

APRIL 2024

Prepared for:

TRI-GID

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1.0 INTRODUCTION

This Water Conservation Plan (Plan) was prepared for the Tahoe Reno Industrial General Improvement District (TRI-GID) and its service areas to provide a framework for implementing and evaluating water conservation strategies. Water conservation is most effective when practiced in a proactive manner. Rather than only acting once an emergency scenario occurs (*e.g.*, extended drought, disruption of water supply), a proactive approach can help mitigate impacts of emergency events before they occur. This can result in a more resilient and sustainable water system for the water supplier and customers. One major advantage of initiating water conservation practices is that they can potentially save water without requiring major capital improvement and infrastructure projects.

1.1 STATUTORY REQUIREMENTS

This report was completed for TRI-GID in accordance with Nevada Revised Statutes (NRS) 540. Specifically, NRS 540.141 (effective as of January 1, 2020) requires that a Water Conservation Plan must include the following:

a) Public education and outreach.
b) Conservation methods to meet service area and legal needs.
c) Water systems management and loss evaluation.
d) Effluent reuse optimization.
e) Contingency plan for drought conditions to ensure potable water supply.
f) Schedule for plan implementation.
g) Pathway to metering all connections.
h) Water efficiency standards for new development.
i) Tiered rate structure.
j) Time and day-based watering restrictions.

2.0 WATER SYSTEM OVERVIEW

2.1 SERVICE AREA

The TRI-GID service area encompasses an area of approximately 82,890 acres, or 129.5 mi^2 (see Figure 1).

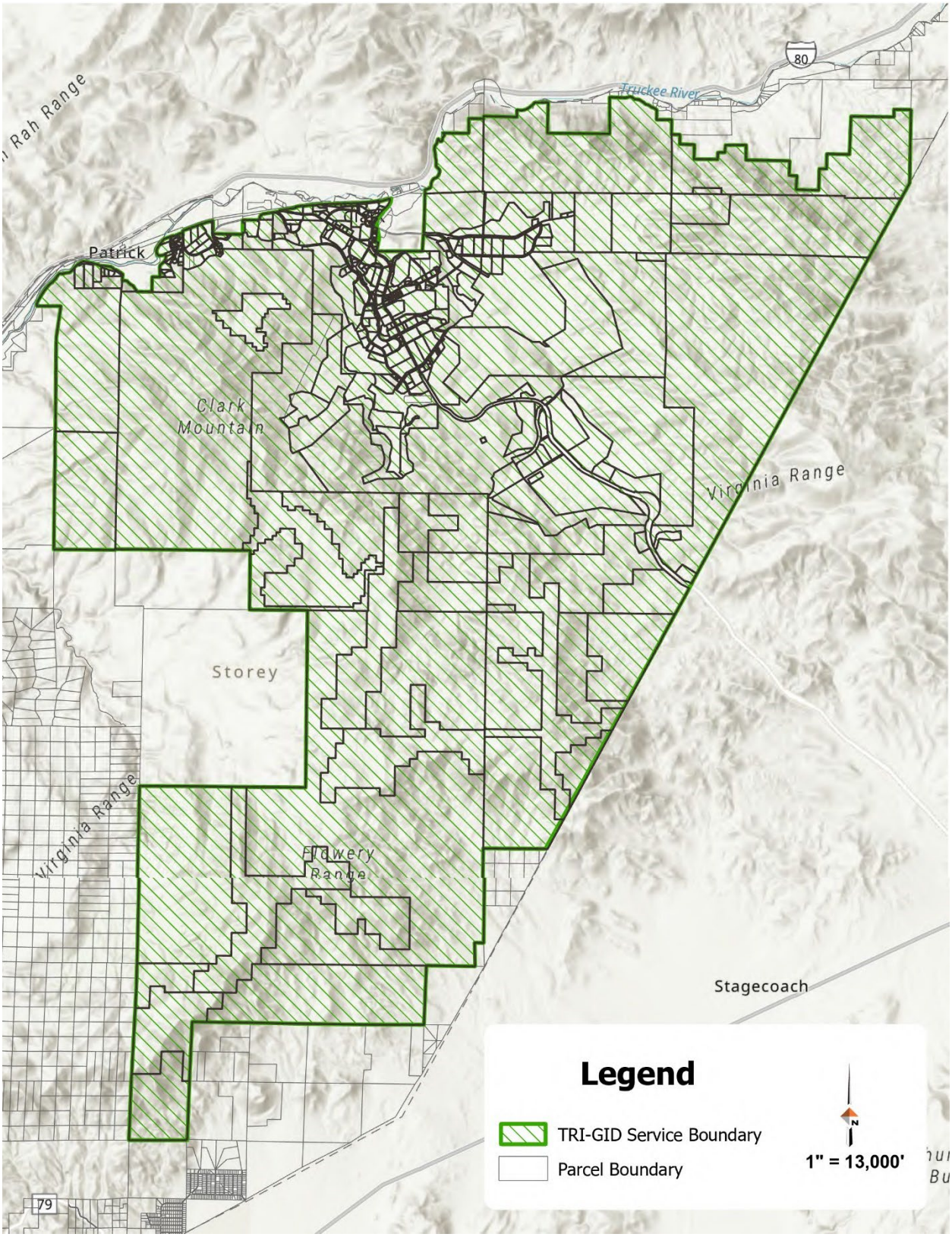


Figure 1. Map of the TRI-GID Service Area.

3.0 NRS 540.141 (1) REQUIRED PROVISIONS OF PLAN OR JOINT PLAN OF WATER CONSERVATION; REVIEW BY SECTION; POSTING OF PLANS AND JOINT PLANS ON INTERNET WEBSITE

According to NRS, all water purveyors must have a plan in place and approved by the Nevada Division of Water Resource, for the conservation of water to ensure a potable water supply, and methods to contend with drought. This section summarizes multiple conservation measures that can be implemented to reduce water use. Most of the actions described in this Section are required by NRS 540.141.

3.1 NRS 540.141 (1) (A) (1) PROVISIONS FOR INCREASING PUBLIC AWARENESS

Once the customer is established, TRI-GID provides historical water usage information on monthly billing statements, so customers can track water usage trends over time. TRI-GID also provides a free landscaping flyer for guidance on the use of drought tolerant plants suitable for the Truckee Meadows region (see Appendix B: Conservation Flyer). During times of drought, TRI-GID will provide inserts in monthly billing statements to customers, to heighten awareness of drought conditions and encourages messaging to be passed on to customers', employees, and staff. Moreover, major water users in the system such as Tesla, Switch, etc., all have their own climate pledges in which they design their factories and processes around water conservation practices and rely on the use of effluent and water recycling practices, as much as possible, for process water.

3.2 NRS 540.141 (1) (A) (2) PROVISIONS FOR ENCOURAGING WATER-EFFICIENT LANDSCAPING

TRI-GID discourages the use of landscape turf on any of their customers properties and landscaping plans must be submitted to TRI-GID, prior to will-serves being issued. TRI-GID requires landscaping plans that promote water-efficient or native vegetation, prior to customers connecting to the system. Landscaping plans and fixture calculations are used to determine water usage and penalties are added should a customer decide to have any landscaping turf on the property. To-date, all customers have a combination of low-flow fixtures within buildings as well as native or water-efficient landscaping irrigated by drip irrigation systems on the exterior.

3.3 NRS 540.141 (1) (B) SPECIFY WATER CONSERVATION MEASURES REQUIRED TO MEET THE NEEDS OF THE SERVICE AREA

TRI-GID actively tracks and fixes leaks, within the distribution system, as soon as possible. Moreover, TRI-GID has a no-waste rule and all customers must fix leaks on their end within 24 hours of written notification. Service can be discontinued after such time, should the customer fail to fix the leak. It is also required for new water users to provide TRI-GID with an estimate of their expected water usage, which serves to plan for water use in the system and to ensure sufficient water rights are available for a will-serve agreement.

All customer connections within the system are fully metered. TRI-GID requires landscaping plans that promote water-efficient or native vegetation, prior to customers connecting to the system. TRI-GID does not have a time of day and day of week watering schedule for customers' outdoor irrigation since there are no turfed areas within the service area. Once connected, customers are charged a monthly base charge and are on a volumetric water rate schedule and are provided

historical water usage so they can manage and track water usage trends. Under TRI-GID's terms of service, customers are obligated:

> *(a) to use the water only on customer's parcel for beneficial purposes not exceeding the amount of customer's water rights utilizing conservation measures (and re-use of effluent) as may be required by TRI-GID or the Nevada State Engineer; and (b) to use water conservation devices such as in-line aerators and flow restrictors, landscaping adapted to the desert environment, and best available water management practices.*

TRI-GID also has an independent effluent water system and is working toward replacing much of its potable water deliveries with effluent for customers' process water needs. Once fully established, this effluent system will reduce approximately 60% of potable water demands moving forward.

3.4 NRS 540.141 (1) (C) (1) GOALS FOR ACCEPTABLE LEVELS OF WATER LOSS IN WATER SUPPLIES

TRI-GID realizes identifying and reducing water loss in water supplies, detecting inaccuracies in water meters, and managing excessively high pressure in the water supply is critical to water conservation, year-round. Currently, based on a water audit using methodology and modeling framework provided by the American Waterworks Association (AWWA), TRI-GID estimates its water loss at 12%, annually (approximately 103.1 million gallons). However, more effort is needed to validate production meter data to ensure this is an accurate percentage of loss. Moreover, TRI-GID plans to better track construction water. Until such time as data can be better validated, TRI-GID is committed to not letting its water loss exceed 12%.

3.5 NRS 540.141 (1) (C) (2) A PLAN WHICH ANALYZES HOW THE SUPPLIER WILL PROGRESS TOWARDS GOALS

TRI-GID completed its first AWWA water audit as part of this conservation plan to determine its historic water loss (both real and apparent). TRI-GID is committed to updating that water audit on an annual basis to track the quality of the data and data gaps, water loss metrics, and improvements, over time. Additionally, TRI-GID will conduct monthly comparisons of production and consumption data to help determine inaccuracies in data and identify any gaps in data.

3.6 NRS 540.141 (1) (D) THE MANAGEMENT OF WATER TO, WHERE APPLICABLE, INCREASE THE REUSE OF EFFLUENT

As stated earlier, TRI-GID has a robust non-potable distribution system already in place to meet industrial process needs. TRI-GID also manages wastewater within the service territory and treats it to reuse effluent from its wastewater treatment plant. TRI-GID has also set up agreements and infrastructure to begin receiving effluent from the nearby cities of Reno and Sparks, via the Truckee River Water Reclamation Facility (TMWRF). Currently, many industrial process demands are being met with potable supply. Given many of TRI-GID's large water users have plans to incorporate effluent as process water, future plans for the management of water include replacing deliveries of potable water used for industrial processes with effluent. TRI-GID anticipates the effluent main distribution system to come online by Quarter 2 of 2024. Once online, TRI-GID expects potable demands from their largest water users to decline significantly (approximately 60% reduction in overall demand for potable water).

3.7 NRS 540.141 (1) (E) A DROUGHT CONTINGENCY PLAN THAT ENSURES A SUPPLY OF POTABLE WATER

Drought Declaration

Groundwater Monitoring

TRI-GID has eight (8) groundwater production wells located throughout its service territory. Currently, these eight wells provide water for all of customer demands. Given that the system is supplied by groundwater for potable demands, drought resilience is inherent and there is a lagged effect between hydrologic drought and impacts to groundwater levels. TRI-GID periodically measures static water levels (SWL) and pumping water levels (PWL) within each well. At the start of each water year (approximately April 1), TRI-GID will conduct groundwater trend analyses to compare SWLs to PWLs of each production well. If SWLs have dropped significantly below historic averages and, based on forecasted customer demands for potable water, pumping is expected to significantly impact "available aquifer saturated thickness" (AAST) over the course of the year, then a Drought Situation will be declared for the service area.

Drought Contingency Plan

During Drought Situations, TRI-GID will increase communication with its customers regarding drought and the importance of conserving water wherever and whenever possible. Based on the groundwater levels trends within its production wells during a Drought Situation, TRI-GID will adjust pumping operations to maintain AAST above the pump so that a constant supply of potable water is available for customer demands. Adjustments to operations might require a combination of pumping wells in a rotation to maintain higher SWL and potentially dropping PWL within wells (i.e. lowering pumps deeper below-ground-surface into wells).

Also, as previously stated, plans are underway to bring the non-potable effluent system online within the next 6 months, which will reduce potable demands within the system. This reduction in demand will create a larger potable supply buffer to draw upon in Drought Situations. Bringing the effluent system online will increase the drought resilience of the TRI-GID water supply.

3.8 NRS 540.141 (1) (F) A SCHEDULE FOR CARRYING OUT THE PLAN OR JOINT PLAN.

Standard conservation is required every year, within TRI-GID's service area. As stated above, a drought classification is determined each year, on April 1. Should a Drought Situation be determined, all customers are notified of the situation via their monthly billing statements throughout the drought and asked to conserve water whenever possible. It is important to note, since all (i) TRI-GID's customers are commercial or industrial in nature; (ii) all connections are fully metered; (iii) all properties have drought-tolerant vegetation for landscaping and waterwise internal fixtures; and (iv) the effluent system will begin providing water to customers within the next year, very few additional conservation measures could be adopted during a Drought Situation.

3.9 NRS 540.141 (1) (G) A PLAN FOR HOW THE SUPPLIER OF WATER WILL PROGRESS TOWARDS THE INSTALLATION OF METERS ON ALL CONNECTIONS

Currently all customer connections are metered within the TRI-GID service area. TRI-GID has also metered all production sources and connected to SCADA.

3.10 NRS 540.141 (1) (H) PROVISIONS FOR WATER EFFICIENCY STANDARDS FOR NEW DEVELOPMENT

As stated earlier, many large water users within the TRI-GID service area have climate pledges which include water conservation goals. Moreover, most developments within the TRI-GID service

area are relatively new (<10 years), so low-flow fixtures are standard building practices. Furthermore, customers are obligated to use water conservation devices such as in-line aerators and flow restrictors, landscaping adapted to the desert environment, and best available water management practices as defined in TRI-GID's terms of service for delivery of water.

3.11 NRS 540.141 (1) (I) TIERED RATE STRUCTURES FOR THE PRICING OF WATER TO PROMOTE THE CONSERVATION OF WATER, INCLUDING, WITHOUT LIMITATION, AN ESTIMATE OF THE MANNER IN WHICH THE TIERED RATE STRUCTURE WILL IMPACT THE CONSUMPTIVE USE OF WATER.

At this time, TRI-GID does not have a tiered rate structure to promote water conservation and therefore cannot provide an estimate of water savings from said structure. TRI-GID shall not increase or change rate structures unless the Board determines that said rates are insufficient to pay all costs of Capital Outlays (including interest carried) along with all operating costs of TRI-GID, including but not limited to, overhead, replacement, water rights lease or purchase fees, any other fees, and expenses and charges normal and customary for water service utility companies. TRI-GID has a water pricing structure that contains a base customer charge that is dependent upon the size of the meter and a constant volumetric charge. In the event that said rates are insufficient to pay all operating costs, then monthly rates may be raised to a level that will cover all costs. Table 3 provides the TRI-GID's rate structure, as of 2023.

Table 1. TRI-GID's Monthly Water Rate Schedule 2023

Meter Size	Charge
3/4 inch	$ 26.51
1 inch	$ 47.08
1 1/2 inch	$ 81.11
2 inch	$ 122.54
4 inch	$ 361.96
6 inch	$ 705.13
8 inch	$ 1,116.53
10 inch	$ 1,945.34
Temporary Construction	$ 75.10
Usage Per 1,000 gallons	$ 3.52

3.12 NRS 540.141 (1) (J) WATERING RESTRICTIONS BASED ON THE TIME OF DAY AND THE DAY OF THE WEEK.

As defined in the watering rules, TRI-GID may from time to time require that a watering schedule be followed or that the use of water be curtailed, or provide incentives for off-peak time watering, by notice to each customer. Unless a different water schedule is promulgated by TRI-GID, the following schedule of restrictions shall apply for outdoor irrigation to all commercial, industrial, and other non-residential customers:

- Customers with odd addresses - Monday and Thursday only;
- Customers with even addresses - Tuesday and Friday only;
- Watering by spray irrigation shall take place only between the hours of 6:00 p.m. to 6:00 a.m. during allowed days;
- Watering by drip irrigation or by hand may take place at any time during allowed days; and

- The watering of new lawns for a period of six weeks from the date of planting seed or laying sod or watering vegetation planted for erosion control in an approved project to the extent necessary to reasonably assure establishment thereof.

4.0 NRS 540.141 (2) A PLAN FROM A SUPPLIER PROVIDING SERVICE FOR 500 OR MORE CONNECTIONS MUST INCLUDE PROVISIONS RELATING TO:

According to the NRS, a water purveyor which provides water to 500 service connections or more must have a conservation plan that can evaluate the effectiveness of conservation measures. TRI-GID has approximately 250 connections therefore is exempt from NRS 540.141 (2) (a) NRS 540.141 (2) (b).

5.0 NRS 540.145 (1) REQUIREMENTS FOR SUPPLIER OF WATER TO CALCULATE WATER LOSS

According to NRS a water purveyor must adopt or update a plan of water conservation in accordance with the provisions of NRS 540.131 and if it serves 3,300 persons or more, it must conduct an AWWA water loss audit. The results of the water loss audit must be submitted by the supplier of water to the Section with the plan of water conservation or update to the plan of water conservation, as applicable. TRI-GID serves approximately 13,300 persons, annually.

5.1 NRS 540.145 (1) (A) IF SERVING 3,300 PERSONS OR MORE, SUBMIT RESULTS OF A WATER LOSS AUDIT USING AMERICAN WATER WORKS ASSOCIATION SOFTWARE AND METHODOLOGY

In the State of Nevada, all Water Conservation Plans completed after January 1, 2020, are required to have an accompanying water audit submitted with the Plan, as per NRS 540.131 and 540.145. The water audit is to be completed using American Water Works Association (AWWA) Free Water Audit Software (FWAS) Version 6. The FWAS consists of a spreadsheet to input water supply, authorized consumption, and water losses, along with system and cost data for the City.

The completed water audit document is included in Appendix A: AWWA Water Audit of this report. The audit was completed using the most readily available and reasonable data provided by TRI-GID for the calendar year 2022 due to the data completeness. During the next update to this Water Conservation Plan, the accompanying water audit must be recompleted to allow the comparison of results.

A summary sheet of the water balance from the AWWA audit is presented in Figure 2. Water supply inputs to the water budget include volume from TRI-GID's own sources (pumping from wells), water imported, and water exported. Consumption inputs included billed metered, unbilled unmetered, and unbilled metered water. The amount of billed metered and unbilled metered water was calculated based on the total number of accounts. Unaccounted-for water (non-revenue water) was estimated at approximately 12% of the total water produced. Estimates of the non-revenue water percentage were calculated by dividing total non-revenue water by total production. Because TRI-GID is a public entity, production cost for each acre-foot of water was assumed to be approximately the sale cost.

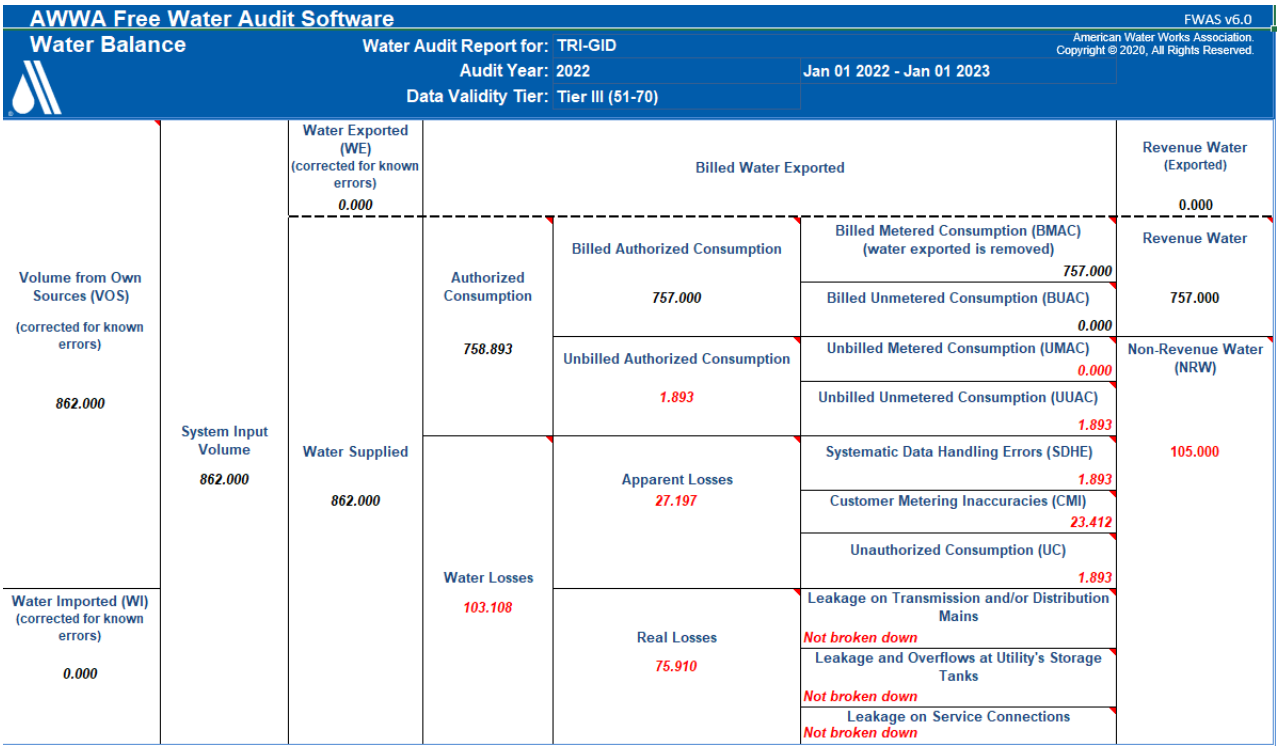


Figure 2. TRI-GID Water Balance.

5.2 NRS 540.145 (1) (B) IF THE SUPPLIER PREVIOUSLY SUBMITTED WATER LOSS AUDIT RESULTS AND IS SUBMITTING A PLAN UPDATE, THE SUPPLIER MUST ALSO SUBMIT:

TRI-GID has not submitted any previous water loss audits.

5.3 NRS 540.145 (1) (C) IF SUPPLIER PREVIOUSLY SUBMITTED CALCULATIONS AND IS SUBMITTING A PLAN UPDATE, SUPPLIER MUST ALSO SUBMIT:

TRI-GID has not submitted any previous calculations or conservation plans.

6.0 NRS 540.151 (1) SUPPLIER OF WATER REQUIRED TO ADOPT PLAN TO PROVIDE CERTAIN INCENTIVES; PROCEDURE FOR ADOPTION OF PLAN; ADOPTION OF JOINT PLANS PERMITTED.

Under this NRS requirement, water purveyors for municipal, industrial, or domestic purposes shall adopt a plan to provide incentives:

6.1 NRS 540.151 (1) (A) TO ENCOURAGE WATER CONSERVATION IN ITS SERVICE AREA

At this time, TRI-GID does not offer incentives for its customers to conserve water. However, prior to gaining service all customers must provide landscaping plans and fixture counts which are used to determine (i) the amount of water rights needed to meet demands and (ii) the size of the meter. Therefore, through efficient fixture design, use of drought-tolerant landscaping, and best management practices, the customer can save money on the amount of water rights needed for

the project, the most efficient base rate, as well as a lower variable volumetric charge than they would have had should they have chosen a more water-intensive design.

6.2 NRS 540.151 (1) (B) TO RETROFIT EXISTING STRUCTURES WITH PLUMBING FIXTURES DESIGNED TO CONSERVE THE USE OF WATER

See Section 6.1.

APPENDIX A:
AWWA AUDIT

AWWA Free Water Audit Software v6.0

FWAS v6.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. 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 targeting loss reduction levels. This tool contains several separate worksheets. Sheets can be accessed using the tabs at the bottom of the screen, or by clicking the TOC links below.

Table of Contents (TOC)

AWWA Web Resources for Water Loss Control

https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control

Items referenced in the Free Water Audit Software v6.0 on the web:

- Data Grading Matrix v6.0
- Example Water Audit v6.0
- Water Audit Compiler v6.0
- AWWA Reports on Performance Indicators
- M36 Manual

Enter Basic Information

Name of Utility:	TRI-GID
Name of Contact Person:	
Email:	
Telephone | Ext.:	
City/Town/Municipality:	
State / Province:	
Country:	USA
Audit Preparation Date:	Dec 05 2023
Audit Year:	2022
Audit Year Label:	2022 (Fiscal, Calendar, etc)
Audit Period Start Date:	Jan 01 2022
Audit Period End Date:	Jan 01 2023
Volume Reporting Units:	Million gallons (US)
Water System Structure:	Retail
Water Type:	Potable Water
System ID Number:	
Validator Name/ID:	
Validator Email:	
Estimated Total Population Served by Water Utility:	14,000

Key of Input Acronyms

In order of appearance in the Worksheet

VOS	Volume from Own Sources
VOSEA	VOS Error Adjustment
WI	Water Imported
WIEA	WI Error Adjustment
WE	Water Exported
WEEA	WE Error Adjustment
BMAC	Billed Metered Authorized Consumption
BUAC	Billed Unmetered Authorized Consumption
UMAC	Unbilled Metered Authorized Consumption
UUAC	Unbilled Unmetered Authorized Consumption
SDHE	Systematic Data Handling Errors
CMI	Customer Metering Inaccuracies
UC	Unauthorized Consumption
Lm	Length of mains
Nc	Number of service connections
Lp	Average length of (private) customer service line
AOP	Average Operating Pressure
CRUC	Customer Retail Unit Charge
VPC	Variable Production Cost

Color Key User input | Calculated | Optional default

Guidance for the Worksheet

Choosing to enter unit of **percent** or **volume** (applies to VOSEA, WIEA, WEEA, CMI)

choose entry option:

1.00%	percent	*or*
	volume	25.000

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC)

choose entry option:

0.25%	default	*or*
	custom	75.000

Guidance for the Interactive Data Grading

Use acronym buttons in IDG header to navigate among inputs. Acronym Key above. White = needs answers, orange = complete, clear = not required. Example below.

VOS	VOSEA	WI	WIEA	WE	WEEA	BMAC	BUAC	UMAC	UUAC
SDHE	CMI	UC	Lm	Nc	Lp	AOP	CRUC	VPC	

After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

Grade will populate when all visible questions are complete for an input: **7**

The limiting criteria will be labeled along the right. If only 1 limiting criterion is shown, improving on that criterion will achieve a higher data grade. If multiple limiting criteria are shown, improving on *each* limiting criterion is necessary to achieve a higher data grade. A complete inventory of data grading criteria is available in the Data Grading Matrix v6.0 (see web resources)

Limiting

If you have questions or comments regarding this software please contact us at: wlc@awwa.org

AWWA Free Water Audit Software: Worksheet

FWAS v6.0

Water Audit Report for: TRI-GID
Audit Year: 2022 | Jan 01 2022 - Jan 01 2023 | 2022

Click 'n' to add notes
Click 'g' to determine data validity grade

To edit water system info: go to start page

To access definitions, click the input name

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

Water Supplied Error Adjustments

WATER SUPPLIED

choose entry option:

VOS	Volume from Own Sources:	n	g	3	862.000	MG/Yr	n g 8		percent	VOSEA
WI	Water Imported:	n	g	n/a	0.000	MG/Yr				WIEA
WE	Water Exported:	n	g	n/a	0.000	MG/Yr				WEEA
	WATER SUPPLIED:				862.000	MG/Yr				

AUTHORIZED CONSUMPTION

choose entry option:

BMAC	Billed Metered:	n	g	8	757.000	MG/Yr			
BUAC	Billed Unmetered:	n	g	n/a	0.000	MG/Yr			
UMAC	Unbilled Metered:	n	g	n/a	0.000	MG/Yr			
UUAC	Unbilled Unmetered:	n	g	3	1.893	MG/Yr	0.25%	default	

Default option selected for Unbilled Unmetered, with automatic data grading of 3

AUTHORIZED CONSUMPTION: 758.893 MG/Yr

WATER LOSSES

103.108 MG/Yr

Apparent Losses

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

choose entry option:

SDHE	Systematic Data Handling Errors:	n	g	3	1.893	MG/Yr	0.25%	default	
CMI	Customer Metering Inaccuracies:	n	g	2	23.412	MG/Yr	3.00%	percent	under-registration
UC	Unauthorized Consumption:	n	g	3	1.893	MG/Yr	0.25%	default	

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

Apparent Losses: 27.197 MG/Yr

Real Losses

Real Losses: 75.910 MG/Yr

WATER LOSSES: 103.108 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 105.000 MG/Yr

SYSTEM DATA

Lm	Length of mains:	n	g	10	88.6	miles	(including fire hydrant lead lengths)
Nc	Number of service connections:	n	g	10	271		(active *and* inactive)
	Service connection density:				3	conn./mile main	
	Are customer meters typically located at the curbstop/property line?				No		
Lp	Average length of (private) customer service line:	n	g	1	100.0	ft	(average distance between property line and meter)
AOP	Average Operating Pressure:	n	g	8	101.5	psi	

COST DATA

CRUC	Customer Retail Unit Charge:	n	g	10	$3.44	$/1000 gallons (US)	Total Annual Operating Cost	
VPC	Variable Production Cost:	n	g	10		$/Million gallons <<< Using CRUC as basis for VPC	$2,140,460	$/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: Customer Metering Inaccuracies (CMI)
3: Billed Metered (BMAC)

KEY PERFORMANCE INDICATOR TARGETS:

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

Unit Total Losses:		gal/conn/day
Unit Apparent Losses:		gal/conn/day
Unit Real Losses[A]:		gal/conn/day
Unit Real Losses[P]:		gal/mile/day

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

FWAS v6.0

AWWA Free Water Audit Software: Dashboard

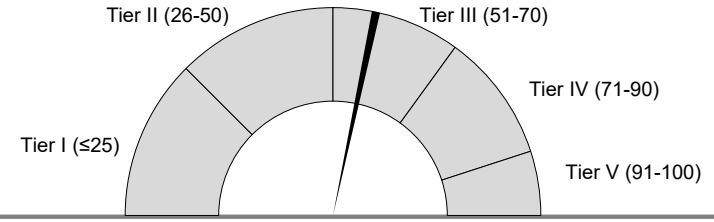
go to worksheet | go to grading | go to references

Water Audit Report for: TRI-GID **Audit Year: 2022 ##** **Jan 01 2022 - Jan 01 2023**

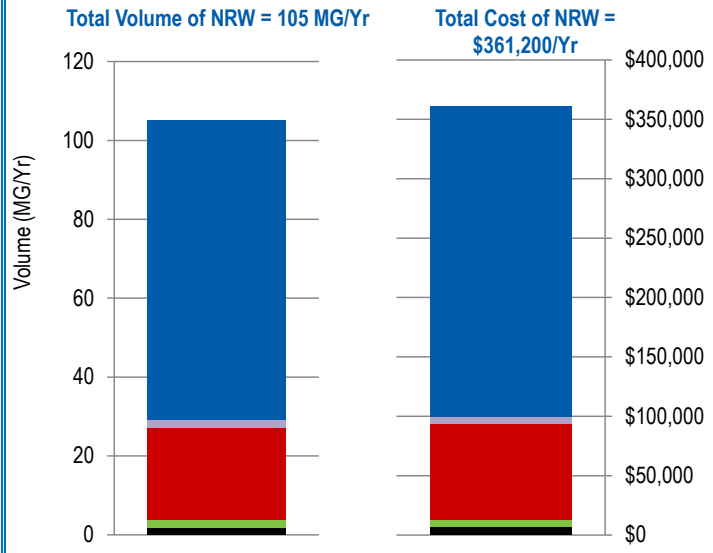
Data Validity

Data Validity Score: 56 **Data Validity Tier:** Tier III (51-70)

See Loss Control Planning for Tier Details



NRW Components Summary



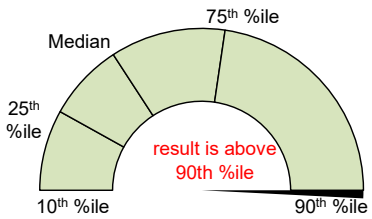
	Volume MG/Yr	Value $/Yr	Basis of Valuation
Apparent Losses	27.2	$93,559	CRUC
Real Losses	75.9	$261,131	CRUC
Unbilled Authorized Cons	1.9	$6,510	CRUC
Non-Revenue Water	105.0	$361,200	CRUC

Actual KPI result

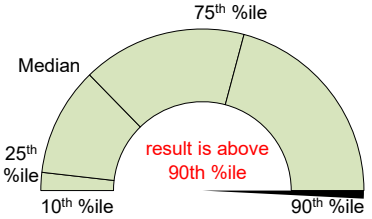
Target (see Worksheet)

Key Performance Indicators

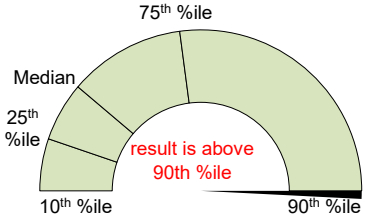
gauge %iles per validated industry ranges[2]



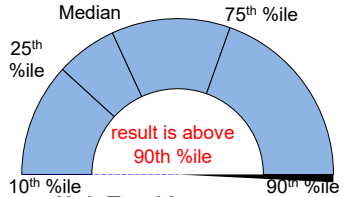
Total Loss Cost Rate
1,308.82 $/conn/year



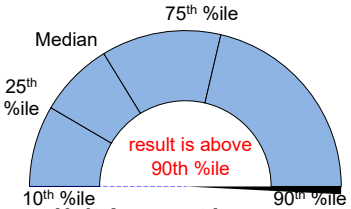
Apparent Loss Cost Rate
345.24 $/conn/year



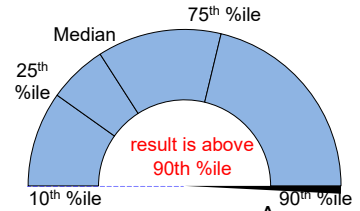
Real Loss Cost Rate
963.58 $/conn/year



Unit Total Losses
1,042.4 gal/conn/day

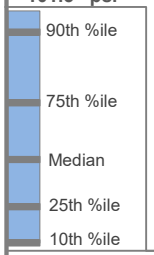


Unit Apparent Losses
275.0 gal/conn/day

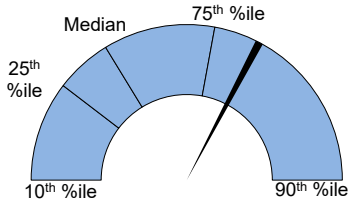


Unit Real Losses[A]
767.4 gal/conn/day

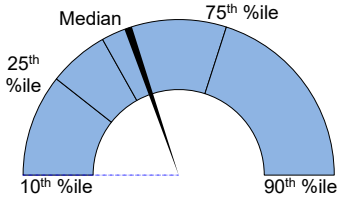
Average Operating Pressure
101.5 psi



AOP is above 90th %ile



Infrastructure Leakage Index (ILI)
3.7 dimensionless



Unit Real Losses[B]
2,349 gal/mile/day

See UARL definition for additional guidance on the ILI

(UARL) Unavoidable Annual Real Losses	20.7	MG/Yr	209.1	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 KPIs[1].
- 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)[5].
- 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.

Table 1

Source: AWWA Water Loss Control Committee Report (2020)[1], with naming conventions updated

2020 AWWA Water Audit Method – Water Audit Outputs and Key Performance Indicators: Uses and Limitations

Type	Indicator	Description	Suitable Purposes					Uses and Limitations	Principal Users
			Assessment	Bench-Marking	Target-Setting	Planning	Tracking		
Attribute	Apparent Loss Volume	Calculated by Free Water Audit Software	✓				✓	Assess loss level	Utility, Regulators
	Apparent Loss Cost	Calculated by Free Water Audit Software	✓				✓	Assess cost loss level	Utility, Regulators
	Real Loss Volume	Calculated by Free Water Audit Software	✓				✓	Assess loss level	Utility, Regulators
	Real Loss Cost	Calculated by Free Water Audit Software	✓				✓	Assess loss cost level	Utility, Regulators
	Unavoidable Annual Real Loss (UARL)	Calculated by Free Water Audit Software	✓				✓	Reveal theoretical technical low level of leakage	Utility, Regulators
Volume	Unit Apparent Losses (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓	✓	✓	Used for performance tracking and target-setting	Utility, Regulators
	Unit Real Losses[A] (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓	✓	✓	Used for performance tracking and target-setting	Utility, Regulators, Policy Makers
	Unit Real Losses[B] (vol/pipeline length/ day)	Strong and understandable indicator for use by utilities with low connection density.	✓	✓	✓	✓	✓	Data collection and assessment of systems with “low” connection density	Utility, Regulators, Policy Makers
	Unit Total Losses (vol/conn/day) **New KPI**	Strong and understandable indicator, suitable for high-level performance measurement.	✓				✓	High level indicator for trending analysis. Not appropriate for target-setting or benchmarking	Utilities, Customers
	Infrastructure Leakage Index (ILI)	Robust, specialized ratio KPI; can be influenced by pressure and connection density.	✓	✓			✓	Benchmarking after pressure management is implemented	Utilities
Value	Apparent Loss Cost Rate (value/conn/year) **New KPI**	Indicators with sufficient technical rigor. Provide the unit financial value of each type of loss, which is useful for planning and assessment of cost efficiency of water loss reduction and control interventions and programs.	✓			✓	✓	Data collection and assessment on AWWA indicators or contextual parameters to use in conjunction with Loss Cost Rates	Utilities, Regulators, Customers
	Real Loss Cost Rate (value/conn/year) **New KPI**		✓			✓	✓		Utilities, Regulators, Customers
Validity	Data Validity Tier (DVT)	Strong indicator of water loss audit data quality, if data has been validated. Tier provides guidance on priority areas of activity.	✓	✓		✓	✓	Assess caliber of data inputs of the water audit	Regulators, Utilities

AWWA Free Water Audit Software
Water Balance

FWAS v6.0

Water Audit Report for: TRI-GID
Audit Year: 2022 Jan 01 2022 - Jan 01 2023
Data Validity Tier: Tier III (51-70)

		Water Exported (WE) (corrected for known errors) 0.000	Billed Water Exported			Revenue Water (Exported) 0.000
Volume from Own Sources (VOS) (corrected for known errors) 862.000	System Input Volume 862.000	Water Supplied 862.000	Authorized Consumption 758.893	Billed Authorized Consumption 757.000	Billed Metered Consumption (BMAC) (water exported is removed) 757.000	Revenue Water 757.000
					Billed Unmetered Consumption (BUAC) 0.000	
				Unbilled Authorized Consumption 1.893	Unbilled Metered Consumption (UMAC) 0.000	Non-Revenue Water (NRW) 105.000
					Unbilled Unmetered Consumption (UUAC) 1.893	
			Water Losses 103.108	Apparent Losses 27.197	Systematic Data Handling Errors (SDHE) 1.893	
					Customer Metering Inaccuracies (CMI) 23.412	
					Unauthorized Consumption (UC) 1.893	
Water Imported (WI) (corrected for known errors) 0.000				Real Losses 75.910	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

APPENDIX B: CONSERVATION FLYER

DESIGNING LANDSCAPES FOR NORTHERN NEVADA'S ARID CLIMATE

An excerpt from the Nevada Cooperative Extension article by Heidi Kratsch

Designing Landscapes for Northern Nevada's Arid Climate | Extension | University of Nevada, Reno (unr.edu)

WATER-EFFICIENT LANDSCAPING

Often known as a xeriscape from the Greek word *xeros*, meaning "dry" plus "landscape," water-efficient landscaping emphasizes use of low-water-requiring plants and zoning such that plants with similar needs are grouped together within an irrigation zone. While some parts of the country promote "dry gardening," emphasizing the use of plants that require only the amount of rainfall available in a specific region, this practice would be difficult in the arid climate of northern Nevada. With less than 7 inches of precipitation annually, very few plants would survive in Nevada's built landscapes without at least some irrigation. Plants native to the region survive without irrigation in their wild habitat, but they occur in the exact location that supports their growth, near a source of water like a stream or seep, or they have exceptionally long root systems that can access very deep water tables. These conditions are rarely available in our built environments, so we must focus on irrigating the plants in our landscapes as efficiently as possible to conserve water.

The seven principles of water-efficient landscaping are based on planning and design, soil analysis and improvement, practical turf areas, appropriate plant selection, efficient irrigation, mulching and appropriate maintenance.

A landscape can be water-efficient when you:

- Group plants according to their water needs
- Use native and drought-adapted plants
- Limit turfgrass areas
- Schedule irrigation wisely
- Keep soil healthy and take good care of plants

Table 1. Some wise plant choices for northern Nevada.

Perennial flowers/foliage

Latin Name	Common Name	Maximum Height (in.)	Maximum Width (in.)	USDA Hardiness Zone Rating	Water Use Rating
Achillea millefolium	Common yarrow	24	24	3-9	Low
Asclepias tuberosa	Butterfly milkweed	36	24	3-9	Low
Astragalus filipes	Milkvetch	18	18	3-8	Very Low
Aurinia saxatilis	Basket-of-gold	12	18	4-7	Low
Calylophus lavandulifolius	Puckered sundrops	7	10	3-10	Very Low
Castilleja chromosa	Desert paintbrush	12	12	4-7	Low
Dalea ornata	Western prairie clover	18	24	4-8	Very Low
Dalea searlsiae	Searls" prairie clover	24	24	4-8	Very Low
Delosperma cooperi	Hardy purple ice plant	3	18	5-7	Low
Gaillardia pinnatifolia	Hopi blanketflower	18	12	3-10	Low
Hymenoxys acaulis	Sundancer daisy	12	8	4-10	Very Low
Linum lewisii	Blue flax	18	12	4-9	Very Low
Mirabilis multiflora	Showy four o" clock	18	36	4-8	Low
Oenothera caespitosa	Tufted evening-primrose	12	12	4-8	Very Low
Penstemon palmeri	Palmer penstemon	48	24	4-9	Very Low
Petrophytum caespitosum	Tufted rockmat	6	36	3-7	Very Low
Salvia nemorosa 'May Night'	May Night meadow sage	18	18	4-9	Low
Sedum 'Autumn Joy'	Autumn Joy stonecrop	18	18	3-8	Moderate
Sphaeralcea munroana	Munro"sglobemallow	27	20	4-9	Very Low
Zauschneria latifolia	Fire chalice	18	24	5-9	Low

Shrubs

Latin Name	Common Name	Maximum Height (in.)	Maximum Width (in.)	USDA Hardiness Zone Rating	Water Use Rating
Amelanchier alnifolia 'Saskatoon'	Saskatoon serviceberry	12	12	3-6	Moderate
Atriplex confertifolia	Shadscale	3	3	3-6	Very Low
Berberis thunbergii 'Crimson Pygmy'	Crimson Pygmy barberry	1	2	4-8	Moderate
Caragana pygmaea	Pygmy peashrub	3	5	3-7	Moderate
Caryopteris x clandonensis 'Longwood Blue'	Blue mist spirea	4	5	5-9	Moderate
Ceanothus martinii	Mountain-lilac	3	5	3-6	Low
Chamaebatiaria millefolium	Fernbush	5	5	4-9	Low
Fraxinus anomala	Singleleaf ash	12	12	6-9	Low
Eriogonum corymbosum	Lacy buckwheat	4	4	3-6	Very Low
Forestiera neomexicana	New Mexico privet	10	8	5-9	Low
Mahonia repens	Creeping Oregon grape	1	4	4-7	Moderate
Peraphyllum ramosissimum	Squaw apple	5	5	3-6	Low
Philadelphus microphyllus	Littleleaf mockorange	6	4	4-10	Moderate
Potentilla fruticosa 'Goldfinger'	Goldfinger potentilla	3	4	3-7	Moderate
Rhus trilobata	Squawbush	4	6	4-7	Low
Ribes aureum	Golden currant	6	5	3-6	Moderate
Rosa woodsii	Woods rose	6	5	3-6	Low
Rosa rugosa	Rugosa rose	6	6	3-7	Moderate
Shepherdia argentea	Silver buffaloberry	12	10	3-9	Moderate
Symphoricarpos oreophilus	Mountain snowberry	5	5	3-6	Moderate

Annual flowers (USDA Hardiness Zone Rating undetermined)

Latin Name	Common Name	Maximum Height (in.)	Maximum Width (in.)	Water Use Rating
Cleome hasslerana	Cleome	36	24	Moderate
Coreopsis tinctoria	Tickseed	36	12	Moderate
Cosmos bipinnatus	Cosmos	36	24	Low
Eschscholzia californica	California poppy	18	12	Low
Gaillardia pulchella	Blanketflower	18	18	Low
Gazania splendens	Gazania	12	12	Moderate
Nicotiana alata	Flowering tobacco	48	18	Moderate
Petunia x hybrid 'Wave'	Wave petunia	12	12	Moderate
Portulaca grandiflora	Moss rose	12	12	Low
Tagetes spp.	Marigold	18-36	12-24	Moderate
Verbena spp.	Verbena	12	12	Moderate
Zinnia angustifolia	Zinnia	12	12	Low

For more information on waterwise landscaping for our area, visit www.extension.unr.edu

WATER CONSERVATION IS EVERYONE'S JOB

DID YOU KNOW?

SECTION 16.1 OF THE

TAHOE-RENO INDUSTRIAL CENTER CC&R'S INCLUDES...

AN OBLIGATION FOR

ALL OWNERS AND OCCUPANTS

AT THE TAHOE-RENO INDUSTRIAL CENTER

TO CONSERVE WATER