

STANDING ADVISORY COMMITTEE

AGENDA

Tuesday, August 4, 2020 at 3:00 p.m. Truckee Meadows Water Authority Meeting Via Teleconference Only

MEMBERS OF THE PUBLIC MAY ATTEND VIA THE WEB LINK, OR TELPHONICALLY BY CALLING THE NUMBER, LISTED BELOW. NO PHYSICAL LOCATION IS BEING PROVIDED FOR THIS MEETING (be sure to keep your phones on mute, and do not place the call on hold)

Please click the link below to join the webinar: https://zoom.us/j/94539045064?pwd=NXINdXFqMCt0Z3Y1UGdUdDRKTkNvUT09 Password: 005798 Or call: Phone: (888) 788-0099 Webinar ID: 945 3904 5064

NOTES:

1. Unless and until the Governor issues a Directive or Order requiring a physical location be designated for meetings of public bodies where members of the public are permitted to attend and participate, no members of the public will be allowed in the TMWA's Corporate Office due to concerns for public safety resulting from the COVID-19 emergency and pursuant to the Governor of Nevada's Declaration of Emergency Directive 006 Section 1 which suspends the requirement in NRS 241.023(1)(b) that there be a physical location designated for meetings of public bodies where members of the public are permitted to attend and participate and subsequent directives related to social distancing. This meeting will be held by teleconference only.

2. The announcement of this meeting has been electronically posted in compliance with NRS 241.020(3) and Directive 006 at http://www.tmwa.com, and NRS 232.2175 at https://notice.nv.gov/.

3. Pursuant to Directive 006, the requirement contained in NRS 241.020(3)(c) that physical locations be available for the public to receive supporting material for public meetings has been suspended. Staff reports and supporting material for the meeting are available on the TMWA website at http://www.tmwa.com/meeting/ or you can contact Sonia Folsom at (775) 834-8002. Supporting material is made available to the general public in accordance with NRS 241.020(6).

4. The Committee may elect to combine agenda items, consider agenda items out of order, remove agenda items, or delay discussion on agenda items. Arrive at the meeting at the posted time to hear item(s) of interest.

5. Asterisks (*) denote non-action items.

6. Pursuant to Directive 006, public comment, whether on action items or general public comment, may be provided without being physically present at the meeting by submitting written comments online on TMWA's Public Comment Form (<u>tmwa.com/PublicComment</u>) or by email sent to <u>boardclerk@tmwa.com</u> prior to the Committee opening the public comment period during the meeting. In addition, public comments may be provided by leaving a voicemail at (775)834-0255 prior to 4:00 p.m. on August 3rd. Voicemail messages received will either be broadcast on the telephone call during the meeting or transcribed for entry into the record. Public comment is limited to three minutes and is allowed during the public comment periods. The Committee may elect to receive public comment only during the two public comment periods rather than each action item. Due to constraints of TMWA's videoconference system, public comment must be provided by voicemail, email or online comment as indicated above.

7. In the event the Chairman and Vice-Chairman are absent, the remaining SAC members may elect a temporary presiding officer to preside over the meeting until the Chairman or Vice-Chairman are present (**Standing Item of Possible Action**).

1. Roll call*

2. Public comment — limited to no more than three minutes per speaker*

- 3. Approval of the agenda (For Possible Action)
- 4. Approval of the minutes of February 4, 2020 meeting (For Possible Action)
- 5. Election of Vice Chair for the remainder of calendar year 2020 Michael Pagni (For Possible Action)
- 6. Presentation on water quality Will Raymond*
- 7. Water Supply Update Bill Hauck*
- 8. Discussion and possible recommendation to the Board on TMWA's Draft 2020-2040 Water Resource Plan — Kara Steeland, John Zimmerman, John Enloe, and Bill Hauck (For Possible Action)
- 9. Presentation on TMWA's new Rate Schedule Interruptible Large Volume Non-Potable Service (ILVNPS) John Enloe and John Zimmerman*
- 10. Presentation on the TMWA Tentative Budget for the Fiscal Year ending June 30, 2021 and Draft Capital Improvement Plan for Fiscal Years 2021 through 2025 Michele Sullivan*
- 11. Discussion and action, and possible recommendation to the Board for reconsideration and modification of implementation of Phase Three rate adjustment in amount of 2.5% currently scheduled to be implemented on first billing cycle in September 2020 Michele Sullivan (For Possible Action)
- 12. Discussion and possible direction to staff regarding agenda items for future meetings (For Possible Action)
- 13. Staff Items* (Unless otherwise listed with a topic description, this portion of the agenda is limited to announcements)
- 14. Committee Items* (Unless otherwise listed with a topic description, this portion of the agenda is limited to announcements)
- 15. Public Comment limited to no more than three minutes per speaker*
- 16. Adjournment (For Possible Action)



STANDING ADVISORY COMMITTEE DRAFT MINUTES

February 4, 2020

The Standing Advisory Committee (SAC) met at Truckee Meadows Water Authority (TMWA) in the Independence Room, 1355 Capital Blvd., Reno, Nevada. Chair McGuire called the meeting to order at 3:03 p.m.

1. ROLL CALL

Primary Members and Voting Alternates Present: Ken Becker, Harry Culbert, Jordan Hastings, Colin Hayes, Don Kowitz, Carol Litster, Neil McGuire, Taylor Russo, Fred Schmidt, Mike Schulewitch, and Jerry Wager.

Alternates Present: Fred Arndt, Karl Katt, Susan Hoog, John Krmpotic, Chris Melton, Scot Munns, Dale Sanderson, and Jim Smith.

Primary Members and Alternates Absent: Robert Chambers, Ken McNeil, Jonnie Pullman, and Ann Silver.

Staff Present: Matt Bowman, Robert Charpentier, Laine Christman, John Enloe, Scott Estes, Sonia Folsom, Mark Foree, Danny Rotter, Michele Sullivan, Sandra Tozi, John Zimmerman, and Legal Counsel Mat Trachok (McDonald Carano).

2. PUBLIC COMMENT

There was no public comment.

3. APPROVAL OF THE AGENDA

Upon motion duly made by Member Culbert, and seconded by Member Becker, and carried by unanimous consent of the members present, the Committee approved the agenda.

4. APPROVAL OF THE MINUTES OF THE DECEMBER 3, 2019 MEETING

Upon motion duly made by Member Kowitz and seconded by Member Litster, and carried by unanimous consent of the members

February 4, 2020 SAC Minutes

present, the Committee approved the December 3, 2019 meeting minutes.

Chair McGuire noted that Mr. Matt Basile was running late and that Chair McGuire would delay the agenda item for which Mr. Basile was responsible until Mr. Basile arrived.

Chair McGuire re-opened agenda item #2 Public Comment.

2. PUBLIC COMMENT

Chair McGuire introduced Chris Melton, the new Sun Valley General Improvement District wholesale alternate representative, John Krmpotic, the new commercial customer alternate representative, and Taylor Russo, the new Reno-Sparks Chamber primary representative.

6. WATER SUPPLY UPDATE

Bill Hauck, TMWA Water Supply Administrator, reported that, even though this year's snowpack was only at 76% of average with the snow season two-thirds through, the region can expect normal river flows. Mr. Hauck added that there is no need for concern because the region has enough water storage for normal river flows even if the next three years are extremely dry.

Member Schulewitch asked what the average at this point was last year. Mr. Hauck replied 140-150% of normal in early February and 175% of normal on April 1st.

5. PRESENTATION ON THE DECLINE IN THE TREE CANOPY IN THE AREA

Matt Basile, Urban Forester, presented on the tree canopy coverage in the Reno area. Mr. Basile stated that the City of Reno currently has only 5.2% canopy coverage, which is significantly lower than what is recommended by the United States Forest Service for the region (15%), and that the City of Reno is taking steps to increase the tree canopy. He provided an overview of what the City of Reno is doing to increase the tree coverage on public property, as well as to improve irrigation efficiency and create a diverse ecosystem to protect against disease. In addition, the City of Reno is updating its tree species list (what trees are either native or will survive in our region) and its ordinances to clarify who is responsible for trees that border private property.

At this time, Committee Members requested that Mr. Basile make a similar presentation to the Builders Association of Northern Nevada (BANN) to address any concerns with respect to the changes to the ordinances before adoption; asked questions and made comments regarding specific items in Mr. Basile's presentation, including the relationship between trees and carbon suppression, tree species selection, planting, and irrigation; and discussed the extent of TMWA's purview with respect to trees. Laine Christman, TMWA Conservation Supervisor, explained that TMWA's role has been to work with Dale Carlin, who provides tree assessments, tips and tricks for tree conservation to TMWA customers,

February 4, 2020 SAC Minutes

as well as to provide a free Landscape Guide, which is on TMWA's website. Mr. Christman added he is working with Mr. Basile at the City of Reno and the UNR Cooperative Extension to align TMWA's landscape guidebook with their list of recommended trees.

7. PRESENTATION OF FINANCIAL PERFORMANCE FOR SECOND QUARTER FISCAL YEAR 2020

Matt Bowman, TMWA Financial Controller, presented the financial performance for the second quarter year-to-date fiscal year 2020. Change in net position was \$4.1m higher than budget, due primarily to net capital contributions that were approximately \$1.9m higher than budget (due to higher developer contributions of \$2.8m offset by lower grant revenue of \$1.0m), higher operating income of \$1.7m, and lower non-operating expenses of \$0.6m (due to higher investment income of \$0.8m). Operating revenue was \$2.9m lower than budget due mostly to \$2.7m less in water sales. Operating expenses were \$4.5m lower than budget primarily due to lower services and supplies costs (\$2.7m lower than budget). Cash on hand was \$213.5m or \$15.7m higher than at the beginning of the fiscal year (\$156.5m unrestricted cash to meet operating & maintenance expenses, principal & interest payments, and construction projects, and \$57.0m restricted cash to pay for scheduled bond principal and interest payments, as well as maintain required reserves as stipulated in TMWA's bond covenants).

8. PRESENTATION OF DIFFERENT WATERING ADVANCEMENTS AND TECHNOLOGY

Mr. Laine Christman presented on the two main categories of real-time leak detection devices: submeters (connected directly to main supply line and WiFi to analyze water consumption, and some allow water to be turned off remotely) and moisture sensors (can be connected to a toilet or put under a sink). The primary goal is to provide early detection of a leak via electronic notification. Mr. Christman also provided an overview of irrigation controllers that are connected via WiFi to provide better control of when and how much to water depending on the weather.

9. DISCUSSION AND POSSIBLE DIRECTION TO STAFF REGARDING AGENDA ITEMS FOR FUTURE MEETINGS

Next meeting:

- 1. Water supply update
- 2. Presentation on FY 2021 tentative budget and 5-year Capital Improvement Plan (CIP)
- 3. Presentation on TMWA's Draft 2020-40 Water Resource Plan
- 4. Presentation on water quality
- 5. Election of Vice Chair for the remainder of calendar year 2020

Upon motion duly made by Member Schulewitch and seconded by Member Hayes, and carried by unanimous consent of the members present, the Committee approved to cancel the March 3, 2020 meeting. Upon motion duly made by Member Culbert and seconded by Vice Chair Schmidt, and carried by unanimous consent of the members present, the Committee approved the above agenda items for future meetings.

10. STAFF ITEMS

Michele Sullivan, TMWA Chief Financial Officer, reported to the Committee that the TMWA Board approved continuing to implement the next 2.5% rate increase, which will go into effect in the May billing cycle.

11. COMMITTEE ITEMS

Vice Chair Schmidt informed the Committee that he is retiring and introduced Chris Melton, Sun Valley General Improvement District Public Works Director, who is to be appointed his alternate.

12. PUBLIC COMMENT

There was no public comment.

13. ADJOURNMENT

With no further items for discussion, Chair McGuire adjourned the meeting at 4:29 p.m.

Approved by the Standing Advisory Committee in session on ______.

Sonia Folsom, Recording Secretary

Truckee Meadows Water Authority Standing Advisory Committee Operations and Water Quality Presentation

August 4, 2020



Water Quality Report

2020 WATER QUALITY REPORT

Our Promise to You: Quality. Delivered.

Trackey Masdews Water Authority (TSTRA) is deduced to providing reliable service and delivering high quality dealang water to more than 125,000 residents theraphone the Rose-Sparka sens, in accordance with the US Environmental Postection Agency (IPA) Commune Cordidence Rule, 1 an pleased to prosent TSFWAs annual Water Quality Report on behalf of our stuff and board of detectors.

Discopert, which is based on data and acted as the 2019 calendar year, contains information about the source of your detailing water and have it compares to detailing water standards established by the EPA. We are possibling this report decrementally. If you would like a prior repy standard is you, phase call Water Quality & Economismum Permit Supervisor Kells Bargers at (723).804-8117 m contact her by equal at Permit Supervisor Lines.

Information in this report reminerors UNIW/is standing arrang the instance leaders in white quality – a distinction recognized by the Partnership for hale Water. The Foreirs day ranks UNIW is Chaft Bull. Water Treatment Plant arrang the highest performing water testiment plants in the constraint with the performance. While we appreciate this recognizion, it imply reflects what has always been our provery maintaining and improving our water system's initializations for the onliny of war constraints and maning that the water delivered to you in of exceptional quality.

If you himr key general questions about water quality, please call one Water Quality Department at (772) 834-8118. For information on other water topics, go for were threasain to find beloful ensuinces as well as a complete fait of the planes manifers for TMDOG departments. We know same has a direct connection to the quality of life in our community, and we are absent ready to hear from you.

Yours to good fashin.

Mart Force

Mark Forec, General Masager

A great source combined with a great team makes for a high-quality product.

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What regulations does TMWA water meet?

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RUCKEE MEADOWS WATER

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Annual Water Quality Report

Water Quality Lookup Page







AUGUST 2020

Each water drop you receive is treated with TMWA's expertise.





NATIONALLY AWARDED FOR EXCELLENCE

Quality, controlled.

Water samples

2.500+ miles of

throughout TMWA's

distribution line are

to ensure quality is

maintained in every

continuously analyzed

neighborhood we serve.

Samples across TMWA's distribution system are analyzed in EPA-certified labs by water quality experts

CHALK BLUFF

Sparators - Chemists - Balogist

who are trained, skilled and accomplished

35 containest yours of experience of gorffications have

to ensure you receive



Did you know?

GLENDALE

Since 1908, conventional water treatment has been eliminating the threat of virus, bacteria and other pathogens through disinfect on and filtration. Learn more at tmwa.com/treatment.

High Quality Drinking Water

Monitored every minute of every day.



08-04-20 SAC Agenda Item 6

Homeless Activities on the Truckee River

- Andy Gebhardt has had extensive outreach in the last couple of years
 - local advocacy groups
 - •Washoe County Health
 - •City of Reno, City of Sparks, Washoe County
 - Takeaway: "We can treat it, but we shouldn't have to..."
- We keep eyes on our WTP source water and have robust online analyzers and confirmation grab samples are collected more frequently than regulations require.
- Portland Loo is being installed/ready as we speak



COVID -19 Impacts to Operations

- As the novel coronavirus (COVID-19) pandemic remains present in our community, TMWA has continued to deliver safe and reliable water service to our customers and our community.
- Since March 18, 2020 TMWA has been operating at Pandemic Response Level 3, which provided for minimal and critical staffing only. We have scheduled as much staff as possible in an effort to ensure continuity of water service for the community.
- We will continue to monitor COVID-19 developments during this recovery phase and will make necessary operational adjustments to ensure continued operations while putting the safety of our employees and community first.



 Robert A. Skinner Filtration Plant #1 · Robert B. Dierner Filtration Plant - Joseph Jensen Filtration Plant

Zone 7 Agency Del Valle Water Treatment Plant

Connectical Aquation Water Company Easton Lake Water Treatment Plant **Eenneyivania** Beliman WTP for Water Treatment

California California American Water: **Monterrey District** Begonia Iron Removal Plant

City Vallejo Public Works: Waler Division Fleming Hill WTP

South Carolina Beaufort Jacper Water & Sewer Department Cherry Point Water Reclamation Fac. Port Royal Water Reclamation Fail.

California Countrella Valley Blater District Welet Reclamation Plant #10



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08-04-20 SAC Agenda Item 6

Town of Cary CarylApex InTF

Cleveland Water · Crown WTP Camett A. Morpan WTP

Bloesburg Water Authority

2019 Partnership Program Award Winners

TMWA is one of only 56 surface water treatment plants to have been awarded the Presidents Award by the PfSW







Cryptosporidium Laboratories Acceptable for Monitoring to

Comply with the Long Term 2 Enhanced Surface Water Treatment Rule

The following list of laboratories may be used by public water systems (PWSs) complying with the Long Term 2 Enhanced Surface Water Treatment Rule. This list generally will be updated via written request from personnel with a state or EPA regional laboratory certification program. Please use the links below to access state websites for the laboratory's current certification status and contact information. PWSs should be aware that their states may establish requirements that are more stringent than EPA's regulations; state requirements would take precedence.

Laboratory Name	Lab	Certifying Authority
NYSDOH Wadsworth Lab	Albany, NY	USEPA Region 2 Amanda Rollizo
Oklahoma State Environmental Laboratory Services	Oklahoms City, OK	NH Laboratory Accreditation
Orange Co. Utilities Central	Orlando, FL	FL Certified Laboratories
PA DEP - Bureau of Laboratories	Harrisburg, PA	NJ Certified Laboratories
Pace Analytical Madisonville	Madisonville, KY	KY Laboratory Certification
Pace Analytical Mount Juliet	Mount Juliet, TN	TN Laboratory Certification
Pace Analytical Tuscaloosa	Tuscaloosa, AL	AL Laboratory Accreditation
Philadelphia Water Dept Service	Philadelphia, PA	PA Laboratory Accreditation
Phoenix Water Services Lab	Phoenix, AZ	AZ Laboratory Licensure
Portland Water Bureau	Portland, OR	OR Laboratory Accreditation
San Diego, City of	La Mesa, CA	CA Certified Laboratories
San Francisco PUC	Milbrae, CA	CA Certified Laboratories
Santa Clara Valley Water Dist.	San Jose, CA	CA Certified Laboratories
Scientific Methods	Granger, IN	NH Laboratory Accreditation
Scottsdale, City of	Scottsdale, AZ	AZ Laboratory Licensure
Southern NV Water Authority	Henderson, NV	NV Laboratory Certification
State Hygienic Lab	Coralville, IA	OR Laboratory Accreditation
Tampa (City of) Water Quality	Tampa, FL	FL Certified Laboratories
Truckee Meadows Water Auth.	Sparks, NV	NV Laboratory Certification

TMWA Laboratory is one of only 38 laboratories in the United States that are certified to conduct analyses for compliance with LT2 Enhanced Surface Water Treatment Rule



Office of Water (MS 140)

EPA 815-8-19-022

December 2019

Thank you! Questions?



10



Northern Nevada Water Supply Outlook

TMWA Standing Advisory Committee Meeting

Bill Hauck, Water Supply Administrator

August 4, 2020



Truckee River Basin Watershed





Truckee River Reservoir System Storage (8/4/2020)



MAX SYSTEM CAPACITY 1,068,270 AF

CURRENTLY 726,785 AF (68% Capacity)



Lake Tahoe Elevation Hydrograph (actual and projected)





Lake Tahoe Basin 2019-2020 SNOTEL Snowpack Summary









Thank you! Questions?

Bill Hauck, Water Supply AdministratorEmail: bhauck@tmwa.comO: (775) 834-8111 M: (775) 250-1333





STAFF REPORT

TO:	Board of Directors
THRU:	Mark Foree
FROM:	John Enloe, Director, Natural Resources
	Kara Steeland, Hydrologist
DATE:	June 1, 2020
SUBJECT:	Discussion, possible action and direction to staff regarding TMWA's Draft 2020-2040 Water Resource Plan

Recommendation

Staff recommends that the Board review the draft 2020-2040 Water Resource Plan and provide comments to the staff prior to staff presenting the final plan in September 2020. Staff also recommends that the Board accepts the public outreach schedule for the draft WRP.

Attachments

Attachment A: TMWA's 2020-2040 Water Resource Plan Draft

Attachment B: 2020-2040 Water Resource Plan – Public Outreach Schedule



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08-04-20 SAC Agenda Item 8 06-17-20 BOARD Agenda Item 7

TO OUR CUSTOMERS

Since 2001, Truckee Meadows Water Authority (TMWA) has drafted its Water Resource Plan (WRP) to analyze future conditions and outline strategies to meet the region's drinking water needs. From the lowest snowpack year in recorded history (2015) to the wettest water year on record (2017), TMWA has effectively managed its water resources to provide a resilient and reliable water supply for the region.

Diligent planning requires an analysis of a broad range of future conditions. Accordingly, the 2020–2040 WRP incorporates climate and population scenarios that effectively stress-test the community's water system for the next 20 years and beyond.

To adapt to changes over time, the WRP is updated every five years. This current revision occurred over 18 months and incorporated customer survey feedback from the beginning. Of the customer insights collected, the top concerns related to two topics: population growth and extreme climate variation. These topics are woven throughout this plan. The following pages provide readers insight into TMWA's water resource management strategies and the future of drinking water in our region.

Many contributors were essential to the completion of this plan. TMWA would like to thank its customers for their invaluable feedback, which helped shape the 2020-2040 WRP. Additionally, TMWA extends its appreciation for contributions made by the following organizations and agencies:

- TMWA Board of Directors
- Precision Water Resource Engineering
- Western Regional Water Commission
- Northern Nevada Water Planning Commission
- Truckee Meadows Regional Planning Agency

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LIST OF ACRONYMS

AIS Aquatic Invasive Species	SACStanding Advisory Committee
AFAcre-Feet	SDFState of Nevada Demographer Forecast
AFA Acre-Feet Annually	SNOTEL Snow Telemetry
ASRAquifer Storage Recovery	STMGID South Truckee Meadows General Improvement
CAB Citizen Advisory Board	District
CFSCubic Feet per Second	STMWRF South Truckee Meadows Water Reclamation
CIP Capital Improvement Plan	Facility
CTMRD Central Truckee Meadows Remediation District	SWPASnow Water Equivalent SWPASource Water Protection Area
DRI Desert Research Institute	TCID Truckee Carson Irrigation District
EPAEnvironmental Protection Agency	TDS Total Dissolved Solids
GCM General Circulation Model	TMRPA Truckee Meadows Regional Planning Agency
GPM Gallons per Minute	TMSA Truckee Meadows Service Area
GWTF Groundwater Treatment Facility	TMWA Truckee Meadows Water Authority
ISWPP Integrated Source Water Protection Plan	TMWRF Truckee Meadows Water Reclamation Facility
JPAJoint Powers Agreement	TNC The Nature Conservancy
MCL Maximum Contaminant Level	TRFTruckee River Fund
MGD Million Gallons per Day	TRFMA Truckee River Flood Management Authority
NAB Neighborhood Advisory Board	TRIC Tahoe Reno Industrial Center
NDEP Nevada Division of Environmental Protection	TRIGIDTahoe Reno Industrial General Improvement
NDOT Nevada Department of Transportation	District
NNWPC Northern Nevada Water Planning Commission	IRUA Iruckee River Operating Agreement
NRCS Natural Resource Conservation Service	UNR University of Nevada, Reno
OTROne Truckee River	USACE United States Army Corps of Engineers
PCETetrachloroethylene	USFS United States Forest Service
PLPT Pyramid Lake Paiute Tribe	USGS United States Geological Survey
POSW Privately Owned Stored Water	WCF Washoe County Consensus Forecast
PWREPrecision Water Resources Engineering	WCMWater Control Manual
RCP Representative Concentration Pathway	WDWR Washoe County Department of Water Resources
RPGB Regional Planning Governing Board	WHPP Wellhead Protection Plan
RWMP Regional Water Management Plan	WRP Water Resource Plan

- RSF.....Rate Stabilization Fund
- RSWRF ... Reno-Stead Water Reclamation Facility
- WUR Water Usage Review

WTP Water Treatment Plant

WRWC Western Regional Water Commission

EXECUTIVE SUMMARY

Lake Tahoe

CHAPTER OVERVIEW

ruckee Meadows Water Authority (TMWA) is a not-for-profit, community-owned water utility overseen by a seven-member Board of Directors from Reno, Sparks, and Washoe County. TMWA was formed in 2001 and currently serves over 425,000 residents in the Truckee Meadows. TMWA's primary objective is to provide reliable, high-quality water service to its customers in an efficient, costeffective manner.

TMWA's Water Resource Plan (WRP), updated every five years, is a long-range planning and management document that spans a 20-year period. The 2020–2040 WRP describes how the utility will meet the drinking water supply needs of current and future customers in the Truckee Meadows. This version of the WRP builds on the four previous versions of the plan and focuses on how regional conditions have changed since the last update in 2016. TMWA's planning efforts and water resource management practices have ensured a reliable, resilient water supply now and into the future.

PLAN UPDATE PROCESS

The 2020–2040 WRP looks different from TMWA's previous plans with more emphasis on future conditions and analysis of TMWA's water resources and their ability to provide a reliable water supply under variable climate conditions and continued population growth. A major goal of this plan update is to increase the usability and approachability of this document for local decision makers and the public. In this regard, community feedback has guided the structure of this plan, with content that directly addresses topics that TMWA customers want to know about.

At the beginning of the plan update process, TMWA distributed an electronic survey to the community. The top three issues the public wanted to see addressed in the WRP were

- Growth and future water demand
- Future availability of existing resources
- The state of our current water resources

These issues are discussed throughout the WRP, providing transparency on how the planning process factors in growth and water availability to ensure a sustainable water supply for the region.

CURRENT WATER RESOURCES

TMWA has a diverse water supply, with a mix of surface and groundwater resources. Surface water includes the Truckee River, upstream reservoir storage, and creek resources. The Truckee River Operating Agreement (TROA), implemented in 2015, provides additional upstream drought storage and operational flexibility for TMWA. Groundwater resources include 89 production wells in nine hydrographic basins, including five production wells in Honey Lake Valley as part of the Fish Springs Ranch water supply project. Through its aquifer storage and recovery (ASR) program, TMWA augments its groundwater supply by injecting treated surface water into many of its production wells during the winter, when customer demand is lower. With this mix of water resources, TMWA is able to conjunctively manage its water supply by utilizing mostly surface water when demand is low and supplementing with groundwater when demand is higher in the summer months or during drought periods.

WATER CONSERVATION

TMWA is a steward of the region's water resources and promotes the efficient use of water in drought and nondrought years. Due to TMWA's ongoing conservation programs, among other factors, municipal residential per capita demand has been decreasing since the early 2000s. TMWA has many education and outreach programs focused on water conservation, particularly during the summer months, when customer demand can be three to four times higher than wintertime use, primarily due to landscape irrigation. When the region is experiencing a drought, TMWA can enact enhanced conservation measures to help decrease demand to minimize the use of drought reserves.

ADAPTING TO CHANGE

Many factors can impact the region's drinking water supply and demand, including population growth, economic cycles, and climate conditions. The WRP considers these factors to ensure that available water resources are sufficient for TMWA's current and future customers. A goal of the WRP is to show that TMWA can reliably meet customer demand under a range of potential future conditions, including extended droughts. Accordingly, supply and demand scenarios are incorporated into the plan to indicate any areas where action needs to be taken to address possible water supply challenges in the future.

FUTURE DEMAND & GROWTH

Estimating future demand is largely a function of projected population growth for the Truckee Meadows. TMWA's 20-year water demand projection estimates that water demand will increase 15% from approximately 83,000 acre-feet in 2020 to 96,000 acre-feet in 2040. All new developments served by TMWA are required

to dedicate water rights to meet the project's estimated water demand. For every acre foot of surface water rights needed for new development, an additional 11% of water rights must be dedicated to TMWA for drought storage. To meet anticipated future demand, TMWA will rely primarily on the conversion of Truckee River water rights from irrigation to municipal use along with Fish Springs Ranch groundwater.

WATER SUPPLY SCENARIO PLANNING

Droughts are a common occurrence in Northern Nevada, and to capture a worst-case scenario TMWA uses the worst historic drought on record, lasting from 1987 to 1994, for planning purposes. Climate change is also factored into this plan, as data show that the region has been warming over the past several decades. In recognition of both, TMWA evaluated a range of scenarios featuring historic drought cycles, climate warming trends, and future greenhouse gas emission projections. These scenarios were created using the most up-to-date climate change research for the region. TMWA ran multiple climate scenarios through the operations model for the Truckee River to determine how municipal water supply may be affected from now until 2098. The results of this research give insight into the resiliency of TMWA water resources under various future conditions.

"TMWA's primary objective is to provide reliable, high-quality water service to its customers in an efficient, cost-effective manner."

In the near and long-term, the modeling effort demonstrates that TMWA has sufficient water resources to meet the growing demand in the region under almost all climate conditions modeled. No water shortages were found under any of the climate scenarios during the 20-year planning horizon. Some water shortages were seen in the latter half of the century, with much higher customer demand levels under the most extreme climate models. Ch. 3 includes a detailed explanation of these results. Shortfalls were identified under a conservative approach that did not account for many of the water resources the region could possibly obtain over the next 50+ years. Uncertainty is a given, especially toward the end of the century when there are many variables that cannot be accurately predicted at this time. TMWA uses the best science available when making resource planning decisions and will continue to model future conditions as the projections and modeling science change.

One of the most significant adaptations that would improve the future water supply outlook for the Truckee River Basin is the reoperation of the federally owned flood control reservoirs in the region, including Prosser, Stampede, and Boca Reservoirs. TMWA and other partners applied for and received a grant through the Bureau of Reclamation in September 2019 to provide the necessary hydrologic modeling and develop new guidelines to allow TMWA and others to store water earlier in the runoff season, based on forecast-informed reservoir operations. Results from this project will be presented in TMWA's next WRP.

FUTURE WATER RESOURCES

TMWA has sufficient water resources and additional water rights are available to meet anticipated demand in 2040 and beyond. To further expand TMWA's water resource portfolio and increase drought supplies and off-river resources, the WRP identifies future water supply projects. Most of the identified projects would provide relatively small quantities of water to the region but are important for expanding and diversifying the community's water supply portfolio. Each future resource includes an analysis of the possible benefits and challenges associated with project implementation. Potential future projects include groundwater expansion and treatment
TMWA // WATER RESOURCE PLAN

of existing groundwater resources, increased use of creek water resources, Marlette Lake Water System wholesale service, and water banking projects. Additionally, OneWater Nevada, which includes TMWA and a diverse group of regional partners, is exploring innovative water treatment technologies to determine the feasibility of using advanced purified water to enhance water resource sustainability and drought resiliency.

ENVIRONMENTAL PROTECTION INITIATIVES

TMWA recognizes that a healthy, thriving Truckee River watershed is essential to having a high-quality water supply and providing benefits for the community as a whole. To help protect the watershed and its water quality, TMWA created the Truckee River Fund which provides grants to local agencies and organizations that are working on projects to protect and enhance the river environment. Sustainability is also a key component of TMWA's operational strategy. For example, when its three runof-the-river hydroelectric plants are running at capacity, TMWA eliminates over 90,000 pounds of CO2 emissions per day, which offsets approximately 75% of the power used by TMWA to produce and deliver treated water throughout the community.

IMPLEMENTING THE WRP

Continued success in managing a resilient water supply for the region will come with the continuation of clear guidance, straightforward action paths, and supportive policies. Based on the findings throughout the WRP, recommended actions fall under three categories for the TMWA Board to consider and act on:

1. Water Resource Planning

These recommendations include the continuation of TMWA's water resource planning process, analysis of the geographic extent of TMWA's planning area, and criteria regarding small water system acquisitions.

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- 2. **Management of Current Water Resources** Recommendations in this category address TMWA's current water resource management strategies, which include continued conjunctive use of resources and expansion of the ASR program. Also included are recommended actions related to the acquisition of water rights, implementation of water conservation measures, and continuation of work on source water protection efforts and emergency water supply standards.
- 3. Future Water Demand and Resources These recommendations include continued analysis of future population and water demand, adaptive management to address potential climate change conditions, coordination on regional efforts for regional effluent management and advanced purified water pilot projects, and continued investigation and evaluation of potential future water supply projects.

CONCLUSIONS

TMWA's WRP accounts for changes over time, while effectively charting the next 20 years of water resource management for the region. Although this plan is formally updated every five years, TMWA constantly analyzes supply and demand conditions and adapts its water management strategies as needed. The 2020–2040 WRP, and subsequent future updates, will help guide TMWA in confronting any potential water challenges to ensure that it continues to deliver reliable, high-quality drinking water to residents of the Truckee Meadows.

INTRODUCTION

Truckee River

CHAPTER OVERVIEW

hile much has transpired since TMWA's inception in 2001, the community has maintained a keen interest in how growth, drought, and extreme climate variation may affect the future of water supply in our region. From environmental factors to technological advancements, each Water Resource Plan update forecasts how to best adapt to change. This chapter introduces major planning considerations, along with an overview of key events and issues that have shifted TMWA's approach to planning over the past two decades.

CHAPTER AT-A-GLANCE

Highlights of Chapter 1 include:

- 1. The scope of TMWA's integrated planning
- 2. How and why TMWA was formed
- 3. The boundaries of TMWA's service area
- 4. Key aspects that influence TMWA's water resource planning
- 5. Influential and historical milestones in water resource planning
- 6. The role of public input in this report

PLAN INTRODUCTION

Truckee Meadows Water Authority's (TMWA) WRP is a planning and management document that spans a 20-year period. Updated every five years, TMWA's 2020–2040 *Water Resource Plan* (2040 WRP) builds upon the information developed in prior WRPs and other regional planning efforts. The WRP is important because it details how TMWA manages existing and future water resources for the region. The 2040 WRP is also a valuable resource to educate TMWA's customers about key aspects of the regional water supply.

TMWA's 2040 WRP describes how the utility will meet the drinking water supply needs of current and future customers in the Truckee Meadows, considering factors such as population growth, economic cycles, climate conditions, and available water supplies. With these variables, water resource planning has become increasingly complex in recent years, but this plan will demonstrate that TMWA has sufficient water resources to meet the region's water needs.

Important aspects of water supply planning in the Truckee Meadows will be explained in detail throughout the plan, with a consistent focus on the following key topics:

• Truckee River Operating Agreement (TROA) implementation: TROA, which was implemented in December 2015 puts into practice an operational framework that provides greater flexibility in Truckee River operations and provides opportunities for additional upstream reservoir storage. Under TROA, TMWA can store additional water in upstream reservoirs in the years preceding and during a drought. This potentially doubles the amount of TMWA's upstream drought reserves compared to the previous operational agreement. TMWA has successfully operated under TROA for the last four years, benefitting the water supply in the Truckee Meadows region. For details on TROA implementation, see Ch. 2.

- New service territory and regional growth: The Truckee Meadows region has been developing quickly since the end of the recession, and TMWA has been diligently working to ensure there is a reliable water supply to meet future demand. The WRP evaluates population growth and future water demand projections to assess the resiliency of the region's water resources.
- Drought situations and scenario planning: Drought cycles are common throughout the West, and Northern Nevada is no exception. A key component of the 2040 WRP is its assessment of the availability of TMWA's water resources under a range of future demand and supply scenarios. These scenarios incorporate the most current and relevant research about changing climate conditions in the region. Using climate modeling and growth



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projections, TMWA can analyze potential future conditions to ensure a sustainable drinking water supply is available for the Truckee Meadows.

• Future water resources and technological advances: While this plan will demonstrate that TMWA has sufficient water resources to meet customer demand well beyond the 20-year planning horizon, developing new water resources to meet future needs takes time. TMWA is actively working to develop innovative new water resources to supplement its existing resources. Through a collaboration called OneWater Nevada, TMWA and regional partners are researching advanced purified water treatment technologies to determine the feasibility of expanding the use of reclaimed water resources in the Truckee Meadows. Ch. 5 details future water resource opportunities and projects.

ABOUT TMWA

TMWA is a not-for-profit, community-owned water utility overseen by a seven-member board of directors made up of elected officials from Reno, Sparks, and Washoe County, as well as an appointed citizen advisory committee. Formerly owned by Sierra Pacific Power Company, the water utility began operations as TMWA in June 2001 through a Joint Powers Agreement (JPA) between the City of Reno, the City of Sparks, and Washoe County. TMWA serves more than 427,000 residents in the Truckee Meadows. TMWA's primary objective is to provide reliable, high-quality water service to its customers in an efficient, cost-effective manner.

One of the main purposes in creating TMWA, as described in the JPA, is to meet the "common interest in assuring that water resources be developed and managed to fulfill the present and future water needs of the greater Truckee Meadows community" and "to assure sufficient water supply to meet the needs of existing and future development."

The Washoe County Department of Water Resources (WDWR) and the South Truckee Meadows General Improvement District (STMGID) water systems were successfully merged into TMWA and consolidated operations began on January 1, 2015. This merger made TMWA the primary water purveyor for the Reno-Sparks metropolitan area and portions of unincorporated Washoe County, also known as the Truckee Meadows. As a result, TMWA provides water for approximately 90% of Washoe County's population.

TMWA'S SERVICE AREA

TMWA's retail service area covers approximately 162 square miles and provides wholesale service to the Sun Valley General Improvement District. The service area expanded by approximately 50 square miles after the consolidation of WDWR and STMGID into TMWA. The service area is within the planning boundary of the Western Regional Water Commission (WRWC) and the Truckee Meadows Regional Planning Agency's (TMRPA) Truckee Meadows Service Area (TMSA), except for several remote satellite service areas in Washoe Valley and near Wadsworth. Figure 1-1 shows TMWA's current service area.

TMWA's service area includes nine hydrographic basins, including Lemmon Valley (hydrographic basin 92A/B), Spanish Springs (hydrographic basin 85), Truckee Meadows (hydrographic basin 87), Pleasant Valley (hydrographic basin 88), and small, satellite systems in Washoe Valley (hydrographic basin 89), Pleasant Valley East (hydrographic basin 88 east), the Tracy Segment (hydrographic basin 83), and Truckee Canyon (hydrographic basin 91). TMWA also manages groundwater in Honey Lake Valley as part of the Fish Springs Ranch water supply project (hydrographic basin 97). Appendix B includes a map of the hydrographic basins.

The portion of TMWA's distribution system located in hydrographic basins 85, 87, 88 (west portion), 91, and 92 provide customers access to Truckee River resources and the benefit of drought reserves made available by TROA. TMWA's satellite systems do not receive Truckee River water because they were developed as stand-alone subdivisions which, upon recordation of a final map, required sufficient groundwater resources to meet the full build-out requirements of the development.



FIGURE 1-1: MAP OF TMWA'S SERVICE AREA, WATER TREATMENT PLANTS, ACTIVE PRODUCTION WELLS, AND SATELLITE SYSTEMS

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PLAN GOALS AND OBJECTIVES

As the regional water provider, it is TMWA's responsibility to ensure water supply reliability for the Truckee Meadows. The WRP update process allows TMWA to assess any changes to the system that have occurred over the previous five years to ensure that water supplies are adequate under a range of future conditions. This section outlines the goals and objectives for the 2040 WRP.



GOALS

- Ensure TMWA has adequate water resources to meet the community's needs over the next 20 years and beyond.
- Create innovative solutions to best manage water resources in the region.
- Maintain community confidence in TMWA's planning process.
- Recommend management strategies and proposed polices to guide TMWA over the next five years.



OBJECTIVES

- Provide an overview of TMWA's current water resources and available water rights.
- Analyze alternative supply and demand scenarios to determine the resiliency of TMWA's resources.
- Assess potential impacts of climate change on regional water resources.
- Describe TMWA's current water management and conservation strategies.
- Identify future water resource opportunities and water management strategies.
- Provide opportunities for input from the public and Board throughout the planning process.

PLAN SCOPE

TMWA updates its WRP every five years to address significant changes in the water system and region. TMWA follows an integrated planning approach, and several other planning documents are relied upon in conjunction with the WRP, including TMWA's Facility Plan and Funding Plan (see Figure 1-2).

The scope of TMWA's water planning process, as defined by its JPA directive, does *not* provide for municipal sewer, water reclamation, flood control, storm water drainage, or groundwater remediation. Those functions are planned for by Reno, Sparks, and Washoe Counties. All water-related utility planning efforts, including TMWA's WRP and Facility Plan, are incorporated into the WRWC's Comprehensive Regional Water Management Plan (RWMP), most recently updated in 2016.

The WRWC is charged with improving water resource planning at the regional level (including water, wastewater, stormwater, and flood



FIGURE 1-2: VISUAL REPRESENTATION OF TMWA'S INTEGRATED PLANNING APPROACH

control) and facilitating coordinated resource management among the Truckee Meadows member entities.

Following an established process, the WRP scope is focused on planning and management of water supplies for existing and future water demand within its existing retail service area as well as those areas where it is deemed appropriate to receive TMWA water service.

PLAN UPDATE PROCESS

Throughout the planning process, TMWA provided opportunities for the public to give feedback on the WRP and regional water resource matters. Initial public outreach for the 2040 WRP included an electronic survey about people's awareness and concerns regarding water resources in the region. The survey was distributed to TMWA customers, employees, and stakeholders via email and social media. Approximately 2,000 responses were received. Input was analyzed and incorporated into the planning process. Appendix A includes a detailed overview of survey responses. TMWA staff presented information about the WRP to TMWA's Board of Directors throughout the update process. Information about the WRP and survey results were also presented at Smart About Water Day in May 2019. In August 2019, TMWA held a workshop with its Board to discuss possible policy recommendations and management strategies for the 2040 WRP.

In June through August 2020, TMWA presented the draft WRP to its Board, its Standing Advisory Committee, the WRWC, and the Northern Nevada Water Planning Commission (NNWPC). Due to the ongoing restrictions resulting from the COVID-19 pandemic, TMWA held four public webinars to present the draft WRP and to collect public feedback, instead of holding open houses in person. Customers were notified about these events via email and social media. Additionally, TMWA provided public access to the draft WRP and an electronic comment form for feedback on its website from June through August 2020.

WRP PUBLIC SURVEY SUMMARY

TMWA surveyed customers, stakeholders, and employees regarding their attitudes toward TMWA's water resource planning efforts. The survey, which was conducted in the fall and winter of 2018, included questions regarding topics the public would like to see addressed in the WRP and concerns over issues that could negatively impact future water supplies. The survey also contained questions on trust in the agency and important issues surrounding the region's water resources such as conservation, drought storage, and the use of reclaimed water. Results from the survey were used to ensure public input was considered in the planning process from the onset. Over a two-month period, approximately 2,000 responses were received.

The top three public concerns for issues that may negatively impact our water supply over the next 20 years:

- Population growth
- More severe droughts
- Wildfire in the upper watershed

The top three issues the public would like to see addressed in the WRP:

- Growth and future water demands
- Future availability of existing resources
- The state of our current water resources

The top three topics of importance to the public:

- Planning water resources around projected growth
- Maintaining drought reserves
- Maintaining groundwater supplies

In general, respondents had a high degree of trust in TMWA to effectively manage regional water resources.

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MAJOR EVENTS SINCE PREVIOUS WATER RESOURCE PLANS

Outlined below is a brief overview of the major events that have been covered in TMWA's WRPs over time. The 2040 WRP is the fourth version of the plan since TMWA was established in 2001.

TMWA's 2005–2025 *Water Resource Plan*, adopted by the Board in 2003, presented the following:

- History of municipal water supply in the Truckee Meadows;
- Description of the region's water supply system including conjunctive use of surface and groundwater;
- Confirmation of the use of Truckee River flows during the historical 1987–1994 drought period as the basis for TMWA's drought plan;
- Projected population and water demand;
- TMWA's conservation program; and
- Potential future water resource options.

The subsequent plan, the 2010–2030 Water Resource Plan, built on the foundational strategies from the first plan and expanded upon the following issues:

- Legislative directives to consolidate water purveyors in Washoe County;
- Execution by the five Mandatory Signatory Parties of TROA (TMWA, Pyramid Lake Paiute Tribe (PLPT), California, Nevada, and the United States) and seven other parties on September 6, 2008;
- Changes in population and demand projections as a direct result of the regional economic downturn from 2007 to 2009; and
- Completion of the conversion of flat-rate, singlefamily residences to the metered rate, which was required as part of the 1989 Preliminary Settlement Agreement.

TMWA's 2016–2035 Water Resource Plan reviewed and updated TMWA's water resource planning strategies due to several key events, including the following:

- The merger of WDWR and STMGID water utilities into TMWA;
- A reversal of negative or stagnant economic trends dominating the region from 2007 to 2009, which altered the economic activity and growth projections for the Truckee Meadows;
- Purchase of the Truckee Carson Irrigation District's (TCID) 4,750 acre-feet of Donner Lake water rights;
- Successful implementation of TROA with the five Mandatory Signatory Parties on December 1, 2015; and
- Extended meteorological drought from 2012 to 2015, culminating in the driest year on record in 2015.

The 2020–2040 Water Resource Plan builds off the foundation established in the previous plans and addresses important issues that have arisen over the past five years, including:

- Successful operation under TROA in storing credit water to improve total upstream drought storage for the Truckee Meadows;
- Recovery from meteorological drought conditions with a record-breaking winter in 2017;
- Expansion of TMWA's aquifer storage and recovery program to increase the ability to store treated surface water in aquifers to sustain groundwater levels and improve drought preparedness;
- Construction of the Mt. Rose Water Treatment Plant in the south Truckee Meadows to increase the sustainability of the groundwater aquifer that provides water to customers in that area;
- TMWA management of the water resources of Reno, Sparks, Tahoe Reno Industrial General Improvement District (TRIGID), and Nevada Department of Transportation (NDOT) for return flow purposes. This will facilitate implementation of the TRIGID effluent management agreement, enhancing the efficient use of Truckee River resources and facilitating regional water management objectives; and
- Purchase of West Reno Water Company's water system in Verdi in 2019.

SUMMARY

The 2040 WRP update builds upon previous plans and continues to establish the importance of long-range planning to address changing conditions in the Truckee Meadows. Challenges faced by the region in 2020 are different from those faced when TMWA was first established in 2001. TMWA strives to provide a reliable, high-quality water supply for its customers, and the WRP is a critical component to ensure TMWA continues to meet that goal. The following chapters describe TMWA's current water resources, current and future planning environment, water conservation strategies, future water resources, watershed and environmental protection efforts, and recommended actions.

"The Water Resource Plan is important because it details how TMWA manages existing and future water resources for the region."

CURRENT WATER RESOURCES

Truckee River

CHAPTER OVERVIEW

he Truckee River is regulated by the Truckee River Operating Agreement, which dictates how much water flows, who gets it, and when. This chapter briefly describes these rules and goes into more detail about TMWA's existing water resources: from surface water reserves stored in six upstream reservoirs to 89 production wells in nine groundwater basins around the Truckee Meadows. This diverse water resource portfolio allows TMWA to efficiently utilize available water by managing the ways in which surface water, groundwater, and storage reservoirs are used.

CHAPTER AT-A-GLANCE

Highlights of Chapter 2 include:

- 1. Management of the Truckee River and creek resources
- 2. TMWA's groundwater production
- 3. Groundwater recharge and management
- 4. TMWA's conjunctive use strategy
- 5. Surface water and groundwater rights over time



TMWA serves more than 425,000 people with a service area spanning over 162 square miles. The utility has built a diverse portfolio of surface water and groundwater resources to ensure the region's water supply is resilient and reliable. This chapter describes TMWA's current water resources and how the Truckee River Operating Agreement (TROA) benefits the region and the Truckee River. TMWA's surface water treatment and groundwater production facilities are also described, which when operated together as an integrated system, allow for conjunctive use, making it possible for TMWA to reliably meet demands under drought and non-drought conditions. Lastly, a summary of TMWA's surface water and groundwater rights portfolio is presented, providing

THE TRUCKEE RIVER WATERSHED

A watershed is an area from which runoff resulting from rainfall or snowmelt collects and drains to a common point, such as a river or lake. Reno and Sparks are in the Truckee River watershed, which spans California and Nevada and encompasses approximately 3,060 square miles. The Lake Tahoe Basin is part of the Truckee River watershed, with the Truckee River being as the only outlet of Lake Tahoe. The length of the Truckee River is 121 miles from Lake Tahoe to its terminus at Pyramid Lake. This watershed is unique in that it does not flow to the ocean like many other watersheds in the United States. There are many tributaries to the Truckee River, including the Little Truckee River and Donner Creek in California and Hunter Creek and Steamboat Creek in Nevada. Ch. 6 includes details about efforts to protect and preserve the Truckee River watershed. The aerial photo included here shows Lake Tahoe on the bottom left and Pyramid Lake on the top right.



an overview of the water resources available to serve existing and future customers.

SURFACE WATER RESOURCES

The Truckee River is the primary source of water for the Truckee Meadows, providing 80–85% of the region's drinking water. TMWA's surface water rights come predominantly from the Truckee River, plus water from several major tributaries, including Hunter, Steamboat, and Whites Creeks.

TMWA has two surface water treatment plants (WTPs) on the Truckee River: Chalk Bluff and Glendale. The Chalk Bluff WTP is TMWA's largest, capable of producing approximately 90 million gallons per day (MGD) of treated water. Raw water at the Chalk Bluff WTP is treated via a conventional water treatment process through settling of heavy solids, screening, flocculation and sedimentation, filtration, and chlorination. The plant is designed for modular expansions to have an ultimate treatment capacity of 120 MGD.

The Glendale WTP is TMWA's supplemental treatment facility and can produce approximately 33 MGD of surface water. The plant is typically operated on a seasonal basis (May through October) to meet summertime demand. Additionally, groundwater from six wells can be pumped to Glendale to be treated for arsenic and blended with surface water to meet water quality standards for distribution into the system. With groundwater included, the combined capacity of Glendale is 45 MGD. The Glendale WTP employs the same treatment process as the Chalk Bluff WTP.

The Mt. Rose WTP will be a relatively small surface-water treatment plant scheduled for completion in 2020. It will treat Whites Creek water to supplement groundwater supplies on the Mt. Rose Fan and will produce up to 4 MGD when sufficient creek flows are available. Construction of the Mt. Rose WTP will further TMWA's conjunctive use of its surface water and groundwater supply, allowing TMWA to rest production wells (passive recharge) and use surface water to meet customer demand. Additionally, the Mt. Rose WTP will allow for the injection of treated surface water into the aquifer (active recharge). This will improve water resource sustainability in the area and will address needed groundwater level recovery. Groundwater elevations were in decline when the area was completely reliant on the groundwater supply to serve residents (prior to consolidation of the utilities).

TMWA has a robust monitoring and operating plan to manage Whites Creek water, which has been approved by the Nevada State Engineer and accepted by the Federal Water Master, Nevada Division of Wildlife, and The Nature Conservancy. To ensure the Whites Creek ecosystem remains healthy and all downstream water rights are satisfied, minimum bypass flows and flushing flows below the Mt. Rose WTP are required. TMWA is exploring options to use additional creek resources, which are described in more detail in Ch. 5.



CHALK BLUFF WATER TREATMENT PLANT



MT. ROSE WATER TREATMENT PLANT CONSTRUCTION (JANUARY 2020)

TRUCKEE RIVER WATERSHED AND THE TRUCKEE RIVER OPERATING AGREEMENT (TROA)

The Truckee River watershed is predominantly snow fed. Mountain snowpack acts as a natural reservoir, accumulating in the winter and melting in the spring and summer months when more water is needed downstream for irrigation and outdoor watering. The Truckee River is the only outlet from Lake Tahoe and is controlled by a dam at Tahoe City that controls the top 6.1 feet of the lake, equalling 744,600 acre-feet (AF) of storage. Truckee River flows are highly dependent on Lake Tahoe's surface elevation at any point in time throughout the year. In addition to Lake Tahoe, other reservoirs within the Truckee River watershed include Donner Lake, Independence Lake, Stampede Reservoir, Boca Reservoir, and Prosser Reservoir (Figure 2-1). TMWA owns all water rights from Donner and Independence Lakes, referred to collectively as TMWA's Privately Owned Stored Water (POSW). Together, this amounts to 27,000 acre-feet annually (AFA) of surface water storage. In dry years, when river flows are low and additional water resources are required in the Truckee Meadows, POSW can be released to help meet those demands.

TROA, implemented in 2015, governs operations on the Truckee River system. The Federal Water Master manages reservoir releases and the flow of water in the Truckee River system to ensure the operating requirements under TROA are satisfied for all water rights holders, including TMWA. TROA ratified the interstate allocation of water between California and Nevada, ensuring that

Nevada will receive 90 % of Truckee River water. The required flow rates at the state line are known as Floriston Rates. Floriston Rates require an average flow at the US Geological Survey (USGS) Farad Gage, near the California-Nevada border, of 500 cubic feet per second (CFS) from March through September and 400 CFS from October through February. Floriston Rates can be reduced under certain TROA conditions. Reduced Floriston Rates require either 300 CFS or 350 CFS at the Farad Gage and go into effect from November 1 through March 31, whenever the water surface elevation of Lake Tahoe is lower than 6,226 feet.

The Federal Water Master is responsible for releasing water from Lake Tahoe and the other federal reservoirs (Stampede, Boca, and Prosser) as needed to meet Floriston Rates until this water is depleted. Lake Tahoe is considered the best barometer regarding the health of the region's water supply. When the elevation of Lake Tahoe approaches its natural rim (6,223 feet), Floriston Rates drop off shortly thereafter. When the elevation of Lake Tahoe drops below the natural rim, water ceases to flow from the lake into the Truckee River. Under TROA, a drought situation occurs when Floriston Rates are not projected to be maintained through October 31st, or the projected elevation of Lake Tahoe on or before November 15th will be less than 6,223.5 feet. TROA requires the Federal Water Master to determine by April 15th of every year whether a drought situation exists based on the above criteria. Figure 2-2 presents the history of recorded month-end elevations for Lake Tahoe.



FIGURE 2-1: DIAGRAM OF THE TRUCKEE RIVER SYSTEM



FIGURE 2-2: LAKE TAHOE ELEVATIONS FROM 1986 TO 2019

TROA provides for modified river and reservoir operations that result in multiple benefits for water users, including benefits to endangered fish and significant improvements in drought storage for TMWA. TROA also satisfies the Truckee-Carson-Pyramid Lake Water Rights Settlement Act signed by Congress in 1990. The five signatory parties of TROA include California, Nevada, TMWA, the Pyramid Lake Paiute Tribe (PLPT), and the US Department of the Interior.

TROA addresses two key elements that differentiate it from former operations: 1) the ability of a water right holder, such as TMWA, to exercise a portion of its water rights by storing water (credit water) that would otherwise have been released from storage or passed through the reservoirs to the Truckee River; and 2) the ability to exchange (or trade) stored water between Truckee River reservoirs. Thus, TROA allows TMWA to accumulate and carry over stored water through multiple drought years. Over time, TMWA has the potential to accumulate a significant amount of drought reserves, ensuring that the Truckee Meadows will be protected from prolonged droughts with the increased ability to store water compared to pre-TROA operations.

A designated drought situation affects TMWA's operations and the ability to carry over credit water from year to year. If Floriston Rates cannot be met at any time, especially during the summertime demand season, TMWA's water operations may require the release of POSW and/or other stored water and may require increased groundwater pumping. In a drought situation, TROA allows TMWA to carry over stored water in upstream reservoirs from one year to the next, which provides additional surface water resources when a drought persists. There are several categories of stored municipal credit water under TROA, including emergency, firm, and non-firm. Emergency and firm storage do not suffer evaporative losses unless it is the only water in a reservoir, whereas non-firm water can spill when a reservoir fills. In non-drought situation years, TMWA's non-firm stored water above the base amount is automatically converted to fish credit water, which can

be used by the United States and PLPT for the recovery of endangered fish and to support the fishery in the lower Truckee River. For more information on TROA, see https://tmwa.com/article/truckee-river-operating-agreement.

GROUNDWATER RESOURCES

PRODUCTION WELLS

TMWA has groundwater production wells throughout the Truckee Meadows and surrounding basins that supplement surface water supplies and provide water to the satellite water systems where surface water supplies are not available. The utility operates and maintains 89 active production wells in nine distinct hydrographic basins, with 74 available to meet customer demand in TMWA's main service area and 15 available for service in the satellite systems. TMWA's groundwater wells range in capacity from approximately 100 gallons per minute (GPM) to 3,000 GPM. Table 2-1 summarizes active production well totals for each hydrographic basin. See Appendix B for a summary of each hydrographic basin.

Generally, TMWA diverts as much surface water as possible year-round and begins to bring on groundwater production wells later in the spring when customer demands increase, and when needed during drought situation years. Some production wells, generally located at the far reaches of the distribution system, may continue to pump during the winter months to meet customer demand and provide greater system reliability. All satellite water systems are solely dependent on groundwater, and therefore, the wells operate year-round.

The wellfield TMWA operates in Honey Lake Valley (Nevada) is a product of the Fish Springs Ranch water supply project completed by Vidler Water Company in 2008. The basin is located approximately 38 miles north of the Reno-Sparks metropolitan area. The project is currently permitted to provide up to 8,000 AFA of groundwater supply to the Truckee Meadows region. With additional aquifer testing and basin monitoring, the Nevada State Engineer may allow an additional 5,000 AFA of groundwater pumping from the wells for a total supply of 13,000 AFA.

Two main issues TMWA must contend with to have a successful groundwater management program are poor groundwater quality areas and groundwater production capacity declines. Groundwater from five of TMWA's production wells undergoes treatment for tetrachloroethylene (PCE), and six wells must be treated or managed for naturally occurring metals such as arsenic. Treatment for PCE is completed at the wellhead via airstripping. Several of the wells contaminated with PCE also have high levels of arsenic and must be treated at the Glendale WTP.

Over time, well production capacity may decline. Capacity declines are typically caused by well screen plugging resulting from chemical reactions that occur between the groundwater, aquifer material, and well screen material. To mitigate this occurrence, TMWA manages an annual well rehabilitation program. The program consists of actively monitoring each production well and prioritizing well rehabilitation based on observed production declines. Drilling a new well to mitigate the loss of groundwater production is considered a last resort due to the expense associated with large-diameter well drilling. However, when replacement wells are necessary, they are constructed with superior casing and screen material to increase well longevity.

PASSIVE AND ACTIVE RECHARGE

Groundwater is pumped to help meet peak summer customer demand and during dry years. In the winter season, most production wells are rested, which allows for passive groundwater recharge. When demand is lower, wells can rest because areas are served instead by surface water resources. For example, during 2017–2019, the Truckee Meadows experienced several above-average water years, which provided adequate Truckee River flows, allowing TMWA to minimize groundwater pumping. With reduced groundwater pumping, passive recharge occurred in many basins. Following the merger with Washoe

BASIN # HYDROGRAPHIC BASIN NUMBER OF ACTIVE PRODUCTION WELLS 83* Tracy Segment 4 85 8 Spanish Springs 87 Truckee Meadows 47 88** 9 Pleasant Valley 89* 5 Washoe Valley 91* Truckee Canyon (Verdi) 4 92A 3 W. Lemmon Valley 92B 4 E. Lemmon Valley 97 5 Honey Lake Valley 89 TOTAL

TABLE 2-1: ACTIVE PRODUCTION WELLS BY HYDROGRAPHIC BASIN

*indicates satellite systems, **Pleasant Valley East contains a satellite system

County Department of Water Resources (WDWR) and South Truckee Meadows General Improvement District (STMGID), TMWA has extended surface water resources to areas previously only served by groundwater, such as the Mt. Rose Fan in the South Truckee Meadows and areas in Spanish Springs and Lemmon Valley. In 2018, TMWA passively recharged approximately 2,240 AF of water by supplying those areas with surface water, thus allowing aquifer levels to recover.

Lower demand in the winter months allows TMWA to undertake its aquifer storage and recovery (ASR) program. Under TMWA's ASR program, treated surface water is injected, or recharged, into groundwater aquifers through many of TMWA's existing production wells to improve water quality at certain sites and enhance groundwater elevations by offsetting the effects of summertime pumping. In the near future, water from Whites Creek and the Mt. Rose WTP will be used to satisfy the ASR program in the South Truckee Meadows.

Since its inception, TMWA's ASR program has helped improve or stabilize groundwater levels in and around many production wells. This has enhanced the ability to utilize groundwater resources to meet peak customer demand during the summertime. ASR is one element of TMWA's integrated management strategy to save drought reserves for use at a later date. Through ASR, TMWA has recharged approximately 38,000 AF of water since the program began in 1993. Figure 2-3 depicts which production wells are equipped for recharge.



FOG OVER FISH SPRING RANCH (HONEY LAKE VALLEY, NV)



FIGURE 2-3: MAP OF TMWA WELLS PERMITTED FOR RECHARGE

The recharge program is evaluated by TMWA on an annual basis and modified to provide the maximum benefits to aquifer health and water quality. The State of Nevada permits TMWA's ASR program, which requires extensive monitoring to ensure groundwater quality is maintained. Expansion of TMWA's ASR program is discussed in Ch. 5.

CONJUNCTIVE USE

Conjunctive use allows TMWA to optimize surface water, groundwater, and drought reserves to maximize the efficient use of water resources systemwide. This strategy allows sustainable management of resources under both drought and non-drought conditions.

The majority of water supply (80–85%) used to meet TWMA's annual demand comes directly from the Truckee River. Chalk Bluff WTP's ability to operate year-round allows TMWA to efficiently utilize its surface water resources in *any* type of year, thereby preserving groundwater for use during the peak summertime demand months. In the summer months of the driest years when Floriston Rates cannot be met, POSW and

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credit water from upstream reservoirs are released to help meet customer demand. TMWA has only had to use a small amount of its stored water in five of the last 30 years, including 2015 which had the lowest snowpack year on record. Figure 2-4 shows the historical sources of TMWA's water supply on an annual basis.

WATER RIGHTS AVAILABLE WATER RIGHTS

The Orr Ditch Decree (the Decree), issued in 1944, adjudicated water rights to the Truckee River and its tributaries. The Decree sets the total volume of mainstem and tributary water rights at 224,000 AF. Although water rights can be divided and converted from one use to another (e.g., agriculture to municipal use), the total number of surface water rights available from the Truckee River does not change from the amount of water rights set by the Decree. Originally, most water rights were for agricultural purposes within the Truckee Meadows. The Decree also granted municipal water rights to TMWA's predecessor, Sierra Pacific Power Company. These decreed municipal water rights, along with storage from Donner and



FIGURE 2-4: SOURCES TO MAKE ANNUAL TMWA WATER SUPPLY FROM 1990 TO 2019

Independence Lakes, were used to satisfy customer demand until the 1960s. Since that time, TMWA and its predecessor have been acquiring decreed agricultural water rights and converting them to municipal use. Figure 2-5 shows the conversion of decreed agricultural rights to municipal use over time. To date, TMWA has acquired over 79,000 AF of agricultural rights and converted them to municipal use to meet the wholesale and retail will-serve commitments of its customers. All water rights under the Decree are administered by the Federal Water Master and the Decree court (the US District Court in Reno). The Federal Water Master also administers TROA, which is designed to provide long-term sustainable water operations for the multiple stakeholders of the Truckee River system.

Groundwater resources began to be developed in the late 1950s and 1960s. Adding wells was a less expensive alternative to building additional surface water treatment plants to increase production capacity to meet the growing summer peak demand. Currently, TMWA operates 89 production wells in nine different hydrographic basins, which can supply about 40% of TMWA's summer peak demand.

Although TMWA is allowed to annually exercise, or pump, the total volume of groundwater rights described in Table 2-2, it actively manages its groundwater pumping within each basin to maintain the long-term sustainability of the aquifers. This strategy takes into account water rights, historical groundwater pumping, water levels, and variable hydrologic conditions. For example, TMWA's total annual groundwater pumping over the last five years has ranged from 11,882 AFA to 24,509 AFA, which demonstrates the variability in pumping depending on whether it's a wet year, like 2017, or a drought year, like 2015. TMWA's conjunctive use program, plus active and passive recharge, promotes sustainable groundwater management.

As summarized in Table 2-2, TMWA's surface and groundwater resources, plus TMWA's POSW in Donner and Independence Lakes, comprise the water rights portfolio that makes up the water supply for TMWA's customers.

NEVADA WATER LAW BASICS

Except for prestatutory water law rights established by federal or state court decrees, groundwater and surface water rights in Nevada are administered and managed by the State Engineer. Nevada water law follows the prior appropriation doctrine (also known as "first in time, first in right"), which stipulates that those who first appropriated a quantity of water and put it to beneficial use have the right to continue to use that water. Irrigation, mining, recreation, industrial, and municipal uses are examples of beneficial uses. Senior water rights holders (i.e., those with earlier priority dates) are protected even if new uses for a water source are allocated. Junior water right holders cannot impinge on the rights of senior water right holders. TMWA holds surface water rights to legally divert water from the Truckee River and groundwater rights to pump groundwater to provide water service to customers.

RULE 7

TMWA continuously works to maintain and improve the yield it receives from its existing water rights-decreed, converted agricultural rights, POSW, and groundwater-to generate a water supply that will meet the current and future needs of its customers. TMWA holds sufficient water rights to meet customer demand (83,000 AF in 2019).





To meet the additional water demand resulting from growth and new development, TMWA requires applicants for new or modified water service to dedicate acceptable water rights to obtain a will-serve commitment. A willserve commitment is a letter from TMWA stating that it has sufficient water resources to provide the requested water delivery and that the project is within TMWA's service territory. Before accepting a water right for a will-serve commitment, TMWA researches a water right's source, priority, quantity, dry-year supply/yield, and ownership. In this manner, TMWA ensures that existing commitments can be sustained in perpetuity. Alternatively, developers can purchase an allocation of water rights from TMWA's inventory of uncommitted water rights. The price for purchasing an allocation from TMWA's inventory is based on TMWA's costs incurred in acquiring, processing, and maintaining the water rights.

Presently, TMWA estimates there are approximately 35,000 AF of mainstem Truckee River agricultural rights available for future dedication. This includes agricultural rights that are still in decree form and agricultural rights that have been converted to municipal use and banked with TMWA for future service. In addition, 13,500 AF of groundwater rights are banked with TMWA and available for future dedication, primarily from the Fish Springs Ranch water supply project.

RECLAIMED WATER

TMWA does not directly supply reclaimed water but actively works with regional partners to utilize reclaimed water in efficient and innovative ways. Reclaimed water is derived through the process of treating wastewater, or effluent, into water that is suitable for use for other purposes. Reclaimed water has been used for irrigation throughout the Truckee Meadows for years. One of the local benefits of using reclaimed water is that it conserves potable (drinking) water and provides a reliable, drought-resistant water source, even in times

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TABLE 2-2: TMWA WATER RIGHTS

TMWA WATER RIGHTS	ACRE FEET
Surface Water–Original M&I decreed rights	38,805
Surface Water–POSW	27,000
Surface Water-Converted decreed ag. rights	79,422
Total Surface Water Resources	145,227
Groundwater Rights By Basin	
Tracy	524
Spanish Springs	3,900
Truckee Meadows	23,689
Pleasant Valley	3,955
Washoe Valley	674
Truckee Canyon-Verdi	415
West Lemmon Valley	938
East Lemmon Valley	1,428
Honey Lake Valley–Fish Springs Ranch	8,000
Total Groundwater Resources	43,523
TOTAL WATER RESOURCES	188,750

of restriction and conservation. Reclaimed water also provides a more predictable way to help water reclamation facilities ensure compliance with discharge permit limitations when compared with river discharge or other effluent management strategies. Table 2-3 summarizes the 2018 reclaimed water usage from each of the region's water reclamation facilities. Reclaimed water currently represents approximately 8% of the region's water supply.

TABLE 2-3: 2018 RECLAIMED WATER USAGE

FACILITY	TOTAL (AFA)
Truckee Meadows Water Reclamation Facility	3,990
South Truckee Meadows Water Reclamation Facility	2,654
Reno-Stead Water Reclamation Facility	496
Total Reclaimed Water Usage	7,140

Commercial and industrial development downstream of the Truckee Meadows has been increasing. The Tahoe-Reno Industrial Center (TRI Center) and other developments require water for potable and non-potable uses. Once built out, TRI Center expects to have 10,000 AFA of non-potable demand and approximately 2,300 AFA or more of potable demand. The Cities of Reno and Sparks have agreed to deliver up to 4,000 AFA of reclaimed water to the TRI General Improvement District (TRIGID) for resale to customers in TRI Center. When effluent generated at the Truckee Meadows Water Reclamation Facility (TMWRF) is used as reclaimed water and not returned to the Truckee River, secondary permits require a return flow component to the Truckee River from other water sources.

To promote the efficient use of Truckee River resources, Reno, Sparks, and TMWA collaborated to create a Return Flow Management Agreement with TRIGID. TMWA will help manage the return flow to the Truckee River to ensure that the river and downstream water rights holders are not adversely impacted. TRIGID will reimburse TMWA for all costs incurred in connection to the administration of the Return Flow Management Agreement.

Return flow resources will include some of TRIGID's Truckee River resources, Nevada Department of Transportation's resources, and TMWA's resources. TMWA, as allowed by TROA, has certain water resources that can support reclaimed water service and are either not subject to the return flow requirement (i.e., groundwater component and POSW) or resources which otherwise can satisfy the return flow requirement to the Truckee River. TMWA will seek to promote the efficient use of resources to minimize the use of TMWA's resources, where feasible. See Table 2-4 for sources of return flow resources.

TABLE 2-4: SOURCES OF TRIGID RETURN FLOW RESOURCES

RETURN FLOW RESOURCES	TOTAL (AFA)
TRIGID Resources	1,500
NDOT Resources	1,500-2,200
TMWA Community Resources	300-1,000
Total Resources	4,000

SUMMARY

TMWA holds sufficient water rights to meet current customer demand. TMWA's water rights portfolio contains a mix of Truckee River, creek water, and groundwater resources. Water from the Truckee River makes up most of the water supply for the Truckee Meadows. With the implementation of TROA, TMWA has more flexibility to store additional water in upstream reservoirs, which can be released as needed. Through conjunctive use, TMWA maximizes the use of surface water in wet years, thereby preserving groundwater capacity for high demand periods. In dry years, TMWA can utilize a combination of increased groundwater pumping and releases from drought storage when Truckee River flows are reduced. While TMWA manages its existing resources, it will continue to evaluate additional, viable resources to ensure that the region has a resilient and sustainable water supply. An evaluation of TMWA's ability to supply increased future demand under a range of potential climate variability appears in Ch. 3.

CURRENT AND FUTURE PLANNING ENVIRONMENT

Independence Lake

DRAFT

CHAPTER OVERVIEW

nalyzing the factors that can impact future water supply and demand is critical to ensuring continued reliability of the region's drinking water. Historic droughts provide important insights into the ways in which TMWA has effectively managed water resources; however, future climate conditions are expected to change from historic patterns. This chapter describes TMWA's analysis of the impacts of climate change scenarios on the regional water supply from the present through the end of the century. Also included is an evaluation of how population growth will affect future water demand.

CHAPTER AT-A-GLANCE

Highlights of Chapter 3 include:

- 1. How TMWA has managed water resources through historic droughts
- 2. Future water demand projections
- 3. Climate change scenarios that stress-test the region's water supply
- 4. Growth and development in the Truckee Meadows
- 5. Water system resiliency during emergencies



This chapter explores the current and future planning environment in the Truckee Meadows, including the reliability of TMWA's water supply under drought, potential future climate change scenarios, and increases in demand due to future development and water use patterns in the region. One of TMWA's goals is to maintain a consistent water supply for its customers under potential future conditions over the 20-year planning horizon and beyond. Information from the historic hydrologic record over the past 115 years provides important insights into water supply for the region. However, with potentially changing climate conditions, looking at alternative future scenarios depicting how the region's water supply may be affected is equally important. TMWA is adept at managing water resources in a highly variable climate but recognizes that new adaptive strategies may be needed in the future to ensure a reliable water supply under climate change.

DROUGHTS

For the Truckee Meadows region, the Truckee River is a crucial component of the water supply. Nevada is the driest state in the country, with the Truckee Meadows receiving an average of only 7.5 inches of rain annually. Due to its proximity to the Sierra Nevada mountains, the climate in Northern Nevada is marked by highly variable weather patterns with alternating periods of flooding and droughts. Water supply planning based on historical droughts is crucial in helping TMWA plan for future water policies and resources.

WHY IS SNOWPACK SO IMPORTANT?

A good indicator of an impending dry year is snowpack accumulation. Measured on April 1st of each year by the Natural Resources Conservation Service (NRCS), the snow water equivalent (SWE), or the water content of the snowpack, is used to forecast the amount of water that will run off each spring to help fill upstream reservoirs and provide river flows. The NRCS uses snow telemetry (SNOTEL) sites (see photo below) throughout the mountains that have automated equipment that measures snowpack. These measurements are key for TMWA to effectively manage its reservoirs and water supply each year.



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FIGURE 3-1: LAKE TAHOE ELEVATIONS DURING DROUGHT PERIODS FROM 1986 TO 2018

Since 1980, there have been four droughts varying in severity within the Truckee River system: 1987–1994 (eight years), 2001–2004 (four years), 2007–2010 (four years), and 2012–2016 (five years). The 1987–1994 drought was the worst drought in over 115 years and has been the basis for drought planning purposes to date. Although the 2012–2016 drought was unprecedented in terms of its severity (2015 had the lowest recorded snowpack and runoff in history), it was shorter in duration than the eight-year 1987–1994 drought. For a detailed explanation of the historic droughts, see Ch. 2 of TMWA's 2035 WRP. Since the completion of TMWA's last WRP, the region has been experiencing a wetter period, with several aboveaverage water years, including 2017 and 2019.

Important inferences can be made by reviewing the historic hydrology of the Truckee River Basin. With full upstream reservoirs (including Lake Tahoe), Floriston Rates can be met for typically the first two to three years of a prolonged drought, regardless of its severity. As the duration of the drought increases and Lake Tahoe approaches its natural rim or goes below it, required rates of flow are less likely to be met, especially during the critical irrigation season. When upstream storage is depleted and springtime runoff is well-below average in successive years, Floriston Rates have fallen off as early as the middle of April (2015) when there was not enough upstream reservoir storage to provide for the required rate of flow at the CA–NV state line. When the elevation of Lake Tahoe approaches or goes below its natural rim during a drought (Figure 3-1), Floriston Rates cannot be maintained for very long and drop off soon thereafter.

As illustrated in Figure 3-1, water levels in Lake Tahoe are depleted gradually over two to three years in an extended drought but can refill rapidly with a large precipitation event or a large snowpack year, thereby ending a hydrologic drought period. For example, 2017 was an excellent recovery year for the region, with Lake Tahoe starting below its natural rim and filling to its legal limit by the summer, thus ending the 2012–2016 drought. 2017 was the largest recovery year in recorded history at Lake Tahoe, with a net rise of 6½ feet between October 2016 and July 2017.



WINTER IN THE LAKE TAHOE BASIN

In the past, TMWA's privately owned stored water (POSW) has been used to meet customer demand during critically dry years. Based on historic droughts, upstream reserves typically do not need to be used until at least the third drought year in a row. Donner and Independence Lakes, TMWA's POSW reservoirs, typically fill each spring; however, Donner Lake may not fill in extremely dry years. During periods of extreme drought, TMWA has used drought reserves to meet customer demand between the months of June and October (1987–1994, 2012–2016). Figure 3-2 shows that TMWA has only had to use its stored water during five years over the last three decades. Even in years when Floriston Rates are not met during the irrigation season, flows in the Truckee River are typically sufficient to meet wintertime production needs by late fall (TMWA's wintertime customer demand is approximately a quarter that in the summertime).



FIGURE 3-2: TMWA UPSTREAM MAXIMUM STORAGE VS. THE AMOUNT OF STORED WATER USED FROM 1985 TO 2019

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CLIMATE CHANGE

While the climate of the Truckee Meadows is characterized by cyclical patterns of high and low precipitation, changing climatic conditions may prove more challenging for water supply reliability in the future.^{1,2} Climate change is defined as shifts in global or regional weather conditions that persist over multiple decades or longer.³ To design effective water supply strategies to mitigate against potential shifts in future climate conditions, TMWA incorporates the best available scientific information regarding regional climate change into its planning process.

Historically, TMWA's WRPs considered changes in water

supply based on hydrologic data recorded over the past 100-plus years. However, as climate variability is projected to become increasingly more common in the future, managing for a sustainable water supply may become more complex. It is uncertain how exactly the climate will change in the Truckee Meadows and the surrounding region, but altered precipitation and temperature patterns have the potential to affect both supply and demand.

Regional temperatures are expected to continue to warm, which is consistent with the increase observed in Nevada over the past several decades (Figure 3-3). As temperatures continue to warm, snowmelt could arrive earlier and evapotranspiration rates may increase. There is large uncertainty about how the magnitude and timing of



FIGURE 3-3: MEAN TEMPERATURE DEPARTURE FOR NEVADA FROM 1895 TO 2018 (SOURCE: WESTERN REGIONAL CLIMATE CENTER)

¹ Gonzalez, P., G.M. Garfin, D.D. Breshears, K.M. Brooks, H.E. Brown, E.H. Elias, A. Gunasekara, N. Huntly, J.K. Maldonado, N.J. Mantua, H.G. Margolis, S. McAfee, B.R. Middleton, and B.H. Udall. 2018. Southwest. In *Impacts, risks, and adaptation in the United States: Fourth national climate assessment*, Volume II. U.S. Global Change Research Program, Washington, DC, USA, pp. 1101–1184. doi: 10.7930/ NCA4.2018.

² Karl, T., J. Melillo and T. Peterson, T. (Eds)., 2009. Global climate change impacts in the United States. Cambridge University Press.

³ Gonzalez, P., G.M. Garfin, D.D. Breshears, K.M. Brooks. H.E. Brown, E.H. Elias, A. Gunasekara, N. Huntly, J.K. Maldonado, N.J. Mantua, H.G. Margolis, S. McAfee, B.R. Middleton, and B.H. Udall, 2018. Southwest. In *impacts, risks, and adaptation in the United States: fourth national climate assessment*, Volume II. U.S. Global Change Research Program, Washington, DC, USA, pp. 1101–1184. doi: 10.7930/ NCA4.2018.

⁴ Gershunov, A., T. Shulgina, R.E.S. Clemesha, K. Guirguis, D.W. Pierce, M.D. Dettinger, D.A. Lavers, D.R. Cayan, S.D. Polade, J. Kalansky, and F.M. Ralph. 2019. *Precipitation regime change in Western North America: The role of atmospheric rivers, nature: scientific reports*, vol 9, 9944, https://doi.org/10.1038/s41598-019-46169-w

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precipitation will change, but more variability is expected.⁴ Appendix C summarizes information from some key climate change research for the Truckee Meadows region.

To analyze the impacts of possible future conditions and to test the reliability of TMWA's water supply, TMWA analyzed specific long-term climatic and hydrologic scenarios in the Truckee River system using results from global climate, hydrologic, operational, and planning models.

Using regional climate modeling results from the Water for the Seasons project, TMWA partnered with Precision Water Resources Engineering (PWRE) to complete an analysis of future hydrologic conditions on the Truckee River system. One outcome of the project was the simulation of regional hydrology within the Truckee and Carson watersheds for a range of future climate scenarios through the end of the century (2098). The results of the hydrologic simulations were fed into the Truckee River planning model (RiverWare) to compare the performance and resiliency of TMWA's water supply under climate change to its performance under historical conditions.

Current climate change research uses General Circulation Models (GCMs). For this purpose, GCMs are mathematical models that simulate the physics of the global climate system. The models are typically downscaled to a smaller area, such as the northern Sierra Nevada, to predict the impacts of climate change under a range of possible greenhouse gas emissions scenarios. Rather than relying on one model, an ensemble, or collection of models created by different climate scientists, is used to predict possible future states. Although there are many GCMs applied globally, the eight best GCMs for this region were selected based on existing climate change research completed for the northern Sierra Nevada.⁵

An additional component of climate modeling consists of Representative Concentration Pathways (RCPs). An RCP is a future scenario that represents a greenhouse gas concentration trajectory. Higher RCP scenarios result in higher temperatures and increased associated impacts (see

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FIGURE 3-4: PROJECTED GLOBAL MEAN TEMPERATURE CHANGE UNDER EACH RCP - RCP 4.5 AND 8.5 ARE USED IN THIS WRP (SOURCE: FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME 1)

Figure 3-4). TMWA used two RCP scenarios representing moderate (RCP 4.5) and very high (RCP 8.5) emissions to provide a range of possible future climatic conditions for the Truckee River Basin. The moderate emissions scenario (RCP 4.5) represents greenhouse gases stabilizing in the mid-21st century, whereas the very high emissions scenario (RCP 8.5) has emissions increasing to the end of the century (a worst-case, most extreme scenario). These scenarios were used in conjunction with future demand projections, described below.

FUTURE WATER DEMAND PROJECTIONS

To estimate future annual water demand in the Truckee Meadows, TMWA creates water demand models using the following data sources: Washoe County population, historical water services in TMWA's service area, and historical water use data. Population growth is the basis for projecting the number of future active water services. Although several population projections for the region exist, including the State of Nevada Demographer's (SDF)

⁵ Lynn, E., A. Schwarz, J. Anderson, M. Correa, W. O'Daly, F. Keeley, and J. Woled. 2015. *Perspectives and guidance for climate change analysis*. California Department of Water Resources, Climate Change Technical Advisory Group Report.

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FIGURE 3-5: TMWA'S WATER DEMAND PROJECTION FOR 2020-2040

projection and Truckee Meadows Regional Planning Agency's (TMRPA's) Consensus Forecast of Washoe County population (WCF), TMWA's population projection is based on a logistical growth curve and provides an estimate of population equilibrium, assuming that current trends and conditions continue. Using its population projection, TMWA creates water demand projections by modeling future active water services in each customer class. Appendix D includes a detailed overview of TMWA's demand projection methodology.

TMWA's 20-year water demand projection estimates that water demand will increase 14% from approximately 83,000 acre-feet (AF) in 2020 to 96,000 AF in 2040. From 2003 to 2019, per capita water use has been declining on average 3% per year. However, annual water demand is quite variable, driven primarily by seasonal weather patterns, such as hot, dry summers or cool, wet springs. Due to variability in weather patterns, the future water demand may be approximately 3% higher on an annual basis than projected, resulting in an estimated demand of nearly 99,000 AF in 2040 (Figure 3-5).

TMWA's forecast is very similar to the WCF, which is used in regional planning. The demand projection derived from the 2018 WCF shows a demand of 100,188 AF in 2040. While statistically similar to the SDF and WCF projections for the region over the next 20 years, TMWA's model is preferred for the WRP because the long-range projection is useful for long-term resource planning.

To stress-test the reliability and sustainability of TMWA's water resources, a long-term water demand projection to 2098 was run through the Truckee River planning model under multiple historical drought and climate change scenarios. Based on TMRPA's recent master planning effort that projects future development based on zoning and analyzes land use scenarios for the region, TMWA generated a demand projection of 140,000 AF in 2098. It is important to note that this demand projection is hypothetical and is only used for water supply scenario modeling purposes in this plan.

FUTURE WATER SUPPLY SCENARIOS

TMWA modeled three scenarios to explore the strengths and vulnerabilities in TMWA's water supply and operational strategies 80 years into the future. A goal of the 2040 WRP is to determine whether TMWA can reliably meet customer demand under a range of future climatic conditions, including extended droughts. The

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scenarios included:

- 1. Historical ensemble of the most extreme droughts in the Truckee Basin
- 2. Moderate emissions scenario (RCP 4.5)
- 3. Very high emissions scenario (RCP 8.5)

HISTORICAL ENSEMBLE

TMWA included a historical ensemble as part of this water supply resiliency assessment. This ensemble includes nine different historical hydrologic patterns run through the RiverWare model under current river and reservoir operations. This analysis tested the reliability of TMWA's water supply under the most extreme droughts on record 80 years into the future at projected future customer demand levels. Three major droughts (1925–1937, 1987–1994, and 2012–2016) over the last 115 years were staggered so that each was run through the planning model at TMWA's highest demand levels projected toward the end of the century.

The results of the historical ensemble scenario show that TMWA's water supply is more than resilient enough to withstand a repeat of any of the major droughts on the Truckee River system on record and not sustain any shortages, even at demand levels projected out to the end of the century (175% higher than current demand levels). Model results show that TMWA's total upstream storage never drops below 40,000 AF, with a median end of month storage value of 52,000 AF throughout the 80-year simulation (Figure 3-6). No shortages were



FIGURE 3-6: LAKE TAHOE ELEVATION (TOP CHART) AND TMWA ANNUAL PROJECTED SOURCES OF SUPPLY (BOTTOM CHART) THROUGH 2098 UNDER HISTORICAL SCENARIO

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observed at any point under any of the historical drought scenarios through the year 2098. TMWA's modeling clearly demonstrates the robustness of the regional water supply to meet projected water demands 80 years into the future under the most extreme hydrologic conditions ever recorded on the Truckee River system.

MODERATE EMISSIONS SCENARIO

Under the more moderate emissions scenario (RCP 4.5), where carbon emissions are projected to continue to increase until 2050 then level off, results show there would be no water supply shortages in any of the eight GCMs until the year 2083 (Figure 3-7⁶). The shortage in supply is shown in only *one* of the eight GCMs in 2083; shortages do not occur again until 2087 and 2088 (in the same GCM). In 2096, 2097, and 2098, two additional GCMs also show shortages occurring. Overall, out of the eight different GCMs in the RCP 4.5 scenario, there were only 10 years out of 640 simulation years (8 GCMs x 80-year simulations) that showed a shortage (1.5%), with the first shortage occurring 63 years in the future.

The RCP 4.5 scenario results indicate that hydrology in the Truckee River Basin will be more volatile than the historical period. In addition, the RCP 4.5 simulation exhibits more severe and frequent drought periods throughout the 80-year run. The ensemble of eight GCMs under the RCP 4.5 scenario provides a wide range of variability in terms of the number, the timing, and the



FIGURE 3-7: LAKE TAHOE ELEVATION (TOP CHART) AND TMWA PROJECTED ANNUAL SOURCES OF SUPPLY (BOTTOM CHART) THROUGH 2098 UNDER RCP 4.5

⁶ Figure 3-7 represents the worst year out of each of the eight GCMs for the RCP 4.5 scenario.

severity of droughts that could be expected through the end of the century.

VERY HIGH EMISSIONS SCENARIO

Under the worst scenario, RCP (RCP 8.5), carbon emissions would continue to increase through the end of the century. As shown in Figure 3-8⁷, results indicate that TMWA would not have a shortage in supply until the year 2069 (in one GCM) at a demand level of approximately 113,000 AF (36% higher than the current demand level of 82,000 AF). The same GCM shows a shortage in year 2070 as well. Then, as emissions levels continue to increase and extreme changes in the climate persist year after year, water supply shortages are shown to begin occurring again in 2085. Under this most extreme emissions scenario, model results show shortages occurring over the last 14 years of the run from 2085 through 2098 as Lake Tahoe goes below its natural rim. Overall, out of the eight different GCMs in the RCP 8.5 scenario, there were 25 years out of 640 simulation years that showed a shortage (3.9%), and the first one did not occur until 49 years in the future.

The volatility in the hydrology is greatest for the RCP 8.5 scenario. In the RCP 8.5 scenario, the duration of droughts is noticeably longer, and the droughts are clearly more extreme. The top chart in Figure 3-8 shows that Lake Tahoe goes below its natural rim for the last 16 years of the model run and never recovers.



FIGURE 3-8: LAKE TAHOE ELEVATION (TOP CHART) AND TMWA PROJECTED ANNUAL SOURCES OF SUPPLY (BOTTOM CHART) THROUGH 2098 UNDER RCP 8.5

⁷ Figure 3-8 represents the worst year out of each of the eight GCMs for the RCP 8.5 scenario.
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SUMMARY

Throughout the rest of the century, regional temperatures are expected to warm well beyond 3°F, which has already occurred since the 1920s. Warming will cause snowmelt to arrive earlier, and evapotranspiration rates will increase. There is large uncertainty about how the magnitude of precipitation will change, but more variability is expected. Global climate and hydrologic modeling suggest that precipitation rates may increase or decrease from historical levels, and the Truckee River may shift from a historically snowmelt-driven system to more of a rainfalldriven system.

TMWA utilized state-of-the-art global climate, hydrologic, and planning models to test the reliability of TMWA's water supply for the next 80 years. The operational model was tested under a demand projection that is higher than anticipated, which estimates 140,000 AF of demand at the end of the century (2098).

Modeling results indicate that TMWA's system is highly resilient, well into the future. The ensemble historical simulations, which emulate extreme drought conditions over the next 80 years, did not show any shortages for the entire simulation period. The warming climate scenarios (eight GCMs for RCP 4.5 and 8.5) did not show any shortages until 2069 (almost 50 years in the future), even with more volatile hydrologic conditions compared to historical conditions.

TMWA has been through periods of extensive drought historically and has used drought storage to meet customer demand in the past. With TROA in place (effective 2015), TMWA's ability to meet customer demand through an intense, prolonged drought has been significantly enhanced. Modeling shows that storage of drought reserves adds significant resiliency, so TMWA can reliably create a water supply for its customers under almost all GCMs.

Even though both the moderate and very high emissions scenarios show more high flow years and fewer low flow years, drought frequency increases in both emissions scenarios by about 10% over the historical frequency. These results suggest that more water flows down the Truckee River, but the water is less efficient for Floriston Rate users (including TMWA) because more precipitation is occurring outside of the historical snowpack building season. Despite projected declines in snowfall and changes in hydrologic patterns, these model results show TMWA's future water supply to be reliable and resilient in the face of future climate change.

There are many factors that could change in terms of supply and demand that may not be accurately captured in a model projecting future hydrologic conditions (available runoff and upstream reservoir storage) 80 years into the future. These two RCPs, each using eight different GCMs representing a wide range of potential future outcomes in the Truckee River Basin, offer a glimpse of potential extremes in the climate of the future. Even under the most extreme scenario (RCP 8.5), shortages are not predicted for at least 50 years into the future and for only one GCM. It is also important to note that, for modeling purposes, very conservative assumptions were made in terms of TMWA's future groundwater pumping capabilities, water treatment plant diversion capacities, infrastructure and system intertie improvements, surface water right acquisitions, interbasin transfers, and development of new water supply projects in the future. TMWA will continue to monitor the most current climate change research and will make water resource management decisions to ensure the sustainability of the region's drinking water for future generations.

ADAPTIVE MANAGEMENT

TMWA uses a wide range of strategies to manage its water resources to address droughts and weather variability, as described in Ch. 2. However, one of the most significant adaptations that would improve the future water supply outlook for the Truckee River Basin is the reoperation of the federally owned flood control reservoirs in the region, including Prosser, Stampede, and Boca Reservoirs. With the implementation of TROA, TMWA can store credit water in Prosser, Stampede, and Boca Reservoirs. These reservoirs are currently



BOCA RESERVOIR DURING DROUGHT SITUATIONS

operated for wintertime flood control based on the 1985 US Army Corps of Engineers' (USACE) Water Control Manual (WCM), which requires minimum specific flood space requirements in each reservoir and prohibits the capture of springtime runoff prior to April. Stakeholders throughout the Truckee River Basin recognize that the system can be better operated for both flood control and water supply. Several studies have provided findings that support the importance of modifying the flood control rule curves that govern the operations of these reservoirs to adapt to future climate change.

The Truckee Basin Study, completed in 2015, found that, without extending the time during which the flood control reservoirs can store their inflows under the drier climate change hydrology scenarios, up to 50,000 AF of the inflow is unable to be stored each year.

One of the publications produced as a result of the Water for the Seasons project explored re-operating the Truckee flood control reservoirs to mitigate impacts due to climate change, specifically earlier runoff timing. The hydrology used for this study came from a hydrology model simulating historical precipitation and historical temperatures, with a uniform increase of 4.3°C. The amount of precipitation was the same as it had been historically, such that impacts attributable to changed

precipitation were not introduced. Any impacts realized were due exclusively to the altered timing of the runoff due to warming. This analysis focused primarily on Prosser Creek Reservoir to illustrate the growing inefficiencies of storing water under the current WCM flood control criteria under climate change. It was found that whereas Prosser historically fills on average 22,500 AF (76% of capacity) each year, under the warming scenario it only fills to 13,800 AF (46% of capacity) each year. The unstored water flows downstream and is unavailable for release later in the year to help achieve environmental flow targets for endangered fish. Further, the study found that with the ability to start filling one month earlier under continued warming conditions, the average annual storage could be increased to 19,200 AF (64% of capacity) and two months earlier to 22,500 AF (76% of capacity). Prosser is indicative of similar effects on the other flood control reservoirs that store water for other types of demand, such as municipal and industrial uses.

Based on these findings, TMWA and other partners applied for and received a grant through the Bureau of Reclamation in September 2019 to provide the necessary hydrologic modeling and develop new guidelines required to revise the USACE's WCM, allowing more flexibility in the winter based on forecast-informed reservoir operations. These changes will be instrumental

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in helping the region adapt to the effects of climate change, such as projections for earlier runoff and more precipitation falling as rain instead of snow. The project proposes to provide additional studies and modeling needed to support necessary revisions to the WCM. New flood control rule curves, adjustments to storage space, and adjustments to downstream flow thresholds for the Truckee River at the Reno gage will be developed based on the historical hydrology and projected hydrology under climate change scenarios. The project is expected to be completed by March 2023.

DEVELOPMENT AND GROWTH IN THE REGION

The Truckee Meadows has been experiencing renewed population growth and increased development since recovering from the economic recession. Economic and population growth has been positive since the completion of TMWA's 2035 WRP in 2016. However, the annual growth rates have not been as fast as those experienced before the start of the Great Recession in 2007.⁸ TMWA estimates future population growth and water demand annually to ensure there are sufficient water resources to meet the increasing demand.

During the WRP public outreach process, concerns were expressed about the adequacy of water sources for new growth. Although acceptable water rights are required for new developments to be approved, Reno, Sparks, and Washoe County determine the amount and type of growth within each of their respective jurisdictions. TMWA enters the process to ensure appropriate and sustainable water rights are dedicated and costs for new water supply, treatment, and delivery infrastructure are covered by developers.

TMWA holds all water rights dedicated to serving existing businesses or residences in its service territory. For any new development, water rights must be dedicated to TMWA or the developer must purchase a will-serve

ARE PROTECTIONS IN PLACE TO ENSURE THAT GROWTH WON'T EXCEED WATER SUPPLY?

Yes, the following measures are in place:

- Set by court decree in 1944, new water rights from the Truckee River cannot be created.
 Existing rights can be bought and sold and are converted from agricultural to municipal use.
- 2. New development is served only if enough water rights are dedicated to meet the estimated water demand of the project. Dedicated rights are controlled by TMWA to divert, treat, and distribute water to new projects.
- 3. Water rights from outside sources can also be dedicated to TMWA. An example is groundwater from the Fish Springs Importation Project, which will serve future growth projected in the North Valleys.
- For every AF of surface water rights needed for new development, an additional 11% of water rights must be dedicated to TMWA for drought storage.

commitment from TMWA's inventory of uncommitted water rights. In most cases in which a developer purchases and dedicates water rights, those rights are decreed agricultural rights that have been converted to municipal use. The amount of Truckee River water available for use was determined by a 1944 court decree and has not changed. Any water rights that are not used in any given year because of water conservation are not rededicated for growth. The water is retained in upstream reservoirs as drought storage or flows downstream to other Truckee River water rights holders. See Ch. 2 for additional information about TMWA's water rights.

⁸ RCG Economics. 2015. Northern Nevada Regional Growth Study 2015-2019. Volume I: A Forecast of Northern Nevada's Employment, Population, Households, and Associated Tax Revenues.



FIGURE 3-9: WASHOE COUNTY POPULATION VERSUS TMWA ANNUAL WATER PRODUCTION

Water demand does not necessarily increase due to population growth. Due to increased efficiency and ongoing water conservation measures, TMWA's water demand has decreased over the last 20 years, even with a growing population in Washoe County (Figure 3-9). TMWA has added more than 36,000 service connections since 2003. The decrease is due largely to TMWA's metering of most services within the system, a tiered rate structure that incentivizes efficient water use, a conservation program that helps customers detect leaks and correct inefficient water use practices, and the transition to a three day/week outdoor watering. Additionally, water use has decreased as older appliances and fixtures are replaced with newer models that are required to be more water efficient. TMWA's public outreach regarding the need for water conservation during droughts also decreases water use because customers adapt and use less water.

WASHOE COUNTY QUESTION #3

In a county-wide general election on November 4, 2008, voters approved Washoe County Ballot Question #3 (WC-3). WC-3 required the Truckee Meadows Regional Plan be amended to reflect and include a policy or policies requiring that local government land use plans be based upon and in balance with identified and sustainable resources available within Washoe County. In January 2010, the Regional Planning Governing Board (RPGB) adopted amendments to the Regional Plan in response to WC-3. These amendments require the Northern Nevada Water Planning Commission (NNWPC) and Western Regional Water Commission (WRWC) to compare the draft WCF population to the population that can be supported by the estimated sustainable water resources identified in the Comprehensive Regional Water Management Plan (RWMP). The comparison consists of four parts: the 20-year population projection for Washoe County provided in the draft Consensus Forecast, the sustainable water resources estimate in the adopted RWMP, a 20-year water demand projection based on the Consensus Forecast provided by TMWA, and a comparison

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of the water demand projection with the sustainable water resources estimate set forth in the RWMP.

If the NNWPC and WRWC find that the Consensus Forecast population can be supported by the sustainable water resources in the RWMP, the WRWC submits the draft population forecast to Reno, Sparks, Washoe County, and TMRPA, with the finding that the forecasted population can be supported.

The 2018–2038 Consensus Forecast projects the total population in Washoe County in 2038 will be 558,746. The 2016 RWMP provides an estimate of potentially available, sustainable water resources of approximately 190,500 AFA (and 143,800 AFA without additional water importation). The estimated water demand to serve the projected 2038 population is 111,875 AF. This forecast differs from TMWA's forecast because it is a projection for all of Washoe County, whereas TMWA's forecast only covers its service area. The projected 2038 population is significantly less than the population that can be supported by the sustainable water resources identified in the RWMP. For more information, see the WRWC Comprehensive Regional Water Management Plan. NEED LINK

WATER SYSTEM RESILIENCY

In addition to climate conditions, there are events beyond TWMA's control that could affect the reliability of its supply, such as chemical spills, earthquakes, or wildfires. While there is a risk to source water during these events, TMWA has enough well capacity and distribution storage to meet reduced customer demand during a water quality emergency; additional actions are available to TMWA in the event of extended off-river emergencies. An earthquake in 2008 tested TMWA's emergency response plan with a loss in water supply and demonstrated TMWA's ability to respond by providing trained staff and alternative water supplies. For more details on TMWA's management strategies during natural disasters, see Ch. 4.

The water quality of the Truckee River is normally

excellent. Surface water is of exceptional quality because flows originate from Sierra Nevada snowpack runoff. Turbidity—the concentration of particulate matter in water—levels are generally very low. However, water in the Truckee River can have higher turbidity at times due to storm runoff and/or algae growth associated with low flows and warm temperatures in summer. To ensure safe, reliable water is always provided to its customers, TMWA utilizes a water quality assurance program comprised of the following components:

- Source Water Protection: TMWA has an integrated and coordinated source water protection program designed to protect or improve the quality of TMWA's surface water and groundwater supplies. TMWA, in conjunction with NDEP, is completing an Integrated Source Water Protection Plan for Washoe County that provides management strategies to protect groundwater and surface water. Further information is provided in Ch. 6.
- Potable Water Treatment: TMWA's modern treatment facilities for its raw surface water and groundwater supplies complies with all federal and state drinking water regulations. Also, TMWA uses a highly skilled staff of scientists, engineers, and operators who continually monitor water quality in the distribution system. Additional information is available at https://tmwa.com/your-water/waterquality-facts/.
- Cross Connection Control: TMWA has an extensive backflow prevention and cross-connection control program. The purpose of the program is to prevent backflow of pollutants or contaminants from customer plumbing systems into TMWA's distribution system.

SUMMARY

Climate change and drought are the most significant variables with the potential to change the quantity of the water supply. Studies indicate that climate change will likely alter the timing and type of precipitation, but

to what extent is still uncertain. By stress-testing the system under various climate change scenarios, TMWA can plan for future variability in supply and demand. Drought periods have established historical patterns in the Truckee River Basin, with the most severe drought on record lasting eight years. TMWA plans for drought periods with a combination of natural river flows, release of POSW and credit water, groundwater pumping, and extraction of banked groundwater stored through aquifer storage recovery (ASR). Addressing climate change will require similar strategies; however, the region is extremely fortunate to have TROA, which provides for additional municipal storage under drought conditions and increased operational flexibility. With TROA and TMWA's conjunctive use of its diverse water resources portfolio, TMWA is confident in its ability to meet the region's growing water demand well into the future.

CONSERVATION STRATEGIES

Truckee River

CHAPTER OVERVIEW

Northern Nevada goes through cyclic patterns of wet periods and droughts. To help mitigate unpredictability, conservation strategies to build resiliency in TMWA's water supply. While customers are asked to use water efficiently in and around their homes and businesses, TMWA also works on reducing water loss in its delivery system. This chapter reviews TMWA's conservation programs and tactics, addressing how conservation efforts ramp up when drought conditions escalate. The outcomes of conservation efforts are demonstrated in the pages that follow.

CHAPTER AT-A-GLANCE

Highlights of Chapter 4 include:

- 1. How TMWA prevents water loss
- 2. Customer conservation programs and outreach
- 3. Demand management during drought situations
- 4. The effectiveness of conservation efforts

As described in the previous chapters, TMWA has a diverse water portfolio and utilizes conjunctive use of its water resources to address variability in climate and hydrologic conditions. Water conservation is also an essential component of TMWA's water management strategy. Conservation allows TMWA to effectively supply water to the Truckee Meadows, even during prolonged periods of drought. This chapter describes these conservation strategies, which are designed to ensure efficient use of water in the region under a range of conditions.

DROUGHT CONTINGENCY PLAN

Conservation is a major component of TMWA's resiliency strategy. TMWA's Drought Contingency Plan addresses the TROA and state law requirements and allows for proactive conservation strategies that promote both drought resiliency and water resource sustainability.¹ To help customers exercise responsible water use, TMWA employs a suite of demand-management programs tailored around seasonal watering habits in the Truckee Meadows. Whereas the 2040 WRP outlines TMWA's conservation initiatives, its Drought Contingency Plan, which is a separate plan, includes a detailed description and analysis of the strategies used for TMWA's conservation program. www.tmwa.com/dcp



TRUCKEE RIVER—FALL 2014 (TOP) AND WINTER 2017 (BOTTOM)

ONGOING CONSERVATION INITIATIVES

A healthy annual snowpack is vitally important to fill upstream reservoirs and naturally recharge aquifers in the Truckee Meadows. Lake Tahoe is the largest reservoir in the system. Three or more years of consecutive

¹ Per TROA Section 12.A 2(e), TMWA must maintain a conservation plan that ensures water savings equal to, or better than, a plan that requires 10% or more water savings during a drought year.

below-average snowpack in the Truckee River Basin can significantly diminish upstream reservoir storage used to provide Floriston Rates (the TROA required flowrate in cubic feet per second in the Truckee River near the Nevada–California border).

The last four exceptionally dry years in a row (2012–2015) reduced the level of Lake Tahoe to below its natural rim in 2015. During that summer and fall, with no water flowing from Lake Tahoe into the Truckee River, TMWA needed to release its upstream drought reserves to meet customer demand. This event highlights the fact that TMWA's water supplies are typically not impacted until the third year of a drought. It also illustrates the need to effectively manage water resources before a drought occurs. Moreover, since climate variability cannot be predicted from year-to-year, and the region is predominantly a high desert, TMWA promotes ongoing conservation measures to help ensure water is used efficiently by all customers. During droughts, any water conserved by TMWA's customers generally can be stored in upstream reservoirs to be used to meet customer demand later. Water conserved by residential customers is not used to support growth.

MANAGING WATER LOSS

A key component of mitigating drought is managing water loss within the delivery system. To efficiently capture and measure the water it delivers to customers, TMWA tracks water loss within its system by conducting a water balance study annually. This information helps ensure TMWA has reliable water resources during drought, minimizing the need to ask customers to reduce their use.

Capital Improvement Plan Projects

TMWA's Capital Improvement Plan (CIP), updated annually, identifies projects that are essential to reducing water loss within the delivery system over the next five years. Through a well-funded program that maintains and expands its existing water system, the CIP further bolsters TMWA's ability to store water.²

MANAGING WATER DEMAND

Promotion of smart water use in drought and nondrought years is important because efficient use of water within the Truckee Meadows extends this vital resource. TMWA focuses on outdoor watering, typically occurring

HOW TMWA MANAGES WATER LOSS

Much of the drinking water infrastructure nationwide is nearing the end of its life. Fortunately, TMWA's delivery system is generally newer than other parts of the United States. TMWA allocates millions of dollars annually into replacing water mains and conducting service repairs and meter change-outs. This ensures water is delivered and measured reliably. Between 2016 and 2018, TMWA replaced 157 water mains, repaired over 1,600 service laterals, and changed out almost 20,000 pieces of metering equipment. Its proactive efforts have resulted in an average of 6–8% water loss per year, which is significantly below the national average.

When planning large water-main rehabilitation jobs, TMWA will often coordinate the project with others (e.g. city street reconstructions, utility projects, etc.) to reduce overall costs and provide the least amount of disruption to customers.



² For more information on the most current CIP, visit http://tmwa.com/about_us/financial_information/





from April through mid-October. During this time, customer demand can be three-to four times higher than wintertime use. Therefore, TMWA conservation efforts are seasonally relevant and targeted to address customers' usage patterns. TMWA's outdoor watering programs also reduce peak-day demand on the system, helping minimize the need for infrastructure expansion. This continual demand management has aided in the general decline in per-capita water consumption within the Truckee Meadows. Proven effective over the years, conservation has resulted in residential per-capita water usage declines of 30% over the last 15 years (Figure 4-1). The following section outlines TMWA's ongoing conservation programs.

Water Conservation Education and Outreach Program

TMWA has numerous educational initiatives designed to help customers learn the benefits of water conservation while providing tools, tips, and techniques to foster smart water use.

These educational initiatives include:

- A free workshop and tour series
- A native landscape planting guide designed specifically for the Truckee Meadows region (available in print or online at tmwa.com/landscape)

- A formal, one-week lesson plan on water conservation, targeting fifth grade students
- Partnerships with other organizations that provide water resource, water quality, and watershed protection activities to students
- Participation in public presentations and events (e.g., speaking engagements, Earth Day festivals, and other community activities)
- Xeriscape, tree care, and smart-watering-tips information provided at all events
- A TMWA YouTube channel containing how-to videos on fixing leaks and conducting water audits at home

TMWA's website provides online resources regarding the programs listed above.



FREE TREE CARE WORKSHOP AT TMWA

LANDSCAPING IN THE TRUCKEE MEADOWS

TMWA offers the only comprehensive landscaping guide to the trees, plants, and shrubs that thrive in the Truckee Meadows region. The guide, which is offered electronically, in print, and in a searchable online format, is tailored to help customers create waterefficient landscaping



that makes sense in the Truckee Meadows region. Users can select vegetation based on a variety of attributes including color, light requirements, wildlife attraction, drought tolerance, and fire resistance. The goal of the guide is to take the guesswork out of creating a beautiful, vibrant, and water-efficient yard that is compatible with our high-desert climate. Visit tmwa.com/landscape for more details.

Year-round outreach strives to promote useful and seasonally relevant information and programs to all customers. These communication channels include:

- Direct communication to customers via bill inserts and e-newsletters
- TV, radio, newspaper, and local magazine advertisements
- Social media engagement including Facebook, Twitter, and Instagram

Water-Efficiency Codes

TMWA's Rule 2 provides water-efficiency codes to which customers must adhere.³ These codes have been effective at managing customer demand over time. As a condition of service, customers must not engage in any act which results in excessive use of water (i.e., no waste). The rule requires that customers follow an assigned, three-day-aweek irrigation schedule for lawns. Assigned-day watering helps prevent overwatering and reduces peak-day demand. Customers with even addresses may water Tuesday, Thursday, and Saturday and those with odd addresses may water Wednesday, Friday, and Sunday. No watering is allowed on Mondays to allow the system to adequately recover. Additionally, lawn irrigation is not permitted between 12 p.m. and 6 p.m. from Memorial Day through Labor Day. Drip systems and hand watering are allowed anytime, as long as no waste occurs. Variances to water anytime will be granted annually for newly seeded lawns or newly laid sod, lawns in public parks, playgrounds, athletic fields, common areas, and parkways (if done in an efficient manner).

Water Watcher Program

To monitor the water-efficiency codes outlined in Rule 2, TMWA hires additional staff during the outdoor watering season. These water conservation consultants drive around the TMWA service territory and are trained to assist customers in following TMWA's water use rules. They also respond to water waste reports submitted by the public and provide customers with information about TMWA's water-efficiency codes and identify any observed leaks or sources of water waste. The rule also contains penalty charges for individuals who repeatedly violate TMWA's water-efficiency codes (from \$25 up to \$75). TMWA also distributes water-saving devices such as low-flow

³ For more information, please refer to https://tmwa.com/wpcontent/uploads/docs/Customer_Services/rules/Rule02_20120119.pdf.



WATER WATCHER IDENTIFYING WATER WASTE

showerheads, automatic hose nozzles, and hose timers upon request.

Water Pricing Structure

TMWA has an inverted, tiered-rate billing structure in which customers are charged increasing rates based on the amount of water they use. This billing structure provides a "price signal" to customers whose usage crosses into a higher tier, thereby encouraging efficient use of water. In 2015, TMWA's Board approved the conversion of all flat-rate customers to a metered rate (applicable if a meter existed at the service location). Since that time, nearly all services have been metered and are being billed at the metered rate.

Water Usage Review Program

The Water Usage Review (WUR) includes reviews of services to determine water usage behavior and help customers determine the sources that contribute to high consumption levels. When a WUR is requested, TMWA staff visit customer premises to check meter accuracy and detect potential leaks in the customer's system. If a leak is detected, staff help customers identify its location and provide information on fixing the leak. When completed, staff provide an overview of leaks detected and review customer watering habits that may be leading to high consumption. Finally, staff make recommendations on how to reduce water use and teach customers how to monitor for future leaks. On average, TMWA provides over 2,000 WURs annually and has conducted over 28,000 WURs since 2003.

Landscape Retrofit Fund

The Landscape Retrofit Fund provides financial support for approved educational projects that improve water efficiency. The fund supports landscape-augmentation projects that focus on public agency grass removal and replacement with artificial turf or xeriscape to reduce water requirements. The fund also supports educational programs designed to inform customers about droughttolerant landscaping (e.g., xeriscape) and conservation practices. Prior projects supported under this program include replacement of traditional turf grass with droughttolerant vegetation and native vegetation, free arborist consultants, and educational classes and workshops targeted toward smart landscaping, such as TMWA's free workshop series and the WaterSense-approved Qualified Water Efficient Landscaper certification class.

DROUGHT RESPONSE

Under average Truckee River flow conditions, Floriston Rates are maintained through October. When Floriston Rates are sufficient, TMWA's surface and groundwater supplies can be used to meet customer demand without using stored water or drought reserves. When a drought situation occurs and Floriston Rates cannot be met, TMWA must rely more heavily on groundwater, and conservation efforts increase as needed. In instances where conditions are severe enough that drought reserves must be released, TMWA may implement additional conservation measures to minimize the use of drought reserves, including temporary, voluntary reductions. This approach was effective during the recent drought of 2012-2015. During the 2015 drought, TMWA was able to temporarily reduce customer usage by 9-16%, on average. Enhanced conservation efforts heighten awareness regarding drought conditions and highlight the importance of responsible water use.

TMWA DROUGHT LEVEL DESIGNATION

As described in Section 2.1, TROA defines a drought situation based on Lake Tahoe's elevation and on the loss of Floriston Rates. When a drought situation exists under

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FIGURE 4-2: TMWA DROUGHT SEVERITY LEVEL FLOWCHART

TROA, TMWA has four categories for drought severity, which are based on when TMWA's upstream drought storage is projected as necessary to meet anticipated customer demand later in the year. If the release of upstream storage projected need is in June, July, and August, drought severity is designated as level 4, 3, or 2, with 4 the most severe. If upstream storage is not expected to be needed until after Labor Day, TMWA's drought severity is a level 1. When the drought severity is a level 4, 3, or 2, TMWA implements enhanced conservation. When the drought severity is a level 1, enhanced conservation is not required, and standard conservation practices are used. Figure 4-2 provides a flowchart of the triggers required for each of TMWA's drought severity levels.

DEMAND MANAGEMENT DURING DROUGHT SITUATIONS

TMWA orients conservation initiatives to better manage demand over the course of a drought situation, with the goal of minimizing the use of upstream drought reserves. The level of response depends on the total amount of drought reserves available and the amount required to meet the demand projected during the summer. To minimize the use of drought reserves, TMWA will enhance existing conservation initiatives when drought severity is at a level 4, 3, or 2. TMWA can also implement additional restrictions and temporary cutback requests, as necessary.

TMWA begins enhancing conservation efforts the month before drought reserves are needed to meet customer demand. Table 4-1 provides the timeline for enhanced conservation based on drought severity.

Enhanced conservation begins with TMWA ramping up its education and outreach efforts during the months when outdoor watering occurs (typically May through mid-October). TMWA increases media advertising to promote awareness of drought conditions and any additional watering restrictions needed. TMWA utilizes expanded media coverage to highlight its programs and online resources that help customers conserve water. Table tents asking that water only be served by request are provided to local restaurants. Mirror stickers encouraging customers to use water efficiently are placed in public restrooms. TMWA also sends letters to homeowners' associations (HOAs), requesting they not penalize residents who let their lawns turn brown during the drought.

TMWA also increases its water-efficiency requirement during drought severity levels 2–4. Time-of-day restrictions are expanded to prohibit watering between 11 a.m. and 7 p.m. from Memorial Day through Labor Day. Depending on the severity of the drought and how many years a drought has been in effect, TMWA can request that customers reduce their water consumption by a targeted amount during the months when reserves are needed. The cutback amount depends on the quantity of drought reserves TMWA has accumulated and the projected level of demand during peak-use months (see Table 4-2).

DEMAND MANAGEMENT AND EMERGENCY SUPPLY CONDITIONS

Natural disasters and other unforeseen events can interrupt TMWA's available water supplies; these include floods, earthquakes, equipment failure, or distribution leaks. Sometimes the events are localized within the distribution system and sometimes the whole community can be affected. During such events, TMWA's goal is to minimize customer disruptions. During states of

	Outdoor Watering Months					
Level of Severity	Мау	June	July	August	September	October
	Drought reser	ves are not nee	ded before Lab	or Day.		
Level 1	Standard Cons	Standard Conservation				
	Drought reserves are needed before Labor Day.					
	Drought Reserves Needed					
Level 2	Standard Conservation		Enhanced Conservation		Standard Conservation	
	Drought Reserves Needed					
Level 3	Standard Conservation	Enhanced Conservation			Standard Conservation	
Level 4	Drought Reserves Needed					
	Enhanced Con	servation				Standard Conservation

TABLE 4-1: DROUGHT SEVERITY LEVEL RESPONSE TIMELINE CHART

TABLE 4-2: CONSERVATION ACTIONS AND DROUGHT SITUATION SEVERIT

	DROUGHT SITUATION LEVEL OF SEVERITY		
CONSERVATION INITIATIVE	LEVEL 1	LEVEL 2 - 4	
Communication and Outreach Campaign	Standard campaign	Enhanced campaign	
Water Efficiency Codes	Time-of-day watering: 12 a.m. to 6 p.m.	Time-of-day watering: 11 a.m. to 7 p.m.	
Water Watcher Programs	Standard staffing level	Increase staffing level	
Water Usage Review Program	Standard staffing level	Standard staffing level	
Landscape Retrofit Fund	Standard funding level	Standard funding level	
Temporary Cutback*	No cutback request	Temporary cutbacks may be requested	
Water Pricing Structure**	Standard pricing structure	Drought rates or increased fines may be implemented	

* The exact amount of curtailment requested is determined based on projected demand levels, drought storage availability, and estimated surface and groundwater available.

** While historically this measure has never been used in the Truckee Meadows, increasing the price of water during a drought has been an effective measure used by other water purveyors.

emergency, the community may be required to comply with increased conservation measures such as mandatory temporary cutbacks or severe watering restrictions (e.g., no outside watering or once per week during summer months). Additionally, commercial properties may be asked to reduce laundry, use paper plates in restaurants, and to not use potable water for non-potable purposes.

Increased conservation by TMWA customers during emergencies is just one element of the successful management of emergency water supply interruptions. TMWA's personnel train for and practice responding to various emergency situations. This has shown success during past emergencies in which water supply interruptions have been mitigated as swiftly and efficiently as possible. For example, the April 2008 earthquake in Mogul destroyed the Highland Flume, thereby preventing gravity-fed delivery of water to the Chalk Bluff Water Treatment Plant (WTP). TMWA mitigated the incident by 1) turning on its Orr Ditch Pump Station and installing temporary pumps to feed Chalk Bluff, 2) turning on its Glendale WTP, 3) turning on its wells as needed for demand, and 4) installing temporary piping around the Highland Flume failure to deliver more water to Chalk Bluff. These actions avoided any water supply interruptions for TMWA customers.

SUMMARY

Conjunctive use allows TMWA to efficiently store drought reserves and recharge underground aquifers for potential use during dry periods. In addition, its robust conservation plan includes actions to reduce water loss on the distribution side and demand management programs to keep customer usage down. Such initiatives include a well-funded CIP, an extensive education and outreach program, tier-based water rates structure, water efficiency codes and enforcement, and other programs tailored to reducing specific customers' usage. Demand management programs can be enhanced to respond to drought. Deployment of these programs is based on the severity of the drought, as defined within TMWA's drought severity index. The conservation strategies outlined in this chapter have proven effective over the past several decades. To enhance existing conservation programs, TMWA will be employing smart meter technology over the next three to five years to allow automated meter monitoring and advanced leak detection. TMWA will continue to research new and innovative ways to further help customers manage their water use in the future.

FUTURE WATER RESOURCES

CHAPTER OVERVIEW

ccounting for continued growth and climate impact on the water supply, all projections confirm TMWA will continue to meet the water needs of this community over the next 20 years and beyond. To further bolster TMWA's water supply resiliency, there are several small-volume water resources identified in this chapter that will be investigated within the 20-year timeframe of this plan. Additionally, technologies to purify reclaimed water to enhance water resource resiliency and sustainability are being explored. If proven feasible, the implementation of these projects will require an investment of time and funds over multiple years.

CHAPTER AT-A-GLANCE

Highlights of Chapter 5 include:

- 1. Overview of future groundwater development
- 2. Additional applications for reclaimed water
- 3. Feasibility studies for advanced purified water
- 4. Exploration of water banking projects
- 5. Potential water importation projects



TMWA has a diverse water resource portfolio that will sufficiently meet the projected needs of the Truckee Meadows over the 20-year planning horizon. Currently, and for the foreseeable future, TMWA will rely on the conversion of Truckee River water rights from agriculture to municipal use and Fish Springs groundwater to meet projected growth. The merger and integration of the Washoe County Department of Water Resources (WDWR) and South Truckee Meadows General Improvement District (STMGID) water systems brought additional groundwater and creek resources and facilities to TMWA. Future water resource projects and management strategies will be pursued and implemented as needed to further increase drought reserves and to continue to meet the region's water needs into the future.

The water resources and projects outlined in this chapter would provide relatively small quantities of water to the region but are important to expand the community's future water supply portfolio. The 2040 WRP is a high-level

TABLE 5-1: ESTIMATED YIELD OR CAPACITY OF FUTURE WATER RESOURCE PROJECTS

RESOURCE/PROJECT	RANGE OF YIELD OR CAPACITY
Additional Groundwater Capacity	
New Well Development*	2 MGD (every 5 years)
ASR Expansion**	9,000 AFA**
Sparks Groundwater Treatment Facility***	11.9 MGD
Spanish Springs Valley Nitrate Treatment Plant***	3-4 MGD
Longley Lane Groundwater Treatment Facility***	4-6 MGD
South Truckee Meadows Groundwater Treatment Facility***	4-6 MGD
Additional Fish Springs Ranch Water	5,000 AFA
Expansion of Water Conservation	Varies
Creek Water Resources	
Mt. Rose Water Treatment Plant	4 MGD
Marlette Lake Water System – Wholesale Service	Varies
Reclaimed Water	
Expanded Irrigation	Varies
Advanced Purified Water	2,000 AFA
Water Banking	Varies

*Additional GW capacity does not increase the total amount available for withdrawal annually.

**Targeting 9,000 acre-feet (AF) of recharge systemwide annually.

***New treatment system required to supply an existing resource.

planning document and is not intended to be used for specific project details (i.e., detailed costs estimates, facility layouts, precise yield values). More detailed information for specific projects will be developed in the future. Table 5-1 (see previous page) summarizes the estimated ranges for the yields and capacity for each project currently being considered. A description of each resource or project, including a summary of the benefits and implementation challenges, is presented in the next section.

ADDITIONAL GROUNDWATER CAPACITY

TMWA's production wells provide peaking capacity to ensure reliable service during the typical irrigation season and provide critical drought capacity in dry years. There are some opportunities within TMWA's current service area where new wells could be developed, and TMWA is constantly analyzing opportunities to expand its groundwater resources and maintain its existing resources. This section outlines projects TMWA could implement to maintain and expand groundwater capacity in its service area, including new wells, ASR expansion, and treatment facilities, so areas with groundwater quality issues can be better utilized.

NEW WELL DEVELOPMENT

Because of the merger with STMGID and WDWR in 2015 and the acquisition of West Reno Water Company in 2019, TMWA has expanded its groundwater well count to approximately 89 active production wells in nine hydrographic basins. TMWA plans to increase its groundwater pumping capacity from 63 million gallons per day (MGD) to 77 MGD over the next 20 years,



DRILLING A NEW PRODUCTION WELL

ABOUT ARSENIC AND OTHER CONSTITUENTS IN GROUNDWATER

The US Environmental Protection Agency (EPA) develops and sets regulatory standards that limit the amount of contaminants in public water supplies. The EPAs standards are enforced by the Nevada Division of Environmental Protection and Washoe County Health District. Some of TMWA's groundwater wells have naturally occurring constituents, such as arsenic, manganese, and iron. Many of these contaminants occur naturally in the geology of the region and erode from natural deposits. However, these constituents are below the maximum contaminant levels (MCL) set by the EPA, are treated to a level below the MCL, or are blended with other water to attain a level below the MCL. An MCL is the highest level of a contaminant that is allowed in drinking water. TMWA has never had a drinking water quality violation. For more information on TMWA's water quality, visit https://quality.tmwa.com/.

primarily to help meet peak summertime irrigation demand. It is highly likely that development of new groundwater sources will require new treatment facilities for naturally occurring constituents such as arsenic, iron, and manganese as TMWA expands its well network into areas with poorer water quality.

TMWA replaces existing wells when efficiency declines and/or a well's physical condition necessitates new well construction. When replaced, the new well is often drilled in proximity to, or on the same parcel as, the existing well. Recent replacement-well drilling includes Army Air (basin 92B), Thomas Creek (basin 89), and Spring Creek 5 (basin 85). In areas where there are no existing wells, exploratory drilling programs are implemented to characterize the groundwater capacity and quality. If the exploratory program results are favorable, the site may later be developed into a full-scale production well. To minimize the need to replace wells, TMWA uses an extensive well rehabilitation program, described in Ch. 2, to maintain and improve well efficiency and capacity.

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Provides added off-river water resources Increases drought supply and peaking capacity Is a resource that the public readily accepts 	 Lack of good locations to site new wells due to water quality constraints
Cost	 Costs to drill and equip new wells can be incorporated into TMWA's capital improvement budget when needed. 	 New wells are relatively expensive to drill and equip. Wells drilled in areas with low water quality may require expensive treatment systems.

TABLE 5-2. BENEFITS	AND CHALLENGES	OF NEW WELL	
TABLE J=Z: DEMERTIS	AND CHALLENGES	OF NEW WELL	DEVELOPMENT

AQUIFER STORAGE AND RECOVERY (ASR) EXPANSION

TMWA has been expanding its existing ASR program by equipping additional wells for recharge in the acquired WDWR and STMGID water systems. Over the last several years, wells in Spanish Springs, South Truckee Meadows, and Pleasant Valley have been retrofitted to increase ASR capacity. In Spanish Springs, Desert Springs Wells 1 and 2 have recently been equipped for ASR. In the South Truckee Meadows and Pleasant Valley, Arrowcreek 2, Tessa East Well, and STGMID 11 have also been retrofitted.

For planning purposes, TMWA is targeting a total annual recharge volume of 9,000 acre-feet annually (AFA). 4,000 AFA is planned within the Central Truckee Meadows and Spanish Springs Valley. The completion of the Mt. Rose Water Treatment Plant (WTP) will allow for approximately 3,000 AFA of recharge opportunities using treated Whites Creek water at production wells on the Mt. Rose Fan. In the North Valleys, a planned recharge volume of 2,000 AFA is being investigated.

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Provides opportunity to use available surface water in winter months when demand is low Aligns with TMWA's strategy of conjunctive use of water resources 	 Requires complex state permits and drilling of new monitoring well sites Only able to recharge a relatively small amount of water in comparison to demand
Cost	 Costs to equip existing wells for ASR can be incorporated into TMWA's capital improvement budget. 	 Costs may increase at certain locations due to potential treatment requirements.

TABLE 5-3: BENEFITS AND CHALLENGES OF ASR EXPANSION

SPARKS GROUNDWATER TREATMENT FACILITY

TMWA has four production wells and two additional potential well sites in Sparks that have not been used due to water quality issues, including elevated levels of arsenic, iron, and manganese. These wells are not currently equipped but will be needed in the future to provide additional peaking capacity to serve future growth and to enhance TMWA's ability to provide reliable service during drought or emergency conditions affecting the Truckee River. Water from these wells will be treated in the proposed Sparks Groundwater Treatment Facility (GWTF), located along East I Street and East Prater Way. The Sparks GWTF will be designed with magnesium dioxide pressure filters to remove arsenic, iron, and manganese to meet federal and state drinking water quality standards. As described in TMWA's 2015–2035 Water Facility Plan, the Sparks GWTF is scheduled to be built in two phases beginning around 2030. Phase 1 will produce up to 7.6 MGD, and Phase 2 will add another 4.3 MGD of treated water production capacity.

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Provides opportunities to use existing wells with arsenic, iron, and manganese water quality issues 	 Requires extensive phased construction of well buildings and treatment facility over several years
	Provides new off-river resource	
	 Increases drought supply and peaking capacity 	
Cost	• Time frame to build the water treatment plant is expected around 2030, based on TMWA's Water Facility Plan.	High cost

TABLE 5-4: BENEFITS AND CHALLENGES OF THE SPARKS GROUNDWATER TREATMENT FACILITY

SPANISH SPRINGS VALLEY NITRATE TREATMENT FACILITY

Due to the high density of septic systems, over-watering of turf and impacts from livestock in the Desert Springs area of Spanish Springs, some of TMWA's municipal wells are contaminated with nitrate. TMWA completed a one-year pilot study to assess the effectiveness of using two-stage, fixed-bed (FXB) biological treatment for the removal of nitrate from Desert Springs Well 3 groundwater. Biological treatment is not presently an approved technology in Nevada for nitrate removal. The pilot study demonstrated that the biological treatment system consistently reduced nitrate from groundwater. With additional chemical treatment, naturally occurring arsenic can also be removed from the groundwater. Based on the findings of the pilot study, a conceptual design was created for a full-scale treatment facility with a capacity of 3–4 MGD to treat water from Desert Springs Wells 1, 2, 3, and 4. TMWA is evaluating various options to ensure its continued ability to use the wells in Desert Springs to meet existing customer demand.

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Allows continued use of TMWA's wells by mitigating water quality issues due to nitrates Will help maintain existing groundwater capacity in Spanish Springs 	 Good location to site the nitrate treatment plant has not been identified. Requires the construction of a pipeline to the treatment plant site Requires permits for operating a new treatment facility
Cost	 A treatment facility may be used to help mitigate a regional water quality issue. 	Relatively high cost to existing customers

TABLE 5-5: BENEFITS AND CHALLENGES OF NITRATE TREATMENT

LONGLEY LANE GROUNDWATER TREATMENT FACILITY

With an existing capacity of approximately 4 MGD, the Longley Lane WTP was owned and operated by WDWR prior to the merger with TMWA. TMWA currently does not use this facility for water treatment; however, it is used as a booster pump station serving the Hidden Valley area. Hidden Valley wells 3 and 4 used to be treated at the Longley Lane WTP when it was operated by WDWR, but TMWA is investigating treating these wells individually on site. TMWA recently completed a preliminary design report defining the necessary improvements to allow these wells to be brought back online. These improvements consist of ultraviolet light (UV) treatment at Hidden Valley 4 for pathogen inactivation and blending with Hidden Valley Well 3 to reduce arsenic concentrations to acceptable levels.

In the future, TMWA plans to retrofit the Longley Lane treatment facility with magnesium dioxide pressure filters to remove iron and manganese from existing and future wells. The combined capacity of Hidden Valley Wells 3 and 4, plus the modified treatment facilities is expected to be approximately 4–6 MGD. These supply facilities are not currently being used but will be needed in the future to provide additional peaking capacity to serve growth and enhance TMWA's ability to provide reliable service during drought or emergency conditions affecting the Truckee River.

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OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Allows continued use of TMWA's wells by mitigating water quality issues Increases drought supply, reliability, and peaking capacity 	 Requires implementation of creative UV/blending treatment process for two wells Requires retrofitting existing treatment facility using media filtration rather than membranes
Cost	 Improves conjunctive use and operational flexibility and lowers operating costs Construction can be phased as needed. 	 Relatively high cost to existing customers

SOUTH TRUCKEE MEADOWS GROUNDWATER TREATMENT FACILITY

Double Diamond Wells 1, 3, and 5 were owned by WDWR prior to the merger with TMWA. Of the three wells, only Well 1 was equipped for operation due to naturally occurring arsenic in Wells 3 and 5. TMWA has since made improvements to Well 3, which is currently blended with treated surface water and operated during peak summertime demand. TMWA is also investigating the feasibility of blending at Well 5. In the future, when needed for peaking capacity, drought protection, and/or reliability, TMWA plans to replace Well 1 with a higher capacity well and route all three to an arsenic groundwater treatment facility. TMWA acquired a 10-acre site off Double R Blvd. during the merger with WDWR that is permitted for a treatment facility. The ultimate capacity is expected to be 4–6 MGD.

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Allows expanded use of TMWA's wells that have water quality issues 	 Requires construction of pipelines to the treatment plant site
	 Increases drought supply and peaking capacity 	 Requires permits for operating a new treatment facility
Cost	 Improves conjunctive use and operational flexibility 	Relatively high cost for construction
	• Construction can be phased as needed.	

TABLE 5-7: BENEFITS AND	CHALLENGES OF I	THE SOUTH TRUCKEE	MEADOWS WATER	IREALMENT FACILITY

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ADDITIONAL FISH SPRINGS RANCH WATER

TMWA's current use of water from the Fish Springs Ranch is discussed in Ch. 2. As Stead, Lemmon Valley, and Cold Springs continue to develop, Fish Springs Ranch water will be the primary supply for these areas. As of December 2019, TMWA has committed 227 AF of the 8,000 AFA of Fish Springs Ranch water to development. Currently, TMWA is permitted to use 8,000 AFA, but there is the potential to increase the water supply in the future by an additional 5,000 AFA. This would be subject to favorable water level and water quality monitoring and by securing all necessary permits. These additional water rights may be increasingly important, given that this water will be available to serve future development throughout the North Valleys and potentially to Spanish Springs.

As a condition of the existing water rights filed with the State Engineer, TMWA has a monitoring plan to track hydrogeological impacts on the southeast side of Honey Lake Valley. The annual monitoring report includes groundwater pumping, groundwater levels, groundwater chemistry, and surface water and spring flow measurements. To predict possible impacts of increased groundwater withdrawal, a groundwater flow model for Honey Lake Valley is maintained. This model will help TMWA analyze the possibility of future water quality concerns, such as the potential to draw in water high in total dissolved solids (TDS) from beneath the playa to the north. In addition to monitoring, multiple permitting approvals will be required prior to TMWA accessing the additional Fish Springs Ranch water.

OBJECTIVE	BENEFITS	CHALLENGES	
Implementation	 Expands utilization of existing infrastructure 	 Requires environmental permitting to use additional 5,000 AFA 	
	 Increases drought supply and peaking capacity, especially for the North Valleys 	 Need to prove ability to pump the additional 5,000 AFA from the basin without impacting water quantity and/ or water quality 	
Cost	• Limited infrastructure will need to be constructed.	• Operating cost is relatively high.	

TABLE 5-8: BENEFITS AND CHALLENGES OF ADDITIONAL FISH SPRINGS RANCH WATER

CREEK WATER RESOURCES

Creeks throughout the South Truckee Meadows represent a valuable resource that TMWA can use to increase off-river reliability of its water supply. TMWA will be diverting Whites Creek water to the Mt. Rose WTP (to be completed in 2020) to decrease reliance on groundwater in that area. Mt. Rose WTP will be used to provide treated water for ASR and will also allow for passive recharge of the aquifer by allowing production wells to rest when Whites Creek water is available to serve customers.

Whites Creek water can also be used through a creek exchange permit. Creek exchange allows TMWA to measure the quantity of Whites Creek water left instream and exchange that water for Truckee River water. In addition to Whites Creek, TMWA holds water rights on Thomas and Galena Creeks. TMWA is currently investigating the feasibility of using additional creek resources through creek exchange permits.



WHITES CREEK

TMWA // WATER RESOURCE PLAN

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OBJECTIVE	BENEFITS	CHALLENGES	
Implementation	 Provides new off-river resources State allows permits for creek exchange for Truckee River water Decreases reliance on groundwater in regions with declining water levels 	 Lacks infrastructure to use many creek resources currently Creek flows likely to be affected by changing climate and hydrologic conditions Not reliable during severe drought conditions 	
Cost	 Creek exchange is a low-cost option 	 New water treatment plants or other infrastructure needed to use creek resources directly are expensive 	

TABLE 5-9: BENEFITS AND CHALLENGES OF CREEK WATER RESOURCES

MARLETTE LAKE WATER SYSTEM—WHOLESALE SERVICE

In late 2018, the Nevada Department of Administration approached TMWA to determine TMWA's interest in purchasing wholesale water supplies from the Marlette Lake Water System, which includes Marlette Lake, Hobart Reservoir, and the so-called "East Slope" facilities. The water system currently provides water from Hobart Reservoir and its East Slope Facilities to Carson City and Virginia City. The water system includes water rights totaling approximately 11,500 AF, only a portion of which are currently used by the state for water service deliveries. Since late 2018, TMWA staff has conducted due diligence and held several discussions with the Nevada Department of Administration and staff from the State Engineer and Federal Water Master's offices. Based on TMWA's due diligence, purchasing available wholesale water from Marlette Lake Water System under a long-term contract could prove beneficial for TMWA customers and the greater Reno, Sparks, and Washoe County community. For instance, possible uses of the water include return flow augmentation for the Truckee Meadows Water Reclamation Facility (TMWRF) and drought storage augmentation.

TMWA, the Department of Administration, Carson City, and Virginia City have initiated discussions to conduct analyses and investigate necessary authorizations for the long-term use of a portion of the water available from Marlette Lake Water System. The goal is to develop the following:

- Provide agreeable terms and conditions for establishing a long-term operating agreement that maximizes the beneficial use of the state's available water resources from the Marlette Lake Water System among TMWA, Carson City, and Virginia City.
- 2) Provide an agreed-upon delivery schedule, special conditions of service, and pre-determined adjustments to the quantity of water available for sale each water year to address variable hydrologic conditions.
- 3) Provide predictable revenue sources to the state and reduce the per-acre-foot charge to each water user by fully allocating the available water resources.

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Provides new water resources Marlette Lake water could be delivered through the Truckee River Maximizes the beneficial use of the state's available water resources among TMWA, Carson City, and Virginia City 	 Requires development of a complex, cooperative agreement among numerous parties Flows may be impacted under changing climate and hydrologic conditions. Not reliable during severe drought conditions Involves water rights and permitting considerations
Cost	• Wholesale service to TMWA requires few infrastructure improvements.	 Unclear whether Marlette Lake Water System improvements required at this time

TABLE 5-10: BENEFITS AND CHALLENGES OF THE MARLETTE LAKE WATER SYSTEM WHOLESALE SERVICE

The water service agreement would also address future rate setting procedures, memorializing the Nevada Department of Wildlife's operating restrictions on Marlette Lake for the benefit of fisheries, water rights permitting requirements, and other general terms and conditions.

RECLAIMED WATER

Reclaimed water provides both local and regional benefits. Reclaimed water use provides a sound method of effluent management and beneficial use through irrigation and other uses. The main local benefit of reclaimed water is that it conserves potable water and provides a reliable, drought-resistant water source, even in times of restriction and conservation. Using reclaimed water provides a more predictable way to ensure compliance with discharge limitations when compared with river discharge but likewise competes with water needs for instream flows. Dedicated Truckee River water that does not return to TMWRF as wastewater, such as in the Stead and South Truckee Meadows areas, generally requires additional water rights to be dedicated to provide for that return flow depletion.

TMWRF currently supplies reclaimed water to numerous sites in Sparks, including Wildcreek Golf Course, Reed High School, Shadow Mountain Sports Complex, Golden Eagle Regional Park, and numerous other parks and streetscapes; and in Reno, this includes the University of Nevada, Reno (UNR) Farms property and Mira Loma Park. Reclaimed water is treated to very high standards that meet both the discharge limits to the Truckee River and the standards required for reclaimed water use.

The Reno-Stead Water Reclamation Facility (RSWRF) has an annual average flow of 1.85 MGD. During the winter and when reclaimed water flows are greater than the irrigation demand, excess reclaimed water is discharged into a natural drainage channel that flows to Swan Lake. This is the primary disposal site for RSWRF, which is permitted to discharge an average of 2.35 MGD (2,630 AFA), with 1.85 MGD being allocated to discharge to the lake after meeting reuse demand. Under present operation, the RSWRF reuses an average of 0.50 MGD, or about 27% of its total flow primarily for irrigation of the Sierra Sage Golf Course, the North Valleys Sports Complex, Mayors Park, and a truck fill station at the treatment plant. Starting in 2019, approximately 0.5 MGD was pumped (aka, "shaved") to TMWRF for treatment to reduce the discharge to Swan Lake due to high lake levels. In the future, when lake levels drop, this practice of flow shaving will likely transition to serve as capacity augmentation for RSWRF, until such time as treatment capacity at RSWRF is expanded and additional effluent management practices are implemented, making the flow shave unnecessary for normal operations.

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Reliable under changing climate and hydrologic conditions 	 TMWA does not have the ability to supply reclaimed water
	 Allows reuse of water for uses when potable water is not needed (e.g., irrigation) 	 Infrastructure to use reclaimed water is only in place in certain areas
	• TMWA has been actively involved in partnerships to expand reclaimed water use in the region.	 Water right return flow requirements must be satisfied
	Offsets wastewater flows to the Truckee River	
	 There is strong public acceptance of reclaimed water for non-potable uses 	
Cost	 Reclaimed water rates are typically less than potable water rates 	 Reclaimed water distribution systems are expensive

TABLE 5-11: BENEFITS AND CHALLENGES OF RECLAIMED WATER

South Truckee Meadows Water Reclamation Facility (STMWRF) is one of the few water reclamation facilities in the United States that operates a zero-discharge system with 100% reuse. STMWRF reclaimed water meets or exceeds the State of Nevada's Category A designation, which permits unrestricted use of reclaimed water. Reclaimed water is used for irrigating parks, schools, golf courses, commercial landscapes, and thoroughfare median landscapes. Specific reuse areas include the South Meadows Industrial Park, Double Diamond and Damonte Ranch residential areas, the Arrow Creek and Wolf Run Golf Courses, the South Valley Regional Park, and Manogue High School, among others.

Although TMWA does not supply reclaimed water, TMWA recognizes the value of using this resource to meet non-potable demand and collaborates with partner agencies to implement regional strategies for its use. As described in Ch. 2, TMWRF will be providing 4,000 AFA to TRIGID, primarily for cooling systems for large companies



SIGN IDENTIFYING RECLAIMED WATER USE AT MIRA LOMA PARK

in the industrial park. TMWA has been a key player in creating operational strategies for this large-scale reclaimed water project. There are future opportunities for TMWA and the region to innovatively use reclaimed water. TMWA strives to use all regional water resources as efficiently as possible. Therefore, TMWA will continue to collaborate with regional partners and pursue projects such as advanced purified water, water banking, and other reclaimed water opportunities, as described in the next several sections.

ADVANCED PURIFIED WATER (ONEWATER NEVADA)

In 2016, Nevada adopted new regulations to permit the use of "Category A+" reclaimed water, or advanced purified water, for groundwater augmentation. These new regulations have the potential to provide many benefits for the Truckee Meadows region. TMWA is a key partner in OneWater Nevada, a collaborative effort involving TMWA, University of Nevada Reno, Washoe County, City of Reno, City of Sparks, WRWC, NNWPC, and TMWRF.



ONEWATER NEVADA ADVANCED PURIFIED WATER TREATMENT DEMONSTRATION PROJECT

The goal of OneWater Nevada is to evaluate treatment technologies and determine if advanced purified water can offer long-range regional benefits and opportunities to the Truckee Meadows' water portfolio.¹ Although new to the Truckee

¹ For more detail on advanced purified water treatment in the Truckee Meadows, visit https://onewaternevada.com/.

BENEFITS OF ADVANCED PURIFIED WATER

SAFE, RELIABLE WATER SUPPLY

Advanced purified water uses proven technology that cleans water to a level that meets or exceeds state and federal drinking water standards.

SUSTAINABLE WATER SUPPLY OPTION

Advanced purified water could diversify the region's water supply portfolio. It provides a sustainable water supply option that is less energy intensive than alternative options.

DROUGHT-PROOF WATER SUPPLY

Having a safe, sustainable water supply ensures water is available even during periods of drought.

INDEPENDENT OF WEATHER VARIABILITY

Advanced purified water may enhance the region's water supply resiliency to help address future climate change uncertainties, such as longer growing seasons, changes to snowpack, and changes in the timing of runoff.

Meadows, advanced purified water has been used to replenish underground aquifers and surface water reservoirs throughout the United States for over 40 years.

OneWater Nevada is assessing the feasibility of multiple field-scale advanced water treatment demonstration projects. The feasibility study will occur over two to three years and consists of technical, social, environmental, and financial analyses; regulatory compliance; public engagement; advanced treatment pilot testing; geotechnical investigations; and field-scale treatment demonstration projects. UNR is leading the treatment technology demonstrations with multiple demonstration trailers that will be equipped with advanced water purification treatment technology including filtration, ozonation with biologically activated carbon, ultraviolet light and advanced oxidation process, and granular activated carbon. These treatment trailers, most recently located at RSWRF and previously at the STMWRF, will be operated as a technology demonstration project for 9–12 months. Following treatment, about 14 gallons per minute (GPM) of purified water will be injected in and recovered from a controlled, test-site aquifer to confirm that the water quality meets all requirements.

Augmenting groundwater or surface water supplies with advanced purified water is generally referred to as indirect potable reuse. This is a process whereby highly purified water is stored in an environmental buffer such as a lake or

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Maintains local control of the water resource Drought-proof and sustainable resource Nevada has adopted regulations that allow use of Category A+ water for groundwater augmentation Potential to offset development of other water resources that could benefit the environment Public outreach efforts are underway 	 Requires construction of advanced treatment facilities Large-scale advanced purified water projects are a long-term goal Requires extensive public outreach and education Public acceptance for using advanced purified water for potable uses is uncertain
Cost	• Potential to generate revenue from sale of will- serve commitments	 New advanced treatment facilities and other infrastructure required will be expensive

TABLE 5-12: BENEFITS AND CHALLENGES OF ADVANCED PURIFIED WATER

aquifer before eventually reentering the drinking water supply. Conceptually, an indirect potable reuse project might be well suited for areas such as the North Valleys or the South Truckee Meadows, because the water reclamation facilities for these areas do not return the treated water to the Truckee River. Purified water could be recharged using infiltration basins or injection wells in areas generally isolated from domestic wells and blended with ambient groundwater. Months or years later, the stored water would be recovered using TMWA's municipal wells, providing "banked water" for future use. TMWA is exploring potential areas where the hydrogeology may be favorable to create a water bank which, as described in the following sections.

WATER BANKING PROJECTS

BEDELL FLAT

As part of TMWA's overall conjunctive use management strategy, TMWA is working with the City of Reno, Washoe County, and the US Geological Survey (USGS) to evaluate the feasibility of an integrated ASR program in Bedell Flat. Bedell Flat is located about 13 miles north of Stead and was identified in a previous analysis performed by the City of Reno in 2007 as having potentially favorable geologic conditions for the storage of advanced purified water. See Figure 5-1 for the regional project location.

Bedell Flat is a relatively small (53 square miles), undeveloped hydrographic basin composed of federal lands administered by the Bureau of Land Management. Depths to water in the aquifer range from less than five feet in the northwest, where surface drainage exits the basin, to at least 180 feet near the middle of the basin.

Several ASR options have been under consideration within Bedell Flat. TMWA and its partners have completed hydrogeological investigations and environmental clearance and permitting work to gain an understanding of the feasibility, scope, and cost of a water banking program in Bedell Flat. Based on initial findings, the geology of the basin does not appear favorable for water banking. However, TMWA is continuing to investigate the feasibility of water banking projects in other basins.

AMERICAN FLAT

Similar to the Bedell Flat project, TMWA is actively working on an ASR feasibility study at the north end of West Lemmon Valley (basin 92A). See Figure 5-1 for regional project location. The purpose of the study is to



AMERICAN FLAT DRILLING

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OBJECTIVE	BENEFITS	CHALLENGES
Implementation	 Feasibility studies at multiple sites are currently ongoing Ability to store water underground for future use Diversifies the water supply and reduces reliance on Truckee River resources Potential to provide drought backup 	 Water banking projects are a long-term goal, in conjunction with groundwater augmentation and using advanced purified water Substantial feasibility testing and permitting
Cost	 Potential to generate revenue from the sale of future will-serve commitments 	 High cost due to advanced treatment and proximity to existing infrastructure

TABLE 5-13: BENEFITS AND CHALLENGES OF WATER BANKING PROJECTS

characterize aquifer storage potential through localized field testing, data acquisition, and groundwater modeling. Three wells were installed at the American Flat Road site. Related activities included geophysical surveying, well siting and drilling, small-scale pump/injection testing, and groundwater flow and transport modeling.

A 124-day injection test using potable water was performed to determine the ability of the aquifer to store water over long periods. Preliminary results of the study indicate the site may be favorable for storage, transmission, and recovery of water. Flow modeling results indicate that up to 2 MGD could be recharged for 25 to 50 years, but only if a nearly equivalent amount of water is pumped to ensure that undesirable shallow groundwater conditions do not develop.

TMWA will continue to collect information to determine if a full-scale ASR program can be implemented and sustained at the site. Should the site be deemed suitable for full-scale ASR program implementation, it will enhance TMWA's ability to safely store, recover, and distribute an additional water resource that could be utilized in the region.

OTHER CONCEPTUAL RESOURCES

The following project descriptions come from various water supply plans that are conceptual and have not been fully permitted or constructed. They are possible future water supply options, and TMWA will continue to monitor their viability. See Figure 5-1 for locations for conceptual projects.

IWS BASIN, LLC (FORMERLY INTERMOUNTAIN WATER SUPPLY, LTD.), DRY VALLEY, BEDELL FLAT, NEWCOMB LAKE VALLEY

This project seeks to import approximately 3,500 AFA of groundwater to Lemmon Valley from three relatively undeveloped hydrographic basins approximately 20–30 miles north of Reno. In 2018, the State Engineer canceled IWS's water right permits because it failed to show reasonable diligence in placing the water to beneficial use. As of this writing, the status of IWS Basin's water right permits is uncertain and subject to legal proceedings. IWS Basin has other pending applications to appropriate water in these basins; however, they are protested by other parties and have not been acted on by the State Engineer.

LOWER SMOKE CREEK

The Lower Smoke Creek project is located just north of Pyramid Lake in the Smoke Creek Desert groundwater basin. Much of the water in the basin is held by the Jaksick family through various entities, including Bright-Holland Co. and Jackrabbit Properties LLC. Jackrabbit and Bright Holland executed a water development agreement with LSC Development, which intends to develop a water importation project. The first phase of the water importation project is intended to capture the water in the southern portion of the basin and pipe the water to Winnemucca Ranch and other planned developments consistent with the relevant water resource plans. The second phase would extend the pipeline to transport water from the northern portion of the basin. The Smoke Creek



FIGURE 5-1: LOCATIONS OF POTENTIAL FUTURE WATER RESOURCES FOR THE TRUCKEE MEADOWS

Desert basin has a perennial yield, substantiated by the USGS, of 16,000 AFA and is currently being adjudicated. With existing monitoring information, including USGS gages in place since 1986, the abovementioned water rights will support approximately 10,500 to 14,000 AFA of municipal water, subject to State Engineer approvals and additional hydrogeological monitoring.

RED ROCK

The Red Rock Valley Importation Project holds 1,273 AFA of water rights in the Red Rock Valley groundwater basin for use in West and East Lemmon Valley. Through 2008 Red Rock's project sponsors progressed with design and planning, which led to filing an application for a Special Use Permit with Washoe County in December 2008. The Board of Adjustment denied the application at its March 4, 2009 meeting, and the Board of County Commissioners also denied an appeal in May 2009. The denial was ultimately upheld by the Nevada Supreme Court in 2011.

SIERRA VALLEY

Since the late 1800s, a diversion ditch has carried up to 60 cubic feet per second of water for agricultural use from the Little Truckee River above Stampede Reservoir out of the Truckee Basin to Sierra Valley, California, in the Feather River Basin. The Little Truckee River diversions are inversely proportional to the Sierra Valley natural runoff, meaning that the lower the available flows in the native Sierra Valley streams, the higher the diversions from the Little Truckee River. Thus, these rights have a higher drought yield than a normal year yield, but the ability to store these rights would be required.

SUMMARY

While the region has adequate water resources to meet future demand, TMWA is constantly analyzing options to further expand its water supply portfolio. TMWA is committed to researching innovative ways to increase water resource resiliency, especially to increase its drought-resistant and off-river resources. There are opportunities for TMWA to expand its groundwater resources and retrofit its existing infrastructure to increase its ability to pump groundwater when needed. Additionally, TMWA is furthering its utilization of creek water resources, especially in the South Truckee Meadows. TMWA is collaborating with many regional partners through OneWater Nevada to explore innovative ways to use advanced purified water and the possibility of creating water banks for additional drought storage. TMWA has an extensive water resource portfolio that has been further bolstered by the implementation of TROA; however, TMWA will continue to identify and develop safe and sustainable local water supplies to ensure that a reliable, high-quality product is delivered to customers into the future.

PROTECTING THE WATERSHED AND THE ENVIRONMENT

Donner Lake

CHAPTER OVERVIEW

s one of the users of the Truckee River, TMWA understands its intrinsic duty to help steward the protection of the watershed. Many initiatives outlined in this chapter are supported through the Truckee River Fund, a vehicle that both allows TMWA to manage the numerous grant requests it receives and also leverage matching funds for projects it supports. TMWA provides funding and support for projects that protect and restore water quality throughout the Truckee River watershed.

CHAPTER AT-A-GLANCE

Highlights of Chapter 6 include:

- 1. Truckee River Fund project spotlights
- 2. TMWA's collaborative efforts to help restore upstream forest health
- 3. Integrated source water protection with state, county, and municipalities
- 4. Assisting the recovery of the Lahontan cutthroat trout
- 5. Long-term energy sustainability through hydroelectric power

TMWA recognizes the importance of protecting the region's unique natural resources by using sustainable business practices to minimize environmental impact. By working cooperatively with community organizations throughout the Truckee River watershed, TMWA has improved the protection of the region's drinking water supply. TMWA participates in and supports many efforts to improve water quality, forest health, and riparian habitats in the watershed. Additionally, TMWA uses renewable energy, including hydropower and solar, to offset most of its power costs and reduce CO, emissions.

WATERSHED RESTORATION AND PROTECTION INITIATIVES

TRUCKEE RIVER FUND

The Truckee River and its tributaries provide key wildlife habitats and important recreational opportunities, while being an essential water source for the community. Because TMWA relies on the Truckee River for most of its water supply, it established the Truckee River Fund (TRF) in 2004 to facilitate source water protection. TRF utilizes



TRF HELPS FUND FOREST THINNING PROJECTS TO IMPROVE FOREST HEALTH AND DECREASE WILDFIRE RISK.

TRF PROJECT SPOTLIGHT: WATERSHED AQUATIC INVASIVE SPECIES PROGRAM



In 2009, the Tahoe Resource Conservation District (TRCD) initiated the pilot Watercraft Inspection program for the Truckee River watershed. Working with partner agencies, the purpose was to begin monitoring and conducting watercraft inspections to prevent and control aquatic invasive species (AIS). This included an education and outreach program and was designed to protect the recreational, economic, and ecological resources of the region.

Over the next few years, the AIS program continued to benefit from funding from the TRF. It was implemented at Lake Tahoe; Donner, Weber, and Independence Lakes; and Stampede, Boca, and Prosser Reservoirs. Since 2013, TRCD was able to fully support the AIS program with funding from other partner agencies such as the US Fish and Wildlife Services.

After extensive public education and outreach, the TRCD established enforceable, mandatory watercraft inspection programs across local jurisdictions (Town of Truckee and Nevada, Sierra, and Placer Counties). Since 2008 no new species have entered Lake Tahoe.

an Advisory Committee of nine appointed members that equally represent Washoe County, the City of Reno, and the City of Sparks.

TRF is used to support projects that protect and enhance water quality or resources of the Truckee River or its watershed, which also benefits TMWA's customers and the community. The projects funded by the TRF normally involve areas of the watershed that are multi–jurisdictional in nature, which makes a watershed improvement project difficult, if not impossible, to implement solely through one entity or agency. In addition, TRF provides TMWA a vehicle for responding to funding requests from outside groups and organizations involved in promoting and improving the health of the Truckee River system and watershed. The TRF has been highly successful in leveraging matching funds for the projects it supports. This allows TMWA to help local organizations and agencies complete projects at a lower cost and support projects outside of its jurisdictional boundaries, without additional impacts on customer rates.
TRF PROJECT SPOTLIGHT

TRUCKEE RIVER WATERSHED COUNCIL

DONNER CREEK RESTORATION

In 2018, TRF provided \$125,000 in funding for the design and construction of two restoration projects along Donner Creek. These projects will reduce erosion, decrease sedimentation, and improve water quality. Improved water quality from restoration work can lead to decreased water treatment costs for municipal supply downstream in addition to providing benefits for instream habitat and flood attenuation. Truckee River Watershed Council leveraged \$900,000 in construction funding from Caltrans in 2019 to implement this work.

TRUCKEE DONNER LAND TRUST WEBBER LAKE, LITTLE TRUCKEE RIVER HEADWATERS MANAGEMENT

In 2016, TRF granted \$18,750 to launch a multi-year program on the trust's Webber Lake property, which is located at the headwaters of the Little Truckee River. The objective was to address areas of tree disease and overstock and assist with the prevention of catastrophic wildfires. Both will aid in source water protection and reduction in the amount of sediment entering waterways due to erosion, which affects water quality.

NEVADA LAND CONSERVANCY CAUGHLIN FIRE EMERGENCY WATERSHED STABILIZATION & RESTORATION EFFORT

In 2011, TRF granted this project approximately \$220,000 to stabilize and restore public and private lands severely damaged by the Caughlin Fire. Work included installation of debris basins, channel clearing and debris removal, reseeding, hydro seeding, straw waddles, check dams, willow waddles, and the installation of other appropriate Best Management Practices (BMPs) to reduce erosion potential and sediment loading to drainage courses and tributary creeks terminating at the Truckee River.

SIERRA NEVADA JOURNEYS WATERSHED EDUCATION INITIATIVE

This program has been funded since 2011. The Watershed Education Initiative program has proven results in empowering youth to protect and enhance the quality of the Truckee River. Over time, there have been significant increases in parent engagement and student volunteerism. This initiative bolsters improved protection of the community's primary water source.

TRUCKEE MEADOWS PARKS FOUNDATION TRUCKEE MEADOWS NATURE STUDY

AREA PROJECT

In 2018, TRF granted this project \$38,400 to repurpose the former Rosewood Lakes Golf Course into the Truckee Meadows Nature Study Area, a wetland habitat that will serve as an outdoor learning laboratory and public recreational park.

CITY OF RENO VIRGINIA LAKE WATER QUALITY IMPROVEMENTS

In 2015, TRF provided \$100,000 in funding to construct a new primary outlet structure for Virginia Lake. The project improved circulation and water quality by relocating the primary outlet structure near the lake's north end. 6 // PROTECTING THE 984 Per 20 ESAND Agenda Item 8 06-17-20 BOARD Agenda Item 7

To date, TRF has approved and funded over 174 diverse projects that further the fund's goals. Since its inception, TRF has approved distribution of nearly \$14.1 million to qualifying projects. Partner organizations provided additional funding of over \$22.3 million in cash and inkind services. Examples include riparian cleanup, river restoration, forest management, watershed education, aquatic invasive species inspections and removal efforts, and many other activities. Projects completed or underway are listed at www.truckeeriverfund.org.

PREVENTING LARGE WILDFIRES IN THE HEADWATERS

Large wildfires in the heavily forested headwaters of the Truckee River watershed can potentially have major impacts on downstream communities. Although fire can be good for forest health, unnaturally large fires can result in high levels of sediment, ash, and debris in waterways. Among many devastating impacts to the community, headwater wildfires can increase the cost of water treatment and degrade source water quality.

The Nature Conservancy—Nevada Chapter (TNC) conducted a study in 2016 to define areas susceptible to high-intensity wildfires in the headwaters of the Truckee River watershed. In collaboration with TMWA and the US Forest Service (USFS), this modeling effort identified areas at increased risk of high-intensity wildfires in forested headwaters. In addition, the study analyzed how fires might impact the community and identified strategies to reduce large wildfires in the watershed. Research shows that restoring forest health can be economically efficient because fire impact costs are often greater than proactive forest treatment costs. Based on findings from the headwater forest study, TNC plans to assist the USFS with leveraging funding and support to increase the pace and efficacy of forest restoration projects in the Truckee River watershed.

ONE TRUCKEE RIVER MANAGEMENT PLAN

TMWA has been an active participant in the implementation of the One Truckee River Management Plan (OTR Plan) since its inception. Phase 1 of the

INDEPENDENCE LAKE & LAHONTAN CUTTHROAT TROUT

TMWA works with The Nature Conservancy (TNC) to promote the health of the federally threatened Lahontan cutthroat trout (LCT) population at the Independence Lake Preserve. Independence Lake hosts one of only two wild, self-sustaining lake populations of LCT in the world. TNC has been working toward recovering the LCT population by removing non-native brook trout, brown trout, and kokanee salmon from Independence Lake and Upper Independence Creek. When operationally feasible, TMWA draws down the lake level at appropriate times to dry out established kokanee salmon redds (spawning nests) in the nearshore areas of the lake in the late fall and early winter. By decreasing the non-native kokanee population, TNC expects that the native LCT population will be able to increase over time.



OTR Plan was completed in 2017 by a wide range of public and private partners in the Truckee Meadows. The overarching goal of the effort is to manage, protect, and provide stewardship of the Truckee River across all jurisdictional boundaries. Areas of focus include water quality, connectivity to community resources, health and wellness opportunities, habitat protection and restoration, stewardship, and long-term funding strategies. Recognizing the efforts to improve conditions

on the Truckee River, TRF funding of OTR continues with specific focus on protecting the community's drinking water supply. TMWA participates in the stewardship of the river and continues to be involved in the implementation of the four primary goals and over 140 strategies and action items identified in the plan. More information can be found at http://onetruckeeriver.org/.

WASHOE COUNTY INTEGRATED SOURCE WATER PROTECTION PLAN

The Nevada Division of Environmental Protection (NDEP) initiated the development of an Integrated Source Water Protection Plan (ISWPP) for Washoe County in 2016. The plan will be finalized and brought to relevant boards for approval in 2020. Prior to the creation of the ISWPP, TMWA updated its Wellhead Protection Plan (WHPP) in 2016 for the coordinated protection of public drinking water resources. TMWA's existing WHPP was a key component in the development of the ISWPP. The ISWPP expounds upon the existing WHPP and takes a collaborative approach with other local agencies, including those in Reno, Sparks, and Washoe County to ensure the protection of groundwater and surface water supplies from future contaminants. The ISWPP identifies Source Water Protection Areas (SWPAs) for drinking water sources. An interdisciplinary team of scientists and stakeholders identified SWPAs and the susceptibility of those areas to contamination or pollution. SWPAs take into consideration buffer areas around drinking water supplies and the modeling of groundwater systems to determine areas at the most risk for contamination. The final plan will describe implementation strategies to help protect the Truckee Meadows' drinking water sources into the future. A key outcome of the planning process has been increased communication between TMWA and regional jurisdictions regarding potential contaminant sources in SWPAs. When identified activities that could impact drinking water supplies are occurring in the SWPAs, TMWA and/or other public water systems will be notified and will work with property owners to help mitigate potential risks to groundwater and surface water quality.

SUSTAINABILITY

Power is one of TMWA's largest expenses. TMWA can offset more than 90% of the power it uses to provide drinking water to its customers on an annual basis through hydroelectric generation. TMWA owns and operates three



VERDI HYDROELECTRIC PLANT

run-of-the-river hydroelectric power plants: Fleish, Verdi, and Washoe. These hydroelectric plants were constructed in the early 1900s and continue to play an important role in TMWA's operations. Run-of-the-river hydroelectric plants rely on gravity to move diverted river water through canals to the power generation facilities. After the water passes through the generators, the water is returned to the river. TMWA's hydroelectric plants produce an average of 6.7 megawatts of power, which is enough to power approximately 3,500 households. The hydroelectric plants provide a source of clean, renewable energy, generating on average 40 million kWh per year. Every day TMWA runs its three hydroelectric plants at capacity, over 90,500 pounds of CO₂ emissions are effectively eliminated from our atmosphere, equating to to roughly 15,000 metric tons a year.

Due to improvements to the Highland Canal raw water delivery system, the installation of a 30-kWh solar power generation project, and multiple improvements in efficiency at TMWA's treatment plants, TMWA anticipates continuing to increase efficiency and optimize its renewable energy generation.

SUMMARY

TMWA uses a range of approaches to support restoration and protection efforts in the Truckee River watershed to maintain the excellent quality of the region's drinking water supply. The TRF effectively leverages funding from diverse partners throughout the watershed and allows TMWA to support projects it could not complete otherwise due to jurisdictional limitations, such as land ownership. TMWA will continue to support projects through TRF and will be involved in collaborative watershed management efforts, such as One Truckee River and the Integrated Source Water Protection Program. Additionally, TMWA values its role in being a good environmental steward for the community and will continue to improve efficiency and utilize renewable energy when feasible to minimize impacts on the environment.



Truckee River

DRAFT

CHAPTER OVERVIEW

Reach WRP details recommendations for the Board of Directors to consider. Some become new policies when warranted. Completed recommendations and policy adoptions from the 2016–2035 WRP are highlighted in this chapter. Many ongoing recommended actions from that plan have been carried over, with new recommendations added to this 2020–2040 update. Actions noted here may need to be amended if new challenges or information should arise.

CHAPTER AT-A-GLANCE

Highlights of Chapter 7 include:

- 1. Completed recommendations from the 2016–2035 WRP
- 2. Conversion of Meter Retrofit Fee to Water Resource Sustainability fee
- 3. Adoption of a Rate Stabilization Fund
- 4. Water resource management recommendations for TMWA Board consideration

The 2040 WRP is a planning document that outlines TMWA's water resource management strategy options through 2040. The preceding chapters have explained TMWA's current water management strategies, future impacts from climate conditions and growth, conservation practices, and possible future water resources. Based on the information and findings presented throughout the plan, this chapter includes recommended actions and policies for the TMWA Board to consider and act upon.

COMPLETED RECOMMENDED ACTIONS AND POLICIES

TMWA's 2016–2035 WRP Volume I: Abstract included "Findings & Recommended Actions" based on the findings from that plan. This section includes an overview of those recommended actions that have been completed. Also included are two important policies that have been approved by the Board and implemented since the adoption of the previous WRP.

COMPLETED RECOMMENDED ACTIONS FROM THE 2016–2035 WRP

Consolidation of TMWA and Washoe County Department of Water Resources (WDWR) Water Operations

In response to the Western Regional Water Commission (WRWC) legislative directive to evaluate the potential consolidation of water purveyors in the Truckee Meadows, WDWR and South Truckee Meadows General Improvement District (STMGID) were effectively merged into TMWA on December 31, 2014.

Truckee River Operating Agreement Implementation

The five mandatory signatory parties—TMWA, Pyramid Lake Paiute Tribe (PLPT), the United States, California, and Nevada—implemented the Truckee River Operating Agreement (TROA) on December 1, 2015.

Donner Lake Acquisition

In March 2016, TMWA purchased the Truckee Carson Irrigation District's (TCID) share (4,750 acre-feet (AF)) of Donner Lake water rights, thereby acquiring all 9,500 AF of Donner Lake water rights.

NEW POLICIES ADOPTED SINCE THE 2016–2035 WRP

Rate Stabilization Fund

In September 2018, TMWA's Board adopted a Rate Stabilization Fund (RSF) with an intended outcome of decreasing, avoiding, or deferring rate increases to customers. The designated maximum amount of funding for the RSF is 3% of annual water sales forecast for the subsequent three years. To be used at the discretion of the board, the fund may be applied toward operating costs, capital improvements, and other necessary expenses related to serving the current customer base as needed (e.g., for years where there is a shortfall in water sales revenue due to drought, weather variations).

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Water Resource Sustainability Fee

In January 2018, TMWA's Board adopted a rule change to allow the Meter Retrofit Fee to be changed to the Water Resource Sustainability Fee. The meter retrofit fee was charged to new development projects and was required by TMWA Rule 7(H)(3) to finance and install water meters. With nearly all services metered, this decision broadens the use of the fee to support projects such as expanded conjunctive use, aquifer storage and recovery (ASR), demonstration and validation of advanced purified water uses, future water resource research and acquisition, and other projects that enhance water resource sustainability and drought resiliency.

2020–2040 WRP RECOMMENDED ACTIONS

Many ongoing recommended actions have been carried over into this plan from the 2016–2035 WRP, and several new actions and policies have been included. It is important to note that while many of these actions have been carried over from the previous plan, the numbering for the recommendations has changed due to plan format changes for the 2040 WRP. Recommendations in this plan also take into consideration Regional Water Planning Policies and Criteria from the WRWC's Comprehensive Regional Water Management Plan to further guide the utility's proposed actions.

http://www.nnwpc.us/2016waterplan.html

OBJECTIVE 1. WATER RESOURCE PLANNING

RECOMMENDATION 1.1 TMWA's Water Resource Planning

Background: TMWA's WRP is a planning and management document that spans a 20-year period and is updated every five years. The WRP is a key component of TMWA's integrated planning approach in conjunction with its Water Facility Plan and Capital Improvement Plan. The 2040 WRP is the fourth version of the plan since TMWA's inception in 2001. **Recommendation**: Continue monitoring, reviewing, and revising its water resource management strategies at least every five years through TMWA's planning efforts in response to current and future conditions including but not limited to changing conditions in hydrology, climate patterns, economic development, regulatory constraints, and customer demand.

RECOMMENDATION 1.2 Geographic Scope of TMWA's Planning Area

Background: The Truckee Meadows has been steadily growing since recovering from the recession. Historically, TMWA's planning for the delivery of water has been focused on areas adjacent to its retail service area. As the region continues to grow, TMWA's service area will likely expand, including through the acquisition of smaller water systems in the region. Moving forward, TMWA will continue to expand its service area as needed and in conformance with regional planning efforts.

Recommendation: Continue to analyze the geographic extent of TMWA's water resource planning area subject to the guidelines of TMWA's Joint Powers Authority.

"The recommended actions outlined in this chapter will help guide TMWA to effectively manage its water resources."

RECOMMENDATION 1.3. Small Water System Acquisitions

Background: There are many private or cooperativelyowned small water systems throughout the region. Although TMWA has acquired small water systems, such as the West Reno Water Company in Verdi in 2019, these water systems often present a range of financial and technical challenges. Other small water systems



SUSPENSION BRIDGE OVER THE FLEISH DAM ON THE TRUCKEE RIVER

have inquired about possible acquisition in recent years; however, TMWA typically requires systems to be improved to TMWA standards prior to acquisition, as demonstrated by the Verdi Business Park acquisition in December 2014.

Recommendation: Encourage local jurisdictions to analyze all conforming regional master plans to determine what growth pressures may be placed on existing small water systems and identify which water utilities could be integrated into TMWA in the future, especially in growth-prone areas. When small water systems approach TMWA, TMWA should perform its due diligence to assess the resource benefits, financial impacts, and technical challenges of each system prior to considering acquisition. When applicable, other options besides acquisition may be more appropriate to assist small water systems by other means (e.g., providing a wholesale meter to a small system).

OBJECTIVE 2. MANAGEMENT OF CURRENT WATER RESOURCES

RECOMMENDATION 2.1. Conjunctive Use of Water Resources

Background: TMWA uses a combination of surface water and groundwater resources to meet customer demand. Following the merger with WDWR and STMGID, TMWA now provides access to Truckee River water resources to much of its service area, excluding its satellite systems which are supplied solely by groundwater. Access to these resources has allowed TMWA to conjunctively manage its resources for most of its customers. Under TROA, TMWA can store additional drought reserves to provide adequate supply for existing and new customers through future droughts. Based on the results from this WRP, TMWA has sufficient drought reserves to meet demand through 2040 in all scenarios tested. Therefore, TMWA does not need to alter its existing planning criteria or water management strategies at this time and will continue to conjunctively use its resources.

Recommendation: Continue to rely on TMWA's pool of resources to meet current demand, acquire additional water rights to meet future demand, and recognize that TROA provides additional drought-year reserves. Continue to monitor TMWA's ability to meet current

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and future demand by modeling the 1987–1994 drought period and include factors such as increased future demand, conservation improvement, hydrologic cycles, climate change, and additional water resources. Analyze management strategies under TROA to ensure that the community is receiving the maximum benefits from the agreement. Update the Board when future conditions evolve that require changes to the planning criteria or supply operation.

RECOMMENDATION 2.2. Groundwater Management

Background: TMWA's 89 production wells, spanning nine hydrographic basins, are an essential component of TMWA's water supply, particularly in the summer months when additional water resources are needed to meet peak demand. The wells are also critical in drought years when Truckee River flows are depleted. Groundwater level declines have historically occurred due to increased pumping in the southwest Truckee Meadows, west Pleasant Valley, and east Lemmon Valley, whereas water levels have remained stable in most other hydrographic basins. TMWA monitors water levels quarterly in all hydrographic basins where TMWA has production wells to track trends in aquifer health. Efficient management of TMWA's wells is important to ensuring continued groundwater level recovery and stabilization throughout the region.

Recommendation: Continue to: (1) use TMWA's wells to meet demand while maintaining the sustainability of the aquifers and (2) maintain or improve water levels through passive and active groundwater recharge.

RECOMMENDATION 2.3. Aquifer Storage & Recovery

Background: TMWA's ASR program started in 1993 and is important to maintaining water levels in aquifers where TMWA has production wells. ASR augments the existing water supply to proactively improve water levels and increase drought storage. The ASR program is currently robust, but TMWA is constantly looking to expand the program, especially in areas where water levels have been declining due to historic over pumping. Once the Mt. Rose Water Treatment Plant (WTP) is operational, TMWA will be able to divert and treat Whites Creek water for ASR in the winter months on the Mt. Rose Fan, which will help increase groundwater levels in that area of the Pleasant Valley hydrographic basin.

Recommendation: Continue to expand passive and active groundwater recharge to: (1) augment groundwater supplies that provide additional drought and peak-demand capacity; (2) reduce water quality concerns in specific areas; and (3) maintain and improve groundwater levels. Increase ASR with the ultimate goal of recharging 9,000 AFA. Increasing the breadth and scope of all three of these activities throughout the service area will help maintain sustainable groundwater levels and lessen the impact from septic, industrial, and naturally occurring contaminants.

RECOMMENDATION 2.4. Water Rights Availability

Background: As a result of the merger in 2014 of the WDWR and STMGID water systems formerly operated by Washoe County, TMWA has integrated most of the region into its distribution system, which allows the area to more effectively utilize Truckee River resources. A review of available Truckee River water rights shows a sufficient number of water rights exist to meet TMWA's average water service demand through the 2040 planning horizon and beyond. However, TMWA needs to continue to acquire Truckee River water rights to be able to issue willserves for new development. Demand for Truckee River water rights has increased in response to a competitive development market, difficulties in finding willing sellers of large blocks of water rights, and competition for water rights from environmental and lower river uses. TMWA has been working proactively to acquire water rights to meet future demand.

Recommendation: Continue to accept the dedication of Truckee River water rights in the growth-prone Truckee Meadows, Spanish Springs, and west Pleasant Valley. Recognize Fish Springs Ranch is available to meet future demand in the North Valleys.

Continue to acquire water rights to meet future water

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demand and maintain an inventory of water rights for future growth, pursuant to Rule 7.

TMWA should continue to pursue strategic water rights purchases where TMWA is uniquely positioned to obtain the maximum benefit through its pooling of resources, upstream storage, and TROA.

RECOMMENDATION 2.5. Water Conservation

Background: TMWA's conservation initiatives include measures to enhance efficient use of water and reduce or eliminate water waste. Specific programs include leak detection and repair, landscape design guidance, assigned-day watering, and water audits. TMWA works with WRWC in developing conservation plans for the region and cooperates with WRWC in implementing its conservation programs. While this WRP contains an overview of TMWA's conservation strategies, a more indepth Drought Contingency Plan will be updated pursuant to Nevada Revised Statute (NRS) 540.131 and will be a separate document that is not included in the WRP.

Recommendation: Continue to implement, and revise as needed, TMWA's Drought Contingency Plan to promote smart and efficient use of the community's water resources in compliance with all federal and state regulations.

RECOMMENDATION 2.6. Source Water Contamination

Background: Generally, TMWA has excellent source water quality given that most of its water supply comes from the Truckee River which flows from Lake Tahoe. However, there are concerns about contaminants reaching the Truckee River, and its tributaries from anthropogenic sources, such as overflows from industrial areas or chemical spills from the railroad or highway. Additionally, some of TMWA's groundwater wells have been contaminated by human activity, including historic tetrachloroethylene (PCE) contamination from dry cleaning businesses, nitrate contamination from high-density septic systems, and leaching from fertilizer. TMWA works closely with the Central Truckee Meadows Remediation District (CTMRD) to identify PCE-contaminated groundwater and remove PCE contamination at the affected wells.

Recommendation: Continue to work with the Nevada Department of Environmental Protection (NDEP) to implement the Integrated Source Water Protection Plan for Washoe County to preserve and enhance available water supplies and address known and potential threats to water quality. Continue to work with the CTMRD to address PCE contamination. Work to find solutions in other areas with water quality issues, such as nitrate contamination in Spanish Springs Valley.

RECOMMENDATION 2.7. Emergency Water Supply Standard

Background: There are events outside of TMWA's control that could lead to an emergency condition in which the water supply could be affected over multiple days, such as a chemical spill into the Truckee River, an earthquake, or a wildfire. Research conducted in 1996 and 2007 by the University of Nevada (UNR) on behalf of TMWA has shown no recorded river contamination events from rail or highway transportation. TMWA has completed analyses of the impacts of theoretical spill events on the Truckee River, but the likelihood of these events is extremely rare and there have been no historically recorded toxic spills that have rendered the Truckee River unusable. TMWA has dealt with supply outages due to earthquakes, such as the 2008 earthquake that damaged TMWA's Highland Canal, which conveys water from the Truckee River to its Chalk Bluff WTP. TMWA has sufficient well capacity and distribution system storage to meet non irrigation customer demand during a water quality emergency and has an extensive emergency action plan in place in the event of an extended river outage.

Recommendation: Maintain, as a minimum, the ability to meet daily indoor water use with TMWA wells. For river outages lasting up to seven days during the summer, maintain the ability to meet average daily indoor water demand using wells, treated water storage, and enhanced conservation measures. 7 // POLICY RECOMMEND&T 01-20 BOARD Agenda Item 7



HYDROELECTRIC FLUME ALONG THE TRUCKEE RIVER

OBJECTIVE 3. FUTURE WATER DEMAND & RESOURCES

RECOMMENDATION 3.1. Water Demand Forecast

Background: TMWA's 2018 population forecast estimates total Washoe County population will increase by 74,000 from approximately 471,500 in 2020 to 545,500 by 2040. The population estimates may change over time as the pace of development within the region varies and as the region moves toward greater density of land use. TMWA's forecast results are statistically similar to the State Demographer's near-term projections.

Water demand per service within TMWA's service area has been decreasing over time, resulting in slower total demand growth in TMWA's extended forecast. Based on the review of current growth and economic trends in the region, future water demand is anticipated to grow in the Truckee Meadows, but at a slower pace than historically seen. Projected water demand is expected to increase by 13,000 AF from approximately 83,000 AF in 2020 to 96,000 AF in 2040. **Recommendation**: Continue to complete future population forecasts, in coordination with other regional planning entities. Accept for planning purposes that TMWA's water demand projections based on these population forecasts are reasonable estimates for use in TMWA's planning areas.

RECOMMENDATION 3.2. Future Climate Change Impacts

Background: TMWA recognizes the importance of addressing the potential impacts of a changing climate, like increased temperatures and more variability in precipitation patterns. Since the adoption of the last WRP, TMWA has been involved in studies with research partners, including UNR, Desert Research Institute (DRI) and Precision Water Resources Engineering (PWRE), to assess the impact of climate change on regional hydrology and water supply. As climate change effects become more pronounced, TMWA will need to adapt to new conditions that may be different from historical hydrologic and demand patterns. Because climate change science is

constantly evolving, TMWA recognizes the importance of being involved in ongoing research in the field.

Recommendation: Continue to consider new findings from climate change research for the greater Truckee Meadows region and continue working with UNR, DRI, and other researchers to assess potential climate change effects on TMWA's sources of supply and regional hydrology. Adaptively manage resources by working with partners to rewrite the existing flood control requirements for the federal storage reservoirs in the Truckee River Basin.

RECOMMENDATION 3.3. Coordination with OneWater Nevada

Background: TMWA supports ongoing regional effluent management efforts with a diverse group of partners including Reno, Sparks, Washoe County, Truckee Meadows Water Reclamation Facility, UNR, and others. This collaborative effort is known as the OneWater Nevada initiative. The initial effort is to evaluate whether advanced purified water offers significant water resource management benefits for the Truckee Meadows region, including improving water use efficiency, providing operating flexibility during periods of water scarcity, and diversifying the region's water supply portfolio.

Recommendation: Remain actively engaged in a leadership role of OneWater Nevada in evaluating the feasibility of using advanced purified water to enhance TMWA's water resource sustainability, drought resiliency, and efficient use of water resources in the region.

RECOMMENDATION 3.4. Future Water Resources

Background: TMWA has adequate water resources to meet expected demand through 2040 and beyond. However, given that water resource development projects can take years to analyze, permit, and implement, TMWA will continue to investigate and pursue other resource development projects to meet future water demand beyond the 20-year planning horizon. The selection of a project is typically a function of a project's yield, ease of implementation, sustainability, and financial feasibility. It is possible that as new technology becomes available or as regulatory requirements or public opinions change, new projects may be developed, or projects previously thought infeasible may become feasible. TMWA is actively pursuing projects related to ASR expansion, new well development, water banking, and the feasibility of using advanced purified water.

Recommendation: Continue to investigate and evaluate potential future water supply projects consistent with and in addition to TROA to further increase the region's water security.

SUMMARY

TMWA has adequate water resources to meet future projected demand through 2040 and beyond under a range of hydrologic and climate conditions. However, because the factors influencing both supply and demand are constantly changing, TMWA recognizes the importance of adapting its management strategies to address new challenges. The recommended actions outlined in this chapter will help guide TMWA to effectively manage its water resources through the next WRP update, recognizing that these actions may be amended if new challenges or information should arise.

APPENDICES

Lake Tahoe

APPENDICES

APPENDIX A TMWA 2020–2040 WATER RESOURCE PLAN PUBLIC SURVEY RESULTS

APPENDIX B HYDROGRAPHIC BASIN SUMMARY UPDATE

APPENDIX C OVERVIEW OF CLIMATE CHANGE IN THE TRUCKEE MEADOWS

APPENDIX D TMWA DEMAND PROJECTION METHODOLOGY

APPENDIX A TMWA 2020–2040 WATER RESOURCE PLAN PUBLIC SURVEY RESULTS

As part of the update process for the 2020–2040 Water Resource Plan (WRP), TMWA surveyed its customers, stakeholders, and employees regarding their attitudes toward TMWA's water resource planning efforts. The survey, which was conducted electronically from November 2018 to January 2019, included questions regarding topics the public would like to see addressed in the WRP and concerns over issues that could negatively affect future water supplies. The survey contained questions on trust in the agency and important issues surrounding the region's water resources, such as conservation, drought storage, and use of reclaimed water. Results from the survey were used to ensure public input was considered in the planning process from the onset. During the two-month survey period, approximately 2,000 responses were received. The word cloud below shows the top words and phrases provided by the public in the open-ended questions. Answers including the words *growth*, *conservation*, *drought*, and *future water resources* were a few of the most common responses. Results from specific questions are presented on subsequent pages.



WHAT TOPICS WOULD YOU LIKE TO SEE ADDRESSED IN THE PLAN? (PERCENTAGE OF RESPONDENTS WHO ANSWERED YES OR DEFINITELY YES)



ARE THE FOLLOWING IMPORTANT TO YOU? (PERCENTAGE OF RESPONDENTS WHO ANSWERED YES OR DEFINITELY YES)



TO WHAT EXTENT ARE YOU CONCERNED THAT THE FOLLOWING MIGHT NEGATIVELY IMPACT OUR WATER SUPPLIES OVER THE NEXT 20 YEARS?



DO YOU UNDERSTAND HOW TMWA MANAGES THE REGION'S WATER SUPPLIES?



DO YOU TRUST TMWA TO EFFECTIVELY MANAGE TRUCKEE RIVER WATER SUPPLIES?



TO WHAT EXTENT DO YOU AGREE WITH THE FOLLOWING? (PERCENTAGE OF RESPONDENTS WHO ANSWERED YES OR DEFINITELY YES)



DO YOU THINK ALTERNATIVE WATER SOURCES SHOULD BE INVESTIGATED IN OUR REGION?



DO YOU THINK A STUDY ON ADVANCED PURIFIED WATER SHOULD BE INVESTIGATED?



APPENDIX B HYDROGRAPHIC BASIN SUMMARY UPDATE

INTRODUCTION

Truckee Meadows Water Authority (TMWA) operates groundwater production wells in nine hydrographic basins including:

- Tracy Segment (083)
- Spanish Springs Valley (085)
- Truckee Meadows (087)
- Pleasant Valley (088)
- Washoe Valley (089)
- Truckee Canyon (091)
- Lemmon Valley West and East (092A and 092B)
- Honey Lake Valley (097)

This appendix provides an update to the basin summaries provided in the previous (2016–2035) Water Resource Plan. The updates include new and rehabilitated wells, groundwater level trends in response to recharge and pumping, and water quality issues since 2015.

NEW AND REHABILITATED WELLS

TMWA manages an annual well rehabilitation program. This program consists of actively monitoring each production well and prioritizing well rehabilitation based on observed production declines. Drilling a new well to mitigate the loss of groundwater production is considered a last resort because of the high cost associated with large-diameter well drilling. However, when replacement wells are necessary, they are constructed with superior casing and screen material to increase well longevity. Figure B-1 shows the location of the 34 wells that have been rehabilitated, and Figure B-2 shows the five wells that have been drilled since 2015.

GROUNDWATER LEVEL TRENDS

TRACY SEGMENT (083)

TMWA operates four production wells in the Tracy Segment. Total production from these wells has decreased from 44 acre feet annually (AFA) in 2015 to 26 AFA in 2018. There have been no discernable trends in groundwater levels at the Truckee Canyon wells since 2015, and groundwater levels have increased approximately two feet from 2015 to 2018 at the Stampmill wells.

SPANISH SPRINGS (085)

TMWA operates eight production wells in the Spanish Springs hydrographic basin. Three wells are in the western portion and five are in the eastern portion of the valley. Groundwater pumping continues to decline in the west side of the valley, with net pumping (pumping—recharge) declining from 240 AFA in 2015 to 160 AFA in 2018. Pumping has increased in the east side from 630 AFA in 2015 to 1,100 AFA in 2018.



FIGURE B-1: TMWA PRODUCTION WELLS THAT HAVE BEEN REHABILITATED SINCE 2015



FIGURE B-2: NEWLY DRILLED PRODUCTION WELLS SINCE 2015

The following groundwater level trends have been observed since 2015:

- West side water levels remain stable since 2015, as shown in Figure B-3 (Desert Springs 4).
- East side water levels have continued to decline since 2015, in locations where a majority of the domestic and municipal groundwater pumping occurs. Springtime water levels have declined approximately 10 feet in the Hawkings well since 2015 (Figure B-4).



FIGURE B-3: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT DESERT SPRINGS 4, WHICH IS IN THE WEST SIDE OF SPANISH SPRINGS VALLEY



FIGURE B-4: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT HAWKINGS, WHICH IS IN THE EAST SIDE OF SPANISH SPRINGS VALLEY

TMWA is currently developing a groundwater management plan for the Spanish Springs hydrographic basin. An important aspect of the management plan will include increasing recharge on the east side of the basin to mitigate observed groundwater level declines.

TRUCKEE MEADOWS (087)

TMWA operates 47 production wells in the Truckee Meadows hydrographic basin. Groundwater pumping has declined significantly since 2015, with net pumping (pumping—recharge) declining from 17,400 AFA in 2015 to 9,100 AFA in 2018.

The following groundwater level trends have been observed since 2015:

- In the northern portion of the basin, continued recharge efforts and decreased pumping volumes have reduced the annual groundwater swings. This can be seen in the View Street well (Figure B-5), where water levels dropped 130 feet between the winter and summer months in 2015, but water levels only dropped 50 feet over the same period in 2018. Springtime water levels have remained relatively stable from 2015 to 2018.
- A similar trend is found in the central portion of the Truckee Meadows hydrographic basin. This can be seen in Figure B-6, where water levels dropped 120 feet between winter and summer months in 2015, but only 10 feet over the same period in 2018. Springtime water levels have remained relatively stable from 2015 to 2018.
- Groundwater levels have risen significantly in the southwest part of the basin in response to decreased pumping volumes. This is evidenced by the rising water levels in Arrowcreek 2, as shown in Figure B-7, where springtime water levels have increased 20 feet from 2015 to 2018.



FIGURE B-5: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT THE VIEW STREET WELL, WHICH IS ON THE NORTH SIDE OF THE TRUCKEE MEADOWS HYDROGRAPHIC BASIN



FIGURE B-6: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT THE SOUTH VIRGINIA STREET WELL, WHICH IS IN THE CENTRAL PORTION OF THE TRUCKEE MEADOWS HYDROGRAPHIC BASIN



FIGURE B-7: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT THE ARROWCREEK 2 WELL, WHICH IS IN THE SOUTHWEST PORTION OF THE TRUCKEE MEADOWS HYDROGRAPHIC BASIN

PLEASANT VALLEY (088)

TMWA operates nine production wells in the Pleasant Valley hydrographic basin. Groundwater pumping declined from 1,400 to 900 AFA from 2015 to 2018.

The following groundwater levels trends have been observed since 2015:

• Groundwater levels have risen significantly in the southwest part of the basin in response to decreased pumping volumes. Increasing groundwater levels are seen at the Tessa East well (Figure B-8) which shows springtime water levels increasing in excess of 30 feet from 2015 to 2018.



FIGURE B-8: PUMPING VOLUMES (TESSA EAST) AND GROUNDWATER LEVELS AT THE TESSA EAST MONITORING WELL, WHICH IS IN THE PLEASANT VALLEY HYDROGRAPHIC BASIN

WASHOE VALLEY (089)

TMWA operates five production wells in the Washoe Valley hydrographic basin. Groundwater pumping has declined from 160 to 140 AFA from 2015 to 2018. There have been no discernable trends in groundwater levels since 2015.

TRUCKEE CANYON (091)

TMWA operates four production wells in the Truckee Canyon hydrographic basin. Groundwater pumping has increased from 170 to 220 AFA from 2015 to 2018. There are no discernable trends in groundwater levels since 2015.

LEMMON VALLEY (092A AND 092B)

TMWA operates seven production wells in the Lemmon Valley hydrographic basin. Groundwater pumping has declined from 220 AFA in 2015 to a net recharge of 40 AFA in 2018.

The following groundwater level trends have been observed since 2015:

• Groundwater levels have risen significantly since 2015. Increasing groundwater levels are seen at the Lemmon Valley 7 well (Figure B-9), which shows water levels have increased 10 feet from 2015 to 2018.



FIGURE B-9: PUMPING VOLUMES (LEMMON VALLEY 7) AND GROUNDWATER LEVELS AT THE USGS WATERASH MONITORING WELL

HONEY LAKE VALLEY (097)

TMWA operates five production wells in the Honey Lake Valley hydrographic basin. Groundwater pumping has declined from 960 AFA in 2015 to no pumping in 2018. There have been no discernable trends in groundwater levels since 2015.

TRUCKEE CANYON (091)

TMWA operates five production wells in the Truckee Canyon hydrographic basin. Groundwater pumping increased from 170 to 220 AFA from 2015 to 2018. There are no discernable trends in groundwater levels since 2015.

WATER QUALITY ISSUES

TRACEY SEGMENT (083)

Wellhead treatment is ongoing at the Truckee Canyon wells to treat elevated concentrations of arsenic.

SPANISH SPRINGS (085)

The following water quality issues have been observed in the Spanish Springs hydrographic basin:

- Nitrate, from septic tanks and natural sources, continues to increase in shallow groundwater in the western portion of the valley and is migrating deeper into the aquifer over time under the influence of pumping and existing downward gradients. Nitrate concentrations have been measured as high as 45 mg/L (DS3—2017).
- The wellhead treatment pilot project on the Desert Springs Well 3 indicates that nitrate and arsenic can be removed effectively. A groundwater treatment plant is being considered for the area to treat nitrate- and arsenic-impacted groundwater from Desert Springs Wells 1, 2 and 3 and Spring Creek Wells 2 and 3.

TRUCKEE MEADOWS (087)

The following water quality issues have been observed in the Truckee Meadows hydrographic basin:

- TMWA continues to monitor the highly mineralized geothermal waters discharged from the Steamboat Geothermal Area at the far southeast end of the basin. Arsenic concentrations continue to increase in the Double Diamond #3 production well, with the highest concentration at 8 ug/L in January 2019 (MCL is 10 ug/L).
- TMWA continues to work with the Washoe County Central Truckee Meadows Remediation District (CTMRD) to monitor the tetrachloroethylene (PCE) plume and associated treatment at TMWA wells (Kietzke, Mill, High, Morrill, and Corbett). No significant changes in PCE have been observed since 2015.
- TMWA continues to treat high arsenic levels in four production wells (Greg, Pezzi, Poplar #1, and Terminal) located in the northeast portion of the valley.
- TMWA continues to work with the Nevada Division of Environmental Protection (NDEP) to monitor other groundwater contaminant sites, including the Sparks Solvent Fuel Site. Concentrations are increasing at the edge of the plume and may be moving offsite toward the Sparks Marina and the Truckee River.

PLEASANT VALLEY (088)

The following water quality issues have been observed in the Pleasant Valley hydrographic basin:

• TMWA continues to monitor the highly mineralized geothermal waters discharged from the Steamboat Geothermal Area. TMWA production wells in Pleasant Valley continue to be outside of the geothermal outflow zone.

WASHOE VALLEY (089)

Wellhead treatment is ongoing at the Lighting W wells to treat elevated concentrations of uranium.

TRUCKEE CANYON (091)

The following water quality issues have been observed in the Truckee Canyon hydrographic basin:

- Elevated levels of aluminum have been measured in Well 9 and 12, with the highest concentration measured in well 9 at 0.19 mg/L (MCL = 0.20 mg/L). Well 9 is scheduled to be abandoned once the Verdi area is connected to the surface water distribution system.
- Iron and manganese are elevated in Well 12 but not in exceedance of the EPA secondary standards (iron MCL = 0.3 mg/L; manganese MCL = 0.05 mg/L) TMWA continues to monitor the water quality in this area to ensure that the aesthetic quality of the water is not impaired.

LEMMON VALLEY (092A AND 092B)

The following water quality issues have been observed in the Lemmon Valley hydrographic basin:

- TMWA continues to work with NDEP to monitor the solvent-related contamination at the Stead Solvent Site near the southern boundary of the Stead Airport in West Lemmon Valley. Remediation activities have successfully reduced the migration of the contaminant plume.
- Groundwater from the Silver Lake well is blended with groundwater from other wells and/or surface water to reduce slightly elevated concentrations of arsenic.

HONEY LAKE VALLEY (097)

There are currently no water quality issues in production wells, but TMWA continues to monitor total dissolved solids (TDS) beneath the playa to ensure that saline water does not migrate toward the production wells.

APPENDIX C OVERVIEW OF CLIMATE CHANGE IN THE TRUCKEE MEADOWS

Although the climate of the Truckee Meadows is characterized by cyclic patterns of flood and drought, changing climatic conditions may prove more challenging for water supply reliability in the future throughout the American West (Gonzalez et al. 2018; Karl et al. 2009). Climate change is defined as shifts in global or regional weather conditions that persist over multiple decades or longer (Gonzalez et al. 2018). To design effective water supply strategies to mitigate against potential shifts in future climate conditions, TMWA incorporates the best available scientific information regarding regional climate change into its planning process. This includes the use of global climate models that are representative of the western United States and hydrologic models of the Truckee River watershed (Lynn et al. 2015; Huntington et al. 2013).

Regional temperatures are expected to warm, which is consistent with warming trends observed in the state over the past several decades (see Figure C-1). A 2018 study completed by the UCLA Center for Climate Science predicts that by 2041–2060, the Sierra Nevada will warm by 4°F on average (Reich et al. 2018). A concern identified in multiple studies is the impact of warmer temperatures on the timing of snowpack melt and the subsequent filling of storage reservoirs (US DOI 2015; Reich et al. 2018). Most climate models predict earlier snowmelt and changing streamflow patterns as spring temperatures increase (Reich et al. 2018). Currently, peak runoff from snowmelt to rivers and streams in the Truckee River Basin typically occurs in May or June. With increased temperatures, peak runoff in the Sierra Nevada could begin to shift as early as March or April by the end of the 21st century (Reich et al. 2018).

Higher average annual temperatures also lead to higher evaporation rates on lakes and reservoirs, thereby potentially reducing the available water supply (Huntington et al. 2015; USBR 2015). Evaporation on Lake Tahoe is expected to increase by an estimated 3% by 2050 and 5% by 2080 (Huntington et al. 2015). However, these evaporation increases could be offset by precipitation and inflow increases in some climate change scenarios.



FIGURE C-1: MEAN TEMPERATURE DEPARTURE FOR NEVADA FROM 1895 TO 2018 (SOURCE: WESTERN REGIONAL CLIMATE CENTER)



FIGURE C-2: TRUCKEE RIVER BASIN AVERAGE APRIL 1 SNOWPACK FROM 1986 TO 2019

There is a lack of consensus and a high degree of uncertainty about future annual precipitation in the Truckee River watershed. Many climate scenarios suggest that the northern Sierra Nevada may receive more precipitation in the future, whereas others suggest that the region may receive less (US DOI 2015; Lynn et al. 2015). However, in addition to the quantity of precipitation, the distribution, timing, and type of precipitation is projected to vary. Warming trends will likely result in more precipitation falling as rain instead of snow, which has the potential to decrease the region's winter snowpack, leading to snow droughts (Harpold et al. 2017; Hatchett et al. 2018; Cooper et al. 2017). Snow levels have already been increasing in elevation in the Sierra Nevada, with more rain falling at mid-elevations from 5,000-8,000 feet, which historically received more snow (Hatchett et al. 2017; Reich et al. 2018). Snow droughts can occur in years with average annual precipitation, but with low snow water equivalent (SWE) (Hatchett et al. 2018). Snowpack is typically variable in the Truckee River system (see Figure C-2), but a prolonged or permanent decrease in snowpack would impact the water supply, because mountain snow

acts as a reservoir that melts throughout the spring and summer during the highest demand periods.

Additionally, climate change has the potential to increase the severity and frequency of extreme weather events, such as atmospheric rivers and droughts (Gonzalez et al. 2018; Cayan et al. 2001; Dettinger et al. 1995). Several large atmospheric river events during the winter of 2017 caused flooding throughout the Truckee Meadows region; these heavy precipitation events and the associated flooding may become more common in the Sierra Nevada in the future. The frequency of prolonged droughts may also increase (Cayan et al. 2010). Frequent shifts, or hydrological cycle intensification between extreme dry years (e.g., 2015) and extreme wet years (e.g., 2017), are predicted, which may make water resource operations more complex (Swain et al. 2018).

TMWA also relies on groundwater to supply water to its customers, which serves as a "buffer" during dry times because it acts as a huge storage reservoir underground. Several studies have investigated the implications of climate change on groundwater systems in the western United States, with wide-ranging results. Estimates range between declines to little change, to even slight increases in groundwater recharge and associated groundwater resources (Meixner et al. 2016; Huntington et al. 2012; Pohll et al. 2018). The uncertainty in the groundwater recharge estimates largely rests on the large uncertainty in future precipitation estimates. Regardless, TMWA's ASR program increases groundwater recharge through ongoing injection of treated surface water during non-drought periods. This strategy ensures sustainable management of groundwater resources under a wide range of future climate conditions.

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APPENDIX D TMWA DEMAND PROJECTION METHODOLOGY

PROJECTIONS OF POPULATION, ACTIVE WATER SERVICES, AND TOTAL WATER DEMAND

As part of its financial and natural resource planning, Truckee Meadows Water Authority (TMWA) maintains a collection of projection models of population, active water services, and water demand. These models produce high-resolution projections suitable in the short run for operational and financial planning and can be aggregated to a resolution suitable for long-term water resource planning. The models are used in a chain where the output of one model serves as an input to the next model.

For the 2020–2040 WRP, the following models are used: Washoe County population, active water services, and water use coefficients. The population projection is a required variable for the projection of active water services. The water use coefficients model provides an estimate of how much water is used by each type of water service. The water demand is a product of active water services and water use coefficients. The active water services and use coefficients are both dependent on TMWA's extensive billing history database to produce meaningful projections in both the short and long term.

Because the model is based on historical information, it assumes current socio economic trends will continue. Therefore, future changes in economic growth, building and landscaping trends, climate conditions, and watersaving technology are not captured. Because these factors can ultimately influence true demand up or down, the model is reestimated on a semiannual bias. Analysis of prior water demand models have shown estimations to be slightly higher than actual demand.

WASHOE COUNTY POPULATION PROJECTIONS

In Washoe County, there are three prominent population projections commonly produced: State of Nevada Demographer's projection (SDF), TMWA's Washoe County population projection, and Truckee Meadows Regional Planning Agency's (TMRPA) Washoe County Consensus Forecast of population (WCF). Each projection is based on a different model/methodology and thus each can meet different needs in the community. TMWA's population projection is the preferred projection to be used with longterm (greater than 20 years) water resource planning.

The TMWA population projection is based on a logistical growth curve and provides an estimate of population equilibrium, assuming that current trends and conditions continue to 2099. TMWA's model is used to project population through 2099. The SDF and WCF projections are each based on a 20-year horizon. The state's model is a statewide economic and demographic model that produces projections for all counties and most major cities in Nevada and is updated annually by the State Demographer. TMRPA's WCF is an average of four different population projects, two of which are the SDF and TMWA projections. In the short run, all three produce very similar population projections. They differ greatly in the long run, and if extrapolated out to year 2100, the differences are very pronounced. To create comparative projections, SDF and WCF are simply extrapolated out to the year 2100 and used to create alternative projections for active water services and water demand.

ACTIVE WATER SERVICES PROJECTIONS

Active water services are a function of population and the businesses that provide services and jobs to the community. All active water services can be grouped into four major classes: single-family homes, multi-family dwelling units, commercial (businesses) services, and irrigation services. Using active water service counts derived from billing history and the historic population, a time series model was developed using a vector autoregression methodology (VAR) model. In this model, each month's service counts are explained by a relationship between the population, active services in prior months, and relationships between different service classes. Given a good model that explains past counts of active service with respect to population, the population projection is used to project future active water service counts. As a result of the differences between the three population forecasts in the long term (beyond 20 years), the number of active water services varies. However, TMWA uses the active water service projection based on the TMWA population forecast for planning purposes.

TOTAL WATER DEMAND PROJECTIONS

The active water services are multiplied with water use coefficients by customer rate class and service size to produce a projection of water demand for each rate class. The water use coefficients are computed monthly as an average of the same month for the prior three years and are the same for all projections. The assumption in each projection is that water use per service does not change moving forward. These models provide very granular details at a monthly level that are well suited for shortterm operations. For water resource planning, the monthly values are summed to provide annual values, and customer class details are combined to provide total water demand.





2020-2040 Water Resource Plan – Public Outreach Schedule

Zoom Virtual Meetings/Webinars

JUNE	
DATE/TIME	ENTITY
June 17 th at 10am	TMWA Board of Directors
June 24 th @ 10:00-11:00am	Public Webinar
June 25 th @ 5:30-6:30pm	Public Webinar
June 30 th @ 2:00-3:00pm	Public Webinar
JULY	
July 1 st @ 1:30pm	Northern Nevada Water Planning Commission
July 8th @ 5:30-6:30pm	Public Webinar
July 15 th @ 9am	Western Regional Water Commission
AUGUST	
August 4 th @ 3pm	Standing Advisory Committee Meeting
SEPTEMBER	
September 16 th @ 10am	TMWA Board of Directors
DRAFT 2020-2040 WATER RESOURCE PLAN

TMWA STANDING ADVISORY COMMITTEE MEETING

AUGUST 4, 2020



HIGHLIGHTS

- The 2020-2040 WRP is the 4th edition since TMWA's inception in 2001
- Focuses on scenario-based planning
 - In-depth analysis of climate change and population growth impacts on water resources
- New user-friendly formatting to engage plan readers





PLAN UPDATE PROCESS

2016	 Board members expressed interest in future WRPs focusing less on TMWA history and more on future planning.
Oct. 2018	 TMWA staff presented table of contents, overview of the plan, and public outreach plan to the Board.
Dec. 2018 – Jan. 2019	 Electronic survey about water resource topics and concerns provided to the public and Board.
Jun. 2019	 PWRE presentation about initial climate change study findings to the Board.
Aug. 2019	 WRP policy recommendation workshop with the Board.
Jun. – Jul. 2020	 Outreach presentations of draft WRP to the Board and public.



PUBLIC SURVEY RESULTS

• Top 3 public concerns for issues that may negatively impact our water supply over the next 20 years:



• Top 3 issues the public would like to see addressed in the WRP:

Growth and future water demands	Future availability of existing water resources	The state of our current water resources
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• Top 3 topics of importance to the public:

Planning water resources around projected growth	Maintaining drought reserves	Maintaining groundwater supplies
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2020-2040 WRP OUTLINE

- 1. Introduction
- 2. Current Water Resources
- 3. Current and Future Planning Environment
- 4. Conservation Strategies
- 5. Future Water Resources
- 6. Protecting the Watershed and Environment
- 7. Policy Recommendations and Management Actions
- 8. Appendices





CHAPTER 1: INTRODUCTION

 Provides an overview of TMWA, TMWA's service area, plan scope, plan goals & objectives, plan update process, and major changes throughout the versions of the WRPs.





CHAPTER 2: CURRENT WATER RESOURCES

• Details TMWA's current surface and groundwater resources, conjunctive use management of resources, and water rights.





CHAPTER 3: CURRENT AND FUTURE PLANNING ENVIRONMENT

- Includes an overview of historic droughts.
- Provides summary of 2020-2040 demand projection.
- Detailed analysis of potential climate change impacts under three different scenarios through the end of the century.
- Discusses the impacts of growth and development on water supply and demand in the region.



CHAPTER 3: DEMAND PROJECTION





CHAPTER 3: CLIMATE CHANGE SCENARIOS

- Developed three scenarios to test the resiliency of TMWA's system under a range of future conditions:
 - 1. Historical drought scenario
 - RCP 4.5 (moderate emissions scenario) – with an ensemble of 8 GCMs
 - RCP 8.5 (very high emissions scenario) with an ensemble of 8 GCMs
- Water supplies tested against a hypothetical demand of 140,000 AF at the end of the century.





CHAPTER 3: CLIMATE CHANGE SCENARIOS

- Model assumptions:
 - 10% conservation under drought conditions
 - Modest assumptions for future groundwater pumping
 - Expanded rates of future recharge
 - Continued acquisition of Truckee River water rights
 - No additional imported water from other basins
 - Existing upstream reservoir operations (Bureau of Reclamation grant)



CHAPTER 3: CLIMATE CHANGE SCENARIOS

- Historical drought scenario shows:
 - No shortages
 - Upstream storage never drops below 40,000 AF
 - Highlights importance of TROA for the region
- Climate change results show that:
 - RCP 4.5 only 10 years out of the 640 simulation years (8 GCMs x 80year simulations) show a shortage (1.5%)
 - First shortage occurs in 2083 at a demand level of 120,000 AF
 - RCP 8.5 only 25 years out of the 640 simulation years show a shortage (3.9%)
 - First shortage occurs in 2069 at a demand level of 113,000 AF
 - Lake Tahoe drops below rim for last 16 years of simulation



CHAPTER 3: BUREAU OF RECLAMATION GRANT

- Received September 2019
- Multiple agency partners (Federal Water Master, Army Corps of Engineers, Bureau of Reclamation)
- Studying the reoperation of federally-owned flood control reservoirs which are regulated by the existing 1985 Army Corps of Engineers' Water Control Manual
- Create new guidelines that allow greater flexibility to capture early runoff
- Instrumental in helping the region adapt to potential climate change impacts
- Anticipated to be completed in March 2023



CHAPTER 4: CONSERVATION STRATEGIES

 Describes TMWA's conservation strategies to mitigate and respond to drought. This section does not include the entirety of TMWA's Conservation Plan, which TMWA's 2016-2035 WRP did include. That document is now separate from the WRP.





CHAPTER 5: FUTURE WATER RESOURCES

- Describes future water resource projects with benefit and challenge tables for each potential resource. Future resource projects detailed in the chapter include the following:
 - Additional Groundwater Capacity Projects
 - Creek Water Resources
 - Marlette Lake Water System Wholesale Service
 - Reclaimed Water
 - Advanced Purified Water
 - Water Banking Projects
 - Other Conceptual Resources



CHAPTER 6: PROTECTING THE WATERSHED AND ENVIRONMENT

 Explains TMWA's commitment to protecting water quality and being a steward of the watershed and environment. Highlights important Truckee River Fund projects and TMWA's hydroelectric plants.





CHAPTER 7: POLICY RECOMMENDATIONS AND MANAGEMENT ACTIONS

- Details completed actions and future recommendations for the Board of Directors to consider based on the findings in the 2020-2040 WRP.
 - Completed Actions
 - Consolidation with WDWR and STMGID
 - Implementation of TROA
 - Acquisition of TCID's Donner Lake water rights
 - New Policies
 - Rate Stabilization Fund
 - Water Resource Sustainability Fee
 - Recommended Actions
 - Water Resource Planning
 - Management of Current Water Resources
 - Future Water Demand and Resources



PUBLIC OUTREACH

PUBLIC MEETINGS

- June 24, 2020 10:00 am Public Zoom Meeting
- June 25, 2020 5:30 pm Public Zoom Meeting
- June 30, 2020 2:00 pm Public Zoom Meeting
- July 1, 2020 1:30 pm Northern Nevada Water Planning Commission
- July 8, 2020 5:30 pm Public Zoom Meeting
- July 15, 2020 9:00 am Western Regional Water Commission
- August 4, 2020 3:00 pm TMWA Standing Advisory Committee Meeting

OTHER PUBLIC INPUT OPPORTUNITIES

- Website with draft plan and outreach schedule available to the public on Thursday, June 18th
 - www.tmwa.com/wrp2020
 - Online comment form, email comments will also be accepted



Thank you! Questions?





STAFF REPORT

 TO: Board of Directors
 THRU: Mark Foree, General Manager
 FROM: John Enloe, Director of Natural Resources & Planning John Zimmerman, Water Resources Manager
 DATE: May 11, 2020
 SUBJECT: Introduction and first reading of TMWA's proposed Rate Schedule Interruptible Large Volume Non-Potable Service (ILVNPS)

Background

Periodically, customers and river stakeholder groups approach TMWA for uses of water for various purposes, such as environmental river restoration and temporary irrigation projects. Most recently, the City of Sparks approached TMWA seeking assistance in providing return flows to the Truckee River related to a proposed temporary connection to the City's reclaimed water system at Pyramid Hwy and Lazy 5 Pkwy for the 5 Ridges development. The reclaimed water use estimate is approximately 180 acre-feet (AF) for 2020 and potentially 60 AF in 2021, to be used for dust control, mass grading and fill compaction.

To allow for such uses, staff is proposing the implementation of a new water rate schedule, referred to as the Interruptible Large Volume Non-Potable Service (ILVNPS).

Discussion

As proposed, delivery of water under Rate Schedule ILVNPS would be available, at the sole discretion of TMWA, for non-potable uses of water such as instream water quality, instream return flows, environmental, or other authorized purposes. Service would only be available for direct deliveries on the Truckee River in excess of 15 acre-feet annually. Service would be subject to interruption or curtailment in TMWA's discretion depending on Truckee River flows, satisfaction of Floriston Rates, drought conditions and availability of water under the Truckee River Operating Agreement, TROA Administrator/Federal Water Master regulatory actions, and other river priorities.

TMWA would provide service on a best-efforts basis where water deliveries could be provided without jeopardizing the integrity of the system and municipal drought supplies. Service would be taken from one or more points of delivery directly on the Truckee River and would not include any service from or through TMWA's treatment facilities or distribution system. TMWA may require dedication of water resources from customers in accordance with Authority Rules or utilize water resources owned or managed by or available to TMWA that are not committed to support a will serve to provide service under this Rate Schedule.

A contract for service between TMWA and the Customer would be required for delivery of water under this Rate Schedule. The contract would require the Customer to accept water within a mutually agreeable specified geographic area and/or use water for a mutually agreeable specified purpose. The Customer would be required to provide and install the necessary facilities and all other equipment necessary for delivery of water.

The fee for water service under this rate schedule would be based upon actual cost of service and operating expenses incurred by TMWA, and would be similar or equal in cost to the City of Reno, City of Sparks and TRI General Improvement District Return Flow Management Agreement Resource Fee of \$47 per acre foot for surface water sources of supply.

Recommendation

If the Board supports staff's recommendation to implement the new water ILVNPS rate schedule as attached hereto, authorize staff to schedule a public hearing on the second reading of Interruptible Large Volume Non-Potable Service Rate Schedule at the next regularly scheduled TMWA Board meeting.

05-21-20 BOARD Agenda Item 6.A

Truckee Meadows Water Authority

RATE SCHEDULES

<u>ILVNPS – INTERRUPTIBLE LARGE VOLUME NONPOTABLE SERVICE RATES AND</u> <u>CHARGES</u>

APPLICABILITY

Rates contained in this Rate Schedule are applicable solely to the Interruptible Large Volume Non-Potable Service (ILVNPS). Water supplies may be supported by water resources owned or managed by or otherwise available to Authority that are not committed to support a Will-Serve Commitment. Authority may use one or more sources of supply in its sole and absolute discretion.

CHARACTER OF SERVICE

Delivery of water under this Rate Schedule ILVNPS is available, at the sole discretion of Authority, to customers for non-potable uses of water for instream water quality, instream return flows, environmental, or other authorized (in the discretion of Authority) non-potable purposes only, and shall be delivered from non-treated water sources of supply owned and/or managed by Authority. Service is only available under Rate Schedule ILVNPS for deliveries in excess of 15 acre-feet annually. Service may be subject to interruptions or curtailments for indefinite periods due to various operating conditions described in Special Condition #4 below. Subject to the foregoing, Authority will provide service on a best-efforts basis where required water deliveries can be provided without jeopardizing the integrity of the system and municipal drought supplies. Service shall be taken from one or more points of delivery directly on the Truckee River and shall not include any service from or through Authority's treatment facilities or distribution system. Authority may, in its sole discretion, require dedication of water resources from customers in accordance with Authority Rules or utilize water resources owned or managed by or available to Authority that are not committed to support a will serve to provide service under this tariff.

AVAILABILITY

Water service under this Rate Schedule is available, at the sole discretion of Authority, to customers at delivery points within Authority's geographic boundaries, subject to additional conditions of delivery which may be set forth in a contract described in Special Condition #1 below:

RATES¹

Commodity Charge Per Acre-Foot Per Year

\$47.00

Customer Charge per Billing Period

Per Delivery Point

\$35.11

¹ Rates for deliveries under the Return Flow Management Agreement between Authority, City of Reno, City of Sparks and TRI General Improvement District entered July 18, 2018 shall be governed by the terms of that agreement.

05-21-20 BOARD Agenda Item 6.A

Truckee Meadows Water Authority

RATE SCHEDULES

<u>ILVNPS – INTERRUPTIBLE LARGE VOLUME NONPOTABLE SERVICE RATES AND</u> <u>CHARGES</u>

Late Charge

5% of any amount in arrears from previous billings.

Other Charges

As specified in Rate Schedule OC (excluding the regional water management fee, Water Resources Sustainability Fee and right-of-way toll) and applied to total bill.

MINIMUM CHARGE

The Minimum Charge for delivery of water service shall be the sum of the Customer Charge, commodity charge, and late charge per Billing Period.

SPECIAL CONDITIONS

- 1. A contract for service between the Authority and the Customer will be required for delivery of water under this Rate Schedule. The service contract shall require the Customer to accept water within a mutually agreeable specified geographic area and/or use water for a mutually agreeable specified purpose. The service contract shall include but is not limited to the rate of diversion, conditions for the termination and extension of delivery of water, requirements as to water resources sufficient to supply water (including uses of Authority Community Resources if applicable), the specific delivery requirements of the Customer, Customer obligations for diversion facilities (if any), conditions of delivery, provisions outlining possible service interruptions or curtailments, and, where appropriate, assurances of financial security sufficient to ensure payment of all charges for delivery of water. For Customer's outside Authority's retail service area, the contract may also include terms and conditions of limited annexation for purposes of ILVNPS service only.
- Customer shall take delivery of water directly from the Truckee River at one or more points of delivery as agreed upon by Authority in its discretion. Customer shall not be eligible to use nor shall it use any of Authority's existing treatment or distribution Facilities in connection with water under this service classification.
- 3. The Customer shall provide and install the necessary facilities to divert and distribute water from the point of delivery in the Truckee River, if applicable, and all other equipment necessary for delivery of water hereunder including flow control devices, piping, and other related equipment.
- 4. Service shall be subject to interruption or curtailment in Authority's discretion depending on Truckee River flows, satisfaction of Floriston Rates, drought

Added:

Page 2 of 3

05-21-20 BOARD Agenda Item 6.A

Truckee Meadows Water Authority

RATE SCHEDULES

<u>ILVNPS – INTERRUPTIBLE LARGE VOLUME NONPOTABLE SERVICE RATES AND</u> <u>CHARGES</u>

conditions and availability of water under the Truckee River Operating Agreement, TROA Administrator/Federal Water Master regulatory actions, and river priorities except as otherwise provided in the contract for service with Authority.

Added:

Page 3 of 3



STAFF REPORT

TO:	Board of Directors
THRU:	Mark Foree, General Manager
FROM:	Michele Sullivan, Chief Financial Officer
	Matt Bowman, Financial Controller
DATE:	May 11, 2020
SUBJECT:	Discussion and action on request for adoption of Resolution No. 285: A resolution to adopt the final budget for the Fiscal Year ending June 30, 2021 and the 2021-2025 Five-Year Capital Improvement Plan

Recommendation

That the TMWA Board approve the proposed Final Budget for the fiscal year ending June 30, 2021 and direct staff to file the adopted Final Budget and related 2021-2025 Capital Improvement Plan with the State of Nevada Department of Taxation as required by statute.

Summary

TMWA has prepared the proposed Final Budget for consideration and approval by the TMWA Board. Changes to the tentative budget presented originally at the April 10, 2020 board meeting result in a decrease to change in net position of \$1.0m. This is due to the deferral of the May 2020 rate increase of 2.5% and reduced hydroelectric revenue. There were changes to the timing of spend in CIP over the next five years, but the total spend remains at \$229.1m. Changes to FY 2021 are discussed in more detail below.

Discussion

Attachments A and B show comparisons between the proposed Final Budget, the Revised Tentative Budget and the Tentative budget. The Tentative budget reflects the budget prepared prior to the COVID-19 Pandemic. In March 2020, following the Governor's declaration of a state of emergency, TMWA staff modified the Tentative budget based on estimated financial impacts of the Pandemic. The Revised Tentative budget was approved by this Board on April 10th, 2020. Staff has further modified the budget to include reductions in water sales revenue and hydroelectric revenue. Following the Board's election to defer a 2.5% rate increase scheduled for May 2020, to no earlier than September 2020, staff decreased water sales by \$0.6m related to the delay effect for July and August, 2020, and assumed implementation of the increase in September, 2020. Hydroelectric revenue is reduced due to failure of a flume at the Washoe plant which will not be repaired until late fall, 2020.

A draft CIP document was presented at the April 10, 2020 board meeting. The final CIP document is accompanying this report in *Attachment D*. Since the revised tentative budget was presented to the Board in April 2020 the only change was to increase the Spanish Springs Main Replacement project by \$1.0 million in FY21 due to \$120 thousand of additional costs to improve the emergency connection to Sky Ranch, \$290 thousand in additional costs for pavement restoration and the remaining \$590 thousand due to continuing escalation of construction costs. This increase is offset by reducing the general streets and highways budget in FY22 and FY23 by \$500 thousand each, leaving customer rate funded projects unchanged over the five-year plan.

For cash flow, *Attachment* C, due to reductions in revenue and an increase in capital spending in FY 2021, ending cash is expected to be lower at the end of Fiscal Year 2021 by \$2.0 million compared to the Revised Tentative Budget.

08-04-20 SAC Agenda Item 10 05-21-20 BOARD Agenda Item 8.A Attachment A

TRUCKEE MEADOWS WATER AUTHORITY

Comparative Statements of Revenues, Expenses and Changes in Net Position

(Proposed) Final Budget

	(Proposed)				1		
	Final Budget	Rev. Budget	Tent. Budget	Fin - Rev	L .	Fin - Tent	
	2021	2021	2021	Variance \$	L .	Variance \$	
OPERATING REVENUES							
Charges for Water Sales	\$ 102,260,229	\$ 102,902,366	\$ 106,659,742	\$ (642,137)	Α	\$ (3,757,376)	С
Hydroelectric Sales	3,193,880	3,512,784	3,512,784	(318,904)	В	-	
Other Operating Sales	2,800,120	2,800,120	2,595,902	-		204,218	D
Total Operating Revenues	108,254,229	109,215,270	112,768,428	(961,041)		(3,553,158)	
OPERATING EXPENSES							
Salaries and Wages	24,563,727	24,563,727	25,082,354	-		(518,627)	Ε
Employee Benefits	10,661,572	10,661,572	12,290,946	-		(1,629,374)	F
Services and Supplies	31,419,113	31,419,113	32,409,467	-		(990,354)	G
Total Operating Expenses Before Depreciation	66,644,412	66,644,412	69,782,767	-		(3,138,355)	
Depreciation	33,518,852	33,518,852	33,518,852	-		-	
Total Operating Expenses	100,163,264	100,163,264	103,301,619	-		(3,138,355)	
OPERATING INCOME	8,090,965	9,052,007	9,466,809	(961,041)		(414,802)	
NONOPERATING REVENUES (EXPENSES)							
Investment Earnings	2,854,243	2,854,243	2,854,243	-		-	
Debt Issuance Costs	(87,400)	(87,400)	(87,400)	-		-	
Interest Expense	(12,514,133)	(12,514,133)	(12,514,133)	-		-	
Total Nonoperating Revenues (Expenses)	(9,747,290)	(9,747,290)	(9,747,290)	-		-	
Gain (Loss) Before Capital Contributions	(1,656,325)	(695,284)	(280,481)	(961,041)		(414,802)	
CAPITAL CONTRIBUTIONS							
Grants	1,900,000	1,900,000	1,900,000	-		-	
Water Resource Sustainability Program	869,696	869,696	869,696	-		-	
Developer Infrastructure Contributions	11,226,546	11,226,546	13,335,614	-		(2,109,068)	н
Developer Will-serve Contributions (Net of Refunds)	4,185,412	4,185,412	4,185,412	-		-	
Developer Capital Contributions - Other	10,242,156	10,242,156	11,710,371	-		(1,468,215)	1
Developer Facility Charges (Net of Refunds)	5,998,608	5,998,608	7,498,260	-		(1,499,652)	1
Contributions from Others	275,000	275,000	275,000	-		-	
Net Capital Contributions	34,697,418	34,697,418	39,774,353	-		(5,076,935)	
CHANGE IN NET POSITION	33,041,093	34,002,134	39,493,871	(961,041)		(5,491,737)	
NET POSITION, BEGINNING PERIOD	760,033,398	760,033,398	760,033,398	-		-	
NET POSITION, END OF PERIOD	\$ 793,074,490	\$ 794,035,532	\$ 799,527,269	\$ (961,041)		\$ (5,491,737)	

A Decrease due to the rate increase delay (presumed implementation in September).

B Reduced revenue due to flume failure at the Washoe Hydroelectric Plant.

- C In the revised budget, water sales are lower by \$3.8 million. Commercial services are projected to decrease by 15% for the first half of FY2021, and 10% in the second half of the fiscal year. This decrease of \$3.25 million in revenue is in line with reductions seen in the last recession during 2008 to 2010. In addition, an estimate for bad debt of \$0.5 million is assumed based on economic conditions resulting from the pandemic.
- D Other operating sales are reduced \$0.2 million due to lower projected new business fees collected, offset by higher late fees and call-out charges.
- E Wages are reduced by \$0.5 million in the revised budget due to deferring headcount additions indefinitely.
- F Benefits expense was reduced by \$1.6 million, \$0.2 million due to reduced headcount, and the remainder due to removal of an estimate for noncash PERS adjustment.
- G Services and supplies expenses were reduced by \$ 1.0 million. \$0.7 million of this reduction is due to lower chemical and electric power costs (based on expected lower use). Various other cuts across several departments make up the remaining \$0.3 million.

H Developer dedicated infrastructure is expected to be lower by \$2.1 million due to slowing of the economy. This is a non cash item.

Area Fees, Supply and Treatment Fees, and Storage Fees are all expected to be lower by 25% due to uncertain economic conditions, resulting in a decrease of \$3.0 million in developer contributions.

08-04-20 SAC Agenda Item 10 05-21-20 BOARD Agenda Item 8.A Attachment B

TRUCKEE MEADOWS WATER AUTHORITY

Comparative Statements of Revenues, Expenses and Changes in Net Position

(Proposed) Final Budget

					2451 200	2451 200	
	(Proposed) Final Budget 2021	Final Budget	Actual Forecast		21Fin - 20B Variance S	21Fin - 20B Variance %	
OPERATING REVENUES	Dudget Lot1	2020	2020		vanance ș	vanance /	
Charges for Water Sales	\$ 102,260,229	\$ 102,706,086	\$ 99,045,757	1	\$ (445,857)	0%	
Hydroelectric Sales	3,193,880	3,664,180	3,273,562	2	(470,300)	-13%	
Other Operating Sales	2,800,120	3,320,950	2,716,585		(520,830)	-16%	A
Total Operating Revenues	108,254,229	109,691,216	105,035,904		(1,436,987)	-1%	
OPERATING EXPENSES							
Salaries and Wages	24,563,727	23,183,489	22,827,355		1,380,238	6%	
Employee Benefits	10,661,572	12,324,771	10,121,942		(1,663,199)	-13%	E
Services and Supplies	31,419,113	31,125,499	29,762,699		293,614	1%	
Total Operating Expenses Before Depreciation	66,644,412	66,633,759	62,711,996		10,653	0%	
Depreciation	33,518,852	33,136,228	32,966,138		382,625	1%	
Total Operating Expenses	100,163,264	99,769,986	95,678,134		393,278	0%	
OPERATING INCOME	8,090,965	9,921,230	9,357,770		(1,830,265)	-18%	
NONOPERATING REVENUES (EXPENSES)							
Investment Earnings	2,854,243	3,409,815	4,080,716		(555,572)	-16%	C
Debt Issuance Costs	(87,400)	(190,800)	(190,800)		103,400	-54%	C
Interest Expense	(12,514,133)	(13,052,442)	(13,052,442)		538,308	-4%	
Total Nonoperating Revenues (Expenses)	(9,747,290)	(9,833,427)	(9,162,526)		86,136	-1%	
Gain (Loss) Before Capital Contributions	(1,656,325)	87,803	195,244		(1,744,129)	-1986%	
CAPITAL CONTRIBUTIONS							
Grants	1,900,000	1,937,500	-		(37,500)	-2%	
Water Resource Sustainability Program	869,696	926,425	1,390,771		(56,729)	-6%	
Developer Infrastructure Contributions	11,226,546	15,768,318	15,768,318		(4,541,772)	-29%	E
Developer Will-serve Contributions (Net of Refunds)	4,185,412	5,067,536	5,067,536		(882,124)	-17%	E
Developer Capital Contributions - Other	10,242,156	6,697,000	7,860,930		3,545,156	53%	F
Developer Facility Charges (Net of Refunds)	5,998,608	8,517,248	9,846,889		(2,518,640)	-30%	E
Contributions from Others	275,000	-	343,630		275,000	-	
Net Capital Contributions	34,697,418	38,914,027	40,278,074		(4,216,609)	-11%	
CHANGE IN NET POSITION	33,041,093	39,001,830	40,473,318		(5,960,738)	-15%	
NET POSITION, BEGINNING PERIOD	760,033,398	602,342,294	602,342,294		157,691,104	26%	
NET POSITION, END OF PERIOD	\$ 793,074,490	\$ 641,344,124	\$ 642,815,612		\$ 151,730,366	24%	

1 FY 2020 forecast includes reduced Q4 commercial sales of \$855k in light of the Pandemic.

2 Decrease in hydroelectric revenue due to flume failure at Washoe and also lower than expected river flows.

A Decrease in other operating sales due to lower new business fees

В

Decrease in employee benefits is primarily due to \$2.2m budgeted in FY 2020 for PERS amortization of deferred outflows (non-cash). This is not budgeted in FY 2021.

- C Lower investment income due to lower cash balances and lower interest rates.
- D Lower debt issuance costs due to lower principal balance in Commercial Paper.
- E Decreases in developer contributions, including will-serve sales due to expected slowing in growth both due to the Pandemic but also we've seen slowing in growth "pre" Pandemic.

F Increase is due to direct developer contributions of \$3.9m related to two specific projects (Stonegate BPS and Kinglet BPS). These payments remain in the FY 2021 budget.

08-04-20 SAC Agenda Item 10 05-21-20 BOARD Agenda Item 8.A Attachment C

TRUCKEE MEADOWS WATER AUTHORITY

Statements of Cash Flows (Proposed) Final Budget

	(Proposed) Final Budget 2021	Rev. Budget 2021	Final Budget 2020	Fin - Rev Variance \$	Fin - Rev Variance %
OPERATING ACTIVITIES					
Cash Received From Customers	\$ 108,254,229	\$ 109,215,270	\$ 109,691,216	\$ (961,041)	-1%
Cash Paid to Employees	(35,225,299)	(35,225,299)	(33,274,359)	-	0%
Cash Paid to Suppliers	(31,419,113)	(31,419,113)	(31,125,499)	-	0%
Net Cash From Operating Activities	41,609,817	42,570,859	45,291,358	(961,041)	-2%
CAPITAL AND RELATED FINANCING ACTIVITIES					
Acquisition & Construction of Capital Assets	(54,720,000)	(53,720,000)	(58,466,000)	(1,000,000)	2%
Interest Paid on Financing	(17,165,004)	(17,165,004)	(17,765,145)	-	0%
Principal Paid on Financing	(13,460,867)	(13,460,867)	(2,829,056)	-	0%
Proceeds from Capital Debt Issuance	-	-		-	-
Redemptions of Commercial Paper Notes	(5,000,000)	(5,000,000)	(5,000,000)	-	0%
Proceeds from Refunding Bonds				-	-
Proceeds Transferred to Refunding/Redemption Escrow				-	-
Proceeds (Spending) from (on) Capital Asset Disposal				-	-
Contributions for Water Resource Sustainability Program	869,696	869,696	926,425	-	0%
Contributions From Developers-Will-Serve Letters	4,185,412	4,185,412	5,067,536	-	0%
Contributions from Developers - Other	10,242,156	10,242,156	6,697,000	-	0%
Contributions from Developers - Facility Charges	5,998,608	5,998,608	8,517,248	-	0%
Grants	2,401,825	2,401,825	1,937,500	-	0%
Bond/Note Issuance Costs	(87,400)	(87,400)	(190,800)	-	0%
Net Cash Used For Capital & Relating Financing Activities	(66,735,574)	(65,735,574)	(61,105,292)	(1,000,000)	2%
INVESTING ACTIVITIES					
Interest Received	2,854,243	2,854,243	3,409,815	-	0%
Net Cash From Investing Activities	2,854,243	2,854,243	3,409,815	-	0%
NET CHANGE IN CASH AND CASH EQUIVALENTS	(22,271,514)	(20,310,472)	(12,404,119)	(1,961,041)	10%
CASH AND CASH EQUIVALENTS, BEGINNING PERIOD	198,132,592	198,132,592	197,000,000	-	0%
CASH AND CASH EQUIVALENTS, END OF PERIOD	\$ 175,861,078	\$ 177,822,120	\$ 184,595,881	\$ (1,961,041)	-1%

Truckee Meadows Water Authority

Capital Improvement Plan FY 2021-2025

				FY	FY	FY	FY	FY	Proposed Five Year
			TMWA 5 Year Draft Capital Plan Summary	2021	2022	2023	2024	2025	CIP Total
Line	Priority	Funding	Raw Water Supply Improvements						
1	2	CR CR	Highland Canal-Upgrades-Downstream Highland Canal-Upgrades-Diversion to Chalk Bluff	225 1.500	225 300	225 300	225 100	225 100	1,125 2,300
3	1	CR	TROA Drought Storage / Implementation	50	50	50	50	50	250
4 5	2	DF & SF	Donner Lake Outlet Improvements Phase 2 IPR Demonstration Facility	300	150 3,500	1,200			150 5,000
6			Ground Water Supply Improvements	2,075	4,225	1,775	375	375	8,825
8	1	CR	Well Rehabilitation Improvements	200	200	200	200	200	1,000
9 10	1 2	DF DF	Double Diamond #5 and Equipping Callamont Well South Equipping	50	450 60	1,140	60	1,140	1,700 1,200
11 12	2	CR	Air Guard Well Replacement Equipping	100			1,100		1,100
13	2	CR	Lemmon Valley Well #8 Replacement	100			0	250	250
14 15	1 2	CR CR	Well Fix & Finish Well Plugging / Conversion	200 120	200	200	200	200	1,000 120
16	1	CR	NDEP Monitoring Wells	200	500				200
18	2	CR	Truckee Canyon Well 3 Site Modifications	50	500				50
19 20	1	CR & SF CR & SF	Well Head TTHM Mitigation Spring Creek Well #7 Recharge	500 75	500 425	500	500	500	2,500 500
21	1	CR	Kietzke, High, Morrill PCE Treatment	50		60	1 1 4 0		50
22	2	DF	Spring Creek Well #8 - Donovan		30	910	1,140		2,000
24 25	1	CR CR	Fish Springs Ranch TDS Monitoring Wells Fish Springs Ranch Weather Station	300 10					300 10
26	1	CR	Geothermal Fluid Monitoring Well	100			4 0 0 0		100
27			Total Ground water	2,705	2,365	3,010	4,260	2,290	14,630
29 30	1	CR	Treatment Plant Improvements Chalk Bluff Plant Improvements	650	750	550	365	360	2 675
31	1	CR	Glendale Treatment Plant Improvements	400	375	200	1,000	375	2,350
32 33	1	CR CR	Glendale Filter Underdrains	800	800	800	800 500	800 500	4,000
34	3	CR	Chalk Bluff Lighting Upgrade		250	350			350
36	2	CR	Orr Ditch Pump Station Rehab	200	≥50 5,000	5,000			250 10,200
37 38	1	CR CR	Truckee Canyon Water Treatment Improvements	100 60	100 20	20 20	20 20	20 150	260 270
39	1	CR	SCADA Rehab / Plant Operating Software	800	500	500	20	100	1,800
40 41	1	CR & DF CR	Mount Rose Surface Water Treatment Plant I ongley Plant HV 3 and HV 4 Treatment Improvements	4,000	900	400			4,000
42	2	CR	Spanish Springs Nitrate Treatment Facility	300	500	500			1,300
43	1	CR	Chalk Bluff Electrical System Upgrades Total Treatment Plant Improvements	150 7,660	9,195	8,340	2,705	2,205	150 30,105
45									
40	1	CR	Pressure Improvements Pressure Regulators Rehabilitation		1,000	500	500	500	2,500
48	1	CR	Pressure Reducing Valve (Roll Seal) Removal	400	250	250	250	250	400
50	2	CR	Desert Fox Standby Generator	200	150	200	200	200	150
51 52	1	DF DF	Disc Drive Low Head Pump Station and Mains Longley Booster Pump Station / Double R Capacity Increase	1,900	1,900 250	1.000			3,800 1,250
53	3	CR	Pump Station Oversizing	100	100	100	100	100	500
54 55	1	CR & DF	Sullivan #2 Booster Pump Station Replacement	1,200	250	250	250	250 80	2,200
56 57	1	CR CR	Mount Rose Well #3 Pump Station Improvements Standby Generator Improvements	250 150	150	150	150	150	250 750
58	2	CR	Idlewild Booster Pump Station Improvements	100	1,200	100	100	100	1,300
59 60	1	DF CR & DF	Raleigh to Fish Springs Booster Pump Station Southwest Pump Zone Consolidation Phase 1		300 330	1,600 6,330			1,900 6,660
61	2	CR	Spanish Springs #1 Pump Zone Intertie	600		- ,		550	600
63	2	DF	Wildwood 2 Pressure Regulating Station Scada Control			100		550	100
64 65	2	CR & DF	Southwest Pump Zone Consolidation Phase 2 Sierra Summit-Kohl's Zone Consolidation			50 380	990 400		1,040 780
66	2	CR	Wild Mustang Regulated Pressure Zone			50	380		430
67 68	1 2	CR CR	Twin Lakes Booster Pump Station Thomas Creek #4 PRS	400			170		400 170
69	1	CR	Kings Row 1 Booster Pump Station	50			000		50
70	2		Lazy 5 Low Head Pump Station & Mains	150	1,200		600		1,350
72 73	1	DR CR	Common (Stonegate) Booster Pump Station Caughlin 5C Pump and Motor Replacement	2,500					2,500
74	- 1	DR	Kinglet Pump Station	1,400					1,400
75 76	2	CR CR	South Hills BPS Replacement Sierra Highlands PRS			70	3,760	490 210	4,320 210
77			Total Pressure Improvements	9,600	7,080	10,830	7,550	2,580	37,640
78			Water Main-Distribution-Service Line Improvements						
80 81	1	CR	Street & Highway Main Replacements Spring Creek South Zone Conversion	4,500	4,500	4,500	5,000	5,000	23,500
82	2	CR	Booth, Sharon Way, Monroe 24" Main Replacements	1,000	1,800	1,100	2,200		5,100
83 84	1	DF CR	South Virginia 24" Main (Kumle to Peckham) North East Sparks Tank Feeder Main Relocation	1,000	975				1,000 975
85	2	CR	Goldeneye Parkway Main Tie and Check Valve		180			0-5	180
86 87	2	CR	Spanish Springs Main Replacement	2,300				350	350 2,300
88	2		Mt Rose Tank 1 Fire Flow Improvements		400	570	2 400		970
90	3		General Waterline Extensions	100	100	100	2,400 100	100	2,570
91 92	1	DF DF	North-East Sparks Feeder Main Ph. 8 Mount Rose 5 Distribution / Pressure Improvements	750	50	2,050			2,100 750
93	2	DF	Goldenrod Main	100	50	1,200			1,250
94 95	1	DF DF	Boomtown Water System Improvements Boomtown to TMWA Connection	2,500 1.900					2,500 1.900
96	2	CR	Lemmon Valley Sand Yard	.,	530			50	530
97 98	2		Montreux High Pressure ACP Replacement				520	1,060	50 1,580
99	2	CR	2nd Galena Creek Main Crossing				40	560	600
101	2		Off-River Supply Improvements - NVS Pump Station				400	1,050	400
102	2	CR DF	Somersett #6 Main Tie & PRS Stonebrook West Main Oversizing	450			280		280 450
104	1	CR	2025 Fire Flow Improvements - Gravity <1,000 GPM	.00				550	550
105	1	CR	2025 Fire Flow Improvements - North Valleys <1,000 GPM					940	940

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					=>/	=>/			Proposed
			TMWA 5 Year Droft Capital Plan Summary	FY 2021	FY 2022	FY 2022	FY 2024	FY 2025	Five Year
106	2	DF	Deluchi to Airway Main Tie	2021	2022	2023	2024	2025 440	240
107	1	DF	SE Sparks Feeder Main Phase 1				50	4,450	4,500
108	1	DF	South Truckee Meadows Capacity Improvements	430	670				1,100
109	1	CR	Stewart-Taylor Main Replacements	2,000					2,000
110		CR	Roberts-Wilson-Moran Main Replacements	2,340	220				2,340
112	2	UK	Total Water Main-Distribution-Service Line Improvements	19 770	9 575	9 690	11 040	14 550	64 625
112				10,770	3,010	3,030	11,040	14,000	04,020
114			Potable Water Storage Improvements						
115	1	CR & DF	Sun Valley #2 Tank					420	420
116	2	DF	Fish Springs Terminal Tank #2	000	000	000	000	40	40
117			Storage Tank Recoats; Access; Drainage improvements Highland Reservoir Tank	900	5 000	2 700	900	900	4,500
119	1	CR & DF	STMGID Tank East Zone 11 Tank	100	2.975	2,700			3.075
120	1	CR	Lightning W Tank 2	400	_,				400
121	1	CR & DF	US 40 Tank & Feeder Main		170	300	2,730		3,200
122	2	CR & DF	Spanish Springs Altitude Valves (SC6 & DS3)			300			300
123		CR	Terminal Tank Generator		200				200
124	2	CR	Hidden Valley Tank Allitude Valve	1 500	350	4 200	3 630	1 360	20 285
125			Total Polable Water Storage Improvements	1,500	3,333	4,200	3,030	1,500	20,203
127			Hydroelectric Improvements						
128	2	CR	Forebay, Diversion, and Canal Improvements	100	100	100	100	100	500
129	3	CR	Flume Rehabilitation	150	150				300
130	3	CR	Hydro Plant Generator Rewinds		650	650	650		1,950
131	1		vvasnoe Fiume Reconstruction	1 1 1 0 0	1,450	500			1,500
132	1	CR	Washoe Flume Reconstruction Boxes 1-68	1,100	4,000	500			5,600
134	'		Hydroelectric Improvements	2.750	6.350	1.250	750	100	11.200
135				,	- ,	,			,
136			Customer Service Outlays						
137	3	CR	Meter Reading Equipment		60		75		135
138	2	DF	New Business Meters	100	100	100	100	100	500
139			Mueller Pit Replacements former Washoe County	125	125	125	125	125	625 1 250
140	1		AMI Automated Meter Infrastructure	2 100	6 000	6 000	6 000	1 000	21 100
142			Total Customer Service Outlays	2,575	6,535	6,475	6,550	1,475	23,610
143				,				, -	-,
144			Administrative Outlays						
145	2	CR	GIS / GPS System Mapping Equipment		20	4.5	20		40
146	2	CR	IT Server Hardware	180	30	45	30		285
147	2		IT Physical Access Security Upgrades	45	60	70 60	60		205
140	2	CR	Printer / Scanner Replacement	40	50		100		190
150	3	CR	Crew Trucks / Vehicles	650	750	750	850	950	3,950
151	1	CR	Emergency Response Projects	150	150	150	150	150	750
152	1	CR	CIS System Replacement	1,000					1,000
153		CR	Emergency Operations Annex Design / Construction	250	200	0	250	250	500
154	<u> </u>		Physical Access Control System Ungrade	250	200	200	200	200	1,050
156		CR	CSR Work Area Security Upgrade	360					360
157	1	CR	Physical Site Security Improvements	200	150	100	100	100	650
158	1	CR	Medeco Intelligent Key System		150	100	100		350
159			Total Administrative Outlays	3,135	1,720	1,475	1 <u>,</u> 870	1 <u>,</u> 650	9,850
160									
161			Total Capital Spending Outlays	51,770	56,640	47,045	38,730	26,585	220,770
162			Ownerial Dusingta Fundad by Davestrowers						
164	2	MR	Special Projects Punded by Development Water Meter Retrofits	100	100	100	100	100	500
165	3	DF	Water Right Purchases	150	150	300	300	300	1,200
166	Ť		······································						.,=••
167			Total Special Projects Funded by Development	250	250	400	400	400	1,700
168									
169			Iotal Projected Capital Spending Including Projects Funded By Development	52,020	56,890	47,445	39,130	26,985	222,470
170									
171			Former STMGID System Improvements						
172	2	STMGID	STMGID Well Fix & Finish	150	150	150	150	150	750
173		STMGID	STMGID Conjunctive Use Facilities	1,600	500				2,100
1/4	1	STMGID	STMCID MUEIIER MIT Replacements	50	100	1 000			2 000
175		STMGID	STMGID NAC Deficiencies Ph2 - Sioux Trail Geiger Grade Westwind Cr	800	100	1,000			2,000
177	1	STMGID	STMGID Well #1 Re Drill and Equipping		900				900
178			Total Former STMGID Capital Spending - Allocated Funding	2,700	1,650	1,950	150	150	6,600
179									
180			Total Projected Capital Spending Including STMGID - Allocated Funding	54,720	58,540	49,395	39,280	27,135	229,070

	FY	FY	FY	FY	FY	Five Year
	2021	2022	2023	2024	2025	CIP Total
Customer Rates	32,472	34,983	34,266	32,875	19,210	153,806
Developer Fees	11,910	11,983	11,729	5,905	7,425	48,952
Developer Reimbursements	3,900	0	0	0	0	3,900
STMGID Reserve Funds	2,700	1,650	1,950	150	150	6,600
Water Meter Retrofit / Developer Fees	2,200	3,711	100	100	100	6,211
Sustainability	438	2,213	850	250	250	4,001
Farad Insurance Settlement - Applied to Orr Ditch Hydro project	1,100	4,000	500	0	0	5,600
Grants	0	0	0	0	0	0
Total	54,720	58,540	49,395	39,280	27,135	229,070
Check Total	0	0	0	0	0	0

54,720	58,540	49,395	39,280	27,135	229,070
-	-	-	-	-	-



June 2020



Photo By: Angel Lacroix, TMWA Engineer

Photo Of: Pressure Reducing Station at Nectar Way

Five Year Capital Improvement Plan Fiscal Year 2021 - 2025

Truckee Meadows Water Authority is a not-for-profit, community-owned water utility,overseen by elected officials and citizen appointees from Reno, Sparks, and Washoe County

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INTRODUCTION

The Truckee Meadows Water Authority's (TMWA's) Five-Year Capital Improvement Plan 2021-2025 (CIP), describes all infrastructure construction and major capital outlays that will take place between July 1, 2020 and June 30, 2025. Guidance for identifying and scheduling projects in the CIP is provided by TMWA's 2015-2035 Water Facility Plan (WFP) and the 2016-2035 Water Resource Plan (WRP). The 2020-2040 WRP Plan is currently being updated and expected to be adopted by the Board in calendar year 2020. The updated Plans will reflect the acquisition of West Reno Water Company, and other small connections in Verdi.

TMWA is a joint powers authority formed in November 2000, pursuant to a Cooperative Agreement (as amended and restated as of February 3, 2010, the "Cooperative Agreement") among the City of Reno, Nevada ("Reno"), the City of Sparks, Nevada ("Sparks") and Washoe County, Nevada (the "County"). The Authority owns and operates a water system (the "Water System") and develops, manages and maintains supplies of water for the benefit of the Truckee Meadows communities. On January 1, 2015, TMWA, the WCWU and STMGID consolidated to create a regional water system under TMWA. TMWA has a total of 162 square miles of service area, which includes the cities of Reno and Sparks and other surrounding populated areas of the County (except certain areas in the vicinity of Lake Tahoe and other small areas bordering California). TMWA has no authority to provide water service outside of its service area; however, may provide service in the future to developments that are annexed into its service area.

The CIP incorporates a comprehensive compilation of water system improvements for TMWA. A major feature of the CIP is the construction of several projects that will expand the conjunctive use of the region's water resources. The philosophy behind conjunctive use of local water resources is to maximize the use of surface water while preserving the integrity of groundwater resources which are drawn upon during periods of persistently dry weather. Another aspect of the CIP is to expand the Aquifer Storage and Recovery Program (ASR Program) which is the recharge of groundwater basins with treated surface water, and explore the possibilities related to Advanced Purified Water (APW). In addition, this CIP includes several major projects to extend limited water service to the Verdi area, made possible by cost effective oversizing of developer main extensions. Full capacity water service for the entire Verdi area will no be available until an additional \$17.0 million of new backbone water facilities are constructed.

The CIP constitutes an essential component in TMWA's system of planning, monitoring and managing the activities of purveying water and generating hydroelectric power. The CIP is incorporated into a broader, constantly-updated Five-Year Funding Plan (FP) for a comparable period. This Funding Plan (FP) will determine adequate levels and sources of funding for projects contained in the CIP.

The 2020-2024 FP indicates that TMWA can fund the CIP in light of a significant funding gap. This situation is the result of substantial reductions in water demands resulting from the drought that ended in the spring of 2017. Otherwise there appears to be adequate treasury and revenues from

various sources to fund operations, pay principal and interest on existing debt, and capital improvements as presented in the CIP.

The CIP includes total spending of \$229.1 million with approximately 67.1% or \$153.8 million dedicated to upgrades or replacement of existing infrastructure, and approximately 21.4% or \$49.0 million allocated to construction of new water system capacity projects, conjunctive use construction projects, retrofit of remaining unmetered services, and potential opportunistic acquisition of water rights. Construction and capital outlays associated with the former STMGID service area are estimated to be approximately 2.9% or \$6.6 million of total spending over fiscal years 2021-2025. STMGID transferred reserves will not be enough to fund the next five years of capital improvements in this category. STMGID Projects totaling \$0.06 million have been included in customer funded projects. Of the total projected spending over the next five years 6.8% or \$15.5 million is considered contingency spending which is dependent on certain events occurring to trigger spending. The \$229.1 million in projected spending is grouped into broad categories of improvements and spending outlays. These categories are described below with detailed project descriptions to be found in the Project Description Section.

Raw Water Supply Improvements contains 3.9% or approximately \$8.8 million of total spending in the CIP. Projects focus on improvements to the Highland Canal/Siphon raw water conveyance infrastructure, upstream storage improvements for Donner Lakes where TMWA stores Privately-Owned Stored Water (POSW) and expenses associated with the storage and implementation of the Truckee River Operating Agreement (TROA). Construction of an APW Demonstration Facility is also included in this category which will be built as a follow up to the OneWater NV advanced purified water feasibility study, and will be a joint effort with other agencies.

Ground Water Supply Improvements contains 6.4% or approximately \$14.6 million of total spending in the CIP. These projects focus on preserving existing well capacities, drilling and equipping of new wells and at times complete replacement of existing wells.

Treatment Plant Improvements contains 13.1% or approximately \$30.1 million of total spending in the CIP. Construction of the Mt. Rose Surface Water Treatment Plant will be completed in fiscal year 2021, and will provide additional critical conjunctive use water supplies on the Mt. Rose/ Galena Fan with water sourced from local creeks. The Orr Ditch pump station project will increase redundancy and reliability by enhancing the Truckee River source of supply to the Chalk Bluff Water Treatment Plant. Other spending in this category targets fix and finish projects with the primary focus on the Chalk Bluff and Glendale Surface Water Treatment Plants located on the Truckee River. Other improvements focus on satellite water system treatment upgrades and a complete upgrade of the Supervisory Control and Data Acquisition (SCADA) system which provides centralized automated system control and data storage for the distribution system and treatment plants.

Distribution System Pressure Improvements contains 16.4% or approximately \$37.6 million of total spending and is the most significant spending category in the CIP. This spending is bifurcated into pressure improvements and water main and service line improvements. Pressure improvements

include pump station rebuilds and new construction, correction of pressure or fire flow deficiencies, pressure regulating station rebuilds and new construction, as well as reconstruction of pressure regulating valves.

Water Main Distribution & Service Line Improvements contains 28.2% or approximately \$64.6 million of total spending in the CIP. These improvements include replacement of aged water mains reaching end of service life, installation of new mains for new and expanded service, water main oversizing and extensions, off-river supply improvements, and two of the three major conjunctive use projects to extend surface water supplies to the areas that rely heavily on year round groundwater pumping. This last set of projects furthers the conjunctive use philosophy of water resource management, and include Mount Rose 5 Distribution/Pressure Improvements, Boomtown water system improvements, and STMGID Conjunctive Use Facilities (\$2.1 million to be funded by STMGID reserves).

Potable Water Storage Improvements contains 8.9% or approximately \$20.3 million of total spending in the CIP. These projects are comprised mainly of new treated water storage tank construction to serve new and expanded service (STMGID Tank East Zone 11 Tank), some replacement of existing treated water tank capacity as well as systematic recoating of treated water tank interiors and exteriors to extend service life of these facilities.

Hydroelectric Improvements contains 4.9% or approximately \$11.2 million of total spending in the CIP. Included in this category is the new Orr Ditch Hydro Facility, which will generate hydroelectric power for the Chalk Bluff Treatment Plant, and directly offset power costs at TMWA's largest treatment plant. Other spending centers on the three run-of-river hydroelectric facilities currently owned by TMWA. Efforts on these facilities focus primarily on flume, forebay, diversion and canal improvements as well as equipment upgrades.

Customer Service Outlays contains 10.3% or approximately \$23.6 million of total spending in the CIP. Spending in this category focuses on meter reading device replacements and meter replacement if required. The principal spending in this category focuses on consolidating the meter system to one format which will provide more frequent and automatic meter reading, and meter data management. Also, in this category is a spending provision for new business meters which is funded by development.

Administrative Outlays contains 4.3% or approximately \$9.9 million of total spending in the CIP. These outlays are primarily for Information Technology equipment, licenses, and hardware replacements as required. Included in this category of spending are fleet upgrades for heavy and light vehicles as well as excavation equipment. Included is the replacement of the Customer Information Services (CIS) system in FY21, including a customer portal for water usage information and bill payment.

Special Programs Funded by Development include outlays for water meter retrofit, and opportunistic water rights purchases. They are separated from a presentation standpoint because in the case of water right acquisitions, spending is currently driven by pricing opportunity. The

completion of the water meter retrofit project may occur during the current five-year planning horizon , with very little opportunity to meter any existing unmetered services. These projects comprise 0.7% or approximately \$1.7 million of total spending in the CIP.

Former STMGID System Improvements are separated from a presentation standpoint because projects in this category are funded by the STMGID reserve, which TMWA acquired through the acquisition of former STMGID. It contains 2.9% or approximately \$6.6 million of total spending in the CIP. Improvements in this category focus on conjunctive use, well replacement and improvements, and tank recoats. Also as meter pit failures occur in the former STMGID water system service areas those meter pits are converted to TMWA material standards. This reserve fund is expected to be depleted by the end of the five year plan.

DEFINITIONS

Capital Improvement Program Definitions

The Five-Year CIP is a planning and budgeting tool, which provides information about TMWA's infrastructure needs for a five-year time frame. Each year, the list of projects is reviewed for cost and priority. New projects may be added and other projects delayed or deleted entirely. Since most projects are mandatory or necessary, deletion of a project would be rare with the exception of contingency spending. However, capital spending plans must remain flexible, and it is often necessary to take revisions to the approved fiscal year's CIP back to the TMWA Board for approval. If construction or outlays can be deferred, TMWA will defer spending in order to preserve cash reserves, regardless whether or not there are difficult economic times. These decisions are made on a case by case basis.

Generally, capital improvements/outlays are defined as physical assets, constructed or purchased, that have a useful life of one year or longer and a cost of \$5,000 or more.

Definition of Capital Outlays

"Capital Outlays," which are in TMWA's capital budget, include construction projects that improve the life of current TMWA infrastructure, or are new additions to TMWA infrastructure, as well as computer equipment and software, vehicles, and heavy equipment needed to support TMWA's operations. These items are generally found in the Administrative category of projects. For Customer Service category, these outlays involve meter installations and related infrastructure, and acquiring meter reading equipment.

PRIORITIZATION OF PROJECTS/OUTLAYS

TMWA may not have sufficient funding to meet all its capital needs each year or may divert funding to meet unexpected capital improvements. If such conditions arise, projects are prioritized based on the effect each project has on TMWA's ability to meet customer demand and maintain water system reliability. TMWA's Five-Year Funding Plan is used to analyze total spending, identify various funding alternatives, and determine whether or not water rate adjustments will be required.

The priority categories represent a relative degree of need for any particular project and are described below.

- * **PRIORITY 1 MANDATORY:** These are considered absolutely required, and are the highest priority of all capital projects. Mandatory projects include those in final design or already under construction, or those required by legislation or regulation for protection of public health and safety. These projects are generally found in the first fiscal year of the 2021-2025 CIP. Water demands or infrastructure conditions are such that if the project is not completed TMWA runs the risk of eventually being unable to reliably provide water service to its existing customers and/or new and expanded service, or incur extended outages.
- * **PRIORITY 2 NECESSARY:** A project that is important for providing water service to customers, yet timing of construction or spending outlay is not as critical as a mandatory project. These projects are required and are generally found in the last four years of the 2021-2025 CIP. External factors such as the pace of new development or the condition of existing infrastructure may delay or accelerate the timing of project construction. A rate of return may not be applicable to projects whose economic/financial benefits cannot be easily quantified.
- * **PRIORITY 3 CONTINGENCY:** These projects or capital outlays are not immediately critical to the operation of the water system. Expenditures in this category generally require a business case study or specific criteria to be met before spending can occur. If such criteria are not met, then spending may or may not be justified. Also, some projects are deferrable if spending is required in an area of higher priority. Even though these projects and outlays are in the 2021-2025 CIP the likelihood that spending will occur may be remote and is based upon future conditions that are difficult to predict.

FUNDING OF CAPITAL SPENDING

Funding Sources

The CIP will rely on various funding sources to pay for capital projects/capital outlays. TMWA relies heavily on revenues generated from water sales, hydroelectric, and other operating sales to fund the majority of projects. Developer contributions have historically been an important funding source for certain construction projects for new and expanded water system capacity. Investment income is also available to augment other revenue sources but is minor in relation to other funding sources. Collection of developer fees have rebounded since reaching historical lows during the great recession . TMWA continues a non-reliance policy on these fees to fund operations or fund annual principal and interest payments on TMWA's outstanding debt. Residential and commercial development activity has accelerated in a meaningful manner providing financial resources to fund projects listed in the CIP for new and expanded service. TMWA may rely on the issuance of new money debt to fund large levels of capital spending in a particular period. The CIP does not anticipate reliance on funding from new money at this time. TMWA has relied on a number of new money debt issuances in the past to fund capital spending.

Developer Contributions

TMWA looks to the development community for developer contributions in the form of system development charges or direct reimbursements to fund capital expenditures related to new or expanded water service, including pump station construction or expansions and feeder main extension projects. In June 2003, the TMWA Board adopted facility charges to pay for new treatment/supply capacity projects and new storage capacity projects. TMWA began collecting these facility charges in January 2004. Under TMWA's Rule 5 these proceeds are used to support new capacity construction. Rule 7 governs the purchase of water rights and reimbursement by developers for issuance of will-serve commitments for water service. However, because of the timing of certain growth driven capital projects, additional financial resources may be called upon as needed. The most recent update to the water system facility charges, which updated area fees, supply and treatment fees, as well as storage unit costs was approved by the TMWA Board in August, 2019 with an effective date of October, 2019. These fees are subject to periodic review for funding adequacy.

Financing Background

New money revenue bond issuance has been historically an integral part of funding construction spending. TMWA has also taken advantage of lower rate, subordinated debt financing obtained through the Drinking Water State Revolving Loan Fund (DWSRF) and a tax-exempt commercial paper program (TECP) due to lower cost of capital and repayment subordination features of these funding vehicles. Federal and State Grants and loan forgiveness programs have also been identified in the past to fund projects. Customer water

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sales and various developer fees may not be immediately sufficient to pay for construction spending and capital outlays so there may be some reliance on new money debt and reliance on future tax-exempt commercial paper note sales. TMWA plans to avoid relying on additional debt whenever possible and reasonable. TMWA has been able to reduce debt by over \$100 million, and 20% during the last 4 years, and currently has no plan to increase debt to fund projects in this plan.

Rule 5 and Rule 7 Fees

These fees are collected from the development community. Rule 5 fees are paid by developers to TMWA for the construction of new water feeder mains, new treatment/supply capacity, new storage capacity, and for new or rebuilt pump stations to meet demand resulting from new and expanded service. Rule 7 Fees are derived from will-serve sales to development. TMWA historically purchased water rights on the open market and reserves these rights for will-serve letters to be sold to development. TMWA also recovers a modest amount of administrative and financing costs with the sale of each will-serve. The title to water rights to meet the demands for new and expanded service for the foreseeable future.

Water Meter Retrofit Fees

TMWA has been retrofitting flat rate water services with meter boxes, setters and meters. The intent is to meter the entire water system which is now in the final stages. To accomplish this task TMWA has collected \$1,830 for each acre-foot of demand when will-serve commitments based on surface water right dedications are issued for new or expanded service. Proceeds from the fee are used to fund water meter retrofits. Pursuant to Resolution 272 passed by the Board of Directors on January 16, 2019, the fee was broadened to include other uses. The pre-January 16, 2019 balance of these fees will be used to complete any remaining water meter retrofits and other water meter replacement projects.

Water Resource Sustainability Fund Fees

Resolution 272, passed by the Board of Directors on January 16, 2019, broadened the purpose of the Water Meter Retrofit Fee to support projects such as expanded conjunctive use, aquifer storage and recovery, demonstration and validation of exceptional quality reclaimed water uses, future water resource identification and acquisition, and other projects that enhance water resource sustainability and drought resiliency. The fee has been reduced from \$1,830 to \$1,600 for each acre-foot of demand when will-serve commitments based on surface water right dedications are issued for new or expanded service.

Capital Contributions from Other Governments

TMWA is a water wholesaler to the Sun Valley General Improvement District (SVGID). From time to time, new infrastructure must be constructed to service this retail water-service provider. There are no expectations of any need for reimbursement from this source in the CIP although historically SVGID has made contributions to TMWA.

Reserves from the Water Utility Consolidation

TMWA, the WCWU and STMGID consolidated on January 1, 2015. As a result of the consolidation, the respective treasuries of the WCWU and STMGID were transferred to TMWA. The WCWU treasury that was transferred to TMWA amounted to approximately \$43.4 million after the final transfer of funds (which was absorbed into TMWA's account) while the STMGID treasury transferred to TMWA was approximately \$15.7 million of which \$6.6 million remains. These cash and investment reserves will continue to be used to make necessary improvements in the former water utility service areas including conjunctive use enhancements.

Other Resources

One method of generating additional funds for capital improvements is to increase existing fees/charges or to add new fees/charges. However, future increases will be provisional if TMWA is able to meet revenue requirements and maintain bond coverage ratios that will suffice to maintain strong investment-grade credit ratings. TMWA has obtained many benefits of Aa2 and AA+ credit ratings from Moody's and S&P, respectively. The Board approved a five-year customer water rate plan in early 2017 which included a water rate increase of 3.0% in May of 2017 and 2018. TMWA Board deferred the 2.5% rate increases scheduled for 2019 through 2021 to 2020 through 2022, effectively delaying the rate increase plan by one year. Recently, the Board decided to defer the 2.5% rate increase in May, 2020 to September, 2020 and will revisit the remaining 2.5% increases scheduled for 2021 and 2022 before they are implemented. Water rate increases are essential for TMWA to maintain sound credit ratings and to preserve access to opportunities in the capital markets. TMWA also funds rehabilitative capital projects in a meaningful manner due to water delivery being an essential municipal service.

FISCAL YEAR 2021 CAPITAL SPENDING-THE CAPITAL BUDGET

TMWA expects to spend \$54.7 million for fiscal year 2021, the first year of the FY 2021-2025 CIP. Of this total \$32.5 million will be paid for by customer rates for water system rehabilitation, hydroelectric improvements, pressure system improvements, water main distribution service line improvements, and administrative and customer service outlays. While \$15.8 million will be paid for by developer fees and will be dedicated to water system expansion, limited opportunistic acquisition of water rights and some water meter retrofit activities. Finally, STMGID reserves account for \$2.7 million of improvements in the STMGID area.

SUMMARY OF PROJECTS FOR THE FISCAL YEAR 2021 BUDGET

Total construction spending, acquisition spending, and capital outlays are expected to be \$54.7 million for the fiscal year 2021. TMWA has established the following projects for the capital budget in fiscal year 2021 (Amounts presented in thousands of dollars):

Summary of Projects for FY 2021	Amount
Raw Water Supply Improvements	
Highland Canal-Upgrades-Downstream	225
Highland Canal-Upgrades-Diversion to Chalk Bluff	1,500
TROA Drought Storage / Implementation	50
Advanced Purified Water Demonstration Facility	300
Total Raw Water Supply	2,075
Ground Water Supply Improvements	
Well Rehabilitation Improvements	200
Double Diamond #5 and Equipping	50
Sunrise Well #3 Replacement	100
Well Fix & Finish	200
Well Plugging/Conversion	120
NDEP Monitoring Wells	200
Thomas Creek Well and Spring Creek 5 Equipping	750
Truckee Canyon Well 3 Site Modifications	50
Well Head TTHM Mitigation	500
Spring Creek Well #7 Recharge	75
Kietzke, High, Morrill PCE Treatment	50
Fish Springs Ranch TDS Monitoring Wells	300
Fish Springs Ranch Weather Station	10
Geothermal Fluid Monitoring Well	100
Total Ground Water Supply	2,705

Summary of Projects for FY 2021 (continued)	Amount					
Treatment Plant Improvements						
Chalk Bluff Treatment Plant Improvements	650					
Glendale Treatment Plant Improvements	400					
Chalk Bluff Filter Underdrains	800					
Orr Ditch Pump Station Rehab	200					
Truckee Canyon Water Treatment Improvements	100					
Lightning W Treatment Improvements	60					
SCADA Rehab / Plant Operating Software	800					
Mount Rose Surface Water Treatment Plant	4,000					
Longley Plant HV 3 and HV 4 Treatment Improvements	200					
Spanish Springs Nitrate Treatment Facility	300					
Chalk Bluff Electrical System Upgrades	150					
Total Treatment Plant	7,660					
Pressure Improvements						
Pressure Reducing Valve (Roll Seal) Removal	400					
Land Acquisitions	250					
Disc Drive Low Head Pump Station and Mains	1,900					
Pump Station Oversizing	100					
Pump Station Rebuilds, Rehabilitations	1,200					
Mount Rose Well #3 Pump Station Improvements	250					
Standby Generator Improvements	150					
Idlewild Booster Pump Station Improvements	100					
Spanish Springs #1 Pump Zone Intertie	600					
Twin Lakes Booster Pump Station	400					
Kings Row 1 Booster Pump Station	50					
Laxy 5 Low Head Pump Station and Mains	150					
Common (Stonegate) Booster Pump Station	2,500					
Caughlin 5C Pump and Motor Replacement	150					
Kinglet Pump Station						
Total Pressure Improvements	9,600					
Water Main-Distribution-Service Line Improvements						
Street & Highway Main Replacements	4,500					
Spring Creek South Zone Conversion						
South Virginia 24" Main - Kumle to Peckham	1,000					
Spanish Springs Main Replacement	2,300					

General Waterline Extensions

Mount Rose 5 Distribution/Pressure Improvements

Boomtown Water System Improvements

100

750 2,500

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Project Summary for FY 2021 (continued)	Amount
Boomtown to TWMA Connection	1,900
Stonebrook West Main Oversizing	450
South Truckee Meadows Capacity Improvements	430
Stewart-Taylor Main Replacements	2,000
Roberts-Wilson-Moran Main Replacements	2,340
Total	19,770
Potable Water Storage Improvements	
Storage Tank Recoats; Access; Drainage Improvements	900
Highland Reservoir Tank	100
STMGID Tank East Zone 11 Tank	100
Lightning W Tank #2	400
Total Potable Water Storage	1,500
Hydroelectric Improvements	
Forebay, Diversion, and Canal Improvements	100
Flume Rehabilitation	150
Washoe Flume Reconstruction	50
Orr Ditch Hydro Facility	1,100
Washoe Flume Reconstruction Boxes 1-68	1,350
Total Hydroelectric	2,750
Customer Service Outlays	
New Business Meters	100
Mueller Pit Replacements former Washoe County	125
Galvanized / Poly Service Line Replacements	250
AMI Automated Meter Infrastructure	2,100
Total Customer Service Outlays	2,575
Administrative Outlays	
IT Server Hardware	180
IT Network Security Upgrades	45
IT Physical Access Security Upgrades	60
Printer / Scanner Replacement	40
Crew Trucks / Vehicles	650
Emergency Response Projects	150
CIS System Replacement	1,000
System Wide Asphalt Rehabilitation	250
Physical Access Control System Upgrade	200
CSR Work Area Security Upgrade	360
Physical Site Security Improvements	200
Total Administrative Outlays	3,135

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Project Summary for FY 2021 (continued)	Amount
Special Projects Funded by Development	
Water Meter Retrofits	100
Water Right Purchases	150
Total Special Projects	250
Former STMGID System Improvements	
STMGID Well Fix & Finish	150
STMGID Conjunctive Use Facilities	1,600
STMGID Mueller Pit Replacements	50
STMGID NAC Deficiencies - Saddlehorn, Upper Toll, STMGID East	100
STMGID NAC Deficiencies - Phase 2 - Sioux Trail, Geiger Grade, Westwind Circle	800
Total STMGID System Improvements	2,700
Total Capital Spend for FY 2021	54,720

Detailed project descriptions are provided for all projects in the CIP. These descriptions cover the fiscal year 2021 capital budget as well as the four additional years from 2022-2025.



Photo By: Jared Harkema, TMWA Inspector

Photo of: Pyramid Hwy & Blackstone Bore Project

CAPITAL EXPENDITURES BY	FUNCTION,,
(Amounts in thousands of d	lollars)

Summary of Capital Expenditures by Function	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five Year CIP
Raw Water Supply Improvements	2,075	4,225	1,775	375	375	8,825
Ground Water Supply Improvements	2,705	2,365	3,010	4,260	2,290	14,630
Treatment Plant Improvements	7,660	9,195	8,340	2,705	2,205	30,105
Distribution System Pressure Improvements	9,600	7,080	10,830	7,550	2,580	37,640
Water Main Distribution Service Line Improvements	19,770	9,575	9,690	11,040	14,550	64,625
Potable Water Storage Improvements	1,500	9,595	4,200	3,630	1,360	20,285
Hydroelectric Improvements	2,750	6,350	1,250	750	100	11,200
Customer Service Outlays	2,575	6,535	6,475	6,550	1,475	23,610
Administrative Outlays	3,135	1,720	1,475	1,870	1,650	9,850
Water Meter Retrofit / Water Rights Purchases	250	250	400	400	400	1,700
Sub-Total TMWA Construction Spending & Outlays	52,020	56,890	47,445	39,130	26,985	222,470
Former STMGID System Improvements	2,700	1,650	1,950	150	150	6,600
Total Projected Capital Spending, Including STMGID	54,720	58,540	49,395	39,280	27,135	229,070



PRELIMINARY FUNDING PLAN FUNDING SOURCES

(Amounts in thousands of dollars)

Summary of Funding Sources	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five Year CIP Total
Capital Improvements Funded by Customer Rates	32,472	34,983	34,266	32,875	19,210	153,806
Capital Improvements Funded by Developer Fees	11,910	11,983	11,729	5,905	7,425	48,952
Capital Improvements Funded by Developer Reimbursements	3,900		_	_		3,900
Capital Improvements Funded with former STMGID Reserve Funds	2,700	1,650	1,950	150	150	6,600
Water Meter Retrofit / Water Rights Purchases	2,200	3,711	100	100	100	6,211
Capital Improvements Funded by Sustainability Fees	438	2,213	850	250	250	4,001
Farad Insurance Settlement - Applied to Orr Ditch Hydro	1,100	4,000	500			5,600
Total Projected Capital Spending	54,720	58,540	49,395	39,280	27,135	229,070

FUNDING BY PRIORITY " (Amounts in thousands of dollars)

Summary of Funding by Priority	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five Year CIP Total
Priority 1 - Mandatory Spending, Projects in Progress, Regulatory	44,400	27,860	22,715	19,970	19,580	134,525
Priority 2 - Necessary Spending	7,920	24,320	23,780	17,085	5,955	79,060
Priority 3 - Contingency Spending	2,400	6,360	2,900	2,225	1,600	15,485
Total Projected Capital Spending	54,720	58,540	49,395	39,280	27,135	229,070



PROJECT FUNCTIONS AND DESCRIPTIONS RAW WATER SUPPLY IMPROVEMENTS Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Highland Canal- Upgrades-Downstream	225	225	225	225	225	1,125
1	Customer Rates	Highland Canal- Upgrades-Diversion to Chalk Bluff	1,500	300	300	100	100	2,300
1	Customer Rates	TROA Drought Storage / Implementation	50	50	50	50	50	250
2	Customer Rates	Donner Lake Outlet Improvements Phase 2		150				150
2	Developer Fees / Sustainability Fees	Advanced Purified Water Demonstration Facility	300	3,500	1,200			5,000
Subtotal	ubtotal Raw Water Supply			4,225	1,775	375	375	8,825

Project Locations: Map of all *Raw Water Supply Improvements* projects are highlighted in the following map.



Raw Water Supply Improvements Highland Canal-Upgrades-Downstream

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Highland Canal- Upgrades-Downstream	225	225	225	225	225	1,125

PROJECT DESCRIPTION: The improvements reflected in this capital project item are for betterments along the canal downstream of the Chalk Bluff Water Treatment Plant to the Rancho San Rafael Park. Approximately 2,000 feet of "smart ditch" (a molded plastic trapezoidal channel section) has been installed downstream of Chalk Bluff in recent years. This product reduces leakage and maintenance and it is planned to continue to extend the installation in the future. Other efforts are rehabilitative in nature and may address access and security concerns.

SCHEDULE: Projects are identified and prioritized on an annual basis.



Raw Water Supply Improvements Highland Canal – Upgrades – Diversion to Chalk Bluff

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Highland Canal-Upgrades- Diversion to Chalk Bluff	1,500	300	300	100	100	2,300

PROJECT DESCRIPTION: These improvements are for the stretch of canal between the diversion on the Truckee River and Chalk Bluff Water Treatment Plant. The proposed spending is to secure the canal from trespass to enhance public safety and prevent encroachment on TMWA property. Due to swift flows in the Highland Canal TMWA will also complete fencing along the canal for public safety, install security cameras and access barriers. The proposed FY 2021 budget is for replacement of the existing 54-inch siphon pipe under the Truckee River just downstream of the diversion installed in 1954.

SCHEDULE: Projects are identified and prioritized on an annual basis.



Raw Water Supply Improvements TROA Drought Storage/Implementation

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	TROA Drought Storage / Implementation	50	50	50	50	50	250

PROJECT DESCRIPTION: TROA became effective and TMWA began implementation officially on December 1, 2015.

SCHEUDLE: Ongoing budget under TROA implementation is for additional stream gages in new locations as required, as well as improving the monitoring capabilities of existing gages as needed on an annual basis. Other smaller capital improvements are related to the operation of reservoir sites.



Raw Water Supply Improvements Donner Lake Outlet Improvements Phase 2

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Donner Lake Outlet Improvements Phase 2	_	150	_	_	_	150

PROJECT DESCRIPTION: Dredging of a portion of the Donner Lake outlet channel was completed in FY2019. The project was scaled back to fit within the CEQA emergency permitting requirements. Additional work is required to extend and improve the outlet channel further into the lake, including possible bank stabilization improvements to minimize future dredging requirements.

SCHEDULE: Permitting and preliminary design will be conducted over the next two years. Construction of improvements is scheduled beyond FY 2025.



Raw Water Supply Improvements Advanced Purified Water Demonstration Facility

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees / Sustainability Fees	Advanced Purified Water Demonstration Facility	300	3,500	1,200			5,000

PROJECT DESCRIPTION: Funds are needed to continue the OneWater NV advanced purified water feasibility study. Following the small scale-pilot study, which will be completed in FY 2021, it is likely that a larger facility will be considered for demonstration purposes. There will likely be cost sharing on this project from other local agencies and outside funding sources.

SCHEDULE: Construction for this project will begin in FY 2022.



GROUND WATER SUPPLY IMPROVEMENTS Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Well Rehabilitation Improvements	200	200	200	200	200	1,000
1	Developer Fees	Double Diamond #5 Equipping & Blending Main	50	450		60	1,140	1,700
2	Developer Fees	Callamont Well South Equipping	_	60	1,140	—	—	1,200
2	Customer Rates	Air Guard Well Replacement				1,100		1,100
2	Customer Rates	Sunrise Well #3 Replacement	100	_		_		100
2	Customer Rates	Lemmon Valley Well #8 Replacement					250	250
1	Customer Rates	Well Fix & Finish	200	200	200	200	200	1,000
2	Customer Rates	Well Plugging / Conversion	120					120
1	Customer Rates	NDEP Monitoring Wells	200					200
1	Customer Rates	Thomas Creek Well & Spring Creek #5 Equipping	750	500				1,250
2	Customer Rates	Truckee Canyon Well #3 Site	50					50
1	Customer Rates / Sustainability Fees	Well Head TTHM Mitigation	500	500	500	500	500	2,500
1	Customer Rates / Sustainability Fees	Spring Creek Well #7 Recharge	75	425	_	_		500
1	Customer Rates	Kietzke, High, Morrill PCE Treatment	50					50
2	Developer Fees	Callamont Well North Equipping	_	_	60	1,140		1,200
2	Developer Fees	Spring Creek Well #8 - Donovan		30	910	1,060		2,000
1	Customer Rates	Fish Springs Ranch TDS Monitoring	300	_				300
1	Customer Rates	Fish Springs Ranch Weather Station	10					10
1	Customer Rates	Geothermal Fluid Monitoring Well	100	_	_	_	_	100
Subtotal	Ground Water Sup	ply	2,705	2,365	3,010	4,260	2,290	14,630

Project Locations: Map of all *Ground Water Supply Improvements* projects are highlighted in the following map.

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Ground Water Supply Improvements Well Rehabilitation Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Well Rehabilitation Improvements	200	200	200	200	200	1,000

PROJECT DESCRIPTION: Funds are budgeted to rehabilitate TMWA production wells as required. Typically for subgrade rehabilitation efforts, five to six wells are inspected, tested and evaluated every year to determine if rehabilitation is required. Typical subgrade rehab activities include but are not limited to pump and pump column pipe replacements; rehabilitation of well casing and screen; and other enhancements to maintain well function and capacities. Spending in fiscal years 2021-2025 will include improvements at several wells to provide general above grade well equipment and building and/or electrical upgrades. Some of the spending will go towards converting an oil lubed shaft vertical turbine to water lubed and eliminate any standing oil in the well. TMWA has over 90 production wells operating throughout the water system. TMWA relies on these wells to provide drought and emergency supply and as a supplemental source to meet peak demands on the water system.

SCHEDULE: Wells targeted for rehabilitation improvements in FY 2021 include Nugget Well, Corbett Well, Silver Knolls Well, STMGID 8 Well, and Boomtown 7.



Ground Water Supply Improvements Double Diamond #5 Equipping & Blending Main

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	Double Diamond #5 Equipping & Blending Main	50	450	_	60	1,140	1,700

PROJECT DESCRIPTION: Construct pumping facilities for the existing Double Diamond Well #5 including the pump house building, electrical power, pump/motor and valves and piping to provide an additional 1,200 gallons per minute of peak period supply to the Double Diamond area. The project also includes construction of a blending main between Double Diamond Wells #4 & #5.

SCHEDULE: Based on current growth rates, it is anticipated that the additional capacity from the new well will be needed in the summer of FY 2025.



Ground Water Supply Improvements Callamont Well South Equipping

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Callamont Well South Equipping		60	1,140		_	1,200

PROJECT DESCRIPTION: Construct pumping facilities for one of the existing Callamont wells in the Mt. Rose system including the pump house building, electrical power, pump/motor and valves and piping to provide an additional 500 gallons per minute of peak period supply to the area.

SCHEDULE: This project is currently scheduled for construction in FY 2023, but may be constructed sooner (or later) depending on the actual schedule for the proposed 210 unit Callamont residential development.



Ground Water Supply Improvements Air Guard Well Replacement Equipping

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Air Guard Well Replacement Equipping	_	_	_	1,100	_	1,100

PROJECT DESCRIPTION: Replacement of the Air Guard Well in Stead was necessary to reduce sanding and provide additional capacity to the Stead system. The new/replacement well was drilled and constructed in FY 2016. Test pumping indicates the new well will have a capacity of about 2,500 gallons per minute which is twice the capacity of the old well. The budget for FY 2024 is for constructing the pumping facilities including the well building, pump and motor, valves and piping, electrical and controls, etc.

SCHEDULE: The pumping facilities are scheduled for construction in FY 2024.



Ground Water Supply Improvements Sunrise Well #3 Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Sunrise Well #3 Replacement	100	_	_			100

PROJECT DESCRIPTION: This project involves construction activities required to move a septic tank located on a property adjacent to Sunrise Well #3. This will allow TMWA to activate the well with the Washoe County Health Department (allowing the well to be utilized as a backup well to meet demands). Sunrise Well #3 is currently located within the regulated septic tank setback radius. Allocated funds will be utilized to complete all required earthwork and install a new septic system outside of the regulated setback radius.

SCHEDULE: Septic tank relocation activities will begin during FY 2021.



Ground Water Supply Improvements Lemmon Valley Well #8 Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Lemmon Valley Well #8 Replacement	_	_	_	_	250	250

PROJECT DESCRIPTION: The existing Lemmon Valley 8 Well has been in service since 1974, making it one of the older wells in the East Lemmon Valley system. The existing well casing and screens show signs of significant corrosion. With the potential for a well casing failure, TMWA intends to drill and equip a replacement well on the existing well property. In addition, the replacement well is expected to have similar construction while producing at least 20 percent more capacity than the original Lemmon Valley 8 Well. The additional capacity will provide supply to support base load supplied from the Fish Springs groundwater system.

SCHEDULE: Well drilling will occur in FY 2025 and well equipping in FY 2026.



Ground Water Supply Improvements Well Fix & Finish

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Well Fix & Finish	200	200	200	200	200	1,000

PROJECT DESCRIPTION: Equipment improvements are expected to bring existing wells up to modern standards, including antiquated equipment replacements and improvements for water quality purposes. This project includes improvements to sodium hypochlorite rooms, pump to waste lines and drainage improvements. It also includes well retrofit for recharge where needed.

SCHEDULE: Projects are identified and prioritized on an annual basis.



Ground Water Supply Improvements Well Plugging / Conversion

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Well Plugging / Conversion	120	_	_	_	_	120

PROJECT DESCRIPTION: There are a number of old wells in the TMWA system that were recently replaced by new wells (or system supply) and are no longer viable or necessary. These old production wells may be plugged or, if they occur in areas where water level and water chemistry data are needed, they will be converted to monitoring wells. Wells slated for plugging will be disconnected from the distribution system and filled with neat cement to 2 feet below land surface. Wells slated for conversion will be designed to accommodate a 2" PVC monitoring well liner, appropriate gravel pack, and sanitary seal to allow formerly screened aquifer intervals to transmit water to the new monitoring well. Plugged wells will be terminated 1 foot below grade. Monitoring wells will be completed to 2' above land surface and secured with a steel monument where possible; otherwise they will be completed at grade with a traffic-rated vault.

SCHEDULE: New monitoring well drilling and installation as well as old monitoring well plugging activities will occur in FY 2021.



Ground Water Supply Improvements NDEP Monitoring Wells

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	NDEP Monitoring Wells	200	_	_	_	_	200

PROJECT DESCRIPTION: There are a number of old monitoring wells in the TMWA system that were relied on to collect water level and/or water quality data to meet the Nevada Division of Environmental Protection - Underground Injection Control (NDEP-UIC) Permit requirements. Several of these wells were found to be plugged and no longer viable monitoring points. This project estimate assumes 3 monitoring wells will be replaced with new monitoring wells and the 3 replaced monitoring wells will be plugged.

SCHEDULE: New monitor well drilling and installation as well as old monitoring well plugging activities began in FY 2020 and are scheduled to be completed in FY 2021.



Ground Water Supply Improvements Thomas Creek Well & Spring Creek 5 Equipping

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Thomas Creek Well & Spring Creek #5 Equipping	750	500				1,250

PROJECT DESCRIPTION: The Thomas Creek and Spring Creek 5 production wells were both replaced in FY 2019. Each well will require new infrastructure prior to use. Allocated funds will be utilized for engineering and construction activities required to bring the wells online.

SCHEDULE: This project requires new well infrastructure in FY 2021 and well equipping in FY 2022.



Ground Water Supply Improvements Truckee Canyon Well #3 Site Modifications

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Truckee Canyon Well #3 Site Modifications	50					50

PROJECT DESCRIPTION: Project includes minor site modifications in cooperation with an A&K Earthmovers project to expand their equipment yard by backfilling an existing drainage channel, relocating the Truckee Canyon Well 3 pump to waste discharge, and installing a security fence and gate. The improvements will provide a new TMWA access point to the well site that does not require travel through the A&K equipment yard.

SCHEDULE: Design was completed in FY 2019 and construction will be completed in FY 2021.


Ground Water Supply Improvements Well Head TTHM Mitigation

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates / Sustainability Fees	Well Head TTHM Mitigation	500	500	500	500	500	2,500

PROJECT DESCRIPTION: Planning, permitting and implementation of tank mixers and ventilation equipment technologies to reduce disinfection by product (DBP) formation in recharged water and receiving groundwater.

SCHEDULE: Planning and design began in FY 2018 and is ongoing. Construction of tank mixers and ventilation equipment at Zolezzi and Verdi Business Park tanks were completed in FY 2019. Other technologies will be implemented at key recharge well sites in subsequent years based on priority.



Ground Water Supply Improvements Spring Creek Well #7 Recharge

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates / Sustainability Fees	Spring Creek Well #7 Recharge	75	425		_	_	500

PROJECT DESCRIPTION: A new 12-inch diameter recharge water line and well piping improvements are needed to provide the necessary capacity to allow TMWA to recharge SC Well 7. TMWA is in the process of expanding its ASR program into areas formerly served by Washoe County.

SCHEDULE: Construction will begin in FY 2022.



Ground Water Supply Improvements Kietzke, High, Morrill PCE Treatment

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Kietzke, High, Morrill PCE Treatment	50					50

PROJECT DESCRIPTION: Currently, the raw water from these wells exceed the PCE limit, and pump-to-waste water discharges directly to the Truckee River without treatment. The project will study treatment alternatives, select a design and construct improvements to reduce PCE to acceptable levels prior to discharge into the Truckee River. It should be noted that discharge of untreated pump-to-waste water only occurs a few times per year and for very short durations since these facilities normally stay on-line for long periods once they are started up. Reimbursement for the project costs will be provided from the remediation district.

SCHEDULE: The improvements are scheduled for completion in FY 2021.



Ground Water Supply Improvements Callamont Well North Equipping

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Callamont Well North Equipping	_	_	60	1,140	_	1,200

PROJECT DESCRIPTION: Construct pumping facilities for the remaining existing Callamont well in the Mt. Rose system including the pump house building, electrical power, pump/motor and valves and piping to provide an additional 500 gallons per minute of peak period supply to the area.

SCHEDULE: This project is currently scheduled for construction in FY 2024, but may be constructed sooner (or later) depending on the actual schedule for the proposed 210 unit Callamont residential development.



Ground Water Supply Improvements Spring Creek Well #8 - Donovan

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Spring Creek Well #8 - Donovan	_		30	910	1,060	2,000

PROJECT DESCRIPTION: The project involves construction and equipping of a new production well located just south of Indian Sage Court in Spanish Springs Valley. TMWA owns a 6,000 square feet parcel at this location where a test well was previously constructed but will need access and pipeline/utility easements. It is anticipated that the new well will produce up to 500 gallons per minute of new supply for the area.

SCHEDULE: This project schedule assumes the new well is drilled and constructed in FY 2024 and the pumping facilities are constructed in FY 2025.



Ground Water Supply Improvements Fish Springs Ranch TDS Monitoring Wells

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Fish Springs Ranch TDS Monitoring Wells	300	_		_	_	300

PROJECT DESCRIPTION: This project involves installing a network of wells that will monitor TDS concentrations and vertical gradients near the Fish Springs Ranch production wellfield in Honey Lake Valley. These monitoring locations will provide critical water quality information associated with increased groundwater production at Fish Springs Ranch. Allocated funds will be utilized to drill and construct three nested monitoring wells completed to approximately 450-feet below land surface.

SCHEDULE: Design and construction for the project is scheduled to be completed in FY 2021.



Ground Water Supply Improvements Fish Springs Ranch Weather Station

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Fish Springs Ranch Weather Station	10	_	_			10

PROJECT DESCRIPTION: This project involves purchasing and installing a new weather station that will record information required by the Nevada Department of Water Resources as part of the Honey Lake Valley Hydrogeologic Monitoring Plan. Allocated funds will be utilized to purchase all new weather station components required to achieve all monitoring requirements.

SCHEDULE: The project is scheduled to be completed in FY 2021.



Ground Water Supply Improvements Geothermal Fluid Monitoring Well

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Geothermal Fluid Monitoring Well	100	_	_	_	_	100

PROJECT DESCRIPTION: This project involves drilling and constructing a new well that will monitor fluid flux on the boundary of the Steamboat Hills geothermal outflow zone in South Truckee Meadows. The well will be installed to monitor water quality changes that may eventually impact down gradient municipal supply wells. Allocated funds will be utilized to drill, construct and test a four- to six-inch monitoring well completed to approximately 600-feet below land surface.

SCHEDULE: New monitoring well drilling and construction will occur in FY 2021.



TREATMENT PLANT IMPROVEMENTS Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Chalk Bluff Treatment Plant Improvements	650	750	550	365	360	2,675
1	Customer Rates	Glendale Treatment Plant Improvements	400	375	200	1,000	375	2,350
1	Customer Rates	Chalk Bluff Filter Underdrains	800	800	800	800	800	4,000
1	Customer Rates	Glendale Filter Underdrains	_			500	500	1,000
3	Customer Rates	Chalk Bluff Lighting Upgrade			350			350
3	Customer Rates	Glendale Lighting Upgrade	_	250		_		250
2	Customer Rates	Orr Ditch Pump Station Rehabilitation	200	5,000	5,000			10,200
1	Customer Rates	Truckee Canyon Water Treatment Improvements	100	100	20	20	20	260
1	Customer Rates	Lightning W Treatment Improvements	60	20	20	20	150	270
1	Customer Rates	SCADA Rehab / Plant Operating Software	800	500	500			1,800
1	Customer Rates / Developer Fees	Mount Rose Surface Water Treatment Plant	4,000					4,000
2	Customer Rates	Longley Plant HV 3 & 4 Treatment Improvements	200	900	400	_	_	1,500
2	Customer Rates	Spanish Springs Nitrate Treatment Facility	300	500	500	_		1,300
1	Customer Rates	Chalk Bluff Electrical System Upgrades	150			_		150
Subtotal	Treatment In	nprovements	7,660	9,195	8,340	2,705	2,205	30,105

Project Locations: Map of all *Treatment Plant Improvements* projects are highlighted in the following map.

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Treatment Plant Improvements Chalk Bluff Treatment Plant Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Chalk Bluff Treatment Plant Improvements	650	750	550	365	360	2,675

PROJECT DESCRIPTION: The Chalk Bluff Water Treatment Plant is 24 years old and requires rehabilitation work to remain operational 24/7/365. This spending is classified as necessary due to the criticality of maintaining plant operations during rehabilitation work. Plant improvements include, but are not limited to, plate settlers inspections, valve and instrument replacement, filter media replacement, UPS upgrades, Trac Vac/sludge removal improvements, treatment train isolation valves, flow meter improvements and safety improvements.

SCHEDULE: Major projects and timelines include: ice fighting improvements to maintain raw water supply via the Highland Canal will continue in FY 2021, instrumentation upgrades will continue within the next five years as obsolete instruments are no longer supported by suppliers, solids removal upgrades started in 2018 will wrap up in FY 2021. Work to isolate sections of the treatment plant influent trains will begin in FY 2019. Filter media replacement will occur when yearly filter media evaluation indicates that replacement will soon be necessary. Since the Chalk Bluff plant is operated year-round, most work will continue over the course of the five-year CIP and when system demands allow maintenance.



Treatment Plant Improvements Glendale Treatment Plant Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Glendale Treatment Plant Improvements	400	375	200	1,000	375	2,350

PROJECT DESCRIPTION: The Glendale Water Treatment Plant is 40 years old and while there have been significant upgrades, Glendale remains a significant piece of the water supply portfolio by operating 24/7 typically during the months of April through October. Glendale plays an important role due to its availability to treat off-river water supplies, such as groundwater wells that cannot pump straight to the distribution system. This spending is classified as necessary due to the criticality of maintaining plant operations. Plant improvements include, but are not limited to, plate settler inspections, valve and instrument replacement, Trac Vac improvements, flow meter improvements, treatment chemical upgrades and maintenance storage/ shop upgrades.

SCHEDULE: The treatment plant maintenance shop and storage improvements are currently scheduled in FY 2024. Instrumentation upgrades will continue within the next five years as obsolete instruments are no longer supported by suppliers. Filter media replacement will occur when yearly filter media evaluation indicates that replacement will soon be necessary. Since the Glendale plant is used seasonally, most work will continue over the course of the five-year CIP and during the periods that the plant is not operating.



Treatment Plant Improvements Chalk Bluff Filter Underdrains

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Chalk Bluff Filter Underdrains	800	800	800	800	800	4,000

PROJECT DESCRIPTION: The dual media filters at Chalk Bluff are nearing 27 years old and maintenance and/or repairs are needed on filters that have experienced recent underdrain performance issues. An engineering evaluation of the filters has been completed and an entire replacement of one or more filter underdrains is recommended.

SCHEDULE: Due to cost and operational complexities associated with taking a filter out of service, this will be a multi-year effort beginning with design and bidding in FY 2021 and construction taking place in at least FY's 2021-25.



Treatment Plant Improvements Glendale Filter Underdrains

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Glendale Filter Underdrains	_	_	_	500	500	1,000

PROJECT DESCRIPTION: The dual media filters at Glendale are nearing 24 years old and maintenance and/or repairs are needed on filters that have experienced recent underdrain performance issues. An engineering evaluation of the filters has been completed and an entire replacement of one or more filter underdrains is recommended.

SCHEDULE: Due to cost and operational complexities associated with taking a filter out of service, this will be a multi-year effort beginning with design and bidding in FY 2024 and construction taking place in at least FY's 2024-25.



Treatment Plant Improvements Chalk Bluff Lighting Upgrade

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Chalk Bluff Lighting Upgrade	_	_	350	_	_	350

PROJECT DESCRIPTION: Upgrade lighting at the Chalk Bluff Water Treatment Plant. Work will include all areas and buildings outside of the most recent remodel areas as well as upgrades to outside area lighting.

SCHEDULE: Lighting upgrade is scheduled to begin in FY 2023.



Treatment Plant Improvements Glendale Lighting Upgrade

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Glendale,,Lighting Upgrade	f	250	f	f	f	250

PROJECT DESCRIPTION: Upgrade,,lighting,,at,,the,,GlendalWater,,Treatment,,Plant.,Work will,,include,,all,,areas,,and,,buildings,,outside,,of,,the,,most,,recent,,remodel,,areas,,as,,well,,as,,upgrades to,,outside,,area,,lighting.

SCHEDULE: Lighting, upgrade, is, scheduled, to, begin, in, **F2022**.



Treatment Plant Improvements Orr Ditch Pump Station Rehabilitation

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Orr Ditch Pump Station Rehabilitation	200	5,000	5,000			10,200

PROJECT DESCRIPTION: This project will increase redundancy and reliability by enhancing the Truckee River source of supply to the Chalk Bluff Water Treatment Plant. Currently, there are very limited options to facilitate repairs or conduct preventative maintenance due to the location and arrangement of the intake structure and wet well. The project design may include modifying the existing proprietary wet well submersible pump design into a pedestal-style vertical turbine pump arrangement with non-submerged motors, may include the construction of a building over the top of the wet well to increase security and allow a safer means of performing maintenance activities and may also incorporate a system to eliminate silting issues within the intake structure.

SCHEDULE: Planning and design will be completed in FY 2021. Construction will commence in FY's 2022-23 and scheduled to be completed in FY 2023.



Treatment Plant Improvements Truckee Canyon Water Treatment Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Truckee Canyon Water Treatment Improvements	100	100	20	20	20	260

PROJECT DESCRIPTION: The current treatment system which removes arsenic, iron, and manganese consists of a greensand filter system and an evaporation pond for backwash water with a total capacity of about 100 gallons per minute. Scheduled improvements may include the addition of a polymer feed system to improve filter performance, fine tuning of the treatment process to reflect chemical changes in the raw water and replacement of miscellaneous components and control upgrades.

SCHEDULE: Expenditures in FY's 2021- 25 are contingent spending related to treatment efficiency and for chemical changes in the raw water.



Treatment Plant Improvements Lightning W Treatment Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Lightning,,W,,Treatment Improvements	60	20	20	20	150	270

PROJECT DESCRIPTION: The,,existing,,treatment,,process,,consists,,of,,two,,ion,,exchange,,resin pressure,,vessels,,to,,remove,,uranium.,,Previous,,work,,included,,change,,out/replacement,,of,,the,,filter media,,,disposal,,of,,the,,spent,,medi**T**,he,,remaining,,work,,includes,,miscellaneous,,improvements,,to the,,building,,that,,houses,,the,,treatment,,equipment.

SCHEDULE: ,The,,FY,,2021,,work,,includes,,miscellaneous,,building,,improvements.,,



Treatment Plant Improvements SCADA Rehab/Plant Operating Software

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	SCADA,,Rehab,,/,,Plant Operating,,Software	800	500	500	f	f	1,800

PROJECT DESCRIPTION: SCADA,,(Supervisory,,Control,,and,,DatAcquisition),,is,,the,,sytem by,,which,TMWA,,monitors,,,records,,and,,controls,,the,,water,,system,,inputs,,,outpttows,,and pressures.,,Data,,acquired,,by,,these,,system,,controls,,are,,primarily,,monitored,,at,,the,,treatment plants,,,but,,the,,system,,equipment,,and,,technology,,are,,spread,,throughout,,the,,water,,system infrastructure.,,Much,,of,,the,,technology,,is,,approaching,,obsolescence,,and,,needs,,to,,be,,replaced with,,emphasis,,on,,standardization,,of,,programmable,,logic,,controllers,,(PLC),,and,,other,,equipment. Therefore,,,TMWA,,decided,,on,,a,,systematic,,approach,,to,,updating,,the,,equipmant,,operating software,,starting,,in,,fiscal,,year,,2015,,with,,telemetry,,improvement,,in,,the,,ensuing,,four,,years,,to convert,,to,,wireless,,transmission,,of,,data,,feeds,,where,,possible.

SCHEDULE: The,,improvements,,and,,replacements,,of,,the,,equipment,,and,,operating,,software have,,already,,begun,,and,,will,,continue,,through,,F2023.



Treatment Plant Improvements Mt. Rose Surface Water Treatment Plant

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates / Developer Fees	Mount Rose Surface Water Treatment Plant	4,000	_	_	_	_	4,000

PROJECT DESCRIPTION: Due to a combination of municipal and domestic well pumping and the extended drought, TMWA has determined that additional infrastructure and facilities are needed to utilize Whites Creek resources to improve the long-term viability and sustainability of groundwater supplies in this region. To provide reliability of supply, avoid or reduce pumping costs and avoid major on-peak capacity improvements within the lower TMWA gravity system, a 4 MGD treatment plant located off of Callahan Road near the Monte Vista subdivision has received a SUP to treat Whites Creek water. The County's South Truckee Meadows Facility Plan recognized "The upper treatment plant is an integral component of the recommended water supply plan. Most importantly; it will provide recharge water and/or offset winter groundwater pumping in the upper Mt. Rose fan area."

SCHEDULE: Permitting, design, and bidding was completed in FY 2019. Construction began in FY 2019. Construction is scheduled for completion in FY 2021.



Treatment Plant Improvements Longley Lane HV 3 and HV 4 Treatment Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Longley Plant HV 3 & 4 Treatment Improvements	200	900	400	_	_	1,500

PROJECT DESCRIPTION: TMWA completed planning and preliminary design of an innovative UV disinfection / Arsenic blending water treatment process to treat the HV 3 and HV 4 groundwater wells that are out of service due to surface water influence and elevated arsenic. These wells were formerly treated at the Longley Lane WTP which is currently not being utilized as a treatment facility due to needed safety improvements on the chemical feed, membrane clean-in-place and the solids handling piping systems. An assessment of the plant was completed, and short-term improvements identified to modify the facility to serve as a booster pump station using either surface water or groundwater supply sources.

SCHEDULE: Planning and permitting to be completed in FY 2021. Design and construction to be performed in FY's 2021 - 23.



Treatment Plant Improvements Spanish Springs Nitrate Treatment Facility

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Spanish Springs Nitrate Treatment Facility	300	500	500	_	_	1,300

PROJECT DESCRIPTION: Initiation of planning, permitting, site acquisition and design for a 3 MGD biological water treatment process to treat several groundwater wells in Spanish Springs that are out of service due to elevated nitrate and arsenic. Treatment is required to maintain and restore the service capacity of the wells.

TMWA completed the operation and testing of a 5 GPM pilot treatment plant in 2018. Biological treatment of nitrate in potable water is currently not permitted in Nevada. TMWA, working with Carollo Engineers, UNR and WaterStart, has evaluated this innovative technology and determined it to be a cost-effective treatment solution compared to traditional, high cost alternatives such as ion exchange.

SCHEDULE: Planning, permitting, site acquisition and design to be conducted in FY's 2021-23.



Treatment Plant Improvements Chalk Bluff Electrical System Upgrades

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Chalk Bluff Electrical System Upgrades	150	_	_	_	_	150

PROJECT DESCRIPTION: Evaluation of the existing electrical system at the Chalk Bluff Treatment Plant to identify the cause of main breaker power disruption when electrical faults occur in auxiliary plant equipment.

SCHEDULE: Electrical System upgrades are scheduled to be completed in FY 2021.



DISTRIBUTION SYSTEM PRESSURE IMPROVEMENTS Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Pressure Regulators Rehabilitation		1,000	500	500	500	2,500
1	Customer Rates	Pressure Reducing Valve (Roll Seal) Removal	400	_	_	_	_	400
2	Customer Rates	Land Acquisitions	250	250	250	250	250	1,250
2	Customer Rates	Desert Fox Standby Generator		150				150
1	Developer Fees	Disc Drive Low Head Pump Station & Mains	1,900	1,900	_			3,800
1	Developer Fees	Longley BPS / Double R Capacity Increase		250	1,000			1,250
3	Customer Rates	Pump Station Oversizing	100	100	100	100	100	500
1	Customer Rates	Pump Station Rebuilds, Rehabilitations	1,200	250	250	250	250	2,200
2	Customer Rates / Developer Fees	Sullivan #2 BPS Replacement	_	_	_	_	80	80
1	Customer Rates	Mount Rose Well #3 Pump Station Improvements	250	_				250
3	Customer Rates	Standby Generator Improvements	150	150	150	150	150	750
2	Customer Rates	Idlewild BPS Improvements	100	1,200				1,300
1	Developer Fees	Raleigh to Fish Springs BPS Station		300	1,600			1,900
2	Customer Rates / Developer Fees	South-West Reno Pump Zone Consolidation Phase 1		330	6,330			6,660
2	Customer Rates	Spanish Springs #1 Pump Zone Intertie	600					600
1	Developer Fees	STMGID Tank #4 BPS / Transmission Line					550	550
2	Developer Fees	Wildwood Pressure Regulating Station SCADA Control	_	_	100	_	_	100
2	Customer Rates / Developer Fees	South-West Reno Pump Zone Consolidation Phase 2			50	990		1,040

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Priority	Funding Source	Description	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	CIP Total
2	Customer Rates	Sierra Summit-Kohl's Zone Consolidation	_		380	400	_	780
2	Customer Rates	Wild Mustang Regulated Pressure Zone			50	380	_	430
1	Customer Rates	Twin Lakes BPS	400		_			400
2	Customer Rates	Thomas Creek #4 PRS				170	_	170
1	Customer Rates	Kings Row 1 BPS	50					50
2	Developer Fees	Spring Creek Tanks #3 & 4 BPS Modifications				600	_	600
2	Developer Fees	Lazy 5 Low Head Pump Station & Mains	150	1,200				1,350
1	Developer Reimbursement	Common (Stonegate) Booster Pump Station	2,500				_	2,500
2	Customer Rates	Caughlin 5C Pump and Motor Replacement	150		_	_	_	150
1	Developer Reimbursement	Kinglet Pump Station	1,400			_	_	1,400
2	Customer Rates	South Hills BPS Replacement			70	3,760	490	4,320
2	Customer Rates	Sierra Highlands PRS					210	210
Sub-Tota	l Pressure Impro	ovements	9,600	7,080	10,830	7,550	2,580	37,640

Project Locations: Map of all *Distribution System Pressure Improvements* projects are highlighted in the following map.

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Distribution System Pressure Improvements Pressure Regulators Rehabilitation

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Pressure Regulators Rehabilitation		1,000	500	500	500	2,500

PROJECT DESCRIPTION: Provision is made in the annual budget for major rehabilitation or complete reconstruction of several pressure regulators in the distribution system. TMWA has evaluated nearly 130 pressure regulator stations currently in service and has identified a number of pressure regulator stations requiring a certain amount of rehabilitation on an annual basis.

SCHEDULE: This is an ongoing rehabilitation project with about 130 individual stations identified as requiring rehabilitation or replacement over the next fifteen years.



Distribution System Pressure Improvements Pressure Reducing Valve (Roll Seal) Removal

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Pressure Reducing Valve (Roll Seal) Removal	400	_	_	_	_	400

PROJECT DESCRIPTION: There were approximately 180 pressure regulating stations in former County systems where Roll Seal pressure reducing valves are installed. These valves are subject to failure on a 3-5 year basis as compared to an expected life of 10-20 years for the Cla-Val regulator valves utilized in the TMWA system. A Roll Seal failure can result in significant damage to customer homes and in most cases requires a major service outage to repair or replace the valve.

SCHEDULE: Projects will be prioritized based on potential damage (unregulated pressure) and failure rate records. FY 2021 will be the last year of multi-year project to replace Roll Seals at about 20 stations per year.



Distribution System Pressure Improvements Land Acquisitions

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Land Acquisitions	250	250	250	250	250	1,250

PROJECT DESCRIPTION: TMWA has over 120 pump stations in service. Many of these pump stations have 480 volt electrical services and are underground (below grade) in locations that allows for water infiltration. Many underground pump stations will be reaching the end of their service life, which will require replacement of the underground vault. Rather than replace the stations in place TMWA is planning to acquire other sites so these stations can be rebuilt above grade improving access and safety. Acquisition of sites may be time consuming and may not be purchased in a particular year.

SCHEDULE: This is an ongoing project with funding to allow purchase of 3-4 sites per year depending on location and market conditions.



Distribution System Pressure Improvements Desert Fox Standby Generator

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Desert Fox Standby Generator	_	150	_	_	_	150

PROJECT DESCRIPTION: This project involves furnishing and installing a new standby generator and ATS to power one 50 Hp pump at the existing Desert Fox booster pump station. This alternative pumping capacity is needed when the existing 0.5 MG Spring Creek #5A Tank is out of service for recoating or other maintenance or if an extended power outage occurs in the area.

SCHEDULE: The installation of the generator is scheduled in FY 2021.



Distribution System Pressure Improvements Disc Drive Low Head Pump Station and Mains

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	Disc Drive Low Head Pump Station & Mains	1,900	1,900	_	_	_	3,800

PROJECT DESCRIPTION: This involves construction of a new low head pump station located just north of the intersection of Disc Dr. and Sparks Blvd. in North-East Sparks/Spanish Springs Valley, along with suction and discharge mains. TMWA owns a 6,000 square foot parcel in this location and has obtained an easement out to Vista Blvd. A suction pipe must be extended from Disc Dr. to Sparks Blvd. The pump station is needed to maintain peak period distribution pressure in the area and to provide adequate suction pressure to the Vista #1 and Spanish Springs #2 pump stations. The low-head pumping option was determined to be more cost effective than oversizing of the Sparks Feeder Main projects.

SCHEDULE: Improvements are scheduled for design in FY 2021 and construction in FY's 2021 - 22.



Distribution System Pressure Improvements Longley Booster Pump Station/Double R Capacity Increase

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	Longley BPS / Double R Capacity Increase	_	250	1,000	_		1,250

PROJECT DESCRIPTION: Increase pumping capacity at the existing Longley Lane Booster Pump Station and make improvements at the Double R Intertie to provide additional peak supply to the Double Diamond area. The improvements at the Longley pump station will consist of replacing one of the existing pumps/motors with a new higher capacity unit along with electrical and motor starter upgrades. Certain components of the Double R Intertie will be replaced to provide the additional capacity without excessive friction losses.

SCHEDULE: The improvements are scheduled for FY 2022. The improvements are necessary when supply through the Double R Intertie must exceed 5,400 gallons per minute.



Distribution System Pressure Improvements Pump Station Oversizing

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Pump Station Oversizing	100	100	100	100	100	500

PROJECT DESCRIPTION: The FY 2021 project may consist of cash contributions towards construction of a new above ground booster pump station located near the Comstock Tank to replace the existing Sierra Pump Station which is located in an underground vault and is in need of major rehabilitation. TMWA would normally expend approximately \$1 million to replace an existing underground pump station with a new above ground station.

SCHEDULE: The improvements are ongoing, but the schedule is subject to change based on development & operational needs.



Distribution System Pressure Improvements Pump Station Rebuilds, Rehabilitations

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Pump,,Station,,Rebuilds, Rehabilitations	1,200	250	250	250	250	2,200

PROJECT DESCRIPTION: TMWA,,has,,over,,120,,pump,,stations,,in,,servi**e**,**n**,amount,,is budgeted,,annually,,for,,rehabilitation,,o**T**,MWA6,,older,,pump,,stations.,,Other,,pum,stations,,may require,,pump,,,motor,,and,,electrical,,upgades.,,Budget,,for,,future,,years,,will,,alloWMWA,,to complete,,up,,to,,one,,above,,ground,,replacement,,project,,per,,year,,if,,suitable,,sites,,can,,be,,acquired. Otherwise,,,normal,,rehabilitation,,work,,will,,be,,performed,,per,,the,,priorities,,established,,by,,the study,,at,a,,lower,,overall,,annual,,cost.,

SCHEDULE: In,,FY,2021,,TMWA,,is,,preparing,,to,,reconstruct,,a,,number,,of,,booster,,stations above,,ground.,,Depending,,on,,land,,acquisition,,timing,,and,,priorities,,of,,rehabilitation,,,it,,could,,be the,,Seventh,,Street,,High,,Pump,,Station,,,Seventh,,Street,,Low,,Pump,,Station,,,or,,Kings,,Row,,#2 Pump,,Station.



Distribution System Pressure Improvements Sullivan #2 Booster Pump Station Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates / Developer Fees	Sullivan #2 BPS Replacement	_		_	_	80	80

PROJECT DESCRIPTION: The project involves construction of a new above grade pump station at the site of the existing Sullivan Tank on El Rancho. The new pump station will pump to the proposed Sun Valley #2 Tank tentatively located off of Dandini Drive near the TMCC/DRI complex. Completion of these facilities should allow the retirement of the existing Sun Valley #1 pump station.

SCHEDULE: Construction has been pushed out to FY 2026 to reflect delays in obtaining a tank site due to unknowns with the US 395 Connector Project.


Distribution System Pressure Improvements Mt. Rose Well #3 Pump Station Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Mount Rose Well #3 Pump Station Improvements	250	_	_	_	_	250

PROJECT DESCRIPTION: The project involves rehab of the building, removal of pipe and valves that will no longer be necessary following completion of the Mt. Rose Well #3 improvements and upgrades to electrical and control systems.

SCHEDULE: Construction is scheduled in FY 2021.



Distribution System Pressure Improvements Standby Generator Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Standby Generator Improvements	150	150	150	150	150	750

PROJECT DESCRIPTION: A number of TMWA pumps stations have backup generation in case of power failures. TMWA incorporates a contingency for replacement of a generator in case of failure or if the Washoe County Health District requires backup generation at a particular site. No spending will occur unless necessary. This spending does not include backup generation for new pump stations required by and paid for by growth.

SCHEDULE: No single project has been identified for the current 5-year CIP and no funds will be expended unless necessary.



Distribution System Pressure Improvements Idlewild Booster Pump Station Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Idlewild BPS Improvements	100	1,200	_	_	_	1,300

PROJECT DESCRIPTION: The project will replace existing pumps and motors at the Idlewild BPS Transfer Station to insure adequate and reliable emergency capacity. It is the only booster station that is capable of transferring water from the Highland Reservoir Zone to the Hunter Creek Reservoir Zone. The station was originally constructed as part of the Idlewild WTP, and was never designed specifically for the purpose that it is used for today. Improvements identified in the project include: Properly sizing new pumps and motors for today's application, upgrading antiquated electrical systems and HVAC systems and bringing building up to modern construction codes. Evaluations by TMWA indicated this was the most cost effective alternative to provide a redundant supply for the zone and allowed retirement of the old 24-inch transmission pipeline on Plumb Lane all the way to the Hunter Creek Reservoir.

SCHEDULE: Design is scheduled for FY2021 and construction should begin in FY 2022. This schedule may be moved based on system needs.



Distribution System Pressure Improvements Raleigh to Fish Springs Booster Pump Station

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	Raleigh to Fish Springs BPS Station	_	300	1,600		_	1,900

PROJECT DESCRIPTION: The project involves construction of a new pump station to pump water from the Raleigh Heights zone to the Fish Springs terminal tank when the Fish Springs Wells are off-line or if a main break occurs on the Fish Springs transmission line. In the future, there will be a number of customers served directly from the Fish Springs terminal tank; therefore, it is necessary to provide a secondary supply to maintain continuous water service.

SCHEDULE: Implementation will begin in FY 2022 and construction in FY 2023.



Distribution System Pressure Improvements South-West Reno Pump Zone Consolidation Phase 1

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates / Developer Fees	South-West Reno Pump Zone Consolidation Phase 1		330	6,330		_	6,660

PROJECT DESCRIPTION: The project includes a new high head booster pump station located on Lakeridge golf course property adjacent to Plumas; a new 12-inch suction pipeline from Lakeside Dr.; a high pressure transmission pipeline from the pump station across golf course property to Greensboro and McCarran Blvd.; and another 12-inch pipeline tie to the Ridgeview #1 pump zone. The completion of Phase 1 will allow the retirement of four existing below ground pump stations (Lakeside, Lakeridge, Plumas, Ridgeview #1).

SCHEDULE: Design of the improvements is scheduled to begin in FY 2022. Construction is scheduled for FY 2023.



Distribution System Pressure Improvements Spanish Springs #1 Pressure Zone Intertie

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Spanish Springs #1 Pump Zone Intertie	600	_	_	_	_	600

PROJECT DESCRIPTION: The project consists of about 1,600 feet of 8-inch main from Rio Alayne Ct to Martini Rd. paralleling the Orr Ditch and a new pressure regulating station. Completion of the facilities will allow the retirement of the existing underground Spanish Springs #1 pump station.

SCHEDULE: The project is scheduled for FY 2021.



Distribution System Pressure Improvements STMGID Tank #4 Booster Pump Station / Transmission Line

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	STMGID Tank #4 BPS / Transmission Line					550	550

PROJECT DESCRIPTION: The project includes a new booster pump station located near the STMGID Tank 4/5 site and approximately 6,000 feet of 12-inch discharge main to the Mt Rose WTP. The facilities will provide a supplemental source to the Mt Rose WTP that will back up plant production on the maximum day during drought and will also provide another source of supply for implementing conjunctive use in the area.

SCHEDULE: Design and construction will begin in FY 2025 and construction will continue into FY 2026. Schedule assumes that the STMGID Conjunctive Use Facilities are completed by FY 2024.



Distribution System Pressure Improvements Wildwood Pressure Regulating Station/Scada Control

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Wildwood Pressure Regulating Station SCADA Control	_	_	100	_	_	100

PROJECT DESCRIPTION: The project involves retrofitting an existing pressure regulating station to SCADA (remote) control to provide additional transfer capacity into the Mt Rose Tank #2 zone. It will be necessary to obtain electrical service to the existing vault; install a new PLC; and to equip the existing pressure regulating valve with solenoid control to allow the valve to be remotely operated from the Glendale control room.

SCHEDULE: The project is scheduled for FY 2023 but may be delayed or accelerated depending on the timing of growth and the need for the additional tank fill capacity.



Distribution System Pressure Improvements South-West Reno Pump Zone Consolidation Phase #2

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates / Developer Fees	South-West Reno Pump Zone Consolidation Phase 2	_	_	50	990	_	1,040

PROJECT DESCRIPTION: The project is a continuation of Phase 1 and involves construction of additional water main to further integrate the new South-West Reno pump station and allow the retirement of one more existing underground pump station plus provide backup to two other pump zones.

SCHEDULE: Design of the facilities is scheduled to begin in FY 2023. Construction is scheduled to start in FY 2024.



Distribution System Pressure Improvements Sierra Summit-Kohl's Zone Consolidation

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Sierra Summit-Kohl's Zone Consolidation			380	400		780

PROJECT DESCRIPTION: The project involves construction of a new pressure regulating station (PRS) at Old Virginia and Sutherland; a short main tie between the former STMGID Well #9 site and the distribution system; and about 950 feet of 8-inch main in Sutherland from the PRS to Sage Hill Road. The improvements will convert an area with very high distribution system pressures to the existing Kohl's Regulated Zone and would expand the regulated zone by consolidating the Kohl's, Walmart and Old Virginia #2 regulated pressure zones.

SCHEDULE: The project is scheduled for construction in FY 2024.



Distribution System Pressure Improvements Wild Mustang Regulated Pressure Zone

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Wild Mustang Regulated Pressure Zone			50	380		430

PROJECT DESCRIPTION: The project involves construction of a new pressure regulator station and approximately 750 LF of water main to create a new pressure zone in the Geiger Grade area of the South Truckee Meadows to reduce distribution system pressures in the area.

SCHEDULE: Design of the construction is scheduled to begin in FY 2023. Construction is scheduled to start in FY 2024.



Distribution System Pressure Improvements Twin Lakes Booster Pump Station

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Twin Lakes BPS	400	_				400

PROJECT DESCRIPTION: The project cost contains oversizing of a developer funded booster pump station to provide redundant supply to the Summit Ridge Regulated Zone which is currently fed off of the Chalk Bluff / Highland Zone. Supply will be provided from the Hunter Creek zone. The current total is estimated at \$800,000 with TMWA providing 50% reimbursement to the developer.

SCHEDULE: Construction is planned to be completed in FY 2021.



Distribution System Pressure Improvements Thomas Creek #4 PRS

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Thomas Creek #4 PRS	_	_	_	170	_	170

PROJECT DESCRIPTION: The project involves construction of a new PRS and approximately 160 LF of water main to increase capacity to the Moonrise pressure zone. The increase in capacity will help with replenishing storage in the STMGID Tank and increase fire flow within the zone.

SCHEDULE: The project is scheduled for FY 2024.



Distribution System Pressure Improvements Kings Row 1 Booster Pump Station

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Kings Row 1 BPS	50	_	_	_		50

PROJECT DESCRIPTION: This project will replace the existing underground Kings Row #1 pump station with a new above ground pump station on TMWA property. The project is part of annual booster pump station rehabilitation/replacement program focused on reconstructing existing pump stations above grade.

SCHEDULE: Planning and design were completed in FY 2019. The project will be completed in FY 2021.



Distribution System Pressure Improvements Spring Creek Tanks #3 & #4 Booster Pump Station Modifications

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Spring Creek Tanks #3 & 4 BPS Modifications				600	_	600

PROJECT DESCRIPTION: This project will replace an existing 200 GPM pump with a new pump/motor rated for 1800 GPM at the existing Spring Creek 3/4 Tanks site in Spanish Springs Valley. The existing regulated bypass will also be equipped for SCADA control. The improvements will provide redundant supply to the Desert Springs 3 and Spring Creek 6 tank zones.

SCHEDULE: Planning, design and construction will occur in FY 2024.



Distribution System Pressure Improvements Lazy 5 Low Head Pump Station & Mains

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Lazy 5 Low Head Pump Station & Mains	150	1,200	_	_	_	1,350

PROJECT DESCRIPTION: The project involves construction of a new low head pump station located near the existing Lazy 5 Intertie in NE Sparks/Spanish Springs Valley along with suction and discharge mains. TMWA will need to acquire a parcel of land and pipeline easements out to the Pyramid Hwy. The project will increase TMWA's ability to transfer surface water to the Spanish Springs Valley and may defer more costly groundwater treatment options to increase capacity for growth.

SCHEDULE: Planning and design will occur in FY 2021 with construction scheduled in FY 2022.



Distribution System Pressure Improvements Common (Stonegate) Booster Pump Station

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Reimbursements	Common (Stonegate) Booster Pump Station	2,500					2,500

PROJECT DESCRIPTION: The project consists of design and construction of a new booster pump station to deliver the water supply for the proposed Stonegate development in Cold Springs. Suction and discharge pipelines on North Virginia and terminal storage facilities in Cold Springs will be constructed by Stonegate as applicant-installed projects. The pump station will be located on a parcel on North Virginia that has already been acquired by Stonegate. Stonegate is responsible for 100 percent of the project costs.

SCHEDULE: Design was initiated in FY 2020 and construction will occur in FY 2021.



Distribution System Pressure Improvements Caughlin 5C Pump and Motor Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Caughlin 5C Pump and Motor Replacement	150					150

PROJECT DESCRIPTION: The project involves replacement of the existing Caughlin #5 pump station "C" Pump with a higher capacity unit and construction of a main tie near Foxcreek Trail and Village Green Parkway to avoid a 300+ customer outage when Caughlin #5 Pump Station is off-line.

SCHEDULE: The project will be designed and built in FY 2021.



Distribution System Pressure Improvements Kinglet Pump Station

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Reimbursement	Kinglet Pump Station	1,400					1,400

PROJECT DESCRIPTION: The project involves construction of a new, above grade Booster Pump Station with a standby generator to serve the Broken Hills residential development in Spanish Springs. The developer is responsible for 100% of the pump station project costs. The pump station will fill a developer designed and built water storage tank for the project.

SCHEDULE: Some design work will occur in FY 2020 and construction will occur in FY 2021.



Distribution System Pressure Improvements South Hills BPS Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	South Hills BPS Replacement	_		70	3,760	490	4,320

PROJECT DESCRIPTION: The project involves construction of a new, above grade BPS with genset; 3,700 feet of 16-inch main, 250 feet of 14-inch main and 2,300 feet of 12-inch main on Broken Hills Rd, Foothill Rd and Broili; a new Caribou PRS; and 9 each individual PRV'S on customer service lines.

SCHEDULE: Planning and design is scheduled to begin in FY 2023 and construction is scheduled to begin in FY 2024 with the project completing in FY 2025.



Distribution System Pressure Improvements Sierra Highlands PRS

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Sierra Highlands PRS	_				210	210

PROJECT DESCRIPTION: The project involves construction of a new PRS located near the intersection of Sierra Highlands Drive and North McCarran Blvd. to provide a secondary/supplemental supply from the Mae Anne-McCarran zone to the Chalk Bluff zone.

SCHEDULE: Construction for the project is scheduled for FY 2025.



WATER MAIN DISTRIBUTION & SERVICE LINE IMPROVEMENTS Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Street & Highway Main Replacements	4,500	4,500	4,500	5,000	5,000	23,500
2	Customer Rates	Spring Creek South Zone Conversion	1,500	_				1,500
2	Customer Rates	Booth, Sharon Way, Monroe 24" Main Replacements	_	1,800	1,100	2,200	—	5,100
1	Developer Fees	South Virginia 24" Main - Kumle to Peckham	1,000	_	_			1,000
2	Customer Rates	North-East Sparks Feeder Tank Main Relocation		975				975
2	Customer Rates	Goldeneye Parkway Main & CV Tie		180				180
2	Developer Fees	Trademark 14" Main Tie					350	350
2	Customer Rates	Spanish Springs Main Replacement	2,300	_	_			2,300
2	Customer Rates	Mt. Rose Tank 1 Fire Flow Improvements	_	400	570			970
2	Customer Rates / Developer Fees	Stead Golf Course Main Replacement			170	2,400		2,570
3	Customer Rates	General Waterline Extensions	100	100	100	100	100	500
1	Developer Fees	North-East Sparks Feeder Main Phase 8		50	2,050			2,100
1	Developer Fees	Mount Rose 5 Distribution / Pressure Improvements	750				_	750
2	Developer Fees	Goldenrod Main		50	1,200			1,250
1	Developer Fees	Boomtown Water System Improvements	2,500				_	2,500
1	Developer Fees	Boomtown to TMWA Connection	1,900	_	_	_		1,900
2	Customer Rates	Lemmon Valley Sand Yard	—	530	—	—	—	530
2	Customer Rates / Developer Fees	Sullivan #1 Main Tie & PRS					50	50
2	Customer Rates	Montreux High Pressure ACP Replacement	_			520	1,060	1,580
2	Customer Rates	2nd Galena Creek Main Crossing				40	560	600
2	Customer Rates	Off-River Supply Improvements - STM	_	_		50	1,050	1,100

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Priority	Funding Source	Description	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	CIP Total
2	Customer Rates	Off-River Supply Improvements - NVS Pump Station	_	_	_	400	_	400
2	Customer Rates	Somersett #6 Main Tie & PRS	_			280		280
1	Developer Fees	Stonebrook West Main Oversizing	450			_		450
1	Customer Rates	2025 Fire Flow Improvements - Gravity <1,000 GPM					550	550
1	Customer Rates	2025 Fire Flow Improvements - North Valleys <1,000 GPM					940	940
2	Developer Fees	Deluchi to Airway Main Tie					440	440
1	Developer Fees	South-East Sparks Feeder Main Phase 1				50	4,450	4,500
1	Developer Fees	South Truckee Meadows Capacity Improvements	430	670		_		1,100
1	Customer Rates	Stewart-Taylor Main Replacements	2,000					2,000
1	Customer Rates	Roberts-Wilson-Moran Main Replacements	2,340					2,340
2	Customer Rates	Verdi Hydro Main Extension		320	_	_		320
Subtotal	Subtotal Water Main Distribution Improvements		19,770	9,575	9,690	11,040	14,550	64,625

Project Locations: Map of all *Water Main Distribution Service Line Improvements* projects are highlighted in the following map.

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Water Main-Distribution Service Line Improvements Street & Highway Main Replacements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Street & Highway Main Replacements	4,500	4,500	4,500	5,000	5,000	23,500

PROJECT DESCRIPTION: Provision is made each year for water main replacements in conjunction with repaving efforts by the City of Reno, City of Sparks, Washoe County and RTC. In addition to repaving projects, TMWA coordinates water main replacements with sewer main replacements in areas where TMWA also has older water lines. TMWA plans for approximately \$5.0 million annually for these efforts, so that TMWA can capitalize on repaving projects planned by other entities. Anticipated spending in the out years is reflective of historical activity. Levels of spending can vary year to year and are difficult to predict. These efforts by far are the largest expenditure in the water system rehabilitation category.

SCHEUDLE: Projects are identified and prioritized on an annual basis.



Water Main-Distribution Service Line Improvements Spring Creek South Zone Conversion

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Spring Creek South Zone Conversion	1,500					1,500

PROJECT DESCRIPTION: The project involves construction of approximately 2,800 linear feed of various size water mains, several interties, retirement of several mains and facilities including the existing Spring Creek Tanks. New water mains include 2060 linear feet of 12-inch on Pyramid Highway and 300 linear feet of 8-inch main across Pyramid Highway at Spring Ridge.

SCHEDULE: Implementation and construction will be completed by FY 2021.



Water Main-Distribution Service Line Improvements Booth, Sharon Way, Monroe 24" Main Replacements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Booth,,,Sharon,Way,,,Monroe 24",,Main,,Replacements	f	1,800	1,100	2,200	f	5,100

PROJECT DESCRIPTION: This,,project,,is,,a,,continuation,,of,,the,,previously,,constructed California-Marsh,,Intertie,,to,,provide,,reliable,,engerncy,,capacity,,to,,the,,Hunter,,Creek,,gravity zone.,,The,,project,,consists,,of,,about,,6,900,,feet,,of,,24-inch,,main,,on,,Booth,,,Sharon,,to,,Plumb,,Lane and,,on,,Monroe,,between,,Sharon,,and,,Nixon,,to,,supply,,the,,Nixon-Monroe,,regulator

SCHEDULE: Construction,,is,,scheduled,,for,,F,Y2022.,TMWA,,will,,attempt,,to,,coordinate construction,,with,,other,,municipal,,infrastructure,,projects,,if,,possible,,,but,,the,,existing,,pipes,,will,,be 73-years,,old,,by,,the,,proposed,,construction,,date.



Water Main-Distribution Service Line Improvements South Virginia 24" Main (Kumle to Peckham)

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	South,,Virginia,,24",,Main,,- Kumle,,to,,Peckham	1,000	f	f	f	f	1,000

PROJECT DESCRIPTION: The,,project,,consists,,of,,construction,,of,,about,,1,700,,feet,,of,,new 24-inch,,water,,main,,on,,Soutkirginia,Street,,between,,Kumle,,Lane,,and,,Peckham,,LanEhe project,,is,,required,,to,,expand,,transmission,,capacity,,to,,the,,SoTtubckee,,Meadows,,area.

SCHEDULE:,,Construction,,is,,scheduled,,to,,be,,completed,,in,,,,2021,,subject,,to,,adjustmenfor actual,,growth,,or,,coordination,,with,,road,,improvements.



Water Main-Distribution Service Line Improvements North-East Sparks Tank Feeder Main Relocation

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	North-East Sparks Feeder Tank Main		975	_			975

PROJECT DESCRIPTION: The North-East Sparks Tank Feeder Main was constructed in 1988 within private easements several years prior to the construction of South Los Altos Parkway. The final alignment selected for South Los Altos Parkway does not follow the alignment of the tank feeder main. As a result, the tank feeder main now runs through developed properties next to buildings, under parking areas and at considerable depth in some locations. This situation presents potential problems for access to the pipe for maintenance and repair of the critical pipeline. This project will relocate approximately 3,000 feet of the 18-inch tank feeder main out into the public right-of-way in South Los Altos Parkway.

SCHEDULE: Design and the improvements are scheduled for FY 2021.



Water Main-Distribution Service Line Improvements Goldeneye Parkway Main & CV Tie

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Goldeneye,,Parkway Main,,&,,CV,Tie	f	180	f	f	f	180

PROJECT DESCRIPTION: The,,project,,involves,,construction,,of,,approximately,,450,,linear,,of 8-inch,,water,,main,,with,,a,,Checkalve,,from,,the,,Eagle,,Canyon,,PRS,,to,,LongspWay,,to,,provide a,,secondary,,supply,,to,,the,,Nightingale,,Regulated,,Zone,,and,,avoid,,customer,,outages,,when maintenance,,of,,the,,Nightingale,,pressure,,reguator,,station,,is,,required.

SCHEDULE:,,Implementation,,and,,construction,,will,,be,,completed,,in, **2022**.



Water Main-Distribution Service Line Improvements Trademark 14" Main Tie

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Trademark 14" Main Tie					350	350

PROJECT DESCRIPTION: This project involves construction of approximately 350 LF of 14" water main from Trademark to South Meadows Parkway, including crossing of an existing major drainage channel. The project will increase transmission capacity in the Double Diamond system to meet the needs of growth.

SCHEDULE: Construction is scheduled to be completed in FY 2025.



Water Main-Distribution Service Line Improvements Spanish Springs Main Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Spanish Springs Main Replacement	2,300					2,300

PROJECT DESCRIPTION: The project involves replacement of approximately 6,700 feet of existing Schedule 40 PVC pipe on Cordoba Blvd, Virgil Dr., Virgil Ct, La Posada, Benedict Dr., Valparaiso Ct. and Cortez Ct. in Spanish Springs. The actual extent of the Schedule 40 pipe has not been determined, but several of these substandard pipes have failed in the last several years in the areas noted.

SCHEDULE: Construction is scheduled to be completed in FY 2021.



Water Main-Distribution Service Line Improvements Mt. Rose Tank 1 Fire Flow Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Mt.,,Rose,Tank,,1,,Fire Flow,,Improvements	f	400	570	f	f	970

PROJECT DESCRIPTION: The,,project,,involves,,reconstruction,,of,,an,,existing,,PRS,,at,,Mt. Rose,,Tank,,#1,,,a,,new,,PRS,,on,,Blue,,**Spe**,,and,,approximately,,3100,,linear,,feet,,of,,10-inch,,water main,,on,,Blue,,Spruce,,and,,Douglas,,Fir,,to,,increase,,system,,pressure,,and,,fire,,flow,,capacity,,to existing,,customers,,in,,Galena,,Forest,,Estates.,,,Existing,,fire,,flows,,are,,currently,,less,,than,,1,000 GPM,,in,,the,,area.

SCHEDULE: Planning,,and,,design,,will,,be,,completed,,in,,**F20**21.,,Construction,,will,,occu**n**, i FY's,,2021-,,2022.



Water Main-Distribution Service Line Improvements Stead Golf Course Main Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates / Developer Fees	Stead Golf Course Main Replacement	_	_	170	2,400	_	2,570

PROJECT DESCRIPTION: The project consists of replacement of about 10,000 feet of 14inch steel pipe installed around 1945. The pipe provides an important hydraulic tie between the Stead tanks and the northeast extremities of the Stead distribution system. The pipeline may also be useful to alleviate an existing bottleneck between the Stead wells and the distribution system.

SCHEDULE: The project is scheduled for construction in FY 2024.



Water Main-Distribution Service Line Improvements General Waterline Extensions

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	General Waterline Extensions	100	100	100	100	100	500

PROJECT DESCRIPTION: A nominal amount of funding is budgeted each year to accommodate water main extensions to correct pressure, dead ends and fire flow deficiencies as they are identified. Funds will not be expended unless determined necessary.

SCHEDULE: This is an ongoing annual project budget. Projects will not be constructed unless determined necessary to correct deficiencies identified above.



Water Main-Distribution Service Line Improvements North-East Sparks Feeder Main Ph. 8

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	North-East Sparks Feeder Main Phase 8		50	2,050	_		2,100

PROJECT DESCRIPTION: The project involves construction of approximately 6,400 linear feet of 14-inch water main on Satellite Drive from Vista Blvd to Sparks Blvd to increase capacity for growth in Spanish Springs and maintain adequate suction pressure at the Satellite Hills booster pump station.

SCHEDULE: Design is scheduled for FY 2022 and the improvements will be constructed in FY 2023.


Water Main-Distribution Service Line Improvements Mount Rose 5 Distribution / Pressure Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	Mount Rose 5 Distribution / Pressure Improvements	750		_			750

PROJECT DESCRIPTION: Improvements are intended to provide off-peak conjunctive use supply. The proposed improvements are intended to be consistent with future improvements to improve peaking supply to the Mt. Rose system and will reduce pressure in the high pressure pipeline downhill of Mt. Rose Well 5. It will also increase the off-peak pumping capacity of surface water into the Mt. Rose 1 and 4 tanks to 650 gpm from 400 gpm. Future phases are intended to increase system redundancy and further reduce high pressures in the system.

SCHEDULE: Construction is scheduled for FY 2021.



Water Main-Distribution Service Line Improvements Goldenrod Main

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Goldenrod Main		50	1,200			1,250

PROJECT DESCRIPTION: The project involves construction of approximately 4,500 LF of 12" water main from the Tessa West Well to the intersection of Goldenrod and Mountain Meadows Lane. This project will provide additional capacity between the Arrowcreek and Mt Rose systems for Mt Rose 2 tank fills and for on-peak supply from the Mt Rose Water Treatment Plant.

SCHEDULE: Design is planned in FY 2022 and construction is planned in FY 2023.



Water Main-Distribution Service Line Improvements Boomtown Water System Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	Boomtown Water System Improvements	2,500					2,500

PROJECT DESCRIPTION: If TMWA successfully acquires the Boomtown water system assets, the system will initially be operated as a stand-alone system that will be 100 percent dependent upon local groundwater resources. To insure reliable water service to existing Boomtown customers, several high priority improvements are necessary to bring the system into compliance with NAC 445A regulations and TMWA standards and to allow efficient operation and maintenance of the water facilities. The improvements consist of upgrades to three existing wells (pump to waste facilities, SCADA, new pumps, new motors, new starters and arc flash analyses), tank site improvements (grading, drainage, overflow, fencing, paving, sampling vault, SCADA) and tank access improvements (improved gravel road, improvements to the existing bridge over Steamboat Ditch).

SCHEDULE: The improvements will be designed and constructed in FY 2021.



Water Main-Distribution Service Line Improvements Boomtown to TMWA Connection

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	Boomtown to TMWA Connection	1,900					1,900

PROJECT DESCRIPTION: The Boomtown water system currently operates as a stand-alone system that is 100 percent dependent upon local groundwater resources. Significant growth in the Boomtown area will require increased pumping of Boomtown wells. The additional groundwater pumping may result in deficiencies in water quality and quantity. To insure reliable water service to Boomtown and to protect the viability of the groundwater resource, TMWA will connect the Boomtown system to the TMWA system. The connection will provide an emergency backup source of supply and most importantly, an off-peak source of supply that will allow TMWA to implement conjunctive use management of surface water and groundwater resources within the Boomtown system. The Boomtown connection consists of about 1,800 feet of 16" main, including a jack and bore crossing of the railroad tracks and a new booster pump station.

SCHEDULE: Design of the facilities was completed in FY 2020. Construction of the facilities would occur in FY's 2020 - 21.



Water Main-Distribution Service Line Improvements Lemmon Valley Sand Yard

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Lemmon,,Valley Sand,,Yard	f	530	f	f	f	530

PROJECT DESCRIPTION: "With, continued, growth, in, the, area, including, the, acquisition, of the, Lemmon, Valley, water, system, formdy, owned, by Washoe, County, it, is, very, in Effcient, for TMWA, crews, to, resond, to, a, main, break, or, other, major, issue, in, the, Northeys, and, have, to either, return, to, the fruckee, Meadows, or, call, out, a, second, crew, to, transport, mate, to, the, site to, complete, the, repairs. To, increase, the, effciency, of, maintenance, operations, ithe, North Valleys, TMWA, plans, to, improve, the plance, of, the, 1.25, acre, lot, surrounding, LemmValley Well, #6, (trans, the, intersection, of, Lemmo, Drive, and Arkansas, Drive), to, store, the, common materials, such, as, sand, and, base, rock, normally, used, in, water, system, maintenafike ...,, improvements, consist, of, import, grading, fencing, drainage, material, storage, bins, lighting, and landscaping., The, project, has, been, designed, and, the, building, permit, has, been, acquired.

SCHEDULE: Assuming,,flood,,water,,recede,,stificiently,,,the,,project,,would,,be,,constructed,,in,,FY 2021.



Water Main-Distribution Service Line Improvements Sullivan #1 Main Tie & PRS

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates / Developer Fees	Sullivan #1 Main Tie & PRS				_	50	50

PROJECT DESCRIPTION: The project involves construction of about 1,300 LF of 10" main on El Rancho and a new PRS to supply the Sullivan #1 zone. The project timeline assumes that the proposed Sun Valley #2 Tank and Sullivan #2 pump station are in service.

SCHEDULE: Planning and design is scheduled to begin in FY 2025.



Water Main-Distribution Service Line Improvements Montreux High Pressure ACP Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Montreux,,High,,Pressure ACP,,Replacement	f	f	f	520	1,060	1,580

PROJECT DESCRIPTION: The,,project,,involves,,replacement,,of,,approximately,,6,500,,linear feet,,of,,existing,,10-inch,,transite,,water,,main,,between,,Mt,,RWkell,,#5,,and,,Joy,,Lake,,RoaTh,e existing,,ACP,,pipe,,installed,,in,,the,,1970's,,is,,currently,,operated,,at,,pressures,,betx,W20-250,,psi.

SCHEDULE: Planning,,and,,design,,will,,occur,,in,,F,**2**024,,with,,construction,,to,,be,,completed,,in FY,,2025.



Water Main-Distribution Service Line Improvements 2nd Galena Creek Main Crossing

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	2nd Galena Creek Main Crossing	_		_	40	560	600

PROJECT DESCRIPTION: The project involves construction of approximately 2,200 linear feet of 10-inch ductile iron water main between Breithorn Cir. and Piney Creek Parklet including a crossing of Galena Creek. The existing 10" ACP pipe that crosses Galena Creek is currently the only tie between well sources and storage tanks.

SCHEDULE: Design will occur in FY 2024 with construction to be completed in FY 2025.



Water Main-Distribution Service Line Improvements Off-River Supply Improvements - South Truckee Meadows

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Off-River Supply Improvements - STM	_		_	50	1,050	1,100

PROJECT DESCRIPTION: The project involves construction of four SCADA controlled, pressure reducing bypass stations in strategic locations in the South Truckee Meadows to allow excess well capacity and excess Mt. Rose Water Treatment Plant capacity to be provided to the Highland gravity zone in case of loss supply from the Truckee River. Two additional bypasses (Arrowcreek BPS & future Veteran's BPS) will be constructed separately under the budget for those facilities.

SCHEDULE: Planning and design will occur in FY 2024 with construction to be completed in FY 2025.



Water Main-Distribution Service Line Improvements Off-River Supply Improvements - North Virginia-Stead Pump Station

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Off-River Supply Improvements - NVS Pump Station			_	400	_	400

PROJECT DESCRIPTION: The project involves construction of a SCADA controlled, pressure reducing bypass station at the North Virginia-Stead booster pump station to allow excess Fish Springs well capacity to be provided to the Highland gravity zone in case of loss supply from the Truckee River.

SCHEDULE: Project implementation and construction will occur in FY 2024.



Water Main-Distribution Service Line Improvements Somersett #6 Main Tie & Pressure Regulator Station

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Somersett #6 Main Tie & PRS	_			280		280

PROJECT DESCRIPTION: The project involves construction of about 600 linear feet of 10inch main within improved paved pathway and a new pressure regulator station to provide a secondary source (looping) to Somersett Village 6.

SCHEDULE: Project implementation and construction will occur in FY 2024.



Water Main-Distribution Service Line Improvements Stonebrook West Main Oversizing

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	Stonebrook West Main Oversizing	450	_	_	_	_	450

PROJECT DESCRIPTION: The project involves oversizing of about 7,000 linear feet of 12inch water main on Wingfield Hills Rd and Tierra Del Sol Prkwy to 16-inch diameter pipe as part of an Applicant-Installed new business project (Stonebrook West, PLL 19-6695 Annex.)

SCHEDULE: This project should be completed by FY 2021, subject to the schedule of the developer.



Water Main-Distribution Service Line Improvements 2025 Fire Flow Improvements - Gravity < 1,000 GPM

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	2025 Fire Flow Improvements - Gravity <1,000 GPM	_	_	_	_	550	550

PROJECT DESCRIPTION: The project involves improvements at 5 separate locations in the gravity zone that have an available fire flow of less than 1000 GPM. Reference Pages 20-22 of the 2035 WFP – Items 14,18,20,25,31 (also Figures 38,42,44,49,55). Construction consists of approximately 1,900 linear feet of new 6-inch & 8-inch main including new hydrant taps and laterals.

SCHEDULE: The improvements are scheduled for construction in FY 2025.



Water Main-Distribution Service Line Improvements 2025 Fire Flow Improvements - North Valleys < 1,000 GPM

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	2025 Fire Flow Improvements - North Valleys <1,000 GPM	_		_		940	940

PROJECT DESCRIPTION: This project involves improvements at two separate locations that have an available fire flow of less than 1,000 GPM. Reference Items SI6 and SI7 on pages 6-7 of the North Valleys section of the 2035 Water Facilities Plan (also Figures D and E). Construction of approximately 3,500 linear feet of new 6-inch and 8-inch main and new high pressure Regulating Station.

SCHEDULE: The improvements are scheduled for construction in FY 2025.



Water Main-Distribution Service Line Improvements Deluchi to Airway Main Tie

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Deluchi to Airway Main Tie	_	_	_	_	440	440

PROJECT DESCRIPTION: The project involves construction of approximately 1,200 linear feet of 14-inch main from Deluchi to Airway including crossing a major storm drainage channel. The project promotes looping of the distribution system and provides additional North to South peak period capacity.

SCHEDULE: The project is scheduled for construction in FY 2025.



Water Main-Distribution Service Line Improvements South-East Sparks Feeder Main Phase 1

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	South-East Sparks Feeder Main Phase 1			_	50	4,450	4,500

PROJECT DESCRIPTION: The project involves construction of approximately 9,700 linear feet of 24-inch main on Greg Street between 21st Street and Stanford to provide additional capacity for future growth and to lower peak period pressure in the area.

SCHEDULE: Planning and design are scheduled to begin in FY 2024 and construction is scheduled to begin in FY 2025.



Water Main-Distribution Service Line Improvements South Truckee Meadows Capacity Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Developer Fees	South Truckee Meadows Capacity Improvements	430	670				1,100

PROJECT DESCRIPTION: The project involves construction of approximately 1,500 linear feet of 14-inch main on Offenhauser and Gateway with a SCADA controlled valve installed an underground vault to provide an intertie between the Longley and Double Diamond systems. Also included is a short 8-inch main tie at Bluestone and Portman. The improvements increase capacity to the South Truckee Meadows system.

SCHEDULE: Design for the project is scheduled to begin in FY 2021 and construction is scheduled for FY 2022.



Water Main-Distribution Service Line Improvements Stewart-Taylor Main Replacements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Stewart-Taylor Main Replacements	2,000	0	0	0	0	2,000

PROJECT DESCRIPTION: Replace approximately 5,000 linear feet of old cast iron water main ahead of COR's 2021 Neighborhood Street Rehabilitation Project.

SCHEDULE: The project is scheduled to begin in FY 2021.



Water Main-Distribution Service Line Improvements Roberts-Wilson-Moran Main Replacements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Roberts-Wilson- Moran Main Replacements	2,340	0	0	0	0	2,340

PROJECT DESCRIPTION: Replace approximately 5,100 linear feet of old cast iron water main ahead of COR's 2021 Neighborhood Street Rehabilitation Project.

SCHEDULE: The project is scheduled to begin in FY 2021.



Water Main-Distribution Service Line Improvements Verdi Hydro Main Extension

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Verdi Hydro Main Extension	_	320	_	_	_	320

PROJECT DESCRIPTION: The project involves construction of approximately 1,700 linear feet of 8-inch main and 750 linear feet of 6-inch main parallel to the penstock from Verdi Elementary School to the Hydro building. Approximately half of the cost will be reimbursed by growth in the area. Completion of the main will also provide fire protection for the hydro facility and will allow the existing water service from the Verdi Mutual Water Co. to be retired, saving about \$21,000 per year.

SCHEDULE: Construction is scheduled for FY 2021.



POTABLE WATER STORAGE IMPROVEMENTS Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates / Developer Fees	Sun Valley Tank #2	_	_	_	_	420	420
2	Developer Fees	Fish Springs Terminal Tank #2					40	40
1	Customer Rates	Storage Tank Recoats; Access; Drainage Improvements	900	900	900	900	900	4,500
2	Customer Rates / Developer Fees	Highland Reservoir Tank	100	5,000	2,700			7,800
1	Customer Rates / Developer Fees	STMGID Tank East Zone 11 Tank	100	2,975				3,075
1	Customer Rates	Lightning W Tank #2	400					400
1	Customer Rates / Developer Fees	US 40 Tank & Feeder Main		170	300	2,730		3,200
2	Customer Rates / Developer Fees	Spanish Springs Altitude Valves			300			300
1	Customer Rates	Terminal Tank Generator		200				200
2	Customer Rates	Hidden Valley Tank Altitude Valve		350		_	_	350
Subtotal	Subtotal Storage Improvements			9,595	4,200	3,630	1,360	20,285

Project Locations: Map of all *Potable Water Storage Improvements* projects are highlighted in the following map.



Potable Water Storage Improvements Sun Valley #2 Tank

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates / Developer Fees	Sun Valley Tank #2					420	420

PROJECT DESCRIPTION: TMWA continues to analyze opportunities to consolidate pump zones to eliminate future pump station replacement costs and to increase reliability to continuous pumping zones. Several years ago, TMWA consolidated the Sutro #1 pump zone with the Sun Valley/Sullivan pump zone, placing additional capacity requirements on the Sun Valley zone. This tank is needed to provide the required emergency storage capacity to the expanded zone and will also provide the capacity for the Sun Valley zone to reach buildout.

SCHEDULE: The project is scheduled for construction in FY 2025 subject to successful acquisition of a suitable tank site which is elevation sensitive and is complicated by the US 395 Connector project alignment.



Potable Water Storage Improvements Fish Springs Terminal Tank #2

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	Fish Springs Terminal Tank #2					40	40

PROJECT DESCRIPTION: Ultimately, a second 2.5 MG storage tank is needed at the terminus of the Fish Springs pipeline at the north end of Lemmon Valley to equalize demand and supply during peak use periods.

SCHEDULE: The project is currently scheduled for design in FY 2025 with construction to follow in FY 2026. The actual schedule will be dependent upon the rate of growth in the North Valleys.



Potable Water Storage Improvements Storage Tank Recoats; Access; Drainage Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Storage Tank Recoats; Access; Drainage Improvements	900	900	900	900	900	4,500

PROJECT DESCRIPTION: TMWA has a very proactive tank reservoir maintenance program whereby 20% of all tanks are inspected annually on a rotating basis. Based upon these inspection observations, a determination is made as to whether interior tank coatings (for steel tanks) or other fix and finish work is required. TMWA has 93 storage tanks in service, with combined storage of approximately 121 million gallons. Interior coating/liners are generally replaced every 15 years resulting in the need to recoat several tanks per year to maintain the rehabilitation cycle. The budget and plan also includes exterior painting of steel tanks and any replacement of any interior components that may be corroded.

SCHEDULE: This is an ongoing annual project. It is anticipated that several tanks will need to be recoated approximately every year.



Potable Water Storage Improvements Highland Reservoir Tank

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates / Developer Fees	Highland Reservoir Tank	100	5,000	2,700			7,800

PROJECT DESCRIPTION: TMWA has two large finished water storage reservoirs, one at Hunter Creek and one at the Highland site just west of the intersection of Washington and College Drive. These reservoirs are lined and covered with flexible polyethylene or hypalon membranes. As such, they are more maintenance intensive and susceptible to damage than a conventional steel or concrete tank. To provide reliability during repairs or during extended outages for inspection and cleaning, it is proposed to construct a conventional 4 million gallon water storage tank at the reservoir site. Due to topography and proximity to residential areas the tank may need to be a buried pre-stressed concrete tank, which is reflected in the project budget. The tank will also provide additional storage capacity to meet future system requirements as required by the NAC regulations.

SCHEDULE: The tank is scheduled for construction in FY's 2022-23.



Potable Water Storage Improvements STMGID Tank East (Zone 11 Tank)

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates / Developer Fees	STMGID Tank East Zone 11 Tank	100	2,975	_	_	_	3,075

PROJECT DESCRIPTION: The project involves construction of a 3.7 MG above ground welded steel storage tank in the South Truckee Meadows area off of Geiger Grade formerly owned by STMGID. Due to growth in the area over the last several years, additional storage is required to meet the requirements of the NAC 445A regulations and TMWA standards. The tank will replace an existing 0.75 MG tank providing a net increase in storage of about 3 MG.

SCHEDULE: The project is currently scheduled for construction in FY 2022, subject to acquisition of the Special Use Permit and Bureau of Land Management (BLM) permitting.



Potable Water Storage Improvements Lightning W Tank 2

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Lightning W Tank #2	400		_	_	_	400

PROJECT DESCRIPTION: Construct a new 0.25 MG steel tank to provide redundancy, system reliability, and alleviate Washoe County Health District concerns related to service in the satellite systems.

SCHEDULE: This project will be completed in FY 2021.



Potable Water Storage Improvements US 40 Tank & Feeder Main

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates / Developer Fees	US 40 Tank & Feeder Main	_	170	300	2,730		3,200

PROJECT DESCRIPTION: The project involves construction of two 800,000 gallon steel tanks with site improvements, utilities, drain line and access road including about 2,100 LF of 20" feeder main. The project will improve reliability and hydraulic performance in the zone which experiences a lot of surge issues due to cycling of the Mae Anne pump train and the closed system on the Mogul end. This situation is only expected to worsen when pumping to Verdi begins.

SCHEDULE: The project is currently scheduled for design in FY's 2022 - 23 and construction in FY 2024.



Potable Water Storage Improvements Spanish Springs Altitude Valves

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates / Developer Fees	Spanish Springs Altitude Valves	_	_	300	_	_	300

PROJECT DESCRIPTION: The project involves the construction of altitude valves in underground vaults at the Desert Springs Tank #3 and at Spring Creek Tank #6. The altitude valves will keep the existing tanks from overflowing when well recharge operations are conducted in Spanish Springs Valley.

SCHEDULE: Implementation and construction will occur in FY 2023.



Potable Water Storage Improvements Terminal Tank Generator

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Terminal Tank Generator	_	200		_	_	200

PROJECT DESCRIPTION: This project includes adding a 40kW generator to provide backup power when NV Energy cannot provide power.

SCHEDULE: The project is scheduled to be completed in FY 2021.



Potable Water Storage Improvements Hidden Valley Tank Altitude Valve

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Hidden Valley Tank Altitude Valve		350			_	350

PROJECT DESCRIPTION: The project involves installation of a new altitude valve in a vault on the Hidden Valley Tank #l in/out line. Requires cutting into and rerouting existing piping, addition of new valves, etc.

SCHEDULE: The project is schedule for construction in FY 2022.



HYDROELECTRIC IMPROVEMENTS

Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Forebay, Diversion, & Canal Improvements	100	100	100	100	100	500
3	Customer Rates	Flume Rehabilitation	150	150	_			300
3	Customer Rates	Hydro Plant Generator Rewinds	_	650	650	650		1,950
1	Customer Rates	Washoe Flume Reconstruction	50	1,450	_			1,500
3	Insurance Settlement	Orr Ditch Hydro Facility	1,100	4,000	500		_	5,600
1	Customer Rates	Washoe Flume Reconstruction Boxes	1,350		_			1,350
Subtotal Hydroelectric Improvements		2,750	6,350	1,250	750	100	11,200	

Project Locations: Map of all *Hydroelectric Improvements* projects are highlighted in the following map.



Hydroelectric Improvements Forebay, Diversion, and Canal Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Forebay, Diversion, & Canal Improvements	100	100	100	100	100	500

PROJECT DESCRIPTION:

Provision is made each year for hydroelectric flume reconstruction to mitigate damage from unexpected rock falls, landslides and/or flooding events. Diversion structures including gates, canals, flumes, forebays and all hydro-plant water conveyance structures are monitored and evaluated for reliable and safe operation.

SCHEDULE: Ongoing annual evaluation and prioritization of forebay and canal conditions in the early spring (winter weather can change priorities) to identify projects for fall construction when historically, river flows are lower.



Hydroelectric Improvements Flume Rehabilitation

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Flume Rehabilitation	150	150				300

PROJECT DESCRIPTION: TMWA's three operating hydroelectric facilities have nearly 12,150 feet of flume. The average service life for flume structures is 35 years using treated timbers, at an average replacement cost of approximately \$1,000 per lineal foot of flume. The present cost to replace a linear foot of flume depends on the location and height of the flume structure.

SCHEDULE: Ongoing annual evaluation and prioritization of flume condition in the early spring (winter weather can change priorities) to identify projects for fall construction when historically, river flows are lower.


Hydroelectric Improvements Hydro Plant Generator Rewinds

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Hydro Plant Generator Rewinds		650	650	650		1,950

PROJECT DESCRIPTION:

The Fleish generator was last rewound in 1958 and is still operational. The typical in-service life of this type of generator is about 50 years. The two Washoe generators were damaged in a flood in 2006. The units were cleaned and repaired but suffered damage to the core laminations that has shortened the operating life. Work would consist of rewinding the plant generators with spending in fiscal years 2020, 2021 and 2022.

SCHEDULE: Washoe Hydro Plant generators FY 2021 and FY 2022, Fleish Hydro Plant generator FY 2023. This schedule may be adjusted depending on river flows and generator condition evaluation.



Hydroelectric Improvements Washoe Flume Reconstruction

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Washoe Flume Reconstruction	50	1,450				1,500

PROJECT DESCRIPTION: The project includes the demolition and reconstruction of the Washoe Flume from the Boomtown Access Rd East to I-80. To be demolished and reconstructed is approximately 1,250 linear feet of wood flume and timer structure. An additional 150 linear feet of flume will be reconstructed with steel sub structure. Approximately 800 linear feet of slope stabilization will be included in the project.

SCHEDULE: This project is schedule to start in FY 2021 with construction to begin in FY 2022.



Hydroelectric Improvements Orr Ditch Hydro Facility

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Insurance Settlement	Orr Ditch Hydro Facility	1,100	4,000	500			5,600

PROJECT DESCRIPTION: During periods of low demand, the Highland Canal has available capacity to bring water to the Chalk Bluff Facility. An existing pipeline brings water from the river via the Orr Ditch Pump Station up to Chalk Bluff. A feasibility and financial study will be completed to analyze the possibility of using existing infrastructure with the addition of power generation equipment to produce power for direct use at the Chalk Bluff Water Treatment Facility.

SCHEDULE: A feasibility study was completed in FY 2020. Construction on the projected is scheduled to begin in FY 2021.



Hydroelectric Improvements Washoe Flume Reconstruction Boxes 1-68

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Washoe Flume Reconstruction Boxes 1-68	1,350	0	0	0	0	1,350

PROJECT DESCRIPTION: Project includes demolition and reconstruction of the Washoe Flume 64 box sections.

SCHEDULE: Construction for the project is scheduled to be completed in FY 2021.



CUSTOMER SERVICE OUTLAYS
Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Meter Reading Equipment		60		75		135
2	Developer Fees	New Business Meters	100	100	100	100	100	500
1	Customer Rates	Mueller Pit Replacements former Washoe County	125	125	125	125	125	625
2	Customer Rates	Galvanized / Poly Service Line Replacements	250	250	250	250	250	1,250
1	Customer Rates / Meter Retrofit Fees	AMI Automated Meter Infrastructure	2,100	6,000	6,000	6,000	1,000	21,100
Subtotal Customer Service			2,575	6,535	6,475	6,550	1,475	23,610

Project Locations: Map of all *Customer Service Outlays* projects are highlighted in the following map.



Customer Service Outlays Meter Reading Equipment

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Meter Reading Equipment		60		75		135

PROJECT DESCRIPTION: TMWA utilizes a multiple meter reading systems in which the transmitters attached to the meters send a signal out to be collected by data collectors. These collectors are mounted in the meter reading vehicles or on various mountain peaks surrounding the valley. TMWA is anticipating replacing units that have degraded.

SCHEDULE: Will need to purchase equipment on an as needed basis.



Customer Service Outlays New Business Meters

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Developer Fees	New Business Meters	100	100	100	100	100	500

PROJECT DESCRIPTION: All new water services are required to be metered. Meters are purchased by TMWA and installed for new development. New business fees pay for these installations.

SCHEDULE: As development picks up, more meters will need to be purchased.



Customer Service Outlays Mueller Pit Replacements Former Washoe County

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Mueller Pit Replacements former Washoe County	125	125	125	125	125	625

PROJECT DESCRIPTION: The Mueller metering pits are a very high maintenance metering facility and are prone to leaks and failures. TMWA plans to replace these facilities in response to leaks and or subsidence of these facilities.

SCHEDULE: Equipment and employee needs are evaluated and updated annually.



Customer Service Outlays Galvanized / Poly Service Line Replacements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Galvanized,,/,,Poly,,Service Line,,Replacements	250	250	250	250	250	1,250

PROJECT DESCRIPTION: TMWA,,has,,shifted,,from,,just,,repairing,,service,,lines,,from,,the street,,main,,to,,the,,curb,,valve,,or,,meter,,box,,to,,completely,,replacing,,service,,lines,,that,,are galvanized,,steel,,or,,polybutyleneT,hese,,two,,materials,,are,,responsible,,for,,many,,afhmurs,,call outs,,which,,escalate,,overtime,,expenses,,to,,repair,,leaks,,in,,the,,street,,because,,the,,galvanized,,lines are,,corroded,,,and,,polybutylene,,once,,thought,,very,,durable,,,becomes,,brittle,,and,,cracks,,or,,splits very,,easily,Just,,repairing,,these,,lines,,does,,not,,prevent,,them,,from,,leaking,,in,,the,,near,,future, escalating,,repair,,costs,,while,,further,,damaging,,city,,streets.,,Complete,,replacement,,provides,,a permanent,,repair,,in,,a,,cost,fetive,,maner,,and,,prevents,,further,,water,,system,,losses.

SCHEDULE: This,,is,,an,,ongoing,,annual,,project,,budget.,,Service,,lines,,will,,be,,replaced,,as,,they are,,identified.



Customer Service Outlays AMI Automated Meter Infrastructure

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates / Meter Retrofit Fees	AMI Automated Meter Infrastructure	2,100	6,000	6,000	6,000	1,000	21,100

PROJECT DESCRIPTION: TMWA utilizes multiple meter reading systems in which the transmitters attached to the meters send a signal out to be collected by data collectors. We currently are utilizing two separate systems to collect this data. TMWA utilized a drive-by data collection system and Washoe County used a radio read system. The technology in these systems have improved vastly over the last couple of years and we are currently analyzing both systems, with the goal to move to one system. We are currently using a consultant to assist TMWA in the move to one remote reading data collection system.

SCHEDULE: Once identified this project would be staged and implemented over the next 4-5 years, the equipment to be replaced or upgraded in many instances is already scheduled for replacement.



ADMINISTRATIVE OUTLAYS

Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	GIS / GPS System Mapping Equipment		20	_	20	_	40
2	Customer Rates	IT Server Hardware	180	30	45	30		285
2	Customer Rates	IT Network Security Upgrades	45	160	70	10		285
2	Customer Rates	IT Physical Access Security Upgrades	60	60	60	60		240
2	Customer Rates	Printer / Scanner Replacement	40	50		100		190
3	Customer Rates	Crew Trucks / Vehicles	650	750	750	850	950	3,950
1	Customer Rates	Emergency Response Projects	150	150	150	150	150	750
1	Customer Rates	CIS System Replacement	1,000					1,000
1	Customer Rates	Emergency Operations Annex Design / Construction		_		250	250	500
2	Customer Rates	System Wide Asphalt Rehabilitation	250	200	200	200	200	1,050
1	Customer Rates	CSR Work Area Security Upgrade	360					360
1	Customer Rates	Physical Access Control System Upgrade	200					200
1	Customer Rates	Physical Site Security Improvements	200	150	100	100	100	650
1	Customer Rates	Medeco Intelligent Key System		150	100	100		350
Subtotal	Administrat	tive Outlays	3,135	1,720	1,475	1,870	1,650	9,850

Project Locations: Map of all *Administrative Outlays* projects are highlighted in the following map.



Administrative Outlays GIS/GPS System Mapping Equipment

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	GIS / GPS System Mapping Equipment		20		20		40

PROJECT DESCRIPTION: TMWA will have to update mapping equipment on a periodic basis to keep up with changes in technology; and to replace existing equipment as it reaches obsolescence.

SCHEDULE: Equipment is replaced and/or purchased as needed.



Administrative Outlays IT Server Hardware

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	IT,,Server,,Hardware	180	30	45	30	f	285

PROJECT DESCRIPTION: TMWA,,currently,,h**a**,,over,,50,,physical,,servers,,and,,130,,vintua servers,,,hosting,,a,,variety,,of,,enterprise,,software,,applications,,that,,supf**AM**,WAS,,daily,,business operations.,All,,physical,,servers,,are,,typally,,purchased,,with,,a,,three,,year,,warran,twith,,the expectation,,that,,they,,will,,reach,,the,,end,,of,,their,,system,,life,,cycle,,in,,a,,three,,to,,five,,year,,time frame,,,requiring,,a,,replacementT,MWA,,annually,,reviews,,its,,server,,platforms,,d,rcan,,option,,a strategy,,of,,warranty,,extension,,,if,,costf,ective,,,rather,,than,,outright,,hardware,,replacementAll servers,,require,,an,,Operating,,System,,Software,,license,,to,,run.,,Operating,,System,,Software,,is upgraded,,only,,when,,the,,current,,release,,is,,obsolete,,or,,a,,newer,,versifers,Of,,significant advantage,,over,,the,,current,,iteration.

SCHEDULE: Spending,,would,,be,,determined,,on,,an,,as,,needed,,basis.



Administrative Outlays IT Network Security Upgrades

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	IT,,Network,,Security Upgrades	45	160	70	10	f	285

PROJECT DESCRIPTION: As,,a,leading,,water,,purveyor,,for,,a,,major,,metropolitan,,area, TMWA,,is,,reliant,,onthe,,internet,,for,,employee,,productivity,,enhancement,,and,,**pid**ing,,valuable customer,,information,,and,,outreach.,,Such,,dependency,,on,,the,,internet,,also,,carries,,a,,significant degree,,of,,risk,,,as,,it,,mak (MWA,,a,,major,,taget,,for,,external,,security,,threats,,loning,,within globalized,,networks.,To,,offset,,this,,risk,,ad,,combat,,network,,threats,,,a,,variety,,of,,security,,specific hardware,,and,,software,,solutions,,are,,used,,,weaving,,them,,into,,a,,layered,,deployment,,strategy called,,Defense,,in,,Depth.,,In,,order,,to,,continually,,evolve,,and,,reinforce,,this,,Defense,,in,,Depth strategy,,and,,efectively,,fight,,new,,unforeseen,,threat (MWA,,must,,continually,,aquire,,new security,,platforms,,that,,adapt,,to,,the,,continually,,changing,,security,,landscape.

SCHEDULE: Spending,,occurs,,only,,on,,an,,as,,needed,,basis



Administrative Outlays IT Physical Security Upgrades

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	IT Physical Access Security Upgrades	60	60	60	60	_	240

PROJECT DESCRIPTION: Security measures that are designed to deny unauthorized access to facilities, equipment and resources to protect personnel from damage or harm such as theft or attacks. Physical security involves the use of multiple layers of interdependent systems which can include surveillance, security guards, protective barriers, locks and other techniques.

SCHEDULE: Equipment is replaced and/or purchased as needed.



Administrative Outlays Printer / Scanner Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	Printer / Scanner Replacement	40	50		100		190

PROJECT DESCRIPTION: TMWA currently has variety of printers and scanners that support TMWA's daily business operations. All printers are typically purchased with a three-year warranty, with the expectation that they will reach the end of their system life cycle in a three to five year time frame, requiring a replacement. TMWA annually reviews its printer/scanner performance and business needs and can option a strategy of warranty extension, if cost effective, rather than outright replacement.

SCHEDULE: Equipment is replaced and/or purchased as needed.



Administrative Outlays Crew Trucks/Vehicles

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
3	Customer Rates	Crew,,Trucks,,/ Vehicles	650	750	750	850	950	3,950

PROJECT DESCRIPTION: TMWAGs, service, fleet, consists, of, light, duty, and, heavy, duty, crew trucks., TMWA, plans, to, cycle, the, light, crew, fleet, over, a, period, of, seven, to, **atsn___Sp**ending, is determined, annually, depending, on, vehicle, availabilities, and, other, factors., Spending, only, occurs if, justified., TMWA s, fleet, cycles, older, chicles, to, the, treatment, plants, or, other, less, demanding activities, prior, to, disposal, at, auction MAA, has, scaled, back, spending, on, light hicles, for, the past, several, years, and, a, number, of, vehicles, will, be, in, excess, of, ten, years, old, and, greater, than 120,000, miles, of, duty,

SCHEDULE: Equipment,,and,,employee,,needs,,are,,evaluated,,and,,updated,,annually



Administrative Outlays Emergency Response Projects

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Emergency Response Projects	150	150	150	150	150	750

PROJECT DESCRIPTION: Various ongoing improvements to security infrastructure are required to protect TMWA facilities. TMWA has performed vulnerability assessment studies in the past and reviews the applicability of the findings to continually improve physical security as needed. In addition, TMWA is preparing a new disaster recovery plan with procedures to recover and protect water system operations.

SCHEDULE: Upgrades to security projects is ongoing and completed on a review of priorities each year.

PROJECT LOCATION: Various locations at treatment plants, at well sites, storage area for water fill station manifolds.



Administrative Outlays CIS System Replacement

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	CIS System Replacement	1,000	_	_	_		1,000

PROJECT DESCRIPTION: Software configuration, training and consulting to implement new Customer Information (billing) system, which will also include a customer portal for water usage information and bill payment.

SCHEDULE: Project implementation began in FY 2020 and will be completed in FY 2021.

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John Doe 123 Corporate Drive RENO, NV 89502

Administrative Outlays Emergency Operations Annex-Design / Construction

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Emergency Operations Annex Design / Construction	_	_	_	250	250	500

PROJECT DESCRIPTION: TMWA is currently in the planning and conceptual design phase for a Primary Emergency Operations Center (EOC) including Disaster Recovery (DR) capacity. TMWA's EOC will relocate from the current location at the corporate office to the Chalk Bluff Water Treatment Plant. Which includes scope review, design, and contract bid packages, bid and award, construction, and testing. Potential emergency operations would include responding to earthquakes, floods, or other emergency related events.

SCHEDULE: Construction of water fill stations at four tank sites, standby power retrofits at four existing wells and ten portable water fill manifold stations to be completed in FY's 2024 - 25.



Administrative Outlays System Wide Asphalt Rehabilitation

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Customer Rates	System Wide Asphalt Rehabilitation	250	200	200	200	200	1,050

PROJECT DESCRIPTION: TMWA has 93 tanks, 90 wells, 113 pump stations, 2 storage reservoirs and 3 treatment plants, most of which have some asphalt pavement. It is much more economical to extend the life of existing pavement with routine maintenance such as repairing cracks and applying slurry seals than it is to prematurely replace the pavement.

SCHEDULE: This is a new reoccurring maintenance item. It is originally assumed that up to 15 sites per year will receive some sort of rehabilitation that may include patching, crack repair, slurry seal and/or partial replacement.



Administrative Outlays Physical Access Control System Upgrade

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Physical Access Control System Upgrade	200					200

PROJECT DESCRIPTION: Replacement of legacy readers and employee cards with multifrequency readers and smart cards to address several vulnerabilities and increase the physical security of various TMWA sites.

SCHEDULE: Construction is scheduled for FY 2021.



Administrative Outlays CSR Work Area Security Upgrade

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	CSR Work Area Security Upgrade	360					360

PROJECT DESCRIPTION: Project involves design of a new desktop work area accommodating UL-3 Ballistic Security Glass as well as security upgrades to doors and walls.

SCHEDULE: Construction is scheduled to be completed in FY 2021.



Administrative Outlays Physical Site Security Improvements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Physical Site Security Improvements	200	150	100	100	100	650

PROJECT DESCRIPTION: Physical site security improvements for Chalk Bluff, Glendale and Corporate based on recommendations from the Department of Homeland Security Infrastructure Survey, Security & Resilience Report dated 18 July 2018. These recommendations were echoed in the Department of Emergency Managements Vulnerability Assessment completed in December 2019. Recommended priority improvements include:

1. Enhanced perimeter fencing with outriggers and barbed wire around 100% of site perimeters, fencing secured into the ground, and repairs as needed to existing fencing.

2. Dedicated security camera system for perimeter fence coverage as well as critical points in and around key buildings.

3. Solar powered LED lighting with motion detection along full fence perimeter of both WTP's.

4. 3M window film application for windows on exteriors of Corporate building not within fenced perimeters.

5. Intrusion detection systems for perimeter fencing and gate areas to be used with the new security camera system.

6. Landscaping improvements including the placement of large boulders around the SE corner of the Chalk Bluff Control Room to protect against high speed vehicle ramming. Cleared areas along both sides of all perimeter fencing.

SCHEDULE: The project is scheduled to begin in FY 2021.

Administrative Outlays Medeco Intelligent Key System

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Customer Rates	Medeco Intelligent Key System		150	100	100		350

PROJECT DESCRIPTION: The Medeco XT Intelligent Key System consists of a robust electronic locking and access control system that is managed by state-of-the-art web-based system software. It uses existing hardware, reduces the risk of lost keys, provides electronic scheduling, and gives audit accountability to the system manager. Key management software and programming devices allow administrators to program, amend or delete keys remotely and instantly.

This system would be used to eventually replace our current CA keys which have left our physical security compromised due to lost keys and unaccounted distribution and recovery of CA keys in the past. It would initially be installed to protect the critical infrastructure sites throughout our system that do not have any form of electronic access control. Eventually it will replace all CA keyed locking devices at all TMWA facilities.

The Medeco Intelligent Key System replaces the existing mechanical locking cylinder core with an intelligent electronic locking cylinder on almost all type of locking devices. All other existing hardware remains the same.

Once installed, this system helps reduce the overall costs of key control program management while providing a high level of security for our employees. It meets all NERC CIP standards and is in currentuse by major utilities in Nevada.

SCHEDULE: The project is scheduled to begin in FY 2021.

FORMER STMGID SYSTEM IMPROVEMENTS Summary

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Reserve	STMGID Well Fix & Finish	150	150	150	150	150	750
1	Reserve	STMGID Conjunctive Use Facilities	1,600	500				2,100
1	Reserve	STMGID Mueller Pit Replacements	50					50
1	Reserve	STMGID NAC Deficiencies - Saddlehorn, Upper Toll, STMGID East	100	100	1,800	_	_	2,000
1	Reserve	STMGID NAC Deficiencies Phase 2 - Sioux Trail, Geiger Grade, Westwind Cr.	800		_	_		800
1	Reserve	STMGID Well #1 Re-Drill and Equipping		900				900
Subtotal STMGID System Improvements			2,700	1,650	1,950	150	150	6,600

Project Locations: Map of all *Former STMGID System Improvements* projects are highlighted in the following map.



Ground Water Supply Improvements STMGID Well Fix & Finish

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
2	Reserve	STMGID Well Fix & Finish	150	150	150	150	150	750

PROJECT DESCRIPTION: Equipment improvements are expected to bring existing wells up to modern standards, including antiquated equipment replacements and improvements for water quality purposes. This project includes improvements to sodium hypochlorite rooms, electrical and instrumentation equipment, pump to waste lines and drainage improvements. It also includes retrofit for recharge where needed.

SCHEDULE: Improvements are planned to continue for the duration of this CIP funding plan.



Water Main-Distribution & Service Line Improvements STMGID Conjunctive Use Facilities

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Reserve	STMGID Conjunctive Use Facilities	1,600	500	_	_	_	2,100

PROJECT DESCRIPTION: The project involves construction of a new booster pump station on the reclaim water reservoir site on Arrowcreek Parkway and approximately 8,100 feet of 14inch discharge pipe on Arrowcreek Parkway to the STMGID Tank 4/5 pressure zone. Approximately \$0.5 million of the \$3.6 million will be used for pipeline oversizing which will be allocated to new development. The facilities will provide off-peak supply which will allow TMWA to implement conjunctive use in the STMGID West system.

SCHEDULE: Construction of the pipeline was completed in FY 2019 and the booster station design/construction is scheduled to begin in FY 2021 completing in FY 2022.



Customer Service Outlays STMGID Mueller Pit Replacements

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Reserve	STMGID Mueller Pit Replacements	50	_		_	_	50

PROJECT DESCRIPTION: The Mueller metering pits are a very high maintenance metering facility and are prone to leaks and failures. TMWA plans to replace these facilities to leaks and or subsidence of these facilities.

SCHEDULE: Equipment and employee needs are evaluated and updated annually.



Distribution System Pressure Improvements NAC Deficiencies-Saddlehorn, Upper Toll Road, STMGID East

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Reserve	STMGID NAC Deficiencies - Saddlehorn, Upper Toll, STMGID East	100	100	1,800	_	_	2,000

PROJECT DESCRIPTION: The project consists of main ties, hydrant installations and individual booster pump systems to be constructed in multiple locations in former STMGID service areas to correct NAC pressure and fire flow deficiencies. In order to correct deficiencies in the upper Toll Road area, it will be necessary to create a new higher pressure zone by constructing a new tank, booster pump station and approximately 6,300 linear feet of 12-inch main.

SCHEDULE: The new pressure zone on upper Toll Road will be constructed in FY 2023 subject to acquisition of the tank site property which may be private or on BLM property.



Distribution System Pressure Improvements NAC Deficiencies Phase 2 - Sioux Trail, Geiger Grade, Westwind Circle

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Reserve	STMGID NAC Deficiencies Phase 2 - Sioux Trail, Geiger Grade, Westwind Cr.	800	_	_	_	_	800

PROJECT DESCRIPTION: Sioux Trail Improvements - Replace existing main with ~204-400 linear feet of 8-inch diameter and ~377-410 linear feet of 10-inch diameter Geiger Grade Hydrant Improvements - Replace existing main with ~250 linear feet of 10-inch diameter Westwind Circle Improvements - Replace existing main with ~1150 linear feet of 8 inch diameter Install 9 individual booster pumps.

SCHEDULE: The deficiencies on Sioux Trail, on Geiger Grade, on Westwind Circle and Terry Way will be addressed in FY 2019/20. The individual booster stations will start in FY 2021 depending on customer needs and coordination.



Distribution System Pressure Improvements STMGID Well #1 Re-Drill and Equipping

FUNDING TIMELINE:

Priority	Funding Source	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	CIP Total
1	Reserve	STMGID Well #1 Re-Drill and Equipping		900				900

PROJECT DESCRIPTION: This project involves the complete replacement of STMGID 1. Recent rehabilitation work on the production well indicated the screens have deteriorated enough to allow sediment and gravel pack to pass through. The well is a critical groundwater supply asset as it currently accounts for ~24% of the max day demand in STMGID Tank Zone 1.

SCHEDULE: The well is estimated to be drilled and constructed in FY 2022.





STAFF REPORT

TO: TMWA Board of Directors
FROM: Michele Sullivan, Chief Financial Officer
THRU: Mark Foree, General Manager
DATE: March 31, 2020
Subject: Discuss and action, direction to staff, and possible reconsideration and modification of implementation of third phase 2.5% rate adjustment currently scheduled to be implemented on first billing cycle in May 2020

RECOMMENDATION

Consistent with the Board's consideration in October 2019 of the 5 year Funding Plan, and with the recommendation of the Standing Advisory Committee (SAC), the TMWA Board made no action to delay the implementation of a 2.5% increase in rates as of May, 2020 at the January, 2020 Board meeting based on Resolution 269 approved at the Board meeting in December, 2018. Subsequent to the January, 2020 Board meeting, a state of emergency has been declared both nationally and in the state of Nevada in March, 2020 related to the COVID-19 Pandemic. Given the Pandemic related restrictions on TMWA's customer base which have created a large increase in unemployment, coupled with the current state of the economy, staff has been asked to reopen the discussion on this rate increase for a possible deferral.

SUMMARY

TMWA has a funding gap between recurring revenues and cost of service which is expected to increase from \$10.4 million to \$13.4 million in FY 2020 based on net losses estimated in connection with the pandemic. *See Attachments A and B.* This estimate is based on the implementation of the approved 2.5% rate increase in the first billing cycle of May, 2020. Deferral of this rate increase will obviously increase that funding gap. The schedule below shows the monetary effect on water sales revenue related to delaying the 2.5% increase. This schedule assumes that the three 2.5% increase will all be pushed out, and will all be implemented one year apart. The compounding effect is shown for each month that the rate increase is pushed for the period of one year, as well as the related five-year plan effect. It should be noted that the delay has not been included in the FY 2021 budget estimates and any delay will directly reduce water sales revenue in the revised budget for FY 2021.
Months	Month	Current Year	Five Year Plan
Delayed		Effect	Effect
1	May	\$195,656	
2	June	462,512	
3	July	777,566	\$1,495,089
4	August	1,104,645	2,522,540
5	September	1,434,016	3,553,951
6	October	1,692,846	4,707,004
7	November	1,874,186	5,559,276
8	December	2,000,933	6,177,013
9	January	2,126,505	6,587,480
10	February	2,250,710	6,869,105
11	March	2,372,926	7,384,040
12	April	2,503,034	7,773,900

TMWA 2.5% Rate Increase, May 2020, 2021, 2022 Decrease in Water Sales Revenue for Deferral

Estimated five-year funding plan results are also included for a 4 month delay, a 9 month delay, and a 12 month delay. See *Attachments C, D and E*. TMWA is implementing a new customer billing system in November, 2020, and recommends avoiding this time frame (6 months after May) for a rate increase. The estimated funding plans show a direct correlation between delaying the rate increases and cash reserve balances. The longer the rate increase is delayed, the more decisions will need to be made related to cash balances. For example, the rate stabilization fund can be used, paydown of commercial paper can be delayed, or additional debt can be acquired, but cash balances must remain strong to maintain TMWA's credit ratings.

BACKGROUND

Previous reports were presented and discussed with the Board during 2017 and the Board approved a 5 year rate adjustment plan at its April, 2017 meeting with Resolution 250. The rate adjustment approved at that time included two 3% increases in May 2017 and May 2018, and three increases of 2.5% in May 2019, May 2020, and May 2021.

The first two increases of 3% were implemented as planned in May 2017 and May 2018. At the December 2018 Board meeting, the Board approved Resolution 269 to elect to defer the 2.5% rate increases out to May 2020, May 2021, and May 2022 for reconsideration. The funding plan was updated in the fall of 2019, and the Board and SAC both concluded that implementing the 2.5% rate increase in May, 2020 is necessary to maintain financial stability. Annual debt principal payments will increase by \$11 million in July, 2020, after being deferred for the last three years. Since there has been no increase since May, 2018, a 2.5% increase in May, 2020 would be lower than total CPI over the two year period.

The chart below shows how the 2.5% increase is expected to affect monthly customer bills. This data is based on bills from December, 2018 to November, 2019. For all customer classes, the median bill increases less than \$1.00 per month.

Changes in Monthly Water Bills by Customer Class from 2.5% increase Based on Retail bills from December 2018 to November 2019

Customer Class	Median Bill
Residential	\$ 0.76
Multi Unit Residential 3/4" (Serving multiple units)	\$ 0.86
Commercial	\$ 0.95
Irrigation	\$ 0.93

ATTACHMENT A

Truckee Meadows Water Authority 2020-2024 Funding Plan with Delayed Rate Increases

TMWA's Revenue Sufficiency and Cost of Service	FY 2020	FY 2021	FY 2022	 FY 2023	 FY 2024
Projected Rate Increases	 2.5%	2.5%	2.5%	 0.0%	 0.0%
Operating Expenses Principal and Interest on customer related debt Rehabilitative Capital Spending	\$ 64,696,259 29,102,896 30,675,000	\$ 64,983,724 28,221,433 30,675,000	\$ 65,633,489 28,602,175 30,675,000	\$ 66,789,307 28,531,333 30,675,000	\$ 68,518,656 28,465,258 30,675,000
Total Projected Cost of Service	\$ 124,474,155	\$ 123,880,157	\$ 124,910,664	\$ 125,995,640	\$ 127,658,914
Recurring Revenues	\$ 114,083,173	\$ 117,069,663	\$ 120,468,851	\$ 123,603,831	\$ 125,256,888
Surplus (Deficiency)	\$ (10,390,982)	\$ (6,810,494)	\$ (4,441,813)	\$ (2,391,809)	\$ (2,402,026)
Surplus (Deficiency) as a % of Cost of Service	 -8.3%	-5.5%	-3.6%	 -1.9%	 - 1.9%
Debt Service Coverage Ratios	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Water Sales Revenues Hydroelectric Sales Other Operating Sales Investment Income	103,490,228 3,664,180 3,518,950 3,409,815	107,430,735 3,100,000 2,673,823 3,865,105	111,227,712 2,800,000 2,331,513 4,109,626	114,458,401 2,500,000 2,269,902 4,375,528	115,325,042 3,000,000 2,263,820 4,668,026
Total Revenues	 114,083,173	117,069,663	120,468,851	 123,603,831	 125,256,888
Operating Expenses	 (66,633,759)	(64,983,724)	(65,633,489)	 (66,789,307)	 (68,518,656)
Net Revenues	47,449,414	52,085,939	54,835,362	56,814,524	56,738,232
Senior Lien Debt Service	28,185,550	27,829,750	28,275,250	28,274,500	28,287,250
Senior Lien DSC	 1.68	1.87	1.94	 2.01	 2.01
Total Sr. Lien and SRF Debt Service	30,606,271	30,250,471	30,695,971	30,695,221	30,707,971
Total Sr. Lien and SRF DSC	 1.55	1.72	1.79	 1.85	 1.85
Total Annual Debt Service incl. TECP Interest	31,358,959	30,479,829	30,864,842	30,794,938	30,732,821
Total Subordinate DSC	 1.51	1.71	1.78	1.84	1.85

TMWA's Cash Balances	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Restricted Cash	\$ 53,409,093	\$ 50,398,778	\$ 50,965,363	\$ 51,790,650	\$ 52,637,426
Rate Stabilization Fund	9,171,715	9,993,505	10,230,335	10,024,692	9,660,631
Unrestricted Cash Required by Policy	 94,242,472	93,692,460	93,909,048	94,294,320	94,870,770
Required Cash Balances	156,823,280	154,084,743	155,104,745	156,109,661	157,168,826
Total Cash Balance	 194,110,897	185,270,296	174,728,897	166,297,415	161,420,247
Difference	\$ 37,287,617	\$ 31,185,553	\$ 19,624,152	\$ 10,187,754	\$ 4,251,421

08-04-20 SAC Agenda Item 11 04-10-20 BOARD Agenda Item 13 ATTACHMENT B

Truckee Meadows Water Authority 2020-2024 Funding Plan REVISED with rate increases in May, 2020,2021,2022

TMWA's Revenue Sufficiency and Cost of Service	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Projected Rate Increases	 2.5%	2.5%	2.5%	0.0%	0.0%
Operating Expenses Principal and Interest on customer related debt Rehabilitative Capital Spending	\$ 62,674,496 \$ 29,102,896 30,811,200	64,744,412 28,221,433 30,811,200	\$ 65,633,489 28,602,175 30,811,200	\$ 66,789,307 28,531,333 30,811,200	\$ 68,518,656 28,465,258 30,811,200
Total Projected Cost of Service	\$ 122,588,592 \$	123,777,045	\$ 125,046,864	\$ 126,131,840	\$ 127,795,114
Recurring Revenues	\$ 109,203,813 \$	112,069,513	\$ 120,468,851	\$ 123,603,831	\$ 125,256,888
Surplus (Deficiency)	\$ (13,384,779) \$	(11,707,532)	\$ (4,578,013)	\$ (2,528,009)	\$ (2,538,226)
Surplus (Deficiency) as a % of Cost of Service	 -10.9%	-9.5%	-3.7%	-2.0%	-2.0%
Debt Service Coverage Ratios	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Water Sales Revenues Hydroelectric Sales Other Operating Sales Investment Income	99,045,757 3,458,684 3,289,557 3,409,815	102,902,366 3,512,784 2,800,120 2,854,243	111,227,712 2,800,000 2,331,513 4,109,626	114,458,401 2,500,000 2,269,902 4,375,528	115,325,042 3,000,000 2,263,820 4,668,026
Total Revenues	 109,203,813	112,069,513	120,468,851	123,603,831	125,256,888
Operating Expenses	(62,711,996)	(66,644,412)	(65,633,489)	(66,789,307)	(68,518,656)
Net Revenues	 46,491,817	45,425,101	54,835,362	56,814,524	56,738,232
Senior Lien Debt Service	 28,185,550	27,829,750	28,275,250	28,274,500	28,287,250
Senior Lien DSC	 1.65	1.63	1.94	2.01	2.01
Total Sr. Lien and SRF Debt Service	 30,606,271	30,250,471	30,695,971	30,695,221	30,707,971
Total Sr. Lien and SRF DSC	 1.52	1.50	1.79	1.85	1.85
Total Annual Debt Service incl. TECP Interest	 31,358,959	30,479,829	30,864,842	30,794,938	30,732,821
Total Subordinate DSC	 1.48	1.49	1.78	1.84	1.85

TMWA's Cash Balances	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Restricted Cash	\$ 53,409,093	\$ 50,398,778	\$ 50,965,363	\$ 51,790,650	\$ 52,637,426
Rate Stabilization Fund	9,171,715	9,857,654	10,230,335	10,024,692	9,660,631
Unrestricted Cash Required by Policy	92,935,216	94,246,022	93,909,048	94,294,320	94,870,770
Required Cash Balances	155,516,024	154,502,454	155,104,745	156,109,661	157,168,826
Total Cash Balance	192,071,870	180,986,006	170,444,607	162,013,125	157,135,957
Difference	\$ 36,555,846	\$ 26,483,552	\$ 15,339,862	\$ 5,903,464	\$ (32,869)

ATTACHMENT C

Truckee Meadows Water Authority 2020-2024 Funding Plan - Delay rate increase to September, 2020

TMWA's Revenue Sufficiency and Cost of Service	FY 2020	FY 2021	FY 2022	F۱	2023	FY 2024
Projected Rate Increases	 0.0%	2.5%	2.5%		2.5%	0.0%
Operating Expenses Principal and Interest on customer related debt Rehabilitative Capital Spending	\$ 62,674,496 29,102,896 30,811,200	\$ 64,744,412 28,221,433 30,811,200	\$ 65,633,489 \$ 28,602,175 30,811,200		66,789,307 28,531,333 30,811,200	\$ 68,518,656 28,465,258 30,811,200
Total Projected Cost of Service	\$ 122,588,592	\$ 123,777,045	\$ 125,046,864 \$		126,131,840	\$ 127,795,114
Recurring Revenues	\$ 108,290,071	\$ 110,945,893	\$ 119,230,605 \$		122,874,258	\$ 125,256,888
Surplus (Deficiency)	\$ (14,298,521)	\$ (12,831,152)	\$ (5,816,259) \$		(3,257,582)	\$ (2,538,226)
Surplus (Deficiency) as a % of Cost of Service	 -11.7%	-10.4%	-4.7%		-2.6%	-2.0%
Debt Service Coverage Ratios	FY 2020	FY 2021	FY 2022	F١	2023	FY 2024
Water Sales Revenues Hydroelectric Sales Other Operating Sales Investment Income	98,132,015 3,458,684 3,289,557 3,409,815	101,778,746 3,512,784 2,800,120 2,854,243	109,989,466 2,800,000 2,331,513 4.109.626		113,728,828 2,500,000 2,269,902 4,375,528	115,325,042 3,000,000 2,263,820 4,668,026
Total Revenues	 108,290,071	110,945,893	119,230,605		122,874,258	125,256,888
Operating Expenses	 (62,711,996)	(66,644,412)	(65,633,489)		(66,789,307)	(68,518,656)
Net Revenues	 45,578,075	44,301,481	53,597,116		56,084,951	56,738,232
Senior Lien Debt Service	28,185,550	27,829,750	28,275,250		28,274,500	28,287,250
Senior Lien DSC	 1.62	1.59	1.90		1.98	2.01
Total Sr. Lien and SRF Debt Service	30,606,271	30,250,471	30,695,971		30,695,221	30,707,971
Total Sr. Lien and SRF DSC	 1.49	1.46	1.75		1.83	1.85
Total Annual Debt Service incl. TECP Interest	 31,358,959	 30,479,829	 30,864,842		30,794,938	30,732,821
Total Subordinate DSC	 1.45	1.45	1.74		1.82	1.85

TMWA's Cash Balances		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024
Restricted Cash	\$	53,409,093	\$	50,398,778	\$	50,965,363	\$	51,790,650	\$	52,637,426
Rate Stabilization Fund		9,171,715		9,764,911		10,171,300		10,002,804		9,660,631
Unrestricted Cash Required by Policy		92,935,216		94,246,022		93,909,048		94,294,320		94,870,770
Required Cash Balances		155,516,024		154,409,711		155,045,711		156,087,774		157,168,826
Total Cash Balance		191,158,128		178,948,644		167,168,999		158,007,944		153,130,776
Difference	\$	35,642,104	\$	24,538,934	\$	12,123,288	\$	1,920,170	\$	(4,038,050)

ATTACHMENT D

Truckee Meadows Water Authority 2020-2024 Funding Plan - Delay rate increase to February, 2021

TMWA's Revenue Sufficiency and Cost of Service	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Projected Rate Increases	 0.0%	2.5%	2.5%	2.5%	0.0%
Operating Expenses Principal and Interest on customer related debt Rehabilitative Capital Spending	\$ 62,674,496 29,102,896 30,811,200	\$ 64,744,412 28,221,433 30,811,200	\$ 65,633,489 28,602,175 30,811,200	\$ 66,789,307 28,531,333 30,811,200	\$ 68,518,656 28,465,258 30,811,200
Total Projected Cost of Service	\$ 122,588,592	\$ 123,777,045	\$ 125,046,864	\$ 126,131,840	\$ 127,795,114
Recurring Revenues	\$ 108,290,071	\$ 109,924,033	\$ 118,096,466	\$ 121,715,103	\$ 125,256,888
Surplus (Deficiency)	\$ (14,298,521)	\$ (13,853,012)	\$ (6,950,398)	\$ (4,416,737)	\$ (2,538,226)
Surplus (Deficiency) as a % of Cost of Service	 -11.7%	-11.2%	-5.6%	-3.5%	-2.0%
Debt Service Coverage Ratios	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Water Sales Revenues Hydroelectric Sales Other Operating Sales Investment Income	98,132,015 3,458,684 3,289,557 3,409,815	100,756,886 3,512,784 2,800,120 2,854,243	108,855,327 2,800,000 2,331,513 4,109,626	112,569,673 2,500,000 2,269,902 4,375,528	115,325,042 3,000,000 2,263,820 4,668,026
Total Revenues	 108,290,071	109,924,033	118,096,466	121,715,103	125,256,888
Operating Expenses	(62,711,996)	(66,644,412)	(65,633,489)	(66,789,307)	(68,518,656)
Net Revenues	 45,578,075	43,279,621	52,462,977	54,925,796	56,738,232
Senior Lien Debt Service	28,185,550	27,829,750	28,275,250	28,274,500	28,287,250
Senior Lien DSC	 1.62	1.56	1.86	1.94	2.01
Total Sr. Lien and SRF Debt Service	30,606,271	30,250,471	30,695,971	30,695,221	30,707,971
Total Sr. Lien and SRF DSC	 1.49	1.43	1.71	1.79	1.85
Total Annual Debt Service incl. TECP Interest	 31,358,959	30,479,829	 30,864,842	 30,794,938	 30,732,821
Total Subordinate DSC	 1.45	1.42	1.70	1.78	1.85

TMWA's Cash Balances	FY 2020		FY 2021		FY 2022		FY 2023		FY 2024	
Restricted Cash	\$	53,409,093	\$	50,398,778	\$ 50,965,363	\$	51,790,650	\$	52,637,426	
Rate Stabilization Fund		9,171,715		9,665,457	10,102,501		9,968,030		9,660,631	
Unrestricted Cash Required by Policy		92,935,216		94,246,022	93,909,048		94,294,320		94,870,770	
Required Cash Balances		155,516,024		154,310,256	154,976,912		156,052,999		157,168,826	
Total Cash Balance		191,158,128		177,926,784	165,013,000		154,692,790		149,815,622	
Difference	\$	35,642,104	\$	23,616,528	\$ 10,036,088	\$	(1,360,209)	\$	(7,353,204)	

Attachment E

Truckee Meadows Water Authority 2020-2024 Funding Plan - Delay rate increase to May, 2021

TMWA's Revenue Sufficiency and Cost of Service		FY 2020	FY 2021		FY 2022		FY 2023		FY 2024
Projected Rate Increases		0.0%	2.5%		2.5%		2.5%		0.0%
Operating Expenses Principal and Interest on customer related debt Rehabilitative Capital Spending	\$	62,674,496 29,102,896 30,811,200	\$ 64,744,412 28,221,433 30,811,200	\$	65,633,489 28,602,175 30,811,200	\$	66,789,307 28,531,333 30,811,200	\$	68,518,656 28,465,258 30,811,200
Total Projected Cost of Service	\$	122,588,592	\$ 123,777,045	\$	125,046,864	\$	126,131,840	\$	127,795,114
Recurring Revenues	\$	109,145,540	\$ 109,547,504	\$	117,697,192	<u>\$</u>	121,303,616	\$	125,256,888
Surplus (Deficiency)	Ş	(13,443,052)	\$ (14,229,541)	Ş	(7,349,672)	Ş	(4,828,224)	Ş	(2,538,226)
Surplus (Deficiency) as a % of Cost of Service		-11.0%	-11.5%		-5.9%		-3.8%		-2.0%
Debt Service Coverage Ratios		FY 2020	FY 2021		FY 2022		FY 2023		FY 2024
Water Sales Revenues Hydroelectric Sales Other Operating Sales Investment Income		98,987,484 3,458,684 3,289,557 3,409,815	100,380,357 3,512,784 2,800,120 2 854 243		108,456,053 2,800,000 2,331,513 4 109 626		112,158,186 2,500,000 2,269,902 4 375 528		115,325,042 3,000,000 2,263,820 4 668 026
Total Revenues		109 145 540	109 547 504		117 697 192		121 303 616		125 256 888
Operating Expenses		(62.711.996)	(66.644.412)		(65.633.489)		(66.789.307)		(68.518.656)
Net Revenues		46,433,544	42,903,092		52,063,703		54,514,309		56,738,232
Senior Lien Debt Service		28,185,550	27,829,750		28,275,250		28,274,500		28,287,250
Senior Lien DSC		1.65	1.54		1.84		1.93		2.01
Total Sr. Lien and SRF Debt Service		30,606,271	30,250,471		30,695,971		30,695,221		30,707,971
Total Sr. Lien and SRF DSC		1.52	1.42		1.70		1.78		1.85
Total Annual Debt Service incl. TECP Interest		31,358,959	30,479,829		30,864,842		30,794,938		30,732,821
Total Subordinate DSC		1.48	1.41		1.69		1.77		1.85

TMWA's Cash Balances	FY 2020		FY 2021		FY 2022		FY 2023		FY 2024	
Restricted Cash	\$	53,409,093	\$	50,398,778	\$ 50,965,363	\$	51,790,650	\$	52,637,426	
Rate Stabilization Fund		9,171,715		9,629,838	10,078,178		9,955,685		9,660,631	
Unrestricted Cash Required by Policy		92,935,216		94,246,022	93,909,048		94,294,320		94,870,770	
Required Cash Balances		155,516,024		154,274,637	154,952,589		156,040,655		157,168,826	
Total Cash Balance		192,013,597		178,405,724	165,092,666		154,360,969		149,483,801	
Difference	\$	36,497,573	\$	24,131,087	\$ 10,140,077	\$	(1,679,686)	\$	(7,685,025)	