



OneWater Nevada Advanced Purified Water Facility at American Flat

Independent Advisory Panel Report January 25, 2023

Prepared for

Western Regional Water Commission

c/o Washoe County

1001 East Ninth Street

Reno, NV 89512

Prepared by

National Water Research Institute

18700 Ward St.

Fountain Valley, CA 92708

June 5, 2023



Disclaimer

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About NWRI

A 501c3 nonprofit organization and California Joint Powers Agency, the National Water Research Institute (NWRI) was founded in 1991 by a group of leading Southern California water agencies in partnership with the Joan Irvine Smith and Athalie R. Clarke Foundation. NWRI collaborates with water utilities, regulators, and researchers in innovative ways to help develop new, healthy, and sustainable sources of drinking water.

NWRI's member agencies include Inland Empire Utilities Agency, Irvine Ranch Water District, Los Angeles Department of Water and Power, Metropolitan Water District of Southern California, Orange County Sanitation District, and Orange County Water District.

For more information, please contact:

National Water Research Institute

18700 Ward Street

Fountain Valley, California 92708 USA

www.nwri-usa.org

Kevin Hardy, Executive Director

Suzanne Sharkey, Water Resources Scientist and Project Manager

Mary Collins, Communications Manager



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Introduction

National Water Research Institute (NWRI) is pleased to present the consensus findings and recommendations of the Independent Advisory Panel (Panel) charged with review of the OneWater Nevada Advanced Purified Water Facility at American Flat (the Project). NWRI convened and facilitated the Panel meeting on January 25, 2023, at the Nevada Division of Environmental Protection in Carson City, Nevada.

The Western Regional Water Commission, a division of the State of Nevada and part of OneWater Nevada, a collaborative regional organization (Project Team), asked NWRI to organize an Independent Advisory Panel under Purchase Order 6500004651 to review the Project. The Panel review process is designed to provide guidance and recommendations on scientific, technical, regulatory, and outreach elements related to the Commission's proposed potable reuse activities. Members of the Panel include:

- Chair: Eva Steinle-Darling, PhD, PE, Carollo Engineers
- Andrew Campbell, PG, CHG, Inland Empire Utilities Agency
- Tyler Nading, PE, Jacobs
- Keel Robinson, Trussell Technologies (Remote Attendance)
- Andrew Salveson, PE, Carollo Engineers (Remote Attendance)
- Melanie Mow Schumacher, PE, Soquel Creek Water District

Brief biographies of the Panel members are available by clicking on each Panel member's name or by going to the NWRI website, www.nwri-usa.org.

Meeting Objectives

The Panel and Project Team met to address the following objectives:

- Share current program status and develop an understanding of 2023 milestones.
- Describe continuing collaborations in support of the Project.
- Obtain acknowledgement that the Project Team may proceed with design based on the recommended treatment train, subject to specific permitting conditions.



- Receive input and suggestions relating to the Project's funding, environmental, permitting, and public engagement processes.
- Provide time for the Panel to begin drafting the recommendation report.

Review Materials

Before the meeting, the Project Team provided the following material to the Panel for review:

- OneWater Nevada Advanced Purified Water Demonstration Study
- OneWater Nevada Basis of Design Report

After the meeting, the Project Team also provided a number of hydrogeologic reports and documents, which the Panel reviewed in preparation for writing this report. The Panel notes that they received a number of versions of the Basis of Design Report (BODR), and that information presented in slides during the meeting was different than the pre-meeting review materials.

Organization of the Report

This report presents a summary of findings and recommendations, including the Panel's responses to questions submitted by the Project Team. The Panel has additional recommendations that it feels will help clarify the path forward for this Project. The Panel recommendations are followed by appendices, which include References (Appendix A), the agenda (Appendix B), a list of attendees (Appendix C), examples of Geologic Cross Sections (Appendix D), and the October 2016 NWRI Panel Report (Appendix E).

NWRI Project History

From 2015 to 2019, the National Water Research Institute (NWRI) provided Independent Expert Advisory Panels to the OneWater Nevada team. Since 2019, the Independent Expert Advisory Panels have been managed and funded through the Western Regional Water Commission (Washoe County, Nevada). The Independent Expert Advisory Panel has provided the State of Nevada and OneWater Nevada significant contributions in several key areas:



- Guidance, technical support, and expert consultation to the NDEP Steering Committee during the State of Nevada's reclaimed water regulatory review and update in 2015/2016
- Independent, third-party review and evaluations
- Scientific and technical advice by relevant, leading industry experts
- Support with challenging scientific questions and regulatory requirements
- Critical review of the water quality sampling, testing, monitoring, quality assurance, quality control, and reporting methods
- Critical review of the operational critical control points for the advanced water treatment unit processes
- Support in interactions with the public, decision makers, and regulators

NWRI facilitated a Panel meeting on May 9-10, 2016, at the University of Nevada, Reno. At that time, the Project was titled **Truckee Meadows Groundwater Replenishment System**, and was operated by the Washoe County Department of Water Resources.

The objectives of the meeting were to:

- Establish the need and legitimacy of the Project.
- Provide critical input to Nevada's draft water reuse regulations.
- Develop public opinion and outreach concepts.

The meeting consisted of presentations made by the Project partners and a closed Panel discussion. Presentations included:

1. Background and overview of the Project concept.
2. Elements of the feasibility phase, including WRRF 15-10, the demonstration project, and hydrogeologic investigations.
3. Project schedule.
4. Public outreach.
5. Draft water reuse regulations for the State of Nevada.



Time was provided on both days for the Panel to ask questions and engage in discussions with Washoe County staff. Panel members met in a closed session on the second day of meetings. NWRI delivered a report dated October 28, 2016, which is included in Appendix E.

Since the first report was submitted in 2016, some of the original Panel members were engaged as informal advisors to the Project Team. People who have worked with the Project Team in addition to the current Panel members are Jeff Mosher, George Tchobanoglous, James Crook, Bob Hultquist, Fred Gerringier, and Mark Millan.

Summary of Findings and Recommendations

The Independent Advisory Panel acknowledges the Project Team's effort to gather and present their work on the Project. The Panel notes that information presented during the meeting was different from reports included in the pre-meeting information they were given to review. Going forward, the Panel would appreciate an opportunity to review the most current proposed Project information before each meeting.

Before the meeting on January 25, 2023, the Project Team submitted questions that they wanted the Panel to address. The Panel considered these questions during the meeting and while writing their findings and recommendations. The questions and Panel responses are presented in the following sections.

The findings and recommendations presented here are derived from a review of the materials provided to the Panel, Project Team presentations, and interactive Panel discussions during and after the meeting.

Question 1

Based upon the expert panel engagement with the OneWater Nevada team since 2015 and seeing many other similar programs evolve, does the Panel have suggestions to enhance the OneWater Nevada team's technical and public outreach approach and /or resources?



The Panel recognizes that the Project Team's Public Outreach approach is intended to address the treatment, water quality, and environmental aspects of the Project and will use the National Environmental Policy Act (NEPA) process (for its environmental compliance requirements with federal funding) to engage the public for input and comments.

The Panel suggests that public outreach and engagement should focus on Project needs, address how the Project will be coming online in a stepwise process, and explain how recycled water will protect the groundwater basin that is the region's drinking water source. The Panel also recommends that the Project Team use tools and methods that other project developers have used for their recycled water projects. (The Project Team recently spent several days touring water reuse facilities in Northern and Southern California.)

The Panel suggests that outreach should address both the potential benefits and issues, for example, unintended consequences or impacts of recycling on downstream bodies of water. Outreach can be equally important as the technical evaluation and engagement could be beneficial to the Project's development above and beyond the public process requirements under NEPA.

Question 2

Based on OneWater Nevada's past pilot testing, demonstration study and preliminary design efforts, and given that the comments received from the Panel continue to be addressed, does the Panel see any fundamental impediments to the Project proceeding as currently proposed?

The Panel does not see any fundamental impediments to the Project proceeding as currently proposed. However, while the Panel agrees with the framework and basic components of the Project, there are significant details that need to be developed and shared with the Panel. This information is needed so that the Panel can be comfortable supporting the Project through the Engineering Report and design phases.

The Panel has specific recommendations on pathogen log removal value (LRV) credits, subsurface data, chemical data, and establishing partnerships. These recommendations



are detailed in the **Additional Panel Recommendations**, subsection, titled **Follow-up Recommendations for December 2022 Project Update Meeting**.

Question 3

Based upon the Panel's involvement with similar programs, are there other future considerations that the OneWater Nevada team and NDEP should be aware of?

Since OneWater Nevada is the first potable reuse project applying for a permit under the Nevada Division of Environmental Protection (NDEP) regulatory framework, it is understandable that both the permitting agency and the potential permit holder need to work together to figure out the best way to interpret the regulatory language.

The Panel can provide recommendations based on years of experience implementing potable reuse regulations in other states. For example, essential regulatory documents include, but are not limited to, an Engineering Report, Monitoring and Reporting Plan, Operations Plan, Tracer Testing Plan, and various conditional acceptance testing requirements during startup. These plans have evolved over the years to give guidance on the intent and content of these regulatory documents to best protect public health, and are based on lessons learned from operating water recycling facilities.

The Panel's primary role is to give the Project Team the benefit of an independent, third-party review. The role of the potable reuse Project Team includes working with regulators to address Project-specific requirements and deliverables based on the Panel's review. Too much Panel input on the development of these deliverables can negate the benefit of an independent, third-party review from the perspective of the regulators.

The Panel, therefore, suggests that the Project Team and/or NDEP staff submit public records requests for Engineering Reports and other regulatory submittals that are required for potable reuse projects in other states (including but not limited to California). This will allow the Project Team to develop an understanding of the depth and detail of the work required for successful Project implementation.

The Panel further suggests that the Project Team develop a brief summary of proposed regulatory deliverables, which includes an outline or draft table of contents for each



deliverable, for review and comment by the Panel and NDEP. Finally, the Panel suggests that the Project Team develop a detailed timeline of submittals for each deliverable that includes ample time for the Panel and the Project Team to review and revise them before submitting to NDEP, along with an analysis of how this timeline relates to the proposed design, construction, and phased commissioning approach.

Additional Panel Findings and Recommendations

The Panel believes the recommendations in this section will advance the technical basis of the Project and will help the Project Team present the proposed treatment process to regulators.

Conceptual and Hydrogeologic Flow Model Documentation

The Panel recommends that the Project Team prepare a conceptual hydrogeologic framework and relevant modeling documentation in a single, current, easy-to-access, and understandable document to give to permitting agencies. This document will be needed for an Engineering Report that models underground travel time and flow paths to obtain treatment credit for biological organism removal. The conceptual hydrogeology is developed in multiple reports ranging from 1967 to 2022; the reports provide more refined information over time. Nevada regulators will need this long-term, regional information distilled into an easy-to-review and understand package that specifically addresses the American Flat Road Project area. Similar, simplified information should be prepared for public engagement.

The Panel recommends that the Project Team prepare these documents and include the following maps at the scale of the Project impact area (not the entire Lemmon Valley):

- A geologic map.
- A current groundwater elevation map showing existing well source data.



- A forecast steady-state groundwater elevation map of chosen flow rate model scenarios with flow paths and vectors.
- A well location map of all wells in the Project impact area.
- A model boundary and grid map showing the boundary elevations between the bedrock and alluvium model layers (Layer 2 and Layer 3).
- A map of relevant groundwater chemistry from wells, including total dissolved solids (TDS), arsenic, etc.

The Panel recommends the Project Team also prepare a minimum of two hydrogeologic cross sections, one north-south and the other west-east. A map of the Project site with three possible cross section locations is included in Appendix D. The cross sections should show, at a minimum:

- The general geologic units, including older and younger alluvium and bedrock.
- Aquifer boundaries.
- Known faults, including the results of the 2019 Seismic Geophysical Analysis (e.g., the Horst and Graben structures at the Project site).
- The correlation of important layers such as hydraulic conductivity differences, perching lenses, the current and modeled water table surfaces, and mapped faults.
- The Project's injection, monitoring, and extraction well construction methods.
- The Truckee Meadows Water Authority (TMWA) and other potable well construction details.
- The relevant depth-specific water chemistry including TDS, arsenic, etc.

Appendix D also includes an example geologic cross section that was developed by the Orange County Water District (OCWD) and a conceptual cross section that Inland Empire Utilities Agency (IEUA) is using for its Chino Basin Project. The cross sections should show similar conceptual information, for example: the numerical model layers, known geology, faults, existing and future well locations, the water table, existing well information (screen depths, logging information), and the path and limit of the Project water.



Groundwater Flow Model Refinement

The regional groundwater flow model of the larger Lemmon Valley (TMWA, 2019) is a robust, calibrated, regional groundwater flow model developed using industry standard software and methods. The model has calibration variations because of dense, available well data for the area. The Project area north of the Reno Stead Airport does not have much well data and calibration points to precisely define groundwater elevations. In comparison, the Silver Lake area has numerous water level data and calibration points. The Panel recommends the Project's groundwater model be updated in the Project area downstream toward Dragstrip Road as pertinent new information becomes available.

Areal refinements can be made in water level data, hydraulic conductivity, bedrock structure, and possible barriers to groundwater flow. The Panel recommends the Project Team consider using areal time domain electromagnetic (TDEM) geophysical methods to fill these data gaps.

Hydraulic Conductivity

The 2019 groundwater model used 1972 pre-development water elevation data from USGS (Harrill, 1973) to calculate hydraulic conductivity using Parameter Estimation (PEST) and Kriging software. In 1972, water level data in the American Flat Road Project area were lacking and, therefore, the model's hydraulic conductivity in this area is calibrated largely to uncertain 1972 water level data and adjusted to approximate a single target point (the North Airport well). The PEST evaluation produced hydraulic conductivity values that differ by an order of magnitude at approximately American Flat Road. The impact of refining hydraulic conductivity in the American Flat Road Project area could lead to refinements of travel time estimates and modeled drawdown at nearby domestic wells.

Bedrock Structure

The nature of the water table in the Project area is potentially controlled by subsurface geologic structures (faults and bedrock horsts) which are identified using geophysics in the area after the 2019 modeled effort. DRI (2022) contoured 1982 water levels in the Project area, showing a generally uniform depth to water on Figure 6 (i.e., paralleling the



land surface for 2 to 3 miles) and then suddenly deepening 30 feet over 1 mile just west of the Reno Stead Airport.

Such a deepening, if real, should be discussed in relationship to mapped faults shown on Project maps and, if needed, modeled as partial barriers to groundwater flow. Mapped faults that do not appear to be considered in the model are shown on Figure 4 (TWA June 2019) west of Reno Stead Airport ending to the north at Dragstrip Road and on Figure A21 (TWA August 2019) running north-south through the Project area.

Follow-up Recommendations from December 2022 Project Update Meeting

On December 20, 2022, the OneWater Nevada Project Team made a comprehensive Project status presentation to the Panel. During the presentation, NWRI facilitated scientific, technical, and policy dialog between the panelists and the Project Team. After the presentation and discussion, the Panel held a closed working session to: (a) Consider new information presented in response to past Panel findings and recommendations; and (b) to reflect upon additional changes to the Project Team's approach provided in the presentation.

These most recent additional updates were considered by the Panel and necessarily led to additional comments from the Panel. The Panel has the following specific comments organized into five categories: Summary, pathogen log removal value (LRV) credits, subsurface, chemicals, and partnering.

Summary

The Panel appreciates the Project Team's efforts to recognize and address previous Panel findings and recommendations and commends the Project Team for making significant progress.

The Panel does not see any fundamental impediments to the Project proceeding as currently proposed. While the Panel agrees with the framework and basic components of the Project, there are significant details that need to be developed and shared with the



Panel. This information is needed so that the Panel can be comfortable supporting the Project through the Engineering Report and design phases.

Some major topics that require additional detail are summarized below. Additional topics of importance are likely to emerge as the Project Team develops its deliverables.

Pathogen Log Removal Value Credits

The Panel recognizes and appreciates the Project Team's focus on answering our questions from the last meeting so that we can confirm the pathogen log removal value (LRV) approach. For the next meeting, the Panel would like the Project Team to provide the design criteria and critical control point system for the treatment processes. This will include the alarm and action setpoints in addition to other aspects of the Project that the team identifies. Discussion of some specific aspects of pathogen reduction are included below.

1. The Panel concurs with the Project Team's approach to use the ultraviolet (UV) system at the Reno Stead Water Reclamation Facility (RSWRF) to obtain additional *Giardia* and *Cryptosporidium* credit in addition to the credit provided by the downstream Advanced Purified Water Facility/wellhead UV system, subject to the following constraints:
 - a. Both UV systems must be validated per the requirements of the United States EPA's UV Disinfection Guidance Manual (UVDGM), ideally, before commissioning.
 - b. Based on the outcome of the validation work, the Panel encourages the Project Team to count all the LRV credit available from the RSWRF UV system towards the regulatory credits for the Project.
 - c. Both UV systems will need to be operated as drinking water UV systems (per UVDGM). This requires that both UV systems be validated under the UVDGM, and designed to UVDGM guidance standards. Further, operating under UVDGM will require a change in formal operating protocols as well as a change in operator mindset, for which the Project Team should start training activities before or during the design phase. The Panel would be glad to advise and review necessary standard operating procedures for both UV systems that dictate stringent



operations and maintenance (O&M) practices for monitoring, repair, calibration, and off-spec water diversion.

2. The Panel will consider supporting the use of a scavenger-corrected, ozone-to-TOC ratio as a basis for virus LRV through the ozone system. However, the Panel does not consider the current pilot/demonstration permit, nor the existing challenge testing data sufficient as a basis for LRV credit; for example, there has been no work with peroxide, which changes how ozone disinfects. To consider supporting this LRV credit paradigm, the Panel asks that challenge tests measuring Bacteriophage MS2 inactivation through the ozone process be conducted under a range of conditions. The challenge testing can be pilot scale or bench scale, noting that bench scale testing is fast and less costly. A Test Plan should be developed and submitted to the Panel. Some Test Plan suggestions are listed below:
 - a. Use multiple (at minimum, three) temperature set points that cover the range of expected operating conditions.
 - b. Use multiple (at minimum, three) ozone dose set points, as a function of scavenger-corrected, ozone-to-TOC ratio, that cover the range of expected operating conditions. Suggested test points include 0.5, 0.7, 0.9, 1.1, and 1.5.
 - c. Include bromate analysis with all test points.
 - d. Use multiple (at minimum, three) hydrogen peroxide dose set points that cover the range of expected operating conditions, in addition to zero hydrogen peroxide dose points for baseline performance.
 - e. Conduct testing to include the addition of nitrite to relevant levels to evaluate performance impact for a select number of the tests.
 - f. Conduct testing to dictate reliable and conservative monitoring and control systems to account for the addition of hydrogen peroxide, including delta UVT, Ozone/TOC with nitrite correction, and temperature impacts on log inactivation.
3. The Panel is concerned by the lack of recent, representative data supporting the ozone/peroxide operating proposal as it applies to bromate formation, including



details for the Test Plan requested above. The Panel asks that the Project Team explain their proposed bromate mitigation approach for the ozonation step, potentially including additional bromate data with the proposed ozone-peroxide system to confirm the design doses. The Panel further suggests that the Project Team identify a chemical indicator to justify the selected ozone and peroxide doses and to provide confidence that the system is performing adequately. Bromate formation mitigation options and chemical indicators could be integrated into the challenge testing suggested above.

4. The Panel recommends that the Project Team not include a TOC limit in the Project permit. While an operational TOC goal of 2 mg/L may turn out to be reasonable, performance of DBP formation potential testing at different finished water TOC concentrations can better inform a finished water TOC goal. Such testing is recommended along with the Test Plan if the Project Team proceeds.

Subsurface

1. Given the challenges the Project Team has experienced with achieving virus LRV credit, the Panel would like the Project Team to clarify why they do not intend to take credit for subsurface travel time. Claiming virus credit for travel time is likely an easier path than seeking approval for virus credit in the ozone-peroxide system.

At the January 25 meeting, the Project Team presented an updated LRV credit table, in which the subsurface travel time is credited with some pathogen removal in lieu of LRV credit from the ozone process. The additional data requested in this report will also support the defensibility of this subsurface travel time LRV credit.

In 2019, there was a preliminary evaluation of water quality mixing and leaching based on hypothetical A+ water and groundwater. The conclusion from that report is as follows:

Overall, the chemistries and constituent levels are relatively compatible between groundwater, source water, and A+ water; hence, they are not likely to cause significant changes in the aquifer when mixed. General water chemistry overlapped between groundwater and source water. A+ water may have higher TDS, specific



ions, and some heavy metals. Speciation calculations indicated that precipitation of minerals is unlikely in groundwater or source water/A+ water and during the mixing of them.

Due to lack of standard or actual values for alkalinity, calcium, and magnesium for A+ water, further analysis with actual A+ water characteristics may be useful for evaluation of possible mineral precipitation during injection of specific A+ water. Possible mineral dissolution and redox reactions should also be evaluated for specific cases of injection. Careful monitoring and control through advanced treatment should be practiced to limit trace organics and disinfection byproducts in A+ water for groundwater recharge.

2. The Panel asks that the relevant American Flat area hydrogeologic findings from Project studies be incorporated into the Project report. Currently, such findings are deep in attached appendices; summaries of the findings need to be readily available for regulatory agencies. Findings of interest to permitting agencies include: the boundaries of the alluvial aquifer; the groundwater model boundaries; the locations of all existing and planned wells (including domestic and municipal potable supply wells); modeled travel times to all extraction wells within the Project's influence; groundwater levels and flow directions; and modeled water level changes.
3. The robust nature of the groundwater flow model should be included to demonstrate confidence in travel time estimates that will be used for virus removal credits. California gives 1 log per month credit, but then discounts that credit based upon the type of groundwater model used. A conservative approach is to model the groundwater travel time using a robust modeling tool, then cut the credit in half. Under this paradigm, the currently modeled travel times would extrapolate to a 10-log removal at 20 months, for example. Proposed injection and extraction locations can be adjusted to achieve the values needed.
4. Show anticipated or planned monitoring wells that will be installed to monitor subsurface travel at full-scale injection rates.



5. If applicable, there should be a distinction between the relevance of earlier hydrogeologic testing at the RSWRF site and the pending repeat tests at the American Flat site.
6. While the proposed method to control biofouling has been used in shallow bioremediation wells, the Panel is unaware of this method being used in large potable water systems; the method is more commonly used for odor and iron treatment in small domestic wells.

Injecting hydrogen peroxide increases groundwater oxygen concentration, inhibits biological processes, and results in off-gassing in the unsaturated zone. The Panel believes it is important that biofouling mitigation using hydrogen peroxide be evaluated so that it is not construed as a subsurface polishing stage for A+ water production.

Chemicals

The Panel acknowledges that a significant amount of data has been collected for unregulated chemicals in the past 15 years. However, given how much the Project approach has changed, the Panel asks that the Project Team clearly identify its approach to unregulated chemicals, particularly for NDMA, 1,4-dioxane, PFAS, and other CECs that the Project Team identifies as important. Will additional data be collected for these chemicals with the proposed final treatment train? Does the Project Team have any water quality goals for these unregulated contaminants? Will the chemical barriers (ozone, GAC, etc.) target specific chemicals to confirm proper operation?

Partnering

With the inclusion of RSWRF components for pathogen credits applied to the Project, the One Water Nevada Team should develop a Work Plan and/or collaboration document, such as a memorandum of agreement, to begin developing O&M targets, alarms, protocols, and other SOPs to ensure that key elements are addressed and incorporated into future potable reuse project permitting requirements.



Appendix A • References

Truckee Meadows Water Authority, August 2019. *American Flat Road Hydrogeologic Investigation Report*. Prepared by Nick White; Greg Pohll, PhD; Randy Van Hoozer; David Kershaw; Satish Pullammanappallil; and Yu Yang.

Truckee Meadows Water Authority, June 2019. *Lemmon Valley Groundwater Model*. Prepared by Greg Pohll, PhD.

State of Nevada Department of Conservation and Natural Resources, Division of Water Resources 1973. *Water Resources Bulletin No. 42, Evaluation of the Water Resources of Lemmon Valley, Washoe County, Nevada, with Emphasis on the Effects of Ground-Water Development to 1971*. Prepared by James Harrill.

Division of Hydrologic Sciences, Desert Research Institute, Nevada System of Higher Education, January 2022. *Publication No. 41287. Coupled Watershed-lake Hydrologic Modeling of Playa Lakes to Support Flood Frequency Estimation in Lemmon Valley, Washoe County, Northwestern Nevada*. Prepared by Chris Garner for the US Army Corps of Engineers



Appendix B • Agenda



Independent Advisory Panel for the OneWater Nevada Advanced Purified Water Facility at American Flat

Meeting Agenda

January 25, 2023, at 9:00 am Pacific Time

Meeting Location

Nevada Division of Environmental Protection
Carson City, Nevada 89701

Contacts

Suzanne Sharkey: 949.258.2093 (mobile)
Kevin Hardy: 760.801.9111 (mobile)

Zoom Online Meeting Teleconference

Meeting ID: 837 0680 4180 Passcode: 270594

Meeting Objectives

- 1) Share current program status and develop understanding of 2023 milestones.
- 2) Describe continuing collaborations in support of the Project.
- 3) Obtain acknowledgement that the project team may proceed with design based on the recommended treatment train, subject to specific permitting conditions.
- 4) Receive input and suggestions relating to the project's funding, environmental, permitting, and public engagement processes.
- 5) Provide time for the Panel to begin drafting the recommendation report.

Questions for the Panel

- 1) Based upon the expert panel engagement with the OneWater Nevada team since 2015 and seeing many other similar programs evolve, does the Panel have suggestions to enhance the OneWater Nevada team's technical and public outreach approach and /or resources?
- 2) Based on OneWater Nevada's past pilot testing, demonstration study and preliminary design efforts, and given that the comments received from the Panel continue to be addressed, does the Panel see any fundamental impediments to the project proceeding as currently proposed?
- 3) Based upon the Panel's involvement with similar programs, are there other future considerations that the OneWater Nevada team and NDEP should be aware of?

18700 Ward St. • Fountain Valley, CA 92708 • nwri-usa.org



One Water Nevada Panel: Meeting Agenda

Schedule

Time	Primary Topics	Presenter/Facilitator
9:00 a.m.	Welcome, Introductions, and Review Agenda and Meeting Objectives	Kevin M. Hardy, NWRRI Eva Steinle-Darling, Panel Chair
9:10 a.m.	Project Team Presentations Background and Schedule (20 min) Treatment and Hydrogeological (45 min) Break (15 min) Environmental Review/Funding (30 min) Permitting (30 min) Public Education and Engagement (30 min)	OneWater Nevada Project Team John Enloe, Lydia Teel, Krishna Pagilla, Vijay Sundaram, Nick White, Greg Pohl, Steff Morris, Nick Brothers, Danny Rotter, Joe Coudriet, Robert Charpentier, Mark Millan, and Rick Warner
12:00 p.m.	Working Lunch	
12:45 p.m.	Final Panel Q & A	Facilitated by Kevin M. Hardy
1:00 p.m.	Closed Panel Discussion	Eva Steinle-Darling
2:00 p.m.	Adjourn	

Panel Members

- Chair: Eva Steinle-Darling, PhD, PE, Carollo Engineers
- Andrew Campbell, PG, CHG, Inland Empire Utilities Agency
- Tyler Nading, PE, Jacobs
- Keel Robinson, Trussell Technologies (Remote Attendance)
- Andrew Salveson, PE, Carollo Engineers (Remote Attendance)
- Melanie Mow Schumacher, PE, Soquel Creek Water District

One Water Nevada Project Team

- Nick Brothers, City of Reno
- Robert Charpentier, Truckee Meadows Water Authority
- Joe Coudriet, City of Reno
- Blaga Delić, AECOM
- John Enloe, Truckee Meadows Water Authority
- John Flansberg, City of Reno
- Angel Lacroix, Truckee Meadows Water Authority
- Trina Magoon, City of Reno



OneWater Nevada Advanced Purified Water Facility Panel Report



One Water Nevada Panel: Meeting Agenda

- Justin Mercado, City of Reno
- Mark Millan, Data Instincts
- Stef Morris, Truckee Meadows Water Authority
- Krishna Pagilla, University of Nevada, Reno
- Greg Pohll, Truckee Meadows Water Authority
- Kimberly Rigdon, Western Regional Water Commission
- Danny Rotter, Truckee Meadows Water Authority
- Jim Smitherman, Western Regional Water Commission
- Vijay Sundaram, AECOM
- Lydia Teel, Truckee Meadows Water Authority
- Rick Warner, Warner and Associates
- Dustin Waters, City of Reno
- Nick White, Truckee Meadows Water Authority
- Robert Zoncki, City of Reno

National Water Research Institute

- Kevin Hardy, Executive Director
- Mary Collins, Communications Manager
- Tianna Manzon, Research Project Coordinator
- Suzanne Sharkey, Project Manager



Appendix C • Attendees

NWRI Panel Members

- Chair: Eva Steinle-Darling, PhD, PE, Carollo Engineers
- Andrew Campbell, PG, CHG, Inland Empire Utilities Agency
- Melanie Mow Schumacher, PE, Soquel Creek Water District
- Tyler Nading, PE, Jacobs
- Keel Robinson, Trussell Technologies (Remote Attendance)
- Andrew Salveson, PE, Carollo Engineers (Remote Attendance)

In-Person Attendees

- Rick Warner, Warner and Associates
- Kevin Hardy, NWRI
- Jennifer Carr, State of Nevada
- Elizabeth Kingsland, State of Nevada
- Andrea Siefert, State of Nevada
- Andrew Kowler, State of Nevada
- Rick Warner, Warner and Associates
- Lydia Teel, Truckee Meadows Water Authority
- Vijay Sundaram, AECOM
- Blaga Delic, AECOM
- Krishna Pagilla, University of Nevada, Reno
- Laura Haak, University of Nevada, Reno
- Trina Magoon, City of Reno
- Dustin Waters, City of Reno
- Joe Coudriet, City of Reno



- Nick Brothers, City of Reno
- Greg Pohll, Truckee Meadows Water Authority
- Nick White, Truckee Meadows Water Authority
- Robert Charpentier, Truckee Meadows Water Authority
- Stef Morris, Truckee Meadows Water Authority
- Kim Rigdon, Western Regional Water Commission
- Mark Millan, Data Instincts

Virtual Attendees

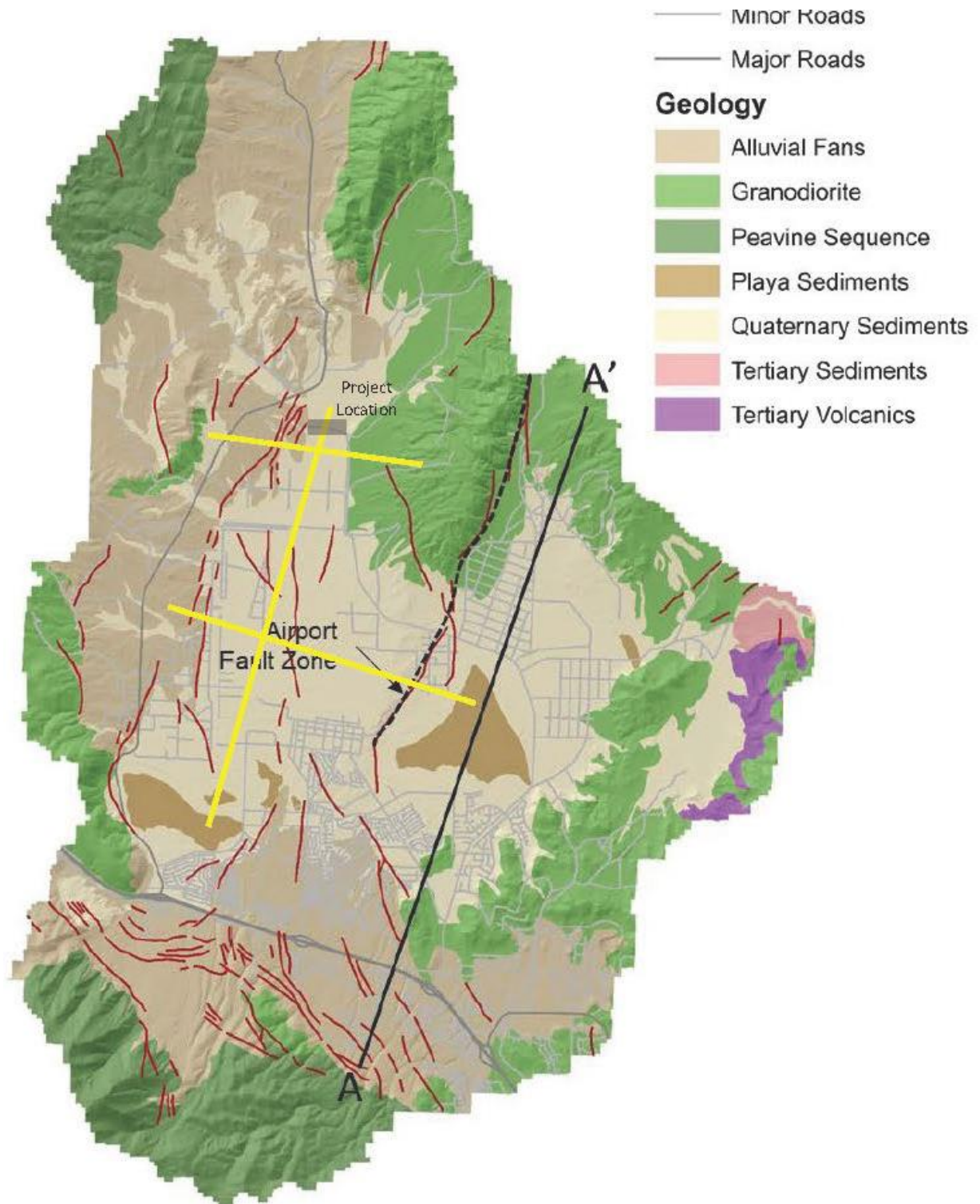
- Mary Collins, NWRI
- Suzanne Sharkey, NWRI
- Jason Cooper
- John Enloe, Truckee Meadows Water Authority
- Reggie Lang
- Ryan Finley
- Dave Kelly
- April Holt
- Ethan Mason
- Alexi Lanza
- Brendon Grant
- Mark Kaminski
- Donette Barreto
- Lori Singer
- S. Fontaine

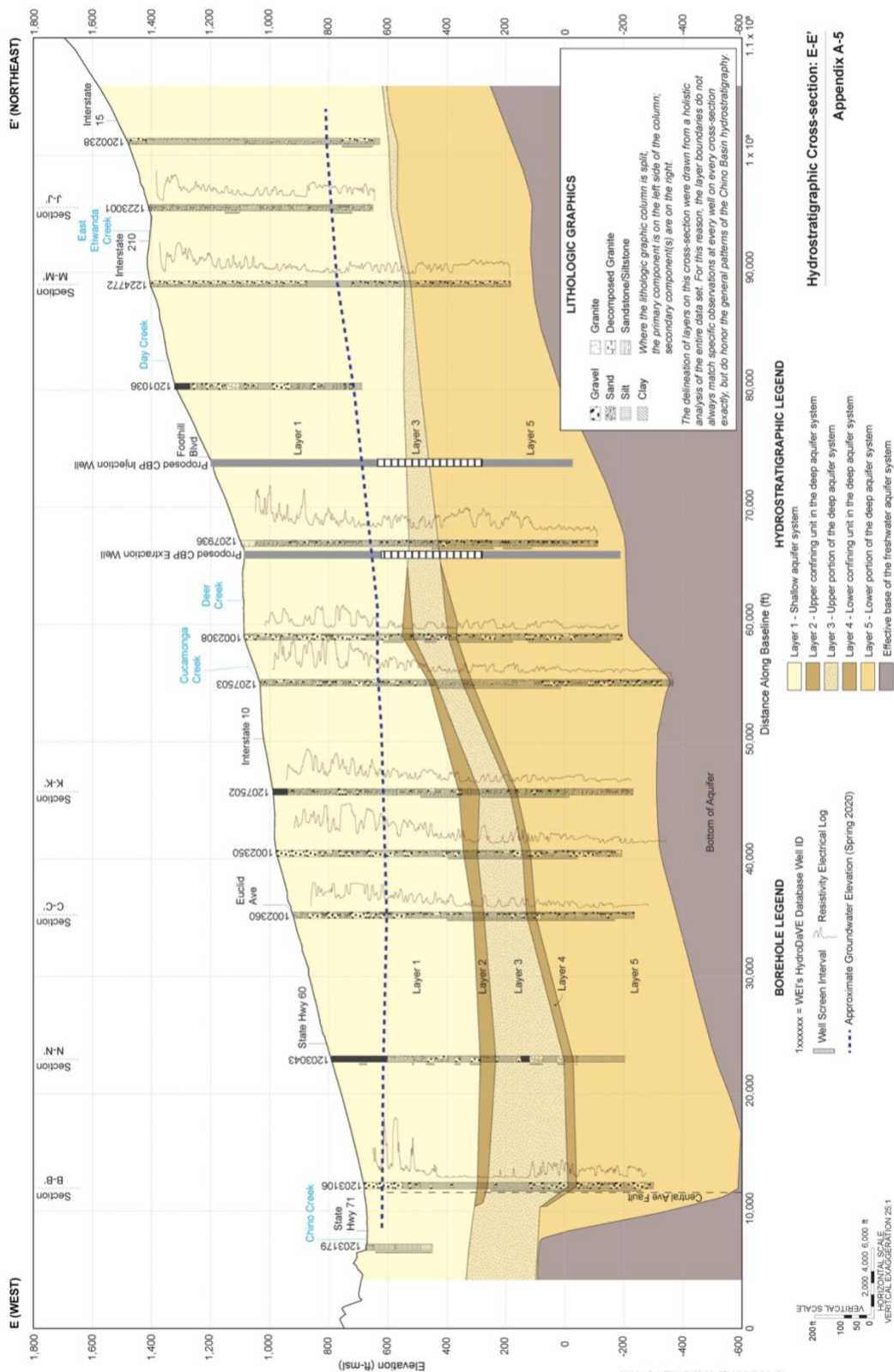


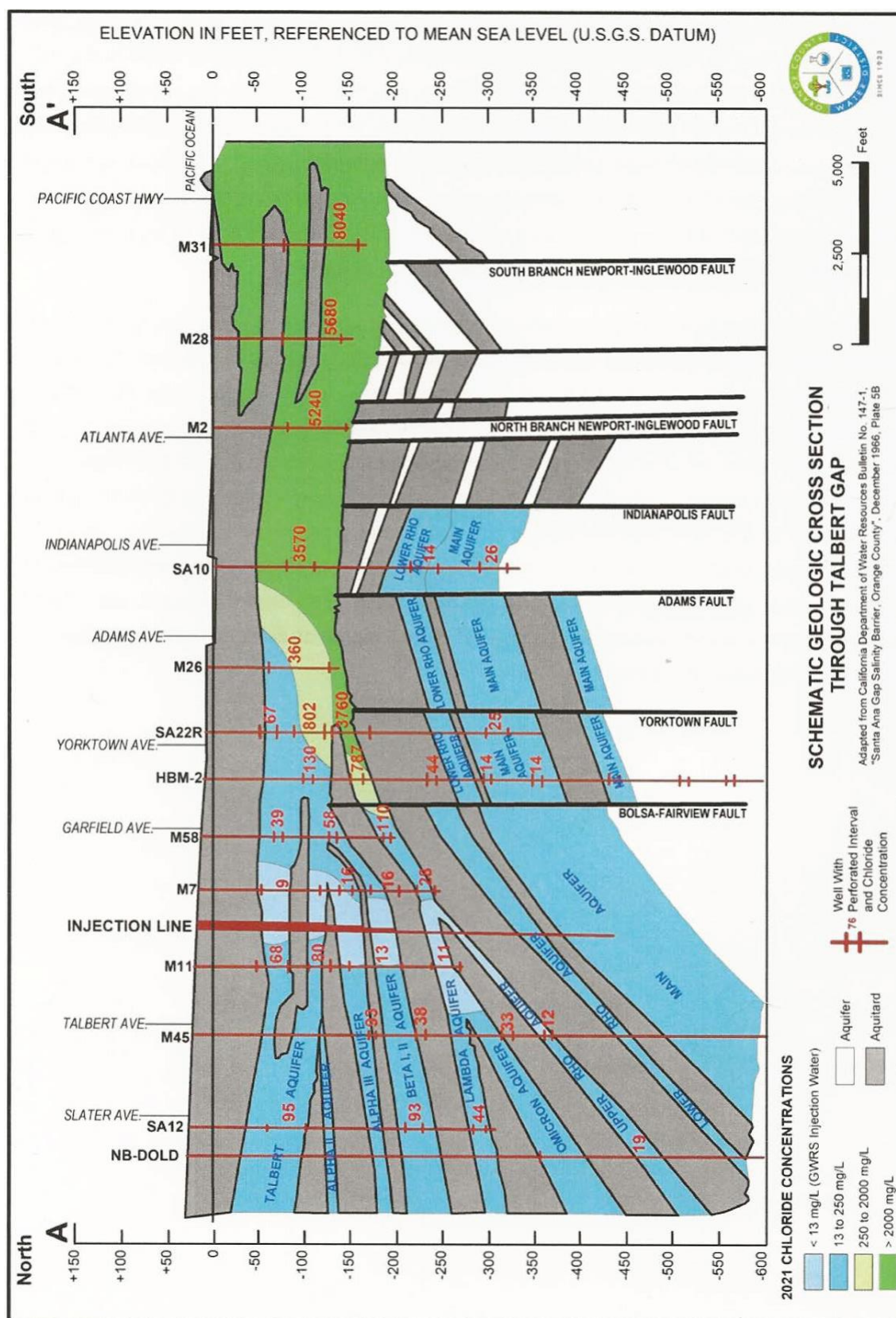
Appendix D · Example Geologic Cross Section

The Panel recommends that the Project Team develop cross sections, as represented in the following figures.

1. Figure of Project site showing recommended cross sections.
2. Example cross section developed by IEUA for its Chino Basin Project.
3. Example cross section developed by OCWD for its Groundwater Replenishment System.









Appendix E • Panel Meeting Report Submitted October 28, 2016

NATIONAL WATER RESEARCH INSTITUTE

NWRI Independent Advisory Panel Draft Meeting Report #1:

Truckee Meadows Groundwater Replenishment System

Based on the Panel Meeting Held May 9-10, 2016 (Meeting #1)

Prepared for:

Washoe County Department of Water Resources
4930 Energy Way
Reno, NV 89502

Submitted by:

National Water Research Institute
18700 Ward Street
Fountain Valley, CA 92708

Submittal Date:

October 28, 2016

DISCLAIMER

This report was prepared by an NWRI Independent Advisory Panel, which is administered by the National Water Research Institute (NWRI). Any opinions, findings, conclusions, or recommendations expressed in this report were prepared by the Panel. This report was published for informational purposes.

ABOUT NWRI

A 501c3 nonprofit organization, the National Water Research Institute (NWRI) was founded in 1991 by a group of California water agencies in partnership with the Joan Irvine Smith and Athalie R. Clarke Foundation to promote the protection, maintenance, and restoration of water supplies and to protect public health and improve the environment. NWRI's member agencies include Inland Empire Utilities Agency, Irvine Ranch Water District, Los Angeles Department of Water and Power, Orange County Sanitation District, Orange County Water District, and West Basin Municipal Water District.

For more information, please contact:

National Water Research Institute
18700 Ward Street
P.O. Box 8096
Fountain Valley, California 92728-8096 USA
Phone: (714) 378-3278
Fax: (714) 378-3375
www.nwri-usa.org

Jeffrey J. Mosher, Executive Director
Gina Melin Vartanian, Editor

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1. PURPOSE AND HISTORY OF THE PANEL

A 501c3 nonprofit organization, the National Water Research Institute (NWRI) of Fountain Valley, California, specializes in facilitating expert panels that provide third-party scientific and technical review by leading experts of projects, programs, and policies in the water industry. In 2015, NWRI was asked by a regional partnership of public agencies in the Reno, Nevada, area to form and coordinate an Independent Advisory Panel (Panel) to provide a science-based review of the “Truckee Meadows Groundwater Replenishment System,” a project that involves determining the feasibility of implementing indirect potable reuse (IPR) as a viable water management option for the region.

The regional partners on the proposed project are as follows:

- City of Reno
- City of Sparks
- Northern Nevada Water Planning Commission
- Truckee Meadows Water Reclamation Facility
- Truckee Meadows Water Authority
- Washoe County

The goal of the Panel review is to assist the project team in framing and validating approaches for project implementation. Activities related to the panel review include the following:

- Regulatory criteria for IPR for the State of Nevada.
- The Water Environment & Research Foundation (WE&RF) project titled “Optimization of O₃-BAC Pilot Test” (WRRF-15-10).
- Demonstration project.
- Geotechnical investigations and groundwater modeling studies on local basins that could benefit from a replenishment project.
- Communicating with the public on project goals.

The Panel is comprised of experts representing local and national expertise in areas such as hydrogeology, groundwater modeling, water reuse regulations, and advanced treatment technologies, among others. Specifically, Panel members include:

- Chair: George Tchobanoglous, PH.D., P.E., NAE, BCEE, University of California, Davis
- Vice-Chair: James Crook, Ph.D., P.E., Environmental Engineering Consultant
- Fredrick W. Gerringer, D.Env., P.E., BCEE, Trussell Technologies, Inc.
- Robert Hultquist, P.E., California Department of Public Health (retired)
- Mark Millan, Data Instincts

- Andrew Salveson, P.E., Carollo Engineers

Background information about the NWRI Panel process can be found in **Appendix A**, and brief biographies of the Panel members can be found in **Appendix B**.

2. PANEL MEETING #1

A two-day meeting of the Panel (Meeting #1) was held on May 9-10, 2016, at the Harry Reid Engineering Laboratory at the University of Nevada, Reno. This meeting represents the first time the Panel has convened to review efforts to implement the Truckee Meadows Groundwater Replenishment System.

2.1 Background Material

In advance of Meeting #1, the Panel received the following material for review:

- State of Nevada draft revisions to Chapter 445A of the Nevada Administrative Code.
- Truckee Meadows Groundwater Replenishment System Feasibility Phase Activities (March 2016).
- Presentation on “The Beginnings of Potable Reuse in Nevada Project Update” (May 2016).

2.2 Meeting Agenda

Staff from the project partners and NWRI collaborated on the development of the agenda for Meeting #1, which is included in **Appendix C**. The agenda was based on meeting the following objectives:

- Establish the need and legitimacy of the project.
- Provide critical input to Nevada’s draft water reuse regulations.
- Develop public opinion and outreach concepts.

The majority of the meeting was devoted to presentations made by the project partners. Presentations included:

- Background and overview of the project concept.
- Elements of the feasibility phase, including WRRF 15-10, the demonstration project, and hydrogeologic investigations.
- Project schedule.
- Public outreach.
- Draft water reuse regulations for the State of Nevada.

Time was provided during the meeting for the Panel to ask questions and engage in discussions with Washoe County staff. On the afternoon of Day 2, the Panel met in a closed session to discuss the information presented. Before the meeting adjourned, the Panel drafted its preliminary findings and recommendations, which were expanded upon in this report.

2.3 Meeting Attendees

Four Panel members attended this meeting in-person, while Panel member Andrew Salveson attended remotely using web-enabled conference call services. Panel Chair George Tchobanoglous was unable to attend Meeting #1. Other attendees included staff from NWRI, Washoe County, and others. A complete list of attendees at Meeting #1 is included in **Appendix D**.

3. FINDINGS AND RECOMMENDATIONS

The principal findings and recommendations provided below are derived from material presented and discussed during Meeting #1. The findings and recommendations are organized under the following categories:

- General Comments
- Draft Water Reuse Regulations
- Outreach/Community Engagement
- Framework for Chemicals

3.1 General Comments

The following comments pertain to the overall Panel review of the Truckee Meadows Groundwater Replenishment System:

- The Panel appreciated the materials and presentations provided by Washoe County as part of Meeting #1.
- The project partners are to be commended for building a collaborative relationship throughout the planning and development of this project.

3.2 Draft Water Reuse Regulations

On May 20, 2016, the Panel transmitted comments regarding its review of the draft amendments to Section NRS 445A.425 of Chapter 445A (Water Controls) of the Nevada Administrative Code. Per the request of the Nevada Department of Environmental Protection (NDEP), the Panel focused on *Section 18. Reuse Category A+ (Exceptional Quality): Water Quality Requirements*. The Panel subsequently reviewed a revised version of the draft regulations and submitted comments on August 29, 2016. The Panel's comments were provided in a separate document and are not included as part of this meeting report.

3.3 Outreach/Community Engagement

Regarding outreach activities related to the project, the Panel recommends the following:

- **Develop a problem statement.** The problem statement will provide stakeholders and the public with a rationale for the need of the project.
- **Describe potential solutions or alternatives.** Listing a range of solutions and alternatives will demonstrate that the project partners evaluated all possible solutions and alternatives before identifying the current project as the most viable alternative.
- **Branding the Project.** For communication and other purposes, the following strategies are recommended: (1) develop a specific project name; (2) develop a tag line (i.e., a short phrase that serves to clarify the purpose of the project); (3) prepare a descriptive paragraph; and (4) define the project on a map and/or infographic.

- **Identify stakeholders.** As part of the process to communicate to community leaders and the influential public, develop a list of important stakeholders to interface with. A slide presentation and one-page information sheet should be developed to support these discussions and conversations. The project team is encouraged to develop a list of stakeholders, including political entities and non-governmental organizations (NGOs), as well as community groups. The Panel is willing to provide review and guidance on the initial list.
- **Attend state regulatory meetings and workshops.** Participate in and support meetings and workshops sponsored by state regulatory agencies to share information and gather feedback provided by the State and stakeholders. If possible, obtain the State's mailing lists, which can be used towards the project's outreach efforts.
- **Prepare an outreach plan.** Document communication and outreach strategies in an outreach plan. Consider assessing public perception using surveys and/or focus groups or interviews to determine what type of outreach effort would be most effective. The goal is to define the specific efforts that the project team would engage in as part of a comprehensive outreach effort.
- **Share costs.** It should be possible to share outreach costs among participating agencies (e.g., through a Memorandum of Understanding). The plan should define specific roles and responsibilities and include an outreach schedule and budget.

3.4 Framework for Chemicals

An approach for the control of chemicals is an important consideration for potable reuse. Treated wastewater contains a range of chemicals, including metals, disinfection byproducts, trace organics (e.g., pharmaceuticals and ingredients in personal care products), and industrial and commercial chemicals.

In developing an approach for the control of chemicals for potable reuse (for both spreading and injection projects), the Panel believes that a comprehensive monitoring framework could be developed that addresses the following items for consideration:

Compliance Monitoring

- Meet all primary drinking water maximum contaminant levels (MCLs) under the Safe Drinking Water Act.
- Identify unregulated chemicals that could be monitored **for health-based reasons**. It is possible to develop a list of chemicals that have health-based criteria (e.g., N-Nitrosodimethylamine [NDMA]). This list would include any chemicals identified by the State as having health concerns. Criteria can be obtained from other sources, such as:
 - NWRI (2013). *Examining the Criteria for Direct Potable Reuse: Recommendations of an NWRI Independent Advisory Panel*. Prepared for Trussell Technologies, Inc. under WateReuse Research Foundation Project 11-02 by the National Water Research Institute, Fountain Valley, CA. Published by the WateReuse Research Foundation, Alexandria, VA.

- Develop a list of unregulated chemicals that can be **used as indicators** for the removal of other chemicals, including trace organics. An example of a chemical that may require removal is 1,4-dioxane.
- Identify unregulated chemicals that could be **used as surrogates** for treatment performance. For instance, compounds like sucralose are found in wastewater and can be readily monitored before and after treatment to indicate the removal of chemicals of public health concern.

Performance Monitoring

- Develop an appropriate monitoring plan for each of the unit treatment processes. This plan could include monitoring to verify pathogen log removal values and critical control points for operations. With appropriate treatments (to meet water quality objectives), appropriate monitoring, and verification testing, it is possible to demonstrate acceptable water quality for spreading or injection projects. Regarding verification testing, testing at startup and (potentially) periodically thereafter could include more extensive challenge testing with pollutants and pathogens to prove the robust nature of the treatment barriers.
- Total organic carbon is a potential bulk measurement of known and unknown chemicals and can be used as a performance measure. Other performance parameters could be used instead (see the description above for unregulated chemicals) and may be more appropriate for particular treatment processes.

APPENDIX A: PANEL BACKGROUND

About NWRI

For over 20 years, NWRI – a science-based 501c3 nonprofit located in Fountain Valley, California – has sponsored projects and programs to improve water quality, protect public health and the environment, and create safe, new sources of water. NWRI specializes in working with researchers across the country, such as laboratories at universities and water agencies, and are guided by a Research Advisory Board (representing national expertise in water, wastewater, and water reuse) and a six-member Board of Directors (representing water and wastewater agencies in Southern California).

Through NWRI's research program, NWRI supports multi-disciplinary research projects with partners and collaborators that pertain to treatment and monitoring, water quality assessment, knowledge management, and exploratory research. Altogether, NWRI's research program has produced over 300 publications and conference presentations.

NWRI also promotes better science and technology through extensive outreach and educational activities, which includes facilitating workshops and conferences and publishing White Papers, guidance manuals, and other informational material.

More information on NWRI can be found online at www.nwri-usa.org.

About NWRI Panels

NWRI also specializes in facilitating Independent Advisory Panels on behalf of water and wastewater utilities, as well as local, county, and state government agencies, to provide credible, objective review of scientific studies and projects in the water industry. NWRI Panels consist of academics, industry professionals, government representatives, and independent consultants who are experts in their fields.

The NWRI Panel process provides numerous benefits, including:

- Third-party review and evaluation.
- Scientific and technical advice by leading experts.
- Assistance with challenging scientific questions and regulatory requirements.
- Validation of proposed project objectives.
- Increased credibility with stakeholders and the public.
- Support of sound public-policy decisions.

NWRI has extensive experience in developing, coordinating, facilitating, and managing expert Panels. Efforts include:

- Selecting individuals with the appropriate expertise, background, credibility, and level of commitment to serve as Panel members.

- Facilitating hands-on Panel meetings held at the project's site or location.
- Providing written report(s) prepared by the Panel that focus on findings and recommendations of various technical, scientific, and public health aspects of the project or study.

Over the past 5 years, NWRI has coordinated the efforts of over 20 Panels for water and wastewater utilities, city and state agencies, and consulting firms. Many of these Panels have dealt with projects or policies involving groundwater replenishment and potable (indirect and direct) reuse. Specifically, these Panels have provided peer review of a wide range of scientific and technical areas related water quality and monitoring, constituents of emerging concern, treatment technologies and operations, public health, hydrogeology, water reuse criteria and regulatory requirements, and outreach, among others.

More information about the NWRI Independent Advisory Panel Program can be found on the NWRI website at <http://nwri-usa.org/Panels.htm>.

APPENDIX B: PANEL BIOGRAPHIES

Chair: George Tchobanoglous, PH.D., P.E., NAE, BCEE

Professor Emeritus, University of California, Davis (Davis, California)

For over 35 years, wastewater expert George Tchobanoglous taught courses on water and wastewater treatment and solid waste management at the University of California, Davis, where he is Professor Emeritus in the Department of Civil and Environmental Engineering. He has authored or coauthored over 550 publications, including 23 textbooks and eight engineering reference books. Along with coauthors, he has written extensively on water reuse including the textbook *Water Reuse: Issues, Technologies, and Applications*, the WaterReuse report *Direct Potable Reuse: A Path Forward*, and the NWRI White Paper *Direct Potable Reuse: Benefits for Public Water Supplies, Agriculture, the Environment, and Energy Conservation*. He has also given more than 550 presentations on a variety of environmental engineering subjects. Tchobanoglous has been past President of the Association of Environmental Engineering and Science Professors. Among his honors, he received the Athalie Richardson Irvine Clarke Prize from NWRI in 2003, was inducted to the National Academy of Engineers in 2004, and received an Honorary Doctor of Engineering degree from the Colorado School of Mines in 2005. In 2012, he received the first Excellence in Engineering Education Award from AAEE and AEESP. In 2013, he was selected as the AAEE and AEESP Kappe Lecturer. Currently, he serves as Chair of numerous expert panels, such as panels for the City of San Diego, Monterey Regional Water Pollution Control Agency, Orange County Sanitation District, and others. He also chaired the effort to develop a “Direct Potable Reuse Framework” document (2015) sponsored by WaterReuse Association, NWRI, and other organizations. Tchobanoglous received a B.S. in Civil Engineering from the University of the Pacific, an M.S. in Sanitary Engineering from the University of California, Berkeley, and a Ph.D. in Environmental Engineering from Stanford University.

Vice-Chair: James Crook, Ph.D., P.E.

Water Reuse and Environmental Engineering Consultant (Boston, MA)

Jim Crook is an environmental engineer with more than 40 years of experience in state government and consulting engineering arenas, serving public and private sectors in the U.S. and abroad. He has authored more than 100 publications and is an internationally recognized expert in water reclamation and reuse. He has been involved in numerous projects and research activities involving public health, regulations and permitting, water quality, risk assessment, treatment technology, and all facets of water reuse. Crook spent 15 years directing the California Department of Health Services’ water reuse program, during which time he developed California’s first comprehensive water reuse criteria. He also spent 15 years with consulting firms overseeing water reuse activities and is now an independent consultant specializing in water reuse. He currently serves on several advisory panels and committees sponsored by NWRI and others. Among his honors, he was selected as the American Academy of Environmental Engineers’ 2002 Kappe Lecturer and the WaterReuse Association’s 2005 Person of the Year. Crook received a B.S. in Civil Engineering from the University of Massachusetts and both an M.S. and Ph.D. in Environmental Engineering from the University of Cincinnati.

Fredrick W. Gerringer, D.Env., P.E., BCEE

Trussell Technologies, Inc.

Fred Gerringer has more than 11 years of experience and has authored seven publications, one book chapter, and more than 30 conference proceedings, presentations, and posters. His professional career has focused on membrane processes in water, seawater, and water reuse applications. He also has extensive experience conducting pilot-scale studies of unit processes such as conventional water treatment (coagulation, sedimentation, and media filtration), ozonation, biofiltration, microfiltration, and reverse osmosis. Recent projects have included pilot testing the ozonation of a non-nitrified secondary effluent before microfiltration, preliminary design of a 4000-pound per day ozone system for West Basin's Edward C. Little Water Recycling Facility, and bench-, pilot- and demonstration-scale testing of preformed chloramines for seawater reverse osmosis desalination. Gerringer is a member of the American Water Works Association (AWWA), the American Society of Civil Engineers (ASCE), Water Environment Federation (WEF) and the International Desalination Association (IDA). He is also involved with AWWA Organic Contaminant Research Committee. Gerringer received a B.S. in Civil and Environmental Engineering from University of California at Berkeley and an M.S. in Civil and Environmental Engineering and D.Env. in Environmental Science and Engineering from the University of California Los Angeles. He is a registered Civil Engineer in the State of California and a Board Certified Environmental Engineer (BCEE) in the Practice of Water Supply and Wastewater Engineering.

Robert H. Hultquist, P.E.

*Retired, Chief of the Drinking Water Technical Operations Section
California Department of Public Health (Sacramento, CA)*

Bob Hultquist retired from the Division of Drinking Water and Environmental Management at the California Department of Public Health (CDPH) after over 30 years of service. Over the course of his career, he worked closely with all regions of California regarding the permitting of recycled water projects. At CDPH, Hultquist was responsible for the development of criteria for drinking water and recycled water regulations for the State of California. He was the lead author of the California's Draft Groundwater Recharge Reuse Regulations, which regulate the recharge of groundwater with recycled water. At present, he works for CDPH on a part-time basis on finalizing the draft Recharge Regulations and regulations for the augmentation of surface water bodies with recycled water. Hultquist received a B.S. in Civil Engineering from San Diego State University and an M.S. in Sanitary Engineering from the University of California, Berkeley. He is a registered civil engineer in California.

Mark Millan

*Principal
Data Instincts (Windsor, CA)*

Mark Millan is the principal of Data Instincts, Public Outreach Consultants – a professional consultancy specializing in public outreach and public engagement for implementing recycled water projects. Mark has over 35 years of experience in marketing and public relations with the last twenty-two focusing on recycled water related projects and issues. Millan's firm has introduced new techniques to the public involvement and outreach process for recycled water projects and has conducted extensive surveys and focus groups on public perceptions of recycled water uses. For seven years he served nationally as Chair of the Public Outreach and Education Committee for the WaterReuse Association (WRA), and recently co-

authored the WaterReuse Research Foundation's *Developing Model Communication Plans for Advancing Awareness and Fostering Acceptance of Potable Reuse* with Patsy Tennyson, Katz & Associates and Dr. Shane Snyder, University of Arizona.

Andrew Salveson, P.E.

*Water Reuse Practice Director and Water Reuse Chief Technologist
Carollo Engineers (Walnut Creek, CA)*

Andy Salveson is Vice President, Practice Director, and Water Reuse Chief Technologist at the national engineering firm of Carollo Engineers, Inc., where he leads advanced technology research and development and oversees Carollo's advanced wastewater treatment designs. He leads the planning, permitting, and design of direct and indirect potable reuse facilities across the Southwestern United States. He has led more than \$6 million in advanced treatment research, including numerous projects for the California Direct Potable Reuse Initiative. In addition, he serves on an NWRI Independent Advisory Panel for the development of potable reuse regulatory guidance in New Mexico, as well as serves on the World Health Organization's team to develop international guidelines for direct and indirect potable reuse. Salveson received a BS in Civil Engineering from San Jose State University and an M.S. in Environmental Engineering Technology/Environmental Technology from the University of California, Davis.

NATIONAL WATER RESEARCH INSTITUTE

Independent Advisory Panel: Truckee Meadows Groundwater Replenishment System

Meeting #1 Agenda

May 9, 2016 (1:00 pm – 5:00 pm) to
May 10, 2016 (8:30 am – 2:30 pm)

<u>Location</u> University of Nevada, Reno Harry Reid Engineering Laboratory (HREL) 109 1664 N Virginia Street Reno, NV 89557 (See attached map)	<u>Contacts:</u> Jeff Mosher, NWRI 714-705-3722 (Mobile) Jaime Lumia, NWRI 714-378-3278 (NWRI Office) Lydia Peri (Washoe County) 775-762-6108 (Mobile)
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Meeting Objectives:

- Establish project need and legitimacy
- Provide critical input to Nevada draft reuse regulations
- Develop public opinion and outreach concepts

Day 1: Monday, May 9, 2016

1:45 pm	Panel Charge and Process	Jeff Mosher, NWRI
2:00 pm	Background & Overview of Project Concept <ul style="list-style-type: none">- Regional background- Drivers and goals- Review of previous pilot (Ozone-BAC)- Introduction of feasibility phase	Rick Warner, Washoe County
3:00 pm	BREAK	
3:15 pm	Elements of Feasibility Phase <ul style="list-style-type: none">- WRRF Ozone-BAC pilot project- Demonstration project- Hydrogeologic investigations	Rick Warner, Washoe County Vijay Sundaram, Stantec Krishna Pagilla, UNR John Enloe, Truckee Meadows Water Authority Lydia Peri, Washoe County
4:30 pm	Project Schedule	Rick Warner, Washoe County
5:00 pm	ADJOURN	

Day 2: Tuesday, May 10, 2016

8:30 am	Welcome and Review of Day 1 - Objectives of Day 2	Jeff Mosher, NWRI
8:45 am	Review of Project Presentation	Rick Warner, Washoe County
9:15 am	Public Outreach Concepts	Lydia Peri, Washoe County Mark Millan, Data Instincts
9:45 am	BREAK	
10:00 am	Input on Nevada Draft Reuse Regulations	ALL
12:00 noon	Lunch	
1:00 pm	Panel Only Discussion	Panel
2:30 pm	ADJOURN	

APPENDIX D: MEETING #1 ATTENDEES

Panel Members:

- Vice-Chair: James Crook, Ph.D., P.E., Environmental Engineering Consultant
- Fredrick W. Gerringer, D.Env., P.E., BCEE, Trussell Technologies, Inc.
- Robert Hultquist, P.E., California Department of Public Health (retired)
- Mark Millan, Data Instincts
- Andrew Salveson, P.E., Carollo Engineers (via conference call)

National Water Research Institute:

- Suzanne Faubl, Water Resources Scientist and Project Manager
- Jeff Mosher, Executive Director

Washoe County Department of Water Resources:

- Lydia Peri
- Rick Warner

Truckee Meadows Water Authority:

- John Enloe
- Paul Miller

Truckee Meadows Water Reclamation:

- Michael Drinkwater
- Kishora Panda, Ph.D., P.E.

Nevada Division of Environmental Protection:

- Bruce Holmgren
- Peter Lassaline

City of Reno:

- Joe Coudriet
- David Kershaw

University of Nevada, Reno:

- Laura Haak
- Krishna Pagilla

Others:

- Jon Benedict, Nevada Division of Water Resources
- Andy Hummel, City of Sparks
- Jim Smitherman, Western Regional Water Commission
- Vijay Sundaram, Stantec
- Matt Tuma, Governor's Office of Economic Development