

**NOTICE OF MEETING AND AGENDA**

**WASHOE COUNTY SEWAGE, WASTEWATER, AND SANITATION HEARING  
BOARD**

**March 5, 2026**

**5:30 p.m.**

**Members**

Matthew Buehler  
Chad Carnes, P.E.  
John Adams  
Kenneth Lund, Attorney  
Robert Sweeney  
Matt Smith  
Julianne Zotter, P.E.

**Northern Nevada Public Health  
1001 East Ninth Street Building B  
Conference Rooms A & B  
Reno, NV**

---

5:30 p.m.

1. Roll Call and Determination of Quorum.
2. Pledge of Allegiance.

3. Public Comment.

Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Board agenda. Unused time may not be allocated to other speakers. Comments are to be made to the Board as a whole. Virtual Public Comment may be taken when facilities are available.

A speaker's viewpoint will not be restricted; however, reasonable restrictions may be imposed upon the time, place, and manner of speech. Irrelevant statements, unduly repetitious statements, and personal attacks that would objectively antagonize or incite others are examples of speech that may be reasonably limited.

This Board carries out the business of Northern Nevada Public Health and its citizens during its meetings. The presiding officer may order a person to be removed if the person's conduct or statements disrupt the order or safety of the meeting. Warnings about disruptive conduct or comments may or may not be given prior to removal.

Furthermore, certain disruptions of a public meeting are criminal acts as defined under NRS 208.090 and/or NRS 203.119, which may result in prosecution in appropriate cases.

4. Approval of Agenda. (FOR POSSIBLE ACTION)

5. Approval of Draft Minutes for September 4, 2025 - (FOR POSSIBLE ACTION)

**Attachments:** [09-04-2025 SWS Draft Minutes.docx](#)

6. PUBLIC HEARING: To determine whether to recommend approval to the District Board of Health for a variance to Section 040.030, allowing for a reduced lot size for a second parcel map on a lot created after October 23, 2001, Parcel 038-280-67, 430 River Pines, Washoe County, NV (FOR POSSIBLE ACTION)

Staff Representative: David Kelly

**Attachments:** [Staff Report 430 River Pines 038-280-67.pdf](#)  
[430RiverPinesDrCookVarianceApplicationPacket.pdf](#)

7. Public Comment.

Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Board agenda. Unused time may not be allocated to other speakers. Comments are to be made to the Board as a whole. Virtual Public Comment may be taken when facilities are available.

A speaker's viewpoint will not be restricted; however, reasonable restrictions may be imposed upon the time, place, and manner of speech. Irrelevant statements, unduly repetitious statements, and personal attacks that would objectively antagonize or incite others are examples of speech that may be reasonably limited.

This Board carries out the business of Northern Nevada Public Health and its citizens during its meetings. The presiding officer may order a person to be removed if the person's conduct or statements disrupt the order or safety of the meeting. Warnings about disruptive conduct or comments may or may not be given prior to removal.

Furthermore, certain disruptions of a public meeting are criminal acts as defined under NRS 208.090 and/or NRS 203.119, which may result in prosecution in appropriate cases.

8. Adjournment.

NOTE: Items on this agenda may be taken out of order, combined with other items, removed from the agenda, or moved to the agenda of a later meeting. The Consent section is a single agenda item and is considered as a block and will not be read aloud. Items on this agenda may also be moved to or from the consent section. Items not voted on in the Consent section may also be voted on in a separate block or blocks. Items designated for a specified time will not be heard prior to the stated time, but may be heard later. There will be only one period of public comment on any block vote. Any public comment made during that period may pertain to any of the items being voted on in the block, but there will not be separate public comment periods for each item within the block.

Location. This meeting will be held at the physical location designated on this agenda, but one or more of the Board Members and/or Staff may attend and participate by a remote technology system. Members of the public wishing to attend the meeting may do so at the designated physical location or may otherwise participate as stated in the Public Comment section. The Chair or their designee will make reasonable efforts to ensure that members of the public body and members of the public present at the physical location can hear or observe each member attending by remote technology system, and each member of the public body in attendance can participate in the meeting.

Accessibility. Northern Nevada Public Health, in compliance with Title VI of the 1964 Civil Rights Act and Title II of the Americans with Disabilities Act, will make its public meetings accessible to members of the public. For limited English proficient and hearing-impaired individuals, the Wordly application is available to members of the public attending the meeting in person. Persons who require special accommodations or assistance in attending this meeting may contact Northern Nevada Public Health at least two working days before the meeting, if possible, by dialing 775-328-2415.

Public Transportation. Public transportation is available to this meeting site. For eligible RTC ACCESS reservations call (775) 348-5438 or visit: <https://www.rtcwashoe.com/public-transportation/>.

Public Comment. Public comment is welcomed during public comment periods and is limited to 3 minutes per person per public comment period. Unused time may not be allocated to other speakers. A speaker's viewpoint will not be restricted; however, reasonable restrictions may be imposed upon the time, place, and manner of speech. Irrelevant statements, unduly repetitious statements, and personal attacks that would objectively antagonize or incite others are examples of speech that may be reasonably limited. All comments are to be directed to the Board as a whole.

During the general public comment periods at the beginning and end of the meeting, speakers may address any matter either on or off the agenda. Items voted on in the Consent section or in a separate block or blocks, shall have a single public comment period per block, and public comment will only be heard about the specific items being considered by the Commission in the block. For the remainder of the agenda, during items designated "for possible action" that are considered individually, public comment will only be heard about the specific item being considered by the Board. Members of the public who wish to share documents or make a brief presentation within their public comment period must provide ten (10) printed copies of each document. Please note that USB drives or any other digital media will not be accepted due to the risk of introducing viruses or malicious code, which could

potentially compromise the County's systems.

Members of the public may also submit comments by mail to NNPH at 1001 E. Ninth St., Reno, NV 89512. NNPH will make reasonable efforts to include all such comments received by 4:00 pm one working day prior to the meeting in the record. Mail will not be read by the Clerk but will be entered into the record.

Forum Restrictions and Orderly Conduct of Business. This Board carries out the business of Northern Nevada Public Health and its citizens during its meetings. The presiding officer may order a person to be removed if the person's conduct or statements disrupt the order or safety of the meeting. Warnings about disruptive conduct or comments may or may not be given prior to removal.

Responses to Public Comments. The Board may only deliberate or take action on matters that have been properly labeled "FOR POSSIBLE ACTION" and listed on a properly noticed Agenda. While the Open Meeting Law allows discussion of public comments by members of the Board, responses to matters not listed on the agenda could become deliberation without notice to the public. To avoid this situation and ensure the public has proper notice of all matters, members may choose not to respond to the public comments, except to correct factual inaccuracies, ask for staff to provide information, or ask that the matter be listed on a future agenda for consideration.

Posting the Notice. Pursuant to NRS 241.020, the Agenda for the District Board of Health has been posted as required at the following locations: Washoe County Administrative Building (1001 E. 9th Street, Bldg A), Northern Nevada Public Health (1001 E. 9th St., Building B), <https://www.nnph.org>, <https://notice.nv.gov>

Although no longer required under NRS 241.020, the agenda has also been physically posted at the following locations: Sparks City Hall (431 Prater Way, Sparks) and Downtown Reno Library (301 S. Center St., Reno)

Support documentation for the items on the agenda provided to this Board, is available to members of the public at Northern Nevada Public Health located at 1001 E. 9th Street, in Reno, Nevada. Ms. Sue Hopkins, Recording Secretary to the Sewage, Wastewater & Sanitation Advisory Board may also be reached by telephone at (775) 328-2684 or by email at [smhopkins@NNPH.org](mailto:smhopkins@NNPH.org). Supporting materials are also available at the Northern Nevada Public Health Website <https://www.NNPH.org> pursuant to the requirements of NRS 241.020.

**SEWAGE, WASTEWATER, AND SANITATION (SWS)  
HEARING ADVISORY BOARD  
MEETING MINUTES**

**Members**

Matthew Buehler, Chair  
Kenneth Lund  
John Adams  
Chad Carnes, P.E.  
Robert Sweeney, REHS  
Matt Smith- Alternate  
Julianne Zotter, P.E.- Alternate

**Thursday, September 4, 2025**

**5:30 p.m.**

**Washoe County Administration Complex,  
Building B  
Health District South Conference Room**

**1001 East Ninth Street  
Reno, NV**

---

**5:30 p.m.**

**1. \*Roll Call and Determination of Quorum**

The following members and staff were present:

Members present: Matthew Buehler  
Kenneth Lund  
John Adams  
Julianne Zotter, P.E.- Alternate  
Robert Sweeney  
Chad Carnes, P.E.- Recused

Staff present: David Kelly  
Latricia Lord  
DDA Herb Kaplan

Members absent: Matt Smith – Alternate

**2. \*Pledge of Allegiance**

Those present pledged allegiance to the flag.

**3. \*Public Comment**

As no public comment was presented, the public comment period was closed.

**4. Approval of Agenda – September 4, 2025**

Mr. Adams moved to approve the agenda of the September 4, 2025, Sewage, Wastewater, and Sanitation (SWS) Board regular meeting. Second by Mr. Lund, motion approved unanimously.

## 5. Approval of Draft Minutes – January 20, 2025

Mr. Lund moved to approve the minutes of the March 6, 2025, Sewage, Wastewater, and Sanitation Board regular meeting. Second by Mr. Adams. Motion approved by all members except for Mr. Sweeney, who abstained.

## 6. Election of New Board Chair – **(For possible action)**

Mr. Buehler asked the rest of the Board if there was anyone interested in being chair. When no other Board members responded, he indicated that he felt that Mr. Lund would be a good chair and he would like to nominate him. Mr. Lund asked if anyone else was interested in the position and when none responded, accepted the nomination. The Board voted unanimously to make Mr. Lund the chair. DDA Mr. Kaplan indicated that the change would be effective next Board meeting.

7. **Public Hearing** – to determine whether to recommend an amended approval to the District Board of Health for a variance for APN 087-044-17, from sections 100.025, Table 3 and 100.100, Table 4 of the Northern Nevada Public Health Regulations Governing Sewage, Wastewater, and Sanitation. A variance was previously granted, with conditions, by the Board of Health on March 27, 2025, based on the recommendation of the SWS Board, to allow installation of a Mode 3 Orenco AX20 treatment system with an Orenco GeoFlow subsurface drip. The variance also included reduced setbacks from impervious soils and high seasonal ground water. Subsequent to the approval of the Board of Health, representatives requested the following modifications to the approved variance: 1) Reduce cover over the top of drip line to 1' from 2', 2) changing the pea gravel bedding for the drip line to crushed rock, and 3) reducing the size of the system from 4,428 square feet to 1,488 square feet. – **(For possible action)**

Staff Representative: David Kelly

Mr. Kelly reviewed the staff report, indicating that staff felt the amendments were not an issue and gave a short review of the request and how it had come about. He indicated that the primary reason that staff felt it important to require an amendment process was due to the fact that actual septic design had already been approved as part of the variance process. He acknowledged that minor changes to a design during construction would not necessarily trigger this process, but with the large change in how the system was sized, staff felt that it was appropriate to have the Board review the amendment request.

Mr. Buehler asked that if in general there would be any impact to public health based on the requested changes. Mr. Kelly said no, the treatment system was the same, which means that the quality of effluent and potential impact to groundwater would be the same.

Mr. Adams asked to go through each of the amendment requests. Mr. Kelly explained each request. The 2/3 size reduction was similar to what was allowed for a sand filter, and while this was not a sand filter, the effluent was considered as clean or cleaner than that coming from a filter so it was felt that the system did not need to be oversized despite slow percolation rates. This had been confirmed by Orenco representatives and the design engineer was in agreement. The drip line being placed into crushed rock versus pea gravel was requested and Orenco had also indicated that was not an issue. Lastly, that cover over the drop line be reduced from 2' to 1' – Mr. Kelly explained that he believed that design feature had come about from a concern with regards to freezing, but again, Orenco representatives had claimed it was non-issue and the system had been used in much colder climates without problems. Mr. Adams commented that in his experience, 1' of soil is plenty and crushed rock is normal.

Mr. Adams did note the dramatic change in the sizing and Mr. Lund asked what had changed in the analysis to account for that. Mr. Carnes (design engineer) came up to answer questions. He reviewed each of the three amendment requests. First, that the reduced cover was not only because of other situations where it had been used and also because the system drained out after dosing and so no water stayed in the piping. He was comfortable that 1' was sufficient cover. The second amendment was the crushed rock versus pea gravel. Mr. Carnes said that he had originally thought that drip line was similar to irrigation line and very fragile but upon inspection of actual product, realized how strong it was and was no longer concerned with using crushed rock – the pea gravel would just be an extra non-needed expense. In relation to the sizing, Mr. Carnes stated that he had not incorporated a 2/3 reduction as allowed for sand filters but when they calculated the cost of all fill needed at the larger size, it turned out to be prohibitive. The property owner had found some very good fill at a reasonable price, and after discussion with Orenco and NNPH, he had calculated that even with the 2/3 reduction the system could take 2,800 gallons a day. Mr. Lund asked if the bottom line was that the effluent would stay where it should and Mr. Carnes said yes, 2,800 gallons a day was a safety margin of 2.8 over the design volume of 1,000 gallons a day.

Mr. Sweeney stated that the value of drip is creating unsaturated flow and if there was timed dosing. Mr. Carnes said that the timing can be adjusted at the panel. Mr. Sweeney asked if the lines could be flushed and Mr. Carnes, after confirming with Orenco, responded in the positive. Mr. Sweeney asked if they were using Geoflow and Mr. Carnes confirmed.

Ms. Zotter asked if any testing had been done on the fill material that the owners had found. After Mr. Carnes said no, she asked if was going to in order to make sure that it was suitable and Mr. Carnes said yes.

Mr. Sweeney opined to the board that variances such as this were important to help bring in new technologies to the jurisdiction.

Mr. Lund to approve the amendments to the variance. The motion was seconded by Mr. Adams. Motion passed unanimously.

Mr. Buehler closed the public hearing.

### **Motion**

Motion made by Mr. Lund “Move to present to the District Board of Health a recommendation for approval of amendments to Variance Case # H25-0001VARI (Benedickt) to allow the reduction in dispersal field sizing, the reduction in cover over the drip line from 2' to 1', and the change of pea gravel drip line bedding material to crushed rock.”

Second by Mr. Adams. Motion passed unanimously. Mr. Buehler closed the public hearing.

### **9. \*Public Comment**

As there were no public comment requests, closed the public comment period.

### **10. Adjournment –**

At 6:40 p.m., Mr. Buehler adjourned the meeting.

**Staff Report**  
**Board Meeting Date: March 5, 2026**

**TO:** Sewage, Wastewater, and Sanitation Hearing Advisory Board  
**FROM:** David Kelly, Environmental Health Specialist Supervisor  
775-846-6623, [dakelly@nnph.org](mailto:dakelly@nnph.org)  
**SUBJECT:** Variance Case H26-0001VARI; Variance to Section 040.030, allowing for a reduced lot size for a second parcel map on a lot created after October 23, 2001, Parcel 038-280-67, 430 River Pines, Washoe County, NV.

---

**SUMMARY**

This staff report summarizes the Environmental Health Services Division's (EHS) review of the submitted variance application for your decision to recommend or deny approval to the District Board of Health (DBOH) a variance for APN 038-280-67, owned by the Cook 2011 Family Trust. The variance requests a reduction in the minimum lot size for second parcel maps on lots created after October 23, 2001, from 5 acres to 1 acre and 1.71 acres. A groundwater study was conducted and advanced treatment septic systems are proposed for the new lots to demonstrate that the two smaller lots will not have a greater impact on water quality than the original parcel size.

**Previous Action**

There has been no previous action with this variance request. The applicant currently has applied for a parcel map with the City of Reno Development Services Department (Planning), PAR24-00023. That parcel map application was put on hold pending the resolution of the septic variance process that is the subject of the request. If the variance application is approved, the parcel map will continue through the process and eventual creation of the new parcels. Documents regarding the status of that process are included in the variance packet.

**Background**

The Northern Nevada Public Health (NNPH) Regulations Governing Sewage, Wastewater, and Sanitation (regulations) requires a minimum acreage of 5 acres for any second or subsequent parcel map from an original parcel created after October 23, 2001. The subject parcel was created in May of 2019, with 2.71 acres, and therefore would not have sufficient acreage for a second parcel map. The regulations allow the Health Authority to allow a smaller lot size, provided that an applicant can demonstrate that adequate measures have been taken to ensure the smaller lot size will not have a greater impact to groundwater quality than the 5-acre lot size. All such decisions require approval by the Sewage, Wastewater, and Sanitation Hearing Board and District Board of Health through the variance procedure.

The applicant consulted with NNPH staff prior to applying for the variance and the general approach was agreed to. NNPH required that they look at overall impact to groundwater quality and how to address the simple fact that having two septic systems will impact groundwater quality less than one; some sort of mitigation would be needed regardless of any groundwater study findings.

A study was performed by Confluence Water Resources (CWR), utilizing guidance from the State of Nevada Bureau of Water Pollution Control (BWPC) that was developed to determine appropriate septic density for an area without degradation to groundwater. Total nitrogen contamination is the primary

contaminant of concern in regard to septic system discharges. The study uses several conservative parameters for sewage discharge from septic systems and drinking water standards for acceptable contamination allowance. The model essentially looks at what will reach the aquifer based on discharge volume and the dilution factor of precipitation. CWR utilized a Truckee Meadow Water Authority Verdi Groundwater Model Report to provide data on recharge from precipitation. The CWR study adjusted the model to account for reduced precipitation volume due to developed, impervious surfaces and the clay layers that reduced the ability for recharge from precipitation. Based on their findings, the proposed acreage can meet the requirement to not have a greater impact on groundwater provided that a denitrification system is utilized.

The study utilized assumptions on existing groundwater quality from the BWPC methodology. No actual sampling was conducted. However, staff did review water quality from nearby public water systems which are required to do annual testing of groundwater for nitrates. All systems in proximity to the site showed either no detected nitrate levels or levels well below the BWPC assumption level of 5 mg/L, indicating that the assumption is a fair model. Staff also looked at soil profiles in the area, and while surface level percolation tests are very fast, requiring a greater separation to groundwater, the soil profiles presented in well logs indicate slower soils below the saturated soil profile, indicating that additional and better soil treatment will occur before groundwater is encountered. This validates the BWPC model assumption of reduction of contaminants from soil capture. In summary, NNPH staff determined that the assumptions in the model seemed appropriate and felt that the study provided was a fair representation of the potential impacts to groundwater.

New technology within the septic industry has advanced a lot over the years. NNPH regulations, recently adopted, allow for use of NSF certified septic systems. Denitrification systems, certified to NSF 245, require a minimum of 50% reduction in total nitrogen from residential septic systems of 1,500 gallons or less. Many newer systems achieve a higher level of reduction. Though nitrogen is the primary contaminant of concern, any system certified to an NSF 245 standard must also meet the NSF 40, which ensures reductions in other contaminants like biochemical oxygen demand, total suspended solids, and pH. The study provided by CWR indicates that utilizing an NSF 245 system, along with naturally occurring precipitation, will yield an equal or lesser degree of contamination from two septic systems serving the two proposed parcel, than from a single standard system on the original parcel.

These types of advanced treatment systems do require routine maintenance, and staff recognize that NNPH will not have direct oversight to ensure that maintenance occurs as needed; in order to have confidence that the system will be maintained as needed, staff has drafted a few recommended conditions if the Board decides to approve the variance. The conditions are provided for the Board below, and as always, the Board may request additional conditions as they see fit. These types of systems are effective and becoming increasingly common and there are a few already in service within Washoe County. While the applicant has specified two specific models that meet the NSF 245 certification, there may be others that have met that certification and the variance request is not specific to single technology or brand, unless the Board wishes to make it a condition of approval.

### **Findings of Fact**

The Board must consider the following when making a recommendation on this variance to the DBOH:

1. Will the proposed variance result in contamination of water to the extent it cannot be used for its existing or expected use?

**Reply:** The variance is proposing to require NSF 245 certified septic treatment systems for each parcel. These types of systems will provide comparable treatment to a sand filter system – better treatment when it comes to nitrate reduction. Provided that the conditions of approval are met and routine maintenance is performed, the system should function as

intended and the effluent discharge to groundwater should be clean or cleaner than a sand filter. Therefore, it should not pose an increased threat to groundwater contamination.

2. Will the proposed variance pose a threat to public health?

**Reply:** There are two primary ways that sewage can pose a threat to public health, direct exposure and groundwater contamination in areas with domestic wells. Sewage discharged underground should not allow for direct exposure as long as the field functions, the same as any onsite sewage disposal system. As indicated in question #1, the system should also not cause a groundwater contamination issue as long as the system is maintained and functions properly. All other setbacks and design to regulatory requirements designed to be protective of public health will be met.

3. Are there other reasonable alternatives?

**Reply:** No. NNPH regulations require that any second or subsequent parcel map from an original parcel created after October 23, 2001, have a minimum parcel size of 5 acres. The only exception to this is demonstration that the smaller lots will not have a greater impact on groundwater quality than the single larger lot, that the proposed measures meet the satisfaction of Health Authority staff, and go through the variance process as we are today. NNPH staff are comfortable with the provided groundwater impact study and a requirement of NSF 245 treatment systems as a way to ensure no greater impact to groundwater quality.

### **Conditions of Approval**

EHS staff are recommending the following conditions of approval:

1. The variance, with all conditions of approval, must be recorded to each new parcel, with language that does not allow for the removal without NNPH approval or connection to municipal sewer.
2. A maintenance contract is required with periodic monitoring for the NSF 245 approved wastewater treatment system. After the initial system check and maintenance, a minimum of annual maintenance and certification is required with all maintenance records kept for a minimum of 5 years. Records must be made available to NNPH upon request.
3. All instances of system non-function must be reported to NNPH for review and repaired immediately. In the event of failure to maintain or lack of system function, NNPH may require sampling and/or impose restrictions on the property based on the functionality of the treatment system, up to and including additional repair.

### **Recommendation**

Staff recommends the Sewage, Wastewater and Sanitation (SWS) Hearing Board support the presented Variance Case # H26-0001VARI(Cook) to allow the proposed parceling of 430 Rive Pines, APN 038-280-67, with parcels smaller than 5 acres but no smaller than 1 acre, provided an certified NSF 245 advanced treatment system is utilized for the septic system for each parcel.

### **Possible Motion**

Should the SWS Hearing Board wish to approve the variance application, the three possible motions would be:

1. "Move to present to the District Board of Health a recommendation for approval of Variance Case # H26-0001VARI(Cook) to allow the proposed parceling of 430 Rive Pines, APN 038-

280-67, with parcels smaller than 5 acres but no smaller than 1 acre, provided an certified NSF 245 advanced treatment system is utilized for the septic system for each parcel, including all recommended conditions.”; OR

2. “Move to present to the District Board of Health a recommendation for approval of Variance Case # H26-0001VARI(Cook) to allow the proposed parceling of 430 Rive Pines, APN 038-280-67, with parcels smaller than 5 acres but no smaller than 1 acre, provided an certified NSF 245 advanced treatment system is utilized for the septic system for each parcel, without conditions.”; OR
3. “Move to present to the District Board of Health a recommendation for approval of Variance Case # H26-0001VARI (Cook) to allow the proposed parceling of 430 Rive Pines, APN 038-280-67, with parcels smaller than 5 acres but no smaller than 1 acre, provided an certified NSF 245 advanced treatment system is utilized for the septic system for each parcel, with the following conditions (if the Board wishes to impose conditions, they would list them here).”

The SWS Board may also formulate their own motion or request additional information from the applicant if desired.

<p style="text-align: center;">NORTHERN NEVADA <b>Public Health</b> Environmental Health</p>	<p style="text-align: center;"><b>NORTHERN NEVADA PUBLIC HEALTH ENVIRONMENTAL HEALTH SERVICES DIVISION</b> 1001 East Ninth Street • Bldg B • Reno, Nevada 89512 Telephone (775) 328-2434 • Fax (775) 328-6176 www.NNPH.org HealthEHS@NNPH.org <b>APPLICATION FOR VARIANCE TO THE REGULATIONS GOVERNING SEWAGE, WASTEWATER, AND SANITATION</b></p>	<p style="text-align: center;"><b>Office Use Only</b></p> <p>Fee Paid _____ Date Paid _____ Cash/CC/Check _____ Receipt No. _____ Date Appl. Received _____ Considered Comp. _____</p>
--	---	--

DATE 2/11/2026 PROJECT NAME 430 RIVER PINES DRIVE, VERDI

**OWNER**

Name THE COOK 2011 FAMILY TRUST

Address PO BOX 314

VERDI, NV 89439

Phone 775-223-7432

Email Address verdicook@gmail.com

**ENGINEER**

Name MATHEW D. BANTA, PROF. HYDROGEOLOGIST

Address CONFLUENCE WATER RESOURCES LLC

14175 SADDLEBOW DR., RENO NV 89511

Phone 775-843-1908

Email Address mbanta@confluencewaterresources.com

**The following items must be submitted with this application:**

JOB ADDRESS 430 RIVER PINES DRIVE

SIZE OF PARCEL 2.71 ACRES /Acre

COPY OF LEGAL DESCRIPTION AND VERIFICATION OF CURRENT VESTING ON TITLE

EXISTING PARCEL(S) APN(S) 038-280-67 LOT PARCEL B BLOCK PM 5351

REASON FOR VARIANCE REQUEST FOR THE 2ND PARCEL MAP ON SUBJECT PARCEL, MUST DEMONSTRATE THAT ADEQUATE MEASURES HAVE BEEN TAKEN TO ENSURE THE SMALLER LOT AREA WILL NOT HAVE A GREATER IMPACT TO THE GROUNDWATER QUALITY THAN THE ORIGINAL PARCEL SIZE.

SECTION(S) OF REGULATIONS TO BE VARIED 040.030

**IF A PARCEL MAP:** PROJECT NAME EXISTING PARCEL MAP FOR GIACOMINI (RECORDED IN 2018)

APN(S) 038-280-67 LOT PARCEL B BLOCK PM 5351

**IF TENTATIVE MAP:** PROJECT NAME PROPOSED PARCEL MAP FOR THE COOK 2011 FAMILY TRUST

NUMBER OF PROPOSED LOTS 2 LOTS REQUIRING VARIANCES 2

LOT DESCRIPTION(S) EXISTING PARCEL "B" OF PARCEL MAP 5351 PROPOSED TO BE DIVIDED INTO PARCEL "B1" (1.00 ACRE) AND PARCEL "B2" (1.71 ACRES) PER THE PROPOSED 2ND PARCEL MAP

**Prepare and submit this original application with 9 copies and 10 copies of a construction plot plan with specifications drawn to scale (minimum 1 inch = 30 feet) and include the required following requirements:**

- Vicinity map.
- The direction of North.
- A diagram of the location of roadways, easements or areas subject to vehicular traffic, material storage or large animal habitation.

... continued from previous page

- ❑ A diagram of the location and distance to any well and on-site sewage disposal system within 150 feet of the subject property (if none, so indicate).
- ❑ A diagram of the distances from the proposed on-site disposal system to any proposed or existing on-site well.
- ❑ A diagram of the location of any percolation hole or test trench(es) on the property.
- ❑ A diagram to scale of the location of all proposed on-site sewage disposal system components, including a delineated area for future replacement of disposal trench(es).
- ❑ A diagram of the distance to any available sewer system (if none, so indicate).
- ❑ The number of bedrooms in the proposed building.
- ❑ The maximum slope across the disposal area.
- ❑ A diagram of the lot dimensions and total lot area.
- ❑ The location of water supply lines.
- ❑ A diagram of all structures on site.
- ❑ A diagram of all existing and proposed drainage improvements.
- ❑ A diagram of the location of any watercourse and/or natural drainage channel within 150 feet of the property (if none, so indicate).
- ❑ Soil logs and percolation test results, including calculations and actual field data (if required).
- ❑ Sewage loading calculations and application rates.
- ❑ System sizing calculations.
- ❑ Pertinent geological and hydrogeological information.
- ❑ Construction drawings, cross-sections and specifications of the proposed system.
- ❑ Certification by an engineer that the proposed system is properly designed to function for at least ten (10) years (engineer's seal).
- ❑ Submit a completed Notice of Special On-Site Requirements. We will give you the form after variance is approved by the District Board of Health.

BE PREPARED TO SUBMIT:

- ❑ Other information may be required to enable the Board to adequately consider the application.

THE SUBMITTED DATA, DOCUMENTS AND DESIGNS MUST DEMONSTRATE WHETHER:

1. The proposed system will significantly and/or adversely impact any water so that the water may no longer be used for its existing or expected beneficial use.
2. The proposed system will be detrimental or pose a danger to the public health, safety or create or contribute to a public health hazard.
3. Other reasonable alternatives for compliance with these regulations are available to the applicant. State the alternatives considered, including reasons for rejection.

**ALL INFORMATION MUST BE PROVIDED AND THIS APPLICATION MUST BE PROPERLY COMPLETED PRIOR TO SUBMITTAL. FAILURE TO DO SO MAY RESULT IN SIGNIFICANT DELAYS TO THE PROCESSING OF THIS VARIANCE REQUEST.**

February 11, 2026

Sewage, Wastewater, and Sanitation (SWS) Hearing Advisory Board  
Northern Nevada Public Health (NNPH), Environmental Health Services  
c/o David Kelly, Environmental Health Specialist Supervisor  
1001 E Ninth St., Bldg. B  
Reno, NV 89512  
775-846-6623  
DAKelly@nnph.org

RE: 430 River Pines Drive, Verdi, Application for Variance (APN 038-280-67)

SWS Hearing Advisory Board,

This application for variance is being made by the owners of 430 River Pines Drive (APN 038-280-67) which is a vacant 2.71 acre parcel located in Verdi, Nevada. Said parcel is within the City of Reno limits, but not within the Truckee Meadows Water Authority service territory. The nearest public sewer line (Lawton Interceptor) is over 3,000' away and is not cost feasible to extend.

Upon pricing the exorbitant construction cost of a retirement home, it became apparent that dividing the parcel and selling off the remainder is the only means to proceed with building. As the City of Reno zoning is LLR1 (1-acre minimum), the owners have submitted and received conditional approval of a City of Reno Parcel Map to split the parcel into a 1.00 acre and a 1.71 acre parcel. However, this proposed parceling is not in conformance with NNPH SWS Regulation 040.030 since the original parcel map recorded in 2018.

Pursuant to the option outlined in 040.030, the enclosed demonstrates that adequate measures have been taken to ensure that the smaller lot area will not have a greater impact to the groundwater quality than the original parcel size. The enclosed exhibits support said demonstration and are summarized as follows:

- |           |  |
|-----------|--|
| Exhibit 1 | Summary of Findings; December 2, 2025 Evaluation of Potential Degradation to Groundwater from Denitrifying Septic Systems at APN 038-280-67 letter prepared by Mathew Banta, Professional Hydrogeologist |
| Exhibit 2 | Groundwater Flow Evaluation; February 9, 2026 Evaluation of Potential Degradation to Groundwater from Septic Systems at APN 038-280-67 memorandum prepared by Mathew Banta, Professional Hydrogeologist  |
| Exhibit 3 | Curriculum Vitae for Mathew Banta, Professional Hydrogeologist   |

- Attachment A Nevada Division of Environmental Protection (NDEP) Bureau of Water Pollution Control (BWPC) guidance document, Division Memorandum dated January 28, 1991, from John Nelson of the Water Permits Branch to Lew Dogion, Administrator and Dick Reavis, Division Bureau Chief; and accompanying Attachment 1; both being referenced in the Exhibit 2 memo
- Attachment B Division of Water Resources Well Driller's Report Lot No. 142829, Permit 35492, Basin 091, of the **existing well within proposed Parcel "B2" that has a Static Water Level of 113' deep**; and three other nearby drilling reports; all being referenced in Exhibit 2 memo
- Attachment C Bio Microbics Bio Barrier Membrane Bioreactor denitrifying septic system literature/specs as referenced in Exhibits 1 & 2
- Attachment D Nexgen Advanced Enviro-Septic System denitrifying septic system literature/specs as referenced in Exhibits 1 & 2
- Attachment E Environmental Protection Agency (EPA) Onsite Wastewater Treatment Systems Technology Fact Sheet 9 as referenced in Exhibits 1 & 2
- Attachment F Washoe County's Assessor Parcel Map with the subject 2.71 acre parcel highlighted in yellow
- Attachment G Grant, Bargain, and Sale Deed Document Number 4871625 being the conveyance of the subject 2.71 acre parcel to the applicant/current owner
- Attachment H Aerial photo showing subject parcel, proposed new internal property line, distance of over 1/4 mile to the Truckee River, and 900' circle with no other water wells (Verdi Elementary School's well has been plugged and they are now hooked to TMWA)
- Attachment I Aerial photo showing subject parcel, proposed new internal property line, and improvements
- Attachment J The 2018 Parcel Map 5351 which created subject Parcel "B", Septic Plot Plan, Test Trench Inspection (permit #4461), and Per Rate Test results
- Attachment K Proposed Parcel Map which would result in Parcel "B1" (1.00 acre) and Parcel "B2" (1.71 acres), Septic Plot Plan, City of Reno approval letter for Case No. 24-00023, and approved Extension of Time for PAR24-00023

- Attachment L Subject Variance NNPH SWS Regulation 040.030
- Attachment M Water Rights Deed Document Number 5374628 which shows the applicant/owner has already purchased the water rights which will be relinquished in favor of proposed Parcel "B1". This is required to have the right to drill a new domestic well on the proposed 1.00 acre parcel (Parcel "B1"); Also the submitted NDWR Affidavit to Relinquish Water Rights in Favor of use of water for Domestic Wells
- Attachment N Two letters of support from the only two directly adjacent residential parcels

The owners are willing to encumber both proposed Parcel "B1" and proposed Parcel "B2" with a recorded requirement to install cited Denitrifying Septic Systems concurrent with residential building permits. We appreciate your consideration in this variance approval.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ryan and Heather Cook". The signature is stylized and cursive.

Ryan and Heather Cook,  
Trustees of the Cook 2011 Family Trust  
Applicant/Owner

## Exhibit 1

Summary of Findings; December 2, 2025 Evaluation of Potential Degradation to Groundwater from Denitrifying Septic Systems at APN 038-280-67 letter prepared by Mathew Banta, Professional Hydrogeologist



Confluence Water Resources LLC

14175 Saddlebow Drive

Reno, Nevada 89511

T: (775) 843-1908

mbanta@confluencewaterresources.com

www.confluencewaterresources.com

December 2, 2025

Ryan and Heather Cook  
430 River Pines Dr.  
Verdi, NV  
89439

**Subject: Evaluation of Potential Degradation to Groundwater from Denitrifying Septic Systems at APN 038-280-67.**

Dear Mr. and Mrs. Cook:

Confluence Water Resources LLC (CWR) has evaluated the potential permeability and hydraulic gradient of groundwater flow in the vicinity of your property (APN 038-280-67). The results of this evaluation were provided to you under separate correspondence. The results suggested that denitrifying septic systems would be required to reduce the minimum lot size requirements to limit potential risks in degrading groundwater from septic effluent.

Denitrifying septic systems are highly effective at removing nitrogen from septic effluent based on claims from at least two major manufacturers. BIO MICROBICS® Bio Barrier Membrane Bio-Reactor system claims it can deliver septic effluent with total nitrogen concentrations less than 10 mg/L. NEXGEN Septic's claims removal of up to 99% of environmental contaminants with the Advanced Enviro-Septic® System.

<https://biomicrobics.com/products/biobarrier-residential/>

<https://www.nexgenseptics.com/products/advanced-enviroseptic-septic-systems/>

Environmental Protection Agency Onsite Wastewater Treatment Systems Technology Fact Sheet 9 for Enhanced Nutrient Removal suggests wastewater separation systems, which remove toilet wastes and garbage grinding, are capable of 80 to 90 percent nitrogen removal. Physical chemical systems such as ion exchange, volatilization, and membrane processes are capable of similar removal rates.

Denitrifying septic systems are expected to be highly efficient in removing nitrogen from septic effluent. If the concentration of nitrogen in untreated septic effluent is 50 to 100 mg/L, the effluent concentration could be <10 mg/L using denitrifying systems as described above.

Confluence Water Resources LLC

775-843-1908

[mbanta@confluencewaterresources.com](mailto:mbanta@confluencewaterresources.com)  
[www.confluencewaterresources.com](http://www.confluencewaterresources.com)

Installation of denitrifying systems on both proposed Parcel "B1" and Parcel "B2" will not have a greater impact on the groundwater quality than a conventional septic system located on the original parcel size, if the denitrifying systems are maintained and operate in accordance with the manufacturer's specifications to deliver septic effluent under the maximum contaminant level (MCL) of 10 mg/L.

Please contact Matt Banta of CWR should you have any questions regarding this evaluation at (775) 843-1908.

Sincerely,

**Confluence Water Resources, LLC**

A handwritten signature in blue ink that reads "Matt D. Banta". The signature is written in a cursive style and is positioned above a horizontal line.

Matt Banta, PH  
[mbanta@confluencewaterresources.com](mailto:mbanta@confluencewaterresources.com)  
(775) 843-1908

## Exhibit 2

Groundwater Flow Evaluation; February 9, 2026 Evaluation of  
Potential Degradation to Groundwater from Septic Systems at APN  
038-280-67 memorandum prepared by Mathew Banta, Professional  
Hydrogeologist



Confluence Water Resources LLC  
www.confluencewaterresources.com  
mbanta@confluencewaterresources.com  
14175 Saddlebow Drive  
Reno, Nevada 89511  
C: (775) 843-1908

February 9, 2026  
Memorandum  
Evaluation of Potential Degradation to Groundwater from Septic Systems at  
APN 038-280-67

---

Confluence Water Resources (CWR) has prepared this memorandum to summarize the findings of an evaluation to degrade groundwater from septic systems on APN 038-280-67, referred herein as the Property.

## 1. Introduction

The objective of the evaluation is to estimate the appropriate maximum density of septic systems that would be permissible on APN 038-280-67 without causing degradation to groundwater. The evaluation was completed using the governing equations in the Nevada Division of Environmental Protection (NDEP) Bureau of Water Pollution Control (BWPC) guidance document, Division Memorandum dated January 28, 1991, from John Nelson of the Water Permit Branch to Lew Dodgion, Administrator and Dick Reavis, Division Bureau Chief, (see **Attachment A**).

Part II., of *Attachment 1* of the BWPC guidance document provides requirements for determining the number of residences (single family units) which will trigger a groundwater study based on the following equation. The objective is to determine density of septic systems per acre or per square mile.

$$\text{Number of Septic Systems} = \frac{(0.2) (\text{ppt recharge AF}) + (0.02) (\text{storage AF})}{0.392 \text{ AF per year per residence}}$$

The following constraints to the governing equation are defined by the BWPC in Part II., of *Attachment 1* of the guidance document.

- Total contamination equals contamination contributed to the total aquifer recharge plus contamination contributed to the groundwater in storage.
- The total contamination is proportional to the total number of residences on a septic system.
- Groundwater in storage equals groundwater stored in the upper 100-feet of saturated alluvium.
- The volume available for assimilating (i.e. diluting) septage is the volume of total aquifer recharge plus groundwater in storage.
- The total number of septic systems equals the number of septic systems affecting recharge volume plus the number of septic systems affecting storage volume.

Part III., of *Attachment 1* of the guidance document provides governing assumptions and definitions which are inherent to the premises for the governing equation.

1. All contamination being considered is derived from septic systems; therefore, total contamination is related to the total number of residences on septic systems.
2. Total nitrogen is the constituent of primary concern with respect to impacts on groundwater quality from septic systems. This is based on known contamination and groundwater studies in Nevada.
3. An estimate of maximum residential flow is 350 gallons per day (gpd), which is equivalent to 0.392-acre feet per year per residence.
4. Based on the EPA Design Manual for Onsite Wastewater Treatment and Disposal Systems, the concentration of total nitrogen which enters a leach field varies from 35 mg/L to 100 mg/L. As a conservative approach to groundwater protection, BWPC assumes 100 mg/L total nitrogen as the input value for nitrogen entering the leach field.
5. As a conservative estimate for use in the governing equation, the accepted limit of total nitrogen in groundwater used for drinking water is 10 mg/L based on NDEP MCL's.
6. All the 100 mg/L of total nitrogen is available to be converted to nitrogen as nitrate. The drinking water standard for nitrate is 10 mg/L per the Federal Safe Drinking Water Act.
7. Precipitation is abbreviated as (ppt) in the governing equation.
8. The abbreviation for acre-feet per year is defined as AFY, and acre-feet is defined as AF.

## **2. Mixing Analysis of Groundwater Recharge and Septic Effluent Discharge**

### **2.1. Septic Effluent Recharge from Precipitation (Part 1)**

Part IV, of *Attachment 1* of the guidance document provides assumptions relating to the number of septic systems limited by precipitation recharge considerations (first factor in the governing equation Part 1).

1. 50% decreases in concentration of septic effluent in the unsaturated zone is assumed (exp., plant uptake, possible dilution etc.). Therefore, the possible concentration of the discharge from a septic system which could reach the groundwater was assumed to be 50 mg/L.
2. Precipitation recharge has a total nitrogen concentration of zero (0) mg/L.
3. If precipitation recharge is assumed to have a nitrogen concentration of zero, then all nitrogen in recharge to groundwater must come from septic systems. If a septic system has an output of 50 mg/L, but 10 mg/L is the acceptable limit, then the ratio of permissible septic recharge to precipitation recharge must be 1:5, or 0.20. Therefore, septic recharge equals  $(0.20) \times (\text{precipitation recharge})$ .

Precipitation recharge is expected to range between 1.0 to 0.5 feet per year depending on the annual precipitation at the elevation of the Property and how the property owner applies irrigation pursuant to their water right permits. Truckee Meadows Water Authority, TMWA, 2019, Verdi Groundwater Model Report, Figure 23 provides an estimate of distribution of recharge from infiltration of precipitation in the vicinity of the Property. According to TWMA and pursuant to the property owner's water right permits, approximately 1-acre foot of water could be recharged from infiltration of precipitation. However, it is important to consider that each lot will

be developed with impervious services, driveways, homes, etc. which will prohibit infiltration on the Property. For this analysis, CWR assumes only about half of the available water will be infiltrated over a unit area of 1-acre once a home and driveways are built. If precipitation recharge is 1.0 foot per year per acre (1-AFY), the analysis must assume 6-inches or 446.3 gallons per day (gpd) will infiltrate to account for loss in area from impermeable surfaces.

## **2.2. Septic Effluent Recharge from Aquifer Storage (Part 2)**

Part V, of *Attachment 1* of the guidance document provides assumptions relating to the number of septic systems limited by aquifer storage considerations (second factor in the governing equation Part 2).

1. A constant volume of aquifer storage is assumed, with negligible inter-basin flow.
2. Groundwater in storage may have a background value of total nitrogen between zero (0) and 5 mg/L.
3. Because 10 mg/L is the “trigger” limit of nitrogen in groundwater used for drinking, and water in storage may have up to 5 mg/L background concentrations, the maximum concentration of nitrogen which could be added to water in storage is 5 mg/L. Therefore, a number less than 5 mg/L must be used in the calculation to provide an adequate means of prevention of pollution. In this instance, 2 mg/L was chosen as a limit for nitrogen added to groundwater in storage.
4. When calculating the effect of nitrogen from septic systems on the groundwater in aquifer storage, no decrease in concentration of “septic effluent” in the unsaturated zone was assumed.
5. If a septic system has an output of 100 mg/L, but 2 mg/L is the acceptable concentration to be added to groundwater in storage, then the ratio of permissible septic nitrogen to aquifer storage nitrogen must be 2:100, or 0.02. Therefore, septic nitrogen contributed to groundwater in storage =  $(0.02) \times (\text{groundwater storage})$ .

### Groundwater Storage

is defined as the capacity of the aquifer to hold and release water. Storativity is defined as in Specific Yield in unconfined aquifer which is equivalent to drainable porosity or volume of water drained “released” under gravity (Fetter, 2001). In this case, groundwater is not necessarily released from storage except for distal losses associated with domestic wells and evapotranspiration. The BWPC guidelines assume a constant volume of “aquifer storage” which implies inflow equals outflow. In this case, the flux of groundwater flow was applied using the groundwater flow equation and information from the domestic well on the property to provide an estimate of the volume of groundwater potentially available for dilution per unit area.

*From Dary's Law:*  $Q = K(i)(A)$

Q = Groundwater flow per cross-sectional area (Ft<sup>3</sup>/day).

K = Hydraulic conductivity (Ft/day).

(i) = hydraulic gradient (Ft/Ft dimensionless)

A = Cross sectional area (Ft<sup>2</sup>)

### 2.3. Assessment of Hydraulic Conductivity

Hydraulic Conductivity (K) was calculated from the Specific Capacity (SC) of the domestic well recently drilled on the property (NDWR Well Log No.142829). Specific Capacity was estimated using drawdown and discharge data provided by the drilling contractor. The Specific Capacity of the well is presented as (gpm/ft) of drawdown. The following equation can be used to estimate Transmissivity (T) from Specific Capacity per (Driscoll, 1986):

$$T = 1500 * Q/s \text{ (for an unconfined aquifer)}$$

Note: T = Transmissivity (gpd/ft); Q/s = Specific Capacity (gpm/ft),

Q = Discharge from the well in gpm, and s = drawdown

Specific Capacity is estimated based on (gpm) pumped or airlifted from the well divided by feet of drawdown. The estimate of Specific Capacity assumes the following.

- Well depth = 298'.
- Static water level = 113'.
- Assuming dynamic water level during airlifting is 10' from bottom of well per the drilling contractor, or approximately 288', (see 3/12/2025 email correspondence with Mr. Cook).
- Total drawdown would then be approximately (288' - 113') = 175'.
- Assuming 15 gpm discharge rate based on the values reported by the drilling contractor.
- SC = 15 gpm/175' = 0.086 gpm/ft.

The following equation can be used to estimate Transmissivity from Specific Capacity per (Driscoll, 1986):

$$T = 1500 \times SC \text{ (for an unconfined aquifer)}$$

Note: T = Transmissivity (gpd/ft); SC (gpm/ft)

$$T = 1500 \times 0.086 \text{ gpm/ft} = 129 \text{ gpd/ft} = 17.244 \text{ ft}^2/\text{day}$$

$$K = T \text{ (ft}^2/\text{day)} / b \text{ (ft)}$$

Where, b = aquifer saturated thickness.

Assuming (b) = (depth of well - static water level).

$$(b) = 298' - 113' = 185'$$

$$K = 17.244 \text{ ft}^2/\text{day} / 185' = 0.09 \text{ ft/day.}$$

#### From Drillers Report:

0' to 38' Cobbles and boulders

38' to 81' Gray clays and volcanics

81' to 126' Dark brown sandy clays

126' to 234' Gray sandy clays

234' to 298' Gray sandy clays with volcanics

\*Clay dominated stratigraphy from static water level to TD of well. (See Log No.142829 **Attachment B**).

### 2.4. Assessment of Hydraulic Gradient

Land surface elevations were approximated using Google Earth elevation data. Groundwater elevation was then approximated using drill collar elevations from land surface and the static water levels from the drilling reports (**Attachment B**). Most wells are domestic. The groundwater elevations are dynamic and subject to influences to pumping, flux along the Truckee River, and potential leaking from the canal. Physical groundwater level data should be collected and monitored to provide a much better understanding of hydraulic gradient in the area. For this reason, the potential gradient on the Property was also evaluated using the

Truckee Meadows Water Authority simulated hydraulic heads for the Verdi-Area, TMWA, 2019, Verdi Groundwater Model Report, Figure 37, simulated hydraulic head for the steady-state model (layer 4).

The gradient is the head difference between wells divided by the horizontal linear distance separating them. The gradient of head perpendicular to the equipotential lines between multiple wells, is found by the following equation derived from C.W. Fetter, 2001, Fourth Addition.

$$\text{Gradient (h)} = \sqrt{[(dh/dx)]^2 + [(dh/dy)]^2}$$

- The gradient was estimated to be between 0.01 to 0.05 in the vicinity of the Property.

### 3. Results of Analysis

The following provides a summary of the results of the analysis using BWPC’s governing equation and the assumptions made in the analysis.

- (K) was assumed to be 0.09 ft/day based on the hydraulic conductivity estimated from Specific Capacity of the domestic well on the Property.
- A hydraulic gradient of 0.05 was assumed, based on the groundwater elevations derived from drillers reports and TMWA’s groundwater model.
- The cross-sectional area is assumed on a per-acre basis. The analysis assumes a minimum lot size of 1-acre and an aquifer thickness of 100 feet per the BWPC guidelines. The resulting cross sectional area is 20,871 Ft<sup>2</sup>.

a=            Lot Size (AC)                            1  
                   SQFT                                        43560  
                   Linear FT                                        208.71  
                   a = 208.7ft x            100 feet deep saturated thickness per NDEP

Q=Kia

K	0.09	ft/day
i	0.05	
a	20871.03	FT <sup>2</sup>
Q=	93.92	Ft <sup>3</sup> /day
Q=	702.61	gall/day over 1-acres

The volume of groundwater potentially available for dilution as “Storage” per unit area according to Dary’s Law, where Q = Kia, is approximately 702.61 gallons per day. Precipitation recharge is expected to be approximately 446.3 gpd as described in Section 2.1.

According to the governing equation, the number of permissible septic systems for the Property would be based on the following.

$$\text{Number of Septic Systems} = \frac{(0.2) (\text{ppt recharge AF}) + (0.02) (\text{storage AF})}{0.392 \text{ AF per year per residence}}$$

Or,

$$\# \text{ of Septic Systems} = \frac{(0.2) (446 \text{ gpd}) + (0.02) (702.61 \text{ gpd})}{350 \text{ gpd per single family residence}}$$

The density of permissible septic systems would be approximately 0.30 septic systems per acre, and the limitation is 1.0 septic systems per acre. The hydraulic conductivity of the clay penetrated by the well on the Property and the hydraulic gradient of groundwater flow through the area are not sufficient to produce enough groundwater flux, or storage to dilute septic effluent. Due to the low hydraulic conductivity of the clay, the lot size must be significantly larger than 1-acre to promote an increase in recharge from precipitation to dilute septic effluent under the governing equation. Alternatively, the concentration of septic effluent could be physically reduced as a measure to increase dilution potential considering the existing hydrogeological conditions. In this case, denitrifying septic systems will be required to reduce the minimum lot size requirements to limit potential risks in degrading groundwater from septic effluent.

Denitrifying septic systems are highly effective at removing nitrogen from septic effluent based on claims from at least two major manufacturers. BIO MICROBICS® Bio Barrier Membrane Bio-Reactor system claims it can deliver septic effluent with total nitrogen concentrations less than 10 mg/L. NEXGEN Septic's claims removal of up to 99% of environmental contaminants with the Advanced Enviro-Septic® System.

<https://biomicrobics.com/products/biobarrier-residential/>

<https://www.nexgenseptics.com/products/advanced-enviroseptic-septic-systems/>

Environmental Protection Agency Onsite Wastewater Treatment Systems Technology Fact Sheet 9 for Enhanced Nutrient Removal suggests wastewater separation systems, which remove toilet wastes and garbage grinding, are capable of 80 to 90 percent nitrogen removal. Physical chemical systems such as ion exchange, volatilization, and membrane processes are capable of similar removal rates.

Denitrifying septic systems are expected to be highly efficient in removing nitrogen from septic effluent. If the concentration of nitrogen in untreated septic effluent is 50 to 100 mg/L, the effluent concentration could be <10 mg/L using denitrifying systems as described above.

### **3.1. Results of Analysis Assuming Denitrifying Septic Systems**

A separate evaluation was completed assuming denitrifying septic systems would be deployed on the Property. Normal septic effluent is expected to have a total nitrogen concentration of 100 mg/L. The BWPC guidance assumes that precipitation recharge has a nitrogen concentration of zero, and all nitrogen in recharge to groundwater comes from septic systems. The BWPC guidance assumes 50% decreases in concentration of septic effluent in the unsaturated zone (exp., plant uptake, possible dilution etc.). Therefore, the possible concentration of the discharge from a septic system which could reach the groundwater would be 50 mg/L. Pursuant to the BWPC guidelines, if a septic system has an output of 50 mg/L, but 10 mg/L is the acceptable limit, then the ratio of permissible septic recharge from precipitation recharge must

be 1:5, or 0.20. Therefore, septic recharge equals  $(0.20) \times$  (precipitation recharge) as previously described in Section 2.1.

The Project will require denitrifying septic systems. For this evaluation, denitrifying septic systems assume an effluent concentration of 10 mg/L vs 100 mg/L total nitrogen. A 50% decrease in concentration in the unsaturated zone in accordance with the BWPC guidance document would result in a contribution of 5 mg/L total nitrogen from precipitation recharge to groundwater. If a septic system has an output of 5 mg/L, but 10 mg/L is the acceptable limit, then the ratio of permissible septic recharge from precipitation recharge must be 2:1, or 2.0. Therefore, septic recharge will equal  $(2.0) \times$  (precipitation recharge).

In accordance with BWPC assumptions, 2.0 mg/L was chosen to provide adequate means of pollution prevention to groundwater in storage as described in Section 2.2. If the nitrogen concentration from denitrifying septic systems is expected to be  $< 10$  mg/L but 2 mg/L is the acceptable concentration to be added to groundwater in storage, then the ratio of permissible septic nitrogen to aquifer storage must be 2:10, or 0.2. Therefore, septic nitrogen contributed to groundwater in storage =  $(0.2) \times$  (groundwater storage).

According to the governing equation, the number of permissible septic systems for the Property using denitrifying technology would be based on the following.

$$\# \text{ of Septic Systems} = \frac{(2.0) (446 \text{ gpd}) + (0.2) (702.61 \text{ gpd})}{350 \text{ gpd per single family residence}}$$

The density of permissible denitrifying septic systems would then be approximately 3.0 septic systems on 1-acre.

Based on this evaluation, the installation of denitrifying systems on both proposed Parcel "B1" and Parcel "B2" will not have a greater impact on the groundwater quality than a conventional septic system located on the original parcel size, if the denitrifying systems are maintained and operate in accordance with the manufacturer's specifications to deliver septic effluent under the maximum contaminant level (MCL) of 10 mg/L.

**4. Disclaimer**

CWR has exercised all due care in reviewing all information collected. Opinions presented in this memorandum apply to the site conditions and features as they existed at the time of the investigation, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of the investigation. All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices. CWR reserves the right but not the obligation to revise this memorandum should additional information become available. The findings of this memorandum are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the work of other people on this or adjacent properties. Accordingly, the findings of this memorandum may be invalidated wholly or partially by changes outside of our control. Therefore, this memorandum is subject to review and revision as changes in conditions are

identified. This evaluation does not consider other potential sources of nitrogen loading to include nitrogen in soils generated from the over application of fertilizers, nitrogen in soils from heavy livestock use, and nitrogen loading from poorly managed septic systems on adjacent properties. This evaluation did not investigate the potential impacts to groundwater from microplastics, caffeine, illicit or pharmaceutical drugs, metals to include arsenic, forever chemicals also known as per-and polyfluoroalkyl (PFAS) chemicals, or any other substances, compounds, or chemicals associated with the effluent of septic discharge except for nitrogen. The evaluation is specific to the potential to degrade groundwater from septic borne nitrogen in accordance with the governing equation of the NDEP-BWPC guidance document (Division Memorandum dated January 28, 1991, from John Nelson of the Water Permit Branch to Lew Dodgion, Administrator and Dick Reavis, Division Bureau Chief).

## 5. References

Bio Microbics, Bio Barrier Membrane Bioreactor.

<https://biomicrobics.com/products/biobarrier-residential/>

C.W. Fetter, 2001, Applied Hydrogeology, Fourth Edition.

Driscoll, F.D, 1989. Groundwater and Wells: 3rd edition, Johnson Filtration Systems.

Environmental Protection Agency Onsite Wastewater Treatment Systems Technology Fact Sheet 9 for Enhanced Nutrient Removal.

[https://www.austintexas.gov/sites/default/files/files/Water/UDS/OSSF/Technology Fact Sheet Nitrogen Removal EPA.pdf](https://www.austintexas.gov/sites/default/files/files/Water/UDS/OSSF/Technology_Fact_Sheet_Nitrogen_Removal_EPA.pdf)

Nevada Division of Water Resources Well Log Database.

<https://water.nv.gov/welllogquery.aspx>

NEXGEN Advanced Enviro-Septic® System.

<https://www.nexgenseptics.com/products/advanced-enviroseptic-septic-systems/>

NDEP-BWPC Guidance Document (Division Memorandum dated January 28, 1991, from John Nelson of the Water Permit Branch to Lew Dodgion, Administrator and Dick Reavis, Division Bureau Chief).

## Exhibit 3

Curriculum Vitae for Mathew Banta, Professional Hydrogeologist

## Mathew D. Banta, PH

Principal Consultant – Water Resources and Environmental Sciences

[mbanta@confluencewaterresources.com](mailto:mbanta@confluencewaterresources.com)

775-843-1908

[www.confluencewaterresources.com](http://www.confluencewaterresources.com)

<b>Profession</b>	Water Resources and Environmental Consultant
<b>Education</b>	Bachelor of Science, Environmental and Natural Resource Science with an Emphasis in Hydrology, University of Nevada, Reno 2003
<b>Registrations/ Affiliations</b>	American Institute of Hydrology, Professional Hydrologist-Ground Water, (No. 15-HGW-7004) MSHA Miner Safety Training (Surface, Metal and Non Metal) Nevada Water Resources Association American Exploration and Mining Association Geologic Society of Nevada

---

<b>Specialization</b>	Groundwater and Surface Water Studies for Mining, Development, Geothermal and Industrial Operations. Dewatering and Water Supply Evaluations for Mining Projects. Water Resource Inventories. Water Rights Acquisitions and Planning. Water Resource Permitting and Water Resource Management Plans.
-----------------------	--

---

<b>Expertise</b>	Mr. Banta has over 20 years of technical and professional experience in groundwater and surface water resource inventories, water development projects and water resource management. Mr. Banta's has managed and completed numerous groundwater and surface water resources investigations and inventories, hydraulic testing programs, aquifer testing programs and groundwater characterization studies throughout the world and western U.S. Mr. Banta has extensive professional expertise in stakeholder engagement, environmental natural resource studies, permitting, regulatory compliance, water resource monitoring plans, and drilling program planning and management.
------------------	--

Mr. Banta earned a Bachelor of Science degree in Environmental and Natural Resource Science, with an emphasis in Hydrology from the University of Nevada-Reno and is a certified professional hydrogeologist with the American Institute of Hydrology. Mr. Banta offers diverse experience in the United States, Canada, South America, Russia, and Mexico, with focused expertise in complex water resource investigations and characterization studies for lithium brine, open pit, and underground mining operations. Mr. Banta's environmental regulatory and permitting experience includes Special Use Permits, Clean Water Act compliance, USACE resource inventories and permitting, NEPA document preparation, discharge permitting, Nevada water rights, and Nevada Water Pollution Control Permit acquisitions.

---

### Employment

<b>2015 - Present</b>	Confluence Water Resources LLC, Owner, and Principal Consultant
<b>2005 - 2015</b>	SRK Consulting (U.S.) Inc, Reno, Nevada, Senior Consultant (Environmental and Hydrogeology)
<b>2003-2005</b>	Wood Rodgers, Inc., Reno, US, Environmental Scientist
<b>2003</b>	California Regional Water Quality Control Board, Lahontan Region, South Lake Tahoe Student Technician
<b>2002</b>	United States Forest Service, Lee Vining, CA, Hydrological Technician
<b>2001</b>	United States Forest Service, Bridgeport, CA, Hydrological Technician

---

<b>Languages</b>	English and some Spanish
------------------	--------------------------

# Mathew D. Banta, PH

## Principal Consultant – Water Resources

### Key Experience: Groundwater and Surface Water Engineering

Recent project experience includes:

#### **5E Advanced Materials Inc., Fort Cady Project, (Boron-Lithium) San Bernardino County, California, 2018 to 2025 - Ongoing Project**

- Prepared a Class III Underground Injection Control (UIC) permit application to support 5E Advanced Materials Inc. Fort Cady California project located in Southern California. The permit application was one of a select few which have been approved by the U.S. Environmental Protection Agency (EPA) in California. The permit allows for construction of up-to 500 injection and recovery wells to be used in the solution mining process.
- Designed all program wells which have been authorized by the EPA under the Class III UIC permit regulations. These include complex monitoring wells, observation wells, area of review wells, and injection and recovery wells.
- Oversight and management of Block 1 drilling program. Oversight of contractors, hydraulic testing program, open and cased hole geophysics programs, cement bond logs, well development, mechanical integrity testing, and all sampling activities.
- Completion of multiple well reports, groundwater studies and regular project updates submitted to the EPA regional office.
- S-K 1300 reporting for project hydrogeology.

#### **APEX Resources, Li Creek (Lithium) Project, Nevada 2023 to 2025 - Ongoing Project**

- Project Hydrogeologist for new lithium brine discovery in Nevada. Responsible for construction of conceptual hydrogeological model for the project.
- Oversight and direction of geophysical surveys and shallow brine sampling programs.
- Assistance with NI-43-101 Technical Report for the project.

#### **ASR Project, Confidential Client, Nevada 2025-Ongoing Project**

- Project Hydrogeologist responsible for design and permitting potential future Aquifer Storage and Recovery (ASR) wells to support a large-scale residential development planned in Northern Nevada.

#### **Project One, Stagecoach Development Hydrogeology Study, Nevada 2024-2025**

- Designed and executed a hydrogeology study to evaluate potential degradation to groundwater from nitrates.
- The investigation included Roto-Sonic drilling, material sampling, monitoring well installation, groundwater quality sampling, hydraulic testing, laboratory analysis, collection of water level measurements and a well elevation survey.

#### **ACME Lithium, Clayton Valley (Lithium) Project, Nevada 2022 – 2024**

- Designed and executed a high-profile, deep brine sampling and hydraulic testing program to assess lithium concentration and permeability at discreet intervals in Nevada Dissolved Minerals Exploration Holes in Clayton Valley, Nevada.
- Managed hydraulic testing and sampling program.
- Collaborated with Nevada Division of Minerals and Nevada Division of Water Resources to assess new drilling, testing and sampling techniques to support future lithium exploration in Nevada and acquired required drilling and discharge permits.
- Designed and executed a long-term pumping test to estimate transmissivity and storativity of the target brine aquifer. Included deep test well design, and oversight of drilling, well construction, development, and testing activities.
- Design and oversight of brine sampling and Geochem program.
- Data analysis and reporting of hydraulic testing results – proprietary to Client.
- Inferred resource estimate for Clayton Valley lithium brine deposit. Assistance with NI 43-101 Technical Report.

#### **ORMAT Technologies Inc, San Emidio (Geothermal) Project, Nevada 2020, 2021, 2022, 2023**

- Reviewed analytical results from injection tests, reviewed drilling program, lithology, geophysical logs and spinner test data to troubleshoot inefficiencies in an existing well which was not meeting the client's injection objectives.
- Design of a large diameter injection wells to support water disposal requirements for ORMAT's. San Emidio Project.
- Provided specifications for drilling programs which were approved by the BLM and Nevada Division of Minerals.
- Oversight of drilling, well installation, well development, and testing activities.
- Completion of well testing in water over 220°F.
- The wells met the client's injection objectives.

# Mathew D. Banta, PH

## Principal Consultant – Water Resources

### Nevada Iron, Buena Vista Project, (Iron) Nevada, 2022 to 2024 Ongoing Project

- WPCP monitoring for Buena Vista Project.
- Water rights management, transfer applications and planning.
- Project Hydrogeologist responsible for mine water supply development and planning.

### Ioneer USA Corporation, Rhyolite Ridge Project, (Lithium and Boron) Nevada, 2019, 2020, 2021, 2022

- Completed a surface water resource inventory of seeps, springs, and streams within the domain of the groundwater model for the project.
- Designed and implemented groundwater baseline data collection program, sampling and analytical plan, and carried out monitoring activities for the project.

### Elko Mining Group, Spring Valley Hydrogeology Study, (Gold) Nevada, 2019

- Project Hydrogeologist responsible for design and implementation of characterization program to assess the hydrogeology influencing the Spring Valley Project located north of the Coeur Rochester Mine.
- Program manager responsible for monitoring well and large diameter test well design, drilling and well installation QA/QC, diamond drilling and corehole testing activities, hydraulic testing of wells and boreholes, and overall program logistics.
- Design of surface water monitoring system using weirs and stilling wells with transducers. The system was designed to collect high resolution flow data.
- Managed hydraulic testing in core holes using Standard Wire-line Packer System (SWPS) technology.
- Completed analysis and interpretation of current and historical data.
- Multiple presentations, and direct interaction with NDEP-BMRR and BLM to approve work plan for baseline characterization study.

### Baker Hughes, Slaven Canyon Pit Lake Dewatering Project, (Barite) 2017 - 2019

- Project hydrogeologist responsible for dewatering planning, water balance preparation and passive inflow estimates to support evaluations for dewatering of the Main Pit at the Slaven Canyon Mine.
- Management and oversight of Waters of the United States Survey and contractor coordination for acquisition of a non-jurisdictional determination from the United States Army Corps of Engineers for Slaven Creek.
- Regulatory agency and stakeholder engagement for pit dewatering.
- Oversight of SLERA contractor and discharge permit contractor. Discharge permit acquired.
- Design modifications for the passive dewatering system.

### Baker Hughes, Argenta and Slaven Canyon Mine WPCP Management, (Barite) Nevada, 2017 - 2023

- WPCP monitoring and reporting for Argenta Mine, Slaven Canyon Mine, and Slaven RIBs for the years 2017 through 2021.
- Water rights management, transfers and planning for Baker Hughes Drilling Fluids, Nevada Barite Operations.

### National Gold Mining Corporation, National Exploration Project, (Gold) Nevada, 2017 - 2021

- Project Hydrogeologist responsible for design and implementation of groundwater and surface water baseline characterization programs to support mine planning and future dewatering studies.
- Water supply development for multi-year exploration drilling campaign.
- Water rights permitting.

### Premier Gold, Helen Cover Underground Project, (Gold) Nevada, 2019

- Completed a Waters of the United States Survey and prepared a preliminary jurisdictional determination application, submitted to the USACOE for several drainages within the project area.
- Completed a surface water inventory of seeps, springs, and streams within the domain of the groundwater model for the project.

### Sierra Lithium, Columbus Salt Marsh (Lithium Exploration) Project, Nevada, 2018

- Designed and executed a high-profile packer isolated brine sampling and hydraulic testing program to assess lithium concentration and permeability at discreet intervals in the first permitted Dissolved Minerals Exploration Hole in Nevada. This hole was drilled HQ core to 3,270 feet below ground surface under authorization of the Nevada Division of Minerals.

## **Mathew D. Banta, PH**

### **Principal Consultant – Water Resources**

- Managed hydraulic testing program using Standard Wire-line Packer System (SWPS) technology, both single and straddle packer systems. Testing included airlift recovery and pumping and recovery tests across target lithology.
- Collaborated with Nevada Division of Minerals and Nevada Division of Water Resources to assess new drilling, testing and sampling techniques to support future lithium exploration in Nevada.
- Data analysis and reporting of hydraulic testing results – proprietary to Client.

#### **American Pacific Borate and Lithium, Fort Cady Project, (Boron and Lithium) San Bernardino County, California, 2018**

- Project hydrogeologist responsible for design and implementation of a testing program to evaluate the hydraulic response and potential connectivity between an alluvial aquifer and the Pisgah fault system influencing the ore body.
- Designed a large diameter pumping well (1,000 feet deep) and smaller diameter observation wells (total of 3,000 feet of drilling). Drill bid solicitation and drill contract negotiation. Provided overall program oversight including drilling, well installation, and well development activities.
- Completed a water quality sampling program and completed an assessment of the geochemical footprint of waters and stable radio isotopes.
- Designed and implemented a long-term pumping and recovery test to determine boundary conditions, hydraulic properties and water quality between the alluvial aquifer and the Pisgah fault. Included pump contractor bid solicitation, contract negotiation and implementation of a step test and long-term pumping test.
- Completed pumping test analysis and prepared results for inclusion into a Class III Underground Injection and Control Permit Application.

#### **America Land Holdings, Warm Springs Development Project, Washoe County, Nevada, 2018**

- Project hydrogeologist responsible for baseline water resources evaluations supporting the Warm Springs Development Project in Warm Springs Valley, Nevada.
- Prepared an evaluation of water resources and water rights available to the buyer of the Project.
- Worked with the seller and the buyer to negotiate available water rights and identify liabilities for development of long term, high-capacity extraction wells based on the results of the evaluation.
- The baseline water resource evaluation included an assessment of long-term water level trends within the groundwater basin and beneath the Project; Completion of a pumping and recovery test; Analysis of data; Assessment of water quality beneath the Project.

#### **World Properties, St. James Village, Serpa and TMWA, Washoe County, Nevada, 2017-2018**

- Project hydrogeologist responsible for baseline data collection and characterization studies supporting water rights transfer applications for St. James Village and Sierra Reflections Projects.
- Design and implementation of short-term hydraulic test and long-term pumping and recovery test to assess cumulative impacts to the Mt. Rose Fan groundwater system and municipal wells.
- Coordination with the local municipality (Truckee Meadows Water Authority), and stakeholder and regulatory engagement.
- Development of conceptual groundwater model and cumulative impact assessments.

#### **GeoXplor Corporation, Chedic Graphite Exploration Project, Nevada, 2017**

- Hydrogeologist responsible for development of conceptual groundwater model to support the project.
- Cumulative impact assessments for Chedic Graphite exploration project. Assessed potential impacts to other water rights holders and domestic wells within and adjacent to the project.
- Public outreach and community engagement, stakeholder meetings and presentation of findings to residence and USFS resource specialist.

#### **West Water Resources, Columbus Salt Marsh (Lithium Exploration Project), Nevada, 2017**

- Project hydrogeologist responsible for completed lithium brine characterization studies in Columbus Salt Marsh, Nevada.
- Implemented brine sampling program to assess potential lithium resource.
- Involvement with Nevada Division of Minerals and Nevada Division of Water Resources to assess new drilling, testing and sampling techniques to support future lithium exploration in Nevada.

# **Mathew D. Banta, PH**

## **Principal Consultant – Water Resources**

### **Elko Mining Group, Goldfield Mining District Hydrogeology Study, Nevada, 2017**

- Project Hydrogeologist responsible for on-going characterization of hydrogeology influencing Goldfield Nevada and McMahan Ridge mineral deposits.
- Completion of confirmatory hydraulic testing and reporting of current conceptual model.

### **Klondex Mining Company, Fire Creek Project, Nevada, 2017**

- Subcontracted Hydrogeologist responsible for support on design and installation of surface water resource monitoring network throughout Fire Creek, Nevada.
- Installation of weirs and stilling wells with transducers.

### **Dyno Nobel Inc., Compliance Monitoring and Reporting, Battle Mountain, Nevada (2008 – 2012 and 2017 - 2021)**

- Quarterly groundwater monitoring and reporting.
- Discharge monitoring reports and compliance monitoring for Dyno Nobel Battle Mt. facility.

### **GeoXplor Corporation, Clayton Valley Exploration Project, (Lithium) Nevada, November 2016**

- Contract hydrogeologist to support ongoing lithium brine characterization studies and resource estimates in Clayton Valley, Nevada. **Subcontracted through GeoXplor Corporation to support the Lithium X Energy Corporation Clayton Valley Project.**
- Completed an extensive brine sampling program from client's exploration test hole and prepared a comprehensive report, interpreting the analytical results relative to the geology encountered in the test hole.
- Completed a scoping level lithium resource estimate based on the results of the LX-1 exploration hole and public domain data for Clayton Valley.

### **Lithium Consolidated Minerals Exploration, South Big Smokey Valley Project, (Lithium) Nevada, June 2016**

- Prepared water rights application with the NDWR to support the lithium exploration project.
- Prepared a Notice of Intent for mineral exploration and drilling on BLM controlled lands.
- Prepared reclamation cost estimate for phase I drilling using the NDEP and BLM approved SRCE.
- Technical advisory on groundwater and surface water resources in Nevada.
- Drilling and characterization program design and coordination.

### **Ultra Lithium Inc, 2016 – South Big Smokey Valley Project, (Lithium) Nevada**

- Acquired waivers for temporary use of groundwater for mineral exploration through the NDWR to support the project.

### **June Lake Public Utility District, Groundwater Supply Project, California, August 2016**

- Completed feasibility evaluations for development of groundwater supply wells(s) for the community of June Lake, CA.
- Prepared feasibility report and proposed new test well locations.
- Completed an evaluation of the Clark Exploration Test Hole.
- Analyzed pumping and recovery data and estimated hydraulic parameters.

### **Newmont Mining, Long Canyon Project, (Gold) Nevada, 2016**

- Subcontracted Hydrogeologist responsible for support on design and installation of surface water resource monitoring network throughout the Big Spring complex and wetland ecosystem.
- Installation of weirs, flumes and stilling wells within Big Spring complex.
- Oversight of data collection and monitoring during long term high capacity pumping and recovery test at the Long Canyon project.

### **Lee Vining Public Utility District, Emergency Water Supply Project, California – Ongoing Project Since March 2016**

- Completed feasibility evaluations for development of an emergency water supply for the community of Lee Vining, CA.
- Prepared a special use permit application with the USFS and work plan for a comprehensive hydrogeological investigation to support NEPA and CEQA evaluations for the emergency supply well located in Lee Vining Canyon.

### **Quilici Investments LLC, 2015 through 2016 - Quilici Ranch Induction Well Investigation, Nevada**

- Project Hydrogeologist responsible for groundwater and surface water investigation supporting permitting and installation of an induction well located along the Truckee River in Verdi Nevada.
- Drilling program design, bid solicitation and contract negotiation.

## **Mathew D. Banta, PH**

### **Principal Consultant – Water Resources**

- Monitoring well design and hydraulic testing.
- Surface and groundwater quality sampling and analytical interpretation.
- Analysis and interpretation of data and project reporting.

#### **Comstock Mining Inc, Dayton Expansion Project, Nevada (Gold) - Ongoing Project Since September 2015**

- Hydrogeologist responsible for characterization of hydrogeology influencing the Dayton Expansion Project and various mineral deposits within the mining district, with primary focus on the Dayton and Spring Valley deposits.
- Field program design, permitting, and implementation of hydrogeological characterization program to support water resource evaluations of a proposed open pit mine expansion.
- Program manager responsible for monitoring well network design, drilling and well installation, hydraulic testing of wells, and program logistics.
- Data analysis, report preparation, and presentations.

#### **Capstone Mining, Pinto Valley Project, (Copper) Arizona, 2015**

- Subcontracted Associate Hydrogeologist supporting hydrogeological investigation of faults influencing deep pit excavation.
- Field program coordination and logistical support.
- Managed hydraulic testing program in deep core holes using Standard Wire-line Packer System (SWPS) technology.
- Managed and oversaw installation of grouted in vibrating wire piezometers.

#### **Lundin Gold, Fruta del Norte, (Gold) Ecuador, 2015**

- Project Hydrogeologist responsible for characterization study design and implementation.
- Responsible for packer testing, diamond drilling, and corehole testing activities, as well as program logistics.
- Health and Safety coordination.
- Data analysis, report preparation, and presentations.

#### **Veris Gold, Jerritt Canyon, Nevada, 2015**

- Potable water supply for SSX mine operations.
- Designed and conducted aquifer testing to support regulatory requirements.

#### **Metallic Goldfield Inc, Gemfield Hydrogeology Study, Nevada, 2011 to 2015**

- Project Hydrogeologist responsible for characterization of hydrogeology influencing Goldfield Nevada and various mineral deposits within the mining district, with primary focus on the Gemfield deposit.
- Field program design, permitting, and implementation.
- Program manager responsible for monitoring and water supply well design, drilling and well installation, diamond drilling and corehole testing activities, hydraulic testing of wells, Roto-Sonic drilling activities, and program logistics.
- Conducted and managed hydraulic testing in core holes using Standard Wire-line Packer System (SWPS) technology.
- Water rights planning, development, and acquisitions.
- Data analysis, report preparation, and presentations.

#### **Gradient Resources Inc, Patua Geothermal Project, 2013**

- Background data collection and characterization of shallow groundwater system.
- Special Use Permit Monitoring.
- Underground Injection Control Permit Monitoring.
- Project coordination and data control.

#### **Hycroft Recourses and Development, Brimstone Pit Expansion Hydrogeologic Study, Northern Nevada, 2010 to 2014**

- Project Hydrogeologist responsible for characterization of Hycroft hydrogeology.
- Field program design, permitting, and implementation.
- Mine water supply exploration and development (potable and non-potable).
- Managed hydraulic testing program in deep core holes with groundwater over 200 °F using Standard Wire-line Packer System (SWPS) technology - Research and Development.

# Mathew D. Banta, PH

## Principal Consultant – Water Resources

- Corehole piezometer design, permitting, and installations.
- Managed rotary drilling program and installation of large production and groundwater monitoring wells in water over 200 °F with dissolved Hydrogen Sulfide Gas.
- Installation and calibration of vibrating wire piezometers (VBW) in geothermal aquifer over 2,200 feet.
- Designed and managed pumping test of thermal aquifer.
- Data analysis and report preparation, and presentations.

### **McEwen Mining Co., Gold Bar Mine Water Supply, Nevada, 2012 to 2014**

- Project Hydrogeologist responsible for conducting mine water supply feasibility studies.
- Water rights planning and development.
- Drilling program management and coordination, well installations, hydraulic testing, analysis, and reporting.
- Development of mine water supply supporting the Gold Bar project.

### **Comstock Mining Co, Hydrogeology Study, Storey Co. Nevada, 2011 to 2014**

- Project Hydrogeologist responsible for characterization studies to support various permits, field program design and well permitting.
- Groundwater monitoring well network installation (Process Area).
- Groundwater characterization supporting pit expansion studies.
- Design, permitting, drilling coordination, and installation and testing of mine water supply wells.
- Water rights planning and development.
- Data analysis and interpretations, and report preparation.

### **Nevada Iron, Buena Vista Project, Nevada, 2011 to 2014**

- Project Hydrogeologist responsible for design and implementation of characterization studies to support various permits including NV WPCP, field program design and well permitting.
- Groundwater monitoring well network installation and well testing.
- Groundwater characterization supporting pit expansion studies.
- Water rights planning and development.
- WPCP application support.
- Data analysis and interpretations, and baseline field report preparation.

### **Baikal Mining, Udakon Project 2012 Hydrogeology Study, Eastern Siberia, Russia, 2012**

- Conducted hydraulic testing in deep core holes using Standard Wire-line Packer System (SWPS) technology.
- Data management and project coordination.

### **Mount Hamilton Ltd., Mount Hamilton Mine Water Supply, Nevada, 2012 to 2013**

- Project Hydrogeologist responsible for conducting mine water supply feasibility studies.
- Drilling program management and coordination, well installations, hydraulic testing, analysis, and reporting.

### **Rhodia Lithium, 2011- Diabillos Hydrogeologic Study, Argentina, 2011**

- Hydrogeologist responsible for installation of piezometers and pumping wells in aquifer with dissolved gas.
- Conducted hydraulic testing in piezometers.

### **CMC Metals - Bishop Mill, Hydrogeology Study, Inyo County, California, 2010**

- Project Hydrogeologist responsible for program design, implementation and permitting.
- Groundwater monitoring network installation.
- Conducted aquifer test in site wells.
- Conducted pump test and analysis to determine aquifer characteristics.
- Report preparation.

# **Mathew D. Banta, PH**

## **Principal Consultant – Water Resources**

### **Fronteer Development, Zanzibar Decline Phase II Hydrogeology Study, Nye Co, Nevada, 2010**

- Project Hydrogeologist responsible for program design, implementation, and permitting.
- Conducted hydraulic testing in core holes using Standard Wire-line Packer System (SWPS) technology.
- Well design and testing.
- Responsible for drilling and testing activities, and program logistics.
- Data analysis and report preparation.

### **Shore Gold, 2010 Star Kimberlite Diamond Project Hydrogeologic Study, Saskatchewan, Canada, 2010**

- Installation of vibrating wire piezometers (VBW) in flowing sands over 300 meters deep.
- Geotechnical logging of core.
- Analysis of VBW data.

### **Vista Gold Corporation, Paradoxes Amarillos Hydrogeologic Study, Baja, Mexico, 2009 to 2010**

- Conducted hydraulic testing in core holes using Standard Wire-line Packer System (SWPS) technology.
- Conducted airlift/recovery test in coreholes with SWPS technology.
- Field program manager responsible for drilling and testing activities, and program logistics.
- Data analysis and report preparation.

### **EP Minerals, Celetom Hydrogeologic Study, Southeast Oregon, 2009**

- Test well design and installation in artesian conditions.
- Monitoring well installations.
- Conducted hydraulic testing in completed test wells (airlift/recovery and slug test).
- Field program manager responsible for drilling and testing activities, and program logistics.
- Data analysis and hydrogeological report preparation.

### **National Oilwell Varco, Big Ledge Mine Hydrogeologic Study, Elko County, Nevada, 2009**

- Conducted hydraulic testing in core holes using SWPS technology.
- Conducted airlift/recovery test in coreholes with SWPS technology.
- Field program manager responsible for subcontractor acquisition, drilling and testing activities, and program logistics.
- Data analysis and report preparation.

### **GMI, Mount Hope Hydrogeologic Study, Central Nevada, 2009**

- Conducted hydraulic testing in core holes using SWPS technology.
- Conducted airlift/recovery test in coreholes with SWPS technology.
- Oversaw the installation of deep Vibe wire piezometers.
- Field program manager responsible for drilling and testing activities, and program logistics.
- Data analysis and report preparation.

### **Vale Inco 2009 Kipper Hydrogeologic Study, Manitoba Canada, 2009**

- Conducted hydraulic testing in core holes using SWPS technology.
- Conducted airlift/recovery test in coreholes with SWPS technology.
- Oversaw the installation of deep piezometers.
- Field program manager responsible for drilling and testing activities, and program logistics.

### **Confidential Client, Heap Leach Pad Closure, Northern Nevada, 2009**

- Conducted ground and surface water sampling.
- Managed sampling program and logistics, and reported to the client.
- Consulted on hydrogeology for closure design.

## **Mathew D. Banta, PH**

### **Principal Consultant – Water Resources**

#### **Northumberland Mine, 2008 Zanzibar Hydrogeologic Investigation, Nye County, Nevada, 2008**

- Oversaw drilling program, conducted hydraulic testing, and designed and installation of deep piezometers.
- Managed logistics, reported to the client.
- Prepared hydrogeology report.

#### **Newmont Mining Corporation, 2008 Hope Bay Hydrogeologic Study, Nunavut, Canada, 2008**

- Conducted hydraulic testing (packer testing) in core holes using SWPS technology.
- Installation of deep piezometers and VW thermistors and transducers in permafrost.
- Groundwater sampling and VW thermistor and pressure transducer measurements.
- Acting Senior Hydrogeologist for the Hope Bay Gold Belt (June to July 2008). Managed hydro program logistics and reported to the client.

#### **AREVA, 2008 Shea Creek Hydrogeologic Study, Saskatchewan, Canada, 2008**

- Conducted hydraulic testing in core holes using SWPS technology.
- Conducted airlift/recovery test in coreholes with SWPS technology.
- Oversaw long-term pump/recovery test.
- Geotechnical logging of rock core.
- Assisted in managing hydro program, managed logistics, conducted SWPS and application training for site staff, and reported to the client.

#### **Vale Inco, 2008 Pipe2 Hydrogeologic Study, Manitoba Canada, 2008**

- Conducted hydraulic (packer testing) testing in core holes using SWPS technology.
- Oversaw the installation of deep piezometers.
- Conducted SWPS training for site staff, managed logistics and reported to the client.

#### **Mono County Landfill, Groundwater Monitoring Well Installation, Mono Co., California, 2007**

- Managed the program to installation and develop compliance monitoring wells at four Mono County Landfills.
- Managed logistics and contracts with drilling companies.

#### **RNMC, Ruth Tailings Closure, Ely, Nevada, 2007**

- Performed preliminary investigation of groundwater influence in Ruth Tailings.
- Collected data and samples to determined closure limitations and design criteria.

#### **Northumberland, Groundwater Sampling Training, Nye County, Nevada, 2007**

- Created a program to assist client with compliance monitoring of site wide groundwater monitoring wells.
- Conducted sampling training for mine staff.

#### **Springer Mine, Groundwater Investigation, Pershing County, Nevada, 2007**

- Performed preliminary groundwater investigation. Collected data and determined the gradient of the potentiometric surface in the subject area.
- Designed and oversaw the installation of groundwater monitoring and observation wells.
- Sampled groundwater monitoring wells, and seeps and springs within the project area.

#### **RNMC, 2007 Well Replacement Program, Ely, Nevada, 2007**

- Managed the program for installation and development of the Giroux Wash replacement monitoring wells.
- Conducted field groundwater analysis.
- Managed logistics and contracts with drilling companies.

#### **Mount Hope, 2005 to 2007 Baseline Surface Water Inventory, Sampling, and Data Collection, Eureka, Nevada**

- Designed and managed a large field program to inventory, sample, and collect local and regional baseline surface water data for the Mt Hope project.
- Managed logistics and project staff.

## **Mathew D. Banta, PH**

### **Principal Consultant – Water Resources**

#### **Mount Hope 2006 Hydraulic Testing, Eureka, Nevada, 2006**

- Performed pumping and recovery testing of the Mount Hope monitoring wells.
- Managed logistics and contracts with drilling companies.

#### **Mount Hope 2005 Well Installation and Development Program, Eureka, Nevada, 2005**

- Managed the installation and development of the Mt. Hope project area monitoring wells.
- Designed and oversaw the installation and development of monitoring wells.
- Managed logistics and contracts with drilling companies.

#### **Mount Hope 2005 Field Analysis of Hydrogeology, Eureka, Nevada, 2005**

- Performed preliminary field analysis of hydrogeology of the Mt. Hope project area.
- Analysis included lift/recovery test, a low stress, short term pumping test.

#### **White Pine Energy Associates, Monitoring Well Installation, White Pine County, Nevada, 2005**

- Assisted in the installation and construction of a monitoring well for the purposes of conceptual design of a coal fire power plant in White Pine County Nevada.

#### **Mono County, Monitoring Well Repair, Mono Co., California, 2005**

- Managed the repair of MW-3 located at the Benton Crossing Landfill for the Mono County Department of Public Works.

#### **Highland Ditch Design, Reno, Nevada, 2005**

- Conveyance and quantities of materials calculations.

#### **Incline Village GID 2004 Stormwater, Incline, Nevada, 2004**

- Conceptual detention basin design.

#### **NDOT Highway 50 2004 Stormwater, Eldorado County, Nevada, 2004**

- Conceptual detention basin design, work scoping and proposal preparation.

#### **USFS, Mill Creek Flow Analysis, Lee Vining, California, 2002**

- Conducted a baseline data collection venture for the USFS to quantify the gaining reaches and the losing reaches of Mill Creek including:
- Establishment of gauging locations; and
- Collection of flow measurements using a flow meter for duration of a water year.

#### **USFS, Wilson Creek Flow Analysis, Lee Vining, California, 2002**

- Conducted a baseline data collection venture for the USFS to quantify the gaining reaches and the losing reaches of Wilson Creek including;
- Establishment of gauging locations; and
- Collection of flow measurements using a flow meter for duration of a water year.

#### **USFS, Deer Creek Flow Analysis, Lee Vining, California, 2002**

- Conducted a baseline data collection venture for the USFS in order to quantify flows of Deer Creek including:
- Establishment of gauging locations; and
- Collection of flow measurements using a flow meter for duration of a water year.

#### **USFS, 2001 West Walker River Watershed Water Resources Inventory, Bridgeport, California, 2001**

- Conducted a water resource inventory of the West Walker River Watershed in order to, assist the USFS in water adjudication.

## **Mathew D. Banta, PH**

### **Principal Consultant – Water Resources**

#### **UNR, Sagehen Creek Met Station Construction, Truckee, California, 2001**

- Assisted the Desert Research Institute (DRI) in the construction of the Sage hen Creek Met Station.

#### **Humboldt Toiyabe National Forest Dist. 4 2001 Culvert Sizing Project, Bridgeport, California, 2001**

- Assisted the USFS in determining the existing condition of culverts, and storm water structures within the national forest.

### **Key Experience: Environmental Permitting**

Recent project experience includes:

#### **Lake Mountain Mining, Olinghouse Project, Nevada, 2025**

- 3-Year Bond Update and Reclamation Bond Reconciliation.
- Assistance with Closure Plan and Reclamation Plan updates.
- Attachment A for release of bond for reclaimed ground.

#### **5E Advanced Materials Inc., Fort Cady Project, (Boron-Lithium) San Bernardino County, California, 2018 to 2025 - Ongoing Project**

- Prepared a Class III Underground Injection Control (UIC) permit application to support 5E Advanced Materials Inc. Fort Cady California project located in Southern California. The permit application was one of a select few which have been approved by the U.S. Environmental Protection Agency (EPA) in California. The permit allows for construction of up-to 500 injection and recovery wells to be used in the solution mining process.

#### **Baker Hughes a GE Company, Scruffy Oz Project, Nevada, 2019**

- Prepared a new Water Pollution Control Permit application for the Scruffy Oz Barite Project located near Battle Mt. Nevada.
- Assisted with the Plan of Operations application for the mine project.
- Compiled results of baseline studies.

#### **Baker Hughes a GE Company, WPCP Monitoring and Reporting, Nevada, Ongoing Since 2017**

- Completion of quarterly and annual monitoring and reporting pursuant to the Argenta Mine and Mill and the Slaven Canyon Mine's respective Water Pollution Control Permits.

#### **American Pacific Borate and Lithium California, 2018**

- Assist in preparation of a Class III Underground Injection and Control Permit application which was submitted to the U.S. EPA in December of 2018.
- Completed hydrogeologic testing and evaluations to support the permit application.

#### **Lee Vining PUD, California, 2016**

- Prepared Special Use Permit Application for Hydrogeological Investigation supporting emergency water supply development.

#### **Bishop Mill Permitting, California, 2010**

- Prepared Report of Waste Discharge.
- Prepared Plan of Operations.
- Prepared permits for hydrogeology study and well installations and CEQA evaluations.

#### **Adelaide Mine 2010 WPCP Application, Nevada**

- Assessment of Area of Review and Meteorological Report.

## **Mathew D. Banta, PH**

### **Principal Consultant – Water Resources**

#### **Humboldt Modular Mill 2009 WPCP Application, Nevada**

- Assessment of Area of Review and Meteorological Report.

#### **Jerritt Canyon 2009 WPCP Renewal Application, Nevada**

- Prepared various sections of permit application including
- Assessment of Area of Review, Meteorological Report, and Emergency Response Plan.

#### **Zanzibar Decline 2008 WPCP Application, Nevada**

- Prepared various sections of permit application including
- Assessment of Area of Review, Meteorological Report, Emergency Response Plan and Seasonal Closure Plan.

#### **Springer Mine 2008 WPCP Application, Nevada**

- Prepared various sections of permit application including.
- Assessment of Area of Review and Meteorological Report.

#### **Hope Canyon Road 2008 EA, California**

- Team member for Hope Canyon Road Environmental Assessment preparation for BLM-Ridgecrest Field Office.

#### **Limousine Butte 2007 EA, Nevada**

- Team member for Limousine Butte Environmental Assessment preparation for BLM-Ely Field Office.

#### **Wedekind Park 2006 EA, Nevada**

- Team member for Wedekind Park Environmental Assessment preparation for BLM-Reno Field Office.

#### **Coeur Rochester Expansion and Closure 2006 EA, Nevada**

- Team member for Coeur Rochester Expansion and Closure Environmental Assessment preparation for BLM-Ely Field Office.

## ATTACHMENT A

Nevada Division of Environmental Protection (NDEP) Bureau of Water Pollution Control (BWPC) guidance document, Division Memorandum dated January 28, 1991, from John Nelson of the Water Permits Branch to Lew Dogion, Administrator and Dick Reavis, Division Bureau Chief; and accompanying Attachment 1; both being referenced in the Exhibit 2 memo

MEMORANDUM

To: Lew Dodgion, Administrator/Dick Reavis, Bureau Chief  
From: John Nelson, Water Permits Branch  
Subject: Groundwater Study Requirements  
Date: January 28, 1991

In putting together the groundwater study requirements the following steps should be followed:

- 1) Determine which groundwater basins may be subject to possible degradation from septic systems.
  - 1) I have developed a model using the basin groundwater storage and the surface recharge. This model creates a density limit for each basin that would trigger the need for the groundwater study. Based on the model the density limits for each basin are found in attachment 1.
  - 2) Once any portion of groundwater basin has an approved septic system density equal to or greater than the density noted in attachment 1 a groundwater study would be required.
- II) Prior to performing the study the area of the study must be determined by a hydrologist. The area of the study shall be determined using as a minimum the following survey requirements.
  - 1) Locate the area that is proposed for development using septic systems.
  - 2) Determine the area of the aquifer that will be impacted the most by the development of proposed septic system.
  - 3) Determine other source areas that will contribute contaminants to the areas identified above.

The area to be studied shall include the combination of the three areas mentioned above.

III) Evaluate the existing water quality of the area to be studied and characterize the ground-water regime.

- 1) Groundwater samples must be obtained for the shallow aquifers in each area. Also the groundwater elevations shall be reported.
- 2) The groundwater shall be sampled for Nitrates, Chlorides, and Total Dissolved Solids.

IV) A conceptual model shall be developed of the study area.

- 1) The geologic and hydrologic setting of the area must be described. Existing reports such as the U.S.G.S. and Nevada Division of Water Resources should be referenced.
- 2) Data from domestic wells and monitoring wells must be used to update existing information and to determine the present conditions.
- 3) Geologic conditions must be evaluated to determine the influence on vertical and horizontal groundwater movement.
- 4) The Mixing of recharge and septic effluent discharge must be evaluated.

V) Next a numerical model must be developed to simulate the response of an aquifer both hydraulically and chemically to stresses on a set of contiguous blocks. The blocks shall be arranged in rows and columns which comprise the model grid. Each block in the grid shall be no longer than 500 feet by 500 feet. The input data for the model shall have the following parameters and may require additional parameters if necessary.

- 1) Groundwater elevation data:
- 2) Transmissivity and Storage Coefficient:
- 3) Nitrate Concentration in the Groundwater:
- 4) Contribution of existing septic systems:

- VI) The model shall then be run for the following simulations with a minimum time period of 50 years:
- 1) Simulate for approved septic systems which have not been constructed to date.
  - 2) Simulate for proposed development with all previously approved septic systems.
  - 3) In areas where the existing groundwater depth is less than 100 feet from the natural ground surface, perform a groundwater mounding analysis.

## Attachment 1

### **POLICY FOR DETERMINATION OF MAXIMUM NUMBER OF RESIDENCES ON SEPTIC SYSTEMS PER SQUARE MILE TO BE PERMITTED WITHOUT REQUIRING A GROUNDWATER STUDY TO DETERMINE IMPACT ON GROUNDWATER QUALITY**

#### **I. INTRODUCTION**

The maximum number of residences on septic systems which will be permitted per square mile without a prior groundwater study has been determined for each of the 232 hydrographic areas in the State of Nevada. Results of this determination are available from the Bureau of Water Pollution Control. Once this predetermined residence number is projected to be exceeded in a given area, a groundwater study will be required before the Nevada Division of Environmental Protection will approve additional septic systems. The groundwater study will be used to determine the impact of proposed septic facilities on existing water quality; approvals may be issued or denied on that basis.

#### **II. THE GOVERNING EQUATION DEFINED**

The premise used in determining the number of residences which will trigger the requirement for a groundwater study is based on the following two—part governing equation:

- Total contamination equals contamination contributed to the total aquifer recharge plus contamination contributed to the groundwater in storage where:
- The total contamination is proportional to the total number of residences on a septic system,
- Groundwater in storage equals groundwater stored in upper 100' of saturated alluvium,
- The volume available for assimilating (diluting) septage is the volume of the total aquifer recharge plus groundwater in storage, and
- The total number of septic systems equals the number of septic systems affecting recharge volume plus the number of septic systems affecting storage volume.

Based on the above premise and on the assumptions and calculations outlined in Parts III, IV, and V below, the governing equation is defined as follows:

$$\text{Number of septic systems} = \frac{(0.2) (\text{ppt recharge AF}) + (.02) (\text{storage AF})}{.392 \text{ AF/yr/residence}}$$

### III. GENERAL ASSUMPTIONS AND DEFINITIONS

General assumptions and definitions inherent in the premise for the governing equation are listed below.

1. All contamination being considered is derived from septic systems; therefore, total contamination is related to the total number of residences on septic systems.
2. Total nitrogen has been selected as the constituent of primary concern with respect to impacts on groundwater quality from septic systems. This is based on known contaminants and groundwater studies done in Nevada to date.
3. An estimate of maximum residential flow is 350 gallon/s per day, which is equivalent to 0.392 acre—ft/year/residence.
4. Based on the EPA Design Manual for Onsite Wastewater Treatment and Disposal Systems, the concentration of total nitrogen which enters a leach field varies from 35 to 100 mg/l. As a conservative approach to groundwater protection, 100 mg/l total nitrogen was chosen as input to the leach field.
5. As a conservative estimate for use in the governing equation, the accepted limit of total nitrogen in groundwater used for drinking water is 10 mg/l.
6. All of the 100 mg/l of total nitrogen is available to be converted to nitrogen as nitrate. The drinking water standard for nitrate is 10 mg/l (Federal Safe Drinking Water Act).
7. The abbreviation for “precipitation” is defined as “ppt”.
8. The abbreviation for “acre—feet per year” is defined as “AFY”, and “acre—feet” is defined as “AF”.

### IV. ASSUMPTIONS AND CALCULATIONS RELATING TO THE NUMBER OF SEPTICS LIMITED BY RECHARGE CONSIDERATIONS (The First Factor in the Governing Equation)

#### A. Assumptions

1. A 50% decrease in concentration of septic effluent in the unsaturated zone was assumed (e.g., plant uptake, possible dilution, etc.). Therefore the possible concentration of the discharge from a septic system which could reach the groundwater was assumed to be 50 mg/l.
2. Precipitation recharge has a total nitrogen content of zero.
3. If precipitation recharge is assumed to have a nitrogen content of zero, then all nitrogen in recharge to groundwater must come from septic systems. If a septic system has an output of 50 mg/l, but 10 mg/l is the acceptable limit (IV.A.1), then the ratio of permissible septic recharge to precipitation recharge must be 1:5, or 0.20. Therefore, septic recharge equals (0.20) (precipitation recharge).

## B. Calculations

In the determination of the first factor in the governing equation, which addresses the relationship of the total number of residences on septic systems to the contamination in the total recharge to the aquifer, the following relationships were employed:

$$\begin{aligned}\text{Septic recharge} &= (\text{number of septic systems}) (\text{output/septic}) \\ &= (\text{number of septic systems}) (0.392 \text{ AFY});\end{aligned}$$

$$\begin{aligned}\text{Septic recharge/precipitation recharge} &= 1/5 = 0.20; \text{ and,} \\ \text{Septic recharge} &= (0.20) (\text{precipitation recharge}).\end{aligned}$$

Consequently,

$$\# \text{ septics} = \frac{(0.20) (\text{ppt recharge AFY})}{0.392 \text{ AFY/residence}}$$

## V. ASSUMPTIONS AND CALCULATIONS RELATING TO THE NUMBER OF SEPTICS LIMITED BY AQUIFER STORAGE CONSIDERATIONS (The Second Factor in the Governing Equation)

### A. Assumptions

1. A Constant volume of aquifer storage is assumed, with negligible interbasin flow.
2. Groundwater in storage may have a background value of total nitrogen of 0-5 mg/l.
3. Because 10 mg/l is the "trigger" limit of nitrogen in groundwater used for drinking (111.5), and water in storage may have up to 5 mg/l background concentration (V.A.2 above), the maximum concentration of nitrogen which could be added to water in storage is 5 mg/l. Therefore, some number less than 5 mg/l must be used in the calculations to provide an adequate means of pollution prevention. In this instance, 2 mg/l was chosen as a limit for nitrogen added to groundwater in storage.
4. When calculating the effect of nitrogen from septic systems on the ground water in aquifer storage, no decrease in concentration of septic effluent in an unsaturated zone was assumed.
5. If a septic system has an output of 100 mg/l (III.4), but 2 mg/l is the acceptable concentration to be added to ground water in storage (V.A.3 above), then the ratio of permissible septic nitrogen to aquifer storage nitrogen must be 2:100, or 0.02. Therefore, septic nitrogen contributed to groundwater in storage = (0.02) (groundwater in storage).

## B. Calculations

In the determination of the second factor in the governing equation, which addresses the relationship of the total number of residences on septic systems to the contamination groundwater in storage in the aquifer, the following relationships were employed:

Total nitrogen of groundwater in storage = nitrogen contributed from septic systems + background nitrogen of ground water in storage;

Concentrations of nitrogen from septic systems and background nitrogen concentrations are proportional to the respective associated fluid volumes;

Nitrogen contributed from septic systems = (number of septic systems) (output from septic systems) = (number of septic systems) (.392 AF);

Concentration of septic nitrogen/background concentration of groundwater in storage =  $1/50 = 0.02$ ; and,

Septic nitrogen contributed to groundwater in storage = (.02) (groundwater in storage).

Consequently,

$$\text{The number of septic} = \frac{(0.02) (\text{AF storage})}{0.392 \text{ AF}}$$

## VI. HIGH AND LOW END LIMITATIONS

The values obtained for the number of residences on septic systems per square mile which will trigger the requirement for a groundwater study prior to approval of additional septic systems have been limited by NDEP on both the high and low ends. Most of the residence numbers fell between 50 and 200; consequently, 50 and 200 were chosen as end—member values. Basins with residence numbers of less than 50 were raised to 50; basins with very high numbers were scaled down to a limit of 200 residences per square mile. This was judged by NDEP to be a fair balance between maximizing groundwater protection in areas of high population pressures, and minimizing the burden on growth in under populated areas.

## ATTACHMENT B

Division of Water Resources Well Driller's Report Lot No. 142829,  
Permit 35492, Basin 091, of the **existing well within proposed  
Parcel "B2" that has a Static Water Level of 113' deep**; and three  
other nearby drilling reports; all being referenced in Exhibit 2 memo

APPROX. 310' FROM  
PROPOSED SEPTIC  
BEING THE ONLY  
WELL WITHIN  
900' OF PROPOSED  
NEW SEPTIC

STATE OF NEVADA  
DIVISION OF WATER RESOURCES  
WELL DRILLER'S REPORT

OFFICE USE ONLY  
Log No. 142829  
Permit No. 35492  
Basin No. 891

PRINT OR TYPE IN BLACK INK ONLY  
DO NOT WRITE ON BACK

Please complete this form in its entirety in  
accordance with NRS 524.170 and NAC 534.340

NOTICE OF INTENT NO N2021-675  
WELL NAME (if applicable):

1. OWNER/CLIENT NAME COOK 2011 FAMILY TRUST  
MAILING ADDRESS P.O. Box 314  
Verdi NV 89439

DETAILED ADDRESS AT WELL LOCATION 430 River Pines Drive  
Reno NV 89439  
Subdivision Name RIVER PINES County Washoe

2. PLS LOCATION SW 1/4 SW 1/4 6 Sec 19 T15 R8 E  
PERMIT/WAIVER NO 35492 038-280-67  
Issued by Water Resources Current Parcel No.

Latitude 39.52153 UTM E  
Longitude 119.98772 UTM N

3. WORKED PERFORMED  
 New Well  Deepen Orig Well #  
 Replacement: Original well log #  
 Recorrdillon: Original well log #

4.  Domestic  
 Mining / Dewater  
 Test / Other

PROPOSED USE  
 Irrigation  Monitor  
 Com / Ind  Stock  
 Mun / OM  Rec

5. WELL TYPE  
 Auger  Rotary  RVC  
 Air  Mud  Sonic  
 Other

6. LITHOLOGIC LOG				
Material Encountered	Last Cnc	Water Strata	From	To
Cobbles, boulders			0	38
gravels, coarse sands				
Gray clays & volcanics			38	81
Dark Brown sandy clays			81	126
Gray sandy clays			126	234
Gray sandy clays with volcanics		x	234	298
Washoe County Permit # H21-0012WELL				

9. WELL CONSTRUCTION  
Depth Drilled: 298 Feet Depth Cased: 298 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
10 5/8 Inches	0	298
Inches		
Inches		

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
6 5/8	12.94	.188	+2	298

ANNULAR MATERIALS

Sanitary Seal  Yes  No

Neat Cement 0 to 105  Pumped  Poured  
 Cement Grout to  Pumped  Poured  
 Concrete Grout to  Pumped  Poured  
 Bentonite Chips to  Pumped  Poured  
 Gravel Pack (> 0.2 in.) 105 to 298  Pumped  Poured  
 Sand Pack (< 0.2 in.) to  Pumped  Poured  
 Other, explain: to  Pumped  Poured

PERFORATIONS:

Type of perforation: Factory Cut  
Size of perforation: 3X3/32

From	To	From	To
238	258	258	278
258	278	278	298
278			

Date started 13-Aug 20 21  
Date completed 17-Aug 20 21

7. WATER QUALITIES  
Static water level 113 Feet below land surface  
Artesian Flow: G.P.M. P.S.I.  
Water Temperature: 62 ° Fahrenheit  
Water Quality: Not Tested

8. WELL TEST DATA

Test Method:	G.P.M.	Draw Down (Feet Below Static)	Recorded Time (Hours)
<input type="checkbox"/> Boiler <input type="checkbox"/> Pump <input checked="" type="checkbox"/> Air Lift	15-20		8 Hours

10. DRILLER'S CERTIFICATION  
This well was drilled under my supervision. This report is true to the best of my knowledge.  
Name Bruce MacKay Pump & Well Service, Inc. Contractor  
Address 7465 Longley Lane Reno NV 89511 Contractor  
Phone 775-851-1600 Ext 3  
Nevada contractor's license number 23096  
as issued by the State Contractor's Board  
Nevada well driller's license number as issued by the Nevada Division of Water Resources (on-site driller) 2889  
Signed [Signature]  
Date: 8/10/2021

39.52163  
119.98670  
NAD  
27

**FORM  
4013**

**STATE OF NEVADA  
DIVISION OF WATER RESOURCES  
WELL DRILLER'S REPORT**

**OFFICE USE ONLY**  
Log No. 136123  
Permit No. 35492  
Basin No. 091

PRINT OR TYPE IN BLACK INK ONLY  
DO NOT WRITE ON BACK

Please complete this form in its entirety in accordance with NRS 534.176 and NAC 534.346

NOTICE OF INTENT NO. N20201025  
WELL NAME (if applicable) \_\_\_\_\_

1. OWNER/CLIENT NAME Doug & Kristin Crowhurst  
MAILING ADDRESS 21 Garner Drive  
Novato CA 94947

DETAILED ADDRESS AT WELL LOCATION 355 River Pines Drive  
Reno NV 89439  
Subdivision Name River Pines County Washoe

2. P.L.S. LOCATION NE 1/4 SW 1/4 8 Sec 19 N S 18 E  
PERMIT/WAIVER NO. 35492 038-280-39  
Issued by Water Resources Survey Party No.

Latitude 39.52378 UTM E  NAD 27  
Longitude -119.98434 UTM N  NAD 83/WGS 84

3. WORKED PERFORMED  
 New Well  Deepen Orig WL# \_\_\_\_\_  
 Replacement: Original well log # \_\_\_\_\_  
 Recondition: Original well log # \_\_\_\_\_

4. PROPOSED USE  
 Domestic  Irrigation  Monitor  
 Mining / Dewater  Com / Ind  Stock  
 Test / Other  Mun / OM  Rac

5. WELL TYPE  
 Auger  Rotary  RVC  
 Air  Mud  Sonic  
 Other

6. LITHOLOGIC LOG

Material Encountered	Test Core	Water Strata	From	To
Cobbles, boulders			0	58
multi colored				
gravels, coarse				
sands				
Brown bally sands			58	73
Gray sandy calys			73	137
Green shale with sands			137	152
Hard green shale			152	174
Green shale with			174	238
Black volcanic rock, fractured				
Fractures 176-218, 218-236				

Washoe County  
Permit #  
H20-0123WELL

9. WELL CONSTRUCTION

Depth Drilled: 238 Feet Depth Cased: 238 Feet

HOLE DIAMETER (BIT) SIZE:

From	To
10 5/8 Inches	0 Feet to 238 Feet
Inches	Feet
Inches	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
6 5/8	12.94	.188	+2	238

ANNULAR MATERIALS

Sanitary Seal  Yes  No

Neat Cement 0 to 105  Pumped  Poured  
 Cement Grout to  Pumped  Poured  
 Concrete Grout to  Pumped  Poured  
 Bentonite Chips to  Pumped  Poured  
 Gravel Pack [ > 0.2 in. ] 105 to 238  Pumped  Poured  
 Sand Pack [ < 0.2 in. ] to  Pumped  Poured  
 Other, explain to  Pumped  Poured

PERFORATIONS

Type of perforation: Factory Cut  
Size of perforation: 3/32 X3

From	Feet	To	Feet
178		198	
198		218	
218		238	

Date started 2-Feb .20 21  
Date completed 8-Feb .20 21

7. WATER QUALITIES  
Static water level 78 Feet below land surface  
Artesian Flow: \_\_\_\_\_ G.P.M. \_\_\_\_\_ P.S.I.  
Water Temperature: \_\_\_\_\_ ° Fahrenheit  
Water Quality: Not Tested

8. WELL TEST DATA

Test Method:	G.P.M.	Draw Down (Feet Below Static)	Recorded Time (Hours)
<input type="checkbox"/> Bailor <input type="checkbox"/> Pump <input checked="" type="checkbox"/> Air Lift	<u>20+</u>		<u>5 Hours</u>

10. DRILLER'S CERTIFICATION

This well was drilled under my supervision. This report is true to the best of my knowledge.

Name Bruce MacKay Pump & Well Service, Inc.  
Address 7465 Longley Lane Reno NV 89511  
Phone 775-851-1600  
Nevada contractor's license number as issued by the State Contractors Board 23096  
Nevada well driller's license number as issued by the Nevada Division of Water Resources on-site driller 2289

Signed [Signature]  
Date 2/10/2020

STATE OF NEVADA  
DIVISION OF WATER RESOURCES  
WELL DRILLER'S PLUGGING REPORT

OFFICE USE ONLY  
Log No. 134151  
Permit No. 49790  
Basin 091

PRINT OR TYPE ONLY  
DO NOT WRITE ON BACK

Please complete this form in its entirety in accordance with NRS 534.170 and NAC 534.340

NOTICE OF INTENT NO. N2020-117  
WELL NAME (if applicable):

1 OWNER Washoe County School District  
MAILING ADDRESS 425 East Ninth Street  
Reno NV 89512  
ADDRESS AT WELL LOCATION 270 Bridge St  
Verdi NV 89439  
Subdivision Name: County: Washoe

2 LOCATION SW 1/4 SW 1/4 Sec 8 T 19N N/S R 18 E  
PERMIT/WAIVER No. 49790 038-060-27  
Latitude 39.522189 UTM E  NAD 27  
Longitude -119.989000 N  NAD 83/WGS 8

3 TYPE OF WELL  
 Domestic  Irrigation  Test  
 Municipal/Industrial  Monitor  Stock  
Is this well being plugged because a replacement well was drilled? No  
If yes, what is replacement well NOI?  
Is there an existing well log? Yes  
If yes, what is NDWR well log #? 27439

4 EXISTING WELL CONSTRUCTION  
Depth Drilled 602 Feet Depth Cased 602 Feet

7 WELL PLUGGING PROCEDURE  
Was well cleaned out to total depth?  yes  no  
If well was not cleaned out to total depth, please explain why:

EXISTING CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
8 5/8	22.36	.250	0	602

Was the well contaminated?  yes  no  
Was the casing pulled?  yes  no If pulled from: \_\_\_\_\_ feet to \_\_\_\_\_ feet  
Was the casing over drilled?  yes  no  
If casing was left in place, please show where additional perforations were made:  
Additional Perforations:

Existing Perforations:

Type of perforation	Factory Mill Slot
From 522 feet to 602 feet	1/8X3
From _____ feet to _____ feet	
From _____ feet to _____ feet	
From _____ feet to _____ feet	
From _____ feet to _____ feet	

Type of perforator used: Air perforator

From	To	Number of perms per linear foot
From 104 feet to 525 feet		6
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		
From _____ feet to _____ feet		

5 WATER LEVEL  
Static water level 73 feet below land surface  
Artesian flow \_\_\_\_\_ G.P.M. \_\_\_\_\_ P.S.I.  
Water temperature 63 °F Quality Not Tested

6 Additional Notes or Comments

8 WELL PLUGGING MATERIALS

From	To	Material Used	Pumped	Poured
From 600 feet to 2 feet		12 sack sand slurry	<input checked="" type="checkbox"/>	<input type="checkbox"/>
From _____ feet to _____ feet			<input type="checkbox"/>	<input type="checkbox"/>
From _____ feet to _____ feet			<input type="checkbox"/>	<input type="checkbox"/>
From _____ feet to _____ feet			<input type="checkbox"/>	<input type="checkbox"/>
From _____ feet to _____ feet			<input type="checkbox"/>	<input type="checkbox"/>
From _____ feet to _____ feet			<input type="checkbox"/>	<input type="checkbox"/>

Neat Cement Fluid Weight lbs/gal  
Bentonite Grout % bentonite

Date Started 4/20/2020  
Date Completed 4/21/2020

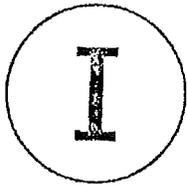
9 DRILLER'S CERTIFICATION  
This well was plugged and abandoned under my supervision and the report is true to the best of my knowledge.  
Name Bruce MacKay Pump & Well Service, Inc.  
Contractor  
Address 7465 Longley Lane Reno NV 89511  
Contractor  
Phone 775-851-1600  
Nevada contractor's license number issued by the State Contractor's Board 23096  
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 2547  
Signed [Signature]  
By driller performing actual drilling on site of contractor  
Date 4/21/2020

NAD 27;  
39.52228  
119.98798

Plugs Well log 27439

RECEIVED  
2020 APR 23 AM 11:57  
STATE ENGINEERS OFFICE

REPORT NO. **A03.125**



STATE OF NEVADA  
DIVISION OF WATER RESOURCES  
**WELL DRILLER'S REPORT**

LOG NO. 102644  
PERMIT NO. \_\_\_\_\_  
BASIN 091

NOTICE OF INTENT NO. 51481

1. OWNER Steve Downing ADDRESS OF WELL River Pine Drive  
MAILING ADDRESS P.O. Box 99 Verdi NV 89439 Off Bridge Street  
2. WELL LOCATION SE 1/4 SW 1/4 SEC. 8 T 19 R 18 E Washoe COUNTY  
PERMIT NO. \_\_\_\_\_ PARCEL NO. 038-280-30 SUBDIVISION NAME \_\_\_\_\_

3. TYPE OF WORK

New Well  Replace  Recondition  
 Deepen  Plug  Other

4. PROPOSED USE

Domestic  Irrigation  Test  
 Municipal/Industrial  Monitor  Stock

5. WELL TYPE

Cable  Rotary  RVC  
 Air  Mud

6. LITHOLOGIC LOG

MATERIAL	STRATA	FROM	TO	THICKNESS
Sand, Small Cobbels		0	16	16
Yellow, White, Black Hard Rock		16	20	4
Black Rock, Yellow Clay & DG		20	30	10
Greenish Yellow Clay		30	35	5
Gray Blue Clay Sand		35		
& Small Black Rock		35	65	30
Blue, Green, Clay Sand & Rock		65	75	10
Gray Blue, Blue Green Sandy Clay		75	100	25
Gray Blue Sandy Clay		100	105	5
Greenish Brown		105		
& Gray Blue Sandy Clay		105	115	10
Black Vol. Rock & Gray Blue Clay		115	130	15
Blue Green Clay, Black Rock		130		
& Volcanic Hard Spots		130	170	40
Dark Blue Green Vol. Rock		170		
& Blue Gray Clay Lt. Green Clay		170	240	70
Heavy Blue Gray Clay		240		
& Rock Traces of Brown Clay		240	285	45
Fract. Drk. Blue Green Vol. Rock		285		
& Blue Green, Blue Gray Clay		285	345	60
Drk Blue Grn. Almost Black Rock		345	357	12

8. WELL CONSTRUCTION

Depth Drilled 357 Depth Cased 357  
HOLE DIAMETER (BIT SIZE)  
10 5/8 Inches 0 Feet 100 Feet  
8 1/2 Inches 100 Feet 357 Feet  
Inches \_\_\_\_\_ Feet \_\_\_\_\_ Feet

CASING SCHEDULE

Size OD	Weight/Ft	Wall Thickness	From	To
<u>6 5/8</u>	<u>12.92</u>	<u>.188</u>	<u>+3</u>	<u>357</u>

PERFORATIONS:

Type Perforation Factory Size Perforation 3/32 X 3  
From 277 Feet to 357 Feet  
From \_\_\_\_\_ Feet to \_\_\_\_\_ Feet  
From \_\_\_\_\_ Feet to \_\_\_\_\_ Feet

SURFACE SEAL:  Yes  No SEAL TYPE:  
 Neat Cement  
Seal Depth 100'  Cement Grout  
PLACEMENT METHOD:  Pumped  Concrete Grout  
 Poured  Bentonite

GRAVEL PACKED:  Yes  No  
From 100 Feet to 357 Feet

9. WATER LEVEL

Static Water Level 63 Feet Below Land Surface  
Artesian Flow \_\_\_\_\_ GPM \_\_\_\_\_ PSI  
Water Temperature Cool F Quality Clear

10. DRILLER'S CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name Aqua Drilling & Well Service, Inc.  
Address 675 Edison Way  
Reno, NV 89502

DRILLER'S LIC. NO. \_\_\_\_\_  
NV. CONTRACTOR'S LIC. NO. 15291 ON SITE 2189

Signed Roger [Signature]  
By driller performing actual drilling on site or contractor  
Dated December 18, 2003

Date Started 12/10/03 Date Completed 12/18/03

7. WELL TEST DATA

TEST METHOD  Baller  Pump  Air Develop

	GPM	DRAWDOWN	TIME (HRS)
	<u>20+</u>		<u>1 1/2hrs.</u>

## ATTACHMENT C

Bio Microbics Bio Barrier Membrane Bioreactor denitrifying septic system literature/specs as referenced in Exhibits 1 & 2

Industry Leading Water Recycling Technology



**BIO** MICROBICS®

# BioBarrier®

MEMBRANE BIOREACTOR



*NSF/ANSI STD 40 Class 1,  
STD 245 and STD 350*



*Ultrafiltration membrane*



*Reliable performance with  
low maintenance*



RESIDENTIAL • COMMERCIAL • COMMUNITY

BETTER WATER. BETTER WORLD.®

[www.biomicrobics.com](http://www.biomicrobics.com)

# SIMPLE • LOW

## BioBarrier® MEMBRANE BIOREACTOR

The BioBarrier® is a Membrane Bioreactor (MBR) technology that removes organic pollutants and suspended solids with the use of ultrafiltration membranes. This membrane system replaces the clarifier, sand filter, and disinfection processes used in many conventional wastewater treatment processes.

The membrane module is submerged in a tank full of aerated MLSS (Mixed Liquor Suspended Solids), where organic matter and suspended solids are biologically broken down. The membranes physically separate water from microorganisms and suspended solids. Water is drawn through the membranes with vacuum pressure, leaving the suspended biomass material in the aeration tank. The resulting effluent is 99% free of contaminants such as BOD, TSS, and fecal coliform. Depending on the design of the system, a high level of nitrogen and phosphorus can be removed as well.



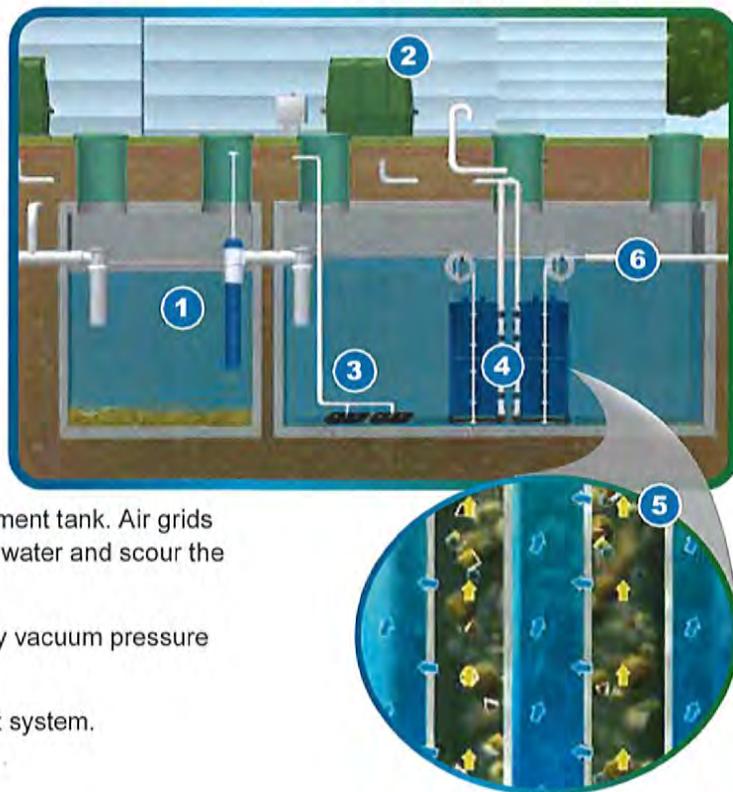
The BioBarrier® system is scalable to fit many residential and commercial applications, from single homes to large businesses, and is particularly suitable for cases where high quality effluent is required, such as in water reuse.

## HOW IT WORKS!

- 1 In the primary settling zone, a SaniTEE® screen prevents large solids from entering the treatment zone.
- 2 An above-ground blower introduces air into the treatment module to aerate the wastewater.
- 3 In the treatment tank, microbes thrive in the richly aerated environment as suspended growth (MLSS).

*An optional BioRobic® system can be used for extra aeration for high BOD concentrations.*

- 4 The BioBarrier® module is immersed in the treatment tank. Air grids supply coarse bubble aeration to oxygenate the water and scour the membrane surfaces.
- 5 Treated water is drawn through the membrane by vacuum pressure delivered by a submersible pump.
- 6 Clear, odorless, treated water exits the treatment system.



# COST • ROBUST

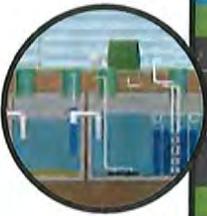
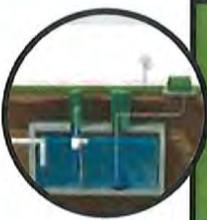
**BioBarrier®** Membrane Bioreactor. Versions with higher Total Nitrogen (TN) reduction, designated as “-N” models, are also available.



UNIT	MAX HYDRAULIC LOADING		MAX ORGANIC LOADING Pop. Equiv.
	GPD	LPD	
EN NSF 0.5 (-N)	500	1890	8
EN NSF 1.0 (-N)	1000	3800	16
EN NSF 1.5 (-N)	1500	5700	24
EN 2.0 (-N)	2000	7600	32
EN 2.5 (-N)	2500	9500	40
EN 3.0 (-N)	3000	11400	48

*MBR module capacities are best rated based on hydraulic loading, organic loading, and other project-specific considerations. Actual capacity may vary with local conditions and performance goals.*

**BioBarrier® HSMBR®** High Strength Membrane Bioreactor. Versions with higher TN reduction (“-N” models) are also available.



UNIT	MAX HYDRAULIC LOADING		MAX ORGANIC LOADING Pop. Equiv.
	GPD	LPD	
HSMBR® 1.5 (-N)	1500	5700	CONSULT FACTORY
HSMBR® 3.0 (-N)	3000	11400	
HSMBR® 4.5 (-N)	4500	17000	
HSMBR® 6.0 (-N)	6000	22700	
HSMBR® 9.0 (-N)	9000	34000	

*For flows larger than 9,000 GPD [34000 LPD] or applications requiring different treatment levels, please consult the factory.*

- NSF** NSF/ANSI Standard 40, Class1 Residential Wastewater Treatment Systems
- NSF** NSF/ANSI Standard 245, Class1 Residential Wastewater Treatment Systems, Nitrogen Reduction
- NSF** NSF/ANSI Standard 350, Onsite Residential and Commercial Treatment, Water Reuse
- CPA** CAN/BNQ 3680-600 (Onsite Residential) Wastewater Treatment Technologies
- EN** EN 12566-3 Packaged wastewater treatment plants for up to 50 people.



Pictured: HSMBR® membrane modules, control panel, blower housing, SaniTEE®



Established in 1996 to focus on water, BioMicrobics – and subsidiaries SeptiTech and Scienco/FAST – is at the forefront of sustainable design, with more than 80,000 systems in over 80 countries. Our systems meet the highest performance standards for treatment of water,

graywater, wastewater, and stormwater. BioMicrobics produces innovative systems dealing with wastewater treatment in decentralized settings. Our products are engineered to be simple, low-cost, and robust.



**Single-Family & Residential Systems**

The BioBarrier® MBR models 0.5-1.5 are certified to the following standards: NSF/ANSI Std 40, Class 1, for wastewater, Std 245 for nitrogen reduction, and Std 350 for water reuse (the first to receive this distinction), as well as EN 12566-3 certified. This product provides opportunities for water reuse.



**Small & Large Commercial Systems**

BioBarrier® HSMBR® (High Strength Membrane Bioreactor) system is designed specifically to treat all the wastewater (greywater and blackwater) from commercial applications, from small flow to higher flows, such as gas stations, strip malls, office buildings, and even wineries.



BETTER WATER. BETTER WORLD!  
 16002 West 110th St. • Lenexa, KS 66219 USA  
 1-800-753-3278 • ph: 1-913-422-0707 • f: 1-913-422-0808  
 www.biomicrobics.com • sales@biomicrobics.com



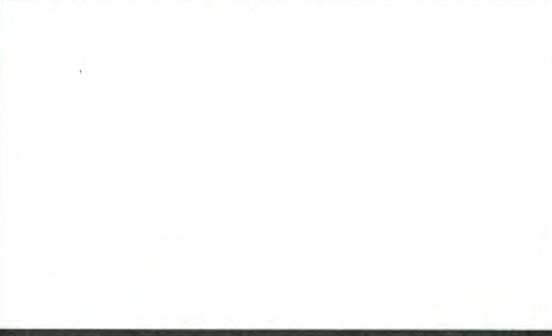
a subsidiary of BioMicrobics, Inc.  
 200 Sun Valley Circle • Fenton, MO 63026 USA  
 1-800-652-4539 • p: 1-314-756-9300 • f: 1-314-756-9306  
 www.sciencofast.com • solutions@sciencofast.com



a subsidiary of BioMicrobics, Inc.  
 69 Holland Street • Lewiston, ME 04240 USA  
 1-800-318-7967 • ph: 1-207-333-6940 • f: 1-207-333-6944  
 www.septitech.com • info@septitech.com



30525 First Street Suite A • Fulshear TX 77441 USA  
 p: 1-832-640-9221 • f: 1-314-756-9306  
 www.intankballast.com • intank@sciencofast.com



## ATTACHMENT D

Nexgen Advanced Enviro-Septic System denitrifying septic system  
literature/specs as referenced in Exhibits 1 & 2



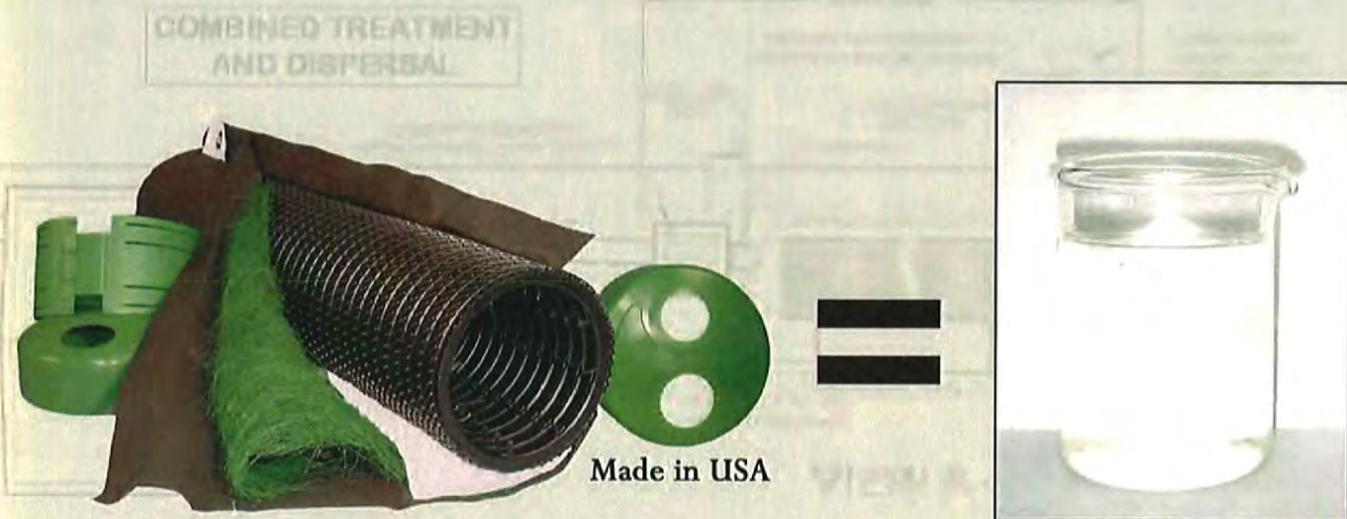
**Presby Environmental**

The Next Generation of Wastewater Treatment Technology

✓ *Minimizes the Expense* ✓ *Protects the Environment* ✓ *Preserves the Site*

# Advanced Enviro-Septic™ (AES) Wastewater Treatment System

**Presby Environmental proudly announces...**



***The onsite wastewater treatment system  
that is sweeping the industry!***



© Copyright 2010 Presby Environmental, Inc.  
All Rights Reserved.

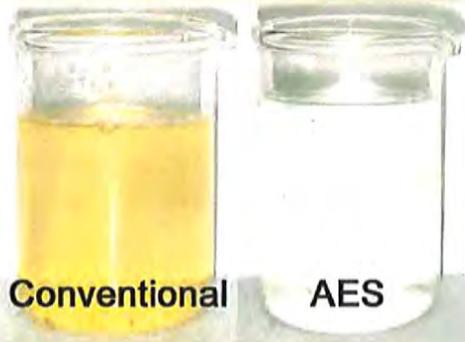
SPD & CTD Models  
Certified to NSF/ANSI  
Standard 40, Class I

Item 71610

[www.PresbyEnvironmental.com](http://www.PresbyEnvironmental.com)

# ADVANCED ENVIRO-SEPTIC™ TREATMENT SYSTEM

## Why choose Advanced Enviro-Septic™ (AES)?



### Third Party Testing

BNQ Testing Parameters	Advanced Enviro-Septic™ Test Results*
CBOD (mg/L)	<2
TSS (mg/L)	<2
Fecal Coliforms (CFU/100 mL)	218

### Industry Standards

EPA Tertiary	NSF-40 Class I	BNQ Advanced Secondary
10	<25	<15
10	<30	<15
1000	n/a	50,000

\* (N/Ref: 30825-049-A) BNQ Test Center, Quebec

## The Environmental Advantage

- Removes up to 99% of wastewater contaminants
- Treats and disperses in the same small footprint
- Proven and reliable track record
- Treatment process requires no energy
- Made with significant amounts of recycled plastic
- Protects soil and groundwater from contamination

## The Cost Advantage



- Smaller installations require smaller crews and less fill material
- Installs quickly and easily
- Lightweight components are easy to handle and transport
- Considerably more cost-effective than mechanical and conventional systems
- Never needs replacement media or special maintenance
- Requires no expensive mechanical devices, computer controls or maintenance contracts
- Durable, non-biodegradable components last indefinitely

## The Design Advantage

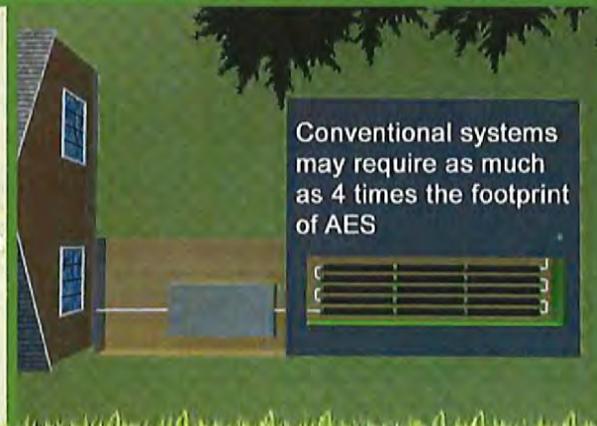
- Available in NSF and non-NSF Certified designs
- Flexible to allow virtually any shape
- Sloping and adaptable configurations
- Multi-Level™ configurations
- Proven performance
- Longevity and reliability
- Technical support
- Free online classes, manuals, templates

*"When we looked at the solution, we determined that Presby was the best alternative for us because of the high performance of the system... The design goes together fast and performs at a high capacity when you have limited space."*

- Jay Gamble, Vice President and General Manager of the Mt. Sunapee Resort, New England Construction Test Magazine, April 27, 2009



A powerful eco-system of aerobic and anaerobic bacteria digests up to 99% of wastewater contaminants, recycling clean water into the environment



Conventional systems may require as much as 4 times the footprint of AES

# ADVANCED ENVIRO-SEPTIC™ TREATMENT SYSTEM

## Ridges

- ▶ Increase surface area
- ▶ Improve cooling
- ▶ Provide more bacterial growth areas

## Skimmers at Each Perforation

- ▶ Prevent grease and suspended solids from leaving the pipe
- ▶ Protect green fibers and geo-textiles from clogging



## Black Geotextile

- ▶ Surrounds the pipe and fibers
- ▶ Provides protected bacterial treatment surface

## Green Plastic Fiber Mat

- ▶ Filters more suspended solids
- ▶ Protects outer geotextile bacterial treatment surface
- ▶ Creates a massive bacterial treatment area

## Bio-Accelerator™ Fabric

- ▶ Quickly develops treatment biomat
- ▶ Screens more solids from the wastewater
- ▶ Ensures distribution of wastewater along the entire length of the pipes
- ▶ Provides additional treatment surface
- ▶ Enhances and accelerates treatment
- ▶ Facilitates quick start-up
- ▶ Further protects outer layers and the receiving surfaces

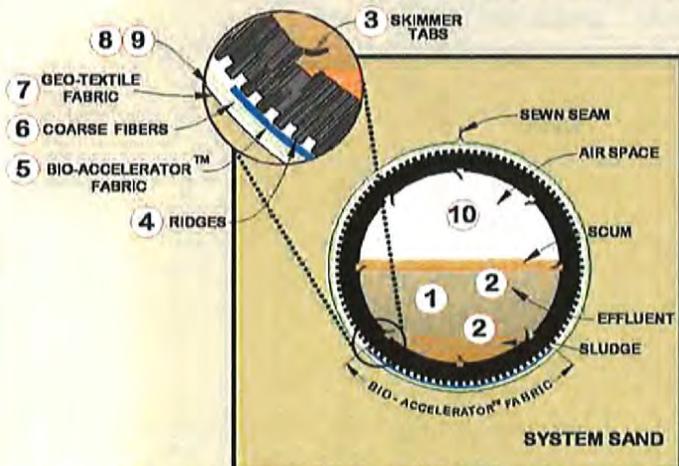


The Public Health and Safety Company™

SPD & CTD Models  
Certified to NSF/ANSI  
Standard 40, Class I



## ADVANCED ENVIRO-SEPTIC™ WASTEWATER TREATMENT SYSTEM



- STAGE 1: WARM EFFLUENT ENTERS THE PIPE AND IS COOLED TO GROUND TEMPERATURE.
- STAGE 2: SUSPENDED SOLIDS SEPARATE FROM THE COOLED LIQUID EFFLUENT.
- STAGE 3: SKIMMERS FURTHER CAPTURE GREASE AND SUSPENDED SOLIDS FROM THE EXITING EFFLUENT.
- STAGE 4: PIPE RIDGES ALLOW THE EFFLUENT TO FLOW UNINTERRUPTED AROUND THE CIRCUMFERENCE OF THE PIPE AND AID IN COOLING.
- STAGE 5: BIO-ACCELERATOR™ GEO-TEXTILE FABRIC FILTERS ADDITIONAL SOLIDS FROM THE EFFLUENT, ENHANCES AND ACCELERATES TREATMENT, FACILITATES QUICK START-UP AFTER PERIODS OF NON-USE, PROVIDES ADDITIONAL SURFACE AREA FOR BACTERIAL GROWTH, PROMOTES EVEN DISTRIBUTION, AND FURTHER PROTECTS OUTER LAYERS AND THE RECEIVING SURFACES SO THEY REMAIN PERMEABLE.
- STAGE 6: A MAT OF COARSE RANDOM FIBERS SEPARATES MORE SUSPENDED SOLIDS FROM THE EFFLUENT.
- STAGE 7: EFFLUENT PASSES INTO THE GEO-TEXTILE FABRIC AND GROWS A PROTECTED BACTERIAL SURFACE.
- STAGE 8: SAND WICKS LIQUID FROM THE GEO-TEXTILE FABRIC AND ENABLES AIR TO TRANSFER TO THE BACTERIAL SURFACE.
- STAGE 9: THE FABRIC AND FIBERS PROVIDE A LARGE BACTERIAL SURFACE TO BREAK DOWN SOLIDS.
- STAGE 10: AN AMPLE AIR SUPPLY AND FLUCTUATING LIQUID LEVELS INCREASE BACTERIAL EFFICIENCY.

## Presby Environmental

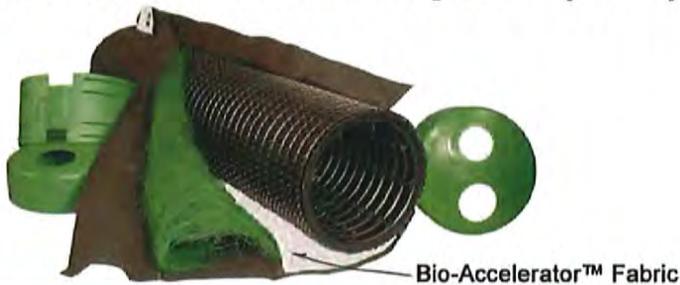
*...changing the way the world approaches wastewater treatment.*

Presby Environmental, Inc. (PEI), founded in 1995 by inventor and entrepreneur David Presby, is an innovative environmental organization that engineers new technology to change the way the world approaches wastewater treatment. Today, PEI is on the cutting edge of wastewater treatment technology to help protect and preserve our most precious natural resources.

Through extensive field testing and R&D, PEI has developed the world's most practical and effective wastewater treatment system, the Advanced Enviro-Septic™ Wastewater Treatment System (AES). AES combines superior treatment and dispersal in the same footprint, offering design, installation and cost advantages no other system can. This System is so effective, it is the only one of its kind to meet the stringent standards of NSF-40 Class I and BNQ Advanced Secondary.

Presby Environmental combines innovation, simplicity and extensive research and development into a patented line of complimentary onsite wastewater treatment technologies, designed and manufactured at PEI's state-of-the-art facility. Mr. Presby continues to lead the industry by striving to improve the techniques and technology used in the field, always pushing to provide the next generation of wastewater treatment technology.

### Advanced Enviro-Septic™ (AES)



### Enviro-Septic® (ES)



### Presby Maze®



### Presby De-Nyte™



## The Best Customer Service in the Industry...for us it's personal

- Design layouts
- User-friendly website
- Design, Installation & Operations Manuals
- Online training classes
- Technical support
- System Sand Supplier List

### To contact our Customer Service Team

Presby Environmental, Inc.  
143 Airport Road  
Whitefield, NH 03598

Tel: 800-473-5298  
Fax: 603-837-9864  
Email: [info@presbyeco.com](mailto:info@presbyeco.com)

## ATTACHMENT E

Environmental Protection Agency (EPA) Onsite Wastewater  
Treatment Systems Technology Fact Sheet 9 as referenced in  
Exhibits 1 & 2



# Onsite Wastewater Treatment Systems Technology Fact Sheet 9

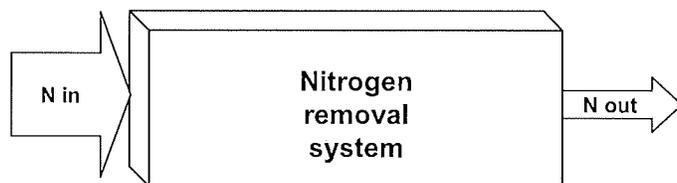
## Enhanced Nutrient Removal— Nitrogen

### Description

Nitrogen is a pollutant of concern for a number of reasons. Nitrogen in the ammonia form is toxic to certain aquatic organisms. In the environment, ammonia is oxidized rapidly to nitrate, creating an oxygen demand and low dissolved oxygen in surface waters. Organic and inorganic forms of nitrogen may cause eutrophication (i.e., high productivity of algae) problems in nitrogen-limited freshwater lakes and in estuarine and coastal waters. Finally, high concentrations of nitrate can harm young children when ingested.

Ammonia oxidation (nitrification) occurs in some of the processes described in previous fact sheets, and is dependent upon oxygen availability, organic biochemical oxygen demand (BOD), and hydraulic loading rates. Nitrogen removal by means of volatilization, sedimentation, and denitrification may also occur in some of the systems and system components. The amount of nitrogen removed (figure 1) is dependent upon process design and operation. Processes that remove 25 to 50 percent of the total nitrogen include aerobic biological systems and media filters, especially recirculating filters (Technology Fact Sheet 11). Enhanced nitrogen removal systems can be categorized by their mode of removal. Wastewater separation systems, which remove toilet wastes and garbage grinding, are capable of 80 to 90 percent nitrogen removal. Physical-chemical systems such as ion exchange, volatilization, and membrane processes, are capable of similar removal rates. Ion exchange resins remove  $\text{NH}_4\text{-N}$  or  $\text{NO}_3\text{-N}$ . Membrane processes employ a variety of membranes and pressures that all have a significant reject flow rate. Volatilization is generally significant only in facultative lagoon systems where ammonia volatilization can be significant. The vast majority of practical nitrogen-removal systems employ nitrification and denitrification biological reactions. Most notable of these are recirculating sand filters (RSFs) with enhanced anoxic modifications, sequencing batch reactors (SBR), and an array of aerobic nitrification processes combined with an anoxic/anaerobic process to perform denitrification. Some of the combinations are proprietary. Any fixed-film or suspended-growth aerobic reactor can perform the aerobic nitrification when properly loaded and oxygenated. A variety of upflow (AUF), downflow, and horizontal-flow anaerobic reactors can perform denitrification if oxygen is absent, a degradable carbon source (heterotrophic) is provided, and other conditions (e.g., temperature, pH, etc.) are acceptable.

Figure 1. Nitrogen removal systems



The most commonly applied and effective nitrogen-removal systems are biological toilets or segregated plumbing options and/or nitrification-denitrification process combinations. A more complete list is described below, along with accompanying schematic diagrams.

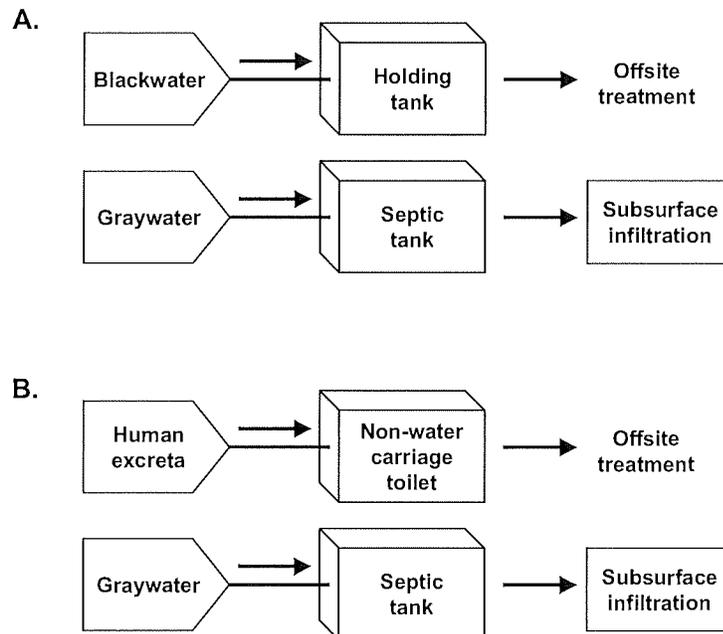
## Source separation systems

Source separation relies on isolating toilet wastes or blackwater from wastewater. This requires separate interior collection systems. Two source separation systems were identified: blackwater holding tank with low-volume-discharge toilets and graywater septic tank system, and non-water-carriage toilets and graywater septic tank system (figure 2). These types of toilets are discussed in chapter 3.

### *Blackwater holding tank with low-volume-discharge toilets and graywater septic tank system*

Blackwater discharged directly to a holding tank requires periodic removal for offsite treatment. Graywater wastes can be discharged to a conventional septic tank or subsurface infiltration system.

**Figure 2. Source separation systems: A. blackwater holding tank with low-volume discharge toilets and graywater septic tank system; B. non-water-carriage toilet and graywater septic tank system**



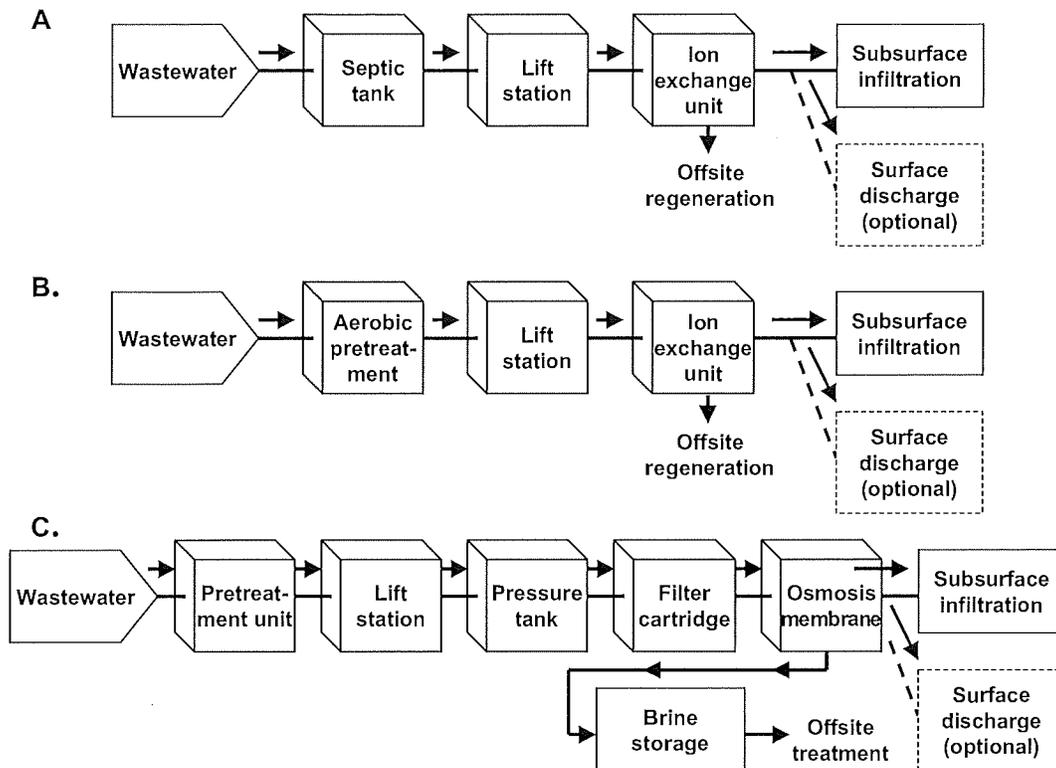
### *Non-water-carriage toilets and graywater septic tank system*

Excreta is discharged to non-water-carriage toilets to promote bulk reduction and decomposition. Biological and incineration toilets are the most common methods of accomplishing this. Non-water-carriage toilets that use these processes are commercially available. The remaining graywater wastes can be discharged to a conventional septic tank subsurface infiltration system.

## Physical/chemical treatment systems

Two types of physical/chemical treatment systems, ion exchange and reverse osmosis, appear to have some promise for single home use, although neither is in use at present (figure 9-3).

Figure 3. Physical/chemical systems: A. cation ( $\text{NH}_4^+$ ) exchange; B. anion ( $\text{NO}_3^-$ ) exchange; C. reverse osmosis



### *Ion exchange*

Two types of systems may be employed: cationic or anionic exchange systems. In the cationic system, the ammonium in septic tank effluent is removed. Clinoptilolite, a naturally occurring zeolite that has excellent selectivity for ammonium over most other cations in wastewater, can be used as an exchange medium. In the anionic system, septic tank effluent must be nitrified prior to passage through the exchange unit. Strong-base anion resins can be employed as an exchange medium for nitrate. Both systems require resin regeneration offsite.

### *Reverse osmosis*

This system requires pretreatment to remove much of the organic and inorganic suspended solids in wastewater. Pretreated wastewater stored under pressure is fed to a chamber containing a semipermeable membrane that allows separation of ions and molecules before disposal. Large volumes of waste brine are generated and must be periodically removed for offsite treatment.

## **Biological treatment systems**

A number of onsite treatment systems use biological denitrification for removal of nitrogen from wastewater. These systems have received the most scrutiny with respect to development and performance monitoring. However, more development and performance monitoring will be necessary to refine the performance consistency and improve understanding of operation processes and mechanisms (see figure 4).

Figure 4. Biological systems: A. an aerobic/anaerobic trickling filter package plant; B. sequencing batch reactor (SBR) design principle; C. ISF with AUF; D. source separation, treatment, recombination; E. recirculating sand filter with septic tank option; F. recirculating sand filter with anaerobic filter and carbon source

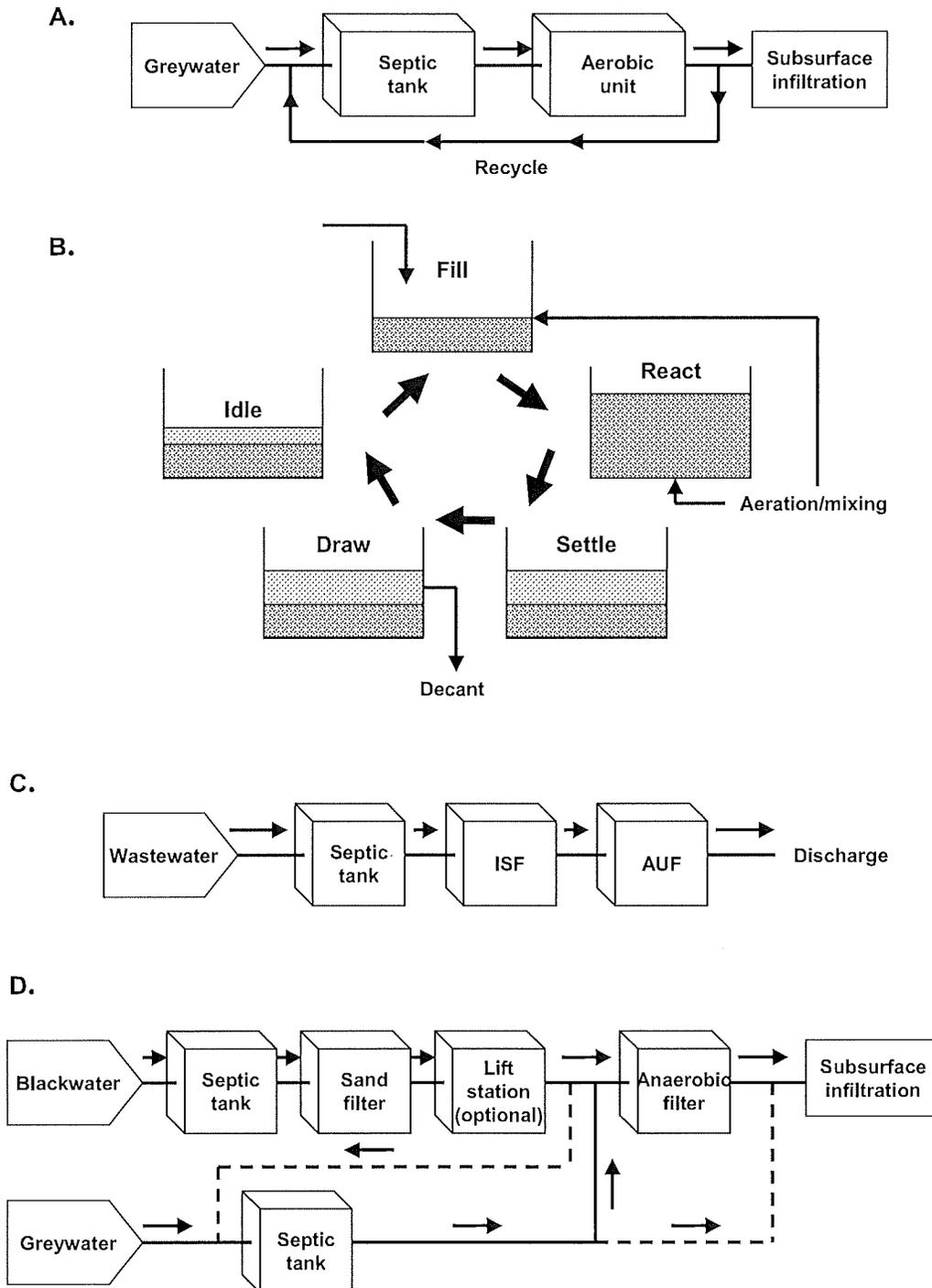
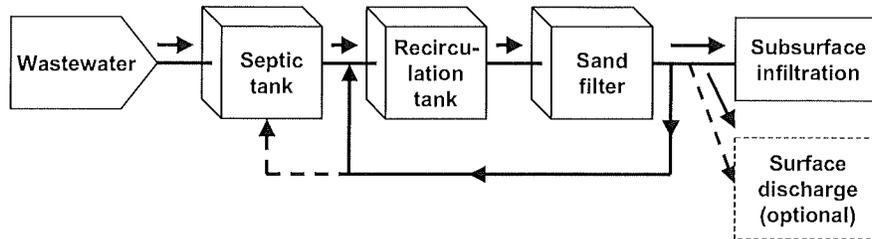
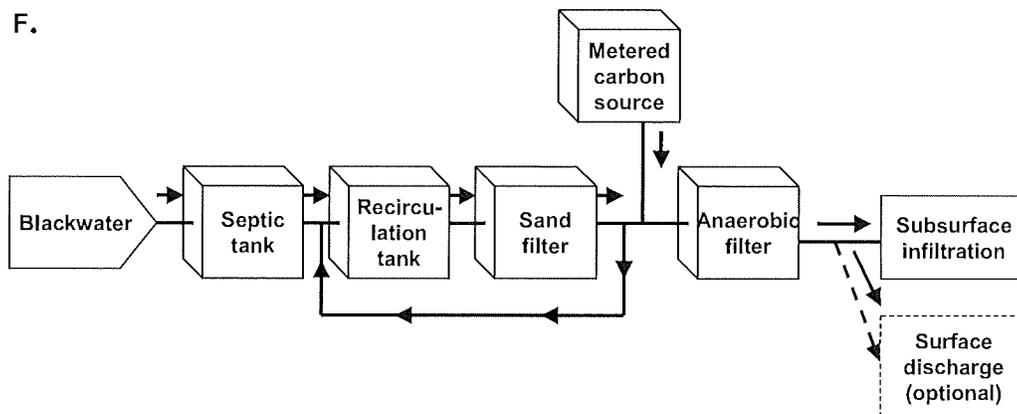


Figure 4. (continued)

E.



F.



#### *Aerobic/anaerobic trickling filter package plant*

These commercial systems use synthetic media trickling filters that receive wastewater from overlying sprayheads for aerobic treatment and nitrification. Filtrate returns to the anaerobic zone to mix with either septic tank contents or incoming septic tank effluent and undergoes denitrification. A portion of the filtered effluent (equal to the influent flow) is discharged for disposal or further treatment.

#### *Sequencing batch reactor (SBR)*

If sufficient hydraulic retention time (HRT) is provided to permit nitrification during the “react” phase of the SBR cycle and if the fill stage is anoxic for a sufficient HRT, the system can remove significant amounts of nitrogen and phosphorus. The SBR design is essentially the same as is described in the SBR fact sheet, while operationally the conditions noted above must be maintained.

#### *Intermittent sand filters with anaerobic filters*

Nitrification is provided in the ISF, while denitrification is provided in either the preceding septic tank with recirculation or a separate anaerobic filter. A vegetated submerged bed (VSB) (“subsurface flow wetland”) may be substituted for the anaerobic filter.

#### *Source separation, treatment, and recombination*

One commercial system employs this sequence where blackwater (toilet wastewater), after settling in a separate tank, is aerobically treated with an ISF to nitrify the majority of the nitrogen before it is recombined with settled greywater in an anaerobic upflow filter (AUF) for denitrification.

### *Recirculating sand filters combined with anaerobic/anoxic filters*

RSF systems normally remove 40 to 50 percent of influent nitrogen. To enhance this capability, they can be combined with a greater supply of carbon, time, and mixing than is normally available from the conventional recirculation tank. The anaerobic/anoxic options include recycling to the septic tank, better mixing, and longer HRT in a separate UF or VSB, or adding supplemental carbon (e.g., methanol, ethanol) to enhance the potential of the denitrification step.

## Typical applications

Nitrogen removal is increasingly being required when onsite systems are on or near coastal waters or over sensitive, unconfined aquifers used for drinking water. Nitrogen removal systems generally are located last in the treatment train prior to SWIS disposal and may be followed by disinfection when the system must discharge to surface waters. Usually, the minimum total nitrogen standard that can be regularly met is about 10 mg/L. Aerobic biological systems should not be employed at seasonal facilities.

## Design assumptions

A myriad of potential systems exist for enhanced nitrogen removal, and all of the major unit processes of such systems are described elsewhere. Also, since waste stream modification is covered in chapter 3, only the most promising, developed options are discussed in this fact sheet. Of the options discussed, granular media filters or aerobic biological systems (usually combined with an anaerobic upflow filter or the original septic tank process) are discussed in more detail.

Some salient design considerations that are not covered in other fact sheets or text include the following:

- Autotrophic denitrification in packed-bed sulfur reactors (variation on AUF) has been successfully demonstrated, but the need for additional alkalinity and the production of a high sulfate effluent have thus far limited the process.
- Denitrification improves with increased HRT in the recirculation tank, better mixing, and a pH between 7 and 8.
- Use of greywater as the degradable carbon source for denitrification limits the degree of denitrification attainable owing to reduced nitrogen content and low carbon-to-nitrogen ratio. The latter should exceed 5:1 for good denitrification.
- Use of synthetic anionic exchange resins appears impractical at this time. Cationic exchange of  $\text{NH}_4\text{-N}$  with clinoptilolite is feasible but very expensive because of the regeneration management costs. Both may be subject to fouling and clogging problems.
- Membranes present a major problem given the volume of the reject stream, which must be collected and frequently trucked to a site that will accept it for disposal.
- The use of beds of carbon-rich materials below SWIS leach lines could be a promising concept if the hydraulic matching problems are solved and the bed service life can be extended for 10 years or more.
- Accessibility, size of the holding tank, and availability of residual management facilities are significant design considerations in blackwater separation systems.
- Recycling to the septic tank may affect solids and grease removal in the tank and cause poor mixing of the nitrified stream with the septic tank contents. This could raise the oxidation-reduction potential (ORP) of the mixture above the normal range for an anoxic zone that accomplishes denitrification. Recycling to the second compartment of a multicompartment tank is suggested at a ratio of less than 2.5 to 1 with a contact time of greater than 2 days.
- An AUF used for enhanced denitrification should be loaded with between 0.06 and 0.3 lb COD/ft<sup>3</sup> per day and have an HRT of at least 24 hours (preferably 36 or more hours). It can be filled with large ( $\geq 2$  inches) rocks or synthetic media. A vegetated submerged bed (VSB) can be substituted for an AUF and may contribute some labile carbon to aid the process.

- SBR design for nitrogen and phosphorus removal is essentially similar, but the amount of labile carbon required is greater (6 to 8 mg/LCOD/ mg/L of TKN to be denitrified).
- Modern microprocessor controls make very complex process combinations possible to remove nitrogen, but overall simplicity is still desirable and requires less O/M sophistication.
- To attain full (>85 percent) nitrification, fixed-film systems cannot be loaded above 3 to 6 g BOD/m<sup>3</sup> per day or 6 to 12 g BOD/m<sup>3</sup> per day for rock and plastic media, respectively.

## Performance

Some expected sustainable performance ranges for the most likely combinations of nitrogen removal processes are given in table 1. Some of the nitrogen-removal systems could be combined with source separation and product substitution (low-phosphate detergents) for a maximum reduction in nitrogen where extreme measures might be required. However, the removals would not be additive owing to the changes in wastewater characteristics.

**Table 1. Typical N-removal ranges for managed systems**

Process	Percent TN removal
RSF	40–50
RSF (with recycle to ST or AUF)	70–80
ST–FFS (with recycle to ST or AUF) <sup>a</sup>	65–75
SBR <sup>a</sup>	50–80
SS and removal	60–80
(SS–TT R) <sup>a</sup>	40–60
ISF–AUF	55–75

<sup>a</sup>Commercially available systems.

Note: RSF = recirculating sand filters; AUF = anaerobic upflow filter; ST = septic tank; FFS = fixed-film system; SBR = sequencing batch reactor; SS = source separation; TT = treatment applied to both systems; R = recombined; ISF = intermittent sand filter.

## Management needs

Management needs for most unit processes are covered in other fact sheets. Source separation is feasible only for new homes, as it would be prohibitively expensive for existing homes. AUF systems are different from the fact sheet in that they must have HRTs greater than 2 days to enable anaerobic biological denitrification to be effective. This will add to O/M tasks by requiring regular flushing of excess biological growth. Some separation and removal would require regular inspection and maintenance of non-water-carriage toilets and periodic removal and proper disposal of excess solids from these units and from holding tanks.

## Risk management issues

Of the most likely systems shown in the table, few are extremely susceptible to upset by hydraulic loading variations. However, soluble toxic shocks could affect any AUF, SBR, or fixed-film nitrification system. Extreme cold will also have an impact on these systems. However, the ISF, RSF, and AUF systems have been the most resilient unit processes (excluding source separation) when properly housed and insulated. Power outages will affect all of the treatment systems. Reliability would be greatest for those that incorporate filters and less for the SBR and fixed-film systems.

## Costs

The capital and total costs of most of the nitrogen removal systems are very site specific, but non-water-carriage toilet source separation (assuming new homes) is the least expensive (low-water-use fixtures and holding tanks would add about \$4,000 to \$6,000). The biological combinations would be more expensive, and the physical/chemical systems would likely be the most expensive. Multiple units will generally increase costs, while the use of gravity transfer between processes will reduce them.

The additional O/M associated with an AUF involves flushing and disposal of excess flushed solids. If methanol is employed to enhance denitrification, additional O/M is required for the feeding system.

## References

- Ayres Associates. 1991. *Onsite Nitrogen Removal Systems: Phase I*. Report to Wisconsin DILHR, Madison, WI.
- Ayres Associates. 1997. *Florida Keys Wastewater Nutrient Reduction Systems Demo Project: 2nd Quarter Report*. Report to Florida Department of Health and U.S. Environmental Protection Agency. Florida Department of Health, Tallahassee, FL.
- Bauer, D.H., E.T. Conrad, and D.G. Sherman. 1979. *Evaluation of Existing and Potential Technologies for Onsite Wastewater Treatment and Disposal*. EPA 600/S2/81/178. Cincinnati, OH.
- Boyle, W.C., R.J. Otis, R.A. Apfel, R.W. Whitmyer, J.C. Converse, B. Burkes, M.J. Bruch, Jr., and M. Anders. 1994. Nitrogen Removal from Domestic Wastewater in Unsewered Areas. In *Proceedings of the Seventh On-Site Wastewater Treatment Conference*. American Society of Agricultural Engineering, St. Joseph, MI.
- Katers, J.F., and A.E. Zaroni. 1998. Nitrogen removal. *Journal of Water Environment and Technology* 10(3):32-36.
- Lamb, B., A.J. Gold, G. Loomis, and C. McKiel. 1987. Evaluation of Nitrogen Removal Systems for Onsite Sewage Disposal. In *Proceedings of Fifth On-Site Wastewater Treatment Conference*. American Society of Agricultural Engineering, St. Joseph, MI.
- U.S. Environmental Protection Agency (USEPA). 1993. *Nitrogen Control Manual*. EPA 625/R-93/010. U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH.
- Venhuizen, D. LCRA onsite demonstration project for nitrogen removal and water reclamation. Unpublished but available from D. Venhuizen, P.E., 21 Cotton Gin Road, Umland, TX 78640.
- Whitmyer, R.W., R.A. Apfel, R.J. Otis, and R.L. Meyer. 1991. Overview of Individual Onsite Nitrogen Removal Systems. In *Proceedings of Sixth On-Site Wastewater Treatment Conference*. American Society of Agricultural Engineering, St. Joseph, MI.
- Winkler, E.S., and P.L.M. Veneman. 1991. A Denitrification System for Septic Tank Effluent Using Sphagnum Peat Moss. In *Proceedings of Sixth On-Site Wastewater Treatment Conference*, American Society of Agricultural Engineering, St. Joseph, MI.

## ATTACHMENT F

Washoe County's Assessor Parcel Map with the subject 2.71 acre  
parcel highlighted in yellow

Assessor's Map Number

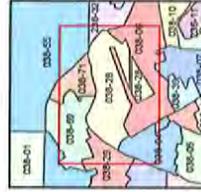
038-28

STATE OF NEVADA  
WASHOE COUNTY  
ASSESSOR'S OFFICE  
Michael E. Clark, Assessor

1301 East Ninth Street  
Reno, NV 89402  
(775) 328-3231



1 inch = 300 feet



created by: KSB 10/31/2017

last update: KSB 01/18/18

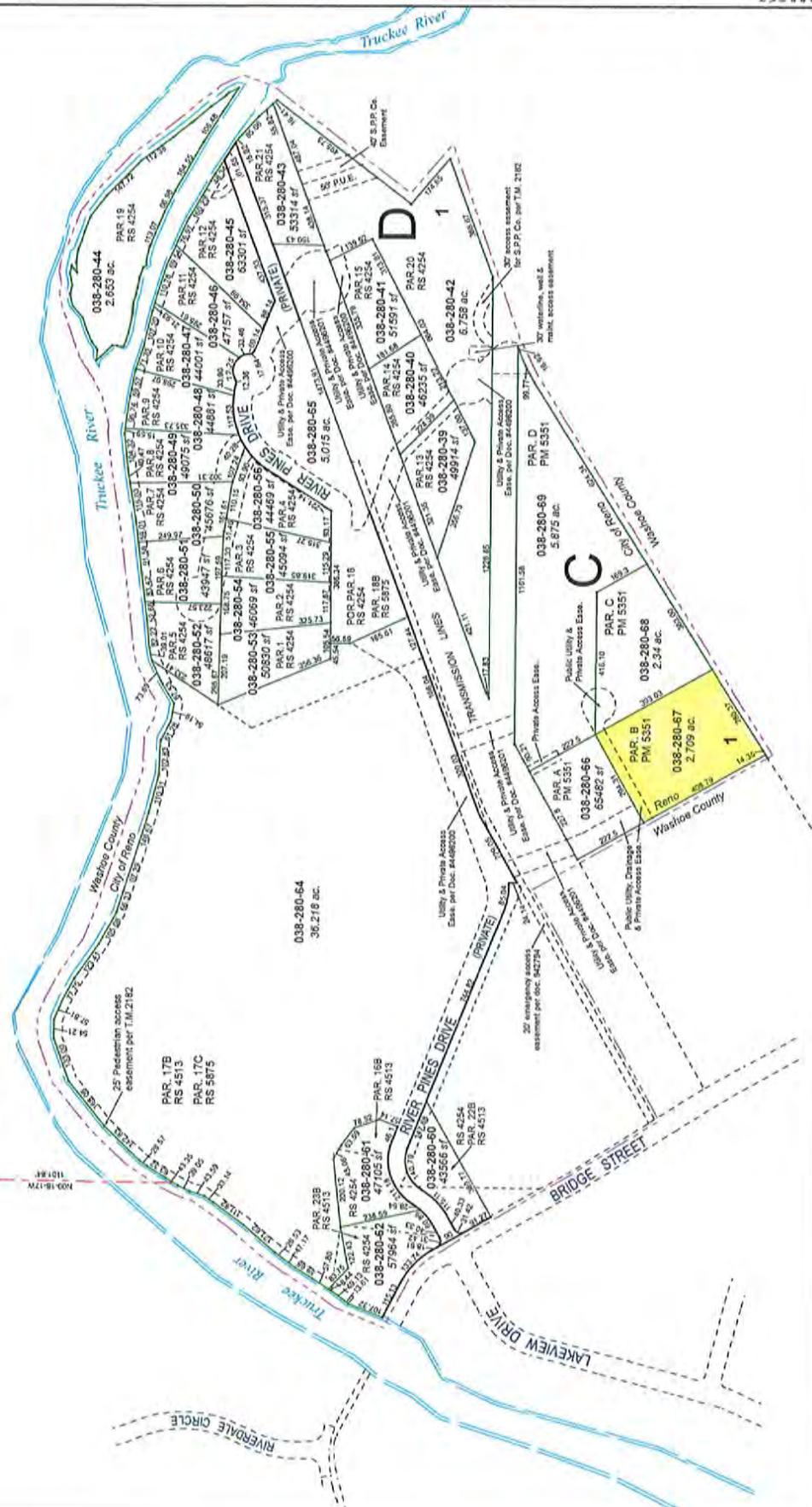
areas previously shown on map(s)

038-05

NOTE: This map was prepared for the use of the Washoe County Assessor for assessment and advisory purposes only. It does not represent a warranty of accuracy or liability. It is the user's responsibility to verify the accuracy of the data delineated herein.

**(#2182)**  
**RIVER PINES**  
A DENSITY SUBDIVISION  
POR. OF SE 1/4 SECTION 7 &  
S 1/2 SECTION 8  
T19N - R18E

REV. TM 4214



## ATTACHMENT G

Grant, Bargain, and Sale Deed Document Number 4871625 being the conveyance of the subject 2.71 acre parcel to the applicant/current owner

DOC #4871625

12/07/2018 01:06:44 PM  
Electronic Recording Requested By  
ETRCO  
Washoe County Recorder  
Lawrence R. Burtness  
Fee: \$41.00 RPTT: \$820.00  
Page 1 of 3

APN#: 038-280-67

RPTT: \$820.00

Recording Requested By:  
Western Title Company

Escrow No.: 099122-MLM

When Recorded Mail To:

Ryan Garrett Cook and

Heather Lynn Cook

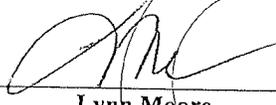
P.O. Box 314

Verdi, NV 89439

Mail Tax Statements to: (deeds only)  
Same as Above

I the undersigned hereby affirm that the attached document, including any exhibits, hereby submitted for recording does not contain the social security number of any person or persons.  
(Per NRS 239B.030)

Signature

  
Lynn Moore

Escrow Officer

**Grant, Bargain, and Sale Deed**

This page added to provide additional information required by NRS 111.312  
(additional recording fee applies)

## GRANT, BARGAIN AND SALE DEED

THIS INDENTURE WITNESSETH: That

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

David A. Giacomini, Trustee of the David A. Giacomini Trust of 2001 U.D.T dated May 31, 2001, as to an undivided 84% interest; and Waldo Giacomini GST Exempt Trust FBO David Giacomini as to an undivided 16% interest

do(es) hereby GRANT(s) BARGAIN SELL and CONVEY to

Ryan Garrett Cook and Heather Lynn Cook, Trustees of the Cook 2011 Family Trust, Dated April 20th 2011

and to the heirs and assigns of such Grantee forever, all the following real property situated in the City of Verdi, County of Washoe State of Nevada bounded and described as follows:

All that certain real property situate in the County of Washoe, State of Nevada, described as follows:

Parcel B of that certain Parcel Map No. 5351 for THE DAVID A. GIACOMINI TRUST OF 2001 U.D.T. DATED MAY 31, 2001, and WALDO GIACOMINI GST EXEMPT TRUST FBO DAVID GIACOMINI, recorded May 21, 2018 as Document No. 4817113, Official Records.

**Together with any easement rights appurtenant to the above described property, as more fully described in UTILITY & PRIVATE ACCESS EASEMENT, recorded July 27, 2015, as Document No. 4496200, and UTILITY & PRIVATE ACCESS EASEMENT, recorded July 27, 2015, as Document No. 4496201, Official Records, Washoe County, Nevada.**

TOGETHER with all tenements, hereditaments and appurtenances, if any, thereto belonging or appertaining, and any reversions, remainders, rents, issues or profits thereof.

Dated: December 5, 2018

Grant, Bargain and Sale Deed – Page 2

The David A. Giacomini Trust of 2001 U.D.T. dated May 31, 2001

By: [Signature]  
David A. Giacomini, Trustee

The Waldo Giacomini GST Exempt Trust FBO David Giacomini

By: [Signature]  
David A. Giacomini, Trustee

STATE OF Nevada  
COUNTY OF Washoe  
This instrument was acknowledged before me on

} ss

December 5, 2018

By David A. Giacomini..

[Signature]  
Notary Public



## ATTACHMENT H

Aerial photo showing subject parcel, proposed new internal property line, distance of over 1/4 mile to the Truckee River, and 900' radius circle with no other water wells (Verdi Elementary School's well has been plugged, per NDWR log number 134151, and they are now hooked to TMWA water - including irrigation)



## ATTACHMENT I

Aerial photo showing subject parcel, proposed new internal property line, and improvements



033-280-69

033-280-68

033-280-67

033-280-66

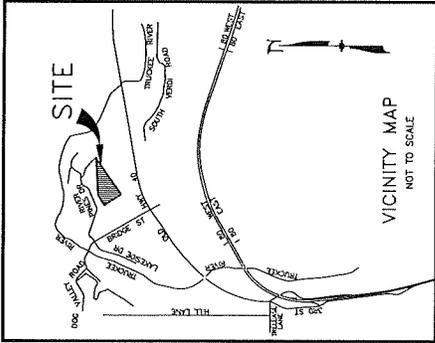
## ATTACHMENT J

The 2018 Parcel Map 5351 which created subject Parcel "B", Septic Plot Plan, Test Trench Inspection (permit #4461), and Per Rate Test results

1535

PARCEL MAP FOR

THE DAVID A. GIACOMINI TRUST OF 2001 U.D.T. DATED MAY 31, 2001 and WALDO GIACOMINI GST EXEMPT TRUST FBO DAVID GIACOMINI



OWNER'S CERTIFICATE:

THIS IS TO CERTIFY THAT THE UNDERSIGNED, DAVID A. GIACOMINI AS TRUSTEE OF THE DAVID A. GIACOMINI TRUST OF 2001 U.D.T. DATED MAY 31, 2001, AS TO AN INTEREST IN THE LANDS SHOWN ON THIS PARCEL MAP, HAVE BEEN FULLY ADVISED OF THE RIGHTS AND OBLIGATIONS OF THE TRUST AND OF THE RIGHTS AND OBLIGATIONS OF THE LANDS SHOWN ON THIS PARCEL MAP AND OF THE RIGHTS AND OBLIGATIONS OF THE TRUST AND OF THE RIGHTS AND OBLIGATIONS OF THE LANDS SHOWN ON THIS PARCEL MAP AND OF THE RIGHTS AND OBLIGATIONS OF THE TRUST...

THE DAVID A. GIACOMINI TRUST OF 2001 U.D.T. DATED MAY 31, 2001
BY: DAVID A. GIACOMINI TRUSTEE
DATE: 2/1/2018

WALDO GIACOMINI TRUST FBO DAVID GIACOMINI
BY: DAVID A. GIACOMINI TRUSTEE
DATE: 2/1/2018

NOTARY PUBLIC CERTIFICATE:

STATE OF NEVADA
COUNTY OF WASHOE
THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON February 1, 2018, BY DAVID A. GIACOMINI.

WALDO GIACOMINI TRUST FBO DAVID GIACOMINI
BY: DAVID A. GIACOMINI TRUSTEE
DATE: 2/1/2018

CITY CERTIFICATE:

APPROVED AND ASSURED BY THE COMMUNITY DEVELOPMENT DEPARTMENT OF THE CITY OF RENO, WASHOE COUNTY, NEVADA, THIS 22nd DAY OF MAY 2018.

APR 1534-285-30
WALDO GIACOMINI TRUST FBO DAVID GIACOMINI
DATE: 05/17/2018

TAX CERTIFICATE:

THE UNDERSIGNED HEREBY CERTIFIES THAT ALL PROPERTY TAXES ON THE LANDS SHOWN ON THIS PARCEL MAP HAVE BEEN PAID AND THAT THE FULL AMOUNT OF ALL TAXES DUE TO ANY AGENCIES HAS BEEN PAID PURSUANT TO NRS. 307A.285.

APR 1534-285-30
WALDO GIACOMINI TRUST FBO DAVID GIACOMINI
DATE: 2/1/2018

TITLE COMPANY CERTIFICATE:

THE UNDERSIGNED HEREBY CERTIFIES THAT THIS PARCEL MAP HAS BEEN EXAMINED AND THAT THE LANDS SHOWN THEREON ARE ACCURATELY DESCRIBED AND THAT THE RECORD FOR ALL THE LANDS SHOWN THEREON AND THE LANDS ARE FREE FROM ENCUMBRANCES AS OF 2/1/2018.

WALDO GIACOMINI TRUST FBO DAVID GIACOMINI
DATE: 2/1/2018

DISTRICT BOARD OF HEALTH CERTIFICATE:

THIS MAP IS APPROVED BY THE WASHOE COUNTY DISTRICT BOARD OF HEALTH, THE HEALTH DEPARTMENT OF THE COUNTY OF WASHOE, NEVADA, AND THE HEALTH DEPARTMENT OF THE ENVIRONMENTAL HEALTH SERVICES DIVISION OF THE WASHOE COUNTY HEALTH DEPARTMENT.

WALDO GIACOMINI TRUST FBO DAVID GIACOMINI
DATE: 2/1/2018

UTILITY COMPANIES CERTIFICATE:

BY THE UNDERSIGNED, THE UTILITY COMPANIES HAVE BEEN ADVISED, ADVISED, AND APPROVED OF THE LOCATION, SIZE, AND CHARACTER OF THE UTILITY LINES SHOWN ON THIS PARCEL MAP AND OF THE RIGHTS AND OBLIGATIONS OF THE TRUST AND OF THE RIGHTS AND OBLIGATIONS OF THE LANDS SHOWN ON THIS PARCEL MAP AND OF THE RIGHTS AND OBLIGATIONS OF THE TRUST...

STATE PUBLIC POWER COMPANY 9/1/A AV DUCT
DATE: 2/1/2018

NEVADA PUBLIC UTILITIES COMPANY 9/1/A AV DUCT
DATE: 2/1/2018

STATE PUBLIC POWER COMPANY 9/1/A AV DUCT
DATE: 2/1/2018

SURVEYOR'S CERTIFICATE:

I, RYAN C. COOK, A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF NEVADA, CERTIFY THAT:
THIS PLAT REPRESENTS THE RESULTS OF A SURVEY CONDUCTED UNDER MY PERSONAL SUPERVISION AND IN ACCORDANCE WITH THE PROVISIONS OF CHAPTER 624B OF THE NEVADA REVISED STATUTES. THE SURVEY WAS COMPLETED ON JANUARY 30, 2018. THE SURVEY WAS CONDUCTED IN ACCORDANCE WITH THE PROVISIONS OF CHAPTER 624B OF THE NEVADA REVISED STATUTES. THE SURVEY WAS CONDUCTED IN ACCORDANCE WITH THE PROVISIONS OF CHAPTER 624B OF THE NEVADA REVISED STATUTES. THE SURVEY WAS CONDUCTED IN ACCORDANCE WITH THE PROVISIONS OF CHAPTER 624B OF THE NEVADA REVISED STATUTES.

RYAN C. COOK
DATE: 1-30-2018

LAND USE RESTRICTION AGREEMENT ACKNOWLEDGMENT

THE UNDERSIGNED, RAYMOND J. PANCHA, JR., IS THE BENEFICIARY SET FORTH IN THE LAND USE RESTRICTION AGREEMENT RECORDED NOVEMBER 5, 2003, AS REFERENCED BY THE UNDERSIGNED.

DATE: 5/10/18

NOTARY PUBLIC CERTIFICATE:

STATE OF NEVADA
COUNTY OF WASHOE
THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON May 10, 2018.

DATE: 5/10/18

TOTAL NUMBER OF PARCELS = 4
TOTAL AREA = 12.43± ACRES

FILE NO. 153113

FOR THE PARCEL MAP
THE DAVID A. GIACOMINI TRUST OF 2001 U.D.T.
DATED MAY 31, 2001, AND WALDO GIACOMINI GST
EXEMPT TRUST FBO DAVID GIACOMINI
LOCATED WITHIN THE SW 1/4 OF SECK 6, T18N, R10E, NAD83
RENO WASHOE COUNTY NEVADA

FILE NO. 153113
FOR THE PARCEL MAP
THE DAVID A. GIACOMINI TRUST OF 2001 U.D.T.
DATED MAY 31, 2001, AND WALDO GIACOMINI GST
EXEMPT TRUST FBO DAVID GIACOMINI
LOCATED WITHIN THE SW 1/4 OF SECK 6, T18N, R10E, NAD83
RENO WASHOE COUNTY NEVADA

DATE: 2/1/2018

CIRCULATIVE INDEXES SHOULD BE EXAMINED FOR ANY SUBSEQUENT CHANGES TO THIS MAP

5351A

5351A

*[Signature]*  
 1-30-2018  
 RYAN COOK  
 COUNTY CLERK  
 WASHOE COUNTY, NEVADA

- LEGEND**
- WASHOE COUNTY GPS STATION AS NOTED
  - SECTION CORNER AS NOTED
  - SET 3/4" RECORD PER 1:12524
  - FOUND MONUMENT AS NOTED
  - COMPUTED POINT MAP
  - SUBDIVISION TRACT MAP
  - RECORD OF SURVEY
  - PUBLIC UTILITY EASEMENT
  - APN ASSESSOR PARCEL NUMBER
  - DOC. DOCUMENT NUMBER
  - RECORD BEARING PER 200-2189
  - E.A.C. EASEMENT ACCESS EASEMENT
  - P.R.A.C. PRIVATE RESPONAL ACCESS EASEMENT
  - D.E. DRAINAGE EASEMENT

HOTEL-CASINO  
 MANAGEMENT, INC.  
 APN 038-280-64  
 PARCEL 17C ROS 5875

WASHOE COUNTY  
 SCHOOL DISTRICT  
 APN 038-080-38

SIERRA PACIFIC  
 POWER COMPANY  
 APN 038-080-37  
 (POWER COORDIOR)

WASHOE COUNTY  
 SCHOOL DISTRICT  
 (VERDI ELEMENTARY SCHOOL)  
 APN 038-080-27

PARCEL "A"  
 [65.482 ACRES]

PARCEL "B"  
 [2.71± ACRES]

PARCEL "C"  
 [2.34± ACRES]

PARCEL "D"  
 [5.87± ACRES]

HOTEL-CASINO  
 MANAGEMENT, INC.  
 APN 038-280-42  
 PARCEL 20 ROS 4254

SIERRA PACIFIC  
 POWER COMPANY  
 APN 038-080-37  
 (POWER COORDIOR)

RIVER BEND  
 INVESTMENTS, LLC  
 APN 038-280-53  
 PARCEL 1 ROS 4254

ELLIOTT & SIEVERT  
 APN 038-280-54  
 PARCEL 2 ROS 4254

RIVER BEND  
 INVESTMENTS, LLC  
 APN 038-280-55  
 PARCEL 3 ROS 4254

STANDER  
 APN 038-280-56  
 PARCEL 4 ROS 4254

HOTEL-CASINO  
 MANAGEMENT, INC.  
 APN 038-280-65  
 PARCEL 18B ROS 5875

RIVER BEND  
 INVESTMENTS, LLC  
 APN 038-280-40  
 PARCEL 14 ROS 4254

RIVER BEND  
 INVESTMENTS, LLC  
 APN 038-280-39  
 PARCEL 13 ROS 4254

SIERRA PACIFIC  
 POWER COMPANY  
 APN 038-080-37  
 (POWERLINE COORDIOR)

**PARCEL MAP**

THE DAVID A. GIACOMINI TRUST OF 2001 U.D.T.  
 DATED MAY 31, 2001 AND WALDO GIACOMINI  
 EXEMPT TRUST FBO DAVID GIACOMINI  
 A DIVISION OF LOT 1 OF BLOCK C SUB 2182  
 LOCATED WITHIN THE SW 1/4 OF SEC. 5, T8N, R7E, MEM  
 REND  
 WASHOE COUNTY, NEVADA

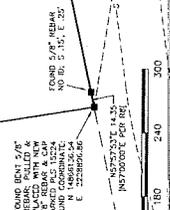
DATE: 01/15/2018  
 TIME: 10:30 AM  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]

SHEET 2 OF 2

H.A. BLIVING TRUST  
 APN 038-080-18

TRUCKEE MEADOWS  
 WATER AUTHORITY  
 APN 038-280-43  
 PARCEL 8 ROS 5613  
 (TAMVA VERDI HYDRO ACCESS ROAD)

WASHOE COUNTY GPS  
 (OWN MONUMENT)  
 ORIGIN COORDINATE  
 E 255717.040



CUMULATIVE INDEXES  
 SHOULD BE EXAMINED  
 FOR ANY SUBSEQUENT  
 CHANGES TO THIS MAP

Parcel Map 5351A

181713



<b>WASHOE COUNTY HEALTH DISTRICT</b> ENHANCING QUALITY OF LIFE	<b>WASHOE COUNTY HEALTH DISTRICT</b> <b>ENVIRONMENTAL HEALTH SERVICES DIVISION</b> 1001 East Ninth Street • PO Box 11130 • Reno, NV 89520 Telephone (775) 328-2434 • Fax (775) 328-6176 www.washoecounty.us/health	<b>Office Use Only</b> Fee Paid _____ Date Paid _____ Cash/CC/Check _____ Receipt No. _____
	<b>SWS TEST TRENCH INSPECTION</b>	

The section below must be filled out in order to receive inspection results:

APN: 038-28-30 Permit #: 4461 Date of Inspection: 11/15/2017 Time of Inspection: 11 AM  
 Site Address: 4410 River Pines Drive  
 Inspection Requestor: Jack Glynn (Summit Engineering) Phone #: 775-530-8814  
 Email/Mail to: jack@summitnv.com

Attach map or plot plan showing property, vicinity map and location of proposed test trench location.

Trench GPS Coordinates: 39.521628, -119.987244 (Parcel B) ★

Soil Log: Trench #: 1 Depth: 13' Engineered / Estimated Perc. Rate (mpi): Percolation test being done by Summit

Log Comments: 0 - 1' - Top soil,

1' - 5' - Sand, loose compaction

5' - 13' - Cobbles, boulders, sand, loose compaction,

Ground Water:  Yes  No Depth: \_\_\_\_\_ Bedrock:  Yes  No Depth: \_\_\_\_\_

Fractured Rock:  Yes  No Depth/Range: \_\_\_\_\_

Standard Septic System Allowed  Soil not Suitable for Standard System

**A 1-3 bedroom house requires a 1,000 gal. tank with:**

- \_\_\_\_\_ leach line(s), \_\_\_\_\_ feet wide, by \_\_\_\_\_ feet deep, by \_\_\_\_\_ feet long or

**A 4 bedroom house requires a 1,200 gal. tank with:**

- \_\_\_\_\_ leach line(s), \_\_\_\_\_ feet wide, by \_\_\_\_\_ feet deep, by \_\_\_\_\_ feet long or

**A 5-6 bedroom house requires a 1,500 gal. tank with:**

- \_\_\_\_\_ leach line(s), \_\_\_\_\_ feet wide, by \_\_\_\_\_ feet deep, by \_\_\_\_\_ feet long or

Other: \_\_\_\_\_

Perforated pipe is to be set at \_\_\_\_\_ feet below grade.

Comments: Sizing will be based on the percolation test results. Due to the depth of the test trench the maximum trench depth will be set a 9' below existing ground surface.

Inspected by: Scott Strickler Date: 11/15/2017

**SUMMIT ENGINEERING CORPORATION**  
**PERC RATE TEST**

PROJECT NAME: Parcel B	PROJECT NUMBER: 30636
TEST SPECIFICATIONS: Fast Perc	DATE: 11/15/2017
TECHNICIAN: Joe/Pedro	

Hole No.	1	Perc Rate:	2 min/in		
Depth from native ground to gravel: 5					
Soil Description: Sandy gravel/Gravelly sand					
Notes:					
Time	Initial Depth (in)	Final Depth (in)	Inches Drop (in)	Time Interval	Min/in
1126	6	11 8/16	5 8/16	2	0.4
1128	6	8	2	2	1.0
1130	6	8 12/16	2 12/16	2	0.7
1132	6	8 8/16	2 8/16	2	0.8
1134	6	9	3	2	0.7
1136	6	8	2	2	1.0
1138	6	8	2	2	1.0
1140	6	8 8/16	2 8/16	2	0.8

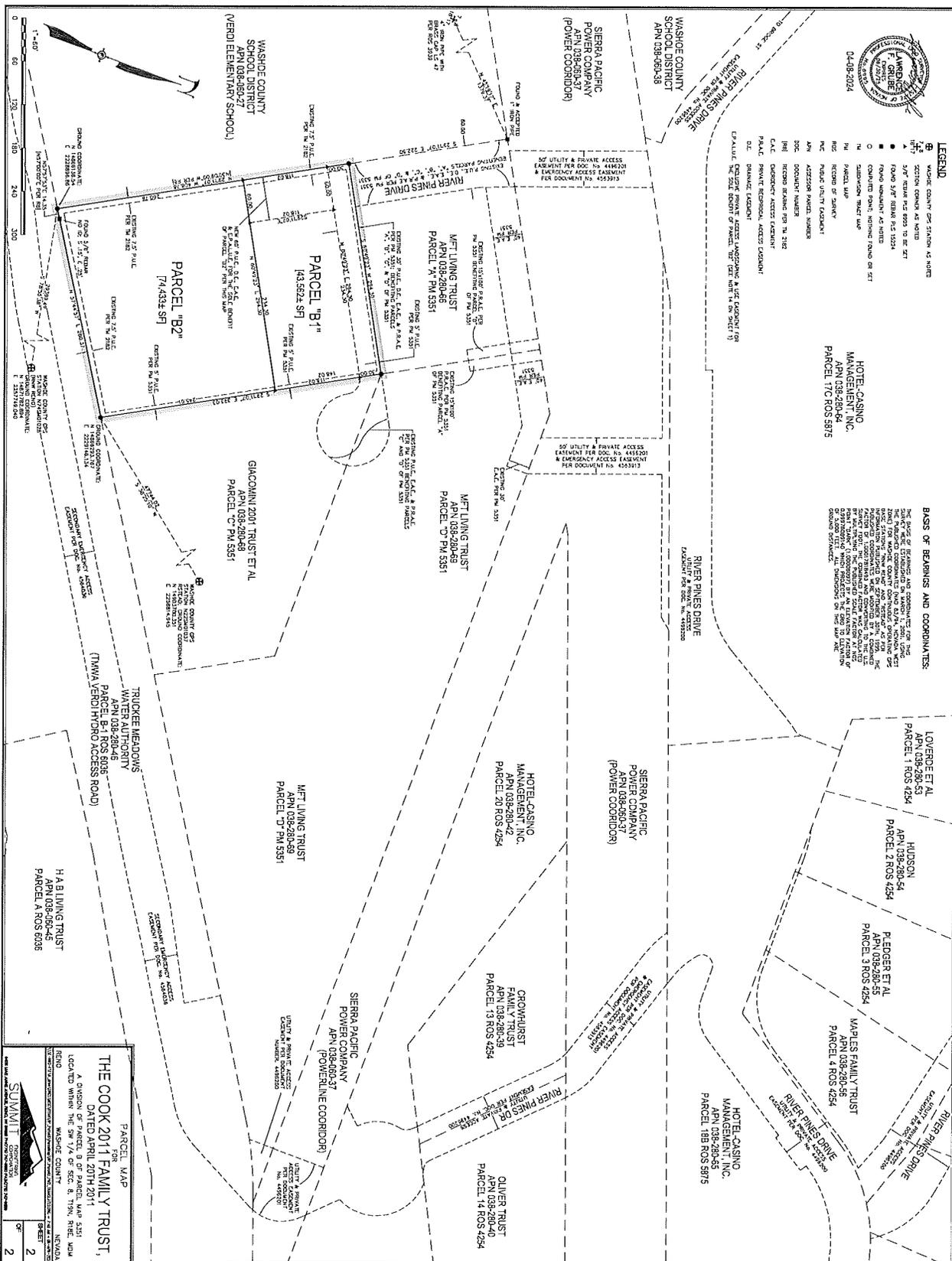
Hole No.	1	Perc Rate:	1 min/in		
Depth from native ground to gravel: 9					
Soil Description: Sandy gravel/Gravelly sand					
Notes:					
Time	Initial Depth (in)	Final Depth (in)	Inches Drop (in)	Time Interval	Min/in
1128	6	11 5/16	5 5/16	5	0.9
1130	6	9 11/16	3 11/16	2	0.5
1132	6	8 7/16	2 7/16	2	0.8
1134	6	8 14/16	2 14/16	2	0.7
1136	6	8 6/16	2 6/16	2	0.8
1138	6	8 5/16	2 5/16	2	0.9
1140	6	9	3	2	0.7
1142	6	8 9/16	2 9/16	2	0.8

## ATTACHMENT K

Proposed Parcel Map which would result in Parcel "B1" (1.00 acre) and Parcel "B2" (1.71 acres), Septic Plot Plan, City of Reno approval letter for Case No. 24-00023, and approved Extension of Time for PAR24-00023



# PRELIMINARY, FOR REVIEW ONLY



**LEGEND**

- MAJOR COUNTY FIRE STATION AS NOTED
- SECTION CORNER AS NOTED
- 3/4" IRON PIPE 10 TO BE SET
- ROUND 3/4" IRON PIPE 10/24
- ROUND 1/2" IRON PIPE 10/24
- CONCRETE SPALL, REMAIN FOUND ON SET
- CONCRETE SPALL, REMAIN FOUND ON SET
- PARCEL WALL
- RECORD OF SURVEY
- PUBLIC UTILITY DOCUMENT
- ADJ. ACCESSORIAL NUMBER
- REC. OCCUPANT NUMBER
- REC. RECORDING FOR N. 2132
- C.A.C. DOCUMENT ACCESS EASEMENT
- PAVEMENT ACCESS EASEMENT
- PAVEMENT EASEMENT
- DE. DRAINAGE EASEMENT
- EASEMENT (SEE PLAN FOR ACCESS EASEMENT AND DOCUMENT FOR EASEMENT)

**HOTEL CASINO MANAGEMENT, INC.**  
 PARCEL 110 ROS 5875

**BASIS OF BEHAVIOR AND COORDINATES:**  
 THE BASIS OF BEHAVIOR AND COORDINATES FOR THIS SURVEY IS THE 1983 NAD 83 DATUM. THE HORIZONTAL COORDINATES AND ELEVATIONS FOR THIS SURVEY ARE BASED ON THE 1983 NAD 83 DATUM. THE VERTICAL COORDINATES ARE BASED ON THE 1983 NAD 83 DATUM. THE HORIZONTAL COORDINATES ARE BASED ON THE 1983 NAD 83 DATUM. THE VERTICAL COORDINATES ARE BASED ON THE 1983 NAD 83 DATUM.

**PARCEL MAP**

**FOR**

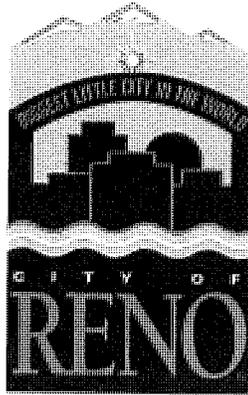
**THE COOK 2011 FAMILY TRUST,**

A DIVISION OF PARCEL 9 OF PARCEL MAP 2311  
 DATED APRIL 20TH 2011  
 LOCATED WITHIN THE SW 1/4 OF SEC. 8, T19N, R16E, W2E  
 WASHINGTON COUNTY, NEVADA

SUNNIT SURVEYING & CONSULTING, INC.  
 1000 S. RIVER PINES DRIVE, SUITE 100  
 LAS VEGAS, NEVADA 89102  
 TEL: 702.735.1111  
 FAX: 702.735.1112  
 WWW.SUNNIT.COM

SHEET  
 OF 2

Chris Pingree  
Development Services Director  
Development Services Department  
P. O. Box 1900  
Reno, NV 89505  
(775) 326-6650



April 24, 2024

Summit Engineering  
Attn: Larry Grube  
5405 Mae Anne Ave.  
Reno, NV 89523

Re: Case No. PAR24-00023 (Cook 2011 Family Trust Parcel Map)  
APN: 038-280-67 (Ward 5)

Dear Sir:

Your application for a Parcel Map for the above-referenced property has been reviewed by the Development Services Department. The proposed parcel map has been determined to be in compliance with the applicable sections of Chapter 278 of the Nevada Revised Statutes.

The subject properties are located in the Large Lot Residential (1 acre), (LLR-1) zone. The Parcel Map is in substantial conformity with the requirements of the zoning district.

This map is hereby approved and must be recorded within one year of the approval date or this approval shall be deemed expired.

Prior to recordation, the applicant shall obtain a technical boundary closure check from Washoe County Engineering.

**Appeal of Administrative Decision:** This administrative decision may be appealed to the City Council by the applicant, the Mayor or a City Council Member, or any person who is "aggrieved" by the action or inaction. An appeal (together with fees) must be filed with the City Clerk within ten business days starting on the day after written notice of the action is filed with the City Clerk. The City Clerk's Office is located on the 2<sup>nd</sup> floor of Reno City Hall located at One East First Street, Reno, NV.

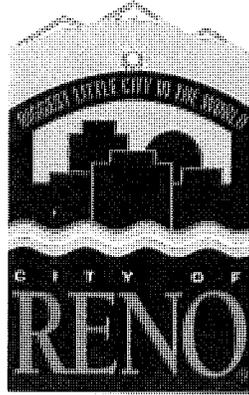
Sincerely,

A handwritten signature in black ink, appearing to read 'Chris Pingree', written in a cursive style.

Chris Pingree, Development Services Director  
Development Services Department

xc: Mikki Huntsman, City Clerk

Chris Pingree  
Development Services Director  
Development Services Department  
P. O. Box 1900  
Reno, NV 89505  
(775) 326-6650



February 19, 2025

Summit Engineering  
Attn: Larry Grube  
5405 Mae Anne Ave.  
Reno, NV 89523

Re: Case No. ADM25-00026 (Cook Family Trust Time Extension)  
Extension of time for PAR24-00023 (Cook 2011 Family Trust Parcel Map)  
APN: 038-280-67 (Ward 5)

Dear Sir:

Per Reno Municipal Code (RMC) 18.08.307 (e) the Administrator may extend the approval of a Parcel Map. The applicant is requesting extending the approval of the above Parcel Map to go through a Variance process initiated by Washoe County District Health Department. As such, a 12 month extension of time is **approved**. With this extension, this map must be recorded by April 24, 2026, or this approval will be deemed expired.

**Appeal of Administrative Decision:** This administrative decision may be appealed to the City Council by the applicant, the Mayor, any member of the City Council, or any person or entity "aggrieved" by the action or inaction. An appeal (together with fees) must be filed with the City Clerk within ten working days starting the day after written notice of the action is filed with the City Clerk. The City Clerk's Office is located on the 2<sup>nd</sup> floor of Reno City Hall, located at One East First Street, Reno, NV.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Pingree".

Chris Pingree, Development Services Director  
Development Services Department

xc: Mikki Huntsman, City Clerk  
Michael Mischel, Engineering Manager



# ATTACHMENT L

Subject Variance request under NNPH SWS Regulation 040.030

**TABLE 1  
MINIMUM LOT SIZE ACCORDING TO SLOPE OVER DISPOSAL AREA**

Average Slope of the Disposal Area	On-Site System with Well		On-Site System Community Water	
	Sq. Ft.	Acres	Sq. Ft.	Acres
Less than 5%	43,560	1.0 acre	14,520	.033
5% or more but less than 10%	54,450	1.25 acres	18,150	.042
10% or more but less than 20%	65,340	1.5 acres	21,780	0.50
20% or more but less than 30%	87,120	2.0 acres	29,040	0.67

**040.025** On-site sewage disposal fields are prohibited in areas where the original ground slope is greater than 30%.

**040.030** The minimum lot size for new subdivisions and a second or subsequent parcel map from the original parcel as it existed on October 23, 2001, proposing to use on-site sewage disposal, shall be 5 acres. The Health Authority may reduce the minimum lot size requirement to as small as one acre per lot if the applicant for division can show to the satisfaction of the Health Authority that adequate measures have been taken to ensure that the smaller lot area will not have a greater impact to the groundwater quality than the 5-acre lot size. In any case, no division shall be approved if the parcel density exceeds the standard established by the Nevada Division of Environmental Protection. Staff decisions regarding the adequacy of the proposed measures shall be approved by the Sewage Wastewater and Sanitation Hearing Board and the District Board of Health through the variance procedure outlined in these regulations. Existing lots and the first four parcels created from an existing parcel shall be a minimum area of 1 acre.

**040.035** For other than a single family dwelling, the required minimum area shall be consistent with Table 1 and shall be computed at twenty-two (22) square feet per gallon of estimated sewage. Current Uniform Plumbing Code fixture unit values shall be rated at not less than twenty-five (25) gallons per fixture unit per day. One-half (1/2) of the required area shall be reserved for sewage disposal only.

**040.040** In all instances, the lot shall contain sufficient area for the installation of two (2) complete disposal trench systems including all applicable and required setbacks as outlined in these regulations (original plus reserve area for future replacement).

**040.045** The disposal trench sidewall shall have a minimum horizontal set back of twenty (20) feet from the face of the finished slope, as measured at the level of the perforated disposal pipe (See Figure 1).

**040.050** The minimum setback for disposal trenches from the flow line of a watercourse (irrigation ditches, rivers, ponds, as defined in section 010.305) may be reduced from 100 feet to 50 feet depending upon site conditions, field observations, water flow, and upon approval by the Health Authority.

**040.060** The Health Authority shall determine and map septic constraint areas within the Health District. Such maps shall, by District Board of Health action, become part of these regulations. In determining the boundaries of septic constraint areas, the Health Authority shall determine if the geologic and hydrologic conditions would be in compliance with the standards stipulated in these regulations. Legal notices for adoption of septic constraint areas

## ATTACHMENT M

Water Rights Deed Document Number 5374628 which shows the applicant/owner has already purchased the water rights which will be relinquished in favor of proposed Parcel "B1". This is required to have the right to drill a new domestic well on the proposed 1.00 acre parcel (Parcel "B1")

APN: N/A (Water Rights Only)

When recorded, mail to Grantee,

Mail tax statement to Grantee:

Cook 2011 Family Trust  
PO Box 314  
Verdi, NV 89439

**DOC #5374628**

04/20/2023 04:06:32 PM

Requested By

COOK 2011 FAMILY TRUST

Washoe County Recorder

Kalie M. Work

Fee: \$43.00 RPTT: \$26.65

Page 1 of 2

**WATER RIGHTS DEED**

THIS INDENTURE, made and entered into this 20th day of April, 2023, between SIERRA MOUNTAIN MORTGAGE 401K PLAN FBO DAVID GIACOMINI (“**Grantor**”) and RYAN GARETT COOK and HEATHER LYNN COOK, trustees of the COOK 2011 FAMILY TRUST, dated April 20<sup>th</sup> 2011, and any amendments thereto, (“**Grantee**”).

W I T N E S S E T H

That said Grantor for and in consideration of the sum of TEN DOLLARS (\$10.00), lawful money of the United States of America, to them in hand paid by Grantee, and other good and valuable consideration, the receipt whereof is hereby acknowledged, by these presents do release, remise and forever, all of their right, title and interest in and to all that certain water and water rights of the Grantor more particularly described as:

A portion of the water and water rights described in **Permit No. 82484**, such portion being a total of **1.12 acre feet annually, more or less**, as granted by the State Engineer and filed in the Nevada Division of Water Resources.

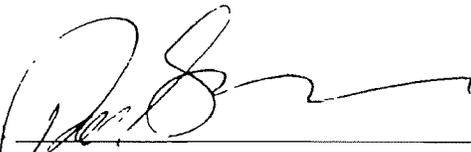
TOGETHER WITH ALL AND SINGULAR, the tenements, hereditaments and appurtenances thereunto belonging and in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof.

TO HAVE AND TO HOLD, ALL AND SINGULAR, the said premises together with the appurtenances, unto the said Grantee and to their heirs, executors, administrators, successors and assigns forever.

IN WITNESS WHEREOF, the said Grantor has caused this Water Rights deed to be executed the day and year first above written.

**"GRANTOR"**

SIERRA MOUNTAIN MORTGAGE 401K PLAN FBO DAVID GIACOMINI

By   
\_\_\_\_\_  
David Giacomini

STATE OF NEVADA        )  
  ) SS  
COUNTY OF WASHOE    )

On this 20<sup>th</sup> day of April, 2023, before me, the undersigned, a Notary Public in and for said State, personally appeared David Giacomini, who executed the within instrument for the purpose herein stated on behalf of such entity.

WITNESS my hand and official seal.

  
\_\_\_\_\_  
Notary Public



PROXY

FORM 4041

Upon recording mail copy to:  
State Engineer's Office  
901 S. Stewart Street, Suite 2002  
Carson City, NV 89701

Relinquishment No. \_\_\_\_\_

*DWR Office Use Only*

OFFICE OF THE NEVADA STATE ENGINEER  
**AFFIDAVIT TO RELINQUISH WATER RIGHTS IN FAVOR OF  
USE OF WATER FOR DOMESTIC WELLS**

1. I, \_\_\_\_\_ RYAN GARETT COOK \_\_\_\_\_ do

*Print/type name of person signing this form as the Affiant.*

hereby swear under penalty of perjury that the assertions of this affidavit are true, and I have the authority to request the relinquishment of the below-mentioned water rights.

2. The owner(s) of record of the water right to be relinquished is \_\_\_\_\_  
COOK 2011 FAMILY TRUST, dated April 20th 2011

3. The owner(s) own all or a portion of the following water right to be relinquished:

Permit \_\_\_\_\_ 82484 \_\_\_\_\_ Certificate \_\_\_\_\_

4. I hereby request to relinquish an amount of water being \_\_\_\_\_ 1.12 \_\_\_\_\_ acre-feet annually for either of the following:

For \_\_\_\_\_ existing parcels **or** the creation of \_\_\_\_\_ 1 \_\_\_\_\_ parcels.  
*# of parcels* *# of parcels*

5. The description of the existing certificated place of use area to be removed from irrigation production is as follows: *(Describe the place of use by Quarter-Quarter Sections, Section, Township, Range, M.D.M., and Assessor's Parcel Number(s). For example: Within the SE¼ SW¼ Section 17, T. 15N., R. 20E., M.D.M., said portion being Carson City Assessor Parcel Number 004-022-01). Please leave #5 blank if the existing permitted place of use to be relinquished is not a certificated irrigation right.*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Relinquishment No. \_\_\_\_\_  
DWR Office Use Only

6. If water to be relinquished is from a certificated irrigation water right, I have provided a map depicting acreage to be stripped or removed from irrigation production. The map is prepared to the standards of the Nevada Division of Water Resource's *Guidelines and Rules for the Preparation of Water Right Maps*.

7. The description of the proposed place of use reflected on the attached parcel map and list of County Assessor Parcel Number(s) is as follows: *(Describe the place of use by Quarter-Quarter Sections, Section, Township, Range, M.D.M., and Assessor's Parcel Number(s). For example: Within the NE¼ NW¼ Section 20, T. 15N., R. 20E., M.D.M., said portion being Carson City Assessor Parcel Number 004-013-01).*

Within the South 1/2 of the SW 1/4 Section 8, T. 19N., R. 18E., M.D.M., said portion being a  
\_\_\_\_\_ portion of Washoe County Assessor Parcel Number 038-280-67 being the proposed 1.00 acre  
\_\_\_\_\_ parcel known as Parcel "B1" of the Parcel Map for the Cook 2011 Family Trust.  
\_\_\_\_\_

8. I have attached a reduced, scaled, 8½ X 11-inch copy of the tentative map and/or final parcel map indicating which parcel is the original parcel ("parent parcel"), and if applicable which parcel(s) are new. The original tentative and/or final parcel map is prepared to the standards of NRS 278.466.

9. I understand I may petition the State Engineer to void this relinquishment if the final subdivision or parcel map is not recorded within 18 months after the approval of the State Engineer. If a petition to void this relinquishment is not submitted to the State Engineer within the 18-month period, the water remains permanently reverted to the source.

10. I understand once these water rights are relinquished by recordation of a final subdivision map in the office of the county recorder of the county wherein the domestic wells are to be located, as provided in NRS 278.380, or in the case of a final parcel map as provided in NRS 278.4725, the process cannot be reversed nor can I claim said right as a water right.

11. I will provide the State Engineer's Office with a copy of this recorded Affidavit to Relinquish including all attachments, which shall be recorded with the county recorder and submitted to the Division of Water Resources within ninety (90) days from the approval date of the State Engineer. If not recorded and submitted to our office within ninety (90) days, then this Affidavit is void and the water right will revert to the base right.

**\$300 FEE FOR FILING & EXAMINATION MUST ACCOMPANY THIS AFFIDAVIT**

Relinquishment No. \_\_\_\_\_

DWR Office Use Only

DATED: This 26 day of JANUARY, 20 26.

*Ryan Cook*  
Affiant's Signature (Sign in front of a Notary.)

PO BOX 314  
Mailing Address  
VERDI, NV 89439  
City, State, Zip Code  
775-223-7432  
Telephone Number  
verdicook@gmail.com  
Email Address

State of NEVADA )  
County of WASHOE : SS )

Subscribed and sworn to before me on this 26 day of JANUARY, 20 26

By: RYAN GARETT COOK  
Affiant's printed name

*Janet Russell*  
Notary Public signature



Area above for Notary stamp

Below is for State Engineer's Use Only

APPROVED: This \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_.

\_\_\_\_\_  
State Engineer

\$300 FEE FOR FILING & EXAMINATION MUST ACCOMPANY THIS AFFIDAVIT

## ATTACHMENT N

Two letters of support from the only two directly adjacent residential parcels owned by others

February 21, 2024

Northern Nevada Public Health  
Environmental Health Services Division  
1001 East Ninth Street  
PO Box 11130  
Reno, NV 89520  
775-325-2434

RE: Letter of Support for 430 River Pines Drive (APN 038-280-67) Application for Variance

NNPH,

I, Randy Mezger, Trustee of the MFT Revocable Living Trust, am the owner of APN 038-280-66 which is the 1.50 acre parcel immediately adjacent to the Cook 2011 Family Trust 2.71 acre parcel (APN 038-280-67). I am aware of the intent to split APN 038-280-67 into two legal parcels via a City of Reno Parcel Map process which would first require a NNPH approval of a Variance related to the additional septic system for the newly created parcel. I do not object to this proposed development.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Mezger". The signature is stylized and somewhat cursive, with a large initial "R" and a long, sweeping underline.

Randy Mezger, Trustee of the  
MFT Revocable Living Trust  
PO Box 859  
Verdi, NV 89439  
775-771-4943  
amx3@me.com

April 20, 2023

Washoe County Health District  
Environmental Health Services Division  
1001 East Ninth Street  
PO Box 11130  
Reno, NV 89520  
775-325-2434

RE: Letter of Support for 430 River Pines Drive (APN 038-280-67) Application for Variance

Washoe County Health District,

I, David Giacomini, am the owner of APN 038-280-68 which is the 2.34 acre parcel immediately adjacent to the Cook 2011 Family Trust 2.71 acre parcel (APN 038-280-67). I am aware of the intent to split APN 038-280-67 into two legal parcels via a City of Reno Parcel Map process which would first require a WCHD Application for Variance related to the additional septic system for the newly created parcel. I do not object to this proposed development.

Sincerely,



David Giacomini  
10098 Jibboom St., Suite 201  
Truckee, CA 96161  
davegiacomini@sbcglobal.net  
530-587-3277