McGinley & Associates
A Universal Engineering Sciences Company

**Reno**
5410 Longley Lane
Reno, Nevada 89511
775.829.2245

**Las Vegas**
4480 W Hacienda Ave
Las Vegas, Nevada 89118
702.873.3478

**www.mcgin.com**

# MEMORANDUM

| | | | |
|---|---|---|---|
| **TO:** | Stakeholders - Sierra Valley Groundwater Management District | **Date:** | June 29, 2022 |
| **CC:** | | **Project:** | Groundwater Dependent Ecosystem Monitoring Wells |
| **FROM:** | Alexa Terrell, M.Sc., Hydrogeologist<br>Dwight Smith, PG, CHg, Principal Hydrogeologist | **Project No:** | SVGMD006 |
| **SUBJECT:** | Criteria and Candidates for Groundwater Dependent Ecosystem Monitoring | | |

## 1. GROUNDWATER DEPENDENT ECOSYSTEM MONITORING WELL CRITERIA

Under the GSP, the GSA is planning to equip four (4) groundwater level monitoring wells in the area of defined as Groundwater Dependent Ecosystems (GDE), as an expansion to the GSA groundwater level monitoring network. The plan for selection of locations for the additional wells was based on identification of existing wells that would be suitable for use for GDE monitoring and equip them with water level monitoring equipment, include telemetry data transmittal.

The process of identification of existing wells involved a desktop review of recorded historical wells in the general area of the GDE using well log data from DWR, and well indicated on USGS topographic maps. Field reconnaissance was then performed to determine present existence, condition, and characteristics suitable for consideration for GDE monitoring. These characteristics have included:

1. Within the area of likely Groundwater Dependent Ecosystems
2. Groundwater levels within 30 ft, and preferably within 10 ft from land surface
3. An existing well which taps into the shallow alluvial aquifer (0 to 100 ft depth), with preference for the shallowest well possible so that water level represent the shallow water table, and not a composite head reflecting screening over multiple aquifers.
4. Relatively ease of access from a dirt road (with less than 1000 feet walk from road).
5. Relatively secure site that is not in a heavily traveled area.
6. Location that has property owner permission for access.
7. Proximity of GDE area to the major pumping regions in Sierra Valley.

## 2. EXISTING SHALLOW GROUNDWATER WELLS

Existing wells that were field identified were then screened for criteria above. One monitoring candidate was found to have met all the screening criteria, FRLT Well-1 located on the west side on Feather River Land Trust property. Another monitoring well was found that met all criteria (ROEN-1), except the proximity to the major pumping centers, and is located on property owned by the Roen family.

Other historically mapped flowing wells on USGS topography maps were found which did not meet the essential criteria for GDE monitoring. Many sites mapped as historical flowing wells could not be found in the field, and were determined to no longer exist. **Figure 1** shows all GDE well candidate sites. **Table 1** includes four existing well sites which were relatively good candidate sites, however only two of the four would be reliable good candidates.

**Table 1 Existing Well Candidates**

| Site ID | FRLT-Well 1 | FRLT-2 | ROEN -1 | ROEN-2 |
|---|---|---|---|---|
| **Date of Visit** | 5/5/2022 | 5/5/2022 | 5/10/2022 | 5/10/2022 |
| **Time of Visit** | 9:15 | 12:20 | 11:15 | 11:25 |
| **Lat** | 39.7885 | 39.799188 | 39.695316 | 39.701327 |
| **Long** | -120.3721 | -120.349438 | -120.37644 | -120.373994 |
| **Coordinate System** | WGS 1984 | WGS 1985 | WGS 1986 | WGS 1987 |
| **Access Notes** | FRLT property, access through ADA gate to old house. Short walk on dirt path. | Park at FRLT Corral on East side of River. Walk along road and cross ditch and go under barbed wire fence. Hike into field 1/3 mile. | Roen property dirt roads. Cross under barbed wire to access flowing well - visible from dirt road. | Roen property dirt roads. Well right along fence. |
| **Well Casing Diameter** | 2" | 3" | 2" | 4" |
| **Well Casing Material** | Steel | Steel | Steel | Steel |
| **Well Casing Condition** | Corroded, Cracked | Corroded | Corroded, Cracked | Corroded - holes |
| **Top of Casing to Ground (ft TOC)** | 2.32 | 1.45 | 1.12 | 2.00 |
| **Well Depth (ft TOC)** | 23.94 | 232.3 | 17.54 | 194 |
| **Well Depth (ft bls)** | **21.62** | **230.85** | **16.42** | **192** |
| **Well Screened Interval** | Unk - screens not visible in video | Not videoed | Plugged, Corroded Screen. 14 - 16 ft deep? | Not videoed |
| **Water Level (ft bls - TOC)** | 2.87 | 15.45 | 6.42 | 6.43 |
| **Water Level (ft bls)** | **0.55** | **14.00** | **5.30** | **4.43** |
| **Videologged?** | 5/12/2022 | No | 5/12/2022 | No |
| **Videolog Notes** | Looks like casing is cracked, still structurally sound. Screens are clogged. | | Well casing very corroded. Screen interval may be at 14 - 16 ft deep. | |
| **Vegetation in Surrounding Area** | Grasses, Rushes | Sagebrush, some sedge, not wetland vegetation | Rushes, Grasses. No saturated soils at present. | Pasture, sagebrush, grass |
| **Notes** | Krisit reported this well can flow in wet years | | | |

## 3. DRIVE-POINT PIEZOMETER OPTION

Drive-Point Piezometers are an affordable and reliable way to access shallow groundwater information, and could be used in leu of existing wells. A small-diameter pipe with screen tip designed for the purpose of groundwater monitoring and sampling is driven into the ground at locations where the water-table is within a shallow depth. One advantage of using the drive-point piezometer rather than an existing well, is that highest priority geographic areas can be targeted for installation, rather than being tied to locations where an existing well is present. Also, the drive-point piezometer will not have complicating questions of composite water level resulting for use of deeper completed monitoring wells that may screen over multiple aquifer zones. A potential disadvantage is the limitation to depth which hand-driven drive-point pieozmeters can be installed.

Soils conditions and diameter of the piezometer pipe dictate the depths to which piezometer may be practically driven. Hand-augering of the selected sites prior to installation can give the estimated depth to water for the piezometer to confirm conditions suitable for drive-point installation. Sierra Valley commonly has loamy silty sands for soils. Some clays may also be encountered. These conditions may be ideal for installation of the drive-point piezometers, and depths for driving the piezometer of 10-12 ft may be reasonably accomplished. For drive-point piezometers to be suitable for GDE water table monitoring, the water table will need to be within 10 ft of land surface. Based on depths to groundwater observed in existing well reconnaissance, depth to groundwater is believed to be within 10 ft of land surface in many parts of the GDE area.

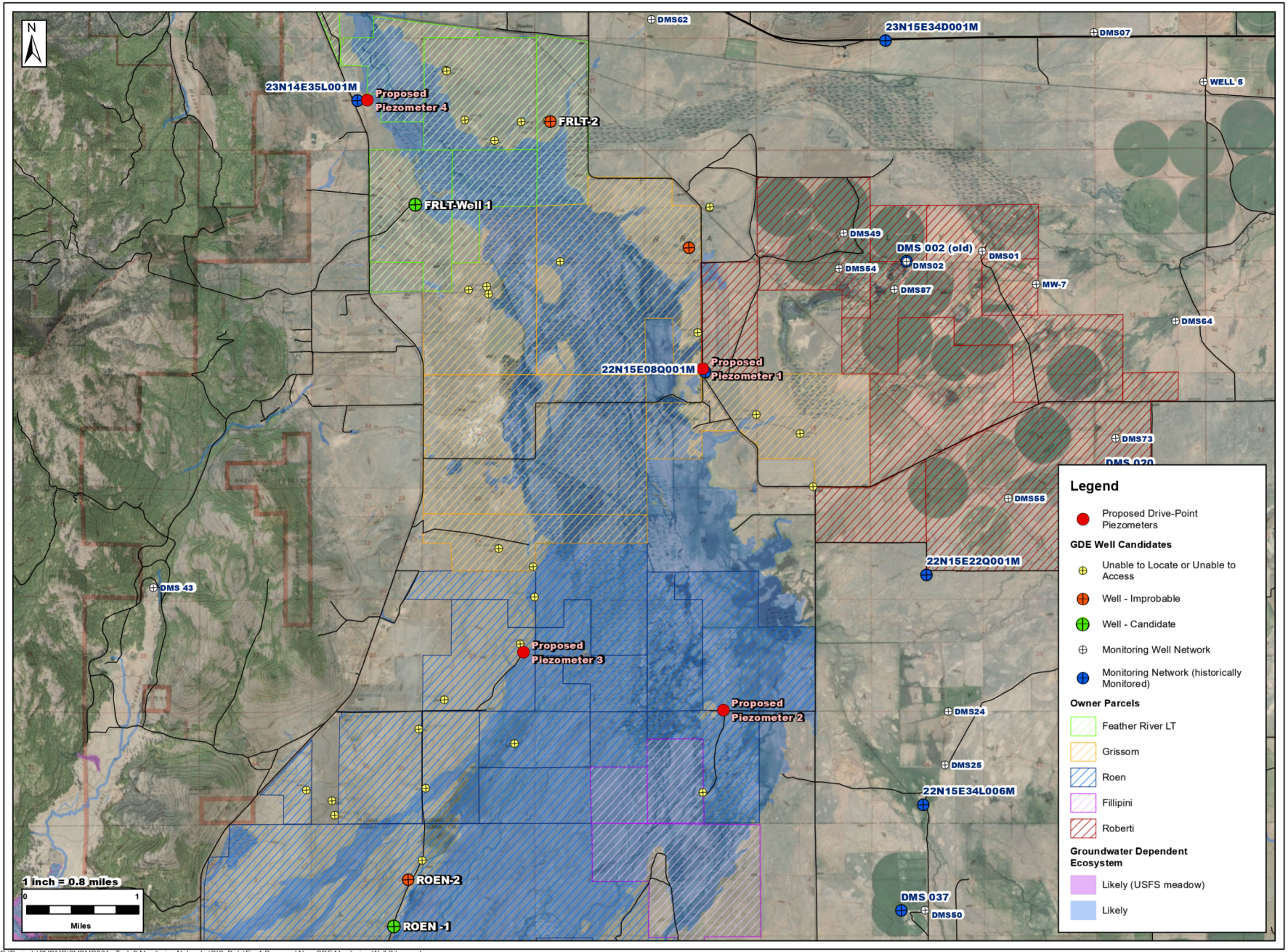
For GDE monitoring purposes, the drive-point piezometers would be installed to around 11 ft in depth below the land surface, and will have the screened portion from around 8 to 11 ft to allow for fluctuations in water levels. Depths may be adjusted based on water table depth. Drive-point piezometers could be installed in the later summer so that late season groundwater levels are more accurately known and the screen will be placed sufficiently deep for dry years.

**Figure 2** shows a schematic of the drive-point piezometer once installed, and possible locations are shown in **Figure 1**. **Table 2** provides the coordinates of four possible places for drive-point piezometer installations. The cost to install the drive-points instead of equipping existing wells is estimate at $1,100 per site for materials, including a surface vault for protection. (not including water level and telemetry). This cost can be accommodated within the grant funding available for GDE monitoring network installation.

**Table 2 Preliminary Proposed Drive-Point Piezometer Locations**

| Proposed Drive Point Piezometer | Latitude | Longitude |
|---|---|---|
| 1 | 39.76710 | -120.32415 |
| 2 | 39.72300 | -120.32109 |
| 3 | 39.73062 | -120.35448 |
| 4 | 39.80206 | -120.38009 |

An option of using a combination of drive-point piezometers and existing wells should also be considered.





# FIGURE 1

TITLE:

**SITE MAP -showing- PROPOSED & EXISTING GROUNDWATER DEPENDENT ECOSYSTEMS MONITORING WELLS**

JOB NO.:

**SVGMD001 - Task 6**

DATE:

**6/29/2022**

FILE:

**Fig 1 Proposed New GDE Monitoring Well Sites**

COORDINATE SYSTEM:

**NAD 1983 UTM Zone 11N**

REF.

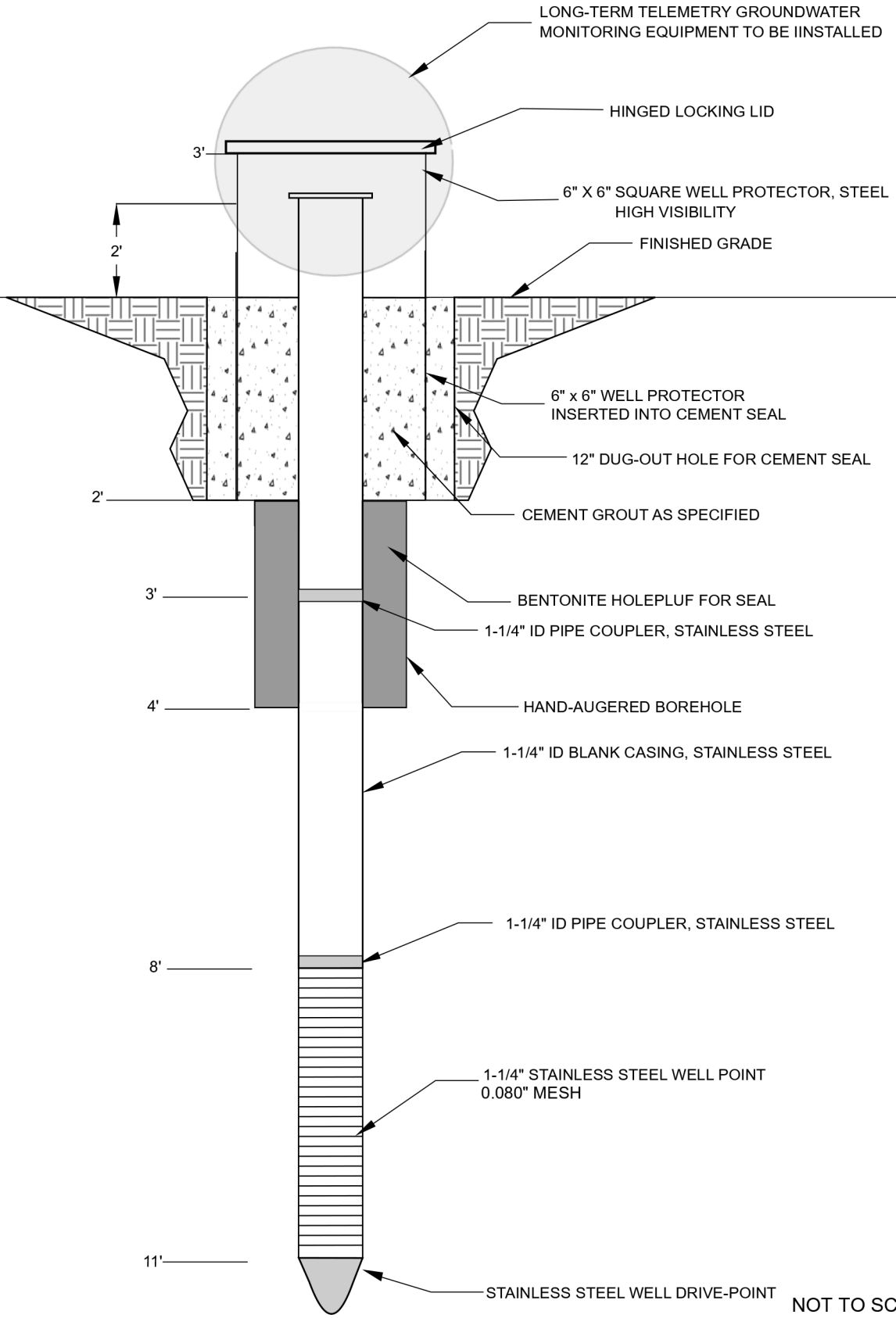
| | |
|---|---|
| DESIGNED | AT |
| DRAWN | AT |
| CHECKED | DS |
| APPROVED | DS |

REVISION:

--

McGinley & Associates
A Universal Engineering Sciences Company

R:\Projects\SVGMD\SVGMD001 - Task 6 Monitoring Networks\GIS_Data\Fig 1 Proposed New GDE Monitoring Well Sites.mxd




NOT TO SCALE (NTS)

McGinley & Associates
A Universal Engineering Sciences Company

Title: **GDE Drive-Point Piezometer Schematic**

| Project Name: | Project Number: | Figure: |
|---|---|---|
| **Groundwater Dependent Ecosystems Monitoring Network** | **SVGMD006** | **2** |
| Client Name: **Sierra Valley Groundwater Management District** | Date: **6/22/2022** | |