

Maintenance Activities and Discussion;

RE-REVISED (9/9/24) REPORT ADWR DCP ADOT Contract 2020-3129

Overview:

The SR89 Chino Valley Pilot Project Dry-well Site has various maintenance activities that take place to care for the physical infrastructure, ensure groundwater quality is being protected, and to maintain the electronic data collection system. All of these systems must be working, maintained, and calibrated where necessary to produce a fact based data-set for a defined set of site conditions on which to base the semi-annual reports. This report covers the period from August 2023 thru March of 2024.

Basis and Frequency:

The systems infrastructure requires a variety of physical maintenance activities depending on the time of the year, amount of precipitation, size of the recent storm events and condition of the systems components. These criteria are monitored in several ways such as electronic data collection, maintenance inspections, and site visits. In addition, the electronic rain-gauge data and battery status data collected is reviewed and downloaded remotely, and water quality sampling is conducted if physically possible. Some activities happen on a monthly basis such as District maintenance inspections, and others happen on an as-needed basis determined by site visits and/or remotely based on the data log and personnel availability.

Activities:

This reporting period consisted of the following activities: site visits, mowing, drainage clearing, flow gauge repair, water quality sampling, storm event data collection & review, and rain event monitoring equipment maintenance. Routine Inspections were performed on 9/06/23; 1/31/24, 3/18/24, 8/13/24, and 9/06/24. There is no set schedule for routine site visits due to staff shortage and distance to the project site for current personnel. It requires two staff to conduct a routine site visit due the weight of cast iron covers on the system's chambers and the confined space that the flow meter resides inside of. The average interval between visits was 4 months.

Mowing was conducted in the collection basin one time during the reporting period based on the vegetation growth present, and in accordance with ADOT's Roadside Vegetation Management Guidelines

(<https://azdot.gov/business/environmental-planning/biology/roadside-vegetation->

[management-guidelines](#)) in order to minimize impact on wildlife and unwanted seed disbursement. The weed growth was significant after the summer growing season with some weeds reaching 48 inches tall after the monsoon rains. The weed growth acts as basin erosion control and additional settling control for suspended sediment that enters the basin with runoff. In addition, weed growth can also uptake certain pollutants if present in runoff as an unintended benefit of their presence.

Water quality sampling was performed this reporting period in accordance with the Site Sampling Plan submitted previously. The water sampling has been difficult over the Grant Term due to the flashy nature of the storms and the distance to the site for the responsible parties. However, samples were obtained this reporting period and the sample results indicated that recharged water quality is of very good quality and showed no risk to groundwater quality based on the current Aquifer Water Quality Standards (AWQS). The laboratory report with results for the sampled water are included as part of this report.

Drainage clearing was necessary on the south end of the collection basin two times during the reporting period. One time due to an influx of mud that created a partial blockage after sliding down from the area above the south inlet's 12" drainage pipe that conveys runoff into the basin, and one time due to wind blown tumbleweeds that had collected and clogged the same entrance point. The mud issue should be eliminated now due to that area above now being fully vegetated and stabilized. It is unknown at this time if the tumbleweeds will be a continuing seasonal maintenance problem and is being monitored.

This reporting period required the flow gauge (both low and high flow sections of the gauge) to be serviced three times to remove sediment impairing the gauge's impeller from rotating freely and registering the flow to the drywell. The gauge is continuing to be an issue for accurate data collection with respect to recharge volumes recorded. It continues to fail to register flows on a regular basis and is causing the volume of recharge to be under or not reported as a result. Due to this no flow volume was measured this reporting period. This issue will require further investigation to find a more reliable method to measure the recharged volume which outside of the resources available for this project due to a lack of a sufficient electrical supply to this site.

The flow meter is a mechanical type meter mounted in the 4" diameter pipe directly before the drywell and after the pre-treatment chamber. There is no power available at the site except for the solar power panel we installed to use to power and track the rain data. If we had power to the site other than solar power the meter choices would have been expanded. Therefore, the flow meter type was limited to a mechanical type when Torrent Inc. designed the system.

The rain gauge and associated data collection had a period of outage during the winter months. Originally, it was thought to be the battery failing. However, inspection and testing proved it to be functioning properly and without issue. Therefore, being the winter months it is likely that snow covered up the solar recharge panel long enough to deplete the battery's capacity for a short time causing a short-term rain gauge data collection gap. However, this issue happened at a time when rainfall was not possible due to local freezing temperatures and ceased as soon as temperatures increased enough to melt the snow from the solar charging panel at which point the data collection system resumed normal operation.

In addition, this reporting there was one instance of repairs completed by Torrent Industries, the drywell's installer. On 1/31/24 they were scheduled and showed up onsite to repair an obstruction in the bailer sampling tube located in the drywell installed to facilitate sampling. According to the repair person onsite a screw installed in the connector between two sections of tubing had protruded through both walls of tubing and was interfering with the bailer being sent down to sample. The tubing connection was repaired and is now fully operational again.

Discussion:

FLOW MEASUREMENT: There was 120 gallons of recharged measured at the flowmeter on 9/6/23. Despite there being precipitation events being large enough to create recharge. The next two visits revealed the meter to again be clogged with a very fine silty grit. This material is not enough to impair the water quality being recharged based on the amount consistently found in the meter upon inspection and maintenance. Nevertheless, the meter continues to get stuck and fails to adequately measure recharge which is very disappointing. Since, 9/6/23 there has been zero recharge measured even though there is evidence of recharge based on the clogged meter. Currently, and due to a lack of AC power available at the site there are limited options available to replace the flowmeter with another type. The most recent, 8/13/24, flowmeter measurement measured 8,950 gallons due a 90-degree elbow fitting being installed on the outlet to the drywell which was very encouraging. However, a subsequent visit on 9/6/24, zero recharge was measured despite there being storms large enough to produce recharge, as evidenced by the physical signs at the site such as wet drywell and gage vault, and the excessive water transported vegetation that had gathered at the drywell inlet grate, and a 1.0 foot wide erosion gulley that appeared on the basin's south end due to inadequate drainage at the south basin inlet causing it to overtop the inlet.

RAIN GAGE & VOLTAGE/RAINFALL: The voltage relationship to the rainfall measurement, serves two purposes. The first purpose is to assess the power level in the system to ensure accurately an accurately rainfall record or "system health" electrically since it is powered by a solar panel. The second purpose is for quality control. If the voltage is too low then there

would be a low confidence level in the accuracy of the data collected. As a side note, you can detect a diurnal pattern in the voltage data which can be used as evidence of day/night, and seasonal patterns. The chart is a composite of two charts for clarity. Time is on the x-axis and has major increments in months. The Y-axis has two components which are color coded. The red scale designates rain events and is measured in tenths of an inch of rain. The second scale, in blue, is the battery's charge for the system. The vertical scale (y-axis) is measured in millivolts and has a maximum of about 13800 millivolts, or 13.8 volts for the 12 volt DC battery which is used. Good battery health is assumed to 13000 millivolts minimum at any given time and would indicate a high confidence in data collected.

Summary:

In summary, the drywell system is working efficiently and mostly without issue. None of the problems reported were causing the system to be inoperable nor caused a flooding issue. Currently, the biggest issue is the inaccurate accounting of the recharged volume even though it is being recharged efficiently. The volume being recorded is significantly less than is being recorded on the installed meter. ADOT is looking at other options to improve the volume recharged accounting accuracy.

DocuSigned by:

Edison Dunn

88728DE9770046F...

9/9/2024

Basin Photos 03/2024

