Natural Soda LLC

2021 Project Status Report
&
Annual Plan of Development
January 2022

Please note CONFIDENTIAL data sections of this document

Prepared for:
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street. Room 215
Denver, CO 80203

Submitted by:
Natural Soda LLC
3200 Rio Blanco County Road 31
Rifle, CO 81650

Prepared by:
Daub & Associates, Inc.
1985 ½ South Broadway
Grand Junction, CO 81507-9649

Vegetation Monitoring Report by:
Rusty Roberts, Rangeland Ecologist/Biologist

Table of Contents

List of Figures

List of Tables (Not including tables in Vegetation Monitoring Report)

1.0 Introduction and Project Summary

This 2021 Project Status Report and Annual Plan of Development is submitted to fulfill the requirements of BLM sodium leases, COC-00118326, COC-00118327, COC-0119986, and COC-37474 as stated in Federal Regulations 43 CFR, Subpart 3591 and 3592 and the Project Record of Decision dated January 20, 1987. This report is also submitted to the Colorado Division of Reclamation Mining and Safety (DRMS) to meet the requirements for an Annual Report per State permit number M-1983-194, and in part to meet the requirements contained in the EPA UIC Class III Area Permits: CO30358-00000 and CO32169-00000.

This report summarizes the Natural Soda LLC (NS) 2021 process operations, production activities, reclamation status, geotechnical and environmental monitoring results, as well as the status of surface facilities and wells. Proposed operations for 2022 will be described in this report, including drilling new production wells (17H-IR-E & 17H-1V), and one subsurface subsidence well (17H-1V-SSMW). In 2022, Plugging and Abandonment (P&A) operations will be undertaken. Groundwater monitor wells (GMWs) and water supply wells (WSWs) will be maintained.

2.0 Description of Project Area

2.1 Location and Regional Setting

The four NS federal sodium leases are located in the Piceance Creek Basin in Rio Blanco County in northwestern Colorado (Figure 1 and Figure 2). The sodium leases are located primarily between the Yellow Creek and Piceance Creek drainages, approximately 41 miles from Meeker, Colorado and 53 miles from Rifle, Colorado. The climate is semi-arid with annual precipitation averaging 12-14 inches. Precipitation generally occurs as snow from November to March and as rain during the remainder of the year. The vegetation is predominantly pinyon pine, sagebrush, Utah juniper, western wheatgrass, and needle-and-thread grass. The total area contained within the four sodium leases is 8,379 acres more or less. The principal area of operation is located in and around Section 26, T1S, R98W, 6th Principal Meridian. Figure 1 shows the NS leases and regional setting. Figure 2 shows sodium leases within the Piceance Creek Basin. Figure 3 and Figure 4 show the NS well locations and proposed well locations.

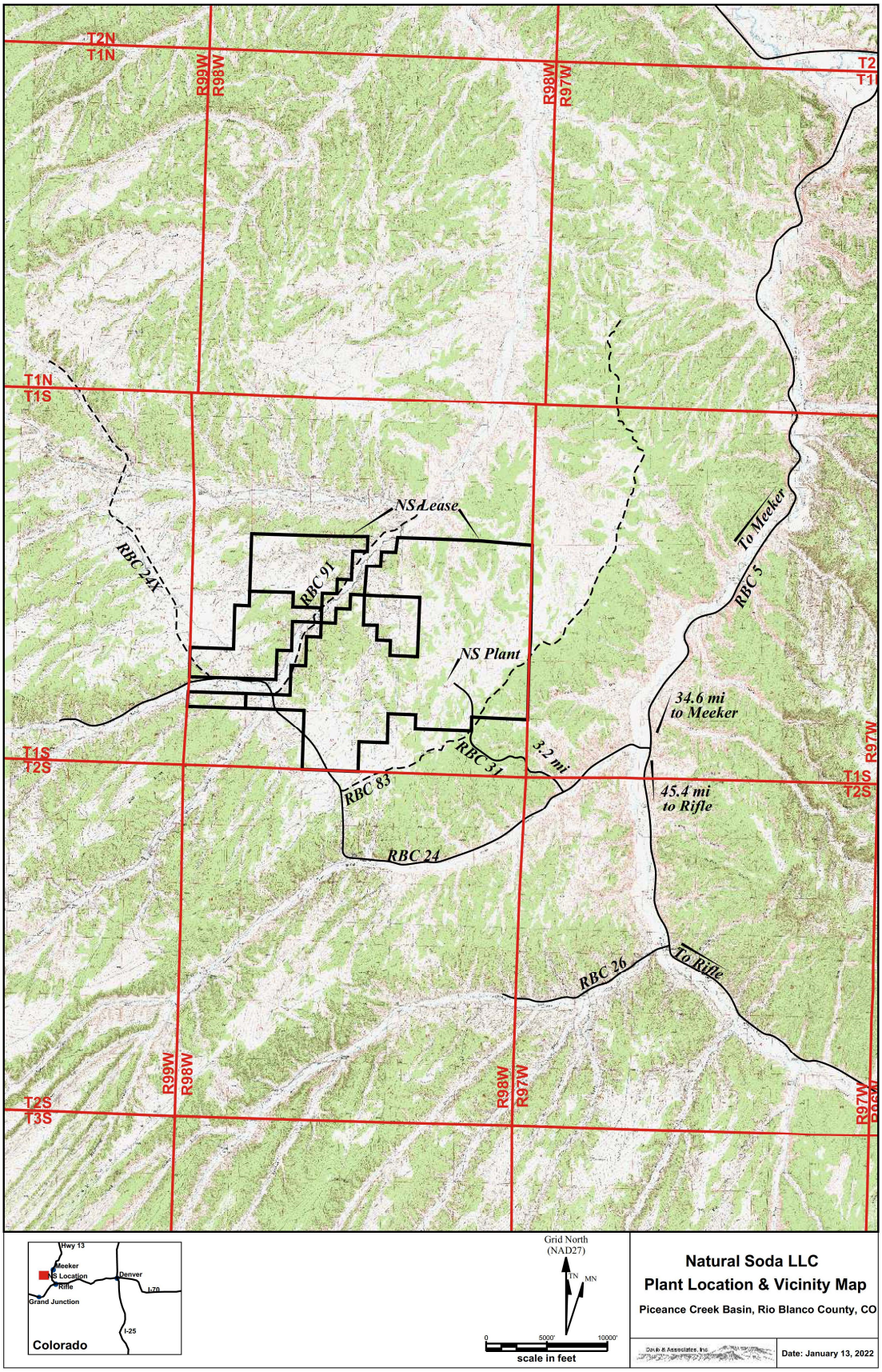


Figure 1: Natural Soda LLC Vicinity Map

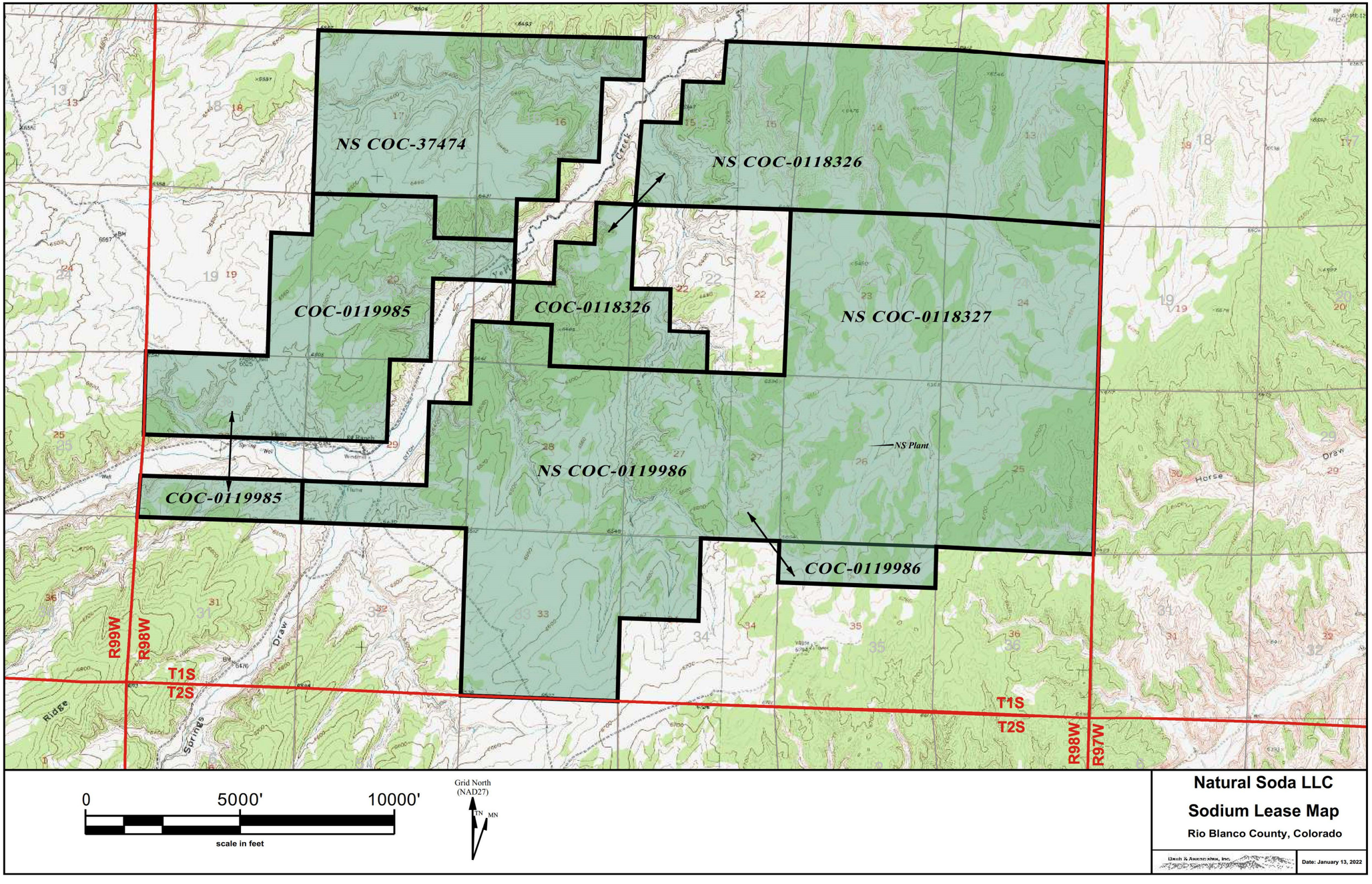


Figure 2: Sodium Leases Map

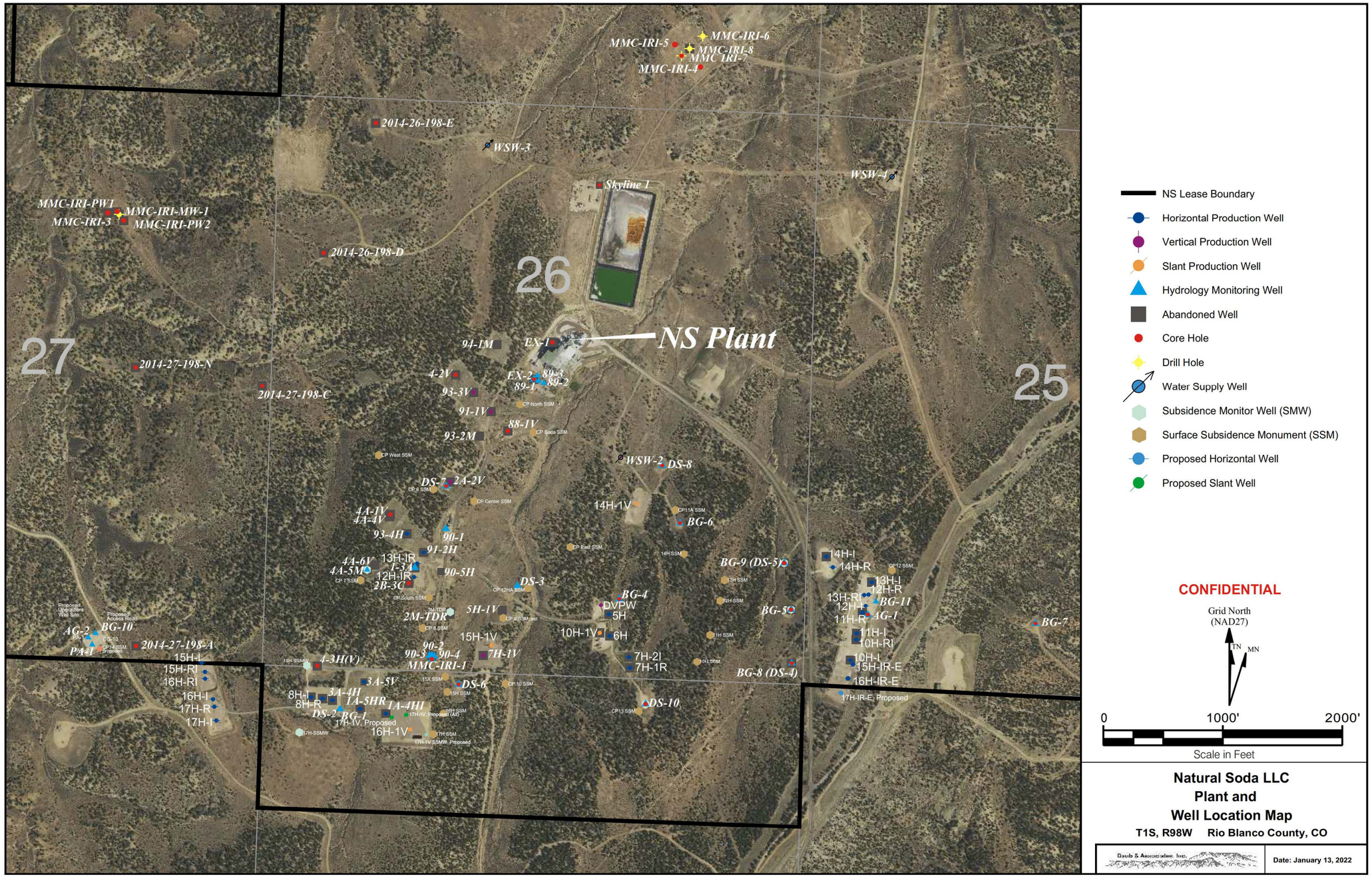


Figure 3: Plant and Well Location Map, Section 26 Detail.

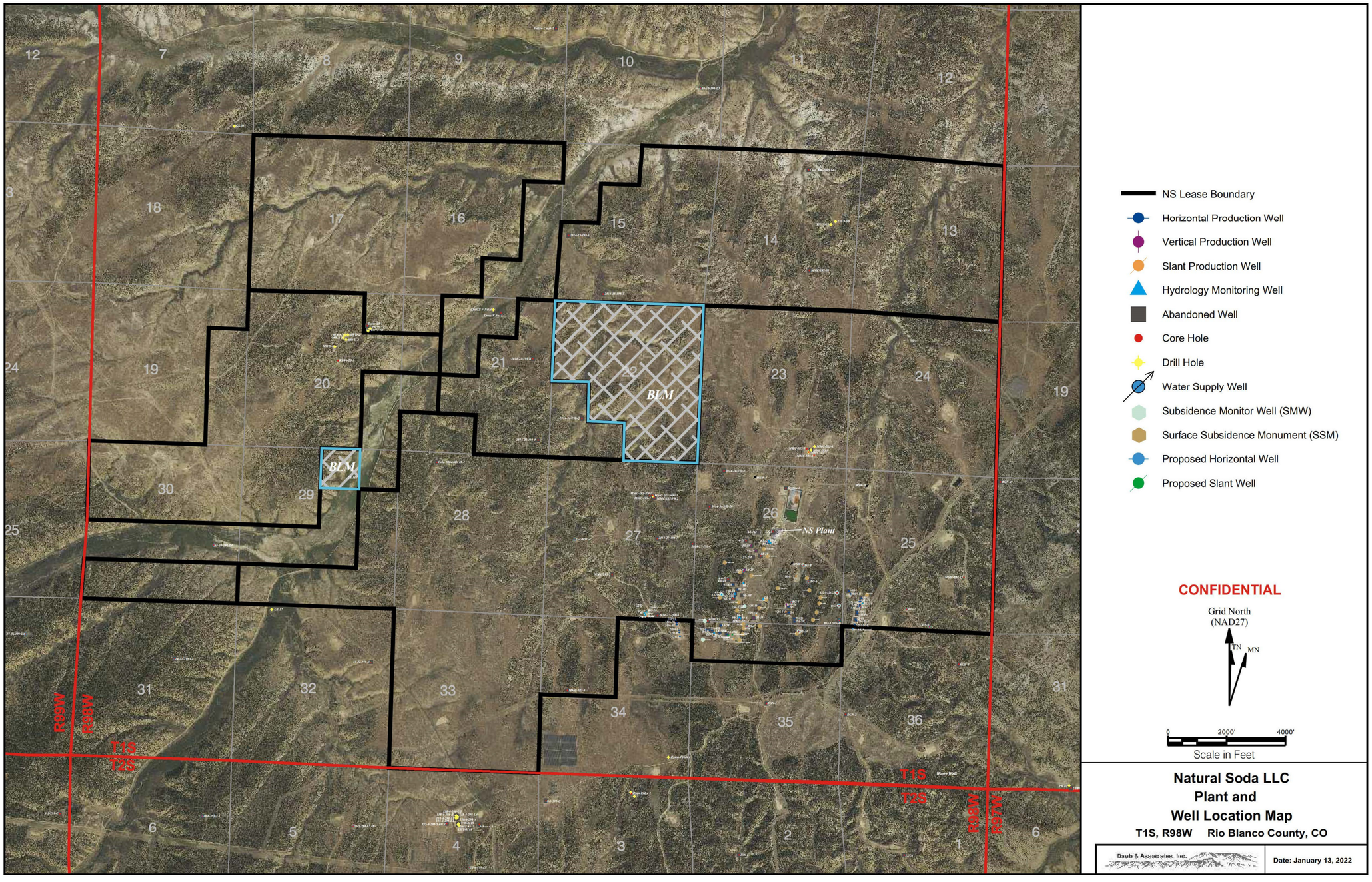


Figure 4: Plant and Well Location Map, Expanded View.

2.2 Leasehold Status

The original four sodium leases were renewed by the BLM, in 2021 for a period of ten years. Annual rental and royalty payments have been submitted to the Mineral Management Service. The NS leases comprise approximately 8,379 acres. NS will be renewing the leases again in 2031 for an additional period of ten years.

3.0 Project Status

3.1 2021 Project Activities (Confidential)

(See Figure 3 & Figure 4: Plant and Well Location Maps)

In 2021 NS produced 257,776 tons of sodium bicarbonate. This product was produced from the 12H, 13H, 14H, 15H, 16H, and 17H mining intervals. Routine boil outs were performed in 2021. During a 3-day outage in May, the original plant barren liquor tank was replaced with a new, larger stainless steel tank. Various short shutdowns were required for routine maintenance, equipment repair and/or replacement throughout the year.

3.1.1 Items of Significance (Confidential)

- NS renewed the four BLM sodium leases for another ten years.
- Four Groundwater Monitoring Wells (GMW) were drilled and completed to strengthen the continuous monitoring of groundwater aquifers within the NS leases; AG-2, BG-11, BG-10, and the PA-1.
- The 15H-IR-E production well 7.0-inch steel liner was shortened approximately 500 feet by way of a successful pullback and perforation operations occurred in March.
- Plug & Abandonment (P&A) operations occurred during 2021 to reduce redundancy and aged wells from the NS ground water monitoring program. The GMWs P&A'ed included the BG-5, BG-9, EX-2, MMC-IRI-9, and the MMC-IRI-8 wells.

3.1.2 Mining Interval Bicarbonate Production (Confidential)

Table 1 Mining Interval Annual and Lifetime Production (Confidential)

	Mining Interval 12H	Mining Interval 13H	Mining Interval 14H	Mining Interval 15H	Mining Interval 16H	Mining Interval 17H	Mining Interval DVPW1
Tons Mined in 2021	31,570	30,012	53,401	51,619	80,341	10,834	0
Total Tons Mined as of Dec 31, 2021	278,540	229,456	319,696	277,273	194,048	128,026	1,349

NS made an adjustment to the lifetime mining intervals total tonnage allocations in late January and early February 2021. Based on updated modeling of the mining intervals, the formulas used in 2020 were found to over report the tons removed from the 15H and 16H mining intervals and underreported the mined tons from the 12H, 13H, 14H, and 17H mining interval totals. DVPW1 mining interval was not affected by these adjustments. NS made additions and subtractions (See Table 2) from the lifetime tons mined from the mining intervals to rectify this imbalance. Following these adjustments the total mining intervals lifetime tons were reset as reflected in Table 2 below.

Table 2: Cavity Tonnage Mined Adjustment January/February 2021 (Confidential)

	Mining Interval 12H	Mining Interval 13H	Mining Interval 14H	Mining Interval 15H	Mining Interval 16H	Mining Interval 17H	Mining Interval DVPW1	**Total**
Total Tons Reported End of 2020	246,116	199,224	265,544	227,240	114,936	116,202	1,349	**1,170,611**
Tons Mined Jan 2021	3,004	1,065	3,519	4,687	5,260	4,462	0	**21,997**
Mined Interval Adjustment of Total Tons Feb 2021	855	220	751	-1,586	-1,230	990	0	**0**
Reset: Total Tons Mined as of Feb. 1, 2021	249,975	200,509	269,814	230,341	118,966	121,654	1,349	**1,192,608**

3.1.3 2021 Monthly Bicarbonate Summary (Confidential)

Table 3: Monthly Production, Sales, and Inventory Summary in Tons (Confidential)

Month	Beginning Inventory	Production	Sales	Ending Inventory
January	7,197	21,997	21,990	7,205
February	7,205	18,477	18,540	7,307
March	7,307	22,650	23,375	6,402
April	6,402	20,917	22,970	4,349
May	4,349	18,873	19,352	3,870
June	3,870	20,749	22,317	2,374
July	2,374	22,183	20,418	4,139
August	4,139	22,448	22,733	3,854
September	3,854	21,921	20,995	4,776
October	4,776	22,422	21,946	5,252
November	5,252	22,377	21,422	6,207
December	6,207	22,761	23,069	5,910
TOTALS		**257,776**	**259,127**	

3.1.4 Regulatory Review (Confidential)

NS submitted routine Sundry Notices, monthly, quarterly, and annual reports to the appropriate agencies. The following summarizes other regulatory related activities:

Bureau of Land Management (BLM)

- NS submitted the four lease renewal applications and fee's in December 2020, BLM approved and renewed the four leases for another 10 years in July 2021.
- An Application to Drill (APD) the BG-11 GMW (form 3160-3) was submitted to the BLM on January 15th, 2021. BLM approved the APD with Conditions of Approval on February 5th 2021. The BG-11 GMW was drilled and completed March 5th 2021. NS submitted the completion report and required documentation for the BLM on April 13, 2021.
- NS requested a Winter Range Variance with the BLM to P&A the BG-5, P&A BG-9, clean out WSW-3 & WSW-4, and to drill a new GMW BG-11 in late January and early February 2021. The variance was approved on January 19th by the BLM.
- The required BLM completion sundry notice documents were submitted for the BG-5 (12H-C) P&A operations on March 11, 2021.
- The required BLM completion sundry notice documents were submitted for the BG-9 (DS-5) P&A operations on March 23, 2021.
- NS reported an Undesirable Event to the BLM in March 2021, the event was due to a NS contracted truck driver having a medical issue causing him/her to drive off the road requiring the driver to be transported to a hospital. There was no spill of product or hazardous materials related to this incident.
- NS notified the BLM of pullback operations to be performed on the 15H-IR-E production well on February 22, 2021. The pullback operation was completed in March 2021. NS submitted the BLM 3160-5 completion form and documentation for the successful completion of the 15H-IR-E pullback operation April 7, 2021.
- On March 12, 2021 the BLM approved, with Conditions of Approval (COA), the 2020 APD application for three new upgradient groundwater monitor wells (AG-2, BG-10, and PA-1). On April 16, 2021, NS submitted required documents to complete the BLM COA requirements. The three new GMWs were drilled late summer 2021, the BLM required completion reports and documents were submitted to the BLM October 11th 2021.
- Notice of Intent to P&A the MMC-IRI-8, MMC-IRI-9 and EX-2 GMWs was submitted to BLM July 8th, 2021. NS P&A'ed the three wells during the summer of 2021. BLM required completion reports and documents were submitted to the BLM October 25th, 2021.

- NS requested a Surety Bond Release and Replacement, for the purpose of changing bonding companies, on September 23, 2021. BLM approved the Surety Bond Release and Replacement on October 1, 2021.

- On December 15th 2021 NS submitted required COA documents for drilling the 17H-1V, 17H-IR-E production wells, and the 17H-1V-subsidence monitoring well (SSMW).

United States Environmental Protection Agency (EPA)

- NS notified EPA February 2021 of the planned 15H-IR-E 7" liner pullback operation, the pullback was completed in March 2021 and NS notified the EPA of the successful operation April 2021.

- The 16H-1V, successful removal of temporary liner, and replacement with permanent 7-inch steel liner. Notification was sent to the EPA in April 2021.

- NS submitted a request for the addition of the 17H-IR-E production well to the UIC area Permit CO30358-00000, and for an extension to the 17H-1V permit deadline set to expire January 31, 2022. July 2, 2021 the EPA approved the addition of the 17H-IR-E production well to the UIC area permit. The 17H-1V permit deadline was extended to January 31, 2023.

- NS conducted routine, EPA mandated, MIT Part 1 pressure testing and/or Part 2 temperature logging in the following injection wells on the indicated dates, no anomalies were detected during any testing or logging and NS submitted all required documentation to the EPA.
    - 16H-IR-E MIT P2 (initial): February 8, 2021
    - 15H-I MIT P1 (5-year): June 16, 2021
    - 15H-I MIT P2 (5-year): July 12-16, 2021
    - DVPW MIT P1 (10-year): June 17, 2021

- September 23, 2021 NS requested from the EPA a FR Surety Bond Release and Replacement to change bonding companies. EPA approved this request on October 13, 2021.

Colorado Division of Reclamation, Mining and Safety (DRMS)

- NS submitted Technical Revision (TR) #45 to drill and complete the BG-11 GMW on January 15, 2021. On January 26th DRMS requested additional information prior to approval of the TR. This information was provided by NS and the DRMS approved TR #45 on February 1, 2021.
- NS submitted required annual fees and reports for DRMS Permits M-1983-194 and M-1999-051.
- On March 2, 2021, DRMS notified NS that the 15H-IR-E pullback operation would require a TR. Following communication with NS the DRMS determined that a TR would not be necessary for pullback operations.
- The DRMS did not undertake a 1st quarter site visit due to DRMS protocols relating to Covid-19. Rather the DRMS inspected NS historic records during March 2021. The DRMS identified and requested clarifications or updates of documents in the DRMS online database. NS submitted clarification comments and documents allowing the DRMS to correct their database.
- NS submitted TR #46 for pad construction, drilling, and completion of three new upgradient water monitoring wells (AG-1, BG-10 and PA-1) on April 15, 2021. TR #46 was approved on April 23, 2021.
- The DRMS conducted a 2nd quarter on location inspection of NS on June 28, 2021. No issues or concerns were noted in this visit. The DRMS also inspected and photographed many of the fully reclaimed pads, and other recent interim reclamation activities.
- On July 22, 2021, following the 2nd Qtr DRMS site visit, NS sent correspondence to the DRMS requesting acknowledgement of the successful reclamation of MMC-IRI-2 pad, Pad D, Pad G, and Pad E. Agency recognition of these successfully reclaimed areas will release NS from continued management responsibilities for these locations, with the understanding that the areas will remain as part of the NS Lease.
- NS requested a Surety Bond Release and Replacement, for the purpose of changing bonding companies, on September 23, 2021. DRMS approved the Surety Bond Release and Replacement on October 7, 2021.
- On November 3, 2021, NS sent correspondence to the DRMS regarding proposed Groundwater Sampling Modifications to be implemented in January 2022. The DRMS requested a TR submission for this action. NS submitted TR #47 to the DRMS on November 22, 2021. The DRMS approved TR #47 on December 7th 2021.
- The DRMS conducted a 4th quarter inspection of NS site on November 5, 2021. No problems or violations were noted during this inspection.

Colorado Division of Water Resources (DWR)

- In May 2020 the Dam Safety Branch of the DWR inspected the Larson Dam #2. The Engineer noted two required maintenance and repair items at the time of the inspection: 1) grade the crest to a uniform elevation with drainage to be directed toward the upstream slope and 2) clear and excavate the spillway. NS undertook the required construction activities in October of 2021. The crest was graded to a uniform 3% slope to promote drainage toward the reservoir, the surface had gravel base added and compacted/rolled to resist erosion. A final layer of gravel was added and compacted for additional durability. The spillway was cleared of all debris as required and a trench was dug out to extend the spillway drainage area to a location that did not erode the adjacent hillside. The hillside next to the spillway was graded to prevent erosion and limit dirt, silt, or other debris from clogging the spillway in the future. A full report with detailed photos of the construction activities was provided to DWR.
- The BG-11 GMW was permitted with the DWR as required in 2021.
- The AG-2, BG-10, and PA-1 GMWs were permitted with the DWR as required in 2021.
- NS submitted the required MMC-IRI-8 GMW P&A report to the DWR in November 2021.

Colorado Department of Public Health & Environment (CDPHE)

- NS applied to the CDPHE for a renewal on June 6th of the Storm Water Discharge (WQCD CDPA) Permit COG501736.
- In 2021 NS complied with all reporting requirements for storm water and environmental emissions.

Rio Blanco County (RBC)

- RBC did not require amendments to the existing Special Use Permit (SUP) 12-04 for the new GMWs drilled, P&A operations, or cleanout operations in 2021. Email notification of operations was sent to RBC in January and June with scheduled work and this sufficed for the SUP update.
- On December 6th 2021 NS submitted a Building Permit Application to RBC for a steel covered structure on a 360 square foot concrete slab located in the receiving area of the plant. On December 7th permit # BIND-0006-21 was issued for the project.
- NS requested a building permit in 2021 from RBC for the addition of an arched roof for the CONEX building structure (structure is identified as “MRO”) outside the plant warehouse that is used to store equipment. RBC approved the request and issued building permit # BIND-0001-22.

3.2 Proposed 2022 Activities and Schedule (Confidential)

3.2.1 Processing (Confidential)

NS anticipates Sodium Bicarbonate production of approximately 245,000 tons in 2022. NS has planned capital projects to replace the #4 crystallizer in Train #1, as well as the installation of a new dryer cyclone in Train #2. Additionally, brief shut-downs for periodic boil-outs and routine maintenance activities will occur.

3.2.2 Well field (Confidential)

- NS anticipates limited production from the DVPW in 2022.
- NS will drill two new production wells to augment the 17H mining interval during the summer of 2022. These wells have been permitted and approved with all agencies. The 17H-1V slant production well will be drilled to intersect the existing 17H-I & R mining interval. The 17H-IR-E production well will be drilled to the east of the existing 17H-I & R production wells, with the goal of intersecting the 17H mining interval near the end of the 17H-I production liner.
- NS will drill a new subsurface subsidence monitor well on existing 16H-1V pad location during the summer of 2022. The 17H-1V-SSMW monitor well will be used to monitor for potential subsurface subsidence near the existing 17H and planned 18H mining intervals.
- NS plans to Plug and Abandon (P&A) the BG-1 GMW, DS-2 GMW, and the 90-1 (A-Groove) GMWs during the summer of 2022. These wells are aged and/or redundant, the continued use of these wells are not needed to support ground water monitoring.
- NS plans to P&A production well 16H-R(I) in the summer of 2022.

3.2.3 EPA Notification – Schedule of Planned Mechanical Integrity Test (MIT) (Confidential)

- Per EPA UIC Permit C030358-00000 requirements, the following routine injection well (initial, 5-year, or 10-year) MIT Part 1 pressure testing and MIT Part 2 temperature logging is planned for 2022 or the first quarter of 2023.
    - 12H-I (10-year): MIT P1 testing is planned for the first quarter of 2022
    - 16H-I (5-year): MIT P1 and P2 testing/logging may occur during the third and/or fourth quarters of 2022.
    - 17H-IR-E (initial): MIT P1 will be conducted, as appropriate, during well construction in 2022.

- 17H-IR-E: MIT P2 baseline temp log will be run, as appropriate, during well construction, MIT P2 initial logs are required 60-90 days post EPA ATI.
- 17H-1V (initial): MIT Part 1 pressure test will be conducted, as appropriate, during well construction in 2022.
- 17H-1V MIT P2 baseline temp log will be run, as appropriate, during well construction, MIT P2 initial logs are required 60-90 days post EPA ATI.

3.2.4 EPA Notification – Schedule of Planned SSM Survey (Confidential)

- NS will next collect biennial surface subsidence monument surveys in 2023, in accordance with UIC Permit C030358-00000 requirements.

3.2.5 EPA Notification – Schedule of Planned SSMW Logging (GR/CCL) (Confidential)

- Per EPA UIC Permit C030358-00000 requirements; the following routine subsurface subsidence monitor well (SSMW) logging (GR/CCL) is planned for 2022 or the first quarter of 2023:
  - 17H-1V-SSMW initial GL/CCL logs should be collected, as appropriate, during well construction in 2022.
  - The 15H-SSMW CL/CCL logging target of 50% production (of the initial 15H mining interval) is not anticipated to occur until 2023. If production of 15H mining interval increases in 2022 and triggers the 15H-SSMW logging target, NS will log the well in 2022.

4.0 2021 Project Activities

4.1 On-Site Facilities and Process Description

4.1.1 General Arrangement

Figure 5 provides an overview of the process flow.

4.1.2 Lab Operation / Sanitation / ISO

In 2021, activities continued in the laboratory to provide analysis for process control, quality assurance, and regulatory requirements.

- Plant operators performed process control analyses.
- Chloride levels were monitored by both operations and laboratory personnel on all USP grades to ensure USP standards were met.
- The USP test for insoluble materials was conducted on a per lot basis by laboratory personnel and a filter test for insoluble materials was conducted on the dry product once per shift by operations.
- Pests were controlled with the use of two UV bug lights and rodent traps around the interior and exterior walls of the plant.
- GMP/ISO/Sanitation training was provided for all employees as required.
- A food safety audit for FSSC 22000 was conducted for which Natural Soda maintained GFSI certification.
- CDPHE, NSF, OMRI, Kosher, Halal, non-GMO, and ISO 9001 certifications were maintained.

4.1.3 Process, Utilities, Facilities

- In 2021 NS undertook a capital project to replace the barren liquor tank. The barren tank replacement operation started May 2nd, and was completed and operational on May 6th. The product packaging facility was upgraded and upgrades to equipment and conveyers occurred between November 28th and December 9th. General maintenance and repairs of utilities, equipment and facilities were completed as needed during 2021.

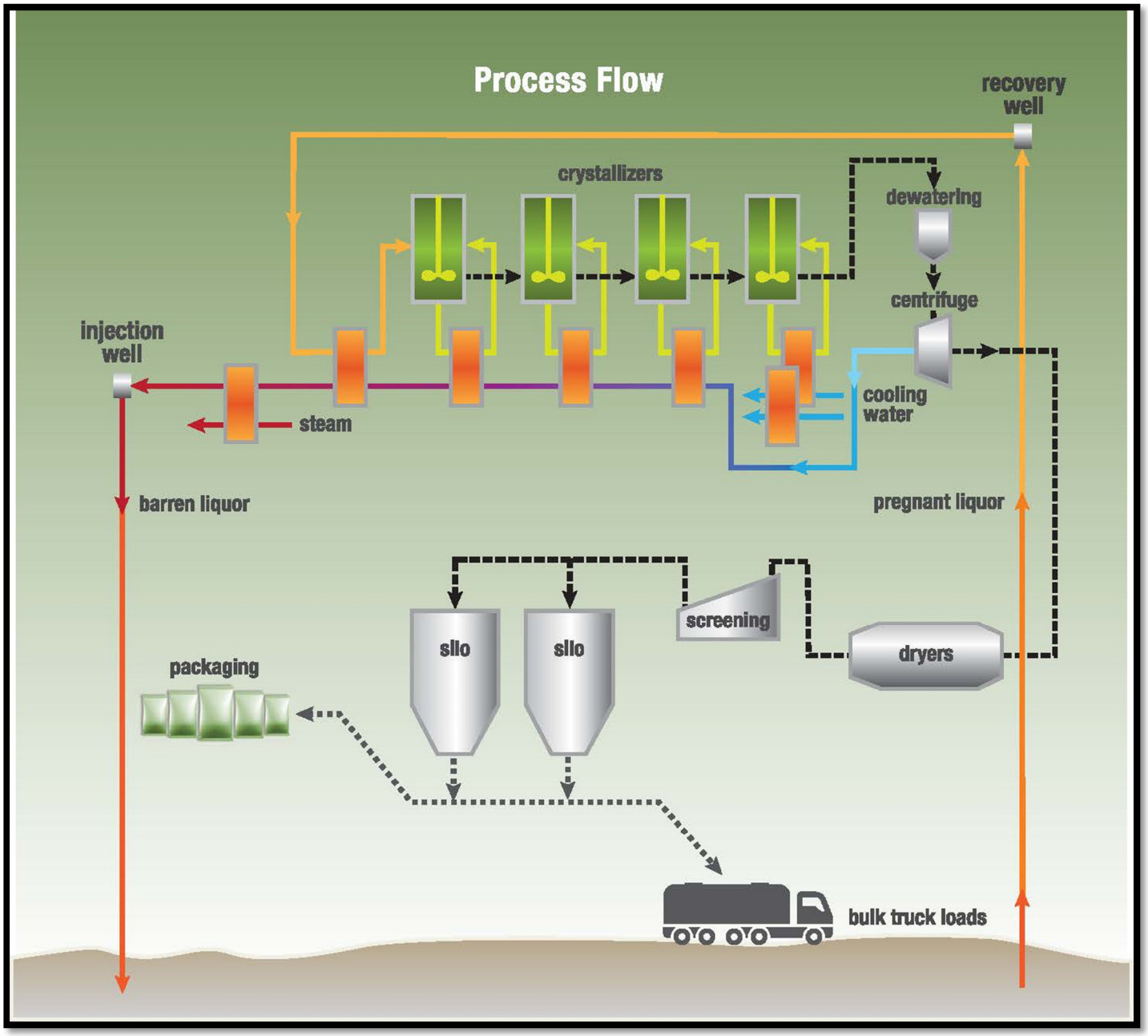


Figure 5: General Flow Process

4.1.4 Wells Associated with the NS Project (Confidential)

The following well-field related activities occurred in 2021: Refer *Figure 3 & Figure 4 Plant and Well Location Map.*

- The 16H-1V slant production well was shut down briefly to remove and replace the temporary production liner. A permanent 7" steel liner and liner hanger system was installed during March of 2021.
- Cleanout operations occurred in January on the WSW-4 water supply well. Himes Drilling Company arrived on location the 25th of January, pulled the pump and tubing out of the well and began the air lifting process to clean out the well bore. Himes completed the clean out operations on January 29th with the reinstallation of the pump and tubing returning the water supply well to operational status.
- Cleanout operations occurred in February on the WSW-3 water supply well. Himes Drilling Company arrived on location the 15th of February, pulled the pump and tubing out of the well and began the air lifting process to clean out the well bore. Himes completed the clean out operations on February 18th with the reinstallation of the pump and tubing returning the water supply well to operational status.
- In December 2020, in coordination with BLM and DRMS, it was determined that the BG-9 (DS-5) should be P&A'ed. P&A operations were started and completed in February of 2021. The BG-9 casing was perforated and was cemented back to surface in multiple lifts to ensure a compete sealing of the well bore. The casing was cut off below surface, marked per agency requirements, and buried. Reclamation of the location was undertaken in spring of 2021.
- The BG-5 was noted to be experiencing water quality issues in November 2020. Following an investigation it was determined, in coordination with BLM and DRMS that the BG-5 well should be P&A'd. P&A operations were started and completed in February of 2021. The BG-5 casing was perforated and was cemented back to surface in multiple lifts to ensure a compete sealing of the well bore. The casing was cut off below surface, marked per agency requirements, and buried. Reclamation of the location was undertaken in spring of 2021.
- In coordination with the BLM and DRMS it was determined that new B-Groove Aquifer monitoring well (BG-11) would be drilled east of the BG-9 (DS-5) well on the 10-13 pad in 2021. NS completed the permitting process for the BG-11 GMW with drilling and completion operations started and completed during February 2021. The new BG-11 GMW began operation as a B-Groove Aquifer monitoring well in March 2021.
- NS P&A'ed three aging and redundant GMWs in the summer of 2021. The MMC-IRI-8 (Perched Aquifer) monitor well was P&A'ed in late August 2021. The MMC-IRI-9 was a hydrology well which was open to both the B-Groove and DS aquifers; this well was P&A'ed in late August 2021. The final well to be P&A'ed was the IRI-26-EX-2 GMW. IRI-26-EX-2 monitored only DS aquifer water levels at the time of P&A operations, the P&A operation was started in late August and completed early September 2021.

- In June 2021 a new pad was built in the southwest NS lease area to accommodate three new Upgradient GMWs. These wells include the AG-2 (A-Groove Aquifer), BG-10 (B-Groove Aquifer), and the PA-1 (Perched Aquifer). Due to the expansion of the NS mining areas near the southern portion of the NS Lease, some of these older monitor wells became redundant. These new upgradient GMWs will provide continued upgradient groundwater monitoring. Himes Drilling Co. was contracted to drill these wells and D&A, Inc. managed the operations. Drilling operations for the BG-10 began on July 20th, and were completed on August 3rd. AG-2 drilling began August 4th and was completed by August 12th. PA-1 well drilling began August 17th, and was completed on August 21st. D&A mobilized to the location August 30th and equipped all three wells with nitrogen lift pumps and associated equipment. NS began sampling operation in these wells during September of 2021. The Upgradient pad location underwent interim reclamation construction activities in October to reduce land disturbance and pad seeding was completed in December of 2021.
- Approximately 500 feet of 1-inch PVC drop tube (for water leveling monitoring) was installed in the 90-3 GMW in September of 2021 to reduce problems with water level equipment becoming entangled with the sample pump equipment.
- The DS-2 well sampling equipment and pump were removed and replaced with a new nitrogen lift pump (NLP) system in July 2021.
- The DS-10 well sampling equipment and pump were removed and replaced with a new nitrogen lift pump (NLP) system in October 2021.
- NS cleaned out the DS-2 (DS aquifer) and the 90-4 (A-Groove aquifer) GMW's in August 2021. All sampling equipment was removed prior to clean out operations. Himes Drilling Co. airlifted both wells for multiple days to clean the wellbores. The 90-4 was returned to service post clean out operations. The DS-2 was found to have continued water quality issues following the clean out operation and the decision was made to P&A this older redundant well in 2022.

The current status of all wells associated with the NS Project is indicated in Table 4*: List and Status of Wells Associated with NS*.

4.1.5 Other Activities

Continuous water level monitoring of proximal DS aquifer monitor wells, using fluid level indicators (pressure transducers), provided real time data for the management of active production mining interval operations. Throughout the year, injection and recovery rates were adjusted to maintain monitoring well water levels near target zones.

Table 4: List and Status of Wells Associated with NS

Well Name	Initial Well Type	Current Well Status	Section	Town-ship	Range	Latitude (NAD 27)	Longitude (NAD 27)	Initial TD, (MD, ft)	Current TD, (MD, ft)	Comments
3M-TDR	Subsidence Monitoring	Subsidence Monitoring	26	1S	98W	39.928794934	108.362551397	1820	1820	No Longer Monitoring
4A-5M	Hydrology/Subsidence Monitoring	Plugged and Abandoned	26	1S	98W	39.929813477	108.365383461	1830	0	P&A June 2012 Currently Operates as TDR Well
12H-I	Horizontal-Injection	Horizontal-Production	25	1S	98W	39.929304000	108.348621000	4189.0	4189	TVD TD=~1985’
12H-R	Horizontal-Recovery	Horizontal-Recovery	25	1S	98W	39.929598000	108.348538000	2623.0	2623	TVD TD=~2007'
12H-IR	Horizontal-Production (Inj/Rec)	Horizontal-Production	26	1S	98W	39.929667896	108.363801054	3464.7	3464.7	TVD TD=-1972’
13H-R(I)	Horizontal-Production (Inj/Rec)	Horizontal-Production	25	1S	98W	39.929583170	108.348684400	2549	2549	TVD TD=~2013’
13H-IR	Horizontal-Production (Inj/Rec)	Horizontal-Production	26	1S	98W	39.930014690	108.363712457	3423.7	3423.7	TVD TD=-1964’
14H-R(I)	Horizontal Production (Inj/Rec)	Horizontal-Production	25	1S	98W	39.930265288	108.349763798	2819	2819	TVD TD=~1983’
14H-1V	Slant Production (Inj/Rec)	Slant Production (Rec)	26	1S	98W	39.931733549	108.35641781	2095.5	2095.5	
15H-I	Horizontal Injection	Horizontal-Injection	27	1S	98W	39.927281590	108.370834800	5477	5477	TVD TD=~1877’
15H-R(I)	Horizontal Production (Inj/Rec)	Horizontal-Production	34	1S	98W	39.927050806	108.370714984	2698	2698	TVD TD=~1850’
15H-1V	Slant Production (Inj/Rec)	Slant Production (Rec)	26	1S	98W	39.92797980	108.36112812	2079.1	2079.1	
15H-IR-E	Horizontal Production (Inj/Rec)	Horizontal Production	25	1S	98W	39.92778393	108.34898748	4032.4	4032.4	
15H-SSMW	Subsurface Subsidence Monitoring	Subsurface Subsidence Monitoring	26	1S	98W	39.927297800	108.367304200	1760.5	1760.5	
16H-I	Horizontal Injection	Horizontal-Injection	34	1S	98W	39.926332533	108.371061443	5425	5425	TVD TD=~1910’
16H-R(I)	Horizontal Production (Inj/Rec)	Horizontal-Production	34	1S	98W	39.926848404	108.371348247	2451	2451	TVD TD=~1856’
16H-1V	Slant Production (Inj/Rec)	Slant Production (Rec)	35	1S	98W	39.925742470	108.363769248	2086	2086	TVD TD= ~1945’
16H-IR-E	Horizontal Production (Inj/Rec)	Horizontal Production	25	1S	98W	39.927419470	108.349138051	4025	4011	TVD TD= ~1959’
17H-I	Horizontal-Injection	Horizontal-Injection	34	1S	98W	39.925807900	108.370279100	5378.9	5378.9	TVD TD=-1911’
17H-R	Horizontal-Recovery	Horizontal-Recovery	34	1S	98W	39.926171184	108.370365216	2431.7	2431.7	TVD TD=-1872’
17H-SSMW	Subsurface Subsidence Monitoring	Subsurface Subsidence Monitoring	35	1S	98W	39.925620961	108.367424479	1731.0	1720.6	
89-1	Hydrology Monitoring	Hydrology Monitoring Well	26	1S	98W	39.934818008	108.359830288	1989	1570	
89-2	Hydrology Monitoring	Hydrology Monitoring Well	26	1S	98W	39.934771572	108.359655360	1409	1389	
89-3	Hydrology Monitoring	Hydrology Monitoring Well	26	1S	98W	39.934959857	108.359876003	400	390	Periodic sampling issues
90-1	Water Supply	Hydrology Monitoring Well	26	1S	98W	39.930942569	108.362786046	1451	1451	Converted to A-Grv MW August 2015
WSW-2 (2010-26-198-2C)	Core Hole	Water Supply	26	1S	98W	39.932913043	108.357000636	1964	1402	Cored July 2010
WSW-3	Water Supply	Water Supply	26	1S	98W	39.940837450	108.361799400	1440	1440	Drilled August 2014
WSW-4	Water Supply	Water Supply	26	1S	98W	39.940358200	108.348198508	1437	1437	Drilled August 2014
90-3	Hydrology Monitoring	Hydrology Monitoring Well	26	1S	98W	39.927659529	108.363196386	1577	1556	
90-4	Hydrology Monitoring	Hydrology Monitoring Well	26	1S	98W	39.927654857	108.363040763	1392	1371	Cleaned out to TD August 2021
AG-1	Core Hole 2014-25-198-J	Hydrology Monitoring Well	25	1S	98W	39.929116963	108.348465043	2061	1487	Cemented up to groundwater monitoring well level
AG-2	Hydrology Monitoring	Hydrology Monitoring Well	27	1S	98W	39.927814	108.375312	1275	1275	Drilled & Completed August 2021
BG-1	Hydrology Monitoring	Hydrology Monitoring	35	1S	98W	39.92620970	108.36612260	1911	1552	
BG-4	Hydrology Monitoring	Hydrology Monitoring Well	26	1S	98W	39.929278506	108.356901248	1999.5	1603	
BG-5 (12H-C)	Core Hole	Hydrology & Subsidence Monitoring Well	26	1S	98W	39.929138572	108.351120681	3005	1645	P&A’ed February 2021
BG-6 (2010-26-198-6C)	Core Hole	Hydrology Subsidence Monitoring Well	26	1S	98W	39.931301816	108.354997679	1978	1577	

Table 4: List and Status of Wells Associated with NS (continued)

Well Name	Initial Well Type	Current Well Status	Section	Town-ship	Range	Latitude (NAD 27)	Longitude (NAD 27)	Initial TD, (MD, ft)	Current TD, (MD, ft)	Comments
BG-7	Core Hole 2014-25-198-K	Hydrology Monitoring Well	25	1S	98W	39.928987896	108.432905289	1967	1593.1	Cemented up to groundwater monitoring well level
BG-9 (DS-5)	Core Hole	Hydrology Subsidence Monitoring Well	26	1S	98W	39.930335423	108.351403951	1973	1902	P&A'ed February 2021
BG-10	Hydrology Monitoring	Hydrology Monitoring Well	27	1S	98W	39.927930	108.375072	1461	1461	Drilled & Completed August 2021
BG-11	Hydrology Monitoring	Hydrology Monitoring Well	25	1S	98W	39.929399	108.348929	1685.5	1685.5	Drilled & Completed February 2021
DS-2 (97 DS2)	Hydrology Monitoring	Hydrology Monitoring Well	35	1S	98W	39.926217942	108.366158755	1854	1829	Cleaned out to TD August 2021
DS-3	Hydrology Monitoring	Hydrology Monitoring Well	26	1S	98W	39.929529067	108.360329121	2100	1874.5	Sample pump replaced with NLP in 2018
DVPW-1	Vertical Production	Vertical Production	26	1S	98W	39.929100000	108.357500000	2904.6	2904.6	Limited Production
DS-6	Core Hole	Hydrology Monitoring Well	35	1S	98W	39.926942000	108.362195000	2962.6	1870	Cemented up to groundwater monitoring well level
DS-7	Core Hole	Hydrology Subsidence Monitoring Well	26	1S	98W	39.932036903	108.362826421	1980	1875	Cemented up to groundwater monitoring well level
DS-8	Core Hole 2014-26-198-I	Hydrology Monitoring Well	26	1S	98W	39.932738295	108.355594975	2000	1881.7	Cemented up to groundwater monitoring well level
DS-9	Core Hole 2014-25-198-M	Hydrology Monitoring Well	25	1S	98W	39.927447860	108.340064803	1916.5	1842	Cemented up to groundwater monitoring well level
DS-10	Hydrology Subsidence Monitoring Well	Hydrology Subsidence Monitoring Well	35	1S	98W	39.92659671	108.35590409	1995	1925	
EX-2	Core Hole	Hydrology Monitoring Well	26	1S	98W	39.934857517	108.359996032	1980	1897	P&A'ed September 2021
MMC-IRI-1	Core Hole	Hydrology Monitoring Well	26	1S	98W	39.927580161	108.363115621	2981	397	Cemented up to groundwater monitoring well level
MMC-IRI-4	Core Hole	Hydrology Monitoring Well	23	1S	98W	39.942950000	108.355333333	3001	1411	Cemented up to groundwater monitoring well level
MMC-IRI-5	Core Hole	Hydrology Monitoring Well	23	1S	98W	39.943578031	108.355623039	2983	378	
MMC-IRI-6	Core Hole	Hydrology Monitoring Well	23	1S	98W	39.943733333	108.355316667	1878	1394	
MMC-IRI-7	Core Hole	Hydrology Monitoring Well	23	1S	98W	39.943516667	108.356033333	1880	1395	
MMC-IRI-8	Core Hole	Hydrology Monitoring Well	23	1S	98W	39.943450000	108.355833333	1880	489	P&A'ed August 2021
MMC-IRI-9	Core Hole	Hydrology Monitoring Well	34	1S	98W	39.920759982	108.383119038	2864	1710	P&A'ed August 2021
MMC-IRI-11	Core Hole	Hydrology Monitoring Well	25	1S	98W	39.931608050	108.336010982	2963	1550	Cemented up to groundwater monitoring well level
MWA-2	Hydrology Monitoring	Hydrology Monitoring Well	20	1S	98W	39.952825612	108.412403600	1200	1200	Rock School Well
MWB-2	Hydrology Monitoring	Hydrology Monitoring Well	20	1S	98W	39.953067253	108.412206500	1398	1398	Rock School Well
MWD-1	Hydrology Monitoring	Hydrology Monitoring Well	20	1S	98W	39.953094778	108.411828300	1731	1731	Rock School Well
MWD-2	Hydrology Monitoring	Hydrology Monitoring Well	20	1S	98W	39.952635000	108.412036900	1703	1703	Rock School Well
MWU-2	Hydrology Monitoring	Hydrology Monitoring Well	20	1S	98W	39.933370000	108.350210000	687	687	Rock School Well
O-GMW-A	Core Hole 2014-27-198-O	Hydrology Monitoring Well (Inactive)	27	1S	98W	39.934483259	108.383446479	1786	1294	Cemented up to groundwater monitoring well level
PA-1	Hydrology Monitoring	Hydrology Monitoring Well	27	1S	98W	39.927639	108.375175	435	435	Drilled & Completed August 2021
TH75-6A	Hydrology Monitoring	Hydrology Monitoring Well	14	1S	98W	39.964492958	108.353578053	1260	1260	USGS Well
TH75-6B	Hydrology Monitoring	Hydrology Monitoring Well	14	1S	98W	39.964807700	108.353045189	1755	1755	USGS Well
TH75-11A	Hydrology Monitoring	Hydrology Monitoring Well	20	1S	98W	39.952321958	108.409207410	1080	1080	USGS Well
TH75-11B	Hydrology Monitoring	Hydrology Monitoring Well	20	1S	98W	39.953286260	108.409494700	1498	1498	USGS Well
RS-96-20-1	Hydrology Monitoring	Inactive	20	1S	98W	39.95037676	108.41282630	2598	1717	OH Packer at 1295' Rock School Well

4.2 New Findings or Developments (Confidential)

- The BG-5, BG-9, EX-2, MMC-IRI-8, and MMC-IRI-9 GMWs were P&A'd in 2021.
- The WSW-4 and WSW-3 underwent clean out operations in 2021 to restore water supply capabilities.
- Four new Upgradient GMWs were drilled in 2021 to augment the NS aquifer sampling operations; AG-2 GMW, BG-10 GMW, BG-11 GMW, and the PA-1 GMWs.
- NS submitted a modification of the groundwater sampling plan within the NS lease. This modified plan was competed and approved in coordination with DRMS (TR #47), BLM, and EPA. The updates will add groundwater sampling and monitoring components for NS's newly constructed PA-1, AG-2, and BG-10 upgradient groundwater monitoring wells (GMWs). The groundwater monitoring program updates also take into account NS's extensive, forty years of historic and current sampling, monitoring, and aquifer characterization. The rationale for these changes was previously presented to the agencies in late 2021. Starting January 2022 NS will begin the sampling schedule per the NS Sampling and Analysis Plan (SAP), Figure 6 highlights the changes from 2021 sampling versus 2022 sampling.

Figure 6: NS GMWs Sampling/Monitoring Schedule – 2021 vs. 2022

Groundwater Sampling Color Key
Sampling: Major & Minor Analytes (Laboratory, NS-1GW, 5 bottle), includes field parameters (Temp, pH, Conductivity)
Sampling: Major Analytes (Laboratory, NS-2GW, 3 bottle), includes field parameters (Temp, pH, Conductivity)
Sampling: Major Analytes (Laboratory, NS-2GW, 3 bottle) monthly, includes field parameters (Temp, pH, Conductivity) and an annual Major & Minor Analytes (Laboratory, NS-1GW, 5 bottle) sample
Sampling: Field Parameters: Temp, pH, Conductivity and/or NS lab: Alkalinity, Chloride, & Conductivity

Aquifer Color Key		Notes
Perched	Historic Upper (Perched & A-Groove)	Wells currently equipped with WL continuous data loggers (WL CDL) are denoted with red font. NS may relocate this equipment as necessary to better monitor mining conditions.
A-Groove		
B-Groove	Historic Lower (B-Groove & DS)	Well name with **bold font** indicates AG or BG GMW which is proximal to current mining and currently has more frequent water quality monitoring.
DS		

Well Name	Aquifer	Current Groundwater Quality Monitoring Sample Frequency (verbiage) and Sample Type (color)	Current Potentiometric Water Level Monitor Frequency (verbiage)	Change in Monitoring (Yes/No)	Modified Groundwater Quality Monitoring Sample Frequency (verbiage) and Sample Type (color)	Modified Potentiometric Water Level Monitor Frequency (verbiage)
89-3	Perched	Quarterly	Quarterly	Yes	Annual	Quarterly
IRI-1	Perched	Quarterly	Quarterly	Yes	Annual	Quarterly
IRI-5	Perched	Annual	Quarterly	No	Annual	Quarterly
PA-1	Perched	Quarterly	Quarterly	Yes	Annual	Quarterly
89-2	A-Groove	Quarterly	Quarterly	No	Quarterly	Quarterly
90-1	A-Groove	Quarterly	Quarterly	Yes	Annual	Quarterly
90-4	A-Groove	Quarterly	Quarterly	No	Quarterly	Quarterly
AG-1	A-Groove	Annual	Annual	Yes	Quarterly	Quarterly
AG-2	A-Groove	Quarterly	Quarterly	Yes	Annual	Quarterly
IRI-4	A-Groove	Annual	Annual	Yes	Annual	Quarterly
89-1	B-Groove	Quarterly	Quarterly	No	Quarterly	Quarterly
90-3	B-Groove	Quarterly	Quarterly	No	Quarterly	Quarterly
BG-1	B-Groove	Quarterly	Quarterly	Yes	Monthly	Monthly
BG-4	B-Groove	Monthly	Monthly	Yes	Monthly	Monthly & WL CDL
BG-6	B-Groove	Monthly	Monthly	Yes	Monthly	Monthly & WL CDL
BG-7	B-Groove	Annual	Annual	No	Annual	Annual
BG-10	B-Groove	Quarterly	Quarterly	No	Quarterly	Quarterly
BG-11	B-Groove	Monthly	Monthly	Yes	Quarterly	Quarterly & WL CDL
IRI-6	B-Groove	Annual	Annual	No	Annual	Annual
IRI-11	B-Groove	na	Annual	No	na	Annual
DS-2	DS	Monthly	Monthly	Yes	Annual	Annual
DS-3	DS	Monthly	Monthly	Yes	Annual	Quarterly & WL CDL
DS-6	DS	Monthly	Monthly	Yes	Annual	Quarterly & WL CDL
DS-7	DS	Monthly	Monthly	Yes	Annual	Quarterly & WL CDL
DS-8	DS	Annual	Annual	No	Annual	Annual
DS-9	DS	Annual	Annual	No	Annual	Annual
DS-10	DS	Monthly	Monthly	Yes	Annual	Quarterly & WL CDL
IRI-7	DS	Annual	Annual	No	Annual	Annual
TH75-6B (USGS)	Lower (B & DS)	na	Annual	No	na	Annual
TH75-11B (USGS)	Lower (B & DS)	na	Annual	No	na	Annual
TH75-6A (USGS)	Upper (Pr & A)	na	Annual	No	na	Annual
TH75-11A (USGS)	Upper (Pr & A)	na	Annual	No	na	Annual
Water Supply Wells						
WSW-2	A-Groove	Monthly	na	No	Monthly	na
		Quarterly	na	No	Quarterly	na
		Annual	na	No	Annual	na
WSW-3	A-Groove	Monthly	na	No	Monthly	na
		Quarterly	na	No	Quarterly	na
		Annual	na	No	Annual	na
WSW-4	A-Groove	Monthly	na	No	Monthly	na
		Quarterly	na	No	Quarterly	na
		Annual	na	No	Annual	na

4.3 2021 Operation Results (Confidential)

Mining and production activities were continuous in 2021. The following Table 5 provides a summary of mining and process results:

Table 5: Mine and Process Data (Confidential)

2021	Recovery	Recovery	Assay	Assay	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Monthly
Month	*Avg GPM*	*Temp.*	*Bicarb g/l*	*NaCl g/l*	*Mining Interval #12H*	*Mining Interval #13H*	*Mining Interval #14H*	*Mining Interval #15H*	*Mining Interval #16H*	*Mining Interval #17H*	*Mining Interval DVPW1*	*Total Tons*
Jan-2021	1,893	192	207	18	3,004	1,065	3,519	4,687	5,260	4,462	0	21,997
Feb-2021	1,808	189	203	17	2,658	916	3,829	4,067	4,881	2,126	0	18,477
Mar-2021	1,946	189	202	16	2,987	3,173	4,922	4,788	5,078	1,702	0	22,650
Apr-2021	1,895	189	206	16	4,788	2,575	4,197	3,522	5,618	219	0	20,917
May-2021	1,661	188	205	16	105	4,765	3,920	2,563	6,022	1,498	0	18,873
Jun-2021	1,893	187	204	16	2,511	4,603	3,447	2,594	6,768	827	0	20,749
Jul-2021	1,916	185	207	17	5,075	68	3,931	5,095	8,015	0	0	22,183
Aug-2021	1,927	188	207	16	6,008	0	4,772	2,790	8,877	0	0	22,448
Sep-2021	2,011	185	207	14	4,434	352	5,010	4,507	7,619	0	0	21,921
Oct-2021	1,942	190	208	14	0	4,447	4,766	5,770	7,439	0	0	22,422
Nov-2021	1,924	191	211	15	0	3,796	5,348	6,226	7,007	0	0	22,377
Dec-2021	1,911	190	209	15	0	4,254	5,740	5,009	7,758	0	0	22,761
AVERAGE	1,894	189	206	16	2,631	2,501	4,450	4,302	6,695	903	0	21,481
TOTAL					*31,570*	*30,012*	*53,401*	*51,619*	*80,341*	*10,834*	*0*	*257,776*

Key to above headings:	
	Recovery - Monthly average house flow rate and pregnant liquor temperature during process operations.
	Assay - g/L sodium bicarbonate (as total bicarbonate) and sodium chloride in the pregnant liquor.
	(Total bicarbonate = bicarbonate g/L + 1.58 x carbonate g/L)
	Tons - Total monthly bicarbonate production from each mining interval.
	Temp. - Temperature in degrees F recovered at the pregnant liquor tank.
	Avg GPM - Monthly average injection flow rate during process operations.

Figure 7 illustrates 2021 pregnant liquor analytical results along with monthly averages of sodium bicarbonate production (tons/day). Figure 8 represents monthly and cumulative annual production for 2021. NS produced and processed their sodium bicarbonate product throughout 2021.

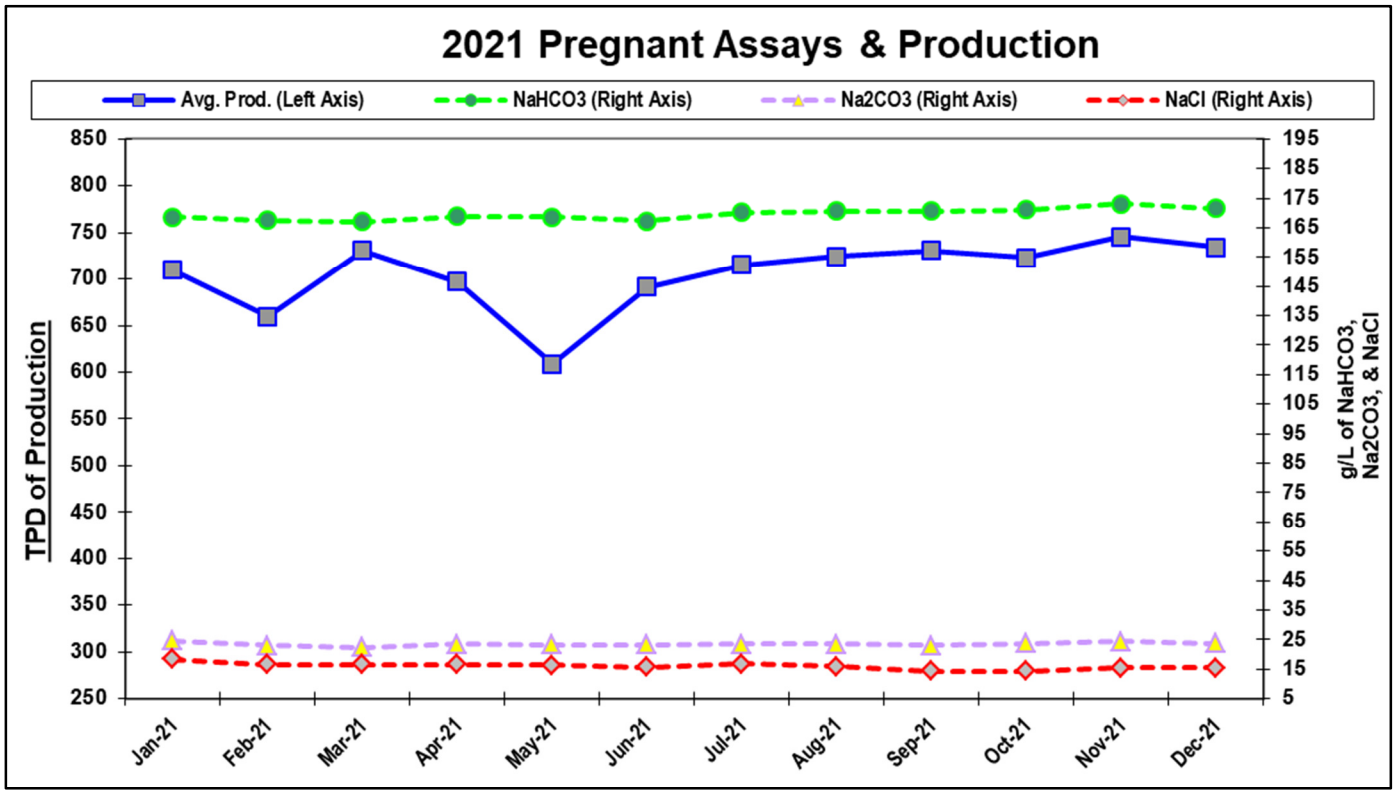


Figure 7: Pregnant Assays and Production (Confidential)

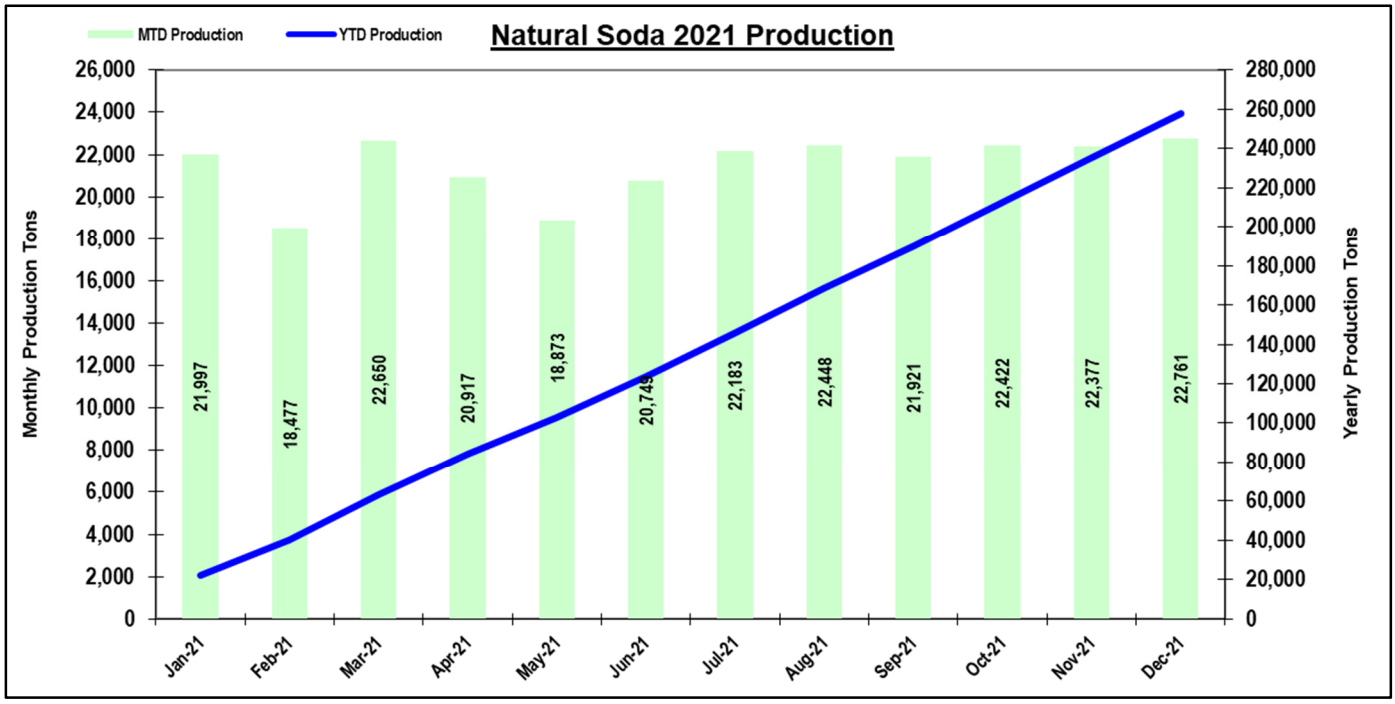


Figure 8: NS 2021 Production (Confidential)

4.4 Geotechnical Program (TDR and Geophysical Logging)

Historically NS monitored two long-time, historic time-domain-reflectometry (TDR) subsurface-subsidence monitor wells, the 4A-5M and 3M-TDR. The TDR monitoring results were reported to the BLM (monthly) and EPA (quarterly). There has been no indication of surface or subsurface subsidence near the 4A-5M or 3M-TDR wells since installation.

After having met the EPA requirement for three years of subsidence monitoring following cessation of mining, the monitoring of the 3M-TDR cables was halted in 2021.

In 2022 the 4A-5M TDR monitoring will cease, following the same EPA guidance. The 4A-5M monitors the 8H mining interval. The 8H wells were abandoned in May of 2019.

4A-5M Cable A (Figure 9), and Cable B (Figure 10) show the original September 2007 TDR measurement versus December 2021.

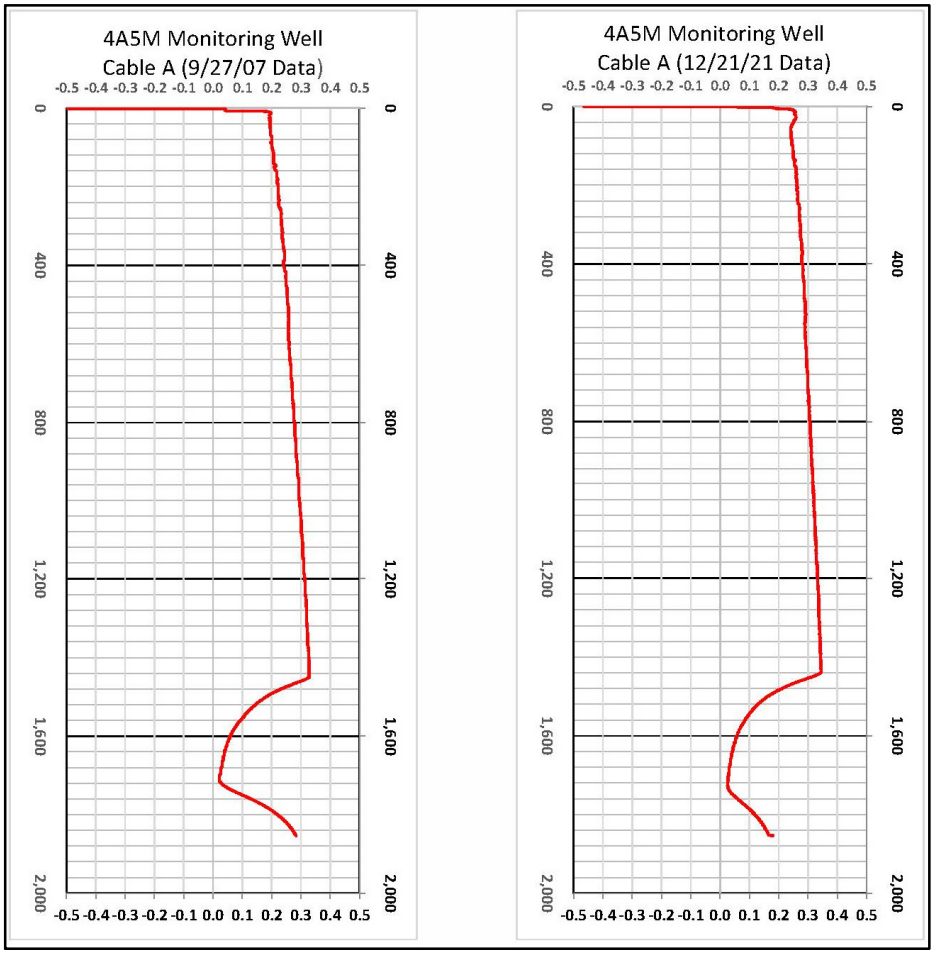


Figure 9: 4A-5M TDR Cable A, Sept 2007 vs. Dec 2021

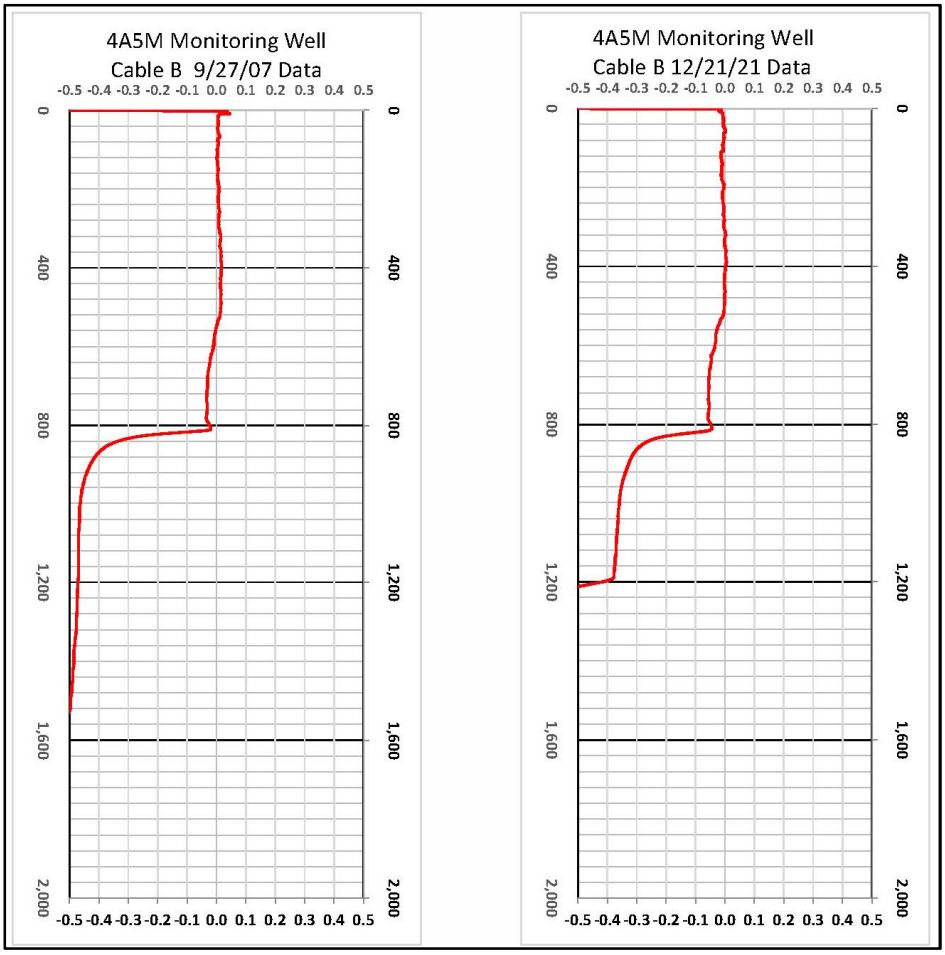


Figure 10: 4A-5M TDR Cable B, Sept 2007 vs. Dec 2021

4.4.1 Subsurface Subsidence Geophysical Logging

NS conducted the final EPA mandated, subsurface subsidence logging, in the BG-9 (DS-5, 2010-26-198-1C) monitor well on January 31, 2021 prior to P&A operations.

4.4.2 Surface Subsidence Monitoring

A surface subsidence monument (SSM) survey of all SSMs above NS's area of operations was conducted in the second quarter of 2021. Results of the 2021 SSM survey are shown in Table 6 below. The next planed SSM survey of all SSM's will be conducted in the second quarter of 2023.

4.5 Water Well Pumpage

In 2021, approximately 83.49 million gallons of water was pumped from water supply wells WSW-2, WSW-3, and WSW-4 with an average of 159.9 gpm. The total pumpage from WSW-2 was 781,190 gallons, WSW-3 was 39.81 million gallons, and the total pumpage from WSW-4 was 42.89 million gallons.

Table 6: Surface Subsidence Monument (SSM) Elevation Monitoring

Surface Subsidence Monument (SSM)	Initial Monument Elevation (ft. AMSL)	2021 Monument Elevation (ft. AMSL)	Elevation Change (ft.)
CP SODA BM	6634.90	6634.90	0.00
CP CENTER SSM	6658.99	6658.92	-0.07
CP NORTH SSM	6639.21	6639.16	-0.04
CP EAST SSM	6669.52	6669.42	-0.10
CP SOUTH SSM	6683.84	6683.77	-0.07
CP WEST SSM	6669.77	6669.70	-0.08
CP 6 SSM	6682.88	6682.84	-0.04
CP 7 SSM	6706.52	6706.58	0.06
CP 8 SSM	6691.65	6691.66	0.01
CP 10 SSM	6687.41	6687.38	-0.03
10H SSM	6712.95	6712.66	-0.29
11H SSM	6705.81	6705.40	-0.41
12H SSM	6695.86	6695.58	-0.27
13H SSM	6684.47	6684.05	-0.43
14H SSM	6675.20	6674.91	-0.29
15X SSM	6694.41	6694.38	-0.02
15H SSM	6702.35	6702.24	-0.11
16H SSM	6713.03	6713.00	-0.03
17H SSM	6719.06	6719.07	0.02
12HA SSM	6661.41	6661.37	-0.04
CP 11 SSM	6653.71	6653.64	-0.07
CP 12 SSM	6702.11	6702.10	-0.01
CP 13 SSM	6725.22	6725.24	0.02

5.0 Environmental Monitoring and Protection

5.1 Hydrology Monitoring

5.1.1 Introduction

NS's hydrology monitoring program concentrates on groundwater, as there are no perennial streams or springs located on the NS's sodium leases. The USGS stream gauging station-monitoring program is conducted, with NS support, to provide regional surface stream flow data on Yellow and Piceance Creeks.

The hydrology-monitoring plan is designed to determine impacts of NS's solution mining operations on underground sources of drinking water, as designated by the US EPA.

Refer to Figure 3 and Figure 4 for the locations of existing monitor wells. Groundwater analytical results are presented in Appendix A.

5.1.2 Stream Gauging Stations

NS contracts with the USGS to monitor surface waters for water quality and quantity. Monitoring was performed upstream and downstream relative to the NS mining operations and with respect to Yellow Creek and Piceance Creek at four existing stations with extensive historical data. Historical stream gauging data is reported in this document and discharge data is complete through the 2021 water year (WY) (October 2020 – September 2021).

The USGS surface water data are available to the public from the USGS web site at http://co.water.usgs.gov. Table 7 and Table 8 summarize key 2021 WY data for surface water near the NS site.

Data reported in Table 7 and Table 8 is compiled from the USGS web site. The Specific Conductance and Temp data included in the tables were generated by using USGS lab test results for each stream reported on the USGS web site during the 2021 WY.

A review of USGS stream water quality data indicated no significant change in stream water quality during 2021. The NS 2021 precipitation data showed a slight increase at the NS location in 2021 compared to 2020 (10.09" vs 9.79"). 2021 precipitation was approximately half that of 2018 (18.2") and 2019 (20.8"). The 2021 water year (WY) discharge (cfs) data in this area indicated a decrease in average stream discharge levels for the 6242 Corral Gulch, 6255 Yellow Creek, 6200 and 6222 Piceance Creek streams discharge. Precipitation and/or irrigation diversions may be affecting stream flow discharge levels. The USGS notes in the 2020 and 2021 year end water reports that the 6200 (Piceance Creek below Ryan Gulch) has diversions for irrigation upstream of the monitor station. The 6222 (Piceance Creek at White River) has diversions for irrigation of approximately 5,500 acres upstream from the monitor station. The 6255 (Yellow Creek near White River) has diversions to irrigate approximately 300 acres upstream from the monitor station. The 6242 (Corral Gulch near Rangely) which historically has been a low flow stream is not reported as having any diversions upstream from the monitoring station.

The 2021 Specific Conductance data from USGS for all four stations was within the range values for the period of record. The four stream locations all had slight increases in Max Specific Conductance from 2020 to 2021 WY.

The 2021 water temperature values were within the range of historic data. Post review of the USGS data, no effect on stream water quality was noted due to the NS mining operations.

Table 7: Historical Comparison with 2021 Water Year Data

Station	Discharge P of R*	Discharge 2021 WY**	Average Total Discharge P of R	Total Discharge 2021	Specific conductance (µS/cm @ 25° C)				Temp (°c.)	
					P of R	2021 WY	P of R	2021 WY	P of R	2021 WY
	cfs	cfs	ac ft/yr	ac ft/yr	Max	Max	Min	Min	Max	Max
6200	25.10 (56 yrs)	5.94	18,151	4,300	2,800	2,100	600	1,610	26.3	24.4
6222	30.07 (55 yrs)	7.43	22,217	5,379	7,240	4,610	516	2,330	30.0	23.7
6242	1.47 (46 yrs)	0.18	1,065	130	1,760	1,440	312	1,260	24.0	16.3
6255	2.32 (43 yrs)	0.53	1,675	384	5,200	4,560	460	4,100	31.0	16.8

6200 Piceance Creek below Ryan Gulch	6242 Corral Gulch near Rangely
6222 Piceance Creek at White River	6255 Yellow Creek near White River
* P of R = Period of Record for collection of data.	**WY = Water Year (October-September).
cfs = cubic feet per second, average annual flow.	N/D = No data available at time of publication

Table 8: Yellow and Piceance Creek Discharge Data up to 2021 Water Year

Project Data Comparison

Discharge for Water Years in cfs

Station	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
6200	27.9	16.3	13.4	36.2	17.5	11.3	10.7	15.9	17.0	11.7	7.5	9.6	10.9	5.9
6222	36.2	20.8	17.6	41.7	19.2	11.8	13.0	19.7	21.2	15.5	8.9	11.6	12.4	7.4
6242	1.3	0.4	0.3	1.1	0.3	0.2	0.5	0.5	1.9	0.6	0.1	1.0	0.4	0.2
6255	1.1	1.0	0.9	1.3	1.2	1.1	1.2	1.3	1.3	1.7	0.8	1.6	0.9	0.5

Maximum Specific Conductance (µS/cm @ 25° C)

Station	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
6200	1,460	1,620	2,020	1,460	1,610	1,930	2,040	1,770	1,840	2,120	1,700	1,740	1,590	2,100
6222	1,950	3,130	4,800	2,290	5,350	5,100	3,190	2,790	2,020	3,550	5,350	3,300	4,160	4,610
6242	1,350	1,320	1,460	1,280	1,480	1,430	1,400	1,330	1,170	1,280	1,490	1,480	1,260	1,440
6255	3,830	4,050	4,260	4,130	4,170	4,720	4,530	4,070	4,520	3,600	3,980	4,530	4,560	4,560

* P of R = Period of Record for collection of data.	**WY = Water Year (October-September).	cfs = cubic feet per second, average annual flow.
6200 Piceance Creek below Ryan Gulch	6242 Corral Gulch near Rangely	
6222 Piceance Creek at White River	6255 Yellow Creek near White River	
N/D No data available at time of publication.		

5.1.3 Monitoring Wells

Per regulatory requirements, dedicated groundwater monitoring wells have been constructed to monitor four water-bearing intervals identified as the Perched, A-Groove, B-Groove, and the Dissolution Surface Aquifers. The Dissolution Surface Aquifer has been exempted as an underground source of drinking water in the NS lease and permit areas. The DS Aquifer monitored by NS contains total dissolved solids (TDS) values in excess of 10,000 parts per million (PPM). These four aquifers are monitored at several locations across the solution mining area: up and down-gradient, remote down-gradient, and toward the east near the southeast portion of Section 26. Baseline and current groundwater monitoring data have been obtained from 1991 through present. Refer to Figure 3 and Figure 4 for well locations.

The Perched Aquifer is characteristically lower in TDS, conductivity, fluoride, SAR (sodium absorption ratio) and moderate to higher in sulfate and pH. The A-Groove and B-Groove Aquifers are similar in water quality with moderate TDS, conductivity, SAR, but higher fluoride. However, the B-Groove Aquifer generally has slightly higher levels of TDS, conductivity, SAR, and fluoride. The Dissolution Surface Aquifer is characterized by very high TDS and conductivity (30,000 to >100,000 ppm), higher SAR, magnesium, potassium, moderate pH, and a generally higher fluoride.

In 2021 the results of groundwater monitoring were analyzed for potential anomalies in order to prevent or mitigate potential negative impacts to the USDW's.

Appendix A contains detailed sampling results for all groundwater monitoring wells.

5.1.4 Storage and Evaporation Ponds

The NS storage and evaporation ponds have a secondary liner and are constructed to collect and direct any condensation or leakage to tubes for removal. Weekly collection and removal of leachate continued in 2021. Pond information is reported on a monthly basis.

5.1.5 Potentiometric Surface Maps (Confidential)

Using groundwater potentiometric elevations from NS groundwater monitoring wells and other NS wells, A-Groove and B-Groove Aquifer potentiometric surface maps have been plotted and have been included with this report in Appendix B (Confidential).

6.0 Land Disturbance and Reclamation

6.1 Summary of 2021 Disturbance

NS created new disturbed acreage in 2021 by building one new pad with an access road (Up Gradient Well Location) and drilling three new GMWs; AG-2, BG-10, and the PA-1 wells. The BG-11 GMW was drilled on the existing 10H-13H pad resulting in no new disturbance. Interim reclamation activities occurred in 2021 on disturbed well pads and roads that reduced 2.66 acres from disturbed to interim reclaimed. An addition 0.44 acres of interim reclaimed well pads in 2021 was designated as undergoing final reclamation. The total disturbed acreage reported in 2020 was 102.59 acres. In 2021 the NS land disturbance increased to 103.68 acres as of December 2021. The total effected acreage of NS operations in 2021 is 108.25, which includes 4.57 acres that have been recognized as fully reclaimed by DRMS. Table 9 lists the disturbed acreage as of December 2021.

Table 9: Disturbed Acreage

Process Area:	**Acres:**
Plant Site Disturbed	26.84
Plant Site Undergoing Interim Reclamation	4.46
Plant Site Undergoing Final Reclamation	0.00
Plant Site Successfully Reclaimed	0.00
Well Field:	
Roads Disturbed	2.49
Well Pads Disturbed	29.84
Roads/Misc. Undergoing Interim Reclamation	1.26
Well Pads Undergoing Interim Reclamation	15.32
Road/Misc. Undergoing Final Reclamation	4.18
Well Pads Undergoing Final Reclamation	19.29
Total Disturbance:	**103.68**
Road/Misc. -- Recognized as Reclaimed by Agencies	0.00
Well Pads -- Recognized as Reclaimed by Agencies	4.57
Total Effected Acreage:	**108.25**

6.2 Regulatory Compliance

6.2.1 Regulatory Activity

In 2021, all required reports were submitted in a timely manner. Required forms were submitted to the appropriate agencies regarding all activities pertaining to the new wells drilled & associated plugging and abandonment operations.

6.3 Reclamation Activity

6.3.1 Regrading & Scarification

In 2021 the 8H-I & R location was regraded and scarification occurred to reclaim the well pad to original contours in preparation of seeding. In October 2021 the newly built Up Gradient Location was regraded and scarification occurred to take the pad from disturbed to interim reclaimed status.

6.3.2 Seeding & Weed Control

All areas reseeded were completed with the BLM approved final seed mix in 2021. The 8H pad was seeded following reclamation regrading activity in November. Following interim regrading operations of the Up Gradient pad, the “pulled in” areas were seeded in November. P&A well pads: BG-5, BG-8 (DS-4), BG-9 (DS-5), IRI-MW-1, PW-1, PW-2, IRI-3, 93-2M, 2014 exploration well pads U and G were spot seeded at first winter snow cover in December.

Prior placed slash was stabilized on the DS-10 location in 2021 for interim reclamation compliance.

The NS 2021 noxious weed control program consisted of spraying the P&A’ed and reclaimed/interim reclaimed production well pads that contained the 7H, 8H, and 10H production wells. Active production well pads containing all wells for the mining intervals 12H, 13H, 14H, 15H, 16H, 17H, and DVPW wells were sprayed for weed control in 2021.

Annual vegetation monitoring continued in 2021 for the areas of study that are currently in final reclamation status. The report, *The 2021 Vegetation Monitoring Reclamation Status Report,* prepared by Mr. Rusty Roberts, can found in Appendix C.

6.3.3 Reclamation Fencing

Repair and maintenance activities were performed, as necessary, on existing fences in 2021. Fencing is utilized to keep livestock and wildlife out of the reclaimed areas. Barbed wire fencing was removed around the 4-3H(V) location.

6.3.4 Precipitation

Perennial vegetation is an indicator of long-term precipitation, the "normal" precipitation for the NS site is 12-14 inches for the calendar year. The distribution of precipitation is important for proper reclamation. 2021 precipitation as measured at the NS plant was 10.09 inches. Table 10 provides a composite of precipitation from the NS mine site for the last 10 years.

Table 10: Annual Precipitation in inches (10 Year)

Month/Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	AVG
Jan	0.18	0.25	0.98	0.47	1.62	1.89	1.26	0.67	1.06	0.32	0.87
Feb	1.15	0.30	0.35	0.39	1.34	1.52	1.35	1.47	0.83	0.17	0.89
Mar	0.30	0.50	0.28	0.82	1.76	1.01	1.55	0.85	0.95	0.60	0.88
Apr	0.40	1.35	0.63	1.71	5.18	1.11	1.74	2.99	0.82	0.20	1.61
May	0.14	1.05	1.66	4.36	2.06	2.17	1.52	2.93	1.29	0.38	1.76
Jun	0.06	0.35	0.01	0.51	0.53	0.47	0.99	3.86	1.83	0.84	0.94
Jul	0.43	1.40	1.34	1.78	1.07	3.36	1.27	1.87	0.61	0.39	1.35
Aug	0.86	0.26	3.17	1.44	2.78	0.85	3.24	0.83	0.37	1.16	1.50
Sep	0.36	2.89	2.14	0.32	2.19	1.55	0.10	1.75	1.17	1.50	1.40
Oct	0.58	1.35	1.09	1.38	1.89	1.62	4.10	1.19	0.08	1.93	1.52
Nov	0.28	1.30	0.80	0.70	1.56	0.64	0.60	1.62	0.14	0.60	0.82
Dec	0.83	0.17	1.00	0.10	1.04	0.44	0.45	0.71	0.66	1.80	0.72
Annual Totals	5.57	11.17	13.45	13.97	23.02	16.63	18.17	20.75	9.79	10.09	14.26

6.3.5 Vegetation Monitoring Results

A vegetation survey is undertaken annually on the NS lease to collect data from eight reclaimed pad sites. Seven of the locations are core hole locations (pad sites C, E, G, Q, U, IRI-3, and IRI-10) that are currently in final reclamation status and one former production well P&A location, the 93-2M. The dry conditions that occurred during the growing season in 2021 resulted in only minimal declines in total vegetation cover and composition of desirable species as compared to the values measured in 2020. Reclaimed sites achieving successful reclamation criteria in 2021 consisted of pad C, pad E, IRI-10, and pad Q. For details of the 2021 vegetation monitoring results, refer to Appendix C for the full *2021 Vegetation Monitoring Reclamation Status Report* prepared for NS by Mr. Rusty Roberts.

6.4 Deer Roadkill Study

Per the monitoring requirement from the BLM, NS compiled deer roadkill data throughout 2021 for vehicles traveling to and from the mine site. Two deer of unknown sex were reported as struck and killed in 2021. One elk of unknown sex was reported as struck in May and departing the area with no apparent injuries to the animal. One elk of unknown sex was reported as struck in August and departed the area with unknown injuries.

6.5 Raptor Survey

On April 20, 2021 D&A, Inc. conducted a raptor breeding activity survey and inventory on behalf of NS in the pinion juniper habitat that is proximal to the 2021 upgradient groundwater monitoring well location, planned 2022 production wells (17H-1V & 17H-IR-E), and planned 2022 17H-1V-SSMW subsidence well drilling. A pedestrian survey, with the addition of call-playback techniques, was undertaken. The surveyed area included portions of sections 25, 26, 35, and 36 of T1S, R98W. The BLM WRFO assisted NS by identifying areas which may provide the most suitable raptor nesting habitat within the project area. No new or known nests were observed within the survey area during the survey. Two known raven nests first documented in 2014 were no longer present in 2021. One golden eagle was observed inside the survey area near the 12H-IR pad, the eagle was on the ground in a wooded area and appeared to be eating, it departed as surveyors approached. Surveyors followed the direction of the eagle's flight but the eagle had left the area. Weather conditions during the survey were optimal with full sun, light breeze and cool temperatures (40 – 55 degrees Fahrenheit). A report was written and submitted to the BLM following completion of the survey. The area surveyed in 2021 included the areas of the planned 2022 well field development activities, therefore, per BLM guidelines, no raptor survey will be conducted in 2022.

6.6 Other Observations

Elk, deer, coyotes, rabbits, bobcat, and fox were noted in and around the well-field throughout the year.

6.7 Waste Disposal

Common domestic solid waste was collected in containers and periodically transported to the Rio Blanco County landfill. Sewage from the plant was directed to a septic system with a leach drain field. Process water, including cooling tower blowdowns, boiler ditch, plant wash down, blow down from the boilers, and precipitation runoff, was directed to the process pond. A pump in the process storage pond allows NS to recycle the water to the barren system. The wastewater evaporation pond contains water from the cooling tower overflow and laboratory drains. Table 11 indicates hazardous waste that was generated and collected at the NS facilities. Hazardous waste was collected, contained safely, stored separately from day to day waste, and then disposed of properly by Clean Harbors, Inc., a certified hazardous waste handling/disposal company.

Table 11: Hazardous Waste Disposal

Date Shipped	# of Containers / Type	Total Quantity	Contents / Waste	Weight:	Code & MGT Code	EPA Waste Code
February , 2021	1 DF	500 P	NA3082, HAZARDOUS WASTE, LIQUID, N.O.S. (SILVER, CHROMIUM) , 9, PG III -- CHLORIDE TEST WASTE	502 LBS	CCSS & H132	D007, D011
	1 CF	15 P	NONE, NON DOT REGULATED MATERIAL, N/A, NONE, (UNIVERSAL WASTE-LAMPS) -- STRAIGHT FLUORESCENT TUBES FOR RECLAIM.	150 LBS	CFL1 & H039	NONE
	1 DF	5 G	Labpack Aerosols For Incineration, Compressed gases	20 LBS	LCCRQ & H040	D003
	1 DF	55 G	Labpack Flammables For Incineration, Lab packs with no acute hazardous waste	68 LBS	LCCRD & H040	D001
	54 CF	1125 P	UN2794, BATTERIES, WET, FILLED WITH ACID, 8, NONE, (UNIVERSAL WASTE-BATTERIES)	486 LBS	LBLA & H141	None
December , 2021	2 DM	10 P	NA3082, HAZARDOUS WASTE, LIQUID, N.O.S. (SILVER, CHROMIUM) , 9, PG III -- CHLORIDE TEST WASTE	0 LBS	CH95548/CCSS & H132	D007, D011
	1 DF	5 G	UN1993, WASTE FLAMMABLE LIQUIDS, N.O.S. (ACETONE, ISOPROPANOL) , 3, PG II -- ACETONE WITH TERPENE PHENOLIC AND BLACK INK.	32 LBS	CH1791276/FB1 & H040	D001, F003
Reported from Natural Soda by Mr. Gerry Deschaine 01/13/2022						

Natural Soda LLC

2021

Appendix A
Groundwater Analytical Results

Table 12: 89-3 Annual Perched Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	179	404.00	08/28/2013	66.00	09/14/1992	201.80	mg/l
Carbonate as CaCO3	179	138.00	12/05/2012	3.00	06/26/1990	30.03	mg/l
Total Alkalinity as CaCO3	179	524.00	08/28/2013	66.00	09/14/1992	224.03	mg/l
Bromide	25	0.60	07/06/2000	0.05	10/22/1989	0.19	mg/l
Cation-Anion Balance	177	15.70	06/14/2017	-13.00	12/16/2015	0.06	%
Sum of Anions	156	12.60	08/28/2013	5.10	06/14/2017	7.53	meq/l
Sum of Cations	157	11.80	08/28/2013	5.78	09/14/1992	7.49	meq/l
Chemical Oxygen Demand	19	300.00	09/23/2010	10.00	10/22/1989	51.82	mg/l
Chloride	179	75.30	08/28/2013	4.00	09/27/1990	16.05	mg/l
Conductivity, Lab	175	1,210.00	08/28/2013	534.00	08/06/1992	724.99	µmhos
Fluoride	179	18.00	07/31/1991	0.02	04/19/2001	0.47	mg/l
Hardness as CaCO3	178	113.00	04/11/2006	27.00	03/30/1990	79.29	mg/l
Nitrate as N, dissolved	27	0.76	07/24/2002	0.02	12/05/2012	0.14	mg/l
Nitrate/Nitrite as N,	27	0.85	07/24/2002	0.03	07/18/1995	0.15	mg/l
Nitrite as N, dissolved	27	0.10	06/26/1991	0.01	06/25/2007	0.04	mg/l
Nitrogen, Ammonia	24	13.10	09/23/2010	0.11	07/12/1996	1.52	mg/l
Nitrogen, Organic	24	13.40	06/26/1991	0.10	07/18/1995	1.93	mg/l
Nitrogen, Total Kjeldahl	24	25.40	09/23/2010	0.20	07/21/1994	3.20	mg/l
pH, lab	178	11.50	12/19/1991	6.60	09/14/1992	8.59	units
Phosphate, total	22	155.00	06/25/2007	0.03	07/02/1998	11.12	mg/l
Phosphorus, total	24	2.33	09/23/2010	0.01	06/26/1991	0.23	mg/l
SAR in Water	168	15.92	03/30/1990	4.82	09/14/1992	6.83	none
Sulfate	179	296.00	03/30/1990	1.00	12/12/2008	126.47	mg/l
Sulfide	21	4.50	09/23/2010	0.03	07/02/1998	0.49	mg/l
Total Dissolved Solids	179	659.00	08/28/2013	329.00	06/14/2017	441.03	mg/l
Conductivity, Field	196	16,000.00	07/01/1990	500.00	02/24/1993	775.64	µmhos
pH, Field	197	10.23	07/19/2009	6.90	12/12/2018	8.68	units
Temperature (°C), Field	107	21.10	07/19/2009	6.40	12/01/1990	12.14	(°C)
Water Level, Field	93	341.00	09/01/2011	315.00	05/18/2021	323.05	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	26	2.12	07/27/2001	0.03	07/07/1999	0.42	mg/l
Arsenic, dissolved	25	0.04	10/22/1989	0.0007	12/05/2012	0.01	mg/l
Barium, dissolved	25	0.69	03/30/1990	0.01	10/22/1989	0.06	mg/l
Beryllium, dissolved	25	0.01	06/26/1991	0.01	06/26/1991	0.01	mg/l
Boron, dissolved	179	0.43	08/28/2013	0.02	04/24/1991	0.06	mg/l
Cadmium, dissolved	25	0.003	09/13/1995	U	12/05/2012	U	mg/l
Calcium, dissolved	179	17.00	09/27/1990	4.50	06/25/2007	11.57	mg/l
Chromium, dissolved	26	0.01	06/26/1991	0.01	06/26/1991	0.01	mg/l
Copper, dissolved	26	0.20	12/05/2012	0.01	03/30/1990	0.06	mg/l
Iron, dissolved	25	4.17	09/27/1990	0.01	07/07/1999	0.44	mg/l
Lead, dissolved	25	0.06	08/19/2009	0.02	06/26/1991	0.04	mg/l
Lithium, dissolved	25	0.05	03/30/1990	0.02	06/26/1991	0.03	mg/l
Magnesium, dissolved	179	18.40	07/24/2002	3.00	03/30/1990	12.23	mg/l
Manganese, dissolved	25	0.14	09/27/1990	0.01	07/07/1999	0.03	mg/l
Mercury, dissolved	24	U	10/22/1989	0.0001	06/26/1991	0.0006	mg/l
Molybdenum, dissolved	25	0.15	06/26/1990	0.01	07/12/1996	0.07	mg/l
Nickel, dissolved	25	0.02	10/22/1989	0.02	10/22/1989	0.02	mg/l
Potassium, dissolved	179	10.00	01/31/1991	0.04	04/28/1995	1.18	mg/l
Selenium, dissolved	25	U	03/30/1990	0.001	09/27/1990	0.002	mg/l
Silica, dissolved	179	33.20	07/27/2001	4.80	01/21/1992	15.53	mg/l
Sodium, dissolved	179	236.00	08/28/2013	96.00	09/14/1992	133.51	mg/l
Strontium, dissolved	179	1.09	04/11/2006	0.17	03/30/1990	0.82	mg/l
Vanadium, dissolved	25	U	09/23/2010	U	12/05/2012	U	mg/l
Zinc, dissolved	25	0.35	03/30/1990	0.01	10/22/1989	0.05	mg/l

Table 13: IRI-1 Annual Perched Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	123	548.00	01/08/2015	0.00	08/01/1990	162.12	mg/l
Carbonate as CaCO3	123	300.00	10/25/1990	0.00	08/30/2008	117.49	mg/l
Total Alkalinity as CaCO3	123	900.00	08/01/1990	96.40	08/10/2021	294.81	mg/l
Bromide	26	1.60	07/21/1993	0.06	06/16/2011	0.29	mg/l
Cation-Anion Balance	120	63.90	08/14/2017	-16.00	03/13/2003	0.64	%
Sum of Anions	113	24.97	08/13/1990	5.00	08/10/2021	8.88	meq/l
Sum of Cations	113	50.00	08/14/2017	5.70	06/14/2011	9.33	meq/l
Chemical Oxygen Demand	19	300.00	09/21/2010	10.00	08/16/1994	46.25	mg/l
Chloride	123	400.00	04/24/1991	14.00	12/15/1992	53.39	mg/l
Conductivity, Lab	120	2,630.00	01/20/1992	347.00	08/10/2021	866.14	µmhos
Fluoride	123	24.00	09/02/1998	1.70	04/20/1992	6.45	mg/l
Hardness as CaCO3	123	553.00	08/01/1990	2.00	06/23/2010	36.33	mg/l
Nitrate as N, dissolved	26	2.77	06/26/2002	0.02	06/28/2006	0.38	mg/l
Nitrate/Nitrite as N,	26	2.79	06/26/2002	0.03	06/28/2006	0.35	mg/l
Nitrite as N, dissolved	26	0.13	08/16/1996	0.01	08/01/1990	0.05	mg/l
Nitrogen, Ammonia	25	2.57	07/31/1991	0.25	06/09/1999	0.76	mg/l
Nitrogen, Organic	25	3.90	07/21/1992	0.10	06/16/2011	1.03	mg/l
Nitrogen, Total Kjeldahl	25	5.90	07/31/1991	0.50	06/16/2011	1.83	mg/l
pH, lab	120	11.30	07/31/1991	6.60	08/30/2008	9.56	units
Phosphate, total	24	155.00	06/28/2006	0.10	08/13/1990	18.35	mg/l
Phosphorus, total	25	1.41	09/21/2010	0.03	07/31/1991	0.26	mg/l
SAR in Water	115	76.00	08/14/2017	5.76	08/01/1990	21.25	none
Sulfate	123	243.00	12/15/1992	40.40	09/16/2019	75.69	mg/l
Sulfide	24	4.00	06/13/2001	0.03	06/02/1998	1.08	mg/l
Total Dissolved Solids	121	1,644.00	08/01/1990	328.00	08/10/2021	582.87	mg/l
Conductivity, Field	181	3,500.00	08/01/1990	573.00	08/10/2021	1,145.74	µmhos
pH, Field	181	12.80	12/01/1990	6.04	08/30/2008	10.21	units
Temperature (°C), Field	121	20.10	05/16/2007	6.50	12/12/2008	12.27	(°C)
Water Level, Field	95	387.19	08/14/2017	308.80	06/20/2017	380.50	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	26	11.10	08/16/1996	0.06	07/29/2009	3.18	mg/l
Arsenic, dissolved	26	0.01	07/31/1991	0.0005	11/27/2012	0.0023	mg/l
Barium, dissolved	26	0.29	08/14/1995	0.01	11/27/2012	0.08	mg/l
Beryllium, dissolved	26	0.003	08/14/1995	U	11/27/2012	U	mg/l
Boron, dissolved	123	0.39	01/08/2015	0.00	10/25/1990	0.17	mg/l
Cadmium, dissolved	26	0.03	07/21/1993	0.03	07/21/1993	0.03	mg/l
Calcium, dissolved	123	223.00	08/01/1990	0.90	06/23/2010	10.90	mg/l
Chromium, dissolved	26	0.02	08/01/1990	0.01	08/16/1996	0.01	mg/l
Copper, dissolved	26	0.20	06/14/2000	0.01	08/01/1990	0.04	mg/l
Iron, dissolved	26	14.10	07/21/1993	0.02	07/21/1992	3.20	mg/l
Lead, dissolved	26	0.10	07/21/1993	0.05	06/16/1997	0.07	mg/l
Lithium, dissolved	26	0.19	08/13/1990	0.00	08/30/2008	0.05	mg/l
Magnesium, dissolved	123	31.20	03/14/2000	0.30	09/26/2001	2.57	mg/l
Manganese, dissolved	26	0.37	08/14/1995	0.01	08/30/2008	0.09	mg/l
Mercury, dissolved	26	0.0002	08/14/1995	U	11/27/2012	U	mg/l
Molybdenum, dissolved	26	0.10	08/01/1990	0.01	06/16/1997	0.04	mg/l
Nickel, dissolved	26	0.02	10/25/1990	0.01	08/16/1996	0.01	mg/l
Potassium, dissolved	123	146.00	08/01/1990	1.00	04/24/1991	7.50	mg/l
Selenium, dissolved	26	0.004	07/31/1991	0.002	08/13/1990	0.003	mg/l
Silica, dissolved	123	99.30	08/14/1995	6.90	09/04/2020	29.15	mg/l
Sodium, dissolved	123	1,110.00	08/14/2017	124.00	05/18/2021	196.50	mg/l
Strontium, dissolved	123	2.45	08/01/1990	0.02	05/24/1994	0.30	mg/l
Vanadium, dissolved	26	0.03	08/14/1995	0.01	06/16/1997	0.01	mg/l
Zinc, dissolved	26	0.24	07/21/1993	0.02	06/09/1999	0.07	mg/l

Table 14: IRI-5 Annual Perched Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	61	327.00	06/30/2009	2.00	12/18/1991	183.65	mg/l
Carbonate as CaCO3	61	284.00	12/18/1991	0.00	06/14/2008	76.07	mg/l
Total Alkalinity as CaCO3	61	406.00	03/25/1992	181.00	05/29/2002	252.00	mg/l
Bromide	31	1.00	08/22/1991	0.00	08/12/1992	0.21	mg/l
Cation-Anion Balance	58	17.30	06/14/2008	-10.20	05/26/2004	0.81	%
Sum of Anions	53	15.77	06/16/1992	8.43	12/19/1995	9.91	meq/l
Sum of Cations	53	15.25	06/16/1992	7.90	05/26/2004	10.13	meq/l
Chemical Oxygen Demand	28	181.00	11/02/2015	0.00	05/29/2002	53.56	mg/l
Chloride	61	420.00	06/16/1992	9.00	12/19/1995	20.90	mg/l
Conductivity, Lab	61	1,500.00	06/16/1992	795.00	08/12/1991	975.49	µmhos
Fluoride	61	0.90	09/16/1991	0.00	06/30/1995	0.29	mg/l
Hardness as CaCO3	61	182.00	06/14/2008	1.00	12/20/1993	33.83	mg/l
Nitrate as N, dissolved	32	12.50	05/29/2002	0.00	08/12/1992	1.03	mg/l
Nitrate/Nitrite as N,	32	12.50	05/29/2002	0.00	08/12/1992	0.91	mg/l
Nitrite as N, dissolved	32	0.06	09/14/1992	0.00	08/12/1992	0.02	mg/l
Nitrogen, Ammonia	32	0.87	06/23/1994	0.08	05/21/2007	0.28	mg/l
Nitrogen, Organic	32	80.00	05/15/1998	0.20	03/09/2020	5.10	mg/l
Nitrogen, Total Kjeldahl	32	80.00	05/15/1998	0.30	03/09/2020	4.60	mg/l
pH, lab	61	11.90	06/28/1993	2.40	06/16/1992	9.21	units
Phosphate, total	30	155.00	07/29/2009	0.06	05/29/2002	5.81	mg/l
Phosphorus, total	32	1.87	06/18/1996	0.02	05/29/2002	0.20	mg/l
SAR in Water	52	90.44	01/20/1994	7.50	06/30/2009	22.27	none
Sulfate	61	290.00	03/25/1992	148.00	03/22/1996	203.74	mg/l
Sulfide	31	6.60	03/09/2020	0.05	06/14/2008	0.56	mg/l
Total Dissolved Solids	60	1,090	06/16/1992	504	04/21/1994	630	mg/l
Conductivity, Field	74	9,880	05/21/2007	715	12/19/1995	1,172	µmhos
pH, Field	73	12.00	08/12/1992	6.33	06/14/2008	9.86	units
Temperature (°C), Field	34	17	06/14/2008	9.70	11/01/2002	12	(°C)
Water Level, Field	55	248.06	06/15/2010	238.20	03/08/2021	241.02	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	31	10.00	08/22/1992	0.04	05/29/2003	1.17	mg/l
Arsenic, dissolved	31	0.01	06/18/1996	0.0003	05/26/2004	0.0017	mg/l
Barium, dissolved	31	0.27	05/21/2007	0.01	05/26/2004	0.04	mg/l
Beryllium, dissolved	31	0.01	08/22/1992	U	08/22/1992	U	mg/l
Boron, dissolved	61	0.11	11/21/2005	0.02	08/22/1997	0.07	mg/l
Cadmium, dissolved	31	0.01	08/22/1992	U	03/22/2016	U	mg/l
Calcium, dissolved	61	63.60	06/14/2008	1.00	06/16/1992	7.07	mg/l
Chromium, dissolved	31	0.02	08/22/1992	0.01	06/23/1994	0.01	mg/l
Copper, dissolved	31	0.04	06/25/2019	0.01	06/23/1994	0.02	mg/l
Iron, dissolved	31	7.30	08/22/1992	0.01	05/26/2004	0.65	mg/l
Lead, dissolved	31	0.12	03/22/2016	0.02	08/12/1991	0.05	mg/l
Lithium, dissolved	31	0.06	10/03/2012	0.02	05/26/2004	0.03	mg/l
Magnesium, dissolved	61	9.10	06/30/2009	0.30	06/30/1995	4.58	mg/l
Manganese, dissolved	35	0.07	08/22/1992	0.01	08/22/1997	0.02	mg/l
Mercury, dissolved	31	0.0001	08/22/1992	U	08/12/1991	U	mg/l
Molybdenum, dissolved	31	0.03	06/14/2008	0.01	06/18/1996	0.02	mg/l
Nickel, dissolved	31	0.04	07/29/2009	0.02	08/22/1992	0.03	mg/l
Potassium, dissolved	60	22.00	12/18/1991	0.70	06/25/2019	7.35	mg/l
Selenium, dissolved	31	0.0010	08/12/1991	U	08/22/1992	U	mg/l
Silica, dissolved	60	74.00	08/22/1992	10.90	03/21/2017	18.27	mg/l
Sodium, dissolved	60	336.00	06/16/1992	166.00	05/26/2004	208.58	mg/l
Strontium, dissolved	60	1.30	06/30/2009	0.06	06/16/1992	0.49	mg/l
Vanadium, dissolved	31	0.01	08/22/1992	U	08/12/1991	U	mg/l
Zinc, dissolved	31	0.08	08/22/1992	0.02	06/23/1994	0.03	mg/l

Table 15: PA-1 Quarterly Perched Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	4	496	08/21/2021	395	09/03/2021	437	mg/l
Carbonate as CaCO3	4	124	09/10/2021	55	08/21/2021	80	mg/l
Total Alkalinity as CaCO3	4	551	08/21/2021	479	09/03/2021	517	mg/l
Bromide	3	U	08/21/2021	U	09/10/2021	U	mg/l
Cation-Anion Balance	4	2.60	09/03/2021	-2.60	11/12/2021	0.60	%
Sum of Anions	4	20.00	08/21/2021	19.00	09/03/2021	19.75	meq/l
Sum of Cations	4	21.00	08/21/2021	19.00	11/12/2021	20.00	meq/l
Chemical Oxygen Demand	3	48.00	08/21/2021	20.00	09/03/2021	34.00	mg/l
Chloride	4	13	09/03/2021	7	08/21/2021	11	mg/l
Conductivity, Lab	4	1,690	09/10/2021	1,630	09/03/2021	1,663	µmhos
Fluoride	4	U	08/21/2021	U	09/10/2021	U	mg/l
Hardness as CaCO3	4	619.00	08/21/2021	470.00	11/12/2021	530.50	mg/l
Nitrate as N, dissolved	3	UH	08/21/2021	UH	09/10/2021	UH	mg/l
Nitrate/Nitrite as N,	3	UH	08/21/2021	UH	09/10/2021	UH	mg/l
Nitrite as N, dissolved	3	UH	08/21/2021	UH	09/10/2021	UH	mg/l
Nitrogen, Ammonia	3	0.43	09/10/2021	0.27	08/21/2021	0.37	mg/l
Nitrogen, Organic	3	0.55	09/10/2021	0.22	09/03/2021	0.38	mg/l
Nitrogen, Total Kjeldahl	3	0.98	09/10/2021	0.29	08/21/2021	0.63	mg/l
pH, lab	4	8.80	09/03/2021	8.40	11/12/2021	8.65	units
Phosphate, total	3	1.02	09/03/2021	0.45	08/21/2021	0.65	mg/l
Phosphorus, total	3	0.33	09/03/2021	0.15	08/21/2021	0.21	mg/l
SAR in Water	4	4	11/12/2021	3.20	08/21/2021	4	none
Sulfate	4	439	08/21/2021	407	09/10/2021	425	mg/l
Sulfide	3	UH	08/21/2021	U	09/10/2021	U	mg/l
Total Dissolved Solids	4	1,190	08/21/2021	1,120	09/03/2021	1,145	mg/l
Conductivity, Field	3	1,633	09/03/2021	1,611	11/12/2021	1,619	µmhos
pH, Field	3	8.60	09/03/2021	8.41	11/12/2021	8.50	units
Temperature (°C), Field	3	16.30	09/10/2021	12.60	11/12/2021	14.87	(°C)
Water Level, Field	3	305.20	11/12/2021	305.10	09/03/2021	305.13	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Arsenic, dissolved	3	0.01	09/10/2021	0.00	08/21/2021	0.01	mg/l
Barium, dissolved	3	0.02	09/03/2021	0.01	09/10/2021	0.02	mg/l
Beryllium, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Boron, dissolved	4	0.10	08/21/2021	0.09	09/03/2021	0.10	mg/l
Cadmium, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Calcium, dissolved	4	74.80	08/21/2021	43.80	11/12/2021	54.95	mg/l
Chromium, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Copper, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Iron, dissolved	3	0.30	09/10/2021	0.13	09/03/2021	0.20	mg/l
Lead, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Lithium, dissolved	3	0.12	09/03/2021	0.08	08/21/2021	0.11	mg/l
Magnesium, dissolved	4	105.00	08/21/2021	87.60	11/12/2021	95.50	mg/l
Manganese, dissolved	3	0.21	08/21/2021	0.05	09/03/2021	0.13	mg/l
Mercury, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Molybdenum, dissolved	3	0.03	09/03/2021	0.02	09/10/2021	0.02	mg/l
Nickel, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Potassium, dissolved	4	15.10	09/10/2021	2.20	08/21/2021	10.65	mg/l
Selenium, dissolved	3	0.00011	09/03/2021	0.00011	08/21/2021	0.00016	mg/l
Silica, dissolved	4	32.50	08/21/2021	21.90	09/03/2021	25.25	mg/l
Sodium, dissolved	4	210	09/10/2021	183	08/21/2021	200	mg/l
Strontium, dissolved	4	2.56	11/12/2021	2.06	08/21/2021	2.36	mg/l
Vanadium, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l
Zinc, dissolved	3	U	08/21/2021	U	09/10/2021	U	mg/l

Table 16: 89-2 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	187	903.00	12/12/2008	41.00	01/30/1997	517.10	mg/l
Carbonate as CaCO3	187	566.00	01/30/1997	8.00	11/28/1990	90.41	mg/l
Total Alkalinity as CaCO3	187	926.00	12/12/2008	160.00	10/25/1990	605.82	mg/l
Bromide	27	3.00	06/26/1990	0.05	07/01/1997	0.44	mg/l
Cation-Anion Balance	178	63.40	04/14/2005	-28.80	08/02/2006	0.54	%
Sum of Anions	161	20.10	12/12/2008	11.66	11/28/1990	14.15	meq/l
Sum of Cations	161	67.50	04/14/2005	7.80	08/02/2006	14.43	meq/l
Chemical Oxygen Demand	24	220.00	09/22/2010	10.00	08/02/2006	80.23	mg/l
Chloride	186	118.00	10/22/1989	2.00	04/24/1991	19.38	mg/l
Conductivity, Lab	184	1,760.00	12/12/2008	1,000.00	05/20/1993	1,257.88	µmhos
Fluoride	187	30.00	12/19/1991	1.90	06/26/1991	21.42	mg/l
Hardness as CaCO3	181	375.00	05/21/2018	0.40	10/25/1990	11.10	mg/l
Nitrate as N, dissolved	28	5.76	08/10/2008	0.02	07/18/1995	0.53	mg/l
Nitrate/Nitrite as N,	28	6.26	08/10/2008	0.02	07/18/1995	0.56	mg/l
Nitrite as N, dissolved	28	0.50	08/10/2008	0.01	03/30/1990	0.13	mg/l
Nitrogen, Ammonia	26	3.77	08/10/2008	0.54	06/15/1992	1.30	mg/l
Nitrogen, Organic	26	14.60	09/27/1990	0.10	06/15/1992	4.37	mg/l
Nitrogen, Total Kjeldahl	26	15.40	09/27/1990	0.60	06/15/1992	5.49	mg/l
pH, lab	183	9.70	12/20/1994	8.00	07/18/1995	8.92	units
Phosphate, total	22	155.00	06/25/2007	0.06	07/02/1998	10.79	mg/l
Phosphorus, total	27	0.46	06/26/1990	0.01	08/17/1993	0.08	mg/l
SAR in Water	144	345.00	04/14/2005	0.21	05/21/2018	57.30	none
Sulfate	187	445.00	06/26/1990	2.49	05/21/2018	40.76	mg/l
Sulfide	23	2.40	07/24/2002	0.02	07/15/2004	0.45	mg/l
Total Dissolved Solids	187	2,040.00	04/14/2005	494.00	10/25/1990	785.18	mg/l
Conductivity, Field	233	1,980.00	12/12/2008	620.00	03/16/1994	1,222.92	µmhos
pH, Field	233	10.00	08/22/1991	6.80	03/10/2015	9.08	units
Temperature (°C), Field	113	17.40	07/01/2002	8.10	02/08/2021	12.21	(°C)
Water Level, Field	99	545.20	06/25/2014	463.95	04/01/2003	496.34	Ft.
Parameters Metals	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	26	0.70	10/22/1989	0.03	07/01/1997	0.12	mg/l
Arsenic, dissolved	26	0.04	06/26/1991	0.0030	06/15/1992	0.0109	mg/l
Barium, dissolved	26	0.23	07/15/2004	0.01	08/02/2006	0.04	mg/l
Beryllium, dissolved	26	0.01	06/26/1990	U	12/27/1990	U	mg/l
Boron, dissolved	180	1.48	04/14/2005	0.19	08/02/2006	0.37	mg/l
Cadmium, dissolved	26	0.01	06/26/1990	U	12/03/2012	U	mg/l
Calcium, dissolved	179	141.00	05/21/2018	0.30	04/27/2004	2.32	mg/l
Chromium, dissolved	26	0.07	07/30/2003	0.01	06/26/1990	0.04	mg/l
Copper, dissolved	26	0.01	06/26/1990	U	12/03/2012	U	mg/l
Iron, dissolved	26	0.80	10/22/1989	0.01	07/18/1995	0.13	mg/l
Lead, dissolved	26	0.05	10/22/1989	0.02	06/26/1990	0.03	mg/l
Lithium, dissolved	26	0.13	07/15/2004	0.02	06/26/1990	0.05	mg/l
Magnesium, dissolved	179	9.10	12/12/2008	0.20	04/27/2004	1.24	mg/l
Manganese, dissolved	25	0.14	07/30/2003	0.01	06/26/1990	0.06	mg/l
Mercury, dissolved	26	0.0006	06/15/1992	0.0001	06/26/1990	U	mg/l
Molybdenum, dissolved	26	0.13	10/22/1989	0.01	07/12/1996	0.05	mg/l
Nickel, dissolved	26	0.52	07/30/2003	0.02	10/22/1989	0.19	mg/l
Potassium, dissolved	180	12.50	05/21/2018	0.50	06/10/2020	1.36	mg/l
Selenium, dissolved	26	0.009	09/27/1990	0.001	06/26/1990	U	mg/l
Silica, dissolved	180	27.70	01/09/2001	2.00	12/10/2019	12.68	mg/l
Sodium, dissolved	180	1,530.00	04/14/2005	9.20	05/21/2018	321.91	mg/l
Strontium, dissolved	180	1.34	12/12/2008	0.03	04/27/2004	0.20	mg/l
Vanadium, dissolved	26	0.01	06/26/1990	U	09/27/1990	U	mg/l
Zinc, dissolved	26	0.03	07/29/2009	0.01	06/26/1990	0.02	mg/l

Table 17: 90-1 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	107	16,300.00	02/24/2020	170.00	06/12/1990	3,545.97	mg/l
Carbonate as CaCO3	107	6,530.00	12/13/2016	9.00	04/27/2004	583.74	mg/l
Total Alkalinity as CaCO3	107	18,700.00	02/24/2020	477.00	04/16/2002	4,099.62	mg/l
Bromide	23	0.10	01/31/1991	0.08	07/31/2009	0.10	mg/l
Cation-Anion Balance	104	30.70	12/13/2016	-14.70	02/27/2017	-0.92	%
Sum of Anions	104	566.00	02/24/2020	11.49	02/24/1992	130.33	meq/l
Sum of Cations	104	516.00	08/17/2021	11.50	09/27/1990	122.23	meq/l
Chemical Oxygen Demand	19	191.00	06/29/2016	10.00	10/22/2002	61.30	mg/l
Chloride	106	6,950.00	08/17/2021	10.00	01/31/1991	1,600.59	mg/l
Conductivity, Lab	105	40,600.00	08/17/2021	1,075.00	01/31/1991	10,539.19	µmhos
Fluoride	107	51.90	02/24/2020	1.40	04/27/2004	19.05	mg/l
Hardness as CaCO3	107	98.00	11/06/2014	4.00	09/09/2015	41.11	mg/l
Nitrate as N, dissolved	23	3.99	01/31/1991	0.02	09/27/1990	0.70	mg/l
Nitrate/Nitrite as N,	23	4.00	01/31/1991	0.02	09/27/1990	0.60	mg/l
Nitrite as N, dissolved	23	0.02	09/27/1990	0.01	01/31/1991	0.02	mg/l
Nitrogen, Ammonia	22	5.10	08/21/2015	0.08	09/27/1990	1.03	mg/l
Nitrogen, Organic	22	2.50	06/29/2016	0.10	01/31/1991	0.53	mg/l
Nitrogen, Total Kjeldahl	22	7.10	06/29/2016	0.04	09/27/1990	1.43	mg/l
pH, lab	105	12.80	01/27/2016	6.30	07/25/2002	8.76	units
Phosphate, total	19	11.00	06/29/2016	0.06	06/28/2007	1.35	mg/l
Phosphorus, total	22	3.40	06/29/2016	0.02	06/28/2007	0.38	mg/l
SAR in Water	102	1,600.00	12/13/2016	25.30	08/04/2008	232.93	none
Sulfate	107	933.00	09/09/2015	10.00	10/04/2011	90.83	mg/l
Sulfide	23	12.00	10/19/2000	0.07	10/22/2002	4.14	mg/l
Total Dissolved Solids	107	29,700.00	08/17/2021	700.00	07/21/1994	6,858.68	mg/l
Conductivity, Field	323	37,620.00	02/24/2020	1,122.70	05/04/2010	4,404.68	µmhos
pH, Field	108	12.50	04/13/2016	7.00	12/11/2018	8.49	units
Temperature (°C), Field	80	24.40	07/28/2011	7.50	03/04/2013	17.70	(°C)
Water Level, Field	26	549.12	10/15/2015	531.00	04/21/2016	538.35	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	23	0.05	06/12/1990	0.04	06/28/2007	0.05	mg/l
Arsenic, dissolved	23	0.05	08/21/2015	0.0008	10/26/2004	0.01	mg/l
Barium, dissolved	23	1.77	11/06/2014	0.02	01/31/1991	0.47	mg/l
Beryllium, dissolved	23	0.01	06/12/1990	0.01	06/12/1990	0.01	mg/l
Boron, dissolved	107	18.40	08/17/2021	0.25	06/12/1990	3.04	mg/l
Cadmium, dissolved	23	0.01	06/12/1990	0.01	09/27/1990	0.01	mg/l
Calcium, dissolved	105	12.00	08/21/2015	0.00	05/17/2017	4.82	mg/l
Chromium, dissolved	23	0.02	09/28/2006	0.01	06/12/1990	0.01	mg/l
Copper, dissolved	23	0.01	06/12/1990	0.01	06/12/1990	0.01	mg/l
Iron, dissolved	23	3.00	08/21/2015	0.02	09/27/1990	0.23	mg/l
Lead, dissolved	23	0.02	06/12/1990	0.02	06/12/1990	0.02	mg/l
Lithium, dissolved	23	0.49	11/06/2014	0.01	06/12/1990	0.18	mg/l
Magnesium, dissolved	107	19.00	11/06/2014	2.00	06/12/1990	7.97	mg/l
Manganese, dissolved	23	0.08	10/04/2011	0.01	09/22/2010	0.02	mg/l
Mercury, dissolved	23	0.0004	10/30/2003	0.0001	06/12/1990	0.0002	mg/l
Molybdenum, dissolved	23	0.05	06/12/1990	0.02	09/15/2007	0.04	mg/l
Nickel, dissolved	23	0.02	06/12/1990	0.02	06/12/1990	0.02	mg/l
Potassium, dissolved	107	746.00	12/13/2016	0.40	07/18/2000	28.83	mg/l
Selenium, dissolved	23	0.0014	08/21/2015	0.00	06/12/1990	0.0011	mg/l
Silica, dissolved	107	40.00	09/09/2015	6.00	01/17/2018	12.73	mg/l
Sodium, dissolved	107	11,700.00	08/17/2021	259.00	06/12/1990	2,710.17	mg/l
Strontium, dissolved	107	4.93	11/06/2014	0.03	09/09/2015	1.90	mg/l
Vanadium, dissolved	23	0.01	06/12/1990	0.01	06/12/1990	0.01	mg/l
Zinc, dissolved	23	0.02	06/28/2007	0.01	06/12/1990	0.01	mg/l

Table 18: 90-4 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	127	1,830.00	12/14/2021	45.00	06/26/2002	780.41	mg/l
Carbonate as CaCO3	127	693.00	06/26/2002	10.00	12/16/2003	91.77	mg/l
Total Alkalinity as CaCO3	127	2,510.00	12/14/2021	142.00	09/28/2006	862.02	mg/l
Bromide	30	16.00	06/16/1997	0.29	08/01/1990	5.56	mg/l
Cation-Anion Balance	124	11.90	06/23/2010	-68.80	08/15/2017	-2.29	%
Sum of Anions	124	153.40	05/24/1994	34.16	08/01/1990	83.99	meq/l
Sum of Cations	124	143.00	02/27/1997	10.00	08/15/2017	80.97	meq/l
Chemical Oxygen Demand	22	840.00	08/16/1994	10.00	08/16/1996	192.50	mg/l
Chloride	127	4,690.00	05/24/1994	700.00	08/01/1990	2,409.16	mg/l
Conductivity, Lab	124	14,100.00	02/21/1994	309.00	05/27/2015	8,366.13	µmhos
Fluoride	127	23.70	08/01/1990	5.50	06/14/2008	12.56	mg/l
Hardness as CaCO3	127	204.00	02/21/1994	25.00	08/15/2017	85.01	mg/l
Nitrate as N, dissolved	29	0.08	06/26/2002	0.02	06/28/2006	0.05	mg/l
Nitrate/Nitrite as N,	29	0.09	06/16/2011	0.02	06/28/2006	0.06	mg/l
Nitrite as N, dissolved	29	0.04	06/16/2011	0.01	01/29/1991	0.02	mg/l
Nitrogen, Ammonia	28	3.30	08/10/2008	0.83	08/13/1990	1.88	mg/l
Nitrogen, Organic	28	10.10	03/14/2008	0.40	07/21/1993	3.39	mg/l
Nitrogen, Total Kjeldahl	28	12.10	03/14/2008	1.30	06/14/2000	5.03	mg/l
pH, lab	124	9.10	12/14/2021	7.70	09/14/2004	8.57	units
Phosphate, total	26	155.00	06/28/2006	0.06	08/14/1995	17.00	mg/l
Phosphorus, total	28	0.11	08/13/1990	0.02	07/31/1991	0.06	mg/l
SAR in Water	124	4,950.00	06/24/2003	19.00	08/15/2017	130.04	none
Sulfate	126	2,310.00	06/15/2014	4.00	12/16/2004	70.78	mg/l
Sulfide	23	5.80	06/26/2002	0.02	08/10/2008	1.18	mg/l
Total Dissolved Solids	127	8,270.00	02/27/1997	2,110.00	08/15/2017	4,902.59	mg/l
Conductivity, Field	185	13,600.00	11/17/1993	2,900.00	08/01/1990	8,504.50	µmhos
pH, Field	180	9.53	07/29/2009	7.30	10/09/2019	8.54	units
Temperature (°C), Field	128	22.10	07/10/2018	7.40	12/15/2005	12.28	(°C)
Water Level, Field	104	549.00	12/14/2021	516.40	10/01/1990	538.32	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	29	0.80	06/16/2005	0.03	09/21/2010	0.28	mg/l
Arsenic, dissolved	29	0.05	01/29/1991	0.00	06/28/2006	0.01	mg/l
Barium, dissolved	29	1.56	03/14/2008	0.09	08/01/1990	0.85	mg/l
Beryllium, dissolved	29	U	05/08/2020	U	05/08/2020	U	mg/l
Boron, dissolved	127	1.29	07/21/1992	0.10	11/20/1996	0.33	mg/l
Cadmium, dissolved	29	0.03	07/21/1993	0.03	07/21/1993	0.03	mg/l
Calcium, dissolved	127	45.00	12/16/2004	3.00	11/20/1996	10.55	mg/l
Chromium, dissolved	29	U	05/08/2020	U	05/08/2020	U	mg/l
Copper, dissolved	29	0.08	06/24/2004	0.08	06/24/2004	0.08	mg/l
Iron, dissolved	29	1.67	10/25/1990	0.07	09/21/2010	0.39	mg/l
Lead, dissolved	29	U	05/08/2020	U	05/08/2020	U	mg/l
Lithium, dissolved	28	0.10	06/16/1997	0.02	08/13/1990	0.04	mg/l
Magnesium, dissolved	127	37.00	02/21/1994	3.90	08/15/2017	14.22	mg/l
Manganese, dissolved	28	0.15	10/25/1990	0.01	09/21/2010	0.05	mg/l
Mercury, dissolved	29	0.002	09/15/2007	0.0002	08/14/1995	0.0009	mg/l
Molybdenum, dissolved	29	0.37	08/13/1990	0.13	10/25/1990	0.24	mg/l
Nickel, dissolved	29	U	05/08/2020	U	05/08/2020	U	mg/l
Potassium, dissolved	127	10.00	07/31/1991	1.37	12/14/2020	2.99	mg/l
Selenium, dissolved	29	0.003	01/29/1991	0.001	08/13/1990	0.002	mg/l
Silica, dissolved	127	63.00	12/16/2004	2.10	04/20/1992	12.21	mg/l
Sodium, dissolved	127	3,180.00	02/27/1997	220.00	08/15/2017	1,857.06	mg/l
Strontium, dissolved	127	8.17	02/21/1994	0.30	08/15/2017	3.08	mg/l
Vanadium, dissolved	29	U	05/08/2020	U	05/08/2020	U	mg/l
Zinc, dissolved	29	0.10	07/31/1991	0.01	10/25/1990	0.05	mg/l

Table 19: AG-1 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	11	1,410	06/03/2020	198	02/10/2015	654	mg/l
Carbonate as CaCO3	11	273	01/29/2015	53	11/04/2014	194	mg/l
Total Alkalinity as CaCO3	11	1,670	06/03/2020	377	02/10/2015	849	mg/l
Bromide	11	2.38	04/22/2019	0.17	01/29/2015	1.27	mg/l
Cation-Anion Balance	11	0.00	12/15/2015	-6.70	02/10/2015	-3.18	%
Sum of Anions	11	45.00	06/11/2019	15.00	12/15/2015	25.45	meq/l
Sum of Cations	11	42.00	06/11/2019	14.00	02/10/2015	23.73	meq/l
Chemical Oxygen Demand	11	37.00	12/15/2015	10.00	06/11/2019	19.11	mg/l
Chloride	11	435	06/11/2019	92	11/04/2014	210	mg/l
Conductivity, Lab	11	3,800	06/11/2019	1,430	11/04/2014	2,320	µmhos
Fluoride	11	17.50	06/03/2020	5.47	06/19/2018	9.72	mg/l
Hardness as CaCO3	11	80.00	06/11/2019	13.00	06/19/2018	37.12	mg/l
Nitrate as N, dissolved	11	0.02	01/29/2015	U	11/04/2014	U	mg/l
Nitrate/Nitrite as N,	11	0.03	01/29/2015	0.00	11/04/2014	U	mg/l
Nitrite as N, dissolved	11	0.01	01/29/2015	0.00	11/04/2014	0.01	mg/l
Nitrogen, Ammonia	11	1.51	09/28/2017	0.47	04/05/2016	0.84	mg/l
Nitrogen, Organic	11	0.50	01/29/2015	0.10	04/05/2016	0.28	mg/l
Nitrogen, Total Kjeldahl	11	1.90	09/28/2017	0.60	04/05/2016	1.05	mg/l
pH, lab	11	9.70	01/29/2015	8.70	11/04/2014	9.29	units
Phosphate, total	11	1.02	06/03/2020	0.06	06/19/2018	0.38	mg/l
Phosphorus, total	11	0.33	06/03/2020	0.02	06/19/2018	0.12	mg/l
SAR in Water	11	59	06/03/2020	20.00	11/04/2014	39	none
Sulfate	11	210	02/10/2015	27.40	06/03/2020	101	mg/l
Sulfide	11	6.20	06/03/2020	0.04	11/04/2014	2.22	mg/l
Total Dissolved Solids	11	2,400	06/11/2019	843	12/15/2015	1,376	mg/l
Conductivity, Field	9	4,062	04/22/2019	1,432	04/05/2016	2,513	µmhos
pH, Field	9	9.64	06/19/2018	8.44	04/22/2019	8.97	units
Temperature (°C), Field	9	22.22	06/19/2018	16.10	11/20/2018	18.53	(°C)
Water Level, Field	9	581.90	09/28/2017	569.40	05/18/2021	575.20	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Arsenic, dissolved	11	0.0038	11/04/2014	0.0004	02/10/2015	0.0011	mg/l
Barium, dissolved	11	0.41	04/22/2019	0.01	12/15/2015	0.12	mg/l
Beryllium, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Boron, dissolved	11	1.07	06/03/2020	0.21	02/10/2015	0.49	mg/l
Cadmium, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Calcium, dissolved	11	7.80	11/04/2014	1.30	04/05/2016	3.63	mg/l
Chromium, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Copper, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Iron, dissolved	11	0.86	09/28/2017	0.03	11/04/2014	0.25	mg/l
Lead, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Lithium, dissolved	11	0.28	06/11/2019	0.12	11/04/2014	0.17	mg/l
Magnesium, dissolved	11	17.10	06/11/2019	2.40	06/19/2018	6.80	mg/l
Manganese, dissolved	11	0.08	11/04/2014	0.01	04/05/2016	0.03	mg/l
Mercury, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Molybdenum, dissolved	11	0.19	06/19/2018	0.06	11/04/2014	0.13	mg/l
Nickel, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Potassium, dissolved	11	11.30	06/19/2018	1.50	06/11/2019	6.23	mg/l
Selenium, dissolved	11	0.0134	05/18/2021	0.0002	09/28/2017	0.0005	mg/l
Silica, dissolved	11	13.90	11/04/2014	0.20	02/10/2015	6.76	mg/l
Sodium, dissolved	11	924	06/11/2019	303	02/10/2015	514	mg/l
Strontium, dissolved	11	1.93	06/11/2019	0.23	12/15/2015	0.78	mg/l
Vanadium, dissolved	11	U	06/03/2020	U	11/04/2014	U	mg/l
Zinc, dissolved	11	0.61	05/18/2021	0.01	11/04/2014	0.23	mg/l

Table 20: AG-2 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	4	441	08/17/2021	308	11/12/2021	357	mg/l
Carbonate as CaCO3	4	283	11/12/2021	80	08/17/2021	190	mg/l
Total Alkalinity as CaCO3	4	592	11/12/2021	513	09/03/2021	547	mg/l
Bromide	3	U	08/17/2021	U	09/10/2021	U	mg/l
Cation-Anion Balance	4	3.20	09/03/2021	-3.00	11/12/2021	0.05	%
Sum of Anions	4	17.00	09/10/2021	13.00	08/17/2021	15.50	meq/l
Sum of Cations	4	17.00	09/10/2021	13.00	08/17/2021	15.50	meq/l
Chemical Oxygen Demand	3	35.00	09/03/2021	25.00	09/10/2021	29.33	mg/l
Chloride	4	32	09/10/2021	16	08/17/2021	27	mg/l
Conductivity, Lab	4	1,620	11/12/2021	1,220	08/17/2021	1,428	µmhos
Fluoride	4	10.40	09/03/2021	9.31	09/10/2021	9.85	mg/l
Hardness as CaCO3	4	60.00	08/17/2021	40.00	09/03/2021	51.50	mg/l
Nitrate as N, dissolved	3	UH	08/17/2021	UH	09/10/2021	UH	mg/l
Nitrate/Nitrite as N,	3	UH	08/17/2021	UH	09/10/2021	UH	mg/l
Nitrite as N, dissolved	3	UH	08/17/2021	UH	09/10/2021	UH	mg/l
Nitrogen, Ammonia	3	0.91	09/03/2021	0.39	08/17/2021	0.69	mg/l
Nitrogen, Organic	3	0.59	09/10/2021	0.31	09/03/2021	0.46	mg/l
Nitrogen, Total Kjeldahl	3	1.36	09/10/2021	0.88	08/17/2021	1.15	mg/l
pH, lab	4	9.80	09/10/2021	8.90	08/17/2021	9.43	units
Phosphate, total	3	1.45	09/03/2021	0.39	08/17/2021	1.04	mg/l
Phosphorus, total	3	0.47	09/03/2021	0.13	08/17/2021	0.34	mg/l
SAR in Water	4	23	09/03/2021	15.00	08/17/2021	20	none
Sulfate	4	190	11/12/2021	82.60	08/17/2021	155	mg/l
Sulfide	3	2.73	09/10/2021	0.10	08/17/2021	1.55	mg/l
Total Dissolved Solids	4	971	09/10/2021	735	08/17/2021	889	mg/l
Conductivity, Field	7	1,561	09/10/2021	1,020	08/11/2021	1,232	µmhos
pH, Field	7	9.71	09/03/2021	7.44	08/11/2021	8.46	units
Temperature (°C), Field	7	28.10	08/11/2021	12.40	11/12/2021	19.99	(°C)
Water Level, Field	3	369.80	11/12/2021	368.70	09/03/2021	369.13	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	3	0.09	08/17/2021	0.09	08/17/2021	0.09	mg/l
Arsenic, dissolved	3	0.45	09/10/2021	0.06	08/17/2021	0.23	mg/l
Barium, dissolved	3	0.07	09/10/2021	0.02	08/17/2021	0.05	mg/l
Beryllium, dissolved	3	U	08/17/2021	U	09/10/2021	U	mg/l
Boron, dissolved	4	0.26	09/10/2021	0.25	08/17/2021	0.25	mg/l
Cadmium, dissolved	3	U	08/17/2021	U	09/10/2021	U	mg/l
Calcium, dissolved	4	11.30	08/17/2021	4.84	09/03/2021	7.52	mg/l
Chromium, dissolved	3	U	08/17/2021	U	09/10/2021	U	mg/l
Copper, dissolved	3	U	08/17/2021	U	09/10/2021	U	mg/l
Iron, dissolved	3	0.30	08/17/2021	0.17	09/03/2021	0.25	mg/l
Lead, dissolved	3	U	08/17/2021	U	09/10/2021	U	mg/l
Lithium, dissolved	3	0.11	09/03/2021	0.07	08/17/2021	0.10	mg/l
Magnesium, dissolved	4	8.79	11/12/2021	6.73	09/03/2021	7.88	mg/l
Manganese, dissolved	3	0.058	08/17/2021	U	09/10/2021	0.05	mg/l
Mercury, dissolved	3	U	08/17/2021	U	09/10/2021	U	mg/l
Molybdenum, dissolved	3	0.69	09/10/2021	0.22	08/17/2021	0.50	mg/l
Nickel, dissolved	3	U	08/17/2021	U	09/10/2021	U	mg/l
Potassium, dissolved	4	30.30	09/03/2021	1.24	08/17/2021	20.61	mg/l
Selenium, dissolved	3	0.0028	08/17/2021	0.00025	09/10/2021	0.00119	mg/l
Silica, dissolved	4	13.40	08/17/2021	6.40	09/03/2021	9.03	mg/l
Sodium, dissolved	4	342	09/10/2021	271	08/17/2021	316	mg/l
Strontium, dissolved	4	1.07	11/12/2021	0.77	08/17/2021	0.91	mg/l
Vanadium, dissolved	3	U	08/17/2021	U	09/10/2021	U	mg/l
Zinc, dissolved	3	0.615	09/10/2021	U	08/17/2021	0.62	mg/l

Table 21: IRI-4 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	60	1,250.00	03/22/1993	34.00	09/08/1993	277.59	mg/l
Carbonate as CaCO3	60	870.00	03/22/1993	24.00	06/30/2009	259.68	mg/l
Total Alkalinity as CaCO3	60	2,120.00	03/22/1993	176.00	06/14/2008	494.27	mg/l
Bromide	31	2.70	11/29/2011	0.07	05/26/2000	0.62	mg/l
Cation-Anion Balance	58	13.30	11/06/2014	-9.10	03/22/2016	1.84	%
Sum of Anions	58	19.49	09/16/1991	9.50	05/29/2003	13.20	meq/l
Sum of Cations	58	18.34	09/16/1991	9.50	05/26/2004	13.77	meq/l
Chemical Oxygen Demand	29	1,300.00	05/29/2002	15.00	03/27/2018	433.56	mg/l
Chloride	60	252.00	06/14/2008	21.00	12/20/1993	113.08	mg/l
Conductivity, Lab	59	3,320.00	09/15/1992	1,010.0	05/29/2003	1,515.4	µmhos
Fluoride	60	27.00	12/19/1995	2.20	09/15/1992	9.24	mg/l
Hardness as CaCO3	60	962.00	03/22/1993	0.00	01/19/1994	33.89	mg/l
Nitrate as N, dissolved	31	3.89	06/14/2008	0.02	09/15/1992	0.43	mg/l
Nitrate/Nitrite as N,	31	3.90	06/14/2008	0.02	09/15/1992	0.33	mg/l
Nitrite as N, dissolved	31	0.05	11/06/2014	0.01	06/18/1996	0.02	mg/l
Nitrogen, Ammonia	31	21.30	09/08/1993	0.34	08/23/2017	3.62	mg/l
Nitrogen, Organic	31	104.00	05/29/2002	0.20	08/23/2017	17.23	mg/l
Nitrogen, Total Kjeldahl	31	106.00	05/29/2002	0.40	04/22/2019	19.28	mg/l
pH, lab	59	11.90	06/16/1992	8.60	06/30/2009	10.18	units
Phosphate, total	31	155.00	07/29/2009	0.03	05/26/1999	6.50	mg/l
Phosphorus, total	31	2.95	09/27/1990	0.01	05/26/1999	0.24	mg/l
SAR in Water	51	190.00	11/14/1997	3.83	03/25/1992	64.43	none
Sulfate	60	360.00	09/16/1991	0.80	02/26/1997	31.18	mg/l
Sulfide	31	29.00	03/22/2016	0.02	09/15/1992	4.48	mg/l
Total Dissolved Solids	59	2,752.00	03/22/1993	578.00	09/27/1990	847.31	mg/l
Conductivity, Field	78	3,910.00	07/29/2009	694.00	06/01/2005	1,578.4	µmhos
pH, Field	77	12.90	09/13/1995	7.78	09/16/2019	10.64	units
Temperature (°C), Field	38	22.50	06/01/2005	7.00	07/01/1991	12.45	(°C)
Water Level, Field	62	487.40	03/08/2021	409.63	11/01/1990	432.77	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	31	1.35	11/06/2014	0.03	08/23/2017	0.22	mg/l
Arsenic, dissolved	31	0.0095	08/23/2017	0.0004	04/22/2019	0.003	mg/l
Barium, dissolved	31	0.20	07/29/2009	0.00	09/08/1993	0.05	mg/l
Beryllium, dissolved	31	U	09/27/1990	U	06/18/1995	U	mg/l
Boron, dissolved	60	0.47	12/20/1993	0.04	03/09/2020	0.22	mg/l
Cadmium, dissolved	31	U	09/27/1990	U	06/18/1996	U	mg/l
Calcium, dissolved	60	27.50	06/30/2009	0.20	11/14/1997	4.16	mg/l
Chromium, dissolved	31	0.02	11/06/2014	0.01	06/23/1994	0.01	mg/l
Copper, dissolved	31	0.04	07/29/2009	0.01	07/30/1991	0.03	mg/l
Iron, dissolved	31	65.10	11/06/2014	0.01	06/30/1995	3.12	mg/l
Lead, dissolved	31	0.63	09/15/2010	0.02	06/23/1994	0.14	mg/l
Lithium, dissolved	31	0.17	09/27/1990	0.02	03/08/2021	0.07	mg/l
Magnesium, dissolved	60	5.00	09/27/1990	0.00	05/24/2005	1.41	mg/l
Manganese, dissolved	31	0.59	11/06/2014	0.01	07/29/2009	0.06	mg/l
Mercury, dissolved	31	0.0007	07/30/1991	0.0001	09/27/1990	0.0004	mg/l
Molybdenum, dissolved	31	0.13	05/24/2005	0.01	05/09/2001	0.05	mg/l
Nickel, dissolved	31	0.03	09/15/1992	0.01	03/22/2016	0.01	mg/l
Potassium, dissolved	60	39.00	03/22/1993	0.47	03/08/2021	5.89	mg/l
Selenium, dissolved	31	0.001	07/30/1991	0.0004	03/27/2018	0.0008	mg/l
Silica, dissolved	60	44.60	06/16/1992	1.30	03/09/2020	15.89	mg/l
Sodium, dissolved	60	567.00	03/22/1993	153.00	03/25/1992	303.55	mg/l
Strontium, dissolved	60	5.10	03/25/1992	0.01	04/21/1994	0.32	mg/l
Vanadium, dissolved	31	0.01	06/23/1994	0.007	05/26/2000	0.0083	mg/l
Zinc, dissolved	31	0.61	11/06/2014	0.01	09/27/1990	0.09	mg/l

Table 22: O-GMW-A Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	1	528.00	10/05/2014	528.00	10/05/2014	528.00	mg/l
Carbonate as CaCO3	1	51.40	10/05/2014	51.40	10/05/2014	51.40	mg/l
Total Alkalinity as CaCO3	1	579.00	10/05/2014	579.00	10/05/2014	579.00	mg/l
Bromide	1	U	10/05/2014	U	10/05/2014	U	mg/l
Cation-Anion Balance	1	-3.70	10/05/2014	-3.70	10/05/2014	-3.70	%
Sum of Anions	1	14.00	10/05/2014	14.00	10/05/2014	14.00	meq/l
Sum of Cations	1	13.00	10/05/2014	13.00	10/05/2014	13.00	meq/l
Chemical Oxygen Demand	1	U	10/05/2014	U	10/05/2014	U	mg/l
Chloride	1	18.60	10/05/2014	18.60	10/05/2014	18.60	mg/l
Conductivity, Lab	1	1,270.00	10/05/2014	1,270.00	10/05/2014	1,270.00	µmhos
Fluoride	1	16.40	10/05/2014	16.40	10/05/2014	16.40	mg/l
Hardness as CaCO3	1	46.00	10/05/2014	46.00	10/05/2014	46.00	mg/l
Nitrate as N, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Nitrate/Nitrite as N,	1	U	10/05/2014	U	10/05/2014	U	mg/l
Nitrite as N, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Nitrogen, Ammonia	1	0.40	10/05/2014	0.40	10/05/2014	0.40	mg/l
Nitrogen, Organic	1	0.30	10/05/2014	0.30	10/05/2014	0.30	mg/l
Nitrogen, Total Kjeldahl	1	0.70	10/05/2014	0.70	10/05/2014	0.70	mg/l
pH, lab	1	8.60	10/05/2014	8.60	10/05/2014	8.60	units
Phosphate, total	1	0.06	10/05/2014	0.06	10/05/2014	0.06	mg/l
Phosphorus, total	1	0.02	10/05/2014	0.02	10/05/2014	0.02	mg/l
SAR in Water	1	17.00	10/05/2014	17.00	10/05/2014	17.00	none
Sulfate	1	60.00	10/05/2014	60.00	10/05/2014	60.00	mg/l
Sulfide	1	0.03	10/05/2014	0.03	10/05/2014	0.03	mg/l
Total Dissolved Solids	1	746.00	10/05/2014	746.00	10/05/2014	746.00	mg/l
Conductivity, Field	0	N/A	N/A	N/A	N/A	N/A	µmhos
pH, Field	0	N/A	N/A	N/A	N/A	N/A	units
Temperature (°C), Field	0	N/A	N/A	N/A	N/A	N/A	(°C)
Water Level, Field	0	N/A	N/A	N/A	N/A	N/A	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Arsenic, dissolved	1	0.02	10/05/2014	0.02	10/05/2014	0.02	mg/l
Barium, dissolved	1	0.13	10/05/2014	U	10/05/2014	0.13	mg/l
Beryllium, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Boron, dissolved	1	0.25	10/05/2014	0.25	10/05/2014	0.25	mg/l
Cadmium, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Calcium, dissolved	1	6.00	10/05/2014	U	10/05/2014	6.00	mg/l
Chromium, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Copper, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Iron, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Lead, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Lithium, dissolved	1	0.12	10/05/2014	0.12	10/05/2014	0.12	mg/l
Magnesium, dissolved	1	7.40	10/05/2014	U	10/05/2014	7.40	mg/l
Manganese, dissolved	1	0.01	10/05/2014	U	10/05/2014	0.01	mg/l
Mercury, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Molybdenum, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Nickel, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Potassium, dissolved	1	1.30	10/05/2014	1.30	10/05/2014	1.30	mg/l
Selenium, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Silica, dissolved	1	11.80	10/05/2014	11.80	10/05/2014	11.80	mg/l
Sodium, dissolved	1	267.00	10/05/2014	267.00	10/05/2014	267.00	mg/l
Strontium, dissolved	1	1.16	10/05/2014	U	10/05/2014	1.16	mg/l
Vanadium, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l
Zinc, dissolved	1	U	10/05/2014	U	10/05/2014	U	mg/l

Table 23: WSW-2 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	55	3,860.00	04/13/2020	483.00	06/16/2014	1,645.7	mg/l
Carbonate as CaCO3	54	636.00	03/03/2021	42.60	11/10/2014	153.59	mg/l
Total Alkalinity as CaCO3	55	4,100.00	04/13/2020	534.00	06/16/2014	1,797.2	mg/l
Bromide	5	0.46	07/11/2013	0.03	10/04/2011	0.18	mg/l
Cation-Anion Balance	53	3.40	06/16/2014	-13.40	06/14/2011	-3.14	%
Sum of Anions	54	135.00	07/03/2019	13.70	10/04/2011	52.39	meq/l
Sum of Cations	54	125.00	07/03/2019	12.60	06/14/2011	48.79	meq/l
Chemical Oxygen Demand	10	91.00	04/07/2021	10.00	01/20/2011	27.00	mg/l
Chloride	54	1,910.00	07/03/2019	11.00	06/14/2011	546.83	mg/l
Conductivity, Lab	55	10,700	11/08/2021	1,250	10/04/2011	4,552	µmhos
Fluoride	54	28.10	11/14/2018	13.80	09/17/2012	20.29	mg/l
Hardness as CaCO3	54	72.00	01/24/2018	14.00	11/30/2011	32.91	mg/l
Nitrate as N, dissolved	3	0.10	11/10/2014	0.02	04/07/2021	0.06	mg/l
Nitrate/Nitrite as N,	3	0.10	11/10/2014	0.02	04/07/2021	0.06	mg/l
Nitrite as N, dissolved	13	U	04/13/2020	U	04/13/2020	U	mg/l
Nitrogen, Ammonia	14	2.08	04/13/2020	0.39	10/04/2011	0.96	mg/l
Nitrogen, Organic	12	0.90	04/03/2019	0.10	03/23/2011	0.31	mg/l
Nitrogen, Total Kjeldahl	14	2.50	04/03/2019	0.60	03/30/2011	1.23	mg/l
pH, lab	55	8.90	03/16/2014	8.50	05/14/2018	8.68	units
Phosphate, total	14	2.51	04/07/2021	0.09	03/23/2011	0.66	mg/l
Phosphorus, total	14	0.81	04/07/2021	0.03	03/23/2011	0.21	mg/l
SAR in Water	54	160.00	07/03/2019	31.30	06/14/2011	76.18	none
Sulfate	48	156.00	09/11/2019	5.41	07/17/2018	36.42	mg/l
Sulfide	14	3.90	10/04/2011	1.41	01/24/2018	2.48	mg/l
Total Dissolved Solids	54	7,230.00	07/03/2019	740.00	11/30/2011	2,791.5	mg/l
Conductivity, Field	126	11,420	01/27/2021	719	03/23/2011	4,558	µmhos
pH, Field	98	9.10	06/15/2020	7.30	05/28/2015	8.27	units
Temperature (°C), Field	98	25.00	07/13/2016	16.35	05/17/2016	21.85	(°C)
Water Level, Field	N/A	N/A	N/A	N/A	N/A	N/A	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	14	0.05	03/23/2011	0.03	11/05/2015	0.04	mg/l
Arsenic, dissolved	14	0.00	03/23/2017	0.00	11/05/2015	0.00	mg/l
Barium, dissolved	14	1.53	04/03/2019	0.03	01/24/2018	0.38	mg/l
Beryllium, dissolved	14	0.00	01/20/2011	0.00	01/20/2011	0.00	mg/l
Boron, dissolved	54	2.80	07/03/2019	0.36	10/04/2011	1.20	mg/l
Cadmium, dissolved	14	U	04/13/2020	U	04/13/2020	U	mg/l
Calcium, dissolved	54	14.10	01/24/2018	1.70	05/14/2019	3.17	mg/l
Chromium, dissolved	14	0.02	04/06/2016	0.02	04/06/2016	0.02	mg/l
Copper, dissolved	14	U	04/13/2020	U	04/13/2020	U	mg/l
Iron, dissolved	14	1.30	04/03/2019	0.05	03/23/2011	0.26	mg/l
Lead, dissolved	14	U	04/13/2020	U	04/13/2020	U	mg/l
Lithium, dissolved	14	0.24	04/07/2021	0.06	01/20/2011	0.11	mg/l
Magnesium, dissolved	54	13.00	04/10/2018	2.00	01/20/2011	6.08	mg/l
Manganese, dissolved	14	0.05	04/03/2019	0.01	03/23/2011	0.02	mg/l
Mercury, dissolved	14	U	04/13/2020	U	04/13/2020	U	mg/l
Molybdenum, dissolved	14	U	04/13/2020	U	04/13/2020	U	mg/l
Nickel, dissolved	14	0.02	07/11/2013	0.01	03/23/2011	0.02	mg/l
Potassium, dissolved	54	7.00	02/11/2020	0.40	11/01/2012	1.45	mg/l
Selenium, dissolved	14	U	04/13/2020	U	04/13/2020	U	mg/l
Silica, dissolved	54	12.80	11/05/2015	9.00	01/24/2018	11.49	mg/l
Sodium, dissolved	54	2,800.00	07/03/2019	279.00	06/14/2011	1,091.5	mg/l
Strontium, dissolved	54	2.67	01/24/2018	0.44	06/14/2011	1.31	mg/l
Vanadium, dissolved	14	U	04/13/2020	U	04/13/2020	U	mg/l
Zinc, dissolved	14	0.07	04/03/2019	0.01	11/05/2015	0.03	mg/l

Table 24: WSW-3 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	33	529.00	08/22/2014	459.00	07/17/2018	488.48	mg/l
Carbonate as CaCO3	33	86.10	04/03/2019	26.70	04/06/2016	54.69	mg/l
Total Alkalinity as CaCO3	33	578.00	11/05/2015	518.00	03/03/2021	543.18	mg/l
Bromide	8	1.54	03/23/2017	0.10	08/22/2014	0.97	mg/l
Cation-Anion Balance	33	13.30	01/24/2018	-7.70	07/08/2020	-1.39	%
Sum of Anions	33	14.00	04/03/2019	12.00	10/18/2016	13.06	meq/l
Sum of Cations	33	17.00	01/24/2018	12.00	08/22/2014	12.73	meq/l
Chemical Oxygen Demand	8	196.00	04/06/2016	22.00	08/22/2014	109.00	mg/l
Chloride	33	22.00	11/08/2021	11.60	08/27/2015	14.55	mg/l
Conductivity, Lab	33	1,260	10/05/2020	1,100	08/16/2016	1,180	µmhos
Fluoride	33	19.80	08/22/2014	15.70	08/10/2021	18.24	mg/l
Hardness as CaCO3	33	238.00	01/24/2018	12.00	06/27/2017	20.07	mg/l
Nitrate as N, dissolved	8	0.09	08/22/2014	U	04/13/2020	UH	mg/l
Nitrate/Nitrite as N,	8	0.25	08/22/2014	U	04/13/2020	UH	mg/l
Nitrite as N, dissolved	8	0.16	08/22/2014	U	04/13/2020	UH	mg/l
Nitrogen, Ammonia	8	0.52	11/05/2015	0.43	04/06/2016	0.46	mg/l
Nitrogen, Organic	8	0.40	08/22/2014	0.30	04/03/2019	0.37	mg/l
Nitrogen, Total Kjeldahl	8	0.80	08/22/2014	0.30	01/24/2018	0.58	mg/l
pH, lab	33	9.30	10/10/2019	8.50	04/13/2020	8.74	units
Phosphate, total	8	0.12	08/22/2014	0.06	04/07/2021	0.09	mg/l
Phosphorus, total	8	0.04	08/22/2014	0.02	04/07/2021	0.03	mg/l
SAR in Water	33	37.00	09/10/2019	7.60	01/24/2018	32.84	none
Sulfate	31	57.90	04/06/2016	11.60	01/27/2016	36.95	mg/l
Sulfide	8	3.78	04/07/2021	0.16	08/22/2014	2.07	mg/l
Total Dissolved Solids	33	774.00	01/24/2018	661.00	08/27/2015	698.39	mg/l
Conductivity, Field	76	1,498	10/10/2019	632	02/21/2019	1,186	µmhos
pH, Field	76	8.90	03/16/2016	7.60	04/06/2016	8.40	units
Temperature (°C), Field	76	23.40	07/17/2017	14.85	02/11/2020	21.33	(°C)
Water Level, Field	N/A	N/A	N/A	N/A	N/A	N/A	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	8	0.04	01/24/2018	0.00	08/22/2014	0.02	mg/l
Arsenic, dissolved	8	0.05	08/22/2014	0.00	03/23/2017	0.01	mg/l
Barium, dissolved	8	0.25	04/07/2021	0.03	01/24/2018	0.19	mg/l
Beryllium, dissolved	8	U	08/22/2014	U	08/22/2014	U	mg/l
Boron, dissolved	33	0.27	08/22/2014	0.21	04/06/2016	0.24	mg/l
Cadmium, dissolved	8	U	08/22/2014	U	08/22/2014	U	mg/l
Calcium, dissolved	33	81.30	01/24/2018	2.20	03/23/2017	4.83	mg/l
Chromium, dissolved	8	U	08/22/2014	U	08/22/2014	U	mg/l
Copper, dissolved	8	U	08/22/2014	U	08/22/2014	U	mg/l
Iron, dissolved	8	0.13	11/05/2015	0.05	03/23/2017	0.07	mg/l
Lead, dissolved	8	U	08/22/2014	U	08/22/2014	U	mg/l
Lithium, dissolved	8	0.13	04/06/2016	0.06	08/22/2014	0.07	mg/l
Magnesium, dissolved	33	8.50	01/24/2018	1.40	09/10/2019	1.90	mg/l
Manganese, dissolved	8	0.03	08/22/2014	0.01	04/06/2016	0.02	mg/l
Mercury, dissolved	8	U	08/22/2014	U	08/22/2014	U	mg/l
Molybdenum, dissolved	8	0.16	01/24/2018	0.07	08/22/2014	0.12	mg/l
Nickel, dissolved	8	0.01	04/06/2016	0.00	08/22/2014	0.01	mg/l
Potassium, dissolved	33	29.20	04/06/2016	0.20	10/18/2016	1.51	mg/l
Selenium, dissolved	8	U	08/22/2014	U	01/24/2018	U	mg/l
Silica, dissolved	33	13.50	07/08/2020	11.30	04/06/2016	12.55	mg/l
Sodium, dissolved	33	297.00	01/14/2019	258.00	05/14/2018	275.18	mg/l
Strontium, dissolved	33	0.57	01/14/2019	0.45	01/24/2018	0.53	mg/l
Vanadium, dissolved	8	U	08/22/2014	U	08/22/2014	U	mg/l
Zinc, dissolved	8	0.36	01/24/2018	0.02	08/22/2014	0.19	mg/l

Table 25: WSW-4 Annual A-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	34	524.00	04/07/2021	439.00	08/27/2015	481.59	mg/l
Carbonate as CaCO3	35	537.00	09/25/2014	46.10	01/13/2020	75.41	mg/l
Total Alkalinity as CaCO3	35	925.00	09/25/2014	511.00	06/09/2015	554.40	mg/l
Bromide	9	0.73	04/03/2019	0.09	08/25/2014	0.46	mg/l
Cation-Anion Balance	34	3.70	01/24/2018	-7.70	07/08/2020	-2.33	%
Sum of Anions	35	22.00	09/25/2014	13.00	06/09/2015	13.66	meq/l
Sum of Cations	35	19.00	09/25/2014	12.00	08/27/2015	13.03	meq/l
Chemical Oxygen Demand	9	53.00	08/25/2014	13.00	04/06/2016	31.25	mg/l
Chloride	35	50.60	11/14/2018	7.87	10/05/2020	18.37	mg/l
Conductivity, Lab	35	2,810	09/25/2014	1,130	04/06/2016	1,261	µmhos
Fluoride	35	19.70	11/14/2018	5.11	09/25/2014	16.63	mg/l
Hardness as CaCO3	35	67.00	01/24/2018	11.00	03/05/2019	14.12	mg/l
Nitrate as N, dissolved	9	0.03	08/25/2014	0.00	09/25/2014	0.02	mg/l
Nitrate/Nitrite as N,	9	0.08	08/25/2014	0.00	09/25/2014	0.04	mg/l
Nitrite as N, dissolved	9	0.05	08/25/2014	0.01	09/25/2014	0.03	mg/l
Nitrogen, Ammonia	9	2.28	09/25/2014	0.43	04/13/2020	0.68	mg/l
Nitrogen, Organic	9	0.40	04/03/2019	0.00	09/25/2014	0.25	mg/l
Nitrogen, Total Kjeldahl	9	1.00	09/25/2014	0.30	03/23/2017	0.65	mg/l
pH, lab	35	11.70	09/25/2014	8.50	10/05/2020	8.86	units
Phosphate, total	9	0.28	09/25/2014	0.06	04/03/2019	0.11	mg/l
Phosphorus, total	9	0.09	09/25/2014	0.02	04/03/2019	0.04	mg/l
SAR in Water	35	44.00	09/25/2014	15.00	01/24/2018	35.03	none
Sulfate	35	130.00	09/25/2014	20.00	04/06/2016	54.55	mg/l
Sulfide	9	4.10	04/03/2019	0.10	09/25/2014	2.54	mg/l
Total Dissolved Solids	35	1,210.00	09/25/2014	696.00	01/13/2020	735.29	mg/l
Conductivity, Field	77	1,558	10/10/2019	1,073	04/06/2016	1,232	µmhos
pH, Field	77	9.40	01/13/2020	7.70	08/27/2015	8.49	units
Temperature (°C), Field	77	29.00	06/20/2016	13.80	04/19/2017	21.31	(°C)
Water Level, Field	N/A	N/A	N/A	N/A	N/A	N/A	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	9	0.42	09/25/2014	0.42	09/25/2014	0.42	mg/l
Arsenic, dissolved	9	0.01	09/25/2014	0.00	04/07/2021	0.00	mg/l
Barium, dissolved	9	0.23	04/06/2016	0.02	09/25/2014	0.09	mg/l
Beryllium, dissolved	9	U	04/13/2020	U	04/13/2020	U	mg/l
Boron, dissolved	35	0.44	09/25/2014	0.18	08/27/2015	0.22	mg/l
Cadmium, dissolved	9	U	04/13/2020	U	04/13/2020	U	mg/l
Calcium, dissolved	35	24.70	01/24/2018	1.90	03/23/2017	2.87	mg/l
Chromium, dissolved	9	U	04/13/2020	U	04/13/2020	U	mg/l
Copper, dissolved	9	U	04/13/2020	U	04/13/2020	U	mg/l
Iron, dissolved	9	1.63	04/03/2019	0.02	03/23/2017	0.33	mg/l
Lead, dissolved	9	U	04/13/2020	U	04/13/2020	U	mg/l
Lithium, dissolved	9	0.14	04/07/2021	0.07	04/06/2016	0.11	mg/l
Magnesium, dissolved	35	2.00	08/27/2015	0.30	09/25/2014	1.69	mg/l
Manganese, dissolved	9	0.01	01/24/2018	0.01	01/24/2018	0.01	mg/l
Mercury, dissolved	9	U	04/13/2020	U	04/13/2020	U	mg/l
Molybdenum, dissolved	9	0.04	01/24/2018	0.02	09/25/2014	0.03	mg/l
Nickel, dissolved	9	U	08/25/2014	U	08/25/2014	U	mg/l
Potassium, dissolved	35	18.30	09/25/2014	0.20	05/14/2018	1.06	mg/l
Selenium, dissolved	9	0.0042	04/07/2021	0.0003	04/03/2019	0.0013	mg/l
Silica, dissolved	35	172.00	09/25/2014	8.90	01/24/2018	16.39	mg/l
Sodium, dissolved	35	416.00	09/25/2014	262.00	07/08/2020	285.97	mg/l
Strontium, dissolved	35	7.97	01/24/2018	0.39	03/05/2019	0.63	mg/l
Vanadium, dissolved	9	U	04/13/2020	U	04/13/2020	U	mg/l
Zinc, dissolved	9	0.02	09/25/2014	0.02	09/25/2014	0.02	mg/l

Table 26: 89-1 Annual B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	187	762.00	03/25/1994	144.00	07/30/1990	610.59	mg/l
Carbonate as CaCO3	187	406.00	05/21/1997	25.00	07/01/1997	100.41	mg/l
Total Alkalinity as CaCO3	187	830.00	07/31/1991	200.00	07/30/1990	711.17	mg/l
Bromide	28	10.00	06/26/1991	0.06	07/01/1997	1.15	mg/l
Cation-Anion Balance	182	24.10	04/16/2002	-10.30	01/13/2021	-0.16	%
Sum of Anions	181	18.00	06/14/2017	4.29	07/30/1990	15.71	meq/l
Sum of Cations	181	18.20	04/11/2006	4.38	07/30/1990	15.47	meq/l
Chemical Oxygen Demand	30	420.00	06/25/2007	30.00	03/30/1990	81.41	mg/l
Chloride	186	70.50	06/14/2017	6.00	09/27/1990	15.35	mg/l
Conductivity, Lab	179	1,850.00	04/24/1991	1,000.00	05/20/1993	1,392.39	µmhos
Fluoride	181	38.20	02/24/1992	0.20	09/29/1994	23.81	mg/l
Hardness as CaCO3	185	65.00	09/27/1990	0.00	07/30/1990	11.13	mg/l
Nitrate as N, dissolved	30	16.50	06/25/2007	0.02	06/26/1991	1.01	mg/l
Nitrate/Nitrite as N,	30	17.00	06/25/2007	0.02	06/26/1991	1.07	mg/l
Nitrite as N, dissolved	31	0.55	06/25/2007	0.01	03/30/1990	0.13	mg/l
Nitrogen, Ammonia	30	9.23	12/26/2018	0.06	07/30/1990	1.85	mg/l
Nitrogen, Organic	29	29.10	06/26/1991	0.10	06/15/1992	5.08	mg/l
Nitrogen, Total Kjeldahl	30	30.10	06/26/1991	0.80	06/15/1992	6.81	mg/l
pH, lab	182	9.80	12/20/1994	8.10	10/28/2002	8.89	units
Phosphate, total	26	155.00	06/25/2007	0.06	07/18/1995	13.46	mg/l
Phosphorus, total	31	2.90	09/27/1990	0.02	07/02/1998	0.17	mg/l
SAR in Water	157	158.62	06/26/1990	16.50	09/27/1990	48.57	none
Sulfate	185	140.00	10/25/1990	0.00	08/16/2017	20.10	mg/l
Sulfide	26	2.10	07/30/1990	0.02	07/27/2001	0.45	mg/l
Total Dissolved Solids	187	1,100.00	10/21/1989	446.00	07/30/1990	863.76	mg/l
Conductivity, Field	204	1,683.00	06/05/2012	925.00	08/02/2006	1,343.18	µmhos
pH, Field	204	10.12	07/29/2009	7.10	06/10/2020	9.02	units
Temperature (°C), Field	110	19.00	07/31/1991	7.60	04/01/2006	12.49	(°C)
Water Level, Field	94	500.70	06/25/2014	432.37	06/25/2014	473.29	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	30	1.54	03/30/1990	0.04	07/01/1997	0.24	mg/l
Arsenic, dissolved	30	0.30	10/21/1989	0.0005	12/03/2012	0.0183	mg/l
Barium, dissolved	30	0.43	08/02/2006	0.02	12/26/2018	0.18	mg/l
Beryllium, dissolved	29	0.01	06/26/1991	U	10/21/1989	U	mg/l
Boron, dissolved	182	3.30	03/25/1991	0.35	01/27/2004	0.68	mg/l
Cadmium, dissolved	29	0.013	10/21/1989	U	12/27/1990	U	mg/l
Calcium, dissolved	179	13.00	09/27/1990	0.50	03/16/2010	2.29	mg/l
Chromium, dissolved	29	0.01	06/26/1991	U	12/27/1990	U	mg/l
Copper, dissolved	30	0.02	06/25/2007	0.01	03/30/1990	0.01	mg/l
Iron, dissolved	30	0.93	03/30/1990	0.01	07/07/1999	0.17	mg/l
Lead, dissolved	29	0.10	10/21/1989	0.02	06/26/1991	0.06	mg/l
Lithium, dissolved	29	0.20	12/27/1990	0.06	03/30/1990	0.13	mg/l
Magnesium, dissolved	181	8.00	09/27/1990	0.30	03/16/2010	1.37	mg/l
Manganese, dissolved	29	0.07	06/25/2007	0.01	07/01/1997	0.03	mg/l
Mercury, dissolved	30	0.001	06/15/1992	0.0001	06/26/1991	0.0005	mg/l
Molybdenum, dissolved	29	0.60	10/21/1989	0.01	07/27/2001	0.14	mg/l
Nickel, dissolved	30	0.03	10/21/1989	0.01	12/03/2012	0.02	mg/l
Potassium, dissolved	181	13.00	03/25/1991	0.60	06/10/2020	1.29	mg/l
Selenium, dissolved	30	0.001	10/21/1989	U	12/27/1990	U	mg/l
Silica, dissolved	182	35.90	10/21/1989	1.80	06/11/2019	16.94	mg/l
Sodium, dissolved	182	408.00	04/11/2006	102.00	12/27/1990	348.94	mg/l
Strontium, dissolved	182	0.83	03/14/2012	0.06	10/21/1989	0.49	mg/l
Vanadium, dissolved	30	0.03	06/26/1991	0.01	10/21/1989	0.02	mg/l
Zinc, dissolved	30	0.07	07/29/2009	0.01	03/30/1990	0.02	mg/l

Table 27: 90-3 Annual B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	126	1,790.00	09/14/2004	419.00	03/23/2005	769.83	mg/l
Carbonate as CaCO3	126	419.00	03/23/2005	4.00	06/16/1997	88.38	mg/l
Total Alkalinity as CaCO3	126	1,790.00	09/14/2004	680.00	06/15/2014	854.72	mg/l
Bromide	14	1.50	07/21/1992	0.10	01/29/1991	0.44	mg/l
Cation-Anion Balance	125	36.90	08/10/2008	-33.50	09/14/2004	-1.53	%
Sum of Anions	116	37.50	09/14/2004	15.00	06/26/2002	18.87	meq/l
Sum of Cations	116	39.50	08/10/2008	11.10	11/23/2010	18.19	meq/l
Chemical Oxygen Demand	21	210.00	09/15/2007	10.00	08/14/1995	75.00	mg/l
Chloride	126	293.00	06/14/2008	9.75	01/16/2018	20.99	mg/l
Conductivity, Lab	123	2,200.00	05/16/2007	1,280.00	07/21/1992	1,591.50	µmhos
Fluoride	126	98.00	03/24/1999	9.00	12/11/2001	23.15	mg/l
Hardness as CaCO3	122	47.00	10/09/2019	1.00	10/25/1990	14.96	mg/l
Nitrate as N, dissolved	26	0.27	06/24/2004	0.04	01/29/1991	0.11	mg/l
Nitrate/Nitrite as N,	26	0.27	06/24/2004	0.05	01/29/1991	0.12	mg/l
Nitrite as N, dissolved	26	0.03	08/16/1994	0.01	01/29/1991	0.02	mg/l
Nitrogen, Ammonia	25	10.90	08/16/1996	0.83	06/28/2006	1.63	mg/l
Nitrogen, Organic	25	12.00	09/15/2007	0.20	01/29/1991	3.56	mg/l
Nitrogen, Total Kjeldahl	25	13.00	09/15/2007	0.50	08/14/1995	4.26	mg/l
pH, lab	123	9.00	04/24/1991	7.40	06/16/1997	8.70	units
Phosphate, total	21	155.00	06/28/2006	0.06	05/08/2020	8.29	mg/l
Phosphorus, total	24	3.63	08/01/1990	0.02	06/28/2006	0.27	mg/l
SAR in Water	117	198.04	10/25/1990	0.08	04/24/1991	48.34	none
Sulfate	82	333.00	01/20/1992	0.60	09/29/1997	49.26	mg/l
Sulfide	19	6.21	08/01/1990	0.03	06/28/2006	0.76	mg/l
Total Dissolved Solids	124	1,490.00	08/10/2008	813.00	11/23/2010	1,011.65	mg/l
Conductivity, Field	184	2,200.00	05/16/2007	1,135.00	06/16/1997	1,548.91	µmhos
pH, Field	184	10.60	12/16/2002	7.00	10/09/2019	8.67	units
Temperature (°C), Field	125	19.70	05/01/2002	7.90	02/09/2021	12.29	(°C)
Water Level, Field	104	547.40	06/14/2011	507.30	01/15/2016	530.53	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	26	9.47	06/16/1997	0.04	06/14/2000	1.73	mg/l
Arsenic, dissolved	26	0.02	08/01/1990	0.00	11/27/2012	0.00	mg/l
Barium, dissolved	26	0.96	06/16/1997	0.03	08/08/1990	0.36	mg/l
Beryllium, dissolved	26	U	08/01/1990	U	08/16/1994	U	mg/l
Boron, dissolved	127	0.93	03/18/2004	0.31	02/21/1994	0.73	mg/l
Cadmium, dissolved	26	0.028	07/21/1993	U	06/02/1998	U	mg/l
Calcium, dissolved	127	15.00	10/09/2019	0.80	12/12/2008	2.50	mg/l
Chromium, dissolved	26	U	08/01/1990	U	07/21/1993	U	mg/l
Copper, dissolved	26	0.40	07/31/1991	0.01	06/24/2004	0.21	mg/l
Iron, dissolved	26	12.10	06/16/1997	0.01	06/16/2005	1.65	mg/l
Lead, dissolved	26	0.07	06/16/1997	0.04	07/21/1992	0.06	mg/l
Lithium, dissolved	25	0.15	06/09/1999	0.04	07/21/1993	0.13	mg/l
Magnesium, dissolved	127	8.00	10/30/1991	0.90	12/12/2008	2.19	mg/l
Manganese, dissolved	25	0.08	06/16/1997	0.01	06/28/2006	0.02	mg/l
Mercury, dissolved	26	0.017	07/31/1991	0.0002	08/14/1995	0.0060	mg/l
Molybdenum, dissolved	26	0.14	08/01/1990	0.02	08/16/1996	0.07	mg/l
Nickel, dissolved	26	0.02	01/29/1991	0.01	09/21/2010	0.02	mg/l
Potassium, dissolved	127	12.00	07/31/1991	1.00	05/23/1994	1.67	mg/l
Selenium, dissolved	26	0.001	08/08/1990	U	07/21/1992	U	mg/l
Silica, dissolved	127	122.00	10/30/1991	0.30	04/24/1991	19.61	mg/l
Sodium, dissolved	127	882.00	08/10/2008	247.00	11/23/2010	407.82	mg/l
Strontium, dissolved	127	1.30	04/20/1992	0.06	06/14/2000	0.68	mg/l
Vanadium, dissolved	26	U	08/01/1990	U	07/21/1993	U	mg/l
Zinc, dissolved	26	0.53	07/31/1991	0.01	08/01/1990	0.09	mg/l

Table 28: BG-1 Annual B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	145	1,010.00	08/07/1997	283.00	02/16/2007	637.90	mg/l
Carbonate as CaCO3	145	581.00	08/21/2003	8.00	05/26/2000	135.29	mg/l
Total Alkalinity as CaCO3	145	1,160.00	08/21/2003	364.00	02/16/2007	769.33	mg/l
Bromide	18	3.00	09/02/1998	0.10	05/18/2006	0.49	mg/l
Cation-Anion Balance	144	42.30	03/17/2009	-36.30	08/07/1997	-1.64	%
Sum of Anions	144	30.80	08/07/1997	9.10	02/16/2007	17.38	meq/l
Sum of Cations	144	43.20	03/17/2009	6.70	02/16/2007	16.86	meq/l
Chemical Oxygen Demand	15	470.00	08/25/2005	10.00	09/14/2000	148.00	mg/l
Chloride	144	249.00	08/07/1997	10	09/25/2002	24.74	mg/l
Conductivity, Lab	145	3,980.00	08/07/1997	769.00	02/16/2007	1,512.94	µmhos
Fluoride	144	56.00	03/25/1998	12.80	06/14/2008	24.12	mg/l
Hardness as CaCO3	144	48.00	04/19/2001	1.00	02/16/2007	11.11	mg/l
Nitrate as N, dissolved	18	0.53	09/25/2002	0.03	08/30/2008	0.20	mg/l
Nitrate/Nitrite as N,	18	0.53	09/25/2002	0.02	05/18/2006	0.17	mg/l
Nitrite as N, dissolved	18	0.02	05/18/2006	0.02	05/18/2006	0.02	mg/l
Nitrogen, Ammonia	16	5.00	09/29/1997	0.72	09/29/2006	1.87	mg/l
Nitrogen, Organic	16	28.00	09/25/2002	0.30	09/22/1999	8.02	mg/l
Nitrogen, Total Kjeldahl	16	28.00	09/25/2002	1.40	09/15/1997	9.79	mg/l
pH, lab	144	22.10	05/01/2020	7.00	12/12/2008	9.05	units
Phosphate, total	14	155.00	05/18/2006	0.08	09/15/1997	24.26	mg/l
Phosphorus, total	16	0.51	09/24/2003	0.03	09/15/1997	0.13	mg/l
SAR in Water	143	148.00	11/23/2010	19.80	04/19/2001	58.06	none
Sulfate	142	70.00	10/30/2003	0.70	11/20/2000	12.83	mg/l
Sulfide	14	1.50	09/24/2003	0.03	09/29/2006	0.33	mg/l
Total Dissolved Solids	144	1,510.00	03/17/2009	453.00	02/16/2007	935.26	mg/l
Conductivity, Field	157	3,980.00	08/07/1997	1,310.00	02/08/2000	1,527.53	µmhos
pH, Field	157	10.69	07/29/2009	6.35	08/30/2008	8.92	units
Temperature (°C), Field	109	16.20	06/01/2007	8.60	12/01/2003	12.62	(°C)
Water Level, Field	108	540.70	10/05/2020	493.67	07/01/2001	522.12	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	18	7.96	09/25/2002	0.03	11/16/2007	1.06	mg/l
Arsenic, dissolved	18	0.00	09/29/1997	0.00	11/27/2012	0.00	mg/l
Barium, dissolved	18	1.26	09/25/2002	0.13	09/29/2006	0.31	mg/l
Beryllium, dissolved	18	U	11/27/2012	U	11/27/2012	U	mg/l
Boron, dissolved	143	1.67	03/17/2009	0.22	04/19/2001	0.82	mg/l
Cadmium, dissolved	18	U	11/27/2012	U	11/27/2012	U	mg/l
Calcium, dissolved	142	8.80	12/12/2008	0.20	11/23/2010	2.29	mg/l
Chromium, dissolved	18	0.02	09/29/1997	0.02	09/29/1997	0.02	mg/l
Copper, dissolved	18	0.38	09/25/2002	0.01	09/24/2003	0.09	mg/l
Iron, dissolved	18	29.40	09/25/2002	0.03	03/14/2008	2.66	mg/l
Lead, dissolved	18	0.88	09/25/2002	0.05	09/21/2010	0.36	mg/l
Lithium, dissolved	18	0.20	09/02/1998	0.12	08/30/2008	0.16	mg/l
Magnesium, dissolved	142	9.40	04/19/2001	0.20	09/29/2006	1.32	mg/l
Manganese, dissolved	17	0.18	09/25/2002	0.01	09/14/2000	0.04	mg/l
Mercury, dissolved	18	0.0006	09/02/1998	U	09/02/1998	U	mg/l
Molybdenum, dissolved	18	0.06	09/29/1997	0.01	09/14/2004	0.03	mg/l
Nickel, dissolved	18	0.05	09/29/2006	0.02	09/25/2002	0.03	mg/l
Potassium, dissolved	144	12.00	08/07/1997	1.20	06/14/2001	3.09	mg/l
Selenium, dissolved	18	U	11/27/2012	U	11/27/2012	U	mg/l
Silica, dissolved	144	50.20	09/25/2002	1.40	10/26/2004	9.68	mg/l
Sodium, dissolved	144	973.00	03/17/2009	152.00	02/16/2007	374.71	mg/l
Strontium, dissolved	143	1.58	09/25/2002	0.14	02/16/2007	0.53	mg/l
Vanadium, dissolved	18	U	11/27/2012	U	11/27/2012	U	mg/l
Zinc, dissolved	18	0.80	09/25/2002	0.01	09/29/1997	0.11	mg/l

Table 29: BG-4 Annual B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	226	899.00	10/28/2002	524.00	09/14/2004	693.31	mg/l
Carbonate as CaCO3	226	210.00	07/30/2003	16.00	11/21/2008	93.13	mg/l
Total Alkalinity as CaCO3	226	984.00	05/07/2018	612.00	04/17/2002	783.17	mg/l
Bromide	30	0.10	08/12/2004	0.10	08/12/2004	0.10	mg/l
Cation-Anion Balance	225	13.40	08/02/2006	-12.80	05/07/2018	-2.29	%
Sum of Anions	225	22.00	05/07/2018	12.60	08/02/2006	17.64	meq/l
Sum of Cations	225	20.00	05/14/2020	13.60	04/29/2010	16.85	meq/l
Chemical Oxygen Demand	30	400.00	08/22/2002	10.00	08/02/2006	75.86	mg/l
Chloride	225	116.00	11/03/2020	2.00	08/02/2006	27.20	mg/l
Conductivity, Lab	225	1,960	01/12/2021	1,160	08/02/2006	1,558	µmhos
Fluoride	225	26.90	12/16/2003	2.09	06/06/2017	22.23	mg/l
Hardness as CaCO3	224	47.00	09/30/2008	5.00	11/27/2002	15.46	mg/l
Nitrate as N, dissolved	29	2.06	09/28/2006	0.03	11/06/2014	1.05	mg/l
Nitrate/Nitrite as N,	29	2.08	09/28/2006	0.02	05/18/2006	0.59	mg/l
Nitrite as N, dissolved	29	0.21	08/02/2006	0.01	05/18/2006	0.07	mg/l
Nitrogen, Ammonia	30	1.61	09/30/2008	0.43	05/14/2020	0.88	mg/l
Nitrogen, Organic	28	27.00	08/22/2002	0.50	08/02/2006	4.75	mg/l
Nitrogen, Total Kjeldahl	30	28.00	08/22/2002	1.00	04/13/2016	5.02	mg/l
pH, lab	226	9.20	05/21/2009	7.50	08/30/2008	8.78	units
Phosphate, total	26	155.00	05/18/2006	0.12	08/18/2010	40.51	mg/l
Phosphorus, total	30	0.32	05/14/2020	0.03	08/02/2006	0.08	mg/l
SAR in Water	224	73.30	12/16/2002	23.40	09/30/2008	42.86	none
Sulfate	223	50.00	09/28/2006	0.00	09/02/2015	12.06	mg/l
Sulfide	22	0.80	08/22/2002	0.03	09/28/2006	0.24	mg/l
Total Dissolved Solids	225	1,110	10/06/2020	789	08/02/2006	934	mg/l
Conductivity, Field	242	2,874	02/10/2016	1,101	10/05/2006	1,545	µmhos
pH, Field	241	10.01	07/29/2009	6.90	11/04/2019	8.52	units
Temperature (°C), Field	238	22.70	08/02/2016	5.80	01/26/2010	12.08	(°C)
Water Level, Field	234	547.26	11/10/2010	468.30	07/01/2002	506.49	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	32	1.26	05/14/2020	0.03	05/18/2006	0.20	mg/l
Arsenic, dissolved	32	0.0009	09/30/2008	0.0003	05/04/2021	0.0005	mg/l
Barium, dissolved	32	0.16	05/04/2021	0.00	07/06/2017	0.03	mg/l
Beryllium, dissolved	32	U	08/22/2002	U	08/12/2004	U	mg/l
Boron, dissolved	226	0.97	07/12/2007	0.34	08/21/2003	0.72	mg/l
Cadmium, dissolved	32	U	05/18/2006	U	09/30/2008	U	mg/l
Calcium, dissolved	227	14.30	11/05/2021	1.10	12/16/2002	2.98	mg/l
Chromium, dissolved	32	0.02	09/28/2006	U	05/18/2006	U	mg/l
Copper, dissolved	32	U	08/22/2002	U	08/21/2003	U	mg/l
Iron, dissolved	32	2.08	05/14/2020	0.01	08/12/2004	0.20	mg/l
Lead, dissolved	32	0.04	05/06/2019	U	08/22/2002	U	mg/l
Lithium, dissolved	32	0.17	05/14/2020	0.08	08/21/2003	0.14	mg/l
Magnesium, dissolved	226	4.40	09/30/2008	0.60	11/27/2002	1.94	mg/l
Manganese, dissolved	30	0.19	09/30/2008	0.01	03/14/2008	0.03	mg/l
Mercury, dissolved	32	0.0004	09/28/2006	U	08/22/2002	U	mg/l
Molybdenum, dissolved	32	0.12	08/22/2002	0.01	08/18/2010	0.04	mg/l
Nickel, dissolved	32	0.03	09/30/2008	0.01	12/03/2012	0.02	mg/l
Potassium, dissolved	227	6.20	07/24/2002	0.60	11/21/2008	1.57	mg/l
Selenium, dissolved	32	0.0001	05/06/2019	U	08/22/2002	U	mg/l
Silica, dissolved	226	29.30	04/17/2002	5.50	08/21/2003	14.64	mg/l
Sodium, dissolved	227	451.00	08/03/2021	302.00	09/11/2013	373.66	mg/l
Strontium, dissolved	226	0.93	11/03/2020	0.06	04/27/2004	0.51	mg/l
Vanadium, dissolved	32	U	05/18/2006	U	09/30/2008	U	mg/l
Zinc, dissolved	32	0.13	08/30/2008	0.01	08/22/2002	0.03	mg/l

Table 30: BG-5 Annual B-Groove Aquifer (P&A Winter 2021)

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	138	5,090.00	12/01/2020	447.00	03/22/2011	1,150.9	mg/l
Carbonate as CaCO3	138	2,120.00	11/03/2020	43.10	02/10/2016	189.36	mg/l
Total Alkalinity as CaCO3	138	7,210.00	11/03/2020	670.00	05/14/2014	1,340.4	mg/l
Bromide	14	0.94	07/10/2013	0.00	11/10/2014	0.47	mg/l
Cation-Anion Balance	138	7.90	10/28/2010	-11.80	07/07/2020	-3.09	%
Sum of Anions	138	191.00	12/01/2020	15.00	05/14/2014	36.84	meq/l
Sum of Cations	138	188.00	11/03/2020	14.90	05/06/2013	34.57	meq/l
Chemical Oxygen Demand	14	320.00	09/22/2010	16.00	10/12/2015	66.50	mg/l
Chloride	138	1,630.00	12/01/2020	14.20	11/30/2015	314.59	mg/l
Conductivity, Lab	138	15,000	11/03/2020	1,420	01/11/2016	3,241	µmhos
Fluoride	138	34.80	12/01/2020	9.80	02/23/2010	22.86	mg/l
Hardness as CaCO3	138	44.00	10/28/2010	4.00	12/01/2020	18.03	mg/l
Nitrate as N, dissolved	15	0.07	11/10/2014	0.02	10/07/2009	0.04	mg/l
Nitrate/Nitrite as N,	15	0.07	11/10/2014	0.02	10/07/2009	0.04	mg/l
Nitrite as N, dissolved	15	0.00	11/10/2014	0.00	11/10/2014	0.00	mg/l
Nitrogen, Ammonia	15	2.32	05/07/2020	0.56	10/07/2009	1.05	mg/l
Nitrogen, Organic	15	3.90	09/22/2010	0.20	12/13/2012	1.07	mg/l
Nitrogen, Total Kjeldahl	15	5.10	09/22/2010	0.80	10/12/2015	2.04	mg/l
pH, lab	138	9.60	03/22/2011	6.10	04/02/2019	8.87	units
Phosphate, total	15	155.00	10/07/2009	0.06	10/12/2015	18.38	mg/l
Phosphorus, total	15	0.70	05/07/2020	0.02	10/12/2015	0.16	mg/l
SAR in Water	138	820.00	12/01/2020	39.20	11/10/2010	81.14	none
Sulfate	138	110.00	11/10/2010	0.00	11/22/2011	29.94	mg/l
Sulfide	15	1.33	08/11/2011	0.00	11/10/2014	0.47	mg/l
Total Dissolved Solids	138	10,200	11/03/2020	829	05/14/2014	1,964	mg/l
Conductivity, Field	165	27,480	12/15/2020	1,232	06/05/2017	3,236	µmhos
pH, Field	163	9.66	02/04/2011	6.70	11/04/2019	8.61	units
Temperature (°C), Field	165	21.00	08/18/2010	7.10	02/05/2014	12.38	(°C)
Water Level, Field	157	541.00	10/05/2020	511.95	02/10/2020	529.55	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	14	0.10	08/18/2010	0.04	08/11/2011	0.06	mg/l
Arsenic, dissolved	14	0.01	11/10/2010	0.0003	11/10/2014	0.0027	mg/l
Barium, dissolved	14	3.06	05/07/2020	0.04	10/07/2009	0.76	mg/l
Beryllium, dissolved	14	U	05/07/2020	U	05/07/2020	U	mg/l
Boron, dissolved	138	8.32	11/03/2020	0.45	11/19/2009	1.12	mg/l
Cadmium, dissolved	14	U	05/07/2020	U	05/07/2020	U	mg/l
Calcium, dissolved	138	7.70	10/28/2010	1.60	06/04/2018	3.00	mg/l
Chromium, dissolved	14	U	05/07/2020	U	05/07/2020	U	mg/l
Copper, dissolved	14	0.07	07/05/2017	0.02	10/07/2009	0.05	mg/l
Iron, dissolved	14	0.90	10/07/2009	0.03	12/04/2012	0.16	mg/l
Lead, dissolved	14	U	05/07/2020	U	05/07/2020	U	mg/l
Lithium, dissolved	14	0.36	05/07/2020	0.17	10/07/2009	0.21	mg/l
Magnesium, dissolved	138	5.90	10/28/2010	1.30	03/09/2014	2.56	mg/l
Manganese, dissolved	14	0.03	10/07/2009	0.01	07/10/2013	0.01	mg/l
Mercury, dissolved	14	U	05/07/2020	U	05/07/2020	U	mg/l
Molybdenum, dissolved	14	1.31	11/10/2010	0.01	10/07/2009	0.30	mg/l
Nickel, dissolved	14	0.05	05/07/2019	0.02	07/10/2013	0.04	mg/l
Potassium, dissolved	138	34.80	08/02/2010	0.60	11/01/2016	2.08	mg/l
Selenium, dissolved	14	0.01	11/10/2010	0.00	08/11/2011	0.00	mg/l
Silica, dissolved	138	16.00	11/03/2020	0.50	02/17/2011	12.62	mg/l
Sodium, dissolved	138	4250	11/03/2020	332.00	05/06/2013	774.84	mg/l
Strontium, dissolved	138	3.16	03/04/2020	0.48	08/02/2010	1.07	mg/l
Vanadium, dissolved	14	U	05/07/2020	U	05/07/2020	U	mg/l
Zinc, dissolved	14	0.17	12/20/2018	U	10/07/2009	0.0525	mg/l

Table 31: BG-6 Annual B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	137	869.00	12/18/2013	541.00	12/08/2010	673.92	mg/l
Carbonate as CaCO3	136	219.00	12/08/2010	48.10	02/10/2020	87.92	mg/l
Total Alkalinity as CaCO3	137	1,040.00	12/18/2013	633.00	06/11/2014	761.22	mg/l
Bromide	14	U	01/13/2011	U	12/27/2012	U	mg/l
Cation-Anion Balance	136	5.90	04/09/2014	-9.70	01/12/2021	-2.50	%
Sum of Anions	136	23.00	12/18/2013	14.30	06/11/2014	16.91	meq/l
Sum of Cations	136	20.00	12/18/2013	13.10	04/11/2011	16.09	meq/l
Chemical Oxygen Demand	13	800.00	01/13/2011	21.00	12/31/2018	232.73	mg/l
Chloride	118	70.00	12/08/2010	10.00	01/20/2011	15.85	mg/l
Conductivity, Lab	137	8,820	06/03/2019	1,320	07/05/2017	1,567	µmhos
Fluoride	136	27.80	06/03/2019	14.60	09/17/2012	23.45	mg/l
Hardness as CaCO3	136	16.00	09/05/2017	10.00	09/11/2013	12.62	mg/l
Nitrate as N, dissolved	14	0.03	12/27/2012	UH	10/12/2015	U	mg/l
Nitrate/Nitrite as N,	14	0.03	12/27/2012	UH	10/12/2015	U	mg/l
Nitrite as N, dissolved	14	U	12/27/2012	UH	10/12/2015	U	mg/l
Nitrogen, Ammonia	13	0.95	10/12/2015	0.71	01/20/2011	0.82	mg/l
Nitrogen, Organic	13	8.30	01/13/2011	0.80	10/12/2015	2.49	mg/l
Nitrogen, Total Kjeldahl	13	9.00	01/13/2011	1.00	05/14/2020	3.11	mg/l
pH, lab	137	9.40	12/08/2010	8.30	06/08/2021	8.81	units
Phosphate, total	13	77.50	08/11/2011	0.09	01/13/2011	6.08	mg/l
Phosphorus, total	13	0.09	07/10/2013	0.03	01/13/2011	0.04	mg/l
SAR in Water	136	56.60	12/18/2013	37.80	04/11/2011	44.44	none
Sulfate	136	20.00	01/13/2011	3.45	11/02/2016	12.06	mg/l
Sulfide	13	0.10	01/20/2011	0.03	07/10/2013	0.05	mg/l
Total Dissolved Solids	136	1,130	12/18/2013	799	05/14/2014	884	mg/l
Conductivity, Field	134	2,413	09/17/2012	1,232	06/05/2017	1,488	µmhos
pH, Field	132	9.58	03/05/2012	6.60	11/04/2019	8.34	units
Temperature (°C), Field	134	23.00	09/05/2017	4.62	11/22/2011	11.82	(°C)
Water Level, Field	133	517.10	08/07/2017	493.95	10/12/2015	507.57	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	14	0.04	01/13/2011	U	12/04/2012	U	mg/l
Arsenic, dissolved	14	0.0619	01/13/2011	0.0002	04/12/2016	0.0058	mg/l
Barium, dissolved	14	0.39	01/13/2011	0.31	07/05/2017	0.34	mg/l
Beryllium, dissolved	14	0.00	11/10/2014	U	05/04/2021	U	mg/l
Boron, dissolved	136	0.91	12/18/2013	0.62	12/08/2010	0.72	mg/l
Cadmium, dissolved	14	U	08/11/2011	U	05/04/2021	U	mg/l
Calcium, dissolved	136	3.40	09/05/2017	2.00	09/11/2013	2.42	mg/l
Chromium, dissolved	14	0.01	12/31/2018	U	05/14/2020	U	mg/l
Copper, dissolved	14	0.04	05/06/2019	U	05/14/2020	U	mg/l
Iron, dissolved	14	0.19	12/31/2018	0.02	12/04/2012	0.07	mg/l
Lead, dissolved	14	0.05	12/04/2012	U	08/11/2011	U	mg/l
Lithium, dissolved	14	0.13	01/13/2011	0.11	07/05/2017	0.12	mg/l
Magnesium, dissolved	136	1.90	03/09/2011	1.30	12/08/2010	1.59	mg/l
Manganese, dissolved	14	0.009	01/13/2011	U	01/20/2011	U	mg/l
Mercury, dissolved	14	U	08/11/2011	U	07/10/2013	U	mg/l
Molybdenum, dissolved	14	0.06	01/13/2011	U	12/04/2012	U	mg/l
Nickel, dissolved	14	U	08/11/2011	U	12/04/2012	U	mg/l
Potassium, dissolved	136	2.10	12/08/2010	0.60	11/02/2016	0.96	mg/l
Selenium, dissolved	14	U	08/11/2011	U	12/27/2012	U	mg/l
Silica, dissolved	136	17.80	08/03/2021	1.10	12/08/2010	15.49	mg/l
Sodium, dissolved	136	439.00	12/18/2013	292.00	04/11/2011	357.36	mg/l
Strontium, dissolved	136	0.83	09/07/2014	0.38	12/08/2010	0.70	mg/l
Vanadium, dissolved	14	U	08/11/2011	U	12/04/2012	U	mg/l
Zinc, dissolved	14	0.03	07/05/2017	0.01	12/04/2012	U	mg/l

Table 32: BG-7 Annual B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	8	912	06/02/2020	501	12/15/2015	694	mg/l
Carbonate as CaCO3	8	307	12/15/2015	80	06/02/2020	190	mg/l
Total Alkalinity as CaCO3	8	992	06/02/2020	808	12/15/2015	884	mg/l
Bromide	8	0.14	10/18/2014	0.13	09/28/2017	0.13	mg/l
Cation-Anion Balance	8	2.40	06/25/2019	-4.80	06/02/2020	-0.83	%
Sum of Anions	8	24.00	10/18/2014	20.00	06/25/2019	22.38	meq/l
Sum of Cations	8	24.00	10/18/2014	20.00	06/02/2020	22.00	meq/l
Chemical Oxygen Demand	8	30.00	06/25/2019	10.00	06/02/2020	21.13	mg/l
Chloride	8	201	12/15/2015	18	06/09/2021	121	mg/l
Conductivity, Lab	8	2,340	10/18/2014	1,770	06/02/2020	2,066	µmhos
Fluoride	8	23.70	06/09/2021	18.20	12/15/2015	20.70	mg/l
Hardness as CaCO3	8	13.00	10/18/2014	11.00	04/05/2016	11.99	mg/l
Nitrate as N, dissolved	8	0.02	10/18/2014	UH	12/15/2015	UH	mg/l
Nitrate/Nitrite as N,	8	0.02	10/18/2014	UH	12/15/2015	UH	mg/l
Nitrite as N, dissolved	8	0.01	12/15/2015	0.00	10/18/2014	UH	mg/l
Nitrogen, Ammonia	8	1.22	10/18/2014	0.81	06/20/2018	1.04	mg/l
Nitrogen, Organic	8	1.20	06/20/2018	0.20	10/18/2014	0.63	mg/l
Nitrogen, Total Kjeldahl	8	2.00	09/28/2017	1.06	06/09/2021	1.55	mg/l
pH, lab	8	9.60	12/15/2015	8.30	06/09/2021	9.10	units
Phosphate, total	8	0.40	12/15/2015	0.06	06/09/2021	0.15	mg/l
Phosphorus, total	8	0.13	12/15/2015	0.02	06/09/2021	0.05	mg/l
SAR in Water	8	66	04/05/2016	53.00	06/09/2021	61	none
Sulfate	8	40	10/18/2014	5.58	06/20/2018	16	mg/l
Sulfide	8	0.15	06/25/2019	0.02	06/02/2020	0.10	mg/l
Total Dissolved Solids	8	1,350	10/18/2014	1,070	06/09/2021	1,198	mg/l
Conductivity, Field	9	2,575	12/15/2015	1,594	10/25/2018	2,030	µmhos
pH, Field	9	9.40	06/20/2018	8.00	06/02/2020	8.69	units
Temperature (°C), Field	9	22.50	10/18/2014	11.49	10/25/2018	15.03	(°C)
Water Level, Field	9	480.10	09/28/2017	470.30	10/25/2018	476.24	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	8	0.08	10/18/2014	U	04/05/2016	0.07	mg/l
Arsenic, dissolved	8	0.03	10/18/2014	U	09/28/2017	0.01	mg/l
Barium, dissolved	8	0.40	06/09/2021	0.02	12/15/2015	0.17	mg/l
Beryllium, dissolved	8	U	10/18/2014	U	09/28/2017	U	mg/l
Boron, dissolved	8	0.83	06/09/2021	0.56	12/15/2015	0.69	mg/l
Cadmium, dissolved	8	U	10/18/2014	U	09/28/2017	U	mg/l
Calcium, dissolved	8	3.60	10/18/2014	U	06/20/2018	2.20	mg/l
Chromium, dissolved	8	U	10/18/2014	U	09/28/2017	U	mg/l
Copper, dissolved	8	U	10/18/2014	U	09/28/2017	U	mg/l
Iron, dissolved	8	0.36	09/28/2017	0.06	12/15/2015	0.17	mg/l
Lead, dissolved	8	U	10/18/2014	U	09/28/2017	U	mg/l
Lithium, dissolved	8	0.17	04/05/2016	0.09	06/02/2020	0.13	mg/l
Magnesium, dissolved	8	1.90	09/28/2017	1.00	10/18/2014	1.62	mg/l
Manganese, dissolved	8	0.02	04/05/2016	0.01	12/15/2015	0.01	mg/l
Mercury, dissolved	8	U	12/15/2015	U	06/25/2019	U	mg/l
Molybdenum, dissolved	8	0.14	10/18/2014	0.05	06/20/2018	0.09	mg/l
Nickel, dissolved	8	U	12/15/2015	U	06/25/2019	U	mg/l
Potassium, dissolved	8	14.50	10/18/2014	0.90	06/25/2019	7.69	mg/l
Selenium, dissolved	8	0.002	10/18/2014	U	04/05/2016	U	mg/l
Silica, dissolved	8	18.90	10/18/2014	0.90	12/15/2015	8.08	mg/l
Sodium, dissolved	8	536	10/18/2014	435	06/02/2020	485	mg/l
Strontium, dissolved	8	0.66	06/25/2019	0.16	12/15/2015	0.39	mg/l
Vanadium, dissolved	8	0.01	10/18/2014	U	04/05/2016	U	mg/l
Zinc, dissolved	8	0.04	12/15/2015	U	10/18/2014	U	mg/l

Table 33: BG-9 (DS-5) Annual B-Groove Aquifer (P&A Winter 2021)

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	28	13,100	01/07/2021	529	08/05/2019	1,843	mg/l
Carbonate as CaCO3	28	4,700	01/07/2021	185	10/10/2018	1,112	mg/l
Total Alkalinity as CaCO3	28	17,800	01/07/2021	793	08/05/2019	2,954	mg/l
Bromide	4	U	10/03/2018	U	05/07/2019	U	mg/l
Cation-Anion Balance	27	2.30	08/05/2019	-24.50	05/07/2019	-4.08	%
Sum of Anions	27	491.00	01/07/2021	20.00	10/10/2018	83.70	meq/l
Sum of Cations	27	410.00	01/07/2021	19.00	10/10/2018	74.07	meq/l
Chemical Oxygen Demand	4	50.00	05/14/2020	23.00	05/07/2019	36.50	mg/l
Chloride	27	4,710	01/07/2021	101	10/10/2018	823	mg/l
Conductivity, Lab	28	36,600	01/07/2021	1,840	10/10/2018	6,734	µmhos
Fluoride	27	59.10	01/07/2021	18.90	10/07/2019	25.99	mg/l
Hardness as CaCO3	27	29.00	01/07/2021	3.00	09/03/2020	10.23	mg/l
Nitrate as N, dissolved	4	UH	10/03/2018	UH	05/07/2019	UH	mg/l
Nitrate/Nitrite as N,	4	UH	10/03/2018	UH	05/07/2019	UH	mg/l
Nitrite as N, dissolved	4	UH	10/03/2018	UH	05/07/2019	UH	mg/l
Nitrogen, Ammonia	4	3.21	05/14/2020	1.37	10/10/2018	1.85	mg/l
Nitrogen, Organic	4	1.00	05/14/2020	0.30	10/03/2018	0.57	mg/l
Nitrogen, Total Kjeldahl	4	4.20	05/14/2020	1.70	10/03/2018	2.57	mg/l
pH, lab	28	9.80	11/04/2019	9.00	12/10/2020	9.51	units
Phosphate, total	4	4.40	05/14/2020	0.09	10/03/2018	1.26	mg/l
Phosphorus, total	4	1.42	05/14/2020	0.03	10/03/2018	0.41	mg/l
SAR in Water	27	1,100	09/03/2020	50.00	10/03/2018	228	none
Sulfate	27	59	07/07/2020	2.41	12/04/2018	20	mg/l
Sulfide	4	2.40	05/14/2020	0.08	10/03/2018	0.86	mg/l
Total Dissolved Solids	27	24,900	01/07/2021	1,060	10/10/2018	4,345	mg/l
Conductivity, Field	29	35,790	01/07/2021	1,560	09/09/2019	9,383	µmhos
pH, Field	28	9.59	02/10/2020	7.60	11/04/2019	9.04	units
Temperature (°C), Field	29	16.20	06/01/2020	8.07	02/11/2019	12.09	(°C)
Water Level, Field	28	532.50	12/10/2020	493.55	03/04/2020	513.14	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l
Arsenic, dissolved	4	0.003	05/14/2020	0.0002	10/10/2018	0.42	mg/l
Barium, dissolved	4	1.14	05/14/2020	0.10	05/07/2019	0.42	mg/l
Beryllium, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l
Boron, dissolved	27	14.30	01/07/2021	0.67	10/10/2018	2.92	mg/l
Cadmium, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l
Calcium, dissolved	27	5.50	10/07/2019	1.01	09/03/2020	1.82	mg/l
Chromium, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l
Copper, dissolved	4	0.01	10/03/2018	0.01	10/03/2018	0.01	mg/l
Iron, dissolved	4	2.40	10/03/2018	0.10	05/07/2019	1.27	mg/l
Lead, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l
Lithium, dissolved	4	0.41	05/14/2020	0.14	10/10/2018	0.21	mg/l
Magnesium, dissolved	27	5.93	12/10/2020	0.50	09/09/2019	1.54	mg/l
Manganese, dissolved	4	0.03	10/03/2018	0.02	10/10/2018	0.02	mg/l
Mercury, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l
Molybdenum, dissolved	4	0.17	10/03/2018	0.10	05/14/2020	0.14	mg/l
Nickel, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l
Potassium, dissolved	27	35.40	09/03/2020	2.40	10/10/2018	10.61	mg/l
Selenium, dissolved	4	0.00	10/03/2018	0.00	10/10/2018	0.00	mg/l
Silica, dissolved	27	18.00	01/07/2021	1.80	06/03/2019	5.63	mg/l
Sodium, dissolved	27	9,300	01/07/2021	420	12/04/2018	1,672	mg/l
Strontium, dissolved	27	1.76	12/10/2020	0.35	08/05/2019	0.69	mg/l
Vanadium, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l
Zinc, dissolved	4	U	05/14/2020	U	05/14/2020	U	mg/l

Table 34: BG-10 Quarterly B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	4	599	08/04/2021	446	09/03/2021	534	mg/l
Carbonate as CaCO3	4	323	09/03/2021	192	09/10/2021	250	mg/l
Total Alkalinity as CaCO3	4	802	08/04/2021	765	09/10/2021	784	mg/l
Bromide	3	U	08/04/2021	U	09/10/2021	U	mg/l
Cation-Anion Balance	4	-2.90	08/04/2021	-5.90	11/12/2021	-3.68	%
Sum of Anions	4	18.00	08/04/2021	17.00	09/10/2021	17.75	meq/l
Sum of Cations	4	17.00	08/04/2021	16.00	09/10/2021	16.50	meq/l
Chemical Oxygen Demand	3	247.00	08/04/2021	16.00	09/10/2021	98.67	mg/l
Chloride	4	42	09/03/2021	28	08/04/2021	34	mg/l
Conductivity, Lab	4	1,610	09/03/2021	1,540	09/10/2021	1,575	µmhos
Fluoride	4	21.00	09/03/2021	20.10	08/04/2021	20.65	mg/l
Hardness as CaCO3	4	88.00	08/04/2021	19.00	09/10/2021	37.25	mg/l
Nitrate as N, dissolved	3	UH	08/04/2021	UH	09/10/2021	UH	mg/l
Nitrate/Nitrite as N,	3	UH	08/04/2021	UH	09/10/2021	UH	mg/l
Nitrite as N, dissolved	3	UH	08/04/2021	UH	09/10/2021	UH	mg/l
Nitrogen, Ammonia	3	1.24	09/03/2021	0.82	08/04/2021	1.07	mg/l
Nitrogen, Organic	3	0.93	08/04/2021	0.20	09/10/2021	0.48	mg/l
Nitrogen, Total Kjeldahl	3	1.75	08/04/2021	1.38	09/10/2021	1.55	mg/l
pH, lab	4	9.70	09/03/2021	9.20	08/04/2021	9.40	units
Phosphate, total	3	6.30	08/04/2021	1.01	09/10/2021	3.34	mg/l
Phosphorus, total	3	2.02	08/04/2021	0.33	09/10/2021	1.08	mg/l
SAR in Water	4	36	09/10/2021	16.00	08/04/2021	30	none
Sulfate	4	U	08/04/2021	U	11/12/2021	U	mg/l
Sulfide	3	0.09	09/10/2021	0.07	09/03/2021	0.08	mg/l
Total Dissolved Solids	4	939	08/04/2021	896	09/10/2021	915	mg/l
Conductivity, Field	8	1,620	07/23/2021	1,430	07/23/2021	1,485	µmhos
pH, Field	8	9.38	11/12/2021	7.04	07/23/2021	8.31	units
Temperature (°C), Field	8	25.50	07/23/2021	13.80	11/12/2021	20.89	(°C)
Water Level, Field	3	450.60	09/10/2021	443.00	11/12/2021	447.77	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Arsenic, dissolved	3	0.0114	08/04/2021	0.0011	09/10/2021	0.0047	mg/l
Barium, dissolved	3	0.40	09/10/2021	0.07	08/04/2021	0.24	mg/l
Beryllium, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Boron, dissolved	4	0.82	08/04/2021	0.71	09/03/2021	0.74	mg/l
Cadmium, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Calcium, dissolved	4	17.40	08/04/2021	3.76	09/10/2021	7.31	mg/l
Chromium, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Copper, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Iron, dissolved	3	1.06	09/03/2021	0.45	09/10/2021	0.66	mg/l
Lead, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Lithium, dissolved	3	0.26	08/04/2021	0.23	09/10/2021	0.24	mg/l
Magnesium, dissolved	4	10.80	08/04/2021	2.24	09/10/2021	4.57	mg/l
Manganese, dissolved	3	0.03	08/04/2021	0.02	09/10/2021	0.02	mg/l
Mercury, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Molybdenum, dissolved	3	0.02	08/04/2021	0.02	08/04/2021	0.02	mg/l
Nickel, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Potassium, dissolved	4	8.03	09/03/2021	6.92	08/04/2021	7.42	mg/l
Selenium, dissolved	3	0.01	09/03/2021	0.00	08/04/2021	0.01	mg/l
Silica, dissolved	4	15.80	08/04/2021	3.90	11/12/2021	7.15	mg/l
Sodium, dissolved	4	356	09/03/2021	347	08/04/2021	354	mg/l
Strontium, dissolved	4	0.69	09/10/2021	0.54	08/04/2021	0.63	mg/l
Vanadium, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l
Zinc, dissolved	3	U	08/04/2021	U	09/10/2021	U	mg/l

Table 35: BG-11 Monthly B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	12	827	03/09/2021	683	03/05/2021	759	mg/l
Carbonate as CaCO3	12	172	11/02/2021	63	03/16/2021	117	mg/l
Total Alkalinity as CaCO3	12	953	03/09/2021	830	05/03/2021	876	mg/l
Bromide	4	U	03/05/2021	U	05/03/2021	U	mg/l
Cation-Anion Balance	12	4.80	08/02/2021	-7.70	07/12/2021	-1.81	%
Sum of Anions	12	23.00	10/05/2021	19.00	03/05/2021	20.75	meq/l
Sum of Cations	12	24.00	11/02/2021	17.00	03/05/2021	20.08	meq/l
Chemical Oxygen Demand	4	34.00	03/05/2021	10.00	03/09/2021	16.75	mg/l
Chloride	12	120	11/02/2021	43	03/16/2021	75	mg/l
Conductivity, Lab	12	2,080	10/05/2021	1,690	05/03/2021	1,861	µmhos
Fluoride	12	24.70	05/03/2021	20.30	08/02/2021	21.94	mg/l
Hardness as CaCO3	12	22.00	08/02/2021	14.00	03/16/2021	17.17	mg/l
Nitrate as N, dissolved	4	0.06	03/05/2021	UH	05/03/2021	UH	mg/l
Nitrate/Nitrite as N,	4	0.06	03/05/2021	UH	05/03/2021	UH	mg/l
Nitrite as N, dissolved	4	UH	03/05/2021	UH	05/03/2021	UH	mg/l
Nitrogen, Ammonia	4	0.99	03/16/2021	0.89	03/05/2021	0.95	mg/l
Nitrogen, Organic	4	0.28	03/05/2021	0.28	03/05/2021	0.28	mg/l
Nitrogen, Total Kjeldahl	4	1.17	03/05/2021	0.96	03/16/2021	1.06	mg/l
pH, lab	12	9.20	11/02/2021	8.50	10/05/2021	8.87	units
Phosphate, total	4	2.04	03/05/2021	0.15	03/16/2021	0.65	mg/l
Phosphorus, total	4	0.66	03/05/2021	0.05	03/16/2021	0.21	mg/l
SAR in Water	12	53	11/02/2021	39.00	03/05/2021	47	none
Sulfate	12	5	03/05/2021	5.38	03/05/2021	5	mg/l
Sulfide	4	0.02	05/03/2021	U	03/05/2021	U	mg/l
Total Dissolved Solids	12	1,260	11/02/2021	972	03/05/2021	1,103	mg/l
Conductivity, Field	11	2,007	11/02/2021	1,637	03/09/2021	1,794	µmhos
pH, Field	11	8.90	10/05/2021	8.15	07/12/2021	8.51	units
Temperature (°C), Field	11	17.40	07/12/2021	12.60	03/09/2021	14.45	(°C)
Water Level, Field	11	558.80	12/07/2021	539.40	03/16/2021	548.99	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	4	U	03/05/2021	U	05/03/2021	U	mg/l
Arsenic, dissolved	4	0.03	03/09/2021	0.00	05/03/2021	0.01	mg/l
Barium, dissolved	4	0.41	05/03/2021	0.19	03/05/2021	0.32	mg/l
Beryllium, dissolved	4	U	03/05/2021	U	05/03/2021	U	mg/l
Boron, dissolved	12	0.89	11/02/2021	0.74	03/05/2021	0.82	mg/l
Cadmium, dissolved	4	U	03/05/2021	U	05/03/2021	U	mg/l
Calcium, dissolved	12	4.78	12/07/2021	2.75	04/05/2021	3.36	mg/l
Chromium, dissolved	4	0.013	03/05/2021	U	05/03/2021	U	mg/l
Copper, dissolved	4	0.011	05/03/2021	U	03/05/2021	U	mg/l
Iron, dissolved	4	0.94	03/16/2021	0.40	05/03/2021	0.66	mg/l
Lead, dissolved	4	I	03/05/2021	U	05/03/2021	U	mg/l
Lithium, dissolved	4	0.16	03/16/2021	0.15	03/05/2021	0.16	mg/l
Magnesium, dissolved	12	2.97	08/02/2021	1.79	03/16/2021	2.14	mg/l
Manganese, dissolved	4	0.04	03/05/2021	0.02	03/16/2021	0.03	mg/l
Mercury, dissolved	4	U	03/05/2021	U	05/03/2021	U	mg/l
Molybdenum, dissolved	4	0.13	03/09/2021	0.06	03/05/2021	0.09	mg/l
Nickel, dissolved	4	U	03/05/2021	U	05/03/2021	U	mg/l
Potassium, dissolved	12	2.90	08/02/2021	0.90	04/05/2021	1.24	mg/l
Selenium, dissolved	4	0.0017	03/09/2021	0.0003	03/05/2021	0.001	mg/l
Silica, dissolved	12	16.60	11/02/2021	10.30	03/05/2021	14.92	mg/l
Sodium, dissolved	12	524	11/02/2021	372	03/05/2021	446	mg/l
Strontium, dissolved	12	1.01	12/07/2021	0.63	03/05/2021	0.83	mg/l
Vanadium, dissolved	4	U	03/05/2021	U	05/03/2021	U	mg/l
Zinc, dissolved	4	U	03/05/2021	U	05/03/2021	U	mg/l

Table 36: IRI-6 Annual B-Groove Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	64	806.00	12/16/1992	356.00	02/26/1991	634.79	mg/l
Carbonate as CaCO3	64	754.00	09/27/1990	10.00	06/16/1992	102.18	mg/l
Total Alkalinity as CaCO3	64	1,064.00	09/27/1990	375.00	09/07/1990	714.30	mg/l
Bromide	34	2.60	09/07/1990	0.06	05/26/2000	0.74	mg/l
Cation-Anion Balance	62	11.10	05/29/2002	-9.40	07/29/2009	0.36	%
Sum of Anions	56	24.21	09/27/1990	12.00	05/26/2004	16.38	meq/l
Sum of Cations	56	23.84	09/27/1990	13.00	05/26/2004	16.44	meq/l
Chemical Oxygen Demand	26	550.00	07/29/2009	11.00	08/24/2017	150.52	mg/l
Chloride	63	524.00	09/07/1990	11.00	06/30/1995	41.48	mg/l
Conductivity, Lab	62	1,660.00	09/08/1993	1,050.0	03/22/1993	1,436.6	µmhos
Fluoride	64	32.00	09/28/1994	2.80	05/28/1991	21.64	mg/l
Hardness as CaCO3	62	59.00	09/27/1990	3.00	06/30/2009	10.87	mg/l
Nitrate as N, dissolved	33	1.99	06/14/2008	0.02	06/30/1995	0.23	mg/l
Nitrate/Nitrite as N,	33	2.13	06/14/2008	0.02	09/28/1994	0.24	mg/l
Nitrite as N, dissolved	33	0.14	06/14/2008	0.01	10/03/2012	0.08	mg/l
Nitrogen, Ammonia	33	5.70	05/09/2001	0.58	05/21/2007	1.13	mg/l
Nitrogen, Organic	33	34.70	07/29/2009	0.37	03/08/2021	8.54	mg/l
Nitrogen, Total Kjeldahl	33	35.50	07/29/2009	1.13	03/08/2021	9.65	mg/l
pH, lab	62	11.60	12/20/1993	8.40	12/30/1996	8.87	units
Phosphate, total	33	0.90	09/07/1990	0.03	05/26/2000	0.14	mg/l
Phosphorus, total	33	0.30	09/07/1990	0.01	06/18/1996	0.05	mg/l
SAR in Water	52	92.00	11/27/2002	29.17	09/27/1990	52.77	none
Sulfate	64	140.00	06/14/2008	2.00	05/28/1991	17.55	mg/l
Sulfide	33	0.80	09/07/1990	0.01	05/26/2004	0.13	mg/l
Total Dissolved Solids	63	1,428.00	09/27/1990	690.00	05/29/2003	914.78	mg/l
Conductivity, Field	88	3,803.00	09/01/2009	982.00	11/21/2005	1,537.8	µmhos
pH, Field	87	12.00	09/27/1990	7.60	09/16/2019	9.28	units
Temperature (°C), Field	45	16.20	06/14/2008	8.00	12/01/1990	12.21	(°C)
Water Level, Field	62	435.60	08/24/2017	398.45	11/01/1990	412.25	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	32	3.79	09/27/1990	U	05/26/2004	0.65	mg/l
Arsenic, dissolved	32	0.03	09/27/1990	U	05/26/2004	0.01	mg/l
Barium, dissolved	32	0.44	03/08/2021	U	09/07/1990	0.23	mg/l
Beryllium, dissolved	32	U	09/07/1990	U	07/31/1991	U	mg/l
Boron, dissolved	64	0.72	01/31/1991	0.19	12/20/1993	0.57	mg/l
Cadmium, dissolved	32	U	09/07/1990	U	09/15/1992	U	mg/l
Calcium, dissolved	64	12.00	09/27/1990	0.00	02/26/1991	2.28	mg/l
Chromium, dissolved	32	0.01	03/08/2021	U	09/07/1990	U	mg/l
Copper, dissolved	32	U	10/22/2013	U	10/22/2013	U	mg/l
Iron, dissolved	32	0.24	11/06/2014	0.01	05/26/1999	0.05	mg/l
Lead, dissolved	32	0.32	03/22/2016	U	06/23/1994	0.15	mg/l
Lithium, dissolved	32	0.13	09/07/1990	0.06	09/15/1992	0.08	mg/l
Magnesium, dissolved	64	7.00	09/27/1990	U	02/26/1991	1.21	mg/l
Manganese, dissolved	32	0.02	03/27/2018	U	07/31/1991	0.01	mg/l
Mercury, dissolved	32	U	09/07/1990	U	09/15/1992	U	mg/l
Molybdenum, dissolved	32	U	03/22/2016	U	09/15/1992	U	mg/l
Nickel, dissolved	32	0.02	06/23/1994	U	09/15/1992	U	mg/l
Potassium, dissolved	64	13.00	09/07/1990	0.86	03/08/2021	1.76	mg/l
Selenium, dissolved	32	0.002	09/27/1990	0.001	07/31/1991	U	mg/l
Silica, dissolved	64	63.00	09/27/1990	9.50	12/20/1993	17.41	mg/l
Sodium, dissolved	64	508.00	09/27/1990	287.00	12/20/1993	367.94	mg/l
Strontium, dissolved	64	0.78	03/08/2021	0.00	12/20/1993	0.47	mg/l
Vanadium, dissolved	32	0.01	09/07/1990	U	07/31/1991	U	mg/l
Zinc, dissolved	32	0.13	10/22/2013	0.01	05/09/2001	0.03	mg/l

Table 37: DS-2 Monthly Dissolution Surface Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	170	66,300.00	08/21/2003	3,970.00	11/18/2006	41,898.64	mg/l
Carbonate as CaCO3	170	33,400.00	08/05/1999	130.00	11/18/2006	3,886.81	mg/l
Total Alkalinity as CaCO3	170	68,800.00	08/21/2003	4,100.00	11/18/2006	45,510.65	mg/l
Bromide	21	3.00	05/18/2006	2.70	11/05/2019	2.85	mg/l
Cation-Anion Balance	169	80.00	11/18/2006	-67.20	09/15/2007	-1.99	%
Sum of Anions	169	1,430.00	05/13/2020	105.00	11/18/2006	980.39	meq/l
Sum of Cations	169	1,320.00	01/15/2019	193.00	09/15/2007	945.90	meq/l
Chemical Oxygen Demand	20	1,100.00	07/29/2009	100.00	09/14/2000	283.35	mg/l
Chloride	169	19,400.00	04/05/2021	105.00	04/11/2006	2,453.58	mg/l
Conductivity, Lab	170	75,100.00	05/13/2020	5,220.00	02/08/2000	51,875.33	µmhos
Fluoride	169	123.00	03/25/1998	8.60	04/11/2006	50.02	mg/l
Hardness as CaCO3	169	150.00	11/16/2007	1.00	03/25/1998	36.14	mg/l
Nitrate as N, dissolved	21	0.96	09/25/2002	0.00	09/24/2003	0.10	mg/l
Nitrate/Nitrite as N,	21	1.65	09/25/2002	0.00	09/24/2003	0.16	mg/l
Nitrite as N, dissolved	21	0.87	09/25/2002	0.00	09/24/2003	0.11	mg/l
Nitrogen, Ammonia	20	20.30	05/13/2020	3.75	09/14/2000	12.56	mg/l
Nitrogen, Organic	20	17.00	05/03/2021	1.90	09/24/2003	7.73	mg/l
Nitrogen, Total Kjeldahl	20	31.90	05/03/2021	1.70	09/14/2000	16.21	mg/l
pH, lab	170	9.10	10/14/2008	8.20	06/09/1999	8.50	units
Phosphate, total	20	77.50	05/18/2006	1.55	10/14/2008	35.71	mg/l
Phosphorus, total	20	18.80	09/15/2007	3.00	10/14/2008	11.16	mg/l
SAR in Water	135	7,600.00	03/25/1998	801.00	11/16/2007	2,285.15	none
Sulfate	169	1,040.00	12/16/2002	10.00	09/27/2005	126.60	mg/l
Sulfide	20	18.60	11/05/2019	0.05	08/25/2005	2.88	mg/l
Total Dissolved Solids	169	71,400.00	05/13/2020	20,800.00	12/08/2000	52,023.81	mg/l
Conductivity, Field	173	82,870.00	12/09/2019	26,900.00	12/01/2008	54,643.29	µmhos
pH, Field	172	12.60	01/11/2021	7.00	03/04/2015	8.50	units
Temperature (°C), Field	127	23.77	06/15/2011	6.30	03/04/2013	12.99	(°C)
Water Level, Field	189	604.20	09/20/2021	471.20	09/03/2020	550.99	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	21	1.60	09/23/2010	0.58	03/14/2008	1.09	mg/l
Arsenic, dissolved	21	U	09/30/1997	U	09/22/1999	U	mg/l
Barium, dissolved	21	3.85	03/14/2008	0.06	10/14/2008	1.78	mg/l
Beryllium, dissolved	21	U	09/30/1997	U	09/22/1999	U	mg/l
Boron, dissolved	168	43.40	01/28/2003	6.60	09/15/2007	31.64	mg/l
Cadmium, dissolved	21	U	09/30/1997	U	09/22/1999	U	mg/l
Calcium, dissolved	168	60.00	11/16/2007	0.40	08/12/2004	13.09	mg/l
Chromium, dissolved	21	0.40	09/23/2010	0.40	09/23/2010	U	mg/l
Copper, dissolved	21	0.60	09/14/2004	0.30	09/02/1998	U	mg/l
Iron, dissolved	21	1.20	09/02/1998	0.24	10/14/2008	U	mg/l
Lead, dissolved	21	0.28	03/14/2008	U	09/02/1998	U	mg/l
Lithium, dissolved	21	12.70	03/14/2008	1.00	09/15/2007	4.62	mg/l
Magnesium, dissolved	168	10.00	09/08/2015	0.30	03/14/2008	5.56	mg/l
Manganese, dissolved	21	0.01	10/14/2008	U	09/22/1999	U	mg/l
Mercury, dissolved	21	U	09/30/1997	U	09/22/1999	U	mg/l
Molybdenum, dissolved	21	0.50	09/23/2010	0.29	03/14/2008	U	mg/l
Nickel, dissolved	21	0.23	03/14/2008	U	09/22/1999	U	mg/l
Potassium, dissolved	168	340.00	10/10/2018	11.40	10/14/2008	51.77	mg/l
Selenium, dissolved	21	0.002	09/30/1997	U	09/22/1999	U	mg/l
Silica, dissolved	168	50.00	06/02/1998	3.60	04/11/2006	26.59	mg/l
Sodium, dissolved	168	29,800.00	04/19/2001	4,370.00	09/15/2007	21,507.56	mg/l
Strontium, dissolved	168	0.60	08/04/1997	0.07	10/14/2008	0.27	mg/l
Vanadium, dissolved	21	0.20	09/23/2010	U	09/22/1999	U	mg/l
Zinc, dissolved	21	3.00	11/16/2007	0.03	03/14/2008	U	mg/l

Table 38: DS-3 Monthly Dissolution Surface Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	216	43,000	05/24/2005	17,400	11/27/2002	27,139	mg/l
Carbonate as CaCO3	216	23,900	05/03/2008	419	06/26/2002	3,913	mg/l
Total Alkalinity as CaCO3	216	60,100	03/14/2008	21,900	06/11/2014	30,879	mg/l
Bromide	31	5.00	05/03/2008	0.70	08/02/2006	2.18	mg/l
Cation-Anion Balance	216	13.50	10/28/2002	-93.80	04/10/2013	-4.67	%
Sum of Anions	216	1,440.00	04/07/2020	511.00	04/29/2003	780.50	meq/l
Sum of Cations	216	1,730.00	03/14/2008	20.70	04/10/2013	726.45	meq/l
Chemical Oxygen Demand	31	1,100.00	07/30/2009	140.00	08/21/2003	412.25	mg/l
Chloride	216	17,200.0	12/19/2018	39.00	05/24/2005	5,697.59	mg/l
Conductivity, Lab	216	81,800	02/13/2019	27,200	09/28/2006	47,322	µmhos
Fluoride	216	329.00	11/07/2018	2.80	05/24/2005	61.35	mg/l
Hardness as CaCO3	216	49.00	03/08/2011	1.00	01/28/2003	15.08	mg/l
Nitrate as N, dissolved	31	0.10	08/12/2004	0.02	09/28/2006	0.05	mg/l
Nitrate/Nitrite as N,	31	0.14	11/10/2014	0.02	09/28/2006	0.05	mg/l
Nitrite as N, dissolved	31	0.05	11/10/2014	0.01	07/11/2013	0.03	mg/l
Nitrogen, Ammonia	31	34.20	12/19/2018	6.11	07/10/2017	13.30	mg/l
Nitrogen, Organic	31	28.00	08/22/2002	0.80	09/30/2008	8.45	mg/l
Nitrogen, Total Kjeldahl	31	50.00	12/19/2018	3.50	09/23/2010	19.56	mg/l
pH, lab	216	9.20	04/10/2008	7.90	10/28/2002	8.61	units
Phosphate, total	31	155.00	07/30/2009	3.10	08/16/2011	32.73	mg/l
Phosphorus, total	31	183.00	09/30/2008	3.20	06/26/2007	14.27	mg/l
SAR in Water	151	8,450	05/18/2006	0.00	12/09/2014	2,481	none
Sulfate	216	1,860	09/23/2010	0.00	09/02/2015	206	mg/l
Sulfide	31	18.10	06/10/2020	0.04	08/25/2005	3.42	mg/l
Total Dissolved Solids	216	88,500	03/14/2008	18,500	05/29/2003	41,500	mg/l
Conductivity, Field	238	86,810	02/13/2019	30,600	04/29/2003	50,351	µmhos
pH, Field	237	9.91	06/30/2009	7.00	03/09/2016	8.43	units
Temperature (°C), Field	237	24.40	07/05/2016	5.30	02/09/2012	12.84	(°C)
Water Level, Field	238	547.30	08/02/2021	484.10	02/04/2016	521.75	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	32	79.90	08/12/2004	0.40	03/14/2008	17.00	mg/l
Arsenic, dissolved	32	0.02	06/10/2020	0.01	12/04/2012	0.02	mg/l
Barium, dissolved	32	3.32	08/25/2005	0.19	08/19/2007	1.82	mg/l
Beryllium, dissolved	32	U	08/22/2002	U	08/12/2004	U	mg/l
Boron, dissolved	217	74.70	02/13/2019	3.69	05/29/2003	19.21	mg/l
Cadmium, dissolved	32	U	08/22/2002	U	08/12/2004	U	mg/l
Calcium, dissolved	217	14.00	07/10/2017	0.30	05/29/2003	4.07	mg/l
Chromium, dissolved	32	0.01	05/18/2006	U	08/22/2003	U	mg/l
Copper, dissolved	32	1.20	08/16/2011	0.50	08/12/2004	0.85	mg/l
Iron, dissolved	32	3.70	09/15/2007	0.07	05/18/2006	1.49	mg/l
Lead, dissolved	32	1.40	08/22/2002	0.22	03/14/2008	0.81	mg/l
Lithium, dissolved	32	8.48	03/14/2008	2.70	12/19/2018	3.36	mg/l
Magnesium, dissolved	217	10.00	01/08/2008	0.00	09/02/2015	U	mg/l
Manganese, dissolved	32	U	08/22/2002	U	08/12/2004	U	mg/l
Mercury, dissolved	32	U	08/22/2002	U	08/12/2004	U	mg/l
Molybdenum, dissolved	32	0.70	08/19/2007	0.30	08/18/2010	0.45	mg/l
Nickel, dissolved	32	0.20	09/23/2010	0.02	05/18/2006	0.13	mg/l
Potassium, dissolved	217	150.00	02/13/2019	0.00	11/21/2008	36.56	mg/l
Selenium, dissolved	32	0.008	08/22/2002	0.00	07/12/2007	0.005	mg/l
Silica, dissolved	217	79.00	04/11/2006	8.90	05/29/2003	25.86	mg/l
Sodium, dissolved	217	39,200	03/14/2008	450	04/10/2013	16,59	mg/l
Strontium, dissolved	217	0.70	02/21/2005	0.04	05/29/2003	0.22	mg/l
Vanadium, dissolved	32	0.20	06/26/2007	0.01	05/18/2006	U	mg/l
Zinc, dissolved	32	1.80	07/10/2017	0.02	03/14/2008	U	mg/l

Table 39: DS-6 Annual Dissolution Surface Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	77	9,560	07/06/2020	5,770	12/07/2017	7,132	mg/l
Carbonate as CaCO3	77	5,060	03/07/2018	2,110	07/06/2020	3,707	mg/l
Total Alkalinity as CaCO3	77	12,400	03/05/2020	9,650	08/09/2016	10,837	mg/l
Bromide	10	U	12/09/2014	U	07/11/2017	U	mg/l
Cation-Anion Balance	76	2.60	02/11/2020	-13.30	07/06/2020	-4.19	%
Sum of Anions	76	272.00	03/05/2020	219.00	11/03/2020	240.07	meq/l
Sum of Cations	76	255.00	02/11/2020	188.00	12/01/2020	220.84	meq/l
Chemical Oxygen Demand	10	167.00	12/09/2014	44.00	04/05/2016	80.50	mg/l
Chloride	76	1,330	12/09/2014	448	11/03/2020	703	mg/l
Conductivity, Lab	77	19,800	12/09/2014	14,900	12/01/2020	16,964	µmhos
Fluoride	76	51.00	04/07/2020	26.80	09/08/2015	37.01	mg/l
Hardness as CaCO3	76	30.00	09/22/2016	U	01/03/2017	6.68	mg/l
Nitrate as N, dissolved	10	U	09/27/2016	UH	04/05/2016	UH	mg/l
Nitrate/Nitrite as N,	10	0.02	12/09/2014	UH	04/05/2016	UH	mg/l
Nitrite as N, dissolved	10	0.03	12/09/2014	UH	04/05/2016	UH	mg/l
Nitrogen, Ammonia	10	4.39	05/13/2020	3.30	12/09/2014	3.82	mg/l
Nitrogen, Organic	10	5.60	05/07/2019	0.80	07/11/2017	3.04	mg/l
Nitrogen, Total Kjeldahl	10	9.30	05/07/2019	4.70	07/11/2017	6.80	mg/l
pH, lab	77	9.50	03/01/2017	9.00	08/10/2020	9.26	units
Phosphate, total	10	7.00	09/27/2016	0.71	12/09/2014	4.81	mg/l
Phosphorus, total	10	2.20	09/27/2016	0.23	12/09/2014	1.55	mg/l
SAR in Water	53	1,600	02/11/2020	410.00	09/22/2016	1,044	none
Sulfate	76	370	12/09/2014	20.60	09/04/2020	86	mg/l
Sulfide	10	3.00	07/11/2017	0.30	04/05/2016	1.61	mg/l
Total Dissolved Solids	76	14,100	12/09/2014	11,200	12/01/2020	12,479	mg/l
Conductivity, Field	72	19,680	05/07/2019	13,820	05/01/2020	16,858	µmhos
pH, Field	72	9.70	08/09/2016	7.30	12/10/2018	8.96	units
Temperature (°C), Field	72	16.70	09/06/2017	8.00	01/14/2020	12.06	(°C)
Water Level, Field	72	550.40	09/08/2021	489.40	10/06/2020	521.93	Ft.
Parameters Metals	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Arsenic, dissolved	10	0.012	12/09/2014	U	07/11/2017	U	mg/l
Barium, dissolved	10	0.46	10/04/2016	0.05	04/05/2016	0.28	mg/l
Beryllium, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Boron, dissolved	75	8.54	04/06/2021	6.20	10/04/2017	7.58	mg/l
Cadmium, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Calcium, dissolved	75	7.34	06/07/2021	1.00	03/25/2015	1.98	mg/l
Chromium, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Copper, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Iron, dissolved	10	0.60	12/09/2014	0.20	09/22/2016	0.38	mg/l
Lead, dissolved	10	0.30	05/07/2019	U	07/11/2017	U	mg/l
Lithium, dissolved	10	2.36	05/03/2021	1.94	09/27/2016	2.13	mg/l
Magnesium, dissolved	75	4.00	03/25/2015	2.00	09/08/2015	2.71	mg/l
Manganese, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Mercury, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Molybdenum, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Nickel, dissolved	10	U	12/09/2014	U	07/11/2017	U	mg/l
Potassium, dissolved	75	113.00	12/09/2014	45.20	12/01/2020	72.47	mg/l
Selenium, dissolved	10	0.00	09/22/2016	U	07/11/2017	U	mg/l
Silica, dissolved	75	34.00	07/11/2017	7.00	01/27/2016	26.20	mg/l
Sodium, dissolved	75	5,750	02/11/2020	4,240	12/01/2020	4,973	mg/l
Strontium, dissolved	75	0.48	12/07/2021	0.05	12/29/2015	0.19	mg/l
Vanadium, dissolved	10	U	12/09/2017	U	07/11/2017	U	mg/l
Zinc, dissolved	10	0.40	09/22/2016	0.10	07/11/2017	0.28	mg/l

Table 40: DS-7 Annual Dissolution Surface Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	83	33,500	04/08/2019	9,000	12/07/2020	24,335	mg/l
Carbonate as CaCO3	83	16,600	08/02/2016	63	12/07/2020	4,787	mg/l
Total Alkalinity as CaCO3	83	41,300	07/07/2016	9,060	12/07/2020	29,005	mg/l
Bromide	9	U	12/17/2014	U	04/05/2016	U	mg/l
Cation-Anion Balance	83	21.30	03/05/2020	-15.70	10/06/2020	-1.97	%
Sum of Anions	83	3,360.00	12/17/2014	302.00	12/07/2020	1,263.2	meq/l
Sum of Cations	83	3,230.00	12/17/2014	296.00	11/05/2021	1,201.3	meq/l
Chemical Oxygen Demand	9	3,630.00	11/05/2015	344.00	05/07/2019	1,693.1	mg/l
Chloride	83	96,000	12/30/2014	3,850	10/12/2021	24,257	mg/l
Conductivity, Lab	83	207,000	12/17/2014	24,000	11/02/2020	74,541	µmhos
Fluoride	83	106.00	12/10/2019	38.50	10/06/2020	64.43	mg/l
Hardness as CaCO3	83	82.40	12/16/2015	0.00	12/30/2014	29.97	mg/l
Nitrate as N, dissolved	9	0.03	05/07/2020	UH	12/17/2014	UH	mg/l
Nitrate/Nitrite as N,	9	0.03	05/07/2020	UH	12/17/2014	UH	mg/l
Nitrite as N, dissolved	9	UH	12/17/2014	UH	04/05/2016	UH	mg/l
Nitrogen, Ammonia	9	40.40	12/17/2014	3.33	05/04/2021	15.16	mg/l
Nitrogen, Organic	9	7.00	05/07/2019	3.00	05/04/2021	4.84	mg/l
Nitrogen, Total Kjeldahl	9	33.00	12/30/2014	1.10	11/05/2015	12.29	mg/l
pH, lab	83	9.10	05/06/2015	8.30	04/08/2020	8.61	units
Phosphate, total	9	71.00	11/05/2015	6.10	05/04/2021	37.46	mg/l
Phosphorus, total	9	23.00	11/05/2015	1.97	05/04/2021	12.12	mg/l
SAR in Water	29	7,600	06/08/2016	670.00	12/07/2021	2,551	none
Sulfate	83	480	12/30/2014	110.00	07/11/2017	350	mg/l
Sulfide	9	4.80	05/07/2019	1.30	12/17/2014	2.63	mg/l
Total Dissolved Solids	83	189,676	12/17/2014	16,600	11/05/2021	69,326	mg/l
Conductivity, Field	81	186,700	12/17/2014	23,190	09/07/2021	75,341	µmhos
pH, Field	81	9.20	03/10/2016	7.10	12/17/2014	8.30	units
Temperature (°C), Field	81	17.60	07/08/2021	7.20	02/09/2021	12.90	(°C)
Water Level, Field	82	643.10	12/12/2014	478.76	11/09/2016	503.11	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Arsenic, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Barium, dissolved	9	1.90	07/11/2017	0.40	11/05/2015	1.13	mg/l
Beryllium, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Boron, dissolved	83	66.00	09/09/2015	7.10	01/09/2018	23.89	mg/l
Cadmium, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Calcium, dissolved	83	30.00	05/06/2015	0.00	12/30/2014	7.46	mg/l
Chromium, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Copper, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Iron, dissolved	9	5.00	12/30/2014	3.00	12/17/2014	4.00	mg/l
Lead, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Lithium, dissolved	9	2.70	07/11/2017	1.00	12/30/2014	2.00	mg/l
Magnesium, dissolved	83	20.00	06/17/2015	2.16	10/12/2021	13.52	mg/l
Manganese, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Mercury, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Molybdenum, dissolved	9	2.00	04/05/2016	U	07/11/2017	U	mg/l
Nickel, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Potassium, dissolved	83	140.00	09/09/2015	14.60	10/12/2021	46.52	mg/l
Selenium, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Silica, dissolved	83	55.00	06/08/2021	16.00	09/11/2017	22.69	mg/l
Sodium, dissolved	83	73,200	12/17/2014	6,700	11/05/2021	27,267	mg/l
Strontium, dissolved	83	1.00	08/12/2015	0.10	06/08/2016	0.33	mg/l
Vanadium, dissolved	9	U	12/17/2014	U	07/11/2017	U	mg/l
Zinc, dissolved	9	0.50	07/11/2017	U	07/11/2017	U	mg/l

Table 41: DS-8 Annual Dissolution Surface Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	9	23,300	01/15/2015	16,700	06/25/2019	19,344	mg/l
Carbonate as CaCO3	9	9,590	06/25/2019	4,200	01/15/2015	7,177	mg/l
Total Alkalinity as CaCO3	9	27,500	01/15/2015	25,300	09/28/2017	26,522	mg/l
Bromide	9	U	01/08/2015	UH	09/28/2017	U	mg/l
Cation-Anion Balance	9	-1.40	06/25/2019	-9.50	01/08/2015	-4.23	%
Sum of Anions	9	586.00	06/03/2020	542.00	09/28/2017	566.11	meq/l
Sum of Cations	9	552.00	06/25/2019	477.00	01/08/2015	520.33	meq/l
Chemical Oxygen Demand	9	731.00	01/15/2015	95.00	09/28/2017	223.14	mg/l
Chloride	9	1,080	06/25/2019	900	01/15/2015	992	mg/l
Conductivity, Lab	9	37,100	06/19/2018	33,200	12/15/2015	35,022	µmhos
Fluoride	9	83.70	06/08/2021	61.80	06/19/2018	69.28	mg/l
Hardness as CaCO3	9	U	01/08/2015	U	09/28/2017	U	mg/l
Nitrate as N, dissolved	9	0.03	01/15/2015	0.00	01/08/2015	UH	mg/l
Nitrate/Nitrite as N,	9	0.03	01/15/2015	0.00	01/08/2015	UH	mg/l
Nitrite as N, dissolved	9	0.01	06/25/2019	0.00	01/08/2015	UH	mg/l
Nitrogen, Ammonia	9	10.50	01/15/2015	5.93	06/08/2021	7.97	mg/l
Nitrogen, Organic	9	10.00	06/08/2021	1.30	06/19/2018	5.30	mg/l
Nitrogen, Total Kjeldahl	9	15.60	06/08/2021	6.80	06/03/2020	12.38	mg/l
pH, lab	9	9.20	04/05/2016	8.70	01/08/2015	9.06	units
Phosphate, total	9	25.00	06/25/2019	15.00	12/15/2015	19.44	mg/l
Phosphorus, total	9	8.20	06/25/2019	4.90	12/15/2015	6.28	mg/l
SAR in Water	0	N/A	N/A	N/A	N/A	N/A	none
Sulfate	9	368	06/25/2019	100.00	01/08/2015	216	mg/l
Sulfide	9	2.18	06/08/2021	0.60	04/05/2016	1.44	mg/l
Total Dissolved Solids	9	30,100	06/25/2019	28,400	09/28/2017	29,233	mg/l
Conductivity, Field	9	39,750	12/15/2015	31,210	04/05/2016	34,519	µmhos
pH, Field	9	9.23	06/19/2018	8.20	10/06/2014	8.90	units
Temperature (°C), Field	9	15.20	06/08/2021	11.20	10/06/2014	13.43	(°C)
Water Level, Field	9	499.50	06/08/2021	81.00	01/08/2015	450.33	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Arsenic, dissolved	9	0.07	01/15/2015	0.01	04/05/2016	0.03	mg/l
Barium, dissolved	9	1.00	01/15/2015	0.30	06/03/2020	0.58	mg/l
Beryllium, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Boron, dissolved	9	14.00	06/25/2019	12.70	04/05/2016	13.41	mg/l
Cadmium, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Calcium, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Chromium, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Copper, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Iron, dissolved	9	2.70	01/15/2015	0.40	09/28/2017	1.44	mg/l
Lead, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Lithium, dissolved	9	4.93	06/08/2021	4.20	01/08/2015	4.50	mg/l
Magnesium, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Manganese, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Mercury, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Molybdenum, dissolved	9	0.50	01/15/2015	0.43	06/08/2021	0.48	mg/l
Nickel, dissolved	9	0.30	01/15/2015	0.30	01/15/2015	0.30	mg/l
Potassium, dissolved	9	68.00	04/05/2016	43.00	01/08/2015	60.10	mg/l
Selenium, dissolved	9	U	01/08/2015	U	06/03/2020	U	mg/l
Silica, dissolved	9	60.00	06/08/2021	18.00	01/08/2015	35.67	mg/l
Sodium, dissolved	9	12,500	06/25/2019	10,800	01/08/2015	11,778	mg/l
Strontium, dissolved	9	0.10	01/15/2015	0.00	01/08/2015	U	mg/l
Vanadium, dissolved	9	0.10	06/25/2019	U	06/03/2020	U	mg/l
Zinc, dissolved	9	0.70	12/15/2015	U	06/03/2020	U	mg/l

Table 42: DS-9 Annual Dissolution Surface Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	10	20,200	06/02/2020	11,900	06/20/2018	14,250	mg/l
Carbonate as CaCO3	10	4,570	04/22/2019	1,880	09/28/2017	2,643	mg/l
Total Alkalinity as CaCO3	10	22,200	06/02/2020	14,300	09/28/2017	16,890	mg/l
Bromide	10	U	11/04/2014	UH	09/28/2017	U	mg/l
Cation-Anion Balance	10	-1.90	09/28/2017	-83.70	06/02/2020	-12.32	%
Sum of Anions	10	474.00	06/02/2020	341.00	06/20/2018	399.50	meq/l
Sum of Cations	10	428.00	06/08/2021	42.00	06/02/2020	326.50	meq/l
Chemical Oxygen Demand	10	132.00	09/28/2017	90.00	06/02/2020	113.22	mg/l
Chloride	10	2,470	02/04/2015	830	06/08/2021	1,754	mg/l
Conductivity, Lab	10	28,900	06/08/2021	24,300	12/15/2015	26,490	µmhos
Fluoride	10	62.50	04/22/2019	41.40	06/20/2018	49.03	mg/l
Hardness as CaCO3	10	36.00	01/28/2015	0.00	12/15/2015	20.83	mg/l
Nitrate as N, dissolved	10	0.03	01/28/2015	U	11/04/2014	UH	mg/l
Nitrate/Nitrite as N,	10	0.04	01/28/2015	U	11/04/2014	UH	mg/l
Nitrite as N, dissolved	10	0.01	01/28/2015	U	11/04/2014	UH	mg/l
Nitrogen, Ammonia	10	7.40	01/28/2015	3.43	06/20/2018	5.20	mg/l
Nitrogen, Organic	10	6.00	06/08/2021	1.80	01/28/2015	3.99	mg/l
Nitrogen, Total Kjeldahl	10	10.50	06/08/2021	2.30	06/02/2020	8.08	mg/l
pH, lab	10	9.00	04/22/2019	8.60	06/08/2021	8.82	units
Phosphate, total	10	12.00	06/02/2020	3.70	02/04/2015	7.39	mg/l
Phosphorus, total	10	3.89	06/08/2021	1.20	02/04/2015	2.37	mg/l
SAR in Water	5	1,700	06/08/2021	83.00	06/02/2020	727	none
Sulfate	10	2,870	02/04/2015	10.80	04/22/2019	588	mg/l
Sulfide	10	U	11/04/2014	U	06/02/2020	U	mg/l
Total Dissolved Solids	10	23,500	04/22/2019	15,500	06/02/2020	20,000	mg/l
Conductivity, Field	9	29,450	04/22/2019	23,740	04/05/2016	26,858	µmhos
pH, Field	9	8.93	06/20/2018	7.20	01/29/2015	8.32	units
Temperature (°C), Field	9	14.35	06/20/2018	11.90	04/22/2019	13.15	(°C)
Water Level, Field	10	470.10	10/29/2014	453.17	10/18/2018	456.73	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Arsenic, dissolved	10	0.01	11/04/2014	0.00	02/04/2015	0.006	mg/l
Barium, dissolved	10	1.87	11/04/2014	0.12	02/04/2015	0.66	mg/l
Beryllium, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Boron, dissolved	10	13.90	06/08/2021	1.20	06/02/2020	9.22	mg/l
Cadmium, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Calcium, dissolved	10	6.00	11/04/2014	2.00	02/04/2015	3.35	mg/l
Chromium, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Copper, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Iron, dissolved	10	1.20	11/04/2014	0.20	12/15/2015	0.58	mg/l
Lead, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Lithium, dissolved	10	4.09	06/08/2021	0.20	06/02/2020	2.86	mg/l
Magnesium, dissolved	10	7.00	01/28/2015	4.00	11/04/2014	5.50	mg/l
Manganese, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Mercury, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Molybdenum, dissolved	10	0.30	02/04/2015	0.20	12/15/2015	0.25	mg/l
Nickel, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Potassium, dissolved	10	30.00	04/22/2019	21.00	06/20/2018	23.84	mg/l
Selenium, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Silica, dissolved	10	29.00	04/22/2019	12.00	06/02/2020	20.40	mg/l
Sodium, dissolved	10	9,700	06/08/2021	940	06/02/2020	7,394	mg/l
Strontium, dissolved	10	1.10	06/02/2020	0.06	09/28/2017	0.30	mg/l
Vanadium, dissolved	10	U	11/04/2014	U	06/20/2018	U	mg/l
Zinc, dissolved	10	1.90	12/15/2015	0.20	09/28/2017	0.83	mg/l

Table 43: DS-10 Annual Dissolution Surface Aquifer

Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	30	41,100	07/08/2021	17,200	12/01/2020	23,510	mg/l
Carbonate as CaCO3	30	13,800	09/07/2021	566	09/03/2020	4,083	mg/l
Total Alkalinity as CaCO3	30	50,300	07/08/2021	19,400	11/02/2020	27,587	mg/l
Bromide	4	U	08/14/2019	U	05/03/2021	U	mg/l
Cation-Anion Balance	29	13.50	05/13/2020	-33.30	04/07/2020	-4.50	%
Sum of Anions	29	1,230.00	07/08/2021	447.00	11/02/2020	786.34	meq/l
Sum of Cations	29	1,280.00	09/07/2021	353.00	12/01/2020	726.62	meq/l
Chemical Oxygen Demand	4	400.00	08/14/2019	400.00	08/14/2019	400.00	mg/l
Chloride	29	19,800	09/10/2019	2,040	11/02/2020	8,072	mg/l
Conductivity, Lab	30	74,500	09/10/2019	25,000	12/01/2020	49,843	µmhos
Fluoride	29	109.00	09/07/2021	29.00	09/10/2019	65.28	mg/l
Hardness as CaCO3	29	18.00	10/07/2019	7.00	04/05/2021	12.00	mg/l
Nitrate as N, dissolved	4	U	08/14/2019	UH	05/03/2021	UH	mg/l
Nitrate/Nitrite as N,	4	U	08/14/2019	UH	05/03/2021	UH	mg/l
Nitrite as N, dissolved	4	U	08/14/2019	UH	05/03/2021	UH	mg/l
Nitrogen, Ammonia	4	11.80	08/20/2019	8.55	05/03/2021	10.44	mg/l
Nitrogen, Organic	4	9.00	05/03/2021	5.00	08/14/2019	6.67	mg/l
Nitrogen, Total Kjeldahl	4	18.00	08/20/2019	2.10	05/13/2020	13.10	mg/l
pH, lab	30	8.90	04/07/2020	8.50	06/02/2020	8.69	units
Phosphate, total	4	31.00	05/03/2021	22.00	08/14/2019	25.25	mg/l
Phosphorus, total	4	9.95	05/03/2021	7.10	08/14/2019	8.11	mg/l
SAR in Water	9	4,200	08/02/2021	1,200.00	11/02/2020	2,414	none
Sulfate	29	U	08/14/2019	U	05/03/2021	U	mg/l
Sulfide	4	10.00	05/13/2020	1.38	08/14/2019	5.17	mg/l
Total Dissolved Solids	29	67,700	09/07/2021	22,700	12/01/2020	41,734	mg/l
Conductivity, Field	29	70,540	08/20/2019	28,730	12/01/2020	48,245	µmhos
pH, Field	28	8.90	01/11/2021	8.20	12/01/2020	8.55	units
Temperature (°C), Field	29	15.90	07/08/2021	9.32	02/10/2020	12.13	(°C)
Water Level, Field	30	627.80	04/07/2020	565.60	01/11/2021	591.36	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Arsenic, dissolved	4	0.01	08/14/2019	0.01	08/14/2019	0.01	mg/l
Barium, dissolved	4	1.90	08/20/2019	1.64	05/03/2021	1.81	mg/l
Beryllium, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Boron, dissolved	29	61.00	09/07/2021	11.50	12/01/2020	23.14	mg/l
Cadmium, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Calcium, dissolved	29	7.00	10/07/2019	2.63	08/02/2021	4.79	mg/l
Chromium, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Copper, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Iron, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Lead, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Lithium, dissolved	4	3.70	05/13/2020	3.50	08/14/2019	3.60	mg/l
Magnesium, dissolved	29	U	08/14/2019	U	05/03/2021	U	mg/l
Manganese, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Mercury, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Molybdenum, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Nickel, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Potassium, dissolved	29	800.00	08/20/2019	44.10	12/01/2020	248.41	mg/l
Selenium, dissolved	4	0.0021	05/03/2021	U	08/14/2019	U	mg/l
Silica, dissolved	29	31.00	12/09/2019	15.00	12/01/2020	22.72	mg/l
Sodium, dissolved	29	29,100	09/07/2021	7,990	12/01/2020	16,369	mg/l
Strontium, dissolved	29	0.42	12/06/2021	0.20	08/02/2021	0.26	mg/l
Vanadium, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l
Zinc, dissolved	4	U	08/14/2019	U	05/03/2021	U	mg/l

Table 44: IRI-7 Annual Dissolution Surface Aquifer

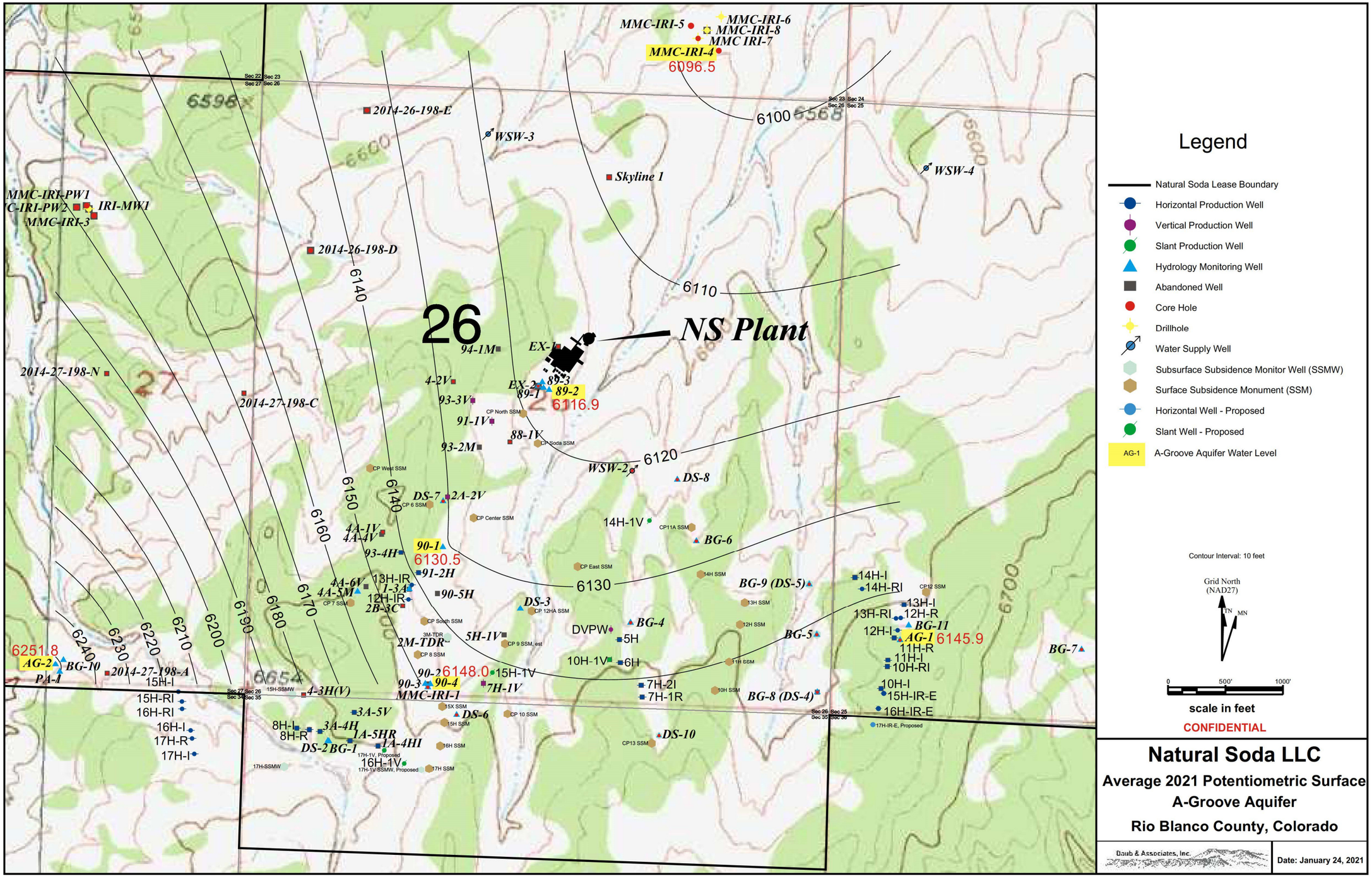
Parameters Wet Chemistry	No. of Samples	High	Date	Low	Date	Average	Units
Bicarbonate as CaCO3	63	30,400	06/25/2019	294	09/16/1991	8,544	mg/l
Carbonate as CaCO3	63	4,730	11/02/2015	10.00	06/30/1995	1,080	mg/l
Total Alkalinity as CaCO3	63	32,000	06/25/2019	294	09/16/1991	9,520	mg/l
Bromide	32	33.00	08/30/1990	0.10	05/21/2007	7.54	mg/l
Cation-Anion Balance	63	6.10	03/28/2018	-26.90	06/25/2019	-2.19	%
Sum of Anions	60	663.00	06/25/2019	30.69	03/25/1992	225.34	meq/l
Sum of Cations	60	409.00	03/09/2020	31.56	05/28/1991	205.87	meq/l
Chemical Oxygen Demand	29	960.00	06/14/2008	37.00	09/27/2017	154.79	mg/l
Chloride	62	739.00	03/09/2021	21.00	08/30/1990	350.10	mg/l
Conductivity, Lab	61	37,300	06/25/2019	2,500	06/16/1992	13,561	µmhos
Fluoride	63	48.30	03/09/2021	1.30	05/28/1991	27.22	mg/l
Hardness as CaCO3	63	135.00	06/14/2008	6.00	08/30/1990	25.47	mg/l
Nitrate as N, dissolved	32	3.22	10/22/2013	0.02	05/24/2005	0.51	mg/l
Nitrate/Nitrite as N,	32	4.14	10/22/2013	0.02	09/27/2017	0.61	mg/l
Nitrite as N, dissolved	32	0.92	10/22/2013	0.00	05/21/2007	0.15	mg/l
Nitrogen, Ammonia	32	7.90	11/06/2014	1.17	09/15/1992	4.05	mg/l
Nitrogen, Organic	32	46.00	06/14/2008	0.50	08/22/1990	7.38	mg/l
Nitrogen, Total Kjeldahl	32	51.00	06/14/2008	1.90	08/22/1990	10.98	mg/l
pH, lab	63	9.20	06/16/1992	8.30	06/30/1995	8.65	units
Phosphate, total	30	155.00	05/21/2007	0.17	09/15/1992	15.72	mg/l
Phosphorus, total	33	4.70	09/15/2010	0.05	09/15/1992	1.83	mg/l
SAR in Water	57	1,020.00	05/21/2007	88.89	03/25/1992	398.48	none
Sulfate	62	2,031.00	09/16/1991	2.50	06/18/1996	169.18	mg/l
Sulfide	32	3.31	08/30/1990	0.00	07/31/1991	0.57	mg/l
Total Dissolved Solids	62	29,000	06/25/2019	1,708	09/15/1992	10,767	mg/l
Conductivity, Field	80	36,320	03/09/2020	1,800	06/01/1991	13,335	µmhos
pH, Field	79	12.20	09/01/1990	7.86	11/07/2015	8.90	units
Temperature (°C), Field	44	19.40	08/01/1990	7.50	12/01/1990	12.35	(°C)
Water Level, Field	57	422.90	03/09/2021	405.03	04/01/2001	410.65	Ft.
Parameters **Metals**	**No. of Samples**	**High**	**Date**	**Low**	**Date**	**Average**	**Units**
Aluminum, dissolved	32	1.40	09/15/2010	0.05	06/23/1994	0.61	mg/l
Arsenic, dissolved	32	0.005	08/22/1990	0.001	09/15/1992	0.0027	mg/l
Barium, dissolved	31	6.65	09/15/2010	0.08	09/15/1992	4.03	mg/l
Beryllium, dissolved	32	U	08/22/1990	U	06/30/1995	U	mg/l
Boron, dissolved	63	8.70	03/09/2020	0.03	02/26/1991	3.17	mg/l
Cadmium, dissolved	32	U	08/22/1990	U	06/30/1995	U	mg/l
Calcium, dissolved	63	44.00	06/14/2008	1.00	05/28/1991	3.47	mg/l
Chromium, dissolved	32	0.20	11/02/2015	0.01	06/23/1994	U	mg/l
Copper, dissolved	32	0.31	03/09/2021	0.10	07/29/2009	U	mg/l
Iron, dissolved	32	1.82	07/31/1991	0.04	06/23/1994	U	mg/l
Lead, dissolved	32	0.04	07/31/1991	0.02	06/23/1994	U	mg/l
Lithium, dissolved	32	4.10	03/09/2020	0.32	09/15/1992	2.18	mg/l
Magnesium, dissolved	63	10.00	12/30/1996	1.00	06/16/1992	4.58	mg/l
Manganese, dissolved	32	0.07	05/26/1999	0.01	06/23/1994	0.04	mg/l
Mercury, dissolved	32	U	08/22/1990	U	06/30/1995	U	mg/l
Molybdenum, dissolved	32	0.10	06/23/1994	U	08/22/1990	U	mg/l
Nickel, dissolved	32	0.02	06/23/1994	U	08/22/1990	U	mg/l
Potassium, dissolved	63	26.00	06/30/2009	3.00	08/30/1990	9.29	mg/l
Selenium, dissolved	32	0.002	07/31/1991	0.001	08/30/1990	0.0015	mg/l
Silica, dissolved	63	34.00	11/20/2001	1.50	02/26/1991	17.29	mg/l
Sodium, dissolved	63	9,280	03/09/2020	710	05/28/1991	4,218	mg/l
Strontium, dissolved	63	2.58	03/26/1997	0.18	06/16/1992	1.23	mg/l
Vanadium, dissolved	32	0.06	05/26/2004	U	08/22/1990	U	mg/l
Zinc, dissolved	32	0.30	03/09/2020	0.01	06/23/1994	U	mg/l

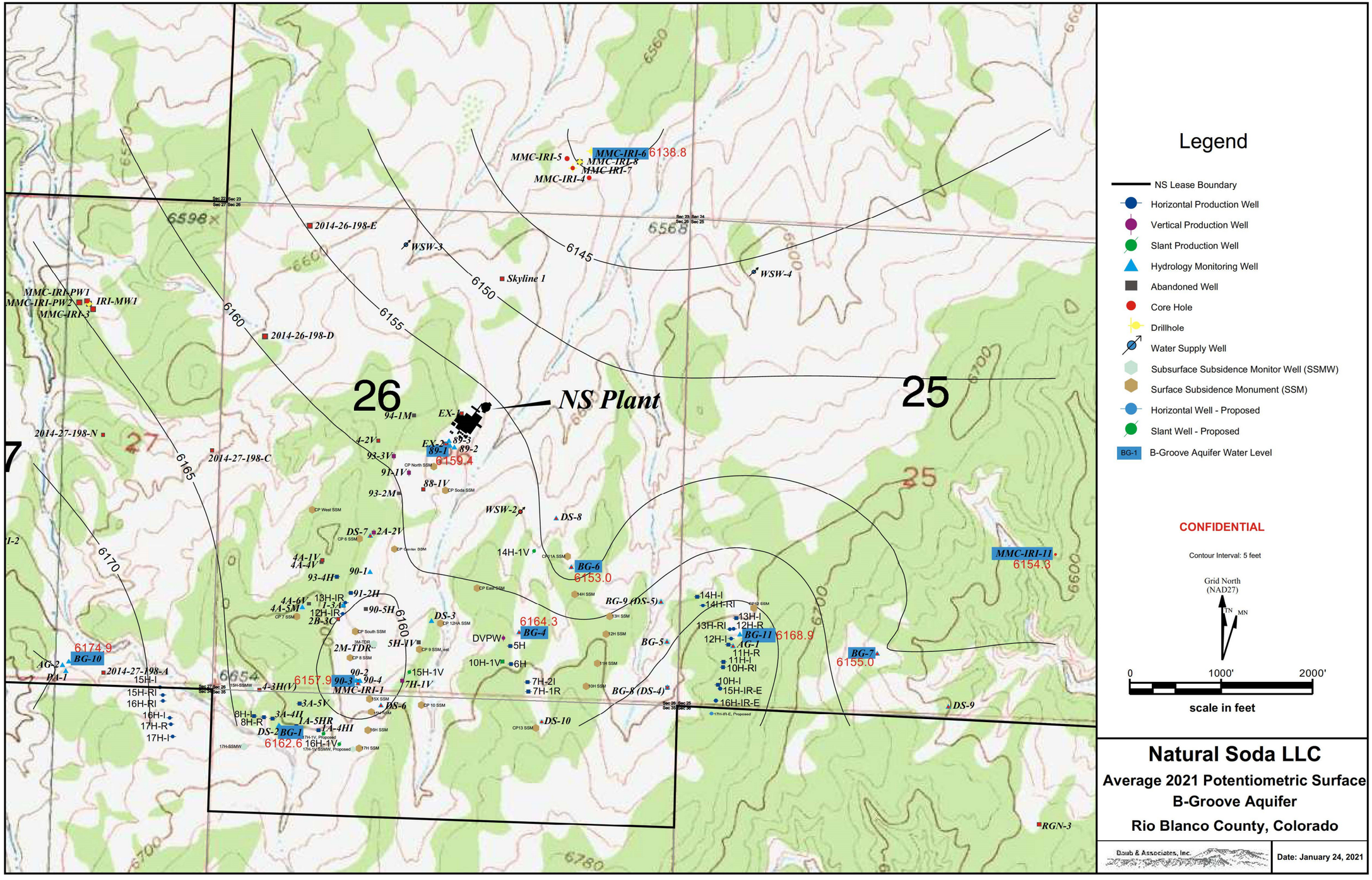
Table 45: Summary of 2021 Annual Remote Water Levels

For Remote Wells (all levels taken from top of casing)						
Well / Ground Level (ft)	Depth to Water Level ft.					
	2016	2017	2018	2019	2020	2021
IRI-8 / 6573.6 (P&A 2021)	318.08	317.80	320.79	321.40	322.10	322.90
IRI-9 / 6666.3 (P&A 2021)	469.68	469.50	470.61	471.40	469.60	471.50
IRI-10 / 6440.7	135.54	P&A	P&A	P&A	P&A	P&A
IRI-11 / 6613.6	466.95	466.90	467.60	468.00	468.30	468.80
*MWU-2 / 6441.0	195.00	195.40	195.38	197.50	195.90	196.00
*MWA-2 / 6441.0	199.80	199.60	199.60	199.40	199.40	199.60
*MWB-2 / 6441.0	253.05	254.80	256.13	255.40	256.00	257.20
*MWD-1 / 6467.0	328.83	329.30	329.60	329.50	329.90	329.70
*MWD-2 / 6641.0	247.82	253.50	254.54	254.30	254.80	254.70
TH75-6A	298.16	298.10	297.21	296.40	298.56	298.65
TH75-6B	294.82	295.50	295.28	294.30	295.93	295.94
TH75-11A	414.94	413.70	413.80	413.80	413.03	411.27
TH75-11B	497.28	494.80	495.00	494.80	495.55	496.02
EX-2 (WL collected quarterly) (P&A 2021)	471.75	472.80	476.15	479.70	481.70	485.22
Note: EX-2, IRI-8, & IRI-9 were P&A'ed Summer of 2021						

2021

Appendix B
Potentiometric Surface Maps
(Confidential)


MMC-IRI-5
MMC-IRI-6
MMC-IRI-8
MMC IRI-7
MMC-IRI-4
6096.5
2014-26-198-E
WSW-3
Skyline 1
WSW-4
MMC-IRI-PW1
C-IRI-PW2
IRI-MW1
MMC-IRI-3
2014-26-198-D
6140
6110
26
NS Plant
94-1M
EX-1
2014-27-198-N
27
4-2V
EX-2
89-3
89-1
89-2
6116.9
93-3V
2014-27-198-C
CP North SSM
91-1V
88-1V
CP Soda SSM
93-2M
6120
WSW-2
DS-8
CP West SSM
DS-7
2A-2V
CP 6 SSM
CP Center SSM
14H-1V
CP11A SSM
BG-6
4A-1V
4A-4V
90-1
6130.5
93-4H
91-2H
CP East SSM
6130
14H SSM
BG-9 (DS-5)
14H-I
14H-RI
CP12 SSM
4A-6V
13H-IR
1-3A
4A-5M
12H-IR
90-5H
CP 7 SSM
2B-3C
DS-3
CP 12HA SSM
13H SSM
13H-I
13H-RI
12H-R
CP South SSM
DVPW
BG-4
12H SSM
BG-5
12H-I
BG-11
AG-1
6145.9
3M-TDR
5H-1V
2M-TDR
5H
CP 9 SSM, est
10H-1V
6H
11H SSM
11H-R
11H-I
10H-RI
BG-7
6251.8
AG-2
BG-10
2014-27-198-A
PA-1
6654
15H-I
15H-SSMW
90-2
6148.0
15H-1V
90-3
90-4
7H-1V
7H-2I
7H-1R
10H SSM
10H-I
15H-IR-E
BG-8 (DS-4)
4-3H(V)
MMC-IRI-1
15H-RI
16H-RI
15X SSM
DS-6
CP 10 SSM
16H-I
3A-5V
8H-I
3A-4H
1A-5HR
17H-R
8H-R
DS-2
BG-1
1A-4HI
16H SSM
DS-10
CP13 SSM
17H-I
17H-1V, Proposed
16H-1V
17H-1V SSMW, Proposed
17H SSM
17H-SSMW
17H-IR-E, Proposed
6150
6160
6170
6180
6190
6200
6210
6220
6230
6240
6700
Sec 22 Sec 23
Sec 27 Sec 26
Sec 23 Sec 24
Sec 26 Sec 25
Sec 27 Sec 26
Sec 35 Sec 35
Sec 26 Sec 25
Sec 35 Sec 36
Legend
Natural Soda Lease Boundary
Horizontal Production Well
Vertical Production Well
Slant Production Well
Hydrology Monitoring Well
Abandoned Well
Core Hole
Drillhole
Water Supply Well
Subsurface Subsidence Monitor Well (SSMW)
Surface Subsidence Monument (SSM)
Horizontal Well - Proposed
Slant Well - Proposed
AG-1
A-Groove Aquifer Water Level
Contour Interval: 10 feet
Grid North
(NAD27)
TN
MN
0
500'
1000'
scale in feet
CONFIDENTIAL
Natural Soda LLC
Average 2021 Potentiometric Surface
A-Groove Aquifer
Rio Blanco County, Colorado
Daub & Associates, Inc.
Date: January 24, 2021



Legend

- NS Lease Boundary
- Horizontal Production Well
- Vertical Production Well
- Slant Production Well
- Hydrology Monitoring Well
- Abandoned Well
- Core Hole
- Drillhole
- Water Supply Well
- Subsurface Subsidence Monitor Well (SSMW)
- Surface Subsidence Monument (SSM)
- Horizontal Well - Proposed
- Slant Well - Proposed
- BG-1 B-Groove Aquifer Water Level

CONFIDENTIAL

Contour Interval: 5 feet

Grid North
(NAD27)

TN MN

0 1000' 2000'

scale in feet

Natural Soda LLC

Average 2021 Potentiometric Surface

B-Groove Aquifer

Rio Blanco County, Colorado

Daub & Associates, Inc.

Date: January 24, 2021

Appendix C

2021 Vegetation Monitoring Reclamation Status Report

Prepared

By

Rusty Roberts

Reclamation Status Report
2021 Vegetation Monitoring Results for Reclaimed Sites

Evaluating Status of Current Plant Communities on Nine Reclaimed Sites in meeting Criteria for Successful Reclamation

Prepared for:
Natural Soda
Rifle, Colorado

Prepared by:
Rusty Roberts
Meeker, Colorado

December 2021

Table of Contents

Introduction

The Bureau of Land Management (BLM) and the State of Colorado require reclaimed lands to be revegetated in a manner that establishes a diverse, effective, and long-lasting vegetation cover that is equal or nearly so to the natural vegetation of the surrounding areas. Natural Soda's approved mine plan requires periodic monitoring to evaluate the success of revegetation efforts.

Vegetation cover, species composition, species density and ground cover data were collected from undisturbed reference area sites on Natural Soda's lease area near their current mining operations. The data collected from undisturbed areas is used in comparison to the vegetation cover, species composition, species density and ground cover data collected from reclaimed sites to determine if a site has met the criteria for successful reclamation.

Data was collected from eight reclaimed pad sites in final reclamation status which included one plugged and abandoned production well site and seven corehole sites. Data was also collected from one corehole access route. Baseline data was collected from five native rangeland reference area sites on Natural Soda's lease area and near the sites evaluated. Table 1 lists the nine sites in final reclamation status for which data was collected in 2021.

Criteria for Successful Reclamation of Disturbed Areas

The approved criteria for successful reclamation must reflect a plant community of at least five desirable plant species where no one species may exceed 70 percent relative cover and desired foliar cover, bare ground, and shrub and/or forb density must have 80 percent similarity in relation to the identified desired plant community.

The desired plant community referenced in the criteria refers to an ecological site present at or near the area of disturbance. Two ecological sites occur on the parts of the lease area being actively mined, a pinyon and juniper woodland site and a rolling loam rangeland site. The vegetative values in the criteria are based on the capability of a site in an early seral plant community, which is basically an herbaceous species dominated site with varying amounts of shrub species. The rolling loam rangeland site reflects more of the capability of a site in an early seral plant community, thus, data collected from the five-rolling loam native rangeland reference areas were used to evaluate the success of the plant community on each reclaimed site in achieving the reclamation criteria.

Vegetation Sampling Methods Utilized to Measure Criteria for Successful Reclamation

Data was collected based upon recommendations in White River Field Office's Surface Reclamation Plan which require that vegetation cover, composition, and diversity data be gathered using quantitative methods to measure the six Core Terrestrial Indicators and Methods in BLM Technical Note 440. BLM approved sampling methods are found in Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume I and II: Quick Start.

The six core terrestrial indicators include:

(1) Bare Ground: The amount of bare ground is accepted as one of the most sensitive indicators of resource condition in rangelands. A large percentage of bare ground can be an indicator of high erosion potential, low forage production, poor wildlife habitat, and increased risk of invasion by nonnative plant species.

(2) Vegetation Composition: Vegetation composition data, including the cover of groups of species are indicators generated from the same data, and when used together, are sensitive to most changes and are useful when determining the status of key species in a plant community.

(3) Nonnative Invasive Plant Species: The presence and cover of nonnative species is acquired as a component of vegetation composition. Nonnative invasive species can have the ability to significantly alter sustainability and site resilience.

(4) Plant Species of Management Concern: The presence and cover of plant species of management concern is also acquired as a component of vegetation composition. Plant species of management concern can be sensitive to site disturbance, provide important ecosystem functions, or contribute to biological diversity.

(5) Vegetation Height: The vertical structure of vegetation which can be used to characterize wildlife habitat and estimate wind erosion potential.

(6) Proportion of Soil Surface in Large Intercanopy Gaps: Canopy gap intercept measures the proportion of a line covered by large gaps between plant canopies and is an important indicator of the potential for erosion.

Line-point intercept with plot-level species inventory was the vegetation monitoring technique used to measure the core indicators of bare ground, vegetation composition, non-native invasive plant species and plant species of management concern.

Line-point intercept is a rapid, accurate method for quantifying soil cover, including vegetation, litter, rocks and biological crusts. The theory behind this method is that if an infinite number of points are placed in a two-dimensional area, the cover of a plant species can be determined by counting the number of points that hit that species. These measurements are related to wind and water erosion, water infiltration, and the ability of the site to resist and recover from disturbance.

Gap intercept measurements were made along the line-point intercept transect line to provide information about the proportion of the line covered by large gaps between plants. Large gaps between plant canopies are important indicators of increased susceptibility to water erosion and runoff, wind erosion, weed invasion, and wildlife habitat.

A plot-level plant species inventory provides a rapid estimate of species richness. A search area at each site was utilized to record all plant species occurring within the plot. A thorough search of the plot can detect less-frequently occurring species that may not have been recorded in line-point intercept cover measurements.

Shrub and forb densities also a criterion for successful reclamation are not measured by the sampling methods used for the other criteria. Forb and shrub density measurements were taken from one-meter square density quadrants along the same line-point intercept transect line used for the other sampling techniques.

Summary of Results for Reclaimed Sites in Achieving Reclamation Goals

Vegetation cover, plant species composition, ground cover and shrub and forb density data were collected from one plugged and abandoned production well pad site in final reclamation status, from seven reclaimed corehole pad sites, from one reclaimed linear site and from five native rangeland reference area sites near the sites evaluated. Data was collected from August 18 thru August 25, 2021. Table 1 lists the sites in final reclamation status for which data was collected in 2021. The location of sites monitored are illustrated on the attached location map.

The drought conditions that have occurred for several years continued during the growing season of 2021. The data collected from the undisturbed native rangeland reference areas resulted in only minimal declines in total cover and composition of desirable species as compared to the values measured in 2020. Foliar cover of native species declined only one percent. The densities of both desirable forbs and shrubs had small increases from the values measured in 2020.

Table 1 is a summary of the progress of each site monitored in achieving successful reclamation. The site-specific monitoring results for each site are discussed in detail later.

Table 1 - Summary of Results for Reclaimed Sites in Achieving Successful Reclamation Criteria

Site	Criteria for Successful Reclamation of Disturbed Areas						Criteria Met
	at least five desirable plant species where no one species may exceed 70 percent relative cover		desired foliar cover, bare ground, and shrub and/or forb density must have 80 percent similarity in relation to the values measured on nearby undisturbed native rangelands				
	the number of desired plant species present	the relative cover of the desired species with the greatest cover	% similarity of desired foliar cover	% similarity of bare ground	% similarity of shrub density	% similarity of forb density	
	2021 Data Collected for Sites in Final Reclamation Status						
93-2M	15 species	16.0%	107%	158%	47%	12%	No
Pad C	28 species	12.7%	105%	146%	121%	56%	Yes
Pad E	18 species	27.3%	118%	145%	62%	111%	Yes
Pad G	22 species	22.7%	82%	79%	36%	36%	No
IRI-3+	22 species	17.3%	103%	152%	67%	52%	No
IRI-10	22 species	33.3%	95%	108%	100%	71%	Yes
Pad Q	22 species	14.0%	98%	150%	87%	68%	Yes
Pad Q access route	30 species	30.7%	97%	110%	39%	96%	Yes
Pad U	13 species	12.0%	61%	97%	56%	33%	No
	2021 Baseline Data Collected from Five Native Rangeland Reference Areas						
	27 species	26.4%	57.2	34.8%	1.84	5.98	

Note: values in red are below the criteria required for successful reclamation

Most of the reclaimed sites have productive plant communities with good distribution of perennial species across the site. Many of the perennial species that have established on most of the sites originated from the seed mix planted during reclamation. The established plant communities are providing a vegetative cover resilient to drought that has stabilized most of the sites. A few of the sites (corehole pads G and U) are being negatively impacted by herbivores from heavy grazing use and trampling.

Vegetation Sampling Methods and Procedures for Reclaimed Sites and Reference Areas

The line-point intercept with plot-level species inventory was the vegetation sampling protocol used on both the reclaimed sites and associated reference areas. The procedure involves random placement of a transect line (measuring tape) as the base for data collection. Values for foliar cover, basal cover, species composition and bare ground were measured at specific points along the line. Gaps in vegetation canopy were measured along the same tape line. Density quadrants were placed adjacent the line at specific points.

A 25-meter tape was used as the baseline transect for collecting data from the 5 rolling loam reference areas and from the 9 reclaimed sites. Data was collected from 1 transect for each of the 5 reference areas. Data was collected from 3 transects for the reclaimed sites.

The following techniques were used to collect the sample data:

- The beginning and ending points of each transect were recorded using a GPS receiver. Azimuths from the 0-meter to the 25-meter point were recorded.
- Photographs were taken at each transect that show vegetation features at the time of sampling.
- Point count data were collected at one half-meter intervals along a 25-meter tape using a thin, straight metal rod (pin flag) for a total of fifty samples taken along each transect.
    - The first plant species in the canopy hit by the drop of a pin flag at each sample point was recorded by species in the "Top Layer". The total of top layer hits was used to determine total foliar cover for the study site and the total foliar cover for each species hit in the top layer.
    - Subsequent plant species encountered at each sample point and vegetative litter hits were recorded in the "Lower Canopy Layers". Vegetative litter was recorded as either unattached herbaceous or woody litter.
    - Species composition based upon total of all plant species encountered in the top layer and the lower layers at each sample point and recorded by species and summarized by plant group.
    - Soil surface hits were recorded as plant species basal intercepts, lichen crust, moss, embedded litter, duff, rock, or bare soil. Bare ground percent was determined by a bare soil hit with no canopy intercepts in the top and lower canopy layers.
- Canopy gaps were recorded directly below the transect tape line. Only perennial plant species were used in the vegetative canopy. Annual species if present were not included as part of the canopy. Gaps larger than 20 centimeters were recorded for the length of each transect. Gaps were totaled into gap sizes (21 to 50; 51 to 100; 101 to 200; >200).

Though the gap data is not used in evaluating reclamation criteria, it was collected as a visualization of perennial species distribution and cover.

- Forb and shrub density data were taken from one-meter square density quadrants alongside the same line-point intercept transect line used for the other sampling techniques. Quadrants were placed at every 5th sample point along the transect tape for a total of 10 one-meter density quads for each transect. Only desirable forb and shrub densities are required in the criteria for successful reclamation. The total number of desirable forb and shrub species rooted in each quad were counted and recorded by species and summarized by plant group. Densities for grasses or trees were not collected.
- A plot-level plant species inventory was conducted within a search area at each site. The search area for reclaimed sites was within the original disturbance at the site. In addition to those plant species recorded during sampling, other species not encountered during sampling but were observed in the sample area were recorded for species richness.

Vegetation Sampling Results for Nearby Native Rangeland Reference Areas

Vegetation cover, species composition, species density and ground cover data were collected from five rolling loam rangeland sites from August 18 thru August 25, 2021. Transects were established in the five rolling loam sites which represent the site characteristic's common in the project area. The pre-disturbance vegetation for some of the reclaimed sites examined had pinyon and juniper tree cover over all or portion of the site. Several of the sites were along the fringe of the pinyon and juniper community and had soils of both a woodland site and a rangeland site. The vegetative values in the criteria are based on the capability of a site in an early seral plant community, which is basically an herbaceous species dominated site with varying amounts of shrub species. The rolling loam rangeland site reflects more of the capability of a site in an early seral plant community, thus, data collected from the 5-rolling loam rangeland reference areas were used to evaluate the success of the plant community on each reclaimed site in achieving the reclamation criteria.

Values for foliar cover, basal cover, species composition and bare ground were collected from five 25 meter transects for a total of 250 sample points. Values for forb and shrub densities were collected from 50 one-meter square quadrants. Table 2 summarizes the data collected in 2021 from the five reference areas. A comparison to the data collected in 2020 is included in the table.

The unusually dry conditions that occurred during the growing season in 2021 resulted in only minimal declines in total cover and composition of desirable species as compared to the values measured in 2020. Foliar cover of native species measured on the reference sites in 2021 declined only one percent from the values measured in 2020. Foliar cover of perennial grasses declined 1.4 percent, perennial forbs cover declined 45 percent and shrub cover increased 14 percent. The foliar cover of invasive nonnative grasses declined 45 percent.

A 4 percent decline in herbaceous litter cover occurred in 2021. The declines in foliar cover and herbaceous litter cover that occurred in 2021 resulted in a 16 percent increase in bare ground. The canopy gaps between perennial species also an indicator of ground cover, increased 38 percent.

Table 2- Rolling Loam Native Rangeland Reference Area
Vegetation Cover, Species Composition, Species Density & Ground Cover

	Line-Point Canopy Intercept Data [1]								Density Data [2]	
	Number of Species		% Foliar Cover		% Basal Cover		Species Composition		Forb/Shrub Density (#/m^2)	
Plant Group	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**
Perennial Grasses	6	5	41.0	40.4	6.66	6.8	69.63	71.52	n/a	n/a
Invasive Non-Native Grasses	1	1	2.33	1.6	0.0	0.0	3.27	2.42	n/a	n/a
Desirable Forbs	18	17	4.34	2.4	0.33	0.0	9.34	3.64	5.90	5.98
Invasive and Non-Native Forbs	2	0	0.0	0.0	0.0	0.0	0.0	0.0	n/a	n/a
Shrubs	5	5	12.67	14.4	0.33	0.4	17.76	22.42	1.80	1.84
Vegetation Totals	**33**	**28**	**60.34**	**58.8**	**7.32**	**7.2**	**100.0**	**100.0**	**7.70**	**7.82**

Line-Point Intercept Soil Surface Cover Data [3]

Percent Cover by Type	Bare Ground		Biotic Crust		Herbaceous Litter		Woody Litter		Duff		Rock	
	2020	**2021**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**
	30.0	**34.8**	**0.33**	**0.0**	**39.3**	**37.6**	**1.3**	**0.8**	**0.0**	**0.0**	**0.0**	**0.0**

[1] Sum of data from 5 randomly placed transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The specific vegetation sampling data collected from the 5 rolling loam rangeland sites are presented in Appendix A. Data in the appendix include (1) vegetation cover, ground cover, species composition, and forb and shrub densities; (2) the scientific and common names of each plant species encountered; (3) GPS coordinate data for the transect start and end points; (4) inter-canopy gaps and (5) photographs of each transect.

Monitoring Results and Evaluation of Criteria for Sites in Final Reclamation Status

Vegetation cover, species composition, species density and ground cover data were collected from the disturbed areas of 9 sites in final reclamation status. The disturbed sites included one plugged and abandoned production well pad site (93-2M), six reclaimed corehole pad sites (pads C, E, G, IRI-3+, IRI-10, Q and U), and one reclaimed linear site (access route to pad Q). Locations are noted on the attached location map.

Vegetation sampling data collected for the 9 reclaimed sites are presented in the Appendix B through Appendix J.

- Appendix B – reclaimed production well pad 93-2M.
- Appendix C – reclaimed corehole pad C.
- Appendix D – reclaimed corehole pad E.
- Appendix E – reclaimed corehole pad G.
- Appendix F – reclaimed corehole pads IRI-3, MW-1, PW-1, PW-2.
- Appendix G – reclaimed corehole pad IRI-10.
- Appendix H – reclaimed corehole pad Q.
- Appendix I – reclaimed access route to pad Q.
- Appendix J – reclaimed corehole pad U.

Vegetation sampling data in the appendixes include (1) vegetation cover, ground cover, species composition, and forb and shrub densities; (2) the scientific and common names of each plant species encountered; (3) GPS coordinate data for the transect start and end points; (4) inter-canopy gaps and (5) photographs of each transect.

Well Pad 93-2M

Data was collected for this site on August 25, 2021. Three 25 meter transects were placed in a spoke pattern on the pad with 50 sample points on each transect for a total of 150 points for cover data. Ten one-meter square density quadrants were placed along each transect for a total of 30 quadrants. Data collected from this site include vegetative foliar and basal cover, species composition, forb and shrub densities all summarized by plant group. In addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock.

The data collected in 2021 is summarized in Table 3 from the sampling data presented in Appendix Table B1. Each plant species encountered at this site is listed in Table B1. As shown in Table B1 there is a good establishment of the perennial grasses with uniform distribution across much of the site.

Table 3 - Reclaimed Well Pad 93-2M
Vegetation Cover, Species Composition, Species Density & Ground Cover

	Line-Point Canopy Intercept Data [1]				Density Data [2]
Plant Group	**Number of Species**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	**Desirable Forb/Shrub Density (#/m²)**
Perennial Grasses	7	54.7	10.7	87.0	n/a
Invasive Non-Native Grasses	1	0.7	0.0	3.0	n/a
Desirable Forbs	4	0.0	0.0	0.0	0.70
Invasive and Non-Native Forbs	0	0.0	0.0	0.0	n/a
Shrubs	4	6.7	0.0	10.0	0.86
Vegetation Totals	**16.0**	**62.1**	**10.7**	**100.0**	**1.56**

Line-Point Intercept Soil Surface Cover Data [3]

Percent Cover by Type	**Bare Ground**	**Biotic Crust**	**Herbaceous Litter**	**Woody Litter**	**Duff**	**Rock**
	14.7	**0.0**	**63.3**	**4.0**	**0.0**	**0.0**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 7 percent greater than that measured on the reference areas. The cover of perennial grasses was 35 percent greater; no cover of desirable forbs was measured, and shrub cover was only 46 percent of that on the reference areas. The species composition of desirable species was equal to that on the reference areas. The composition of perennial grasses was 22 percent greater, and shrubs was 45 percent lower.

The density of desirable forbs on the site was only 12 percent of that on reference areas. The density of shrubs on the site was only 47 percent of that on reference areas.

The amount of bare ground on the reference areas was 58 percent greater than that measured on this site. The amount of herbaceous litter on this site was 41 percent greater than that on the reference areas. The canopy gaps between perennial species were 64 percent larger on the reference areas than measured on this site.

The site has a productive established plant community which has good representation of the perennial species used in the seed mix with good distribution of those species across the site. The plant community has stabilized the site.

Table 4 is a comparison of the data collected for reclaimed well pad 93-2M with that of the rolling loam rangeland reference areas. Only the data required to access the success of achieving successful reclamation is used in Table 4.

Table 4 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas

Site	# desired plant species	% desired foliar cover	% bare ground	shrub density (#/m^2)	forb density (#/m^2)
Well Pad 93-2M	15 species	61.4	14.7	0.86	0.70
Reference Area [1]	27 species	57.2	34.8	1.84	5.98

[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*

Evaluation of the reclamation efforts of the disturbance on Well Pad 93-2M:

- There are 15 desirable plant species established on the site (7 perennial grasses, 4 desirable forbs, and 4 shrubs) meeting the requirement of at least five plant species.
- Western wheatgrass *(Pascopyrum smithii*) was the desired species with the greatest relative cover at 16.0 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 107 percent of that on the native rangeland reference area exceeding the requirement of 80 percent similarity.
- The amount of unprotected bare ground on the site was 58 percent less than on the native rangeland reference area which equates to 158 percent similarity, exceeding the required 80 percent similarity.
- The density of desirable forbs and shrubs on the site in comparison with the native rangeland reference areas was 12 percent and 47 percent, respectively. Neither forb density nor shrub density have met the requirement of 80 percent similarity.

The plant community established on this site are the perennial grasses used in the seed mix. The perennial grasses are well established providing a resilient plant community that has been difficult for desirable forbs and shrubs to compete and increase in cover and density. The plant community on this site has adequately stabilized the site. The plant community does meet the

criteria for species diversity, desired foliar cover, and the amount of bare ground. The site does not meet the criteria for the densities of desirable forbs or shrubs.

Corehole Pad C

Data was collected for this site on August 18, 2021. Three 25 meter transects were placed in a spoke pattern on the pad with 50 sample points on each transect for a total of 150 points for cover data. Ten one-meter square density quadrants were placed along each transect for a total of 30 quadrants. Data collected from this site include vegetative foliar and basal cover, species composition, forb and shrub densities and ground cover all summarized by plant group. In addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock.

The data collected in 2021 is summarized in Table 5 from the sampling data presented in Appendix Table C1. Each plant species encountered at this site is listed in Table C1.

Table 5 - Reference Area for Reclaimed Corehole Pad C
Vegetation Cover, Species Composition, Species Density & Ground Cover

	Line-Point Canopy Intercept Data [1]				Density Data [2]
Plant Group	**Number of Species**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	**Desirable Forb/Shrub Density (#/m²)**
Perennial Grasses	10	40.2	8.7	61.68	n/a
Invasive Non-Native Grasses	1	2.7	0.0	5.61	n/a
Desirable Forbs	12	4.0	0.0	6.54	3.33
Invasive and Non-Native Forbs	1	1.3	0.0	1.87	n/a
Shrubs	6	15.9	0.7	24.30	2.34
Vegetation Totals	**30**	**64.1**	**9.4**	**100.00**	**5.67**

Line-Point Intercept Soil Surface Cover Data [3]

Percent Cover by Type	Bare Ground	Biotic Crust	Herbaceous Litter	Woody Litter	Duff	Rock
	18.7	**0.0**	**56.0**	**6.7**	**0.0**	**0.7**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 5 percent greater of that measured on the reference areas. The cover of perennial grasses was nearly equal, desirable forbs cover was 40 percent greater, and shrub cover was 10 percent greater than that on the reference areas. The species composition of desirable species was 95 percent of that on the reference areas. The composition of perennial grasses was 14 percent lower, desirable forbs was 44 percent greater, and shrubs was 8 percent greater than that on the reference areas.

The density of desirable forbs on the site was 44 percent of that on reference areas. The density of shrubs on the site was 21 percent greater than that on reference areas.

The amount of bare ground on the reference areas was 46 percent greater than that measured on this site. The amount of herbaceous litter on this site was 33 percent greater than that on the reference areas. The canopy gaps between perennial species measured on the site were 7 percent larger than that measured on the reference areas.

Table 6 is a comparison of the data collected for reclaimed Pad C with that of the rolling loam rangeland reference areas. Only the data required to access the success of achieving successful reclamation is used in Table 6.

Table 6 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas

Site	# desired plant species	% desired foliar cover	% bare ground	shrub density (#/m^2)	forb density (#/m^2)
Corehole Pad C	28 species	60.1	18.7	2.34	3.33
Reference Area [1]	27 species	57.2	34.8	1.84	5.98

[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*

Evaluation of the reclamation efforts of the disturbance on Corehole Pad C:

- There are 28 desirable plant species established on the site (10 perennial grasses, 12 desirable forbs, and 6 shrubs) meeting the requirement of at least five plant species.
- Needle & thread needlegrass (*Hesperostipa comata*) was the desired species with the greatest relative cover at 12.7 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 105 percent of that on the native rangeland reference areas exceeding the requirement of 80 percent similarity.
- The amount of unprotected bare ground on the site was 46 percent less than that on the native rangeland reference areas which equates to 146 percent similarity, exceeding the required 80 percent similarity.
- The density of forbs and shrubs on the site in comparison with the native rangeland reference areas was 44 percent and 121 percent, respectively. The criteria only require either forb density or shrub density meet the requirement of 80 percent similarity. Shrub density has met the required criteria.

The plant community established on this site has a good representation of the perennial species used in the seed mix. The perennial species are well established providing a resilient plant community that meets the species diversity, desired foliar cover, shrub density and bare ground criteria necessary for successful reclamation of the disturbance at this site.

Corehole Pad E

Data was collected for this site on August 25, 2021. Three 25 meter transects were placed in a spoke pattern on the pad with 50 sample points on each transect for a total of 150 points for cover data. Ten one-meter square density quadrants were placed along each transect for a total of

30 quadrants. Data collected from this site include vegetative foliar and basal cover, species composition, forb and shrub densities and ground cover all summarized by plant group. In addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock.

The data collected in 2021 is summarized in Table 7 from the sampling data presented in Appendix Table D1. Each plant species encountered at this site is listed in Table D1.

Table 7 - Reference Area for Reclaimed Corehole Pad E
Vegetation Cover, Species Composition, Species Density & Ground Cover

	Line-Point Canopy Intercept Data [1]				Density Data [2]
Plant Group	**Number of Species**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	**Desirable Forb/Shrub Density (#/m²)**
Perennial Grasses	7	52.6	12.7	76.64	n/a
Invasive Non-Native Grasses	0	0.0	0.0	0.0	n/a
Desirable Forbs	5	6.7	1.3	13.08	6.73
Invasive and Non-Native Forbs	1	0.0	0.0	0.0	n/a
Shrubs	5	8.1	0.0	10.28	1.13
Vegetation Totals	**18**	**67.4**	**14.0**	**100.0**	**16.68**

Line-Point Intercept Soil Surface Cover Data [3]

Percent Cover by Type	Bare Ground	Biotic Crust	Herbaceous Litter	Woody Litter	Duff	Rock
	19.3	**0.0**	**43.3**	**2.7**	**0.0**	**2.0**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 5 percent greater than that measured on the reference areas. The cover of perennial grasses was 30 percent greater, desirable forbs cover was 2.8 times greater and shrub cover was only 44 percent of that on the reference areas. The species composition of desirable species was 2.5 percent greater than that measured on the reference areas. The composition of perennial grasses was 7 percent greater, desirable forbs was 2.5 times greater, and shrubs was 46 percent lower.

The density of desirable forbs on the site was 11 percent greater than that on reference areas. The density of shrubs on the site was 62 percent of that on the reference areas.

The amount of bare ground on the reference areas was 45 percent greater than that measured on this site. The amount of herbaceous litter on this site was 13 percent greater than that on the reference areas. The canopy gaps between perennial species measured on the site were 33 percent smaller than that measured on the reference areas.

Table 8 is a comparison of the data collected for reclaimed Pad E with that of the rolling loam rangeland reference areas. Only the data required to access the success of achieving successful reclamation is shown in Table 8.

Table 8 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas					
Site	**# desired plant species**	**% desired foliar cover**	**% bare ground**	**shrub density (#/m^2)**	**forb density (#/m^2)**
Corehole Pad E	18 species	67.4	19.3	1.13	6.73
Reference Area [1]	27 species	57.2	34.8	1.84	5.98
[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*					

Evaluation of the reclamation efforts of the disturbance on Corehole Pad E:

- There are 18 desirable plant species established on the site (8 perennial grasses, 5 desirable forbs, and 5 shrubs) meeting the requirement of at least five plant species.
- Slender wheatgrass (*Elymus trachycaulus*) was the desired species with the greatest relative cover at 27.3 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 18 percent greater than on the native rangeland reference areas which equates to 118 percent similarity, exceeding the requirement of 80 percent similarity.
- The amount of unprotected bare ground on the site was 45 percent less than on the native rangeland reference areas which equates to 145 percent similarity, exceeding the required 80 percent similarity.
- The density of forbs and shrubs on the site in comparison with the native rangeland reference areas was 111 percent and 62 percent, respectively. The criteria only require either forb density or shrub density to meet the requirement of 80 percent similarity. The density of desirable forbs exceeds the required criteria.

The plant community established on this site has a good representation of the perennial species used in the seed mix. This site has a very productive plant community with good distribution of perennial species across the site which has stabilized the site. The plant community does meet all the criteria of species diversity, desired foliar cover, desirable forb density, and bare ground for successful reclamation of the disturbance at this site.

Corehole Pad G

Vegetation sampling data was collected on August 23, 2021. Three 25 meter transects were randomly placed on the pad with 50 sample points on each transect for a total of 150 points for cover data. Ten one-meter square density quadrants were placed along each transect for a total of 30 quadrants. Data collected from this site include vegetative foliar and basal cover, species composition, forb and shrub densities and ground cover all summarized by plant group. In addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock.

The 2021 data in the Table 9 is summarized from data presented in Appendix Table E1. Each plant species encountered at this site is listed in Table E1. As shown in Table E1 there is a good representation of the seeded species established on the site.

Table 9 - Reference Area for Reclaimed Corehole Pad G
Vegetation Cover, Species Composition, Species Density & Ground Cover

Plant Group	Line-Point Canopy Intercept Data [1] Number of Species	% Foliar Cover	% Basal Cover	Species Composition	Density Data [2] Desirable Forb/Shrub Density (#/m^2)
Perennial Grasses	9	42.1	10.0	81.71	n/a
Invasive Non-Native Grasses	1	0.7	0.0	1.22	n/a
Desirable Forbs	8	1.4	0.0	2.44	2.13
Invasive and Non-Native Forbs	1	4.7	0.0	8.53	n/a
Shrubs	5	3.4	0.7	6.10	0.67
Vegetation Totals	**24**	**52.3**	**10.7**	**100.00**	**2.80**

Line-Point Intercept Soil Surface Cover Data [3]

Percent Cover by Type	Bare Ground	Biotic Crust	Herbaceous Litter	Woody Litter	Duff	Rock
	42.0	**0.0**	**42.7**	**6.0**	**0.0**	**0.0**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 82 percent of that measured on the reference areas. The cover of perennial grasses was 4 percent greater, desirable forbs cover was 42 percent lower and shrub cover was only 24 percent of that on the reference areas. The species composition of desirable species was only 92 percent of that on the reference areas. The composition of perennial grasses was 14 percent greater, desirable forbs was 33 percent lower and shrubs was 73 percent lower.

The density of desirable forbs on the site was only 36 percent of that on reference areas. The density of shrubs on the site was only 36 percent of that on reference areas.

The amount of bare ground on this site was 17 percent greater than that measured on the reference areas. The amount of herbaceous litter on this site was 12 percent greater than that on the reference areas. The canopy gaps between perennial species measured on the site were 14 percent larger than that measured on the reference areas.

The pad site has a plant community with good representation of the perennial species used in the seed mix. There is fair distribution of perennial species across most of the site. This site is being negatively impacted by heavy grazing use and trampling from herbivores, especially wild horses.

Table 10 is a comparison of the data collected for exploration corehole pad G with that from the rolling loam rangeland reference area. Only the data required to access the success of achieving successful reclamation is used in Table 10.

Table 10 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas					
Site	**# desired plant species**	**% desired foliar cover**	**% bare ground**	**shrub density (#/m^2)**	**forb density (#/m^2)**
Corehole Pad G	22 species	46.9	42.0	0.67	2.13
Reference Area [1]	27 species	57.2	34.8	1.84	5.98
[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*					

Evaluation of the reclamation efforts of the disturbance on Corehole Pad G:

- There are 22 desirable plant species established on the site (9 perennial grasses, 8 desirable forbs, and 5 shrubs) meeting the requirement of at least five plant species.
- Slender wheatgrass (*Elymus trachycaulus*) was the desired species with the greatest relative cover at 22.7 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 82 percent of that on the native rangeland reference areas, 2 percent greater than required to meet 80 percent similarity.
- The amount of unprotected bare ground on the site was 79 percent of that on the native rangeland reference areas not meeting the required to meet 80 percent similarity.
- The density of forbs and shrubs on the site in comparison with the native rangeland reference areas was 36 percent and 36 percent, respectively. Neither desirable forbs nor shrub densities have met the requirement of 80 percent similarity.

The plant community does meet the criteria for species diversity, desired foliar cover, and bare ground, but does not meet the desirable forb density nor shrub density criteria for successful reclamation of the disturbance at the site.

Corehole Pads IRI-3, MW-1, PW-1, PW-2

This site includes corehole pads IRI-3, MW-1, PW-1, and PW-2. Vegetation sampling data was collected on August 18, 2021. Three 25 meter transects were randomly placed on the site with 50 sample points on each transect for a total of 150 points for cover data. Ten one-meter square density quadrants were placed along each transect for a total of 30 quadrants. Data collected from this site include vegetative foliar and basal cover, species composition, forb and shrub densities and ground cover all summarized by plant group. In addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock.

The 2021 data in the Table 11 is summarized from data presented in Appendix Table F1. Each plant species encountered at this site is listed in Table F1. As shown in Table F1 there is a good representation of the seeded species established on the site.

Table 11 - Reference Area for Reclaimed Corehole Pads IRI-3, MW-1, PW-1, and PW-2 Vegetation Cover, Species Composition, Species Density & Ground Cover					
	Line-Point Canopy Intercept Data [1]				Density Data [2]
Plant Group	Number of Species	% Foliar Cover	% Basal Cover	Species Composition	Desirable Forb/Shrub Density (#/m^2)
Perennial Grasses	9	54.5	5.4	88.12	n/a
Invasive Non-Native Grasses	1	2.0	0.0	4.95	n/a
Desirable Forbs	8	0.7	0.0	0.99	3.11
Invasive and Non-Native Forbs	0	0.0	0.0	0.0	n/a
Shrubs	5	4.0	0.0	5.94	1.24
Vegetation Totals	**23**	**61.2**	**5.4**	**100.0**	**4.35**

Line-Point Intercept Soil Surface Cover Data [3]						
Percent Cover by Type	Bare Ground	Biotic Crust	Herbaceous Litter	Woody Litter	Duff	Rock
	16.7	**0.0**	**59.3**	**2.0**	**0.0**	**0.0**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 3 percent greater than that measured on the reference areas. The cover of perennial grasses was 35 percent greater, desirable forbs cover was 29 percent and shrub cover was 28 percent of that on the reference areas. The species composition of desirable species was 97 percent of that on the reference areas. The composition of perennial grasses was 23 percent greater than on the reference areas. Desirable forbs composition was 27 percent and shrub composition was 26 percent of that on the reference areas.

The density of desirable forbs on the site was 52 percent of that on reference areas. The density of shrubs on the site was 67 percent of that on reference areas.

The amount of bare ground on the reference areas was 52 percent greater than that measured on this site. The amount of herbaceous litter on this site was 37 percent greater than that on the reference areas. The canopy gaps between perennial species measured on the site were 16 percent smaller than that measured on the reference areas.

The site has a productive established plant community which has good representation of the perennial species used in the seed mix with good distribution of those species across the site. The plant community has stabilized the site.

Table 12 is a comparison of the data collected for exploration corehole pad IRI-3, MW-1, PW-1 and PW-2 with that from the rolling loam rangeland reference area. Only the data required to access the success of achieving successful reclamation is used in Table 12.

Table 12 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas					
Site	**# desired plant species**	**% desired foliar cover**	**% bare ground**	**shrub density (#/m^2)**	**forb density (#/m^2)**
Corehole IRI-3, MW-1, PW-1, and PW-2	22 species	59.2	16.7	1.24	3.11
Reference Area [1]	27 species	57.2	34.8	1.84	5.98
[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*					

Evaluation of the reclamation efforts of the disturbance on Corehole Pads IRI-3, MW-1, PW-1, and PW-2:

- There are 22 desirable plant species established on the site (9 perennial grasses, 8 desirable forbs, and 5 shrubs) meeting the requirement of at least five plant species.
- Russian wildrye (*Psathyrostachys juncea*) was the desired species with the greatest relative cover at 17.3 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 103 percent of that on the native rangeland reference areas, 23 percent greater than required to meet the 80 percent similarity.
- The amount of unprotected bare ground on the site was 52 percent less than on the native rangeland reference areas which equates to 152 percent similarity, meeting the required 80 percent similarity.
- The density of forbs and shrubs on the site in comparison with the native rangeland reference areas was 52 percent and 67 percent, respectively. Neither desirable forbs nor shrub densities have met the requirement of 80 percent similarity.

The plant community does meet the criteria of species diversity, desired foliar cover, and bare ground but does not meet the criteria for desirable forb density nor shrub density for successful reclamation of the disturbance at the site.

Corehole Pad IRI-10

Vegetation sampling data was collected on August 23, 2021. Three 25 meter transects were randomly placed on the pad with 50 sample points on each transect for a total of 150 points for cover data. Ten one-meter square density quadrants were placed along each transect for a total of 30 quadrants. Data collected from this site include vegetative foliar and basal cover, species composition, forb and shrub densities and ground cover all summarized by plant group. In addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock.

A visual inspection of the one-half mile access route to the pad site was conducted with photographs taken at points along the route. No quantitative vegetation data was collected along the route. The route was not reclaimed, just drill seeded with the same seed mix used on the pad, mostly perennial grasses. Road cuts were not recontoured and several areas of soil erosion were

noted along the route. The perennial grasses have established on portions of the route primarily in uncompacted areas between the two tracks.

The 2021 data in the Table 13 is summarized from data presented in Appendix Table G1. Each plant species encountered at this site is listed in Table G1. As shown in Table G1 there is a good representation of the seeded species established on the site.

Table 13 - Reclaimed Corehole Pad IRI-10
Vegetation Cover, Species Composition, Species Density & Ground Cover

	Line-Point Canopy Intercept Data [1]				Density Data [2]
Plant Group	**Number of Species**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	**Desirable Forb/Shrub Density (#/m²)**
Perennial Grasses	4	40.0	8.7	73.86	n/a
Invasive Non-Native Grasses	0	0	0	0	n/a
Desirable Forbs	14	1.3	0.7	3.41	4.23
Invasive and Non-Native Forbs	0	0	0	0	n/a
Shrubs	4	12.8	2.1	22.73	1.84
Vegetation Totals	**22**	**54.1**	**11.5**	**100.0**	**6.07**

Line-Point Intercept Soil Surface Cover Data [3]						
Percent Cover by Type	**Bare Ground**	**Biotic Crust**	**Herbaceous Litter**	**Woody Litter**	**Duff**	**Rock**
	32.0	**0.0**	**44.6**	**2.0**	**0.0**	**2.0**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 95 percent of that measured on the reference areas. The cover of perennial grasses was 99 percent, desirable forbs cover was 54 percent, and shrub cover was 89 percent of that on the reference areas. The species composition of desirable species was 2 percent greater than that on the reference areas. The composition of perennial grasses was 3 percent greater, desirable forbs was 93 percent, and shrubs was 1 percent greater than that on the reference areas.

The density of desirable forbs on the site was 71 percent of that on reference areas. The density of shrubs on the site was equal to that on reference areas. Nearly all the density of both desirable forbs and shrubs came from species not seeded on the site but from seed sources in either the topsoil or from adjacent plants.

The amount of bare ground measured on this site was 92 percent of that on the reference areas. The amount of herbaceous litter was 16 percent greater than that on the reference areas. The canopy gaps between perennial species measured on this site were 3 percent smaller than that measured on the reference areas.

Table 14 is a comparison of the data collected for corehole pad IRI-10 with that from the rolling loam rangeland reference area. Only the data required to access the success of achieving successful reclamation is used in Table 14.

Table 14 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas					
Site	**# desired plant species**	**% desired foliar cover**	**% bare ground**	**shrub density (#/m^2)**	**forb density (#/m^2)**
Corehole IRI-10	22 species	54.1	32.0	1.84	4.23
Reference Area [1]	27 species	57.2	34.8	1.84	5.98
[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*					

Evaluation of the reclamation efforts of the disturbance on Corehole IRI-10

- There are 22 desirable plant species established on the site (4 perennial grasses, 14 desirable forbs, and 4 shrubs) meeting the requirement of at least five plant species.
- Crested wheatgrass (*Agropyron cristatum*) was the desired species with the greatest relative cover at 33.3 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 95 percent of that on the native rangeland reference areas, 15 percent greater than required to meet the 80 percent similarity.
- The amount of unprotected bare ground on the site was 8 percent less than that on the native rangeland reference areas, which equates to 108 percent similarity meeting the required 80 percent similarity.
- The density of forbs on the site was 71 percent of that on native rangeland reference areas not meeting the requirement of 80 percent similarity. The shrub density was equal to that on native rangeland reference areas meeting the required 80 percent similarity. The criteria only require either forb density or shrub density meet the requirement of 80 percent similarity.

The plant community does meet the criteria for species diversity, desired foliar cover, shrub density and bare ground but not the criteria for density of desirable forbs. The plant community on this site meets the required criteria for successful reclamation of the disturbance.

Corehole Pad Q

Vegetation sampling data was collected on August 24, 2021. Three 25 meter transects were randomly placed on the pad with 50 sample points on each transect for a total of 150 points for cover data. Ten one-meter square density quadrants were placed along each transect for a total of 30 quadrants. Data collected from this site include vegetative foliar and basal cover, species composition, forb and shrub densities and ground cover all summarized by plant group. In addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock.

The 2021 data in the Table 15 is summarized from data presented in Appendix Table H1. Each plant species encountered at this site is listed in Table H1. As shown in Table H1 there is a good representation of the seeded species established on the site.

Table 15 - Reference Area for Reclaimed Corehole Pad Q
Vegetation Cover, Species Composition, Species Density & Ground Cover

Plant Group	Line-Point Canopy Intercept Data [1]				Density Data [2]
	Number of Species	% Foliar Cover	% Basal Cover	Species Composition	Desirable Forb/Shrub Density (#/m^2)
Perennial Grasses	9	40.0	10.6	60.01	n/a
Invasive Non-Native Grasses	1	3.3	0.0	8.18	n/a
Desirable Forbs	9	6.7	0.7	9.09	4.08
Invasive and Non-Native Forbs	1	4.7	0.0	6.36	n/a
Shrubs	4	9.3	0.0	16.36	1.60
Vegetation Totals	**24**	**64.0**	**11.3**	**100.0**	**5.68**

Line-Point Intercept Soil Surface Cover Data [3]

Percent Cover by Type	Bare Ground	Biotic Crust	Herbaceous Litter	Woody Litter	Duff	Rock
	17.3	**0.0**	**53.3**	**4.7**	**0.0**	**0.7**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 98 percent of that measured on the reference areas. The cover of perennial grasses was 100 percent, desirable forbs cover was 64 percent greater, and shrub cover was 55 percent of that on the reference areas. The species composition of desirable species was 88 percent of that on the reference areas. The composition of perennial grasses was 84 percent greater, desirable forbs composition was nearly 2.5 times greater, and shrubs composition was 73 percent of that on the reference areas.

The density of desirable forbs on the site was 68 percent of that on reference areas. The density of shrubs was 87 percent greater than that on reference areas.

The amount of bare ground on the reference areas was 50 percent greater than that measured on this site. The amount of herbaceous litter on this site was 71 percent greater than that on the reference areas. The canopy gaps between perennial species measured on the site were 12 percent larger than that measured on the reference areas.

The site has a productive established plant community which has good representation of the perennial species used in the seed mix with good distribution of those species across the site. The plant community has stabilized the site.

Table 16 is a comparison of the data collected for exploration corehole pad Q with that from the rolling loam rangeland reference area. Only the data required to access the success of achieving successful reclamation is used in Table 16.

Table 16 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas					
Site	**# desired plant species**	**% desired foliar cover**	**% bare ground**	**shrub density (#/m^2)**	**forb density (#/m^2)**
Corehole Pad Q	22 species	56.0	17.3	1.60	4.07
Reference Area [1]	27 species	57.2	34.8	1.84	5.98
[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*					

Evaluation of the reclamation efforts of the disturbance on Corehole Pad Q

- There are 22 desirable plant species established on the site (9 perennial grasses, 9 desirable forbs, and 4 shrubs) meeting the requirement of at least five plant species.
- Needle & thread needlegrass (*Hesperostipa comata*) was the desired species with the greatest relative cover at 14 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 98 percent of that on the native rangeland reference areas meeting the requirement of 80 percent similarity.
- The amount of unprotected bare ground on the site was 50 percent less than on the native rangeland reference areas which equates to 150 percent similarity, meeting the required 80 percent similarity.
- The density of forbs and shrubs on the site in comparison with the native rangeland reference areas was 68 percent and 87 percent, respectively. The criteria only require either forb density or shrub density meet the requirement of 80 percent similarity. The density of shrubs exceeds the required criteria.

The plant community does meet the criteria of species diversity, desired foliar cover, desirable shrub density and bare ground. The requirements for successful reclamation of the disturbance have been met for this site.

Corehole Pad Q Access Route

This is a narrow linear reclaimed access road leading to corehole pad Q. Vegetation sampling data was collected on August 24, 2021. As this site was a linear disturbance, three 25 meter transects were randomly placed one near either end of the route and one near the mid-point of the route. Each transect had 50 sample points for a total of 150 points for the site for cover data. Ten one-meter square density quadrants were placed along each transect for a total of 30 quadrants. Data collected from this access route include vegetative foliar and basal cover, species composition, forb and shrub densities and ground cover all summarized by plant group. In addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock. Photographs were taken at each transect to show the plant community present.

The 2021 data in the Table 17 is summarized from data presented in Appendix Table I1. Each plant species encountered at this site is listed in Table I1. As shown in Table I1 there is a good representation of the seeded species established on the site.

Table 17 - Reclaimed Access Route to Corehole Pad Q
Vegetation Cover, Species Composition, Species Density & Ground Cover

Plant Group	Line-Point Canopy Intercept Data [1]				Density Data [2]
	Number of Species	% Foliar Cover	% Basal Cover	Species Composition	Desirable Forb/Shrub Density (#/m^2)
Perennial Grasses	7	38.1	10.0	68.54	n/a
Invasive Non-Native Grasses	0	0.0	0.0	0.0	n/a
Desirable Forbs	16	12.2	0.7	21.34	5.74
Invasive and Non-Native Forbs	0	0.0	0.0	0.0	n/a
Shrubs	7	5.3	0.0	10.12	0.72
Vegetation Totals	**30**	**55.6**	**10.7**	**100.0**	**6.46**

Line-Point Intercept Soil Surface Cover Data [3]

Percent Cover by Type	Bare Ground	Biotic Crust	Herbaceous Litter	Woody Litter	Duff	Rock
	31.3	**0.0**	**30.7**	**2.7**	**0.0**	**2.7**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 97 percent of that measured on the reference areas. The cover of perennial grasses was 94 percent, desirable forbs cover was 4 times greater, and shrub cover was 63 percent of that measured on the reference areas. The species composition of desirable species was 2.5 percent greater than that on the reference areas. The composition of perennial grasses was 4 percent lower, desirable forbs was 4 times greater and shrubs was 45 percent of that measured on the reference areas.

The density of desirable forbs on the site was 96 percent of that on reference areas. The density of shrubs on the site was 39 percent of that on reference areas.

The amount of bare ground on this site was 10 percent less than that measured on the reference areas. The amount of herbaceous litter was 82 percent of that on the reference areas. The canopy gaps between perennial species measured on this site were 19 percent larger than that measured on the reference areas.

The access route has a plant community which has a composition of the perennial species from the seed mix along with seed from native species in the replaced topsoil or from adjacent plants. There was an excellent response of native forbs and shrubs adjacent the route pioneering onto and establishing on the route. There is good distribution of desirable species across the route which has stabilized the disturbance.

Table 18 is a comparison of the data collected from the access route to corehole pad Q with that from the rolling loam rangeland reference area. Only the data required to access the success of achieving successful reclamation is used in Table 18.

Table 18 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas					
Site	**# desired plant species**	**% desired foliar cover**	**% bare ground**	**shrub density (#/m^2)**	**forb density (#/m^2)**
Access Route to Pad Q	30 species	55.6	31.3	0.72	5.74
Reference Area [1]	27 species	57.2	34.8	1.84	5.98
[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*					

Evaluation of the reclamation efforts of the disturbance on Access Route to Corehole Pad Q:

- There are 30 desirable plant species established on the site (7 perennial grasses, 16 desirable forbs, and 7 shrubs) meeting the requirement of at least five plant species.
- Indian ricegrass (*Achnatherum hymenoides*) was the desired species with the greatest relative cover at 30.7 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 97 percent of than that on the native rangeland reference areas, 17 percent greater than the requirement of 80 percent similarity.
- The amount of unprotected bare ground on the site was 10 percent greater than that on the native rangeland reference areas which equates to 110 percent similarity, meeting the required 80 percent similarity.
- The density of forbs on the site was 96 percent of that on native rangeland reference areas meeting the requirement of 80 percent similarity. The shrub density was 39 percent of that on native rangeland reference areas not meeting the required 80 percent similarity. The criteria only require either forb density or shrub density meet the requirements. Forb density exceeds 80 percent similarity with the native rangeland reference areas meeting the required criteria.

The plant community meets the criteria for species diversity, desired foliar cover, desirable forb density and bare ground. It does not meet the shrub density criteria. The reclaimed route meets the reclamation standards required for successful reclamation.

Corehole Pad U

Vegetation sampling data was collected on August 24, 2021. Three 25 meter transects were randomly placed on the pad with 50 sample points on each transect for a total of 150 points for cover data. Ten one-meter square density quadrants were placed along each transect for a total of 30 quadrants. Data collected from this site include vegetative foliar and basal cover, species composition, forb and shrub densities and ground cover all summarized by plant group. In

addition, ground cover data was collected for dead vegetative litter, bare ground, and surface rock.

The 2021 data in the Table 19 is summarized from data presented in Appendix Table J1. Each plant species encountered at this site is listed in Table J1. As shown in Table J1 there is a good representation of the seeded species established on the site.

Table 19 - Reference Area for Reclaimed Corehole Pad U
Vegetation Cover, Species Composition, Species Density & Ground Cover

Plant Group	Line-Point Canopy Intercept Data [1]				Density Data [2]
	Number of Species	% Foliar Cover	% Basal Cover	Species Composition	Desirable Forb/Shrub Density (#/m^2)
Perennial Grasses	5	14.6	2.7	34.29	n/a
Invasive Non-Native Grasses	0	0.0	0.0	0.0	n/a
Desirable Forbs	3	2.7	0.0	5.71	1.96
Invasive and Non-Native Forbs	1	10.7	0.0	22.86	n/a
Shrubs	5	17.4	0.7	37.14	1.03
Vegetation Totals	**14**	**45.4**	**3.4**	**100.0**	**2.99**

Line-Point Intercept Soil Surface Cover Data [3]

Percent Cover by Type	Bare Ground	Biotic Crust	Herbaceous Litter	Woody Litter	Duff	Rock
	36.0	**0.0**	**30.0**	**6.0**	**0.0**	**0.0**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from ten 1-meter square quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

The foliar cover of desirable species on the site was 61 percent of that measured on the reference areas. The cover of perennial grasses was 36 percent, desirable forbs cover was 11 percent greater, and shrub cover was 17 percent greater than that measured on the reference areas. The species composition of desirable species was only 79 percent of that on the reference areas. The composition of perennial grasses was 48 percent lower, desirable forbs was 36 percent greater and shrubs was 34 percent greater than that measured on the reference areas.

The density of desirable forbs on the site was only 33 percent of that on reference areas. The density of shrubs on the site was only 56 percent of that on reference areas.

The amount of bare ground on this site was 3 percent greater than that measured on the reference areas. The amount of herbaceous litter on this site was 20 percent less than that on the reference areas. The canopy gaps between perennial species measured on the site were 46 percent larger than that measured on the reference areas.

This site is being negatively impacted from heavy grazing use by cattle and wild horses. There is poor distribution across the site of the perennial species used in the seed mix. Most of the perennial species on the site are grazing tolerant grasses and shrubs that have pioneered the site

from adjacent stands. The foliar cover of Russian thistle, an invasive non-native species, exceeds the cover of all the perennial species on the site except for yellow rabbitbrush.

Table 20 is a comparison of the data collected for exploration corehole pad U with that from the rolling loam rangeland reference area. Only the data required to access the success of achieving successful reclamation is used in Table 20.

Table 20 – Comparison of Reclamation Criteria Elements with Native Rangeland Reference Areas

Site	# desired plant species	% desired foliar cover	% bare ground	shrub density (#/m^2)	forb density (#/m^2)
Corehole Pad U	13 species	34.7	36.0	1.03	1.96
Reference Area [1]	27 species	60.4	34.8	1.84	5.98

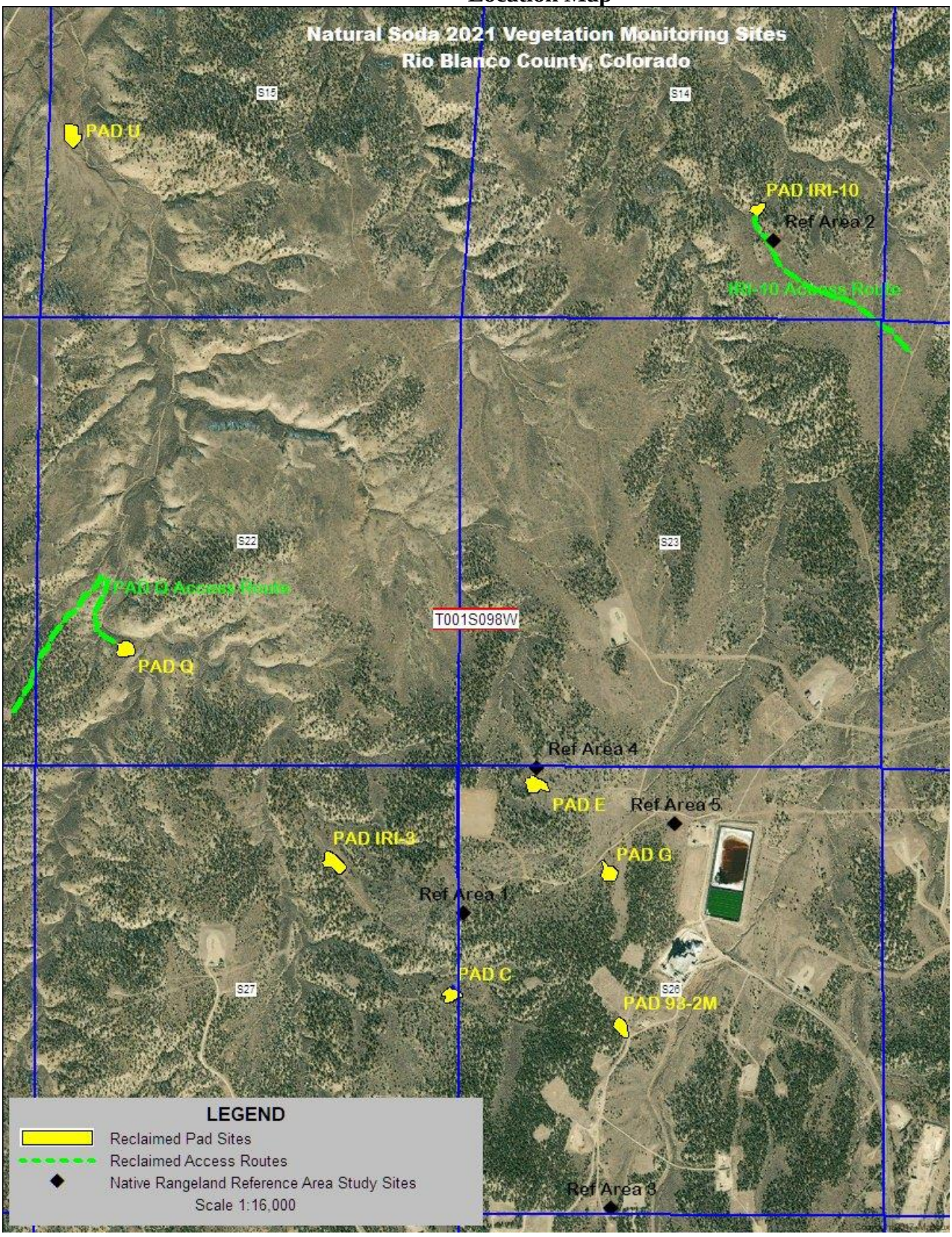
[1] *The average of five native rangelands reference areas were used as the base for evaluating success of the reclamation criteria.*

Evaluation of the reclamation efforts of the disturbance on Corehole Pad U:

- There are 13 desirable plant species established on the site (5 perennial grasses, 3 desirable forbs, and 5 shrubs) meeting the requirement of at least five plant species.
- Yellow rabbitbrush (*Chrysothamnus viscidiflorus*) was the desired species with the greatest relative cover at 12 percent meeting the requirement that no one species can exceed 70 percent relative cover.
- The foliar cover of desirable species on the site was 61 percent of that on the native rangeland reference areas not meeting the requirement of 80 percent similarity.
- The amount of unprotected bare ground on the site was 3 percent greater than on the native rangeland reference areas which equates to 97 percent similarity, meeting the required 80 percent similarity.
- The density of forbs and shrubs on the site in comparison with the native rangeland reference areas was 33 percent and 56 percent, respectively. Neither desirable forbs nor shrub densities have met the requirement of 80 percent similarity.

The plant community only meets the criteria for species diversity and bare ground. The criteria for the desired foliar cover, desirable forb density and shrub density have not been met. This site does not meet all the criteria for successful reclamation of the disturbance at the site.

Location Map



Appendix A – Vegetation Sampling Data Native Rangeland Reference Areas

Table A1 - Vegetation Cover, Species Composition, Species Density & Ground Cover Rolling Loam Native Rangeland Reference Area						
Plant Species Observed within Study Area			**Line-Point Canopy Intercept Data [1]**			**Density Data [2]**
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	
ACHY	*Achnatherum hymenoides*	Indian ricegrass	2.00	0.80	3.03	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	26.40	6.00	44.85	
KOMA	*Koeleria macrantha*	prairie junegrass	4.40	0.00	9.70	
PASM	*Pascopyrum smithii*	western wheatgrass	6.40	0.00	10.30	
POSE	*Poa secunda*	Sandberg bluegrass	1.20	0.00	3.64	**Desirable Forb/Shrub Density (#/m^2)**
Perennial Grass Totals			**40.40**	**6.80**	**71.52**	
ASCH	*Astragalus chamaeleuce*	cicada milkvetch	0.00	0.00	0.00	0.10
ASCO12	*Astragalus convallarius*	lesser-rushy mlkvetch	0.40	0.00	0.61	0.04
ASSP6	*Astragalus spatulatus*	tufted milkvetch	0.00	0.00	0.00	0.02
CAFI	*Carex filifolia*	threadleaf sedge	1.60	0.00	2.42	0.00
CRAC	*Crepis acuminata*	longleaf hawksbeard	0.00	0.00	0.00	0.02
CRFL6	*Cryptantha flavoculata*	roughseed cryptanth	0.00	0.00	0.00	0.00
EREA	*Erigeron eatonii*	Eaton's fleabane	0.00	0.00	0.00	0.30
HEBO	*Hedysarum boreale*	Utah sweetvetch	0.00	0.00	0.00	0.08
LEER	*Leucelene ericoides*	heath aster	0.00	0.00	0.00	0.22
MAGR2	*Machaeranthera grindelioides*	rayless tansyaster	0.00	0.00	0.00	0.30
OPPO	*Opuntia polyacantha*	plains pricklypear cactus	0.00	0.00	0.00	0.06
PAMU11	*Pakera multilobata*	lobeleaf groundsel	0.00	0.00	0.00	0.02
PEFRF5	*Penstemon fremontii var. fremontii*	Fremont beardtongue	0.00	0.00	0.00	0.00
PHHO	*Phlox hoodii*	Hood's phlox	0.40	0.00	0.61	1.62
PHLO2	*Phlox longifolia*	longleaf phlox	0.00	0.00	0.00	0.00
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.00	0.00	0.00	3.18
TOIN	*Townsendia incana*	Townsend daisy	0.00	0.00	0.00	0.02
Desirable Forb Totals			**2.40**	**0.00**	**3.64**	**5.98**
ARTRW	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush	13.20	0.40	20.61	1.56
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	0.80	0.00	1.21	0.02
GUSA2	*Gutierrezia sarothrae*	broom snakeweed	0.00	0.00	0.00	0.14
JUOS	*Juniperus osteosperma*	Utah juniper	0.00	0.00	0.00	0.02
KRLA2	*Krascheninnikovia lanata*	winterfat	0.40	0.00	0.61	0.10
Shrub Totals			**14.40**	**0.40**	**22.42**	**1.84**
BRTE	*Bromus tectorum*	cheatgrass	1.60	0.00	2.42	
Totals for Invasive and Non-Native Species			**1.60**	**0.00**	**2.42**	
		Vegetation Totals	**58.80**	**7.20**	**100.00**	**7.82**

[1] Sum of data from 5 randomly placed transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at reach sample point.

[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.

[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface.

Soil Surface Cover Type (%)[3]	
Bare Ground	**34.8**
Biotic Crust	**0.0**
Herbaceous Litter	**37.6**
Woody Litter	**0.8**
Duff	**0.0**
Rock	**0.0**

Table A2 - Canopy Gap Intercept Data Rolling Loam Native Rangeland Reference Area										
Canopy Gaps > 20 centimeters	**Total of Gaps > 20 cm**		**Gaps 21-50 cm**		**Gaps 51-100 cm**		**Gaps 101-200 cm**		**Gaps >200 cm**	
	2020	**2021**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**
Transect 1	991	1378	452	282	317	326	222	770	0	0
Transect 2	628	996	224	335	404	661	0	0	0	0
Transect 3	629	1113	498	358	131	755	0	0	0	0
Transect 4	317	691	222	528	95	163	0	0	0	0
Transect 5	434	485	383	345	51	140	0	0	0	0
Total Gaps (cm)	**4042**	**4663**	**2224**	**1848**	**1306**	**2045**	**512**	**770**	**0**	**0**
% Line in Gaps	**26.95**	**37.30**	**14.83**	**14.78**	**8.71**	**16.36**	**3.41**	**6.16**	**0.00**	**0.00**
Line length for each transect was 25 meters for site total length of 125 meters.										

Table A3 - Transect Coordinates Native Rangeland Reference Areas (Datum: UTM Zone 12, WGS 84)						
Site	**Azimuth from starting point (true N)**	**Transect Starting Point**		**Transect Ending Point**		**Length**
		Northing (mN)	**Easting (mE)**	**Northing (mN)**	**Easting (mE)**	
Transect 1	303 º	4424086.2	724791.8989	4424098.45	724770.4119	25 meters
Transect 2	020 º	4426548.8	725836.8301	4426569.88	725839.625	25 meters
Transect 3	001 º	4423016.56	725352.0032	4423043.21	725347.7937	25 meters
Transect 4	335 º	4424614.262	725035.7116	4424637.846	725025.4365	25 meters
Transect 5	168 º	4424440.817	725542.7802	4424417.982	725552.0941	25 meters

Transect Photos Native Rangeland Reference Areas

Figure A1 - Rolling Loam Rangeland Reference Area Transect #1

Figure A2 - Rolling Loam Rangeland Reference Area Transect #2

Figure A3 - Rolling Loam Rangeland Reference Area Transect #3

Figure A4 - Rolling Loam Rangeland Reference Area Transect #4

Figure A5 - Rolling Loam Rangeland Reference Area Transect #5

Appendix B – Vegetation Sampling Data Reclaimed Well Pad 93-2M

Table B1 - Vegetation Cover, Species Composition, Species Density & Ground Cover Reclaimed Pad 93-2M						
Plant Species Observed within Study Area			**Line-Point Canopy Intercept Data [1]**			**Density Data [2]**
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	
AGCR	*Agropyron cristatum*	crested wheatgrass	4.7	0.7	7.00	
ELLAL	*Elymus lanceolatus*	thickspike wheatgrass	5.3	2.7	8.00	
ELTR7	*Elymus trachycaulus*	slender wheatgrass	4.7	0.0	8.00	
LECI4	*Leymus cinereus*	basin wildrye	4.7	1.3	7.00	
PASM	*Pascopyrum smithii*	western wheatgrass	16.0	0.7	27.00	
PSJU3	*Psathyrostachys juncea*	Russian wildrye	13.3	2.7	20.00	
THIN6	*Thinopyrum intermedium*	pubescent wheatgrass	6.0	2.7	10.00	**Forb/Shrub Density (#/m^2)**
		Perennial Grass Totals	**54.7**	**10.8**	**87.00**	
DEPI	*Descurainia pinnata*	western tansymustard	0.0	0.0	0.00	0.47
GRSQ	*Grindelia squarrosa*	curlycup gumweed	0.0	0.0	0.00	0.03
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.0	0.0	0.00	0.17
TRDU	*Tragopogon dubius*	western salsify	0.0	0.0	0.00	0.03
		Desirable Forb Totals	**0.0**	**0.0**	**0.00**	**0.70**
ARTRW	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush	0.0	0.0	0.00	0.33
ATCA2	*Atriplex canescens*	four-wing saltbush	0.7	0.0	1.00	0.03
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	6.0	0.0	9.00	0.37
GUSA2	*Gutierrezia sarothrae*	broom Snakeweed	0.0	0.0	0.00	0.13
		Shrub Totals	**6.7**	**0.0**	**10.00**	**0.86**
BRTE	*Bromus tectorum*	cheatgrass	0.7	0.0	3.00	
		Totals for Invasive and Non-Native Species	**0.7**	**0.0**	**3.00**	
		Vegetation Totals	**62.1**	**10.8**	**100.0**	**1.56**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [3]	
Bare Ground	**14.7**
Biotic Crust	**0.0**
Herbaceous Litter	**63.3**
Woody Litter	**4.0**
Duff	**0.0**
Rock	**0.0**

Table B2 - Canopy Gap Intercept Data Reclaimed Pad 93-2M										
Canopy Gaps > 20 centimeters	**Total of Gaps > 20 cm**		**Gaps 21-50 cm**		**Gaps 51-100 cm**		**Gaps 101-200 cm**		**Gaps >200 cm**	
	2019	**2021**	**2019**	**2021**	**2019**	**2021**	**2019**	**2021**	**2019**	**2021**
Transect 1	354	584	130	325	224	259	0	0	0	0
Transect 2	860	656	60	417	503	239	297	0	0	0
Transect 3	944	467	54	161	302	197	588	109	0	0
Total Gaps (cm)	**2158**	**1707**	**244**	**903**	**1029**	**695**	**885**	**109**	**0**	**0**
% Line in Gaps	**28.77**	**22.76**	**3.25**	**12.04**	**13.72**	**9.27**	**11.80**	**1.45**	**0.00**	**0.00**
Line length for each transect was 25 meters for site total length of 75 meters										

Table B3 - Transect Coordinates Reclaimed Pad 93-2M (Datum: UTM Zone 12, WGS 84)						
Site	Azimuth from starting point (true N)	Transect Starting Point		Transect Ending Point		Length
		Northing (mN)	Easting (mE)	Northing (mN)	Easting (mE)	
Transect 1	157 º	4423693.7	725376.2914	4423661.47	725379.9814	25 meters
Transect 2	248 º	4423690.39	725369.803	4423690.22	725348.8525	25 meters
Transect 3	319 º	4423690.29	725377.5042	4423713.9	725364.4891	25 meters

Transect Photos

Figure B1 Transect 1 Reclaimed Pad 93-2M

Figure B2 Transect 2 Reclaimed Pad 93-2M

Figure B3 Transect 3 Reclaimed Pad 93-2M

Appendix C – Vegetation Sampling Data Reclaimed Corehole Pad C

Table C1 - Vegetation Cover, Species Composition, Species Density & Ground Cover Reclaimed Exploration Pad C						
Plant Species Observed within Study Area			**Line-Point Canopy Intercept Data [1]**			**Density Data [2]**
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	
ACHY	*Achnatherum hymenoides*	Indian ricegrass	10.0	1.3	15.89	
ELLAL	*Elymus lanceolatus*	thickspike wheatgrass	2.7	0.7	3.74	
ELTR7	*Elymus trachycaulus*	slender wheatgrass	6.0	2.7	9.35	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	12.7	3.3	18.69	
LECI4	*Leymus cinereus*	basin wildrye	4.0	0.0	5.61	
NAVI4	*Nassella viridula*	green needlegrass	0.0	0.0	0.93	
PASM	*Pascopyrum smithii*	western wheatgrass	0.7	0.0	0.93	
PSJU3	*Psathyrostachys juncea*	Russian wildrye	2.7	0.7	3.74	
PSSPI	*Pseudoroegneria spicata ssp. inermis*	beardless bluebunch wheatgrass	0.7	0.0	0.93	
PSSPS	*Pseudoroegneria spicata ssp. spicata*	bearded bluebunch wheatgrass	0.7	0.0	1.87	**Desirable Forb/Shrub Density (#/m^2)**
		Perennial Grass Totals	**40.2**	**8.7**	**61.68**	
ASCI4	*Astragalus cicer*	cicer milkvetch	1.3	0.0	1.87	0.47
ASCO12	*Astragalus convallarius*	lesser-rushy mlkvetch	0.0	0.0	0.00	0.30
CLSE	*Cleome serrulata*	Rocky Mtn. beeplant	2.0	0.0	3.74	0.17
CRFL6	*Cryptantha flavoculata*	roughseed cryptanth	0.0	0.0	0.00	0.13
EREA	*Erigeron eatonii*	Eaton's fleabane	0.0	0.0	0.00	0.23
HEBO	*Hedysarum boreale*	Utah sweetvetch	0.0	0.0	0.00	0.10
IPAGA3	*Ipomopsis aggregata*	scarlet gilia	0.0	0.0	0.00	0.03
LEER	*Leucelene ericoides*	heath aster	0.0	0.0	0.00	0.07
LILE3	*Linum lewisii*	Lewis flax	0.0	0.0	0.00	0.23
MACA2	*Machaeranthera canescens*	hoary tansyaster	0.7	0.0	0.93	0.63
MESA	*Medicago sativa*	alfalfa	0.0	0.0	0.00	0.77
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.0	0.0	0.00	0.20
		Desirable Forb Totals	**4.0**	**0.0**	**6.54**	**3.33**
ARTRW	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush	0.0	0.0	0.00	0.07
ATCA2	*Atriplex canescens*	four-wing saltbush	12.0	0.7	16.82	1.07
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	0.0	0.0	0.00	0.03
GUSA2	*Gutierrezia sarothrae*	broom Snakeweed	1.3	0.0	1.87	0.80
KRLA2	*Krascheninnikovia lanata*	winterfat	1.3	0.0	3.74	0.17
PUTR2	*Purshia tridentata*	antelope bittrebrush	1.3	0.0	1.87	0.20
		Shrub Totals	**15.9**	**0.7**	**24.30**	**2.34**
BRTE	*Bromus tectorum*	cheatgrass	2.7	0.0	5.61	
SATR12	*Salsola tragus*	Russian thistle	1.3	0.0	1.87	
		Totals for Invasive and Non-Native Species	**4.0**	**0.0**	**7.48**	
		Vegetation Totals	**64.1**	**9.4**	**100.00**	**5.67**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.

[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.

[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [3]	
Bare Ground	**18.7**
Biotic Crust	**0.0**
Herbaceous Litter	**56.0**
Woody Litter	**6.7**
Duff	**0.0**
Rock	**0.7**

Table C2 - Canopy Gap Intercept Data Reclaimed Corehole Pad C					
Canopy Gaps > 20 centimeters	**Total of Gaps > 20 cm**	**Gaps 21-50 cm**	**Gaps 51-100 cm**	**Gaps 101-200 cm**	**Gaps >200 cm**
Transect 1	958	487	115	356	0
Transect 2	1103	226	703	174	0
Transect 3	936	414	259	263	0
Total Gaps (cm)	**2997**	**1127**	**1077**	**793**	**0**
% Line in Gaps	**39.96**	**15.03**	**14.36**	**10.57**	**0.00**
Line length for each transect was 25 meters for site total length of 75 meters					

Table C3 - Transect Coordinates Reclaimed Corehole Pad C (Datum: UTM Zone 12, WGS 84)						
	Azimuth from starting point (true N)	**Transect Starting Point**		**Transect Ending Point**		
Site		**Northing (mN)**	**Easting (mE)**	**Northing (mN)**	**Easting (mE)**	**Length**
Transect 1	222 º	4423787.56	724743.487	4423766.34	724728.4604	25 meters
Transect 2	069 º	4423782.37	724748.1733	4423796.6	724767.3404	25 meters
Transect 3	285 º	4423786.86	724746.2445	4423791.92	724718.1265	25 meters

Transect Photos

Figure C1 Transect 1 Reclaimed Corehole Pad C

Figure C2 Transect 2 Reclaimed Corehole Pad C

Figure C3 Transect 3 Reclaimed Corehole Pad C

Appendix D – Vegetation Sampling Data Reclaimed Corehole Pad E

Table D1 - Vegetation Cover, Species Composition, Species Density & Ground Cover Reclaimed Exploration Corehole Pad E						
Plant Species Observed within Study Area			**Line-Point Canopy Intercept Data [1]**			**Density Data [2]**
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	
ACHY	*Achnatherum hymenoides*	Indian ricegrass	2.0	0.0	2.80	
ELLAL	*Elymus lanceolatus*	thickspike wheatgrass	4.0	1.3	5.61	
ELTR7	*Elymus trachycaulus*	slender wheatgrass	27.3	6.7	41.12	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	4.0	0.7	5.61	
NAVI4	*Nassella viridula*	green needlegrass	7.3	2.7	10.28	
PASM	*Pascopyrum smithii*	western wheatgrass	2.0	0.0	2.80	**Desirable Forb/Shrub Density (#/m^2)**
PSJU3	*Psathyrostachys juncea*	Russian wildrye	6.0	1.3	8.41	
		Perennial Grass Totals	**52.6**	**12.7**	**76.64**	
CLSE	*Cleome serrulata*	Rocky Mtn. beeplant	0.0	0.0	0.0	0.10
HEBO	*Hedysarum boreale*	Utah sweetvetch	0.0	0.0	0.0	0.20
MACA2	*Machaeranthera canescens*	hoary tansyaster	5.3	1.3	10.28	0.03
MESA	*Medicago sativa*	alfalfa	0.7	0.0	0.93	5.10
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.7	0.0	1.87	1.30
		Desirable Forb Totals	**6.7**	**1.3**	**13.08**	**6.73**
ARTRW	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush	0.7	0.0	9.35	0.1 3
ATCA2	*Atriplex canescens*	four-wing saltbush	6.7	0.0	0.00	0.53
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	0.0	0.0	0.00	0.03
GUSA2	*Gutierrezia sarothrae*	broom snakeweed	0.0	0.0	0.00	0.07
KRLA2	*Krascheninnikovia lanata*	winterfat	0.7	0.0	0.93	0.37
		Shrub Totals	**8.1**	**0.0**	**10.28**	**1.13**
SATR12	*Salsola tragus*	Russian thistle	0.0	0.0	0.0	
		Totals for Invasive and Non-Native Species	**0.0**	**0.0**	**0.0**	
		Vegetation Totals	**67.4**	**14.0**	**100.0**	**7.86**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [3]	
Bare Ground	**19.3**
Biotic Crust	**0.0**
Herbaceous Litter	**43.3**
Woody Litter	**2.7**
Duff	**0.0**
Rock	**2.0**

Table D2 - Canopy Gap Intercept Data Reclaimed Corehole Pad E					
Canopy Gaps > 20 centimeters	**Total of Gaps > 20 cm**	**Gaps 21-50 cm**	**Gaps 51-100 cm**	**Gaps 101-200 cm**	**Gaps >200 cm**
Transect 1	712	459	253	0	0
Transect 2	514	341	61	112	0
Transect 3	653	383	155	115	0
Total Gaps (cm)	**1879**	**1183**	**469**	**227**	**0**
% Line in Gaps	**25.05**	**15.77**	**6.25**	**3.03**	**0.00**
Line length for each transect was 25 meters for site total length of 75 meters					

Table D3 - Transect Coordinates Reclaimed Corehole Pad E (Datum: UTM Zone 12, WGS 84)						
	Azimuth from starting point (true N)	Transect Starting Point		Transect Ending Point		
Site		Northing (mN)	Easting (mE)	Northing (mN)	Easting (mE)	Length
Transect 1	197 º	4424567.02	725031.2057	4424539.64	725025.8566	25 meters
Transect 2	264 º	4424566.0	725030.5516	4424563.74	725006.8428	25 meters
Transect 3	081 º	4424562.74	725036.8056	4424574.28	725058.7864	25 meters

Transect Photos

Figure D1 Transect 1 Reclaimed Corehole Pad E

Figure D2 Transect 2 Reclaimed Corehole Pad E

Figure D3 Transect 3 Reclaimed Corehole Pad E

Appendix E – Vegetation Sampling Data Reclaimed Corehole Pad G

Table E1 - Vegetation Cover, Species Composition, Species Density & Ground Cover
Reclaimed Exploration Pad G

Plant Species Observed within Study Area			Line-Point Canopy Intercept Data [1]			Density Data [2]
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	
ACHY	*Achnatherum hymenoides*	Indian ricegrass	3.3	1.3	7.32	
ELLAL	*Elymus lanceolatus*	thickspike wheatgrass	4.0	0.7	7.32	
ELTR7	*Elymus trachycaulus*	slender wheatgrass	22.7	5.3	45.12	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	7.3	2.7	13.41	
LECI4	*Leymus cinereus*	basin wildrye	0.7	0.0	1.22	
NAVI4	*Nassella viridula*	green needlegrass	2.0	0.0	3.66	
PASM	*Pascopyrum smithii*	western wheatgrass	0.7	0.0	1.22	
POSE	*Poa secunda*	Sandberg bluegrass	0.7	0.0	1.22	
PSSPS	*Pseudoroegneria spicata ssp. spicata*	bearded bluebunch wheatgrass	0.7	0.0	1.22	**Desirable Forb/Shrub Density (#/m^2)**
		Perennial Grass Totals	**42.1**	**10.0**	**81.71**	
ASCO12	*Astragalus convallarius*	lesser-rushy mlkvetch	0.0	0.0	0.00	0.10
ASSP6	*Astragalus spatulatus*	tufted milkvetch	0.0	0.0	0.00	0.03
CLSE	*Cleome serrulata*	Rocky Mtn. beeplant	0.0	0.0	0.00	0.03
HEBO	*Hedysarum boreale*	Utah sweetvetch	0.0	0.0	0.00	0.33
LEER	*Leucelene ericoides*	heath aster	0.0	0.0	0.00	0.07
MACA2	*Machaeranthera canescens*	hoary tansyaster	0.7	0.0	1.22	0.27
MESA	*Medicago sativa*	alfalfa	0.0	0.0	0.00	0.57
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.7	0.0	1.22	0.73
		Desirable Forb Totals	**1.4**	**0.0**	**2.44**	**2.13**
ARTRW	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush	0.0	0.0	0.0	0.13
ATCA2	*Atriplex canescens*	four-wing saltbush	2.7	0.7	4.88	0.37
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	0.7	0.0	1.22	0.00
GUSA2	*Gutierrezia sarothrae*	broom Snakeweed	0.0	0.0	0.0	0.10
KRLA2	*Krascheninnikovia lanata*	winterfat	0.0	0.0	0.0	0.07
		Shrub Totals	**3.4**	**0.7**	**6.10**	**0.67**
BRTE	*Bromus tectorum*	cheatgrass	0.7	0.0	1.22	
SATR12	*Salsola tragus*	Russian thistle	4.7	0.0	8.53	
		Totals for Invasive and Non-Native Species	**5.4**	**0.0**	**9.75**	
		Vegetation Totals	**52.3**	**10.7**	**100.00**	**2.80**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [3]	
Bare Ground	**42.0**
Biotic Crust	**0.0**
Herbaceous Litter	**42.7**
Woody Litter	**6.0**
Duff	**0.0**
Rock	**0.0**

Table E2 - Canopy Gap Intercept Data
Reclaimed Corehole Pad G

Canopy Gaps > 20 centimeters	Total of Gaps > 20 cm	Gaps 21-50 cm	Gaps 51-100 cm	Gaps 101-200 cm	Gaps >200 cm
Transect 1	925	137	331	224	233
Transect 2	1035	518	401	116	0
Transect 3	1280	270	452	119	439
Total Gaps (cm)	**3240**	**925**	**1184**	**459**	**672**
% Line in Gaps	**43.20**	**12.33**	**15.79**	**6.12**	**8.96**

Line length for each transect was 25 meters for site total length of 75 meters

Table E3 - Transect Coordinates Reclaimed Corehole Pad G (Datum: UTM Zone 12, WGS 84)						
	Azimuth from starting point (true N)	Transect Starting Point		Transect Ending Point		
Site		Northing (mN)	Easting (mE)	Northing (mN)	Easting (mE)	Length
Transect 1	096 º	4424253.9	725308.6655	4424256.7	725332.0171	25 meters
Transect 2	214 º	4424254.82	725302.3946	4424233.96	725288.3007	25 meters
Transect 3	318 º	4424260.32	725304.1992	4424278.06	725287.7668	25 meters

Transect Photos

Figure E1 Transect 1 Reclaimed Corehole Pad G

Figure E2 Transect 2 Reclaimed Corehole Pad G

Figure E3 Transect 3 Reclaimed Corehole Pad G

Appendix F – Vegetation Sampling Data Reclaimed Corehole Pad IRI-3, MW1, PW1, PW2

Table F1 - Vegetation Cover, Species Composition, Species Density & Ground Cover
Reclaimed Exploration Corehole Pad IRI-3, MW-1, PW-1, and PW-2

Plant Species Observed within Study Area			Line-Point Canopy Intercept Data [1]			Density Data [2]
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	
ACHY	*Achnatherum hymenoides*	Indian ricegrass	1.3	0.7	1.98	
AGCR	*Agropyron cristatum*	crested wheatgrass	4.0	0.7	8.91	
ELTR7	*Elymus trachycaulus*	slender wheatgrass	11.3	0.7	18.81	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	7.3	1.3	10.89	
NAVI4	*Nassella viridula*	green needlegrass	1.3	0.0	1.98	
PASM	*Pascopyrum smithii*	western wheatgrass	2.0	0.0	3.96	
POSE	*Poa secunda*	Sandberg bluegrass	0.7	0.0	0.99	
PSJU3	*Psathyrostachys juncea*	Russian wildrye	17.3	0.0	25.74	
THIN6	*Thinopyrum intermedium*	pubescent wheatgrass	9.3	2.0	14.85	
		Perennial Grass Totals	**54.5**	**5.4**	**88.12**	
ASCO12	*Astragalus convallarius*	lesser-rushy mlkvetch	0.0	0.0	0.00	0.20
CHAL	*Chenopodium album*	lambsquarter	0.0	0.0	0.00	0.17
EREA	*Erigeron eatonii*	Eaton's fleabane	0.0	0.0	0.00	0.07
LILE3	*Linum lewisii*	Lewis flax	0.0	0.0	0.00	0.17
MACA2	*Machaeranthera canescens*	hoary tansyaster	0.0	0.0	0.00	0.30
MAGR2	*Machaeranthera grindelioides*	rayless tansyaster	0.7	0.0	0.99	0.03
MESA	*Medicago sativa*	alfalfa	0.0	0.0	0.00	2.10
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.0	0.0	0.00	0.07
		Desirable Forb Totals	**0.7**	**0.0**	**0.99**	**3.11**
ARTRW	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush	0.0	0.0	0.00	0.30
ATCA2	*Atriplex canescens*	four-wing saltbush	2.7	0.0	3.96	0.60
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	1.3	0.0	1.98	0.20
GUSA2	*Gutierrezia sarothrae*	broom Snakeweed	0.0	0.0	0.00	0.07
KRLA2	*Krascheninnikovia lanata*	winterfat	0.0	0.0	0.00	0.07
		Shrub Totals	**4.0**	**0.0**	**5.94**	**1.24**
BRTE	*Bromus tectorum*	cheatgrass	2.0	0.0	**4.95**	
		Totals for Invasive and Non-Native Species	**2.0**	**0.0**	**4.95**	
		Vegetation Totals	**61.2**	**5.4**	**100.0**	**4.35**

Desirable Forb/Shrub Density (#/m^2)

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [3]	
Bare Ground	**16.7**
Biotic Crust	**0.0**
Herbaceous Litter	**59.3**
Woody Litter	**2.0**
Duff	**0.0**
Rock	**0.0**

Table F2 - Canopy Gap Intercept Data
Reclaimed Corehole Pad IRI-3, MW-1, PW-1, and PW-2

Canopy Gaps > 20 centimeters	Total of Gaps > 20 cm	Gaps 21-50 cm	Gaps 51-100 cm	Gaps 101-200 cm	Gaps >200 cm
Transect 1	707	289	418	0	0
Transect 2	1246	502	528	216	0
Transect 3	391	391	0	0	0
Total Gaps (cm)	**2344**	**1182**	**946**	**216**	**0**
% Line in Gaps	**31.25**	**15.76**	**12.61**	**2.88**	**0.00**

Line length for each transect was 25 meters for site total length of 75 meters

Table F3 - Transect Coordinates Reclaimed Corehole Pad IRI-3, MW-1, PW-1, and PW-2 (Datum: UTM Zone 12, WGS 84)						
	Azimuth from starting point (true N)	Transect Starting Point		Transect Ending Point		
Site		Northing (mN)	Easting (mE)	Northing (mN)	Easting (mE)	Length
Transect 1	273 º	4424252.81	724288.8793	4424255.13	724265.8046	25 meters
Transect 2	116 º	4424258.97	724301.6981	4424258.07	724323.9613	25 meters
Transect 3	137 º	4424245.81	724304.0524	4424233.96	724323.9014	25 meters

Transect Photos

Figure F1 Transect 1 Reclaimed Pad IRI3, MW1, PW1, PW2

Figure F2 Transect 2 Reclaimed Pad IRI3, MW1, PW1, PW2

Figure F3 Transect 3 Reclaimed Pad IRI3, MW1, PW1, PW2

Appendix G – Vegetation Sampling Data Reclaimed Corehole Pad IRI-10

Table G1 - Vegetation Cover, Species Composition, Species Density & Ground Cover Reclaimed Exploration Corehole Pad IRI-10						
Plant Species Observed within Study Area			**Line-Point Canopy Intercept Data [1]**			**Density Data [2]**
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	**Desirable Forb/Shrub Density (#/m²)**
ACHY	*Achnatherum hymenoides*	Indian ricegrass	0.7	0.0	1.14	
AGCR	*Agropyron cristatum*	crested wheatgrass	33.3	8.0	61.36	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	2.7	0.0	4.55	
THIN6	*Thinopyrum intermedium*	pubescent wheatgrass	3.3	0.7	6.82	
		Perennial Grass Totals	**40.0**	**8.7**	**73.86**	
ARFR4	*Artemisia frigida*	fringed sage	0.0	0.0	0.0	0.03
ASCH	*Astragalus chamaeleuce*	cicada milkvetch	0.0	0.0	0.0	0.07
ASCO12	*Astragalus convallarius*	lesser-rushy mlkvetch	0.0	0.0	0.0	0.10
ASSP6	*Astragalus spatulatus*	tufted milkvetch	0.0	0.0	0.0	0.40
ERLO4	*Eriogonum lonchophyllum*	spearleaf buckwheat	0.0	0.0	0.0	0.07
HEBO	*Hedysarum boreale*	Utah sweetvetch	0.0	0.0	0.0	0.17
LILE3	*Linum lewisii*	Lewis flax	0.0	0.0	0.0	0.10
MAGR2	*Machaeranthera grindelioides*	rayless tansyaster	0.0	0.0	0.0	0.33
MESA	*Medicago sativa*	alfalfa	0.0	0.0	0.0	0.03
PHAC4	*Physaria acutifolia*	common twinpod	0.0	0.0	0.0	0.07
PHHO	*Phlox hoodii*	Hood's phlox	1.3	0.7	2.27	0.87
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.0	0.0	1.14	1.90
TAOF	*Taraxacum officinale*	dandielion	0.0	0.0	0.00	0.03
TRGY	*Trifolium gymnocarpon*	hollyleaf clover	0.0	0.0	0.00	0.07
		Desirable Forb Totals	**1.3**	**0.7**	**3.41**	**4.23**
ARTRW	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush	2.7	0.7	5.68	0.17
ATCA2	*Atriplex canescens*	four-wing saltbush	2.7	0.7	4.55	0.07
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	2.7	0.7	4.55	0.20
GUSA2	*Gutierrezia sarothrae*	broom snakeweed	4.7	0.0	7.95	1.40
		Shrub Totals	**12.8**	**2.1**	**22.73**	**1.84**
		Totals for Invasive and Non-Native Species	**0.0**	**0.0**	**0.00**	
		Vegetation Totals	**54.1**	**11.5**	**100.00**	**6.07**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [3]	
Bare Ground	**32.0**
Biotic Crust	**0.0**
Herbaceous Litter	**44.6**
Woody Litter	**2.0**
Duff	**0.0**
Rock	**2.0**

Table G2 - Canopy Gap Intercept Data Reclaimed Corehole Pad IRI-10					
Canopy Gaps > 20 centimeters	**Total of Gaps > 20 cm**	**Gaps 21-50 cm**	**Gaps 51-100 cm**	**Gaps 101-200 cm**	**Gaps >200 cm**
Transect 1	790	577	213	0	0
Transect 2	1168	533	419	216	0
Transect 3	767	523	244	0	0
Total Gaps (cm)	**2725**	**1633**	**876**	**216**	**0**
% Line in Gaps	**36.33**	**21.77**	**11.68**	**2.88**	**0.00**
Line length for each transect was 25 meters for site total length of 75 meters					

Table G3 - Transect Coordinates and Access Route Photo-point Locations Reclaimed Corehole Pad IRI-10 (Datum: UTM Zone 12, WGS 84)						
Site	Azimuth from starting point (true N)	Transect Starting Point		Transect Ending Point		Length
		Northing (mN)	Easting (mE)	Northing (mN)	Easting (mE)	
Transect 1	210 º	4426682.46	725780.6252	4426659.8	725769.498	25 meters
Transect 2	270 º	4426683.03	725777.5301	4426676.68	725758.1388	25 meters
Transect 3	046 º	4426681.08	725786.651	4426702.65	725798.4089	25 meters
Access Route/Photo-point Location						
Photo-point # 1		4426613.174	725770.966			
Photo-point # 2		4426453.708	725897.45			
Photo-point # 3		4426324.036	726174.143			
Photo-point # 4		4426246.573	726278.195			

Transect Photos and Route Photos

Figure G1 Transect 1 Reclaimed Corehole Pad IRI-10

Figure G2 Transect 2 Reclaimed Corehole Pad IRI-10

Figure G3 Transect 3 Reclaimed Corehole Pad IRI-10

Figure G4 Photo Point 1 - Access Road to Corehole Pad IRI-10

Figure G5 Photo Point 2 - Access Road to Corehole Pad IRI-10

Figure G6 Photo Point 3 - Access Road to Corehole Pad IRI-10

Figure G7 Photo Point 4 - Access Road to Corehole Pad IRI-10

Appendix H – Vegetation Sampling Data Reclaimed Corehole Pad Q

Table H1 - Vegetation Cover, Species Composition, Species Density & Ground Cover Reclaimed Exploration Pad Q						
Plant Species Observed within Study Area			**Line-Point Canopy Intercept Data [1]**			**Density Data [2]**
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	
ACHY	*Achnatherum hymenoides*	Indian ricegrass	5.3	1.3	7.27	
ELLAL	*Elymus lanceolatus*	thickspike wheatgrass	1.3	0.0	1.82	
ELTR7	*Elymus trachycaulus*	slender wheatgrass	6.7	2.7	11.82	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	14.0	3.3	20.91	
LECI4	*Leymus cinereus*	basin wildrye	0.7	0.0	0.91	
NAVI4	*Nassella viridula*	green needlegrass	8.0	2.0	11.82	
PASM	*Pascopyrum smithii*	western wheatgrass	1.3	0.0	1.82	
PSJU3	*Psathyrostachys juncea*	Russian wildrye	1.3	1.3	1.82	
PSSPI	*Pseudoroegneria spicata ssp. inermis*	beardless bluebunch wheatgrass	1.3	0.0	1.82	**Desirable Forb/Shrub Density (#/m^2)**
		Perennial Grass Totals	**39.9**	**10.6**	**60.01**	
ARFR4	*Artemisia frigida*	fringed sage	6.0	0.0	8.18	1.17
ASCO12	*Astragalus convallarius*	lesser-rushy mlkvetch	0.0	0.0	0.0	0.03
CHAL	*Chenopodium album*	lambsquarter	0.0	0.0	0.0	0.07
LILE3	*Linum lewisii*	Lewis flax	0.0	0.0	0.0	0.37
MAGR2	*Machaeranthera grindelioides*	rayless tansyaster	0.0	0.0	0.0	0.07
MACA2	*Machaeranthera canescens*	hoary tansyaster	0.0	0.0	0.0	0.17
MESA	*Medicago sativa*	alfalfa	0.7	0.7	0.91	0.90
PEPA8	*Penstemon palmeri*	Palmer's beardtongue	0.0	0.0	0.0	0.03
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.0	0.0	0.0	1.27
		Desirable Forb Totals	**6.7**	**0.7**	**9.09**	**4.08**
ARTRW	*Artemisia tridentata var . wyomingensis*	Wyoming big sagebrush	2.0	0.0	2.73	0.20
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	4.7	0.0	6.36	0.50
GUSA2	*Gutierrezia sarothrae*	broom Snakeweed	2.0	0.0	6.36	0.77
KRLA2	*Krascheninnikovia lanata*	winterfat	0.7	0.0	0.91	0.13
		Shrub Totals	**9.4**	**0.0**	**16.36**	**1.60**
BRTE	*Bromus tectorum*	cheatgrass	3.3	0.0	8.18	
SATR12	*Salsola tragus*	Russian thistle	4.7	0.0	6.36	
		Totals for Invasive and Non-Native Species	**8.0**	**0.0**	**14.54**	
		Vegetation Totals	**64.0**	**11.3**	**100.0**	**5.68**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.

[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.

[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [3]	
Bare Ground	**17.3**
Biotic Crust	**0.0**
Herbaceous Litter	**53.3**
Woody Litter	**4.7**
Duff	**0.0**
Rock	**0.7**

Table H2 - Canopy Gap Intercept Data Reclaimed Exploration Pad Q					
Canopy Gaps > 20 centimeters	**Total of Gaps > 20 cm**	**Gaps 21-50 cm**	**Gaps 51-100 cm**	**Gaps 101-200 cm**	**Gaps >200 cm**
Transect 1	1102	422	497	183	0
Transect 2	1008	509	150	349	0
Transect 3	1067	274	200	230	363
Total Gaps (cm)	**3177**	**1205**	**847**	**762**	**363**
% Line in Gaps	**42.36**	**16.07**	**11.29**	**10.16**	**4.84**
Line length for each transect was 25 meters for site total length of 75 meters					

Table H3 - Transect Coordinates Reclaimed Exploration Pad Q (Datum: UTM Zone 12, WGS 84)						
	Azimuth from starting point (true N)	Transect Starting Point		Transect Ending Point		
Site		Northing (mN)	Easting (mE)	Northing (mN)	Easting (mE)	Length
Reclaimed Well Pad 5H-1V						
Transect 1	146 º	4425021.08	723527.9977	4425000.07	723542.7245	25 meters
Transect 2	203 º	4425022.41	723520.3477	4425000.59	723511.1536	25 meters
Transect 3	267 º	4425024.64	723520.6243	4425027.58	723495.8239	25 meters

Transect Photos

Figure H1 Transect 1 Reclaimed Corehole Pad Q

Figure H2 Transect 2 Reclaimed Corehole Pad Q

Figure H3 Transect 3 Reclaimed Corehole Pad Q

Appendix I – Vegetation Sampling Data Reclaimed Access Route to Corehole Pad Q

Table I1 - Vegetation Cover, Species Composition, Species Density & Ground Cover Reclaimed Access Route to Pad Q

Plant Species Observed within Study Area			Line-Point Canopy Intercept Data [1]			Density Data [2]
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	**Desirable Forb/Shrub Density (#/m²)**
ACHY	*Achnatherum hymenoides*	Indian ricegrass	30.7	8.0	51.69	
BOGR2	*Bouteloua gracilis*	blue grama	0.0	0.0	1.12	
ELLAL	*Elymus lanceolatus*	thickspike wheatgrass	0.7	0.7	1.12	
ELTR7	*Elymus trachycaulus*	slender wheatgrass	4.0	1.3	10.11	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	1.3	0.0	2.25	
LECI4	*Leymus cinereus*	basin wildrye	0.7	0.0	1.12	
NAVI4	*Nassella viridula*	green needlegrass	0.7	0.0	1.12	
		Perennial Grass Totals	**38.1**	**10.0**	**68.54**	
ARFR4	*Artemisia frigida*	fringed sage	0.7	0.0	1.12	0.23
ASCH	*Astragalus chamaeleuce*	cicada milkvetch	0.0	0.0	0.00	0.10
ASCO12	*Astragalus convallarius*	lesser-rushy mlkvetch	0.7	0.0	2.25	0.03
CIBA	*Cirsium barnebyi*	Barneby's thistle	0.7	0.0	1.12	0.07
CRFL6	*Cryptantha flavoculata*	roughseed cryptanth	0.0	0.0	0.00	0.10
ERCO4	*Erigeron compositus*	cutleaf daisy	0.7	0.0	1.12	0.07
ERLO4	*Eriogonum lonchophyllum*	spearleaf buckwheat	2.0	0.0	3.38	0.20
EUFE	*Euphorbia fendleri*	Fendler spurge	0.0	0.0	0.00	0.10
HEBO	*Hedysarum boreale*	Utah sweetvetch	0.7	0.0	1.12	0.03
LILE3	*Linum lewisii*	Lewis flax	0.0	0.0	0.00	0.10
LUAR3	*Lupinus argenteus*	silvery lupine	2.0	0.0	3.37	0.17
MAGR2	*Machaeranthera grindelioides*	rayless tansyaster	2.0	0.0	3.37	0.67
MUMU2	*Mentzelia multicaulis*	manystem blazingstar	0.0	0.0	0.00	0.27
MESA	*Medicago sativa*	alfalfa	2.7	0.7	4.49	3.40
PEPA8	*Penstemon palmeri*	Palmer's beardtongue	0.0	0.0	0.00	0.07
SPCO	*Sphaeralcea coccinea*	scarlet globemallow	0.0	0.0	0.00	0.13
		Desirable Forb Totals	**12.2**	**0.7**	**21.34**	**5.74**
ARTRW	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush	0.0	0.0	0.00	0.03
ATCA2	*Atriplex canescens*	four-wing saltbush	1.3	0.0	2.25	0.10
ATCO	*Atriplex confertifolia*	shadscale saltbush	0.0	0.0	0.00	0.03
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	1.3	0.0	2.25	0.10
GUSA2	*Gutierrezia sarothrae*	broom Snakeweed	1.3	0.0	3.38	0.33
PUTR2	*Purshia tridentata*	antelope bittrebrush	0.7	0.0	1.12	0.00
TECA2	*Tetradymia canescens*	spineless horsebrush	0.7	0.0	1.12	0.13
		Shrub Totals	**5.3**	**0.0**	**10.12**	**0.72**
SATR12 [3]	*Salsola tragus*	Russian thistle	0.0	0.0	0.0	
		Totals for Invasive and Non-Native Species	**0.0**	**0.0**	**0.0**	
		Vegetation Totals	**55.6**	**10.7**	**100.0**	**6.46**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.

[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.

[3] Plant species not encountered in sampling data but were present within the study area.

[4] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [4]	
Bare Ground	**31.3**
Biotic Crust	**0.0**
Herbaceous Litter	**30.7**
Woody Litter	**2.7**
Duff	**0.0**
Rock	**2.7**

Table I2 - Canopy Gap Intercept Data Reclaimed Access Route to Pad Q					
Canopy Gaps > 20 centimeters	**Total of Gaps > 20 cm**	**Gaps 21-50 cm**	**Gaps 51-100 cm**	**Gaps 101-200 cm**	**Gaps >200 cm**
Transect 1	1076	344	508	224	0
Transect 2	1271	134	599	107	431
Transect 3	1125	238	777	110	0
Total Gaps (cm)	**3472**	**716**	**1884**	**441**	**431**
% Line in Gaps	**46.29**	**9.55**	**25.12**	**5.88**	**5.75**
Line length for each transect was 25 meters for site total length of 75 meters					

Table I 3 - Transect Coordinates Reclaimed Access Route to Pad Q (Datum: UTM Zone 12, WGS 84)						
Site	**Azimuth from starting point (true N)**	**Transect Starting Point**		**Transect Ending Point**		**Length**
		Northing (mN)	**Easting (mE)**	**Northing (mN)**	**Easting (mE)**	
Transect 1	046 º	4424841.8	723154.4117	4424862.94	723162.943	25 meters
Transect 2	067 º	4425070.1	723255.9875	4425086.87	723270.8888	25 meters
Transect 3	160 º	4425143.17	723394.9457	4425120.26	723401.6891	25 meters

Transect Photos

Figure I 1 - Transect 1 Reclaimed Access Route to Corehole Pad Q

Figure I 2 -Transect 2 Reclaimed Access Route to Corehole Pad Q

Figure I 3 Transect 3 Reclaimed Access Route to Corehole Pad Q

Appendix J – Vegetation Sampling Data Reclaimed Corehole Pad U

Table J1 - Vegetation Cover, Species Composition, Species Density & Ground Cover Reclaimed Exploration Corehole Pad U						
Plant Species Observed within Study Area			**Line-Point Canopy Intercept Data [1]**			**Density Data [2]**
Species Symbol	**Scientific Name**	**Common Name**	**% Foliar Cover**	**% Basal Cover**	**Species Composition**	
ACHY	*Achnatherum hymenoides*	Indian ricegrass	1.3	1.3	2.86	
ELTR7	*Elymus trachycaulus*	slender wheatgrass	1.3	0.7	4.29	
HECO26	*Hesperostipa comata*	needle & thread needlegrass	4.0	0.7	8.57	
PASM	*Pascopyrum smithii*	western wheatgrass	7.3	0.0	17.14	**Desirable Forb/Shrub Density (#/m^2)**
POSE	*Poa secunda*	Sandberg bluegrass	0.7	0.0	1.43	
		Perennial Grass Totals	**14.6**	**2.7**	**34.29**	
ARDR4	*Artemisia dracunculus*	tarragon	0.0	0.0	0.00	0.03
CHAL	*Chenopodium album*	lambsquarter	0.7	0.0	1.43	0.00
MESA	*Medicago sativa*	alfalfa	2.0	0.0	4.28	1.93
		Desirable Forb Totals	**2.7**	**0.0**	**5.71**	**1.96**
ARTRT	*Artemisia tridentata var. tridentata*	basin big sagebrush	0.0	0.0	0.0	0.03
CHDE2	*Chrysothamnus depressus*	longflower rabbitbrush	0.7	0.0	1.43	0.03
CHVI8	*Chrysothamnus viscidiflorus*	yellow rabbitbrush	12.0	0.7	25.71	0.77
GUSA2	*Gutierrezia sarothrae*	broom Snakeweed	0.7	0.0	1.4	0.03
SAVE4	*Sarcobatus vermiculatus*	greasewood	4.0	0.0	8.6	0.17
		Shrub Totals	**17.4**	**0.7**	**37.14**	**1.03**
SATR12	*Salsola tragus*	Russian thistle	10.7	0.0	22.86	
		Totals for Invasive and Non-Native Species	**10.7**	**0.0**	**22.86**	
		Vegetation Totals	**45.4**	**3.4**	**100.0**	**2.99**

[1] Sum of data from 3 randomly placed 25 meter transects with 50 sample points collected from each transect. Foliar cover based upon 1st plant species encountered in the canopy at each sample point. Species composition based upon total of all plant species encountered at each sample point.
[2] Sum of density data collected from 10 one-square meter quadrants along each transect. Only desirable forb and shrub densities were recorded based upon reclamation criteria.
[3] Percentages are not cumulative with vegetation totals, rather a measure by layer of ground cover from the top layer thru the lower layers to the soil surface. Values for bare ground have no vegetative, litter or rock cover above the soil surface.

Percent Ground Cover by Cover Type [3]	
Bare Ground	**36.0**
Biotic Crust	**0.0**
Herbaceous Litter	**30.0**
Woody Litter	**6.0**
Duff	**0.0**
Rock	**0.0**

Table J2 - Canopy Gap Intercept Data Reclaimed Exploration Corehole Pad U					
Canopy Gaps > 20 centimeters	**Total of Gaps > 20 cm**	**Gaps 21-50 cm**	**Gaps 51-100 cm**	**Gaps 101-200 cm**	**Gaps >200 cm**
Transect 1	1401	161	894	122	224
Transect 2	1832	125	399	750	558
Transect 3	1906	97	484	458	867
Total Gaps (cm)	**5139**	**383**	**1777**	**1330**	**1649**
% Line in Gaps	**68.52**	**5.11**	**23.69**	**17.73**	**21.99**
Line length for each transect was 25 meters for site total length of 75 meters					

Table J3 - Transect Coordinates Reclaimed Exploration Corehole Pad U (Datum: UTM Zone 12, WGS 84)						
	Azimuth from starting point (true N)	**Transect Starting Point**		**Transect Ending Point**		
Site		**Northing (mN)**	**Easting (mE)**	**Northing (mN)**	**Easting (mE)**	**Length**
Transect 1	160 º	4426867.86	723262.5429	4426844.37	723272.1234	25 meters
Transect 2	100 º	4426875.01	723263.8722	4426876.53	723289.0489	25 meters
Transect 3	014 º	4426874.24	723260.2186	4426898.08	723262.5117	25 meters

Transect Photos

Figure J1 Transect 1 Reclaimed Corehole Pad U

Figure J2 Transect 2 Reclaimed Corehole Pad U

Figure J3 Transect 3 Reclaimed Corehole Pad U