October 20, 2023

Submitted via ePermitting and email (brock.bowles@state.co.us)

Mr. Brock Bowles
Colorado Division of Reclamation, Mining, and
Safety Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

Re: Technical Revision TR-12 to DRMS Permit M-2002-004
Proposed Monitoring Well Installation Work Plan for Groundwater Monitoring

Dear Mr. Bowles:

GCC Rio Grande Inc. (GCC) owns and operates the Pueblo cement plant and associated on-site limestone quarry operations. GCC has prepared the attached Technical Revision (TR) requesting a revision to the DRMS Permit M-2002-004 to install additional groundwater monitoring wells at the facility, as supplemental to the existing compliance groundwater monitoring wells, for improved hydrogeologic characterization and better spatial distribution of groundwater compliance monitoring at the site.

GCC looks forward to working with DRMS to approve and implement this expansion of groundwater monitoring for its Pueblo facility. If you have questions or concerns regarding this submittal, please do not hesitate to contact me at (719) 647-6861.

Sincerely,

Amy Rodrigues
Environmental Engineer
GCC Rio Grande Inc.

Attachment

TECHNICAL REVISION

GCC owns and operates a cement manufacturing plant located in Pueblo. The Pueblo Plant also operates an on-site limestone quarry. The quarry operates under the Mining Permit No. M- 2002-004 issued on August 29, 2003. With this application, GCC is requesting a technical revision to its 112 Permit Application submitted in 2002. Specifically, this TR requests that DRMS review for approval the attached 2024 Monitoring Well Installation Work Plan. The proposed Work Plan describes in detail the monitoring well permitting process and locations, construction specifications, target monitoring intervals, drilling and well installation methodologies, rock and water sampling and documentation protocols during drilling and development, and the contents of the final Monitoring Well Installation Report, to be provided to DRMS upon completion of the program.

ATTACHMENT 1

2024 Monitoring Well Installation Work Plan

WORK PLAN

2024 MONITORING WELL INSTALLATION PROGRAM

GCC RIO GRANDE, INC.
PUEBLO PLANT
PUEBLO, COLORADO

Date:
October 4, 2023

Resource Hydrogeologic Services, Inc.
232 Ute Pass West
Durango, CO 81301
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Email: info@resourcehydrogeologic.com

RESOURCE HYDROGEOLOGIC SERVICES

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PURPOSE

The purpose of the GCC Rio Grande, Inc. Pueblo Plant (GCC or Pueblo Plant) 2024 Monitoring Well Installation Program is to install environmental monitoring wells to address groundwater data gaps to further characterize groundwater quality and quantity in the mined horizon and underburden to support permitting efforts of the Colorado Division of Reclamation, Mining and Safety (CDRMS) under mining permit M2002004. Existing monitoring wells at the Facility were installed in 2008, 2018 and 2021 and focus on the mined Fort Hayes Limestone member of the Niobrara Formation and the underlying Codell Sandstone member of the Carlile Shale Formation and are subject to monitoring requirements as documented in TR-11. The monitoring well installed in 2008 (MW-5) is completed in shallow surficial sediments and has been dry since installation, while all of the other monitoring wells are wet.

The work plan, as detailed in the following section, is to install ten permanent bedrock monitoring wells at five additional locations at the Pueblo Plant to increase the spatial distribution of site water quality monitoring and allow confirmation and refinement of groundwater gradient and flow direction. This basic hydrogeologic characterization effort is expected to support future recommendations towards meeting operational and environmental monitoring goals. The wells, if saturated conditions exist, will also allow future groundwater characterization by slug testing to estimate hydraulic conductivity and storativity parameters.

The primary objective of each permanent monitoring well is to provide a dedicated access point for measuring groundwater levels and to allow the collection of groundwater samples that accurately represent groundwater conditions at the specific point of sampling. To successfully achieve this objective, it is necessary to fulfill the following criteria:

1. Construct each well with minimum disturbance to the geologic formation.
2. Construct each well of materials that are compatible with the anticipated geochemical and chemical environment.
3. Properly complete each well in the desired monitoring zone.
4. Adequately seal each well annulus with materials that will not interfere with the collection of representative water quality samples.
5. Sufficiently develop each well to remove any air or water introduced associated with drilling, allow well filter pack to properly re-sort, and generally ensure unobstructed flow through the well.

In addition to appropriate construction details, each monitoring well must be designed in concert with the overall goals of the monitoring program. Key factors that must be considered include the following, with specific considerations to the Pueblo Plant groundwater monitoring program italicized:

1. Intended purpose of each well – *documentation of groundwater presence, if present then documentation of water level and water quality through quarterly monitoring over time utilizing the approved and current compliance groundwater laboratory suite and methodologies for comparative purposes against existing Pueblo Plant monitoring wells as adopted in the Sampling and Analysis Plan (SAP), per Technical Revision TR-11.*
2. Placement of each well to achieve accurate water levels and/or representative water quality samples – *proper design and installation methods to prevent groundwater from inadvertently migrating to strata above or below the target interval*.
3. Adequate well bore diameter to accommodate appropriate tools for well development, water quality sampling devices, and aquifer testing equipment – *primarily a nominal 2-inch downhole surge block for development and nominal 2-inch environmental sampling bailer or pump as needed*.
4. Surface protection at each well to assure no alteration of the structure or impairment of the data collected from the well – *locking wellhead and bollard posts as shown in the design figures which are the same as all of the existing Pueblo Plant monitoring wells*.

Critical to be completed during this monitoring well installation program is the accurate documentation of the site subsurface geology. The field hydrogeologist from Resource Hydrogeologic Services, Inc. (RHS) shall direct the GCC-contracted drill crew with respect to specific target formation depths and collect and document geologic samples generated by rotary cuttings or core samples as applicable.

WORK PLAN

Work is planned to be conducted by RHS to support the Pueblo Plant monitoring well installations. This will include well design, materials specification, required Colorado Division of Water Resources (CDWR) monitoring well permitting, drilling and completion services contractor solicitation and coordination, underground utility locates/clearance services for drill sites, professional surveying services, as well as project coordination as needed with CDRMS and ongoing Pueblo Plant operations.

MONITORING WELL PERMITTING

RHS, as the authorized agent of GCC, shall submit the appropriate CDWR monitoring well permit applications (GWS-46 forms) for each planned and potential well and obtain the corresponding permits to construct in advance of mobilization for drilling and completion activities. Following the monitoring well installation program, the required CDWR Well Construction and Yield Estimate Reports (GWS-31 forms) shall be submitted by RHS to CDWR within 60 days of completion of each monitoring well, per CDWR regulations.

MONITORING WELL LOCATIONS

The 2024 groundwater monitoring locations have been selected for five areas as shown in **Figure 1**. MW-15, MW-16, MW-17, and MW-18 are upgradient of the reclaimed, operating, and planned mine panels to allow baseline groundwater condition monitoring. MW-19 and MW-20 are sited immediately downgradient of mine panels 5 and 6 in an area sufficiently cross-gradient from previous and current mining to likely represent baseline groundwater conditions for a period of at least several years before mining commences upgradient of those locations. MW-21, MW-22, MW-23, and MW-24 are sited north-northeast and downgradient of all mine panels and the plant. Specifically, MW-23 and MW-24 are downgradient from the reclaimed mine panel 1.

Each new monitoring location shall consist of two wells completed in the two intervals of interest in a tightly spaced straight line "twinned" configuration with surface spacing distance on the order of 20 feet. The orientation shall be at a bearing of approximately 45° in line with formation dip direction with the shallowest well to the southwest (upgradient) and deepest well to the northwest (downgradient).

Locations shall be surveyed by the GCC-contracted professional surveyor in advance of mobilization of the drilling and completion effort. This process will be part of the underground utility clearance, but will also confirm all planned monitoring well locations are inside of the DRMS mine permit boundary and, in the case of the presumed upgradient monitoring well locations, outside of the southwest extent of the mine panels 1, 2, and 3. GCC shall commit to a minimum 300-foot mining setback from this location to prevent future disturbance to monitoring. A follow-up survey of the as-built monitoring wells shall also be conducted, with emphasis on high accuracy elevation in order to allow future reliable plotting of the potentiometric groundwater elevation data across the facility, thus allowing refinement of the groundwater flow direction and gradient.

MONITORING WELL DESIGN

Specifications for the monitoring well designs are included in this Work Plan as **Table 1**. This design follows industry standard practice and is intended to be installation guidance, but the as-built construction will be ultimately determined by the professional judgement of the RHS field hydrogeologist based on site-specific conditions. Well design shall be industry standard 2-inch PVC monitoring wells installed for the purpose of monitoring groundwater level and water quality of the specified intervals identified during drilling and subsurface documentation at the planned monitoring well locations. **Figure 1** shows the planned monitoring well locations. The design for the ten proposed monitoring wells is shown in **Figure 2**.

BOREHOLE DRILLING & MONITORING WELL INSTALLATION

Monitoring well installation specification calls for:

1. Air rotary (with minimal potable water injection) drill 6-3/8-inch hole (bit size to 7-inch range ok) hole from surface through Fort Hayes Limestone at the subject location. Temporary casing will be required to hold back as much as 20 feet of dry, unconsolidated sediments based on previous site-specific experience. Drilling contractor shall collect 5-foot interval cuttings grab samples and set aside per direction by the RHS field hydrogeologist for review and documentation from surface through total depth at each borehole. Hollow-stem auger drilling through the unconsolidated colluvium until bedrock refusal is acceptable to effectively set temporary casing through this interval provided that the auger inner diameter allows the bedrock borehole diameter to create a minimum 2-inch annulus between the borehole wall and the screen/casing per 2 CCR 402-2 State of Colorado Water Well Construction Rules, which for this project utilizing nominal 2-inch schedule 40 screen and casing is 6-3/8-inches. Air lift production test sending produced water through the side discharge blooey line from an appropriate drill rod pack-off wellhead assembly connected to the temporary surface casing to determine Fort Hayes flow rate via portable flume or bucket-and-stopwatch method. RHS will also collect field water quality parameters from the discharged water at this time. All drilling make-up and produced water shall be discharged to the ground or a small infiltration pit as the site conditions warrant. For the five (5) Fort Hayes monitoring wells, borehole drilling is now complete so move to step 3 below.
2. Air rotary (with minimal potable water injection) advance 6-3/8-inch to 7-inch borehole from base of Fort Hayes Limestone into Codell Sandstone until either penetrating significant additional groundwater in the Codell or otherwise through the entire Codell Sandstone Member (expected thickness 10-30 feet). Again, the drilling contractor shall collect 5-foot interval cuttings grab samples and set aside per direction by the RHS field hydrogeologist for review and documentation from surface through total depth at each borehole. Air lift production test sending produced water through the side discharge blooey line from an appropriate drill rod pack-off wellhead assembly connected to the temporary surface casing to determine Fort Hayes flow rate via portable flume or bucket-and-stopwatch method. RHS will again collect field water quality parameters from the discharged water at this time.
3. Hang in tension from appropriate threaded installation plug or clamp 2-inch schedule 40 PVC environmental flush joint screen (0.020-inch factory-machined slot) from total depth to near top of either Fort Hayes or Codell, as appropriate for the location. Blank flush joint 2-inch schedule 40 PVC shall extend from the top of screen section to 2-1/2 feet above ground surface. Stainless steel bow spring environmental centralizers shall be placed at the bottom and top of each screen section and then every 20 feet to surface. All tubulars and centralizers shall arrive to site new, bagged and boxed.
4. Complete by 10-20 silica sand pack from total borehole depth to 3 feet above the top of screen section via tremie pipe, with continuous depth tagging utilizing an appropriate non-stretching depth tagger tape incremented in 1/100^{ths} feet, such as a Solinst Model 103, to the level specified by the RHS hydrogeologist. Bentonite seal shall be accomplished by pouring one 5-gallon pail of

¼-inch or 3/8-inch coated bentonite pellets via surface pour, hydrating with potable water as necessary if the hole is not holding water at this depth. Continuous depth tagging shall be employed to ensure pellet bridging does not occur. The remaining annular seal up to ground surface shall be placed by mixing bentonite grout as 30% solids with density 10.2 pounds/gallon with potable water (available onsite) and pumping it through tremie pipe to depth. RHS shall provide quality assurance of the grout density during grouting operations by periodic measurements utilizing an industry-standard mud balance. Withdraw temporary casing before grouting the uppermost annulus. The exception is for MW-15, MW-17, and MW-19, which have short annular seals, projected at 12-foot lengths. These annular seals may be installed with 3/8" bentonite chips, hydrated with potable water as placed.

5. Confirm wellbore is open and clear with no significant deviation from surface to total depth by drifting wellbore with a Proactive stainless steel Sample Champ XL pump (provided by GCC), with dimensions 1.82-inch diameter by 7-1/2-inch length. This is the pump that is specified for post-development installation at all monitoring wells in the 2024 Monitoring Well Installation Program, which is also the nominal diameter of the surge block to be used for all well developments, as described in the following section. Failure to successfully drift the pump to total depth shall indicate a failed completion and will require plugging and abandonment of the wellbore by surface pour of 3/8" bentonite chips (i.e., Baroid Hole Plug) from total depth to surface, hydrating with potable water as it is added. Blank casing extending above ground surface shall be cut approximately 1 foot below grade and buried. The replacement well, to be constructed to the same original specifications, shall be located approximately 20 feet away per direction of the RHS site hydrogeologist and installed as soon as practically possible.
6. Install appropriate 5-foot length by 4-inch square or round locking environmental monitoring well head protector set in 3 feet by 3 feet by 4-inch-thick cement pad with 4-inch X 6-foot steel pipe protective bollards cemented in-place offset at each pad corner. Each wellhead shall be clearly labeled by the well name welded on the top cap prior to arriving onsite. The well names are MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23, and MW-24.

Figure 2 shows the schematic of the planned monitoring wells. **Table 1** lists the specifications and materials quantity estimates. The lithologic log and well completion diagrams for two representative existing monitoring wells (MW-11 and MW-12) are included here for general site lithology reference as **Figures 3 and 4**. Examples of representative monitoring well surface completions are shown as **Figure 5**.

MONITORING WELL DEVELOPMENT

For wells where groundwater presents in the completed well, well development will be conducted by RHS no sooner than 48 hours following curing of annular bentonite seals and surface cement pad. However, the most likely wait period will be on the order of one to two weeks following well installation as

experience with installation of wells MW-8 through MW-14 has indicated days to weeks are required for groundwater to present in newly constructed Fort Hayes and Codell monitoring wells. These developments may be batched as appropriate to minimize mobilization/standby time. Standard monitoring well development procedures shall be followed utilizing nominal 2-inch surge block with foot valve driven by an inertial pump (Waterra Hydrolift II) on new HDPE tubing to remove fines and properly distribute the annular filter pack. A new disposable bailer and cord may be used in conjunction with this method depending on the well production rate. Water quality field parameters shall be monitored by the RHS field hydrogeologist during this process with emphasis in monitoring and reduction of turbidity over time as fines generated during the drilling process are removed through the wellbore. It is generally expected that well development operations may take on the order of one continuous hour surging per 5-foot screen length, but development shall continue until turbidity, pH, and specific conductance have reached relative stabilization and produced development water is in excess of 5 wellbore volumes at each well, provided the well will yield groundwater at a rate great enough to sustain development production.

MONITORING WELL DOCUMENTATION

RHS shall prepare complete documentation of the monitoring well installation activities in technical memorandum or report format for submittal to GCC and subsequently CDRMS including the following:

1. Description of all monitoring well drilling and completion methodologies for each constructed monitoring well.
    a. Description of any produced water during drilling, including flow rates and field water quality parameters (temperature, pH, specific conductance) with corresponding depth/formation documentation.
    b. Lithology logs documenting cuttings/core sample by industry-standard descriptions.
    c. Industry-standard as-built well completion diagrams.
    d. Table of all as-built monitoring well construction information, including survey data.
    e. As-built location site map.
2. Well development methodology and results including field parameters (temperature, pH, specific conductance, turbidity).
3. Photos of all as-built twinned monitoring well locations.

Additionally, as noted in the Monitoring Well Permitting section above, the appropriate CDWR GWS-31 Well Construction and Yield Test Reports shall also be completed and submitted for each monitoring well to CDWR within 60 days of construction, per CDWR regulations.

TABLE

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Table 1. Proposed Monitoring Well Specifications (Construction Guidelines)

GCC Rio Grande Pueblo Plant 2024 Monitoring Well Specifications

Wells	Completion Target	Well Type	Well Diameter (inches)	Estimated Drilling & Completion Total Depth (ftbgs)	Estimated Screen Interval Depth (ftbgs)	Estimated Total Blank Casing Length (ft)	Estimated Total Screen Length (ft)	Screen Slot Size (inches)	Silica Sand Filter Pack Size	Estimated Silica Sand Filter Pack Length (ft)	Estimated Bentonite Pellet Seal Length (ft)	Estimated Annular Grout Seal Length (ft)	Estimated Annular 3/8" Chip Bentonite Seal Length (ft)	Estimated Number of Casing Centralizers
MW-15	Fort Hayes Limestone	Bedrock Monitoring Well	2	45	15-45	18	30	0.02	10-20	33	5	NA	12	4
MW-16	Codell Sandstone	Bedrock Monitoring Well	2	70	50-70	53	20	0.02	10-20	23	5	47	NA	6
MW-17	Fort Hayes Limestone	Bedrock Monitoring Well	2	45	15-45	18	30	0.02	10-20	33	5	NA	12	4
MW-18	Codell Sandstone	Bedrock Monitoring Well	2	70	50-70	53	20	0.02	10-20	23	5	47	NA	6
MW-19	Fort Hayes Limestone	Bedrock Monitoring Well	2	70	30-70	33	40	0.02	10-20	43	5	NA	27	6
MW-20	Codell Sandstone	Bedrock Monitoring Well	2	95	75-95	78	20	0.02	10-20	23	5	72	NA	7
MW-21	Fort Hayes Limestone	Bedrock Monitoring Well	2	120	80-120	83	40	0.02	10-20	43	5	77	NA	8
MW-22	Codell Sandstone	Bedrock Monitoring Well	2	145	125-145	128	20	0.02	10-20	23	5	122	NA	9
MW-23	Fort Hayes Limestone	Bedrock Monitoring Well	2	90	50-90	53	40	0.02	10-20	43	5	47	NA	7
MW-24	Codell Sandstone	Bedrock Monitoring Well	2	115	95-115	98	20	0.02	10-20	23	5	92	NA	8
		Estimated Project Totals		**865**	**NA**	**610**	**280**	**NA**	**NA**	**310**	**50**	**504**	**NA**	**63**

Detailed Specifications - Bedrock Monitoring Wells

Drilling by air rotary with 5' cuttings samples staged for hydrogeologist documentation
3/8" bentonite chips set at bottom of hole (poured) for any incidental/exploratory over-drill past target well screen interval (have 10 extra bags Hole Plug)
PVC environmental well casing to be schedule 40, flush-joint threaded, 10' length pieces, with surface stickups of 2.50'
PVC environmental screen to be schedule 40, 0.020" machined slot, flush-joint threaded, 5' and 10' length pieces
PVC environmental well casing end cap, flush-joint threaded installed at bottom of well
SS bow centralizers to be installed on top & bottom of screen and on casing every 20' to surface
Filter pack to be monitoring well silica sand size 10-20, installed via tremie pipe, depth tagging as installed
Bentonite seal to be 1/4" or 3/8" bentonite pellets (5-gal pail), hydrated at time of installation with potable water
Annular seal to be 100% powdered bentonite grout (i.e. Envirogrout or similar) mixed with potable water to 30% solids with 10.2 lb/gallon density and pumped through tremie pipe
Annular seal for lengths ≤30 feet to be 3/8" bentonite chips installed by surface pour, hydrated at time of installation with potable water
4" X 5' lockable steel well protector installed with "MW-15", "MW-16", "MW-17", "MW-18", "MW-19", "MW-20", "MW-21", "MW-22", "MW-23", "MW-24" well ID welded to lid, painted hi-vis yellow
3' X 3' X 4" concrete wellhead pad with (4) 4" X 6' steel protective posts cemented in place at each corner, 3' stick-up, painted hi-vis yellow
Standard 2" PVC slip cap provided for top of 2" casing

General Project Specifications

Environmental monitoring well installations - standard pre-job rig & drill pipe decontamination required, but no de-con between locations
Environmental grade thread compounds to be NSF 60 certified (i.e. Jet-Lube Eco-Safe or Bullseye) - no metallic or petroleum compounds on drill pipe or well materials
All well installation materials (casing, screen, centralizers, filter pack, bentonite, dope) to meet NSF 60 certification
All PVC well screen/casing materials to be provided new and factory boxed/bagged to site, handling with new cotton/nitrile gloves only

FIGURES

Figure 1. Location map.

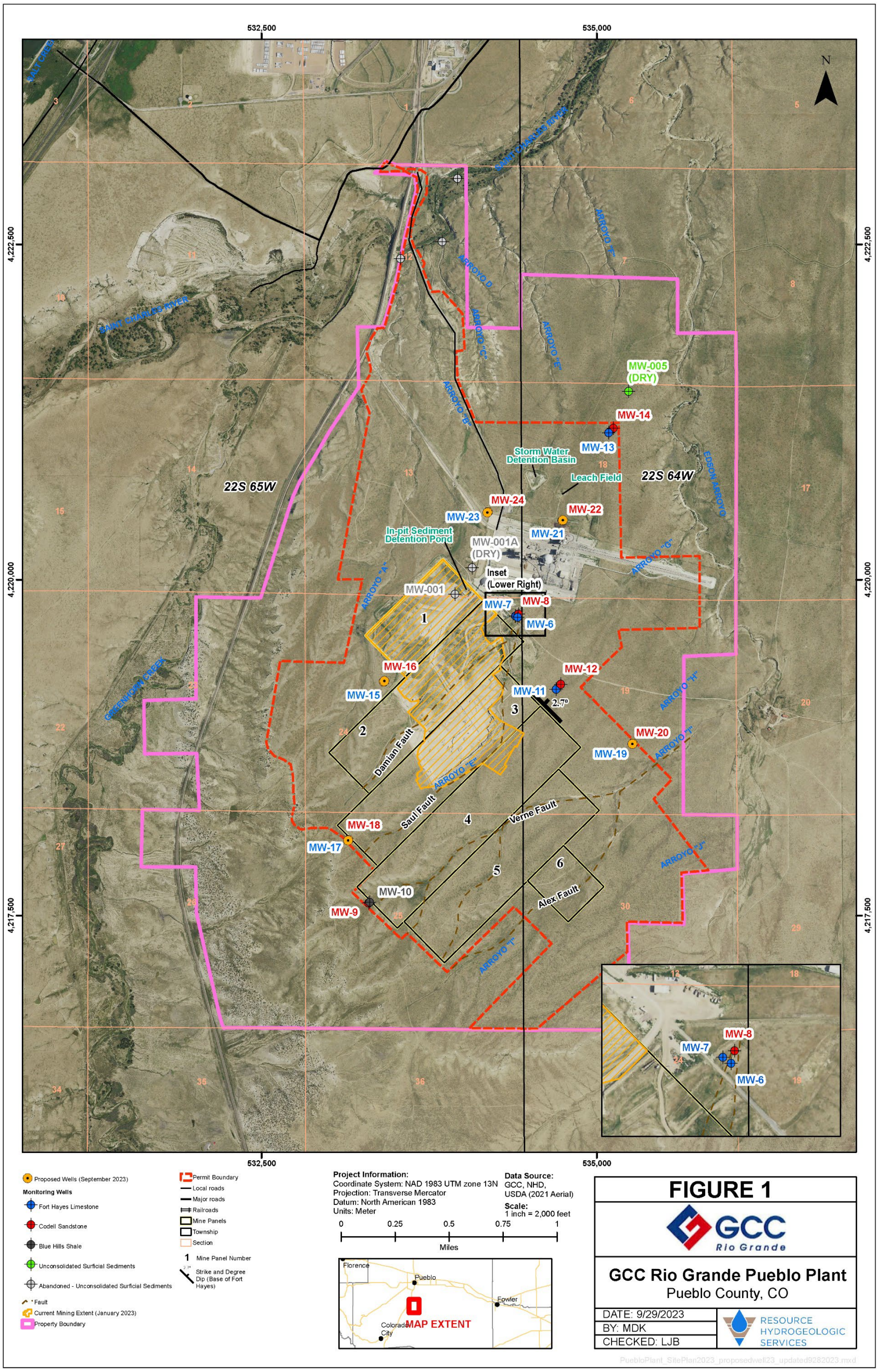

Figure 2. Monitoring well design schematic for the 2024 Monitoring Well Installation Program.

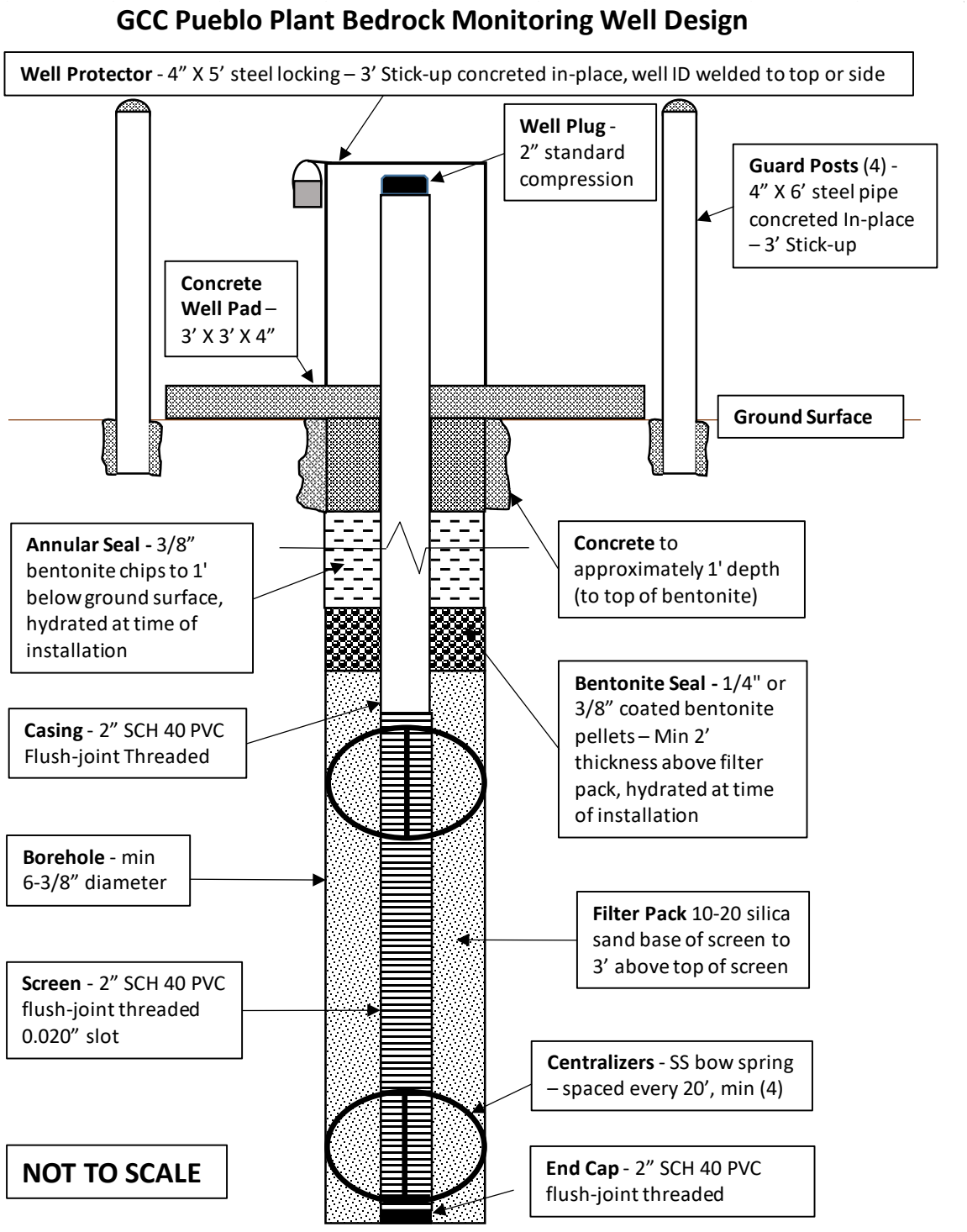

Figure 3. MW-11 boring log & well installation diagram – typical Fort Hayes Limestone

RESOURCE HYDROGEOLOGIC SERVICES

	PROJECT: **GCC RIO GRANDE PUEBLO PLANT**	BORING ID: **MW-11**	
	LOCATION: **PUEBLO COUNTY, COLORADO**	WELL ID: **MW-11**	
	DRILLING CONTRACTOR: **HRL COMPLIANCE SOLUTIONS**	NORTHING (UTM NAD 83): **534405.4851**	EASTING (UTM NAD 83): **4219710.5297**
	DRILLING EQUIPMENT: **DIEDRICH D-90**	GROUND SURFACE ELEV.: **5082.09 FT AMSL**	TOC PVC ELEVATION: **5084.30 FT AMSL**
	DRILLING METHOD: **HOLLOW-STEM AUGER TO ROTARY AIR HAMMER**	TOTAL WELL DEPTH: **70.0 FT BGS**	DEPTH TO WATER: **52.76 FT BGS**
LOGGED BY: **LJB**	SAMPLING METHOD: **5' INTERVAL ROTARY CUTTINGS GRAB SAMPLES**	DATE STARTED: **24 AUGUST 2021**	DATE COMPLETED: **26 AUGUST 2021**

Depth (ft bgs)	Graphic Log	Description	Depth (ft bgs)	Well Construction
-5			-5	Wellhead Protector 4" square steel: locking
0			0	3' x 3' X 0.3' concrete well pad
5		SILT - moderate yellowish brown (10YR5/4), dry/loose eolian deposit, sandy, very fine, well-sorted.	5	Casing: 2" SCH 40 PVC; TFJ; -2.5'-39.6'
10		SILT w/GRAVEL - same as 0'-9' with coarse limestone gravel up to 1", dry, sub-angular, weathered to hard, poorly sorted, coarsening upwards.	10	Centralizer: SS bow-spring type
15		GRAVEL - light gray (N7), dry, limestone up to 1-1/2" diameter, subangular, well-sorted.	15	
20			20	
25			25	Annular Seal: 3/8" bentonite chips; 0'-30.0'
30			30	Bentonite Seal: Wyo-Ben ENVIROPLUG 3/8" coated bentonite pellets; 30.0'-36.6'
35		LIMESTONE - light gray (N7), dry, hard, with thin dark gray (N3), dry, calcareous shale interbeds.	35	
40			40	
45			45	Filter Pack: Colorado silica sand 10-20; 36.6'-70.6'
50			50	
		SHALE - dark gray (N3), medium hard, dry.		
55			55	Screen: 2" SCH 40 PVC; TFJ; 0.020" slot; 39.6'-69.6'
60		LIMESTONE - light gray (N7), dry, hard, with thin dark gray (N3), dry, calcareous shale interbeds.	60	
65			65	
70			70	End Cap: 2" SCH 40 PVC; TFJ; 69.6'-69.9'
		SHALE - black (N1), carbonaceous, dry, soft to medium hard.		

NOTES: Centralizers placed at 9', 19', 39', 49', 59', 69'. Dry drilling method, well dry upon completion with water coming in after approximately 1 week. All bentonite hydrated with potable water. Well developed with Waterra Hydrolift 2 inertial pump & surge block on new poly tubing on 11/7/2021.

Figure 4. MW-12 boring log & well installation diagram – typical Codell Sandstone

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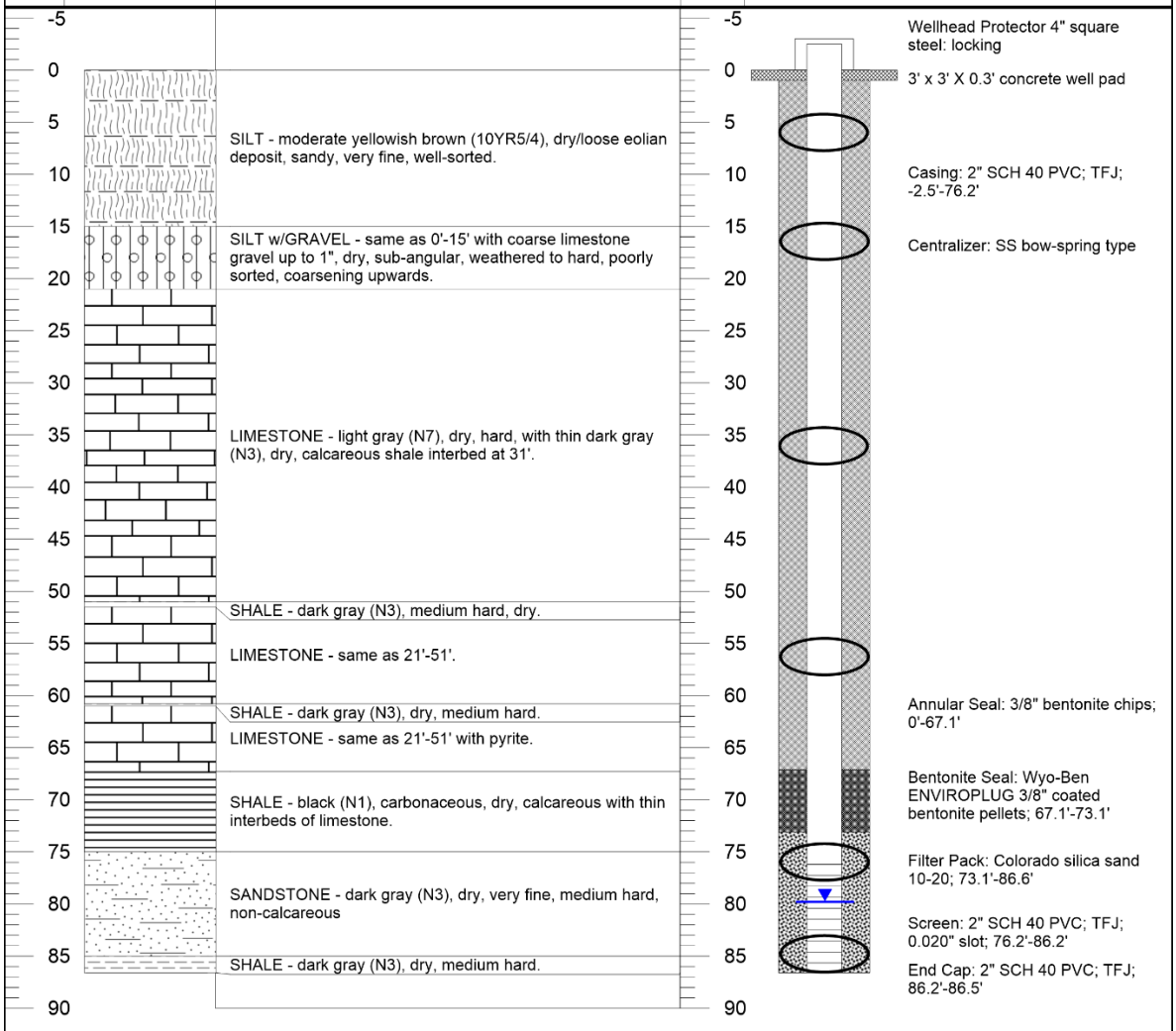
	PROJECT: **GCC RIO GRANDE PUEBLO PLANT**	BORING ID: **MW-12**	
	LOCATION: **PUEBLO COUNTY, COLORADO**	WELL ID: **MW-12**	
	DRILLING CONTRACTOR: **HRL COMPLIANCE SOLUTIONS**	NORTHING (UTM NAD 83): **534407.9271**	EASTING (UTM NAD 83): **4219719.2092**
	DRILLING EQUIPMENT: **DIEDRICH D-90**	GROUND SURFACE ELEV.: **5081.64 FT AMSL**	TOC PVC ELEVATION: **5083.94 FT AMSL**
	DRILLING METHOD: **HOLLOW-STEM AUGER TO ROTARY AIR HAMMER**	TOTAL WELL DEPTH: **86.5 FT BGS**	DEPTH TO WATER: **79.79 FT BGS**
LOGGED BY: **LJB**	SAMPLING METHOD: **5' INTERVAL ROTARY CUTTINGS GRAB SAMPLES**	DATE STARTED: **22 AUGUST 2021**	DATE COMPLETED: **26 AUGUST 2021**



NOTES: Centralizers placed at 6',16', 36', 56', 76', 86'. Dry drilling method, well dry upon completion with water coming in after approximately 1 week. All bentonite hydrated with potable water. Well developed with Waterra Hydrolift 2 inertial pump & surge block on new poly tubing on 11/7/2021.

Figure 5. Typical as-built twinned monitoring wells, MW-9 & MW-10 upper photo, MW-13 & MW-14 lower photo, both looking north-northeast. (TR-08 2021 Monitoring Well Installation Program)