DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF, G-9
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

September 18, 2023

Army Environmental Division - BRAC Operations Branch

Mr. Ricardo Maestas
Acting Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

RE: Letter Report for Downhole Video Inspection for Well BGMW08, Fort Wingate Depot Activity, McKinley County, New Mexico. EPA# NM6213820974

Dear Mr. Maestas:

This letter describes the investigation of the integrity of well BGMW08 as required in the Approval Letter, Letter Work Plan for Downhole Video Inspection for Well BGMW08, from the New Mexico Environment Department (NMED), dated May 10, 2023, HWB-FWDA-23-002. This letter report provides a general description of the activities conducted in the completion of this task, a summary of the video inspection, and a presentation of the findings of well conditions as determined from the video inspection.

BACKGROUND INFORMATION

Groundwater monitoring well BGMW08 was installed and developed in March of 2018. The well is located within the Northern Area of Fort Wingate Deport Activity, north of the former Workshop Area and east of the former Administration Area (see Attachment 1, Figures 1 and 2). The well was installed in the bedrock aquifer at a total depth of 185 feet below the ground surface and constructed of a 2-inch diameter, schedule 40, polyvinyl chloride (PVC) casing and screen. It was installed with 20 feet of 0.010-inch-wide slotted screen. Solid PVC casing (blank) was placed above the screened interval to the surface. Based on historical data, well BGMW08 has had consistently low yield, and lack of recharge following purging, causing difficulty in obtaining groundwater samples during semi-annual sampling events conducted since April 2019. A boring log of the well, showing subsurface lithology and well construction details, is presented in Attachment 2.

OBJECTIVES

The primary objective of this investigation was to perform a video inspection of well BGMW08 to assess the integrity of the casing and screen interval regarding historically low yield in the well. The fieldwork was conducted in accordance with the Department of the Army letter work plan, dated December 28, 2022.

NARRATIVE OF WORK ACTIVITIES

Eco & Associates, Inc. contracted Southwest Exploration Services, LLC (Southwest) to perform the video inspection. The inspection was conducted on July 11, 2023. Southwest used a 1.75-inch diameter camera with a downward view, side-scan, and zoom capabilities. The camera

assembly contained lighting to provide illumination of both downward and side views. The camera depth was measured directly from the cable spool and this data is superimposed on the video file. The top of the well casing was used as the zero point for the depth measurement. The video camera was lowered at a rate of approximately 10 feet per minute. A photo log illustrating the wellhead, downhole camera, and camera pulley system can be found in Attachment 3. A compact disc containing the video inspection is provided in Attachment 4.

OBSERVATIONS AND FINDINGS

Observations made from the downhole video inspection of well BGMW08 are summarized as follows:

- Blank casing between the top of the well and the top of the screened interval was installed in 10-foot sections and is intact.

- Groundwater was first encountered just below the top of the screen at approximately 166 feet below the top of the casing. Screen perforations appeared intact and unimpeded.

This video inspection showed no indications of holes or blockage throughout the entire well length. The groundwater level observed was consistent with the slow recharge rate observed between monitoring events, conducted since April 2019.

Obstructions or deformities are not present in any section of the blank casing, connecting threads, or screen interval relevant to the historically low yield in the well.

If you have questions or require further information, please contact me at George.h.cushman.civ@army.mil, 703-455-3234 (Temporary Home Office, preferred) or 703-608-2245 (Mobile).

Sincerely,

George H. Cushman IV

George H. Cushman IV
BRAC Environmental Coordinator
Fort Wingate Depot Activity
BRAC Operations Branch
Environmental Division

Enclosures

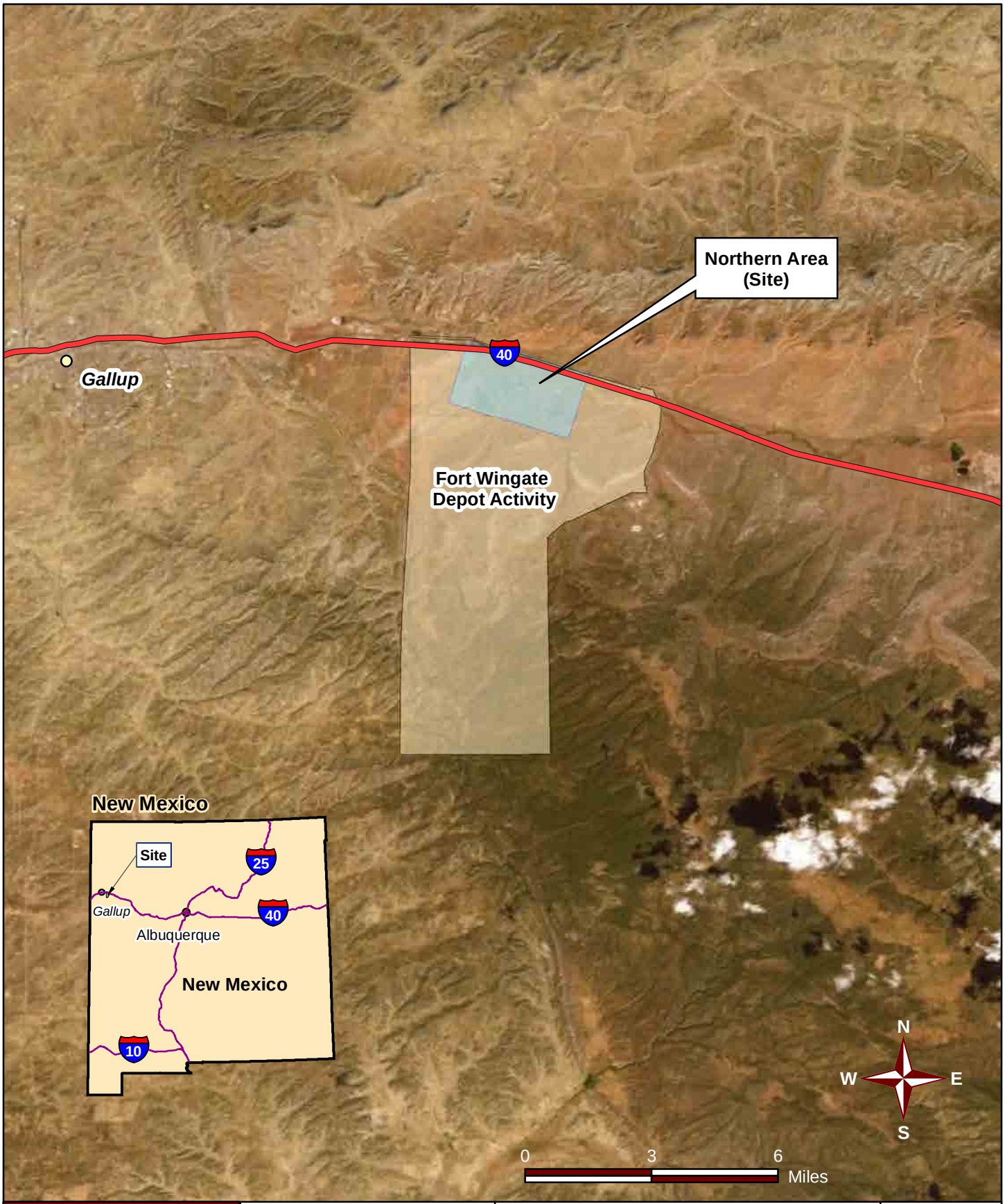
Attachment 1- Figures
Attachment 2- BGMW08 Boring Log and Well Completion Detail
Attachment 3- Field Photographs
Attachment 4- Video File (CD Only)

CF:

Dave Cobrain, NMED, HWB
Ben Wear, NMED, HWB
Michiya Suzuki, NMED, HWB
Dale Thrush, U.S. EPA Region 6
Laurie King, U.S. EPA Region 6
Ian Thomas, BRAC Ops
Alan Soicher, USACE
Ben Moayyad, USACE
Mike Hernandez, USACE
George Padilla, BIA/NRO/DECSM
Valdis Neha, BIA SW
Sharlene Begay-Platero, Navajo Nation/IDR
Timothy Trimble, Zuni Tribe
Rebekah Krispinsky, DOI SW
Admin Record, NM / Ohio

ATTACHMENT 1

FIGURES



Eco & Associates, Inc.
Environmental & Construction Services

Eco & Associates, Inc.
18231 Irvine Boulevard, Ste 204
Tustin, CA 92780

Phone: 714.289.0995 Fax: 714.289.0965

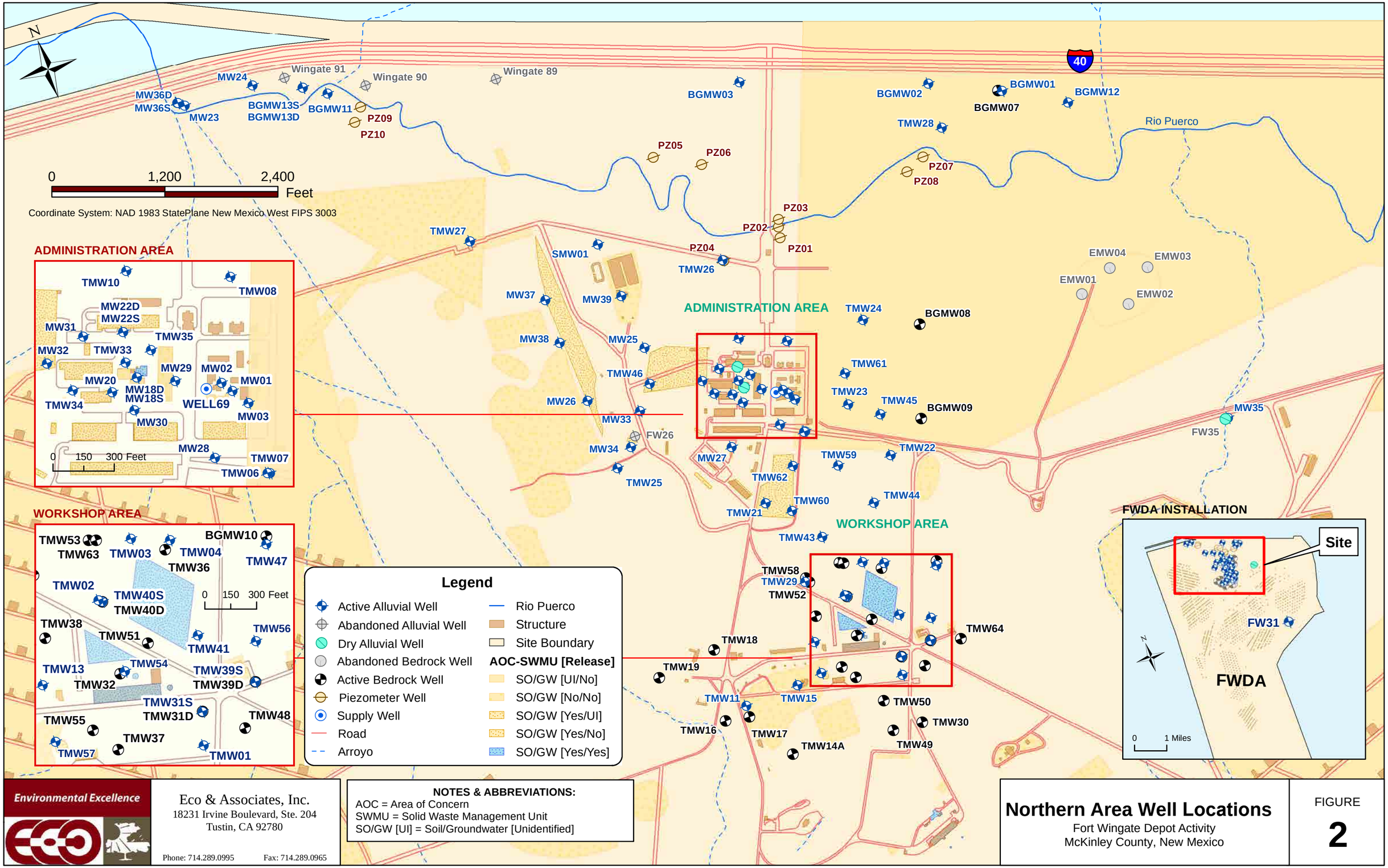
SITE LOCATION MAP

Fort Wingate Depot Activity
McKinley County, New Mexico

FIGURE
1

Updated on: 10/6/2020

Project No.: Eco-18-1237



Environmental Excellence

Eco & Associates, Inc.
18231 Irvine Boulevard, Ste. 204
Tustin, CA 92780
Phone: 714.289.0995 Fax: 714.289.0965

NOTES & ABBREVIATIONS:
AOC = Area of Concern
SWMU = Solid Waste Management Unit
SO/GW [UI] = Soil/Groundwater [Unidentified]

Northern Area Well Locations

Fort Wingate Depot Activity
McKinley County, New Mexico

FIGURE
2

Updated on: 2/23/2023

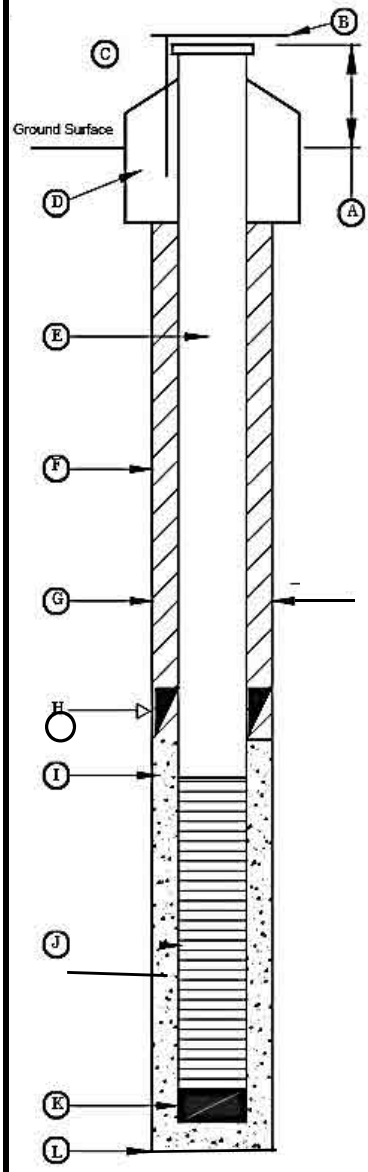
Project No.: Eco-18-1237

ATTACHMENT 2

BGMW08 BORING LOG AND WELL COMPLETION DETAIL

Project Name: FWDA US01027	Location: BGMW08	Logger: MB	Well ID: BGMW08
Driller: YellowJacket	Well Depth: 185	Water Level ATD: 178.60'	
Start Date: 3/10/2018	End Date: 3/12/2018	Elevation: 6685.02' TOC	

Screened Monitoring Well Completion Detail



A.	Stick up Length:	2'	Coordinate System:	NM State Plane West
B.	Key Number:	Master	Northing:	1643942.73
C.	Protective Casing:		Easting:	2500318.10
	Diameter:	8"	Method of Drilling:	Sonic
	Material:	Steel	Well Type:	Monitoring Well
	Length:	5'	Pump Information:	NA
	Depth to Bottom:	2'	Date Installed:	NA
D.	Surface Completion:		Manufacturer:	NA
	Dimensions:	4x4'	Type:	NA
	Depth:	6"	Model Number:	NA
	Material:	Concrete	Volts:	NA
E.	Well Casing Data:		Horse Power:	NA
	Diameter:	2"	Capacity:	NA
	Material:	PVC sch40	Depth of Pump Intake Setting:	NA
	Length:	187'	Number of Stages:	NA
	Depth to Bottom:	185'	Power Source:	NA
F.	Grout Type:	QUIK GROUT	Material of Drop Pipe:	NA
	Depth to Top:	0'	Other:	NA
	Depth to Bottom:	163'	Volumes:	
	Material:	sodium based bentonite	Bag of sand:	7.5
	Method of Installation:	Tremie pipe	Bag of grout:	3
	Depth to Cement in Casing:	158'	Comments:	
G.	Borehole Diameter:	6"		
H.	Type of Seal:	Bentonite chips		
	Quantity:	5'		
I.	Type of Filter Pack:	colorado silica sand		
	Quantity:	23'		
	Size:	10/20	1 foot of sand @ bottom, filter from 163-186	
J.	Screen:			
	Depth to Top:	165'	Well Location Sketch:	
	Depth to Bottom:	185'		
	Material:	PVC SCH40		
	Slot Size:	0.01		
	Method of Installation:	Machined		
K.	Bottom Cap:			
	Material:	PVC		
	Length:	4"		
L.	Boring Depth:	186'		

Sundance Consulting Inc.

Fort Wingate Depot Activity
Project US-01027

Date Started	: 3/10/2018
Date Completed	: 3/12/2018
Hole Diameter	: 6"
Drilling Method	: Sonic
Logged By	: McKenze Booth
Drilling Company	: Yellow Jacket
Northing Coord.	: 1643942.73
Easting Coord.	: 2500318.10
Elevation (amsl)	: 6685.02
Total Depth	: 186ft btoc

BORING LOG: BGMW08

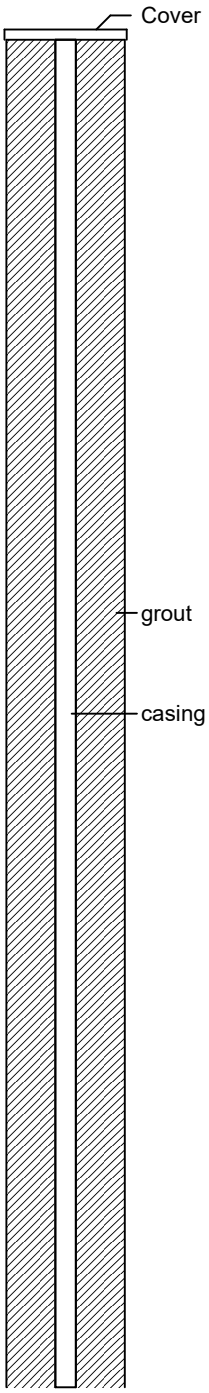
Monitoring Well Details:

Casing Type	: PVC schedule-40
Screen Size	: 0.01"
Seal Type	: bentonite chips
Sand Pack Type	: Colorado silica 10/20

Sample Legend: Sample; Submitted to Lab

Water Levels: During Drilling; After Completion

Depth in Feet	USCS	DESCRIPTION	% Recovery
0	CL	SILTY CLAY, dry, very fine grained, 2.5 YR 4/8	
5	CL	SANDY CLAY, dry & crumbly, 2.5 YR 4/8	100
	SP	SAND, fine grained, traces of gravel, 2.5 YR 4/8	
10	CL	CLAY, dry & crumbly, friable 2.5 YR 4/8	100
15			
20	SC	CLAYEY SAND, dry, 2.5 YR 4/8	100
	CL	CLAYSTONE, slightly moist, some sand, 2.5 YR 4/8	
25	GP	SANDY GRAVEL, dry, 10 R 3/4	
	SC	CLAYEY SANDSTONE, with white streaks, dry, 10 R 3/4	
	SW	SAND, coarse grained, very moist, very loose, non plastic, 10 R 3/4	100
	SM	SAND, medium grained,very loose, some silt, dry, 10 R 3/4	
30	SW	SANDSTONE, dense, dry, 10 R 3/4	
	SC	CLAYEY SANDSTONE, moist, non cohesive, 10 R 3/4	
	SP	GRAVELY SAND, dry, with petrified wood, 10 R 3/4	100
	SC	CLAYEY SANDSTONE, dry, non cohesive, medium to coarse grained, 10 R 3/4	
35			



Sundance Consulting Inc.

Fort Wingate Depot Activity
Project US-01027

Date Started	: 3/10/2018
Date Completed	: 3/12/2018
Hole Diameter	: 6"
Drilling Method	: Sonic
Logged By	: McKenze Booth
Drilling Company	: Yellow Jacket
Northing Coord.	: 1643942.73
Easting Coord.	: 2500318.10
Elevation (amsl)	: 6685.02
Total Depth	: 186ft btoc

BORING LOG: BGMW08

Monitoring Well Details:

Casing Type	: PVC schedule-40
Screen Size	: 0.01"
Seal Type	: bentonite chips
Sand Pack Type	: Colorado silica 10/20

Sample Legend: Sample; Submitted to Lab

Water Levels: During Drilling; After Completion

Depth in Feet	USCS	DESCRIPTION	% Recovery
35	SC		100
	CL	CLAYSTONE, some sand, moist, dense, non plastic, 7.5 R 2.5/4	
	SP	GRAVELY SAND, dry, coarse grained, yellow/white nodules, 10 R 3/4	100
40	SC	CLAYEY SAND, moist, fine to medium grained, 10 R 3/4	
	SP	GRAVELY SAND, dry, very loose, 10R 4/6	100
45	SP	GRAVELY SAND, dry, very loose, 10 R 7/2	
		CLAYEY SANDSTONE, fine grained, dry, dense, non plastic, with white streaking, 7.5 R 3/4	100
50			
		CLAYEY SANDSTONE, fine grained, dry, dense, non plastic, with white streaking, green/white nodules, irregular shaped, damp at 57ft btoc, 7.5 R 3/4	100
55			
60			100
65			100
70			

Well ID: BGMW08

grout

casing

Depth in Feet

Sundance Consulting Inc.

Fort Wingate Depot Activity
Project US-01027

Date Started	: 3/10/2018
Date Completed	: 3/12/2018
Hole Diameter	: 6"
Drilling Method	: Sonic
Logged By	: McKenze Booth
Drilling Company	: Yellow Jacket
Northing Coord.	: 1643942.73
Easting Coord.	: 2500318.10
Elevation (amsl)	: 6685.02
Total Depth	: 186ft btoc

BORING LOG: BGMW08

Monitoring Well Details:

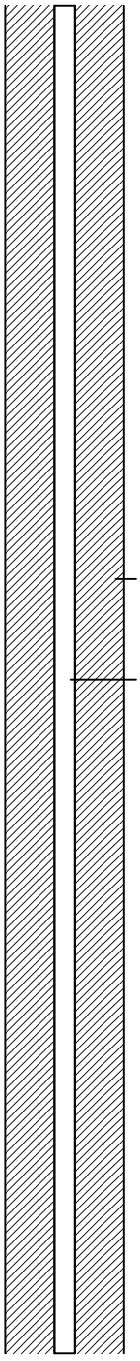
Casing Type	: PVC schedule-40
Screen Size	: 0.01"
Seal Type	: bentonite chips
Sand Pack Type	: Colorado silica 10/20

Sample Legend
- Sample
- Submitted to Lab

Water Levels
- During Drilling
- After Completion

Depth in Feet	Water Level	USCS	GRAPHIC	DESCRIPTION	% Recovery
70					
75				CLAYSTONE, some very fine sand, green/white nodules 2-4mm, medium plastic when wet, dry, 7.5 R 3/4	100
80					100
85					
90					100
95					
100					100
105					

Well ID: BGMW08



Depth in Feet: 70, 75, 80, 85, 90, 95, 100, 105

Sundance Consulting Inc.

Fort Wingate Depot Activity
Project US-01027

Date Started	: 3/10/2018
Date Completed	: 3/12/2018
Hole Diameter	: 6"
Drilling Method	: Sonic
Logged By	: McKenze Booth
Drilling Company	: Yellow Jacket
Northing Coord.	: 1643942.73
Easting Coord.	: 2500318.10
Elevation (amsl)	: 6685.02
Total Depth	: 186ft btoc

BORING LOG: BGMW08

Monitoring Well Details:

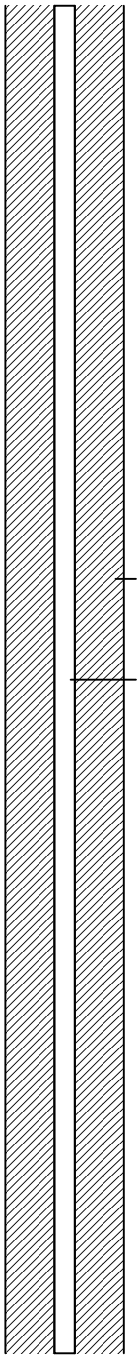
Casing Type	: PVC schedule-40
Screen Size	: 0.01"
Seal Type	: bentonite chips
Sand Pack Type	: Colorado silica 10/20

Sample Legend: Sample; Submitted to Lab

Water Levels: During Drilling; After Completion

Depth in Feet	Water Level	USCS	GRAPHIC	DESCRIPTION	% Recovery
105					100
				SANDY CLAYSTONE, dense, dry, non plastic, green/gray nodules, 7.5 R 3/4	
110					100
115					
120					100
125					
130					100
				CLAYEY SANDSTONE, very fine grained, dry, dense, non plastic, with white streaking, green/white irregular shaped nodules, with very thin laminae of sandstone <1", 10 R 5/4	
135				SANDY CLAYSTONE, hard, dry, green/white nodules, 10 R 5/4	100
140					

Well ID: BGMW08



Depth in Feet: 105, 110, 115, 120, 125, 130, 135, 140

Sundance Consulting Inc.

Fort Wingate Depot Activity
Project US-01027

Date Started	: 3/10/2018
Date Completed	: 3/12/2018
Hole Diameter	: 6"
Drilling Method	: Sonic
Logged By	: McKenze Booth
Drilling Company	: Yellow Jacket
Northing Coord.	: 1643942.73
Easting Coord.	: 2500318.10
Elevation (amsl)	: 6685.02
Total Depth	: 186ft btoc

BORING LOG: BGMW08

Monitoring Well Details:

Casing Type	: PVC schedule-40
Screen Size	: 0.01"
Seal Type	: bentonite chips
Sand Pack Type	: Colorado silica 10/20

Sample Legend: Sample; Submitted to Lab

Water Levels: During Drilling; After Completion

Depth in Feet | Water Level | USCS | GRAPHIC | DESCRIPTION | % Recovery | Well ID: BGMW08 | Depth in Feet

140
145
150
155
160
165
170
175

SANDY CLAYSTONE, hard, dry, green/white nodules, cohesive,
10 R 5/4

CLAYEY SANDSTONE, fine grained, dry, green/gray irregular shaped nodules,
7.5 YR 5/4

CLAYSTONE, dry, cohesive, medium density,
7.5 YR 5/4

CLAYEY SANDSTONE, fine grained, dry, thin beds to laminations, green/gray nodules 7-8mm,
7.5 YR 5/4

SANDY CLAY, dense, wet, some coarse sand, fine gravel semi round to angular, very plastic, cohesive,
7.5 YR 2.5/3

% Recovery: 100; 100; 100; 100; 0

Well ID: BGMW08 — grout; casing; sand pack; screen

05-23-2018 C:\Users\cjennings\Desktop\Ft Wingate\Ft Wingate Boring Logs\FWDA_BGMW08.bor

Sundance Consulting Inc.

Fort Wingate Depot Activity
Project US-01027

Date Started	: 3/10/2018
Date Completed	: 3/12/2018
Hole Diameter	: 6"
Drilling Method	: Sonic
Logged By	: McKenze Booth
Drilling Company	: Yellow Jacket
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Elevation (amsl)	: 6685.02
Total Depth	: 186ft btoc

BORING LOG: BGMW08

Monitoring Well Details:

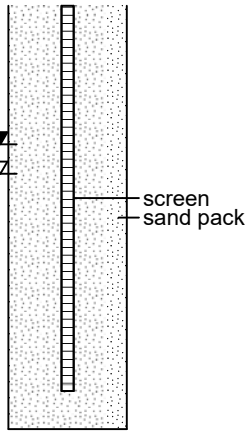
Casing Type	: PVC schedule-40
Screen Size	: 0.01"
Seal Type	: bentonite chips
Sand Pack Type	: Colorado silica 10/20

Sample Legend
- Sample
- Submitted to Lab

Water Levels
- During Drilling
- After Completion

Well ID: BGMW08

Depth in Feet	Water Level	USCS	GRAPHIC	DESCRIPTION	% Recovery
175				CLAYEY SANDSTONE, fine grained, dry, thin beds to laminations, green/gray nodules, downward increase in clay content, 7.5 YR 5/3	0
180					100
185					100
				TD = 186ft btoc	



Depth in Feet: 175, 180, 185, 190, 195, 200, 205, 210

ATTACHMENT 3

FIELD PHOTOGRAPHS

Photograph #1

Description of Photograph:
Well head of BGMW08.

Site Location:
Fort Wingate Depot Activity
Fort Wingate, New Mexico

Photograph Taken By:
Garrett Pankratz

Date of Photograph:
July 11, 2023

Photograph #2

Description of Photograph:
Downhole camera suspended prior to exploration.

Site Location:
Fort Wingate Depot Activity
Fort Wingate, New Mexico

Photograph Taken By:
Garrett Pankratz

Date of Photograph:
July 11, 2023

Photograph #3

Description of Photograph:
Camera pulley system.

Site Location:
Fort Wingate Depot Activity
Fort Wingate, New Mexico

Photograph Taken By:
Garrett Pankratz

Date of Photograph:
July 11, 2023

Photograph #4

Description of Photograph:
Downhole camera side view.

Site Location:
Fort Wingate Depot Activity
Fort Wingate, New Mexico

Photograph Taken By:
Garrett Pankratz

Date of Photograph:
July 11, 2023

NOTE: Attachment 4 is provided as a separate file on CD.

ATTACHMENT 4

VIDEO FILE
(CD ONLY)