

WATER WELL RECORD Form WWC-5

Division of Water Resources App. No.

[Empty box]

Well ID

MW-14S

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: County: Ottawa Fraction NW 1/4 SW 1/4 NE 1/4 1/4 Section Number 16 Township Number T 11 S Range Number R 2 E W

2 WELL OWNER: Last Name: Business: US Army Corp of Engineers Address: 601 E 12th Street City: Kansas City State: MO ZIP: 64106 Street or Rural Address where well is located

3 LOCATE WELL WITH 'X' IN SECTION BOX: [Diagram] 4 DEPTH OF COMPLETED WELL: 67.8 ft. 5 Latitude: 39.0994053° N Longitude: -97.5466808° E 6 Elevation: 1365.5 ft.

7 WELL WATER TO BE USED AS: 1. Domestic: 2. Irrigation 3. Feedlot 4. Industrial 5. Public Water Supply 6. Dewatering 7. Aquifer Recharge 8. Monitoring: well ID MW-14S 9. Environmental Remediation 10. Oil Field Water Supply 11. Test Hole 12. Geothermal 13. Other

Was a chemical/bacteriological sample submitted to KDHE? Water well disinfected?

8 TYPE OF CASING USED: 2 in. to 47.8 ft. CASING JOINTS: Threaded TYPE OF SCREEN OR PERFORATION MATERIAL: PVC SCREEN OR PERFORATION OPENINGS ARE: Mill Slot SCREEN-PERFORATED INTERVALS: 67.8 ft. to 47.8 ft. GRAVEL PACK INTERVALS: 73.6 ft. to 42.3 ft.

9 GROUT MATERIAL: Cement grout Bentonite Other Bentonite Seal 42.3'-38.2' Nearest source of possible contamination: Missile Silo Direction from well? East Distance from well? 600 ft.

Table with 6 columns: FROM, TO, LITHOLOGIC LOG, FROM, TO, LITHO. LOG (cont.) or PLUGGING INTERVALS. Rows show depth intervals and lithology: Sand, Lean Clay W/Sand, Sand, Clayey Sand, Sand.

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) 7/31/2023 and this record is true to the best of my knowledge and belief.

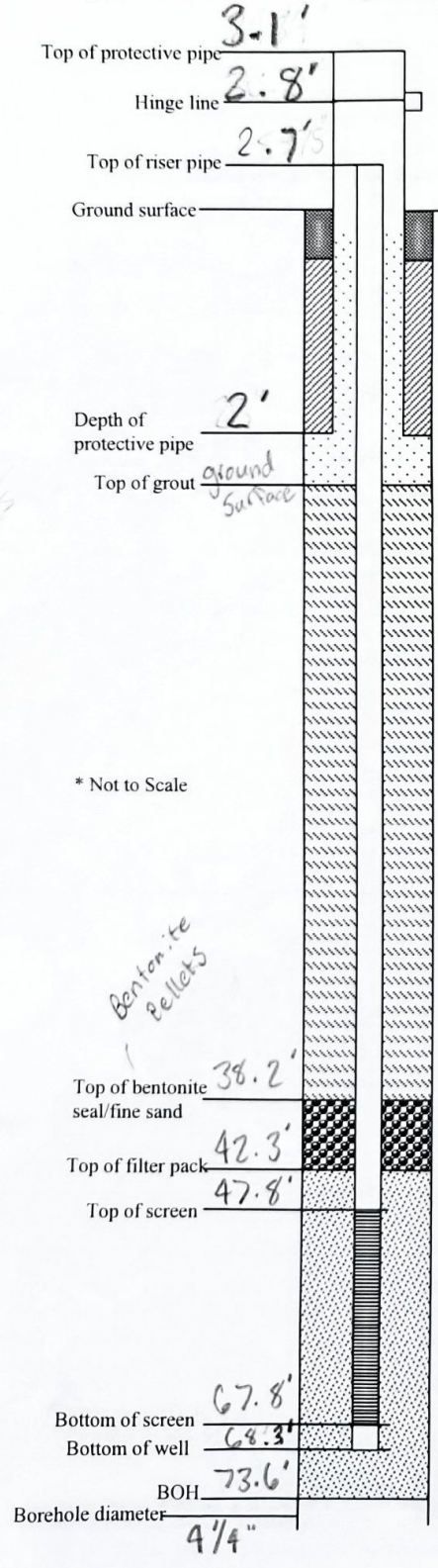
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### MONITORING WELL INSTALLATION FORM

Project Schilling S-1  
Boring Number MW-145

Well Number MW-145  
Date Installed 07/31/23

Type of riser pipe & diameter 2 in. diameter, schedule 40 pvc  
Type of screen & slot size schedule 40 pvc, 0.010" slot size



**Measurements:**  
 Length of riser pipe 71.05'  
 Length of screen 20'  
 Length of end blank N/A  
 Total length of well installation 68.3'  
 Bottom depth of borehole 73.6'  
 Length of riser pipe stickup above ground surface 2.7'

**Centralizers:**  
 Total number of centralizers N/A  
 Depth(s) of centralizer(s) BGS N/A

**Protective Pipe:**  
 Date set 08/03/2023  
 Size and type of protective pipe 5', 4x4"  
 Number of weep holes drilled in protective pipe N/A

**Well Pad:**  
 Dimensions of well pad 2' x 2' x 4"  
 Number and size of protective posts around well 2, 3 in dia

**Filter Pack:**  
 Type and grain size of filter pack material 20/40 sand

**Grout Mix(es):**  
 Type of grout mix and locations used in the well installation

Amount and type of grout materials used for each mix  
 Other:  
 Portland: limestone cement type 1 and 5% bentonite gel  
 Bentonite (specify type):  
 Water: 12 gal H<sub>2</sub>O 12 bags cement

1. Material used to fill annular space between borehole and protective pipe Sand
2. Material used to fill void between protective pipe and well riser pipe Sand

21.8 bags of 50lb Gillibrand industrial sand  
H<sub>2</sub>O: 50 gallons  
- had to flush out 2' collapsed sand below auger  
- 1.2 bags of sand for firm bottom

# HTW DRILLING LOG

HOLE NO.  
**MW-145**

1. COMPANY NAME <b>USACE - EDE-H</b>		2. DRILLING SUBCONTRACTOR <b>USACE - EDG-G</b>		SHEET 1 OF 9 SHEETS		
3. PROJECT <b>Schillings 5-1</b>			4. LOCATION <b>Bennington, Kansas</b>			
5. NAME OF DRILLER <b>Lane Wisdom/Josh Devaul</b>			6. MANUFACTURER'S DESIGNATION OF DRILL <b>Diedrich D-90 ATV</b>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		4 1/4 ID HSA		8. HOLE LOCATION <b>39.099443°N, -97.546733°E</b>		
		6 - 1/2" ID HSA		9. SURFACE ELEVATION <b>1346'</b>		
		PACOR 4.85 O.D.		10. DATE STARTED <b>7/24/23</b>		
		NW 1/4 3 1/4" Rock		11. DATE COMPLETED <b>8/01/23</b>		
12. OVERBURDEN THICKNESS <b>73.6</b>			15. DEPTH GROUNDWATER ENCOUNTERED <b>57.2 bgs / on 7/31/23</b>			
13. DEPTH DRILLED INTO ROCK <b>0</b>			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <b>53.2 bgs / 12 hrs after drilling 8/01/23</b>			
14. TOTAL DEPTH OF HOLE <b>73.6'</b>			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)			
18. GEOTECHNICAL SAMPLES <b>3 Jar samples</b>		DISTURBED <b>X</b>	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS <b>N/A</b>		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)
22. DISPOSITION OF HOLE		BACKFILLED	MONITORING WELL <b>X</b>	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR <b>Austin Noll Austin Noll</b>	
21. TOTAL CORE RECOVERY %						

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	<b>SANDY SILT to SAND w/ SILT</b> <b>V. LOOSE</b> <b>DRY</b> <b>ORANGE</b>  <i>root s/ vegetation @ surface</i>		<b>No Sample</b>	<b>NS</b>	<b>NS</b>	<b>Auger - 1</b> <b>4 1/4" Inner Diameter</b> <b>(5D)</b> <b>Hollow stem Auger</b> <b>(HSA)</b>  <b>Logged by</b> <b>Cuttings</b>
	2						
	3						
	4						
	5						



# HTW DRILLING LOG (CONT.)

HOLE NO  
**MW-14S**

PROJECT  
**Schillings S-1**

INSPECTOR  
**auth Noel**

SHEET  
OF 9 SHEETS

ELEV. a	DEPTH b 5	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. i	BLOW COUNTS g	REMARKS h
	6	<p><b>SAND</b>  <b>DRY</b>      Fine, poorly                      v. LOOSE      graded sand,  <b>TAN-ORANGE</b>      Trace                      (SP)      clay nodules                      Logged from cuttings</p>		NS	N/A	N/A	4 1/4" ID HSA A-2
	7						
	8						
	9						
	10			NS	N/A	NA	10.0 A-3 4 1/4" ID HSA
	11						
	12						
	13						
	14	<p>More moisture w/depth LOOSE</p>					

# HTW DRILLING LOG (CONT.)

HOLE NO  
**MW-145**

PROJECT  
**Schillings S-1**

INSPECTOR  
**Allen Moe**

SHEET **3**  
OF **9** SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same as above SAND w/CLAY LOOSE MOIST TAN-ORANGE (SP) Logged by cuttings					A-3 cont-
	15			NS	N/A	N/A	15.0 A-4 4 1/4" ID HSA
	16						
	17						
	18						
	19						
	20			NS	N/A	N/A	20.0 A-5 4 1/4" ID HSA
	21						
	22						
	23						

# HTW DRILLING LOG (CONT.)

HOLE NO.  
MW-14 S

PROJECT  
Schillings S-1

INSPECTOR  
Austin Noel

SHEET 4  
OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	Same as above SAND Fine gr, poorly MOIST graded LOOSE TAN-ORANGE (SP) logged by cuttings					A-5 cont
	24						
	25			NS	NA	NA	25.0 A-6 4 1/4" ID HSA
	26						
	27						
	28						
	29	Brown					
	30			NS	NA	NA	30.0 A-7 4 1/4" ID HSA
	31						
	32						

# HTW DRILLING LOG (CONT.)

HOLE NO  
MW-14S

PROJECT  
Schilling's S-1

INSPECTOR  
Austin Naeel

SHEET 5  
OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32						
	33	<p><del>SAND</del> (SP) fine gr, poorly sorted                      MOIST heavily with SS                      LOOSE                      ORANGE</p> <p>logged by cuttings</p>					A-7 font 4 1/4" ID HSA
	34						
	35			NS	NA	NA	35.0 A-8 font 4 1/4" ID HSA
	36						
	37						
	38						
	39						
	40	Brown		NA	NS	NA	40 A-9 4 1/4" ID HSA
	41						

# HTW DRILLING LOG (CONT.)

HOLE NO  
**MW-145**  
SHEET **6**  
OF **9** SHEETS

PROJECT  
**Schillings S-1**

INSPECTOR  
**Austin Mace**

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	42	<p><del>SAA SAND (SP) Poorly graded</del>                      Moist Loose                      BROWN                      Possibly in erosional channel                      logged from cuttings</p>		NA	NA	NA	A-9 cont 4
	43						
	44						
	45			NS			45.0 A-10 4 1/4" ID HSA
	46	<p><del>LEAN CLAY W/ SAND</del>                      DRY TO MOIST                      GRAY-GREEN                      STIFF (CL-SP) 46.2</p>	46.2	46.0 Jar #1 46.2	46.0 NA 46.2	NA	Collected from cuttings
	47	<p>SAND (SP) Poorly GRADED                      Moist LOOSE ORANGE                      fine gr</p>					
	48						
	49						
	50						



# HTW DRILLING LOG (CONT.)

HOLE NO  
MW-14 S  
SHEET 7  
OF 9 SHEETS

PROJECT  
Schilling's S-1

INSPECTOR  
Austin Naeff

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	SAA SAND (SP) Poorly graded MOIST fire-graded 0 RANGE LOOSE		50.0			A-11 4 1/4" ID HSA
	51	Logged from cuttings		JCR-2	NA	NA	Collected from cuttings
	52						
	53	<p>7/31/23 11:54 before drilling 53.2'</p>					
	54	<p>7/31/23 1:08 during drilling 53.3'</p>					
	55	resumed w/		NS	NA	NA	A-12 4 1/4" ID HSA 7/24/23 out of augers 7/25/23 resumed w/ added augers leave added 100 gallons @ 200 water
	56						
	57	<p>7/25/23 11:55 during drilling leave</p>					Water from RWD #2 PLS wells
	58						
	59						

# HTW DRILLING LOG (CONT.)

HOLE NO  
MW-14 S  
SHEET 8  
OF 9 SHEETS

PROJECT  
Schillings S-1

INSPECTOR  
Justin Moe

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAA SAND (sp) <span style="margin-left: 20px;">poorly graded, fine gr.</span> MOIST LOOSE ORANGE Logged from cuttings					A-12 cont
	60			NS	NA	NA	60.0
	61						A-13 4 1/4" ID HSA Logged by cuttings
	62	SAA					
	63						
	64						
	65			NS	NA	NA	Hoops added 64.5 added 1.5 gal 8/21/5 65.0
	66	CLAYEY SAND (CL-SP) MOIST-WET V. SOFT TAN-BROWN					A-14 4 1/4" ID HSA
	67						
	68						68.0

# HTW DRILLING LOG (CONT.)

HOLE NO  
MW-14S

PROJECT  
Schillings S-1

INSPECTOR  
Austin Naeff

SHEET 9  
OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
68.4	68.4	SH (SP) SAND frags, poorly MOIST graded Loo SE ORANGE		NS			A-14 cont added 40 gal water 100% water loss heave/sandlocked center bit 13:50 2/1432
69	69	logged from cuttings					
70	70	end of day 7/25/23 broke input shaft 7/26/23 resurf		NS	NA	NA	A-15 4 1/4" ID HSA
71	71	SAA					1406 flushed fine gr. sand from augers, 8' in augers, augers sandlocked. flushing until clear, then adding rod's one at a time! went slightly past end of augers used ~300 gal to flush ~300 in tank
73	73	TAN-BROWN (SP) SAND Clean, 6 possibly from washing		73.4 J-3	NA	NA	
73.6	73.6	end of day		73.6			
74	74	7/26/23 B.O.H.: Monitoring well installed					
75	75	Water level 6/31/23 before drilling 53.2' during drilling 53.3'					
76	76	7/25/23 during drilling 57.2'					
77	77						A-16 4 1/4" ID 336 HSA heave, added 100 gal Total ~200 gal 100 gal/minute 100% loss

Well Development Form

<b>Project Name:</b> Schilling S-1		<b>Project Number:</b>		<b>Well Number:</b> 145	
<b>Project Information</b>			<b>Elevation of Well</b>		
Facility Name:			Ground Surface Elevation:		
Location: N E			Top of Casing Elevation (TOC):		
<b>Well Information</b>			<b>Borehole Volume Calculation:</b>		
Date and Time Well Seal Installed:			$1 \text{ borehole volume (gallons)} = \text{initial height of water column (ft)} \times 0.0408 \times (\text{borehole diameter (in)})^2$ $\text{initial height of water column} = \text{total depth (ft)} - \text{initial depth to water (ft)}$		
Total Depth of Well: 71 feet from top of riser					
Depth to Top of Screen: 50.5 feet from top of casing					
Length of Casing Screened: 20 feet					
Type of Formation Screened:			<b>Volume of Water Lost During Drilling and Well Installation:</b>		
<b>Well development Method description</b>			<b>Development Completion Criteria</b>		
Surge: manual			Field parameter stabilized? Y N		
Bail:			Turbidity < 50 NTU? Y N		
Pump: Well pump			Volume of water removed during development: gallons		
Other:			Other:		

Date	Start time	End time	Depth to water	Total depth	Water removed		Temp (degrees F)	pH (units)	S.C. (µS/cm)	Turbidity (NTU)	Remarks (color, odor, particulates)
					Gallons	Total					
08/07/23	13:26		56'	71'	5 @ 3min	45 sec	64.31	7.45	319	1000	brown, opaque
	14:20						63.37	7.26	352	1000	brown, opaque
	15:22						63.24	7.62	387	1000	brown, pale, opaque
08/09/23	09:22				5 @ 2min	50 sec	62.22	7.41	386	1000	tannish brown, opaque
	10:04						62.49	7.27	371	511	orangish brown, opaque
Surge	10:05						63.17	7.32	378	82	mucky gray, almost clear, cloudy
	10:35										
Surge	10:36										
Surge	10:45										
	11:17						63.95	7.29	369	827	tannish brown, opaque
Surge	11:18						64.58	7.31	368	375	tannish brown, semi-opaque
	11:35										
Surge	11:36										
	12:03						62.69	7.42	368	80.5	mostly clear, cloudy, gray
Surge	12:04										
	12:18						65.17	7.45	378	85.2	gray, cloudy
Surge	12:29										

Measurements from TOC unless otherwise noted.

Surge	12:51						64.86	7.46	369	251	gray, semi-opaque
	13:14						64.94	7.31	368	70.6	gray, cloudy



	Time	Temp (°F)	pH	S.C. (µS/cm)	Turbidity (NTU)	Remarks
	13:40	65.10	7.65	371	130	gray, cloudy
Surge	13:42					
	14:11	65.55	7.52	360	37.5	gray, cloudy, mostly clear
Surge	14:12					
	14:47	65.69	7.26	360	25.2	gray, mostly clear
Surge	14:48					
Surge	15:15	65.13	7.85	385	1200	orangish brown, opaque
	15:34	66.74	7.29	362	25.7	Clear
Surge	15:35					
		H <sub>2</sub> O level 56.4'				
	16:30	66.12	7.66	363	3.5	clear
8/11/23	10:24	68.72	6.15	435	113	gray, cloudy
	10:48	68	6.85	373	14.9	clear
Surge	10:49					
	11:21	69.4	7.30	357	56.5	Pale yellow, almost clear
	11:54	69.3	7.31	352	4.0	clear