



**MONITORING WELL INSTALLATION FORM**

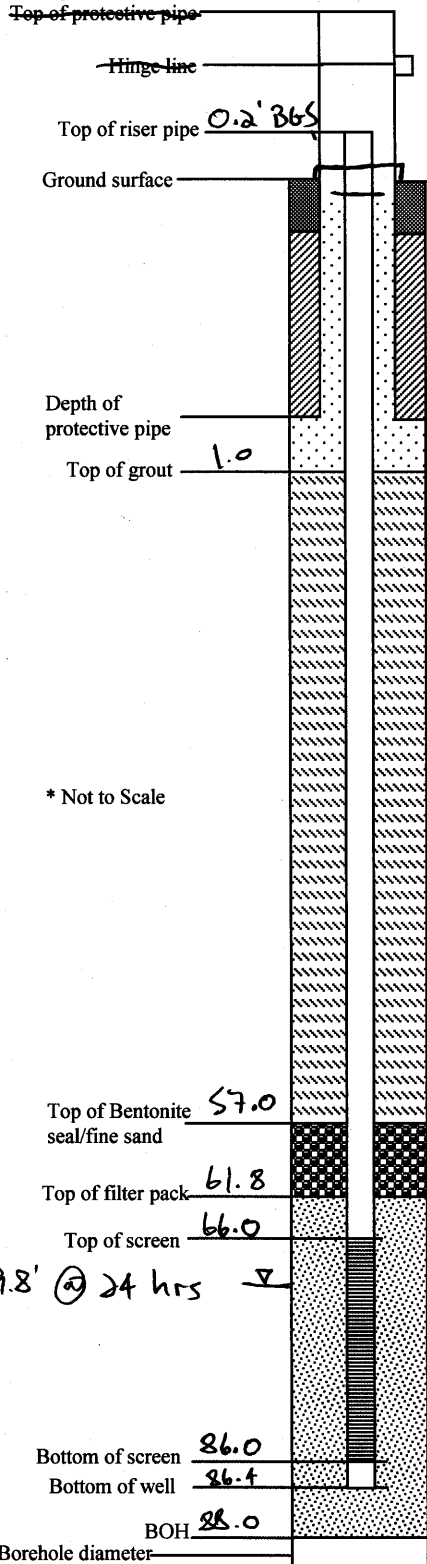
Project Schilling  
 Boring Number MW-04

Well Number MW-04  
 Date Installed 7/6/11

Type of riser pipe & diameter Sch 40 2" PVC

Type of screen & slot size PVC Screen, 20 Slot

**Flush Mount**



**Measurements:**

Length of riser pipe 65.8'  
 Length of screen 20.0'  
 Length of end blank 0.4'  
 Total length of well installation 86.4  
 Bottom depth of borehole 88.0  
 Length of riser pipe stickup above ground surface -0.2'

**Centralizers:**

Total number of centralizers 2  
 Depth(s) of centralizer(s) BGS 65.0' + 45.0'

**Protective Pipe:**

Date set \_\_\_\_\_  
 Size and type of protective pipe \_\_\_\_\_  
 Number of weep holes drilled in protective pipe \_\_\_\_\_

**Well Pad:**

Dimensions of well pad 3'x3'  
 Number and size of protective posts around well 0

**Filter Pack:**

Type and grain size of filter pack material 20/40 Silica Sand

**Grout Mix (es):**

Type of grout mix and locations used in the well installation  
1:1 portland grout with Sl. Bentonite

Amount and type of grout materials used for each mix

**Other:**

Portland:  
 Bentonite (specify type):  
 Water:

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

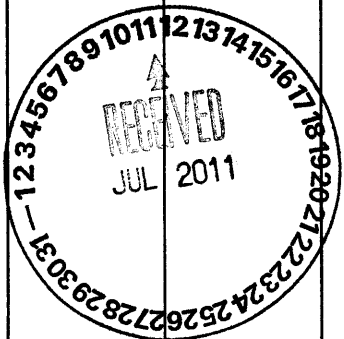
# HTW DRILLING LOG

HOLE NO.  
MW-04

|   |                 |                           |   |                                     |  |
|---|-----------------|---------------------------|---|-------------------------------------|--|
| 1. COMPANY NAME<br><b>OSACE</b>                       |                 | 2. DRILLING SUBCONTRACTOR |   | SHEET 1<br>OF 11 SHEETS             |  |
| 3. PROJECT<br><b>Schilling S-1</b>                    |                 |                           | 4. LOCATION<br><b>Minneapolis, KS</b>                                       |                                     |  |
| 5. NAME OF DRILLER<br><b>D. Marguis</b>               |                 |                           | 6. MANUFACTURER'S DESIGNATION OF DRILL<br><b>Dockeye 25W + DicoRich 290</b> |                                     |  |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT | 6" Drive Barrel |                           | 8. HOLE LOCATION<br><b>KS STATE PLANE 1501</b>                              |                                     |  |
|   | 4" Drive Barrel |                           | 279109.941 W 144.1576113 NAD 83   |                                     |  |
|   | 4" Core Barrel  |                           | 9. SURFACE ELEVATION<br><b>1389.167</b>                                     |                                     |  |
|   |                 |                           | 10. DATE STARTED<br><b>6/29/11</b>  | 11. DATE COMPLETED<br><b>7/7/11</b> |  |
| 12. OVERBURDEN THICKNESS<br><b>11.5</b>               |                 |                           | 15. DEPTH GROUNDWATER ENCOUNTERED   |                                     |  |
| 13. DEPTH DRILLED INTO ROCK<br><b>76.0</b>            |                 |                           | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED                |                                     |  |
| 14. TOTAL DEPTH OF HOLE<br><b>87.5</b>                |                 |                           | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)                                |                                     |  |

|                                       |  |                         |                 |                            |  |                 |
|---------------------------------------|--|-------------------------|-----------------|----------------------------|--|-----------------|
| 18. GEOTECHNICAL SAMPLES              |  | DISTURBED               | UNDISTURBED     |                            | 19. TOTAL NUMBER OF CORE BOXES<br><b>6</b> |                 |
| 20. SAMPLES FOR CHEMICAL ANALYSIS     |  | VOC                     | METALS          | OTHER (SPECIFY)            | OTHER (SPECIFY)                            | OTHER (SPECIFY) |
|                                       |  | ✓                       | NA              | NA                         | NA   | NA              |
| 21. TOTAL CORE RECOVERY<br><b>59%</b> |  | 22. DISPOSITION OF HOLE |                 | 23. SIGNATURE OF INSPECTOR |  |                 |
|                                       |  | BACKFILLED              | MONITORING WELL | OTHER (SPECIFY)            | Brandon Harmon <i>[Signature]</i>          |                 |
|                                       |  | NA                      | ✓               | NA                         |  |                 |

| ELEV.<br>a | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c                       | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f  | BLOW COUNTS<br>g | REMARKS<br>h                                 |
|------------|------------|---|------------------------------|-------------------------------------|---|------------------|--|
|            | 0          | SILT<br>BROWN<br>MEDIUM DENSE<br>DRY<br>Rootlets    | Measured<br>w/ PID           |                                     | Discrete<br>Sampling<br>Using<br>4x VOA<br>Vials<br>1x 4oz<br>Jar | 39               | Drive 1<br>6" Drive Barrel<br>D-2 R-2        |
|            | 1          |   | 0.0ppm                       | NA                                  |   |                  |  |
|            | 2          | 2.0<br>LEAN CLAY<br>REDDISH BROWN<br>STIFF<br>MOIST |                              |                                     | NA  | 2.0              | 2.0<br>Drive 2<br>6" Drive Barrel<br>D-2 R-2 |
|            | 3          |   |                              |                                     |   | 25               |  |
|            | 4          |   | 4.0                          |                                     | 4.0   | 4.0              | 4.0  |
|            | 5          | 4.9   | 0.5ppm                       |                                     | MW-04-SB-01<br>MW-04-SB-01MS<br>MW-04-SB-01MS P<br>4.9            | 4.9              | Drive 3<br>6" Drive Barrel<br>D-2 R-2        |



# HTW DRILLING LOG

HOLE NO.  
MW-04

PROJECT Schilling S1

INSPECTOR *[Signature]*

SHEET 2  
OF 11 SHEETS

| ELEV.<br>a | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c                             | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h  |
|------------|------------|---|------------------------------|-------------------------------------|----------------------------|------------------|---|
|            | 5          | SILT<br>ORANGISH BROWN<br>LOOSE<br>MOIST                  | 0.1 ppm <sub>5.2</sub>       | NA                                  | 5.2                        |                  | Drive 3<br>Cont'd   |
|            | 5.2        | LEAN CLAY<br>ORANGISH BROWN<br>STIFF<br>DRY               | 0.8 ppm<br>6.0               |                                     | MW-04-<br>SB-02            | 49               | 9-2 R-2   |
|            | 6.0        | LEAN CLAY<br>GREY<br>VERY STIFF<br>DRY                    | 0.0 ppm                      |                                     | 6.0                        | 6.0              | 6.0   |
|            | 7.0        | Weathered   | 7.0                          |                                     | NA                         | 32               | Drive 4<br>6' Drive Barrel  |
|            | 7.6        | SILT<br>TAN<br>DENSE<br>DRY<br>Porphyry Red Clay Partings | 0.0 ppm<br>7.6               |                                     | 7.6                        | 49               | Drive 5<br>4' Drive Barrel  |
|            | 8.0        | SILT<br>ORANGISH BROWN<br>MED DENSE<br>DRY                | 0.5 ppm<br>8.0               |                                     | MW-04-<br>SB-03<br>8.0     | 8.0              | 0-1.0<br>8.0  |
|            | 9.4        | SAND<br>TAN<br>LOOSE<br>DRY<br>Fine grained               | 0.0 ppm                      |                                     |                            | 200              | Drive 6<br>4' Drive Barrel  |
|            | 10.0       | SILT<br>REDDISH ORANGE<br>VERY DENSE<br>DRY               | 0.5 ppm<br>10.0              |                                     | NA                         | 10.0             | 10.0  |
|            | 11.0       | SILT<br>REDDISH ORANGE<br>MED DENSE<br>DRY                | 0.0 ppm                      |                                     |                            | 300              | Drive 7<br>4' Drive Barrel  |
|            | 11.5       |   |                              |                                     |                            | 11.0             | 11.0  |
|            | 11.5       |   |                              |                                     |                            | 200              | Drive 8<br>4' Drive Barrel  |
|            | 12.0       | SHALE<br>GREY<br>Logged by cuttings                       | 0.0 ppm                      |                                     |                            | NA               | 11.5  |
|            | 13.0       |   |                              |                                     |                            |                  | End 4 1/2"<br>Clean out w/ 1"<br>7/8" Core Barrel<br>Set (11.5' CAS/S<br>Clean out<br>5 1/2" Core Barrel at<br>11.5           |
|            | 14.0       |   |                              |                                     |                            |                  | PULL 1<br>4' Double Tube<br>Core Barrel<br>Start 14.4 Stop (44)<br>Down 4.0 Rev'd 0<br>Reap 0 CD 15.0<br>Loss 3.0<br>UL = 3.5 |

# HTW DRILLING LOG

HOLE NO. MW-04

PROJECT Schilling S-1

INSPECTOR *[Signature]*

SHEET 3 OF 11 SHEETS

| ELEV.<br>a                      | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c  | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h  |
|---------------------------------|------------|--|------------------------------|-------------------------------------|----------------------------|------------------|---|
| Loss                            | 14         | Same as above<br>SHALE<br>GREY<br>SOFT<br>FINE GRAINED<br>THEN TO MEDIUM<br>BEDDED                               | 0.0 ppm                      |                                     |                            |                  | PULL 1<br>Cut 1<br>Run 4.0 Rec'd 0  |
|                                 | 15         |  |                              |                                     |                            | NA               | CD  |
| Loss = 3.4'                     | 16         |  |                              |                                     |                            | NA               | 15.5  |
|                                 | 17         |  | 0.0 ppm                      | Box 1                               |                            |                  | PULL 2<br>4' Core Barrel<br>Start 15.11 Stop 15.23<br>Run 6.1 Rec'd 2.6<br>RCD 31 LDU<br>CD 21 loss 3.5<br>UL 3.4 |
|                                 | 18         |  |                              |                                     |                            |                  |   |
|                                 | 19         | (A.L)  |                              |                                     |                            |                  |   |
|                                 | 20         | SANDSTONE<br>ORANGISH BROWN<br>SOFT<br>FINE GRAINED<br>THIN BEDDED<br>MODERATELY CEMENTED<br>Some SHALE partings |                              |                                     |                            | NA               |   |
| Highly Fractured<br>Loss = 0.8' | 21         |  |                              |                                     |                            |                  | CD  |
|                                 | 22         |  | 0.0 ppm                      |                                     |                            |                  | 21.6  |
|                                 | 23         |  |                              |                                     |                            |                  | PULL 3<br>4' Core Barrel<br>Start 15.45 Stop 16.00<br>Run 9.7 Rec'd 9.2<br>RCD 57 CD 31<br>LDU loss 0.5<br>UL 0.8 |

# HTW DRILLING LOG

HOLE NO. MW-04

PROJECT Schilling S-1

INSPECTOR *[Signature]*

SHEET 4 OF 11 SHEETS

| ELEV.<br>a | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c   | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h   |
|------------|------------|---|------------------------------|-------------------------------------|----------------------------|------------------|--|
|            | 23         | SANDSTONE<br>ORANGISH BROWN<br>SOFT<br>THEN TO MEDIUM BEDDED<br>MODERATELY CEMENTED<br>pitted |                              | Box<br>1                            |                            |                  | PULL 3<br>Lot'd<br>Start 155 Stop 160<br>Run 9.3 Bed 9.2<br>RAT 5% CP 31<br>LOW LOSS 0.5<br>UL = 0.8 |
|            | 24         |   |                              |                                     |                            |                  |  |
|            | 25         |   | 0.0ppm                       |                                     | NA                         | NA               |  |
|            | 26         |   |                              | 26.6                                |                            |                  |  |
|            | 27         |   |                              | Box<br>2                            |                            |                  |  |
|            | 28         |   |                              |                                     | 27.9<br>MW-04-05<br>28.1   |                  |  |
|            | 29         |   |                              |                                     | NA                         |                  |  |
|            | 30         |   |                              |                                     |                            |                  |  |
|            | 31         |   |                              |                                     |                            |                  |  |
|            | 31         | SANDSTONE<br>TAN<br>SOFT  |                              |                                     |                            |                  | 31.3<br>PULL 4   |
|            | 32         | THEN TO THICK BEDDED<br>MODERATELY CEMENTED   |                              |                                     |                            |                  | Start 162 Stop 165   |

# HTW DRILLING LOG

HOLE NO. MW-04

PROJECT Schilling S-1

INSPECTOR *[Signature]*

SHEET 5 OF 11 SHEETS

| ELEV.<br>a | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c  | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h   |
|------------|------------|--|------------------------------|-------------------------------------|----------------------------|------------------|--|
|            | 32         | Same As Above<br>SANDSTONE<br>TAN<br>SOFT<br>THEN TO THICK BEDDED<br>MODERATELY CEMENTED | 0.0 ppm                      | Box 2                               | NA                         | NA               | Pull #<br>4" Core Barrel<br>Start low stop 1.55<br>Run 10.5 Read 9.0<br>RRD 28% LOW<br>CD 4.5 Loss 1.0<br>Uol. 0 |
|            | 33         |  |                              | 33.2                                |                            |                  |  |
|            | 34         |  |                              | Box 3                               |                            |                  |  |
|            | 35         |  |                              |                                     |                            |                  |  |
|            | 36         |  |                              |                                     |                            |                  |  |
|            | 37         |  |                              |                                     |                            |                  |  |
|            | 38         |  |                              |                                     |                            |                  |  |
|            | 39         |  |                              |                                     |                            |                  |  |
|            | 40         |  |                              |                                     |                            |                  |  |
| 40.5       | 41         |  |                              |                                     |                            |                  |  |

# HTW DRILLING LOG

HOLE NO.  
MW-04  
SHEET 6  
OF 11 SHEETS

PROJECT Schilling S-1

INSPECTOR *[Signature]*

| ELEV.<br>a | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c                       | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h   |
|------------|------------|---|------------------------------|-------------------------------------|----------------------------|------------------|--|
| Loss       | 41         | Same as Above                                       |                              | Box 3                               |                            |                  | PULL 4<br>Lent'd<br>A.S. End 7/5/11  |
|            | 42         | SANDSTONE<br>TAN<br>SOFT<br>THIN TO THICK<br>BEDDED | 0.0 ppm                      | 43                                  | NA                         | NA               | PULL 5<br>4' Core Barrel<br>Start 0.5' Stop 0.8'<br>Run 9.5' Run 8.5'<br>RQD 28% CD 49.5<br>LDW Loss 1.2<br>Begin 7/6/11<br>JL = 0.7 |
|            | 43         | MODERATELY CEMENTED                                 |                              |                                     |                            |                  |  |
|            | 44         |   |                              | Box 4                               |                            |                  |  |
|            | 45         |   |                              |                                     |                            |                  |  |
|            | 46         |   |                              |                                     |                            |                  |  |
|            | 47         |   |                              |                                     |                            |                  |  |
|            | 48         |   |                              |                                     |                            |                  |  |
|            | 49         |   |                              |                                     |                            |                  |  |
| Loss       | 50         | See Next Page For Description                       |                              |                                     |                            |                  |  |





# HTW DRILLING LOG

HOLE NO. MW-04

PROJECT Schilling S-1

INSPECTOR *[Signature]*

SHEET 8 OF 11 SHEETS

| ELEV.<br>a | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c                               | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h  |
|------------|------------|---|------------------------------|-------------------------------------|----------------------------|------------------|---|
|            | 59         | Same As Above   |                              |                                     |                            |                  | PULL 6<br>Core<br>CD-59.0   |
|            | 60         | SANDSTONE<br>SOFT<br>TAN                                    | 0.0ppm                       | Box<br>5                            |                            |                  | 66.0  |
|            | 61         | THEN TO MEDIUM<br>BEDDED<br>FINE GRAINED<br>Poorly cemented |                              |                                     |                            |                  | PULL 7<br>4" Core Barrel<br>Start 1005 Stop 1015<br>Run 6.0 Rev 0<br>RWD 0 CD-60.5<br>LW Loss 6.0<br>V2 = 1.5 |
|            | 62         |   |                              |                                     |                            |                  |   |
|            | 63         |   |                              |                                     |                            |                  |   |
|            | 64         |   |                              |                                     |                            |                  |   |
|            | 65         |   |                              |                                     |                            |                  |   |
|            | 66         |   |                              |                                     |                            |                  | 66.0  |
|            | 67         |   |                              |                                     |                            |                  | PULL 8<br>4" Core Barrel<br>Start 1020 Stop 1041<br>Run 4.5 Rev 0<br>LW CD 702<br>RWD 0 Loss 4.5<br>V2 = 9.7  |
|            | 68         |   |                              |                                     |                            |                  |   |

NO RECOVERY

LOST CORE

# HTW DRILLING LOG

HOLE NO. MW-04  
 SHEET 9 OF 11 SHEETS

PROJECT Schilling S-1

INSPECTOR [Signature]

| ELEV.<br>a       | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c   | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h  |  |
|------------------|------------|---|------------------------------|-------------------------------------|----------------------------|------------------|---|--|
| Loss             | 68         | Same As Above<br>SANDSTONE<br>TAN<br>SOFT<br>POORLY CEMENTED<br>THIN TO MEDIUM BEDDED<br>FINE GRAINED |                              | Box<br>5                            |                            |                  | Pull 8<br>Cor'd<br>Run 4.5 Rec'd 0<br>CD 70.2<br>UL 9.7   |  |
|                  | 69         |   |                              |                                     |                            |                  |   |  |
|                  | 70         |   |                              |                                     |                            |                  |   |  |
| Loss = 1.7'      | 71         |   | 0.0mm                        |                                     |                            | NA               | 70.5<br>Pull 9<br>4" Core Barrel<br>Start 1250 Stop 1300<br>Run 10 Rec'd 8.2<br>LDC 100mm CD 89.1<br>Rec'd 5.1 Loss 1.8<br>UL 1.7 |  |
| Highly Fractured | 72         |   |                              |                                     |                            |                  |   |  |
|                  | 73         |   |                              |                                     |                            |                  |   |  |
|                  | 74         |   |                              |                                     |                            |                  |   |  |
|                  | 75         |   |                              |                                     |                            |                  |   |  |
|                  | 76         |   |                              | 76.0                                |                            |                  |   |  |
|                  | 77         |   |                              | Box<br>6                            |                            |                  |   |  |

# HTW DRILLING LOG

HOLE NO.  
MW-04

PROJECT  
Schilling S-1

INSPECTOR  
*[Signature]*

SHEET 10  
OF 11 SHEETS

| ELEV.<br>a | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c  | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h  |
|------------|------------|--|------------------------------|-------------------------------------|----------------------------|------------------|---|
|            | 77         | Same As Above  |                              |                                     |                            |                  | Pull 9  |
|            | 78         | SANDSTONE<br>TAN<br>SOFT<br>THEN TO MEDIUM BEDDED<br>Poorly cemented | 0.0 ppm                      |                                     |                            |                  | cont'd<br>Run 10 Rec'd 8.2<br>RQD 5% CD-201<br>UL = 1.7 → loss 1.8  |
|            | 79         |  |                              |                                     |                            |                  |   |
|            | 80         |  |                              | Box 6                               | NA                         | NA               | CD<br>80.5  |
|            | 81         |  |                              |                                     |                            |                  | PULL 10<br>A <sup>1</sup> Core Barrel<br>Start 1407 Stop 1477<br>Run 7.5 Rec'd 2.6<br>RQD 21% CD 27.5<br>LOW loss 4.9<br>UL = 4.8 |
|            | 82         |  |                              |                                     |                            |                  |   |
|            | 83         |  |                              |                                     |                            |                  |   |
|            | 84         |  |                              |                                     |                            |                  |   |
|            | 85         |  |                              |                                     |                            |                  |   |
|            | 86         |  | 0.0 ppm                      |                                     |                            |                  |   |

LOSS = 4.8'

# HTW DRILLING LOG

HOLE NO.  
MW-01

PROJECT  
Schillings S1

INSPECTOR  
*[Signature]*

SHEET 11  
OF 11 SHEETS

| ELEV.<br>a | DEPTH<br>b | DESCRIPTION OF MATERIALS<br>c                    | FIELD SCREENING RESULTS<br>d | GEOTECH SAMPLE OR CORE BOX NO.<br>e | ANALYTICAL SAMPLE NO.<br>f | BLOW COUNTS<br>g | REMARKS<br>h  |
|------------|------------|--|------------------------------|-------------------------------------|----------------------------|------------------|---|
|            | 86         | Same As Above<br>SANDSTONE<br>TAN                | 0.0ppm                       | Box<br>6                            | NA                         | NA               | PULL 10<br>cont'd<br>Run 7.5 Rev'd 2.6<br>UL 4.8 CD 38.5<br>R00 21%<br><br>CD |
|            | 87         | THEN TO MEDIUM BEDDED<br>SOFT<br>Weakly cemented | 87.5                         | 87.5                                | 87.5                       | 87.5             |   |
|            |            | 87.5 BOM   |                              |                                     |                            |                  |   |
|            | 88         |  |                              |                                     |                            |                  | 88.0  |
|            | 89         |  |                              |                                     |                            |                  |   |
|            | 90         |  |                              |                                     |                            |                  |   |
|            | 91         |  |                              |                                     |                            |                  |   |
|            | 92         |  |                              |                                     |                            |                  |   |
|            | 93         |  |                              |                                     |                            |                  |   |
|            | 94         |  |                              |                                     |                            |                  |   |
|            | 95         |  |                              |                                     |                            |                  |   |

88.95 TOC  
71.21

## Well Development Form

|  |  |                        |  |  |  |
|--|--|------------------------|--|--|--|
| <b>Project Name:</b> <i>Schelling 5-1</i>                |  | <b>Project Number:</b> |  | <b>Well Number:</b> <i>MW-4</i>  |  |
| <b>Project Information</b>                               |  |                        |  | <b>Elevation of Well</b>   |  |
| Facility Name: <i>Schelling 5-1</i>                      |  |                        |  | Ground Surface Elevation: <i>1389.425</i>  |  |
| Location: <i>N 27 9109.941 E 14415 76.113</i>            |  |                        |  | Top of Casing Elevation (TOC): <i>1389.167</i>   |  |
| <b>Well Information</b>                                  |  |                        |  | <b>Borehole Volume Calculation:</b>  |  |
| Date and Time Well Seal Installed: <i>7/6/2011</i>       |  |                        |  | $88.95 - 71.21 \times 0.0408 \times 2^{2.5}$ $17.74 \times 0.1632 = 2.89 \text{ Gallon}$ <p>1 borehole volume (gallons) = initial height of water column (ft) x 0.0408 x (borehole diameter (in))<sup>2</sup><br/>           initial height of water column = total depth (ft) - initial depth to water (ft)</p> |  |
| Total Depth of Well: <i>86.4</i> feet from <i>BGS</i>    |  |                        |  |  |  |
| Depth to Top of Screen: <i>66.0</i> feet from <i>BGS</i> |  |                        |  |  |  |
| Length of Casing Screened: <i>20</i> feet                |  |                        |  |  |  |
| Type of Formation Screened: <i>Sandstone</i>             |  |                        |  |  |  |
| <b>Well development Method description</b>               |  |                        |  | <b>Volume of Water Lost During Drilling and Well Installation:</b>   |  |
| Surge: <input checked="" type="checkbox"/>               |  |                        |  | <b>Development Completion Criteria</b>   |  |
| Bail:  |  |                        |  | Field parameter stabilized? <input checked="" type="checkbox"/> N  |  |
| Pump: <input checked="" type="checkbox"/>                |  |                        |  | Turbidity < 50 NTU? <input checked="" type="checkbox"/> N  |  |
| Other:   |  |                        |  | Volume of water removed during development: <i>883</i> gallons   |  |
|  |  |                        |  | Other:   |  |

| Observations During Well Development |            |          |                |             |               |       |                  |            |              |                 |   |
|--------------------------------------|------------|----------|----------------|-------------|---------------|-------|------------------|------------|--------------|-----------------|---|
| 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 |                  |            |              |                 |   |
| 9/7/11                               | 08:25      |          | 71.21          | 88.95       |               |       |                  |            |              |                 | Water level at TO only                            |
|                                      | 08:28      |          |                |             |               |       |                  |            |              |                 | Start Surging                                     |
|                                      | 08:48      |          |                |             |               |       |                  |            |              |                 | Stop Surging                                      |
|                                      | 09:10      | 09:15    | See Note       |             |               | 25    | 25               | 59.9 °F    | 7.27         | 79.3            | Over head   |
|                                      | 09:15      | 09:20    |                |             | 25            | 50    | 59.2 °F          | 7.15       | 617          | Over head       | Cloudy  |
|                                      | 09:20      | 09:25    |                |             | 25            | 75    | 57.6 °F          | 7.12       | 500          | 355             | Turbid.   |
|                                      | 09:25      | 09:30    |                |             | 25            | 100   | 57.3 °F          | 7.04       | 570          | 206             | Turbid DO = 5.78 mg/L                             |
|                                      | 09:30      | 09:35    |                |             | 25            | 125   | 57.2 °F          | 7.02       | 574          | 155             | Turbid DO = 5.81 mg/L                             |
|                                      | 09:46      | 10:00    |                |             |               |       |                  |            |              |                 | Stop Pump. to Surger.                             |
|                                      | 10:32      |          | 69.91          | 87.00       |               |       |                  |            |              |                 | Surger. level                                     |
|                                      | 10:37      | 10:42    |                |             | 200           | 145   | 60.7 °F          | 6.81       | 561          | Over Range      | Water level at TO DO = 8.35 mg/L ORP = 194 ORP mv |
|                                      | 10:42      | 10:47    |                |             | 20            | 165   | 60.1 °F          | 6.87       | 560          | 900             | DO = 9.47 mg/L ORP = 192 ORP mv Turbid            |
|                                      | 10:47      | 10:52    |                |             | 20            | 185   | 61.1             | 6.99       | 557          | 439             | DO = 7.57 mg/L ORP = 185 ORP mv Turbid            |

Measurements from TOC unless otherwise noted.

Well Development Form

| Project Name: <i>Schilling 5-1</i>   |              | Project Number: |                |              |               | Well Number: <i>MW-04</i> |                 |             |              |                 |            |             |                                     |
|--------------------------------------|--------------|-----------------|----------------|--------------|---------------|---------------------------|-----------------|-------------|--------------|-----------------|------------|-------------|-------------------------------------|
| Observations During Well Development |              |                 |                |              |               |                           |                 |             |              |                 |            |             |                                     |
| Date                                 | Start time   | End time        | Depth to water | Total depth  | Water removed |                           | Temp (degree F) | pH (units)  | S.C. (µS/cm) | Turbidity (NTU) | ORP (mV)   | DO (mg/L)   | Remarks (Color, Odor, Particulates) |
|                                      |              |                 |                |              | Gallons       | Total                     |                 |             |              |                 |            |             |                                     |
| <i>09/07/11</i>                      | <i>10:52</i> | <i>10:57</i>    |                |              | <i>20</i>     | <i>205</i>                | <i>60.8</i>     | <i>6.95</i> | <i>551</i>   | <i>274</i>      | <i>181</i> | <i>6.59</i> | <i>Turbid</i>                       |
|                                      | <i>10:57</i> | <i>11:02</i>    |                |              | <i>20</i>     | <i>225</i>                | <i>60.1</i>     | <i>6.96</i> | <i>556</i>   | <i>244</i>      | <i>179</i> | <i>6.76</i> | <i>Cloudy</i>                       |
|                                      | <i>11:02</i> | <i>11:07</i>    |                |              | <i>20</i>     | <i>245</i>                | <i>60.4</i>     | <i>6.94</i> | <i>557</i>   | <i>224</i>      | <i>178</i> | <i>6.89</i> | <i>Cloudy</i>                       |
|                                      | <i>11:07</i> | <i>11:12</i>    |                |              | <i>20</i>     | <i>265</i>                | <i>59.6</i>     | <i>6.93</i> | <i>553</i>   | <i>194</i>      | <i>177</i> | <i>6.47</i> | <i>Cloudy</i>                       |
|                                      | <i>11:12</i> | <i>11:17</i>    |                |              | <i>20</i>     | <i>285</i>                | <i>59.6</i>     | <i>6.98</i> | <i>556</i>   | <i>170</i>      | <i>176</i> | <i>6.26</i> | <i>Cloudy</i>                       |
|                                      | <i>11:17</i> | <i>11:22</i>    |                |              | <i>20</i>     | <i>305</i>                | <i>59.8</i>     | <i>6.97</i> | <i>553</i>   | <i>142</i>      | <i>176</i> | <i>6.37</i> |                                     |
|                                      | <i>11:22</i> |                 |                |              |               |                           |                 |             |              |                 |            |             | <i>Stop Pumping for Level</i>       |
|                                      | <i>13:07</i> | <i>13:24</i>    |                |              |               |                           |                 |             |              |                 |            |             | <i>Surge Well</i>                   |
|                                      | <i>13:29</i> |                 | <i>69.94</i>   | <i>87.00</i> |               |                           |                 |             |              |                 |            |             |                                     |
|                                      | <i>13:30</i> | <i>13:45</i>    |                |              | <i>28</i>     | <i>337</i>                |                 |             |              |                 |            |             | <i>Pump Quite Running</i>           |
|                                      | <i>13:40</i> |                 |                |              |               |                           |                 |             |              |                 |            |             | <i>Restart Pump</i>                 |
|                                      | <i>13:40</i> | <i>13:50</i>    |                |              | <i>40</i>     | <i>373</i>                | <i>66.7</i>     | <i>7.51</i> | <i>559</i>   | <i>485</i>      | <i>220</i> | <i>7.51</i> | <i>Cloudy</i>                       |
|                                      | <i>13:58</i> | <i>14:00</i>    |                |              | <i>40</i>     | <i>413</i>                | <i>64.9</i>     | <i>7.37</i> | <i>532</i>   | <i>135</i>      | <i>206</i> | <i>6.61</i> | <i>Cloudy</i>                       |
|                                      | <i>14:00</i> | <i>14:10</i>    |                |              | <i>40</i>     | <i>453</i>                | <i>64.7</i>     | <i>7.03</i> | <i>531</i>   | <i>84</i>       | <i>212</i> | <i>6.04</i> | <i>Clear</i>                        |
|                                      | <i>14:10</i> | <i>14:20</i>    |                |              | <i>40</i>     | <i>493</i>                | <i>62.7</i>     | <i>7.02</i> | <i>524</i>   | <i>54</i>       | <i>213</i> | <i>7.06</i> | <i>Clear</i>                        |
|                                      | <i>14:20</i> | <i>14:30</i>    |                |              | <i>40</i>     | <i>533</i>                | <i>62.2</i>     | <i>6.97</i> | <i>525</i>   | <i>153</i>      | <i>216</i> | <i>6.55</i> |                                     |
|                                      | <i>14:30</i> | <i>14:40</i>    |                |              | <i>40</i>     | <i>573</i>                | <i>62.5</i>     | <i>6.87</i> | <i>525</i>   | <i>372</i>      | <i>218</i> | <i>6.43</i> | <i>Turbid</i>                       |
|                                      | <i>14:40</i> | <i>14:50</i>    |                |              | <i>40</i>     | <i>613</i>                | <i>62.2</i>     | <i>6.84</i> | <i>524</i>   | <i>245</i>      | <i>217</i> | <i>6.32</i> | <i>Turbid</i>                       |
|                                      | <i>14:50</i> | <i>15:00</i>    |                |              | <i>40</i>     | <i>653</i>                | <i>62.4</i>     | <i>6.84</i> | <i>523</i>   | <i>191</i>      | <i>216</i> | <i>7.45</i> | <i>Cloudy</i>                       |
|                                      | <i>15:00</i> | <i>15:10</i>    |                |              | <i>40</i>     | <i>693</i>                | <i>62.4</i>     | <i>6.81</i> | <i>504</i>   | <i>183</i>      | <i>216</i> | <i>7.45</i> | <i>Cloudy</i>                       |
|                                      | <i>15:10</i> | <i>15:20</i>    |                |              | <i>40</i>     | <i>733</i>                | <i>62.5</i>     | <i>6.86</i> | <i>511</i>   | <i>130</i>      | <i>213</i> | <i>7.90</i> | <i>Cloudy</i>                       |
|                                      | <i>15:20</i> | <i>15:30</i>    |                |              | <i>40</i>     | <i>773</i>                | <i>62.6</i>     | <i>6.92</i> | <i>527</i>   | <i>154</i>      | <i>208</i> | <i>6.49</i> | <i>Cloudy</i>                       |
|                                      | <i>15:30</i> | <i>15:40</i>    |                |              | <i>40</i>     | <i>813</i>                | <i>62.7</i>     | <i>6.88</i> | <i>519</i>   | <i>75</i>       | <i>208</i> | <i>7.80</i> | <i>Clear</i>                        |
|                                      | <i>15:40</i> | <i>15:50</i>    |                |              | <i>40</i>     | <i>843</i>                | <i>61.9</i>     | <i>6.95</i> | <i>515</i>   | <i>64</i>       | <i>207</i> | <i>7.87</i> | <i>Clear</i>                        |
|                                      | <i>15:50</i> | <i>16:00</i>    |                |              | <i>40</i>     | <i>883</i>                | <i>62.1</i>     | <i>6.96</i> | <i>527</i>   | <i>49</i>       | <i>206</i> | <i>8.11</i> | <i>Clear</i>                        |
|                                      | <i>16:00</i> |                 | <i>69.85</i>   | <i>87.00</i> |               |                           |                 |             |              |                 |            |             | <i>Stop development</i>             |

Measurements from TOC unless otherwise noted.

TABLE 1  
Monitoring Well Network Construction Information

Schilling Air Force Base Atlas S-01, Project No. B07KS025902 - Correct locations provided by Samantha See, E.I.T. (USACE-KCD)

| Well ID                         | Northing   | Easting     | Latitude      | Longitude      | Top of Casing (ft amsl) | Well Depth (ft bgs) | Top of Screen (ft bgs) | Bottom of Screen (ft bgs) | Well Diameter (inches) | Sampling Frequency |
|---------------------------------|------------|-------------|---------------|----------------|-------------------------|---------------------|------------------------|---------------------------|------------------------|--------------------|
| <b>Shallow Monitoring Wells</b> |            |             |               |                |                         |                     |                        |                           |                        |                    |
| MW-02                           | 279032.169 | 1441867.496 | 39.0985705727 | -97.5435716983 | 1397.54                 | 90.1                | 70.1                   | 90.1                      | 2                      | Annually           |
| MW-03                           | 278937.277 | 1441577.013 | 39.0983140530 | -97.5445969123 | 1384.71                 | 78.60               | 58.60                  | 78.60                     | 2                      | Annually           |
| MW-04                           | 279109.941 | 1441576.113 | 39.0987881310 | -97.5445970239 | 1389.17                 | 86.00               | 66.00                  | 86.00                     | 2                      | Annually           |
| MW-05                           | 279344.840 | 1441570.378 | 39.0994331480 | -97.5446130692 | 1383.92                 | 79.65               | 59.65                  | 79.65                     | 2                      | Annually           |
| MW-06                           | 279210.863 | 1442001.957 | 39.0990593324 | -97.5430947409 | 1404.76                 | 101.40              | 81.40                  | 101.40                    | 2                      | Annually           |
| MW-07                           | 279310.810 | 1442343.890 | 39.0993290033 | -97.5418881317 | 1384.41                 | 79.70               | 59.70                  | 79.70                     | 2                      | Annually           |
| MW-09                           | 278756.990 | 1441794.260 | 39.0978160555 | -97.5438346336 | 1391.50                 | 85.90               | 65.90                  | 85.90                     | 2                      | Annually           |
| MW-10S                          | 279105.200 | 1441252.830 | 39.0987795724 | -97.5457362163 | 1388.86                 | 81.20               | 61.20                  | 81.20                     | 2                      | Annually           |
| MW-14S                          | 279330.968 | 1440981.456 | 39.0994031739 | -97.5466884379 | 1368.40                 | 71.25               | 47.70                  | 67.70                     | 2                      | Annually           |
| <b>Deep Monitoring Wells</b>    |            |             |               |                |                         |                     |                        |                           |                        |                    |
| MW-08                           | 279035.52  | 1441848.21  | 39.0985800401 | -97.5436395941 | 1396.88                 | 126.90              | 106.90                 | 126.90                    | 2                      | Annually           |
| MW-10D                          | 279086.68  | 1441253.16  | 39.0987287194 | -97.5457353809 | 1390.13                 | 124.70              | 104.70                 | 124.70                    | 2                      | Annually           |
| MW-11                           | 279409.82  | 1441246.39  | 39.0996160246 | -97.5457535239 | 1375.15                 | 114.00              | 94.00                  | 114.00                    | 2                      | Annually           |
| MW-12                           | 278823.90  | 1441248.66  | 39.0980072936 | -97.5457558816 | 1391.58                 | 127.10              | 107.10                 | 127.10                    | 2                      | Annually           |
| MW-13                           | 279215.44  | 1440657.48  | 39.0990904279 | -97.5478320311 | 1362.53                 | 93.90               | 73.90                  | 93.90                     | 2                      | Annually           |
| MW-14D                          | 279337.39  | 1440978.52  | 39.0994208465 | -97.5466986699 | 1368.10                 | 106.93              | 83.00                  | 103.00                    | 2                      | Annually           |
| <b>Other Wells</b>              |            |             |               |                |                         |                     |                        |                           |                        |                    |
| MW-01                           | 278836.203 | 1441792.168 | 39.0980335714 | -97.5438405989 | 1391.64                 | 91.15               | 65.73                  | 91.15                     | 4                      | Annually           |
| TH 06-10                        | 278851.15  | 1442371.89  | 39.0980665739 | -97.5417976666 | 1390.63                 | 115.00              | 95.00                  | 115.00                    | 2                      | Annually           |
| TH 09-10                        | 279590.79  | 1440702.39  | 39.1001203716 | -97.5476671807 | 1366.13                 | 104.00              | 83.50                  | 103.50                    | 2                      | Annually           |

Notes:

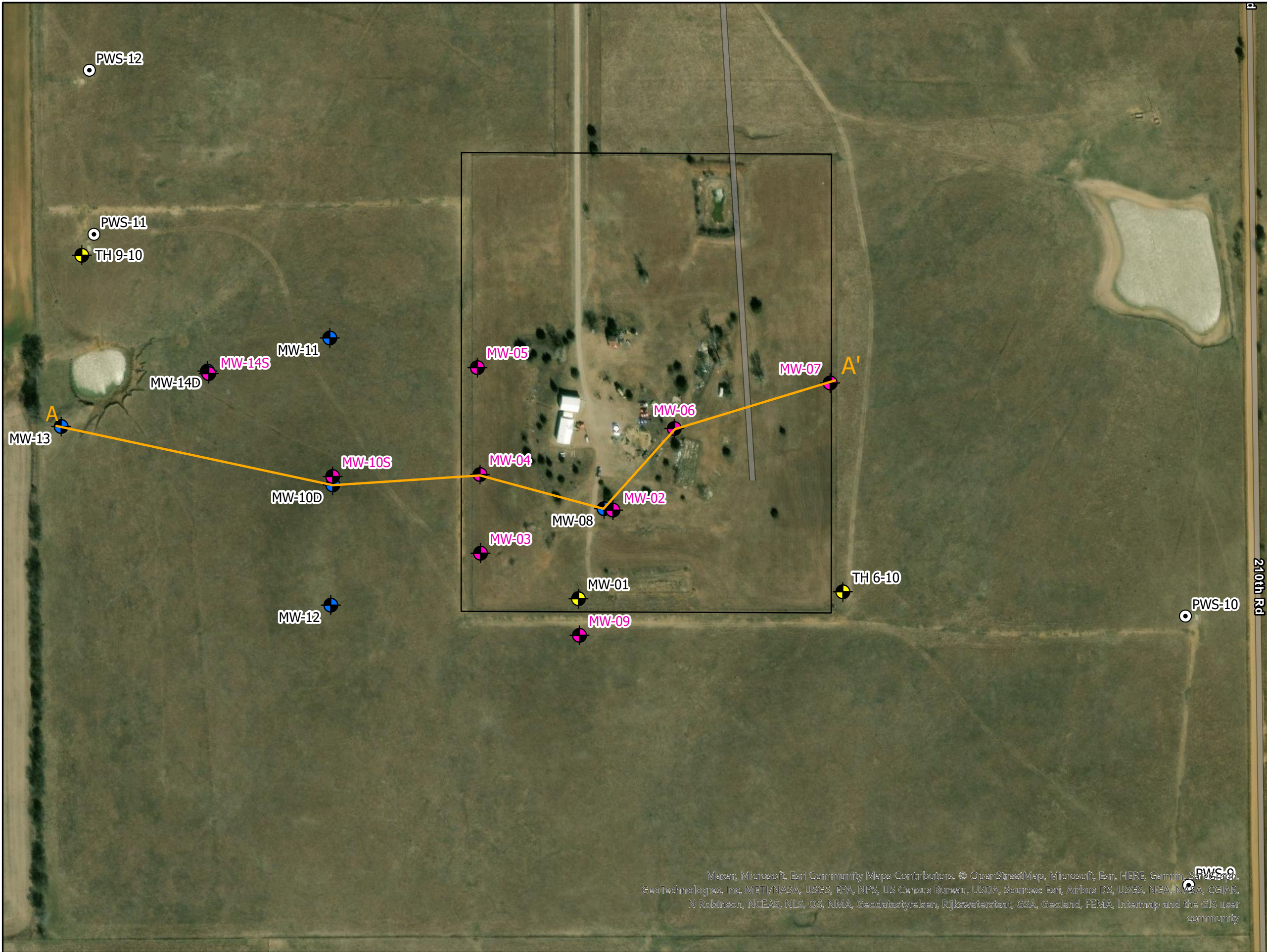
- 1) Horizontal Coordinates are Kansas State Plane North, Zone 1501, NAD 1983 US Survey feet and Geographic NAD83
- 2) Elevations are NAVD 1988 US Survey feet
- 3) ft amsl = feet above mean sea level
- 4) ft bgs = feet below ground surface

*received KGS-DRL 1/4/2024 (dls)*



Table 1: MODFLOW Observation Data

| Well    | Northing   | Easting     | Ground Surface Elevation | TOC Corrected Elevation (USACE -0.49 ft) | Screen Mid Point Elevation | September 2011 Water Level Elevation |
|---------|------------|-------------|--------------------------|--|----------------------------|--------------------------------------|
| MW-02   | 279032.169 | 1441867.496 | 1397.73                  | 1397.05                                  | 1316.95                    | 1319.63                              |
| MW-03   | 278937.277 | 1441577.013 | 1385.01                  | 1384.22                                  | 1315.62                    | 1319.17                              |
| MW-04   | 279109.941 | 1441576.113 | 1389.43                  | 1388.68                                  | 1312.68                    | 1319.17                              |
| MW-05   | 279344.84  | 1441570.378 | 1384.18                  | 1383.43                                  | 1313.78                    | 1319.24                              |
| MW-06   | 279210.771 | 1442001.931 | 1405.08                  | 1404.27                                  | 1312.87                    | 1319.87                              |
| TH1-10  | 280513.40  | 1440693.08  | 1359.12                  | 1361.58                                  | 1280.08                    | 1315.79                              |
| TH2-10  | 278194.98  | 1440713.24  | 1355.61                  | 1358.19                                  | 1278.19                    | 1317.62                              |
| TH3-10  | 278198.09  | 1443127.10  | 1381.35                  | 1383.58                                  | 1277.58                    | 1321.05                              |
| TH4-10  | 280618.82  | 1443138.71  | 1377.74                  | 1379.58                                  | 1276.58                    | 1323.76                              |
| TH5-10  | 278778.84  | 1443158.88  | 1374.51                  | 1377.21                                  | 1279.21                    | 1321.72                              |
| TH6-10  | 278851.15  | 1442371.89  | 1388.27                  | 1390.63                                  | 1285.63                    | 1320.23                              |
| TH8-10  | 279917.13  | 1440699.72  | 1371.23                  | 1373.77                                  | 1273.77                    | 1316.68                              |
| TH9-10  | 279590.79  | 1440702.39  | 1363.79                  | 1366.13                                  | 1275.13                    | 1317.08                              |
| TH11-10 | 279108.87  | 1441553.16  | 1388.16                  | 1390.93                                  | 1283.93                    | 1319.36                              |
| TW10-10 | 279593.93  | 1440716.42  | 1364.36                  | 1366.96                                  | 1275.96                    | 1317.12                              |
| TW12-10 | 278201.09  | 1443112.03  | 1381.89                  | 1384.31                                  | 1278.31                    | 1321.07                              |
| TW13-10 | 279970.88  | 1440696.52  | 1371.57                  | 1373.99                                  | 1277.99                    | 1316.64                              |
| TW7-10  | 278797.28  | 1443161.43  | 1375.78                  | 1378.21                                  | 1282.21                    | 1321.76                              |



### Legend

- Missile Property Boundary
- Shallow Monitoring Well
- Deep Monitoring Well
- Other Monitoring Well
- PWS Well

LTM - Long Term Monitoring  
 Note: Cross-section A to A' shown on Figure 2-5

0 50 100 200 300 400 Feet



Figure 2-4  
 LTM Network and Existing Wells  
 2023 Annual Report  
 Schilling Air Force Base Atlas Site S-01  
 Bennington, Kansas

|                     |                 |
|---------------------|-----------------|
| DESIGNED BY: SMC    | CHECKED BY: SS  |
| DRAWN BY: SMC       | REVIEWED BY: SS |
| DATE: DECEMBER 2023 |                 |

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