# APPENDIX A

# Groundwater Monitoring Field Logs

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# Spring 2008 Sampling Event

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**YSI Calibration Form**
**Daily 2007 GW Monitoring for New Bedford Harbor – G606422**

Instrument Model # YSI 6600V2 S/N# 05H1397 AC

| | |
|---|---|
| Date: 5/19/08 / 1000 | Initials: MW/MRF |
| DO membrane changed? Y (N) NA | Turbidity Wiper Changed? Y (N) |
| Battery Voltage: 12.3 | Turbidly wiper parks 180° from optics? (Y) N |

| Parameter | Initial Reading | Calibrated Reading | Calibration Data (acceptable range) |
|---|---|---|---|
| Conductivity (mS/cm) 1.021 | ~~.974~~ | 1.000 | Cell constant (4.55 – 5.45) |
| Depth ~~(ft)~~ meters | -.174 | 0.00 | Pressure offset, vented ( 0 ± 6) |
| Turbidity (NTU) 0 | -1.9 | 0.0 | Turbidity Offset: |
| Turbidity (NTU) 123 | 121.4 | 123.0 | |
| D.O. (% Sat) | 80.6 | 100.5 | D.O. Gain (0.7 - 1.4) |
| pH 4 | 3.89 | 4.00 | |
| pH 7 | 6.86 | 7.00 | |
| ORP | 236.7 | 244.0 | |
| **Comments:** | | | |

| | |
|---|---|
| Date: 5/19/08 / 1836 | Initials: MW |
| DO membrane changed? Y (N) NA | Turbidity Wiper Changed? ~~Y~~ (N) |
| Battery Voltage: 12.8 | Turbidly wiper parks 180° from optics? (Y) N |

① End of Day

| Parameter | ① ~~Initial Reading~~ | Calibrated Reading | Calibration Data (acceptable range) |
|---|---|---|---|
| Conductivity (mS/cm) | 0.964 | | Cell constant (4.55 – 5.45) |
| Depth ~~(ft)~~ m | 0.013 | | Pressure offset, vented ( 0 ± 6) |
| Turbidity (NTU) 0 | 1.2 | | Turbidity Offset: |
| Turbidity (NTU) 123 | 124.3 | | |
| D.O. (% Sat) | 101.9 | | D.O. Gain (0.7 - 1.4) |
| pH 4 | 4.00 | | |
| pH 7 | 6.99 | | |
| ORP | 241.7 | | |
| **Comments:** | | | |

**YSI Calibration Form**
**Daily 2007 GW Monitoring for New Bedford Harbor – G606422**

Instrument Model # YSI 6600V2 S/N# 05H1397 AC

| | |
|---|---|
| Date: 5/20/08 | Initials: MLF |
| DO membrane changed? Y (N) NA | Turbidity Wiper Changed? Y (N) |
| Battery Voltage: 13.2 | Turbidly wiper parks 180° from optics? (Y) N |

| Parameter | Initial Reading | Calibrated Reading | Calibration Data (acceptable range) |
|---|---|---|---|
| Conductivity (mS/cm) | .972 | 1.00 | Cell constant (4.55 – 5.45) |
| Depth ~~(ft)~~ m | .088 | 0.00 | Pressure offset, vented ( 0 ± 6) |
| Turbidity (NTU) 0 | 0.0 | 0.0 | Turbidity Offset: |
| Turbidity (NTU) 123 | 125.2 | 123 | |
| D.O. (% Sat) | 99.3 | 98.5 | D.O. Gain (0.7 - 1.4) |
| pH 4 | 3.93 | 4.00 | |
| pH 7 | 6.99 | 7.00 | |
| ORP | 247.4 | 244 | |
| **Comments:** | | | |

| | |
|---|---|
| Date: 5/20/08 / 1507 | Initials: MW |
| DO membrane changed? Y (N) NA | Turbidity Wiper Changed? Y (N) |
| Battery Voltage: 12.6 | Turbidly wiper parks 180° from optics? (Y) N |

| Parameter | Initial Reading (1) | Calibrated Reading | Calibration Data (acceptable range) |
|---|---|---|---|
| Conductivity (mS/cm) | 1.007 | | Cell constant (4.55 – 5.45) |
| Depth ~~(ft)~~ m | -0.0057 | | Pressure offset, vented ( 0 ± 6) |
| Turbidity (NTU) 0 | 0.5 | | Turbidity Offset: |
| Turbidity (NTU) 123 | 122.3 | | |
| D.O. (% Sat) | 97.7 | | D.O. Gain (0.7 - 1.4) |
| pH 4 | 4.08 | | |
| pH 7 | 7.05 | | |
| ORP | 241.3 | | |
| **Comments:** | | | |

(1) End of Day

**Battelle**
*The Business of Innovation*

Well ID: MW-7A

## Groundwater Sample Collection Record

Client: ACOE  Date: 5/19/08  Time: 11 am  Start 11 AM  am/pm
Project No: NBH  Finish 1320  am/pm
Site Location: Sawyer Street
Weather Conditions:  Collectors: JMF / MRF / MW

### 1. WATER LEVEL / WELL DATA

① Measured Well Depth: ~~8.02~~ ② 15.03 ft  Height of Water Column: ⊗ 4.55 ft  0.16 GAL/FT (2 IN) 0.65 GAL/FT (4 IN) = 1.5 GAL/FT (6 IN)  Gallons (Volume)

Depth to Water (initial): ① 10.48 ft  Purged Volume: 8.586 + .600 = 9.186

Depth to Water (pump in well): ② ~~13.0~~ 10.51 ft  Pump Depth: 13.0 ft ↑ from top of well casing

② S/B JMF 5/19/08 ③ Please ignore JMF 5/19/08

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Solinst Water level Meter | | | |
| YSI 6600 V2 multi parameter water quality Sonde | | | ~~08~~ ③ 0581397 AC |
| MP10 QED Controller | Micro Purge Basics | | MP10-1628 |

Probes w/ Optical DO, Turb., pH, Spec. Cond., ORP, Temp

| Time (24 hr) | ±3% Temp (°C) | ±3% Spec Cond. (µS/cm) | ±10% DO (mg/L) | ±0.1 pH | ±10 ORP (mV) | ±10% <1 Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1132 | 13.16 | +0.786 | 4.37 | 6.27 | +277.9 | 14.7 | — | 153 | 10.75 | -0.24 | clear |
| 1135 | 12.45 | +0.778 | 4.08 | 6.45 | +270.7 | 12.1 | .459 | 154 | 10.82 | -0.31 | clear |
| 1138 | 11.92 | +0.769 | 3.66 | 6.57 | +266.9 | 11.8 | .921 | 101 | 10.82 | -0.31 | clear |
| 1141 | 12.11 | 0.768 | 3.38 | 6.61 | +265.1 | 11.0 | 1.845 | 101 | 10.82 | -0.31 | |
| 1144 | 12.09 | 0.772 | 3.05 | 6.63 | +263.7 | 10.5 | 2.769 | 101 | 10.83 | -0.32 | |
| 1147 | 12.13 | 0.777 | 2.79 | 6.63 | +262.7 | 10.4 | 3.693 | | 10.84 | -0.33 | |
| 1150 | 12.13 | 0.787 | 2.48 | 6.63 | 261.2 | 10.3 | 4.617 | 101 | 10.84 | -0.33 | |
| 1153 | 11.98 | 0.798 | 2.24 | 6.63 | 260.2 | 10.3 | 4.920 | | 10.85 | -0.34 | |
| 1156 | 11.95 | 0.807 | 2.03 | 6.63 | 259.0 | 10.3 | 5.223 | | | | |
| 1159 | 11.78 | 0.821 | 1.84 | 6.62 | 256.8 | 10.2 | 5.526 | 102 | | | |
| 1202 | 11.77 | 0.828 | 1.70 | 6.63 | 253.5 | 11.3 | 5.832 | | 10.86 | -0.35 | |
| 1205 | 11.80 | .833 | 1.54 | 6.62 | 250.5 | 11.6 | 6.444 | 102 | 10.88 | ~~-0.37~~ ② 0.37 | |
| 1208 | 11.65 | .842 | 1.36 | 6.63 | 248.4 | 11.7 | 6.75 | | 10.89 | -0.38 | |
| 1211 | 11.70 | .844 | 1.28 | 6.63 | 247.3 | 11.6 | 7.056 | | 10.87 | -0.36 | clear |
| 1214 | 11.69 | .849 | 1.20 | 6.63 | 246.0 | 11.7 | 7.362 | | 10.88 | -0.37 | |
| 1217 | 11.56 | .854 | 1.08 | 6.63 | 244.7 | 11.9 | 7.668 | | 10.88 | -0.37 | |

- reduced discharge Rate 1137

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-07A-051908 | 3 sets | 40ml vial | HCl | VOA (MS/MSD) | 1225 |
| MW-07A-051908 | 4 | Amber 1L | 4°C | PCB (MS/MSD) | 1241 |
| MW-07A-051908 | 1 | 500ml | $HNO_3$ | Metals (MS/MSD) | 1315 |

**NOTES:** ① @ start of day 0904 from top of well casing JMF/MRF 5/19/08

② S/B MS/CM JMF 2/12/09

Signature: [signature]  Date: 5/19/08

**Battelle**
*The Business of Innovation*

Well ID: MW-7A

## Groundwater Sample Collection Record

Client: NBH - ACOE  Date: 5/19/08  Time: 11 Start  am/pm
Project No: S. NBH  1320 Finish  am/pm
Site Location: Sawyer St
Weather Conditions: Partly Sunny  Collectors: JMF/MRF/HW

### 1. WATER LEVEL / WELL DATA

Measured Well Depth:  Height of Water Column:

0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =  Gallons (Volume)
1.5 GAL/FT (6 IN)

Depth to Water (initial):_____ Purged Volume:_____

Depth to Water (pump in well):_____

see page 1

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

see page 1

| Time (24 hr) | Temp (°C) | Spec Cond (mS/cm) | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1220 | 11.61 | .857 | 1.03 | 6.64 | 243.7 | 12.0 | 8.28 | | 10.88 | -0.37 | clear |
| 1223 | 11.56 | .860 | 0.93 | 6.63 | 242.7 | 12.0 | 8.586 | | 10.89 | -0.38 | |
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* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

see page 1

**NOTES:**

Signature: [signature]  Date: 5/19/08

**Battelle**
*The Business of Innovation*

Well ID: MW-6

## Groundwater Sample Collection Record

Client: ACOE
Date: 5/19/08
Time: 1325 Start am/pm
Project No: NBH
Finish ~~1458~~ 1558 am/pm
Site Location: Sawyer Street
Weather Conditions: Partly Cloudy + Windy
Collectors: JMF/MRF/MW

### 1. WATER LEVEL / WELL DATA

Measured Well Depth: 19.48 ft (1)
Height of Water Column: 7.02 ft
0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =
1.5 GAL/FT (6 IN)
Gallons (Volume)

(1) Depth to Water (initial): 12.46 ft
Purged Volume: 7.705 + .6 (2) = 8.305

Depth to Water (pump in well): ~~17.48~~ @ ~~12~~ 13.19 ft

Pump Depth 17.48 ft
↑ from top of well casing

(2) Please ignore JMF 5/19/09

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Solinst $H_2O$ level meter | | | 101-200-P2 DC |
| MP10 Controller | | | MP10-1586 |
| YSI 6600 V2 Probes: Turb, DO, pH, ORP, temp | | | 05S1397 AC |
| CO2 cylinder | | | |

| Time (24 hr) | ±3% Temp (°C) | ±3% Spec Cond ~~(µS/cm)~~ (3) | ±10% DO (mg/L) | ±0.1 pH | ±10 ORP (mV) | ±10% Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) (4) | Color/Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ±.4 | ±.02 | | | | | | | | | |
| 1325 | 14.11 | 0.564 | 2.84 | 7.30 | 256.2 | 21.2 | — | 100 | 13.8 | ~~-0.7~~ -0.61 | clear/No odor |
| 1330 | 12.90 | 0.558 | 2.25 | 7.15 | 249.3 | 12.6 | .5 | 49 | 14.05 | -0.86 | |
| 1335 | 13.42 | 0.558 | 2.07 | 7.12 | 255.3 | 10.2 | .745 | | 13.8 | ~~-0.7~~ -0.61 | |
| 1340 | 14.47 | 0.557 | 1.83 | 7.13 | 246.6 | 8.7 | .99 | 45 | 13.7 | -0.51 | |
| 1345 | 14.81 | 0.561 | 1.68 | 7.13 | 238.1 | 6.6 | 1.215 | 45 | 13.65 | -0.46 | |
| 1350 | 15.08 | 0.562 | 1.51 | 7.12 | 227.7 | 6.4 | 1.44 | ~~45~~ 44 | 13.65 | -0.46 | |
| 1355 | 15.17 | 0.564 | 1.39 | 7.11 | 218.1 | 5.8 | 1.660 | 44 | 13.63 | -0.44 | |
| 1400 | 15.32 | 0.564 | 1.31 | 7.11 | 212.3 | 5.6 | 1.88 | ~~50~~ 55 | 13.58 | -0.39 | Δ discharge rate @ 1401 |
| 1405 | 14.31 | 0.568 | 1.20 | 7.09 | 198.3 | 5.4 | 2.155 | 80 | 13.68 | -0.49 | |
| 1410 | 13.34 | 0.566 | 1.16 | 7.10 | 178.5 | 6.7 | 2.555 | | 13.80 | -0.61 | Δ discharge @ 1411 |
| 1415 | 13.13 | 0.564 | 1.17 | 7.08 | 165.3 | 7.0 | 2.955 | 60 | 13.85 | -0.66 | |
| 1420 | 12.87 | 0.564 | 1.12 | 7.07 | 143.5 | 6.9 | 3.255 | ~~65~~ 65 | 13.96 | -0.77 | Δ discharge @ 1422 |
| 1425 | 13.05 | 0.570 | 0.93 | 7.11 | 114.7 | 5.7 | 3.58 | ~~50~~ 75 | 13.95 | -0.76 | |
| 1430 | 13.22 | 0.578 | 0.79 | 7.11 | 108.6 | 5.4 | 3.955 | ~~50~~ 75 | 13.88 | -0.69 | |
| 1435 | 13.08 | 0.586 | 0.62 | 7.14 | 86.8 | 5.2 | 4.33 | | 13.85 | -0.66 | |
| 1440 | 12.89 | 0.592 | 0.48 | 7.15 | 66.8 | 5.3 | 4.705 | 75 | 13.85 | -0.66 | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-06-051908 ~~MW-07A-051908~~ | 1 set | 40 ml vial | HCl | VOC | 1519 |
| MW ↓ | 2 | 1L Amber | 4°C | PCB | 1522 |
| | 1 | 500 ml Teflon | $HNO_3$ | Metals | 1546 |

**NOTES:** (1) taken 5/19/08 0916 JMF/MRF (top of well casing)
(2) - $H_2O$ in flow thru cell
(3) S/B mS/cm JMF 6/10/09
(4) S/B JMF 6/12/09

Signature: [signature] Date: 5/19/08

**Battelle**
*The Business of Innovation*

Well ID: MW-6

## Groundwater Sample Collection Record

Client: ACOE
Date: 5/19/08
Time:
Start 1325 am/pm
Finish 1556 am/pm
Project No: NBH
Site Location: Sawyer St
Weather Conditions: Partly Cloudy + Windy
Collectors: JMF / MCF / MW

### 1. WATER LEVEL / WELL DATA

Measured Well Depth:
Height of Water Column:
0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =
1.5 GAL/FT (6 IN)
Gallons (Volume)

Depth to Water (initial):
Purged Volume:
Depth to Water (pump in well):

see page 1

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| | | | |

see page 1

| Time (24 hr) | ±3% Temp (°C) | ±3% Spec Cond (µS/cm) | ±10% DO (mg/L) | ±0.1 pH | ±10 ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1445 | 13.05 | 0.595 | .43 | 7.16 | *54.5 | 5.2 | 5.08 | ~~80~~ 75 | 13.8 | 0.61 | |
| 1450 | 13.19 | 0.597 | .38 | 7.15 | *40.9 | 5.2 | 5.455 | | ← | | |
| 1455 | 12.83 | 0.600 | .35 | 7.11 | *34.5 | 5.4 | 5.83 | ~~50~~ 75 | 13.8 | 0.61 | |
| 1500 | 12.68 | 0.601 | .32 | 7.17 | *25.5 | 5.4 | 6.205 | 75 | 13.8 | 0.61 | |
| 1505 | 12.51 | 0.602 | .31 | 7.18 | *19.1 | 5.7 | 6.58 | | 13.78 | -0.59 | |
| 1510 | 12.61 | 0.602 | .30 | 7.18 | 12.8 | 5.6 | 6.955 | 75 | 13.78 | -0.59 | |
| 1515 | 12.66 | 0.603 | .31 | 7.21 | 6.7 | 5.7 | 7.33 | | | -0.59 | |
| 1518 | 12.69 | 0.604 | 0.30 | 7.19 | 4.5 | 5.7 | 7.705 | | 13.78 | -0.59 ✓ | |
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* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| | | | | | |

see page 1

**NOTES:**

Signature: [signature]
Date: 5/19/08

Pg 1 of 1

**Battelle**
*The Business of Innovation*

Well ID: MW-1

## Groundwater Sample Collection Record

Client: ACOE
Date: 5/19/08 Time: ~~1402~~ Start ~~1406~~ 1602 am/pm
Project No: NRH
Finish ~~1630~~ 1830 am/pm
Site Location: Sawyer Street
Weather Conditions: Partly Sunny + Windy Collectors: JMF/MRF/MW

### 1. WATER LEVEL / WELL DATA

① Measured Well Depth: 24.39 ft Height of Water Column: 9.09 ft

0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) = Gallons (Volume)
1.5 GAL/FT (6 IN)

① Depth to Water (initial): 15.3 ft Purged Volume: 3.62 * .600 ② = 4.22

Depth to Water (pump in well): 14.55 ft

Pump Depth: 22.0 ft
↑ from top of well casing

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Solinst $H_2O$ level Mete | | | A10126A |
| MP10 Controller | QED | MP10 1586 | |
| YSI 6600 V2 | Probes - DO, Turb, Temp pH, Cond | | 0581397AC |

| Time (24 hr) | ±3 Temp (°C) | ±3 Spec Cond. ~~(µS/cm)~~ ③ | ±10 DO (mg/L) | ±0.1 pH | ±10 ORP (mV) | ±10% Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1616 | 13.35 | .918 | 2.83 | 7.09 | 209.8 | 29.5 | — | 50 | 15.65 | -1.1 | |
| 1621 | 13.46 | .918 | 2.48 | 7.10 | 213.0 | 21.5 | .25 | 50 | 16.10 | ~~-.35~~ -1.45 | |
| 1628 | 13.49 | .924 | 2.27 | 7.13 | 214.1 | 17.1 | .60 | 15 | 16.22 | -1.67 | |
| 1634 | 13.35 | .926 | 2.05 | 7.07 | 214.7 | 15.7 | .69 | 60 | 16.38 | -1.83 | |
| 1639 | 13.07 | .927 | 1.87 | 7.07 | 118.2 | 13.3 | .99 | 50 | 16.68 | -2.13 | |
| 1644 | 12.81 | 0.925 | 1.71 | 7.06 | 74.4 | 10.8 | 1.24 | 45 | 16.90 | -2.35 | |
| 1649 | 12.66 | 0.925 | 1.64 | 7.07 | 61.7 | 10.3 | 1.49 | 45 | 17.05 | -2.5 | |
| 1654 | 12.80 | 0.925 | 1.55 | 7.06 | 53.6 | 9.4 | 1.74 | | 17.11 | -2.56 | |
| 1659 | 12.79 | 0.927 | 1.48 | 7.05 | 43.4 | 8.2 | 1.99 | 45 | 17.16 | -2.61 | |
| 1704 | 12.74 | 0.928 | 1.39 | 7.02 | 34.9 | 7.6 | 2.24 | 45 | 17.16 | -2.61 | |
| 1709 | 12.62 | 0.929 | 1.29 | 7.00 | 26.5 | 6.8 | 2.49 | 45 | 17.16 | -2.61 | |
| 1714 | 12.51 | 0.931 | 1.19 | 6.97 | 23.1 | 6.8 | 2.74 | | | | |
| 1720 | 12.47 | 0.930 | 1.05 | 7.00 | 13.6 | 6.6 | 3.01 | 45 | 17.06 | -2.51 | |
| 1725 | 12.35 | 0.931 | .95 | 6.96 | 8.2 | 6.6 | 3.26 | 45 | 17.1 | -2.55 | |
| 1729 | 12.29 | 0.932 | .88 | 6.96 | 7.0 | 6.9 | 3.44 | 45 | 17.07 | -2.52 | |
| 1733 | 12.26 | 0.932 | .84 | 6.91 | 5.8 ~~1.8~~ | 7.1 | 3.62 | 45 | 17.03 | -2.48 | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-001-051908 | 1 Set | 40ml Vial | HCL | VOC | 1735 |
| MW-001-051908 | 2 | 1L Amber | 4°C | PCB | 1742 |
| ↓ | 1 | 500ml Teflon | $HNO_3$ | METALS | 1820 |

**NOTES:** ① TAKEN 5/19/08 0911 AM JMF/MRF (to top of well casing)

② $H_2O$ left in flow thru cell

③ s/b mS/cm JMT 2/12/09

Signature: Michael Walsh Date: 5/19/08

**Battelle**
*The Business of Innovation*

Well ID: MW-5

## Groundwater Sample Collection Record

Client: ACOE
Date: 5/20/08 Time: _____ Start 0900 am/pm
Project No: NBH Finish 1050 am/pm
Site Location: Sunnyside Street
Weather Conditions: Collectors: JMF/MF/MW

### 1. WATER LEVEL / WELL DATA

① Measured Well Depth: 19.25 ✗ Height of Water Column: 11.24 ✗

0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) = Gallons (Volume)
1.5 GAL/FT (6 IN)

① Depth to Water (initial): 8.01 ✗ Purged Volume: 2.95 + .600 ② = 3.55

Depth to Water (pump in well): 8.3 ✗

Pump Depth: 17.0 ↑ from top of well casing

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| YSI 6600 V2 | | | 05B1397AC |
| MP10 Controller | | | MP10-1628 |
| Solinst Water Level Meter | | | |

| Time (24 hr) | Temp (°C) | Spec Cond. (µS/cm) ③ | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0924 | 11.34 | 3.274 | 2.16 | 7.46 | 186.8 | 7.7 | — | 75 | 9.1 | ~~7~~ -0.8 | clear / no odor |
| 0930 | 11.14 | 3.275 | 0.96 | 7.46 | 94.5 | 5.2 | .45 | | 9.55 | -1.25 | |
| 0935 | 11.07 | 3.270 | 0.65 | 7.46 | 46.8 | 4.9 | .825 | 79 | 9.70 | -1.40 | |
| 0940 | 11.02 | 3.266 | 0.48 | 7.46 | 3.2 | 4.0 | 1.22 | 68 | 9.98 | -1.68 | Δ ↓ discharge rate @ 0941 |
| 0945 | 11.22 | 3.263 | 0.37 | 7.46 | -16.5 | 3.9 | 1.56 | | 10.00 | -1.7 | |
| 0950 | 11.29 | 3.264 | 0.30 | 7.46 | -31.0 | 4.1 | 1.9 | | 10.02 | -1.72 | |
| 0955 | 11.30 | 3.263 | 0.26 | 7.46 | -41.4 | 3.9 | 2.24 | | 10.06 | -1.76 | |
| 1000 | 11.37 | 3.261 | 0.23 | 7.46 | -47.0 | 3.9 | 2.58 | 74 | 10.08 | -1.78 | |
| 1005 | 11.32 | 3.263 | 0.19 | 7.45 | -51.4 | 4.1 | 2.95 | | 10.09 | -1.79 | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time | |
|---|---|---|---|---|---|---|
| MW-005-052008 | 2 sets R&P | 40ml | HCl | VOC+(R&P) | 1007 | |
| MW-005-052008 | 3 | 1L Amber | 4°C | PCB | 1015 | - Replicate (1 of jar) |
| ↓ | 2 | 500ml Teflon | $HNO_3$ | Metals | 1050 | - Rep |

**NOTES:** ① taken on 5/19/08 @ 0928 JMF/MRF (top of well casing)

② $H_2O$ on flow thru cell

③ mS/cm 5/15 JMF 5/12/09

Signature: [signature] Date: 5/20/08

**Battelle**
*The Business of Innovation*

Well ID: MW-4A

## Groundwater Sample Collection Record

Client: ACOE
Date: 5/20/08
Time: Start 1058 am/pm
Finish 1325 am/pm
Project No: NBH
Site Location: Sawyer Street
Weather Conditions: Overcast Windy SW 15-20
Collectors: JMF/MF/MW

### 1. WATER LEVEL / WELL DATA

(1) Measured Well Depth: 24.63 ft
Height of Water Column: 15.42 ft
0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =
1.5 GAL/FT (6 IN)
Gallons (Volume)

(1) Depth to Water (initial): 9.21 ft
Purged Volume: 3.525 + .600 (2) = 4.125

Depth to Water (pump in well): ~~8.95~~ 9.21 ft

Pump Depth - 22.0 ft
ft down from top well casing

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| YSI 6600 V2 | | | 0581397 AC |
| MP10 Controller | | | MP10 - 1628 |
| Solinst water level meter | | | |

| Time (24 hr) | Temp (°C) | Spec Cond (µS/cm) | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1105 | 15.45 | 7.366 | 1.16 | 6.9 | -222.6 | 18.0 | — | 45 | 9.75 | -.54 | clear/sulfide |
| 1110 | 14.89 | 7.404 | .35 | 6.77 | -269.6 | 14.7 | .255 | 45 | 10.02 | -.81 | |
| 1115 | 14.32 | 7.315 | .14 | 6.73 | -280.1 | 12.1 | .510 | 55 | 10.21 | -1.00 | |
| 1120 | 14.07 | 7.045 | .06 | 6.72 | -281.9 | 10.1 | .785 | 55 | 10.42 | -1.21 | |
| 1125 | 14.04 | 6.722 | .02 | 6.72 | -284.1 | 9.0 | 1.06 | 55 | 10.60 | -1.39 | |
| 1130 | 13.86 | 6.337 | 0 | 6.74 | -284.2 | 8.4 | 1.335 | 55 | 10.79 | -1.58 | |
| 1136 | 13.24 | 5.926 | 0 | 6.76 | -281.7 | 9.4 | 1.6065 | 55 | 10.96 | -1.75 | |
| 1143 | 13.09 | 5.641 | 0 | 6.80 | -282.2 | 11.1 | 2.05 | 55 | 11.10 | -1.89 | |
| 1148 | 13.23 | 5.531 | 0 | 6.81 | -281.4 | 14.0 | 2.325 | 55 | 11.18 | -1.97 | |
| 1153 | 12.9 | 5.538 | 0 | 6.80 | -277 | 14.4 | 2.6 | 55 | 11.32 | -2.11 | |
| 1158 | 13.03 | 5.180 | 0 | 6.80 | -274.7 | 17.3* | 2.875 | 65 | 11.42 | -2.21 | - cleaned optics* |
| 1203 | 13.11 | 5.112 | 0 | 6.81 | -275.8 | 4.9 | 3.2 | wl | ~~11.50~~ | | |
| 1208 | 13.01 | 5.074 | 0 | 6.81 | -275.5 | 4.8 | 3.525 | | 11.50 | -2.29 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time | |
|---|---|---|---|---|---|---|
| MW-04A-052008 | 6 | 40 ml | HCl | VOC | 1217 | - 3 for QA |
| ↓ | 4 | 1 Liter | 4°C | Org. | 1227 | - 2 for QA |
| ↓ | 2 | Teflon | $HNO_3$ | metals | 1301 | - 1 for QA |

**NOTES:** (1) taken @ 0931 on 5/19/08 JMF/MRF (to top of well casing
(2) water from flow thru cell
(3) 516 mS/cm 2/12/07 JMT

Signature: Matthew R. Mizerski
Date: 5/20/08

**Battelle**
*The Business of Innovation*

Well ID: MW-3

## Groundwater Sample Collection Record

Client: ACOF  Date: 5/20/08  Time: 1330  Start  am/pm
Project No: NRH  Finish 1500 ②  am/pm
Site Location: Sawyer Street
Weather Conditions: overcast windy SW 15-20  Collectors: MRF, JF, MW

### 1. WATER LEVEL / WELL DATA

① Measured Well Depth: 24.10 ft  Height of Water Column: 9.21 ft

① Depth to Water (initial): 14.89 ft  Purged Volume: 4.4 + .6 ③ = 5.0 L

Depth to Water (pump in well): 13.7 ft

0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =  Gallons (Volume)
1.5 GAL/FT (6 IN)

Pump Depth: 22.0 ft
↑ from top of PVC

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| YSI 6600 V2 | | | 0581397AC |
| MP10 Controller | | | MP10-1628 |
| Solnist Water level meter | | | |

| Time (24 hr) | Temp (°C) | Spec Cond. ~~(µS/cm)~~ mS/cm ④ | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1325 | 13.90 | 4.78 | 2.16 | 6.84 | -93.0 | 33.5 | — | 45 | 14.38 | -.68 | Yellow |
| 1330 | 13.95 | 4.772 | 1.48 | 6.82 | -84.8 | 29.5 | .225 | 90 | 14.68 | -.98 | |
| 1335 | 13.60 | 4.813 | 1.45 | 6.82 | -78.6 | 27.2 | .675 | 95 | 15.10 | -1.4 | |
| 1340 | 12.58 | 4.792 | 1.09 | 6.83 | -73.9 | 20.5 | 1.150 | | 15.42 | -1.72 | |
| 1345 | 12.38 | 4.724 | .89 | 6.82 | -64.7 | 16.1 | 1.625 | 75 | 15.55 | -1.85 | |
| 1350 | 12.35 | 4.635 | .85 | 6.83 | -59.7 | 13.8 | 2.000 | 75 | 15.55 | -1.85 | |
| 1354 | 12.27 | 4.527 | .79 | 6.85 | -58.3 | 11.4 | 2.3 | 75 | 15.55 | -1.85 | |
| 1358 | 12.26 | 4.406 | .63 | 6.89 | -60.4 | 10.1 | 2.6 | 75 | 15.55 | -1.85 | |
| 1402 | 12.27 | 4.294 | .60 | 6.92 | -62.2 | 8.6 | 2.9 | 75 | 15.52 | -1.82 | |
| 1406 | 12.22 | 4.198 | .55 | 6.94 | -64.1 | 7.7 | 3.2 | 75 | 15.54 | -1.84 | |
| 1410 | 12.27 | 4.055 | .51 | 6.98 | -68.9 | 6.2 | 3.5 | 75 | 15.54 | -1.84 | |
| 1414 | 12.28 | 3.985 | .52 | 6.99 | -71.3 | 5.8 | 3.8 | 75 | 15.54 | -1.84 | |
| 1418 | 12.23 | 3.936 | .5 | 7.01 | -73.4 | 5.4 | 4.1 | 75 | 15.52 | -1.82 | |
| 1422 | 12.12 | 3.872 | .48 | 7.02 | -77 | 5.3 | 4.4 | 75 | 15.52 | -1.82 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

- increased discharge rate
Δ↓ discharge rate 1343

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-003-052008 | 3 | 40 ml glass | HCl | VOC | 1430 |
| | 2 | 1 liter | 4°C | Org | 1432 |
| | 1 | Teflon | $HNO_3$ | Metals | 1453 |

**NOTES:** ① taken on 5/19/08 JMF/MRF 0920 (top of PVC @ Notch)
② s/b JMF 5/21/08
③ $H_2O$ in flow thru cell
④ s/b ~~mter~~ mS/cm JMF 2/12/09
equipment blank take @ 1600

Signature: [signature]  Date: 5/20/08

# Fall 2008 Sampling Event

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# YSI Calibration Form for Groundwater Surveys

| | | |
|---|---|---|
| **Project No.** G606422 | **Date:** 11/06/08 | **Recorded By:** Patrick Curran |
| **Data File Name:** N/A | | **Instrument Model / SN:** 6820/03E0613AD |

**CALIBRATION and MAINTENANCE**

| | |
|---|---|
| DO membrane changed? Y (N) | Turbidity Wiper Changed? Y (N) |
| Battery Voltage: | Turbidly wiper parks 180° from optics? (Y) N |

| Parameter | Initial Reading | Calibrated Reading | End of Day Reading | Calibration Data (acceptable range) |
|---|---|---|---|---|
| Conductivity (~~mS~~ uS① /cm) | 1012 | 1000 | 998 | Cell constant (4.55 – 5.45) |
| ORP | 201.4 | 201.4 | 201.8 | Pressure offset, vented ( 0 ± 6) |
| Turbidity (NTU) 0 | -0.2 | 0.0 | .2 | Turbidity Offset: |
| Turbidity (NTU) 123 | 123.6 | 123.0 | 121.8 | |
| D.O. (% Sat) | 101.9 | 100.2 | 99.4 | D.O. Gain (0.7 - 1.4) |
| pH 4 | 3.90 | 4.00 | 4.06 | |
| pH 7 | 6.95 | 7.00 | 6.86 | |
| pH 10 | 10.15 | 10.03 | 10.01 | |

**Comments:**

| | | |
|---|---|---|
| **Project No.** G606422 | **Date:** 11/06/08 | **Recorded By:** Patrick Curran |
| **Data File Name:** | | **Instrument Model / SN:** 6820/97K1095AE |

**CALIBRATION and MAINTENANCE**

| | |
|---|---|
| DO membrane changed? Y (N) | Turbidity Wiper Changed? Y (N) |
| Battery Voltage: | Turbidly wiper parks 180° from optics? (Y) N |

| Parameter | Initial Reading | Calibrated Reading | End of Day Reading | Calibration Data (acceptable range) |
|---|---|---|---|---|
| Conductivity (~~mS~~ uS① /cm) | 1019 | 1000 | 1001 | Cell constant (4.55 – 5.45) |
| ORP | 201.4 | 201.4 | 202.8 | Pressure offset, vented ( 0 ± 6) |
| Turbidity (NTU) 0 | 0.9 | 0.0 | -.6 | Turbidity Offset: |
| Turbidity (NTU) 123 | 122.1 | 123.0 | 122.0 | |
| D.O. (% Sat) | 101.2 | 101.0 | 100.3 | D.O. Gain (0.7 - 1.4) |
| pH 4 | 3.99 | 4.00 | 3.98 | |
| pH 7 | 6.96 | 7.00 | 6.92 | |
| pH 10 PC 0648 | ~~10.15~~ | ~~10.03~~ | 10.01 | |
| **Comments:** 11/06/08 | 10.08 | 10.02 | | |

① S/B uS/cm JM 2/12/09

# YSI Calibration Form for Groundwater Surveys

| | | |
|---|---|---|
| **Project No.** G606422 | **Date:** 11/7/08 | **Recorded By:** Matt Kirkpatrick |
| **Data File Name:** NA | | **Instrument Model / SN:** 6820 03E0613 AD |

**CALIBRATION and MAINTENANCE**

| | |
|---|---|
| DO membrane changed? Y (N) | Turbidity Wiper Changed? Y (N) |
| Battery Voltage: | Turbidly wiper parks 180° from optics? (Y) N |

| Parameter | Initial Reading | Calibrated Reading | End of Day Reading | Calibration Data (acceptable range) |
|---|---|---|---|---|
| Conductivity (~~mS~~ µS/cm) (1) | 981 | 1000 | 995 | Cell constant (4.55 – 5.45) |
| ORP | 203.1 | 201.4 | 200.6 | Pressure offset, vented ( 0 ± 6) |
| Turbidity (NTU) 0 | .3 | 0.0 | -0.3 | Turbidity Offset: |
| Turbidity (NTU) 123 | 122.3 | 123 | 123.9 | |
| D.O. (% Sat) | 102.2 | 100.0 | 103.1 | D.O. Gain (0.7 - 1.4) |
| pH 4 | 4.01 | 4.00 | 4.18 | |
| pH 7 | 6.93 | 7.00 | 6.96 | |
| pH 10 | 10.13 | 10.02 | 10.04 | |

**Comments:**

| | | |
|---|---|---|
| **Project No.** G606422 | **Date:** 11/7/08 | **Recorded By:** Matt Kirkpatrick |
| **Data File Name:** NA | | **Instrument Model / SN:** 6820 97K1095 AE |

**CALIBRATION and MAINTENANCE**

| | |
|---|---|
| DO membrane changed? Y (N) | Turbidity Wiper Changed? Y (N) |
| Battery Voltage: | Turbidly wiper parks 180° from optics? (Y) N |

| Parameter | Initial Reading | Calibrated Reading | End of Day Reading | Calibration Data (acceptable range) |
|---|---|---|---|---|
| Conductivity (~~mS~~ µS/cm) (1) | 984 | 1001 | 998 | Cell constant (4.55 – 5.45) |
| ORP | 204.3 | 201.4 | 201.1 | Pressure offset, vented ( 0 ± 6) |
| Turbidity (NTU) 0 | -.1 | 0.0 | -0.7 | Turbidity Offset: |
| Turbidity (NTU) 123 | 124.5 | 123.1 | 121.1 | |
| D.O. (% Sat) | 103.4 | 100.5 | 103.2 | D.O. Gain (0.7 - 1.4) |
| pH 4 | 3.93 | 4.00 | 4.12 | |
| pH 7 | 6.95 | 7.00 | 6.95 | |
| pH 10 | 10.17 | 10.03 | 10.01 | |

**Comments:**

(1) S/B µS/cm JMT 2/11/09

**Battelle**
*The Business of Innovation*

Well ID: MW-7A

## Groundwater Sample Collection Record

Client: NBH
Project No: 660642 2
Site Location: Sawyer STREET
Weather Conditions: Cloudy
Date: 11/6/08
Time: 0730 Start (am/pm)
0930 Finish (am/pm)
Collectors: MF

### 1. WATER LEVEL / WELL DATA

Measured Well Depth: 14.85 ft
Height of Water Column: 3.77 ft
0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =
1.5 GAL/FT (6 IN)
Gallons (Volume)
Depth to Water (initial): 11.08 ft
Purged Volume: 2.35 + 0.6 ② = 2.95 L
Depth to Water (pump in well): 10.96 ft

### 2. SAMPLE COLLECTION

Method:
Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Controler | MicroPurge | MP10 | 2249 |
| Water Level meter | Solonist | 101 | 31389 |
| Sonde | YSI | 6820 | 97K1095 AE |

| Stabilization Criteria: | ± 3% .47 | ± 3% 26 | ± 10% | ± 0.1 units | ± 10 mV | ± 10% | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (24 hr) | Temp (°C) | Spec Cond. (µS/cm) ③ | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
| 0747 | 15.99 | 783 | 2.77 | 6.36 | 285.5 | .5 | — | 75 | 11.14 | -.18 | clear ① |
| 0753 | 15.75 | 859 | 1.80 | 6.54 | 238.3 | .1 | 0.45 | 50 | 11.11 | -.15 | |
| 0758 | 15.69 | 874 | 1.62 | 6.58 | 225.8 | .1 | 0.7 | 55 | 11.11 | -.15 | |
| 0803 | 15.56 | 876 | 1.55 | 6.57 | 224.0 | .1 | 0.975 | 55 | 11.11 | -.15 | |
| 0808 | 15.44 | 875 | 1.37 | 6.60 | 220.0 | .1 | 1.25 | 55 | 11.12 | -.16 | |
| 0813 | 15.35 | 874 | 1.18 | 6.63 | 217.2 | .1 | 1.525 | 55 | 11.12 | -.16 | |
| 0818 | 15.30 | 874 | 1.06 | 6.64 | 213.8 | .1 | 1.8 | 55 | 11.12 | -.16 | |
| 0823 | 15.28 | 875 | .96 | 6.65 | 209.7 | .2 | 2.075 | 55 | 11.12 | -.16 | |
| 0828 | 15.29 | 877 | .90 | 6.66 | 204.8 | .1 | 2.35 | 55 | 11.11 | -.15 | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-07A-110608 | 3 | 40 ml glass | HCl/4°C | VOA | 0831 |
| ↓ | 2 | 1L glass | 4°C | PCB | 0835 |
| | 1 | 1L Teflon | $HNO_3$/4°C | Metals | 0912 |

NOTES:
① reduce flow rate to 50ml/min @ 0749
② Volume in flow-thru cell
③ s/B uS/cm 2/12/09 JMT

Signature: [signature]
Date: 11/13/08

**Battelle**
*The Business of Innovation*

Well ID: MW-6 ①

## Groundwater Sample Collection Record

| | | | | | |
|---|---|---|---|---|---|
| Client: | NBH | Date: 11/6/08 | Time: 0810 | Start | am/pm |
| Project No: | G606422 | | 1050 | Finish | am/pm |
| Site Location: | Sawyer ST | | | | |
| Weather Conditions: | Cloudy / Drizzle | Collectors: | JT / PC | | |

### 1. WATER LEVEL / WELL DATA

Measured Well Depth: 19.19 ft  Height of Water Column: 5.87 ft

0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =
1.5 GAL/FT (6 IN)
Gallons (Volume)

Depth to Water (initial): 13.32 ft  Purged Volume: 5.69 + 0.6 ① = 6.29 L

Depth to Water (pump in well): 12.92 ft

① ~~well label as marked on pavement at the aerovox site. It appears that MW-6 + MW-6A are marked incorrectly (ie backwards) See the Discussion in the tech memo for more details~~ JMT 2/4/09 Please ignore

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Compressor | QED | 3020 | 17723 |
| Controller | Micro Purge | MP10 | 2253 |
| YSI | YSI | 6820 | 03E0613 AD |
| Solinist | Water Level Meter | 101 | 45547 |

| Stabilization Criteria: | ± 3% | ± 3% | ± 10% | ± 0.1 units | ± 10 mV | ± 10% | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (24 hr) | Temp (°C) | Spec Cond. ~~(µS/cm)~~ ② | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
| 0830 | 15.19 | 514 | 5.20 | 7.03 | 340.6 | 23.6 | — | 75 | 13.62 | ③ ~~-30~~ -0.70 | NA |
| 0835 | 15.17 | 517 | 4.04 | 7.09 | 316.6 | 23.0 | 0.45 | * | 13.73 | -0.81 | |
| 0840 | 15.18 | 519 | 3.21 | 7.13 | 296.2 | 20.4 | 0.69 | 8 | 13.75 | ③ ~~-49~~ 0.83 | |
| 0845 | 15.15 | 521 | 2.62 | 7.15 | 277.6 | 17.5 | 0.99 | 60 | 13.75 | -083 | |
| 0850 | 15.16 | 523 | 1.96 | 7.17 | 263.4 | 14.6 | 1.29 | — | 13.75 | -0.83 | |
| 0855 | 15.19 | 523 | 1.55 | 7.19 | 249.0 | 11.0 | 1.59 | 62 | 13.76 | -0.84 | |
| 0900 | 15.19 | 525 | 1.27 | 7.18 | 120.6 | 9.2 | 1.9 | | 13.78 | -0.86 | |
| 0905 | 15.18 | 526 | 1.04 | 7.20 | 99.3 | 6.7 | 2.21 | 60 | 13.78 | -0.86 | |
| 0910 | 15.18 | 528 | 0.86 | 7.20 | 39.4 | 6.4 | 2.51 | | 13.79 | -0.87 | |
| 0915 | 15.21 | 528 | 0.76 | 7.21 | 5.2 | 4.7 | 2.81 | 60 | 13.79 | -0.87 | |
| 0920 | 15.23 | 529 | 0.70 | 7.22 | -4.5 | 4.5 | 3.11 | | 13.78 | -0.86 | |
| 0925 | 15.27 | 529 | 0.63 | 7.23 | -37.6 | 3.6 | 3.41 | 60 | 13.78 | | |
| 0930 | 15.27 | 529 | 0.59 | 7.24 | -45.1 | 3.0 | 3.71 | | 13.78 | | |
| 0935 | 15.30 | 529 | 0.56 | 7.24 | -70.4 | 2.6 | 4.01 | 60 | 13.78 | | |
| 0940 | 15.28 | 528 | 0.55 | 7.25 | -79.7 | 2.3 | 4.31 | | 13.78 | | |
| 0945 | 15.23 | 526 | 0.54 | 7.27 | -98.1 | 6.9 | 4.61 | | 13.78 | -0.86 | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-006-110608 | 3 | 40ml vial | HCl | Voa | 1005 |
| ↓ | 2 | 1L Amber | 4°C | PCB | 1007 |
| | 1 | 1L Teflon | $HNO_3$ | Metals | 1037 |

NOTES:
* water level dooped fast / before flow thru cell filled 13.6
* discharge lowered @ 0836 to 60ml/min

③ s/B JMT 2/12/09

① Volume in flow thru cell
② s/B µS/cm JMT 2/12/09

Signature: Jessie M Jenzer  Date: 11/13/08

1 of 2

**Battelle**
*The Business of Innovation*

Well ID: MW-6

## Groundwater Sample Collection Record

Client: NBH  Date: _____  Time: _____ Start  am/pm
Project No: _____  Finish  am/pm
Site Location: _____
Weather Conditions:  Collectors:

### 1. WATER LEVEL / WELL DATA

Measured Well Depth:  Height of Water Column:  0.16 GAL/FT (2 IN)  0.65 GAL/FT (4 IN) =  1.5 GAL/FT (6 IN)  Gallons (Volume)

Depth to Water (initial): _____  Purged Volume: _____

Depth to Water (pump in well): _____

see page 1

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

see page 1

| Stabilization Criteria: | ± 3% | ± 3% | ± 10% | ± 0.1 units | ± 10 mV | ± 10% | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (24 hr) | Temp (°C) | ~~(mS/cm)~~ Spec Cond. ~~(µS/cm)~~ ② | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
| 0950 | 15.14 | 524 | 0.53 | 7.28 | -106.4 | 1.7 | 4.91 | 60 | 13.78 | -0.86 | |
| 0955 | 15.03 | 522 | 0.51 | 7.29 | -112.3 | 1.3 | 5.21 | | 13.78 | -0.86 | |
| 1003 | 14.93 | 520 | 0.50 | 7.30 | 111.0 | 1.5 | 5.69 | 60 | 13.78 | -0.86 | |
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* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| | | | | [illegible] | 1005 |
| | | | | [illegible] | 1007 |
| | | | | Metals | 1017 |

see page 1

**NOTES:** ② s/b uS/cm
2/12/09 JMT

Signature: Jesse M Jonza  Date: 11/13/08

pg 2 of 2

**Battelle**
*The Business of Innovation*

Well ID: MW-1

## Groundwater Sample Collection Record

Client: USACE
Project No: 6606427
Site Location: Sawyer St
Weather Conditions: Rain NE wind ~10

Date: 11/6/08 Time: 1040 Start am/pm
1350 Finish am/pm

Collectors: MRF / PC / JMT

### 1. WATER LEVEL / WELL DATA

Measured Well Depth: 24.2 ft
Height of Water Column: 8.59 ft
Depth to Water (initial): 15.61 ft
Depth to Water (pump in well): 14.85 ft
Purged Volume: 3.64 + 0.6 ③ = 4.24 L

0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =
1.5 GAL/FT (6 IN)
Gallons (Volume)

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Controler | MicroPurge | MP10 | 2249 |
| Water Level Meter | Solonist | 101 | 31389 |
| Sonde | YSI | 6820 | 97K1095 AE |

| Stabilization Criteria: | ± 3% | ± 3% | ± 10% | ± 0.1 units | ± 10 mV | ± 10% | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (24 hr) | Temp (°C) | ~~(mS/cm)~~ Spec Cond. (µS/cm) ④ | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor | |
| 1059 | 16.07 | 861 | 4.04 | 6.90 | 203.3 | 1.8 | — | 105 | 16.31 | -1.46 | Clear | ① |
| 1107 | 15.88 | 864 | 4.05 | 6.89 | 207.3 | 2.7 | 0.84 | 50 | 16.87 | -2.02 | | |
| 1121 | 15.67 | 867 | 2.44 | 6.87 | 207.9 | 1.7 | 1.54 | 50 | 16.60 | -1.75 | | |
| 1126 | 15.39 | 868 | 2.24 | 6.87 | 207.1 | 1.9 | 1.79 | 45 | 16.62 | -1.77 | | |
| 1131 | 15.21 | 885 | 1.92 | 6.84 | 120.0 | 2.0 | 2.015 | 45 | 16.75 | -1.9 | | |
| 1137 | 15.19 | 894 | 1.61 | 6.83 | 83.7 | 1.9 | 2.285 | 45 | 16.79 | -2.04 | | ② |
| 1143 | 15.14 | 900 | 1.43 | 6.82 | 54.2 | 1.3 | 2.555 | 35 | 16.76 | -1.91 | | |
| 1149 | 15.02 | 907 | 1.13 | 6.81 | 30.5 | 1.0 | 2.765 | 35 | 16.76 | -1.91 | | |
| 1154 | 15.00 | 908 | 1.07 | 6.81 | 25.1 | .6 | 2.94 | 35 | 16.76 | -1.91 | | |
| 1159 | 15.07 | 909 | .95 | 6.81 | 15.9 | .9 | 3.115 | 35 | 16.76 | -1.91 | | |
| 1204 | 15.05 | 910 | .84 | 6.80 | 11.0 | .6 | 3.29 | 35 | 16.76 | -1.91 | | |
| 1209 | 15.06 | 910 | .77 | 6.80 | 4.8 | .7 | 3.465 | 35 | 16.76 | -1.91 | | |
| 1214 | 15.05 | 911 | .77 | 6.80 | 3.8 | .5 | 3.64 | 35 | 16.76 | -1.91 | | |
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* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-001-110608 | 3 | 40 ml glass | 4°C / HCl | VOA | 1217 |
| ↓ | 2 | 1L glass | 4°C | PCB | 1222 |
| | 1 | 1L teflon | 4°C / $HNO_3$ | Metals | 1345 |

NOTES: ① reduced flow to 50 ml/min @ 11:01
② reduced flow to 35 ml/min @ 11:40
- increased fow to 50 ml/min during VOC collection to fill bottle in 1 discharge

③ Volume in flow thru JMT 11/13/08

④ S/B uS/cm JMT 2/12/09

Signature: [signature] Date: 11/6/08

**Battelle**
*The Business of Innovation*

Well ID: MW-5

## Groundwater Sample Collection Record

Client: NBH
Date: 11/6/08 Time: 1205 Start am/pm
Project No: 6606422 230 Finish am/pm
Site Location: Sawyer Street
Weather Conditions: Cloudy, Rainy Collectors: JT/MF/RC

### 1. WATER LEVEL / WELL DATA

Measured Well Depth: 19.03 ft Height of Water Column: 10.47 ft

0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =
1.5 GAL/FT (6 IN)
Gallons (Volume)

Depth to Water (initial): 8.56 ft Purged Volume: 2.6 + .6 (4) = 3.2

Depth to Water (pump in well): 8.0 ft

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Compressor | QED | 3020 | 17723 |
| Controller | Micro Purge | MP10 | 2253 |
| YSI | | 6820 | 03E0613AD |
| Water Level Meter | Solinist | 101 | 45547 |

| Stabilization Criteria: | ± 3% | ± 3% | ± 10% | ± 0.1 units | ± 10 mV | ± 10% | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (24 hr) | Temp (°C) | ~~mS/cm~~ Spec Cond. (µS/cm) (5) | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
| 1226 | 14.76 | 641 | ~~3.88~~ | 7.86 | -120.3 | 4.7 | — | 60 | 9.5 | -1.5 | Sulfur |
| 1231 | 14.79 | 1824 | 2.76 | 7.84 | -149.2 | 10.0 | 1.02 | (1) | 9.2 | -1.3 | |
| 1236 | 14.78 | 1888 | 2.29 | 7.85 | -160.0 | 3.8 | 1.2 | 50 | 9.4 | -1.4 | |
| 1241 | 14.76 | 1880 | 2.06 | 7.85 | -160.4 | ~~3.8~~ | 1.45 | | 9.54 | -1.5 | |
| 1246 | 14.76 | 1866 | 1.96 | 7.85 | -156.3 | 2.8 | 1.7 | 60 (2) | 9.7 | -1.7 | |
| 1251 | 14.73 | 1856 | 1.78 | 7.85 | -158.4 | 2.8 | 2 | | 9.74 | -1.74 | |
| 1256 | 14.72 | 1865 | 1.81 | 7.85 | -158.1 | 2.7 | 2.3 | | 9.71 | -1.71 | |
| 1301 | 14.71 | 1878 | 1.85 | 7.85 | -154.7 | 2.2 | 2.6 | | 9.61 | -1.61 | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-005-110608 | 3 | 40ml vial | HCl | VOA | 1303 |
| | 2 | 1L Amber | 4°C | PCB | 1305 |
| | 1 | 1L Teflon | $HNO_3$ | Metals | 1352 |

**NOTES:** dropped quickly 8-9.6 before flow thru cell filled (1) 3.6 - cleaned probe
(3) Reduced flow rate @ 1227 45 (2) turned down pressure
(4) Volume of Flow-thru cell
(5) s/B uS/cm 2/12/09 JMT

Signature: Jessica M Jungen Date: 11/13/08

**Battelle**
*The Business of Innovation*

Well ID: MW-4A

## Groundwater Sample Collection Record

Client: NBH - ACOE
Date: 11/7/08
Time: 0735 Start am/pm
0945 Finish am/pm
Project No: G606422
Site Location: Sawyer St
Weather Conditions: Cloudy, Foggy, Misty
Collectors: JT

### 1. WATER LEVEL / WELL DATA

Measured Well Depth: 24.46 ft
Height of Water Column: 14.65 ft
0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) =
1.5 GAL/FT (6 IN)
Gallons (Volume)

Depth to Water (initial): 9.81 ft
Purged Volume: 4.505 + 0.6 ② = 5.105 L

Depth to Water (pump in well): 9.88 ft

### 2. SAMPLE COLLECTION

Method:
Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Water Level Meter | Solinst | 101 | 45547 |
| YSI 6820 | | | 97K1095 |
| Controller | MicroPunge | MP10 | 0249 |
| Compressor | QED | 3020 | 17723 |

| Stabilization Criteria: | ± 3% | ± 3% | ± 10% | ± 0.1 units | ± 10 mV | ± 10% | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (24 hr) | Temp (°C) ±.4 | Spec Cond ~~µS/cm~~ ±130 ③ | DO (mg/L) ±.1 | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor |
| 0748 | 14.20 | 5999 | 2.54 | 7.00 | -268.9 | 13.3 | — | 80 | 10.85 | -.97 | |
| 0755 | 14.22 | 5885 | 0.98 | 7.01 | -315.2 | 9.5 | 0.56 | 80 | 10.98 | -1.1 | |
| 0800 | 14.25 | 5666 | 1.59 | 7.02 | -328.0 | 6.3 | 0.80 | 65 ① | 11.10 | -1.22 | |
| 0805 | 14.30 | 5453 | 1.31 | 7.02 | -336.6 | 5.8 | 1.255 | | 11.23 | -1.35 | |
| 0810 | 14.23 | 5388 | 1.25 | 7.03 | -341.5 | 6.0 | 1.58 | 65 | 11.28 | -1.40 | |
| 0815 | 14.30 | 5154 | 1.02 | 7.04 | -344.7 | 6.0 | 1.905 | | 11.40 | -1.52 | |
| 0820 | 14.34 | 5000 | 0.88 | 7.04 | -348.0 | 5.5 | 2.23 | 65 | 11.53 | -1.65 | |
| 0825 | 14.36 | 4856 | 0.80 | 7.05 | -350.3 | 5.3 | 2.555 | | 11.58 | -1.7 | |
| 0830 | 14.36 | 4728 | 0.70 | 7.05 | -349.9 | 4.5 | 2.88 | 65 | 11.68 | -1.8 | |
| 0835 | 14.41 | 4596 | 0.63 | 7.06 | -351.7 | 3.9 | 3.205 | | 11.78 | -1.9 | |
| 0840 | 14.47 | 4517 | 0.59 | 7.06 | -353.0 | 3.4 | 3.53 | 65 | 11.86 | -1.98 | |
| 0845 | 14.51 | 4471 | 0.57 | 7.06 | -353.6 | 3.0 | 3.855 | | 11.90 | -2.02 | |
| 0850 | 14.52 | 4417 | 0.55 | 7.06 | -354.5 | 2.8 | 4.18 | 65 | 11.97 | -2.09 | |
| 0855 | 14.52 | 4370 | 0.52 | 7.06 | -352.2 | 2.7 | 4.505 | | 12.00 | -2.12 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-04A-110708 | 3 | 40ml vial | HCl | VOA | 0817 |
| | 2 | 1L Amber Bottle | 4°C | PCB | 0959 |
| | 1 | 1L Teflon Bottle | $HNO_3$ | Metals | 0929 |
| MW-04A-110708-QA1 | ↓ | ↓ | ↓ | ↓ | ↓ |

**NOTES:** Water level dropped to 10.3 before flow thru cell was filled
① reduced @ 0758
② Volume of Flow-thru cell
③ 5/16 uS/cm JMT 11/10/09

Signature: Jesse M Junzu
Date: 11/13/08

**Battelle**
*The Business of Innovation*

Well ID: MW-3

## Groundwater Sample Collection Record

Client: USACE
Date: 11/7/08 Time: 0730 Start am/pm
Project No: 6606422 1030 Finish am/pm
Site Location: Sawyer St
Weather Conditions: Misty lite NE wind Collectors: Matt Fitzpatrick

### 1. WATER LEVEL / WELL DATA

Measured Well Depth: 23.94 ft Height of Water Column: 8.96 ft

0.16 GAL/FT (2 IN)
0.65 GAL/FT (4 IN) = Gallons (Volume)
1.5 GAL/FT (6 IN)

Depth to Water (initial): 14.98 ft Purged Volume: 3.01 + 0.6 (2) = 3.61 L

Depth to Water (pump in well): 14.43 ft

### 2. SAMPLE COLLECTION

Method:

Field Equipment Used:

| Equipment | Make | Model | Serial Number |
|---|---|---|---|
| Controler | Micro Purge | MP10 | 2253 |
| Water Level Meter | Solonist | 101 | 31389 |
| Sonde | YSI | 6820 | 03E0613 AD |

| Stabilization Criteria: | ± 3% | ± 3% | ± 10% | ± 0.1 units | ± 10 mV | ± 10% | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (24 hr) | Temp (°C) | Spec Cond. ~~µS/cm~~ (4) | DO (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Volume Removed (Liters) | Flow Rate (mL/min) | Depth to Water (Feet) | Drawdown* (Feet) | Color/Odor | |
| 0801 | 13.94 | 4567 | 2.24 | 6.95 | -156.0 | 86.1 | 0.— | 55 | 15.82 | -1.39 | lt. orange | (1) |
| 0806 | 13.92 | 4566 | 1.70 | 7.06 | -155.0 | 86.2 | 0.11 | 40 | 15.87 | -1.44 | no odor | |
| 0811 | 13.93 | 4492 | 1.33 | 7.11 | -155.7 | 80.0 | 0.23 | 40 | 15.87 | -1.44 | | |
| 0816 | 13.95 | 4414 | 1.08 | 7.14 | -155.0 | 69.5 | 0.43 | 40 | 15.85 | -1.42 | | |
| 0821 | 13.97 | 4387 | .95 | 7.16 | -160.2 | 59.7 | 0.63 | 40 | 15.87 | -1.44 | | |
| 0826 | 14.00 | 4379 | .82 | 7.19 | -166.8 | 51.4 | 0.83 | 40 | 15.82 | -1.39 | | |
| 0831 | 14.03 | 4386 | .73 | 7.21 | -171.7 | 43.1 | 1.03 | 40 | 15.85 | -1.42 | | |
| 0836 | 14.05 | 4395 | .62 | 7.25 | -176.9 | 35.5 | 1.23 | 40 | 15.85 | -1.42 | | |
| 0841 | 14.09 | 4412 | .55 | 7.28 | -186.6 | 30.1 | 1.43 | 40 | 15.85 | -1.42 | | |
| 0846 | 14.13 | 4423 | .49 | 7.31 | -193.7 | 24.6 | 1.63 | 40 | 15.82 | -1.39 | | |
| 0851 | 14.19 | 4434 | .44 | 7.33 | -194.8 | 19.5 | 1.83 | 40 | 15.82 | -1.39 | | |
| 0856 | 14.22 | 4437 | .40 | 7.35 | -200.0 | 17.3 | 2.03 | 40 | 15.82 | -1.39 | | |
| 0901 | 14.24 | 4435 | .37 | 7.37 | -200.8 | 14.5 | 2.23 | 40 | 15.77 | -1.34 | | |
| 0906 | 14.24 | 4429 | .33 | 7.39 | -204.8 | 11.9 | 2.35 | 55 | 15.77 | -1.34 | | (2) |
| 0911 | 14.24 | 4409 | .30 | 7.41 | -210.2 | 9.6 | 2.735 | 55 | 15.82 | -1.39 | | |
| 0916 | 1424 | 4401 | .28 | 7.41 | -212.7 | 9.8 | 3.01 | 55 | 15.82 | -1.39 | | |

* To calculate the drawdown value you subtract the depth to water at the end of purging from the depth of water after the pump has been placed in the well.

| Sample ID | No. Containers | Container Type | Preservation | Analysis Req. | Time |
|---|---|---|---|---|---|
| MW-003-110708 | 3 | 40 ml glass | HCl/4°C | VOA | 0920 |
| ↓ | 2 | 1L glass | 4°C | PCB | 0923 |
| | 1 | 1L teflon | $HNO_3$/4°C | Metals | 1001 |
| MW-003-110708-REP | 1 | 1L teflon | $HNO_3$/4°C | metals | 1001 |

NOTES:
(1) Reduce flow rate to 40 ml/min @ 0803
(2) increased flow rate back to 55 ml/min @ 0904
(3) Volume of flow thru cell
(4) S/B µS/cm JMT 2/12/09

Signature: Matthew R Fitzpatrick Date: 11/7/08