RORE, Inc. • 5151 Shoreham Place, Suite 260 • San Diego, CA 92122 • 858.404.7393 • Fax 858.404.7395 • www.roreinc.com

July 27, 2016

Mr. James Stellmach, CESPK-ED-EE
US Army Corps of Engineers
1325 J Street
Sacramento, CA 95814

Subject: Well Completion Report, Modesto Groundwater Superfund Site, Contract W91238-15-D-0003 Task 0001

Introduction and Objective:

RORE, Inc., (RORE) under contract with the United States Army Corps of Engineers (USACE) has installed five additional groundwater monitoring wells for the United States Environmental Protection Agency (EPA) at the Modesto Groundwater Superfund Site (site). This work was based on the scope of work from the USACE dated November 17, 2014, and the RORE work plan dated December 16, 2015.

The site is located at 941 McHenry Avenue, in central Modesto, California. Groundwater beneath the site has been contaminated with tetrachloroethene (PCE) as a result of past dry cleaning activities. This zone of contamination is referred to as the Halford's plume. The contamination of the groundwater beneath the site is currently being remediated by a pump and treat system; however, PCE contamination has been reported to be migrating laterally and vertically (hydrogeological zones A, B, and C identified) away from the source area.

In addition to the Halford's plume, there is another plume of PCE contamination also resulting from past dry cleaning activities located downgradient to the south, referred to as the Elwood's plume. Groundwater contamination of both plumes are affected by soil lithography and it is proposed that hydraulic influences of the City of Modesto pumping from their water supply wells. As of the most recent data (TetraTech 2011), PCE contamination in the Elwood's plume was detected in the A zone only, with no wells screened in the B zone.

In the Halford's plume, the horizontal extent of the A zone and B zone PCE plumes are not fully delineated to less than the maximum contaminant level (MCL) of 5 micrograms per liter (Figure 1). Monitoring well (MW)-36A will assist in delineating concentrations of PCE exceeding the MCL in the southwest direction of plume migration for the A zone; MW-37B will assist in delineating concentrations of PCE exceeding the MCL in the southwest direction of plume migration for the B zone. MW-36A is located southwest of well MW-31A (A zone) and MW- 37B is located southwest of MW-34B (B zone).

In addition, three B zone monitoring wells (MW-38B, MW-39B, and MW-40B) have been installed beneath the previously investigated depths of the Elwood's plume (TetraTech 2011) to further delineate the southern boundary of the Halford's plume and evaluate potential comingling of the two plumes. All newly installed monitoring wells have been field screened for PCE contamination using a Photo-Ionization Detector (PID).

As reported in the *Remedial investigation of the Former Elwoods and Coit/Gordos Dry Cleaners, Modesto, California Report* (TetraTech 2011), the Elwood's plume has more shallow delineations of the A and B zones; all Elwood wells fall into the deeper Zone A delineation which is presented in the URS Second Quarter O&M Report (URS 2014). All well locations for both plumes (Figure 1) use the zone delineations from the URS Second Quarter O&M Report (URS 2014).

Field Work Summary:

The locations of the newly installed monitoring wells are depicted on Figure 1. Well locations are based on recommendations from the 2Q14 Quarter O&M Report (URS 2014), and the agreements reached during discussions with the EPA, USACE, and regulatory agencies.

- **MW-36A.** Is located along Coleman Court between Coldwell and Enslen Avenue, approximately 500 feet south of well MW-31A in the A zone. The well was installed to help delineate the southwestern extent of the A zone for the Halford's plume.
- **MW-37B.** Is located along Virginia Avenue between Coldwell and West Morris Avenue, approximately 700 feet southwest of well MW-34B in the B zone. The well was installed to help delineate the western extent of the B zone for the Halford's plume.
- **MW-38B.** Is located along Stoddard Avenue between McHenry and Elmwood Avenue in the Elwood's plume, approximately 1,030 feet southwest of well MW-25B in the B zone. The well was installed to help delineate the southern extent of the B zone for the Halford's plume.
- **MW-39B.** Is located at Elmwood Avenue and Wright Street west of the Elwood's plume, approximately 1,320 feet southwest of well MW-25B in the B zone. The well was installed to help delineate the southwestern extent of the B zone for the Halford's plume.
- **MW-40B.** Is located at Lee Street and McHenry Avenue in the Elwood's plume, approximately 1,500 feet south of MW-25B in the B zone. The well was installed to help delineate the southern extent of the B zone for the Halford's plume.

Pre-Drilling Activities

Prior to drilling and well installation, RORE obtained a drilling and encroachment permit from the City of Modesto for all locations (permit# ENC2016-80135), Appendix A. For utility clearance, RORE contacted Underground Service Alert for utility markings at all locations (ticket# 159887, 159894, 159901, 159912, 159918, 173617, 173620). The RORE geologist also used air knife in the first 6.5 to 8.5 feet of each borehole to verify there were no underground

utilities prior to initiating drilling of each borehole. A temporary staging area, located at 931 McHenry Avenue, was used for this project (Figure 1). The staging area was used to store drilling equipment, materials and IDW for the duration of the task.

Borehole Drilling and Lithologic Logging:

The five new monitoring wells were drilled using a Boart Longyear LS600 rotosonic drilling rig. All drilling operations were overseen by RORE's California registered engineer. Wells were logged according to ASTM D2488-06 soil logging standards. These activities included recording the estimated percent of geologic materials, and the documentation that the drilling operations as prescribed in the Sampling and Analysis Plan (SAP) (URS 2013a) and the Letter Work Plan (RORE 2015) were completed. The completed boring logs are presented in Appendix B. Three of the four B zone wells were drilled using the telescoping drilling methods by continuously coring an approximate 8-inch diameter pilot borehole from the ground surface to the anticipated aquitard depth that was located between 68 feet to 81 feet below ground surface (bgs). Once the A/B zone aquitard was identified, then a bentonite plug was installed before advancing the 6-inch borehole through the 8-inch casing and bentonite seal down to total depth of approximately 160 feet below ground surface (bgs) into the B zone (Appendix B). Soil cutting and samples were screened during drilling with a PID.

Monitoring Well Construction Summary and Details:

Well Casing – All wells were constructed with 2-inch, nominal diameter, Schedule 40 polyvinyl chloride (PVC) casing with flush threads. The casing surface was checked to ensure it was free of solvents, oils, grease, paint, and dirt and was certified clean from the factory prior to installation. All sections of the casing were received from the supplier wrapped in polyethylene protective wrappers with sealed ends in order to limit exposure to potential contaminants. The casing was not removed from the wrapping until placement into monitoring well boreholes.

Well Screen and Centralizers – Well screens were 10 feet in length, and 2-inch, nominal diameter, Schedule 40 PVC with flush threads. All well screens used a slot size of 0.020" to be compatible with the filter pack that will surround the screen. The depth of the screen interval was modified, from the Work Plan and SAP based on the occurrences of sand deposits observed during drilling through the estimated screen intervals. The well screen was selected to be of sufficient size and designed to hold back and support the filter pack and in situ soils surrounding the screen. The well screen surfaces were free of solvents, oils, grease, paint, and dirt and were certified clean from the factory. The well screen was smooth, free of sharp-edged openings, burrs, chipped edges, or broken pieces on the interior and exterior surfaces of the pipe. Sections of the screen were received from the supplier wrapped in polyethylene protective wrappers with sealed ends to limit exposure to potential contaminants. Centralizers were placed at the top and bottom of the screen and at every 40 feet of blank well casing from the top of the screen to the ground surface (3 to 5 centralizers per well).

Filter Pack and Sand Bridge – Filter pack material was composed of #2/12 round, hard, water-worn siliceous sand, free of flat or elongated pieces, organic matter, or other foreign matter. All filter pack material was placed in the borehole annular space by using a tremie pipe. Once the filter pack was in place, the well screen interval was swabbed and surged for approximately 30 minutes and verified that there was no measurable settling in the filter pack. Following the filter pack installation, an approximately 2-foot-thick bridge of #30 sand was then placed on top of the filter pack sand by using a tremie pipe.

Bentonite Seal – Each monitoring well was constructed with a 2-foot-thick bentonite transition seal placed above the bridge sand to protect the filter pack during grouting. The bentonite seal consisted of bentonite chips, which were allowed to hydrate a minimum of 30 minutes.

Cement Grout – Cement grout was used to fill the annular space from the top of the hydrated bentonite transition seal to within 2 feet of ground surface on all of the new wells. Cement grout consisted of Type II Portland cement with 3 pounds of powdered non-beneficiated bentonite and approximately 7 gallons of water per 94-pound sack of cement. The cement grout was mechanically mixed with a paddle-type mixer and then emplaced by tremie pipe. The upper surface of the grout was then checked for any settling within 24-hours of grout emplacement; additional grout was added as necessary to bring back to within 2 feet of ground surface.

Wellheads – After each well's grout seal had cured, the wells were then secured with a flush-mounted, 8-inch traffic-rated vault set in a 2-foot diameter asphalt matched concrete pad. Each wellhead was secured with a lockable expansion cap.

Well Development Records:

All well development operations were conducted more than 48 hours after the well construction was completed. The development procedure was accomplished using a Pulstar 12000 winch mounted development rig by bailing and swabbing. This was followed by pumping from various depths within the well insuring that all the turbid water was removed. The bailing and surging at each well was repeated at until the fine-grained sediments collected were approximately less than 1 teaspoon per bailer load before pumping began.

Using a submersible pump, a minimum of approximately 10 casing volumes was pumped from each well in addition to the volume of water added during drilling, until water was visually absent of sediments. Groundwater field parameters were monitored until they were stable and within well development standards. These parameters consisted of temperature, pH, conductivity, and turbidity. Depth to water measurements were also taken during well development. There were no potential issues with the wells reported during development. The well development records are presented in Appendix C.

Well Location Survey Data:

All well locations were surveyed following installation and development. The top-of-casing elevation was measured for each newly installed monitoring well. Horizontal coordinates were determined to the closest 1.0-foot and referenced to the State Plane Coordinate System, Zone 3, North American Datum of 1983. Ground surface and top-of-casing elevations were also measured to the closest 0.1-foot and 0.01-foot, respectively. These elevations will be referenced to the National Geodetic Vertical Datum of 1988. The well location survey data is presented in Appendix D.

Investigation-Derived Waste Management:

All investigation-derived waste was stored prior to transportation and disposal in compliance with all pertinent federal, state, and local regulations and requirements. Drill cuttings were contained in a covered 30-cubic yard bin and 55-gallon drums; the bin and each drum was properly labeled and stored at the temporary staging area. Composite IDW soil samples were collected and analyzed for metals, VOCs, and total petroleum hydrocarbons to profile the waste and determine the appropriate landfill for disposal after drilling activities were completed. All soil results were below screening criteria and categorized as non-hazardous. Results are presented in Appendix E. Once the appropriate landfill is determined and has approved to accept the IDW, a waste manifest will be completed by RORE personnel and signed by authorized USEPA/USACE personnel. Decontamination water and groundwater purged during well development was contained in a 500-gallon temporary storage tank and drums prior to being added to the project groundwater treatment system.

Fieldwork Summary and Narrative of Conditions:

A field logbook was maintained and the appropriate field forms for well installations were completed. The logbook documented the work accomplished, data collected, and problems encountered and actions taken. The field forms and field logbook are provided in Appendix F.

Table 1 represents the actual well conditions and specifications for each well that was constructed during these activities.

Table 1 – As-Built A and B Zone Well Specifications, Modesto Superfund

Well	Well Type	Depth of Borehole (ft bgs)	Diameter of Borehole (inches)	Target Lithology	Groundwater Level (ft bgs)	Screen Interval (ft bgs)	Casing Diameter (inches)	Casing and Screen Material	Well Screen Slot Size (inches)
MW-36A	Standard	100	6	(SM) Sand	45.72	88-98	2	Sch 40 PVC	0.020
MW-37B	Standard	160	6	(SM) Sand	43.46	145-155	2	Sch 40 PVC	0.020
MW-38B	Telescope	161	8 to 6	(SP) Sand	46.79	150-160	2	Sch 40 PVC	0.020
MW-39B	Telescope	160	8 to 6	(SP) Sand	47.47	149.5-159.5	2	Sch 40 PVC	0.020

Well	Well Type	Depth of Borehole (ft bgs)	Diameter of Borehole (inches)	Target Lithology	Groundwater Level (ft bgs)	Screen Interval (ft bgs)	Casing Diameter (inches)	Casing and Screen Material	Well Screen Slot Size (inches)
MW-40B	Telescope	160	8 to 6	(SP) Sand	48.12	145-155	2	Sch 40 PVC	0.020

Abbreviations:
ft = feet
bgs = below ground surface
Sch = Schedule
PVC = Poly Vinyl Chloride

Health and Safety

Field activities outlined in this work plan were performed in accordance with the *Site Specific Health & Safety Plan and Injury & Illness Prevention Plan* (RORE 2016).

Work Plan Variations

To avoid drilling on McHenry Avenue, the drilling location of well MW-38B was relocated southwest to the location specified for MW-39B; consequently, the drilling location for MW-39B was relocated to the south and west. The boring diameter for MW-36A and MW-37B was reduced from 10-inches to 6-inches, this was done to reduce the amount of drill rod required and to reduce the amount IDW generated with the soil cuttings; the smaller diameter boring was sufficient for a 2-inch well installation. The boring diameters for wells MW-38B, MW-39B and MW-40B were 8-inches that stepped to 6-inches as necessitated by the telescope type well installation.

Wells MW-37B, MW-38B, MW-39B, and MW-40B were completed at depths of 160 to 161 feet bgs.

During drilling of the telescope type wells (locations MW-38B, MW-39B, and MW-40B), the confining layer that represents the A/B zone aquitard was encountered between 70 and 80 feet bgs; 20 to 30 feet shallower than the estimated 100 feet bgs. The A zone was sealed at the shallower depth as specified in the work plan.

The drilling of the telescope type wells MW-38B, MW-39B and MW40B did not require a 6-inch pilot boring to the A/B zone confining layer prior to advancing the 8-inch casing; the rotosonic drilling platform mobilized was capable of advancing the 8-inch casing directly.
The screen interval for well MW-36A, MW-37B and MW-40B was modified based on sand deposits observed in the field and to avoid screening the well in fine grained soils where possible. The selected screen interval for well MW-36A is 88 feet to 98 feet bgs, the screen interval for wells MW-37B and MW-40B is 145 feet to 155 feet bgs.

The finished well construction at MW-38B, MW-39B and MW-40B did not employ hydrated bentonite at the A/B zone transition, as depicted on Figure 2 of the Work Plan; this zone was constructed and sealed with bentonite-cement grout within hydrated bentonite that remained

from the A/B zone seal placed during drilling. The adjusted well construction used improved the performance of the annular seal and the A/B transition zone seal.

During well development at MW-36A and MW-39B the Turbidity standard of 5 Nephelometric Turbidity Units (NTUs) could not be achieved within a reasonable amount of time or purge volume; all silts were removed from the well casing and the purge water, other measured parameters were stabilized, and more than 10 casing volumes were removed from each well.

Samples collected for classification of the soil IDW were sent to EnviroMatrix Analytical, Inc. in San Diego, CA for analysis.

The equipment staging area was located behind 931 McHenry Avenue, not 901 Mc Henry Avenue.

References

RORE, Inc. 2015. *Contract Number W91238-15-P-0010, Modesto Groundwater Superfund Site, Modesto, CA, Letter Work Plan.* December 16.

RORE, Inc. 2016. *Accident Prevention Plan, Final Feasibility Study, Modesto Groundwater Superfund Site, Modesto, CA.* April.

Tetra Tech, 2011. *Remedial Investigation of the Former Elwood's and Coit/Gordos Dry Cleaners, Modesto, California.* May.

URS, 2013a. *Sampling and Analysis Plan for Long-Term Monitoring, Site Investigation, and Soil Vapor Extraction, Modesto Groundwater Superfund Site.* June.

URS, 2014. *Quarterly Operations and Monitoring Report Groundwater Treatment and Soil Vapor Extraction Remediation Systems, Second Quarter 2014.* August.

Respectfully Submitted,

John McGuire, P.M.P.
Project Manager

Appendices:
A – Drilling and Encroachment Permit
B – Boring Logs
C – Well Development Logs
D – Land Survey Data
E – IDW Sample Results
F – Field Logbook

Figure

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N

0 300

Scale in Feet

Halford's Plume : Zone A

Halford's Plume : Zone B

Elwood's Plume : Zone A

Monitoring Well
Halford's Plume-Zone A
MW-36A

Monitoring Well
Halford's Plume - Zone B
MW-37B

Monitoring Well
Elwood's Plume - Zone B
MW-38B

Monitoring Well
Elwood's Plume - Zone B
MW-39B

Monitoring Well
Elwood's Plume - Zone B
MW-40B

MW-11A MW-07A MW-15A MW-02A MW-01A MW-05A MW-09B MW-08A MW-14A EW-01R MW-30B MW-30A MW-04B MW-04A MW-12A MW-23A EW-02 Staging Area MW-06A MW-10A MW-19A MW-19B1 MW-10B MW-29B MW-31A MW-13A MW-20A MW-20B MW-18A MW-28B MW-24B MW-34B MW-16A MW-16B MW-17A MW-17B MW-21A MW-25B MW-22A MW-35B IA1-MW-1 MW-32B MW-26B MW-9 MW-5 MW-27B IA1-MW-3 MW-7 IA1-MW-2 MW-33B IA1-MW-4 IA1-MW-5 IA1-MW-6 IA1-MW-11 IA1-MW-7 IA1-MW-12 IA1-MW-8 IA1-MW-9 IA1-MW-10 IA1-MW-13

Legend

- Monitoring Well - Halford's Plume : Zone A
- Extraction Well - Halford's Plume : Zone A
- Existing Monitoring Wells - Halford's Plume : Zone A
- Monitoring Well - Halford's Plume : Zone B
- Existing Monitoring Well - Halford's Plume : Zone B
- Monitoring Well - Elwood's Plume : Zone B
- Existing Monitoring Well - Elwood's Plume : Zone A
- Staging Area

Halford's Plume [4Q, 2015]

PCE in Groundwater

- 100-999 µg/L
- 49-99 µg/L
- 5-49 µg/L

Elwood's Plume [2013]

PCE in Groundwater

- 2000-4500 µg/L
- 1000-2000 µg/L
- 100-999 µg/L
- 50-99 µg/L
- 5-49 µg/L

Note:
Zone delineations defined by Quartely Operations and Monitoring.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

G:\GIS_DATA\ALL_RORE_GIS\PROJECTS\MODESTO2016\MXD\1ST_QUARTER\FIGURES-PDF_SOURCE\Figure 1 Proposed New Wells_CP.mxd MS 7/18/2016 SAC

RORE

Figure 1
Monitoring Wells
Halford's and Elwood's Plumes
Zone A and Zone B
Modesto, CA Superfund Site

011-40001-15

July 2016

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Appendix A

City of Modesto Drilling and Encroachment Permit

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LAND DEVELOPMENT ENGINEERING DIVISION
1010 10TH ST, Suite 3100, MODESTO, CA 95353
OFFICE (209) 342-4712

OFFICE HOURS
8:30 AM - 4:30 PM

CITY OF MODESTO
ENCROACHMENT PERMIT

PERMIT NUMBER: ENC2016-80135
FEES PAID TODAY:
PERMIT TYPE: W - Work Intersecting Groundwa

DATE OF APPLICATION	DATE OF ISSUE	APN	VALID DATES
4/13/2016	4/14/2016	113006036	04/14/2016 - 10/14/2016

WORK ADDRESS	SUBDIVISION	BLOCK	LOT
VARIOUS LOCATIONS 1/2 RADIOUS OF 941 MCHENRY SEE APP	FALK TRACT	728	2

CONTRACTOR

NATIONAL EXPLORATION WELLS & PUMPS
1961 MEEKER AV
RICHMOND CA 94804
530-668-4080

OWNER

APPLICANT/CONSULTANT

RORE INC
5151 SHOREHAM PL #260
SAN DIEGO CA 92122

858-404-7393

TIME & MATERIALS? NO
SEWER COST SHARING? NO
ESCROW ACCT:
CITY/COUNTY: CITY
ISSUED BY: CCOSTA
PLANS PROVIDED? NO

DESCRIPTION OF WORK: VARIOUS LOCATIONS SEE APPLICATION, WITHIN 1/2 MILE RADIUS OF 941 MCHENRY AVE, INSTALL 5 GROUNDWATER WELLS, NO FEE PERMIT (GOVERNMENT AGENCY) PER THE CERCLA SECTION 121 (E)(1) CLIENT IS U.S. EPA

Work Detail	Qty	Width	Length
Monitoring well application	1.00		
Monitoring well inspection	5.00		

FEE SUMMARY

RECEIVED BY: **TOTAL PERMIT FEES PAID ON 4/14/2016:**

TOTAL PERMIT FEES PAID PRIOR TO 4/14/2016: $0.00

Inspector's Acceptance Assigned To: GERALD PADGET

Date

STANDARD ENCROACHMENT PERMIT CONDITIONS - ENC2016-80135

The following conditions are for the City standard encroachment permit:

1. **Call the inspector 48 hours BEFORE starting work AND for final inspection - 577-5452.**

2. Perform work according to City of Modesto Standard Specifications and MMC Sec. 7-2.01 et seq, Sec. 7-1.105 et seq, and Sec. 7-1.109 et seq.

3. Call USA at 800-642-2444 and 800-227-2600 and MID at 209-526-7373 for utility locations at least 48 hours before digging. Other companies include, but are not limited to: PG&E, SBC, and Comcast.

4. Provide a copy of these permit conditions to **ALL** contractors doing work covered under this permit.

5. Construct subdivision improvements in accordance with approved plan set. Inspection fees to be reimbursed in accordance with Subdivision Agreement and/or Modesto Municipal Code (MMC).

6. Prior to receiving any water taps, the developer shall pay the water service connection charges.

7. Prior to issuance of the permit for a project over 1 acre, the contractor or developer shall provide the Developer/Contractor Information and a copy of the Notice of Intent (NOI) filed with the Water Resources Board. In compliance with the Water Resources Board, the Stormwater Pollution Prevention Plan is required to be onsite. A copy of the NOI shall be attached to this permit.

8. A copy of the City of Modesto Erosion and Sediment Control and Standard Specifications for Construction Activities is available at Kinko's or on the City of Modesto's Website (www.modestogov.com).

9. For projects with no existing concrete or asphalt, an aggregate pad shall be constructed at each ingress and egress point to the street pavement.

10. Off-site inlets adjacent to your project shall have filter screens placed in the grates to prevent silt contamination. These shall be maintained during the entire duration of the project.

11. All CFD, CFF and reimbursable utility line construction work shall be permitted by a separate agreement. No work shall be done on these items until a reimbursement agreement is executed and a permit is issued specifically for the items.

12. No landscaping work is permitted unless plans are approved by the Parks, Recreation and Neighborhoods Department.

13. The Permittee is responsible for the preservation of survey monuments within the work area herein permitted. If any are disturbed, the Permittee is required to tie out each location and re-establish them after completion of work, using a licensed land surveyor. A corner record must be filed in accordance with state law for any re-set monuments.

Standard Encroachment Permit Conditions (revision to Street & Alley Closures/Traffic Control)

14. Notify the following agencies two weeks, one week and 24 hours prior to implementing the approved Traffic Control Plan:

- City of Modesto Dispatch	209-552-2470
- Stanislaus Regional 911	209-552-3900
- AMR Ambulance Service	800-913-9142
- Modesto Area Express (MAX Bus Service)	209-577-5295
- Stanislaus Regional Transit (START Bus Service)	209-525-4130
- Stanislaus County Road Department	209-525-4130
- Modesto City School District	209-576-4011
- Sylvan Union School District	209-574-5000, ext. 202

15. Notify schools within 1/2 mile of the work zone two weeks, one week and 24 hours prior to implementing the approved Traffic Control Plan in the vicinity of the school.

Standard Encroachment Permit Conditions (revision to Street & Alley Closures/Traffic Control) - continued

16. Notify the U.S. Post Office, waste haulers, recycling operations and busses within the project area:
    - Coordinate to ensure no stoppage of mail delivery.
    - Schedule work in project area to minimize disturbance to bus service operations.

17. Open all traffic lanes during peak hours: Mon-Fri 7:30 - 9:30 AM and 4:00 - 6:00 PM

18. Full street closures will require a separate permit. Street closure permits must be approved by the Traffic Engineer and will be conditioned to post all streets converging to this location with public warning signs of the pending closure. The traffic plan shall be approved a minimum of 2 weeks prior to pending closure. The traffic plan will address the detour of traffic. The permit will minimize the amount of time the closure is in effect.

19. Partial street closures may be coordinated with the inspector. Partial street closures may be limited in time to 9:00 am to 4:00 pm. All construction traffic control shall follow the most current edition of the Manual of Uniform Traffic Control Devices California Supplement.

ADDITIONAL PERMIT REQUIREMENTS - ENC2016-80135

1. Driller is responsible for protecting all City utilities impacted by this scope of work.

2. A copy of all reports generated by the installation of these wells or borings **must** be sent to:
   City of Modesto, Water Division
   Pumps and System Maintenance Supervisor
   P. O. Box 642
   Modesto, CA 95353

   AND

   Stanislaus County - DER
   Nicole Damin
   3800 Cornucopia Way, Suite C
   Modesto, CA 95358

3. Contractor is responsible for contacting USA to have ALL utilities marked prior to starting any work related to this permit.

4. **Provide a detailed report showing scaled well construction details and GPS coordinates of the wells to:**
   City of Modesto, Water Division
   Pumps and System Maintenance Supervisor
   P. O. Box 642
   Modesto, CA 95353

5. **Contractor/Owner MUST install a Backflow Prevention Device to City Standards.**

APPLICANT'S SIGNATURE

4/14/16
DATE

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Appendix B

Boring Logs

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RORE, Inc.
5151 Shoreham Place Suite 260
San Diego CA 92122
Telephone: 858-404-7393
Fax: 858-404-7395

WELL NUMBER MW-36A

CLIENT U.S. EPA / U.S ACE
PROJECT NAME Modesto Groundwater Superfund Site
PROJECT NUMBER 011-40001-15
PROJECT LOCATION Modesto, CA
DATE STARTED 4/25/16 **COMPLETED** 4/27/16
GROUND ELEVATION 88.54 **HOLE SIZE** 6 inches
DRILLING CONTRACTOR National EWP
GROUND WATER LEVELS:
DRILLING METHOD Rotosonic LS600
AFTER DRILLING 45.72 ft prior to well development
LOGGED BY Brian Zanco **CHECKED BY** Jacobe Washburn
NORTHING 2060451.81
NOTES 2" dia. groundwater monitoring well.
EASTING 6417184.76

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
0					0.5 Asphalt.		Locking cap
		Surface Completion: 8" dia. flush mount traffic rated well vault in 2' dia. asphaltic concrete pad.	SP-SM		(SP-SM) Alluvium: Poorly graded fine Sand with Silt - few fine sand, medium dense, dry, 7.5yr 4/3 brown, (10% fines, 90% sand, 0% gravel).	PID = 0	Surface Seal/Pad: concrete, 0'-2' bgs
5					8.5		
		Air knife clearance 8.5'.	ML		9.5 (ML) Sandy Silt - sand is fine to medium grained, trace clay, soft, moist, non-plastic, 7.5yr 4/3 brown, (60% fines, 40% sand, 0% gravel).	PID = 2.5	
10			SW		(SW) Well graded Sand - sand is very fine to medium grained, trace silt, loose, moist, 10yr 6/2 light brownish gray, (5% fines, 95% sand, 0% gravel).	PID = 6.3 PID = 2.2 PID = 1.3	Annular Seal: 95% cement-bentonite grout, 2'-82' bgs
					12.0		
			SP		(SP) Poorly graded fine Sand - few medium grained sand, trace silt, loose, moist, 10yr 5/2 grayish brown, trace limonite staining, (5% fines, 95% sand, 0% gravel).	PID = 2.2 PID = 1.6	
15					16.0	PID = 1.6 PID = 1.9	
	MW-36A-S-18	VOCs	CL		(CL) Sandy Clay - sand is fine grained, few silt, medium stiff, moist, low plasticity, 10yr 4/4 dark yellowish brown, mottled iron oxide staining, (65% fines, 35% sand. 0% gravel).	PID = 14.9	Centralizers at 48', 88', and 98'
					18.5	PID = 29.4	
			SP		19.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace silt, loose, moist, 10yr 4/2 dark grayish brown, trace clay nodules, (5% fines, 95% sand, 0% gravel)		
20						PID = 25.9	
			CL		21.0 (CL) Sandy Clay - sand is fine grained, few silt, medium stiff, moist, low plasticity, 10yr 4/4 dark yellowish brown, trace iron oxide mottling, (65% fines, 35% sand, 0% gravel).		
					- stiff.	PID = 4.8	
					24.0	PID = 6.1	
25					- very stiff, 10yr 3/4 dark yellowish brown.	PID = 7.8	

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WELL NUMBER MW-36A

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
25			CL		(CL) Sandy Clay - sand is fine grained, few silt, medium stiff, moist, low plasticity, 10yr 4/4 dark yellowish brown, trace iron oxide mottling, (65% fines, 35% sand, 0% gravel).	PID = 6.2 PID = 1.1 PID = 4.8	
					27.5 - medium stiff.	PID = 1.6	
					28.5	PID = 8.7	
30			SC		(SC) Clayey fine Sand - few silt, trace fine sand, dense, moist, 10yr 5/3 brown, trace iron oxide staining, (35% fines. 65% sand, 0% gravel).	PID = 1.5	
					32.0 - sand is fine to medium grained, medium dense, 10yr 4/3 brown, (25% fines, 75% sand, 0% gravel).	PID = 1.1	
					33.0	PID = 6.2	
35			CL		(CL) Sandy Clay with Silt - sand is fine to medium grained, stiff, moist, low plasticity, 10yr 5/2 grayish brown, trace iron oxide mottling, (60% fines, 40% sand, 0% gravel).	PID = 12.6	
			ML		34.5 - trace clay nodules [10yr 3/2 very dark grayish brown]	PID = 9.2	
			SM		35.0 (ML) Sandy Silt - few clay, sand is fine grained, trace medium sand, medium, moist, non-plastic, 10yr 5/3 brown, trace iron oxide mottling, (65% fines, 35% sand, 0% gravel).	PID = 0.5	
			ML		36.0 (SM) Silty Sand - sand is fine to medium grained, trace clay, medium dense, moist, 10yr 4/2 dark grayish brown, trace iron oxide staining, (35% fines, 65% sand, 0% gravel).	PID = 6.1	
40			CL		37.0 (ML) Silt with fine Sand - trace clay, medium, moist, non-plastic, 10yr 4/2 dark grayish brown, trace iron oxide mottling, (65% fines, 35% sand, 0% gravel).	PID = 0.5 PID = 3.1	
			ML		38.5 (CL) Sandy Clay - few silt, sand is fine grained, stiff, moist, low plasticity, 10yr 4/2 dark grayish brown, trace iron oxide mottling, (70% fines, 30% sand, 0% gravel).	PID = 5.8	
					40.0 (ML) Silt with Sand - sand is fine grained, few clay, medium, moist, non-plastic, 10yr 4/2 dark grayish brown, few iron oxide mottling (75% fines, 25% sand, 0% gravel).	PID = 0.7	
					42.0 - little clay, trace mottling.	PID = 0.5	
45					44.0 (CL) Clay with Sand - little silt, sand is fine grained, stiff, moist, low plasticity, 10yr 4/2 dark grayish brown, trace iron oxide mottling, (75% fines, 25% sand, 0% gravel).	PID = 0.7 PID = 1.2	
	▼				45.0 Sandy Clay - few silt, medium, non-plastic, 10yr 5/2 grayish brown, (65% fines, 35% sand, 0% gravel).	PID = 2	
					46.0 - stiff, low plasticity	PID = 0.2 PID = 1.9	
			CL		47.5 Clay with Sand - (70% fines, 30% sand. 0% gravel).	PID = 3.1	
					48.5 - trace iron oxide mottling.	PID = 2.5	
50					49.8	PID = 0.7	
			SC		51.0 (SC) Clayey Sand - sand is fine grained, trace medium grained sand, few silt, medium dense, moist, 10yr 5/2 grayish brown, trace iron oxide staining, (35% fines, 65% sand, 0% gravel).	PID = 3 PID = 0.9	
			SP-SM		52.5 (SP-SM) Poorly graded fine Sand with Silt - sand is fine to medium grained, loose, wet, 10 yr 5/2 grayish brown, trace iron oxide staining, (10% fined, 90% sand, 0% gravel).	PID = 4 PID = 11.1	

Annular Seal: 95% cement-bentonite grout, 2'-82' bgs

Riser Casing: 2" PVC, 0.25'-88' bgs

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WELL NUMBER MW-36A

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
55			SP-SM		55.0 - sand is fine grained, no staining.	PID = 12.6	
					56.5 (SM) Silty Sand - sand is fine grained, trace clay, medium dense, wet, 10yr 5/2 grayish brown, (30% fines, 70% sand, 0% gravel).	PID = 0.3	
			SM		57.5 - few clay.	PID = 2.4	
					58.5 - iron oxide staining throughout.	PID = 0.5	
60					60.0 - few clay, dense.	PID = 0.3	
			CL		62.5 (CL) Sandy Clay - little silt, sand is fine to medium grained, medium, wet, medium plasticity, 10yr 4/2 dark grayish brown, (65% fines, 35% sand, 0% gravel).	PID = 0.5	
					63.0 - iron oxide mottling throughout	PID = 2.9	
			ML		64.0 (ML) Sandy Silt - few clay, sand is fine grained, medium, wet, non-plastic, 10yr 4/2 dark grayish brown, trace iron oxide staining, (70% fines, 30% sand, 0% gravel).	PID = 1	
			CL		65.0 (CL) Clay with Sand - few silt, sand is fine grained, stiff, wet, low plasticity, 10yr 4/2 dark grayish brown, few iron oxide mottling, (70% fines, 30% sand, 0% gravel).	PID = 0.2	
65						PID = 1.8	
						PID = 3	
					66.0 (SC) Clayey Sand - sand is fine grained, few silt, medium dense, wet, 10yr 5/2 grayish brown, trace iron oxide staining, (35% fines, 65% sand, 0% gravel).	PID = 3	Annular Seal: 95% cement-bentonite grout, 2'-82' bgs
			SC		67.5 - loose.	PID = 0.5	
					68.5 - with iron oxide staining throughout.	PID = 1	
70					70.0 - dense, trace iron oxide staining.	PID = 0.8	
			ML		71.0 (ML) Sandy Silt - few clay, sand is fine grained, stiff, moist, non-plastic, 10yr 5/2 grayish brown, (60% fines, 40% sand, 0% gravel).	PID = 2.4	
			CL		73.0 (CL) Clay with Silt and Sand - sand is fine grained, very stiff, moist, low plasticity, 7.5yr 4/4 brown, (75% fines, 25% sand, 0% gravel).	PID = 0.5	
					Sandy Clay with Silt - stiff, medium plasticity, 10yr 5/2 grayish brown, (65% fines, 35% sand, 0% gravel).	PID = 0.8	
75					74.5	PID = 1.6	
			ML		77.0 (ML) Sandy Silt with Clay - sand is fine grained, medium, moist, non-plastic, 10yr 5/2 grayish brown, (60% fines, 40% sand, 0% gravel).	PID = 1.9	
			CL		79.0 (CL) Sandy Clay with Silt - sand is fine grained, medium, moist, low plasticity, 10yr 4/2 dark grayish brown, mottled, (65% fines, 35% sand, 0% gravel).	PID = 2.8	
						PID = 0.1	
80			ML		80.0 (ML) Sandy Silt - few clay, sand is fine grained, medium, moist, non-plastic, 10yr 4/2 dark grayish brown, mottled, (65% fines, 35% sand, 0% gravel).	PID = 0.5	
					80.3 - trace manganese oxide staining.	PID = 0.8	
			SC		81.3 (SC) Clayey fine Sand - little silt, loose, moist, 7.5yr 4/4 brown. (40% fines, 60% fines, 0% gravel).	PID = 1.2	
						PID = 1.4	
						PID = 0.4	
						PID = 0.1	

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WELL NUMBER MW-36A

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
					82.3 - trace iron oxide staining.	PID = 0.6	Transition Seal: Hydrated Bentonite, 82'-84' bgs
					(SM) Silty fine Sand - few clay, medium dense, moist, 10yr 4/3 brown, (40% fines, 60% sand, 0% gravel).	PID = 0.1	
85					85.0	PID = 0.2	
					- little clay, dense, (45% fines, 55% sand, 0% gravel).	PID = 4.2	Transition Sand: #30 Sand, 84'-86' bgs
						PID = 0.2	
			SM		88.0	PID = 0.1	Filter Pack: #2/12 Sand, 86'-100' bgs
					- medium dense, trace iron oxide mottling.	PID = 0.2	
90					90.0	PID = 0.9	
					90.5 - few iron oxide mottling throughout.	PID = 1.4	
					- dense, trace iron oxide staining, micaceous, (40% fines, 60% sand, 0% gravel).	PID = 0.1	
					92.8	PID = 0.2	
			CL		(CL) Sandy Clay - few silt, sand is fine grained, stiff, moist, low plasticity, 10yr 5/2 grayish brown, trace iron oxide staining, micaceous, (65% fines, 35% sand, 0% gravel).	PID = 0.2	Screen: 2" PVC, 0.020" slot, 88'-98' bgs
					94.3	PID = 0.2	
95					(SM) SIlty fine Sand - few clay, medium dense, moist, 10yr 4/3 brown, trace limonite staining, micaceous, (35% fines, 65% sand, 0% gravel).	PID = 0.4	
					95.5		
			SM		- iron oxide and limonite banding.	PID = 0.3	
					97.0		
					97.5 - iron oxide mottling throughout.	PID = 0.2	
					98.0 - dense.		
					(CL) Clay - little silt, little fine sand, very stiff, moist, medium plasticity, 2.5y 6/2 light brownish gray, few iron oxide mottling, (60% fines, 20% sand, 0% gravel).	PID = 0.5	Bottom Cap
100			CL		100.0	PID = 0.3	
					Bottom of borehole at 100.0 feet.	PID = 0.2	

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WELL NUMBER MW-37B

CLIENT U.S. EPA / U.S ACE
PROJECT NAME Modesto Groundwater Superfund Site
PROJECT NUMBER 011-40001-15
PROJECT LOCATION Modesto, CA
DATE STARTED 4/28/16 **COMPLETED** 5/2/16
GROUND ELEVATION _____ **HOLE SIZE** 6 inches
DRILLING CONTRACTOR National EWP
GROUND WATER LEVELS:
DRILLING METHOD Rotosonic LS600
AFTER DRILLING 43.46 ft prior to well development
LOGGED BY Brian Zanco **CHECKED BY** Jacobe Washburn **NORTHING** _____
NOTES 2" dia. groundwater monitoring well.
EASTING _____

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
0					0.5 Asphalt		Locking cap
		Surface Completion: 8" dia. flush mount traffic rated well vault in 2' dia. asphaltic concrete pad.	SM		(SM) Alluvium: Silty fine Sand - few medium sand, few clay, medium dense, dry, 7.5yr 5/3 brown, (35% fines, 65% sand, 0% gravel). 5.0		Surface Seal/Pad: concrete, 0'-2' bgs
5			ML		5.8 (ML) Silt with fine Sand - few clay, trace medium sand, medium stiff, dry, non-plastic, 7.5yr 4/3 brown, (65% fines, 35% sand, 0% gravel). 6.5	PID = 0	
		Air knife clearance 6.5'.	CL		- stiff. (CL) Sandy Clay - few silt, sand is fine grained, medium stiff, moist, low plasticity, 2.5y 5/2 grayish brown, (70% fines, 30% sand, 0% gravel). 8.0	PID = 1	
			SM		9.0 (SM) Silty Sand - trace clay, sand is fine grained, loose, moist, 2.5y 5/2 grayish brown, (25% fines, 75% sand, 0% gravel).	PID = 2.9 PID = 1.7	
10					10.0 -mottled iron oxide staining throughout.		Annular Seal: 95% cement-bentonite grout, 2'-139' bgs
			ML		11.0 (ML) Sandy Silt - trace clay, sand is fine grained, trace medium grained sand, medium, moist, non-plastic, 2.5y 4/2 dark grayish brown, mottled iron oxide staining throughout, (60% fines, 40% sand, 0% gravel). 11.5	PID = 2.2 PID = 1.2	
			CL		12.5 -few clay, (70% fines, 30% sand, 0% gravel).	PID = 0.9	
			SP		13.5 (CL) Clay - few fine sand, few silt, stiff, moist, medium plasticity, 2.5y 4/2 dark grayish brown, mottled iron oxide staining, (75% fines, 25% sand, 0% gravel).	PID = 1.9	
			SP-SM		14.5 (SP) Poorly graded fine Sand - trace medium sand, trace silt, loose, moist, 2.5y 5/2 grayish brown, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 3 PID = 4.4	
15			SP		15.5 (SP-SM) Poorly graded fine Sand with Silt - trace medium sand, loose, moist, 2.5y 5/2 grayish brown, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 5.1	Centralizers at 25', 65', 105', 145', 155'
			ML		(SP) Poorly graded fine Sand - trace medium sand, trace silt, loose, moist, 2.5y 5/2 grayish brown, trace mica, (5% fines, 95% sand, 0% gravel). 18.0	PID = 0.4 PID = 1.4	
			SC		(ML) Sandy Silt - few clay, sand is fine grained, medium, moist, non-plastic, 2.5y 5/2 grayish brown, mottled iron oxide staining, trace mica, (65% fines, 35% sand, 0% gravel). 20.0	PID = 1.7 PID = 3.2 PID = 4.5	
20			SP-SM		(SC) Clayey fine Sand - few silt, trace medium grained sand, medium dense, moist, 2.5y 5/2 grayish brown, mottled iron oxide staining throughout, trace mica, (35% fines, 65% sand, 0% gravel). 21.0	PID = 3.6 PID = 0.6	
			ML		(SP-SM) Poorly graded fine Sand with Silt - trace medium grained sand, loose, moist, 2.5y 5/2 grayish brown, trace iron oxide staining, (10% fines, 90% sand, 0% gravel). 22.5	PID = 1.9 PID = 3.2	
			SM		(ML) Sandy Silt - few clay, sand is fine grained, stiff, moist, low plasticity, 2.5y 5/2 grayish brown, trace iron oxide staining, (70% fines, 30% sand, 0% gravel). 25.0	PID = 0.2 PID = 0.1	
25							

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WELL NUMBER MW-37B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
25							
					(SM) Silty Sand - sand is fine grained, trace clay, loose, moist, 2.5y 5/3 light olive brown, trace iron oxide staining, (35% fines, 65% sand, 0% gravel).	PID = 0	
					26.0	PID = 5.3	
					- 2.5y 4/3 olive brown		
					- few clay, trace medium grained sand.	PID = 0	
			SM			PID = 0.1	
30						PID = 2.5	
						PID = 4.7	
						PID = 5.2	
					32.0		
					(SP-SM) Poorly graded fine Sand with Silt - trace medium grained sand, medium dense, moist, 2.5y 4/2 dark grayish brown, trace limonite staining, (10% fines, 90% sand, 0% gravel).	PID = 7.1	
			SP-SM			PID = 5.2	
	MW-37B-S-34	VOCs			34.0	PID = 8.1	
			ML		(ML) Silt with Sand - trace clay, sand is fine grained, medium, moist, non-plastic, 2.5y 4/2 dark grayish brown, mottled iron oxide staining, trace mica, (75% fines, 25% sand, 0% gravel).	PID = 11.8	
35					34.8		
					35.0	PID = 10.3	Annular Seal: 95% cement-bentonite grout, 2'-139' bgs
			SM		35.8		
					- few clay, 2.5y 4/3 olive brown.		
					(SM) Silty Sand - sand is fine to medium grained, loose, moist, 2.5y 5/2 grayish brown, trace limonite staining, (25% fines, 75% sand, 0% gravel).	PID = 1.9	
					37.5		
			CL		(CL) Clay with Sand - trace silt, sand is fine grained, medium stiff, moist, non-plastic, 2.5y4/2 dark grayish brown, (75% fines, 25% sand, 0% gravel).		
					39.5 Sandy Clay - few silt, wet, medium plasticity, (65% fines, 35% sand, 0% gravel).	PID = 0.3	
40							Riser Casing: 2" PVC, 0.25'-145' bgs
					- interbedded lenses of fine Sand (SP), less than 2" thick.	PID = 1.5	
					41.0		
					(SP-SC) Poorly graded fine Sand with Clay - sand is fine to medium grained, trace silt, loose, wet, 2.5y 5/2 grayish brown, mottled iron oxide staining, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 1.1	
			SP-SC		43.0		
					- increased mottling,	PID = 4.5	
					44.0		
					- sand is fine grained, decreased staining.	PID = 2.7	
45					45.0	PID = 1.1	
					(SP) Poorly graded fine Sand - trace silt, trace medium grained sand, loose, wet, 2.5y 5/2 grayish brown, trace iron oxide staining, micaceous, (5% fines, 95% sand, 0% gravel).	PID = 1.2	
					47.0	PID = 0	
					- mottled limonite staining.	PID = 0	
						PID = 0.7	
						PID = 1.2	
			SP		49.5	PID = 2.5	
50					- no medium grained sand.	PID = 1.8	
					51.0		
					- sand is fine to medium grained, trace staining.	PID = 0	
					52.0		
					- mottled.	PID = 0	
					53.0		
					- fine grained sand, trace medium.	PID = 1.6	

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WELL NUMBER MW-37B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
55			SP		54.0 (SP) Poorly graded fine Sand - trace silt, trace medium grained sand, loose, wet, 2.5y 5/2 grayish brown, trace iron oxide staining, micaceous, (5% fines, 95% sand, 0% gravel).	PID = 5.9	
					55.0 - fine to medium grained sand, limonite staining throughout.		
			SC		56.0 - fine grained sand, trace medium, trace limonite staining.	PID = 0	
			CL		57.0 (SC) Clayey fine Sand - few silt, medium dense, moist, 2.5y 5/2 grayish brown, mottled iron oxide staining, (35% fines, 65% sand, 0% gravel).	PID = 0	
					58.0 - grades to Sandy Clay (CL).	PID = 0	
60			SM		59.0 (CL) Sandy Clay - few silt, sand is fine grained, medium, moist, low plasticity, 2.5y 4/3 olive brown, trace mica, (65% fines, 35% sand, 0% gravel).	PID = 0.1	
			CL		59.5 Clay with Sand and Silt - (75% fines, 25% sand, 0% gravel).	PID = 0	
					60.5 - stiff.	PID = 0	
					62.5 (SM) Silty fine Sand - trace clay, loose, wet, 2.5y 5/2 grayish brown, trace iron oxide staining, trace mica, (30% fines, 70% sand, 0% gravel).	PID = 0	
65			ML		64.5 (CL) Clay - few silt, little sand, stiff, moist, medium plasticity, 2.5y 4/2 dark grayish brown, trace iron oxide staining, trace mica, (85% fines, 15% sand, 0% gravel).	PID = 0	
					- grades to Silt with Sand (ML).	PID = 0	
					(ML) Silt with Sand - sand is fine grained, trace medium grained sand, medium, moist, non-plastic, 2.5y 4/4 olive brown, (60% fines, 40% sand, 0% gravel).	PID = 2.1	
					67.0 Sandy Silt - medium stiff, (60% fines, 40% sand, 0% gravel).	PID = 0	
70			SC		68.5 (SC) Clayey Sand - little silt, sand is fine grained, trace medium sand, medium dense, wet, 2.5y 4/2 dark grayish brown, mottled iron oxide staining, (40% fines, 60% sand, 0% gravel).	PID = 0	
					69.3 - moist.	PID = 0	
					70.0 - iron oxide stained nodules.	PID = 0.1	Annular Seal: 95% cement-bentonite grout, 2'-139' bgs
			SM		(SM) Silty fine Sand - few clay, trace medium sand, medium dense, wet, 2.5y 4/2 dark grayish brown, trace mica, (30% fines, 70% sand, 0% gravel).	PID = 0 PID = 0	
					72.5	PID = 0	
75			SP-SC		73.8 (SP-SC) Poorly graded Sand with Clay - sand is fine to medium grained, trace silt, loose, wet, 2.5y 4/2 dark grayish brown, trace iron oxide staining, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 2.4	
			SP		74.5 (SP) Poorly graded fine Sand - sand is fine to medium grained, trace silt, loose, wet, 2.5y 3/2 very dark grayish brown, trace iron oxide staining, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 0	
			SM		75.5 (SM) Silty Sand - few clay, sand is fine to medium grained, medium dense, wet, 2.5y 3/2 very dark grayish brown, mottled iron oxide staining, micaceous, (30% fines, 70% sand, 0% gravel).	PID = 1.7 PID = 8.5	
			ML		77.5 (ML) Sandy Silt - few clay, sand is fine grained, medium, wet, non-plastic, 2.5y 4/2 dark grayish brown, trace iron oxide staining, trace mica, (60% fines, 40% sand, 0% gravel).	PID = 6.1	
80			SP		79.5 (SP) Poorly graded Sand - sand is fine to medium grained, trace silt, loose, wet, 2.5y 5/2 grayish brown, trace iron oxide staining, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 1.2 PID = 0.2 PID = 10.4	
					- fine grained sand, trace medium sand.		

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WELL NUMBER MW-37B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
			SP		83.0 - grades to Clay with Silt (CL).	PID = 0	
					(CL) Clay with Silt - few fine sand, stiff, wet, medium plasticity, 10yr 4/4 dark yellowish brown, mottled iron oxide staining, trace mica, (85% fines, 15% sand, 0% gravel).	PID = 0	
85					85.0	PID = 0	
			CL		Sandy Clay - little silt, medium stiff, low plasticity, 2.5y 4/2 dark grayish brown, (65% fines, 35% sand, 0% gravel).	PID = 0	
					86.5 87.0 - mottled iron oxide staining throughout.		
					- decreased mottling, trace mica.	PID = 3.1	
						PID = 5.7	
						PID = 7.3	
90					90.0	PID = 10.7	
			SM		90.5 (SM) Silty Sand - sand is fine grained, few clay, loose, wet, 2.5y 4/2 dark grayish brown, trace iron oxide staining, trace mica, (30% fines, 70% sand, 0% gravel).	PID = 3.5	
					92.0 - little clay, (35% fines, 65% sand, 0% gravel).	PID = 7.4	
					93.0 (ML) Sandy Silt - few clay, sand is fine grained, medium stiff, moist, non-plastic, 2.5y 4/2 dark grayish brown, trace iron oxide staining, (60% fines, 40% sand, 0% gravel).	PID = 5.2	
			ML		- little clay, decreased staining, (70% fines, 30% sand, 0% gravel).	PID = 3	
95					95.0	PID = 2	Annular Seal: 95% cement-bentonite grout, 2'-139' bgs
					- few clay, mottled iron oxide staining, trace mica, (60% fines, 40% sand, 0% gravel).	PID = 1.2	
					97.0 - grades to Silty Sand (SM).	PID = 2.7	
					98.5 (SM) Silty Sand - sand is fine grained, trace clay, medium dense moist, 2.5y 4/3 olive brown, mottled iron oxide staining throughout, trace mica, (40% fines, 60% sand 0% gravel).	PID = 2.6	
					- (30% fines, 70% sand, 0% gravel).	PID = 4	
100						PID = 2.2	
			SM		100.5 - clay nodules for 6" [2.5y 5/2 grayish brown]	PID = 0	
						PID = 1.5	
						PID = 1.6	
					104.0	PID = 1.6	
			CL		(CL) Clay with Sand - little silt, stiff, moist, low plasticity, 2.5y 5/2 grayish brown, mottled iron oxide staining, (75% fines, 25% sand, 0% gravel).	PID = 1.3	
105					105.5	PID = 1	
			SC		106.5 (SC) Clayey Sand - sand is fine grained, few silt, loose, moist, 2.5y 4/3 olive brown, mottled iron oxide staining, trace mica, (40% fines, 60% sand, 0% gravel).	PID = 0.6	
					- grades to:	PID = 0.8	
			CL		(CL) Clay - little silt, few sand, stiff moist, medium plasticity, 2.5y 5/2 grayish brown, mottled iron oxide staining, trace manganese oxide staining, (85% fines, 15% sand, 0% gravel).	PID = 1.7	
						PID = 2.8	
110						PID = 2	
					110.5	PID = 2.3	

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WELL NUMBER MW-37B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
					Clay with Sand - few silt, (75% fines, 25% sand, 0% gravel).	PID = 0.6	
					(CL) Clay - little silt, few sand, stiff moist, medium plasticity, 2.5y 5/2 grayish brown, mottled iron oxide staining, trace manganese oxide staining, (85% fines,	PID = 0.9	
					113.0 15% sand, 0% gravel).	PID = 1.5	
					114.0 Sandy Clay - little silt, (70% fines, 30% sand, 0% gravel).	PID = 0.4	
115					115.0 Clay with Sand - (80% fines, 20% sand, 0% gravel).	PID = 0.4	
			CL		- very stiff, low plasticity.	PID = 0.4	
						PID = 0.6	
						PID = 1.1	
					118.0	PID = 0.8	
					- few silt, high plasticity.	PID = 0.4	
					119.0		
					- little silt, medium plasticity.	PID = 0.8	
120						PID = 1	Annular Seal: 95% cement-bentonite grout, 2'-139' bgs
						PID = 1.4	
						PID = 1.1	
						PID = 0.9	
					123.5	PID = 0.9	
			ML		(ML) Silt with Sand - little clay, sand is fine grained, stiff, moist, low plasticity, 2.5y 5/2 grayish brown, mottled iron oxide and trace manganese oxide staining, (75%	PID = 1.1	
125					125.5 fines, 25% sand, 0% gravel).	PID = 1.3	
			CL		(CL) Sandy Clay - little silt, sand is fine grained, medium stiff, wet, low plasticity, 2.5y 5/2 grayish brown, mottled iron oxide and trace manganese oxide staining, (70%	PID = 0.5	
					fines, 30% sand, 0% gravel).	PID = 0.7	
					127.5 - grades to poorly graded fine Sand with Silt (SP-SP).		
					(SP-SM) Poorly graded fine Sand with Silt - trace medium sand, loose, wet, 2.5y 4/4 olive brown, mottled iron oxide staining, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 0.8	
						PID = 1.2	
			SP-SM			PID = 2.2	
130					130.0		
					- trace iron oxide staining.	PID = 1.2	
						PID = 1.2	
					132.0	PID = 1.3	
					(SM) Silty Sand - sand is fine grained, loose, wet, 2.5y 4/2 dark grayish brown, trace iron oxide mottling,		
					133.0 micaceous, (20% fines, 80% sand, 0% gravel).	PID = 0.8	
					134.0 - (25% fines, 75% sand, 0% gravel).	PID = 0.8	
					- (30% fines, 70% sand, 0% gravel).		
135						PID = 0.4	
			SM				
						PID = 1.8	
					138.0	PID = 2.2	
					- medium dense, 2.5y 3/3 dark olive brown, mottled iron oxide staining, (35% fines, 65% sand, 0% gravel).	PID = 1.7	

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WELL NUMBER MW-37B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
140	MW-37B-149	VOCs			(SM) Silty Sand - sand is fine grained, loose, wet, 2.5y 4/2 dark grayish brown, trace iron oxide mottling, micaceous, (20% fines, 80% sand, 0% gravel).	PID = 1.6 PID = 1.3	Transition Seal: Hydrated Bentonite, 139'-141' bgs
					141.5	PID = 1.6	
					- trace clay nodules.	PID = 1.4	Transition Sand: #30 Sand, 141'-143' bgs
					143.0		
					- no clay nodules, (30% fines, 70% sand, 0% gravel).	PID = 1	
						PID = 0.5	Filter Pack: #2/12 Sand, 143'-160' bgs
145			SM				
					146.5	PID = 0.4	
					- (35% fines, 65% sand, 0% gravel).		
					147.5	PID = 2.1	
					- no mottling.	PID = 2.3	
					149.0	PID = 4.4	
					- trace clay nodules, (40% fines, 60% sand, 0% gravel).	PID = 6.2	
150						PID = 4.1	Screen: 2" PVC, 0.020" slot, 145'-155' bgs
						PID = 0.5	
					152.0		
			SM		(SM) Silty fine Sand - loose, wet, 2.5y 4/2 dark grayish brown, mottled, iron oxide staining, micaceous, (35% fines, 65% sand, 0% gravel); with interbedded Sandy Clay (CL) - few silt, sand is fine grained, medium, wet, medium plasticity, (65% fines, 35% sand, 0% gravel).	PID = 2.9	
					154.5	PID = 4.1	
					(SM) Silty Sand - sand is fine grained, loose, wet, 2.5y 4/2 dark grayish brown, trace iron oxide staining, micaceous, trace clay nodules, (35% fines, 65% sand, 0% gravel).	PID = 3.8	
155						PID = 0.4	Bottom Cap
			SM		156.0		
					- (40% fines, 60% sand, 0% gravel).	PID = 0.7	
						PID = 0.7	
					158.0		
			SM		(SM) Silty fine Sand - loose, wet, 2.5y 4/2 dark grayish brown, mottled, iron oxide staining, micaceous, (35% fines, 65% sand, 0% gravel); with interbedded Sandy Clay (CL) - few silt, sand is fine grained, medium, wet, medium plasticity, (60% fines, 40% sand, 0% gravel).	PID = 1.2	
160		160 gallons of water added.			160.0	PID = 2.5	

Bottom of borehole at 160.0 feet.

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WELL NUMBER MW-38B

CLIENT U.S. EPA / U.S ACE
PROJECT NAME Modesto Groundwater Superfund Site
PROJECT NUMBER 011-40001-15
PROJECT LOCATION Modesto, CA
DATE STARTED 5/3/16 **COMPLETED** 5/5/16
GROUND ELEVATION 88.84 **HOLE SIZE** 8 to 6 inches
DRILLING CONTRACTOR National EWP
GROUND WATER LEVELS:
DRILLING METHOD Rotosonic LS600
AFTER DRILLING 46.79 ft prior to well development
LOGGED BY Brian Zanco **CHECKED BY** Jacobe Washburn
NORTHING 2059204.01
NOTES 2" dia. groundwater monitoring well.
EASTING 6418552.02

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
0					0.5 Asphalt.		Locking cap
		Surface Completion: 8" dia. flush mount traffic rated well vault in 2' dia. asphaltic concrete pad.	SP-SM		(SP-SM) Alluvium: Poorly graded fine Sand with Silt - trace medium grained sand, trace clay, loose, dry, 7.5yr 5/3 brown, (10% fines, 90% sand, 0% gravel).	PID = 0	Surface Seal/Pad: concrete, 0'-2' bgs
					4.5		
5					5.0 - dense.		
			ML		(ML) Silt - few fine sand, little clay, stiff, dry, non-plastic, 10yr 6/2 light brownish gray, (90% fines, 10% sand, 0% gravel).	PID = 1	
					8.0		
		Air knife clearance 8'.			(SP-SM) Poorly graded fine Sand with Silt - trace medium sand, loose, dry, 2.5y 5/3 light olive brown, trace iron oxide staining, trace mica, trace roots, (10% fines, 90% sand, 0% gravel).	PID = 1.6	
					9.5	PID = 3.6	
10					- no staining.	PID = 3.1	Annular Seal: 95% cement-bentonite grout, 2'-144' bgs
					11.0 - trace iron oxide staining.	PID = 4.6	
			SP-SM		12.0 - few sandy silt nodules (ML), mottled iron oxide staining, 2.5y 4/2 dark grayish brown.	PID = 4.2	
					13.0 - 2.5y 5/2 grayish brown, no silt nodules.	PID = 5.2	
						PID = 6	
15						PID = 3.9	
					16.0		
			CL		(CL) Clay with fine Sand - little silt, medium, moist, medium plasticity, 10yr 4/4 dark yellowish brown, trace iron oxide staining, (80% fines, 20% sand, 0% gravel).	PID = 1.7	Centralizers at 25', 65', 105', 145', 155'
					17.5	PID = 4	
			SP		(SP) Poorly graded Sand - sand is fine to medium grained, trace silt, loose, dry, 2.5y 5/3 light olive brown, (5% fines, 95% sand, 0% gravel).	PID = 6.3	
					19.0		
20					20.0 (CL) Clay with fine Sand - little silt, medium stiff, moist, medium plasticity, 10yr 4/4 dark yellowish brown, (85% fines, 15% sand, 0% gravel).	PID = 4.7	
			CL		- low plasticity, (80% fines, 20% sand, 0% gravel).	PID = 5.4	
						PID = 6.8	
						PID = 0.7	
					22.0	PID = 5.7	
			SP		(SP) Poorly graded Sand - sand is fine to medium grained, trace silt, loose, moist, 2.5y 5/2 grayish brown, trace iron oxide staining, (5% fines, 95% fines, 0% gravel).	PID = 5.7	
					24.0	PID = 4.7	
					24.5 - few clay nodules, 2.4y 4/3 olive brown.	PID = 8.4	
25			CL		- grades to:		

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WELL NUMBER MW-38B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
25			CL		(CL) Sandy Clay - little silt, sand is fine to medium grained, stiff moist, low plasticity, 10yr 4/4 dark yellowish brown, trace iron oxide staining, (75% fines, 25% sand, 0% gravel).	PID = 5.2 PID = 3.9 PID = 7.7	
					28.0 - grades to Clayey Sand (SC).		
30			SC		(SC) Clayey Sand - sand is fine to medium grained, few silt, trace fine gravel, dense, moist, 10yr 4/4 dark yellowish brown, few iron oxide staining, (30% fines, 65% sand, 5% gravel).	PID = 6.5 PID = 8.5 PID = 5.5	
					31.0 - grades to poorly graded Sand (SP).		
			SP		32.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace silt, medium dense, moist, sub-rounded, 2.5y 4/3 olive brown, (5% fines, 95% sand, 0% gravel).	PID = 2 PID = 2	
			SW		33.0 Poorly graded fine Sand - few medium grained sand, sub-rounded.	PID = 2.3	
35					34.0 (SW) Well graded Sand - sand is fine to coarse, trace silt, medium dense, moist, sub-angular, 2.5y 4/3 olive brown, trace limonite staining, (5% fines, 95% sand, 0% gravel).	PID = 6.3 PID = 7	Annular Seal: 95% cement-bentonite grout, 2'-144' bgs
			SP		35.8 (SP) Poorly graded fine Sand - trace medium grained sand, trace silt, medium dense, moist, 2.5y 5/3 light olive brown, trace iron oxide staining, few sandy silt (ML) nodules, [2.5y 4/3 olive brown], (5% fines, 95% sand, 0% gravel).	PID = 7.3	
					36.3		
					37.5 - trace fine gravel, no silt nodules, (5% fines, 90% sand, 5% gravel).	PID = 10.6 PID = 8.5	
40			ML		39.5 - few medium grained sand, trace coarse grained sand, few sandy silt (ML) nodules, [2.5y 4/3 olive brown]. - little sandy silt nodules. - grades to Sandy Silt (ML).	PID = 5.4 PID = 3.5	Riser Casing: 2" PVC, 0.25'-150' bgs
					41.0 (ML) Sandy Silt - sand is fine to medium grained, few clay, medium stiff, moist, low plasticity, 2.5y 4/3 olive brown, trace iron oxide staining, (70% fines, 30% sand, 0% gravel).	PID = 1.9 PID = 5.3	
					- little clay, stiff, mottled.		
					43.0 - trace clay, trace coarse sand, non-plastic, 2.5y 5/3 light olive brown, no mottling, (60% fines, 40% sand, 0% gravel).	PID = 13.3	
			SP-SM		44.0 - grades to poorly graded fine Sand with Silt (SP-SM).	PID = 7.2	
45					44.8 45.0 (SP-SM) Poorly graded fine Sand with Silt - sand is fine to medium grained, loose, moist, 2.5y 5/4 light olive brown, trace limonite staining, (10% fines, 90% sand, 0% gravel).	PID = 9.5 PID = 3.7	
					46.0	PID = 3.6	
					47.0 - trace coarse sand, 2.5y 5/3, trace iron oxide and limonite staining.	PID = 5.8	
					48.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse, trace silt, loose, moist, sub-rounded, 2.5y 6/3 light yellowish brown, (5% fines, 95% sand, 0% gravel).	PID = 4.7	
			SP		49.5	PID = 5.2	
50					- wet, 2.5y 5/4 light olive brown.	PID = 9.7	
					- few medium sand, no coarse sand.	PID = 73.9	
					- sand is fine to medium grained, sub-angular, 2.5y 4/3 olive brown.	PID = 48.7	
					52.0 - trace limonite staining.	PID = 28.3	
					53.0 - sand is fine grained, trace medium, no coarse grained.	PID = 55.8	

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WELL NUMBER MW-38B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
			SP-SM		54.0 (SP-SM) Poorly graded fine Sand with Silt - trace medium grained sand, loose, wet, 2.5y 4/3 olive brown, trace clay (CL) nodules, trace limonite staining, (10% fines, 90% sand, 0% gravel).	PID = 22.8	
55					55.0	PID = 14.2	Annular Seal: 95% cement-bentonite grout, 2'-144' bgs
					56.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, trace silt, loose, wet, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 22 PID = 7.6	
					57.0 - no coarse sand, 2.5y 6/3 light yellowish brown, no staining.	PID = 12.2	
			SP		58.0 - 2.5y 5/3 light olive brown	PID = 6.1	
					59.0 Poorly graded fine Sand - few medium grained sand.	PID = 2.7	
					Poorly graded Sand - sand is fine to medium grained,	PID = 3.8	
60					60.0 trace coarse sand, 2.5y 5/2 grayish brown.		
					60.5 - mottled iron oxide staining.	PID = 12.1	
					61.0 - trace staining.	PID = 3.6	
					- mottled iron oxide staining.		
					62.0 - no staining.	PID = 5.9	
			CL		(CL) Clay with Sand - sand is fine to medium grained, little silt, medium stiff, wet, medium plasticity, 2.5y 5/2 grayish brown, trace iron oxide staining, (80% fines,	PID = 4.4	
					64.0 20% sand, 0% gravel).	PID = 4.6	
			ML		- grades to Sandy Silt (ML).	PID = 3.9	
65					(ML) Sandy Silt - sand is fine grained, few clay,		
					65.5 medium, wet, low plasticity, 2.5y 5/2 grayish brown,	PID = 5.3	
					66.0 mottled iron oxide staining, (65% fines, 35% sand, 0% gravel).	PID = 9.3	
					67.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, trace silt, loose, wet,	PID = 3.9	
					sub-rounded, 2.5y 5/3 light olive brown, trace clay (CL)	PID = 7.1	
			SP		nodules, trace limonite staining, trace mica, (5% fines,		
					95% sand, 0% gravel).	PID = 3.3	
					- no clay nodules.		
					- few clay (CL) nodules, [nodules are medium plasticity,	PID = 4.9	
70					2.5y 4/2 dark grayish brown].	PID = 15.9	
						PID = 81	
					71.0 - grades to Sandy Clay (CL).		
					(CL) Sandy Clay - sand is fine grained, little silt, medium stiff, wet, low plasticity, 2.5y 4/2 dark grayish brown, trace iron oxide mottling, (65% fines, 35% sand, 0% gravel).	PID = 134 PID = 121	
						PID = 96	
			CL			PID = 42.2	
75							
					76.0	PID = 9.4	
					- trace medium sand, stiff, 7.5yr 4/4 brown, mottled iron oxide staining, (60% fines, 40% sand, 0% gravel).	PID = 19.1	
					77.5		
			ML		(ML) Sandy Silt - sand is fine grained, trace medium	PID = 6.1	
					78.3 grained, little clay, very stiff, wet, non-plastic, 7.5yr 4/6	PID = 4.8	
			CL		strong brown, mottled iron and manganese oxide		
					79.0 staining, (65% fines, 35% sand, 0% gravel).	PID = 4.2	A-Zone Seal: Hydrated Bentonite with 95% cement-bentonite grout, 77'-81' bgs
80	MW-38B-S-80	VOCs	ML		(CL) Sandy Clay - sand is fine grained, little silt, stiff, wet, low plasticity, 2.5y 4/2 dark grayish brown, trace		
					80.5 manganese oxide staining, (65% fines, 35% sand, 0% gravel).	PID = 162	
			CL		(ML) Sandy Silt - sand is fine grained, trace medium sand, little clay, very stiff, wet, non-plastic, 7.5yr 4/6	PID = 4.1 PID = 5.8	

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WELL NUMBER MW-38B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
			CL		83.0 strong brown, mottled iron and manganese oxide staining, (65% fines, 35% sand, 0% gravel).	PID = 6.9	
			SC		84.5 (CL) Sandy Clay - sand is fine grained, trace medium sand, little silt, stiff, wet, low plasticity, 7.5yr 4/6 strong brown, mottled iron oxide staining, (60% fines, 40% sand, 0% gravel). - medium plasticity, trace mottling. - grades to Clayey Sand (SC).	PID = 7.2 PID = 6.1 PID = 24	
85					86.0 (SC) Clayey Sand - sand is fine grained, trace medium sand, few silt, loose, wet, 7.5yr 5/4 brown, trace iron and manganese oxide mottling, trace clay (CL) nodules [medium stiff], (40% fines, 60% sand, 0% gravel).	PID = 24.7	◄Telescope Well Transition, 8" dia to 6" dia
			SM		87.0 - trace coarse sand. - grades to Silty Sand (SM).	PID = 12.2 PID = 10	
					89.0 (SM) Silty Sand - sand is fine grained, trace medium sand, few clay, medium dense, wet, 2.5y 5/2 grayish brown, mottled iron oxide staining, trace mica, (25% fines, 75% sand, 0% gravel).	PID = 12.6	
90			SP-SM		90.5 - dense.	PID = 3.3 PID = 4	
					92.0 (SP-SM) Poorly graded Sand with Silt - sand is fine grained, trace medium sand, loose, wet, sub-rounded, 10yr 4/4 dark yellowish brown, mottled iron oxide staining, few mica, (10% fines, 90% sand, 0% gravel).		
			SP		92.3 - 10yr 4/3 brown, trace clay (CL) nodules [medium plasticity, 2.5y 5/3 light olive brown].	PID = 4	
			SW		93.3 - trace manganese oxide staining, micaceous.	PID = 3.9 PID = 3.3	
					94.5 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, trace silt, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, trace iron oxide and limonite staining, micaceous, (5% fines, 95% sand, 0% gravel).	PID = 1.3	
95			SP		(SW) Well graded Sand - sand is fine to coarse grained, trace silt, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, trace limonite staining, micaceous, (5% fines, 95% sand, 0% gravel).	PID = 1 PID = 5.5 PID = 6.7	
					98.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, trace silt, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, trace limonite staining, micaceous, (5% fines, 95% sand, 0% gravel).	PID = 6 PID = 11.2	
100			SW		(SW) Well graded Sand - sand is fine to coarse grained, trace silt, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, trace limonite and manganese oxide staining, micaceous, (5% fines, 95% sand, 0% gravel).	PID = 4.7 PID = 4.8 PID = 4.5 PID = 3.5	◄Annular Seal: 95% cement-bentonite grout, 2'-144' bgs
					103.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, trace manganese oxide staining, micaceous, (5% fines, 95% sand, 0% gravel).	PID = 3.2 PID = 7	
			SP		104.5	PID = 5.3	
105			SP-SM		105.3 (SP-SM) Poorly graded fine Sand with Silt - trace medium sand, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, mottled iron oxide staining, micaceous, (10% fines, 90% sand, 0% gravel).	PID = 2.9	
			SM		106.0	PID = 27.6 PID = 13.5	
			SP-SM		107.3 (SM) SIlty Sand - sand is fine grained, trace medium sand, loose, wet, 2.5y 5/3 light olive brown, mottled iron oxide staining, micaceous, (25% fines, 75% sand, 0% gravel).	PID = 9	
			SM		109.5 (SP-SM) Poorly graded fine Sand with Silt - trace medium grained sand, loose, wet, 2.5y 5/3 light olive brown, trace iron oxide staining, micaceous, (10% fines, 90% sand, 0% gravel).	PID = 4.2 PID = 2.5	
110					110.5 (SM) Silty Sand - sand is fine grained, trace medium	PID = 5.1	

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WELL NUMBER MW-38B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
			CL		sand, loose, wet, 2.5y 5/3 light olive brown, mottled iron oxide staining, micaceous, (35% fines, 65% sand, 0% gravel).	PID = 39.9 PID = 17.5	
					112.0 - 2.5y 5/2 grayish brown, trace iron oxide staining.	PID = 10.9	
					113.0 (CL) Clay with Sand - sand is fine grained, little silt, medium dense, wet, low plasticity, 2.5y 5/2 grayish brown, trace iron oxide mottling, trace mica, (75% fines, 25% sand, 0% gravel).	PID = 11.3	
					113.8		
					114.5 - mottled iron oxide staining.	PID = 11.7	
115					- few silt, medium plasticity, (80% fines, 20% sand, 0% gravel).	PID = 21.2 PID = 19	
					116.0 - little silt, very stiff, low plasticity.	PID = 13.1	
					- stiff.		
			CL		- iron oxide mottling.	PID = 9.1	
					118.0 - trace coarse grained sand, trace fine gravel, (70% fines, 25% sand, 5% gravel),	PID = 12.9	
					119.0 - very stiff, 2.5y 4/2 dark grayish brown.	PID = 9.7	
120						PID = 11.7 PID = 16	Annular Seal: 95% cement-bentonite grout, 2'-144' bgs
					121.5 - trace iron oxide staining, (65% fines, 30% sand, 5% gravel).	PID = 13	
					123.0		
					123.5 - grades to Silty Sand (SM).	PID = 11	
					(SM) Silty Sand - sand is fine grained, trace medium sand, few clay, medium dense, wet, 2.5y 5/4 light olive brown, trace iron oxide staining, trace mica, (35% fines, 65% sand, 0% gravel).	PID = 12.1	
125			SM		125.5 - sand is fine to medium grained, trace coarse sand, trace fine gravel, no clay, 2.5y 4/4 olive brown, (25% fines, 70% sand, 5% gravel).	PID = 7.3	
					126.0	PID = 17.7	
			SP		127.0 - grades to poorly graded fine Sand (SP).	PID = 13.6 PID = 10	
					128.0 (SP) Poorly graded fine Sand - trace medium grained sand, trace silt, loose, wet, sub-angular, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 8.5	
			SW		129.0 - trace fine gravel, (5% fines, 90% sand, 5% gravel).	PID = 7.8	
130					130.0 (SW) Well graded Sand - sand is fine to coarse grained, trace fine gravel, trace silt, loose, wet, sub-rounded, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (5% fines, 90% sand, 5% gravel).	PID = 11.9 PID = 104 PID = 114	
	MW-38B-S-131	VOCs	SP		(SP) Poorly graded fine Sand - trace medium grained sand, trace silt, loose, wet, sub-rounded, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 30.6	
					133.0 - trace fine gravel, trace coarse sand, (5% fines, 90% sand, 5% gravel).	PID = 26.2	
135					(SM) Silty Sand - sand is fine grained, trace medium sand, loose, wet, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (25% fines, 75% sand, 0% gravel).	PID = 23.8 PID = 4	
			SM		136.0 - (30% fines, 70% sand, 0% gravel).	PID = 4.1 PID = 3.9	
					138.0 - trace clay (CL) nodules, trace iron oxide mottling.	PID = 4.5	
					139.0		

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WELL NUMBER MW-38B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
140			SM		- no clay nodules, no mottling, (25% fines, 75% sand, 0% gravel). (SM) Silty Sand - sand is fine grained, trace medium sand, loose, wet, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (25% fines, 75% sand, 0% gravel).	PID = 3.4 PID = 6.3 PID = 4.1 PID = 2.9	Annular Seal: 95% cement-bentonite grout, 2'-144' bgs
					142.5	PID = 2	
			SP-SM		(SP-SM) Poorly graded fine Sand with Silt - trace medium grained sand, loose, wet, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 3.8	
145					145.0		
			SP		(SP) Poorly graded fine Sand - few medium grained sand, trace silt, loose, wet, sub-rounded, 2.5y 4/3 olive brown, trace mica, few clay (CL) nodules [low plasticity, mottled iron oxide staining], (5% fines, 95% sand, 0% gravel).	PID = 8.4 PID = 7.3	Transition Seal: Hydrated Bentonite, 144'-146' bgs
					146.0		
					146.8	PID = 4.2	
			SM		- no clay nodules.		Transition Sand: #30 Sand, 146'-148' bgs
					148.0	PID = 5	
			SP-SM		(SM) Silty Sand - sand is fine grained, trace medium sand, loose, wet, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (20% fines, 80% sand, 0% gravel).	PID = 0.1	Filter Pack: #2/12 Sand, 148'-161' bgs
150					(SP-SM) Poorly graded fine Sand with Silt - trace medium grained sand, loose, wet, 2.5y 4/3 olive brown, trace limonite staining, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 0.2	
					150.0		
			SP		(SP) Poorly graded fine Sand - trace medium grained sand, trace silt, loose, wet sub-rounded, 2.5y 5/3 light olive brown, trace limonite staining, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 4.9 PID = 5.6	
					152.5		
			SP-SM		(SP-SM) Poorly graded fine Sand with Silt - trace medium grained sand, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, trace limonite staining, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 6.6 PID = 4.3	
					153.8		
155			SP		(SP) Poorly graded Sand - sand is fine to medium grained, trace silt, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, trace limonite staining, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 22.8 PID = 60.9 PID = 4.1 PID = 4	Screen: 2" PVC, 0.020" slot, 150'-160' bgs
					156.0		
					157.0 - sand is fine grained, trace medium sand.		
					- micaceous.	PID = 6	
					158.0		
		300 gallons of water added.	SP-SM		(SP-SM) Poorly graded fine Sand with Silt - trace medium sand, loose, wet, sub-rounded, 2.5y 5/3 light olive brown, trace limonite staining, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 6 PID = 8.4	
160					161.0		Bottom Cap

Bottom of borehole at 161.0 feet.

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WELL NUMBER MW-39B

CLIENT U.S. EPA / U.S ACE
PROJECT NAME Modesto Groundwater Superfund Site
PROJECT NUMBER 011-40001-15
PROJECT LOCATION Modesto, CA
DATE STARTED 5/9/16 **COMPLETED** 5/11/16
GROUND ELEVATION 88.36 **HOLE SIZE** 8 to 6 inches
DRILLING CONTRACTOR National EWP
GROUND WATER LEVELS:
DRILLING METHOD Rotosonic LS600
AFTER DRILLING 47.47 ft prior to well development
LOGGED BY Brian Zanco **CHECKED BY** Jacobe Washburn **NORTHING** 2058986.58
NOTES 2" dia. groundwater monitoring well.
EASTING 6418336.40

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
0					0.5 Asphalt		Locking cap
		Surface Completion: 8" dia. flush mount traffic rated well vault in 2' dia. asphaltic concrete pad.	SM		(SM) Alluvium: Silty Sand - sand is fine grained, trace medium and coarse sand, trace clay, loose, moist, 2.5y 4/4 olive brown, (35% fines, 65% sand, 0% gravel).		Surface Seal/Pad: concrete, 0'-2' bgs
5							
		Air knife clearance 8'.			8.0		
			ML		(ML) Sandy silt - sand is fine grained, trace clay, medium, moist, non-plastic, 2.5y 5/3 light olive brown, trace mica, (75% fines, 25% sand, 0% gravel).	PID = 25.6	
					9.5	PID = 12.5	
10			SP-SM		(SP-SM) Poorly graded fine Sand with Silt - sand is fine to medium grained, loose, moist, sub-angular, 2.5y 5/4 light olive brown, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 11.5	Annular Seal: 95% cement-bentonite grout, 2'-143.5' bgs
						PID = 13.9	
						PID = 16.7	
						PID = 1.9	
15	MW-39B-S-15	VOCs			15.0	PID = 2.9	
					(ML) Sandy Silt - sand is fine grained, few clay, medium, moist, low plasticity, 10yr 5/4 yellowish brown, (80% fines, 20% sand, 0% gravel).	PID = 920	
						PID = 447	Centralizers at 30', 70', 110', 150', 160'
			ML		17.5	PID = 96.8	
					- trace medium grained sand, (65% fines, 35% sand, 0% gravel).	PID = 96.2	
						PID = 100	
20					20.0	PID = 132	
					(SM) Silty Sand - sand is fine grained, trace medium sand, few clay, loose, moist, 10yr 5/4 yellowish brown, (40% fines, 60% sand, 0% gravel).	PID = 158	
					21.0	PID = 11.6	
					- trace coarse grained sand, little clay.	PID = 56.5	
					22.0		
			SM		- few clay.	PID = 2.1	
						PID = 3	
					24.0		
25					- trace clay, no coarse sand.	PID = 3.4	

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WELL NUMBER MW-39B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
25					25.5 (SM) Silty Sand - sand is fine grained, trace medium sand, few clay, loose, moist, 10yr 5/4 yellowish brown, (40% fines, 60% sand, 0% gravel).	PID = 2.5	
					- few clay, trace coarse sand.	PID = 0.1	
			SM		28.0	PID = 1.2	
					- trace clay, no coarse sand.	PID = 1.5	
30					29.5		
			SP-SM		31.0 (SP-SM) Poorly graded fine Sand with Silt - trace medium and coarse grained sand, loose, moist, 10yr 5/4 yellowish brown, (10% fines, 90% sand, 0% gravel).	PID = 2	
					(SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, trace silt, trace fine gravel, loose, moist, 10yr 5/4 yellowish brown, (5% fines, 90% sand, 5% gravel).	PID = 2.7	
					33.0	PID = 1.9	
			SP		- no gravel, wet, trace limonite, staining, (5% fines, 95% sand, 0% gravel).	PID = 3.5	
						PID = 0.1	
35					35.0		Annular Seal: 95% cement-bentonite grout, 2'-143.5' bgs
					- sand is fine to coarse grained, trace fine gravel, trace silt nodules, 10yr 5/3 brown, (5% fines, 90% sand, 5% gravel).	PID = 0.1	
					36.0	PID = 2.9	
					- 10yr 6/3 pale brown.	PID = 0.1	
					37.0		
			SM		38.0 (SM) Silty Sand - sand is fine grained, medium dense, moist, 10yr 4/3 brown, (40% fines, 60% sand, 0% gravel).	PID = 0.6	
					39.0 - trace medium sand, (30% fines, 70% sand, 0% gravel).	PID = 0.9	
40					(SP-SM) Poorly graded fine Sand with Silt - trace medium and coarse grained sand, trace fine gravel, medium dense, moist, 10yr 4/2 dark grayish brown, (10% fines, 85% sand, 5% gravel).		Riser Casing: 2" PVC, 0.25'-149.5' bgs
					41.0	PID = 3	
					- no gravel, trace silt and clay, dense, 10yr 4/3 brown, trace clay nodules [10yr5/1 gray], (15% fines, 85% sand, 0% gravel).	PID = 0	
					42.0		
			SP-SM		- no clay, medium dense, 10yr 5/3 brown, (10% fines, 90% sand, 0% gravel).	PID = 0	
					44.0	PID = 0	
45					- trace clay nodules [10yr 5/1 gray].	PID = 5.3	
						PID = 0	
						PID = 1.5	
						PID = 5.8	
					47.0		
					- trace clay, 10yr 5/2 grayish brown, (15% fines, 85% sand, 0% gravel).	PID = 8.8	
					48.0		
					(SC) Silty Clay - sand is fine grained, few silt, medium dense, moist, 10yr 5/1 gray, (20% fines, 80% sand, 0% gravel).	PID = 0.3	
					49.0	PID = 18	
50			SC		- trace fine gravel, loose, (20% fines, 75% sand, 5% gravel).	PID = 7.7	
					50.0	PID = 1.5	
					- no gravel, 10yr 5/3 grayish brown, (20% fines, 80% sand, 0% gravel).	PID = 9.5	
					51.0		
					- (30% fines, 70% sand, 0% gravel).	PID = 18.9	
					52.0		
			SM		53.0 (SM) Silty Sand - sand is fine grained, medium dense, moist, 10yr 5/3 brown, (40% fines, 60% sand, 0% gravel).		
			SP-		53.5	PID = 1.3	

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WELL NUMBER MW-39B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
			SM/SP		54.0 (SP-SM) Poorly graded fine Sand with Silt - few medium grained sand, medium dense, moist, 10yr 5/2 grayish brown, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 2.6 PID = 0.6	Annular Seal: 95% cement-bentonite grout, 2'-143.5' bgs
55			CL		55.5 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, trace silt, loose, moist, 10yr 5/2 grayish brown, trace iron oxide mottling, trace mica, (5% fines, 95% sand, 0% gravel). 56.0	PID = 2	
			SP		57.0 (CL) Clay with fine Sand - trace medium and coarse grained sand, few silt, stiff, moist, non-plastic, 10yr 5/2 grayish brown, trace iron oxide mottling, trace mica, (80% fines, 20% sand, 0% gravel). 58.0	PID = 0.7	
			SP-SC		59.0 - low plasticity	PID = 31.6	
60			SP		- trace medium grained sand, no coarse, wet, 10yr 4/3 brown, (70% fines, 30% sand, 0% gravel). 60.0	PID = 29.3	
			SP-SC		60.5 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse grained, trace silt, loose, wet, 10yr 5/2 grayish brown, trace mica, (5% fines, 95% sand, 0% gravel). 61.3	PID = 14.8 PID = 16.5 PID = 19.1	
					62.5 (SP-SC) Poorly graded fine Sand with Clay - trace medium grained sand, medium dense, wet, 10yr 5/3 brown, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 5.1 PID = 5.6	
			CL		63.8 (SP) Poorly graded fine Sand - trace medium grained sand, trace clay, loose, wet, 10yr 5/3 brown, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 4.3	
65					65.0 (SP-SC) Poorly graded fine Sand with Clay - trace medium grained sand, loose, wet, 10yr 5/3 brown, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 3.9 PID = 0.1	
			SP-SC		66.5 - few medium grained sand.		
			CL		67.5 - trace medium grained sand, trace clay (CL) nodules. - grades to Silty Clay with Sand (CL).	PID = 0.3 PID = 2.9	
			SP		69.0 (CL) Silty Clay with Sand - sand is fine grained, medium, wet, low plasticity, 10yr 5/3 brown, trace iron oxide mottling, (75% fines, 25% sand, 0% gravel).	PID = 1.4	
70					- medium stiff, (80% fines, 20% sand, 0% gravel).	PID = 0.8	A-Zone Seal: Hydrated Bentonite with 95% cement-bentonite grout, 68'-71' bgs
			CL		70.3 (SP-SC) Poorly graded Sand with Clay - sand is fine to medium grained, loose, wet, 10yr 5/3 brown, trace limonite staining, (10% fines, 90% sand, 0% gravel). - grades to Silty Clay with Sand (CL).	PID = 0.1	
					72.0 (CL) Silty Clay with Sand - sand is fine grained, medium stiff, wet, low plasticity, 10yr 5/3 brown, trace iron oxide staining, trace mica, (80% fines, 20% sand, 0% gravel).	PID = 0	
			CH		73.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, trace silt, loose, wet, 10yr 5/2 grayish brown, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 0 PID = 0	
					74.0 - grades to Silty Clay with Sand (CL).	PID = 0	
75					75.0 (CL) Silty Clay with Sand - sand is fine grained, stiff, wet, low plasticity, 10yr 5/3 brown, trace iron oxide mottling, trace mica, (75% fines, 25% sand, 0% gravel).	PID = 0	
					- medium stiff, medium plasticity, (85% fines, 15% sand, 0% gravel). 77.0	PID = 0 PID = 0	
			CL		(CH) Sandy Clay - sand is fine grained, few silt, medium, high plasticity, 10yr 5/3 brown, trace iron oxide mottling, trace mica, (80% fines, 20% sand, 0% gravel).	PID = 0	
80					(CL) Silty Clay with Sand - sand is fine grained, trace medium sand, medium, wet, low plasticity, 10yr 5/3 brown, trace iron oxide mottling, trace mica, (70% fines, 30% sand, 0% gravel).	PID = 0	Telescope Well Transition, 8" dia to 6" dia
					Silty Clay with Sand - sand is fine grained, medium stiff, (80% fines, 20% sand, 0% gravel).	PID = 0 PID = 0	
					Sandy Clay with Silt - sand is fine to medium grained,		

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WELL NUMBER MW-39B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
					10yr 4/4 dark yellowish brown, (70% fines, 30% sand, 0% gravel).	PID = 0.9	
					- trace coarse sand, stiff.	PID = 5.8	
85			CL		(CL) Silty Clay with Sand - sand is fine grained, trace medium sand, medium, wet, low plasticity, 10yr 5/3 brown, trace iron oxide mottling, trace mica, (70% fines, 30% sand, 0% gravel).	PID = 5.4	
						PID = 0	
						PID = 1.2	
						PID = 0	
					88.0		
					(SP-SM) Poorly graded Sand with Silt - trace medium grained sand , loose, wet, 10yr 4/6 dark yellowish brown, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 0	
						PID = 0	
90			SP-SM			PID = 0	
						PID = 0	
					92.0		
					(SP) Poorly graded Sand - sand is fine to medium grained, trace coarse sand, trace silt, loose, wet, sub-rounded, 10yr 5/2 grayish brown, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 0	
						PID = 0	
95						PID = 0	
						PID = 0	
			SP			PID = 0	
						PID = 0	
					98.0		
					- trace manganese oxide mottling.	PID = 0	
						PID = 0	
100						PID = 0	
						PID = 0	
					101.0		
					(CL) Silty Clay with Sand - sand is fine grained, stiff, wet, low plasticity, 10yr 5/2 grayish brown, trace mottling, 85% fines, 15% sand, 0% gravel).	PID = 0	
						PID = 0	
			CL			PID = 0	
					104.0		
					- trace iron oxide mottling.	PID = 0	
105					105.0		
					(SP-SC) Poorly graded fine Sand with Clay - trace medium grained sand, loose, wet, 10yr 5/3 brown, trace iron oxide mottling, (10% fines, 90% sand, 0% gravel).	PID = 0	
			SP-SC			PID = 0	
						PID = 0	
					107.0 - grades to Silty Clay with Sand (CL).		
					(CL) Silty Clay with Sand - sand is fine grained medium stiff, wet, medium plasticity, 10yr 5/3 brown, trace iron oxide mottling, (80% fines, 20% sand, 0% gravel).	PID = 2	
			CL			PID = 0.6	
					109.5		
110					- high plasticity.	PID = 0	

Annular Seal: 95% cement-bentonite grout, 2'-143.5' bgs

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WELL NUMBER MW-39B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
					(CL) Silty Clay with Sand - sand is fine grained medium stiff, wet, medium plasticity, 10yr 5/3 brown, trace iron oxide mottling, (80% fines, 20% sand, 0% gravel).	PID = 0 PID = 0.1	
					112.0		
					- medium plasticity.	PID = 0.7	
			CL			PID = 0.6	
115					115.0	PID = 1.3	
					- very stiff.	PID = 0	
					117.0 - grades to:	PID = 0.4	
					(SP-SC) Poorly graded Sand with Clay - sand is fine to medium grained, trace coarse sand, loose, wet, sub-angular, 10yr 5/3 brown, trace iron oxide staining, trace mica, (10% fines, 90% sand, 0% gravel).	PID = 0	
						PID = 1.6	
					119.5	PID = 1.1	
120					- trace medium grained sand, no coarse sand, mottled iron oxide staining.	PID = 2.9	← Annular Seal: 95% cement-bentonite grout, 2'-143.5' bgs
			SP-SC			PID = 0.7 PID = 6.6	
						PID = 6.7	
						PID = 0.5	
						PID = 0.7	
125					125.0	PID = 3.8	
					(SP) Poorly graded fine Sand - trace clay, loose, moist, 10yr 4/4 dark yellowish brown, few mottling, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 1.7	
						PID = 3.9	
						PID = 5.6	
						PID = 3.9	
					129.5	PID = 6	
130					- trace iron oxide staining.	PID = 0.1	
						PID = 2.2	
			SP			PID = 4	
					133.0		
					- mottled iron oxide staining.	PID = 6.3	
						PID = 6.8	
135						PID = 5.3	
					136.5	PID = 0	
					- trace mottling.	PID = 0.8	
						PID = 2.4	

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WELL NUMBER MW-39B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
140			SP		(SP) Poorly graded fine Sand - trace clay, loose, moist, 10yr 4/4 dark yellowish brown, few mottling, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 1.8 PID = 3.2 PID = 2.2 PID = 0 PID = 0.7	Annular Seal: 95% cement-bentonite grout, 2'-143.5' bgs
					143.0	PID = 1.2	
			SC		(SC) Clayey Sand - sand is fine grained, few silt, loose, wet, 10yr 4/4 dark yellowish brown, trace manganese oxide mottling, few clay (CL) nodules [medium plasticity, 10yr 5/3 brown], trace mica, (30% fines, 70% sand, 0% gravel).	PID = 1.2	
					144.5	PID = 1.2	
145					145.0 - trace clay nodules, micaceous.	PID = 0.6	Transition Seal: Hydrated Bentonite, 143.5'-145.5' bgs
					146.0 - laminated.	PID = 2.8	
					(SP) Poorly graded fine Sand - trace clay, loose, wet, 10yr 4/3 brown, micaceous, (5% fines, 95% sand, 0% gravel).	PID = 4.3 PID = 2.4	Transition Sand: #30 Sand, 145.5'-147.5' bgs
					149.0	PID = 3.9	
150					- trace clay nodules, mottled iron oxide staining.	PID = 0.1	Filter Pack: #2/12 Sand, 147.5'-160' bgs
					150.0		
					150.5 - trace medium grained sand, no clay nodules.	PID = 2.5	
					- few medium grained sand, trace silt, trace iron oxide staining, trace mica.	PID = 0.2	
			SP			PID = 1.4	
						PID = 3.7	
						PID = 4.3	
155	MW-39B-S-155	VOCs			155.0		Screen: 2" PVC, 0.020" slot, 149.5'-159.5' bgs
					- trace medium grained sand, trace clay.	PID = 8.1	
					156.0		
					- trace silt, trace iron oxide staining, no mottling.	PID = 0.1	
						PID = 0.2	
						PID = 3.9	
		230 gallons of water added.			158.5 - trace clay.	PID = 4.3	
160					160.0	PID = 4.6	Bottom Cap

Bottom of borehole at 160.0 feet.

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WELL NUMBER MW-40B

CLIENT U.S. EPA / U.S ACE
PROJECT NAME Modesto Groundwater Superfund Site
PROJECT NUMBER 011-40001-15
PROJECT LOCATION Modesto, CA
DATE STARTED 5/11/16 **COMPLETED** 5/13/16
GROUND ELEVATION 88.86 **HOLE SIZE** 8 to 6 inches
DRILLING CONTRACTOR National EWP
GROUND WATER LEVELS:
DRILLING METHOD Rotosonic LS600
AFTER DRILLING 48.12 ft prior to well development
LOGGED BY Carrie Plath/Brian Zanco **CHECKED BY** Jacobe Washburn
NORTHING 2058704.82
NOTES 2" dia. groundwater monitoring well.
EASTING 6418833.02

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
0					0.5 Asphalt		Locking cap
		Surface Completion: 8" dia. flush mount traffic rated well vault in 2' dia. asphaltic concrete pad.			(SP-SM) Alluvium: Poorly graded fine Sand with Silt - loose, dry, 10yr 6/3 pale brown, (10% fines, 90% sand, 0% gravel).		Surface Seal/Pad: concrete, 0'-2' bgs
5			SP-SM			PID = 4.7	
		Air knife clearance 8'.				PID = 9.5	
10					10.5	PID = 0	Annular Seal: 95% cement-bentonite grout, 2'-138' bgs
			SP-SC		(SP-SC) Poorly graded fine Sand with Clay - loose, moist, 10yr 6/3 pale brown, (15% fines, 85% sand, 0% gravel).	PID = 12.9 PID = 0	
					13.5	PID = 0 PID = 1.7	
15			SP		(SP) Poorly graded fine Sand - few fine gravel, trace silt, loose, dry, angular, 10yr 5/2 grayish brown, (5% fines, 85% sand, 10% gravel).	PID = 5.4	
					17.0	PID = 8 PID = 13.8 PID = 6.6	Centralizers at 25', 65', 105', 145', 155'
	MW-40B-S 19	VOCs	CL		(CL) Sandy Clay with Silt - sand is fine grained, trace medium sand, stiff, moist, low plasticity, 10yr 4/3 brown, (65% fines, 35% sand, 0% gravel).	PID = 0 PID = 0.1 PID = 16.2	
20					20.0		
					(ML) Sandy Silt with Clay - sand is fine to medium grained, medium stiff, moist, non-plastic, 10yr 4/3 brown, (65% fines, 35% sand, 0% gravel).	PID = 6.5	
			ML		22.5	PID = 0.2 PID = 0.5	
					- trace iron oxide staining.	PID = 0.1	
25					24.5 - stiff.		

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WELL NUMBER MW-40B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
25					25.5 (ML) Sandy Silt with Clay - sand is fine to medium grained, medium stiff, moist, non-plastic, 10yr 4/3 brown, (65% fines, 35% sand, 0% gravel).	PID = 0.1 PID = 0.1	
			ML		27.0 - few clay, 10yr 4/4 dark yellowish brown, (60% fines, 40% sand, 0% gravel). - trace coarse sand.		
					29.0 - grades to Silty Sand (SM).	PID = 0.3	
30			SM		(SM) Silty Sand - sand is fine to medium grained, trace coarse sand, trace clay, medium dense, moist, sub-angular, 10yr 4/4 dark yellowish brown, (35% fines, 65% sand, 0% gravel).	PID = 0.2	
			SW		30.5 (SW) Well graded Sand - sand is fine to coarse grained, trace silt, trace fine gravel, loose, moist, rounded, 10yr 5/3 brown, (5% fines, 90% sand, 5% gravel).	PID = 0.2	
					33.0 - grades to Silty Sand (SM).	PID = 0.3	
					(SM) Silty Sand - sand is fine to medium grained, trace coarse sand, loose, dry, sub-rounded, 10yr 5/2 grayish brown, (30% fines, 70% sand, 0% gravel).		
35					34.5 - trace fine gravel, (30% fines, 65% sand, 5% gravel).		
			SM		35.0 - no gravel, moist, 10yr 5/4 yellowish brown, trace iron oxide staining, trace mice, (30% fines, 70% sand, 0% gravel).	PID = 0.8	Annular Seal: 95% cement-bentonite grout, 2'-138' bgs
					38.0	PID = 0.2	
			CL		(CL) Silty Clay - little fine sand, medium stiff, moist, low plasticity, 10yr 5/3 brown, (80% fines, 20% sand, 0% gravel).	PID = 5	
40					39.5 - increased moisture, medium plasticity.		Riser Casing: 2" PVC, 0.25'-145' bgs
					41.0	PID = 13 PID = 9.6	
			SP-SC		(SP-SC) Poorly graded Sand with Clay - loose, moist, 10yr 5/2 grayish brown, (10% fines, 90% sand, 0% gravel).	PID = 7.4	
					42.0 - (15% fines, 85% sand, 0% gravel).	PID = 16	
			SM		43.0 (SM) Silty Sand - loose, moist, 10yr 5/2 grayish brown, (20% fines, 80% sand, 0% gravel).	PID = 0	
45					44.0 - increased silt, (40% fines, 60% sand, 0% gravel).	PID = 5.4	
					45.0		
			ML		(ML) Sandy Silt - stiff, moist, 10yr 5/2 grayish brown, (80% fines, 20% sand, 0% gravel).	PID = 4.7 PID = 2.5	
					46.0 - grades to Silty Sand (SM).	PID = 0.6	
			SM		(SM) Silty Sand - sand is fine grained, trace clay, loose, moist, 10yr 4/3 brown, trace iron oxide staining, trace mica, (25% fines, 75% sand, 0% gravel).	PID = 8.6	
			SP		47.5 (SP) Poorly graded fine Sand - trace medium grained sand, trace silt, loose, moist, 10yr 5/2 grayish brown, trace mica, (5% fines, 95% sand, 0% gravel).	PID = 3.2	
					48.5	PID = 9.8	
50			SM		(SM) Silty Sand - sand is medium to coarse grained, loose, moist, 10yr 5/2 grayish brown, trace mica, (25% fines, 75% sand, 0% gravel).	PID = 13.5	
					50.5	PID = 1.2	
			ML		(ML) Silt with Sand - sand is very fine grained, medium, moist, non-plastic, 10yr 5/3 brown, trace mica, (90% fines, 10% sand, 0% gravel).	PID = 0	
					52.0 Sandy Silt - sand is fine grained, 10yr 4/4 dark yellowish brown, (70% fines, 30% sand, 0% gravel).	PID = 3.5	
					53.0	PID = 0	

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RORE, Inc.
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WELL NUMBER MW-40B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
			SP-SM		(SP-SM) Poorly graded Sand with Silt - loose, wet, 10yr 5/3 brown, (10% fines, 90% sand, 0% gravel).	PID = 4.8
55			SM		54.5 (SM) Silty Sand - loose, wet, 10yr 5/3 brown, (20% fines, 80% sand, 0% gravel).	PID = 4.9
					55.5 (SP) Poorly graded fine Sand - loose, wet, 10yr 5/3 brown, (5% fines, 95% sand, 0% gravel).	PID = 0 PID = 5.1
			SP		58.0 - sand is fine to medium grained.	PID = 10.4 PID = 0
60					60.0	PID = 11.2
			SP-SM		60.5 (SP-SM) Poorly graded fine sand with Silt - loose wet, 10yr 5/3 brown, (10% fines, 90% sand, 0% gravel).	PID = 4.9
			SM		61.0 (SM) Silty Sand - loose, wet, 10yr 5/3 brown, trace mica, (40% fines, 60% sand, 0% gravel).	PID = 0 PID = 2.5
			CL		63.0 (CL) Clay - little silt, trace sand, stiff, moist, 10yr 5/4 yellowish brown, mottles, (95% fines, 5% sand, 0% gravel).	PID = 0
					63.5 - few sand, very stiff. (90% fines, 10% sand, 0% gravel).	PID = 0
65			SC		(SC) Clayey Sand - sand is fine to medium grained, loose, wet, 10yr 5/3 brown, (40% fines, 60% sand, 0% gravel).	PID = 0
					65.5	PID = 0
			SP		67.0 (SP) Poorly graded Sand - sand is fine to medium grained trace clay, loose, wet, 10yr 5/2 grayish brown, (5% fines, 95% sand, 0% gravel).	PID = 2.1 PID = 10
			CL		68.5 (CL) Clay with Sand - sand is fine to medium grained, medium stiff, moist, low plasticity, 10yr 5/3 brown, trace mica, (85% fines, 15% sand, 0% gravel).	PID = 15
70			SP		70.0 (SP) Poorly graded Sand - sand is fine to medium grained, trace clay, loose, wet, 10yr 5/2 grayish brown, (5% fines, 95% sand, 0% gravel).	PID = 0.3
					71.0 Poorly graded fine Sand	PID = 1 PID = 0.3
			CL		72.0 (CL) Clay - little silt, trace fine sand, stiff, moist, low plasticity, friable, 10yr 5/4 yellowish brown, (95% fines, 5% sand, 0% gravel).	PID = 0.1
					73.0 - some silt, medium plasticity, (100% fines, 0% sand, 0% gravel).	PID = 1.3
75					- trace sand, trace mica, (95% fines, 5% sand, 0% gravel).	PID = 2.4
					75.0	
					75.5 - little silt, 10yr 5/3 brown, (100% fines, 0% sand, 0% gravel).	
					76.0	PID = 2.2
			ML		- trace mica.	
			SM		77.0 (ML) Silt, some clay, trace fine sand, medium, wet, non-plastic, 10yr 5/3 brown, trace mica, (95% fines, 5% sand, 0% gravel).	PID = 0.9
			CL		78.0 (SM) Silty Sand - sand is medium to coarse grained, trace clay, loose, wet, 10yr 5/3 brown, (20% fines, 80% sand, 0% gravel).	PID = 0.8
80					80.0 (CL) Clay - some silt, trace fine sand, stiff, wet, medium plasticity, 10yr 5/3 brown, (95% fines, 5% sand, 0% gravel).	PID = 0.7
			SC		(SC) Clayey Sand - sand is fine grained, few silt, loose, moist, 10yr 5/3 brown, (30% fines, 70% sand, 0% gravel).	PID = 1.3

WELL DIAGRAM:
- Annular Seal: 95% cement-bentonite grout, 2'-138' bgs
- A-Zone Seal: Hydrated Bentonite with 95% cement-bentonite grout, 68'-77' bgs
- Telescope Well Transition, 8" dia to 6" dia

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WELL NUMBER MW-40B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
			SC		83.0		
			CL		(CL) Clay - some silt trace very fine sand, stiff, moist, medium plasticity, 10yr 5/3 brown, (95% fines, 5% sand, 0% gravel).		
85					85.5	PID = 0.5	
					(ML) Silt - some clay, trace fine sand, stiff, moist, low plasticity, 10yr 5/4 yellowish brown, (95% fines, 5% sand, 0% gravel).	PID = 0.5	
90					90.0		
	MW-40B-S-91	VOCs	ML		- mottled, trace mica.	PID = 1.3	
						PID = 3	
					94.0		
95					- little fine grained sand, medium, non-plastic, 10yr 5/4 yellowish brown, mottling [10yr 4/3 brown], (80% fines, 20% sand, 0% gravel). 95.5	PID = 1.6	
					- wet. 96.5	PID = 2.3	
					(SP) Poorly graded fine Sand - trace silt, loose, wet, 10yr 5/2 grayish brown, mottled, trace mica, (5% fines, 95% sand, 0% gravel).		
					99.0		
					Poorly graded Sand - sand is fine to medium grained.	PID = 3	
100						PID = 0.8	← Annular Seal: 95% cement-bentonite grout, 2'-138' bgs
			SP		104.0		
					- sand is medium grained, 10yr 5/3 brown.		
105					105.0		
					- no silt, (0% fines, 100% sand, 0% gravel).	PID = 1.6	
					107.0		
					- sand is very fine to medium grained, sub-rounded.		
110						PID = 0.5	

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WELL NUMBER MW-40B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
					111.0 (SP) Poorly graded fine Sand - trace silt, loose, wet, 10yr 5/2 grayish brown, mottled, trace mica, (5% fines, 95% sand, 0% gravel).		
			SP		- trace silt, no mottling, (5% fines, 95% sand, 0% gravel).		
115					115.0	PID = 0.4	
					(CL) Clay - some silt, trace fine sand, stiff, moist, low plasticity, 10yr 5/4 yellowish brown, trace mica, (95% fines, 5% sand, 0% gravel).	PID = 0.7	
					117.0		
			CL		Sandy Clay - trace silt, (75% fines, 25% sand, 0% gravel).		
					118.0 Clay - some silt, trace very fine sand, very stiff, mottled, (95% fines, 5% sand, 0% gravel).		
120					120.0		Annular Seal: 95% cement-bentonite grout, 2'-138' bgs
			ML		(ML) Silt - some clay, trace very fine sand, very stiff, moist, non-plastic, 10yr 5/4 yellowish brown, trace mica, (95% fines, 5% sand, 0% gravel).	PID = 0.9	
					122.0	PID = 0.2	
					(CL) Clay - little silt, trace fine sand, stiff, moist, medium plasticity, 10yr 5/4 yellowish brown, (95% fines, 5% sand, 0% gravel).		
125					125.0	PID = 1.3	
			CL		- some silt, few sand, medium plasticity, (85% fines, 15% sand, 0% gravel).	PID = 1.5	
					126.5 - little fine to medium grained sand, low plasticity, (75% fines, 25% sand, 0% gravel).		
					128.0 - grades to poorly graded Sand with Clay (SP-SC).		
			SP-SC		(SP-SC) Poorly graded Sand with Clay - sand is fine grained, loose, moist, 10yr 5/4 yellowish brown, (15% fines, 85% sand, 0% gravel).		
			SP		129.0 (SP) Poorly graded fine Sand - trace clay, loose, moist, 10yr 5/4 yellowish brown, (5% fines, 95% sand, 0% gravel).	PID = 0.5	
130					130.0		
			ML		(ML) Silt with Sand - sand is fine to medium grained, some clay, medium stiff, moist, low plasticity, 10yr 5/4 yellowish brown, (85% fines, 15% sand, 0% gravel).	PID = 0.8	
					134.0		
135					(SM) SIlty Sand - sand is fine grained, trace clay, loose, moist, 10yr 5/3 brown, (25% fines, 75% sand, 0% gravel).	PID = 0.7	
			SM		136.0	PID = 0.3	
					- sand is very fine to fine grained, trace low plasticity clay, 10yr 5/4 yellowish brown, (15% fines, 85% sand. 0% gravel).		
					138.0		
			SP		(SP) Poorly graded Sand - sand is fine to medium grained, trace silt, loose, moist, 10yr 5/4 yellowish brown, (5% fines, 95% sand, 0% gravel).		

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WELL NUMBER MW-40B

CLIENT U.S. EPA / U.S ACE **PROJECT NAME** Modesto Groundwater Superfund Site

PROJECT NUMBER 011-40001-15 **PROJECT LOCATION** Modesto, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA	WELL DIAGRAM
140					(SP) Poorly graded Sand - sand is fine to medium grained, trace silt, loose, moist, 10yr 5/4 yellowish brown, (5% fines, 95% sand, 0% gravel).	PID = 1.1	Transition Seal: Hydrated Bentonite, 138'-141' bgs
					142.0 Poorly graded fine Sand - trace medium grained sand, wet, 10yr 5/2 grayish brown.		Transition Sand: #30 Sand, 141'-143' bgs
145					145.0 Poorly graded Sand - sand is fine to medium grained.	PID = 0.5	Filter Pack: #2/12 Sand, 143'-160' bgs
			SP			PID = 0.8	
150						PID = 1.2	Screen: 2" PVC, 0.020" slot, 145'-155' bgs
					151.0 - moist.	PID = 0.5	
					153.0 Poorly graded medium Sand.		
155					155.5 Poorly graded Sand - sand is very fine grained, trace clay, no silt, medium dense, trace mica.	PID = 1	Bottom Cap
						PID = 0.5	
					157.5 (ML) Silt with Sand - sand is fine grained, trace clay, stiff, moist, non-plastic, 10yr 5/4 yellowish brown, trace mica, (75% fines, 25% sand, 0% gravel).	PID = 0.6	
160		130 gallons of water added.	ML		160.0	PID = 0.7	

Bottom of borehole at 160.0 feet.

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Appendix C

Well Development Logs

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Well Development Log

Installation: 4/25-4/27/10 **Project:** Modesto FS

Well #: MW 36A **Reported By:** C. Plath

Screen Type/Interval: PVC 10/.020" Slot, 88'-98' **Screen Diameter/Slot Size:** 2" , .020"

Static Water Level Prior to Development: 45.72' BTOC **Development Started:** 1020 **Development Ended:** 1625

Quantity of Water Discharged During Development: 175 gallons

Equipment/Tools Used: Pulstar 12,000 Truck Mounted Winch. 1-L metal bailer. geotech submersible stainless steel ; Horiba Waterquality meter & Hanna Turbidity Reader

DTW BTOC	Time	Development Method	Temp °C	pH	Conductivity mS/cm	Turbidity NTU	Comments
50.18	1450	Submers. pump	25.09	5.73	0.988	576 (Horiba U52)	50 gallons purged, water clear - light brown, 4" of silt/sed at bottom of drum
50.3	1500		23.18	5.87	1.05	359	cloudy, silt content w/ mica
50.05	1508		22.28	5.83	1.08	278	cloudy, ~90 gallons purged/bailed total, SW level... coming up
49.35	1518		23.07	5.87	1.08	267	med. cloudy
49.15	1540		23.08	5.91	1.08	259	~165 gallons purged/bailed
49.13	1555		23.16	5.92	1.08	249	no silts a mica observed ~117 gallons bailed/pumped
49.7	1612		21.98	5.93	1.08	128 Hanna	~150 gal bailed/surged, brought pump up to 93' BTOC
49.68	1620		21.79	5.94	1.08	117	~160 gallons bailed/pumped slightly cloudy, no silts, no odor

Well Development Log

Installation: 4/28 - 5/3/16 **Project:** Modesto PS

Well #: MW 37B **Reported By:** C. Plath

Screen Type/Interval: PVC, 145' - 155' **Screen Diameter/Slot Size:** 2", 0.020"

Static Water Level Prior to Development: 43.46' BTOC **Development Started:** 0905 5/24/16 **Development Ended:** 1120 5/25/16

Quantity of Water Discharged During Development: 280 gallons

5/25/16 **Equipment/Tools Used:** Pulstar rear winch mounted Truck, 2-L Bailer (SS), Horiba Water Quality Meter, water level Indicator, MiniRae 3000 PID, Geotech Sub. Pump.

DTW

Time	Development Method	Temp °C	pH	Conductivity mS/cm	Turbidity NTU	Comments
54.48 0928	Sub. pump 2 1 2.58 gal/min	19.91	4.29	0.521	143	water is cloudy, pump to 153
54.51 0935		20.08	4.37	0.499	84.8	water clearing up, pumped ~25 gallons so far (5/25), 165 total
54.48 0943		20.15	4.37	0.505	44.7	slightly cloudy, pumped 40 gals, bringing pump up to 100'
52.22 0951		20.25	4.35	0.508	25.0	
52.1 1003		20.62	4.36	0.514	15.2	
52.11 1010		20.77	4.38	0.513	11.6	
52.06 1020		20.89	4.4	0.514	6.01	
50.19 1031		21.48	4.18	0.457	6.63	Brought pump to 145', water is clear
50.19 1038		21.58	4.41	0.512	4.53	
50.88 1047		21.83	4.44	0.509	4.07	
50.78 1101		21.79	4.45	0.510	9.0	Brought pump up to 142'
50.66 1108		21.45	4.49	0.516	7.37	
51.52 1118		21.91	4.51	0.522	4.85	water is clear, no odor, no sheen.

Well Development Log

Installation: 5/3 - 5/9/16 **Project:** Modesto FS

Well #: MW 38B **Reported By:** C. Plath

Screen Type/Interval: PVC, 150'-160' **Screen Diameter/Slot Size:** 2", .020"

Static Water Level Prior to Development: DTW 46.79', TD 160.8' BTOC **Development Started:** 0940 5/18/16 **Development Ended:** 1130 5/19/16

Quantity of Water Discharged During Development: 365 gallons

Equipment/Tools Used: Pulstar 2000 Truck-mounted winch, 1-L Stainless steel bailer, Geotech Submersible pump (2 gal/min), Rae Rae 3000 PID, Horiba U51, water level meter, water level meter

DTW

Time	Development Method	Temp °C	pH	Conductivity mS/cm	Turbidity	Comments
47.77 1118	submersible pump 2 gal/min	13.00	3.95	0.564	177	Sulfur odor during pumping of first 40 gals.
50.75 1138		22.67	3.94	0.493	80.9	sulfur odor, water is cloudy, low pH, during drilling PID readings were 73.9 ppm @ 47' 54' BGS
47.95 1210		24.71	3.95	0.513	44.5	mostly clear, no odor ranked 5
1245	pump stopped					ordered a new pump for delivery 5/18/16
47.68 5/19/16	submersible pump 2.7 gal/min	start again on				5/19/16 @ 0850
53.78 0905		21.3	3.92	0.538	1.98	water is clear, no odor no sed.
53.74 0920		21.26	3.91	0.531	1.63	
53.71 0935		20.98	3.97	0.543	3.12	water is clear, slight recharge.
53.55 1030		21.79	4.11	0.541	5.49	" " Pumped ~ 250 gallons total
53.61 1035		21.36	4.11	0.540	4.29	
53.57 1050		21.52	4.12	0.541	5.15	
53.51 1100		21.95	4.13	0.539	3.77	
53.57 1115		21.89	4.13	0.537	1.98	
53.51 1125		21.95	4.13	0.540	0.23	water is very clear, no odor, no sheen.

Well Development Log

Installation: 5/9 - 5/11/16 Project: Modesto FS

Well #: MW 39B Reported By: C. Plath

Screen Type/Interval: PVC, 149.5' - 159.5' Screen Diameter/Slot Size: 2", 0.020"

Static Water Level Prior to Development: 47.47' BTOC Development Started: 0930 Development Ended: 1300

Quantity of Water Discharged During Development: 220 gallons

Equipment/Tools Used: PullStar winch mounted truck, 2-L Bailer, Geotech Sub. pump, water level meter, Horiba, Minirae 3000 PID.

DTW	Time	Development Method	Temp °C	pH	Conductivity ms/cm	Turbidity	Comments
49.75'	1135	Sub pump @ 2-3 gpm	20.81	4.08	0.515	95.7	water is cloudy with v. fine sed & mica (trace) pump @ 156.5' BTOC
49.73'	1145		20.7	4.13	0.500	103	
49.75'	1155		20.49	4.19	0.480	98.7	
49.6'	1200		20.42	4.16	0.483	95.3	Bringing pump up to 153.5' BTOC
49.61'	1210		20.66	4.19	0.481	97.4	water is slightly cloudy ' negligible silts
49.63'	1217		20.65	4.21	0.480	91.4	
49.66'	1223		20.62	4.26	0.479	92.9	
49.5'	1237		20.61	4.29	0.479	85.5	Brought pump to 149.5'
49.35'	1241		20.51	4.37	0.480	91.7	
49.38'	1245		20.48	4.41	0.480	96.1	
49.4	1250		20.47	4.41	0.479	97.4	water slightly cloudy, negligible silts.
49.4	1255		20.44	4.41	0.480	89.2	

Well Development Log

Installation: 5/11 - 5/13/16 **Project:** Modesto FS

Well #: MW 40B Lee Street **Reported By:** C. Plath

Screen Type/Interval: PVC , 145' - 155' **Screen Diameter/Slot Size:** 2" , .020"

Static Water Level Prior to Development: 48.12' BTOC **Development Started:** 1215 5/19/16 **Development Ended:** 1200 5/20/16

Quantity of Water Discharged During Development: 330 gallons

Equipment/Tools Used: Pustar 2000 mast mounted truck, 1-SS steel bailer, Geotech sub pump, Horiba, water level indicator PID Aeroqual 3000

DTW

Time	Development Method	Temp °C	pH	Conductivity ms/cm	Turbidity	Comments
123.62' 1517	Sub. pump	24.9	4.39	0.754	713	
131' 1537		23.11	4.37	0.754	471	
127.3' 1557		21.67	4.3	0.783	266	
128.68' 1610		21.48	4.38	0.802	261	water is cloudy/grey ish no odor, no sheen
127.75' 1620		21.62	4.51	0.787	165	brought pump up 4'
125.8' 1625		21.05	4.57	0.791	222	
124.9' 1640		21.55	4.64	0.784	285	Total of 3 drums/165 gallons removed from well
130.41 0935		19.96	3.92	0.4461	24.5	
129.1 0950		20.9	4.0	0.396	20.4	pumped 55 gallons today so far, water is slightly cloudy
121.7 1020		20.98	4.0	0.397	30.3	
124.55 123.92 1030		21.01	3.99	0.399	14.4	Water clearer, so pumping pump up to top of screen
122.5 1050		21.34	3.99	0.402	16.3	
124.45 121.29 1120		21.41	3.99	0.396	5.86	
124.2 1133		21.34	3.99	0.397	18.6	brought pump up 2' above screen 142' BTOC
119.45 1155		21.45	3.99	0.398	4.12	
51.1 1230						water recharged from 1155 to 1230 by 68.55'
						~1.5 gal./min.

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Appendix D

Land Survey Data

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CITY OF MODESTO
GROUNDWATER WELLS SURVEY
JUNE 23, 2016

MONITORING WELL NO.	DATE	NORTHING	EASTING	TOP OF PVC ELEVATION (NAVD 88)	TOP OF WELL CASING ELEVATION (NAVD 88)
MW-03A	6/23/2016	2061801.30	6418536.19	91.48 ft	92.03 ft
MW-04A	6/23/2016	2061647.00	6418512.35	91.40 ft	91.90 ft
MW-04B	6/23/2016	2061663.31	6418515.61	91.51 ft	92.03 ft
MW-04C	6/23/2016	2061671.83	6418515.89	91.61 ft	92.05 ft
MW-16A	6/23/2016	2060433.22	6419386.40	91.57 ft	91.93 ft
MW-16B	6/23/2016	2060427.10	6419386.26	91.55 ft	91.92 ft
MW-16C	6/23/2016	2060420.67	6419386.11	91.58 ft	91.87 ft
MW-32B	6/23/2016	2059924.43	6420058.62	90.90 ft	91.46 ft
MW-32C	6/23/2016	2059924.39	6420058.82	91.01 ft	91.46 ft
MW-33B	6/23/2016	2059372.84	6419702.80	90.50 ft	90.86 ft
MW-36A	6/23/2016	2060451.81	6417184.76	88.54 ft	88.95 ft
MW-37B	6/23/2016	2060286.85	6416087.65	87.65 ft	88.06 ft
MW-38B	6/23/2016	2059204.01	6418552.02	88.84 ft	89.44 ft
MW-39B	6/23/2016	2058986.58	6418336.40	88.36 ft	88.88 ft
MW-40B	6/23/2016	2058704.82	6418833.02	88.86 ft	89.32 ft

COORDINATES SHOWN ARE BASED ON THE 1992 ADJUSTMENT OF THE NORTH AMERICAN DATUM OF 1983 (NAD 83). THE COORDINATES VALUES ARE TAKEN AT THE PVC LOCATION INSIDE THE MONITORING WELL.

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). THE TOP OF PVC ELEVATIONS ARE TAKEN AT THE TOP OF PVC INSIDE THE MONITORING WELL CASING. THE TOP OF WELL CASING ELEVATION IS TAKEN AT THE RIM OF THE CASING.

KENT A. HYSELL, P.L.S. 6953

6/24/16
DATE

J16-1774
NORTHSTAR ENGINEERING GROUP, INC. - KENT HYSELL, PLS6953

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Appendix E

IDW Sample Results

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EnviroMatrix Analytical, Inc.

24 May 2016

RORE, Inc. **EMA Log #: 16E0702**
Attn: Matthew McClellan
5151 Shoreham Place, Suite 260
San Diego, CA 92122

Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Enclosed are the results of analyses for samples received by the laboratory on 05/19/16 16:38. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon
Laboratory Director

CA ELAP Certification #: 2564

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Waste Char. Rolloff Bih (Composite)	16E0702-01	Soil	05/13/16 16:00	05/19/16 16:38
Waste Char. - Drum MFS - D001 (Composite)	16E0702-02	Soil	05/16/16 08:00	05/19/16 16:38

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Waste Char. Rolloff Bih (Composite) (16E0702-01) Soil Sampled: 05/13/16 16:00 Received: 05/19/16 16:38									
Antimony	ND	10.0	mg/kg	1	6052344	05/23/16	05/23/16	EPA 6010	
Arsenic	**1.42**	1.00	"	"	"	"	"	"	
Barium	**52.5**	1.00	"	"	"	"	05/23/16	"	
Beryllium	ND	1.00	"	"	"	"	05/23/16	"	
Cadmium	ND	1.00	"	"	"	"	05/23/16	"	
Chromium	**7.14**	1.00	"	"	"	"	"	"	
Cobalt	**4.44**	1.00	"	"	"	"	"	"	
Copper	**4.04**	1.00	"	"	"	"	05/23/16	"	
Lead	**1.49**	1.00	"	"	"	"	05/23/16	"	
Molybdenum	ND	5.00	"	"	"	"	"	"	
Nickel	**5.61**	1.00	"	"	"	"	"	"	
Selenium	ND	1.00	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	05/23/16	"	
Thallium	ND	1.00	"	"	"	"	05/23/16	"	
Vanadium	**29.9**	1.00	"	"	"	"	05/23/16	"	
Zinc	**19.8**	1.00	"	"	"	"	05/23/16	"	
Mercury	ND	0.05	"	"	6052240	05/22/16	05/23/16	EPA 7471	
Waste Char. - Drum MFS - D001 (Composite) (16E0702-02) Soil Sampled: 05/16/16 08:00 Received: 05/19/16 16:38									
Antimony	ND	10.0	mg/kg	1	6052344	05/23/16	05/23/16	EPA 6010	
Arsenic	**1.23**	1.00	"	"	"	"	"	"	
Barium	**79.9**	1.00	"	"	"	"	05/23/16	"	
Beryllium	ND	1.00	"	"	"	"	05/23/16	"	
Cadmium	ND	1.00	"	"	"	"	05/23/16	"	
Chromium	**11.8**	1.00	"	"	"	"	"	"	
Cobalt	**6.48**	1.00	"	"	"	"	"	"	
Copper	**7.32**	1.00	"	"	"	"	05/23/16	"	
Lead	**3.68**	1.00	"	"	"	"	05/23/16	"	
Molybdenum	ND	5.00	"	"	"	"	"	"	
Nickel	**10.6**	1.00	"	"	"	"	"	"	
Selenium	ND	1.00	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	05/23/16	"	
Thallium	ND	1.00	"	"	"	"	05/23/16	"	
Vanadium	**35.3**	1.00	"	"	"	"	05/23/16	"	
Zinc	**37.4**	1.00	"	"	"	"	"	"	
Mercury	ND	0.05	"	"	6052240	05/22/16	05/23/16	EPA 7471	

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Waste Char. Rolloff Bih (Composite) (16E0702-01) Soil	**Sampled: 05/13/16 16:00**		**Received: 05/19/16 16:38**						**R-06**
Acetone	ND	100	ug/kg	2	6052326	05/23/16	05/23/16	EPA 8260B	
Acetonitrile	ND	100	"	"	"	"	"	"	
Acrolein	ND	200	"	"	"	"	"	"	
Acrylonitrile	ND	50.0	"	"	"	"	"	"	
Allyl chloride	ND	10.0	"	"	"	"	"	"	
Benzene	ND	4.00	"	"	"	"	"	"	
Bromobenzene	ND	4.00	"	"	"	"	"	"	
Bromochloromethane	ND	4.00	"	"	"	"	"	"	
Bromodichloromethane	ND	4.00	"	"	"	"	"	"	
Bromoform	ND	4.00	"	"	"	"	"	"	
Bromomethane	ND	10.0	"	"	"	"	"	"	
2-Butanone	ND	100	"	"	"	"	"	"	
n-Butylbenzene	ND	4.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	10.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	10.0	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	10.0	"	"	"	"	"	"	
Chlorobenzene	ND	4.00	"	"	"	"	"	"	
Chlorodibromomethane	ND	4.00	"	"	"	"	"	"	
Chloroethane	ND	10.0	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	10.0	"	"	"	"	"	"	
Chloroform	ND	4.00	"	"	"	"	"	"	
Chloromethane	ND	10.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	10.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	10.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	4.00	"	"	"	"	"	"	
Dibromomethane	ND	4.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	4.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	4.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	4.00	"	"	"	"	"	"	
trans-1,4-Dichloro-2-butene	ND	10.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	10.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	4.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	4.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	4.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	4.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	4.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	4.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	10.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	10.0	"	"	"	"	"	"	

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Waste Char. Rolloff Bih (Composite) (16E0702-01) Soil	**Sampled: 05/13/16 16:00**		**Received: 05/19/16 16:38**						**R-06**
cis-1,3-Dichloropropene	ND	4.00	ug/kg	2	6052326	05/23/16	05/23/16	EPA 8260B	
trans-1,3-Dichloropropene	ND	4.00	"	"	"	"	"	"	
Diethyl ether	ND	10.0	"	"	"	"	"	"	
Ethylbenzene	ND	4.00	"	"	"	"	"	"	
Hexachlorobutadiene	ND	4.00	"	"	"	"	"	"	
Hexachloroethane	ND	4.00	"	"	"	"	"	"	
2-Hexanone	ND	20.0	"	"	"	"	"	"	
Iodomethane	ND	4.00	"	"	"	"	"	"	
Isopropylbenzene	ND	4.00	"	"	"	"	"	"	
Methylene chloride	ND	10.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	4.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	50.0	"	"	"	"	"	"	
Naphthalene	ND	10.0	"	"	"	"	"	"	
n-Propylbenzene	ND	4.00	"	"	"	"	"	"	
Styrene	ND	4.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	4.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	10.0	"	"	"	"	"	"	
Tetrachloroethene	ND	4.00	"	"	"	"	"	"	
Toluene	ND	4.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	4.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	4.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	4.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	10.0	"	"	"	"	"	"	
Trichloroethene	ND	4.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	10.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	10.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane	ND	20.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	4.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	4.00	"	"	"	"	"	"	
Vinyl acetate	ND	20.0	"	"	"	"	"	"	
Vinyl chloride	ND	10.0	"	"	"	"	"	"	
m,p-Xylene	ND	10.0	"	"	"	"	"	"	
o-Xylene	ND	4.00	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*103 %*	*61-141*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*100 %*	*70-124*		"	"	"	"	
Surrogate: Toluene-d8		*99 %*	*80-121*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Waste Char. - Drum MFS - D001 (Composite) (16E0702-02) Soil			**Sampled: 05/16/16 08:00**			**Received: 05/19/16 16:38**			**R-06**
Acetone	ND	200	ug/kg	4	6052326	05/23/16	05/23/16	EPA 8260B	
Acetonitrile	ND	200	"	"	"	"	"	"	
Acrolein	ND	400	"	"	"	"	"	"	
Acrylonitrile	ND	100	"	"	"	"	"	"	
Allyl chloride	ND	20.0	"	"	"	"	"	"	
Benzene	ND	8.00	"	"	"	"	"	"	
Bromobenzene	ND	8.00	"	"	"	"	"	"	
Bromochloromethane	ND	8.00	"	"	"	"	"	"	
Bromodichloromethane	ND	8.00	"	"	"	"	"	"	
Bromoform	ND	8.00	"	"	"	"	"	"	
Bromomethane	ND	20.0	"	"	"	"	"	"	
2-Butanone	ND	200	"	"	"	"	"	"	
n-Butylbenzene	ND	8.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	20.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	20.0	"	"	"	"	"	"	
Carbon disulfide	ND	20.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	20.0	"	"	"	"	"	"	
Chlorobenzene	ND	8.00	"	"	"	"	"	"	
Chlorodibromomethane	ND	8.00	"	"	"	"	"	"	
Chloroethane	ND	20.0	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	20.0	"	"	"	"	"	"	
Chloroform	ND	8.00	"	"	"	"	"	"	
Chloromethane	ND	20.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	20.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	20.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	20.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	8.00	"	"	"	"	"	"	
Dibromomethane	ND	8.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	8.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	8.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	8.00	"	"	"	"	"	"	
trans-1,4-Dichloro-2-butene	ND	20.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	20.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	8.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	8.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	8.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	8.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	8.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	8.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	8.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	20.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	20.0	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Waste Char. - Drum MFS - D001 (Composite) (16E0702-02) Soil			**Sampled: 05/16/16 08:00**			**Received: 05/19/16 16:38**			**R-06**
cis-1,3-Dichloropropene	ND	8.00	ug/kg	4	6052326	05/23/16	05/23/16	EPA 8260B	
trans-1,3-Dichloropropene	ND	8.00	"	"	"	"	"	"	
Diethyl ether	ND	20.0	"	"	"	"	"	"	
Ethylbenzene	ND	8.00	"	"	"	"	"	"	
Hexachlorobutadiene	ND	8.00	"	"	"	"	"	"	
Hexachloroethane	ND	8.00	"	"	"	"	"	"	
2-Hexanone	ND	40.0	"	"	"	"	"	"	
Iodomethane	ND	8.00	"	"	"	"	"	"	
Isopropylbenzene	ND	8.00	"	"	"	"	"	"	
Methylene chloride	ND	20.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	8.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	100	"	"	"	"	"	"	
Naphthalene	ND	20.0	"	"	"	"	"	"	
n-Propylbenzene	ND	8.00	"	"	"	"	"	"	
Styrene	ND	8.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	8.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	20.0	"	"	"	"	"	"	
Tetrachloroethene	ND	8.00	"	"	"	"	"	"	
Toluene	ND	8.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	8.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	8.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	8.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	20.0	"	"	"	"	"	"	
Trichloroethene	ND	8.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	20.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	20.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane	ND	40.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	8.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	8.00	"	"	"	"	"	"	
Vinyl acetate	ND	40.0	"	"	"	"	"	"	
Vinyl chloride	ND	20.0	"	"	"	"	"	"	
m,p-Xylene	ND	20.0	"	"	"	"	"	"	
o-Xylene	ND	8.00	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*110 %*	*61-141*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*92 %*	*70-124*		"	"	"	"	
Surrogate: Toluene-d8		*98 %*	*80-121*		"	"	"	"	

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Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

TPH by EPA 8015B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Waste Char. Rolloff Bih (Composite) (16E0702-01) Soil Sampled: 05/13/16 16:00 Received: 05/19/16 16:38									
Diesel (C10-C28)	**101**	10.0	mg/kg	1	6052001	05/20/16	05/23/16	EPA 8015B	
Surrogate: 4-Bromofluorobenzene		*105 %*	*75-129*		"	"	"	"	
Gasoline (C6-C10)	ND	1.00	"	10	6052343	05/23/16	05/23/16	"	R-06
Surrogate: 4-Bromofluorobenzene		*107 %*	*60-160*		"	"	"	"	
Waste Char. - Drum MFS - D001 (Composite) (16E0702-02) Soil Sampled: 05/16/16 08:00 Received: 05/19/16 16:38									
Diesel (C10-C28)	**413**	10.0	mg/kg	1	6052001	05/20/16	05/23/16	EPA 8015B	D-09
Surrogate: 4-Bromofluorobenzene		*107 %*	*75-129*		"	"	"	"	
Gasoline (C6-C10)	ND	1.00	"	10	6052343	05/23/16	05/23/16	"	R-06
Surrogate: 4-Bromofluorobenzene		*92 %*	*60-160*		"	"	"	"	

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Total Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052240										
Blank (6052240-BLK1)				Prepared: 05/22/16 Analyzed: 05/23/16						
Mercury	ND	0.05	mg/kg							
LCS (6052240-BS1)				Prepared: 05/22/16 Analyzed: 05/23/16						
Mercury	0.17	0.05	mg/kg	0.167		100	75-125			
LCS Dup (6052240-BSD1)				Prepared: 05/22/16 Analyzed: 05/23/16						
Mercury	0.16	0.05	mg/kg	0.167		99	75-125	2	20	
Duplicate (6052240-DUP1)		**Source: 16E0573-01**		Prepared: 05/22/16 Analyzed: 05/23/16						
Mercury	0.03	0.05	mg/kg		0.03			10	20	
Duplicate (6052240-DUP2)		**Source: 16D0910-03**		Prepared: 05/22/16 Analyzed: 05/23/16						
Mercury	2.90	0.10	mg/kg		2.98			3	20	
Duplicate (6052240-DUP3)		**Source: 16D0910-03**		Prepared: 05/22/16 Analyzed: 05/23/16						
Mercury	2.79	0.10	mg/kg		2.98			7	20	
Matrix Spike (6052240-MS1)		**Source: 16E0573-01**		Prepared: 05/22/16 Analyzed: 05/23/16						
Mercury	0.38	0.05	mg/kg	0.333	0.03	107	75-125			
Matrix Spike Dup (6052240-MSD1)		**Source: 16E0573-01**		Prepared: 05/22/16 Analyzed: 05/23/16						
Mercury	0.36	0.05	mg/kg	0.323	0.03	103	75-125	6	20	
Batch 6052344										
Blank (6052344-BLK1)				Prepared & Analyzed: 05/23/16						
Antimony	ND	10.0	mg/kg							
Arsenic	ND	1.00	"							
Barium	ND	1.00	"							
Beryllium	ND	1.00	"							
Cadmium	ND	1.00	"							
Chromium	ND	1.00	"							
Cobalt	ND	1.00	"							
Copper	ND	1.00	"							
Lead	ND	1.00	"							
Molybdenum	ND	5.00	"							
Nickel	ND	1.00	"							
Selenium	ND	1.00	"							
Silver	ND	0.50	"							
Thallium	ND	1.00	"							
Vanadium	ND	1.00	"							

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Total Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052344										
Blank (6052344-BLK1)				Prepared & Analyzed: 05/23/16						
Zinc	ND	1.00	mg/kg							
LCS (6052344-BS1)				Prepared & Analyzed: 05/23/16						
Antimony	98.6	10.0	mg/kg	100		99	75-125			
Arsenic	102	1.00	"	100		102	75-125			
Barium	104	1.00	"	100		104	75-125			
Beryllium	107	1.00	"	100		107	75-125			
Cadmium	101	1.00	"	100		101	75-125			
Chromium	104	1.00	"	100		104	75-125			
Cobalt	102	1.00	"	100		102	75-125			
Copper	107	1.00	"	100		107	75-125			
Lead	104	1.00	"	100		104	75-125			
Molybdenum	103	5.00	"	100		103	75-125			
Nickel	107	1.00	"	100		107	75-125			
Selenium	97.4	1.00	"	100		97	75-125			
Silver	52.3	0.50	"	50.0		105	75-125			
Thallium	104	1.00	"	100		104	75-125			
Vanadium	105	1.00	"	100		105	75-125			
Zinc	102	1.00	"	100		102	75-125			
LCS Dup (6052344-BSD1)				Prepared & Analyzed: 05/23/16						
Antimony	97.6	10.0	mg/kg	100		98	75-125	1	20	
Arsenic	102	1.00	"	100		102	75-125	0.8	20	
Barium	104	1.00	"	100		104	75-125	0.1	20	
Beryllium	105	1.00	"	100		105	75-125	2	20	
Cadmium	101	1.00	"	100		101	75-125	0.2	20	
Chromium	104	1.00	"	100		104	75-125	0.2	20	
Cobalt	101	1.00	"	100		101	75-125	0.3	20	
Copper	107	1.00	"	100		107	75-125	0.4	20	
Lead	103	1.00	"	100		103	75-125	1	20	
Molybdenum	103	5.00	"	100		103	75-125	0.2	20	
Nickel	106	1.00	"	100		106	75-125	0.09	20	
Selenium	96.6	1.00	"	100		97	75-125	0.8	20	
Silver	53.7	0.50	"	50.0		107	75-125	3	20	
Thallium	103	1.00	"	100		103	75-125	0.8	20	
Vanadium	106	1.00	"	100		106	75-125	0.4	20	
Zinc	102	1.00	"	100		102	75-125	0.4	20	

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Total Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052344										
Duplicate (6052344-DUP1)		**Source: 16E0685-02**		Prepared & Analyzed: 05/23/16						
Antimony	ND	10.0	mg/kg		ND				20	
Arsenic	7.20	1.00	"		6.96			3	20	
Barium	57.2	1.00	"		55.7			3	20	
Beryllium	ND	1.00	"		ND				20	
Cadmium	ND	1.00	"		ND				20	
Chromium	14.7	1.00	"		13.9			5	20	
Cobalt	6.96	1.00	"		6.75			3	20	
Copper	10.0	1.00	"		10.4			3	20	
Lead	11.6	1.00	"		10.6			9	20	
Molybdenum	ND	5.00	"		ND				20	
Nickel	8.06	1.00	"		7.92			2	20	
Selenium	ND	1.00	"		ND				20	
Silver	ND	0.50	"		ND				20	
Thallium	ND	1.00	"		ND				20	
Vanadium	36.0	1.00	"		34.5			4	20	
Zinc	59.2	1.00	"		49.8			17	20	
Matrix Spike (6052344-MS1)		**Source: 16E0685-02**		Prepared & Analyzed: 05/23/16						
Antimony	56.5	10.0	mg/kg	104	ND	54	75-125			QM-05
Arsenic	110	1.00	"	104	6.96	99	75-125			
Barium	164	1.00	"	104	55.7	104	75-125			
Beryllium	105	1.00	"	104	ND	101	75-125			
Cadmium	100	1.00	"	104	ND	96	75-125			
Chromium	119	1.00	"	104	13.9	101	75-125			
Cobalt	107	1.00	"	104	6.75	96	75-125			
Copper	120	1.00	"	104	10.4	105	75-125			
Lead	112	1.00	"	104	10.6	98	75-125			
Molybdenum	97.4	5.00	"	104	ND	94	75-125			
Nickel	113	1.00	"	104	7.92	101	75-125			
Selenium	89.1	1.00	"	104	ND	86	75-125			
Silver	57.9	0.50	"	52.1	ND	111	75-125			
Thallium	95.3	1.00	"	104	ND	92	75-125			
Vanadium	142	1.00	"	104	34.5	103	75-125			
Zinc	168	1.00	"	104	49.8	114	75-125			

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Total Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052344										
Matrix Spike Dup (6052344-MSD1)		**Source: 16E0685-02**		Prepared & Analyzed: 05/23/16						
Antimony	56.3	10.0	mg/kg	102	ND	55	75-125	0.3	20	QM-05
Arsenic	105	1.00	"	102	6.96	96	75-125	4	20	
Barium	163	1.00	"	102	55.7	106	75-125	0.4	20	
Beryllium	102	1.00	"	102	ND	100	75-125	3	20	
Cadmium	95.6	1.00	"	102	ND	94	75-125	5	20	
Chromium	115	1.00	"	102	13.9	99	75-125	3	20	
Cobalt	102	1.00	"	102	6.75	94	75-125	4	20	
Copper	116	1.00	"	102	10.4	103	75-125	4	20	
Lead	106	1.00	"	102	10.6	94	75-125	6	20	
Molybdenum	94.7	5.00	"	102	ND	93	75-125	3	20	
Nickel	108	1.00	"	102	7.92	98	75-125	5	20	
Selenium	86.9	1.00	"	102	ND	85	75-125	2	20	
Silver	55.2	0.50	"	51.0	ND	108	75-125	5	20	
Thallium	90.9	1.00	"	102	ND	89	75-125	5	20	
Vanadium	139	1.00	"	102	34.5	102	75-125	2	20	
Zinc	159	1.00	"	102	49.8	107	75-125	6	20	

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052326										
Blank (6052326-BLK1)				Prepared & Analyzed: 05/23/16						
Acetone	ND	50.0	ug/kg							
Acetonitrile	ND	50.0	"							
Acrolein	ND	100	"							
Acrylonitrile	ND	25.0	"							
Allyl chloride	ND	5.00	"							
Benzene	ND	2.00	"							
Bromobenzene	ND	2.00	"							
Bromochloromethane	ND	2.00	"							
Bromodichloromethane	ND	2.00	"							
Bromoform	ND	2.00	"							
Bromomethane	ND	5.00	"							
2-Butanone	ND	50.0	"							
n-Butylbenzene	ND	2.00	"							
sec-Butylbenzene	ND	5.00	"							
tert-Butylbenzene	ND	5.00	"							
Carbon disulfide	ND	5.00	"							
Carbon tetrachloride	ND	5.00	"							
Chlorobenzene	ND	2.00	"							
Chlorodibromomethane	ND	2.00	"							
Chloroethane	ND	5.00	"							
2-Chloroethylvinyl ether	ND	5.00	"							
Chloroform	ND	2.00	"							
Chloromethane	ND	5.00	"							
2-Chlorotoluene	ND	5.00	"							
4-Chlorotoluene	ND	5.00	"							
1,2-Dibromo-3-chloropropane	ND	5.00	"							
1,2-Dibromoethane (EDB)	ND	2.00	"							
Dibromomethane	ND	2.00	"							
1,2-Dichlorobenzene	ND	2.00	"							
1,3-Dichlorobenzene	ND	2.00	"							
1,4-Dichlorobenzene	ND	2.00	"							
trans-1,4-Dichloro-2-butene	ND	5.00	"							
Dichlorodifluoromethane	ND	5.00	"							
1,1-Dichloroethane	ND	2.00	"							
1,2-Dichloroethane	ND	2.00	"							
1,1-Dichloroethene	ND	2.00	"							
cis-1,2-Dichloroethene	ND	2.00	"							

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052326										
Blank (6052326-BLK1)				Prepared & Analyzed: 05/23/16						
trans-1,2-Dichloroethene	ND	2.00	ug/kg							
1,2-Dichloropropane	ND	2.00	"							
1,3-Dichloropropane	ND	2.00	"							
2,2-Dichloropropane	ND	5.00	"							
1,1-Dichloropropene	ND	5.00	"							
cis-1,3-Dichloropropene	ND	2.00	"							
trans-1,3-Dichloropropene	ND	2.00	"							
Diethyl ether	ND	5.00	"							
Ethylbenzene	ND	2.00	"							
Hexachlorobutadiene	ND	2.00	"							
Hexachloroethane	ND	2.00	"							
2-Hexanone	ND	10.0	"							
Iodomethane	ND	2.00	"							
Isopropylbenzene	ND	2.00	"							
Methylene chloride	ND	5.00	"							
Methyl tert-butyl ether	ND	2.00	"							
4-Methyl-2-pentanone	ND	25.0	"							
Naphthalene	ND	5.00	"							
n-Propylbenzene	ND	2.00	"							
Styrene	ND	2.00	"							
1,1,1,2-Tetrachloroethane	ND	2.00	"							
1,1,2,2-Tetrachloroethane	ND	5.00	"							
Tetrachloroethene	ND	2.00	"							
Toluene	ND	2.00	"							
1,2,3-Trichlorobenzene	ND	2.00	"							
1,2,4-Trichlorobenzene	ND	2.00	"							
1,1,1-Trichloroethane	ND	2.00	"							
1,1,2-Trichloroethane	ND	5.00	"							
Trichloroethene	ND	2.00	"							
Trichlorofluoromethane	ND	5.00	"							
1,2,3-Trichloropropane	ND	5.00	"							
1,1,2-Trichlorotrifluoroethane	ND	10.0	"							
1,2,4-Trimethylbenzene	ND	2.00	"							
1,3,5-Trimethylbenzene	ND	2.00	"							
Vinyl acetate	ND	10.0	"							
Vinyl chloride	ND	5.00	"							
m,p-Xylene	ND	5.00	"							

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052326										
Blank (6052326-BLK1)				Prepared & Analyzed: 05/23/16						
o-Xylene	ND	2.00	ug/kg							
Surrogate: Dibromofluoromethane	*121*		*"*	*125*		*97*	*61-141*			
Surrogate: 4-Bromofluorobenzene	*120*		*"*	*125*		*96*	*70-124*			
Surrogate: Toluene-d8	*125*		*"*	*125*		*100*	*80-121*			
LCS (6052326-BS1)				Prepared & Analyzed: 05/23/16						
Benzene	120	2.00	ug/kg	125		96	81-120			
Chlorobenzene	122	2.00	"	125		97	90-109			
1,1-Dichloroethene	111	2.00	"	125		88	67-116			
Toluene	118	2.00	"	125		94	78-112			
Trichloroethene	126	2.00	"	125		101	79-108			
Surrogate: Dibromofluoromethane	*117*		*"*	*125*		*94*	*61-141*			
Surrogate: 4-Bromofluorobenzene	*116*		*"*	*125*		*93*	*70-124*			
Surrogate: Toluene-d8	*121*		*"*	*125*		*97*	*80-121*			
LCS Dup (6052326-BSD1)				Prepared & Analyzed: 05/23/16						
Benzene	120	2.00	ug/kg	125		96	81-120	0.1	30	
Chlorobenzene	122	2.00	"	125		97	90-109	0.04	30	
1,1-Dichloroethene	111	2.00	"	125		88	67-116	0.02	30	
Toluene	118	2.00	"	125		95	78-112	0.5	30	
Trichloroethene	124	2.00	"	125		100	79-108	1	30	
Surrogate: Dibromofluoromethane	*117*		*"*	*125*		*93*	*61-141*			
Surrogate: 4-Bromofluorobenzene	*116*		*"*	*125*		*93*	*70-124*			
Surrogate: Toluene-d8	*122*		*"*	*125*		*98*	*80-121*			
Duplicate (6052326-DUP1)		**Source: 16E0702-01**		Prepared & Analyzed: 05/23/16						
Acetone	ND	50.0	ug/kg		ND				30	
Acetonitrile	ND	50.0	"		ND				30	
Acrolein	ND	100	"		ND				30	
Acrylonitrile	ND	25.0	"		ND				30	
Allyl chloride	ND	5.00	"		ND				30	
Benzene	ND	2.00	"		ND				30	
Bromobenzene	ND	2.00	"		ND				30	
Bromochloromethane	ND	2.00	"		ND				30	
Bromodichloromethane	ND	2.00	"		ND				30	
Bromoform	ND	2.00	"		ND				30	
Bromomethane	ND	5.00	"		ND				30	
2-Butanone	ND	50.0	"		ND				30	

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052326										
Duplicate (6052326-DUP1)		**Source: 16E0702-01**		Prepared & Analyzed: 05/23/16						
n-Butylbenzene	ND	2.00	ug/kg		ND				30	
sec-Butylbenzene	ND	5.00	"		ND				30	
tert-Butylbenzene	ND	5.00	"		ND				30	
Carbon disulfide	ND	5.00	"		ND				30	
Carbon tetrachloride	ND	5.00	"		ND				30	
Chlorobenzene	ND	2.00	"		ND				30	
Chlorodibromomethane	ND	2.00	"		ND				30	
Chloroethane	ND	5.00	"		ND				30	
2-Chloroethylvinyl ether	ND	5.00	"		ND				30	
Chloroform	ND	2.00	"		ND				30	
Chloromethane	ND	5.00	"		ND				30	
2-Chlorotoluene	ND	5.00	"		ND				30	
4-Chlorotoluene	ND	5.00	"		ND				30	
1,2-Dibromo-3-chloropropane	ND	5.00	"		ND				30	
1,2-Dibromoethane (EDB)	ND	2.00	"		ND				30	
Dibromomethane	ND	2.00	"		ND				30	
1,2-Dichlorobenzene	ND	2.00	"		ND				30	
1,3-Dichlorobenzene	ND	2.00	"		ND				30	
1,4-Dichlorobenzene	ND	2.00	"		ND				30	
trans-1,4-Dichloro-2-butene	ND	5.00	"		ND				30	
Dichlorodifluoromethane	ND	5.00	"		ND				30	
1,1-Dichloroethane	ND	2.00	"		ND				30	
1,2-Dichloroethane	ND	2.00	"		ND				30	
1,1-Dichloroethene	ND	2.00	"		ND				30	
cis-1,2-Dichloroethene	ND	2.00	"		ND				30	
trans-1,2-Dichloroethene	ND	2.00	"		ND				30	
1,2-Dichloropropane	ND	2.00	"		ND				30	
1,3-Dichloropropane	ND	2.00	"		ND				30	
2,2-Dichloropropane	ND	5.00	"		ND				30	
1,1-Dichloropropene	ND	5.00	"		ND				30	
cis-1,3-Dichloropropene	ND	2.00	"		ND				30	
trans-1,3-Dichloropropene	ND	2.00	"		ND				30	
Diethyl ether	ND	5.00	"		ND				30	
Ethylbenzene	ND	2.00	"		ND				30	
Hexachlorobutadiene	ND	2.00	"		ND				30	
Hexachloroethane	ND	2.00	"		ND				30	
2-Hexanone	ND	10.0	"		ND				30	

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052326										
Duplicate (6052326-DUP1)		**Source: 16E0702-01**		Prepared & Analyzed: 05/23/16						
Iodomethane	ND	2.00	ug/kg		ND				30	
Isopropylbenzene	ND	2.00	"		ND				30	
Methylene chloride	ND	5.00	"		ND				30	
Methyl tert-butyl ether	ND	2.00	"		ND				30	
4-Methyl-2-pentanone	ND	25.0	"		ND				30	
Naphthalene	ND	5.00	"		ND				30	
n-Propylbenzene	ND	2.00	"		ND				30	
Styrene	ND	2.00	"		ND				30	
1,1,1,2-Tetrachloroethane	ND	2.00	"		ND				30	
1,1,2,2-Tetrachloroethane	ND	5.00	"		ND				30	
Tetrachloroethene	ND	2.00	"		ND				30	
Toluene	ND	2.00	"		ND				30	
1,2,3-Trichlorobenzene	ND	2.00	"		ND				30	
1,2,4-Trichlorobenzene	ND	2.00	"		ND				30	
1,1,1-Trichloroethane	ND	2.00	"		ND				30	
1,1,2-Trichloroethane	ND	5.00	"		ND				30	
Trichloroethene	ND	2.00	"		ND				30	
Trichlorofluoromethane	ND	5.00	"		ND				30	
1,2,3-Trichloropropane	ND	5.00	"		ND				30	
1,1,2-Trichlorotrifluoroethane	ND	10.0	"		ND				30	
1,2,4-Trimethylbenzene	ND	2.00	"		ND				30	
1,3,5-Trimethylbenzene	ND	2.00	"		ND				30	
Vinyl acetate	ND	10.0	"		ND				30	
Vinyl chloride	ND	5.00	"		ND				30	
m,p-Xylene	ND	5.00	"		ND				30	
o-Xylene	ND	2.00	"		ND				30	
Surrogate: Dibromofluoromethane	*126*		*"*	*125*		*101*	*61-141*			
Surrogate: 4-Bromofluorobenzene	*126*		*"*	*125*		*101*	*70-124*			
Surrogate: Toluene-d8	*125*		*"*	*125*		*100*	*80-121*			

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052326										
Matrix Spike (6052326-MS1)		**Source: 16E0702-01**		Prepared & Analyzed: 05/23/16						
Benzene	122	2.00	ug/kg	125	ND	98	77-127			
Chlorobenzene	123	2.00	"	125	ND	98	84-114			
1,1-Dichloroethene	112	2.00	"	125	ND	90	61-129			
Toluene	120	2.00	"	125	ND	96	66-139			
Trichloroethene	124	2.00	"	125	ND	99	83-113			
Surrogate: Dibromofluoromethane	*127*		*"*	*125*		*101*	*61-141*			
Surrogate: 4-Bromofluorobenzene	*123*		*"*	*125*		*98*	*70-124*			
Surrogate: Toluene-d8	*124*		*"*	*125*		*99*	*80-121*			
Matrix Spike Dup (6052326-MSD1)		**Source: 16E0702-01**		Prepared & Analyzed: 05/23/16						
Benzene	122	2.00	ug/kg	125	ND	98	77-127	0.2	30	
Chlorobenzene	120	2.00	"	125	ND	96	84-114	2	30	
1,1-Dichloroethene	112	2.00	"	125	ND	90	61-129	0.3	30	
Toluene	119	2.00	"	125	ND	95	66-139	0.5	30	
Trichloroethene	122	2.00	"	125	ND	98	83-113	1	30	
Surrogate: Dibromofluoromethane	*123*		*"*	*125*		*98*	*61-141*			
Surrogate: 4-Bromofluorobenzene	*125*		*"*	*125*		*100*	*70-124*			
Surrogate: Toluene-d8	*124*		*"*	*125*		*99*	*80-121*			

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

TPH by EPA 8015B - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052001										
Blank (6052001-BLK1)				Prepared: 05/20/16 Analyzed: 05/23/16						
Diesel (C10-C28)	ND	10.0	mg/kg							
Surrogate: 4-Bromofluorobenzene	*59.5*		*"*	*50.0*		*119*	*75-129*			
LCS (6052001-BS1)				Prepared: 05/20/16 Analyzed: 05/23/16						
Diesel (C10-C28)	546	10.0	mg/kg	500		109	75-125			
Surrogate: 4-Bromofluorobenzene	*57.4*		*"*	*50.0*		*115*	*75-129*			
LCS Dup (6052001-BSD1)				Prepared: 05/20/16 Analyzed: 05/23/16						
Diesel (C10-C28)	532	10.0	mg/kg	500		106	75-125	3	30	
Surrogate: 4-Bromofluorobenzene	*59.8*		*"*	*50.0*		*120*	*75-129*			
Duplicate (6052001-DUP1)		**Source: 16E0686-01**		Prepared: 05/20/16 Analyzed: 05/23/16						
Diesel (C10-C28)	ND	10.0	mg/kg		136				30	
Surrogate: 4-Bromofluorobenzene	*61.3*		*"*	*50.0*		*123*	*75-129*			
Matrix Spike (6052001-MS1)		**Source: 16E0686-01**		Prepared: 05/20/16 Analyzed: 05/23/16						
Diesel (C10-C28)	544	10.0	mg/kg	500	136	82	75-125			
Surrogate: 4-Bromofluorobenzene	*61.6*		*"*	*50.0*		*123*	*75-129*			
Matrix Spike Dup (6052001-MSD1)		**Source: 16E0686-01**		Prepared: 05/20/16 Analyzed: 05/23/16						
Diesel (C10-C28)	520	10.0	mg/kg	500	136	77	75-125	5	30	
Surrogate: 4-Bromofluorobenzene	*62.0*		*"*	*50.0*		*124*	*75-129*			
Batch 6052343										
Blank (6052343-BLK1)				Prepared & Analyzed: 05/23/16						
Gasoline (C6-C10)	ND	0.100	mg/kg							
Surrogate: 4-Bromofluorobenzene	*0.0569*		*"*	*0.0625*		*91*	*60-160*			

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

TPH by EPA 8015B - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6052343										
LCS (6052343-BS1)				Prepared & Analyzed: 05/23/16						
Gasoline (C6-C10)	0.480	0.100	mg/kg	0.500		96	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0553*		"	*0.0625*		*89*	*60-160*			
LCS Dup (6052343-BSD1)				Prepared & Analyzed: 05/23/16						
Gasoline (C6-C10)	0.492	0.100	mg/kg	0.500		98	70-130	2	30	
Surrogate: 4-Bromofluorobenzene	*0.0558*		"	*0.0625*		*89*	*60-160*			
Duplicate (6052343-DUP1)		**Source: 16E0720-01**		Prepared & Analyzed: 05/23/16						
Gasoline (C6-C10)	ND	1.00	mg/kg		ND				30	R-06
Surrogate: 4-Bromofluorobenzene	*0.0699*		"	*0.0625*		*112*	*60-160*			
Matrix Spike (6052343-MS1)		**Source: 16E0720-01**		Prepared & Analyzed: 05/23/16						
Gasoline (C6-C10)	0.486	0.100	mg/kg	0.500	ND	97	60-140			
Surrogate: 4-Bromofluorobenzene	*0.0695*		"	*0.0625*		*111*	*60-160*			
Matrix Spike Dup (6052343-MSD1)		**Source: 16E0720-01**		Prepared & Analyzed: 05/23/16						
Gasoline (C6-C10)	0.515	0.100	mg/kg	0.500	ND	103	60-140		30	
Surrogate: 4-Bromofluorobenzene	*0.0740*		"	*0.0625*		*118*	*60-160*			

Client Name: RORE, Inc. **EMA Log #: 16E0702**
Project Name: Modesto Well Drilling/011-40001-15 CC:02.22.06

Notes and Definitions

R-06	Sample dilution was necessary due to nature of the matrix.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
D-09	Results in the diesel organics range are primarily due to overlap from a heavy oil range product.
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CHAIN-OF-CUSTODY RECORD 16E0702

EnviroMatrix Analytical, Inc.
4340 Viewridge Ave., Ste. A - San Diego, CA 92123 - Phone (858) 560-7717 - Fax (858) 560-7763

EMA LOG #:

Client: RORE, Inc
Attn: Matthew McClellan
Samplers(s): Currie & John McGuire
Address: 5151 Shoreham Place, Suite 260
San Diego, CA 92122
Phone: 858-404-7393 Fax: 858-404-7395
Email: mmcclellan@roreinc.com
Billing Address: 5151 Shoreham Place, Suite 260
San Diego, CA 92122
Project ID: Modesto Well Drilling
Project #: 011-40001-15 CC: 02.20.06 PO #: PO528

Requested Analysis

ID #	Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container # / Type	Oil & Grease □ 413.1 □ 413.2 □ 1664	8015 (TPH) X Gas X Diesel □ Ext	624/8260 (VOC) (Full/BTXE/MTBE) Oxy Nap	625 / 8270 (SVOC) □ PAH only	608 / 8081 (Organochlorine Pesticides)	608 / 8082 (Polychlorinated Biphenyls)	8141 (Organophosphorus Pesticides)	TBT (Organotin Compounds)	□ pH □ EC □ TSS □ TDS	□ Nitrate □ Nitrite □ TKN □ NH3	CAC Title 22/CAM17 Metals X TTLC □ STLC	TCLP (RCRA) □ Metals □ Organics	Cd Cr Cu Pb Ni Ag Zn □ Dissolved	Coliform, □ Total (MTF) □ Fecal (MTF)	Colilert, T+E.Coli □ P/A □ Enumeration	Enterococcus, □ MTF □ Enterolert	Heterotrophic Plate Count (HPC)	□ BOD □ COD □ Cyanide
1	Waste Char. - Rolloff Bin (Composite)	5/13/16	1600	S	4/Glass Jar		X	X								X							
2	Waste Char. - Drum MFS-D001 (Composite)	5/16/16	0800	S	4/Glass Jar		X	X								X							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Matrix Codes: A = Air, DW = Drinking Water, GW = Groundwater, SW = Storm Water
WW = Wastewater, S = Soil, SED = Sediment, SD = Solid, T = Tissue, O = Oil, L = Liquid

Shipped By: □ Courier □ UPS □ FedEx □ USPS X Client Drop Off □ Other

[1]**Turn-Around-Time:** □ Same Day □ 1 day □ 2 day X 3 day □ 4 day □ 5 day □ STD (7 day)

[1]**Reporting Requirements:** □ Fax X PDF □ Excel □ Geotracker/EDF □ Hard Copy □ EDT

[1]**Sample Disposal:** X By Laboratory □ [2]Return to Client: P/U or Delivery □ Archive

Sample Integrity

Correct Containers: Yes No N/A	Containers Properly Preseved: Yes No N/A
Custody Seals Intact: Yes No N/A	Temp @ Receipt: 20 °C ONG
COC/Labels Agree: Yes No N/A	Sampled By: Client EMA Autosampler

RELINQUISHED BY	DATE/TIME	RECEIVED BY
Signature:	1638 5/19/16	Signature:
Print: Carolina Delgado		Print: Mark Koh
Company: RORE to RORE		Company: EMA
Signature		Signature
Print		Print
Company:		Company:
Signature		Signature
Print		Print
Company:		Company:

Project/Sample Comments:

[1]Additional costs may apply. Please note there is a $35 minimum charge for all clients.

[2]EMA reserves the right to return any samples that do not match our waste profile.

NOTE: By relinquishing samples to EMA, Inc., client agrees to pay for the services requested on this COC form and any additional analyses performed on this project. Payment for services is due within 30 days from date of invoice. Samples will be disposed of 7 days after report has been finalized unless otherwise noted. All work is subject to EMA's terms and conditions.

Appendix F

Field Logbook

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4/25/16

B. Zamora, E. Arroyo, A. Mason, J. McGuire

Weather: Clear 55°F

SOW: Break asphalt and air knife utility clearance @ borehole locations prior to drilling. Begin w/ MW-36A, MW-37B, followed by MW-38B, -39B, -40B.

7:45 Mob to 941 McHenry. (site)

8:00 On site, meet w/ Airknife crew from National (E. Jimenez, J. Mowbray)
- Calibrate PID - J. McGuire onsite
- Assist A. Mason w/ traffic control

900 A Mason onsite w/ traffic control
- Tailgate meeting, discuss SOW
- Prep. lay down area, meet w/ Transitec tenant.

945 Mob to 430 Colonial Ct - MW-36A

1000 On site @ MW-36A. Deploy traffic control
- Set up airknife / break asphalt.

1115 Location MW-36A air knife cleared to 8.5'. Location clear to drill. Cover hole w/ patch

1200 Move from MW-36A to MW-37B on 5N Virginia Ave. Deploy traffic control

1215 Begin clearance @ MW-37B.

1300 Location MW-37B air knife cleared to 6.5'. Location clear to drill. Cover hole w/ patch. Metal plate + cold patch. 6'8"

- Stiff silt @ 5-6', limit to air knife on MW-37B, 6'8".

1445 Mob to Stoddard + McHenry - MW-38B. Deploy traffic control

- Meet w/ driller for National (E.J.), discuss lay down area
- Drill rig delivered to lay down area. Materials delivered to lay down area.

1500 Begin airknife clearance @ MW-38B.

1530 Hard silt / clay @ ~5', hand auger
- National driller in area reviewing drilling locations.

1600 MW-38B cleared by airknife / hand auger to 8'. Location clear to drill. Cover hole; use metal plate w/ cold patch.

1610 Clear up traffic control, de-mob to site.
- Stop for day, airknife / clear remaining locations on 4/26/16.

1645 Unload equipment @ lay down.
- Drill rig and all materials @ lay down; no soil offloaded or PI.
- Meet w/ tenant @ 931 McHenry.
- National off site.

1730 Stop for day, off site

B2

4/26/16
B. Zamco, E. Arias, A. Mason
Weather: Clear, 55°F
SOW: Mob. sonic drilling + equipment to MW-36A on Coleman Ct, begin drilling monitoring well. Mob. Vac-truck to MW-39B + MW40B (Elmwood and Lee), break asphalt and airknife utility clearance
730 B. Zamco onsite, recon drill rig approach to MW-36A,
- E.A. and A.M. obtaining rental truck.
800 National onsite (Sonic: C. Hurd, Kodakkasseri, S. McNabb; Vac: F. Jimenez, J. Mendez)
- Tailgate safety meeting
830 Load t.c.; load drilling supplies; fill drilling water tanks.
- Vac-truck crew mob to MW-39B
- Porta John delivered to project site; hook up to truck. Meet w/ permit inspector; ok to work 8:30-1600
930 Mob sonic drilling + supplies to MW-36A (Coleman Ct)
- Meet w/ homeowner @ 430 Coleman Ct. Ok to block driveway, does not need to move.
- Set up on MW-36A.
1105 Begin drilling MW-36A w/ 4" core barrel
1400 MW-36A drilled to TD @ 100' w/ 4" core
- Screen well from 88-98' w/ 0.020" (SM)
- Clean out boring to 6".
- Complete logging + soil screening
1500 Secure boring, lower mast
1530 Re mob rig + supplies to lay down
- Clean up drill site
1630 All personnel, supplies, and equipment debriefed from drill location (MW-36A) to lay down
- E. Arias + A. Mason offsite to Riverbend
- Air/dust monitoring: 0.016 mg/m³ TWA
- Soil screening @ MW-36A - collected peak @ 18', 29.4 ppm (4/26/16 @ 11:35a)
* Per meeting w/ permit inspector from City of Modesto @ 9:30a, G. Padgett, ok to run traffic control 8:30a - 4:30pm @ Coleman Ct (MW-36A) and Elmwood Ave (MW-39B); others are 9a - 4p.
1645 National offsite
1700 Secure sampling supplies
- Notify permit inspector of work for 4/27/16
1730 Stop for day, B. Zamco offsite
- Airknife completed @ MW-39B and MW40B.

BZ

Scale: 1 square =

4/27/16

B. Zamco, E. Arcas, A. Mason

Weather: Clear, 60°F

SOW: Mob drill rig + equipment to MW-36A, deploy traffic control, set well and surface completion. Return to lay down and decon casing; if time deploy traffic control @ MW-37B, Mob to MW-37B and begin drilling

720 B. Zamco, E. Arcas, A. Mason onsite
- Meet w/ National (C. Hurd, K. Gibson, S. McNiff)
- Discuss SOW

800 Tailgate Safety meeting
- Prep equipment

830 Call from City of Modesto; request to repair odd patch.
- Mob drilling + equipment to MW-36A

900 onsite @ MW-36A
- Notify 430 Columbet, ok to block driveway
- D. Murthy onsite; H+S tailgate
- Setup on MW-36A
- Dig alert tickets extended (3), by A. Mason
- Calibrate Air monitoring / Pids RAE

930 Begin well construction @ MW-36A.

1030 J. McGuire onsite near MW-36A

- MW-36A
  - Screen: 2" Sch 40, 0.020" slot PVC 88'-98'
  - Filter Pack: #2/12 sand 86-100'
  - Transition sand #30 sand: 84-86'
  - Bentonite: 82'-84'
  - Grout Seal; 94 lbs cement - 3 lbs bentonite - 7 gal water 2'-82'
  - Blank: 2" PVC Sch 40 0-88'
  - Centralizers @ 48', 88', 98'
  - * Set well materials via tremie method

1120 Begin surging filter pack.

1150 Stop surging filter pack. Resume well installation.

1230 Bentonite set, allow to hydrate.

1255 Lightening strike reported 6 miles from drilling location; 30 min. stand-down. Rain

1320 EPA onsite (DI) A. Nguyen)

1403 Lightening clear, resume well construction.
- Begin setting Grout seal

1505 Grout to 3' bgs. Break down rig to demob. EPA Offsite

1530 Demob rig + equipment to lay down.
- Set surface completion / top up grout.

1600 Break down traffic control. EA, AM offsite.
- ~~BM~~. Surface completion:
- 5" traffic rated well vault

- Set in concrete 0-2' w/ asphalt match concrete pad.

1650 Surface completion set, well locked, key #2357. Well MW-36A finished.

- Clean-up + demob remaining equipment to lay down
- Leave 3 cones to prevent driving on well pad overnight.

1710 Soil roll off bin delivered to lay down, along fence line just outside fence line (behind 931 McHenry) @ ~10AM; ok per J. McCarthy

- Locate equipment into lay down.
- Air/Dust monitoring: 0.013 mg/m³ TWA
- Decon drill rig and casing for 4/28/16.

1820 Lay down area secure.
RoRE / National offsite (B. Zamco)

BZ

4/28/16
B. Zamco, E. Annor, A. Mason, M. Madumo
Weather: Clear, 58°F
SOW: Mob to MW-37B location on/c 518 Virginia Ave; setup traffic control; drill borings for MW-37B.
7:30 B.Z., EA, A.M, M.M onsite
- Additional personnel for traffic control
- Meet w/ National (C. Hood, K. Gibson, S. McDuffy)

745 H+S Tailgate, discuss SOW
800 lay down open, prep equipment
- Calibrate PID and PDR

835 Setup traffic control and mob drill rig to MW-37B
900 D. Murthy onsite. Position drilling equipment up.
915 V. Bonn ACE onsite
930 J. McCarthy onsite
935 Begin drilling MW-37B
1330 Hydraulic fluid leak from drilling rig @ ~155'
- shut down, deploy spill kit, diagnose source

1410 leak repaired, resume drilling
1430 MW-37B drilled to TD @ 160' (SM)
- Screen well from 145'-155', 0.020" slot
- Increased silt content 155-160'.
- Clean out well to 6".

1500 Finished drilling for day, demob rig ↑

equipment to laydown area.
1550 Equipment demobed,
- take down traffic control.
1620 Locate equipment into laydown
- Representative at neighboring "Seasons" (Joe Rocha); unhappy about equip. traffic access parking lot; given PM Contact at EPA
1645 2nd representative from "Seasons" (Laura Tarverdi); unhappy w/ equip/ traffic on parking lot; given PM contact info
1650 Complete stowing of equipment. Notified
- Contact J McGuire about Seasons
1715 RORE (B. Zanco, E. Arroyo) offsite.
* Complete Soil logging on 4/28/16
- Air Post Monitoring: 0.031 mg/m3 TWA
- Soil Screening @ MW-37B - collected peak @ 34, 11.8 ppm (4/28/16 @ 11:17)
1740 Notify CoM permit in operation.

B2

Scale: 1 square = _____

4/28/16
B. Zanco, E. Arroyo, A. Mason, M. Mahon
Weather: Overcast 60°F
SOW: Mob. traffic control to MW-37B, mob drill rig + equipment to MW-37B, construct well MW-37B and surface completion.
7:30 Obtain batteries for PID
745 RORE onsite. Meet w/ National (C. Ward, K. Johnson, S. McCarthy)
800 H+S tailgate; discuss SOW + parking lot issue w/ Seasons.
830 Calibrate PID + PDR.
- Mob traffic control setup. Begin mob of support equipment.
1030 160 gal water added, hearing sounds
- MW-37B
screen: 2" sch 40, 0.020" slots PVC 145'-155'
filterpack: #2/12 sand, 143-160'
transition sand: #3, 141-143'
bentonite 139-141'
grout seal: 94 lbs cement: 3 lbs bentonite - 7 gal water
2'-139'
blank 0'-145'
centralizers: 155', 145', 105', 65', 25'
* well materials set via tremie
1200 Begin surging filter pack

Scale: 1 square = _____

1230 Stop surging filterpack
1245 Bentonite placed, allow to hydrate.
1330 Resume well construction; set grout.
1445 Grout set; secure casing w/ plate
* cold patch - for weekend, return 5/2/16
to set surface completion
- Demob drill rig + equipment to laydown
- Call permit inspector about "no parking" signage
- load logging soils into hopper.
1500 Mob equipment into lay down area
- Unload truck, store equipment in
SVE trailer + secure trailer
1615 Secure roll off bin
- National offsite
1645 RORE (B2, EA) offsite
- Safety incident closing SVE door.

B2

5/2/16

Scale: 1 square =

Scale: 1 square =

5/3/16
B. Zanco, A. Mason, M. Mahn
Weather: P. Cloudy 62°F
730 RORE onsite (BZ, AM, MM)
- Meet w/ National (CH, KL, SM)
800 H+S tailgate (traffic, Mob to well, safety incident @ SVE door), SOW.
SOW: Mob to Stoddard Ave. (MW-38B) - drill telescope boring, 8" casing to aquitard @ ~100', set bentonite, drill 6" casing to ~160'.
810 load equipment into truck
830 Calibrate PID + PDR
845 Mob drill rig to Stoddard Ave; deploy traffic control.
105 Begin drilling MW-38B
1730 Clay encountered @ 71'-80'
- Set 8" casing @ 80.5'
- Add bentonite chips up to 77'; allow to hydrate until 5/4. 100 gal added
1615 Break down + demob equipment to lay down. WL @ ~0.5' TOC (water added)
- Secure boring w/ plate + Coldpatch.
- Walk past 160' to set bentonite seal.
1800 Equipment secure in laydown
1815 National offsite; RORE offsite

5/4/16
B. Zanco, A. Mason, M. Mahn
Weather: Cloudy, 60°F
730 RORE onsite (BZ, AM, MM)
- Meet w/ National (CH, KL, SM)
800 H+S tailgate
SOW: Mob to Stoddard Ave., drill through bentonite seal w/ 6" casing to total depth (~160'); begin well construction
815 Begin moving equipment from laydown
- load additional 8" casing
- Calibrate PID + PDR
830 Begin setting up traffic control.
930 Resume drilling, proceed through bentonite seal w/ 6". WL @ 0.5' TOC, same @ 5/3/16, casing + water added
1130 2nd clay encountered @ ~113, evaluate
- 2nd clay is not A/B zone transitory lower PID levels than @ ~80', keep 77-80' seal; resume drilling
1300 Drilled to total depth @ 160' in
- Set screen from 150'-160', 0.020" slot
- Begin clean out
1430 Boring ready to set well on 5/5/16
- Break down rig + demob equipment to laydown
- Secure borehole w/ steel plate and coldpatch
1530 Mob equipment into laydown

- Air/Dust monitoring: 0.009 mg/m3

1600 Equipment secure; National off site
- Call Permit completion w/ SOW for 5/5/16
- Call PM w/ status update

1620 RoRE off site
* Complete soil logging on 5/5/16

BZ

Scale: 1 square =

5/5/16 B. Zanco, A Hasan, Madison

Weather: Overcast, 60°F

730 RoRE onsite (BZ, AM, MM)

SOW: Mob to Stoddard Ave, construct well MW-38B w/ surface completion (decon equipment) if time, mob to Elmwood Ave, begin drilling MW-39B.

900 Head National driller out (Family issue)
- National stand-down.
- Update project manager - AM offsite.

930 Revised SOW: log BZ / sample remaining soil cuttings; MM to provide backup

1000 Calls from AM + Matt McMahon
- clarification on sampling / submittal

1130 Logging / sampling complete
- Breakdown, cuttings into rolloff bin.

1145 Communication w/ neighbors (Seasons), Tonia Tarvesdi; re. heavy equipment on pavement
- Access to gate will be blocked on Monday 5/9/16, if not contacted.

1200 RoRE offsite
- Prep. soil samples for shipment. (BZ)

1530 Transmit samples to Fedex

BZ

Scale: 1 square =

5/6/16
B. Zamco, A. Mason, M. Mahoney
Weather: Cloudy, rain 56°F
SOW: Mob to Stoddard Ave., construct well MW-38B w/ surface completion; decon drill rig + equipment
7:30 RORE onsite (BZ, MM, AM)
- Meet w/ National (CH, KJ, SM)
7:50 Tailgate safety meeting (Traffic, slip/trip/fall)
800 Discuss SOW + issue w/ Seasons.
810 Begin moving equipment out of laydown, mob to Stoddard Ave.
820 AECOM onsite for treatment system O+M.
910 Setup on MW-38B. Begin Well Construction MW-38B

screen: 2" sch40, 0.020" slot, PVC 150'-160'
filterpack: #2/12 sand, 148'-150'
transition sand: #30 sand, 146'-148'
bentonite: 143'-146'
grout: 2'-143'
* 8" dia 0-81', 6" dia 81'-160'
* Bentonite seal 77'-81'
blank: 2" PVC, 0'-150'
centralizers: 160', 150', 110', 70', 30'

1030 Begin setting well materials
-200 gal added to clean borehole sand out of casing.
1100 Rain, moderate-heavy at times
- Berm material deployed around boring to prevent runoff down borehole.
1255 Begin surging filterpack.
1335 Stop surging, set bentonite
~~1335~~
1350 Hydrate/Set bentonite
1420 Begin setting grout
1609 Grout set @ 143' bgs
* Past permit time to complete grout
- Breakdown rig + demob to laydown.
- Set concrete surface completion on 5/9/16
1630 Return to laydown.
1700 Secure equipment inside laydown.
1730 National off site; RORE offsite.
-Call MM

BZ

5/9/16
B2anco, A. Mason, R. Caulkett
Weather: Clear, 60°F
SOW: Mob to MW-38B, add grout, construct well surface completion; decon drill rig concurrently; deploy traffic control, mob drill rig to MW-39B on Elmwood Ave, drill + set A-zone seal w/ 8" casing
730 RORE onsite (B2)
- Meet w/ Natural (CH, Kal, SM)
805 JHS tailgate
830 Mob to Stoddard Ave.
- Construct well surface @ MW-38B
- Meet w/ A. Mason, R. Caulkett; traffic control deployed.
- Meet w/ C. Platten
920 Add 9½ bags grout mix to top up grout to 2'.
1000 Surface completion @ MW-38B set
1030 Mob drill rig to Elmwood Ave (MW-39B)
- Set up at MW-39B
1130 Begin drilling MW-39B
1400 Clay encountered @ 69' (Clay w/ sand or Sandy Clay). Continues to 72' as Sandy Clay
- Clean out + set A-Zone seal w/ bentonite chips from 68'-71'; 8" casing to 71'. Hydrate for 30min.
1430 DTSC onsite (J. Roar)
1510 Resume drilling; 6" casing through bentonite seal. DTSC offsite.
1600 Stop drilling for day @ 95'. Demob drilling + retreat to lay down.
- Air/Vapor Monitoring - 0.005 mg/m3 TWA
- Soil sampling: A-Zone sample; 15' @ 920 Hrs 1100
1730 Equipment secure @ lay down
- Natural offsite; RORE offsite
* Call PM w/ update
- Call CoM w/ status

B2

5/10/16

B.Zanco, A.Mason, R. Caldwell, C. Plath

Weather: Clear, 65°F - 86°F

SOW: Mob drilling to Elmwood Ave., complete drilling @ MW-39B; begin well construction of MW-39B.

730 RORE onsite (BZ, AM, RC)
- Meet w/ National (CH, KJ, SM)

800 Hess tail gate.

815 Mob to Elmwood Ave, setup on MW-39B, deploy traffic Control

900 Calibrate PID+pDR

915 Resume drilling MW-39B.

1130 Drilled to Total depth @ 160'
- Set screen from 150'-160' in fine Sand (SP)
- Clean out boring, heave sand; 230 gal added

MW-39B
screen: 150'-160'
f. Morpack: #2/12, 148-160
transition sand: #30, 146-148'
bentonite 144'-146'
grout: 2'-144'
* 8" dia. 0-71', 6" dia. 71'-160'
* bentonite seal: 68'-71'
blank 0-150'

centralizers: 160, 150' 110', 70', 30'

1445 Begin surging filterpack.

1515 End surging

1535 Begin hydrating bentonite.

1600 C. Plath offsite

1405 Resume well construction; soil grout

1700 B. Zanco return to laydown to hold access gate.

1740 Grout complete to 6'
- Breakdown rig + demob equipment to laydown

1815 Mob equipment to laydown
- Break down traffic control

1830 Leave Message for permit inspector

1900 National offsite, RORE offsite
- Air monitoring: 0.003 mg/m³ TWA

BZ

5/11/16
B. Zanco, A. Mason, R. Cantrell, C. Plath
Weather: Clear, 68°F.
SOW: Mob to MW-39B, add grout + set concrete surface completion, decon drill rig, mob to Lee Ave + begin drilling MW-40B.
730 RORE onsite (BZ, AM, RC, EA)
- Meet w National (CH, KJ, SH)
800 H+S tailgate
815 Mob equipment to MW-39B, set up traffic control.
830 Check Lee Ave, block parking @ well location. Notify business owner of activity, closed on 5/11/16.
920 MW-39B surface complete
- Relocate to Lee Ave (MW-40B)
- Drill rig to cross Mattern Ave @ Morissey
1000 Calibrate PID + PDR. Set up traffic control.
1030 Drill rig around @ Lee (MW-40B)
- Set up on location
1125 Begin drilling MW-40B.
1215 PID malfunction, unable to screen soil
1430 Sand Clay (CL) encountered @ 70'. Continuous to 77' as Silty Clay (CL).
- Casing raised to 72' to avoid cave in.

stick up within road. Set bentonite chips 68'-77' and hydrate within (CL), 4' of chips within casing.
1515 Resume drilling through A-Zone bentonite seal.
1620 Stop drilling for the day @ 115'.
- Demob equipment + drill rig to laydown
1700 Move equipment w/ to laydown lot.
- Air monitoring: 0.009 mg/m³ TWA
1745 National offsite, RORE offsite

B2

5/12/16 Modesto FS

C. Plath, A. Mason, R. Cambell,
National Drilling: CJ, Shane, Kevin
Weather: Clear 61°F - 82°F
SOW: Complete drilling to TD at + mw-10B and begin well installation
Collect soil sample in the B zone
0730 RORE meet National at laydown discuss daily activities & logistics, tailgate safety briefing
0800 gate open to laydown and begin mobilization to 10B.
0930 Begin drilling 120' - 160' (T.D.)
1030 USACE PM & Geologist on site to observe drilling & MW Installation.
1100 Complete borehole to 160'
Soil type at 160' has higher clay content, so screen will be set at 145' - 155'. 155'-160' will be backfilled with sand before setting casing (PVC)
1130 Clearing borehole and bring steel drill casings to surface.
1140 Slutt - 12' - at bottom of borehole, so adding water to blow out borehole so casing

Scale: 1 square = _____

5/12/16 Modesto FS

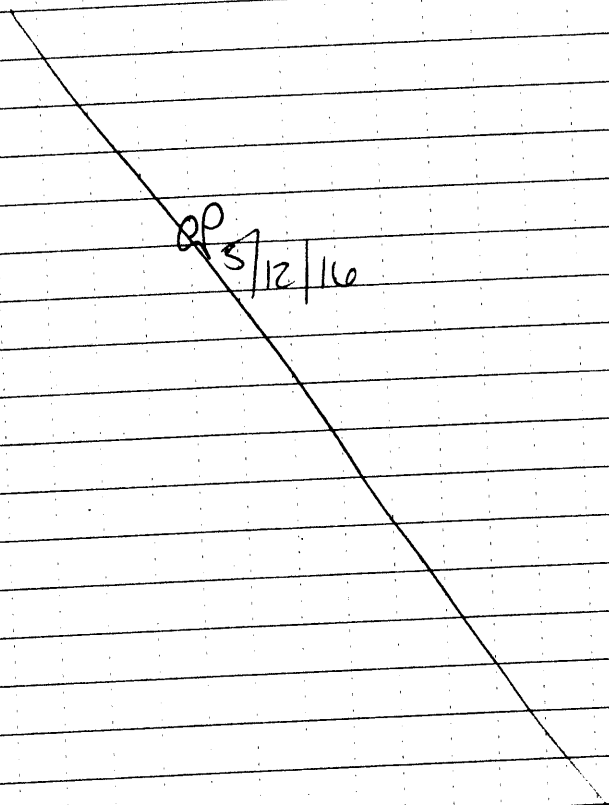
can be set at 155'. 130 sacks added
1200 finish clearing heaving sands & TD @ 160', and add. filter pack sand to 155', then install screen.
1230 USACE off-site, drillers take lunch. C. Plath receives new rental PID to screen soil, then continues to screen soil to obtain Zone B fingerprint PCE soil sample.
1340 Drillers back from lunch and continue to install filter pack.
1400 #30 sand installed to 143'
60 bags of sand used. Begin surging.
1410 complete surging and filter pack still @ 143'.
1445 Installing fine/transition sand to 141'
1500 Add 1 bag of bentonite chips and hydrate. Will not begin grouting because of permit requirements & would be on site past 4pm.
1530 begin clean up at mw-10B leaving casing in ground.

Scale: 1 square = _____

5/12/16 Modesto CS

1600 Continue to demob & bring equipment back to laydown.

1700 Complete securing laydown and end of day.



Scale: 1 square = _____

5/13/16 Modesto CS

C. Plath, A. Mason, R. Campbell

National Drilling: CJ, Kevin

Weather: clear

SAW: Grout well to 2' & install well box & surface completion. Begin demob.

0730 Meet @ laydown & discuss daily activities & safety briefing

0800 Begin mob. to MW40B.

0920 Bring drill casing back to surface, check depth of bentonite & it is at 138'

1000 Rig/Rig bm delivered to laydown.

1030 Feix with National arrives on site to help with grouting & demob.

1040 Continue to grout & bring up more drill casing.

1100 All drill casings out of borehole.

1110 - 5 gallons of water used for grout 26 bags of portland and 2 bags of bentonite.

1130 Jose with National arrives at laydown to begin decon.

Scale: 1 square = _____

5/13/16 Modesto PB

1145 - 1245 Drillers take lunch
1245 grout settled to 3½ - 4' bgs so more grout added to bring to 2' bgs.
1330 Complete grout to 2' bgs. Begin breakdown & demob to laydown.
1340 Finish surface completion and plate comes to allow to dry.
1420 Flatbed arrives to load drill rig. A. Marsh & R. Campbell depart.
1500 Flatbed departs & Jose off site.
1600 laydown cleanup Complete End of day.

CP 5/13/16

5/16/16

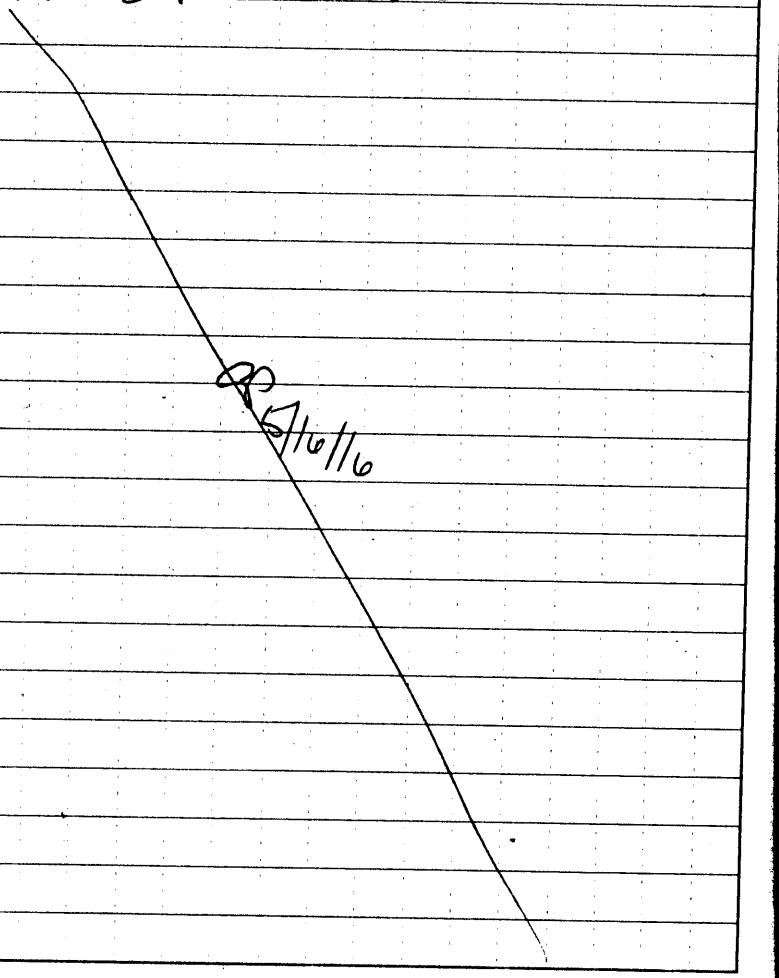
C. Plath & National: D, Shane, Kevin.
SW: Demob, sample drums, ship samples.
Weather: clear, breezy, high 90°F.
0800 CP & Drillers on site, Safety briefing.
0900 Drillers move IDW drums & stage them on pallets.
3 samples collected from the three soil drums. 1 ashcan drum on site, not sampled. 2 drums of decon water will be disposed of in treatment system.
0930 Samples - fingerprint - dropped off at FedEx.
1005 Trucking company arrives to pick other half of rig - iron drill casings.
1100 Drillers complete demob. Forklift outside of laydown for pick. C. Plath continues to pack samples, drums, and equipment

Scale: 1 square = _____

Scale: 1 square = _____

5/16/16 Modesto FS

1330 drop drum samples & PID at FedEx to ship to RORE office.
1500 Complet labeling drums and cover with tarp until they can be disposed.
1530 C. Plath off site



Scale: 1 square =

5/17/16 Modesto FS

0800 C. Plath & Neil with National on site. George Bradshaw performing O&M on system, discuss disposal activities. 500-gal poly-top open for storage until Thursday morning disposal.
0855 A. Hearn & R. Campbell on site, Safety briefing & discuss daily activities.
Weather: 70°-95°F, clear, slight breeze.
SAV: Development begin at 36A on Coleman Ct.
0915 Depart laydown for 36A
1000 open MW36A, PID = 7.4 ppm. DTW 45.72' BTOC
1008 Attempt to get TD, but tape stopped @ 48.5' BTOC. Trying with heavier tape. made it to 91.9' BTOC. Bringing tape back up & catching on something @ 49' BTOC
1020 will use metal bailer to carefully try to bring water/sed from ~50' BTOC to surface. IL bailer.
1050 TD @ DTW 91.91' BTOC

Scale: 1 square =

5/17/16 Modesto FS

1105 Continue to bail small amounts of sediment & water from well until we reach bottom of screen. Currently TD is 91.9' BTOC & bottom of screen is @ 98' BTOC, ~ Approx. 9 gallons bailed from well.

1150 TD @ 99.4' BTOC & ~ 14 gals removed from well. Water is brown & lots of silt/sand.

1200 Break for lunch.

1230 Continue to bail until less sediment.

1330 bailed approx 40 gallons Begin swab/surge

1350 98.8' after 20 min of surge & now bail the 6" of sed/silt out.

1410 low depth ~ 45' BTOC

1430 Begin pump, set @ 98' BTOC

1440 1.97 gal/per/min pump rate

1450 Begin collecting water quality parameters.

1555 Water quality parameters stable, turbidity duppy very

5/17/17 Modesto FS

Stady, water has slight cloudy color. Bring pump up 5' to middle of screened interval.

1610 some brown water for a few minutes of pumping, then back to slightly cloudy. Pumped/bailed more than 10 casings and 6" of silt in 55-gallon drum. C. Plath called & left message with J. McGuire regarding completion of development. Water seems to have cloudiness, but stable parameters. Development is considered complete. low level in well has been stable for last hour too. Total volume removed = 175 gallons.

1625 Complete Development & pumping, begin cleanup.

1700 Complete cleanup and stage trailer in laydown area.

1715 end of day

Scale: 1 square =

Scale: 1 square =

5/18/17 Modesto FS

C. Plath, A. Mason, E. Campbell - FORGE
Neil - National
SOW: Decon. submersible pump, develop MW 38B.
Weather: Clear 70°F - 99°F
0800 All personal on site, discuss safety & days' activities, then mob! to Stoddard & McHenry to 38B.
0850 Calibrate MiniRae 3000 Zero Cal, successful.
0925 MW 38B open, PID=0.8ppm
0940 DTW 46.79' TD 160.8' BTOC
Begin bailing water. 185 gallons in addition to 200 gallons added during borehole drilling & well installation = 385 gallons to be bailed/pumped during development
0955 pulled up a few bailers & water is mostly clear, not much sediment. ~~Few~~ pieces of white plastic/PVC pulled up.
1000 Begin swabbing/surging
1020 Finish swabbing & no sediment, but negligible amount of sand from bailed water

Scale: 1 square = _____

5/18/17 Modesto FS

1045 Decon. submersible pump & start pumping & collecting water quality parameters. Auto-Cal the Horiba - calibration success.
1100 Start pumping water from 157' BTOC.
1111 Water was light brown when first pumped. Pumping rate is ~2gal/min.
1206 had some air bubbles in pump and pump rate decreased for about 20 mins & GW level came up from ~50' to ~48' BTOC.
1245 pump stopped, attempt to fix, but unable to. Neil contacted Geotech & C. Tatum.
1430 National will p/u new pump from Geotech & drive to drop off in Modesto. Complete breakdown at MW 36B.
1530 Pump well development water into 500-gal black poly tank at water treatment facility.

end of day

Scale: 1 square = _____

5/19/16 Modesto FS

RURE: C Plath, A. Mason, R Campbell
National: Neil
Weather: 68°-82°F, clear, some clouds
SOW: Finish well development @ MW 38B and begin @ MW40B on Lee St.
0730 personel on site to discuss IDW mgmt. well development, & safety briefing.
0800 Begin mobs to 38B - Stoddard
0820 George Bradshaw - AECOM arrives on site to perform O&M of water treatment system & assist w/ water IDW disposal/ treatment.
0845 MW 38B DTW 47.68' BTOC
0940 Brought pump up from 157' to 155' BTOC and no change in water, still clear. ~ 110 gal and pumped so far today, & total of 200 gallons for MW 36B.
1040 Water still clear and pumped 3½ drums today. Total 190+90=280
1115 Demob to 40B
1200 DTSC on site

5/19/16 Modesto FS

1215 open MW 40B and PID = 5.4 ppm
DTW 48.12' BTOC 153.5' BTOC TD
17 gallons = 1 casing volumes & 130 gals added during drilling; total = 301
1315 Finish bailing 15 gallons, DTW 73.5' BTOC and rising, TD = 155.5' BTOC water was light brown (choc. milk) - with some sand. Begin surge
1335 Finish surging 51.92' BTOC DTW, TD unchanged @ 155.5' BTOC
1415 DTW 64.9' BTOC, finish bailing & setting up to pump. bailed ~ 30 gallons.
1435 Begin pumping.
1450 DTW 123.02' BTOC pumping @ 2 gal/min.
1530 Pumping rate slowed & stopped to rate of 30, SW level came up. Reset pump & watching drawdown. DTW 117' BTOC & dropping. Will need to water 2 adj, wells often. ~ 1.5 drums bailed/pumped total. DTSC off site.
1615 Bring pump up 4' to 148' BTOC
1640 Stop pumping & begin site

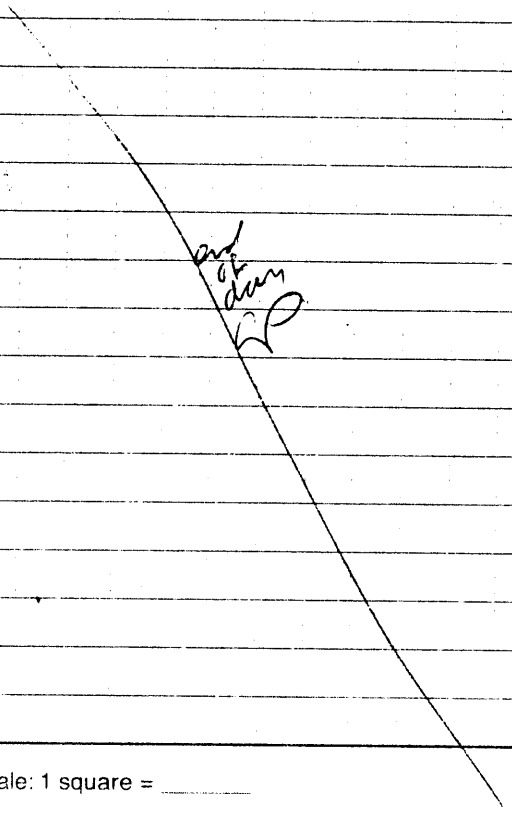
Scale: 1 square = _____

5/19/16 Modesto FS

Cleanup.

1730 At laydown and pumping water from trailer to storage tank at treatment system.

1800 finish pumping & depart laydown area. Will p/u water wagon tomorrow morning & start on MW-37B on Virginia Ave, then finish 40B if time left.



5/20/16 Modesto FS

0700 C. Plath & Neil p/u water wagon @ Blueline Rental - Salida.

0800 C. Plath, A. Moran, Neil @ laydown to p/u trailer & drop off water wagon

0830 Setting up @ 40B to complete well development, conduct safety Briefing.

0900 PID = 0.7 ppm, pump placed in middle of screen @ 150' BTOC DTW = 46.15' BTOC, TD 155.5' BTOC

0930 150.89' BTOC, pump on high, bumping pump rate down to 230 ml/min

1030 pumped 1 2/3 drums today for a total of 257 gallons hauled/pumped so far. Bought pump up to top of screen - 145' BTOC - to eval.

1045 DTSC on site

1145 DTSC offsite

1200 Complete well development & turn off pump

1210 DTW 77.6' BTOC

1218 DTW 63.45' BTOC

1222 DTW 58.65' BTOC

1228 DTW 54.92' BTOC

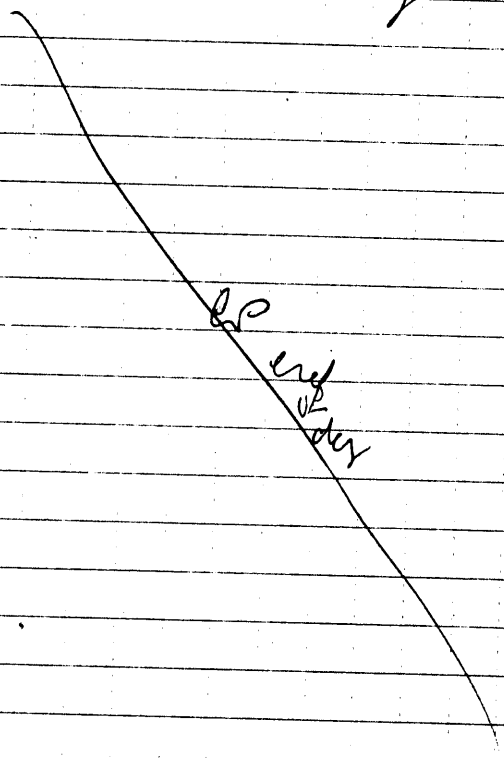
1234 DTW 52.00' BTOC

Scale: 1 square = _____

Scale: 1 square = _____

5/20/16 Modesto FS

1238 51.1' DTW BTOC
1240 Complete well development at 4MB. Recharge acceptable
1300 At laydown yard to pump water into storage near treatment system.
1315 500-gallon black poly tank is full.
1400 Complete well development activities for the day.



Scale: 1 square = _____

5/23/16 Modesto FS

CORE: C. Plath, A. Mason, A. Pinkham
National: Neil
Weather: Clear 37°-73°F
SOW: Well development @ MW 39B located on Elmwood.
0830 Discuss days' activities & conduct tailgate safety briefing. Begin mob of equipment to MW 39B.
0920 Open well, PID = 3.5 ppm
DTW = 47.47' BTOC, TD = 159.27' BTOC
when water level meter tape brought to surface, more plastic shavings brought to surface. Levels checked again & same depths measured.
0935 Using 2, 1-L Bailers for bailing
1005 Baled ~18 gallons from well. Water is milky brown, with some sand.
1010 Begin swab/surge.
1050 Surged for 20 minutes, then baled until cleared up. Will begin to pump. Baled ~25 gallons from well. DTW 47.76' BTOC
1115 Pump is placed 3' from

Scale: 1 square = _____

5/23/16 Modesto I-5

bottom of well to start pumping
1300 Pumping completed, DTW after pump turned off 47.58' BTOC. Removed more than 10 casing Volumes of water. Well has good recharge. Fine sediments removed from well during bailing and pumping. Water quality parameters stable during development & turbidity less than 100 NTUs. Fine silts are negligible & will settle prior to sampling.
1430 Complete well development activities for the day. Pumped ~ 300 gallons into water wagon.

end of day.

5/24/16 Modesto FS

RORE: C. Plath, A. Mason, A. Pinkham.
National: Neil Hale
Weather: clear 60°-75°F
SOW: Develop MW 37B located on Virginia Ave., Stage IDW for disposal on 5/25.
0855 open MW 37B, PID = 2.4 ppm
DTW = 43.46' BTOC, TD = 153.6' BTOC
Bottom of screen is 155', so will bail to remove sediment/sand.
0910 First bailer brought up had more plastic pieces from well installation.
0915 a few gallons bailed & there is a sulfur odor.
0940 ~15 gallons bailed, sediment and sand removed, water starting to clean up; less of a sulfur smell.
1010 DTW 70.4' BTOC, finish bailing ~30 gallons. TD 156.2' BTOC.
1015 Begin surge/swab.
1045 Finish surging & now bailing.
1130 Finish bailing & begin installing pumping. DTW 45.1' BTOC. Pump located @ 3' off bottom
1200 Begin pumping.

5/24/16 Modesto FS

1220 Sub pump stopped, need to find out why. Baled ~60 gallons only pumped about 5 gallons
1320 Started baling again and National is tasked with getting another pump.
1440 A new subpump from Geotech is being delivered to site by 4/4:30. Continue to bail until 4pm. Baled about 95 gallons total. Water is light brown; but after settled, it is cloudy. No water quality parameters collected because of mixed sed/silt in water from bailing. Will wait for pump & continue on 5/25.
1545 Finish bailing for the day, removed ~140 gallons from well & water is mostly clear. DTW 44.68' BTOC & TD = 156.4'
1610 New pump dropped off @ site.
1700 Demob. from MW37B, pump water into water wagon & secure equipment @ laydown.

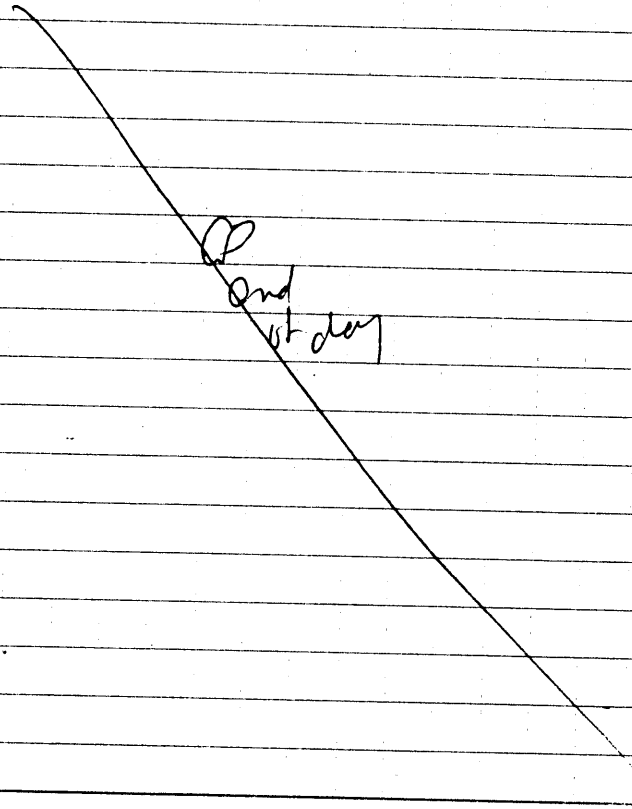
5/25/16 Modesto FS

PORE: C. Plath, A. Mason, A. Burkham
National: Neil H.
AECOM: G. Bradshaw
Weather: Clear 60°-75°F
SOW: Complete Development of MW37B, Dispose water, demob.
0745 All personnel on site, tailgate safety brief, discuss days' activities.
0800 G. Bradshaw on site and PORE stages drums. 005 & 006 & water trailer to be pumped into treatment system.
0855 open MW37B, PID = 0.8ppm DTW = 45.69' BTOC TD = 155.91' BTOC
0920 Pump started, drawdown DTW @ 54.48' BTOC
1120 Development complete @ MW37B Water is clear, no odor, no sheen PID after pump stopped = 0.8ppm total volume baled/pumped = 280 gallons
1155 DTW 44.62', finish site cleanup.
1200 Pump water into black poly tank for future disposal in treatment system.
1300 Blueline p/u water trailer

Scale: 1 square = _____

5/25/16 Modesto 1=5

1330 Drums placed on pallets, labeled (2 water drums cos 006 were labeled empty) and covered until disposal. Bed roll off box secured. Demob complete and all personnel off site. C. Plath will ship rental equipment and return rental truck.



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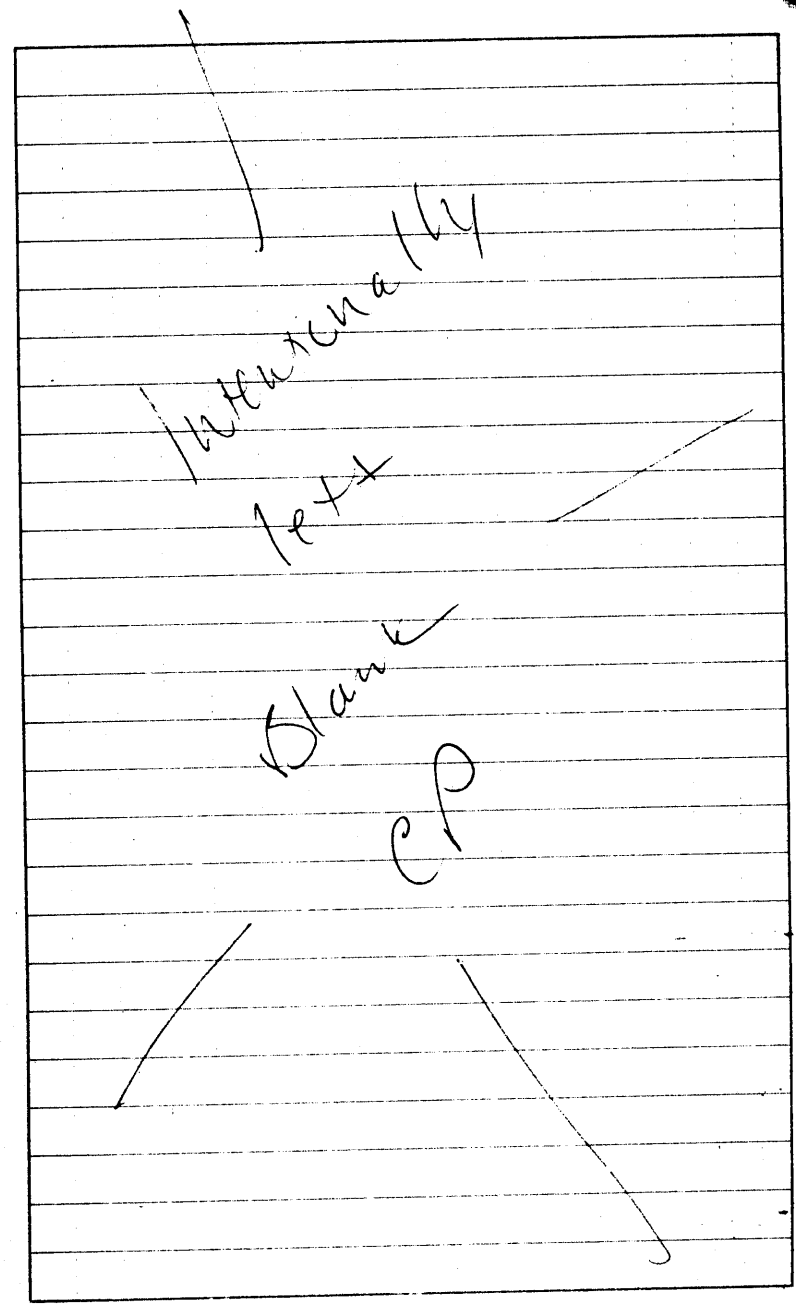

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