RESULTS OF WELL INSTALLATION AND GROUNDWATER MONITORING THROUGH THE SECOND QUARTER OF 2015 FOR THE EXPANDED GROUNDWATER MONITORING PROGRAM

MITIGTION ORDER ON CONSENT DOCKET NO. P-121-07

Prepared for:

FREEPORT MINERALS CORPORATION
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Prepared by:

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August 19, 2015

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August 19, 2015

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1.0 INTRODUCTION

This report describes the results of installation, testing, and sampling of new monitor wells for the expanded groundwater monitoring program through June 2015. The expanded groundwater monitoring program is a requirement of the Mitigation Plan submitted to Arizona Department of Environmental Quality (ADEQ) in March 2015 (Clear Creek Associates, 2015a) pursuant to Mitigation Order on Consent No. P-121-07 (ADEQ, 2007) between ADEQ and Freeport-McMoRan Corporation Copper Queen Branch (CQB). ADEQ is currently reviewing the Mitigation Plan.

The Mitigation Plan describes the process being followed to implement mitigation actions for sulfate in groundwater that may affect existing drinking water supplies in the vicinity of Naco, Arizona (Figure 1). The Mitigation Order requires mitigation of existing drinking water supplies exceeding 250 milligrams per liter (mg/L) sulfate at the point of use, if the sulfate originates from the Concentrator Tailing Storage Area (CTSA).

The mitigation actions consist of groundwater monitoring and contingency planning. The expanded groundwater monitoring program will be used to evaluate the rate of migration and rate of change in sulfate concentrations between the western edge of the plume and public drinking water supplies. Contingency planning will establish sentinel wells with action levels for sulfate, evaluate potential alternate sources of drinking water supply, and develop preliminary engineering designs for actions that could be used to mitigate public drinking water supplies, if needed.

1.1 Objectives of Expanded Groundwater Monitoring Program

The expanded groundwater monitoring program monitors the position of the sulfate plume in the immediate vicinity of the existing Arizona Water Company (AWC) and Naco Water Company (NWC) public water supplies near Naco, Arizona (Figures 1 and 2). The new monitoring wells reported herein were installed between the plume and the public supplies to characterize aquifer hydraulic properties, the water table configuration, and the distribution of sulfate at the front of the plume. Monitoring at wells at the front of the plume will allow measurement of plume velocity (i.e., the time for the leading edge of the plume to migrate between monitoring wells) and the rate of change of sulfate concentrations at the leading edge of the plume (i.e., how long does it take for concentrations to

increase from low levels to a concentration of 250 mg/L). The data collected for the expanded groundwater monitoring program will be used to assess the potential for sulfate to affect public water supplies. Monitoring data collected under the expanded groundwater monitoring program will be incorporated into the annual groundwater monitoring report to be submitted to ADEQ.

An objective of the expanded groundwater monitoring program is to identify sentinel well locations and sulfate action levels for the sentinel wells that would, if exceeded, initiate a contingent mitigation action. The establishment of sentinel wells and setting of action levels requires an understanding the plume velocity, the rate of change of sulfate concentrations at the leading edge of the plume, and the implementation timeframe for the potential mitigation actions. Considering these factors, the Mitigation Plan set the following schedule for work for the expanded groundwater monitoring program:

- install and test new monitoring wells by October 1, 2015, and complete eight quarters of sampling and analysis for sulfate by October 1, 2017,
- complete the alternate water supply study by July 1, 2016 (Section 2.1) unless drilling is delayed by logistical factors beyond CQB's control, such as land access, and
- in consultation with AWC, develop a conceptual design and critical path analysis to identify the implementation timeframe for an alternate water supply by July 1, 2017. If an alternate supply is infeasible, the conceptual design and critical path analysis will be developed for a large scale RO treatment system by July 1, 2017.

The installation and testing of wells reported here is the first step of the expanded groundwater monitoring program and was completed before the October 2015 deadline described above. A water supply study was initiated in 2015 to evaluate the feasibility of developing an alternate water supply, if needed in the future. Based on the results of expanded groundwater monitoring, the outcome of the water supply study, and the identification of implementation timeframes, CQB will recommend sentinel well locations, sulfate action levels, and the action(s) to be implemented if the action levels are exceeded. A report describing the development of action levels and sentinel well recommendations will be prepared by April 1, 2018 and submitted to ADEQ, as specified by the Mitigation Plan. Details of the expanded groundwater monitoring program are described in the Mitigation Plan. A review of the progress of the mitigation action in 2014 is provided by the mitigation performance review (Clear Creek Associates, 2015c).

1.2 Hydrogeologic Setting

The hydrogeology in the vicinity of the plume is described in detail in the Aquifer Characterization Report (Clear Creek Associates, 2010) prepared under the Mitigation Order. The following summary is provided to describe the general hydrogeologic framework in which the mitigation actions are conducted.

The CTSA is in the northeastern portion of the Bisbee-Naco physiographic basin south of the Mule Mountains (Figure 1). The Mule Mountains, Cerro La Muela, and Sierra San Jose, form the northern, eastern, and southern margins of the basin, respectively. Approximately one-half of the physiographic basin lies in Mexico. The mountains surrounding the basin are composed of bedrock materials, and the basin area consists of clastic sediment, called basin fill, which is underlain by bedrock. Surface runoff from the Bisbee-Naco watershed drains into Greenbush Draw, which flows to the west to the Upper San Pedro River.

Groundwater occurs in two hydrostratigraphic units in the vicinity of the sulfate plume: basin fill and bedrock of the Bisbee Group. Basin fill is relatively permeable and consists of poorly to moderately cemented sand and gravel deposits that form alluvial fans emanating from the mountains. The thickness of the basin fill increases from zero at the mountain fronts to approximately 635 feet in the central portion of the basin north of Naco. Bedrock of the Bisbee Group underlies the basin fill and consists of (from younger to older) the Cintura Formation, Mural Limestone, Morita Formation, and Glance Conglomerate. The bedrock has a low to moderate permeability compared to the basin fill, although massively bedded portions of the Mural Limestone may be relatively impermeable.

The sulfate plume extends southwest and south from the vicinity of a former evaporation pond in the CTSA to the vicinity of Naco and Bisbee Junction. West of the Black Gap fault, the sulfate plume is contained primarily within the basin fill, although elevated sulfate concentrations do extend into the underlying undifferentiated Bisbee Group in the central and northern portions of the plume. East of the Black Gap fault the sulfate plume is entirely within bedrock as the basin fill is unsaturated.

Groundwater flows to the west in the basin fill and bedrock in the vicinity of the plume. The sulfate plume migrates to the west at the average groundwater flow velocity. At the front of the plume, west of Naco Highway, the plume is constrained to the basin fill. The basin fill thickness in that area ranges

from 636 feet at BMO-2008-4B to 241 feet at the new well BMO-2015-1B. Beyond the plume extent to the west, the basin fill increases in thickness to 380 feet at BMO-2010-3M.

2.0 WELL INSTALLATION AND MONITORING

Monitoring wells were installed in the basin fill aquifer at six sites at the front of the plume (Figures 1 and 2). Two wells were installed at each site to target different elevation intervals in the aquifer. The twelve monitoring wells were installed, developed, and tested between September 30, 2014 and March 6, 2015 by Cascade Drilling LP. Three of the well sites are located on property owned by Rosemead Properties, Inc. (RPI), and three well sites are on the Turquoise Valley Golf Course (TVGC).

The wells were installed, developed, and tested in accordance with Technical Specifications for the project (Clear Creek Associates, 2014). Clear Creek Associates field staff observed the drilling contractor and collected data per the Field Work Plan (Clear Creek Associates, 2015b). Hydraulic testing was conducted at each well and an initial water quality sample was collected from each well near the end of the hydraulic testing. Subsequent water quality sampling has been conducted on a quarterly basis.

2.1 Well Installation Summary

The new monitoring wells were installed in the basin fill aquifer, the primary aquifer from which the public drinking water supplies draw water. Two wells were planned at each site to investigate the water quality and hydraulic properties of the upper and lower portions of the basin fill aquifer separately. The objective of the shallow well was to provide a sampling interval representative of the depth interval from which most of the public water supply wells pump. Table 1 contains well information for the AWC and NWC wells. The shallow well was to be screened from the water table to approximately 4,270 feet above mean sea level (ft amsl) which is the elevation of the bottom of the screen of the AWC-03 public supply well. In this way, the shallow well would also encompass the screened depths of the AWC-02, AWC-04, and NWC-06 supply wells, the uppermost screened portion of the AWC-05 supply well, and the majority of the screened interval of NWC-02. The deep wells were to be installed with a screened interval spanning from the bottom of the shallow well to the basin fill-bedrock contact, depending on site-specific conditions. A site-specific condition that prevented using this well construction plan was the occurrence of bedrock at 4,270 ft amsl or higher at some sites. In these cases, one well was installed across the entire saturated thickness of the basin fill and a second well was installed to monitor only a lower depth interval of the basin fill.

Six wells (BMO-2014-1BL, BMO-2014-1BU, BMO-2014-2BL, BMO-2014-2BU, BMO-2014-3BL, and BMO-2014-3BU) were installed on TVGC property and six wells (BMO-2014-4B, BMO-2014-4BL, BMO-2015-1B, BMO-2015-1BL, BMO-2015-2B, and BMO-2015-2BL) were installed on RPI property (Figure 2). The wells on TVGC property included one deep well and one shallow well at each site. The wells on RPI property encountered shallow bedrock such that one well at each site was screened over the entire saturated thickness of the basin fill aquifer, and one well at each site was screened over the lower 40-60 feet of the basin fill. As-built diagrams for the wells, lithologic information, and water quality data collected during drilling are shown on Figures 3 to 8. Table 2 provides survey coordinates, depths, and construction information for the wells. Geologic logs for the wells deep boreholes at each site are contained in Appendix A.1. Photographs of sediment core collected from the boreholes are contained on the compact disc in Appendix A.2. Well construction and development summaries showing well construction materials and the dates and times of drilling, well construction, and well development are included as Appendix B.

2.1.1 Borehole Installation

Boreholes for each well were drilled using the rotosonic method. The rotosonic method is a direct push drilling method that utilizes a 10-foot core barrel and drive casing to advance the borehole while the drill rod and core barrel are vibrated. The method allowed the collection of a relatively undisturbed continuous core of basin fill material that retained the relative stratigraphic position of sediments and bedrock. Clear Creek Associates logged the core and created lithologic logs of the first borehole drilled at each site as they were installed to the bedrock contact to determine the thickness of the basin fill (Appendix A). The lithologic logs for basin fill were created using ASTM Standard D 2488-00, *Standard Practice for Description and Identification of Soils (Visual Manual Procedure)*. The second borehole at each site was not logged or sampled due to its close proximity (30 to 50 feet) to the first borehole.

To advance a borehole using the rotosonic method, the core barrel was pushed directly into the bottom of the borehole; retrieving 2 to 10 feet of core at a time depending on the material encountered. The core was boxed in 4-foot intervals. The average core recovery for the six boreholes where sampling was conducted ranged from 87 to 92 percent based on length of the core and the sample interval. The

quality of the core was good; with most cores believed to be minimally disturbed and representative of the depth interval sampled.

Drive casing was installed to keep the advancing borehole stable. Nominal 9- and 10-inch diameter drive casings were used individually or together in the boreholes (Figures 3 to 8). The drive casing was installed to within 2 to 4 feet of the last sampling interval between core sampling runs. This kept the drive casing above the sampling interval to avoid disturbing the next core interval. In some cases, particularly in the deeper wells, both drive casings were used to reduce the friction on the casing as the borehole depth increased. Each time the drive casing was advanced, the core barrel was used to clean out to the top of the next core sampling interval.

2.1.2 Reconnaissance Depth-Specific Water Quality Sampling

Reconnaissance depth-specific water quality samples were collected from the first borehole at each site to evaluate vertical trends in sulfate concentration. Samples were collected at 20- to 80-foot spacings beginning approximately 20 feet below the water surface, depending on site conditions. For example, more closely spaced samples were collected in certain boreholes to verify sulfate concentrations. Also, there were intervals in some boreholes which could not be sampled due to a lack of groundwater inflow from the basin fill. Depth specific sample results are shown on Figures 3 to 8. Depth-specific samples were not collected from the second borehole drilled at each site due to its close proximity (30 to 50 feet) to the initial borehole.

Depth-specific samples were collected using a Push-Ahead sampler, when there was sufficient groundwater inflow from the basin fill. The Push-Ahead sampler includes a conical metal end cap on a solid piece of pipe inside of which is a perforated screen. When closed, the screen is sealed from contact with sub-surface materials. The sealed sampler was attached to the end of the drill pipe, lowered into the borehole, and checked to confirm that the seals were intact. The sampler was then pushed approximately two feet into the sediment below the advancing borehole and the drill pipe retracted approximately one foot to expose the screen to the basin fill. A disposable, 1-inch diameter bailer was lowered into the sampler to collect the formation water. Samples collected using the push ahead sampler are expected to be representative of the depth interval of the sampler because inflow should be only from the formation exposed to the sampler, with no mixing with groundwater from the upper portion of the borehole.

In cases when there was little or no inflow to the Push-Ahead sampling tool, samples were collected by bailing a minimum of one wetted borehole volume from the drive casing. Water bailed from the drive casing was transferred to a decontaminated bucket. The drive casing was five to ten feet from the bottom of the borehole during bailing and the samples were designated with the borehole depth at the time of collection.

Cases of insufficient inflow to the Push-Ahead sampler are believed to be due to a low permeability of the basin fill or clogging of the sampler perforations by fine grained sediment. The depth representativeness of samples collected by bailing is difficult to quantify. The sample would be representative of inflow from the 5- to 10-foot section of borehole below the drive casing if there were minimal vertical downward flow along the outside of the drive casing. If there is significant vertical downward flow along the outside of the drive casing, the sample could represent a larger vertical interval than the exposed portion of the borehole. The proportion of groundwater coming from above the above the exposed portion of the borehole cannot be quantitatively determined. However, in the few cases where bailed and push-ahead samples were collected consecutively the sample concentrations were comparable.

The depth-specific samples were collected for field and laboratory analyses. If the samples were turbid, the solid material was allowed to settle up to several hours. The pH, electrical conductivity, and temperature of the water samples were measured with a Myron Ultrameter II portable instrument. Samples were field-filtered with a 0.45 micrometer (µm) filter. The filtered water was divided into two aliquots for sulfate analysis: one was analyzed in the field with a factory-calibrated DR/820 HACH colorimeter and the other was submitted for analysis. The laboratory samples were packed on ice and delivered to Turner Laboratories in Tucson, Arizona. Laboratory reports for reconnaissance depth-specific samples are in Appendix C.1. Both field and laboratory sulfate results are shown on Figures 3 to 8.

2.1.3 Well Construction

The depth to bedrock at the TVI sites ranged from 372 feet below land surface (ft bls) to 546 ft bls, equating to elevations of 4,185 and 4,026 ft amsl, respectively. Thus, the TVI sites were deep enough to install a shallow well screened down to an elevation of approximately 4,270 feet amsl and a deep well screened over the underlying portion of the saturated basin fill. The depth to bedrock at the RPI

sites ranged from 244 ft bls to 272 ft bls, equating to elevations of 4,317 and 4,308 ft amsl, respectively. Because the basin fill-bedrock contact was higher than 4,270 ft amsl at the RPI sites, one well was installed with a screened interval from the water table to the basin fill-bedrock contact and a second well was installed with 40 to 60 feet of screen above the bedrock contact, overlapping the lower portion of the longer screened well. Well construction information is summarized on Table 2 and shown on Figures 3 to 6.

The wells were constructed with nominal 5-inch PVC screen and blank casing, and a surface casing of 5-inch low carbon steel (LCS). A total of 1,324 feet of 5-inch PVC screen with 0.125-inch slots, 2,084 feet of 5-inch PVC blank casing, and 277 feet of 5-inch LCS were used to construct the twelve wells. The wells were installed using the pull-back method. The casing was installed inside the temporary drive casing and then the drive casing was removed as annular materials were installed. Cascade Drilling LP alternately added annular materials and pulled up the drive casing during well construction. The well casing and screen were held in suspension during the installation of all annular materials. The drive casing was kept within 3 feet of the top of the filter pack during its installation, within 5 feet of the top of the bentonite pellet seal during seal installation, and was submerged in bentonite grout and cement when those materials were installed.

2.1.4 Well Development

Each well was developed to remove fine-grained material from the filter pack and to maximize the hydraulic connection to the basin fill. The wells were developed first by bailing and then by swabbing while airlifting. The wells were bailed using a 10-foot steel bailer attached to a winch line until no more sand could be removed from the bottom of the well. A dual swab block with 5 feet of perforated pipe between the swabs was used to swab and airlift each 20-foot section of the borehole at least 3 times until the water contained less than 0.5 mg/L of sand.

2.1.5 Dedicated Pump Installation and Well Surface Completion

A 1.5 horsepower, 230 volt pump was installed at approximately 75 feet below static water level in each well after development and hydraulic testing. A 1-inch PVC sounding tube with perforations over the bottom 20 feet was installed starting at the top of the pump. The pump, drop pipe, and sounding

tube were hung on the well cap. The surface completion at each well consisted of a 3 foot by 5 foot concrete well pad and a locking steel box 3 feet long, 2 feet wide, and 20 inches tall with a covered lock box in the front.

2.2 Hydraulic Testing

Two short duration aquifer tests were conducted after development of each well. A step rate pumping test consisting of at least three 60-minute pumping steps was completed first, followed by a constant-rate pumping test of at least 480 minutes. Recovery was monitored after the constant-rate test until water levels were at 90 percent of pre-test levels or for two hours. Pumping rates ranged from 10 gpm to 50 gpm depending on the drawdown characteristics of the well.

Clear Creek Associates measured water levels in the pumping well using a pressure transducer with a vented cable. Manual depth to water measurements were collected with an electric sounder for verification of transducer data. The discharge rate was measured using a Great Plains Industries, Inc. TM series turbine driven digital totalizing flowmeter. The discharge rate was periodically checked by measuring the fill rate of a 500-gallon plastic water tank. The pH, temperature, and electrical conductivity of discharge were also measured during testing. Toward the end of the constant rate test, an initial water quality sample was collected from each well for analysis of sulfate and major element ions. The results of water quality sampling are discussed in Section 2.3.

Drawdown data for the step rate pumping tests were interpreted using the Theis method in the analytical software AQTESOLV (Hydro Solve, Inc., 2000). The graphical Cooper-Jacob straight line method was used to interpret drawdown data from the constant rate pumping tests. Appendix D contains semi logarithmic drawdown plots for all tests and describes the interpretation of the aquifer tests.

Table 3 lists transmissivity and hydraulic conductivity estimates for the tests. The transmissivity estimates for the constant rate and step tests agreed for some wells, but for some wells the step tests gave significantly lower values than the constant rate tests unless unrealistically low values of storativity were used. The transmissivity estimates of the constant rate tests are considered to be more reliable than those of the step rate tests due to the longer duration and higher pumping rates of the constant rate tests, and their lack of complicating factors such as the well losses that occur in step rate tests. The transmissivity estimates for the constant rate tests ranged from 7,022 feet squared per day

(ft^2/day) to 8,144 ft^2/day and averaged 4,395 ft^2/day. Hydraulic conductivity estimates ranged from 6.2 feet per day (ft/day) to 65.2 ft/day and averaged 23.1 ft/day.

2.3 Well Water Quality Results

An initial water quality samples was collected from each well between six and eight hours into the constant rate test, after the discharge had cleared of sediment and field parameter readings were stable. The initial well sample was collected directly from a spigot in the discharge line of the pumping test after passing through a 0.45 µm in line filter. Each sample was collected in laboratory supplied bottles with preservative as needed. The water quality samples were shipped overnight or delivered directly to Turner Laboratories for analysis of sulfate, chloride, fluoride, alkalinity, nitrate, nitrite, calcium, magnesium, sodium, potassium, and total dissolved solids.

The new wells are being sampled for sulfate quarterly for a minimum of eight quarters to determine baseline sulfate concentrations. The wells were added to the quarterly monitoring list when they were equipped with permanent pumps. Quarterly samples were collected from BMO-2014-1BL, BMO-2014-1BU, BNO-2014-2BL, and BMO-2014-2BU in the first quarter 2015 and from all twelve wells in the second quarter of 2015. Quarterly samples were analyzed by SVL Analytical, Inc. of Kellogg, Idaho.

Table 4 contains the results of the initial well sample and subsequent quarterly samples. Laboratory reports for samples from the completed wells are contained in Appendix C.2. The sulfate concentrations in the wells ranged from 7.8 mg/L at BMO-2014-3BL in February 2015 to 463 mg/L at BMO-2014-2BL in January and April 2015. Fluoride, nitrate, and nitrite concentrations were less than their Arizona Aquifer Water Quality Standards, when detected.

2.4 Water Level Measurement Results

The location and elevations of the well sites were surveyed by CQB. Water levels were measured at the BMO-2014 and BMO-2015 wells at the time aquifer tests were conducted and as part of quarterly groundwater monitoring. Appendix D provides water levels measured during aquifer testing. Table 5 lists the water level measurements collected for quarterly groundwater monitoring through the second quarter 2015.

The measurements in Table 5 indicate that the initial water level measurements for the well pairs tended to differ by 0.75 to 1.34 feet. Over time, the water level differences at the well pairs has decreased to less than 0.02 feet; except at the BMO-2014-1 wells where the water level in BMO-2014-1BL is 0.1 to 0.4 feet higher than in BMO-2014-1BU.

3.0 RESULTS

3.1 Geologic and Water Quality Cross-Sections

The depths to bedrock determined from drilling were used along with information for existing wells to create geologic sections at the front of the plume. Water quality data from reconnaissance sampling during drilling and samples collected in the first quarter 2015 were plotted on the cross-sections to portray the distribution of sulfate in groundwater. Figure 9 shows the locations of the cross-sections and the well data used to construct the sections. The cross-sections are shown on Plate 1. The reconnaissance sulfate concentrations portrayed on Plate 1 for wells installed prior to 2014 represent different timeframes because the reconnaissance samples were collected during well installation. The year the reconnaissance data were collected can be determined by the year in the well name (e.g., BMO-2008-4B). The older reconnaissance data were included to constrain the sub-surface depiction of the plume.

3.2 Sulfate Concentration and Water Elevation Maps

The results of groundwater monitoring at the BMO-2014 and BMO-2015 wells were used with the results of ongoing groundwater monitoring to prepare sulfate concentration and water elevation maps. The BMO-2014 and BMO-2015 wells will be monitored for eight quarters to develop representative baseline information on their sulfate concentrations and water elevations. Exhibits based on the sulfate concentration and water elevation data collected through the second quarter of 2015 are considered preliminary until the completion of collection of the baseline data.

Figures 10, 11, and 12 are sulfate concentration maps focused on the western edge of the plume for the fourth quarter of 2014, the first quarter of 2015, and the second quarter of 2015, respectively. The difference in the 250 mg/L contour between the data for 2014 and 2015 reflects the additional information obtained from the wells installed in 2015. Figure 13 shows the sulfate concentration in the site-wide groundwater samples in the first quarter of 2015. Figures 14, 15, and 16 are water elevation maps for the fourth quarter of 2014, the first quarter of 2015, and the second quarter of 2015, respectively.

4.0 REFERENCES

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TABLES

TABLE 1
Well Information for Public Water Supplies

Well Name	ADWR Registry Number	Date Completed	UTM Northing (m)	UTM Easting (m)	Measuring Point Elevation (ft amsl)	Screened Interval (ft bls)	Screened Interval (ft amsl)*
AWC-02	616586	1954	3468549.357	598907.911	4547.64	100 - 215	4444.64 - 4329.64
AWC-03	616585	7/25/1956	3468681.898	599090.322	4539.52	83 - 269	4453.52 - 4267.52
AWC-04	616584	7/1959	3468717.084	598949.929	4540.48	106 - 187	4431.48 - 4350.48
AWC-05	590620	6/24/2002	3468541.692	599269.904	4542.51	163 - 603, 623 - 1163	4377.51 - 3376.51
NWC-02	562944	6/11/1997	3467474.673	600177.435	4600.44	212 - 312	4385.44 - 4285.44
NWC-06	575700	9/15/1999	3467749.954	599822.821	4592.50	180 - 279, 302 - 340	4409.50 - 4249.50

Notes:
** Assumes measuring point is 3 feet above land surface*
ADWR = Arizona Department of Water Resources
UTM = Universal Transverse Mercator Zone 12, North American Datum 1983 (NAD83)
m = meters
ft amsl = feet above mean sea level
ft bls = feet below land surface

TABLE 2
Monitor Well Construction Information

Well Name	ADWR Registry Number	UTM Northing (m)	UTM Easting (m)	Total Depth Drilled (ft)	Land Surface Elevation (ft amsl)	Depth to Bedrock (ft bls)	Bedrock Elevation (ft amsl)	Filter Pack Interval (ft bls)	Screened Interval (ft bls)	Depth of Surface Casing (ft)	Sounding Tube Measuring Point Elevation (ft amsl)
BMO-2014-1BU	55-917393	3468231.440	600570.805	283	4557.63	372	4185	110 - 283	120 - 273	22	4558.536
BMO-2014-1BL	55-917394	3468234.798	600563.194	398	4557.45			282 - 372	292 - 366	26	4558.45
BMO-2014-2BU	55-917453	3468192.762	600788.520	286	4560.75	400	4160	116 - 286	127 - 276	25	4561.851
BMO-2014-2BL	55-917452	3468183.921	600784.872	410	4560.73			286 - 400	297 - 396	21	4561.799
BMO-2014-3BU	55-917494	3467787.733	600810.534	298	4573.84	546	4026	127 - 298	139 - 288	21	4574.887
BMO-2014-3BL	55-917527	3467786.416	600822.399	549	4572.81			318 - 526	328 - 521	22	4573.765
BMO-2014-4B	55-917620	3468581.267	600508.792	272	4566.74	262	4304	119 - 262	129 - 258	22	4567.672
BMO-2014-4BL	55-917619	3468566.229	600498.091	262	4566.02			216 - 261	220 - 260	24	4567.045
BMO-2015-1B	55-917622	3468563.389	600261.991	256	4561.3	244	4317	116 - 244	125 - 244	23	4562.063
BMO-2015-1BL	55-917621	3468583.092	600272.479	243	4562.22			197 - 243	201 - 241	24	4563.402
BMO-2015-2B	55-917827	3468996.635	600267.799	280	4580.64	272	4308	139 - 273	149 - 268	22	4582.082
BMO-2015-2BL	55-917828	3468983.910	600252.069	272	4579.83			207 - 272	212 - 272	25	4580.644

Notes:
ADWR = Arizona Department of Water Resources
UTM = Universal Transverse Mercator Zone 12, North American Datum 1983 (NAD83)
m = meters
ft = feet
ft amsl = feet above mean sea level
ft bls = feet below land surface

CLEAR CREEK ASSOCIATES

TABLE 3
Hydraulic Testing Parameters

Pumped Well	Solution	Transmissivity (ft^2/day)	Aquifer Thickness (ft)	Hydraulic Conductivity (ft/day)
BMO-2014-1BU	Cooper-Jacob	3,227	249	13.0
BMO-2014-1BL	Cooper-Jacob	8,144	125	65.2
BMO-2014-2BU	Cooper-Jacob	8,826	274	32.2
BMO-2014-2BL	Cooper-Jacob	9,803		35.8
BMO-2014-3BU	Cooper-Jacob	3,150	409	7.7
BMO-2014-3BL	Cooper-Jacob	5,882		14.4
BMO-2014-4B	Cooper-Jacob	4,901	130	37.7
BMO-2014-4BL	Cooper-Jacob	830		6.4
BMO-2015-1B	Cooper-Jacob	722	116	6.2
BMO-2015-1BL	Cooper-Jacob	934		8.1
BMO-2015-2B	Cooper-Jacob	3,603	125	28.8
BMO-2015-2BL	Cooper-Jacob	2,715		21.7
	Arithmetic Mean	4,395		23.1

Notes:

ft = feet

ft^2/day = feet squared per day

ft/day = feet per day

CLEAR CREEK ASSOCIATES

TABLE 4
Laboratory Results for Well Samples

Well Name	ADWR Registry Number	Sample Date	Field Readings			Laboratory Results														
			pH (SU)	Electrical Conductivity (µS/cm)	Temperature (°C)	Sulfate (mg/L)	Alkalinity, Bicarbonate (mg/L)	Alkalinity, Carbonate (mg/L)	Alkalinity, Hydroxide (mg/L)	Alkalinity, Total (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Nitrogen, Nitrate (mg/L)	Nitrogen, Nitrite (mg/L)	Conductivity (µS/cm)	TDS, residue filterable (mg/L)
BMO-2014-1BU	55-917393	11/13/14	7.46	571	22.1	84	160	<2.0	<2.0	160	72	9.7	<5.0	27	20	<0.50	4.4	<0.10	590	360
		1/28/15	7.45	694	21.6	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		4/15/15	7.40	735.2	21.3	189	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2014-1BL	55-917394	11/7/14	7.21	716	24.2	160	NA	NA	NA	NA	89	12	<5.0	37	25	0.56	2.6	<0.10	730	480
		1/29/15	7.46	686	22.2	167	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		4/15/15	7.43	695	21.9	167	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2014-2BU	55-917453	12/1/14	7.35	819.2	20.8	230	170	<2.0	<2.0	170	110	14	<5.0	34	39	<0.50	4.1	<0.10	860	560
		1/30/15	7.65	524	19.9	63.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		4/15/15	7.56	536.1	20.7	64.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2014-2BL	55-917452	11/20/14	7.34	804	22.8	210	180	<2.0	<2.0	180	110	15	<5.0	34	22	<0.50	2.6	<0.10	870	550
		1/29/15	7.36	1109	20.8	463	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		4/15/15	7.27	1169	21.2	463	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2014-3BU	55-917494	2/24/15	7.64	471.4	18.2	8.2	180	<2.0	<2.0	180	57	7.9	<5.0	22	30	<0.50	3.7	<0.10	490	270
		4/15/15	7.67	469.5	20.4	8.71	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2014-3BL	55-917527	2/13/15	7.34	384	22.4	7.8	190	<2.0	<2.0	190	47	7.0	<5.0	21	8.7	<0.50	1.2	<0.10	410	260
		4/15/15	7.72	402.3	21.6	8.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2014-4B	55-917620	3/4/15	7.68	524.0	20.3	65	170	<2.0	<2.0	170	59	8.7	<5.0	29	19	<0.50	2.4	<0.10	530	330
		4/14/15	7.61	494.7	20.9	61.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2014-4BL	55-917619	3/1/15	7.63	671.9	21.1	170	170	<2.0	<2.0	170	78	11	<5.0	33	19	<0.50	2.4	<0.10	700	450
		4/14/15	7.63	665.1	214	184	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2015-1B	55-917622	3/15/15	8.11	676.3	20.2	170	160	<2.0	<2.0	160	77	11	<5.0	34	20	<0.50	2.3	<0.10	680	450
		4/14/15	7.59	680.1	20.9	187	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2015-1BL	55-917621	3/12/15	7.70	708.2	20.8	220	150	<2.0	<2.0	150	91	13	<5.0	37	19	<0.50	2.3	<0.10	750	510
		4/14/15	7.55	733.4	20.7	239	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2015-2B	55-917827	3/19/15	7.43	795.2	20.0	290	170	<2.0	<2.0	170	100	16	<5.0	34	19	<0.50	2.0	<0.10	830	560
		4/14/15	7.41	832.4	20.7	271	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BMO-2015-2BL	55-917828	3/26/15	7.29	887.1	22.3	280	160	<2.0	<2.0	160	120	17	<5.0	34	18	<0.50	1.9	<0.10	910	620
		4/14/15	7.38	860	20.9	305	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
ADWR = Arizona Department of Water Resources
SU = standard units
µS/cm = microsiemens per centimeter
°C = degrees Celsius
mg/L = milligrams per Liter
TDS = total dissolved solids
NA = not analyzed

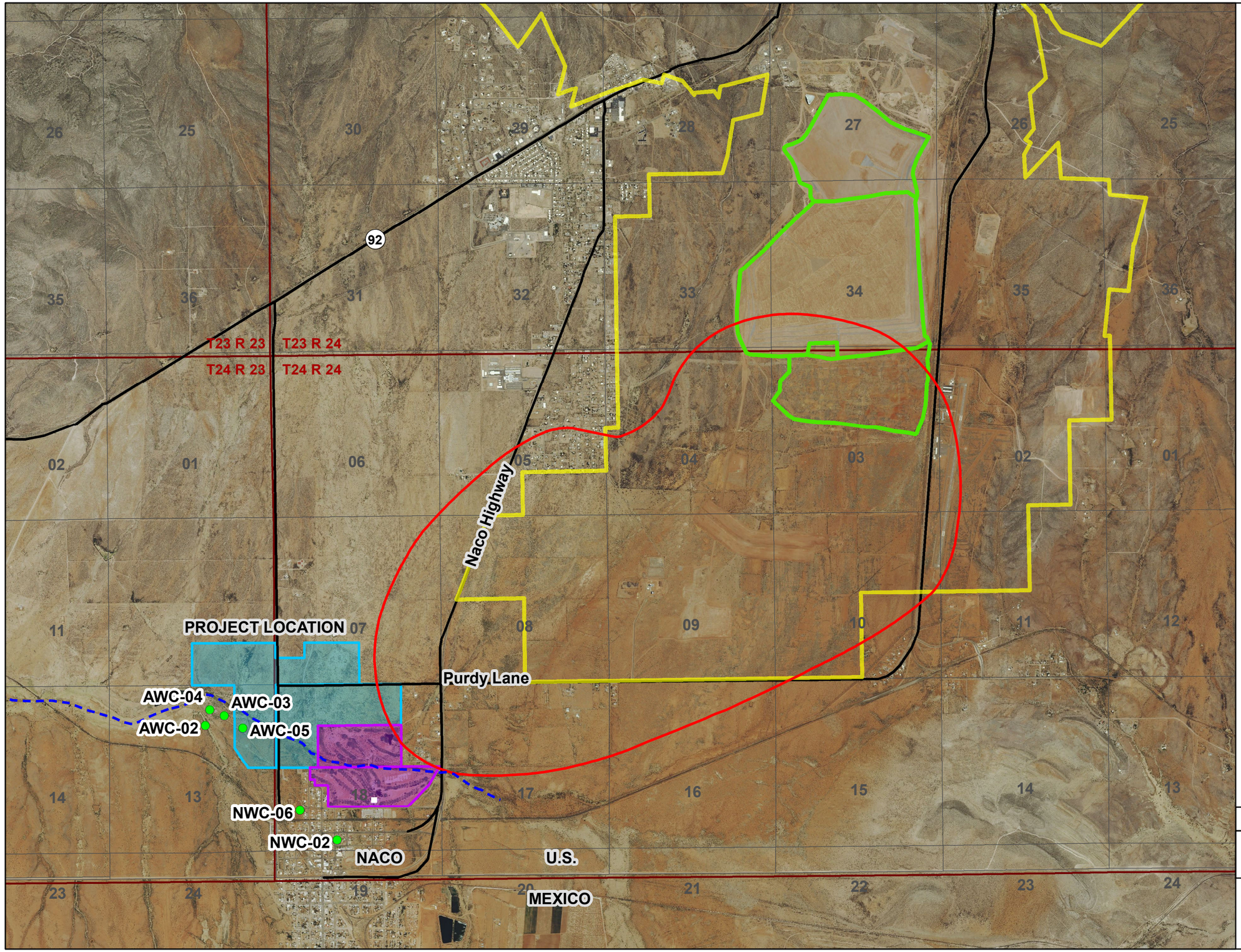
TABLE 5
Water Elevation Measurements

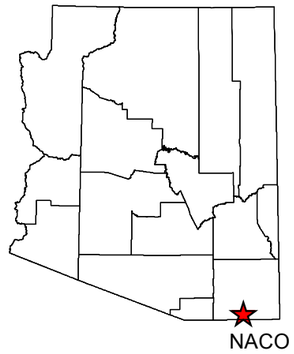
Well Name	ADWR 55 Registry Number	UTM East (meters)	UTM North (meters)	Measuring Point Elevation (ft amsl)	Date	Depth To Water (feet)	Groundwater Elevation (ft amsl)
BMO-2014-1BU	917393	600570.805	3468231.440	4557.18	11/13/14	123.51	4434.94
				4558.54	1/28/15	123.74	4434.80
					4/15/15	123.90	4434.64
					5/18/15	124.42	4434.12
BMO-2014-1BL	917394	600563.194	3468234.798	4557.18	11/7/14	123.03	4434.15
				4558.45	1/29/15	123.53	4434.92
					4/15/15	123.45	4435.00
					5/18/15	123.93	4434.52
BMO-2014-2BU	917453	600788.520	3468192.762	4560.31	12/1/14	126.73	4433.58
				4561.85	1/30/15	126.73	4435.12
					4/15/15	126.65	4435.20
					5/18/15	127.21	4434.64
BMO-2014-2BL	917452	600784.872	3468183.921	4560.31	11/20/14	126.15	4434.16
				4561.80	1/29/15	126.74	4435.06
					4/15/15	126.70	4435.10
					5/18/15	127.18	4434.62
BMO-2014-3BU	917494	600810.534	3467787.733	4572.213	2/24/15	137.91	4434.30
				4574.887	4/15/15	139.45	4435.44
					5/18/15	139.74	4435.15
BMO-2014-3BL	917527	600822.399	3467786.416	4572.213	2/13/15	136.57	4435.64
				4573.765	4/15/15	138.35	4435.42
					5/18/15	138.64	4435.13
BMO-2014-4B	917620	600508.792	3468581.267	4566.453	3/4/15	132.43	4434.02
				4567.672	4/14/15	133.60	4434.07
					5/18/15	133.85	4433.82
BMO-2014-4BL	917619	600498.091	3468566.229	4566.453	3/1/15	131.89	4434.56
				4567.045	4/14/15	132.95	4434.10
					5/18/15	133.23	4433.82
BMO-2015-1B	917622	600261.991	3468563.389	4561.382	3/15/15	128.05	4433.33
				4562.063	4/14/15	129.10	4432.96
					5/18/15	129.24	4432.82
BMO-2015-1BL	917621	600272.479	3468583.092	4561.382	3/12/15	129.10	4432.28
				4563.402	4/14/15	130.45	4432.95
					5/18/15	130.59	4432.81
BMO-2015-2B	917827	600267.799	3468996.635	4579.624	3/19/15	147.17	4432.45
				4582.082	4/14/15	149.05	4433.03
					5/18/15	149.18	4432.90
BMO-2015-2BL	917828	600252.069	3468983.910	4579.624	3/26/15	146.43	4433.19
				4580.644	4/14/15	147.60	4433.04
					5/18/15	147.82	4432.82

Notes:
ADWR = Arizona Department of Water Resources
UTM = Universal Transverse Mercator Zone 12, North American Datum 1983 (NAD83)
ft amsl = feet above mean sea level

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FIGURES





Legend

- Public Water Supply Well
- Fourth Quarter 2014 250 mg/L Sulfate Concentration Contour
- RPI Property
- TVGC Property
- Greenbush Draw
- CTSA Facility
- CQB Property Boundary
- Road
- Township and Range

Miles

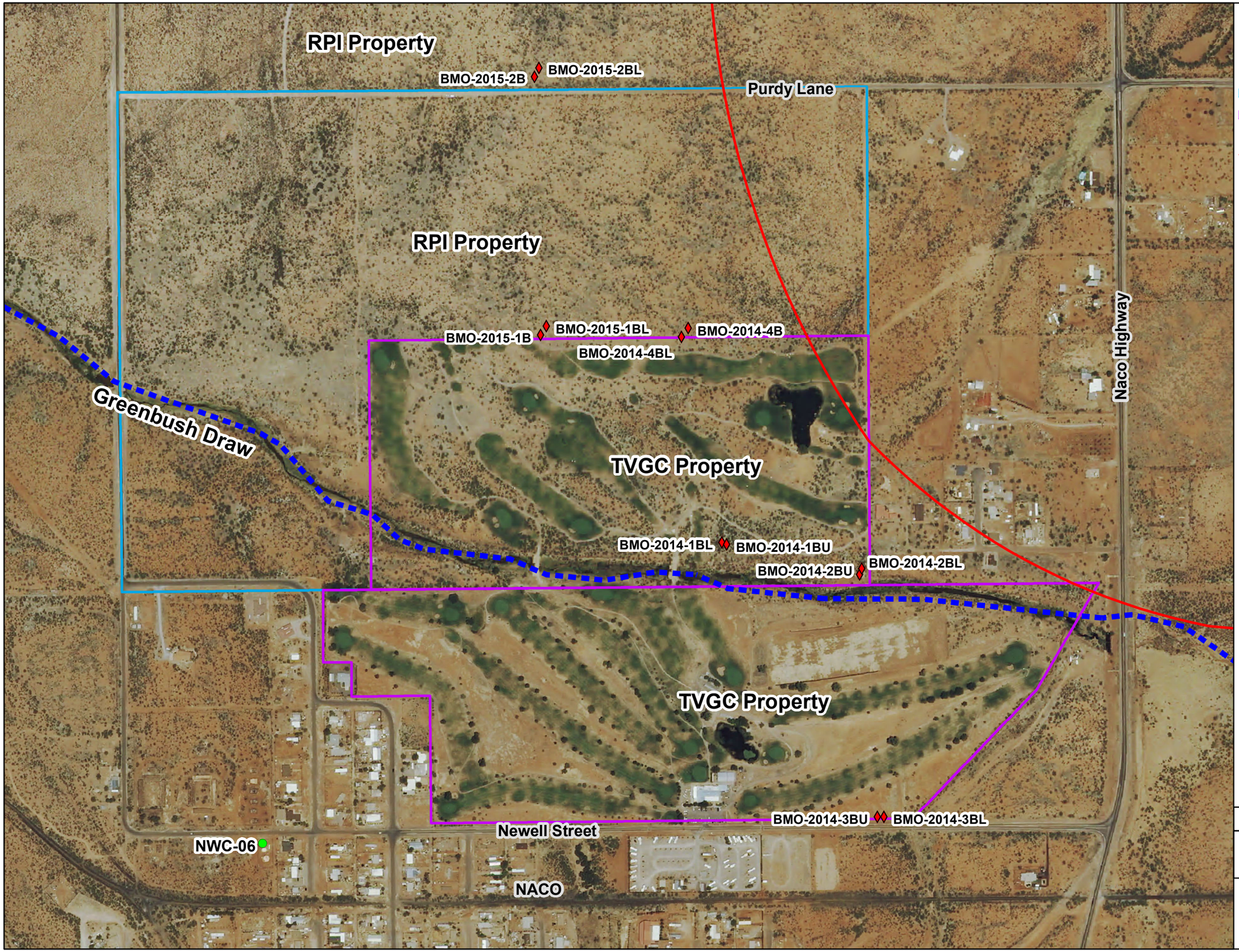
0 0.25 0.5 1

Projection: UTM Zone 12N NAD83

Date	File ID
9/4/2014	055038-433

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FIGURE 1
Project Location Map



Legend

- Monitor Well
- Greenbush Draw
- RPI Property
- TVGC Property
- Q4 2014 250 mg/LSulfate Concentration Contour

Feet

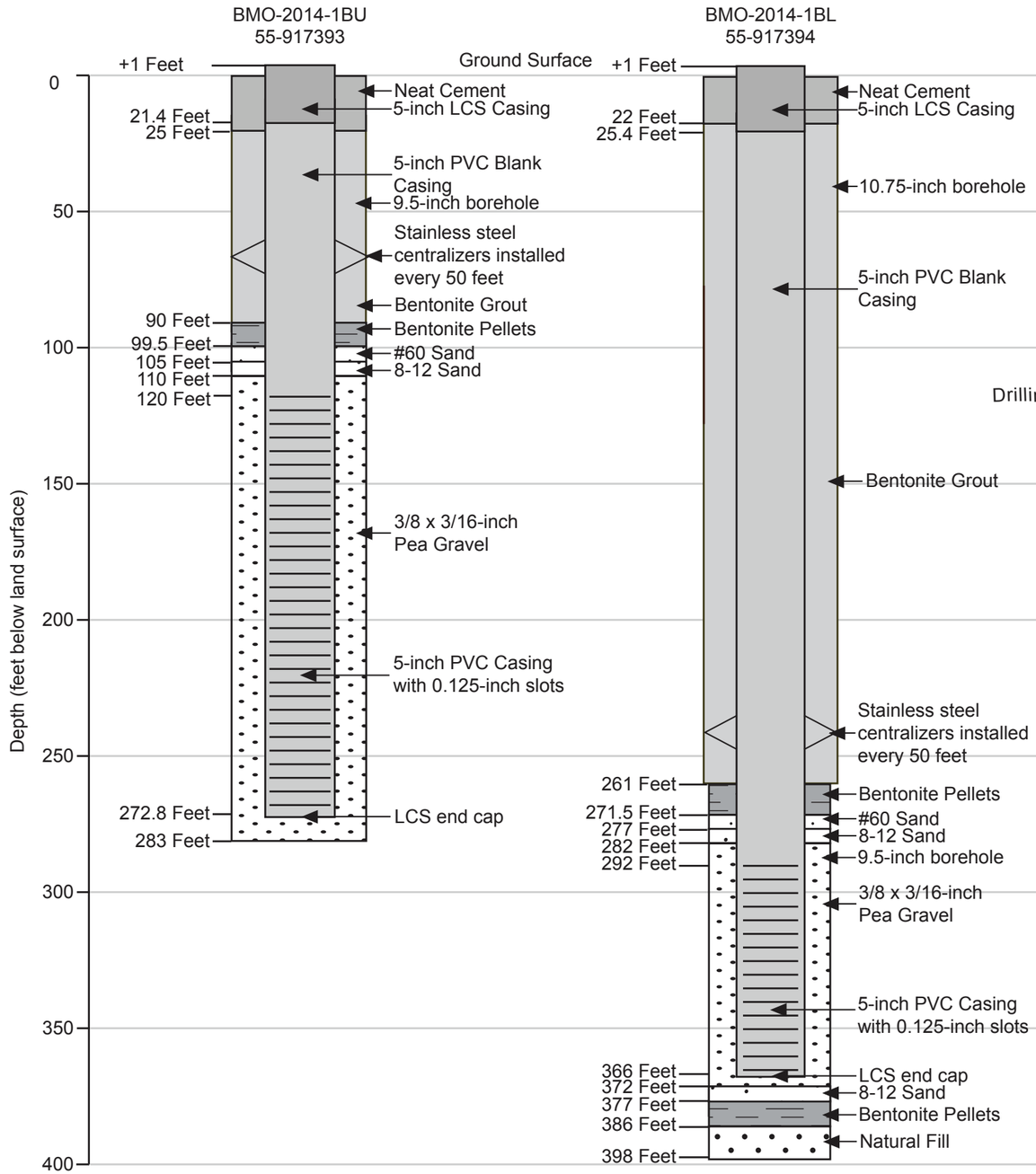
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Projection: UTM Zone 12N NAD83

Date	File ID
8/6/15	055038-434

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FIGURE 2
Monitor Well Locations



DEPTH-SPECIFIC GROUNDWATER SAMPLING DURING DRILLING

	pH (s.u.)	Electrical Conductivity (uS/cm)	Field Sulfate (mg/L)	Laboratory Sulfate (mg/L)	Sampling Method Bailer (B) or Push-Ahead (P)
140 Feet	7.46	533.2	54	64	P
180 Feet	6.46	607.4	No Sample	No Sample	
235 Feet	7.22	651.0	160	150	B
248 Feet	6.65	555.2	96	120	B
280 Feet	7.56	559.4	134	180	B
300 Feet	7.89	603.4	128	170	B
320 Feet	8.27	598.5	82	180	B
360 Feet	8.03	539.3	106	140	B
398 Feet	8.09	609.2	146	200	B

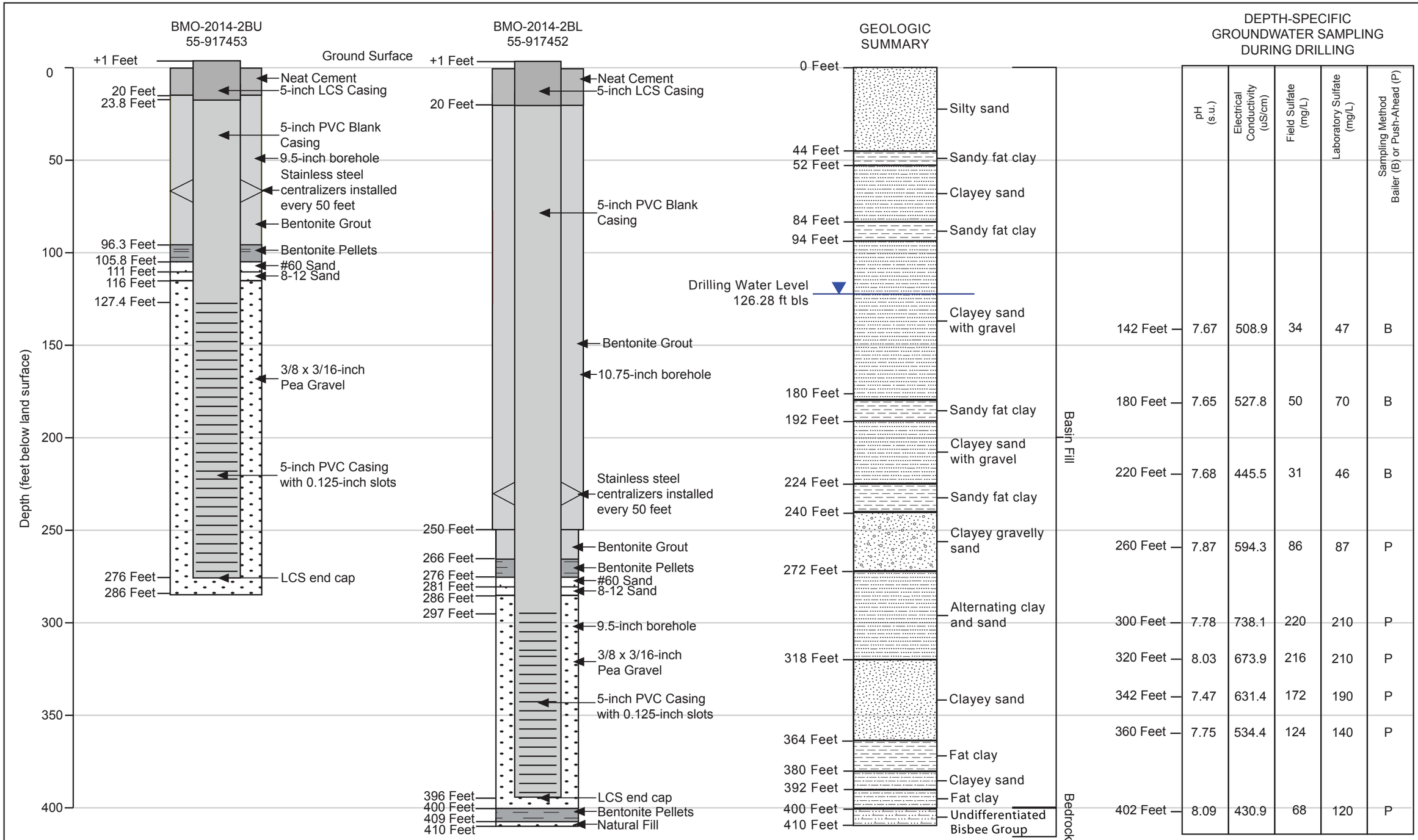
CLEAR CREEK ASSOCIATES

Site Coordinates: UTM Zone 12 North
Northing: 3468232.37 meters
Easting: 600566.18 meters
Land Surface Elevation: 4557.18 feet amsl

LCS = Low Carbon Steel
PVC = Polyvinyl Chloride
Scale Approximate

Date 6/11/15 | File ID A055038-006

FIGURE 3
Summary Log and As-Built Diagrams for BMO-2014-1 Wells



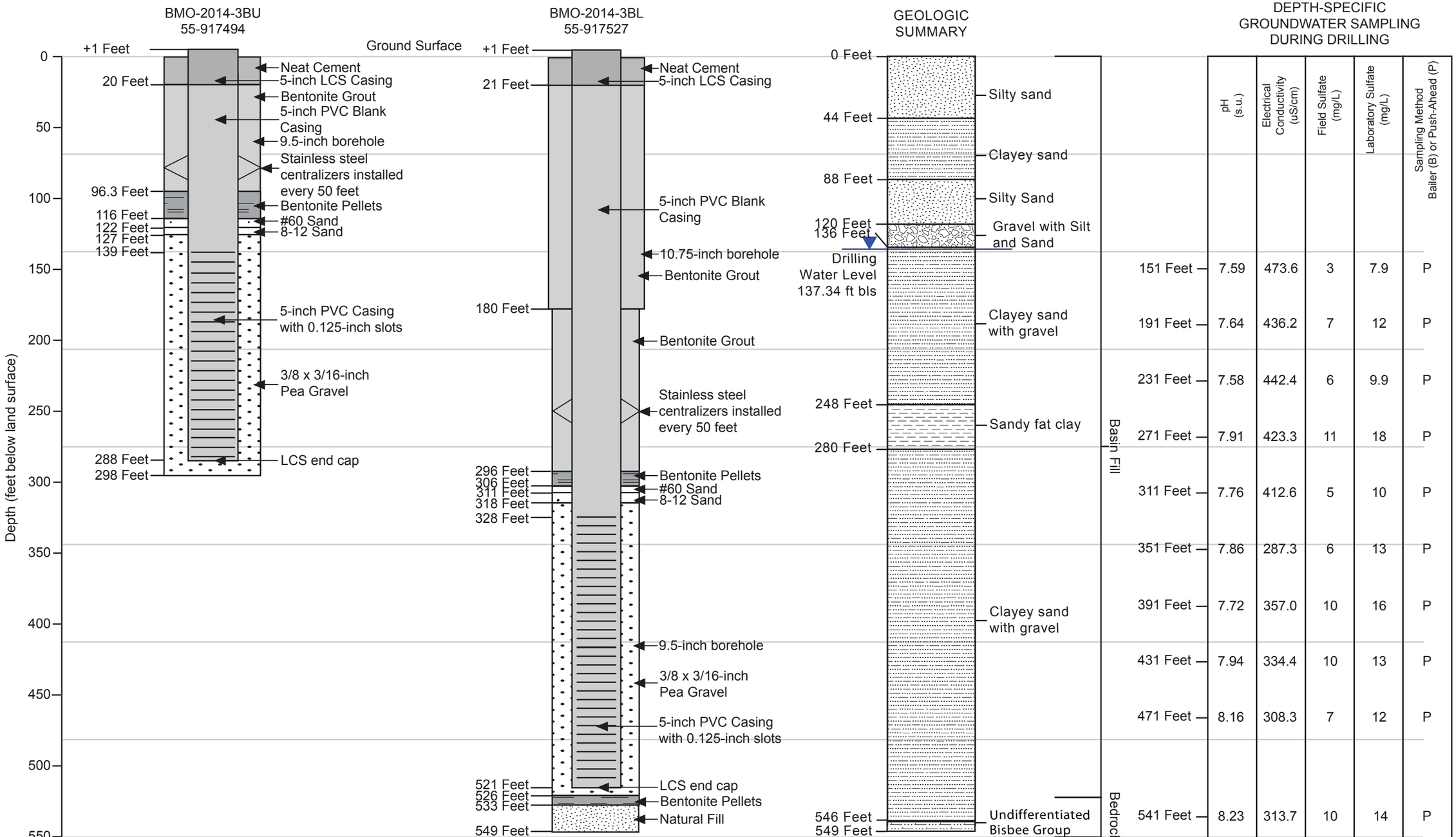
CLEAR CREEK ASSOCIATES

Site Coordinates: UTM Zone 12 North
Northing: 3468189.77 meters
Easting: 600790.00 meters
Land Surface Elevation: 4560.31 feet amsl

LCS = Low Carbon Steel
PVC = Polyvinyl Chloride
Scale Approximate

Date	File ID
6/11/15	A055038-007

FIGURE 4
Summary Log and As-Built Diagrams for BMO-2014-2 Wells



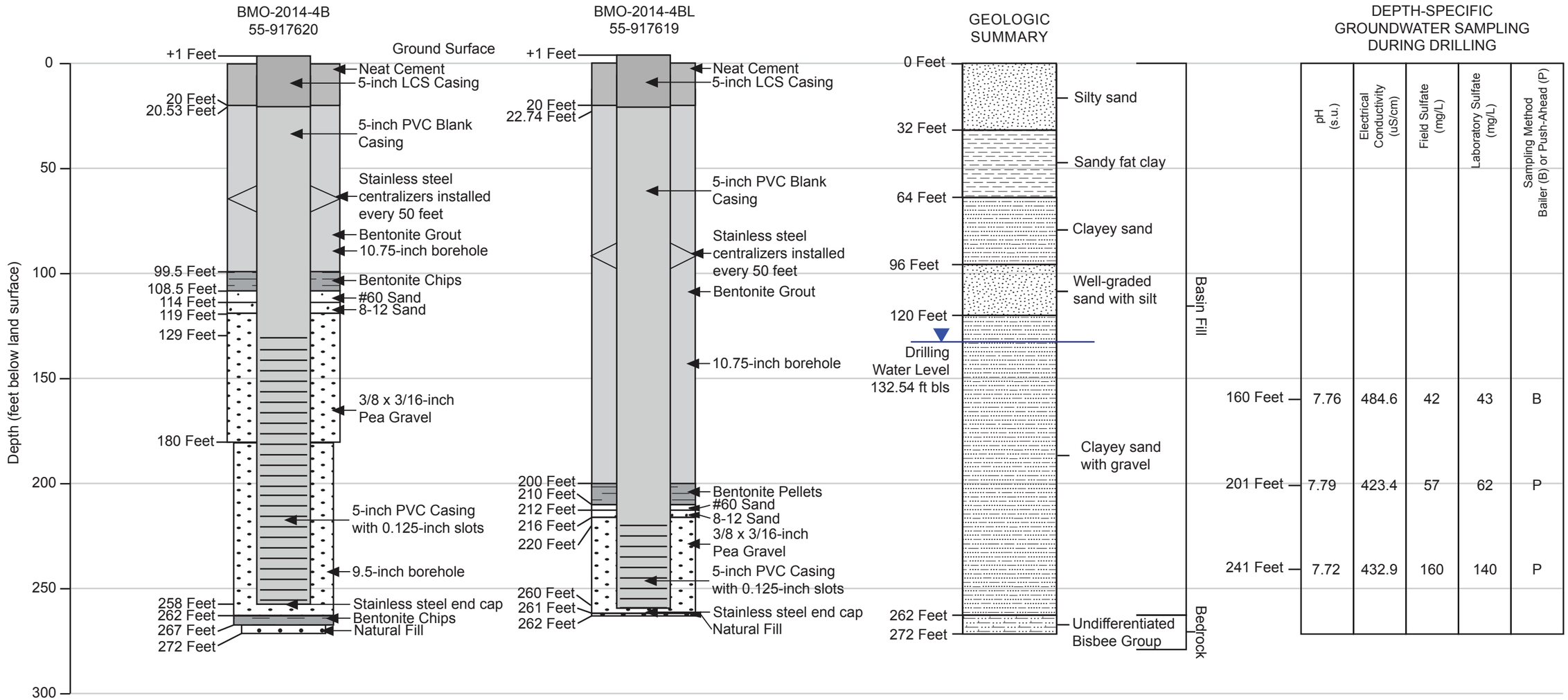
CLEAR CREEK ASSOCIATES

Site Coordinates: UTM Zone 12 North
Northing: 3467789.33 meters
Easting: 600822.70 meters
Land Surface Elevation: 4572.21 feet amsl

LCS = Low Carbon Steel
PVC = Polyvinyl Chloride
Scale Approximate

Date	File ID
6/11/15	A055038-013

FIGURE 5
Summary Log and As-Built Diagrams for BMO-2014-3 Wells



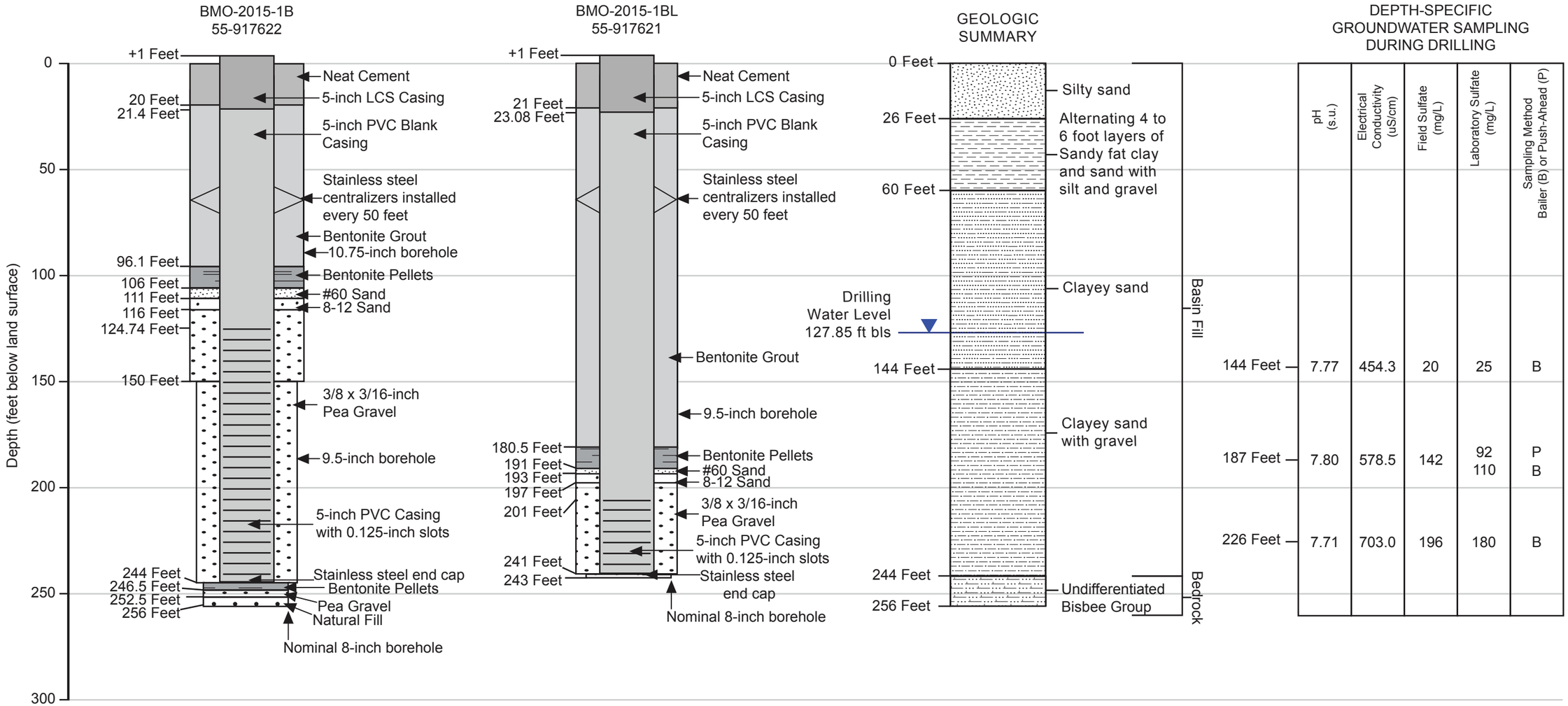
CLEAR CREEK ASSOCIATES

Site Coordinates: UTM Zone 12 North
Northing: 3468579.90 meters
Easting: 600502.58 meters
Land Surface Elevation: 4566.45 feet amsl

LCS = Low Carbon Steel
PVC = Polyvinyl Chloride
Scale Approximate

Date	File ID
6/11/15	A055038-018

FIGURE 6
Summary Log and As-Built Diagrams for BMO-2014-4 Wells



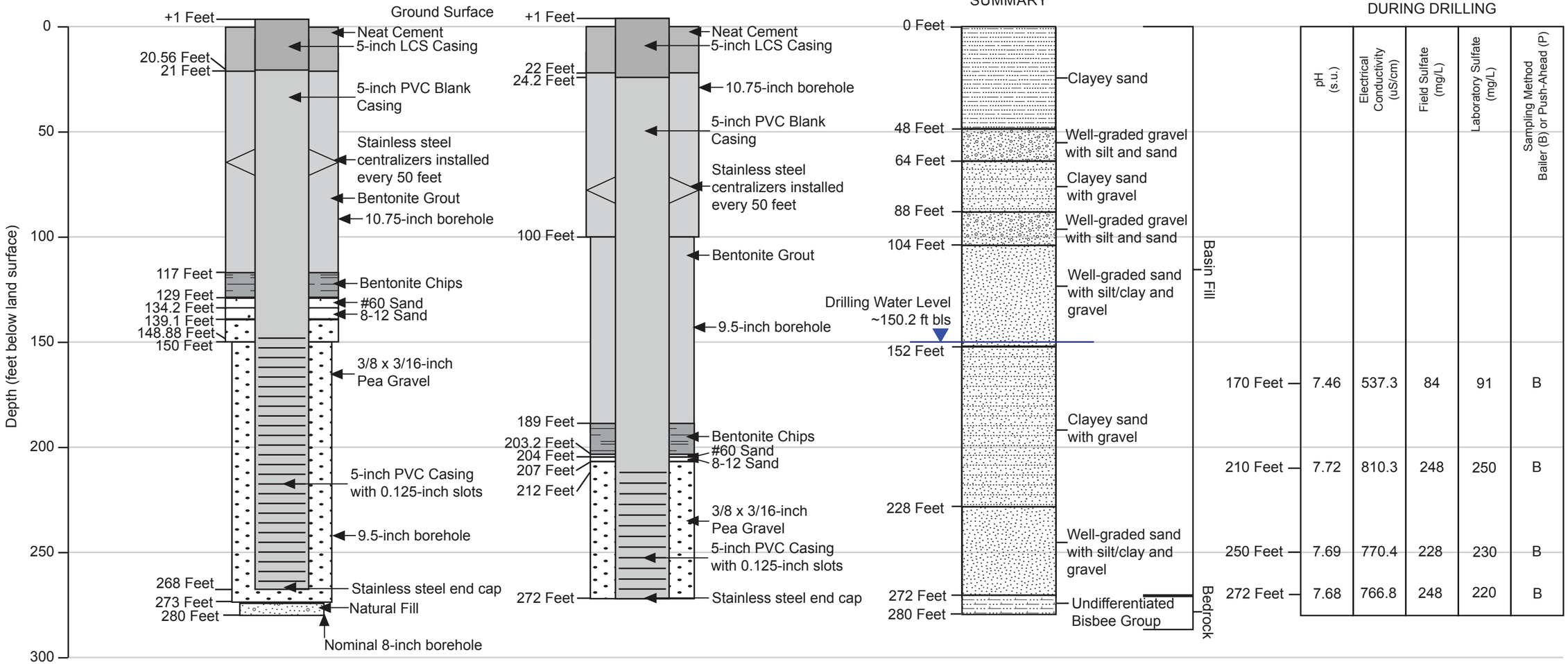
CLEAR CREEK ASSOCIATES

Site Coordinates: UTM Zone 12 North
Northing: 3468570.23 meters
Easting: 600268.43 meters
Land Surface Elevation: 4561.38 feet amsl

LCS = Low Carbon Steel
PVC = Polyvinyl Chloride
Scale Approximate

Date	6/11/15	File ID	A055038-020

FIGURE 7
Summary Log and As-Built Diagrams for BMO-2015-1 Wells



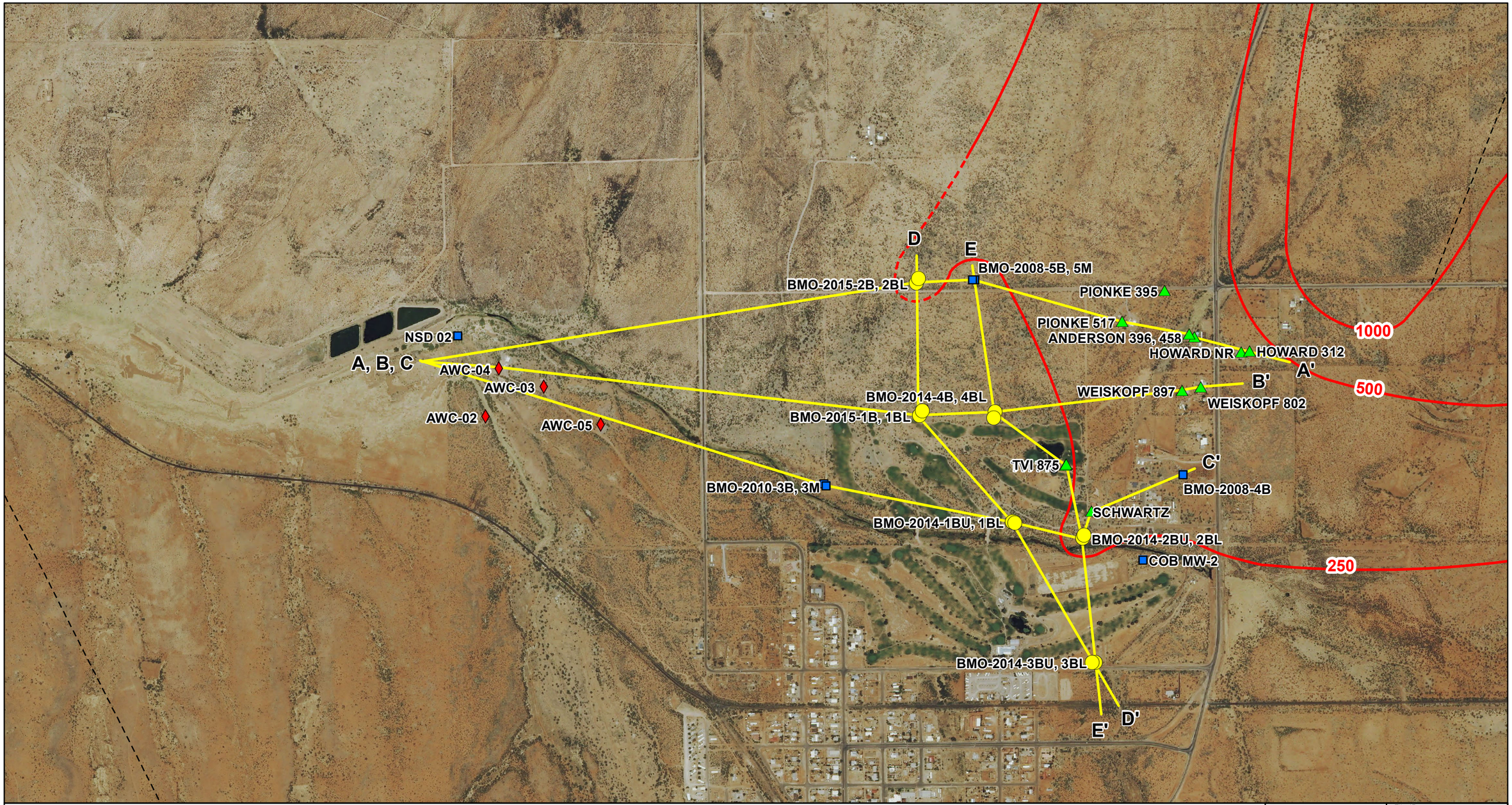
CLEAR CREEK ASSOCIATES

Site Coordinates: UTM Zone 12 North
Northing: 3468983.911 meters
Easting: 600261.048 meters
Land Surface Elevation: 4579.624 feet amsl

LCS = Low Carbon Steel
PVC = Polyvinyl Chloride
Scale Approximate

Date	6/11/15	File ID	A055038-020

FIGURE 8
Summary Log and As-Built Diagrams for BMO-2015-2 Wells



Legend

- First Quarter 2015 Sulfate Concentration Contour
- Cross Section
- EGMP Monitor Well
- Public Water Supply Well
- Private Well
- Existing Monitor Well

Map only shows wells used for cross sections

Scale (Feet)

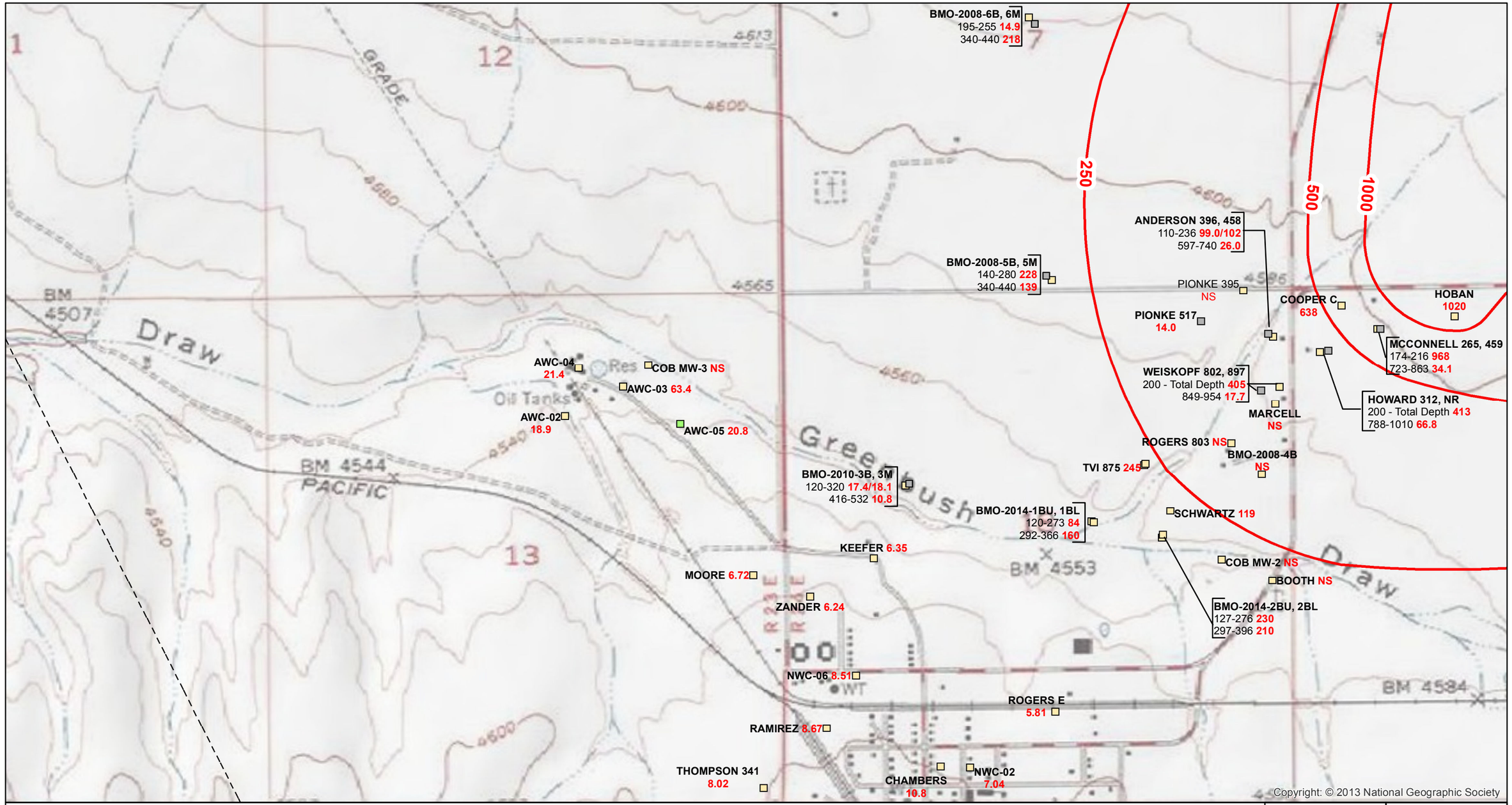
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Projection: UTM Zone 12N NAD83

Date	File ID
6/5/15	055038-438

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FIGURE 9
Cross Section
Location Map



Legend

- RAY 147 — Well ID, Sulfate Concentration (mg/L)
- Sulfate Concentration Contours
- Fault

Co-located Wells
- Well ID
- Screen (ft bls): Sulfate Levels (mg/L)

Screened Formation
- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate - Estimated

Undifferentiated Bisbee Group: Cintura, Mural Limestone, and Morita Formations

NS= Not scheduled for sampling or inaccessible
mg/L = milligrams per liter
ft bls = feet below land surface
Sulfate contours are based on represented quarter and historical data.

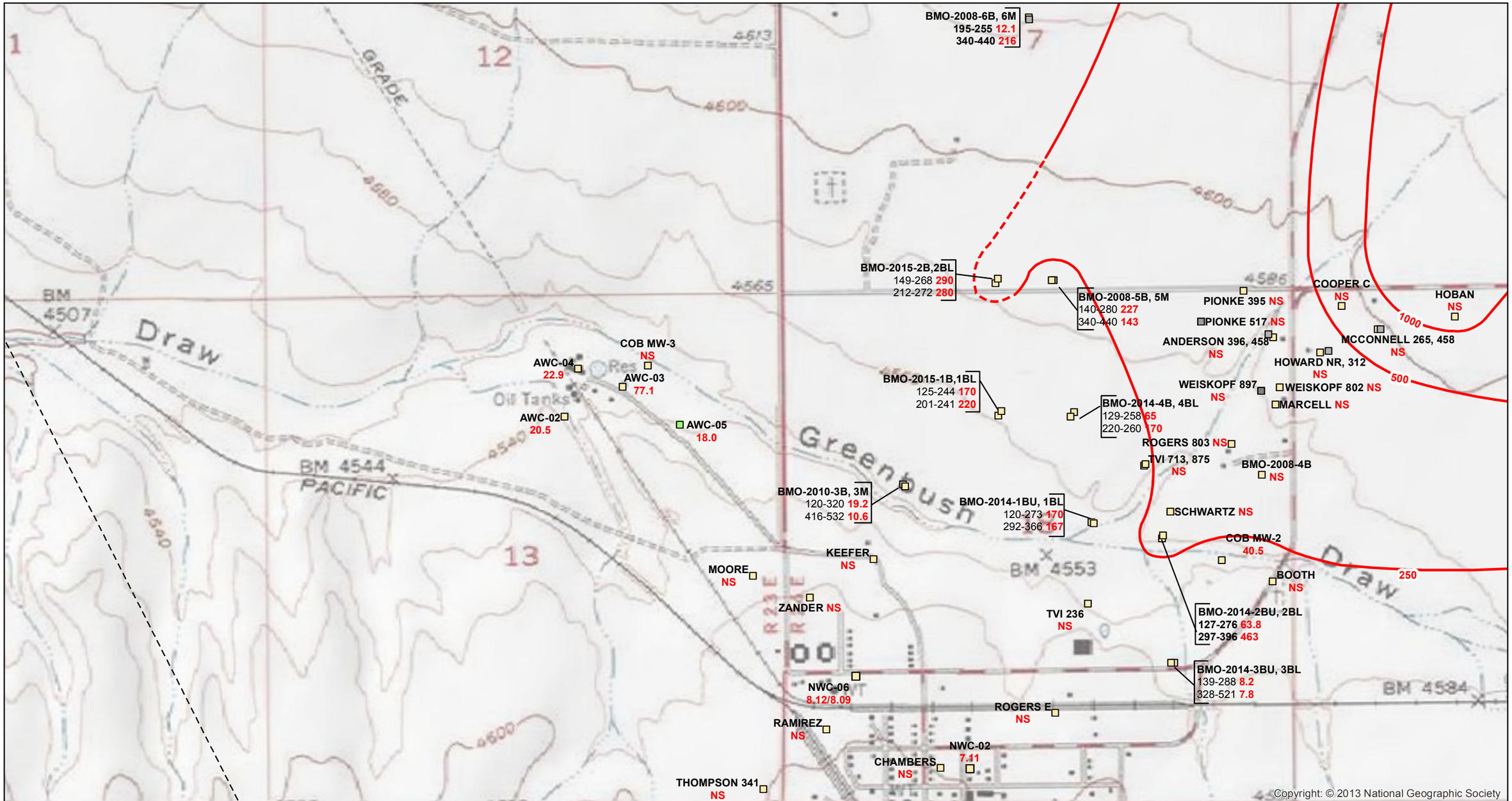
Scale (Feet)
0 1,000 2,000

Projection: UTM Zone 12N NAD83

Date	8/7/15	File ID	055038-435

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FIGURE 10
Sulfate Concentrations at the Western Edge of the Plume for Fourth Quarter 2014



Legend

- **NWC-02** Well ID
  7.11 Sulfate Concentration (mg/L)
- Sulfate Concentration Contour
- Fault

Co-located Wells
- Well ID
- Screen (ft bls): Sulfate Levels (mg/L)

Screened Formation
- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate - Estimated

Undifferentiated Bisbee Group: Cintura, Mural Limestone, and Morita Formations

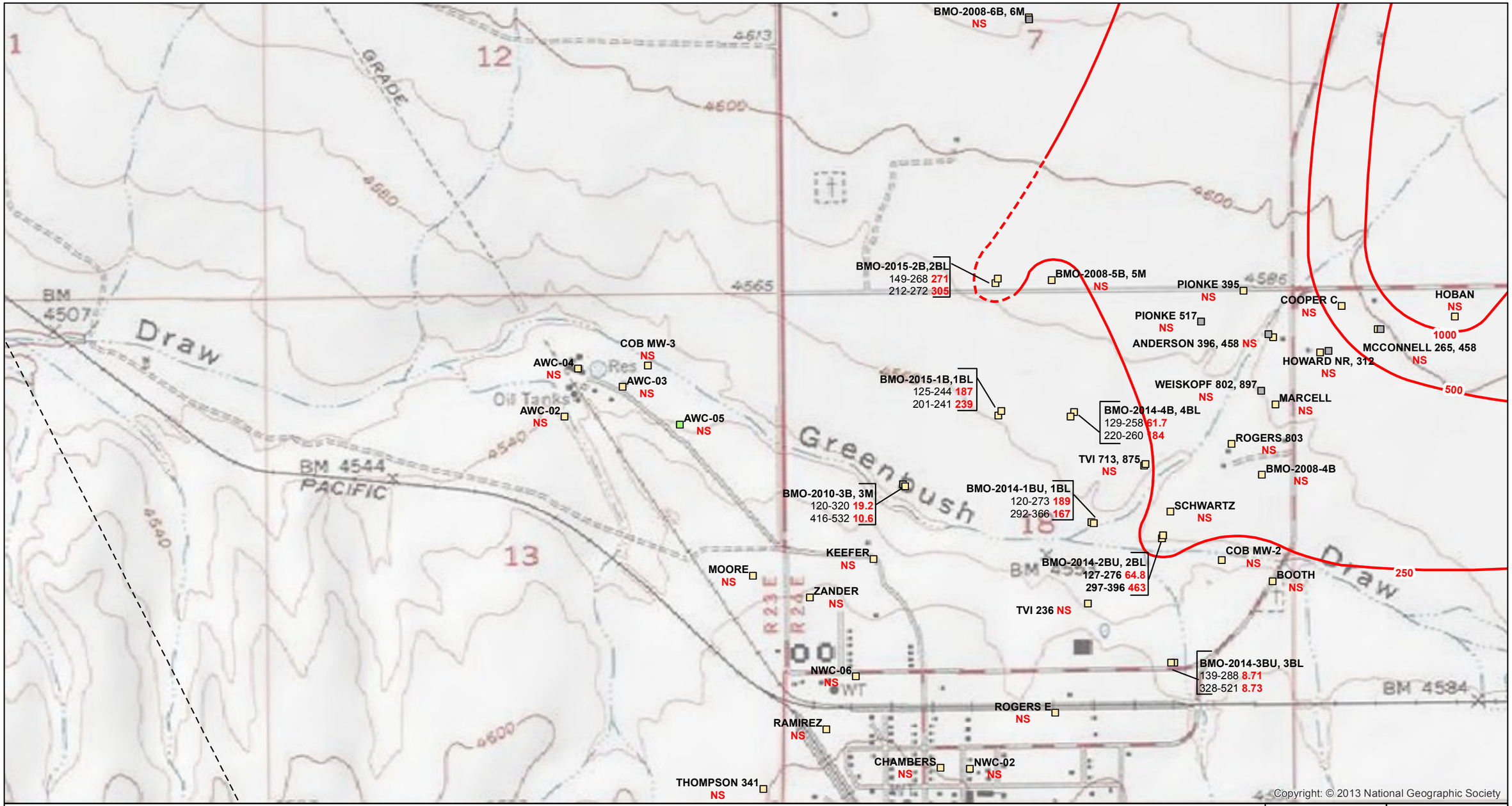
NS = Not scheduled for sampling or inaccessible
mg/L = milligrams per liter
ft bls = feet below land surface
Sulfate contours are based on represented quarter and historical data.

Scale (Feet)
0 1,000 2,000
Projection: UTM Zone12N
NAD83

Date 8/7/15
File ID 055038-427

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FIGURE 11
Sulfate Concentrations at the Western Edge of the Plume for First Quarter 2015



Legend

- NWC-02 Well ID
- 7.11 Sulfate Concentration (mg/L)
- Sulfate Concentration Contour
- Fault

Co-located Wells

- Well ID
- Screen (ft bls): Sulfate Levels (mg/L)

Screened Formation

- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate - Estimated

Undifferentiated Bisbee Group: Cintura, Mural Limestone, and Morita Formations

NS = Not scheduled for sampling or inaccessible
mg/L = milligrams per liter
ft bls = feet below land surface
Sulfate contours are based on represented quarter and historical data.

Scale (Feet)
0 1,000 2,000

Projection: UTM Zone 12N
NAD83

Date 8/7/15
File ID 055038-429

CLEAR CREEK ASSOCIATES

FIGURE 12
Sulfate Concentrations at the Western Edge of the Plume for Second Quarter 2015

ABRIGO FAULT

BMO-2008-11G
12.5

COB WL
73.7

BMO-2008-1G
116

TM-10 USBP
3.96

COOPER
29.8

TM-07
102

RUIZ 215

POWER 639
265

WEED
14.2

250
500
1000
1500
1000
500
250

BMO-2008-6B, 6M
195-255 12.1
340-440 216

BMO-2015-2B,2BL
149-268 290
212-272 280

BMO-2008-5B, 5M
140-280 227
340-440 143

BMO-2015-1B,1BL
125-244 170
201-241 220

AWC-04
22.9

AWC-03
77.1

AWC-02
20.5

AWC-05
18.0

BMO-2010-3B, 3M
120-320 19.2
416-532 10.6

SCHWARTZ 125/126

COB MW-2
40.5

BMO-2008-3B
145

BMO-2014-2BU, 2BL
127-276 63.8
297-396 463

BMO-2014-4B, 4BL
129-258 65
220-260 170

NWC-06
8.12/8.09

NWC-02
7.11

BMO-2014-1BU, 1BL
120-273 170
292-366 167

BMO-2014-3BU, 3BL
139-288 8.2
328-521 7.8

BMO-2012-1M
214

PANAGAKOS
428

DODSON
59.5/59.9

NWC-04
177

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Legend

- **NWC-02** Well ID
  7.11 SO4 Concentration (mg/L)
- SO4 Concentration Contours
- Fault

Co-located Wells
- Well ID
- Screen (ft bls): Sulfate Levels (mg/L)

Screened Formation
- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate - Estimated

Undifferentiated Bisbee Group: Cintura, Mural Limestone, and Morita Formations

Scale (Feet)
0 3,000 6,000

Notes:

Projection: UTM Zone 12N NAD83
mg/L = milligrams per liter
ft bls = feet below land surface
Sulfate contours are based on first quarter 2015 and historical data.

Date 8/7/15
File ID 055038-401

CLEAR CREEK ASSOCIATES

FIGURE 13
Sulfate Concentrations in Site-Wide Groundwater Samples for First Quarter 2015

BMO-2008-6B
4431.70

BMO-2008-5B
4434.32

PIONKE 395
4435.66

COOPER C
4436.66

HOBAN
4436.79

MCCONNELL 265
4436.81

ANDERSON 396
4435.81

HOWARD NR
4436.23

WEISKOPF 802
4436.00

ROGERS 596
NS

ROGERS 803
NS

NSD 02
4430.08

AWC-04
4426.19

COB MW-3
NS

AWC-03
4419.92

AWC-02
4425.12

AWC-05
4226.35

LADD 977
4432.45

NSD 03
4431.48

TVI 713
4434.93

TVI 875
NS

BMO-2010-3B
4431.43

BMO-2008-4B
NS

NWC-03 CAP
NS

BMO-2014-1BU, 1BL
120-273 4435.03
292-366 4435.42

SCHWARTZ
4434.83

BMO-2014-2BU, 2BL
127-276 4435.12
297-396 4435.65

KEEFER
4430.58

MOORE
NS

ZANDER
NS

COB MW-2
NS

BOOTH
NS

TVI 236
NS

BMO-2008-3B
NS

NWC-06
NS

ROGERS E
NS

RAMIREZ
NS

CHAMBERS
NS

NWC-02
NS

THOMPSON 151
4430.06

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Legend

- AWC-02 Well ID
- 4425.12 Groundwater Elevation (ft amsl)
- Groundwater Elevation Contour (ft amsl)
- Groundwater Elevation Depression Contour (ft amsl)
- Faults (dashed where inferred)

Co-located Wells
- Well ID
- Screen (ft bls): Water Elevation (ft amsl)

Screened Formation
- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate-Estimated

NS = Not scheduled for sampling or inaccessible
ft amsl = feet above mean sea level
ft bls = feet below land surface

Scale (Feet)
0 1,000 2,000

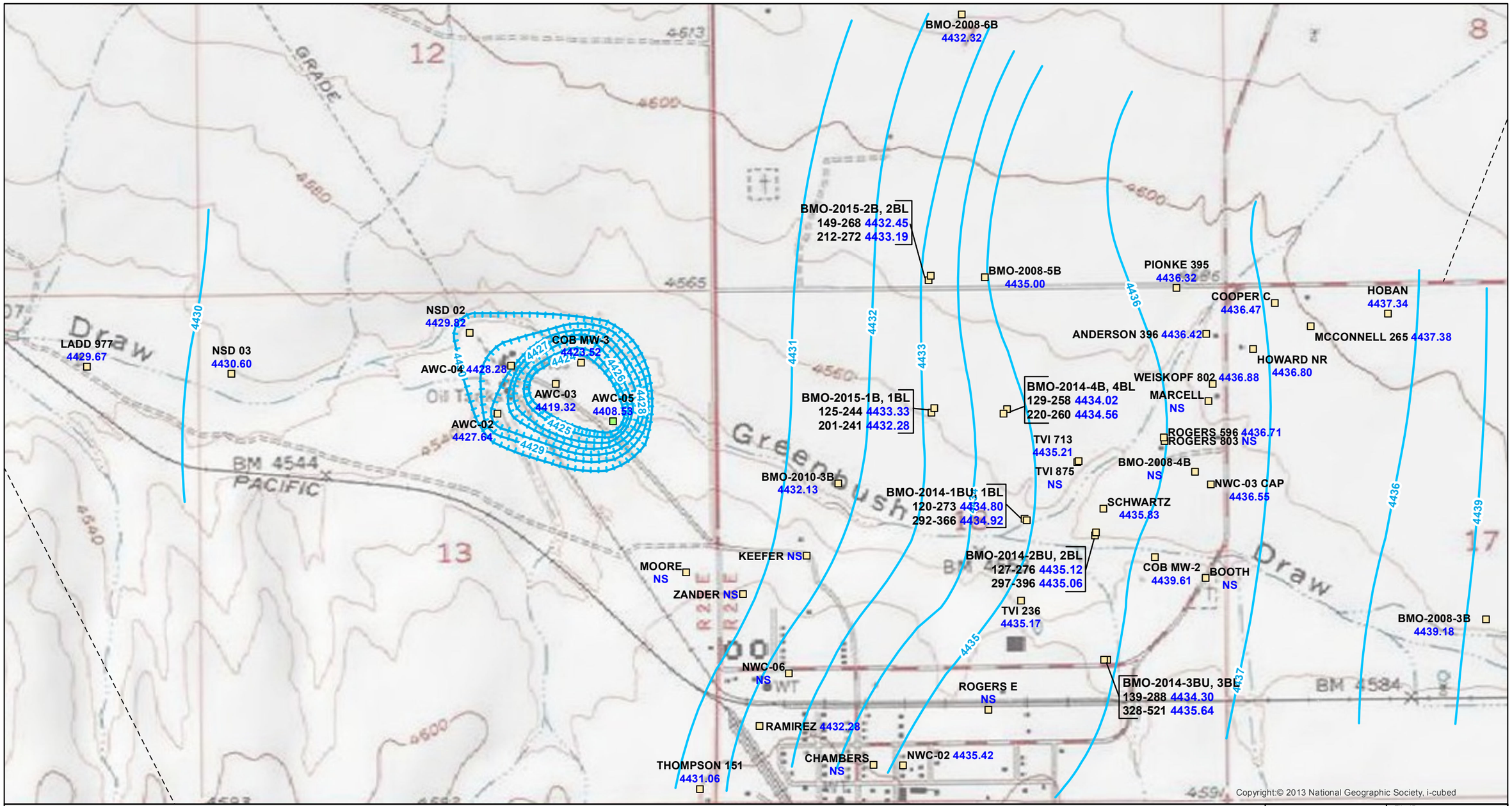
Projection: UTM Zone 12N NAD83

Date 8/6/15

File ID 055038-436

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FIGURE 14
Basin Fill Groundwater Elevation for Fourth Quarter 2014



Legend

- AWC-02 Well ID
- 4427.64 Groundwater Elevation (ft amsl)
- Groundwater Elevation Contour (ft amsl)
- Groundwater Elevation Depression Contour (ft amsl)
- Faults (dashed where inferred)

Co-located Wells
- Well ID
- Screen (ft bls): Water Elevation (ft amsl)

Screened Formation
- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate-Estimated

NS = Not scheduled for sampling or inaccessible
ft amsl = feet above mean sea level
ft bls = feet below land surface

Scale (Feet)
0 1,000 2,000

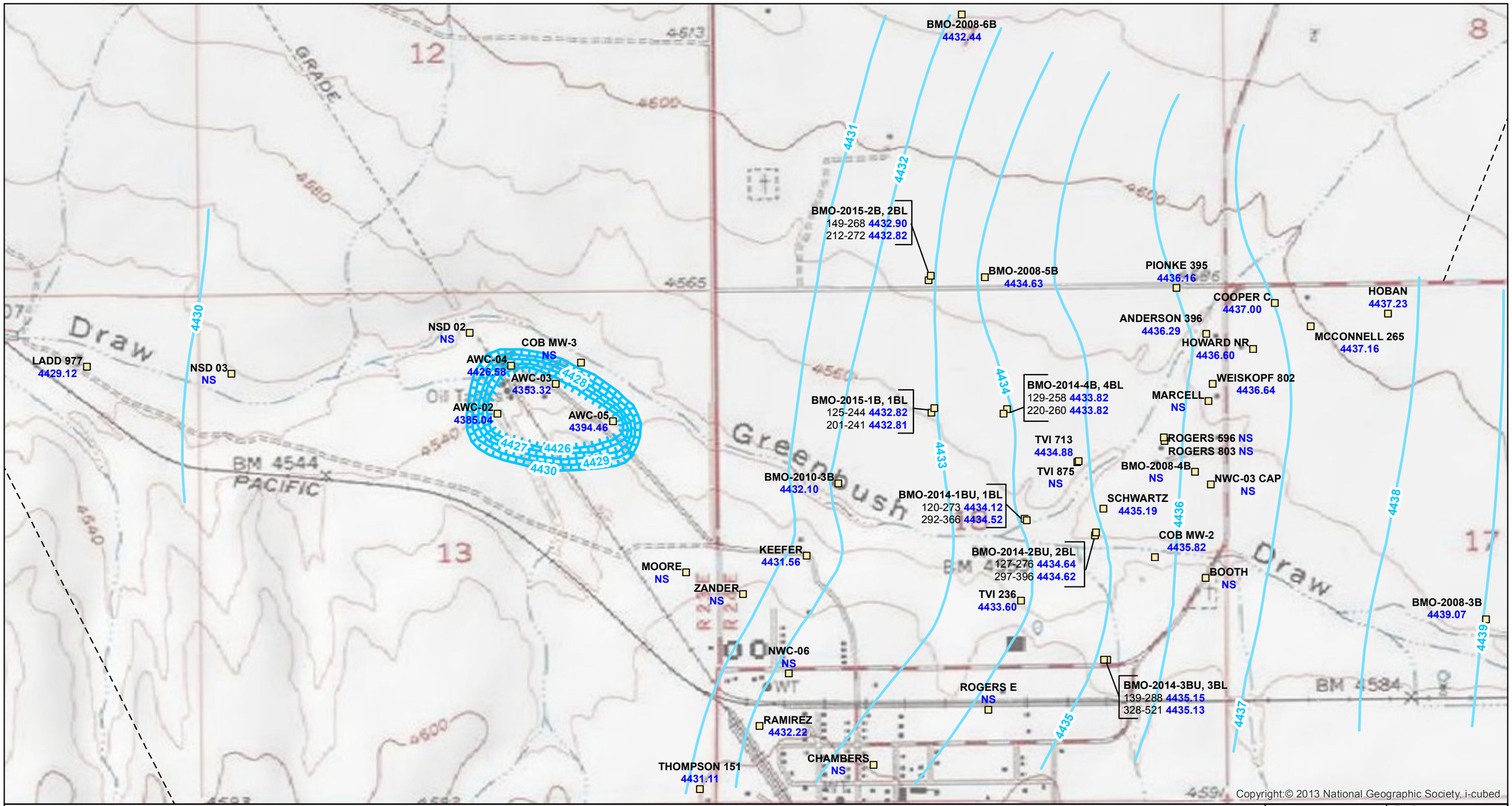
Projection: UTM Zone 12N NAD83

Date 8/6/15

File ID 055038-426B

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FIGURE 15
Basin Fill Groundwater Elevation for First Quarter 2015



Legend

- **AWC-02** Well ID
  4385.04 Groundwater Elevation (ft amsl)
- Groundwater Elevation Contour (ft amsl)
- Groundwater Depression Contour (ft amsl)
- Faults (dashed where inferred)

Co-located Wells
- Well ID
- Screen (ft bls): Water Elevation (ft amsl)

Screened Formation
- Basin Fill
- Basin Fill and Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group
- Undifferentiated Bisbee Group - Estimated
- Undifferentiated Bisbee Group and Glance Conglomerate
- Glance Conglomerate
- Glance Conglomerate-Estimated

NS = Not scheduled for sampling or inaccessible
ft amsl = feet above mean sea level
ft bls = feet below land surface

Scale (Feet)
0 1,000 2,000

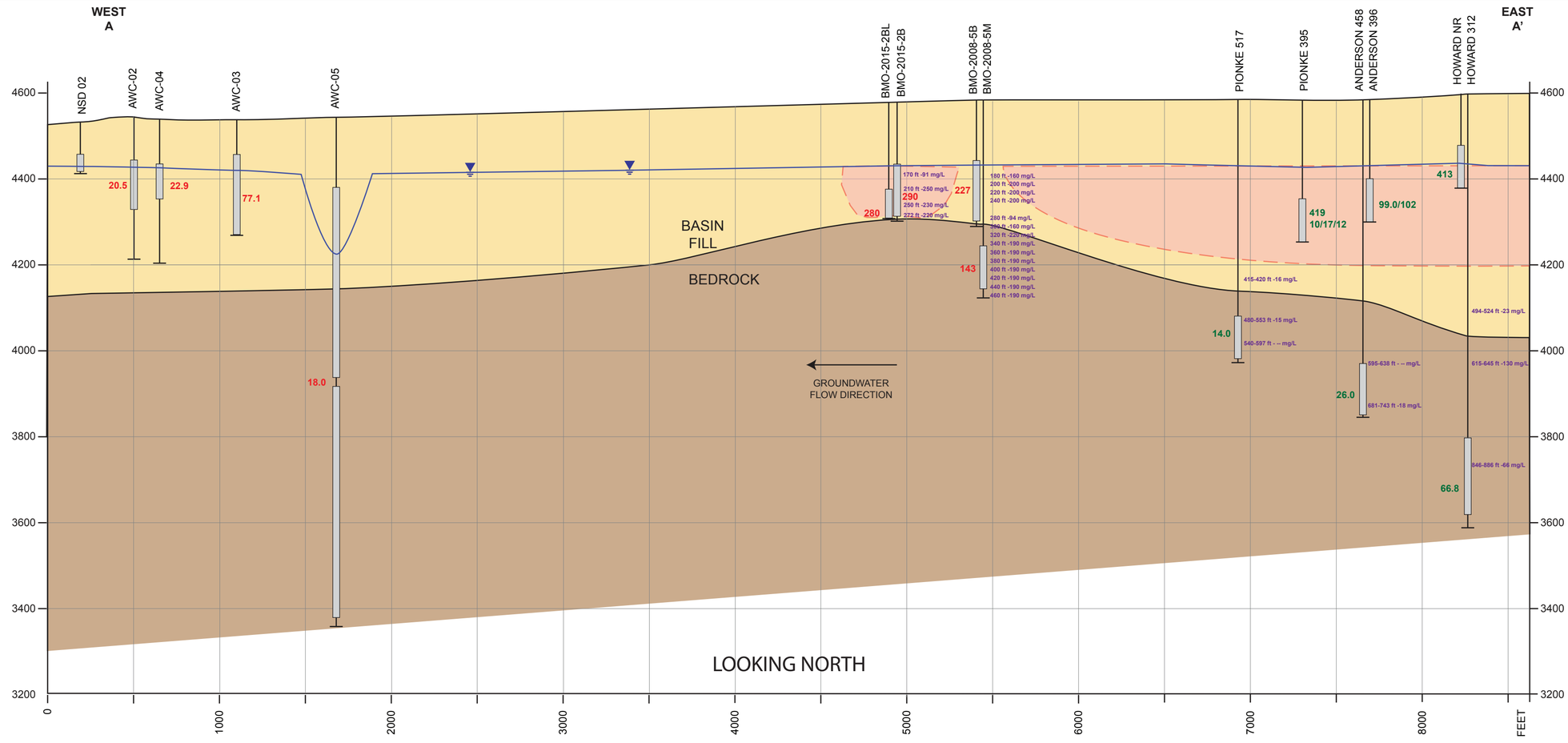
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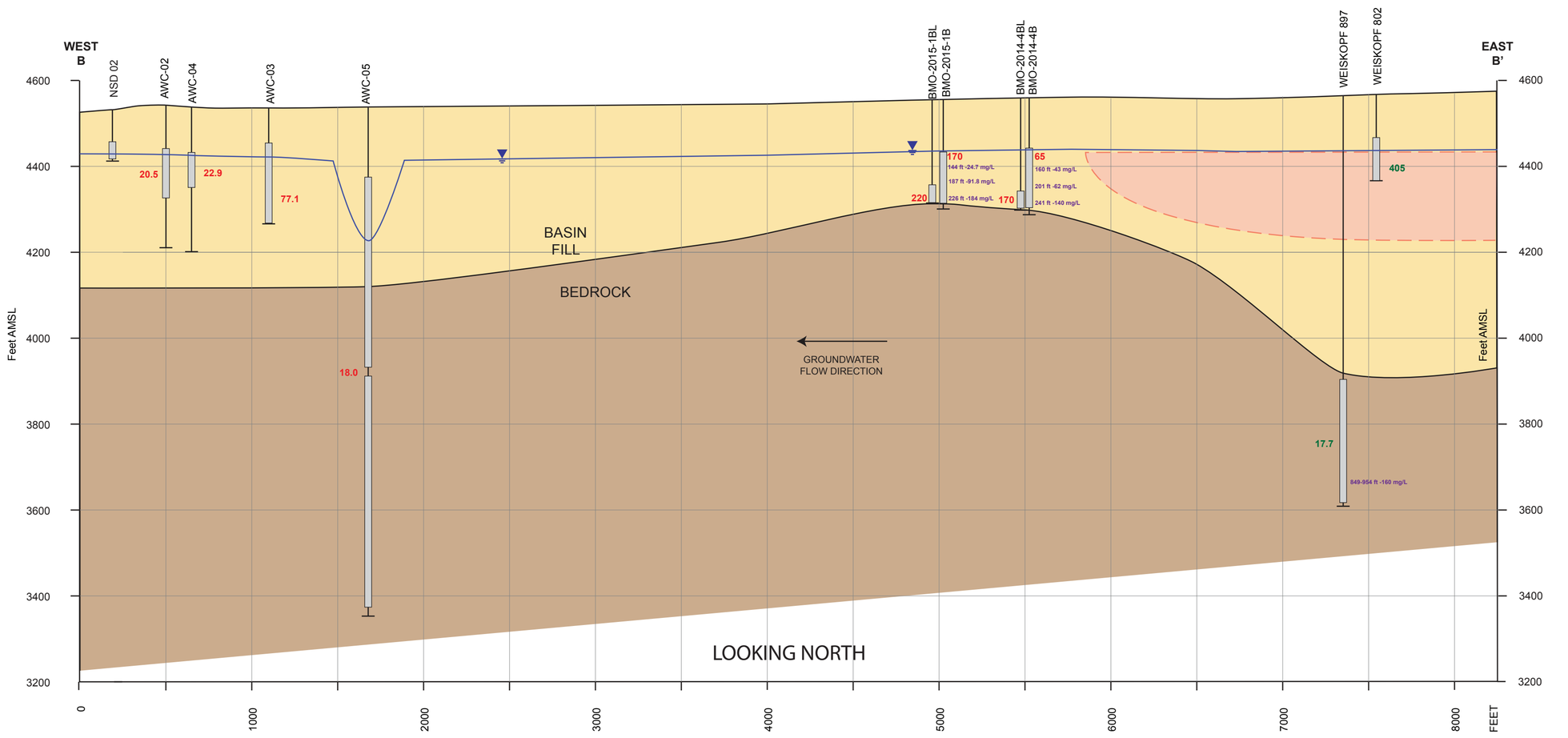
Date	File ID
8/6/15	055038-442

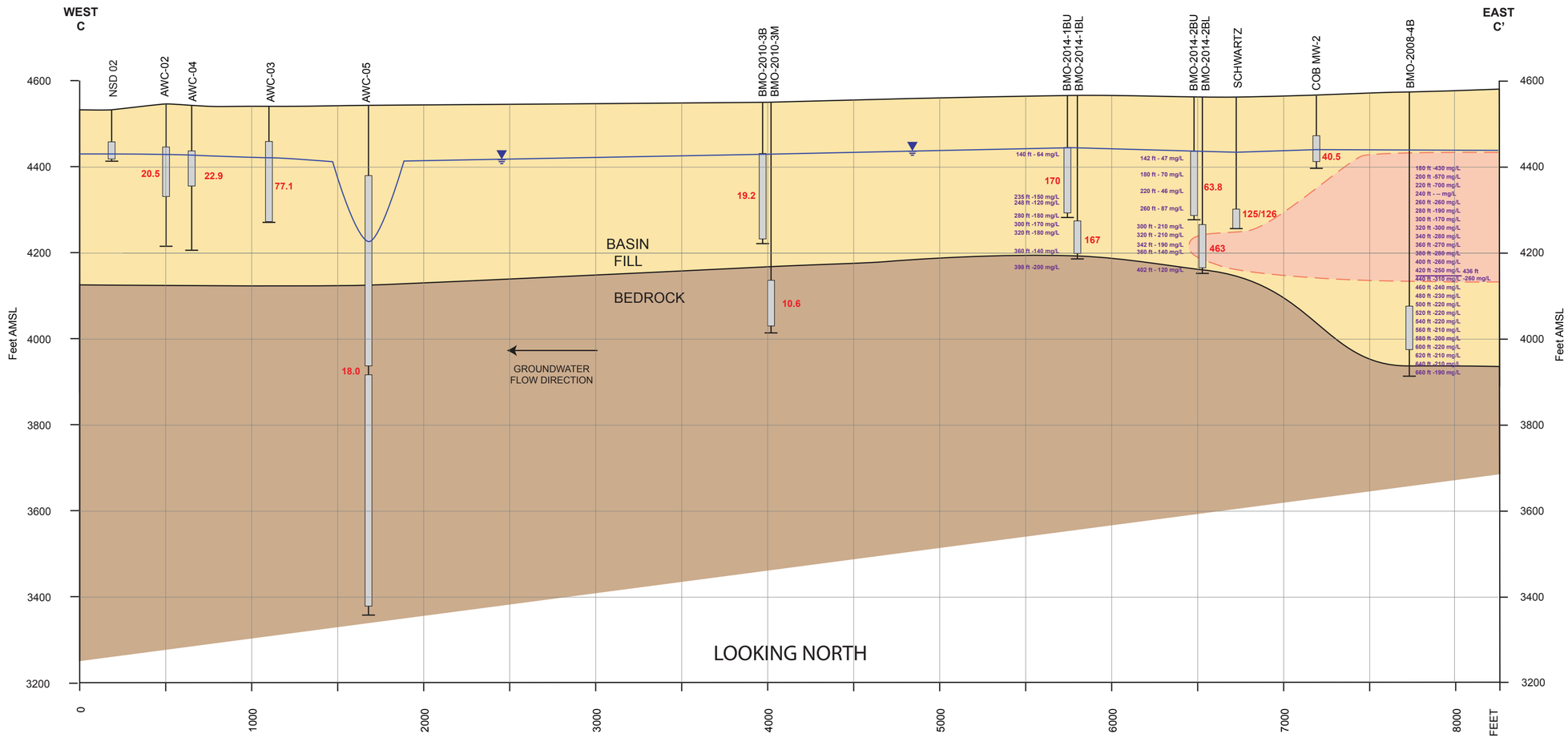
CLEAR CREEK ASSOCIATES

FIGURE 16
Basin Fill Groundwater Elevation for Second Quarter 2015

PLATES







EXPLANATION

- Basin Fill
- Bedrock (Undifferentiated)
- 250 mg/L Sulfate Concentration Contour

AWC-04 — Well Name

300 ft -160 mg/L — Depth-specific Sulfate Concentration (mg/L)

63.4 — Well Sample Sulfate Concentration (mg/L) 2015 Q1

405 — 2014 Q4

Screened Interval

Depth Drilled

Horizontal Scale: 0 500 1000 (feet)

Vertical Scale: 0 200 400 (feet)

2.5 x Vertical Exaggeration

NOTES
-Depth-specific samples collected during drilling, year indicated by well name.
-Water elevation and well sample sulfate concentration data are for first quarter 2015 except as indicated.
-amsl = above mean sea level

CLEAR CREEK ASSOCIATES

Date: 5/12/15

File ID: A055038-017

PLATE 1
CROSS SECTIONS A-A' THROUGH E-E'

APPENDIX A
LITHOLOGIC LOGS AND CORE PHOTOGRAPHS

APPENDIX A.1
LITHOLOGIC LOGS

Project No.: 287051	Boring Name: BMO-2014-1BL
Project Name: Expanded Groundwater Monitoring	Date/ Time Started: 9/30/14 19:52
ADWR Number: 55-917394	Date/Time Completed: 10/9/14 08:35
Location Cadastral: SE1/4 of SW1/4 of NE1/4 T24S R24E S18	Drilling Equipment: GP24-300RS
Location NAD 83: 31° 20' 39.12" N, 109° 56' 34.04" W	Drilling Method: Rotosonic
Drill Company: Cascade Drilling	Bit Size/Type: 10-inch (0-260 ft bls), 9-inch (260-398)
Driller(s): C Rockhill and J Maples	Conductor Casing (type; diameter; depth): None
Logged By: V Hermosilla / M Lindsey / B Daigneau	Total Borehole Depth: 398 feet

* Percentages of fines, sand, & gravel based on visual estimates of volume

■ Relative % fines (F < 0.074 mm)

□ Relative % sand (S >0.074 < 4.8 mm)

▨ Relative % gravel (G > 4.8 mm)

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
0	70	20	10	■	■	▨	Weak	5YR 4/3	ML		Sandy Silt. Reddish brown, poorly graded, moist sample. Sand is very fine to medium-grained (with occasional coarse grain), subround, felsic (mostly quartz and plagioclase). Silt-sized fines.	MML logging - start drilling at 19:52 on 9/30/14 (24hr drilling). Munsell (Yr. 2000 revised) color by artificial light. Samples received in 2 foot core bags. T = Trace
4	60	30	10	■	■	▨	None	7.5YR 4/4	ML		Sandy Silt. Brown, well-graded, moist. Gravel fine to very coarse (up to 70 mm). Subangular to subround, weathered felsic igneous rock. Sand is very fine to coarse subround, felsic with oxide staining.	
8	80	20	T	■	■	▨	None	5YR 4/4	ML		Silt with Sand. Reddish brown, well-graded, moist. Mostly fine gravel (<2 cm), subround, weathered felsic rock. Sand is very fine to medium, predominantly felsic, subangular to subround. Silt fines with some weak plasticity.	
12	80	20	T	■	■	▨	None	5YR 5/4	ML		Silt with Sand. Reddish brown, well-graded, moist. Trace gravel is fine (<2 cm). Subangular, felsic. Sand is mostly very fine to medium, subangular to subround, felsic silt fines, forms clumps that can be difficult to break between fingers.	
16	60	40	T	■	■	▨	None	5YR 5/3	ML		Sandy Silt. Reddish brown, well-graded, moist. Silty fines form clumps with low to medium strength. Gravel is up to 4 cm, subround to subangular and includes a mafic volcanic rock. Sand is very fine to coarse, subround (from approximately 18 to 19 feet there is a pinkish grey (5YR 7/2) silt coating gravel), less sand in this interval.	
20	60	40	T	■	■	▨	Moderate	5YR 5/3	ML/CL		Sandy Silt and Clay. Reddish brown, poorly graded, moist. Sand is very fine to medium. Silt with some clay, clumps have some plasticity. Some calcite veins going through core. Increasing HCl reaction.	

Notes: : Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
24	70	30	0				Strong	5YR 7/3	ML		Sandy Silt. Pink, poorly graded, moist. Sand is very fine to medium grained. Sections with higher calcite content are pinkish white (5YR 8/2). Clumps break apart, not plastic	
28	20	60	20				None	5YR 5/4	SM		Silty Sand with Gravel. Reddish brown, very well-graded, moist. Few cobbles are present (mostly felsic volcanic rock). Gravel is dominated by 2 cm sized gravels, subround to subangular of mixed lithology. Sand is fine to coarse, subangular to subround with mixed lithology. Oxide staining present.	Few cobbles present
32	30	70	T				Strong	5YR 5/4	SM		Silty Sand. Reddish brown, well-graded, moist. Overall, this interval fines downward. Fines are predominantly silt, some clumping from compaction but breaks fairly easily. Sand is very fine to medium.	
36	100	T	0				Strong	5YR 4/6	CL	42/48	Lean Clay and Silt, trace sand. Yellowish red, poorly graded, moist. Fairly uniform lean clay with silt, trace sand. Clay in clumps, breaks under moderate pressure. From 39 to 40 feet clay is harder and covered in white with a very strong HCl reaction.	36ft - Logging by VNH in sunlight.
40	20	70	10				Strong	10R 7/3, 10R 5/4	SM	46/48	Silty Sand. Pale red to weak red, medium to fine sand. Silt is dominant fine with approximately 5% clay. Gravel is coarse, dusky red (10R 3/3) fine sandstone/mudstone. Some secondary mineralization (calcite) on some grains. Trace gravel from 40 to 42 feet.	
44	60	30	10				Strong	5YR 4/4	CL	37/48	Sandy Lean Clay. Reddish brown lean clay coarsening down to well graded yellowish red (5YR 4/6) sand. Sand is fine to coarse, subangular. Gravel is fine, subangular, gray siltstone with secondary calcite coating.	
48	20	40	40				Moderate	5YR 4/4	SC/SG	43/48	Clayey Sand and Gravel. Reddish brown, well-graded gravel, coarse dominant, angular to subangular, gray siltstones and light gray limestone. Calcite secondary mineralization on gravels. Well-graded reddish brown sand, subangular.	
52	20	40	40				Moderate	5YR 4/4	SC/SG	40/48	Same as above. Some cobbles, highly angular.	

Notes: : Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
56	20	10	70				Strong	5YR 5/3	GC	42/48	Clayey Gravel. Reddish brown, angular to subangular, coarse gravel consisting of light gray limestone and gray siltstone, with secondary mineralization of calcite. Clay is reddish brown, lean. Sand is subangular, medium to coarse. Cobbles present up to 4 inches, very angular.	
60	30	50	20				Moderate	5YR 4/4	SC	45/48	Clayey Sand with Gravel. Reddish brown, poorly graded, angular to subangular sand. Clay is reddish brown (same) lean. Gravel is fine to medium, angular, light gray limestone and gray siltstone with secondary mineralization of calcite.	
64	30	50	20				Strong	5YR 4/4	SC	42/48	Same as above.	
68	30	50	20				Strong	5YR 4/4	SC	40/48	Same as above. Some cobbles, same composition as gravel.	
72	40	50	10				Strong	5YR 4/4	SC	42/48	Clayey Sand. Reddish brown, poorly graded, angular to subangular sand. Section fines downward to fat clay, also reddish brown. Bottom 4 inches is 95% fat clay. Gravel is angular, light yellowish brown (2.5Y 6/3), fine sandstone with secondary mineralization of calcium coating exterior.	
76	70	30	T				Strong	5YR 5/4	CH	40/48	Sandy Fat Clay. Reddish brown fat clay with well-graded sand. Sand is subangular to subrounded. Trace gravel. Whitish patches of calcium in clay and sand. Clay predominantly from 76 to 78 feet.	
80	50	40	10				Strong	5YR 4/4	CH/ML	42/48	Sandy Fat Clay/Silt. Reddish brown fat clay and silt (50/50) with poorly graded, subrounded sand. Gravel is angular, gray, siltstone with calcium mineralization on exterior.	
84	40	40	20				Strong	5YR 4/4	SC/SM	42/48	Clayey, Silty Sand with Gravel. Reddish brown well-graded subrounded sand with lean clay and silt. Gravel is subangular to subrounded, gray limestone, gray siltstone with calcium mineralization on surface. Calcium deposited with sand and fines.	

Notes: : Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak none)

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
88	50	40	10				Strong	5YR 4/6	CL	36/36	Sandy Lean Clay. Yellowish red, lean clay and silt with poorly graded, subangular sand. Sand is polylithic deriving from local strata (sandstone, mudstone, limestone). Gravel is well graded, angular to subangular, limestone and siltstone. Secondary mineralization present throughout sediment, and coating gravel (calcium).	88ft - 10/1/14 Logging by VNH in sunlight. This interval (3 feet) determined by driller and helpers.
91	40	50	10				Strong	5YR 4/6	SC	36/48	Clayey Sand. Same description as above.	
95	30	60	10				Strong	5YR 4/6	SC	43/48	Clayey Sand. Same description as above.	
99	60	30	10				Strong	5YR 4/6	CH	45/48	Sandy Clay. Same description as above. Some cementation at 101 feet and 103 feet.	
103	70	30	T				Strong	5YR 4/6	CH	43/48	Same as above. More cementation present.	
107	40	60	T				Strong	5YR 4/4	SC	41/48	Clayey Sand. Reddish brown, poorly graded. Upper interval (107 to 109 feet) is clay dominant as above. 109 to 111 feet has increase in grain size, sand dominant, fine to coarse.	107ft - Logging by MML in artificial light.
111	40	60	T				Strong	5YR 4/4	SC	42/48	Clayey Sand. Reddish brown, well-graded, fines are weakly to moderately cemented. Sands predominantly have fine to medium grain size.	

Notes: : Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
115	70	20	10				Strong	5YR 4/3	CH	41/48	Sandy Fat Clay. Reddish brown, poorly graded. Fat clay is soft and plastic. Sand is predominantly fine to medium grained, gravel is fine and up to 4.5 cm. Some large gravels have calcite cemented to sides, subround and igneous. Sample coarsens downward, HCl reaction increases with depth.	
119	70	20	10				Strong	5YR 5/3	ML	43/48	Sandy Silt. Reddish brown. Very fine to medium sand, gravel fine up to approximately 3 cm, mostly volcanic, subangular with evident cemented calcite. Some clay with silt but not very fat, core is moderately to well compacted. Fines downward.	SWL = 121.97 ft bls
123	70	20	10				Strong	5YR 5/3	ML	40/48	Same as above.	
125	80	20	T				Strong	5YR 5/3	CH		Fat Clay with Sand. Reddish brown, poorly graded. Soft plastic, sticky clay that is more compact with depth, fine sand dominant. Calcite streaks and clumps present.	
127	70	20	10				Strong	5YR 5/3	CH	44/48	Sandy Fat Clay. Same as above plus polylithic (includes light grey limestone) subround to subangular gravel up to approximately 1.5 cm.	
131	80	20	T				Strong	5YR 5/3	CH	44/48	Fat Clay with Sand. Same as above.	
135							No sample collected.					unable to collect core sample
136	70	20	10				Strong	5YR 5/3	CH	37/48	Sandy Fat Clay. Reddish brown, poorly graded. Soft, sticky clay (less compacted than above). Predominantly fine sand and fine gravel, polylithic, subround.	
140	80	20	T				Strong	5YR 5/3	CH	45/48	Fat Clay with Sand. Reddish brown, poorly graded, soft clay, well compacted from 140 to 143 feet. At 143 feet, increase in grain size and calcite streaking. Less compaction.	141ft - Collected water sample 1BL-141 via push ahead: pH = 7.46, EC = 533.2µS/cm, SO_4 = 54mg/L
144	80	20	T				Strong	5YR 5/3	CH	42/48	Fat Clay with Sand. Reddish brown, slightly coarser with numerous calcite streaks, trace gravel of limestone from 44 to 146 feet. Then finer from 146 to 148 feet with greater compaction.	

Notes: : Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
148	70	30	T				Strong	5YR 4/3	CH	34/36	Sandy Fat Clay. Reddish brown, well-graded, well compacted. Very fine to coarse sand (angular to subangular, polylithic) but predominantly finer. Heavy calcite streaking plus oxide staining.	
151	70	30	T				Moderate	5YR 5/3	CH	38/48	Sandy Fat Clay. Reddish brown, same as above except calcite streaking is absent, increase in coarse sand (coarsens downward).	
155	70	30	T				Moderate	5YR 5/3	CH	37/48	Sandy Fat Clay. Same as above.	
159	60	20	20				Moderate	5YR 5/4	CH	39/48	Sandy Fat Clay. Reddish brown, well-graded clay to 7 cm gravel. Clay to coarse sand dominate, polylithic.	159ft - Logging by BJD in sunlight.
163	60	30	10				Moderate	5YR 5/4	CH	40/48	Sandy Fat Clay. Reddish brown, well-graded, firm clay to 3 cm gravel. Clay to coarse sand dominant.	
167	70	20	10					5YR 4/4	CH	48/48	Sandy Fat Clay. Reddish brown, well-graded, firm to hard clay. Some gravel up to 4 cm. Clay to coarse sand dominant. Limestone and decomposed limestone (calcium carbonate) present.	
171	60	40	T				Strong	5YR 7/3	CH	48/48	Sandy Fat Clay. Reddish brown, hard clay. Well-graded, subangular sand and poorly graded gravel (up to 2 cm). Composition as above, some free quartz.	
175	30	60	10				Strong	5YR7/3	ML	48/48	Silty Sand. Pink, silty sand with some gravel grades to hard sandy clay in last foot. Gravels up to 7 cm.	

Notes: : Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
179	60	30	10				Strong	5YR 6/3	CL		Sandy Lean Clay. Hard, silty clay with gravel up to 3 cm.	
180	40	50	10				Strong	5YR 4/4	SC	36/36	Clayey Sand. Reddish brown clay with some silt, up to 2 cm gravels, fine sand dominant.	180ft - Failed push-ahead sample attempt
182	60	30	10				Strong	5YR 4/3	CL	48/48	Sandy Clay. Reddish brown sand and gravel suspend in silty clay matrix. Well-graded with gravels up to 2 cm.	
186	60	30	10				Strong	5YR 4/3	CL	42/48	Sandy Clay. Reddish brown. As above except firm.	
190	50	40	10				Strong	5YR 4/3	CL	48/48	Sandy Clay. Reddish brown, well-graded silty clay to 3 cm gravel. Clay to medium sand dominant. Sand and gravel are polylithic.	
194	50	40	10				Strong	5YR 4/4	CL	23/24	Sandy Clay. Reddish brown, else same as above, gravels are subround and igneous dominant.	194ft - Logging by MML in artificial light.
196	50	40	10				Moderate	5YR 4/4	CL	43/48	Sandy Clay. Reddish brown, well-graded, more clay than above, forms small balls, sand and gravel are mostly igneous rock, subrounded.	
200	50	40	10				Strong	5YR 5/4	CL	40/48	Sandy Clay. Reddish brown, lots of calcite streaks, silty clay is soft, subrounded sand and gravel is polylithic. Sample is moderately well compacted and damp.	200ft - Attempted water sample with push-ahead sampler - only produced mud.
204	50	40	10				Strong	5YR 5/4	CL	42/48	Same as above, although more compacted from 206 to 208 feet.	

Notes: : Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
208	60	30	10				Strong	5YR 6/4	CL	40/48	Sandy Clay. Core is mostly dry, barely damp. Light reddish brown, well-graded. Silty clay (clay dominant) easily balls. Low to moderate compaction, breaks easily in hand. Mostly fine sand. Coarse sand and gravel are subrounded, polylithic. One cobble (limestone) was rounded. Calcite streaking.	
212	60	30	10				Strong	5YR 6/4	CL	40/48	Same as above, sample is dry.	
216	60	30	10				Strong	5YR 6/4	CL	39/48	Same as above.	
220	50	40	10				Strong	5YR 6/4	CL		Sample is dry, same as above with increase in sand	220ft - Sample attempted. No water in push-ahead sample tool.
224	50	40	10				Strong	5YR 6/4	CL		Same as above.	
226	50	40	10				Weak	5YR 5/3	CL		Sandy Clay. Reddish brown, very moist clay. Loss of calcite streaks, clay is softened, rollable, can feel grit of sand. Section fines downward.	
229	40	50	10				Weak	5YR 5/3	SC		Clayey Sand. Clay as above. Fine to coarse sand. Sand is subround, polylithic. Sample is wet.	
230							Moderate	5YR 5/3	SW		Poorly Graded Sand. 230 to 231 feet: sand lens fine sand to 5 cm gravel. No fines	230ft - driller noted it was easier to drill. BJD logging.
232	20	50	30				Moderate	5YR 5/6	SC		Clayey Sand with Gravel. Well-graded clay to 3 cm gravel. Polylithic including igneous and sedimentary rocks, subangular to subround.	
234	40	30	30				Moderate	5YR 5/4	SC		Clayey Sand with Gravel. Saturated silty clay with sand and gravel suspended within. Sand and gravels are polylithic, subangular to subround as above.	235ft - No water in push-ahead sampler. Bail sample: pH=7.22, EC=651.0µS/cm, field SO_4=160mg/L.

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Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
236	10	50	40				Weak	2.5YR 5/4	SW-SC	38/48	Well-graded Sand with Clay and Gravel. Well-graded. Some clay to 5-inch cobbles. Medium sand to 3 cm gravel dominant. More clay at 236 feet grades to more coarse at 240 feet. Subangular to subround.	
240	40	40	20				Moderate	2.5YR 5/4	SC	46/48	Clayey Sand with Gravel. Reddish brown, very well-graded. Few cobbles also present with fine to coarse gravels, polylithic, subround. Fine to coarse sand, polylithic, subround to subangular. Silty clay (dominant from 241.5 to 244 feet) is sticky and plastic and saturated (fines downward).	
244	40	40	20				Moderate	2.5YR 5/4	SM	46/48	Silty Sand with Gravel. Same as above, except more silt compared to clay and it coarsens downward.	
248	40	40	20				Weak	5YR 5/4	SC	37/48	Clayey Sand with Gravel. Reddish brown, very well-graded, overall weak HCl reaction unless on a piece of limestone. Silty clay is saturated, very soft. Lots of coarse sand, and fine to coarse gravels are polylithic, subround to subangular and increases with depth. Cobbles (few) still present. Also, more clay than above unit.	248ft - collected open borehole sample: pH=6.65, EC=555.2µS/cm, field SO_4= 96mg/L.
252	40	40	20				Weak	5YR 5/4	SC	41/48	Same as above with less coarse sand.	
256	40	40	20				Weak	5YR 5/4	SC	37/48	Same as above.	
260	40	50	10				Strong	7.5YR 5/3	SC	36/48	Clayey Sand. Brown, very well-graded, saturated. Polylithic sand and gravel, subround to subangular, coarsens downward.	260ft - failed push-ahead sample attempt.
264	30	40	30				Strong	7.5YR 5/3	SC	37/48	Clayey Sand with gravel. Same as above with more gravel.	

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Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
268	30	40	30				Strong	5YR 5/3	SC	22/24	Clayey Sand with Gravel. Reddish brown, very well-graded, sand coarsens downward. Silty clay is saturated, very soft and plastic. Sands (mostly fine to medium on top) and gravels (up to approximately 3 cm) are polylithic (igneous and sedimentary) and subround to subangular.	
270	40	30	30				Moderate	5YR 4/4	SC	14/24	Clayey Sand with Gravel. Reddish brown, fat clay with well-graded, subrounded gravel and medium to coarse sand. Gravel is dark reddish brown siltstone and gray limestone. One large (6-inch) siltstone cobble in core. Secondary mineralization (calcium) on some gravel surfaces.	270ft - Stop drilling for two days off. Resume 10/6/14. Core described by VNH in sunlight. -most of 270-271 was not recovered.
272	40	30	30				Moderate	5YR 6/3	SC	44/48	Same as above, approximately four more cobbles. Some light reddish brown clay present, some oxidation present (mixed in with clay), some cementation present.	
276	40	20	40				Strong	5YR 5/4	GC	46/48	Clayey Gravel with Sand. Reddish brown, gravelly clay with sand and cobbles. Gravel is subangular to subrounded limestone, siltstone, sandstone, and some quartz. Sand is same lithology. Gravel is well-graded. Clay is fat.	
280	40	30	30				Moderate	2.5YR 5/4	SC	39/48	Clayey Sand with Gravel. Reddish brown, very well-graded. Silty clay is very soft, very sticky, plastic, springy and saturated (fat clay). Sand (mostly fine to medium) and gravel (up to 4 cm) are subround to subangular, polylithic.	280ft - collect borehole sample: pH=7.56, EC=559.4µS/cm, field SO_4= 134mg/L. Logging by MML (artificial light).
284	30	40	30				Moderate	2.5YR 5/4	SC	44/48	Clayey Sand with Gravel. Reddish brown, very well-graded. Silty clay is soft (less than above), sticky, and saturated (fat). Sand is fine to coarse (much more coarse sand than above), gravel is up to 4 cm, both are polylithic with visible cobbles.	
288	30	30	40				Moderate	5YR 5/3	GC	22/24	Clayey Gravel with Sand. Reddish brown, very well-graded. Silty clay is firm, fat, plastic, and saturated. Fine to medium sand, fine to approximately 3 cm gravel.	
290	10	40	50				Moderate	5YR 5/3	GW - GC	20/24	Well-graded Gravel with Clay and Sand. As above but with coarse sand.	
292	30	30	40				Moderate	5YR 5/3	GC	45/48	Clayey Gravel with Sand. Reddish brown, very well-graded. Silty clay is hard (softer near top), and gets leaner with depth. Gravel is up to 4 cm and sand (fine to coarse but fines downward) is subround to subangular.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
296	20	40	40				Strong	5YR 5/3	SC	43/48	Clayey Sand with Gravel. Reddish brown, very well-graded. Silty clay has fat qualities, moist (gets drier with depth). Sand (mostly fine to medium) and gravel (fine to coarse) with at least one visible cobble (approximately 8 cm) are subround to subangular and polylithic (both igneous and sedimentary rocks present).	
300	10	60	30				Strong	5YR 4/3	SW - SM	41/48	Well-graded Sand with Silt and Gravel. Reddish brown, very well-graded. Fines are predominantly silt. Very fine to coarse sand is polylithic, subangular to subround as is gravel (fine to approximately 4 cm). Core is mostly dry.	300 ft - Collect borehole sample: pH=7.89, EC=603.4µS/cm, field SO_4= 128mg/L.
304	10	60	30				Strong	5YR 4/3	SW - SM	40/48	Well-graded Sand with Silt and Gravel. Same as above except saturated.	
306	10	60	30				Strong	5YR 4/3	SW - SC	37/48	Well-graded Sand with Clay and Gravel. Same as above except fines include fat clay and sand is predominantly very fine to medium grained.	
308	10	60	30				Strong	5YR 4/3	SW - SC		Well-graded Sand with Clay and Gravel. Reddish brown, well-graded, fat clay, easily rolls, seems to be collected in pockets. Sand is fine to coarse. Gravel is fine up to approximately 5 cm (gravels coarsen downward), both are subround to subangular and polylithic.	
312	20	50	30				Strong	5YR 4/3	SC		Clayey Sand with Gravel. Same as above, increase in fat clay presence, increase in gravel size with depth to include cobbles.	
316	30	50	20				Strong	5YR 4/3	SC		Clayey Sand with Gravel. Very well-graded, reddish brown, fat clay, easily rolls. Sand is predominantly very fine to medium, giving the sample a spongy texture, fine gravel to small cobbles present, same polylithic subround to subangular, increase in calcite mineralization.	
320	20	50	30				Strong	5YR 4/3	SC		Clayey Sand with Gravel. Less clay. Sand coarsens with depth, else the same (including presence of cobbles and calcite mineralization).	320 - Collect water sample from borehole via Hydrasleeve: pH=8.27, EC=598.5µS/cm, field SO_4= 80mg/L
324	20	60	20				Strong	5YR 4/3	SC		Same as above, more sand (mostly very fine to some coarse).	

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Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
328	20	60	20				Strong	5 YR 4/4	SC		Clayey Sand with Gravel. Reddish brown, very well-graded. Fat clay is soft and plastic. Sand is very fine to coarse, polylithic, subround to subangular. Gravel is mostly fine (<2 cm) and gets finer with depth, polylithic (sedimentary and igneous) and subround to subangular. Core is saturated. No visible cobbles.	
332	20	60	20				Strong	5 YR 4/4	SC		Same as above except from 332 to 334 feet, core is mostly dry.	
336	20	50	30				Strong	5YR 5/3	SC		Clayey Sand with Gravel. Reddish brown, very well-graded. Silty, fat clay is harder than above (more compact). Polylithic, subround to subangular sand is very fine to coarse. Polylithic, subround/subangular gravel is fine (mostly <3 cm) and coarsens downward to small cobbles (approximately 8 cm). Core is moist.	
340	30	70	T				Moderate	5YR 5/3	SC		Clayey Sand. Reddish brown, poorly graded. Silty fat clay is soft, sticky, spongy, plastic, and saturated. Sand is fine to coarse (well-graded), polylithic, subangular to subround. The few gravels are subround. Minimal calcite mineralization.	
344	20	60	20				Strong	5YR 5/3	SC		Clayey Sand with Gravel. Reddish brown, well-graded. Silty fat clay (silt dominant from 346 to 348 feet) is soft and plastic (harder from 346 to 348 feet). Polylithic, subround to subangular sand is very fine to coarse (as above). Polylithic subangular to subround gravel is fine to coarse (up to 70 mm). Core is saturated.	
348	20	50	30				Strong	5YR 5/3	SC		Clayey Sand with Gravel. Very well-graded, same as described above except cores is dry from 350 to 352 feet.	
352	20	60	20				Strong	5YR 4/3	SM	41/48	Silty Sand with Gravel. Reddish brown, well-graded. Predominantly silty fines, highly compacted. Sand is very fine to medium. Gravel is subround to subangular, polylithic and up to approximately 3 cm, mostly. There is calcite mineralization resulting in white streaks.	
356	20	60	20				Strong	5YR 4/3	SM		Same as above.	

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Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
360	60	10	30				Moderate	10YR 6/6	CH		Gravelly Fat Clay. Brownish yellow, very well-graded. Core from 360 to 361 feet is very hard, below 361 feet it is very soft, creamy and sticky, very plastic and saturated. Sand is fine, offering very little grit to the clay. Gravels are fine to cobbles, angular to subround, sandstone (fine grained, greenish grey, non calcareous, and fossiliferous limestone).	360ft - collect borehole sample via bailer: pH=8.03, EC=539.3µS/cm, field SO_4= 106mg/L. *Color change
364	60	10	30				Moderate	10YR 6/6	CH		Same as above.	
365	50	10	40				Weak	10YR 6/4	CH		Gravelly Fat Clay. Light yellowish brown, very well-graded, fat clay, soft, plastic, and saturated. Large cobbles of a light greenish grey fine grained sandstone.	
368	50	10	40				None	7.5YR 6/6	CH		Gravelly Fat Clay. Reddish yellow, very well-graded. Very saturated clay. Fine sand (that coarsens slightly with depth). Gravels and cobbles (some larger than bit) are subangular to subround, pale red (oxidized) sandstone (fine grained).	
372							Strong	GLEY1-8/5GY			Light greenish gray, semisoft, moist. Trace fine sand. Highly weathered Cintura/Morita Formation.	**372 feet: Bedrock Contact**
373							Moderate	5YR 5/6			Fine grained sandstone. Cuttings appear as silt and sand with gravel sized pieces of sandstone.	Bedrock drilling: Cintura or Morita Formation
378							Strong	See Description			Varies from damp to dry. Color is pale olive (5Y 6/3) near top, white (5Y 8/1) in middle, to pale yellow (205Y 7/4). Some breaks down to powder, others cobble size.	
382							Strong	10YR 7/4			Light greenish gray fine grained sandstone in cobble and sand sized cuttings.	
384							Moderate	5YR 5/6			Cuttings appear as sandy fat clay. With pieces of light red fine grained sandstone.	384ft - driller notes slower drilling.

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Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
388							Strong	10YR 8/6, 8/4			Siltstone and fine-grained sandstone with clay. Yellow and pale yellow, friable. Some cobbles of fine sandstone with red streaks. Cintura or Morita Formation.	388ft - Logging by VNH, 10/9/14 with artificial light.
392							Strong	2.5Y 8/3 and 7.5YR 6/6			Mudstone. Pale yellow, friable, grading down to light yellowish brown (2.5Y 6/3) mudstone and clay. Some reddish yellow (7.5YR 6/6) spots. Pale yellow (5Y 8/3) mudstone and clay, friable. Some calcium cement near bottom.	
396							Strong	5Y 8/3			Mudstone and clay. Pale yellow, friable, some calcium cement	398ft - collect borehole sample via bailer: pH=8.09, EC=609.2µS/cm, field SO_4= 146mg/L.
398												**Total Depth: 398 feet** 10/9/14 08:35

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CLEAR CREEK ASSOCIATES

Project No.: 287051	Boring Name: BMO-2014-2BL
Project Name: Expanded Groundwater Monitoring	Date/ Time Started: 10/17/14, 07:16
ADWR Number: 55-917452	Date/Time Completed: 10/28/14 20:47
Location Cadastral: SE1/4 of SW1/4 of NE1/4 S18 T24S R24E	Drilling Equipment: GP24-300RS
Location NAD 83: 31°20'37.67"N, 109°56'25.58"W	Drilling Method: Rotosonic
Drill Company: Cascade Drilling	Bit Size/Type: 10.75 in to 250 ft bls, 9.5 in from 250 to 410 ft bls
Driller(s): C RockHill and J Maples	Conductor Casing (type; diameter; depth): None
Logged By: M Lindsey and V Hermosilla	Total Borehole Depth: 410 feet

* Percentages of fines, sand, & gravel based on visual estimates of volume

- Relative % fines (F < 0.074 mm)
- Relative % sand (S >0.074 < 4.8 mm)
- Relative % gravel (G > 4.8 mm)

Depth (feet)	* Est. % F	* Est. % S	* Est. % G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
0	60	40	T	None	7.5YR 2.5/2	MH		Sandy Silt. Very dark brown, poorly graded. Clayey silt (clay, more present in upper 2 feet, is soft, forms balls) to very fine to fine sand. Roots are present throughout entire interval, with an organic smell. Clay balls have high dry strength.	Start Drilling 10/17/14 07:16, 16hr/day. Start logging 10/17/14 by MML. Munsell year 2000 revised. Clear skies.
4	40	60	T	None	7.5YR 4/4	SM		Silty Sand. Brown, poorly graded, no HCl reaction (except for on calcite veins). Clayey silt (less clay than above and low dry strength) to sand (very fine to medium). Sand coarsens downward to include some coarse sand. In addition to calcite streaking, black and orange oxide streaking is prevalent.	
8	40	60	T	None	7.5YR 4/4	SM		Same as above.	
10	10	70	20	None	2.5YR 4/6	SW-SM		Well-graded Sand with Silt and Gravel. Red, well-graded, highly oxidized, slight metallic odor. Fines are silty. Sand is very fine to coarse, angular to subround, gravel is fine (< 1.5 cm), mostly subround. Lithology is mixed, felsic to mafic, both igneous and sedimentary.	
12	10	80	10	None	2.5YR 4/6	SW-SM		Well-graded Sand with Silt. Description same as above except overall less gravel and less coarse sand.	
16	10	50	40	Strong	5YR 4/4	SW-SM		Well-graded Sand with Silt and Gravel. Yellowish red, very well-graded. Fines are silty. Very fine to coarse, subround to angular sand of mixed lithology. Fine gravel up to 4 cm, subround to subangular of mixed lithology. Increase in calcite presence, greatest amount of calcite from 19 to 20 feet, is also more consolidated than portion with less calcite.	

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
20	20	70	10				Strong	7.5YR 6/4	SM		Silty Sand. Light brown, poorly graded. Fines are silty. Predominantly fine to medium sand. The sample has low to moderate toughness. Many gravel size clumps, easily break between fingers. Coarsens with depth, majority of gravels from 22 to 24 feet.	Overcast - affects Munsell color.
24	10	60	30				None	7.5YR 4/4	SW-SM		Well-graded Sand with Silt and Gravel. Brown, well-graded. Fines are silty. Well-graded sand (fine to coarse), angular to subround of mixed composition. Fine gravel (<2 cm) is subround and also of mixed composition.	
28	10	60	30				None	7.5YR 4/4	SW-SM		Same as above, slightly more coarse.	
30	10	40	50				Strong	5YR 8/1	GW-GM		Well-graded Gravel with Silt and Sand. Well-graded. White, silty fines coat section. Mostly medium sand. Fine gravel to cobbles are subround to subangular, igneous and sedimentary rocks present (10% cobbles (fine) included in gravel percentage)	
32	10	50	40				Strong	7.5YR 6/2	SW-SM		Well-graded Sand with Silt and Gravel. Light brown, increase in sand, fine to coarse, subangular to subround of mixed lithology, else the same.	
34	10	90	T				Strong	5YR 6/4	SP-SM		Poorly Graded Sand with Silt. Light reddish brown, poorly graded. Fine sand, forms clumps with low to moderate toughness.	
36	10	90	T				Strong	5YR 6/4	SP-SM		Same as above except coarsens gradually with depth.	
40	20	60	20				Strong	5YR 5/4 and 5YR 6/4	SM	41/48	Silty Sand with Gravel. Well-graded sand with silt and gravel, trace cobbles. Reddish brown, fine to medium sand with silt, subangular to subround. Grades to more cobbly and gravelly interval, which is light reddish brown in color (5YR 6/4). Gravel is well-graded, fine to coarse, subangular grains. Mostly fine sandstone and siltstone (dark reddish brown) and some igneous rocks.	40ft - VNH logging 10/17/14, sunlight.
44	90	10	T				Strong	5YR 4/5	ML / CL	41/48	Silt/Lean Clay. Silty clay with some fine sand. Yellowish red (5YR 4/6) and reddish brown (5YR 4/4) silty lean clay with some fine sand. Crumbles easily. White streaks throughout (calcium). Grades down to slightly more cemented silty clay.	
48	80	20	T				Strong	5YR 4/5	ML / CL	40/48	Silt/Lean Clay with Sand. Same as above, slightly more sand. Sand is fine, angular to subangular.	

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
52	30	50	20				Moderate	2.5YR 5/4	SC	43/48	Clayey Sand with Gravel. Reddish brown, silty clay (clay dominant), sand is fine to coarse, subangular to subrounded. Gravel is fine to medium, subangular, greenish-grey sandstone, some dark reddish brown siltstones. White calcium streaks and some oxidation present. Trace cobbles (same lithology as gravel).	
56	30	50	20				Moderate to Strong	2.5YR 5/4	SC	42/48	Same as above.	
60	20	50	30				Moderate to Strong	2.5YR 5/4	SC	39/48	Same as above, more white calcium coating grains.	
64	30	50	20				Strong	2.5YR 5/4	SC	42/48	Same as above.	
68	20	50	30				Strong	2.5YR 5/4	SM / SC	42/48	Same as above. More white calcium coating grains and clay clumps. More cobbles. Cobbles include black metamorphic rock with quartz veins.	
72	20	50	30				Strong	5YR 5/4 and 5YR 6/4	SM	41/48	Silty Sand with Gravel. Well-graded silty sand. Pink (5YR 7/3) and reddish brown (5YR 5/4) silt and fine sand, up to coarse sand. Subangular to subrounded. Gravel is angular to subangular, grey limestone and dark reddish brown sandstone.	
76	30	50	20				Weak	5YR 4/4	SM / SC	45/48	Silty/Clayey Sand with Gravel. Well-graded silty, clayey sand. Reddish brown, silty clayey sand. Sand is fine to coarse, subangular to subrounded. Gravel is fine, angular, dark grey siltstone (breaks in flat pieces) and some reddish grey sandstone. Calcium coating on grains.	
80	30	50	20				Strong	5YR 4/4	SM / SC	44/48	Same as above, oxidation is present.	
82	50	30	20				Strong	5YR 4/4	CH		Sandy Fat Clay with Gravel. Reddish brown fat clay. Oxidation present. Sand is fine to medium, subangular. Gravel is fine, angular, greenish grey sandstone. Gravel and some sand clumps are coated in calcium.	

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
84	70	30	T				Weak	5YR 4/4	CH	47/48	Sandy Fat Clay. Reddish brown fat clay with moderately graded sand, fine to medium, subangular. Patches of yellow and red oxidation present. Patches of calcium present. A moderate amount of moisture present.	Continue logging by VNH, 10/17/14 in artificial light
88	80	20	T				Weak	5YR 4/4	CH	41/48	Fat Clay with Sand. Same as above. Increase in moisture. Patch of olive green sand.	
92	60	40	T				Weak	5YR 4/4	CH	43/48	Sandy Fat Clay. Brown. Clay with poorly graded, medium, subrounded sand. Sand is polylithic (limestone, sandstone, siltstone, volcanics). A lot of moisture.	
94	30	50	20				Strong	5YR 4/4	SM / SC		Silty/Clayey Sand with Gravel. Reddish brown silt and clay (50/50), well-graded (fine to coarse), subrounded sand (polylithic as above). Gravel is fine to medium, subrounded to subangular, same lithology as sand. Oxidation present. Calcium coating on grains. Mostly dry interval.	
96	20	50	30				Strong	5YR 4/4	SM / SC	44/48	Same as above.	
100	20	50	30				Strong	5YR 4/4	SM / SC	45/48	Same as above. Increased calcium and cementation.	
104	20	70	10				Weak	5YR 4/4	SM / SC	46/48	Silty/Clayey Sand. Same as above.	
108	20	70	10				Moderate	5YR 4/4	SM / SC	43/48	Same as above.	
112	10	60	30				Moderate	5YR 5/4	SW-SC	42/48	Well-graded Sand with Gravel. Reddish brown, polylithic, well-graded (fine to coarse), angular to subround, with minor calcium cementation (as white clumps and streaks). Gravel is fine to medium, subangular to subround, also polylithic (sandstone, limestone quartz, volcanics), also with some calcium coating. Clay is present throughout, clumps easily. Interval is dry.	114ft - Pause drilling 10/17/15 for 2 days off. Resume drilling 10/20/14. Begin logging 10/20/14 by VNH in shade.

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
116	20	60	20				Moderate	5YR 5/4	SC	45/48	Clayey Sand with Gravel. Reddish brown, polylithic, well-graded (fine to coarse), angular to subrounded sand. Minor calcium cementation (as white clumps and streaks coating grains). Gravel is fine to medium, polylithic, subangular to subround. Clay present throughout, clumps easily. Interval is dry.	
120	20	70	10				Strong	5YR 5/4	SC	44/48	Clayey Sand. Lithology as described above.	
124	50	50	T				Strong	2.5YR 4/4	CH	39/48	Sandy Fat Clay. Reddish brown fat clay with well-graded, polylithic, subangular to subrounded sand. Interval is moderately cemented with calcium (white coating on grains and between clay). Interval has a little bit of moisture.	SWL= 126.28 feet bls (10/20/14 09:27)
128	40	50	10				Strong	2.5YR 4/4	SC	38/48	Clayey Sand. Same as above, more calcium, clay is harder between 129 and 130 feet, dry. Interval from 130 to 132 feet is very wet, sandy clay, very plastic.	
132	30	60	10				Weak	2.5YR 4/4	SC	43/48	Same as above, less calcium. Interval is very wet. Trace cobbles.	
136	20	60	20				Strong	5YR 5/3	SC	40/48	Clayey Sand with Gravel. Reddish brown. Fat clay with well-graded polylithic sand is subangular to subround. Gravel is mostly fine (<1 cm) with few up to 3 cm, polylithic, subangular to subround. Interval is damp, drying quickly in air, with moderate cementation and medium to high toughness.	136ft - Logging by MML in sunlight.
140	20	60	20				Strong	5YR 5/3	SC	41/48	Same as above.	
142	20	70	10				Strong	5YR 5/3	SC		Clayey Sand. Same lithology as above, interval is saturated, soft, increase in coarse sand.	142ft - Collect Open borehole sample via bailer: pH=7.67, EC=508.9µS/cm, field SO_4=34mg/L (confirmed at 35mg/L).
144	30	50	20				Strong	5YR 4/3	SC	42/48	Clayey Sand with Gravel. Reddish brown fat clay with predominantly fine to medium sand. Gravel is fine to coarse (up to 6 cm), subround mostly. Interval is saturated from 144 to 146 feet, and only moist from 146 to 148 feet. The moist section has high toughness. Lots of white calcium streaking.	

Notes: : Unified Soil Classification System (ASTM D2488-00)
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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
148	10	80	10				Strong	5YR 4/4	SP-SC	39/48	Poorly Graded Sand with Clay. Reddish brown, interval is damp and exhibits lot of calcite mineralization. Predominantly fine to medium sand, moderate to high toughness, moderate cementation. Gravel up to 3 cm, polylithic (sedimentary and igneous rocks present), subround.	MML continues logging in artificial light.
152	30	50	20				Moderate	5YR 4/4	SC	37/48	Clayey Sand with Gravel. Much less calcite mineralization than above, sample is saturated, soft to mildly firm. Fat clay is soft and plastic. Well-graded sand is subangular to subround and polylithic as is the gravel (up to 3 cm).	
156	20	60	20				Strong	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Same color as above, fat clay with well-graded sand, soft, forms sandy balls. Sample is wet from 156 to 158 feet and damp from 158 to 160 feet. Lots of calcite mineralization from 158 to 160 feet, which is also harder to break apart (moderate to high toughness).	
160	20	70	10				Strong	5YR 4/3	SC	41/48	Clayey Sand. Reddish brown fat clay forms balls where saturated, well-graded with fine to coarse sand, subround to subangular. Subangular to subround fine gravel up to 3 cm is polylithic, although mostly limestone. Lots of calcite mineralization, sample is mostly damp with a saturated pocket around 161 feet.	
164	20	70	10				Strong	5YR 4/3	SC	38/48	Same as above, less moisture.	
168	20	50	30				Weak	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Reddish brown, well-graded, lack of calcite mineralization, very saturated. Silty fat clay with predominantly coarse sand (angular to subround and polylithic). Gravel is fine (<1 cm) from 168 to 170 feet and coarsens to 3 cm from 170 to 172 feet.	
172	30	20	50				Moderate	5YR 4/3	GC	41/48	Clayey Gravel with Sand. Reddish brown, overall well-graded. Fat clay with poorly graded fine sand. Fine to coarse gravel, subround and subangular. Fine cobbles are subround, mostly reddish brown sandstone (cobbles are 20% of gravel percentage).	
174	20	60	20				Strong	5YR 4/4	SC		Clayey Sand with Gravel. Reddish brown, well-graded, damp sample, lots of calcite mineralization causing moderate toughness and cementation of fine grains. Predominantly fine to medium sand. Fine gravel up to 3 cm.	
176	20	60	20				Strong	5YR 4/4	SC	45/48	Same as above, more cementation, harder.	

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
180	70	20	10				Weak	5YR 4/4	CH	43/48	Sandy Fat Clay. Reddish brown clay with moderately graded sand (fine to medium) and some gravel (fine). Interval is moderately cemented, streaks of calcium present, some patches of oxidation. Sand is polylithic (limestone, sandstone, volcanics, quartz), subangular to subrounded. Gravel is same as sand. Interval is fairly wet.	180ft - Collect Open borehole sample via bailer: pH=7.65, EC=527.8µS/cm, field SO_4=50mg/L Begin logging by VNH, 10/21/14 in shade.
184	50	30	20				Moderate	5YR 4/4	CH	44/48	Sandy Fat Clay with Gravel. Same as above. Trace cobbles present. Increase in cementation.	
188	50	30	20				Strong	5YR 4/4	CH	40/48	Same as above. Increase in cementation, decrease in moisture. Dry from approximately 190 to 192 feet.	190ft - Resume drilling on 10/21/14.
192	40	40	20				Weak	5YR 4/4	SC	46/48	Clayey Sand with Gravel. Same as above. Increase in moisture.	
194	30	50	20				Strong	5YR 4/4 with 7.5YR 7/1	SC		Clayey Sand with Gravel. Reddish brown clayey sand (fine to coarse) coated in pink clay/silt/fine sand, which is very reactive to HCl. Dry, poorly cemented. Sand and gravel as described above.	
196	40	40	20				Strong	5YR 4/4	SC	42/48	Clayey Sand with Gravel. Reddish brown clay with well-graded sand (fine to coarse) and some gravel. Interval is well cemented, dry. Streaks, clumps, and coating of calcium present.	
198	40	50	10				Weak	2.5YR 3/4	SC		Clayey Sand. Dark reddish brown fat clay with polylithic sand (as described above). Interval is very wet.	
200	40	30	30				Moderate	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Reddish brown fat clay with polylithic, well-graded sand (fine to coarse) and gravel (fine to medium). Trace cobbles. Sand and gravel are angular to subrounded, limestone, sandstone, siltstone, cobbles, volcanics, quartz. Interval starts very wet and gets dry down to 204 feet. 200 to 202 feet is very plastic; 202 to 204 feet is more cemented. Calcium present.	
204	40	40	20				Strong	5YR 4/4	SC	38/48	Clayey Sand with Gravel. Reddish brown. Same lithology as above. Interval starts moist and is damp from 206 to 208 feet, slight coarsening of sand with depth.	204ft - Logging by MML (daylight).
208	50	40	10				Strong	5YR 4/4	CH	44/48	Sandy Fat Clay. Same as above. Interval is moist, less cemented than above.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
212	30	60	10				Strong	5YR 4/4	SC		Clayey Sand. Reddish brown at moist center. Sand is well-graded (fine to coarse) but mostly fine to medium, subangular to subround and of mixed composition. Gravel is mostly subround and less than 2 cm.	
214	10	60	30				Strong	5YR 4/4	SW-SC		Well-graded Sand with Clay and Gravel. Reddish brown at moist center, very poorly sorted. Fine to coarse sand is polylithic (igneous and sedimentary rocks present), subangular to subround. Gravel is subround to subangular, mostly <3 cm with few up to 6 cm, polylithic. Trace cobbles. Material is loose, with greater cementation from 216 to 218 feet.	
218	20	60	20				Strong	5YR 4/4	SC		Clayey Sand with Gravel. Lithologically same as above with greater cementation.	
220	40	30	30				None and Moderate	5YR 5/4	SC	41/48	Clayey Sand with Gravel. Reddish brown fat clay with well-graded, polylithic, subangular to subrounded sands. More clay from 220 to 222 feet. More gravel from 222 to 224 feet. Gravel is well-graded, very angular to subangular, dark grey (10YR 4/1) limestone and decomposing sandstone/siltstone with calcium cement (moderate HCl reaction). Interval is wet, but gets a little dry toward bottom. Poor cementation.	220ft - Collect open borehole sample via bailer: pH=7.68, EC=445.5µS/cm, field SO_4=31mg/L Begin logging by VNH, 10/22/14 in shade.
224	60	30	10				None	5YR 4/4	CH	36/48	Sandy Fat Clay. Reddish brown, fat, plastic clay. Well-graded sand and poorly graded gravel (fine) are polylithic (limestone, sandstone, siltstone, quartz, volcanics), subangular to subround. Interval is wet, poorly cemented.	
228	50	30	20				Moderate	5YR 4/4	CH	37/48	Sandy Fat Clay with Gravel. Same as above, dry from 229 to 230 feet. Some calcium present, some cementation. Gravel is well-graded.	230ft - Resume drilling 10/22/14
232	60	30	10				Weak	5YR 4/4	CH	43/48	Sandy Fat Clay. Same as above, trace cobbles.	
236	50	40	10				Weak	5YR 4/4	CH	38/48	Same as above. Increased cementation. Gravel is predominantly fine.	
240	30	40	30				Moderate	5YR 4/4	SC	38/48	Clayey Sand with Gravel. Reddish brown. Sand is well-graded, polylithic (sandstone, limestone, quartz, volcanics), subangular to subround. Gravel is also polylithic, very angular to subround, some elongated pieces of siltstone. Interval is well cemented, calcium present as white streaks and clumps. Some oxidation present. Interval is mostly dry.	

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Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
244	40	40	20				Weak	5YR 4/4	SC	46/48	Clayey Sand with Gravel. Well-graded (fine to coarse), polylithic (quartz, sandstone, limestone, siltstone, volcanics), subangular to subrounded sand with reddish brown fat, plastic clay. Gravel is mostly fine, angular to subrounded, same lithology as sand. Some gravel grains are elongated pieces of grey fine grained sandstone. Interval is wet, moderately cemented.	Logging by VNH, 10/22/14 in sunlight.
248	40	40	20				Weak	5YR 4/4	SC	45/48	Same as above.	
252	30	40	30				Moderate	5YR 4/4	SC	44/48	Same as above, increase in gravel. Increase in cementation. Decrease in moisture.	
256	30	40	30				Strong	5YR 4/4	SC	36/48	Clayey Sand with Gravel. Reddish brown, well-graded sand is fine to coarse but mostly medium grains. Gravel is mostly fine (<2 cm) with few larger (plus trace cobbles from 258 to 260 feet). Largest grains are predominantly limestone but quartz, igneous rocks and sandstone also present with fat clay. Moderate cementation from 256 to 258 feet, else material is fairly loose. Interval is wet, subround to subangular grains.	256ft - Logging by MML (artificial light).
260	30	40	30				Strong	5YR 4/4	SC	37/48	Same as above with well-graded gravels.	260ft - Collect sample via push-ahead: pH=7.87, EC=594.3µS/cm, field SO4=86mg/L
264	30	40	30				Strong	5YR 4/4	SC	42/48	Clayey Sand with Gravel. Well-graded, polylithic sand, subangular to subrounded. Lithics include limestone, sandstone, siltstone, quartz, volcanics. Clay is reddish brown, lean, but well cemented with calcium. Calcium present as white streaks and clumps. Gravel is moderately graded (fine to medium), angular to subangular, polylithic. Trace cobbles present (quartzite). Interval is wet except from 264.5 to 265.5 feet. Moderate cementation throughout. Oxidation present.	264ft - Resume drilling 10/23/14. Logging by VNH 10/23/14 in shade.
268	30	20	50				Weak	2.5YR 5/4	GC	43/48	Clayey Gravel with Sand. Well-graded polylithic (as above), angular to subrounded gravel with reddish brown clay. Clay is fat and well cemented, provides cement for gravel. Sand is well-graded, polylithic (as above), subangular to subround. Interval is wet, moderately cemented. Oxidation present.	
272	50	50	T				None	2.5YR 5/4	SC	43/48	Clayey Sand. Reddish brown, fat, plastic clay with moderately graded sand (fine to coarse, predominantly medium). Sand is polylithic as above, subangular to subrounded. Trace gravel. Some calcium present, oxidation present. Interval is very wet, especially from 274 to 276 feet.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
276	40	40	20				Strong	5YR 4/3	SC	45/48	Clayey Sand with Gravel. Reddish brown, well-graded. Interval is wet, soft with mild cementation overall. Fat clay mixed with predominantly fine sand. Some coarse sand, subangular to subround with limestone, siltstone, quartz and igneous rocks. Gravel fine to 3 cm mostly subround, also polylithic with greater abundance of limestone. Some larger gravels show cemented sand on sides.	276ft - Logging by MML in daylight.
280	40	40	20				Strong	5YR 4/3	SC	44/48	Same as above with slight coarsening of sand, also small cobbles (280 to 282 feet).	
284	50	30	20				Weak	5YR 5/4	CH	32/48	Sandy Fat Clay with Gravel. Reddish brown, well-graded, saturated. Fat, soft, sticky clay. Mostly coarse mafic sand, angular to subround. Mostly fine grained gravel (<1.5 cm) but up to 3 cm, polylithic, subangular to subround.	
288	50	30	20				Moderate	5YR 5/4	CH	36/48	Sandy Fat Clay with Gravel. Same as above, plus one large limestone cobble (wider than barrel (6-inch)) at 290 feet.	288ft - MML Logging in artificial light.
292	40	40	20				Moderate	5YR 4/3	SC	39/48	Clayey Sand with Gravel. Well-graded, reddish brown, saturated. Soft, sticky, plastic fat clay with well-graded sands, angular to subround, polylithic but mostly mafic. Subangular to subround gravels are fine (<2 cm) and polylithic.	
296	60	30	10				Strong	5YR 4/3	CH	43/48	Sandy Fat Clay. Well-graded, reddish brown, damp, light cementation (breaks easily by hand). Wetting the sample shows fat sticky clay. Mostly fine sand. Sparse gravels are polylithic (lots of limestone) and subangular.	
300	30	50	20				Strong	5YR 5/3	SC	44/48	Clayey Sand with Gravel. Well-graded, reddish brown, dry to damp, weak to moderate toughness. Fat clay. Well-graded sand, polylithic as above, angular to subround. Mostly fine gravel with few to 4 cm, subround to subangular, polylithic. Trace cobble (300 to 302 feet).	300ft - Collect sample via push-ahead: pH=7.78, EC=738.1µS/cm, field SO_4=220mg/L
304	60	30	10				None	5YR 4/4	CH	41/48	Sandy Fat Clay with Gravel. Reddish brown fat, plastic clay with well-graded, polylithic (sandstone, quartz, limestone, siltstone, mudstone, volcanics), subangular to subrounded sand. Gravel is poorly graded (mostly fine), polylithic, angular to subangular. Interval is wet, poorly cemented.	304ft - Logging 10/24/14, VNH in shade.

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
308	40	40	20				None	5YR 4/4	SC	41/48	Clayey Sand with Gravel. Reddish brown fat clay and well-graded polylithic (sandstone, limestone, quartz, siltstone), subangular to subrounded sand. Gravel is fine to coarse, predominantly fine sandstone, angular to subround. Interval is wet, poorly cemented. Some oxidation present. Trace cobble.	
312	40	40	20				Weak	5YR 4/4	SC	36/48	Same as above. Some calcium present.	
314	10	70	20				None	5YR 4/4	SP-SC		Poorly Graded Sand with Gravel and Clay. Polylithic (siltstone, sandstone, limestone, quartz, mudstone, volcanics) sands and gravels are well-graded (fine to coarse), angular to subround. Some silt present. Interval is very wet, no cementation.	314ft - Resume drilling 10/24/14
316											No Sample.	316-318ft lost during trip-out and clean-out.
318	40	50	10				Strong	5YR 4/2	SC	23/24	Clayey Sand. Well-graded. Fat, soft, sticky, plastic clay. Reddish brown, saturated. Fine to coarse sand (mostly medium), angular to subround, polylithic. Gravel up to approximately 3 cm, mostly elongated, polylithic (limestone and sandstone), subround to subangular.	318 to 320ft is very disturbed. Logging by MML (artificial light)
320	40	50	10				Strong	5YR 4/2	SC	44/48	Same as above.	320ft - Collect sample via push-ahead: pH=8.03, EC=673.9µS/cm, field SO_4=216mg/L (confirmed at 224mg/L)
324	30	50	20				Moderate	5YR 4/2	SC	42/48	Clayey Sand with Gravel. Same description as above.	
328	40	50	10				Strong	5YR 4/4	SC	43/48	Clayey Sand. Same as above with color change at 330 to reddish brown.	
332	40	50	10				Strong	5YR 4/4	SC	39/48	Clayey Sand. Reddish brown, well-graded, wet (gets drier with depth), mild cementation with depth. Fat clay (sticky and soft when hydrated). Polylithic sand is mostly fine to medium. Polylithic gravel is mostly fine with few up to 4 cm, subround.	
336	40	50	10				Strong	5YR 4/4	SC	38/48	Same as above with coarser sand. Interval is moist.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
340	40	50	10				Moderate	5YR 4/4	SC	44/48	Clayey Sand. Well-graded, reddish brown. Fat, soft, plastic clay. Saturated. No cementation. Well-graded sand, subangular to subround, polylithic (limestone, sandstone, siltstone, igneous rocks). Gravel fine to coarse, polylithic, subangular to subround. Some green alteration. Sand coarsens downward. Some cemented calcite and sand visible on larger grains.	340ft - Logging 10/27/14 by MML (partly cloudy skies). 342ft - Collect sample via push-ahead: pH=7.47, EC=631.4µS/cm, field SO_4=172mg/L
344	30	50	20				Moderate	5YR 5/4	SC	42/48	Clayey Sand with Gravel. Reddish brown. Fat, soft, saturated clay. Fine to coarse sand, polylithic, angular to subround. Gravel mostly fine (<2 cm), polylithic, subangular to subround.	
348	30	50	20				Strong	2.5YR 5/4	SC	42/48	Clayey Sand with Gravel. Reddish brown. Same lithology as above. More coarse sand from 348 to 350 feet. More clay and fine sand from 350 to 352 feet. Some gravel up to 5 cm.	350ft - Pause drilling 10/24/14 for 2 days off. Resume drilling 10/27/14.
352	20	50	30				Strong	2.5YR 5/4	SC	43/48	Clayey Sand with Gravel. Well-graded, reddish brown. Soft, saturated fat clay, very sticky. Predominantly fine sand, some coarse, subangular to subround. Gravel is fine to 5 cm, subangular to subround, polylithic but primarily limestone and siltstone.	
356	30	50	20				Strong	2.5YR 5/4	SC	41/48	Description same as above.	
360	40	30	30				None	5YR 5/4	SC	43/48	Clayey Sand with Gravel. Reddish brown fat clay with well-graded, polylithic (quartz, siltstone, limestone, sandstone), subangular to subrounded sand. Gravel is moderately graded (fine to medium) and primarily located from 362 to 364 feet. Gravel is subangular to subround, same lithics as sand. Interval is wet, poorly cemented.	360ft - Collect sample via push-ahead: pH=7.75, EC=534.4µS/cm, field SO4=124mg/L (confirmed at 120mg/L); - Begin logging 10/28/14, VNH, shade. -
364	50	30	20				None	5YR 4/4	CH	40/48	Sandy Fat Clay with Gravel. Reddish brown fat clay with sand (as above). Gravel is poorly graded, mostly fine. Lithics as above. Increase in cementation, interval is wet. Some calcium streaks.	
368	50	40	10				None	5YR 4/4	CH	41/48	Sandy Fat Clay. Same description as above, some cobbles present. Quartzite and fine sandstone.	370ft - Resume drilling 10/28/14.

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
372	50	40	10				None	5YR 4/4	CH	39/48	Sandy Fat Clay with Gravel. Reddish brown fat clay with moderately graded polylithic (quartz, sandstone, limestone, siltstone, volcanics), subangular to subrounded sand. Sand is medium to coarse from 372 to 374 feet and mostly fine from 374 to 376 feet. Some grey (10YR 5/1) fine grained sandstone, cobbles near 376 feet. Interval is moderately cemented, wet, some calcium streaks.	
376	50	40	10				None	5YR 4/4	CH	41/48	Same as above. Gravel primarily in the interval from 376 to 378 feet. Very, very wet from 378 to 380 feet.	
380	20	70	10				Moderate	5YR 4/4	SC	42/48	Clayey Sand. Poorly graded, polylithic (as above), subangular to subrounded sand is fine to coarse, but predominantly fine. Fine gravel, angular to subrounded. Trace cobbles. Clay is lean. Interval is wet, moderate cementation.	
384	20	70	10				Weak	5YR 4/4	SC	46/48	Same as above. Gravel primarily from 386 to 388 feet.	
388	20	70	10				Weak	5YR 4/4 and 7.5YR 7/2	SC	43/48	Same as above. Most sand is as described above however, some seems to be derived from very friable light grey (pinkish grey) fine sandstone, gravel, and cobbles. Some gravel and cobbles are dark reddish brown, harder sandstone. Still reddish brown fat clay present. Interval is wet, moderately cemented. Oxidation present.	
392	80	20	T				Strong	2.5YR 5/4	CH	48/48	Fat Clay with Sand. Reddish brown fat clay with moderately graded (very fine to medium) sand. Interval is moist to dry, well cemented, oxidation present.	Sharp decrease in moisture, sharp increase in cementation.
396	70	30	T				Strong	2.5YR 5/4	CH	45/48	Sandy Fat Clay. Same description as above. Interval is dry to moist, well cemented. Sand is mostly very fine to fine.	Sharp decrease in moisture, sharp increase in cementation.
400											Dry to moist, transition from basin fill to bedrock. Fine to coarse gravel consist mostly of very brittle limestone.	**400ft - Bedrock, Limestone**
402												402ft - Collect sample via push-ahead: pH=8.09, EC= 430.9 µS/cm, field SO4=68mg/L (confirmed at 74mg/L)
403								5YR 7/3			Light green limestone covered in pink rock flour (material pulverized from vibration and drilling method)	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
404											Limestone. White to light green, limestone has fine grained, uniform crystals with orange streaks (oxidation), however fewer streaks with depth.	Bedrock - Limestone
408												
410												**Total Depth: 410 ft bls**, 10/28/14 20:47

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CLEAR CREEK ASSOCIATES

Project No.: 287051	Boring Name: BMO-2014-3BL	* Percentages of fines, sand, & gravel based on visual estimates of volume
Project Name: Expanded Groundwater Monitoring	Date/ Time Started: 11/10/14 16:55	
ADWR Number: 55-917527	Date/Time Completed: 12/5/14 22:30	■ Relative % fines (F < 0.074 mm)
Location Cadastral: SW1/4 of NE1/4 of SE1/4 S18 T24S R24E	Drilling Equipment: 0-516 ft: PS600T; 516-549 ft: GP24-300RS	
Location NAD 83: 31° 20' 24.8"W, 109° 56' 24.6"W	Drilling Method: Rotosonic	□ Relative % sand (S >0.074 < 4.8 mm)
Drill Company: Cascade Drilling L.P.	Bit Size/Type: 0-180 ft: 10.75-in; 180-549 ft: 9.5-in	
Driller(s): G Cain / J Maples / C Rockhill	Conductor Casing (type; diameter; depth): None	▨ Relative % gravel (G > 4.8 mm)
Logged By: M Lindsey and V Hermosilla	Total Borehole Depth: 549 feet	

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
0	10	70	20				None	7.5YR 3/4 and 10YR 4/4	SP-SM	42/48	Poorly Graded Sand with Silt and Gravel. Upper 10-in of core is soil - dark brown (7.5YR 3/4). Core is dry and overall well-graded and dark yellowish brown (10YR 4/4). Mostly fine to medium sand with silt. Gravel is mostly fine, up to 3cm, subangular to subround, mostly dark purple siltstone and highly weathered/oxidized sandstone.	Start drilling 11/10/14, 16:55; 16hr/day. Logging by MML in artificial light. Munsell color chart year 2000 revised.
4	10	80	10				None	10YR 5/4 and 7.5YR 4/6	SP-SM	44/48	Poorly Graded Sand with Silt. Dry interval. Fine to medium sand, that slightly coarsens downward. Gravel as described above. Dark yellowish brown (10YR 4/4) from 4 to 6 feet, and strongly brown (7.5YR 4/6) from 6 to 8 feet. Moderately poorly graded.	
8	10	80	10				None	7.5YR 4/6	SP-SM	44/48	Poorly Graded Sand with Silt. Dry interval, moderately poorly graded. Fine to medium sand that forms small clumps, easily broken between fingers. Few small gravels present. Strong brown.	
12	20	80	T				None	5YR 4.5/6	SM	43/48	Silty Sand. Fine to medium sand, yellowish red.	
14	10	60	30				None	5YR 4.5/6	SW-SM		Well-graded Sand with Silt and gravel. Dry, overall well-graded. Fine to coarse sand, angular to subround, 50% Quartz. Gravel is fine to 4 cm, subangular to subround, mostly comprised of siltstone and sandstone, lots of yellow oxidation staining.	
16	10	60	30				None	5YR 4.5/6	SW-SM	45/48	Well-graded Sand with Silt and Gravel. Same as described above with an increase in fine sand with depth.	
20											No sample recovered.	20-21ft Not recovered
21	20	70	10				Strong	5YR 5/4	SM	31/36	Silty Sand. Moderately poorly graded. Silt with fine to medium sand that forms small clumps easily broken in hand, reddish brown. Fine gravels present (less so with depth).	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
24	20	60	20				Strong	7.5YR 4/6	SM	44/48	Silty Sand with Gravel. Overall well-graded. Strongly brown. Silt with fine to coarse sand (mostly fine to medium sand), coarsens with depth, angular to subround. Gravel is fine to 3 cm, mostly sandstone and siltstone, subangular to round. Lots of white calcite streaking 27 to 28 feet. Coarsens with depth.	
28	20	70	10				Moderate	7.5YR 4/6	SM	42/48	Silty Sand. Overall well-graded, strong brown. Silt with fine to coarse sand (mostly fine to medium). Fine gravel, subangular to subround, as above. Lots of calcite streaking at top of interval, decreases with depth.	
32	40	60	0				Weak	7.5YR 4/6	SM	40/48	Silty Sand. Overall poorly graded, strong brown. Silt with fine to medium sand, forms small clumps that are easily broken by hand. Minor white calcite streaking.	
36	40	60	0				Weak	7.5YR 4/6	SM	45/48	Same as above.	
38	10	70	20				Moderate	7.5YR 4/6	SW-SM		Well-graded Sand with Silt and Gravel. Overall well-graded, strong brown. Fine to coarse sand, subangular to subround, quartz dominated grains. Gravel is fine to 3 cm, subangular to subround. Mostly sandstone and siltstone with some plutonic rocks.	
40	30	60	10				Strong	7.5YR 4/6	SM	37/48	Silty Sand. Moderately poorly graded, strong brown. Fine to medium sand from 40 to 43 feet, forms clumps that easily break. Coarsens from 43 to 44 feet to include coarse sand and gravel - quartz, plagioclase, siltstone, angular to subround.	
44	10	60	30				Moderate	7.5YR 4/4	SW-SM	40/48	Well-graded Sand with Silt and Gravel. Well-graded, brown. Fine to coarse sand. Subangular to subround, quartz, plagioclase, and siltstone. Gravel is predominantly fine, subangular to subround, with siltstone, sandstone, and plutonic rocks, minor calcite streaking.	
48	10	70	20				Moderate	7.5YR 4/4	SW-SM	43/48	Well-graded Sand with Silt and Gravel. Well-graded (very fine to coarse), polylithic (limestone, sandstone, siltstone, quartzite, mudstone, volcanics), subangular to subrounded sand. No dominant rock. Some calcium cement on larger grains, gravel is fine to medium, same lithics as sand, angular to subangular. Fines are predominantly silt, minor amounts of clay. Trace cobble.	48ft - Begin logging 11/11/14, VNH in sunlight.
52	10	60	30				Moderate	7.5YR 4/4	SW-SM	39/48	Same as above, increase in cobbles (still trace), and increase in calcium streaking.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
56	20	70	10				Strong	5YR 4/4	SC	43/48	Clayey Sand. Moderately graded (very fine to medium), polylithic (quartz, limestone, mudstone, siltstone, schist), subangular to subrounded sand, fines are predominantly clay, reddish brown, clumps easily. Several moderately cemented medium, gravel-sized clumps of clay and sand. Gravel is mostly fine, polylithic, subangular to subround. Streaks of calcium present.	
60	10	60	30				Strong	5YR 4/4	SW-SC	41/48	Well-graded Sand with Clay and Gravel. Sand as above (very fine to coarse). Increase in angular to subrounded gravel is moderately to poorly graded (fine to medium). No cementation. Trace cobbles, subangular, fine sandstone, quartzite, mudstone. Cobbles and some gravel have calcium cement present on surface.	
64	10	70	20				Strong	5YR 4/4	SW-SC	44/48	Well-graded Sand with Clay and Gravel. Same as above, decrease in cobbles, increase in calcium presence, minor oxidation present.	66ft - Resume drilling 11/11/14.
68	20	50	30				Strong	2.5YR 4/4	SC	42/48	Clayey Sand with Gravel. Well-graded sand (same as above) with reddish brown clay. Some cemented clumps present. Gravel is as above, fine to coarse. Cobbles are angular, fine-grained sandstone, quartzite, and mudstone. Calcium coating on 90% of gravel and cobbles.	
72	10	80	10				Strong	2.5YR 4/4	SW-SC	47/48	Well-graded Sand with Clay. Same as above, no cobbles.	
76	10	70	20				Strong	2.5YR 4/4	SW-SC	46/48	Well-graded Sand with Clay and Gravel. Same as above, increase in calcium coating and cementation. Gravel is poorly graded (mainly medium). Trace oxidation (<0.1%)	
80	20	70	10				Moderate	2.5YR 4/4	SC	48/48	Clayey Sand. Moderately poorly graded sand (very fine to medium), same as above. Increase in cementation. No cobbles.	
84	20	70	10				Strong	2.5YR 4/4	SC	43/48	Clayey Sand. Same as above.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
88	10	70	20				Strong	5YR 5.5/4	SW-SM	44/48	Well-graded Sand with Silt and Gravel. Overall well-graded, light reddish brown. Fines are silt dominant. Well-graded sand (very fine to coarse), subangular to subround, sandstone and siltstone dominant, also loose quartz and plagioclase (~70% of which show yellow oxide staining). Gravel is mostly fine (few up to 3 cm), angular to subround, same lithology as coarse sand. Some large grains show calcite cementation on sides.	88ft - Logging by MML in sunlight
92	20	70	10				Moderate	2.5YR 5/4	SM	48/48	Silty Sand. Overall well-graded, reddish brown, coarsening of sand and gravel with depth. Very fine to coarse sand, angular to subround. Gravel is mostly fine with a few up to 4 cm, subangular to subround. Sand and gravel have same lithology and above.	
96	20	70	10				Moderate	2.5YR 5/4	SM	45/48	Silty Sand. Same as above except it gets finer with depth. Silty clumps are more difficult to break apart. Some larger gravel.	
100	30	60	10				Moderate	2.5YR 5/4	SM	48/48	Silty Sand. Moderately poorly graded, reddish brown. Silty, clayey fines, help form mild to moderate cementation. Very fine to coarse sand, angular to subround. Fine gravels are present, subangular to subround. No change in sand/gravel composition. Calcite mineralization on ~30% of interval.	Continue logging in artificial light.
104	30	50	20				Strong	5YR 5/4	SM	47/48	Silty Sand with Gravel. Well-graded, reddish brown. Silty clayey fines, interval fines with depth, also greater cementation and calcite mineralization with depth. Sand is very fine to coarse, angular to subround, and consists of sandstone, siltstone, and loose quartz and plagioclase. Gravel is fine to 4 cm, angular to subround, consisting of sandstone and siltstone, and lesser amounts of limestone and quartzite. Some grains have cemented sand on sides.	
108	20	60	20				Moderate	5YR 5/4	SM	44/48	Silty Sand with Gravel. Description same as above.	
112	20	60	20				Strong	5YR 5/4	SM	48/48	Silty Sand with Gravel. Description same as above with gravel up to 5 cm, mostly fine to medium from 114 to 116 feet.	
116	10	60	30				Strong	5YR 5/4	SW-SM	46/48	Well-graded Sand with Silt and Gravel. Overall well-graded, reddish brown. Silty clayey fines. Fine to coarse sand, angular to subround, polylithic. Polylithic gravel fine to 3 cm, angular to subround. Increase in limestone.	

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
120	10	60	30				Moderate	5YR 4/4	SW-SM	48/48	Well-graded Sand with Silt and Gravel. Well-graded overall, reddish brown. Sand is fine to coarse, angular to subround, polylithic (sandstone, siltstone, limestone, loose quartz and plagioclase). Gravel is mostly fine with rare few up to 5 cm, subangular to subround and polylithic as well. 70% of sand/gravel show oxide staining.	
124	10	30	60				Strong	5YR 6/4	GW-GM	45/48	Well-graded Gravel with Silt and Sand. Very fine to coarse sand, angular to subround, polylithic as above. Gravel is fine to 5 cm, angular to round (limestone grains tend to be more jagged). Light reddish brown.	
128	10	40	50				Moderate	5YR 6/4	GW-GM	48/48	Well-graded Gravel with Silt and Sand. Same as above with trace cobble present at end of interval.	
132	10	40	50				Strong	7.5YR 5/4	GP-GM	44/48	Poorly Graded Gravel with Sand and Silt. Gravel is mostly fine, up to 2.5 cm with rare few up to 4 cm, polylithic, angular to subround. Well-graded overall, brown. Fine to coarse sand as above.	
136	30	50	20				Moderate	7.5YR 4/4	SC	44/48	Clayey Sand with Gravel. Well-graded, brown. Clay with some silt. Fine to coarse sand, angular to subround, polylithic. Fine polylithic, subangular to subround gravel, sample is wet from 139 to 140 feet.	SWL = 137.34' bls on 11/11/14 at 12:51
140	30	60	10				Strong	7.5YR 4/4	SC	47/48	Clayey Sand. Well-graded overall, brown. Clayey, silty fines. Sand is mostly fine to medium, with some coarse grains, angular to sub round, polylithic. Gravel same as above with trace larger grains, and trace cobbles present. Sample is wet, finer sand with depth.	
144	30	60	10				Strong	7.5YR 4/4	SC	44/48	Clayey Sand. Same as above with fine to medium sand and fine gravel.	
148	20	70	10				Strong	7.5YR 4/4	SC	41/48	Clayey Sand. Overall well-graded, brown. Clayey, silty fines. Fine to coarse sand, subangular to subround, polylithic, coarsens with depth. Gravels are fine to 5 cm. Only fine gravel present from 148 to 150 feet, larger gravel 150 to 152 feet, is polylithic, subangular to subround. Sample is dry to moist.	151ft - Collected sample via push-ahead: pH= 7.59, EC=473.6 µS/cm, field SO_4=3mg/L (confirmed at 3mg/L)

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
152	50	40	10				None	2.5YR 5/4	CH	41/48	Sandy Fat Clay. Reddish brown, fat clay with moderately poorly graded (fine to medium), polylithic (quartz, quartzite, siltstone, sandstone, mudstone, schist), angular to subround sand. Gravel is primarily fine, with ~5% coarse clasts (~6 cm), dark-gray fine-grained sandstone is dominant rock. Trace cobbles (approximately five, 10 cm sized pieces), also dark-gray fine-grained sandstone. Interval is poorly cemented, moist.	152ft - Logging 11/12/14, VNH, sunlight
156	40	40	20				Weak	5YR 5/4	SC	41/48	Clayey Sand with Gravel. Reddish brown fat clay with well-graded (fine to coarse) sand, as above. Gravel similar to sand; no dominant rock, well-graded (fine to coarse). Only 1-2 cobbles, Bisbee Group (fine-grained sandstone, pink and yellow), moderately well cemented, calcium streaks throughout. Red and yellow oxidation present.	
160	40	40	20				Weak	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Same as above, cobbles include dark-gray fine grained sandstone.	
164	40	40	20				Weak	5YR 5/4	SC	40/48	Clayey Sand with Gravel. Same as above.	
168	40	40	20				Weak	5YR 5/4	SC	40/48	Clayey Sand with Gravel. Same as above. Gravel is very coarse. Some large (15 to 20 cm) cobbles present. Dark gray and yellow fine-grained sandstone.	
172	30	60	10				None	5YR 5/4	SC	41/48	Clayey Sand. Same as above.	
176	30	50	20				None	5YR 5/4	SC	39/48	Clayey Sand with Gravel. Same as above. Cobbles include Glance Conglomerate.	
180	50	40	10				Weak	2.5YR 4/4	CH	45/48	Sandy Fat Clay. Reddish brown fat clay with sand (as described above). Gravel is moderately poorly graded (fine to medium). No cobbles, poorly cemented interval.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
184	30	50	20				Weak	2.5YR 4/6	SC	42/48	Clayey sand with gravel. Well-graded, angular to subround, polylithic (quartz, limestone, sandstone, mudstone, schist, volcanics) sand with red fat clay. Gravel also well-graded (fine to coarse), largest pieces are 7 cm. Trace cobble. Interval is poorly cemented.	
188	40	40	20				Moderate	5YR 4/4	SC	40/48	Clayey Sand with Gravel. Overall well-graded, reddish brown. Fat clay is saturated, soft, and plastic. Fine to coarse sand, subangular to subround, mixed composition as above. Fine gravel up to 7 cm, subangular to subround, mixed composition, some show cemented sand and calcite mineralization on side.	
192	20	60	20				Moderate	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Overall well-graded. Same as above with gravel fine to 3 cm, subangular to round. Less coarse sand.	188ft - Logging by MML (artificial light) 190ft - Resume drilling 11/12/14 191ft - Collect sample via push-ahead: pH= 7.64, EC= 436.2 µS/cm, field SO_4= 7mg/L (confirmed at 7mg/L)
196	30	50	20				Strong	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Overall well-graded, reddish brown. Fat clay, soft and plastic. Fine to coarse sand, subangular to subround, mixed composition. Fine to 5 cm gravel, subangular to subround, also of mixed composition as above.	
200	30	60	10				Moderate	5YR 4/4	SC	43/48	Clayey Sand. Well-graded, reddish brown. Fat clay is soft, plastic. Very fine to coarse sand (less coarse sand with depth), subangular to subround, grains of mixed composition. Gravel is fine to 3 cm, subangular to subround, mixed composition. Increase in orange oxide staining.	
204	30	70	T				Moderate (204-206) Strong (206-208)	7.5YR 4/4	SC	42/48	Clayey Sand. Well-graded, brown. Soft, fat, saturated clay. Fine to medium sand. Mostly fine gravel (<1.5 cm) with a few up to 4 cm, subround, polylithic.	
208	40	50	10				Moderate	7.5YR 4/4	SC	43/48	Clayey Sand. Well-graded, brown. Fat clay. Unit is damp from 208 to 210 feet, wet from 210 to 212 feet. Fine to medium sand from 208 to 210 feet, fine to coarse (210 to 212 feet). Sand is angular to subround, of mixed composition. Gravel component mostly from 208 to 210 feet, is fine to 3 cm, polylithic, subangular to subround with trace cobble.	
212	30	50	20				Moderate	7.5YR 4/4	SC	46/48	Clayey Sand with Gravel. Brown, well-graded. Fat clay, plastic. Fine to coarse sand, subangular to subround, mixed composition. Fine gravels are mostly <1.5 cm, subround, mixed composition.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
216	40	50	10				Moderate	7.5YR 4/4	SC	40/48	Clayey Sand. Overall well-graded, brown. Fat, saturated, plastic clay. Mostly fine to medium sand, some coarse from 216 to 217 feet (subangular to subround). Gravel is mostly fine with few up to 4 cm, mixed composition (sandstone, siltstone, limestone, loose quartz) subround mostly.	
220	40	50	10				Strong	7.5YR 4/4	SC	45/48	Clayey Sand. Overall well-graded, increase in calcite mineralization, else same as above, and interval is damp.	
224	40	50	10				Strong	7.5YR 4/4	SC	43/48	Clayey Sand. Same as above, slight increase in coarse sand. Interval is moist.	
228	40	50	10				Strong	7.5YR 4/4	SC	44/48	Clayey Sand. Same as above.	231ft - Collect sample via push-ahead: pH.= 7.58, EC= 442.4 µS/cm, field SO_4= 6mg/L (confirmed at 6mg/L)
232	30	40	30				Moderate	7.5YR 4/4	SC	45/48	Clayey Sand with Gravel. Overall well-graded. Fat clay present. Unit is moist. Very fine to coarse sand (predominantly very fine to medium), subangular to subround, mixed composition. Mostly very fine gravel (<1 cm) with some up to 2.5 cm, subangular to subround, polylithic as above.	
236	40	40	20				Weak	5YR 4/4	SC	40/48	Clayey Sand with Gravel. Overall well-graded, reddish brown. Fat clay with silt. Unit is moist. Very fine to medium sand. Polylithic, fine (<2 cm) gravel is subangular to subround. Unit coarsens with depth.	
240	40	40	20				Moderate	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Wet from 242 to 244 feet, else same as above.	
244	30	50	20				Moderate	5YR 4/4	SC	39/48	Clayey Sand with Gravel. Overall well-graded, brown. Fat clay. Sample is wet from 244 to 246 feet, moist from 246 to 248 feet. Very fine to coarse sand, is subangular to subround, and polylithic. Gravel is very fine to 5cm, subangular to subround, and polylithic as above.	

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
248	60	40	T				None	5YR 5/4	CH	43/48	Sandy Fat Clay. Reddish brown, fat clay with well-graded (very fine to coarse), angular to subround, polylithic (quartz, limestone, sandstone, siltstone, mudstone, volcanics, schist) sand. Gravel is fine to medium, primarily quartz, gray siltstone, and conglomerate. Interval is poorly cemented and very wet.	248ft - Logging 11/13/14, VNH, sunlight
250	20	70	10				None	5YR 4/4	SC		Clayey Sand. Sand is moderately graded (medium to coarse), though ~20% is fine, as above. Gravel is poorly graded, mostly fine as above. Clay is reddish brown, fat. Interval is poorly cemented, and has a lot of moisture.	
252	30	50	20				Weak	5YR 4/4	SC	37/48	Clayey Sand with Gravel. Moderately graded sand (described above) with reddish brown fat clay. Sand is predominantly very fine to fine from 252 to 254 feet, and medium from 254 to 256 feet. Gravel is fine, 90% of grains are dark gray sandstone. Cobbles present (trace), similar to gravel. Gravel and cobbles are subround. Calcium and yellow oxidation present, mostly from 252 to 254 feet. Interval is poorly cemented and moist.	
256	60	40	T				None	2.5YR 5/3	CH	39/48	Sandy fat clay. Reddish brown fat clay with moderately graded (fine to medium) sand (as above). Some yellow oxidation present. Interval is poorly cemented, wet. Trace gravel is fine.	
260	60	40	T				None	2.5YR 5/3	CH	39/48	Sandy Fat Clay. Same as above.	
262	30	40	30				Weak	2.5YR 5/6	SC		Clayey Sand with Gravel. Well-graded sand (very fine to coarse), as above, with red clay. Gravel is moderately graded (fine to medium), similar to sand. Interval has calcium streaks, red and yellow oxidation, and is mostly dry. Moderately cemented.	
264	30	40	30				Weak	2.5YR 5/6	SC	44/48	Clayey Sand with Gravel. Same as above.	
266	40	50	10				Strong	5YR 7/3	SM		Silty Sand. Well-graded (very fine to coarse) sand (as above), with silt and clay. Fines are approximately 75% silt & pink. Gravel is fine to medium, similar to sand. Interval is dry, poorly cemented.	
268	50	40	10				Moderate	2.5YR 5/4	CH	40/48	Sandy Fat Clay. Reddish brown fat clay with well-graded sand (as above). Gravel is similar to sand, is fairly poorly graded, mostly fine. Approximately 10% of gravel is medium. Interval has some moisture, is poorly cemented, and has calcium streaks. One 20 cm dark gray sandy siltstone cobble with some calcium cement present.	271ft - Collect sample via push-ahead: pH.= 7.91, EC= 423.3 µS/cm, field SO_4= 11 mg/L (confirmed at 9mg/L)
272	50	40	10				Strong	2.5YR 5/4	CH	43/48	Sandy Fat Clay. Same as above. Some moisture from 272 to 274 feet as above. From 274 to 276 feet is very dry, but is the same material. Interval is moderately cemented, increase in calcium streaks.	
276	50	40	10				Moderate	2.5YR 5/4	CH	45/48	Sandy Fat Clay. Same as above. Increase in moisture.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
280	30	50	20				Moderate	5YR 5/4	SC	40/48	Clayey Sand with Gravel. Well-graded (very fine to coarse), angular to subround, polylithic (quartz, schist, limestone, sandstone, siltstone, mudstone, volcanics) sand, with reddish brown fat clay. Gravel is well-graded (fine to coarse) with approximately 40% coarse, similar lithology to sand. Gravel is mostly subangular. Interval is poorly cemented, and has some moisture.	
284	30	50	20				Moderate	5YR 5/4	SC	39/48	Clayey Sand with Gravel. Same as above.	
288	30	50	20				Moderate	5YR 5/4	SC	46/48	Clayey Sand with Gravel. Same as above. Interval is very dry.	
290	30	40	30				None	2.5YR 5/4	SC		Clayey Sand with Gravel. Moderately poorly graded (fine to medium), angular to subangular, polylithic (as above) sand with reddish brown fat clay, and fine to medium, polylithic gravel. Gravel is angular to subangular. Calcium cement on some surfaces. Interval is wet, poorly cemented.	
292	30	60	10				weak	5YR 5/4	SC	47/48	Clayey Sand. Well-graded sand (as above) with reddish brown fat clay. Gravel is mostly fine, similar to sand. Interval is moist, poorly cemented, 2 to 3 calcium streaks present.	
296	40	40	20				Moderate	7.5YR 4/6	SC	45/48	Clayey Sand with Gravel. Very well-graded. Strong brown. Soft, fat clay. Interval is wet, poorly cemented. Sand is fine to coarse (fine to medium from 298 to 300 feet), subangular to subround, polylithic. Gravel is also fine to coarse with trace cobbles, subangular to subround, polylithic.	296ft - Logging by MML, artificial light
300	30	40	30				Weak	5YR 4/4	SC	41/48	Clayey Sand with Gravel. Very well-graded, reddish brown. Interval is wet and coarsens with depth. Sand is fine to coarse, subangular to subround, polylithic. Gravel is fine to 5 cm, subangular to subround and polylithic as above.	
304	30	40	30				Strong	5YR 4/3	SC	44/48	Clayey Sand with Gravel. Well-graded, reddish brown. Interval starts wet, loses moisture with depth. Predominantly fine to medium sand. Fine to coarse gravel with trace cobbles throughout. Polylithic, subangular to subround.	
308	40	40	20				Moderate	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Well-graded, reddish brown. Interval is damp from 308 to 310 feet, wet from 310 to 312 feet. Fat, sticky clay. Polylithic, fine to coarse sand is subangular to subround. Gravel is fine to 4cm, but 80% fine, subangular to subround and polylithic.	311ft - Collect sample via push-ahead: pH= 7.76, EC= 412.6µS/cm, field SO_4= 5mg/L (confirmed at 4mg/L)

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
312	20	50	30				Weak	5YR 4/3	SC	41/48	Clayey Sand with Gravel. Well-graded, reddish brown. Interval is wet. Sand is fine to coarse, angular to subround, mixed composition (loose quartz, sandstone, limestone, siltstone quartzite). Gravel is predominantly <2 cm but up to 6 cm, subangular to subround with mixed composition as sand. Fat clay.	
316	20	50	30				Moderate	5YR 4/3	SC	44/48	Clayey Sand with Gravel. Same as described above.	
320	30	50	20				Moderate	5YR 5/4	SC	41/48	Clayey Sand with Gravel. Well-graded, reddish brown. Interval is wet. Fat, sticky clay. Fine to coarse sand, angular to subround, polylithic. Gravel is fine with rare few up to 5 cm, angular to subround, mixed composition as above.	
324	40	50	10				Moderate	5YR 4/4	SC	45/48	Clayey Sand. Well-graded, reddish brown. Interval is wet. Fat clay. Sand is fine to coarse, angular to subround, mixed composition. Gravel is fine to 3 cm, mostly elongated, subangular to subround, mixed composition.	
328	40	40	20				Moderate	5YR 4/4	SC	42/48	Clayey Sand with Gravel. Well-graded, reddish brown. Interval is wet. Sand is fine to coarse, mixed composition, angular to subround. Gravel is fine to coarse with trace cobbles from 330 to 332 feet, subangular to subround, of mixed composition.	
332	30	40	30				Moderate	5YR 4/3	SC	41/48	Clayey Sand with Gravel. Well-graded, wet, reddish brown. Fat clay. Fine to coarse sand, angular to subround, mixed composition. Gravel, mostly fine, up to 4 cm, subangular to subround, mixed composition.	
334	20	80	T				Weak	5YR 4/3	SC		Clayey Sand. Moderately poorly graded. Fat clay, fine to coarse sand is of mixed composition and angular to subround.	
336	40	40	20				Weak	5YR 4/4	SC	42/48	Clayey Sand with Gravel. Well-graded, reddish brown. Fat clay. Fine to coarse, polylithic sand is angular to subround. Gravel is mostly fine with few up to 4 cm (larger gravel from 338 to 340 feet), subangular to subround and of mixed composition.	
340	50	40	10				Strong	5YR 4/4	CH	40/48	Sandy Fat Clay. Well-graded, reddish brown. Fat clay. Predominantly fine to medium sand, some coarse (polylithic), angular to subangular. Gravel is mostly fine with rare few up to 5 cm, subangular to subround, of mixed composition.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
344	40	40	20				Moderate	5YR 4/4	SC	41/48	Clayey Sand with Gravel. Very well-graded, reddish brown. Fat clay. Interval is wet and fines with depth. Sand is fine to coarse, angular to subangular, polylithic (sandstone, siltstone, limestone, loose quartz). Gravel is mainly fine with few to 3 cm, subangular to subround, with same composition as sand.	
348	30	60	10				Moderate	5YR 5/4	SC	41/48	Clayey Sand. Moderately poorly graded sand (very fine to fine). Gravel is fine to medium, and 80% is from 350 to 352 feet with 4 to 5 large (5 to 8 cm) pieces. Clay is reddish brown, fat. Interval is poorly cemented.	348ft - Begin logging 11/14/14, VNH. 350ft - Resume drilling 11/14/14. 351ft - Collect sample via push-ahead: pH= 7.86, EC= 289.3 µS/cm, field SO_4= 6 mg/L (confirmed at 8 mg/L)
352	30	50	20				Weak	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Very well-graded, angular to subangular, polylithic (as above) sand with reddish brown fat clay. Gravel is also well-graded (fine to medium), angular to subangular, polylithic. Interval has some moisture, is moderately cemented and has red and yellow oxidation, two to three streaks of calcium present.	
356	30	50	20				None	5YR 5/4	SC	45/48	Clayey Sand with Gravel. Same as above with increase in red oxidation patches (about 12 of 1 cm^2 size). Gravel includes several (20%) light greenish-grey, friable, fine sandy siltstone.	
360	10	80	10				None	5YR 4/4	SW-SC	44/48	Well-graded Sand with Clay. Well-graded sand (very fine to coarse) as above with reddish brown clay (approximately 30% silt). Gravel is mostly fine, similar to sand. Interval is wet, poorly cemented.	
362	30	40	30				Strong	2.5YR 4/4	SC		Clayey Sand with Gravel. Well-graded sand (fine to coarse) and moderately poorly graded gravel (fine to medium), as described above, with fat reddish brown clay. Interval is well cemented and dry.	
364	30	40	30				Strong	2.5YR 4/4	SC	40/48	Clayey Sand with Gravel. Same as described above. Interval is very dry.	
366	30	60	10				Weak	5YR 5/4	SC		Clayey Sand. Very well-graded sand (very fine to coarse) and gravel (only fine or coarse) as described above, with clay and silt (60/40 respectively). Clay is reddish brown. Interval is very wet, water poured from bag when opened.	
368	30	60	10				Weak	2.5YR 5/4	SC	48/48	Clayey Sand. Very well-graded (very fine to coarse) sand poorly graded gravel (90% fine) as described above. Clay is reddish brown, fat. Presence of black friable mudstone. Interval is moderately cemented, moist.	
372	30	60	10				Strong	5YR 4/4	SC	44/48	Clayey Sand. Very well-graded, reddish brown. Silty, fat clay. Mostly fine to medium sand (some coarse) is subangular to subround. Gravel is mostly fine with few up to 3 cm plus trace cobble from 374 to 376 feet, subangular to subround.	372ft - Logging by MML, sunlight

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Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
376	30	50	20				Strong	5YR 5/4	SC	45/48	Clayey Sand with Gravel. Very well-graded, reddish brown. Silty, fat clay. Interval is wet from 378 to 380 feet and damp from 380 to 382 feet. Predominantly very fine to medium sand with some coarse. Gravel is fine to 5 cm, subangular to subround, and of mixed composition (sandstone, siltstone, limestone, plutonic rocks, loose quartz). Moderately cemented, increases with dryness.	
380	50	30	20				Moderate	5YR 4/4	CH	44/48	Sandy Fat Clay with Gravel. Very well-graded, reddish brown. Interval is wet. Fat clay is soft and plastic. Very fine to medium sand. Fine gravel to 5 cm plus one trace cobble, subangular to subround, polylithic.	
382	30	50	20				Strong	5YR 4/4	SC		Clayey Sand with Gravel. Very well-graded, reddish brown. Interval is moist. Fat clay. Very fine to coarse sand is angular to subround, mixed composition. Gravel is mostly fine, up to 3 cm, subangular to subround of mixed composition.	
384	20	60	20				Moderate	5YR 4/4	SC	48/48	Clayey Sand with Gravel. Well-graded, reddish brown. Interval is wet, fines with depth (to trace gravel from 386 to 388 feet). Fat clay. Very fine to coarse sand, polylithic, subround to subangular. Gravel is predominately fine but few up to 4 cm is subround to subangular and of mixed composition.	
388	20	60	20				Moderate	5YR 4/4	SC	39/48	Clayey Sand with Gravel. Well-graded, reddish brown. Fat clay. Fine to coarse sand is angular to subround. Gravel is fine to 3 cm, subangular to subround, mixed lithology.	388ft - continue logging in artificial light.
390	30	50	20				Moderate	5YR 4/4	SC		Clayey Sand with Gravel. Same as described above with an increase in fines and less coarse sand. Wet.	391ft - Collect sample via push-ahead: pH=7.72; EC=357.0 µs/cm; field SO_4=10mg/L (confirmed at 8mg/L)
392	30	50	20				Moderate	5YR 4/4	SC	42/48	Clayey Sand with Gravel. Very well-graded, reddish brown. Interval is wet. Fat clay with silt, fine to coarse polylithic sand is angular to subround. Gravel is fine to 4 cm, subround to subangular, mixed lithology. Very little cementation.	
396	30	50	20				Moderate	5YR 4/4	SC	41/48	Clayey Sand with Gravel. Same as described above with more cementation (moderate toughness).	
400	40	40	20				Moderate	5YR 5/3	SC	40/48	Clayey Sand with Gravel. Very well-graded, reddish brown. Fat clay, wet. Fine to coarse sand is polylithic, angular to subround. Gravel is polylithic, fine to 3 cm, subround to subangular.	
404	40	50	10				Strong	5YR 4/3	SC	40/48	Clayey Sand. Well-graded, reddish brown. Fat clay. Fine to medium sand (from 404 to 406 feet) and fine to coarse (from 406 to 408 feet), angular to subround and polylithic. Fine gravel is also polylithic as above and subangular to subround.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
408	40	50	10				None	2.5YR 5/4	SC	39/48	Clayey Sand. Well-graded (very fine to coarse), subangular to subround polylithic sand (quartz, sandstone, quartzite, volcanics, limestone, mudstone, schist) sand with reddish brown fat clay. Gravel is mostly (90%) fine to medium, similar to sand, angular to subround. Interval is poorly cemented, moist, no oxidation or calcium.	408ft - Logging 11/17/14, VNH, sunlight. 410ft - Pause drilling 11/14/14 for 2 days off. Resume drilling 11/17/14
412	40	50	10				None	2.5YR 5/4	SC	44/48	Clayey Sand. Same as described above with some cobbles present (2 to 3), primarily dark reddish brown fine sandstone and quartzite.	
416	30	50	20				None	2.5YR 5/4	SC	46/48	Clayey Sand with Gravel. Well-graded sand as above with reddish brown fat clay. Gravel is also well-graded (fine to coarse), no dominant size, as described above. Trace cobble, reddish brown sandstone. Interval is moist, poorly cemented. Trace calcium streaks (2 to 3), no oxidation.	
420	40	50	10				None	2.5YR 5/4	SC	44/48	Clayey Sand. Well-graded sand as above with reddish brown fat clay. Gravel is moderately poorly graded (medium to coarse), dominant clast size is 3 to 4 cm (about 70% of gravel). Mostly (70%) sandstone. Trace cobbles. Interval is moist, moderately cemented.	
424	30	50	20				Strong	2.5YR 5/4	SC	44/48	Clayey Sand with Gravel. Well-graded sand as above with reddish brown fat clay. Gravel is well-graded, as described above. Large (13 cm) dark reddish brown fine sandstone cobbles present (about 5). Interval is well cemented, has little moisture, trace oxidation.	
428	30	50	20				Moderate	7.5YR 4/4	SC	42/48	Clayey Sand with Gravel. Very well-graded, brown. Fat clay, wet. Very fine to coarse sand, polylithic, angular to subangular. Gravel also polylithic, angular to subround, fine to coarse, trace cobble (8 cm). Poorly cemented.	428ft - Logging by MML, artificial light. 431ft - Collect sample via push-ahead: pH=7.94; EC= 334.4µs/cm; field SO_4=10mg/L (confirmed at 6mg/L)
432	40	40	20				Moderate	7.5YR 4/4	SC	46/48	Clayey Sand with Gravel. Very well-graded, brown. Fat, wet clay. Fine to coarse sand, angular to subround, fines with depth. Polylithic gravel is fine to 4 cm, angular to subround. Poorly cemented.	
436	40	40	20				Moderate	7.5YR 4/4	SC	40/48	Clayey Sand with Gravel. Very well-graded, brown. Fat, wet clay. Sand is fine to coarse (coarsens with depth), polylithic, angular to subround. Gravel is fine to coarse with trace cobble (fines with depth).	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
440	30	50	20				Moderate	7.5YR 4/4	SC	42/48	Clayey Sand with Gravel. Very well-graded, brown. Saturated, fat clay. Fine to coarse sand, angular to subround, slightly coarsens with depth. Gravel is fine to 5 cm, subangular to subround, polylithic (sandstone, siltstone, quartzite, loose quartz and plagioclase).	
444	40	40	20				Moderate	7.5YR 4/3	SC	42/48	Clayey Sand with Gravel. Very well-graded, brown. Saturated fat clay. Fine to coarse sand, angular to subround. Gravel fine to 5 cm, subangular to subround, polylithic as above. Majority of gravel from 444 to 446 feet.	
448	30	50	20				Moderate	7.5YR 4/3	SC	45/48	Clayey Sand with Gravel. Very well-graded, brown. Saturated fat clay. Fine to coarse sand (less coarse sand with depth), angular to subround, polylithic. Mostly fine gravel with few up to 5 cm, subround to subangular, polylithic. Poorly cemented from 448 to 450 feet, moderate cementation from 450 to 452 feet.	
452	30	50	20				Moderate	7.5YR 4/3	SC	42/48	Clayey Sand with Gravel. Very well-graded, brown. Saturated fat clay. Fine to coarse sand but predominantly medium. Gravel is fine with few up to 3 cm, polylithic, subangular to subround.	
456	30	50	20				Weak	5YR 4/4	SC	43/48	Clayey Sand with Gravel. Well-graded (very fine to coarse), angular to subround, polylithic (quartz, sandstone, limestone, siltstone, volcanics) sand with reddish brown fat clay. Gravel is well-graded, angular to subround, polylithic, trace cobbles (2 cobbles are about 13 cm, greenish-grey sandstone). Interval is moderately cemented, moist.	456ft - Logging 11/18/14 by VNH, sunlight.
460	40	60	T				None	5YR 5/4	SC	33/48	Clayey Sand. Well-graded (very fine to coarse) sand as above, with reddish brown fat clay. Trace gravel, fine, dark grey sandstone. Interval is poorly cemented, wet.	
464	40	50	10				Weak	5YR 5/4	SC	35/48	Clayey Sand. Same as described above with increase in gravel. Gravel is mostly (90%) fine, some medium, quartz and sandstone. Interval is poorly cemented, wet.	466ft - Resume drilling 11/18/14
468	30	50	20				Moderate	5YR 5/4	SC	48/48	Clayey Sand with Gravel. Well-graded, reddish brown. Fat clay. Sand is fine to coarse (but mostly fine). Gravel is fine to 3 cm, comprised mostly of quartz rich plutonic rock, quartzite and sandstone, subangular to subround. Interval is poorly cemented, moist.	468ft - Logging by MML, sunlight.

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
472	40	50	10				Moderate	5YR 4/3	SC	47/48	Clayey Sand. Very well-graded, reddish brown. Fat clay. Predominantly fine sand, some coarse. Gravel is mostly fine with few up to 4 cm, subangular to subround. Present lithology includes sandstone, siltstone, quartz-rich plutonic rock, loose quartz and plagioclase. Interval is damp with moderate cementation/toughness, fines with depth.	
476	30	50	20				Moderate	5YR 4/4	SC	46/48	Clayey Sand with Gravel. Well-graded, reddish brown. Fat clay. Fine to coarse sand is polylithic, angular to subround. Gravel is mostly fine with rare few up to 3 cm, subround to subangular, polylithic as above. Interval starts dry, moist from 478 to 480 feet, poorly cemented.	
480	30	50	20				Moderate	5YR 4/4	SC	43/48	Clayey Sand with Gravel. Same description as above except, interval is moist from 480 to 483 feet and dry from 483 to 484 feet.	
484	40	40	20				Moderate	5YR 4/4	SC	42/48	Clayey Sand with Gravel. Well-graded, reddish brown. Fat clay. Sand is fine to coarse (coarsens with depth), angular to subround, polylithic. Gravel is fine, subangular to subround, polylithic. Interval is poorly cemented, moist.	484ft - continue logging in artificial light.
488	40	40	20				Moderate	5YR 4/4	SC		Clayey Sand with Gravel. Same as described above except sand is mostly fine with some coarse. Few gravel up to 4 cm.	488ft - Resume logging 11/20/14, MML, artificial light 490ft - Pause drilling 11/18/14 - rig broken down. Resume drilling 11/20/14.
492	40	40	20				Moderate	5YR 4/4	SC		Clayey Sand with Gravel. Same as described above.	
494										40/48	Disturbed sample - no major changes in lithology are visible - sample also extremely watery	*494 to 498ft is very saturated, disturbed - sat submerged in core barrel overnight, the barrel was also dropped during trip out. 494ft - Logging by MML, 11/21/14, overcast.
498											No sample recovered.	No core retrieved.
500	40	40	20				Strong	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Very well-graded, reddish brown. Fat clay. Mostly fine sand with some coarse. Fine gravel with few up to 4 cm (rare). In addition to previously mentioned lithology a couple of well cemented conglomerate are found. Interval is wet with a dry pocket around 503 feet.	502ft - Resume drilling 11/21/14.

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
504	30	50	20				Moderate	7.5YR 4/4	SC	42/48	Clayey Sand with Gravel. Very well-graded, brown. Fat clay with silt. Predominantly fine sand with some coarse (angular to subround and polylithic). Fine to 3 cm gravel, subangular to subround and polylithic (limestone, sandstone, siltstone, quartzite, loose quartz and plagioclase). Interval is moist and poorly cemented.	
508	30	50	20				Strong	7.5YR 4/4	SC	43/48	Clayey Sand with Gravel. Very well-graded, brown. Fat clay. Sand as described above. Gravel is fine to 5 cm, subangular to subround, polylithic. Interval is moist and coarsens with depth, poorly cemented.	510ft - Resume logging by MML 11/24/14, daylight.
512	20	60	20				Moderate	7.5YR 4.5/4	SC	39/48	Clayey Sand with Gravel. Very well-graded, brown. Fine to coarse sand (predominantly fine to medium), subround to subangular and polylithic. Gravel is mainly <3 cm, but up to 5 cm, subangular to subround, polylithic. Interval is dry from 512 to 514 feet, damp from 514 to 516 feet, poorly cemented, fines with depth.	
516	30	60	10				Moderate	7.5YR 4/4	SC	46/48	Clayey Sand. Brown, fat clay with silt, well-graded sand (fines with depth), angular to subround. Fine (<2 cm), polylithic subangular to subround gravel. Poorly cemented, wet.	516ft - Pause drilling 11/21/14 for 2 days off. Resume drilling 11/25/14 - Switched Rigs on 11/24/14 from PS600T to the GP24-300RS. Logging by MML 11/25/14, daylight.
518	40	40	20				Weak	7.5YR 4/4	SC		Clayey Sand with Gravel. Brown, fat clay is sticky. Fine to medium sand, fine gravel with few up to 5 cm, subround and polylithic. Poorly cemented and wet.	
520	40	30	30				Moderate	7.5YR 5/4	SC	46/48	Clayey Sand with Gravel. Brown, fat clay with poorly graded sand (fine to medium). Well-graded gravel (fine to coarse) with few cobbles (weathered medium to coarse grained sandstone).	
522	40	40	20				Moderate	7.5YR 5/4	SC		Clayey Sand with Gravel. As described above with loss of cobbles. Only fine gravel (< 2 cm).	
524	40	30	30				Moderate	5YR 4/4	SC	48/48	Clayey Sand with Gravel. Reddish brown, fat, sticky clay. Well-graded sand that is predominantly fine to medium grained, subangular to subround and polylithic. Well-graded gravel to include trace cobble (12 cm sandstone). Gravels are subangular to subround and polylithic. Interval is firm and saturated.	524ft - Pause drilling for 5 days off. -Casing stuck on 12/1/14 -Resume drilling 12/5/14, logging by MML, overcast.
526	30	40	30				Moderate	5YR 4/4	SC		Clayey Sand with Gravel. Same as above except less clay and more sand (also an increase in medium sand).	
528	30	40	30				Moderate	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Reddish brown, fat clay is sticky and plastic. Well-graded sand is of mixed lithology is subangular to subround. Gravel is mostly fine (< 2 cm) with few larger, plus one cobble (10 cm sandstone). Gravel is subround and polylithic. Interval is firm and saturated.	
532	20	60	20				Strong	5YR 5/3	SC	22/24	Clayey Sand with Gravel. Reddish brown, fat clay with poorly graded sand (fine to medium) although minor amounts of coarse sand are present. Fine to 3 cm gravel is polylithic and subround to subangular. Interval coarsens with depth.	
534	20	50	30				Moderate	5YR 5/3	SC	N/A	Clayey Sand with Gravel. Reddish brown, fat clay. Well-graded polylithic sand is angular to subround with trace cobbles (sandstone).	*534-540ft - core was dropped on deck. Bagged sample is highly disturbed.

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
536	20	50	30				Moderate	5YR 5/3	SC	N/A	Clayey Sand with Gravel. Reddish brown, fat clay. Well-graded polylithic (quartz, sandstone, siltstone, plagioclase) sand is angular to subround. Interval is watery, trace cobbles (about 9 cm).	*534-540ft - core was dropped on deck. Bagged sample is highly disturbed.
540	40	40	20				Moderate	7.5YR 5/3	SC	33/48	Clayey Sand with Gravel. Well-graded (very fine to coarse), angular to subround, polylithic (quartz, sandstone, mudstone, siltstone) sand with brown, fat clay. Gravel is fine to 4 cm, subangular to subround and similar lithology to sand. Interval is poorly cemented, and gets drier with depth. From 542 to 544 feet is very dry and has strong HCL reaction. White calcium streaks throughout interval.	
544	60	40	T				None	7.5YR 7/2	CH	40/48	Sandy Clay. Slippery, pinkish grey clay with some polylithic sand (as above) and more angular grey (10YR 6/1) sand.	
546											Bedrock, as evidenced by very angular grey silty limestone with some red streaks and yellow streaks. All fragments are same limestone material, grey, very angular. From 547 to 548 interval is dry.	**546ft - BEDROCK - Limestone** ***The "fine" material starting at 545 feet is termed "rock flour" (per driller) from being drilled on with regular and auger drill shoes in three attempts to retrieve core. Furthermore drill was very slow per driller.
548										12/12		
549												**TD = 549 ft** 12/5/14 22:30

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CLEAR CREEK ASSOCIATES

Project No.: 287051	Boring Name: BMO-2014-4B
Project Name: Expanded Groundwater Monitoring	Date/ Time Started: 12/18/14 00:17
ADWR Number: 55-917620	Date/Time Completed: 12/23/14 04:09
Location Cadastral: SW1/4 of NW1/4 of NE1/4 S18 T24S R24E	Drilling Equipment: GP24-300RS
Location NAD 83: 31° 20' 50.23"N, 109° 56' 45.46"W	Drilling Method: Rotosonic
Drill Company: Cascade Drilling L.P.	Bit Size/Type: *0-180 ft: 10.75-in; 180-272 ft: 9.5-in*
Driller(s): J Maples and C Rockhill	Conductor Casing (type; diameter; depth): None
Logged By: M Lindsey and V Hermosilla	Total Borehole Depth: 272 feet

* Percentages of fines, sand, & gravel based on visual estimates of volume

■ Relative % fines (F < 0.06 mm)

□ Relative % sand (S >0.06 < 2 mm)

▨ Relative % gravel (G > 2 mm)

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
0	10	90	T				Strong	7.5YR 3/4 to 7.5YR 7/4	SP-SM	44/48	Poorly Graded Sand with Silt. The upper 16-in of core is dark brown fine sand with no HCl reaction. From 16-in to 4 feet is pink silt with fine sand, strong HCl reaction. Trace gravel up to 3 cm, subangular to round of limestone and sandstone. Interval is dry and loosely compacted (with an organic smell and roots throughout.	Start drilling 12/18/14, 00:17, 24-hr. Logging by MML in artificial light. Munsell Color chart Yr. 2000 Rev.
4	20	70	20				Strong	7.5YR 5/4	SM	40/48	Silty Sand with Gravel. Brown silt with poorly graded sand (fine to medium). Fine gravel (<2 cm) are subangular, sandstone and limestone.	
8	20	80	T				Strong	7.5YR7/4	SM	42/48	Silty Sand. Pink silt with poorly graded sand (fine to medium). Some portions break between fingers, some require hammer.	
10	0	70	30				Weak	7.5YR 5/4	SW		Well-graded Sand with Gravel. Brown, well-graded polylithic sand is subangular to round. Well graded gravel up to 7 cm, subangular to subround, polylithic (sandstone, limestone, siltstone, granite, loose quartz and plagioclase). Interval is dry, no cementation.	
12	0	70	30				Moderate	7.5YR 5/4	SW	44/48	Well-graded Sand with Gravel. Same description as above.	
14	20	80	T				Moderate	7.5YR 4/6	SM		Silty Sand. Strong brown silt with poorly graded sand (fine to medium) that forms gravel sized clumps requiring moderate to high pressure to break between fingers.	
16	20	70	10				Weak	7.5YR 4/6	SM	41/48	Silty Sand. Strong brown silt with poorly graded sand as above with fine gravel, subangular to subround Limestone (strong HCl reaction).	
20	20	80	0				Strong	5YR 7/3	SM	45/48	Silty Sand. Pink silt with fine to medium sand is clumped together requiring high pressure to break between fingers, some requiring both hands. Loosens with depth.	
22	20	70	10				Strong	7.5YR 6/3	SM		Silty Sand. Light brown silt with very fine to medium sand. Formation is looser than above. Polylithic gravel is mostly <1 cm but up to 6 cm (largest pieces are limestone), subround and present at bottom of interval (from 23 to 24 feet).	

Notes: Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
24	40	50	10				Strong	7.5YR6/4	SC	39/48	Clayey Sand. Light brown fat clay with silt (60/40), when wetted, clay rolls easily. Predominantly very fine to fine sand. Well-graded limestone gravel is subround. Interval is loose and dry.	
28	30	50	20				Strong	7.5 YR 6/3	SC/SM	34/48	Clayey, Silty Sand. Well-graded sand (fine to coarse), subangular to subround, polylithic (quartz, sandstone, limestone, schist, mudstone). Fines are about 50/50 silt /clay, light brown. Gravel is poorly graded (mostly fine), up to 7 cm, polylithic, subangular to subround. One cobble.	28ft - Logging by VNH, 12/18/14, sunlight.
30	20	50	30				Strong	7.5 YR 6/3	SC/SM		Clayey, Silty Sand. Same as above based on what was retrieved.	*30-32 ft core bag dropped on deck, sample is highly disturbed.
32	60	30	10				Strong	5YR 4/6	CH	47/48	Sandy Fat Clay. Yellowish red fat clay with poorly graded sand (fine), as above and poorly graded gravel (fine) as above.	
36	60	30	10				Strong	5YR 4/6	CH	46/48	Sandy Fat Clay. Same as described above with increase in very fine sand.	
40	60	30	10				Strong	5YR 4/6	CH	48/48	Sandy Fat Clay. Same as described above. Clay appears as gravel sized, well cemented pieces. Some silt (about 20% of fines).	
44	60	30	10				Strong	5YR 4/6	ML	46/48	Sandy Silt. Yellowish red silt and clay (70/30 respectively) with very fine to medium sand (as above) and some fine gravel (as above). Some patches of calcium present.	
48	20	70	10				Moderate	5YR 5/4	SC	42/48	Clayey Sand. Well-graded (very fine to coarse) polylithic sand (as above) with reddish brown fat clay. Some gravel, fine, as above. Cobble sized (9 cm) cemented clay and sand in an otherwise poorly cemented interval.	
50	90	10	T				None	5YR 4/6	CH		Fat Clay. Yellowish red fat clay with poorly graded sand (very fine to fine). Trace fine gravel.	
52	90	10	T				None	5YR 4/6	CH	40/48	Fat Clay. Same as described above with increase in medium to coarse sand.	
54	30	40	30				None	5YR 4/6	SC/SM		Clayey, Silty Sand with Gravel. Well-graded sand (fine to coarse) and gravel (fine to 8 cm) are angular to subangular, and polylithic (as above) with yellowish red clay and silt (50/50). One cobble (fine-grained sandstone, dark reddish brown (5YR 3/2)).	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
56	30	50	20				Moderate	5YR 4/6	SC	41/48	Clayey Sand with Gravel. Well-graded, angular to subround polylithic (quartz, sandstone, siltstone, limestone, schist) sand with yellowish red silty clay (60/40 clay/silt) and well-graded, angular to subangular gravel, fine to 6 cm, some calcium present.	
60	20	40	40				Strong	5YR 4/4	SC/SM	43/48	Clayey, Silty Sand with Gravel. Well-graded (very fine to coarse) angular to subangular polylithic sand (as above) with poorly graded (fine to medium, 70% fine), angular to subangular, polylithic (as above) gravel. One to two gravel up to 8 cm. Fines are 50/50 clay/silt and reddish brown.	60ft - Logging by VNH, 12/19/14, sunlight.
64	30	50	20				Strong	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Well-graded sand (fine to coarse), angular to subangular, polylithic (as above) with reddish brown fat clay and poorly graded fine gravel, angular to subangular, polylithic.	
68	30	40	30				Moderate	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Same as above, increase in gravel. Calcium streaks present. Cobble at 70 feet.	
72	30	40	30				Moderate	5YR 4/4	SC	42/48	Clayey Sand with Gravel. Same as described above.	
76	40	50	10				Moderate	2.5YR 4/6	SC	41/48	Clayey Sand. Well-graded sand (as above) with fat clay (red). Some gravel, fine, same as above. Much of the clay is well cemented with fine to medium sand and appears as gravel. Some calcium streaks.	
80	40	50	10				None	2.5YR 4/4	SC	46/48	Clayey Sand. Same as described above.	
82	20	50	30				Weak	2.5YR5/4	SC		Clayey Sand with Gravel. Well-graded sand (as above) with well-graded gravel (fine to 8 cm) and trace cobbles. Fat clay, reddish brown. Calcium streaks present.	
84	20	50	30				Moderate	2.5YR5/4	SC	42/48	Clayey Sand with Gravel. Same as described above. Strong calcium presence from 87 to 88 feet.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
88	30	50	20				Strong	2.5YR5/4	SC	43/38	Clayey Sand with Gravel. Well-graded sand (very fine to coarse) and poorly graded gravel (fine) are angular to subangular, polylithic (sandstone, limestone, quartz, schist), with fat clay, reddish brown. Some calcium present.	
90	20	40	40				Strong	2.5YR 8/3	SC		Clayey Sand with Gravel. Well-graded sand (as above) and well-graded gravel (fine to 8 cm), as above, trace cobbles. Fat clay. Strong calcium presence.	
92	40	50	10				Strong	2.5YR5/4	SC	39/48	Clayey Sand. Moderately graded sand (fine to medium), as above with reddish brown fat clay. Clay and sand are well cemented, strong calcium presence. Gravel is poorly graded (mostly fine), similar to sand.	
96	10	80	10				Moderate	2.5YR 4/6	SW-SC	44/48	Well-graded Sand with Clay. Well-graded sand (very fine to coarse), angular to subangular, polylithic. Red fat clay. Poorly graded gravel (fine), angular to subangular, polylithic. Calcium present. Some (1%) yellow oxidation present.	
100	10	80	10				Weak	2.5YR 4/6	SW-SC	36/48	Well-graded Sand with Clay. Same as described above.	
104	10	70	20				Moderate	7.5YR 3/4	SP-SM	43/48	Poorly Graded Sand with Silt and Gravel. Dark brown silt with predominantly medium sand, has tendency to form small clumps. Fine gravel up to 4 cm, angular to subangular, polylithic. Gravel is more prevalent from 107 to 108 feet. Increase in coarse sand with depth. Calcium streaks throughout, dry and loose.	104ft - 12/18/14, pause drilling for Rig repairs; Resume drilling 12/21/14. Logging by MML, 12/21/14, artificial light.
108	10	70	20				Moderate	7.5YR 3/4	SW-SM	37/48	Well-graded Sand with Silt and Gravel. Same as described above plus well-graded sand throughout (fine to coarse) also, decrease in gravel with depth.	
112	10	70	20				Strong	5YR 4/3	SW-SM	42/48	Well-graded Sand with Silt and Gravel. Reddish brown silt with well-graded sand (fine to coarse), more coarse sand than above, angular to subangular, polylithic. Fine to coarse gravel plus one cobble (fine grained sandstone) is subangular to subround, polylithic. Interval is loose and dry with calcium throughout.	
116	10	60	30				Strong	5YR 5/4	SW-SM	32/48	Well-graded Sand with Silt and Gravel. Reddish brown silt with well-graded sand as above. Gravel is polylithic, subangular to subround, mostly fine with few up to 5 cm. Interval is loose and dry.	*118-120ft core bag dropped on deck, sample is highly disturbed.

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
120	30	40	30				Strong	5YR 4/6	SC	45/48	Clayey Sand with Gravel. Well-graded sand (very fine to coarse), angular to subangular, polylithic (sandstone, quartz, schist, limestone, siltstone, mudstone). Fines are silt and lean clay (40/60 respectively), yellowish red. Gravel is moderately graded (fine to 6 cm, but about 70% are fine), angular to subangular, polylithic. Calcium streaks present.	120ft - Logging by VNH, 12/21/14, sunlight.
124	20	60	20				Strong	5YR 4/6	SM	46/48	Silty Sand with Gravel. Sand and gravel as above, with silt.	
128	30	50	20				Strong	5YR 4/6	SC	41/48	Clayey Sand with Gravel. Same as above except fine gravel, fat clay.	
132	40	50	10				Weak	5YR 4/4	SC	44/48	Clayey Sand. Reddish brown fat clay with well-graded, angular to subangular, polylithic sand and gravel. Gravel (fine to 8 cm) is mostly from 134 to 136 feet. Yellow oxidation present, white calcium streaks present, well cemented. Trace cobbles.	SWL = 132.54 feet bls on 12/21/14
136	40	40	20				Strong	5YR 4/4	SC	42/48	Clayey Sand with Gravel. Same as above and coarsens with depth. Increase in calcium, one large cobble (limestone, grey) at 138 feet. Well cemented interval.	
140	30	50	20				Moderate	5YR 4/4	SC	39/48	Clayey Sand with Gravel. Well-graded sand (as above) with fat, reddish brown clay and poorly graded gravel (fine). Moist from 140 to 142 feet, moderately cemented. Dry from 142 to 144 feet, very well cemented, with strong calcium presence.	141ft - attempted depth specific sample via push-ahead - no water in tool.
144	30	40	30				Moderate	5YR 4/4	SM	42/48	Silty Sand with Gravel. Silt and clay (70/30). Sand and gravel same as above with yellow oxidation present, well cemented.	
148	40	40	20				Strong	5YR 4/4	SC	38/48	Clayey Sand with Gravel. Same as above. Very dry from 150 to 151 feet, moderately cemented.	

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
152	40	20	40				Moderate	2.5YR 4/4	GC	41/48	Clayey Gravel with Sand. Well-graded sand, angular to subangular, polylithic (sandstone, limestone, quartz, siltstone, schist), very fine to coarse in reddish brown fat clay. Gravel is poorly graded (fine), angular to subangular and polylithic. Calcium streaks and yellow oxidation present, well cemented.	
156	20	60	20				Strong	2.5YR 4/6	SM	41/48	Silty Sand with Gravel. Same as above with silt. Very dry from 156 to 158 feet and has very strong calcium presence, upon wetting there is elastic silt. Moderately cemented.	
160	30	50	20				Strong	5YR 4/3	SC	44/48	Clayey Sand with Gravel. Reddish brown fat clay with well-graded sand as described above. Gravel is mostly fine with rare few up to 4 cm, subangular to subround, polylithic. Interval is streaked with calcium, wet from 160 to 161 feet and damp from 161 to 164 feet. Little to moderate cementation, slightly coarsens with depth.	160ft - Collect sample via bailer: pH= 7.76, EC= 484.6 µS/cm, field SO_4= 42mg/L (confirmed at 48mg/L); Logging by MML, artificial light.
164	30	60	10				Moderate	5YR 4/3	SC	40/48	Clayey Sand. Lithology as described above. Interval is saturated, moderately cemented.	
168	30	60	10				Moderate	5YR 4/3	SC	41/48	Clayey Sand. Same as above. Interval is damp, moderately to well cemented, sand fines with depth.	
172	30	60	10				Moderate	5YR 4/3	SC	39/48	Clayey Sand. Same as above, damp and well cemented. Sand is very fine to medium.	
176	40	50	10				Strong	5YR 4/4	SC	41/48	Clayey Sand. Reddish brown fat clay with well-graded sand (very fine to medium) as above. Well-graded gravel with couple of limestone cobbles (up to 13cm), subangular to subround, polylithic. Interval is damp and moderately cemented.	
180	30	40	30				Weak	7.5YR 4/4	SC	41/48	Clayey Sand with Gravel. Brown fat clay with well-graded sand, angular to subround, polylithic. Gravel is well-graded (fine to coarse) with one limestone cobble (11 cm) with cemented sand and gravel on the sides. Gravel is polylithic, subangular to subround. Interval is wet with poor cementation.	
182	20	50	30				weak	7.5YR 4/4	SC		Same as above with addition of some silt; fat clay/silt is 70/30.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
184	30	50	20				None	5YR 5/4	SC	47/48	Clayey Sand with Gravel. Reddish brown fat clay with well-graded (fine to coarse) sand, polylithic, angular to subround. Well-graded (fine to coarse) gravel is also polylithic (sandstone, limestone, schist, siltstone, loose quartz and plagioclase), subangular to round. Interval is wet, weakly cemented.	
188	30	40	30				None	5YR 5/4	SC	46/48	Clayey Sand with Gravel. Same as above with less coarse gravel.	
192	40	40	20				Moderate	7.5YR 4/4	SC	46/48	Clayey Sand with Gravel. Brown fat clay with well-graded (very fine to coarse) sand, polylithic, angular to subround. Polylithic, subangular to subround gravel is mostly fine but up to 5 cm. Interval is saturated through but less so than previous, loosely compacted. One visible streak of calcium.	
196	40	50	10				Strong	7.5YR 4/4	SC	41/48	Clayey Sand. Brown fat clay with well-graded sand (very fine to coarse) that fines with depth, is polylithic and angular to subround. Gravel as above but up to 3 cm. Interval is drier than above, damp, weakly to moderately cemented.	
200	30	50	20				Moderate	5YR 4/4	SC	44/48	Clayey Sand with Gravel. Reddish brown fat clay with well-graded polylithic sand (as above) that fines with depth. Subround, polylithic gravels are fine to coarse. Interval is saturated through, firm.	201ft - Collect sample via push-ahead: pH= 7.79, EC= 423.4 µS/cm, field SO_4= 57mg/L (confirmed at 62mg/L)
204	30	50	20				Moderate	5YR 5/4	SC	41/48	Clayey Sand with Gravel. Reddish brown fat clay with well-graded sand (very fine to coarse). Well-graded gravel (fine to coarse) is polylithic, subround. Interval is saturated, firm.	
208	30	50	20				Weak	5YR 5/4	SC	38/48	Clayey Sand with Gravel. Reddish brown fat clay with well-graded sand (very fine to coarse), angular to subround, polylithic. Lots of fine gravel but up to 6 cm, polylithic, subangular to subround. Interval is saturated (very watery form 210 to 212 feet) and firm.	
212	30	50	20				Moderate	5YR 5/4	SC	40/48	Clayey Sand with Gravel. Reddish brown lean clay with lots of fine sand although sand is well-graded (very fine to coarse) as above. Gravel also well-graded (fine to coarse), polylithic, subangular to subround. Interval is saturated, firm with calcium streaks.	
214	20	60	20				Moderate	5YR 5/4	SM		Silty Sand with Gravel. Sand and gravel as above with silt.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
216	30	50	20				Strong	5YR 5/3	SC	40/48	Clayey Sand with Gravel. Reddish brown lean clay and some silt (80/20) with well-graded sand (fine to coarse), is angular to subround, polylithic. Gravel is fine to coarse, subangular to subround, polylithic (sandstone, limestone, siltstone, schist, quartz). Interval is saturated, firm, coarsens with depth.	
220	20	60	20				Strong	5YR 5/3	SC	40/48	Clayey Sand with Gravel. Same as above, lots of coarse sand. Gravel up to 4 cm but mostly <1 cm. Increase in silt with depth. Interval is saturated, loose.	
224	20	60	20				Weak	2.5YR 5/4	SM	41/48	Silty Sand with Gravel. Well-graded sand (very fine to coarse) and gravel (fine to 8 cm, mostly <2 cm) are angular to subangular, polylithic (quartz, schist, sandstone, limestone, siltstone). Reddish brown silt. Some cobbles up to 20 cm. Interval is wet, well cemented.	224ft - Logging by VNH, 12/22/14, sunlight
226	30	50	20				Weak	2.5YR 5/4	SM		Silty Sand with Gravel. Sand and gravel as described above. Silt with lean clay (60/40).	
228	20	60	20				Weak	5YR 5/4	SM/SC	42/48	Silty, Clayey Sand with Gravel. Lean clay and silt (50/50). Sand and Gravel is poorly graded from 228 to 230 feet and well-graded from 230 to 232 feet. Cobbles only up to 12 cm. Interval is moist, soft and moderately cemented.	
232	30	50	20				None	5YR 4/4	SC	39/48	Clayey Sand with Gravel. Well-graded (very fine to coarse) sand, as above, with reddish brown fat clay with some silt (80/20), and well-graded (fine to 8 cm) gravel (as above). Interval is wet, poorly cemented, 232 to 234 feet is coarser grained than 234 to 236 feet.	
236	40	40	20				None	2.5 YR 6/4	SC	39/48	Clayey Sand with Gravel. Well-graded sand as above with fat, light reddish brown clay. Gravel as above. One large grey limestone cobble, 20 cm. Interval is saturated, moderately cemented.	
238	20	60	20				Weak	5YR 6/3	SM		Silty Sand with Gravel. Well-graded sand (as above) with light reddish brown silt. Gravel is fine, similar to sand, one cobble. Yellow and red oxidation present. Calcium streaks present. Interval has moisture, poorly cemented.	
240	30	50	20				Weak	5YR 6/3	SC	44/48	Clayey Sand with Gravel. Sand and gravel as above with fat clay. Interval is mostly dry, moderately cemented.	241ft - Collect sample via push-ahead: pH= 7.72, EC= 432.9 µS/cm, field SO_4= 160mg/L (confirmed at 134mg/L)
244	80	20	T				Strong	2.5YR 7/3	CH	47/48	Fat Clay with Sand. Light reddish brown fat clay with minor silt (90/10), has medium to high dry strength. Well-graded sand (as above). Some gravel present, mostly fine to medium. Interval is dry, hard, with a lot of white calcium streaking.	
247	30	50	20				Strong	2.5YR 7/3	SC		Clayey Sand with Gravel. Lithology as described above. Interval is wet, soft and moderately cemented.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
248	30	50	20				Moderate	5YR 4/4	SC	43/48	Clayey Sand with Gravel. Well-graded (very fine to coarse), angular to subangular, polylithic (quartz, limestone, sandstone, siltstone, schist) sand with reddish brown lean clay and silt (60/40). Gravel is well-graded (fine to 7 cm), angular to subangular and polylithic. Interval is moist, poorly cemented.	
252	40	50	10				Strong	5YR 5/4	SC	40/48	Clayey Sand. Sand and gravel as above. Loss of silt, fat clay present. Increase in calcium presence, moist from 252 to 253 feet, then very wet from 253 to 256 feet. Well cemented.	
256	30	50	20				Moderate	7.5YR 4/4	SC	40/48	Clayey Sand with Gravel. Brown fat clay with silt (60/40) and well-graded sand, polylithic, subangular to round. Polylithic well-graded gravel is subangular to subround plus a few cobbles, up to 10 cm. Interval is wet, poorly cemented.	256ft - Logging by MML, artificial light.
260	30	50	20				Moderate	7.5YR 4/4	SC		Same as above with less coarse sand, gravel up to 4 cm, no cobbles.	
262							Strong	5Y 6/4		40/48	Weathered bedrock - Pale olive fine grained sandstone is highly weathered, appears as gravel sized clumps that easily break between fingers.	**Bedrock** Logging by VNH, artificial light
264								5Y 6/3		40/48	As above with some angular, competent Limestone (6-12 cm)	
268								See Description		45/48	Light Grey (10YR 7/2) Limestone with light yellowish brown (104Y 6/4) friable mudstone, yellowish red (5YR 5/6) friable mudstone and pale brown (10YR 6/3) mud throughout.	very hard drilling
272												**TD= 272 feet. 12/23/14, 04:09**

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CLEAR CREEK ASSOCIATES

Project No.: 287051	Boring Name: BMO-2015-1B
Project Name: Expanded Groundwater Monitoring	Date/ Time Started: 1/26/15 07:42
ADWR Number: 55-917622	Date/Time Completed: 2/3/15 12:38
Location Cadastral: SE1/4 of NE1/4 of NW1/4 S18 T24S R24E	Drilling Equipment: GP24-300RS
Location NAD 83: 31° 20' 52.44"N, 109° 56' 56.94"W	Drilling Method: Rotosonic
Drill Company: Cascade Drilling L.P.	Bit Size/Type: *0-150 ft: 10.75-in; 150-256 ft: 9.5-in*
Driller(s): C Rockhill	Conductor Casing (type; diameter; depth): None
Logged By: M Lindsey and V Hermosilla	Total Borehole Depth: 256 feet

* Percentages of fines, sand, & gravel based on visual estimates of volume

■ Relative % fines (F < 0.074 mm)

□ Relative % sand (S >0.074 < 4.8 mm)

▨ Relative % gravel (G > 4.8 mm)

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
0	30	70	T				Strong	7.5YR 3/4	SM	41/48	Silty Sand. Interval is dry, weak cementation, dark brown. Silt has very soft consistency. Poorly graded sand (fine to medium). Roots present, organic smell. Trace fine gravel.	Start drilling 1/26/15, 07:42, drilling 12hr shifts. Logging by MML, in overcast conditions. Munsell year 2000 revised. Color of moist sample, unless noted otherwise.
2	20	70	10				Strong	7.5YR 5/6	SM		Silty Sand. Dry, weak cementation. Strong brown silt with very soft consistency. Well-graded sand (fine to coarse), poorly graded gravel (fine to <1.0 cm), felsic subround sandstone.	
4	20	60	20				Strong	7.5YR 5/6	SM	45/48	Silty Sand with Gravel. Dry, weak cementation, strong brown. Silt with very soft consistency. Well-graded sand (fine dominant), well-graded gravel up to 7 cm, angular to round, felsic limestone dominant with volcanics and sandstone.	
8	20	60	20				Weak	5YR 5/6	SM	43/48	Silty Sand with Gravel. Dry, weak to moderate cementation, yellowish red. Silt with clay (80/20%), soft consistency. Well-graded sand and gravel, angular to round, polylithic (quartz, plagioclase, siltstone, sandstone, limestone). Fines and sand form gravel-sized clumps. Coarsens with depth.	
12	20	60	20				Weak	5YR 5/6	SM	46/48	Silty Sand with Gravel. Same as above.	
14	20	80	T				None	7.5YR 5/8	SM		Silty Sand. Dry, clumps have medium to strong cementation, strong brown. Silt with clay (80/20%), soft. Poorly graded sand (fine).	
16	20	80	T				None	7.5YR 5/8	SM	43/48	Silty Sand. Dry, moderate to strong cementation, strong brown. Silt has soft consistency. Gradationally coarsens with depth from fine sand to well-graded sand and gravel up to 2.5 cm (subround, polylithic).	
20	20	70	10				None	7.5YR 5/8	SM	44/48	Silty Sand. Same as above. The bottom 6 inches (approximately 23.5 to 24 feet) is coated in dark reddish brown (2.5YR 3/4) fine sand.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
24	20	70	10				None	7.5YR 5/6	SM	45/48	Silty Sand. Dry, soft, weak cementation, strong brown. Silt has soft consistency. Well-graded sand, angular to subround, polylithic. Fine gravel mostly felsic igneous rock. Loss of gravel and coarse sand with depth to silt and fine sand with hard consistency.	24ft - continue logging in sunlight
26	50	50	0				None	7.5YR 5/6	CL		Sandy Lean Clay. Dry, gravel-sized clumps with strong cementation. Soft, strong brown lean clay (medium dry strength, medium plasticity) and fine sand.	
28	60	40	0				None	7.5 YR 5/8	CH	46/48	Sandy Fat Clay. Dry, large clumps are breakable by hand. Fat clay (high plasticity and dry strength) with fine sand. Fines with depth. Strong brown.	
32	40	60	0				None	7.5 YR 5/8	SC	42/48	Clayey Sand. Dry, clumps have weak cementation, fine to medium sand with soft , fat clay.	
34	10	50	40				Weak	7.5 YR 6/3	SW-SM		Well-graded Sand with Silt and Gravel. Dry, weakly cemented clumps. Soft, light brown silt. Well-graded sand and gravel, subangular to subround, polylithic.	
36	10	50	40				Moderate	7.5 YR 5/4	SW-SM	46/48	Well-graded Sand with Silt and Gravel. Dry, weakly cemented clumps. Soft, brown silt with well-graded sand and gravel as above. No cobbles. Large white calcite coated area (3 inches thick) at approximately 39 feet.	
40	10	60	30				Strong	7.5YR 5/4	SW-SM	47/48	Well-graded Sand with Silt and Gravel. Dry, clumps with weak to moderate cementation. Soft, brown silt with well-graded, angular to subangular, polylithic sand. Fine polylithic gravel up to 3 cm. Fines with depth.	40ft - Resume logging 1/27/15, MML, sunlight.
42	40	60	T				Moderate	7.5YR 4/6	SC		Clayey Sand. Dry, weakly to moderately cemented clumps, strong brown. Soft, high plasticity fat clay with fine sand. Very minor calcite streaking (5%).	
44	40	60	0				Strong	7.5YR 4/6	SC	45/48	Clayey Sand. Same as above with fat clay/silt at 80/20 and 30% covered in calcite mineralization from 46 to 48 feet.	
48	70	30	0				Strong	5YR 5/4	CH	43/48	Sandy Fat Clay. Dry, soft, reddish brown. Highly plastic fat clay with silt (70/30) very fine sand forms moderately cemented gravel sized clumps.	
52	70	30	0				Strong	5YR 5/4	CH	42/48	Sandy Fat Clay. Same as above.	
54	10	60	30				Strong	5YR 5/4	SW-SM		Well-graded Sand with Silt and Gravel. Dry, no to weak cementation, reddish brown. Soft silt with well-graded sand & gravel. Angular to subround, polylithic but limestone dominant in gravel, one limestone cobble (11 cm).	

Notes: Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak, none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
56	10	70	20				Strong	5YR 5/4	SW-SM	44/48	Well-graded Sand with Silt and Gravel. Dry, no to weak cementation, reddish brown. Soft silt with well-graded sand and gravel, angular to subround, polylithic (limestone, siltstone, sandstone). Fines with depth.	
58	70	30	T				Moderate	5YR 5/4	CH		Sandy Fat Clay. Dry, firm, 30% calcium streaking. Fat clay with fine sand forms moderately cemented clumps.	
60	90	10	0				Strong	5YR 4/6	CH	46/48	Fat Clay. Dry, hard, minor calcium mineralization. Fat clay with very fine sand forms moderately to strongly cemented clumps. Yellowish red.	
62	20	60	20				Strong	5YR 5/4	SC		Clayey Sand with Gravel. Dry, moderate cementation. Reddish brown, soft clay/silt (80/20). Fine to medium sand, fine to 6 cm gravel (limestone).	
64	10	60	30				Moderate	5YR 5/4	SW-SM	41/48	Well-graded Sand with Silt and Gravel. Dry, weak cementation. Soft silt with some clay (80/20). Well-graded sand, angular to round, polylithic (quartz, plagioclase, quartzite, sandstone, siltstone, limestone). Well-graded gravel, angular to subround, also polylithic, 40% calcite coating. One siltstone cobble (9 cm).	
68	20	60	20				Moderate	5YR 4/6	SM	44/48	Silty Sand with Gravel. Dry, weak cementation, yellowish red. Soft clayey silt (60s/40c), fines with depth. Well-graded, polylithic sand. Gravel up to 5cm but mostly <2 cm.	
70	20	50	30				Strong	5YR 6/2	SM		Silty Sand with Gravel. Dry, moderate cementation, pinkish grey. 90% coated in calcite. Firm, clayey silt (60s/40c). Well-graded sand. Well-graded gravel. Lots of large limestone gravels and one cobble (9 cm).	
72	10	70	20				Strong	5YR 4/6	SW-SM	41/48	Well-graded Sand with Silt and Gravel. Dry, no cementation, yellowish red. Soft silt with well-graded sand and gravel up to 5 cm.	
74	10	50	40				Strong	5YR 4/6	SW-SM		Well-graded Sand with Silt and Gravel. Same as above with silt/clay 80/20. More large gravel (limestone).	
76	10	60	30				None	5YR 4/6	SW-SM	43/48	Well-graded Sand with Silt and Gravel. Dry, no cementation from 76 to 78 feet and moderate cementation from 78 to 80 feet. Yellowish red. Soft, clayey silt (80s/20c). Well-graded, polylithic, angular to subround sand. Fine to 6 cm gravel, subangular to subround, polylithic. From 79 to 80 feet lots of gravel fine to 3 cm completely coated in calcite and strong HCL reaction.	
80	30	60	10				Strong	2.5YR 4/6	SC	45/48	Clayey Sand. Dry, moderate to strong cementation of clumps, Red, 60% coated in calcite. Firm, fat, plastic clay with silt (70c/30s). Fine to medium sand. Fine gravel, subangular to subround, polylithic.	
84	20	60	20				Strong	5YR 4/6	SC	44/48	Clayey Sand with Gravel. Dry, firm clay, with moderate to strong cementation from 84 to 86 feet, soft clay with moderate cementation from 86 to 88 feet. Yellowish red. Fine sand coarsens with depth. Polylithic, well-graded gravel.	

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Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
88	20	60	20				Moderate	5YR 4/6	SC	44/48	Clayey Sand with Gravel. Dry, weak to moderate cementation of clumps, yellowish red. Soft lean clay, moderate plasticity. Predominantly fine to medium sand, however, coarsens with depth, subangular to subround, polylithic. Well-graded gravel (fine to coarse), angular to round, polylithic (limestone, siltstone, sandstone, quartz). 30% calcite coating.	88ft - Resume logging 1/28/15, MML, sunlight.
92	20	60	20				Strong	5YR 4/6	SC	47/48	Clayey Sand with Gravel. Dry, weak to moderate cementation, yellowish red. Soft, fat clay, high plasticity. Fine to coarse sand, polylithic, subangular to subround. Predominantly fine gravel (1 cm) with few up to 4 cm, subangular to subround, polylithic. 20% calcite coating.	
96	20	50	30				Strong	5YR 4/6 to 5YR 5/4	SC	47/48	Clayey Sand with Gravel. Dry, no to moderate cementation, yellowish red. Soft, fat clay, high plasticity, well-graded polylithic sand (increases in sand with depth). Fine to 6 cm gravel, angular to subround, polylithic, some are strongly cemented clumps. From 99 to 100 feet there are finer sands and gravels (reddish brown, 5YR 5/4).	
100	10	60	30				Strong	5YR 4/6	SW-SC	46/48	Well-graded Sand with Clay and Gravel. Dry, no to moderate cementation (increases with depth), yellowish red. Soft, fat clay (increases with depth). Lots of medium sand but overall well-graded, polylithic. Well-graded gravel, angular to subround, polylithic, one sandstone cobble (10 cm). 30% calcium coating.	
104	30	60	10				Weak	2.5YR 4/6	SC	44/48	Clayey Sand. Dry, moderate cementation, red. Soft, fat clay with minor silt (80/20). Well-graded polylithic sand. Mostly fine gravel with few up to 3 cm, subangular to subround.	
106	10	60	30				Strong	5YR 5/4	SW-SC		Well-graded Sand with Clay. Dry, no to weak cementation, reddish brown. Soft, fat clay with well-graded sand, subangular to subround, polylithic. Fine to 4 cm gravel, angular to subround, polylithic. 90% coated in calcite.	106ft - Resume drilling 1/27/15.
108	20	60	20				Strong	5YR 4/6	SC	42/48	Clayey Sand with Gravel. Dry, moderate cementation, yellowish red. Soft clay/silt (80/20, coarsens to 60/40 with depth). Well-graded sand fines to fine sand with depth. Gravel <3 cm, polylithic, subangular to subround, one sandstone cobble (12 cm). 40% calcite coating.	
112	20	60	20				Strong	5YR 5/4	SC	42/48	Clayey Sand with Gravel. Dry, weak cementation, reddish brown, overall fines with depth. Clay has soft consistency. Well-graded sand, polylithic, subangular to subround. Gravel <3 cm, polylithic, subangular to subround. 40% calcite coating.	
116	20	60	20				Strong	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Dry, moderate to strong cementation, reddish brown. Well-graded sand coarsens with depth. Lots of coarse sand/very fine gravel (0.5 cm), polylithic, angular to subround gravel. Firm, fat clay. 20% calcite coating.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
120	30	50	20				Strong	5YR 4/4	SC	43/48	Clayey Sand with Gravel. Dry, moderate to strong cementation, reddish brown, coarsens with depth. Firm, fat clay with fine sand. Fine gravel (<3 cm), polylithic (sandstone, siltstone, limestone, quartz, plagioclase), subangular to subround. 30% calcium coating.	
124	30	60	10				Strong	5YR 4/6	SC	41/48	Clayey Sand. Dry, weak to moderate cementation, yellowish red. Firm, fat clay with fine to medium sand (fines with depth). Gravel up to 3 cm, polylithic, subround. 20% coated in calcite.	SWL = 127.85 bls. 1/27/15, 11:56
128	40	50	10				Moderate	5YR 6/4	SC	42/48	Clayey Sand. Dry, strong to moderate cementation, light reddish brown. Hard, fat clay with predominantly fine sand. Fine gravel, polylithic, subangular to subround, up to 3 cm.	
132	30	60	10				Strong	5YR 4/4	SC	40/48	Clayey Sand. Dry. Firm to hard (hardens with depth) clay. Fine to medium sand (fines with depth). Fine gravel (<2 cm), subangular to subround. 20% coated.	
136	30	60	10				Strong	5YR 4/4	SC	45/48	Clayey Sand. Dry, moderate cementation, reddish brown. Firm, fat clay (hydrated), fine to medium sand (coarsens with depth). Gravel <4 cm, polylithic, subangular. One limestone cobble (10 cm). 50% coated.	
140	30	60	10				Moderate	5YR 4/6	SC	44/48	Clayey Sand. Moist, moderate cementation, yellowish red. Firm, fat clay, sticky, high plasticity. Well-graded sand, subangular to subround, polylithic. Gravel up to 4 cm, subangular to subround, polylithic. 30% coated.	
144	40	30	30				Strong	5YR 4/6	SC	46/48	Clayey Sand with Gravel. Moist, moderate cementation, yellowish red. Firm, fat clay with fine to medium sand. Fine gravel, polylithic, subangular to subround, <2 cm. 10% coated.	145ft - Push-ahead failed. Collect borehole sample via bailer: pH = 7.77, EC = 454.3 µS/cm, field SO_4 = 20 mg/L (confirmed at 20 mg/L)
148	40	40	20				Strong	5YR 4/6	SC	46/48	Clayey Sand with Gravel. Moist from 148 to 151 feet, dry from 151 to 152 feet, moderate cementation, yellowish red. Fat clay with fine sand. Well-graded gravel, polylithic, subangular to subround. One sandstone cobble (9 cm).	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
152	50	40	10				Strong	5YR 4/4	CH	43/48	Sandy Fat Clay. Moist, hard, reddish brown. Fat clay. Fine sand, some medium with fine gravel, subangular to subround, polylithic (limestone, sandstone, siltstone), moderately cemented.	
156	40	50	10				Strong	5YR 4/6	SC	41/48	Clayey Sand. Dry (some moisture from 158 to 159 feet, moderate cementation, yellowish red. Firm, fat clay with fine to medium sand. Gravel is fine to 4 cm, subangular to subround, polylithic as above.	
160	50	40	10				Moderate	5YR 4/6	CH	45/48	Sandy Fat Clay. Moist, hard, yellowish red. Fat clay with fine to medium sand from 160 to 162 feet, and fine sand from 162 to 164 feet. Gravel up to 3 cm, polylithic, subround, moderate cementation. 20% calcium coating.	160ft - Resume logging 1/29/15, MML, overcast.
164	40	40	20				Strong	5YR 4/6	SC	44/48	Clayey Sand with Gravel. Dry, moderate cementation, yellowish red. 70% coated in calcite. Firm, fat clay, fine sand, fine to coarse gravel (lots of limestone and sandstone), subangular to subround.	164ft - Resume drilling 1/28/15.
168	30	50	20				Strong	5YR 4/6	SC	44/48	Clayey Sand with Gravel. Dry, moderate cementation, yellowish red. 50% coated in calcite. Firm, fat clay (decreases with depth). Well-graded sand (coarsens with depth). Fine gravel (up to 3 cm), polylithic, subangular to subround.	
172	40	30	30				Moderate	5YR 5/4	SC	46/48	Clayey Sand with Gravel. Moist (increases with depth), weak cementation, reddish brown, 10% calcite streaks. Firm, fat clay. Fine to coarse sand (fines with depth). Well-graded gravel, subangular to subround, polylithic, green alteration, lots of large gravel (5 to 7.5 cm). Cobbles up to 12 cm.	
176	40	30	30				Weak	5YR 5/4	SC	45/48	Clayey Sand with Gravel. Moist, weak cementation, reddish brown. Firm, fat clay. Predominantly fine sand but fine to coarse present. Well-graded gravel, as above, several cobbles up to 10 cm.	
180	20	50	30				Strong	5YR 5/4	SC	45/48	Clayey Sand with Gravel. Moist, weak cementation, reddish brown. Firm, fat clay. Fine to coarse sand (coarsens with depth). Fine to 6 cm gravel, subangular to subround, fines with depth, polylithic, green alteration, limestone is highly weathered, sometimes crumbling.	

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
184	40	30	30				Moderate	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Moist, weak cementation, reddish brown. Firm, fat clay. Well-graded sand, polylithic, subangular to subround. Gravel is fine to coarse with lots of pieces <2 cm and >5 cm, multiple cobbles (up to 11 cm), subangular to subround. Polylithic (siltstone, limestone, sandstone, quartz). Highly weathered with green alteration.	186ft - Collect borehole sample via bailer: pH = 7.80, EC = 578.5 µS/cm, Field SO_4 = 142 mg/L (confirmed at 128 mg/L)
188	40	30	30				Strong	5YR 5/4	SC	45/48	Clayey Sand with Gravel. Same as described above, cobbles up to 12 cm.	
192	20	50	30				Strong	7.5YR 5/4	SC	44/48	Clayey Sand with Gravel. Moist to wet, weak cementation, brown. Same as above with cobbles up to 12 cm.	
196	30	40	30				Strong	7.5YR 4/6	SC	45/48	Clayey Sand with Gravel. Moist, weak cementation, strong brown. Firm, fat clay. Fine to medium sand from 196 to 198 feet, fine to coarse sand from 198 to 200 feet. Polylithic, well-graded gravel, subround, one cobble (11 cm).	198ft - Resume drilling 1/29/15.
200	30	50	20				Strong	5YR 5/4	SC	46/48	Clayey Sand with Gravel. Moist, weak cementation, reddish brown. Hard, fat clay. Well-graded sand (but mostly fine). Well-graded polylithic gravel.	
204	20	60	20				Strong	5YR 4/6	SC	45/48	Clayey Sand with Gravel. Moist, weak cementation, yellowish red. Firm, fat clay. Fine to coarse sand. Well-graded gravel, polylithic, subround, subangular, 2 small cobbles (up to 9 cm).	
208	30	50	20				Strong	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Moist, soft clay from 208 to 210 feet. Hard clay, nearly dry from 210 to 212 feet. Fine to coarse sand (fines with depth). Fine to coarse gravel (coarsens with depth), polylithic, angular to round. Reddish brown.	
212	20	60	20				Strong	5YR 5/4	SC	44/48	Clayey Sand with Gravel. Moist, weak cementation, reddish brown. Firm, fat clay with well-graded sand, angular to subround, polylithic. Well-graded gravel, subround to subangular, polylithic. One cobble (9 cm).	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
216	30	40	30				Strong	5YR 5/4	SC	47/48	Clayey Sand with Gravel. Moist, weak cementation, reddish brown. Hard, fat clay with well-graded sand from 218 to 220 feet, fine sand from 216 to 218 feet. Well-graded gravel, subangular to subround, polylithic (sandstone, limestone, siltstone, quartz).	
220	30	50	20				Strong	5YR 4/4	SC	47/48	Clayey Sand with Gravel. Moist, weak cementation, reddish brown. Firm, fat clay. Fine sand, fines with depth. Fine to coarse gravel, coarsens with depth. Cobbles up to 13cm.	
224	30	50	20				Strong	5YR 4/6 and 2.5YR 5/4	SC	46/48	Clayey Sand with Gravel. Interval is moist, weak cementation. Yellowish red from 224 to 226 feet, reddish brown from 226 to 228 feet. Clay is fat, firm, slightly more from 226 to 228 feet. Sand is well-graded, fine to coarse, subround to angular, polylithic (sandstone, quartz, limestone, siltstone). Gravel is well-graded (fine to 8 cm), predominantly fine grained sandstone, 2 cobbles up to 10 cm, fine grained sandstone.	226ft - Collect borehole sample via bailer: pH=7.71, EC = 703.0 µS/cm, Field SO_4=196mg/L (confirmed at 212 mg/L); -Pause drilling for 4 days off; -Resume drilling 2/3/15, VNH logging in sunlight.
228	30	40	30				Weak	2.5YR 5/4	SC	43/48	Clayey Sand with Gravel. Moist, weakly cemented, reddish brown. Clay is fat, soft. Sand is well-graded (fine to coarse), subround to angular, polylithic as above. Gravel is well-graded (fine to 8 cm), subround to angular, polylithic as sand. 2 cobbles up to 12 cm.	
232	10	70	20				Strong	2.5YR 5/4	SW-SC	44/48	Well-graded Sand with Clay and Gravel. Moist, weakly cemented, reddish brown. Fines are clay dominant (80/20%); clay is fat with soft consistency. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is moderately graded, fine to medium, with some grains up to 8 cm, angular to subround, polylithic as sand. One 9 cm cobble, Glance Conglomerate.	
236	20	40	40				Strong	2.5 YR 5/4	SC	46/48	Clayey Sand with Gravel. Moist, weakly cemented, light reddish brown. Soft, fat clay dominant. Sand as above. Gravel as above, with approximately 50% from 5 to 8 cm in diameter.	
240	30	50	20				Strong	2.5YR 6/4	SC	44/48	Clayey Sand with Gravel. Moist, weakly cemented, light reddish brown. Clay is fat, soft, clumps easily. Sand and gravel as above. One cobble up to 12cm.	
244										45/48	Cintura/Morita Formation: Yellow, reddish yellow, dark red, thinly bedded to indiscernibly bedded, friable claystone. Some siltstone with fine grained sand present. Areas of gray, light olive, and grayish red claystone and clayey siltstone. Red streaks present.	**Bedrock - Cintura/Morita Formation**

Notes: Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak, none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
248										46/48	Cintura/Morita Formation: Yellow, reddish yellow, dark red, thinly bedded to indiscernibly bedded, friable claystone. Some siltstone with fine-grained sand present. Areas of gray, light olive, and grayish red claystone and clayey siltstone. Red streaks present.	**Bedrock - Cintura/Morita Formation**
252										45/48	Same as described above.	
256												**TD = 256 feet** 2/3/15 12:38

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CLEAR CREEK ASSOCIATES

Project No.: 287051	Boring Name: BMO-2015-2B	* Percentages of fines, sand, & gravel based on visual estimates of volume
Project Name: Expanded Groundwater Monitoring	Date/ Time Started: 2/11/15 11:30	
ADWR Number: 55-917827	Date/Time Completed: 2/23/15 13:30	■ Relative % fines (F < 0.074 mm)
Location Cadastral: SE1/4 of SE1/4 of SW1/4 S07 T24S R24E	Drilling Equipment: GP24-300RS	
Location NAD 83: 31° 21' 3.64"N, 109° 56' 45.31"W	Drilling Method: Rotosonic	□ Relative % sand (S >0.074 < 4.8 mm)
Drill Company: Cascade Drilling L.P.	Bit Size/Type: *0-150 ft: 10.75-in; 150-272 ft: 9.5-in; 272-280 ft: 8-in*	
Driller(s): C. Rockhill	Conductor Casing (type; diameter; depth): None	▨ Relative % gravel (G > 4.8 mm)
Logged By: V. Hermosilla and R. Toomey	Total Borehole Depth: 280 feet	

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
0	70	30	T				Strong	7.5YR 3/4	ML	41/48	Sandy Silt. Moist, very soft consistency. Dark brown. Roots are present. Fines are silt dominant (70/30%). Sand is poorly graded, predominantly fine, angular to subround, polylithic (sandstone, siltstone, limestone, quartz), weak cementation. Some caliche present at bottom of interval. Trace gravel is fine, limestone dominant. Organic odor.	Start drilling 2/11/15, 11:30, drilling 12hr shifts. Logging by VNH, RDT. Color of moist sample, unless noted otherwise.
2	20	60	20				Strong	5YR 5/6	SM		Silty Sand with Gravel. Dry, weak cementation, yellowish red. Organic odor, some roots present, calcium coating on approximately 50% of gravel grains. Fines are silt, very soft. Sand is well-graded (fine to coarse), angular to subround, polylithic as above. Gravel is moderately graded (fine to medium), angular to subangular, polylithic as sand.	
4	30	50	20				Strong	5YR 5/6	SM	41/48	Silty Sand with Gravel. Dry, weak cementation, roots present from 4 to 6 feet. Fines are silt dominant (80/20%), very soft. Sand is well-graded (fine to coarse), angular to subround, polylithic as above. Gravel is moderately graded (fine to medium), subangular to subround, calcium coating on approximately 50% of gravel grains. Yellowish red.	
8	80	20	T				Strong	5YR 6/6	ML	39/48	Silt with Sand. Dry, soft, reddish yellow. Fines are silt dominant (60/40%), moderately cemented gravel sized clumps. Sand is well-graded (fine to coarse), angular to subround, polylithic as above, moderate cementation. Trace gravel, all fine, polylithic.	
12	20	70	10				Strong	5YR 5/6	SC	43/48	Clayey Sand. Dry, weak to moderate cementation, reddish yellow. Fines are clay dominant (60/40%), some moderately cemented gravel sized clumps, soft. Sand is well-graded (fine to coarse), angular to subround, polylithic as above. Gravel is poorly graded (fine to medium), one grain approximately 4 cm. Some calcium cementation on gravel.	
14	30	60	10				Strong	5YR 6/4	SC		Clayey Sand. Dry, moderate cementation, light reddish brown. Fines are soft, clay dominant (80/20%), lots of moderately cemented gravel sized clumps (about 3 cm). Sand is well-graded (fine to coarse), angular to subround, polylithic as above. Gravel is poorly graded, predominantly fine, some calcium cementation.	
16	30	60	10				Strong	5YR 5/4	SC	42/48	Clayey Sand. Dry, moderate cementation, reddish brown. Fines are soft, clay dominant (80/20%), moderately cemented gravel sized clumps, (1 to 4 cm). Sand is well-graded (fine to coarse), angular to subround, polylithic as above. Gravel is poorly graded, mostly fine, polylithic.	
20	50	50	T				Strong	5YR 5/3 and 5YR 4/6	CH	43/48	Sandy Fat Clay. Dry, soft, calcium streaks present, reddish brown from 20 to 22 feet, and yellowish red from 22 to 24 feet. Fines are clay dominant (70/30%). Sand is poorly graded, mostly fine, some trace fine gravel, moderately cemented.	20 ft - VNH logging, 2/12/15, sunlight

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
24	30	70	T				Strong	5YR 5/4	SC	44/48	Clayey Sand. Dry, weak cementation, reddish brown from 24 to 26 feet, and yellowish red from 26 to 28 feet, some moderately cemented gravel sized clumps, and some calcium coating on clumps and grains. Fines are clay dominant (70/30%), soft. Sand is moderately graded, approximately 30% fine, remaining is medium to coarse, polylithic (sandstone, siltstone, limestone, quartz), calcium cementation present on coarse grains. Trace fine gravel. Polylithic as above, angular to subround.	
28	30	70	T				Strong	5YR 5/4	SC	42/48	Clayey Sand. Dry, weak cementation, reddish brown, very similar to above. Slightly more sand and trace fine gravel from 30 to 32 feet.	
32	30	70	T				Strong	5YR 5/4	SC	48/48	Clayey Sand. Dry, weak cementation, reddish brown. Same as above, sand is moderately graded, fine to medium with some coarse present.	
36	20	80	T				Strong	5YR 5/4	SC	43/48	Clayey Sand. Dry, weak cementation, reddish brown. Fines are very soft clay. Sand is poorly graded, mostly fine with trace medium to coarse grains. Trace gravel is fine.	Disturbed sample- fell out of bag during collection
40	40	60	T				Strong	5YR 5/4	SC	40/48	Clayey Sand. Dry, weak cementation, reddish brown. Fines are clay dominant (80/20%), very soft. Sand is poorly graded, predominantly fine, some medium to coarse (about 10%), polylithic, angular to subround as above.	
44	40	60	0				Strong	5YR 5/4	SM	42/48	Silty Sand. Dry, weak cementation, reddish brown. Fines are silt dominant (80/20%), very soft. Sand is poorly graded, predominantly fine, some medium to coarse.	
48	20	50	30				Strong	5YR 5/4	SC	45/48	Clayey Sand with Gravel. Dry, weak to moderate cementation, calcium coating and cementation on grains, reddish brown. Fines are clay dominant (60/40%), very soft. Sand is well-graded (fine to coarse), polylithic, angular to subround. Gravel is well-graded (fine to coarse), similar to sand. One 10 cm cobble.	
52	10	40	50				Strong	5YR 5/4	GW-GM	39/48	Well-graded Gravel with Silt. Dry, weak cementation, some strongly cemented clumps. Reddish brown. Fines are silt, soft. Sand is well-graded (fine to coarse). Gravel is well-graded (fine to 4 cm). Sand and gravel are polylithic as above, angular to subround as above. Some calcium coating on grains.	

Notes: Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak, none)

CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
56	T	50	50				Strong	5YR 5/6	GW	43/48	Well-graded Gravel with Sand. Dry, weak cementation, yellowish red. Trace fines are silt, soft. Sand and gravel (fine to 8 cm) are well-graded, polylithic (sandstone, siltstone, limestone, quartz), angular to subround. Two cobbles up to 12 cm.	56ft - VNH & RDT Logging, 2/12/15, sunlight
60	10	40	50				Strong	5YR 5/6	GW-GC	41/48	Well-graded Gravel with Clay and Sand. Dry, weak cementation, calcium coating on grains, yellowish red. Fines are clay, very soft. Sand is well-graded, angular to subround, polylithic as above. Gravel is moderately graded (fine to medium), some 5 cm grains, angular to subround.	62ft - Resume drilling 2/12/15
64	30	70	T				Strong	2.5YR 5/4	SC	43/48	Clayey Sand. Dry, weak cementation, reddish brown. Fines are clay, very soft. Sand is poorly graded, predominantly fine with trace medium to coarse, moderate caliche present, dominantly polylithic as above, caliche is size of coarse sand and fine gravel.	
68	30	70	T				Strong	2.5YR 5/4	SC	46/48	Clayey Sand. Dry, weak cementation with moderately cemented clumps. Same as above. Some silt present, still clay dominant (80/20%), soft.	
72	20	40	40				Strong	5YR 4/3	SM	43/48	Silty Sand with Gravel. Dry, weak cementation, calcium coating on grains, reddish brown. Fines are silt, soft. Sand is well-graded (fine to coarse), polylithic. Gravel is well-graded (fine to 8 cm). Many grains are fine-grained sandstone, both sand and gravel are angular to subround.	
76	20	40	40				Strong	5YR 4/3	SM	41/48	Silty Sand with Gravel. Same as above.	
78	80	20	0				Strong	5YR 5/4	CH		Fat Clay with Sand. Dry, very soft. Fines are fat clay, appear as platy claystone. Reddish Brown. Sand is poorly graded, fine, subangular to subround, moderate cementation.	
80	40	40	20				Strong	5YR 5/3	SC	43/48	Clayey Sand with Gravel. Dry, moderate cementation, reddish brown. Fines are clay dominant (80/20%), very soft. Sand is well-graded (fine to coarse), polylithic, angular to subround. Gravel is moderately graded (fine to medium), similar to sand, calcium coating on grains.	
84	20	40	40				Strong	2.5YR 5/4	SC	40/48	Clayey Sand with Gravel. Dry, moderate cementation, calcium coating and yellow oxidation present, reddish brown. Fines are clay dominant (70/30%), very soft. Sand is well-graded (fine to coarse). Gravel is well-graded (fine to 7 cm). Both sand and gravel are polylithic and angular to subround. One 12 cm cobble.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
88	10	30	60				Strong	2.5YR 5/4	GW-GM	44/48	Well-graded Gravel with Silt and Sand. Dry, weak cementation, reddish brown. Fines are silt, very soft. Sand is well-graded (fine to coarse), polylithic (sandstone, limestone, quartz), angular to subround. Gravel is well-graded (fine to 8 cm). Two 10 cm cobbles present. Calcium coating on grains.	VNH & RDT continue logging, 2/12/15, sunlight
92	10	20	70				Strong	2.5YR 5/4	GW-GM	43/48	Well-graded Gravel with Silt and Sand. Dry, weak cementation, reddish brown. Fines are silt, very soft. Sand is well-graded (fine to coarse), polylithic as above, angular to subround. Gravel is well-graded (fine to 8 cm), polylithic, angular to subround. A few 10 cm cobbles. Calcium coating on grains throughout.	
96	20	50	30				Strong	2.5YR 5/4	SC	37/48	Clayey Sand with Gravel. Dry, overall weakly cemented with moderately cemented clumps. Calcium coating on grains. Reddish brown. Fines are clay dominant (70/30%), very soft consistency. Sand is well-graded, as above. Gravel is well-graded (fine to 7 cm), as above. One 12 cm cobble.	
98	20	50	30				Weak	2.5YR 5/4	SM		Silty Sand with Gravel. Same as above, fines are silt. Less calcium. Gravel is fine to 3 cm.	
100	10	40	50				Strong	2.5YR 4/4	GW-GM	47/48	Well-graded Gravel with Silt and Sand. Dry, weak cementation, calcium coating on grains, reddish brown. Fines are silt dominant (70/30%), very soft. Sand is well-graded (fine to coarse), angular to subround, polylithic as above. Gravel is well-graded (fine to 8 cm), angular to subround, polylithic as sand. One 10 cm cobble, and one 11 cm cobble size piece of caliche.	
104	30	60	10				Strong	2.5YR 5/4	SC	43/48	Clayey Sand. Dry, moderate cementation, reddish brown, calcium streaks and coating on grains. Fines are clay-dominant (70/30%), very soft. Sand is well-graded (fine to coarse), angular to subround, polylithic as above. Gravel is poorly graded (mostly fine), with one 6 cm grain.	
108	10	50	40				Strong	2.5YR 4/4	SW-SM	39/48	Well-graded Sand with Silt and Gravel. Dry, weak cementation, calcium coating on grains and streaks throughout, reddish brown. Fines are silt dominant (60/40%), very soft. Sand is well-graded (fine to coarse), angular to subround, polylithic as above. Gravel is moderately graded (fine to medium), with some coarse grains up to 8 cm.	
112	20	50	30				Moderate	2.5YR 4/4	SM	45/48	Silty Sand with Gravel. Dry, weak cementation, calcium coating on grains and some streaks, reddish brown. Fines are silt dominant (60/40%), soft; clay clumps into gravel and cobble sized pieces with silt and sand. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is poorly graded, fine with some 5 to 8 cm grains. One 13 cm cobble with calcium coating.	112ft - Pause drilling 2/12/15; resume drilling 2/19/15, 15:17; VNH Logging, sunlight
116	20	50	30				Strong	2.5YR 4/6	SM	45/48	Silty Sand with Gravel. Dry, moderate cementation, some calcium coating and streaks, red. Same as above. Gravel is moderately graded, fine to medium, trace cobbles. Yellow and red oxidation present.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
120	T	70	30					2.5YR 4/4	SW	44/48	Well-graded Sand with Gravel. Dry, weakly cemented, some calcium coating on grains and calcium streaks, reddish brown. Fines are silt, very soft. Sand is well-graded, fine to coarse, angular to subround, polylithic (quartz, sandstone, limestone, some schist and volcanics). Gravel is poorly graded, fine with some medium grains. Yellow oxidation present.	120ft - VNH Logging, 2/20/15, overcast
124	10	60	30				Weak	2.5YR 4/4	SW-SM	43/48	Well-graded Sand with Silt and Gravel. Dry, moderately cemented, calcium streaks, yellow oxidation present. Reddish brown. Fines are silt with some clay, very soft. Sand is well-graded, angular to subround, polylithic as above. Gravel is poorly graded, fine with some medium grains.	
128	10	60	30				Strong	2.5YR 4/4	SW-SM	43/48	Well-graded Sand with Silt and Gravel. Same as above. Silt/Clay is 60/40%.	
132	10	60	30				Strong	2.5YR 4/4	SW-SM	44/48	Well-graded Sand with Silt and Gravel. Same as above.	
136	10	50	40				Strong	2.5YR 4/6	SW-SM/SC	40/48	Well-graded Sand with Silt/Clay and Gravel. Dry, moderate cementation, calcium coating on grains. Red. Fines are silt/clay (50/50%), very soft; silt dominant from 136 to 138 feet, clay dominant from 138 to 140 feet. Sand and gravel as above.	138ft - Resume drilling 2/20/15
140	20	70	10				Moderate	2.5YR 4/4	SC	39/48	Clayey Sand. Dry, moderately cemented, calcium streaks present, reddish brown. Fines are clay-dominant (80/20%), very soft, and present as well-cemented gravel and cobble size clumps. Sand is well-graded, angular to subround, polylithic as above. Gravel is poorly graded, fine.	
144	10	50	40				None 144-147 & Strong 147-148	2.5YR 4/4	SW-SC	45/48	Well-graded Sand with Clay and Gravel. Dry, moderately cemented, calcium streaks from 144 to 147 feet, calcium coating on grains from 147 to 148 feet. Fines are clay dominant (80/20%), very soft, and present as gravel to cobble sized clumps. Sand is well-graded, angular to subangular, polylithic as above. Gravel is poorly graded, mostly fine, some medium to 4 cm grains.	
148	10	50	40				None	2.5YR 4/4	SW-SC	46/48	Well-graded Sand with Clay and Gravel. Reddish brown. Same as above.	SWL = 150.16 ft bls 2/20/15, 15:00

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
152	20	40	40				None	2.5YR 4/4	SC	43/48	Clayey Sand with Gravel. Dry from 152 to154 feet, moist from 154 to156 feet, moderately cemented. Reddish brown. Fines are clay dominant (70/30%), very soft. Sand is well-graded, fine to coarse, angular to subround, polylithic (limestone, sandstone, quartz, mudstone, volcanics). Gravel is well-graded (fine to 4 cm), angular to subangular, polylithic.	
156	20	40	40				Weak	2.5YR 4/4	SC	39/48	Clayey Sand with Gravel. Dry from 156 to158 feet, moist from 158 to160 feet, very soft, moderate cementation, reddish brown. Lithology as described above.	
160	20	50	30				Strong 160-162 & None 162-164	2.5YR 4/4	SC	42/48	Clayey Sand with Gravel. Moderate cementation, reddish brown. Fines are clay dominant (70/30%), very soft. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is well-graded (fine to 4 cm), angular to subround, polylithic.	
164	20	50	30				Strong	2.5YR 4/4	SC/SM	42/48	Clayey/Silty Sand with Gravel. Moderately cemented from 164 to 166 feet, weak cementation from 166 to 168 feet, but with strongly cemented clumps. Fines are very soft, 50/50% clay/silt, from 164 to 166 feet is clay dominant, and from 166 to 168 feet is silt dominant. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is well-graded (fine to 4 cm), angular to subround, polylithic.	
168	20	40	40				Strong	2.5YR 4/6	SC	42/48	Clayey Sand with Gravel. Dry, moderately cemented, red. Fines are clay, soft. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is well-graded, angular to subround, polylithic as above.	168ft - VNH Logging, 2/21/15, overcast
170	20	60	20				Strong	2.5YR 5/4	SC		Clayey Sand with Gravel. Moist, moderately cemented, reddish brown. Fines are clay, firm. Sand and gravel as above. One 10 cm cobble.	170ft - Collect open borehole sample via bailer: pH = 7.46, EC = 537.3 µS/cm, Field SO_4 = 84 mg/L (confirmed at 68 mg/L) - Resume drilling 2/21/15
172	20	50	30				Strong	2.5YR 5/4	SC	47/48	Clayey Sand with Gravel. Moist, moderately cemented, reddish brown. Fines are clay, hard. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is well-graded (fine to 8 cm), angular to subround, polylithic.	
176	20	30	50				Strong	2.5YR 5/4	GC	46/48	Clayey Gravel with Sand. Moist, moderately cemented, reddish brown. Fines are clay, soft consistency. Sand as above. Gravel is well-graded, fine to 8cm, several grains are greater than 4 cm.	
178	20	50	30				Strong	2.5YR 5/4	SC	42/48	Clayey Sand with Gravel. Dry, moderately cemented, calcium coating and streaks, some yellow oxidation present. Fines are clay, very soft. Sand and gravel as above.	
180	20	50	30				Strong	2.5YR 5/4	SM		Silty Sand with Gravel. Moist, weak cementation, reddish brown. Fines are silt dominant, very soft. Sand as above. Gravel is moderately graded, fine to medium.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
184	10	40	50				Strong	2.5YR 5/4	GW-GM	46/48	Well-graded Gravel with Silt and Sand. Moist, moderately cemented, reddish brown. Fines are silt dominant (60/40%), very soft consistency. Sand is well-graded, fine to coarse, angular to subround, polylithic (quartz, sandstone, limestone, volcanics, siltstone, chert). Gravel is well-graded, fine to 8 cm, angular to subround, polylithic. Four cobbles (10 to 15 cm). Gravel and cobbles prevalent from 186 to 188 feet.	
188	10	40	50				Strong	2.5YR 5/6	GW-GM	46/48	Well-graded Gravel with Silt and Sand. Moist, very soft consistency, red silt. Same as above. Two cobbles at 192 feet.	
192	30	40	30				Strong	2.5YR 5/6	SC	45/48	Clayey Sand with Gravel. Dry, moderately cemented, red, calcium coating on grains. Fines are clay, very soft. Sand as above. Gravel is moderately graded, fine to medium, angular to subround, polylithic. No cobbles.	
194	20	50	30				Strong	2.5YR 5/4	SC/SM		Clayey/Silty Sand with Gravel. Moist, weakly cemented, reddish brown. Fines are clay/silt (50/50%), soft. Sand as above. Gravel is well-graded, fine to 8 cm, angular to subround, polylithic. One cobble.	
196	20	20	60				Strong	2.5YR 5/4	GC	43/48	Clayey Gravel with Sand. Moist, moderately cemented, reddish brown. Calcium coating from 199 to 200 feet. Fines are very soft, mainly clay and rock flour; rock flour most prevalent at 198 feet, with some cobbles. Sand is well-graded, angular to subround, polylithic as above. Gravel is well-graded, fine to 8 cm, angular to subround, polylithic. Several 9 to 15 cm cobbles present.	
200	20	40	40				Strong	2.5YR 5/6	SM	41/48	Silty Sand with Gravel. Dry, moderately to well cemented, red. Fines are soft, mainly silt and rock flour. Sand as above. Gravel is well-graded, fine to 8cm, as above. Three cobbles approximately 10 cm present.	200ft - VNH Logging, 2/22/15, sunny
202	30	20	50				Moderate	2.5YR 5/4	GC		Clayey Gravel with Sand. Moist, moderately cemented, reddish brown. Fines are clay and rock flour, very soft. Sand as above. Gravel same as above. Two 13 cm cobbles.	
204	30	50	20				None	2.5YR 5/4	SC	45/48	Clayey Sand with Gravel. Moist, weakly cemented, reddish brown. Fines are clay, very soft. Sand is moderately graded, medium to coarse, some fine, angular to subround, polylithic as above. Gravel is well-graded, fine to 7 cm, angular to subround, polylithic.	
206	20	50	30				Weak	5YR 5/4	SC		Clayey Sand with Gravel. Moist, moderately cemented, reddish brown. Fines are clay, soft. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is well-graded, fine to 6 cm, angular to subround, polylithic. One 12 cm cobble.	
208	10	50	40				None	2.5YR 6/4	SW-SC	46/48	Well-graded Sand with Clay and Gravel. Wet, weakly cemented, light reddish brown. Fines are clay dominant (80/20%), very soft. Sand as above. Gravel is well-graded, fine to 8 cm, as above. No cobbles present.	
210	20	40	40				Strong	2.5YR 5/4	SC		Clayey Sand with Gravel. Dry, weakly cemented, reddish brown. Fines are clay dominant (80/20%), very soft. Sand as above. Gravel as above. Five cobbles up to 16 cm.	210ft - Collect open borehole sample via bailer: pH=7.72, EC=810.3 µS/cm, Field SO_4 = 248 mg/L (confirmed at 260 mg/L) - Resume drilling 2/22/15
212	30	40	30				Weak	2.5YR 5/4	SC	43/48	Clayey Sand with Gravel. Moist, weakly cemented, reddish brown. Fines are clay, caliche, and rock flour, mostly very soft; caliche is in several gravel to 15 cm cobble-sized pieces which account for 30% of interval, and is shape of core barrel with cut marks. Sand is well-graded, angular to subround, polylithic as above. Gravel is well-graded, fine to 8 cm, angular to subround, polylithic. No cobbles present.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. %			* Est. %			HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
	F	S	G	F	S	G						
216	20	30	50				Moderate	2.5YR 5/4	GC	41/48	Clayey Sand with Gravel. Moist, weakly cemented, reddish brown, red oxidation present. Fines are clay and rock flour, very soft. Sand is well-graded, fine to coarse, angular to subround, polylithic (quartz, sandstone, limestone, volcanics, siltstone). Gravel is well-graded, fine to 8 cm, angular to subround, polylithic. Some cobbles up to 12 cm.	
220	30	40	30				Moderate	2.5YR 5/3	SC	45/48	Clayey Sand with Gravel. Moist, moderately cemented, reddish brown. Fines are clay, very soft; very strong caliche presence in gravel and cobble sized pieces. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is well-graded, fine to 8 cm, as above. Two cobbles up to 12 cm.	
224	20	70	10				Strong	2.5YR 5/4	SM	44/48	Silty Sand. Moist, weakly cemented (from 224 to 226 feet), moderately cemented (from 226 to 228 feet), reddish brown. Fines are silt dominant (60/40%), very soft, with clay as caliche. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is moderately graded, fine to medium. Two 12 cm cobbles.	
228	10	20	70				Strong	2.5YR 5/2	GW-GC	47/48	Well-graded Gravel with Clay and Sand. Moist, moderately cemented, weak red. Fines are clay dominant as caliche (60/40%). Sand as above. Gravel is well-graded (fine to coarse), angular to subround, polylithic, cobbles up to 18 cm.	
230	10	80	10				Moderate	5YR 5/2	SW-SC		Well-graded Sand with Clay. Moist, moderately cemented, reddish gray. Fines are clay, firm as caliche. Sand as above. Gravel is poorly graded, fine. One 9 cm cobble.	
232	30	60	10				Strong	5YR 5/4	SC	43/48	Clayey Sand. Moist, moderately cemented, reddish brown. Fines are clay, soft. Sand as above. Gravel is moderately graded, fine to medium, some coarse grains from 234 to 236 feet. Two 10 cm cobbles from 234 to 236 feet.	232ft - VNH logging 2/25/15, sunlight
236	10	60	30				Strong	5YR 5/4	SW-SC	43/48	Well-graded Sand with Clay and Gravel. Moist, moderately cemented, reddish brown. Fines are clay, soft, some caliche. Sand as above. Gravel is moderately graded as above, 1 to 2 coarse grains. One 9 cm cobble.	
240	10	50	40				Strong	5YR 5/3	SW-SM	43/48	Well-graded Sand with Silt and Gravel. Moist, moderately cemented, reddish brown. Fines are silt, very soft. Sand as above. Gravel is poorly graded, predominantly fine, some medium grains, 1 to 2 coarse grains.	
244	10	70	20				Strong	5YR 5/3	SW-SM	44/48	Well-graded Sand with Silt and Gravel. Same as above. Yellow oxidation present. Calcium streaks present.	

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CLEAR CREEK ASSOCIATES

Depth (feet)	* Est. % F	S	G	* Est. % F	S	G	HCl Rxn	Munsell Color	USCS	Recovery (inches)	Sample Description	Remarks
248	20	80	T				Strong	7.5YR 5/3	SM	43/48	Silty Sand. Dry, moderately cemented, brown. Fines are silt dominant (60/40%), soft, with clay as caliche in gravel and cobble-sized pieces. Sand is well-graded, fine to coarse, angular to subround, polylithic (quartz, chert, limestone, sandstone, siltstone, volcanics). Gravel is poorly graded, mostly fine, angular to subround, polylithic.	248ft - VNH logging 2/25/15, sunlight
250	20	80	T				Strong	10YR 4/3	SC		Clayey Sand. Moist, moderately cemented, brown. Fines are clay dominant, very soft, some caliche present. Sand and gravel as above.	250ft - Collect open borehole sample via bailer: pH=7.69, EC=770.4 µS/cm, Field SO_4 = 228 mg/L (confirmed at 228 mg/L) - Resume drilling 2/23/15
252	20	80	T				Strong	10YR 4/3	SC	42/48	Clayey Sand. Same as above.	
254	20	80	T				Strong	5YR 5/4	SM		Silty Sand. Moist, moderately cemented, red oxidation present, calcium streaks present, reddish brown. Fines are silt dominant (70/30%) with clay as caliche, firm. Sand as above. Gravel as above.	
256	20	40	40				Strong	5YR 5/4	SM	41/48	Silty Sand with Gravel. Dry, moderately cemented, yellow oxidation present, reddish brown. Fines are silt dominant (60/40%), soft, with clay as caliche. Sand is well-graded, fine to coarse, angular to subround, polylithic as above. Gravel is poorly graded, mostly fine, some medium. One 10 cm cobble.	
260	20	50	30				Strong	2.5YR 5/3	SM	44/48	Silty Sand with Gravel. Moist from 260 to 261 feet, and dry from 261 to 262 feet, moderately cemented, reddish brown. Fines are silt dominant (80/20%), soft. Sand as above. Gravel is poorly graded, mostly fine, some medium to coarse. Two cobbles, 10 cm and 13 cm.	
262	20	50	30				Moderate	7.5YR 5/3	SC		Clayey Sand with Gravel. Moist, moderate cementation, brown. Fines are clay, firm. Sand as above. Gravel is poorly graded, fine.	
264	40	40	20				Strong	7.5YR 5/3	SC	40/48	Clayey Sand with Gravel. Moist from 264 to 266 feet, and dry from 266 to 268 feet, moderately cemented, red oxidation present, calcium streaks present, brown. Fines are clay, mostly as caliche. Sand as above. Gravel is moderately graded, fine to medium, trace coarse grains.	
268	40	40	20				Strong	7.5YR 5/3	SC	42/48	Clayey Sand with Gravel. Same as above.	
270	30	50	20				Strong	2.5YR 7/4	SC		Clayey Sand with Gravel. Moist, moderately cemented, light reddish brown. Fines are clay as caliche, and rock flour. Sand as above. Gravel is well-graded, fine to 6 cm, angular to subround, polylithic.	
272							Strong	See Description		45/48	Cintura/Morita Formation. Pale red (2.5YR 7/2) silty sandstone, light yellowish brown (2.5Y 6/4) thinly-bedded sandy siltstone, olive yellow (2.5Y 6/6) massive sandy mudstone, and yellowish red (5YR 5/6) sandy mudstone. Rock flour present. Formation in large gravel to cobble size pieces from drilling. Mudstones are friable. Sandstone and siltstone are more hard. Dry from 272 to 280 feet.	272ft - Collect open borehole sample via bailer: pH=7.68, EC=766.8 µS/cm, Field SO4 = 248 mg/L (confirmed at 232 mg/L)
276							Weak			45/48		
280												**TD = 280 feet** 2/23/15 13:30

Notes: Unified Soil Classification System (ASTM D2488-00)
bls = below land surface; HCL Rxn = Hydrochloric acid reaction (strong, moderate, weak, none)

CLEAR CREEK ASSOCIATES

APPENDIX A.2
CORE PHOTOGRAPHS



BMO-2014-1BL Core 0-4

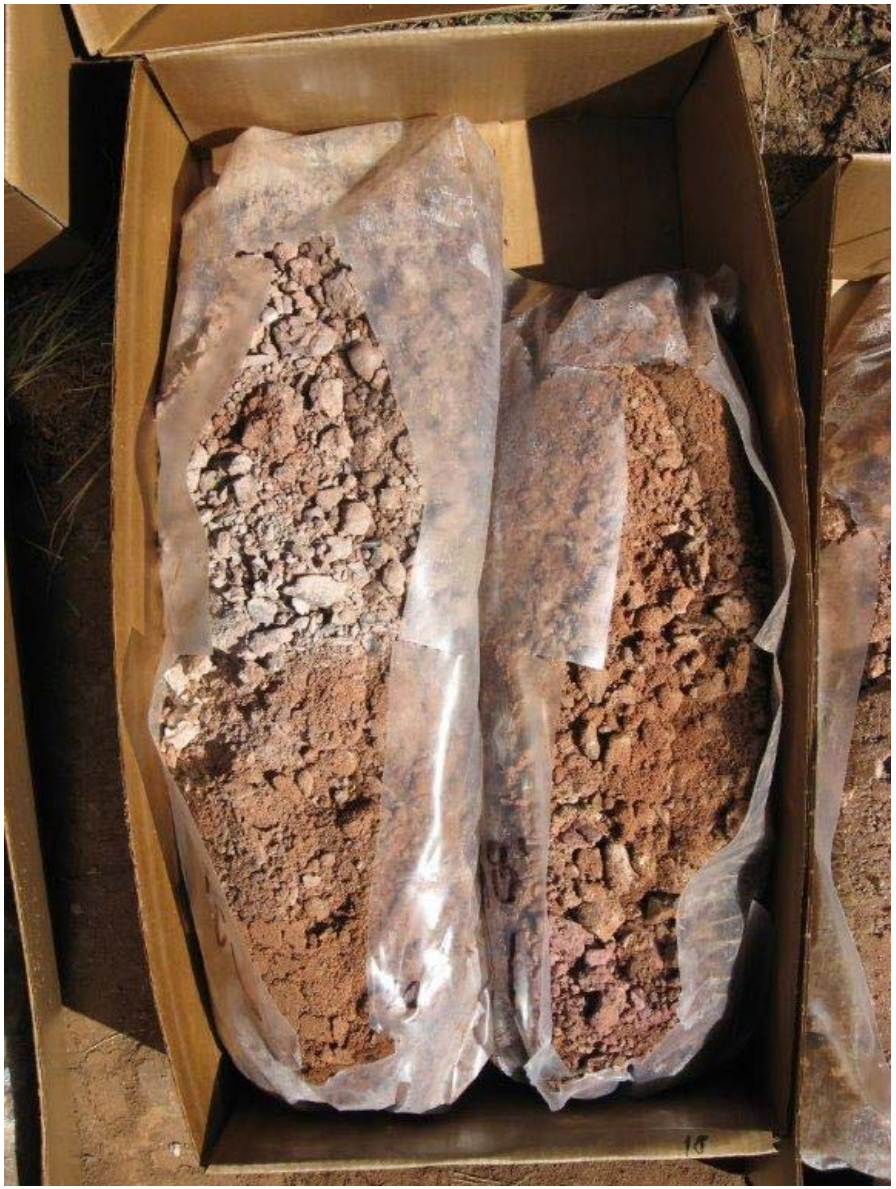

BMO-2014-1BL Core 4-8



BMO-2014-1BL Core 8-12



BMO-2014-1BL Core 12-16



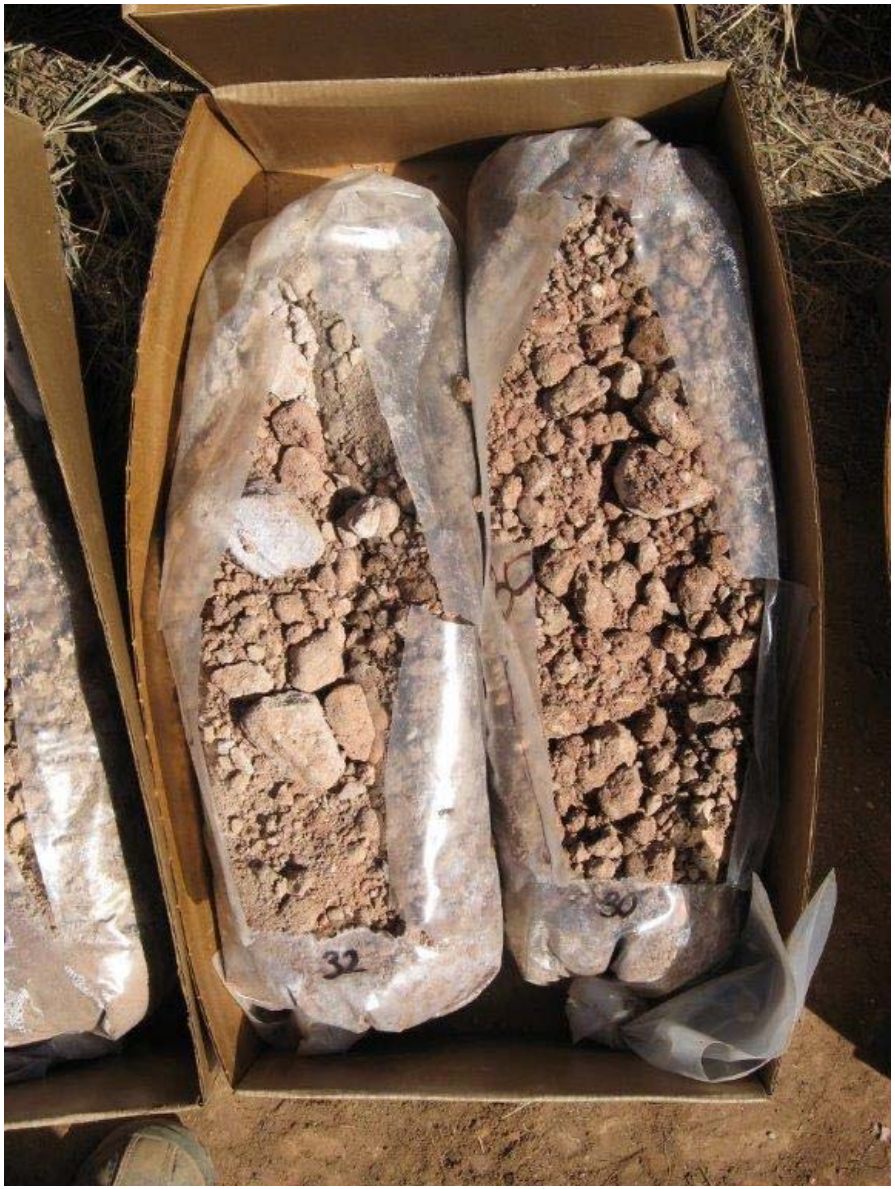
BMO-2014-1BL Core 16-20



BMO-2014-1BL Core 20-24



BMO-2014-1BL Core 24-28



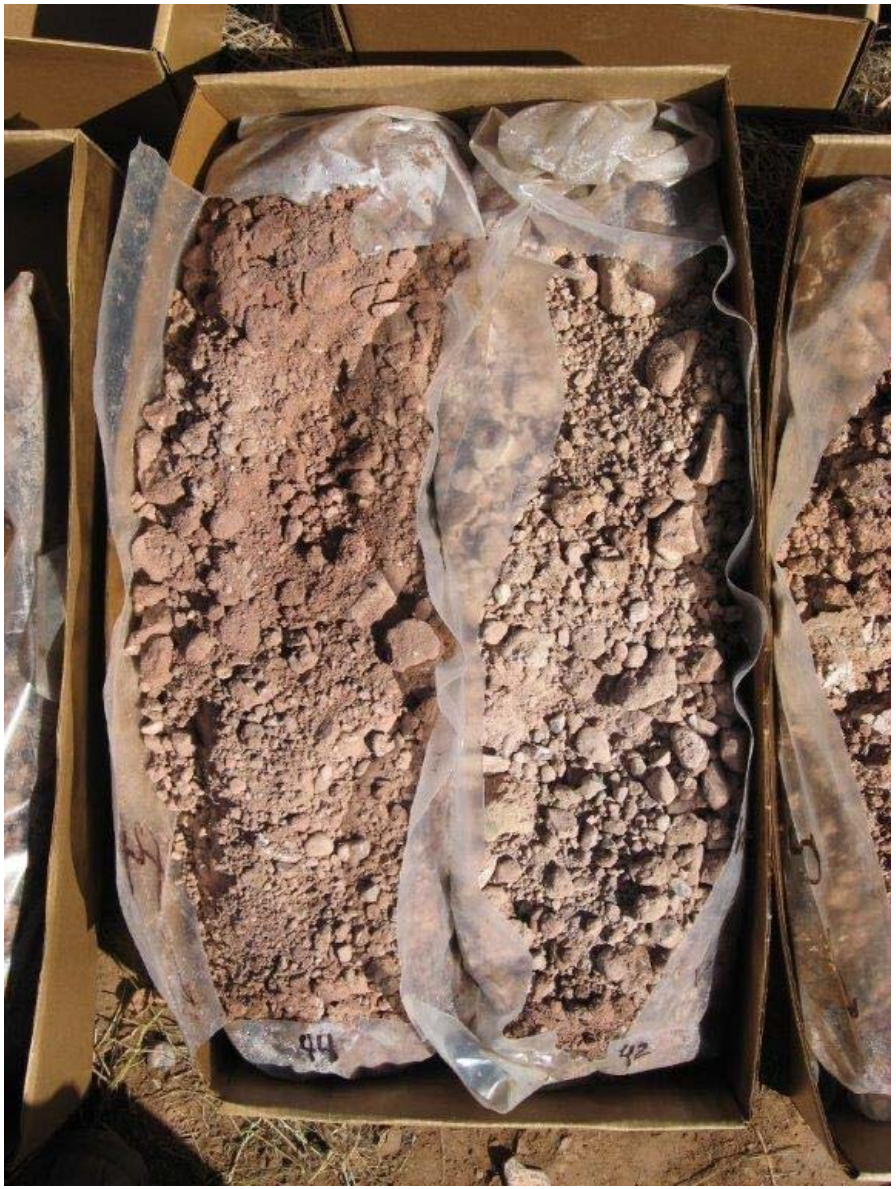
BMO-2014-1BL Core 28-32



BMO-2014-1BL Core 32-36



BMO-2014-1BL Core 36-40



BMO-2014-1BL Core 40-44



BMO-2014-1BL Core 44-48



BMO-2014-1BL Core 48-52



BMO-2014-1BL Core 52-56



BMO-2014-1BL Core 56-60



BMO-2014-1BL Core 60-64



BMO-2014-1BL Core 64-68



BMO-2014-1BL Core 68-72



BMO-2014-1BL Core 72-76



BMO-2014-1BL Core 76-80



BMO-2014-1BL Core 80-84


BMO-2014-1BL Core 84-88



BMO-2014-1BL Core 88-91

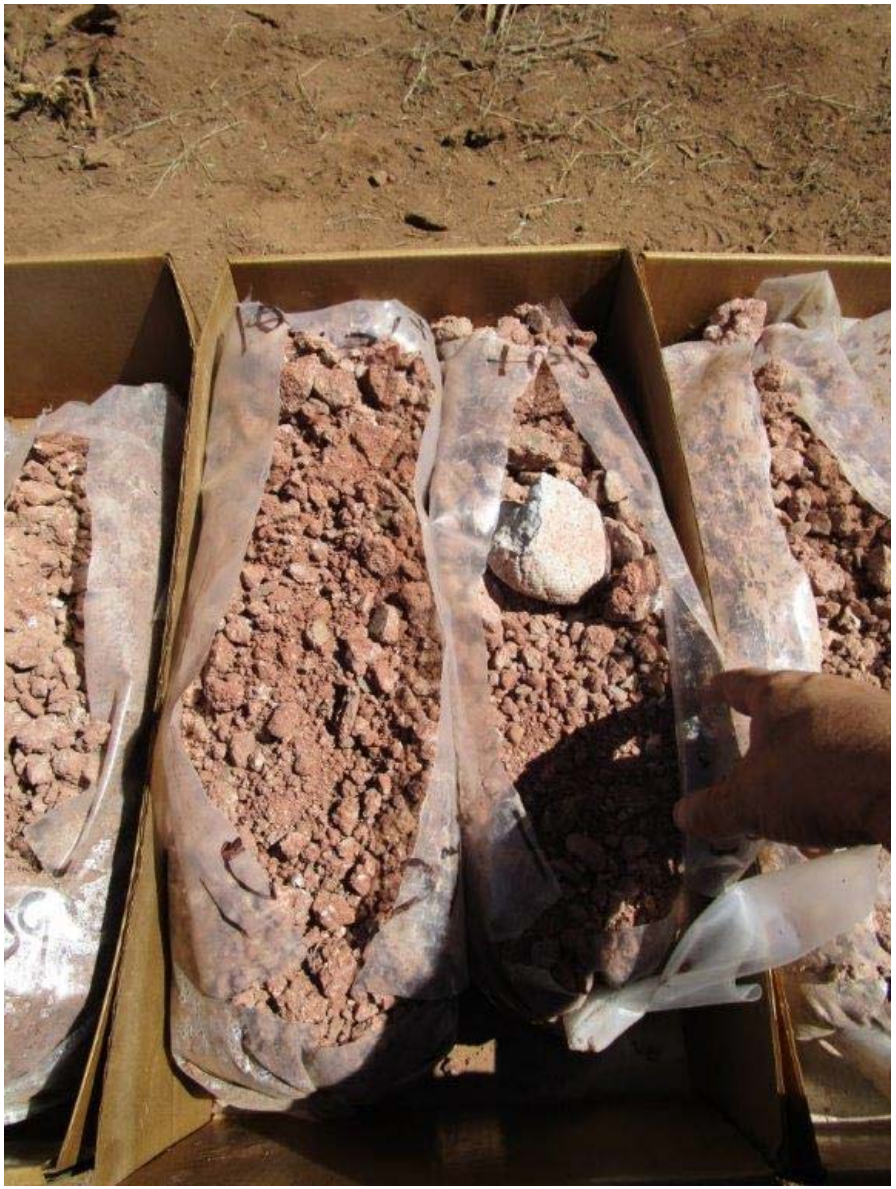


BMO-2014-1BL Core 91-95 MISLABELED IN PHOTO

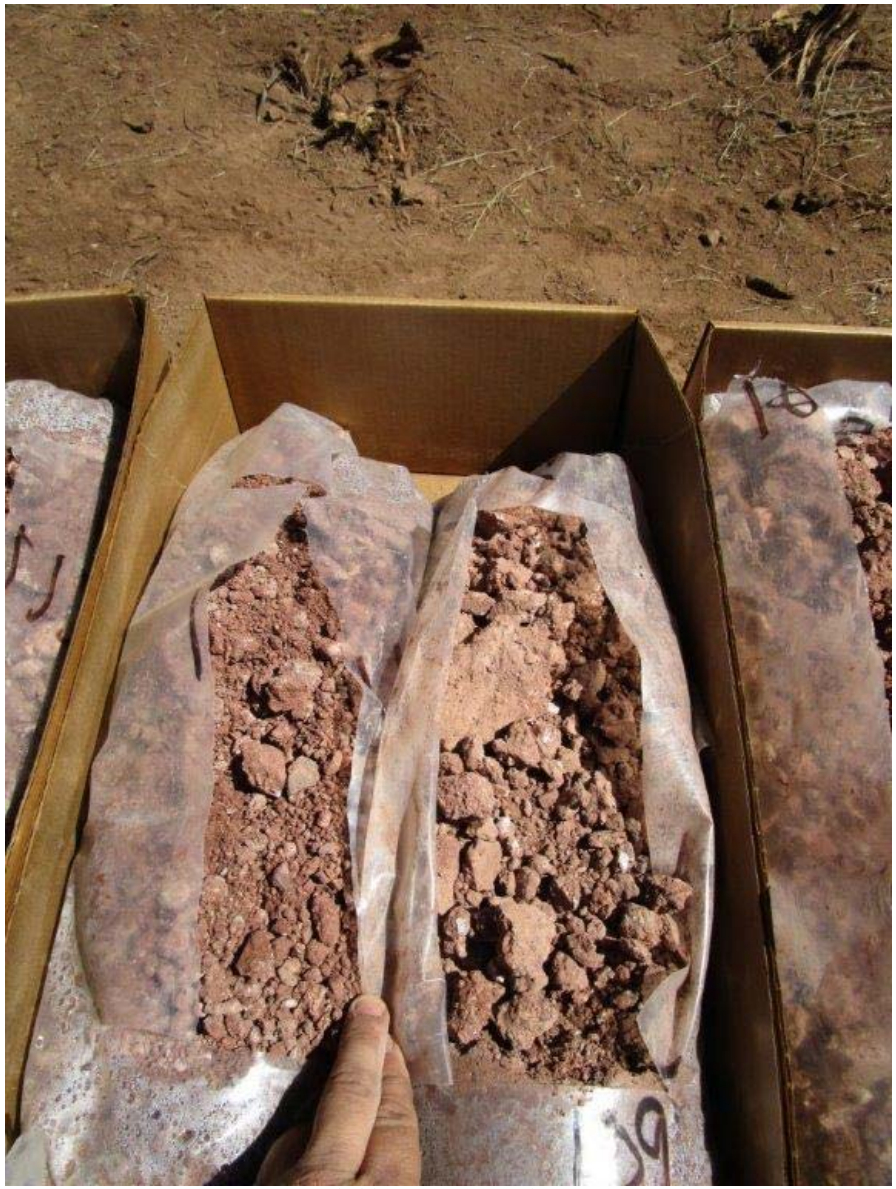


BMO-2014-1BL Core 95-99 MISLABELED IN PHOTO

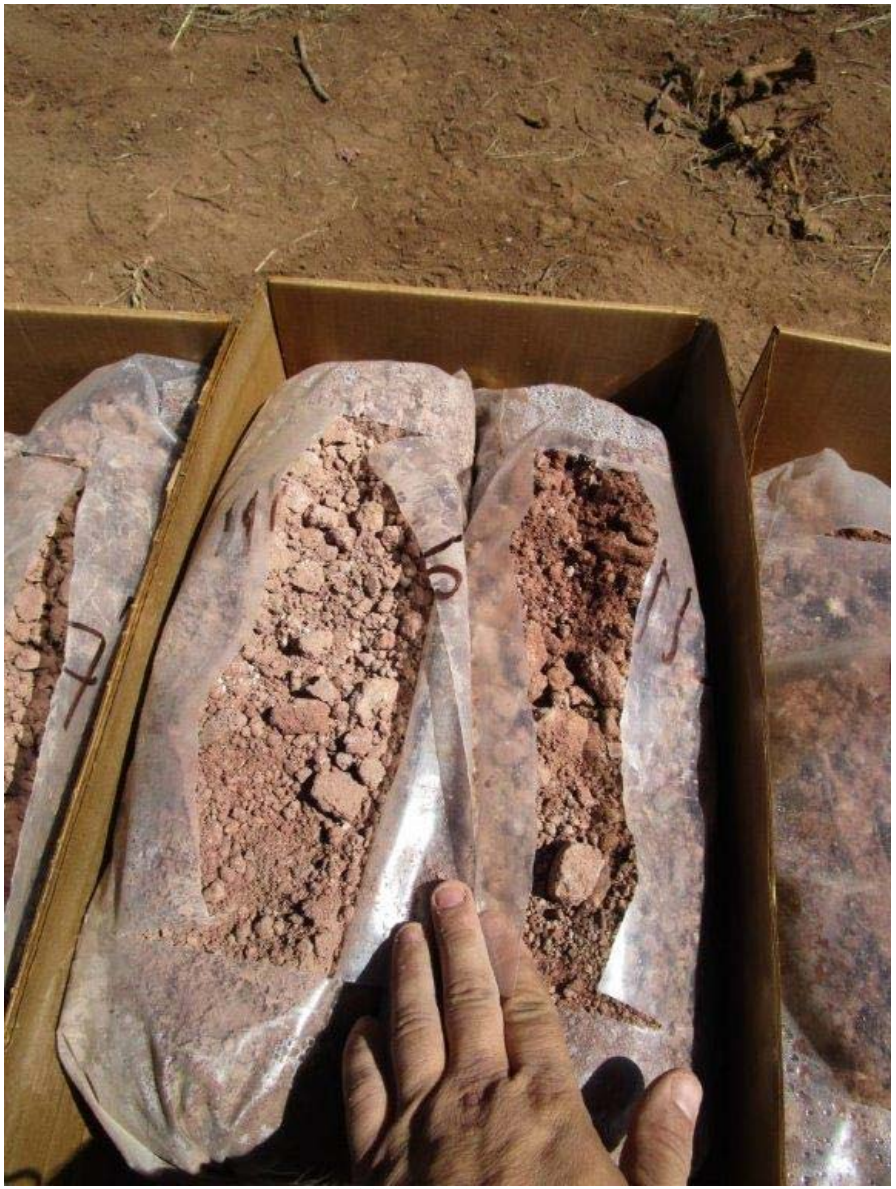

BMO-2014-1BL Core 99-103 MISLABELED IN PHOTO



BMO-2014-1BL Core 103-107



BMO-2014-1BL Core 107-111



BMO-2014-1BL Core 111-115



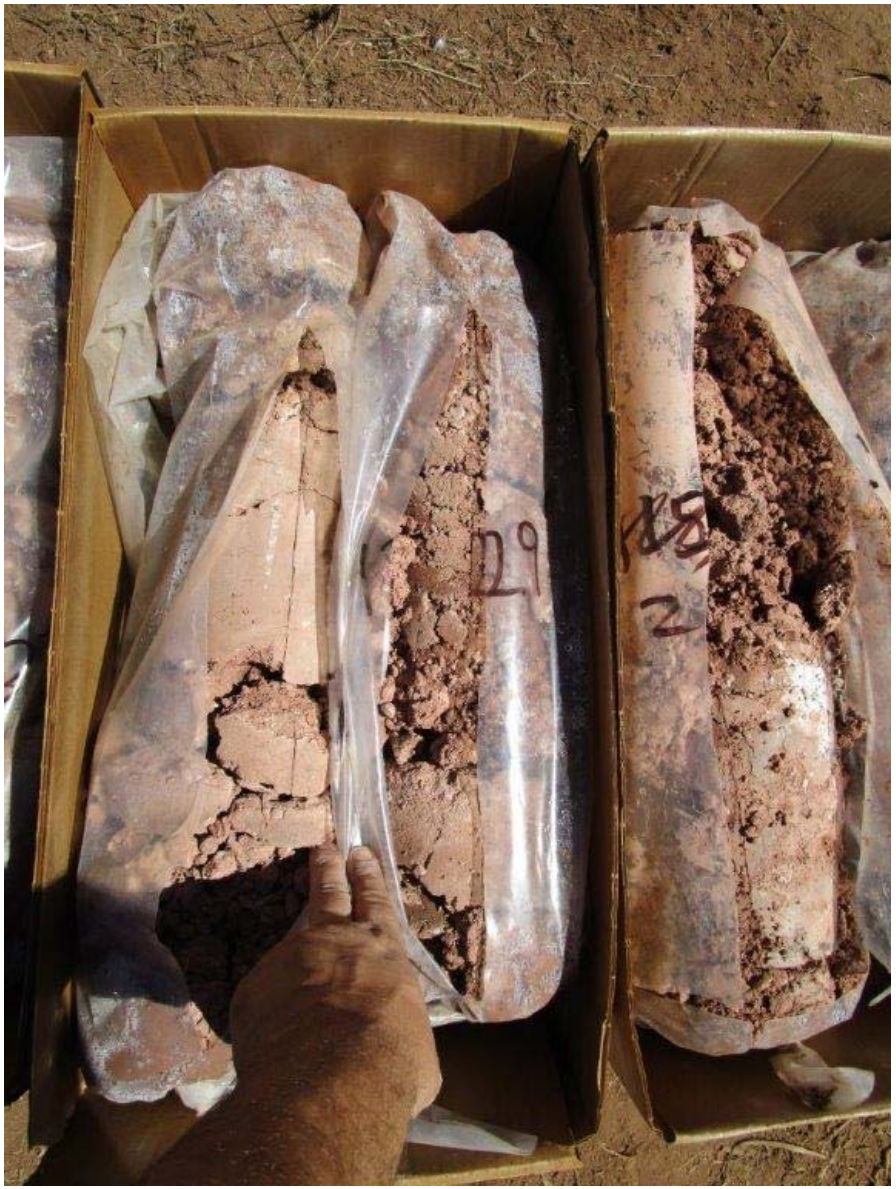
BMO-2014-1BL Core 115-119



BMO-2014-1BL Core 119-123



BMO-2014-1BL Core 123-127



BMO-2014-1BL Core 127-131



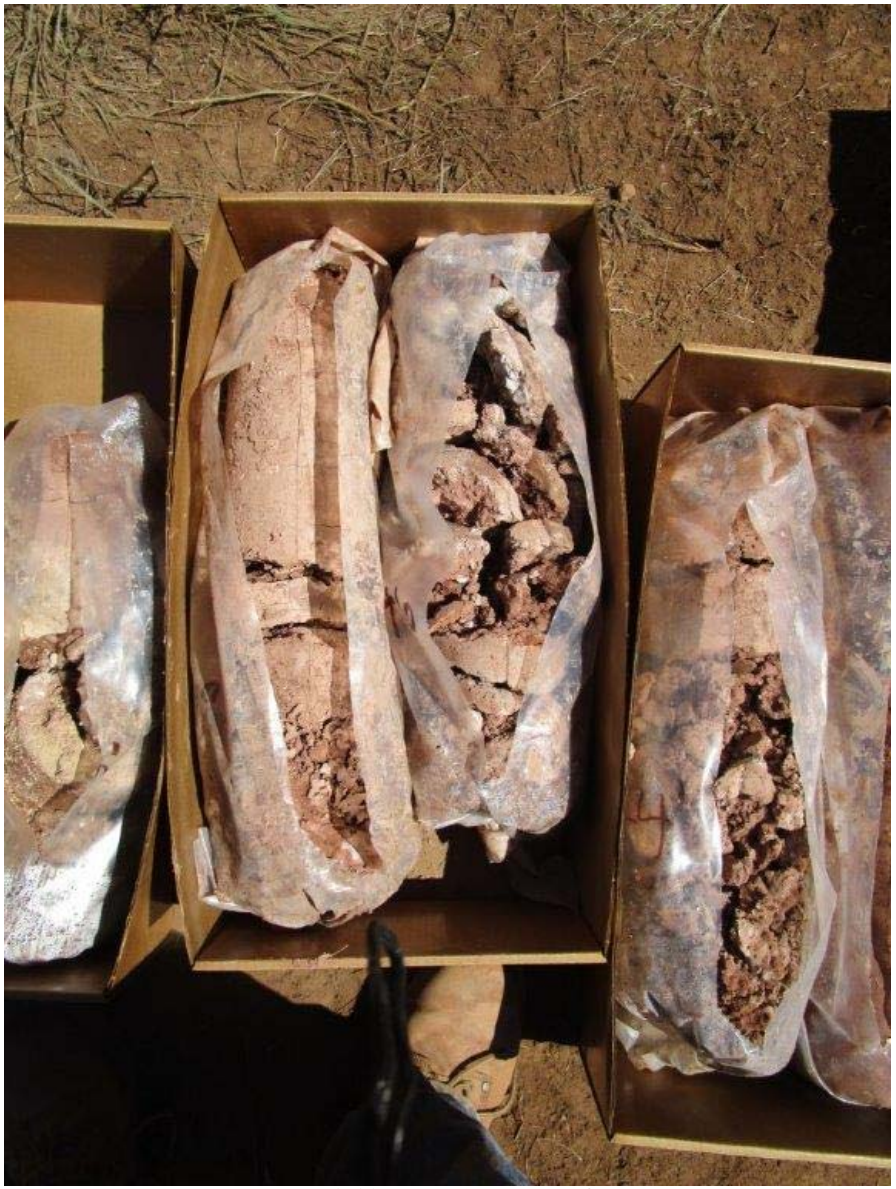
BMO-2014-1BL Core 131-135



BMO-2014-1BL Core 136-140



BMO-2014-1BL Core 140-144



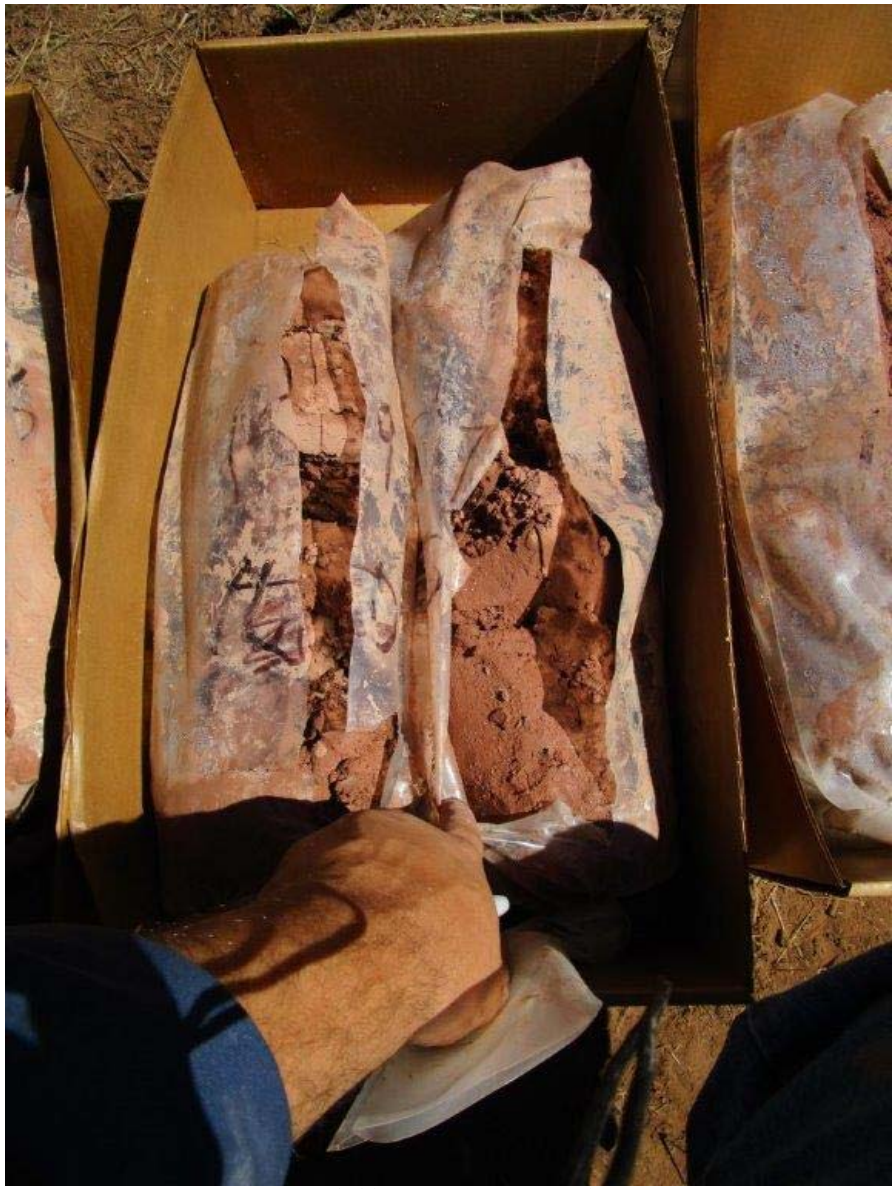
BMO-2014-1BL Core 144-148



BMO-2014-1BL Core 148-151



BMO-2014-1BL Core 151-155



BMO-2014-1BL Core 155-159



BMO-2014-1BL Core 159-163


BMO-2014-1BL Core 163-167



BMO-2014-1BL Core 167-171


BMO-2014-1BL Core 171-175



BMO-2014-1BL Core 175-179



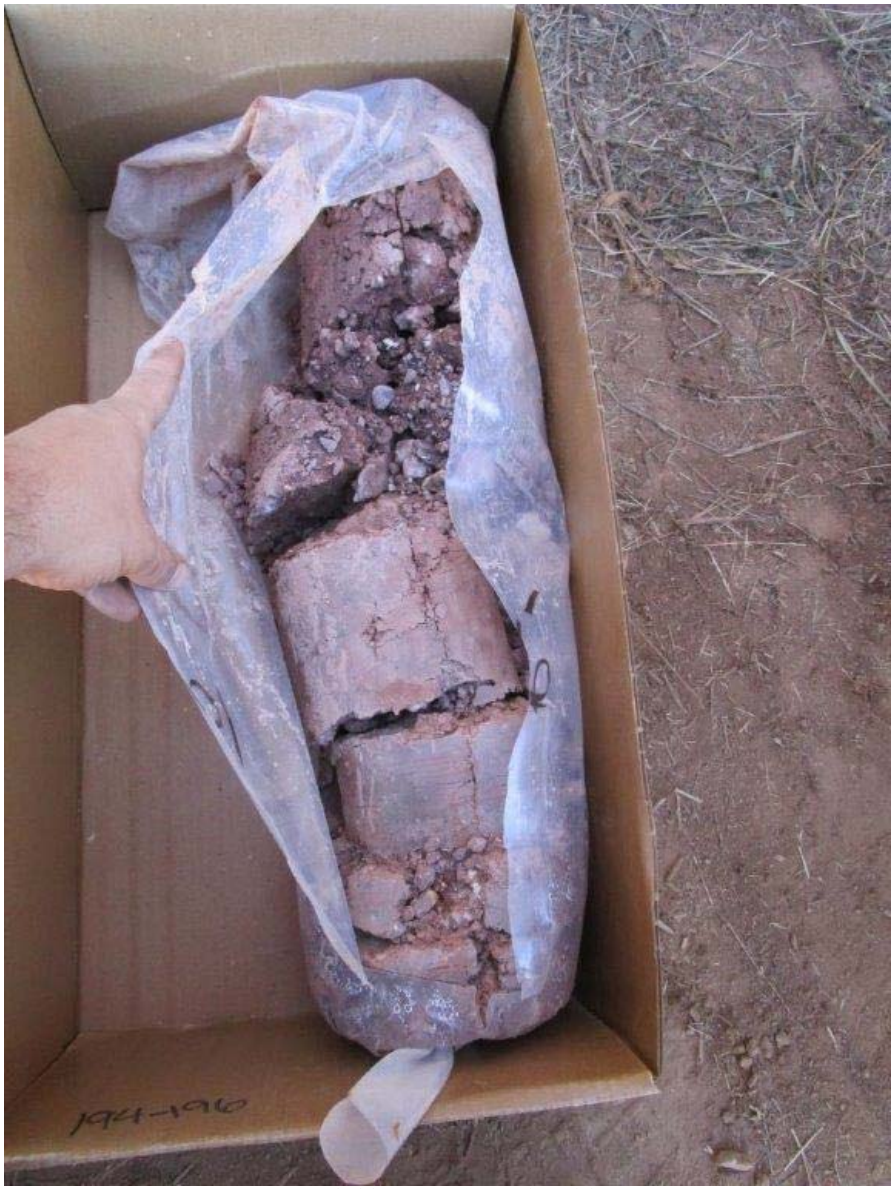
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BMO-2014-1BL Core 186-190



BMO-2014-1BL Core 190-194



BMO-2014-1BL Core 194-196



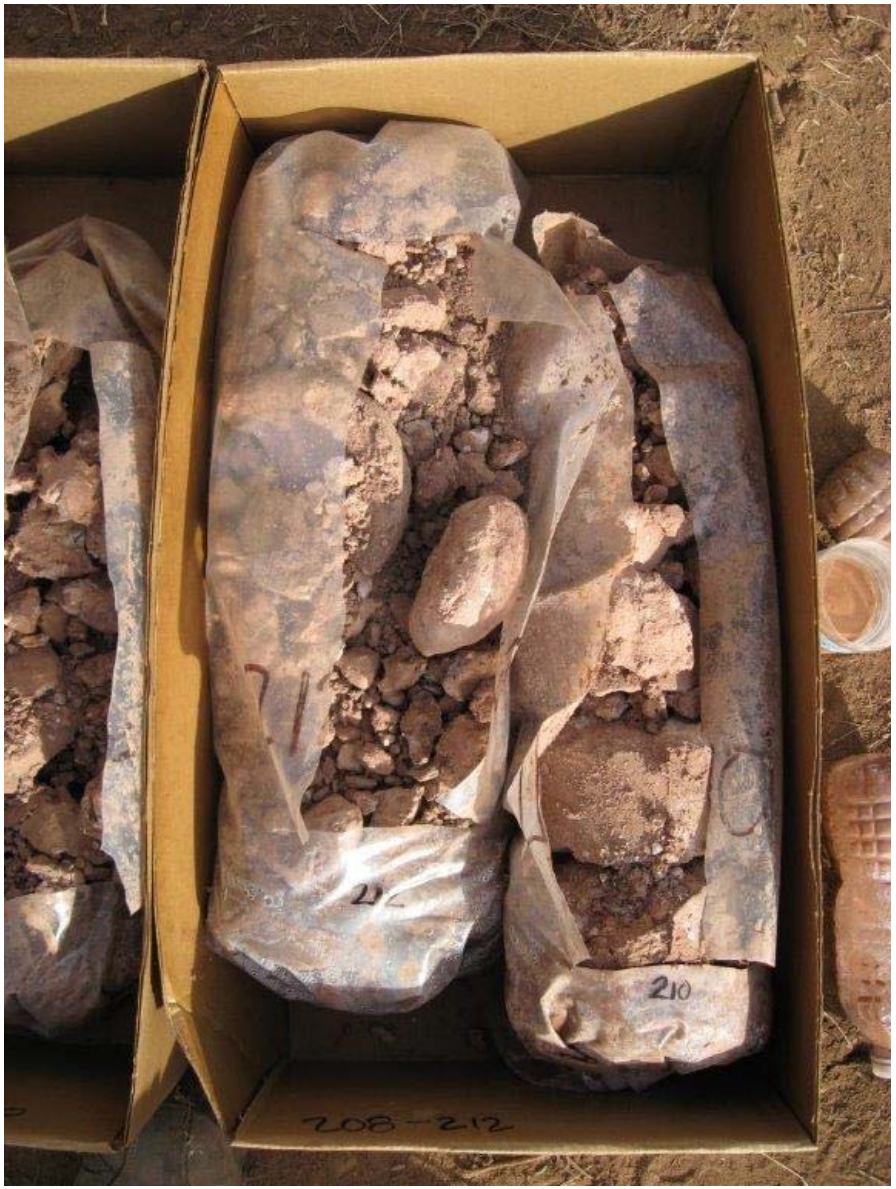
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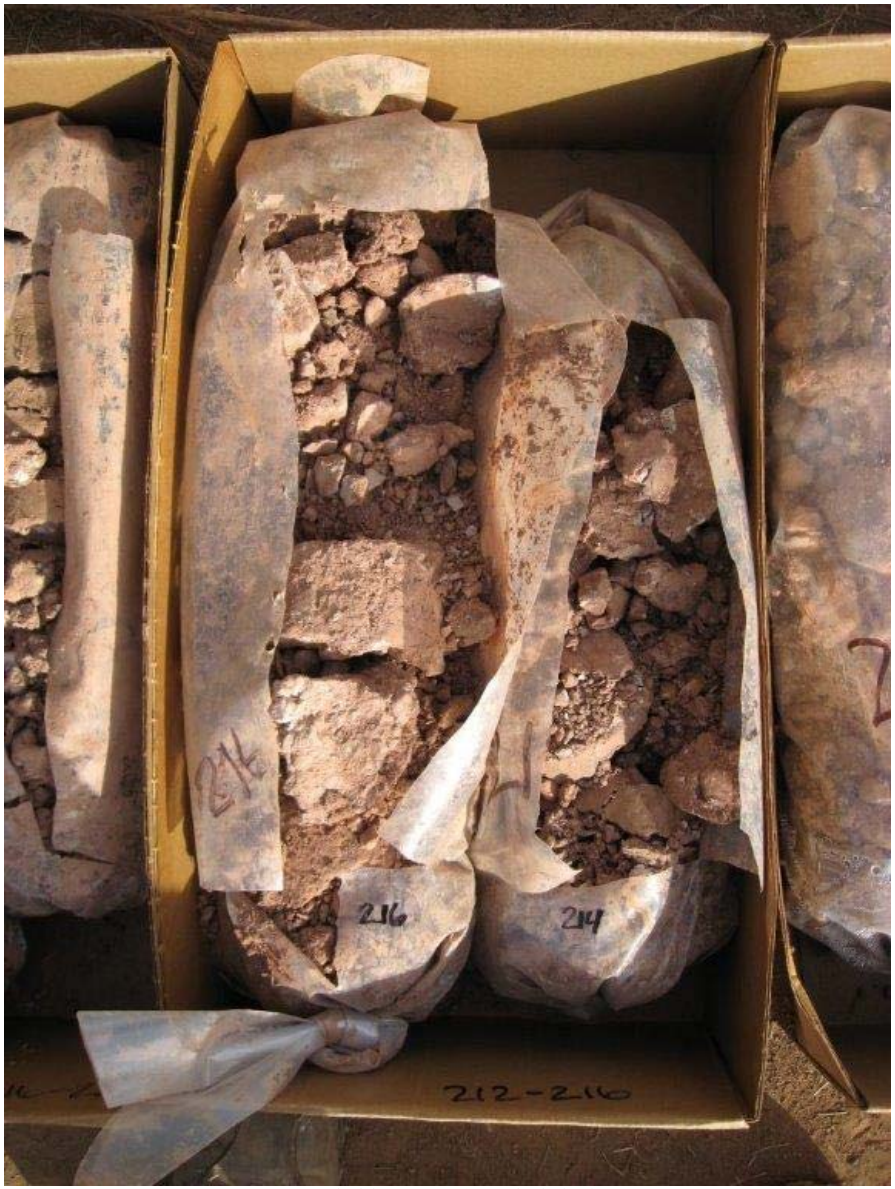
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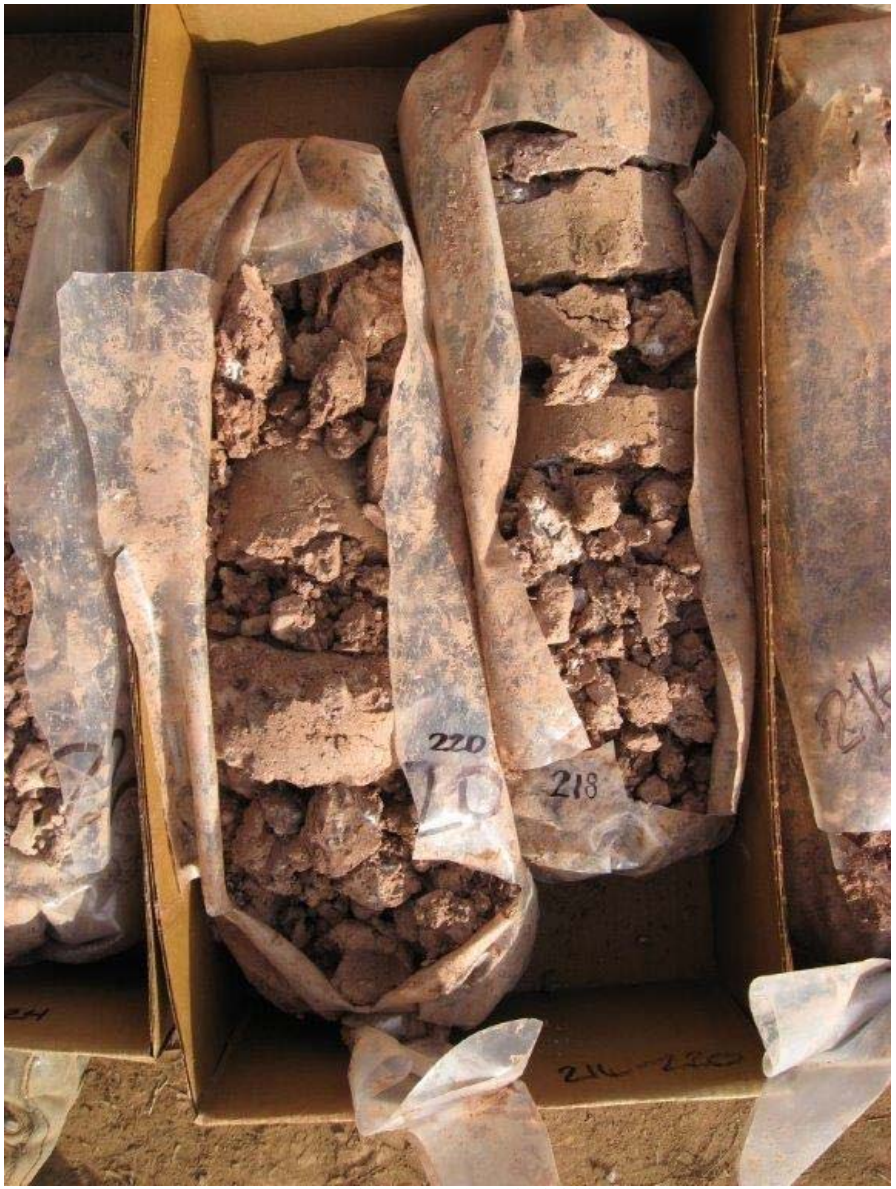
BMO-2014-1BL Core 204-208



BMO-2014-1BL Core 208-212



BMO-2014-1BL Core 212-216



BMO-2014-1BL Core 216-220



BMO-2014-1BL Core 220-224



BMO-2014-1BL Core 224-228



BMO-2014-1BL Core 228-232



BMO-2014-1BL Core 232-236



BMO-2014-1BL Core 236-240



BMO-2014-1BL Core 240-244



BMO-2014-1BL Core 244-248



BMO-2014-1BL Core 248-252



BMO-2014-1BL Core 252-256



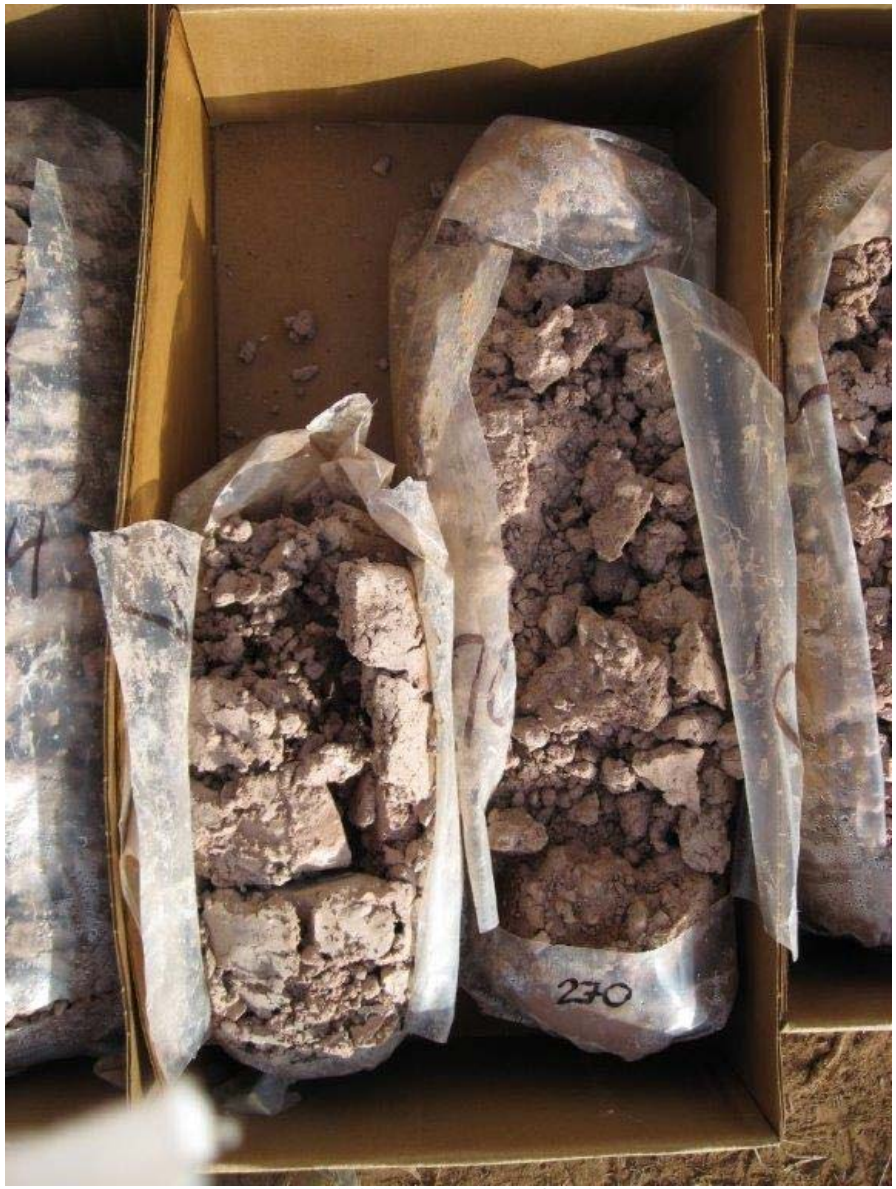
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BMO-2014-1BL Core 260-264



BMO-2014-1BL Core 264-268



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BMO-2014-1BL Core 272-276



BMO-2014-1BL Core 276-280



BMO-2014-1BL Core 280-284



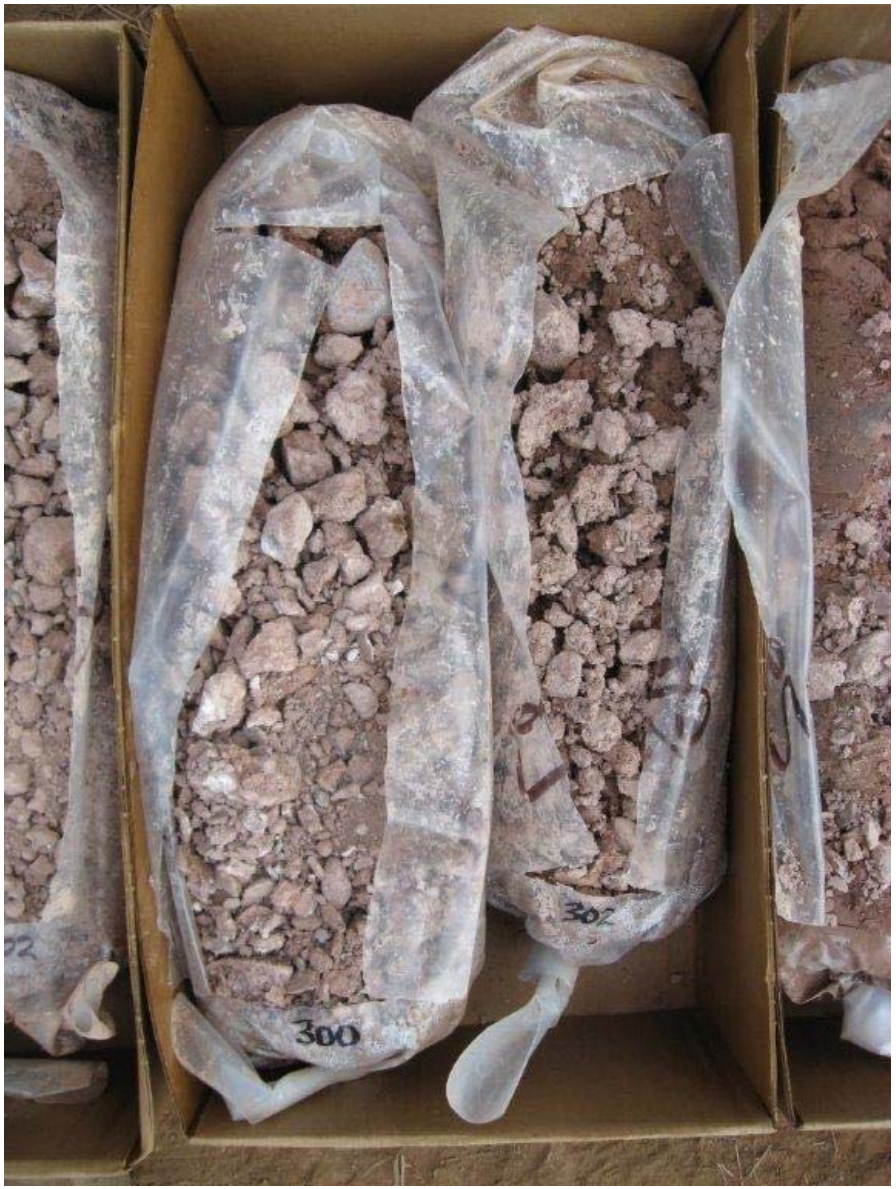
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BMO-2014-1BL Core 288-292



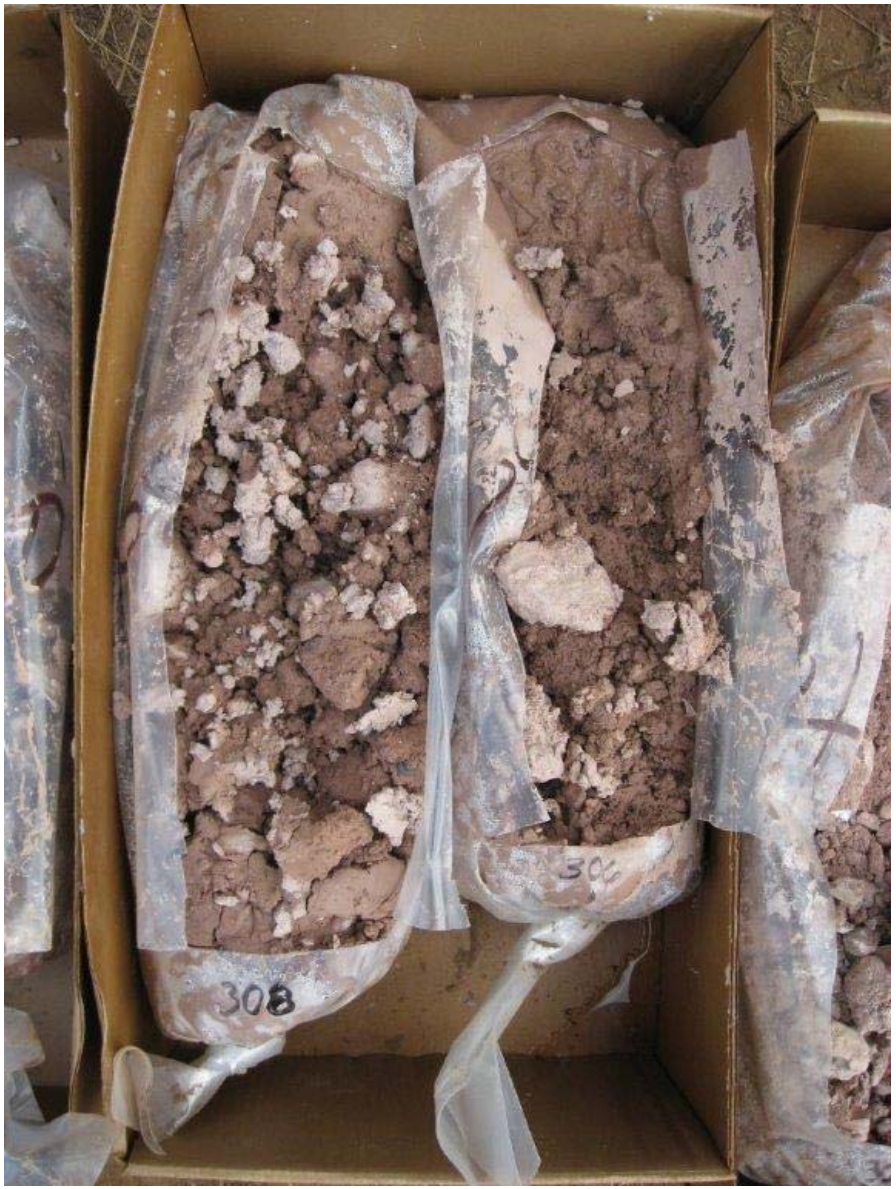
BMO-2014-1BL Core 292-296



BMO-2014-1BL Core 296-300 MISLABELED IN PHOTO



BMO-2014-1BL Core 300-304



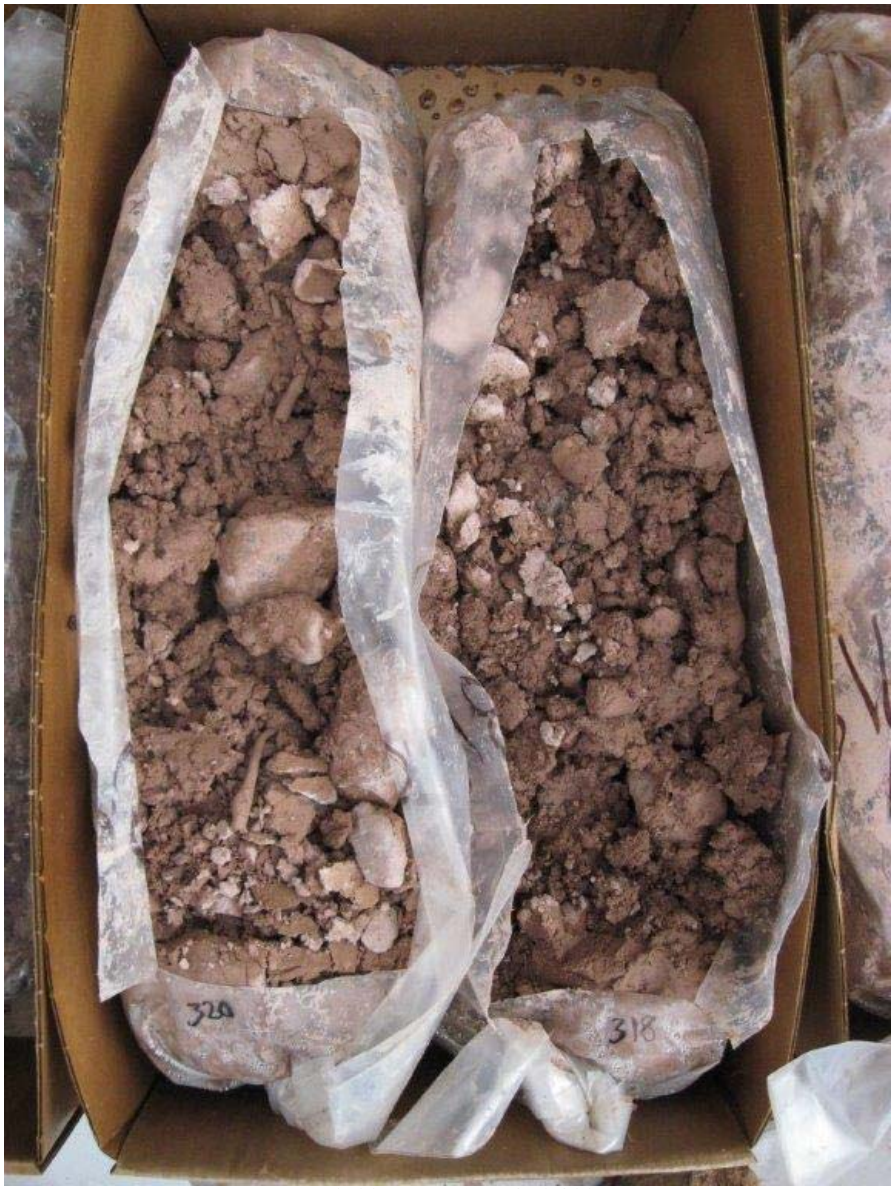
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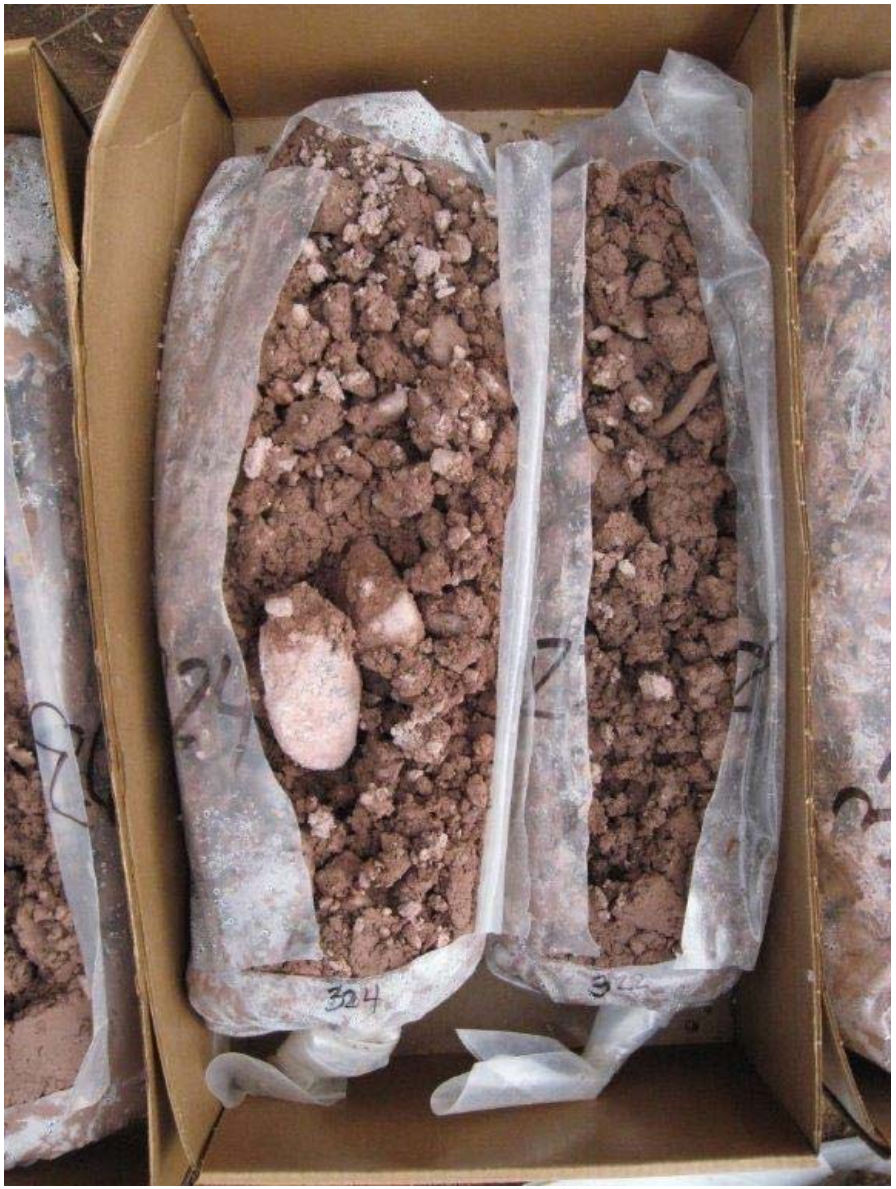
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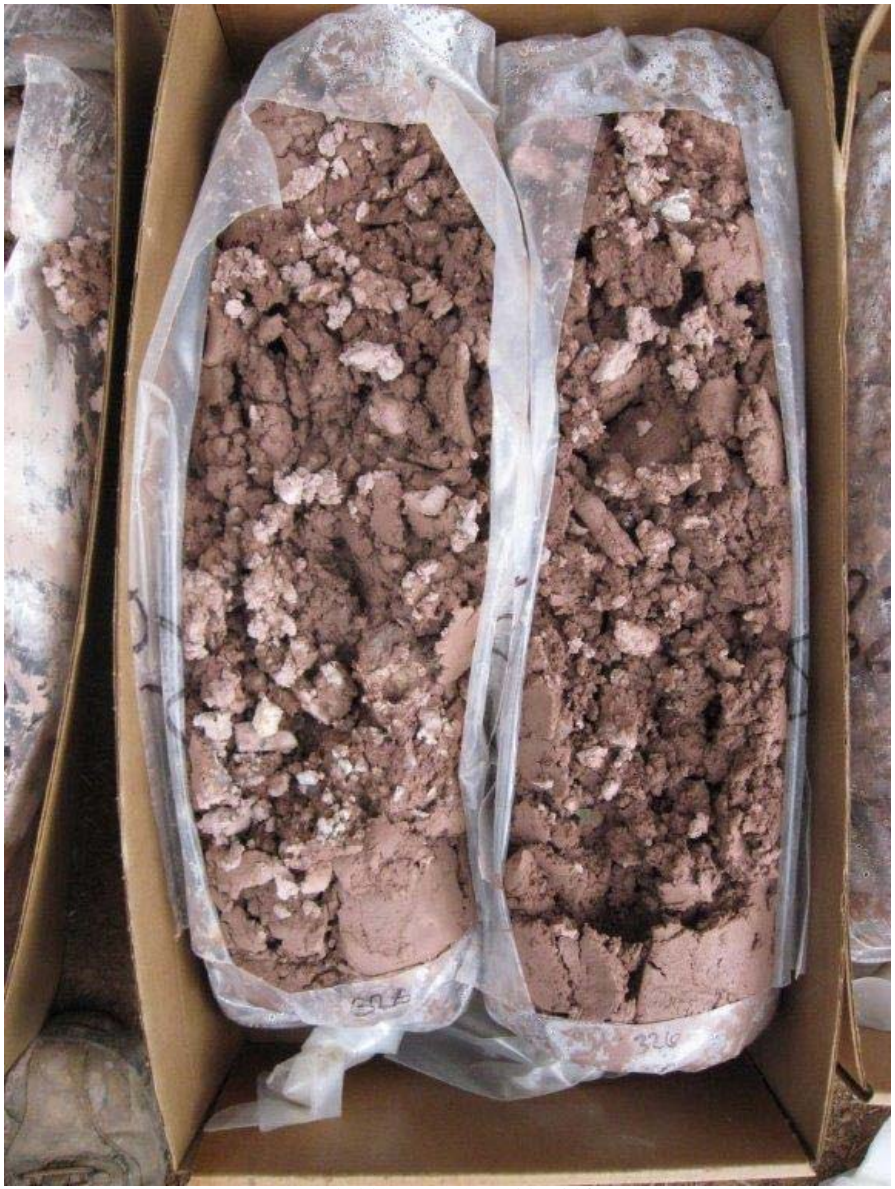
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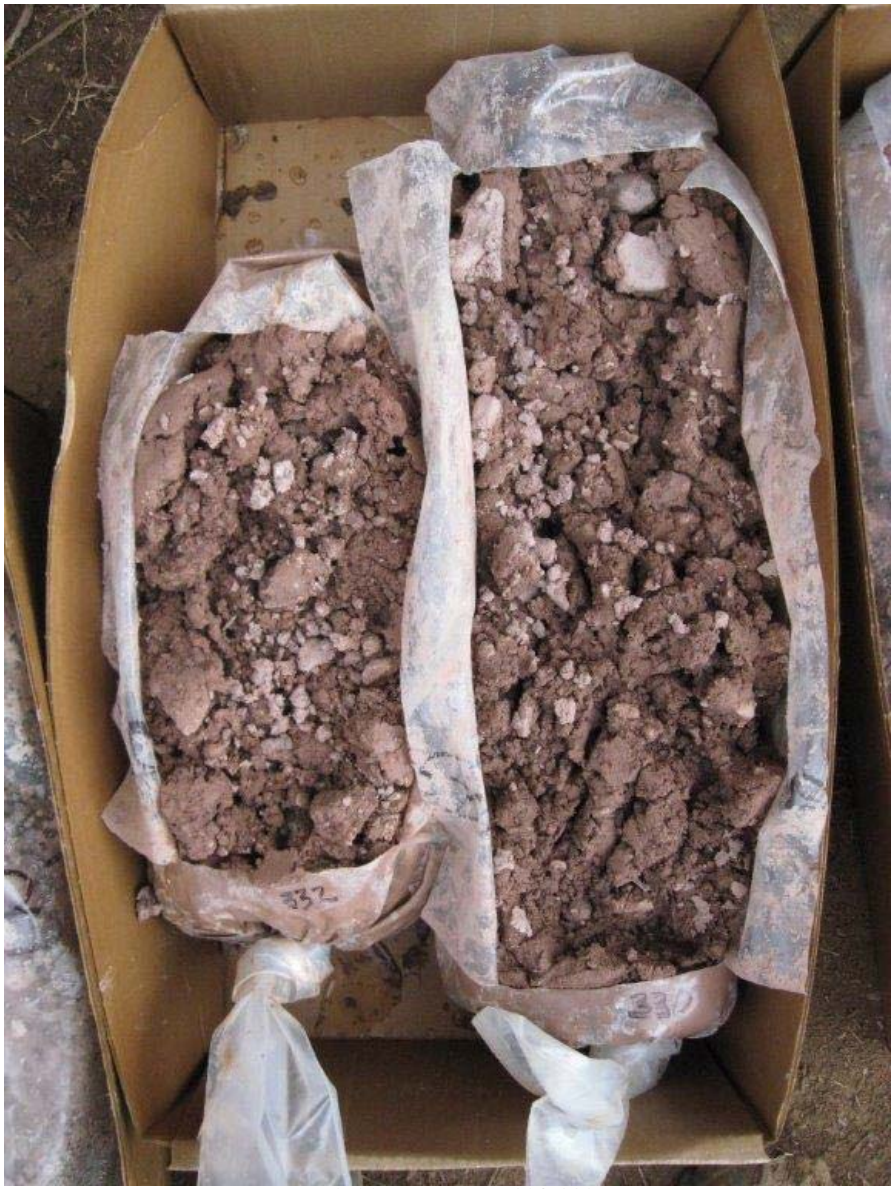
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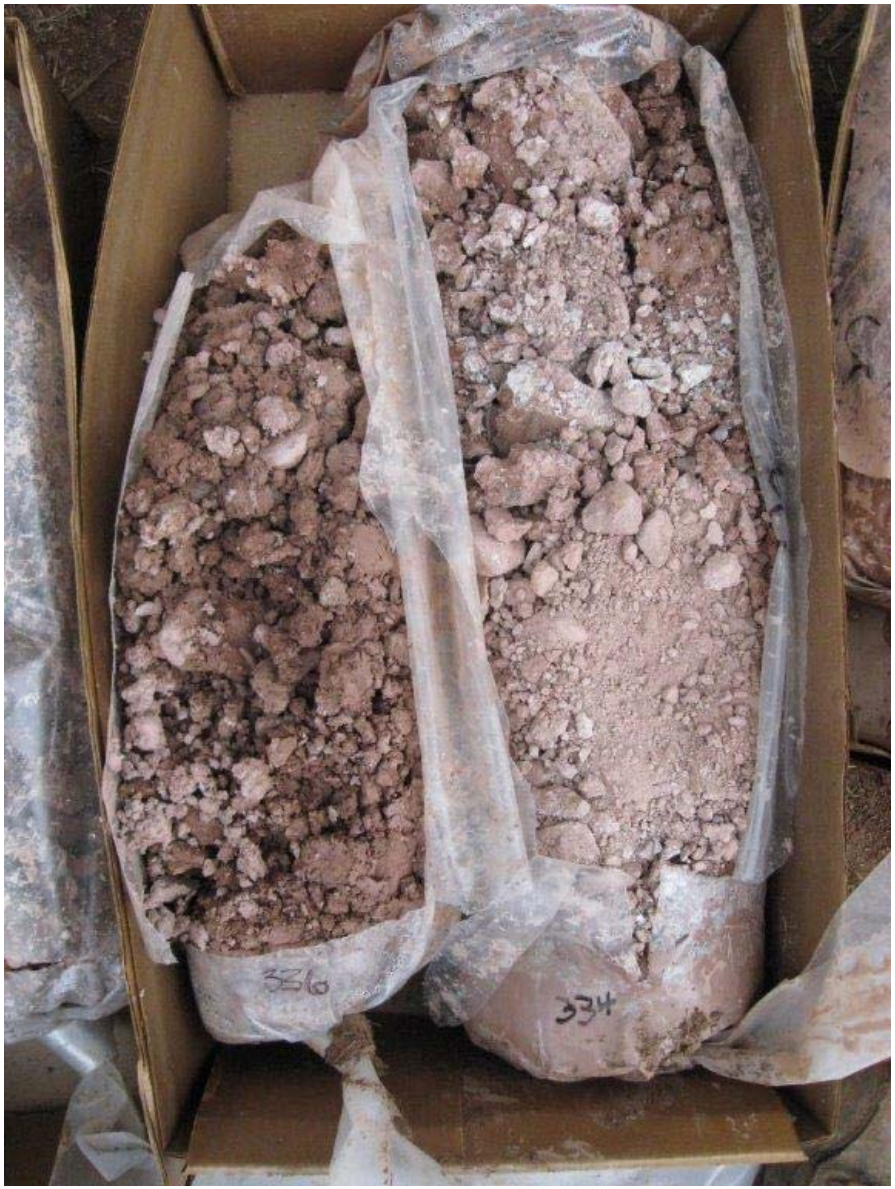
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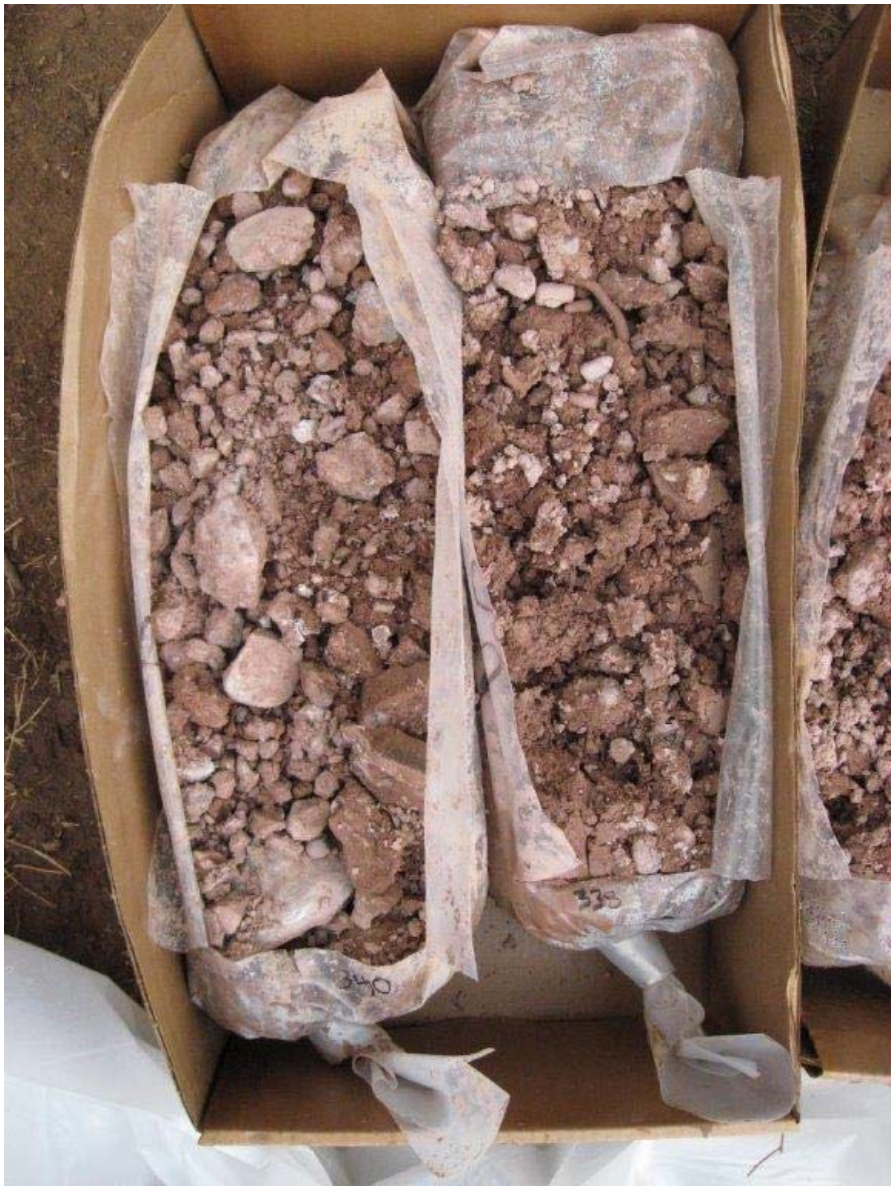
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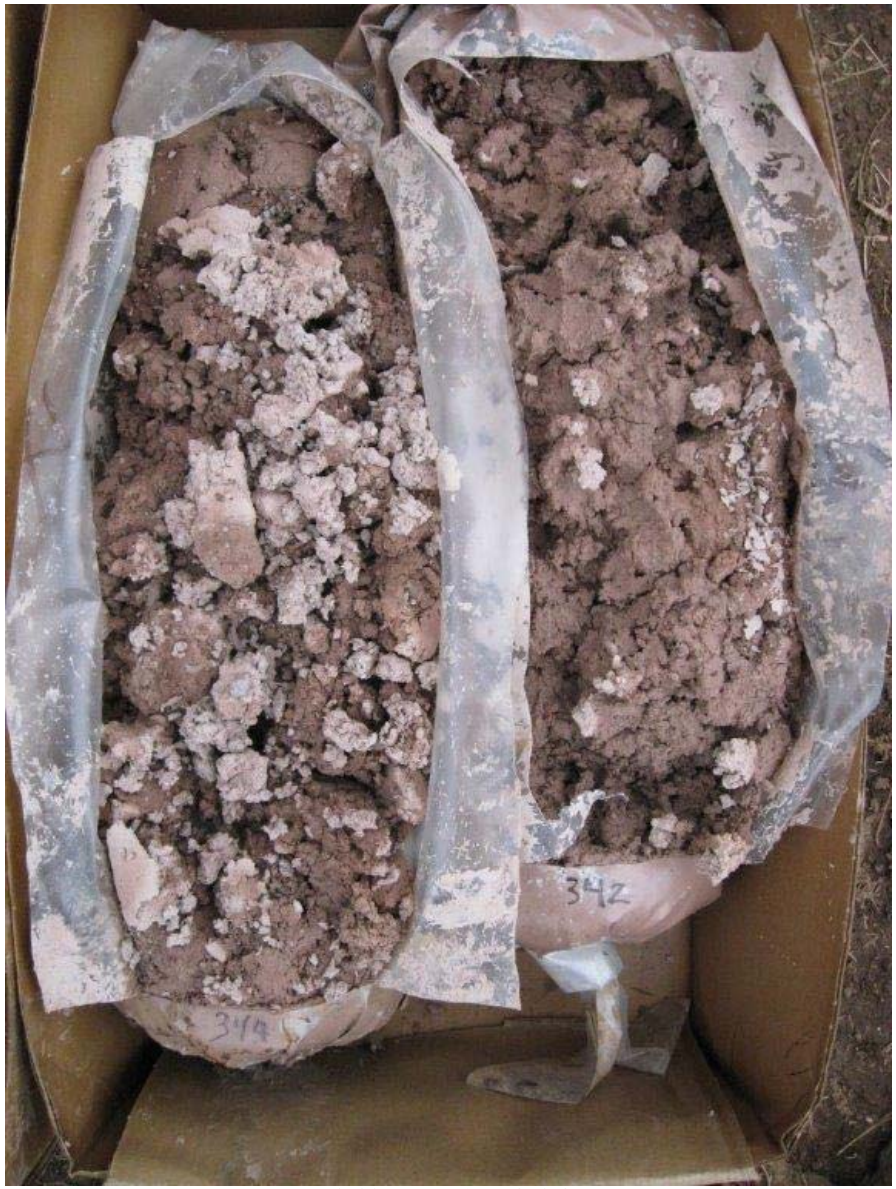
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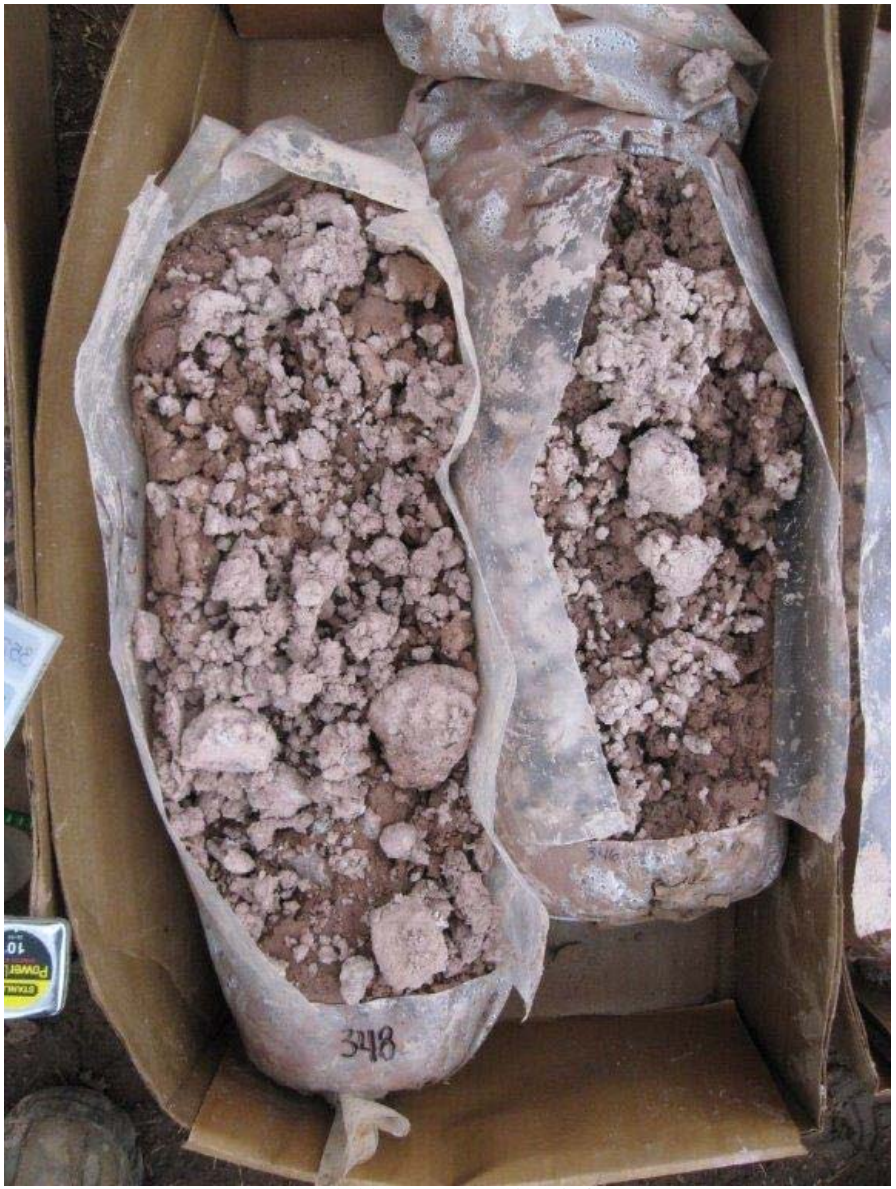
BMO-2014-1BL Core 332-336



BMO-2014-1BL Core 336-340



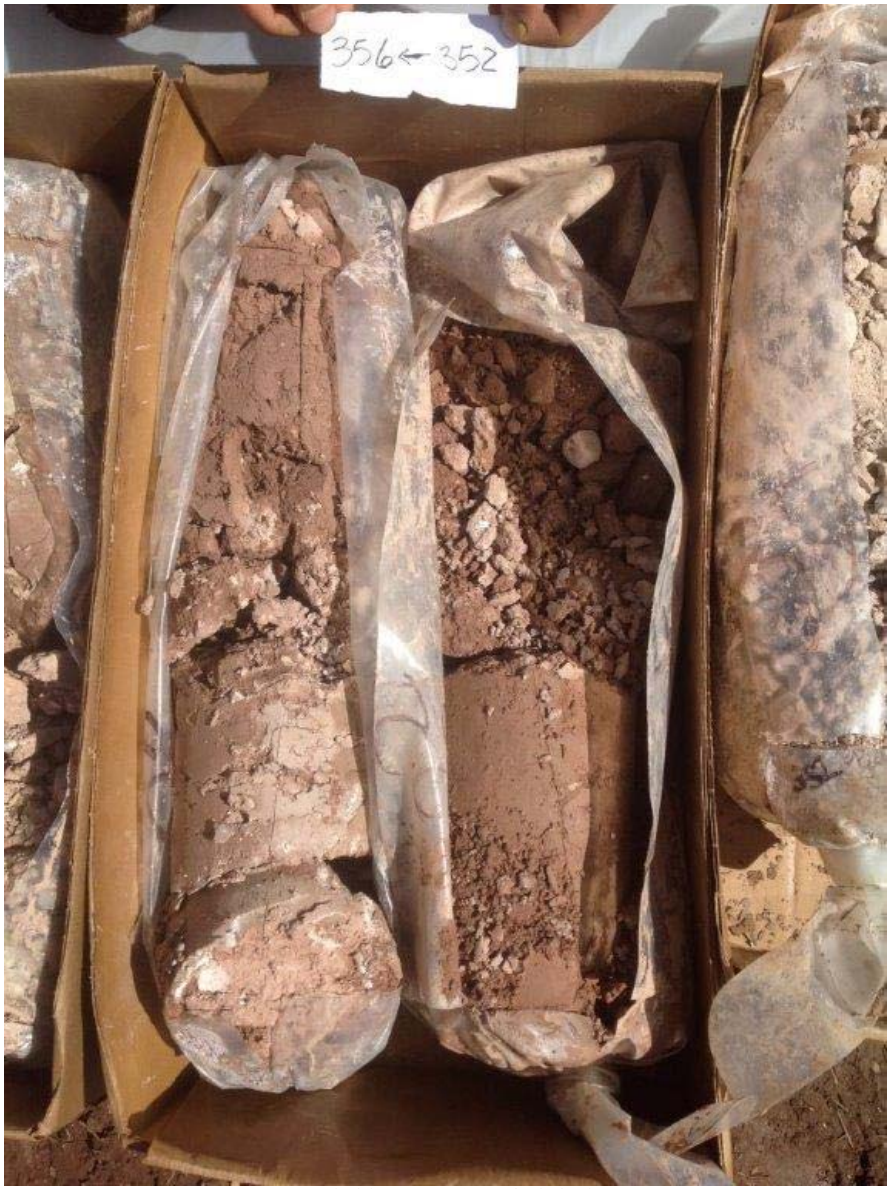
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BMO-2014-1BL Core 344-348



BMO-2014-1BL Core 348-352



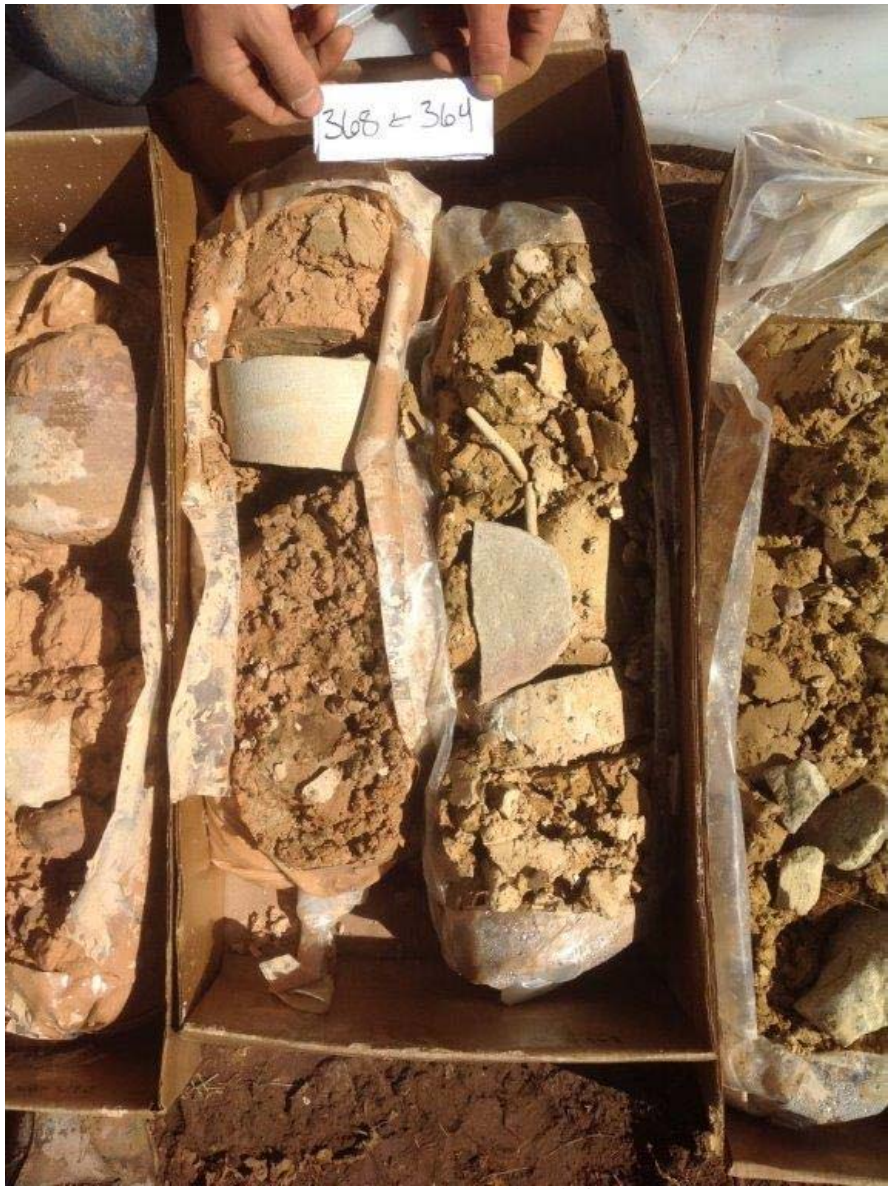
BMO-2014-1BL Core 352-356



BMO-2014-1BL Core 356-360



BMO-2014-1BL Core 360-364



BMO-2014-1BL Core 364-368



BMO-2014-1BL Core 368-372



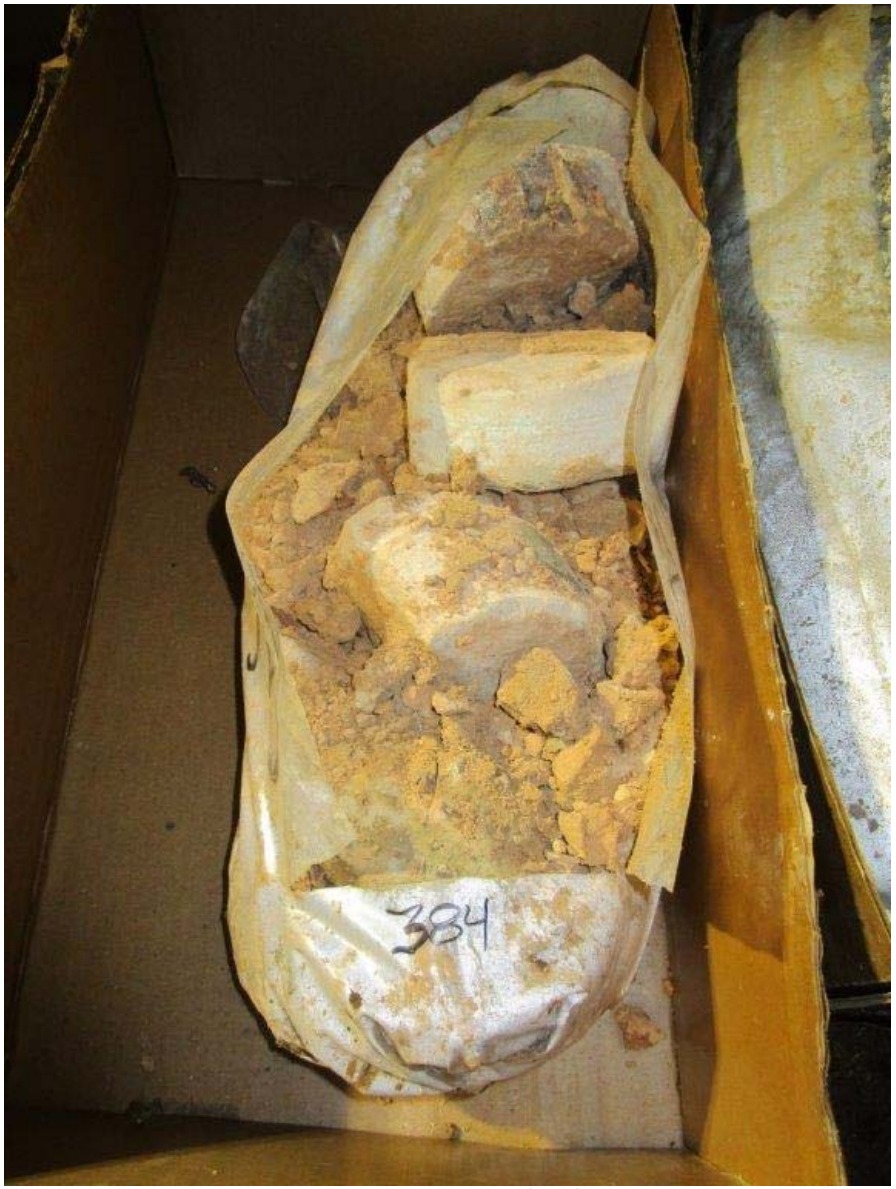
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BMO-2014-1BL Core 376-380



BMO-2014-1BL Core 380-384



BMO-2014-1BL Core 382-384



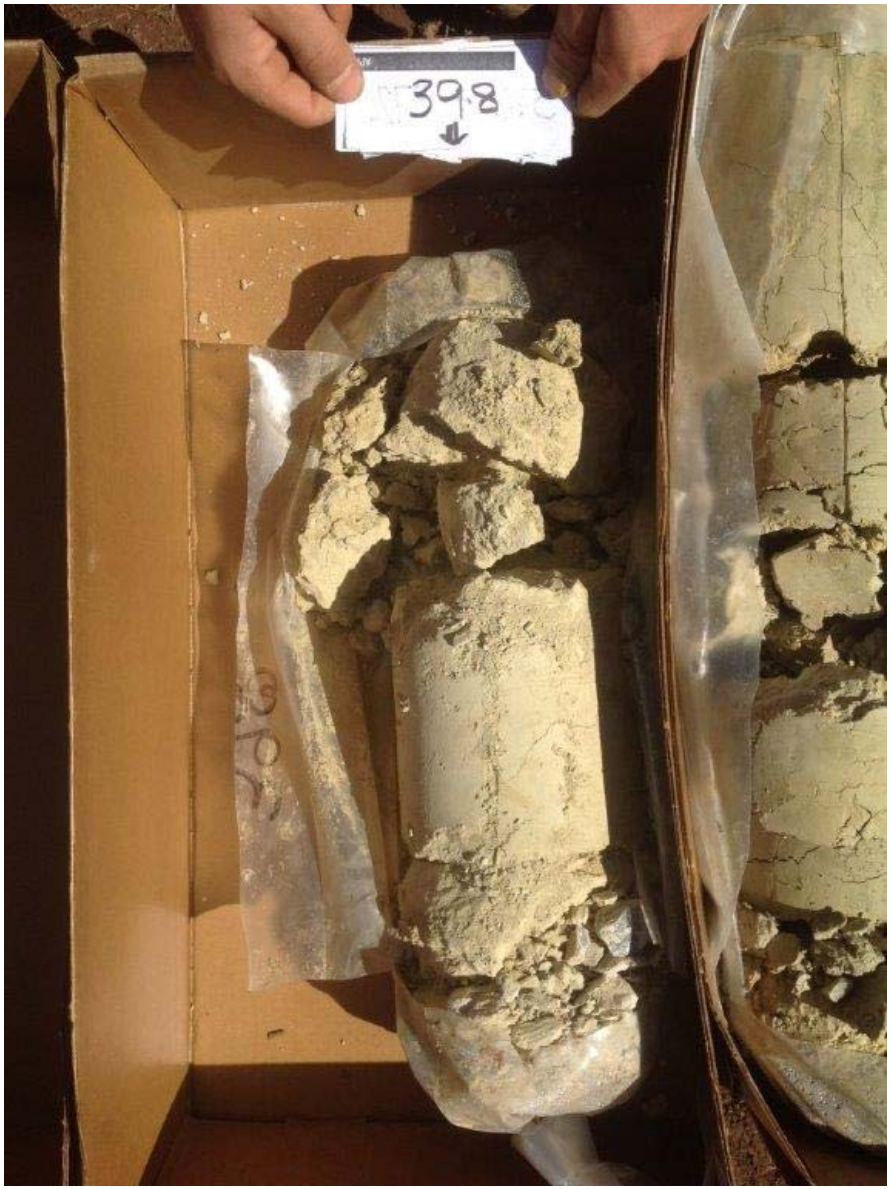
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BMO-2014-1BL Core 388-392



BMO-2014-1BL Core 392-396



BMO-2014-1BL Core 396-398



BMO-2014-2BL Core 0-4



BMO-2014-2BL Core 4-8



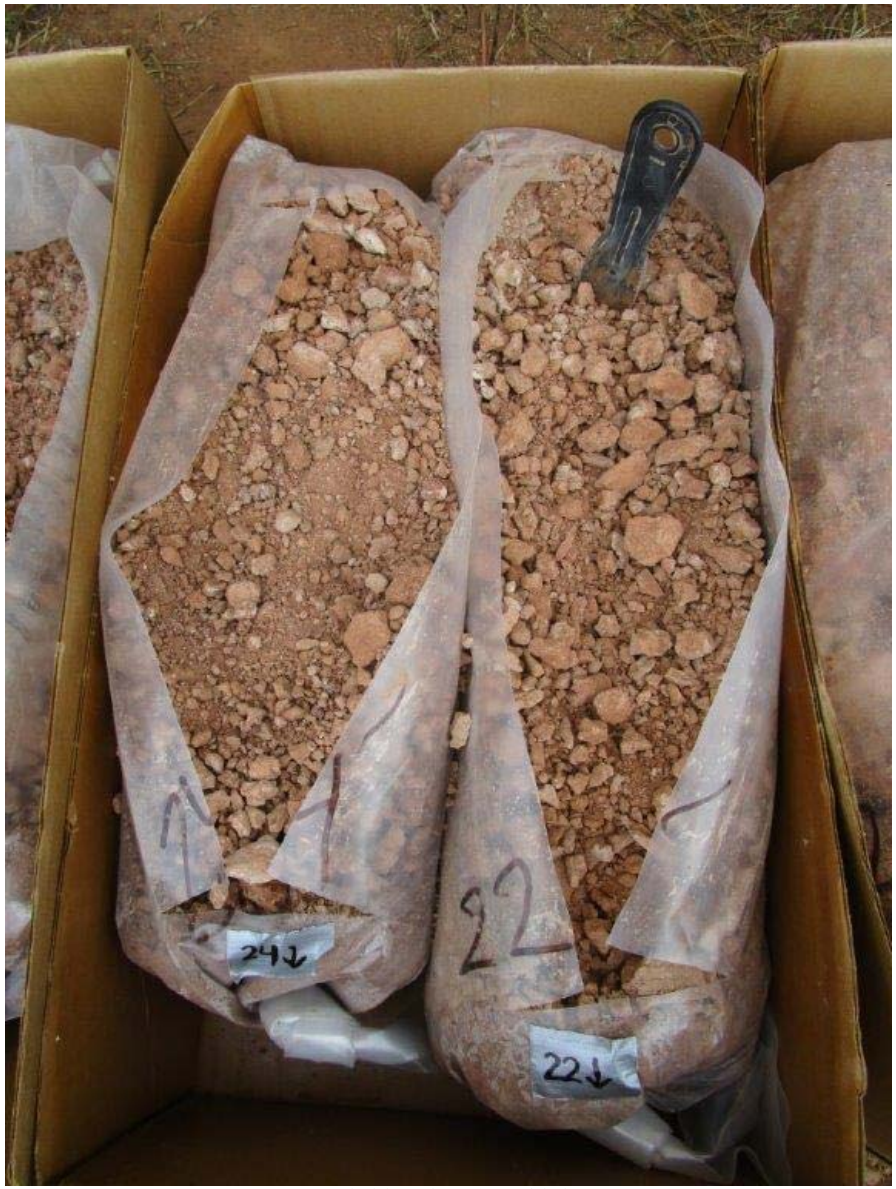
BMO-2014-2BL Core 8-12



BMO-2014-2BL Core 12-16



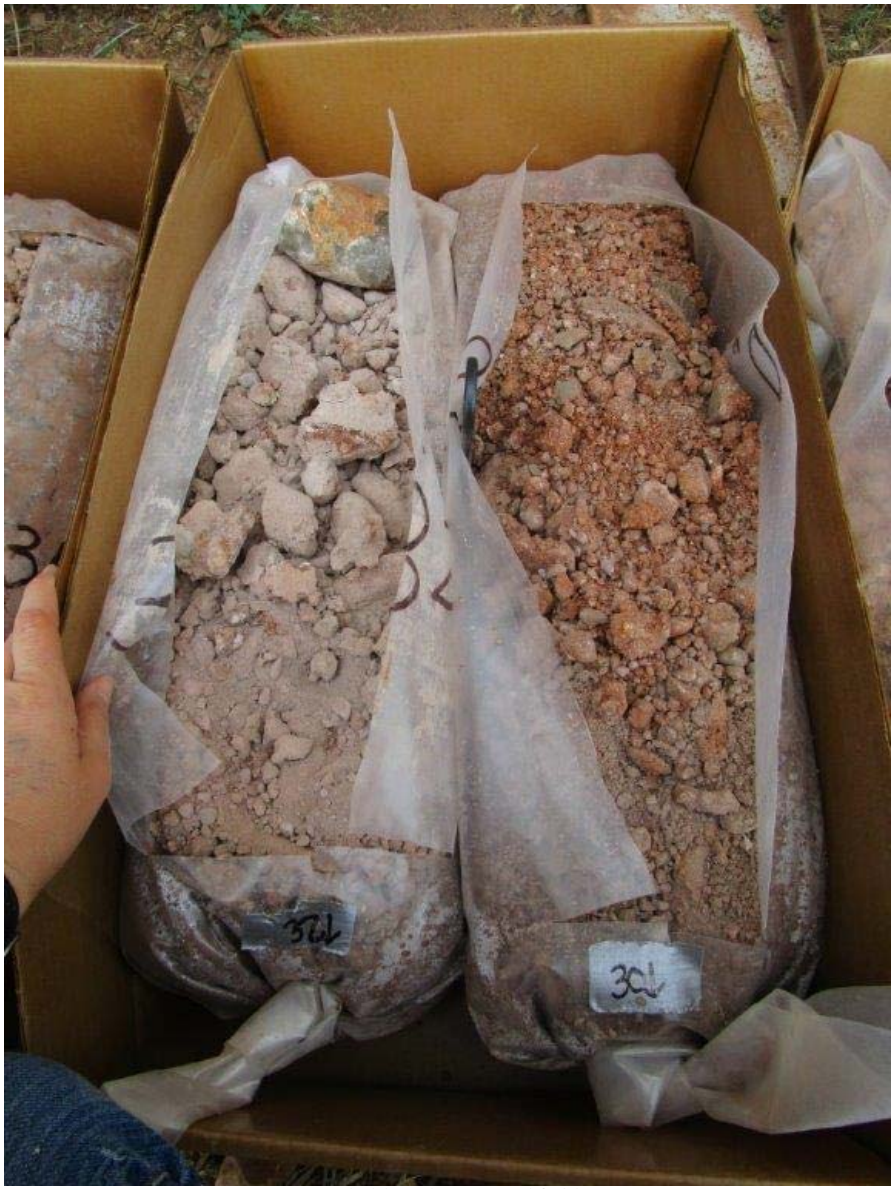
BMO-2014-2BL Core 16-20



BMO-2014-2BL Core 20-24



BMO-2014-2BL Core 24-28



BMO-2014-2BL Core 28-32



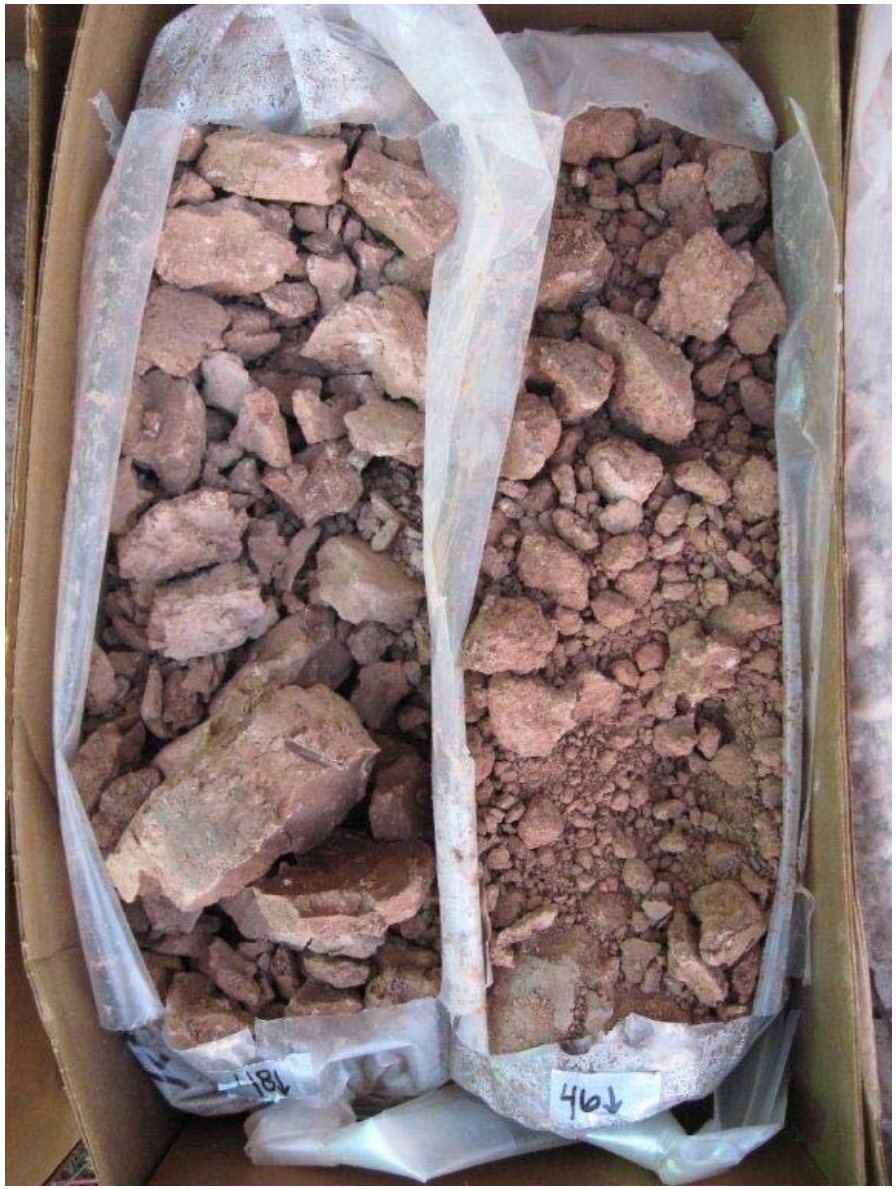
BMO-2014-2BL Core 32-36



BMO-2014-2BL Core 36-40



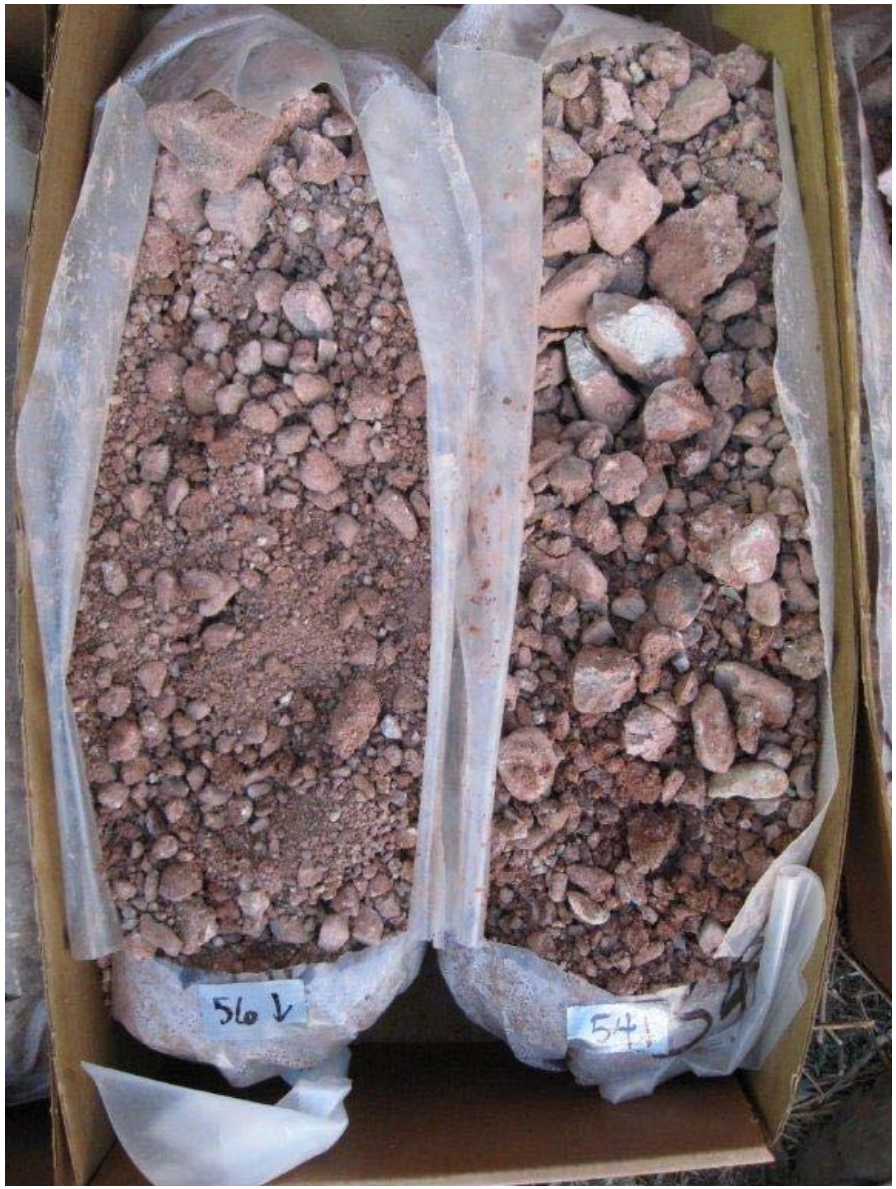
BMO-2014-2BL Core 40-44



BMO-2014-2BL Core 44-48



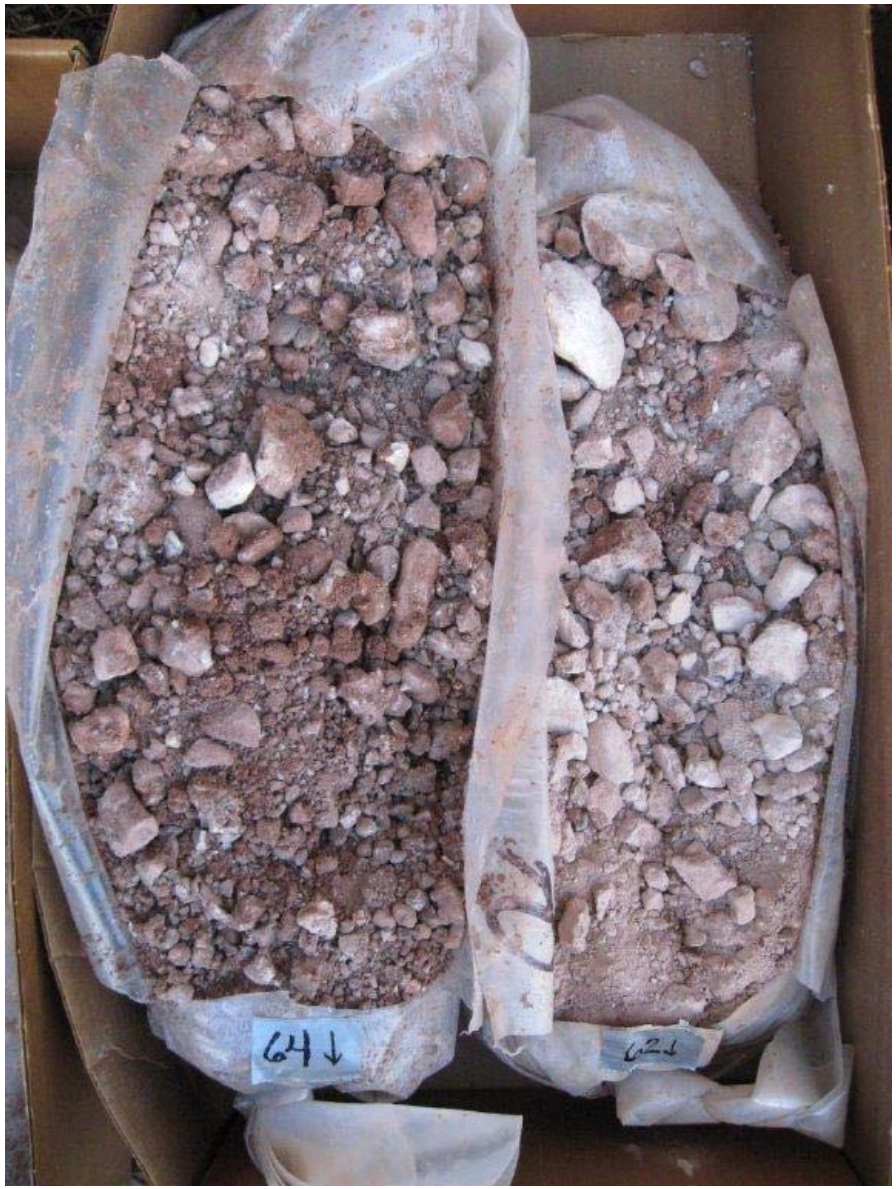
BMO-2014-2BL Core 48-52



BMO-2014-2BL Core 52-56



BMO-2014-2BL Core 56-60



BMO-2014-2BL Core 60-64



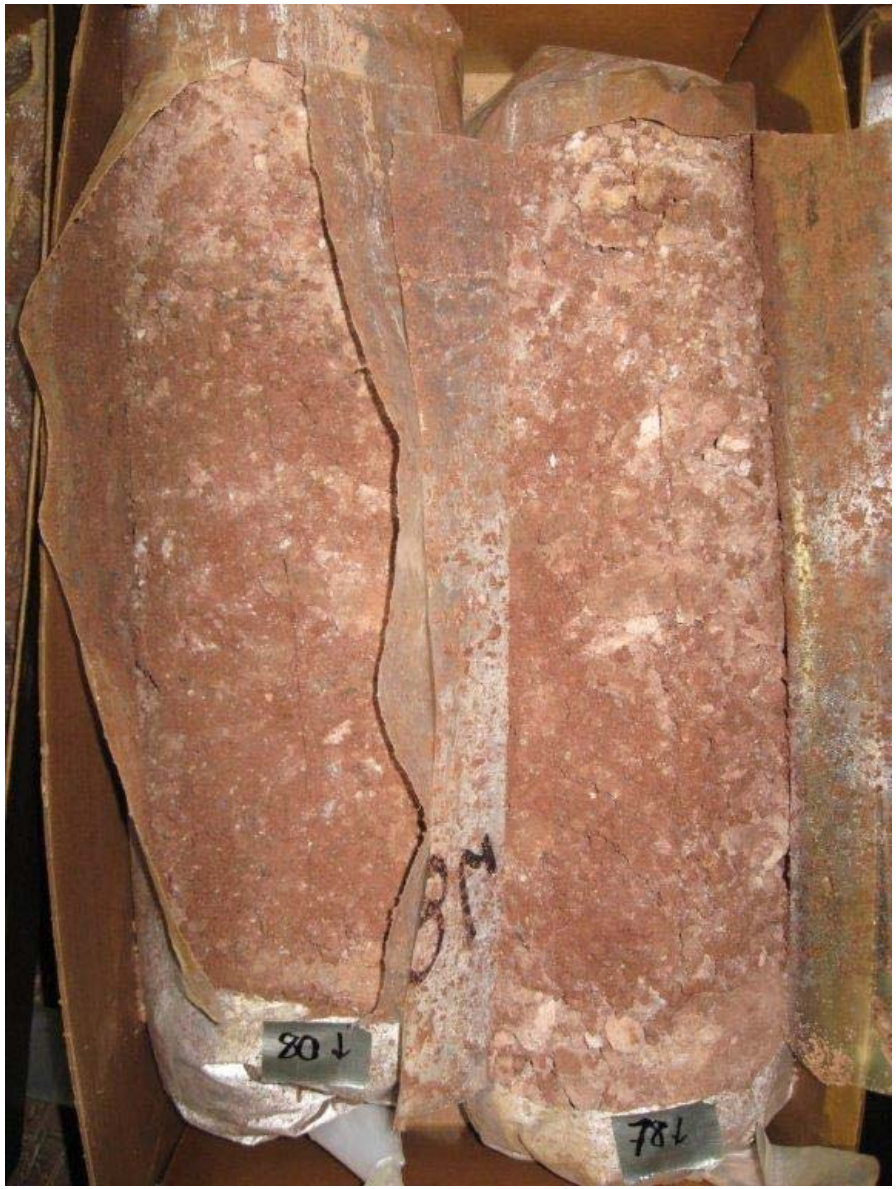
BMO-2014-2BL Core 64-68



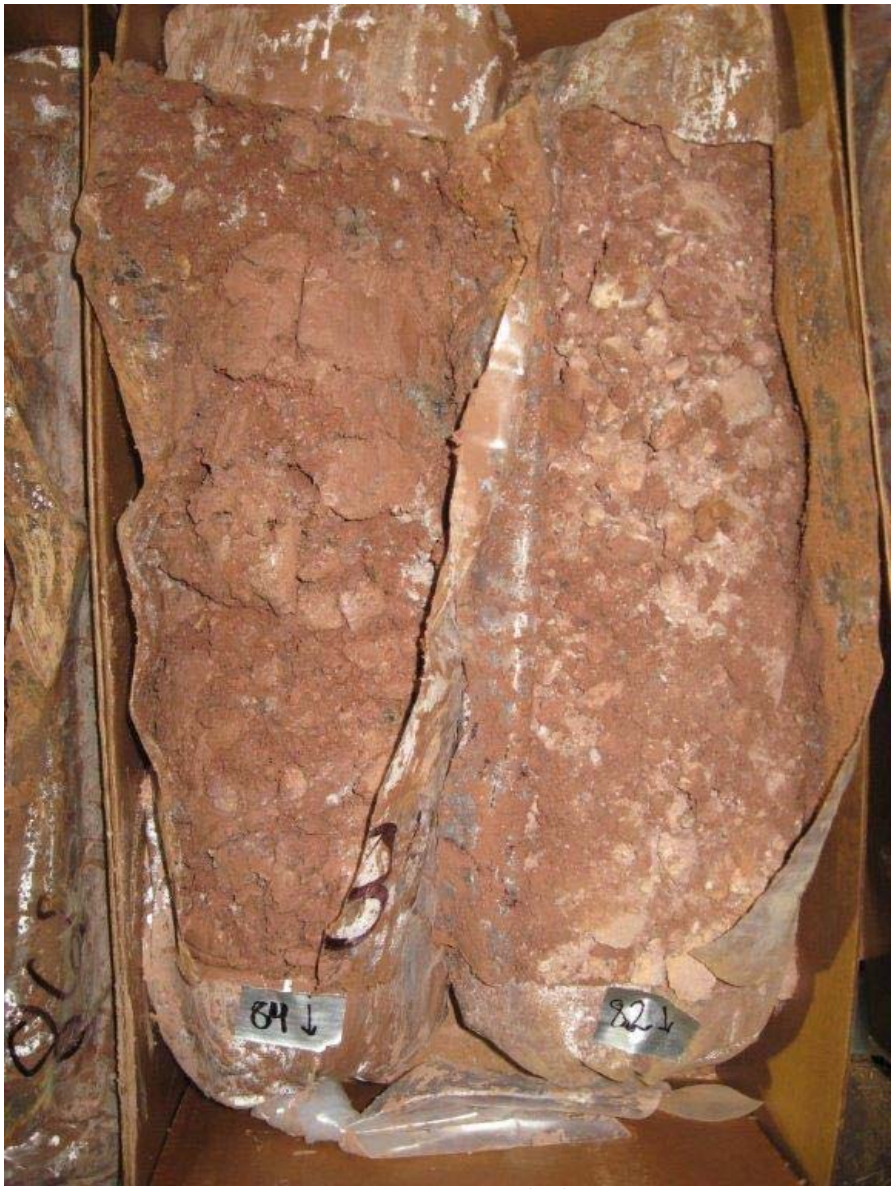
BMO-2014-2BL Core 68-72



BMO-2014-2BL Core 72-76



BMO-2014-2BL Core 76-80



BMO-2014-2BL Core 80-84



BMO-2014-2BL Core 84-88



BMO-2014-2BL Core 88-92



BMO-2014-2BL Core 92-96



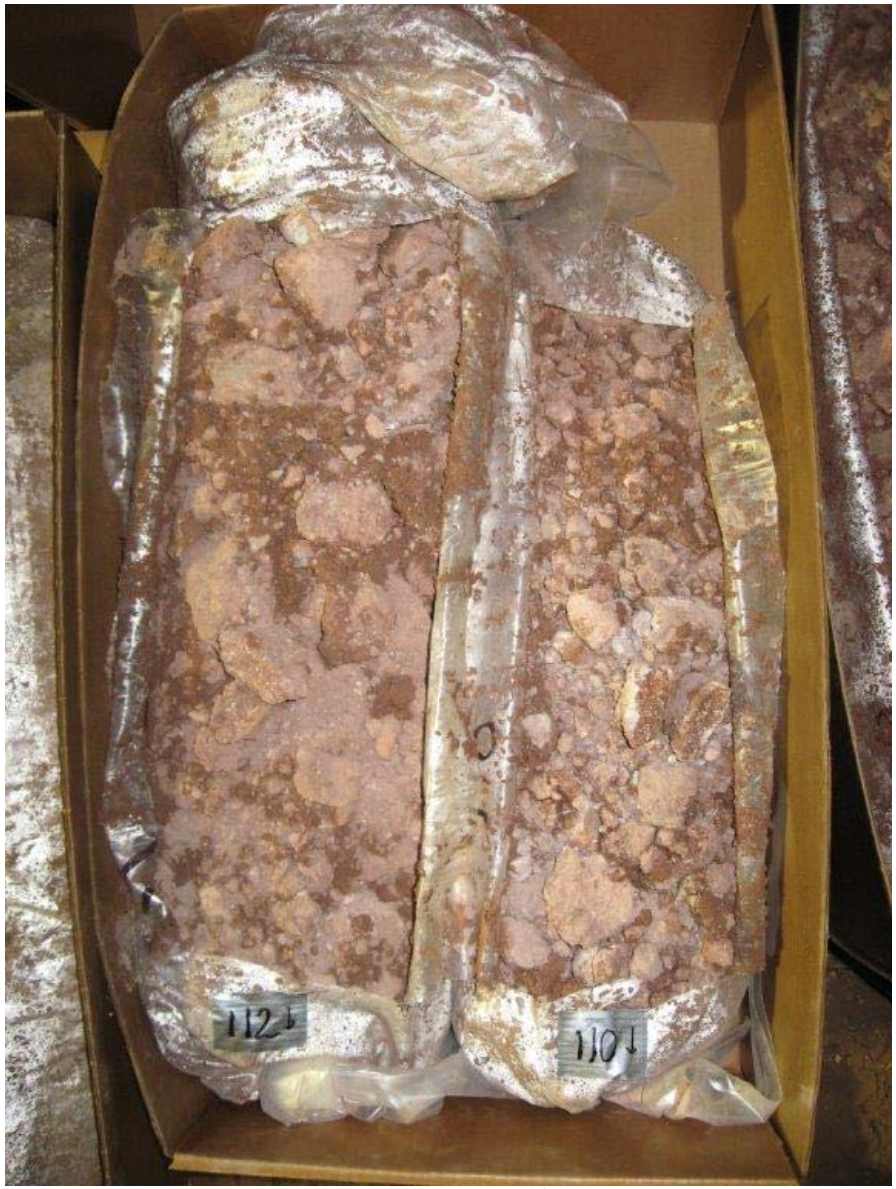
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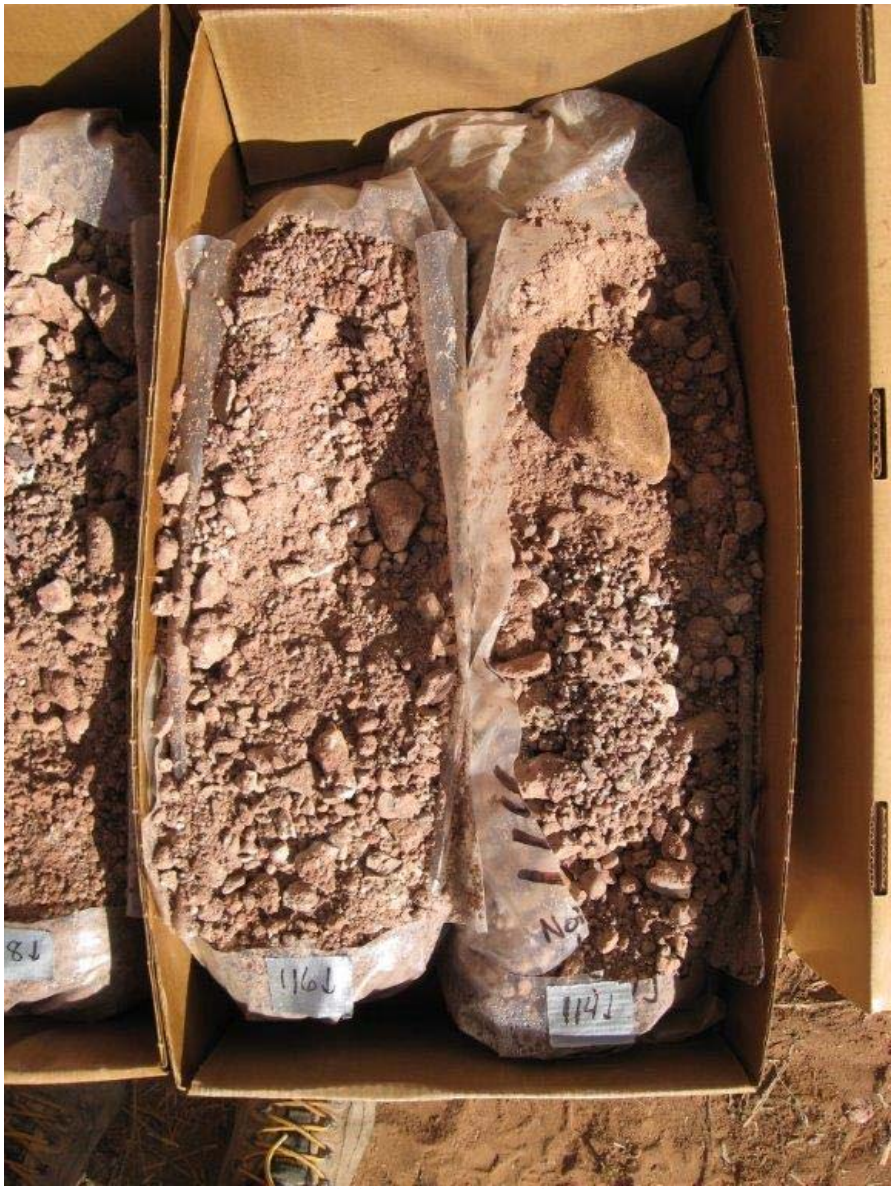
BMO-2014-2BL Core 100-104



BMO-2014-2BL Core 104-108



BMO-2014-2BL Core 108-112



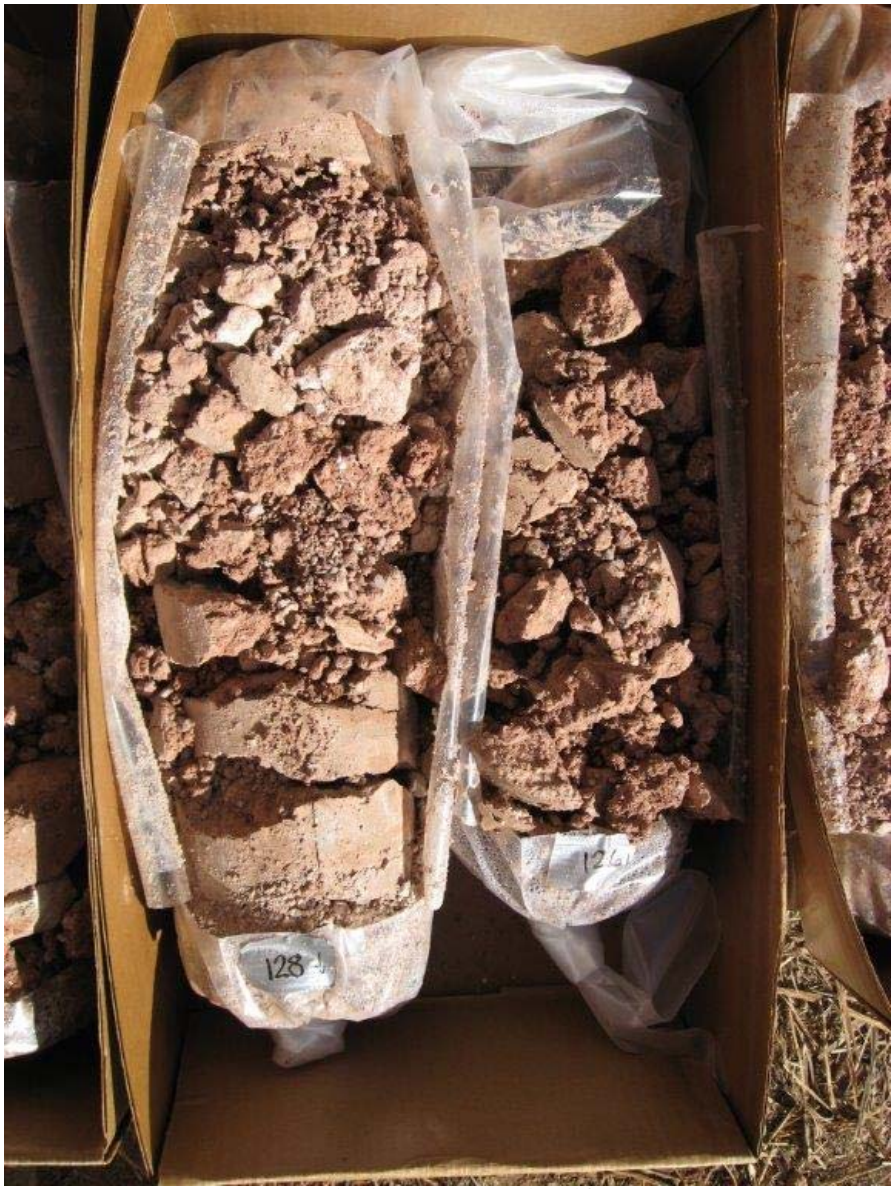
BMO-2014-2BL Core 112-116



BMO-2014-2BL Core 116-120



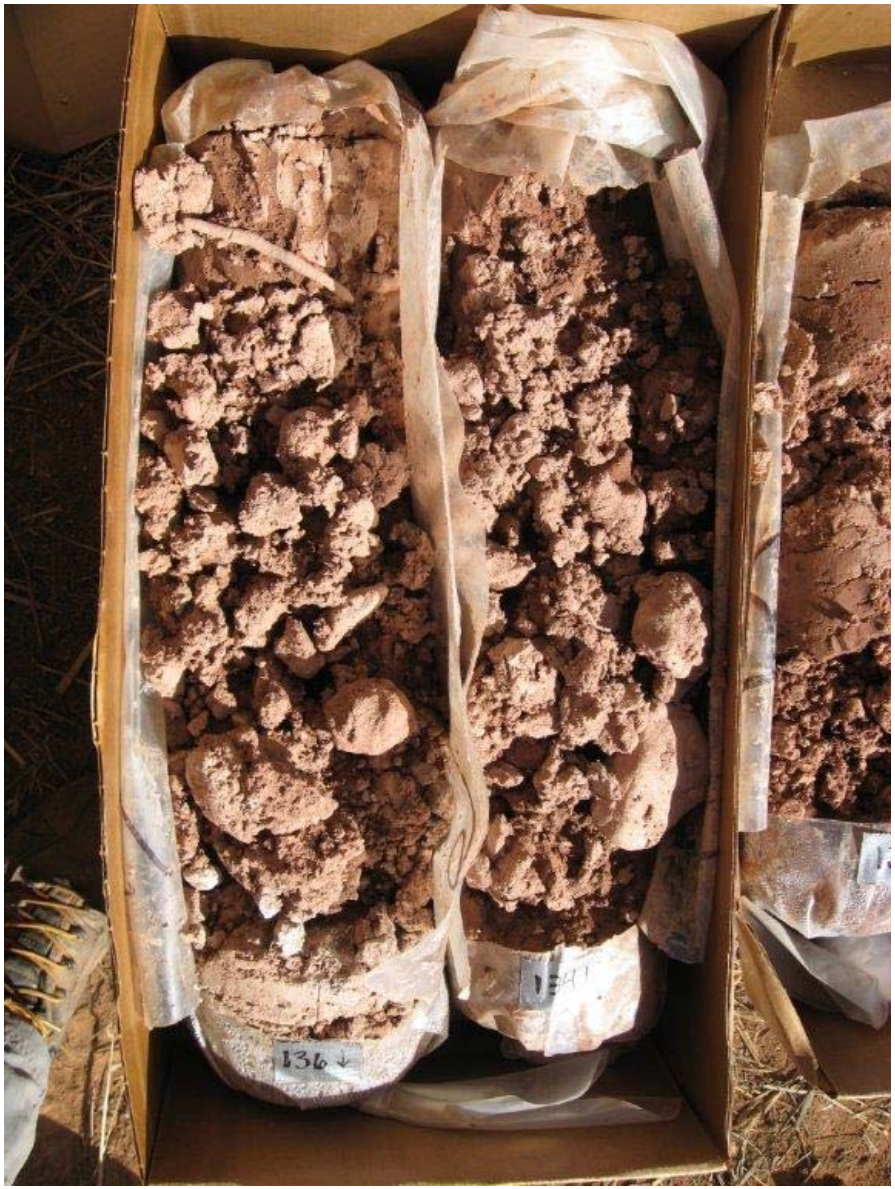
BMO-2014-2BL Core 120-124



BMO-2014-2BL Core 124-128



BMO-2014-2BL Core 128-132



BMO-2014-2BL Core 132-136



BMO-2014-2BL Core 136-140



BMO-2014-2BL Core 140-144



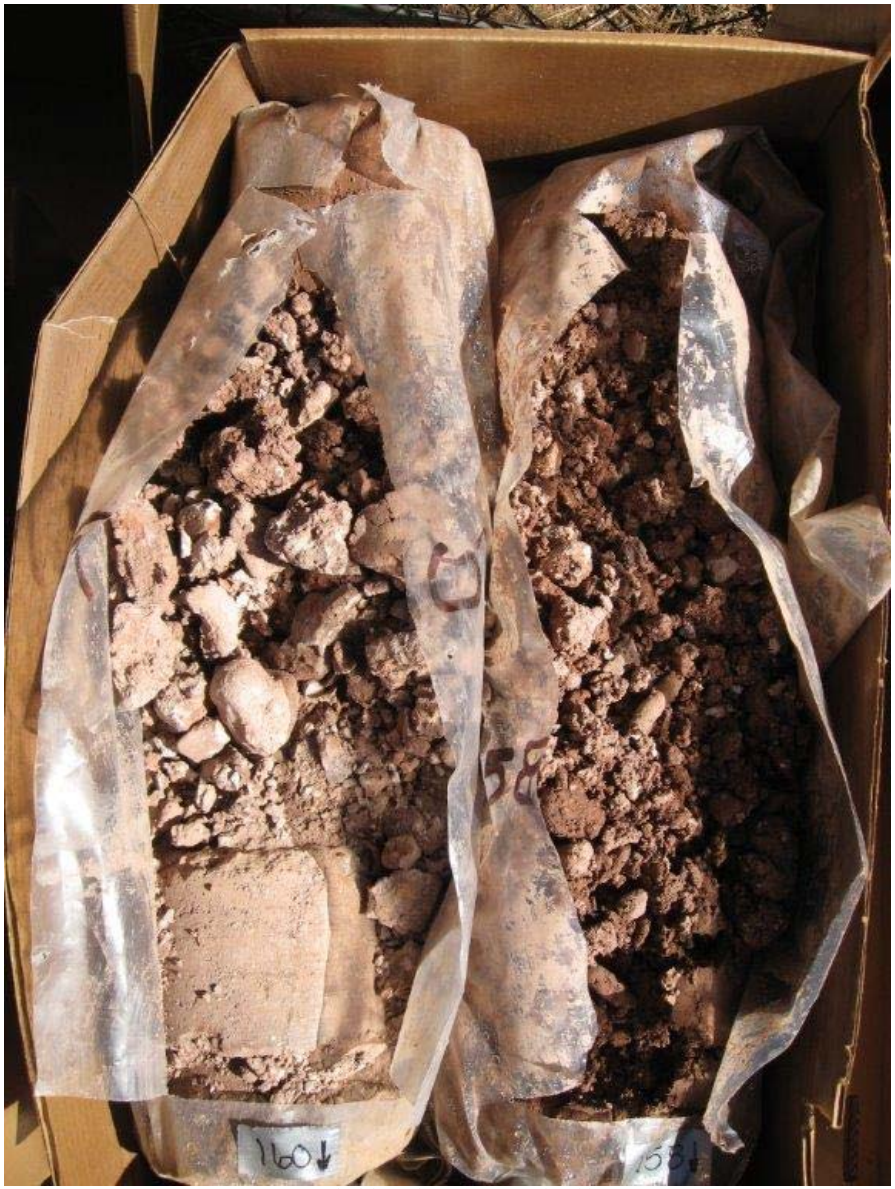
BMO-2014-2BL Core 144-148



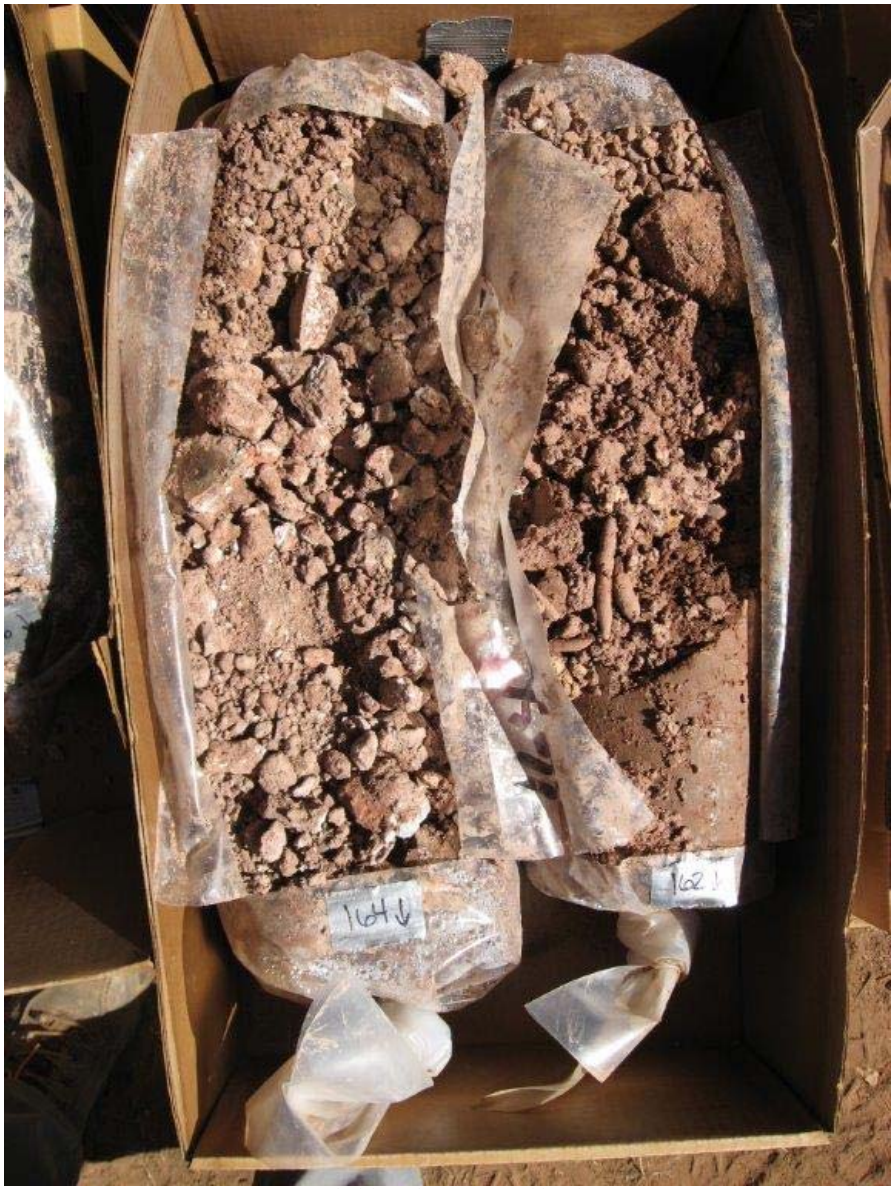
BMO-2014-2BL Core 148-152



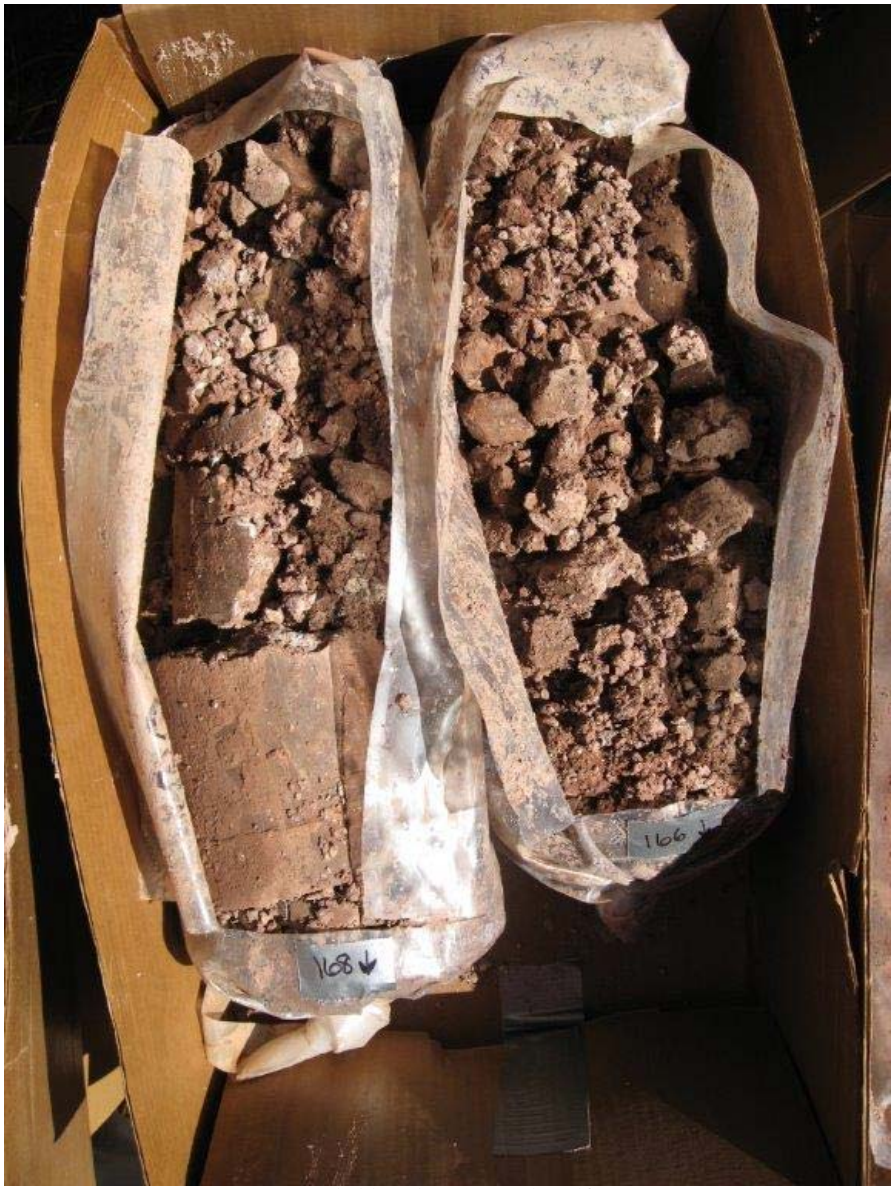
BMO-2014-2BL Core 152-156



BMO-2014-2BL Core 156-160



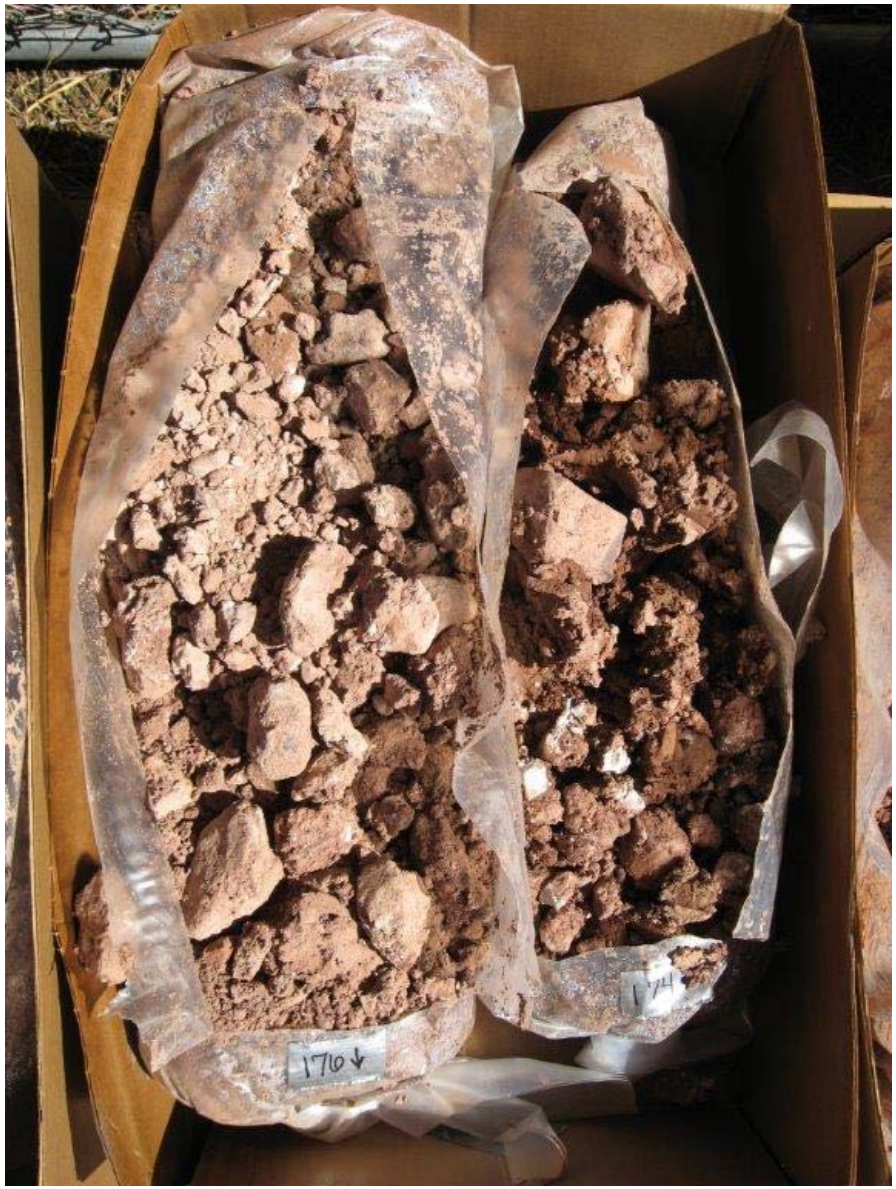
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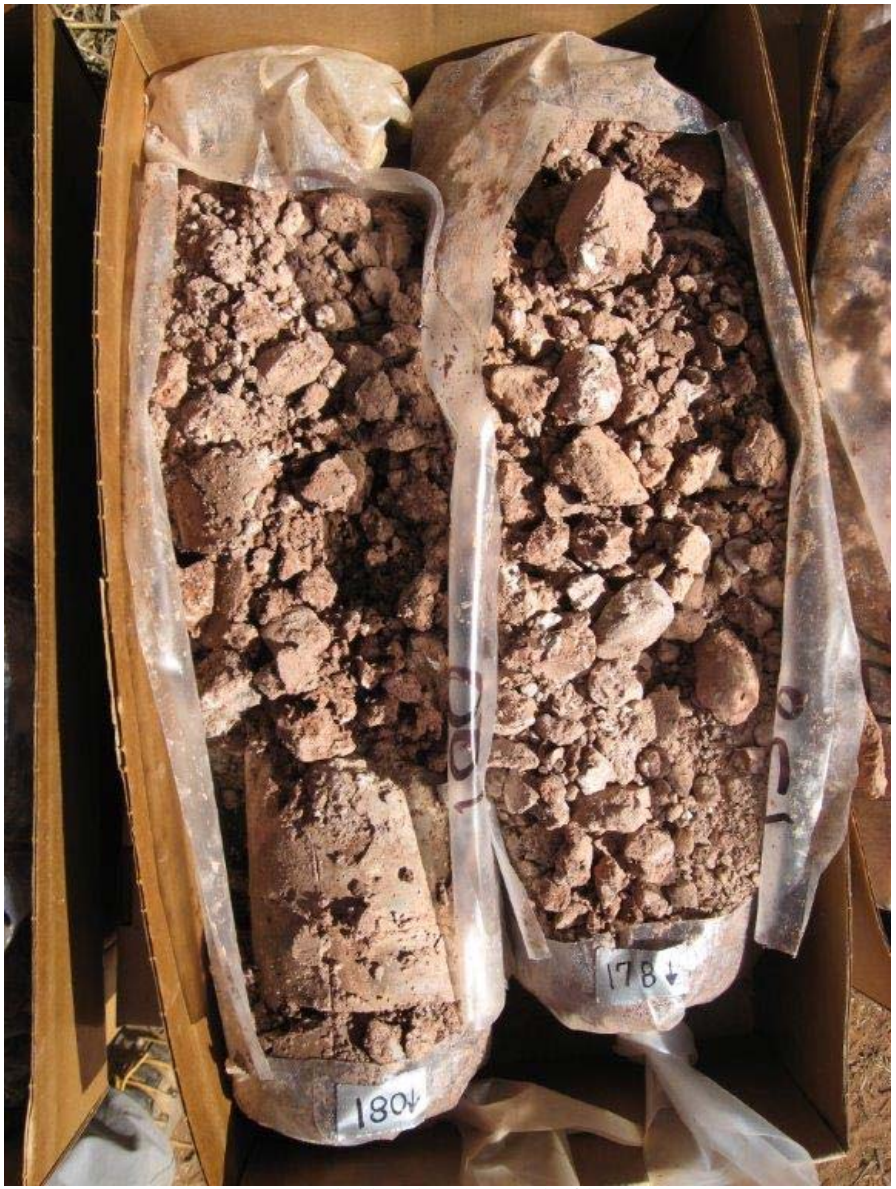
BMO-2014-2BL Core 164-168



BMO-2014-2BL Core 168-172



BMO-2014-2BL Core 172-176



BMO-2014-2BL Core 176-180



BMO-2014-2BL Core 180-184



BMO-2014-2BL Core 184-188



BMO-2014-2BL Core 188-192



BMO-2014-2BL Core 192-196



BMO-2014-2BL Core 196-200



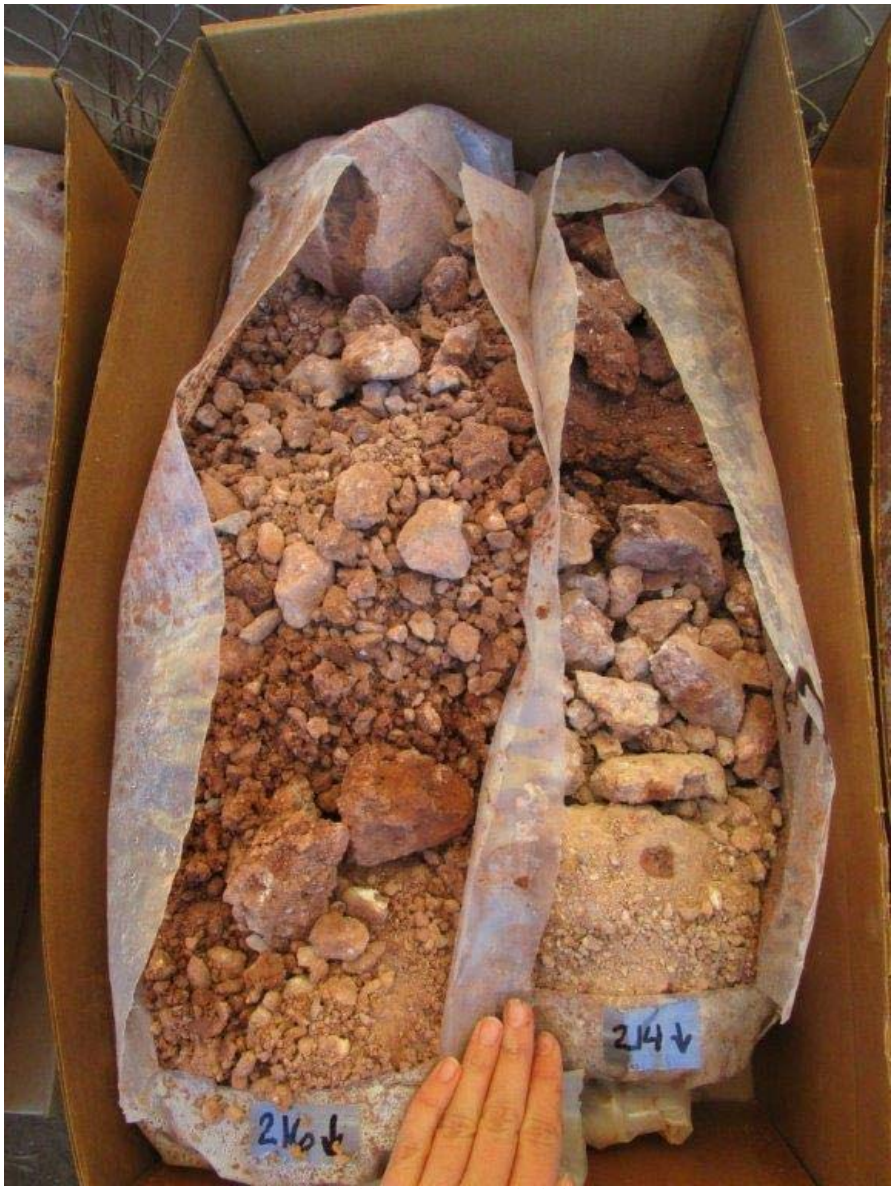
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BMO-2014-2BL Core 204-208



BMO-2014-2BL Core 208-212



BMO-2014-2BL Core 212-216



BMO-2014-2BL Core 216-220



BMO-2014-2BL Core 236-240



BMO-2014-2BL Core 240-244



BMO-2014-2BL Core 244-248



BMO-2014-2BL Core 248-252



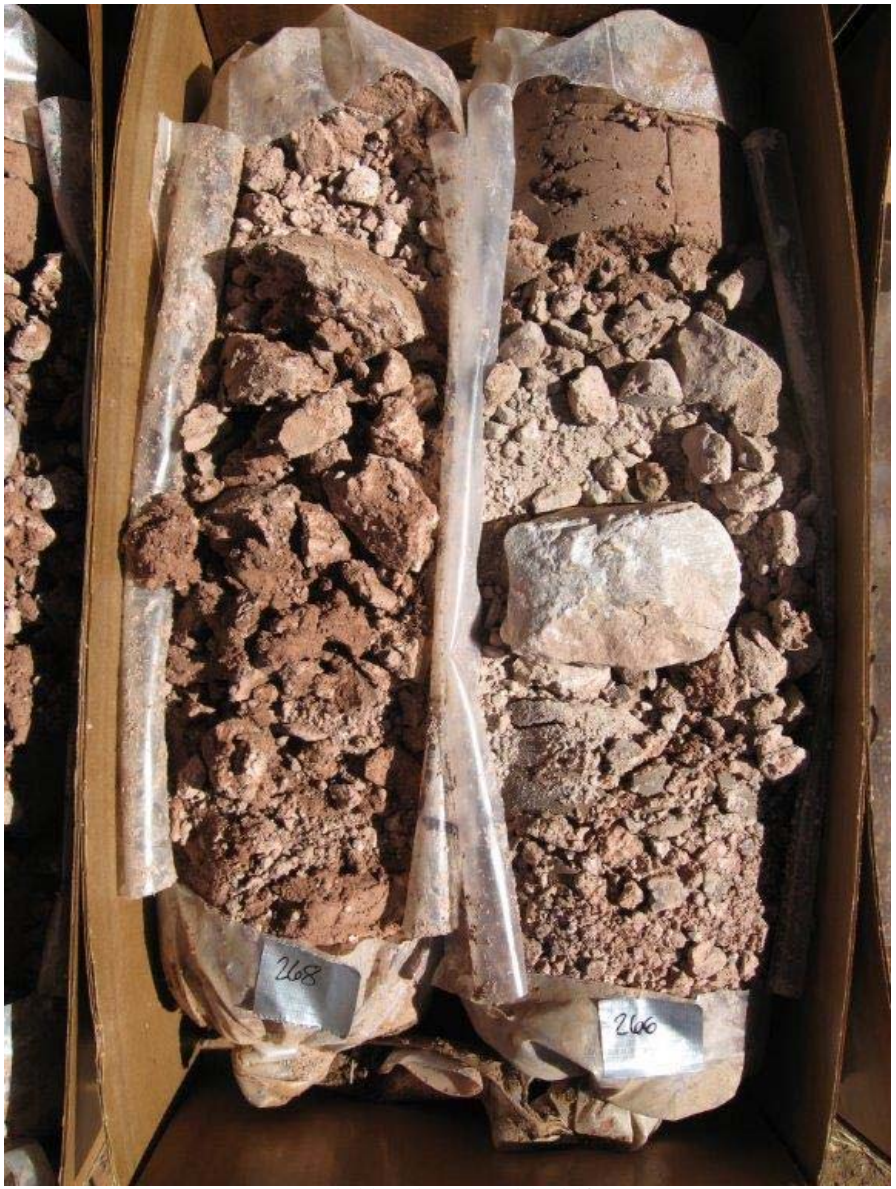
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BMO-2014-2BL Core 264-268



BMO-2014-2BL Core 268-272



BMO-2014-2BL Core 276-280



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BMO-2014-2BL Core 284-288



BMO-2014-2BL Core 288-292



BMO-2014-2BL Core 292-296



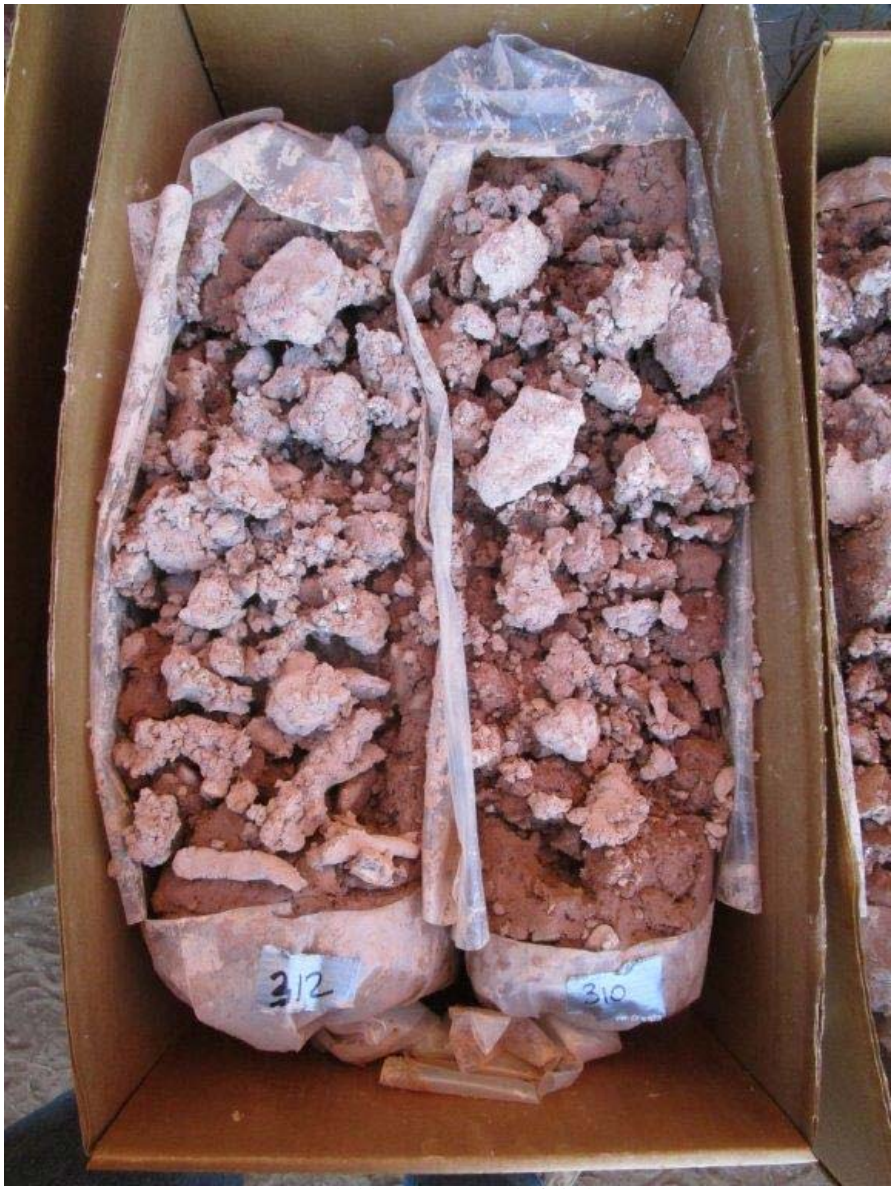
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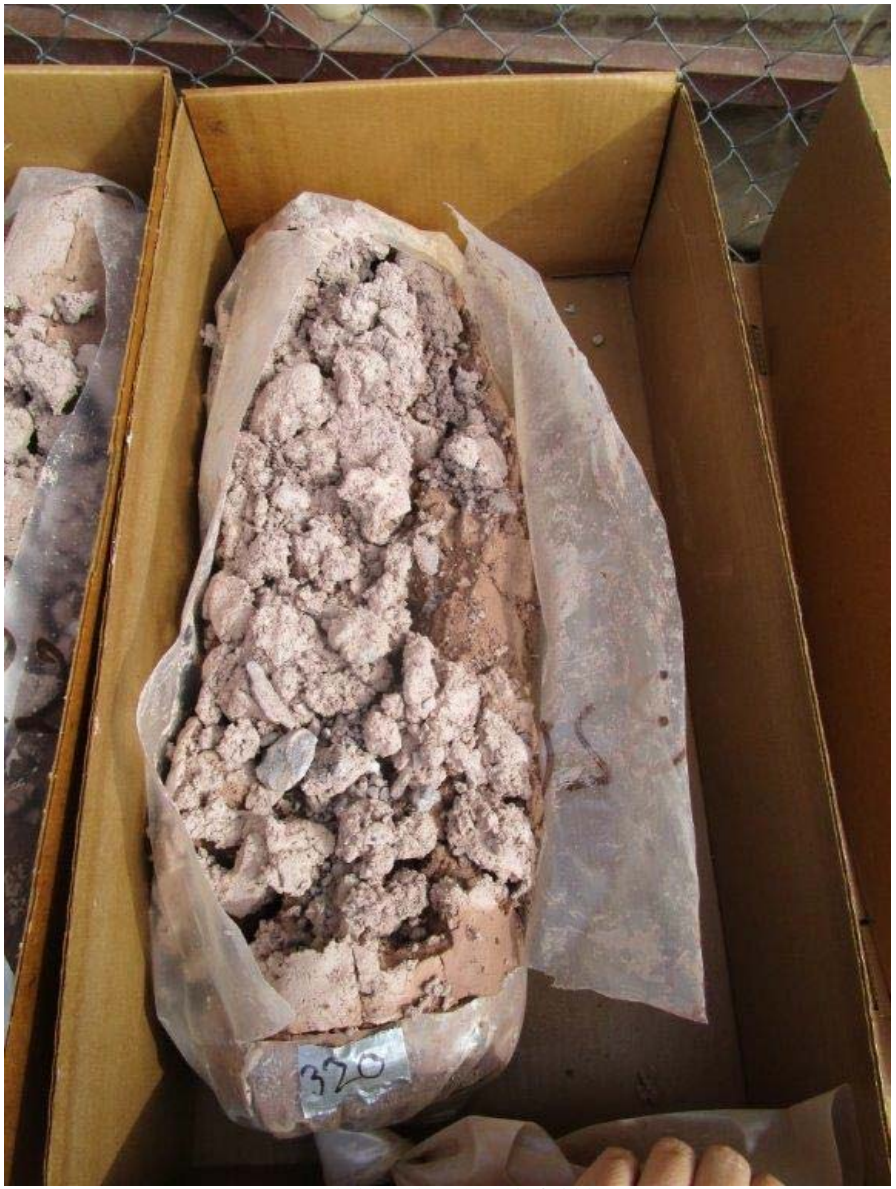
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BMO-2014-2BL Core 308-312



BMO-2014-2BL Core 312-316



BMO-2014-2BL Core 318-320



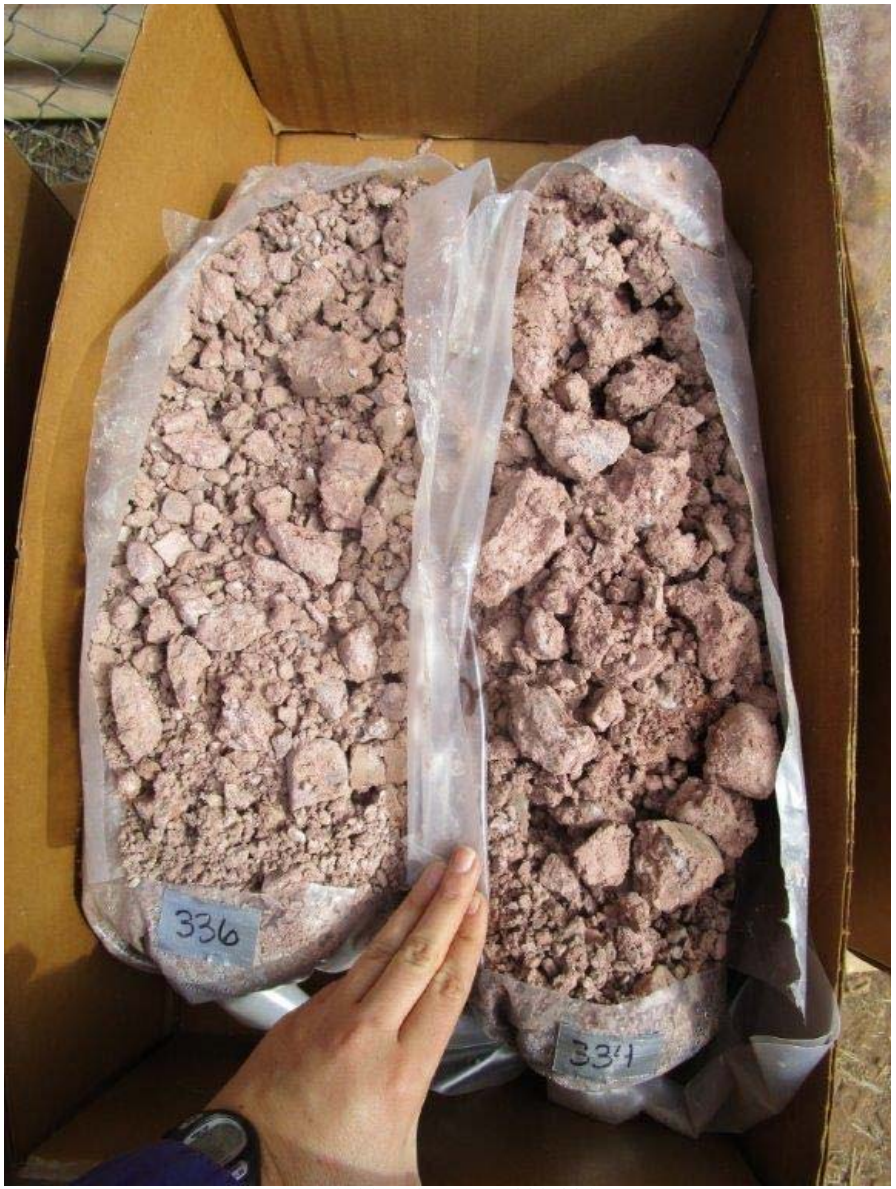
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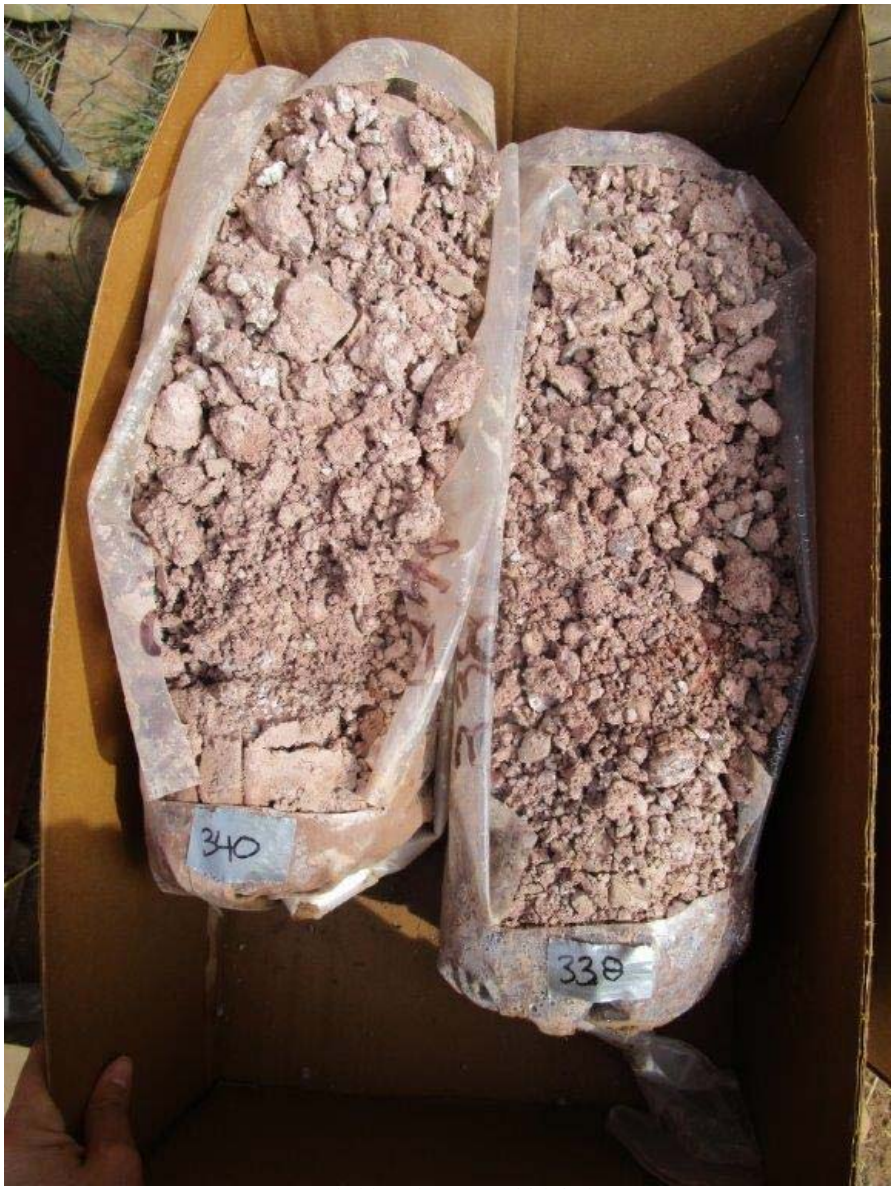
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BMO-2014-2BL Core 336-340



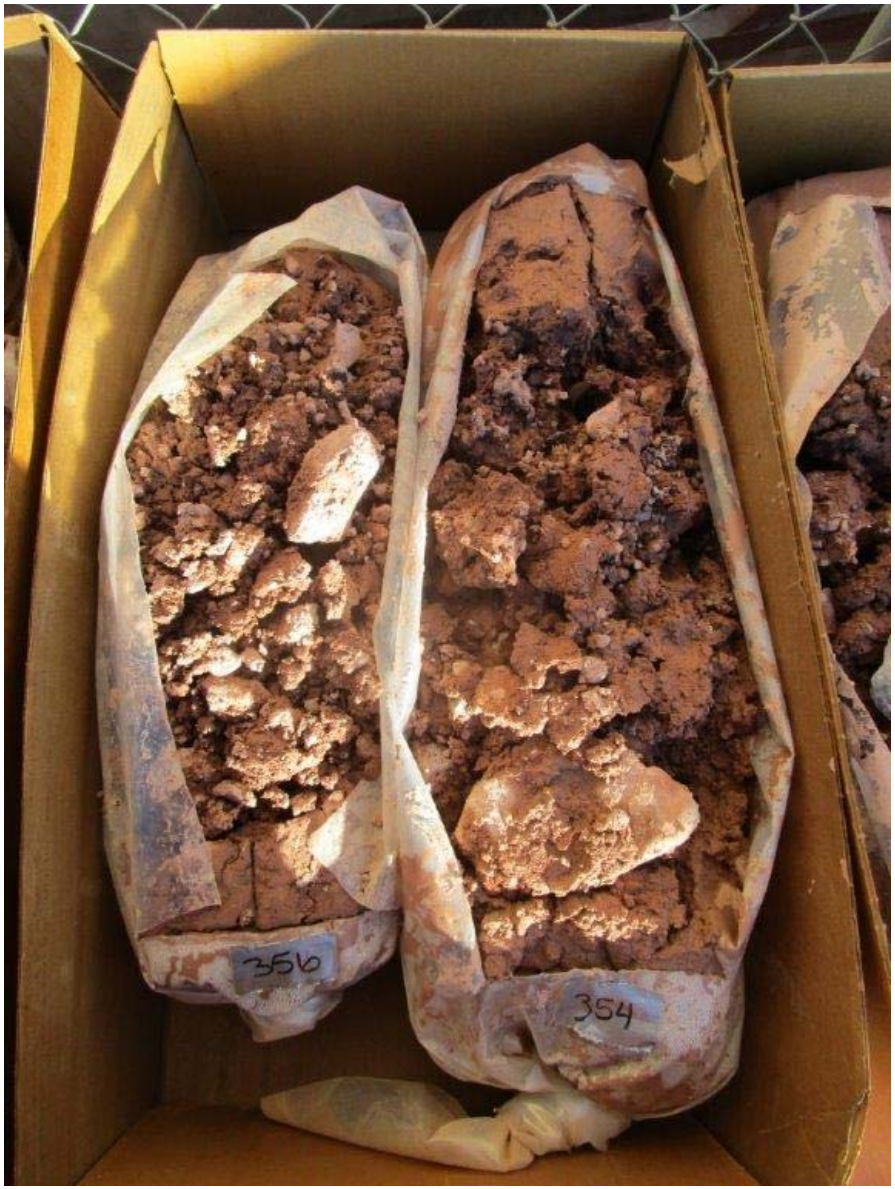
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BMO-2014-2BL Core 348-352



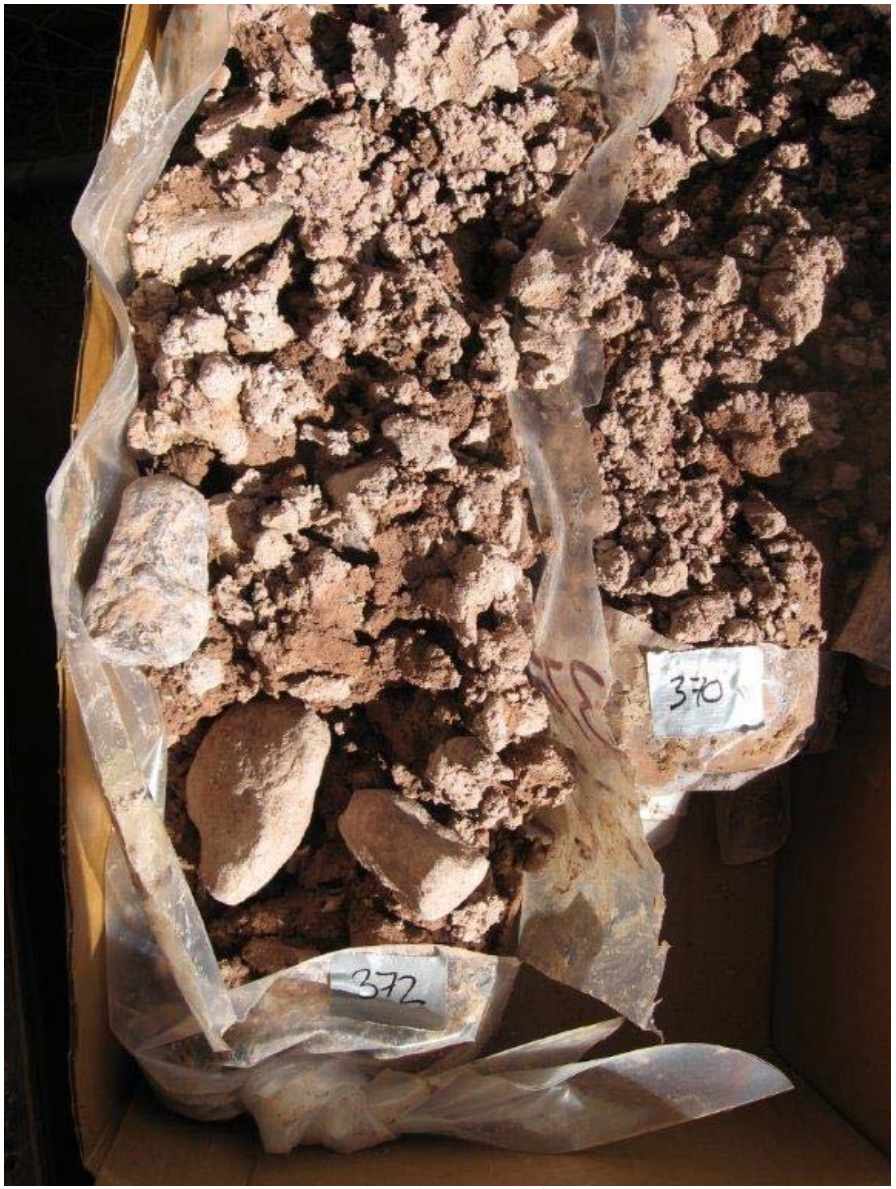
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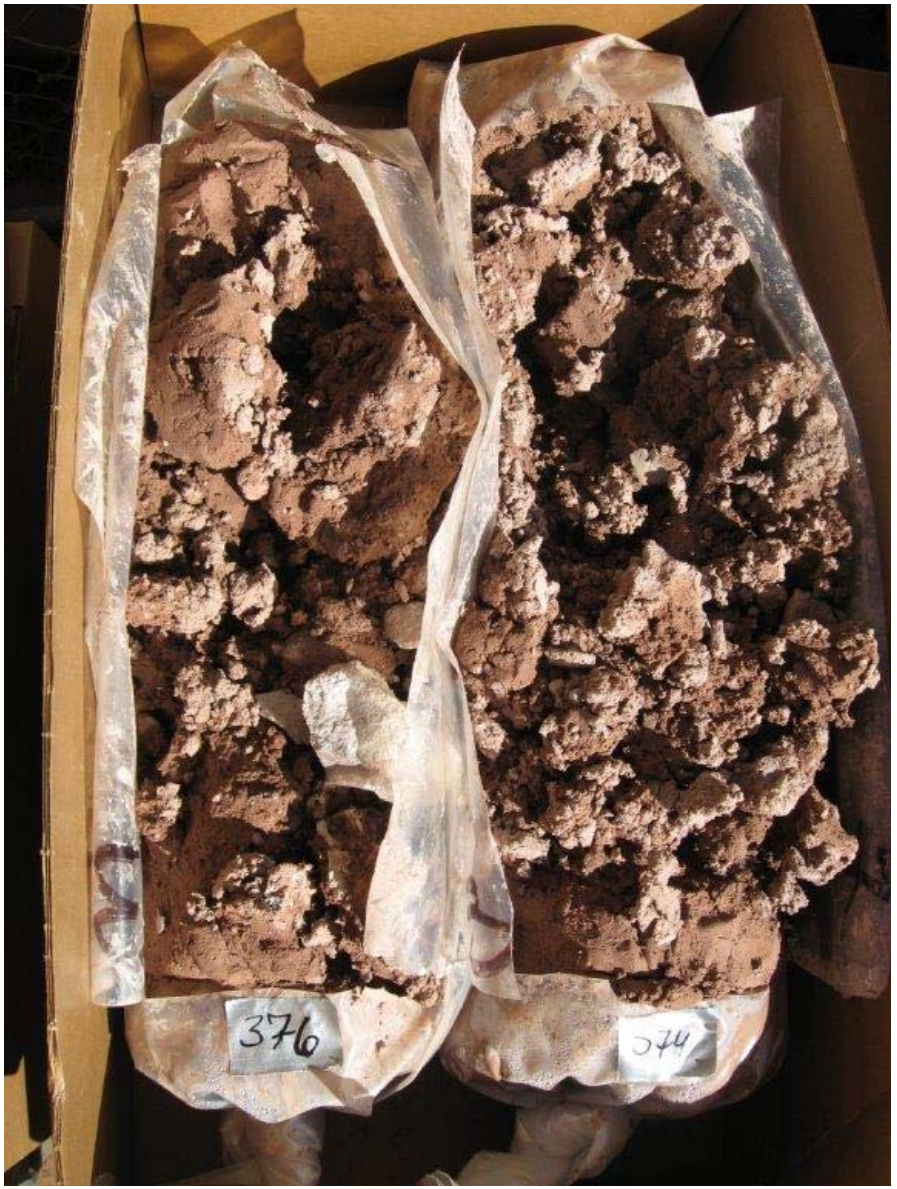
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BMO-2014-2BL Core 372-376



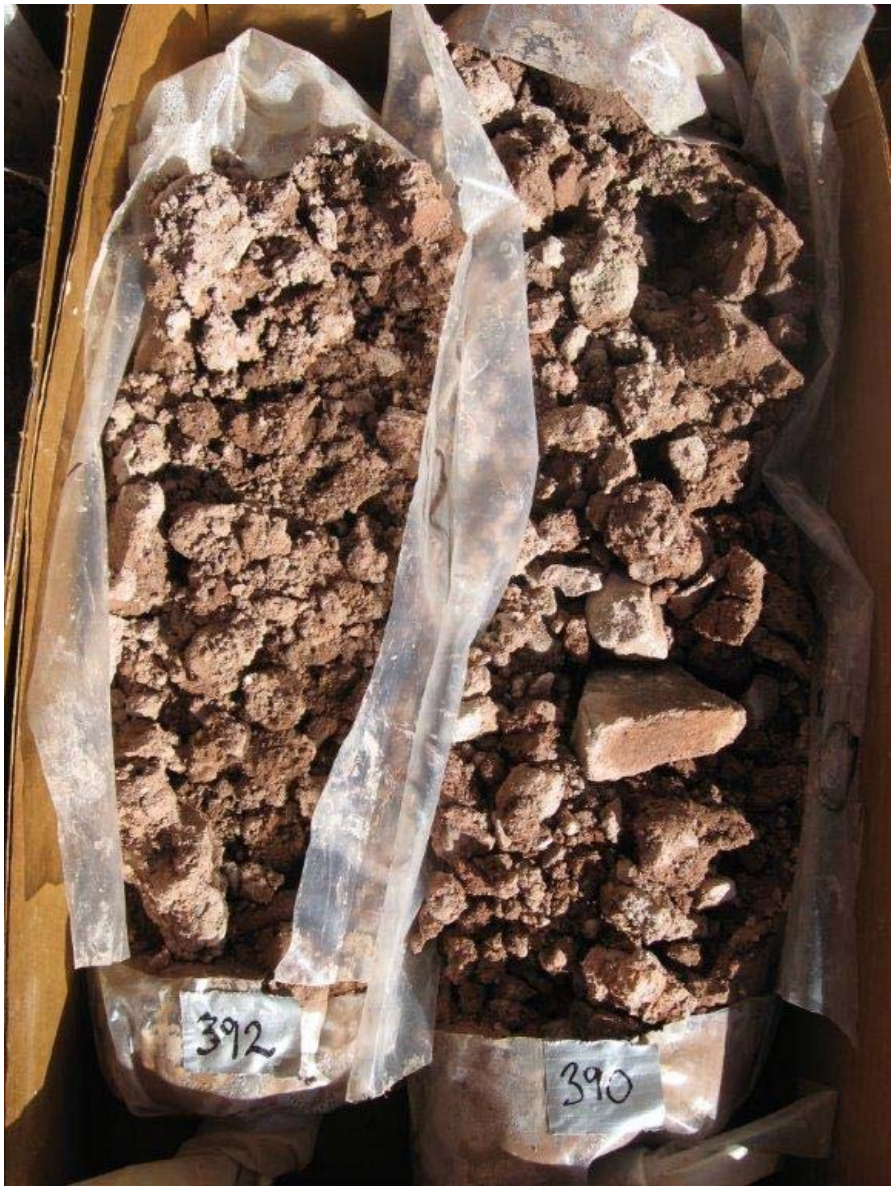
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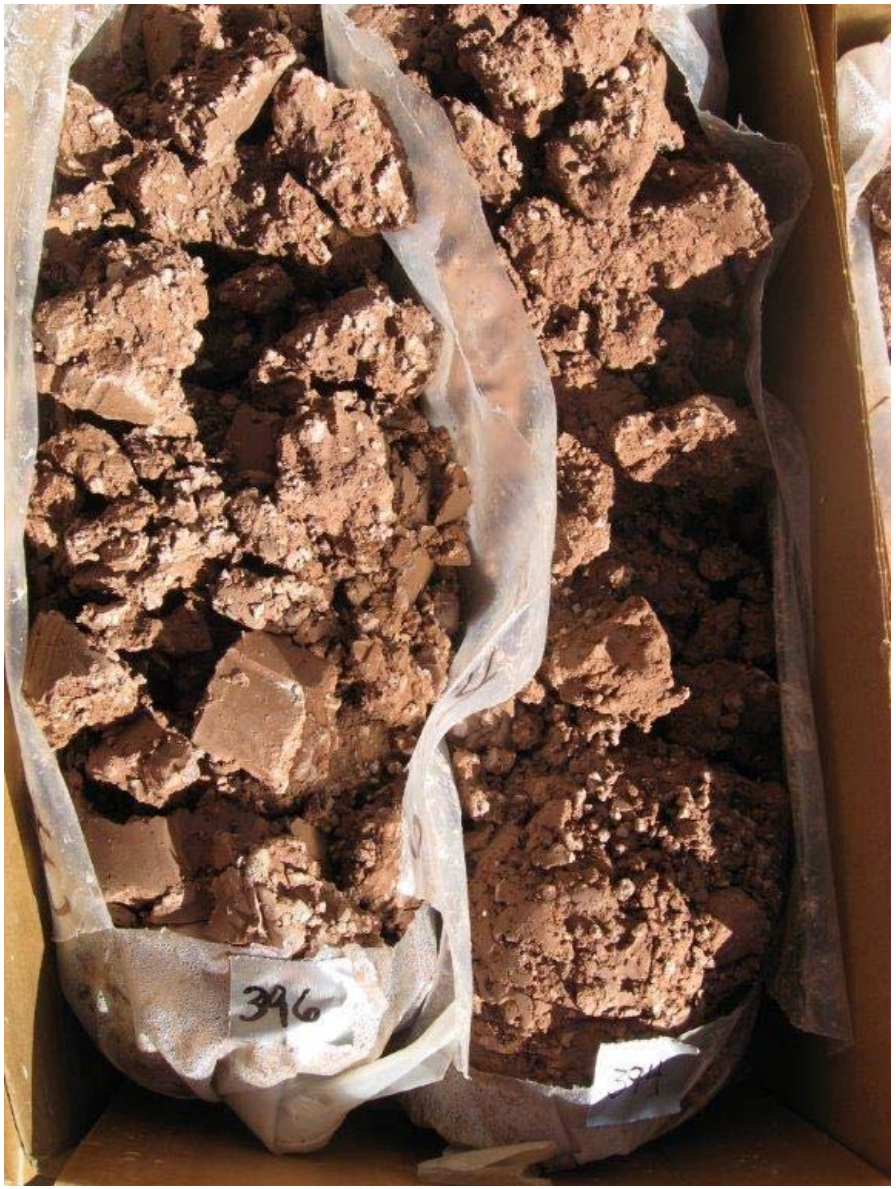
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BMO-2014-2BL Core 384-388



BMO-2014-2BL Core 388-392



BMO-2014-2BL Core 392-396



BMO-2014-2BL Core 396-400



BMO-2014-2BL Core 400-404



BMO-2014-2BL Core 404-408



BMO-2014-2BL Core 408-410



BMO-2014-3BL Core 0-4



BMO-2014-3BL Core 4-8



BMO-2014-3BL Core 8-12



BMO-2014-3BL Core 12-16



BMO-2014-3BL Core 16-20



BMO-2014-3BL Core 20-24



BMO-2014-3BL Core 24-28



BMO-2014-3BL Core 28-32



BMO-2014-3BL Core 32-36



BMO-2014-3BL Core 36-40



BMO-2014-3BL Core 40-44



BMO-2014-3BL Core 44-48



BMO-2014-3BL Core 48-52



BMO-2014-3BL Core 52-56



BMO-2014-3BL Core 56-60



BMO-2014-3BL Core 60-64



BMO-2014-3BL Core 64-68



BMO-2014-3BL Core 66-70



BMO-2014-3BL Core 68-72



BMO-2014-3BL Core 72-76



BMO-2014-3BL Core 76-80



BMO-2014-3BL Core 80-84



BMO-2014-3BL Core 84-88



BMO-2014-3BL Core 88-92



BMO-2014-3BL Core 92-96



BMO-2014-3BL Core 96-100



BMO-2014-3BL Core 100-104



BMO-2014-3BL Core 104-108



BMO-2014-3BL Core 108-112



BMO-2014-3BL Core 112-116



BMO-2014-3BL Core 116-120



BMO-2014-3BL Core 120-124



BMO-2014-3BL Core 124-128



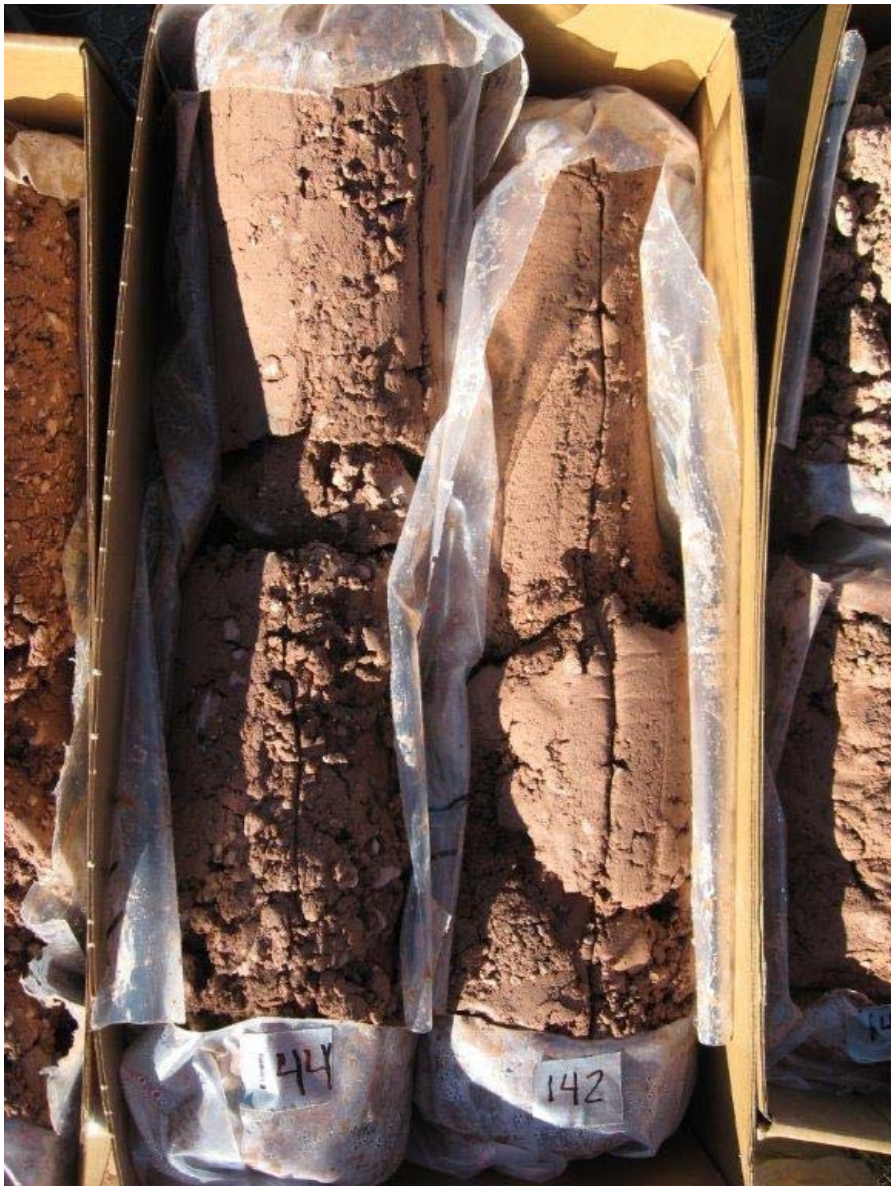
BMO-2014-3BL Core 128-132



BMO-2014-3BL Core 132-136



BMO-2014-3BL Core 136-140



BMO-2014-3BL Core 140-144



BMO-2014-3BL Core 144-148



BMO-2014-3BL Core 148-152



BMO-2014-3BL Core 152-156



BMO-2014-3BL Core 156-160



BMO-2014-3BL Core 160-164



BMO-2014-3BL Core 164-168



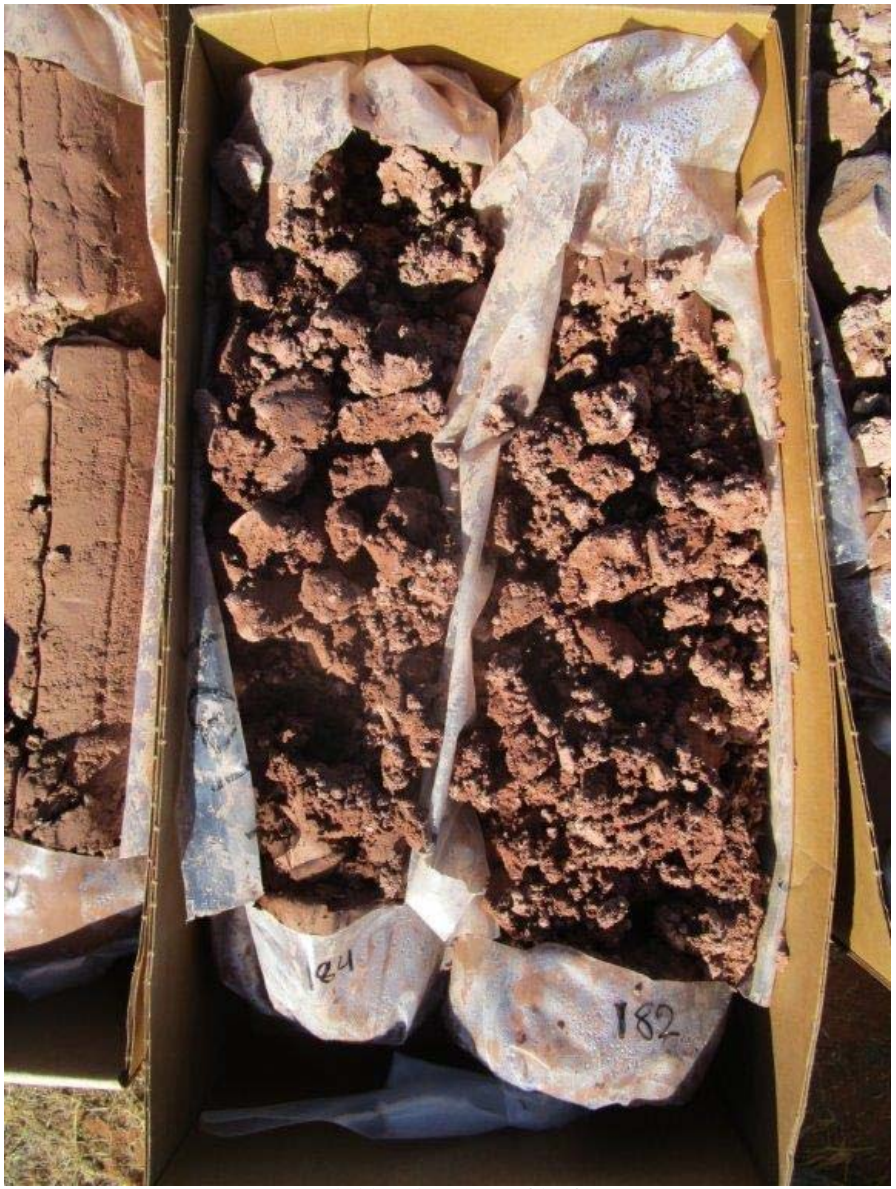
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BMO-2014-3BL Core 172-176



BMO-2014-3BL Core 176-180



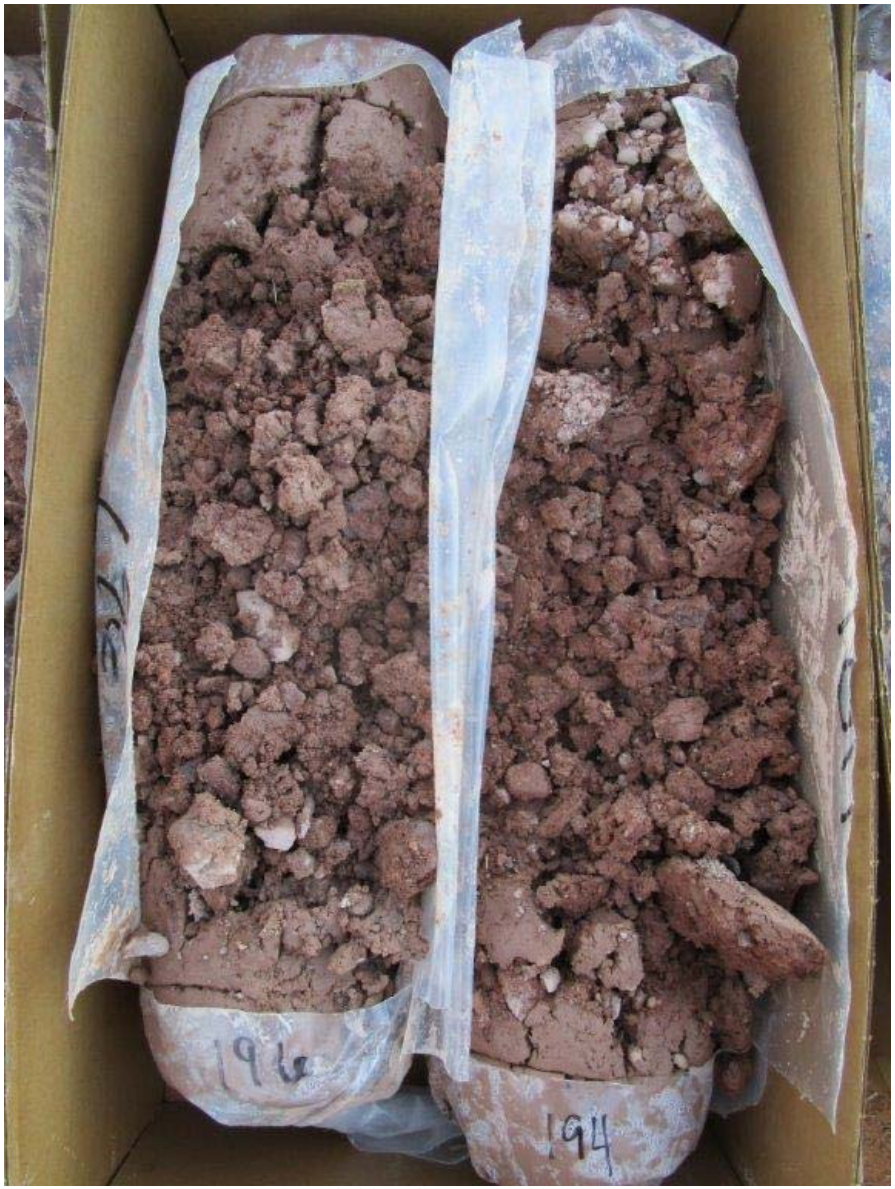
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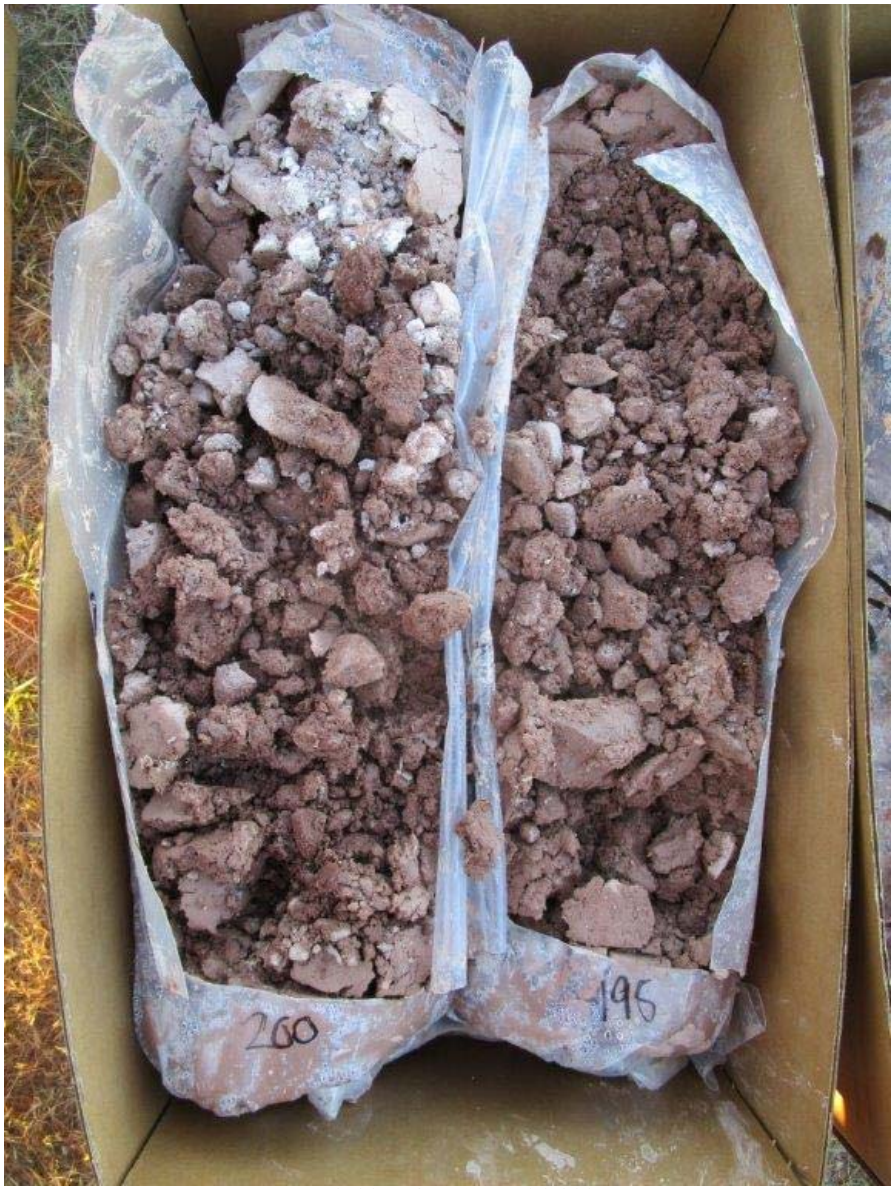
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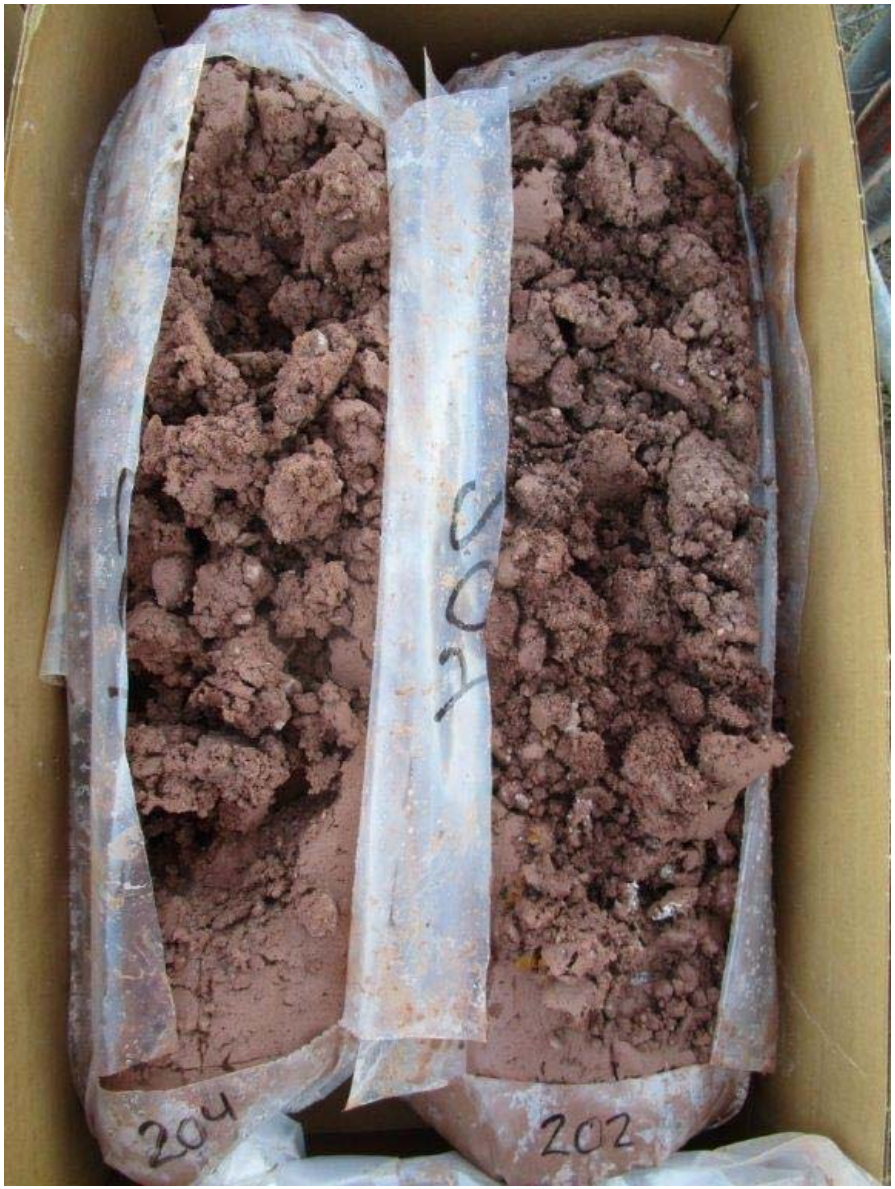
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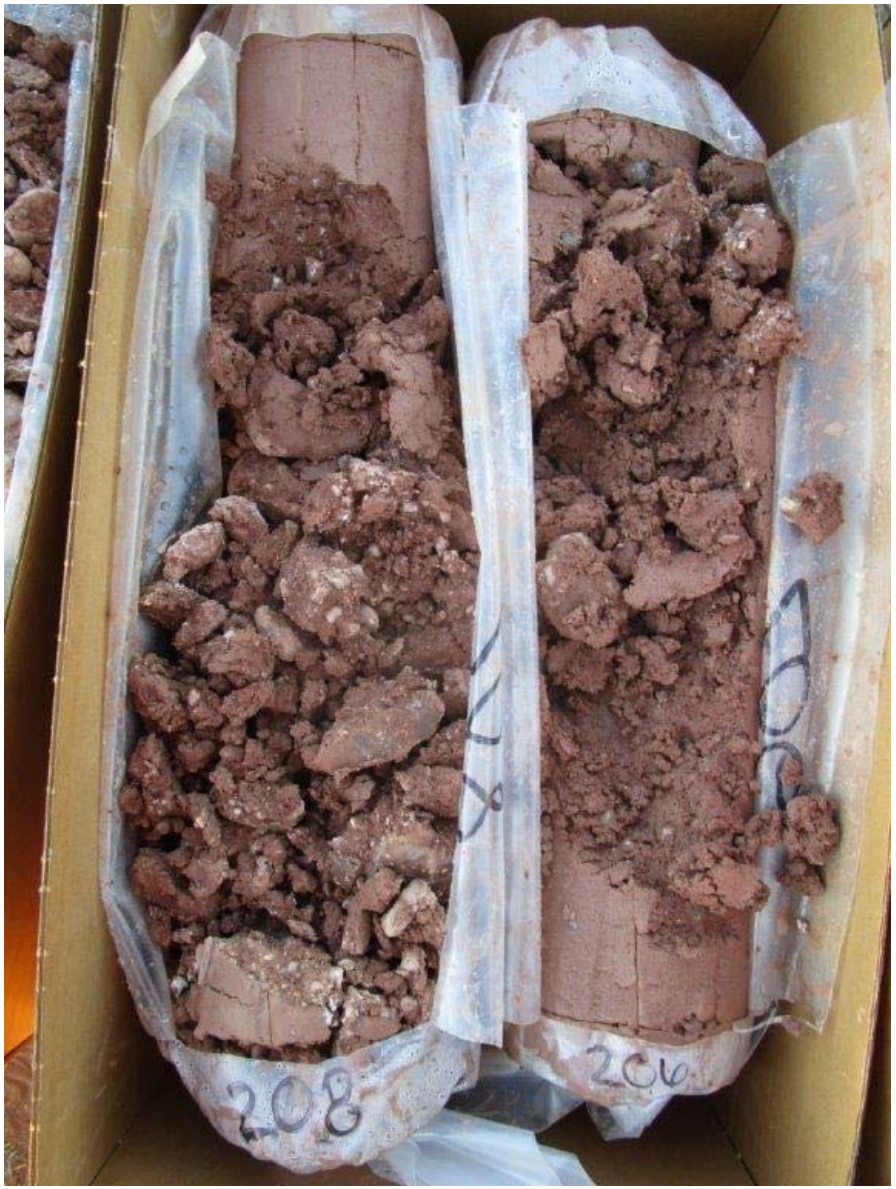
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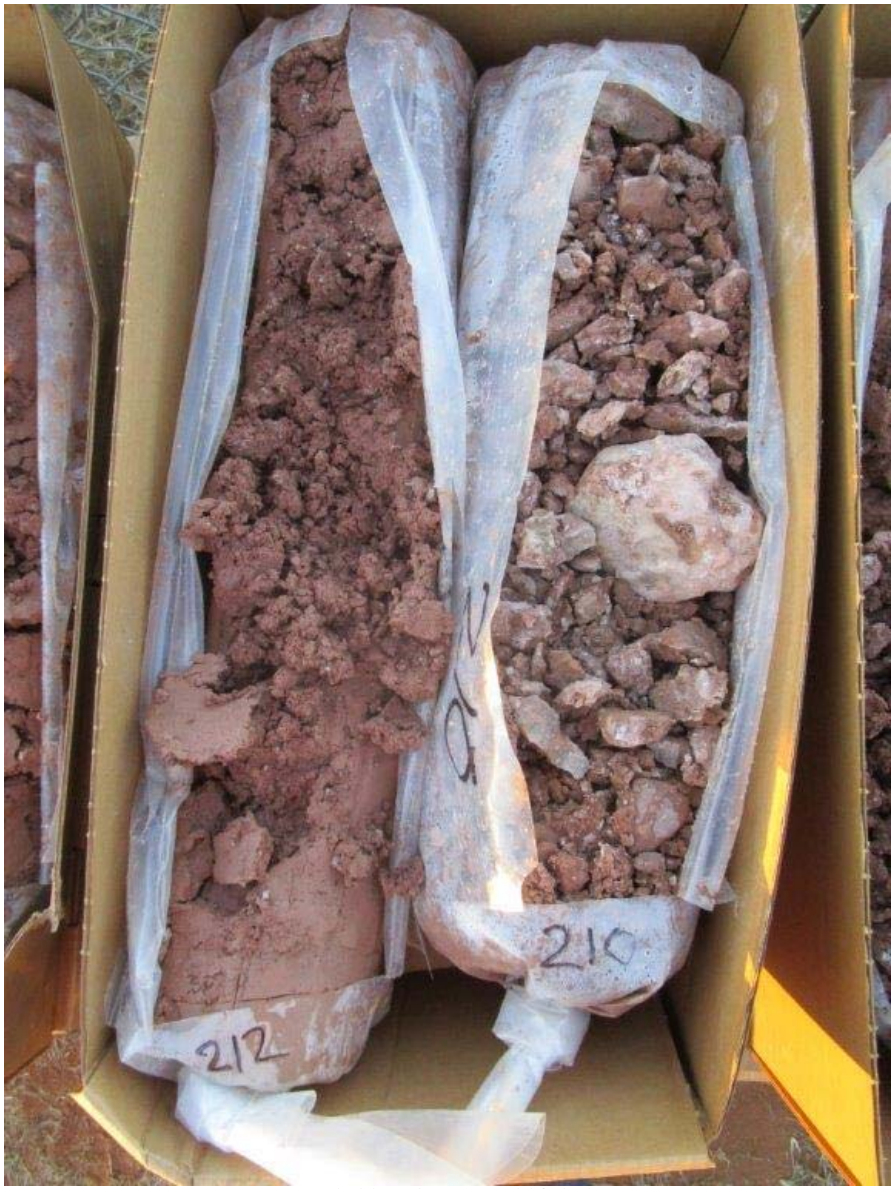
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BMO-2014-3BL Core 200-204



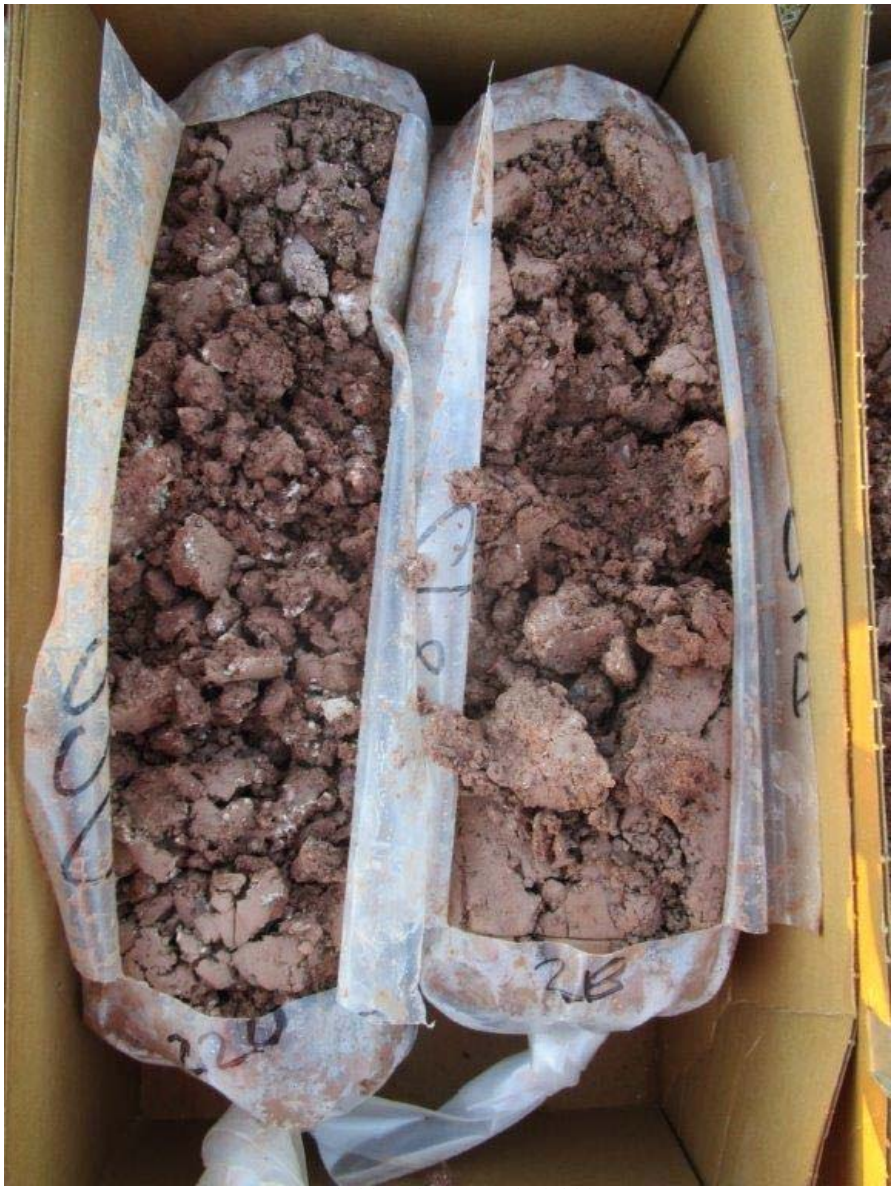
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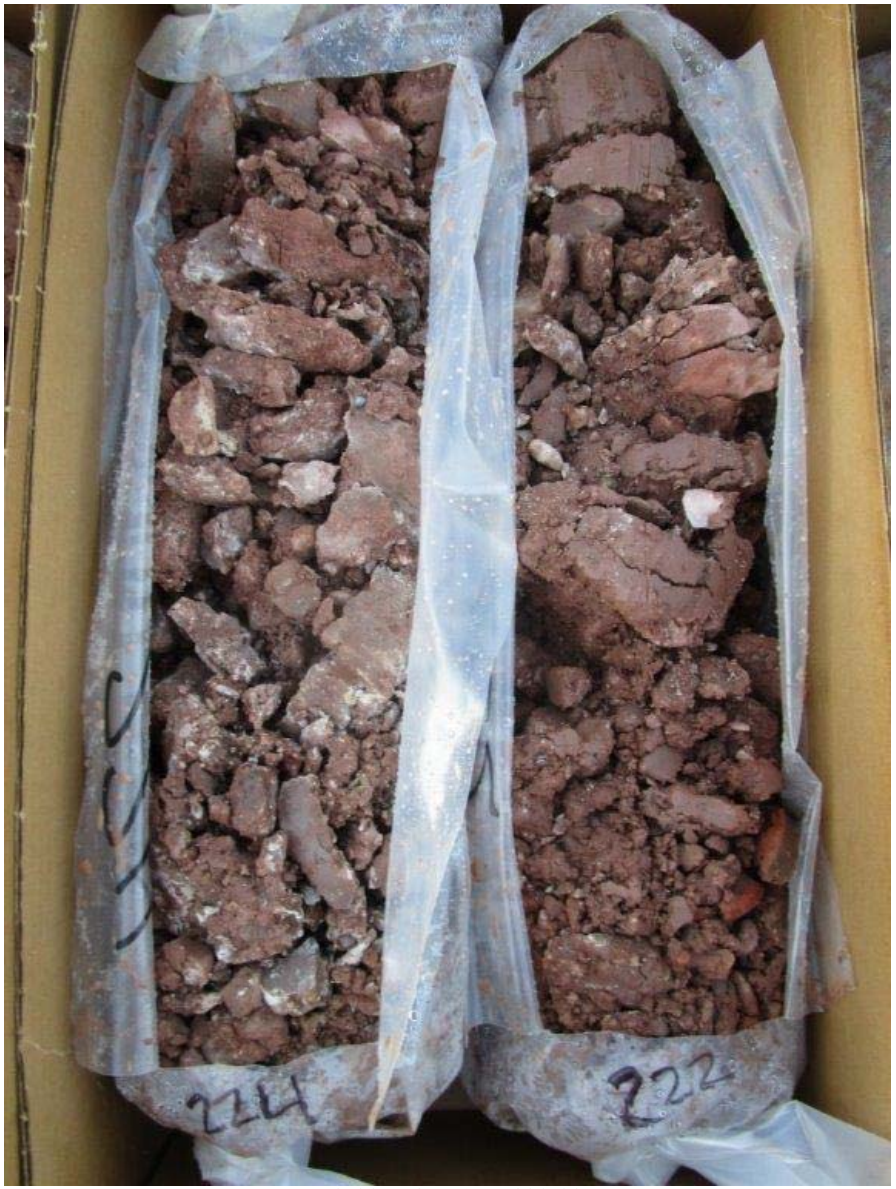
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BMO-2014-3BL Core 212-216



BMO-2014-3BL Core 216-220



BMO-2014-3BL Core 220-224



BMO-2014-3BL Core 224-228



BMO-2014-3BL Core 228-232



BMO-2014-3BL Core 232-236



BMO-2014-3BL Core 236-240



BMO-2014-3BL Core 240-244



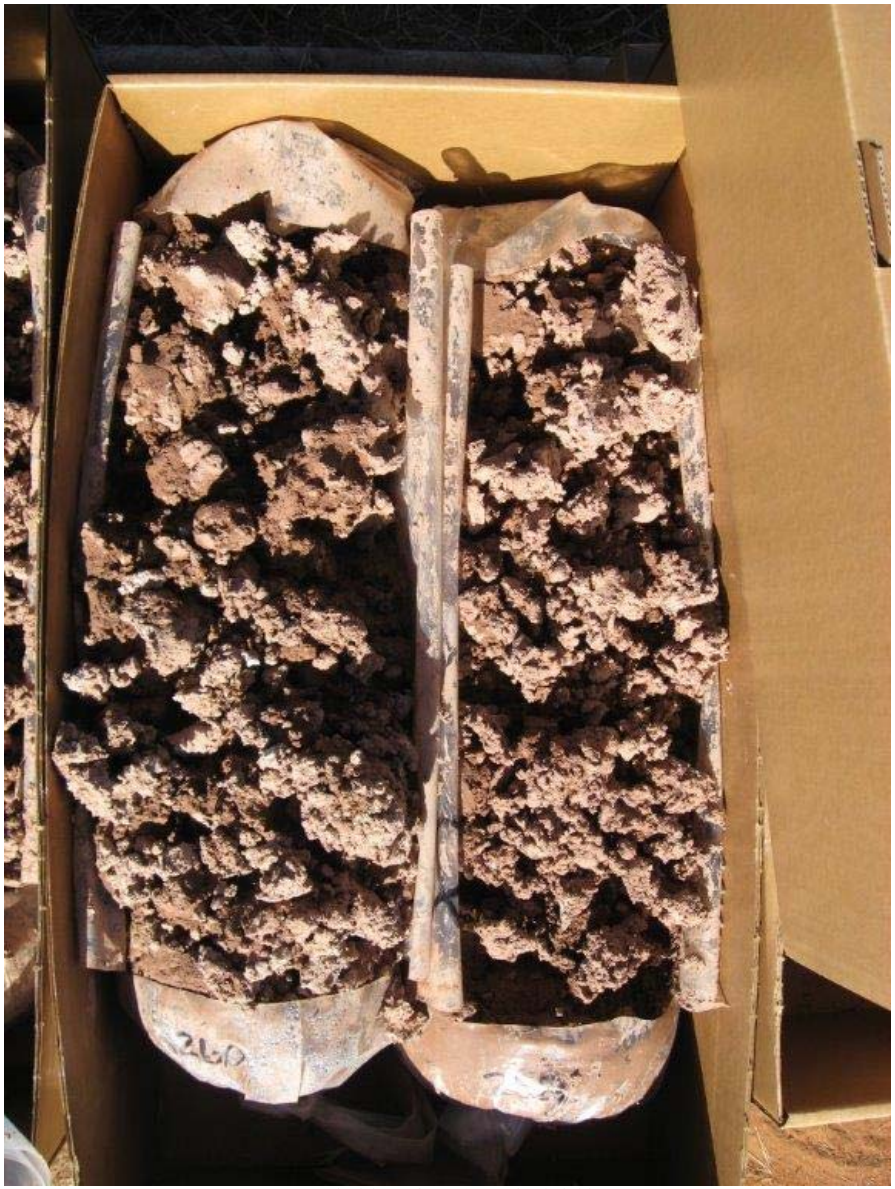
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BMO-2014-3BL Core 248-252



BMO-2014-3BL Core 252-256



BMO-2014-3BL Core 256-260



BMO-2014-3BL Core 260-264



BMO-2014-3BL Core 264-268



BMO-2014-3BL Core 268-272



BMO-2014-3BL Core 272-276



BMO-2014-3BL Core 276-280



BMO-2014-3BL Core 280-284



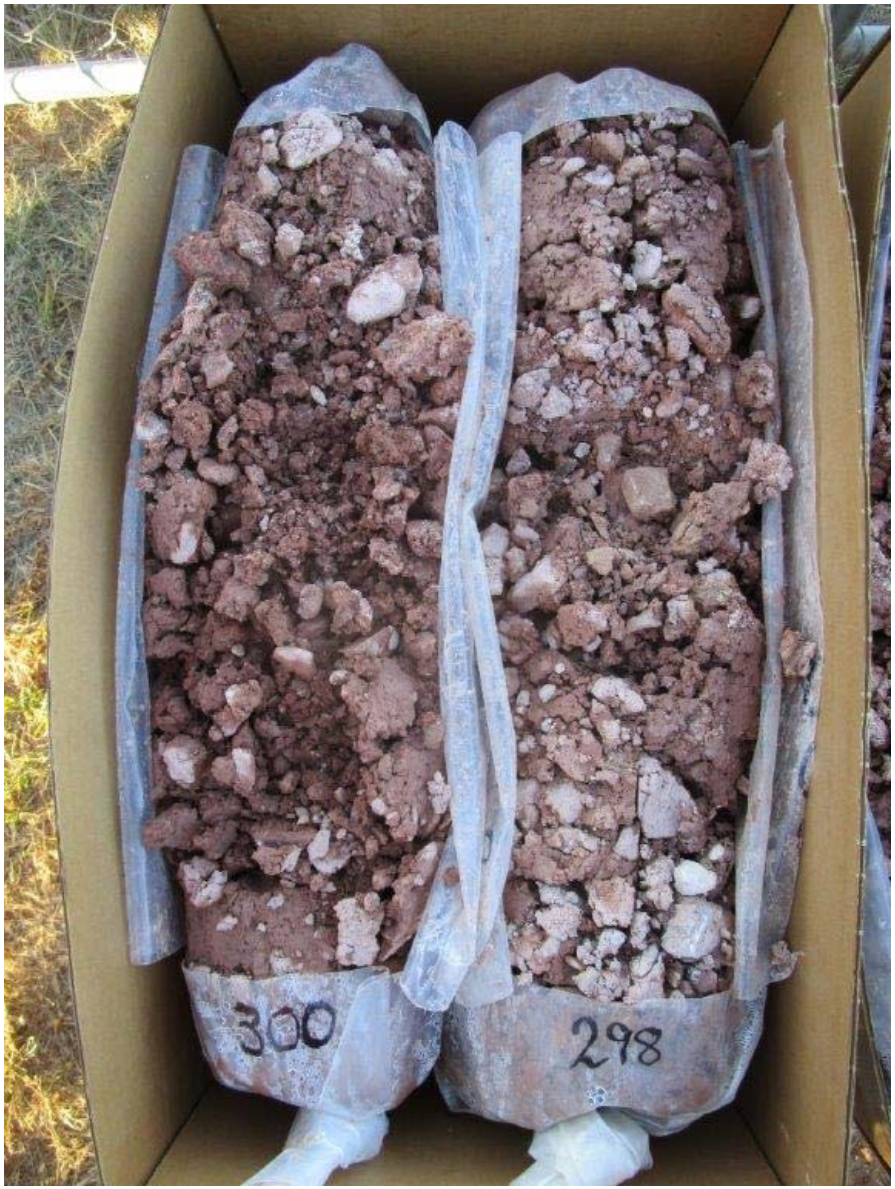
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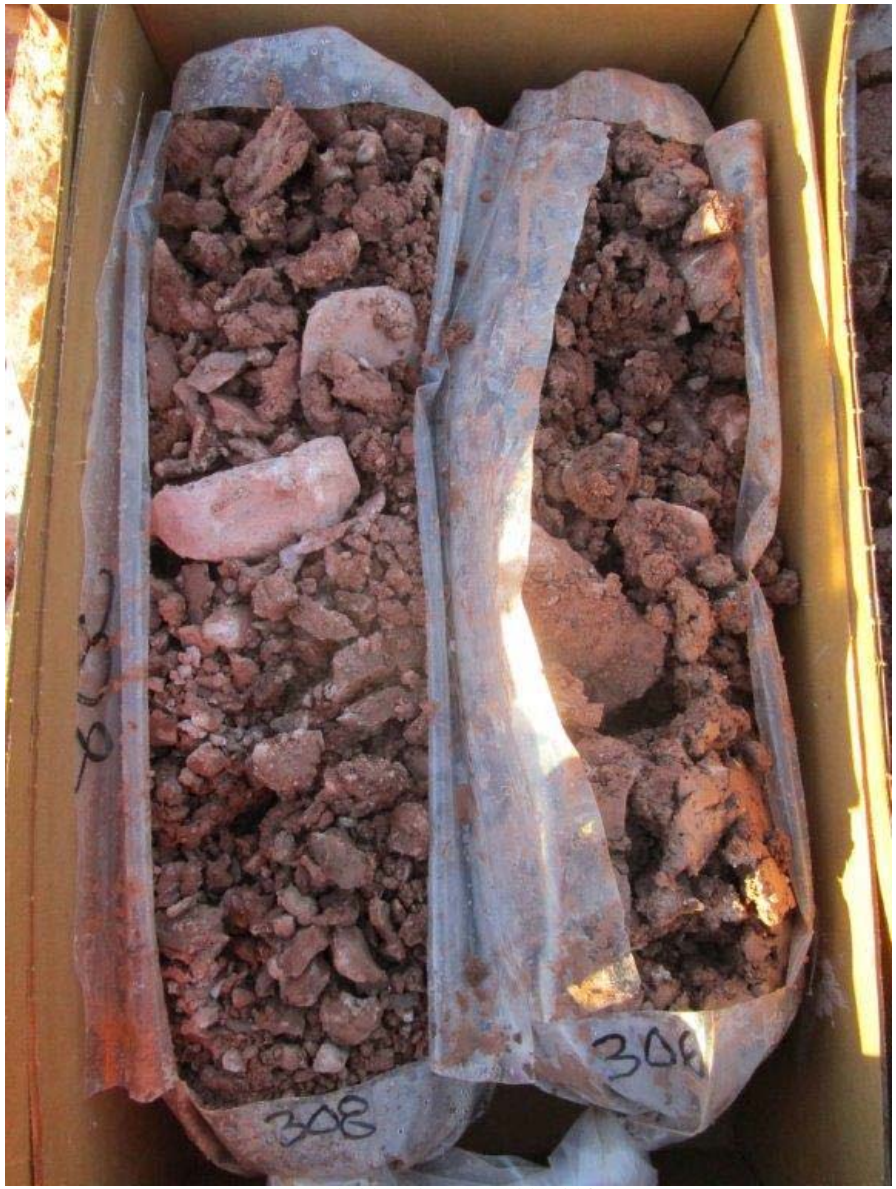
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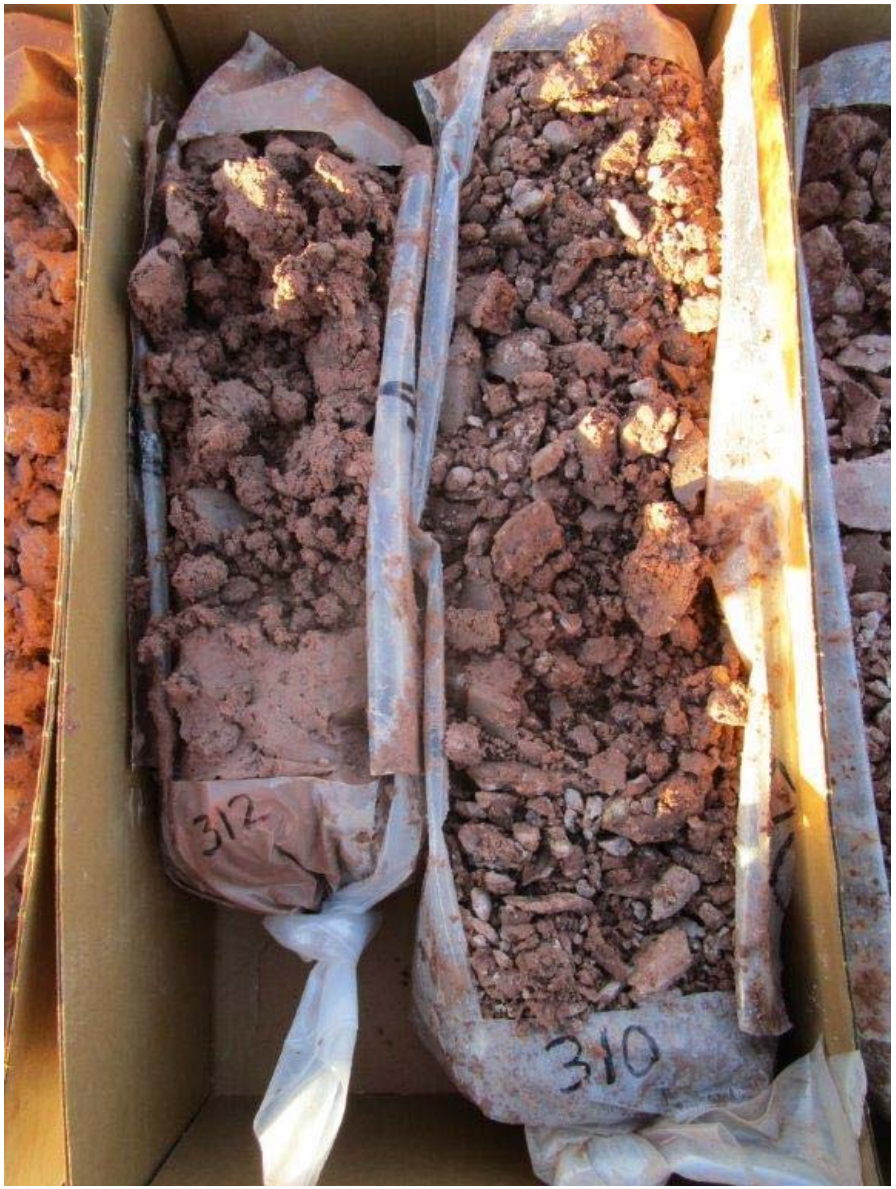
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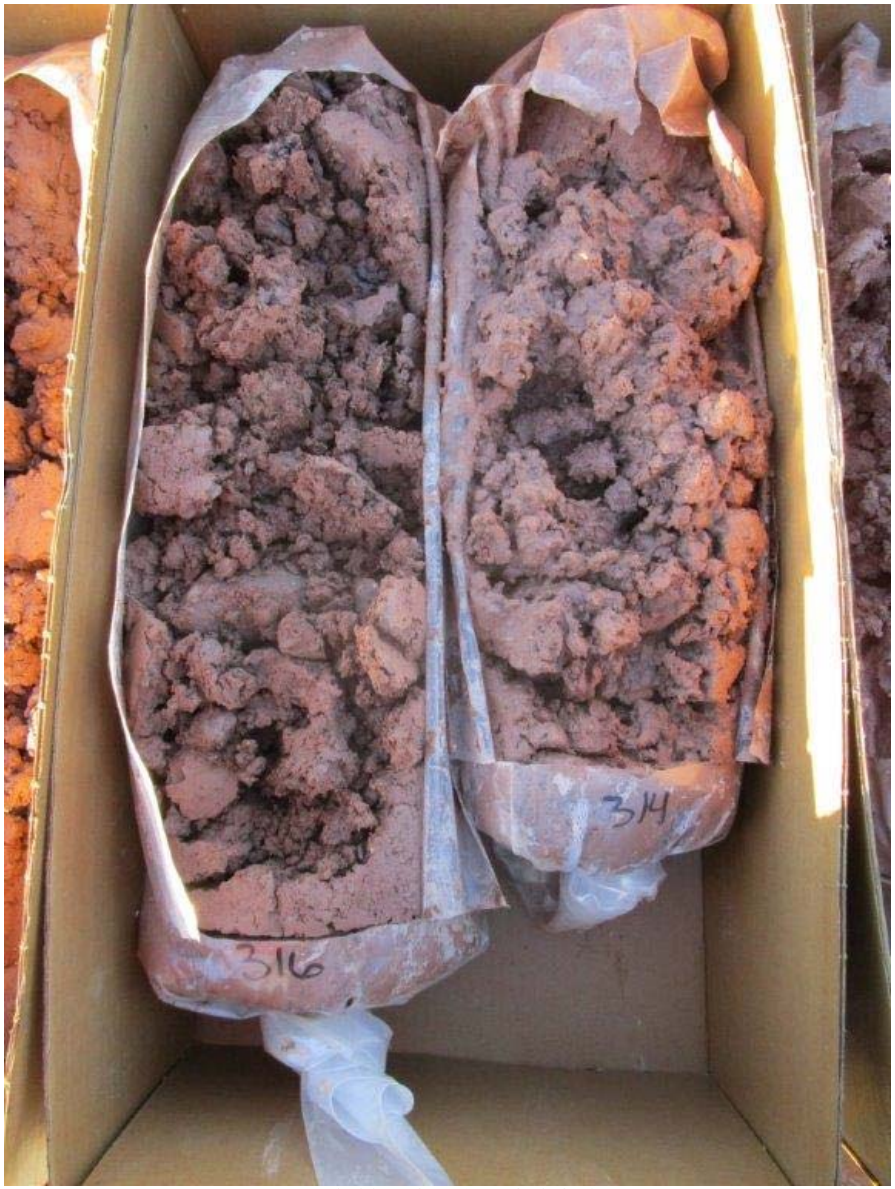
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BMO-2014-3BL Core 304-308



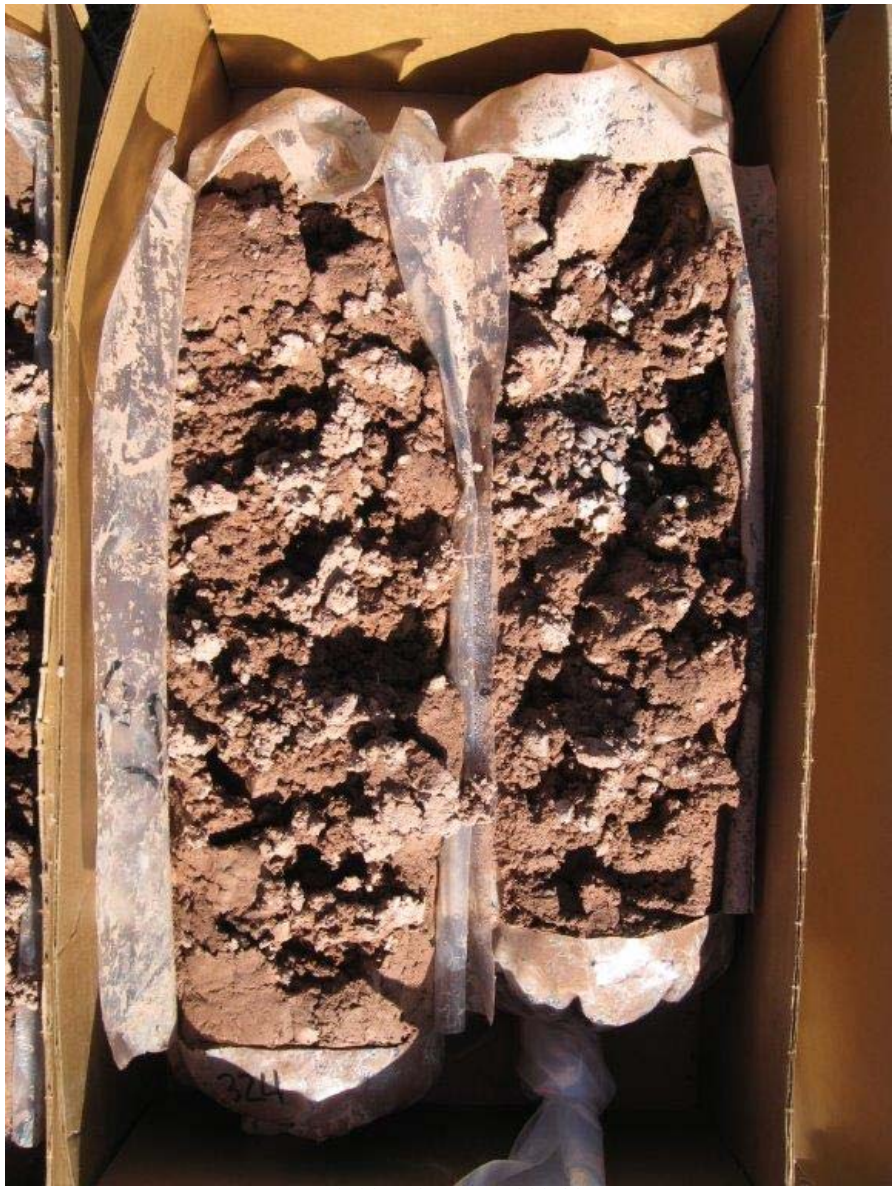
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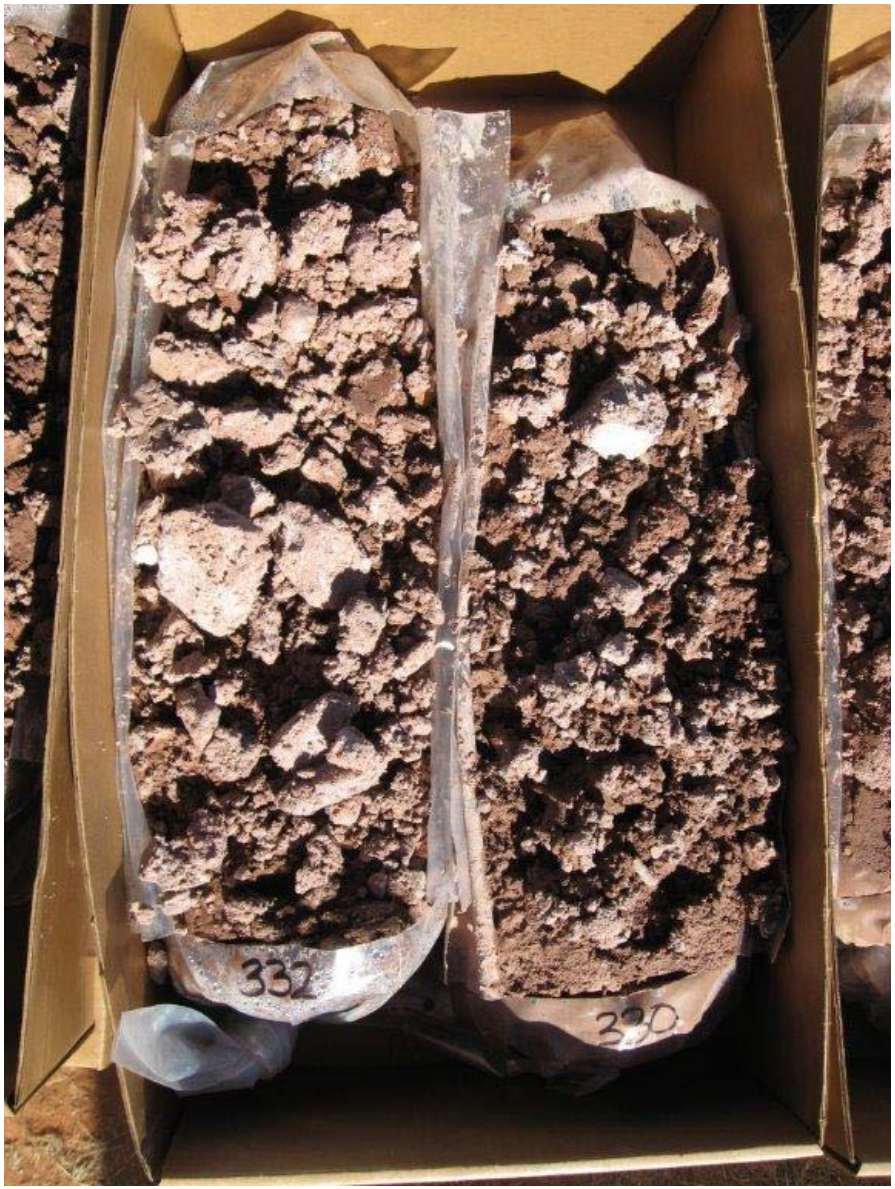
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BMO-2014-3BL Core 320-324



BMO-2014-3BL Core 324-328



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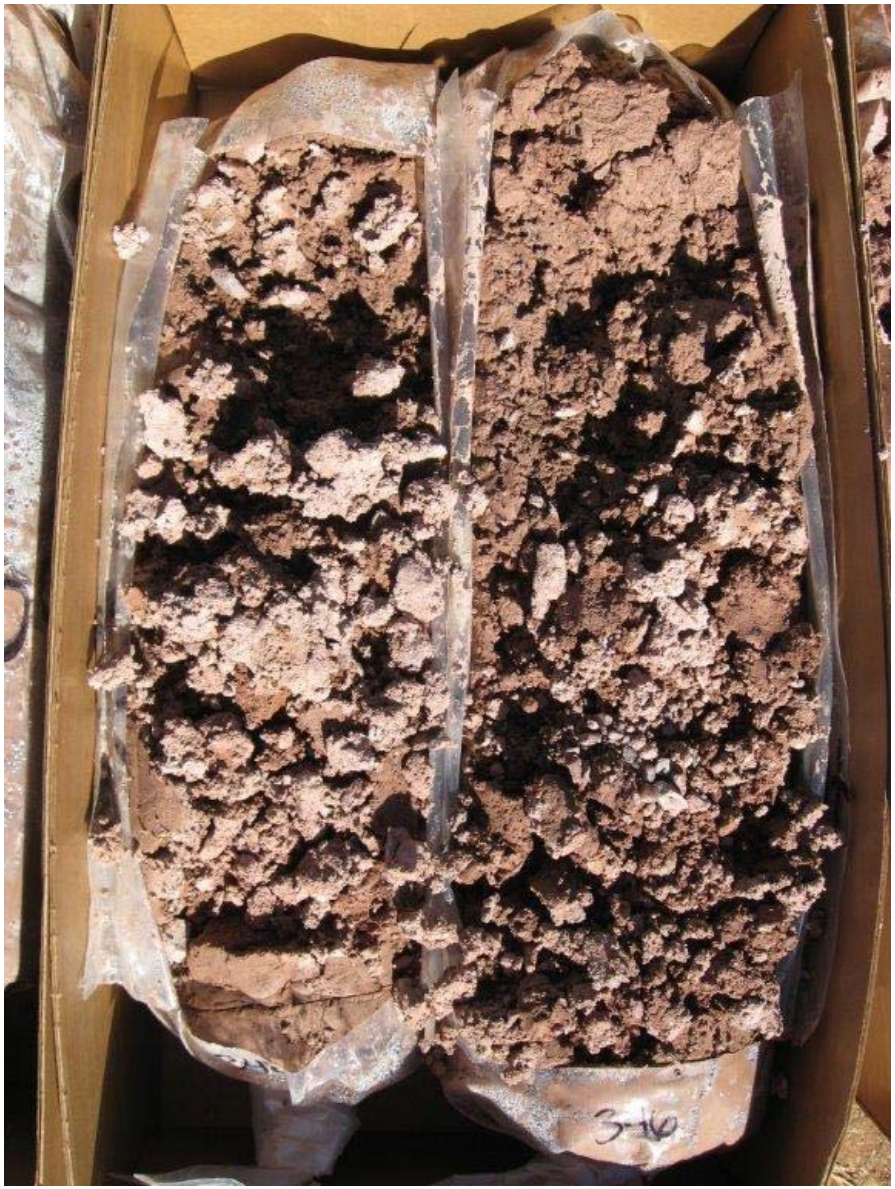
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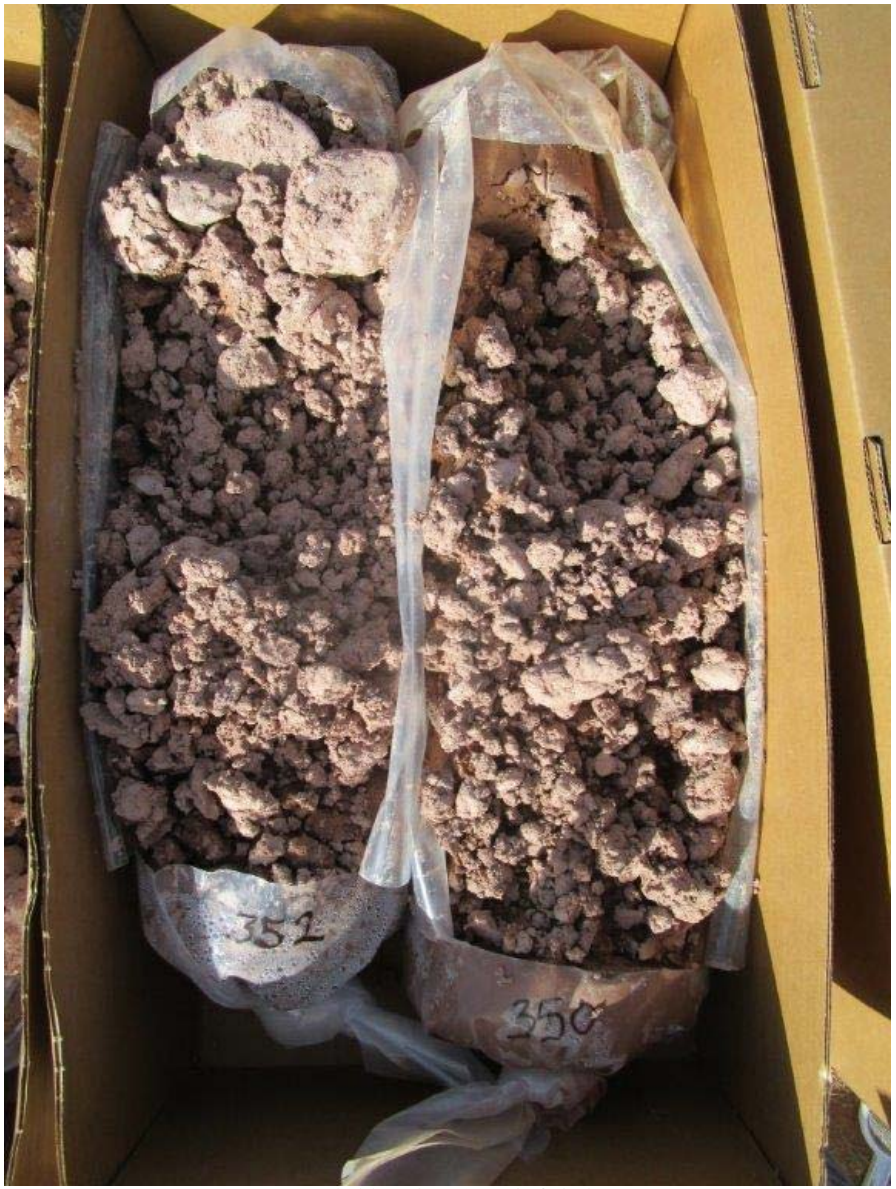
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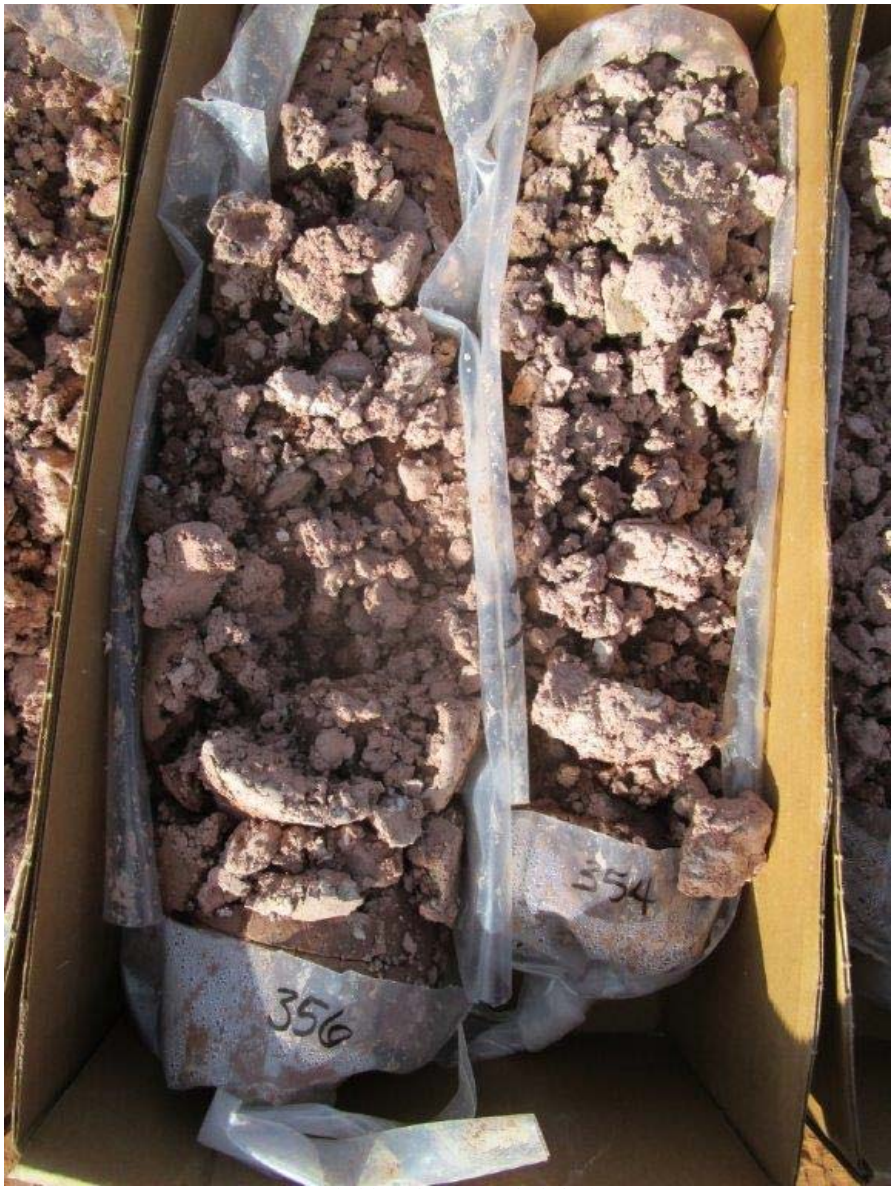
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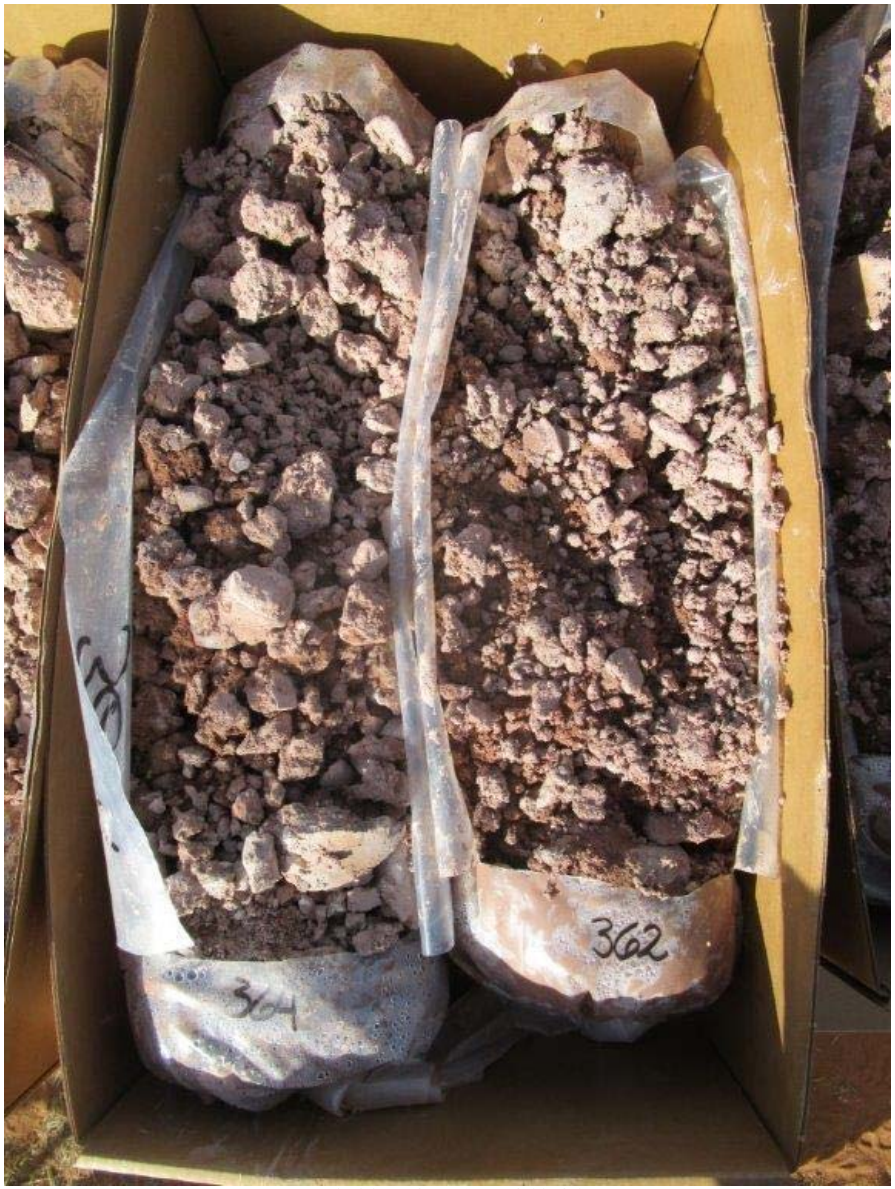
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BMO-2014-3BL Core 360-364



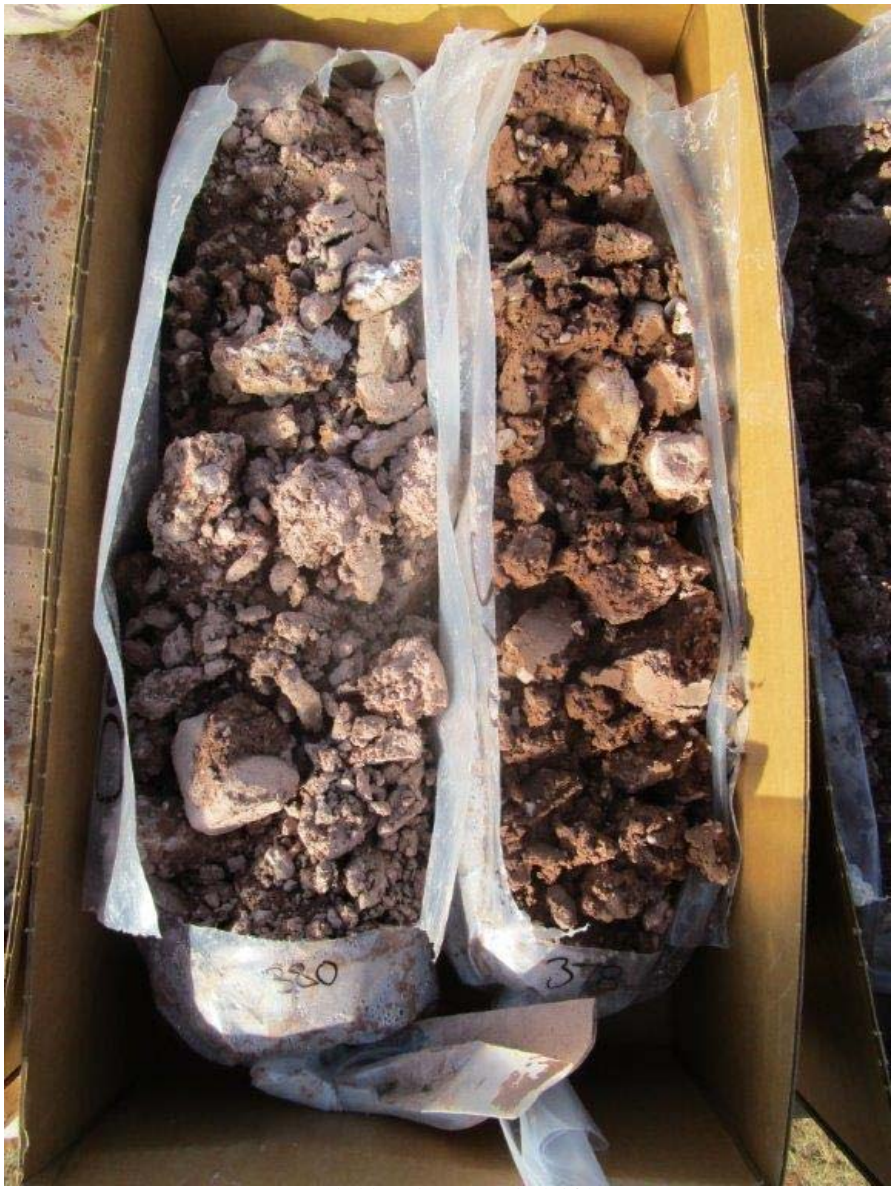
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BMO-2014-3BL Core 368-372



BMO-2014-3BL Core 372-376



BMO-2014-3BL Core 376-380



BMO-2014-3BL Core 380-384



BMO-2014-3BL Core 384-388



BMO-2014-3BL Core 388-392



BMO-2014-3BL Core 392-396



BMO-2014-3BL Core 396-400



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BMO-2014-3BL Core 404-408



BMO-2014-3BL Core 408-412



BMO-2014-3BL Core 412-416



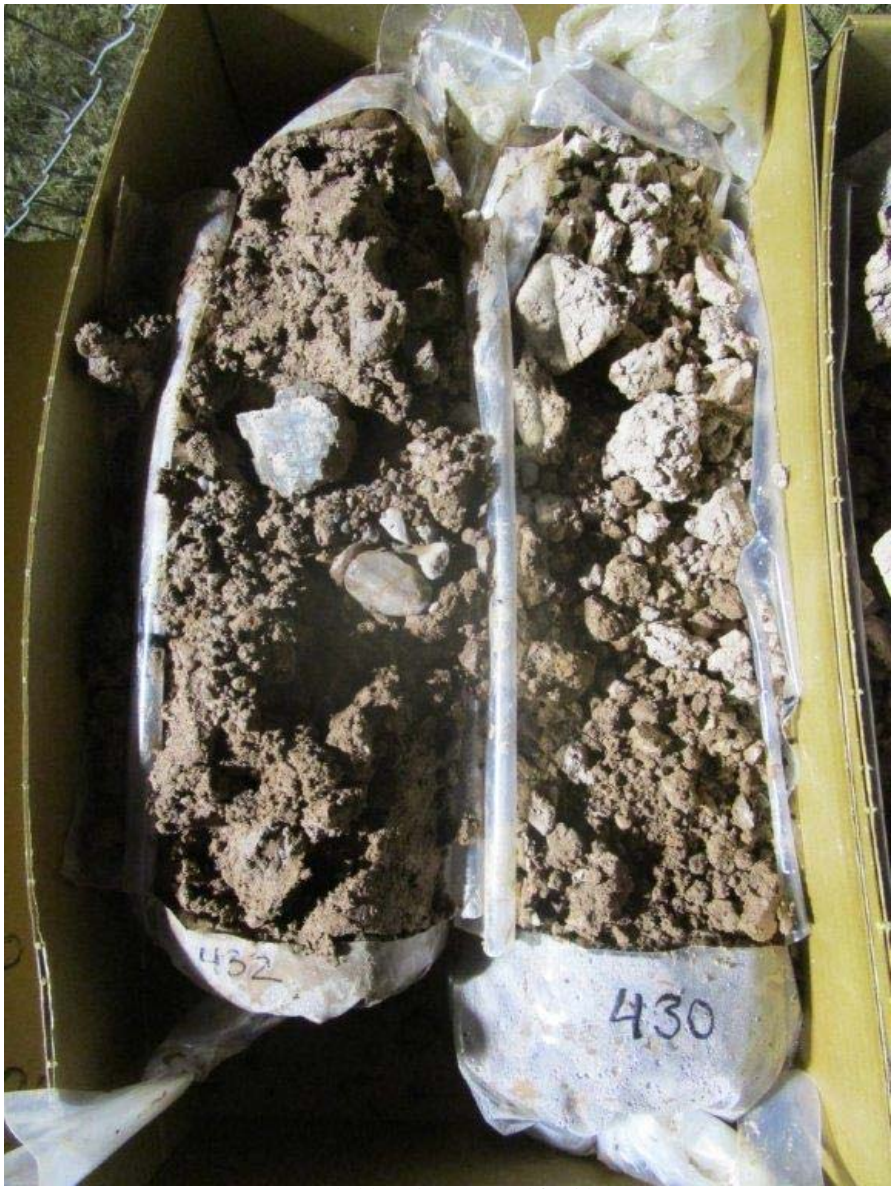
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BMO-2014-3BL Core 420-424



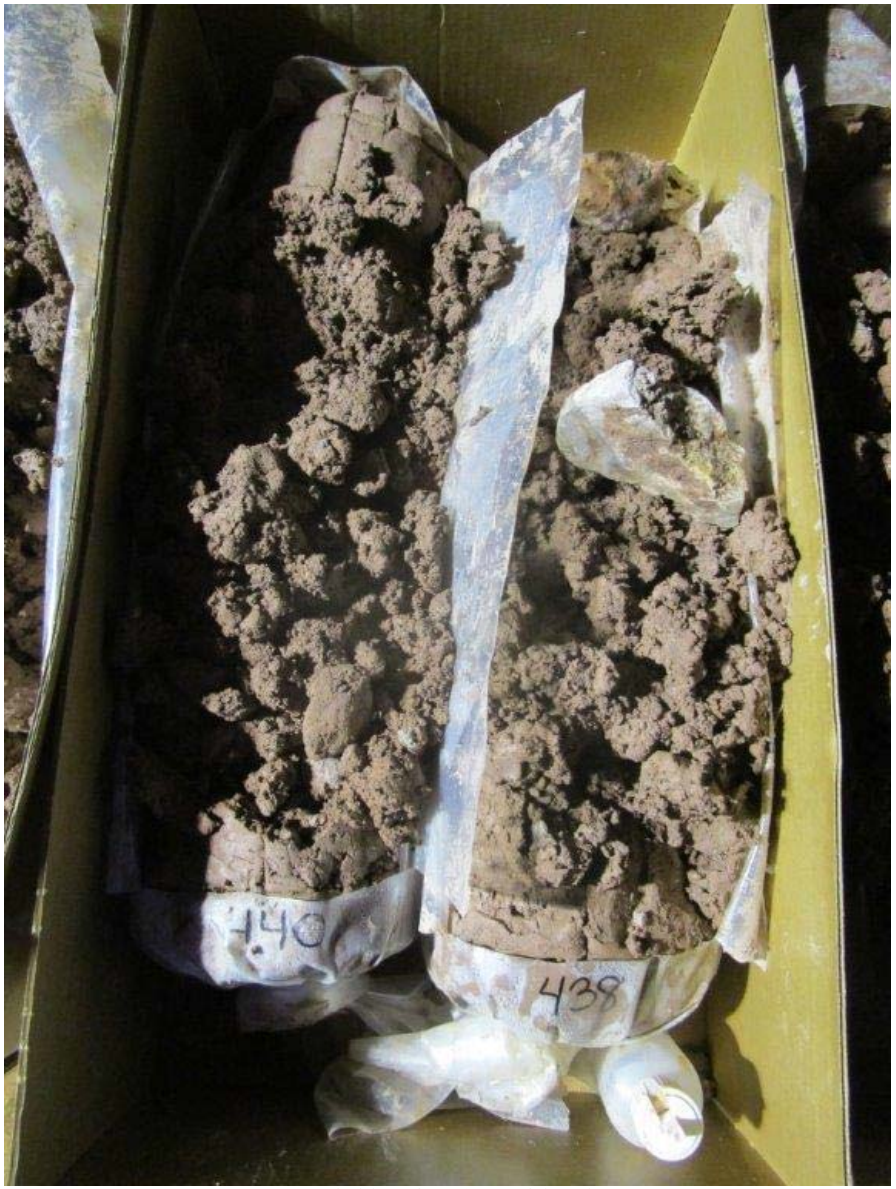
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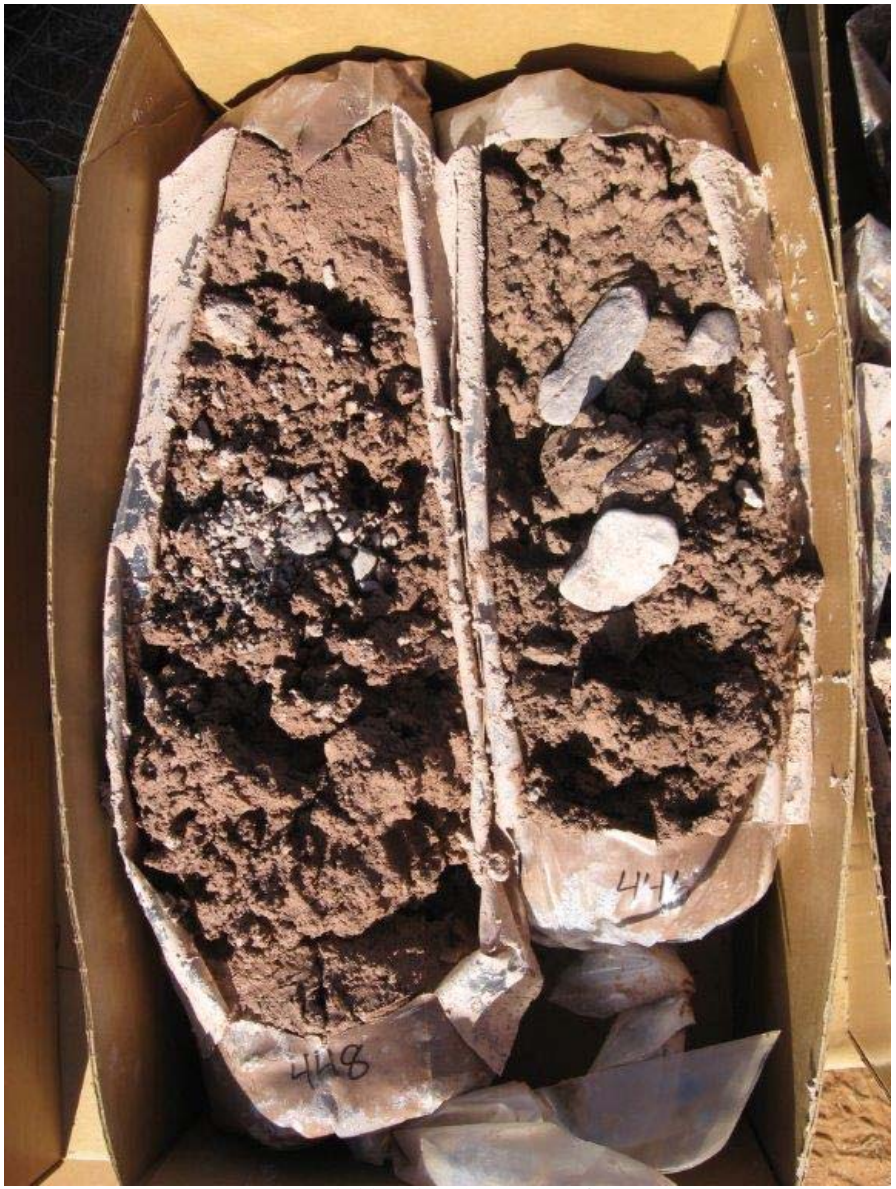


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BMO-2014-3BL Core 436-440


BMO-2014-3BL Core 440-444



BMO-2014-3BL Core 444-448



BMO-2014-3BL Core 448-452



BMO-2014-3BL Core 452-456



BMO-2014-3BL Core 456-460



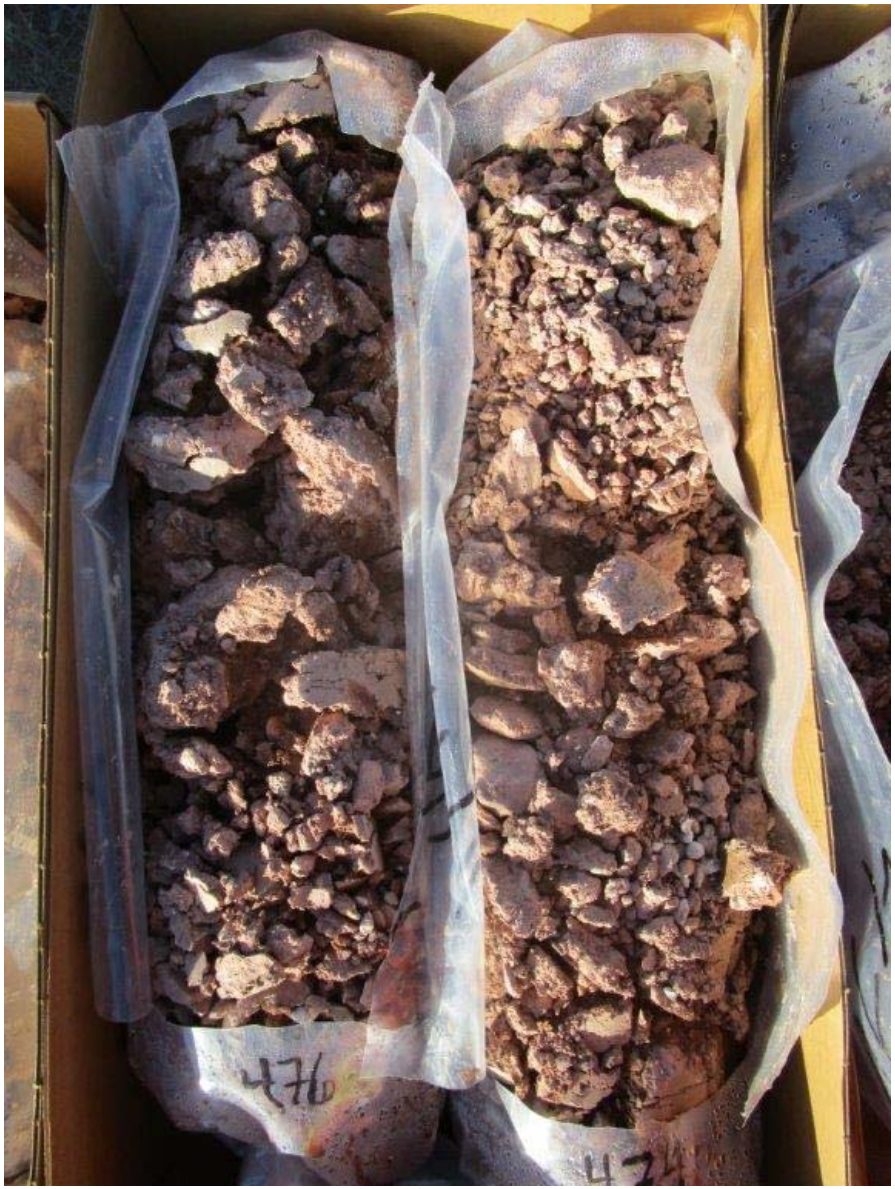
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BMO-2014-3BL Core 464-468



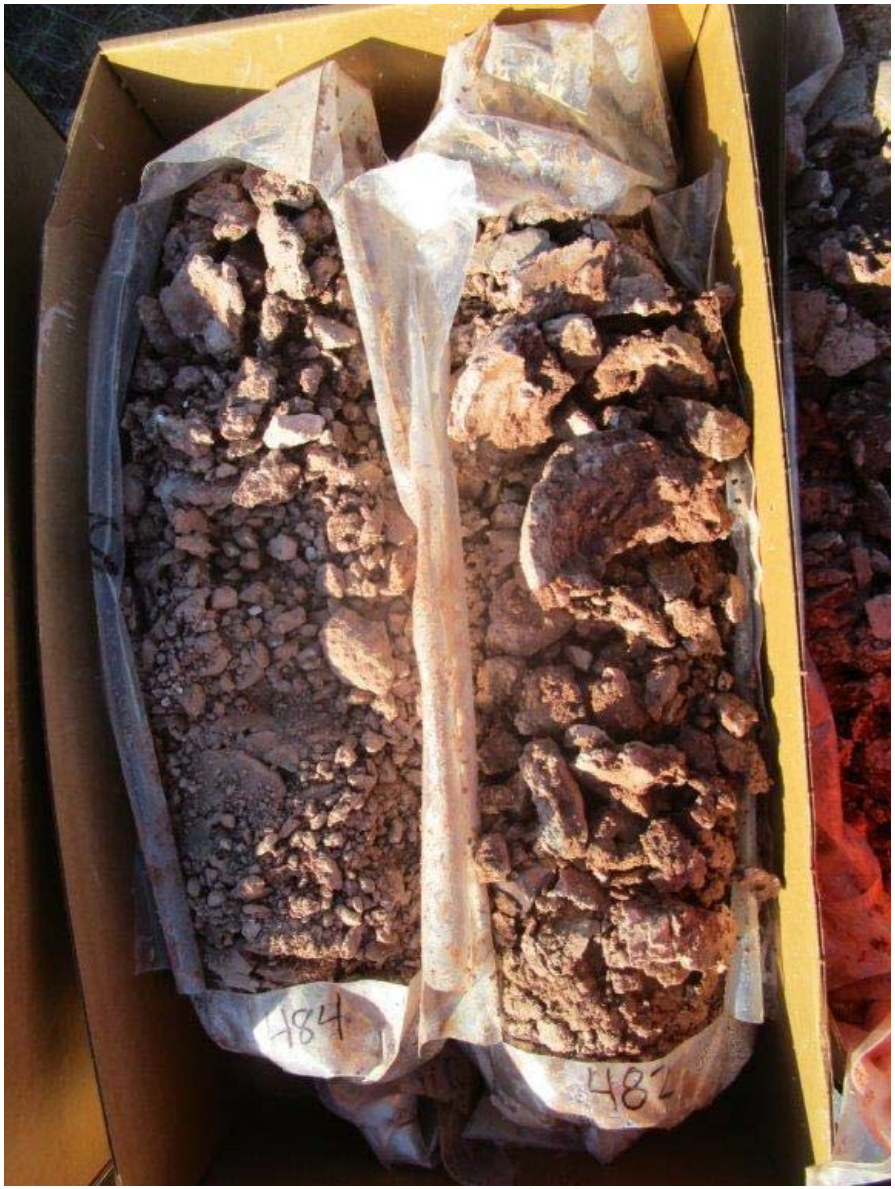
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BMO-2014-3BL Core 472-476



BMO-2014-3BL Core 476-480



BMO-2014-3BL Core 480-484



BMO-2014-3BL Core 484-488



BMO-2014-3BL Core 488-492



BMO-2014-3BL Core 492-496



BMO-2014-3BL Core 496-498



BMO-2014-3BL Core 500-504



BMO-2014-3BL Core 504-508



BMO-2014-3BL Core 508-512



BMO-2014-3BL Core 512-516



BMO-2014-3BL Core 516-520



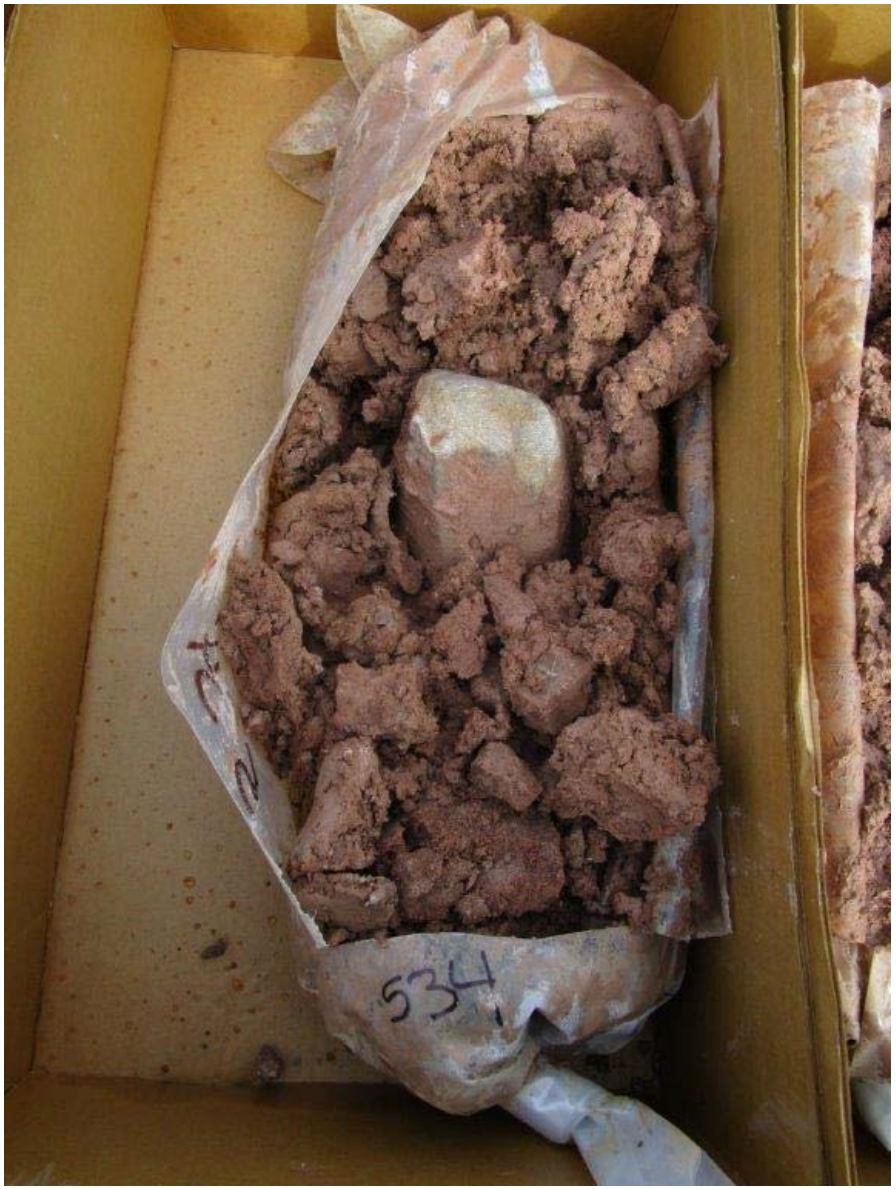
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BMO-2014-3BL Core 524-528



BMO-2014-3BL Core 528-532



BMO-2014-3BL Core 532-534



BMO-2014-3BL Core 532-540



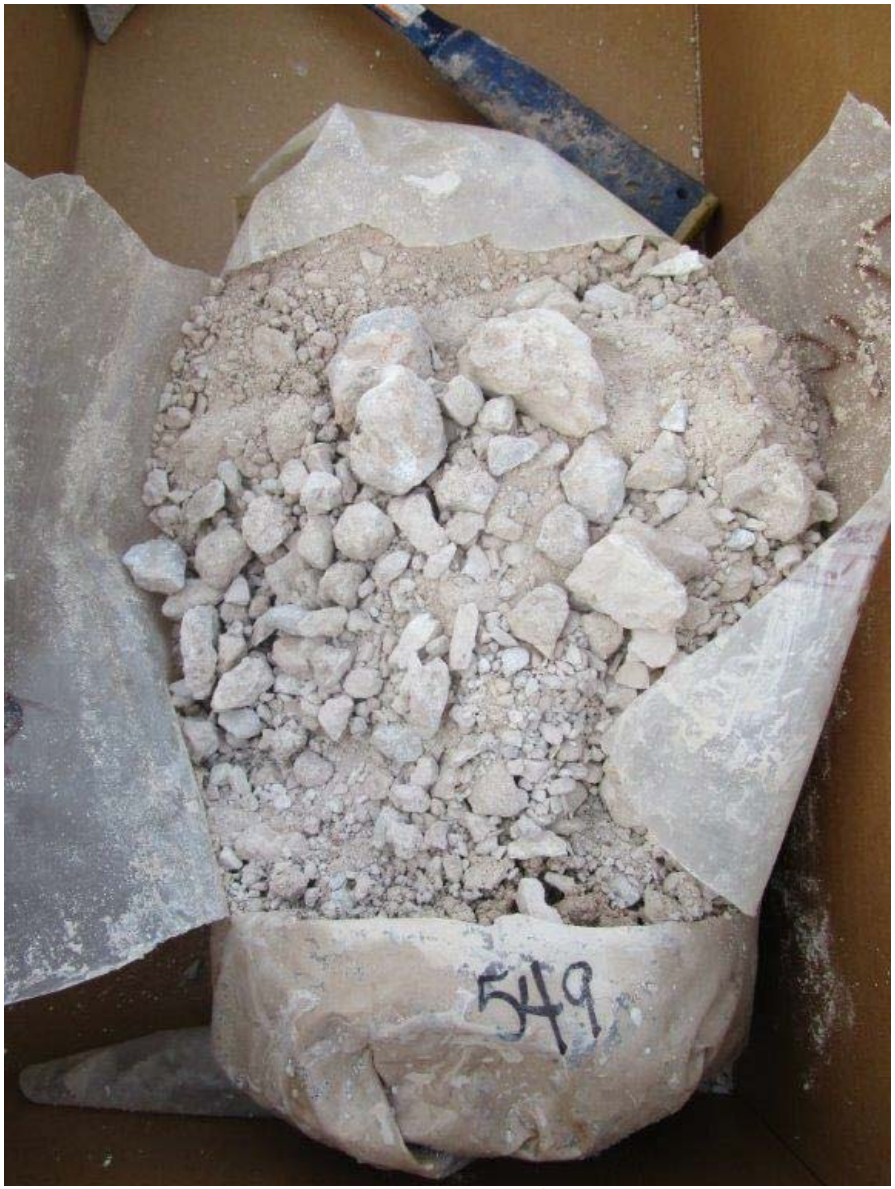
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BMO-2014-3BL Core 540-544



BMO-2014-3BL Core 544-548



BMO-2014-3BL Core 548-549



BMO-2014-4BL Core 0-4



BMO-2014-4BL Core 4-8



BMO-2014-4BL Core 8-12



BMO-2014-4BL Core 12-16



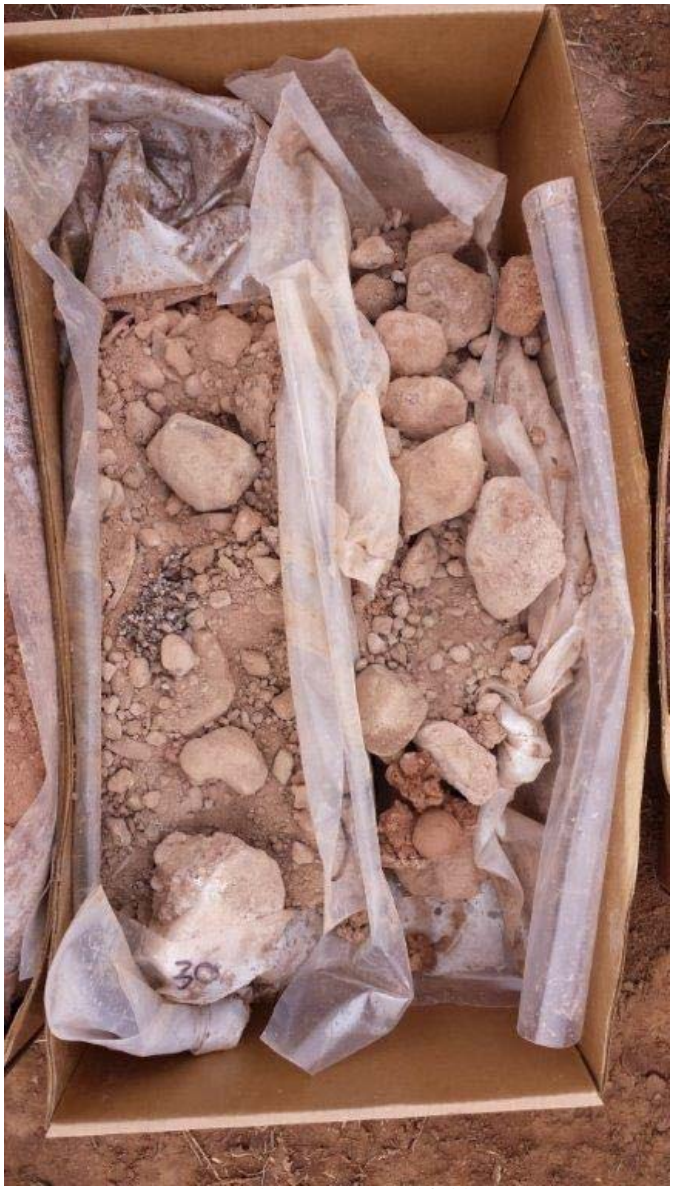
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BMO-2014-4BL Core 20-24



BMO-2014-4BL Core 24-28



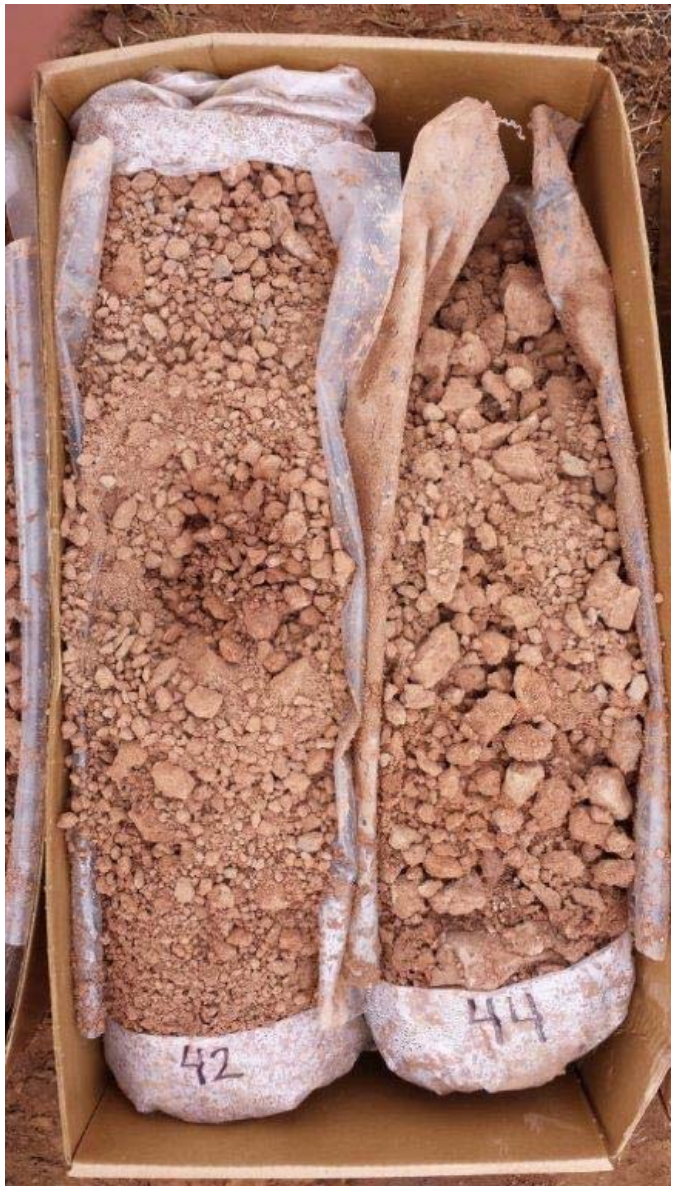
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BMO-2014-4BL Core 40-44



BMO-2014-4BL Core 44-48



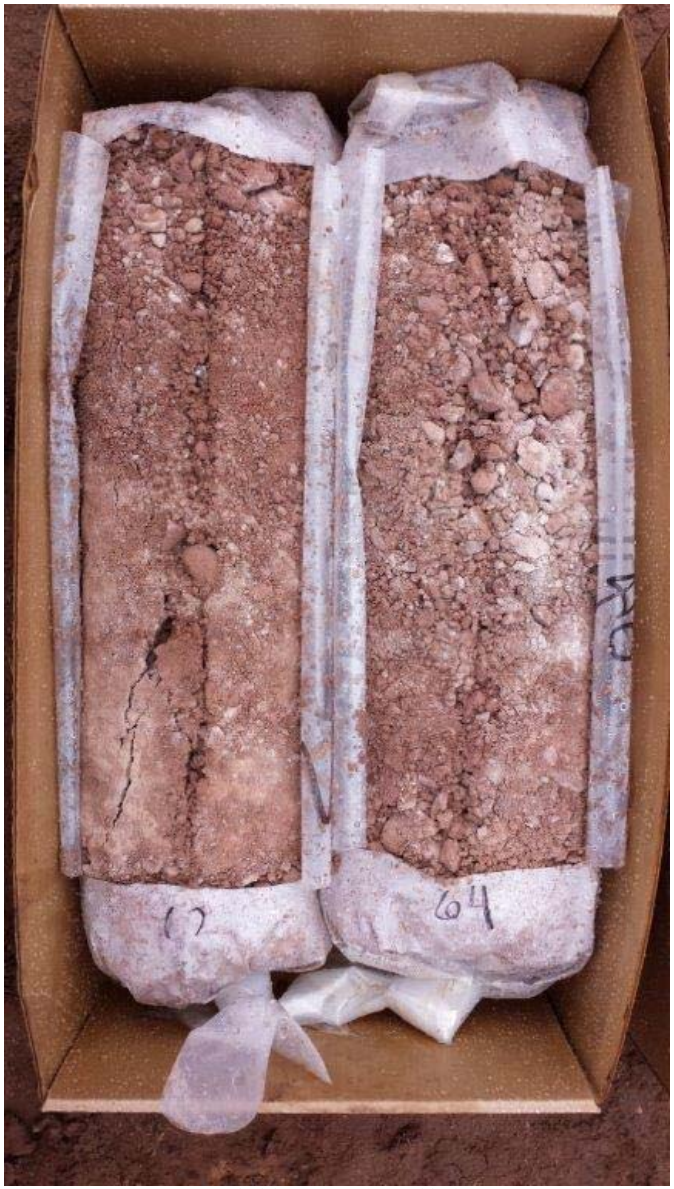
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BMO-2014-4BL Core 52-56



BMO-2014-4BL Core 56-60



BMO-2014-4BL Core 60-64



BMO-2014-4BL Core 64-68



BMO-2014-4BL Core 68-72



BMO-2014-4BL Core 72-76



BMO-2014-4BL Core 76-80



BMO-2014-4BL Core 80-84



BMO-2014-4BL Core 84-88



BMO-2014-4BL Core 88-92



BMO-2014-4BL Core 92-96



BMO-2014-4BL Core 96-100



BMO-2014-4BL Core 100-104



BMO-2014-4BL Core 104-108



BMO-2014-4BL Core 108-112



BMO-2014-4BL Core 112-116



BMO-2014-4BL Core 116-120



BMO-2014-4BL Core 120-124



BMO-2014-4BL Core 124-128



BMO-2014-4BL Core 128-132



BMO-2014-4BL Core 132-136



BMO-2014-4BL Core 136-140



BMO-2014-4BL Core 140-144



BMO-2014-4BL Core 144-148



BMO-2014-4BL Core 148-152



BMO-2014-4BL Core 152-156



BMO-2014-4BL Core 156-160



BMO-2014-4BL Core 160-164



BMO-2014-4BL Core 164-168



BMO-2014-4BL Core 168-172



BMO-2014-4BL Core 172-176



BMO-2014-4BL Core 176-180



BMO-2014-4BL Core 180-184



BMO-2014-4BL Core 184-188



BMO-2014-4BL Core 188-192



BMO-2014-4BL Core 192-196



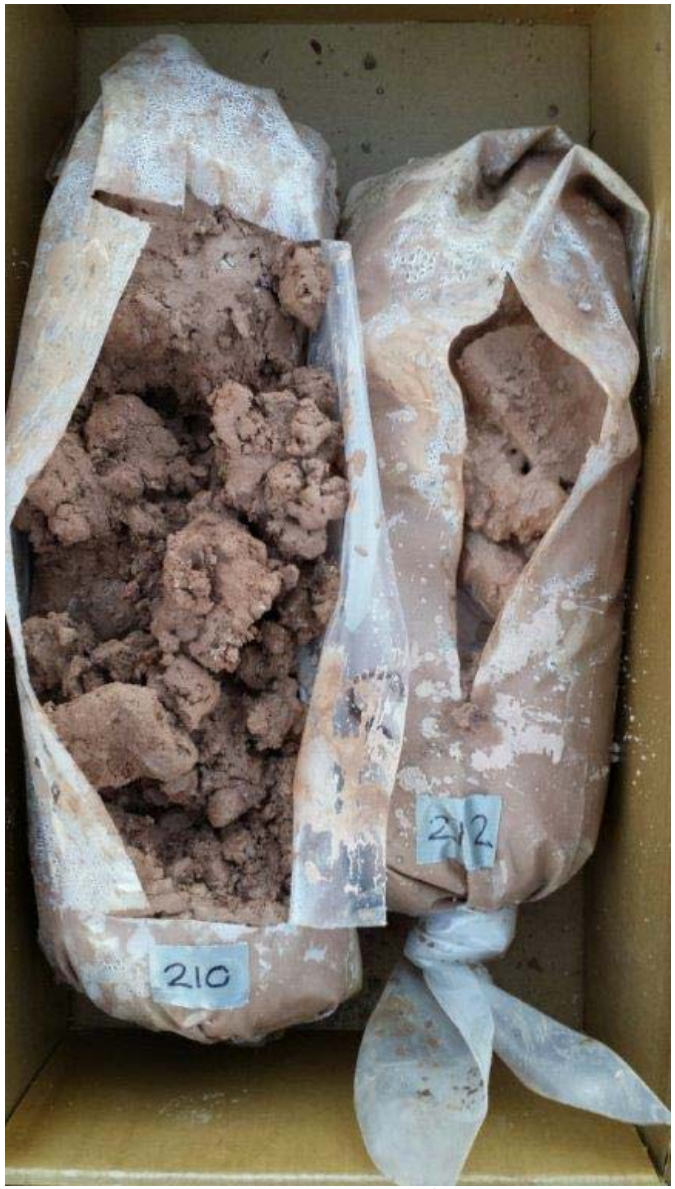
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BMO-2014-4BL Core 208-212



BMO-2014-4BL Core 212-216



BMO-2014-4BL Core 216-220



BMO-2014-4BL Core 220-224



BMO-2014-4BL Core 224-228



BMO-2014-4BL Core 228-232



BMO-2014-4BL Core 232-236



BMO-2014-4BL Core 236-240



BMO-2014-4BL Core 240-244



BMO-2014-4BL Core 244-248



BMO-2014-4BL Core 248-252



BMO-2014-4BL Core 252-256



BMO-2014-4BL Core 256-260



BMO-2014-4BL Core 260-264



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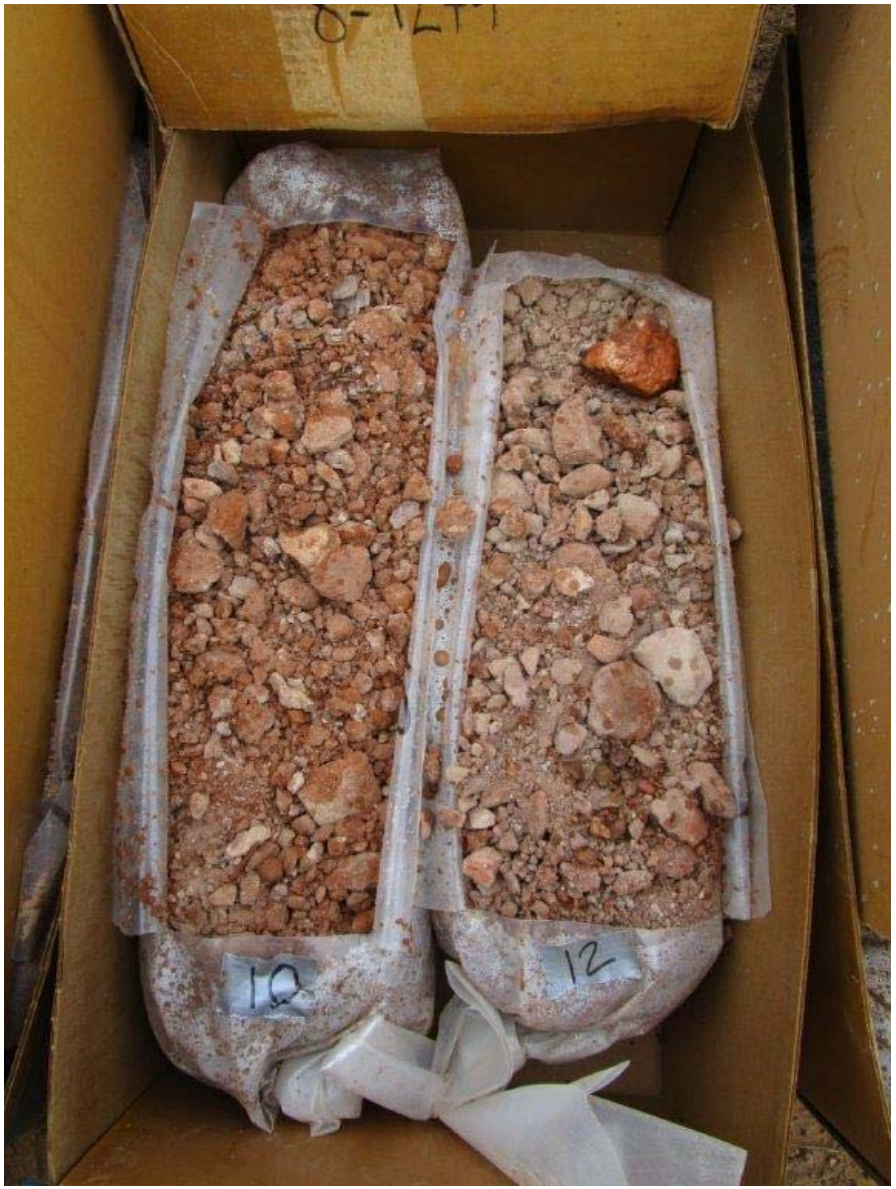
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BMO-2015-1 Core 0-4



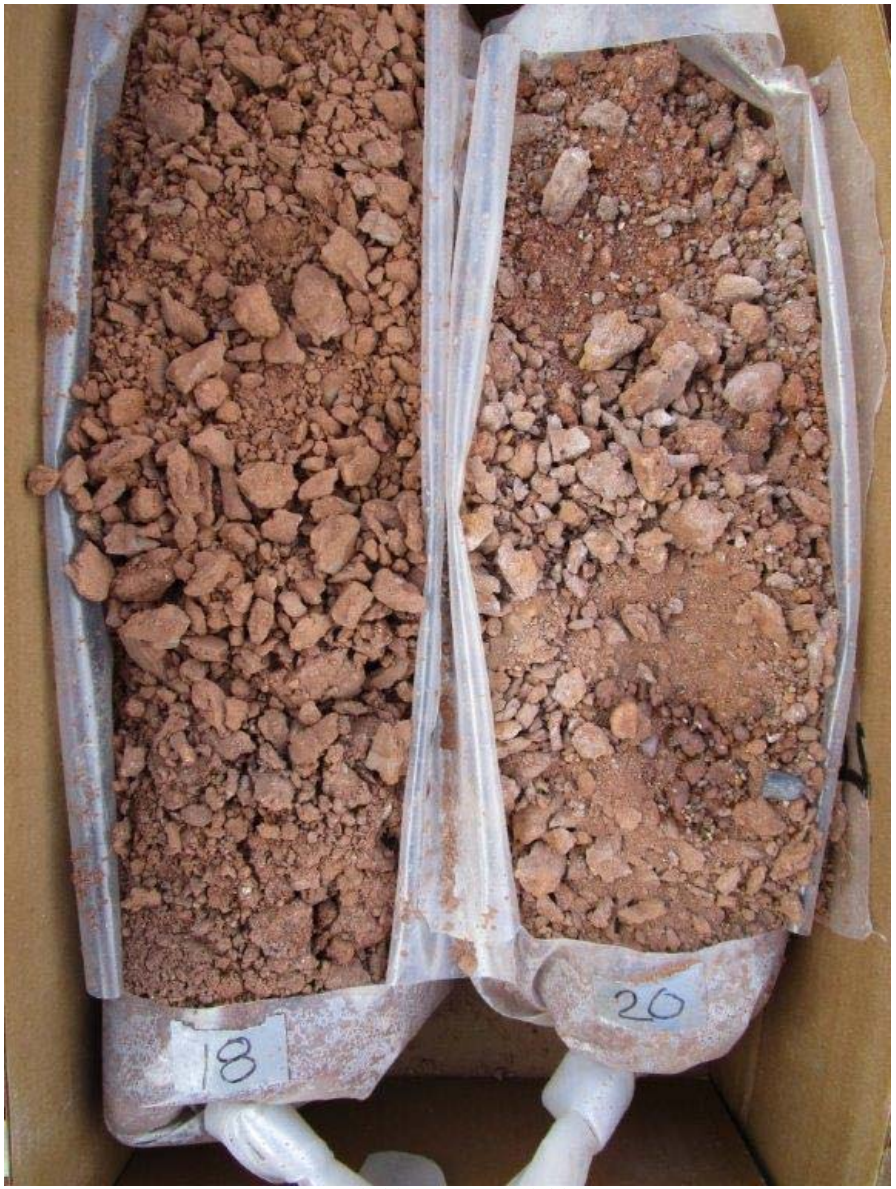
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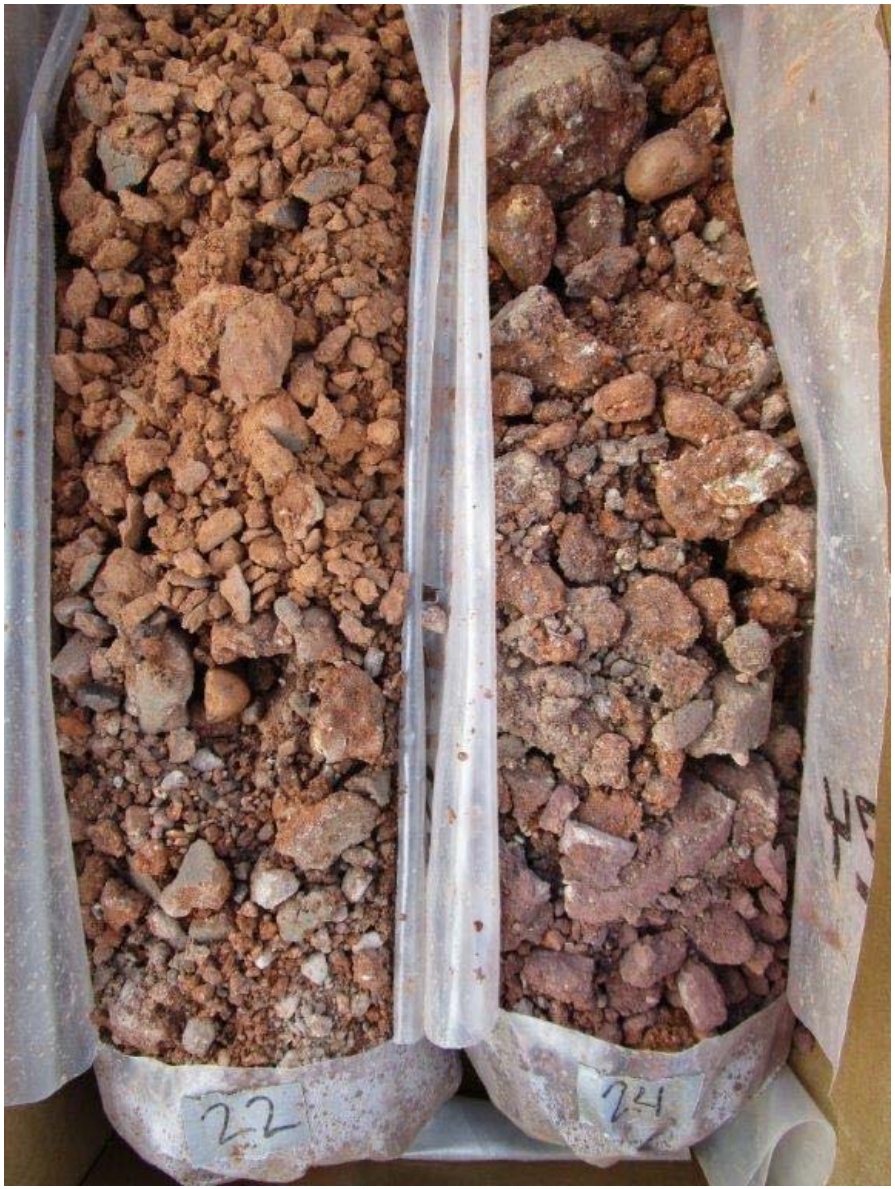
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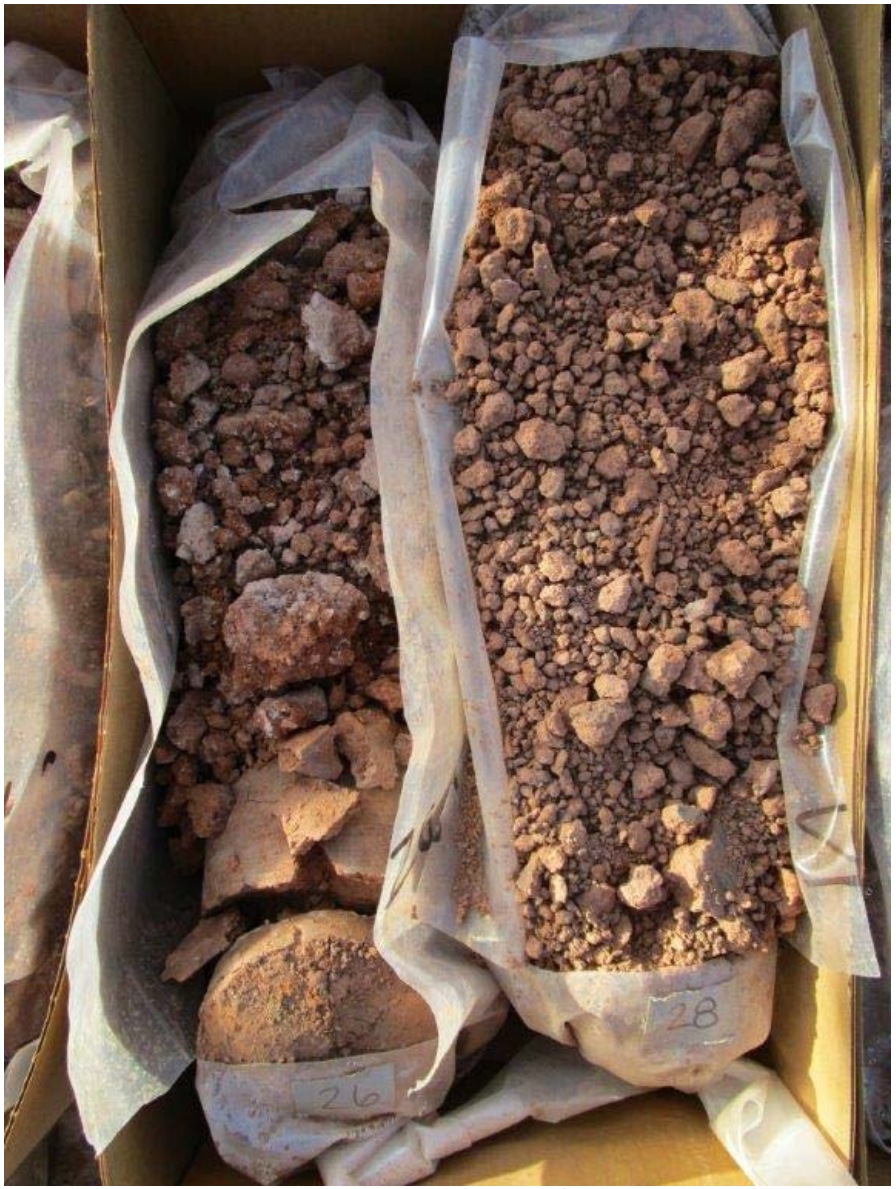
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BMO-2015-1 Core 24-28



BMO-2015-1 Core 28-32



BMO-2015-1 Core 32-36



BMO-2015-1 Core 36-40



BMO-2015-1 Core 40-44



BMO-2015-1 Core 44-48



BMO-2015-1 Core 48-52



BMO-2015-1 Core 52-56



BMO-2015-1 Core 56-60



BMO-2015-1 Core 60-64



BMO-2015-1 Core 64-68



BMO-2015-1 Core 68-72



BMO-2015-1 Core 72-76



BMO-2015-1 Core 76-80



BMO-2015-1 Core 80-84



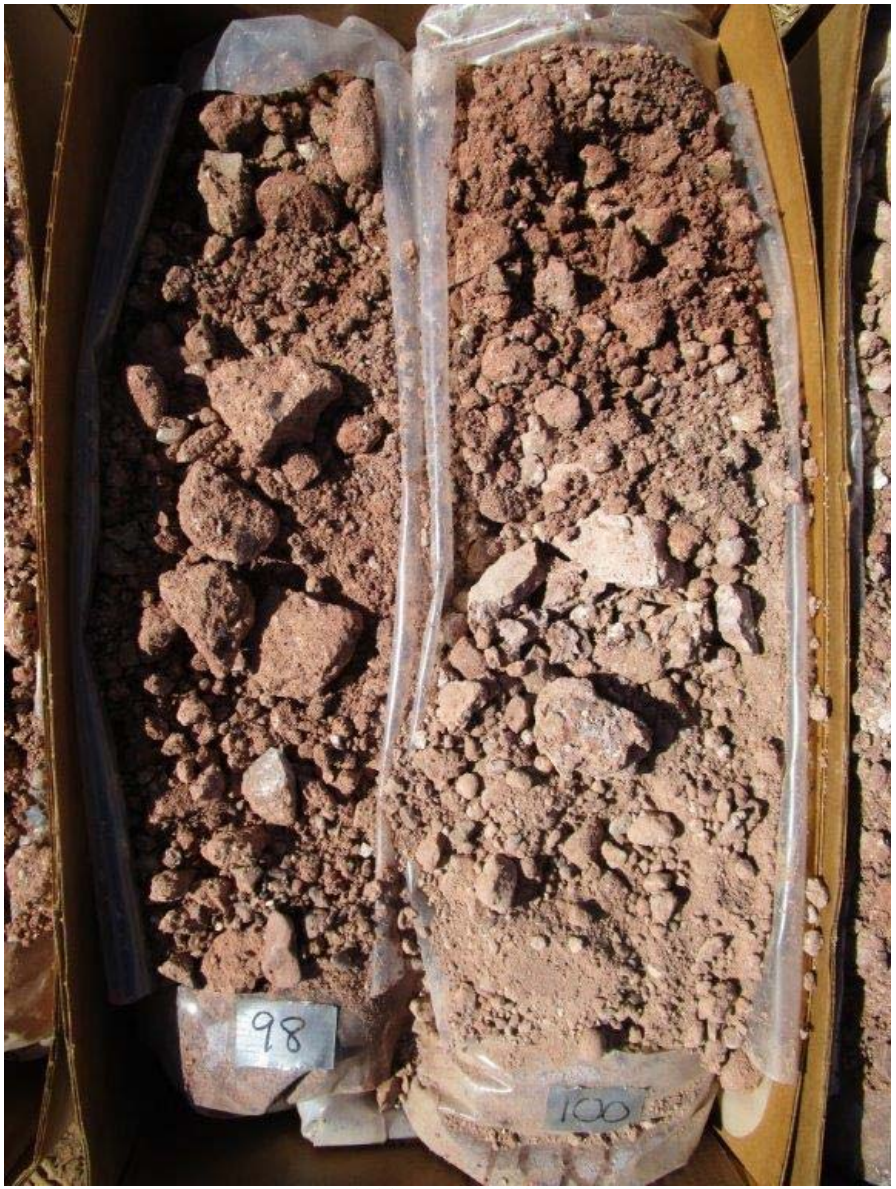
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BMO-2015-1 Core 96-100



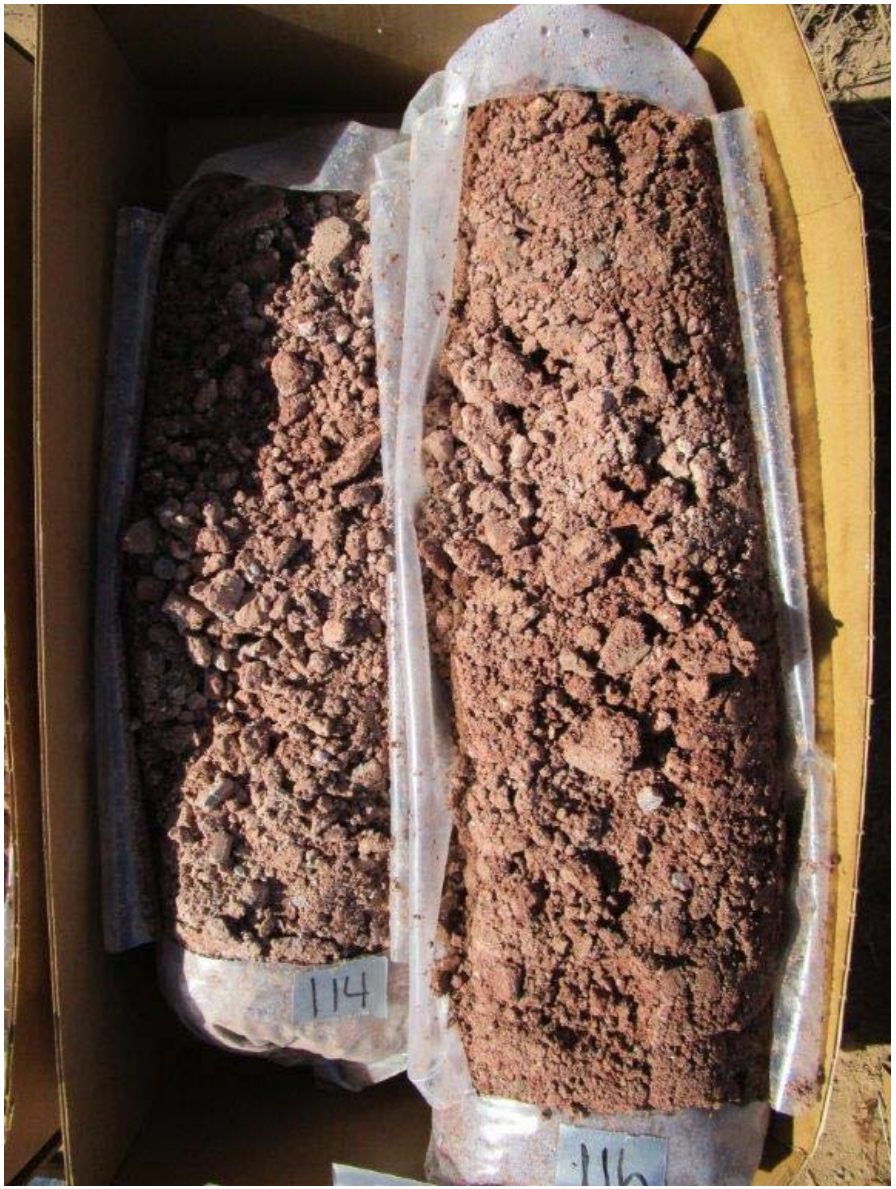
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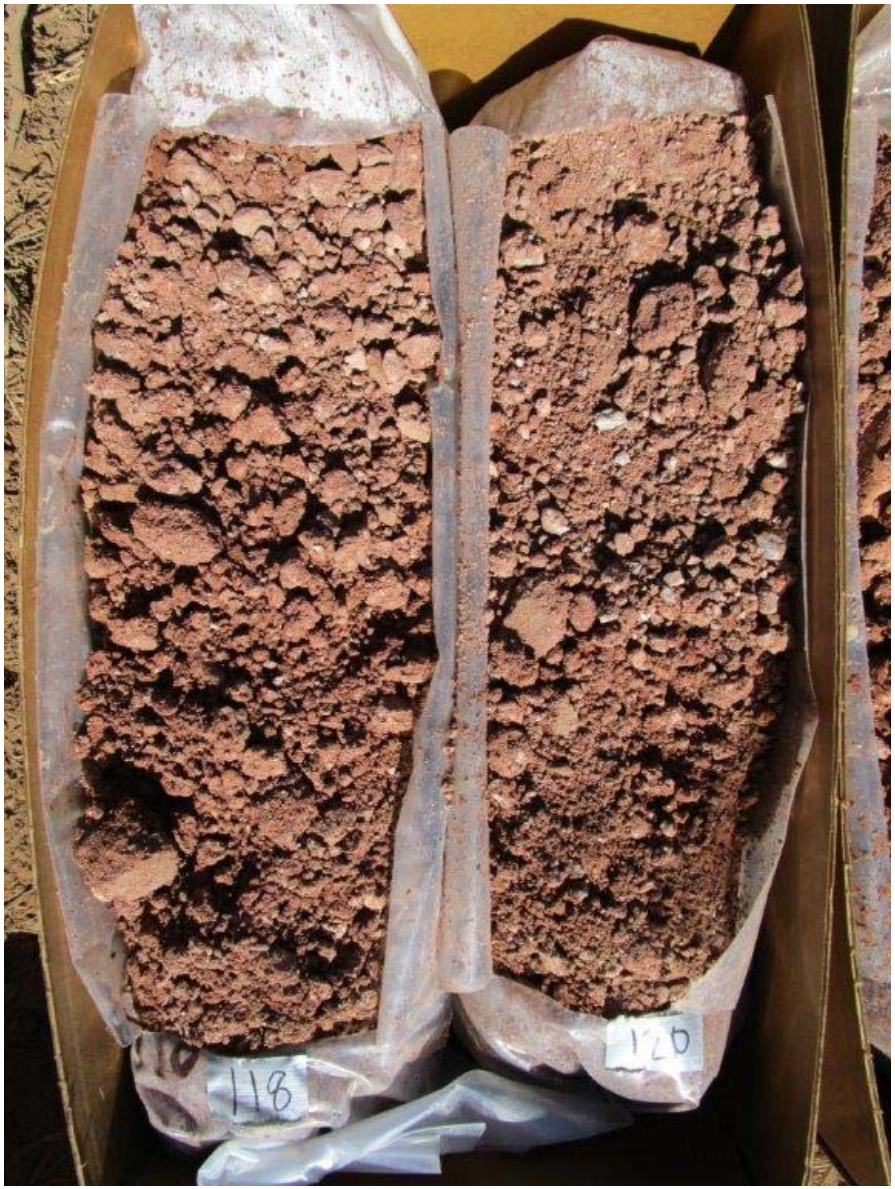
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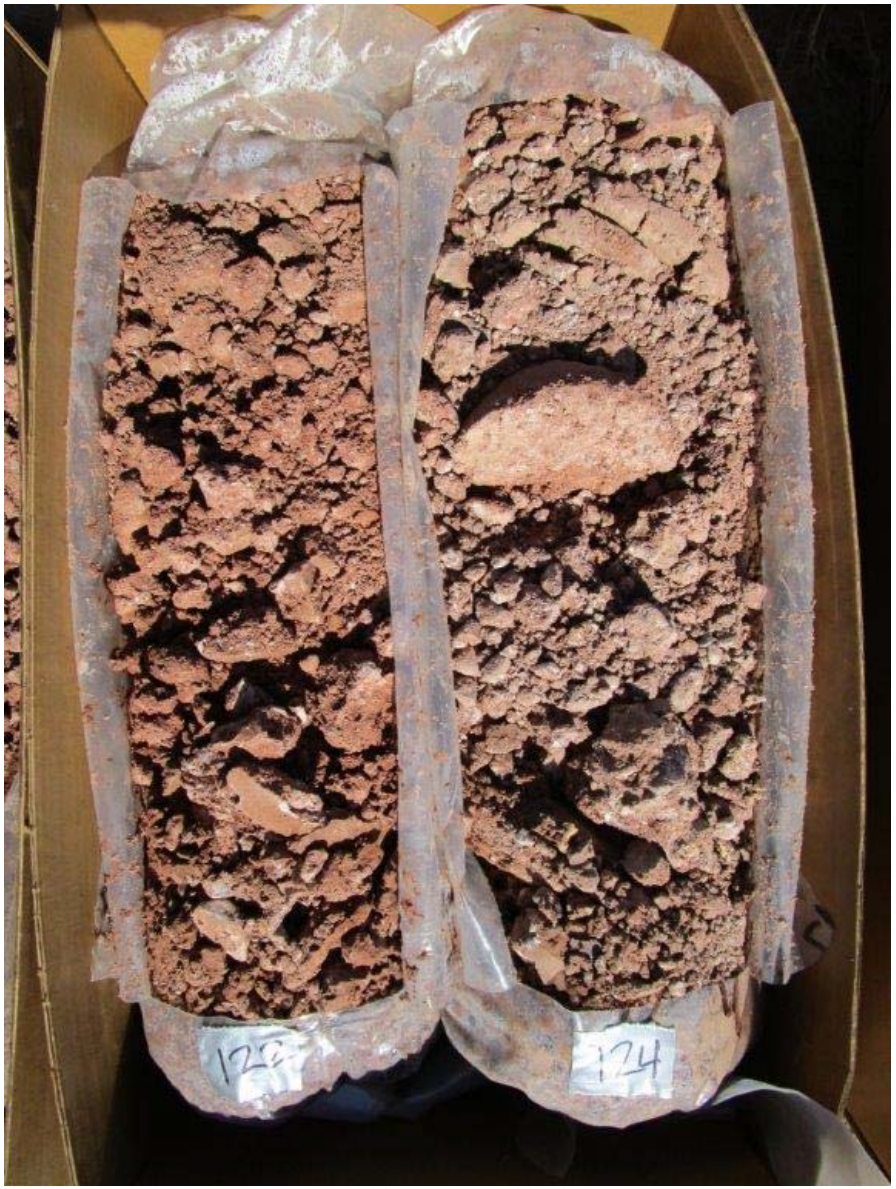
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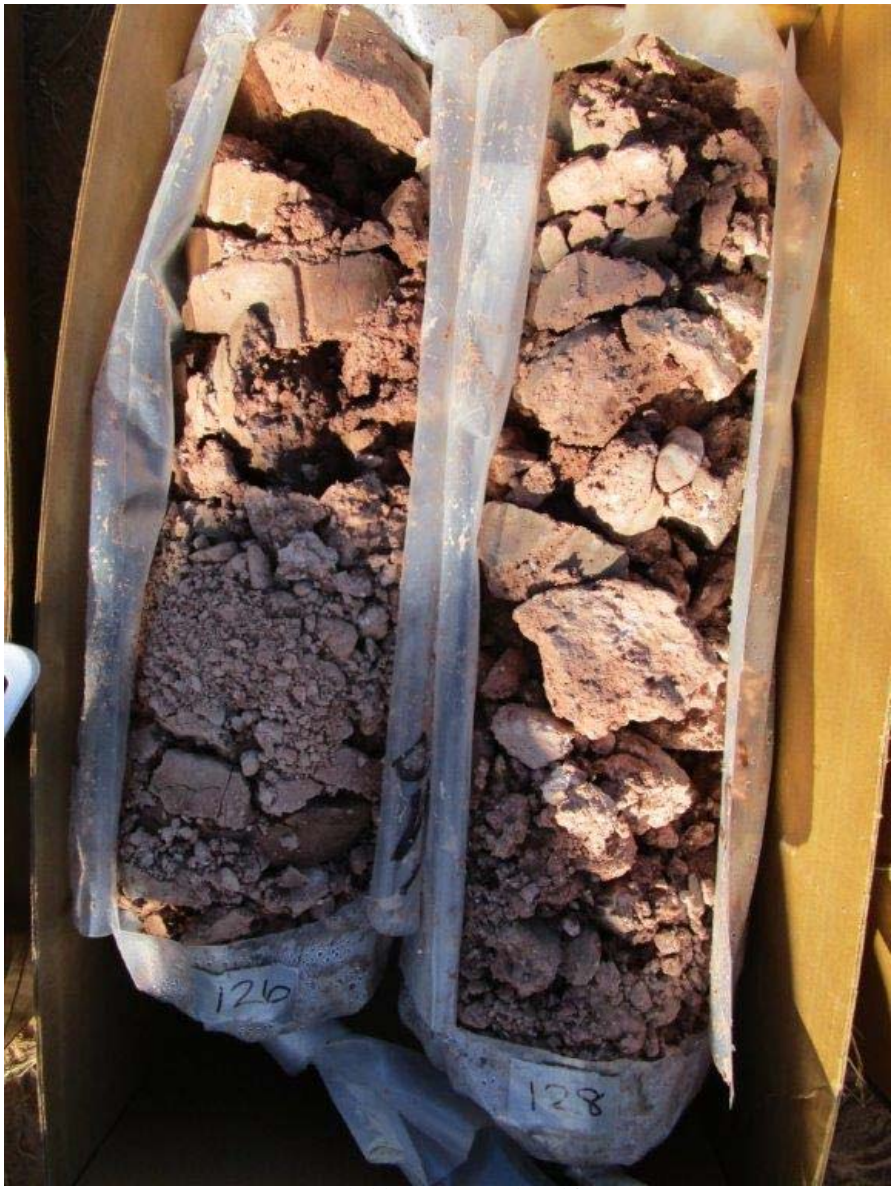
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BMO-2015-1 Core 128-132



BMO-2015-1 Core 132-136



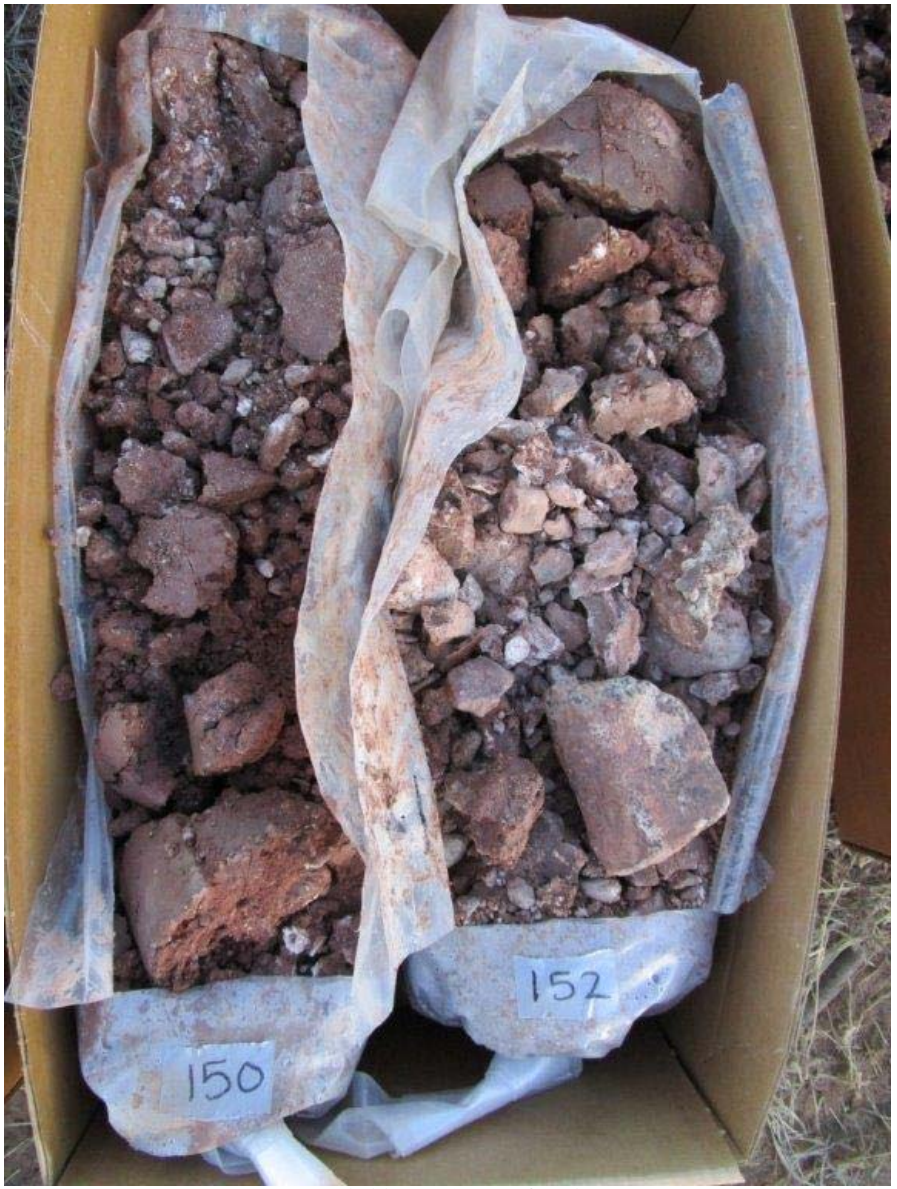
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BMO-2015-1 Core 148-152



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BMO-2015-1 Core 156-160



BMO-2015-1 Core 160-164



BMO-2015-1 Core 164-168



BMO-2015-1 Core 168-172



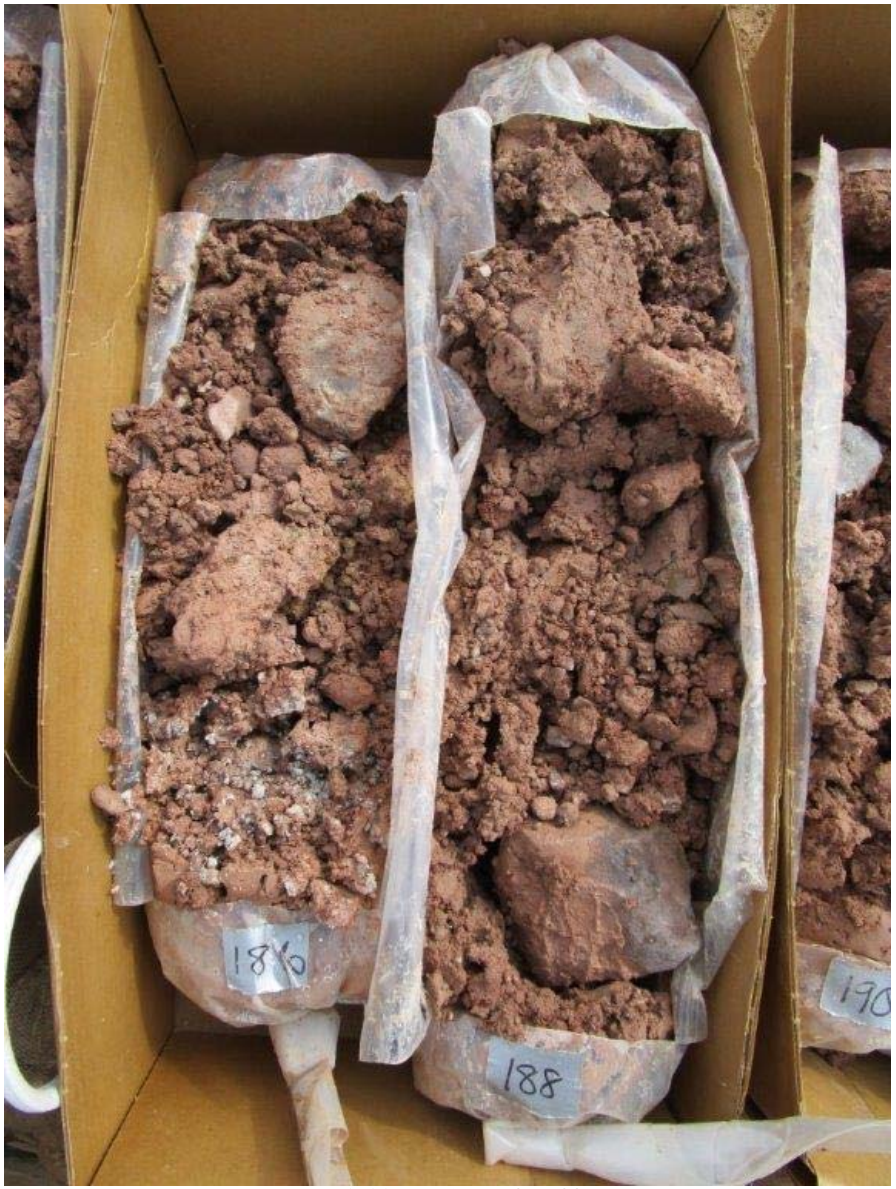
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BMO-2015-1 Core 176-180



BMO-2015-1 Core 180-184



BMO-2015-1 Core 184-188



BMO-2015-1 Core 188-192



BMO-2015-1 Core 192-196



BMO-2015-1 Core 196-200



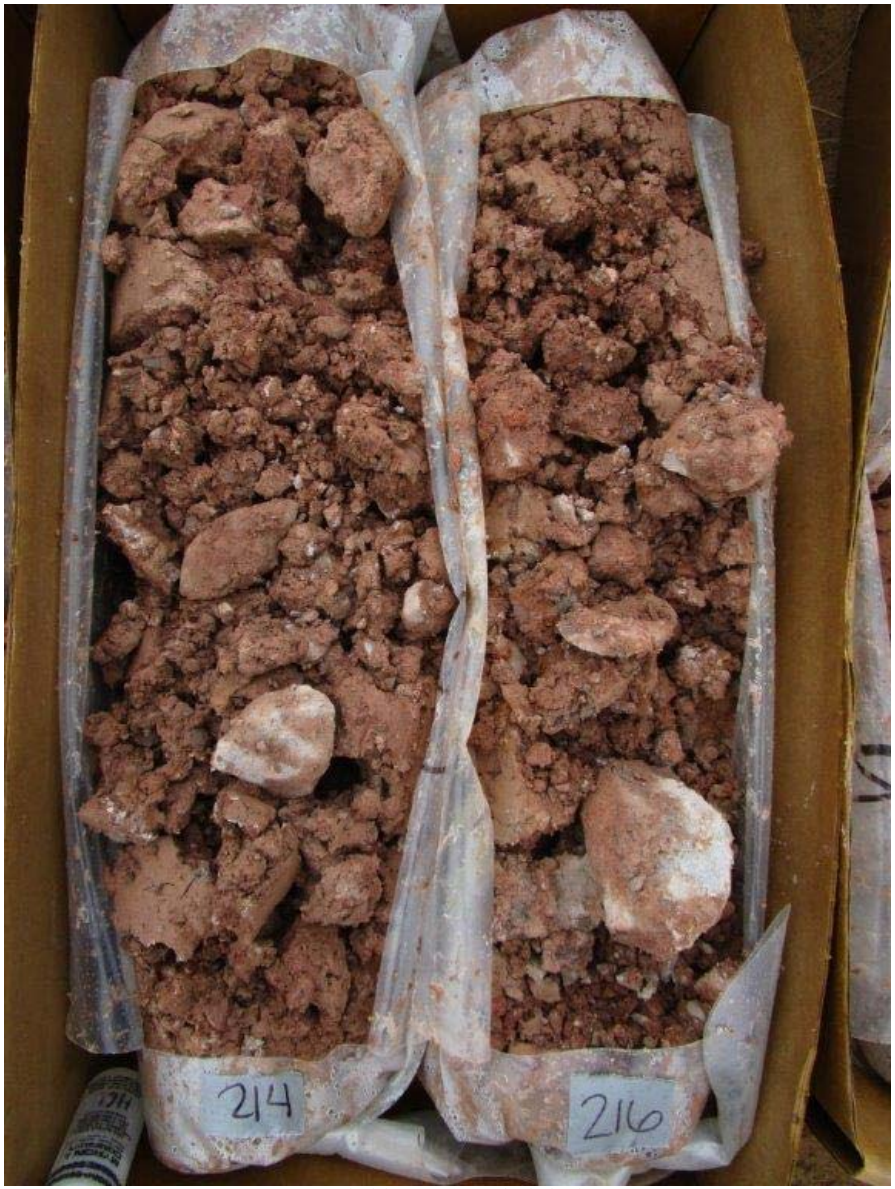
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BMO-2015-1 Core 204-208



BMO-2015-1 Core 208-212



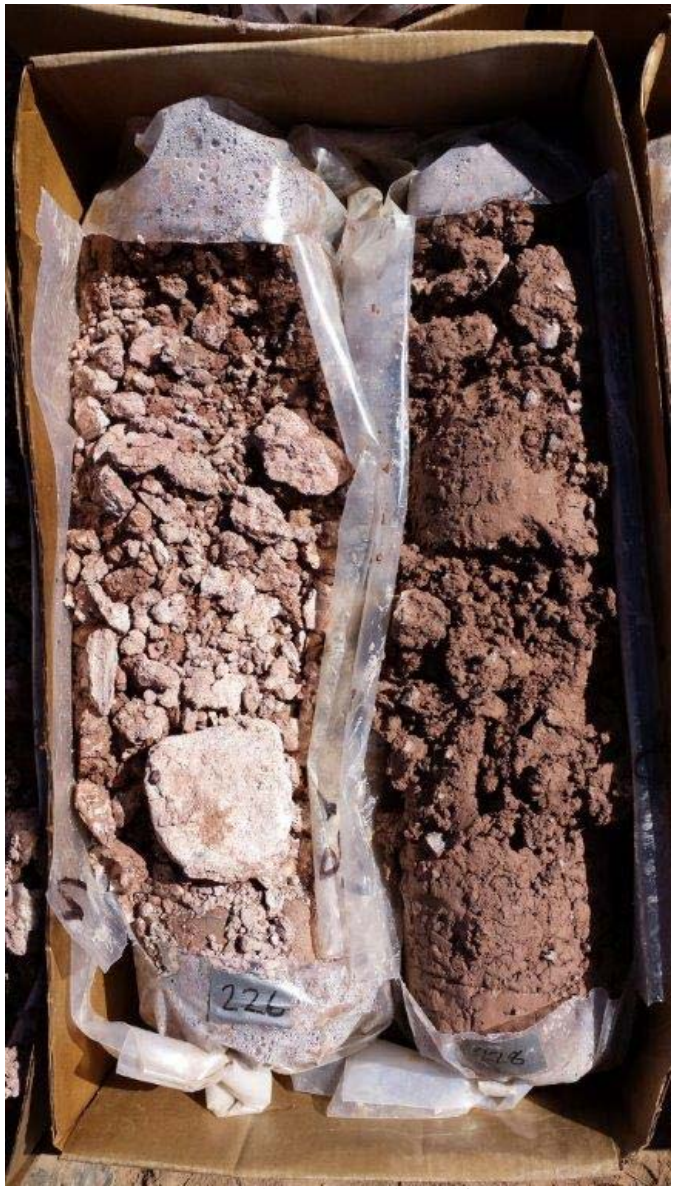
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BMO-2015-1 Core 216-220



BMO-2015-1 Core 220-224



BMO-2015-1 Core 224-228



BMO-2015-1 Core 228-232



BMO-2015-1 Core 232-236



BMO-2015-1 Core 236-240



BMO-2015-1 Core 240-244



BMO-2015-1 Core 244-248



BMO-2015-1 Core 248-252



BMO-2015-1 Core 252-256



BMO-2015-2B Core 0-4



BMO-2015-2B Core 4-8



BMO-2015-2B Core 8-12



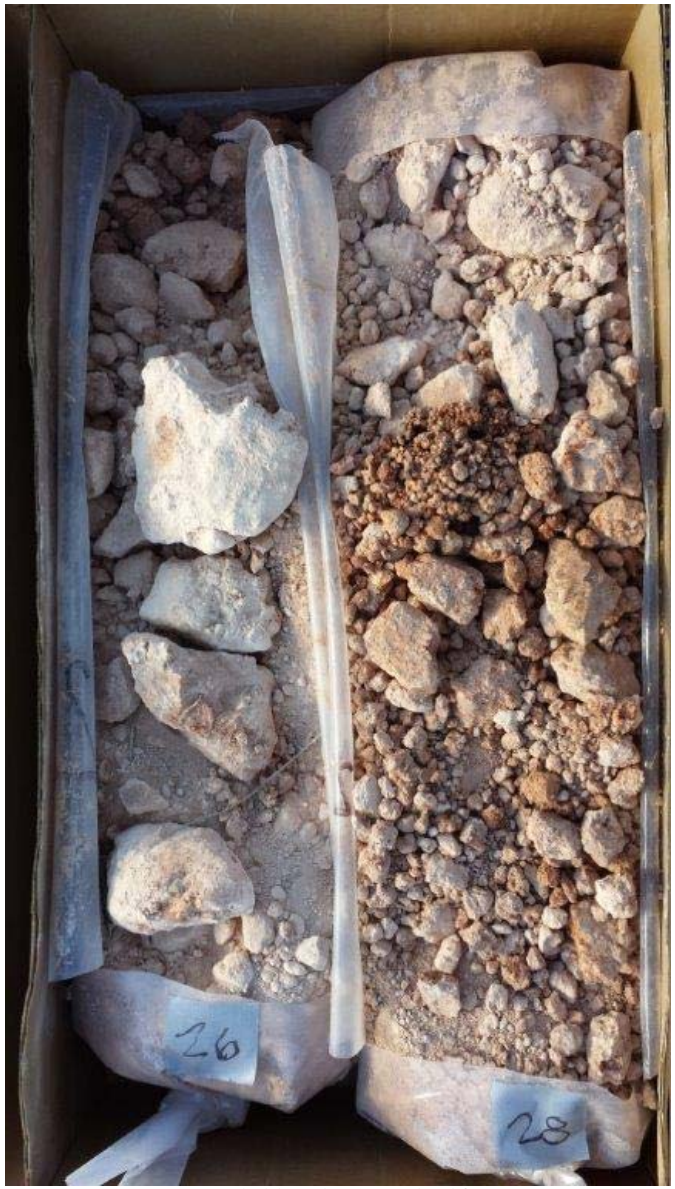
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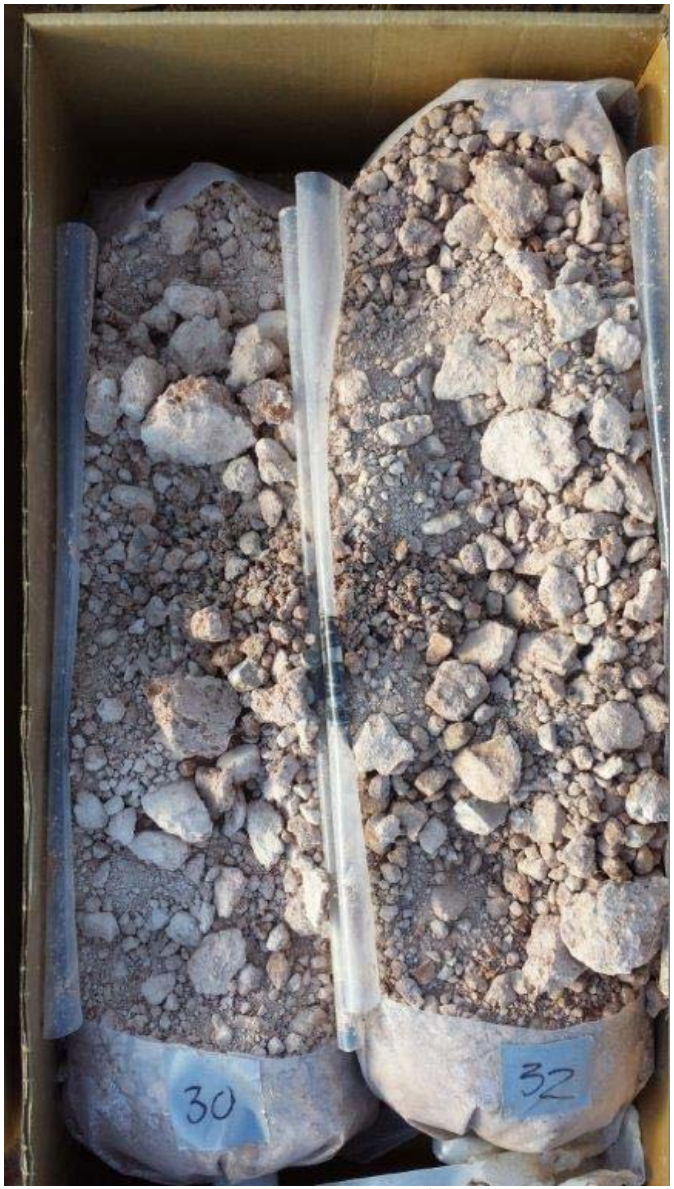
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BMO-2015-2B Core 20-24



BMO-2015-2B Core 24-28



BMO-2015-2B Core 28-32



BMO-2015-2B Core 32-36



BMO-2015-2B Core 36-40



BMO-2015-2B Core 40-44



BMO-2015-2B Core 44-48



BMO-2015-2B Core 48-52



BMO-2015-2B Core 52-56



BMO-2015-2B Core 56-60



BMO-2015-2B Core 60-64



BMO-2015-2B Core 64-68



BMO-2015-2B Core 68-72



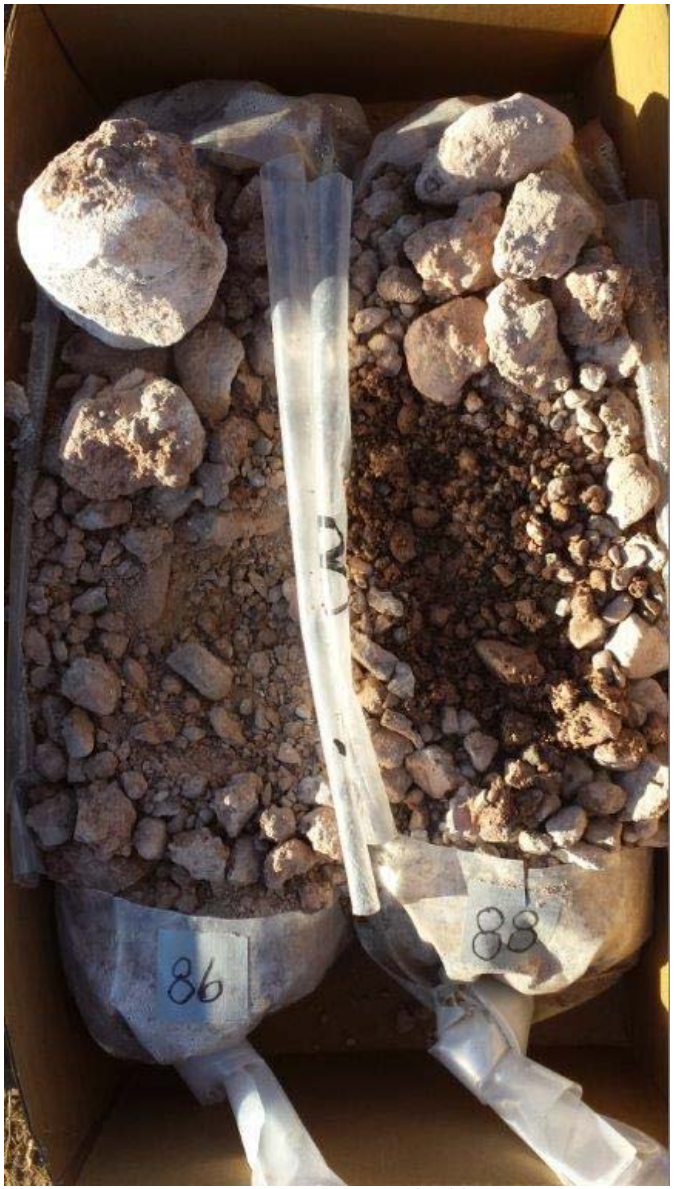
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BMO-2015-2B Core 84-88



BMO-2015-2B Core 88-92



BMO-2015-2B Core 92-96



BMO-2015-2B Core 96-100



BMO-2015-2B Core 100-104



BMO-2015-2B Core 104-108



BMO-2015-2B Core 108-112



BMO-2015-2B Core 112-116



BMO-2015-2B Core 116-120



BMO-2015-2B Core 120-124



BMO-2015-2B Core 124-128



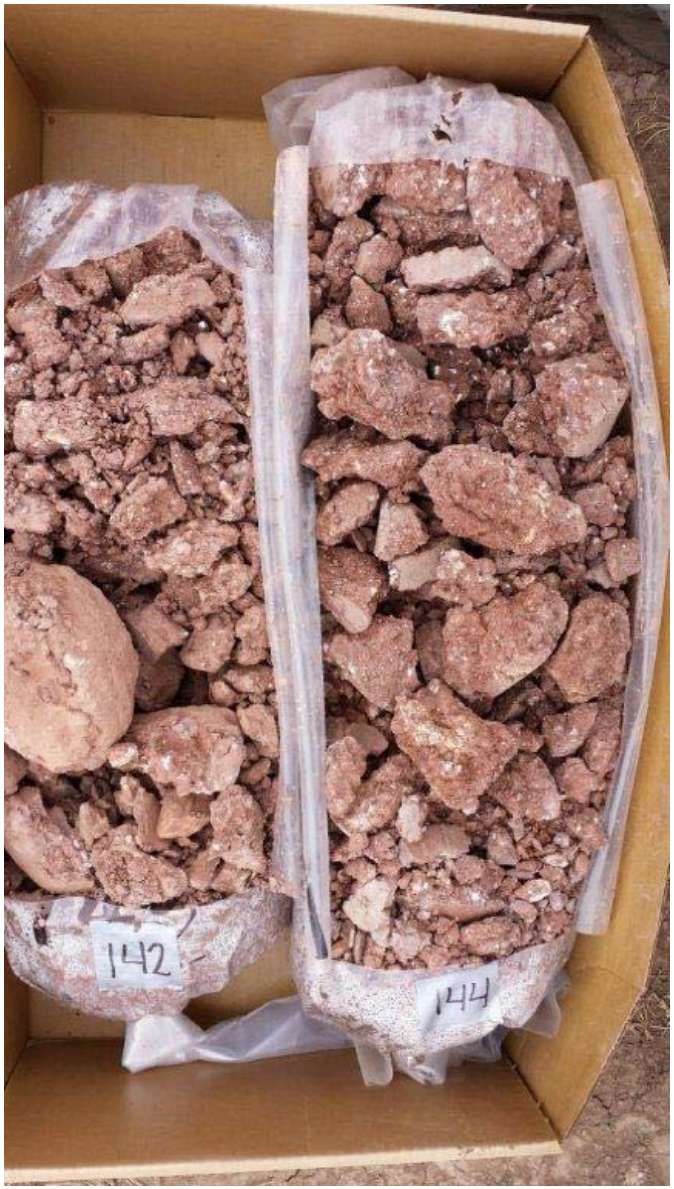
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BMO-2015-2B Core 148-152



BMO-2015-2B Core 152-156



BMO-2015-2B Core 156-160



BMO-2015-2B Core 160-164



BMO-2015-2B Core 164-168



BMO-2015-2B Core 168-172



BMO-2015-2B Core 172-176



BMO-2015-2B Core 176-180



BMO-2015-2B Core 180-184



BMO-2015-2B Core 184-188



BMO-2015-2B Core 188-192



BMO-2015-2B Core 192-196



BMO-2015-2B Core 196-200



BMO-2015-2B Core 200-204



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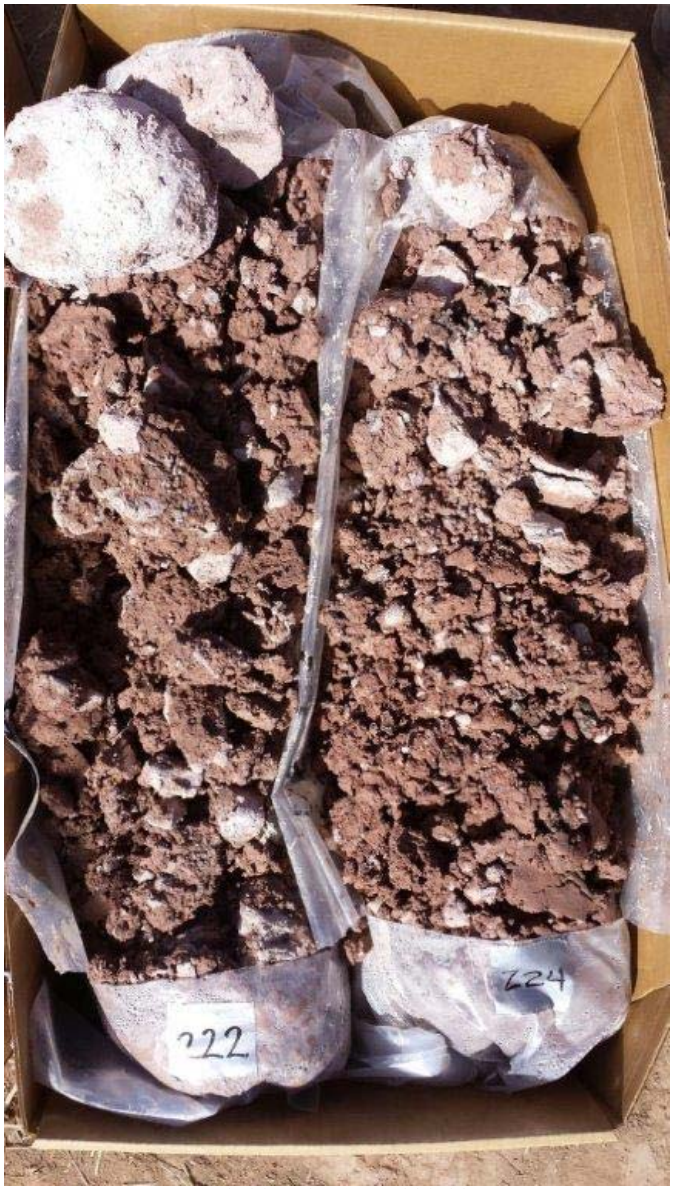
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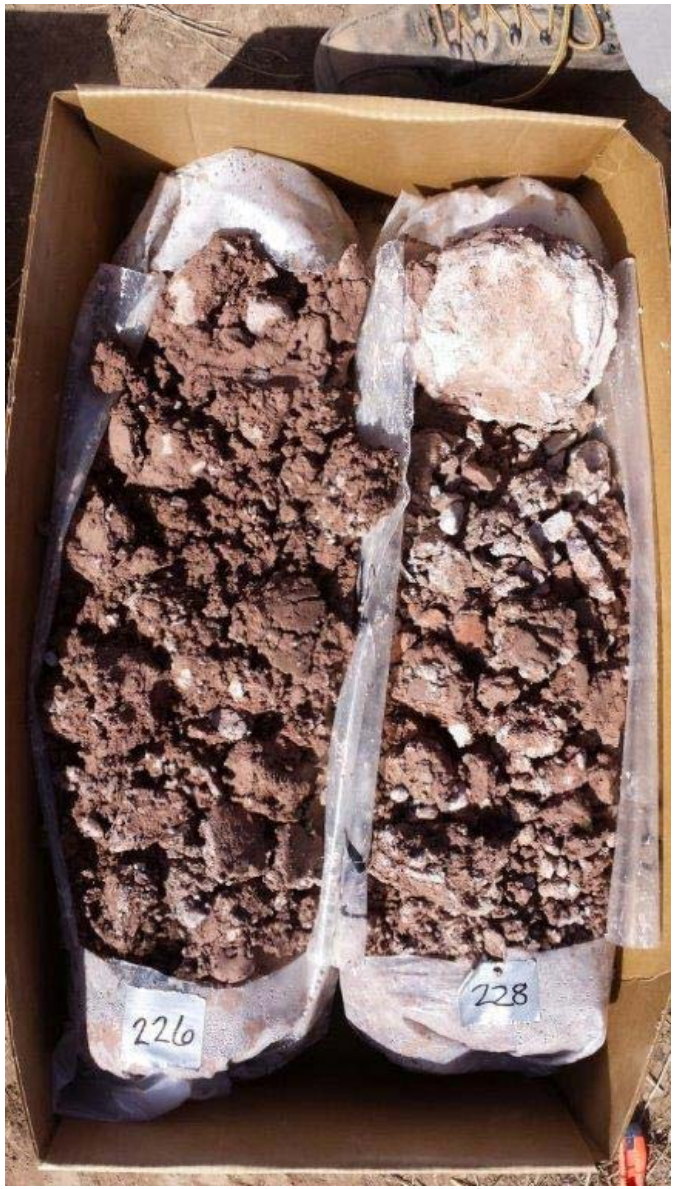
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BMO-2015-2B Core 228-232



BMO-2015-2B Core 232-236



BMO-2015-2B Core 236-240



BMO-2015-2B Core 240-244



BMO-2015-2B Core 244-248



BMO-2015-2B Core 248-252



BMO-2015-2B Core 252-256



BMO-2015-2B Core 256-260



BMO-2015-2B Core 260-264



BMO-2015-2B Core 264-268



BMO-2015-2B Core 268-272



BMO-2015-2B Core 272-276



BMO-2015-2B Core 276-280

APPENDIX B
WELL CONSTRUCTION AND DEVELOPMENT SUMMARIES

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2014-1BU**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917393**	Drillers:	C. Rockhill, J. Maples	Geologist:	VNH + MML
UTM Location:	3468231.44 N 600570.805 E		Surface Elevation:	4557.626 ft	NAD83

DRILLING SUMMARY

Total Drilled Depth:	283 ft bls	Hole Diameter:	9.5" to 283'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	21.4	5" Low Carbon Steel
Casing	21.4	120	5" Sched. 80 PVC
Well Screen	120	272.8	5" Sched. 80 PVC. 0.125" Hoz. Slots
End Cap	272.8	272.8	5" Stainless Steel
Centralizer Locations	*10*	*260*	*6 @ 50' ft intervals along casing*
Cement Grout	0	25	Type II Portland Cement
Bentonite Grout	25	90	High-solids bentonite grout
Bentonite Pellets	90	99.5	Coated time release pellets
FineTransition Sand	99.5	105	No. 60 Sand
CoarseTransition Sand	105	110	8x12 Sand
Filter Pack	110	283	3/8" x 3/16" Pea Gravel

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	13-Oct-14	15:03	15-Oct-14	12:50
Casing	15-Oct-14	16:23	15-Oct-14	17:00
Filter Pack	15-Oct-14	17:08	15-Oct-14	23:19
Bentonite Pellets	15-Oct-14	23:30	15-Oct-14	23:49
Bentonite Grout	16-Oct-14	5:15	16-Oct-14	6:54
Cement	16-Oct-14	7:03	16-Oct-14	7:57

WELL DEVELOPMENT

SWL Date & Time:	10-Nov-14 8:55		
Bailing Date & Time Started:	10-Nov-14 8:55	Static water level in feet bls:	123.32
Number of bails:	32	Gallons Bailed:	96
Airlift Date & Time Started:	10-Nov-14 13:00	Static water level in feet bls:	126
Duration in minutes:	733	Gallons Airlifted:	4,419
Pump Date & Time Started:	11-Nov-14 17:35	Static water level in feet bls:	123.49
Duration in minutes:	25	Gallons Pumped:	500
Date & Time Completed:	11-Nov-14 18:00	Total Gallons Purged:	5,015

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2014-1BL**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917394**	Drillers:	C. Rockhill, J. Maples	Geologist:	VNH + MML
UTM Location:	3468234.798 N 600563.194 E		Surface Elevation:	4557.447 ft	NAD83

DRILLING SUMMARY

Total Drilled Depth:	398 ft bls	Hole Diameter:	10.75" to 261', 9.5" to 398'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	25.4	5" Low Carbon Steel
Casing	25.4	292	5" PVC
Well Screen	292	366	5" PVC. 0.125" Horizontal Slots
End Cap	366	366	5" Stainless Steel
Centralizer Locations	*20*	*360*	*8 @ 50' ft intervals along casing*
Cement Grout	0	22	Type II Portland Cement
Bentonite Grout	22	261	High-solids bentonite grout
Bentonite Pellets	261	271.5	Coated time release pellets
FineTransition Sand	271.5	277	No. 60 Sand
CoarseTransition Sand	277	282	8x12 Sand
Filter Pack	282	372	3/8" x 3/16" Pea Gravel
CoarseTransition Sand	372	377	8x12 Sand
Bentonite	377	386	Chips
Fill	386	398	3/8" x 3/16" Pea Gravel

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	30-Sep-14	19:52	9-Oct-14	8:35
Casing	10-Oct-14	5:01	10-Oct-14	6:26
Filter Pack	10-Oct-14	7:55	10-Oct-14	14:27
Bentonite Pellets	10-Oct-14	14:50	10-Oct-14	20:45
Bentonite Grout	10-Oct-14	21:35	13-Oct-14	10:35
Cement	13-Oct-14	11:32	13-Oct-14	12:09

WELL DEVELOPMENT

SWL Date & Time:	04-Nov-14 11:21		
Bailing Date & Time Started:	04-Nov-14 11:40	Static water level in feet bls:	122.65
Number of bails:	7	Gallons Bailed:	21
Airlift Date & Time Started:	04-Nov-14 16:25	Static water level in feet bls:	122.95
Duration in minutes:	435	Gallons Airlifted:	3,909
Pump Date & Time Started:	05-Nov-14 17:10	Static water level in feet bls:	123.89
Duration in minutes:	184	Gallons Pumped:	2,612
Date & Time Completed:	06-Nov-14 10:20	Total Gallons Purged:	6,542

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2014-2BU**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917453**	Drillers:	C. Rockhill, J. Maples	Geologist:	VNH + MML
UTM Location:	3468192.762 N 600788.52 E		Surface Elevation:	4560.750	NAD83

DRILLING SUMMARY

Total Drilled Depth:	286 ft bls	Hole Diameter:	9.5" to 286'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	23.8	5" Low Carbon Steel
Casing	23.8	127.4	5" PVC
Well Screen	127.4	276	5" PVC. 0.125" Horizontal Slots
End Cap	276	276	5" Stainless Steel
Centralizer Locations	*20*	*270*	*6 @ 50' ft intervals along casing*
Cement Grout	0	20	Type II Portland Cement
Bentonite Grout	20	96.3	High-solids bentonite grout
Bentonite Pellets	96.3	105.8	Coated time release pellets
FineTransition Sand	105.8	111	No. 60 Sand
CoarseTransition Sand	111	116	8x12 Sand
Filter Pack	116	286	3/8" x 3/16" Pea Gravel

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	31-Oct-14	10:35	5-Nov-14	21:36
Casing	6-Nov-14	9:25	6-Nov-14	10:28
Filter Pack	6-Nov-14	10:33	6-Nov-14	16:27
Bentonite Pellets	6-Nov-14	16:36	6-Nov-14	16:54
Bentonite Grout	6-Nov-14	17:45	6-Nov-14	20:30
Cement	6-Nov-14	21:26	7-Nov-14	10:06

WELL DEVELOPMENT

SWL Date & Time:	21-Nov-14 9:00		
Bailing Date & Time Started:	21-Nov-14 9:55	Static water level in feet bls:	125.93
Number of bails:	23	Gallons Bailed:	69
Airlift Date & Time Started:	1121/2014 12:50	Static water level in feet bls:	--
Duration in minutes:	907	Gallons Airlifted:	2,592
		Total Gallons Purged:	2,661

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2014-2BL**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917452**	Drillers:	C. Rockhill, J. Maples	Geologist:	VNH + MML
UTM Location:	3468183.921 N 600784.872 E		Surface Elevation:	4560.730	NAD83

DRILLING SUMMARY

Total Drilled Depth:	410 ft bls	Hole Diameter:	10.75" to 250', 9.5" to 409'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	20	5" Low Carbon Steel
Casing	20	297	5" PVC
Well Screen	297	396	5" PVC. 0.125" Horizontal Slots
End Cap	396	396	5" Stainless Steel
Centralizer Locations	*20*	*380*	*8 @ 50' ft intervals along casing*
Cement Grout	0	20	Type II Portland Cement
Bentonite Grout	20	266	High-solids bentonite grout
Bentonite Pellets	266	276	Coated time release pellets
FineTransition Sand	276	281	No. 60 Sand
CoarseTransition Sand	281	286	8x12 Sand
Filter Pack	286	400	3/8" x 3/16" Pea Gravel
Bentonite	400	409	Chips
Natural Fill	409	410	Basin Fill Formation

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	17-Oct-14	7:16	28-Oct-14	20:47
Casing	29-Oct-14	11:33	29-Oct-14	12:30
Filter Pack	29-Oct-14	13:01	29-Oct-14	20:35
Bentonite Pellets	29-Oct-14	20:54	29-Oct-14	21:33
Bentonite Grout	30-Oct-14	8:37	30-Oct-14	15:50
Cement	30-Oct-14	16:17	30-Oct-14	17:21

WELL DEVELOPMENT

SWL Date & Time:	17-Nov-14 7:36		
Bailing Date & Time Started:	17-Nov-14 7:56	Static water level in feet bls:	125.85
Number of bails:	13	Gallons Bailed:	39
Airlift Date & Time Started:	17-Nov-14 11:49	Static water level in feet bls:	--
Duration in minutes:	604	Gallons Airlifted:	9,162
Pump Date & Time Started:	18-Nov-14 13:57	Static water level in feet bls:	125.94
Duration in minutes:	152	Gallons Pumped:	6,100
Date & Time Completed:	18-Nov-14 17:26	Total Gallons Purged:	15,301

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**	Boring No.:	**BMO-2014-3BU**
Drilling Co.:	Cascade Drilling	Project No.:	287051
ADWR Well No.:	**55-917494** Drillers: G. Cain, C. Rockhill, J. Maples	Geologist:	VNH + MML
UTM Location:	3467787.733 N 600810.534 E	Surface Elevation:	4573.836 NAD83

DRILLING SUMMARY

Total Drilled Depth:	298 ft bls	Hole Diameter:	9.5" to 298'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	20	5" Low Carbon Steel
Casing	20	139	5" PVC
Well Screen	139	288	5" PVC. 0.125" Horizontal Slots
End Cap	288	288	5" Stainless Steel
Centralizer Locations	*10*	*285*	7 @ 50' ft intervals along casing
Cement Grout	0	20	Type II Portland Cement
Bentonite Grout	20	107	High-solids bentonite grout
Bentonite Pellets	107	117	Coated time release pellets
FineTransition Sand	117	122	No. 60 Sand
CoarseTransition Sand	122	127	8x12 Sand
Filter Pack	127	298	3/8" x 3/16" Pea Gravel

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	10-Dec-14	20:32	16-Dec-14	8:30
Casing	16-Dec-14	11:40	16-Dec-14	12:24
Filter Pack	16-Dec-14	12:53	16-Dec-14	17:20
Bentonite Pellets	16-Dec-14	17:28	16-Dec-14	17:48
Bentonite Grout	16-Dec-14	19:37	16-Dec-14	20:47
Cement	16-Dec-14	20:55	16-Dec-14	21:38

WELL DEVELOPMENT

SWL Date & Time:	17-Feb-15 7:30		
Bailing Date & Time Started:	17-Feb-15 8:00	Static water level in feet bls:	137.72
Number of bails:	15	Gallons Bailed:	45
Airlift Date & Time Started:	17-Feb-15 10:55	Static water level in feet bls:	137.76
Duration in minutes:	1453	Gallons Airlifted:	7,874
Pump Date & Time Started:	--	Static water level in feet bls:	--
Duration in minutes:	--	Gallons Pumped:	--
Date & Time Completed:	20-Feb-15 8:16	Total Gallons Purged:	7,919

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2014-3BL**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917527**	Drillers:	C. Rockhill, J. Maples	Geologist:	VNH + MML
UTM Location:	3467786.416 N 600822.399 E		Surface Elevation:	4572.807	NAD83

DRILLING SUMMARY

Total Drilled Depth:	549 ft bls	Hole Diameter:	10.75" to 180', 9.5" to 549'
Drill Rig:	0'-516' PS600T, 516'-549' GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	21	5" Low Carbon Steel
Casing	21	328	5" PVC
Well Screen	328	521	5" PVC. 0.125" Horizontal Slots
End Cap	521	521	5" Stainless Steel
Centralizer Locations	*60*	*520*	10 @ 50' ft intervals along casing
Cement Grout	0	23	Type II Portland Cement
Bentonite Grout	23	296	High-solids bentonite grout
Bentonite Pellets	296	306	Coated time release pellets
FineTransition Sand	306	311	No. 60 Sand
CoarseTransition Sand	311	318	8x12 Sand
Filter Pack	318	526	3/8" x 3/16" Pea Gravel
Bentonite	526	533	Coated time release pellets
Natural Fill	533	549	Basin Fill Formation

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	10-Nov-14	16:55	8-Dec-14	11:50
Casing	8-Dec-14	17:50	8-Dec-14	21:17
Filter Pack	8-Dec-14	21:17	9-Dec-14	15:54
Bentonite Pellets	9-Dec-14	15:54	9-Dec-14	17:37
Bentonite Grout	10-Dec-14	8:45	10-Dec-14	15:46
Cement	10-Dec-14	16:31	10-Dec-14	18:31

WELL DEVELOPMENT

SWL Date & Time:	09-Feb-15 15:21		
Bailing Date & Time Started:	09-Feb-15 15:40	Static water level in feet bls:	136.70
Number of bails:	27	Gallons Bailed:	81
Airlift Date & Time Started:	10-Feb-15 12:27	Static water level in feet bls:	137.45
Duration in minutes:	921	Gallons Airlifted:	20,615
Pump Date & Time Started:	--	Static water level in feet bls:	--
Duration in minutes:	--	Gallons Pumped:	--
Date & Time Completed:	12-Feb-15 9:00	Total Gallons Purged:	20,696

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2014-4B**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917620**	Drillers:	C. Rockhill, J. Maples	Geologist:	VNH + MML
UTM Location:	*3468581.267 N 600508.792 E*		Surface Elevation:	4566.741	NAD83

DRILLING SUMMARY

Total Drilled Depth:	272 ft bls	Hole Diameter:	10.75" to 180', 9.5" to 272'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	20.5	5" Low Carbon Steel
Casing	20.5	129	5" PVC
Well Screen	129	258	5" PVC. 0.125" Horizontal Slots
End Cap	258	258	5" Stainless Steel
Centralizer Locations	*20*	*250*	*6 @ 50' ft intervals along casing*
Cement Grout	0	20.5	Type II Portland Cement
Bentonite Grout	20.5	99.5	High-solids bentonite grout
Bentonite Pellets	99.5	108.5	Coated time release pellets
FineTransition Sand	108.5	114	No. 60 Sand
CoarseTransition Sand	114	119	8x12 Sand
Filter Pack	119	262	3/8" x 3/16" Pea Gravel
Bentonite	262	267	Coated time release pellets
Natural Fill	267	272	Basin Fill Formation

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	18-Dec-14	0:17	23-Dec-14	4:02
Casing	8-Jan-15	9:00	8-Jan-15	12:24
Filter Pack	8-Jan-15	12:44	9-Jan-15	9:05
Bentonite Pellets	9-Jan-15	9:05	9-Jan-15	10:15
Bentonite Grout	9-Jan-15	10:15	9-Jan-15	12:00
Cement	9-Jan-15	12:00	16-Dec-14	12:20

WELL DEVELOPMENT

SWL Date & Time:	02-Mar-15 7:25		
Bailing Date & Time Started:	02-Mar-15 7:45	Static water level in feet bls:	132.40
Number of bails:	7	Gallons Bailed:	21
Airlift Date & Time Started:	02-Mar-15 9:15	Static water level in feet bls:	132.50
Duration in minutes:	612	Gallons Airlifted:	2,201
Pump Date & Time Started:	--	Static water level in feet bls:	--
Duration in minutes:	--	Gallons Pumped:	--
Date & Time Completed:	03-Mar-15 9:47	Total Gallons Purged:	2,222

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2014-4BL**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917619**	Drillers:	C. Rockhill, J. Maples	Geologist:	VNH + MML
UTM Location:	*3468566.229 N 600498.091 E*		Surface Elevation:	4566.022	NAD83

DRILLING SUMMARY

Total Drilled Depth:	262 ft bls	Hole Diameter:	10.75" to 262'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	22.74	5" Low Carbon Steel
Casing	22.74	220.04	5" PVC
Well Screen	220.04	260	5" PVC. 0.125" Horizontal Slots
End Cap	260	260	5" Stainless Steel
Centralizer Locations	*10*	*260*	*6 @ 50' ft intervals along casing*
Cement Grout	0	20	Type II Portland Cement
Bentonite Grout	20	200	High-solids bentonite grout
Bentonite Pellets	200	210	Coated time release pellets
FineTransition Sand	210	212	No. 60 Sand
CoarseTransition Sand	212	216	8x12 Sand
Filter Pack	216	261	3/8" x 3/16" Pea Gravel
Natural Fill	261	262	Basin Fill Formation

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	9-Jan-15	14:30	12-Jan-15	16:49
Casing	23-Jan-15	11:28	23-Jan-15	12:17
Filter Pack	23-Jan-15	13:30	23-Jan-15	18:06
Bentonite Pellets	23-Jan-15	18:06	23-Jan-15	18:20
Bentonite Grout	24-Jan-15	9:05	24-Jan-15	15:02
Cement	25-Jan-15	7:21	25-Jan-15	8:32

WELL DEVELOPMENT

SWL Date & Time:	26-Feb-15 10:08		
Bailing Date & Time Started:	26-Feb-15 10:15	Static water level in feet bls:	131.35
Number of bails:	17	Gallons Bailed:	51
Airlift Date & Time Started:	26-Feb-15 12:47	Static water level in feet bls:	141.00
Duration in minutes:	733	Gallons Airlifted:	4,576
Pump Date & Time Started:	--	Static water level in feet bls:	--
Duration in minutes:	--	Gallons Pumped:	--
Date & Time Completed:	27-Feb-15 15:59	Total Gallons Purged:	4,627

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2015-1B**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917622**	Driller:	C. Rockhill	Geologist:	VNH + MML
UTM Location:	*3468563.389 N 600261.991 E*	Surface Elevation:	4561.297	NAD83	

DRILLING SUMMARY

Total Drilled Depth:	256 ft bls	Hole Diameter:	10.75" to 150', 9.5" to 256'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	21.14	5" Low Carbon Steel
Casing	21.14	124.74	5" PVC
Well Screen	124.74	244	5" PVC. 0.125" Horizontal Slots
End Cap	244	244	5" Stainless Steel
Centralizer Locations	*10*	*200*	*5 @ 50' ft intervals along casing*
Cement Grout	0	20	Type II Portland Cement
Bentonite Grout	20	96.1	High-solids bentonite grout
Bentonite Pellets	96.1	106	Coated time release pellets
FineTransition Sand	106	111	No. 60 Sand
CoarseTransition Sand	111	116	8x12 Sand
Filter Pack	116	244	3/8" x 3/16 Pea Gravel
Bentonite	244	246.5	Coated time release pellets
Filler	246.5	252.5	3/8" x 3/16" Pea Gravel
Natural Fill	252.5	256	Basin Fill Formation

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	26-Jan-15	7:42	3-Feb-15	12:38
Casing	4-Feb-15	12:45	4-Feb-15	13:30
Filter Pack	4-Feb-15	14:05	5-Feb-15	7:40
Bentonite Pellets	5-Feb-15	7:55	5-Feb-15	8:20
Bentonite Grout	5-Feb-15	9:52	5-Feb-15	11:25
Cement	5-Feb-15	11:35	5-Feb-15	11:48

WELL DEVELOPMENT

SWL Date & Time:	13-Mar-15 8:07		
Bailing Date & Time Started:	13-Mar-15 8:15	Static water level in feet bls:	128.07
Number of bails:	11	Gallons Bailed:	33
Airlift Date & Time Started:	13-Mar-15 10:28	Static water level in feet bls:	128.45
Duration in minutes:	596	Gallons Airlifted:	2,664
Pump Date & Time Started:	--	Static water level in feet bls:	--
Duration in minutes:	--	Gallons Pumped:	--
Date & Time Completed:	14-Mar-15 10:57	Total Gallons Purged:	2,697

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2015-1BL**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917621**	Driller:	C. Rockhill	Geologist:	VNH + RDT
UTM Location:	*3468583.092 N 600272.479 E*	Surface Elevation:	4562.215	NAD83	

DRILLING SUMMARY

Total Drilled Depth:	243 ft bls	Hole Diameter:	9.5" to 241'; 8" from 241-243'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	23.08	5" Low Carbon Steel
Casing	23.08	201	5" PVC
Well Screen	201	241	5" PVC. 0.125" Horizontal Slots
End Cap	241	241	5" Stainless Steel
Centralizer Locations	--	--	*4 @ 50' ft intervals along casing*
Cement Grout	0	21	Type II Portland Cement
Bentonite Grout	21	180.5	High-solids bentonite grout
Bentonite Pellets	180.5	191	Coated time release pellets
FineTransition Sand	191	193	No. 60 Sand
CoarseTransition Sand	193	197	8x12 Sand
Filter Pack	197	243	3/8" x 3/16" Pea Gravel

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	5-Feb-15	14:00	9-Feb-15	16:02
Casing	9-Feb-15	16:36	9-Feb-15	17:19
Filter Pack	9-Feb-15	17:28	10-Feb-15	10:42
Bentonite Pellets	10-Feb-15	10:45	10-Feb-15	11:35
Bentonite Grout	10-Feb-15	11:46	10-Feb-15	12:46
Cement	10-Feb-15	14:20	10-Feb-15	14:29

WELL DEVELOPMENT

SWL Date & Time:	05-Mar-15 11:40		
Bailing Date & Time Started:	05-Mar-15 11:40	Static water level in feet bls:	129.00
Number of bails:	13	Gallons Bailed:	39
Airlift Date & Time Started:	10-Mar-15 9:28	Static water level in feet bls:	128.82
Duration in minutes:	292	Gallons Airlifted:	1,200
Pump Date & Time Started:	--	Static water level in feet bls:	--
Duration in minutes:	--	Gallons Pumped:	--
Date & Time Completed:	10-Mar-15 14:20	Total Gallons Purged:	1,239

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2015-2B**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917827**	Driller:	C. Rockhill	Geologist:	VNH + RDT
UTM Location:	*3468996.635 N 600267.799 E*	Surface Elevation:	4580.638	NAD83	

DRILLING SUMMARY

Total Drilled Depth:	280 ft bls	Hole Diameter:	10.75" to 150'; 9.5" to 277'; 6" to 280'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	20.56	5" Low Carbon Steel
Casing	20.56	148.88	5" PVC
Well Screen	148.88	268	5" PVC. 0.125" Horizontal Slots
End Cap	268	268	5" Stainless Steel
Centralizer Locations	*10*	*260*	*6 @ 50' ft intervals along casing*
Cement Grout	0	21	Type II Portland Cement
Bentonite Grout	21	117	High-solids bentonite grout
Bentonite Pellets	117	129	Coated time release pellets
FineTransition Sand	129	134.2	No. 60 Sand
CoarseTransition Sand	134.2	139.1	8x12 Sand
Filter Pack	139.1	273	3/8" x 3/16" Pea Gravel
Natural Fill	273	280	Basin Fill Formation

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	11-Feb-15	11:30	23-Feb-15	13:30
Casing	24-Feb-15	8:39	24-Feb-15	9:23
Filter Pack	24-Feb-15	10:03	25-Feb-15	7:30
Bentonite Pellets	25-Feb-15	7:56	25-Feb-15	9:27
Bentonite Grout	25-Feb-15	9:33	25-Feb-15	13:24
Cement	25-Feb-15	13:30	25-Feb-15	13:43

WELL DEVELOPMENT

SWL Date & Time:	16-Mar-15 13:30		
Bailing Date & Time Started:	16-Mar-15 13:30	Static water level in feet bls:	147.80
Number of bails:	40	Gallons Bailed:	120
Airlift Date & Time Started:	16-Mar-15 16:48	Static water level in feet bls:	147.22
Duration in minutes:	675	Gallons Airlifted:	6,542
Pump Date & Time Started:	--	Static water level in feet bls:	--
Duration in minutes:	--	Gallons Pumped:	--
Date & Time Completed:	18-Mar-15 11:14	Total Gallons Purged:	6,662

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

CLEAR CREEK ASSOCIATES

Well Construction and Development Summary

Project Name:	**Bisbee Mitigation Order**			Boring No.:	**BMO-2015-2BL**
Drilling Co.:	Cascade Drilling			Project No.:	287051
ADWR Well No.:	**55-917828**	Driller:	C. Rockhill	Geologist:	VNH + RDT
UTM Location:	*3468983.910 N 600252.069 E*	Surface Elevation:	4579.834	NAD83	

DRILLING SUMMARY

Total Drilled Depth:	272 ft bls	Hole Diameter:	10.75" 0-100'; 9.5" 100-to 272'
Drill Rig:	GP24-300RS	Drill bit/Type:	Rotosonic

WELL CONSTRUCTION DATA

Type of Material	Depth Interval (ft bls)		Description
	From	To	
Surface Casing	0	24.17	5" Low Carbon Steel
Casing	24.17	212.08	5" PVC
Well Screen	212.08	272	5" PVC. 0.125" Horizontal Slots
End Cap	272	272	5" Stainless Steel
Centralizer Locations	*10*	*250*	*6 @ 50' ft intervals along casing*
Cement Grout	0	22	Type II Portland Cement
Bentonite Grout	22	189	High-solids bentonite grout
Bentonite Pellets	189	203.2	Coated time release pellets
FineTransition Sand	203.2	204	No. 60 Sand
CoarseTransition Sand	204	207	8x12 Sand
Filter Pack	207	272	3/8" x 3/16" Pea Gravel

CONSTRUCTION TIME LOG

TASK	Start		Finish	
	Date	Time	Date	Time
Drilling	25-Feb-15	16:23	5-Mar-15	15:08
Casing	5-Mar-15	16:40	5-Mar-15	17:26
Filter Pack	5-Mar-15	17:30	6-Mar-15	9:07
Bentonite Pellets	6-Mar-15	9:09	6-Mar-15	9:44
Bentonite Grout	6-Mar-15	9:52	6-Mar-15	16:51
Cement	6-Mar-15	16:53	6-Mar-15	17:35

WELL DEVELOPMENT

SWL Date & Time:	24-Mar-15 12:52		
Bailing Date & Time Started:	24-Mar-15 13:02	Static water level in feet bls:	146.17
Number of bails:	26	Gallons Bailed:	78
Airlift Date & Time Started:	24-Mar-15 15:38	Static water level in feet bls:	147.47
Duration in minutes:	250	Gallons Airlifted:	2,185
Pump Date & Time Started:	--	Static water level in feet bls:	--
Duration in minutes:	--	Gallons Pumped:	--
Date & Time Completed:	25-Mar-15 9:48	Total Gallons Purged:	2,263

Remarks: Discharge rate during airlifting was estimated, total gallons purged is based on gpm estimation.

APPENDIX C
ANALYTICAL LABORATORY REPORTS

APPENDIX C.1
ANALYTICAL LABORATORY REPORTS
FOR RECONNAISSANCE DEPTH-SPECIFIC WATER SAMPLING

October 07, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14J0270
Order Name: Exp. GW Monitoring 287051

RE: Drill Depths

Dear Ben Daigneau,

Turner Laboratories, Inc. received 3 sample(s) on 10/06/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0270
Date Received: 10/06/2014

Order: Exp. GW Monitoring 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14J0270-01	IBL-141	Ground Water	10/02/2014 0038
14J0270-02	IBL-248 Open	Ground Water	10/03/2014 2026
14J0270-03	IBL-235 Open	Ground Water	10/03/2014 1705

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0270
Date Received: 10/06/2014

Case Narrative

M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-141
Project:	Drill Depths	**Collection Date/Time:**	10/02/2014 0038
Work Order:	14J0270	**Matrix:**	Ground Water
Lab Sample ID:	14J0270-01	**Order Name:**	Exp. GW Monitoring 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	64	50		mg/L	10	10/06/2014 1400	10/06/2014 1706	EW

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-248 Open
Project:	Drill Depths	**Collection Date/Time:**	10/03/2014 2026
Work Order:	14J0270	**Matrix:**	Ground Water
Lab Sample ID:	14J0270-02	**Order Name:**	Exp. GW Monitoring 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	120	50		mg/L	10	10/06/2014 1400	10/06/2014 1725	EW

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-235 Open
Project:	Drill Depths	**Collection Date/Time:**	10/03/2014 1705
Work Order:	14J0270	**Matrix:**	Ground Water
Lab Sample ID:	14J0270-03	**Order Name:**	Exp. GW Monitoring 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	150	50		mg/L	10	10/06/2014 1400	10/06/2014 1743	EW

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0270
Date Received: 10/06/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1410057 - E300										
Blank (1410057-BLK1)				Prepared: 10/03/2014 Analyzed: 10/06/2014						
Sulfate	ND	5.0	mg/L							
LCS (1410057-BS1)				Prepared: 10/03/2014 Analyzed: 10/06/2014						
Sulfate	12	5.0	mg/L	12.50		98	90-110			
LCS Dup (1410057-BSD1)				Prepared: 10/03/2014 Analyzed: 10/06/2014						
Sulfate	13	5.0	mg/L	12.50		103	90-110	5	10	
Matrix Spike (1410057-MS1)		**Source: 14J0229-01**		Prepared: 10/03/2014 Analyzed: 10/06/2014						
Sulfate	82	5.0	mg/L	12.50	70	98	80-120			M3
Matrix Spike Dup (1410057-MSD1)		**Source: 14J0229-01**		Prepared: 10/03/2014 Analyzed: 10/06/2014						
Sulfate	81	5.0	mg/L	12.50	70	93	80-120	0.8	10	M3

TURNER LABORATORIES INC.
2445 N. Coyote Drive, Suite 104
Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14J0270 DATE 10/6/14 PAGE 1 OF 1

PROJECT NAME Exp. GW Monitoring # 2870851
CONTACT NAME Ben Daigneau
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Ste 101 Tucson, AZ
ZIP 857701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE Melanie Lindsey

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270	Acids	Volatile Organics 624	524.2	8260	THMS	HAA5	Chloride	Sulfate	Resistivity	NO3	NO2	TKN	TPH	1664	Oil & Grease	VOA	TCLP Analysis	Semi-VOA	Pest.	TCLP	Metals	Dissolved	Total	RCRA8	Total	Amen.	Cyanide	WAD	SDWA-INORGANICS PRIMARY	SECONDARY	MPN	Coliform	PTA	pH	Fecal	Cl2	Cl-	Turb	COD	TSS	BOD	Alkalinity	TDS	pH, Conductivity, TDS
IBL-141	10/2/14	0:38		GW	1								X	X		X											X																		X	X		
IBL-248 OPEN	10/3/14	20:20		GW	1								X	X		X											X																		X	X		
IBL-235 OPEN	10/3/14	17:05		GW	1								X	X		X											X																		X	X		

1. RELINQUISHED BY:
Signature: Melanie Lindsey
Printed Name: Melanie Lindsey
Firm: Clear Creek Assoc.
Date/Time: 10/4/14 08:17

2. RECEIVED BY:
Signature: Kristi Sagar
Printed Name: Kristi Sagar
Firm: ClearCreek ASSOC.
Date/Time: 10/4/14 08:17

3. RELINQUISHED BY:
Signature: Kristi Sagar
Printed Name: Kristi Sagar
Firm: Clear Creek
Date/Time: 10/6/14 11:10

4. RECEIVED BY:
Signature: Alissa Silva
Printed Name: Alissa Silva
Firm: TURNER LABORATORIES, INC.
Date/Time: 10/6/14 11:10A

TURNAROUND REQUIREMENTS:
X Standard (approx. 10 days)*
SOs only Next Day ____ 2 Day ____ 5 Day*
X Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____ Y ____ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 0.3
Wet Ice
Ambient
Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: Yes No
ADEQ Forms: Yes No
Mail ADEQ Forms: Yes No
Custody Seals
Container Intact
COC / Labels Agree
Preservation Confirmation
Appropriate Head Space
Received Within Hold Time

SPECIAL INSTRUCTIONS/COMMENTS:
2 SOs requires 24-hr turnaround time

October 22, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14J0469
Order Name: Expanded GW Monitoring

RE: Drill Depths

Dear Ben Daigneau,

Turner Laboratories, Inc. received 6 sample(s) on 10/10/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Terri L. Garcia

Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0469
Date Received: 10/10/2014

Order: Expanded GW Monitoring

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14J0469-01	IBL-280-Open Unfiltered	Ground Water	10/06/2014 1240
14J0469-02	IBL-300-Open	Ground Water	10/07/2014 0059
14J0469-03	IBL-320-Open	Ground Water	10/07/2014 1303
14J0469-04	IBL-360-Open	Ground Water	10/08/2014 1241
14J0469-05	IBL-398-Open	Ground Water	10/09/2014 1230
14J0469-06	IBL-280-Open Filtered	Ground Water	10/06/2014 1240

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0469
Date Received: 10/10/2014

Case Narrative

Results are above instrument calibration and require further dilution. Data should be considered estimated. Final report to follow with results within calibration.

M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-280-Open Unfiltered
Project:	Drill Depths	**Collection Date/Time:**	10/06/2014 1240
Work Order:	14J0469	**Matrix:**	Ground Water
Lab Sample ID:	14J0469-01	**Order Name:**	Expanded GW Monitoring

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	120	50		mg/L	10	10/10/2014 0800	10/13/2014 1540	AC

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-300-Open
Project:	Drill Depths	**Collection Date/Time:**	10/07/2014 0059
Work Order:	14J0469	**Matrix:**	Ground Water
Lab Sample ID:	14J0469-02	**Order Name:**	Expanded GW Monitoring

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	130	50		mg/L	10	10/10/2014 0800	10/13/2014 1558	AC

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-320-Open
Project:	Drill Depths	**Collection Date/Time:**	10/07/2014 1303
Work Order:	14J0469	**Matrix:**	Ground Water
Lab Sample ID:	14J0469-03	**Order Name:**	Expanded GW Monitoring

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	140	50		mg/L	10	10/10/2014 0800	10/13/2014 1617	AC

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-360-Open
Project:	Drill Depths	**Collection Date/Time:**	10/08/2014 1241
Work Order:	14J0469	**Matrix:**	Ground Water
Lab Sample ID:	14J0469-04	**Order Name:**	Expanded GW Monitoring

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	110	50		mg/L	10	10/10/2014 0800	10/13/2014 1635	AC

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-398-Open
Project:	Drill Depths	**Collection Date/Time:**	10/09/2014 1230
Work Order:	14J0469	**Matrix:**	Ground Water
Lab Sample ID:	14J0469-05	**Order Name:**	Expanded GW Monitoring

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	140	50		mg/L	10	10/10/2014 0800	10/13/2014 1654	AC

Client:	Clear Creek Associates	**Client Sample ID:**	IBL-280-Open Filtered
Project:	Drill Depths	**Collection Date/Time:**	10/06/2014 1240
Work Order:	14J0469	**Matrix:**	Ground Water
Lab Sample ID:	14J0469-06	**Order Name:**	Expanded GW Monitoring

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	140	50		mg/L	10	10/10/2014 0800	10/13/2014 1712	AC

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0469
Date Received: 10/10/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1410131 - E300										
Blank (1410131-BLK1)				Prepared & Analyzed: 10/10/2014						
Sulfate	ND	5.0	mg/L							
LCS (1410131-BS1)				Prepared & Analyzed: 10/10/2014						
Sulfate	13	5.0	mg/L	12.50		100	90-110			
LCS Dup (1410131-BSD1)				Prepared & Analyzed: 10/10/2014						
Sulfate	13	5.0	mg/L	12.50		101	90-110	0.5	10	
Matrix Spike (1410131-MS3)		**Source: 14J0477-01RE1**		Prepared & Analyzed: 10/11/2014						
Sulfate	82		mg/L	12.50	71	94	80-120			M3
Matrix Spike Dup (1410131-MSD3)		**Source: 14J0477-01RE1**		Prepared & Analyzed: 10/11/2014						
Sulfate	82		mg/L	12.50	71	87	80-120	1	10	M3
Batch 1410151 - E300										
Blank (1410151-BLK1)				Prepared & Analyzed: 10/13/2014						
Sulfate	ND	5.0	mg/L							
LCS (1410151-BS1)				Prepared & Analyzed: 10/13/2014						
Sulfate	12	5.0	mg/L	12.50		95	90-110			
LCS Dup (1410151-BSD1)				Prepared & Analyzed: 10/13/2014						
Sulfate	12	5.0	mg/L	12.50		95	90-110	0.3	10	
Matrix Spike (1410151-MS1)		**Source: 14J0501-01**		Prepared & Analyzed: 10/13/2014						
Sulfate	15	5.0	mg/L	12.50	3.9	92	80-120			
Matrix Spike (1410151-MS2)		**Source: 14J0498-01**		Prepared: 10/13/2014 Analyzed: 10/14/2014						
Sulfate	15	5.0	mg/L	12.50	3.8	93	80-120			
Matrix Spike Dup (1410151-MSD1)		**Source: 14J0501-01**		Prepared & Analyzed: 10/13/2014						
Sulfate	15	5.0	mg/L	12.50	3.9	91	80-120	0.4	10	
Matrix Spike Dup (1410151-MSD2)		**Source: 14J0498-01**		Prepared: 10/13/2014 Analyzed: 10/14/2014						
Sulfate	16	5.0	mg/L	12.50	3.8	94	80-120	1	10	

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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 1450469 DATE 10/10/14 PAGE 1 OF 1

PROJECT NAME Expanded GW Monitoring # _____
CONTACT NAME Dan Dabrieau + Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N Court Ave #101 Tucson AZ
ZIP 85701 PHONE 520 622 3222 EMAIL vhermosilla@clearcreekassociates.com
SAMPLER'S SIGNATURE [signature]

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270	Acids	Volatile Organics 624	524.2	8260	THMS	HAA5	Chloride	Sulfate	Resistivity	NO_2	NO_3	TKN	TPH	1664	Oil & Grease	VOA	TCLP Analysis	Semi-VOA	Pest.	TCLP	Metals	Dissolved	Total	RCRA8	Total	Cyanide	Amen.	WAD	SDWA-INORGANICS	PRIMARY	SECONDARY	MPN	Coliform	PIA	Fecal	pH	Cl_2	Cl_2	Turb	COD	TSS	BOD	Rush - 24hr
IBL-280-open unfiltered	10/6/14	12:40		GW	2	Lab 10/10/14							X	X																																	X	
IBL-300-open	10/7/14	00:59		GW	1								X																																		X	
IBL-320-open	10/7/14	13:03		GW	1								X																																		X	
IBL-360-open	10/8/14	12:41		GW	1								X																																		X	
IBL-398-open	10/6/14	12:30		GW	1								X																																		X	
IBL-280-open filtered	10/6/14	12:40		GW									X																																		X	

1. RELINQUISHED BY:
Signature [signature]
Printed Name Victoria Hermosilla
Firm Clear Creek Associates
Date/Time 10/10/14 0630

2. RECEIVED BY:
Signature [signature]
Printed Name Kristi Sagar
Firm ClearCreek Associates
Date/Time 10/10/14 0630

3. RELINQUISHED BY:
Signature [signature]
Printed Name KRISTI SAGAR
Firm CLEAR CREEK ASSOC
Date/Time 10/10/14 10:47

4. RECEIVED BY:
Signature [signature]
Printed Name [illegible]
Firm TURNER LABORATORIES, INC.
Date/Time 10/10/14 1047

TURNAROUND REQUIREMENTS:
____ Standard (approx. 10 days)*
X Next Day ____ 2 Day ____ 5 Day*
____ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____ Y ____ N
P.O. # _____
Bill to: _____

SAMPLE RECEIPT:
Total Containers 6
Temperature 7.1
☒ Wet Ice
☐ Ambient
☐ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☒
COC / Labels Agree ☒

Preservation Confirmation ☐
Appropriate Head Space ☒
Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:
Dissolved Sulfate only

October 27, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14J0759
Order Name: Drill Depths

RE: Drill Depths

Dear Ben Daigneau,

Turner Laboratories, Inc. received 6 sample(s) on 10/24/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Terri L. Garcia

Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Date Received: 10/24/2014

Order: Drill Depths

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14J0759-01	2BL-142- Open	Ground Water	10/20/2014 1208
14J0759-02	2BL-180- Open	Ground Water	10/20/2014 2053
14J0759-03	2BL-220- Open	Ground Water	10/21/2014 2043
14J0759-04	2BL-260	Ground Water	10/22/2014 1841
14J0759-05	2BL-300	Ground Water	10/23/2014 1851
14J0759-06	2BL-320	Ground Water	10/24/2014 1122

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Date Received: 10/24/2014

Case Narrative

E4	Concentration estimated. Analyte was detected below laboratory Minimum Reporting Limit (MRL) but above MDL.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Lab Sample ID: 14J0759-01

Client Sample ID: 2BL-142- Open
Collection Date/Time: 10/20/2014 1208
Matrix: Ground Water
Order Name: Drill Depths

Analyses	Result	MDL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300									
Sulfate	47	2.4	50	E4	mg/L	10	10/25/2014 1600	10/26/2014 0503	AC

Turner Laboratories, Inc.

Date: 10/27/2014

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Lab Sample ID: 14J0759-02

Client Sample ID: 2BL-180- Open
Collection Date/Time: 10/20/2014 2053
Matrix: Ground Water
Order Name: Drill Depths

Analyses	Result	MDL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300									
Sulfate	70		50		mg/L	10	10/25/2014 1600	10/26/2014 0522	AC

Turner Laboratories, Inc.

Date: 10/27/2014

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Lab Sample ID: 14J0759-03

Client Sample ID: 2BL-220- Open
Collection Date/Time: 10/21/2014 2043
Matrix: Ground Water
Order Name: Drill Depths

Analyses	Result	MDL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300									
Sulfate	46	2.4	50	E4	mg/L	10	10/25/2014 1600	10/26/2014 0540	AC

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Lab Sample ID: 14J0759-04

Client Sample ID: 2BL-260
Collection Date/Time: 10/22/2014 1841
Matrix: Ground Water
Order Name: Drill Depths

Analyses	Result	MDL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300									
Sulfate	87		50		mg/L	10	10/25/2014 1600	10/26/2014 0559	AC

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Lab Sample ID: 14J0759-05

Client Sample ID: 2BL-300
Collection Date/Time: 10/23/2014 1851
Matrix: Ground Water
Order Name: Drill Depths

Analyses	Result	MDL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300									
Sulfate	210		130		mg/L	25	10/25/2014 1600	10/26/2014 0617	AC

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Lab Sample ID: 14J0759-06

Client Sample ID: 2BL-320
Collection Date/Time: 10/24/2014 1122
Matrix: Ground Water
Order Name: Drill Depths

Analyses	Result	MDL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300									
Sulfate	210		130		mg/L	25	10/25/2014 1600	10/26/2014 0636	AC

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0759
Date Received: 10/24/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1410318 - IC PREP										
Blank (1410318-BLK1)				Prepared & Analyzed: 10/25/2014						
Sulfate	ND	5.0	mg/L							
LCS (1410318-BS1)				Prepared & Analyzed: 10/25/2014						
Sulfate	12	5.0	mg/L	12.50		99	90-110			
LCS Dup (1410318-BSD1)				Prepared & Analyzed: 10/25/2014						
Sulfate	12	5.0	mg/L	12.50		99	90-110	0.09	10	

TURNER LABORATORIES INC.
2445 N. Coyote Drive, Suite 104
Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14J0759 DATE 10/24/14 PAGE 1 OF 1

PROJECT NAME Expanded GW Monitoring #
CONTACT NAME Ben Daigneau + Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. #101 Tucson AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270	Acids	Volatile Organics 624	524.2	8260	TTHMS	HAA5	Chloride	Sulfate X 300.0	Resistivity	NO_2	NO_3	TKN	TPH	1664	Oil & Grease	VOA	TCLP Analysis Semi-VOA	Pest.	TCLP	Metals Total	Dissolved	RCRA8	Total	Cyanide Amen.	WAD	SDWA-INORGANICS PRIMARY	SECONDARY	MPN	Coliform PA	pH	Fecal	Cl_2	Cr_6	Turb	TSS	BOD	COD
2BL-142-open	10/20/14	12:08		GW									X																													
2BL-180-open	10/20/14	20:53		GW									X																													
2BL-220-open	10/21/14	20:43		GW									X																													
2BL-260	10/22/14	18:41		GW									X																													
2BL-300	10/23/14	18:51		GW									X																													
2BL-320	10/24/14	11:22		GW									X																													

1. RELINQUISHED BY:
Signature
Victoria Hermosilla
Printed Name
Clear Creek Associates
Firm
10/24/14, 16:20
Date/Time

2. RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

TURNAROUND REQUIREMENTS:
___ Standard (approx. 10 days)*
X Next Day ___ 2 Day ___ 5 Day*
___ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 6
Temperature 6.8
☑ Wet Ice
☐ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
10/24/14 1620
Date/Time

* LEGEND
SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☑
COC / Labels Agree ☑

Preservation Confirmation ☑
Appropriate Head Space ☑
Received Within Hold Time ☑

SPECIAL INSTRUCTIONS/COMMENTS:

October 28, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14J0761
Order Name: Drill Depths

RE: Drill Depths

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 10/27/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0761
Date Received: 10/27/2014

Order: Drill Depths

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14J0761-01	2BL-342	Ground Water	10/23/2014 1942

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0761
Date Received: 10/27/2014

Case Narrative

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Turner Laboratories, Inc.

Date: 10/28/2014

Client:	Clear Creek Associates	**Client Sample ID:**	2BL-342
Project:	Drill Depths	**Collection Date/Time:**	10/23/2014 1942
Work Order:	14J0761	**Matrix:**	Ground Water
Lab Sample ID:	14J0761-01	**Order Name:**	Drill Depths

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	190	130		mg/L	25	10/26/2014 1700	10/28/2014 1041	AC

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0761
Date Received: 10/27/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1410319 - E300										
Blank (1410319-BLK1)				Prepared & Analyzed: 10/26/2014						
Sulfate	ND	5.0	mg/L							
LCS (1410319-BS1)				Prepared & Analyzed: 10/26/2014						
Sulfate	12	5.0	mg/L	12.50		97	90-110			
LCS Dup (1410319-BSD1)				Prepared & Analyzed: 10/26/2014						
Sulfate	12	5.0	mg/L	12.50		99	90-110	3	10	
Matrix Spike (1410319-MS1)	**Source: 14I0761-01**			Prepared: 10/26/2014 Analyzed: 10/27/2014						
Sulfate	39		mg/L	12.50	27	93	80-120			
Matrix Spike Dup (1410319-MSD1)	**Source: 14I0761-01**			Prepared: 10/26/2014 Analyzed: 10/27/2014						
Sulfate	38		mg/L	12.50	27	83	80-120	3	10	

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Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 1450761 DATE 10/27/14 PAGE 1 OF 1

PROJECT NAME ExpGW Monitoring # 287051
CONTACT NAME Ben Daigneau
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave Tucson AZ
ZIP 85701 PHONE 622 3227 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE Melanie Lindsey

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX: SO4 300.0
23L-342	10/24/14	19:42		GW	1	X

1. RELINQUISHED BY: Melanie Lindsey — Clear Creek — 10/27/14 08:45
2. RECEIVED BY: Kristi Sagar — Clear Creek — 10/27/14 08:45
3. RELINQUISHED BY: Kristi Sagar — Clear Creek — 10/27/14 9:18 AM
4. RECEIVED BY: TURNER LABORATORIES, INC. — 10/27/14 0918

TURNAROUND REQUIREMENTS:
- ___ Standard (approx. 10 days)*
- X Next Day ___ 2 Day ___ 5 Day*
- X Email Preliminary Results

* Working Days

REPORT REQUIREMENTS:
- ___ I. Routine Report
- ___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
- ___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___Y ___N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 1
Temperature 12.1
- X Wet Ice
- ☐ Ambient
- ☐ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No	Custody Seals ☐	Preservation Confirmation ☐ NR
ADEQ Forms: ☐ Yes ☐ No	Container Intact ☑	Appropriate Head Space ☐
Mail ADEQ Forms: ☐ Yes ☐ No	COC / Labels Agree ☑	Received Within Hold Time ☑

SPECIAL INSTRUCTIONS/COMMENTS:

October 31, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14J0834
Order Name: Drill Depths

RE: Drill Depths

Dear Ben Daigneau,

Turner Laboratories, Inc. received 3 sample(s) on 10/30/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

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Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0834
Date Received: 10/30/2014

Order: Drill Depths

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14J0834-01	2BL-360-Open	Ground Water	10/27/2014 2014
14J0834-02	2BL-362	Ground Water	10/27/2014 1848
14J0834-03	2BL-402	Ground Water	10/28/2014 1856

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0834
Date Received: 10/30/2014

Case Narrative

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client:	Clear Creek Associates	**Client Sample ID:**	2BL-360-Open
Project:	Drill Depths	**Collection Date/Time:**	10/27/2014 2014
Work Order:	14J0834	**Matrix:**	Ground Water
Lab Sample ID:	14J0834-01	**Order Name:**	Drill Depths

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	140	50		mg/L	10	10/30/2014 0800	10/30/2014 2142	AC

Client:	Clear Creek Associates	**Client Sample ID:**	2BL-362
Project:	Drill Depths	**Collection Date/Time:**	10/27/2014 1848
Work Order:	14J0834	**Matrix:**	Ground Water
Lab Sample ID:	14J0834-02	**Order Name:**	Drill Depths

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	140	50		mg/L	10	10/30/2014 0800	10/30/2014 2200	AC

Client:	Clear Creek Associates	**Client Sample ID:**	2BL-402
Project:	Drill Depths	**Collection Date/Time:**	10/28/2014 1856
Work Order:	14J0834	**Matrix:**	Ground Water
Lab Sample ID:	14J0834-03	**Order Name:**	Drill Depths

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	120	50		mg/L	10	10/30/2014 0800	10/30/2014 2219	AC

Client: Clear Creek Associates
Project: Drill Depths
Work Order: 14J0834
Date Received: 10/30/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1410366 - E300										
Blank (1410366-BLK1)				Prepared & Analyzed: 10/30/2014						
Sulfate	ND	5.0	mg/L							
LCS (1410366-BS1)				Prepared & Analyzed: 10/30/2014						
Sulfate	13	5.0	mg/L	12.50		101	90-110			
LCS Dup (1410366-BSD1)				Prepared & Analyzed: 10/30/2014						
Sulfate	13	5.0	mg/L	12.50		101	90-110	0.3	10	
Matrix Spike (1410366-MS1)	**Source: 14J0834-03**			Prepared & Analyzed: 10/30/2014						
Sulfate	20		mg/L	12.50	8.2	93	80-120			
Matrix Spike Dup (1410366-MSD1)	**Source: 14J0834-03**			Prepared & Analyzed: 10/30/2014						
Sulfate	20		mg/L	12.50	8.2	93	80-120	0.3	10	

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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14J0834 DATE 10/30/14 PAGE 1 OF 1

PROJECT NAME Exp GW Monitoring #
CONTACT NAME Ben Daigneau + Victoria Hermosilla
COMPANY NAME Clear Creek Assoc.
ADDRESS 221 N. Court Ave #101 Tucson AZ
ZIP 85705 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX
2BL-360-open	10/27/14	2014		GW	1	Chloride, Sulfate 300.0
2BL-362	10/27/14	1848		GW	1	Chloride
2BL-402	10/28/14	1856		GW	1	Chloride

Analysis columns: Base Neutrals 625/8270; Acids; Volatile Organics 624; 524.2; 8260 HAA5; TTHMS; Chloride; Sulfate 300.0; Resistivity; NO_2; NO_3; TKN; 1664 TPH; Oil & Grease; TCLP Analysis VOA; Semi-VOA; Pest.; Metals TCLP; Total; Dissolved; RCRA8; Cyanide Total; Amen.; WAD; SDWA-INORGANICS PRIMARY; SECONDARY; Coliform MPN; PIA; Fecal; pH; Cl_2; Cl_2; Turb; COD; TSS; BOD

1. RELINQUISHED BY:
Signature
Victoria Hermosilla
Printed Name
Clear Creek Assoc.
Firm
10/29/14 1500
Date/Time

2. RECEIVED BY:
Signature
Printed Name
Fedex
Firm
Date/Time

TURNAROUND REQUIREMENTS:
___ Standard (approx. 10 days)*
X Next Day ___ 2 Day ___ 5 Day*
___ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 3.7
☒ Wet Ice
☐ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature
Printed Name
Fedex
Firm
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
10/30/14 0945
Date/Time

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☑
COC / Labels Agree ☑

Preservation Confirmation ☑
Appropriate Head Space ☒
Received Within Hold Time ☑

SPECIAL INSTRUCTIONS/COMMENTS:

December 01, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14K0488
Order Name: New Project 9-29-14

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 5 sample(s) on 11/14/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0488
Date Received: 11/14/2014

Order: New Project 9-29-14

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14K0488-01	3BL-151	Ground Water	11/11/2014 1559
14K0488-02	3BL-191	Ground Water	11/12/2014 0900
14K0488-03	3BL-231	Ground Water	11/12/2014 1330
14K0488-04	3BL-271	Ground Water	11/12/2014 2145
14K0488-05	3BL-311	Ground Water	11/13/2014 1414

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0488
Date Received: 11/14/2014

Case Narrative

M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-151
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/11/2014 1559
Work Order:	14K0488	**Matrix:**	Ground Water
Lab Sample ID:	14K0488-01	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	7.9	5.0		mg/L	1	11/14/2014 2200	11/14/2014 2300	AC

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-191
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/12/2014 0900
Work Order:	14K0488	**Matrix:**	Ground Water
Lab Sample ID:	14K0488-02	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	12	5.0		mg/L	1	11/14/2014 2200	11/14/2014 2300	AC

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-231
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/12/2014 1330
Work Order:	14K0488	**Matrix:**	Ground Water
Lab Sample ID:	14K0488-03	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	9.9	5.0		mg/L	1	11/14/2014 2200	11/14/2014 2300	AC

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-271
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/12/2014 2145
Work Order:	14K0488	**Matrix:**	Ground Water
Lab Sample ID:	14K0488-04	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	18	5.0		mg/L	1	11/14/2014 2200	11/14/2014 2300	AC

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-311
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/13/2014 1414
Work Order:	14K0488	**Matrix:**	Ground Water
Lab Sample ID:	14K0488-05	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	10	5.0		mg/L	1	11/14/2014 2200	11/14/2014 2300	AC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0488
Date Received: 11/14/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411129 - E300										
Blank (1411129-BLK1)				Prepared & Analyzed: 11/14/2014						
Sulfate	ND	5.0	mg/L							
LCS (1411129-BS1)				Prepared & Analyzed: 11/14/2014						
Sulfate	13	5.0	mg/L	12.50		101	90-110			
LCS Dup (1411129-BSD1)				Prepared & Analyzed: 11/14/2014						
Sulfate	13	5.0	mg/L	12.50		101	90-110	0.6	10	
Matrix Spike (1411129-MS1)		**Source: 14K0419-03**		Prepared & Analyzed: 11/14/2014						
Sulfate	110	5.0	mg/L	12.50	100	76	80-120			M3
Matrix Spike (1411129-MS4)		**Source: 14K0487-01RE1**		Prepared & Analyzed: 11/17/2014						
Sulfate	20		mg/L	12.50	8.4	96	80-120			
Matrix Spike Dup (1411129-MSD1)		**Source: 14K0419-03**		Prepared & Analyzed: 11/14/2014						
Sulfate	110	5.0	mg/L	12.50	100	77	80-120	0.1	10	M3
Matrix Spike Dup (1411129-MSD4)		**Source: 14K0487-01RE1**		Prepared & Analyzed: 11/17/2014						
Sulfate	20		mg/L	12.50	8.4	95	80-120	0.7	10	

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Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14K0488 DATE 11/13/14 PAGE 1 OF 1

PROJECT NAME Bisbee Mountain Wells # _____
CONTACT NAME Ben Daigneau
COMPANY NAME Clear Creek Associates
ADDRESS 221 N Court Ave Ste 101
ZIP 85701 PHONE 520 622 3122 EMAIL bdaigneau@clear-creekassociates.com
SAMPLER'S SIGNATURE [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Chloride	Sulfate	Resistivity	NO_3	NO_2	TKN	TPH	1664	Oil & Grease	TCLP Analysis	Semi-VOA	VOA	Pest.	Metals	TCLP	Dissolved	Total	RCRA8	Cyanide	Total	Amen.	WAD	SDWA-INORGANICS	PRIMARY	SECONDARY	Coliform	MPN	PIA	Fecal	pH	Cl_2	Cr_6	Turb	COD	TSS	BOD
3BL-151	11/11/14	15:59		GW	1	X																																	
3BL-191	11/12/14	09:00		GW	1	X																																	
3BL-231	11/12/14	13:30		GW	1	X																																	
3BL-271	11/12/14	21:45		GW	1	X																																	
3BL-311	11/13/14	14:14		GW	1	X																																	

1. RELINQUISHED BY:
Signature [signature]
Melanie Lindsey
Printed Name
Clear Creek
Firm
11/13/14 15:33
Date/Time

2. RECEIVED BY:
Signature [signature]
Ben Daigneau
Printed Name
Clear Creek
Firm
11/13/14 15:33
Date/Time

3. RELINQUISHED BY:
Signature [signature]
Clear Creek
Printed Name
Ben Daigneau
Firm
11/14/14 08:11
Date/Time

4. RECEIVED BY:
Signature [signature]
Printed Name
TURNER LABORATORIES, INC.
Firm
11/14/14 8:11
Date/Time

TURNAROUND REQUIREMENTS:
___ Standard (approx. 10 days)*
X Next Day ___ 2 Day ___ 5 Day*
X Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
X I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. # _____
Bill to: Clear Creek

SAMPLE RECEIPT:
Total Containers 5
Temperature 2.5
X Wet Ice
☐ Ambient
☐ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☑
COC / Labels Agree ☑

Preservation Confirmation ☑
Appropriate Head Space ☑
Received Within Hold Time ☑

SPECIAL INSTRUCTIONS/COMMENTS:

November 19, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14K0517
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 2 sample(s) on 11/18/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

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Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0517
Date Received: 11/18/2014

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14K0517-01	3BL-351	Ground Water	11/14/2014 0815
14K0517-02	3BL-391	Ground Water	11/14/2014 1717

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0517
Date Received: 11/18/2014

Case Narrative

M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-351
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/14/2014 0815
Work Order:	14K0517	**Matrix:**	Ground Water
Lab Sample ID:	14K0517-01	**Order Name:**	287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	13	5.0		mg/L	1	11/18/2014 1100	11/18/2014 1341	AC

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-391
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/14/2014 1717
Work Order:	14K0517	**Matrix:**	Ground Water
Lab Sample ID:	14K0517-02	**Order Name:**	287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	16	5.0		mg/L	1	11/18/2014 1100	11/18/2014 1359	AC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0517
Date Received: 11/18/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411173 - E300										
Blank (1411173-BLK1)				Prepared & Analyzed: 11/18/2014						
Sulfate	ND	5.0	mg/L							
LCS (1411173-BS1)				Prepared & Analyzed: 11/18/2014						
Sulfate	13	5.0	mg/L	12.50		101	90-110			
LCS Dup (1411173-BSD1)				Prepared & Analyzed: 11/18/2014						
Sulfate	13	5.0	mg/L	12.50		102	90-110	0.5	10	
Matrix Spike (1411173-MS1)		**Source: 14K0530-04**		Prepared & Analyzed: 11/18/2014						
Sulfate	400	5.0	mg/L	12.50	410	NR	80-120			M3
Matrix Spike Dup (1411173-MSD1)		**Source: 14K0530-04**		Prepared & Analyzed: 11/18/2014						
Sulfate	400	5.0	mg/L	12.50	410	NR	80-120	0.03	10	M3

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Fax: (520) 882-9788
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14K0517 DATE 11/18/14 PAGE 1 OF 1

PROJECT NAME Exp GW Monitoring # 287051
CONTACT NAME Ben Daigneau
COMPANY NAME Clear Creek Associates
ADDRESS 221 N Court Ave Ste 101 Tucson, AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Chloride
3BL-351	11/14/14	05:15		GW	1	X
3BL-391	11/14/14	17:17		GW	1	X

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX

Base Neutrals 625/8270 ☐ Acids ☐ Volatile Organics ☐ 624 ☐ 524.2 ☐ 8260 TTHMS ☐ HAA5 ☐ Chloride ☐ Sulfate ☒ Resistivity ☐ NO_2 ☐ NO_3 ☐ TKN ☐ TPH ☐ 1664 Oil & Grease ☐ VOA ☐ TCLP Analysis Semi-VOA ☐ Pest ☐ TCLP ☐ Metals Dissolved ☐ Total ☐ RCRA8 ☐ Total ☐ Cyanide Amen. ☐ WAD ☐ SDWA-INORGANICS PRIMARY ☐ SECONDARY ☐ MPN ☐ Coliform PIA ☐ Fecal ☐ pH ☐ Cl, ☐ Cl, ☐ Turb ☐ COD ☐ TSS ☐ BOD ☐

1. RELINQUISHED BY:
Signature
Melanie Lindsey
Printed Name
Clear Creek
Firm
11/17/14 08:00
Date/Time

2. RECEIVED BY:
Signature
Kristi Sagar
Printed Name
Clear Creek
Firm
11/17/14 08:00
Date/Time

TURNAROUND REQUIREMENTS:
___ Standard (approx. 10 days)*
X Next Day ___ 2 Day ___ 5 Day*
X Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___Y ___N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 2
Temperature 1.6
☒ Wet Ice
☐ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature
Kristi Sagar
Printed Name
Clear Creek
Firm
11/18/14 9:31
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
11/18/14 0931
Date/Time

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☒
COC / Labels Agree ☒

Preservation Confirmation N/A ☐
Appropriate Head Space ☒
Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:

November 25, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14K0642
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 2 sample(s) on 11/24/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Terri L. Garcia

Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0642
Date Received: 11/24/2014

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14K0642-01	3BL-431	Ground Water	11/17/2014 1255
14K0642-02	3BL-471	Ground Water	11/18/2014 1046

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0642
Date Received: 11/24/2014

Case Narrative

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-431
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/17/2014 1255
Work Order:	14K0642	**Matrix:**	Ground Water
Lab Sample ID:	14K0642-01	**Order Name:**	287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	13	5.0		mg/L	1	11/24/2014 0900	11/24/2014 1347	AC

Turner Laboratories, Inc.

Date: 11/25/2014

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-471
Project:	Exp GW Monitoring	**Collection Date/Time:**	11/18/2014 1046
Work Order:	14K0642	**Matrix:**	Ground Water
Lab Sample ID:	14K0642-02	**Order Name:**	287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	12	5.0		mg/L	1	11/24/2014 0900	11/24/2014 1406	AC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0642
Date Received: 11/24/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411233 - E300										
Blank (1411233-BLK1)				Prepared & Analyzed: 11/24/2014						
Sulfate	ND	5.0	mg/L							
LCS (1411233-BS1)				Prepared & Analyzed: 11/24/2014						
Sulfate	13	5.0	mg/L	12.50		103	90-110			
LCS Dup (1411233-BSD1)				Prepared & Analyzed: 11/24/2014						
Sulfate	13	5.0	mg/L	12.50		101	90-110	1	10	
Matrix Spike (1411233-MS1)		**Source: 14K0643-01**		Prepared & Analyzed: 11/24/2014						
Sulfate	21	5.0	mg/L	12.50	9.8	92	80-120			
Matrix Spike Dup (1411233-MSD1)		**Source: 14K0643-01**		Prepared & Analyzed: 11/24/2014						
Sulfate	21	5.0	mg/L	12.50	9.8	90	80-120	0.7	10	

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Tucson, Arizona 85745
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14K0642 DATE 11/24/14 PAGE 1 OF 1

PROJECT NAME Exp GW Monitoring # 287051
CONTACT NAME Ben Daigneau
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Ste 101 Tucson Az 85701 PHONE (622-3222 FAX (622-4040
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX: SO4 300.0
3BL-431	11/17/14	1255		GW		X
3BL-471	11/18/14	1040		GW		X

Base Neutrals 625/8270 ☐ Acids ☐ | Volatile Organics 624/524.2/8260 ☐ | THMS ☐ | HAAS ☐ | Pesticides 8081 ☐ | PCB's 8082 ☐ | NO_2 ☐ | NO_3 ☐ | TKN ☐ | Oil and Grease Grav. 1664A ☐ | TCLP Analysis VOA ☐ | SemiVOA ☐ | Pest. ☐ | Metals TCLP ☐ | Total ☐ | Dissolved ☐ | RCRA8 ☐ | Cyanide Total ☐ | Amen. ☐ | WAD ☐ | SDWA-INORGANICS PRIMARY ☐ | SECONDARY ☐ | Coliform MPN ☐ | Colilert ☐ | pH ☐ | Cl_2 ☐ | Cr_6 ☐ | COD ☐ | TSS ☐ | BOD ☐

1. RELINQUISHED BY:
Signature
Melanie Lindsey
Printed Name
Clear Creek
Firm
11/24/14 0700
Date/Time

2. RECEIVED BY:
Signature
KRISTI SAGAR
Printed Name
Clear Creek
Firm
11/24/14 0700
Date/Time

TURNAROUND REQUIREMENTS:
___ Standard (approx. 10 days)*
X Next Day ___ 2 Day ___ 5 Day*
Y Email Preliminary Results To:
bdaigneau@clearcreekassociates.com
* Working Days

REPORT REQUIREMENTS:
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 2
Temperature 0.3
☒ Wet Ice ☐ Blue Ice

3. RELINQUISHED BY:
Signature
Kristi Sagar
Printed Name
Clear Creek
Firm
11/24/14 0844
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
11/24/14 0844
Date/Time

* LEGEND
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

SPECIAL INSTRUCTIONS/COMMENTS:

Compliance Analysis: ☐ Yes ☐ No		Custody Seals ☐	Preservation Confirmation ☒
ADEQ Forms: ☐ Yes ☐ No		Container Intact ☒	Appropriate Head Space ☒
Mail ADEQ Forms: ☐ Yes ☐ No		COC / Labels Agree ☒	Received Within Hold Time ☒

December 19, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14L0632
Order Name: New Project 9-29-14

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 12/17/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0632
Date Received: 12/17/2014

Order: New Project 9-29-14

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14L0632-01	3BL-541	Ground Water	12/05/2014 1402

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0632
Date Received: 12/17/2014

Case Narrative

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client:	Clear Creek Associates	**Client Sample ID:**	3BL-541
Project:	Exp GW Monitoring	**Collection Date/Time:**	12/05/2014 1402
Work Order:	14L0632	**Matrix:**	Ground Water
Lab Sample ID:	14L0632-01	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	14	5.0		mg/L	1	12/17/2014 1500	12/17/2014 2325	AC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0632
Date Received: 12/17/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1412198 - E300										
Blank (1412198-BLK1)				Prepared & Analyzed: 12/17/2014						
Sulfate	ND	5.0	mg/L							
LCS (1412198-BS1)				Prepared & Analyzed: 12/17/2014						
Sulfate	13	5.0	mg/L	12.50		103	90-110			
LCS Dup (1412198-BSD1)				Prepared & Analyzed: 12/17/2014						
Sulfate	13	5.0	mg/L	12.50		104	90-110	0.1	10	
Matrix Spike (1412198-MS4)		**Source: 14L0632-01**		Prepared: 12/17/2014 Analyzed: 12/18/2014						
Sulfate	24		mg/L	12.50	14	86	80-120			
Matrix Spike Dup (1412198-MSD4)		**Source: 14L0632-01**		Prepared: 12/17/2014 Analyzed: 12/18/2014						
Sulfate	24		mg/L	12.50	14	86	80-120	0.3	10	

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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 146632 DATE 12/17/14 PAGE 1 OF 2

PROJECT NAME Exp. GW Monitoring # 287051
CONTACT NAME Ben Daigneau & Victoria Hermosille
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave Tucson AZ 85701
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270	Acids	Volatile Organics 624	524.2	TTHMS	8260 HAA5	Chloride	Sulfate	Resistivity	NO3	NO2	TKN	TPH	1664 Oil & Grease	VOA	TCLP Analysis Semi-VOA	Pest.	TCLP	Metals Total	Dissolved	RCRA8	Total	Cyanide Amen.	WAD	Total	SDWA-INORGANICS PRIMARY	SECONDARY	Coliform MPN	PIA	Fecal	pH	Cl2	Cl	Turb	COD	TSS	BOD
3BL-541	12/5/14	14:02		GW	1							X																													

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX

1. RELINQUISHED BY:
Signature
Victoria Hermosilla
Printed Name
Clear Creek Associates
Firm
12/16/14, 1200
Date/Time

2. RECEIVED BY:
Signature
Kristi Sagar
Printed Name
Clear Creek Assoc.
Firm
12/16/14 1200
Date/Time

TURNAROUND REQUIREMENTS:
____ Standard (approx. 10 days)*
____ Next Day X 2 Day ____ 5 Day*
X Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____Y ____N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 1
Temperature 1.6
☒ Wet Ice
☐ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature
Kristi Sagar
Printed Name
Clear Creek Assoc.
Firm
12/17/14 1533
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
12/17/14 1537
Date/Time

* LEGEND
SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No		Custody Seals ☐	Preservation Confirmation ☒
ADEQ Forms: ☐ Yes ☐ No		Container Intact ☒	Appropriate Head Space ☒
Mail ADEQ Forms: ☐ Yes ☐ No		COC / Labels Agree ☒	Received Within Hold Time ☐

SPECIAL INSTRUCTIONS/COMMENTS: Received Sample Frozen. Client wanted to Proceed with Analysis

December 30, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14L0701

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 3 sample(s) on 12/23/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0701
Date Received: 12/23/2014

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14L0701-01	4BL-160-open	Ground Water	12/21/2014 1503
14L0701-02	4BL-201	Ground Water	12/22/2014 0839
14L0701-03	4BL-241	Ground Water	12/22/2014 1000

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0701
Date Received: 12/23/2014

Case Narrative

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0701
Lab Sample ID: 14L0701-01

Client Sample ID: 4BL-160-open
Collection Date/Time: 12/21/2014 1503
Matrix: Ground Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	43	25		mg/L	5	12/24/2014 1222	12/24/2014 1409	AC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0701
Lab Sample ID: 14L0701-02

Client Sample ID: 4BL-201
Collection Date/Time: 12/22/2014 0839
Matrix: Ground Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	62	25		mg/L	5	12/24/2014 1222	12/24/2014 1427	AC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0701
Lab Sample ID: 14L0701-03

Client Sample ID: 4BL-241
Collection Date/Time: 12/22/2014 1000
Matrix: Ground Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	140	130		mg/L	25	12/24/2014 1222	12/24/2014 1445	AC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0701
Date Received: 12/23/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1412243 - E300										
Blank (1412243-BLK1)				Prepared & Analyzed: 12/23/2014						
Sulfate	ND	5.0	mg/L							
LCS (1412243-BS1)				Prepared & Analyzed: 12/23/2014						
Sulfate	12	5.0	mg/L	12.50		99	90-110			
LCS Dup (1412243-BSD1)				Prepared & Analyzed: 12/23/2014						
Sulfate	12	5.0	mg/L	12.50		99	90-110	0.08	10	
Matrix Spike (1412243-MS3)		**Source: 14L0701-03RE1**		Prepared & Analyzed: 12/24/2014						
Sulfate	17		mg/L	12.50	5.6	92	80-120			
Matrix Spike Dup (1412243-MSD3)		**Source: 14L0701-03RE1**		Prepared & Analyzed: 12/24/2014						
Sulfate	17		mg/L	12.50	5.6	91	80-120	0.5	10	

TURNER LABORATORIES INC.
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Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14L0701 DATE 12/23/14 PAGE 1 OF 1

PROJECT NAME Exp GW Monitoring # _____
CONTACT NAME Ben Daigneau - Victoria Hermesillo
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave #101 Tucson AZ
ZIP 85701 PHONE 622 3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX: Chloride (Sulfate)
4BL-160-GPM	12/21/14	1503		GW	1	X
4BL-201	12/22/14	0830		GW	1	X
4BL-241	12/22/14	1000		GW	1	X

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX: Base Neutrals 625/8270 ☐ Acids ☐ Volatile Organics ☐ 624 ☐ 524.2 ☐ 8260 ☐ TTHMS ☐ HAA5 ☐ Chloride ☐ (Sulfate) ☒ Resistivity ☐ NO_2 ☐ NO_3 ☐ TKN ☐ TPH ☐ 1664 ☐ Oil & Grease ☐ VOA ☐ TCLP Analysis ☐ Semi-VOA ☐ Pest. ☐ TCLP ☐ Metals ☐ Dissolved ☐ Total ☐ RCRA8 ☐ Total ☐ Cyanide ☐ Amen. ☐ WAD ☐ SDWA-INORGANICS PRIMARY ☐ SECONDARY ☐ Coliform ☐ MPN ☐ FIA ☐ Fecal ☐ pH ☐ Cr^{+6} ☐ Cl ☐ Turb ☐ COD ☐ TSS ☐ BOD ☐

1. RELINQUISHED BY:
Signature [signature]
Melanie Lindsey
Printed Name
Clear Creek Assoc
Firm
12/23/14 15:50
Date/Time

2. RECEIVED BY:
Signature [signature]
Krish Sagar
Printed Name
ClearCreek
Firm
12/23/14 15:50
Date/Time

TURNAROUND REQUIREMENTS:
____ Standard (approx. 10 days)*
X Next Day ____ 2 Day ____ 5 Day*
____ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____ Y ____ N
P.O. # _____
Bill to: _____

SAMPLE RECEIPT:
Total Containers 3
Temperature 4.1
☒ Wet Ice
☐ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature [signature]
Krish Sagar
Printed Name
ClearCreek
Firm
12/23/14 16:05
Date/Time

4. RECEIVED BY:
Signature [signature]
Printed Name
TURNER LABORATORIES, INC.
Firm
12/23/14 1605
Date/Time

* LEGEND
SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☒
COC / Labels Agree ☒

Preservation Confirmation N/A ☐
Appropriate Head Space ☒
Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:

February 27, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15B0750
Order Name: New Project 9-29-14

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 4 sample(s) on 02/26/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0750
Date Received: 02/26/2015

Order: New Project 9-29-14

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15B0750-01	2015-2B-170-open	Ground Water	02/21/2015 0931
15B0750-02	2015-2B-210-open	Ground Water	02/22/2015 0755
15B0750-03	2015-2B-250-open	Ground Water	02/22/2015 1749
15B0750-04	2015-2B-272-open	Ground Water	02/13/2015 1741

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0750
Date Received: 02/26/2015

Case Narrative

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client:	Clear Creek Associates	**Client Sample ID:**	2015-2B-170-open
Project:	Exp GW Monitoring	**Collection Date/Time:**	02/21/2015 0931
Work Order:	15B0750	**Matrix:**	Ground Water
Lab Sample ID:	15B0750-01	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	91	50		mg/L	10	02/26/2015 1100	02/27/2015 1100	AC

Client:	Clear Creek Associates	**Client Sample ID:**	2015-2B-210-open
Project:	Exp GW Monitoring	**Collection Date/Time:**	02/22/2015 0755
Work Order:	15B0750	**Matrix:**	Ground Water
Lab Sample ID:	15B0750-02	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	250	130		mg/L	25	02/26/2015 1100	02/27/2015 1118	AC

Client:	Clear Creek Associates	**Client Sample ID:**	2015-2B-250-open
Project:	Exp GW Monitoring	**Collection Date/Time:**	02/22/2015 1749
Work Order:	15B0750	**Matrix:**	Ground Water
Lab Sample ID:	15B0750-03	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	230	130		mg/L	25	02/26/2015 1100	02/27/2015 1137	AC

Client:	Clear Creek Associates	**Client Sample ID:**	2015-2B-272-open
Project:	Exp GW Monitoring	**Collection Date/Time:**	02/13/2015 1741
Work Order:	15B0750	**Matrix:**	Ground Water
Lab Sample ID:	15B0750-04	**Order Name:**	New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300								
Sulfate	220	130		mg/L	25	02/26/2015 1100	02/27/2015 1155	AC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0750
Date Received: 02/26/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1502253 - E300										
Blank (1502253-BLK1)				Prepared & Analyzed: 02/26/2015						
Sulfate	ND	5.0	mg/L							
LCS (1502253-BS1)				Prepared & Analyzed: 02/26/2015						
Sulfate	13	5.0	mg/L	12.50		100	90-110			
LCS Dup (1502253-BSD1)				Prepared & Analyzed: 02/26/2015						
Sulfate	12	5.0	mg/L	12.50		100	90-110	0.3	10	
Matrix Spike (1502253-MS1)		**Source: 15B0751-01**		Prepared & Analyzed: 02/26/2015						
Sulfate	20	5.0	mg/L	12.50	8.2	96	80-120			
Matrix Spike Dup (1502253-MSD1)		**Source: 15B0751-01**		Prepared & Analyzed: 02/26/2015						
Sulfate	20	5.0	mg/L	12.50	8.2	93	80-120	1	10	

TURNER LABORATORIES INC
2445 N. Coyote Drive, Suite 104
Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 15B0750 DATE _____ PAGE _____ OF _____

PROJECT NAME Expanded GW Monitoring# 28705.1
CONTACT NAME Ben Daigneau & Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave #101, Tucson AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX
2015-2B-170-open	2/21/15	0931		GW	1	Chloride, Sulfate, Resistivity, NO_2, NO_3, TKN, TPH 1664, Oil & Grease, VOA, Semi-VOA, TCLP, Dissolved, Total, RCRA8, Total, WAD, SDWA-INORGANICS PRIMARY, SECONDARY, MPN, PIA, pH, Fecal, C_l, C_4, Turb, COD, TSS, BOD
2015-2B-210-open	2/22/15	0755		GW	1	
2015-2B-250-open	2/22/15	1149		GW	1	
2015-2B-272-open	2/13/15	1041		GW	1	

1. RELINQUISHED BY:
Signature
Victoria Hermosilla
Printed Name
Clear Creek Associates
Firm
2/25/15, 0730
Date/Time

2. RECEIVED BY:
Signature
Ryan Toomey
Printed Name
Clear Creek Associates
Firm
2/25/15 0730
Date/Time

TURNAROUND REQUIREMENTS:
___ Standard (approx. 10 days)*
X Next Day ___ 2 Day ___ 5 Day*
X Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. # _____
Bill to: _____

SAMPLE RECEIPT:
Total Containers 4
Temperature 2.9
X Wet Ice
Ambient
Blue Ice

3. RELINQUISHED BY:
Signature
Ryan Toomey
Printed Name
Clear Creek
Firm
2/25/15 09:30
Date/Time

4. RECEIVED BY:
Signature
Darin Weyer
Printed Name
TURNER LABORATORIES, INC.
Firm
2/25/15 1151
Date/Time

* LEGEND
SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No		Custody Seals ☐	Preservation Confirmation ☑
ADEQ Forms: ☐ Yes ☐ No		Container Intact ☑	Appropriate Head Space N/A
Mail ADEQ Forms: ☐ Yes ☐ No		COC / Labels Agree ☑	Received Within Hold Time ☑

SPECIAL INSTRUCTIONS/COMMENTS:

APPENDIX C.2
ANALYTICAL LABORATORY REPORTS
FOR WELL SAMPLES

www.svl.net One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5B0019**
Reported: 26-Feb-15 11:24

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
BMO-2014-1BU	W5B0019-12	Ground Water	28-Jan-15 17:04	DP	03-Feb-2015	
BMO-2014-1BL	W5B0019-17	Ground Water	29-Jan-15 15:19	DP	03-Feb-2015	
BMO-2014-2BL	W5B0019-18	Ground Water	29-Jan-15 16:52	DP	03-Feb-2015	
BMO-2014-2BU	W5B0019-19	Ground Water	30-Jan-15 09:06	DP	03-Feb-2015	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested. Non-Detects are reported at the MDL.
Sample preparation is defined by the client as per their Data Quality Objectives.
This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.
The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

Case Narrative

-2/26/2015mab: Report reissued. Client requested reanalysis for SO4 Dissolved on sample -18.
Reanalysis (analyzed in duplicate) confirmed the original result.
Reanalysis and orginal results are reported.

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5B0019**
Reported: 26-Feb-15 11:24

Client Sample ID: **BMO-2014-1BU**
SVL Sample ID: **W5B0019-12 (Ground Water)**

Sampled: 28-Jan-15 17:04
Received: 03-Feb-15
Sampled By: DP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	170	mg/L	3.00	0.50	10	W507127	JMW	02/12/15 11:26	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5B0019**
Reported: 26-Feb-15 11:24

Client Sample ID: **BMO-2014-1BL**
SVL Sample ID: **W5B0019-17 (Ground Water)**

Sampled: 29-Jan-15 15:19
Received: 03-Feb-15
Sampled By: DP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	167	mg/L	3.00	0.50	10	W507127	JMW	02/12/15 11:51	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5B0019**
Reported: 26-Feb-15 11:24

Client Sample ID: **BMO-2014-2BL**
SVL Sample ID: **W5B0019-18 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 29-Jan-15 16:52
Received: 03-Feb-15
Sampled By: DP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	463	mg/L	3.00	0.50	10	W507127	JMW	02/11/15 21:17	D2
EPA 300.0	**Sulfate as SO4**	448	mg/L	3.00	0.50	10	W507127	JMW	02/25/15 18:51	D2,N10
EPA 300.0	**Sulfate as SO4**	436	mg/L	3.00	0.50	10	W507127	JMW	02/25/15 19:00	D2,N10

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5B0019**
Reported: 26-Feb-15 11:24

Client Sample ID: **BMO-2014-2BU**
SVL Sample ID: **W5B0019-19 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 30-Jan-15 09:06
Received: 03-Feb-15
Sampled By: DP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	63.8	mg/L	3.00	0.50	10	W507127	JMW	02/12/15 12:04	D2,M3

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5B0019**
Reported: 26-Feb-15 11:24

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Anions by Ion Chromatography								
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.05	0.30	W507095	10-Feb-15	
Filtered Anions by Ion Chromatography								
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.05	0.30	W507039	09-Feb-15	
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.05	0.30	W507127	11-Feb-15	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Anions by Ion Chromatography									
EPA 300.0	Sulfate as SO4	mg/L	10.1	10.0	101	90 - 110	W507095	10-Feb-15	
Filtered Anions by Ion Chromatography									
EPA 300.0	Sulfate as SO4	mg/L	10.1	10.0	101	90 - 110	W507039	09-Feb-15	
EPA 300.0	Sulfate as SO4	mg/L	10.5	10.0	105	90 - 110	W507127	11-Feb-15	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Anions by Ion Chromatography										
EPA 300.0	Sulfate as SO4	mg/L	40.4	28.7	10.0	118	90 - 110	W507095	10-Feb-15	M1
EPA 300.0	Sulfate as SO4	mg/L	169	160	10.0	95.8	90 - 110	W507095	10-Feb-15	D2,M3
Filtered Anions by Ion Chromatography										
EPA 300.0	Sulfate as SO4	mg/L	585	577	10.0	R > 4S	90 - 110	W507039	09-Feb-15	D2,M3
EPA 300.0	Sulfate as SO4	mg/L	69.9	59.9	10.0	100	90 - 110	W507127	12-Feb-15	D2,M3
EPA 300.0	Sulfate as SO4	mg/L	75.4	63.8	10.0	R > 4S	90 - 110	W507127	12-Feb-15	D2,M3

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
Anions by Ion Chromatography											
EPA 300.0	Sulfate as SO4	mg/L	40.2	40.4	10.0	116	0.5	20	W507095	10-Feb-15	M1
Filtered Anions by Ion Chromatography											
EPA 300.0	Sulfate as SO4	mg/L	584	585	10.0	R > 4S	0.2	20	W507039	09-Feb-15	D2,M3
EPA 300.0	Sulfate as SO4	mg/L	69.6	69.9	10.0	97.1	0.5	20	W507127	12-Feb-15	D2,M3

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5B0019**
Reported: 26-Feb-15 11:24

Notes and Definitions

D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of target analyte.
M1	Matrix spike recovery was high, but the LCS recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
N10	After reanalysis original results are confirmed.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
BMO-2015-2BL	W5D0349-01	Ground Water	14-Apr-15 09:48	RT	17-Apr-2015	
BMO-2015-2B	W5D0349-02	Ground Water	14-Apr-15 10:45	RT	17-Apr-2015	
BMO-2015-1BL	W5D0349-03	Ground Water	14-Apr-15 11:47	RT	17-Apr-2015	
BMO-2015-1B	W5D0349-04	Ground Water	14-Apr-15 12:33	RT	17-Apr-2015	
BMO-2014-4B	W5D0349-05	Ground Water	14-Apr-15 13:39	RT	17-Apr-2015	
BMO-2014-4BL	W5D0349-06	Ground Water	14-Apr-15 14:31	RT	17-Apr-2015	
BMO-2014-3BL	W5D0349-07	Ground Water	15-Apr-15 10:25	RT	17-Apr-2015	
BMO-2014-3BU	W5D0349-08	Ground Water	15-Apr-15 11:19	RT	17-Apr-2015	
BMO-2014-2BL	W5D0349-09	Ground Water	15-Apr-15 13:00	RT	17-Apr-2015	
BMO-2014-2BU	W5D0349-10	Ground Water	15-Apr-15 13:50	RT	17-Apr-2015	
BMO-2014-1BL	W5D0349-11	Ground Water	15-Apr-15 15:00	RT	17-Apr-2015	
BMO-2014-1BU	W5D0349-12	Ground Water	15-Apr-15 15:43	RT	17-Apr-2015	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested. Non-Detects are reported at the MDL.
Sample preparation is defined by the client as per their Data Quality Objectives.
This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.
The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2015-2BL**
SVL Sample ID: **W5D0349-01 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 14-Apr-15 09:48
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	305	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 20:08	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

www.svl.net One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2015-2B**
SVL Sample ID: **W5D0349-02 (Ground Water)**

Sampled: 14-Apr-15 10:45
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	271	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 20:19	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

www.svl.net One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2015-1BL**
SVL Sample ID: **W5D0349-03 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 14-Apr-15 11:47
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	239	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 20:31	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

www.svl.net One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2015-1B**
SVL Sample ID: **W5D0349-04 (Ground Water)**

Sampled: 14-Apr-15 12:33
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	187	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 20:42	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

www.svl.net One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2014-4B**
SVL Sample ID: **W5D0349-05 (Ground Water)**

Sampled: 14-Apr-15 13:39
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	61.7	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 20:54	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2014-4BL**
SVL Sample ID: **W5D0349-06 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 14-Apr-15 14:31
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	184	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 21:05	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2014-3BL**
SVL Sample ID: **W5D0349-07 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 15-Apr-15 10:25
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	8.73	mg/L	0.33	0.06		W517232	MCE	04/24/15 10:09	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2014-3BU**
SVL Sample ID: **W5D0349-08 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 15-Apr-15 11:19
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	8.71	mg/L	0.33	0.06		W517232	MCE	04/24/15 10:20	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2014-2BL**
SVL Sample ID: **W5D0349-09 (Ground Water)**

Sampled: 15-Apr-15 13:00
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	463	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 21:39	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2014-2BU**
SVL Sample ID: **W5D0349-10 (Ground Water)**

Sampled: 15-Apr-15 13:50
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	64.8	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 21:51	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2014-1BL**
SVL Sample ID: **W5D0349-11 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 15-Apr-15 15:00
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	167	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 22:25	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Client Sample ID: **BMO-2014-1BU**
SVL Sample ID: **W5D0349-12 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 15-Apr-15 15:43
Received: 17-Apr-15
Sampled By: RT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	189	mg/L	16.5	2.75	50	W517232	MCE	04/23/15 22:36	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

www.svl.net One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

Freeport McMoRan - Bisbee
36 West Hwy 92
Bisbee, AZ 85603

Project Name: Copper Queen Branch Sulfate Mitigation Order
Work Order: **W5D0349**
Reported: 24-Apr-15 12:58

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Filtered Anions by Ion Chromatography								
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.05	0.30	W517232	23-Apr-15	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Filtered Anions by Ion Chromatography									
EPA 300.0	Sulfate as SO4	mg/L	10.0	10.0	100	90 - 110	W517232	23-Apr-15	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	Sulfate as SO4	mg/L	30.8	21.9	10.0	88.6	90 - 110	W517232	23-Apr-15	M2
EPA 300.0	Sulfate as SO4	mg/L	26.4	17.1	10.0	93.0	90 - 110	W517232	23-Apr-15	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
Filtered Anions by Ion Chromatography											
EPA 300.0	Sulfate as SO4	mg/L	26.4	26.4	10.0	92.3	0.3	20	W517232	23-Apr-15	

Notes and Definitions

D2	Sample required dilution due to high concentration of target analyte.
M2	Matrix spike recovery was low, but the LCS recovery was acceptable.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable

December 02, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14K0338
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 11/07/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0338
Date Received: 11/07/2014

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14K0338-01	BMO-2014-1BL	Ground Water	11/07/2014 1346

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0338
Date Received: 11/07/2014

Case Narrative

C4	Confirmatory analysis was past holding time
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
L2	The associated LCS/LCSD recovery was below laboratory acceptance limits.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0338
Lab Sample ID: 14K0338-01

Client Sample ID: BMO-2014-1BL
Collection Date/Time: 11/07/2014 1346
Matrix: Ground Water
Order Name: 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	89	4.0		mg/L	1	11/10/2014 1130	11/12/2014 1135	RAD
Magnesium	12	3.0		mg/L	1	11/10/2014 1130	11/12/2014 1135	RAD
Potassium	ND	5.0		mg/L	1	11/10/2014 1130	11/12/2014 1135	RAD
Sodium	37	5.0		mg/L	1	11/10/2014 1130	11/12/2014 1135	RAD
pH-E150.1								
pH (pH Units)	7.4	0.0	H5	-	1	11/07/2014 1653	11/07/2014 1656	AC
Temperature (°C)	16		H5	-	1	11/07/2014 1653	11/07/2014 1656	AC
Anions by Ion Chromatography-E300								
Chloride	25	1.0		mg/L	1	11/07/2014 1350	11/07/2014 2228	AC
Fluoride	0.56	0.50		mg/L	1	11/07/2014 1350	11/07/2014 2228	AC
Nitrogen, Nitrate (As N)	2.6	0.50		mg/L	1	11/07/2014 1350	11/07/2014 2228	AC
Nitrogen, Nitrite (As N)	ND	0.10	C4	mg/L	1	11/07/2014 1350	12/02/2014 1242	AC
Sulfate	160	130		mg/L	25	11/22/2014 1700	11/23/2014 0908	AC
Specific Conductance-SM2510 B								
Conductivity	730	0.10		µmhos/cm	1	11/10/2014 1315	11/10/2014 1359	AC
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	480	20		mg/L	1	11/11/2014 0820	11/11/2014 1715	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0338
Date Received: 11/07/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411091 - E 200.7										
Blank (1411091-BLK1)				Prepared: 11/10/2014 Analyzed: 11/12/2014						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1411091-BS1)				Prepared: 11/10/2014 Analyzed: 11/12/2014						
Calcium	9.9	4.0	mg/L	10.00		99	85-115			
Magnesium	10	3.0	mg/L	10.00		101	85-115			
Potassium	10	5.0	mg/L	10.00		102	85-115			
Sodium	11	5.0	mg/L	10.00		108	85-115			
LCS Dup (1411091-BSD1)				Prepared: 11/10/2014 Analyzed: 11/12/2014						
Calcium	9.8	4.0	mg/L	10.00		98	85-115	0.2	20	
Magnesium	10	3.0	mg/L	10.00		101	85-115	0.03	20	
Potassium	10	5.0	mg/L	10.00		103	85-115	1	20	
Sodium	11	5.0	mg/L	10.00		110	85-115	2	20	
Matrix Spike (1411091-MS1)	**Source: 14K0338-01**			Prepared: 11/10/2014 Analyzed: 11/12/2014						
Calcium	97	4.0	mg/L	10.00	89	79	70-130			
Magnesium	22	3.0	mg/L	10.00	12	100	70-130			
Potassium	12	5.0	mg/L	10.00	2.7	95	70-130			
Sodium	46	5.0	mg/L	10.00	37	93	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0338
Date Received: 11/07/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411099 - SM2540 C										
Duplicate (1411099-DUP1)		**Source: 14K0292-01**		Prepared: 11/11/2014 Analyzed: 11/12/2014						
Total Dissolved Solids (Residue, Filterable)	370	20	mg/L		370			0.3	5	
Batch 1411113 - E150.1										
Duplicate (1411113-DUP1)		**Source: 14K0331-01**		Prepared & Analyzed: 11/07/2014						
pH (pH Units)	7.4	0.0	-		7.4			0.5	200	
Temperature (°C)	21		-		21			1	200	
Batch 1411138 - SM2510 B										
Duplicate (1411138-DUP1)		**Source: 14J0867-01**		Prepared & Analyzed: 11/10/2014						
Conductivity	540	0.10	µmhos/cm		520			2	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0338
Date Received: 11/07/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411058 - E300										
Blank (1411058-BLK1)				Prepared & Analyzed: 11/07/2014						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1411058-BS1)				Prepared & Analyzed: 11/07/2014						
Chloride	11	1.0	mg/L	12.50		91	90-110			
Fluoride	1.9	0.50	mg/L	2.000		95	90-110			
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		96	90-110			
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500		87	90-110			L2
Sulfate	13	5.0	mg/L	12.50		102	90-110			
LCS Dup (1411058-BSD1)				Prepared & Analyzed: 11/07/2014						
Chloride	11	1.0	mg/L	12.50		90	90-110	0.4	10	
Fluoride	1.8	0.50	mg/L	2.000		92	90-110	3	10	
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		96	90-110	0.06	10	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500		87	90-110	0.8	10	L2
Sulfate	13	5.0	mg/L	12.50		102	90-110	0.1	10	
Matrix Spike (1411058-MS2)	**Source: 14K0324-01**			Prepared: 11/07/2014 Analyzed: 11/23/2014						
Chloride	12		mg/L	12.50	ND	95	80-120			
Fluoride	2.4		mg/L	2.000	ND	118	80-120			
Nitrogen, Nitrate (As N)	5.0		mg/L	5.000	ND	99	80-120			
Nitrogen, Nitrite (As N)	2.5		mg/L	2.500	ND	99	80-120			
Matrix Spike (1411058-MS3)	**Source: 14J0784-15RE1**			Prepared: 11/22/2014 Analyzed: 11/23/2014						
Chloride	12		mg/L	12.50	0.34	91	80-120			
Fluoride	2.1		mg/L	2.000	0.041	104	80-120			
Nitrogen, Nitrate (As N)	4.9		mg/L	5.000	ND	98	80-120			
Nitrogen, Nitrite (As N)	2.4		mg/L	2.500	ND	97	80-120			
Sulfate	18		mg/L	12.50	7.1	90	80-120			
Matrix Spike Dup (1411058-MSD2)	**Source: 14K0324-01**			Prepared: 11/07/2014 Analyzed: 11/23/2014						
Chloride	12		mg/L	12.50	ND	94	80-120	0.7	10	
Fluoride	2.3		mg/L	2.000	ND	116	80-120	2	10	
Nitrogen, Nitrate (As N)	4.9		mg/L	5.000	ND	98	80-120	1	10	
Nitrogen, Nitrite (As N)	2.5		mg/L	2.500	ND	100	80-120	0.6	10	
Matrix Spike Dup (1411058-MSD3)	**Source: 14J0784-15RE1**			Prepared: 11/22/2014 Analyzed: 11/23/2014						
Chloride	12		mg/L	12.50	0.34	90	80-120	1	10	
Fluoride	2.1		mg/L	2.000	0.041	101	80-120	3	10	
Nitrogen, Nitrate (As N)	4.8		mg/L	5.000	ND	96	80-120	1	10	
Nitrogen, Nitrite (As N)	2.5		mg/L	2.500	ND	98	80-120	1	10	
Sulfate	18		mg/L	12.50	7.1	89	80-120	0.8	10	

TURNER LABORATORIES INC.
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Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14K0338 DATE 11/7/14 PAGE 1 OF 1

PROJECT NAME Exp GW Monitoring # 287051
CONTACT NAME Ben Dejarnett
COMPANY NAME Clear Creek Associates
ADDRESS 221 N Court Ave Tucson, AZ
ZIP 85701 PHONE 622-3222 EMAIL bdejarnett@clearcreekassociates.com
SAMPLER'S SIGNATURE

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270 / Acids	Volatile Organics 624 / 524.2 / 8260 / THMS / HAA5	Chloride / Sulfate / Resistivity	NO_2 / NO_3 / TKN	TPH / 1664 / Oil & Grease	VOA / TCLP Semi-VOA / Pest.	TCLP / Dissolved / Total / RCRA8 Metals	Total / Amen. / WAD Cyanide	SDWA-INORGANICS PRIMARY / SECONDARY	MPN / PIA Coliform / Fecal	pH / Cl_2 / C_6 / Turb	COD / TSS / BOD	pH, Temp(SU), Cond, TDS	F, Ca, Mg, K, Na
BMO-2014-1BL	11/7/14	1316		GW	3			X	X			X						X	X

1. RELINQUISHED BY:
Signature
Melanie Lindsey
Printed Name
Clear Creek
Firm
11/7/14 16:30
Date/Time

2. RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

3. RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
11/7/14 1630
Date/Time

TURNAROUND REQUIREMENTS:
____ Standard (approx. 10 days)*
____ Next Day ____ 2 Day ____ 5 Day*
____ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____Y ____N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 8.7
☒ Wet Ice
☐ Ambient
☐ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☒
COC / Labels Agree ☒

Preservation Confirmation ☒
Appropriate Head Space ☒
Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:

December 12, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14K0487
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 11/14/2014 for the analyses presented in the following report.

The attached report has been revised. Please refer to the Case Narrative page for an explanation of the changes. We apologize for any inconvenience this may have caused you.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Terri L. Garcia

Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0487
Date Received: 11/14/2014

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14K0487-01	BMO-2014-1BU	Ground Water	11/13/2014 1429

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0487
Date Received: 11/14/2014

Case Narrative

This report was originally generated on 12/2/2014. It is being revised on 12/12/2014 to include corrected sample name, which was not on the original report.

H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0487
Lab Sample ID: 14K0487-01

Client Sample ID: BMO-2014-1BU
Collection Date/Time: 11/13/2014 1429
Matrix: Ground Water
Order Name: 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	72	4.0		mg/L	1	11/17/2014 1440	11/18/2014 1646	RAD
Magnesium	9.7	3.0		mg/L	1	11/17/2014 1440	11/18/2014 1646	RAD
Potassium	ND	5.0		mg/L	1	11/17/2014 1440	11/18/2014 1646	RAD
Sodium	27	5.0		mg/L	1	11/17/2014 1440	11/18/2014 1646	RAD
pH-E150.1								
pH (pH Units)	7.6	0.0	H5	-	1	11/14/2014 0925	11/14/2014 0930	AC
Temperature (°C)	10		H5	-	1	11/14/2014 0925	11/14/2014 0930	AC
Anions by Ion Chromatography-E300								
Chloride	20	1.0		mg/L	1	11/14/2014 1600	11/15/2014 0609	AC
Fluoride	ND	0.50		mg/L	1	11/14/2014 1600	11/15/2014 0609	AC
Nitrogen, Nitrate (As N)	4.4	0.50		mg/L	1	11/14/2014 1600	11/15/2014 0609	AC
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	11/14/2014 1600	11/15/2014 0609	AC
Sulfate	84	50		mg/L	10	11/14/2014 1600	11/17/2014 2118	AC
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	160	2.0		mg/L	1	11/25/2014 1320	11/25/2014 1445	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	11/25/2014 1320	11/25/2014 1445	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	11/25/2014 1320	11/25/2014 1445	CC
Alkalinity, Total (As CaCO3)	160	2.0		mg/L	1	11/25/2014 1320	11/25/2014 1445	CC
Specific Conductance-SM2510 B								
Conductivity	590	0.10		µmhos/cm	1	11/17/2014 1215	11/17/2014 1232	AC
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	360	20		mg/L	1	11/18/2014 0820	11/19/2014 1320	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0487
Date Received: 11/14/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411175 - E 200.7										
Blank (1411175-BLK1)				Prepared & Analyzed: 11/18/2014						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1411175-BS1)				Prepared & Analyzed: 11/18/2014						
Calcium	10	4.0	mg/L	10.00		102	85-115			
Magnesium	10	3.0	mg/L	10.00		102	85-115			
Potassium	10	5.0	mg/L	10.00		102	85-115			
Sodium	11	5.0	mg/L	10.00		111	85-115			
LCS Dup (1411175-BSD1)				Prepared & Analyzed: 11/18/2014						
Calcium	11	4.0	mg/L	10.00		105	85-115	3	20	
Magnesium	10	3.0	mg/L	10.00		105	85-115	3	20	
Potassium	10	5.0	mg/L	10.00		104	85-115	2	20	
Sodium	11	5.0	mg/L	10.00		110	85-115	0.4	20	
Matrix Spike (1411175-MS1)	**Source: 14K0487-01**			Prepared & Analyzed: 11/18/2014						
Calcium	76	4.0	mg/L	10.00	72	47	70-130			M3
Magnesium	19	3.0	mg/L	10.00	9.7	90	70-130			
Potassium	12	5.0	mg/L	10.00	2.3	94	70-130			
Sodium	36	5.0	mg/L	10.00	27	81	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0487
Date Received: 11/14/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411158 - E150.1										
Duplicate (1411158-DUP1)		**Source: 14K0487-01**		Prepared & Analyzed: 11/14/2014						
pH (pH Units)	7.5	0.0	-		7.6			0.5	200	
Temperature (°C)	11		-		10			10	200	
Batch 1411179 - SM2510 B										
Duplicate (1411179-DUP1)		**Source: 14K0394-01**		Prepared & Analyzed: 11/17/2014						
Conductivity	1100	0.10	µmhos/cm		1100			0.3	10	
Batch 1411194 - SM2540 C										
Duplicate (1411194-DUP1)		**Source: 14K0487-01**		Prepared: 11/18/2014 Analyzed: 11/19/2014						
Total Dissolved Solids (Residue, Filterable)	360	20	mg/L		360			1	5	
Batch 1411260 - SM2320B										
LCS (1411260-BS1)				Prepared & Analyzed: 11/25/2014						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		100	90-110			
LCS Dup (1411260-BSD1)				Prepared & Analyzed: 11/25/2014						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		98	90-110	2	10	
Matrix Spike (1411260-MS1)		**Source: 14K0630-03**		Prepared & Analyzed: 11/25/2014						
Alkalinity, Total (As CaCO3)	460	2.0	mg/L	250.0	230	93	85-115			
Matrix Spike Dup (1411260-MSD1)		**Source: 14K0630-03**		Prepared & Analyzed: 11/25/2014						
Alkalinity, Total (As CaCO3)	450	2.0	mg/L	250.0	230	90	85-115	1	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0487
Date Received: 11/14/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411129 - E300										
Blank (1411129-BLK1)				Prepared & Analyzed: 11/14/2014						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1411129-BS1)				Prepared & Analyzed: 11/14/2014						
Chloride	12	1.0	mg/L	12.50		97	90-110			
Fluoride	2.0	0.50	mg/L	2.000		102	90-110			
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000		100	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		101	90-110			
Sulfate	13	5.0	mg/L	12.50		101	90-110			
LCS Dup (1411129-BSD1)				Prepared & Analyzed: 11/14/2014						
Chloride	12	1.0	mg/L	12.50		97	90-110	0.3	10	
Fluoride	2.1	0.50	mg/L	2.000		103	90-110	0.7	10	
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000		100	90-110	0.1	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		102	90-110	0.3	10	
Sulfate	13	5.0	mg/L	12.50		101	90-110	0.6	10	
Matrix Spike (1411129-MS1)		**Source: 14K0419-03**		Prepared & Analyzed: 11/14/2014						
Chloride	100	1.0	mg/L	12.50	100	43	80-120			M3
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000	0.25	95	80-120			
Nitrogen, Nitrite (As N)	2.1	0.10	mg/L	2.500	ND	86	80-120			
Sulfate	110	5.0	mg/L	12.50	100	76	80-120			M3
Matrix Spike (1411129-MS2)		**Source: 14K0419-03**		Prepared & Analyzed: 11/14/2014						
Fluoride	3.0		mg/L	2.000	1.1	94	80-120			
Matrix Spike (1411129-MS3)		**Source: 14K0487-01**		Prepared: 11/14/2014 Analyzed: 11/15/2014						
Fluoride	2.2	0.50	mg/L	2.000	0.23	96	80-120			
Nitrogen, Nitrate (As N)	9.6	0.50	mg/L	5.000	4.4	103	80-120			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	ND	99	80-120			
Matrix Spike (1411129-MS4)		**Source: 14K0487-01RE1**		Prepared & Analyzed: 11/17/2014						
Chloride	14		mg/L	12.50	2.0	94	80-120			
Sulfate	20		mg/L	12.50	8.4	96	80-120			
Matrix Spike Dup (1411129-MSD1)		**Source: 14K0419-03**		Prepared & Analyzed: 11/14/2014						
Chloride	100	1.0	mg/L	12.50	100	44	80-120	0.06	10	M3
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000	0.25	95	80-120	0.3	10	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	87	80-120	1	10	
Sulfate	110	5.0	mg/L	12.50	100	77	80-120	0.1	10	M3
Matrix Spike Dup (1411129-MSD2)		**Source: 14K0419-03**		Prepared & Analyzed: 11/14/2014						
Fluoride	3.0		mg/L	2.000	1.1	94	80-120	0.03	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0487
Date Received: 11/14/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411129 - E300										
Matrix Spike Dup (1411129-MSD3)	**Source: 14K0487-01**			Prepared: 11/14/2014 Analyzed: 11/15/2014						
Fluoride	2.1	0.50	mg/L	2.000	0.23	96	80-120	0.05	10	
Nitrogen, Nitrate (As N)	9.5	0.50	mg/L	5.000	4.4	102	80-120	0.7	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	ND	98	80-120	0.5	10	
Matrix Spike Dup (1411129-MSD4)	**Source: 14K0487-01RE1**			Prepared & Analyzed: 11/17/2014						
Chloride	14		mg/L	12.50	2.0	94	80-120	0.4	10	
Sulfate	20		mg/L	12.50	8.4	95	80-120	0.7	10	

TURNER LABORATORIES INC.
2445 N. Coyote Drive, Suite 104
Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14K0487 DATE 11/13/14 PAGE 1 OF 1

PROJECT NAME Exp. GW Monitoring # 287051
CONTACT NAME Ben Daigneault Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. #101 Tucson, AZ
ZIP 85701 PHONE (520) 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE David Pence

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270	Acids	Volatile Organics 624	524.2	TTHMS 8260	HAA5	Chloride	Sulfate	Resistivity	NO_2	NO_3	TKN	TPH 1664	Oil & Grease	VOA	TCLP Analysis Semi-VOA	Pest.	TCLP	Metals see quote Dissolved	Total	RCRA8	Total Cyanide	Amen.	WAD	SDWA-INORGANICS PRIMARY	SECONDARY see quote	MPN Coliform	PIA	Fecal	pH	C_a	Cl_2	Turb	COD	TSS	BOD	TDS, Total Alkalinity as $CaCO_3$	Fluoride
BMO-2014-1BU	11/13/14	14:29		GW	3							✓			✓							✓		✓				✓					✓							✓		✓		

1. RELINQUISHED BY: David Pence — Signature; David Pence — Printed Name; CCA — Firm; 11/13/14 14:40 — Date/Time

2. RECEIVED BY: Ben Daigneau — Signature; Ben Daigneau — Printed Name; Clear Creek — Firm; 11/13/14 14:40 — Date/Time

3. RELINQUISHED BY: Ben Daigneau — Signature; Ben Daigneau — Printed Name; Clear Creek — Firm; 11/12/14 08:11 — Date/Time

4. RECEIVED BY: [signature] — Signature; [illegible] — Printed Name; TURNER LABORATORIES, INC. — Firm; 11/14/14 8:11A — Date/Time

TURNAROUND REQUIREMENTS:
- X Standard (approx. 10 days)*
- ___ Next Day ___ 2 Day ___ 5 Day*
- ___ Email Preliminary Results

* Working Days

REPORT REQUIREMENTS:
- X I. Routine Report
- ___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
- ___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. #
Bill to: Clear Creek

SAMPLE RECEIPT:
Total Containers 3
Temperature 2.5
- X Wet Ice
- ☐ Ambient
- ☐ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No	Custody Seals ☐	Preservation Confirmation ☒
ADEQ Forms: ☐ Yes ☐ No	Container Intact ☒	Appropriate Head Space ☒
Mail ADEQ Forms: ☐ Yes ☐ No	COC / Labels Agree ☒	Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:

December 19, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14K0634
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 11/21/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0634
Date Received: 11/21/2014

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14K0634-01	BMO-2014-2BL	Ground Water	11/20/2014 1338

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0634
Date Received: 11/21/2014

Case Narrative

H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0634
Lab Sample ID: 14K0634-01

Client Sample ID: BMO-2014-2BL
Collection Date/Time: 11/20/2014 1338
Matrix: Ground Water
Order Name: 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	110	4.0		mg/L	1	11/21/2014 1010	12/02/2014 1340	RAD
Magnesium	15	3.0		mg/L	1	11/21/2014 1010	12/02/2014 1340	RAD
Potassium	ND	5.0		mg/L	1	11/21/2014 1010	12/02/2014 1340	RAD
Sodium	34	5.0		mg/L	1	11/21/2014 1010	12/02/2014 1340	RAD
pH-E150.1								
pH (pH Units)	7.5	0.0	H5	-	1	11/21/2014 1026	11/21/2014 1036	AC
Temperature (°C)	21		H5	-	1	11/21/2014 1026	11/21/2014 1036	AC
Anions by Ion Chromatography-E300								
Chloride	22	1.0		mg/L	1	11/21/2014 1220	11/21/2014 1954	AC
Fluoride	ND	0.50		mg/L	1	11/21/2014 1220	11/21/2014 1954	AC
Nitrogen, Nitrate (As N)	2.6	0.50		mg/L	1	11/21/2014 1220	11/21/2014 1954	AC
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	11/21/2014 1220	11/21/2014 1954	AC
Sulfate	210	130		mg/L	25	11/21/2014 1220	11/24/2014 1824	AC
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	180	2.0		mg/L	1	11/25/2014 1320	11/25/2014 1445	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	11/25/2014 1320	11/25/2014 1445	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	11/25/2014 1320	11/25/2014 1445	CC
Alkalinity, Total (As CaCO3)	180	2.0		mg/L	1	11/25/2014 1320	11/25/2014 1445	CC
Specific Conductance-SM2510 B								
Conductivity	870	0.10		µmhos/cm	1	11/25/2014 1412	11/25/2014 1420	AC
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	550	20		mg/L	1	11/25/2014 0800	11/26/2014 1240	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0634
Date Received: 11/21/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1412018 - E 200.7										
Blank (1412018-BLK1)				Prepared: 12/01/2014 Analyzed: 12/02/2014						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1412018-BS1)				Prepared: 12/01/2014 Analyzed: 12/02/2014						
Calcium	10	4.0	mg/L	10.00		104	85-115			
Magnesium	10	3.0	mg/L	10.00		104	85-115			
Potassium	10	5.0	mg/L	10.00		102	85-115			
Sodium	11	5.0	mg/L	10.00		109	85-115			
LCS Dup (1412018-BSD1)				Prepared: 12/01/2014 Analyzed: 12/02/2014						
Calcium	9.9	4.0	mg/L	10.00		99	85-115	4	20	
Magnesium	10	3.0	mg/L	10.00		102	85-115	2	20	
Potassium	10	5.0	mg/L	10.00		100	85-115	3	20	
Sodium	11	5.0	mg/L	10.00		114	85-115	5	20	
Matrix Spike (1412018-MS1)	**Source: 14K0630-03**			Prepared: 11/21/2014 Analyzed: 12/02/2014						
Calcium	62	4.0	mg/L	10.00	54	79	70-130			
Magnesium	22	3.0	mg/L	10.00	12	101	70-130			
Potassium	13	5.0	mg/L	10.00	2.9	97	70-130			
Sodium	67	5.0	mg/L	10.00	57	95	70-130			
Matrix Spike (1412018-MS2)	**Source: 14K0641-01**			Prepared: 12/01/2014 Analyzed: 12/02/2014						
Calcium	160	4.0	mg/L	10.00	160	4	70-130			M3
Magnesium	52	3.0	mg/L	10.00	44	77	70-130			
Potassium	12	5.0	mg/L	10.00	2.4	100	70-130			
Sodium	190	5.0	mg/L	10.00	200	NR	70-130			M3

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0634
Date Received: 11/21/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411229 - E150.1										
Duplicate (1411229-DUP1)		**Source: 14K0634-01**		Prepared & Analyzed: 11/21/2014						
pH (pH Units)	7.5	0.0	-		7.5			0.3	200	
Temperature (°C)	21		-		21			0	200	
Batch 1411253 - SM2540 C										
Duplicate (1411253-DUP1)		**Source: 14K0641-01**		Prepared: 11/25/2014 Analyzed: 11/26/2014						
Total Dissolved Solids (Residue, Filterable)	1300	20	mg/L		1300			0.4	5	
Batch 1411257 - SM2510 B										
Duplicate (1411257-DUP1)		**Source: 14K0634-01**		Prepared & Analyzed: 11/25/2014						
Conductivity	860	0.10	µmhos/cm		870			0.5	10	
Batch 1411260 - SM2320B										
LCS (1411260-BS1)				Prepared & Analyzed: 11/25/2014						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		100	90-110			
LCS Dup (1411260-BSD1)				Prepared & Analyzed: 11/25/2014						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		98	90-110	2	10	
Matrix Spike (1411260-MS1)		**Source: 14K0630-03**		Prepared & Analyzed: 11/25/2014						
Alkalinity, Total (As CaCO3)	460	2.0	mg/L	250.0	230	93	85-115			
Matrix Spike Dup (1411260-MSD1)		**Source: 14K0630-03**		Prepared & Analyzed: 11/25/2014						
Alkalinity, Total (As CaCO3)	450	2.0	mg/L	250.0	230	90	85-115	1	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0634
Date Received: 11/21/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411215 - E300										
Blank (1411215-BLK1)				Prepared & Analyzed: 11/21/2014						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1411215-BS1)				Prepared & Analyzed: 11/21/2014						
Chloride	12	1.0	mg/L	12.50		97	90-110			
Fluoride	2.0	0.50	mg/L	2.000		98	90-110			
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		98	90-110			
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500		97	90-110			
Sulfate	13	5.0	mg/L	12.50		101	90-110			
LCS Dup (1411215-BSD1)				Prepared & Analyzed: 11/21/2014						
Chloride	12	1.0	mg/L	12.50		97	90-110	0.2	10	
Fluoride	1.9	0.50	mg/L	2.000		97	90-110	1	10	
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		98	90-110	0.04	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		100	90-110	3	10	
Sulfate	13	5.0	mg/L	12.50		100	90-110	0.5	10	
Matrix Spike (1411215-MS1)		**Source: 14K0630-08**		Prepared & Analyzed: 11/21/2014						
Fluoride	3.9	0.50	mg/L	2.000	2.0	94	80-120			
Nitrogen, Nitrate (As N)	9.8	0.50	mg/L	5.000	4.7	102	80-120			
Nitrogen, Nitrite (As N)	2.3	0.10	mg/L	2.500	ND	92	80-120			
Matrix Spike (1411215-MS2)		**Source: 14K0630-08**		Prepared & Analyzed: 11/21/2014						
Chloride	19		mg/L	12.50	6.8	96	80-120			
Matrix Spike (1411215-MS3)		**Source: 14K0630-08RE1**		Prepared & Analyzed: 11/21/2014						
Sulfate	26		mg/L	12.50	14	93	80-120			M3
Matrix Spike (1411215-MS4)		**Source: 14K0448-01**		Prepared & Analyzed: 11/21/2014						
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000	0.24	91	80-120			
Matrix Spike (1411215-MS5)		**Source: 14K0630-08**		Prepared: 11/21/2014 Analyzed: 11/24/2014						
Sulfate	18		mg/L	12.50	6.4	90	80-120			
Matrix Spike (1411215-MS6)		**Source: 14K0448-01**		Prepared: 11/21/2014 Analyzed: 12/18/2014						
Chloride	0.0		mg/L	12.50	2.6	NR	80-120			
Matrix Spike Dup (1411215-MSD1)		**Source: 14K0630-08**		Prepared & Analyzed: 11/21/2014						
Fluoride	3.9	0.50	mg/L	2.000	2.0	94	80-120	0.4	10	
Nitrogen, Nitrate (As N)	9.7	0.50	mg/L	5.000	4.7	102	80-120	0.5	10	
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500	ND	94	80-120	2	10	
Matrix Spike Dup (1411215-MSD2)		**Source: 14K0630-08**		Prepared & Analyzed: 11/21/2014						
Chloride	19		mg/L	12.50	6.8	95	80-120	0.5	10	
Matrix Spike Dup (1411215-MSD3)		**Source: 14K0630-08RE1**		Prepared & Analyzed: 11/21/2014						
Sulfate	25		mg/L	12.50	14	92	80-120	0.5	10	M3

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14K0634
Date Received: 11/21/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1411215 - E300										
Matrix Spike Dup (1411215-MSD4)	**Source: 14K0448-01**			Prepared & Analyzed: 11/21/2014						
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	0.24	89	80-120	1	10	
Matrix Spike Dup (1411215-MSD5)	**Source: 14K0630-08**			Prepared: 11/21/2014 Analyzed: 11/24/2014						
Sulfate	18		mg/L	12.50	6.4	90	80-120	0.3	10	
Matrix Spike Dup (1411215-MSD6)	**Source: 14K0448-01**			Prepared: 11/21/2014 Analyzed: 12/18/2014						
Chloride	0.0		mg/L	12.50	2.6	NR	80-120		10	

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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 14K0634 DATE 11/21/14 PAGE 1 OF 1

PROJECT NAME Exp. GW Monitoring# 287051
CONTACT NAME Ben Daigneau & Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave #101, Tucson, AZ
ZIP 85701 PHONE (520) 622-3222 EMAIL bdaigneau@clearcreekassociates
SAMPLER'S SIGNATURE David Pence

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX
BMO-2014-2BL	11/20/14	13:38		GW	3	Chloride, Sulfate, Resistivity, NO_2, NO_3, TKN, TPH 1664, Oil & Grease, VOA, Semi-VOA, Pest., TCLP, Dissolved Metals, RCRA8 Total, Total Cyanide, Amen., WAD, SDWA-INORGANICS PRIMARY, SECONDARY, Coliform MPN, PIA, pH, Fecal, Cl_2, Cl, Turb, COD, TSS, BOD, Fluoride, Calcium, Magnesium, Potassium, Sodium, Total Alkalinity, *See Quote

1. RELINQUISHED BY: David Pence — Signature; David Pence — Printed Name; CCA — Firm; 11/20/14 13:50 — Date/Time

2. RECEIVED BY: Victoria Hermosilla — Signature; Victoria Hermosilla — Printed Name; CCA — Firm; 11/20/14, 13:50 — Date/Time

3. RELINQUISHED BY: Victoria Hermosilla — Signature; Victoria Hermosilla — Printed Name; CCA — Firm; 11/20/14, 14:15 — Date/Time

4. RECEIVED BY: Signature; Printed Name; TURNER LABORATORIES, INC. — Firm; 11/21/14 1000 — Date/Time

TURNAROUND REQUIREMENTS:
____ Standard (approx. 10 days)*
____ Next Day ____ 2 Day ____ 5 Day*
____ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____ Y ____ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 3.2
☒ Wet Ice
☐ Ambient
☐ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No		Custody Seals ☐	Preservation Confirmation ☒
ADEQ Forms: ☐ Yes ☐ No		Container Intact ☒	Appropriate Head Space ☒
Mail ADEQ Forms: ☐ Yes ☐ No		COC / Labels Agree ☒	Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:

December 19, 2014

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 14L0162
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 12/02/2014 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Terri L. Garcia

Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0162
Date Received: 12/02/2014

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
14L0162-01	BMO-2014-2BU	Ground Water	12/01/2014 1305

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0162
Date Received: 12/02/2014

Case Narrative

H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0162
Lab Sample ID: 14L0162-01

Client Sample ID: BMO-2014-2BU
Collection Date/Time: 12/01/2014 1305
Matrix: Ground Water
Order Name: 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	110	4.0		mg/L	1	12/02/2014 1140	12/06/2014 1547	RAD
Magnesium	14	3.0		mg/L	1	12/02/2014 1140	12/06/2014 1547	RAD
Potassium	ND	5.0		mg/L	1	12/02/2014 1140	12/06/2014 1547	RAD
Sodium	34	5.0		mg/L	1	12/02/2014 1140	12/06/2014 1548	RAD
pH-E150.1								
pH (pH Units)	7.3	0.0	H5	-	1	12/02/2014 1150	12/02/2014 1200	AC
Temperature (°C)	21		H5	-	1	12/02/2014 1150	12/02/2014 1200	AC
Anions by Ion Chromatography-E300								
Chloride	39	25		mg/L	25	12/02/2014 0920	12/03/2014 1150	AC
Fluoride	ND	0.50		mg/L	1	12/02/2014 0920	12/02/2014 1642	AC
Nitrogen, Nitrate (As N)	4.1	0.50		mg/L	1	12/02/2014 0920	12/02/2014 1642	AC
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	12/02/2014 0920	12/02/2014 1642	AC
Sulfate	230	130		mg/L	25	12/02/2014 0920	12/03/2014 1150	AC
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	170	2.0		mg/L	1	12/08/2014 1445	12/08/2014 1520	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	12/08/2014 1445	12/08/2014 1520	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	12/08/2014 1445	12/08/2014 1520	CC
Alkalinity, Total (As CaCO3)	170	2.0		mg/L	1	12/08/2014 1445	12/08/2014 1520	CC
Specific Conductance-SM2510 B								
Conductivity	860	0.10		µmhos/cm	1	12/03/2014 1420	12/03/2014 1435	AC
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	560	20		mg/L	1	12/04/2014 0800	12/05/2014 1150	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0162
Date Received: 12/02/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1412088 - E 200.7										
Blank (1412088-BLK1)				Prepared: 12/04/2014 Analyzed: 12/06/2014						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1412088-BS1)				Prepared: 12/04/2014 Analyzed: 12/06/2014						
Calcium	10	4.0	mg/L	10.00		100	85-115			
Magnesium	10	3.0	mg/L	10.00		100	85-115			
Potassium	9.8	5.0	mg/L	10.00		98	85-115			
Sodium	11	5.0	mg/L	10.00		111	85-115			
LCS Dup (1412088-BSD1)				Prepared: 12/04/2014 Analyzed: 12/06/2014						
Calcium	10	4.0	mg/L	10.00		100	85-115	0.4	20	
Magnesium	9.9	3.0	mg/L	10.00		99	85-115	0.9	20	
Potassium	9.9	5.0	mg/L	10.00		99	85-115	0.4	20	
Sodium	11	5.0	mg/L	10.00		109	85-115	1	20	
Matrix Spike (1412088-MS1)	**Source: 14L0162-01**			Prepared: 12/04/2014 Analyzed: 12/06/2014						
Calcium	120	4.0	mg/L	10.00	110	91	70-130			
Magnesium	25	3.0	mg/L	10.00	14	105	70-130			
Potassium	13	5.0	mg/L	10.00	2.8	103	70-130			
Sodium	45	5.0	mg/L	10.00	34	108	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0162
Date Received: 12/02/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1412044 - E150.1										
Duplicate (1412044-DUP1)		**Source: 14L0162-01**		Prepared & Analyzed: 12/02/2014						
pH (pH Units)	7.3	0.0	-		7.3			0.1	200	H5
Temperature (°C)	21		-		21			2	200	H5
Batch 1412064 - SM2510 B										
Duplicate (1412064-DUP1)		**Source: 14L0241-01**		Prepared & Analyzed: 12/03/2014						
Conductivity	550	0.10	µmhos/cm		540			2	10	
Batch 1412080 - SM2540 C										
Duplicate (1412080-DUP1)		**Source: 14L0008-01**		Prepared: 12/04/2014 Analyzed: 12/05/2014						
Total Dissolved Solids (Residue, Filterable)	870	20	mg/L		880			0.5	5	
Batch 1412096 - SM2320B										
LCS (1412096-BS1)				Prepared & Analyzed: 12/08/2014						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		100	90-110			
LCS Dup (1412096-BSD1)				Prepared & Analyzed: 12/08/2014						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		99	90-110	0.8	10	
Matrix Spike (1412096-MS1)		**Source: 14L0241-02**		Prepared & Analyzed: 12/08/2014						
Alkalinity, Total (As CaCO3)	300	2.0	mg/L	250.0	68	94	85-115			
Matrix Spike Dup (1412096-MSD1)		**Source: 14L0241-02**		Prepared & Analyzed: 12/08/2014						
Alkalinity, Total (As CaCO3)	300	2.0	mg/L	250.0	68	93	85-115	1	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0162
Date Received: 12/02/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1412026 - E300										
Blank (1412026-BLK1)				Prepared & Analyzed: 12/02/2014						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1412026-BS1)				Prepared & Analyzed: 12/02/2014						
Chloride	12	1.0	mg/L	12.50		95	90-110			
Fluoride	2.0	0.50	mg/L	2.000		102	90-110			
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		99	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		100	90-110			
Sulfate	13	5.0	mg/L	12.50		101	90-110			
LCS Dup (1412026-BSD1)				Prepared & Analyzed: 12/02/2014						
Chloride	12	1.0	mg/L	12.50		96	90-110	0.2	10	
Fluoride	2.0	0.50	mg/L	2.000		102	90-110	0.05	10	
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		99	90-110	0.2	10	
Nitrogen, Nitrite (As N)	2.6	0.10	mg/L	2.500		102	90-110	2	10	
Sulfate	13	5.0	mg/L	12.50		101	90-110	0.06	10	
Matrix Spike (1412026-MS1)		**Source: 14L0162-01**		Prepared & Analyzed: 12/02/2014						
Fluoride	2.1	0.50	mg/L	2.000	0.23	94	80-120			
Nitrogen, Nitrate (As N)	9.1	0.50	mg/L	5.000	4.1	99	80-120			
Nitrogen, Nitrite (As N)	2.1	0.10	mg/L	2.500	ND	83	80-120			
Matrix Spike (1412026-MS2)		**Source: 14L0191-02**		Prepared & Analyzed: 12/02/2014						
Fluoride	2.0	0.50	mg/L	2.000	ND	101	80-120			
Nitrogen, Nitrite (As N)	1.9	0.10	mg/L	2.500	ND	78	80-120			
Matrix Spike (1412026-MS3)		**Source: 14L0162-01RE1**		Prepared: 12/02/2014 Analyzed: 12/03/2014						
Chloride	12		mg/L	12.50	1.6	87	80-120			
Sulfate	21		mg/L	12.50	9.2	92	80-120			
Matrix Spike (1412026-MS4)		**Source: 14L0008-01RE1**		Prepared: 12/02/2014 Analyzed: 12/03/2014						
Nitrogen, Nitrate (As N)	6.8		mg/L	5.000	1.9	99	80-120			
Nitrogen, Nitrite (As N)	2.3		mg/L	2.500		92	80-120			
Matrix Spike (1412026-MS5)		**Source: 14L0191-02**		Prepared: 12/02/2014 Analyzed: 12/03/2014						
Fluoride	2.0		mg/L	2.000	0.036	97	80-120			
Nitrogen, Nitrate (As N)	7.4		mg/L	5.000	2.6	97	80-120			
Nitrogen, Nitrite (As N)	2.0		mg/L	2.500	ND	82	80-120			
Sulfate	29		mg/L	12.50	17	95	80-120			
Matrix Spike Dup (1412026-MSD1)		**Source: 14L0162-01**		Prepared & Analyzed: 12/02/2014						
Fluoride	2.1	0.50	mg/L	2.000	0.23	94	80-120	0.7	10	
Nitrogen, Nitrate (As N)	9.1	0.50	mg/L	5.000	4.1	99	80-120	0.4	10	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	86	80-120	3	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 14L0162
Date Received: 12/02/2014

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1412026 - E300										
Matrix Spike Dup (1412026-MSD2)	**Source: 14L0191-02**			Prepared & Analyzed: 12/02/2014						
Fluoride	2.1	0.50	mg/L	2.000	ND	103	80-120	2	10	
Nitrogen, Nitrite (As N)	2.0	0.10	mg/L	2.500	ND	81	80-120	4	10	
Matrix Spike Dup (1412026-MSD3)	**Source: 14L0162-01RE1**			Prepared: 12/02/2014 Analyzed: 12/03/2014						
Chloride	13		mg/L	12.50	1.6	88	80-120	0.7	10	
Sulfate	21		mg/L	12.50	9.2	94	80-120	1	10	
Matrix Spike Dup (1412026-MSD4)	**Source: 14L0008-01RE1**			Prepared: 12/02/2014 Analyzed: 12/03/2014						
Nitrogen, Nitrate (As N)	6.7		mg/L	5.000	1.9	97	80-120	1	10	
Nitrogen, Nitrite (As N)	2.3		mg/L	2.500		93	80-120	0.7	10	
Matrix Spike Dup (1412026-MSD5)	**Source: 14L0191-02**			Prepared: 12/02/2014 Analyzed: 12/03/2014						
Fluoride	2.0		mg/L	2.000	0.036	97	80-120	0.3	10	
Nitrogen, Nitrate (As N)	7.4		mg/L	5.000	2.6	97	80-120	0.3	10	
Nitrogen, Nitrite (As N)	2.1		mg/L	2.500	ND	83	80-120	1	10	
Sulfate	29		mg/L	12.50	17	95	80-120	0.01	10	

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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 1410162 DATE 12/2/14 PAGE 1 OF 1

PROJECT NAME Ex. GW Monitoring # 287091
CONTACT NAME Ben Daigneau & Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. # 101 Tucson AZ
ZIP 85701 PHONE 520 622-3232 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE Melanie Lindsey

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270	Acids	Volatile Organics 624	524.2	8260	TTHMS	HAA5	Chloride	Sulfate	Resistivity	NO_2	NO_3	TKN	1664	TPH	Oil & Grease	VOA	TCLP Analysis SemiVOA	Pest.	TCLP	Metals Dissolved	Total	RCRA8	Total	Cyanide Amen.	WAD	SDWA-INORGANICS PRIMARY	SECONDARY	MPN	Californ PIA	Fecal	pH	Cl_2	C_6	Turb	COD	TSS	BOD	F, Ca, Mg, K, Na	Total Alkalinity as $CaCO_3$	*See Quote
BMO-2014-ZBU	12/1/14	13:05		GW	3								X			X										X																	X	X		

1. RELINQUISHED BY:
Signature: Melanie Lindsey
Printed Name: Melanie Lindsey
Firm: Clear Creek Assoc.
Date/Time: 12/1/14 13:37

2. RECEIVED BY:
Signature:
Printed Name:
Firm: UPS
Date/Time:

TURNAROUND REQUIREMENTS:
____ Standard (approx. 10 days)*
____ Next Day ____ 2 Day ____ 5 Day*
X Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____Y ____N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 13.7
☐ Wet Ice
☒ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature:
Printed Name:
Firm: UPS
Date/Time:

4. RECEIVED BY:
Signature:
Printed Name:
Firm: TURNER LABORATORIES, INC.
Date/Time: 12/2/14 1113

* LEGEND
SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No		Custody Seals ☐	Preservation Confirmation ☒
ADEQ Forms: ☐ Yes ☐ No		Container Intact ☒	Appropriate Head Space ☒
Mail ADEQ Forms: ☐ Yes ☐ No		COC / Labels Agree ☒	Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:

March 03, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15B0530
Order Name: New Project 9-29-14

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 02/16/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0530
Date Received: 02/16/2015

Order: New Project 9-29-14

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15B0530-01	BMO-2014-3BL	Ground Water	02/13/2015 1416

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0530
Date Received: 02/16/2015

Case Narrative

H3 Sample was received and/or analysis requested past holding time.

H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0530
Lab Sample ID: 15B0530-01

Client Sample ID: BMO-2014-3BL
Collection Date/Time: 02/13/2015 1416
Matrix: Ground Water
Order Name: New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	47	4.0		mg/L	1	02/16/2015 1010	02/17/2015 1515	RAD
Magnesium	7.0	3.0		mg/L	1	02/16/2015 1010	02/17/2015 1515	RAD
Potassium	ND	5.0		mg/L	1	02/16/2015 1010	02/17/2015 1515	RAD
Sodium	21	5.0		mg/L	1	02/16/2015 1010	02/17/2015 1515	RAD
pH-E150.1								
pH (pH Units)	7.6	0.0	H5	-	1	02/16/2015 1015	02/16/2015 1025	EK
Temperature (°C)	18		H5	-	1	02/16/2015 1015	02/16/2015 1025	EK
Anions by Ion Chromatography-E300								
Chloride	8.7	1.0		mg/L	1	02/16/2015 0938	02/16/2015 1259	AC
Fluoride	ND	0.50		mg/L	1	02/16/2015 0938	02/16/2015 1259	AC
Nitrogen, Nitrate (As N)	1.2	0.50	H3	mg/L	1	02/16/2015 0938	02/16/2015 1259	AC
Nitrogen, Nitrite (As N)	ND	0.10	H3	mg/L	1	02/16/2015 0938	02/16/2015 1259	AC
Sulfate	7.8	5.0		mg/L	1	02/16/2015 0938	02/16/2015 1259	AC
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	190	2.0		mg/L	1	02/19/2015 1515	02/19/2015 1550	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	02/19/2015 1515	02/19/2015 1550	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	02/19/2015 1515	02/19/2015 1550	CC
Alkalinity, Total (As CaCO3)	190	2.0		mg/L	1	02/19/2015 1515	02/19/2015 1550	CC
Specific Conductance-SM2510 B								
Conductivity	410	0.10		µmhos/cm	1	02/25/2015 1020	02/25/2015 1028	EK
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	260	20		mg/L	1	02/17/2015 0815	02/18/2015 1315	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0530
Date Received: 02/16/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1502162 - E 200.7										
Blank (1502162-BLK1)				Prepared: 02/16/2015 Analyzed: 02/17/2015						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1502162-BS1)				Prepared: 02/16/2015 Analyzed: 02/17/2015						
Calcium	9.2	4.0	mg/L	10.00		92	85-115			
Magnesium	9.5	3.0	mg/L	10.00		95	85-115			
Potassium	9.5	5.0	mg/L	10.00		95	85-115			
Sodium	9.7	5.0	mg/L	10.00		97	85-115			
LCS Dup (1502162-BSD1)				Prepared: 02/16/2015 Analyzed: 02/17/2015						
Calcium	9.1	4.0	mg/L	10.00		91	85-115	1	20	
Magnesium	9.4	3.0	mg/L	10.00		94	85-115	0.6	20	
Potassium	9.3	5.0	mg/L	10.00		93	85-115	2	20	
Sodium	9.6	5.0	mg/L	10.00		96	85-115	0.8	20	
Matrix Spike (1502162-MS1)	**Source: 15B0530-01**			Prepared: 02/16/2015 Analyzed: 02/17/2015						
Calcium	55	4.0	mg/L	10.00	47	76	70-130			
Magnesium	16	3.0	mg/L	10.00	7.0	90	70-130			
Potassium	11	5.0	mg/L	10.00	1.6	91	70-130			
Sodium	30	5.0	mg/L	10.00	21	90	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0530
Date Received: 02/16/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1502156 - E150.1										
Duplicate (1502156-DUP1)		**Source: 15B0530-01**		Prepared & Analyzed: 02/16/2015						
pH (pH Units)	7.6	0.0	-		7.6			0.5	200	
Temperature (°C)	18		-		18			0.6	200	
Batch 1502185 - SM2540 C										
Duplicate (1502185-DUP1)		**Source: 15B0530-01**		Prepared: 02/17/2015 Analyzed: 02/18/2015						
Total Dissolved Solids (Residue, Filterable)	250	20	mg/L		260			2	5	
Batch 1502203 - SM2320B										
LCS (1502203-BS1)				Prepared & Analyzed: 02/19/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		99	90-110			
LCS Dup (1502203-BSD1)				Prepared & Analyzed: 02/19/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		98	90-110	0.8	10	
Matrix Spike (1502203-MS1)		**Source: 15B0606-01**		Prepared & Analyzed: 02/19/2015						
Alkalinity, Total (As CaCO3)	320	2.0	mg/L	250.0	84	94	85-115			
Matrix Spike Dup (1502203-MSD1)		**Source: 15B0606-01**		Prepared & Analyzed: 02/19/2015						
Alkalinity, Total (As CaCO3)	320	2.0	mg/L	250.0	84	94	85-115	0.6	10	
Batch 1502257 - SM2510 B										
Duplicate (1502257-DUP1)		**Source: 15B0530-01**		Prepared & Analyzed: 02/25/2015						
Conductivity	400	0.10	µmhos/cm		410			1	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0530
Date Received: 02/16/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1502146 - E300										
Blank (1502146-BLK1)				Prepared & Analyzed: 02/16/2015						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1502146-BS1)				Prepared & Analyzed: 02/16/2015						
Chloride	12	1.0	mg/L	12.50		96	90-110			
Fluoride	2.0	0.50	mg/L	2.000		101	90-110			
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		97	90-110			
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500		98	90-110			
Sulfate	12	5.0	mg/L	12.50		99	90-110			
LCS Dup (1502146-BSD1)				Prepared & Analyzed: 02/16/2015						
Chloride	12	1.0	mg/L	12.50		96	90-110	0.05	10	
Fluoride	2.0	0.50	mg/L	2.000		100	90-110	0.8	10	
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		97	90-110	0.4	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		99	90-110	0.7	10	
Sulfate	12	5.0	mg/L	12.50		99	90-110	0.02	10	
Matrix Spike (1502146-MS1)	**Source: 15B0530-01**			Prepared & Analyzed: 02/16/2015						
Chloride	21	1.0	mg/L	12.50	8.7	97	80-120			
Fluoride	2.1	0.50	mg/L	2.000	0.22	93	80-120			
Nitrogen, Nitrate (As N)	5.9	0.50	mg/L	5.000	1.2	94	80-120			
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500	ND	94	80-120			
Sulfate	20	5.0	mg/L	12.50	7.8	95	80-120			
Matrix Spike Dup (1502146-MSD1)	**Source: 15B0530-01**			Prepared & Analyzed: 02/16/2015						
Chloride	21	1.0	mg/L	12.50	8.7	97	80-120	0.2	10	
Fluoride	2.1	0.50	mg/L	2.000	0.22	93	80-120	0.5	10	
Nitrogen, Nitrate (As N)	5.9	0.50	mg/L	5.000	1.2	95	80-120	0.5	10	
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500	ND	95	80-120	1	10	
Sulfate	20	5.0	mg/L	12.50	7.8	95	80-120	0.05	10	

TURNER LABORATORIES INC.
2445 N. Coyote Drive, Suite 104
Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 15B0530 DATE 2/16/15 PAGE 1 OF 1

PROJECT NAME Exp. GW Monitoring # 2570S1
CONTACT NAME Ben Daigneau + Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave Ste 101. Tucson, AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE David Pence

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS
BMO-2014-3BL	2/13/15	14:16		GW	1
BMO-2014-3BL	2/13/15	14:16		GW	1
BMO-2014-3BL	2/13/15	14:16		GW	1

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX

Base Neutrals 625/8270 ☐ Acids ☐
Volatile Organics 624 ☐ 524.2 ☐ 8260 ☐
TTHMS ☐ HAA5 ☐
Chloride ☒ Sulfate ☒ Resistivity ☐
NO_3 ☒ NO_2 ☐ TKN ☐
TPH ☐ 1664 ☐ Oil & Grease ☐
VOA ☐ TCLP Analysis Semi-VOA ☐ Pest. ☐
TCLP ☐ Dissolved ☒ Metals Total ☐ RCRA8 ☐
Total ☐ Cyanide Amen. ☐ WAD ☐
SDWA-INORGANICS PRIMARY ☐ SECONDARY ☐
MPN ☐ Coliform PA ☐ Fecal ☐
pH ☐ C_l ☐ C_l ☐ Turb ☐
COD ☐ TSS ☐ BOD ☐
F, Ca, Mg, K, N_2
Total Alkalinity as $CaCO_3$
* See Quote

1. RELINQUISHED BY:
David Pence
Signature
David Pence
Printed Name
Clear Creek
Firm
2/13/15 17:45
Date/Time

2. RECEIVED BY:
Signature
Ben Daigneau
Printed Name
Clear Creek
Firm
2/16/15 07:30
Date/Time

3. RELINQUISHED BY:
Signature
Ben Daigneau
Printed Name
Clear Creek
Firm
2/16/15 08:00
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
2/16/15 08:00
Date/Time

TURNAROUND REQUIREMENTS:
____ Standard (approx. 10 days)*
____ Next Day ____ 2 Day ____ 5 Day*
____ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____ Y ____ N
P.O. # ____
Bill to: ____

SAMPLE RECEIPT:
Total Containers 3
Temperature 5.4
☐ Wet Ice
☐ Ambient
☒ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☒
COC / Labels Agree ☒

Preservation Confirmation ☒
Appropriate Head Space ☒
Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:
Please run out of hold time if necessary

Project Information

Clear Creek Associates

221 N. Court Ave., Suite 101
Tucson, AZ 85701
Laboratory PM: **Terri Garcia**

:EK ASSOCIATES
Phone:(520) 622-3222
Fax:(520) 622-4040

2/16/2015

Project Name:	Exp GW Monitoring	**Invoice To:**	Clear Creek Associates
Project Number:	New Project 9-29-14	**Invoice Bid:**	New Project 9-29-14
Client PM:	Ben Daigneau	**Invoice Manager:**	Tracy Hillman
Comments:	Temperature - NC. All Sulfates will be a 24 hr TAT. Everything else is a 10 day TAT.		

Analysis	Comment
Total Dissolved Solids	
Sulfate by Ion Chromatography	
pH	
Nitrite by Ion Chromatography	
Nitrate by Ion Chromatography	
Na by ICP, Dissolved	
Mg by ICP, Dissolved	
Metals Prep ICP	
K by ICP, Dissolved	
IC Prep	
Fluoride by Ion Chromatography	
Conductivity	
Chloride by Ion Chromatography	
Ca by ICP, Dissolved	
Alkalinity	

March 11, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15B0751
Order Name: Exp GW Mon 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 02/26/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0751
Date Received: 02/26/2015

Order: Exp GW Mon 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15B0751-01	BMO-2014-3BU	Ground Water	02/24/2015 1545

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0751
Date Received: 02/26/2015

Case Narrative

H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0751
Lab Sample ID: 15B0751-01

Client Sample ID: BMO-2014-3BU
Collection Date/Time: 02/24/2015 1545
Matrix: Ground Water
Order Name: Exp GW Mon 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	57	4.0		mg/L	1	02/26/2015 1455	03/04/2015 1146	RAD
Magnesium	7.9	3.0		mg/L	1	02/26/2015 1455	03/04/2015 1146	RAD
Potassium	ND	5.0		mg/L	1	02/26/2015 1455	03/04/2015 1146	RAD
Sodium	22	5.0		mg/L	1	02/26/2015 1455	03/04/2015 1146	RAD
pH-E150.1								
pH (pH Units)	7.5	0.0	H5	-	1	02/26/2015 1210	02/26/2015 1212	EK
Temperature (°C)	21		H5	-	1	02/26/2015 1210	02/26/2015 1212	EK
Anions by Ion Chromatography-E300								
Chloride	30	5.0		mg/L	5	02/26/2015 1100	02/27/2015 2156	AC
Fluoride	ND	0.50		mg/L	1	02/26/2015 1100	02/26/2015 1215	AC
Nitrogen, Nitrate (As N)	3.7	0.50		mg/L	1	02/26/2015 1100	02/26/2015 1215	AC
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	02/26/2015 1100	02/26/2015 1215	AC
Sulfate	8.2	5.0		mg/L	1	02/26/2015 1100	02/26/2015 1215	AC
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	180	2.0		mg/L	1	02/26/2015 1510	02/26/2015 1605	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	02/26/2015 1510	02/26/2015 1605	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	02/26/2015 1510	02/26/2015 1605	CC
Alkalinity, Total (As CaCO3)	180	2.0		mg/L	1	02/26/2015 1510	02/26/2015 1605	CC
Specific Conductance-SM2510 B								
Conductivity	490	0.10		µmhos/cm	1	03/02/2015 1320	03/02/2015 1322	EK
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	270	20		mg/L	1	03/02/2015 0930	03/03/2015 1650	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0751
Date Received: 02/26/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503032 - E 200.7										
Blank (1503032-BLK1)				Prepared: 03/03/2015 Analyzed: 03/04/2015						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1503032-BS1)				Prepared: 03/03/2015 Analyzed: 03/04/2015						
Calcium	9.5	4.0	mg/L	10.00		95	85-115			
Magnesium	9.7	3.0	mg/L	10.00		97	85-115			
Potassium	9.2	5.0	mg/L	10.00		92	85-115			
Sodium	10	5.0	mg/L	10.00		100	85-115			
LCS Dup (1503032-BSD1)				Prepared: 03/03/2015 Analyzed: 03/04/2015						
Calcium	9.4	4.0	mg/L	10.00		94	85-115	2	20	
Magnesium	9.6	3.0	mg/L	10.00		96	85-115	0.5	20	
Potassium	9.1	5.0	mg/L	10.00		91	85-115	2	20	
Sodium	10	5.0	mg/L	10.00		100	85-115	0.2	20	
Matrix Spike (1503032-MS1)	**Source: 15C0185-01**			Prepared: 03/03/2015 Analyzed: 03/04/2015						
Calcium	87	4.0	mg/L	10.00	78	88	70-130			
Magnesium	20	3.0	mg/L	10.00	11	92	70-130			
Potassium	12	5.0	mg/L	10.00	2.3	93	70-130			
Sodium	42	5.0	mg/L	10.00	33	88	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0751
Date Received: 02/26/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1502270 - SM2320B										
LCS (1502270-BS1)				Prepared & Analyzed: 02/26/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		99	90-110			
LCS Dup (1502270-BSD1)				Prepared & Analyzed: 02/26/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		99	90-110	0	10	
Matrix Spike (1502270-MS1)		**Source: 15B0760-01**		Prepared & Analyzed: 02/26/2015						
Alkalinity, Total (As CaCO3)	370	2.0	mg/L	250.0	120	100	85-115			
Matrix Spike Dup (1502270-MSD1)		**Source: 15B0760-01**		Prepared & Analyzed: 02/26/2015						
Alkalinity, Total (As CaCO3)	360	2.0	mg/L	250.0	120	98	85-115	1	10	
Batch 1502275 - E150.1										
Duplicate (1502275-DUP1)		**Source: 15B0751-01**		Prepared & Analyzed: 02/26/2015						
pH (pH Units)	7.5	0.0	-		7.5			0.5	200	
Temperature (°C)	21		-		21			2	200	
Batch 1503025 - SM2510 B										
Duplicate (1503025-DUP1)		**Source: 15B0751-01**		Prepared & Analyzed: 03/02/2015						
Conductivity	490	0.10	µmhos/cm		490			0.4	10	
Batch 1503028 - SM2540 C										
Duplicate (1503028-DUP1)		**Source: 15B0698-01**		Prepared & Analyzed: 03/02/2015						
Total Dissolved Solids (Residue, Filterable)	260	20	mg/L		260			0.8	5	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15B0751
Date Received: 02/26/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1502253 - E300										
Blank (1502253-BLK1)				Prepared & Analyzed: 02/26/2015						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1502253-BS1)				Prepared & Analyzed: 02/26/2015						
Chloride	12	1.0	mg/L	12.50		95	90-110			
Fluoride	2.1	0.50	mg/L	2.000		104	90-110			
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		96	90-110			
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500		96	90-110			
Sulfate	13	5.0	mg/L	12.50		100	90-110			
LCS Dup (1502253-BSD1)				Prepared & Analyzed: 02/26/2015						
Chloride	12	1.0	mg/L	12.50		95	90-110	0.2	10	
Fluoride	2.1	0.50	mg/L	2.000		103	90-110	0.9	10	
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		96	90-110	0.02	10	
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500		97	90-110	0.7	10	
Sulfate	12	5.0	mg/L	12.50		100	90-110	0.3	10	
Matrix Spike (1502253-MS1)		**Source: 15B0751-01**		Prepared & Analyzed: 02/26/2015						
Fluoride	2.3	0.50	mg/L	2.000	0.25	102	80-120			
Nitrogen, Nitrate (As N)	8.6	0.50	mg/L	5.000	3.7	97	80-120			
Nitrogen, Nitrite (As N)	2.1	0.10	mg/L	2.500	ND	86	80-120			
Sulfate	20	5.0	mg/L	12.50	8.2	96	80-120			
Matrix Spike (1502253-MS2)		**Source: 15B0751-01**		Prepared & Analyzed: 02/26/2015						
Chloride	18		mg/L	12.50	6.7	89	80-120			
Matrix Spike Dup (1502253-MSD1)		**Source: 15B0751-01**		Prepared & Analyzed: 02/26/2015						
Fluoride	2.3	0.50	mg/L	2.000	0.25	101	80-120	1	10	
Nitrogen, Nitrate (As N)	8.5	0.50	mg/L	5.000	3.7	96	80-120	0.9	10	
Nitrogen, Nitrite (As N)	2.1	0.10	mg/L	2.500	ND	85	80-120	1	10	
Sulfate	20	5.0	mg/L	12.50	8.2	93	80-120	1	10	
Matrix Spike Dup (1502253-MSD2)		**Source: 15B0751-01**		Prepared & Analyzed: 02/26/2015						
Chloride	18		mg/L	12.50	6.7	89	80-120	0.4	10	

TURNER LABORATORIES INC
2445 N. Coyote Drive, Suite 104
Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 15B0751 DATE _____ PAGE 1 OF 1

PROJECT NAME Exp GW Mon # 287051
CONTACT NAME Ben Daigneau + Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Ste. 101 Tucson, AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270	Acids	Volatile Organics 624	524.2	8260	THMS	HAA5	Chloride	Sulfate	Resistivity	NO_3	NO_2	TKN	TPH	1664	Oil & Grease	VOA	TCLP Analysis SemiVOA	Pest.	TCLP	Metals Dissolved	Total	RCRA8	Total	Cyanide Amen.	WAD	SDWA-INORGANICS PRIMARY	SECONDARY	Coliform MPN	PIA	pH	Fecal	Cl_2	Cr_6	COD	Turb	TSS	BOD	F, Ca, Mg, K, Na	Total Alkalinity as $CaCO_3$	* See Quote
BMO-2014-3BU	2/24/15	15:45		GW	3								X			X										X																	X	X	X	

1. RELINQUISHED BY:
Signature
Printed Name Ryan Toomey
Firm Clear Creek
Date/Time 2/25/15 09:30

2. RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

TURNAROUND REQUIREMENTS:
X Standard (approx. 10 days)*
___ Next Day ___ 2 Day ___ 5 Day*
X Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 2.9
X Wet Ice
Ambient
Blue Ice

3. RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
2/26/15 1151
Date/Time

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No		Custody Seals ☐	Preservation Confirmation ☑
ADEQ Forms: ☐ Yes ☐ No		Container Intact ☑	Appropriate Head Space N/A ☐
Mail ADEQ Forms: ☐ Yes ☐ No		COC / Labels Agree ☒	Received Within Hold Time ☑

SPECIAL INSTRUCTIONS/COMMENTS:

March 20, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15C0312
Order Name: Exp GW Monitoring
287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 03/06/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0312
Date Received: 03/06/2015

Order: Exp GW Monitoring 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15C0312-01	BMO-2014-4B	Ground Water	03/04/2015 1512

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0312
Date Received: 03/06/2015

Case Narrative

H3	Sample was received and/or analysis requested past holding time.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.
N4	The Minimum Reporting Limit (MRL) verificataion check did not meet laboratory acceptance limits.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0312
Lab Sample ID: 15C0312-01

Client Sample ID: BMO-2014-4B
Collection Date/Time: 03/04/2015 1512
Matrix: Ground Water
Order Name: Exp GW Monitoring 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	59	4.0		mg/L	1	03/06/2015 1655	03/17/2015 0938	RAD
Magnesium	8.7	3.0		mg/L	1	03/06/2015 1655	03/17/2015 0939	RAD
Potassium	ND	5.0		mg/L	1	03/06/2015 1655	03/17/2015 0938	RAD
Sodium	29	5.0		mg/L	1	03/06/2015 1655	03/17/2015 0939	RAD
pH-E150.1								
pH (pH Units)	7.7	0.0	H5	-	1	03/06/2015 1600	03/06/2015 1607	EK
Temperature (°C)	23		H5	-	1	03/06/2015 1600	03/06/2015 1607	EK
Anions by Ion Chromatography-E300								
Chloride	19	1.0		mg/L	1	03/06/2015 1130	03/06/2015 2203	MR
Fluoride	ND	0.50		mg/L	1	03/06/2015 1130	03/06/2015 2203	MR
Nitrogen, Nitrate (As N)	2.4	0.50	H3	mg/L	1	03/06/2015 1130	03/06/2015 2203	MR
Nitrogen, Nitrite (As N)	ND	0.10	H3, N4	mg/L	1	03/06/2015 1130	03/06/2015 2203	MR
Sulfate	65	25		mg/L	5	03/06/2015 1130	03/09/2015 1403	MR
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	170	2.0		mg/L	1	03/13/2015 1435	03/13/2015 1515	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	03/13/2015 1435	03/13/2015 1515	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	03/13/2015 1435	03/13/2015 1515	CC
Alkalinity, Total (As CaCO3)	170	2.0		mg/L	1	03/13/2015 1435	03/13/2015 1515	CC
Specific Conductance-SM2510 B								
Conductivity	530	0.10		µmhos/cm	1	03/06/2015 1600	03/06/2015 1605	EK
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	330	20		mg/L	1	03/11/2015 0810	03/12/2015 1230	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0312
Date Received: 03/06/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503163 - E 200.7										
Blank (1503163-BLK1)				Prepared: 03/16/2015 Analyzed: 03/17/2015						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1503163-BS1)				Prepared: 03/16/2015 Analyzed: 03/17/2015						
Calcium	9.7	4.0	mg/L	10.00		97	85-115			
Magnesium	9.9	3.0	mg/L	10.00		99	85-115			
Potassium	9.4	5.0	mg/L	10.00		94	85-115			
Sodium	10	5.0	mg/L	10.00		104	85-115			
LCS Dup (1503163-BSD1)				Prepared: 03/16/2015 Analyzed: 03/17/2015						
Calcium	9.8	4.0	mg/L	10.00		98	85-115	1	20	
Magnesium	10	3.0	mg/L	10.00		100	85-115	0.1	20	
Potassium	9.4	5.0	mg/L	10.00		94	85-115	0.1	20	
Sodium	10	5.0	mg/L	10.00		102	85-115	2	20	
Matrix Spike (1503163-MS1)	**Source: 15C0514-01**			Prepared: 03/16/2015 Analyzed: 03/17/2015						
Calcium	96	4.0	mg/L	10.00	91	45	70-130			M3
Magnesium	22	3.0	mg/L	10.00	13	90	70-130			
Potassium	12	5.0	mg/L	10.00	2.4	95	70-130			
Sodium	44	5.0	mg/L	10.00	37	75	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0312
Date Received: 03/06/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503072 - SM2510 B										
Duplicate (1503072-DUP1)		**Source: 15C0185-01**		Prepared & Analyzed: 03/06/2015						
Conductivity	700	0.10	µmhos/cm		700			0.4	10	
Batch 1503080 - E150.1										
Duplicate (1503080-DUP1)		**Source: 15C0312-01**		Prepared & Analyzed: 03/06/2015						
pH (pH Units)	7.7	0.0	-		7.7			0.3	200	
Temperature (°C)	24		-		23			8	200	
Batch 1503114 - SM2540 C										
Duplicate (1503114-DUP1)		**Source: 15C0284-01**		Prepared: 03/11/2015 Analyzed: 03/12/2015						
Total Dissolved Solids (Residue, Filterable)	89	20	mg/L		91			2	5	
Batch 1503154 - SM2320B										
LCS (1503154-BS1)				Prepared & Analyzed: 03/13/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		100	90-110			
LCS Dup (1503154-BSD1)				Prepared & Analyzed: 03/13/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		101	90-110	0.8	10	
Matrix Spike (1503154-MS1)		**Source: 15C0386-01**		Prepared & Analyzed: 03/13/2015						
Alkalinity, Total (As CaCO3)	350	2.0	mg/L	250.0	110	96	85-115			
Matrix Spike Dup (1503154-MSD1)		**Source: 15C0386-01**		Prepared & Analyzed: 03/13/2015						
Alkalinity, Total (As CaCO3)	350	2.0	mg/L	250.0	110	95	85-115	0.6	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0312
Date Received: 03/06/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503061 - E300										
Blank (1503061-BLK1)				Prepared & Analyzed: 03/06/2015						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1503061-BS1)				Prepared & Analyzed: 03/06/2015						
Chloride	12	1.0	mg/L	12.50		94	90-110			
Fluoride	1.9	0.50	mg/L	2.000		97	90-110			
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000		95	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		98	90-110			
Sulfate	12	5.0	mg/L	12.50		95	90-110			
LCS Dup (1503061-BSD1)				Prepared & Analyzed: 03/06/2015						
Chloride	12	1.0	mg/L	12.50		94	90-110	0.6	10	
Fluoride	2.0	0.50	mg/L	2.000		98	90-110	0.7	10	
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		95	90-110	0.7	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		100	90-110	1	10	
Sulfate	12	5.0	mg/L	12.50		96	90-110	1	10	
Matrix Spike (1503061-MS1)		**Source: 15C0312-01**		Prepared & Analyzed: 03/06/2015						
Fluoride	2.1	0.50	mg/L	2.000	0.28	91	80-120			
Nitrogen, Nitrate (As N)	7.0	0.50	mg/L	5.000	2.4	90	80-120			
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	88	80-120			
Matrix Spike (1503061-MS2)		**Source: 15C0197-01**		Prepared & Analyzed: 03/06/2015						
Chloride	12		mg/L	12.50	0.39	91	80-120			
Sulfate	22		mg/L	12.50	10	95	80-120			
Matrix Spike (1503061-MS3)		**Source: 15C0312-01RE1**		Prepared: 03/06/2015 Analyzed: 03/09/2015						
Sulfate	19		mg/L	12.50	6.5	98	80-120			
Matrix Spike Dup (1503061-MSD1)		**Source: 15C0312-01**		Prepared & Analyzed: 03/06/2015						
Fluoride	2.2	0.50	mg/L	2.000	0.28	94	80-120	3	10	
Nitrogen, Nitrate (As N)	7.1	0.50	mg/L	5.000	2.4	94	80-120	2	10	
Nitrogen, Nitrite (As N)	2.3	0.10	mg/L	2.500	ND	92	80-120	5	10	
Matrix Spike Dup (1503061-MSD2)		**Source: 15C0197-01**		Prepared & Analyzed: 03/06/2015						
Chloride	12		mg/L	12.50	0.39	92	80-120	0.7	10	
Sulfate	22		mg/L	12.50	10	96	80-120	0.3	10	
Matrix Spike Dup (1503061-MSD3)		**Source: 15C0312-01RE1**		Prepared: 03/06/2015 Analyzed: 03/09/2015						
Sulfate	19		mg/L	12.50	6.5	98	80-120	0.2	10	

TURNER LABORATORIES INC.
2445 N. Coyote Drive, Suite 104
Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 1560312 DATE 3/6/15 PAGE 1 OF 1

PROJECT NAME Exp GW Monitoring # 287051
CONTACT NAME Ben Daigneau + Victoria Hermosillo
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Suite #101 Tucson, AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270 ☐ / Acids ☐	Volatile Organics ☐ 624 / ☐ 524.2 / ☐ 8260 / ☐ TTHMS / ☐ HAA5	☒ Chloride / ☒ Sulfate / ☐ Resistivity	NO_2 ☒ / NO_3 ☒ / ☐ TKN	☐ TPH / ☐ 1664 / ☐ Oil & Grease	☐ VOA / ☐ Semi-VOA / ☐ TCLP Analysis / ☐ Pest.	☐ TCLP / ☒ Dissolved / ☐ Total / ☐ RCRA8 / ☐ Metals	☐ Total / ☐ Amen. / ☐ WAD / ☐ Cyanide	☐ PRIMARY / ☐ SDWA-INORGANICS / ☐ SECONDARY	☐ MPN / ☐ PIA / ☐ Coliform	☐ pH / ☐ Cl_2 / ☐ Fecal / ☐ Cl / ☐ Turb	☐ COD / ☐ TSS / ☐ BOD	F, Ca, Mg, K, Na	Total Alkalinity as $CaCO_3$	* See Quote
BMO-2014-4B	3/4/15	15:12		GW	3			X	X			X						X	X	X

1. RELINQUISHED BY:
Signature
Printed Name: Ryan Toomey
Firm: Clear Creek
Date/Time: 3/5/15 09:30

2. RECEIVED BY:
Signature
Printed Name
Firm: Fedex
Date/Time

3. RELINQUISHED BY:
Signature
Printed Name
Firm: Fedex
Date/Time

4. RECEIVED BY:
Signature
Printed Name
Firm: TURNER LABORATORIES, INC.
Date/Time: 3/6/15 1530

TURNAROUND REQUIREMENTS:
___ Standard (approx. 10 days)*
___ Next Day ___ 2 Day ___ 5 Day*
___ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers: 3
Temperature: 1.1
☒ Wet Ice
☐ Ambient
☐ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No	Custody Seals ☐	Preservation Confirmation ☒
ADEQ Forms: ☐ Yes ☐ No	Container Intact ☒	Appropriate Head Space ☒
Mail ADEQ Forms: ☐ Yes ☐ No	COC / Labels Agree ☒	Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:
Recieved NO_2/NO_3 out of hold time
Contacted Client. KLB 3/6/15

March 13, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15C0185
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 03/03/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0185
Date Received: 03/03/2015

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15C0185-01	BMO-2014-4BL	Ground Water	03/01/2015 1520

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0185
Date Received: 03/03/2015

Case Narrative

H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0185
Lab Sample ID: 15C0185-01

Client Sample ID: BMO-2014-4BL
Collection Date/Time: 03/01/2015 1520
Matrix: Ground Water
Order Name: 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	78	4.0		mg/L	1	03/03/2015 1145	03/04/2015 1150	RAD
Magnesium	11	3.0		mg/L	1	03/03/2015 1145	03/04/2015 1150	RAD
Potassium	ND	5.0		mg/L	1	03/03/2015 1145	03/04/2015 1150	RAD
Sodium	33	5.0		mg/L	1	03/03/2015 1145	03/04/2015 1150	RAD
pH-E150.1								
pH (pH Units)	7.5	0.0	H5	-	1	03/03/2015 1140	03/03/2015 1315	EK
Temperature (°C)	21		H5	-	1	03/03/2015 1140	03/03/2015 1315	EK
Anions by Ion Chromatography-E300								
Chloride	19	1.0		mg/L	1	03/03/2015 1115	03/03/2015 1202	MR
Fluoride	ND	0.50		mg/L	1	03/03/2015 1115	03/03/2015 1202	MR
Nitrogen, Nitrate (As N)	2.4	0.50		mg/L	1	03/03/2015 1115	03/03/2015 1202	MR
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	03/03/2015 1115	03/03/2015 1202	MR
Sulfate	170	50		mg/L	10	03/06/2015 1130	03/06/2015 1213	MR
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	170	2.0		mg/L	1	03/05/2015 1520	03/05/2015 1610	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	03/05/2015 1520	03/05/2015 1610	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	03/05/2015 1520	03/05/2015 1610	CC
Alkalinity, Total (As CaCO3)	170	2.0		mg/L	1	03/05/2015 1520	03/05/2015 1610	CC
Specific Conductance-SM2510 B								
Conductivity	700	0.10		µmhos/cm	1	03/06/2015 1230	03/06/2015 1234	EK
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	450	20		mg/L	1	03/05/2015 0830	03/06/2015 1220	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0185
Date Received: 03/03/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503032 - E 200.7										
Blank (1503032-BLK1)				Prepared: 03/03/2015 Analyzed: 03/04/2015						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1503032-BS1)				Prepared: 03/03/2015 Analyzed: 03/04/2015						
Calcium	9.5	4.0	mg/L	10.00		95	85-115			
Magnesium	9.7	3.0	mg/L	10.00		97	85-115			
Potassium	9.2	5.0	mg/L	10.00		92	85-115			
Sodium	10	5.0	mg/L	10.00		100	85-115			
LCS Dup (1503032-BSD1)				Prepared: 03/03/2015 Analyzed: 03/04/2015						
Calcium	9.4	4.0	mg/L	10.00		94	85-115	2	20	
Magnesium	9.6	3.0	mg/L	10.00		96	85-115	0.5	20	
Potassium	9.1	5.0	mg/L	10.00		91	85-115	2	20	
Sodium	10	5.0	mg/L	10.00		100	85-115	0.2	20	
Matrix Spike (1503032-MS1)	**Source: 15C0185-01**			Prepared: 03/03/2015 Analyzed: 03/04/2015						
Calcium	87	4.0	mg/L	10.00	78	88	70-130			
Magnesium	20	3.0	mg/L	10.00	11	92	70-130			
Potassium	12	5.0	mg/L	10.00	2.3	93	70-130			
Sodium	42	5.0	mg/L	10.00	33	88	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0185
Date Received: 03/03/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503038 - E150.1										
Duplicate (1503038-DUP1)		**Source: 15C0185-01**		Prepared & Analyzed: 03/03/2015						
pH (pH Units)	7.6	0.0	-		7.5			0.4	200	
Temperature (°C)	21		-		21			1	200	
Batch 1503058 - SM2320B										
LCS (1503058-BS1)				Prepared & Analyzed: 03/05/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		99	90-110			
LCS Dup (1503058-BSD1)				Prepared & Analyzed: 03/05/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		98	90-110	0.8	10	
Matrix Spike (1503058-MS1)		**Source: 15C0284-02**		Prepared & Analyzed: 03/05/2015						
Alkalinity, Total (As CaCO3)	330	2.0	mg/L	250.0	92	97	85-115			
Matrix Spike Dup (1503058-MSD1)		**Source: 15C0284-02**		Prepared & Analyzed: 03/05/2015						
Alkalinity, Total (As CaCO3)	340	2.0	mg/L	250.0	92	98	85-115	1	10	
Batch 1503059 - SM2540 C										
Duplicate (1503059-DUP1)		**Source: 15C0267-01**		Prepared: 03/05/2015 Analyzed: 03/06/2015						
Total Dissolved Solids (Residue, Filterable)	91	20	mg/L		90			1	5	
Batch 1503072 - SM2510 B										
Duplicate (1503072-DUP1)		**Source: 15C0185-01**		Prepared & Analyzed: 03/06/2015						
Conductivity	700	0.10	µmhos/cm		700			0.4	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0185
Date Received: 03/03/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503017 - E300										
Blank (1503017-BLK1)				Prepared & Analyzed: 03/03/2015						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
LCS (1503017-BS1)				Prepared & Analyzed: 03/03/2015						
Chloride	12	1.0	mg/L	12.50		96	90-110			
Fluoride	1.9	0.50	mg/L	2.000		94	90-110			
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		98	90-110			
Nitrogen, Nitrite (As N)	2.6	0.10	mg/L	2.500		104	90-110			
LCS Dup (1503017-BSD1)				Prepared & Analyzed: 03/03/2015						
Chloride	12	1.0	mg/L	12.50		97	90-110	1	10	
Fluoride	1.9	0.50	mg/L	2.000		95	90-110	1	10	
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000		99	90-110	1	10	
Nitrogen, Nitrite (As N)	2.7	0.10	mg/L	2.500		106	90-110	2	10	
Matrix Spike (1503017-MS1)		**Source: 15C0015-01**		Prepared & Analyzed: 03/03/2015						
Fluoride	2.5	0.50	mg/L	2.000	0.39	106	80-120			
Matrix Spike (1503017-MS3)		**Source: 15C0015-01**		Prepared & Analyzed: 03/03/2015						
Chloride	14		mg/L	12.50	3.2	90	80-120			
Nitrogen, Nitrate (As N)	5.1		mg/L	5.000	0.14	100	80-120			
Nitrogen, Nitrite (As N)	2.5		mg/L	2.500	ND	101	80-120			
Matrix Spike Dup (1503017-MSD1)		**Source: 15C0015-01**		Prepared & Analyzed: 03/03/2015						
Fluoride	2.5	0.50	mg/L	2.000	0.39	107	80-120	0.9	10	
Matrix Spike Dup (1503017-MSD3)		**Source: 15C0015-01**		Prepared & Analyzed: 03/03/2015						
Chloride	15		mg/L	12.50	3.2	91	80-120	0.6	10	
Nitrogen, Nitrate (As N)	5.1		mg/L	5.000	0.14	100	80-120	0.3	10	
Nitrogen, Nitrite (As N)	2.6		mg/L	2.500	ND	102	80-120	1	10	
Batch 1503061 - E300										
Blank (1503061-BLK1)				Prepared & Analyzed: 03/06/2015						
Sulfate	ND	5.0	mg/L							
LCS (1503061-BS1)				Prepared & Analyzed: 03/06/2015						
Sulfate	12	5.0	mg/L	12.50		95	90-110			
LCS Dup (1503061-BSD1)				Prepared & Analyzed: 03/06/2015						
Sulfate	12	5.0	mg/L	12.50		96	90-110	1	10	
Matrix Spike (1503061-MS2)		**Source: 15C0197-01**		Prepared & Analyzed: 03/06/2015						
Sulfate	22		mg/L	12.50	10	95	80-120			
Matrix Spike (1503061-MS3)		**Source: 15C0312-01RE1**		Prepared: 03/06/2015 Analyzed: 03/09/2015						
Sulfate	19		mg/L	12.50	6.5	98	80-120			
Matrix Spike Dup (1503061-MSD2)		**Source: 15C0197-01**		Prepared & Analyzed: 03/06/2015						
Sulfate	22		mg/L	12.50	10	96	80-120	0.3	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0185
Date Received: 03/03/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503061 - E300										
Matrix Spike Dup (1503061-MSD3)	**Source: 15C0312-01RE1**			Prepared: 03/06/2015 Analyzed: 03/09/2015						
Sulfate	19		mg/L	12.50	6.5	98	80-120	0.2	10	

TURNER LABORATORIES INC.
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 15C0185 DATE 3/3/15 PAGE 1 OF 1

PROJECT NAME Exp GW Monitoring # 287051
CONTACT NAME Ben Daigneau + Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Ste. 101 Tucson, AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals ☐ Acids ☐ 625/8270	Volatile Organics ☐ 624 ☐ 5242 ☐ 8260	TTHMS ☐ HAA5 ☐	Chloride ☒ Sulfate ☐ Resistivity ☐	NO_2 ☒ NO_3 ☒ TKN ☐	TPH ☐ 1664 ☐ Oil & Grease ☐	VOA ☐ TCLP Analysis Semi-VOA ☐ Pest. ☐	TCLP ☐ Dissolved ☒ Metals Total ☐ RCRA8 ☐	Total ☐ Cyanide Amen. ☐ WAD ☐	SDWA-INORGANICS PRIMARY ☐ SECONDARY ☐	MPN ☐ Coliform PIA ☐ Fecal ☐	pH ☐ Cl_2 ☐ Cr_6 ☐ Turb ☐	COD ☐ TSS ☐ BOD ☐	F, Ca, Mg, K, Na	Total Alkalinity as $CaCO_3$	* See Quote
BMO-2014-4B2	3/1/15	15:20		GW	3				X	X				X						X	X	X

1. RELINQUISHED BY:
Signature
Printed Name Ryan Toomey
Firm Clear Creek
Date/Time 3/2/15 11:15

2. RECEIVED BY:
Signature
Printed Name Fedex
Firm
Date/Time

TURNAROUND REQUIREMENTS:
____ **Standard (approx. 10 days)***
____ Next Day ____ 2 Day ____ 5 Day*
____ Email Preliminary Results
* **Working Days**

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____ Y ____ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 4.4
☒ Wet Ice
☐ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature
Printed Name
Firm Fedex
Date/Time

4. RECEIVED BY:
Signature
Printed Name
Firm TURNER LABORATORIES, INC.
Date/Time 3/2/15 1057

* LEGEND
SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☒
COC / Labels Agree ☐

Preservation Confirmation ☒
Appropriate Head Space ☒
Received Within Hold Time ☐

SPECIAL INSTRUCTIONS/COMMENTS:

April 06, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15C0539
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 03/17/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0539
Date Received: 03/17/2015

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15C0539-01	BMO-2015-1B	Ground Water	03/15/2015 1520

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0539
Date Received: 03/17/2015

Case Narrative

H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0539
Lab Sample ID: 15C0539-01

Client Sample ID: BMO-2015-1B
Collection Date/Time: 03/15/2015 1520
Matrix: Ground Water
Order Name: 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	77	4.0		mg/L	1	03/20/2015 1025	03/25/2015 0944	RAD
Magnesium	11	3.0		mg/L	1	03/20/2015 1025	03/25/2015 0944	RAD
Potassium	ND	5.0		mg/L	1	03/20/2015 1025	03/25/2015 0944	RAD
Sodium	34	5.0		mg/L	1	03/20/2015 1025	03/25/2015 0944	RAD
pH-E150.1								
pH (pH Units)	7.5	0.0	H5	-	1	03/17/2015 1200	03/17/2015 1217	EK
Temperature (°C)	19		H5	-	1	03/17/2015 1200	03/17/2015 1217	EK
Anions by Ion Chromatography-E300								
Chloride	20	1.0		mg/L	1	03/17/2015 1000	03/17/2015 1105	MR
Fluoride	ND	0.50		mg/L	1	03/17/2015 1000	03/17/2015 1105	MR
Nitrogen, Nitrate (As N)	2.3	0.50		mg/L	1	03/17/2015 1000	03/17/2015 1105	MR
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	03/17/2015 1000	03/17/2015 1105	MR
Sulfate	170	50		mg/L	10	03/17/2015 1000	03/17/2015 1410	MR
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	160	2.0		mg/L	1	03/18/2015 1330	03/18/2015 1405	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	03/18/2015 1330	03/18/2015 1405	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	03/18/2015 1330	03/18/2015 1405	CC
Alkalinity, Total (As CaCO3)	160	2.0		mg/L	1	03/18/2015 1330	03/18/2015 1405	CC
Specific Conductance-SM2510 B								
Conductivity	680	0.10		µmhos/cm	1	03/18/2015 1205	03/18/2015 1229	EK
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	450	20		mg/L	1	03/18/2015 0825	03/19/2015 1300	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0539
Date Received: 03/17/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503253 - E 200.7										
Blank (1503253-BLK1)				Prepared: 03/20/2015 Analyzed: 03/25/2015						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1503253-BS1)				Prepared: 03/20/2015 Analyzed: 03/25/2015						
Calcium	9.8	4.0	mg/L	10.00		98	85-115			
Magnesium	9.8	3.0	mg/L	10.00		98	85-115			
Potassium	9.7	5.0	mg/L	10.00		97	85-115			
Sodium	10	5.0	mg/L	10.00		102	85-115			
LCS Dup (1503253-BSD1)				Prepared: 03/20/2015 Analyzed: 03/25/2015						
Calcium	9.8	4.0	mg/L	10.00		98	85-115	0.2	20	
Magnesium	9.6	3.0	mg/L	10.00		96	85-115	2	20	
Potassium	9.6	5.0	mg/L	10.00		96	85-115	0.6	20	
Sodium	11	5.0	mg/L	10.00		105	85-115	3	20	
Matrix Spike (1503253-MS1)	**Source: 15C0610-01**			Prepared: 03/20/2015 Analyzed: 03/25/2015						
Calcium	110	4.0	mg/L	10.00	100	52	70-130			M3
Magnesium	25	3.0	mg/L	10.00	16	90	70-130			
Potassium	12	5.0	mg/L	10.00	3.0	89	70-130			
Sodium	42	5.0	mg/L	10.00	34	80	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0539
Date Received: 03/17/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503191 - E150.1										
Duplicate (1503191-DUP1)		**Source: 15C0539-01**		Prepared & Analyzed: 03/17/2015						
pH (pH Units)	7.6	0.0	-		7.5			0.5	200	
Temperature (°C)	19		-		19			0.5	200	
Batch 1503193 - SM2540 C										
Duplicate (1503193-DUP1)		**Source: 15C0484-01**		Prepared: 03/18/2015 Analyzed: 03/19/2015						
Total Dissolved Solids (Residue, Filterable)	240	20	mg/L		240			2	5	
Batch 1503194 - SM2510 B										
Duplicate (1503194-DUP1)		**Source: 15C0514-01**		Prepared & Analyzed: 03/18/2015						
Conductivity	750	0.10	µmhos/cm		750			0.5	10	
Batch 1503197 - SM2320B										
LCS (1503197-BS1)				Prepared & Analyzed: 03/18/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		98	90-110			
LCS Dup (1503197-BSD1)				Prepared & Analyzed: 03/18/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		100	90-110	2	10	
Matrix Spike (1503197-MS1)		**Source: 15C0509-01**		Prepared & Analyzed: 03/18/2015						
Alkalinity, Total (As CaCO3)	370	2.0	mg/L	250.0	120	99	85-115			
Matrix Spike Dup (1503197-MSD1)		**Source: 15C0509-01**		Prepared & Analyzed: 03/18/2015						
Alkalinity, Total (As CaCO3)	380	2.0	mg/L	250.0	120	101	85-115	1	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0539
Date Received: 03/17/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503168 - E300										
Blank (1503168-BLK1)				Prepared & Analyzed: 03/17/2015						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1503168-BS1)				Prepared & Analyzed: 03/17/2015						
Chloride	12	1.0	mg/L	12.50		98	90-110			
Fluoride	2.1	0.50	mg/L	2.000		104	90-110			
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000		100	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		100	90-110			
Sulfate	13	5.0	mg/L	12.50		100	90-110			
LCS Dup (1503168-BSD1)				Prepared & Analyzed: 03/17/2015						
Chloride	12	1.0	mg/L	12.50		98	90-110	0.1	10	
Fluoride	2.1	0.50	mg/L	2.000		104	90-110	0.2	10	
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000		100	90-110	0.1	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		101	90-110	1	10	
Sulfate	12	5.0	mg/L	12.50		100	90-110	0.3	10	
Matrix Spike (1503168-MS1)	**Source: 15C0544-01**			Prepared & Analyzed: 03/17/2015						
Fluoride	2.1	0.50	mg/L	2.000	ND	106	80-120			
Nitrogen, Nitrate (As N)	6.1	0.50	mg/L	5.000	1.3	97	80-120			
Nitrogen, Nitrite (As N)	2.3	0.10	mg/L	2.500	ND	91	80-120			
Matrix Spike (1503168-MS2)	**Source: 15C0544-01**			Prepared & Analyzed: 03/17/2015						
Chloride	14		mg/L	12.50	1.8	96	80-120			
Sulfate	18		mg/L	12.50	6.1	94	80-120			
Matrix Spike (1503168-MS3)	**Source: 15C0545-01**			Prepared & Analyzed: 03/17/2015						
Nitrogen, Nitrate (As N)	6.1	0.50	mg/L	5.000	1.2	97	80-120			
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500	ND	98	80-120			
Matrix Spike Dup (1503168-MSD1)	**Source: 15C0544-01**			Prepared & Analyzed: 03/17/2015						
Fluoride	2.1	0.50	mg/L	2.000	ND	107	80-120	0.7	10	
Nitrogen, Nitrate (As N)	6.2	0.50	mg/L	5.000	1.3	98	80-120	0.7	10	
Nitrogen, Nitrite (As N)	2.3	0.10	mg/L	2.500	ND	93	80-120	2	10	
Matrix Spike Dup (1503168-MSD2)	**Source: 15C0544-01**			Prepared & Analyzed: 03/17/2015						
Chloride	14		mg/L	12.50	1.8	96	80-120	0.3	10	
Sulfate	18		mg/L	12.50	6.1	95	80-120	0.4	10	
Matrix Spike Dup (1503168-MSD3)	**Source: 15C0545-01**			Prepared & Analyzed: 03/17/2015						
Nitrogen, Nitrate (As N)	6.0	0.50	mg/L	5.000	1.2	96	80-120	1	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	ND	98	80-120	0.4	10	

TURNER LABORATORIES INC.
2445 N. Coyote Drive, Suite 104
Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 1500539 DATE 3/17/15 PAGE 1 OF 1

PROJECT NAME Exp. GW Monitoring # 287051
CONTACT NAME Ben Daigneau + Victoria Hermosillo
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Ste. 101 Tucson, AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals ☐ Acids ☐ 625/8270	Volatile Organics ☐ 624 ☐ 5242 ☐ 8260 ☐ TTHMS ☐ HAA5	Chloride ☒ Sulfate ☐ Resistivity	NO_2 ☒ NO_3 ☒ TKN ☐	TPH ☐ 1664 ☐ Oil & Grease	VOA ☐ TCLP Analysis Semi-VOA ☐ Pest. ☐	TCLP ☐ Metals Dissolved ☒ Total ☐ RCRA8 ☐	Total ☐ Cyanide Amen. ☐ WAD ☐	SDWA-INORGANICS PRIMARY ☐ SECONDARY ☐	MPN ☐ Coliform PA ☐ Fecal ☐	pH ☐ Cl_2 ☐ Turb ☐	COD ☐ TSS ☐ BOD ☐	F, Ca, Mg, K, Na	Total Alkalinity as $CaCO_3$	* See Quote
BMO-2015-1B	3/15/15	15:20		GW	3			X	X			X						X	X	X

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX

1. RELINQUISHED BY:
Signature
Printed Name Ryan Toomey
Firm Clear Creek
Date/Time 3/16/15 09:30

2. RECEIVED BY:
Signature
Printed Name Fedex
Firm
Date/Time

TURNAROUND REQUIREMENTS:
____ **Standard (approx. 10 days)***
____ Next Day ____ 2 Day ____ 5 Day*
____ Email Preliminary Results
* **Working Days**

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____ Y ____ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 2.1
☒ Wet Ice
☐ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature
Printed Name Fedex
Firm
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
3/16/15 0940
Date/Time

* LEGEND
SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☒
COC / Labels Agree ☒

Preservation Confirmation ☒
Appropriate Head Space ☒
Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:

April 01, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15C0514
Order Name: New Project 9-29-14

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 03/16/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0514
Date Received: 03/16/2015

Order: New Project 9-29-14

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15C0514-01	BMO-2015-1BL	Ground Water	03/12/2015 1535

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0514
Date Received: 03/16/2015

Case Narrative

H3	Sample was received and/or analysis requested past holding time.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0514
Lab Sample ID: 15C0514-01

Client Sample ID: BMO-2015-1BL
Collection Date/Time: 03/12/2015 1535
Matrix: Ground Water
Order Name: New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	91	4.0		mg/L	1	03/16/2015 1225	03/17/2015 0950	RAD
Magnesium	13	3.0		mg/L	1	03/16/2015 1225	03/17/2015 0950	RAD
Potassium	ND	5.0		mg/L	1	03/16/2015 1225	03/17/2015 0950	RAD
Sodium	37	5.0		mg/L	1	03/16/2015 1225	03/17/2015 0950	RAD
pH-E150.1								
pH (pH Units)	7.5	0.0	H5	-	1	03/16/2015 1210	03/16/2015 1230	EK
Temperature (°C)	19		H5	-	1	03/16/2015 1210	03/16/2015 1230	EK
Anions by Ion Chromatography-E300								
Chloride	19	1.0		mg/L	1	03/16/2015 1600	03/16/2015 2056	MR
Fluoride	ND	0.50		mg/L	1	03/16/2015 1600	03/16/2015 2056	MR
Nitrogen, Nitrate (As N)	2.3	0.50	H3	mg/L	1	03/16/2015 1600	03/16/2015 2056	MR
Nitrogen, Nitrite (As N)	ND	0.10	H3	mg/L	1	03/16/2015 1600	03/16/2015 2056	MR
Sulfate	220	130		mg/L	25	03/16/2015 1600	03/17/2015 1124	MR
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	150	2.0		mg/L	1	03/18/2015 1330	03/18/2015 1405	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	03/18/2015 1330	03/18/2015 1405	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	03/18/2015 1330	03/18/2015 1405	CC
Alkalinity, Total (As CaCO3)	150	2.0		mg/L	1	03/18/2015 1330	03/18/2015 1405	CC
Specific Conductance-SM2510 B								
Conductivity	750	0.10		µmhos/cm	1	03/18/2015 1205	03/18/2015 1225	EK
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	510	20		mg/L	1	03/18/2015 0825	03/19/2015 1300	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0514
Date Received: 03/16/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503163 - E 200.7										
Blank (1503163-BLK1)				Prepared: 03/16/2015 Analyzed: 03/17/2015						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1503163-BS1)				Prepared: 03/16/2015 Analyzed: 03/17/2015						
Calcium	9.7	4.0	mg/L	10.00		97	85-115			
Magnesium	9.9	3.0	mg/L	10.00		99	85-115			
Potassium	9.4	5.0	mg/L	10.00		94	85-115			
Sodium	10	5.0	mg/L	10.00		104	85-115			
LCS Dup (1503163-BSD1)				Prepared: 03/16/2015 Analyzed: 03/17/2015						
Calcium	9.8	4.0	mg/L	10.00		98	85-115	1	20	
Magnesium	10	3.0	mg/L	10.00		100	85-115	0.1	20	
Potassium	9.4	5.0	mg/L	10.00		94	85-115	0.1	20	
Sodium	10	5.0	mg/L	10.00		102	85-115	2	20	
Matrix Spike (1503163-MS1)	**Source: 15C0514-01**			Prepared: 03/16/2015 Analyzed: 03/17/2015						
Calcium	96	4.0	mg/L	10.00	91	45	70-130			M3
Magnesium	22	3.0	mg/L	10.00	13	90	70-130			
Potassium	12	5.0	mg/L	10.00	2.4	95	70-130			
Sodium	44	5.0	mg/L	10.00	37	75	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0514
Date Received: 03/16/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503174 - E150.1										
Duplicate (1503174-DUP1)		**Source: 15C0514-01**		Prepared & Analyzed: 03/16/2015						
pH (pH Units)	7.5	0.0	-		7.5			0.9	200	
Temperature (°C)	19		-		19			0.5	200	
Batch 1503193 - SM2540 C										
Duplicate (1503193-DUP1)		**Source: 15C0484-01**		Prepared: 03/18/2015 Analyzed: 03/19/2015						
Total Dissolved Solids (Residue, Filterable)	240	20	mg/L		240			2	5	
Batch 1503194 - SM2510 B										
Duplicate (1503194-DUP1)		**Source: 15C0514-01**		Prepared & Analyzed: 03/18/2015						
Conductivity	750	0.10	µmhos/cm		750			0.5	10	
Batch 1503197 - SM2320B										
LCS (1503197-BS1)				Prepared & Analyzed: 03/18/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		98	90-110			
LCS Dup (1503197-BSD1)				Prepared & Analyzed: 03/18/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		100	90-110	2	10	
Matrix Spike (1503197-MS1)		**Source: 15C0509-01**		Prepared & Analyzed: 03/18/2015						
Alkalinity, Total (As CaCO3)	370	2.0	mg/L	250.0	120	99	85-115			
Matrix Spike Dup (1503197-MSD1)		**Source: 15C0509-01**		Prepared & Analyzed: 03/18/2015						
Alkalinity, Total (As CaCO3)	380	2.0	mg/L	250.0	120	101	85-115	1	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0514
Date Received: 03/16/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503156 - E300										
Blank (1503156-BLK1)				Prepared & Analyzed: 03/16/2015						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1503156-BS1)				Prepared & Analyzed: 03/16/2015						
Chloride	12	1.0	mg/L	12.50		97	90-110			
Fluoride	2.0	0.50	mg/L	2.000		102	90-110			
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		98	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		99	90-110			
Sulfate	12	5.0	mg/L	12.50		100	90-110			
LCS Dup (1503156-BSD1)				Prepared & Analyzed: 03/16/2015						
Chloride	12	1.0	mg/L	12.50		97	90-110	0.008	10	
Fluoride	2.0	0.50	mg/L	2.000		101	90-110	0.9	10	
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		98	90-110	0.1	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		101	90-110	1	10	
Sulfate	12	5.0	mg/L	12.50		99	90-110	0.4	10	
Matrix Spike (1503156-MS1)		**Source: 15C0518-01**		Prepared & Analyzed: 03/16/2015						
Chloride	23	1.0	mg/L	12.50	12	93	80-120			
Fluoride	2.1	0.50	mg/L	2.000	ND	104	80-120			
Nitrogen, Nitrate (As N)	6.1	0.50	mg/L	5.000	1.1	100	80-120			
Nitrogen, Nitrite (As N)	2.1	0.10	mg/L	2.500	ND	83	80-120			
Matrix Spike (1503156-MS2)		**Source: 15C0518-01RE1**		Prepared: 03/16/2015 Analyzed: 03/17/2015						
Sulfate	20		mg/L	12.50	8.3	93	80-120			
Matrix Spike Dup (1503156-MSD1)		**Source: 15C0518-01**		Prepared & Analyzed: 03/16/2015						
Chloride	23	1.0	mg/L	12.50	12	93	80-120	0.1	10	
Fluoride	2.1	0.50	mg/L	2.000	ND	104	80-120	0.05	10	
Nitrogen, Nitrate (As N)	6.1	0.50	mg/L	5.000	1.1	100	80-120	0.3	10	
Nitrogen, Nitrite (As N)	2.1	0.10	mg/L	2.500	ND	84	80-120	1	10	
Matrix Spike Dup (1503156-MSD2)		**Source: 15C0518-01RE1**		Prepared: 03/16/2015 Analyzed: 03/17/2015						
Sulfate	20		mg/L	12.50	8.3	97	80-120	3	10	

TURNER LABORATORIES INC.
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Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 15C0514 DATE 3-16-15 PAGE 1 OF 1

PROJECT NAME Exp GW Monitoring # 287051
CONTACT NAME Ben Daigneau + Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Ste # 101 Tucson, AZ
ZIP 85701 PHONE 622-3722 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals ☐ Acids ☐ 625/8270	Volatile Organics ☐ 624 ☐ 524.2 ☐ 8260 ☐ TTHMS ☐ HAA5	Chloride ☒ Sulfate ☐ Resistivity	NO_2 ☒ NO_3 ☒ TKN ☐	TPH ☐ 1664 ☐ Oil & Grease	VOA ☐ SemiVOA ☐ TCLP Analysis Pest. ☐	TCLP ☐ Dissolved ☒ Metals Total ☐ RCRA8 ☐	Total ☐ Cyanide Amen. ☐ WAD ☐	SDWA-INORGANICS PRIMARY ☐ SECONDARY ☐	MPN ☐ Coliform PIA ☐ Fecal ☐	pH ☐ Cl_2 ☐ Cl_f ☐ Turb ☐	COD ☐ TSS ☐ BOD ☐	F, Ca, Mg, K, Na	Tot. Alkalinity as $CaCO_3$	See Quote
BMO-2015-IBL	3-12-15	15:35		GW	3			X	X			X						X	X	X

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX

1. RELINQUISHED BY:	2. RECEIVED BY:	TURNAROUND REQUIREMENTS:	REPORT REQUIREMENTS:	INVOICE INFORMATION:	SAMPLE RECEIPT:
Signature	Signature	___ Standard (approx. 10 days)*	___ I. Routine Report	Account ___Y ___N	Total Containers 3
Printed Name Ryan Toomey	Printed Name	___ Next Day ___2 Day ___5 Day*	___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)	P.O. #	Temperature 1.9
Firm Clear Creek	Firm	___ Email Preliminary Results	___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice	Bill to:	☒ Wet Ice
Date/Time 3-13-15 10:30	Date/Time	* Working Days			☐ Ambient
					☐ Blue Ice

3. RELINQUISHED BY:	4. RECEIVED BY:
Signature FedEx	Signature
Printed Name	Printed Name
Firm	Firm TURNER LABORATORIES, INC.
Date/Time 3-16-15 921A	Date/Time 3-16-15 921A

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No	Custody Seals ☒	Preservation Confirmation ☒
ADEQ Forms: ☐ Yes ☐ No	Container Intact ☒	Appropriate Head Space ☒
Mail ADEQ Forms: ☐ Yes ☐ No	COC / Labels Agree ☒	Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:
* NO_2, NO_3 out of hold run anyway per Project request

April 06, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15C0610
Order Name: New Project 9-29-14

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 03/20/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0610
Date Received: 03/20/2015

Order: New Project 9-29-14

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15C0610-01	BMO-2015-2B	Ground Water	03/19/2015 1523

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0610
Date Received: 03/20/2015

Case Narrative

H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
M2	Matrix spike recovery was low; the associated LCS/LCSD was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.
N4	The Minimum Reporting Limit (MRL) verificataion check did not meet laboratory acceptance limits.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0610
Lab Sample ID: 15C0610-01

Client Sample ID: BMO-2015-2B
Collection Date/Time: 03/19/2015 1523
Matrix: Ground Water
Order Name: New Project 9-29-14

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	100	4.0		mg/L	1	03/20/2015 1025	03/25/2015 0948	RAD
Magnesium	16	3.0		mg/L	1	03/20/2015 1025	03/25/2015 0948	RAD
Potassium	ND	5.0		mg/L	1	03/20/2015 1025	03/25/2015 0948	RAD
Sodium	34	5.0		mg/L	1	03/20/2015 1025	03/25/2015 0948	RAD
pH-E150.1								
pH (pH Units)	7.5	0.0	H5	-	1	03/20/2015 1015	03/20/2015 1055	EK
Temperature (°C)	22		H5	-	1	03/20/2015 1015	03/20/2015 1055	EK
Anions by Ion Chromatography-E300								
Chloride	19	1.0		mg/L	1	03/20/2015 1030	03/20/2015 1054	MR
Fluoride	ND	0.50		mg/L	1	03/20/2015 1030	03/20/2015 1054	MR
Nitrogen, Nitrate (As N)	2.0	0.50		mg/L	1	03/20/2015 1030	03/20/2015 1054	MR
Nitrogen, Nitrite (As N)	ND	0.10	N4	mg/L	1	03/20/2015 1030	03/20/2015 1054	MR
Sulfate	290	130		mg/L	25	03/20/2015 1100	03/20/2015 1131	MR
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	170	2.0		mg/L	1	03/27/2015 1545	03/27/2015 1630	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	03/27/2015 1545	03/27/2015 1630	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	03/27/2015 1545	03/27/2015 1630	CC
Alkalinity, Total (As CaCO3)	170	2.0		mg/L	1	03/27/2015 1545	03/27/2015 1630	CC
Specific Conductance-SM2510 B								
Conductivity	830	0.10		µmhos/cm	1	03/30/2015 1210	03/30/2015 1218	EK
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	560	20		mg/L	1	03/24/2015 0830	03/25/2015 1300	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0610
Date Received: 03/20/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503253 - E 200.7										
Blank (1503253-BLK1)				Prepared: 03/20/2015 Analyzed: 03/25/2015						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1503253-BS1)				Prepared: 03/20/2015 Analyzed: 03/25/2015						
Calcium	9.8	4.0	mg/L	10.00		98	85-115			
Magnesium	9.8	3.0	mg/L	10.00		98	85-115			
Potassium	9.7	5.0	mg/L	10.00		97	85-115			
Sodium	10	5.0	mg/L	10.00		102	85-115			
LCS Dup (1503253-BSD1)				Prepared: 03/20/2015 Analyzed: 03/25/2015						
Calcium	9.8	4.0	mg/L	10.00		98	85-115	0.2	20	
Magnesium	9.6	3.0	mg/L	10.00		96	85-115	2	20	
Potassium	9.6	5.0	mg/L	10.00		96	85-115	0.6	20	
Sodium	11	5.0	mg/L	10.00		105	85-115	3	20	
Matrix Spike (1503253-MS1)	**Source: 15C0610-01**			Prepared: 03/20/2015 Analyzed: 03/25/2015						
Calcium	110	4.0	mg/L	10.00	100	52	70-130			M3
Magnesium	25	3.0	mg/L	10.00	16	90	70-130			
Potassium	12	5.0	mg/L	10.00	3.0	89	70-130			
Sodium	42	5.0	mg/L	10.00	34	80	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0610
Date Received: 03/20/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503230 - E150.1										
Duplicate (1503230-DUP1)		**Source: 15C0610-01**		Prepared & Analyzed: 03/20/2015						
pH (pH Units)	7.5	0.0	-		7.5			0.1	200	
Temperature (°C)	23		-		22			4	200	
Batch 1503264 - SM2540 C										
Duplicate (1503264-DUP1)		**Source: 15C0583-01**		Prepared: 03/24/2015 Analyzed: 03/25/2015						
Total Dissolved Solids (Residue, Filterable)	560	20	mg/L		550			1	5	
Batch 1503291 - SM2320B										
LCS (1503291-BS1)				Prepared & Analyzed: 03/27/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		99	90-110			
LCS Dup (1503291-BSD1)				Prepared & Analyzed: 03/27/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		101	90-110	2	10	
Matrix Spike (1503291-MS1)		**Source: 15C0583-01**		Prepared & Analyzed: 03/27/2015						
Alkalinity, Total (As CaCO3)	370	2.0	mg/L	250.0	120	98	85-115			
Matrix Spike Dup (1503291-MSD1)		**Source: 15C0583-01**		Prepared & Analyzed: 03/27/2015						
Alkalinity, Total (As CaCO3)	370	2.0	mg/L	250.0	120	99	85-115	1	10	
Batch 1503298 - SM2510 B										
Duplicate (1503298-DUP1)		**Source: 15C0699-01**		Prepared & Analyzed: 03/30/2015						
Conductivity	910	0.10	µmhos/cm		910			0.1	10	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0610
Date Received: 03/20/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503219 - E300										
Blank (1503219-BLK1)				Prepared & Analyzed: 03/20/2015						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1503219-BS1)				Prepared & Analyzed: 03/20/2015						
Chloride	12	1.0	mg/L	12.50		97	90-110			
Fluoride	2.1	0.50	mg/L	2.000		105	90-110			
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000		100	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		101	90-110			
Sulfate	13	5.0	mg/L	12.50		102	90-110			
LCS Dup (1503219-BSD1)				Prepared & Analyzed: 03/20/2015						
Chloride	12	1.0	mg/L	12.50		97	90-110	0.05	10	
Fluoride	2.1	0.50	mg/L	2.000		105	90-110	0.7	10	
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000		100	90-110	0.04	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		101	90-110	0.5	10	
Sulfate	13	5.0	mg/L	12.50		101	90-110	1	10	
Matrix Spike (1503219-MS1)		**Source: 15C0612-01**		Prepared & Analyzed: 03/20/2015						
Fluoride	2.7	0.50	mg/L	2.000	0.71	99	80-120			
Matrix Spike (1503219-MS2)		**Source: 15C0612-01**		Prepared & Analyzed: 03/20/2015						
Chloride	17		mg/L	12.50	6.9	81	80-120			
Fluoride	2.1		mg/L	2.000	0.028	102	80-120			
Nitrogen, Nitrate (As N)	5.3		mg/L	5.000	0.37	99	80-120			
Nitrogen, Nitrite (As N)	2.4		mg/L	2.500	ND	98	80-120			
Sulfate	20		mg/L	12.50	10	82	80-120			
Matrix Spike Dup (1503219-MSD1)		**Source: 15C0612-01**		Prepared & Analyzed: 03/20/2015						
Fluoride	2.7	0.50	mg/L	2.000	0.71	99	80-120	0.6	10	
Matrix Spike Dup (1503219-MSD2)		**Source: 15C0612-01**		Prepared & Analyzed: 03/20/2015						
Chloride	17		mg/L	12.50	6.9	78	80-120	2	10	M2
Fluoride	2.1		mg/L	2.000	0.028	103	80-120	0.7	10	
Nitrogen, Nitrate (As N)	5.4		mg/L	5.000	0.37	100	80-120	0.9	10	
Nitrogen, Nitrite (As N)	2.4		mg/L	2.500	ND	95	80-120	3	10	
Sulfate	20		mg/L	12.50	10	81	80-120	0.4	10	

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Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 15C0610 DATE _____ PAGE _____ OF _____

PROJECT NAME Exp GW Monitoring # 287051
CONTACT NAME Ben Daigneau + Victoria Hermosilla
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Suite #
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Base Neutrals 625/8270	Acids	Volatile Organics 624	524.2	8260	TTHMS	HAA5	Chloride	Sulfate	Resistivity	NO_3	NO_2	TKN	TPH	1664	Oil & Grease	TCLP Analysis VOA	Semi-VOA	Pest.	TCLP	Metals	Dissolved	Total	RCRA8	Total	Cyanide	Amen.	WAD	SDWA-INORGANICS PRIMARY	SECONDARY	MPN	Coliform	PIA	pH	Fecal	Cl_2	C_6	Turb	TSS	COD	BOD	F, Ca, Mg, K, Na	Total Alkalinity as $CaCO_3$	* SiO_2 Cl, SO_4
BMO-2@15-2B	3/19/15	15:23		GW	3								X			X										X																		X	X	X

1. RELINQUISHED BY:
Signature
Ryan Toomey
Printed Name
Clear Creek
Firm
3/19/15 20:50
Date/Time

2. RECEIVED BY:
Signature
Kristi Sagar
Printed Name
Clear Creek
Firm
3/19/15 20:50
Date/Time

3. RELINQUISHED BY:
Signature
Kristi Sagar
Printed Name
Clear Creek
Firm
3/20/15 9:51
Date/Time

4. RECEIVED BY:
Signature
Printed Name
TURNER LABORATORIES, INC.
Firm
3/20/15 9:51
Date/Time

TURNAROUND REQUIREMENTS:
____ Standard (approx. 10 days)*
____ Next Day ____ 2 Day ____ 5 Day*
____ Email Preliminary Results
* Working Days

REPORT REQUIREMENTS:
____ I. Routine Report
____ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
____ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ____ Y ____ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 5.4
☒ Wet Ice
☐ Ambient
☐ Blue Ice

* LEGEND SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No

Custody Seals ☐
Container Intact ☑
COC / Labels Agree ☑

Preservation Confirmation ☒
Appropriate Head Space NA
Received Within Hold Time ☑

SPECIAL INSTRUCTIONS/COMMENTS:

April 14, 2015

Ben Daigneau
Clear Creek Associates
221 N. Court Ave., Suite 101
Tucson, AZ 85701

TEL (520) 622-3222
FAX (520) 622-4040

Work Order No.: 15C0699
Order Name: 287051

RE: Exp GW Monitoring

Dear Ben Daigneau,

Turner Laboratories, Inc. received 1 sample(s) on 03/30/2015 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066



Terri Garcia
Technical Director

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0699
Date Received: 03/30/2015

Order: 287051

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
15C0699-01	BMO-2015-2BL	Ground Water	03/26/2015 1510

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0699
Date Received: 03/30/2015

Case Narrative

H3	Sample was received and/or analysis requested past holding time.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0699
Lab Sample ID: 15C0699-01

Client Sample ID: BMO-2015-2BL
Collection Date/Time: 03/26/2015 1510
Matrix: Ground Water
Order Name: 287051

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7								
Calcium	120	4.0		mg/L	1	03/31/2015 1100	04/03/2015 1059	RAD
Magnesium	17	3.0		mg/L	1	03/31/2015 1100	04/03/2015 1059	RAD
Potassium	ND	5.0		mg/L	1	03/31/2015 1100	04/03/2015 1059	RAD
Sodium	34	5.0		mg/L	1	03/31/2015 1100	04/03/2015 1059	RAD
pH-E150.1								
pH (pH Units)	7.4	0.0	H5	-	1	03/30/2015 1145	03/30/2015 1156	EK
Temperature (°C)	19		H5	-	1	03/30/2015 1145	03/30/2015 1156	EK
Anions by Ion Chromatography-E300								
Chloride	18	2.0		mg/L	2	03/30/2015 1500	03/30/2015 1717	MR
Fluoride	ND	0.50		mg/L	1	03/30/2015 1400	03/30/2015 1621	MR
Nitrogen, Nitrate (As N)	1.9	0.50	H3	mg/L	1	03/30/2015 1400	03/30/2015 1621	MR
Nitrogen, Nitrite (As N)	ND	0.10	H3	mg/L	1	03/30/2015 1400	03/30/2015 1621	MR
Sulfate	280	130		mg/L	25	03/30/2015 1500	03/30/2015 1735	MR
Alkalinity-SM2320B								
Alkalinity, Bicarbonate (As CaCO3)	160	2.0		mg/L	1	03/31/2015 1000	03/31/2015 1020	CC
Alkalinity, Carbonate (As CaCO3)	ND	2.0		mg/L	1	03/31/2015 1000	03/31/2015 1020	CC
Alkalinity, Hydroxide (As CaCO3)	ND	2.0		mg/L	1	03/31/2015 1000	03/31/2015 1020	CC
Alkalinity, Total (As CaCO3)	160	2.0		mg/L	1	03/31/2015 1000	03/31/2015 1020	CC
Specific Conductance-SM2510 B								
Conductivity	910	0.10		µmhos/cm	1	03/30/2015 1210	03/30/2015 1216	EK
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	620	20		mg/L	1	04/01/2015 0930	04/02/2015 1215	CC

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0699
Date Received: 03/30/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1504027 - E 200.7										
Blank (1504027-BLK1)				Prepared: 04/02/2015 Analyzed: 04/03/2015						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1504027-BS1)				Prepared: 04/02/2015 Analyzed: 04/03/2015						
Calcium	9.1	4.0	mg/L	10.00		91	85-115			
Magnesium	9.3	3.0	mg/L	10.00		93	85-115			
Potassium	9.5	5.0	mg/L	10.00		95	85-115			
Sodium	10	5.0	mg/L	10.00		100	85-115			
LCS Dup (1504027-BSD1)				Prepared: 04/02/2015 Analyzed: 04/03/2015						
Calcium	9.1	4.0	mg/L	10.00		91	85-115	0.7	20	
Magnesium	9.3	3.0	mg/L	10.00		93	85-115	0.2	20	
Potassium	9.6	5.0	mg/L	10.00		96	85-115	0.06	20	
Sodium	9.8	5.0	mg/L	10.00		98	85-115	3	20	
Matrix Spike (1504027-MS1)	**Source: 15C0699-01**			Prepared: 04/02/2015 Analyzed: 04/03/2015						
Calcium	120	4.0	mg/L	10.00	120	52	70-130			M3
Magnesium	25	3.0	mg/L	10.00	17	84	70-130			
Potassium	12	5.0	mg/L	10.00	3.3	89	70-130			
Sodium	42	5.0	mg/L	10.00	34	79	70-130			

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0699
Date Received: 03/30/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503298 - SM2510 B										
Duplicate (1503298-DUP1)		**Source: 15C0699-01**		Prepared & Analyzed: 03/30/2015						
Conductivity	910	0.10	µmhos/cm		910			0.1	10	
Batch 1503304 - SM2320B										
LCS (1503304-BS1)				Prepared & Analyzed: 03/31/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		102	90-110			
LCS Dup (1503304-BSD1)				Prepared & Analyzed: 03/31/2015						
Alkalinity, Total (As CaCO3)	250	2.0	mg/L	250.0		100	90-110	2	10	
Matrix Spike (1503304-MS1)		**Source: 15C0699-01**		Prepared & Analyzed: 03/31/2015						
Alkalinity, Total (As CaCO3)	410	2.0	mg/L	250.0	160	98	85-115			
Matrix Spike Dup (1503304-MSD1)		**Source: 15C0699-01**		Prepared & Analyzed: 03/31/2015						
Alkalinity, Total (As CaCO3)	410	2.0	mg/L	250.0	160	99	85-115	0.5	10	
Batch 1503308 - E150.1										
Duplicate (1503308-DUP1)		**Source: 15C0699-01**		Prepared & Analyzed: 03/30/2015						
pH (pH Units)	7.4	0.0	-		7.4			0.4	200	
Temperature (°C)	19		-		19			3	200	
Batch 1504005 - SM2540 C										
Duplicate (1504005-DUP1)		**Source: 15C0720-06**		Prepared: 04/01/2015 Analyzed: 04/02/2015						
Total Dissolved Solids (Residue, Filterable)	890	20	mg/L		880			0.6	5	

Client: Clear Creek Associates
Project: Exp GW Monitoring
Work Order: 15C0699
Date Received: 03/30/2015

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1503296 - E300										
Blank (1503296-BLK1)				Prepared & Analyzed: 03/30/2015						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1503296-BS1)				Prepared & Analyzed: 03/30/2015						
Chloride	12	1.0	mg/L	12.50		97	90-110			
Fluoride	1.9	0.50	mg/L	2.000		96	90-110			
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		97	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		99	90-110			
Sulfate	12	5.0	mg/L	12.50		97	90-110			
LCS Dup (1503296-BSD1)				Prepared & Analyzed: 03/30/2015						
Chloride	12	1.0	mg/L	12.50		97	90-110	0.1	10	
Fluoride	1.9	0.50	mg/L	2.000		97	90-110	0.2	10	
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		97	90-110	0.2	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		100	90-110	0.8	10	
Sulfate	12	5.0	mg/L	12.50		98	90-110	0.8	10	
Matrix Spike (1503296-MS1)		**Source: 15C0702-01**		Prepared & Analyzed: 03/30/2015						
Fluoride	2.6	0.50	mg/L	2.000	0.74	93	80-120			
Nitrogen, Nitrate (As N)	8.8	0.50	mg/L	5.000	3.8	100	80-120			
Matrix Spike (1503296-MS2)		**Source: 15C0702-01**		Prepared: 03/30/2015 Analyzed: 03/31/2015						
Nitrogen, Nitrite (As N)	2.2		mg/L	2.500	ND	86	80-120			
Sulfate	18		mg/L	12.50	7.1	91	80-120			
Matrix Spike (1503296-MS3)		**Source: 15C0702-01**		Prepared: 03/30/2015 Analyzed: 03/31/2015						
Chloride	14		mg/L	12.50	3.0	86	80-120			
Matrix Spike Dup (1503296-MSD1)		**Source: 15C0702-01**		Prepared & Analyzed: 03/30/2015						
Fluoride	2.6	0.50	mg/L	2.000	0.74	93	80-120	0.3	10	
Nitrogen, Nitrate (As N)	8.8	0.50	mg/L	5.000	3.8	99	80-120	0.1	10	
Matrix Spike Dup (1503296-MSD2)		**Source: 15C0702-01**		Prepared: 03/30/2015 Analyzed: 03/31/2015						
Nitrogen, Nitrite (As N)	2.2		mg/L	2.500	ND	87	80-120	0.09	10	
Sulfate	18		mg/L	12.50	7.1	90	80-120	0.8	10	
Matrix Spike Dup (1503296-MSD3)		**Source: 15C0702-01**		Prepared: 03/30/2015 Analyzed: 03/31/2015						
Chloride	14		mg/L	12.50	3.0	87	80-120	1	10	

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Tucson, Arizona 85745
(520) 882-5880
Fax: (520) 882-9788
www.turnerlabs.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 1506699 DATE 3/30/15 PAGE 1 OF 1

PROJECT NAME Exp. GW Monitoring # 28705.1
CONTACT NAME Ben Daigneau + Victoria Hermosillo
COMPANY NAME Clear Creek Associates
ADDRESS 221 N. Court Ave. Ste 101 Tucson, AZ
ZIP 85701 PHONE 622-3222 EMAIL bdaigneau@clearcreekassociates.com
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX
BMO-2015-2BL	3/26/15	15:10		GW	3	Chloride ☒ X; Sulfate ☒ X; NO_3 ☒ X; Dissolved ☒ X; BOD ☐ X; FCA, Mg, K, Na X; Total Alkalinity as $CaCO_3$ X; * See Quote X

1. RELINQUISHED BY:
Signature
Printed Name Ryan Toomey
Firm Clear Creek
Date/Time 3/27/15 12:20

2. RECEIVED BY:
Signature
Printed Name Fedex
Firm
Date/Time

TURNAROUND REQUIREMENTS:
___ Standard (approx. 10 days)*
✓ Next Day ___ 2 Day ___ 5 Day*
✓ Email Preliminary Results
One day turnaround for Sulfate please.
* Working Days

REPORT REQUIREMENTS:
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data) Add 10% to invoice

INVOICE INFORMATION:
Account ___ Y ___ N
P.O. #
Bill to:

SAMPLE RECEIPT:
Total Containers 3
Temperature 4.1
☒ Wet Ice
☐ Ambient
☐ Blue Ice

3. RELINQUISHED BY:
Signature
Printed Name
Firm Fedex
Date/Time

4. RECEIVED BY:
Signature
Printed Name Kevin Bua
Firm TURNER LABORATORIES, INC.
Date/Time 3/30/15 0950

* LEGEND
SAMPLE MATRIX
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

Compliance Analysis: ☐ Yes ☐ No		Custody Seals ☐	Preservation Confirmation ☒
ADEQ Forms: ☐ Yes ☐ No		Container Intact ☒	Appropriate Head Space ☐
Mail ADEQ Forms: ☐ Yes ☐ No		COC / Labels Agree ☒	Received Within Hold Time ☒

SPECIAL INSTRUCTIONS/COMMENTS:

APPENDIX D
HYDRAULIC TESTING RESULTS

APPENDIX D

HYDRAULIC TESTING RESULTS

Prepared for:

FREEPORT MINERALS CORPORATION
COPPER QUEEN BRANCH
36 West Highway 92
Bisbee, Arizona 85603

Prepared by:

CLEAR CREEK ASSOCIATES, P.L.C.
221 North Court Avenue, Suite 101
Tucson, Arizona 85701

August 19, 2015

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1.0 INTRODUCTION

1.1 Aquifer Pumping Tests at BMO-2014 and BMO-2015 Wells

Constant and step rate pumping tests were conducted at each of the BMO-2014 and BMO-2015 wells (Figure 1). In all cases the step rate test was conducted immediately after well development and the constant rate test was conducted after the step rate test.

The following general approach was used to analyze the pumping test data. First, the geology at the well and the well construction were reviewed to develop a preliminary conceptual model for the aquifer based on the geologic logs, core photographs, and well construction summaries for the BMO-2014 and BMO-2015 series wells (Figures 3 through 8 and Appendices A and B of main text). Second, the results of the constant rate tests were evaluated results using a graphical Cooper-Jacob Method (Cooper and Jacob, 1946) to estimate transmissivity. Third, the step rate test data were interpreted to estimate transmissivity and for comparison to the constant rate estimate. Drawdown data from the step rate tests were analyzed using the Theis solution in AQTESOLV (HydroSOLV, Inc., 2007) for ease of analysis given the variable pumping rates and partial penetration of some wells. AQTESOLV is a commercially available software package for analyzing hydraulic test data.

1.2 Basic Assumptions

Interpretation of hydraulic testing data requires making assumptions on a number of factors; including the type of aquifer, the analytical solution appropriate for the aquifer, the drawdown data that are most representative of the formation properties, and the reasonableness of the calculated hydraulic properties estimates. Table 1 summarizes basic information for the aquifer tests: well construction, depth to water at the time of the tests, depth to bedrock at the wellsite, and the basin fill saturated thickness.

Values of storativity were constrained for estimation of transmissivity by the Theis method. Storativity values lower than 0.00001 were considered to be unrealistic based on information in Todd (1980) and Freeze and Cherry (1979), and descriptions of specific storage for geologic materials (Batu, 1998). Storativity values up to several tenths are possible given the unconfined nature of the basin fill; in which case the storativity would be the specific yield.

Bedding in the basin fill is believed to be relatively flat because of its fluvial depositional environment and the lack of evidence of significant tilting of beds. The anisotropy ratio, Kv/Kr, is the ratio of the vertical to radial hydraulic conductivity. The Kv/Kr was assumed to range from 1 (isotropic) to 0.001. The lower range for Kv/Kr is reasonable based on the assumption that the vertical permeability is less than the radial permeability due to the high percentage of fines in the sand units of the basin fill and the presence of clay interbeds.

The effects of partial penetration were considered in the Theis solution in AQTESOLV. The length of the well screen was considered to be the length of the pea gravel filter pack.

Features in the vicinity of the pumping tests that could potentially affect drawdown responses are the recharge sources of Greenbush Draw and the water ponds at the golf course (Figure 1). Greenbush Draw generally has continuous surface flow in the vicinity of the new wells because it receives discharge from the City of Bisbee wastewater treatment facility. The wastewater discharge is approximately 285 gallons per minute or less depending on whether there are other uses for reclaimed water. Flow in Greenbush Draw usually occurs along the segment traversing the golf course. Several small ponds are maintained on the golf course and probably act as low flow recharge sources. As will be described, the pumping test results did not appear to be influenced by the recharge features.

The well discharge for each pumping test was routed through a hose to a location at least 200 feet from the test and allowed to infiltrate. It is unlikely that the infiltration of the discharge would affect the pumping test results because of the 150-foot depth to groundwater and the short duration of the tests relative to the time it would take for infiltration to reach the water table assuming the measured horizontal saturated hydraulic conductivities for the basin fill are representative of vertical hydraulic conductivities.

2.0 INTERPRETATION OF HYDRAULIC TEST RESULTS

Table 2 summarizes the pumping rates, duration, maximum drawdown, and transmissivity estimates for the pumping tests. The interpretation of individual tests is discussed below. The transmissivity estimates based on the constant rate pumping tests were considered to be more reliable than those from the step rate pumping tests. Hydraulic conductivity estimates made with the constant rate test transmissivities are in Table 3.

2.1 Aquifer Tests at BMO-2014-1

There are two generalized sediment units in the saturated basin fill aquifer at BMO-2014-1: an upper clay unit from the water table to a depth of 229 feet below land surface (ft bls) and a lower sand unit from 229 to 360 ft bls. Well BMO-2014-1BU is screened across the water table in sandy clay and clayey sand. The saturated portion of the BMO-2014-1BU consists of, from top to bottom, approximately 50 feet of sandy fat clay, 50 feet of sandy lean clay and 50 feet of clayey sand with gravel.

BMO-2014-1BL is constructed in clayey sand beneath the clay unit and above the bedrock contact. The sand is relatively uniform with approximately 20% fines, 50% to 60% sand, and 30% to 40% gravel. Clay beds are not noted within the sand unit. Water level monitoring data (Table 5 of main text) indicate that the water level in BMO-2014-1BL was slightly higher than in BMO-2014-1BU when the well was first installed; suggesting that the sand unit may be semi-confined by the clay unit above and the bedrock below.

2.1.1 BMO-2014-1BU Constant Rate and Step Rate Pumping Tests

Figures 2 and 3 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2014-1BU. BMO-2014-1BL was manually monitored as an observation well during the constant rate pumping test, but showed no clear drawdown response; with the water level increasing by 0.2 feet over the pumping period.

Figure 2 shows a good correspondence between the transducer and manual measurements during the constant rate test. Drawdown during the constant rate test displayed a straight line semilog plot from

four minutes to 200 minutes. After 200 minutes, the drawdown became steady for approximately 150 minutes and then increased through the end of test. The cause of the period of steady drawdown is not known, but could be ongoing well development due to pumping. A transmissivity of 3,227 feet squared per day (ft^2/day) was estimated using the Cooper-Jacob Method and the manual measurements from four to 200 minutes (Figure 4); not accounting for partial penetration of the basin fill aquifer.

Drawdown data from the BMO-2014-1B step rate test were analyzed using AQTESOLV's Theis solution for an unconfined aquifer with partial penetration. The calculated drawdown for the Theis solution at a transmissivity of 2,088 ft^2/day, storativity of 0.00005, and Kv/Kr of 0.001 is shown on Figure 5.

A sensitivity analysis indicated that increasing the storativity by two orders of magnitude and Kv/Kr by an order of magnitude resulted in estimated transmissivities that were up to 25% lower. Fixing the transmissivity at the value estimated from the constant rate test (2,088 ft^2/day) and allowing AQTESOLV to solve for storativity and Kv/Kr yielded lower values of $1x10^{-10}$ and 0.0001, respectively, for those parameters, but the resulting solution did not match the data as well.

The screened interval of BMO-2014-1BU penetrates both the clay and sand units that overlie the bedrock. The aquifer thickness is estimated to be 249 feet; the full saturated thickness of the basin fill at this location. The transmissivity estimate for the constant rate test is 1.55 times larger than the estimate for the step rate test. The transmissivity of the constant rate was used to estimate hydraulic conductivity, assuming the constant rate test is more representative of the formation because of its longer duration and higher pumping rate than the step rate test. Assuming an aquifer thickness of 249 feet and a transmissivity of 3,227 ft^2/day, the average hydraulic conductivity is 13.0 feet per day (ft/day).

2.1.2 BMO-2014-1BL constant Rate and Step Rate Pumping Tests

Figures 6 and 7 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2014-1BL. BMO-2014-1BU was manually monitored as an observation well during the constant rate pumping test, but showed no clear drawdown response; with the water level increasing by 0.2 feet over the pumping period. The effective aquifer thickness for the BMO-2014-1BL test is assumed to be 125 feet; which is the thickness of the sand unit between the overlying clay and the

bedrock. The overlying clay and underlying bedrock are unlikely to have contributed significant flow to the sand unit because of their assumed lower permeability than the sand unit.

The drawdown data for the constant rate test display a high degree of noise in the transducer data relative to the magnitude of drawdown. For this reason, the manual measurements were used for interpretation of the test. The semilog drawdown plot for the constant rate test displayed a relatively flat line from 20 minutes to 500 minutes. The drawdown curve is difficult to interpret due to it flatness. Expanding the scale of the plot shows a curvilinear line between 40 and 280 minutes followed by a slight recovery (Figure 8). A straight line fit through the semi-log data from 40 to 280 minutes results in a calculated transmissivity of 8,144 ft^2/day using the Cooper-Jacob Method; uncorrected for partial penetration of the basin fill aquifer.

Drawdown data for the BMO-2014-1B step rate test were evaluated in AQTESOLV using the Theis solution for an unconfined aquifer with partial penetration and full penetration, the Theis solution for a confined aquifer, and the Hantush-Jacob solution for a leaky confined aquifer. None of the solutions provided good fits to the drawdown data. The Hantush-Jacob solution for a leaky confined aquifer had the best ability to match the shape of the drawdown curve, but not the magnitude of drawdown. The transmissivity obtained from the Theis solution was 1,184 ft^2/day assuming a storativity of 0.00005 and Kv/Kh of 0.001 (Figure 9).

The transmissivity estimate of the constant rate test is significantly greater than that for the step rate test, and is considered the most appropriate value derived from the pumping tests. The estimated hydraulic conductivity for the sand unit is 65.2 ft/day based on the constant rate transmissivity and an aquifer thickness of 125 feet.

2.2 Aquifer Tests at BMO-2014-2

The saturated basin fill at BMO-2014-2 consists of interbedded fine and coarse grained sediment. The fine grained sediment is predominantly sandy fat clay with and without gravel. The coarse grained sediment is clayey sand with and without gravel. The coarse and fine sediment in the saturated zone occur in alternating bedding units between 10 and 55 feet in thickness.

Well BMO-2014-2BU is completed across the water table at approximately 126 ft bls. The saturated portion of the BMO-2014-2BU screened interval consists of approximately 75% coarse grained

sediment and 25% fine grained sediment; with the coarse grained sediment beds between 30 and 55 feet thick. BMO-2014-1BL is constructed across approximately equal thicknesses of coarse and fine grained sediment that occur in several beds down to the bedrock contact at 400 ft bls.

The material types and bedding are similar at BMO-2014-2BU and BMO-2014-2BL. The interbeded fine and coarse grained sediment suggests an intermediate to low value for Kv/Kr. The interbedding occurs throughout the well screen intervals such that leaky confining conditions may occur at the scale of the well screens.

2.2.1 BMO-2014-2BU Constant Rate and Step Rate Pumping Tests

Figures 10 and 11 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2014-2BU. BMO-2014-2BL was not monitored during the constant rate pumping test.

Figure 10 shows a good correspondence between the transducer and manual measurements during the constant rate test. Drawdown during the constant rate test displayed a straight line semi-log plot from approximately 10 minutes to the end of the test (Figure 12). A transmissivity of 8,826 ft^2/day was estimated using the Cooper-Jacob Method using the transducer data and not accounting for partial penetration of the basin fill aquifer.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with partial penetration. The Theis solution for a transmissivity of 1,837 ft^2/day, storativity of 0.00001, and a Kv/Kr of 0.001 is shown on Figure 13. The Theis solution generally matches the drawdown curve, but does not exactly match the slope or magnitude of drawdown during the steps. Fixing the transmissivity at the value estimated from the constant rate test (8,826 ft^2/day) and allowing AQTESOLV to solve for storativity and Kv/Kr yielded unrealistically low values for those parameters and was unable to match the magnitude of drawdown.

The screened interval of BMO-2014-2BU partially penetrates the interbedded clay and sand units of the basin fill. The aquifer thickness is assumed to be 274 feet, the full saturated thickness of the basin fill, because there is no evidence indicating a lack of vertical hydraulic connectivity. The transmissivity estimates of the constant rate and step rate tests did not agree; with the estimated transmissivity of the step rate test being about 20% of the transmissivity estimated for the constant rate

test data. The constant rate test results are considered more reliable than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 274 feet and a transmissivity of 8,826 ft^2/day, the hydraulic conductivity at BMO-2014-2BU is estimated to be 32.2 ft/day.

2.2.2 BMO-2014-2BL Constant Rate and Step Rate Pumping Tests

Figures 14 and 15 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2014-2BL. BMO-2014-2BU was manually monitored during the constant rate pumping test, but showed no drawdown response as the water level increased by 0.1 feet over the pumping period.

Figure 14 shows a good correspondence between the transducer and manual measurements during the constant rate test. Drawdown during the constant rate test displayed a straight line semi-log plot from four minutes to 130 minutes at which time drawdown decreased approximately 0.3 feet between 130 and 220 minutes and declined from 220 minutes the end of the test. The cause of the change in drawdown at 130 minutes is not known, but could be the result of additional well development through pumping. A transmissivity of 9,803 ft^2/day was estimated using the Cooper-Jacob Method and the drawdown data from 220 to 491 minutes; the period after the drawdown decreased (Figure 16). The slope of the drawdown curve from 220 to 491 minutes is similar to the slope of the curve from four to 130 minutes. The analysis did not account for partial penetration of the basin fill aquifer.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with partial penetration. The Theis solution for a transmissivity of 1,359 ft^2/day, storativity of 0.00005, and a Kv/Kr of 0.002 is shown on Figure 17. The Theis solution generally matches the magnitude of drawdown, but does not exactly match the slope of drawdown during the steps. Fixing the transmissivity at the value estimated from the constant rate test (9,803 ft^2/day) and allowing AQTESOLV to solve for storativity and Kv/Kr yielded unrealistically low values for those parameters and was unable to match the magnitude of drawdown.

The screened interval of BMO-2014-2BL partially penetrates the interbedded clay and sand units of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 274 feet; the full saturated thickness of the basin fill. The transmissivity estimates of the constant rate and step rate tests did not agree; with the step rate test estimated transmissivity being about 14% of the transmissivity

estimated for the constant rate test data. The constant rate test results are considered more reliable than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 274 feet and a transmissivity of 9,803 ft^2/day, the hydraulic conductivity at BMO-2014-2BL is estimated to be 35.8 ft/day.3

2.3 Aquifer Tests at BMO-2014-3

The saturated basin fill at BMO-2014-5 primarily consists of clayey sand with gravel. A layer having a high percentage of sandy fat clay occurs from 248 to 276 ft bls. The bedrock at BMO-2014-3 occurs at 546 ft bls and the water table at approximately 137 ft bls. The bedrock intercept at BMO-2014-3 is the deepest occurrence of bedrock found during this phase of the expanded groundwater monitoring program.

Well BMO-2014-3BU is completed across the water table with filter pack to 300 ft bls; just below the clay unit. The saturated clayey sand in the screened portion of the BMO-2014-3BU has a relatively high clay content of 30% to 40%. BMO-2014-3BL is constructed across clayey sand with a clay content of 30% to 40%; similar to the clayey sand in BMO-2014-3BU. The geologic log identified two 2-foot thick beds of fat clay between 319 and 382 ft bls.

The material types and bedding are similar at BMO-2014-3BU and BMO-2014-3BL. The high percentage of fine grained sediment in the sand unit and occasional clay beds suggest an intermediate to low value for Kv/Kr. The clay dominated stratigraphy at 248 to 276 ft bls could cause leaky confining conditions at BMO-2014-3BL.

2.3.1 BMO-2014-3BU Constant Rate and Step Rate Pumping Tests

Figures 18 and 19 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2014-3BU. BMO-2014-3BL was not monitored during the constant rate pumping test.

Figure 18 shows a good correspondence between the transducer and manual measurements during the constant rate test. The drawdown during the constant rate displayed relatively straight line behavior from three to 100 minutes at which time the rate of drawdown increased; giving the semi-log plot a curvilinear shape. The cause of the increased rate of drawdown is uncertain as there was no increase in the pumping rate. The Cooper-Jacob Method was used with the manual drawdown measurements

from 100 minutes to 460 minutes as they represent the majority of the test and are interpreted to be most representative of the aquifer response (Figure 20). The estimated transmissivity is 3,150 ft^2/day; not accounting for partial penetration of the basin fill aquifer.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with partial penetration. The Theis solution for a transmissivity of 6,264 ft^2/day, storativity of 0.000014, and a Kv/Kr of 0.1 is shown on Figure 21. The Theis solution matches the drawdown curve fairly well except for the early time data before one minute. Fixing the transmissivity at the value estimated from the constant rate test (3,150 ft^2/day) and allowing AQTESOLV to solve for storativity and Kv/Kr yielded unrealistically high values of storativity (e.g., a value of 1) and was unable to match the magnitude of drawdown.

The screened interval of BMO-2014-3BU partially penetrates the clayey sand of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 409 feet; the full saturated thickness of the basin fill. The transmissivity estimates of the constant rate and step rate tests did not agree; with the step rate test transmissivity being about two times higher than the constant rate test transmissivity. The difference between the two tests may be that the short duration step rate test did not stress the aquifer sufficiently to observe the late response observed during the constant rate test. For example, analysis of the constant rate drawdown data from 20 minutes to 100 minutes (before the increase in drawdown rate) yields a transmissivity estimate of approximately 5,500 ft^2/day, which is similar to the estimate based on the step rate test. The late time constant rate test results are considered more representative than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 409 feet and a transmissivity of 3,150 ft^2/day, the hydraulic conductivity at BMO-2014-3BU is estimated to be 7.7 ft/day.

2.3.2 BMO-2014-3BL Constant Rate and Step Rate Pumping Tests

Figures 22 and 23 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2014-3BL. BMO-2014-3BU was not monitored during the constant rate pumping test.

Figure 22 shows a good correspondence between the transducer and manual measurements during the constant rate test, although the transducer measurements vary over a range of 0.2 feet in late time. The semi-log plot for the test shows a straight line behavior from four to 60 minutes. After 60 minutes, the

slope of the drawdown curve decreased and established a new straight line segment through the end of the test. The cause of the change in drawdown at 60 minutes is not known, but could be the result of additional development through pumping. A transmissivity of 5,882 ft^2/day was estimated using the Cooper-Jacob Method and the manual drawdown data from 160 to 491 minutes (Figure 24); the period after the drawdown decreased. The analysis did not account for partial penetration of the basin fill aquifer.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with partial penetration. The Theis solution for a transmissivity of 1,131 ft^2/day, storativity of 0.00001, and a Kv/Kr of 0.1 is shown on Figure 25. The Theis solution matches the drawdown curve fairly well, except for early time data before 1 minute. Fixing the transmissivity at the value estimated from the constant rate test (5,882 ft^2/day) and allowing AQTESOLV to solve for storativity and Kv/Kr yielded unrealistically low values for those parameters and was unable to match the magnitude of drawdown.

The screened interval of BMO-2014-3BL partially penetrates the clayey sand of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 409 feet; the full saturated thickness of the basin fill. The transmissivity estimates of the constant rate and step rate tests did not agree; with the step rate test estimated transmissivity being about 19% of the transmissivity estimated on the constant rate test data. The difference between the two tests may be that the short duration step rate test did not stress the aquifer sufficiently to observe the late response observed during the constant rate test. For example, if the constant rate data from 4 to 60 minutes are used to represent the aquifer behavior, the Cooper-Jacob Method yields a transmissivity of about 1,350 ft^2/day; which is similar to the transmissivity estimate for the step rate test. The constant rate test results are considered more reliable than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 409 feet and a transmissivity of 5,882 ft^2/day, the hydraulic conductivity at BMO-2014-3BL is estimated to be 14.4 ft/day.

2.4 Aquifer Tests at BMO-2014-4

The saturated basin fill at BMO-2014-4 consists of clayey sand with gravel. The bedrock at BMO-2014-4 occurs at 262 ft bls and the water table at 132 ft bls. Bedrock at BMO-2014-4 is shallow relative to the bedrock depths at sites BMO-2014-1, -2, and -3.

Well BMO-2014-4B is completed across the water table to the depth of the bedrock. Thus, BMO-2014-4B fully penetrates the basin fill. The clayey sand in the screened portion of the BMO-2014-4B has a relatively high clay content of 30% to 40%. Well BMO-2014-4BL is constructed with filter pack from 216 to 261 ft bls; a depth interval equivalent to the lower 45 feet of BMO-2014-4B. There are no significant contrasts in the stratigraphy that would cause confined or leaky confining conditions at BMO-2014-4.

2.4.1 BMO-2014-4B Constant Rate and Step Rate Pumping Tests

Figures 26 and 27 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2014-4B. BMO-2014-4BL was not monitored during the constant rate pumping test.

Figure 26 shows a good correspondence between the transducer and manual measurements during the constant rate test, although the transducer measurements vary over a range of 0.2 feet in late time readings. The semi-log drawdown plot for the constant rate test can be approximated by three straight line segments: 2 to 20 minutes, 20 to 200 minutes, and 200 to 491 minutes. Overall, the semi-log plot displays a curvilinear shape with a slope that increases over time. The cause of the increased slope of the drawdown curve is uncertain as there was no increase in the pumping rate. The Cooper-Jacob Method was used with the manual drawdown measurements from 200 minutes to 491 minutes as they represent the majority of test time and interpreted to be most representative of the aquifer response (Figure 28). The estimated transmissivity is 4,901 ft^2/day.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with a fully penetrating pumping well. The Theis solution for a transmissivity of 3,620 ft^2/day, storativity of 0.00001, and a Kv/Kr of 0.1 is shown on Figure 29. The Theis solution generally matches the drawdown curve, but doesn't exactly match the magnitude and slope of the drawdown curve. Fixing the transmissivity at the value estimated from the constant rate test (4,901 ft^2/day) and allowing AQTESOLV to solve for storativity yielded a storativity of $1x10^{-8}$. The solution was insensitive to the anisotropy ratio.

The screened interval of BMO-2014-4B fully penetrates the clayey sand of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 130 feet. The transmissivity estimate based on the step rate test is about 74% of the transmissivity estimated on the constant rate test data. The difference

between the two tests may be that the short duration step rate test did not stress the aquifer sufficiently to observe the late response observed during the constant rate test. The constant rate test results are considered more representative than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 130 feet and a transmissivity of 4,901 ft^2/day, the hydraulic conductivity at BMO-2014-4B is estimated to be 37.7 ft/day.

2.4.2 BMO-2014-4BL Constant Rate and Step Rate Pumping Tests

Figures 30 and 31 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2014-4BL. BMO-2014-4B was monitored during the constant rate pumping test. BMO-2014-4B had 0.39 feet of water level decline drawdown while BMO-2014-BL was pumped.

Figure 30 shows a good correspondence between the transducer and manual measurements during the constant rate test. The semi-log plot for the test shows that 39 feet of drawdown occurred in the first five minutes of the test, drawdown increased to 40 feet by 100 minutes, decreased to approximately 38.7 feet (based on manual measurements) from 100 to 340 minutes, and decreased from 38.7 to 39 feet from 340 to 491 minutes. The drawdown curve displays periodic decreases and increases in drawdown suggesting that additional well development was occurring due to pumping. The drawdown data for the BMO-2014-4BL test are difficult to interpret because of the variations in drawdown. The manual measurements from 340 to 491 minutes represent the last period of linear semilog behavior and were used to estimate transmissivity by the Cooper-Jacob Method (Figure 32). A transmissivity of 830 ft^2/day was estimated by the Cooper-Jacob Method. The analysis did not account for partial penetration of the basin fill aquifer.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with partial penetration. The Theis solution for a transmissivity of 637 ft^2/day, storativity of 0.00001, and a Kv/Kr of 0.008 is shown on Figure 33. The Theis solution was generated using the automated parameter estimation routine in AQTESOLV and only generally matches the drawdown curve. The magnitude of drawdown and relative differences between pumping steps could not be replicated. The automated parameter estimation routine failed to converge on a solution. The storativity was fixed at 0.00001 for parameter estimation because AQTESOLV selected unrealistically low storativity values.

The screened interval of BMO-2014-4BL partially penetrates the clayey sand of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 130 feet. The transmissivity estimates of the constant rate and step rate tests are similar; with the step rate test estimated transmissivity being about 77% of the transmissivity estimated on the constant rate test data. The constant rate test results are considered more representative than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. The difference between the two tests may be that the short duration step rate test did not stress the aquifer sufficiently to observe the late response observed during the constant rate test. The late time data for the constant rate test used to estimate the transmissivity represent the last behavior of the well after showing variable drawdown through the test either due to well losses associated with its short (40-foot) screen, efficiency changes due to well development during pumping, or both. Assuming an aquifer thickness of 130 feet and a transmissivity of 830 ft^2/day, the hydraulic conductivity at BMO-2014-4BL is estimated to be 6.4 ft/day.

2.5 Aquifer Tests at BMO-2015-1

The saturated basin fill at BMO-2015-1 consists of clayey sand and clayey sand with gravel. The bedrock at BMO-2015-1 occurs at 244 ft bls and the water table at 128 ft bls. Bedrock at BMO-2015-1 is similar in depth to BMO-2014-4 and shallow relative to the bedrock depths at sites BMO-2014-1, -2, and -3.

Well BMO-2015-1B is completed across the water table to the depth of the bedrock; fully penetrating the basin fill. The clayey sand and clayey sand with gravel in the screened portion of the BMO-2015-1B has a relatively high clay content of 30% to 40%. A sandy fat clay occurs from 152 to 156 ft bls. Well BMO-2015-1BL is constructed with filter pack from 197 to 241 ft bls; a depth interval equivalent to the lower 44 feet of BMO-2015-1B.

The high percentage of fine grained sediment in the sand unit suggests an intermediate to low value for Kv/Kr. There are no significant contrasts in the stratigraphy that would cause confined or leaky confining conditions at BMO-2015-1.

2.5.1 BMO-2015-1B Constant Rate and Step Rate Pumping Tests

Figures 34 and 35 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2015-1B. BMO-2015-1BL was monitored during the constant rate pumping test and had approximately 0.78 feet of water level decline through the test.

Figure 34 shows a good correspondence between the transducer and manual measurements during the constant rate test. The semi-log drawdown plot for the constant rate test can be approximated by a straight line from about 12 minutes to the end of the test. The semi-log plot shows several periods of increase and decrease in the drawdown, but the slope of the drawdown curve is approximately the same over each period. An estimated transmissivity of 722 ft^2/day was calculated using the Cooper-Jacob Method with the manual drawdown measurements from 12 to 501 minutes (Figure 36).

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with a fully penetrating pumping well. The Theis solution for a transmissivity of 270 ft^2/day, storativity of 0.00005, and a Kv/Kr of 0.1 is shown on Figure 37. The Theis solution generally matches the drawdown curve and the magnitude of drawdown, but doesn't exactly match the relatively flat line behavior of the drawdown curves for each step. Fixing the transmissivity at the value estimated from the constant rate test (722 ft^2/day) and allowing AQTESOLV to solve for storativity yielded an unrealistically low storativity (10^{-10}). The solution was insensitive to the anisotropy ratio.

The screened interval of BMO-2015-1B fully penetrates the clayey sand of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 116 feet. The transmissivity estimates of the constant rate and step rate tests differ; with the step rate test transmissivity being about 36% of the transmissivity estimated on the constant rate test data. The constant rate test results are considered more representative than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 116 feet and a transmissivity of 722 ft^2/day, the hydraulic conductivity at BMO-2015-1B is estimated to be 6.2 ft/day.

2.5.2 BMO-2015-1BL Constant Rate and Step Rate Pumping Tests

Figures 38 and 39 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2015-1BL. BMO-2015-1BL was not monitored during the constant rate pumping test.

Figure 38 shows a good correspondence between the transducer and manual measurements during the constant rate test. The semi-log drawdown plot for the constant rate test can be approximated by a straight line from about 9 minutes to the end of the test. The semi-log plot shows several periods of increase and decrease in the drawdown, but the slope of the drawdown curve is approximately the same between the periods. A transmissivity of 934 ft^2/day was calculated using the Cooper-Jacob Method with the manual drawdown measurements from 320 to 501 minutes (Figure 40); the last period of drawdown.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with a partially penetrating pumping well. The Theis solution did not provide a satisfactory fit to the drawdown curve as it was unable to match the magnitude of drawdown or the relative difference in drawdown between the steps. Fixing the transmissivity at the value estimated from the constant rate test (934 ft^2/day) and allowing AQTESOLV to solve for storativity yielded an unrealistically low storativity (less than 10^{-10}). The entire set of step rate test data cannot be reliably interpreted, perhaps because there was ongoing well development during pumping; as suggested by the last two steps of the test which had water level recovery. Using AQTESOLV to window the data for the first pumping step and fixing the storativity at 0.00001 yielded a transmissivity of 713 ft^2/day and an anisotropy ratio of 0.01 (Figure 41).

The screened interval of BMO-2015-1BL partially penetrates the clayey sand of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 116 feet. The transmissivity estimates of the constant rate and first pumping step of the step rate test are similar; with the step rate test estimated transmissivity being about 76% of the transmissivity estimated on the constant rate test data. The constant rate test results are considered more representative than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 116 feet and a transmissivity of 934 ft^2/day, the hydraulic conductivity at BMO-2015-1BL is estimated to be 8.1 ft/day.

2.6 Aquifer Tests at BMO-2015-2

The saturated basin fill at BMO-2015-2 consists of clayey sand with gravel and well-graded sand. The bedrock at BMO-2015-1 occurs at 273 ft bls and the water table at 147 ft bls. The bedrock depth at BMO-2015-2 is similar the bedrock depths at BMO-2014-4 and BMO-2015-1, but is shallow relative to the bedrock depths at sites BMO-2014-1, -2, and -3.

Well BMO-2015-2B is completed across the water table to the depth of the bedrock; fully penetrating the basin fill. The clayey sand with gravel in the screened portion of the BMO-2015-1B has a clay content of 20% to 30%. Well-graded sand with 10% to 20% fines occurs from 228 to 248 ft bls. The basin fill transitions to silty and clayey sand between 248 ft bls and the bedrock at 273 ft bls. Well BMO-2015-2BL is constructed with filter pack from 212 to 272 ft bls; a depth interval equivalent to the lower 60 feet of BMO-2015-2B. There are no significant contrasts in the stratigraphy that would cause confined or leaky confining conditions at BMO-2015-1.

2.6.1 BMO-2015-2B Constant Rate and Step Rate Pumping Tests

Figures 42 and 43 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2015-2B. BMO-2015-2BL was monitored during the constant rate pumping test and had approximately 0.97 feet of water level decline through the test.

Figure 42 shows a good correspondence between the transducer and manual measurements during the constant rate test, although the transducer measurements vary over a range of 0.2 feet. The semi-log drawdown plot for the constant rate test shows a straight line segment from 10 to 200 minutes and a relatively flat line segment from 200 to 501 minutes. The segment from 200 to 501 minutes appears as if a recharge boundary were intersected, but there is no known recharge source in the area unless the discharge from the test infiltrated to the water table after 200 minutes. An estimated transmissivity of 3,603 ft^2/day was calculated using the Cooper-Jacob Method with the manual drawdown measurements from 10 to 200 minutes (Figure 44). The data from 200 to 501 minutes had little to no slope. Any attempt to interpret a slope from these data would have resulted in an unrealistically high transmissivity (greater than 20,000 ft^2/day). The period before the flattening of drawdown is interpreted to be the most representative data for the response of the basin fill to pumping. The cause of the flattening of drawdown after 200 minutes is not known.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with a fully penetrating pumping well. The Theis solution for a transmissivity of 680 ft^2/day, storativity of 0.00001, and a Kv/Kr of 0.1 is shown on Figure 45. The Theis solution generally matches the drawdown curve and the magnitude of drawdown, but doesn't exactly match the relatively flat line behavior of the drawdown curves for each step. Fixing the transmissivity at the value estimated from the constant rate test (3,603 ft^2/day) and allowing AQTESOLV to solve for storativity yielded an unrealistically low storativity (less than 10^{-10}). The solution was insensitive to the anisotropy ratio. Using only the drawdown data for the first step, a transmissivity of 3,539 ft^2/day is calculated by the Cooper-Jacob Method; similar to the transmissivity estimate for the constant rate test.

The screened interval of BMO-2015-2B fully penetrates the clayey sand of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 125 feet. The transmissivity estimates of the constant rate and step rate tests differ; with the step rate test estimated transmissivity being about 18% of the transmissivity estimated on the constant rate test data. The constant rate test results are considered more representative than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 125 feet and a transmissivity of 3,603 ft^2/day, the hydraulic conductivity at BMO-2015-2B is estimated to be 28.8 ft/day.

2.6.2 BMO-2015-2BL Constant Rate and Step Rate Pumping Tests

Figures 46 and 47 show semilog drawdown plots for the constant rate and step rate pumping tests at BMO-2015-2BL. BMO-2015-2B was monitored during the constant rate pumping test and had approximately 0.77 feet of water level decline through the test.

Figure 46 shows a good correspondence between the transducer and manual measurements during the constant rate test, although the transducer measurements varied over a range of 0.2 feet and were 0.05 to 0.1 feet higher than the manual data. The semi-log drawdown plot for the constant rate test shows a straight line segment from 45 to approximately 370 minutes and a relatively flat line segment from 370 to 491 minutes. The segment from 200 to 491 minutes appears as if a recharge boundary were intersected as was observed during the constant rate test at BMO-2015-2B. There is no known recharge source in the area unless the discharge from the test infiltrated to the water table after 200

minutes. An estimated transmissivity of 2,715 ft^2/day was calculated using the Cooper-Jacob Method with the manual drawdown measurements from 45 to 370 minutes (Figure 48). The data from 200 to 491 minutes had little to no slope. Any attempt to interpret a slope from these data would have resulted in an unrealistically high transmissivity (greater than 20,000 ft^2/day). The period before the flattening of drawdown is interpreted to be the most representative data for the response of the basin fill to pumping. The cause of the flattening of drawdown after 200 minutes is not known.

Step rate test drawdown data were analyzed with AQTESOLV using the Theis solution for an unconfined aquifer with a partially penetrating pumping well. The Theis solution matched the drawdown curve fairly well. The Theis solution for a transmissivity of 537 ft^2/day, storativity of 0.00001, and a Kv/Kr of 0.01 is shown on Figure 49. Fixing the transmissivity at the value estimated from the constant rate test (2,715 ft^2/day) and allowing AQTESOLV to solve for storativity yielded an unrealistically low storativity (less than 10^{-10}). The solution was insensitive to the anisotropy ratio. Using only the drawdown data for the first step, a transmissivity of 3,529 ft^2/day is calculated by the Cooper-Jacob Method; similar to the transmissivity estimate of the constant rate test.

The screened interval of BMO-2015-2BL partially penetrates the clayey sand of the basin fill overlying the bedrock. The aquifer thickness is estimated to be 125 feet. The constant rate test results are considered more representative than the step rate test results due to the higher average pumping rate and longer duration of the constant rate test. Assuming an aquifer thickness of 125 feet and a transmissivity of 2,715 ft^2/day, the hydraulic conductivity at BMO-2015-1BL is estimated to be 21.7 ft/day.

3.0 REFERENCES

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TABLES

TABLE 1
Well Construction and Aquifer Geometric Data

Well Name	ADWR Registry Number	UTM Northing (m)	UTM Easting (m)	Land Surface Elevation (ft amsl)	Total Depth Drilled (ft)	Depth to Bedrock (ft bls)	Bedrock Elevation (ft amsl)	Filter Pack Interval (ft bls)	Screened Interval (ft bls)	Depth to Water (ft bls)	Saturated Thickness (ft)
BMO-2014-1BU	55-917393	3468231.440	600570.805	4557.18	283	372	4185	110-283	120-273	123	249
BMO-2014-1BL	55-917394	3468234.798	600563.194		398			282-372	292-366		
BMO-2014-2BU	55-917453	3468192.762	600788.520	4560.31	286	400	4160	116-286	127-276	126	274
BMO-2014-2BL	55-917452	3468183.921	600784.872		410			286-400	297-396		
BMO-2014-3BU	55-917494	3467787.733	600810.534	4572.21	298	546	4026	127-298	139-288	137	409
BMO-2014-3BL	55-917527	3467786.416	600822.399		549			318-526	328-521		
BMO-2014-4B	55-917620	3468581.267	600508.792	4566.45	272	262	4304	119-262	129-258	132	130
BMO-2014-4BL	55-917619	3468566.229	600498.091		262			216-261	220-260		
BMO-2015-1B	55-917622	3468563.389	600261.991	4561.38	256	244	4317	116-244	125-244	128	116
BMO-2015-1BL	55-917621	3468583.092	600272.479		243			197-243	201-241		
BMO-2015-2B	55-917827	3468996.635	600267.799	4579.62	280	272	4308	139-273	149-268	147	125
BMO-2015-2BL	55-917828	3468983.910	600252.069		272			207-272	212-272		

Notes:
ADWR = Arizona Department of Water Resources
UTM = Universal Transverse Mercator Zone 12, North American Datum 1983 (NAD83)
m = meters
ft = feet
ft amsl = feet above mean sea level
ft bls = feet below land surface

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TABLE 2
Hydraulic Properties Estimates for Constant Rate and Step Rate Pumping Tests

Pumped Well	Test Type	Well Penetration of Basin Fill	Pumping Rates (gpm)	Pumping Time (minutes)	Maximum Drawdown (ft)	Solution	Transmissivity (ft^2/day)	Storativity	Anisotropy Ratio (Kz/Kr)
BMO-2014-1BU	Constant-Rate	Partial	32	490	6.60	Cooper-Jacob	3227	NA	NA
BMO-2014-1BU	Step-Rate	Partial	20, 25, 30	180	6.42	Theis	2088	0.00005	0.001
BMO-2014-1BL	Constant-Rate	Partial	30	490	10.75	Cooper-Jacob	8144	NA	NA
BMO-2014-1BL	Step-Rate	Partial	10, 15, 20	180	6.63	Theis	1184	0.00005	0.001
BMO-2014-2BU	Constant-Rate	Partial	50	480	13.23	Cooper-Jacob	8826	NA	NA
BMO-2014-2BU	Step-Rate	Partial	40, 50, 55	180	15.81	Theis	1837	0.00001	0.001
BMO-2014-2BL	Constant-Rate	Partial	50	490	24.55	Cooper-Jacob	9803	NA	NA
BMO-2014-2BL	Step-Rate	Partial	40, 45, 50	180	24.41	Theis	1359	0.00005	0.002
BMO-2014-3BU	Constant-Rate	Partial	50	490	5.65	Cooper-Jacob	3150	NA	NA
BMO-2014-3BU	Step-Rate	Partial	40, 45, 50	180	5.13	Theis	6264	0.000014	0.1
BMO-2014-3BL	Constant-Rate	Partial	50	490	23.36	Cooper-Jacob	5882	NA	NA
BMO-2014-3BL	Step-Rate	Partial	40, 45, 50	180	23.09	Theis	1131	0.00001	0.1
BMO-2014-4B	Constant-Rate	Full	50	490	4.79	Cooper-Jacob	4901	NA	NA
BMO-2014-4B	Step-Rate	Full	30, 40, 50	180	4.48	Theis	3620	0.00001	0.1
BMO-2014-4BL	Constant-Rate	Partial	40	490	39.97	Cooper-Jacob	830	NA	NA
BMO-2014-4BL	Step-Rate	Partial	20, 30, 40	180	43.16	Theis	637	0.00001	0.008
BMO-2015-1B	Constant-Rate	Full	45	500	40.94	Cooper-Jacob	722	NA	NA
BMO-2015-1B	Step-Rate	Full	25, 35, 45	180	43.20	Theis	270	0.00005	0.1
BMO-2015-1BL	Constant-Rate	Partial	45	500	48.31	Cooper-Jacob	934	NA	NA
BMO-2015-1BL	Step-Rate	Partial	20, 25, 30, 40, 46	300	56.16	Theis	713	0.00001	0.01
BMO-2015-2B	Constant-Rate	Full	50	500	20.67	Cooper-Jacob	3603	NA	NA
BMO-2015-2B	Step-Rate	Full	30, 40, 49	180	21.36	Theis	680	0.00001	0.1
BMO-2015-2BL	Constant-Rate	Partial	40	490	34.60	Cooper-Jacob	2715	NA	NA
BMO-2015-2BL	Step-Rate	Partial	30, 40, 45	180	42.36	Theis	537	0.00001	0.01

Notes:

gpm = gallons per minute

ft = feet

ft^2/day = feet squared per day

K_z = Vertical hydraulic conductivity

K_r = Radial (horizontal) hydraulic conductivity

NA = not analyzed

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TABLE 3
Transmissivity and Hydraulic Conductivity Estimates for Constant Rate Pumping Tests

Pumped Well	Solution	Transmissivity (ft^2/day)	Aquifer Thickness (ft)	Hydraulic Conductivity (ft/day)
BMO-2014-1BU	Cooper-Jacob	3,227	249	13.0
BMO-2014-1BL	Cooper-Jacob	8,144	125	65.2
BMO-2014-2BU	Cooper-Jacob	8,826	274	32.2
BMO-2014-2BL	Cooper-Jacob	9,803		35.8
BMO-2014-3BU	Cooper-Jacob	3,150	409	7.7
BMO-2014-3BL	Cooper-Jacob	5,882		14.4
BMO-2014-4B	Cooper-Jacob	4,901	130	37.7
BMO-2014-4BL	Cooper-Jacob	830		6.4
BMO-2015-1B	Cooper-Jacob	722	116	6.2
BMO-2015-1BL	Cooper-Jacob	934		8.1
BMO-2015-2B	Cooper-Jacob	3,603	125	28.8
BMO-2015-2BL	Cooper-Jacob	2,715		21.7
	Arithmetic Mean	4,395		23.1

Notes:

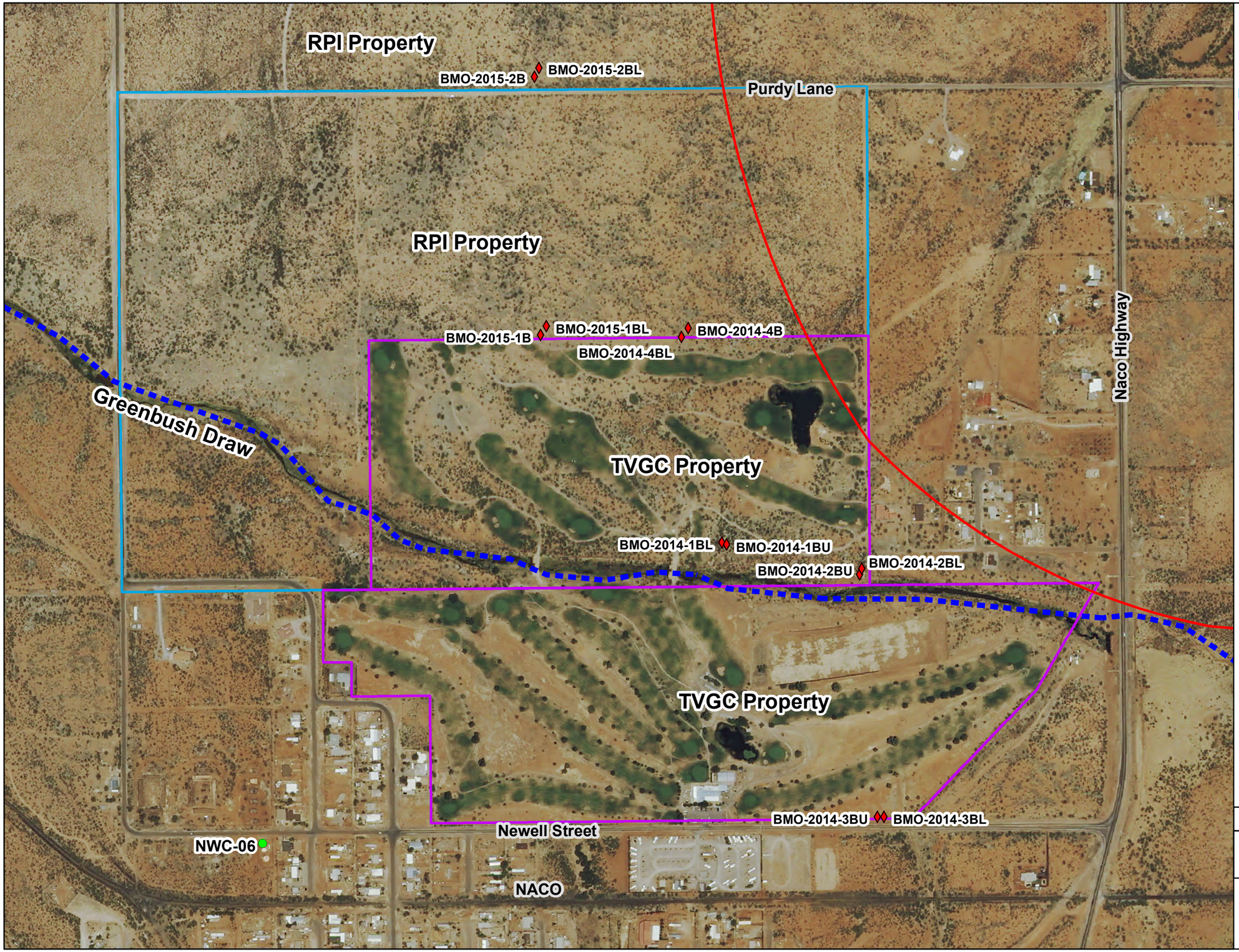
ft = feet

ft^2/day = feet squared per day

ft/day = feet per day

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FIGURES



Legend

- Monitor Well
- Greenbush Draw
- RPI Property
- TVGC Property
- Q4 2014 250 mg/LSulfate Concentration Contour

Feet

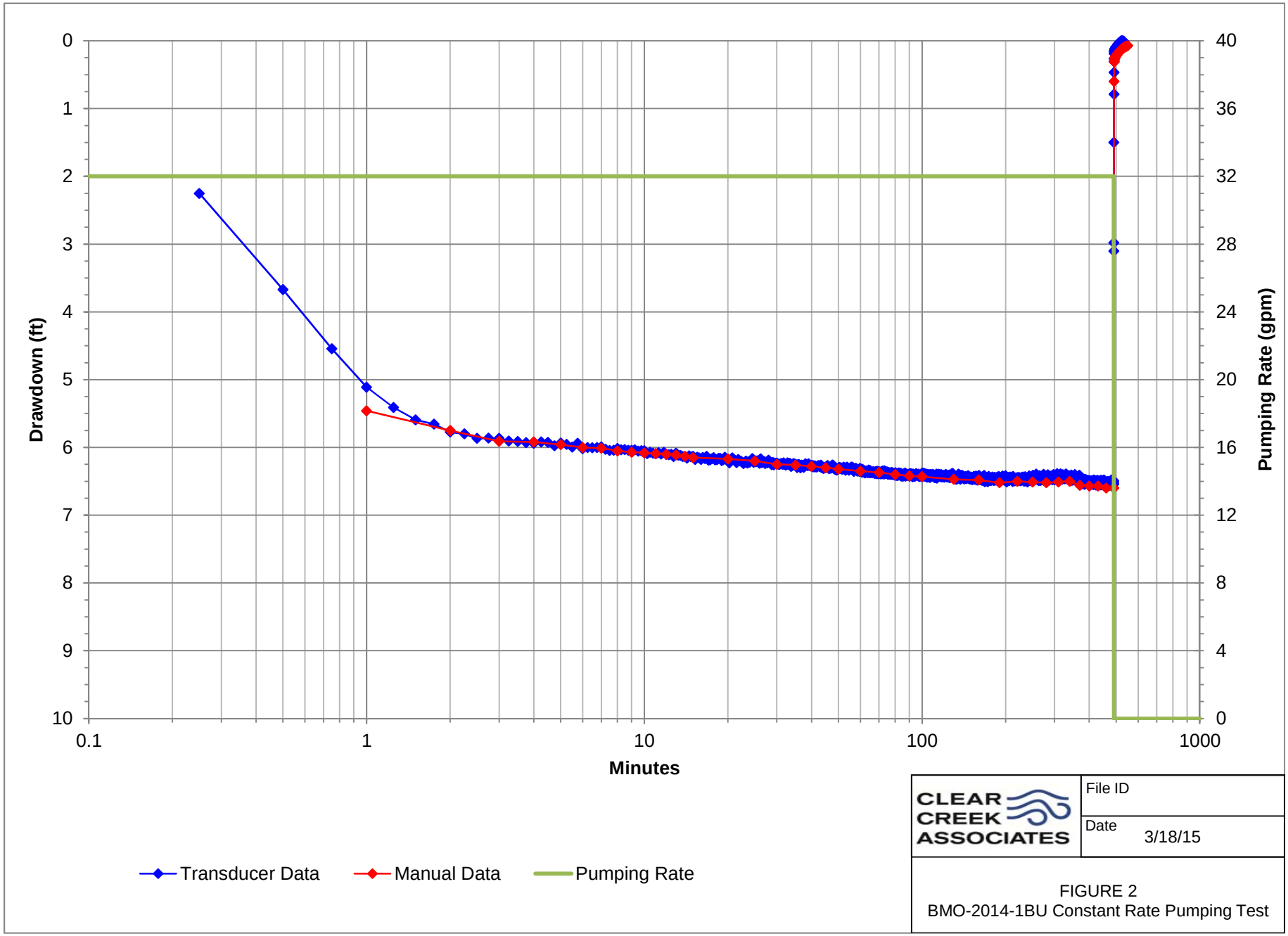
0 250 500 1,000

Projection: UTM Zone 12N NAD83

Date	File ID
8/10/15	055038-434

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FIGURE 1
Monitor Well Locations

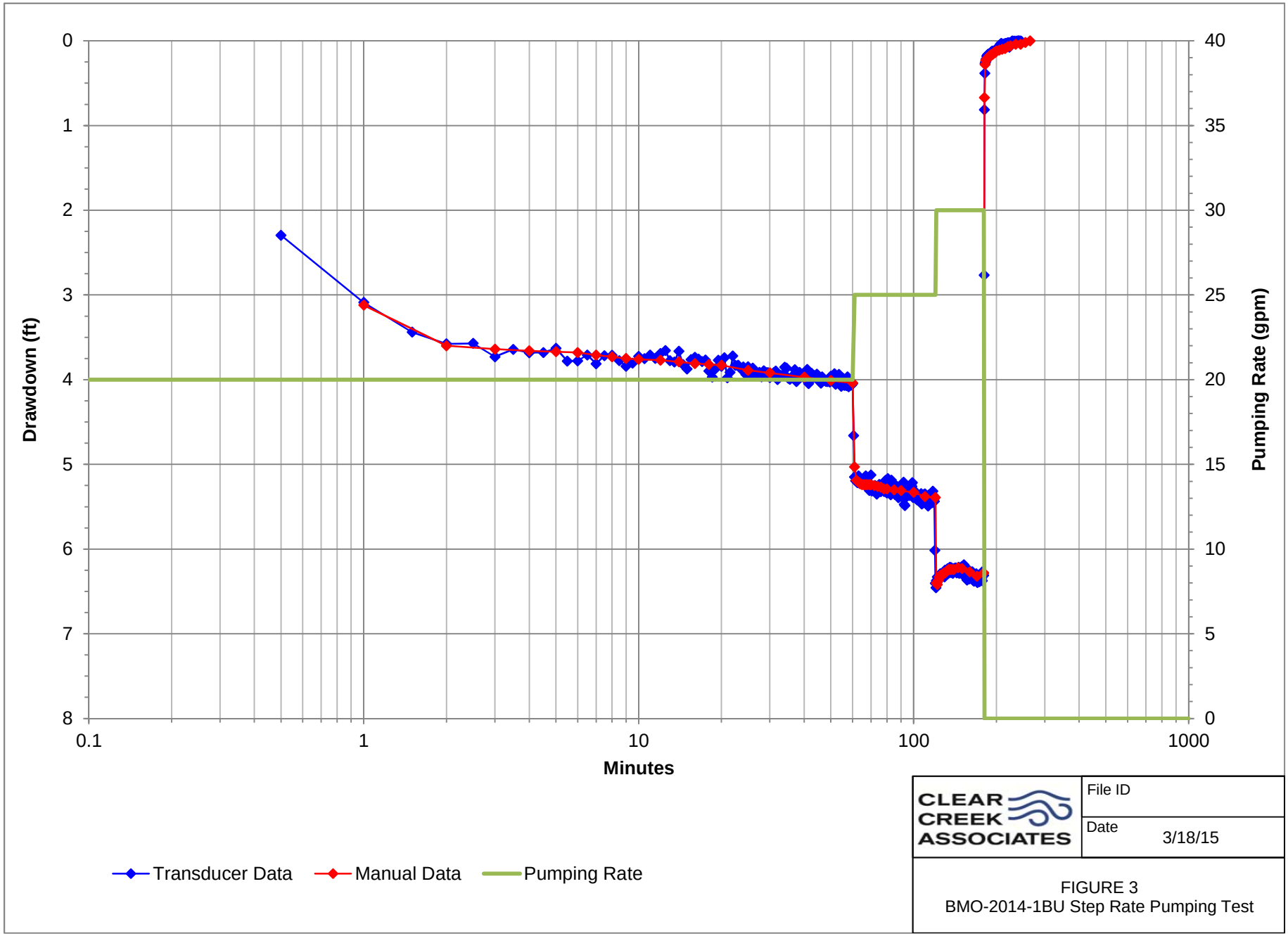


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File ID

Date 3/18/15

FIGURE 2
BMO-2014-1BU Constant Rate Pumping Test

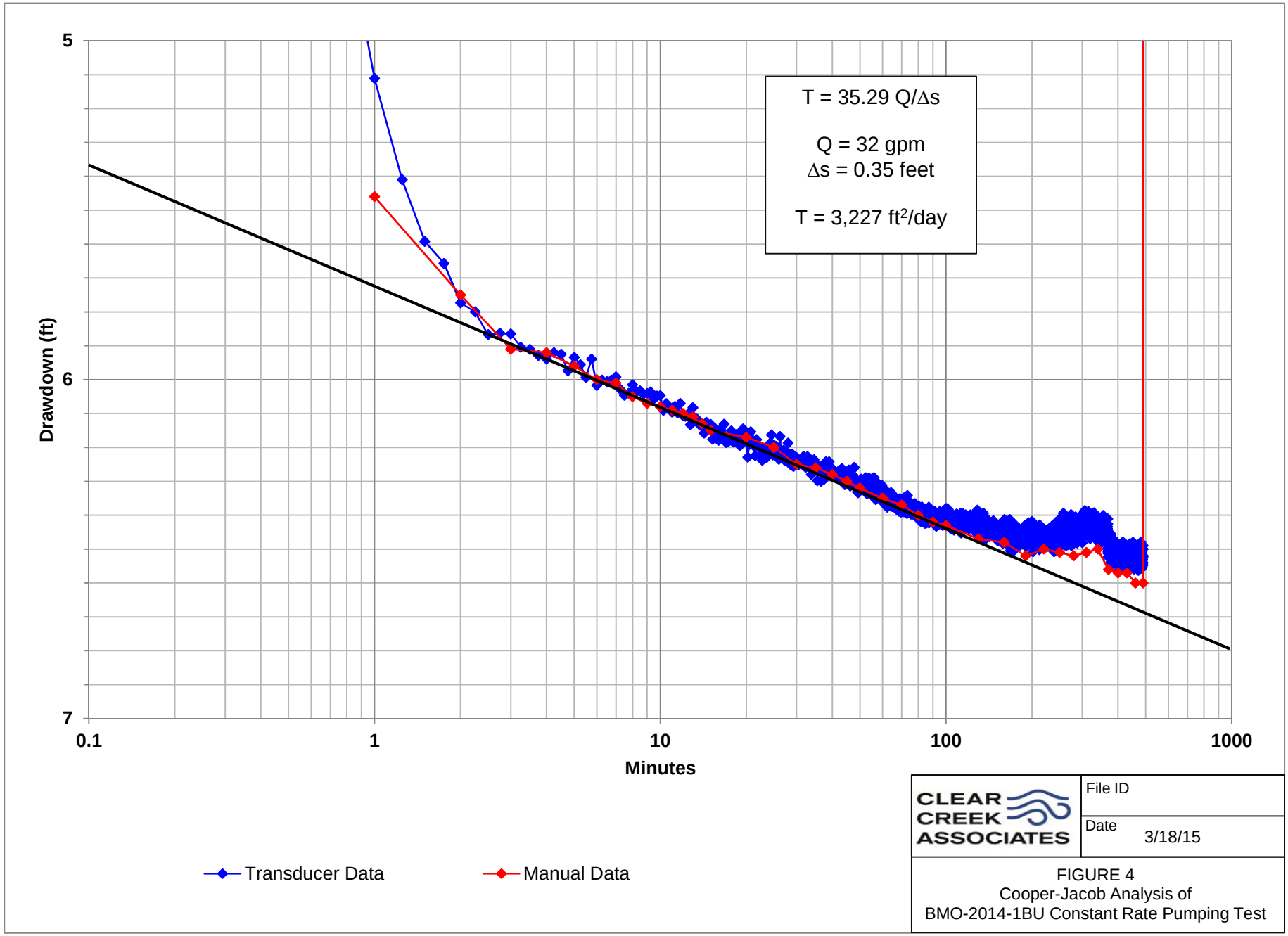


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File ID

Date 3/18/15

FIGURE 3
BMO-2014-1BU Step Rate Pumping Test

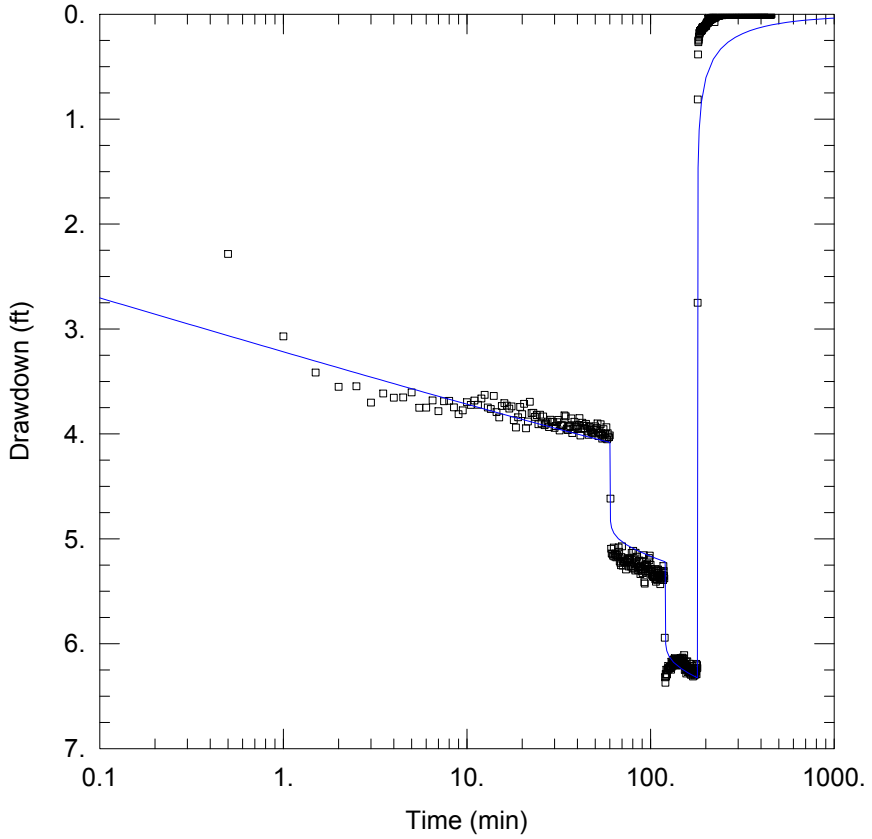


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File ID

Date 3/18/15

FIGURE 4
Cooper-Jacob Analysis of
BMO-2014-1BU Constant Rate Pumping Test



BMO-2014-1BU STEP RATE TEST

Data Set: N:\...\1 BU Step Test_jrn.aqt
Date: 06/22/15 Time: 12:47:53

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2014-1BU
Test Date: 11/12/14

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2014-1BU	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2014-1BU	0	0

SOLUTION

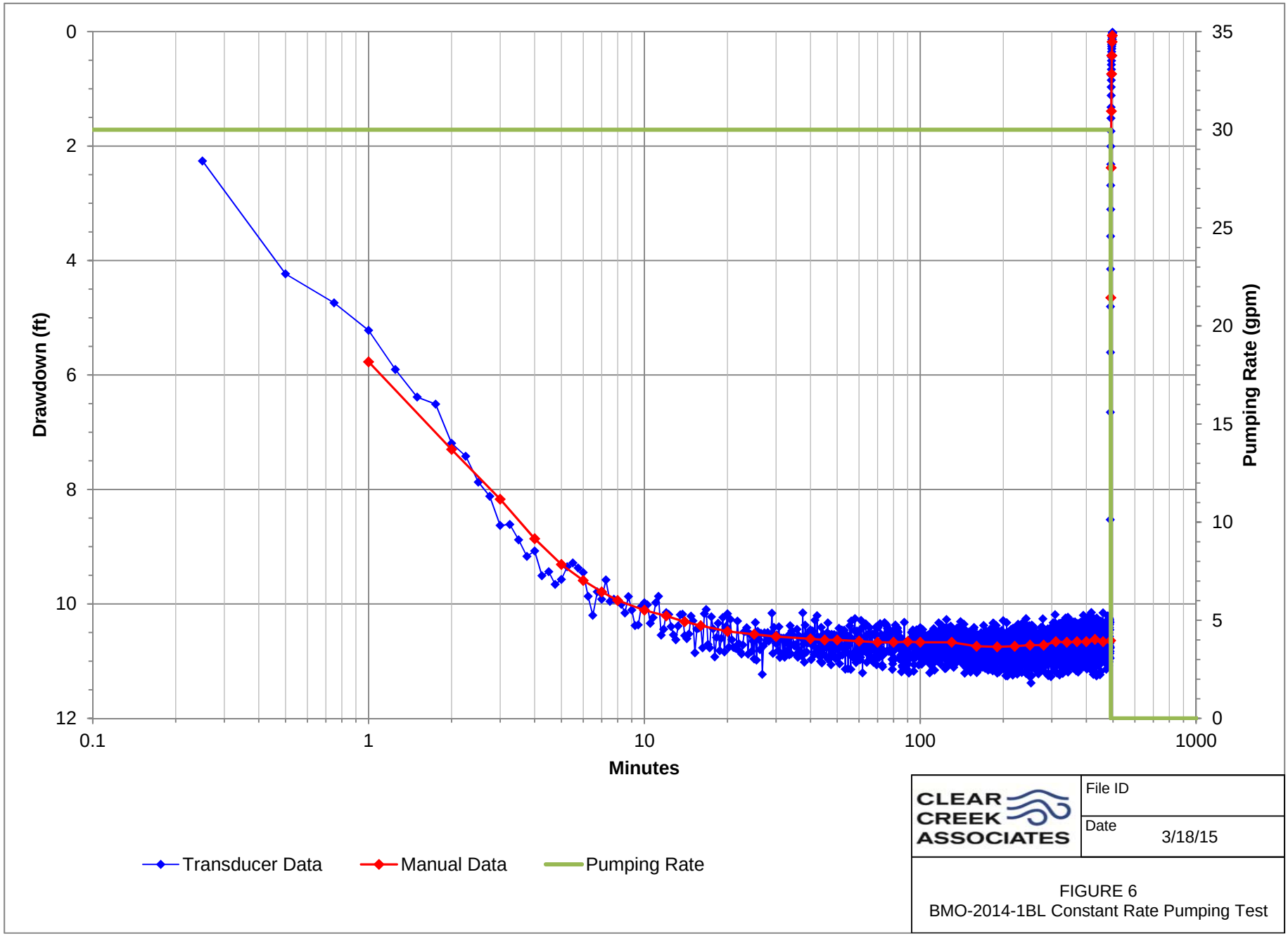
Aquifer Model: Unconfined
Solution Method: Theis

T = 2088. ft^2/day
S = 5.0E-5
Kz/Kr = 0.001
b = 249. ft

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File ID 055038-023
Date 3/11/15

FIGURE 5
Theis Analysis of BMO-2014-1BU
Step Rate Pumping Test

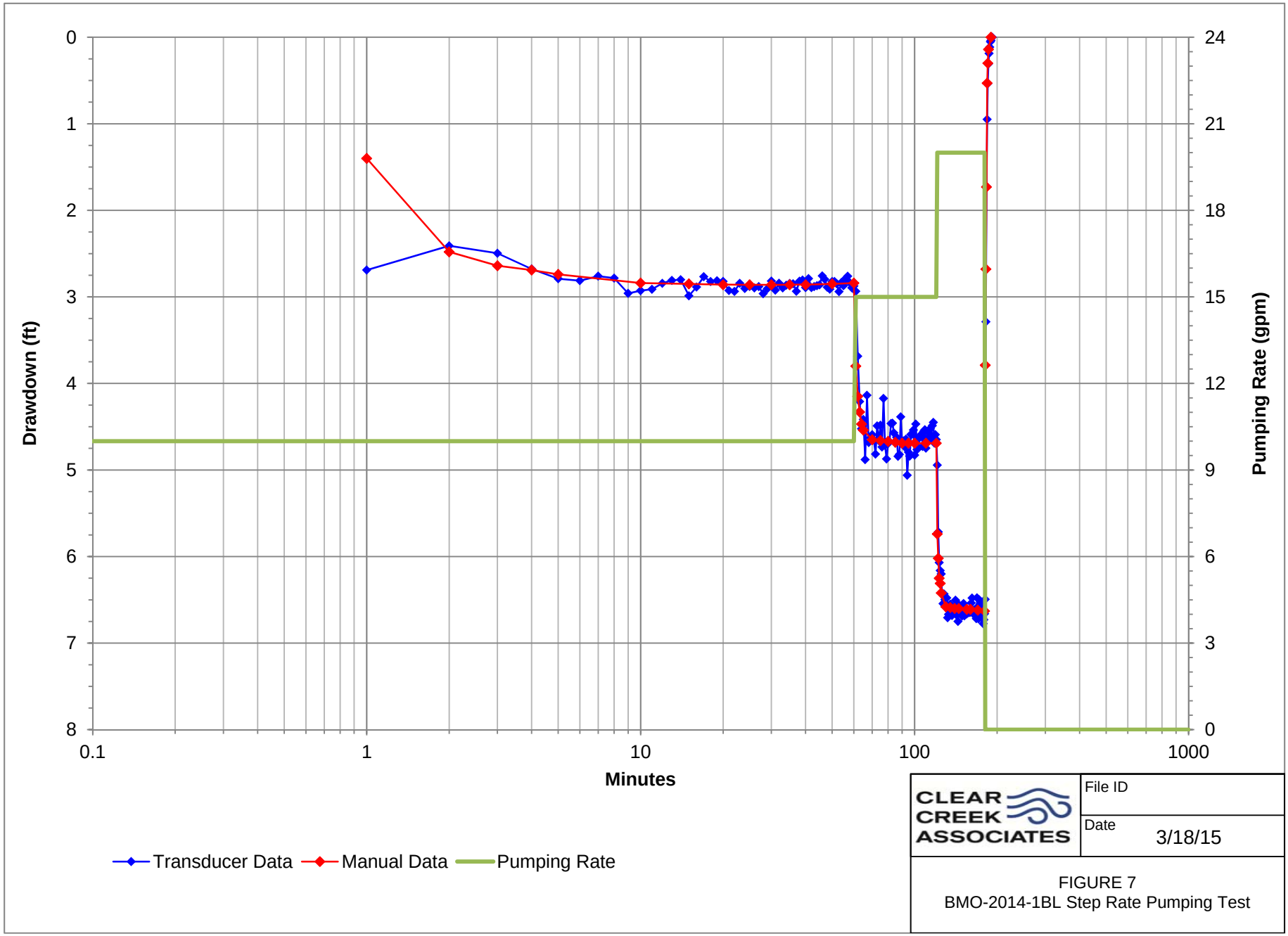


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File ID

Date 3/18/15

FIGURE 6
BMO-2014-1BL Constant Rate Pumping Test

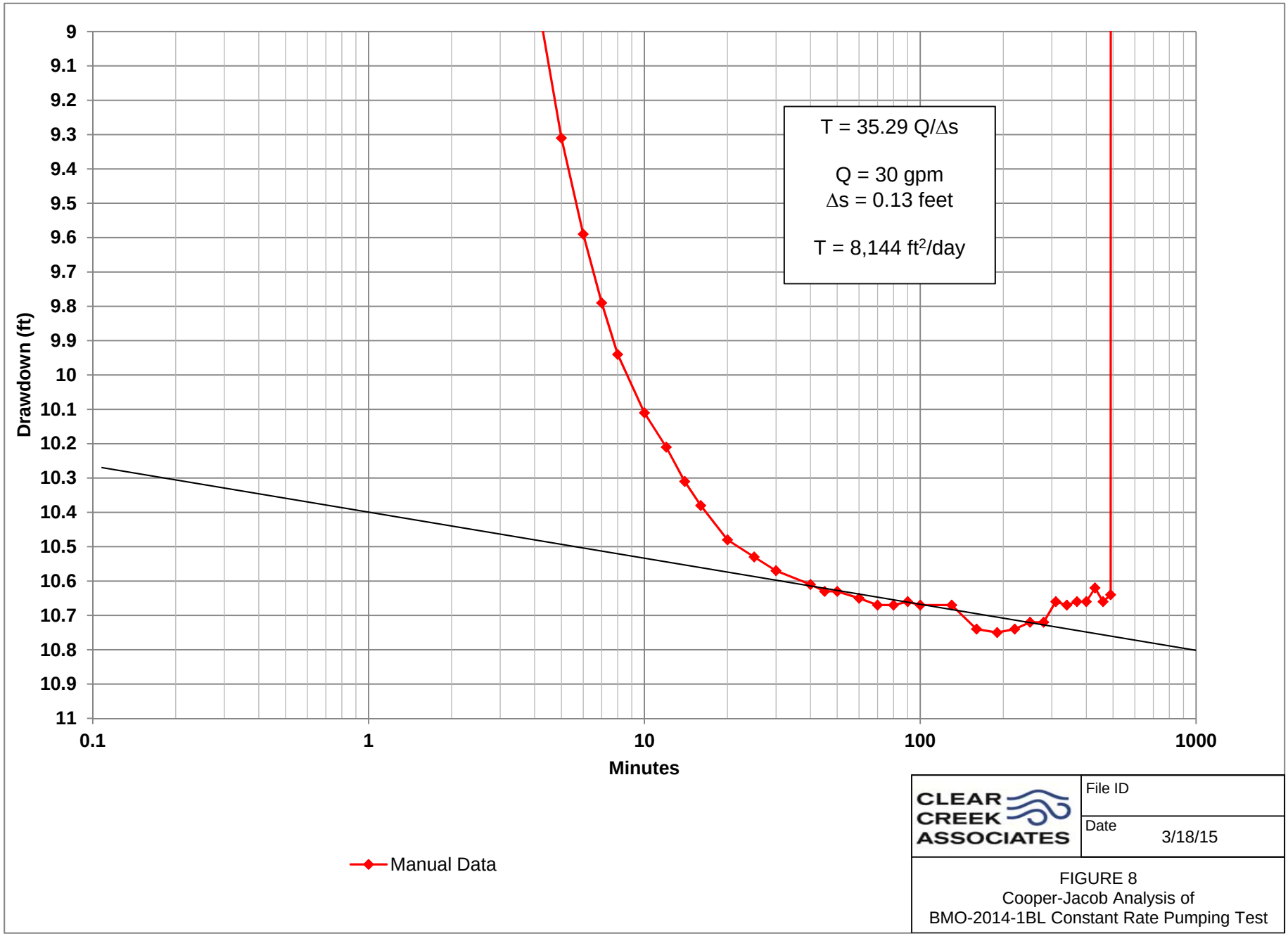


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File ID

Date 3/18/15

FIGURE 7
BMO-2014-1BL Step Rate Pumping Test

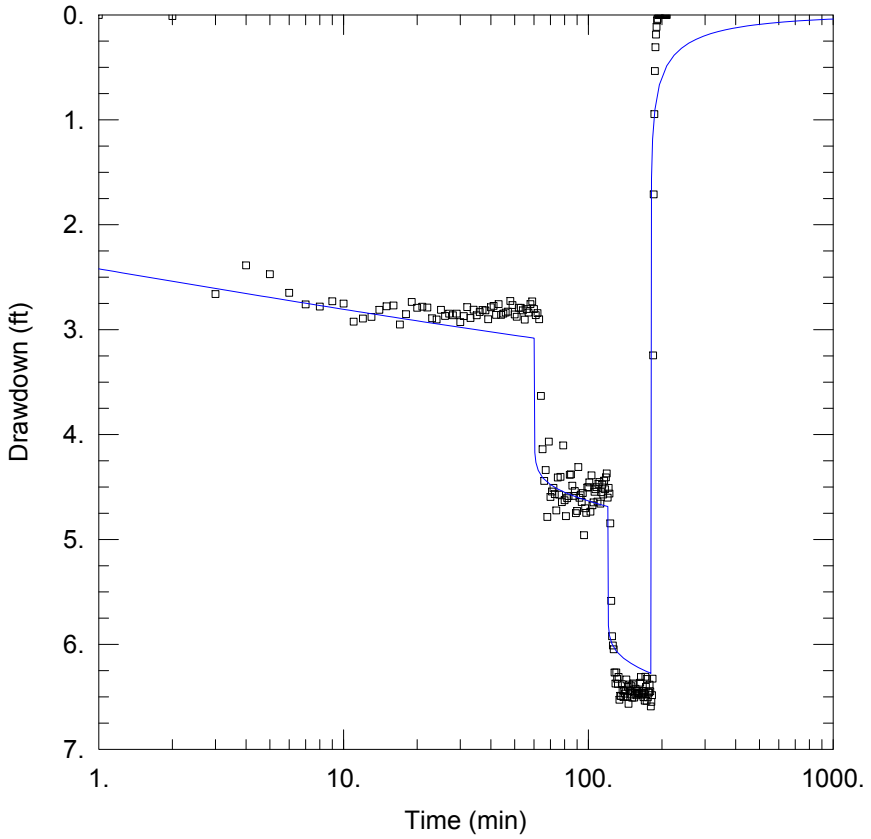


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File ID

Date 3/18/15

FIGURE 8
Cooper-Jacob Analysis of
BMO-2014-1BL Constant Rate Pumping Test



BMO-2014-1BL STEP RATE TEST

Data Set: N:\...\1 BL Step Test jrn.aqt
Date: 06/22/15 Time: 12:48:59

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2014-1BL
Test Date: 11/06/14

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2014-1BL	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2014-1BL	0	0

SOLUTION

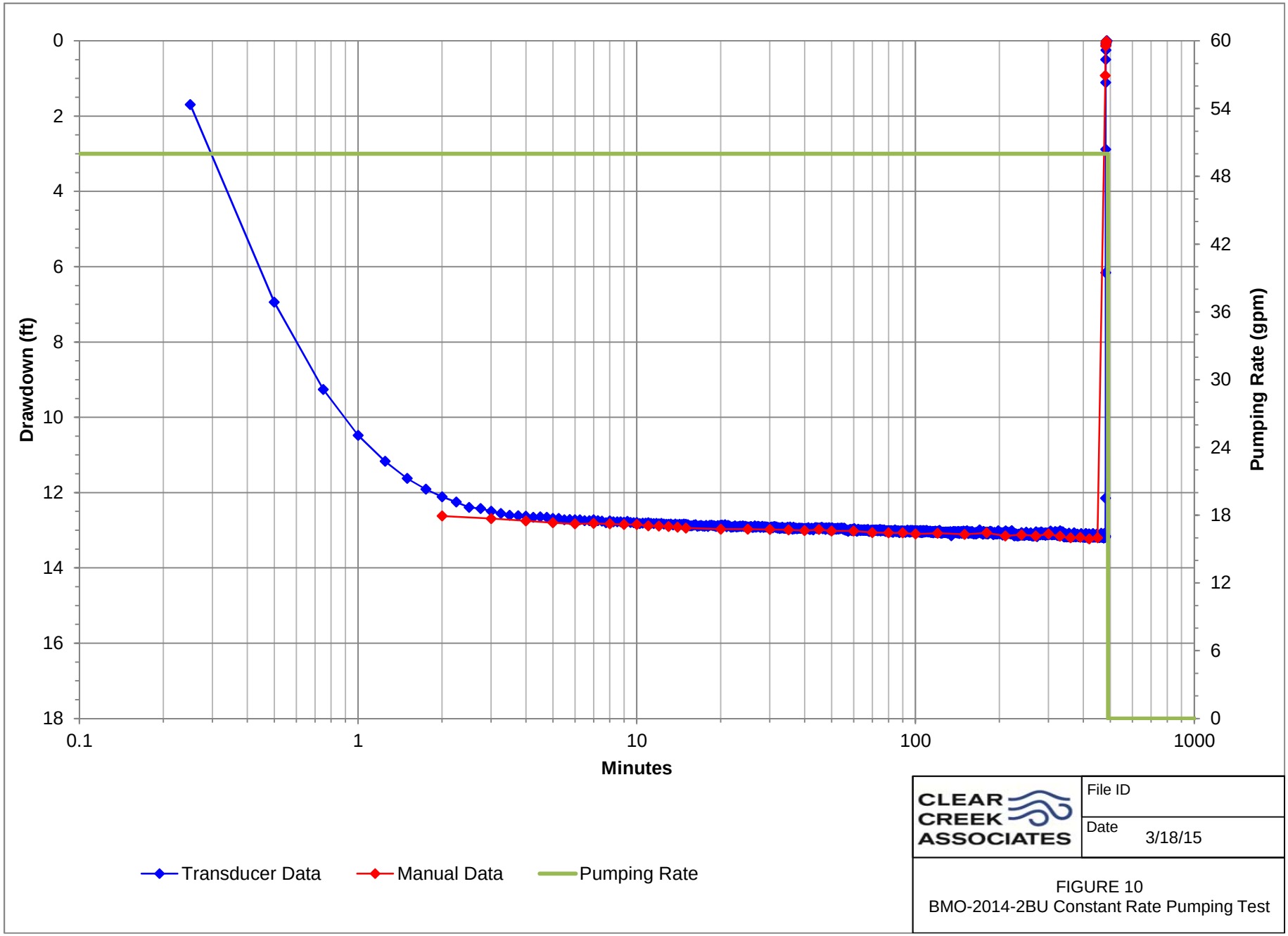
Aquifer Model: Unconfined
Solution Method: Theis

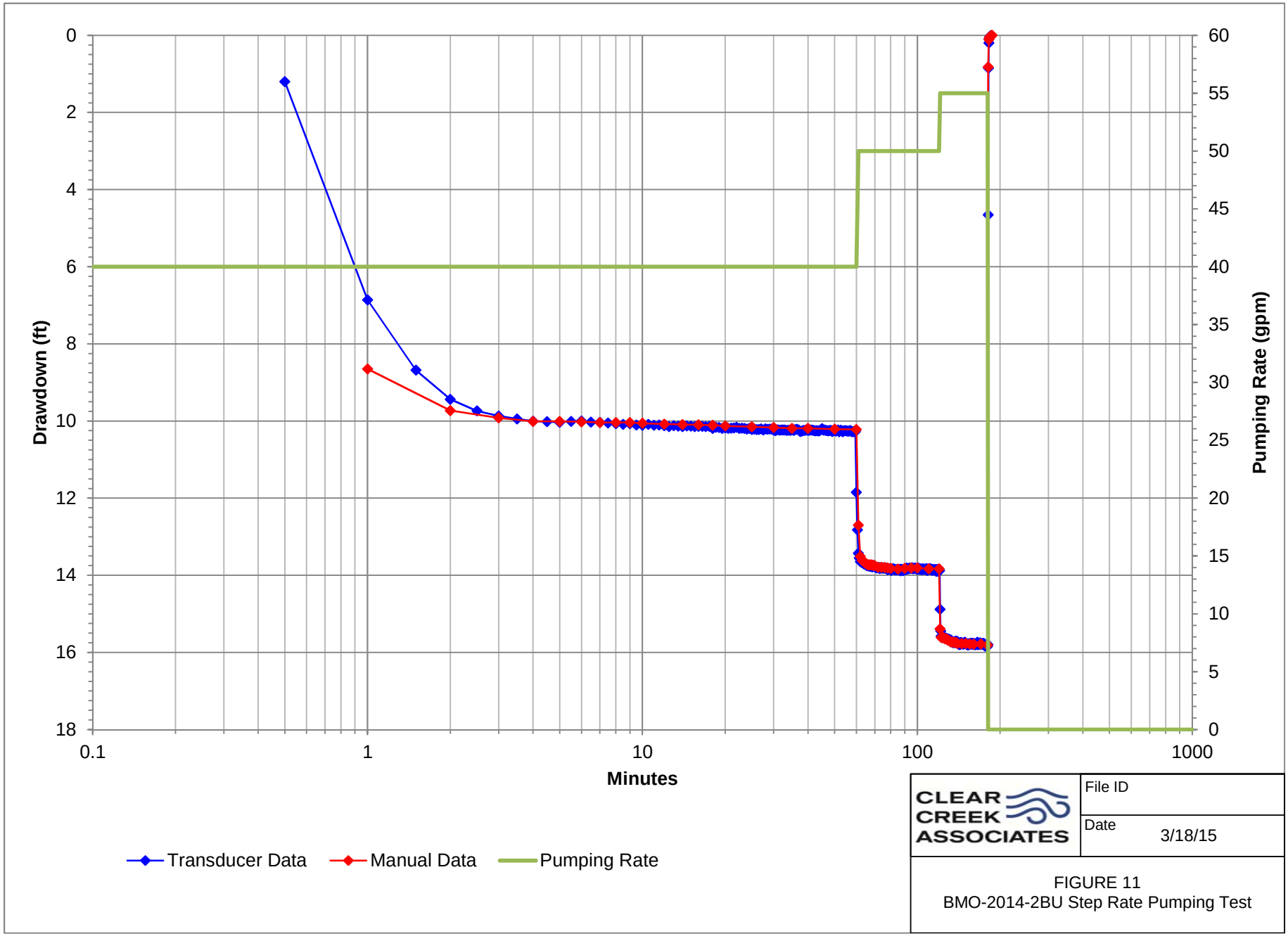
T = 1184. ft^2/day
S = 5.0E-5
Kz/Kr = 0.001
b = 125. ft

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File ID 055038-023
Date 6/22/15

FIGURE 9
Theis Analysis of BMO-2014-1BL
Step Rate Pumping Test


Drawdown (ft)
0
2
4
6
8
10
12
14
16
18
Pumping Rate (gpm)
60
54
48
42
36
30
24
18
12
6
0
0.1
1
10
100
1000
Minutes
Transducer Data
Manual Data
Pumping Rate
CLEAR CREEK ASSOCIATES
File ID
Date
3/18/15
FIGURE 10
BMO-2014-2BU Constant Rate Pumping Test

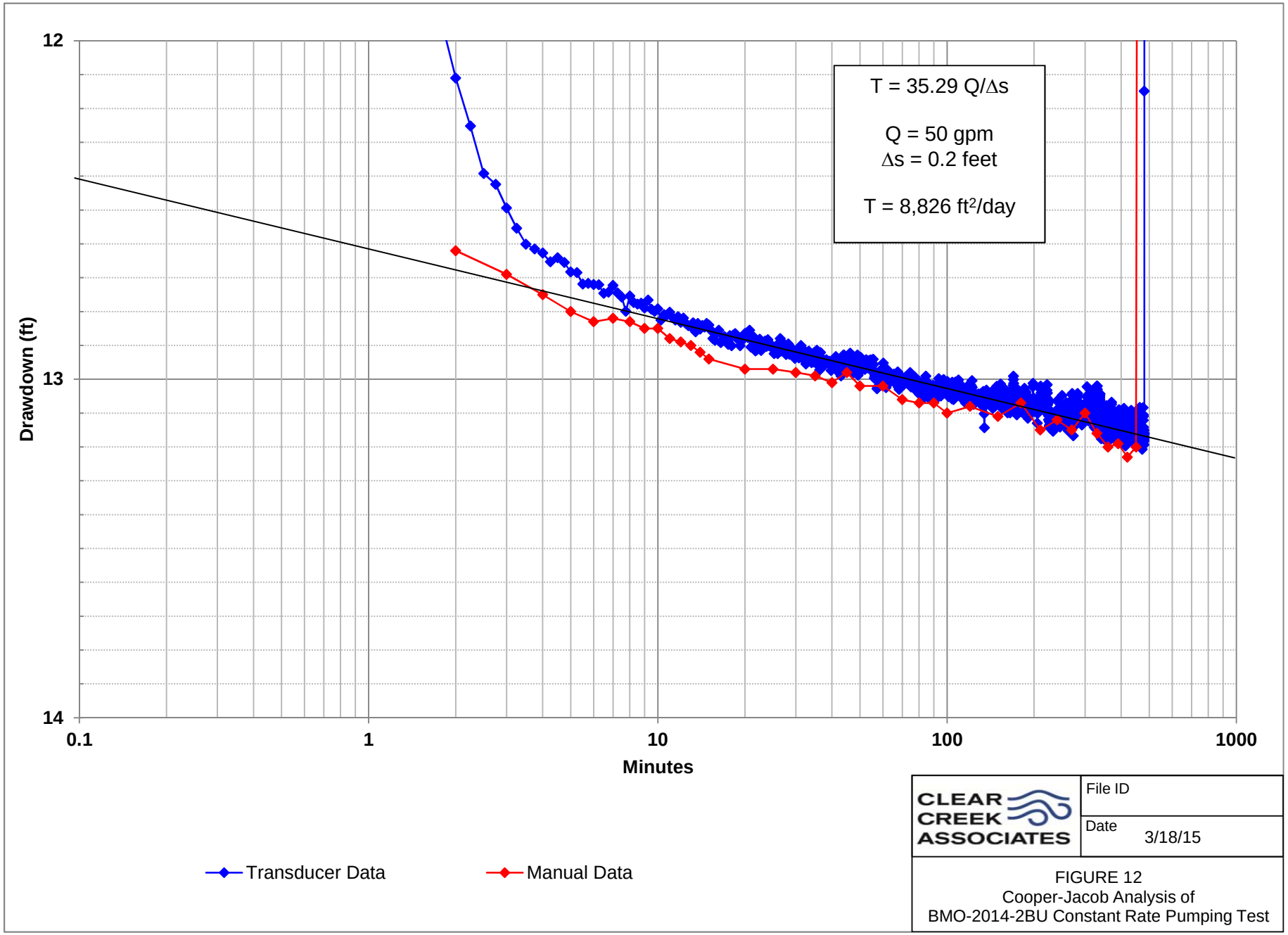


CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 11
BMO-2014-2BU Step Rate Pumping Test

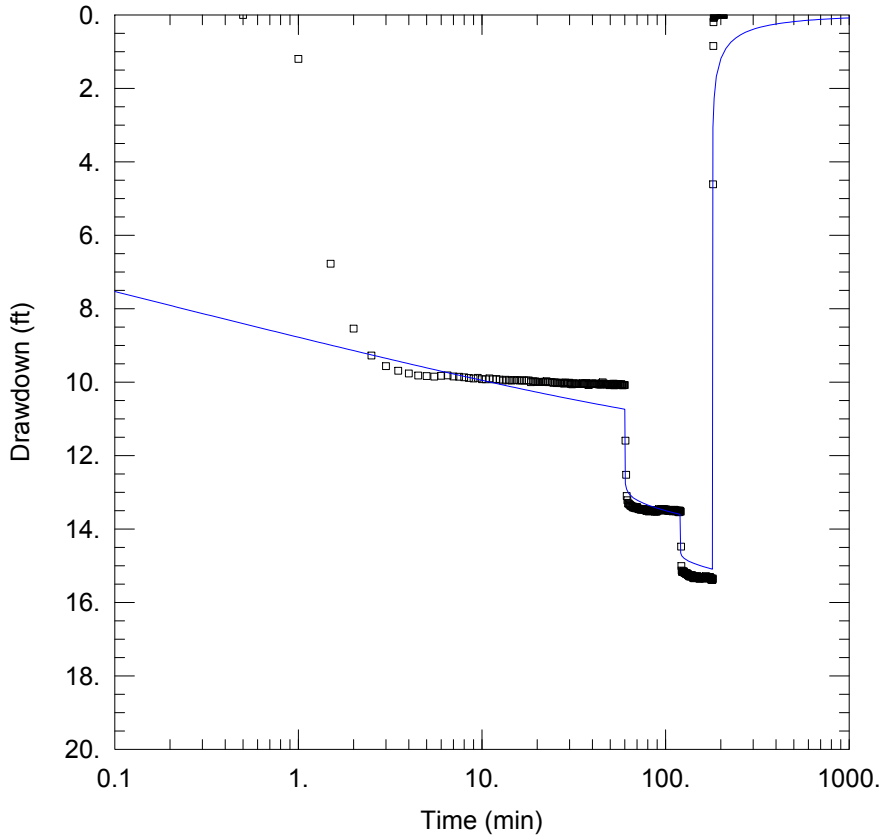


CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 12
Cooper-Jacob Analysis of
BMO-2014-2BU Constant Rate Pumping Test



BMO-2014-2BU STEP RATE TEST

Data Set: N:\...\2 BU Step Test jrn.aqt
Date: 06/22/15 Time: 12:48:04

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2014-2BU
Test Date: 11/25/14

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2014-2BU	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2014-2BU	0	0

SOLUTION

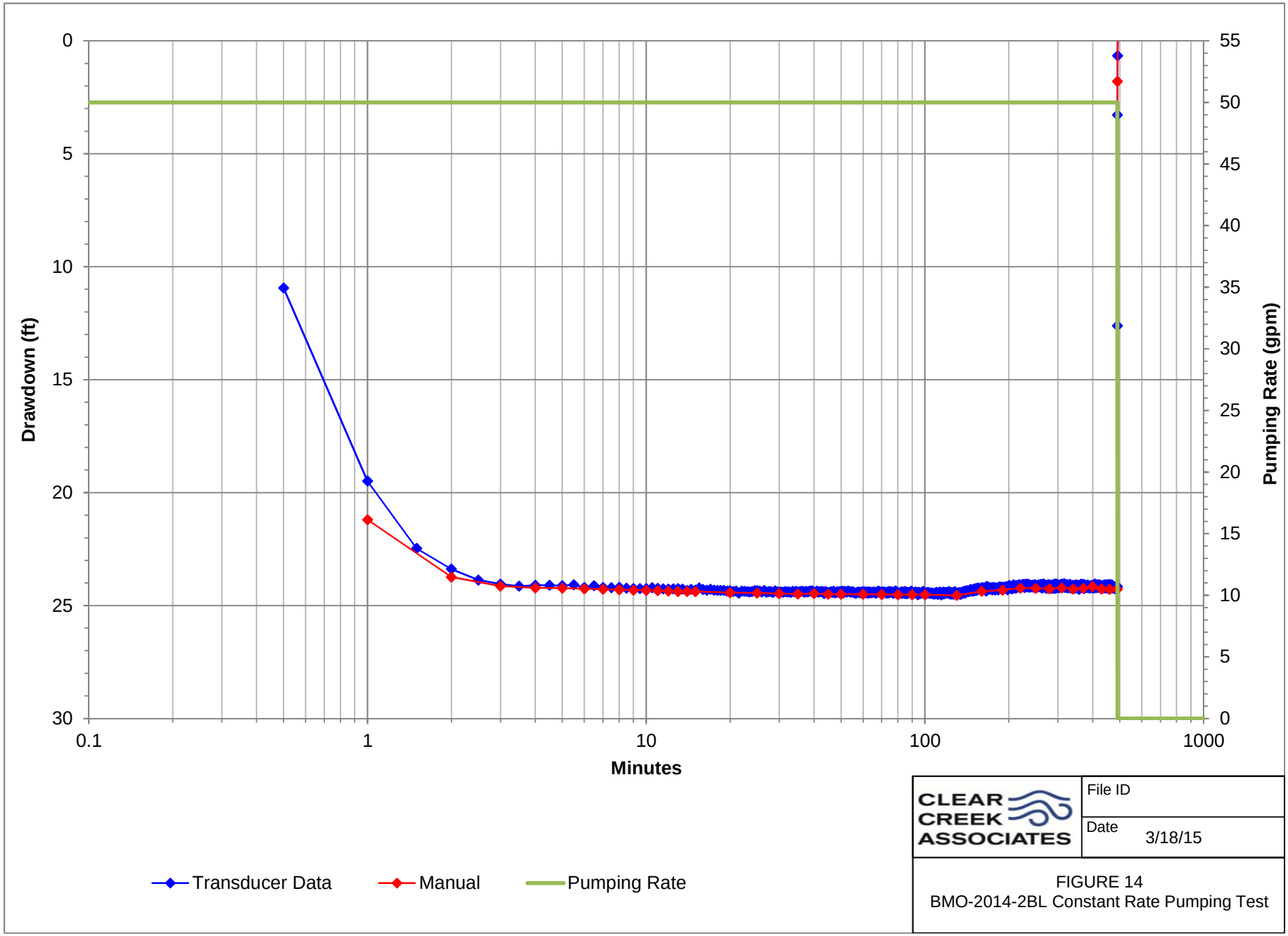
Aquifer Model: Unconfined
Solution Method: Theis

T = 1837. ft^2/day
S = 1.0E-5
Kz/Kr = 0.001
b = 274. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

FIGURE 13
Theis Analysis of BMO-2014-2BU
Step Rate Pumping Test

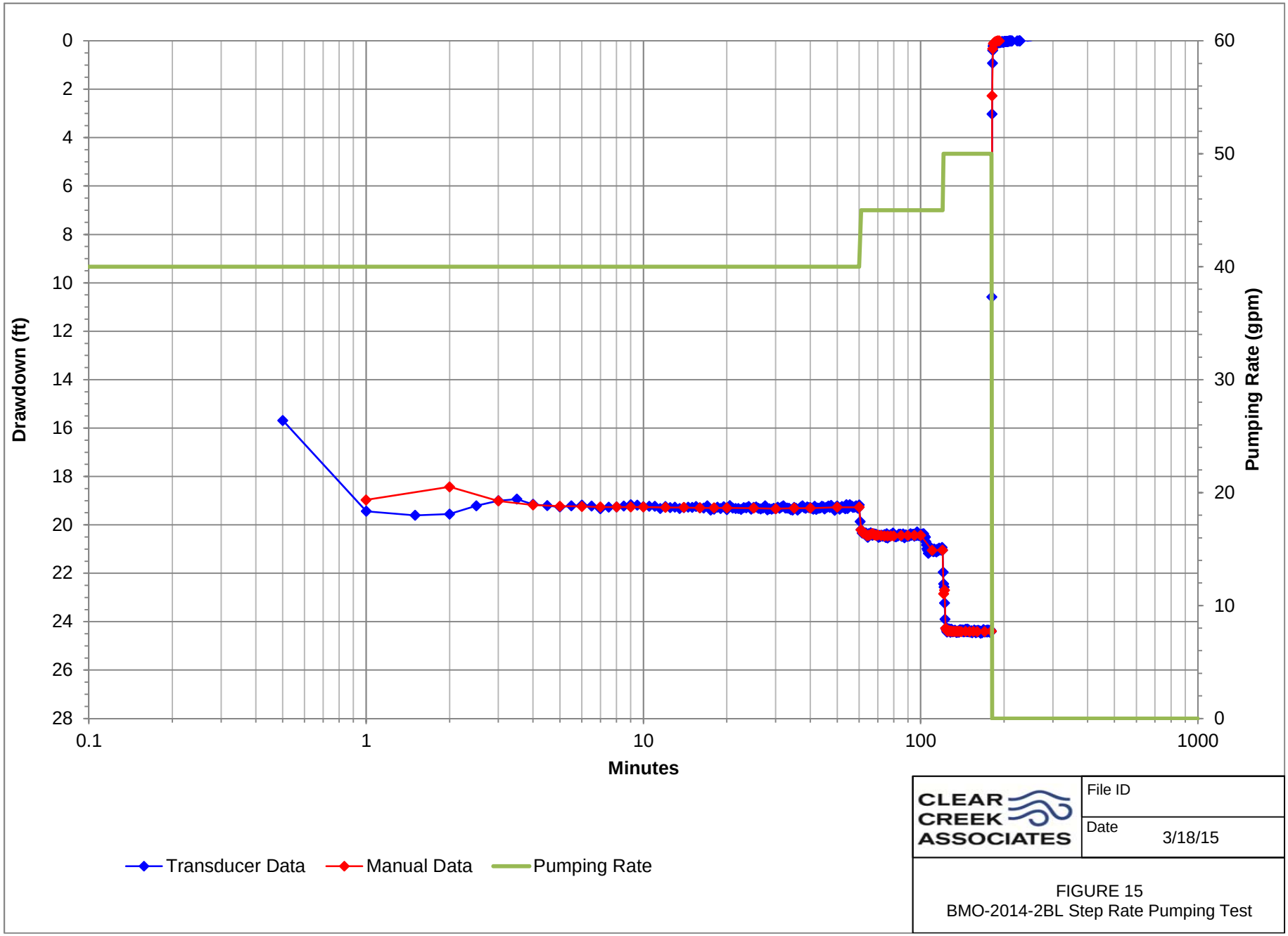


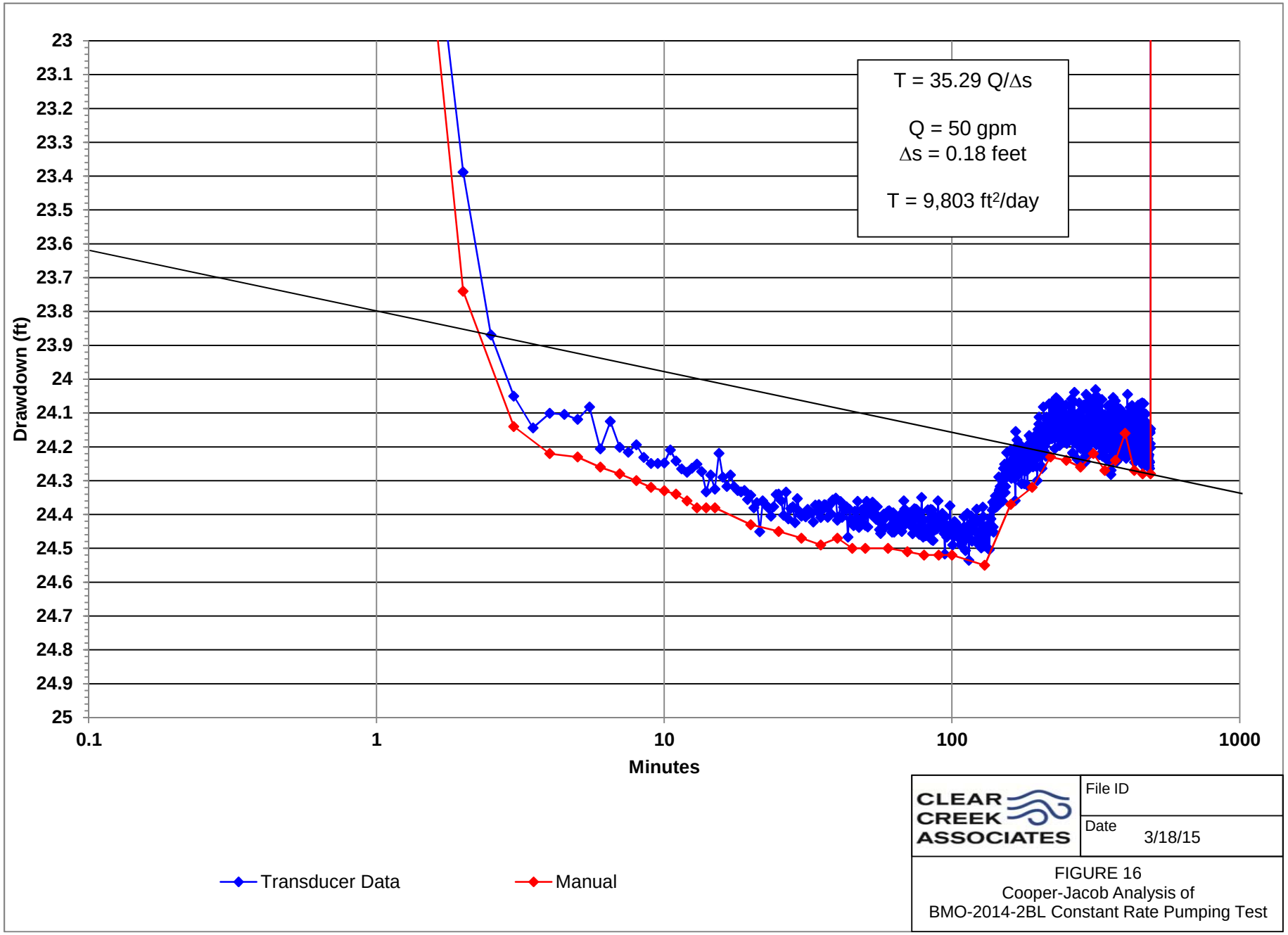
CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 14
BMO-2014-2BL Constant Rate Pumping Test


Drawdown (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Pumping Rate (gpm)
60
50
40
30
20
10
0
0.1
1
10
100
1000
Minutes
Transducer Data
Manual Data
Pumping Rate
CLEAR CREEK ASSOCIATES
File ID
Date
3/18/15
FIGURE 15
BMO-2014-2BL Step Rate Pumping Test

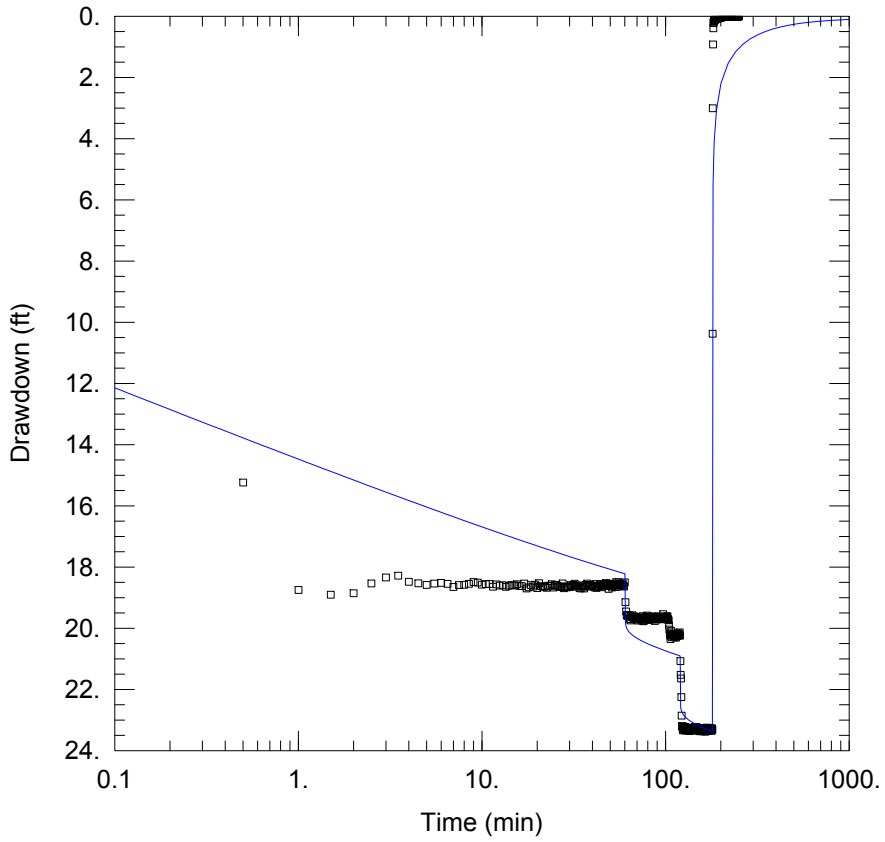


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Date 3/18/15

FIGURE 16
Cooper-Jacob Analysis of
BMO-2014-2BL Constant Rate Pumping Test



BMO-2014-2BL STEP RATE TEST

Data Set: N:\...\2 BL Step Test jrn.aqt
Date: 06/22/15 Time: 12:48:12

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2014-2BL
Test Date: 11/19/14

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2014-2BL	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2014-2BL	0	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 1359. ft^2/day
S = 5.0E-5
Kz/Kr = 0.002
b = 274. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

FIGURE 17
Theis Analysis of BMO-2014-2BL
Step Rate Pumping Test

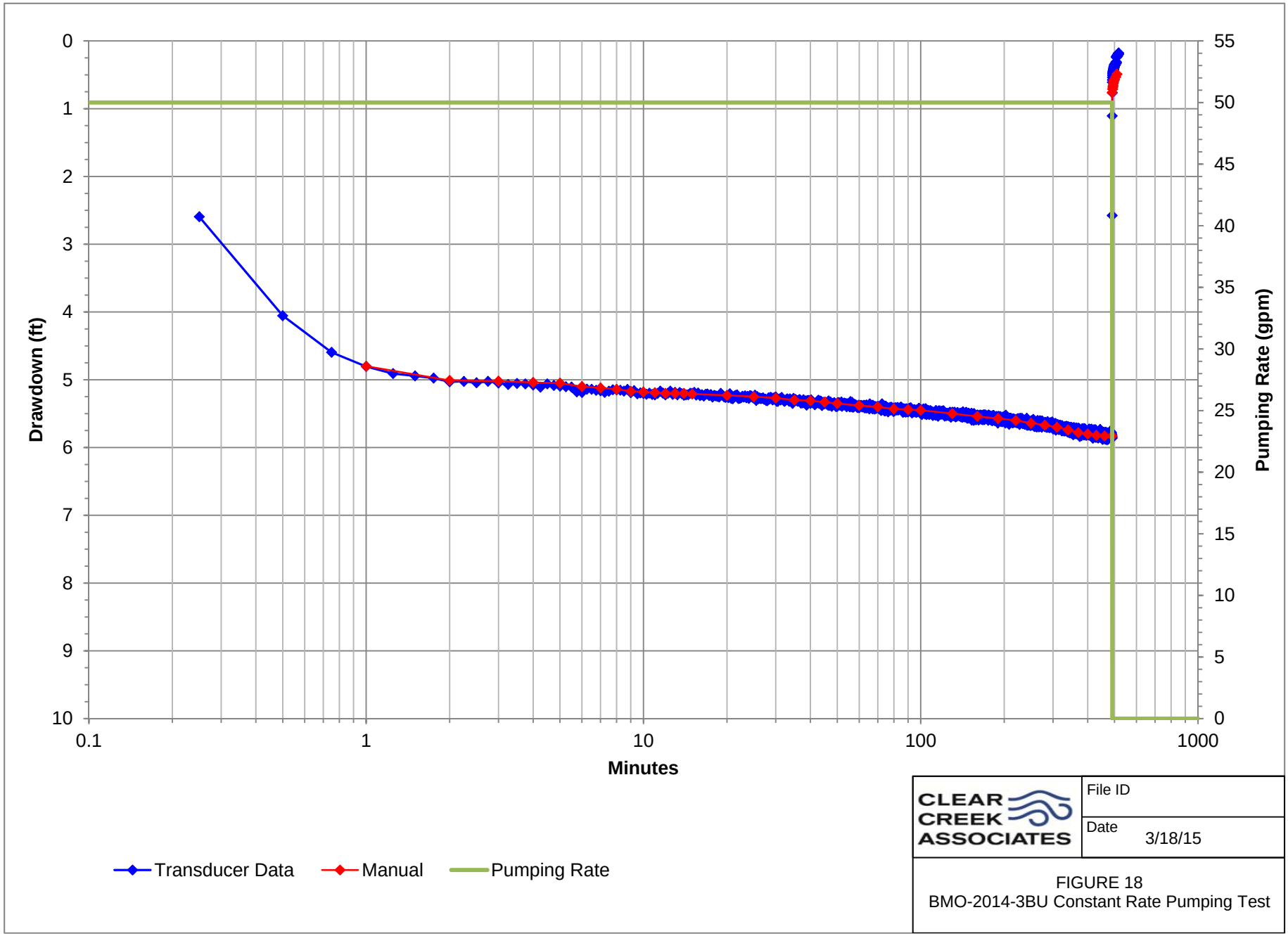
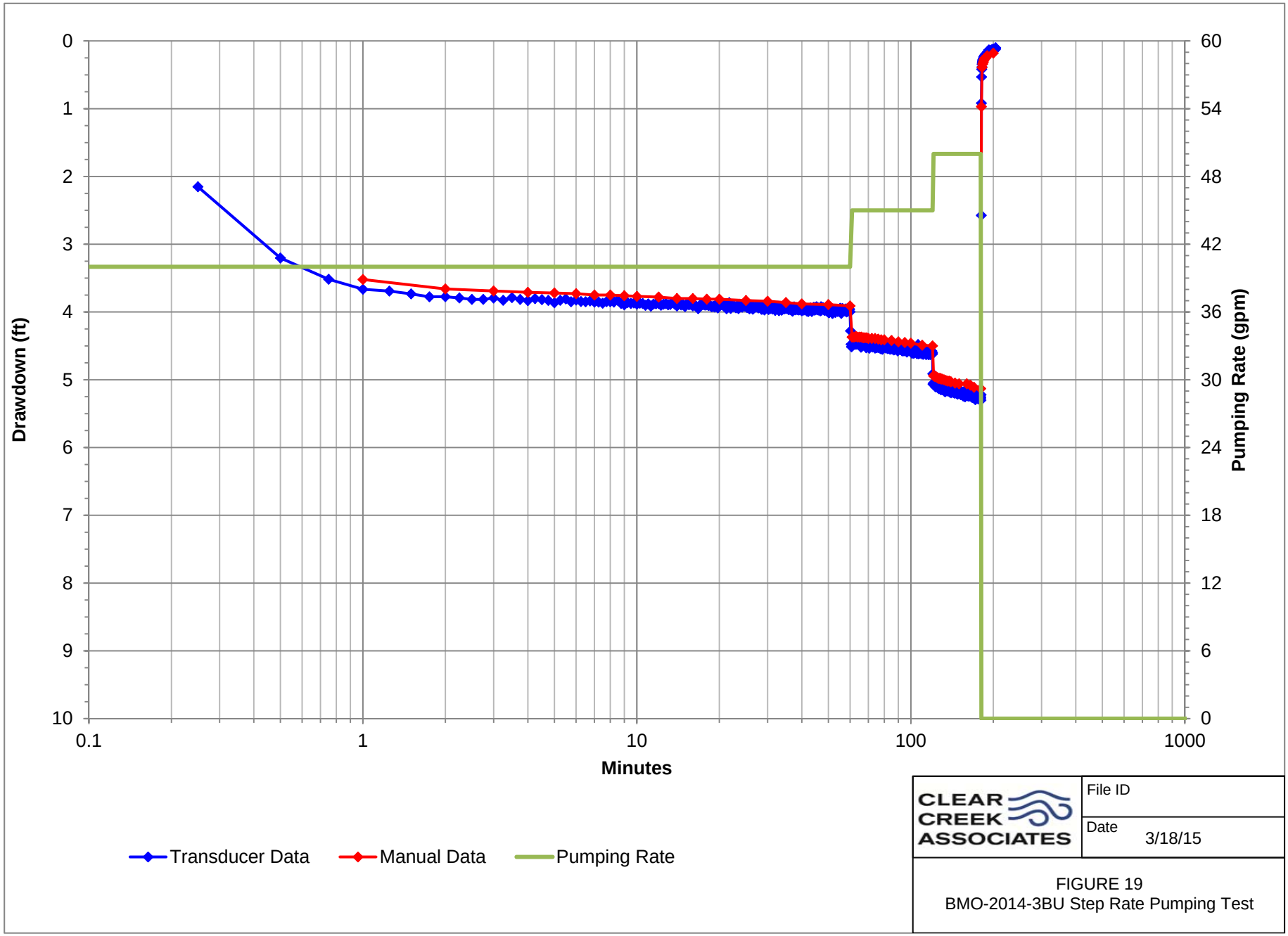


FIGURE 18
BMO-2014-3BU Constant Rate Pumping Test

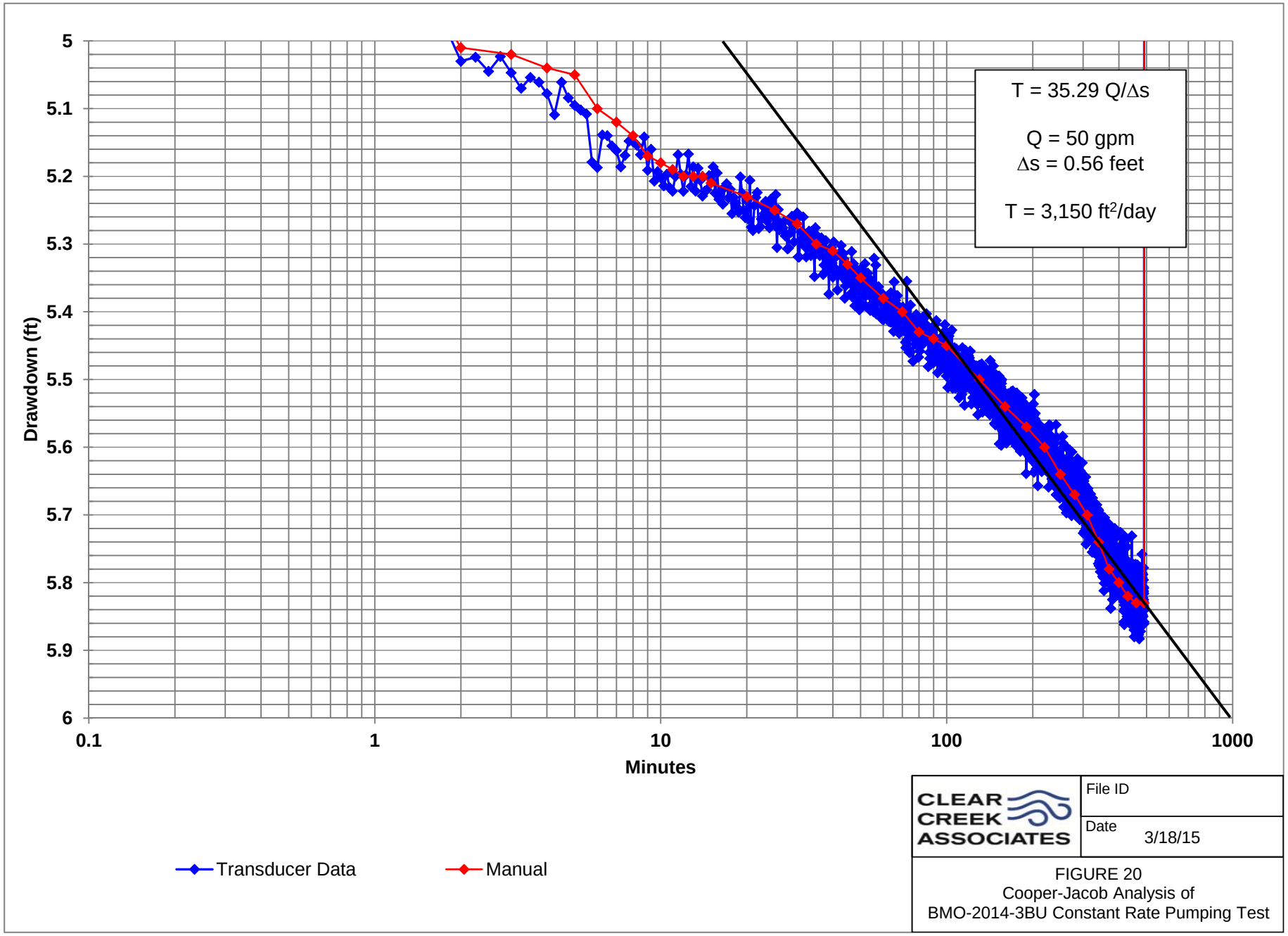


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File ID

Date 3/18/15

FIGURE 19
BMO-2014-3BU Step Rate Pumping Test

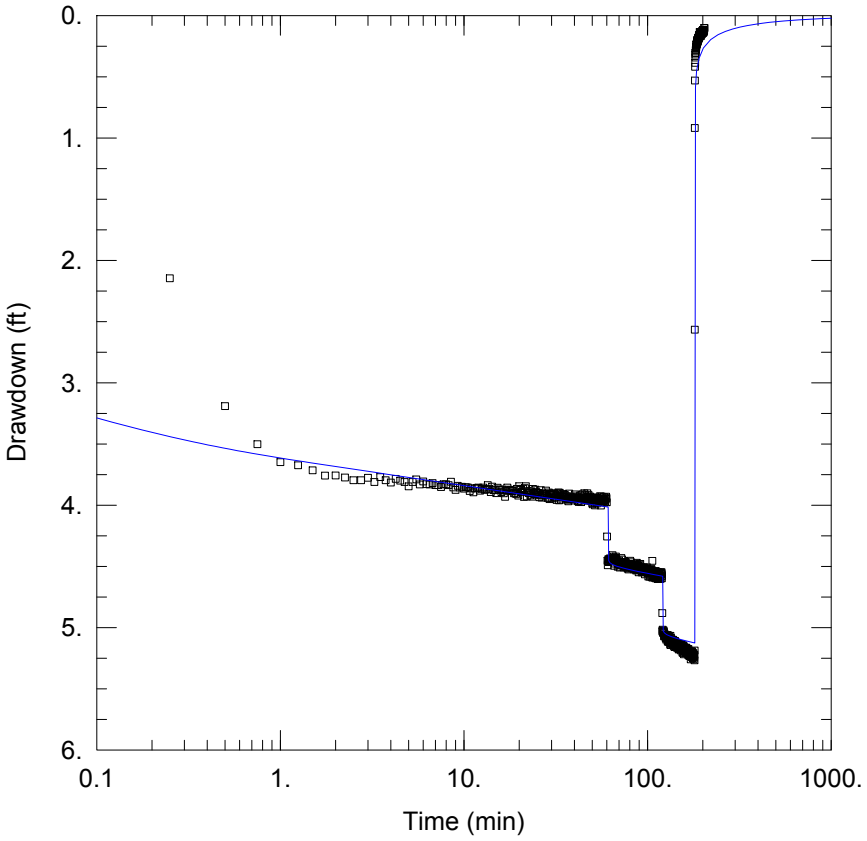


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File ID

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FIGURE 20
Cooper-Jacob Analysis of
BMO-2014-3BU Constant Rate Pumping Test



STEP TEST

Data Set: N:\...\2014-3BU Step jrn.aqt
Date: 06/22/15 Time: 12:48:20

PROJECT INFORMATION

Company: Clear Creek Associates
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2014-3BU
Test Date: 2/20/15

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2014-3BU	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
BMO-2014-3BU	0	0

SOLUTION

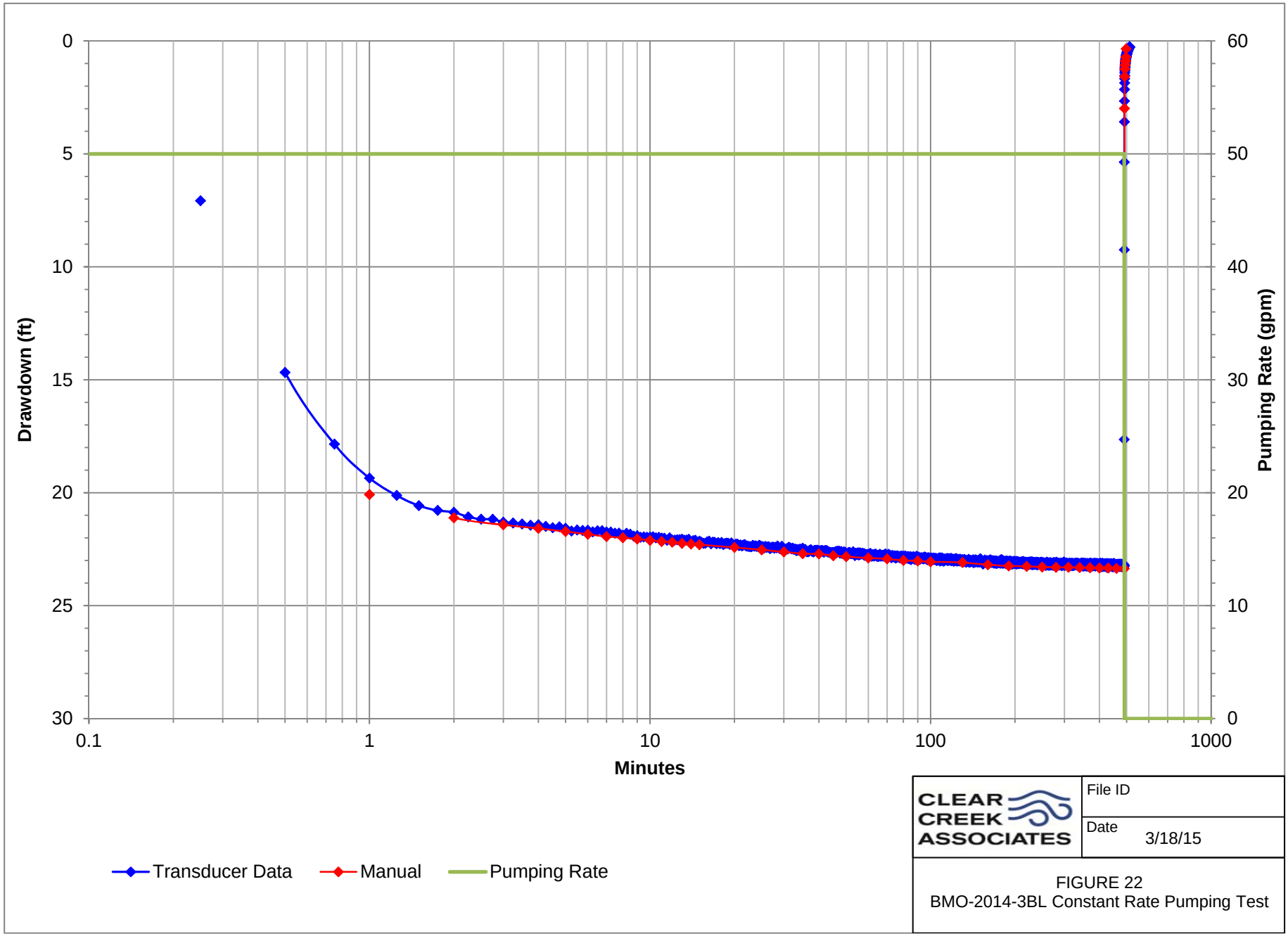
Aquifer Model: Unconfined
Solution Method: Theis

T = 6264. ft^2/day
S = 1.0E-5
Kz/Kr = 0.1
b = 409. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

FIGURE 21
Theis Analysis of BMO-2014-3BU
Step Rate Pumping Test

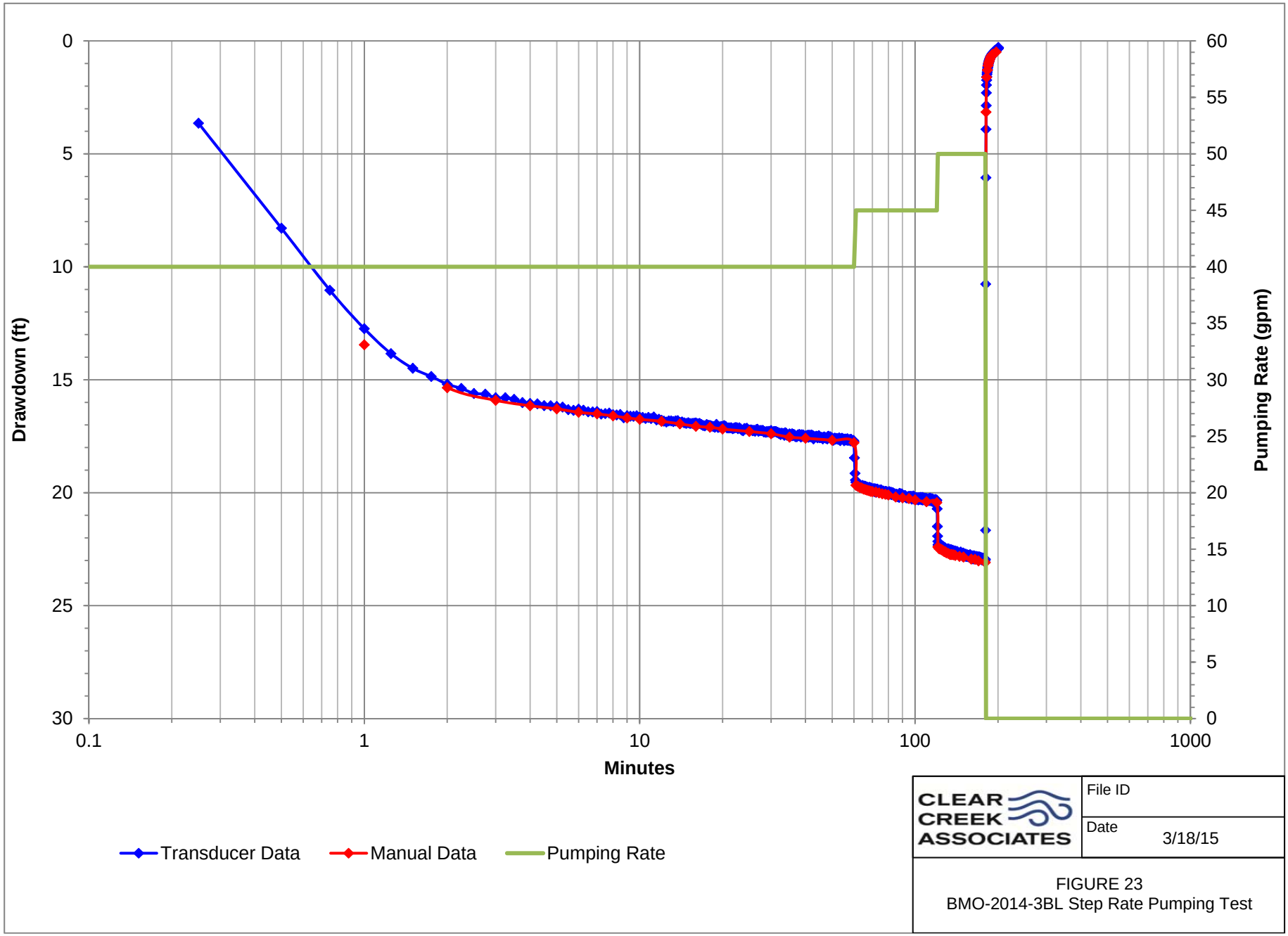


CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 22
BMO-2014-3BL Constant Rate Pumping Test

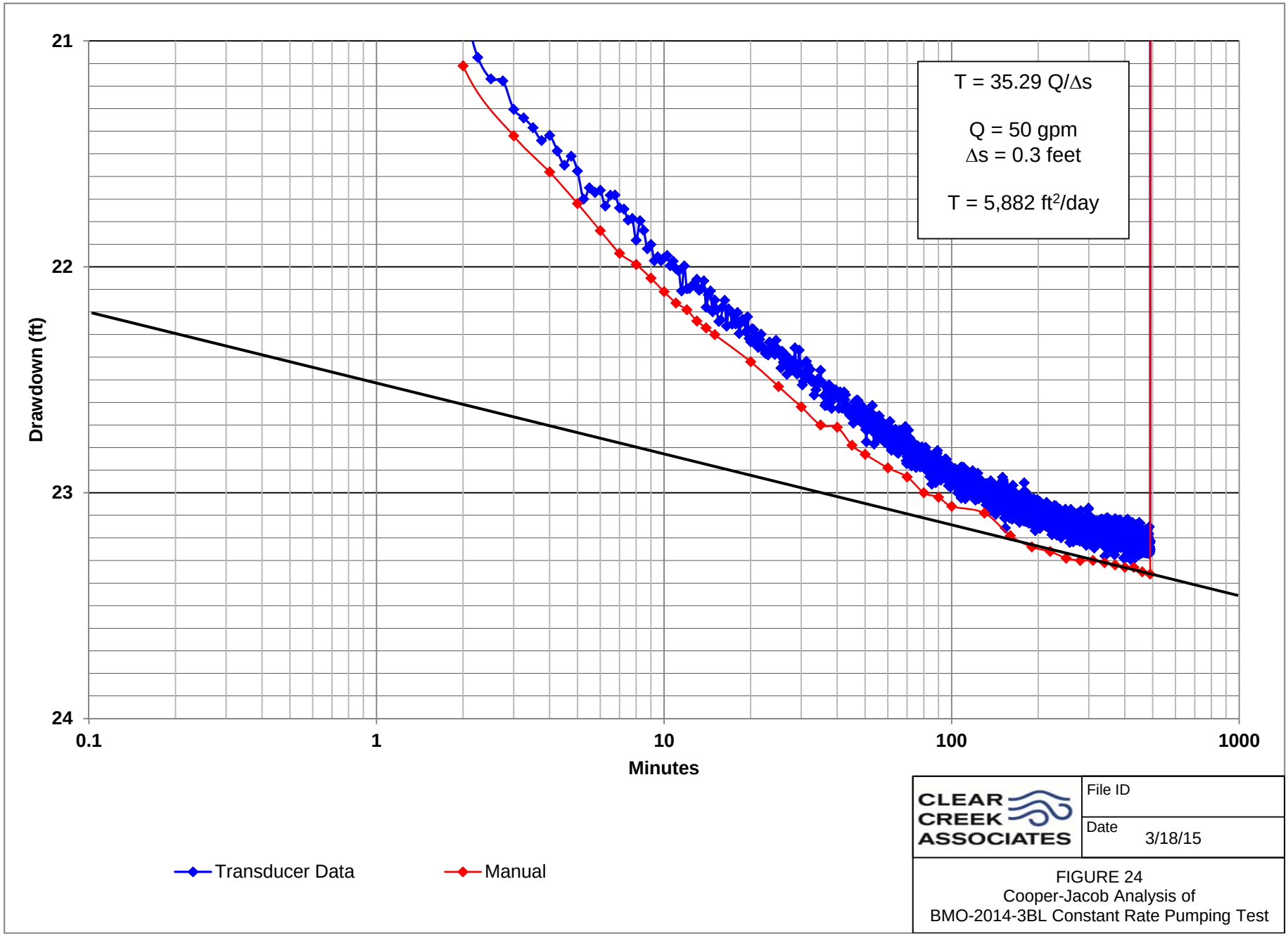


CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 23
BMO-2014-3BL Step Rate Pumping Test

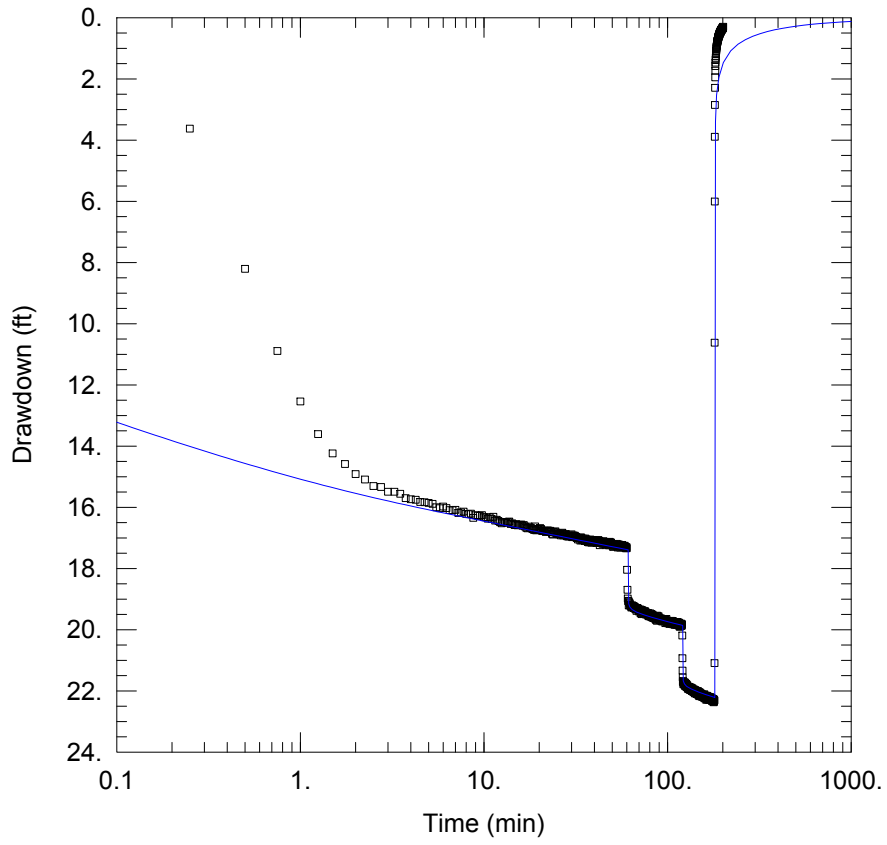


CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 24
Cooper-Jacob Analysis of
BMO-2014-3BL Constant Rate Pumping Test



WELL TEST ANALYSIS

Data Set: N:\...\3BL Step jrn.aqt
Date: 06/22/15 Time: 12:48:27

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2014-3BL
Test Date: 11/13/14

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2014-3BL	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
BMO-2014-3BL	0	0

SOLUTION

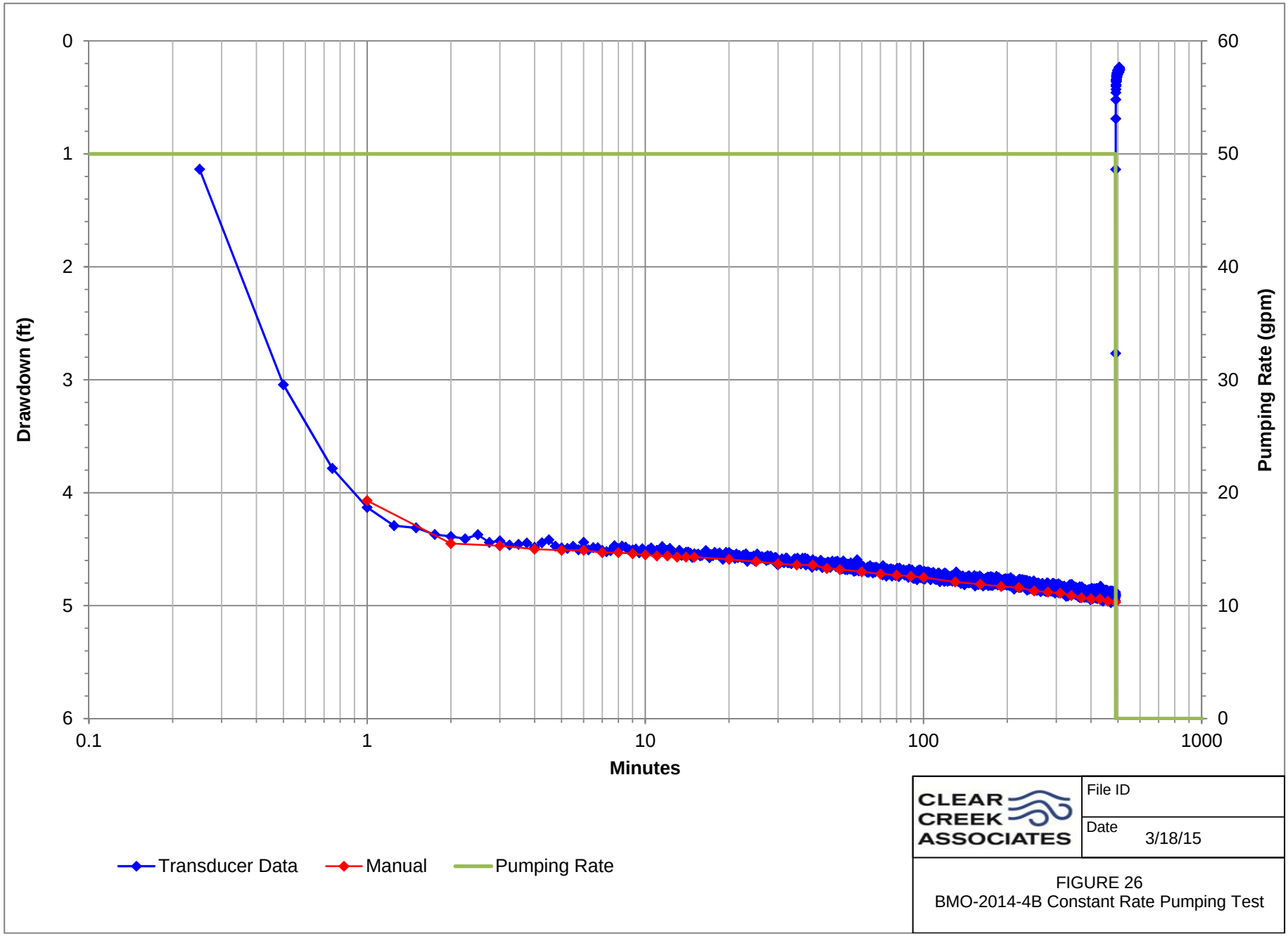
Aquifer Model: Unconfined
Solution Method: Theis

T = 1131. ft^2/day
S = 1.0E-5
Kz/Kr = 0.1
b = 409. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

FIGURE 25
Theis Analysis of BMO-2014-3BL
Step Rate Pumping Test

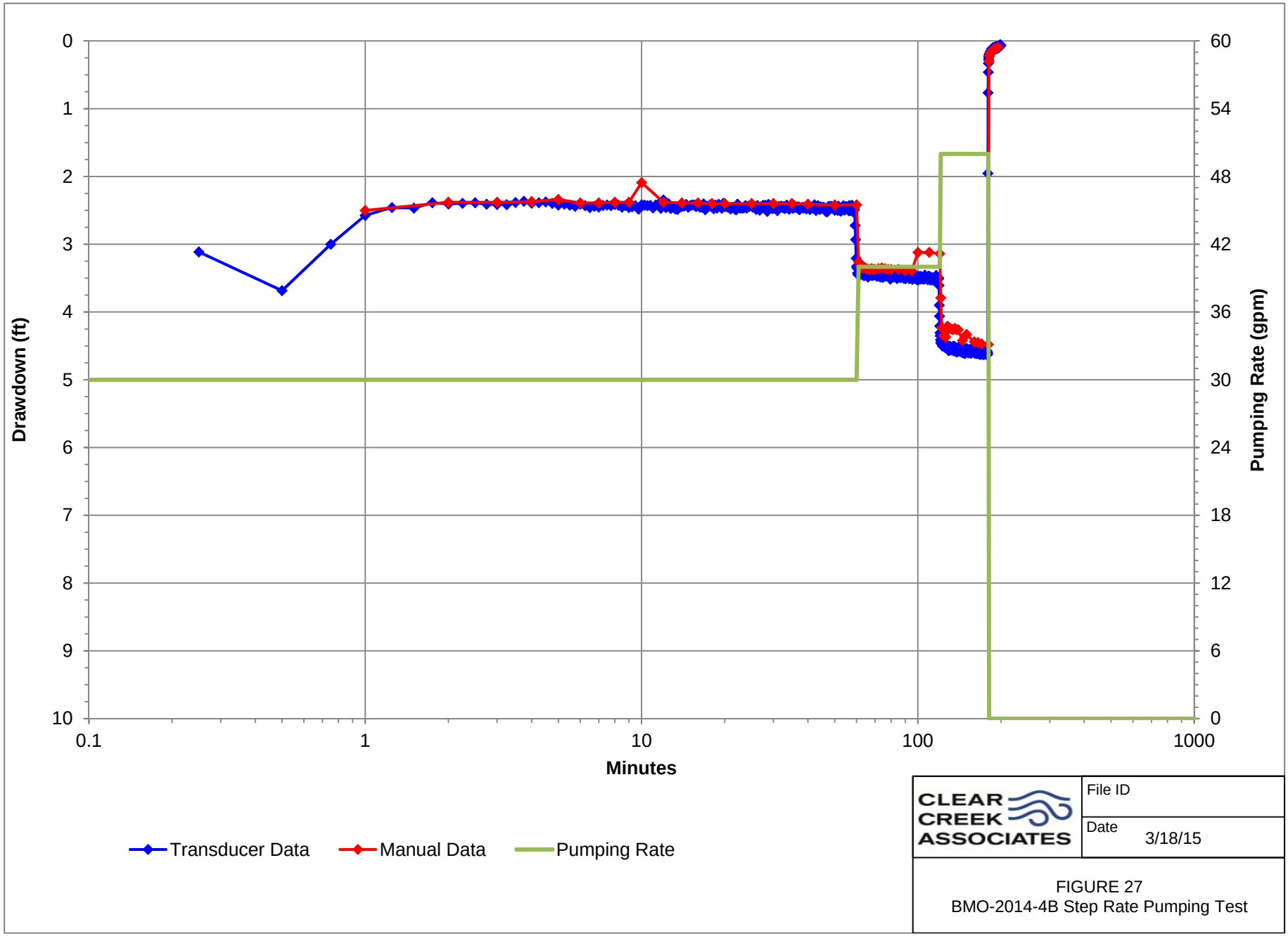


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File ID

Date 3/18/15

FIGURE 26
BMO-2014-4B Constant Rate Pumping Test

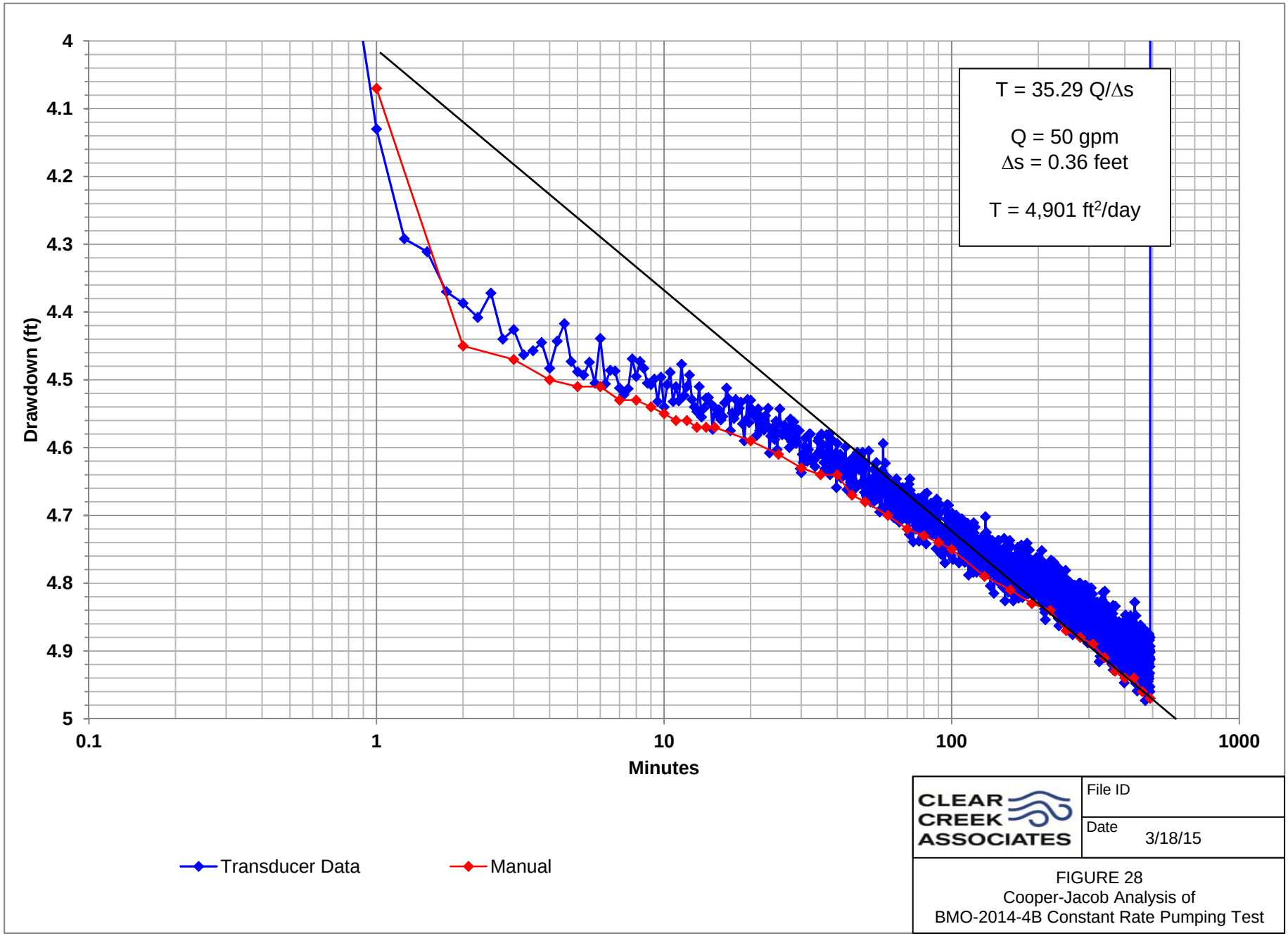


CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 27
BMO-2014-4B Step Rate Pumping Test

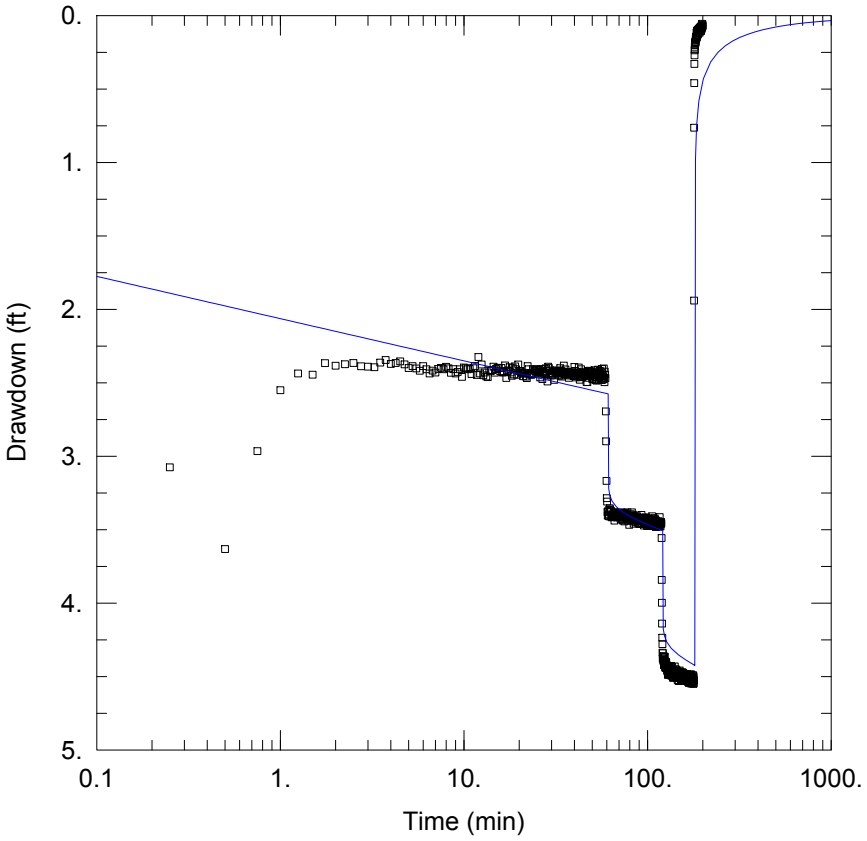


CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 28
Cooper-Jacob Analysis of
BMO-2014-4B Constant Rate Pumping Test



BMO-2014-4B STEP-RATE TEST

Data Set: N:\...\2014-4B Step jrn.aqt
Date: 06/22/15 Time: 12:49:14

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2014-4B
Test Date: 3/2/2015

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2014-4B	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2014-4B	0	0

SOLUTION

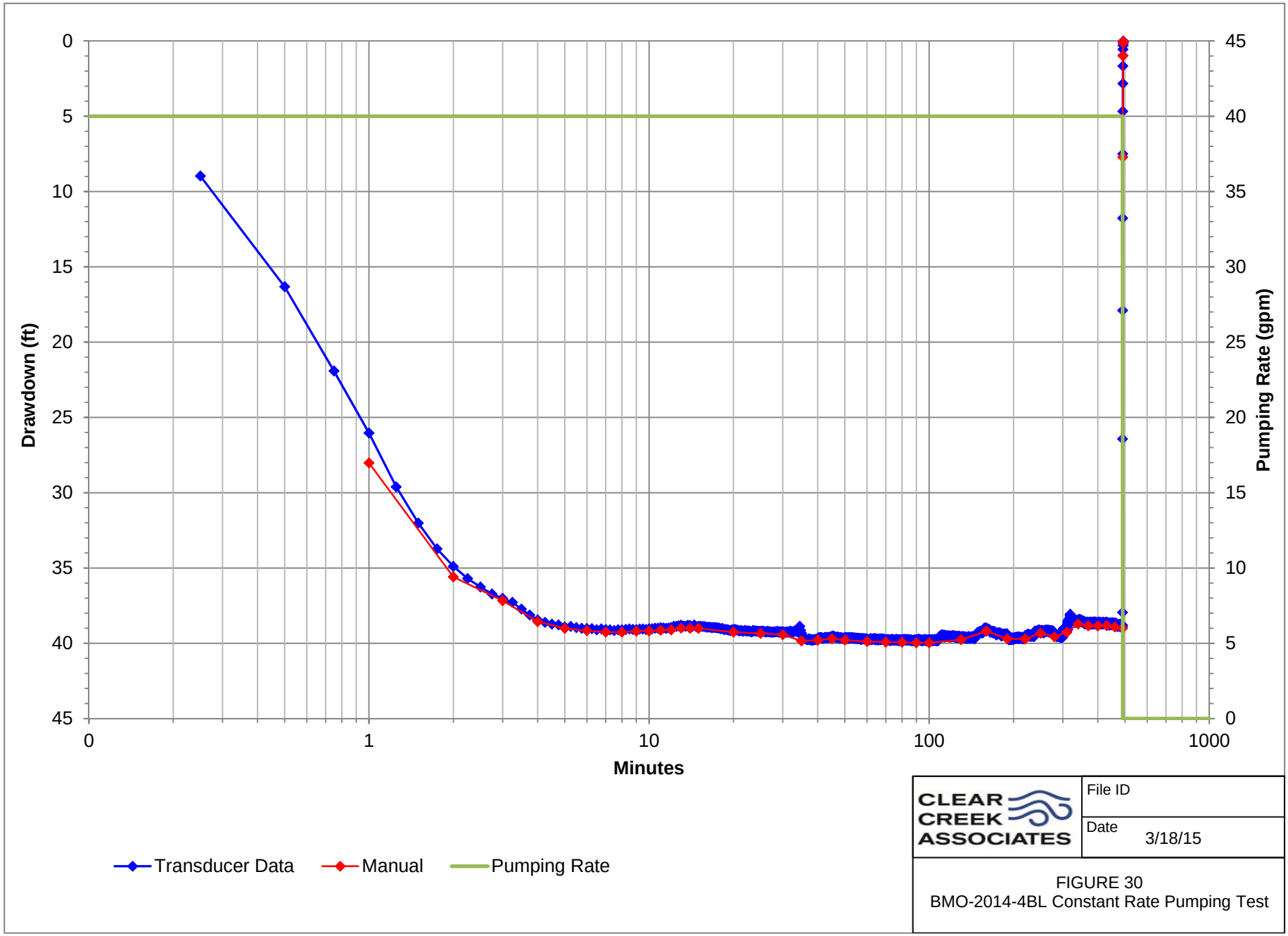
Aquifer Model: Unconfined
Solution Method: Theis

T = 3620. ft^2/day
S = 1.0E-5
Kz/Kr = 0.1
b = 130. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

FIGURE 29
Theis Analysis of BMO-2014-4B
Step Rate Pumping Test

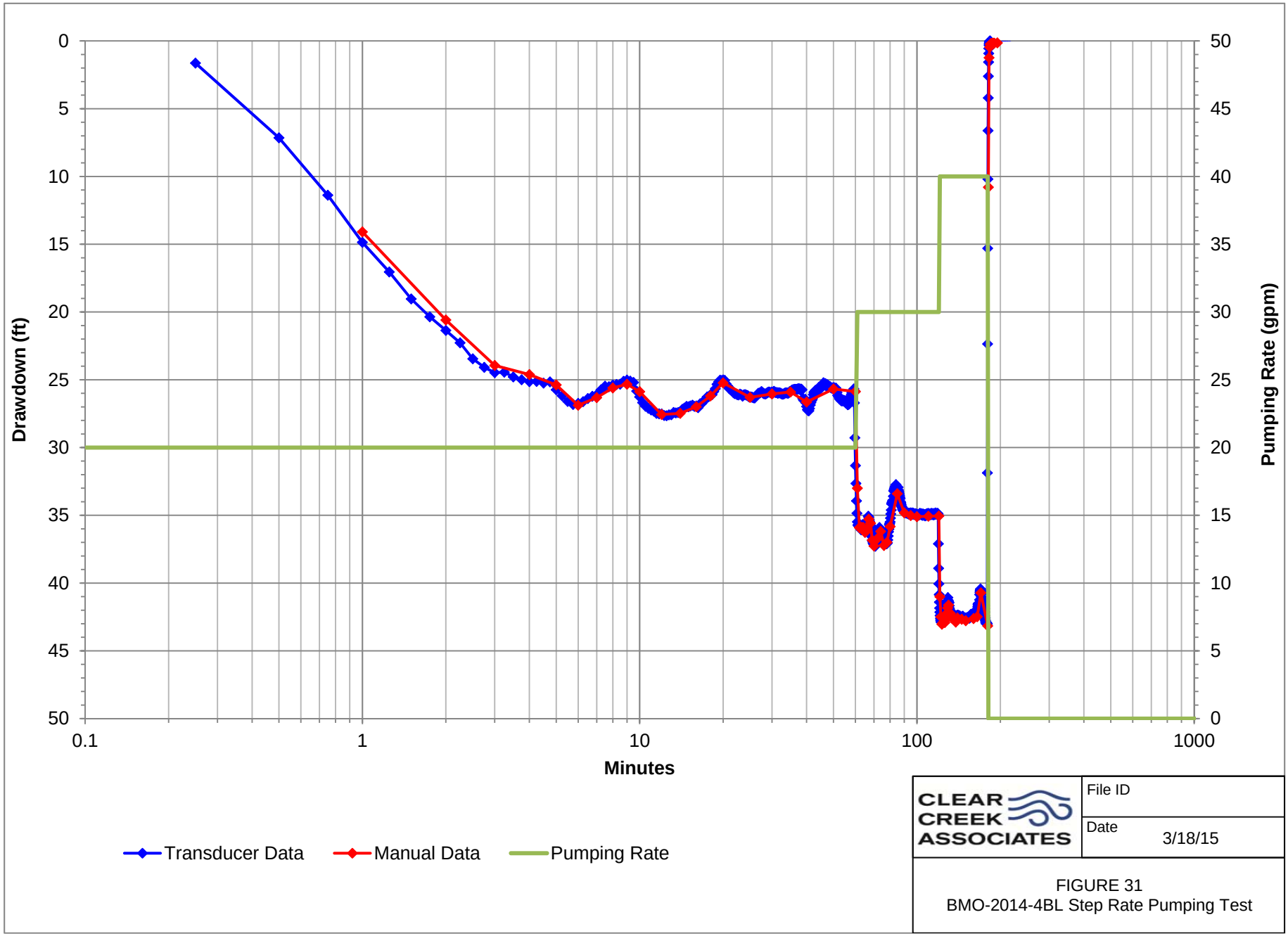


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File ID

Date 3/18/15

FIGURE 30
BMO-2014-4BL Constant Rate Pumping Test

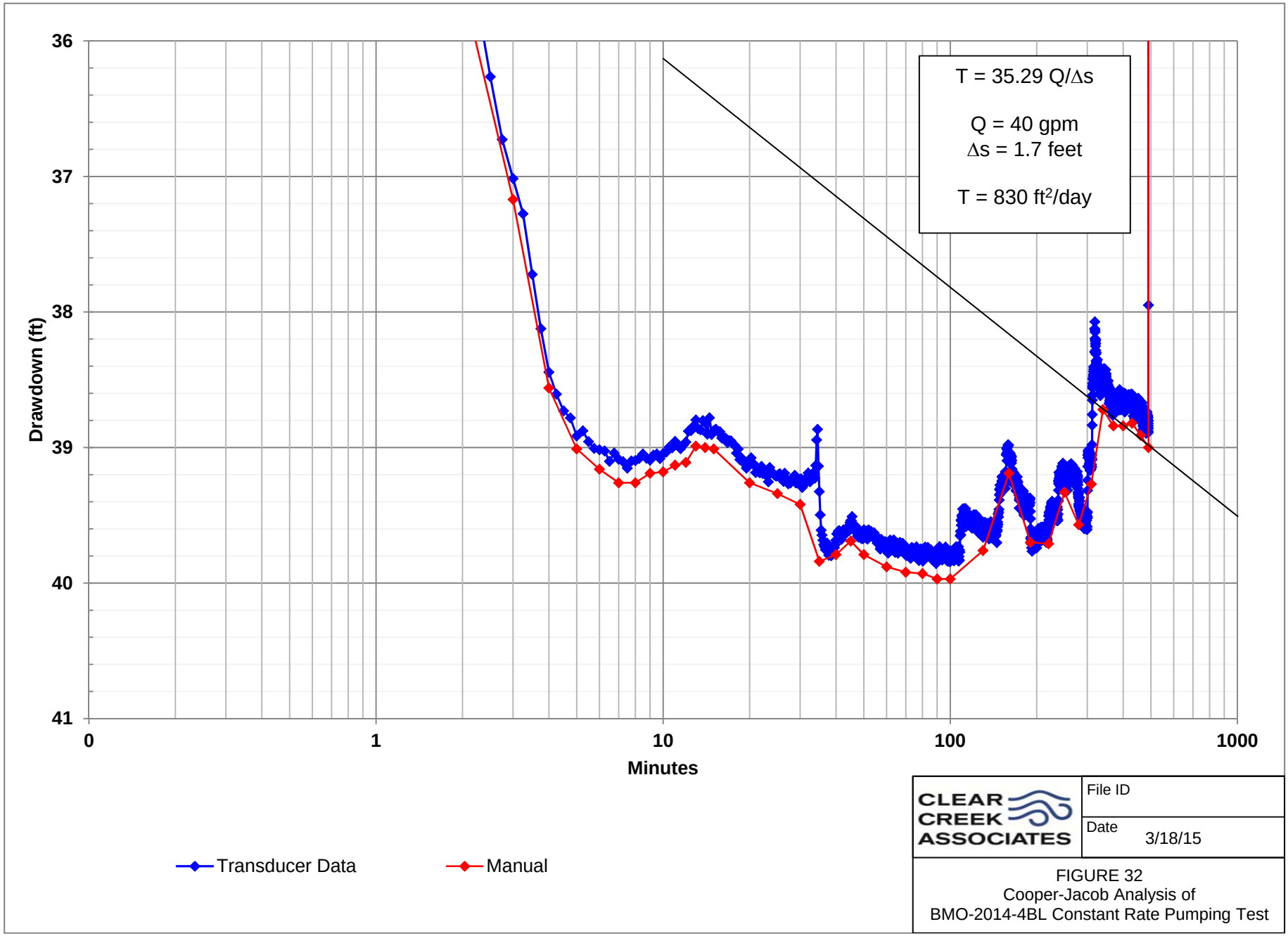


CLEAR CREEK ASSOCIATES

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FIGURE 31
BMO-2014-4BL Step Rate Pumping Test

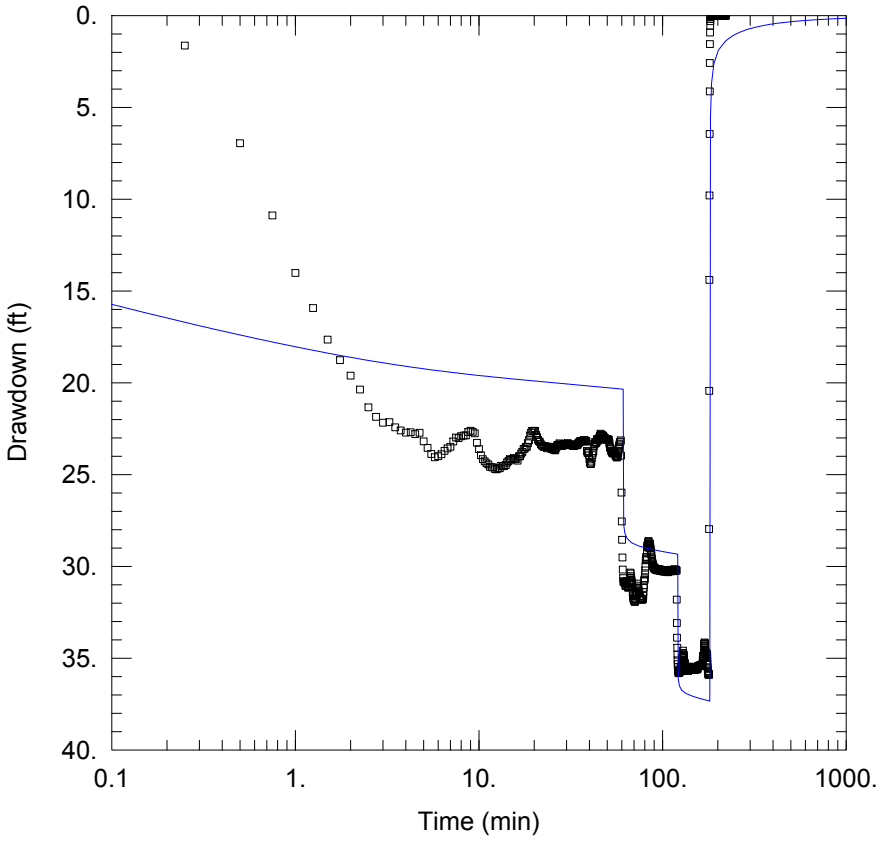


CLEAR CREEK ASSOCIATES

File ID

Date 3/18/15

FIGURE 32
Cooper-Jacob Analysis of
BMO-2014-4BL Constant Rate Pumping Test



BMO-2014-4BL STEP-RATE TEST

Data Set: N:\...\2014-4BL Step data jrn.aqt
Date: 06/22/15 Time: 12:48:33

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2014-4BL
Test Date: 2/28/2015

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2014-4BL	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2014-4BL	0	0

SOLUTION

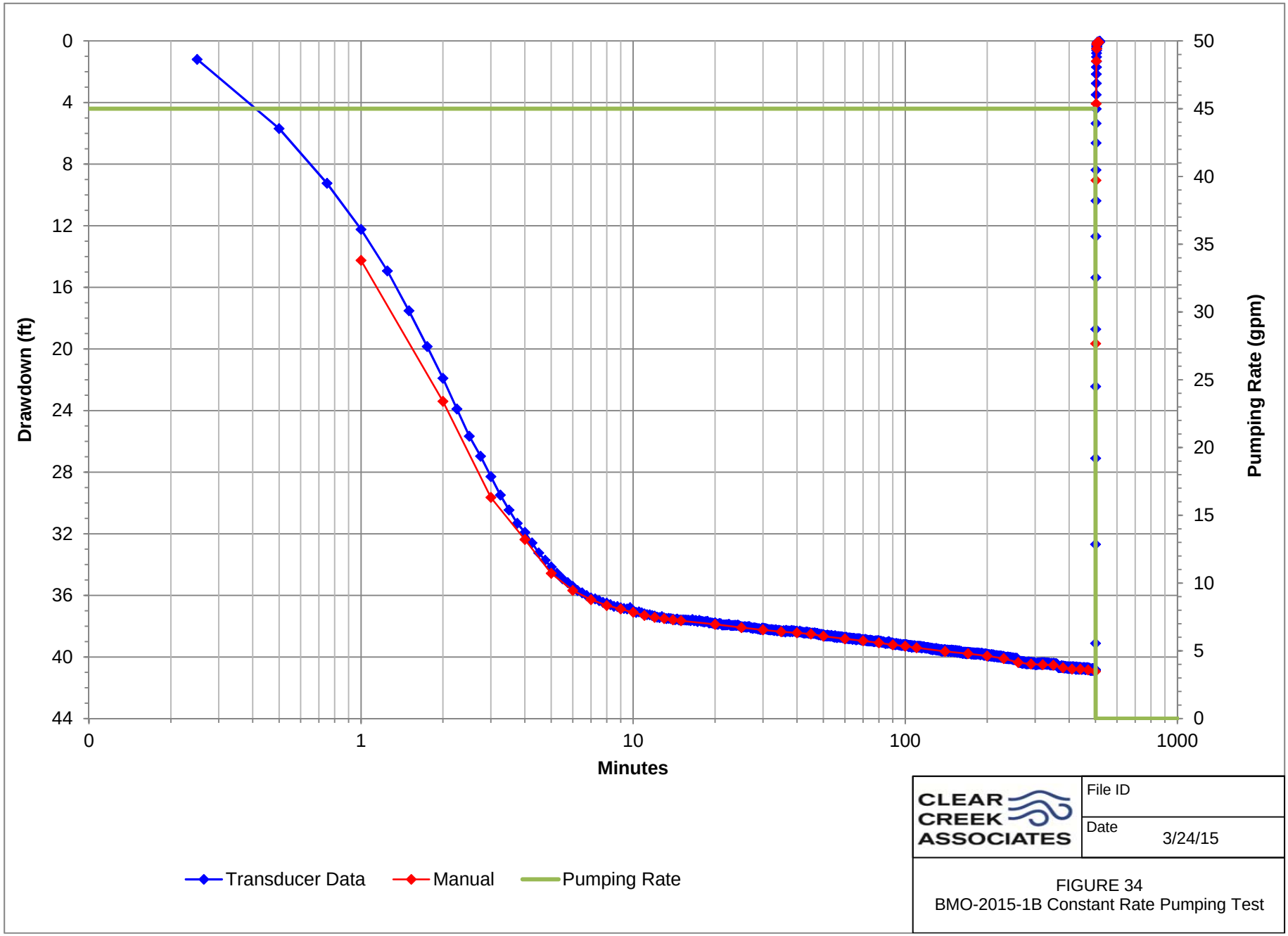
Aquifer Model: Unconfined
Solution Method: Theis

T = 637. ft^2/day
S = 1.0E-5
Kz/Kr = 0.008
b = 130. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

FIGURE 33
Theis Analysis of BMO-2014-4BL
Step Rate Pumping Test

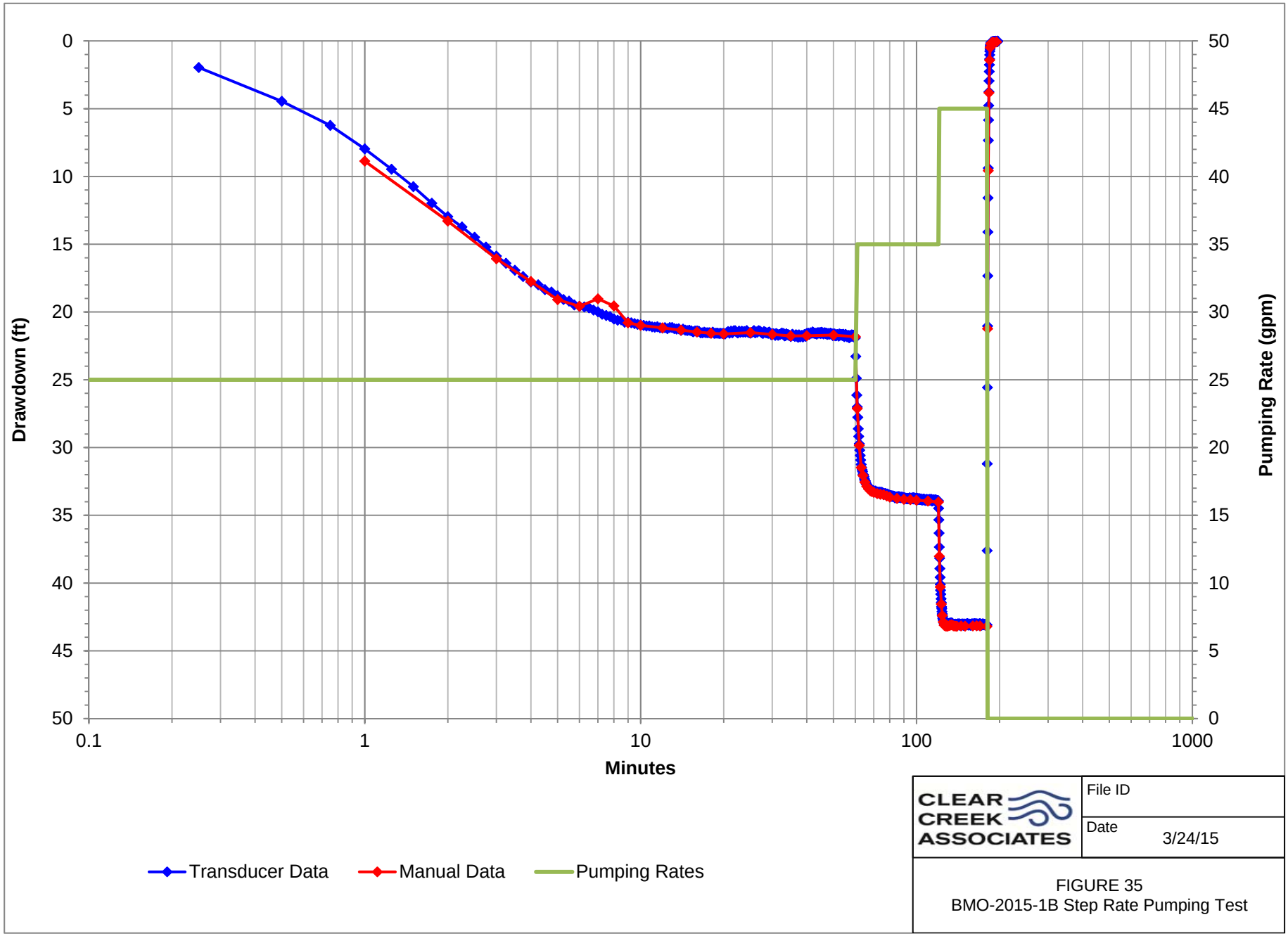


CLEAR CREEK ASSOCIATES

File ID

Date 3/24/15

FIGURE 34
BMO-2015-1B Constant Rate Pumping Test

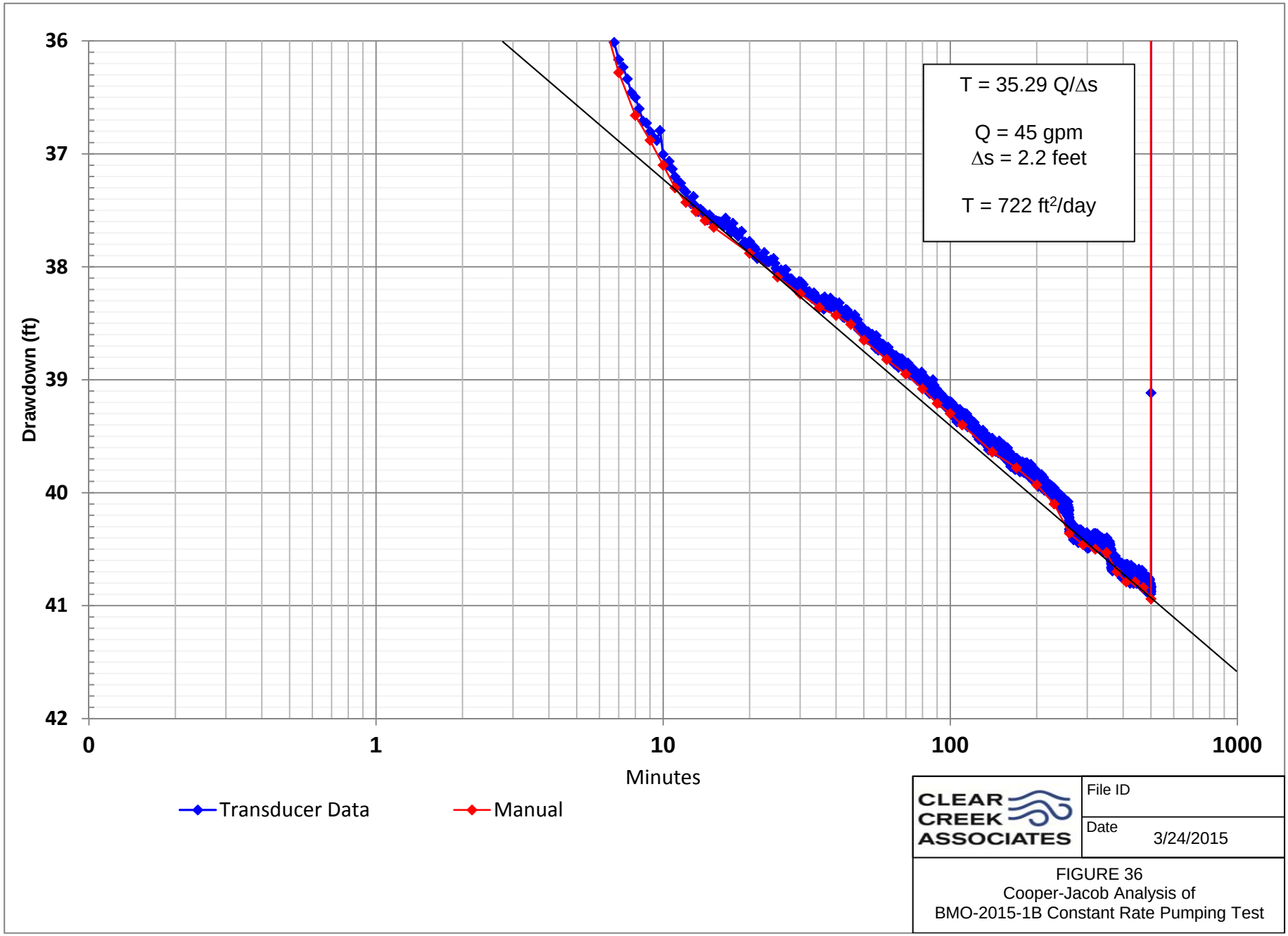


CLEAR CREEK ASSOCIATES

File ID

Date 3/24/15

FIGURE 35
BMO-2015-1B Step Rate Pumping Test

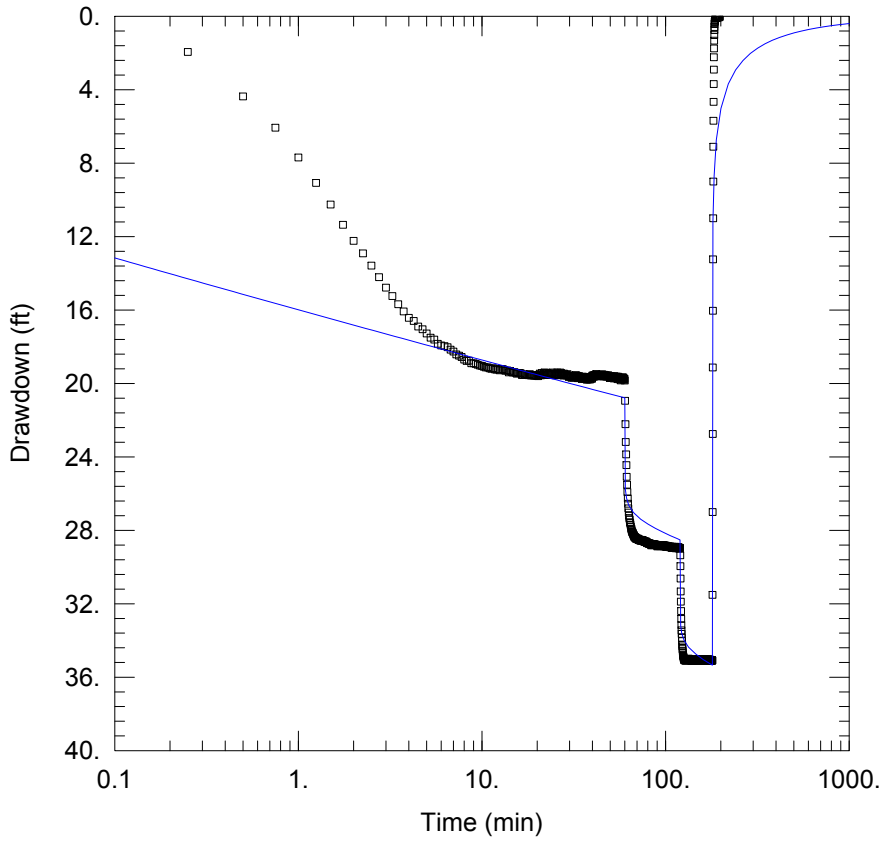


CLEAR CREEK ASSOCIATES

File ID

Date 3/24/2015

FIGURE 36
Cooper-Jacob Analysis of
BMO-2015-1B Constant Rate Pumping Test



WELL TEST ANALYSIS

Data Set: N:\...\2015-1B Step Test jrn.aqt
Date: 06/22/15 Time: 12:48:40

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2015-1B
Test Date: 3/14/15

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2015-1B	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2015-1B	0	0

SOLUTION

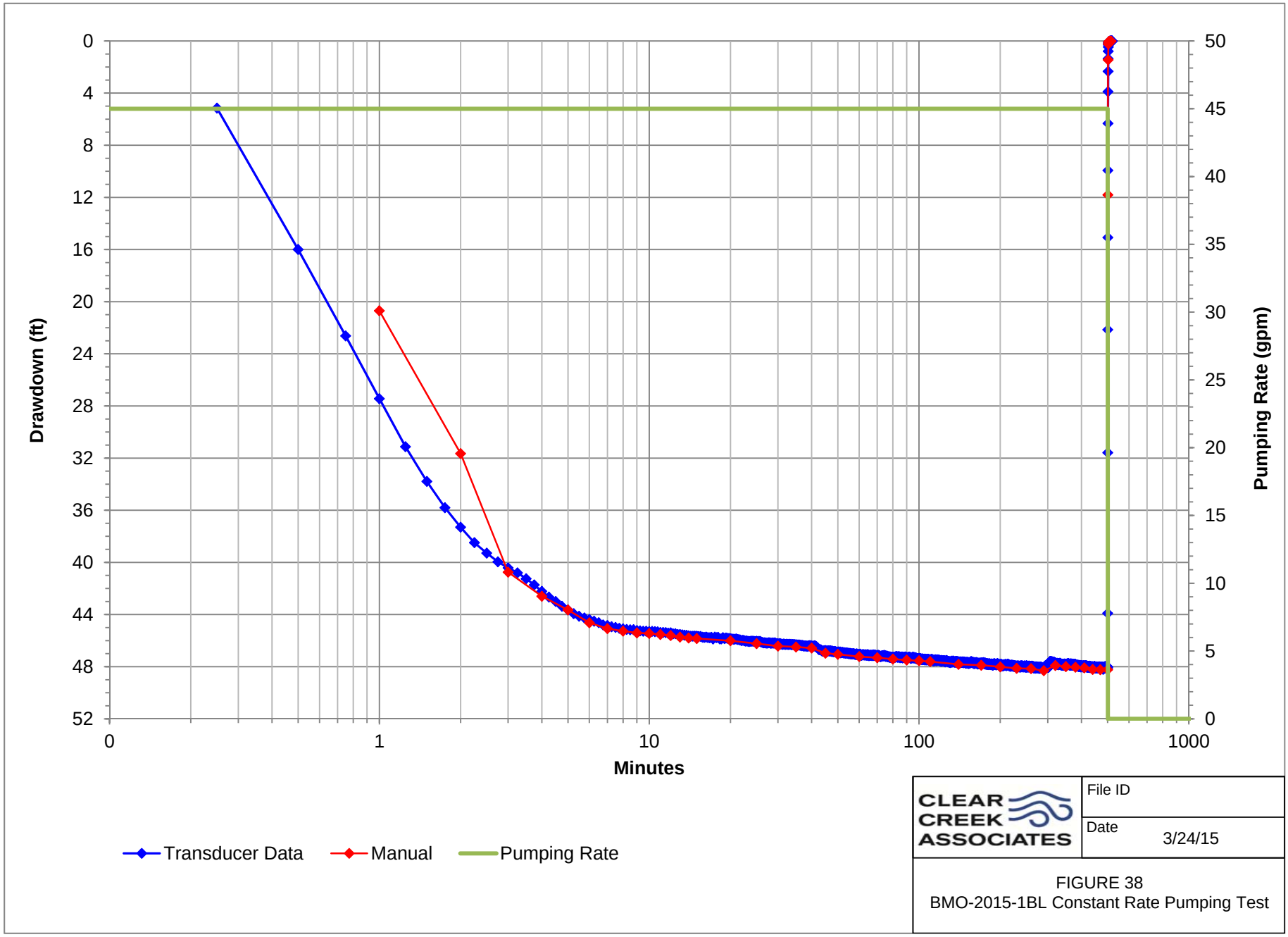
Aquifer Model: Unconfined
Solution Method: Theis

T = 270. ft^2/day
S = 5.0E-5
Kz/Kr = 0.1
b = 116. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

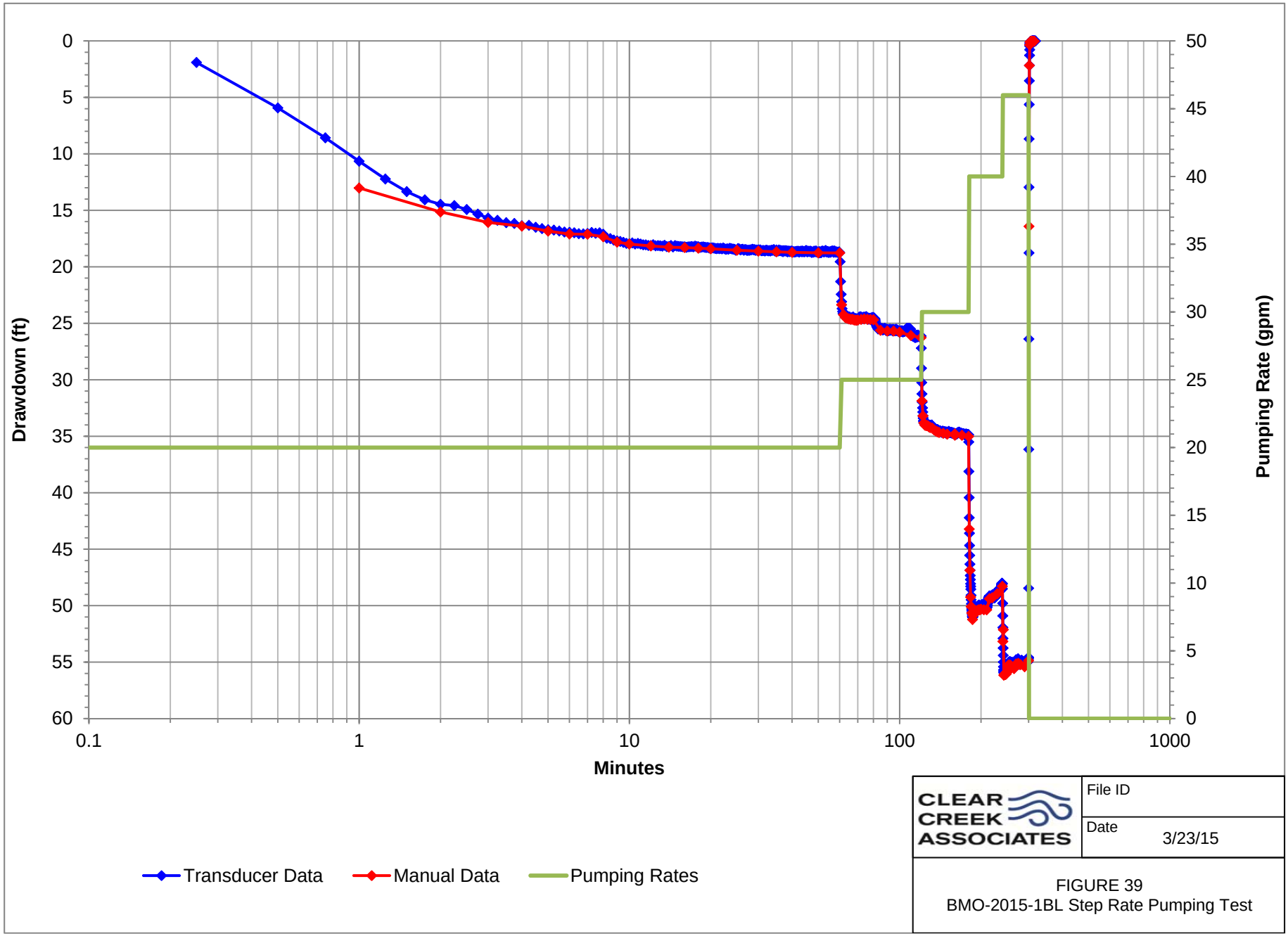
FIGURE 37
Theis Analysis of BMO-2015-1B
Step Rate Pumping Test



CLEAR CREEK ASSOCIATES

File ID	
Date	3/24/15

FIGURE 38
BMO-2015-1BL Constant Rate Pumping Test

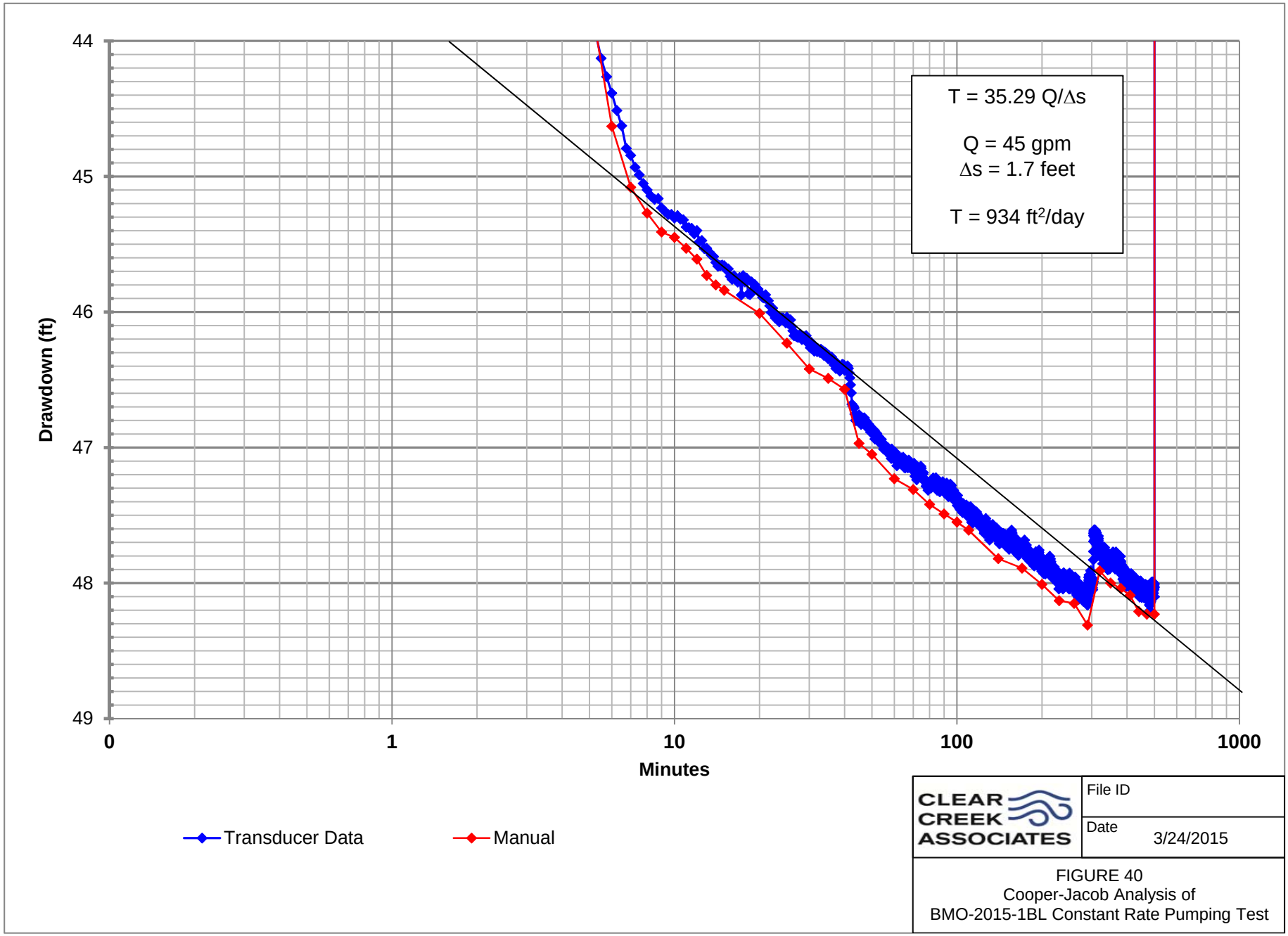


CLEAR CREEK ASSOCIATES

File ID

Date 3/23/15

FIGURE 39
BMO-2015-1BL Step Rate Pumping Test

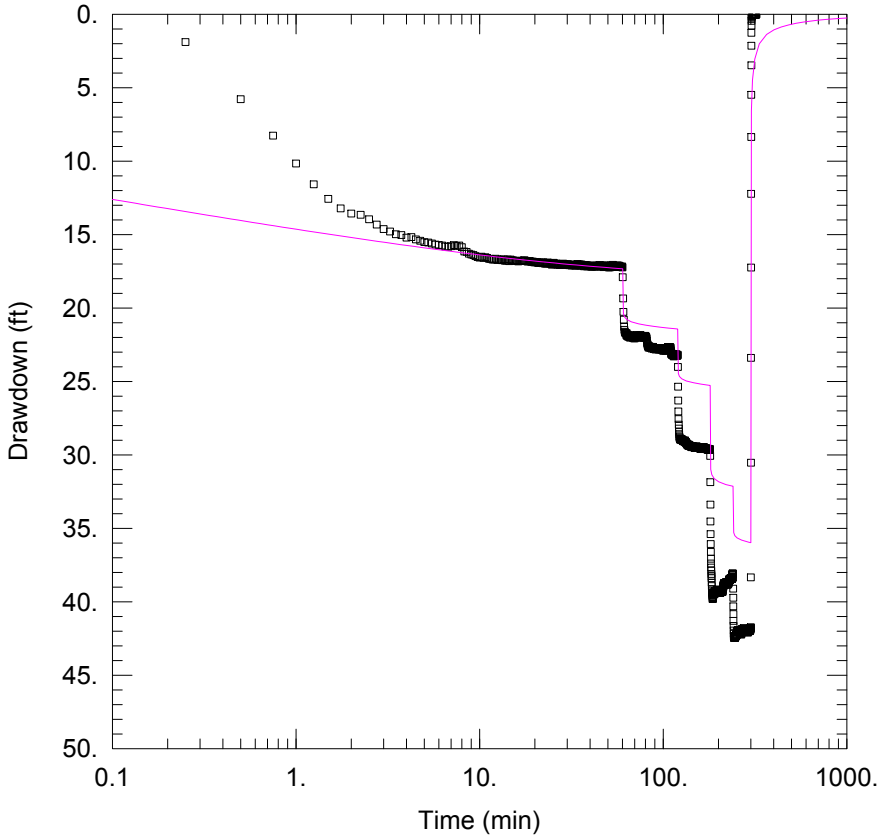


CLEAR CREEK ASSOCIATES

File ID

Date 3/24/2015

FIGURE 40
Cooper-Jacob Analysis of
BMO-2015-1BL Constant Rate Pumping Test



WELL TEST ANALYSIS

Data Set: N:\...\2015-1BL Step Test jrn.aqt
Date: 06/22/15 Time: 12:49:06

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2015-1BL
Test Date: 3/11/15

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2015-1BL	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
BMO-2015-1BL	0	0

SOLUTION

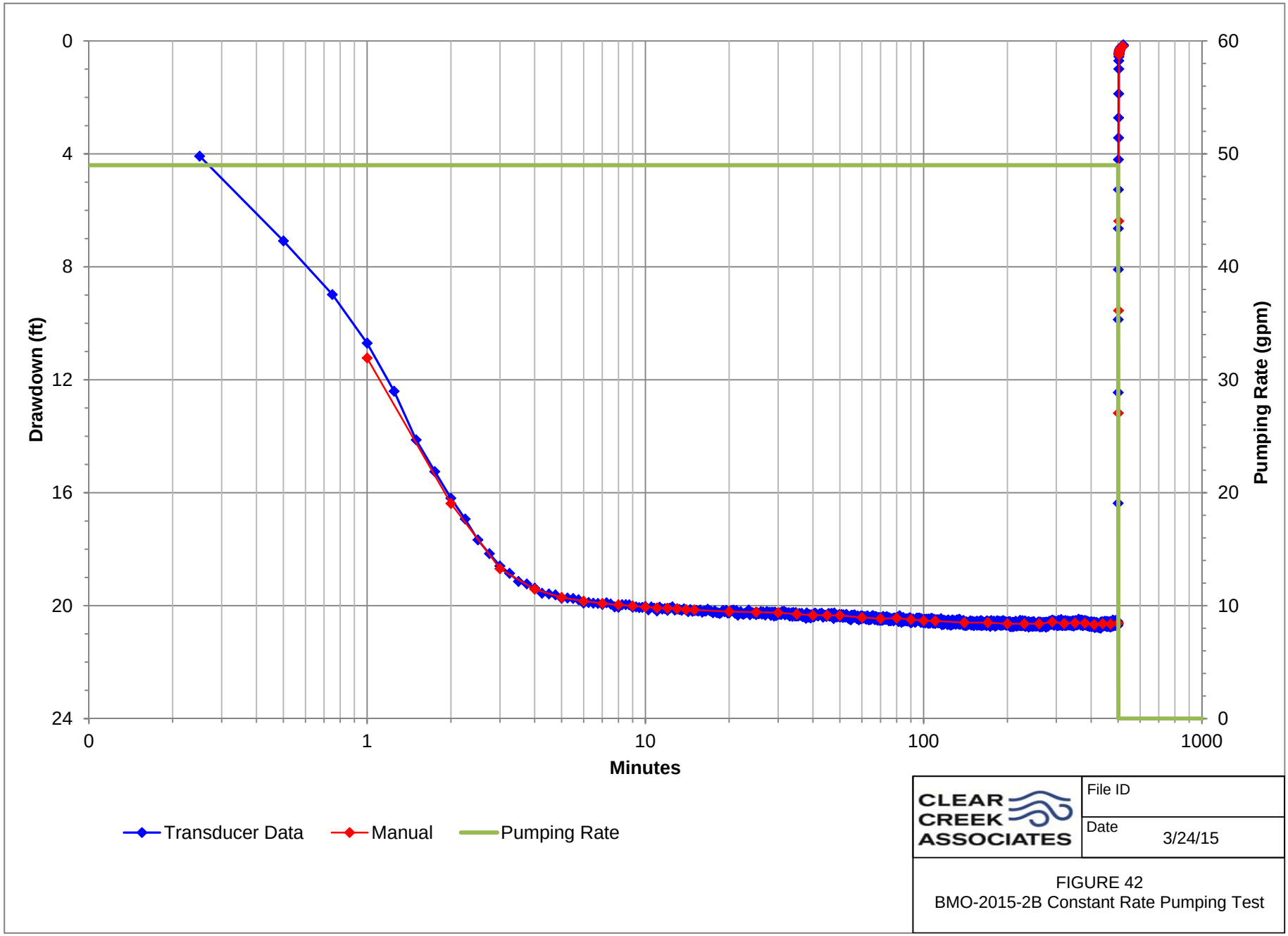
Aquifer Model: Unconfined
Solution Method: Theis

T = 713. ft^2/day
S = 1.0E-5
Kz/Kr = 0.001
b = 116. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

FIGURE 41
Theis Analysis of BMO-2015-1BL
Step Rate Pumping Test

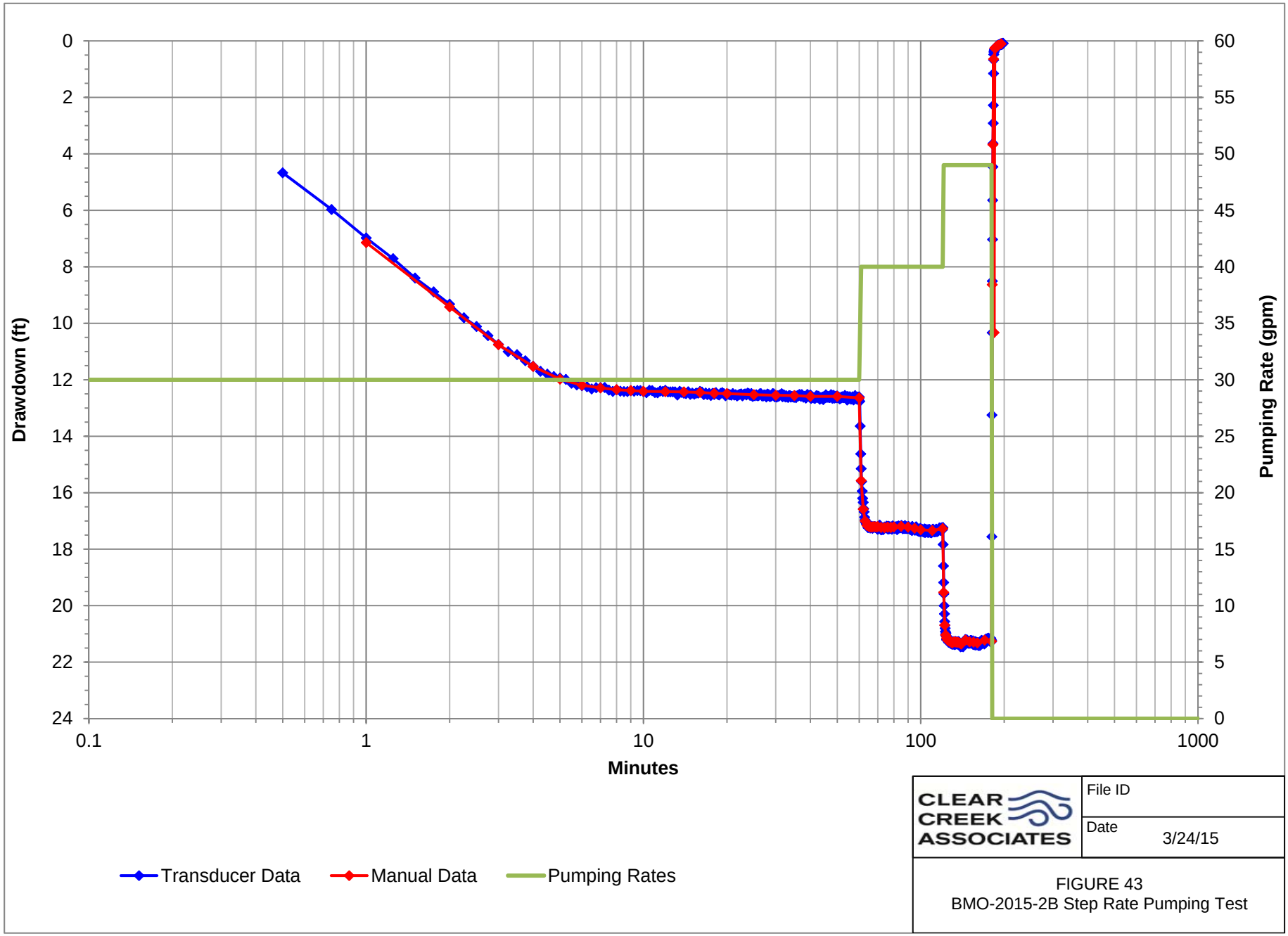


CLEAR CREEK ASSOCIATES

File ID

Date 3/24/15

FIGURE 42
BMO-2015-2B Constant Rate Pumping Test

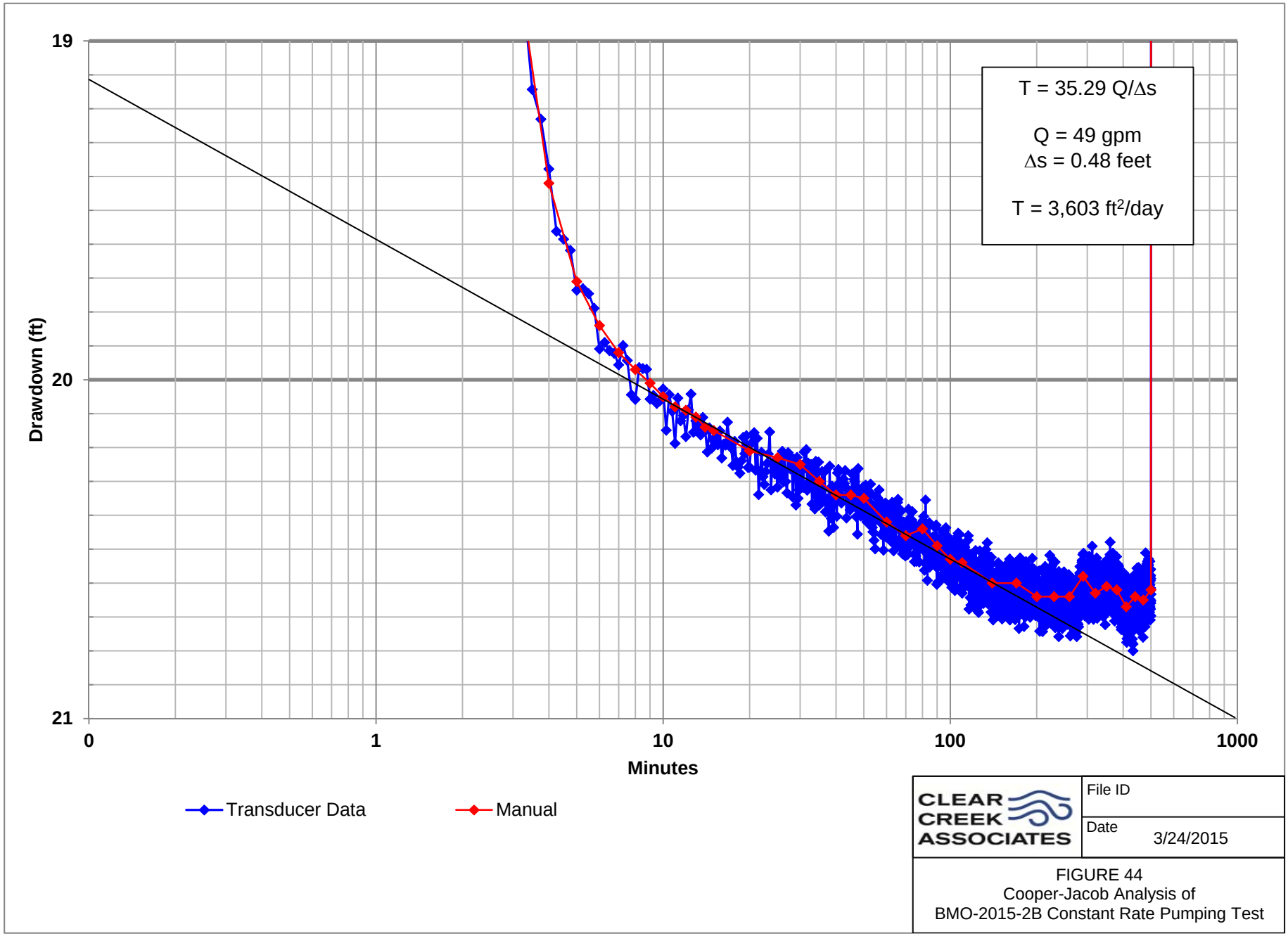


CLEAR CREEK ASSOCIATES

File ID

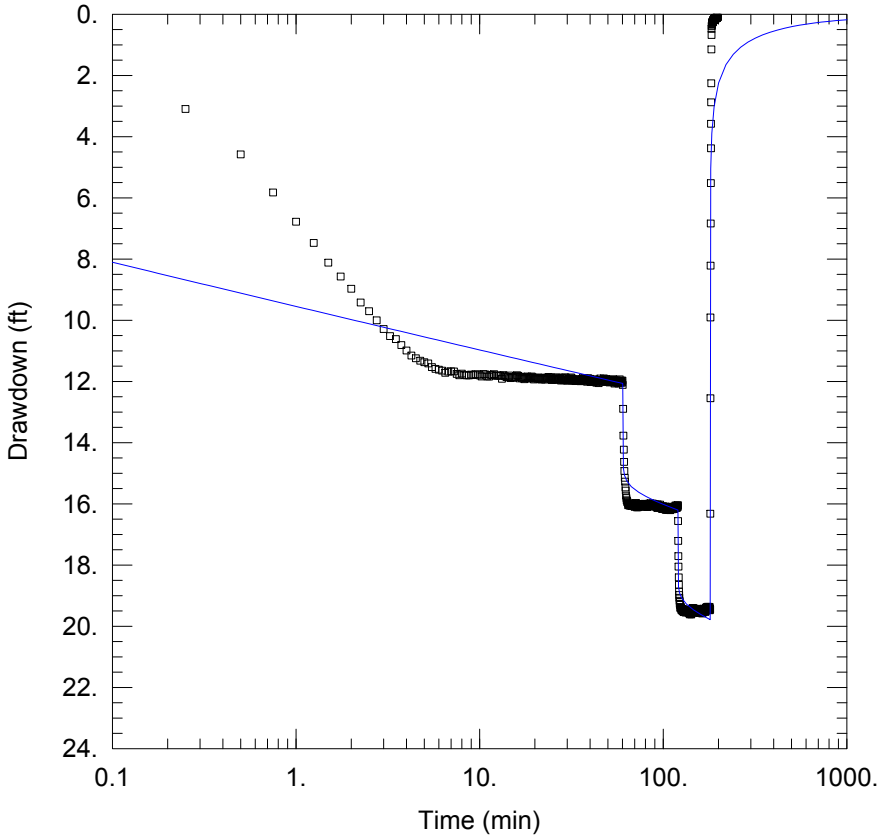
Date 3/24/15

FIGURE 43
BMO-2015-2B Step Rate Pumping Test



CLEAR CREEK ASSOCIATES	File ID
	Date 3/24/2015

FIGURE 44
Cooper-Jacob Analysis of
BMO-2015-2B Constant Rate Pumping Test



WELL TEST ANALYSIS

Data Set: N:\...\2015-2B Step Test jrn.aqt
Date: 06/22/15 Time: 12:48:46

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2015-2B
Test Date: 3/18/15

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2015-2B	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2015-2B	0	0

SOLUTION

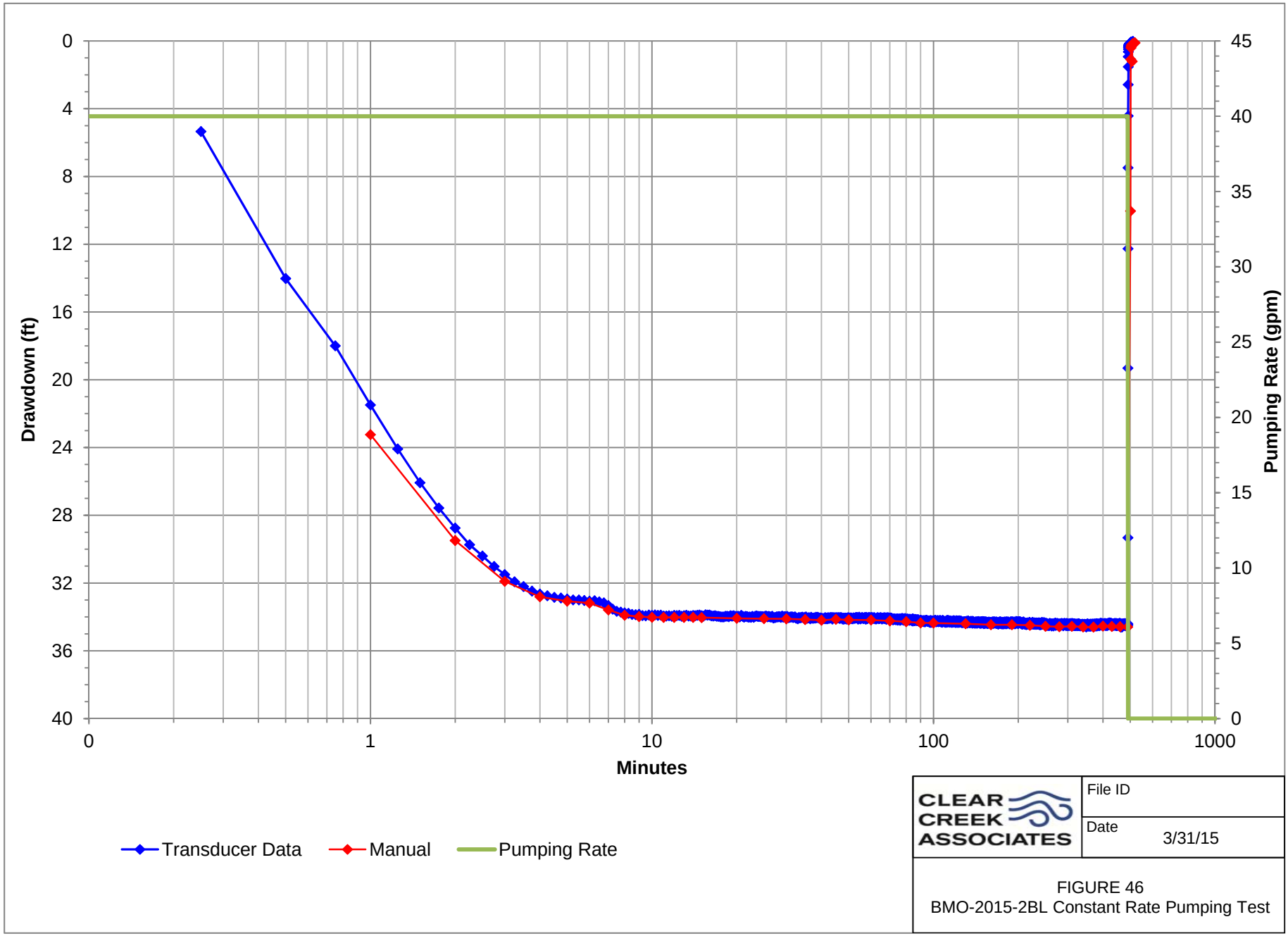
Aquifer Model: Unconfined
Solution Method: Theis

T = 680. ft^2/day
S = 1.0E-5
Kz/Kr = 0.1
b = 125. ft

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FIGURE 45
Theis Analysis of BMO-2015-2B
Step Rate Pumping Test



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FIGURE 46
BMO-2015-2BL Constant Rate Pumping Test

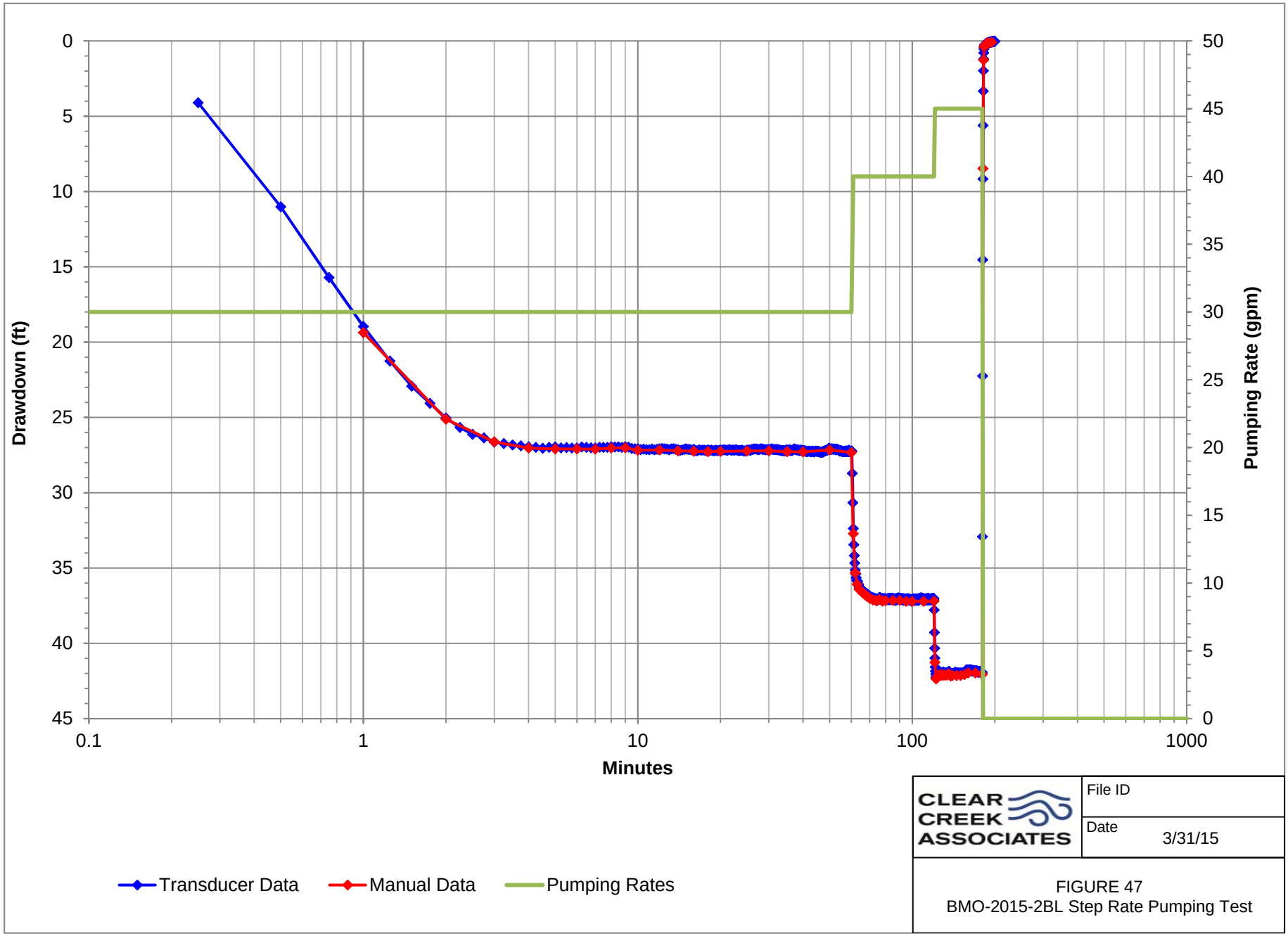
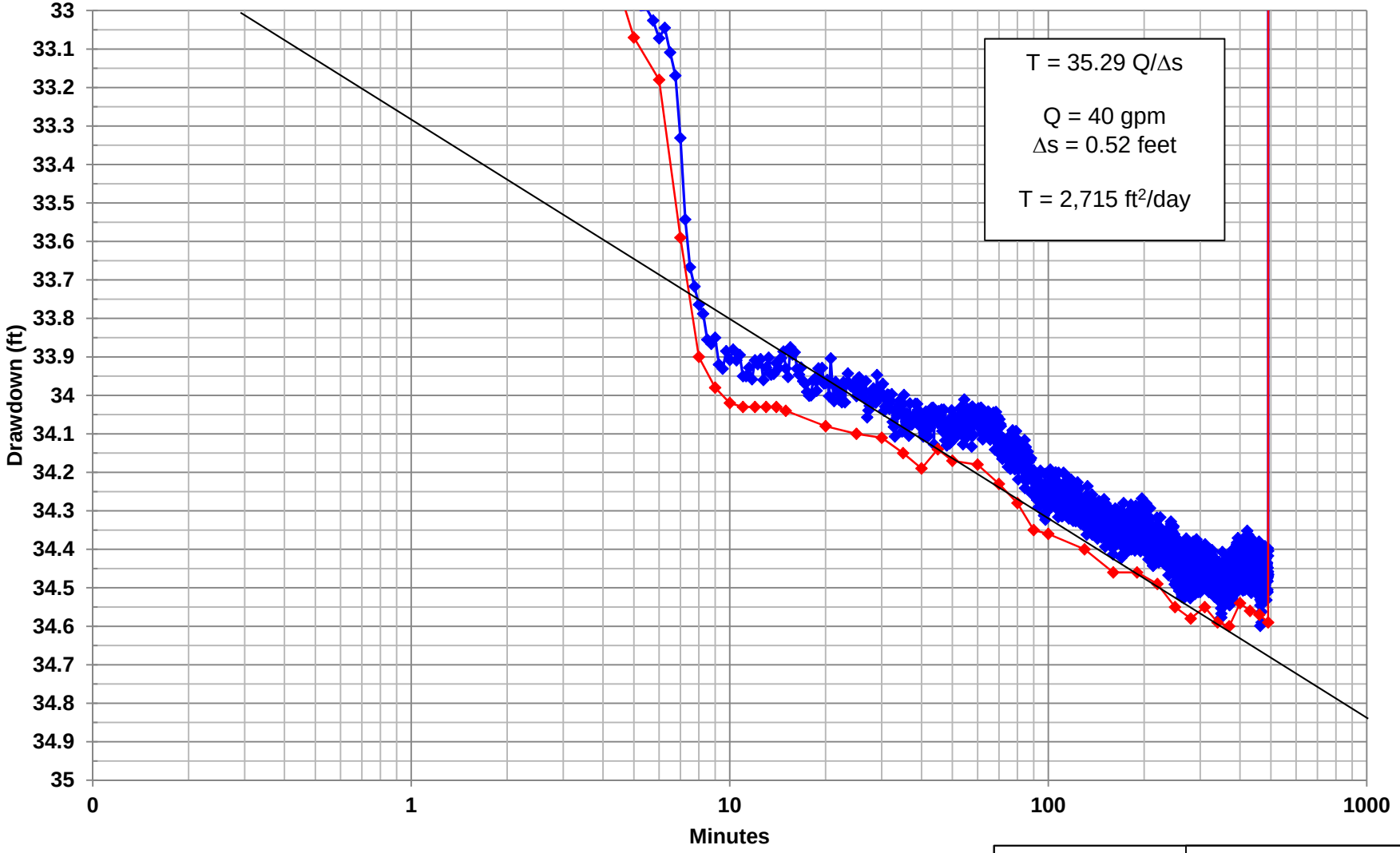


FIGURE 47
BMO-2015-2BL Step Rate Pumping Test

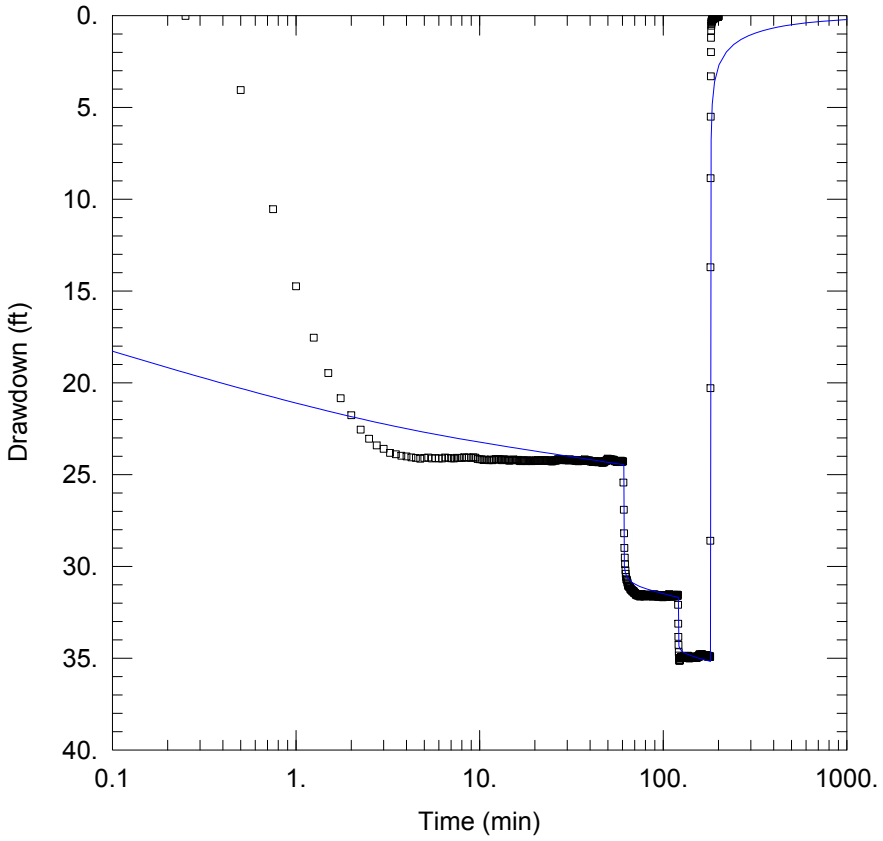


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File ID

Date 3/31/2015

FIGURE 48
Cooper-Jacob Analysis of
BMO-2015-2BL Constant Rate Pumping Test



WELL TEST ANALYSIS

Data Set: N:\...\2015-2BL Step Test jrn.aqt
Date: 06/22/15 Time: 12:48:53

PROJECT INFORMATION

Company: Clear Creek
Client: CQB
Project: 287051
Location: Bisbee, AZ
Test Well: BMO-2015-2BL
Test Date: 3/25/15

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BMO-2015-2BL	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BMO-2015-2BL	0	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 537. ft^2/day
S = 1.0E-5
Kz/Kr = 0.01
b = 125. ft

CLEAR CREEK ASSOCIATES

File ID 055038-023
Date 6/22/15

FIGURE 49
Theis Analysis of BMO-2015-2BL
Step Rate Pumping Test