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Safety & Environmental Solutions, Inc.

May 22, 2017

Ms. Amber Griffin, Rep Safety & Environmental II
EOG Resources – Artesia Division
105 South Fourth Street
Artesia, New Mexico 88210-2118

RE: Groundwater Investigation, Compromise SWD #1, 2016 Summary and Update

Dear Ms. Griffin:

This letter will provide the 2016 update of the results of the groundwater investigation conducted at the Compromise SWD #1 well site, located 8 miles south of Artesia at the east end of Dayton Road. The site is identified as being at the location of a topographic feature called Kaiser Lake, which is now dry. A location map is included as Figure 1.

The investigation begun in 2015 consisted of installing groundwater monitoring wells on July 21-23, 2015 which was followed by well development, initial water quality sampling and completing surveys of the monitor wells in order to determine groundwater flow direction and hydraulic gradient. A subsequent water quality sampling event was performed on December 15, 2015.

Details of the investigation including background information on the produced water release at that location, work performed to install the monitor wells and water quality sampling that occurred in July and December 2015 was provided in a letter report to Yates Petroleum dated February 26, 2016 and was submitted to New Mexico Oil Conservation Division on March 9, 2016.

Also included in that letter report was a presentation of investigation results specifically soil lithology, groundwater conditions, and water quality sampling analyses. This was followed by a discussion of the findings and interpretation of the water quality results.

The general conclusions reached in the initial letter report were that 1) surficial soils were fine-grained clay and silty clay which limit the depth of spill infiltration and transport of a large volume of high concentration chlorides to the naturally saline near surface groundwater and 2) concentrations in downgradient monitor well MW-2 were not impacted by the SWD release. As described below, subsequent investigation in 2016 continues to support these initial conclusions.

Work Performed in 2016

Quarterly sampling was performed on March 22, June 16, October 4 and December 13, 2016. A brief description of the sampling events is provided below. Sampling was performed using accepted low flow purging techniques which limits turbidity and volume of water produced. Accepted purge rates are between 0.5 and 1.0 liters per minute. During purging, the pump is placed halfway between the water surface and the well bottom and water quality parameters are monitored during the purging. At these monitor well locations, the water pH, specific conductivity and temperature were measured. For convenience, these are recorded at the beginning and every 5 minutes for a period of 15 minutes or

longer, if necessary for parameter stabilization. Also, the wells were further developed to remove sediment but not in a manner so as to affect the low flow purging.

March 22-23, 2016 Groundwater Sampling

The location was visited on March 22 to perform additional well development prior to sampling the following day. Monitor wells MW-1 and MW-2 were purged of approximately 8 gallons of slightly turbid water. There was little or no change in the total well depth indicating minimum sediment accumulation.

Well MW-3 had a very soft bottom with an initial depth of 30.84 ft. below the top of casing (28.48 ft. below ground surface). The well was purged of 15 gallons of very turbid water with silt and sand to the adjacent 55 gallon storage drum. Following the purge, the depth was measured at 32.0 ft. Sediment accumulation in MW-3 is attributed to the additional five feet of silty clay that required drilling through to reach a permeable water zone. This fine-grained material is now saturated and opposite the screen and outer sand pack; it is drawn into the well during purging and likely due to sloughing in between sampling events.

Water quality sampling was performed the following day on March 23. At the direction of the Yates representative, only inorganic water constituents were collected for analysis. Prior to sampling groundwater levels and total depth readings were taken and recorded in the field notebook. A comparison of the water levels from December 15, 2015 to March 23, 2016 show a change in MW-1 of -0.37 feet, while both MW-2 and MW-3 showed increases of 0.20 and 0.07 ft., respectively. The changes in water levels from event to event are best viewed in Table 1 which provides water depths, elevations and changes in water levels for all measurements to date.

Purging of MW-1 occurred for 30 minutes as the electrical conductivity had significantly increased during each 5 minute measurement. Initially measured at 8.71 millisiemens per centimeter (mS/cm), it incrementally increased to 14.62 mS/cm at 25 minutes. At 30 minutes it was beyond the range of the instrument used and the sample was obtained at that time. Temperature during this time ranged from 19.3 to 20.1 degrees C.

During sampling of MW-2 and MW-3 the water in MW-3 was very turbid even at the low flow rate and conductivity readings for MW-2 were not available due to the very high concentration of dissolved constituents present in that well.

The collected samples from this and other sampling events were preserved on ice and submitted together with a properly completed chain-of-custody to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for testing. In addition to chloride and Total Dissolved Solids (TDS), a full suite of major inorganic constituents was analyzed. These included the cations: sodium, potassium, calcium and magnesium; anions: sulfate, chloride, bicarbonate/carbonate and several minor anionic constituents including nitrate, fluoride, bromide and phosphorus. The purpose of the additional analyses will be discussed below. Copies of the 2016 analytical results for the monitor wells, plus those for a water sample from the Compromise SWD #1 are provided in the Appendix.

June 6, 2016 Groundwater Sampling

The second quarter groundwater sampling conducted on June 6 was generally performed as described above, but without further well development occurring before or after the sampling. Low flow measurements were performed as before, but with a different meter that measures higher values of the specific electrical conductivity of the water.

The water level in MW-2 increased slightly (0.02 ft.) while decreases were measured in both MW-1 (-0.36 ft.) and MW-3 (-0.53 ft.).

Electrical conductivity measurements for MW-1 were elevated at 16.35 mS/cm at the start, decreased to 11.98 at 5 minutes and then to 11.36 at 10 minutes, followed by an increase to 13.21 at 15 minutes and a final reading of 13.88 mS/cm at 20 minutes when purging ceased and the sample was collected. Water temperature was at 21.2 °C at both the start and finish of purging.

Measurements at MW-2 and MW-3 varied within a narrow range. At MW-2 the range was 58.23 mS/cm at the beginning of purging to 57.14 mS/cm at 15 minutes. The range for MW-3 was 11.21 at the start to 10.83 mS/cm at 15 minutes when the sample was collected. There was a relatively small decline in temperature in both wells during the purge process. The temperature in MW-2 declined from 28.3 to 25.1°C, and that in MW-3 decreased from 24.0 to 22.9°C.

October 4, 2016 Groundwater Sampling

Third quarter groundwater sampling was conducted on October 4 and followed procedures as described earlier. However, following sampling the wells were developed in an effort to remove additional accumulated sediment.

From June to October there was a significant decline of -1.44 ft. in the water level in MW-1 while lessor declines of -0.10 ft. and -0.50 ft. were measured in MW-2 and MW-3, respectively.

Electrical conductivity measurements for MW-1 continued to increase relative to earlier measurements. A value of 33.69 mS/cm at the start increased to 38.02 mS/cm at 16 minutes when purging ceased and the sample was collected. Water temperature was at 21.7 °C at the start and slightly lower at 21.4 °C at the completion of purging.

Conductivity measurements at MW-2 and MW-3 again varied within a narrow range. At MW-2 the range was 56.67 mS/cm at the beginning of purging and 57.12 mS/cm at 15 minutes. The value for MW-3 was 12.05 ms/cm at the start and decreased to 10.98 mS/cm at 15 minutes when the sample was collected. There was a relatively small decline in temperature in both wells during the purge process. The temperature in MW-2 declined from 24.3 to 23.6°C, and that in MW-3 decreased from 25.1 to 23.5°C.

Following sampling additional purging was performed to remove sediment. MW-1 was pumped to dryness and removed approximately 2 gallons of water and some sediment. MW-2 was purged of about 3 gallons of water with minimum sand. MW-3 pumping removed approximately 2 gallons of sand and silt (as measured in a 5-gallon bucket) and about 15 gallons of water. The water at the end of pumping remained heavily turbid. Pumping removed 1.61 ft. of sediment in the well increasing the bottom depth from 30.19 to 31.80 ft. below top of casing.

December 13, 2016 Groundwater Sampling

Sampling on December 13 was similar to that performed in earlier quarters and was followed by additional pumping to remove sediment.

Monitor well MW-1 continued to show differing behavior compared to the other wells. Following the large decline in October, the water level rose slightly by 0.04 ft. Water levels in MW-2 and MW-3 declined slightly by -0.13 in MW-2 and -0.04 in MW-3.

Conductivity measurements made during sample purging of MW-1 showed variation in concentration values starting at 32.01 mS/cm declining to 31.14 mS/cm at 5 minutes, increasing to 38.42 mS/cm at 10 minutes then declining again to 35.16 mS/cm at 20 minutes. Temperature was measured at 19.1°C and both start and finish with little intermediate variation.

Values of conductivity and temperature in both MW-2 and MW-3 varied only slightly during purging. Electrical conductivity in MW-2 ranged from 56.50 mS/cm at the start, increased to 57.41 mS/cm at 10 minutes and declined to 56.90 mS/cm at 15 minutes when the pump was lowered and ran dry at the bottom. Sampling occurred after waiting 10 minutes for water level. Conductivity in MW-3 declined from 11.92 ms/cm at the start of purging to 11.11 mS/cm at 15 minutes when sampled. Temperature in MW-2 was 18.8°C at the start and declined slightly to 18.7°C at 15 minutes. Temperature in MW-3 declined from 20.7°C to 20.3°C at 15 minutes.

At the completion of sampling each well it was purged. Purging of MW-1 removed only minor sediment and the total depth of 26.50 ft. below TOC remained the same. MW-2 was not purged due to the lack of water. Purging of MW-3 resulted in removing 10 gallons of water; 1-in. of sand remained in the bottom of a 5-gallon bucket.

Investigation Results

Groundwater

Quarterly groundwater measurements were taken on site in 2016 to determine the depth to water and total depth of each well. The measurements were made from the top of the PVC casing and the results are shown in Table 1. These measurements were tabulated together with surveyed monitor well elevation data to determine groundwater elevations. Also shown on the table are the 2015 measurements, and quarterly and 12-month water level changes. Over all, since measurements began in July 2015, there has been a water level decline of -3.08 ft. in MW-1, an increase of 0.53 ft. in MW-2, and a decline of -1.27 ft. in MW-3. These changes have had a significant effect on groundwater flow direction and gradient as will be discussed below.

Water level elevations were plotted and the groundwater flow direction and gradient were determined. The resultant maps are shown in Figures 2 through 7 (note that the contour intervals differ on the figures). For measurements made from July 23, 2015 through June 16, 2016, groundwater flow was generally southeasterly though in subsequent quarters since July 2015 the direction rotated slightly to the east. However in October and December 2016 the groundwater flow direction rotated 90 degrees from southeast to the northeast. This effect is due to the relatively large decline in MW-1, somewhat smaller decline in MW-3 and a water level increase in MW-2.

Together with the change in groundwater flow direction, the hydraulic gradient has steadily decreased from July 2015 through December 2015. The five-fold decline from 0.0067 ft./ft. to 0.0013 ft./ft. is a significant flattening of the gradient that graphically requires a decrease of the contour interval to show the mapped direction of flow. There is not an immediately obvious explanation for the flattening of the gradient; however, it is noted that the area received significant rainfall and flooding in early July 2015 with ponding in the area of MW-1 which is slightly lower in elevation than the other wells. December 2015 and later measurements may reflect continued redistribution of infiltration moisture in the shallow subsurface.

Water Quality

Following each sample analysis, a cation-anion balance sheet was requested from the laboratory. The balance sheet is used to compare cation-anion totals. For substances like salt dissolved in water, there are an equal number of sodium ions and chloride ions in solution. However, because the molecular weights of the ions differ, 100 grams of sodium are not balanced by 100 grams of chloride. To balance 100 grams of sodium, 154 grams of chloride are required. In addition for calcium, magnesium and sulfate, the electron charge of the ion must also be considered. This leads to the concept of equivalent weights so that the charge balance of cations must equal that of anions. In theory and assuming no unknown organic particles with an electron charge are present in the water, the milliequivalent total of cations should equal the anion total. The sample balance sheets are included with the water quality analyses in the Appendix.

A sample analysis table was prepared for each sampling to compare the results and calculate percentages of each constituent in each sample. These results are shown in Tables 2 through 7. Comparative results discussing changes between July 2015 and December 2015, and July 2015 and December 2016 are presented below. Comparisons for other dates can be made by reviewing the detailed tables.

From July 2015 to December 2015 chloride in MW-1 increased from 1,800 mg/L to 2,200 mg/L and in MW-3 the increase was from 2,600 mg/L to 2,900 mg/L. TDS for MW-1 increased from 8,130 mg/L to 10,000 mg/L and in MW-3 the increase was from 8,790 mg/L to 9,370 mg/L. These constituents in both wells greatly exceed New Mexico Water Quality Control Commission (WQCC) groundwater standards of 250 mg/L for chloride and 1,000 mg/L for TDS. In addition, sulfate in the two wells is over five times greater than the WQCC standard of 600 mg/L. MW-1 is upgradient from the release area and the results, though exceeding standards, could be considered background for this site as of December 2015. The TDS value of 10,000 mg/L in MW-1 is also the maximum TDS level which is offered protection under state regulations[1]. MW-3 is off gradient and though the TDS and chloride results differ, sodium concentrations are approximately the same as MW-1.

From July 2015 to December 2016 chloride in MW-1 increased from 1,800 mg/L to 14,000 mg/L while the chloride in MW-3 remained the same at 2,600 mg/L. During this time TDS for MW-1 increased from 8,130 mg/L to 29,000 mg/L and in MW-3 the increase was from 8,790 mg/L to 9,400 mg/L. Obviously the approximately eight time increase in MW-1 chloride and four time increase in TDS need explanation. A plausible explanation that works in conjunction with the decline in water levels in MW-1 is that water from the July 2015 flooding infiltrated from ponding near the well and both raised the water level and diluted the native saline groundwater in the well. Over time the water level declined and purging of the well to remove sediment likely allowed the native groundwater concentrations to be reestablished. However, future flooding events may again produce the dilution results seen in the well.

With TDS in MW-2 averaging 64,000± mg/L for the six sampling events and chloride ranging from 15,000 mg/L to 19,000 mg/L, the concentrations are over six times higher than the July 2015 average concentrations in offgradient well MW-3. At first glance and looking only at TDS and chloride, it could be thought that the MW-2 well has been impacted by the Compromise SWD #1 release which has TDS and chloride at 201,365 mg/L and 120,000 mg/L, respectively. However, as discussed below, such a conclusion would likely be incorrect.

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[1] The New Mexico State Engineer has defined protectable underground water as all waters in the State of New Mexico containing 10,000 milligrams per liter or less of total dissolved solids (TDS).

Discussion

A number of methods can be used to graphically present and interpret water quality analyses. In this instance the likelihood of MW-2 being impacted by the Compromise SWD #1 release is examined. The method chosen is use of a Piper Tri-linear graph which plots percentages of each major constituent on its own axis. The percentages (shown in Figures 8 through 13) do not consider total concentration, only the makeup of the water.[1] The two discussions below apply to comparison of results from July 2015 – December 2015 and July 2015 – December 2016 sampling dates.

For cations, we see that MW-1 and MW-3 plot similarly but MW-2 is separated (Figures 8 and 9). This is because MW-2 is high in magnesium and very low in calcium. MW-2 has a higher percentage of sodium than the other two wells (55% in July 2015 and 59% in December 2015). The Compromise SWD #1 water sample with 94.6% sodium is far down in the lower right corner of the Cation triangle. If MW-2 had been impacted by the Compromise SWD #1 release, the sodium percentage would be higher and it would lay on a straight line between numbers 1 and 3, and the SWD. Instead it is near the horizontal line representing the 40+% magnesium content.

For anions, we see that all three wells lie on a line midway between high sulfate and high chloride (Figures 8 and 9). Carbonate/bicarbonate is 5.4% or less in all samples. Just taking into consideration the anions, we see that MW-3 has slightly more chloride than the other two, but all three wells are between 38% and 52% chloride for these two sampling events. Depending on the well, sulfate is between 45% and 57% while the SWD has only 2.6% sulfate. Again, if the sample in MW-2 had been contaminated by SWD water with 97.3% chloride, it would not be grouped with the other two monitor wells but would be plotted between that group and the SWD sample.

The diamond portion of the graph shows all three monitor well waters plot close to each other and the SWD water is by itself in the right corner. If mixing had occurred, MW-2 would lay on a line between the other two monitor wells and the SWD.

As pointed out above, the graph shows only water quality, not total concentration. Given that the SWD water has a sodium and chloride concentration greater than 94%, and has TDS over 3 times that of MW-2, if the water in MW-2 was impacted it would show up as lying close to SWD water on the graph.

The results lead to a question as to why the 2015 water analyses for MW-2 are so different than that in the other two wells. A possible and likely answer is that the water is from a relatively isolated permeable lithologic stringer that is hydraulically connected with deeper permeable sediments, but due to the high occurrence of clay, mass movement of the water is restricted. The high concentration of magnesium in the sample (38% to 42%) may be due to dissolution of rocks in the San Andres, Chalk Bluff and Rustler formations up river from the location.[2] The San Andres formation in Eddy County is composed of limestone, dolomitic limestone and dolomite ($CaMg(CO_3)_2$). On the east side of the Pecos River, magnesium is present in dolomitic limestone and dolomite in the Chalk Bluff and Rustler formations. The Rustler consists of anhydrite, gypsum and some, interbedded sandy clay and some dolomite beds. In any case, magnesium is not present in the SWD water above 1.4 percent.

Beginning in March 2016 the situation changes for constituents analyzed in MW-1. The TDS increases from 10,000 to 22,000 mg/L and chloride percentage increases from 37.9% to 57.0%.

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[1] Hounslow, Arthur W., Water Quality Data; Analysis and Interpretation, CRC Press, 1995.

[2] Hendrickson, G.E. and R.S. Jones, Geology and Ground-Water Resources of Eddy County, New Mexico, Ground-Water Report 3, New Mexico Bureau of Mines and Mineral Resources, 1952.

June 2016 brings a TDS reduction to 14,000 mg/L and chloride down to 45.4%. However, MW-1 TDS and chloride concentrations in October and December 2016 again are quite elevated (average for these two months 30,100 mg/L TDS and 67.6 percent chloride). Review of the tri-linear diagrams for these months (figures 12 and 13) show MW-1 close to MW-2 on the cation triangle; sodium+potassium percentages for both wells are nearly equal while magnesium ranges between 33 and 39 percent for the two wells during October and December 2016. While low, calcium is a few percent higher in MW-1 than MW-2.

The chloride changes in MW-1 affect its position on the anion triangle. In both October and December, the chloride concentration, averaging 67.6%, moves closer to the SWD well concentration. Though the chloride position would seem to indicate an impact from the SWD release, the cation composition for both months is about one-third magnesium with a small contribution from calcium. In addition MW-1 is the upgradient monitor well located about 400 ft. from the Compromise SWD well and the area of the produced water release. As discussed in the water quality section, it is plausible that the recent elevated concentrations seen in MW-1 are more likely related to the composition of the native very saline groundwater than due to any effects from the produced water release.

Summary Observations

Soils

Surficial soils in the monitor well borings which encircle the release area are fine grained clay and silty clays. Their presence will limit, to some extent, the depth of infiltration of the spill and their low permeability will prevent transport of a large volume of contaminated chlorides to the naturally brackish groundwater below.

Groundwater Elevation Conditions

1. Groundwater in the area of the Compromise SWD #1 well site release is at a depth between 12 feet and 18 feet BGS, depending on the well and date of measurement.
2. The water level elevation in MW-1 has decreased 3.1 feet from July 2015 and decreased 2.2 feet from December 2015.
3. The water level elevation in MW-2 has increased 0.5 feet from July 2015 and decreased 0.1 feet from December 2015.
4. The water level elevation in MW-3 has decreased 1.3 feet from July 2015 and decreased 1.0 feet from December 2015.
5. The direction of groundwater movement from July 2015 through June 2016 was generally southeast.
6. The direction of groundwater movement in October and December 2016 was northeast, a 90° change in direction.
7. The groundwater gradient has decreased (flattened) from 0.0067 ft/ft in July 2015 to 0.0013 ft/ft in December 2016. The gradient decrease was continuous over this period.

Water Quality Conditions

1. The Total Dissolved Solids (TDS) concentration of upgradient well MW-1 increased from 8,130 mg/l in July 2015 to 31,200 mg/l in October 2016 then declined slightly to 29,000 in December 2016.
2. For constituent cations the TDS increase in MW-1 was accompanied with an approximate 10% increase in sodium, 5% increase in magnesium and 15% decrease in calcium.
3. For constituent anions the TDS increase in MW-1 was accompanied with an approximate 26% increase in chloride, 22% decrease in sulfate and 4% decrease in bicarbonate.
4. There were relatively minor changes in cation and anion constituent concentrations in MW-2 and MW-3 during the 18 month period.
5. The October and December 2016 water quality graphs show MW-1 cation concentrations approaching that of MW-2 (i.e. increase in Na and Mg, decrease in Ca).
6. The October and December 2016 water quality graphs show MW-1 anion concentrations approaching that of the composition of water in the SWD well (i.e. increase in Cl, decrease in SO4 and HCO3).

Conclusions

1. The changes in groundwater flow direction and reduction in gradient are mainly a result of the decrease in groundwater levels in upgradient MW-1.
2. This was accompanied by a TDS increase in MW-1 3.4 times the original observed concentration, and current results are three times the New Mexico TDS concentration for protectable groundwater (10,000 mg/l).
3. Notwithstanding the increase in sodium and chloride, MW-1 still maintains a magnesium concentration of 33 percent (the concentration in the SWD is 1.4 percent) and the well is upgradient approximately 400 feet from the location of the release at the Compromise SWD.
4. More than likely the lower, but still poor, initial TDS concentration in MW-1 was due to intersecting a near-surface permeable lens of limited extent containing fresher infiltration water that has been dewatered with well development resulting in capture and analysis of the poorer water quality below.
5. Shifting emphasis to the downgradient monitor wells, first to MW-2 (July 2015 – June 2016) and now MW-3 (October and December 2016), based on the results of the graphical analysis, there is no indication that the produced water release has impacted groundwater in any of these wells. The most significant change in water level elevations and water quality concentrations have occurred in upgradient well MW-1.
6. The results of testing shallow groundwater in the vicinity of the Compromise SWD #1 well site release have shown the water is naturally saline with the current concentrations in MW-1 and MW-2 classified as highly saline.
7. Graphical plotting of these concentrations on Piper tri-linear diagrams indicates that the water in MW-2 is unlikely to have originated from or has been impacted by the Compromise SWD #1 release. The water is most probably from a relatively isolated, lithologically permeable sedimentary stringer in a heavily clay environment.

If you have any questions, please contact me at (575) 397-0510 or at (575) 390-7067.

Sincerely yours,

David G. Boyer, P.G.

Attachments:

Tables 1 - 7
Figures 1 - 13
Appendix – Copies of 2016 Water Quality Analyses

Ms. Amber Griffin
May 22, 2017

2016 Report Tables

Table 1. Water Level Measurements, Compromise SWD #1 Release Site

Monitor Well Name	Elevation Top of Casing (feet)	Measurement Date	Depth to Water Below TOC (feet)	Total Depth Below TOC (feet)	Water Level Elev. (feet)	Water Saturated Thickness (feet)	Water Level Change (ft)	12-Month Water Level Change (ft)
MW-1	3,283.12	07/23/15	15.65	26.50	3,267.47	10.9	- -	- -
		12/15/15	16.54	26.50	3,266.58	10.0	-0.89	- -
		03/22/16	16.91	26.69	3,266.21	9.8	-0.37	- -
		03/23/16	16.97	26.69	3,266.15	9.7	-0.06	- -
		06/16/16	17.33	26.64	3,265.79	9.3	-0.36	-1.68
		10/04/16	18.77	26.49	3,264.35	7.7	-1.44	- -
		12/13/16	18.73	26.50	3,264.39	7.8	0.04	-2.19
MW-2	3,284.34	07/23/15	20.75	27.04	3,263.59	6.3	- -	- -
		12/15/15	20.16	26.99	3,264.18	6.8	0.59	- -
		03/22/16	19.96	27.22	3,264.38	7.3	0.20	- -
		03/23/16	20.01	27.21	3,264.33	7.2	-0.05	- -
		06/16/16	19.99	27.21	3,264.35	7.2	0.02	0.76
		10/04/16	20.09	27.00	3,264.25	6.9	-0.10	- -
		12/13/16	20.22	26.99	3,264.12	6.8	-0.13	-0.06
MW-3	3,284.56	07/23/15	19.79	31.60	3,264.77	11.8	- -	- -
		12/15/15	20.06	30.94	3,264.50	10.9	-0.27	- -
		03/22/16	19.99	30.84	3,264.57	10.9	0.07	- -
		03/23/16	19.99	32.00	3,264.57	12.0	0.00	- -
		06/16/16	20.52	30.89	3,264.04	10.4	-0.53	-0.73
		10/04/16	21.02	30.19	3,263.54	9.2	-0.50	- -
		12/13/16	21.06	31.55	3,263.50	10.5	-0.04	-1.00

Table 2. Yates Compromise SWD Water Quality Comparison, July 23, 2015

		MW-1		MW-2			MW-3			SWD #1 (08/17/15)		
CATIONS	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%
Sodium	1,500	65.25	48.9	12,000	521.97	55.2	1,600	69.60	48.9	73,000	3,175.29	94.1
Potassium	10	0.26	0.2	18	0.46	0.0	4.1	0.10	0.1	580	14.83	0.4
Calcium	600	29.94	22.5	560	27.94	3.0	760	37.92	26.7	2,700	134.73	4.0
Magnesium	460	37.86	28.4	4,800	395.06	41.8	420	34.57	24.3	580	47.74	1.4
Total Cations		133.31	100.0		945.43	100.0		142.19	100.0		3,372.59	100.0
ANIONS												
Sulfate	3,200	66.63	53.4	26,000	541.33	52.5	3,300	68.71	46.9	4,300	89.53	2.6
Chloride	1,800	50.78	40.7	17,000	479.55	46.5	2,600	73.34	50.1	120,000	3,385.05	97.3
Bicarbonate	337.1	6.74	5.4	430	8.59	0.8	214.8	4.29	2.9	276	5.52	0.2
Carbonate	--	0	0.0	0	0	0.0	--	0	0.0	--	0	0.0
Nitrate	6.2	0.44	0.4	20	1.43	0.1	--	0	0.0	--	0	0.0
Fluoride	1.7	0.09	0.1	3.6	0.19	0.0	--	0	0.0	--	0	0.0
Bromide	1.4	0.02	0.0	18	0.23	0.0	1.2	0.02	0.0	39	0.49	0.0
Total Anions		124.70	100.0		1,031.32	100.0		146.36	100.0		3,480.59	100.0
TDS (measured)	8,130			64,900			8,790			191,000		
Sodium plus Potassium:			49.1			55.3			49.0			94.6
Cacium plus Magnesium:			50.9			44.7			51.0			5.4
Sulfate plus Chloride:			94.2			99.0			97.1			99.8
Carbonate plus Bicarbonate:			5.4			0.8			2.9			0.2

Table 3. Yates Compromise SWD Water Quality Comparison, December 15, 2015

		MW-1		MW-2			MW-3			SWD #1 (08/17/15)		
CATIONS	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%
Sodium	1,600	69.60	50.3	14,000	608.96	59.2	1,500	65.25	46.5	73,000	3,175.29	94.1
Potassium	7	0.19	0.1	13	0.33	0.0	6.7	0.17	0.1	580	14.83	0.4
Calcium	550	27.45	19.8	500	24.95	2.4	810	40.42	28.8	2,700	134.73	4.0
Magnesium	500	41.15	29.7	4,800	395.06	38.4	420	34.57	24.6	580	47.74	1.4
Total Cations		138.39	100.0		1,029.30	100.0		140.41	100.0		3,372.59	100.0
ANIONS												
Sulfate	4,500	93.69	57.2	30,000	624.61	53.3	3,400	70.79	45.1	4,300	89.53	2.6
Chloride	2,200	62.06	37.9	19,000	535.97	45.8	2,900	81.81	52.1	120,000	3,385.05	97.3
Bicarbonate	345.4	6.90	4.2	417.6	8.35	0.7	216.7	4.33	2.8	276	5.52	0.2
Carbonate	--	0	0.0	--	0	0.0	--	0	0.0	--	0	0.0
Nitrate	12	0.86	0.5	33	2.36	0.2	--	0	0.0	--	0	0.0
Fluoride	3.1	0.16	0.1	--	0	0.0	--	0	0.0	--	0	0.0
Bromide	--	0	0.0	--	0	0.0	--	0	0.0	39	0.49	0.0
Total Anions		163.67	100.0		1,171.29	100.0		156.93	100.0		3,480.59	100.0
TDS (measured)	10,000			65,500			9,370			191,000		
Sodium plus Potassium:			50.4			59.2			46.6			94.6
Cacium plus Magnesium:			49.6			40.8			53.4			5.4
Sulfate plus Chloride:			95.2			99.1			97.2			99.8
Carbonate plus Bicarbonate:			4.2			0.7			2.8			0.2

Table 4. Yates Compromise SWD Water Quality Comparison, March 23, 2016

		MW-1		MW-2			MW-3			SWD #1 (08/17/15)		
CATIONS	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%
Sodium	3,800	165.29	57.3	15,000	652.46	60.7	1,600	69.60	48.8	73,000	3,175.29	94.1
Potassium	6.4	0.16	0.1	15	0.38	0.0	3.8	0.10	0.1	580	14.83	0.4
Calcium	650	32.44	11.2	540	26.95	2.5	800	39.92	28.0	2,700	134.73	4.0
Magnesium	1,100	90.53	31.4	4,800	395.06	36.8	400	32.92	23.1	580	47.74	1.4
Total Cations		288.42	100.0		1074.85	100.0		142.54	100.0		3,372.59	100.0
ANIONS												
Sulfate	6,600	137.41	40.2	28,000	582.97	54.3	3,100	64.54	47.3	4,300	89.53	2.6
Chloride	6,900	194.64	57.0	17,000	479.55	44.7	2,400	67.70	49.6	120,000	3,385.05	97.3
Bicarbonate	401.0	8.01	2.3	407.2	8.14	0.8	208.1	4.16	3.0	276	5.52	0.2
Carbonate	--	0	0.0	0	0	0.0	--	0	0.0	--	0	0.0
Nitrate	20	1.43	0.4	30	2.14	0.2	--	0	0.0	--	0	0.0
Fluoride	3.2	0.17	0.0	8.7	0.46	0.0	0.17	0.01	0.0	--	0	0.0
Bromide	4.7	0.06	0.0	13	0.16	0.0	0.20	0.00	0.0	39	0.49	0.0
Total Anions		341.72	100.0		1,073.42	100.0		136.41	100.0		3,480.59	100.0
TDS (measured)	22,900			66,500			8,600			191,000		
Sodium plus Potassium:			57.4			60.7			48.9			94.6
Cacium plus Magnesium:			42.6			39.3			51.1			5.4
Sulfate plus Chloride:			97.2			99.0			96.9			99.8
Carbonate plus Bicarbonate:			2.3			0.8			3.0			0.2

Table 5. Yates Compromise SWD Water Quality Comparison, June 16, 2016

		MW-1		MW-2			MW-3			SWD #1 (08/17/15)		
CATIONS	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%
Sodium	3,300	143.54	56.0	12,000	521.97	53.9	1,700	73.95	50.5	73,000	3175.29	94.1
Potassium	5.8	0.15	0.1	15	0.38	0.0	3.9	0.10	0.1	580	14.83	0.4
Calcium	640	31.94	12.5	690	34.43	3.6	740	36.93	25.2	2,700	134.73	4.0
Magnesium	980	80.66	31.5	5,000	411.52	42.5	430	35.39	24.2	580	47.74	1.4
Total Cations		256.28	100.0		968.30	100.0		146.36	100.0		3,372.59	100.0
ANIONS												
Sulfate	5,600	116.59	50.7	26,000	541.33	52.4	3,100	64.54	46.3	4,300	89.53	2.6
Chloride	3,700	104.37	45.4	17,000	479.55	46.5	2,500	70.52	50.6	120,000	3385.05	97.3
Bicarbonate	368.2	7.36	3.2	399.4	7.99	0.8	210.9	4.22	3.0	276	5.52	0.2
Carbonate	--	0	0.0	0	0	0.0	--	0	0.0	--	0	0.0
Nitrate	18	1.28	0.6	40	2.86	0.3	--	0	0.0	--	0	0.0
Fluoride	2.7	0.14	0.1	6.8	0.36	0.0	--	0	0.0	--	0	0.0
Bromide	4.4	0.06	0.0	15	0.19	0.0	--	0	0.0	39	0.49	0.0
Total Anions		229.81	100.0		1,032.27	100.0		139.28	100.0		3,480.58	100.0
TDS (measured)	14,000			61,400			8,590			191,000		
Sodium plus Potassium:			56.1			53.9			50.6			94.6
Cacium plus Magnesium:			43.9			46.1			49.4			5.4
Sulfate plus Chloride:			96.2			98.9			97.0			99.8
Carbonate plus Bicarbonate:			3.2			0.8			3.0			0.2

Table 6. Yates Compromise SWD Water Quality Comparison, October 4, 2016

		MW-1		MW-2			MW-3			SWD #1 (08/17/15)		
CATIONS	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%
Sodium	7,800	339.28	60.0	14,000	608.96	59.6	1,700	73.95	51.3	73,000	3175.29	94.1
Potassium	14.0	0.36	0.1	22	0.56	0.1	4.3	0.11	0.1	580	14.83	0.4
Calcium	730	36.43	6.4	520	25.95	2.5	680	33.93	23.5	2,700	134.73	4.0
Magnesium	2,300	189.30	33.5	4,700	386.83	37.8	440	36.21	25.1	580	47.74	1.4
Total Cations		565.36	100.0		1022.30	100.0		144.20	100.0		3,372.59	100.0
ANIONS												
Sulfate	7,500	156.15	29.2	29,000	603.79	52.4	3,300	68.71	46.1	4,300	89.53	2.6
Chloride	13,000	366.71	68.7	19,000	535.97	46.5	2,700	76.16	51.1	120,000	3385.05	97.3
Bicarbonate	487.6	9.75	1.8	400	8.00	0.7	214.4	4.29	2.9	276	5.52	0.2
Carbonate	--	0	0.0	0	0	0.0	--	0	0.0	--	0	0.0
Nitrate	17	1.21	0.2	43	3.07	0.3	--	0	0.0	--	0	0.0
Fluoride	--	0	0.0	8.8	0.46	0.0	--	0	0.0	--	0	0.0
Bromide	10	0.13	0.0	12	0.15	0.0	0.7	0	0.0	39	0.49	0.0
Total Anions		533.96	100.0		1,151.44	100.0		149.16	100.0		3,480.58	100.0
TDS (measured)	31,200			63,700			9,580			191,000		
Sodium plus Potassium:			60.1			59.6			51.4			94.6
Cacium plus Magnisum:			39.9			40.4			48.6			5.4
Sulfate plus Chloride:			97.9			99.0			97.1			99.8
Carbonate plus Bicarbonate:			1.8			0.7			2.9			0.2

Table 7. Yates Compromise SWD Water Quality Comparison, December 13, 2016

		MW-1		MW-2			MW-3			SWD #1 (08/17/15)		
CATIONS	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%
Sodium	6,400	278.38	58.9	13,000	565.46	58.1	1,600	69.60	48.3	73,000	3175.29	94.1
Potassium	11.0	0.28	0.1	18	0.46	0.05	3.9	0.10	0.1	580	14.83	0.4
Calcium	760	37.92	8.0	580	28.94	3.0	750	37.43	26.0	2,700	134.73	4.0
Magnesium	1,900	156.38	33.1	4,600	378.60	38.9	450	37.04	25.7	580	47.74	1.4
Total Cations		472.97	100.0		973.47	100.0		144.16	100.0		3,372.59	100.0
ANIONS												
Sulfate	9,000	187.38	31.6	23,000	478.87	52.4	3,000	62.46	44.6	4,300	89.53	2.6
Chloride	14,000	394.92	66.5	15,000	423.13	46.3	2,600	73.34	52.4	120,000	3385.05	97.3
Bicarbonate	446.0	8.92	1.5	404.6	8.09	0.9	212.2	4.24	3.0	276	5.52	0.2
Carbonate	--	0	0.0	0	0	0.0	--	0	0.0	--	0	0.0
Nitrate	32	2.28	0.4	48	3.43	0.4	--	0	0.0	--	0	0.0
Fluoride	--	0	0.0	--	0	0.0	--	0	0.0	--	0	0.0
Bromide	8.6	0.11	0.0	11	0.14	0.0	--	0	0.0	39	0.49	0.0
Total Anions		593.62	100.0		913.65	100.0		140.05	100.0		3,480.58	100.0
TDS (measured)	29,000			62,300			9,400			191,000		
Sodium plus Potassium:			58.9			58.1			48.3			94.6
Cacium plus Magnesium:			41.1			41.9			51.7			5.4
Sulfate plus Chloride:			98.1			98.7			97.0			99.8
Carbonate plus Bicarbonate:			1.5			0.9			3.0			0.2

Ms. Amber Griffin
May 22, 2017

2016 Report Figures

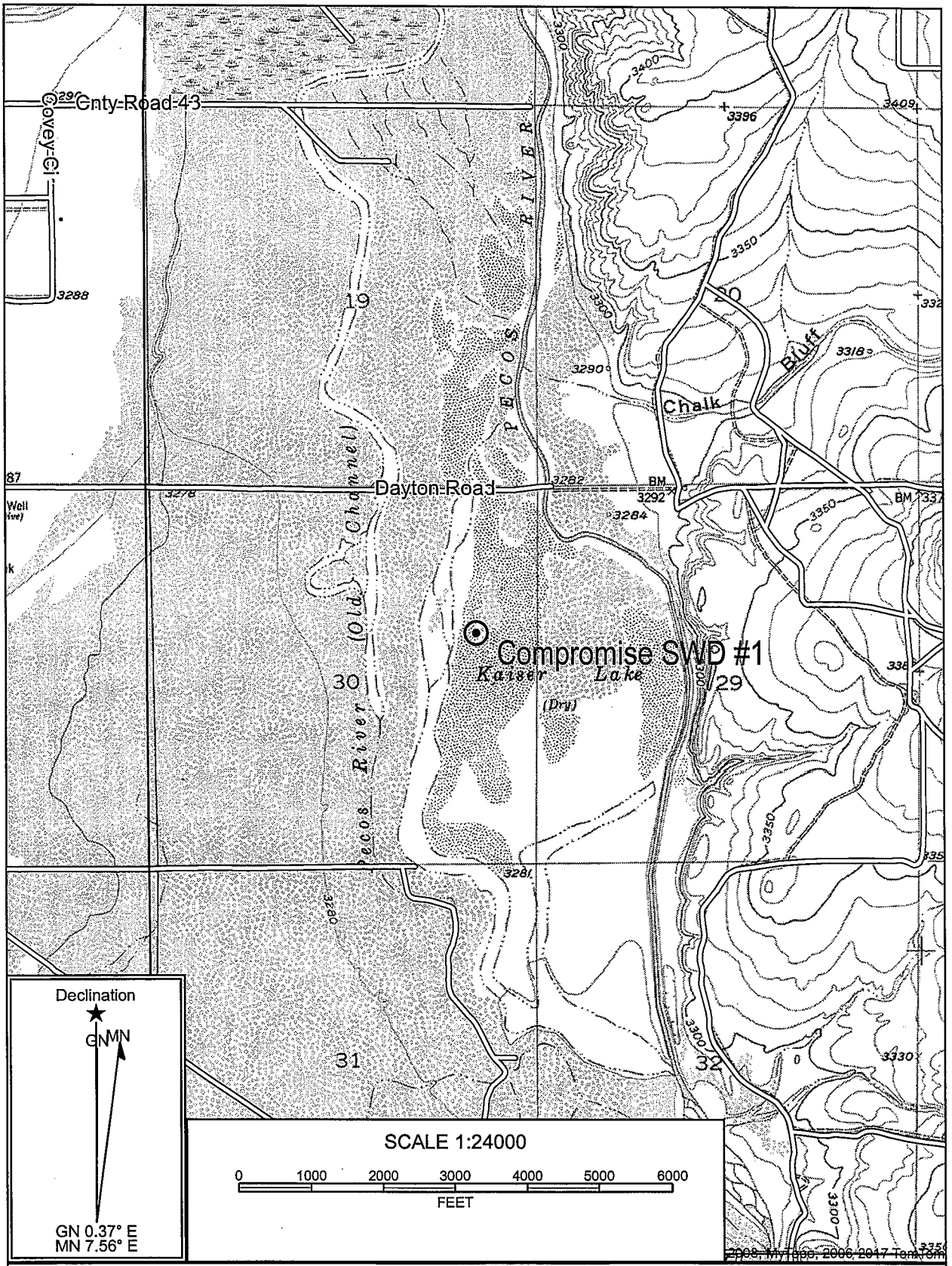
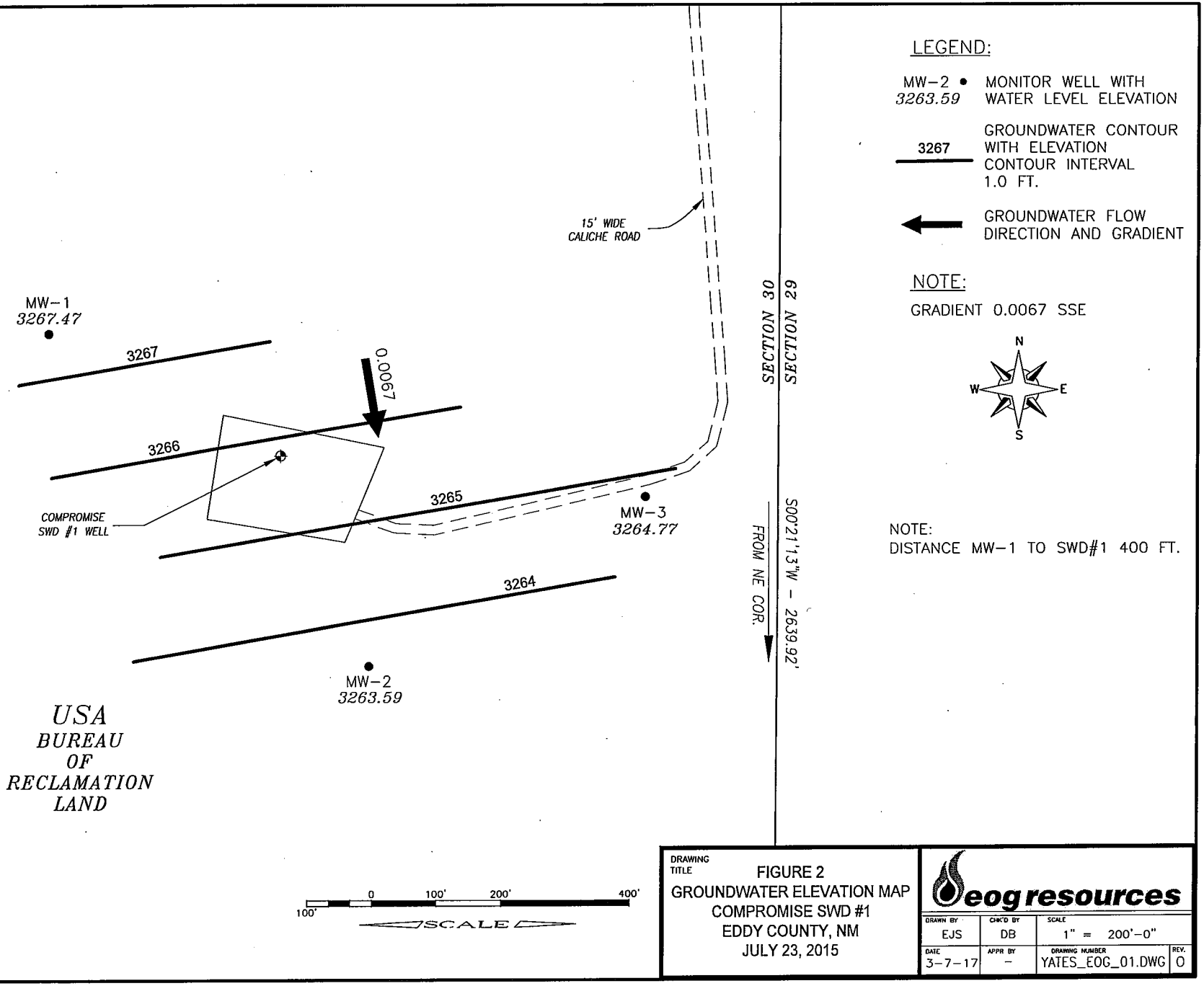


Figure 1. Location Map, Compromise SWD #1
Township 18 South, Range 27 East
Eddy County, New Mexico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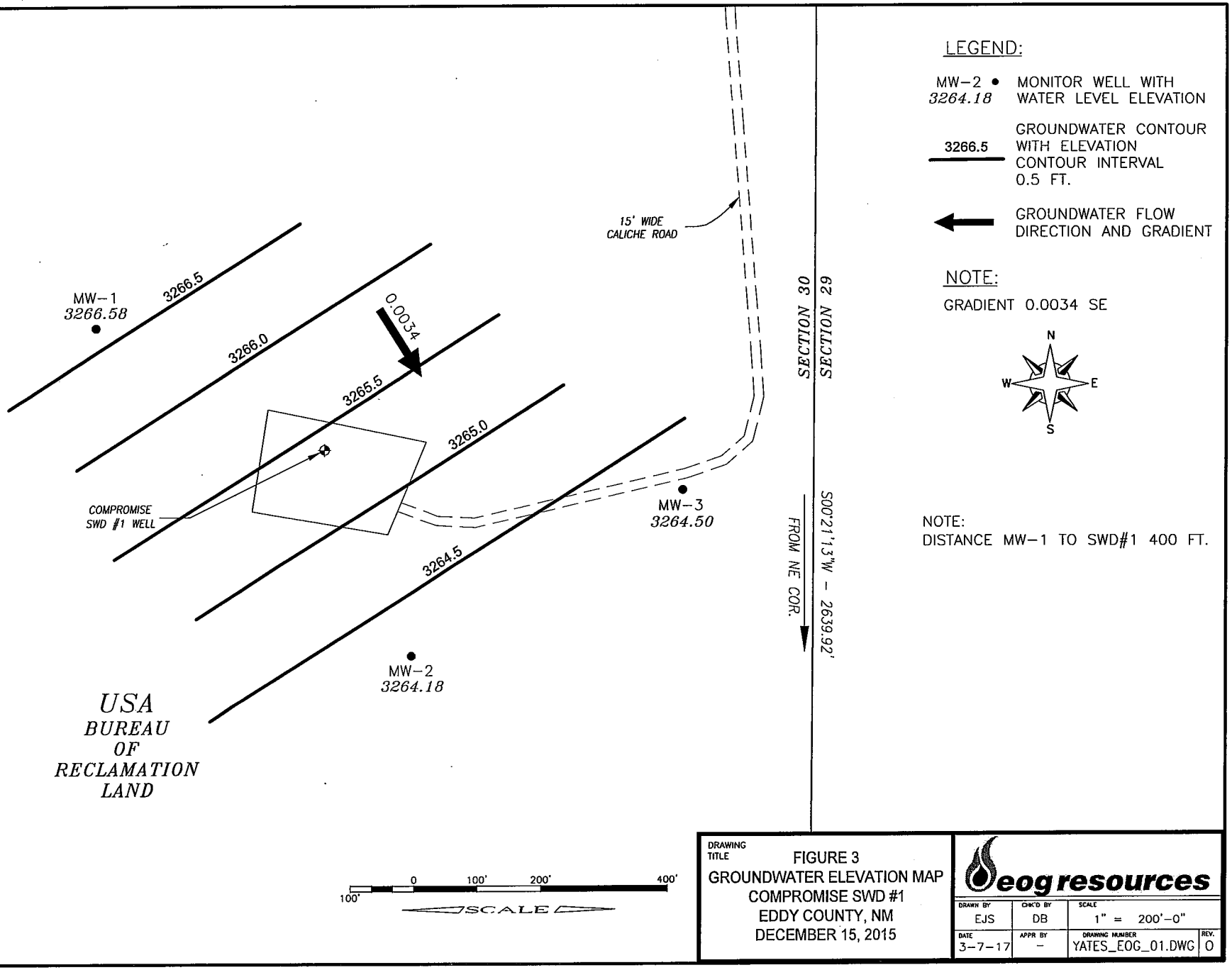
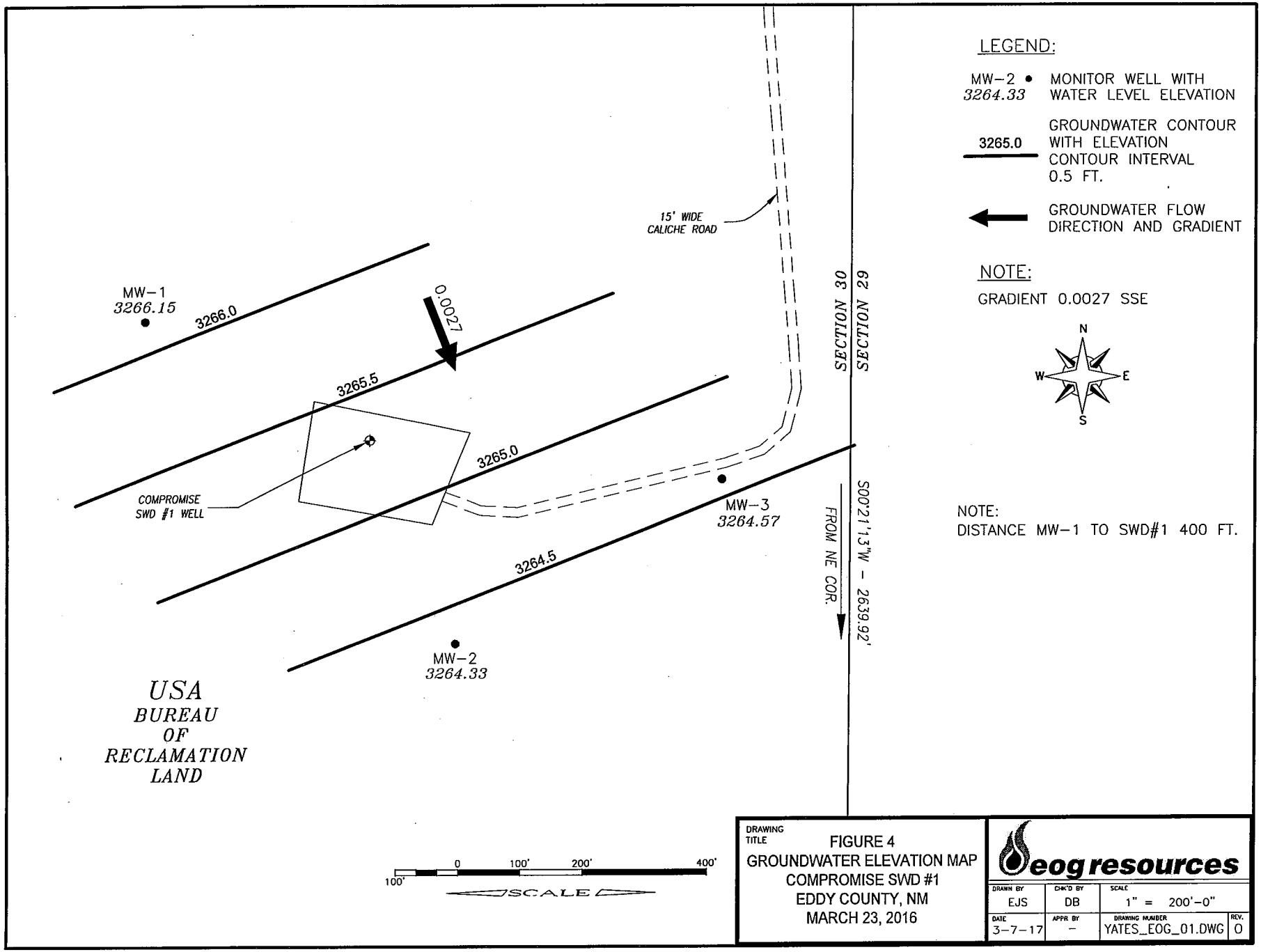
MW–2 • 3263.59 MONITOR WELL WITH WATER LEVEL ELEVATION
3267 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 1.0 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
NOTE:
GRADIENT 0.0067 SSE
NOTE:
DISTANCE MW–1 TO SWD#1 400 FT.
15' WIDE CALICHE ROAD
MW–1 3267.47
3267
3266
3265
3264
0.0067
COMPROMISE SWD #1 WELL
MW–3 3264.77
MW–2 3263.59
SECTION 30
SECTION 29
S00°21'13"W – 2639.92'
FROM NE COR.
USA BUREAU OF RECLAMATION LAND
0 100' 200' 400'
100'
SCALE
DRAWING TITLE
FIGURE 2
GROUNDWATER ELEVATION MAP
COMPROMISE SWD #1
EDDY COUNTY, NM
JULY 23, 2015
eog resources
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 200'–0"
DATE 3–7–17
APPR BY –
DRAWING NUMBER YATES_EOG_01.DWG
REV. 0


LEGEND:
MW-2 • 3264.18 MONITOR WELL WITH WATER LEVEL ELEVATION
3266.5 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.5 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
NOTE:
GRADIENT 0.0034 SE
N
W
E
S
NOTE:
DISTANCE MW-1 TO SWD#1 400 FT.
15' WIDE CALICHE ROAD
SECTION 30
SECTION 29
S00°21'13"W - 2639.92'
FROM NE COR.
MW-1
3266.58
3266.5
3266.0
3265.5
3265.0
3264.5
0.0034
COMPROMISE SWD #1 WELL
MW-3
3264.50
MW-2
3264.18
USA
BUREAU
OF
RECLAMATION
LAND
0
100'
200'
400'
100'
SCALE
DRAWING TITLE
FIGURE 3
GROUNDWATER ELEVATION MAP
COMPROMISE SWD #1
EDDY COUNTY, NM
DECEMBER 15, 2015
eog resources
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 200'-0"
DATE 3-7-17
APP'R BY -
DRAWING NUMBER YATES_EOG_01.DWG
REV. 0


LEGEND:
MW-2 • 3264.33 MONITOR WELL WITH WATER LEVEL ELEVATION
3265.0 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.5 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
NOTE:
GRADIENT 0.0027 SSE
N
W
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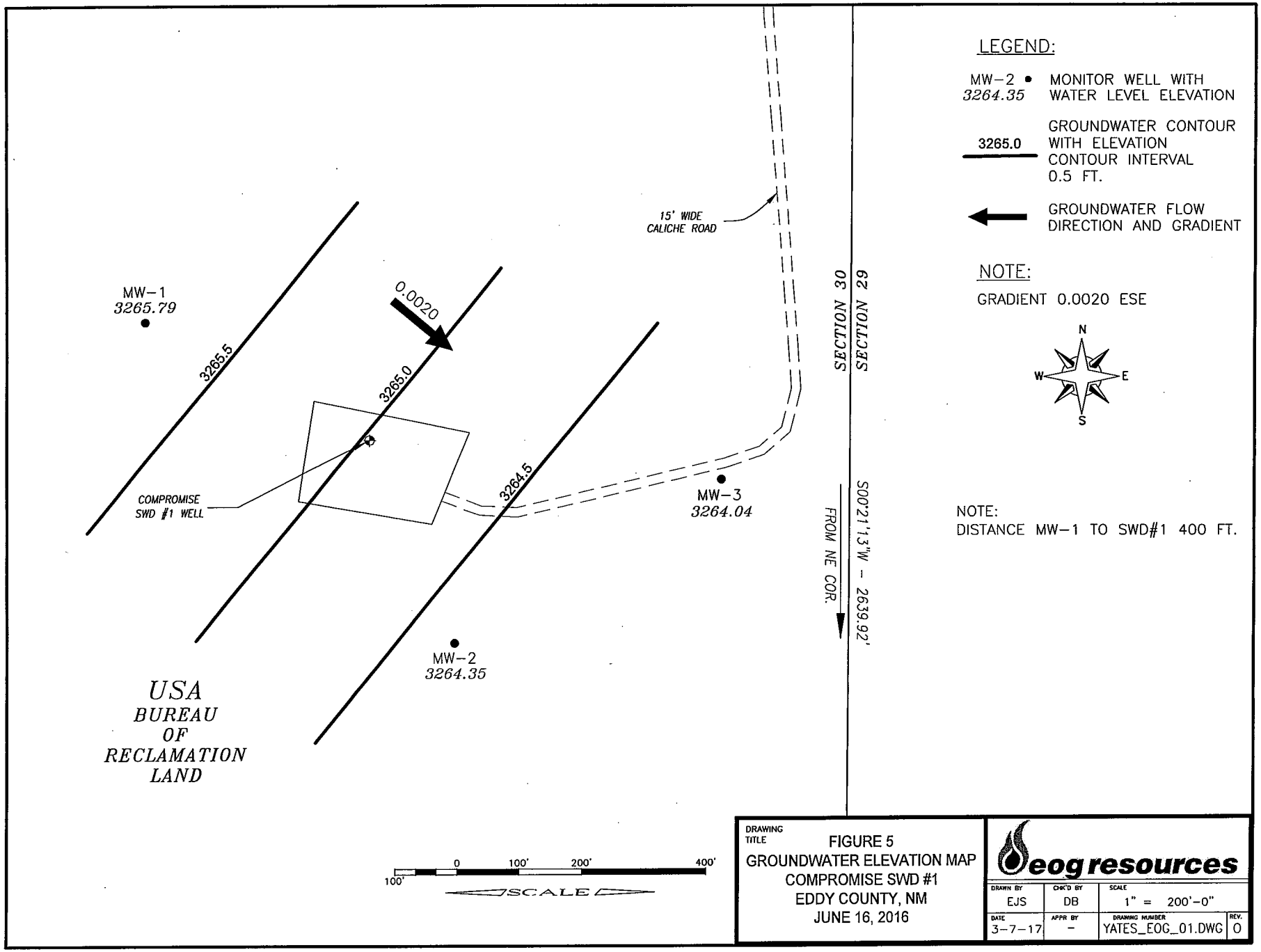
S
NOTE:
DISTANCE MW-1 TO SWD#1 400 FT.
15' WIDE CALICHE ROAD
MW-1 3266.15
3266.0
0.0027
3265.5
3265.0
COMPROMISE SWD #1 WELL
MW-3 3264.57
3264.5
MW-2 3264.33
SECTION 30
SECTION 29
S00°21'13"W - 2639.92'
FROM NE COR.
USA BUREAU OF RECLAMATION LAND
0 100' 200' 400'
100'
SCALE
DRAWING TITLE
FIGURE 4
GROUNDWATER ELEVATION MAP
COMPROMISE SWD #1
EDDY COUNTY, NM
MARCH 23, 2016
eog resources
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 200'-0"
DATE 3-7-17
APPR BY -
DRAWING NUMBER YATES_EOG_01.DWG
REV. 0


LEGEND:
MW-2 • 3264.35 MONITOR WELL WITH WATER LEVEL ELEVATION
3265.0 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.5 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
NOTE:
GRADIENT 0.0020 ESE
N
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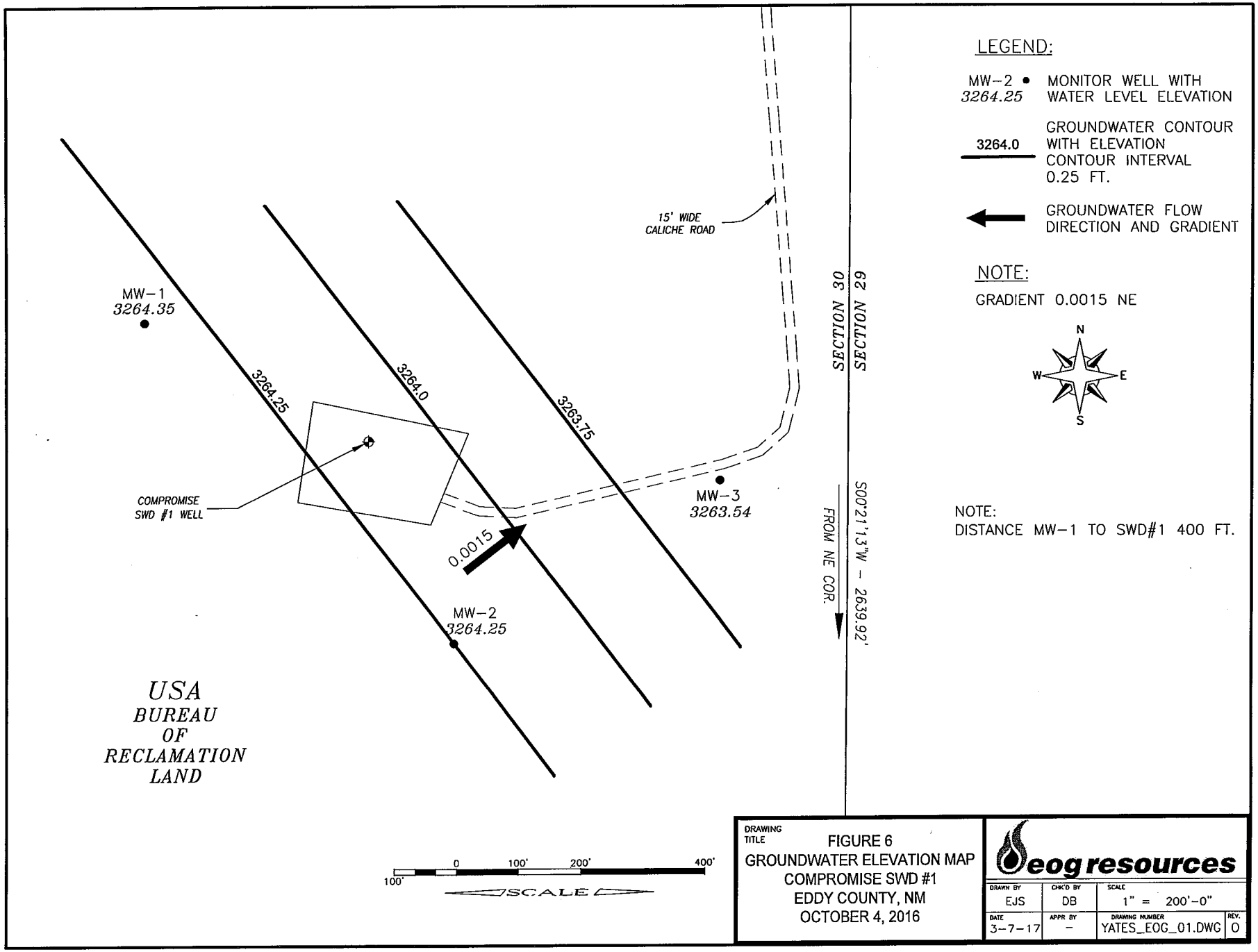
S
NOTE:
DISTANCE MW-1 TO SWD#1 400 FT.
15' WIDE CALICHE ROAD
SECTION 30
SECTION 29
MW-1 3265.79
MW-2 3264.35
MW-3 3264.04
0.0020
3265.5
3265.0
3264.5
COMPROMISE SWD #1 WELL
S00°21'13"W - 2639.92'
FROM NE COR.
USA BUREAU OF RECLAMATION LAND
0 100' 200' 400'
100'
SCALE
DRAWING TITLE
FIGURE 5
GROUNDWATER ELEVATION MAP
COMPROMISE SWD #1
EDDY COUNTY, NM
JUNE 16, 2016
eog resources
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 200'-0"
DATE 3-7-17
APPR BY -
DRAWING NUMBER YATES_EOG_01.DWG
REV. 0


LEGEND:
MW-2 • 3264.25 MONITOR WELL WITH WATER LEVEL ELEVATION
3264.0 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.25 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
NOTE:
GRADIENT 0.0015 NE
NOTE:
DISTANCE MW-1 TO SWD#1 400 FT.
15' WIDE CALICHE ROAD
MW-1 3264.35
3264.25
3264.0
3263.75
COMPROMISE SWD #1 WELL
0.0015
MW-3 3263.54
MW-2 3264.25
SECTION 30
SECTION 29
S00°21'13"W - 2639.92'
FROM NE COR.
USA BUREAU OF RECLAMATION LAND
0 100' 200' 400'
100'
SCALE
DRAWING TITLE
FIGURE 6
GROUNDWATER ELEVATION MAP
COMPROMISE SWD #1
EDDY COUNTY, NM
OCTOBER 4, 2016
eog resources
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 200'-0"
DATE 3-7-17
APPR BY -
DRAWING NUMBER YATES_EOG_01.DWG
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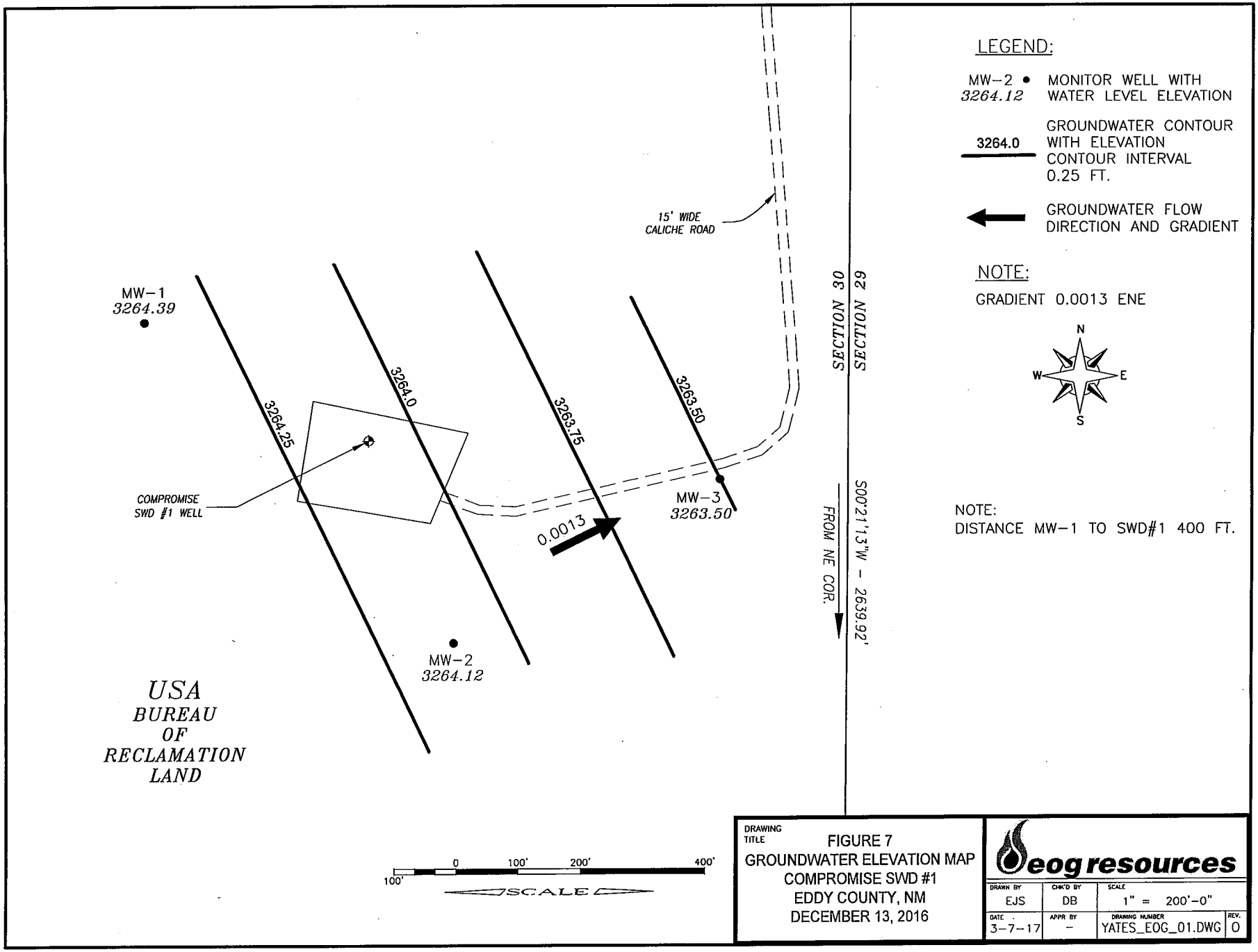
LEGEND:
MW-2 • 3264.12 MONITOR WELL WITH WATER LEVEL ELEVATION
3264.0 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.25 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
NOTE:
GRADIENT 0.0013 ENE
N
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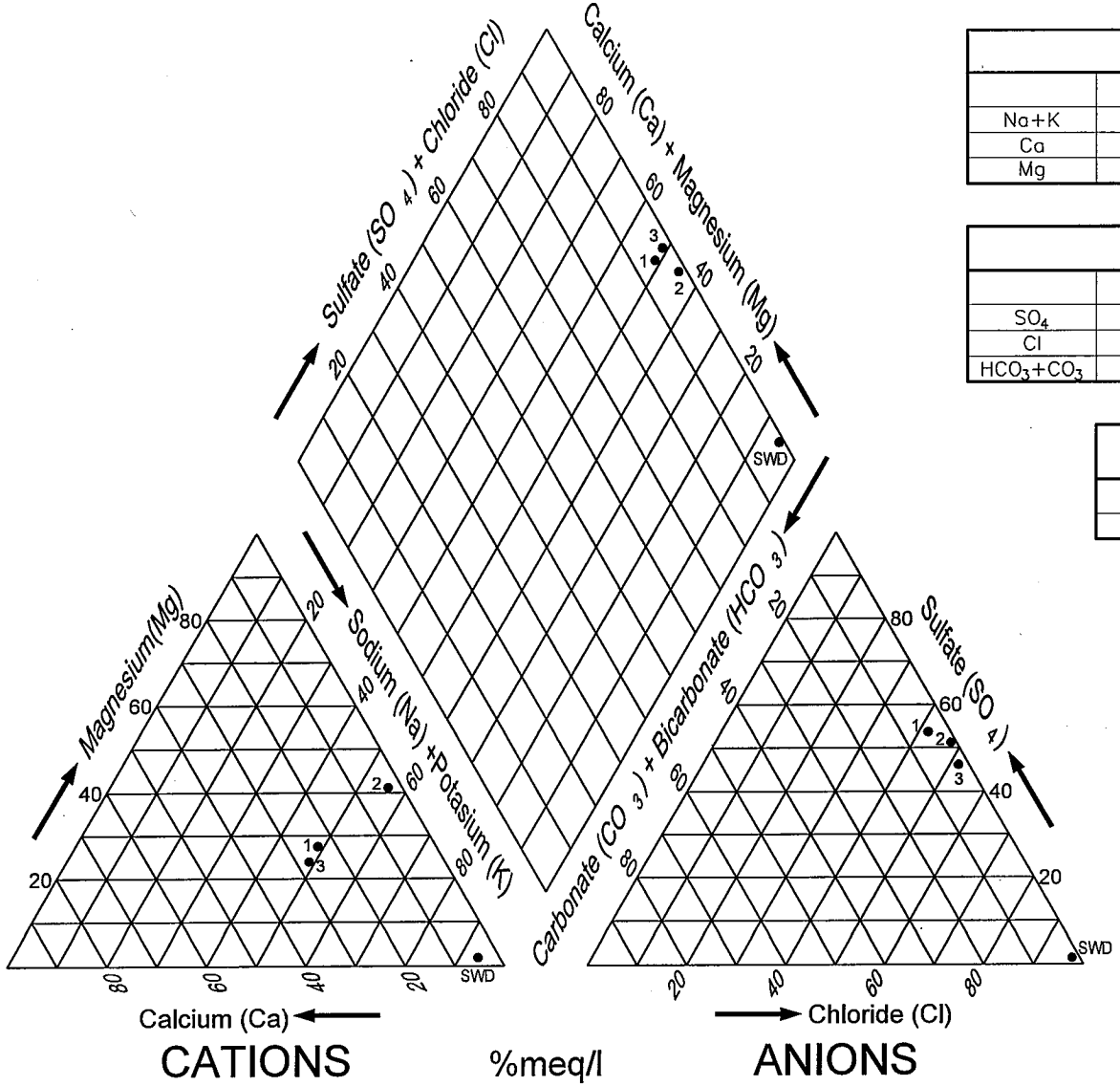
S
NOTE:
DISTANCE MW-1 TO SWD#1 400 FT.
15' WIDE CALICHE ROAD
SECTION 30
SECTION 29
MW-1 3264.39
3264.25
3264.0
3263.75
3263.50
COMPROMISE SWD #1 WELL
MW-3 3263.50
0.0013
MW-2 3264.12
S00°21'13"W - 2639.92'
FROM NE COR.
USA BUREAU OF RECLAMATION LAND
100' 0 100' 200' 400'
SCALE
DRAWING TITLE
FIGURE 7
GROUNDWATER ELEVATION MAP
COMPROMISE SWD #1
EDDY COUNTY, NM
DECEMBER 13, 2016
eog resources
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 200'-0"
DATE 3-7-17
APPR BY -
DRAWING NUMBER YATES_EOG_01.DWG
REV. 0



CATIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
Na+K	49.1	55.3	49.0	94.6
Ca	22.5	3.0	26.7	4.0
Mg	28.4	41.8	24.3	1.4

ANIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
SO_4	53.4	52.5	46.9	2.6
Cl	40.7	46.5	50.1	97.3
HCO_3+CO_3	5.4	0.8	2.9	0.2

TDS (mg/L)			
MW-1	MW-2	MW-3	SWD#1
8,130	64,900	8,790	191,000

NOTE:
SWD#1 SAMPLING 08/17/15

DRAWING TITLE
FIGURE 8
CATION/ANION PERCENTAGES
COMPROMISE SWD #1
EDDY COUNTY, NM
JULY 23, 2015

eog resources

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	NONE	
DATE	APPR BY	DRAWING NUMBER	REV.
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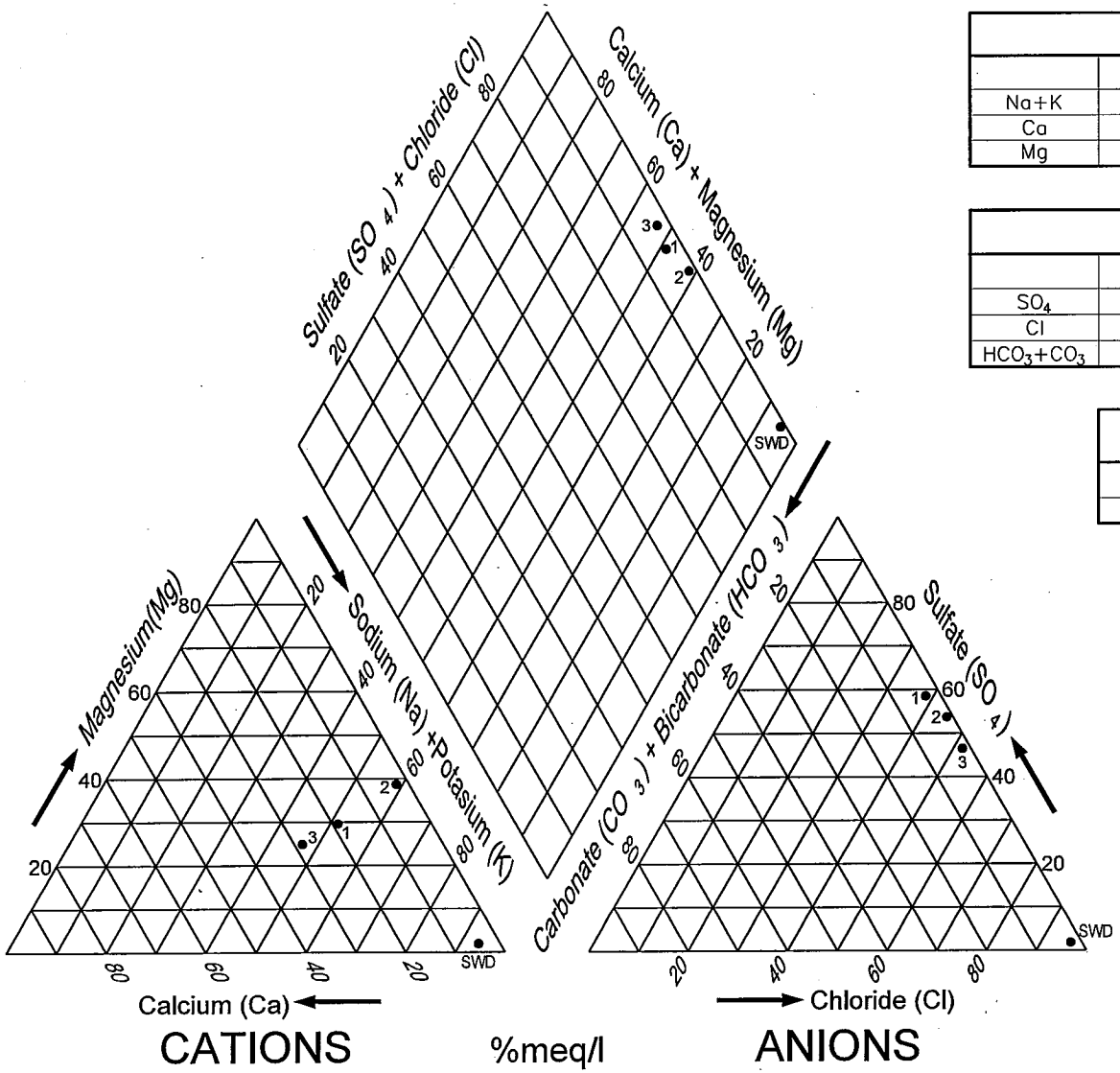


CATIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
Na+K	50.4	59.2	46.6	94.6
Ca	19.8	2.4	28.8	4.0
Mg	29.7	38.4	24.6	1.4

ANIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
SO_4	57.2	53.3	45.1	2.6
Cl	37.9	45.8	52.1	97.3
HCO_3+CO_3	4.2	0.7	2.8	0.2

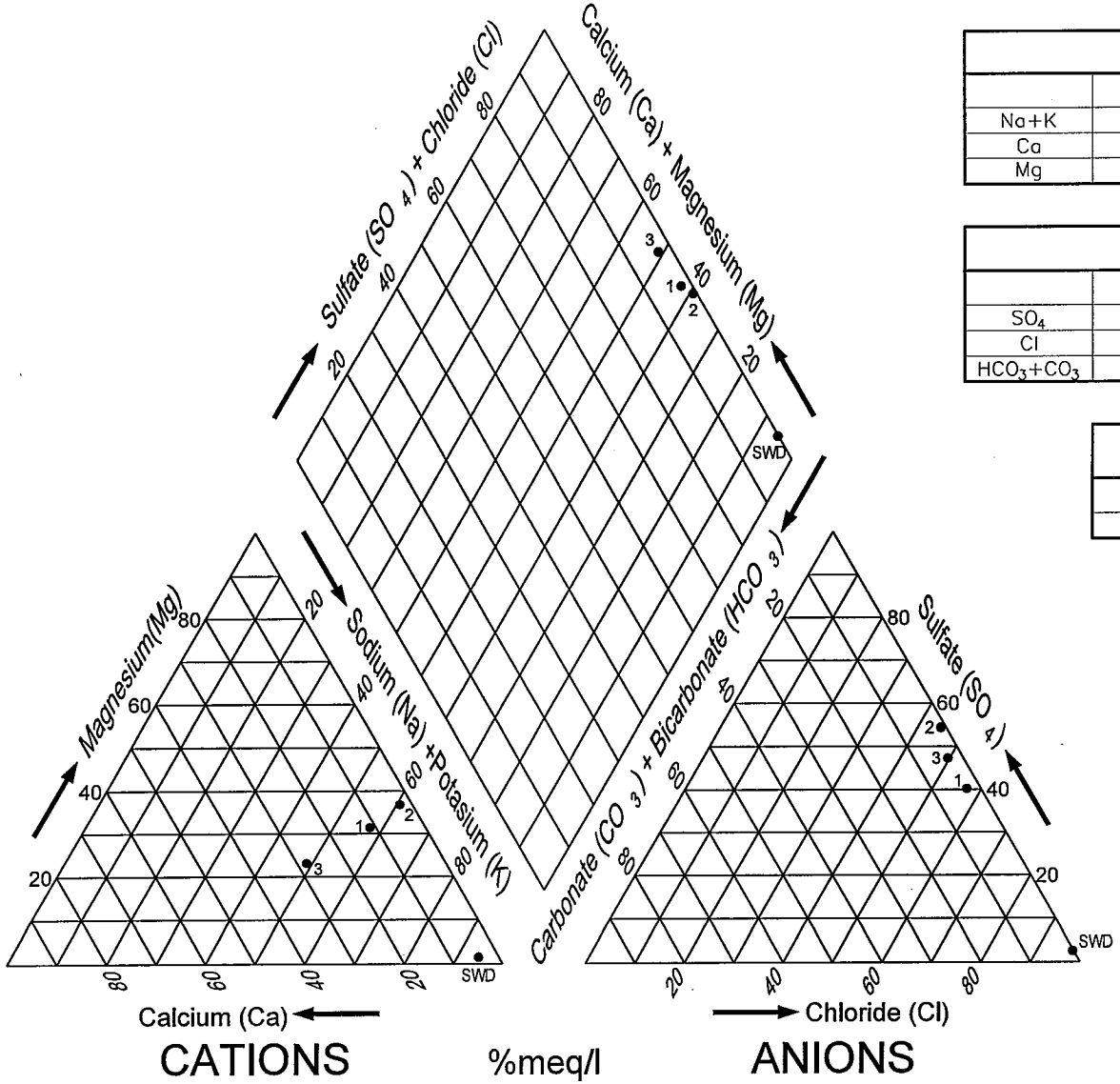
TDS (mg/L)			
MW-1	MW-2	MW-3	SWD#1
10,000	65,500	9,370	191,000

NOTE:
SWD#1 SAMPLING 08/17/15

DRAWING TITLE
FIGURE 9
CATION/ANION PERCENTAGES
COMPROMISE SWD #1
EDDY COUNTY, NM
DECEMBER 15, 2015

eog resources

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	NONE	
DATE	APPR BY	DRAWING NUMBER	REV.
3-7-17	-	YATES_EOG_01.DWG	0



CATIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
Na+K	57.4	60.7	48.9	94.6
Ca	11.2	2.5	28.0	4.0
Mg	31.4	36.8	23.1	1.4

ANIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
SO_4	40.2	54.3	47.3	2.6
Cl	57.0	44.7	49.6	97.3
HCO_3+CO_3	2.3	0.8	3.0	0.2

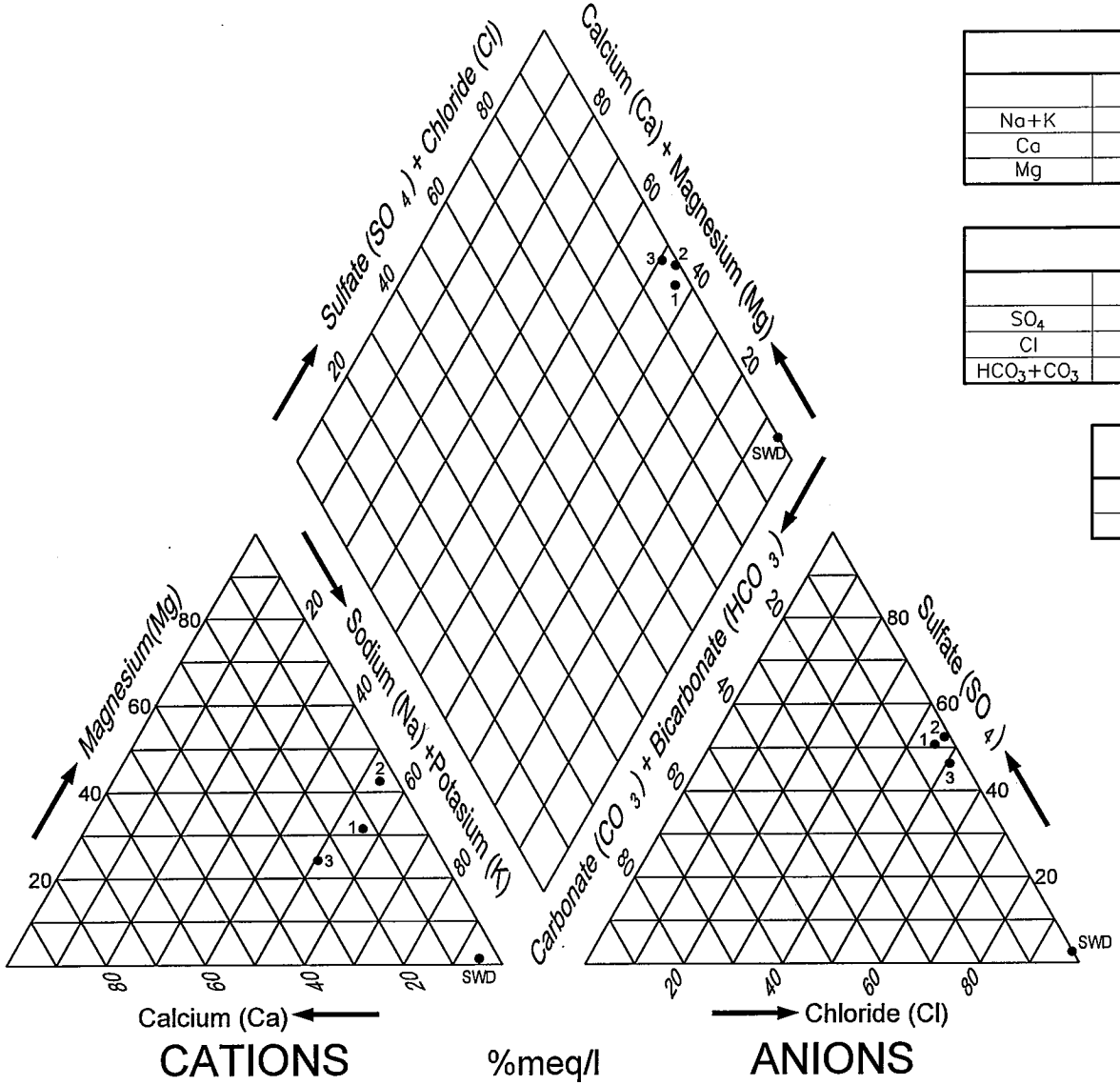
TDS (mg/L)			
MW-1	MW-2	MW-3	SWD#1
22,900	66,500	8,600	191,000

NOTE:
SWD#1 SAMPLING 08/17/15

DRAWING TITLE
FIGURE 10
CATION/ANION PERCENTAGES
COMPROMISE SWD #1
EDDY COUNTY, NM
MARCH 23, 2016

eog resources

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	NONE	
DATE	APPR BY	DRAWING NUMBER	REV.
3-7-17	-	YATES_EOG_01.DWG	0



CATIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
Na+K	56.1	53.9	50.6	94.6
Ca	12.5	3.6	25.2	4.0
Mg	31.5	42.5	24.2	1.4

ANIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
SO_4	50.7	52.4	46.3	2.6
Cl	45.4	46.5	50.6	97.3
HCO_3+CO_3	3.2	0.8	3.0	0.2

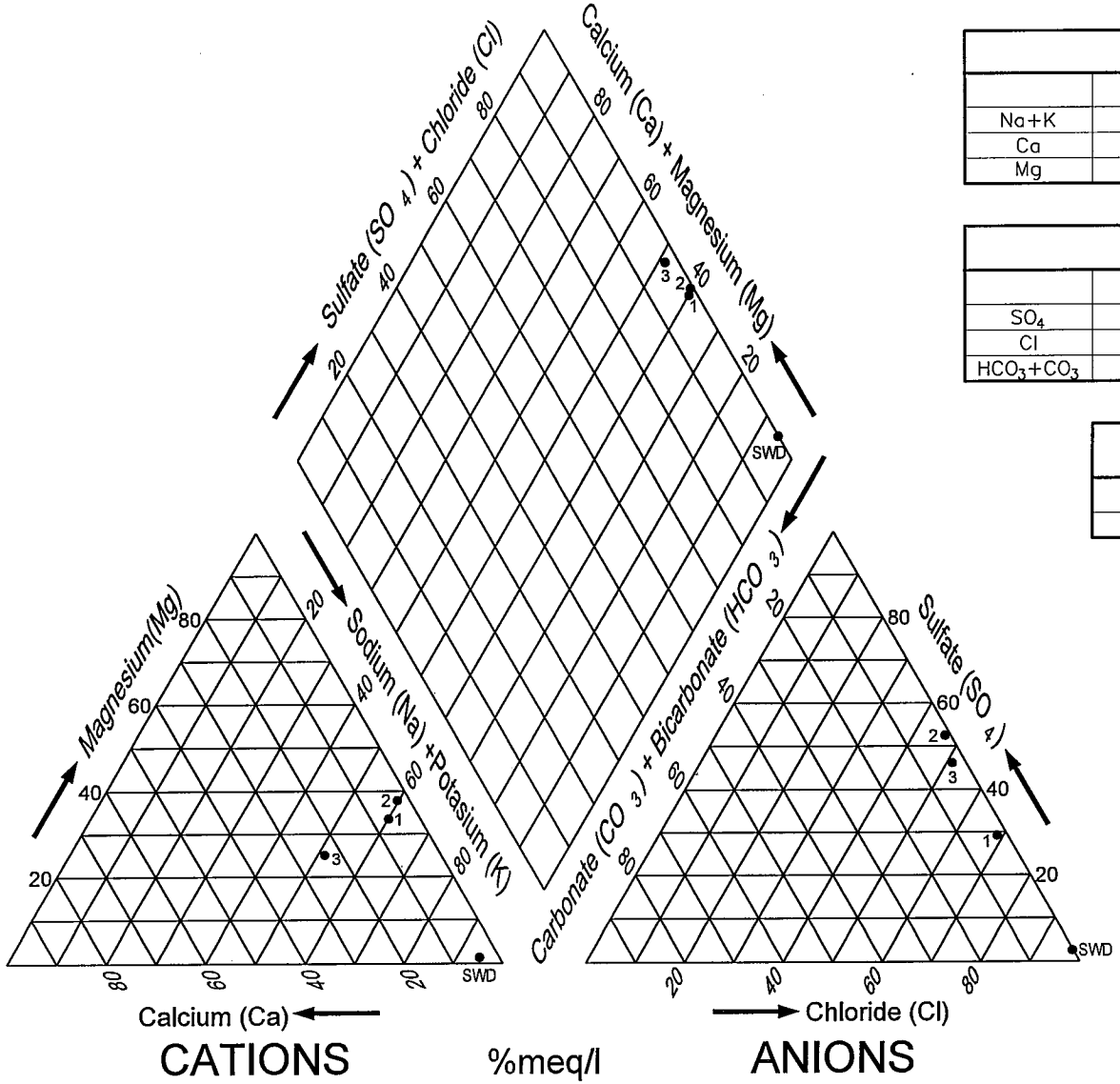
TDS (mg/L)			
MW-1	MW-2	MW-3	SWD#1
14,000	61,400	8,590	191,000

NOTE:
SWD#1 SAMPLING 08/17/15

DRAWING TITLE
FIGURE 11
CATION/ANION PERCENTAGES
COMPROMISE SWD #1
EDDY COUNTY, NM
JUNE 16, 2016

eog resources

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	NONE	
DATE	APPR BY	DRAWING NUMBER	REV.
3-7-17	-	YATES_EOG_01.DWG	0



CATIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
Na+K	60.1	59.6	51.4	94.6
Ca	6.4	2.5	23.5	4.0
Mg	33.5	37.8	25.1	1.4

ANIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
SO_4	29.2	52.4	46.1	2.6
Cl	68.7	46.5	51.1	97.3
HCO_3+CO_3	1.8	0.7	2.9	0.2

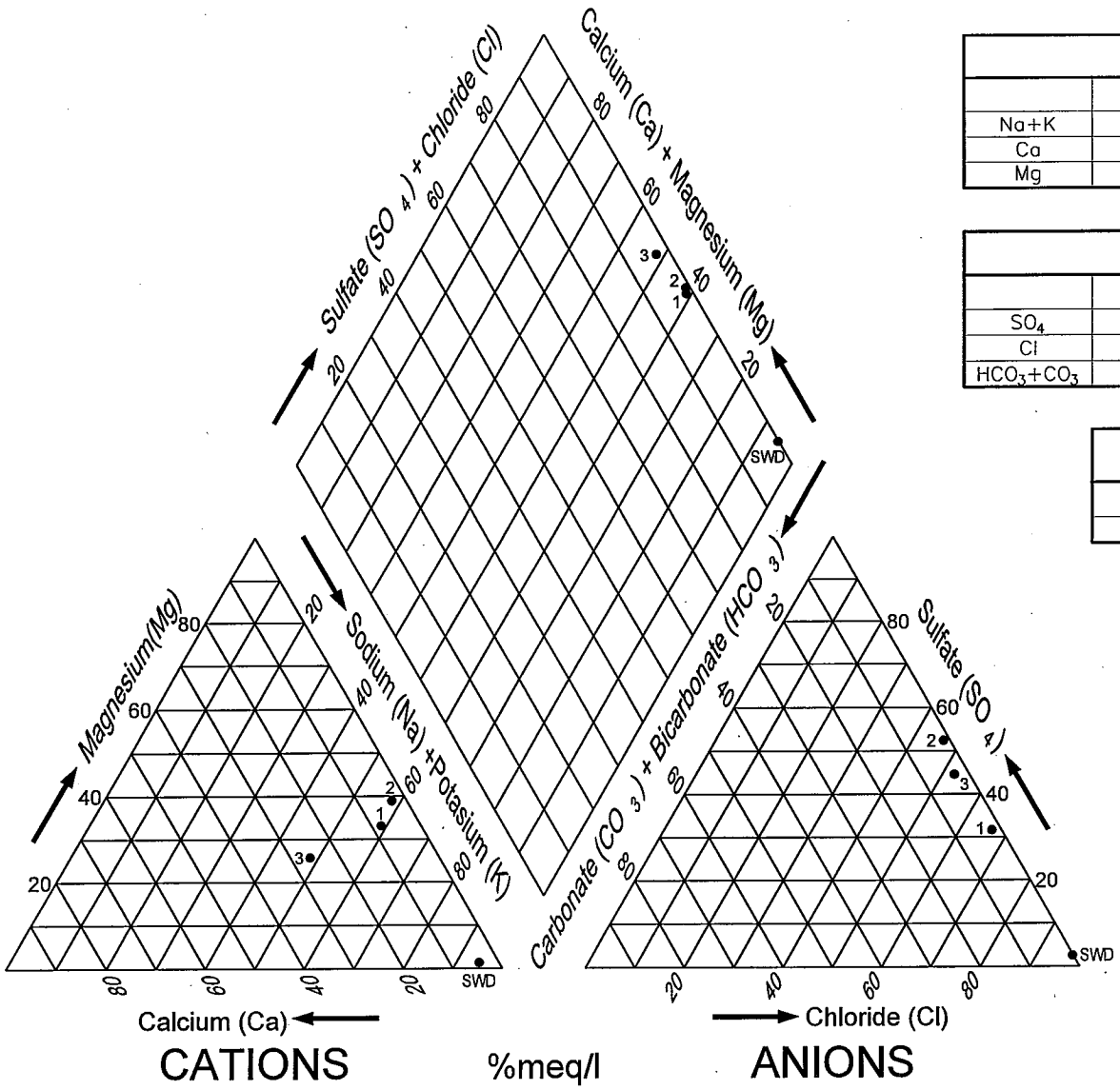
TDS (mg/L)			
MW-1	MW-2	MW-3	SWD#1
31,200	63,700	9,580	191,000

NOTE:
SWD#1 SAMPLING 08/17/15

DRAWING TITLE
FIGURE 12
CATION/ANION PERCENTAGES
COMPROMISE SWD #1
EDDY COUNTY, NM
OCTOBER 4, 2016

eog resources

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	NONE	
DATE	APPR BY	DRAWING NUMBER	REV.
3-7-17	-	YATES_EOG_01.DWG	0



CATIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
Na+K	58.9	58.1	48.3	94.6
Ca	8.0	3.0	26.0	4.0
Mg	33.1	38.9	25.7	1.4

ANIONS (%)				
	MW-1	MW-2	MW-3	SWD#1
SO_4	31.6	52.4	44.6	2.6
Cl	66.5	46.3	52.4	97.3
HCO_3+CO_3	1.5	0.9	3.0	0.2

TDS (mg/L)			
MW-1	MW-2	MW-3	SWD#1
29,000	62,300	9,400	191,000

NOTE:
SWD#1 SAMPLING 08/17/15

DRAWING TITLE
FIGURE 13
CATION/ANION PERCENTAGES
COMPROMISE SWD #1
EDDY COUNTY, NM
DECEMBER 13, 2016

eog resources

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	NONE	
DATE	APPR BY	DRAWING NUMBER	REV.
3-7-17	–	YATES_EOG_01.DWG	0