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REPORT OF PERCHED AQUIFER EVALUATION AND FUTURE CORRECTIVE ACTION RECOMMENDATIONS
FORMER SURFACE IMPOUNDMENTS
TRANSWESTERN COMPRESSOR STATION NO. 9
(ROSWELL COMPRESSOR STATION)
6381 NORTH MAIN STREET
ROSWELL, CHAVES COUNTY, NEW MEXICO
NMOCD GW-052
NMED 1656; EPA ID NMD986676955

PREPARED FOR:

TRANSWESTERN PIPELINE COMPANY, LLC
1300 MAIN
HOUSTON, TEXAS 77002

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EarthCon Project No. 02.20180005.00

June 2021

Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations
Former Surface Impoundments
Transwestern Compressor Station No. 9
(Roswell Compressor Station)
6381 North Main Street
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Prepared For:

Transwestern Pipeline Company, LLC
1300 Main
Houston, TX 77002

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EarthCon Consultants, Inc. (EarthCon) is submitting to Transwestern Pipeline Company, LLC (Transwestern) this *Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* for the Roswell Compressor Station in Roswell, Chaves County, New Mexico. This report has been prepared for the exclusive use of and reliance by Transwestern and may not be relied upon by any other person or entity without the express written authorization of EarthCon.

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1.0 INTRODUCTION

This *Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* was prepared by EarthCon Consultants, Inc. (EarthCon) on behalf of Transwestern Pipeline Company, LLC (Transwestern) to summarize the results of a perched aquifer evaluation and evaluate future corrective actions associated with the Former Surface Impoundments at the Transwestern Compressor Station No. 9 (also known as the Roswell Compressor Station) property, located at 6381 North Main Street in Roswell, New Mexico (the "Site"). Historic reports indicate the potential for perched aquifer conditions intersecting the soil vapor extraction (SVE) wells and RW-1, all of which are located on the Transwestern site near the former surface impoundments.

The Facility is an active natural gas compressor station, owned and operated by Transwestern, located approximately 8 miles north of the city center of Roswell, New Mexico along the eastern side of U.S. Highway 285. The Facility occupies approximately 77 acres of land in Section 21 (SW¼ of the SW¼) and Section 28 (NW¼ of the NW¼) of Township 9S and Range 24E, Chaves County, New Mexico (**Figure 1-1**). Access is via U.S. Highway 285, and the entire Facility is secured by a chain-link fence with locked gates. The Project Area encompasses a portion of the northeast corner of the Facility and a portion of a 40-acre easement of land to the northeast, leased from the New Mexico State Land Office (SLO) State Trust Land for remediation and monitoring purposes (**Figure 1-2**).

Comment 4 of the NMED's *Approval with Modifications Laboratory Results Submittal for SVE and RW-1 Wells and Additional Laboratory Results for SVE and RW-1 Wells*, dated February 21, 2020, requires a report that summarizes the results of the perched zone evaluation. Further, Comment 1 of the NMED's *Additional Response to Comments* 10/14/2020, dated April 9, 2021, requests a standalone report evaluating and recommending corrective action for the perched aquifer.

2.0 PERCH AQUIFER EVALUATION

According to historical groundwater gauging data, field personnel observed the presence of water at depths between 28 feet below ground surface (bgs) and 35 feet bgs in certain soil vapor extraction (SVE) wells, while other SVE wells remained dry. Two of the deepest wells in the perched aquifer, RW-1 and SVE-30, are both over 41 ft BTOC with measurable groundwater. Wells SVE-23 and SVE-28 are each approximately 36 ft BTOC and typically have measurable

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groundwater, including the year 2020. Wells SVE-25, SVE-27 and SVE-31, the shallowest wells in the perched aquifer (approximately 33 ft BTOC) often do not have water, and SVE-25 and SVE-27 were dry in 2020.

Boring logs developed for SVE, and the deeper multiphase extraction (MPE) wells were reviewed, which did not note a distinct water bearing zone between the surface and 50 feet bgs. In the MPE wells, groundwater was reported to be approximately 60 feet bgs. Considering the presence and absence (dry) of groundwater in certain SVE wells at various times and the construction depth of these wells, it was suspected that a combination of rainwater and condensate buildup within the SVE piping conveyance network could be back flowing and contributing to the water that was being observed in certain SVE wells. Further investigation was performed in the field to identify the source of the water in the SVE wells.

Further review of the suspected perch aquifer was conducted by recovering water from RW-1 until dry and monitoring rebound over time. Beginning in April 2020, groundwater was extracted from recovery well RW-1 to evaluate the perched aquifer. However, the extraction process was deactivated after a short period due to groundwater volumes unexpectedly reaching the storage tank capacity, and the evaluation was suspended pending further review of the process and results.

The evaluation of the perched aquifer in RW-1 resumed on September 23, 2020, and continued to October 20, 2020. Prior to installing a pump, the groundwater level was measured as 33.55 feet below top of casing (btoc). The pump inlet was lowered to approximately 38 feet btoc and the pump recovered groundwater at an average rate of approximately 0.16 gallons per minute during the evaluation period. Groundwater levels were measured daily in RW-1 to evaluate recharge of the well. According to liquid levels, the groundwater was drawn down to approximately 37.5 feet before stabilizing. The pump was deactivated, and groundwater recharged at a rate of approximately 0.2 feet per day. Based on pump evaluation on RW-1 and historical groundwater gauging data in SVE wells, a perch aquifer may exist in this portion of the site.

Further review of historical documents revealed that an initial field site assessment performed in 1991 reported the presence of a perched aquifer which intersected wells SVE-23, SVE-25, SVE-27, SVE-28, SVE-30, SVE-31, and RW-1. A summary of construction information for wells in the perched aquifer is provided in **Table 2-1**, and groundwater elevations for wells in the perched aquifer are shown in **Table 2-2**.

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2.1 PSH Thickness

Liquid levels were measured in SVE wells and RW-1 using an optical interface probe to determine the presence and apparent thickness of PSH (phase separated hydrocarbons). According to historical liquid levels, SVE-23 was the only well to consistently contain PSH; however, recently, PSH has been observed in SVE-25 in November 2020 after 11 years of no detections. The apparent thickness of 3.0 feet and 0.10 foot was measured in SVE-23 and SVE-25 in April 2021, respectively. Distribution of PSH apparent thickness is presented in **Figures 2-2a** and **2-2b**. Further PSH monitoring will continue for SVE-23 and SVE-25 in 2021.

2.2 Groundwater Analytical Results

Groundwater samples were collected and analyzed for BTEX by EPA method 8260 or for VOCs via EPA Method 8260B, and 1,4-dioxane was analyzed by EPA method 8270SIM in accordance with the approved *Sampling and Analysis Plan* (SAP). The analytical results for groundwater samples in the are summarized in **Table 3-1**. Wells in the perched aquifer that had measurable groundwater and did not contain PSH (i.e., RW-1, SVE-28, SVE-30, and SVE-31) were sampled. Wells SVE-23 and SVE-25 contained water and PSH, while SVE-27 was dry and did not have measurable PSH.

In summary, BTEX constituents were detected above laboratory reporting limits in wells SVE-28, SVE-30, and RW-1. Benzene exceeded the Groundwater Concentration Limit (GCL) in both SVE-30 and RW-1, and 1,1-DCA exceeded the GCL in SVE-30. Based on the 2020 analytical data, the areal distribution of BTEX, Benzene, and 1,1-DCA in the Perched Aquifer remains delineated within the Project Area boundaries and within the limits of the plume in the lower water bearing unit; as well as being consistent with the 2019 data for those wells (**Figures 3-1** through **3-3**).

3.0 FUTURE CORRECTIVE ACTION RECOMMENDATIONS

In correspondence dated July 2, 2020, and November 25, 2020, NMED requested that Transwestern suspend PSH recovery activities in SVE-23 and monitor PSH thickness over time. Transwestern recommends that PSH recovery via manual bailing be initiated immediately in SVE-23 and SVE-25 considering the overall corrective action objective for the site. It is apparent that LNAPL is present at recoverable thicknesses and PSH will be monitored for rebound after selected recovery event.

Since SVE-23 and most recently SVE-25 are the only wells in the Perched Aquifer to contain PSH, it is believed that the PSH appearances may be residual product that may have accumulated

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in those wells after source removal activities. Historical PSH measurements in wells located in the perched aquifer and upper aquifer indicate that the PSH footprint has stabilized or decreased.

Liquid levels and recovery data collected from bailing activities has been evaluated and the current remediation system is effective showing a decrease in BTEX, and 1,1-DCE concentrations. Due to the current results of the PSH plume and dissolved-phase concentrations, additional delineation does not appear warranted at this time.

4.0 REFERENCES

Roswell Shallow Subsurface Investigation by Harding Lawson Associates, June 20, 1991

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Table 2-1. Summary of Perched Aquifer Well Completion Details
Transwestern Compressor Station No. 9 - Roswell, NM

Well	Date of Completion	Total Depth of Boring (ft bgs)	Measured Depth of Well (ft from TOC)	Surface Completion Type	Casing Diameter (in.)	Screen Interval (ft bgs)	Top of Sand Pack (ft bgs)
RW-1	06/13/93	42.5	41.47	Flush Mount	4	36.8 - 41.7	34.75
SVE-1A	09/21/96	30	29.65	Flush Mount	2	20-30	19
SVE-2A	09/20/96	30	29.83	Flush Mount	2	20-30	17.5
SVE-22	11/07/02	35	33.20	Flush Mount	2	25-35	23
SVE-23	11/07/02	39	36.70	Flush Mount	2	25-35	22
SVE-24	11/13/02	30	28.85	Flush Mount	2	20-30	18
SVE-25	11/04/02	34	53.30	Flush Mount	2	24-34	21.6
SVE-26	11/05/02	35	32.45	Flush Mount	2	24-34	22
SVE-27	11/01/02	35	33.90	Flush Mount	2	20-35	18
SVE-28	10/29/02	35	36.00	Flush Mount	2	25-35	23
SVE-30	10/25/02	45	44.00	Flush Mount	2	20-45	18
SVE-31	10/28/02	35	33.95	Flush Mount	2	25-35	23

Note:
ft bgs - feet below ground surface
TOC - top of casing
in. - inches
na - not applicable

Prepared by: HRB 3/2/21
Checked by: SWS 3/2/21

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-1A	6/24/2019	NA	(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
SVE-2A	6/24/2019	NA	(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
SVE-22	3/10/2009	NA	33.00	33.20	0.20	NA
	10/8/2009		32.92	33.10	0.18	NA
	1/26/2010		33.05	33.05 (TD)	0.00	NA
	3/22/2010		33.02	33.02 (TD)	0.00	NA
	4/17/2011		32.90	33.00 (TD)	0.10	NA
	12/22/2011		(a)	33.04	(a)	NA
	4/17/2012		(a)	33.00 (TD)	(a)	NA
	10/18/2012		(a)	33.00 (TD)	(a)	NA
	4/15/2013		(a)	32.98	(a)	NA
	11/3/2013	3616.76 (h)	(a)	33.08	(a)	3,583.68
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	dry	(a)	NA
	11/3/2015		33.00	33.11	0.11	3,583.73
	4/29/2016		32.94	33.09	0.15	3,583.78
	11/16/2016		32.78	32.95	0.17	3,583.94
	5/22/2017		33.00	33.10	0.10	3,583.74
	11/13/2017		33.14	33.19	0.05	3,583.61
	6/1/2018		33.02	33.10	0.08	3,583.72
	11/6/2018		(a)	33.05	(a)	3,583.71
	6/24/2019		32.74	32.75	0.01	3,584.02
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
SVE-23	3/10/2009	NA	32.78	36.75	3.97	NA
	10/8/2009		33.01	33.79	0.78	NA
	1/26/2010		33.12	36.98 (TD)	3.86	NA
	3/22/2010		32.09	33.65	1.56	NA
	4/17/2011		33.00	33.30	0.30	NA
	12/22/2011		33.60	34.05	0.45	NA
	4/17/2012		33.62	34.10	0.48	NA
	10/18/2012		34.11	34.68	0.57	NA
	4/15/2013		33.65	33.92	0.27	NA
	11/3/2013	3612.45 (h)	33.73	36.52	2.79	3,578.05
	5/1/2014		33.78	36.80	3.02	3,577.95
	11/21/2014		32.15	32.84	0.69	3,580.13
	4/21/2015		32.75	33.4	0.65	3,579.54
	11/3/2015		32.74	33.07	0.33	3,579.63
	4/29/2016		33.01	33.33	0.32	3,579.36
	11/16/2016		33.37	33.82	0.45	3,578.97
	5/22/2017		33.60	34.15	0.55	3,578.72
	11/13/2017		32.64	33.28	0.64	3,579.66
	6/1/2018		33.27	33.95	0.68	3,579.02
	11/6/2018		32.55	35.70	3.15	3,579.14
	6/24/2019		Not Gauged - Snake Hazard Exist in Vault			
	1/5/2020		33.10	33.75	0.65	3,579.19
	5/13/2020		33.52	36.50	2.98	3,578.21
	11/10/2020		33.70	34.87	1.17	3,578.47
	1/18/2021		33.80	34.88	1.08	3,578.39
	2/10/2021		33.78	34.87	1.09	3,578.41
	3/8/2021		33.85	34.88	1.03	3,578.35
	4/5/2021		34.00	37.00	3.00	3,577.73

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-24	3/10/2009	NA	(a)	dry	(a)	NA
	10/8/2009		(a)	dry	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	dry	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	dry	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3608.97 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	28.61	(a)	3,580.36
	11/3/2015		(a)	dry	(a)	NA
	4/27/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	dry	(a)	NA
	5/31/2018		(a)	dry	(a)	NA
	11/6/2018		(a)	dry	(a)	NA
	6/24/2019		(a	dry	(a)	NA
	1/6/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/9/2020		(a)	dry	(a)	NA
SVE-25	3/10/2009	NA	(a)	32.70	(a)	NA
	10/8/2009		(a)	31.40	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	32.80	(a)	NA
	4/17/2011		(a)	32.23	(a)	NA
	12/22/2011		(a)	32.65	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	32.70	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3617.02 (h)	(a)	32.72	(a)	3,584.30
	5/1/2014		(a)	32.70	(a)	3,584.32
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	32.73	(a)	3,584.29
	11/3/2015		(a)	dry	(a)	NA
	4/29/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	31.88	(a)	3,585.14
	6/1/2018		(a)	32.6	(a)	3,584.42
	11/6/2018		(a)	31.75	(a)	3,585.27
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		32.5	32.69	0.19	3,584.47
	1/18/2021		32.6	32.71	0.11	3,584.39
	2/10/2021		32.57	32.7	0.13	3,584.42
	3/8/2021		32.55	32.82	0.27	3,584.41
	4/5/2021		32.65	32.75	0.1	3,584.35

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-26	3/10/2009	NA	(a)	dry	(a)	NA
	10/8/2009		(a)	dry	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	dry	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	dry	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3614.43 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	32.6	(a)	3,581.83
	11/3/2015		(a)	dry	(a)	NA
	4/29/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	dry	(a)	NA
	6/1/2018		(a)	dry	(a)	NA
	11/6/2018		(a)	dry	(a)	NA
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
SVE-27	3/10/2009	NA	(a)	32.92	(a)	NA
	10/8/2009		(a)	33.63	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	33.70	(a)	NA
	4/17/2011		(a)	33.70	(a)	NA
	12/22/2011		(a)	33.83	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	33.82	(a)	NA
	11/3/2013	3613.19 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	33.01	(a)	3,580.18
	4/21/2015		(a)	33.58	(a)	3,579.61
	11/3/2015		(a)	33.54	(a)	3,579.65
	4/29/2016		(a)	33.82	(a)	3,579.37
	11/16/2016		(a)	34.15	(a)	3,579.04
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	33.48	(a)	3,579.71
	6/1/2018		(a)	34.00	(a)	3,579.19
	11/6/2018		(a)	33.31	(a)	3,579.88
	6/24/2019		Not Gauged			
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-28	3/10/2009	NA	(a)	28.60	(a)	NA
	10/8/2009		(a)	28.95	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	29.07	(a)	NA
	4/17/2011		(a)	29.17	(a)	NA
	12/22/2011		(a)	29.65	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	33.58	(a)	NA
	11/3/2013	3607.84 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	28.59	(a)	3,579.25
	4/21/2015		(a)	28.86	(a)	3,578.98
	11/3/2015		(a)	28.75	(a)	3,579.09
	4/27/2016		(a)	28.97	(a)	3,578.87
	11/16/2016		(a)	29.18	(a)	3,578.66
	5/22/2017		(a)	29.44	(a)	3,578.40
	11/13/2017		(a)	28.76	(a)	3,579.08
	6/1/2018		(a)	29.15	(a)	3,578.69
	11/6/2018		(a)	28.53	(a)	3,579.31
	6/24/2019		(a)	28.97	(a)	3,578.87
	1/5/2020		(a)	28.81	(a)	3,579.03
	5/13/2020		(a)	29.05	(a)	3,578.79
	11/10/2020		(a)	29.73	(a)	3,578.11
SVE-30	3/10/2009	NA	(a)	39.32	(a)	NA
	10/8/2009		(a)	39.29	(a)	NA
	3/22/2010		(a)	40.28	(a)	NA
	4/17/2011		(a)	40.11	(a)	NA
	12/22/2011		(a)	41.11	(a)	NA
	4/17/2012		(a)	41.65	(a)	NA
	10/18/2012		(a)	41.42	(a)	NA
	4/15/2013		(a)	41.67	(a)	NA
	11/3/2013	3616.00 (h)	(a)	43.02	(a)	3,572.98
	5/1/2014		(a)	43.35	(a)	3,572.65
	11/21/2014		(a)	43.30	(a)	3,572.70
	4/21/2015		(a)	41.80	(a)	3,574.20
	11/3/2015		(a)	41.60	(a)	3,574.40
	4/28/2016		(a)	41.56	(a)	3,574.44
	11/16/2016		(a)	41.23	(a)	3,574.77
	5/22/2017		NA	NA	NA	NA
	11/13/2017		(a)	42.00	(a)	3,574.00
	6/1/2018		(a)	42.02	(a)	3,573.98
	11/6/2018		(a)	42.46	(a)	3,573.54
	6/24/2019		(a)	42.52	(a)	3,573.48
	1/5/2020		(a)	42.45	(a)	3,573.55
	5/13/2020		(a)	42.55	(a)	3,573.45
	11/10/2020		(a)	43.05	(a)	3,572.95

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-31	3/10/2009	NA	(a)	30.45	(a)	NA
	10/8/2009		(a)	30.43	(a)	NA
	1/26/2010		(a)	30.55	(a)	NA
	3/22/2010		(a)	31.49	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	28.50	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3612.67 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	30.27	(a)	3,582.40
	4/21/2015		(a)	30.97	(a)	3,581.70
	11/3/2015		(a)	30.200	(a)	3,582.47
	4/28/2016		(a)	30.35	(a)	3,582.32
	11/16/2016		(a)	30.73	(a)	3,581.94
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	30.48	(a)	3,582.19
	6/1/2018		(a)	dry	(a)	NA
	11/6/2018		(a)	30.24	(a)	3,582.43
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	31.65	(a)	3,581.02
RW-1	3/10/2009	NA	(a)	33.17	(a)	NA
	10/8/2009		(a)	33.48	(a)	NA
	3/22/2010		(a)	33.62	(a)	NA
	4/17/2011		(a)	33.80	(a)	NA
	12/22/2011		(a)	34.26	(a)	NA
	4/17/2012		(a)	34.57	(a)	NA
	10/18/2012		(a)	35.16	(a)	NA
	4/15/2013		(a)	35.77	(a)	NA
	11/3/2013	3612.72 (h)	(a)	34.95	(a)	3,577.77
	4/30/2014		(a)	35.48	(a)	3,577.24
	11/19/2014		(a)	32.46	(a)	3,580.26
	4/21/2015		(a)	33.08	(a)	3,579.64
	11/3/2015		(a)	33.00	(a)	3,579.72
	4/28/2016		(a)	33.32	(a)	3,579.40
	11/16/2016		(a)	33.70	(a)	3,579.02
	5/22/2017		(a)	34.03	(a)	3,578.69
	11/13/2017		(a)	32.96	(a)	3,579.76
	6/1/2018		(a)	33.62	(a)	3,579.10
	11/6/2018		(a)	32.82	(a)	3,579.90
	6/24/2019		(a)	33.57	(a)	3,579.15
	1/5/2020		(a)	33.38	(a)	3,579.34
	5/13/2020		(a)	33.68	(a)	3,579.04
	11/10/2020		(a)	34.55	(a)	3,578.17

Notes:
PSH - Phase separated hydrocarbon
ft - feet
TOC - Top of Casing
Corrections to ground water surface elevation for PSH is calculated assuming a specific gravity of 0.76
(NA) Information not available
(a) Not applicable since no measurable thickness of PSH is present
Historical data before 2009 is presented in previous reports
Historical data for wells that were plugged and abandoned is not shown.

Prepared by: SWS 4/6/21
Checked by: HRB 4/6/21

Table 3-1. Summary of Groundwater Analytical Results in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well	Sampling Date	Benzene	Toluene	Ethylbenzene	Xylenes (total)	1,1-Dichloroethane	1,1-Dichloroethene	Vinyl Chloride
NMWQCC Human Health Standard		10	750	750	620	25	5	1
USEPA MCL		5	1,000	700	10,000	--	7	2
Tap Water (2012)		4.13	2280	14.8	-	24.2	340	0.16
Groundwater Cleanup Level (GCL)		5	750	700	620	25	5	1
SVE-28	11/12/18	**14**	<1.0	<1.0	<1.5	NA	NA	NA
	06/26/19	1.5	<1.0	<1.0	<1.5	2.2	<1.0	<1.0
	01/08/20	1.5	<1.0	<1.0	<1.5	2.2	<1.0	<1.0
	11/23/20	1.3	<1.0	<1.0	<1.5	1.3	<1.0	<1.0
SVE-30	11/12/18	**15**	<5.0	41	<7.5	NA	NA	NA
	06/26/19	**10**	<5.0	24	<7.5	**30**	<5.0	<5.0
	01/08/20	**8.9**	<5.0	29	<7.5	**32**	<5.0	<5.0
	09/10/20	**8.6**	<5.0	20	<7.5	**25**	<5.0	<5.0
	11/23/20	**5.7**	<1.0	8	<1.5	**33**	NA	NA
SVE-31	11/12/18	<1.0	<1.0	<1.0	<1.5	NA	NA	NA
	11/23/20	<1.0	<1.0	<1.0	<1.5	NA	NA	NA
RW-1	11/12/18	**32**	<1.0	1.4	<1.5	NA	NA	NA
	06/26/19	**51**	<1.0	1.4	<1.5	12	<1.0	<1.0
	01/08/20	**26**	<1.0	1.5	<1.5	4.3	<1.0	<1.0
	09/10/20	**25**	<1.0	6.2	<1.5	3.1	<1.0	<1.0
	11/23/20	**38**	<1.0	13	7.9	3.5	<1.0	<1.0

Notes:

Bold indicates that the analytical result exceeds the applicable regulatory limits.

* - Phase separated hydrocarbons (PSH) present in well. Sample collected below PSH.

-- Data not available.

Only constituents detected in one or more groundwater samples are shown in this table

All results reported above the applicable standard are shown in bold type

Results reported in micrograms per liter (µg/L)

NA - Not analyzed; constituent is not part of the sampling plan

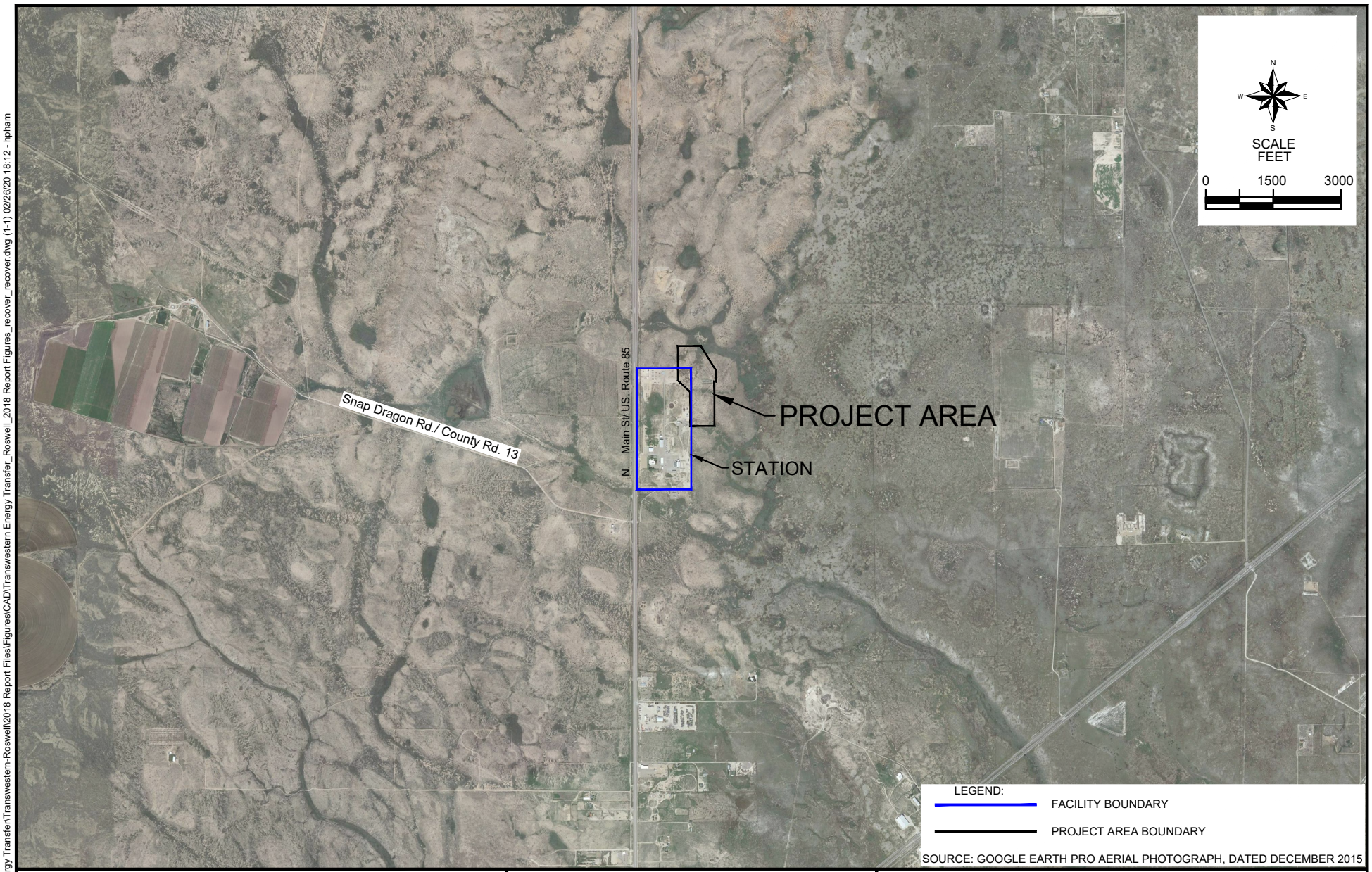
NMWQCC - New Mexico Water Quality Control Commission

Prepared by: SWS 5/20/21
Checked by: HRB 6/6/2021

NMWQCC Human Health Standards - from New Mexico Administrative Code (NMAC) 20.6.2, Part A, Human Health Standards. Used as GCL for target cleanup if lower than the MCL.

USEPA MCL - United States Environmental Protection Agency's Maximum Concentration Limit. Used as GCL for target cleanup if lower than the NMWQCC Human Health Standard.

Tap Water (2012) - From Table A-1 for the 2012 NMED Risk Assessment Guidance for Site Investigation and Remediation. Used as GCL for target cleanup if WQCC standard nor MCL has been established.



TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No. 9
(ROSWELL COMPRESSOR STATION)
ROSWELL, CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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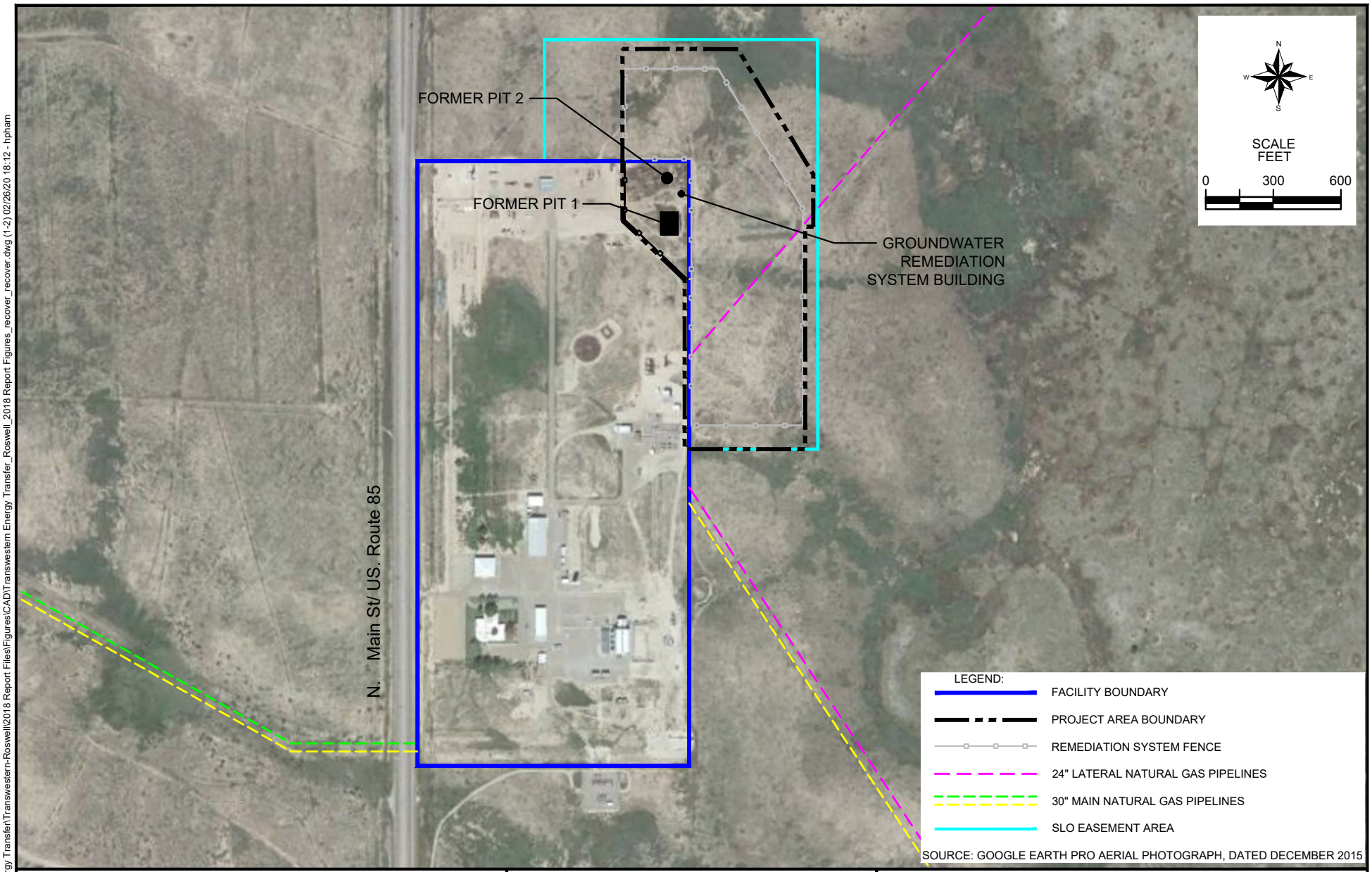
PROJECT AREA LOCATION MAP

DRAWN:	CHECKED:	DATE:	FIGURE:
HVP	JM	02/26/2020	1-1

FILENAME: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2018 Report Files\Figures\CAD\Transwestern Energy Transfer_Roswell_2018 Report Figures_recover_recover.dwg (1-1) 02/26/20 18:12 - hpham



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ROSWELL, CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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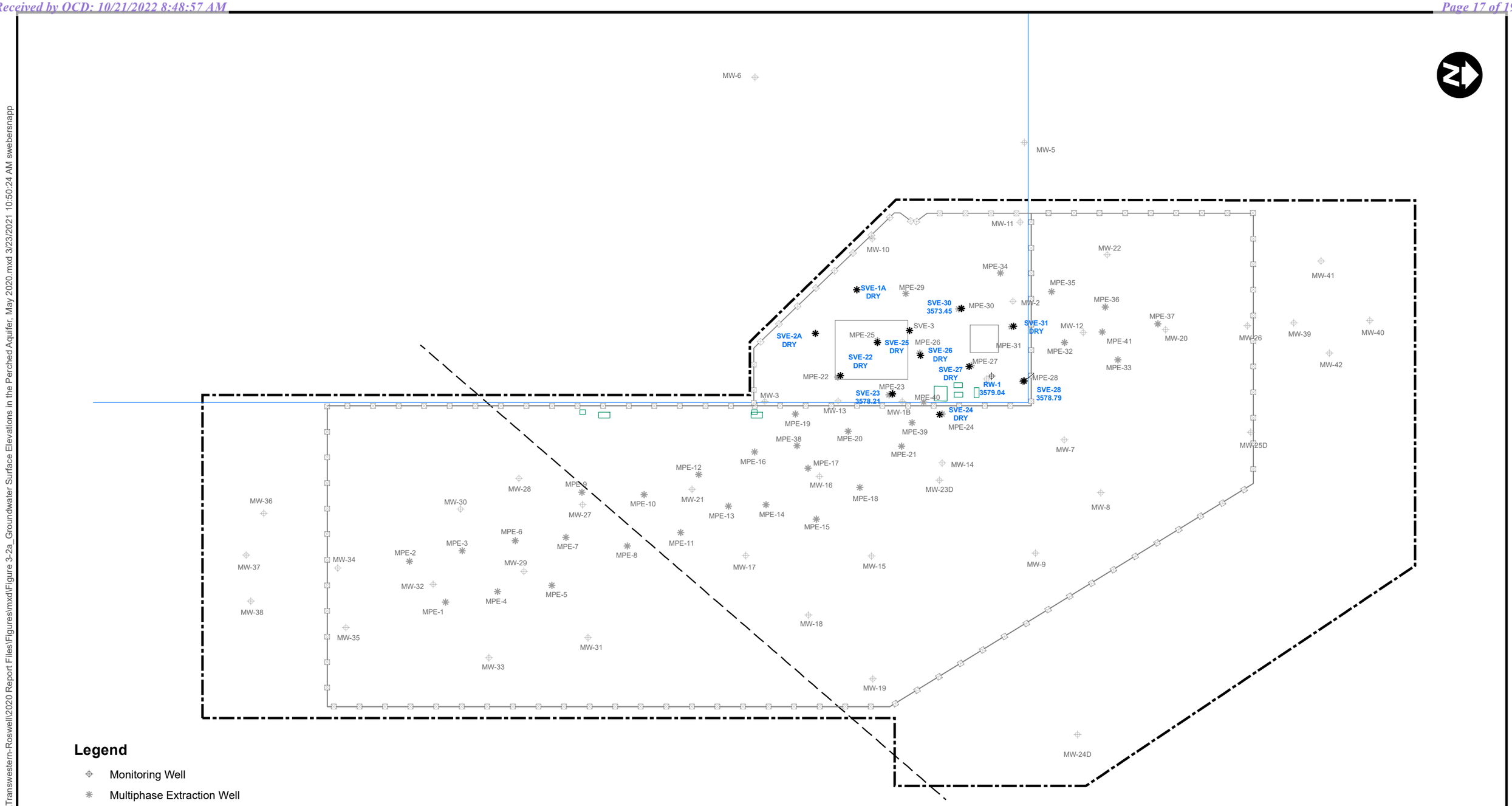
PROJECT AREA FEATURES

DRAWN:	CHECKED:	DATE:	FIGURE:
HVP	JM	02/26/2020	1-2

FILENAME:S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2018 Report Files\Figures\CAD\Transwestern Energy Transfer_Roswell_2018 Report Figures_recover_recover.dwg (1-2) 02/26/20 18:12 - hpham



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary

0 75 150 300 Feet

Note: RW-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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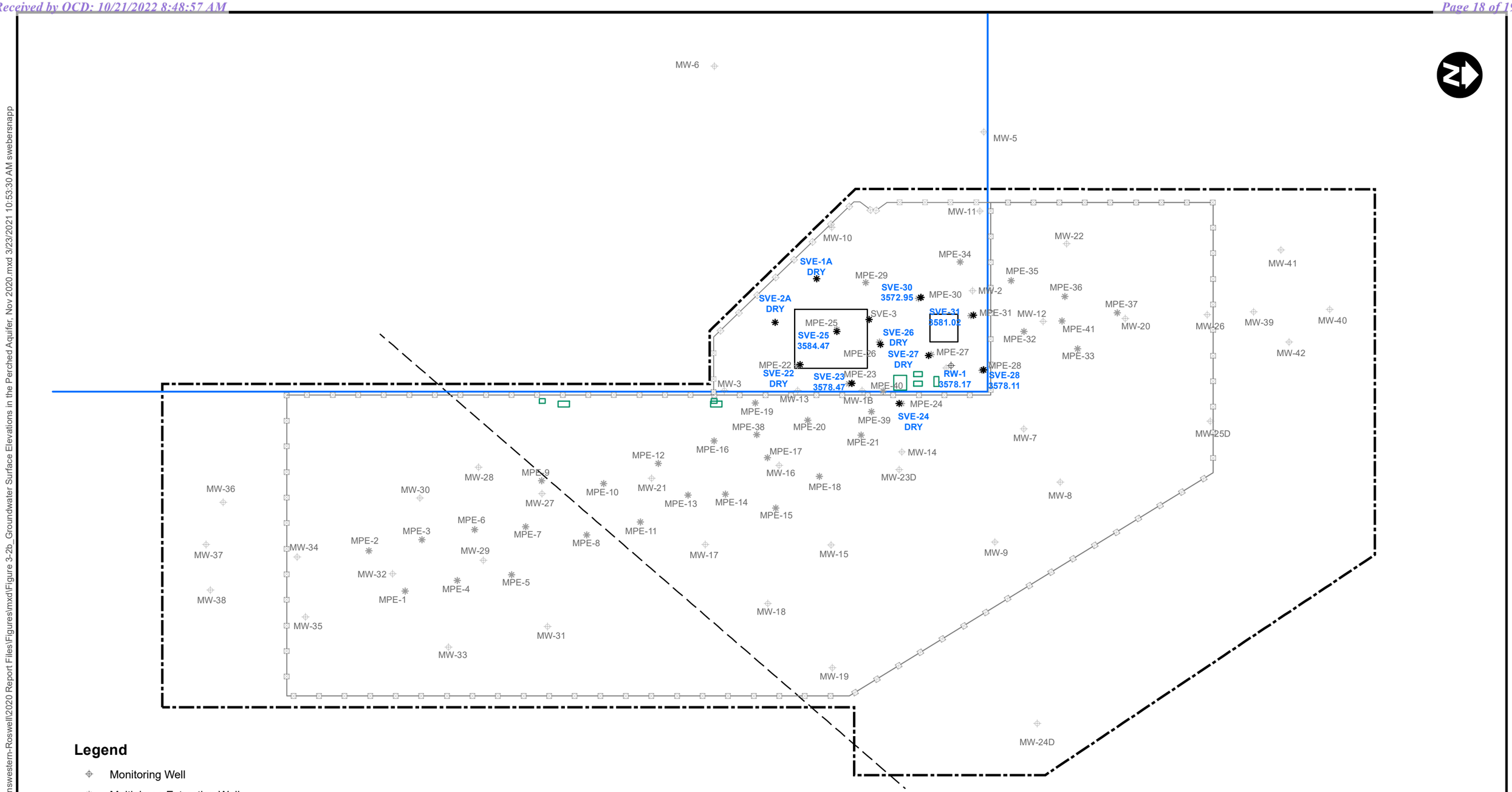
Groundwater Surface Elevations in the Perched Aquifer May 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JAN 2021	2-1a

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-2a_Groundwater Surface Elevations in the Perched Aquifer, May 2020.mxd 3/23/2021 10:50:24 AM swebersnapp



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary

0 75 150 300 Feet

Note: RW-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
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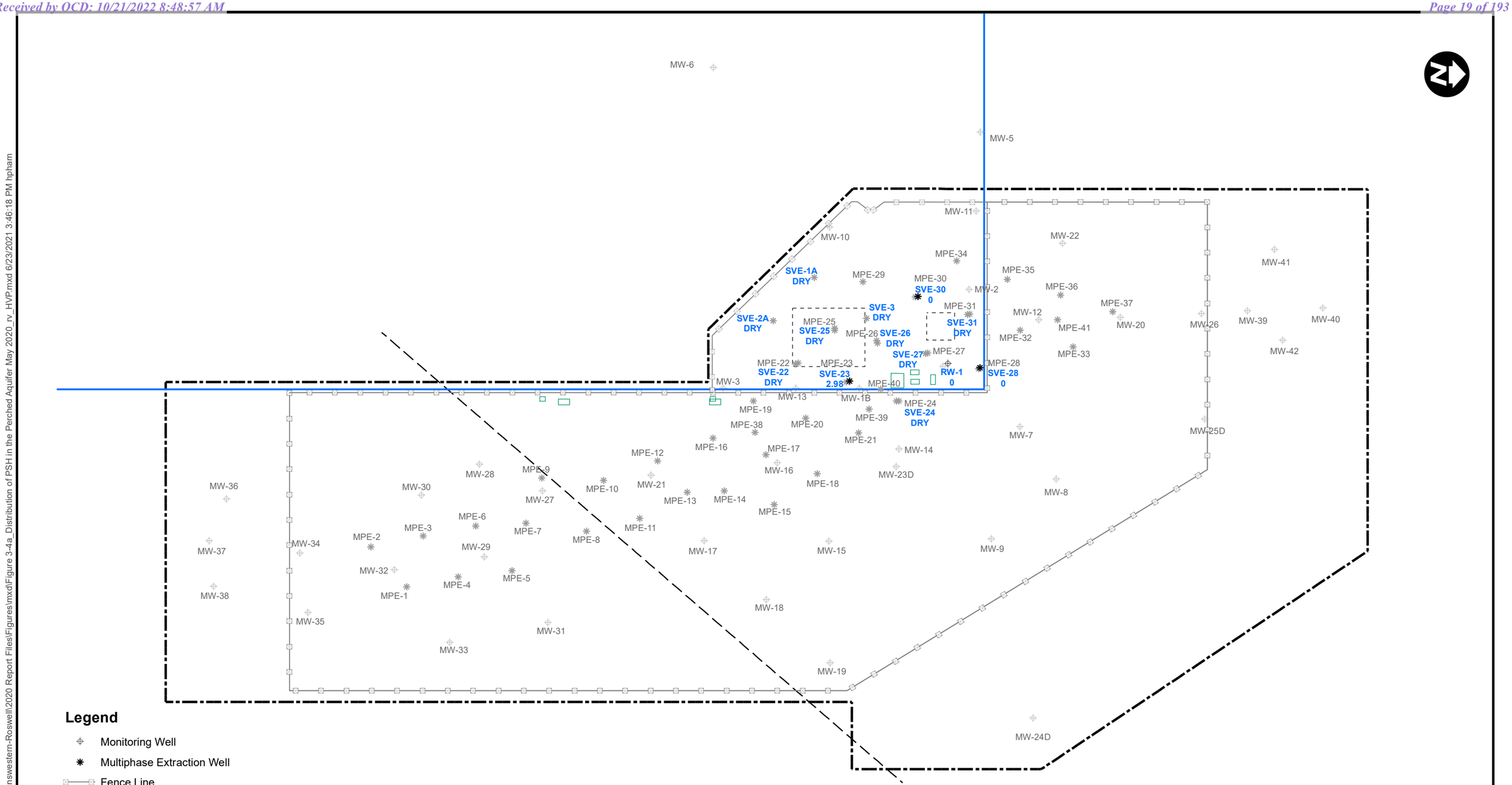
Groundwater Surface Elevations in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JAN 2021	2-1b

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-2b_Groundwater Surface Elevations in the Perched Aquifer, Nov 2020.mxd 3/23/2021 10:53:30 AM swebersnapp



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- 2.98 PSH thickness in feet

0 75 150 300 Feet

Note: Rw-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

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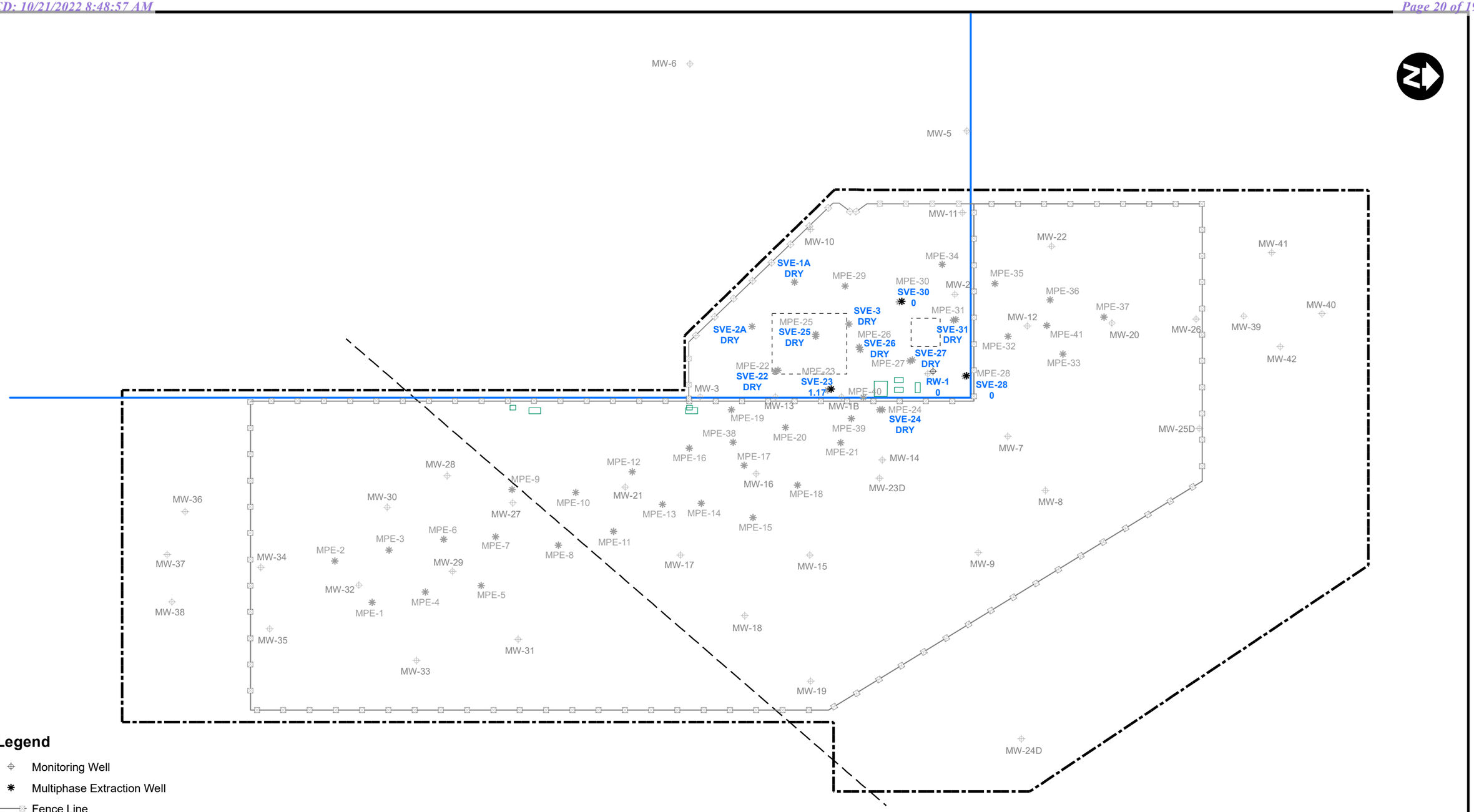
Distribution of PSH in the Perched Aquifer May 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	2-2a

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-4a_Distribution of PSH in the Perched Aquifer May 2020_rv_HVP.mxd 6/23/2021 3:46:18 PM hpham



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- 1.17 PHS thickness in feet

0 75 150 300 Feet

Note: Rw-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
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Distribution of PSH in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	2-2b

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-4b_Distribution of PSH in the Perched Aquifer Nov 2020_rv_HVP.mxd 6/23/2021 3:28:52 PM hpham

MW-6
MW-5
MW-11
MW-10
MW-22
MW-41
MPE-34
MPE-35
MPE-36
MPE-37
MW-39
MW-40
MW-42
MW-12
MW-41
MW-20
MW-26
MPE-32
MPE-33
MPE-28
MW-7
MW-25D
MW-3
MW-1B
MPE-19
MPE-38
MPE-20
MPE-39
MPE-21
MPE-16
MW-14
MPE-12
MPE-17
MW-16
MW-28
MPE-9
MPE-10
MW-30
MW-21
MPE-18
MW-23D
MW-8
MW-36
MW-27
MPE-13
MPE-14
MPE-15
MPE-6
MPE-3
MPE-11
MPE-2
MPE-7
MPE-8
MW-34
MW-29
MW-17
MW-15
MW-9
MW-37
MW-32
MPE-4
MPE-5
MPE-1
MW-38
MW-18
MW-35
MW-31
MW-33
MW-19
MW-24D

SVE-1A NS
SVE-2A NS
SVE-30 13.7
SVE-3 NS
SVE-31 NS
SVE-25 NS
SVE-26 NS
SVE-22 NS
SVE-27 NS
RW-1 58.9
SVE-23 NS
SVE-28 1.3
SVE-24 NS

Legend

- Monitoring Well
- Multiphase Extraction Well
- Approximate PSH Extent greater than 0.01 ft in Perched Aquifer (Nov 2020)
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- 13.7 BTEX Concentration in ug/L
- NS Not sampled in accordance with SAP.

0 75 150 300 Feet

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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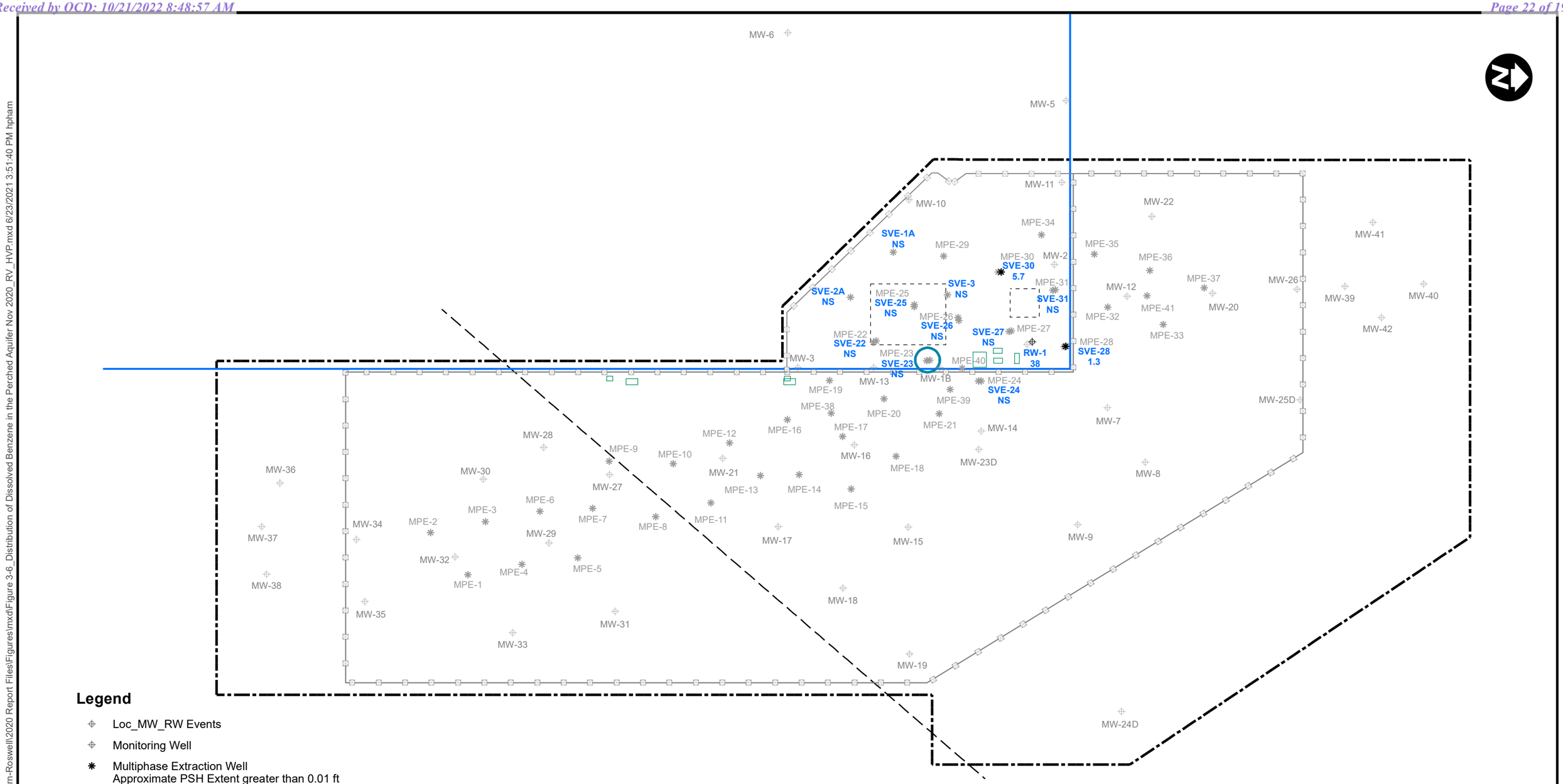
Distribution of Dissolved BTEX in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	3-1



Legend

- Loc_MW_RW Events
- Monitoring Well
- Multiphase Extraction Well
- Approximate PSH Extent greater than 0.01 ft in Perched Aquifer (Nov 2020)
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- **5.7** Benzene Concentration in ug/L
- **NS** Not sampled in accordance with SAP.

0 75 150 300 Feet

Note: Rw-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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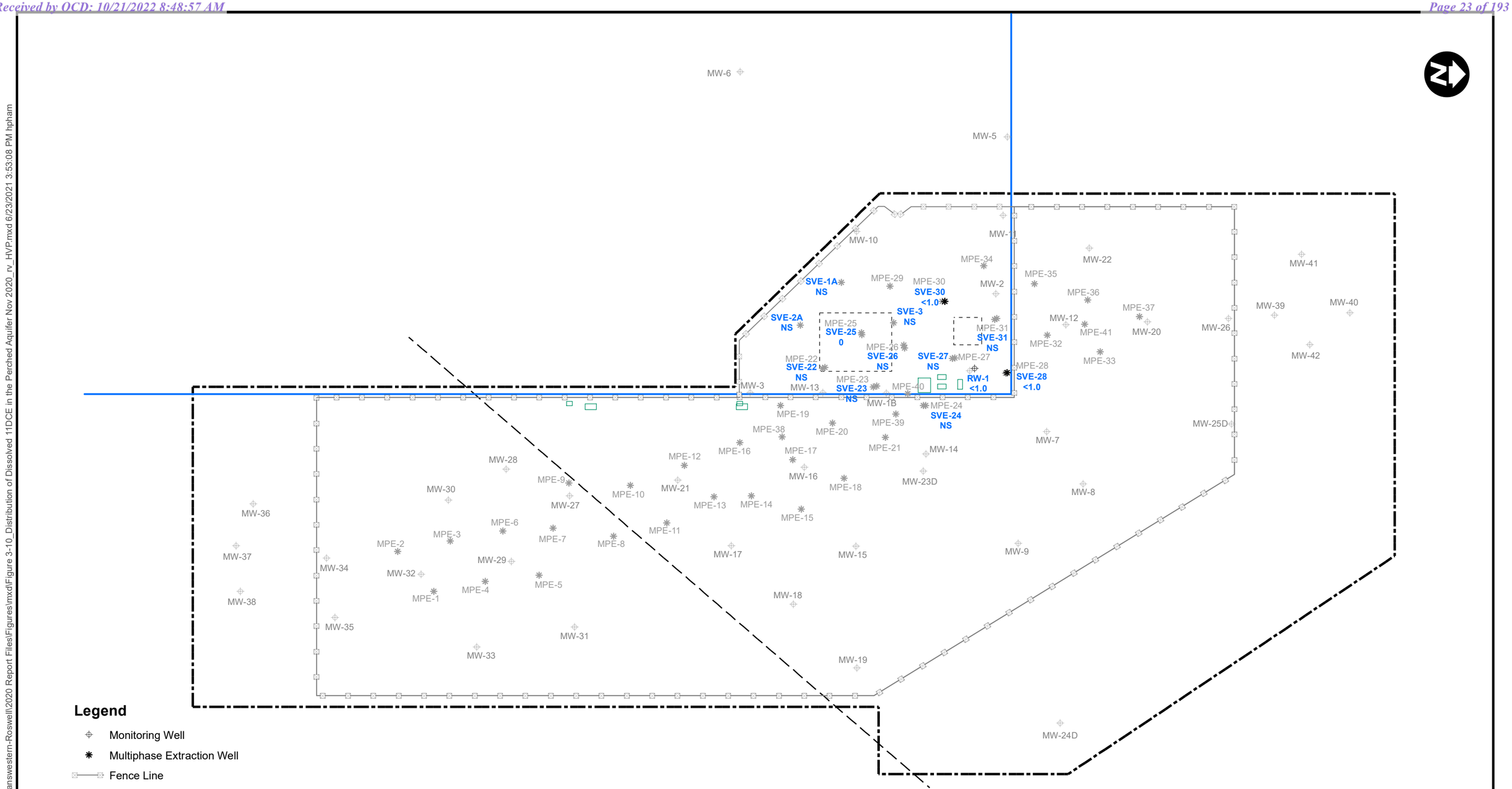
Distribution of Dissolved Benzene in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	3-2

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-6_Distribution of Dissolved Benzene in the Perched Aquifer Nov 2020_RV_HVP.mxd 6/23/2021 3:51:40 PM hpham



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- **<1.0** 1,1-DCE Concentration in ug/L
- **NS** Not sampled in accordance with SAP.

0 75 150 300 Feet

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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Distribution of Dissolved 1,1-DCE in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	3-3

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-10_Distribution of Dissolved 11DCE in the Perched Aquifer Nov 2020_rv_HVP.mxd 6/23/2021 3:53:08 PM hpham

NV

TRANSWESTERN PIPELINE COMPANY
An ENERGY TRANSFER Company

January 27, 2022

Mr. Rick Shean
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

RE: Response to Disapproval
Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations
Roswell Compressor Station No. 9
Transwestern Pipeline Company
Roswell, Chaves County, New Mexico
NMOCD Abatement Plan #AP-125 (formerly #GW-052)
EPA ID No. NMD986676955
HWB-TWP-21-002

Dear Mr. Shean;

Transwestern Pipeline, LLC (Transwestern) submits this *Response to Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* regarding the comments received from the New Mexico Environment Department (NMED) via the letter titled *Disapproval Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* for the above referenced Site. To respond specifically to each of the Agency's comments, dated September 8, 2021, the original comment included within the NMED letter is in **bold**, with the Transwestern response included in plain text immediately following the item requiring a response.

Comment 1

In Section 2.0, Perched Aquifer Evaluation, page 6, the Respondent states, "[b]oring logs developed for SVE, and the deeper multiphase extraction (MPE) wells were reviewed, which did not note a distinct water bearing zone between the surface and 50 feet bgs." The referenced boring logs were not included in the Report. Provide all relevant boring logs and well construction diagrams in the revised Report or reference the previously submitted documents that present the logs and well construction diagrams.

Boring logs are included in Attachment 1 in the revised Report.

Comment 2

In Section 2.2, Groundwater Analytical Results, page 7, the Respondent states, "[g]roundwater samples were collected and analyzed for BTEX by EPA method 8260 or for

VOCs via EPA Method 8260B, and 1,4-dioxane was analyzed by EPA method 8270SIM in accordance with the approved Sampling and Analysis Plan (SAP). The analytical results for groundwater samples in the are summarized in Table 2-3." Table 2-3, Summary of Groundwater Analytical Results in the Perched Aquifer did not include analytical results for 1,4-dioxane. Revise the table to include the results of 1,4-dioxaine analysis in the revised Report. In addition, the page number and designation of the table in the footer of Table 2-3 are shown as page 7 of 7 and Table 3-5, respectively. They are incorrect and must be revised to present correct page number (page 1 of 1) and designation of the table (Table 2-3). Correct the page number and designation of the table in the revised Report.

Table 2-3 has been revised to include 1,4-dioxane results. The footer has been updated on Table 2-3.

Comment 3

In Section 2.2, Groundwater Analytical Results, page 7, the Respondent states, "[b]ased on the 2020 analytical data, the areal distribution of BTEX, Benzene, and 1,1-DCA in the Perched Aquifer remains delineated within the Project Area boundaries and within the limits of the plume in the lower water bearing unit; as well as being consistent with the 2019 data for those wells (Figures 3-1 through 3-3).

Section 2.0, Perch[ed] Aquifer Evaluation, pages 5 and 6, states, "[t]wo of the deepest wells in the perched aquifer, RW-1 and SVE-30, are both over 41 ft BTOC and consistently have measurable groundwater. Wells SVE-23 and SVE-28 are each approximately 36 ft BTOC and typically have measurable groundwater, including the year 2020. Wells SVE-22, SVE-25, SVE-27, and SVE-31 (all approximately 33 ft BTOC) often do not have water; SVE-22, SVE-27, and SVE-31 were dry during at least part of 2020. Wells SVE-24 and SVE-26 (28.9 and 32.5 ft BTOC, respectively) have not had measurable water in the past five years."

Section 2.0 indicates that a sufficient number of wells was not completed in the water bearing zone in the perched aquifer. Section 2.2 asserts that the perched aquifer remains delineated, but the assertion is not supported by the data provided by the Report. Many wells advanced to the perched aquifer are too shallow to produce water; therefore, they are not useful to support the assertion and the plumes are not delineated in the perched aquifer. Revise the Report to provide the data that supports the assertion or propose to submit a work plan to install wells to delineate the horizontal and vertical extent of the plumes in the perched aquifer in the revised Report. In addition, referencing depth relative to the top of well casings does not provide useful information since well stickups can vary. Depths relative to ground surface elevations provide useful information.

A work plan will be developed to provide details for delineating the horizontal and vertical extent of the plumes in the perched aquifer. The ground surface elevation is not included within the project files, therefore, the depth from the ground surface cannot be included within the revised

Report. Surveying the ground elevations in these locations will be included within the forthcoming work plan.

Comment 4

In Section 3.0, Future Corrective Action Recommendations, page 7, the Respondent states, "Transwestern recommends that PSH recovery via manual bailing be initiated immediately in SVE-23 and SVE-25 considering the overall corrective action objective for the site. It is apparent that LNAPL is present at recoverable thicknesses and PSH will be monitored for rebound after selected recovery event[s]." The proposed interim measure is hereby approved. However, PSH recovery via manual bailing will not prevent PSH from expanding within and possibly beyond the perched aquifer. More effective remedies must be evaluated and proposed as an interim corrective measure in the revised Report.

Comment noted. Information related to PSH recovery in the perched aquifer is provided in the revised Report.

Comment 5

In Section 3.0, Future Corrective Action Recommendations, page 7, the Respondent states, [l]iquid levels and recovery data collected from bailing activities has been evaluated and the current remediation system is effective showing a decrease in BTEX, and 1,1-DCE concentrations. Due to the current results of the PSH plume and dissolved-phase concentrations, additional delineation does not appear warranted at this time." NMED does not agree with the statement. The contaminant concentrations are fluctuating in the groundwater samples collected from the perched aquifer according to Table 2-3. In addition, many wells advanced to the perched aquifer are too shallow to produce water; therefore, they are not useful for delineation. Furthermore, the current SVE wells advanced to the perched aquifer do not extract liquid PSH or contaminated groundwater and are not capable of containing the plumes. The horizontal and vertical extent of the plumes must be delineated, and more effective interim measures must be proposed to contain the plumes in the perched aquifer (see Comments 3 and 4 above). Revise the Report accordingly.

Comment noted. A work plan will be developed to provide details for delineating the horizontal and vertical extent of the plumes in the perched aquifer. This information is provided in the Revised Report.

Comment 6

According to Table 2-1, Summary of Perched Aquifer Well Completion Details, the measured depth of well SVE-23 is recorded as 36.70 feet from the TOC. However, depth to groundwater in well SVE-23 is recorded as 37.00 feet below TOC according to Table 2-2, Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer. Resolve the discrepancy in the revised Report. In addition, the page numbers and designation of the tables shown in the footer of the tables are incorrect. Correct the page numbers and designation of the tables in the revised Report (see Comment 2 above).

The footer on the included tables have been corrected. The depth to water collected on 4/5/2021 is a field error measurement, it has been footnoted on Table 2-2.

Transwestern appreciates the opportunity to continue to work with NMED and NMOCD to continue to bring this site to closure. If you have any further questions or comments regarding these responses, please do not hesitate to contact me at (210) 870-2725 or JD Haines of EarthCon Consultants, Inc. at (317) 450-6126.

Sincerely,

Ms. Stacy Boultinghouse, PG
Environmental Manager
Transwestern Pipeline Company, LLC
Stacy.Boultinghouse@energytransfer.com

Attachment : Revised Report

Cc: D. Cobrain, NMED HWB
M. Suzuki, NMED HWB
M. Bratcher, NMOCD
B. Billings, NMOCD
L. King, USEPA Region 6
JD Haines, WSP
S. Diamond, WSP

REPORT OF PERCHED AQUIFER EVALUATION AND FUTURE CORRECTIVE ACTION RECOMMENDATIONS
FORMER SURFACE IMPOUNDMENTS
TRANSWESTERN COMPRESSOR STATION NO. 9
(ROSWELL COMPRESSOR STATION)
6381 NORTH MAIN STREET
ROSWELL, CHAVES COUNTY, NEW MEXICO
NMOCD GW-052
NMED 1656; EPA ID NMD986676955

PREPARED FOR:

TRANSWESTERN PIPELINE COMPANY, LLC
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HOUSTON, TEXAS 77002

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EarthCon Project No. 02.20180005.00

June 2021
(REVISED January 2022)

Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations
Former Surface Impoundments
Transwestern Compressor Station No. 9
(Roswell Compressor Station)
6381 North Main Street
Roswell, Chaves County, New Mexico
NMOCD GW-052
NMED 1656; EPA ID NMD986676955

Prepared For:

Transwestern Pipeline Company, LLC
1300 Main
Houston, TX 77002

June 2021
EarthCon Project No. 02.20180005.00

EarthCon Consultants, Inc. (EarthCon) is submitting to Transwestern Pipeline Company, LLC (Transwestern) this *Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* for the Roswell Compressor Station in Roswell, Chaves County, New Mexico. This report has been prepared for the exclusive use of and reliance by Transwestern and may not be relied upon by any other person or entity without the express written authorization of EarthCon.

Any reliance, use, or re-use of this document (or the opinions, findings, conclusions, or recommendations if any represented herein), by parties other than those expressly authorized by EarthCon is at the sole risk of those parties. This report was prepared by or performed under the direction of the EarthCon Professionals listed below and approved by Transwestern.

Signed:

Sofie Weber
Senior Professional
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Steve Diamond, PE (AL, GA, LA, MO, SC, MI)
Senior Engineer
EarthCon Consultants, Inc.

J.D. Haines, LPG (IN)
Principal Geologist
EarthCon Consultants, Inc.

Date: 6/28/2021 (Revised 1/27/22)

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1.0 INTRODUCTION

This *Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* was prepared by EarthCon Consultants, Inc. (EarthCon) on behalf of Transwestern Pipeline Company, LLC (Transwestern) to summarize the results of a perched aquifer evaluation and evaluate future corrective actions associated with the Former Surface Impoundments at the Transwestern Compressor Station No. 9 (also known as the Roswell Compressor Station) property, located at 6381 North Main Street in Roswell, New Mexico (the "Site"). Historic reports indicate the potential for perched aquifer conditions intersecting the soil vapor extraction (SVE) wells and RW-1, all of which are located on the Transwestern site near the former surface impoundments.

The Facility is an active natural gas compressor station, owned and operated by Transwestern, located approximately 8 miles north of the city center of Roswell, New Mexico along the eastern side of U.S. Highway 285. The Facility occupies approximately 77 acres of land in Section 21 (SW¼ of the SW¼) and Section 28 (NW¼ of the NW¼) of Township 9S and Range 24E, Chaves County, New Mexico (**Figure 1-1**). Access is via U.S. Highway 285, and the entire Facility is secured by a chain-link fence with locked gates. The Project Area encompasses a portion of the northeast corner of the Facility and a portion of a 40-acre easement of land to the northeast, leased from the New Mexico State Land Office (SLO) State Trust Land for remediation and monitoring purposes (**Figure 1-2**).

Comment 4 of the NMED's *Approval with Modifications Laboratory Results Submittal for SVE and RW-1 Wells and Additional Laboratory Results for SVE and RW-1 Wells*, dated February 21, 2020, requires a report that summarizes the results of the perched zone evaluation. Further, Comment 1 of the NMED's *Additional Response to Comments* 10/14/2020, dated April 9, 2021, requests a standalone report evaluating and recommending corrective action for the perched aquifer.

2.0 PERCHED AQUIFER EVALUATION

According to historical groundwater gauging data, field personnel observed the presence of water at depths between 28 feet below ground surface (bgs) and 35 feet bgs in certain soil vapor extraction (SVE) wells, while other SVE wells remained dry. Two of the deepest wells in the perched aquifer, RW-1 and SVE-30, are both over 41 ft BTOC and consistently have measurable groundwater. Wells SVE-23 and SVE-28 are each approximately 36 ft BTOC and typically have

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measurable groundwater, including the year 2020. Wells SVE-22, SVE-25, SVE-27, and SVE-31 (all approximately 33 ft BTOC) often do not have water; SVE-22, SVE-27, and SVE-31 were dry during at least part of 2020. Wells SVE-24 and SVE-26 (28.9 and 32.5 ft BTOC, respectively) have not had measurable water in the past five years.

Boring logs developed for SVE, and the deeper multiphase extraction (MPE) wells were reviewed, which did not note a distinct water bearing zone between the surface and 50 feet bgs (**Attachment 1, Perched Aquifer Boring Logs**). In the MPE wells, groundwater was reported to be approximately 60 feet bgs. Considering the presence and absence (dry) of groundwater in certain SVE wells at various times and the construction depth of these wells, it was suspected that a combination of rainwater and condensate buildup within the SVE piping conveyance network could be back flowing and contributing to the water that was being observed in certain SVE wells. Further investigation was performed in the field to identify the source of the water in the SVE wells.

Further review of the suspected perched aquifer was conducted by recovering water from RW-1 until dry and monitoring rebound over time. Beginning in April 2020, groundwater was extracted from recovery well RW-1 to evaluate the perched aquifer. However, the extraction process was deactivated after a short period due to groundwater volumes unexpectedly reaching the storage tank capacity, and the evaluation was suspended pending further review of the process and results.

The evaluation of the perched aquifer in RW-1 resumed on September 23, 2020, and continued to October 20, 2020. Prior to installing a pump, the groundwater level was measured as 33.55 feet below top of casing (btoc). The pump inlet was lowered to approximately 38 feet btoc and the pump recovered groundwater at an average rate of approximately 0.16 gallons per minute during the evaluation period. Groundwater levels were measured daily in RW-1 to evaluate recharge of the well. According to liquid levels, the groundwater was drawn down to approximately 37.5 feet before stabilizing. The pump was deactivated, and groundwater recharged at a rate of approximately 0.2 feet per day. Based on pump evaluation on RW-1 and historical groundwater gauging data in SVE wells, a perched aquifer may exist in this portion of the site.

Further review of historical documents revealed that an initial field site assessment performed in 1991 reported the presence of a perched aquifer which intersected wells SVE-23, SVE-25, SVE-27, SVE-28, SVE-30, SVE-31, and RW-1. A summary of construction information for wells in the

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perched aquifer is provided in **Table 2-1**, and groundwater elevations for wells in the perched aquifer are shown in **Table 2-2**.

2.1 PSH Thickness

Liquid levels were measured in SVE wells and RW-1 using an optical interface probe to determine the presence and apparent thickness of PSH (phase separated hydrocarbons). According to historical liquid levels, SVE-23 was the only well to consistently contain PSH; however, recently, PSH has been observed in SVE-25 in November 2020 after 11 years of no detections. The apparent thickness of 3.0 feet and 0.10 foot was measured in SVE-23 and SVE-25 in April 2021, respectively. Distribution of PSH apparent thickness is presented in **Figures 2-2a** and **2-2b**. Further PSH monitoring will continue for SVE-23 and SVE-25 in 2022.

2.2 Groundwater Analytical Results

Groundwater samples were collected and analyzed for BTEX by EPA method 8260 or for VOCs via EPA Method 8260B, and 1,4-dioxane was analyzed by EPA method 8270SIM in accordance with the approved *Sampling and Analysis Plan* (SAP). The analytical results for groundwater samples in the are summarized in **Table 2-3**. Wells in the perched aquifer that had measurable groundwater and did not contain PSH (i.e., RW-1, SVE-28, SVE-30, and SVE-31) were sampled. Wells SVE-23 and SVE-25 contained water and PSH, while SVE-24, SVE-26, and SVE-27 were dry and did not have measurable PSH.

In summary, BTEX constituents were detected above laboratory reporting limits in wells SVE-28, SVE-30, and RW-1. Benzene exceeded the Groundwater Concentration Limit (GCL) in both SVE-30 and RW-1, and 1,1-DCA exceeded the GCL in SVE-30. The areal distribution of BTEX, Benzene, and 1,1-DCA in the Perched Aquifer in November 2020 is shown in **Figures 3-1** through **3-3**.

3.0 FUTURE CORRECTIVE ACTION RECOMMENDATIONS

In correspondence dated July 2, 2020, and November 25, 2020, NMED requested that Transwestern suspend PSH recovery activities in SVE-23 and monitor PSH thickness over time. Currently, it is unknown if the recovery rates of the PSH and/or groundwater in the perched aquifer can sustain a more active recovery method such as PSH skimming, or multiphase extraction. Therefore, Transwestern recommends that PSH recovery via manual bailing be initiated immediately in SVE-23 and SVE-25 considering the overall corrective action objective for the site. It is apparent that LNAPL is present at recoverable thicknesses and PSH will be monitored for

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rebound after selected recovery event. Data will be collected from manual bailing events during 2022 to determine feasibility of additional recovery measures or impracticability. Results will be provided in the 2022 Annual Groundwater Remediation Activities Report. Since SVE-23 and most recently SVE-25 are the only wells in the Perched Aquifer to contain PSH, it is believed that the PSH appearances may be residual product that may have accumulated in those wells after source removal activities. Historical PSH measurements in wells located in the perched aquifer and upper aquifer indicate that the PSH footprint has stabilized or decreased. A work plan will be prepared and submitted detailing delineation of the horizontal and vertical extent of the LNAPL plume. Based on the results of perched aquifer delineation evaluation, the apparent extent of LNAPL, and results of bailing recovery, additional measures will be evaluated to identify appropriate and effective action to recover LNAPL in the perched aquifer.

4.0 REFERENCES

Roswell Shallow Subsurface Investigation by Harding Lawson Associates, June 20, 1991

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TABLES

Table 2-1. Summary of Perched Aquifer Well Completion Details
Transwestern Compressor Station No. 9 - Roswell, NM

Well	Date of Completion	Total Depth of Boring (ft bgs)	Measured Depth of Well (ft from TOC)	Surface Completion Type	Casing Diameter (in.)	Screen Interval (ft bgs)	Top of Sand Pack (ft bgs)
RW-1	06/13/93	42.5	41.47	Flush Mount	4	36.8 - 41.7	34.75
SVE-1A	09/21/96	30	29.65	Flush Mount	2	20-30	19
SVE-2A	09/20/96	30	29.83	Flush Mount	2	20-30	17.5
SVE-22	11/07/02	35	33.20	Flush Mount	2	25-35	23
SVE-23	11/07/02	39	36.70	Flush Mount	2	25-35	22
SVE-24	11/13/02	30	28.85	Flush Mount	2	20-30	18
SVE-25	11/04/02	34	32.85	Flush Mount	2	24-34	21.6
SVE-26	11/05/02	35	32.45	Flush Mount	2	24-34	22
SVE-27	11/01/02	35	33.90	Flush Mount	2	20-35	18
SVE-28	10/29/02	35	36.00	Flush Mount	2	25-35	23
SVE-30	10/25/02	45	44.00	Flush Mount	2	20-45	18
SVE-31	10/28/02	35	33.95	Flush Mount	2	25-35	23

Note:
ft bgs - feet below ground surface
TOC - top of casing
in. - inches
na - not applicable

Prepared by:
Checked by:

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-1A	6/24/2019	NA	(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
SVE-2A	6/24/2019	NA	(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
SVE-22	3/10/2009	NA	33.00	33.20	0.20	NA
	10/8/2009		32.92	33.10	0.18	NA
	1/26/2010		33.05	33.05 (TD)	0.00	NA
	3/22/2010		33.02	33.02 (TD)	0.00	NA
	4/17/2011		32.90	33.00 (TD)	0.10	NA
	12/22/2011		(a)	33.04	(a)	NA
	4/17/2012		(a)	33.00 (TD)	(a)	NA
	10/18/2012		(a)	33.00 (TD)	(a)	NA
	4/15/2013		(a)	32.98	(a)	NA
	11/3/2013	3616.76 (h)	(a)	33.08	(a)	3,583.68
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	dry	(a)	NA
	11/3/2015		33.00	33.11	0.11	3,583.73
	4/29/2016		32.94	33.09	0.15	3,583.78
	11/16/2016		32.78	32.95	0.17	3,583.94
	5/22/2017		33.00	33.10	0.10	3,583.74
	11/13/2017		33.14	33.19	0.05	3,583.61
	6/1/2018		33.02	33.10	0.08	3,583.72
	11/6/2018		(a)	33.05	(a)	3,583.71
	6/24/2019		32.74	32.75	0.01	3,584.02
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
SVE-23	3/10/2009	NA	32.78	36.75	3.97	NA
	10/8/2009		33.01	33.79	0.78	NA
	1/26/2010		33.12	36.98 (TD)	3.86	NA
	3/22/2010		32.09	33.65	1.56	NA
	4/17/2011		33.00	33.30	0.30	NA
	12/22/2011		33.60	34.05	0.45	NA
	4/17/2012		33.62	34.10	0.48	NA
	10/18/2012		34.11	34.68	0.57	NA
	4/15/2013		33.65	33.92	0.27	NA
	11/3/2013	3612.45 (h)	33.73	36.52	2.79	3,578.05
	5/1/2014		33.78	36.80	3.02	3,577.95
	11/21/2014		32.15	32.84	0.69	3,580.13
	4/21/2015		32.75	33.4	0.65	3,579.54
	11/3/2015		32.74	33.07	0.33	3,579.63
	4/29/2016		33.01	33.33	0.32	3,579.36
	11/16/2016		33.37	33.82	0.45	3,578.97
	5/22/2017		33.60	34.15	0.55	3,578.72
	11/13/2017		32.64	33.28	0.64	3,579.66
	6/1/2018		33.27	33.95	0.68	3,579.02
	11/6/2018		32.55	35.70	3.15	3,579.14
	6/24/2019		Not Gauged - Snake Hazard Exist in Vault			
	1/5/2020		33.10	33.75	0.65	3,579.19
	5/13/2020		33.52	36.50	2.98	3,578.21
	11/10/2020		33.70	34.87	1.17	3,578.47
	1/18/2021		33.80	34.88	1.08	3,578.39
	2/10/2021		33.78	34.87	1.09	3,578.41
	3/8/2021		33.85	34.88	1.03	3,578.35
	4/5/2021		34.00	37.00**	NA	NA

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-24	3/10/2009	NA	(a)	dry	(a)	NA
	10/8/2009		(a)	dry	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	dry	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	dry	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3608.97 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	28.61	(a)	3,580.36
	11/3/2015		(a)	dry	(a)	NA
	4/27/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	dry	(a)	NA
	5/31/2018		(a)	dry	(a)	NA
	11/6/2018		(a)	dry	(a)	NA
	6/24/2019		(a	dry	(a)	NA
	1/6/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/9/2020		(a)	dry	(a)	NA
SVE-25	3/10/2009	NA	(a)	32.70	(a)	NA
	10/8/2009		(a)	31.40	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	32.80	(a)	NA
	4/17/2011		(a)	32.23	(a)	NA
	12/22/2011		(a)	32.65	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	32.70	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3617.02 (h)	(a)	32.72	(a)	3,584.30
	5/1/2014		(a)	32.70	(a)	3,584.32
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	32.73	(a)	3,584.29
	11/3/2015		(a)	dry	(a)	NA
	4/29/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	31.88	(a)	3,585.14
	6/1/2018		(a)	32.6	(a)	3,584.42
	11/6/2018		(a)	31.75	(a)	3,585.27
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		32.5	32.69	0.19	3,584.47
	1/18/2021		32.6	32.71	0.11	3,584.39
	2/10/2021		32.57	32.7	0.13	3,584.42
	3/8/2021		32.55	32.82	0.27	3,584.41
	4/5/2021		32.65	32.75	0.1	3,584.35

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-26	3/10/2009	NA	(a)	dry	(a)	NA
	10/8/2009		(a)	dry	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	dry	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	dry	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3614.43 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	32.6	(a)	3,581.83
	11/3/2015		(a)	dry	(a)	NA
	4/29/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	dry	(a)	NA
	6/1/2018		(a)	dry	(a)	NA
	11/6/2018		(a)	dry	(a)	NA
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
SVE-27	3/10/2009	NA	(a)	32.92	(a)	NA
	10/8/2009		(a)	33.63	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	33.70	(a)	NA
	4/17/2011		(a)	33.70	(a)	NA
	12/22/2011		(a)	33.83	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	33.82	(a)	NA
	11/3/2013	3613.19 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	33.01	(a)	3,580.18
	4/21/2015		(a)	33.58	(a)	3,579.61
	11/3/2015		(a)	33.54	(a)	3,579.65
	4/29/2016		(a)	33.82	(a)	3,579.37
	11/16/2016		(a)	34.15	(a)	3,579.04
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	33.48	(a)	3,579.71
	6/1/2018		(a)	34.00	(a)	3,579.19
	11/6/2018		(a)	33.31	(a)	3,579.88
	6/24/2019		Not Gauged			
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-28	3/10/2009	NA	(a)	28.60	(a)	NA
	10/8/2009		(a)	28.95	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	29.07	(a)	NA
	4/17/2011		(a)	29.17	(a)	NA
	12/22/2011		(a)	29.65	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	33.58	(a)	NA
	11/3/2013	3607.84 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	28.59	(a)	3,579.25
	4/21/2015		(a)	28.86	(a)	3,578.98
	11/3/2015		(a)	28.75	(a)	3,579.09
	4/27/2016		(a)	28.97	(a)	3,578.87
	11/16/2016		(a)	29.18	(a)	3,578.66
	5/22/2017		(a)	29.44	(a)	3,578.40
	11/13/2017		(a)	28.76	(a)	3,579.08
	6/1/2018		(a)	29.15	(a)	3,578.69
	11/6/2018		(a)	28.53	(a)	3,579.31
	6/24/2019		(a)	28.97	(a)	3,578.87
	1/5/2020		(a)	28.81	(a)	3,579.03
	5/13/2020		(a)	29.05	(a)	3,578.79
	11/10/2020		(a)	29.73	(a)	3,578.11
SVE-30	3/10/2009	NA	(a)	39.32	(a)	NA
	10/8/2009		(a)	39.29	(a)	NA
	3/22/2010		(a)	40.28	(a)	NA
	4/17/2011		(a)	40.11	(a)	NA
	12/22/2011		(a)	41.11	(a)	NA
	4/17/2012		(a)	41.65	(a)	NA
	10/18/2012		(a)	41.42	(a)	NA
	4/15/2013		(a)	41.67	(a)	NA
	11/3/2013	3616.00 (h)	(a)	43.02	(a)	3,572.98
	5/1/2014		(a)	43.35	(a)	3,572.65
	11/21/2014		(a)	43.30	(a)	3,572.70
	4/21/2015		(a)	41.80	(a)	3,574.20
	11/3/2015		(a)	41.60	(a)	3,574.40
	4/28/2016		(a)	41.56	(a)	3,574.44
	11/16/2016		(a)	41.23	(a)	3,574.77
	5/22/2017		NA	NA	NA	NA
	11/13/2017		(a)	42.00	(a)	3,574.00
	6/1/2018		(a)	42.02	(a)	3,573.98
	11/6/2018		(a)	42.46	(a)	3,573.54
	6/24/2019		(a)	42.52	(a)	3,573.48
	1/5/2020		(a)	42.45	(a)	3,573.55
	5/13/2020		(a)	42.55	(a)	3,573.45
	11/10/2020		(a)	43.05	(a)	3,572.95

Table 2-2. Summary of Groundwater Surface Elevations for Wells in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-31	3/10/2009	NA	(a)	30.45	(a)	NA
	10/8/2009		(a)	30.43	(a)	NA
	1/26/2010		(a)	30.55	(a)	NA
	3/22/2010		(a)	31.49	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	28.50	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3612.67 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	30.27	(a)	3,582.40
	4/21/2015		(a)	30.97	(a)	3,581.70
	11/3/2015		(a)	30.200	(a)	3,582.47
	4/28/2016		(a)	30.35	(a)	3,582.32
	11/16/2016		(a)	30.73	(a)	3,581.94
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	30.48	(a)	3,582.19
	6/1/2018		(a)	dry	(a)	NA
	11/6/2018		(a)	30.24	(a)	3,582.43
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	31.65	(a)	3,581.02
RW-1	3/10/2009	NA	(a)	33.17	(a)	NA
	10/8/2009		(a)	33.48	(a)	NA
	3/22/2010		(a)	33.62	(a)	NA
	4/17/2011		(a)	33.80	(a)	NA
	12/22/2011		(a)	34.26	(a)	NA
	4/17/2012		(a)	34.57	(a)	NA
	10/18/2012		(a)	35.16	(a)	NA
	4/15/2013		(a)	35.77	(a)	NA
	11/3/2013	3612.72 (h)	(a)	34.95	(a)	3,577.77
	4/30/2014		(a)	35.48	(a)	3,577.24
	11/19/2014		(a)	32.46	(a)	3,580.26
	4/21/2015		(a)	33.08	(a)	3,579.64
	11/3/2015		(a)	33.00	(a)	3,579.72
	4/28/2016		(a)	33.32	(a)	3,579.40
	11/16/2016		(a)	33.70	(a)	3,579.02
	5/22/2017		(a)	34.03	(a)	3,578.69
	11/13/2017		(a)	32.96	(a)	3,579.76
	6/1/2018		(a)	33.62	(a)	3,579.10
	11/6/2018		(a)	32.82	(a)	3,579.90
	6/24/2019		(a)	33.57	(a)	3,579.15
	1/5/2020		(a)	33.38	(a)	3,579.34
	5/13/2020		(a)	33.68	(a)	3,579.04
	11/10/2020		(a)	34.55	(a)	3,578.17

Notes:
PSH - Phase separated hydrocarbon
ft - feet
** field error measurment
TOC - Top of Casing
Corrections to ground water surface elevation for PSH is calculated assuming a specific gravity of 0.76
(NA) Information not available
(a) Not applicable since no measurable thickness of PSH is present
Historical data before 2009 is presented in previous reports
Historical data for wells that were plugged and abandoned is not shown.

Prepared by: SWS 4/6/21
Checked by: HRB 4/6/21

Table 2-3. Summary of Groundwater Analytical Results in the Perched Aquifer
Transwestern Compressor Station No. 9 - Roswell, NM

Well	Sampling Date	Benzene	Toluene	Ethylbenzene	Xylenes (total)	1,1-Dichloroethane	1,1-Dichloroethene	Vinyl Chloride	1,4-Dioxane
NMWQCC Human Health Standard		10	750	750	620	25	5	1	-
USEPA MCL		5	1,000	700	10,000	--	7	2	-
Tap Water (2012)		4.13	2280	14.8	-	24.2	340	0.16	-
Groundwater Cleanup Level (GCL)		5	750	700	620	25	5	1	-
SVE-28	11/12/18	**14**	<1.0	<1.0	<1.5	NA	NA	NA	NA
	06/26/19	1.5	<1.0	<1.0	<1.5	2.2	<1.0	<1.0	NA
	01/08/20	1.5	<1.0	<1.0	<1.5	2.2	<1.0	<1.0	NA
	09/10/20	NA	NA	NA	NA	NA	NA	NA	<1.0
	11/23/20	1.3	<1.0	<1.0	<1.5	1.3	<1.0	<1.0	NA
SVE-30	11/12/18	**15**	<5.0	41	<7.5	NA	NA	NA	NA
	06/26/19	**10**	<5.0	24	<7.5	**30**	<5.0	<5.0	NA
	01/08/20	**8.9**	<5.0	29	<7.5	**32**	<5.0	<5.0	NA
	09/10/20	**8.6**	<5.0	20	<7.5	**25**	<5.0	<5.0	**5.9**
	11/23/20	**5.7**	<1.0	8	<1.5	**33**	NA	NA	**6.0**
SVE-31	11/12/18	<1.0	<1.0	<1.0	<1.5	NA	NA	NA	NA
	11/23/20	<1.0	<1.0	<1.0	<1.5	NA	NA	NA	NA
RW-1	11/12/18	**32**	<1.0	1.4	<1.5	NA	NA	NA	NA
	06/26/19	**51**	<1.0	1.4	<1.5	12	<1.0	<1.0	NA
	01/08/20	**26**	<1.0	1.5	<1.5	4.3	<1.0	<1.0	NA
	09/10/20	**25**	<1.0	6.2	<1.5	3.1	<1.0	<1.0	<1.0
	11/23/20	**38**	<1.0	13	7.9	3.5	<1.0	<1.0	<u><25</u>

Notes:

Bold indicates that the analytical result exceeds the applicable regulatory limits.

Bold indicates that the analytical result exceeds the detection limit

<u><25</u> indicates that the limit of quantitation (LOQ) value is higher than the applicable GCLs

Prepared by: SWS
Checked by: SSD

* - Phase separated hydrocarbons (PSH) present in well. Sample collected below PSH.

-- Data not available.

Only constituents detected in one or more groundwater samples are shown in this table

All results reported above the applicable standard are shown in bold type

Results reported in micrograms per liter (µg/L)

NA - Not analyzed; constituent is not part of the sampling plan

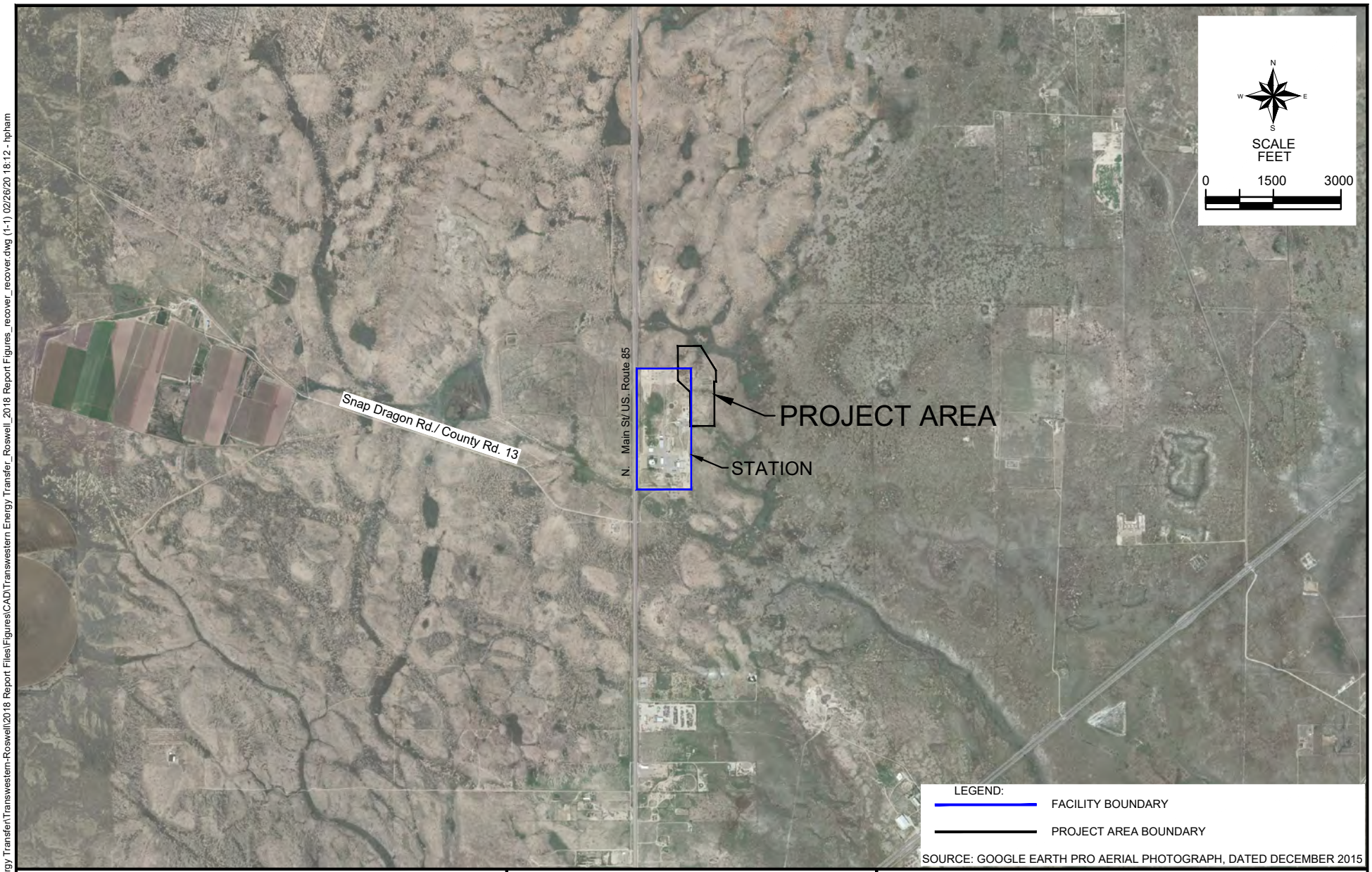
NMWQCC - New Mexico Water Quality Control Commission

NMWQCC Human Health Standards - from New Mexico Administrative Code (NMAC) 20.6.2, Part A, Human Health Standards. Used as GCL for target cleanup if lower than the MCL.

USEPA MCL - United States Environmental Protection Agency's Maximum Concentration Limit. Used as GCL for target cleanup if lower than the NMWQCC Human Health Standard.

Tap Water (2012) - From Table A-1 for the 2012 NMED Risk Assessment Guidance for Site Investigation and Remediation. Used as GCL for target cleanup if WQCC standard nor MCL has been established.

FIGURES



TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No. 9
(ROSWELL COMPRESSOR STATION)
ROSWELL, CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

EARTHCON®

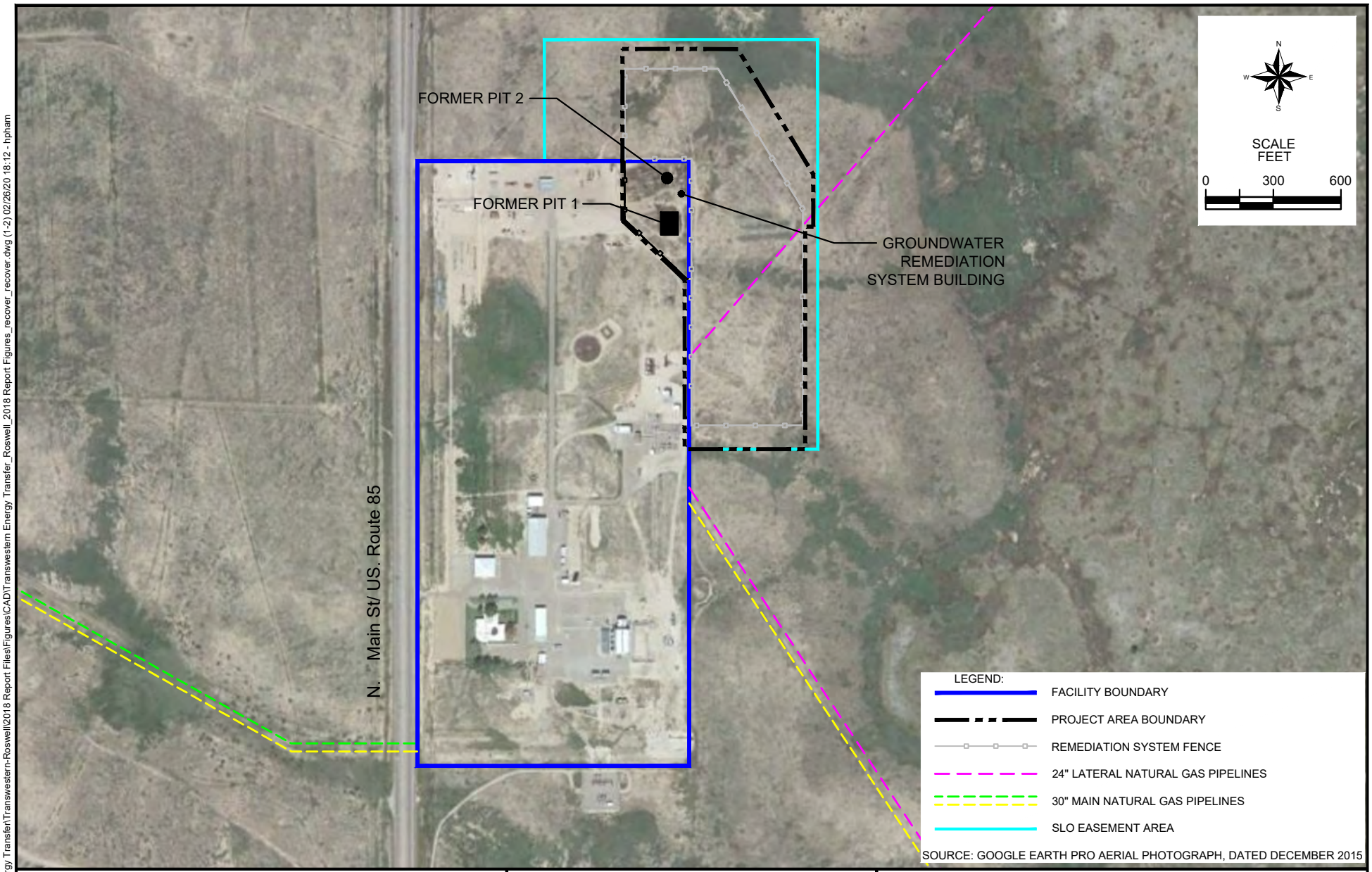
EarthCon Consultants, Inc.

1880 WEST OAK PKWY, BLDG 100, STE 106, MARIETTA, GA, 30062

PROJECT AREA LOCATION MAP

DRAWN:	CHECKED:	DATE:	FIGURE:
HVP	JM	02/26/2020	1-1

FILENAME: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2018 Report Files\Figures\CAD\Transwestern Energy Transfer_Roswell_2018 Report Figures_recover_recover.dwg (1-1) 02/26/20 18:12 - hpham



TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No. 9
(ROSWELL COMPRESSOR STATION)
ROSWELL, CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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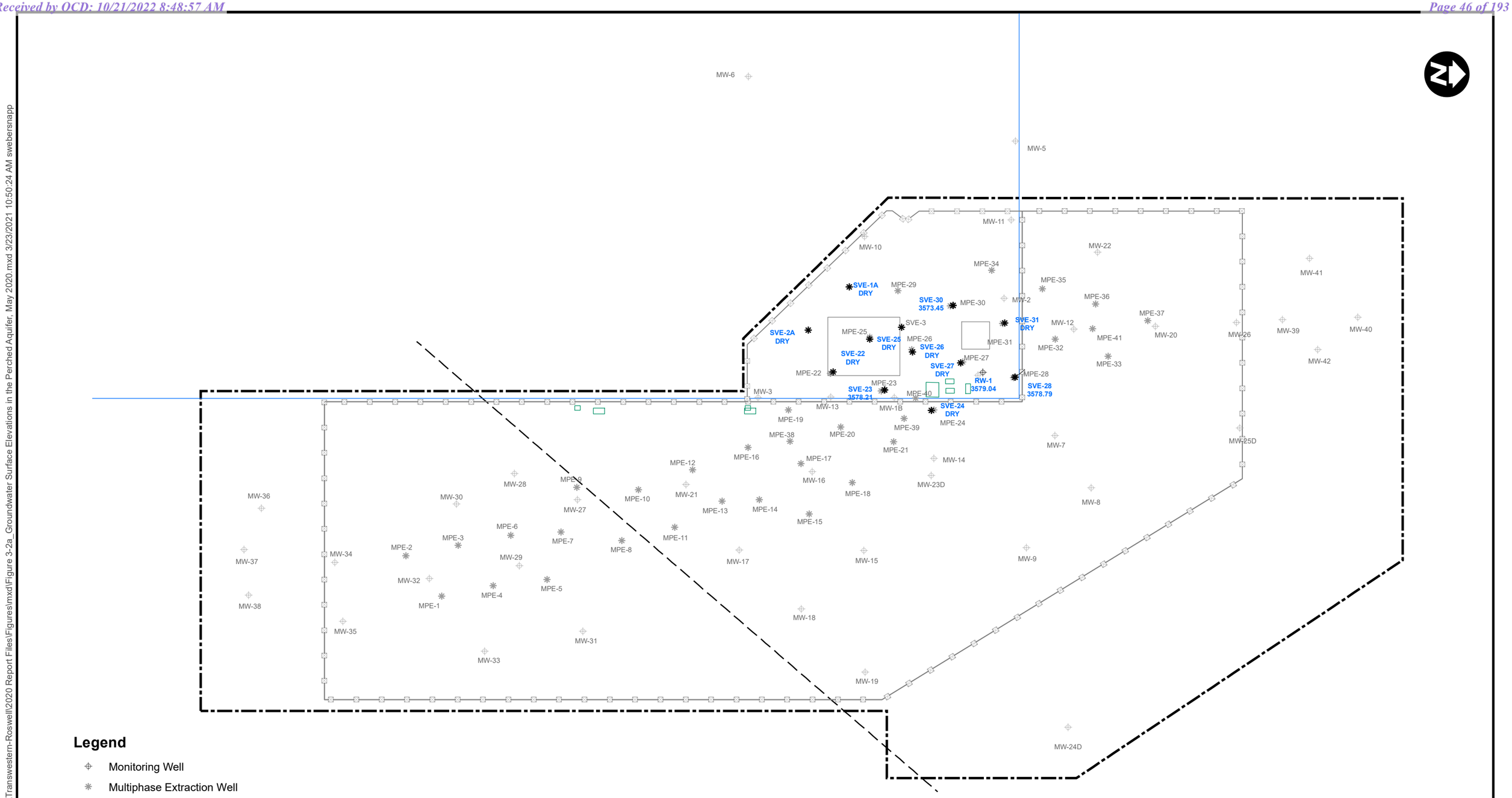
PROJECT AREA FEATURES

DRAWN:	CHECKED:	DATE:	FIGURE:
HVP	JM	02/26/2020	1-2

FILENAME:S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2018 Report Files\Figures\CAD\Transwestern Energy Transfer_Roswell_2018 Report Figures_recover_recover.dwg (1-2) 02/26/20 18:12 - hpham



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary

0 75 150 300 Feet

Note: RW-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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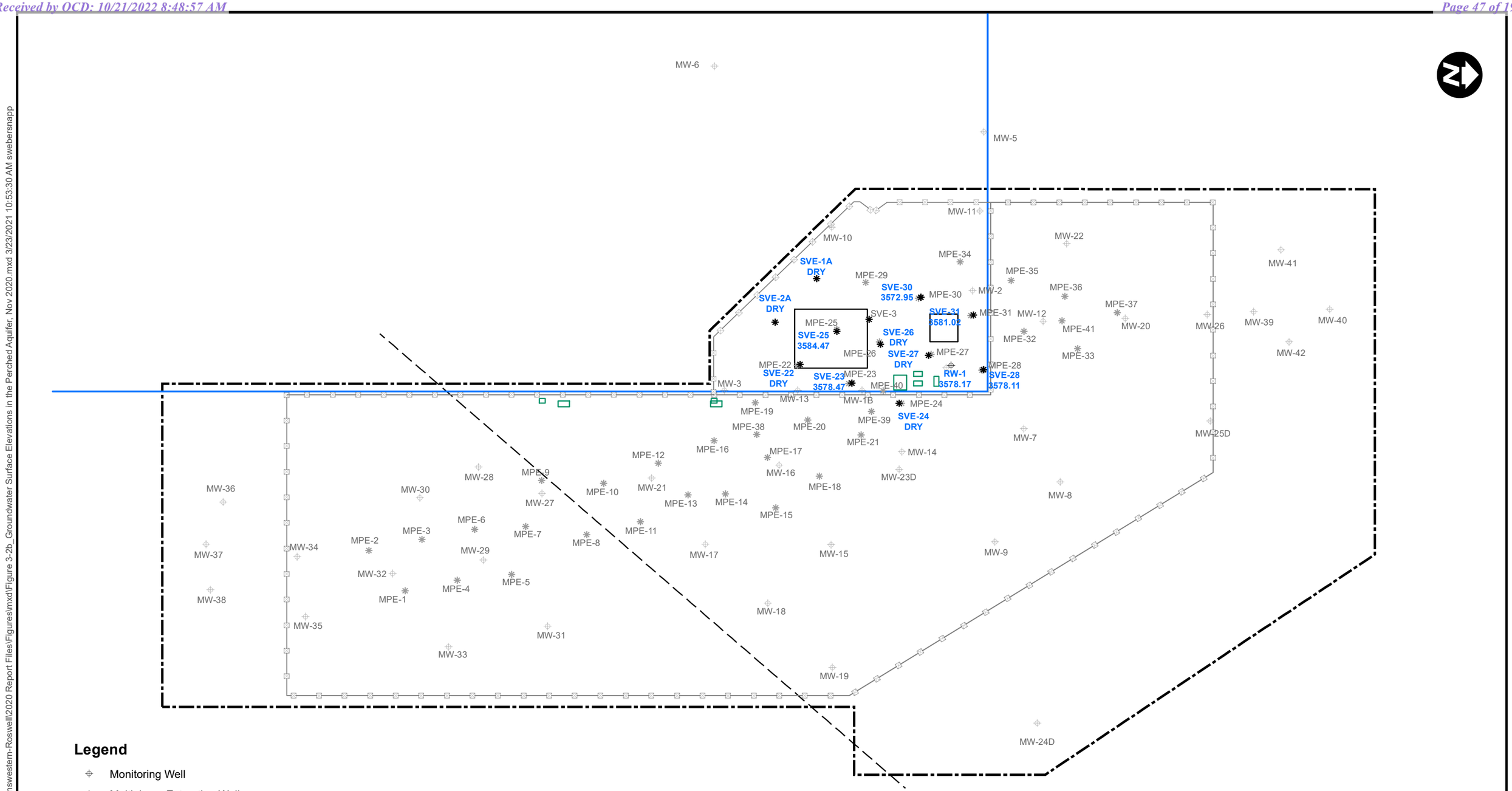
Groundwater Surface Elevations in the Perched Aquifer May 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JAN 2021	2-1a

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-2a_Groundwater Surface Elevations in the Perched Aquifer, May 2020.mxd 3/23/2021 10:50:24 AM swebersnapp



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary

0 75 150 300 Feet

Note: RW-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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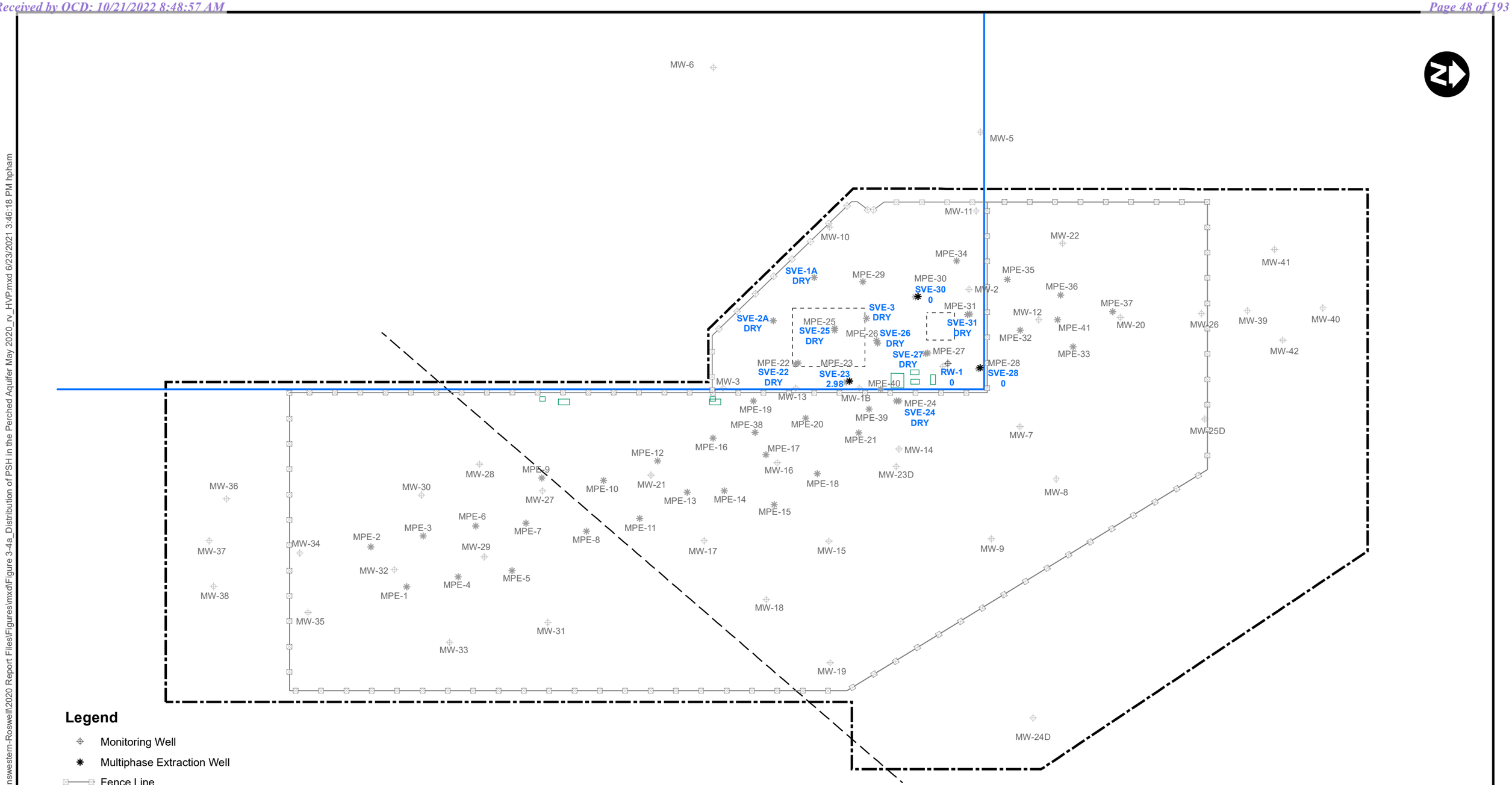
Groundwater Surface Elevations in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JAN 2021	2-1b

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-2b_Groundwater Surface Elevations in the Perched Aquifer, Nov 2020.mxd 3/23/2021 10:53:30 AM swebersnapp



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- 2.98 PSH thickness in feet

0 75 150 300 Feet

Note: Rw-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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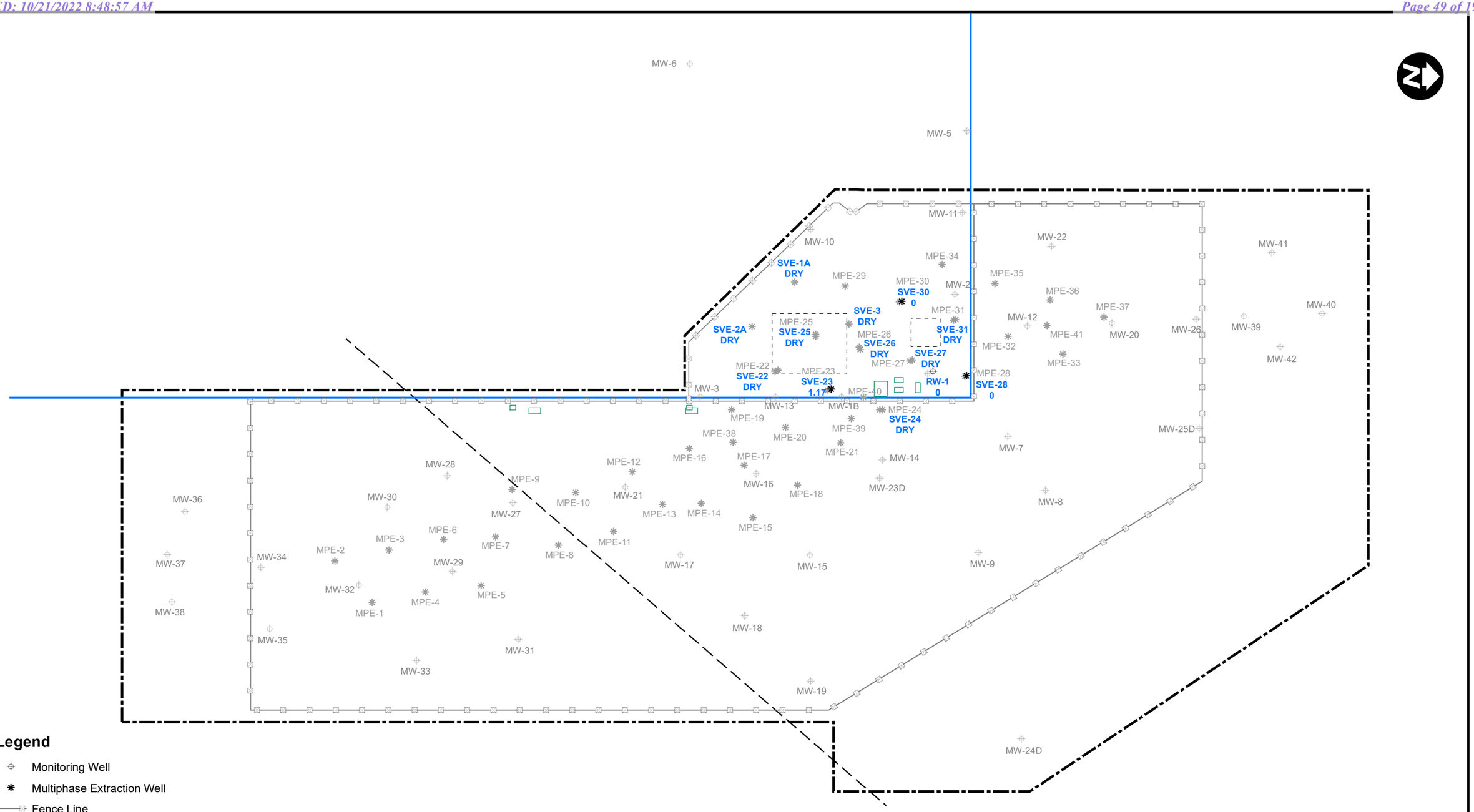
Distribution of PSH in the Perched Aquifer May 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	2-2a

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-4a_Distribution of PSH in the Perched Aquifer May 2020_rv_HVP.mxd 6/23/2021 3:46:18 PM hpham



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- 1.17 PHS thickness in feet

0 75 150 300 Feet

Note: Rw-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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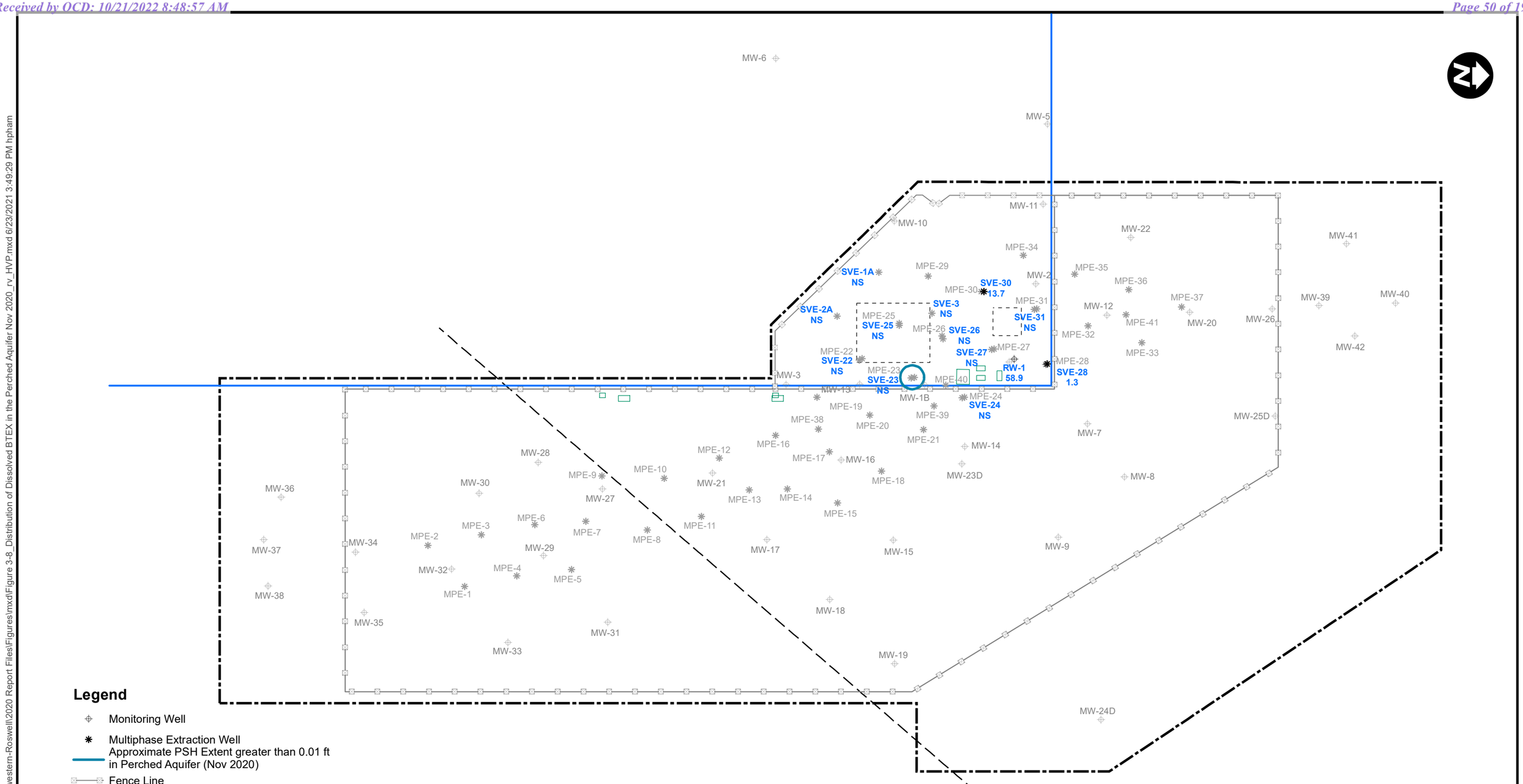
Distribution of PSH in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	2-2b

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-4b_Distribution of PSH in the Perched Aquifer Nov 2020_rv_HVP.mxd 6/23/2021 3:28:52 PM hpham



Legend

- Monitoring Well
- Multiphase Extraction Well
- Approximate PSH Extent greater than 0.01 ft in Perched Aquifer (Nov 2020)
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- **13.7** BTEX Concentration in ug/L
- **NS** Not sampled in accordance with SAP.

0 75 150 300 Feet

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

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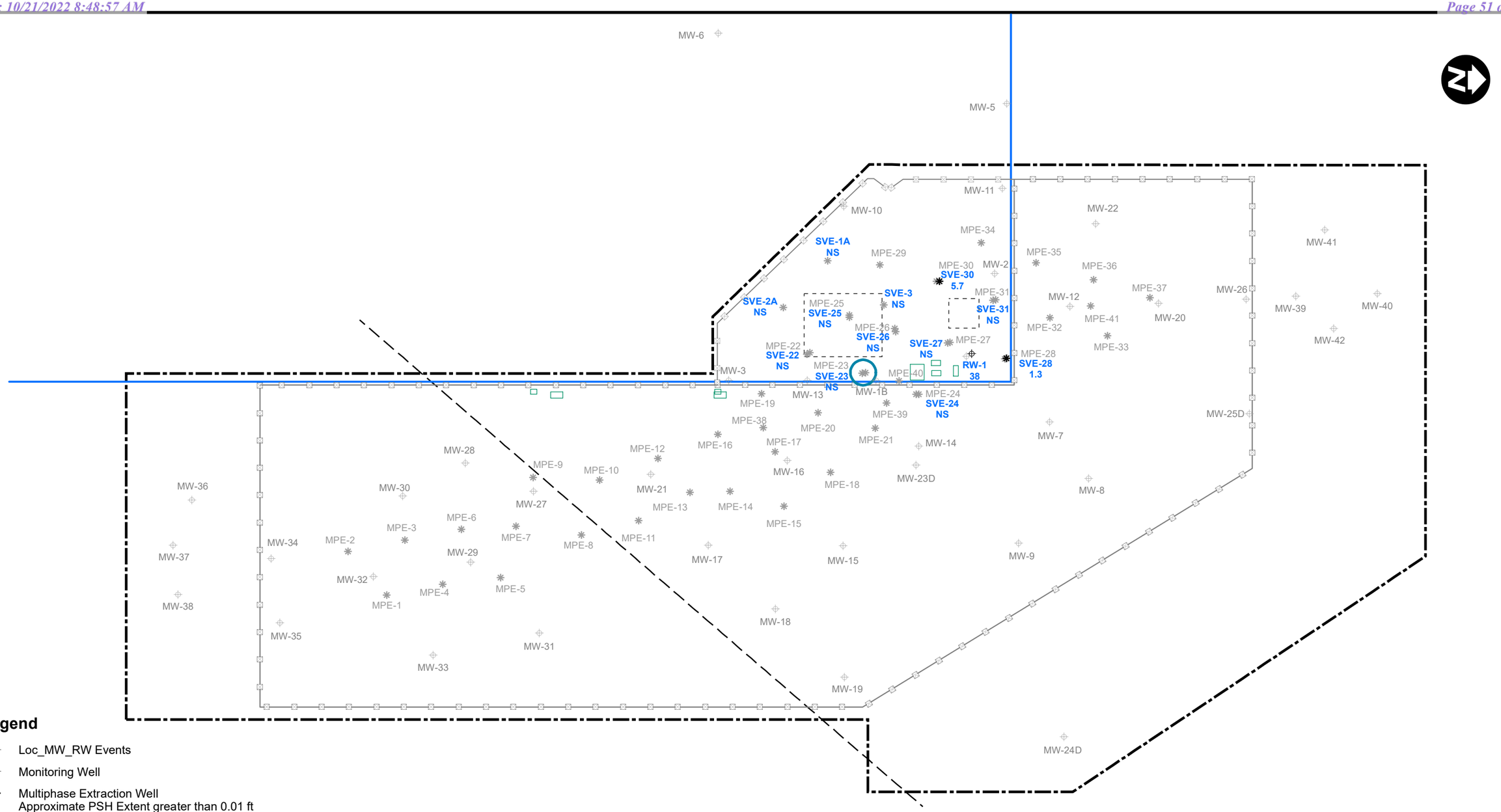
Distribution of Dissolved BTEX in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	3-1



Legend

- Loc_MW_RW Events
- Monitoring Well
- Multiphase Extraction Well
- Approximate PSH Extent greater than 0.01 ft in Perched Aquifer (Nov 2020)
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- **5.7** Benzene Concentration in ug/L
- **NS** Not sampled in accordance with SAP.

0 75 150 300 Feet

Note: Rw-1, SVE-23, SVE-28, SVE-30 are in the Perched Aquifer and required to be sampled per the approved 2020 Sampling Plan.

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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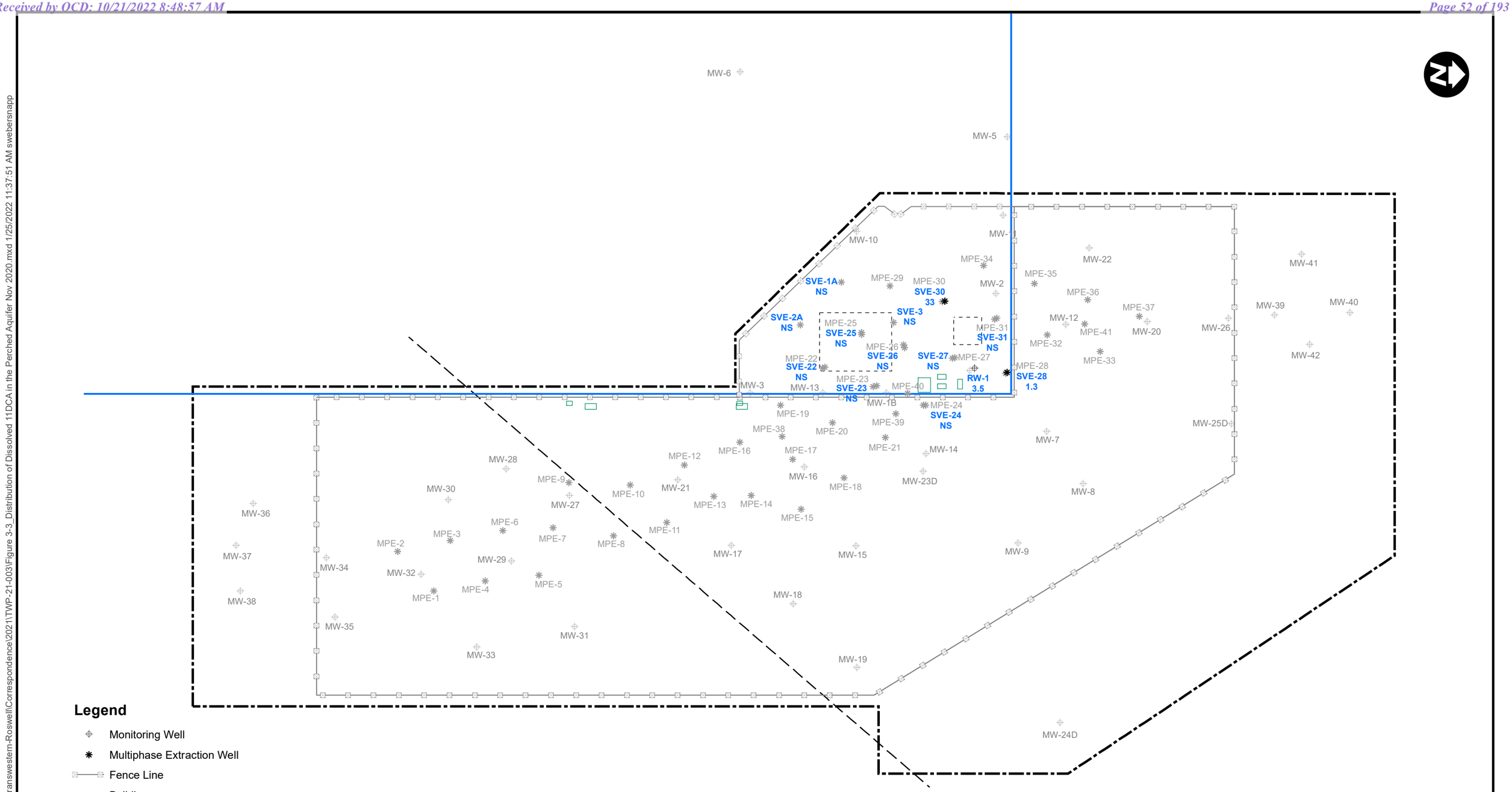
Distribution of Dissolved Benzene in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	3-2

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2020 Report Files\Figures\mxd\Figure 3-6_Distribution of Dissolved Benzene in the Perched Aquifer Nov 2020_RV_HVP.mxd 6/23/2021 3:51:40 PM hpham



Legend

- Monitoring Well
- Multiphase Extraction Well
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary
- **<1.0** 1,1-DCE Concentration in ug/L
- **NS** Not sampled in accordance with SAP.

0 75 150 300 Feet

REPORT OF 2018 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)

ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. 02.20180005.00

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Distribution of Dissolved 1,1-DCA in the Perched Aquifer November 2020

DRAWN	CHECKED	DATE	FIGURE
SWS	SD	JUNE 2021	3-3

File: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\Correspondence\2021\TWP-21-003\Figure 3-3_Distribution of Dissolved 11DCA in the Perched Aquifer Nov 2020.mxd 1/25/2022 11:37:51 AM swebersnapp

ATTACHMENT

Cypress Engineering Services, Inc.
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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-1**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**M. Bates**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/06/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -30		GM	GRAVEL AND SAND: 0'-2': Silty clay w/ gravel, 2'-4' caliche, white pink, dry 5'-32':GM: Gravel, Sand, Silt, Mixture, gravel to 2", Lt. Brown, med. dense, dry. Gravel is cemented 5'-7',26'-29', hard drilling @32' Sand with clay, red to brown, soft, slightly plastic, moist					Cement Grout 3'-46'
-30 to -40		SC/CL	CLAY AND SAND: SC: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
-40 to -65		SP/SC	CLAY AND SAND: SP/SC: 50'-75' Poorly Graded Sand with clay , Reddish / Tan No odor , Saturated @62' BGS TD 79' Riser 79'-74', 0.020 Slot Screen 74'-54', 12/20 Sand Pack 79'-49', Bentonite Seal 49'-46',					Bentonite 46' Top Sand 49' Top Screen 54'
-65 to -75		SC	CLAYEY SAND: Reddish Tan, Soft, Moist, No Odor or Staining Depth to Water 61.03' BGS 12/07/02					Sump 74'-79' TD 79'
-75		SC						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-2**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Ingersoll-Rand A-300**
LOGGED BY:	**C.M. Barnhill, PG**	METHOD OF DRILLING:	**HSA 81/4" Augers**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/21-24/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -30		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-30		Cngl.	CONGLOMERATE: Hard					
-30 to -55		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @60' BGS, No odor or staining, TD 79' Water Level @ 59.95' BGS 01/06/03					Bentonite 48' Top Sand 51' Top Screen 54' 12/20 Sand 0.020 Slot Screen
-55 to -75		SW/SP	SW: Med. to fine grained tan sand, well sorted, saturated @ 60' BGS, No odor or staining. Damp @ TD, Flowing Sands.					TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-3**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M. Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/20-21/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-5 to -10		GM						
-10 to -20		GM						
-20 to -25		GM						
-25 to -30		Cngl.	CONGLOMERATE: Hard					
-30 to -35		SW	SW: Sand Layer, brown,					
-35 to -40		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @62' BGS, No odor or staining, @ 74' BGS TD 79' Water Level @ 63.82' BGS 12/21/02					
-40 to -45		SC						
-45 to -50		SC						
-50 to -55		SC						
-55 to -60		SC						
-60 to -65		SW/SP	SW: Med. to fine grained tan sand, well sorted, saturated @ 62' BGS, No odor or staining. Damp @ TD					Bentonite 48' Top Sand 51' Top Screen 54' 12/20 Sand 0.020 Slot Screen
-65 to -70		SW/SP						
-70 to -75		SW/SP						
-75 to -85		SW/SP						TD 79'
-85 to -90		SW/SP						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-4**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/18-19/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-30 to -35		Cngl.	CONGLOMERATE: Hard					
-35 to -40		GM	GM: Gravel, pea sized, mixed with sand, silt					
-40 to -60		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @64' BGS, No odor or staining, @ 74' BGS TD 79' Water Level @ 63.82' BGS 12/21/02					Bentonite 48' Top Sand 51' Top Screen 54'
-60 to -75		SW/SP	SW: Med. to fine grained tan sand, well sorted, saturated @ 64' BGS, No odor or staining.					
-75 to -90		SC/SW	SC: Sand ,fine gr., well sorted , Clayey, 60% Sand, No odor or Staining, Damp					TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-5**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/16/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-53'
-35		Cngl.	CONGLOMERATE: Hard					
-35 to -75		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @64' BGS, No odor or staining, TD 79' Water Level @ 63.75' BGS 12/17/02					Bentonite 53' Top Sand 56' Top Screen 59' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-6**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/16-17/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

⧖ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: *Gravel, Sand, Silt, Mixture*, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-5 to -25		Cngl.	CONGLOMERATE: Hard Drilling, well cemented conglomerate or cemented sandstone layer.					
-25 to -35			GM: Harder Drilling, gravel fragments, yellowish color					
-35 to -50		SC	SC: Clayey Sand Lt. Red/ tan brown, to tand brown, fn. to med.grained sand, well sorted, strong clay fraction, soft, No odor /staining.					Bentonite 48'
-50 to -55		CL	CL: Strong Clay					Top Sand 51'
-55 to -75		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @64' BGS, No odor or staining, @ 74' BGS Clay & Sand:,gravel & Clay lenses, TD 79' Water Level @ 65.55' BGS 12/18/02					Top Screen 54'
-75 to -90		GC / GC	GC: Gravel 10%, Clay30%, fine gr. sand 60%, No odor or Staining, Damp					TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-7**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/10-13/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GRAVEL AND SAND: 0'-5': GM *mixed with caliche*, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-47'
		Cngl.	CONGLOMERATE: Hard Drilling, well cemented conglomerate or cemented sandstone layer.					
		SC	SC: Clayey Sand Lt. Red/ tan brown, to tand brown, fn. to med.grained sand, well sorted, strong clay fraction, soft, No odor and staining.					Bentonite 47' Top Sand 50' Top Screen 54'
		SC/GC	GC: Gravel 10%, Clay30%, fine gr. sand					
		SC	SC: Clayey Sand, tan *brown to light brown* reddish saturated @63' BGS, No odor or staining, @ 74' BGS Clay & Sand:& Fat Clay lenses, TD 79' Water Level @ 64.79' BGS 12/14/02					Sump 74'-79' TD 79'
		SC						
		SC						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-8**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/13-14/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ *Water level in completed well*

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-53'
-30		Cngl.	CONGLOMERATE: Hard					
-35		SC	SC: Clayey Sand					
-40		SC/GC	GC: Clayey Gravel / Sand Lt. Red/ tan brown, to tan					
-45		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @64' BGS, No odor or staining, @ 74' BGS Clay & Sand:& Fat Clay lenses, TD 79' Water Level @ 64.79' BGS 12/16/02 @ 77' Strong staining of sand, and odor. Odor more sewer-like than hydrocarbon odor.@79' BGS Strong Fat Clay					Bentonite 53' Top Sand 56' Top Screen 59'
-75		SP/SC	SP: SP/SW Med, gr. sand					
-90		CH	CH: Fat Clay, red brown, dry	79'-81'	41/24"			TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-9**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/17-18/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-40		SC	SC: Clayey Sand Lt. Red/ tan brown, to tand brown, fn. to med.grained sand, well sorted, strong clay *fraction, soft, No odor and* staining.					
-55		SW/SP	SW: Sand, med. gr. well	54'-56'	105/16			Bentonite 48' Top Sand 51' Top Screen 54'
-60		SC	SC: Clayey Sand, tan brown to light brown red	59'-61'	20/24"			
-70		SW/SP	SW: Tan to brown, med. *to fine gr. well sorted sand,* slight odor, saturated at 62' BGS, slight hydrocarbon odor, no staining	64'-66'	70/24"			
				69'-71'	30/24"			
-75		SC	SC: Brown Clayey Sand Dry @ 75'	74'-76'	30/24"			Sump 74'-79' TD 79'
-85		CL	CL: Brown Fat Clay, Dry, No Odor or Staining	79'-81'	50/24"			
-90								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-10**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/09/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▾ Water level during drilling
▾ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP.	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-27':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 27'-30' Hard cemented Conglomerate 30-50' SM/SP/SC: Poorly graded sand with clay, red to brown, soft, slightly plastic moist.					Cement Grout 3'-47'
-25		Conglom	CONGLOMERATE					
-30			CLAY AND SAND: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
-40		SC/CL						
-45								Bentonite 47'
-50		SW	SAND: SW: 50'-59' Fine gr. Sand, tan brown, well sorted, No odor or staining.	49'-51'	18"/50			Top Sand 50'
-55				54'-56'	12"/50			Top Screen 54'
-60		SC	CLAYEY SAND: SC: Clayey Sand Lt. Red/ tan	59'-61'	24"/40			
-65		SW	SAND: Tan brown, reddish tan sand, med. to fine gr., well sorted, No Odor. Saturated @ 62' BGS	64'-66'	12"/46			
-70				69'-71'	18"/50			
-75		SC	CLAYEY SAND: Tan Brown / Red tan, Clayey	74'-76'	24"/30			Sump 74'-79'
-80		SC/CL	CLAY: Clay & Sand:& Fat Clay lenses, Dry@ 74' BGS	79'-81'	24"/50			TD 79'
-85								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-11**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/07/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▾ Water level during drilling
▪ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP.	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -80		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 24'-32': Hard cemented Conglomerate / Hard drilling					Cement Grout 3'-47'
-25		Cngl.	CONGLOMERATE: Hard Drilling, well cemented					
-30 to -50		SC/CL	CLAYEY SAND: SC: Clayey Sand Lt. Red/ tan brown, to tand brown, fine to medium grained sand, well sorted, strong clay fraction, soft, Saturated @ 60' BGS Slight odor and staining, strong contamination in capillary fringe 55'-60' BGS, gray black stain to sandy clay with strong hydrocarbon odor. No PsH in well Water @ 60.90' BGS 12/09/02					Bentonite 47' Top Sand 50' Top Screen 54'
-50		SC						
-65		SC						
-75		CH	CLAY: Clay & Sand:& Fat Clay lenses, Dry					Sump 74'-79' TD 79'
-80		CH						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-12**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill, / M. Bates**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/03-06/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▾ Water level during drilling
▪ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP.	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-37':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 5'-15' SM/SP/SC: Poorly graded sand & Silt @37' Sand with clay, red to brown, soft, slightly plastic, moist.					Cement Grout 3'-48'
-35 to -40		SC/CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
-40 to -60		SP/SC	CLAYEY SAND: SP/SC: 50'-75' Poorly Graded Sand with clay ,No odor Saturated @62' BGS TD 79' Riser 79'-74', 0.020 Slot Screen 74'-54', 12/20 Sand Pack 79'-51', ~~Bentonite Seal 51'-48'~~,					Bentonite 48' Top Sand 51' Top Screen 54'
-60 to -65		SP/SC						
-65 to -75		SS	CALCAREOUS SANDSTONE: Hard					Sump 74'-79'
-75 to -85		CL	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown, stiff, low plasticity, moist, blocky @79' SP/SC Poorly Graded sand with clay					TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-13**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill, / R. Marshall**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/02-03/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▾ Water level during drilling
▪ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP.	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -80		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-33':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 5'-15' SM/SP/SC: Poorly graded sand & Silt @33' Sand with clay, red to brown, soft, slightly plastic, moist. 40'-49': CL/SC: Lean clay with sand, red, medium stiff, plastic moist.					Cement Grout 3'-46'
-35		SC/CL	CLAYEY SAND: SC/CL Clayey Sand , Red med-fine gr. well sorted sand ~~with strong clay fraction~~					
-40			CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					Bentonite 46'
-50		SP/SC	CLAYEY SAND: SP/SC: 50'-75' Poorly Graded Sand with clay ,no odor Saturated @60' BGS TD 79' Riser 79'-74', 0.020 Slot Screen 74'-54', 12/20 Sand Pack 79'-49', Bentonite Seal 49'-47', Cement Grout 47'-3'					Top Sand 50.7' Top Screen 54'
-65		SP/SC						
-75		CL	CALCAREOUS SANDSTONE: Hard					Sump 74'-79'
-80		CL	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown, stiff, low plasticity, moist, blocky @79' SP/SC Poorly Graded sand with clay					TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-14**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Clayton M Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/25/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: 0'-3': GM mixed with caliche, white pink, dry 3'-40':GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-48'
-40 to -43		CH	CLAY: CH: 40'-43': Fat					
-43 to -45		SS	CALCAREOUS					
-45 to -79		CL/CH SC	CLAYEY SAND: SC/CL/CH: 45'-79' Sandy clay, Clayey sand, red/ brown, med. stiff, moist, moderate odor, no staining. Saturated @ 62 TD 79' Grout 48'-3' Bentonite 48'-51' Sand 51'-79' 0.020 Screen 74'-54' Riser 74'-79' Water Level @ 61.70' BGS 11/26/02					Bentonite 48' Top Sand 51' Top Screen 54' Sump 74'-79' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-15**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/22/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GRAVEL AND SAND: 0'-4': GM mixed with caliche, white pink, dry 4'-42':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry becoming moist @ 40' BGS					Cement Grout 3'-49'
		CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist. Water Level 61.13' BGS 11/25/02	49'-51'	24"/33			Bentonite 49.9'
		SP/SC	CLAYEY SAND: SP/SC: 54'-79' Poorly Graded Sand with clay & gravel, red dense, moist, fragements of sandstone as gravel, hard drilling 65'-71', No odor or staining. TD 79' Saturated @ 60' BGS Cement / Bentonite Grout 49'-3' Bentonite 49'-54' 12/20 Sand Pack ' 54'-74' 0.020 Slot Screen 74'-59' Riser 74'-79' No Odor or Staining at TD	54'-56'	12"/51			Top Sand 54'
				59'-61'	24"/41			Top Screen 59'
				64'-66'	14"/50			
				69'-71'	24"/50			
		SP/SC		74'-76'	20"/70			Sump 74'-79' TD 79'
				79'-81'	24"/74			

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-16**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill, / R. Marshall**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/26-27/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: Strong PsH in Soil Boring

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-40':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 15'-40' SM/SP/SC: Poorly graded sand with clay, red to brown, soft, slightly plastic, moist. 40'-49': CL/SC: Lean clay with sand, red, medium stiff, plastic moist. Minor gravel.					Cement Grout 3'-47'
		SC/CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
		SP/SC	CLAYEY SAND: SP/SC: 50'-75' Poorly Graded Sand with clay ,slight odor Saturated @60' BGS Strong hydrocarbon staining, odor, and PsH at 64'-74' TD 79' Riser 79'-74', 0.020 Slot Screen 74'-54', 12/20 Sand Pack 79'-49', Bentonite Seal 49'-47', Cement Grout 47'-3'	49'-51' 54'-56' 59'-61' 64'-66' 69'-71'	41"/18 22"/24 12"/34 12"/34 24"/18			Bentonite 47' Top Sand 49' Top Screen 54'
		SP/SC						
		CL Redbed	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown,	74'-76'	24"/32			Sump 74'-79'
			MUDSTONE: Marroon Mudstone, with Gypsum and anhydrite lenses, hard drilling, dry, no odor.	79'-81'	6"/51			TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-17**
TOTAL DEPTH: **75'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/20/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: PsH@ 61.75'H2O@66.25'(BGS)11/25/02

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -45		GM	GRAVEL AND SAND: GM: 0'-4' BGS White Pink Caliche, Hard, Dry 4'-43' :Gravel, Sand, Silt, Mixture, gravel to 4", Light Brown, medium dense, dry, No odor					Cement Grout 3'-46'
-45 to -50		SP/SC	CLAYEY SAND: SP-SC: Poorly graded Sand with clay, red to strong brown, soft moist, slight odor					Bentonite 46'
-50 to -55		CL	CLAY AND SAND: CL: Lean clay with sand, red, medium stiff, plastic, moist, moderate odor					Top Sand 49'
-55 to -70		SP/SC	CLAYEY SAND: SP-SC: Poorly graded sand with clay, lt. red brown, med to loose, moist, dense. Mod.odor, increased drilling rate. TD 75' BGS Strong Odor @ 70' BGS 5' sump 70'-75', 0.020 slot screen 55'-70', 12/20 Sand 49'-75', Bentonite 46'-49', cement grout 3'-46' 11/25/02: PsH@61.75' (BGS)					Top Screen 55'
-70 to -90		SP/SC						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-18**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/21/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

⧖ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -55		GM	GRAVEL AND SAND: 0'-4': GM mixed with caliche, white pink, dry 4'-58':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry becoming moist @ 50' BGS Slight Odor to No Odor 58'-72' SP/SC Poorly Graded Sand With Clay, Lt. Reddish-brown, med. dense, moist					Cement Grout 3'-52'
-55 to -60		GM SP/SC	CLAY AND SAND: SP/SC:Poorly graded sand with clay, Lt. reddish -brown, med. dense, moist Water Level 59.87' BGS 11/25/02 Saturated @58' BGS					Bentonite 52' Top Sand 55' Top Screen 58'
-60 to -90		SP/SC	CLAYEY SAND: CL: 72'-79' Sandy lean clay red/ brown, med. stiff, moist, moderate odor, no staining. TD 79' Grout 52'-3' Bentonite 52'-55' Sand 55'-79' 0.020 Screen 73'-58' Riser 73'-78'					Sump 73'-78' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-19**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill, / R. Marshall**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/26/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-31':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 31'-42' SM/SP/SC: Poorly graded sand with clay, red to brown, soft, slightly plastic, moist. 40'-49': CL/SC: Lean clay with sand, red, medium stiff, plastic moist. Minor gravel. Slight odor @ 36' and SW moist.					Cement Grout 3'-43'
-35		SM/SC	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
-40		SC/CL						Bentonite 43'
-45								Top Sand 46'
-50		SP/SC	CLAYEY SAND: SP/SC: 50'-75' Poorly Graded Sand with clay ,slight odor . TD 79' Saturated @ 54' BGS No staining or odor at 75'-TD	49'-51'	24"/19			Top Screen 49'
-55				54'-56'	18"/41			
-60				59'-61'	24"/25			
-65		SP/SC		64'-66'	24"/46			
-70				69'-71'	24"/42			
-75		CL	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown,	74'-76'	24"/16			Sump 74'-79'
		CL /						TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-20**
TOTAL DEPTH: **78'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/19-20/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: PsH@ 60.02' H2O@ 61.50' BGS

⧖ Water level during drilling
⧗ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: 0'-8': GM mixed with caliche, white pink, dry 8'-39':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 39'-42' SP/SC: Poorly graded sand with clay, red to brown,k soft, slightly plastic, moist. 42'-49': CL: Lean clay with sand, red, medium stiff, plastic moist.					Cement Grout 3'-39'
-40		SP/SC	CLAY AND SAND:					Bentonite 39'
		CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist. Psh : 60.02', H2O 61.50'					Top Sand 42'
-50		SP/SC	CLAY AND SAND: Clay & Poorly graded sand, yellow	49'-51'	24"/51			Top Screen 48'
-55			CLAYEY SAND: SP/SC: 54'-75' Poorly Graded Sand with clay , strong odor & staining @ 65'-75'. TD 78' Saturated @ 60' BGS Wet with PsH @65' BGS PsH @ 60.02' H2O @ 61.50 BGS No staining or odor at 75'-TD	54'-56'	24"/51			
				59'-61'	24"/33			
-65		SP/SC		64'-66'	24"/51			
-70				69'-71'	24"/44			
-75		CL	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown, stiff, low plasticity, moist, blocky @78' SP/SC Poorly Graded sand with clay & gravel, red. med. dense.	74'-76'	24"/20			Sump 73'-78' TD 78'
		SP/SC		79'-81'	6"/51			
-85								
-90								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-21**
TOTAL DEPTH: **69'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/19/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: GM: 0'-5' BGS White Pink Caliche, Hard, Dry 5'-32 GM' :Gravel, Sand, Silt, Mixture, gravel to 4", Light Brown, medium dense, dry, No odor					Cement Grout 3'-37.4'
-30 to -35		CH	CLAY: Fat Clay, red, medium stiff, plastic, moist					
-35 to -70		CL/CH	CLAYEY SAND: CL: Fat Lean clay with sand, red, medium stiff, low plasticity, moist, no odor, some interbedded with lenses (<1') of SP/SC, starting @ 50' BGS, Poorly graded sand with clay, red to strong brown, soft, slightly plastic, very moist Water @ 55.45' BGS 11/25/02					Bentonite 37.4' Top Sand 41.9' Top Screen 44' TD 69'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-22**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/07/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2"					Cement Grout 3'-49'
-40 to -60		GM / CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					
-60 to -75		CL / CH	CLAYEY SAND: TD 80' Saturated @ 65' BGS Cement / Bentonite Grout 49'-3' Bentonite 49'-52' 12/20 Sand Pack ' 52'-80' 0.010 Slot Screen 80'-55'					Bentonite 49' Top Sand 52' Top Screen 55'
-75 to -85		CH	CLAY: Red Fat Clay, Water Level @ 65.0' from BGS 11/08/02 No Odor or hydrocarbon staining.					T.D. @80'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-23**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/06/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2"					Cement Grout 3'-49'
-5 to -35			SAND AND SILT: Silty, Sand, Tan Brown Fine					
-35 to -40		CL	CLAYEY SAND: Red Clayey Sand					
-40 to -55		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					Bentonite 49' Top Sand 52' Top Screen 55'
-55 to -60		CL / CH	CLAYEY SAND: Dark Stained, Hydrocarbon					
-60 to -75			CLAYEY SAND: TD 80' Saturated @ 65' BGS Cement / Bentonite Grout 49'-3' Bentonite 49'-52' 12/20 Sand Pack ' 52'-80' 0.010 Slot Screen 80'-55'					
-75 to -85		CH	CLAY: Red Fat Clay, Water Level @ 60.0' from BGS 11/07/02 No Odor or hydrocarbon staining.					T.D. @80'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-24**
TOTAL DEPTH: **74'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/11-13/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

⧖ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	COLLUVIUM: Hard White Caliche 0'-4'					Cement Grout 3'-43'
-5			CLAYEY SAND: Clayey					
-10		CL	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					
-20								
-25								
-30			CONGLOMERATE: Hard					
-35		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses Damp @40', Perched Aquifer? Strong Contamination & Odor, Black Streaks in Clayey Sand					
-40								
-45								Bentonite 43'
-50				49'-51'	33/24"			Top Sand 46'
-55 ▼		CL / CH	CLAYEY SAND: TD 79' Saturated @ 58' BGS Cement / Bentonite Grout 43'-3' Bentonite 43'-46' 12/20 Sand Pack ' 46'-74' 0.010 Slot Screen 74'-49' Strong Contamination & Odor, Black Gray Color Water Level 58.27' TOC	54'-56'	39/24"			Top Screen 49'
-60				59'-61'	No SPT			
-65								
-70				70'-72'	80/16"			TD 74'
-75			CALCAREOUS SANDSTONE: Calcareous Cement, White, fine gr., Hard Drilling, Dry, No Odor or Staining	74'-76'	50/24"			
-85								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-25**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/04/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4" Contaminated Pit Soil begins @ 7' BGS Pit Liner @ 17' BGS					Cement Grout 3'-48'
-40 to -55		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses Moist @ 38'					Bentonite 48'
-55 to -75		CL / CH	CLAYEY SAND: TD 79' Saturated @ 65' BGS Cement / Bentonite Grout 48'-3' Bentonite 48'-51' 12/20 Sand Pack ' 51'-79' 0.010 Slot Screen 79'-54'					Top Sand 51' Top Screen 54'
-75 to -80		CL	CLAYEY SAND: Water Level @ 60.20' from BGS 11/05/02 No Odor or hydrocarbon staining.					

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-26**
TOTAL DEPTH: **84'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/05-06/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2" @ 25'					Cement Grout 3'-47'
-5 to -35		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses Moist Light Hydrocarbon Odor 35'-40' BGS	49'-51' Rec. 2'				
-35 to -55		CL / CH	CLAYEY SAND: TD 84' Saturated @ 65' BGS Cement / Bentonite Grout 47'-3' Bentonite 47'-49' 12/20 Sand Pack 49'-85' 0.010 Slot Screen 84'-54'	54'-56' Rec. 2' 59'-61' Rec. 2' 64'-66' Rec.1.5'				Bentonite 47' Top Sand 49' Top Screen 54'
-55 to -75		CL	CLAYEY SAND: Water Level @ 61.20' from BGS 11/08/02 No Odor or hydrocarbon staining.	69'-71' Rec. 2' 74'-76' Rec. 2'	15			
-75 to -90		CH	CLAY: Red Brown Fat Clay @79' BGS	79'-81' Rec. 2' 84'-86' Rec. 2'	28 >50			T.D.@84'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-27**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/31/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2.5" Srong Contamination Begins @ 12' BGS					Cement Grout 3'-40'
-35 to -40		CL	CLAYEY SAND: CL: Red Clayey Sand Strong Hydrrocarbon Odor & Staining Gray / Black Saturated , very wet /stinky					
-40 to -45		SM	SAND AND SILT: 2' Sand					Bentonite 40'
-45 to -75		CL	CLAYEY SAND: Saturated from 40'-TD Strong Contamination	SPT	46 Blows			Top Sand 48' Top Screen 54'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-28**
TOTAL DEPTH: **82' (Casing 76')**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/30-31/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

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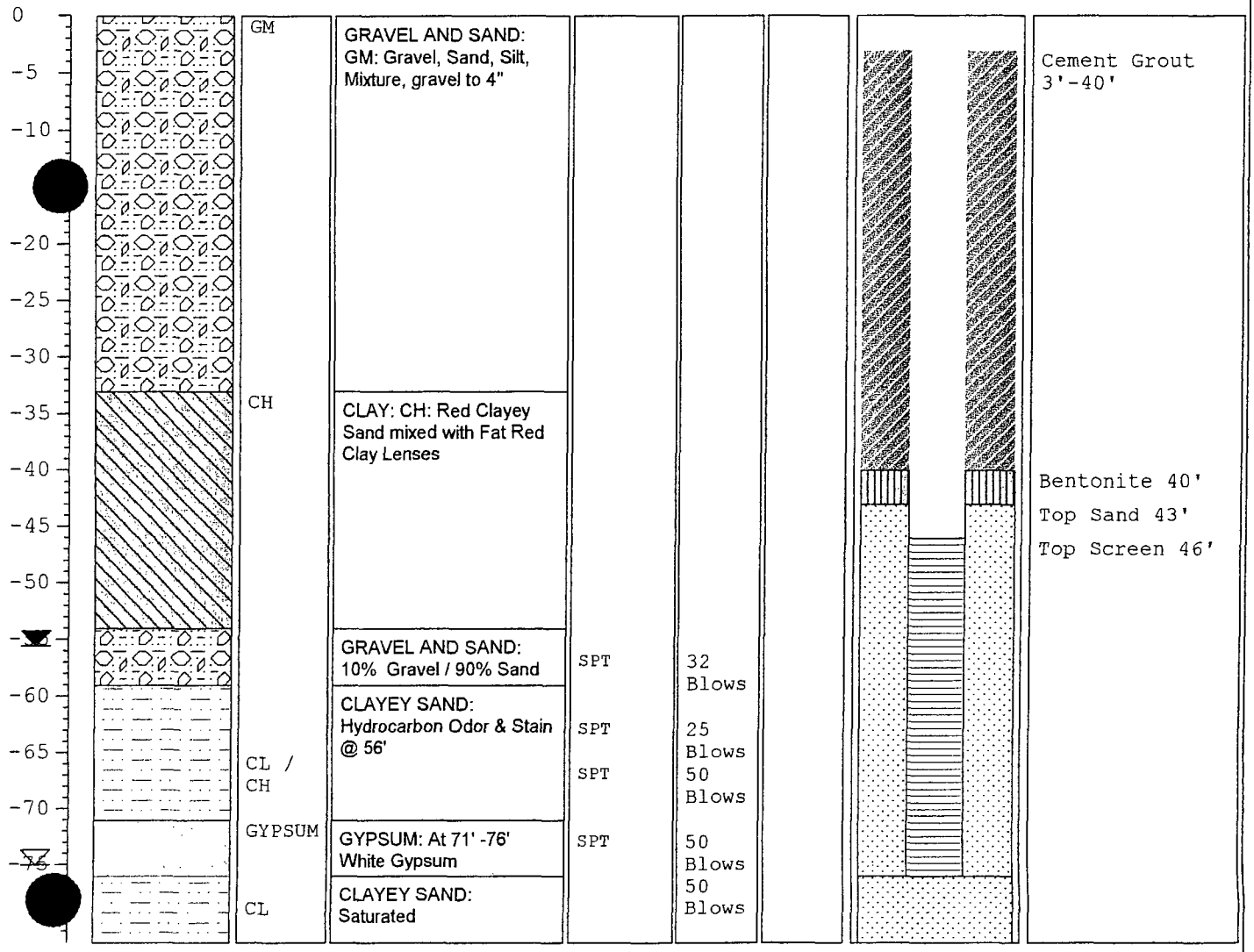

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-29**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/01-02/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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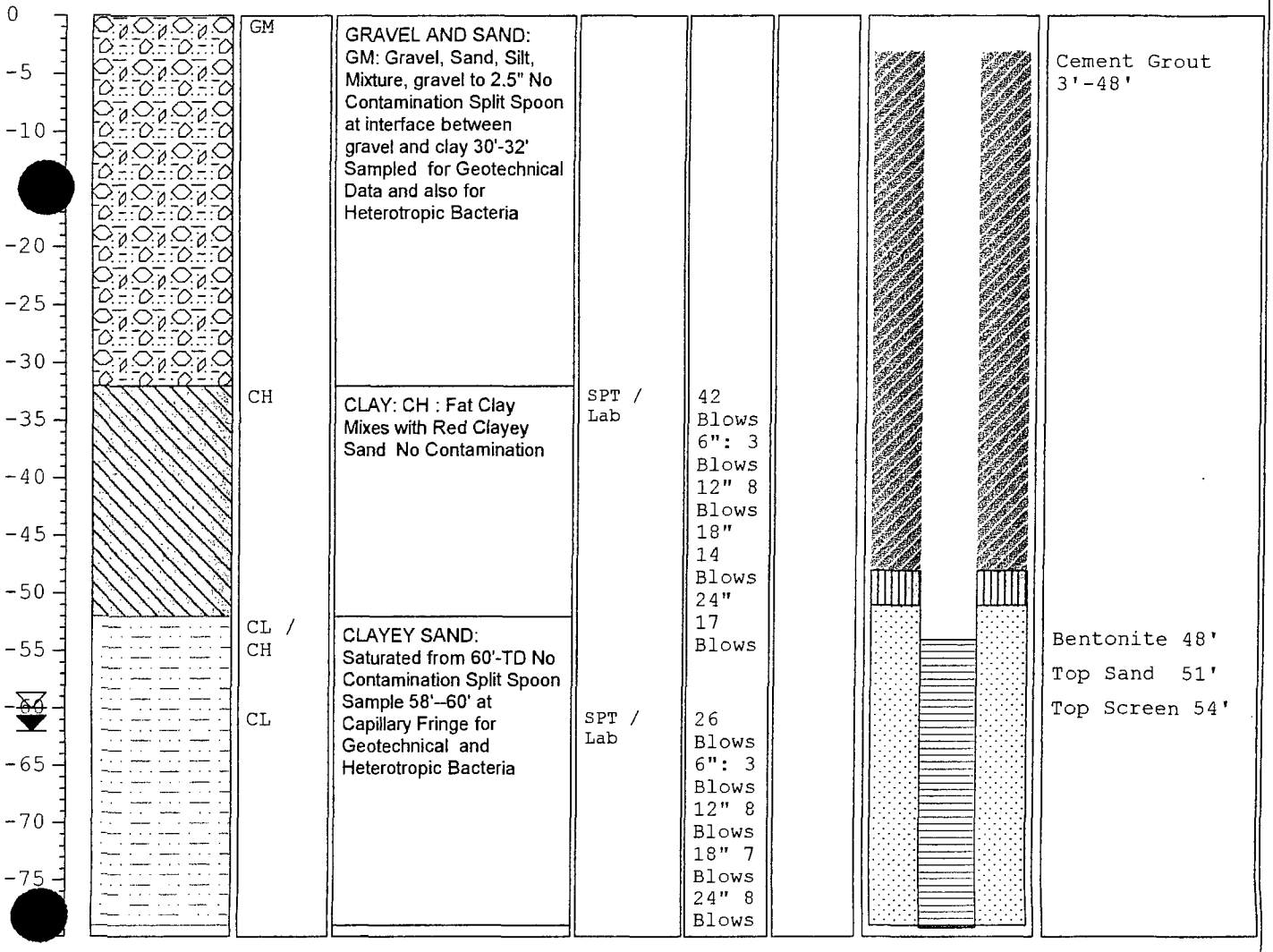
DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -30		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2.5" No Contamination Split Spoon at interface between gravel and clay 30'-32' Sampled for Geotechnical Data and also for Heterotropic Bacteria					
-30 to -50		CH	CLAY: CH : Fat Clay Mixes with Red Clayey Sand No Contamination	SPT / Lab	42 Blows 6": 3 Blows 12" 8 Blows 18" 14 Blows 24" 17 Blows			
-50 to -75		CL / CH CL	CLAYEY SAND: Saturated from 60'-TD No Contamination Split Spoon Sample 58'--60' at Capillary Fringe for Geotechnical and Heterotropic Bacteria	SPT / Lab	26 Blows 6": 3 Blows 12" 8 Blows 18" 7 Blows 24" 8 Blows			



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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-30**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/25/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -85		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-53'
-35		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					
-45			CLAY: Hydrocarbon Odor 42'-46', Gone @56'					
-50			CLAY: Decreasing Hydrocarbon Odor					
-60			CLAY: Water Level @ 63.82' from TOC 10/29/02					Bentonite -53'
-65		CL / CH	CLAYEY SAND: TD 79' Saturated @ 65' BGS Cement / Bentonite Grout 53'-3' Bentonite 56'-53' 12/20 Sand Pack ' 56'-79' 0.010 Slot Screen 79'-59'					Sand 79'-56' Screen 79'- 59'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-31**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/28/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-55'
-20 to -25			GRAVEL AND SAND: Hydrocarbon Odor 23'-33'					
-35 to -55		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					Top Bentonite 55'
-55	▼		CLAY: Water Level @ 60.59' from TOC 10/29/02					Top Sand 58'
-65 to -75		CL / CH	CLAYEY SAND: TD 79' Saturated @ 65' BGS Cement / Bentonite Grout 55'-3' Bentonite 55'-58' 12/20 Sand Pack ' 58'-79' 0.010 Slot Screen 79'-59'					Top Screen 59'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-32**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/18-19/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: 0'-3': GM mixed with caliche, white pink, dry 3'-42':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, No Odor					Cement Grout 3'-36.60'
-40 to -45		GM						Bent. 36.60'
-45 to -50		CH	CLAY: CH: 42'-54': Fat Clay with Sand, red, medium stiff, plastic, very moist at contact, No odor. Water Level @ 55.20' BGS 11/25/02					Top Sand 39.20'
-50 to -90		CL/CH	CLAYEY SAND: CL: 54'-79' Sandy lean clay red/ brown, med. stiff, moist, moderate odor, no staining. Trace gravel @ 57', slow drilling, TD 79' Grout 36'-3' Bentonite 36'-39' Sand 39'-79' 0.020 Screen 74'-44' Riser 74'-79'					Top Screen 44'
								Sump 74'-79'
								TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-33**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/18/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-42':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, No Odor				Cement Grout 3'-36.40'	
		GM CH	CLAY: CH: 42'-54': Fat Clay with Sand, red, medium stiff, plastic, very moist at contact, No odor. Water Level @ 51.75'				Bent. 36.40' Top Sand 41.6' Top Screen 44'	
		CL/CH	CLAYEY SAND: CL:53'-79' Sandy lean clay red/ brown, med. stiff, moist, wet @ 53', moderate odor, no staining. TD 79' Grout 36'-3' Bentonite 36'-41' Sand 41'-79' 0.020 Screen 79'-44'					TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-34**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/24/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-53'
-35 to -50		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					
-50 to -55			CLAY: Decreasing Hydrocarbon Odor	50'-52'	30 Blows			Bentonite -53'
-55 to -65			CLAY: Water Level @ 63.49' from TOC 10/29/02	55'-57'	37 Blows			Sand 79'-56'
-60 to -65				60'-62'	36 Blows			Screen 79'- 59'
-65 to -75		CL / CH	CLAYEY SAND: TD 79' Saturated @ 65' BGS Cement / Bentonite Grout 53'-3' Bentonite 56'-53' 12/20 Sand Pack ' 56'-79' 0.010 Slot Screen 79'-59'	65'-67'	56 Blows			
				70'-72'	36 Blows			
				75'-77'	46			

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-35**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/15/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-48'
-40 to -50		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses Water Level 56.75' BGS 11/16/02					Bentonite 48'
-50 to -55			GRAVEL AND SAND:					Top Sand 51'
-55 to -75		CL / CH	CLAYEY SAND: TD 79' Saturated @ 58' BGS Cement / Bentonite Grout 38'-3' Bentonite 48'-51' 12/20 Sand Pack ' 51'-74' 0.020 Slot Screen 74'-54' Riser 74'-79' No Odor or Staining Fat Clay lenses layered 50'-74' Dry at 74'					Top Screen 54'
-75 to -79		CH	CLAY: Red Fat Clay, Dry, No Odor or Staining					Sump 74'-79' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-36**
TOTAL DEPTH: **74'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/14/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-38'
-40 to -50		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					Bentonite 38'
-50 to -75		CL / CH	CLAYEY SAND: TD 74' Saturated @ 51' BGS Cement / Bentonite Grout 38'-3' Bentonite 38'-41' 12/20 Sand Pack ' 41'-74' 0.020 Slot Screen 74'-44' No Odor or Staining Fat Clay & Sandy Clay lenses layered 50'-70' Dry at 70' BGS	49'-51' 54'-56' 59'-61'	50/24" 50/24" 25/24"			Top Sand 41' Top Screen 44'
-75		CH	CLAY: Red Fat Clay, Dry, No Odor or Staining	74'-76'	23/24"			

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-37**
TOTAL DEPTH: **74'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/15/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: GM: 0'-4' BGS White Tan Brown Caliche, Hard, 4'-34' :Gravel, Sand, Silt, Mixture, gravel to 4",					Cement Grout 3'-38'
-5 to -35		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					Bentonite 38'
-35 to -50		CL / CH	CLAYEY SAND: TD 74' Saturated @ 50' BGS Cement / Bentonite Grout 38'-3' Bentonite 38'-41' 12/20 Sand Pack ' 41'-74' 0.020 Slot Screen 74'-44' No Odor or Staining Fat Clay & Sandy Clay lenses layered 50'-70' Dry at 70' BGS Water Level 49.4' BGS 11/16/02					Top Sand 41' Top Screen 44'
-50 to -75		CH	CLAY: Red Fat Clay, Dry, No Odor or Staining					

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MW-38**
TOTAL DEPTH: **68'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-58**
LOGGED BY:	**C.M. Barnhill, PG**	METHOD OF DRILLING:	**HSA 81/4" Augers**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**09/30/03**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 2" SCH 40 PVC Monitor Well

⧖ Water level during drilling
⧗ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GM: 0'-5': GM mixed with caliche, white pink, dry 5'-18':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.		67/20"	9'-11'		Cement Grout 0'-41'
		SC	SC: Clayey Sand, tan brown to light brown reddish		52/24"	19'-21'		
		SC			15/24"	29'-31'		
		SC			20/24"	39'-41'		Top Bentonite 45'
		SP	SP: Fine gr. sand, reddish					Top Sand 46' 12/20 Sand Top Screen 48' 0.010 Slot Screen
		SC	SC: Clayey Sand, fine gr. well sorted, no odor or staining. Reddish Brown to yellowish color. Saturated at 55' feet below ground surface. DTW=43.27' BGS Total Depth 68' BGS.	@55' BGS Sampled 2 x 4/oz. Jars @08:32hr. 8260 VOC / TPH Mod. 8015 8270 SVOC Total Metals	19/24"	49'-51'		
		SC			36/24"	59'-61'		
		SC						
		SC						TD 68'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-22**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/07/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: Water @ 20' (BGS)? Strong Odor

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	COLLUVIUM: Backfill / Colluvium					Concrete seal: 13'-3'
-5								
-10			GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture, 2" Gravel Perched Aquifer @ 20' BGS ??					
-15								Bentonite: 18'-13'
-20								Top Sand 23'
-25		CH	CLAY: CH: Red Sandy Clay to Fat Clay Lense					2" 0.010 Slot Screen 35' - 25'
-30			GRAVEL AND SAND: Silty Gravel, gray with Hydrocarbon Odor	25'-27'	100			
-35								TD 35'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-23**

TOTAL DEPTH: **39'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/07/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: 2" SVE Well

▽ Water level during drilling

▼ Water level in completed well

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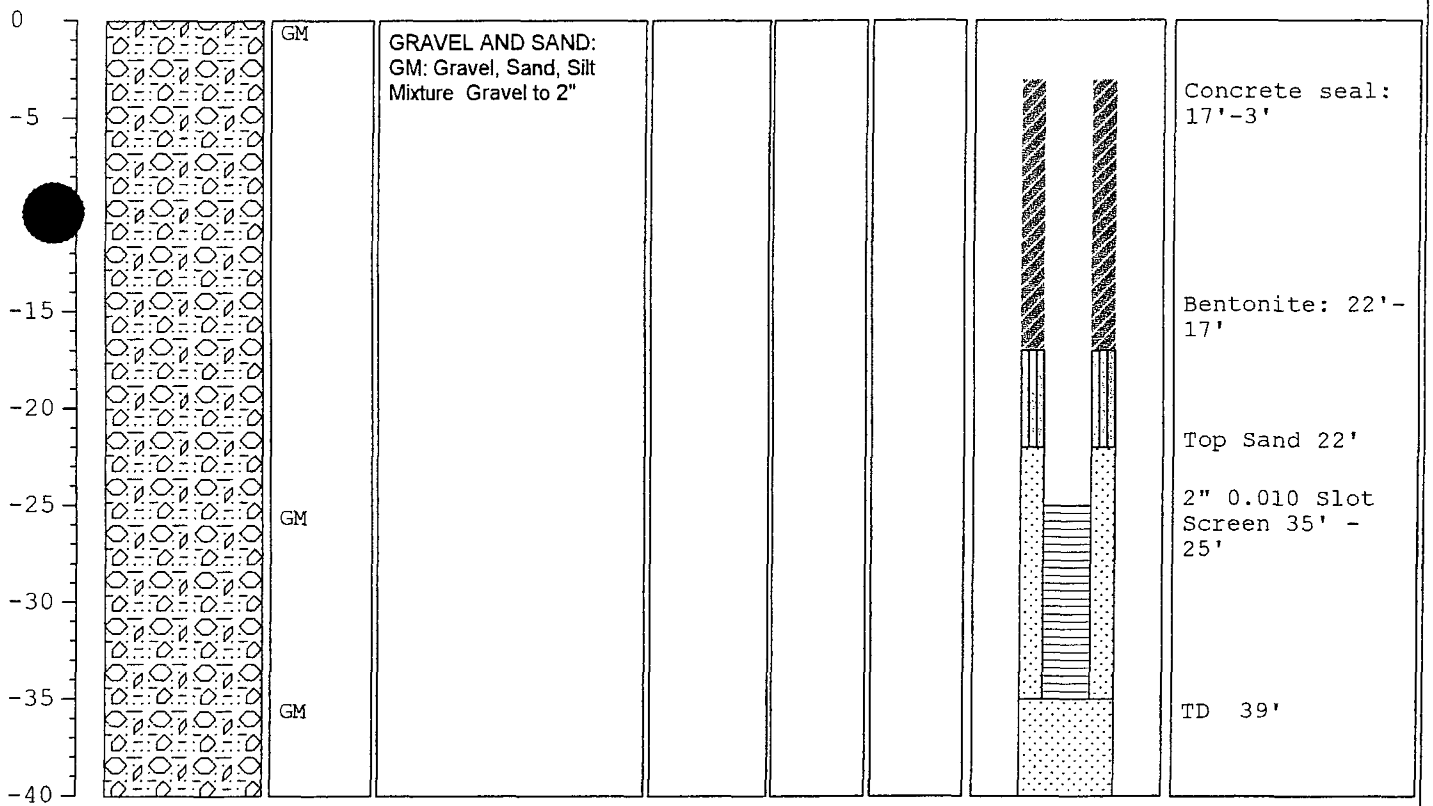
DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION



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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-24**
TOTAL DEPTH: **30'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/13/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES:

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Gravel to 2"					Concrete seal: 13'-3'
-5								
-15								Bentonite 18'-13'
-20								Top Sand 18'
-25								2" 0.010 Slot Screen 30' - 20'
-30		CH	CLAY: CH: Red Sandy Clay to Fat Clay					TD 30'
-35								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-25**
TOTAL DEPTH: **34'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/04/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: 2" SVE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Strong Hydrocarbon odor Pit liner @ 17'					Concrete seal: 14'-3'
								Bentonite: 21'-14'
								Top Sand 21.6'
								2" 0.010 Slot Screen 34' - 24'
		CH	CLAY: CH: Red Sandy Clay to Fat Clay					TD 34'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-26**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/05/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: 2" SVE Well

Water level during drilling
Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Gravel to 2"					Concrete seal: 17'-3'
								Bentonite: 22'-17'
								Top Sand 22'
		GM						2" 0.010 Slot Screen 34' - 24'
-35		CH	CLAY: CH: Red Sandy Clay to Fat Clay					TD 35'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-27**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/01/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: No Fat Clay Seen in Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Gravel 2"-4" Contaminated at 10' BGS No Fat Clay Seen in well. Very Strong Contamination Srtong/ Odor/ Staining Black Color to sand/silt					Concrete seal: 13'-3' Bentonite: 18'-13' Top Sand 18' 2" 0.010 Slot Screen 35' - 20'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-28**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/29/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: Water @ 35' (BGS)? Strong Odor

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture					Concrete seal: 13'-3'
								Bentonite: 18'-13'
								Top Sand 23'
								2" 0.010 Slot Screen 35' - 25'
-35		CH	CLAY: CH: Red Sandy Clay to Fat Clay Wet with Strong Hydrocarbon Odor					TD 35'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-30A**
TOTAL DEPTH: **45'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/25/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: 2" PVC SVE Well

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture	50 Blows	+50			Concrete seal: 13'-3'
-5								
-15								Bentonite 13'
-20				22 Blows	22			2" Slot Screen 45' - 20'
-25								Top Sand 18'
-30								
-35								
-40		CH	CLAY: CH: Red Clayey Sand, Strong Hydrocarbon Odor, Moist Fat Clay	20 Blows	20			
-45								TD

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-31**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/28/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: Poor recovery in Split Spoon .

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture	SPT Sample 24'-26'	+50			Concrete seal: 13'-3'
		CH	CLAY: CH: Red Sandy Clay to Fat Clay					Bentonite: 18'-13'
								Top Sand 23'
								2" 0.010 Slot Screen 35' - 25'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MW-34**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-58**
LOGGED BY:	**C.M. Barnhill, PG**	METHOD OF DRILLING:	**HSA 81/4" Augers**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**01/06/03**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 2" SCH 40 PVC Monitor Well

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 0'-32':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-42'
-5 to -30		GM						
-30 to -35		GM SC						
-35 to -55		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @55' BGS, No odor or staining, Water Level @ 57.74' BGS 01/07/03	@55' BGS Sampled 2 x 4/oz. Jars @11:10hr. 8260 VOC / TPH Mod. 8015 8270 SVOC Total Metals	42/24" 46/24" 51/24" 56/24" 61/24" 66/24" 71/24" 76/24" 81/24"	40-42' 44-46' 49-51' 54-56' 59-61' 64-66' 69-71' 74-76' 79-81'		Bentonite 42' Top Sand 46' Top Screen 49'
-55 to -60		SW	SW: Med. to fine grained tan sand, well sorted,					12/20 Sand
-60 to -65		SC	SC: Clayey Saturated					
-65 to -70		CH	CH: Fat Brown Silty Clay,					0.010 Slot Screen
-70 to -75		SW	SW: Tan, Reddish, Brown Sand, Fine Gr., Well Sorted, Saturated, Flowing Sand, No Odor Or					
-75 to -80		SW						
-80 to -85		SP/SW	SP: Tan, Reddish Brown Sand, Fn. Gr., Well Sorted, Saturated, mixed with angular to subrounded gravel to 1/2", No odor or staining.					TD 79'

NV

TRANSWESTERN PIPELINE COMPANY
An ENERGY TRANSFER Company

March 4, 2022

Mr. Rick Shean
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

RE: Response to Approval with Modifications
[Revised] Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations
Roswell Compressor Station No. 9
Transwestern Pipeline Company
Roswell, Chaves County, New Mexico
NMOCD Abatement Plan #AP-125 (formerly #GW-052)
EPA ID No. NMD986676955
HWB-TWP-21-003

Dear Mr. Shean;

Transwestern Pipeline, LLC (Transwestern) submits this *Response to Approval with Modifications [Revised] Report of Perched Aquifer Evaluation And Future Corrective Action Recommendations* regarding the comments received from the New Mexico Environment Department (NMED) via the letter titled *Approval with Modifications [Revised] Report of Perched Aquifer Evaluation And Future Corrective Action Recommendations* for the above referenced Site. To respond specifically to each of the Agency's comments, dated March 1, 2022, the original comment included within the NMED letter is in **bold**, with the Transwestern response included in plain text immediately following the item requiring a response.

Comment 1

The response to NMED's Disapproval Comment 1 states, " [b]oring logs are included in Attachment 1 in the revised Report." The referenced "Attachment 1" is not included in the Report. Provide the required boring logs with the response letter.

Boring logs are included in Attachment 1 to this letter.

Comment 2

The response to NMED's Disapproval Comment 3 states, "[a] work plan will be developed to provide details for delineating the horizontal and vertical extent of the plumes in the perched aquifer [and] surveying the ground elevations in these locations will be included within the forthcoming work plan." NMED concurs; however, a proposed schedule for

submittal of the work plan was not included with the response. Submit the referenced work plan no later than August 31, 2022.

Comment noted.

Comment 3

The response to NMED's Disapproval Comment 4 states, "[i]nformation related to PSH recovery in the perched aquifer is provided in the revised Report." Although the Report was revised to address the NMED's Disapproval Comment 4, the response does not identify the sections of the Report where text was revised. Identify all sections of the Report where text was revised based on the comment in the response letter.

Section 3 (Future Corrective Action Recommendations) states, "[d]ata will be collected from manual bailing events during 2022 to determine feasibility of additional recovery measures or impracticability. Results will be provided in the 2022 Annual Groundwater Remediation Activities Report." NMED acknowledges that remedies for phase separate hydrocarbons (PSH) in the perched aquifer will be evaluated based on the data collected in 2022 in the 2022 Annual Groundwater Remediation Activities Report.

Red-line pages are included in Attachment 2 to this letter.

Transwestern appreciates the opportunity to continue to work with NMED and NMOCD to continue to bring this site to closure. If you have any further questions or comments regarding these responses, please do not hesitate to contact me at (210) 870-2725 or JD Haines of WSP USA, Inc. at (317) 450-6126.

Sincerely,

SBoultinghouse

Ms. Stacy Boultinghouse, PG
Environmental Manager
Transwestern Pipeline Company, LLC
Stacy.Boultinghouse@energytransfer.com

Attachment:
Attachment 1: Boring Logs
Attachment 2: Revised Report

Cc: D. Cobrain, NMED HWB
M. Suzuki, NMED HWB
M. Bratcher, NMOCD
B. Billings, NMOCD
L. King, USEPA Region 6
JD Haines, WSP
S. Diamond, WSP

ATTACHMENT 1
BORING LOGS

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-1**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**M. Bates**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/06/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -30		GM	GRAVEL AND SAND: 0'-2': Silty clay w/ gravel, 2'-4' caliche, white pink, dry 5'-32':GM: Gravel, Sand, Silt, Mixture, gravel to 2", Lt. Brown, med. dense, dry. Gravel is cemented 5'-7',26'-29', hard drilling @32' Sand with clay, red to brown, soft, slightly plastic, moist					Cement Grout 3'-46'
-30 to -40		SC/CL	CLAY AND SAND: SC: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
-40 to -55		SP/SC	CLAY AND SAND: SP/SC: 50'-75' Poorly Graded Sand with clay , Reddish / Tan No odor , Saturated @62' BGS TD 79' Riser 79'-74', 0.020 Slot Screen 74'-54', 12/20 Sand Pack 79'-49', Bentonite Seal 49'-46',					Bentonite 46' Top Sand 49' Top Screen 54'
-55 to -75		SC	CLAYEY SAND: Reddish Tan, Soft, Moist, No Odor *or Staining Depth to* Water 61.03' BGS 12/07/02					Sump 74'-79' TD 79'
-75		SC						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-2**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Ingersoll-Rand A-300**
LOGGED BY:	**C.M. Barnhill, PG**	METHOD OF DRILLING:	**HSA 81/4" Augers**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/21-24/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-5 to -10		GM						
-10 to -20		GM						
-20 to -25		GM						
-25 to -30		GM						
-30		Cngl.	CONGLOMERATE: Hard					
-30 to -35		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @60' BGS, No odor or staining, TD 79' Water Level @ 59.95' BGS 01/06/03					
-35 to -40		SC						
-40 to -45		SC						
-45 to -50		SC						
-50 to -55		SC						Bentonite 48'
-55 to -60		SC						Top Sand 51'
-60		SC						Top Screen 54'
-60 to -65		SW/SP	SW: Med. to fine grained tan sand, well sorted, saturated @ 60' BGS, No odor or staining. Damp @ TD, Flowing Sands.					12/20 Sand
-65 to -70		SW/SP						0.020 Slot Screen
-70 to -75		SW/SP						
-75 to -85		SW/SP						TD 79'
-85 to -90		SW/SP						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-3**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M. Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/20-21/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -25		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-25 to -30		Cngl.	CONGLOMERATE: Hard					
-30 to -35		SW	SW: Sand Layer, brown,					
-35 to -60		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @62' BGS, No odor or staining, @ 74' BGS TD 79' Water Level @ 63.82' BGS 12/21/02					Bentonite 48' Top Sand 51' Top Screen 54' 12/20 Sand 0.020 Slot Screen
-60 to -75		SW/SP	SW: Med. to fine grained tan sand, well sorted, saturated @ 62' BGS, No odor or staining. Damp @ TD					TD 79'
-75 to -90		SW/SP						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-4**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/18-19/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-35		Cngl.	CONGLOMERATE: Hard					
-35 to -40		GM	GM: Gravel, pea sized, mixed with sand, silt					
-40 to -65		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @64' BGS, No odor or staining, @ 74' BGS TD 79' Water Level @ 63.82' BGS 12/21/02					Bentonite 48' Top Sand 51' Top Screen 54'
-65 to -75		SW/SP	SW: Med. to fine grained tan sand, well sorted, saturated @ 64' BGS, No odor or staining.					
-75 to -90		SC/SW	SC: Sand ,fine gr., well sorted , Clayey, 60% Sand, No odor or Staining, Damp					TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-5**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/16/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-53'
-30 to -35		Cngl.	CONGLOMERATE: Hard					
-35 to -75		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @64' BGS, No odor or staining, TD 79' Water Level @ 63.75' BGS 12/17/02					Bentonite 53' Top Sand 56' Top Screen 59' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-6**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/16-17/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

⧖ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: *Gravel, Sand, Silt, Mixture*, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-5 to -25		Cngl.	CONGLOMERATE: Hard Drilling, well cemented conglomerate or cemented sandstone layer.					
-25 to -35			GM: Harder Drilling, gravel fragments, yellowish color					
-35 to -50		SC	SC: Clayey Sand Lt. Red/ tan brown, to tand brown, fn. to med.grained sand, well sorted, strong clay fraction, soft, No odor /staining.					Bentonite 48'
-50 to -55		CL	CL: Strong Clay					Top Sand 51'
-55 to -75		SC	SC: Clayey Sand, tan brown to light brown *reddish saturated* @64' BGS, No odor or staining, @ 74' BGS Clay & Sand:,gravel & Clay lenses, TD 79' Water Level @ 65.55' BGS 12/18/02					Top Screen 54'
-75 to -85		GC	GC: Gravel 10%, Clay30%, fine gr. sand 60%, No odor or Staining, Damp					TD 79'
-85 to -90		GC						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-7**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/10-13/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GRAVEL AND SAND: 0'-5': GM *mixed with caliche*, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-47'
		Cngl.	CONGLOMERATE: Hard Drilling, well cemented conglomerate or cemented sandstone layer.					
		SC	SC: Clayey Sand Lt. Red/ tan brown, to tand brown, *fn. to med.grained sand*, well sorted, strong clay fraction, soft, No odor and staining.					Bentonite 47' Top Sand 50' Top Screen 54'
		SC/GC	GC: Gravel 10%, Clay30%, fine gr. sand					
		SC	SC: Clayey Sand, tan *brown to light brown* reddish saturated @63' BGS, No odor or staining, @ 74' BGS Clay & Sand:& Fat Clay lenses, TD 79' Water Level @ 64.79' BGS 12/14/02					Sump 74'-79' TD 79'
		SC						
		SC						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-8**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C.M Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/13-14/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ *Water level in completed well*

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-53'
-30		Cngl.	CONGLOMERATE: Hard					
-35		SC	SC: Clayey Sand					
-40		SC/GC	GC: Clayey Gravel / Sand Lt. Red/ tan brown, to tan					
-45		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @64' BGS, No odor or staining, @ 74' BGS Clay & Sand:& Fat Clay lenses, TD 79' Water Level @ 64.79' BGS 12/16/02 @ 77' Strong staining of sand, and odor. Odor more sewer-like than hydrocarbon odor.@79' BGS Strong Fat Clay					Bentonite 53' Top Sand 56' Top Screen 59'
-75		SP/SC	SP: SP/SW Med, gr. sand					
-80		CH	CH: Fat Clay, red brown, dry	79'-81'	41/24"			TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-9**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/17-18/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.					Cement Grout 3'-48'
-40 to -45		SC	SC: Clayey Sand Lt. Red/ tan brown, to tand brown, fn. to med.grained sand, well sorted, strong clay *fraction, soft, No odor and* staining.					
-50 to -55		SW/SP	SW: Sand, med. gr. well	54'-56'	105/16			Bentonite 48' Top Sand 51' Top Screen 54'
-55 to -60		SC	SC: Clayey Sand, tan brown to light brown red	59'-61'	20/24"			
-60 to -70		SW/SP	SW: Tan to brown, med. *to fine gr. well sorted sand,* slight odor, saturated at 62' BGS, slight hydrocarbon odor, no staining	64'-66'	70/24"			
				69'-71'	30/24"			
-75 to -85		SC	SC: Brown Clayey Sand Dry @ 75'	74'-76'	30/24"			Sump 74'-79' TD 79'
		CL	CL: Brown Fat Clay, Dry, No Odor or Staining	79'-81'	50/24"			
-90								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-10**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/09/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▾ Water level during drilling
▪ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP.	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-27':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 27'-30' Hard cemented Conglomerate 30-50' SM/SP/SC: Poorly graded sand with clay, red to brown, soft, slightly plastic moist.					Cement Grout 3'-47'
-25 to -30		Conglom	CONGLOMERATE					
-30 to -40		SC/CL	CLAY AND SAND: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
-50 to -55		SW	SAND: SW: 50'-59' Fine gr. Sand, tan brown, well sorted, No odor or staining.	49'-51' 54'-56'	18"/50 12"/50			Bentonite 47' Top Sand 50' Top Screen 54'
-55 to -60		SC	CLAYEY SAND: SC: Clayey Sand Lt. Red/ tan	59'-61'	24"/40			
-60 to -70		SW	SAND: Tan brown, reddish tan sand, med. to fine gr., well sorted, No Odor. Saturated @ 62' BGS	64'-66' 69'-71'	12"/46 18"/50			
-70 to -75		SC	CLAYEY SAND: Tan Brown / Red tan, Clayey	74'-76'	24"/30			Sump 74'-79'
-75 to -80		SC/CL	CLAY: Clay & Sand:& Fat Clay lenses, Dry@ 74' BGS	79'-81'	24"/50			TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-11**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/07/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▾ Water level during drilling
▪ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP.	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -80		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-24':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 24'-32': Hard cemented Conglomerate / Hard drilling				Cement Grout 3'-47'	
-25		Cngl.	CONGLOMERATE: Hard Drilling, well cemented					
-30 to -45		SC/CL	CLAYEY SAND: SC: Clayey Sand Lt. Red/ tan brown, to tand brown, fine to medium grained sand, well sorted, strong clay fraction, soft, Saturated @ 60' BGS Slight odor and staining, strong contamination in capillary fringe 55'-60' BGS, gray black stain to sandy clay with strong hydrocarbon odor. No PsH in well Water @ 60.90' BGS 12/09/02				Bentonite 47' Top Sand 50' Top Screen 54'	
-50 to -65		SC						
-75		CH	CLAY: Clay & Sand:& Fat Clay lenses, Dry				Sump 74'-79' TD 79'	
-80 to -85		CH						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-12**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill, / M. Bates**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/03-06/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▾ Water level during drilling
▾ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP.	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-37':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 5'-15' SM/SP/SC: Poorly graded sand & Silt @37' Sand with clay, red to brown, soft, slightly plastic, moist.					
-35 to -40		SC/CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
-40 to -60		SP/SC	CLAYEY SAND: SP/SC: 50'-75' Poorly Graded Sand with clay ,No odor Saturated @62' BGS TD 79' Riser 79'-74', 0.020 Slot Screen 74'-54', 12/20 Sand Pack 79'-51', ~~Bentonite Seal 51'-48'~~,					
-60 to -75		SP/SC						
-75 to -77		SS	CALCAREOUS SANDSTONE: Hard					
-77 to -80		CL	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown, stiff, low plasticity, moist, blocky @79' SP/SC Poorly Graded sand with clay					
								Cement Grout 3'-48'
								Bentonite 48'
								Top Sand 51'
								Top Screen 54'
								Sump 74'-79'
								TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-13**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill, / R. Marshall**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**12/02-03/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▾ Water level during drilling
▾ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP.	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -80		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-33':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 5'-15' SM/SP/SC: Poorly graded sand & Silt @33' Sand with clay, red to brown, soft, slightly plastic, moist. 40'-49': CL/SC: Lean clay with sand, red, medium stiff, plastic moist.				Cement Grout 3'-46'	
-35		SC/CL	CLAYEY SAND: SC/CL Clayey Sand , Red med-fine gr. well sorted sand ~~with strong clay fraction~~					
-40			CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.				Bentonite 46'	
-50		SP/SC	CLAYEY SAND: SP/SC: 50'-75' Poorly Graded Sand with clay ,no odor Saturated @60' BGS TD 79' Riser 79'-74', 0.020 Slot Screen 74'-54', 12/20 Sand Pack 79'-49', Bentonite Seal 49'-47', Cement Grout 47'-3'				Top Sand 50.7' Top Screen 54'	
-65		SP/SC						
-75		CL	CALCAREOUS SANDSTONE: Hard				Sump 74'-79'	
-80		CL	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown, stiff, low plasticity, moist, blocky @79' SP/SC Poorly Graded sand with clay				TD 79'	

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-14**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Clayton M Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/25/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: 0'-3': GM mixed with caliche, white pink, dry 3'-40':GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-48'
-40 to -43		CH	CLAY: CH: 40'-43': Fat					
-43 to -45		SS	CALCAREOUS					
-45 to -79		CL/CH SC	CLAYEY SAND: SC/CL/CH: 45'-79' Sandy clay, Clayey sand, red/ brown, med. stiff, moist, moderate odor, no staining. Saturated @ 62 TD 79' Grout 48'-3' Bentonite 48'-51' Sand 51'-79' 0.020 Screen 74'-54' Riser 74'-79' Water Level @ 61.70' BGS 11/26/02					Bentonite 48' Top Sand 51' Top Screen 54' Sump 74'-79' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-15**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/22/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GRAVEL AND SAND: 0'-4': GM mixed with caliche, white pink, dry 4'-42':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, *med. dense, dry becoming* moist @ 40' BGS					Cement Grout 3'-49'
		CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist. Water Level 61.13' BGS 11/25/02	49'-51'	24"/33			Bentonite 49.9'
		SP/SC	CLAYEY SAND: SP/SC: 54'-79' Poorly Graded Sand with clay & gravel, red dense, moist, fragements of sandstone as gravel, hard drilling 65'-71', No odor or staining. TD 79' Saturated @ 60' BGS Cement / Bentonite Grout 49'-3' Bentonite 49'-54' 12/20 Sand Pack ' 54'-74' 0.020 Slot Screen 74'-59' Riser 74'-79' No Odor or Staining at TD	54'-56'	12"/51			Top Sand 54'
				59'-61'	24"/41			Top Screen 59'
				64'-66'	14"/50			
				69'-71'	24"/50			
		SP/SC		74'-76'	20"/70			Sump 74'-79' TD 79'
				79'-81'	24"/74			

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-16**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill, / R. Marshall**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/26-27/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: Strong PsH in Soil Boring

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-40':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 15'-40' SM/SP/SC: Poorly graded sand with clay, red to brown, soft, slightly plastic, moist. 40'-49': CL/SC: Lean clay with sand, red, medium stiff, plastic moist. Minor gravel.					Cement Grout 3'-47'
		SC/CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					
		SP/SC	CLAYEY SAND: SP/SC: 50'-75' Poorly Graded Sand with clay ,slight odor Saturated @60' BGS Strong hydrocarbon staining, odor, and PsH at 64'-74' TD 79' Riser 79'-74', 0.020 Slot Screen 74'-54', 12/20 Sand Pack 79'-49', Bentonite Seal 49'-47', Cement Grout 47'-3'	49'-51' 54'-56' 59'-61' 64'-66' 69'-71'	41"/18 22"/24 12"/34 12"/34 24"/18			Bentonite 47' Top Sand 49' Top Screen 54'
		SP/SC						
		CL Redbed	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown,	74'-76'	24"/32			Sump 74'-79' TD 79'
			MUDSTONE: Marroon Mudstone, with Gypsum and anhydrite lenses, hard drilling, dry, no odor.	79'-81'	6"/51			

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-17**

TOTAL DEPTH: **75'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/20/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: PsH@ 61.75'H2O@66.25'(BGS)11/25/02

▽ Water level during drilling

▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GRAVEL AND SAND: GM: 0'-4' BGS White Pink Caliche, Hard, Dry 4'-43' :Gravel, Sand, Silt, Mixture, gravel to 4", Light Brown, medium dense, dry, No odor					Cement Grout 3'-46'
-45		SP/SC	CLAYEY SAND: SP-SC: Poorly graded Sand with clay, red to strong brown, soft moist, slight odor					Bentonite 46'
-50								Top Sand 49'
-55		CL	CLAY AND SAND: CL: Lean clay with sand, red, *medium stiff, plastic,* moist, moderate odor					Top Screen 55'
-60		SP/SC	CLAYEY SAND: SP-SC: Poorly graded sand with clay, lt. red brown, med to *loose, moist, dense.* Mod.odor, increased drilling rate. TD 75' BGS *Strong Odor* @ 70' BGS 5' sump 70'-75', 0.020 slot screen 55'-70', 12/20 Sand 49'-75', Bentonite 46'-49', cement grout 3'-46' 11/25/02: PsH@61.75' (BGS)					
-70		SP/SC						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-18**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/21/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -55		GM	GRAVEL AND SAND: 0'-4': GM mixed with caliche, white pink, dry 4'-58':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry becoming moist @ 50' BGS Slight Odor to No Odor 58'-72' SP/SC Poorly Graded Sand With Clay, Lt. Reddish-brown, med. dense, moist					Cement Grout 3'-52'
-55 to -60		GM SP/SC	CLAY AND SAND: SP/SC:Poorly graded sand with clay, Lt. reddish -brown, med. dense, moist Water Level 59.87' BGS 11/25/02 Saturated @58' BGS					Bentonite 52' Top Sand 55' Top Screen 58'
-60 to -90		SP/SC	CLAYEY SAND: CL: 72'-79' Sandy lean clay red/ brown, med. stiff, moist, moderate odor, no staining. TD 79' Grout 52'-3' Bentonite 52'-55' Sand 55'-79' 0.020 Screen 73'-58' Riser 73'-78'					Sump 73'-78' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-19**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**C. Barnhill, / R. Marshall**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/26/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

⧖ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -75		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-31':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 31'-42' SM/SP/SC: Poorly graded sand with clay, red to brown, soft, slightly plastic, moist. 40'-49': CL/SC: Lean clay with sand, red, medium stiff, plastic moist. Minor gravel. Slight odor @ 36' and SW moist.					Cement Grout 3'-43'
		SM/SC SC/CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist.					Bentonite 43' Top Sand 46'
		SP/SC	CLAYEY SAND: SP/SC: 50'-75' Poorly Graded Sand with clay ,slight odor . TD 79' Saturated @ 54' BGS No staining or odor at 75'-TD	49'-51' 54'-56' 59'-61' 64'-66' 69'-71'	24"/19 18"/41 24"/25 24"/46 24"/42			Top Screen 49'
		SP/SC CL CL /	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown,	74'-76'	24"/16			Sump 74'-79' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-20**
TOTAL DEPTH: **78'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/19-20/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: PsH@ 60.02' H2O@ 61.50' BGS

Water level during drilling
Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: 0'-8': GM mixed with caliche, white pink, dry 8'-39':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry. 39'-42' SP/SC: Poorly graded sand with clay, red to brown,k soft, slightly plastic, moist. 42'-49': CL: Lean clay with sand, red, medium stiff, plastic moist.					Cement Grout 3'-39'
-40		SP/SC	CLAY AND SAND:					Bentonite 39'
		CL	CLAY: CH: Red Clayey Sand: lean clay with sand, med. stiff, plastic, moist. Psh : 60.02', H2O 61.50'					Top Sand 42'
-50		SP/SC	CLAY AND SAND: Clay & Poorly graded sand, yellow	49'-51'	24"/51			Top Screen 48'
-55			CLAYEY SAND: SP/SC: 54'-75' Poorly Graded Sand with clay , strong odor & staining @ 65'-75'. TD 78' Saturated @ 60' BGS Wet with PsH @65' BGS PsH @ 60.02' H2O @ 61.50 BGS No staining or odor at 75'-TD	54'-56'	24"/51			
				59'-61'	24"/33			
-65		SP/SC		64'-66'	24"/51			
-70				69'-71'	24"/44			
-75		CL	CLAY: CL: Sandy Lean Clay, Lt. Reddish brown, stiff, low plasticity, moist, blocky @78' SP/SC Poorly Graded sand with clay & gravel, red. med. dense.	74'-76'	24"/20			Sump 73'-78' TD 78'
		SP/SC		79'-81'	6"/51			
-85								
-90								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-21**
TOTAL DEPTH: **69'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/19/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: 0'-5' BGS White Pink Caliche, Hard, Dry 5'-32 GM' :Gravel, Sand, Silt, Mixture, gravel to 4", Light Brown, medium dense, dry, No odor					Cement Grout 3'-37.4'
-30 to -35		CH	CLAY: Fat Clay, red, medium stiff, plastic, moist					
-35 to -70		CL/CH	CLAYEY SAND: CL: Fat Lean clay with sand, red, medium stiff, low plasticity, moist, no odor, some interbedded with lenses (<1') of SP/SC, starting @ 50' BGS, Poorly graded sand with clay, red to strong brown, soft, slightly plastic, very moist Water @ 55.45' BGS 11/25/02					Bentonite 37.4' Top Sand 41.9' Top Screen 44' TD 69'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-22**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/07/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2"					Cement Grout 3'-49'
-40 to -60		GM / CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					
-60 to -75		CL / CH	CLAYEY SAND: TD 80' Saturated @ 65' BGS Cement / Bentonite Grout 49'-3' Bentonite 49'-52' 12/20 Sand Pack ' 52'-80' 0.010 Slot Screen 80'-55'					Bentonite 49' Top Sand 52' Top Screen 55'
-75 to -85		CH	CLAY: Red Fat Clay, Water Level @ 65.0' from BGS 11/08/02 No Odor or hydrocarbon staining.					T.D. @80'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-23**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/06/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2"					Cement Grout 3'-49'
-5 to -35			SAND AND SILT: Silty, Sand, Tan Brown Fine					
-35 to -40		CL	CLAYEY SAND: Red Clayey Sand					
-40 to -45		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					
-45 to -55		CL / CH	CLAYEY SAND: Dark Stained, Hydrocarbon					Bentonite 49' Top Sand 52' Top Screen 55'
-55 to -75			CLAYEY SAND: TD 80' Saturated @ 65' BGS Cement / Bentonite Grout 49'-3' Bentonite 49'-52' 12/20 Sand Pack ' 52'-80' 0.010 Slot Screen 80'-55'					
-75 to -85		CH	CLAY: Red Fat Clay, Water Level @ 60.0' from BGS 11/07/02 No Odor or hydrocarbon staining.					T.D. @80'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-24**
TOTAL DEPTH: **74'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/11-13/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	COLLUVIUM: Hard White Caliche 0'-4'					Cement Grout 3'-43'
-5			CLAYEY SAND: Clayey					
-10		CL	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					
-20								
-25								
-30			CONGLOMERATE: Hard					
-35		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses Damp @40', Perched Aquifer? Strong Contamination & Odor, Black Streaks in Clayey Sand					
-40								
-45								Bentonite 43'
-50				49'-51'	33/24"			Top Sand 46'
-55		CL / CH	CLAYEY SAND: TD 79' Saturated @ 58' BGS Cement / Bentonite Grout 43'-3' Bentonite 43'-46' 12/20 Sand Pack ' 46'-74' *0.010 Slot Screen* 74'-49' Strong Contamination & Odor, Black Gray Color Water Level 58.27' TOC	54'-56'	39/24"			Top Screen 49'
-60				59'-61'	No SPT			
-65								
-70				70'-72'	80/16"			TD 74'
-75			CALCAREOUS SANDSTONE: Calcareous Cement, White, fine gr., Hard Drilling, Dry, No Odor or Staining	74'-76'	50/24"			
-85								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-25**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/04/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4" Contaminated Pit Soil begins @ 7' BGS Pit Liner @ 17' BGS					Cement Grout 3'-48'
-40 to -55		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses Moist @ 38'					Bentonite 48'
-55 to -70		CL / CH	CLAYEY SAND: TD 79' Saturated @ 65' BGS Cement / Bentonite Grout 48'-3' Bentonite 48'-51' 12/20 Sand Pack ' 51'-79' 0.010 Slot Screen 79'-54'					Top Sand 51' Top Screen 54'
-70 to -75		CL	CLAYEY SAND: Water Level @ 60.20' from BGS 11/05/02 No Odor or hydrocarbon staining.					

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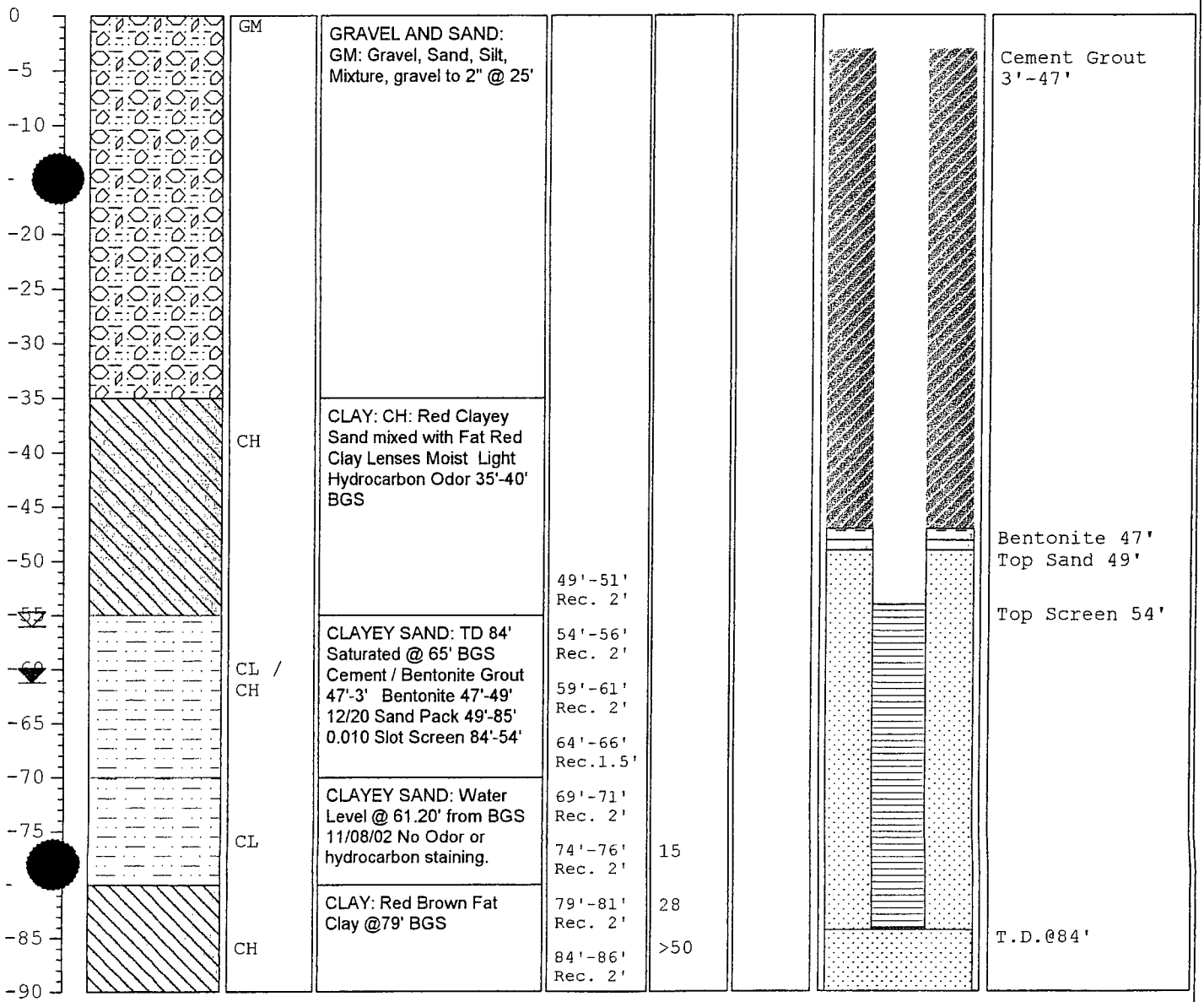
FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-26**
TOTAL DEPTH: **84'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/05-06/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well



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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-27**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/31/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2.5" Srong Contamination Begins @ 12' BGS					Cement Grout 3'-40'
-35 to -40		CL	CLAYEY SAND: CL: Red Clayey Sand Strong Hydrrocarbon Odor & Staining Gray / Black Saturated , very wet /stinky					
-40 to -45		SM	SAND AND SILT: 2' Sand					Bentonite 40'
-45 to -79		CL	CLAYEY SAND: Saturated from 40'-TD Strong Contamination	SPT	46 Blows			Top Sand 48' Top Screen 54'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-28**
TOTAL DEPTH: **82' (Casing 76')**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/30-31/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

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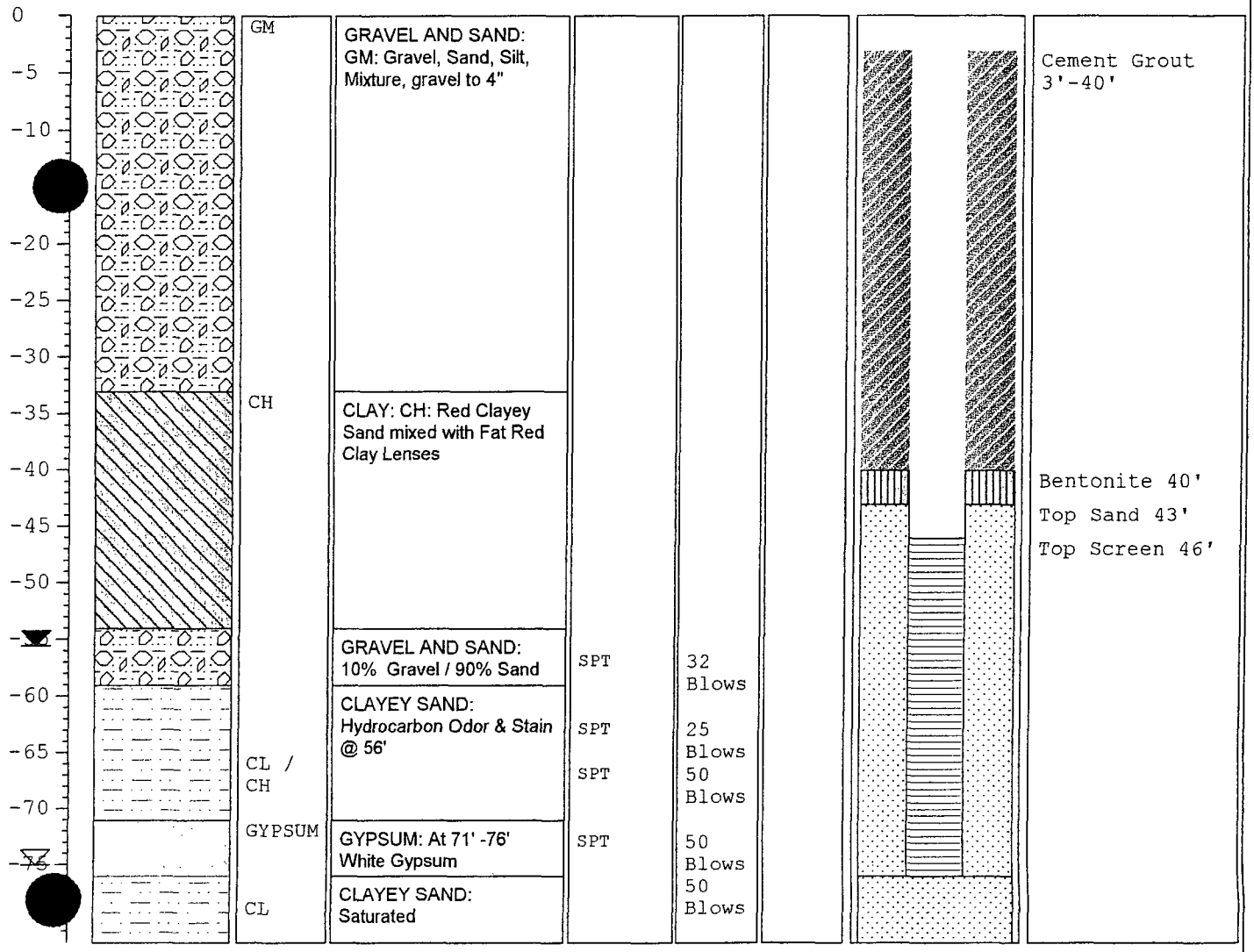

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-29**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/01-02/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -75		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 2.5" No Contamination Split Spoon at interface between gravel and clay 30'-32' Sampled for Geotechnical Data and also for Heterotropic Bacteria					Cement Grout 3'-48'
		CH	CLAY: CH : Fat Clay Mixes with Red Clayey Sand No Contamination	SPT / Lab	42 Blows 6": 3 Blows 12" 8 Blows 18" 14 Blows 24" 17 Blows			
		CL / CH	CLAYEY SAND: Saturated from 60'-TD No Contamination Split Spoon Sample 58'–60' at Capillary Fringe for Geotechnical and Heterotropic Bacteria					Bentonite 48'
-60 ▼		CL		SPT / Lab	26 Blows 6": 3 Blows 12" 8 Blows 18" 7 Blows 24" 8 Blows			Top Sand 51' Top Screen 54'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-30**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/25/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -85		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-53'
		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					
			CLAY: Hydrocarbon Odor 42'-46', Gone @56'					
			CLAY: Decreasing Hydrocarbon Odor					
			CLAY: Water Level @ 63.82' from TOC 10/29/02					Bentonite -53'
		CL / CH	CLAYEY SAND: TD 79' Saturated @ 65' BGS Cement / Bentonite Grout 53'-3' Bentonite 56'-53' 12/20 Sand Pack ' 56'-79' 0.010 Slot Screen 79'-59'					Sand 79'-56' Screen 79'- 59'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-31**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/28/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-55'
-5 to -25			GRAVEL AND SAND: Hydrocarbon Odor 23'-33'					
-25 to -55		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					Top Bentonite 55'
-55 to -65			CLAY: Water Level @ 60.59' from TOC 10/29/02					Top Sand 58'
-65 to -75		CL / CH	CLAYEY SAND: TD 79' Saturated @ 65' BGS Cement / Bentonite Grout 55'-3' Bentonite 55'-58' 12/20 Sand Pack ' 58'-79' 0.010 Slot Screen 79'-59'					Top Screen 59'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-32**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/18-19/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: 0'-3': GM mixed with caliche, white pink, dry 3'-42':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, No Odor					Cement Grout 3'-36.60'
-40 to -45		GM						Bent. 36.60'
-45 to -50		CH	CLAY: CH: 42'-54': Fat Clay with Sand, red, medium stiff, plastic, very moist at contact, No odor. Water Level @ 55.20' BGS 11/25/02					Top Sand 39.20'
-50 to -90		CL/CH	CLAYEY SAND: CL: 54'-79' Sandy lean clay red/ brown, med. stiff, moist, moderate odor, no staining. Trace gravel @ 57', slow drilling, TD 79' Grout 36'-3' Bentonite 36'-39' Sand 39'-79' 0.020 Screen 74'-44' Riser 74'-79'					Top Screen 44'
								Sump 74'-79'
								TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-33**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Rick Smith, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/18/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 5'-42':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, No Odor					Cement Grout 3'-36.40'
-40 to -45		GM CH	CLAY: CH: 42'-54': Fat Clay with Sand, red, medium stiff, plastic, very moist at contact, No odor. Water Level @ 51.75'					Bent. 36.40' Top Sand 41.6' Top Screen 44'
-50 to -90		CL/CH	CLAYEY SAND: CL:53'-79' Sandy lean clay red/ brown, med. stiff, moist, wet @ 53', moderate odor, no staining. TD 79' Grout 36'-3' Bentonite 36'-41' Sand 41'-79' 0.020 Screen 79'-44'					TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-34**
TOTAL DEPTH: **80'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/24/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

Water level during drilling
Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-53'
-35 to -45		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					
-45 to -50			CLAY: Decreasing Hydrocarbon Odor					
-50 to -60			CLAY: Water Level @ 63.49' from TOC 10/29/02	50'-52' 55'-57'	30 Blows 37 Blows			Bentonite -53' Sand 79'-56'
-60 to -65				60'-62'	36 Blows			
-65 to -75		CL / CH	CLAYEY SAND: TD 79' Saturated @ 65' BGS Cement / Bentonite Grout 53'-3' Bentonite 56'-53' 12/20 Sand Pack ' 56'-79' 0.010 Slot Screen 79'-59'	65'-67' 70'-72' 75'-77'	56 Blows 36 Blows 46			Screen 79'- 59'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-35**

TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/15/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling

▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"					Cement Grout 3'-48'
-35 to -50		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses Water Level 56.75' BGS 11/16/02					Bentonite 48'
-50 to -55			GRAVEL AND SAND:					Top Sand 51'
-55 to -75		CL / CH	CLAYEY SAND: TD 79' Saturated @ 58' BGS Cement / Bentonite Grout 38'-3' Bentonite 48'-51' 12/20 Sand Pack ' 51'-74' 0.020 Slot Screen 74'-54' Riser 74'-79' No Odor or Staining Fat Clay lenses layered 50'-74' Dry at 74'					Top Screen 54'
-75 to -79		CH	CLAY: Red Fat Clay, Dry, No Odor or Staining					Sump 74'-79' TD 79'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-36**
TOTAL DEPTH: **74'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/14/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt, Mixture, gravel to 4"				Cement Grout 3'-38'	
-40 to -50		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses				Bentonite 38'	
-50 to -75		CL / CH	CLAYEY SAND: TD 74' Saturated @ 51' BGS Cement / Bentonite Grout 38'-3' Bentonite 38'-41' 12/20 Sand Pack ' 41'-74' 0.020 Slot Screen 74'-44' No Odor or Staining Fat Clay & Sandy Clay lenses layered 50'-70' Dry at 70' BGS	49'-51' 54'-56' 59'-61'	50/24" 50/24" 25/24"		Top Sand 41' Top Screen 44'	
-75		CH	CLAY: Red Fat Clay, Dry, No Odor or Staining	74'-76'	23/24"			

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MPE-37**
TOTAL DEPTH: **74'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**8 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/15/02**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 4" SCH 40 PVC MPE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -5		GM	GRAVEL AND SAND: GM: 0'-4' BGS White Tan Brown Caliche, Hard, 4'-34' :Gravel, Sand, Silt, Mixture, gravel to 4",					Cement Grout 3'-38'
-5 to -35		CH	CLAY: CH: Red Clayey Sand mixed with Fat Red Clay Lenses					Bentonite 38'
-35 to -50		CL / CH	CLAYEY SAND: TD 74' Saturated @ 50' BGS Cement / Bentonite Grout 38'-3' Bentonite 38'-41' 12/20 Sand Pack ' 41'-74' 0.020 Slot Screen 74'-44' No Odor or Staining Fat Clay & Sandy Clay lenses layered 50'-70' Dry at 70' BGS Water Level 49.4' BGS 11/16/02					Top Sand 41' Top Screen 44'
-50 to -75		CH	CLAY: Red Fat Clay, Dry, No Odor or Staining					

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MW-38**
TOTAL DEPTH: **68'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-58**
LOGGED BY:	**C.M. Barnhill, PG**	METHOD OF DRILLING:	**HSA 81/4" Augers**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**09/30/03**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 2" SCH 40 PVC Monitor Well

⧖ Water level during drilling
⧗ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -90		GM	GM: 0'-5': GM mixed with caliche, white pink, dry 5'-18':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.		67/20"	9'-11'		Cement Grout 0'-41'
		SC	SC: Clayey Sand, tan brown to light brown reddish		52/24"	19'-21'		
		SC			15/24"	29'-31'		
		SC						
		SP	SP: Fine gr. sand, reddish		20/24"	39'-41'		Top Bentonite 45'
		SC	SC: Clayey Sand, fine gr. well sorted, no odor or staining. Reddish Brown to yellowish color. Saturated at 55' feet below ground surface. DTW=43.27' BGS Total Depth 68' BGS.	@55' BGS Sampled 2 x 4/oz. Jars @08:32hr. 8260 VOC / TPH Mod. 8015 8270 SVOC Total Metals	19/24"	49'-51'		Top Sand 46' 12/20 Sand Top Screen 48' 0.010 Slot Screen
		SC			36/24"	59'-61'		
		SC						
		SC						
		SC						
								TD 68'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-22**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/07/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: Water @ 20' (BGS)? Strong Odor

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	COLLUVIUM: Backfill / Colluvium					Concrete seal: 13'-3'
-5								
-10			GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture, 2" Gravel Perched Aquifer @ 20' BGS ??					
-15								
-20 ▽								Bentonite: 18'-13'
-25		CH	CLAY: CH: Red Sandy Clay to Fat Clay Lense					Top Sand 23'
-30			GRAVEL AND SAND: Silty Gravel, gray with Hydrocarbon Odor	25'-27'	100			2" 0.010 Slot Screen 35' - 25'
-35								TD 35'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-23**
TOTAL DEPTH: **39'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/07/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: 2" SVE Well

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Gravel to 2"					Concrete seal: 17'-3'
-5								
-15								Bentonite: 22'-17'
-20								Top Sand 22'
-25		GM						2" 0.010 Slot Screen 35' - 25'
-30								
-35		GM						TD 39'
-40								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-24**
TOTAL DEPTH: **30'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/13/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES:

▽ Water level during drilling
▼ Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Gravel to 2"					Concrete seal: 13'-3'
-5								
-15								Bentonite 18'-13'
-20								Top Sand 18'
-25								2" 0.010 Slot Screen 30' - 20'
-30		CH	CLAY: CH: Red Sandy Clay to Fat Clay					TD 30'
-35								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-25**
TOTAL DEPTH: **34'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/04/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: 2" SVE Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Strong Hydrocarbon odor Pit liner @ 17'					Concrete seal: 14'-3'
								Bentonite: 21'-14'
								Top Sand 21.6'
								2" 0.010 Slot Screen 34' - 24'
		CH	CLAY: CH: Red Sandy Clay to Fat Clay					TD 34'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-26**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**Jim Chionis**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/05/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: 2" SVE Well

Water level during drilling
Water level in completed well

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DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -40		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Gravel to 2"					Concrete seal: 17'-3'
								Bentonite: 22'-17'
								Top Sand 22'
		GM						2" 0.010 Slot Screen 34' - 24'
-35		CH	CLAY: CH: Red Sandy Clay to Fat Clay					TD 35'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-27**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**11/01/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: No Fat Clay Seen in Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -35		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture Gravel 2"-4" Contaminated at 10' BGS No Fat Clay Seen in well. Very Strong Contamination Srtong/ Odor/ Staining Black Color to sand/silt					Concrete seal: 13'-3' Bentonite: 18'-13' Top Sand 18' 2" 0.010 Slot Screen 35' - 20'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-28**

TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/29/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: Water @ 35' (BGS)? Strong Odor

▽ Water level during drilling

▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture					Concrete seal: 13'-3'
-5								
-15								Bentonite: 18'-13'
-20								Top Sand 23'
-25								2" 0.010 Slot Screen 35' - 25'
-30		CH						
-35 ▽			CLAY: CH: Red Sandy Clay to Fat Clay Wet with Strong Hydrocarbon Odor					TD 35'
-40								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-30A**
TOTAL DEPTH: **45'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/25/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: 2" PVC SVE Well

▽ Water level during drilling
▼ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture	50 Blows	+50		Concrete seal: 13'-3'	
-5								
-15								Bentonite 13'
-20				22 Blows	22			2" Slot Screen 45' - 20'
-25								Top Sand 18'
-30								
-35								
-40		CH	CLAY: CH: Red Clayey Sand, Strong Hydrocarbon Odor, Moist Fat Clay	20 Blows	20			
-45								TD

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVE-31**
TOTAL DEPTH: **35'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-68**
LOGGED BY:	**CM Barnhill, PG**	METHOD OF DRILLING:	**6 1/4" Hollow Stem Auger**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**10/28/02**	HAMMER WT./DROP	**140 LB., 30 IN.**

NOTES: Poor recovery in Split Spoon .

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		GM	GRAVEL AND SAND: GM: Gravel, Sand, Silt Mixture					Concrete seal: 13'-3'
-5								
-15								Bentonite: 18'-13'
-20								Top Sand 23'
-25				SPT Sample 24'-26'	+50			2" 0.010 Slot Screen 35' - 25'
-30		CH	CLAY: CH: Red Sandy Clay to Fat Clay					
-35								

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MW-34**
TOTAL DEPTH: **79'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Remediation Drilling**	DRILLING CO.:	**Atkins Engineering**
SITE LOCATION:	**TWP Roswell Station 9**	DRILLER:	**Mort Bates**
JOB NO.:	**P-202203**	RIG TYPE:	**Mobile Drill B-58**
LOGGED BY:	**C.M. Barnhill, PG**	METHOD OF DRILLING:	**HSA 81/4" Augers**
PROJECT MANAGER:	**George Robinson, PE**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**01/06/03**	HAMMER WT./DROP	**140 lb., 30 in.**

NOTES: 2" SCH 40 PVC Monitor Well

▽ Water level during drilling
▼ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	SAMP. #	Blows / ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 to -30		GM	GRAVEL AND SAND: 0'-5': GM mixed with caliche, white pink, dry 0'-32':GM: Gravel, Sand, Silt, Mixture, gravel to 4", Lt. Brown, med. dense, dry.		42/24"	40-42'		Cement Grout 3'-42'
-30 to -45		SC	SC: Clayey Sand, tan brown to light brown reddish saturated @55' BGS, No odor or staining, Water Level @ 57.74' BGS 01/07/03		46/24"	44-46'		
-45 to -50		SC		@55' BGS	51/24"	49-51'		Bentonite 42'
-50 to -55		SW	SW: Med. to fine grained tan sand, well sorted,	Sampled 2 x 4/oz. Jars	56/24"	54-56'		Top Sand 46'
-55 to -60		SC	SC: Clayey Saturated	@11:10hr.	61/24"	59-61'		Top Screen 49'
-60 to -65		CH	CH: Fat Brown Silty Clay,	8260 VOC / TPH Mod. 8015	66/24"	64-66'		12/20 Sand
-65 to -75		SW	SW: Tan, Reddish, Brown Sand, Fine Gr., Well Sorted, Saturated, Flowing Sand, No Odor Or	8270 SVOC Total Metals	71/24"	69-71'		0.010 Slot Screen
-75 to -79		SP/SW	SP: Tan, Reddish Brown Sand, Fn. Gr., Well Sorted, Saturated, mixed with angular to subrounded gravel to 1/2", No odor or staining.		76/24"	74-76'		
-79 to -81					81/24"	79-81'		TD 79'

ATTACHMENT 2
RED-LINE REPORT OF PERCHED AQUIFER EVALUATION AND FUTURE CORRECTIVE ACTION RECOMMENDATIONS

REPORT OF PERCHED AQUIFER EVALUATION AND FUTURE CORRECTIVE ACTION RECOMMENDATIONS
FORMER SURFACE IMPOUNDMENTS
TRANSWESTERN COMPRESSOR STATION NO. 9
(ROSWELL COMPRESSOR STATION)
6381 NORTH MAIN STREET
ROSWELL, CHAVES COUNTY, NEW MEXICO
NMOCD GW-052
NMED 1656; EPA ID NMD986676955

PREPARED FOR:

TRANSWESTERN PIPELINE COMPANY, LLC
1300 MAIN
HOUSTON, TEXAS 77002

PREPARED BY:

EARTHCON CONSULTANTS, INC.
14405 WALTERS ROAD, SUITE 700
HOUSTON, TEXAS 77014
281.240.5200

EarthCon Project No. 02.20180005.00

June 2021
(REVISED January 2022)

Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations
Former Surface Impoundments
Transwestern Compressor Station No. 9
(Roswell Compressor Station)
6381 North Main Street
Roswell, Chaves County, New Mexico
NMOCD GW-052
NMED 1656; EPA ID NMD986676955

Prepared For:

Transwestern Pipeline Company, LLC
1300 Main
Houston, TX 77002

June 2021
EarthCon Project No. 02.20180005.00

EarthCon Consultants, Inc. (EarthCon) is submitting to Transwestern Pipeline Company, LLC (Transwestern) this *Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* for the Roswell Compressor Station in Roswell, Chaves County, New Mexico. This report has been prepared for the exclusive use of and reliance by Transwestern and may not be relied upon by any other person or entity without the express written authorization of EarthCon.

Any reliance, use, or re-use of this document (or the opinions, findings, conclusions, or recommendations if any represented herein), by parties other than those expressly authorized by EarthCon is at the sole risk of those parties. This report was prepared by or performed under the direction of the EarthCon Professionals listed below and approved by Transwestern.

Signed:

Sofie Weber
Senior Professional
EarthCon Consultants, Inc.

Steve Diamond, PE (AL, GA, LA, MO, SC, MI)
Senior Engineer
EarthCon Consultants, Inc.

J.D. Haines, LPG (IN)
Principal Geologist
EarthCon Consultants, Inc.

Date: 6/28/2021 (Revised 1/27/22)

EarthCon Consultants, Inc.
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ATTACHMENTS

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1.0 INTRODUCTION

This *Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* was prepared by EarthCon Consultants, Inc. (EarthCon) on behalf of Transwestern Pipeline Company, LLC (Transwestern) to summarize the results of a perched aquifer evaluation and evaluate future corrective actions associated with the Former Surface Impoundments at the Transwestern Compressor Station No. 9 (also known as the Roswell Compressor Station) property, located at 6381 North Main Street in Roswell, New Mexico (the "Site"). Historic reports indicate the potential for perched aquifer conditions intersecting the soil vapor extraction (SVE) wells and RW-1, all of which are located on the Transwestern site near the former surface impoundments.

The Facility is an active natural gas compressor station, owned and operated by Transwestern, located approximately 8 miles north of the city center of Roswell, New Mexico along the eastern side of U.S. Highway 285. The Facility occupies approximately 77 acres of land in Section 21 (SW¼ of the SW¼) and Section 28 (NW¼ of the NW¼) of Township 9S and Range 24E, Chaves County, New Mexico (**Figure 1-1**). Access is via U.S. Highway 285, and the entire Facility is secured by a chain-link fence with locked gates. The Project Area encompasses a portion of the northeast corner of the Facility and a portion of a 40-acre easement of land to the northeast, leased from the New Mexico State Land Office (SLO) State Trust Land for remediation and monitoring purposes (**Figure 1-2**).

Comment 4 of the NMED's *Approval with Modifications Laboratory Results Submittal for SVE and RW-1 Wells and Additional Laboratory Results for SVE and RW-1 Wells*, dated February 21, 2020, requires a report that summarizes the results of the perched zone evaluation. Further, Comment 1 of the NMED's *Additional Response to Comments* 10/14/2020, dated April 9, 2021, requests a standalone report evaluating and recommending corrective action for the perched aquifer.

2.0 PERCHED AQUIFER EVALUATION

According to historical groundwater gauging data, field personnel observed the presence of water at depths between 28 feet below ground surface (bgs) and 35 feet bgs in certain soil vapor extraction (SVE) wells, while other SVE wells remained dry. Two of the deepest wells in the perched aquifer, RW-1 and SVE-30, are both over 41 ft BTOC and consistently have measurable groundwater. Wells SVE-23 and SVE-28 are each approximately 36 ft BTOC and typically have

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measurable groundwater, including the year 2020. Wells SVE-22, SVE-25, SVE-27, and SVE-31 (all approximately 33 ft BTOC) often do not have water; SVE-22, SVE-27, and SVE-31 were dry during at least part of 2020. Wells SVE-24 and SVE-26 (28.9 and 32.5 ft BTOC, respectively) have not had measurable water in the past five years.

Boring logs developed for SVE, and the deeper multiphase extraction (MPE) wells were reviewed, which did not note a distinct water bearing zone between the surface and 50 feet bgs **(Attachment 1, Perched Aquifer Boring Logs)**. In the MPE wells, groundwater was reported to be approximately 60 feet bgs. Considering the presence and absence (dry) of groundwater in certain SVE wells at various times and the construction depth of these wells, it was suspected that a combination of rainwater and condensate buildup within the SVE piping conveyance network could be back flowing and contributing to the water that was being observed in certain SVE wells. Further investigation was performed in the field to identify the source of the water in the SVE wells.

Further review of the suspected perched aquifer was conducted by recovering water from RW-1 until dry and monitoring rebound over time. Beginning in April 2020, groundwater was extracted from recovery well RW-1 to evaluate the perched aquifer. However, the extraction process was deactivated after a short period due to groundwater volumes unexpectedly reaching the storage tank capacity, and the evaluation was suspended pending further review of the process and results.

The evaluation of the perched aquifer in RW-1 resumed on September 23, 2020, and continued to October 20, 2020. Prior to installing a pump, the groundwater level was measured as 33.55 feet below top of casing (btoc). The pump inlet was lowered to approximately 38 feet btoc and the pump recovered groundwater at an average rate of approximately 0.16 gallons per minute during the evaluation period. Groundwater levels were measured daily in RW-1 to evaluate recharge of the well. According to liquid levels, the groundwater was drawn down to approximately 37.5 feet before stabilizing. The pump was deactivated, and groundwater recharged at a rate of approximately 0.2 feet per day. Based on pump evaluation on RW-1 and historical groundwater gauging data in SVE wells, a perched aquifer may exist in this portion of the site.

Further review of historical documents revealed that an initial field site assessment performed in 1991 reported the presence of a perched aquifer which intersected wells SVE-23, SVE-25, SVE-27, SVE-28, SVE-30, SVE-31, and RW-1. A summary of construction information for wells in the

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perched aquifer is provided in **Table 2-1**, and groundwater elevations for wells in the perched aquifer are shown in **Table 2-2**.

2.1 PSH Thickness

Liquid levels were measured in SVE wells and RW-1 using an optical interface probe to determine the presence and apparent thickness of PSH (phase separated hydrocarbons). According to historical liquid levels, SVE-23 was the only well to consistently contain PSH; however, recently, PSH has been observed in SVE-25 in November 2020 after 11 years of no detections. The apparent thickness of 3.0 feet and 0.10 foot was measured in SVE-23 and SVE-25 in April 2021, respectively. Distribution of PSH apparent thickness is presented in **Figures 2-2a** and **2-2b**. Further PSH monitoring will continue for SVE-23 and SVE-25 in 2022~~1~~.

2.2 Groundwater Analytical Results

Groundwater samples were collected and analyzed for BTEX by EPA method 8260 or for VOCs via EPA Method 8260B, and 1,4-dioxane was analyzed by EPA method 8270SIM in accordance with the approved *Sampling and Analysis Plan* (SAP). The analytical results for groundwater samples in the are summarized in **Table 2-3**. Wells in the perched aquifer that had measurable groundwater and did not contain PSH (i.e., RW-1, SVE-28, SVE-30, and SVE-31) were sampled. Wells SVE-23 and SVE-25 contained water and PSH, while SVE-24, SVE-26, and SVE-27 were dry and did not have measurable PSH.

In summary, BTEX constituents were detected above laboratory reporting limits in wells SVE-28, SVE-30, and RW-1. Benzene exceeded the Groundwater Concentration Limit (GCL) in both SVE-30 and RW-1, and 1,1-DCA exceeded the GCL in SVE-30. The areal distribution of BTEX, Benzene, and 1,1-DCA in the Perched Aquifer in November 2020 ~~remains delineated within the Project Area boundaries and within the limits of the plume in the lower water bearing unit; as well as being consistent with the 2019 data for those wells~~is shown in ~~(~~**Figures 3-1** through **3-3**~~)~~.

3.0 FUTURE CORRECTIVE ACTION RECOMMENDATIONS

In correspondence dated July 2, 2020, and November 25, 2020, NMED requested that Transwestern suspend PSH recovery activities in SVE-23 and monitor PSH thickness over time. Currently, it is unknown if the recovery rates of the PSH and/or groundwater in the perched aquifer can sustain a more active recovery method such as PSH skimming, or multiphase extraction. Therefore, Transwestern recommends that PSH recovery via manual bailing be initiated immediately in SVE-23 and SVE-25 considering the overall corrective action objective for the site.

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It is apparent that LNAPL is present at recoverable thicknesses and PSH will be monitored for rebound after selected recovery event. Data will be collected from manual bailing events during 2022 to determine feasibility of additional recovery measures or impracticability. Results will be provided in the 2022 Annual Groundwater Remediation Activities Report.

Since SVE-23 and most recently SVE-25 are the only wells in the Perched Aquifer to contain PSH, it is believed that the PSH appearances may be residual product that may have accumulated in those wells after source removal activities. Historical PSH measurements in wells located in the perched aquifer and upper aquifer indicate that the PSH footprint has stabilized or decreased. A work plan will be prepared and submitted detailing delineation of the horizontal and vertical extent of the LNAPL plume. Based on the results of perched aquifer delineation evaluation, the apparent extent of LNAPL, and results of bailing recovery, additional measures will be evaluated to identify appropriate and effective action to recover LNAPL in the perched aquifer.

~~Liquid levels and recovery data collected from bailing activities has been evaluated and the current remediation system is effective showing a decrease in BTEX, and 1,1-DCE concentrations. Due to the current results of the PSH plume and dissolved-phase concentrations, additional delineation does not appear warranted at this time.~~

4.0 REFERENCES

Roswell Shallow Subsurface Investigation by Harding Lawson Associates, June 20, 1991

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TRANSWESTERN PIPELINE COMPANY
An ENERGY TRANSFER Company

September 19, 2022

Mr. Rick Shean, Bureau Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

RE: Submittal of Work Plan to Delineate Hydrocarbons in the Perched Aquifer
Roswell Compressor Station No. 9
Transwestern Pipeline Company, LLC
Roswell, Chavez County, New Mexico
NMOCD Case #GW-052/EPA ID NO. NMD986676955

Dear Mr. Shean:

Transwestern Pipeline Company, LLC's (Transwestern) is submitting a *Work Plan to Delineate Hydrocarbons in the Perched Aquifer* at the Roswell Compressor Station No. 9.

If you have any questions or comments regarding this submission, please do not hesitate to contact me at 210.870.2725 (office) or Steve Diamond of WSP USA, Inc. at 770-973-2100, ext. 2876.

Sincerely,

SBoultinghouse

Stacy Boultinghouse, PG(TX4889/LA73)
Environmental Manager
Transwestern Pipeline Company, LLC
Stacy.Boultinghouse@energytransfer.com

Attachment: Work Plan to Delineate Hydrocarbons in the Perched Aquifer – (two hard copies and one electronic copy)

ec: D. Cobrain, NMED HWB
M. Suzuki, NMED HWB
Mr. M. Bratcher, NMOCD
B. Billings, NMOCD
L. King, USEPA Region 6
JD Haines, WSP USA
S. Diamond, WSP USA

WORK PLAN TO DELINEATE HYDROCARBONS IN THE PERCHED AQUIFER

TRANSWESTERN COMPRESSOR STATION NO. 9
ROSWELL, CHAVES COUNTY, NEW MEXICO
NMED 1656; EPA ID NMD986676955

PREPARED FOR
TRANSWESTERN PIPELINE COMPANY, LLC
1300 MAIN HOUSTON, TX 77002

PROJECT NO. EC02.20180005.01
DATE: SEPTEMBER 2022
REVISED:

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FIGURES

TABLES

1 INTRODUCTION

This *Work Plan to Delineate Hydrocarbons in the Perched Aquifer* (Work Plan) was prepared by WSP USA Inc. (WSP) on behalf of Transwestern Pipeline Company, LLC (Transwestern) to summarize the proposed methods to further delineate the hydrocarbons detected in the perched aquifer at the Transwestern Compressor Station No. 9 (also known as the Roswell Compressor Station) property, located at 6381 North Main Street in Roswell, New Mexico (the "Site").

The Site is an active natural gas compressor station, owned and operated by Transwestern, located approximately 8 miles north of the city center of Roswell, New Mexico along the eastern side of U.S. Highway 285. The site occupies approximately 77 acres of land in Section 21 (SW¼ of the SW¼) and Section 28 (NW¼ of the NW¼) of Township 9S and Range 24E, Chaves County, New Mexico (**Figure 1**). Access is via U.S. Highway 285, and the entire Facility is secured by a chain-link fence with locked gates. The Project Area encompasses a portion of the northeast corner of the Facility and a portion of an adjacent 40-acre easement of land to the northeast, leased from the New Mexico State Land Office (SLO) State Trust Land for remediation and monitoring purposes (**Figure 2**).

The two former surface impoundments were historically used to dispose of waste hydrocarbons, including pipeline condensate, pigging wastes, spent solvents, and other wastes and debris from pipeline maintenance activities conducted at the Roswell Compressor Station. The wastes were removed from the former surface impoundments and the area was backfilled with clean soil in 2001. The water bearing unit at the Site has been reported as two aquifers within the area of the former surface impoundments, an upper aquifer within which most of the monitoring and remedial activities currently take place, and the deeper San Andres Formation Aquifer. The upper aquifer system also includes a perched aquifer under the former surface impoundments that exhibited phase-separated and dissolved hydrocarbons.

A soil and groundwater remediation system were subsequently designed and installed to address adsorbed-phase hydrocarbons in the vadose zone and dissolved-phase and phase separated hydrocarbons (PSH) detected in groundwater in the upper aquifer. The remediation system also includes twelve shallow soil vapor extraction (SVE) wells and RW-1 (average total depth of the wells is approximately 35 feet bgs) that are connected to vacuum blowers for recovering volatile organic compounds (VOC) adsorbed to soils in the vadose zone within the surface impoundments. In addition, the remediation system includes 35 deep multiphase extraction (MPE) wells (average total depth MPE wells is approximately 75 feet bgs) which are connected to the vacuum blowers but are also equipped with down-well pneumatic fluid recovery pumps to recover vapor-phase VOCs, dissolved-phase VOCs and PSH in the upper aquifer in the vicinity and downgradient of the surface impoundments.

2 BACKGROUND

In correspondence (HWB-TWP-19-001) dated on April 23, 2019, *Approval with Modifications Report of 2018 Groundwater Remediation Activities*, the New Mexico Environment Department (NMED) requested the perched aquifer zone that was identified in the report be separated from the upper aquifer in future reports. Additionally, the NMED noted that Benzene concentrations exceeded the screening level in the groundwater samples collected from wells SVE-28, SVE-30, and RW-1, and that the extent of contamination in the perched zone is not delineated due to the limited number of wells screened to the perched zone. The NMED requested that Transwestern submit a work plan to investigate the extent of the contamination in the perched aquifer or, provide justification for not proposing to investigate the perched aquifer. In correspondence dated May 30, 2019, Transwestern indicated that the benzene concentrations were low in the perch aquifer and most likely not beyond the current known extent. Furthermore, and as previously requested by the NMED, Tranwestern planned to collect additional data during two groundwater sampling events in 2019 and 2020 from twelve of the SVE wells and RW-1 for VOC analysis and discuss results of the investigation with the NMED. Approval was received by the NMED on June 27, 2019 (HWB-TWP-19-001).

Transwestern submitted letter reports titled *Laboratory Results Submittal for SVE wells and RW-1 (Report 1)* and *Additional Laboratory Results Submittal for SVE and RW-1 Wells (Report 2)* on December 19, 2019, and January 30, 2020, respectively. Transwestern stated in the January 2020 letter report that the residual water observed in the SVE wells may be associated with condensation build-up from the existing SVE system. Transwestern proposed to evaluate the residual water by performing pumping tests and present the results of the evaluation to the NMED. In correspondence titled *Approval with Modifications Laboratory Results Submittal for SVE and RW-1 Wells and Additional Laboratory Results for SVE and RW-1 Wells* from NMED dated February 21, 2020 (HWB-TP-19-003), the NMED approved the proposed evaluation and stated that contaminant concentrations in the samples collected from well SVE-30 and RW-1 exceeded applicable screening levels, and the NMED requested a perched zone investigation and work plan be submitted by Transwestern.

On June 28, 2021, the *Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* (Report) was submitted to the NMED for review. The report stated that based on historical information dating back to 1991, the perched aquifer appears to intersect shallow wells SVE-23, SVE-25, SVE-27, SVE-28, SVE-31, and RW-1. Groundwater elevations range between 3,577 feet to approximately 3,380 feet (reference to North American Vertical Datum (NAVD)) in the perched aquifer. The report also stated that based on most recent groundwater data, PSH thicknesses above 0.5 foot was observed in SVE-23 and dissolved-phase hydrocarbons in groundwater were observed in SVE-28, SVE-30, and RW-1. Wells SVE-23 and SVE-25 contained water and PSH, while SVE-24, SVE-26, and SVE-27 were dry and did not have measurable PSH. The location of SVE wells and RW-1 are presented in **Figure 3**. The PSH observations are shown in **Figure 3** and dissolved-phase hydrocarbons detections are shown in **Figure 4**. A summary of well completion details is presented in **Table 1.** Historical groundwater/PSH levels and dissolved-phase hydrocarbon data for the perched aquifer is presented in **Tables 2** and **3**, respectively.

Based on the Report, Transwestern believed that the PSH appearances may be residual product that may have accumulated after source removal activities since SVE-23 and SVE-25 are the only wells in the perched aquifer to contain PSH and are located nearby the former surface impoundments. In addition, over ten years of historical PSH measurements in wells located in the perched aquifer and upper aquifer

indicated that the PSH footprint has stabilized or decreased. Based on historical laboratory data, it was also believed that the areal distribution of BTEX, Benzene, and 1,1-DCE in the Perched Aquifer has remained delineated within the project area boundaries and within the limits of the existing plume and that the current remediation system was effectively showing a decrease in BTEX and 1,1-DCE concentrations. In addition, the current remediation dual-phase extraction system encompasses the area of the former surface impoundments. Due to the results presented in the *Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations*, Transwestern did not recommend additional delineation efforts in the perch aquifer.

On September 8, 2021, the NMED issued a *Disapproval Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations* (HWP-TW-21-003) to Transwestern. In this correspondence, the NMED did not agree with the statement that additional delineation is not warranted. Instead, the NMED stated that many of the wells advanced to the perched aquifer are too shallow to produce water and therefore are not useful for delineation. Additionally, the NMED stated that the contaminant concentrations are fluctuating in the groundwater samples collected from the perched aquifer according to the tables, and the current SVE wells in the perched aquifer do not extract liquid PSH or groundwater and are not capable of containing the plumes. The NMED requested a work plan for delineating the horizontal and vertical extent of the phase separated hydrocarbon (PSH) and dissolved-phase hydrocarbon plumes in the perched aquifer portion of the upper aquifer system.

On January 27, 2022, Transwestern provided a response to the NMED's disapproval correspondence dated September 8, 2021, which proposed to develop a work plan with details for delineating the horizontal and vertical extent of the plume in the perched aquifer. Subsequently, the NMED concurred with the development of the work plan in correspondence dated March 1, 2022 "Approval with Modifications" (HWB-TW-21-003).

2.1 DELINEATION OF PSH PLUME

Since 2018, a PSH thickness has been detected in SVE-23 with thicknesses averaging 1.35 feet. Most recently, a PSH thickness of 0.47 foot was measured in August 2022. Sporadic detections of PSH were also observed in SVE-22 and SVE-25 since 2018. The average PSH thicknesses for SVE-22 and SVE-25 was 0.15 foot since 2018. Since December 2021, PSH detections were not observed in SVE-22 and SVE-25.

Based on historical groundwater/PSH liquid levels, the PSH plume in the perch aquifer is delineated towards the south, west, and north by SVE-22, SVE-25, and SVE-27 respectively. Therefore, future investigations to delineate the PSH plume extent in the perched aquifer is proposed towards the southwest and southeast of SVE-23. The proposed locations of monitoring wells (PMW-1A and PMW-2A) are shown on **Figure 3**.

2.2 DELINEATION OF DISSOLVED-PHASE HYDROCARBON PLUME

Based on historical and current groundwater laboratory data, dissolved-phase hydrocarbons in the perched aquifer are observed in SVE-28, SVE-30, and RW-1. Currently, these three wells and SVE-31, which intersect the perch aquifer, are the only wells included in the 2022 sampling analysis plan (SAP). Four existing wells, SVE-22, SVE-25, and SVE-27 are proposed to be added to the 2022 SAP to delineate the

plume extent towards the south of SVE-28 and RW-1. Groundwater samples will also be collected from proposed monitoring wells PMW-1A and PMW-2A to delineate the extent of the plume towards the southeast. Two additional wells (PMW-3A and PMW-4A) are proposed for installation to delineate the dissolved-phase hydrocarbon plume extend towards the east and north of RW-1. One additional well (PMW-5A) is proposed to delineate the plume extent of SVE-30. The proposed locations of monitoring wells (PMW-3A through PMW-5A) are shown on **Figure 4**.

Due to the complex geology at the site, the perched aquifer horizontal extent may vary and installation of monitoring wells to delineate PSH and dissolved-phase hydrocarbons without understanding the perched aquifer extent could result in "dry" wells and be very costly. Therefore, the investigative approach to delineate the hydrocarbon plumes is recommended to begin with delineating the extent of the perched aquifer using electric resistivity (ER) technology. Once the extent of the perch aquifer is understood, the actual number of proposed monitoring wells may be adjusted and will be presented for prior approval from the NMED. This work plan provides details of the investigative approach.

3 PROCEDURES

3.1 ELECTRICAL RESISTIVITY STUDY

WSP will conduct an electrical resistivity imaging survey to identify depth to groundwater and delineate the lateral and vertical extent of the perched aquifer at the site. Electrical resistivity (ER) is a geophysical technique based on the flow of electrical current through the underlying media, creating measurements and producing a two-dimensional (2D) and three-dimensional (3D) model of the subsurface. Resistivity measurements are correlated to the amount of water saturation and the connectivity of pore spaces between sediments. With an increase in saturation, the measured resistivity is decreased; inversely, with a decrease in saturation, the measured resistivity is increased. This allows geoscientists to determine the depth of groundwater, based on the measurements produced through electrical resistivity surveying.

Three electrical resistivity lines will be placed at the surface near the wells that encounter the perched aquifer. The proposed location of the electrical resistivity lines is shown in **Figure 4**. Line 1 will be oriented from north to south and electrodes will be spaced with 5-10 ft spacing between each. Line 2 will be oriented from east to west and will be spaced with 5-10 ft spacing. Line 3 will be oriented north to south on a diagonal and electrodes will be spaced with 5-10 ft spacing.

The data will be consolidated to develop a cross section visualization of the perch aquifer along the lines of evaluation. Based on the extent of the perched aquifer and historical groundwater data, monitoring well locations will be proposed for the perched aquifer to delineate the hydrocarbon plumes. A summary report will be prepared to document the ER study and present the locations of the proposed monitoring wells. The summary report will be submitted to the NMED for approval of the proposed monitoring well locations.

3.2 MONITORING WELL INSTALLATION

Based on the results of the electrical resistivity study, it is anticipated that potentially five groundwater monitoring wells may be installed within the perched aquifer in general accordance with the NMED Groundwater Quality Bureau Monitoring Well Construction and Abandonment Guidelines (March 2011). Well drilling activities will be performed by a licensed well driller with appropriate permits issued by the New Mexico Office of State Engineer (NMOSE).

A pilot borehole will be advanced prior to installation of each well to provide cores for logging of soils. Each boring will be cleared by excavating with a hand auger to a target depth of at least 5 feet below ground surface (bgs) prior to commencing drilling operations. Soil borings will be advanced using hollow-stem auger drilling methods to the specified depth. Soil cores will be continuously collected to the total boring depth for logging by field personnel. Each soil core will be characterized for soil type, color, grain size, moisture, and will be field screened for organic vapors potentially indicative of the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). One soil sample with the highest PID reading in the vadose zone from each boring location will be submitted to the laboratory for

VOC analysis by EPA Method 8260C under chain of custody procedures. The soil borings will be completed as groundwater monitoring wells within the hollow-stem augers.

The monitoring wells will be constructed with 2-inch diameter, flush-threaded, schedule 40 PVC riser and 15-feet of schedule 40 PVC 0.010-inch slotted screen to a maximum depth between 40 to 50 feet bgs or at the time of encountering the aquitard. Filter sand will be placed around the well screen and brought to approximately 2 feet above the top of the screen followed by a 2 to 3-foot bentonite seal. The bentonite seal will be allowed to hydrate for a minimum of 8 hours or the manufacturer's recommended hydration time, whichever is longer. The remaining borehole will be grouted to the surface. The grout will be allowed to set for a minimum of 24 hours before the surface pad and protective casing are installed. The monitoring wells will be completed with a lockable expandable monitoring well cap and a flush mounted well vault at ground surface installed in a concrete pad. Each well will be properly developed at least 48 hours after the surface pad and outer protective casing are installed. Once wells are installed, the monitoring wells top of casing as well as surveying surface elevations (new and existing SVE wells) will be surveyed by a professional and licensed surveyor.

Soil cuttings, development and decontamination water will be collected in dedicated 55-gallon drums during field activities. Development and decontamination water will be transferred to the surge tank for on-site treatment. Drums of soil cuttings will be characterized for proper disposal.

3.3 GROUNDWATER SAMPLING

The new groundwater monitoring wells in addition to the existing SVE wells and RW-1 will be sampled after development using low-flow sampling methods. Prior to sampling, the monitoring wells will be gauged for the presence of PSH and determine the depth to groundwater. Subsequently, the monitoring wells will be purged and monitored for stabilization of water quality parameters, including pH, specific conductance, dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature using a calibrated YSI Meter (or equivalent). Purging will be considered complete when the measured parameters of the purge water stabilize to within 10 percent for three consecutive measurements. Stable water quality parameter (temperature, pH, and specific conductance) measurements indicate representative sampling is obtainable.

Bladder pumps with dedicated tubing will be used to purge and collect groundwater samples from monitoring wells. Samples will be collected in clean, laboratory supplied containers and analyzed for quality assurance/quality control (QA/QC) purposes. The QA/QC samples will include duplicates, MS/MSD, equipment blanks, and trip blanks.

Purged groundwater will be collected in a dedicated 55-gallon drum during sampling and then transferred to the surge tank for on-site treatment and disposal

3.4 LABORATORY ANALYSES

Each soil sample collected will be assigned a unique identification number. Each groundwater sample will be assigned to the well name for which it is sampled. For each soil and groundwater sample container, a sample label will be affixed to the outside with the date, time of sample collection, project name, sample

identification number, and analysis required. Each sample container will be placed in a Ziploc® bag (or equivalent) and placed in laboratory-supplied coolers with ice.

The groundwater and soil samples will be transported under chain-of-custody protocols to ALS Laboratory in Albuquerque, New Mexico for analysis. Soil samples will be submitted to the laboratory for VOC analysis by EPA Method 8260C under chain of custody procedures. Groundwater samples will be analyzed for VOC via EPA Method 8260C, and for 1,4-Dioxane via EPA Method 8270D SIM

3.5 FIELD DECONTAMINATION

Reusable sampling equipment will be decontaminated before and immediately after each use. The equipment will be cleaned with a phosphate-free detergent such as Liquinox® (or equivalent) and deionized water using a brush or scrub pad to remove any particulate matter or surface film. The equipment will be rinsed with deionized water and allowed to air dry. Equipment decontamination water will be collected in a dedicated 55-gallon drum during sampling and then transferred to the surge tank for on-site treatment and disposal

4 REPORTING

The results of the evaluation will be provided to the NMED in a *Perched Aquifer Delineation Report*. The Report will also include a summary of the field activities, summary tables, field sampling records, boring logs, well construction diagrams, site figure, PSH and groundwater quality figure and the laboratory analytical reports.

5 SCHEDULE

Implementation of this project will begin upon approval of this Work Plan, according to the following proposed schedule for completing the work:

Task	Estimated Schedule
Electric Resistivity (ER)	2 months (after the NMED approval)
ER Summary/Proposed Well Location Report	2 months
Well Installation PermitApproval (NMOSE)	2 months
Well Installation	1 month
Groundwater Sampling and Lab Analysis	1 month
Perch Aquifer Delineation Report	2 months

6 REFERENCES

EarthCon, March 2013. Amended Investigation Work Plan and Groundwater Monitoring Plan.

New Mexico Environment Department, April 2019. Approval with Modifications Report of 2018 Groundwater Remediation Activities Transwestern Compressor Station No. 9

New Mexico Environment Department, February 2020. Approval with Modifications Laboratory Results Submittal for SVE and RW-1 Wells and Additional Laboratory Results for SVE and RW-1 Wells Transwestern Compressor Station No. 9

New Mexico Environment Department, June 2019. Response to NMED Approval with Modifications Correspondence Report of 2018 Groundwater Remediation Activities Transwestern Compressor Station No. 9

New Mexico Environment Department, March 2020. Approval with Modifications [Revised] Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations Transwestern Compressor Station No. 9

New Mexico Environment Department, September 2021. Disapproval Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations Transwestern Compressor Station No. 9

Transwestern Pipeline Company, December 2019. Laboratory Results Submittal for SVE wells and RW-1 (Report 1) Transwestern Compressor Station No. 9

Transwestern Pipeline Company, January 2020. Additional Laboratory Results Submittal for SVE and RW-1 Wells (Report 2) Transwestern Compressor Station No. 9

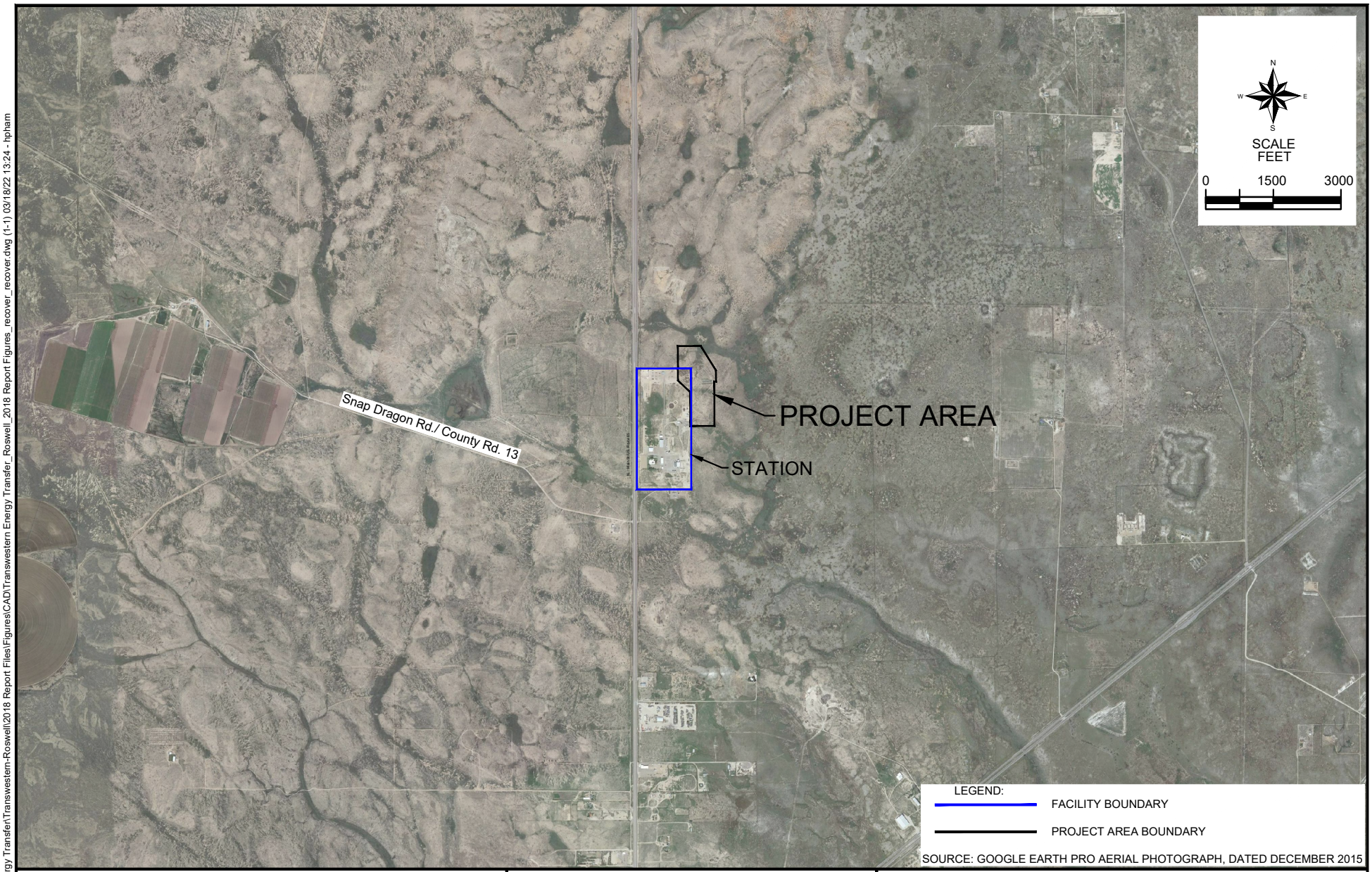
Transwestern Pipeline Company, January 2022. [Revised] Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations Transwestern Compressor Station No. 9

Transwestern Pipeline Company, June 2021. Report of Perched Aquifer Evaluation and Future Corrective Action Recommendations Transwestern Compressor Station No. 9

Transwestern Pipeline Company, May 2019. Response to NMED Approval with Modifications Correspondence Report of 2018 Groundwater Remediation Activities Transwestern Compressor Station No. 9

Roswell Shallow Subsurface Investigation by Harding Lawson Associates, June 20, 1991

FIGURES



REPORT OF 2021 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No. 9
(ROSWELL COMPRESSOR STATION)
ROSWELL, CHAVES COUNTY, NEW MEXICO

PROJECT NO. EC02.20210005.00

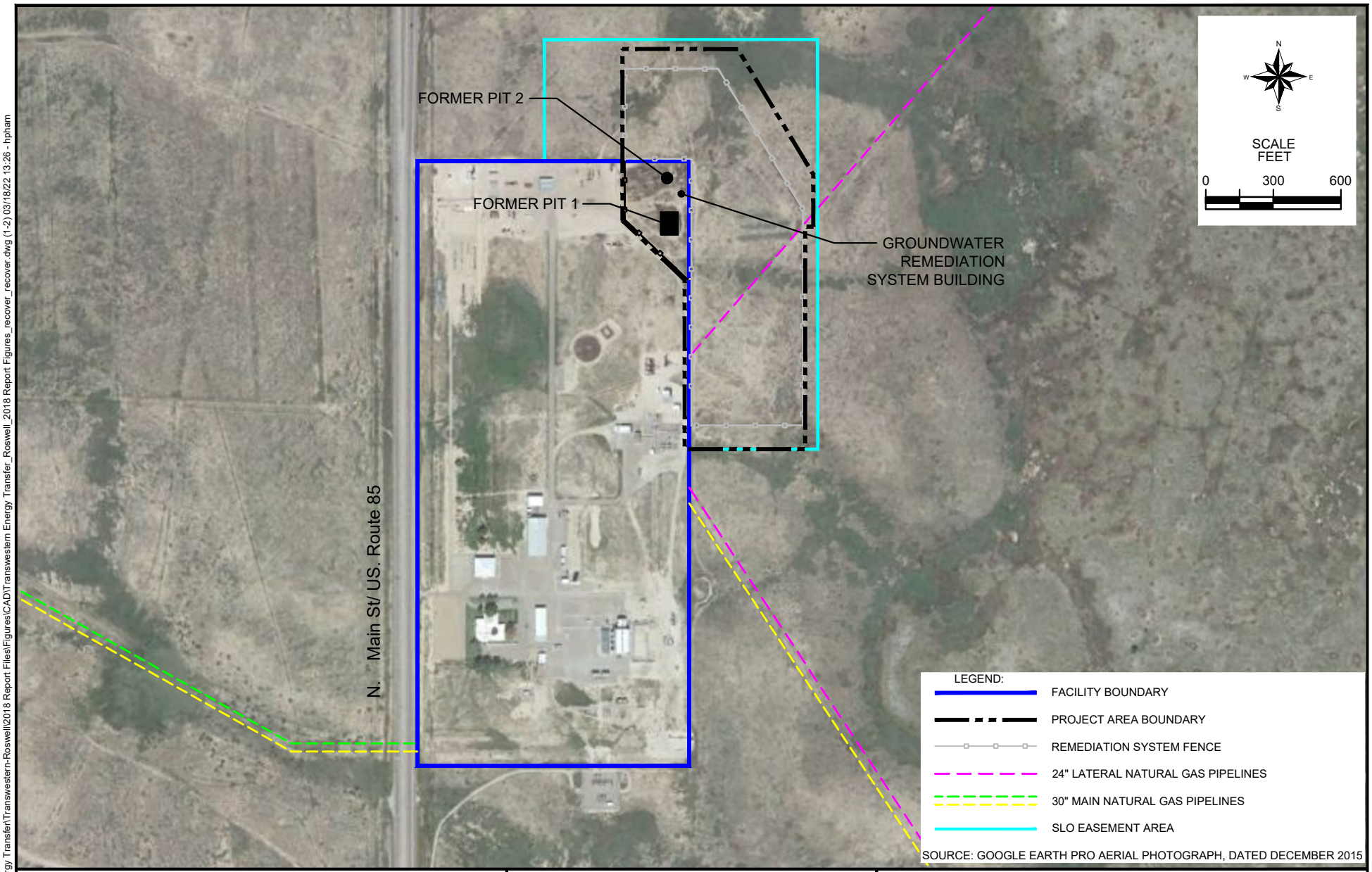
WSP USA, Inc.

1880 WEST OAK PKWY, BLDG 100, STE 106, MARIETTA, GA, 30062

Site Location

DRAWN:	CHECKED:	DATE:	FIGURE:
HVP	SSD	03/17/22	1

FILENAME: S:\Premier\Projects\Energy Transfer\Transwestern-Roswell\2018 Report Files\Figures\CAD\Transwestern Energy Transfer_Roswell_2018 Report Figures_recover_recover.dwg (1-1) 03/18/22 13:24 - hpham



REPORT OF 2021 GROUNDWATER REMEDIATION ACTIVITIES
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No. 9
(ROSWELL COMPRESSOR STATION)
ROSWELL, CHAVES COUNTY, NEW MEXICO

PROJECT NO. EC02.20210005.00

WSP USA, Inc.

1880 WEST OAK PKWY, BLDG 100, STE 106, MARIETTA, GA, 30062

SITE MAP

DRAWN:	CHECKED:	DATE:	FIGURE:
HVP	SSD	03/17/22	2

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ER Line 3

PMW-5A

SVE-1A

SVE-30

SVE-31

SVE-3

SVE-2A

SVE-25

SVE-26

SVE-27

RW-1

SVE-22

SVE-23
0.47

SVE-28

PMW-4A

ER Line 1

PMW-1A

PMW-2A

SVE-24

PMW-3A

ER Line 2

Legend

- Proposed Perched Monitoring Well Location
- Recovery Well Location
- Soil Vapor Extraction Location
- Proposed Electric Resistivity Line
- PSH Contour
- Fence Line
- Building
- Facility Boundary
- Station Pipeline
- Site Boundary

0 25 50 100 Feet

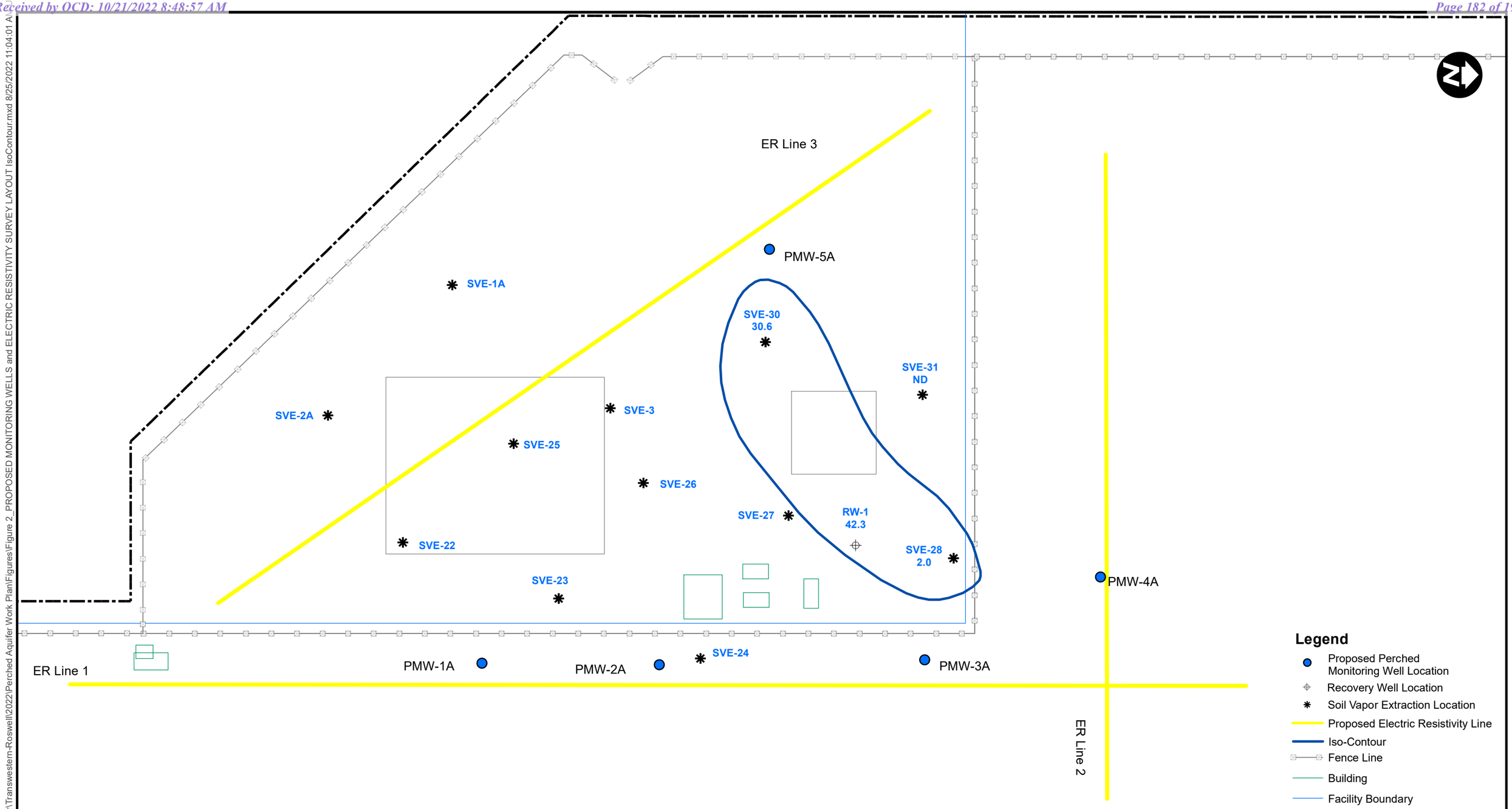
TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)
ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. EC02.20180005.00

WSP USA, Inc.
1880 West Oak Pkwy, Building 100, Suite 106
Marietta, GA 30062
(770)-973-2100

Proposed Monitoring Wells and Electric Resistivity Survey Layout PSH Plume Delineation

DRAWN	CHECKED	DATE	FIGURE
SWS		AUG 2022	3



Average of Sum of VOC (BTEX and chlorinated compounds) in ug/L in 2021

TRANSWESTERN PIPELINE COMPANY, LLC
TRANSWESTERN COMPRESSOR STATION No.9
(ROSWELL COMPRESSOR STATION)
ROSWELL. CHAVES COUNTY, NEW MEXICO

PROJECT NO. EC02.20180005.00

WSP USA, Inc.
1880 West Oak Pkwy, Building 100, Suite 106
Marietta, GA 30062
(770)-973-2100

Proposed Monitoring Wells and Electric Resistivity Survey Layout Dissolved-phase Hydrocarbon Plume Delineation

DRAWN	CHECKED	DATE	FIGURE
SWS		AUG 2022	4

TABLES

Table 1. Summary of Well Completion Details
Transwestern Compressor Station No. 9 - Roswell, NM

Well	Date of Completion	Total Depth of Boring (ft bgs)	Measured Depth of Well (ft from TOC)	Surface Completion Type	Casing Diameter (in.)	Screen Interval (ft bgs)	Top of Sand Pack (ft bgs)
RW-1	06/13/93	42.5	41.47	Flush Mount	4	36.8 - 41.7	34.75
SVE-1A	09/21/96	30	29.65	Flush Mount	2	20-30	19
SVE-2A	09/20/96	30	29.83	Flush Mount	2	20-30	17.5
SVE-3	09/16/96	62.3	61.90	Flush Mount	2	32.0-62.3	29.5
SVE-22	11/07/02	35	33.20	Flush Mount	2	25-35	23
SVE-23	11/07/02	39	36.70	Flush Mount	2	25-35	22
SVE-24	11/13/02	30	28.85	Flush Mount	2	20-30	18
SVE-25	11/04/02	34	32.85	Flush Mount	2	24-34	21.6
SVE-26	11/05/02	35	32.45	Flush Mount	2	24-34	22
SVE-27	11/01/02	35	33.90	Flush Mount	2	20-35	18
SVE-28	10/29/02	35	36.00	Flush Mount	2	25-35	23
SVE-30	10/25/02	45	44.00	Flush Mount	2	20-45	18
SVE-31	10/28/02	35	33.95	Flush Mount	2	25-35	23

Note:

Prepared by: SWS 8/19/2022
Checked by:

ft bgs - feet below ground surface
TOC - top of casing
in. - inches

Table 2. Summary of Groundwater Surface Elevations
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
SVE-1A	6/24/2019	NA	(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
	5/7/2021		(a)	dry	(a)	NA
	11/10/2021		(a)	dry	(a)	NA
	5/14/2022		(a)	dry	(a)	NA
SVE-2A	6/24/2019	NA	(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
	5/7/2021		(a)	dry	(a)	NA
	11/10/2021		(a)	29.42	(a)	NA
	5/14/2022		(a)	dry	(a)	NA
SVE-3	6/24/2019	NA	(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
	5/7/2021		(a)	dry	(a)	NA
	11/10/2021		(a)	dry	(a)	NA
	5/14/2022		(a)	dry	(a)	NA
SVE-22	3/10/2009	NA	33.00	33.20	0.20	NA
	10/8/2009		32.92	33.10	0.18	NA
	1/26/2010		33.05	33.05 (TD)	0.00	NA
	3/22/2010		33.02	33.02 (TD)	0.00	NA
	4/17/2011		32.90	33.00 (TD)	0.10	NA
	12/22/2011		(a)	33.04	(a)	NA
	4/17/2012		(a)	33.00 (TD)	(a)	NA
	10/18/2012		(a)	33.00 (TD)	(a)	NA
	4/15/2013		(a)	32.98	(a)	NA
	11/3/2013	3616.76 (h)	(a)	33.08	(a)	3,583.68
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	dry	(a)	NA
	11/3/2015		33.00	33.11	0.11	3,583.73
	4/29/2016		32.94	33.09	0.15	3,583.78
	11/16/2016		32.78	32.95	0.17	3,583.94
	5/22/2017		33.00	33.10	0.10	3,583.74
	11/13/2017		33.14	33.19	0.05	3,583.61
	6/1/2018		33.02	33.10	0.08	3,583.72
	11/6/2018		(a)	33.05	(a)	3,583.71
	6/24/2019		32.74	32.75	0.01	3,584.02
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
	5/7/2021		(a)	dry	(a)	NA
	11/10/2021		33.10	33.20	0.10	3,583.64
	4/4/2022		(a)	33.00	(a)	3,583.71
	5/14/2022		(a)	33.32	(a)	3,583.44
	6/1/2022		(a)	33.10	(a)	3,583.66
	7/18/2022		(a)	dry	(a)	NA
	8/10/2022		(a)	33.20	(a)	3,583.56
SVE-23	3/10/2009	NA	32.78	36.75	3.97	NA
	10/8/2009		33.01	33.79	0.78	NA
	1/26/2010		33.12	36.98 (TD)	3.86	NA
	3/22/2010		32.09	33.65	1.56	NA
	4/17/2011		33.00	33.30	0.30	NA
	12/22/2011		33.60	34.05	0.45	NA
	4/17/2012		33.62	34.10	0.48	NA
	10/18/2012		34.11	34.68	0.57	NA
SVE-23	4/15/2013		33.65	33.92	0.27	NA
	11/3/2013	3612.45 (h)	33.73	36.52	2.79	3,578.05
	5/1/2014		33.78	36.80	3.02	3,577.95

Table 2. Summary of Groundwater Surface Elevations
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
	11/21/2014		32.15	32.84	0.69	3,580.13
	4/21/2015		32.75	33.4	0.65	3,579.54
	11/3/2015		32.74	33.07	0.33	3,579.63
	4/29/2016		33.01	33.33	0.32	3,579.36
	11/16/2016		33.37	33.82	0.45	3,578.97
	5/22/2017		33.60	34.15	0.55	3,578.72
	11/13/2017		32.64	33.28	0.64	3,579.66
	6/1/2018		33.27	33.95	0.68	3,579.02
	11/6/2018		32.55	35.70	3.15	3,579.14
	6/24/2019		Not Gauged - Snake Hazard Exist in Vault			
	1/5/2020		33.10	33.75	0.65	3,579.19
	5/13/2020		33.52	36.50	2.98	3,578.21
	11/10/2020		33.70	34.87	1.17	3,578.47
	1/18/2021		33.80	34.88	1.08	3,578.39
	2/10/2021		33.78	34.87	1.09	3,578.41
	3/8/2021		33.85	34.88	1.03	3,578.35
	4/5/2021		34.00	37.00	3.00	3,577.73
	5/7/2021		33.10	33.75	0.65	3,579.19
	6/9/2021		34.06	36.80	2.74	3,577.73
	7/10/2021		33.33	34.66	1.33	3,578.80
	8/2/2021		32.65	34.20	1.55	3,579.43
	9/1/2021		32.72	34.35	1.63	3,579.34
	10/5/2021		32.85	34.15	1.30	3,579.29
	11/3/2021		32.89	34.36	1.47	3,579.21
	11/10/2021		Not Gauged			
	12/2/2021		32.89	34.35	1.46	3579.21
	1/10/2022		33.15	34.30	1.15	3579.02
	2/11/2022		33.22	34.10	0.88	3579.02
	3/1/2022		33.00	34.10	1.10	3579.19
	4/4/2022		33.23	34.50	1.27	3578.92
	5/14/2022		33.30	33.89	0.59	3579.01
	6/1/2022		33.35	34.05	0.70	3578.93
	7/18/2022		32.95	33.00	0.05	3579.49
	8/10/2022		33.00	33.47	0.47	3579.34
SVE-24	3/10/2009	NA	(a)	dry	(a)	NA
	10/8/2009		(a)	dry	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	dry	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	dry	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3608.97 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	28.61	(a)	3,580.36
	11/3/2015		(a)	dry	(a)	NA
	4/27/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	dry	(a)	NA
	5/31/2018		(a)	dry	(a)	NA
	11/6/2018		(a)	dry	(a)	NA
	6/24/2019		(a	dry	(a)	NA
	1/6/2020		(a)	dry	(a)	NA
SVE-24	5/13/2020		(a)	dry	(a)	NA
	11/9/2020		(a)	dry	(a)	NA
	5/7/2021		(a)	dty	(a)	NA
	11/10/2021		(a)	dry	(a)	NA
	5/11/2022		(a)	dry	(a)	NA
SVE-25	3/10/2009	NA	(a)	32.70	(a)	NA

Table 2. Summary of Groundwater Surface Elevations
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
	10/8/2009		(a)	31.40	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	32.80	(a)	NA
	4/17/2011		(a)	32.23	(a)	NA
	12/22/2011		(a)	32.65	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	32.70	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3617.02 (h)	(a)	32.72	(a)	3,584.30
	5/1/2014		(a)	32.70	(a)	3,584.32
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	32.73	(a)	3,584.29
	11/3/2015		(a)	dry	(a)	NA
	4/29/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	31.88	(a)	3,585.14
	6/1/2018		(a)	32.6	(a)	3,584.42
	11/6/2018		(a)	31.75	(a)	3,585.27
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		32.5	32.69	0.19	3,584.47
	1/18/2021		32.6	32.71	0.11	3,584.39
	2/10/2021		32.57	32.7	0.13	3,584.42
	3/8/2021		32.55	32.82	0.27	3,584.41
	4/5/2021		32.65	32.75	0.1	3,584.35
	5/7/2021		(a)	dry	(a)	NA
	6/9/2021		32.85	32.9	0.05	3,584.16
	7/10/2021		32.67	32.71	0.04	3,584.34
	8/2/2021		32.3	32.8	0.5	3,584.60
	9/1/2021		31.35	31.65	0.3	3,585.60
	10/5/2021		31.12	31.14	0.02	3,585.90
	11/3/2021		(a)	32.2	(a)	3,584.82
	11/10/2021		(a)	32.24	(a)	3,584.78
	12/2/2021		(a)	32.25	(a)	3,584.77
	1/10/2022		(a)	32.35	(a)	3,584.67
	2/11/2022		(a)	32.4	(a)	3,584.62
	3/1/2022		(a)	32.35	(a)	3,584.67
	4/4/2022		(a)	32.45	(a)	3,584.57
	5/14/2022		(a)	32.81	(a)	3,584.21
	6/1/2022		(a)	32.5	(a)	3,584.52
	7/18/2022		(a)	dry	(a)	NA
	8/10/2022		(a)	32.55	(a)	3,584.47
SVE-26	3/10/2009	NA	(a)	dry	(a)	NA
	10/8/2009		(a)	dry	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	dry	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	dry	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
SVE-26	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3614.43 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	dry	(a)	NA
	4/21/2015		(a)	32.6	(a)	3,581.83
	11/3/2015		(a)	dry	(a)	NA
	4/29/2016		(a)	dry	(a)	NA
	11/16/2016		(a)	dry	(a)	NA

Table 2. Summary of Groundwater Surface Elevations
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	dry	(a)	NA
	6/1/2018		(a)	dry	(a)	NA
	11/6/2018		(a)	dry	(a)	NA
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
	5/7/2021		(a)	dry	(a)	NA
	11/10/2021		(a)	dry	(a)	NA
	5/14/2022		(a)	dry	(a)	NA
SVE-27	3/10/2009	NA	(a)	32.92	(a)	NA
	10/8/2009		(a)	33.63	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	33.70	(a)	NA
	4/17/2011		(a)	33.70	(a)	NA
	12/22/2011		(a)	33.83	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	33.82	(a)	NA
	11/3/2013	3613.19 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	33.01	(a)	3,580.18
	4/21/2015		(a)	33.58	(a)	3,579.61
	11/3/2015		(a)	33.54	(a)	3,579.65
	4/29/2016		(a)	33.82	(a)	3,579.37
	11/16/2016		(a)	34.15	(a)	3,579.04
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	33.48	(a)	3,579.71
	6/1/2018		(a)	34.00	(a)	3,579.19
	11/6/2018		(a)	33.31	(a)	3,579.88
	6/24/2019		Not Gauged			
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	dry	(a)	NA
	5/7/2021		(a)	dry	(a)	NA
	11/10/2021		(a)	dry	(a)	NA
	5/14/2022		(a)	dry	(a)	NA
SVE-28	3/10/2009	NA	(a)	28.60	(a)	NA
	10/8/2009		(a)	28.95	(a)	NA
	1/26/2010		(a)	dry	(a)	NA
	3/22/2010		(a)	29.07	(a)	NA
	4/17/2011		(a)	29.17	(a)	NA
	12/22/2011		(a)	29.65	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	33.58	(a)	NA
	11/3/2013	3607.84 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	28.59	(a)	3,579.25
	4/21/2015		(a)	28.86	(a)	3,578.98
SVE-28	11/3/2015		(a)	28.75	(a)	3,579.09
	4/27/2016		(a)	28.97	(a)	3,578.87
	11/16/2016		(a)	29.18	(a)	3,578.66
	5/22/2017		(a)	29.44	(a)	3,578.40
	11/13/2017		(a)	28.76	(a)	3,579.08
	6/1/2018		(a)	29.15	(a)	3,578.69
	11/6/2018		(a)	28.53	(a)	3,579.31
	6/24/2019		(a)	28.97	(a)	3,578.87
	1/5/2020		(a)	28.81	(a)	3,579.03
	5/13/2020		(a)	29.05	(a)	3,578.79

Table 2. Summary of Groundwater Surface Elevations
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
	11/10/2020		(a)	29.73	(a)	3,578.11
	5/7/2021		(a)	31.37	(a)	3,576.47
	11/10/2021		(a)	30.63	(a)	3,577.21
	5/14/2022		(a)	29.1	(a)	3,578.74
SVE-30	3/10/2009	NA	(a)	39.32	(a)	NA
	10/8/2009		(a)	39.29	(a)	NA
	3/22/2010		(a)	40.28	(a)	NA
	4/17/2011		(a)	40.11	(a)	NA
	12/22/2011		(a)	41.11	(a)	NA
	4/17/2012		(a)	41.65	(a)	NA
	10/18/2012		(a)	41.42	(a)	NA
	4/15/2013		(a)	41.67	(a)	NA
	11/3/2013	3616.00 (h)	(a)	43.02	(a)	3,572.98
	5/1/2014		(a)	43.35	(a)	3,572.65
	11/21/2014		(a)	43.30	(a)	3,572.70
	4/21/2015		(a)	41.80	(a)	3,574.20
	11/3/2015		(a)	41.60	(a)	3,574.40
	4/28/2016		(a)	41.56	(a)	3,574.44
	11/16/2016		(a)	41.23	(a)	3,574.77
	5/22/2017		NA	NA	NA	NA
	11/13/2017		(a)	42.00	(a)	3,574.00
	6/1/2018		(a)	42.02	(a)	3,573.98
	11/6/2018		(a)	42.46	(a)	3,573.54
	6/24/2019		(a)	42.52	(a)	3,573.48
	1/5/2020		(a)	42.45	(a)	3,573.55
	5/13/2020		(a)	42.55	(a)	3,573.45
	11/10/2020		(a)	43.05	(a)	3,572.95
	5/7/2021		(a)	43.22	(a)	3,572.78
	11/10/2021		(a)	43.25	(a)	3,572.75
	5/14/2022		(a)	43.01	(a)	3,572.99
SVE-31	3/10/2009	NA	(a)	30.45	(a)	NA
	10/8/2009		(a)	30.43	(a)	NA
	1/26/2010		(a)	30.55	(a)	NA
	3/22/2010		(a)	31.49	(a)	NA
	4/17/2011		(a)	dry	(a)	NA
	12/22/2011		(a)	28.50	(a)	NA
	4/17/2012		(a)	dry	(a)	NA
	10/18/2012		(a)	dry	(a)	NA
	4/15/2013		(a)	dry	(a)	NA
	11/3/2013	3612.67 (h)	(a)	dry	(a)	NA
	5/1/2014		(a)	dry	(a)	NA
	11/21/2014		(a)	30.27	(a)	3,582.40
	4/21/2015		(a)	30.97	(a)	3,581.70
	11/3/2015		(a)	30.200	(a)	3,582.47
	4/28/2016		(a)	30.35	(a)	3,582.32
	11/16/2016		(a)	30.73	(a)	3,581.94
	5/22/2017		(a)	dry	(a)	NA
	11/13/2017		(a)	30.48	(a)	3,582.19
	6/1/2018		(a)	dry	(a)	NA
SVE-31	11/6/2018		(a)	30.24	(a)	3,582.43
	6/24/2019		(a)	dry	(a)	NA
	1/5/2020		(a)	dry	(a)	NA
	5/13/2020		(a)	dry	(a)	NA
	11/10/2020		(a)	31.65	(a)	3,581.02
	5/7/2021		(a)	dry	(a)	NA
	11/10/2021		(a)	30.63	(a)	3,582.04
	5/14/2022		(a)	dry	(a)	NA
RW-1	3/10/2009	NA	(a)	33.17	(a)	NA
	10/8/2009		(a)	33.48	(a)	NA
	3/22/2010		(a)	33.62	(a)	NA
	4/17/2011		(a)	33.80	(a)	NA

Table 2. Summary of Groundwater Surface Elevations
Transwestern Compressor Station No. 9 - Roswell, NM

Well ID	Date	TOC elevation (ft)	Depth to PSH (ft below TOC)	Depth to Groundwater (ft below TOC)	PSH (ft)	Groundwater Surface Elevation (ft)
	12/22/2011		(a)	34.26	(a)	NA
	4/17/2012		(a)	34.57	(a)	NA
	10/18/2012		(a)	35.16	(a)	NA
	4/15/2013		(a)	35.77	(a)	NA
	11/3/2013	3612.72 (h)	(a)	34.95	(a)	3,577.77
	4/30/2014		(a)	35.48	(a)	3,577.24
	11/19/2014		(a)	32.46	(a)	3,580.26
	4/21/2015		(a)	33.08	(a)	3,579.64
	11/3/2015		(a)	33.00	(a)	3,579.72
	4/28/2016		(a)	33.32	(a)	3,579.40
	11/16/2016		(a)	33.70	(a)	3,579.02
	5/22/2017		(a)	34.03	(a)	3,578.69
	11/13/2017		(a)	32.96	(a)	3,579.76
	6/1/2018		(a)	33.62	(a)	3,579.10
	11/6/2018		(a)	32.82	(a)	3,579.90
	6/24/2019		(a)	33.57	(a)	3,579.15
	1/5/2020		(a)	33.38	(a)	3,579.34
	5/13/2020		(a)	33.68	(a)	3,579.04
	11/10/2020		(a)	34.55	(a)	3,578.17
	5/7/2021		(a)	36.85	(a)	3,575.87
	11/10/2021		(a)	33.40	(a)	3,579.32
	5/14/2022		(a)	33.60	(a)	3,579.12

Notes:
PSH - Phase separated hydrocarbon
ft - feet
TOC - Top of Casing
Corrections to ground water surface elevation for PSH is calculated assuming a specific gravity of 0.76

Prepared by: SWS 8/19/2022
Checked by:

(NA) Information not available
(a) Not applicable since no measurable thickness of PSH is present
(b) Elevation based on survey by Wagener Engineering dated 5/6/98
(c) Elevation based on survey by Wagener Engineering dated 9/17/98
(d) Elevation based on survey by Wagener Engineering dated 11/29/00
(e) Elevation based on survey by Wagener Engineering dated 10/03/01
(f) Elevation based on survey by Cypress Engineering dated 03/14/03
(g) Elevation based on survey by Cypress Engineering dated 06/23/07
(h) Elevation based on survey by PR Patton & Associates dated 10/01/13
Historical data before 2009 is presented in previous reports
Historical data for wells that were plugged and abandoned is not shown.

Table 3. Summary of Groundwater Analytical Results
Transwestern Compressor Station No. 9 - Roswell, NM

Well	Sampling Date	Benzene	Toluene	Ethylbenzene	Xylenes (total)	1,1-Dichloroethane	1,1-Dichloroethene	Vinyl Chloride
NMWQCC Human Health Standard		5	1,000	700	620	25	7	2
USEPA MCL		5	1,000	700	10,000	--	7	2
Tap Water (2022)		4.55	--	15.0	--	27.5	--	0.32
Groundwater Cleanup Level (GCL) (see notes)		5	1,000	700	620	25	7	2
SVE-28	11/12/18	**14**	<1.0	<1.0	<1.5	NA	NA	NA
	06/26/19	1.5	<1.0	<1.0	<1.5	2.2	<1.0	<1.0
	01/08/20	1.5	<1.0	<1.0	<1.5	2.2	<1.0	<1.0
	11/23/20	1.3	<1.0	<1.0	<1.5	1.3	<1.0	<1.0
	05/11/21	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0
	11/15/21	**4.0**	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0
	05/14/22	**2.7**	<0.20	<0.30	<0.30	<0.20	<0.20	<0.20
SVE-30	11/12/18	**15**	<5.0	41	<7.5	NA	NA	NA
	06/26/19	**10**	<5.0	24	<7.5	**30**	<5.0	<5.0
	01/08/20	**8.9**	<5.0	29	<7.5	**32**	<5.0	<5.0
	09/10/20	**8.6**	<5.0	20	<7.5	**25**	<5.0	<5.0
	11/23/20	**5.7**	<1.0	8	<1.5	**33**	NA	NA
	05/11/21	**6.4**	<1.0	3.5	<1.5	**37**	<1.0	<1.0
	11/14/21	<5.0	<5.0	<5.0	<1.5	**35**	<5.0	<5.0
	05/14/22	**6.5**	2.4	5.2	12	<0.20	<0.20	<0.20
SVE-31	11/12/18	<1.0	<1.0	<1.0	<1.5	NA	NA	NA
	11/23/20	<1.0	<1.0	<1.0	<1.5	NA	NA	NA
	05/11/21	dry						
	11/15/21	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0
	05/14/22	dry						
RW-1	11/12/18	**32**	<1.0	1.4	<1.5	NA	NA	NA
	06/26/19	**51**	<1.0	1.4	<1.5	12	<1.0	<1.0
	01/08/20	**26**	<1.0	1.5	<1.5	4.3	<1.0	<1.0
	09/10/20	**25**	<1.0	6.2	<1.5	3.1	<1.0	<1.0
	11/23/20	**38**	<1.0	13	7.9	3.5	<1.0	<1.0
	05/11/21	**46**	<5.0	10	<7.5	5.6	<5.0	<5.0
	11/15/21	**17**	<1.0	3.8	<1.5	2.1	<1.0	<1.0
	05/14/22	**9.9**	<0.20	1.8	<0.30	<0.20	<0.20	<0.20

Notes:

Bold indicates that the analytical result exceeds the applicable regulatory limits.

* - Phase separated hydrocarbons (PSH) present in well. Sample collected below PSH.

-- Data not available.

Only constituents detected in one or more groundwater samples are shown in this table
All results reported above the applicable standard are shown in bold type
Historical data before 2009 is presented in previous reports
Results reported in micrograms per liter (µg/L)
NA - Not analyzed; constituent is not part of the sampling plan
NMWQCC - New Mexico Water Quality Control Commission

Prepared by: SWS 8/19/2022
Checked by: SSD 8/22/22

NMWQCC Human Health Standards - from New Mexico Administrative Code (NMAC) 20.6.2, Part A, Human Health Standards. Used as GCL for target cleanup if lower than the MCL.

USEPA MCL - United States Environmental Protection Agency's Maximum Concentration Limit. Used as GCL for target cleanup if lower than the NMWQCC Human Health Standard.

Tap Water (2022) - Tap Water, Cancer From Table A-1 for the 2022 NMED Risk Assessment Guidance for Site Investigation and Remediation. Used as GCL for target cleanup if WQCC standard nor MCL have not been established.

Table 4. Summary of Groundwater Analytical Results - Other Constituents Detected
Transwestern Compressor Station No. 9 - Roswell, NM

Well	Sampling Date	Chloroethane	Isopropyl benzene	n-Propylbenzene	1,2,4-Trichlorobenzene	Napthalene	cis-1,2-Dichloroethene	Acetone	1,4-Dioxane
NMWQCC Human Health Standard		--	--	--	70	-	70	--	-
USEPA MCL		--	--	--	70	--	70	--	--
Tap Water (2022)		--	--	--	11.5	1.17	--	--	4.59
Groundwater Cleanup Level (GCL)		--	--	--	70	1.17	70	--	4.59
SVE-28	09/10/20	NA	NA	NA	NA	NA	NA	NA	<1.0
	05/11/21	<2.0	<1.0	<1.0	<1.0	*<2.0*	<1.0	14	<10
	11/15/21	<2.0	<1.0	<1.0	<1.0	<0.10	<1.0	<10	<1.0
	05/14/22	<0.30	<0.30	-	<0.50	0.029J	<0.20	<2.0	0.27
SVE-30	09/10/20	**10**	**6**	**2**	<1.0	**6.0**	**1.0**	<50	**5.9**
	11/23/20	**4**	**4.1**	**3.1**	**3.3**	*<2.0*	<1.0	<10	**6**
	05/11/21	**3.3**	**2.4**	**1.8**	**3.2**	*<2.0*	<1.0	<10	<10
	11/14/21	<10	<5.0	<5.0	<5.0	*<0.1*	<5.0	<50	4.2
	05/14/22	<0.30	<0.30	-	<0.50	0.23	<0.20	<2.0	2.5
SVW-31	11/15/21	<1.0	<1.0	<1.0	<1.0	*<2.0*	<1.0	<10	-
RW-1	09/10/20	<2.0	**3**	<5.0	<5.0	*<10*	<5.0	<10	<1.0
	11/23/20	<2.0	**3.9**	**3.2**	<1.0	**4.0**	**3.6**	<10	*<25*
	05/11/21	<10	<5.0	<5.0	<5.0	**<10**	**6**	<50	*<50*
	11/15/21	<2.0	<1.0	<1.0	<1.0	**0.5**	**1.7**	<10	*<1.0*
	05/14/22	<0.30	<0.30	-	<0.50	**0.4**	<0.20	<2.0	0.058J

Notes:

Results only shown for other detected constituents in wells. All other constiutents for wells not shown are below laboratory detection limits.

-- data not available or established

Results reported in micrograms per liter (µg/L)

Prepared by: SWS 8/19/2022
Checked by: SSD 8/22/22

NMWQCC - New Mexico Water Quality Control Commission Standard

NMWQCC Human Health Standards - from New Mexico Administrative Code (NMAC) 20.6.2, Part A, Human Health Standards. Used as GCL for target cleanup if lower than the MCL.

USEPA MCL - United States Environmental Protection Agency's Maximum Concentration Limit. Used as GCL for target cleanup if lower than the NMWQCC Human Health Standard.

Tap Water (2022) - Tap Water Cancer From Table A-1 for the 2022 NMED Risk Assessment Guidance for Site Investigation and Remediation. Used as GCL for target cleanup if WQCC standard nor MCL have not been established.

Bold	indicates that the analytical result exceeds the applicable regulatory limits.
Bold	indicates that the analytical result exceeds the detection limit
<25	indicates that the limit of quantitation (LOQ) value is higher than the applicable GCLs

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Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 152562

CONDITIONS

Operator:	OGRID:
Transwestern Pipeline Company, LLC 8501 Jefferson NE Ave Albuquerque, NM 87113	329750
	Action Number: 152562
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See app ID 154725 for most updated status.	11/22/2022