



Grants Project

Letter to Agencies
RE: Groundwater Monitoring Plan
Homestake Mining Company of
California

Thomas Wohlford
Closure Manager

20 November 2017

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RE: Groundwater Monitoring Plan

Dear Sirs:

Homestake Mining Company's (HMC) is proposing to update the groundwater monitoring plan in its NRC license (SUA-1471) to adjust the compliance monitoring for the groundwater restoration areas at the Grants Reclamation Project site. The groundwater monitoring plan needs to be updated to take into account changes in the restoration program and problematic wells. The compliance monitoring for the SP2 site is also included with the groundwater monitoring. During the NRC inspection of the Grants site the NRC indicated the groundwater monitoring plan should be updated for coverage of all of the restoration areas at the site. HMC respectfully requests NRC review and adjust the license condition to update the Grants site groundwater monitoring plan.

The current groundwater monitoring wells are presented in Appendix A of the attached report. Discussion of reasons for changing the groundwater monitoring wells are presented in the report.

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NMSS

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original by PM
JAW

RE: Groundwater Monitoring Plan

This amendment requests an adjustment in the constituents monitored and modification of the compliance monitoring well network to more appropriately address the current Site conditions as a result of progress in groundwater restoration. This license amendment request does not result in (i) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, (ii) there is no significant increase in individual or cumulative occupational radiation exposure, (iii) there is no significant construction impact, and (iv) there is no significant increase in the potential for or consequences from radiological accidents. Therefore, this request meets the criteria in 10 CFR Part 51.22(c).11 for categorical exclusion from requiring an environmental review.

Thank you for your time and attention on this matter. If you or anyone on your staff has any questions, please contact me at the Grants office at 505.287.4456, extension 34, or call me directly on my cell phone at 505.290.2187.

Respectfully,



Thomas Wohlford

Closure Manager
Homestake Mining Company of California
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HOMESTAKE MINING COMPANY OF CALIFORNIA

Grants Reclamation Project



Groundwater Compliance Monitoring Plan Revisions

Submitted On:
December 2017

Submitted To:
Nuclear Regulatory Commission
New Mexico Environment Department

Submitted By:
Thomas Wohlford, Closure Manager, Grants
George Hoffman, Hydro-Engineering LLC

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1. INTRODUCTION

Homestake Mining Company of California (HMC) is proposing to update the groundwater monitoring plan in its NRC license (SUA-1471) to adjust the compliance monitoring for the groundwater restoration areas at the Grants Reclamation Project site. The reason for this is to take in account changes in the restoration program and problematic wells where access is restricted by current property owners. This report includes a listing and location of the proposed wells to be used for continued compliance groundwater monitoring at HMC's Grants Reclamation Project. The monitoring wells will be used to demonstrate groundwater restoration at the Grants site relative to the site standards. Appendix A contains a table and figure summarizing the existing Grants groundwater monitoring program. Tables 2-1 and 2-2 and Figures 2-1 through 2-5 in this report present the proposed groundwater monitoring wells and their locations that will be used for more accurate monitoring of site conditions. These wells have already been installed and are currently being sampled.

Three ground-water restoration areas have been defined for the Grants site. These areas are the On-Site restoration area and two Off-Site areas (South and North). Figure 1-1 shows the locations of the three ground-water restoration areas. Ground water collected from wells in the On-Site area will mainly be treated with the RO plant, while the collected water from the two Off-Site areas is treated through the zeolite process. The aquifer figures show the areas where ground-water restoration is needed in the alluvial, Upper Chinle, Middle Chinle and the Lower Chinle aquifers. Wells were selected for the groundwater compliance monitoring to cover the areas of the ground-water restoration in each aquifer.

1.1 On-Site

The On-Site restoration area includes the areas near the Large Tailings Pile (LTP) and Small Tailings Pile (STP) and an area west of the LTP out to the center of Section 27. It also includes the restoration of the alluvial aquifer to the south of the STP which is called the L area. Restoration in the On-Site area will be in the alluvial, Upper and Middle Chinle aquifers.

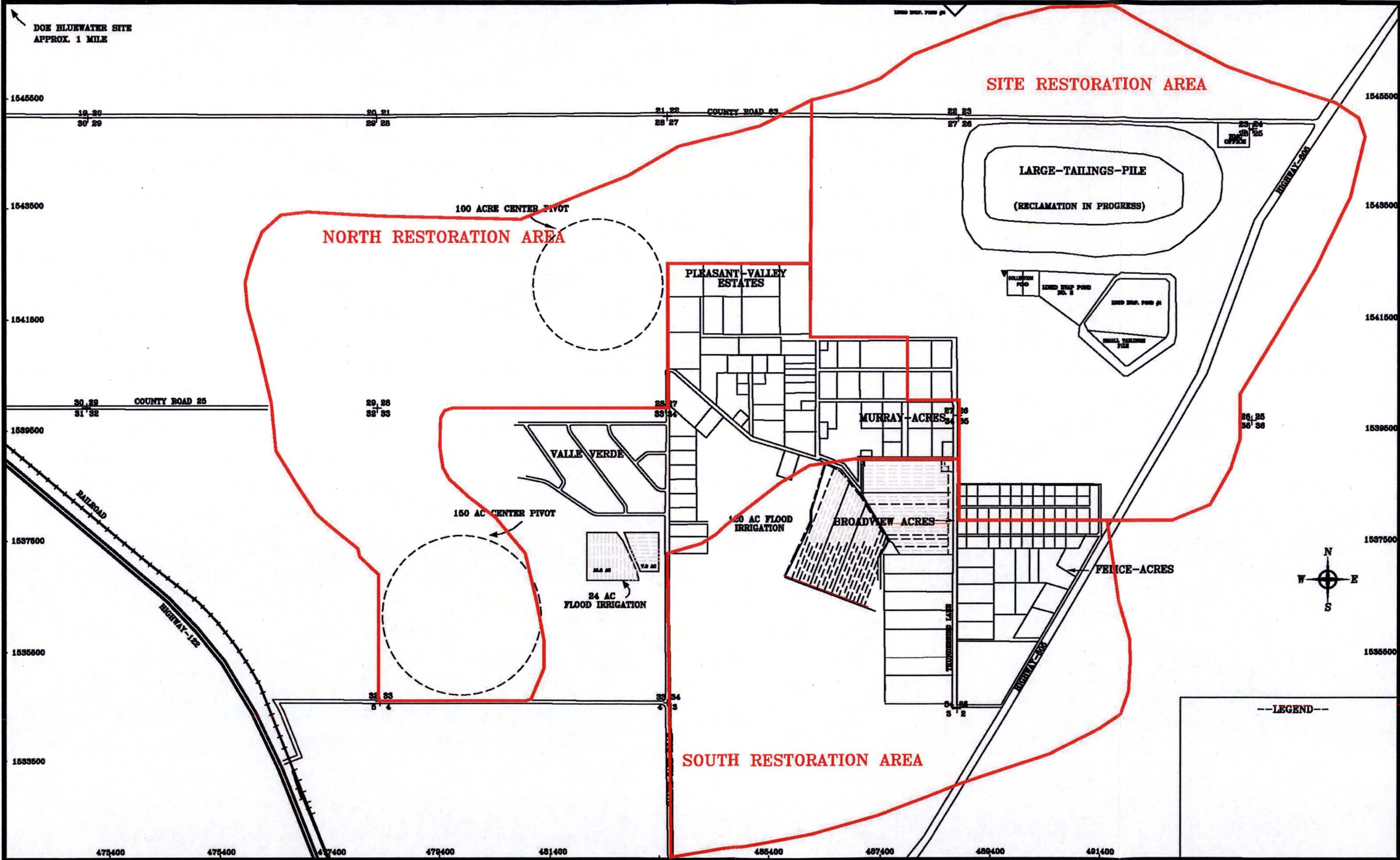
1.2 South Off-Site

The South Off-Site restoration area includes areas in Section 3, Section 34 irrigation area and Felice Acres and adjacent areas. Restoration in the South Off-Site area will be in the alluvial, Middle and Lower Chinle aquifers. A very minor amount of restoration is needed in the Upper Chinle aquifer in the South Off-Site area.

1.3 North Off-Site

The North Off-Site restoration area includes the western half of Section 27, Section 28 and an area to the south of this area which includes the Section 33 South Pivot. Restoration in the North Off-Site area is only in the alluvial aquifer.

Figure 1-1. Restoration Areas and the Location of Irrigation Areas



2. GROUNDWATER COMPLIANCE MONITORING

The revised groundwater compliance monitoring program will consist of selected monitoring wells in the restoration areas to demonstrate restoration efforts to meet the Grants groundwater site standards. These wells will be monitored annually for all of the Grants site standard constituents. A large amount of additional groundwater information will be collected and used annually to evaluate the groundwater restoration. Wells were selected to provide a distribution over the groundwater restoration areas for compliance monitoring to adequately define water quality in the restored aquifer. These wells are also expected to be used for the post-closure monitoring.

The existing groundwater monitoring wells are presented in Appendix A {Table 2 (8-99)} and their locations are also shown in the figure in Appendix A. Addition of wells for coverage of the compliance monitoring of the restoration areas and changes from wells that have been problematic in sampling have been made. Table 2-1 presents the list of wells to be monitored at the Grants site. This monitoring table initially list alluvial background wells, P, Q and 921 to be sampled annually for the B and F list of parameters. The constituents in each of these list are tabulated in Table 2-2 which also presents the laboratory method of analysis, detection limit and units for each parameter. Well Q is added for an additional background well for additional data beyond well P. Well 921 replaces well 920 as the far upgradient monitoring well. Well 921 was drilled by NMED and is a PVC cased well, on HMC land and is located in the center of the San Mateo alluvial channel. It therefore is considered to be a better monitoring well than well 920.

Operational monitoring is listed next in Table 2-1 followed by the San Andres monitoring which defines the water quality of the fresh water used at the Grants site. Figure 2-1 shows the locations of the four San Andres wells on the Grants site used for monitoring of the fresh water supply. San Andres wells 943M and 951R have been added to the San Andres monitoring due to the usage of these two wells for fresh water supply. The four pairs of reversal wells are listed in the operational monitoring. The KZ-KF pair has been replaced with the KZ-DZ reversal pair of wells while well S5 has replaced well S1 in the S2-S1 reversal pair. Reversal pair SM-SN have replaced SO-SP to better define the groundwater gradient reversal in this area. The operational monitoring also includes the monitoring of Post Treatment Tank (PTT) water prior to injection into the groundwater. The PTT water which includes a mixture of RO product water, zeolite treated water and fresh water from the San Andres aquifer is monitored quarterly for all site standards. Four of the site standards, nitrate, vanadium, Ra-226+228 and Th-230, should be less than their site standard concentration in the input water to the treatment systems and therefore are not measured in the monthly samples.

Compliance monitoring wells for the alluvial and Upper, Middle and Lower Chinle aquifers are listed in the remainder of Table 2-1.

2.1 Alluvial Aquifer

Wells in the On-Site, South Off-Site and North Off-Site areas will be used to restore the alluvial aquifer in these three areas. Figure 2-2 shows the locations of the alluvial wells to be used in the compliance monitoring of the alluvial aquifer. The green pattern on this figure shows where the alluvial aquifer exceeded the uranium site standard in 2016. The alluvial compliance monitoring wells, DD, DD2 and X, adjacent to the evaporation ponds are first listed in Table 2-1. Figure 2-2 shows the locations of these three wells while Table 2-3 gives the well data for these three wells and the remainder of the alluvial On-site wells. The additional On-site alluvial compliance monitoring wells are listed in an additional row on Table 2-1 while the locations of these wells are also shown on Figure 2-2. These alluvial compliance monitoring wells were selected for coverage of the On-site alluvial restoration area. Several On-site monitoring wells have been added to wells F, FB, GH and MO for better coverage of the alluvial On-site compliance monitoring of this restoration area.

The South Off-site area alluvial compliance monitoring wells are listed in two categories, Section 34 land application and South Off-site, in Table 2-1. Table 2-4 presents the completion information for the Off-site alluvial monitoring wells. The Section 34 land application wells were selected within the irrigation area and for coverage downgradient of the land application area. These Section 34 wells are the same as those required in the New Mexico Environment Department (NMED, 2014) DP200 permit and are used to monitor the groundwater in the Section 34 flood area and downgradient of this irrigation. The remainder of the South Off-site area were selected to define the restoration of the alluvial South Off-site area. Several additional wells have been added to the 490 and SUB 2 monitoring of the South Off-site area to have adequate coverage of the South Off-site alluvial groundwater restoration area. Wells 492 and SUB1 which have been sampled only a few times in the last decade because lack of access have been dropped from the South Off-site monitoring. Wells 490, SUB2 and 844 adequately cover this area of the South Off-site alluvial aquifer.

The remaining two rows of the alluvial compliance monitoring are in the North Off-site area and listed as the North Off-site area and western portion of the North Off-site area. Compliance wells in the western portion of the North Off-site area are the same as those proposed for post-closure monitoring in this area because alluvial groundwater quality has been restored in the western portion of the North Off-site area. Table 2-1 lists the proposed monitoring wells in the western portion of the North Off-site area which include the Section 33 former land application area. Table 2-4 also presents the completion information for the North Off-site alluvial compliance monitoring wells. The North Off-site alluvial compliance monitoring wells were selected to cover the North Off-site restoration area and are listed in Table 2-1. This list includes the Section 28 land application wells required in NMED DP200 permit. The North Off-site compliance monitoring wells have been added for compliance monitoring of the North Off-site restoration area. Well 942 which has not been accessible to be sampled the last several years is being replaced with well 883.

2.2 Upper Chinle Aquifer

Compliance monitoring is needed in the On-Site and South Off-Site areas for the Upper Chinle aquifer. Figure 2-3 shows the Upper Chinle areas where restoration is needed and the locations of the Upper Chinle compliance wells to cover these two restoration areas. Table 2-1 lists the compliance monitoring wells for the Upper Chinle aquifer. The completion information for these compliance Upper Chinle monitoring wells is presented in Tables 2-5 and 2-6 for the On-site and Off-site Chinle wells respectively. The compliance monitoring wells are distributed over the Upper Chinle aquifer for the Grants site. All of the Upper Chinle compliance monitoring wells have been added for coverage of the Upper Chinle restoration areas, except well CE9 which is a replacement well for Upper Chinle well 446. A sample has not been able to be produced from well 446 for the last several years. Wells CE2, CE8 and CW25 monitor the Upper Chinle downgradient of the tailings in this aquifer. Wells CW3, CF4, DE9 and CE15 will be used to define restoration in the Upper Chinle aquifer in these areas while wells 494, CW13 and CW18 define the Upper Chinle water quality changes downgradient of the site.

2.3 Middle Chinle Aquifer

Restoration is needed for the Middle Chinle aquifer in the On-Site and South Off-Site areas. Figure 2-4 shows the Middle Chinle areas that require restoration and shows the locations of compliance monitoring wells in the Middle Chinle aquifer. Restoration is needed in the Middle Chinle between the two faults in the Felice Acres and adjacent areas. Restoration is also needed in the Middle Chinle west of the West Fault in the area of well CW62 but is not required in the area to the north of well CW17 because these concentrations are natural. Wells have been selected to cover the Middle Chinle aquifer in the Grants site area and the restoration areas. Table 2-1 lists the Middle Chinle compliance wells for the Grants site while the well data for the On-site and Off-site Middle Chinle wells are given in Tables 2-5 and 2-6 respectively. All of these wells have been added to the Middle Chinle compliance monitoring program except well CW2 which was previously used to monitor Middle Chinle downgradient of the site. Middle Chinle wells 493, CW17, CW45, CW55, R3 and Y7 will be used to define restoration in these areas of the Middle Chinle aquifer while wells ACW, CW2, CW28 and CW76 monitor Middle Chinle downgradient of the restoration areas.

2.4 Lower Chinle Aquifer

Wells in the South Off-Site area will be used to restore the Lower Chinle aquifer in this area and Figure 2-5 shows the Lower Chinle area where restoration is needed and compliance wells to cover the Lower Chinle area. Wells have been selected in the restoration area of the Lower Chinle aquifer and also selected for coverage of other areas in the Lower Chinle aquifer. Table 2-1 lists the Lower Chinle compliance wells. Tables 2-5 and 2-6 present the completion information for the On-site and Off-site Lower Chinle compliance monitoring wells. Lower Chinle wells CW29, CW41, CW42 and V6 will be used to define the groundwater restoration in the Lower Chinle aquifer. Monitoring wells CW32 and CW43 will be used for downgradient monitoring in the Lower Chinle aquifer.

Table 2-1. Groundwater Monitoring at the Grants Site		
Well	Parameter List Code	Frequency of Monitoring
<i>Alluvial Background Wells</i>		
P, Q, 921	B, F	Annual
<i>Operational Monitoring</i>		
Collection system wells	Total Volume	Monthly
Injection system wells	Total Volume	Monthly
Reversal wells B, BA, KZ, DZ, SM, SN, S2, S5	Water Level	Weekly
SP2	B, F H	Quarterly Monthly
<i>San Andres Wells</i>		
Deep #1@, Deep #2@, 943M, 951R	B, F H	Annual Semiannual
<i>Alluvial Compliance Monitoring Wells</i>		
On-Site Monitoring Wells (Evap. Ponds) DD, DD2, X	B, F plus Mn H	Annual Quarterly
Additional On-Site Monitoring Wells 1A, 1K, 639, 802, B11, D1, F, FB, GH, GN, L, L5, K9, M3, MX, MB, MQ, NC, S4, SUB3, T2, T19, T23, T41, T54	B, F	Annual
South Off-Site Wells 497, 540, 631, 643#, 644, 864, 869, Q5, R3, SUB2	B, F	Annual
Section 34 Land application wells 555, 556, 557, 844, 845, 846	B, F	Annual
North Off-Site Wells(includes Section 28 Land application wells) 688, 881, 882, 883, 884, 886, 888, 893, 659, H2A, MR, H55, MO	B, F	Annual
Western Portion of North Off-Site Wells (Includes Section 33 Land application wells) 541, 551, 647, 649, 654, 899, 996	B, F	Annual
<i>Chinle Compliance Monitoring Wells</i>		
Upper Chinle Wells 494, CE8, CE9, CE15, CF4, CW3, CW13#, CW18, CW25#	B, F	Annual
Middle Chinle Wells 493, ACW, CW17, CW2, CW28, CW45, CW55, CW62, CW76, R3, Y7	B, F	Annual
Lower Chinle Wells CW29, CW32, CW41, CW42, CW43, V6	B, F	Annual

Note: # Monitoring will start after well ceasing to be used for injection

@ = Monitoring will be changed to replacement well when replaced

Table 2-2. Site Analytical Suites

Parameter List Code	Included Parameters (Dissolved)	Method	Reporting Limits	Units
B	Water level			
	pH	A4500-HB	0.01	s.u.
	Total dissolved solids (TDS)	A2540 C	20	mg/L
	Sulfate (SO ₄)	E300.0	4	mg/L
	Chloride (Cl)	E300.0	1	mg/L
	Bicarbonate (HCO ₃)	A2320 B	5	mg/L
	Carbonate (CO ₃)	A2320 B	5	mg/L
	Sodium (Na)	E200.7	0.9	mg/L
	Calcium (Ca)	E200.7	0.5	mg/L
	Magnesium (Mg)	E200.7	0.5	mg/L
	Potassium (K)	E200.7	0.5	mg/L
	Nitrate (NO ₃)	E353.2	0.1	mg/L
	Uranium (U)	E200.8	0.0003	mg/L
	Selenium (Se)	E200.8	0.005	mg/L
	Molybdenum (Mo)	E200.8	0.03	mg/L
	Radium-226 (Ra-226)	E903.0	Precision Variable	pCi/L
F	Vanadium (V)	E200.8	0.01	mg/L
	Radium-228 (Ra-228)	RA-05	Precision Variable	pCi/l
	Thorium-230 (Th-230)	E908.0	Precision Variable	pCi/L
H	Water Level			
	TDS	A2540 C	20	mg/L
	SO ₄	E300.0	4	mg/L
	U	E200.8	0.0003	mg/L
	Se	E200.8	0.005	mg/L
	Mo	E200.8	0.03	mg/L
	Cl	E300.0	1	mg/L

TABLE 2-3. WELL DATA FOR THE ALLUVIAL ON-SITE GROUNDWATER MONITORING

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR. (FT-LSD)	SATURATED THICKNESS
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
SUB3	1538280	489420	84.0	6.0	10/26/2017	35.33	6521.74	0.0	6557.07	72	6485.1 A	56-72	36.7
1A	1543790	493768	61.0	5.0	9/19/2017	36.90	6548.53	2.9	6585.43	47	6535.5 A	39-51	13.0
1K	1541992	493275	55.6	5.0	3/22/2017	33.90	6550.23	1.0	6584.13	47	6536.1 A	30-55	14.1
B11	1542517	491329	84.9	5.0	7/14/2008	53.00	6524.39	2.2	6577.39	77	6498.2 A	42-80	26.2
D1	1542140	489615	89.4	4.0	6/28/2017	39.40	6531.50	1.0	6570.90	80	6489.9 A	58-90	41.6
DD	1546989	488943	78.5	4.0	10/12/2017	47.10	6545.49	1.9	6592.59	83	6507.7 A	40-80	37.8
DD2	1547439	489251	94.3	5.0	11/2/2017	45.40	6547.88	2.0	6593.28	80	6511.3 A	50-90	36.6
F	1539908	489554	63.8	4.0	3/17/2017	30.85	6533.97	1.2	6564.82	62	6501.6 A	45-65	32.3
FB	1540417	488857	62.0	4.0	3/17/2017	32.52	6533.14	2.0	6565.66	58	6505.7 A	43-58	27.5
GH	1538807	489509	69.2	4.0	3/17/2017	31.34	6531.42	1.3	6562.76	67	6494.5 A	55-65	37.0
GN	1538602	490944	116.5	4.0	8/14/2017	36.30	6531.67	1.8	6567.97	70	6496.2 A	50-120	35.5
K9	1541287	491787	86.0	5.0	3/31/2017	57.84	6542.50	2.0	6600.34	79	6519.3 A	56-86	23.2
L	1538970	492150	67.0	4.0	10/23/2017	57.34	6517.63	0.8	6574.97	59	6515.2 A	46-66	2.5
L5	1539946	492730	60.2	5.0	10/23/2017	51.55	6524.52	1.3	6576.07	50	6524.8 A	25-55	0.0
M3	1542805	489151	105.3	4.0	3/23/2017	40.15	6535.95	1.0	6576.10	---	---	79-99	---
MB	1541296	487512	90.0	4.0	9/5/2000	2.05	6570.01	1.0	6572.06	85	6486.1 A	60-90	84.0
MQ	1543173	486326	98.0	5.0	9/19/2017	72.20	6502.10	1.6	6574.30	88	6484.7 A	58-98	17.4
MX	1541287	486244	103.0	5.0	8/11/2017	49.20	6519.41	1.7	6568.61	94	6472.9 A	63-103	46.5
NC	1545220	491282	95.0	4.0	12/13/2016	39.82	6546.01	0.8	6585.83	85	6500.0 A	65-95	46.0
P	1546691	491058	109.1	4.0	10/26/2017	39.59	6547.67	1.7	6587.26	107	6478.6 A	82-112	69.1
Q	1548693	492153	98.3	4.0	6/1/2017	70.27	6523.55	2.3	6593.82	100	6491.5 A	72-102	32.0
S4	1543344	488359	112.4	5.0	3/14/2017	37.30	6537.99	2.3	6575.29	108	6465.0 A	50-110	73.0
T2	1543538	489303	186.0	5.0	7/27/2015	114.46	6550.36	1.6	6664.82	180	6483.2 A	100-186	67.1
T19	1543958	490722	167.0	5.0	5/15/2015	112.83	6554.93	2.5	6667.76	162	6503.3 A	137-167	51.7
T23	1543901	492805	140.0	5.0	6/9/2015	112.64	6548.47	---	6661.11	140	---	120-140	---
T41	1543278	491079	160.0	5.0	5/14/2015	82.85	6577.11	3.2	6659.96	155	6501.8 A	130-160	75.4
T54	1544523	489796	200.0	4.5	6/5/2014	110.08	6547.02	2.0	6657.10	---	---	140-200	---
X	1540512	491892	50.7	4.0	10/26/2017	29.62	6541.99	1.7	6571.61	---	---	-	---
0802	1540765	488277	98.0	6.0	9/8/2016	88.27	6474.45	2.0	6562.72	81	6479.7 A	75-81	0.0
0639	1539370	492961	80.0	5.0	4/27/2017	51.61	6536.27	2.5	6587.88	71	6514.4 A	35-80	21.9
0921	1555400	495800	---	5.0	10/22/2014	39.63	6584.37	1.9	6624.00	---	---	-	---

Note: A = Alluvial Aquifer
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

TABLE 2-4. WELL DATA FOR THE ALLUVIAL OFF-SITE GROUNDWATER MONITORING

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL		MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	SATURATED THICKNESS
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)					
SUB2	1537392	490370	—	4.0	5/28/2014	40.85	6526.72	0.0	6567.57	—	— A -	—
0490	1536553	489752	63.0	4.0	12/1/2015	24.50	6537.92	0.0	6562.42	75	6487.4 A	20-80
0497	1535039	489503	94.0	5.0	3/17/2017	50.00	6512.62	2.0	6562.62	89	6471.6 A	64-94
Q5	1534829	488945	100.0	4.5	3/4/2016	48.65	6512.83	2.8	6561.48	—	— A	60-100
0844	1538376	487002	75.0	4.0	3/27/2017	35.96	6520.17	1.2	6556.13	70	6484.9 A	35-75
0845	1537280	487833	65.0	4.0	3/27/2017	33.45	6523.60	1.7	6557.05	55	6500.4 A	45-65
0688	1541257	483955	105.0	5.0	8/9/2017	59.00	6503.62	2.9	6562.62	95	6464.7 A	65-105
0540	1534125	488091	90.0	6.0	11/16/2017	58.87	6497.04	2.7	6555.91	80	6473.2 A	30-90
0541	1539831	477236	120.0	5.0	12/28/2016	88.56	6467.06	2.0	6555.62	112	6441.6 A	78-118
0551	1536272	479881	135.0	5.0	3/28/2017	97.28	6450.02	2.1	6547.30	115	6430.2 A	95-135
0555	1538572	486236	100.0	5.0	3/27/2017	41.83	6515.31	2.5	6557.14	100	6454.6 A	60-90
0556	1538006	486184	100.0	5.0	3/27/2017	47.11	6508.91	2.4	6556.02	95	6458.6 A	60-90
0557	1537204	486000	65.0	5.0	2/10/2016	41.55	6512.22	2.5	6553.77	55	6496.3 A	45-65
0631	1532234	483756	118.0	6.0	6/30/2017	86.40	6454.70	2.2	6541.10	109	6429.9 A	58-118
0643	1533760	487386	108.0	5.0	10/16/2002	75.89	6475.44	1.5	6551.33	93	6456.8 A	58-108
0644	1533481	485450	110.0	5.0	11/6/2017	68.21	6475.69	2.0	6543.90	102	6439.9 A	55-110
0647	1536623	478308	140.0	4.5	3/15/2017	102.95	6448.96	1.4	6551.91	132	6418.5 A	80-140
0649	1534730	479798	124.0	4.5	3/15/2017	101.56	6441.73	0.3	6543.29	115	6428.0 A	84-124
0654	1541994	478636	120.0	4.5	12/12/2016	71.45	6479.05	1.4	6550.50	106	6443.1 A	60-120
0659	1541689	480772	101.0	4.5	3/20/2017	69.56	6490.61	2.0	6560.17	97	6461.2 A	61-101
0846	1537219	484730	75.0	4.0	8/9/2017	43.80	6505.12	0.8	6548.92	65	6483.1 A	40-65
0864	1533735	486464	95.0	5.0	8/9/2016	64.53	6482.19	1.9	6546.72	78	6466.9 A	44-84
0869	1533251	486073	94.0	5.0	11/3/2017	65.44	6479.05	1.7	6544.49	99	6443.8 A	44-94
0881	1542034	481478	96.0	4.5	2/23/2017	71.47	6493.57	2.0	6565.04	103	6460.0 A	76-96
0882	1541404	482396	110.0	4.5	3/15/2017	63.90	6497.26	2.0	6561.16	98	6461.2 A	70-110
0883	1540097	483039	100.0	5.0	11/30/2015	57.08	6500.05	1.9	6557.13	96	6459.3 A	60-90
0884	1542677	481498	90.0	5.0	3/27/2017	71.02	6495.08	1.0	6566.10	85	6480.2 A	58-88
0886	1542327	482487	90.0	5.0	11/6/2017	67.54	6497.01	1.5	6564.55	87	6476.1 A	60-90
0888	1542285	479335	105.0	5.0	10/6/2017	75.30	6482.03	1.1	6557.33	90	6466.2 A	75-105
0893	1541934	482244	98.0	4.5	3/14/2017	67.52	6496.45	2.1	6563.97	93	6468.9 A	78-98
0899	1543801	477288	110.0	4.0	10/3/2017	99.00	6471.84	2.0	6570.84	120	6448.8 A	70-110
0996	1537621	477989	138.0	5.0	12/5/2011	49.60	6502.92	1.7	6552.52	136	6414.8 A	126-136
H2A	1541694	479997	88.0	4.5	3/20/2017	72.50	6487.37	2.0	6559.87	88	6469.9 A	66-88
H55	1542909	484706	95.0	4.5	9/15/2014	60.00	6509.25	2.0	6569.25	95	6472.3 A	75-95
MO	1543620	485518	88.0	4.5	3/17/2017	62.05	6510.84	2.0	6572.89	80	6490.9 A	45-85
MR	1542609	483574	100.0	5.0	10/27/2017	66.71	6499.55	1.8	6566.26	100	6484.5 A	54-94
R3	1534546	488196	140.0	5.0	3/21/2017	55.07	6500.66	2.0	6555.73	88	6465.7 A	60-80
										88	6465.7 M	100-140

Note: A = Alluvial Aquifer

MP = Measuring Point

LSD = Land Surface Datum

IN = Inches

FT = Feet

MSL = Mean Sea Level

TABLE 2-5. WELL DATA FOR THE CHINLE ON-SITE GROUNDWATER MONITORING

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
CE9	1538203	489458	130.0	6.0	3/21/2017	60.40	6502.72	1.2	6563.12	---	---	U 90-130	Upper
CW55	1538283	489471	360.0	6.0	12/13/2016	53.92	6510.24	2.3	6564.16	260	6302	M -	Middle
CE2	1541923	489979	119.7	5.0	10/25/2017	78.90	6497.45	1.8	6576.35	74	6501	A -	---
										74	6501	U 78-118	Upper
CE8	1540704	491556	216.6	6.0	3/2/2017	34.33	6535.37	1.7	6569.70	166	6402	U 160-200	Upper
CE15	1539507	489460	130.0	5.0	3/21/2017	36.16	6529.92	2.0	6566.08	77	6487	U 90-130	Upper
CF4	1543680	490520	197.0	4.5	12/12/2016	126.15	6537.54	2.0	6663.69	166	6496	A -	---
										166	6496	U 177-197	Upper
CW2	1545212	491302	355.0	5.0	8/10/2017	106.70	6478.78	1.7	6585.48	85	6499	A -	---
										136	6448	U -	---
										305	6279	M 306-353	Middle
CW3	1545200	493496	235.0	5.0	12/13/2016	51.71	6535.47	0.7	6587.18	70	6516	A -	---
										209	6377	U 210-235	Upper
										348	6238	M -	---
CW13	1538349	491827	267.7	6.0	11/22/2010	0.55	6576.15	2.7	6576.70	230	6344	U 225-265	Upper
										378	6196	M -	---
CW17	1545279	487771	108.0	5.0	10/23/2017	55.00	6534.32	3.1	6589.32	73	6513	A -	---
										85	6501	M 83-103	Middle
CW25	1540802	488866	102.0	5.0	11/22/2010	0.92	6566.28	3.0	6567.20	53	6511	U 62-102	Upper
										53	6511	A -	---
CW62	1544555	487847	150.0	5.0	5/3/2017	89.54	6490.32	1.9	6579.86	60	6518	A -	---
										134	6444	M 130-150	Middle
ACW	1540235	488070	325.0	6.0	12/19/2016	78.58	6485.22	1.2	6563.80	40	6523	A -	---
										57	6506	U -	---
										264	6299	M 265-325	Middle

NOTE: A = Alluvial Aquifer, Base
U = Upper Chinle Aquifer, Top
M = Middle Chinle Aquifer, Top
L = Lower Chinle Aquifer, Top
* = Abandoned

TABLE 2-6. WELL DATA FOR THE CHINLE OFF-SITE GROUNDWATER MONITORING

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL			MP ABOVE LSD (FT)	MP ELEV. (FT-MSL)	DEPTH TO AQUIFER (FT-LSD)	ELEV. OF AQUIFER (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	AQUIFER
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
0493	1536702	489492	300.0	5.0	3/1/2017	68.43	6491.85	0.9	6560.28	40	6519 A	-	---
										65	6494 U	-	---
										236	6323 M	270-300	Middle
0494	1536689	489494	85.0	5.0	6/28/2017	33.90	6526.24	0.6	6560.14	40	6520 A	-	---
										65	6495 U	65-85	Upper
CW45	1535036	489494	193.0	5.0	3/24/2017	53.75	6507.56	0.6	6561.31	90	6471 A	-	---
										166	6395 M	163-193	Middle
Y7	1535339	488870	220.0	4.5	3/28/2017	68.27	6492.16	2.5	6560.43	90	6468 A	-	---
										158	6400 M	180-220	Middle
CW18	1535924	491378	230.7	5.0	3/20/2017	38.45	6534.20	1.5	6572.65	90	6481 A	-	---
										190	6381 U	177-232	Upper
										340	6231 M	-	---
CW28	1535112	491008	370.0	5.0	12/12/2016	72.01	6499.67	1.9	6571.68	90	6480 A	-	---
										110	6460 U	-	---
										294	6276 M	280-360	Middle
CW29	1534551	487435	290.0	5.0	3/20/2017	75.50	6476.72	1.7	6552.22	52	6499 M	-	---
										52	6499 A	-	---
										228	6323 L	230-270	Lower
CW32	1543413	483523	300.0	6.0	6/29/2017	148.40	6418.88	1.7	6567.28	77	6489 A	-	---
										157	6409 L	218-303	---
										157	6409 L	158-188	Lower
CW41	1533174	488584	206.0	6.0	12/12/2016	76.00	6479.41	1.5	6555.41	59	6495 A	-	---
										138	6416 L	146-206	Lower
CW42	1533169	487177	205.0	6.0	8/14/2017	66.90	6481.88	0.0	6548.78	98	6451 A	-	---
										124	6425 L	125-205	Lower
CW43	1537587	482493	104.1	5.0	12/20/2016	67.80	6480.99	2.0	6548.79	57	6490 A	-	---
										57	6490 L	81-101	Lower
CW76	1536661	487861	270.0	4.5	5/4/2017	69.26	6487.35	2.4	6556.61	40	6514 A	-	---
										210	6344 M	230-270	Middle
R3	1534546	488196	140.0	5.0	3/21/2017	55.07	6500.66	2.0	6555.73	88	6466 A	60-80	Alluvium
										88	6466 M	100-140	Middle
V6	1534158	485711	260.0	4.5	8/22/2017	73.60	---	2.0	---	220	---	L 220-260	Lower

NOTE: A = Alluvial Aquifer, Base
U = Upper Chinle Aquifer, Top
M = Middle Chinle Aquifer, Top
L = Lower Chinle Aquifer, Top
* = Abandoned

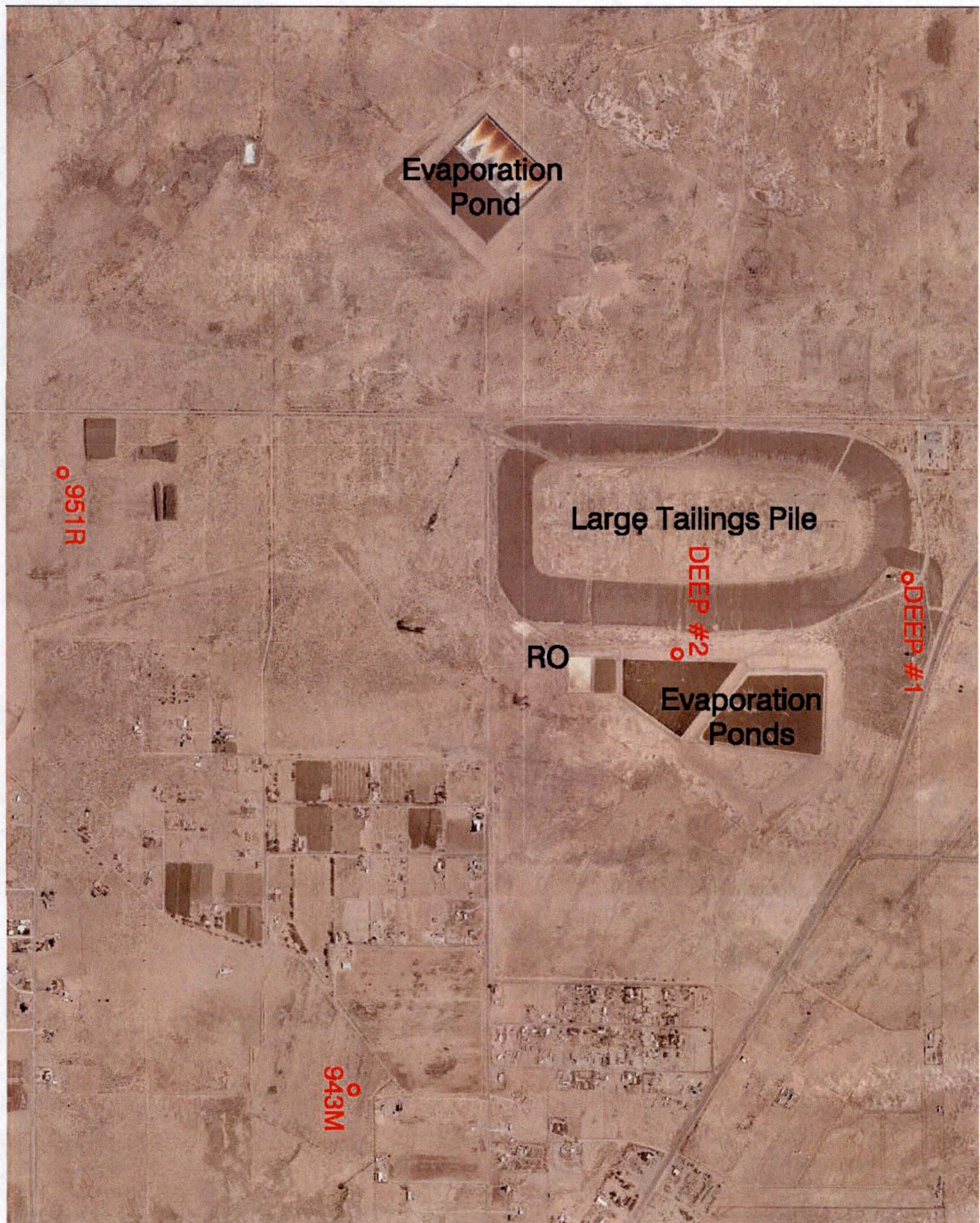
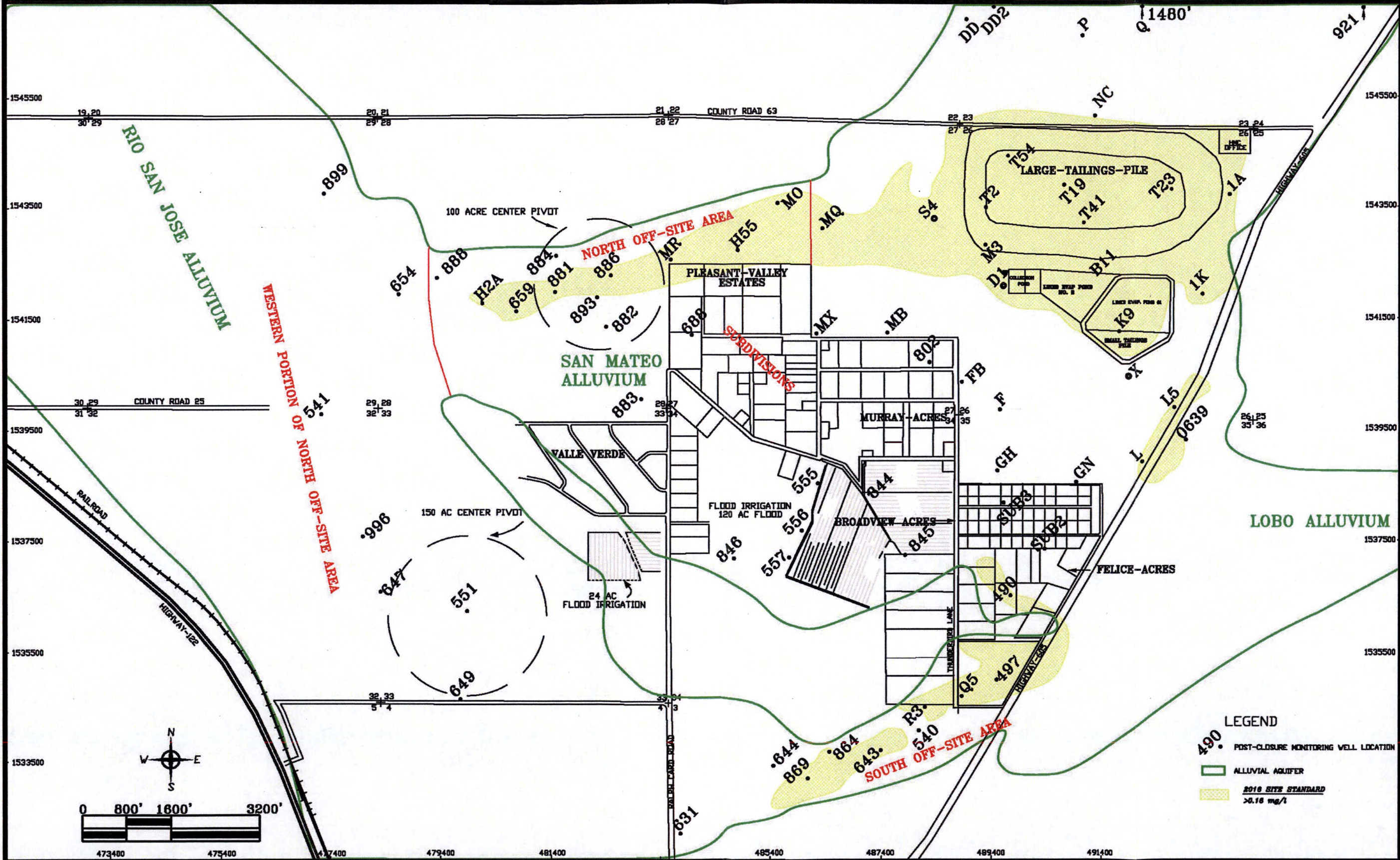


Figure 2-2. San Andres Aquifer Monitoring Well Locations

Figure 2-2. Alluvial Aquifer Compliance Monitoring Well Locations



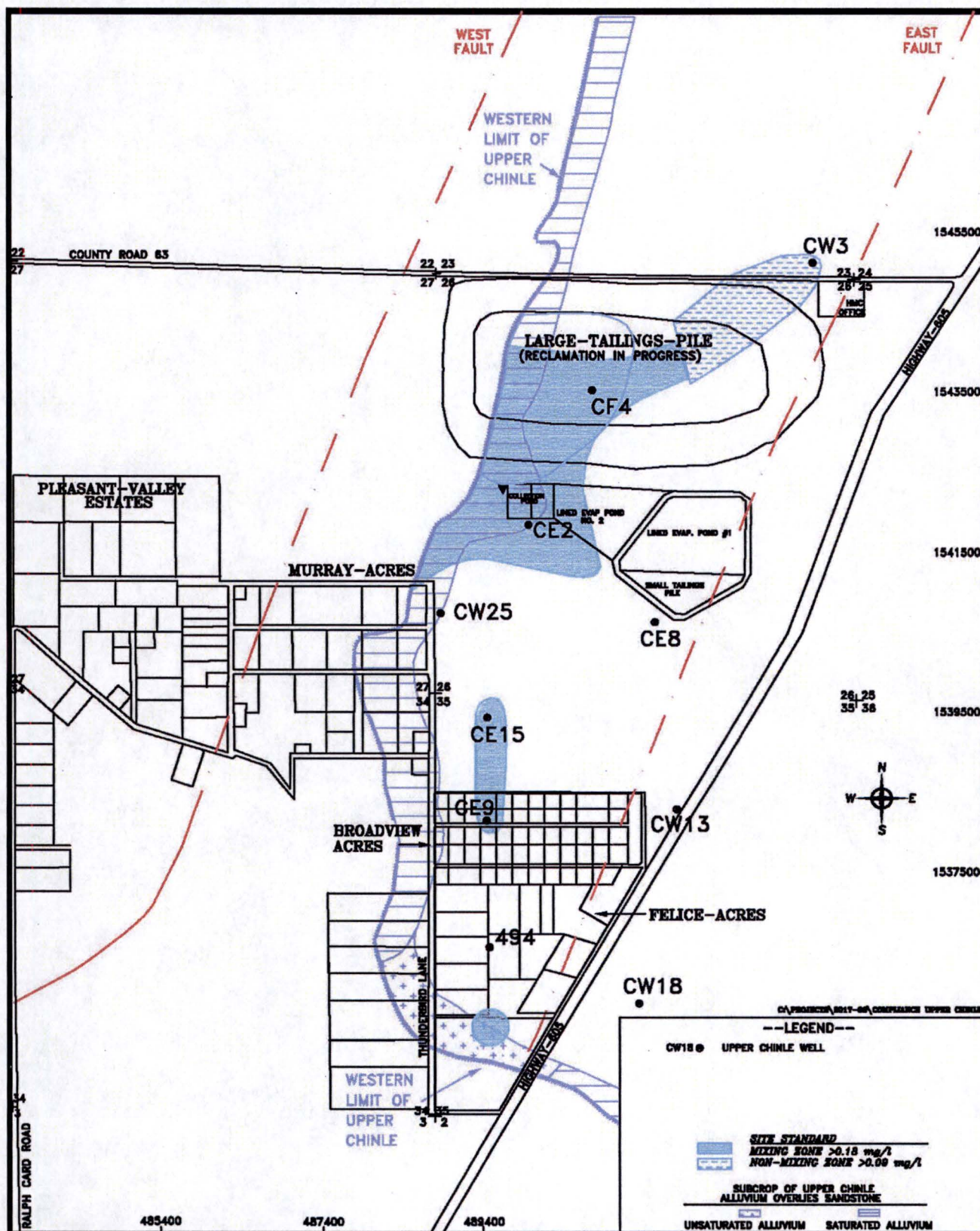


Figure 2-3. Upper Chinle Aquifer Compliance Monitoring Well

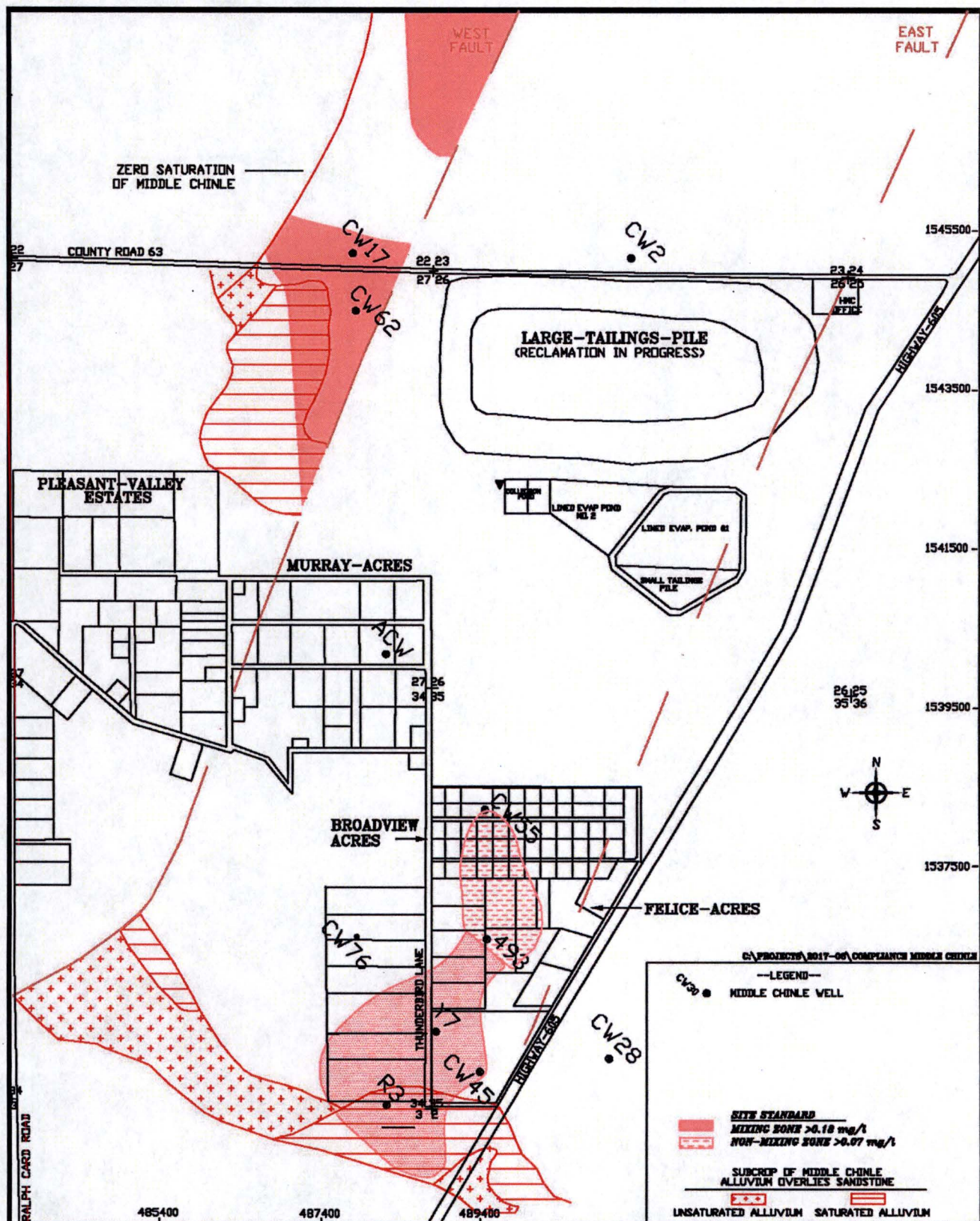
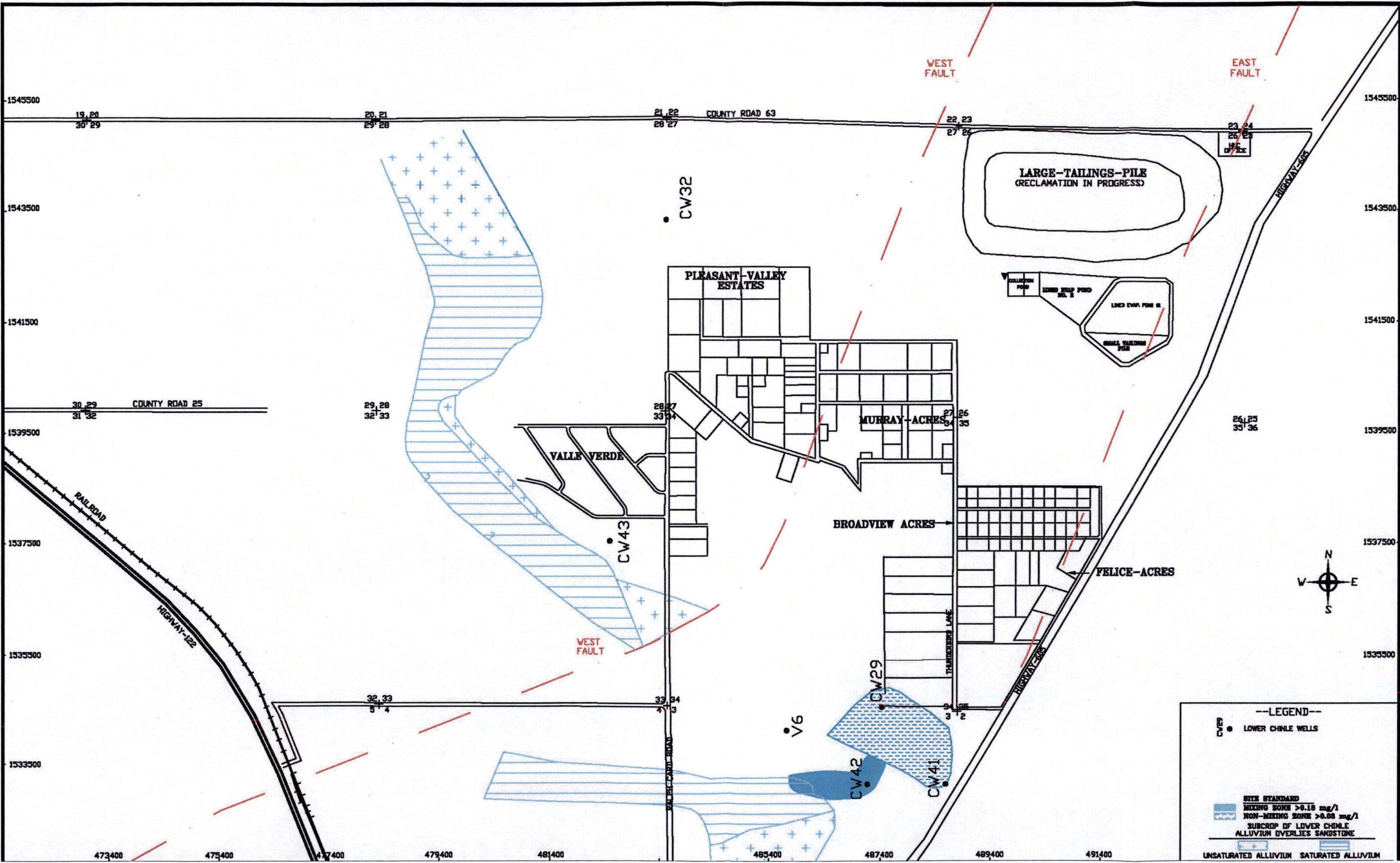


Figure 2-4. Middle Chinle Aquifer Compliance Monitoring Well Locations

Figure 2-5. Lower Chinle Aquifer Compliance Monitoring Well Locations



3. REFERENCES

New Mexico Environment Department, 2014, Ground Water Quality Bureau, Ground Water Discharge Permit DP-200, Renewal and Modification.

APPENDIX A
Grants Site Existing Groundwater Monitoring

NRRC's Revised TABLE 2 (8-99)

Well Number	Parameters to be Monitored	Frequency of Monitoring
#1 & 2 Deepwells	D	Annually
Broadview Acres Wells 446, SUB1, SUB2, SUB 3	G	Annually
Felice Acres Wells 490, 492, 493, 494	G	Annually
Murray Acres Wells 802, 844	G	Annually
Pleasant Valley Wells 688, 846	G	Annually
Regional Wells 920, 942	G	Annually
Site Monitoring Wells F, FB, GH, MO, CW2	G	Annually
Collection System Wells	Total Volume	Monthly
Injection System Wells	Total Volume	Monthly
Reversal Wells B, BA, KZ, KF, SO, SP, S1, S2	Water Level	Weekly
Point of Compliance Wells D1, X, S4	B, F	Annually
Background Well P	B	Annually

B: Water Level, pH, TDS, SO₄, Cl, HCO₃, CO₃, Na, Ca, Mg, K, NO₃, U, Se, Mo, Ra-226

D: Ca, Mg, K, Na, HCO₃, CO₃, Cl, SO₄, pH, TDS, A1, As, Ba, Cd, Co, Cu, CN, F, Fe, Pb, Mn, Hg, Mo, Ni, NO₃ as N, Se, Ag, Zn, U, Filtered Ra-226

F: V, Ra-228, Th-230

G: Water Level, SO₄, U, Se, TDS, Mo

