2006 ANNUAL MONITORING REPORT / PERFORMANCE REVIEW
FOR
HOMESTAKE'S GRANTS PROJECT
PURSUANT TO
NRC LICENSE SUA-1471 AND DISCHARGE PLAN DP-200

FOR:

U.S. NUCLEAR REGULATORY COMMISSION
AND
NEW MEXICO ENVIRONMENT DEPARTMENT

BY:

HOMESTAKE MINING COMPANY OF CALIFORNIA
GRANTS, NEW MEXICO

AND

HYDRO-ENGINEERING, LLC
CASPER, WYOMING

MARCH, 2007

GEORGE L. HOFFMAN, P.E.
5831 N.M. HYDROLOGIST

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

APPENDICES

NOTE: TABLE OF CONTENTS IS PRESENTED AFTER THE TAB FOR EACH SECTION

SECTION 1

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

1.0 EXECUTIVE SUMMARY AND INTRODUCTION

1.1 EXECUTIVE SUMMARY

Homestake Mining Company of California manages a ground water restoration program as defined by Nuclear Regulatory Commission (NRC) License SUA-1471, and New Mexico Environment Department (NMED), DP-200 permit. The restoration program is a dynamic on-going strategy based on a restoration plan, which began in 1977, and is scheduled to be completed in 2015. Additional evaluation of the ground water restoration has extended the end of the program to 2015 from 2011.

Homestake's long-term goal is to restore the ground water aquifer to levels as close as practicable to the up-gradient background levels. A ground water collection area (see shaded area on Figure 2.1-1, Page 2.1-12) has been established and is bounded by a down-gradient perimeter of injection/infiltration wells and trenches. Alluvial ground water that flows beneath the tailings enters this collection area. All ground water in the alluvial aquifer that is within the collection area is eventually captured by the collection well system. Once ground water quality restoration within the zone is complete and approved by the agencies, the site is to be transferred to the U.S. Department of Energy, which will have the responsibility for long-term site care and maintenance.

The data reported within this document represent the results of the monitoring program during 2006. This is a yearly reporting requirement. A similar report has been submitted to the agencies each year since 1983 (see list in Section 1.2).

The restoration program is designed to remove target contaminants from the ground water by flushing the alluvial aquifer with deep-well supplied fresh water or water produced from the reverse osmosis (R.O.) plant. A series of collection wells is used to collect the contaminated water, which is pumped to the R.O. plant for treatment or, alternatively, reported to the evaporation ponds.

Historically, the contaminants are found in two different aquifer systems. The aquifer system of primary concern is the alluvial system, which averages approximately 100 feet in depth, and extends generally north to south encompassing the San Mateo alluvial aquifer. In addition, a second aquifer system is found within the Chinle formation underlying the San Mateo alluvium. It is comprised of three separate aquifers designated as the Upper, Middle and Lower Chinle aquifers. The Hydro-Engineering 2003b report should be reviewed for details of the geologic setting and aquifer conditions on the site. The Upper and Middle Chinle aquifers subcrop beneath the alluvial system near the project site. Slight to moderately elevated concentrations of constituents of concern have been observed in the Upper, Middle and Lower Chinle aquifers near their subcrops with the overlying alluvial system.

The restoration program, as described above, is made up of injection and collection well systems. R.O. product water, or fresh water pumped from deep wells, is injected in a series of wells or infiltration trenches arranged to form a continuous injection line across the site. The injection line creates a hydraulic barrier that results in containment of the contaminants within the collection area. The contaminated ground water is pumped and collected from a series of wells within the collection area. The collected aquifer water is pumped to the R.O. plant or to two large lined evaporation ponds for passive and forced (spray) evaporation.

In the years from 1977 to the present, the combination of injection wells and the up-gradient collection system has gradually continued the withdrawal of the contaminated ground water plume up-gradient of the current hydraulic barrier which assists in aquifer restoration of ground water concentrations to or below background levels.

An average of 693 gallons per minute (gpm) was pumped into the alluvial fresh-water injection systems in 2006. An additional 75 gpm of fresh water was injected into the Upper and Middle Chinle aquifer systems. An average rate of 184 gpm of R.O. product water was injected into the alluvial aquifer in 2006, in addition to the fresh-water injection program. Production of significant quantities of R.O. product water started in July of 1999 with consistent operation during 2000 through 2006 except during equipment repair periods.

In 2006, the average collection rate for the alluvial aquifer was maintained at 257 gpm. An additional 53 gpm was pumped from the alluvial aquifer and re-injected within the collection area. The Upper Chinle aquifer collection program consisted of pumping wells CE2, CE5, CE6, CE11 and CE12 at an average rate of 55 gpm in 2006. The up-gradient alluvial aquifer collection system averaged 40 gpm in 2006, while average rates of 39 and 84 gpm were pumped from the Large Tailings Pile toe drains and in situ tailings pile dewatering, respectively.

The continuing evaluation of the performance of the Grants restoration system, including the 2006 results, shows that sulfate, TDS, chloride, uranium, selenium and molybdenum are still the key constituents of interest at this site. Successful restoration of ground water quality with respect to these key constituents will also accomplish restoration for other constituents. The monitoring program has shown that any low levels of nitrate, radium-226, radium-228, vanadium and thorium-230 are also reduced when the key constituents are restored in a particular area.

Data relating to key constituents currently being restored at the site have been reviewed and statistically evaluated to determine upgradient background water quality. These background water quality levels have been accepted by NRC, EPA and NMED; the NRC has set site standards based on the background water quality. It should be noted that these site standards are utilized throughout this report for comparison purposes in discussing restoration progress.

Observed alluvial background concentrations of key constituents at the Grants site were similar to those in previous years. The only areas where sulfate, TDS and chloride concentrations exceed the alluvial site standard are small localized areas in Broadview, Pleasant Valley, south of Murray Acres and Pleasant Valley, plus the large area in close proximity to the Large and Small Tailings Piles in the Grants Project area.

Uranium concentrations exceed the alluvial site standard of 0.16 mg/l within the collection area near the tailings. There are also seven wells in Felice Acres and one well in Murray Acres subdivision that contain concentrations of uranium exceeding site standard. Ground water withdrawal for irrigation is being used to further reduce uranium levels that exceed the standard in a small area southwest of Felice Acres in Section 3 and in the western half of Section 27 and Section 28. Collection of water from one well in Murray Acres is being used to reduce uranium concentrations in that area.

Selenium concentrations also exceed the relevant site standard in the collection area near the Large Tailings Pile and southeast of the Small Tailings Pile. None of the sampled subdivision wells contained selenium concentrations above the NRC site standard.

Molybdenum concentrations above the NRC site standard of 0.10 mg/l are not present in the sampled subdivision wells. The wells exhibiting elevated molybdenum concentrations are all located near the Large and Small Tailings Piles, to the southeast of the Small Tailings Pile and a small area in central Section 27. Migration of this constituent has been limited due to natural retardation within the alluvial aquifer.

Nitrate concentrations are compared to the alluvial site standard of 12 mg/l. Areas to the west of the Large Tailings Pile contain higher nitrate concentrations above the site standard, but these levels are likely natural given their location. Nitrate concentrations in the area of the Large and Small Tailings Piles and to the east are likely caused by tailings seepage. A small area southeast of Valle Verde area exceeds the nitrate alluvial site standard. Water quality with respect to this constituent should easily be remediated through the ongoing restoration program.

All radium values in the alluvial aquifer outside of the tailings perimeter were less than the NRC site standard. This demonstrates that radium is only a constituent of concern under the Large Tailings Pile.

None of the vanadium concentrations measured in 2006 exceeded the alluvial site standard. Concentrations of this constituent have been adequately restored to below the site standard except for levels immediately under the Large Tailings Pile.

Thorium levels observed in 2006 were less than the NRC site standard except levels in the alluvium immediately under the Large Tailings Pile. The mobility of this constituent has been very limited and is found in close proximity to the tailings. However, the analytical results for this constituent vary significantly at the low observed levels that are approaching laboratory detection limits. Slightly higher values should not be given any significance until they are supported by additional monitoring. The monitoring records for thorium indicate that it is a minor constituent of concern at the Grants site.

Fresh-water injection into Upper Chinle well CW13, east of the East Fault, continued in 2006. This injection has maintained higher water levels in the Upper Chinle aquifer east of the East Fault which in turn has allowed continued operation of the nearby Upper Chinle collection wells.

Fresh-water injection continued in 2006 in Upper Chinle well CW5 just north of Broadview Acres and also in Upper Chinle wells CW4R and CW25. This injection has resulted in gradient reversal within the Upper Chinle, thereby forcing ground water from this area back to the north toward the tailings piles. Collection from Upper Chinle well CE2 was initiated in 1999 and continued through 2006. Collection in Upper Chinle wells CE5, CE6, CE11 and CE12 was started in 2006. This collection is used in conjunction with injection wells CW4R, CW5 and CW25 to restore ground water quality in this area. Injection into well CW25 was started in 2000 and continued through 2006.

All sulfate and TDS concentrations in the Upper Chinle aquifer are below the site standards except for samples from wells CE7, CE13 and CW3, where the concentrations are higher than the site standards. Therefore, the Upper Chinle aquifer only requires restoration with respect to TDS and sulfate in a localized area near the Large Tailings Pile.

Uranium concentrations in ten Upper Chinle wells exceeded the Upper Chinle site standard in 2006. Restoration of these elevated values should result from CE2, CE5, CE6, CE11 and CE12 well collection and the CW4R, CW5 and CW25 well injection efforts.

Selenium concentrations in the Upper Chinle aquifer exceed the site standard in one well in the non-mixing zone and four wells in the mixing zone. The site standards for selenium for the Upper Chinle mixing zone and the Upper Chinle non-mixing zone are 0.14 and 0.06 mg/l, respectively.

The concentrations of molybdenum exceeded the site standard in four wells near the tailings in the Upper Chinle aquifer and six more to the south of the Collection Ponds during 2006. Restoration for these locations should occur from continued CE2, CE5, CE6, CE11 and CE12 well collection and CW4R, CW5 and CW25 well injection activities.

The nitrate site standard for the Upper Chinle mixing zone is greater than any of the concentrations observed in 2006. This indicates that nitrate is not a constituent of concern in this aquifer.

None of the Upper Chinle wells contain a radium-226 plus radium-228 value above 5 pCi/l. None of the observed vanadium concentrations from 2006 sampling in the Upper Chinle aquifer exceeded the site standard. None of the measured thorium-230 concentrations in the Upper Chinle aquifer wells during 2006 were at a significant level. This is consistent with the low observed concentrations in the overlying alluvial aquifer.

The direction and rate of ground water flow in the Middle Chinle aquifer in 2006 is very similar to that of past years. Fresh-water injection into well CW14 started in December of 1997. Fresh-water injection into wells CW30 and CW46 started in 2004. The fresh water is building up a mound of ground water in this area, which will result in a reversal of the flow of Middle Chinle water back toward the alluvial subcrop. Wells 498, CW44 and CW45 are being used for irrigation supply, which will increase the flow in the Middle Chinle aquifer from Broadview and Felice Acres to the south. Additionally, well CW28 was added as a supply well for fresh-water injection in 2002.

Water quality in the Middle Chinle aquifer is generally good. All sulfate concentrations are less than the site standards except for a natural exceedance in the mixing zone area at well

WR25. All TDS and chloride concentrations in the Middle Chinle aquifer are less than the standards except for three TDS values in Felice Acres, two TDS values in Broadview Acres that are slightly above the non-mixing zone background value and one natural TDS value in a well west of the West Fault. One chloride concentration in Murray Acres exceeds the Middle Chinle site standard. Uranium and selenium concentrations in the western portion of Felice Acres are above site standards due to the alluvial recharge to the Middle Chinle aquifer just south of Felice Acres. Continued irrigation use of this water by Homestake will reduce these elevated concentrations in western Felice Acres. The uranium background is also exceeded in Broadview Acres in wells 434 and CW55 and wells CW35 and WR25 west of the West Fault. The non-mixing zone selenium site standard is slightly exceeded in well CW28 which is located east of the East Fault and also well 493 in Felice Acres. Uranium site standards of 0.18 and 0.07 mg/l, respectively, were set for the mixing and non-mixing zones in the Middle Chinle aquifer, while selenium site standards are 0.14 and 0.07 mg/l. Molybdenum concentration in well 434 is slightly above the non-mixing zone standard of 0.10 mg/l.

Nitrate, radium, vanadium and thorium-230 concentrations in the Middle Chinle aquifer are at less than significant levels for each of the constituents. Hence, uranium and selenium are considered the important constituents relative to restoration needs for the Middle Chinle aquifer system.

Concentrations of major constituents in the Lower Chinle aquifer generally increase in the down-gradient direction due to the slow movement of water in the fractured shale. All sulfate, TDS and chloride concentrations are less than the site standards except in far-down-gradient areas, where natural concentrations exceed the non-mixing zone site standard. These exceedances result because there is only limited background data for the far-down-gradient areas of the Lower Chinle aquifer, and there is a naturally occurring deterioration of water quality in the down-gradient direction. The uranium site standard in the Lower Chinle aquifer is exceeded in six wells. The three wells where concentrations significantly exceed the mixing zone site standard of 0.18 mg/l are located near the subcrop of the Lower Chinle aquifer with the alluvial aquifer. Concentrations in three non-mixing zone wells exceed the site standard of 0.03 mg/l.

Concentrations of selenium do not exceed the standards in the two zones for the Lower Chinle aquifer. All molybdenum concentrations in the Lower Chinle aquifer are less than the site standard. None of the Lower Chinle nitrate concentrations exist at a significant level. All radium, vanadium and thorium-230 concentrations in the Lower Chinle aquifer in 2006 were at low levels for these constituents.

1.2 INTRODUCTION

This report, as required by the New Mexico Environment Department (NMED) discharge plan DP-200 and the Nuclear Regulatory Commission (NRC) License SUA-1471, presents results of the 2006 annual ground water monitoring program at Homestake's Grants Project. Homestake Mining Company (HMC) conducted uranium milling operations five miles northeast of Milan, New Mexico from 1958 to 1990 (see Figure 1.2-1). Referred to as the Grants Project or Grants site, HMC deposited uranium tailings from the alkaline (high pH) Grants mills into two unlined piles (Large and Small Tailings Piles) that overlie San Mateo alluvium. The San Mateo alluvium is simply referred to as the alluvium or alluvial aquifer in this report. In 1977, due to initial concerns about ground water selenium levels, HMC installed a system of wells and pumps in order to inject fresh water into the alluvium at the property boundary and to withdraw contaminated water from the alluvium near the tailings.

Previous monitoring reports have been published in quarterly, semi-annual and annual reports[1], which were presented to the NMED and the NRC.

Four subdivisions, Broadview Acres, Murray Acres, Felice Acres and Pleasant Valley Estates, are adjacent to the HMC site. These subdivisions are shown on many of the various report figures found in this report.

Monitoring data for ground water west of the project site is included in the 1995 through 2006 reports (see Appendix A for water levels and Appendix B for water quality). This area has been designated the "West Area" and was so labeled on the figures in the annual reports prior to 2003. The 2003 through 2006 annual reports combine the project site and West Area figures on one 11 x 17 inch figure.

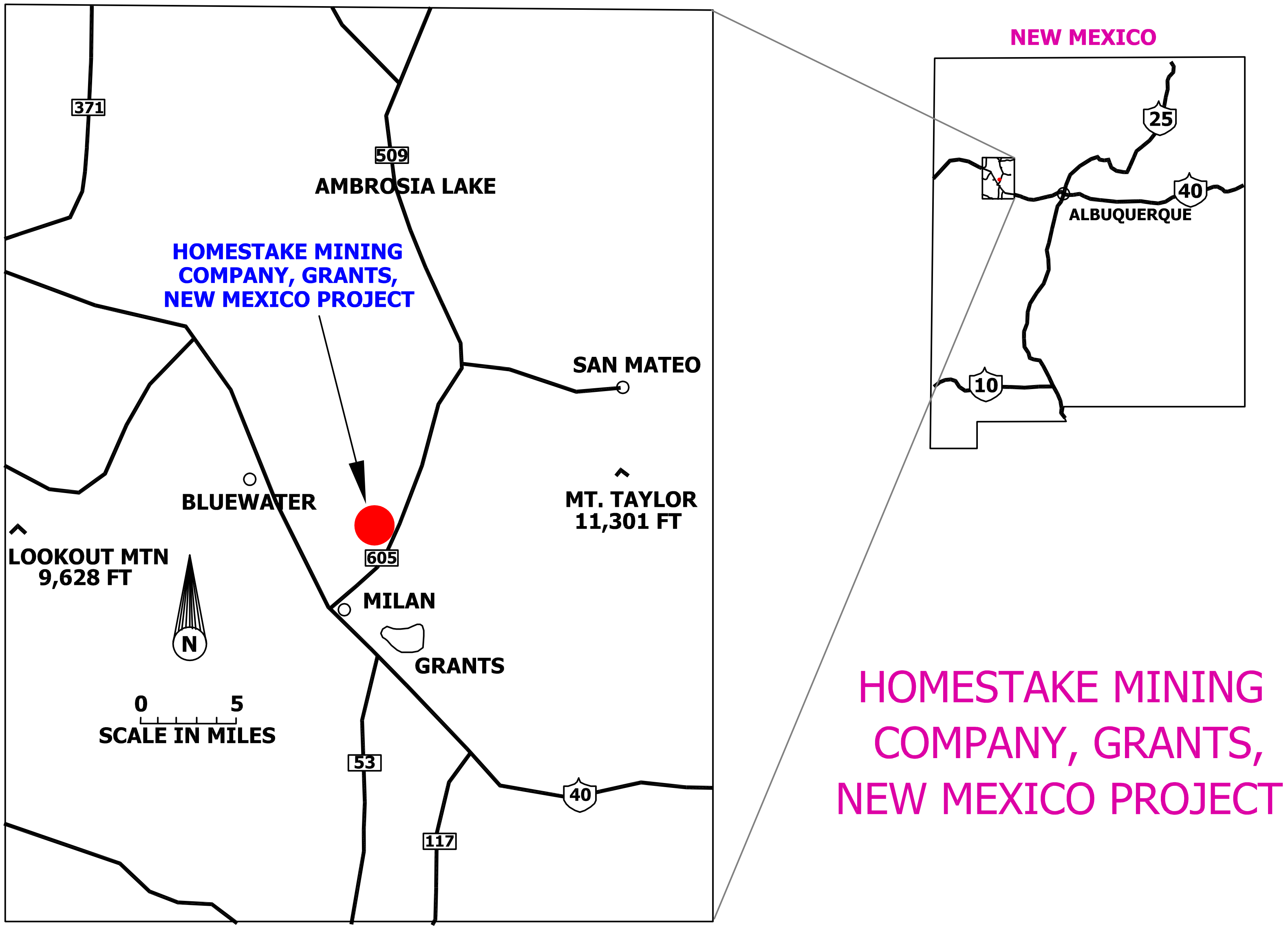
The annual ALARA audit, required as an NRC license condition, is presented in Appendix C. Additionally, a report of an annual inspection of the tailings piles and pond dikes must be submitted per license condition and is presented in Appendix D. Appendix E provides an annual land-use survey discussion for the immediate Grants site area; this was an added license condition

---

[1] See Hydro-Engineering 1983b, 1983c, 1984a, 1984b, 1984c, 1985a, 1985b, 1985c, 1985d, 1986a, 1986b, 1986c, 1987a, 1987b, 1988a, 1988b, 1990, 1991, 1992, 1993a, 1994, 1995, 1996, 1997, 1998, 1999, 2000a, 2001a, 2002, 2003a, 2004, 2005 and 2006.

beginning in 2002. The annual radon flux survey report for the Large and Small Tailings Piles is presented in Appendix F of this report.

A detailed table of contents is included at the front of each report section including a list of associated section figures and tables.



DATE: 03/15/07 bjm
PROJECTS\2006-06\DWG\STATELOC.DWG

FIGURE 1.2-1. LOCATION OF THE GRANTS PROJECT

SECTION 2

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 2
TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT
(continued)

2.0 OPERATIONS

2.1 CURRENT OPERATIONS SUMMARY

The annual precipitation of 12.6 inches on site in 2006 was slightly greater than two inches above normal precipitation for Grants, New Mexico. The above normal condition following an extended drought has resulted in a continuing natural decline in water levels regionally and at the Grants site.

The Grants Project ground water remediation system consists of collection of contaminated ground water near the tailings piles and down-gradient injection of fresh water and R.O. product water. These collection and injection systems continued to operate in 2006, along with the reverse osmosis (R.O.) plant, which is used to treat and manage the majority of collected ground water. The R.O. plant produces product water that is of much better quality than the natural alluvial water, and it is used as injection water in some areas of the Grants Project restoration program. Figure 2.1-1 on page 2.1-12 shows the location of the present (end of 2006) injection and collection systems along with their starting dates of operation. Water collected from the site is pumped to the R.O. plant or discharged into lined collection ponds or one of two lined evaporation ponds (light blue areas).

The area where ground water flow is controlled by the fresh-water injection and collection systems is called the "Collection Area" and is shown by the yellow cross-hatched pattern on Figure 2.1-1. All of the alluvial ground water within the collection area converges to the collection wells.

2.1.1 R.O. PLANT

The R.O. plant utilizes a lime/caustic pre-treatment and clarification unit. Blowdown (sludge) from the pre-treatment unit discharges to the West Collection Pond with the treated water feeding the two 300 gpm low-pressure R.O. units. The brine from the No. 1 low-pressure unit feeds a 75-gpm high-pressure R.O. unit. The No. 2 R.O. unit is a single stage 300 gpm system. The R.O. product water from the two units is discharged to a series of injection wells. The brine from the R.O. plant is discharged to the evaporation ponds. Other miscellaneous flows and blowdown from the R.O. plant are pumped to the West Collection Pond for recycle to the R.O. plant.

The R.O. plant inputs and output of R.O. product water for injection are listed in the following tabulation:

R.O. Plant Performance (GPM) (2000-2006)				
Year	Input		Output	
	Collection Wells	Tailings Collection	R.O. Injection	Brine and Blowdown
2000	274	0	204	70
2001	276	5	222	59
2002	383	5	288	100
2003	338	4	266	76
2004	293	12.2	249	64
2005	250	6.4	198	49
2006	257	2.1	184	48

Aquifer restoration results continue to show that the R.O. product water injection is much more effective than the fresh water in reducing the uranium and molybdenum concentrations within the alluvial aquifer.

2.1.2 COLLECTION

The 2006 alluvial aquifer collection rate was slightly greater than that in 2005. In general, the R.O. plant was operated on a single unit 300 gpm basis during 2006; each of the two R.O. units were operated alternatively to allow single unit operation while the other unit was on a backwash cleaning cycle.

Up-gradient alluvial aquifer collection continues north of County Road 63. Well P2 was used to collect upgradient alluvial aquifer water (brown triangle symbol on Figure 2.1-1) for transfer to the drainage system farther west. This collection well reduces the quantity of alluvial water flowing into the tailings area. Upper Chinle aquifer collection continued from well CE2 and was expanded to include CE5, CE6, CE11 and CE12 in 2006 (gold X symbol located south of the collection ponds), and this water was used as injection supply water for the Large Tailings Pile (LTP) flushing program described later in Section 2.1.5.

2.1.2.1 ALLUVIAL AQUIFER

Figure 2.1-1 shows the locations of five lines of alluvial aquifer collection wells (red x symbols). The S and D-lines are adjacent to the Large Tailings Pile, and the K and C-lines are adjacent to the Small Tailings Pile. No new wells were added to the alluvial collection system in 2006. The L-line south of the Small Tailings Pile continued to operate in 2006 and includes collection wells 521, 522 and 639 which are located on the east side of Highway 605 (see Figure 4.1-1 for location). Alluvial water is pumped from these lines of collection wells to the R.O. plant or, depending on water quality, it is pumped to re-injection wells. Figure 2.1-2 on page 2.1-13 graphically presents collection rates for the last ten years at the Grants Project. The alluvial collection system operated at an average rate of 257 gpm in 2006. Additionally, an average of 53.0 gpm was extracted from the alluvium for re-injection in 2006.

2.1.2.2 UP-GRADIENT ALLUVIAL WATER

Collection of alluvial water up-gradient of the tailings piles started in January of 1993 and continued through 2006. Well P2 was the only well pumped in 2006 (see Figure 2.1-1). This up-gradient water was transferred to the next drainage channel to the west. The transfer of this up-gradient water prevents some of the alluvial water from entering the Grants Project area at the north side of the Large Tailings Pile and helps maintain the gradient reversal. The collection rate for this effort averaged 40 gpm during 2006 (see Figure 2.1-2). Monthly rates were not measured for the up-gradient wells, and therefore only the yearly average is presented for 2001 through 2006 on Figure 2.1-2.

2.1.2.3 UPPER CHINLE AQUIFER

Figure 2.1-2 shows the collection rate for Upper Chinle collection wells CE2, CE5, CE6, CE11 and CE12, which are located on the south side of the collection ponds. Collection from Upper Chinle well CE2 started in 1999 and is expected to continue for several years. Collection from wells CE5 and CE6 started in August 2006 while pumping from wells CE11 and CE12 was initiated in October of 2006. These wells were used to supply water to the Large Tailings Pile for the tailings flushing program during 2006. The yearly average collection rate from the Upper Chinle was 54.8 gpm.

2.1.2.4 QUANTITY OF CONSTITUENTS COLLECTED FROM THE ALLUVIAL AQUIFER

Table 2.1-1 (page 2.1-17) presents the quantities of chemical constituents extracted from the ground water system, the tailings piles and the toe drains. The ground water collection system has produced an average pumping rate of 259 gpm for the entire period between 1978 and 2006. The portion of the collection water that has been re-injected into the alluvial aquifer is not included in the values in Table 2.1-1. The quantity of constituents removed in 2006 was computed by multiplying the average concentration of a particular constituent for each source of water (ground water, toe drains and tails collection) by the volume of water pumped for each that year.

2.1.3 INJECTION

The fresh-water and R.O. injection systems, which aid in the reversal of the ground water gradients back toward the collection wells, consist of lines of injection wells, which are oriented generally along the east, south and west perimeter of the two tailings piles and evaporation pond complex (see green and blue circles on Figure 2.1-1).

In 2003, approximately 2100 feet of four-inch corrugated slotted polyethylene pipe was installed at a depth of approximately 6 feet below land surface west of the Large Tailings Pile to serve as a horizontal injection line (see green line on Figure 2.1-1). A filter sock was placed over the pipe thus negating the need for a sandpack. Water is currently being injected into this injection line (S injection line) at three locations. The 2006 injection rate for this horizontal injection line is included in the Broadview and Murray Acres injection rates, and was approximately 140 gpm for the year.

In July 2004, two 250 foot sections of injection line (EBA1 and EBA2) were added south of collection well 522 east of Highway 605 (see Figure 2.1-1 for location). The average injection rate for these two lines is estimated at 20 gpm and is included in the Broadview and Murray Acres injection rate.

A 400-foot extension to the S injection line was added on the north end of this line in 2005. Five EMA injection lines were added southwest of the Large Tailings while three ETA injection lines were added east of the Large Tailings in 2005 (see Figure 2.1-1).

2.1.3.1 BROADVIEW AND MURRAY ACRES

The Broadview Acres injection system started in 1977 with the G line on the north side of this subdivision. Injection into the majority of the G-line wells was discontinued in mid-April of 2000 in order to supply more water to injection wells near the collection area. The J-line, wells X1 through X10, and wells X28 through X31 are also considered part of the Broadview Acres injection system. Fresh water was injected into wells X13 through X27, 1A and 1E in 2006. Alluvial fresh-water injection wells 523 and 524 were added to the Broadview Acres injection system in 2002 (see Figure 4.1-1).

All wells adjacent to the northeast corner and to the north and east of Murray Acres are included in the Murray Acres injection system. This system includes all of the M and WR series injection wells. The M line of the Murray Acres injection system was initially used in 1983. Injection into the M-line west of well WR1R was discontinued at the end of September of 2000, and injection into the WR-line, north of WR10, began at this time. The horizontal injection line, west of the Large Tailings Pile, (S. Inj. Line) was added to this system on August 25, 2003. Fresh-water injection into lines ETA1, ETA2 and ETA3 started in July of 2005 while injection into EMA1 with fresh water started in December, 2005.

Figure 2.1-3 (page 2.1-14) presents fresh-water injection rates for the last nine years. An average of 693 gpm, or a total of 364 million gallons, was injected during 2006.

2.1.3.2 R.O. PRODUCT

The R.O. product water injection system supplies water to the X wells to the south and east of the Small Tailings Pile. Until October, 2005, R.O. product water was discharged into the X line and injected into wells X1 through X10, X28 through X31 and into wells K2, K6, KA through KE, KM, KN, C4, C13, C5, C3R and PM. Fresh-water injection was commenced after that date for these wells. R.O. product was switched to injection lines EMA2 through EMA5 in October 2005. Figure 2.1-3 shows the rates of R.O. product water injection, which averaged 184 gpm in 2006 for a total of 97 million gallons.

2.1.3.3 UPPER CHINLE AQUIFER

Hydro-Engineering 2003b should be reviewed for a detail discussion of the geologic setting for the Chinle aquifers. From 1984 through early 1995, the Upper Chinle injection system consisted of injecting fresh water into Upper Chinle well CW5, located on the north side of Broadview Acres. This effort restored most of the area in the Upper Chinle aquifer between the two faults. Injection into well CW5 was resumed in April of 1997 and continues at present to complete the restoration of this aquifer.

In order to maintain head in the Upper Chinle aquifer east of the East Fault, injection of fresh water into well CW13, an Upper Chinle well, was begun in June, 1996. Injection into Upper Chinle well CW25, located on the western edge of the Upper Chinle outcrop east of Murray Acres, began in 2000. Injection into CW25 will increase the head in the Upper Chinle aquifer and force flow in the Upper Chinle back toward collection well CE2. Injection into Upper Chinle well 944 started in June of 2002, and injection into well CW4R started in 2003. The red squares on Figure 2.1-3 present monthly average injection rates into Upper Chinle wells 944, CW4R, CW5, CW13 and CW25, with an overall 2006 average of 54 gpm.

2.1.3.4 MIDDLE CHINLE AQUIFER

Injection of San Andres fresh water into Middle Chinle well CW14 was started in December of 1997. This injection was initiated to prevent northward movement of alluvial water that recharges the Middle Chinle on the south side of Felice Acres. The injection rate averaged 20.6 gpm in 2006 (see Figure 2.1-3). This injection has prevented the movement of constituents further to the north and allows up-gradient collection from wells 498, CW44 and CW45.

2.1.3.5 SECTIONS 28 AND 29

A test of fresh-water injection was initiated in late 1999 and continued through January of 2000 by pumping San Andres well 951, which is located in Section 20, (see Figure 2.1-1 for location of supply well 951). This water was subsequently injected into alluvial wells 682, 656, 894, 633 and 655 (see Figure 4.1-1 for location). This fresh-water injection in Sections 28 and 29 was resumed in March of 2002 to impede movement of ground water with modest contaminant concentrations in Section 28 until ongoing irrigation water extraction can reduce these low concentrations. Eight injection lines were added in 2005 in Sections 27 and 28 to replace the injection wells and adjust the location of this injection. Injection into lines NPV1 through NPV5 (5 of the 8 injection lines) was started on July 27, 2005 while injection into NPV6 was started in December 2005. This injection rate averaged 333 gpm for 2006 with a total injected volume of 172 million gallons. Figure 2.1-3 presents the monthly injection rates into wells and injection lines located in Sections 28 and 29.

2.1.3.6 SECTIONS 35 AND 3

Fresh-water injection in the southwestern quarter of Section 35 was initiated in late 2002 utilizing production from Upper Chinle well CW18 and Middle Chinle well CW28. This water was injected into alluvial wells 641, 642, 848 and 868 (see Figure 4.1-1 for location).

Fresh-water injection into alluvial wells 643, 863, 865 and 866, located in the northeast portion of Section 3 was initiated in 2003. Injection into Middle Chinle wells CW30 and CW46 was added to this program in 2004 (see Figure 2.1-1). Seven injection lines in Section 3 and two injection lines in Felice Acres were also added in 2004. Two additional injection lines, FA1 in central Felice Acres and WFA1 west of Felice Acres, were added in 2005. These injection wells and lines were supplied with water by San Andres well 943 in 2006.

Figure 2.1-3 presents the combined monthly injection rates for Sections 34, 35 and 3 fresh-water injection lines and wells (see brown diamond symbols on Figure 2.1-3). This injection effort is associated with the ground water restoration of the Sections 3 and 35 areas. Water collected from wells in Section 3 and 35 is used for the irrigation program. During 2006, the yearly average injection rate in Sections 34, 35 and 3 was 101 gpm.

2.1.4 RE-INJECTION

Alluvial water containing relatively low concentrations of contaminants is collected and is then injected into areas of the alluvial aquifer near the Large Tailings Pile with higher concentrations of contaminants in order to enhance restoration in this area. This aspect of the restoration plan at the Grants sites is referred to as the collection for re-injection program. The lower-concentration water will be as effective (see sulfate, uranium, selenium and molybdenum concentrations in plots for wells T and TA – see report Sec. 4.3) as fresh water during the initial stages of restoration, and therefore, re-injection is a beneficial use of this slightly contaminated ground water. Water collected from the L-line to the south of the Small Tailings Pile and wells 521, 522 and 639 was used for re-injection into the alluvial aquifer and tailings in 2006. The total collection for re-injection rate in 2006 averaged 53.0 gpm. Re-injection into alluvial wells X11, X12, D2 through D4, DAA, DAB, DL, DW, DY, DF, DG and DX was roughly 45 percent of the rate or 24 gpm. The monthly re-injection rates are depicted on Figure 2.1-2 as collection for re-injection use (COL/RE-INJ). Some of the collection for re-injection water was re-injected into the Large Tailings Pile wells in 2006. Approximately 55 percent of the yearly average is estimated to have been injected into the tailings.

2.1.5 TAILINGS CONDITIONS

Tailings wells were installed in the Large Tailings Pile beginning in 1994, and wells have been periodically added through 2006. Thirty-nine additional tailings injection wells were drilled in 2006 and two additional monitoring wells. Twenty-two additional or replacement 5 inch dewatering wells were also drilled in 2006. Data collected from these wells has been used to estimate the amount of drainable water in the re-contoured, stabilized tailings. The tailings wells are also a primary component of the tailings dewatering program. With the exception of some testing of dewatering options in 1999, no dewatering of the tailings occurred in 1998 and 1999 due to limited available capacity in the evaporation ponds. The complete dewatering program was restarted in 2000 and operated through mid-April 2002. Dewatering rates were reduced through the remainder of 2002 and 2003 due to limited available storage in the evaporation ponds. The dewatering wells were operated near capacity starting in April of 2004 and throughout 2005 and 2006.

Figure 2.1-4 (page 2.1-15) shows the locations of tailings wells that were pumped in 2006. The cumulative volume of tailings water pumped from 1995 through 2006 is presented on Figure 2.1-5. A total volume of 252 million gallons of water had been removed from the tailings via dewatering wells by the end of 2006. Of that total, 43.7 million gallons was pumped from the tailings in 2006. The yearly average collection rate from the tailings was 84.5 gpm in 2006.

Wells CE2, CE5, CE6, CE11, CE12, CW1, CW2, CW3, 929 and 934 have been used to supply water for flushing the Large Tailings Pile in 2006. A total of 124 million gallons were injected into the tailings in 2006, which is an average rate of 240 gpm. Additionally, 29 gpm of the alluvial collection for re-injection was injected into the tailings for a total tailings injection rate of 269 gpm. This injection for tailings flushing allows larger extraction rates from the tailings dewatering wells and reduces contaminant concentrations in the tailings.

Table 2.1-1 presents the quantity of constituents collected from the tailings wells since dewatering began in 1995. Tables B.1-1 and B.1-2 of Appendix B present chemical analyses of tailings well water during 2006.

2.1.6 TOE DRAIN CONDITIONS

A series of toe drains have been installed around the Large Tailings Pile to intercept perched ground water seeping from the tailings into the alluvium. The locations of the toe drains and their associated sumps are shown on Figure 2.1-4. Nine sumps are located around the perimeter of the Large Tailings Pile that are utilized for collection of toe seepage. Two of these sumps are tied to the old tailings decant towers (East and West reclaim sumps).

Figure 2.1-5 shows that 241 million gallons of water have been pumped from the toe drains. Approximately 39.4 gpm of water was collected from the toe drains in 2006, which is essentially the same as the 2005 rate. This steady rate is due to the injection into the tailings, which offsets the removal of water from the tailings.

Table 2.1-1 also presents the 2006 quantity of constituents collected from the toe drains (see Tables B.2-1 and B.2-2 of Appendix B for toe drain sump water-quality results for 2006).

2.1.7 LINED EVAPORATION PONDS

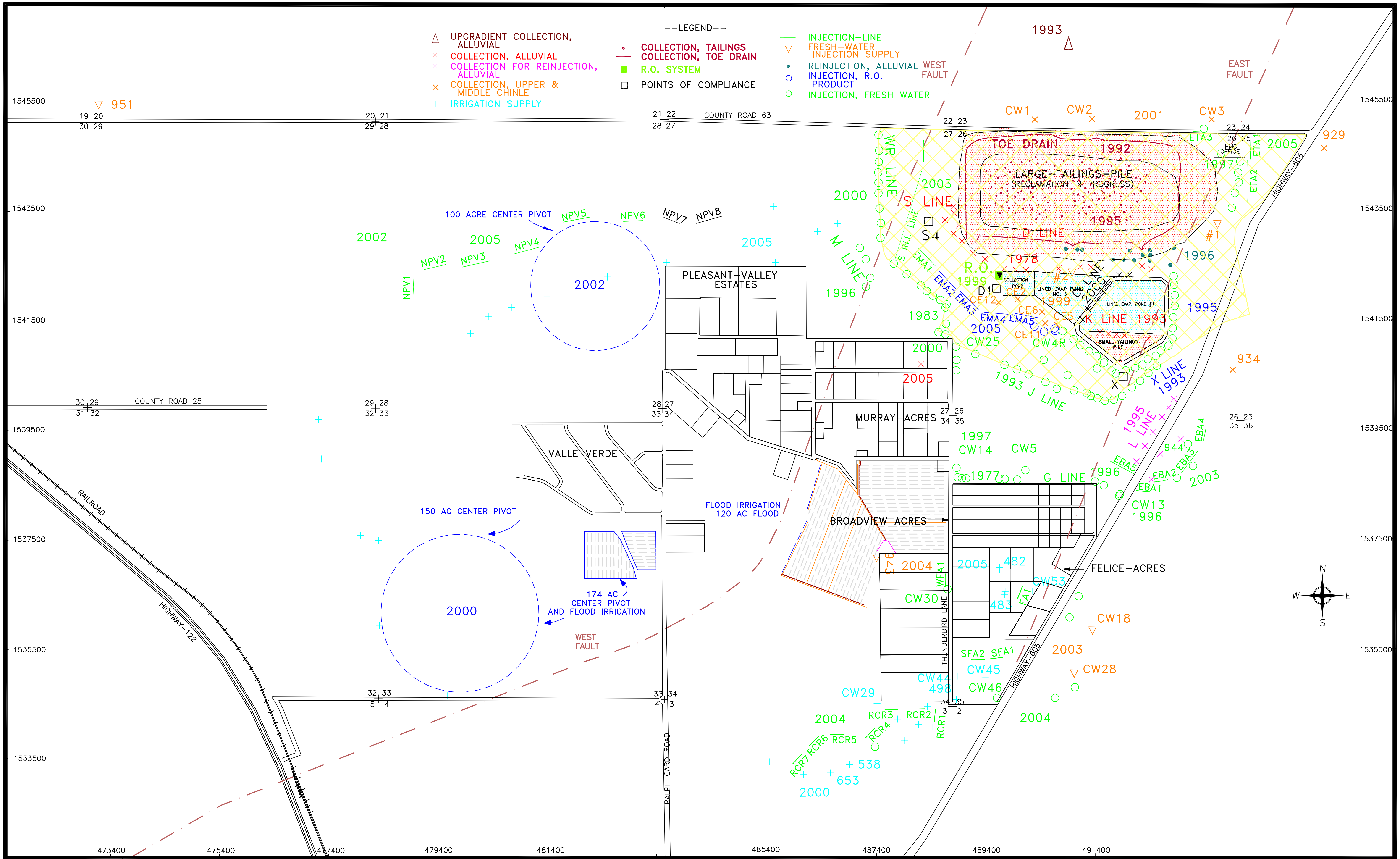
The use of lined evaporation collection ponds (East Collection Pond and West Collection Pond) began in October of 1986 when the two ponds were constructed. The No. 1 Large Evaporation Pond, located on the Small Tailings Pile, began receiving water in November of 1990. Usage of the No. 2 Large Evaporation Pond began in March of 1996.

The water from the well collection system and some water from the tailings dewatering wells and toe drains is pumped to the R.O. plant as feed water. The majority of the extracted tailings water is reported directly to the East Collection Pond for subsequent evaporation. Excess water is transferred from the East Collection Pond to the No. 2 Evaporation Pond. When necessary, water is transferred from the No. 2 Evaporation Pond to the No. 1 Evaporation Pond. Both ponds use spray systems to enhance evaporation. A total of 96 million gallons (average rate of 183 gpm) of water was delivered to the evaporation pond system in 2006 in addition to the 16 million gallons (average rate of 30 gpm) of precipitation added to the pond. The net evaporation from the evaporation system averaged 173 gpm in 2006, compared to 183 gpm in 2005.

Water quality samples results collected from the No. 1 and No. 2 Large Evaporation Ponds, the East Collection Pond (E COLL POND), and the West Collection Pond (W COLL POND) are presented in Tables B.3-1 and B.3-2 of Appendix B.

2.1.8 IRRIGATION

Three irrigation systems were operated in 2006 (see Figure 2.1-1 for locations). The 150-acre center pivot in the southwest quarter of Section 33 and 120 acres of flood irrigation in the eastern half of Section 34 were used for the seventh full irrigation season; the 100 acre center pivot in Section 28 was operated for the fifth irrigation season. The 24 acre flood irrigation in the eastern portion of Section 33 was not operated in 2006. Figure 4.1-1 shows the supply wells for these irrigated areas. In 2006, wells 482, 483, 490, 491, 496, 498, 538, 540, 541, 631, 647, 648, 649, 653, 657, 658, 687, 862, 863, 865, 866, 996, CW29, CW44, CW45 and CW53 were used for the irrigation supply to the areas in Sections 33 and 34. Water from these supply wells is collected into a common piping system and is used on only one irrigation area at a time. Wells 634, 659, 881, 886, 890, M9, MO, MQ, MR and MS were used to supply the Section 28 pivot irrigation. These three areas were successfully irrigated during the entire 2006 growing season with 3 hay cuttings produced from the center pivot irrigation within Sections 28 and 33. Only 2 hay cuttings were produced from Section 34 flood. A total of 837 Ac-Ft of water was applied to the four irrigation areas in 2006. The average uranium and selenium concentrations applied to the Section 33/34 fields were 0.29 and 0.07 mg/l for uranium and selenium respectively in 2006 while the average values for Section 28 were 0.35 and 0.08 mg/l, respectively.



SCALE: 1"=1600'
C:\PROJECTS\ 2007-06\ 07COLL-INJ -jf
DATE: 03/27/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 2.1-1. LOCATION OF PRESENT INJECTION AND COLLECTION SYSTEMS WITH START OF OPERATION DATES

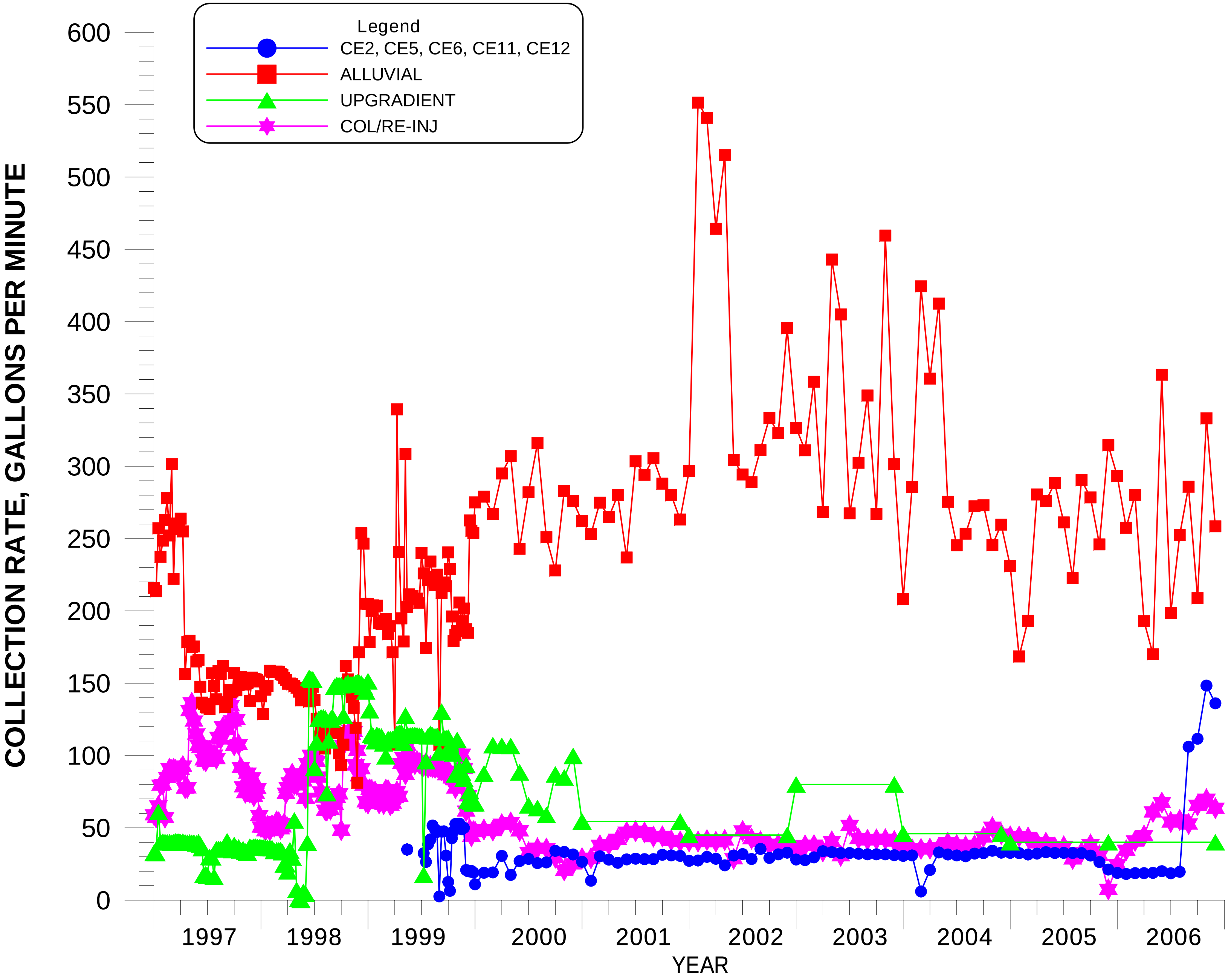


FIGURE 2.1-2. AVERAGE MONTHLY COLLECTION RATES FOR THE ALLUVIAL AND UPPER CHINLE AQUIFERS.

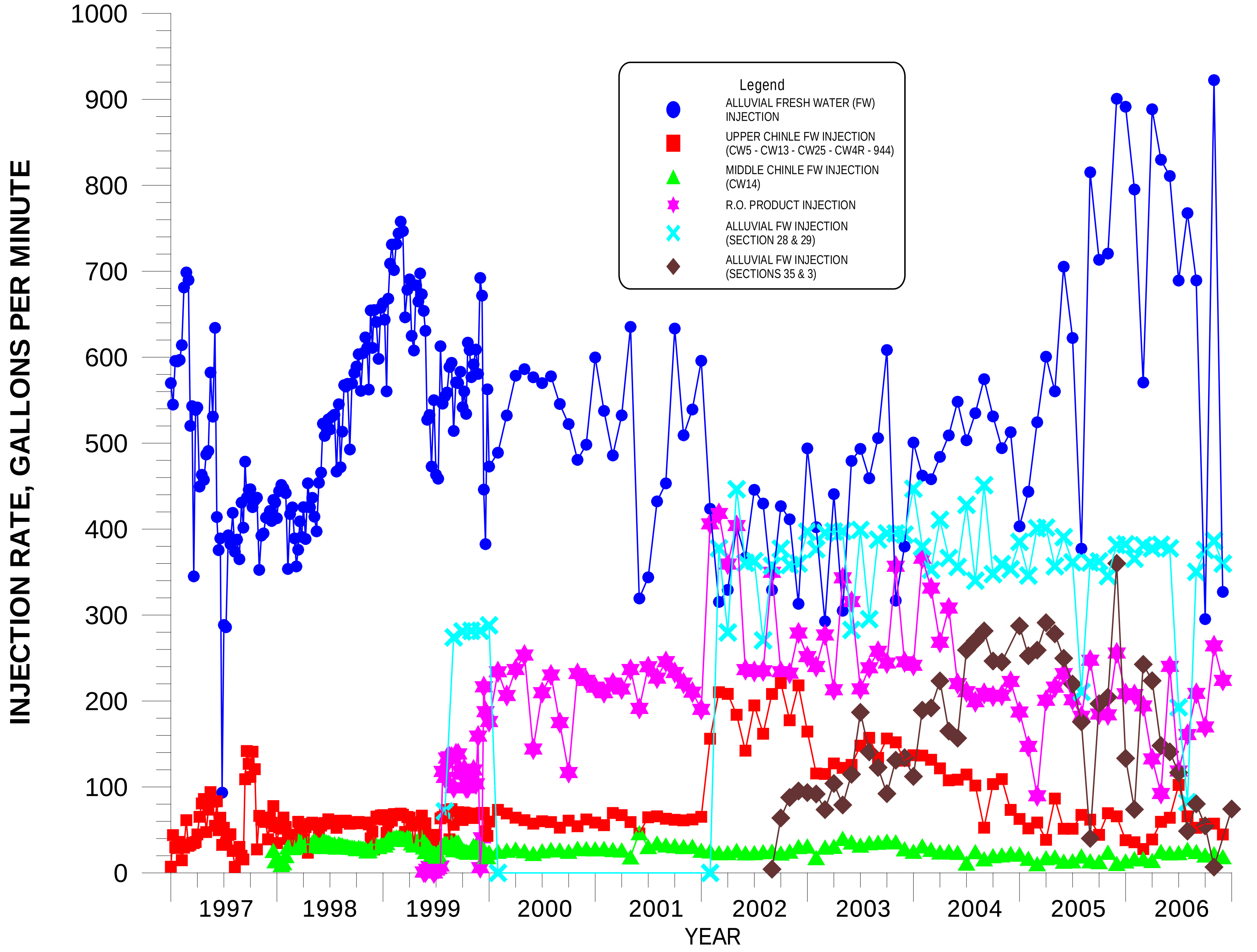


FIGURE 2.1-3. AVERAGE MONTHLY INJECTION RATES FOR THE ALLUVIAL UPPER CHINLE AND MIDDLE CHINLE AQUIFERS.

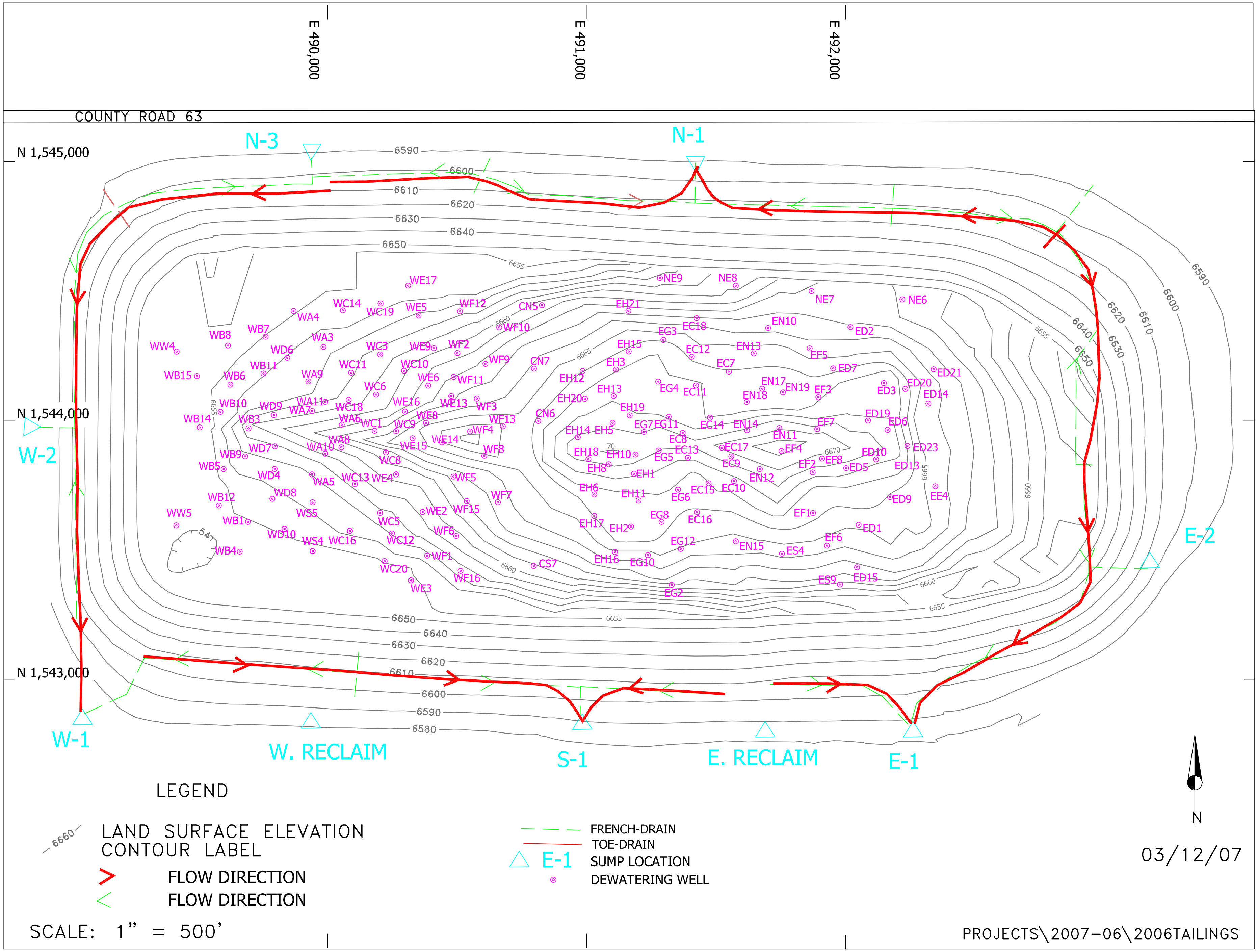


FIGURE 2.1-4. LOCATIONS OF TAILINGS DEWATERING WELLS, TOE DRAINS AND SUMPS

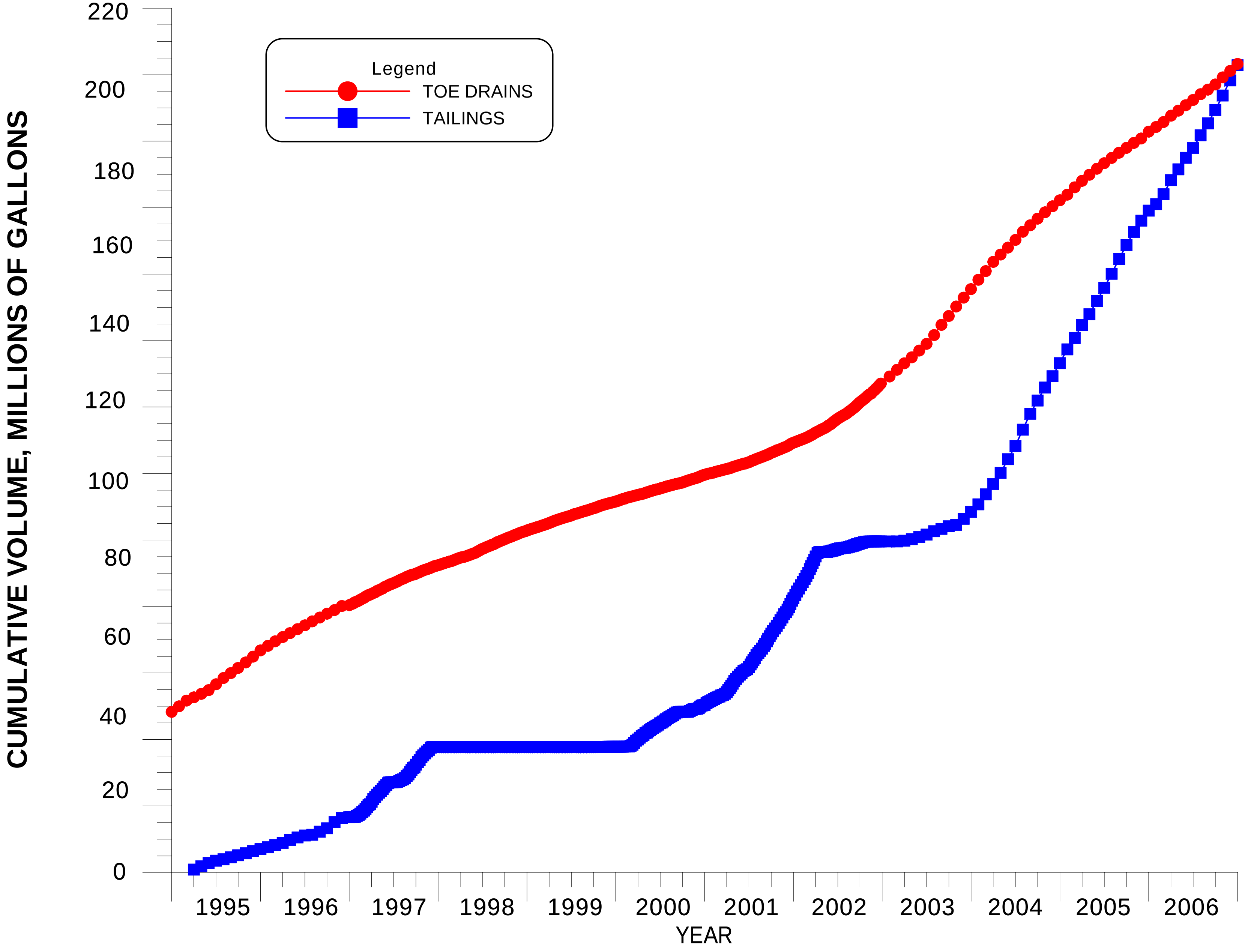


FIGURE 2.1-5. CUMULATIVE VOLUME OF COLLECTION WATER FROM TAILINGS DEWATERING WELLS AND TOE DRAINS.

TABLE 2.1-1. QUANTITIES OF CONSTITUENTS COLLECTED.

YEAR	SOURCE	TOTAL VOLUME	SULFATE (SO4)		URANIUM (U)		MOLYBDENUM (MO)		SELENIUM (SE)	
		PUMPED	CONC.	AMT.	CONC.	AMT.	CONC.	AMT.	CONC.	AMT.
		(GAL)	(MG/L)	(LB)	(MG/L)	(LB)	(MG/L)	(LB)	(MG/L)	(LB)
1978	G.W.	27670033	5200	1200620	35	8081	40	9236	2	462
1979	G.W.	46371629	5200	2012095	35	13543	40	15478	2	774
1980	G.W.	39385860	5200	1708978	35	11503	40	13146	2	657
1981	G.W.	91613183	5200	3975155	35	26756	40	30578	2	1529
1982	G.W.	159848025	5200	6935910	35	46684	40	53353	2	2668
1983	G.W.	167018540	5200	7247043	35	48778	40	55746	2	2787
1984	G.W.	203258522	5200	8819519	35	59362	40	67842	2	3392
1985	G.W.	194074421	5200	8421015	35	56680	40	64777	2	3239
1986	G.W.	199326030	5200	8648886	35	58214	40	66530	2	3326
1987	G.W.	180881740	5200	7848576	35	52827	40	60374	2	3019
1988	G.W.	166460826	5200	7222843	35	48615	40	55560	2	2778
1989	G.W.	175780800	5200	7627243	35	51337	40	58671	2	2934
1990	G.W.	164378919	5200	7132508	35	48007	40	54865	2	2743
1991	G.W.	171497720	5200	7441397	35	50086	40	57242	2	2862
1992	G.W.	128398849	4925	5276234	27.2	29134	35.9	38419	1.60	1718
1992	TOE	8544670	12117	864006	53.2	3793	106.5	7595	1.73	123
1993	G.W.	115795020	5011	4841203	28.1	27130	45.4	43885	1.47	1425
1993	TOE	18357680	12117	1856262	53.2	8150	106.5	16315	1.73	265
1994	G.W.	98294087	4423	3624762	26.0	21146	27.3	22349	1.42	1162
1994	TOE	18337680	12117	1854240	53.2	8141	106.5	16299	1.73	264
1995	G.W.	108306398	3256	2942827	16.1	14553	19.2	17355	1.65	1491
1995	TOE	17711370	11370	1680500	54.6	8069	94.4	13952	2.25	332
1995	TAILS	5905740	8191	403680	36.1	1778	89.7	4420	0.15	7
1996	G.W.	122064160	3899	3967919	20.9	21225	26.8	27259	1.92	1950
1996	TOE	15431810	11537	1484295	46.4	5970	105.0	13509	1.29	166
1996	TAILS	9181390	9434	722129	40.2	3077	108.0	8236	0.18	14
1997	G.W.	94465562	4955	3836678	26.9	20892	33.4	25887	3.17	2456
1997	TOE	12029390	11094	1113808	41.8	419	100.0	10040	0.81	81
1997	TAILS	21292900	10284	1827575	45.8	8139	92.4	16420	0.14	25
1998	G.W.	74459130	5088	3161866	29.6	18385	34.8	21625	1.85	1151
1998	TOE	10321780	9870	850257	42.5	3665	95.2	8203	0.73	63
1999	G.W.	117752408	3363	3305027	16.6	16314	14.8	14545	2.06	2024
1999	TOE	8809890	11560	849976	54.3	3993	106.0	7794	0.46	34
1999	TAILS	120550	9420	9478	40.9	41	111.5	112	0.19	0
2000	G.W.	146609842	3358	4108868	18.8	23004	20.6	25206	1.94	2374
2000	TOE	8032870	9734	652590	58.6	3929	118.0	7911	0.34	23
2000	TAILS	12446810	9710	1008685	37.8	3927	127.0	13193	0.30	31
2001	G.W.	144925056	2770	3350438	19.6	23707	21.4	25884	1.65	1996
2001	TOE	9606280	9935	796529	43.1	3455	95.7	7673	0.78	63
2001	TAILS	31465370	8688	2281555	34.6	9086	89.2	23425	0.19	50
2002	G.W.	201357360	2748	4618092	14.9	25040	16.7	28065	1.23	2067
2002	TOE	17975520	9210	1381718	33.4	5011	88.7	13307	0.76	114
2002	TAILS	17817840	7670	1140588	23.5	3495	40.8	6067	0.12	18
2003	G.W.	177727419	2417	3585168	13.8	20470	15.5	22991	0.73	1083
2003	TOE	28418871	9457	2243048	35.6	8444	78.9	18714	4.35	1032
2003	TAILS	8890076	9800	727126	28.0	2078	92.0	6826	0.30	22
2004	G.W.	154422720	2272	2931913	11.3	14633	16.6	21386	0.79	1017
2004	TOE	26720928	8007	1787722	31.9	7115	67.6	15102	2.78	622
2004	TAILS	44745696	6360	2377848	23.1	8637	60.9	22769	0.20	75
2005	G.W.	130810679	2478	2705346	11.8	12883	15.5	16922	0.59	644
2005	TOE	20704320	8228	1421784	43.5	7517	87.5	15120	2.63	454
2005	TAILS	45685786	4389	1673497	18.7	7130	56.3	21467	0.18	69
2006	G.W.	132406109	1990	2199072	9.6	10609	14.3	15802	0.73	807
2006	TOE	20374782	7432	1263796	38.0	6462	76.2	12958	1.09	185
2006	TAILS	43707760	4278	1560550	17.6	6420	51.9	18932	0.14	51
SUM G.W.		3,935,361,047		140,697,202		879,596		1,030,979		56,535
SUM TOE		241,377,841		20,100,531		84,132		184,491		3,821
SUM TAILS		241,259,918		13,732,713		53,808		141,867		362
COMBINED SUM		4,417,998,806		174,530,445		1,017,536		1,357,337		60,717

NOTE: Average concentrations for 1978 to 1991 were used in calculating the quantities of constituents removed.
Concentrations from the collection wells have gradually decreased from 1978 through 1991.
G.W. = Ground water; TOE = Toe drains on edge of tailings; TAILS = Large tailings collection wells

2.2 FUTURE OPERATION

Ground water quality restoration in 2007 will continue as a combination of fresh-water and R.O. product injection to maintain the overall piezometric gradient reversal between the lines of injection (M Line, WR Line, J Line and X Line) and contaminated water collection near the tailings piles. The reverse osmosis (R.O.) plant can be operated at a rate of up to 600 gpm but is projected to operate at an average rate of approximately 400 gpm in 2007 due to present limitations on pond storage capacity. When the plant is operated at full capacity, approximately 440 gpm of R.O. product is produced for injection into the alluvium and approximately 160 gpm of brine reject is discharged to the evaporation ponds. A larger collection rate and use of the very good quality R.O. product for injection will continue to enhance the progress in restoration.

Water collected from the alluvial and Chinle aquifers, where there are relatively low levels of selenium and uranium, will continue to be collected and used for re-injection in the initial phase of restoration of some areas. This re-injection will occur in the alluvium, where concentrations are greater than those of the injected water, until such time as injection with San Andres fresh water or R.O. product water will better complete the restoration. Use of the low-concentration re-injection water will be limited to areas up-gradient of the J, WR and X injection lines. For the purpose of this document, the reversal zone is called the collection area. To date, re-injection has occurred in wells X5 through X27, 1A, C4, D2 through D4 and DAA, DAB, DL, DW, DY, DF, DG, DQ, DX and K and a few tailings wells. Additional wells in this area will be included in the re-injection program in 2007.

Collection from Upper Chinle wells CE2, CE5, CE6, CE11 and CE12 will continue to intercept contaminants in this aquifer. Injection into Upper Chinle wells 944, CW4R, CW5, CW13 and CW25 is planned to continue to control the direction of flow in these areas of the Upper Chinle aquifer.

Injection into well CW14 will be continued in order to build the head in this area of the Middle Chinle aquifer. This will prevent alluvial water from flowing into this portion of the Middle Chinle aquifer.

Irrigation with water from Sections 3, 27, 28, 32, 33 and 35 is planned for the entire growing season in 2007. Irrigation of the 24 acres of flood in Section 33 is also planned for 2007. Fresh-water well injection lines in Section 28 will continue to be utilized in 2007 to restore these areas of low level aquifer contamination. Fresh-water injection will be continued in Sections 35 and 3 in 2007 to complement the use of water for irrigation and assist in final aquifer restoration in this area.

SECTION 3

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

Page Number

FIGURES

TABLES

3.0 SITE STANDARDS AND BACKGROUND CONDITIONS

3.1 ALLUVIAL SITE STANDARDS

Ten water-quality site standards (U, Se, Mo, SO4, Cl, TDS, NO3, Ra226 + Ra228, Th230 and V) have been set for the alluvial aquifer at the Homestake site by the United States Nuclear Regulatory Commission (NRC). These site standards were established on the basis of defining the full range in alluvial aquifer background concentration values for these constituents. The procedures used to establish background concentrations and subsequent setting of appropriate site standards were reviewed and approved by NRC and the New Mexico Environmental Department (NMED). Adjustment of the site standards to account for the full range in natural background concentrations was important in assuring that appropriate site standards are set in relation to background concentrations.

The NRC alluvial aquifer site standards are shown in Table 3.1-1 and will be incorporated in the New Mexico Environment Department (NMED) DP-200 Discharge Plan when the permit is renewed. Alluvial site standards for the Grants Project are applicable at three points of compliance; these Point of Compliance (POC) wells are S4, D1, and X (see Figure 2.1-1 for locations).

TABLE 3.1-1. GRANTS PROJECT ALLUVIAL SITE STANDARDS.

Constituents	NRC License Site Standards	New Mexico Site Standards*
Uranium	0.16	0.16
Selenium	0.32	0.32
Molybdenum	0.10	1.0**
Vanadium	0.02	-----
RA-226 + Ra-228	5	30
Thorium-230	0.3	-----
Sulfate	1500	1500
Chloride	250	250
TDS	2734	2734
Nitrate	12	12

NOTE: All concentrations are in mg/l except: Ra-226 + Ra-228 and Th-230, which are in pCi/l.
* = Pending NMED renewal of DP-200 Discharge Plan
** = New Mexico Irrigation Standard

3.2 ALLUVIAL BACKGROUND WATER QUALITY

Background alluvial aquifer water-quality conditions at the Grants site are those found up-gradient or north of the Large Tailings Pile. These conditions in the San Mateo alluvium have been monitored since 1976. Ground water flow in the San Mateo alluvial system is generally from the northeast to the southwest (see Figure 3.2-1). Lobo Creek joins San Mateo Creek in the Felice Acres subdivision area at the Homestake site, although neither creek has a well-defined surface flow channel in this area. Surface-water flow occurs only after extreme precipitation events and then generally only within some reaches of the channels.

Hydrographs of up-gradient wells that have been used to define the background hydrologic conditions of the alluvial aquifer are presented in Section 4 of this report. Wells DD, P, P1, P2, P3, P4, Q, R and ND, located just north of the Large Tailings Pile, have been used for monitoring alluvial background water quality and are called the near up-gradient wells.

Additional alluvial background wells located farther north have also been sampled (wells 914, 920, 921, 922 and 950, see Figure 3.2-1 for locations). Information gathered from these wells has been used to further define the piezometric surface and water-quality conditions in the up-gradient alluvial aquifer, and these wells are referred to as the far up-gradient wells.

Figure 3.2-1 presents the latest 2006 water-quality data for the near and far-up-gradient alluvial background wells for six parameters: sulfate, uranium, selenium, chloride, TDS and nitrate. Sulfate concentrations for the wells varied from 989 to 1460 mg/l in 2006. Uranium concentrations also varied over a large range, from 0.02 to 0.20 mg/l. Selenium concentrations also varied over a large range, from 0.04 to 0.57 mg/l.

Chloride concentrations in water sampled in 2006 from the up-gradient wells ranged from a low of 60 mg/l to a high of 109 mg/l. The TDS concentrations varied from 1710 to 2660 mg/l. Nitrate concentrations also vary naturally over a large range in the alluvial aquifer, and ranged from 2.1 to 18.0 mg/l in 2006. Molybdenum concentrations in all up-gradient wells were less than 0.03 mg/l. Concentration versus time plots for up-gradient wells DD, ND, P, P2, Q and R are presented later in Section 4.3 of this report.

The 95th percentile of the historical background alluvial aquifer water-quality data for the Grants site was defined by ERG (1999a and 1999b). These documents, along with a hydrologic support document (Hydro-Engineering 2001c), were submitted to the NRC in 2001 with a request to adjust some of the site standards based on the full range of natural background conditions. The 95th percentile was used to define the upper limit of background. Background data for a ten year period of 1995 through 2004 was used to determine the 95th percentile values. A tabulation of alluvial standards for the Grants Project area constituents is included in Figure 3.2-1.

The range in concentrations in the alluvial up-gradient wells[1] sampled during 2006 is tabulated in Table 3.2-1 with a list of the site standards. These site standards were established from data from the near up-gradient wells[2]. The following table (Table 3.2-1) summarizes the 2006 data for near up-gradient and far up-gradient wells for constituents of concern where site standards have been set for the Grants site.

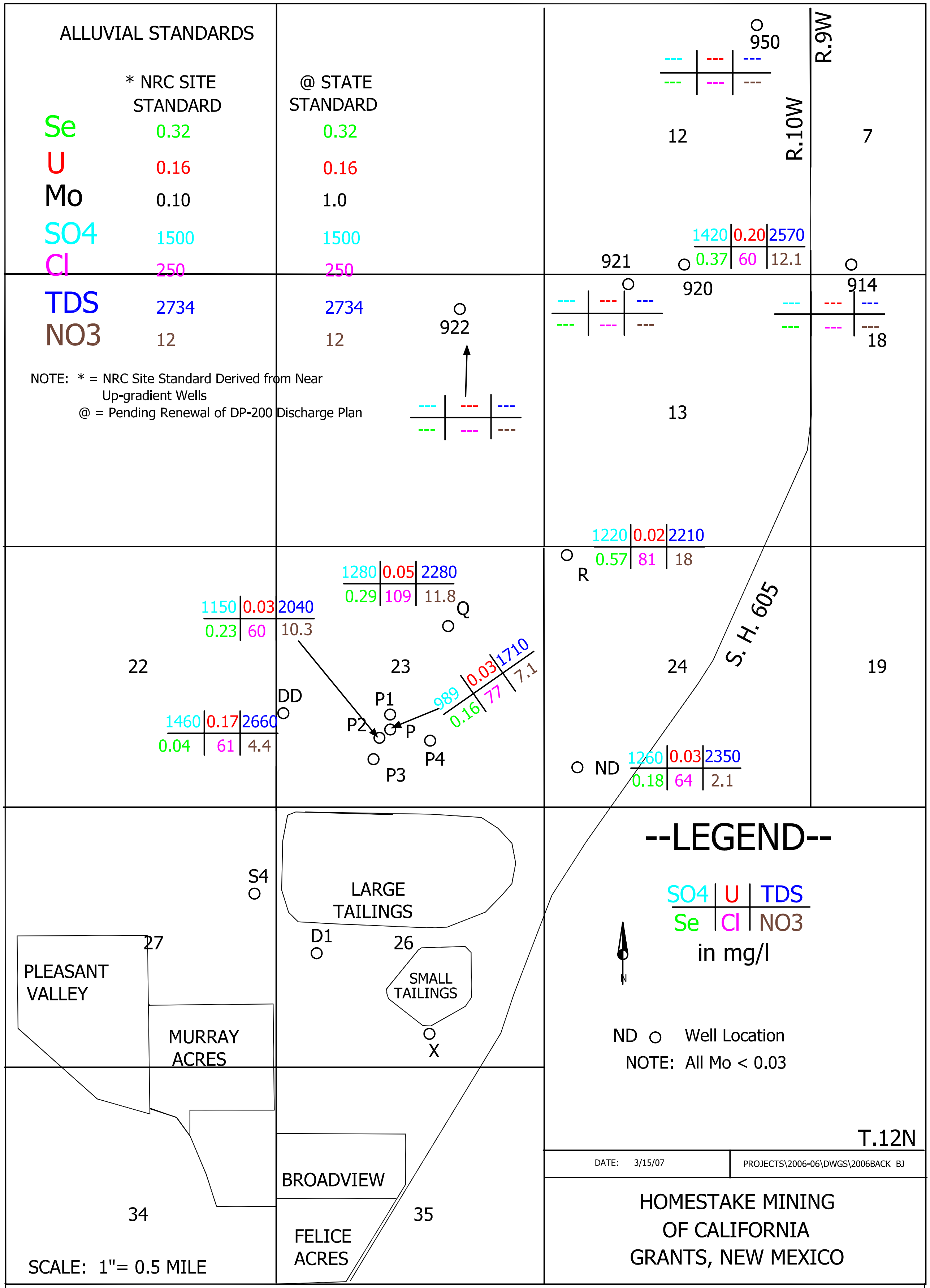
TABLE 3.2-1 2006 BACKGROUND WELL DATA - ALLUVIUM

	PARAMETERS						
	Se	U	Mo	SO4	Cl	TDS	NO_3
NRC Site Standard	0.32	0.16	0.10	1500	250	2734	12
Pending NMED Standard	0.32	0.16	1.0	1500	250	2734	12
NEAR UP-GRADIENT WELLS							
DD	0.04	0.17	<0.03	1460	61	2660	4.4
ND	0.18	0.03	<0.03	1260	64	2350	2.1
P	0.16	0.03	<0.03	989	77	1710	7.1
P2	0.23	0.03	<0.03	1150	60	2040	10.3
Q	0.29	0.05	<0.03	1280	109	2280	11.8
R	0.57	0.02	<0.03	1220	81	2210	18.0
FAR UP-GRADIENT WELLS							
920	0.37	0.20	<0.03	1420	60	2570	12.1

[1] Wells DD, ND, P, P2, Q, R and 920

[2] Wells DD, ND, P, P1, P2, P3, P4, Q and R

As shown by the present data, there is a large natural areal variability in the background water quality. Therefore, the cumulative database for all of the background wells more adequately defines background concentrations, and this expanded database, based on near-up-gradient wells, was utilized in the two ERG (1999a and 1999b) studies. Naturally occurring background variation is illustrated by the uranium concentrations, where concentrations in 2006 varied from 0.02 to 0.20 mg/l.



ALLUVIAL STANDARDS

	* NRC SITE STANDARD	@ STATE STANDARD
Se	0.32	0.32
U	0.16	0.16
Mo	0.10	1.0
SO4	1500	1500
Cl	250	250
TDS	2734	2734
NO3	12	12

NOTE: * = NRC Site Standard Derived from Near Up-gradient Wells

@ = Pending Renewal of DP-200 Discharge Plan

--LEGEND--

SO4	U	TDS
Se	Cl	NO3

in mg/l

ND ○ Well Location

NOTE: All Mo < 0.03

DATE: 3/15/07

PROJECTS\2006-06\DWGS\2006BACK BJ

HOMESTAKE MINING
OF CALIFORNIA
GRANTS, NEW MEXICO

SCALE: 1"= 0.5 MILE

FIGURE 3.2-1. ALLUVIAL BACKGROUND GROUND WATER QUALITY, 2006

3.3 CHINLE SITE STANDARDS

Eight water quality site standards (U, Se, Mo, SO4, Cl, TDS, NO3, and V) have been set for the Chinle aquifers at the Homestake site by the NRC. The site standards were also established to be based on the full range of background concentration in the Chinle aquifers for these constituents. The procedures accepted and used to establish these site standards can result in a minor amount of observed natural concentrations exceeding the site standards.

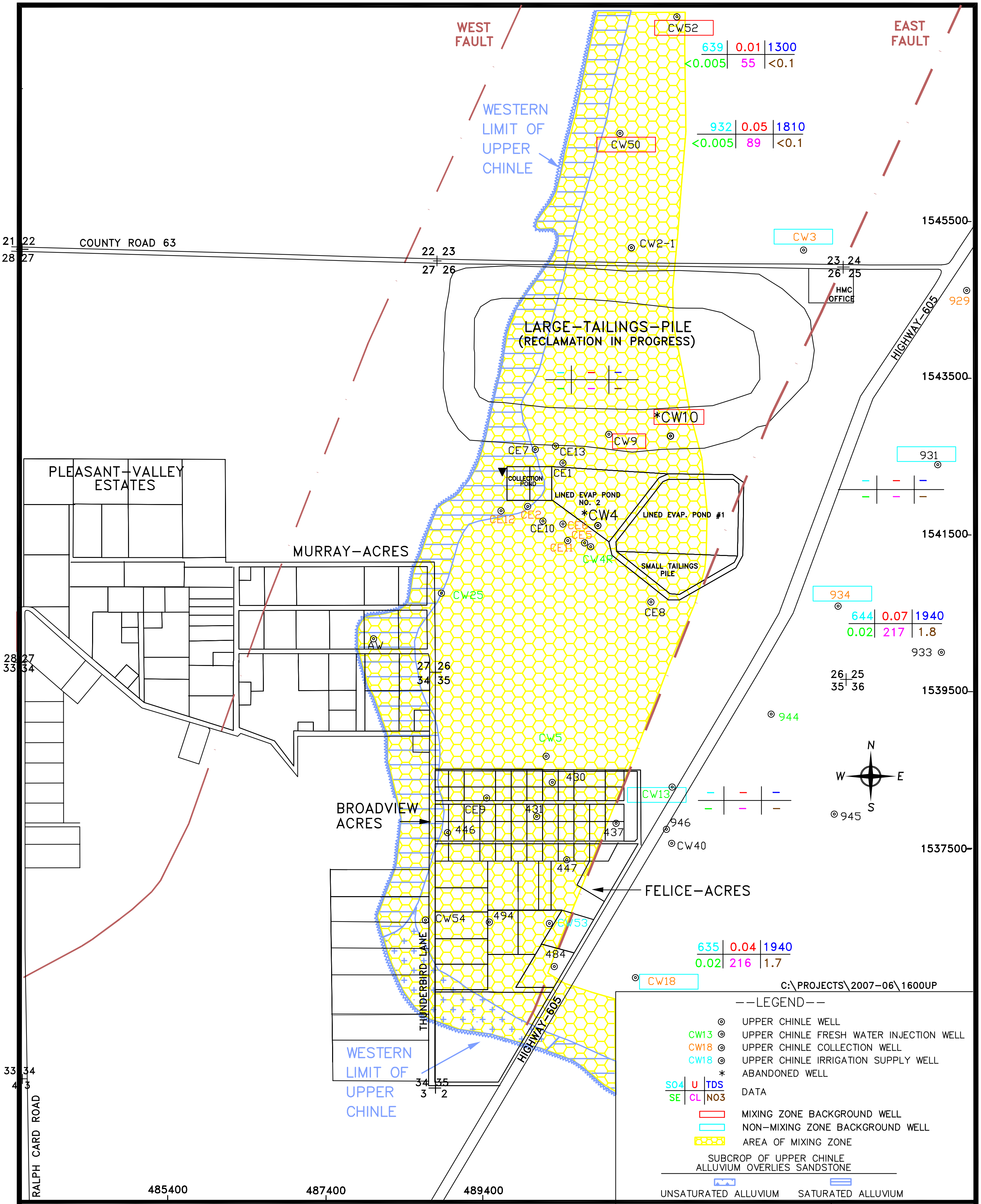
Site standards have been established for the Chinle mixing zone, Upper Chinle non-mixing zone, Middle Chinle non-mixing zone and Lower Chinle non-mixing zone. Separate site standards exist for each of these four Chinle aquifer zones. Figures 3.3-1 through 3.3-3 show the Upper Chinle, Middle Chinle and Lower Chinle aquifers with the portion of the aquifer in the mixing zone and the remainder that is in the non-mixing zone. Figure 3.3-1 presents the location of the Upper Chinle mixing-zone (yellow pattern) and the wells used in the analysis of background values. Wells within the mixing zone that were used in the mixing-zone background calculations have a red box around the well name. Wells used to define the Upper Chinle non-mixing zone are indicated by a light blue rectangular box around their name.

Table 3.3-1 below presents the Chinle site standards for the four Chinle aquifer zones.

TABLE 3.3-1. GRANTS PROJECT - CHINLE SITE STANDARDS

	CONSTITUENT, concentrations in mg/l except Thorium-230 and Ra226+Ra228 in pCi/l.									
Aquifer Zone	Selenium	Uranium	Molybdenum	TDS	Sulfate	Chloride	Nitrate	Vanadium	Thorium-230	Ra-226 +Ra-228
Chinle Mixing	0.14	0.18	0.10	3140	1750	250	15	0.01	*	*
Upper Chinle Non-Mixing	0.06	0.09	0.10	2010	914	412	*	0.01	*	*
Middle Chinle Non-Mixing	0.07	0.07	0.10	1560	857	250	*	*	*	*
Lower Chinle Non-Mixing	0.32	0.03	0.10	4140	2000	634	*	*	*	*

* Background water quality analyses for constituent determined that site standard is not necessary.



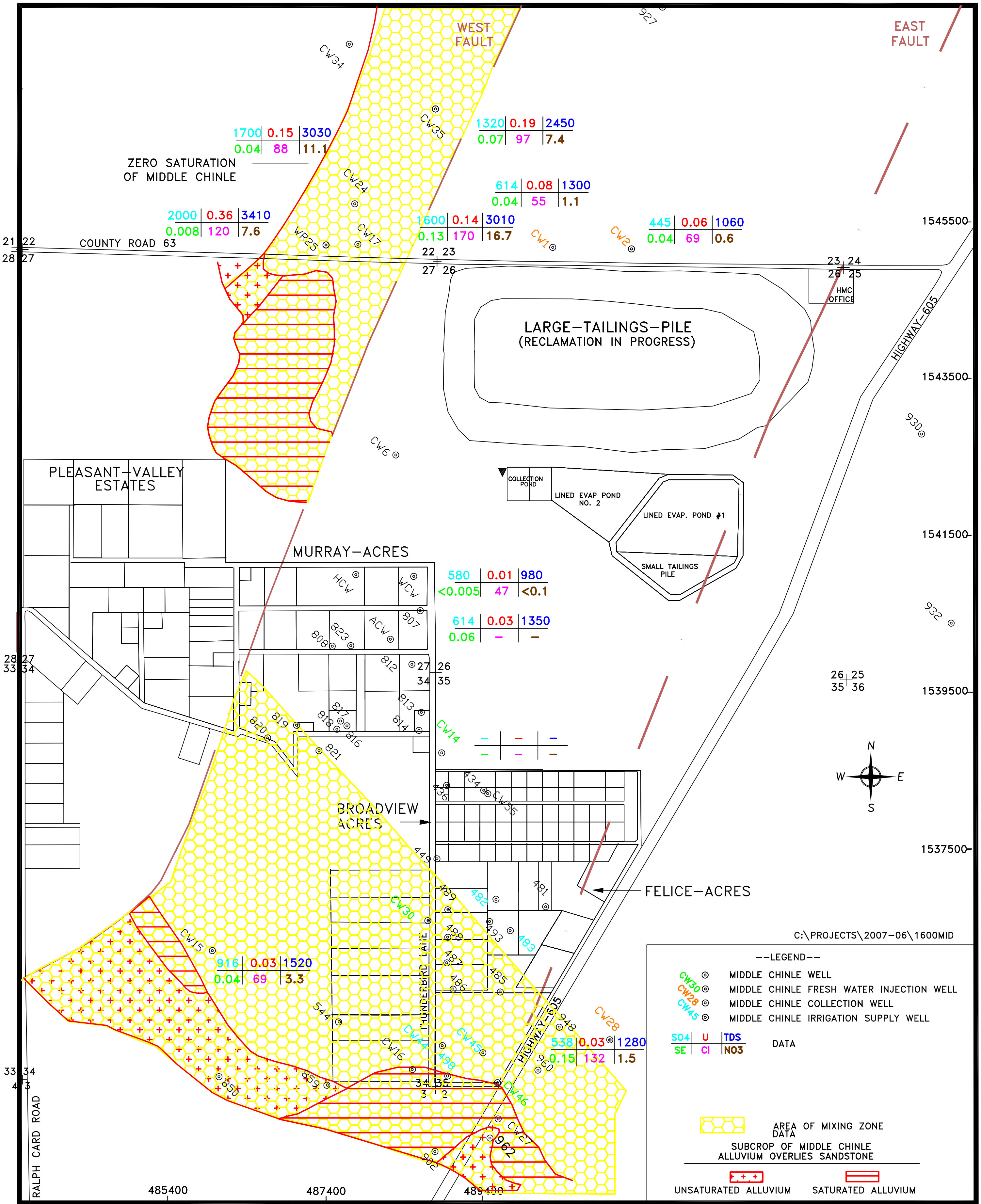
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

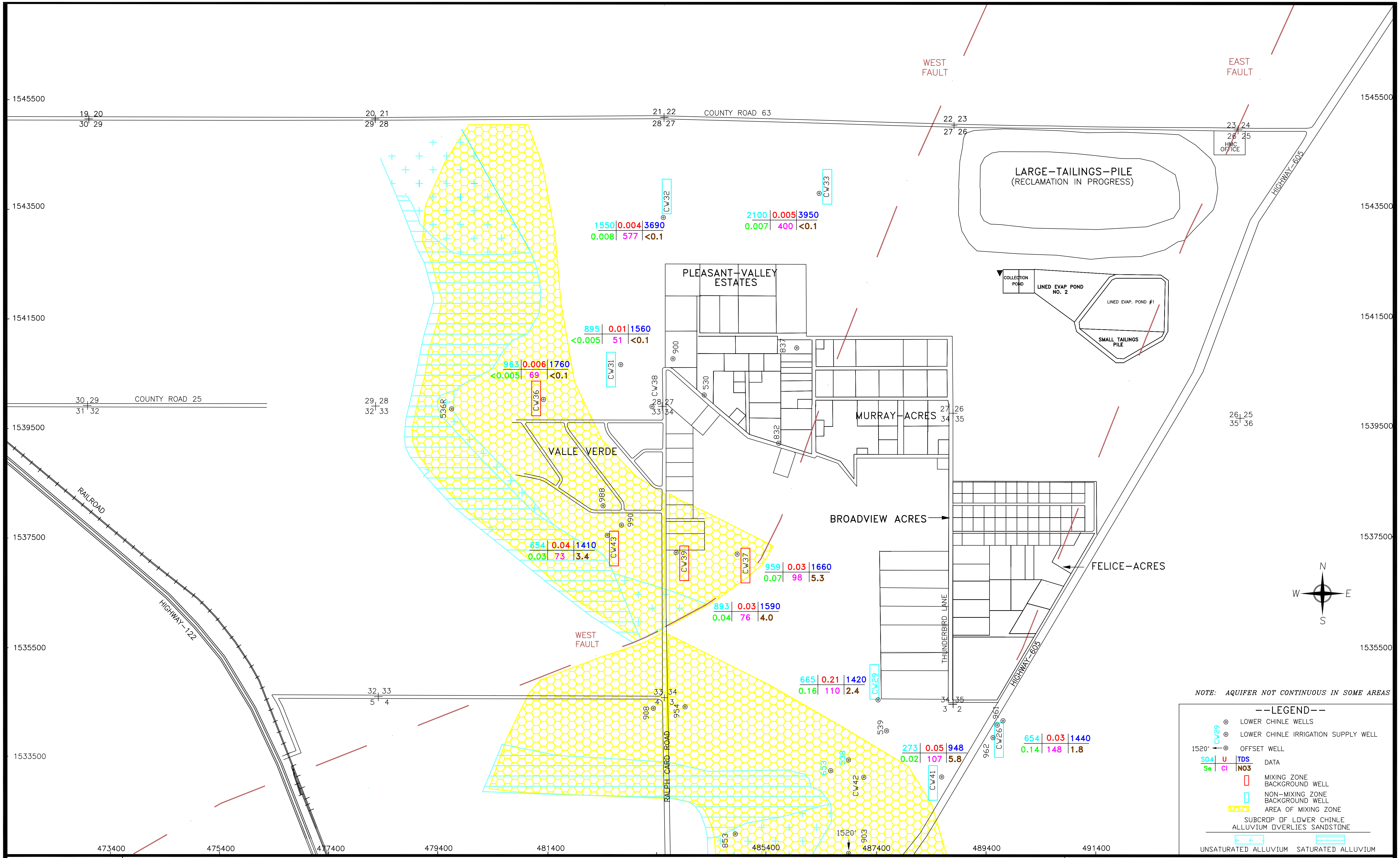
FIGURE 3.3-1. UPPER CHINLE MIXING ZONE AND 2006 GROUND WATER QUALITY

SCALE: 1"=1600'

PAGE: 3.3-2



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 03/08/07
FIGURE 3.3-2. MIDDLE CHINLE MIXING ZONE AND 2006 GROUND WATER QUALITY	SCALE: 1"=1600'
	PAGE: 3.3-3



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600LOW
DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 3.3-3. LOWER CHINLE MIXING ZONE AND 2006 GROUND WATER QUALITY

3.4 CHINLE BACKGROUND WATER QUALITY

The Chinle aquifer background water quality has been analyzed and presented to the NRC and NMED in Hydro-Engineering 2003b and ERG 2003. The background concentrations for the mixing zones in the Upper, Middle and Lower Chinle aquifers were grouped together to develop a mixing zone background level. The non-mixing zone water chemistry data for each of the three aquifers were analyzed separately. Table 3.4-1 presents the site standards that resulted from the analysis and related discussions with NRC and NMED concerning agreement on the standards. Figure 3.4-1 also presents the 2006 data collected from these background wells for selected parameters of sulfate, uranium, TDS, selenium, chloride and nitrate. This data is presented in a format similar to that used for the alluvial background data. The data for well CW3 is not presented on Figure 3.3-1 because concentrations are not natural in this well after 2001. Table 3.4-1 also presents the 2006 data for the Chinle mixing zone background wells and the Upper, Middle and Lower Chinle non-mixing zone wells separated by their category.

The Middle Chinle mixing zone is presented in Figure 3.3-2 with a yellow pattern. Five wells are shown in the Middle Chinle mixing zone, and these wells were included with the Upper Chinle and Lower Chinle mixing-zone wells in establishing the mixing-zone background values. Six wells shown on Figure 3.3-2 were used to establish the Middle Chinle non-mixing zone background levels. This figure also presents the 2006 data collected for these background wells.

Figure 3.3-3 presents the Lower Chinle mixing zone in a yellow pattern. This figure also shows which wells were used to establish the background concentrations in the mixing and non-mixing zones of the Lower Chinle aquifer. The 2006 data for the Lower Chinle wells previously used to define background concentrations are also presented on Figure 3.3-3. The Lower Chinle non-mixing zone background levels are somewhat problematic, because the water quality tends to deteriorate naturally as the ground water moves down-gradient. Therefore, the expected natural water quality deterioration is a function of the distance from the Lower Chinle subcrop beneath the alluvium to a particular point within the aquifer.

TABLE 3.4-1. 2006 BACKGROUND WELL DATA - CHINLE

	CONSTITUENT, concentrations in mg/l							
Aquifer Zone	Selenium	Uranium	Molybdenum	TDS	Sulfate	Chloride	Nitrate	Vanadium
CHINLE SITE STANDARDS								
Chinle Mixing	0.14	0.18	0.10	3140	1750	250	15	0.01
Upper Chinle Non-Mixing	0.06	0.09	0.10	2010	914	412	*	0.01
Middle Chinle Non-Mixing	0.07	0.07	0.10	1560	857	250	*	*
Lower Chinle Non-Mixing	0.32	0.03	0.10	4140	2000	634	*	*
CHINLE MIXING ZONE WELLS								
CW50	<0.005	0.05	<0.03	1810	932	89	<0.1	<0.01
CW52	<0.005	0.01	<0.03	1300	639	55	<0.1	<0.01
CW15	0.04	0.03	<0.03	1520	916	69	3.3	-
CW17	0.13	0.14	<0.03	3010	1600	170	16.7	-
CW24	0.04	0.15	<0.03	3030	1700	88	11.1	-
CW35	0.07	0.19	<0.03	2450	1320	97	7.4	-
CW25	0.01	0.36	<0.03	3410	2000	120	7.6	-
CW36	<0.005	0.006	<0.03	1760	963	69	<0.1	-
CW37	0.07	0.03	<0.03	1660	959	98	5.3	-
CW39	0.04	0.03	<0.03	1590	893	76	4	-
CW43	0.03	0.04	<0.03	1410	654	73	3.4	-
UPPER CHINLE NON-MIXING ZONE WELLS								
934	0.02	0.07	<0.03	1940	644	217	1.8	-
CW18	0.02	0.04	<0.03	1940	635	216	1.7	-
MIDDLE CHINLE NON-MIXING ZONE WELLS								
ACW	0.06	0.03	<0.03	1350	614	-	-	-
CW1	0.04	0.08	<0.03	1300	614	58	1.1	-
CW2	0.04	0.06	<0.03	1060	445	69	0.6	-
CW28	0.15	0.03	<0.03	1280	538	132	1.5	-
WCW	<0.005	0.004	<0.03	980	580	47	<0.1	-
LOWER CHINLE NON-MIXING ZONE WELLS								
CW26	0.14	0.03	<0.03	1440	654	148	1.8	-
CW29	0.16	0.21	<0.03	1420	665	110	2.4	-
CW31	<0.005	0.01	<0.03	1560	895	51	<0.1	-
CW32	0.008	0.004	<0.03	3690	1550	577	<0.1	-
CW33	0.007	0.005	<0.03	3950	2100	400	<0.1	-
CW41	0.02	0.05	<0.03	948	273	107	5.8	-

* Background water quality analyses for constituent determined that site standard is not necessary.

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

Page Number

FIGURES

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 4

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

TABLES

4.0 ALLUVIAL AQUIFER MONITORING

This section presents 2006 monitoring results for the alluvial aquifer. The alluvial aquifer immediately underlies the Grants Project site and is therefore the most important ground water system at the Grants Project site. The section describing well completions is presented first, and is followed by several report sections presenting water-level and water-quality information.

4.1 ALLUVIAL WELL COMPLETIONS

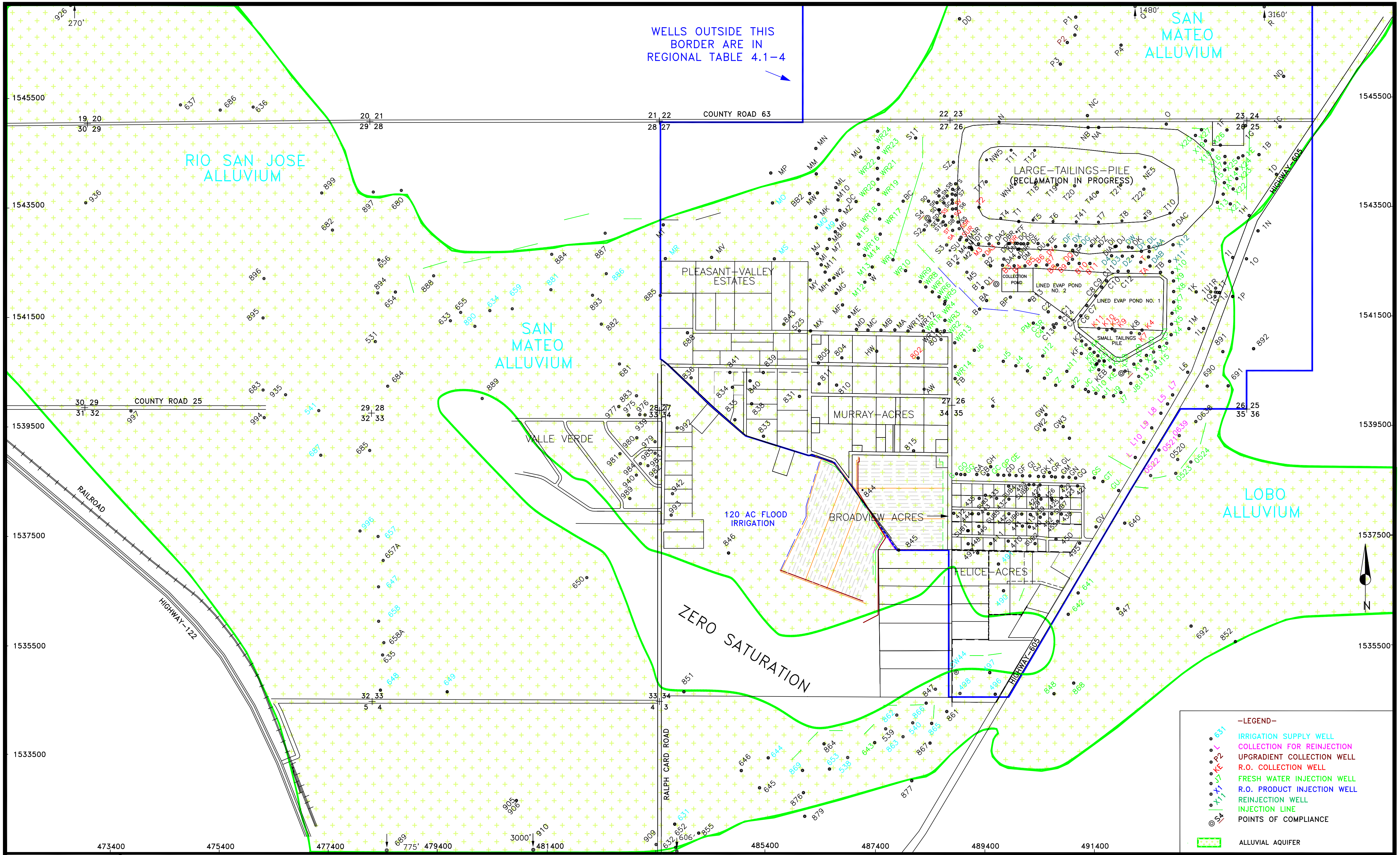
Alluvial well M16 was drilled in 2006. No additional injection lines were installed in 2006. Operational status and other characteristics of the new and previously installed alluvial wells and injection lines are discussed in this section. Figure 4.1-1 shows the locations of the alluvial wells near the Homestake Grants Project with the operational status for each well and injection line for 2006. Black wells were used only for monitoring in 2006 and black injection lines were not injected into in 2006. This figure is plotted at a scale of 1" = 1600'.

Alluvial wells 914, 920, 921, 922 and 950 are located outside of the area presented on Figure 4.1-1. These upgradient wells are shown on Figure 3.2-1 in the previous report section.

The currently active injection and collection wells are labeled with different colors on Figure 4.1-1 so that they can be distinguished from monitoring wells. This figure also shows the wells used for irrigation water supply during the 2006 irrigation season. Table 4.1-1 presents basic well data for alluvial wells located on the Grants Project that have been used to define the alluvial ground water hydrology. Many additional alluvial wells outside of the Grants Project have also been used for that purpose. The basic well data table presents the location, well depth, casing diameter, water-level information, depth to the base of the alluvium and casing perforation intervals for each well.

Table 4.1-2 presents the same type of basic well data for alluvial wells in the Broadview and Felice Acres subdivisions. These two subdivisions are located just south of the Homestake property. Figure 4.1-1 shows the locations of the subdivision wells. Table 4.1-3 presents similar basic data for alluvial wells located in Murray Acres and Pleasant Valley Estates subdivisions.

Table 4.1-4 presents data for regional wells located outside of the subdivisions and the immediate Homestake property around the tailings sites (Grants Project). Wells outside the area delineated with a heavy blue boundary line on Figure 4.1-1 are considered to be regional wells; data for these wells are presented in this table. Over 100 alluvial wells are included on the regional table, which brings the total number of alluvial wells used to characterize this site to more than 400. The wells are listed in numerical or alphabetical order based on their well names.



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\06-CO-IN-IRR
DATE: 02/15/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.1-1. ALLUVIAL WELL LOCATIONS

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

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)						
0690	1540279	493465	65.0	5.0	11/21/2006	35.27	6546.79	2.5	6582.06	55	6524.6 A	25-65	22.2
0691	1540276	493860	66.0	5.0	11/21/2006	42.19	6546.62	2.9	6588.81	55	6530.9 A	26-66	15.7
0891	1540904	493751	54.0	5.0	2/21/2005	30.58	6550.54	2.1	6581.12	50	6529.0 A	24-54	21.5
0892	1540954	494317	50.0	5.0	12/19/2002	41.96	6545.25	2.0	6587.21	42	6543.2 A	30-50	2.0
1A	1543790	493768	61.0	5.0	3/10/2003	39.40	6546.03	2.9	6585.43	47	6535.5 A	39-51	10.5
1B	1544502	494412	51.8	5.0	10/30/2001	38.70	6545.72	1.5	6584.42	50	6532.9 A	20-50	12.8
1C	1545018	494799	52.9	5.0	9/28/2000	43.26	6544.73	2.5	6587.99	43	6542.5 A	34-54	2.2
1D	1544142	494752	42.9	5.0	12/3/2005	26.42	6559.55	2.2	6585.97	40	6543.8 A	22-42	15.8
1E	1544481	494116	51.4	5.0	12/10/2006	23.03	6561.28	2.1	6584.31	43	6539.2 A	34-54	22.1
1F	1544952	493831	61.8	5.0	12/10/2005	44.16	6543.22	1.8	6587.38	54	6531.6 A	30-60	11.6
1G	1545034	494170	57.5	5.0	12/10/2006	40.76	6546.31	2.3	6587.07	48	6536.8 A	35-55	9.5
1H	1543363	494266	55.4	5.0	1/8/2004	55.00	6531.39	1.8	6586.39	43	6541.6 A	25-55	0.0
1I	1542627	493928	49.8	5.0	12/3/2005	35.55	6562.80	1.3	6598.35	35	6562.1 A	27-47	0.7
1J	1541986	493695	50.3	5.0	12/2/2005	35.40	6550.00	1.8	6585.40	40	6543.6 A	30-50	6.4
1K	1541992	493275	55.6	5.0	12/2/2005	34.38	6549.75	1.0	6584.13	47	6536.1 A	30-55	13.6
1L	1541256	493416	53.4	5.0	11/21/2005	25.90	6552.71	3.1	6578.61	40	6535.5 A	35-55	17.2
1M	1541327	493133	43.1	5.0	12/2/2005	23.00	6552.53	1.3	6575.53	33	6541.2 A	25-54	11.3
1N	1543100	494396	45.6	5.0	11/21/2005	33.62	6557.23	2.4	6590.85	25	6563.5 A	15-44	0.0
1O	1542592	494175	44.0	5.0	11/21/2005	43.85	6551.09	0.8	6594.94	29	6565.1 A	14-34	0.0
1P	1541902	493924	52.8	5.0	11/21/2005	35.14	6550.10	2.6	6585.24	35	6547.6 A	20-40	2.5
1Q	1541993	493619	56.0	5.0	5/20/2003	33.82	6549.29	1.8	6583.11	56	6525.3 A	36-56	24.0
1R	1542071	493623	56.0	5.0	5/20/2003	34.92	6551.07	1.5	6585.99	56	6528.5 A	36-56	22.6
1S	1541920	493614	56.0	5.0	7/11/2005	34.48	6547.51	1.8	6581.99	56	6524.2 A	36-56	23.3
1T	1541990	493656	56.0	5.0	5/20/2003	33.80	6551.11	1.8	6584.91	56	6527.1 A	36-56	24.0
1U	1542001	493542	44.2	4.0	5/21/2003	35.10	6551.12	3.2	6586.22	---	--- A	-	---
* A1	1542365	491539	55.6	4.0	1/12/1994	45.29	6527.86	1.1	6573.15	55	6517.1 A	37-57	10.8
* A2	1542356	491539	46.4	4.0	12/23/1991	47.98	6608.85	1.1	6656.83	---	--- A	27-47	---
B	1541684	489311	68.6	4.0	12/27/2006	38.26	6532.64	2.4	6570.90	60	6508.5 A	49-69	24.1
B1	1542071	489370	90.9	5.0	12/20/2006	20.76	6635.69	0.6	6656.45	82	6573.9 A	62-82	61.8
B2	1542475	489515	83.0	5.0	10/17/2006	42.08	6616.31	2.0	6658.39	72	6584.4 A	55-75	31.9
B3	1542480	489731	87.0	5.0	8/28/2006	51.18	6607.80	2.6	6658.98	77	6579.4 A	58-78	28.4
B4	1542471	489942	88.8	5.0	6/15/2005	43.52	6618.85	7.4	6662.37	82	6573.0 A	63-83	45.9
B5	1542474	490141	91.0	5.0	6/15/2005	41.25	6623.83	1.4	6665.08	81	6582.7 A	62-82	41.2
B6	1542478	490341	90.0	5.0	12/5/2000	48.94	6619.67	2.0	6668.61	80	6586.6 A	63-83	33.1
B7	1542488	490540	87.0	5.0	6/15/2005	39.80	6631.89	2.2	6671.69	77	6592.5 A	53-78	39.4
B8	1542488	490734	87.0	5.0	6/15/2005	40.30	6628.14	2.3	6668.44	77	6589.1 A	53-78	39.0

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)						
B9	1542514	490935	86.0	5.0	6/15/2005	40.03	6628.82	2.2	6668.85	76	6590.7 A	51-78	38.2
B10	1542517	491133	84.8	5.0	6/15/2005	40.38	6536.39	2.3	6576.77	75	6499.5 A	51-78	36.9
B11	1542517	491329	84.9	5.0	9/25/2006	39.86	6626.08	2.2	6665.94	77	6586.7 A	42-80	39.3
B12	1542524	488915	100.0	5.0	12/20/2006	42.72	6530.30	2.2	6573.02	91	6479.8 A	30-100	50.5
B13	1541841	490223	80.0	5.0	12/20/2006	34.56	6535.48	3.1	6570.04	72	6494.9 A	30-80	40.5
BA	1541835	489440	86.0	5.0	12/27/2006	40.61	6530.97	1.7	6571.58	76	6493.9 A	64-78	37.1
BB2	1543791	486213	56.6	4.0	11/15/2002	53.36	6520.44	0.6	6573.80	---	--- A	42-62	---
BC	1543655	487910	82.8	4.0	12/20/2006	42.91	6531.70	2.6	6574.61	75	6497.0 A	63-83	34.7
BP	1541882	489841	85.4	4.0	9/25/2006	39.33	6532.97	3.0	6572.30	75	6494.3 A	40-85	38.7
* C	1541762	490854	79.7	4.0	5/16/1994	41.50	6529.34	0.3	6570.84	75	6495.5 A	59-79	33.8
C1	1541533	490780	76.0	5.0	9/25/2006	31.16	6625.61	0.8	6656.77	67	6589.0 A	41-68	36.6
C2	1541630	490566	76.0	5.0	9/25/2006	26.50	6633.66	0.9	6660.16	66	6593.3 A	42-67	40.4
* C3	1541344	490481	75.0	5.0	6/20/1994	36.20	6628.58	0.9	6664.78	65	6598.9 A	45-67	29.7
C3R	1541338	490472	75.0	5.0	3/7/2002	18.00	6551.29	2.0	6569.29	66	6501.3 A	43-68	50.0
C4	1541348	490675	75.0	5.0	10/2/2000	39.66	6627.10	1.3	6666.76	66	6599.5 A	46-66	27.6
C5	1541344	490869	72.0	5.0	11/7/2005	28.71	6642.43	0.8	6671.14	62	6608.3 A	43-63	34.1
C6	1541533	491142	80.8	5.0	9/27/2006	44.40	6626.51	1.6	6670.91	72	6597.3 A	34-74	29.2
C7	1541734	491280	72.4	5.0	9/27/2006	44.30	6626.21	1.5	6670.51	61	6608.0 A	25-65	18.2
C8	1541906	491415	78.1	5.0	9/27/2006	44.66	6627.14	1.6	6671.80	67	6603.2 A	31-71	23.9
C9	1542075	491545	77.0	5.0	9/27/2006	44.30	6627.12	1.5	6671.42	65	6604.9 A	27-67	22.2
C10	1542182	491629	71.6	5.0	9/27/2006	45.00	6627.39	2.7	6672.39	65	6604.7 A	30-70	22.7
C11	1542376	491844	68.2	5.0	9/27/2006	39.48	6627.12	2.4	6666.60	60	6604.2 A	35-65	22.9
C12	1542375	492029	63.5	5.0	9/27/2006	37.70	6542.85	2.6	6580.55	55	6523.0 A	34-64	19.9
C13	1541394	490655	63.0	5.0	11/9/2005	30.00	6540.01	2.0	6570.01	63	6505.0 A	36-70	35.0
C14	1541413	490713	63.0	5.0	11/9/2005	29.95	6539.74	2.0	6569.69	63	6504.7 A	36-70	35.0
* D	1542127	490118	89.7	4.0	7/28/1986	48.04	6524.85	0.8	6572.89	90	6482.1 A	71-91	42.8
D1	1542140	489615	89.4	4.0	7/24/2006	38.90	6619.33	1.0	6658.23	80	6577.2 A	58-90	42.1
D2	1542641	492107	70.0	5.0	11/29/1999	0.50	6654.72	3.0	6655.22	62	6590.3 A	40-70	64.5
D3	1542646	491917	80.0	5.0	11/29/1999	0.50	6658.51	2.5	6659.01	72	6584.5 A	40-80	74.0
D4	1542652	491724	78.0	5.0	11/29/1999	0.50	6660.62	2.5	6661.12	70	6588.6 A	48-78	72.0
DA	1542864	489488	99.1	5.0	12/4/1997	61.40	6524.15	3.0	6585.55	90	6492.6 A	50-100	31.6
DA2	1542881	489656	82.1	5.0	1/13/1995	51.11	6536.18	2.8	6587.29	83	6501.5 A	64-74	34.7
DA3	1542664	489390	81.0	5.0	8/28/2006	47.38	6526.98	2.6	6574.36	72	6499.8 A	30-81	27.2
DA4	1542598	489756	81.0	5.0	6/26/2002	76.50	6497.47	1.7	6573.97	71	6501.3 A	31-81	0.0
DAA	1542733	492411	62.7	5.0	12/5/2000	2.00	6578.60	2.2	6580.60	54	6524.4 A	30-60	54.2
DAB	1542633	492399	65.1	5.0	12/5/2000	0.50	6579.38	2.3	6579.88	56	6521.6 A	30-60	57.8

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)							
DAC	1543218	492851	67.7	5.0	---	---	---	4.1	6620.36	45	6571.3	A	20-30	---
DB	1542874	489842	73.2	5.0	9/8/1998	66.15	6523.33	0.5	6589.48	---	---	A	55-85	---
DBR	1542877	489855	55.6	5.0	1/25/1995	52.19	6536.97	4.8	6589.16	---	---	A	-	---
DC	1543646	487060	64.1	4.0	12/20/2006	39.00	6532.31	2.7	6571.31	---	---	A	45-65	---
DD	1546989	488943	78.5	4.0	10/24/2006	55.66	6536.93	1.9	6592.59	83	6507.7	A	40-80	29.2
DE	1542877	490193	70.2	5.0	10/5/1998	63.70	6527.65	0.8	6591.35	80	6510.6	A	60-90	17.1
DF	1542839	490869	88.5	5.0	5/23/2002	65.06	6525.53	0.6	6590.59	---	---	A	65-95	---
DG	1542839	491157	88.9	5.0	5/23/2002	59.80	6531.98	0.4	6591.78	---	---	A	65-95	---
DH	1542835	491365	61.7	5.0	12/24/1991	52.65	6538.69	4.8	6591.34	---	---	A	65-95	---
DI	1542821	491788	86.1	5.0	12/9/1997	57.87	6531.75	2.3	6589.62	75	6512.3	A	35-85	19.4
DIA	1542821	491793	---	4.0	12/23/1991	50.41	6543.22	1.4	6593.63	---	---	A	-	---
DJ	1542821	491793	85.7	5.0	8/24/1988	46.87	6542.69	0.7	6589.56	75	6513.9	A	35-85	28.8
DK	1542799	492094	65.4	5.0	12/23/1991	43.58	6542.33	0.7	6585.91	55	6530.2	A	35-55	12.1
DL	1542813	492398	64.4	5.0	12/5/2000	2.00	6582.87	2.9	6584.87	55	6527.0	A	35-55	55.9
DM	1542628	490035	62.8	5.0	12/14/2000	52.00	6523.08	3.0	6575.08	---	---	A	-	---
DN	1542776	490020	66.7	4.0	12/14/2000	51.52	6525.14	3.7	6576.66	---	---	A	-	---
DNR	1542779	490031	79.7	4.0	12/5/2000	51.80	6525.26	3.3	6577.06	---	---	A	-	---
DO	1542874	490049	75.8	5.0	12/5/2000	65.20	6525.13	1.6	6590.33	75	6513.7	A	65-75	11.4
DP	1542754	491012	79.8	5.0	6/26/2002	53.46	6526.25	3.5	6579.71	---	---	A	-	---
DQ	1542592	491006	85.3	5.0	7/11/2002	48.10	6528.33	2.2	6576.43	---	---	A	-	---
DR	1542884	489966	87.8	5.0	12/5/2000	66.05	6524.78	2.7	6590.83	85	6503.1	A	65-85	21.6
DS	1542876	490118	87.0	5.0	8/2/1999	65.22	6523.59	0.9	6588.81	77	6510.9	A	62-77	12.7
DT	1542871	489293	72.3	5.0	12/5/2000	59.80	6524.01	2.7	6583.81	99	6482.1	A	59-99	41.9
DU	1542879	490380	84.6	5.0	7/6/1988	51.56	6539.51	2.9	6591.07	81	6507.2	A	61-81	32.3
DV	1542826	490702	80.0	5.0	8/28/2006	54.64	6530.96	2.9	6585.60	77	6505.7	A	60-80	25.3
DW	1542818	492029	73.4	5.0	12/5/2000	2.50	6586.16	3.6	6588.66	59	6526.1	A	45-60	60.1
DX	1542838	491074	90.0	6.0	8/2/1999	61.80	6530.18	1.0	6591.98	80	6511.0	A	60-90	19.2
DY	1542737	492271	65.7	5.0	12/5/2000	1.50	6579.11	2.3	6580.61	56	6522.3	A	15-65	56.8
DZ	1542834	491501	81.8	5.0	12/27/2006	50.83	6539.70	2.2	6590.53	---	---	A	-	---
E	1540553	490187	61.7	4.0	12/5/2000	2.00	6566.94	1.7	6568.94	60	6507.2	A	44-64	59.7
EE	1542853	490523	91.2	5.0	1/31/1995	45.26	6542.85	0.6	6588.11	80	6507.5	A	50-90	35.3
F	1539908	489554	63.8	4.0	9/14/2006	31.00	6533.82	1.2	6564.82	62	6501.6	A	45-65	32.2
FB	1540417	488857	62.0	4.0	9/11/2006	37.75	6527.91	2.0	6565.66	58	6505.7	A	43-58	22.3
* FF	1542878	490017	---	4.0	6/21/1983	41.08	6535.46	0.2	6576.54	124	6452.3	A	52-132	83.1
G	1538672	488890	78.3	4.0	12/13/2004	4.00	6559.09	2.0	6563.09	75	6486.1	A	50-80	73.0
GA	1538657	489255	---	4.0	12/20/2006	34.20	6528.59	1.8	6562.79	62	6499.0	A	45-65	29.6

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)						
GB	1538654	489456	65.2	4.0	4/3/2000	4.00	6558.99	1.9	6562.99	64	6497.1 A	45-65	61.9
GC	1538650	489654	---	4.0	12/11/2003	33.82	6531.35	2.5	6565.17	78	6484.7 A	60-80	46.7
GD	1538646	489855	---	4.0	12/4/1995	0.50	6565.12	1.8	6565.62	72	6491.8 A	55-75	73.3
GE	1538637	489972	117.0	4.0	12/11/2003	34.61	6531.66	2.4	6566.27	65	6498.9 A	50-120	32.8
GF	1538632	490097	119.2	4.0	12/20/2006	38.64	6527.37	1.8	6566.01	67	6497.2 A	50-120	30.2
GG	1538662	489055	58.7	4.0	4/3/2000	4.00	6559.13	1.8	6563.13	57	6504.3 A	48-68	54.8
GH	1538807	489509	69.2	4.0	12/20/2006	33.75	6529.01	1.3	6562.76	67	6494.5 A	55-65	34.6
GI	1538631	490218	119.0	4.0	4/3/2000	4.00	6561.85	1.5	6565.85	67	6497.4 A	50-120	64.5
GJ	1538629	490382	119.2	4.0	4/3/2000	4.00	6562.15	2.0	6566.15	65	6499.2 A	50-120	63.0
GK	1538622	490482	115.7	4.0	12/20/2006	34.73	6532.03	2.4	6566.76	67	6497.4 A	50-120	34.7
GL	1538614	490701	119.3	4.0	4/3/2000	4.00	6563.15	2.1	6567.15	71	6494.1 A	50-120	69.1
GM	1538605	490824	118.2	4.0	4/3/2000	4.00	6563.65	2.1	6567.65	69	6496.6 A	50-120	67.1
GN	1538602	490944	116.5	4.0	8/21/2006	35.00	6532.97	1.8	6567.97	70	6496.2 A	50-120	36.8
GO	1538663	488973	122.3	4.0	4/3/2000	4.00	6559.00	1.6	6563.00	75	6486.4 A	50-120	72.6
GP	1538649	489752	121.4	4.0	12/5/2000	5.00	6559.87	2.1	6564.87	68	6494.8 A	50-120	65.1
GQ	1538599	491067	70.0	4.0	12/20/2006	0.00	6568.16	0.9	6568.16	71	6496.3 A	50-70	71.9
GR	1538619	490619	85.0	4.0	12/23/1991	36.55	6528.66	1.0	6565.21	75	6489.2 A	50-85	39.5
GS	1538597	491408	86.4	5.0	12/5/2000	33.00	6541.31	2.0	6574.31	80	6492.3 A	50-85	49.0
GT	1538534	491565	84.0	5.0	12/5/2000	8.30	6567.87	2.1	6576.17	76	6498.1 A	60-84	69.8
GU	1538367	491854	80.0	5.0	3/7/2002	15.00	6560.65	2.0	6575.65	73	6500.7 A	60-80	60.0
GV	1537701	491428	83.0	5.0	12/20/2006	49.86	6527.52	2.5	6577.38	74	6500.9 A	62-82	26.6
GW1	1539755	490530	73.0	5.0	12/20/2006	30.91	6534.36	1.0	6565.27	65	6499.3 A	48-73	35.1
GW2	1539471	490497	75.0	5.0	12/20/2006	32.21	6533.87	1.0	6566.08	68	6497.1 A	47-75	36.8
GW3	1539532	490835	72.0	5.0	5/4/1993	34.42	6531.86	1.0	6566.28	62	6503.3 A	45-72	28.6
H	1538703	490582	69.3	4.0	12/23/1991	37.93	6528.65	1.8	6566.58	69	6495.8 A	50-70	32.9
I	1539319	490954	70.0	4.0	6/26/2006	30.83	6536.37	1.6	6567.20	68	6497.6 A	52-72	38.8
J	1540174	491302	65.6	4.0	12/5/2000	6.00	6564.19	3.4	6570.19	56	6510.8 A	46-68	53.4
J1	1540082	491585	57.0	6.0	12/5/2000	18.80	6553.05	3.8	6571.85	55	6513.1 A	50-57	40.0
J2	1540271	491013	58.0	6.0	12/5/2000	26.00	6544.19	2.9	6570.19	55	6512.3 A	50-58	31.9
J3	1540414	490499	70.0	6.0	12/5/2000	27.40	6541.74	2.6	6569.14	66	6500.5 A	43-70	41.2
J4	1540643	489974	80.0	6.0	12/5/2000	18.00	6551.52	3.9	6569.52	68	6497.6 A	40-70	53.9
J5	1540728	489747	65.0	6.0	12/5/2000	10.55	6559.24	2.8	6569.79	61	6506.0 A	50-65	53.2
J6	1540919	489221	67.0	6.0	12/5/2000	7.10	6563.00	3.7	6570.10	65	6501.4 A	48-67	61.6
J7	1540168	491892	61.9	5.0	12/5/2000	19.50	6550.88	2.1	6570.38	53	6515.3 A	40-60	35.6
J8	1540318	492064	63.2	5.0	12/5/2000	23.30	6547.49	2.4	6570.79	52	6516.4 A	35-61	31.1
J9	1540101	491759	68.0	5.0	12/5/2000	24.60	6546.60	2.0	6571.20	58	6511.2 A	36-68	35.4

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)						
J10	1540138	491436	66.0	5.0	12/5/2000	18.00	6552.91	3.5	6570.91	36	6531.4 A	66-	21.5
J11	1540545	490909	66.0	5.0	12/5/2000	12.00	6557.86	2.0	6569.86	55	6512.9 A	36-66	45.0
J12	1540827	490466	70.0	5.0	12/5/2000	18.44	6551.86	3.0	6570.30	60	6507.3 A	40-70	44.6
J13	1540451	492218	55.0	5.0	2/5/2002	4.00	6564.40	1.8	6568.40	46	6520.6 A	15-55	43.8
J14	1540585	492367	55.0	5.0	2/5/2002	12.90	6556.08	1.7	6568.98	44	6523.3 A	15-55	32.8
J15	1540719	492521	55.0	4.0	2/5/2002	3.10	6566.53	2.2	6569.63	46	6521.4 A	15-55	45.1
JC	1540215	491240	60.0	5.0	12/5/2000	22.10	6546.34	1.8	6568.44	50	6516.6 A	35-55	29.7
K	1540730	491590	61.7	4.0	8/12/2002	2.00	6571.51	3.8	6573.51	60	6509.7 A	44-64	61.8
K2	1540736	491587	58.9	4.0	7/15/2005	19.40	6552.81	2.5	6572.21	58	6511.7 A	46-56	41.1
K3	1540744	491571	56.7	2.0	7/15/2005	19.20	6551.47	1.3	6570.67	---	--- A	53-58	---
K4	1541211	492371	86.2	5.0	10/11/2006	62.00	6540.02	2.5	6602.02	80	6519.5 A	65-85	20.5
K5	1541269	491935	86.4	5.0	9/29/2006	56.90	6544.83	2.8	6601.73	80	6518.9 A	55-85	25.9
K6	1540689	491459	58.0	5.0	3/6/2002	13.00	6557.07	2.0	6570.07	---	--- A	33-58	---
K7	1541232	492237	86.0	5.0	9/29/2006	54.30	6547.23	2.0	6601.53	79	6520.5 A	56-86	26.7
K8	1541250	492081	86.0	5.0	9/29/2006	54.70	6545.79	2.0	6600.49	78	6520.5 A	66-86	25.3
K9	1541287	491787	86.0	5.0	9/29/2006	57.00	6543.34	2.0	6600.34	79	6519.3 A	56-86	24.0
K10	1541305	491638	87.0	5.0	9/29/2006	58.20	6542.61	2.0	6600.81	81	6517.8 A	47-87	24.8
K11	1541325	491490	84.0	5.0	10/11/2006	62.30	6538.31	2.0	6600.61	78	6520.6 A	64-84	17.7
KA	1540959	491331	67.8	5.0	8/12/2002	13.00	6559.19	1.9	6572.19	65	6505.3 A	42-72	53.9
KB	1540893	491406	61.8	5.0	8/12/2002	0.60	6571.05	0.8	6571.65	60	6510.9 A	40-70	60.2
KC	1540826	491477	68.6	5.0	8/12/2002	0.50	6569.81	0.7	6570.31	59	6510.6 A	42-72	59.2
KD	1540627	491701	62.1	5.0	8/12/2002	1.10	6569.12	0.6	6570.22	---	--- A	40-70	---
KE	1540566	491776	60.8	5.0	8/12/2002	9.10	6563.18	2.5	6572.28	---	--- A	40-70	---
KEB	1540570	491487	59.9	5.0	11/21/2006	22.48	6547.25	1.5	6569.73	50	6518.2 A	40-60	29.0
KF	1540870	491169	63.5	5.0	11/21/2006	26.35	6543.86	2.2	6570.21	50	6518.0 A	30-60	25.8
KM	1540671	491444	52.4	5.0	3/6/2002	12.20	6557.57	2.2	6569.77	---	--- A	-	---
KN	1540734	491492	50.1	5.0	10/11/2002	8.36	6561.23	2.3	6569.59	---	--- A	-	---
KZ	1541100	491183	58.4	5.0	12/27/2006	29.02	6542.70	1.2	6571.72	---	--- A	-	---
L	1538970	492150	67.0	4.0	10/9/2006	43.67	6531.30	0.8	6574.97	59	6515.2 A	46-66	16.1
L5	1539946	492730	60.2	5.0	10/10/2006	59.00	6517.07	1.3	6576.07	50	6524.8 A	25-55	0.0
L6	1540526	493110	51.1	5.0	10/10/2006	25.70	6548.94	2.1	6574.64	50	6522.5 A	25-55	26.4
L7	1540113	492842	67.8	5.0	10/10/2006	64.70	6511.91	2.3	6576.61	62	6512.3 A	36-66	0.0
L8	1539773	492621	73.9	5.0	10/10/2006	71.00	6505.49	2.1	6576.49	65	6509.4 A	32-72	0.0
L9	1539509	492463	74.9	5.0	10/10/2006	50.42	6526.81	2.2	6577.23	64	6511.0 A	43-73	15.8
L10	1539250	492310	74.2	5.0	10/9/2006	42.00	6534.83	2.0	6576.83	63	6511.8 A	53-73	23.0
M1	1542797	489157	103.4	4.0	1/3/1989	79.80	6505.17	1.5	6584.97	120	6463.5 A	66-106	41.7

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	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
M2	1542785	489159	40.4	4.0	1/20/1995	34.85	6541.41	1.4	6576.26	---	---	A	-	---
M3	1542805	489151	105.3	4.0	8/28/2006	57.00	6519.10	1.0	6576.10	---	---	A	79-99	---
M4	1542804	489134	81.8	5.0	10/31/2000	56.72	6521.54	3.7	6578.26	---	---	A	78-82	---
M5	1542360	489080	92.3	5.0	12/20/2006	44.89	6530.45	3.2	6575.34	84	6488.1	A	60-90	42.3
M6	1543097	486674	110.0	5.0	12/20/2006	64.65	6510.39	2.2	6575.04	65	6507.9	A	60-110	2.5
M7	1542790	486523	83.0	5.0	12/20/2006	59.60	6513.25	2.4	6572.85	71	6499.4	A	63-83	13.8
M8	1542960	486567	83.0	5.0	9/5/2000	33.71	6541.52	2.4	6575.23	57	6515.8	A	53-83	25.7
M9	1543310	486699	103.0	5.0	12/20/2006	65.65	6511.16	3.5	6576.81	78	6495.3	A	63-103	15.8
M10	1543677	486723	88.0	5.0	12/20/2006	53.43	6519.93	2.3	6573.36	86	6485.1	A	58-88	34.9
M11	1542358	486486	118.0	5.0	12/8/2003	53.98	6519.24	3.2	6573.22	109	6461.0	A	58-118	58.2
M12	1542174	487209	124.0	5.0	12/5/2000	3.87	6569.64	2.5	6573.51	118	6453.0	A	57-124	116.7
M13	1542450	487336	117.0	5.0	12/5/2000	29.81	6546.35	3.0	6576.16	108	6465.2	A	57-117	81.2
M14	1542661	487216	117.0	5.0	12/5/2000	29.42	6547.75	2.7	6577.17	109	6465.5	A	57-117	82.3
M15	1542872	487094	102.0	5.0	12/5/2000	3.71	6575.37	3.5	6579.08	93	6482.6	A	52-102	92.7
M16	1543252	485112	93.3	5.0	9/19/2006	66.90	6503.69	1.4	6570.59	100	6469.2	A	60-100	34.5
MA	1541290	487767	85.0	4.0	12/20/2006	45.25	6526.97	1.0	6572.22	85	6486.2	A	70-85	40.8
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
MC	1541304	487264	100.0	4.0	12/20/2006	46.20	6525.86	1.0	6572.06	95	6476.1	A	70-100	49.8
MD	1541311	487050	105.0	4.0	9/5/2000	2.00	6569.46	1.0	6571.46	105	6465.5	A	75-105	104.0
ME	1541537	486934	105.0	4.0	9/5/2000	1.61	6569.31	1.0	6570.92	105	6464.9	A	75-105	104.4
MF	1541757	486808	110.0	4.0	12/20/2006	50.65	6521.63	1.0	6572.28	110	6461.3	A	90-110	60.3
MG	1541972	486694	110.0	4.0	9/5/2000	1.72	6571.36	1.0	6573.08	110	6462.1	A	90-110	109.3
MH	1542208	486569	110.0	4.0	12/20/2006	54.81	6519.11	1.0	6573.92	110	6462.9	A	90-110	56.2
MI	1542486	486413	110.0	4.0	9/5/2000	2.24	6574.03	1.0	6576.27	110	6465.3	A	90-110	108.8
MJ	1542682	486350	60.0	4.0	12/20/2006	54.15	6518.79	1.8	6572.94	60	6511.1	A	40-60	7.6
MK	1543373	486324	57.0	4.5	12/8/2004	60.05	6513.74	1.5	6573.79	92	6480.3	A	-	33.5
ML	1543902	486691	76.0	5.0	12/20/2006	47.70	6525.00	2.3	6572.70	80	6490.4	A	56-76	34.6
MM	1544154	486324	63.0	5.0	9/5/2000	3.46	6573.99	2.4	6577.45	50	6525.1	A	33-63	48.9
MN	1544613	486325	63.0	5.0	12/18/1996	64.15	6513.41	1.9	6577.56	42	6533.7	A	23-63	0.0
MO	1543620	485518	88.0	4.5	12/20/2006	66.20	6506.69	2.0	6572.89	80	6490.9	A	45-85	15.8
MP	1544164	485492	80.0	5.0	12/18/1996	62.66	6511.82	2.1	6574.48	50	6522.4	A	33-63	0.0
MQ	1543173	486326	98.0	5.0	12/20/2006	66.81	6507.49	1.6	6574.30	88	6484.7	A	58-98	22.8
MR	1542609	483574	100.0	5.0	12/20/2006	70.10	6496.16	1.8	6566.26	100	6464.5	A	54-94	31.7
MS	1542607	485570	82.0	5.0	12/20/2006	63.80	6506.87	1.5	6570.67	89	6480.2	A	52-82	26.7
MT	1543221	483531	98.0	4.5	11/14/2006	70.14	6497.29	2.3	6567.43	87	6478.1	A	34-94	19.2
MU	1544461	487143	80.0	5.0	12/20/2006	37.91	6536.28	1.5	6574.19	72	6500.7	A	50-80	35.6

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)						
MV	1542618	484418	105.0	4.5	10/22/1998	65.97	6503.81	1.3	6569.78	95	6473.5 A	75-105	30.3
MW	1543802	486346	85.0	5.0	12/20/2006	68.80	6506.11	1.9	6574.91	83	6490.0 A	35-85	16.1
MX	1541287	486244	103.0	5.0	10/23/2006	54.06	6514.55	1.7	6568.61	94	6472.9 A	63-103	41.6
MY	1542200	486213	112.0	5.0	10/23/2006	59.76	6513.80	3.0	6573.56	102	6468.6 A	72-112	45.2
MZ	1543485	486757	92.0	5.0	12/20/2006	67.75	6508.89	3.0	6576.64	84	6489.6 A	60-92	19.3
N	1545101	489665	92.0	4.0	11/8/2005	49.51	6534.46	0.9	6583.97	80	6503.1 A	54-94	31.4
NA	1545000	491488	91.4	5.0	11/8/2005	53.65	6537.33	1.1	6590.98	80	6509.9 A	50-90	27.4
NB	1545000	491296	96.4	5.0	11/8/2005	49.68	6543.62	3.5	6593.30	80	6509.8 A	50-90	33.8
NC	1545220	491282	95.0	4.0	8/7/2006	49.56	6536.27	0.8	6585.83	85	6500.0 A	65-95	36.2
ND	1545927	494872	70.0	4.0	12/10/2006	47.03	6545.86	1.1	6592.89	65	6526.8 A	50-70	19.1
NE5	1544279	492332	156.8	5.0	12/15/2006	51.20	6615.80	3.2	6667.00	150	--- T	50-110	---
										150	6513.8 A	135-155	102.0
NW5	1544408	489433	149.8	5.0	3/13/2006	56.01	6601.57	2.7	6657.58	155	--- T	39-79	---
										155	6499.9 A	119-159	101.7
O	1545060	492725	69.9	4.0	11/8/2005	46.44	6541.39	1.3	6587.83	77	6509.5 A	40-70	31.9
P	1546691	491058	109.1	4.0	10/17/2006	51.38	6535.88	1.7	6587.26	107	6478.6 A	82-112	57.3
P1	1547017	491060	105.0	6.0	11/28/2000	55.75	6536.72	0.8	6592.47	105	6486.7 A	60-105	50.1
P2	1546555	490912	105.0	6.0	2/21/2006	63.40	6526.39	0.9	6589.79	105	6483.9 A	60-105	42.5
P3	1546159	490785	95.0	5.0	3/16/2006	53.11	6536.84	2.2	6589.95	85	6502.8 A	55-95	34.1
P4	1546504	491899	92.0	5.0	3/16/2006	49.30	6540.22	3.6	6589.52	84	6501.9 A	52-92	38.3
PM	1541426	490292	81.9	4.0	1/12/2004	12.33	6555.09	1.8	6567.42	---	--- A	-	---
Q	1548693	492153	98.3	4.0	10/23/2006	48.60	6545.22	2.3	6593.82	100	6491.5 A	72-102	53.7
R	1550372	494514	85.0	4.0	10/23/2006	42.50	6561.53	0.3	6604.03	95	6508.7 A	60-90	52.8
S	1543871	488816	72.2	4.0	12/20/2006	46.95	6534.22	2.0	6581.17	75	6504.2 A	52-72	30.0
S1	1543288	488401	85.0	2.0	12/27/2006	43.33	6531.86	5.3	6575.19	85	6484.9 A	60-85	47.0
S2	1543127	488299	100.0	3.0	12/27/2006	42.50	6531.22	2.0	6573.72	100	6471.7 A	90-100	59.5
S3	1542857	488714	122.6	5.0	12/20/2006	44.22	6530.56	6.2	6574.78	116	6452.6 A	80-120	78.0
S4	1543344	488359	112.4	5.0	12/20/2006	42.94	6532.35	2.3	6575.29	108	6465.0 A	50-110	67.4
S5	1543269	488923	115.0	5.0	12/27/2006	48.82	6525.87	1.0	6574.69	105	6468.7 A	54-106	57.2
S5R	1543150	488938	115.0	5.0	8/28/2006	51.20	6529.29	1.9	6580.49	109	6469.6 A	55-115	59.7
S6	1543515	488874	113.2	5.0	1/3/2000	55.85	6524.22	1.3	6580.07	105	6473.8 A	55-105	50.5
S7	1543763	488874	97.0	5.0	1/4/1999	57.38	6522.51	1.0	6579.89	82	6496.9 A	40-84	25.6
S8	1543968	488879	43.8	5.0	8/22/1995	43.28	6537.06	1.0	6580.34	40	6539.3 A	12-42	0.0
S11	1544793	488150	76.2	5.0	12/20/2006	31.95	6546.44	1.9	6578.39	70	6506.5 A	48-78	39.9
S12	1543297	488628	93.0	5.0	12/20/2006	48.50	6530.35	2.1	6578.85	80	6496.7 A	53-93	33.6
SA	1543122	488811	123.7	5.0	8/28/2006	56.00	6524.31	1.0	6580.31	115	6464.3 A	100-130	60.0

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)						
SB	1543371	488811	125.0	5.0	12/5/2000	57.43	6523.66	0.9	6581.09	115	6465.2 A	100-130	58.5
SC	1543617	488815	105.4	5.0	12/5/2000	57.11	6521.69	1.2	6578.80	103	6474.6 A	55-105	47.1
SD	1543490	488564	90.1	5.0	12/23/1991	63.14	6515.17	0.6	6578.31	107	6470.7 A	50-110	44.5
SD4	1543497	488556	95.0	5.0	6/1/1993	61.44	6517.33	1.1	6578.77	95	6482.7 A	45-95	34.7
SE	1543301	488550	111.8	5.0	3/19/2001	55.38	6522.61	0.5	6577.99	88	6489.5 A	50-90	33.1
SE4	1543308	488560	105.3	2.0	3/19/2001	53.71	6524.29	---	6578.00	---	--- A	-	---
SM	1543748	488566	86.0	5.0	12/20/2006	43.92	6534.82	0.7	6578.74	---	--- A	-	---
SN	1543752	488716	67.5	4.0	12/20/2006	46.30	6532.96	1.1	6579.26	---	--- A	-	---
SO	1543652	488381	92.3	5.0	12/27/2006	45.71	6533.08	0.6	6578.79	---	--- A	-	---
SP	1543630	488531	94.4	4.0	12/27/2006	45.44	6533.22	2.0	6578.66	---	--- A	-	---
SQ	1543507	488814	95.0	5.0	8/28/2006	68.90	6510.30	0.9	6579.20	95	6483.3 A	55-95	27.0
SR	1543611	488669	95.0	5.0	11/2/1998	58.25	6520.94	0.8	6579.19	95	6483.4 A	50-90	37.6
SS	1543374	488666	101.0	5.0	8/28/2006	50.88	6527.50	1.2	6578.38	90	6487.2 A	51-101	40.3
ST	1543215	488688	97.0	5.0	8/28/2006	48.10	6531.21	2.2	6579.31	96	6481.1 A	55-97	50.1
* SU	1542946	488953	110.0	5.0	9/5/1995	35.60	6542.50	0.7	6578.10	110	6467.4 A	50-110	75.1
SUR	1542991	488968	115.0	5.0	8/28/2006	53.00	6527.72	2.6	6580.72	106	6472.1 A	35-115	55.6
SV	1543676	488813	78.2	6.0	8/28/2006	51.78	6527.47	1.7	6579.25	100	6477.6 A	55-105	49.9
SW	1543783	488812	81.9	6.0	5/10/2005	50.43	6530.86	2.9	6581.29	75	6503.4 A	35-80	27.5
SX	1544510	489025	45.0	5.0	---	---	---	1.0	6581.49	40	6540.5 A	20-40	---
SZ	1544367	488833	62.6	5.0	12/20/2006	36.90	6544.57	2.2	6581.47	60	6519.3 A	40-70	25.3
T	1542536	492260	70.2	4.0	9/14/2005	50.10	6529.13	2.4	6579.23	68	6508.8 A	61-71	20.3
T1	1543285	490027	---	5.0	12/6/2002	102.40	6561.51	1.0	6663.91	161	6501.9 A	121-171	59.6
T2	1543538	489303	186.0	5.0	8/28/2006	125.30	6539.52	1.6	6664.82	180	6483.2 A	100-186	56.3
T4	1543340	489699	205.0	5.0	3/20/2006	78.45	6579.29	2.9	6657.74	175	6479.8 A	145-205	99.5
T5	1543307	490289	182.0	5.0	3/20/2006	119.48	6537.85	3.1	6657.33	151	6503.2 A	122-182	34.6
T6	1543282	490655	160.0	5.0	3/20/2006	122.19	6536.58	3.3	6658.77	156	6499.5 A	130-160	37.1
T7	1543272	491484	160.0	5.0	3/21/2006	120.61	6539.06	2.4	6659.67	142	6515.3 A	130-160	23.8
T8	1543296	491914	162.0	5.0	3/21/2006	123.00	6538.61	2.6	6661.61	158	6501.0 A	132-162	37.6
T9	1543347	492337	141.0	5.0	3/21/2006	96.90	6567.05	3.3	6663.95	138	6522.7 A	121-141	44.4
T10	1543434	492791	148.0	5.0	4/3/2006	103.38	6556.58	2.3	6659.96	142	6515.7 A	108-148	40.9
T11	1544585	489887	193.0	5.0	4/3/2006	123.00	6533.81	2.7	6656.81	160	6494.1 A	113-193	39.7
T12	1544583	490317	200.0	5.0	4/3/2006	82.60	6574.63	2.5	6657.23	170	6484.7 A	120-200	89.9
T17	1544008	489430	183.0	5.0	4/3/2006	124.11	6532.80	2.5	6656.91	170	6484.4 A	143-183	48.4
T18	1543977	490333	195.0	5.0	4/3/2006	130.22	6534.94	2.9	6665.16	162	6500.3 A	115-195	34.7
T19	1543958	4090722	167.0	5.0	4/4/2006	130.14	6537.62	2.5	6667.76	162	6503.3 A	137-167	34.4
T20	1543935	491048	170.0	5.0	4/4/2006	132.86	6537.83	1.5	6670.69	162	6507.2 A	140-170	30.6

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)						
T21	1543951	491882	170.0	5.0	4/5/2006	124.88	6545.12	1.6	6670.00	163	6505.4 A	140-170	39.7
T22	1543876	492311	165.0	5.0	4/3/2006	119.28	6547.91	2.1	6667.19	160	6505.1 A	120-165	42.8
T40	1543819	491466	170.0	5.0	4/5/2006	131.00	6539.27	2.3	6670.27	165	6503.0 A	140-170	36.3
T41	1543278	491079	160.0	5.0	3/21/2006	121.75	6538.21	3.2	6659.96	155	6501.8 A	130-160	36.5
TA	1542471	492426	62.4	5.0	9/25/2006	35.52	6544.78	2.4	6580.30	55	6522.9 A	35-65	21.9
TB	1542351	492616	64.4	5.0	9/26/2006	38.00	6545.57	1.9	6583.57	55	6526.7 A	35-65	18.9
W	1542302	487297	99.3	4.0	12/20/2006	47.95	6524.19	0.3	6572.14	117	6454.8 A	58-118	69.3
W2	1542251	486654	79.1	4.0	3/2/1998	56.21	6515.29	0.9	6571.50	---	--- A	-	---
WN4	1543958	489961	142.4	5.0	3/13/2006	69.36	6593.42	3.0	6662.78	165	--- T	40-100	---
										165	6494.8 A	50-190	98.6
WR1	1541280	488529	---	5.0	6/27/1989	46.54	6521.86	0.8	6568.40	---	--- A	-	---
WR1R	1541302	488536	85.0	5.0	12/5/2000	28.62	6539.85	0.0	6568.47	85	6483.5 A	-	56.4
WR2	1541290	488678	94.1	5.0	12/5/2000	2.52	6566.07	0.9	6568.59	85	6482.7 A	65-95	83.4
WR3	1541490	488671	82.3	5.0	12/5/2000	32.96	6536.58	2.7	6569.54	83	6483.8 A	63-93	52.7
WR4	1541788	488678	62.0	5.0	12/5/2000	1.92	6570.89	0.0	6572.81	---	--- A	-	---
WR5	1541813	488683	72.4	5.0	12/5/2000	38.69	6532.54	0.6	6571.23	80	6490.6 A	60-80	41.9
WR6	1541902	488566	96.8	5.0	12/5/2000	3.04	6569.99	1.3	6573.03	84	6487.7 A	55-85	82.3
WR7	1541997	488456	97.3	5.0	12/5/2000	38.91	6534.82	2.0	6573.73	84	6487.8 A	55-85	47.0
WR8	1542095	488328	110.2	5.0	12/5/2000	38.72	6533.88	0.4	6572.60	100	6472.2 A	50-100	61.7
WR9	1542185	488217	111.3	5.0	12/5/2000	46.82	6526.23	0.8	6573.05	100	6472.3 A	50-100	54.0
WR10	1542389	487961	120.6	5.0	1/29/2003	14.84	6558.35	0.7	6573.19	110	6462.5 A	60-110	95.9
WR11	1542586	487728	120.5	5.0	1/29/2003	14.88	6559.61	0.3	6574.49	110	6464.2 A	60-110	95.4
WR12	1541280	488277	96.7	4.0	12/20/2006	21.75	6546.44	1.1	6568.19	85	6482.1 A	55-85	64.4
WR13	1541068	488861	70.0	5.0	12/5/2000	18.98	6550.19	3.2	6569.17	60	6506.0 A	50-60	44.2
WR14	1540638	488863	70.0	5.0	5/28/2003	15.50	6551.41	2.3	6566.91	61	6503.6 A	50-60	47.8
WR15	1541280	488016	70.0	4.0	5/28/2003	10.90	6560.29	0.0	6571.19	75	6496.2 A	60-75	64.1
WR16	1543051	487495	122.3	5.0	1/29/2003	6.54	6566.24	1.9	6572.78	100	6470.9 A	40-120	95.4
WR17	1543328	487485	124.4	5.0	1/29/2003	2.45	6570.64	2.2	6573.09	75	6495.9 A	40-120	74.7
WR18	1543597	487465	73.6	5.0	1/29/2003	2.97	6569.94	2.2	6572.91	70	6500.7 A	20-70	69.2
WR19	1543873	487458	87.8	5.0	1/29/2003	3.31	6571.62	2.2	6574.93	74	6498.7 A	25-85	72.9
WR20	1544059	487449	102.3	5.0	1/29/2003	3.98	6570.49	2.1	6574.47	80	6492.4 A	42-102	78.1
WR21	1544241	487449	88.9	5.0	1/29/2003	6.28	6569.77	2.1	6576.05	77	6497.0 A	28-88	72.8
WR22	1544434	487462	91.5	5.0	1/29/2003	3.44	6574.45	2.4	6577.89	86	6489.5 A	30-90	85.0
WR23	1544632	487445	94.3	5.0	1/29/2003	1.72	6574.75	2.2	6576.47	77	6497.3 A	32-92	77.5
WR24	1544938	487438	89.2	5.0	1/29/2003	2.04	6586.63	3.0	6588.67	82	6503.7 A	50-90	83.0
X	1540512	491892	50.7	4.0	12/27/2006	24.67	6546.94	1.7	6571.61	---	--- A	-	---

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)						
X1	1540671	492129	54.0	5.0	8/12/2002	7.50	6654.61	3.9	6662.11	47	6611.2 A	37-47	43.4
X2	1540836	492363	53.0	6.0	8/12/2002	2.50	6569.43	1.9	6571.93	45	6525.0 A	40-45	44.4
X3	1540992	492599	52.0	5.0	8/12/2002	2.50	6570.78	2.0	6573.28	42	6529.3 A	32-42	41.5
X4	1541210	492814	54.0	5.0	8/12/2002	13.10	6563.84	3.2	6576.94	45	6528.7 A	37-45	35.1
X5	1541408	492821	44.0	6.0	8/12/2002	7.80	6569.81	3.6	6577.61	35	6539.0 A	24-36	30.8
X6	1541609	492828	46.0	6.0	8/12/2002	8.00	6570.72	3.5	6578.72	35	6540.2 A	22-37	30.5
X7	1541808	492851	56.0	6.0	12/5/2000	8.60	6571.83	3.4	6580.43	45	6532.0 A	32-46	39.8
X8	1542007	492852	61.0	5.0	12/5/2000	13.00	6568.76	3.4	6581.76	51	6527.4 A	32-52	41.4
X9	1542194	492852	61.0	5.0	12/5/2000	27.00	6555.92	3.6	6582.92	51	6528.3 A	24-52	27.6
X10	1542352	492835	61.0	5.0	8/12/2002	4.00	6578.43	3.6	6582.43	53	6525.8 A	30-55	52.6
X11	1542553	492782	57.0	5.0	12/5/2000	0.50	6581.50	3.0	6582.00	53	6526.0 A	17-57	55.5
X12	1542861	492852	57.0	5.0	12/5/2000	0.50	6582.83	3.0	6583.33	53	6527.3 A	17-57	55.5
X13	1543640	493665	56.0	5.0	4/9/2002	40.76	6546.18	2.5	6586.94	51	6533.4 A	16-56	12.7
X14	1544002	493777	56.0	5.0	4/9/2002	39.80	6546.40	2.1	6586.20	49	6535.1 A	16-56	11.3
X15	1544222	493800	57.0	5.0	4/9/2002	40.54	6542.37	2.3	6582.91	51	6529.6 A	17-57	12.8
X16	1544473	493795	47.0	5.0	4/9/2002	40.64	6544.15	2.3	6584.79	47	6535.5 A	22-47	8.7
X17	1544356	493793	55.0	5.0	4/9/2002	41.06	6544.78	3.3	6585.84	48	6534.6 A	35-55	10.2
X18	1544593	493569	57.0	5.0	11/17/2006	26.94	6559.14	2.9	6586.08	49	6534.2 A	37-57	24.9
X19	1544753	493437	63.0	5.0	11/17/2006	32.46	6552.74	4.2	6585.20	56	6525.1 A	33-63	27.7
X20	1544855	493256	71.0	5.0	11/17/2006	40.15	6545.58	5.0	6585.73	64	6516.8 A	31-71	28.8
X21	1543606	493894	55.0	5.0	12/5/2000	38.99	6547.34	2.7	6586.33	51	6532.6 A	35-55	14.7
X22	1543874	493946	56.0	5.0	12/5/2000	39.21	6546.49	2.6	6585.70	50	6533.1 A	36-56	13.4
X23	1544064	494012	56.0	5.0	12/5/2000	38.96	6546.98	2.8	6585.94	47	6536.1 A	36-56	10.8
X24	1544244	494011	56.0	5.0	12/5/2000	39.94	6545.78	2.6	6585.72	46	6537.1 A	36-56	8.7
X25	1544445	494042	53.0	5.0	12/5/2000	39.41	6546.22	2.8	6585.63	46	6536.9 A	33-53	9.3
X26	1544693	493702	53.0	5.0	12/5/2000	35.34	6552.30	2.8	6587.64	43	6541.8 A	33-53	10.5
X27	1544953	493374	71.0	5.0	11/17/2006	39.75	6545.55	6.0	6585.30	64	6515.4 A	31-71	30.2
X28	1540545	491971	56.0	5.0	8/12/2002	8.30	6561.66	2.0	6569.96	48	6520.0 A	16-56	41.7
X29	1540735	492256	51.0	5.0	8/12/2002	4.00	6566.03	2.0	6570.03	43	6525.0 A	11-51	41.0
X30	1540897	492493	51.0	5.0	8/12/2002	3.00	6569.53	2.0	6572.53	43	6527.5 A	11-51	42.0
X31	1541052	492731	51.0	5.0	8/12/2002	8.00	6566.13	2.0	6574.13	44	6528.1 A	11-51	38.0
Y	1541025	491256	60.8	4.0	10/15/2002	15.20	6557.68	2.4	6572.88	57	6513.5 A	54-59	44.2
Z	1540290	490701	73.9	4.0	12/5/2000	5.00	6564.22	0.6	6569.22	68	6500.6 A	60-70	63.6

TABLE 4.1-1. WELL DATA FOR THE HOMESTAKE ALLUVIAL WELLS.

(cont'd.)

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)						

Note: A = Alluvial Aquifer, Base
M = Middle Chinle Aquifer, Top
T = Tailings Aquifer, Base
* = Well Abandoned
? = Uncertain Identity

TABLE 4.1-2. WELL DATA FOR THE ALLUVIAL AQUIFER BROADVIEW AND FELICE ACRES WELLS.

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)						
							Broadview						
0410	1537459	489882	105.0	6.0	5/25/2005	40.47	6519.19	0.0	6559.66	75	6484.7 A	90-105	34.5
0411	1537400	489510	70.0	6.0	8/7/1996	35.10	6524.90	0.0	6560.00	70	6490.0 A	65-70	34.9
0412	1537940	488830	---	6.0	---	---	---	0.0	6561.00	---	--- A	-	---
0413	1537900	490100	---	---	4/27/1994	35.25	6530.75	0.0	6566.00	---	--- A	-	---
0421	1538450	491100	88.0	5.0	1/30/1996	37.58	6534.42	0.9	6572.00	92	6479.1 A	72-102	55.3
0422	1538440	490810	80.0	4.0	4/6/1994	32.82	6537.18	0.0	6570.00	75	6495.0 A	60-80	42.2
0423	1538223	490926	---	---	---	---	---	0.0	6570.00	---	--- A	-	---
0425	1538430	490630	90.0	6.0	4/7/1994	32.42	6534.58	0.0	6567.00	71	6496.0 A	50-90	38.6
0426	1538230	490620	100.0	---	11/10/1981	30.65	6534.35	0.0	6565.00	80	6485.0 A	80-100	49.4
0427	1538450	490410	121.0	6.0	4/12/1994	35.00	6535.00	0.0	6570.00	81	6489.0 A	62-120	46.0
0428	1538367	490435	110.0	4.0	---	---	---	0.0	6570.00	66	6504.0 A	83-104	---
0429	1538210	490430	100.0	6.0	9/1/1995	37.21	6532.79	0.0	6570.00	74	6496.0 A	58-75	36.8
0430	1538469	490300	145.0	---	---	---	---	0.0	6568.00	72	6496.0 A	-	---
										72	6433.0 U	-	---
0431	1538045	490090	130.0	6.0	4/12/1994	35.00	6533.00	0.0	6568.00	60	6508.0 A	125-130	25.0
										60	6450.0 U	125-130	83.0
0432	1538210	489840	---	---	---	---	---	0.0	6565.00	---	--- A	-	---
0433	1538220	489620	90.0	4.0	5/2/1997	36.05	6527.95	1.5	6564.00	75	6487.5 A	58-84	40.5
0435	1538220	489300	85.0	6.0	3/25/2003	34.48	6526.52	1.3	6561.00	85	6474.7 A	-	51.8
0438	1537854	490840	120.0	4.0	---	---	---	0.0	6571.00	105	6466.0 A	70-100	---
0439	1537940	490490	97.0	4.0	8/7/1996	39.80	6527.20	0.0	6567.00	75	6492.0 A	77-97	35.2
0440	1537700	490230	---	---	---	---	---	0.0	6566.00	---	--- A	-	---
0441	1537720	490090	116.0	6.0	1/30/1995	35.19	6530.81	0.0	6566.00	78	6488.0 A	106-116	42.8
0442	1537940	489840	100.0	4.0	8/7/1996	37.15	6527.85	0.0	6565.00	80	6485.0 A	70-100	42.8
0443	1537940	489280	---	4.0	---	---	---	0.0	6561.00	75	6486.0 A	60-80	---
0444	1537940	489180	80.0	4.0	5/18/1994	28.84	6532.16	0.0	6561.00	---	--- A	-	---
0445	1537720	489300	108.0	6.0	---	---	---	0.0	6561.00	79	6482.0 A	75-105	---
0446	1537830	488960	110.0	6.0	9/8/1983	41.28	6518.72	0.0	6560.00	60	6500.0 A	60-95	18.7
										60	6500.0 U	60-95	18.7
0447	1537490	490480	142.0	6.0	4/11/1985	41.18	6526.82	0.0	6568.00	80	6488.0 A	120-142	38.8
										80	6430.0 U	120-142	96.8
0448	1537400	489100	---	---	---	---	---	0.0	6561.00	---	--- A	-	---
0450	1537448	490763	---	6.0	1/25/1995	42.29	6528.71	0.0	6571.00	85	6486.0 A	70-105	42.7
* 0451	1537700	490600	---	---	---	---	---	0.0	0.00	---	--- A	-	---
0452	1537880	490420	100.0	4.0	8/7/1996	41.20	6525.80	0.8	6567.00	85	6481.2 A	40-100	44.6

TABLE 4.1-2. WELL DATA FOR THE ALLUVIAL AQUIFER BROADVIEW AND FELICE ACRES WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	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
0453	1538375	490300	110.0	4.0	7/1/2002	34.93	6533.07	0.9	6568.00	80	6487.1 A	60-110	46.0
* 0454	1537920	489025	---	4.0	---	---	---	0.0	0.00	---	--- A	-	---
0455	1537804	490737	0.0	---	---	---	---	---	---	---	--- A	-	---
CW55	1538283	489471	360.0	6.0	12/12/2006	32.40	6531.76	2.3	6564.16	80	6481.9 A	-	49.9
										80	6301.9 C	-	229.9
SUB1	1537620	489100	---	4.0	10/18/2006	38.30	6522.70	0.0	6561.00	---	--- A	-	---
SUB2	1537392	490370	---	4.0	5/4/2004	40.10	6527.47	0.0	6567.57	---	--- A	-	---
SUB3	1538280	489420	84.0	6.0	10/26/2006	31.98	6525.09	0.0	6557.07	72	6485.1 A	56-72	40.0
SUB4	1538440	489840	100.0	4.0	9/21/1978	49.11	6515.89	0.0	6565.00	78	6487.0 A	60-85	28.9
SUB5	1537940	489470	86.0	4.0	---	---	---	0.0	6562.31	66	6496.3 A	55-80	---
SUB6	1537940	490090	82.0	4.0	---	---	---	0.0	6566.00	80	6486.0 A	52-82	---
SUB7	1537940	490630	98.0	4.0	---	---	---	0.0	6568.00	85	6483.0 A	78-98	---
SUB8	1538450	490210	150.0	5.0	---	---	---	0.0	6568.00	72	6496.0 A	60-90	---
SUB9	---	---	---	---	---	---	---	0.0	0.00	---	--- A	-	---
						Felice Acres							
0481	1538350	490180	320.0	4.0	---	---	---	0.0	6568.00	110	6458.0 A	270-310	---
										110	6298.0 M	270-310	---
0482	1536981	489579	260.0	5.0	12/18/2006	38.30	6524.36	0.0	6562.66	80	6482.7 A	220-260	41.7
										80	6352.7 M	220-260	171.7
0483	1536586	489753	280.0	5.0	10/11/2006	44.64	6518.02	0.0	6562.66	40	6522.7 A	-	0.0
										40	6497.7 U	-	20.4
										40	6326.7 M	270-300	191.4
0490	1536553	489752	63.0	4.0	10/11/2006	47.90	6514.52	0.0	6562.42	75	6487.4 A	20-80	27.1
0491	1537031	489658	63.0	4.0	12/18/2006	40.15	6522.47	0.0	6562.62	40	6522.6 A	30-63	0.0
0492	1537220	489280	60.0	4.0	4/12/2006	35.46	6525.22	1.2	6560.68	55	6504.5 A	40-60	20.7
0495	1537400	497100	---	---	---	---	---	0.0	6571.00	---	--- A	-	---
0496	1534650	489603	93.0	5.0	8/14/2006	59.68	6502.84	1.6	6562.52	86	6474.9 A	53-93	27.9
0497	1535039	489503	94.0	5.0	8/14/2006	77.24	6485.38	2.0	6562.62	89	6471.6 A	64-94	13.8
0498	1534661	488953	150.0	6.0	8/14/2006	135.60	6424.99	2.0	6560.59	80	6478.6 M	130-150	0.0
										80	6478.6 A	70-110	0.0
CW44	1535048	488891	208.0	6.0	12/18/2006	64.00	6496.74	2.5	6560.74	94	6464.2 A	-	32.5
										94	6428.2 M	69-208	68.5

Note: A = Alluvial Aquifer, Base
M = Middle Chinle Aquifer, Top
T = Tailings Aquifer, Base
* = Well Abandoned
? = Uncertain Identity

ABLE 4.1-3. WELL DATA FOR THE ALLUVIAL AQUIFER MURRAY ACRES AND PLEASANT VALLEY WELLS

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)						
							Murray						
* 0801	1541020	488600	100.0	4.0	7/15/2004	39.20	6528.53	0.0	6567.73	85	6482.7 A	80-100	45.8
0801R	1541096	488431	90.0	5.0	11/4/2004	41.01	6528.04	3.0	6569.05	82	6484.1 A	60-90	44.0
0802	1540765	488277	98.0	6.0	12/18/2006	74.55	6488.17	2.0	6562.72	81	6479.7 A	75-81	8.4
0803	1540800	487430	---	6.0	9/19/1983	84.86	6476.14	0.0	6561.00	85	--- C	85-180	---
										85	6476.0 A	85-180	0.1
0804	1540790	486790	137.0	6.0	11/28/2006	47.00	6515.00	0.0	6562.00	85	6477.0 A	125-136	38.0
0805	1540818	486241	140.0	5.0	10/6/1994	59.34	6507.66	0.0	6567.00	110	6457.0 A	100-140	50.7
0810	1540244	486563	105.0	6.0	---	---	---	0.0	6562.00	81	6481.0 A	75-101	---
0811	1540320	486373	140.0	4.0	---	---	---	0.0	6563.00	110	6453.0 A	100-140	---
0815	1539090	488100	255.0	4.0	5/22/1991	29.14	6526.12	0.0	6555.26	---	--- A	-	---
0844	1538376	487002	75.0	4.0	3/14/2006	35.51	6520.62	1.2	6556.13	70	6484.9 A	35-75	35.7
0845	1537280	487833	65.0	4.0	11/22/2006	35.88	6521.17	1.7	6557.05	55	6500.4 A	45-65	20.8
AW	1540235	488015	156.0	6.0	11/28/2006	36.20	6527.23	0.1	6563.43	63	6500.3 A	-	26.9
										63	6463.3 U	66-155	63.9
HW	1540920	487435	115.0	6.0	11/9/1994	40.00	6517.00	0.0	6557.00	95	6462.0 A	60-94	55.0
							Pleasant Valley						
0525	1541283	486020	0.0	4.5	7/12/2002	55.36	6514.64	---	6570.00	---	--- A	-	---
0688	1541257	483955	105.0	5.0	8/8/2006	64.44	6498.18	2.9	6562.62	95	6464.7 A	65-105	33.5
0831	1540090	486030	---	---	9/6/1983	54.95	6506.05	0.0	6561.00	---	--- A	-	---
0833	1539335	485445	110.0	6.0	12/10/1996	46.61	6511.39	0.0	6558.00	103	6455.0 A	60-90	56.4
0834	1540259	484847	100.0	4.0	---	---	---	0.0	6560.00	80	6480.0 A	60-80	---
0835	1539610	484795	98.0	5.0	5/2/2000	49.74	6509.26	0.0	6559.00	94	6465.0 A	73-94	44.3
0836	1540250	484010	90.0	4.0	---	---	---	0.0	6558.00	80	6478.0 A	65-80	---
0838	1540600	485640	100.0	---	7/22/1995	49.03	6513.97	0.0	6563.00	---	--- A	-	---
0839	1540782	485371	100.0	5.0	12/19/1994	50.00	6510.00	0.0	6560.00	94	6466.0 A	80-96	44.0
0840	1540440	485360	98.0	6.0	9/8/1983	47.32	6513.68	0.0	6561.00	94	6467.0 A	73-94	46.7
0841	1540835	485020	100.0	---	7/22/1995	54.66	6506.34	0.0	6561.00	---	--- A	-	---
0843	1541411	485738	120.0	4.0	6/27/1989	52.40	6517.60	0.0	6570.00	112	6458.0 A	100-110	59.6

Note: A = Alluvial Aquifer, Base
M = Middle Chinle Aquifer, Top
T = Tailings Aquifer, Base
* = Well Abandoned
? = Uncertain Identity

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

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)						
0520	1538934	492935	75.0	5.0	10/2/2006	50.89	6535.13	0.3	6586.02	68	6517.7 A	35-75	17.4
0521	1539104	492588	75.0	5.0	10/2/2006	59.51	6524.93	2.5	6584.44	65	6516.9 A	35-75	8.0
0522	1538640	492437	77.0	5.0	10/2/2006	52.68	6527.85	2.8	6580.53	68	6509.7 A	37-77	18.1
0523	1538680	492896	74.0	5.0	9/10/2002	2.00	6584.79	3.0	6586.79	62	6521.8 A	34-74	63.0
0524	1538889	493173	78.0	5.0	1/28/2003	3.47	6586.88	3.0	6590.35	70	6517.4 A	33-78	69.5
0531	1541086	478262	---	---	10/30/1996	79.24	6474.55	2.0	6553.79	---	--- A	-	---
0532	1518700	482400	214.0	---	---	---	---	0.0	6515.00	---	--- A	-	---
* 0533	---	---	195.0	---	---	---	---	0.0	6520.00	---	--- A	-	---
0538	1533486	486899	170.0	6.0	12/11/2006	81.90	6467.04	2.0	6548.94	95	6451.9 A	50-90	15.1
										95	6413.9 L	130-170	53.1
0539	1534014	487596	210.0	6.0	12/11/2006	79.51	6475.81	2.0	6555.32	100	--- A	80-100	---
										---	--- A	80-100	---
										100	6453.3 A	50-70	22.5
										100	6453.3 A	50-70	22.5
										100	6378.3 L	170-210	97.5
										175	6378.3 L	170-210	97.5
0540	1534125	488091	90.0	6.0	12/18/2006	69.35	6486.56	2.7	6555.91	80	6473.2 A	30-90	13.4
0541	1539831	477236	120.0	5.0	8/30/2006	99.20	6456.42	2.0	6555.62	---	--- A	78-118	---
0631	1532234	483756	118.0	6.0	10/10/2006	106.50	6434.60	2.2	6541.10	109	6429.9 A	58-118	4.7
0632	1531850	483767	110.0	6.0	12/18/2006	91.70	6449.60	1.4	6541.30	102	6437.9 A	70-110	11.7
0633	1541467	479642	83.0	8.0	12/20/2006	74.20	6483.36	0.0	6557.56	95	6462.6 A	11-83	20.8
0634	1541652	480362	103.0	4.5	12/20/2006	71.40	6488.67	2.8	6560.07	95	6462.3 A	80-100	26.4
0635	1535363	478401	63.0	12.0	---	---	---	---	6546.25	---	--- A	4-63	---
0636	1545374	476038	123.0	4.5	11/13/2006	104.18	6469.26	2.3	6573.44	119	6452.1 A	103-123	17.1
0637	1545409	474710	124.0	4.5	11/13/2006	109.94	6465.26	2.5	6575.20	118	6454.7 A	104-124	10.6
0638	1539628	493265	75.0	5.0	10/2/2006	44.10	6541.46	0.0	6585.56	65	6520.6 A	35-75	20.9
0639	1539370	492961	80.0	5.0	10/2/2006	56.14	6531.74	2.5	6587.88	71	6514.4 A	35-80	17.4
0640	1537790	491961	84.0	5.0	12/12/2006	52.40	6527.57	2.2	6579.97	77	6500.8 A	64-84	26.8
0641	1536494	491110	95.0	5.0	1/29/2003	2.23	6571.13	2.5	6573.36	87	6483.9 A	65-95	87.3
0642	1536104	490932	95.0	5.0	1/29/2003	1.69	6570.19	2.4	6571.88	89	6480.5 A	65-95	89.7
0643	1533760	487386	108.0	5.0	10/16/2002	75.89	6475.44	1.5	6551.33	93	6456.8 A	58-108	18.6
0644	1533481	485450	110.0	5.0	12/18/2006	83.80	6460.10	2.0	6543.90	102	6439.9 A	55-110	20.2
0645	1532924	485282	80.0	5.0	12/11/2006	80.00	6463.79	2.5	6543.79	70	6471.3 A	60-80	0.0
0646	1533246	484953	100.0	5.0	10/18/2006	87.08	6456.27	1.5	6543.35	91	6450.9 A	60-100	5.4
0647	1536623	478308	140.0	4.5	12/20/2006	103.55	6448.36	1.4	6551.91	132	6418.5 A	80-140	29.8
0648	1534730	478343	120.0	4.5	12/20/2006	110.05	6437.74	2.0	6547.79	120	6425.8 A	80-120	11.9
0649	1534730	479798	124.0	4.5	12/20/2006	100.21	6443.08	0.3	6543.29	115	6428.0 A	84-124	15.1

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	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
0650	1536779	482135	109.0	4.5	11/14/2006	82.31	6464.80	2.2	6547.11	103	6441.9 A	89-109	22.9
0652	1531170	483779	88.0	5.0	12/18/2006	86.03	6452.12	1.5	6538.15	79	6457.7 A	60-88	0.0
0653	1533283	486570	206.0	6.0	12/18/2006	79.63	6465.34	1.6	6544.97	97	6446.4 A	69-206	19.0
										97	6408.4 L	-	57.0
0654	1541994	478636	120.0	4.5	12/20/2006	73.03	6477.47	1.4	6550.50	106	6443.1 A	60-120	34.4
0655	1541620	479830	96.0	8.0	5/2/2000	75.15	6483.03	---	6558.18	88	--- A	21-84	---
0656	1542578	478333	88.0	8.0	11/16/2005	71.00	6483.07	---	6554.07	88	--- A	6-88	---
0657	1537497	478392	128.0	6.0	12/20/2006	100.15	6451.66	2.2	6551.81	120	6429.6 A	87-128	22.0
0657A	1537083	478412	35.0	12.0	4/13/1999	37.00	6512.00	---	6549.00	---	--- A	17-35	---
0658	1535922	478436	130.0	6.0	12/20/2006	105.20	6444.98	0.4	6550.18	129	6420.8 A	89-130	24.2
0659	1541689	480772	101.0	4.5	12/20/2006	71.30	6488.87	2.0	6560.17	97	6461.2 A	61-101	27.7
0680	1543850	478746	80.0	4.5	10/25/1996	77.39	6481.48	2.0	6558.87	75	6481.9 A	50-80	0.0
0681	1540676	482734	117.0	6.0	9/24/1998	64.18	6496.34	2.1	6560.52	111	6447.4 A	67-117	48.9
0682	1543125	477489	94.0	4.0	11/16/2005	82.82	6471.15	2.8	6553.97	102	6449.2 A	54-94	22.0
0683	1540198	476217	120.0	6.0	10/4/2006	92.20	6463.84	2.0	6556.04	140	6414.0 A	80-120	49.8
0684	1540273	478499	143.0	6.0	10/4/2006	87.91	6465.37	2.0	6553.28	118	6433.3 A	83-143	32.1
0685	1539098	478170	100.0	4.0	10/10/2006	98.76	6457.81	1.7	6556.57	116	6438.9 A	60-100	18.9
0686	1545319	475438	115.0	4.0	11/13/2006	112.47	6466.33	1.8	6578.80	136	6441.0 A	75-115	25.3
0687	1539011	477276	102.0	6.0	10/10/2006	97.80	6458.16	2.2	6555.96	120	6433.8 A	62-102	24.3
0689	1530024	478478	80.0	4.5	7/6/2005	79.12	6462.90	2.6	6542.02	75	6464.4 A	60-80	0.0
0692	1535892	493175	90.0	5.0	11/22/2006	63.60	6521.22	2.5	6584.82	80	6502.3 A	58-90	18.9
0846	1537219	484730	75.0	4.0	8/8/2006	45.11	6503.81	0.8	6548.92	65	6483.1 A	40-65	20.7
0847	1534736	488508	92.0	5.0	11/22/1996	53.88	6504.39	2.6	6558.27	80	6475.7 A	52-92	28.7
0848	1534634	490660	92.0	5.0	1/29/2003	13.22	6559.27	2.7	6572.49	91	6478.8 A	52-92	80.4
0851	1534692	483909	91.0	5.0	11/22/2006	83.81	6462.63	3.3	6546.44	80	6463.1 A	41-91	0.0
0852	1535610	493989	74.0	5.0	11/22/1996	73.26	6516.88	2.5	6590.14	70	6517.7 A	54-74	0.0
0855	1532111	484184	105.0	5.0	10/10/2006	92.60	6448.51	2.1	6541.11	97	6442.0 A	70-105	6.5
0861	1534332	488702	100.0	5.0	8/16/2006	74.96	6484.89	2.3	6559.85	65	6492.6 A	50-100	0.0
0862	1534265	487800	110.0	5.0	12/18/2006	65.70	6490.48	3.3	6556.18	97	6455.9 A	63-103	34.6
0863	1533867	487912	110.0	5.0	5/30/2006	78.00	6478.56	2.5	6556.56	94	6460.1 A	63-103	18.5
0864	1533735	486464	95.0	5.0	8/16/2006	77.40	6469.32	1.9	6546.72	78	6466.9 A	44-84	2.4
0865	1534123	488429	97.0	5.0	5/30/2006	77.00	6479.78	2.2	6556.78	88	6466.6 A	37-97	13.2
0866	1534494	488340	120.0	5.0	8/16/2006	70.10	6488.02	1.8	6558.12	80	6476.3 A	33-113	11.7
0867	1533762	488409	88.0	5.0	12/18/2006	74.40	6481.50	2.0	6555.90	86	6467.9 A	48-88	13.6
0868	1534848	491033	103.0	5.0	1/29/2003	5.38	6569.36	2.2	6574.74	94	6478.5 A	53-103	90.8
0869	1533251	486073	94.0	5.0	12/18/2006	86.50	6457.99	1.7	6544.49	99	6443.8 A	44-94	14.2

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

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)						
* 0870	1532680	484906	93.0	5.0	1/11/1996	68.56	6475.60	1.9	6544.16	95	6447.3 A	69-89	28.3
0871	1533603	485400	100.0	5.0	1/11/1996	66.86	6477.85	2.4	6544.71	93	6449.3 A	60-100	28.5
* 0872	1533092	485407	100.0	5.0	1/11/1996	65.80	6477.51	1.8	6543.31	96	6445.5 A	55-100	32.0
* 0873	1533286	484505	100.0	5.0	1/11/1996	67.55	6475.46	1.9	6543.01	96	6445.1 A	60-100	30.3
* 0874	1533968	484925	105.0	5.0	1/11/1996	68.68	6476.66	2.2	6545.34	110	6433.1 A	55-105	43.5
* 0875	1532785	483634	125.0	5.0	1/11/1996	69.85	6472.99	1.7	6542.84	116	6425.1 A	65-125	47.9
0876	1532853	486088	95.0	5.0	12/18/2006	83.05	6461.21	1.9	6544.26	85	6457.4 A	58-88	3.9
0877	1533068	488067	70.0	5.0	8/18/1998	63.58	6489.50	1.9	6553.08	65	6486.2 A	58-68	3.3
0879	1532401	486104	70.0	5.0	12/18/2006	69.25	6475.30	2.2	6544.55	62	6480.4 A	48-68	0.0
0881	1542034	481478	96.0	4.5	12/20/2006	74.80	6490.24	2.0	6565.04	103	6460.0 A	76-96	30.2
0882	1541404	482396	110.0	4.5	10/3/2006	72.06	6489.10	2.0	6561.16	98	6461.2 A	70-110	27.9
0883	1540097	483039	100.0	5.0	11/14/2006	63.30	6493.83	1.9	6557.13	96	6459.3 A	60-90	34.6
0884	1542677	481498	90.0	5.0	10/3/2006	78.20	6487.90	1.0	6566.10	85	6480.2 A	58-88	7.8
0885	1541919	483474	100.0	5.0	12/20/2006	68.75	6495.89	1.5	6564.64	95	6468.1 A	70-100	27.8
0886	1542327	482487	90.0	5.0	12/20/2006	71.60	6492.95	1.5	6564.55	87	6476.1 A	60-90	16.9
0887	1543063	482469	67.0	5.0	10/3/2006	58.10	6509.63	1.5	6567.73	60	6506.2 A	42-67	3.4
0888	1542285	479335	105.0	5.0	12/20/2006	76.00	6481.33	1.1	6557.33	90	6466.2 A	75-105	15.1
0889	1540047	480222	65.0	5.0	10/24/1996	63.31	6486.32	1.5	6549.63	60	6488.2 A	35-65	0.0
0890	1541365	480088	101.0	5.0	12/20/2006	73.90	6484.53	1.7	6558.43	93	6463.7 A	81-101	20.8
0893	1541934	482244	98.0	4.5	12/20/2006	71.50	6492.47	2.1	6563.97	93	6468.9 A	78-98	23.6
0894	1541976	478317	78.0	4.5	11/16/2005	77.40	6476.89	3.0	6554.29	97	6454.3 A	58-78	22.6
0895	1541521	476222	104.0	5.0	10/4/2006	86.44	6467.40	2.4	6553.84	116	6435.4 A	61-101	32.0
0896	1542246	476237	113.0	5.0	10/4/2006	87.40	6468.21	2.0	6555.61	117	6436.6 A	73-113	31.6
0897	1543819	478237	93.0	4.0	9/27/1998	83.28	6478.97	2.0	6562.25	70	6490.3 A	63-93	0.0
0899	1543801	477288	110.0	4.0	10/4/2006	101.70	6469.14	2.0	6570.84	120	6448.8 A	70-110	20.3
0905	1532700	480850	120.0	5.0	11/13/2006	0.00	6545.00	0.0	6545.00	120	6425.0 A	100-120	120.0
0906	1532900	480450	---	---	8/29/1995	74.65	6462.75	0.0	6537.40	---	--- A	-	---
0909	1531900	483400	140.0	4.0	11/13/2006	90.22	6448.68	0.0	6538.90	112	6426.9 A	80-135	21.8
0910	1528800	481150	138.0	5.0	---	---	---	0.0	6535.00	132	6403.0 A	120-134	---
0912	1471000	478250	---	---	---	---	---	0.0	6530.00	---	--- A	-	---
0913	1555800	500950	---	8.0	1/24/1996	38.40	6604.60	0.3	6643.00	---	--- A	-	---
0914	1555500	500850	---	6.0	5/16/2005	41.08	6600.92	1.4	6642.00	---	--- A	-	---
0915	1552650	499650	100.0	4.0	6/19/2006	30.00	6595.00	0.0	6625.00	70	6555.0 A	55-85	40.0
0916	1552350	499600	160.0	4.0	4/26/1994	40.00	6585.00	0.0	6625.00	---	--- A	45-70	---
0917	1542200	514600	---	---	---	---	---	0.0	6800.00	---	--- A	-	---
0920	1555800	496900	---	7.0	5/11/1994	33.40	6594.20	0.7	6627.60	---	--- A	-	---

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	WATER LEVEL DATE	WATER LEVEL DEPTH (FT-MP)	WATER LEVEL ELEV. (FT-MSL)	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
0921	1555400	495800	---	5.0	5/16/2005	38.57	6585.43	1.9	6624.00	---	--- A	-	---
0922	1555200	492500	---	6.0	5/16/2005	51.51	6570.19	1.7	6621.70	---	--- A	-	---
0924	1547500	438900	135.0	4.0	---	---	---	0.0	6592.90	112	6480.9 A	94-114	---
0925	1548600	480800	150.0	4.0	---	---	---	0.0	6601.40	140	6461.4 A	126-141	---
0926	1547500	472700	134.0	4.0	---	---	---	0.0	6596.90	132	6464.9 A	123-132	---
0935	1540115	476629	300.0	16.0	10/4/2006	94.00	6464.12	2.6	6558.12	125	6430.5 A	95-132	33.6
0936	1543621	472978	160.0	5.0	---	---	---	0.0	6573.38	160	6413.4 A	100-160	---
0939	1539751	483202	97.0	8.0	7/25/1996	59.31	6497.69	2.3	6557.00	---	--- A	-	---
0940	1538651	483040	70.0	---	7/24/1996	57.30	6495.70	8.8	6553.00	---	--- A	-	---
0942	1538306	483703	100.0	6.0	---	---	---	0.0	6550.20	95	6455.2 A	85-95	---
0947	1536206	491841	100.0	4.0	7/27/1994	54.63	6520.55	0.0	6575.18	95	6480.2 A	70-100	40.4
0950	1560400	498300	81.0	5.0	7/12/2000	25.70	6631.30	0.5	6657.00	---	--- A	-	---
0952	1534550	477800	140.0	---	---	---	---	0.0	6550.00	---	--- A	-	---
0975	1539753	482896	---	---	---	---	---	0.0	6556.00	---	--- A	-	---
0976	1539751	483100	115.0	---	---	---	---	0.0	0.00	---	--- A	-	---
0977	1539900	482720	---	---	12/9/1995	61.47	6495.53	1.0	6557.00	---	--- A	-	---
0979	1538860	483110	105.0	5.0	7/10/2002	57.56	6593.44	0.0	6651.00	100	6551.0 A	90-100	42.4
0980	1539330	483050	---	---	11/8/1995	57.70	6497.30	0.0	6555.00	---	--- A	-	---
0981	1539040	483740	---	---	---	---	---	0.0	6554.00	---	--- A	-	---
0982	1538610	483400	110.0	5.0	---	---	---	0.0	6651.00	105	6546.0 A	90-105	---
0983	1538590	483100	---	---	---	---	---	0.0	6552.00	---	--- A	-	---
0984	1538750	482950	103.0	5.0	---	---	---	0.0	6651.00	98	6553.0 A	88-98	---
0985	1539048	483380	115.0	5.0	7/18/1996	58.75	6592.25	0.0	6651.00	102	6549.0 A	90-110	43.3
0989	1538220	482920	---	---	11/2/1995	58.10	6494.90	1.0	6553.00	---	--- A	-	---
0992	1539510	483790	100.0	5.0	---	---	---	0.0	6652.00	95	6557.0 A	85-95	---
0993	1537920	483677	102.0	5.0	---	---	---	0.0	6650.00	98	6552.0 A	85-98	---
0994	1539700	476240	144.0	6.0	10/24/2006	95.00	6460.00	0.0	6555.00	---	--- A	95-110	---
0996	1537621	477989	138.0	5.0	8/30/2006	113.00	6439.52	1.7	6552.52	136	6414.8 A	126-136	24.7
0997	1539821	473807	---	---	3/12/1996	76.90	6491.40	0.0	6568.30	---	--- A	-	---
0999	1524230	480187	185.0	---	---	---	---	0.0	6527.00	---	--- A	-	---
1012	---	---	---	6.0	---	---	---	0.0	0.00	---	--- A	-	---
1013	---	---	---	4.0	---	---	---	0.0	0.00	---	--- A	-	---
1014	---	---	---	9.0	---	---	---	0.0	0.00	---	--- A	-	---
1015	---	---	---	6.0	---	---	---	0.0	0.00	---	--- A	-	---
1018	---	---	---	5.0	---	---	---	0.0	0.00	---	--- A	-	---
1020	---	---	---	5.0	1/18/1996	15.17	-15.17	0.0	0.00	---	--- A	-	---

TABLE 4.1-4. WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS.

(cont'd.)

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)						
1021	---	---	---	---	1/18/1996	18.00	-18.00	0.0	0.00	---	--- A	-	---

Note: A = Alluvial Aquifer, Base
M = Middle Chinle Aquifer, Top
T = Tailings Aquifer, Base
* = Well Abandoned
? = Uncertain Identity

4.2 ALLUVIAL WATER LEVELS

4.2.1 WATER-LEVEL ELEVATION - ALLUVIAL

This section presents information necessary to evaluate the direction of ground water flow in the alluvial aquifer. Water-level elevations are used to quantify the gradient of the alluvial water table, which in turn can be used to interpret the direction of ground water flow.

Figure 4.2-1 presents the Fall of 2006 alluvial aquifer water-level elevation contours for the Grants Project area near Homestake's tailings. The alluvial aquifer limits were defined based on the 2002 water-level elevation map and base of the alluvium map. There were no recent adjustments in the alluvial aquifer limits, because water-level changes between 2002 and 2006 have been minor. Locations of the alluvial wells, with their respective well names listed adjacent to the well symbol, are plotted on Figure 4.1-1 in the previous section. The 2006 ground water flow patterns in the alluvial aquifer are very similar to those observed in the Fall of 2005. The ridge in the piezometric surface west of the Large Tailings Pile is attributable to continued injection of water into the injection line in 2006 (see Figure 4.1-1 for location of the injection line). The hydraulic ridge on the southeast side of the Small Tailings Pile was similar in 2006 to that which was observed in 2005. The water-level elevations and flow directions indicate the extent of the area of the alluvial aquifer from which ground water is drawn by the collection system. The area of collection is between the fresh-water injection area and the collection wells, where ground water is flowing back to the collection wells. The area underlying the Large Tailings Pile is also within the collection area, because alluvial ground water in this area flows to the collection wells.

The water-level elevations in Section 3 decreased from 2005 to 2006 as a result of irrigation supply water pumping from ten wells in this section (see Figure 4.2-1). Water-level changes are even more pronounced in Section 33 (see the western half of Figure 4.2-1), because eight irrigation supply wells are located in this area, and because natural recharge was below normal in 2006. The water levels in Section 28 increased in 2006 due to the fresh water injection in central Section 28.

Several wells were drilled in the area of the zero saturation boundaries to better define the limits of the alluvial aquifer. However, there are occurrences of limited saturation in the Chinle shale below the alluvium, indicating that there may be zones of perched water in the upper part of the Chinle shale. These wells have been used to help define where the zero saturation boundary of the alluvium occurs and the water levels in these wells may not be representative of the alluvial aquifer.

Flow in the San Mateo alluvium is naturally diverted either west through the western portion of Section 28 or south/southwest through Section 35 around the area where the base of the alluvium is elevated. There is no alluvial saturation where the elevation of the base of the alluvium is above the water table. Further downgradient, the San Mateo alluvial water then mixes with the Rio San Jose alluvial water flowing from the northwest. The combined flow continues to flow in a southerly direction. The gradient of the alluvial water surface in the Rio San Jose alluvium has been increased somewhat due to irrigation water withdrawal, but it is still relatively flat due to its large transmitting ability. San Mateo alluvial ground water that flows through the northern portion of Section 3 (see Figure 4.2-1) joins the Rio San Jose ground water system in the eastern portion of Section 4.

Water-level data for the alluvial wells are presented in Appendix A as Table A.1-1 (HMC alluvial wells), Table A.1-2 (Murray Acres, Broadview Acres, Felice Acres, and Pleasant Valley Estates alluvial wells) and Table A.1-3 (regional alluvial wells).

4.2.2 WATER-LEVEL CHANGE - ALLUVIAL

Figure 4.2-2 presents well locations and indicates the grouping of wells for presentation on water-level elevation versus time plots. The figure number of the water-level elevation plots for each group of wells is shown by the well groupings in the black boxes depicted on Figure 4.2-2. The colors used for the well name and well symbol on Figure 4.2-2 correspond with those used on the water-level elevation plots. Time plots (Figures 4.2-3 through 4.2-18) present the last ten years of data to illustrate the recent trends.

Water levels in the alluvial aquifer have been fairly stable during the last year. Figure 4.2-3 presents water-level elevation data for up-gradient wells DD, ND, NC, P, Q and R. A very slight increasing trend was observed in up-gradient wells during 2006.

Water-level elevation data are presented for two sets of wells monitored for the purpose of detection of a reversal of water-surface gradient near the S line of the collection system. These wells (SP and SO) are located just northeast of the majority of the S line of collection wells. Figure 4.2-4 graphically illustrates that the alluvial hydraulic gradient is very flat in the area of wells SN, SO and SP. Water-level rises were observed in these three wells in 2003 and 2004 due to injection of fresh water into the injection line with an overall decline in 2005. Water levels rose for the first three quarters in 2006 but declined the fourth quarter due to a decrease in injection rate. The water levels actually indicate a very slight outward gradient from well SP to SO for most of 2006. The injection of water into the injection line has caused slightly more rise in well SP than SO. The head is larger near the injection line than near wells SP and SO.

Wells S2 and S5 are the two reversal wells down-gradient of the S line of collection wells (see Figures 4.1-1 and 4.2-2 for their location). Recent data from these two wells indicate a very good reversal of the ground water flow direction due to the collection wells near well S5 and the rise in water levels caused by the injection line (see Figure 4.2-5). The injection line water caused a larger water level rise in well S1 than in well S2. This data shows that a strong reversal has been maintained between wells S2 and S5.

Figure 4.2-6 presents water-level elevation data for a group of wells located west of the S line of collection wells. Water-level elevations in each of these wells were maintained higher in 2006 due to the injection into the injection line. Water levels overall rose in well S4 in 2006 but did decline in late 2006 due to the decrease in injection.

The alluvial water levels north of Murray Acres were overall steady in 2006 in wells MO, MQ, MS, MY and W except during the pumping period for irrigation supply (see Figure 4.2-7).

Wells B and BA are monitored in order to define the reversal in the ground water gradient between the M and J injection lines and the D collection line. Figure 4.2-8 presents water-level elevation data for wells B and BA and indicates a continued ground water reversal. Water levels in this area sharply rose after the addition of the R.O. product injection into the new EMA injection lines until the second quarter of 2006 when the water levels declined.

Figure 4.2-9 presents water-level elevation plots for alluvial wells BP, B13, D1, M5 and S3, which are located near the lined collection ponds and to the northwest of these ponds. This plot shows that the water levels increased in each of these wells in 2006.

Water-level elevations in the alluvial aquifer near the Small Tailings collection system are presented on Figure 4.2-10 for reversal wells DZ and KZ. Well DZ is near the D collection line and well KZ is close to the K injection line and, therefore, is naturally down-gradient of well DZ. This plot shows that, during 2006, a strong reversal of the ground water gradient was maintained between the line of injection and line of collection. This pair of reversal wells is adequate to define the ground water gradient between this major zone of injection and the collection system.

Figure 4.2-11 presents water-level elevation data for wells B11, C12, L6 and TA. This data reflects the changes in water levels near the north and east sides of the Small Tailings Pile. The water level in well B11 stayed higher and steady in 2006 due to less collection from this well. Injection of R.O. product and fresh water has caused the higher water-level elevations observed in well L6 but a gradual decline occurred in 2006 due to slightly less injection. The water level in well TA in 2006 stayed high due to limited pumping of this collection well.

Figure 4.2-12 shows the water-level elevation plots for wells I, KEB, KF and X. Water levels gradually declined in these wells in 2006 except for a steady level in well I.

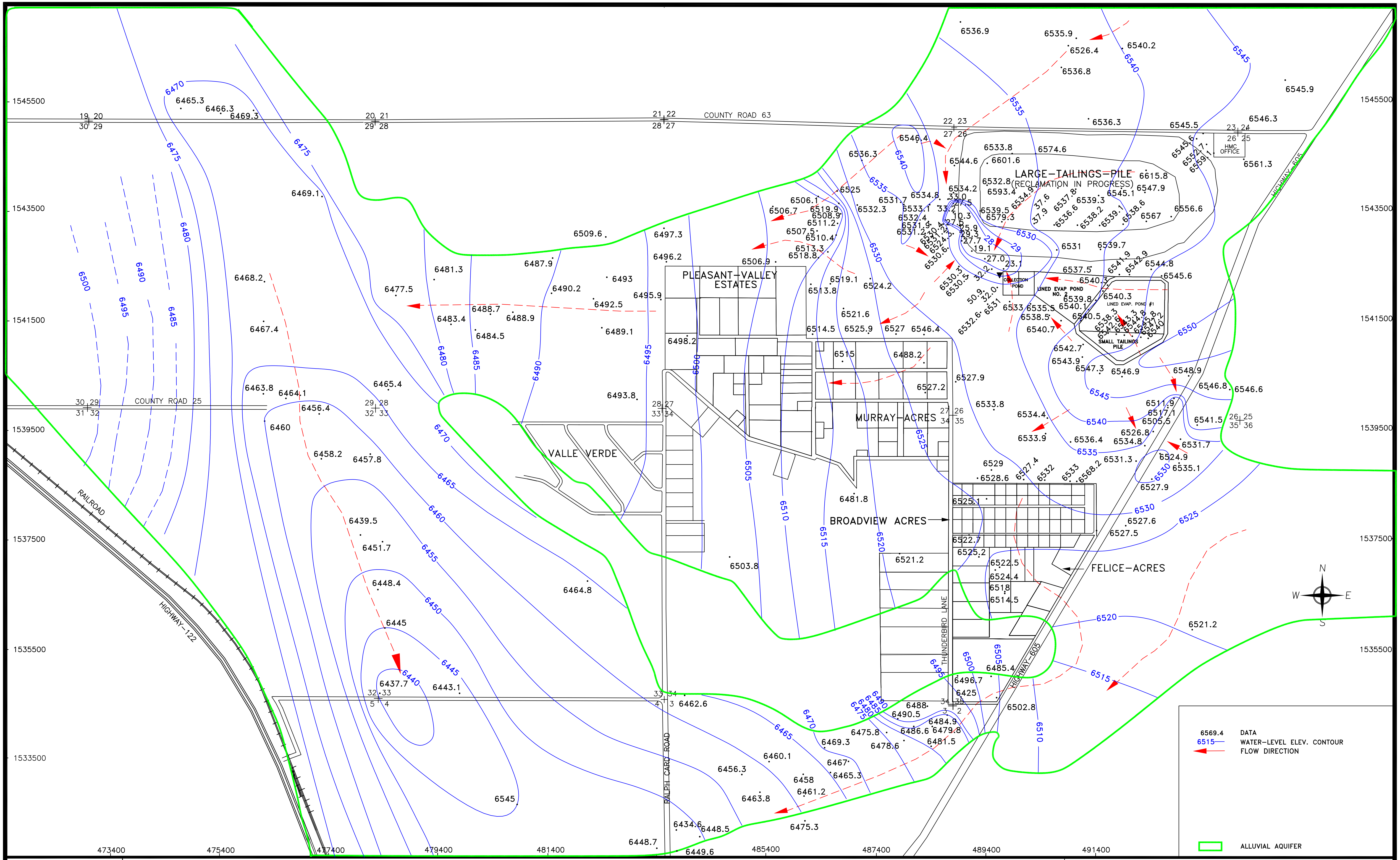
Water-level elevations in the alluvial aquifer south of the Broadview Acres injection system varied some in 2006 (see water levels for wells 490, 497, GH and SUB1 on Figure 4.2-13). Water levels overall declined in the wells with larger drops in irrigation supply wells 490 and 497.

Water levels in the Murray Acres area were also fairly steady in alluvial wells 688, 844, 846, FB and MX during 2006 except for a continued gradual decrease in the water level in wells 688, 845, 846 and FB (see Figure 4.2-14).

Figure 4.2-15 presents water-level hydrographs for six wells in Section 3. Water levels gradually declined in 2006 in well 864 due to less fresh water injection in this area. The injection lines caused water levels in well 876 to become fairly steady and slightly rise in 2006. Water levels in alluvial well 652 have gradually declined over the last seven years due to the production of irrigation water and continuing drought conditions.

Water-level hydrographs for six wells in the Section 28 area are presented on Figure 4.2-16. Wells 881, 890 and MR were used as irrigation supply wells. Late season water levels in 2006 were slightly above those at a similar time in recent years due to the fresh water injection in this area. Figure 4.2-17 presents the water- level time plots for the group of wells west and southwest of the Section 28 irrigation supply wells. Some decline in water levels in wells 685, 686, 895, 899 and 935 was observed in 2006 with a fairly steady level in well 654 which has been affected by the Section 28 injection.

Figure 4.2-18 presents the water-level plots for the Section 33 wells shown on Figure 4.2-2. Wells 647, 648, 649, 657 and 996 are irrigation supply wells, and therefore, their water levels are influenced by the periodic withdrawal of water from these wells. The observed water levels during December of 2006 were slightly lower than those observed in previous years at this time. The combination of withdrawal for irrigation and the ongoing drought conditions is the likely cause of the overall decline in water levels with time.



SCALE: 1"=1600'

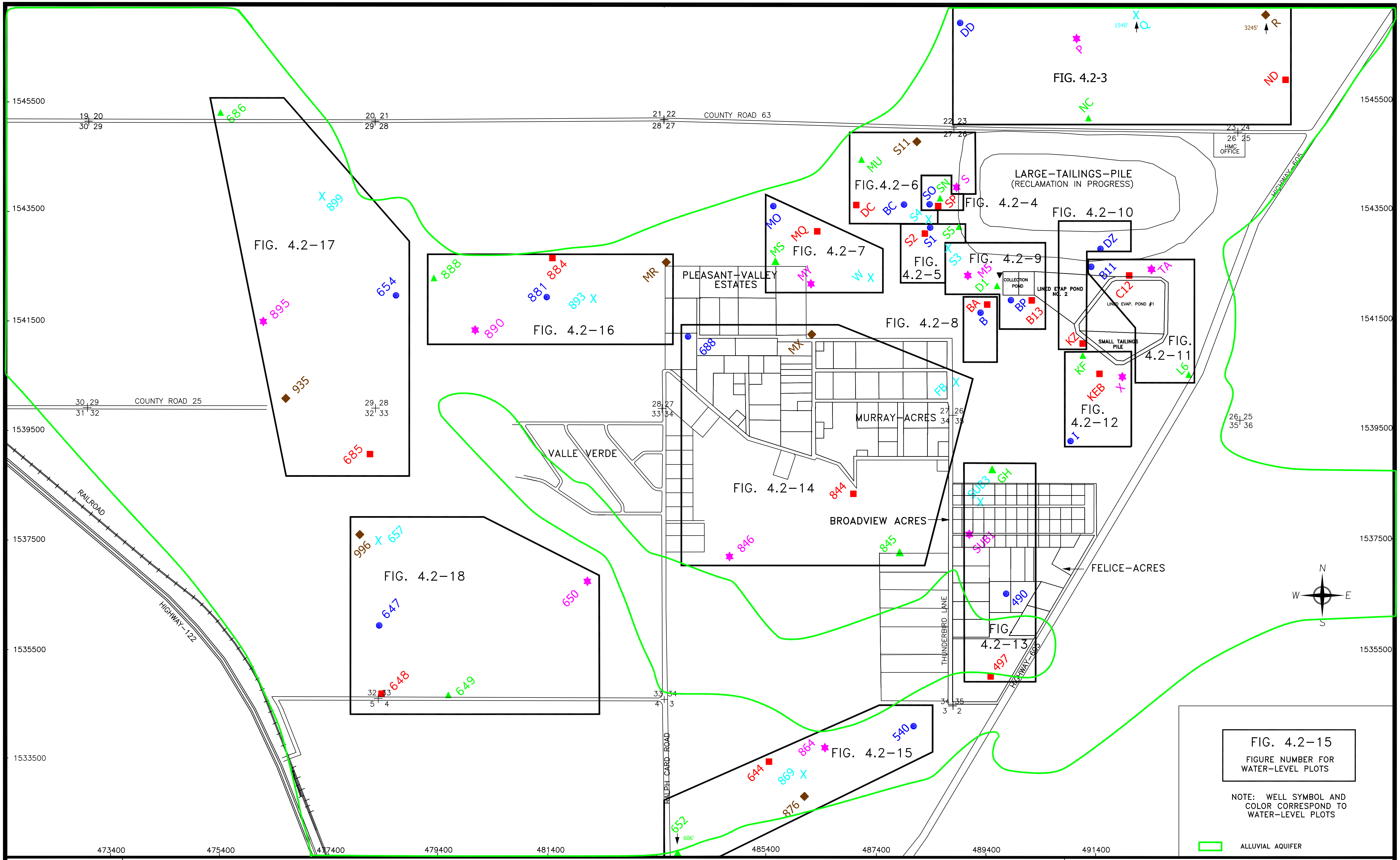
C:\PROJECTS\
2007-06\1600QAL --JDF

DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.2-1. WATER-LEVEL ELEVATIONS OF THE ALLUVIAL AQUIFER, FALL 2006, FT-MSL



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.2-2. LOCATION OF ALLUVIAL WELLS WITH WATER-LEVEL PLOTS

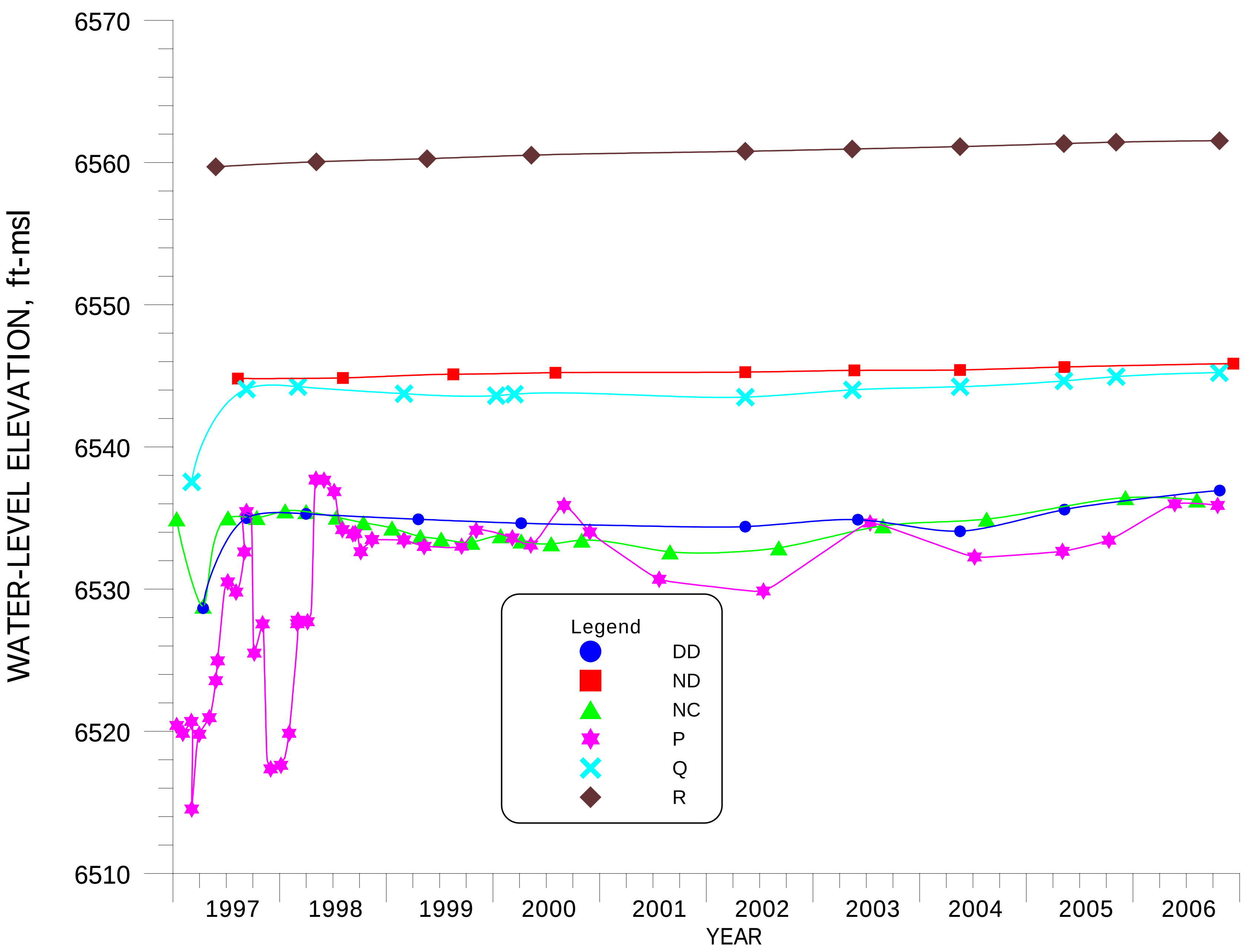


FIGURE 4.2-3. WATER-LEVEL ELEVATION FOR WELLS DD, ND, NC, P, Q AND R.

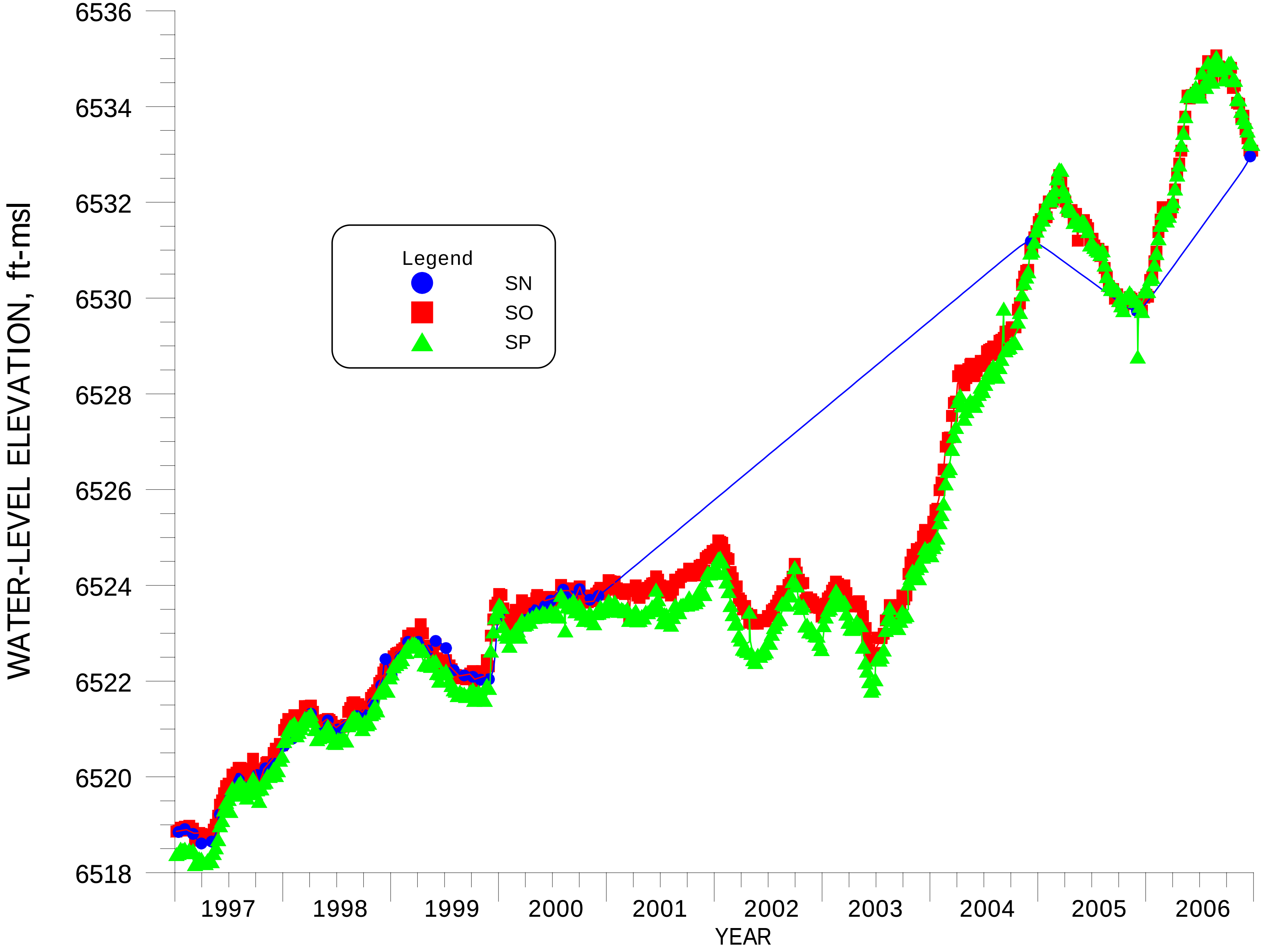


FIGURE 4.2-4. WATER-LEVEL ELEVATION FOR WELLS SN, SO AND SP.

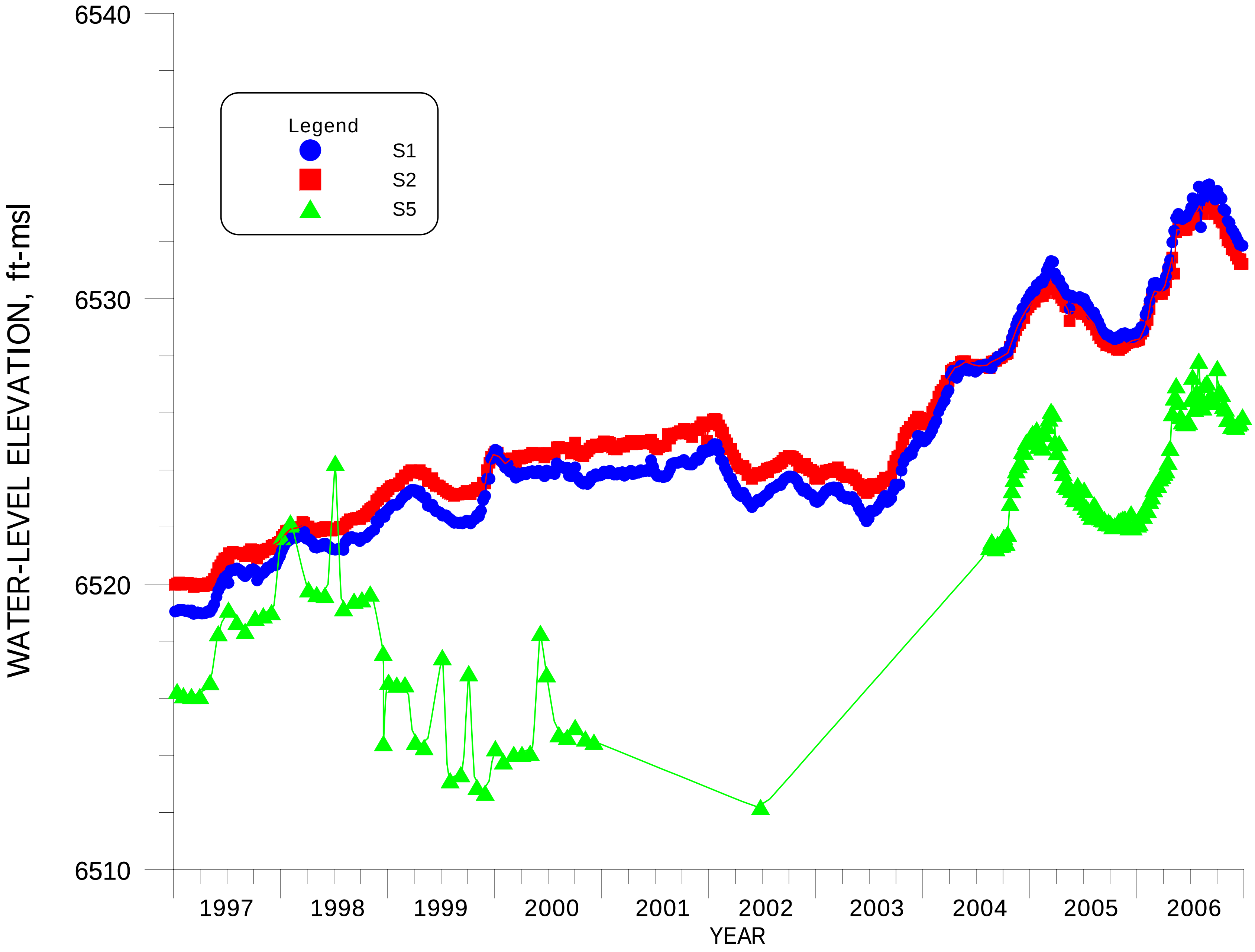


FIGURE 4.2-5. WATER-LEVEL ELEVATION FOR WELLS S1, S2 AND S5.

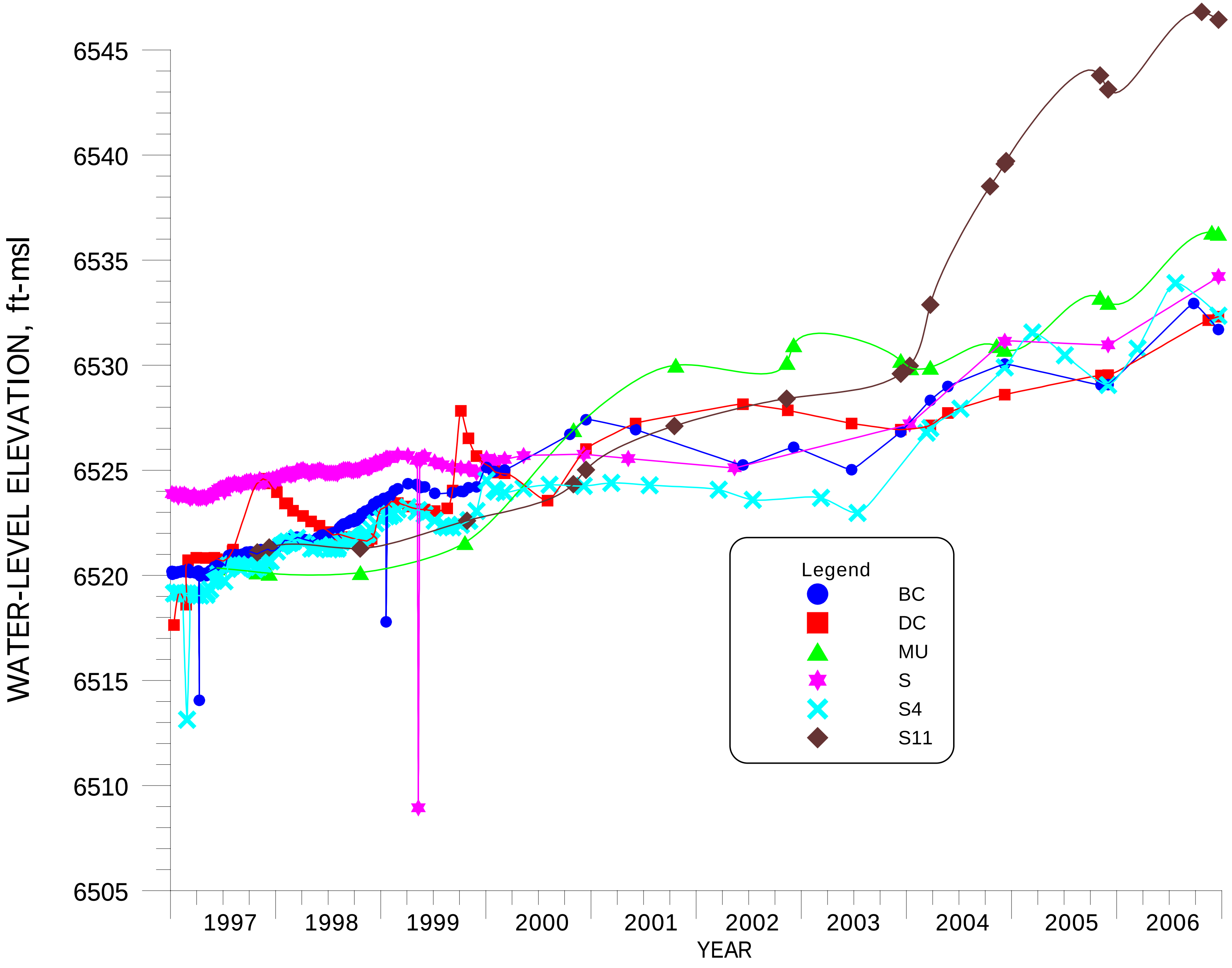


FIGURE 4.2-6. WATER-LEVEL ELEVATION FOR WELLS BC, DC, MU, S, S4 AND S11.

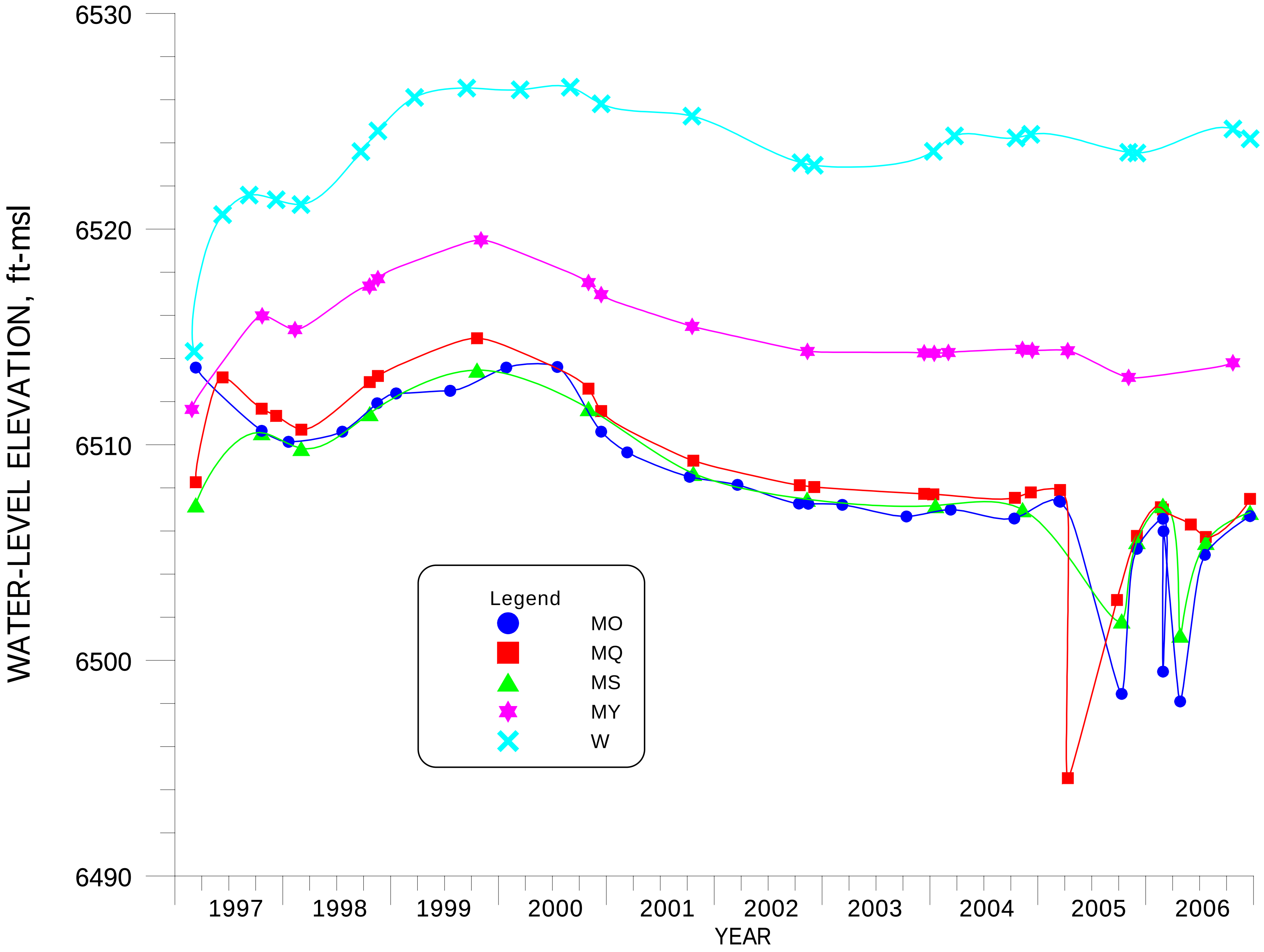


FIGURE 4.2-7. WATER-LEVEL ELEVATION FOR WELLS MO, MQ, MS, MY AND W.

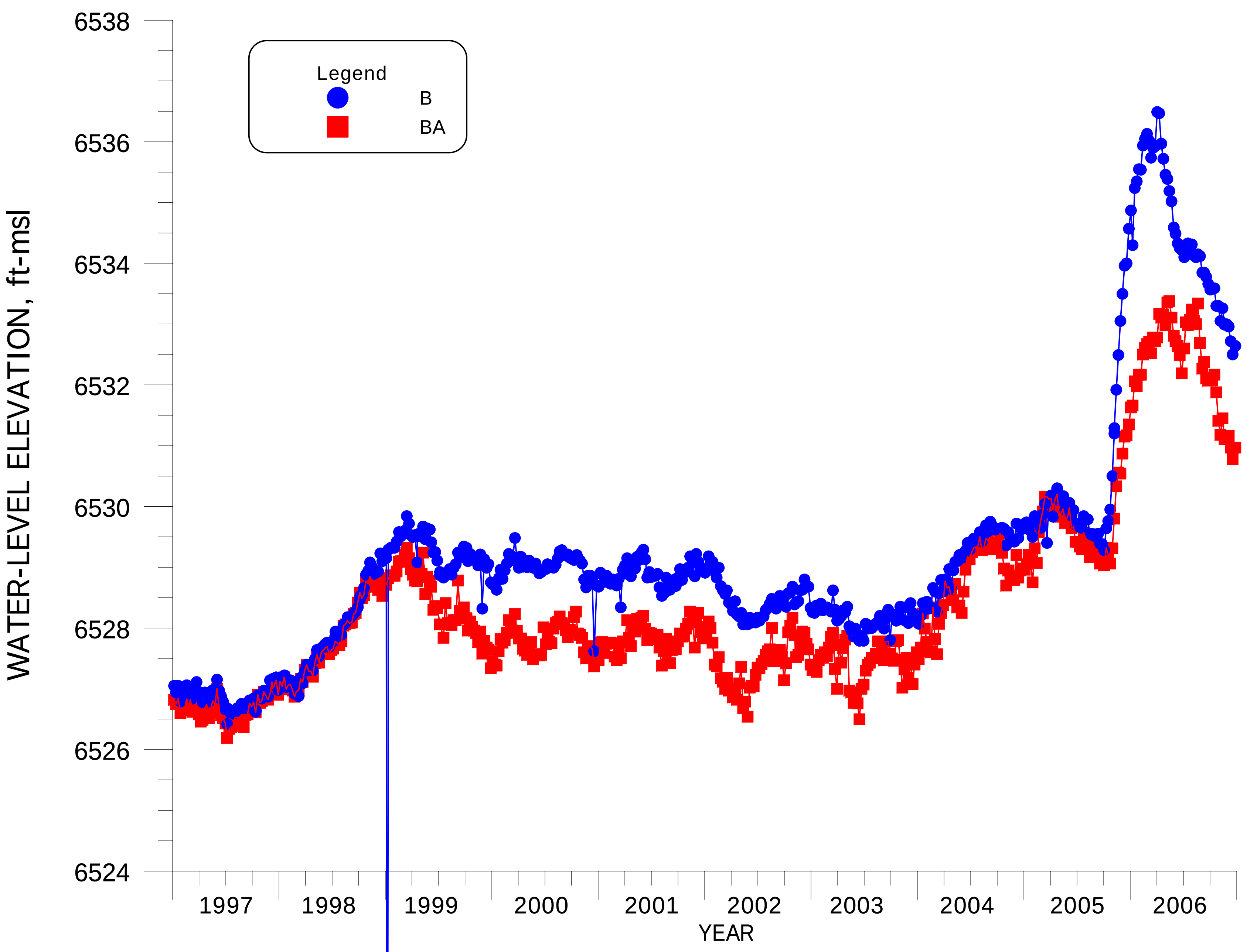


FIGURE 4.2-8. WATER-LEVEL ELEVATION FOR WELLS B AND BA.

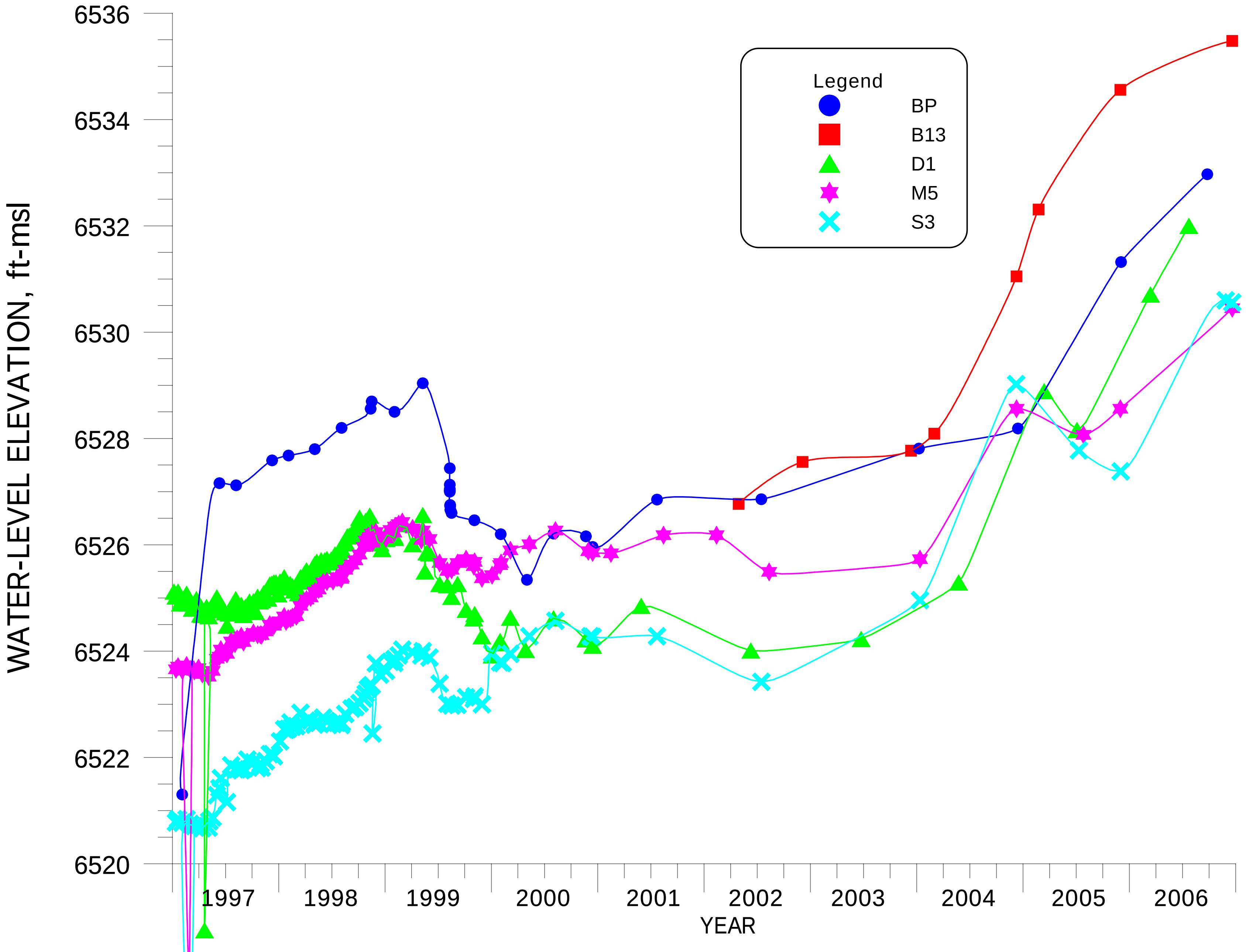


FIGURE 4.2-9. WATER-LEVEL ELEVATION FOR WELLS BP B13, D1, M5 AND S3.

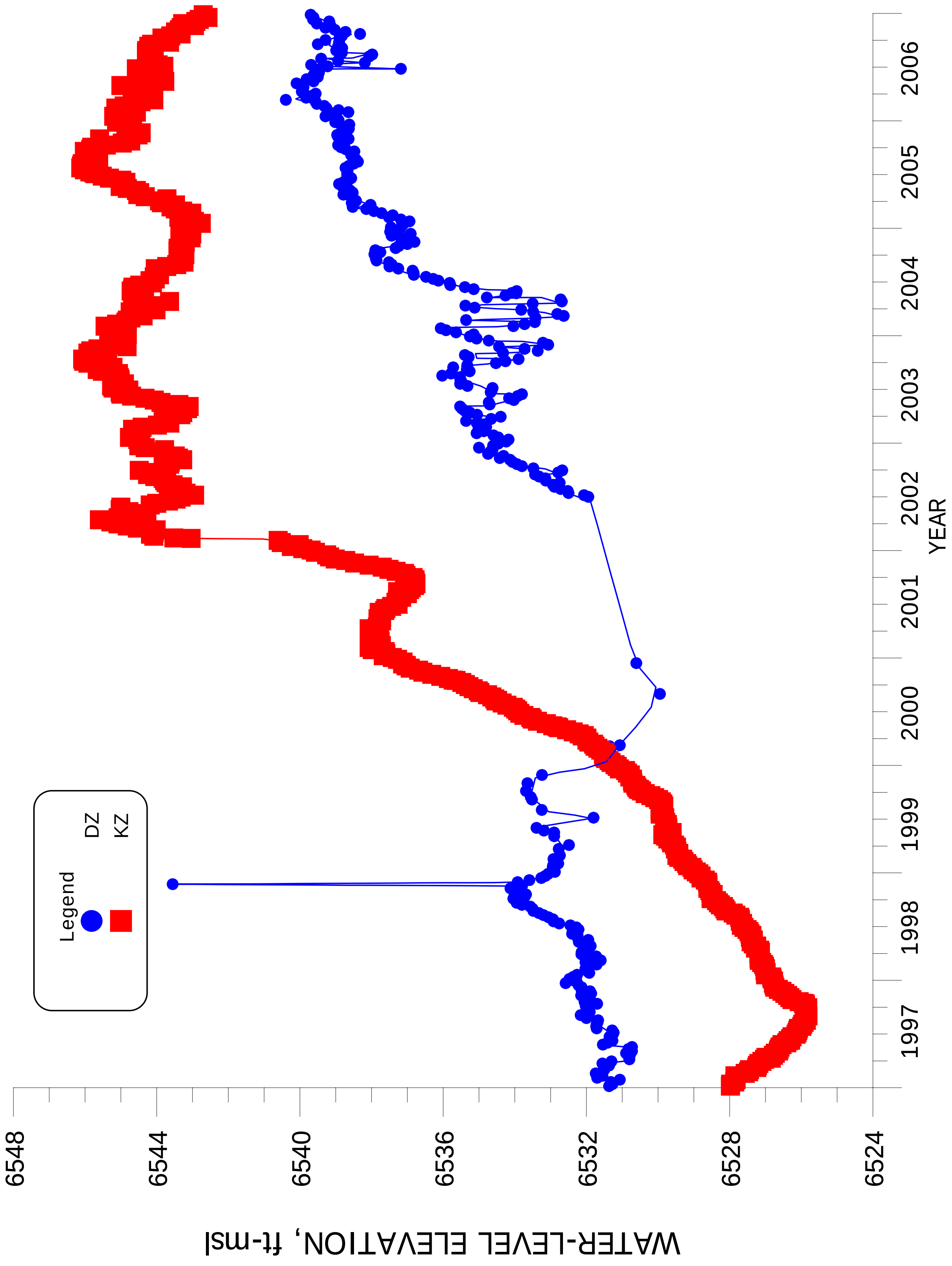


FIGURE 4.2-10. WATER-LEVEL ELEVATION FOR WELLS DZ AND KZ.

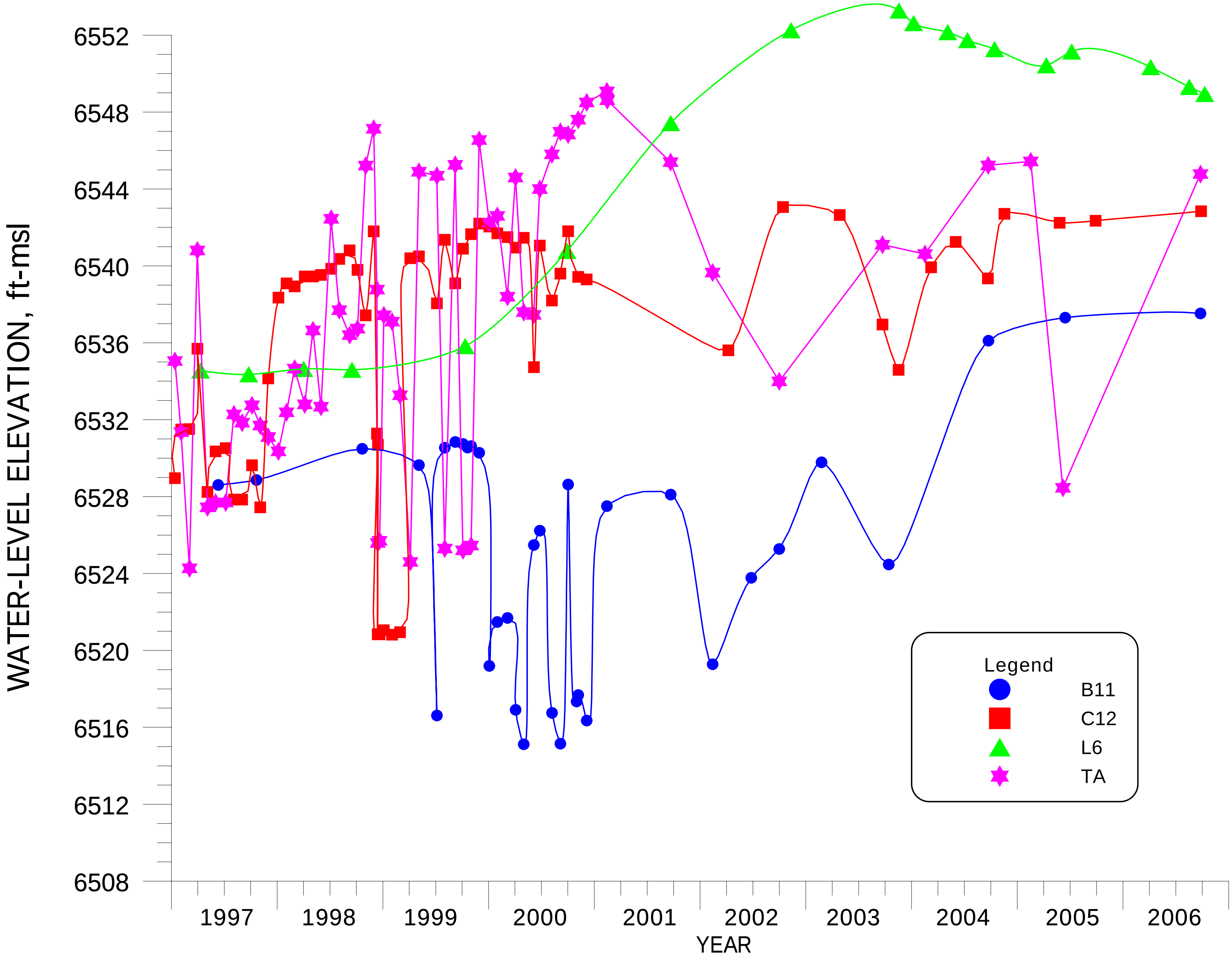


FIGURE 4.2-11. WATER-LEVEL ELEVATION FOR WELLS B11, C12, L6 AND TA.

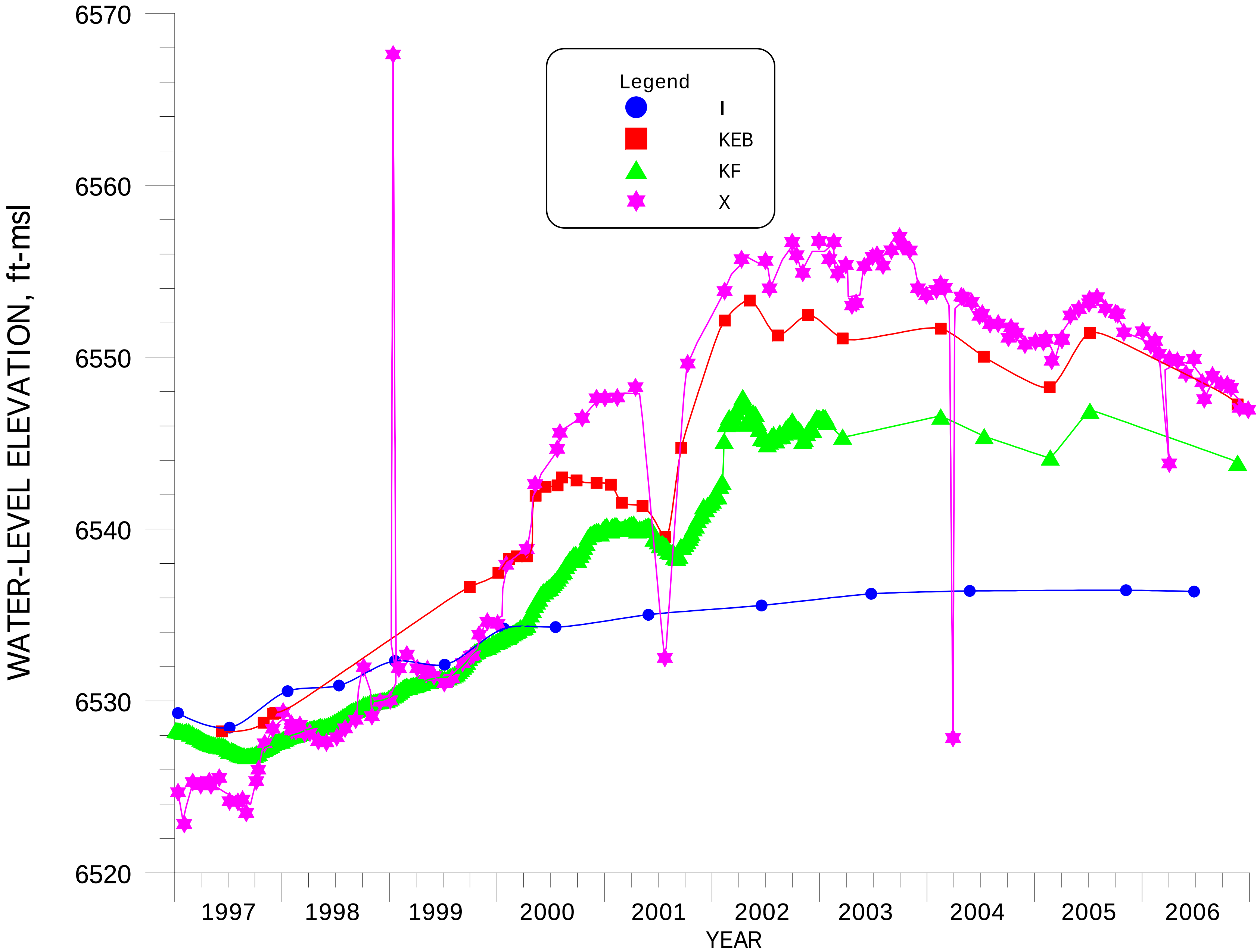


FIGURE 4.2-12. WATER-LEVEL ELEVATION FOR WELLS I, KEB, KF AND X.

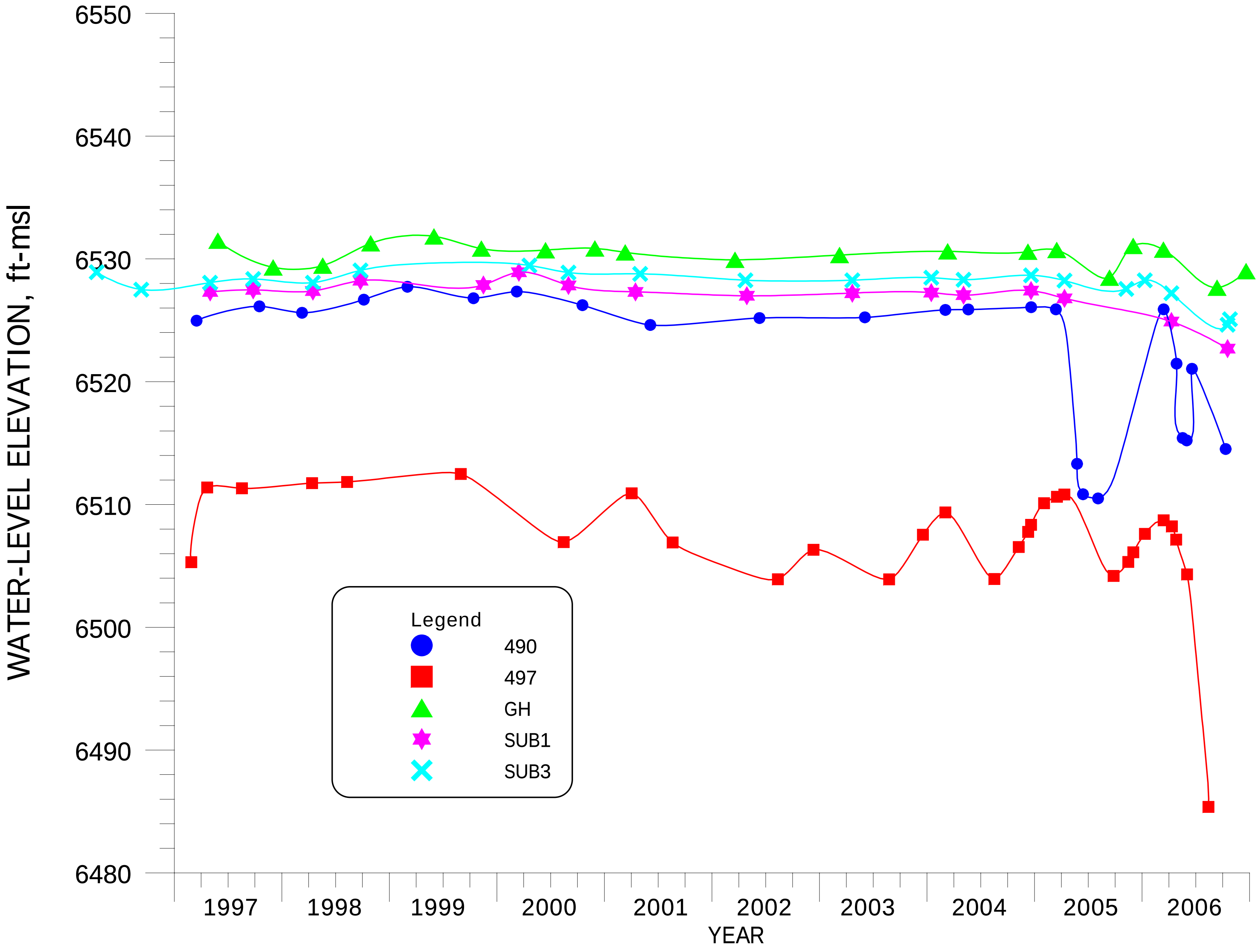


FIGURE 4.2-13. WATER-LEVEL ELEVATION FOR WELLS 490, 497, GH, SUB1 AND SUB3.

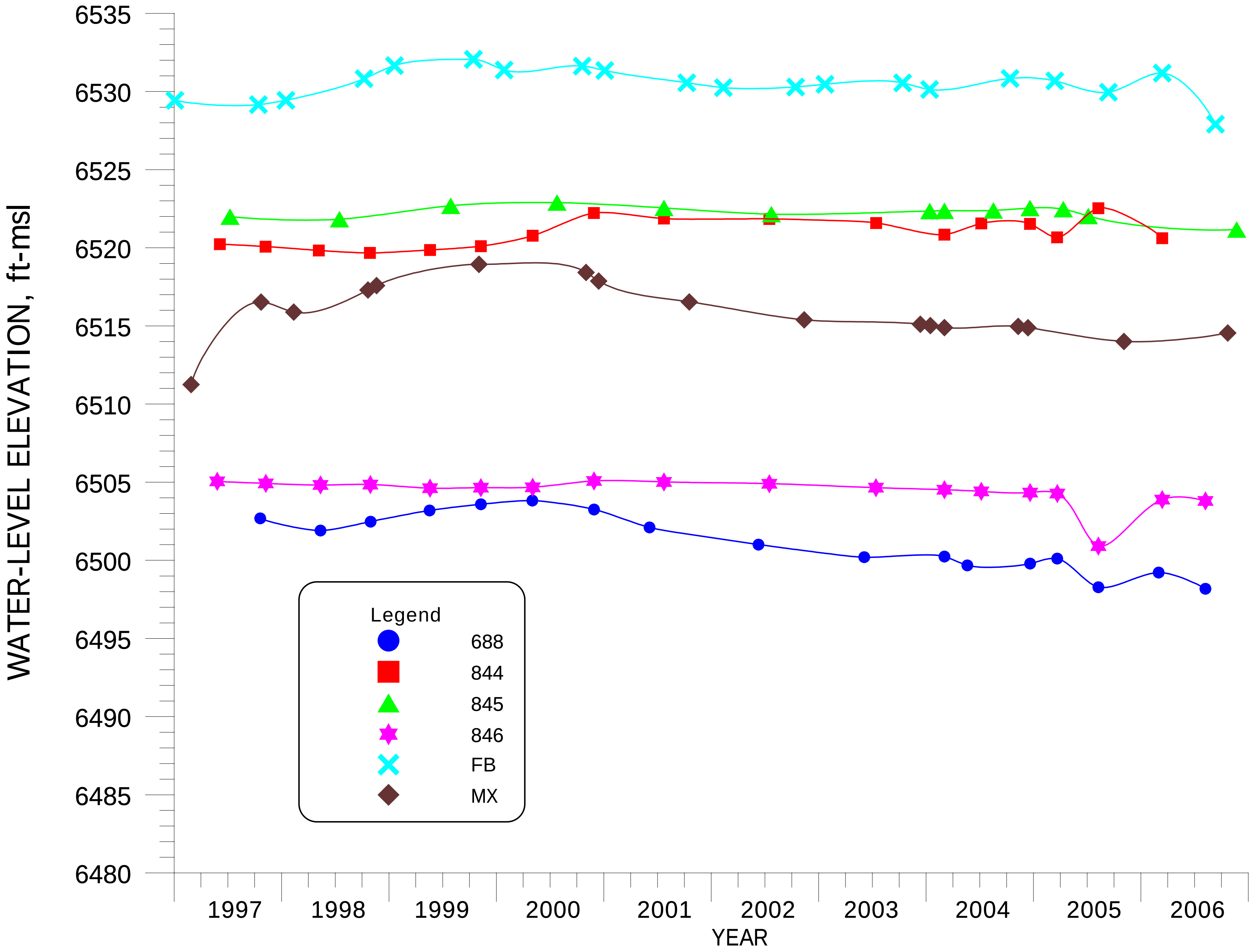


FIGURE 4.2-14. WATER-LEVEL ELEVATION FOR WELLS 688, 844, 845, 846, FB AND MX.

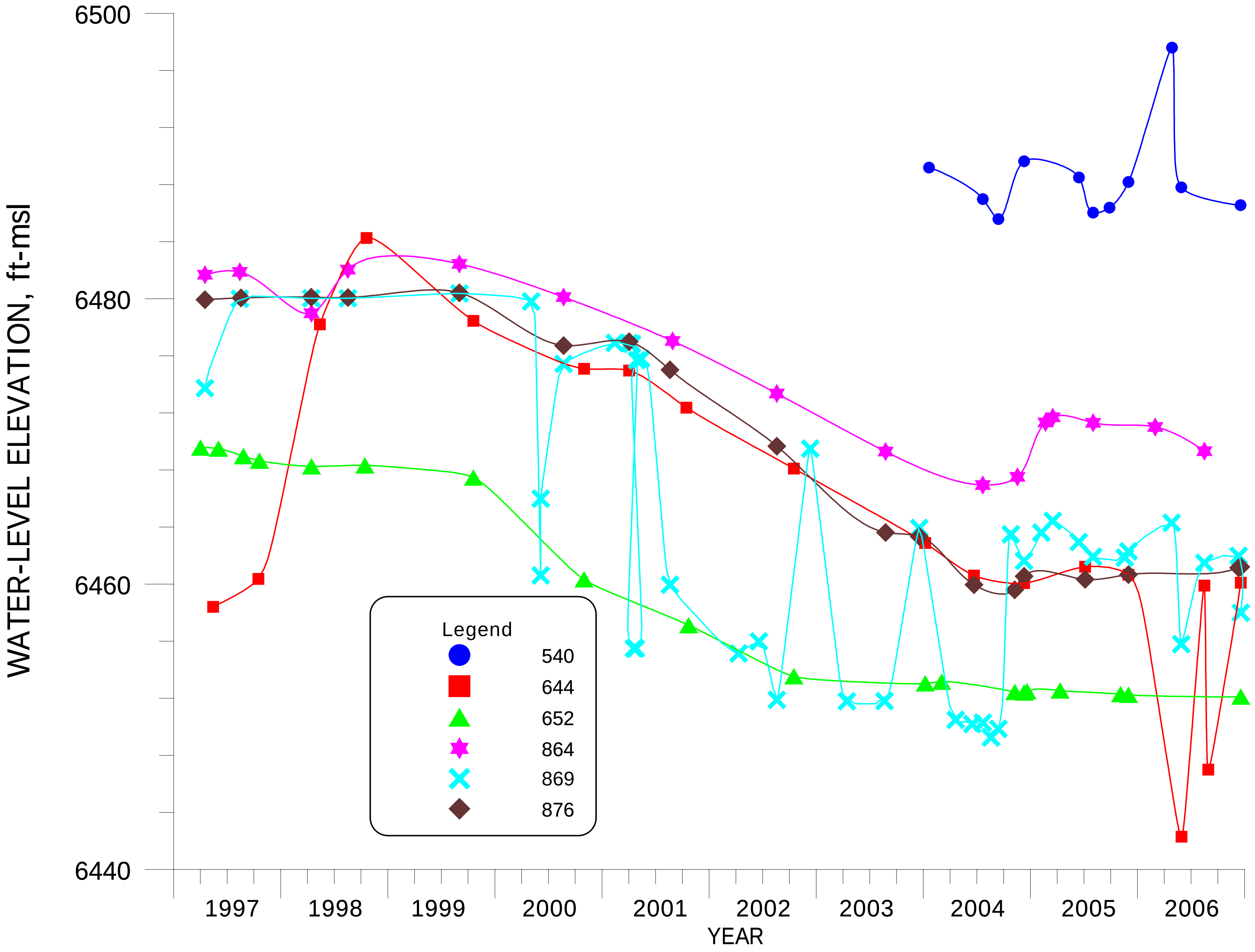


FIGURE 4.2-15. WATER-LEVEL ELEVATION FOR WELLS 540, 644, 652, 864, 869 AND 876.

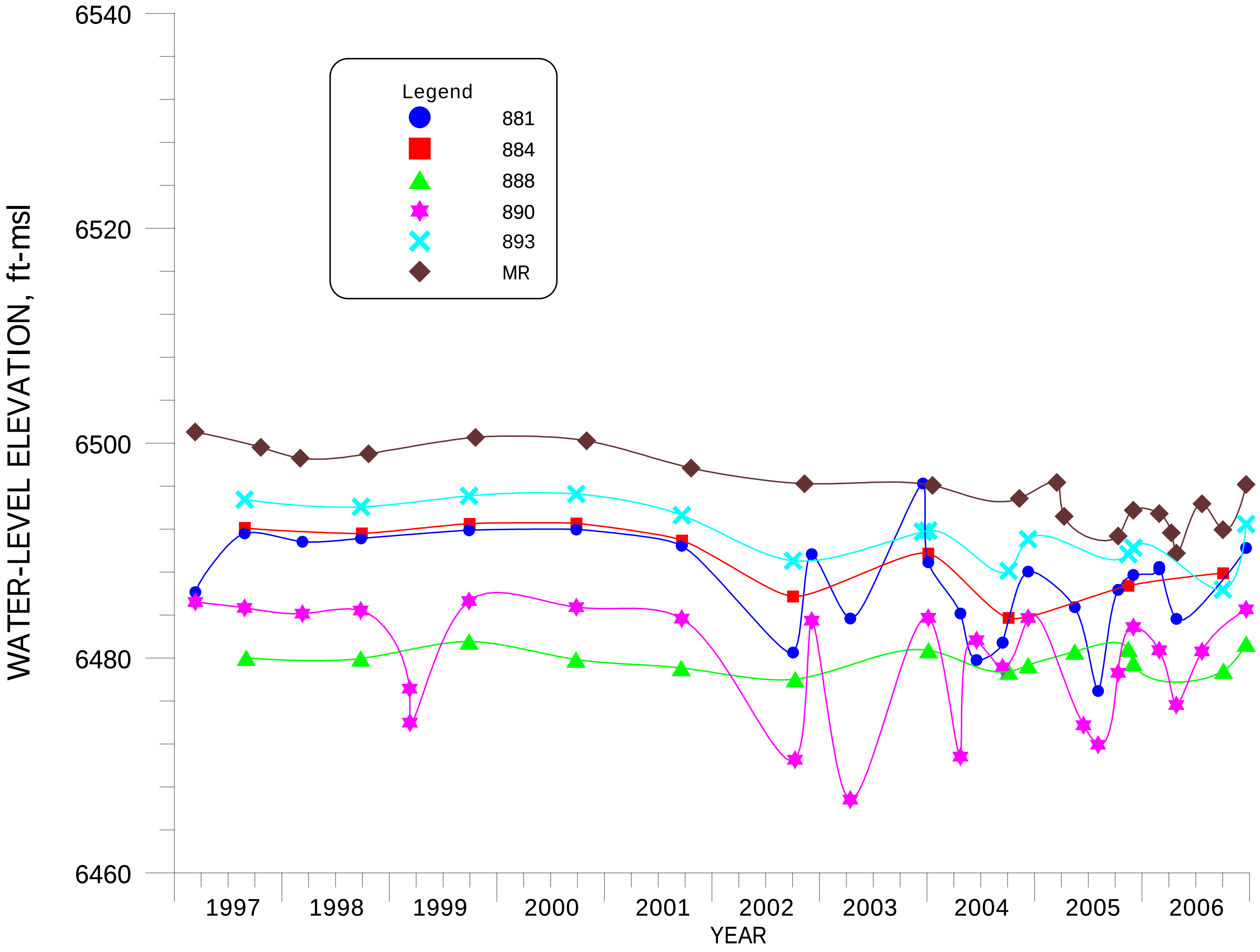


FIGURE 4.2-16. WATER-LEVEL ELEVATION FOR WELLS 881, 884, 888, 890, 893 AND MR.

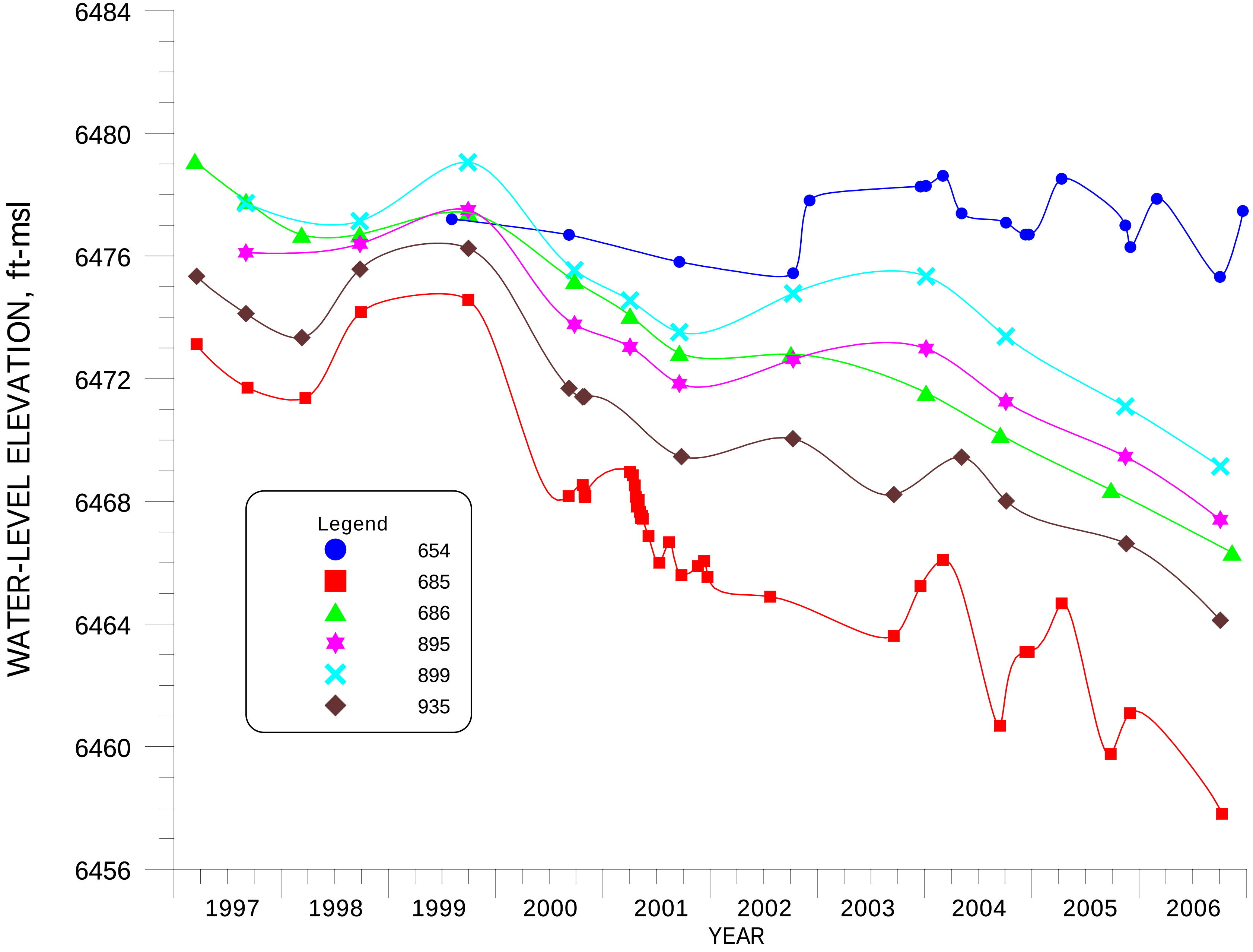


FIGURE 4.2-17. WATER-LEVEL ELEVATION FOR WELLS 654, 685, 686, 895, 899 AND 935.

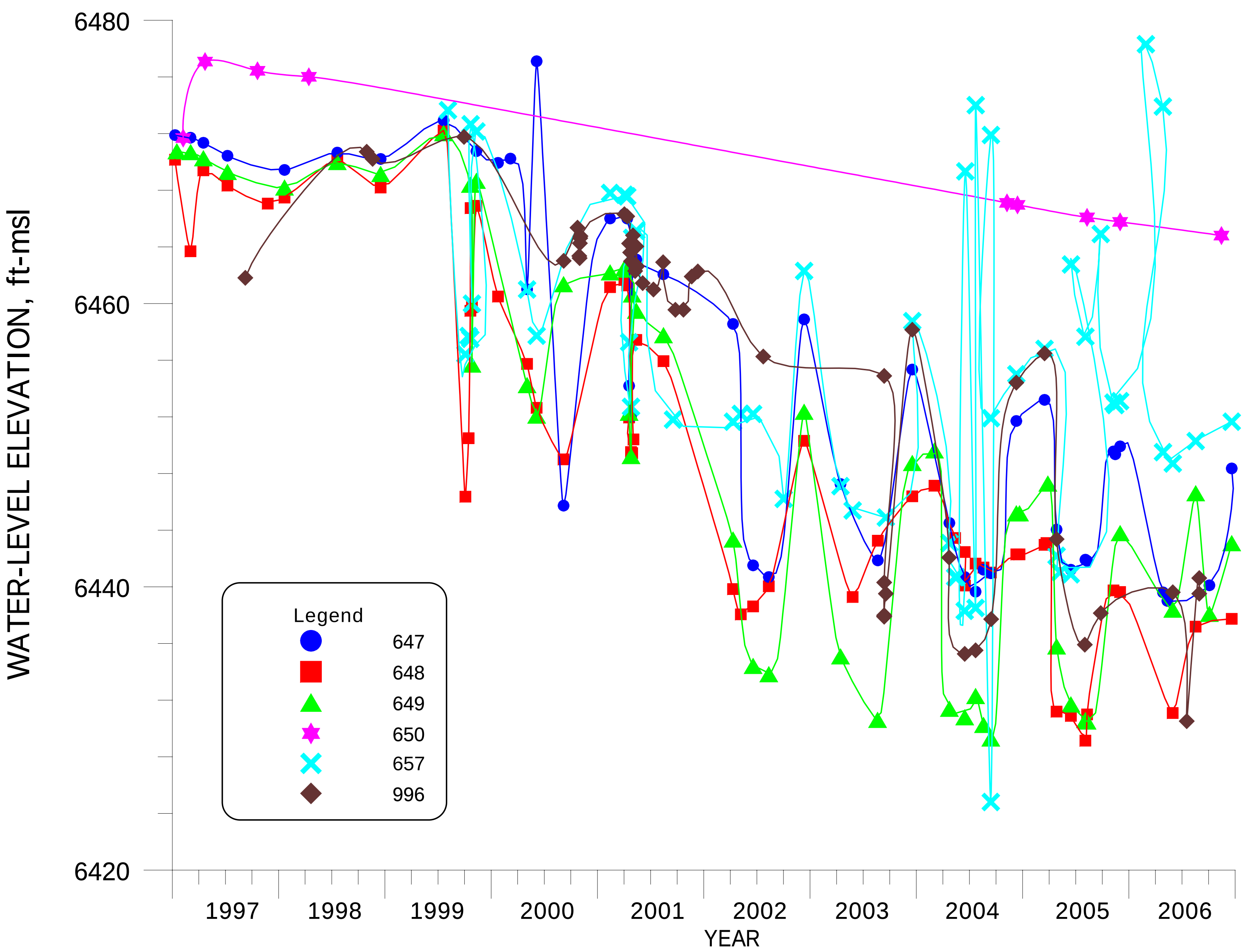


FIGURE 4.2-18. WATER-LEVEL ELEVATION FOR WELLS 647, 648, 649, 650, 657 AND 996.

4.3 ALLUVIAL WATER QUALITY

This section presents the 2006 water-quality data for the alluvial aquifer. The major constituents that are typically measured at this site are sulfate, chloride and TDS. Sulfate concentrations are used as the primary indicator of contaminant remediation. Selenium, uranium and molybdenum are the metals of concern at this site. Nitrate, radium, chromium, vanadium and thorium are also discussed in the monitoring report, but these constituents are of only minor concern at the Grants site. Tables B.4-1 through B.4-6 in Appendix B present the 2006 alluvial water-quality data for each well. The most recent monitoring values were used for the concentration contour figures presented in this section.

Colored patterns are used on the figures to delineate where concentration limits exceed the NRC site standards for each of the constituents. The standard is presented in the legend of the respective figure for each parameter. A greater than sign was added in front of the numeric value to note that the pattern shows where the standard is exceeded.

4.3.1 SULFATE - ALLUVIAL

Sulfate has been used as the primary indicator constituent for this site, because concentrations are large in the tailings solution. Concentrations of sulfate in the alluvial aquifer for 2006 are presented on Figure 4.3-1. Background concentrations observed in 2006 ranged from 989 to 1460 mg/l. An updated statistical evaluation of the background sulfate concentration with data for a ten year period (1995 – 2004) showed that concentrations as great as 1500 mg/l could occur naturally at this site and is, therefore, the NRC site standard. Areas where sulfate concentrations exceed 1500 mg/l are shown with a green pattern on Figure 4.3-1. One well in Broadview Acres and one well in west-central portion of Section 34 slightly exceeds the site standard. As shown sulfate concentrations in two small areas underlying the Large Tailings Pile still locally exceed 10,000 mg/l. A significant reduction in sulfate concentration was achieved along the restoration zone in Section 28 in 2006. The observed sulfate concentrations in Broadview Acres and Felice Acres were less than 1000 mg/l in 2006, except for a value of 1520 mg/l measured in a water sample collected from well SUB3. Sulfate concentrations were fairly stable in Section 3 in 2006. Sulfate concentrations exceeded 1000 mg/l in the southwest portion of Murray Acres, southern Pleasant Valley Estates, eastern Valle Verde and to the southeast of Valle Verde. Sulfate concentrations also exceeded 1000 mg/l adjacent to the zero saturation boundary in the northern portion of Section 27 and extending into Section 28 (see Figure 4.3-1). Down-gradient of the Grants Project site, the sulfate concentrations are all within the natural range of background except for the two wells previously mentioned and, therefore, no water-quality restoration with respect to sulfate is necessary beyond the immediate Grants Project area except for these two wells.

Plots of constituent concentrations versus time have been prepared for the alluvial aquifer for sulfate, TDS, chloride, uranium, selenium, molybdenum and nitrate. The groupings of wells used for these plots are shown on Figure 4.3-2. The figure numbers for each of the well groupings that correspond with the sulfate concentration versus time plots are indicated. The color and symbol used for each well are the same as those used in the time plots for each constituent. Figure numbers for the time plots of other constituents are not shown on this map; however, it is useful for the other time-concentration plots because the color, symbol and well groupings are consistent.

Figure 4.3-3 presents sulfate concentrations plotted versus time for up-gradient wells DD, ND, P, P2, Q and R. A gradually increasing trend is occurring in the up-gradient well ND in 2006. An overall declining trend in sulfate concentration has been observed in well Q in 2006. The historical values for these wells show similar periods of short term increasing and decreasing trends in the alluvial aquifer. The changes in sulfate concentration in these wells are well within the range previously observed for sulfate in the up-gradient wells. Some of these increases could be due to the influx of ground water with higher sulfate concentrations into this area up-gradient of Homestake’s background wells.

Sulfate concentrations immediately west of the Large Tailings Pile in alluvial wells S3, S4 and S11 were fairly steady in 2006 (see Figure 4.3-4). The sulfate concentrations for well S2 increased in 2005 and 2006 after a similar decrease in 2004. Concentrations to the north of the Large Tailings Pile at well NC were steady in 2006.

Figure 4.3-5 presents sulfate concentrations plotted versus time for alluvial wells BC, DC, MO, MU and W situated further west of the Large Tailings Pile. Sulfate concentrations were fairly stable in alluvial wells MO and W in 2006, while concentrations increased in wells BC and MU. Concentrations decreased in well DC in 2005 and 2006 after increasing in 2004.

Figure 4.3-6 presents sulfate concentration versus time plots for alluvial wells B, BP, D1 and M3. Overall, sulfate concentrations in each of these wells were fairly steady in 2006 except for a decrease in well B and an increase in collection well M3.

Figure 4.3-7 presents time plots of sulfate concentrations for wells B11, DP, SA, T and TA. The sulfate concentrations in collection well B11 and DP have shown an increase during 2006. Sulfate concentrations in well SA were fairly steady in 2006. Concentrations in wells T and TA have slightly increased in 2006 likely due to the switching from R.O. product injection to fresh water injection in this area.

Figure 4.3-8 presents plots of sulfate concentration versus time for alluvial wells on the west side of the Small Tailings Pile. Sulfate concentrations were relatively stable in each of these wells in 2006.

Figure 4.3-9 presents sulfate concentrations versus time for alluvial wells on the south side of the Small Tailings Pile. Sulfate concentrations in these wells were all small in 2006 but an increase was observed in wells KF and KZ. The small increases in sulfate concentrations are due to the switching to fresh water injection in this area in place of the R.O. product injection. R.O. product water injection had reduced sulfate concentrations in wells KF, KZ and X to very low levels over the previous 5 years.

Figure 4.3-10 shows the sulfate concentrations for the Small Tailings Pile collection wells K4, K5, K7 and K10. Some increase was observed in well K10 during 2006. The sulfate concentrations declined in wells K5 and K7 in 2006 and were steady and low in well K4.

Time plots of sulfate concentrations in collection wells located southeast of the Small Tailings Pile are presented on Figure 4.3-11. This figure shows a reasonably steady sulfate concentration in 2006 in wells L5, L6, L7, L8, and L9 while levels increased in well L10.

Figure 4.3-12 presents sulfate concentration time plots for Broadview Acres alluvial wells GH, SUB1, SUB2 and SUB3. Small increases were observed in wells SUB1 and SUB3 in 2006. A gradual decline in sulfate concentration was observed in wells SUB2 and GH in 2006.

Figure 4.3-13 presents sulfate concentrations versus time for Felice Acres alluvial wells 490, 491, 496 and 497. The sulfate concentrations in these wells were fairly steady in 2006.

Figure 4.3-14 contains time plots of sulfate concentrations for Murray Acres and Pleasant Valley Estates alluvial wells 688, 802, 844, 846 and FB. This plot shows that sulfate concentrations in water taken from alluvial well 846 were slightly smaller in 2006. Concentrations were fairly steady in alluvial wells 688, 802, 844 and FB during 2006.

Figure 4.3-15 presents the sulfate concentration time plots for six wells in Section 3 (see Figure 4.3-2 for the location of these wells). Sulfate concentrations in each of these Section 3 alluvial wells have been fairly steady over the last several years. A small decline in sulfate concentration in well 876 has been observed while a small increase was observed in wells 631, 862 and 864.

The sulfate concentrations in water from five wells near the Section 28 center pivot irrigation system are presented on Figure 4.3-16. A significant decline occurred in monitoring well 884 in 2006 due to the fresh water injection into the injection line which is 650 feet north of this well.

Figure 4.3-17 presents sulfate concentrations with time for five wells located to the west of the Section 28 irrigation area. The sulfate concentrations in these wells remained fairly stable during 2006 except for a small decrease in wells 654, 685 and 895. Some of the small changes in sulfate concentrations may be due to the injection of fresh water in Section 28.

The time variations of sulfate concentrations in water sampled from four irrigation supply wells in Section 33 and one well in the eastern portion of Section 33 are plotted on Figure 4.3-18. Sulfate concentrations in each of these wells were fairly steady in 2006.

4.3.2 TOTAL DISSOLVED SOLIDS - ALLUVIAL

Total dissolved solids (TDS) concentration contours for the alluvial aquifer during 2006 are presented on Figure 4.3-19. The alluvial background TDS concentrations measured up-gradient of the Large Tailings Pile in 2006 varied from 1710 to 2660 mg/l. Based on an updated statistical analysis, TDS concentration must exceed 2734 mg/l before it is considered elevated beyond the naturally occurring range. A light green pattern is shown on Figure 4.3-19 to indicate where the TDS concentrations exceed 2734 mg/l. None of the observed concentrations in the west half of this figure exceed this level. The TDS concentrations near the tailings exceed 2734 mg/l for a distance of approximately 600 feet to the west of the Large Tailings Pile. Some TDS concentrations underlying the Large Tailings area exceed 20,000 mg/l. A zone of 2000 mg/l or greater TDS concentration extends to the west of the Large Tailings Pile into the western half of Section 28 (see Figure 4.3-19). An additional area of TDS concentrations greater than 2000 mg/l exists in the southern portion of Pleasant Valley Estates and the western portion of Murray Acres and to the south and southwest of this area. The only other area of TDS concentrations above 2000 mg/l are small areas in western Broadview Acres and east of Highway 605 near the L collection wells. Only the areas closely proximal to the two tailings piles and small areas west of the Large Tailings and south of Pleasant Valley Estates require ground water quality restoration with respect to TDS.

TDS-time concentration plots were developed for the same grouping of wells as those prepared for sulfate (see Figure 4.3-2 for groupings of wells with TDS plots). Figure 4.3-20 presents the TDS concentrations versus time for the up-gradient wells. TDS concentrations have gradually increased in well ND over the last few years. TDS concentrations in the remainder of the upgradient wells remained fairly steady in 2006 except for a very gradual decline in wells P and P2.

Figure 4.3-21 presents TDS concentrations plotted versus time for wells NC, S2, S3, S4 and S11. This plot shows steady concentrations in 2006 for well NC. Declines in TDS concentrations are noted in well S3 while fairly steady concentrations were observed in wells S2, S4 and S11.

TDS concentrations were relatively stable in water collected from wells BC, MO, MU and W during 2006 (see Figure 4.3-22). Decreasing concentrations have been observed in 2006 in well DC.

TDS concentrations in water sampled from wells B, BP, D1 and M3 are presented in Figure 4.3-23. TDS concentrations were relatively unchanged in 2006 in each of these wells except for a decline in well B.

Figure 4.3-24 presents TDS concentrations for wells B11, DP, SA, T and TA. Low and steady concentrations were observed in wells T and TA in 2006, while a decrease was observed in well SA. TDS concentrations gradually increased in wells B11 and DP.

Figure 4.3-25 presents time concentration plots for the wells on the west side of the Small Tailings Pile. The concentrations in these wells were fairly steady in 2006.

TDS concentrations versus time for four wells just south of the Small Tailings Pile are presented in Figure 4.3-26. This figure shows low and gradual increases in concentrations for wells KF and KZ. A small decrease in TDS concentration was observed in wells KEB and X in 2006.

Figure 4.3-27 presents plots of TDS concentrations for four wells on the south side of the No. 1 Evaporation Pond on top of the Small Tailings Pile. Samples from these alluvial wells have shown fairly steady TDS concentrations in 2006 for well K4. The TDS concentrations gradually declined in well K5 and K7 in 2006 and increased in well K10.

TDS concentrations in water taken from the L line of wells are presented in Figure 4.3-28. TDS concentrations are gradually decreasing or steady with time in each of the wells except for a rise in L10 during the second half of 2006.

Figure 4.3-29 presents the TDS concentrations versus time for the Broadview Acres wells. This plot shows a gradual decline in TDS concentrations in 2006 in wells GH and SUB2 and a small increase in values from wells SUB1 and SUB3.

The TDS concentrations in the Felice Acres alluvial wells gradually declined in 2006 (see Figure 4.3-30) except for a steady level in well 490.

TDS concentrations for the Murray Acres and Pleasant Valley Estates alluvial wells are presented in Figure 4.3-31. A gradual decreasing trend in concentrations was observed in well 846 in 2006 after a gradual rise for several years. The TDS concentration in water sampled from well 844 slightly declined in 2006. The TDS concentrations in the other three wells have remained relatively unchanged.

Figure 4.3-32 presents time plots of TDS concentrations for six wells located in Section 3. Overall, TDS concentrations have been relatively steady over the last few years.

The TDS concentrations for the Section 28 irrigation supply and monitoring wells were also stable in 2006 (see Figure 4.3-33) except for a decline in well 884 due to the fresh water injection.

TDS concentrations in alluvial wells in Section 29 and adjacent areas are presented on Figure 4.3-34. TDS concentrations in these wells in 2006 were fairly steady except for a small decrease in concentration in wells 654 and 685.

Figure 4.3-35 presents TDS concentrations in the Section 33 alluvial wells. This plot shows fairly steady concentrations in the Section 33 wells in 2006.

4.3.3 CHLORIDE - ALLUVIAL

Chloride concentration is another important indicator of tailings seepage because of the conservative nature of this constituent and the fact that up-gradient concentrations are low.

Chloride concentrations measured during 2006 in the alluvial aquifer near the tailings are presented on Figure 4.3-36. Up-gradient chloride concentrations in the alluvial aquifer varied from 60 to 109 mg/l in 2006. The fresh-water injection systems have used water with chloride concentrations of approximately 200 mg/l, whereas the R.O. product chloride concentration is less than 10 mg/l. The alluvial aquifer around and underlying the Large and Small Tailings Piles contains chloride concentrations in excess of the State drinking water standard of 250 mg/l (NRC site standard). Measurement of chloride concentration in ground water is useful in defining areas where the R.O. product water has migrated in the alluvial aquifer. A light green pattern on Figure 4.3-36 is used to illustrate where concentrations exceed 250 mg/l. The limited areal extent of the green pattern on this figure shows that the need for ground water-quality restoration with respect to chloride is limited to the immediate area of the tailings. Chloride concentrations in the alluvial water in the western half of Figure 4.3-36 have never exceeded 250 mg/l and, therefore, chloride concentrations are not typically measured in all of the wells in the west area. However, chloride concentrations were measured in samples collected from most of these wells in 2006.

Figure 4.3-37 presents chloride concentrations versus time for the six up-gradient wells. Analysis of the data on this figure shows an increase in chloride concentrations in 2006 in wells Q and R. Fairly steady chloride concentrations were observed in wells DD, ND and P2 in 2006.

Figure 4.3-38 presents time plots of chloride concentration for wells NC, S2, S3, S4 and S11. A gradual increase in chloride levels were measured in wells S2, S3, S4 and S11 in 2006. The 2006 chloride concentration in well NC was steady in 2006.

Chloride concentrations in well BC gradually increased in 2006, while a larger increase in chloride concentrations was observed in well DC (see Figure 4.3-39). Fairly steady chloride levels were observed in the three other wells.

Plots of chloride concentration for wells B, BP, D1 and M3 are presented on Figure 4.3-40. The chloride concentration in well D1 is similar to the fresh water injection concentration. The decline in concentrations in wells B and BP was caused by the R.O. product injection in this area. The chloride concentration in collection well M3 was fairly steady in 2006.

Chloride concentrations in wells B11, DP, SA, T and TA are presented on Figure 4.3-41. Chloride concentration in well B11 increased in 2006 while a very gradual increase was observed in collection well DP. Chloride concentrations in samples from wells SA, T and TA were steady in 2006.

Chloride concentrations in alluvial wells on the west side of the Small Tailings Pile are presented on Figure 4.3-42. This figure shows stable chloride concentrations in these wells.

All of the chloride concentrations on the south side of the Small Tailings Pile remained very low in 2006 but have increased due to the switch to fresh water injection. This reflects the changes from the removal of R.O. product water injection in this area (see Figure 4.3-43). The chloride concentrations in water from the K wells (see Figure 4.3-44) have been steady and low in 2006.

The chloride concentrations in water collected from the L line wells are presented in Figure 4.3-45. The chloride concentrations have generally decreased in these wells but were fairly steady in wells L8 and L9. An increase in the chloride concentration in well L10 is likely due to the fresh water injection to the south of this well. With respect to chloride concentration, the quality of water has been restored in the vicinity of the L wells, and measured concentrations reflect a mixture of the R.O. product and fresh water injection.

Figure 4.3-46 presents time plots of chloride concentrations in the Broadview Acres wells with the concentrations very similar to the fresh water chloride concentration.

Figure 4.3-47 presents the chloride concentration-time plots for the four Felice Acres wells. The 2006 chloride concentrations are fairly similar to previous chloride concentrations except for a decline in irrigation supply well 496.

Chloride concentration plots for the Murray Acres and Pleasant Valley Estates wells are presented on Figure 4.3-48. Chloride concentrations are very similar to the fresh water injection concentration with a small increase in concentration for well FB.

The plots of chloride concentration versus time in Section 3 wells are presented on Figure 4.3-49. Chloride concentrations were slightly lower in 2006 in wells 862 and 864.

Figure 4.3-50 presents plots of the variation of chloride concentrations with time in Section 28 wells. Decline in chloride concentrations were observed in wells 881, 890, and 886 in 2006. These declines are likely due to the lower chloride concentration in this fresh water injection area.

Chloride concentrations in the Section 29 monitoring wells are presented on Figure 4.3-51. It is anticipated that chloride concentrations in samples from these wells will decrease with time because of the nearby injection of fresh water with a lower chloride concentration. The water in injection supply well 951 typically has a chloride concentration of approximately 80 mg/l. The chloride in well 654 is similar to the injection concentration.

Figure 4.3-52 presents time plots of chloride concentrations in the Section 33 wells. The 2006 chloride concentrations for these wells are fairly similar to those measured prior to 2006.

4.3.4 URANIUM - ALLUVIAL

Uranium is considered an important ground water constituent at this site due to the significant levels in the tailings seepage. Uranium data and contours for 2006 are presented on Figure 4.3-53. Background uranium concentrations during 2006 varied from 0.02 to 0.20 mg/l, and the NRC alluvial site standard is 0.16 mg/l. The light green pattern on Figure 4.3-53 shows where uranium concentrations exceed 0.16 mg/l, the statistical upper range of background from previous statistical analysis of the 1995-2004 data.

Uranium concentrations exceed background in the area of the Large and Small Tailings Piles, and to the west extending into Section 28. Uranium concentrations in Sections 28 and 29 also reflect a contribution from the Rio San Jose alluvial system in Section 20, but these levels have decreased to less than 0.16 mg/l. The zones of moderately elevated concentrations join together and the combined area extends down-gradient approximately one-half mile into Section 33.

Uranium concentrations greater than 0.16 mg/l are also present near the L collection wells south of the Small Tailings Pile. Uranium concentrations in the L wells were overall slightly reduced in 2006.

An additional area where uranium concentrations in the alluvium are greater than 0.16 mg/l exists in Felice Acres and to the southwest into Section 3 (see Figure 4.3-53). The area of elevated concentrations extends for approximately one-half mile to the southwest of the southwest corner of Felice Acres. Uranium concentrations in this area were generally reduced in 2006. The uranium concentrations in another small area in the northeast portion of Murray

Acres at well 802 exceed 0.16 mg/l. Additional restoration is needed in each of these areas with respect to uranium concentrations.

Uranium concentration plots were prepared in order to illustrate changes that result from the corrective action program and other factors. Figure 4.3-2 shows the grouping and location of the alluvial wells used for the uranium-time plots. The figure numbers shown on Figure 4.3-2 correspond to the sulfate time plots. The same grouping of wells was used for the uranium plots, and their symbols and colors are the same as those used on other time plots.

Figure 4.3-54 presents uranium concentrations plotted versus time for up-gradient wells DD, ND, P, P2, Q and R. The uranium concentrations in these wells have been fairly steady during the last few years. The NRC site standard 0.16 mg/l is shown in the legend on Figure 4.3-53.

A decrease in uranium concentrations was observed in 2006 for wells S3 and S4 (see Figure 4.3-55). Uranium concentrations remained low in wells NC and S11 and exhibited an increase in well S2.

Figure 4.3-56 presents the uranium concentration time plots for alluvial wells west of the Large Tailings Pile. Uranium concentrations are low with a large increase in well BC in 2005 and 2006. Well BC is completed in a low permeability area of the alluvial aquifer and is responding slower than other wells in this area to restoration. Variable concentrations were observed in well MO and the 2006 value in well MU was steady. Concentrations were also low in wells DC and W.

Figure 4.3-57 presents time plots of uranium concentrations for alluvial wells B, BP, D1 and M3. Fairly steady uranium concentrations were observed in wells B, BP and D1 in 2006. Uranium concentrations increased in 2006 in well M3.

Plots of uranium concentration versus time are presented on Figure 4.3-58 for alluvial wells B11, DP, SA, T and TA. In general, concentrations in collection wells B11 and DP increased in 2006 while a small decrease was observed in well SA. Small concentrations were observed in water from wells T and TA during 2006.

Figure 4.3-59 presents plots of uranium concentration versus time for collection wells on the west side of the Small Tailings Pile. Uranium concentrations in wells C2, C6 and C9 were fairly steady. Uranium concentrations decreased in well C12 during 2006 after an increase in 2005.

Figure 4.3-60 presents uranium concentrations for wells on the south side of the Small Tailings Pile. Uranium concentrations are low in each of these wells, due to the injection of R.O. product and fresh water into this area.

Uranium concentrations in wells K4 and K5 were reasonably steady in 2006 (see Figure 4.3-61). Concentrations in well K7 declined in 2006 while K10 concentrations increased.

Uranium concentrations in water from alluvial wells L5, L6, L7, L8, L9 and L10 are presented on Figure 4.3-62. Uranium concentrations were fairly steady in 2006 in all of these wells except a gradual increase in well L10 concentrations.

Figure 4.3-63 presents uranium concentrations versus time for four Broadview Acres alluvial wells: GH, SUB1, SUB2 and SUB3. Uranium concentrations in wells SUB1 and SUB2 gradually declined in 2006. Uranium concentrations to the north, in wells GH and SUB3, have been small for several years and a leveling of the very gradual increase was observed in well GH in 2006.

Figure 4.3-64 presents the uranium concentration time plots for Felice Acres wells 490, 491, 496 and 497. An overall decrease in concentration was observed in each of these wells in 2006 except for fairly steady values from well 490.

Figure 4.3-65 presents uranium concentrations for wells in the Murray Acres and Pleasant Valley Estates subdivision areas. Uranium concentrations gradually declined in well 802 in 2006 and are expected to continue to gradually decrease with time. Uranium concentrations in the remainder of the wells in this area are low.

The uranium concentrations for six wells in Section 3 southwest of Felice Acres are plotted on Figure 4.3-66. The uranium concentrations in the western well 631 have been low throughout the period of record. Uranium concentrations overall decreased in well 862 in 2006 due to fresh-water injection in this area. The concentration at the leading edge of the uranium plume, as demonstrated by the values measured in wells 644, 869 and 876, increased in 2006, showing that additional restoration is needed in central Section 3. The uranium concentration in monitoring well 864 were steady in 2006 indicating the fresh water injection is going to be slow to decrease these concentrations.

Uranium concentrations from four Section 28 wells and one western Section 27 well are plotted on Figure 4.3-67. A declining trend was observed in concentration in well 884 in

2006 due to the fresh water injection in this area. The remainder concentrations were overall steady.

Uranium concentration time plots for wells in the eastern area of Section 29 are presented on Figure 4.3-68. The uranium concentrations to the north of Section 29 (well 686) gradually declined in 2006. Well 686 is located in the Rio San Jose alluvial system up-gradient of its confluence with the San Mateo alluvial system. Fairly steady concentrations were also noted in alluvial wells 685 and 935 in the northern portion of Section 32 and the southern portion of Section 29. The uranium concentrations in well 654 decreased in 2006 after the fresh-water injection caused a similar decrease in 2004. The uranium concentration in well 895 also decreased.

Uranium concentrations in wells located in Section 33 are relatively small and are plotted on Figure 4.3-69. Concentrations have remained low with steady low values in wells 648, 649, 650 and 658 during 2006. The concentrations in wells 649, 657 and 658 increased slightly in 2006.

4.3.5 SELENIUM - ALLUVIAL

Selenium is an important constituent at the Grants Project site because, like uranium, it is present in significant concentrations in the tailings water. Figure 4.3-70 presents a map of the spatial distribution of selenium concentrations throughout the site. The upper limit of background based on statistical analysis and the NRC site standard is 0.32 mg/l. Selenium concentrations upgradient of the site varied from less than 0.04 and 0.57 mg/l in 2006. Concentrations that exceed 0.32 mg/l are considered indicative of seepage impacts, while smaller concentrations are within the range of natural variation. A green pattern is superimposed on the concentration contour figure to show where concentrations exceed 0.32 mg/l. A 0.1 mg/l selenium concentration contour extends approximately 0.6 miles into Section 28. Selenium concentrations in excess of 0.1 mg/l were measured southwest of Felice Acres in areas of Section 3 to its western border.

Selenium concentrations exceeding 0.32 mg/l were measured in wells around the Large and Small Tailings Piles and extend approximately 800 feet to the west of the Large Tailings Pile and also extend to the south of the Small Tailings Pile in the area near the eastern edge of the L collection wells. None of the selenium concentrations in alluvial wells located in the subdivisions exceeded 0.1 mg/l. This shows that only the area near the tailings pile need additional restoration in order to reduce selenium concentration.

Figure 4.3-2 presents the location and grouping of wells for selenium concentration plots. The symbols and colors used on Figure 4.3-2 are the same as those used on each constituent time plot.

Figure 4.3-71 presents plots of selenium concentration versus time for up-gradient wells DD, ND, P, P2, Q and R. There has been an increasing selenium concentration trend in up-gradient well R which is the farthest near-up-gradient well from the tailings. A smaller increasing trend or steady concentrations have also been observed in the data for wells DD, Q and ND. The 2006 concentrations in these four wells were steady except an increase in well ND. Collection of water from up-gradient well P began in 1993. However, the pumping from well P has not been continuous since 1998. Thus, the concentrations of selenium have remained higher in this well. The selenium concentration in well P2 was steady during 2006.

Figure 4.3-72 shows low selenium concentrations in wells NC, S3, S4 an S11 during 2006. Steady but higher selenium concentrations were observed in well S2 in 2006.

Figure 4.3-73 presents selenium concentrations for wells BC, DC, MO, MU and W. Selenium concentrations have remained low in all of these wells except for an increase in well BC.

Selenium concentrations in water from alluvial wells located southwest of the Large Tailings Pile are plotted on Figure 4.3-74. This figure shows a small selenium concentration in well B in 2006 and a slight gradual decrease in wells BP and M3. A gradual increase was observed for data from well D1.

Figure 4.3-75 presents plots of selenium concentrations for wells B11, DP, SA, T and TA. A gradual increasing trend in selenium was noted for well B11 in 2006. Fairly steady selenium concentrations in wells DP, SA, T and TA were observed during 2006.

The selenium concentrations for collection wells located on the west side of the Small Tailings Pile are plotted on Figure 4.3-76. Selenium concentrations in samples collected from wells C2 and C6 were small in 2006. A gradual increase in concentration was observed in well C9 in 2006. The C12 selenium concentration declined in 2006 after a large increase in 2005.

Figure 4.3-77 presents selenium concentrations for wells KEB, KF, KZ and X, which are located on the south side of the Small Tailings Pile. Only small concentrations were measured in water taken from these wells and this is attributed to restoration by injection of R.O. product and fresh water in this area.

Selenium concentrations in wells K5, K7 and K10 were fairly steady in 2006 (see Figure 4.3-78). Concentrations in 2006 in collection well K4 increased after decreasing in 2005.

Figure 4.3-79 presents selenium concentration for wells L5, L6, L7, L8, L9 and L10. An increase was measured in well L10 in 2006. Fairly steady to very gradual decreasing selenium concentrations with time were observed in wells L5, L6, L7, L8, and L9 during 2006.

Figures 4.3-80 and 4.3-81 present selenium concentration plots for the Broadview Acres and Felice Acres alluvial wells. These plots show that the selenium concentrations have been reduced and maintained at low levels for the last several years in these two subdivisions. A small increase was observed in well 496 in 2006.

Selenium concentrations are presented for wells in the Murray Acres and Pleasant Valley Estates areas on Figure 4.3-82. This plot shows continuing low selenium concentrations in monitoring wells in this area of the alluvial aquifer.

Selenium concentrations for six wells in Section 3 are plotted on Figure 4.3-83. Well 631 is located in the western portion of Section 3. Selenium concentrations in this well decreased in early 2006 but returned to its previous value later in the year. Concentrations in wells 644, 869 and 876, which are located in the central portion of Section 3, gradually declined in 2006. Steady concentrations were observed in well 862.

The selenium concentrations in alluvial water in Section 28 have been fairly steady with time. Figure 4.3-84 presents the selenium concentrations from the Section 28 alluvial wells. A significant decline was observed in concentration in well 884 in 2006 due to the fresh water injection in this area.

Figure 4.3-85 displays selenium concentrations in wells in Section 29 and in wells 686 and 685, which are located to the north and south of Section 29, respectively. Fairly steady and small selenium concentrations were observed in 2006 in these wells.

Selenium concentrations from wells in Section 33 are presented on Figure 4.3-86. The data demonstrated small and steady selenium concentrations in 2006 in these wells.

4.3.6 MOLYBDENUM - ALLUVIAL

This section discusses the molybdenum concentrations in the alluvial aquifer at the Grants Project during 2006. Figure 4.3-87 is a spatial presentation of the concentration data and contours. Molybdenum concentrations in alluvial water in the west area of this figure have typically been less than 0.03 mg/l and, therefore, samples from the western wells are not routinely analyzed for molybdenum. Numerous samples were taken from these wells in 2006 to update the molybdenum database. The movement of molybdenum in the alluvial aquifer is dramatically attenuated in comparison to that of selenium and uranium. Molybdenum concentrations exceed 100 mg/l near the Large Tailings Pile and a 10 mg/l contour extends around most of the Large Tailings Pile and the western portion of the Small Tailings Pile.

The light green pattern on Figure 4.3-87 shows the area where molybdenum concentrations exceed 0.10 mg/l, the NRC site standard. A molybdenum concentration of 0.10 mg/l is considered the threshold of significance for this constituent at this site. Significant molybdenum concentrations extend approximately 1100 feet west of the Large Tailings Pile and also to the southeast of the Small Tailings Pile to the L collection wells. Concentrations in two wells in the central portion of Section 27 exceed the molybdenum site standard of 0.10 mg/l. Concentrations in none of the alluvial wells in the subdivisions exceed 0.10 mg/l of molybdenum.

Figure 4.3-88 presents molybdenum concentration for the up-gradient wells DD, ND, P, P2, Q and R. Concentrations have remained low in these six wells.

A decreasing trend in molybdenum concentration was observed in well S4 in 2006, while the molybdenum concentrations in well S2 increased (see Figure 4.3-89). Molybdenum concentrations in wells NC, S3 and S11 were steady in 2006.

Figure 4.3-90 presents time plots of molybdenum concentration for wells BC, DC, MO, MU and W. Molybdenum concentrations in each of these wells were small in 2006 except for an increase in well BC. This well is in a low permeability area of the alluvial aquifer and is restoring at a very slow rate.

Figure 4.3-91 displays molybdenum concentrations for wells B, BP, D1 and M3. Molybdenum concentrations in well M3 declined in 2006. Relatively stable concentrations with time were observed in wells B, BP and D1.

Figure 4.3-92 presents molybdenum concentrations for wells B11, DP, SA, T and TA. A decrease in the molybdenum concentrations in wells DP and SA was observed in 2006. The molybdenum concentrations in well B11 increased in 2006 while the values in the other two wells were fairly steady.

Molybdenum concentrations in wells on the west side of the Small Tailings Pile are presented on Figure 4.3-93. Large molybdenum concentrations became fairly steady in the water in wells C6 and C12 in 2006. A decline in concentration was observed in well C9.

Figure 4.3-94 presents molybdenum concentrations for wells on the south side of the Small Tailings Pile. Small molybdenum concentrations continued to be observed in wells KEB, KF, KZ and X during the last year.

Figure 4.3-95 shows declining molybdenum concentrations in wells K5 and K7 in 2006. Concentrations were steady in well K4 while a small increase was observed in well K10.

Figure 4.3-96 presents molybdenum concentrations in wells L5, L6, L7, L8, L9 and L10, which are located further to the southeast of the Small Tailings Pile. Molybdenum concentrations were generally very gradually declining or steady in these wells during 2006. A small increase was observed in well K10.

Molybdenum concentrations in alluvial wells located in Broadview Acres and Felice Acres are plotted on Figures 4.3-97 and 4.3-98, respectively. The molybdenum concentrations in Broadview wells GH, SUB1, SUB2 and SUB3 have been low for the last several years. Molybdenum concentrations in wells 490, 491, 496 and 497 in Felice Acres were reasonably steady for 2006.

Figure 4.3-99 presents the molybdenum concentrations for wells in the Murray Acres and the Pleasant Valley Estates areas. This plot shows that molybdenum concentrations have remained low in these alluvial wells.

Molybdenum concentration plots for the irrigation area wells have been updated. Figures 4.3-100 through 4.3-103 present the molybdenum concentration time plots for the Section 3, Section 28, Section 29 and Section 33 wells, respectively. All of the molybdenum concentrations have remained low in wells located in these areas in 2006 except for a higher value from well 886. The larger molybdenum concentration observed in well 886 in 2006 may be anomalous because previous values in this area have been very small. Molybdenum concentrations have migrated into Section 27 and could possibly have migrated into western Section 28 in a small area.

4.3.7 NITRATE - ALLUVIAL

The presence of relatively large nitrate concentrations up-gradient of the Grants site has resulted in an NRC site standard of 12 mg/l (see Table 3.1-1). A statistical analysis of the up-gradient data 1995 through 2004 produced the nitrate concentration of 12 mg/l based on the 95th percentile of background. Figure 4.3-104 presents nitrate concentrations measured in 2006 in the alluvial aquifer. The nitrate concentrations north and up-gradient of the tailings ultimately impact the nitrate concentrations down-gradient of the Large Tailings Pile in the northern portion of Sections 27 and 28. It is difficult to determine whether seepage from the tailings has any significant impact on the nitrate concentrations in this area, because the naturally higher concentrations up-gradient of the Large Tailings Pile makes modestly elevated nitrate concentrations indistinguishable from background. The nitrate concentrations in the northern portion of Section 27 did exceed 12 mg/l in 2006. Some of these larger nitrate concentrations could be caused by the higher historical nitrates upgradient of the site.

Nitrate concentrations exceed 12 mg/l in an area on the south side of the Large Tailings Pile which are all likely due to seepage from the tailings. Small areas of nitrates above 12 mg/l also exist east of the Small Tailings and south of Pleasant Valley. Nitrate concentrations in all of the alluvial subdivision wells are below 12 mg/l. The water-quality restoration with respect to nitrate is shown by the green patterns on Figure 4.3-104. Restoration of nitrate should occur prior to the restoration of key parameters.

Plots of nitrate concentration over time were prepared for the alluvial wells that are listed on Figure 4.3-2. Figure 4.3-105 presents the nitrate concentrations for the background wells. Concentrations in these wells have been relatively stable except for a gradual increasing trend over the last few years in well R and well Q for the last two years. The present nitrate concentration in well R exceeds the site standard which shows that nitrate concentrations above the site are entering the near-up-gradient area. Well Q nitrate concentrations are essentially equal to the site standard. The recent increases in well Q fit the travel time between wells R and Q.

The nitrate concentrations in wells NC, S2, S3, S4 and S11, immediately west of the Large Tailings Pile, are plotted on Figure 4.3-106. This figure shows small and steady concentrations except for the declining level in well S2 in 2006.

Figure 4.3-107 presents the nitrate concentrations for wells BC, DC, MO, MU and W. Nitrate concentrations increased in 2006 in well MO along with a decrease observed in well MU after a large increase in 2005. Small decreases in nitrate were observed in wells BC, DC and W.

Nitrate concentrations in the group of wells southwest of the Large Tailings Pile are presented as time plots on Figure 4.3-108. All of the concentrations in these wells are fairly steady except for a decrease in well M3.

Figure 4.3-109 presents nitrate concentrations in wells B11, DP, SA, T and TA. Nitrate concentrations were fairly steady in these wells in 2006 except for an increase in well B11.

Nitrate concentrations in wells on the west side of the Small Tailings Pile are plotted on Figure 4.3-110. Fairly steady and small nitrate concentrations were observed in these wells in 2006.

Figure 4.3-111 shows nitrate concentrations for wells on the south side of the Small Tailings Pile. All of the nitrate concentrations in these wells are low and steady.

The nitrate concentrations in the K and L series wells are presented on Figures 4.3-112 and 4.3-113, respectively. Concentrations in recent samples have been very small in all of these wells.

Nitrate concentrations in the Broadview Acres wells are presented on Figure 4.3-114. Small and relatively steady nitrate concentrations were measured in water from all of these wells with time. A small increase was observed in well SUB1 in 2006.

Nitrate concentrations for the Felice Acres wells are presented on Figure 4.3-115, with reasonably steady concentrations over time.

Nitrate concentrations in Murray Acres and Pleasant Valley Estates wells are presented on Figure 4.3-116. Nitrate concentrations in well 846 are slightly higher than the other four wells shown on this figure and shows a small decrease in 2006. A small decrease was observed in well 844 also.

Nitrate concentrations in Section 3 wells are presented on Figure 4.3-117. The nitrate concentrations in these wells were low in 2006 with a gradual increase in wells 631, 644, 864, 869 and 876.

Nitrate concentrations for the Section 28 wells are presented on Figure 4.3-118. There had been a gradual increasing trend with time for well 886 but a decline was observed in 2004 and 2005 with the 2006 values returning to near the peak of the rise. The nitrate concentrations for the remainder of the wells have been reasonably steady except for a decrease in well 884 in 2006, likely due to fresh water injection reaching this well.

Figure 4.3-119 presents nitrate concentrations in wells 654, 686, 687, 895 and 935. The nitrate concentrations have been decreasing or steady over the last few years in each of these wells.

Nitrate concentrations in the Section 33 wells are presented on Figure 4.3-120, and, in these wells, nitrate concentrations were steady in 2006.

4.3.8 RADIUM-226 AND RADIUM-228 - ALLUVIAL

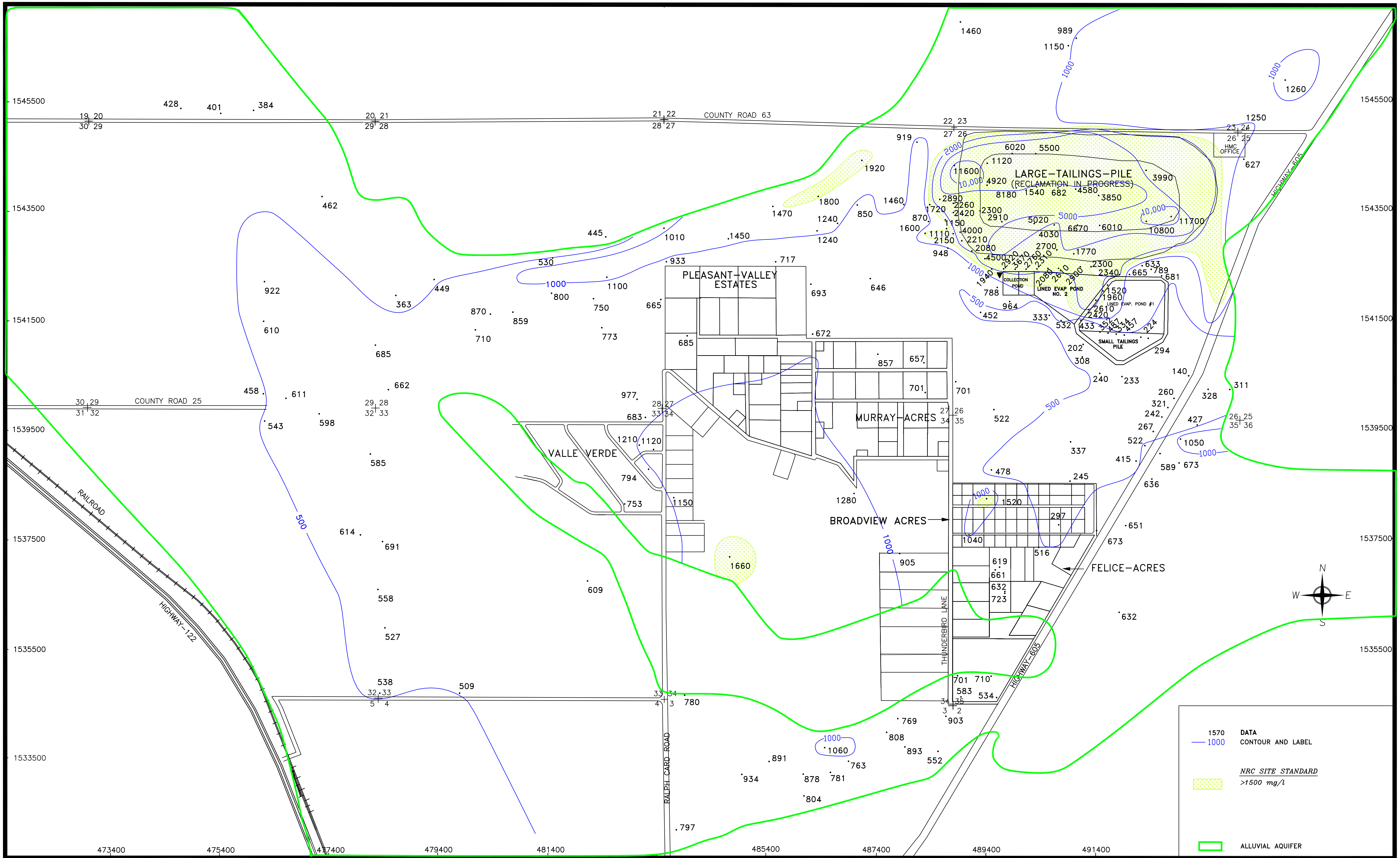
Figure 4.3-121 presents radium concentrations for the alluvial ground water in the Grants Project area. Radium concentrations are very small in the alluvial aquifer except directly underneath the Large Tailings Pile. The monitoring program for radium has been scaled back, because radium is not present in significant concentrations in the alluvial aquifer. The radium-226 concentrations are printed horizontally in black, while the radium-228 values are shown at a 45^{o} angle and in magenta. The State standard for radium-226 plus radium-228 is 30 pCi/l, while the NRC site standard is 5 pCi/l. Measured activities of radium-226 in alluvial wells beneath the Large Tailings Pile exceed 50 pCi/l in some areas and therefore exceeded the NRC site standard in 2006. No significant radium-228 values were measured in 2006, similar to the 2005 results. No radium concentrations outside of the Large Tailings Pile area are in exceedance of the standard. Past data has shown that radium is not mobile in the alluvial aquifer at this site.

4.3.9 VANADIUM - ALLUVIAL

Vanadium concentrations measured in 2006 are shown on Figure 4.3-122. None of the vanadium concentrations in the POC wells exceeded the site standard of 0.02 mg/l. POC well X was the only POC well that routinely contained a vanadium concentration above the site standard prior to restoration of that area. Therefore, none of the POC wells are expected to contain vanadium concentrations above the site standard of 0.02 mg/l in the future. Injection of R.O. product water has effectively restored ground water quality in the area near well X. Vanadium concentrations in 2004, in eight alluvial wells located within the footprint of the Large Tailings Pile, were above the site standard for vanadium. The ongoing corrective action program will restore vanadium concentrations in this area.

4.3.10 THORIUM-230 - ALLUVIAL

Figure 4.3-123 presents the 2006 thorium-230 concentrations in the alluvial aquifer. Thorium-230 concentrations are low at this site. The very low site standard of 0.3 pCi/l was established to reflect the low background concentrations. The thorium-230 activity was significant in some of the alluvial wells underneath the Large Tailings Pile in 2004. Thorium-230 has not been mobile in the alluvial aquifer except in the immediate vicinity of the tailings. The site standard for thorium-230 was exceeded in 2004 in ten wells in the alluvial aquifer underneath the Large Tailings Pile. This area is within the collection area, and additional restoration will result from the ongoing collection/injection programs. Thorium-230 levels in wells 648, 649, 653, 688, 846 and SUB1 also slightly exceeded the standard in 2005 but none of these wells that were measured in 2006 were above the detection limit. The 2005 minor exceedances are thought to be a result of laboratory variation at activities near the detection limit. The 2006 and previous measurements of thorium-230 in these wells have not exceeded 0.3 pCi/l except for previous measurements of 0.4 pCi/l from well 846. Therefore, no significance should be given to the 2005 slightly higher values.

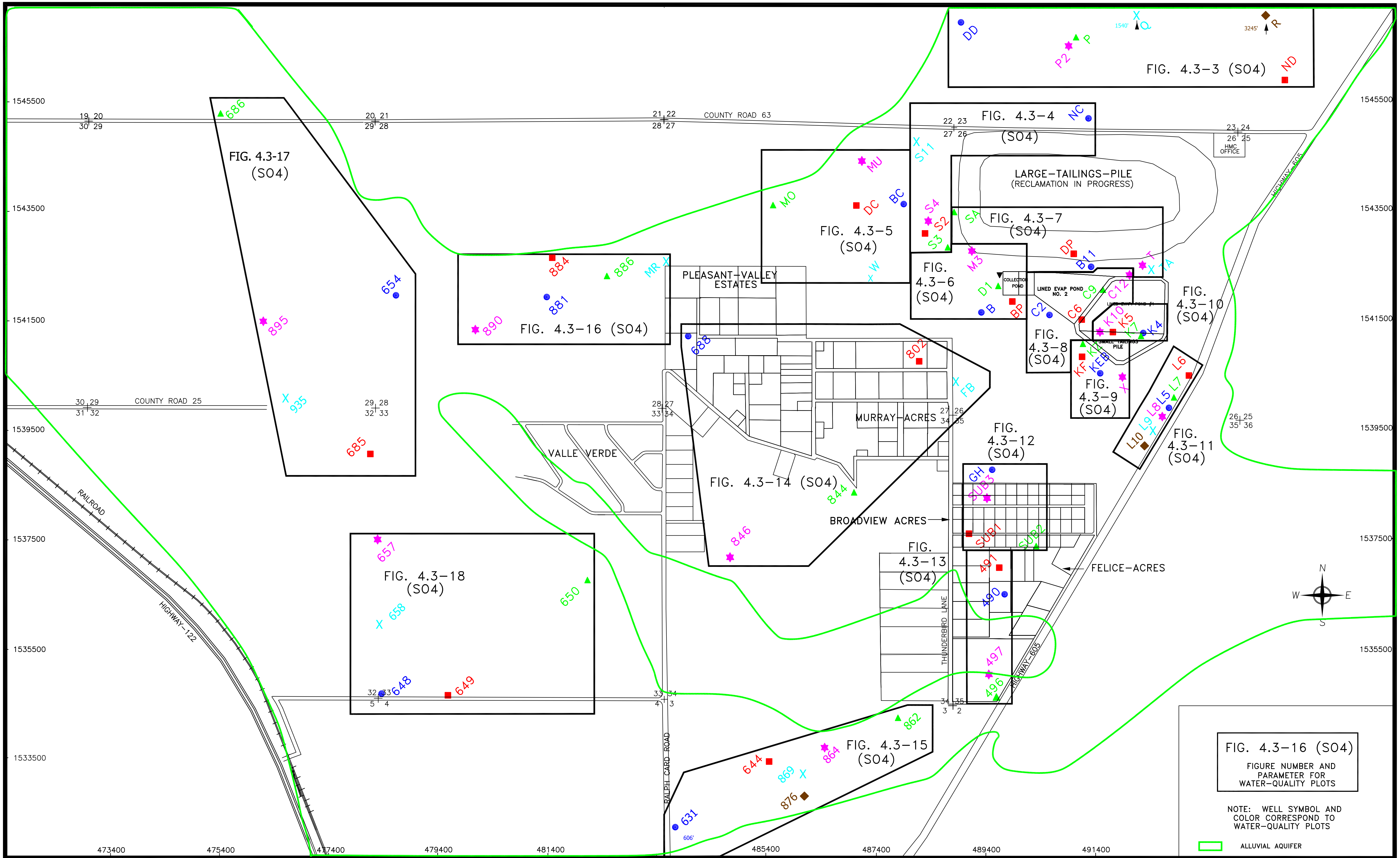


SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.3-1. SULFATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, mg/l



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.3-2. LOCATION OF ALLUVIAL WELLS WITH WATER-QUALITY PLOTS

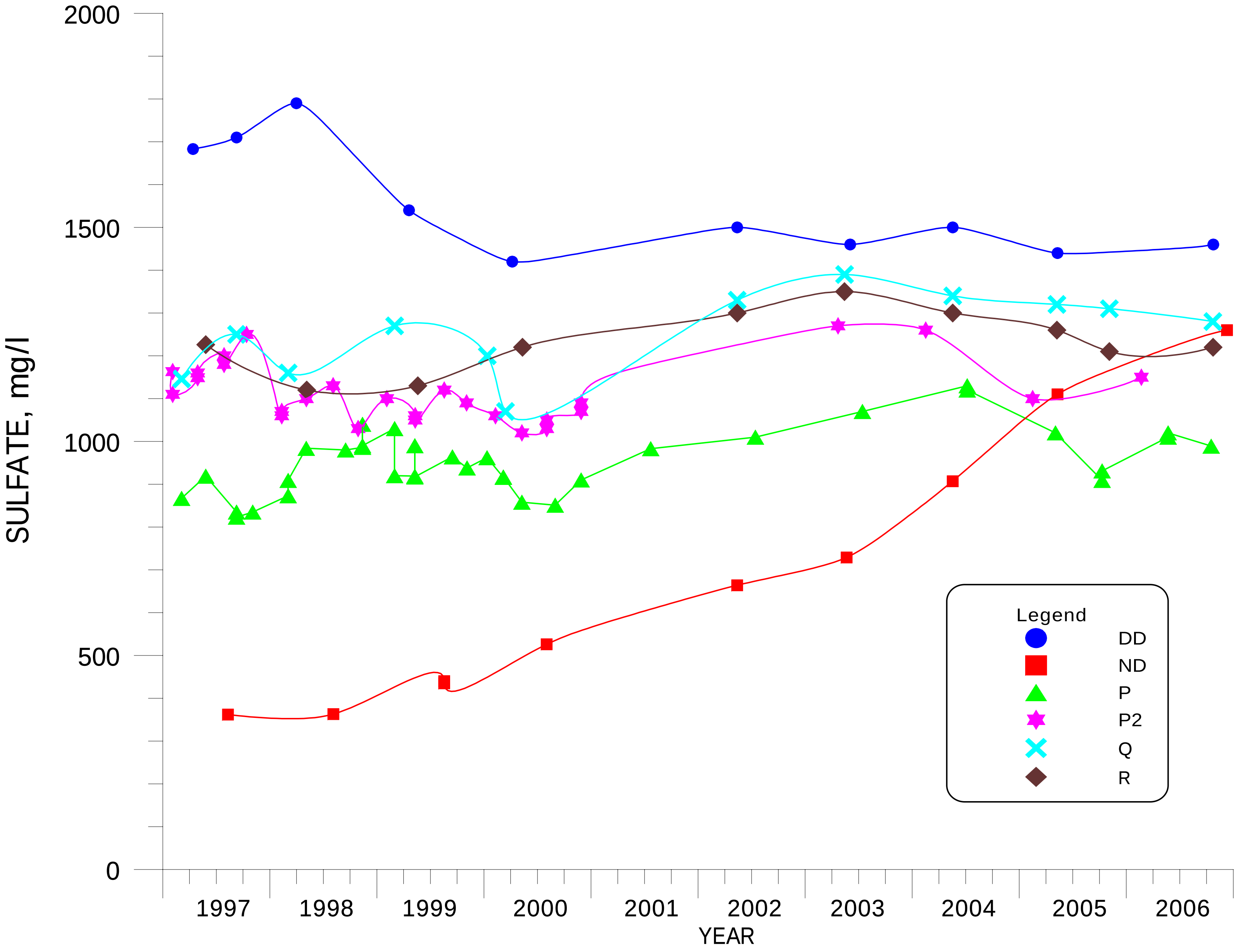


FIGURE 4.3-3. SULFATE CONCENTRATIONS FOR WELLS DD, ND, P, P2, Q AND R.

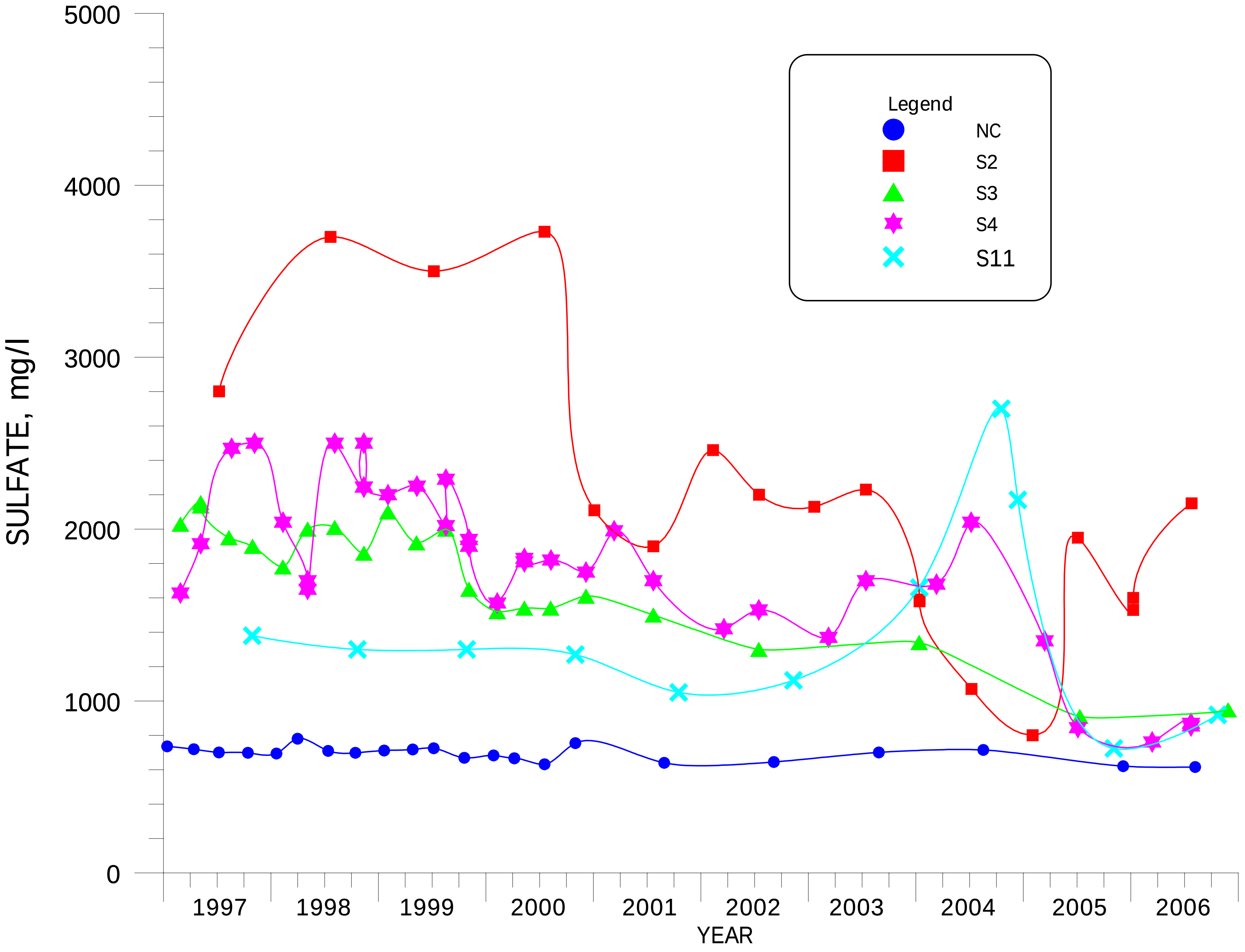


FIGURE 4.3-4. SULFATE CONCENTRATIONS FOR WELLS NC, S2, S3, S4 AND S11.

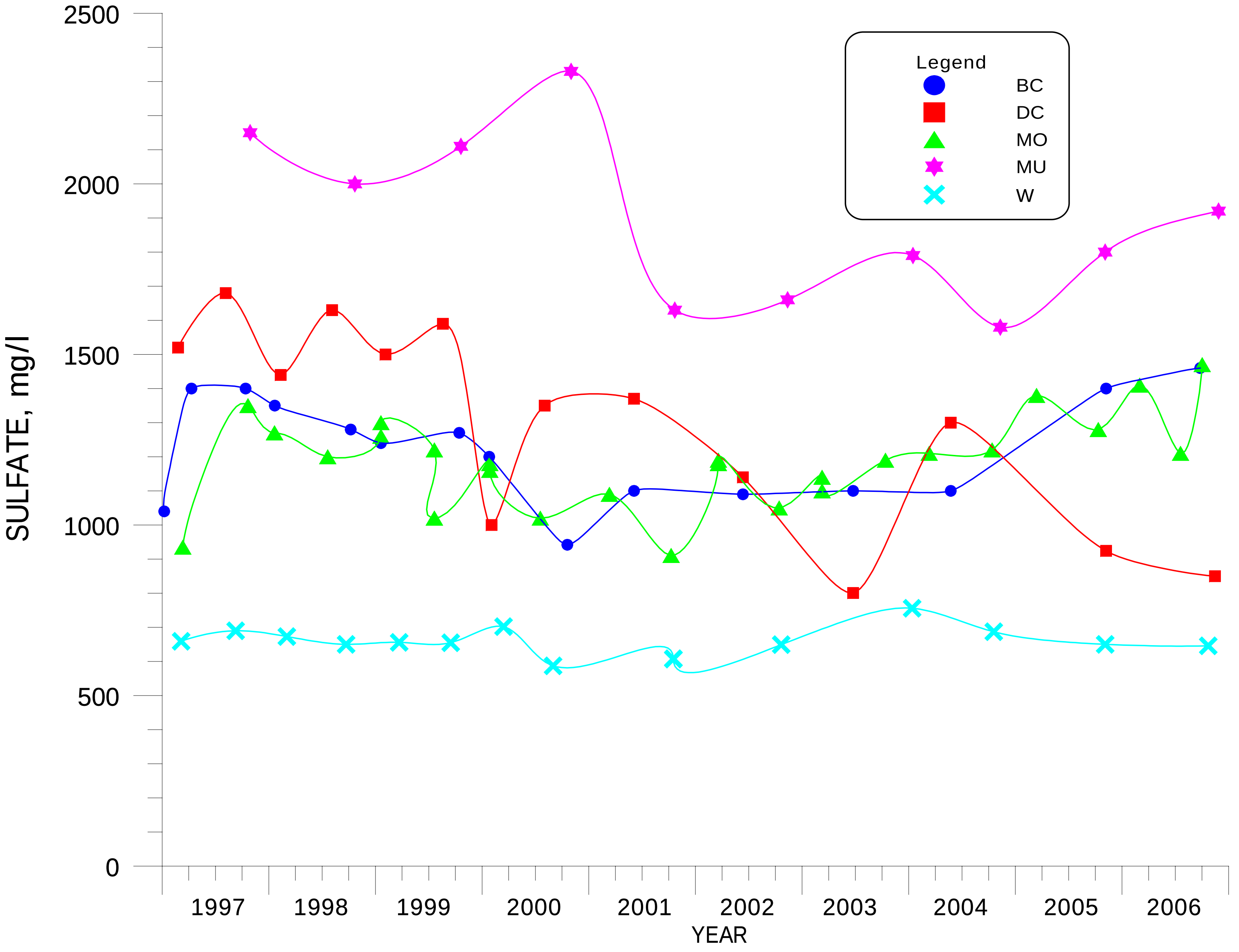


FIGURE 4.3-5. SULFATE CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.

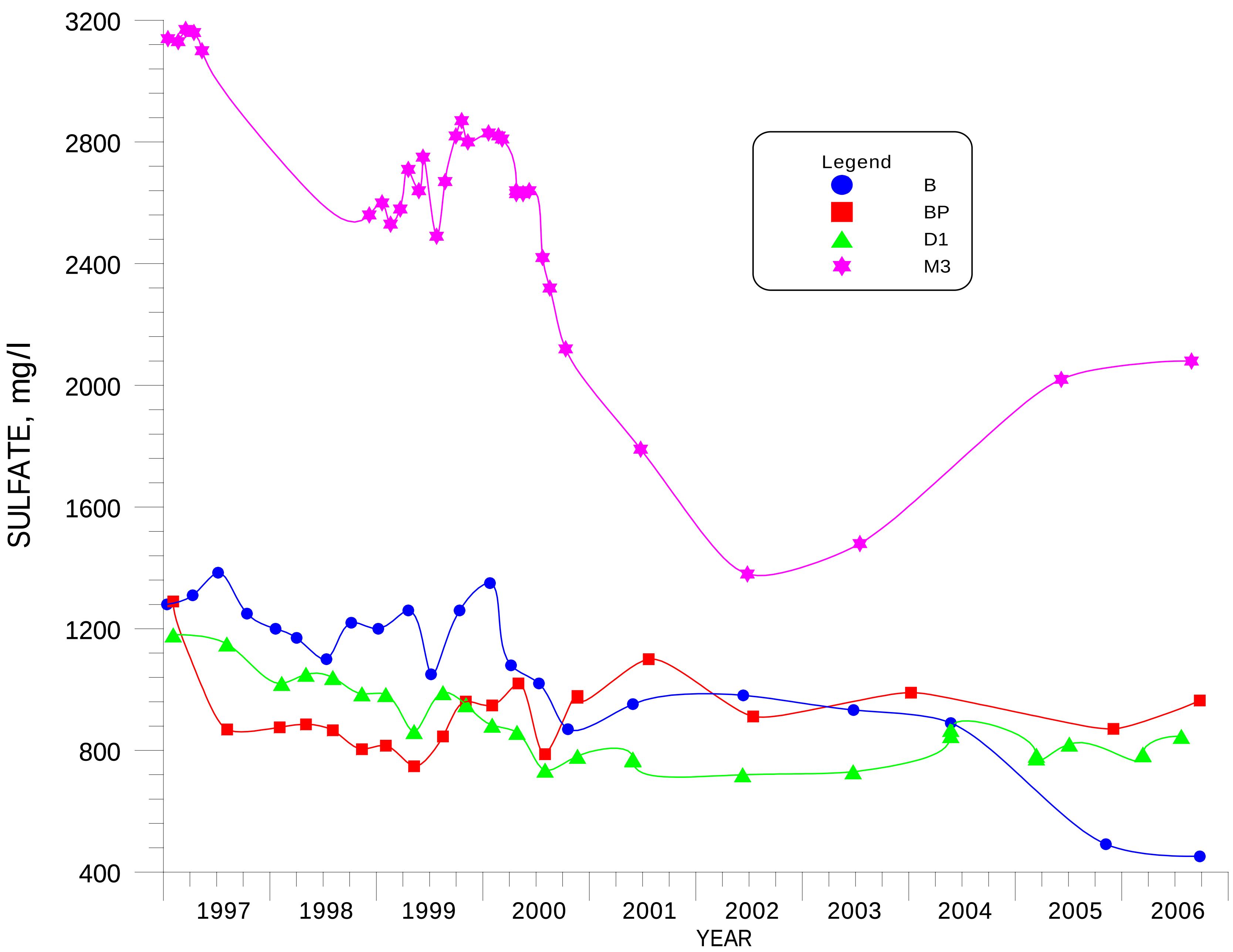


FIGURE 4.3-6. SULFATE CONCENTRATIONS FOR WELLS B, BP, D1 AND M3.

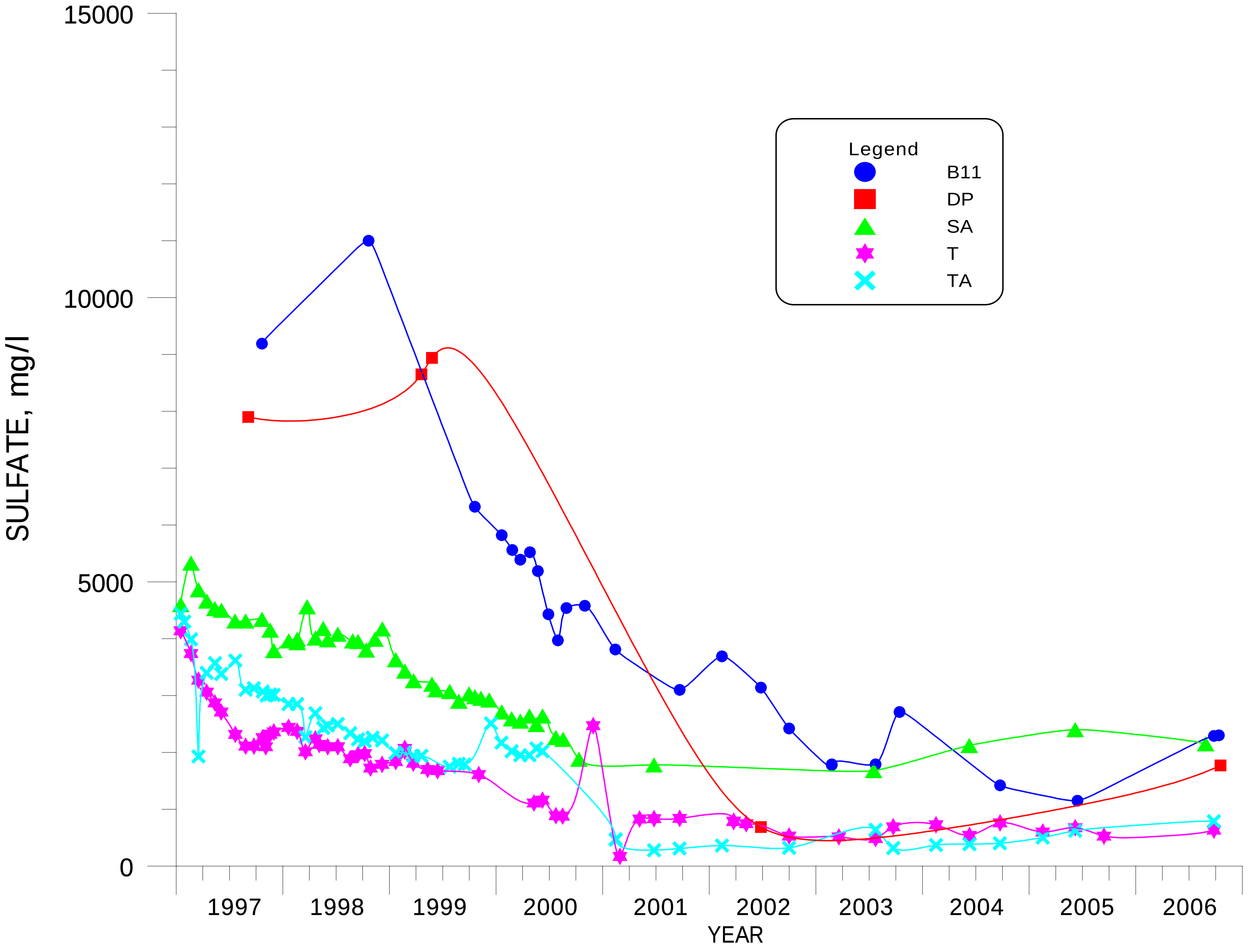


FIGURE 4.3-7. SULFATE CONCENTRATIONS FOR WELLS B11, DP, SA, T AND TA.

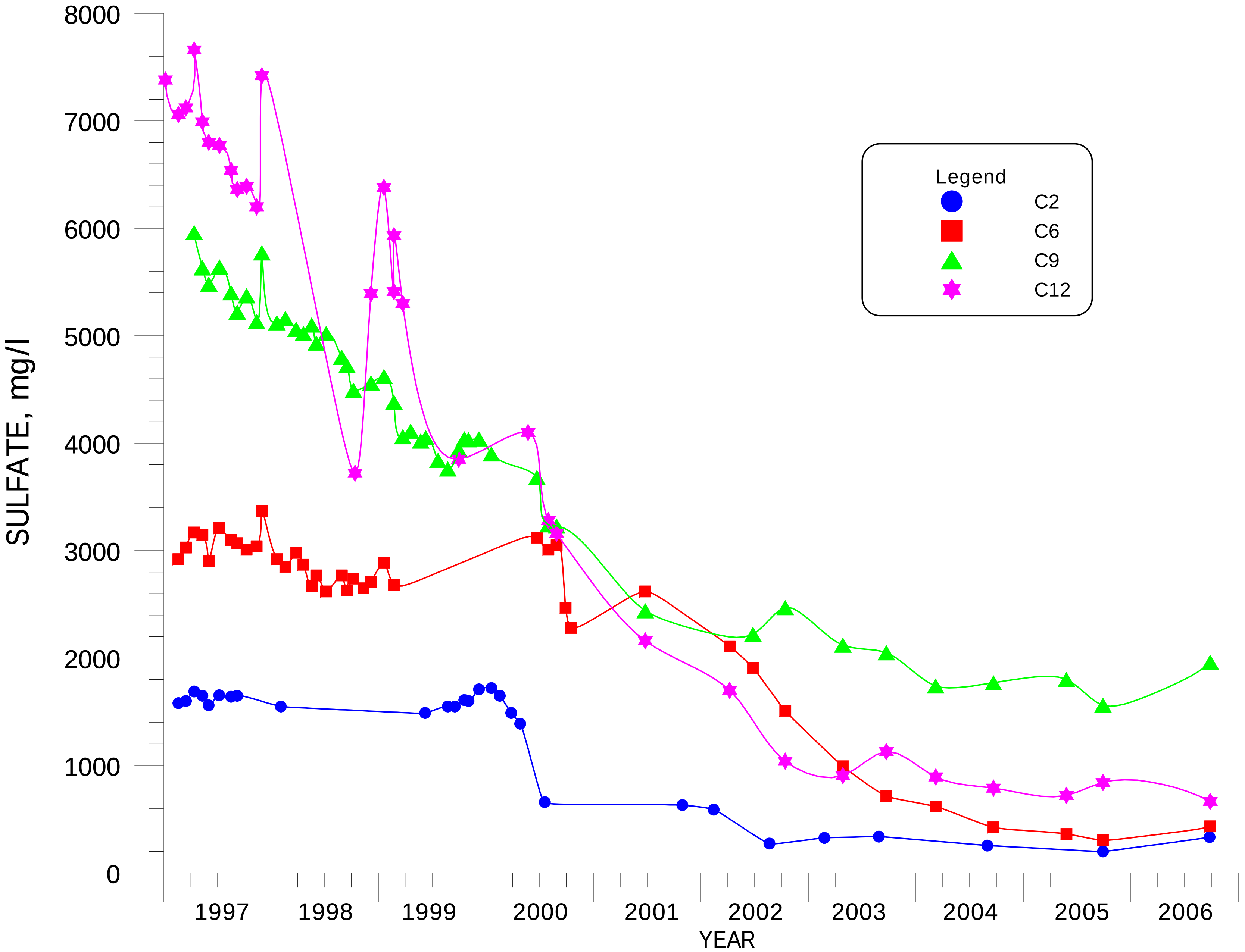


FIGURE 4.3-8. SULFATE CONCENTRATIONS FOR WELLS C2, C6, C9 AND C12.

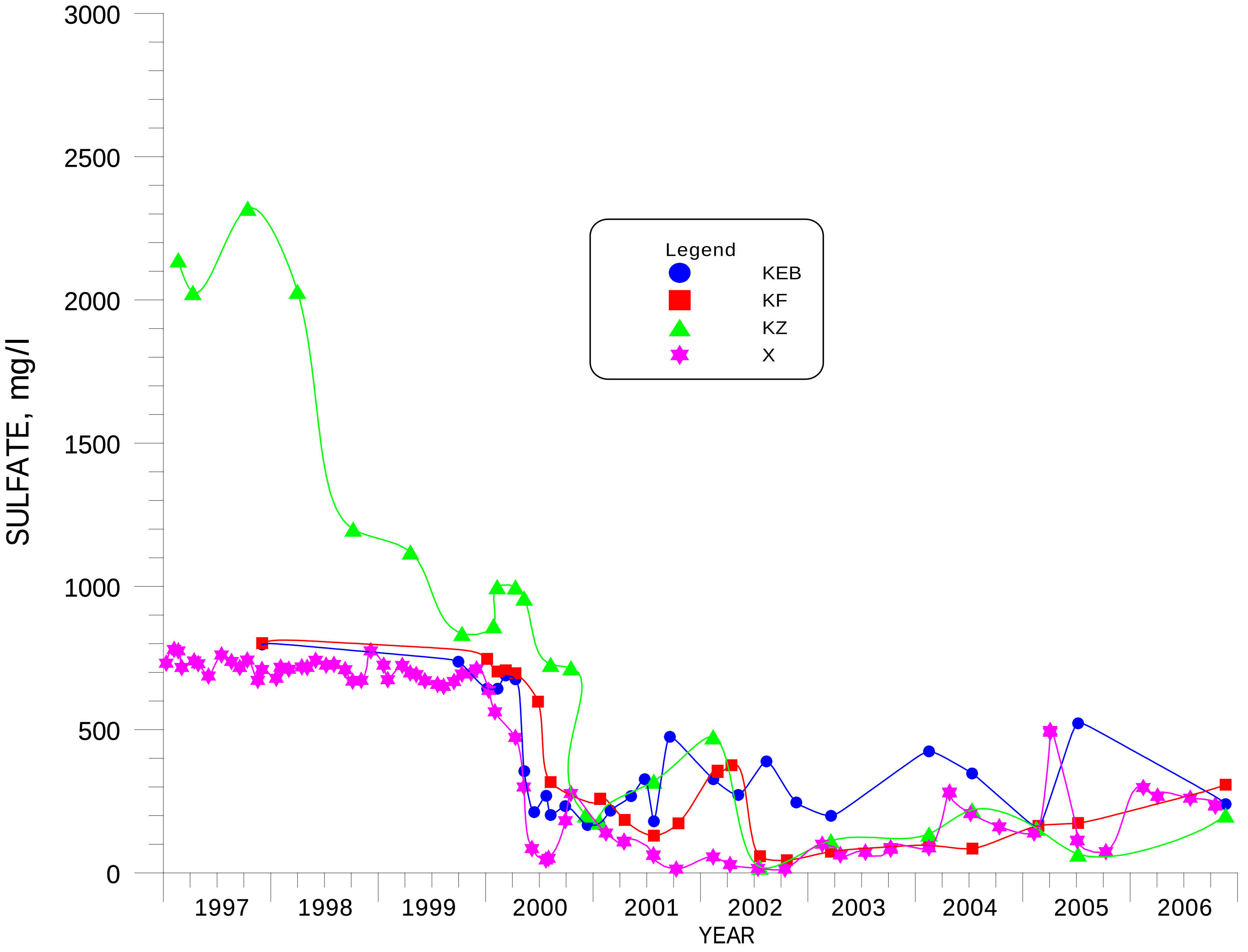


FIGURE 4.3-9. SULFATE CONCENTRATIONS FOR WELLS KEB, KF, KZ AND X.

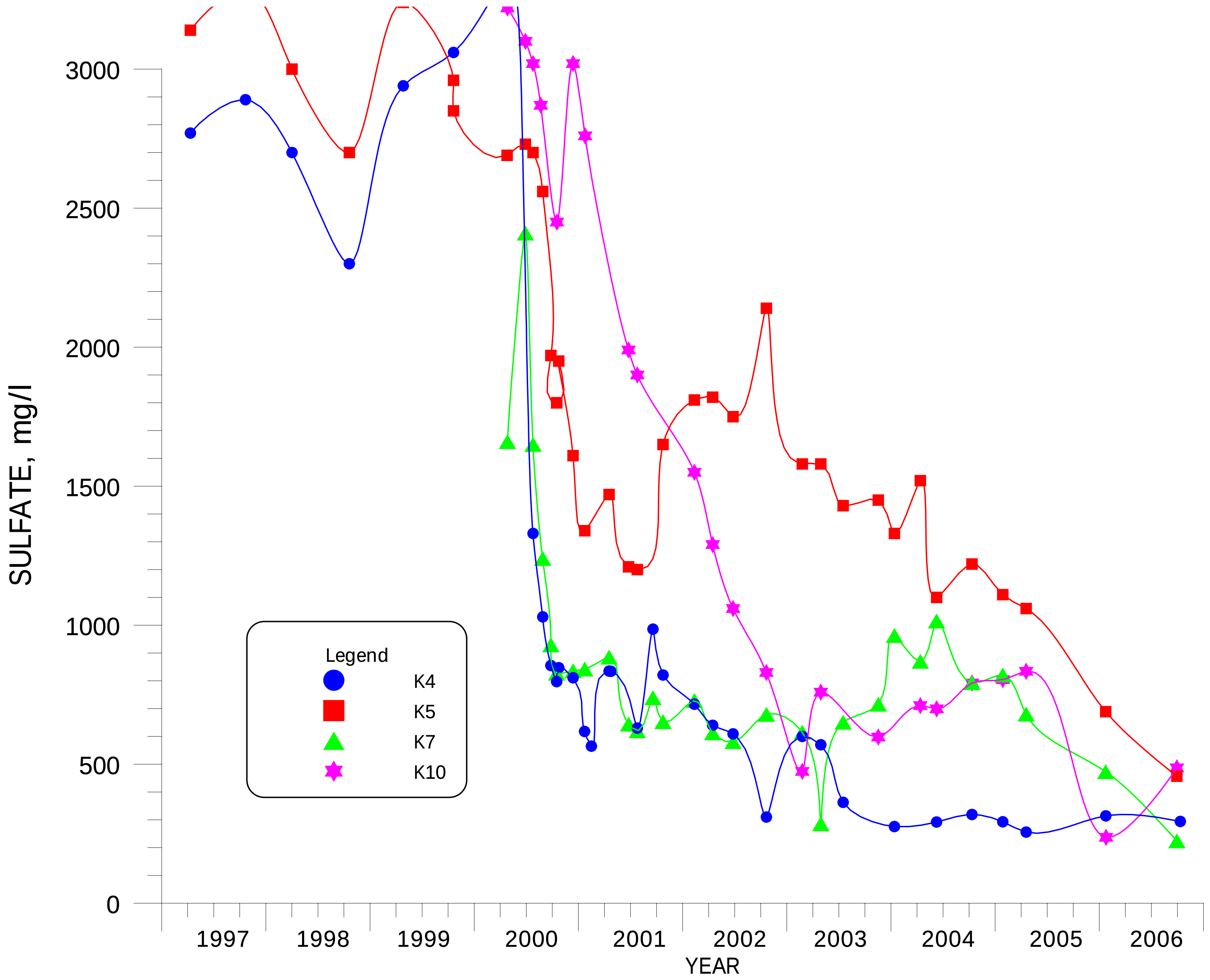


FIGURE 4.3-10. SULFATE CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.

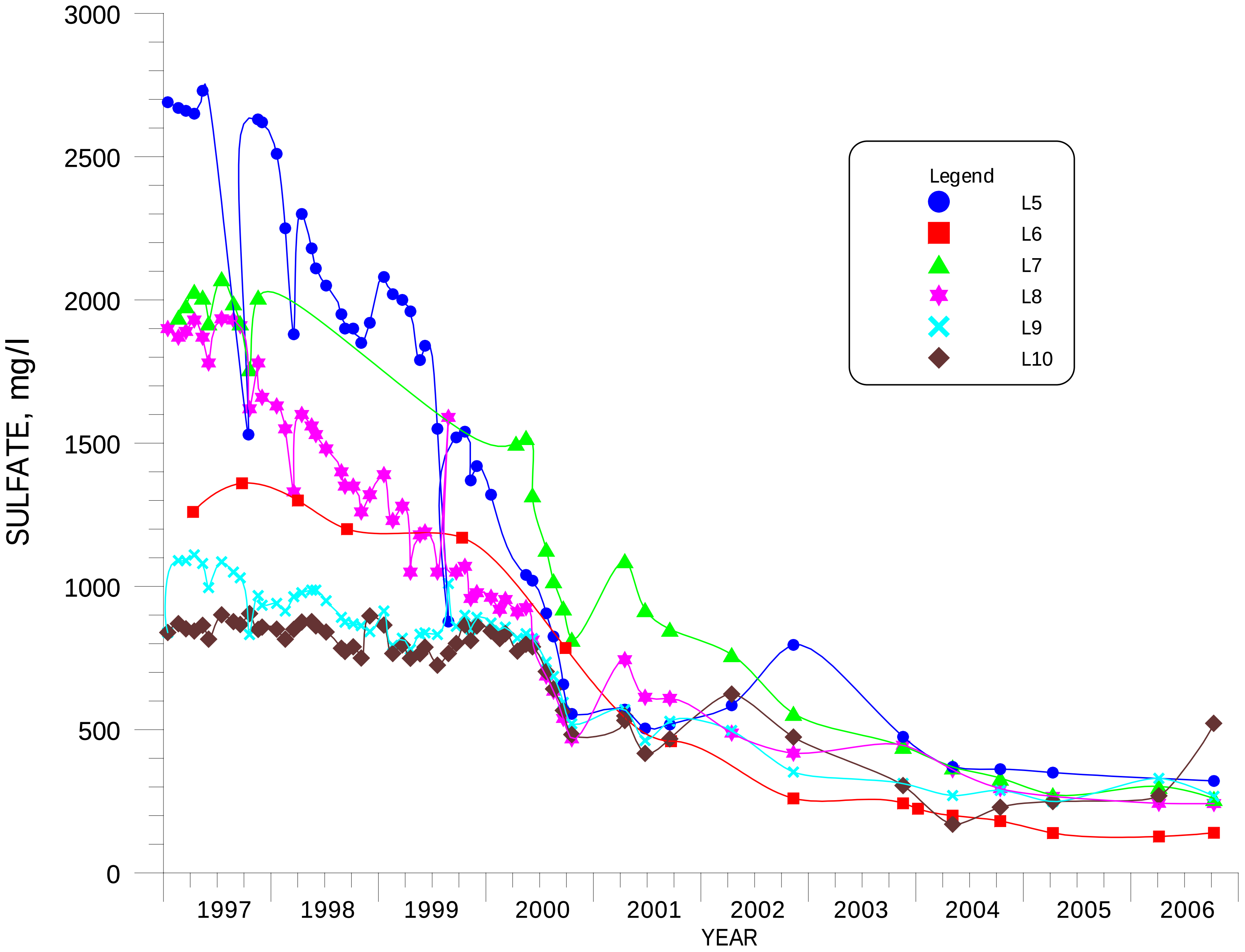


FIGURE 4.3-11. SULFATE CONCENTRATIONS FOR WELLS L5, L6, L7, L8, L9 AND L10.

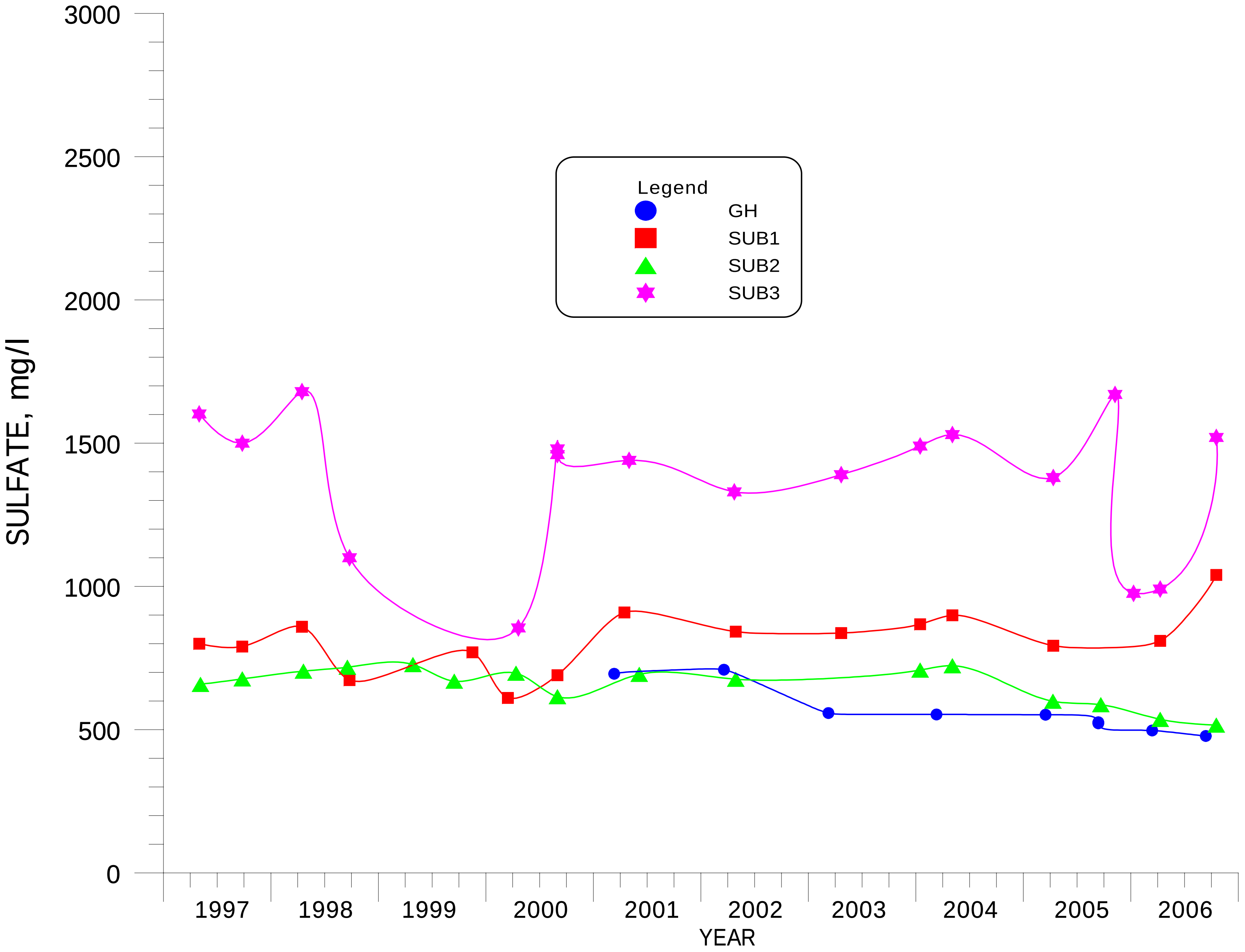


FIGURE 4.3-12. SULFATE CONCENTRATIONS FOR WELLS GH, SUB1, SUB2 AND SUB3.

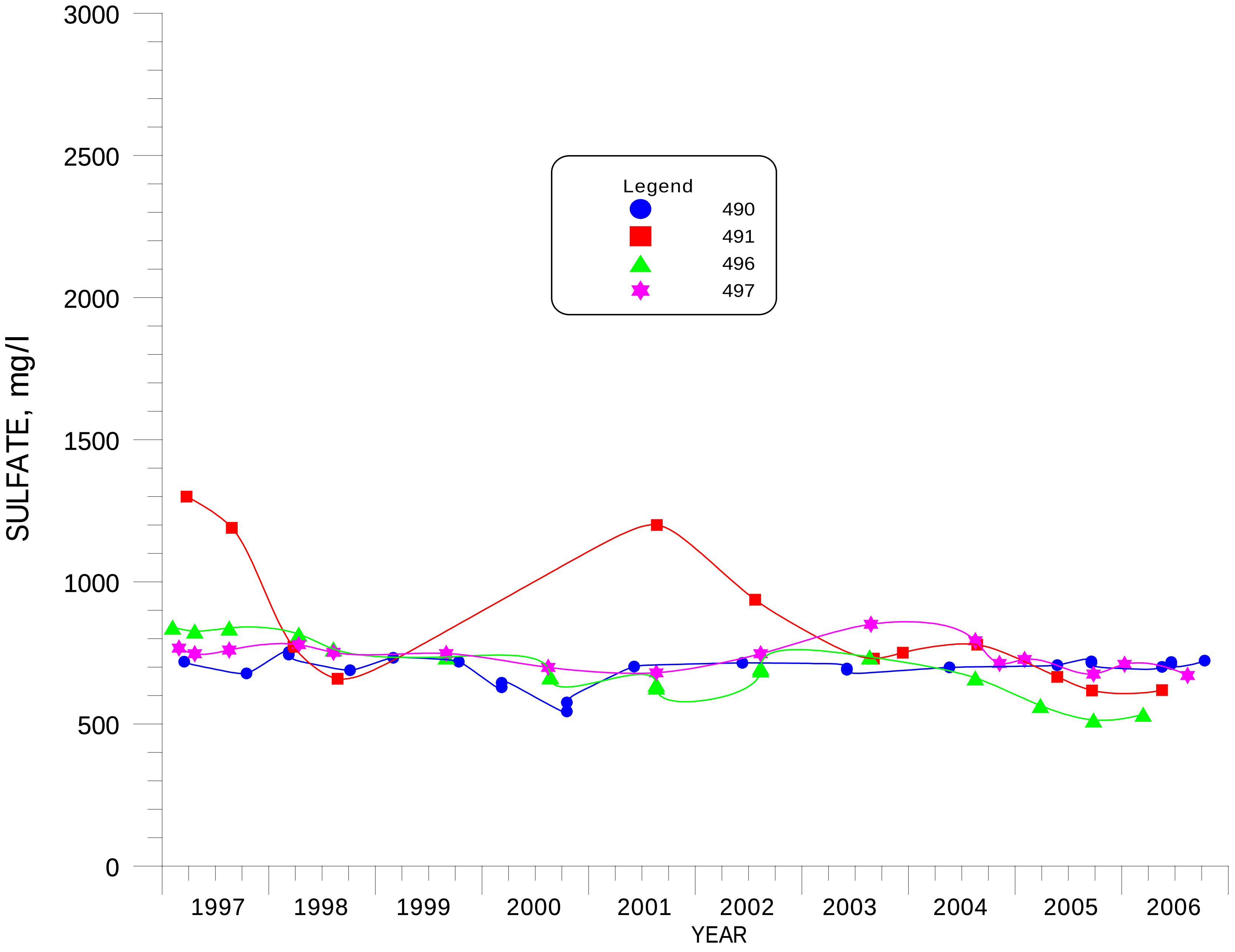


FIGURE 4.3-13. SULFATE CONCENTRATIONS FOR WELLS 490, 491, 496 AND 497.

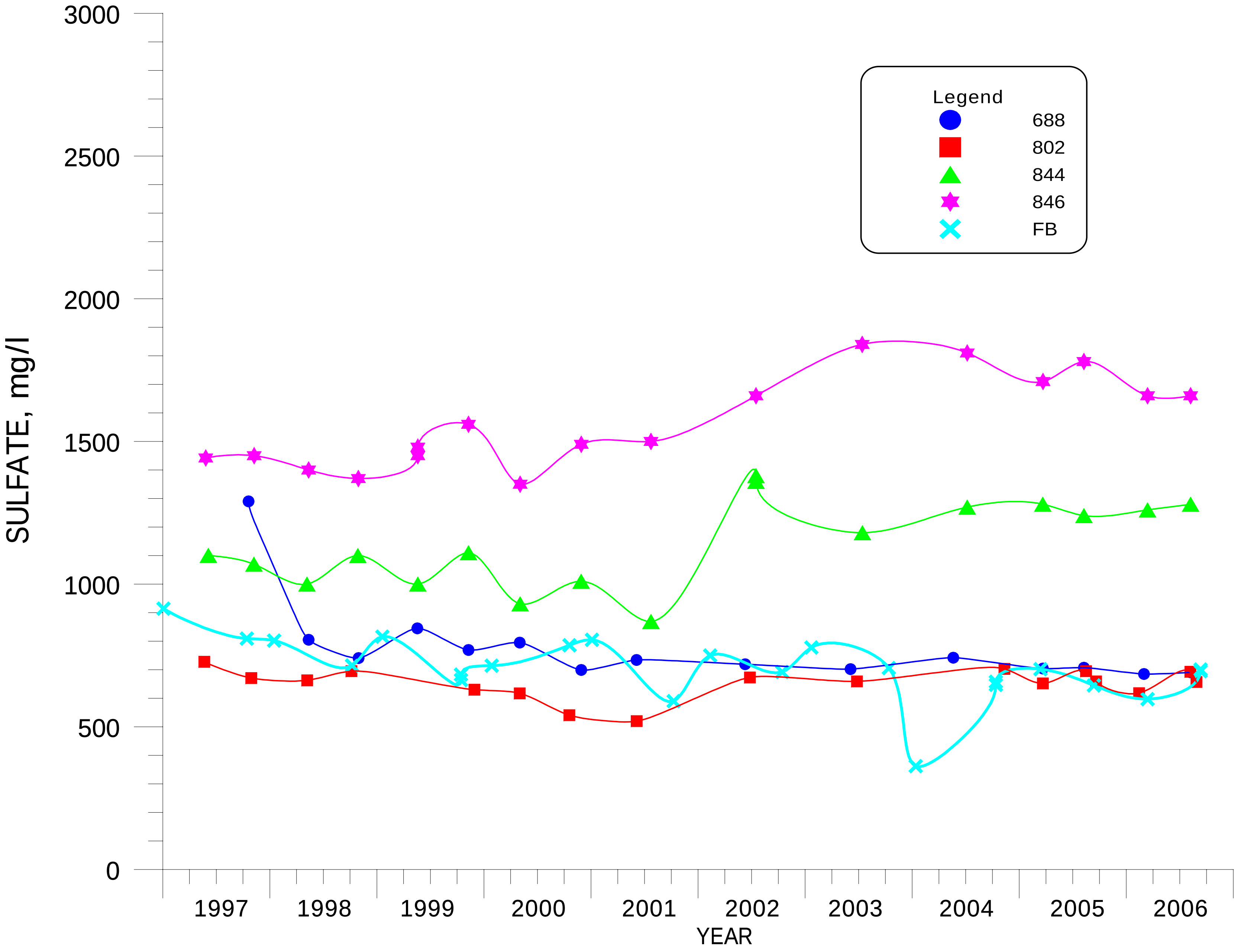


FIGURE 4.3-14. SULFATE CONCENTRATIONS FOR WELLS 688, 802, 844, 846 AND FB.

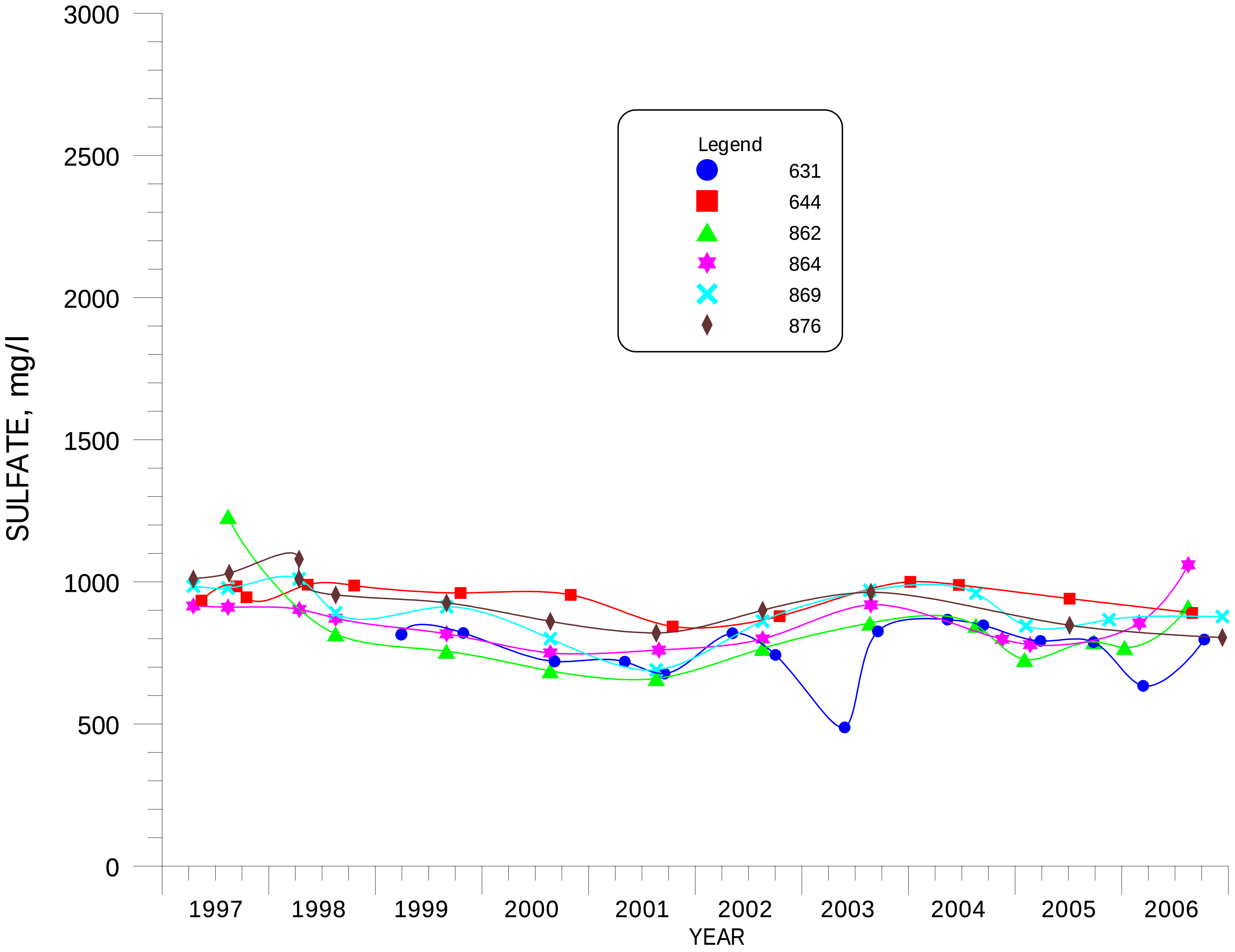


FIGURE 4.3-15. SULFATE CONCENTRATIONS FOR WELLS 631, 644, 862, 864, 869 AND 876.

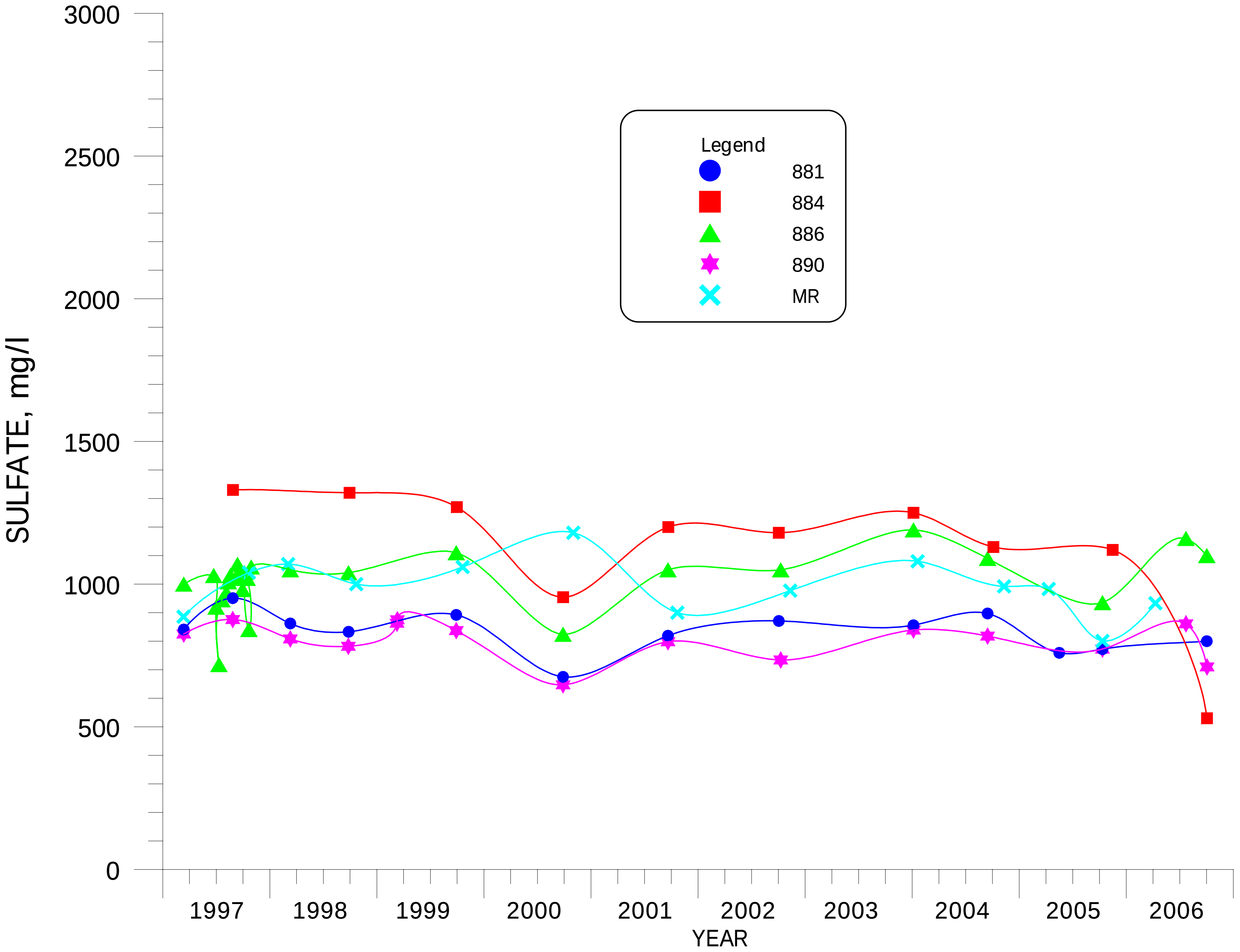


FIGURE 4.3-16. SULFATE CONCENTRATIONS FOR WELLS 881, 884, 886, 890 AND MR.

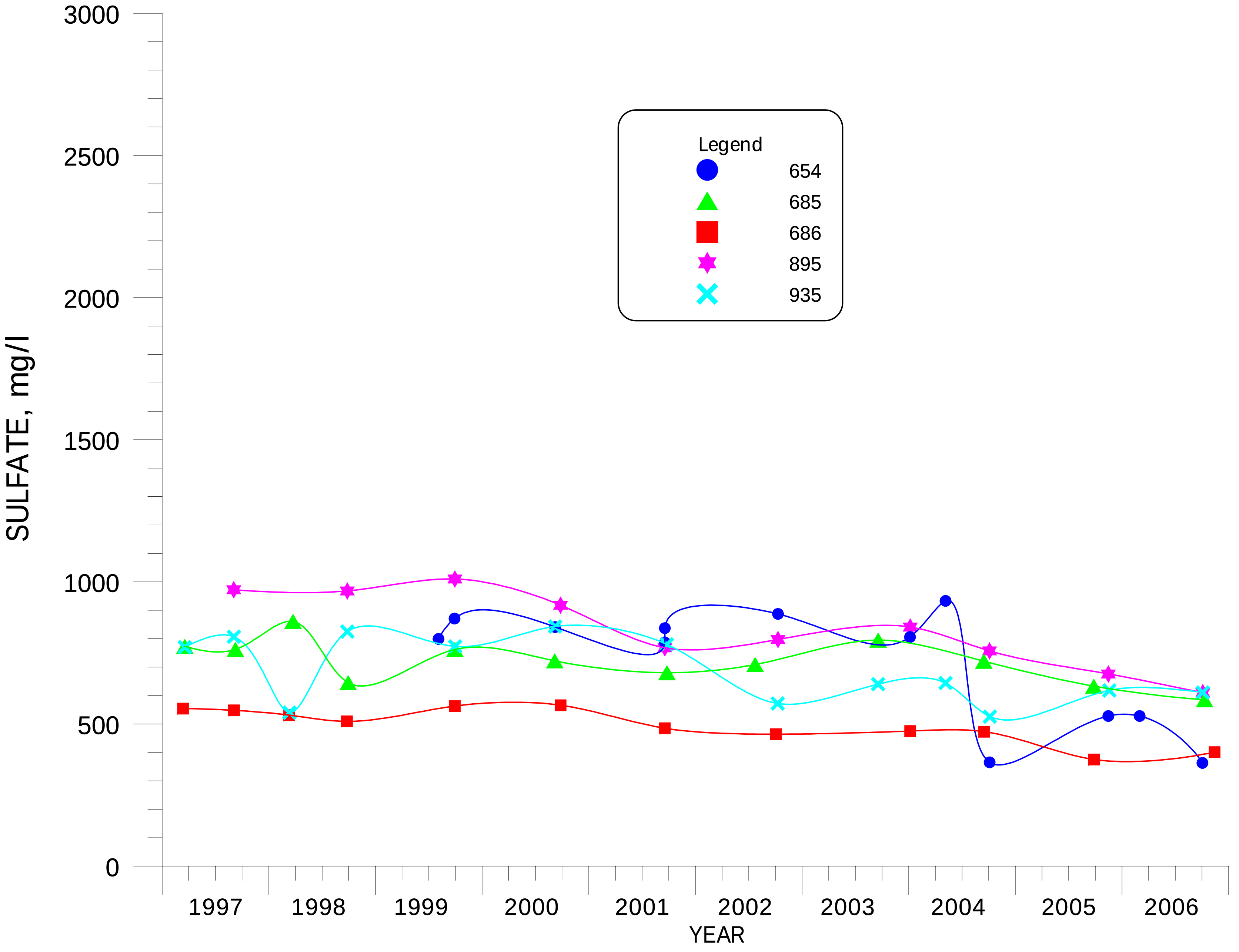


FIGURE 4.3-17. SULFATE CONCENTRATIONS FOR WELLS 654, 685, 686, 895 AND 935.

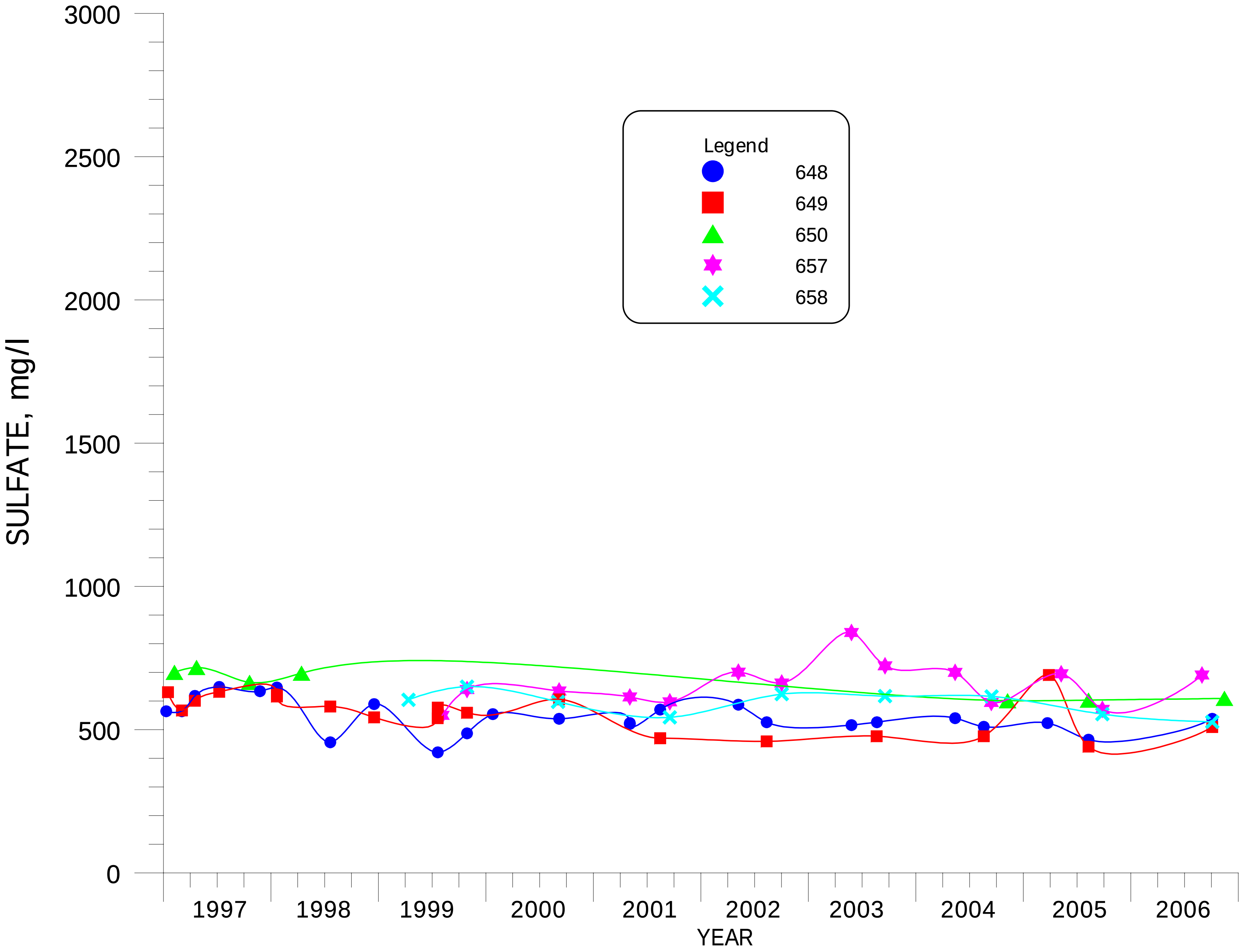
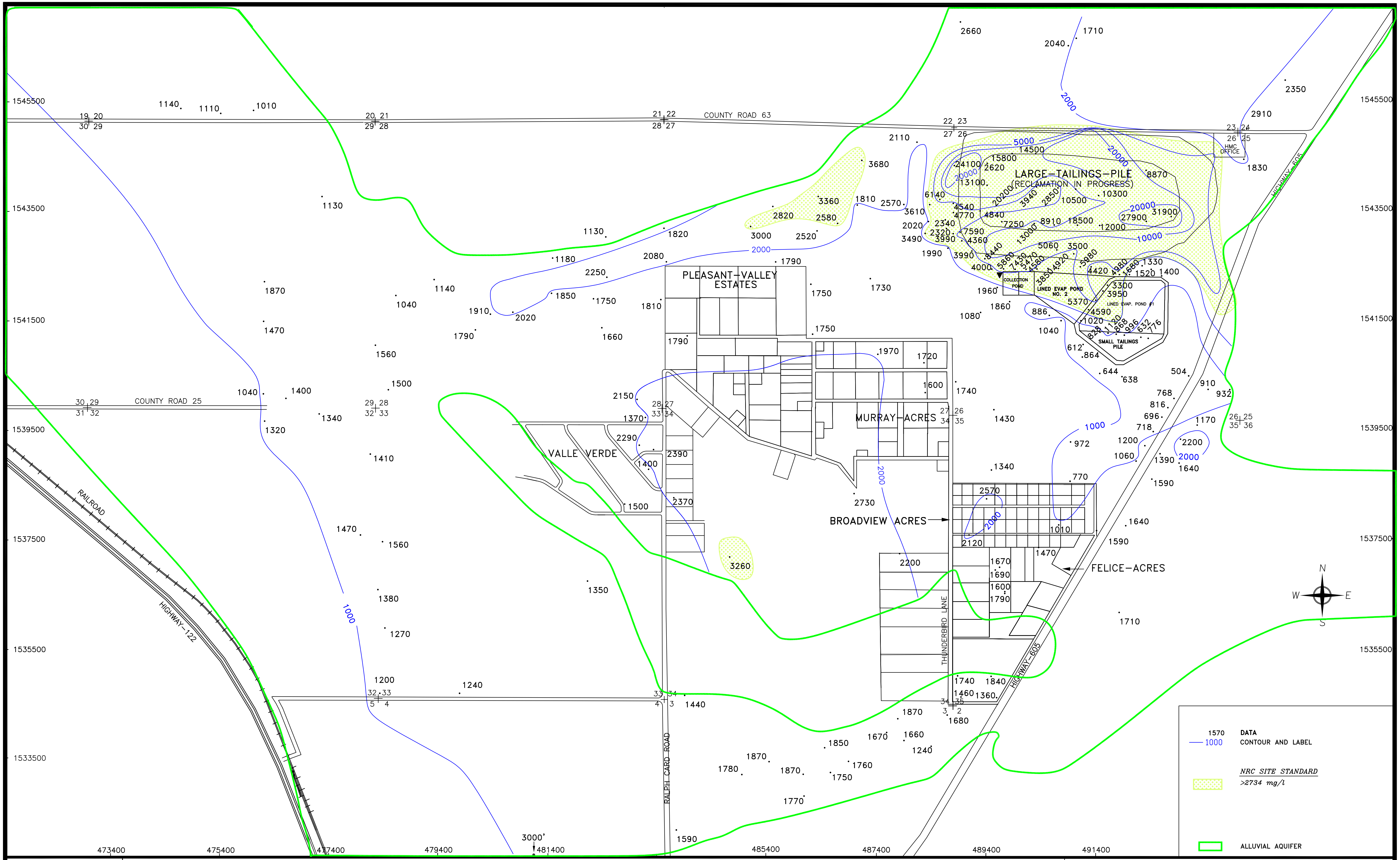


FIGURE 4.3-18. SULFATE CONCENTRATIONS FOR WELLS 648, 649, 650, 657 AND 658.



SCALE: 1"=1600'

C:\PROJECTS\2007-06\1600QAL --JDF

DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.3-19. TDS CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, mg/l

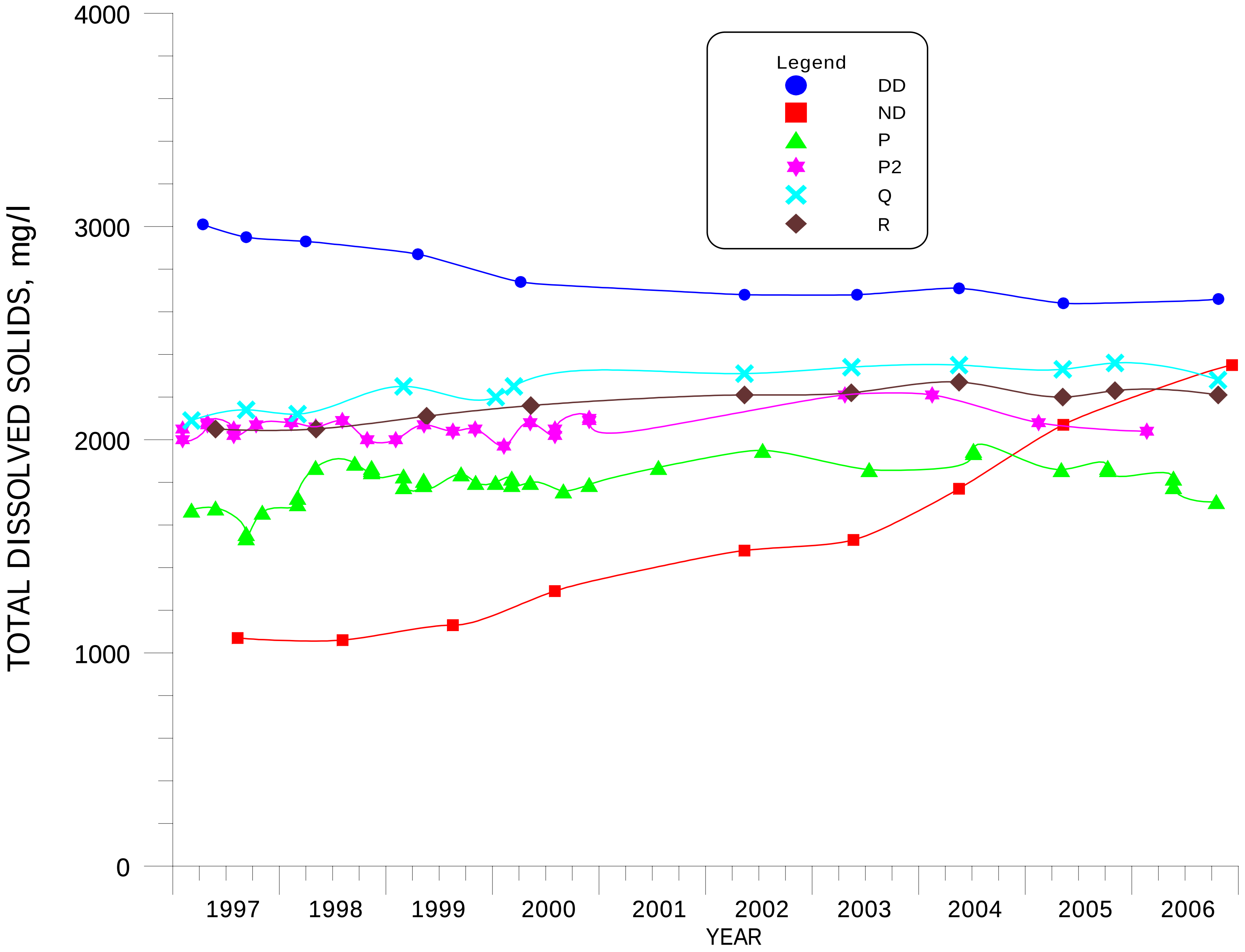


FIGURE 4.3-20. TDS CONCENTRATIONS FOR WELLS DD, ND, P, P2, Q AND R.

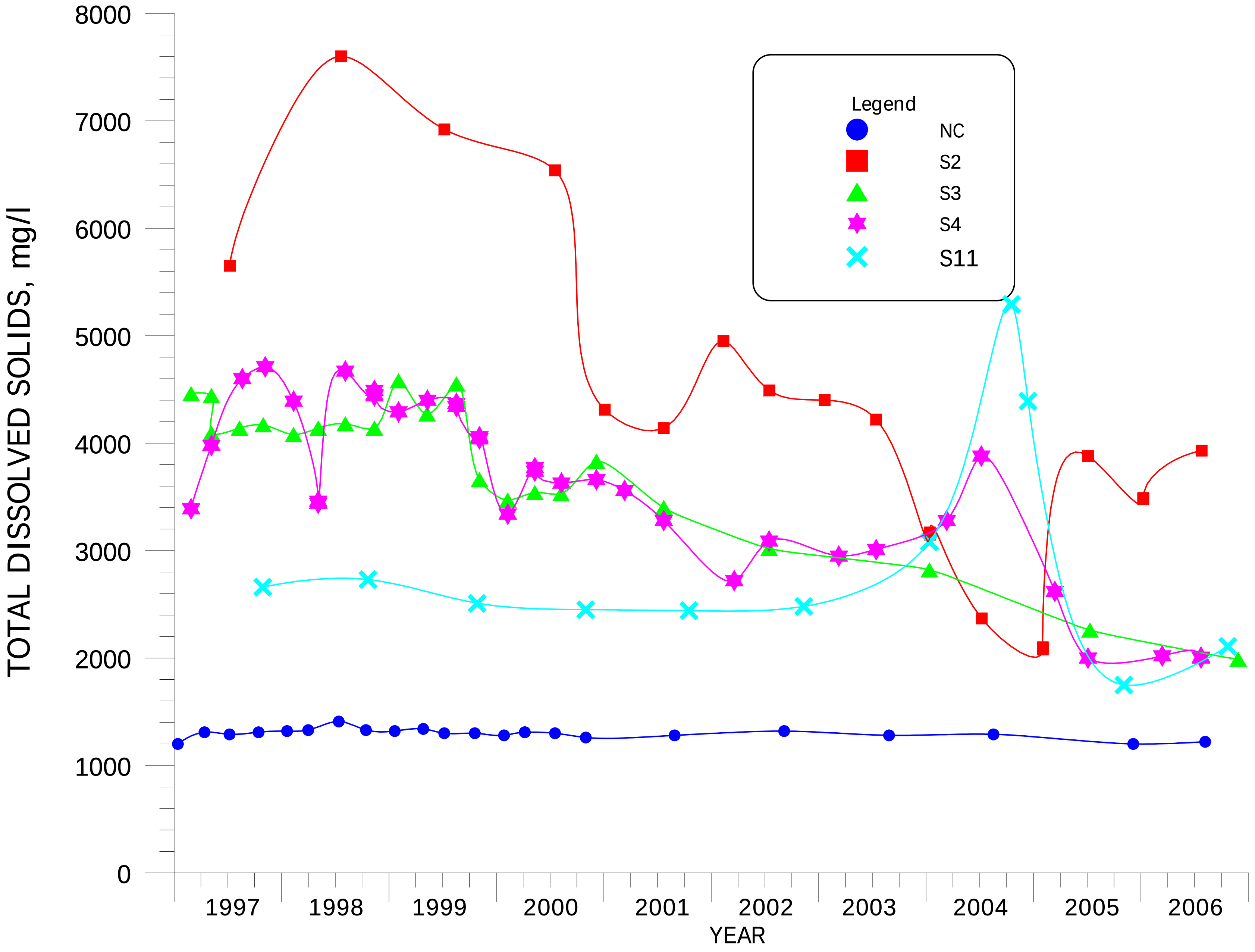


FIGURE 4.3-21. TDS CONCENTRATIONS FOR WELLS NC, S2, S3, S4 AND S11.

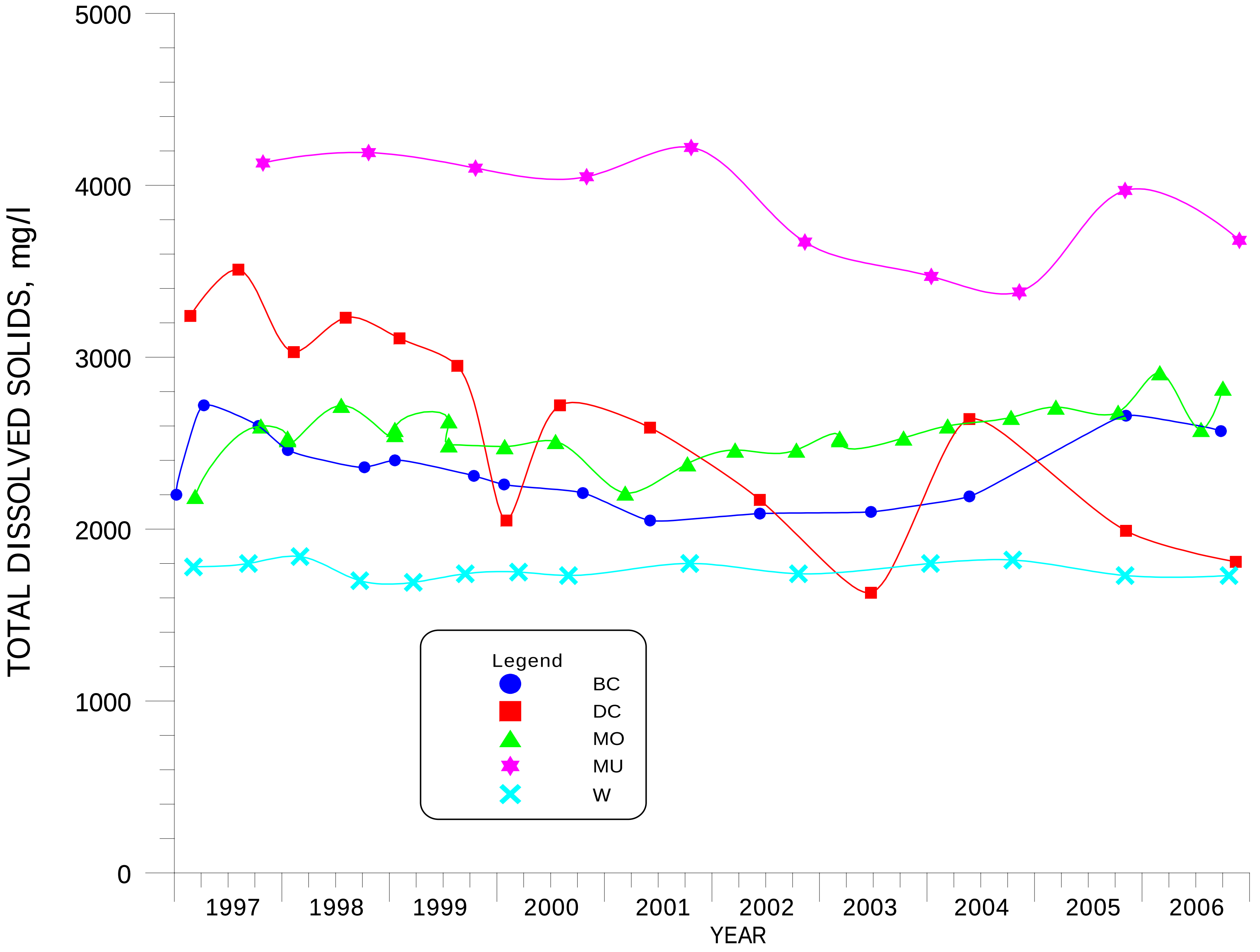


FIGURE 4.3-22. TDS CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.

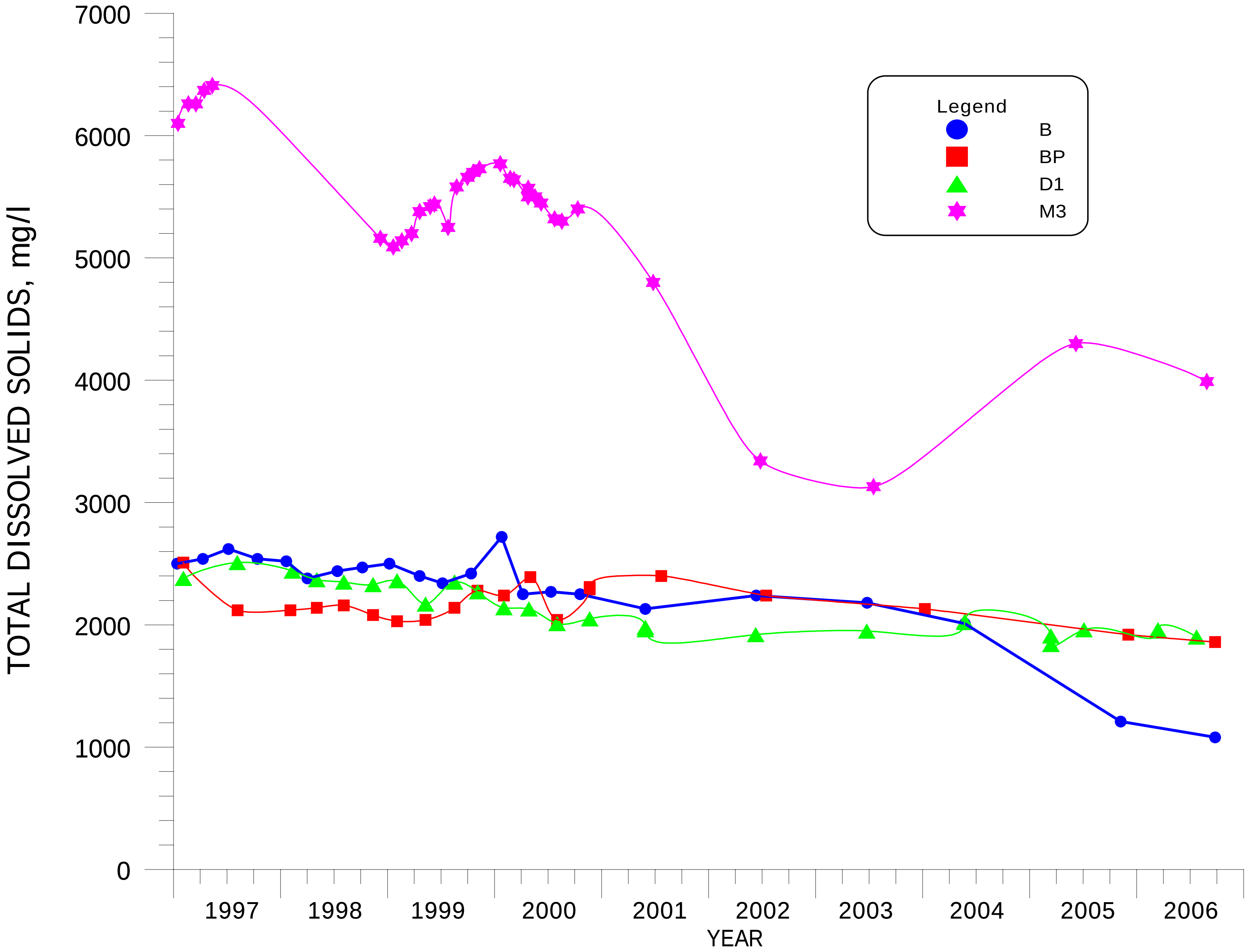


FIGURE 4.3-23. TDS CONCENTRATIONS FOR WELLS B, BP, D1 AND M3.

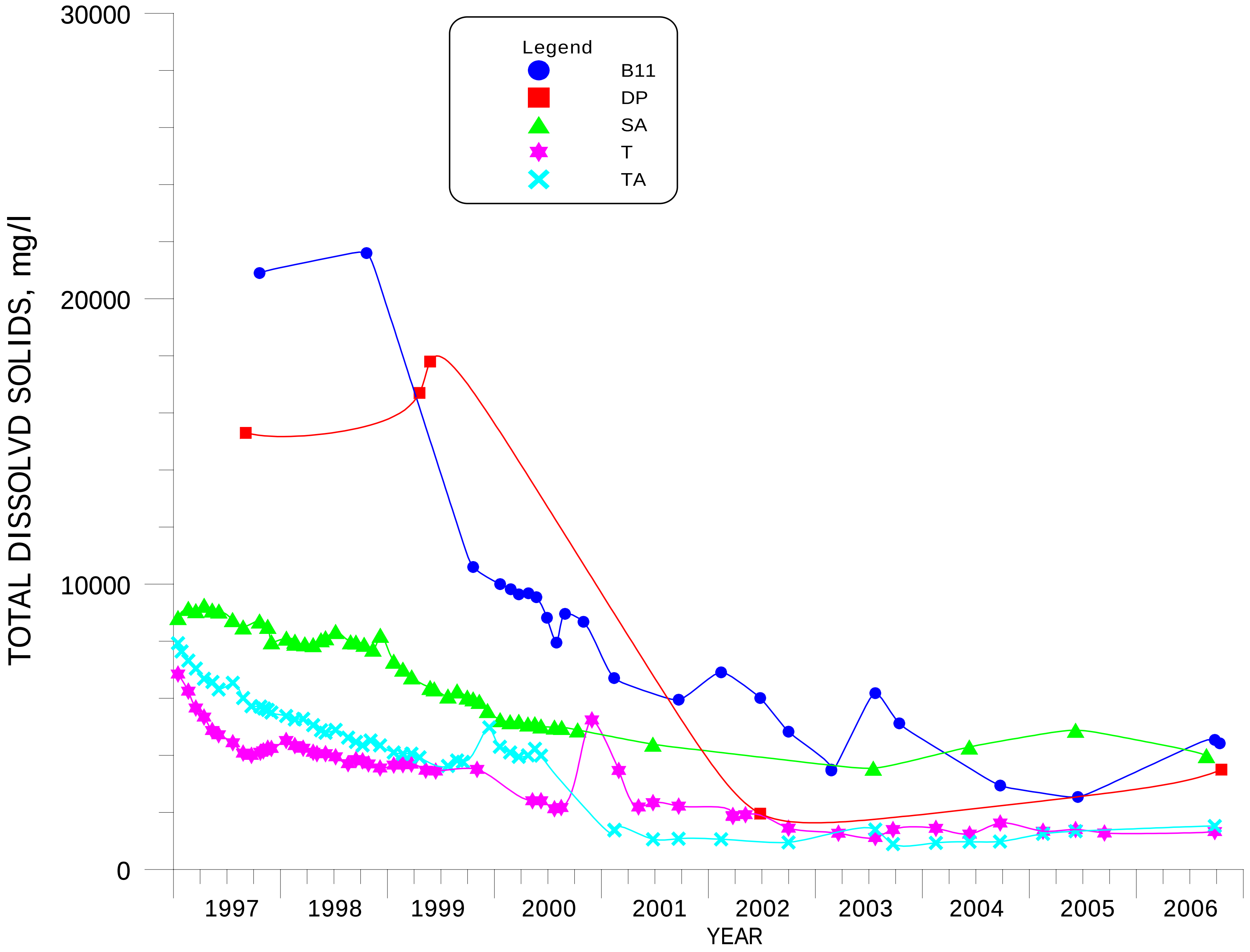


FIGURE 4.3-24. TDS CONCENTRATIONS FOR WELLS B11, DZ, SA, T AND TA.

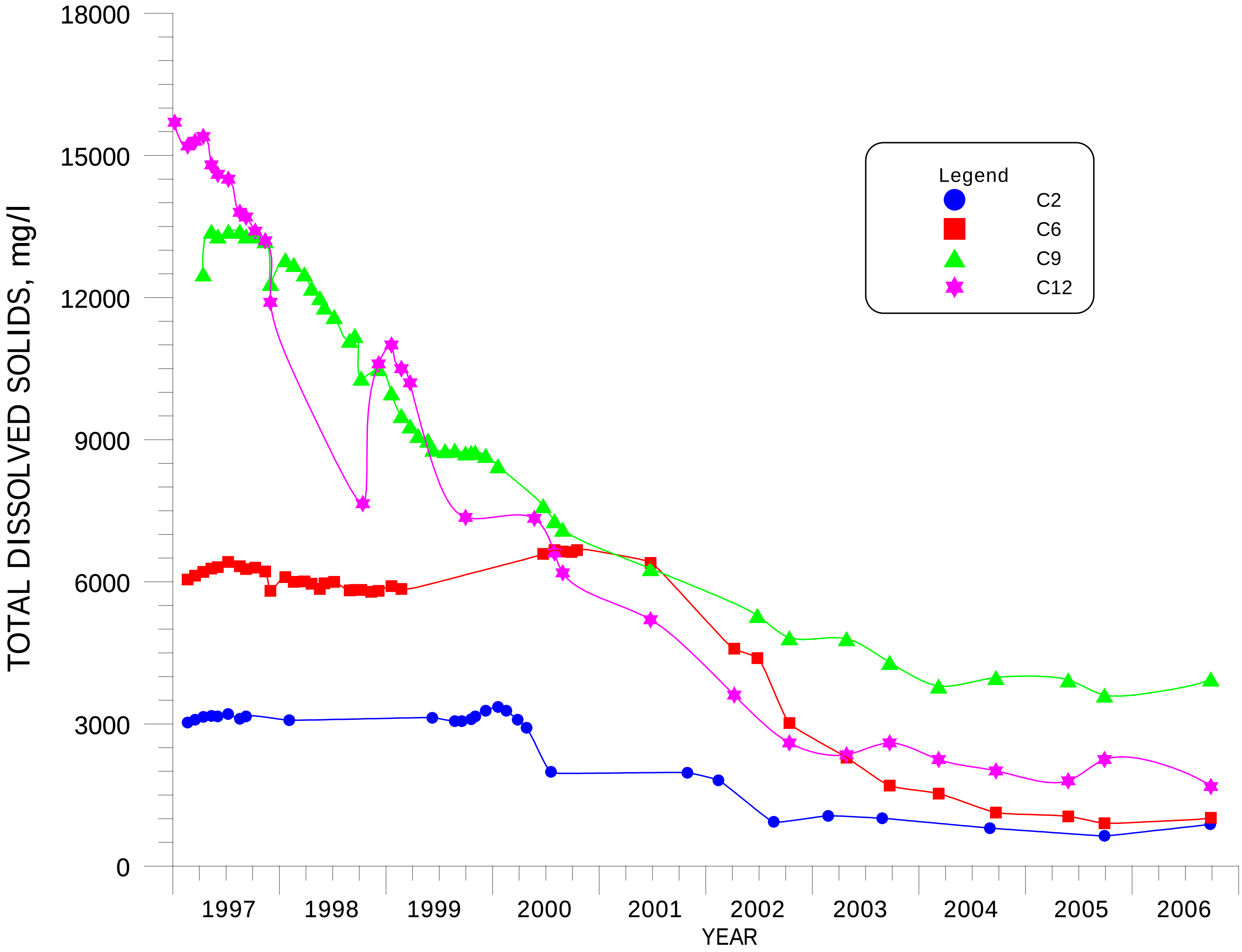


FIGURE 4.3-25. TDS CONCENTRATIONS FOR WELLS C2, C6, C9 AND C12.

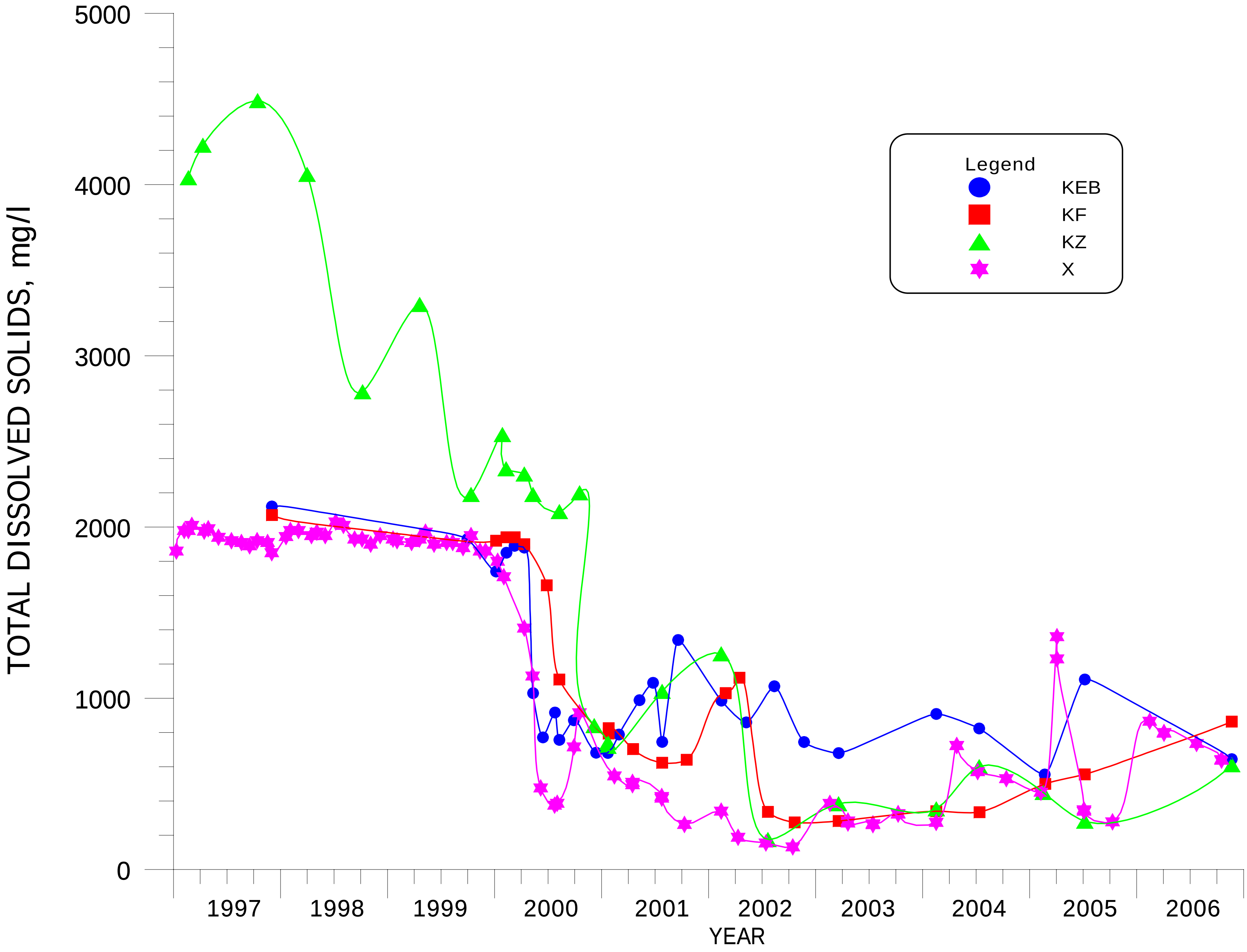


FIGURE 4.3-26. TDS CONCENTRATIONS FOR WELLS KEB, KF, KZ AND X.

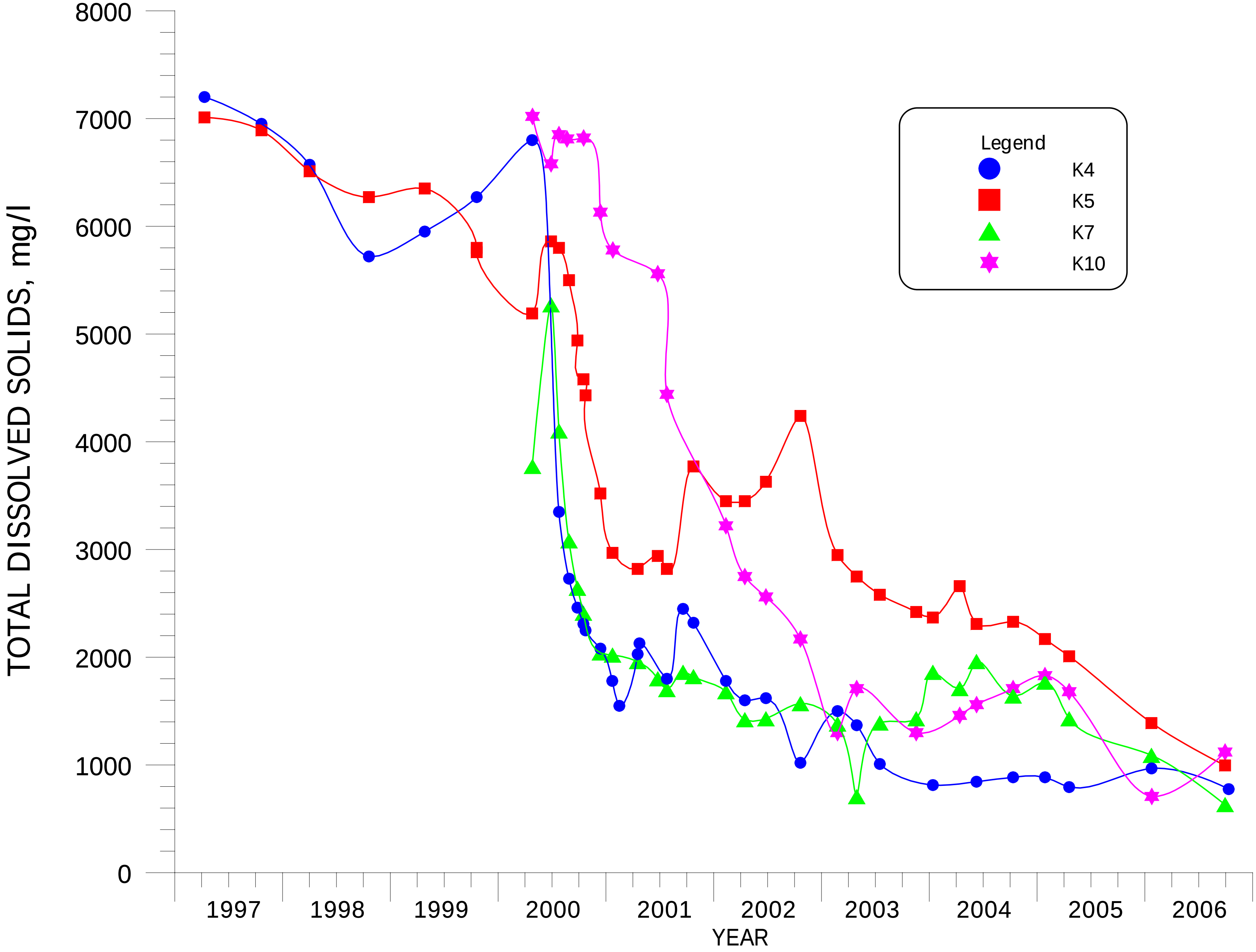


FIGURE 4.3-27. TDS CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.

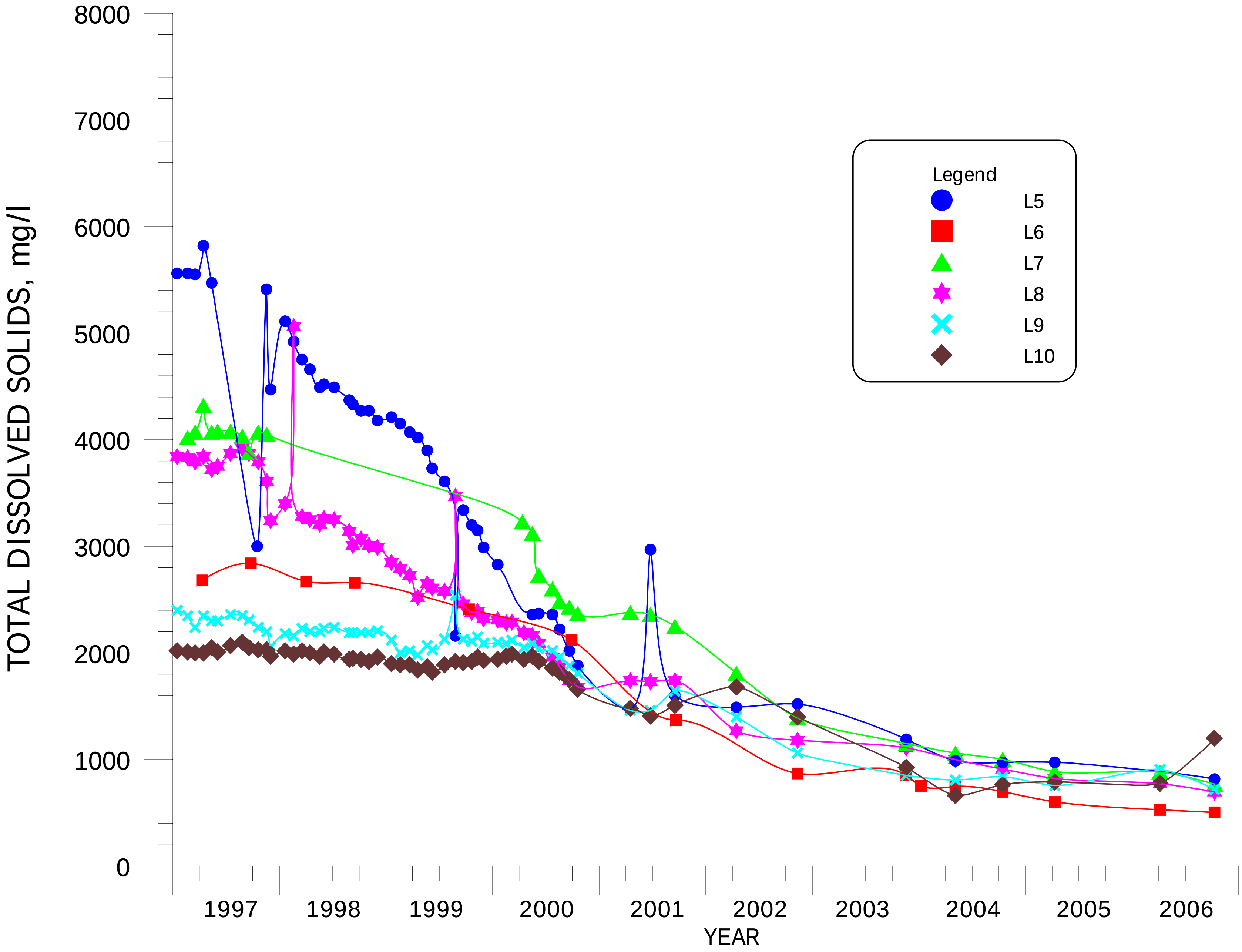


FIGURE 4.3-28. TDS CONCENTRATIONS FOR WELLS L5, L6, L7, L8, L9 AND L10.

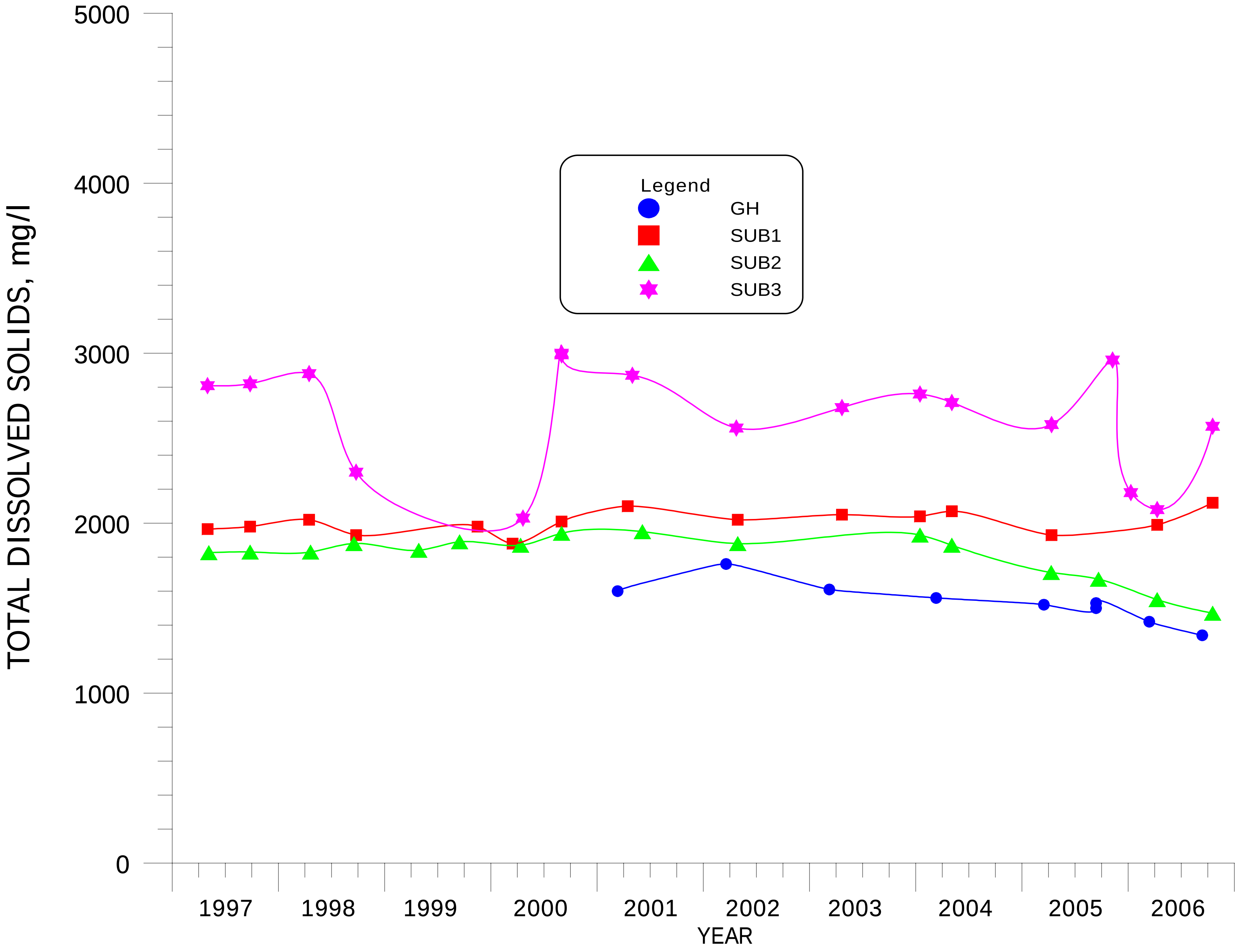


FIGURE 4.3-29. TDS CONCENTRATIONS FOR WELLS GH, SUB1, SUB2 AND SUB3.

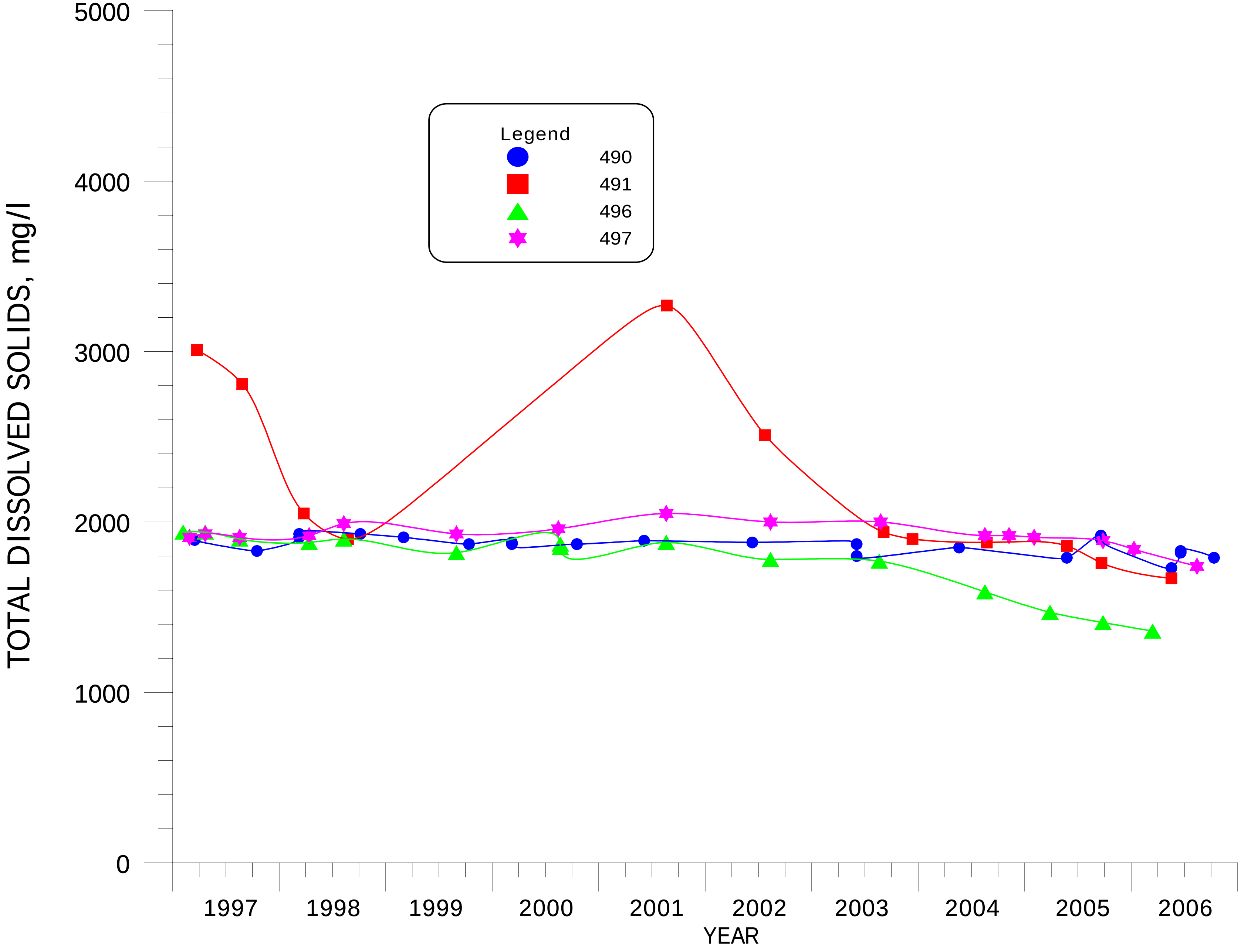


FIGURE 4.3-30. TDS CONCENTRATIONS FOR WELLS 490, 491, 496 AND 497.

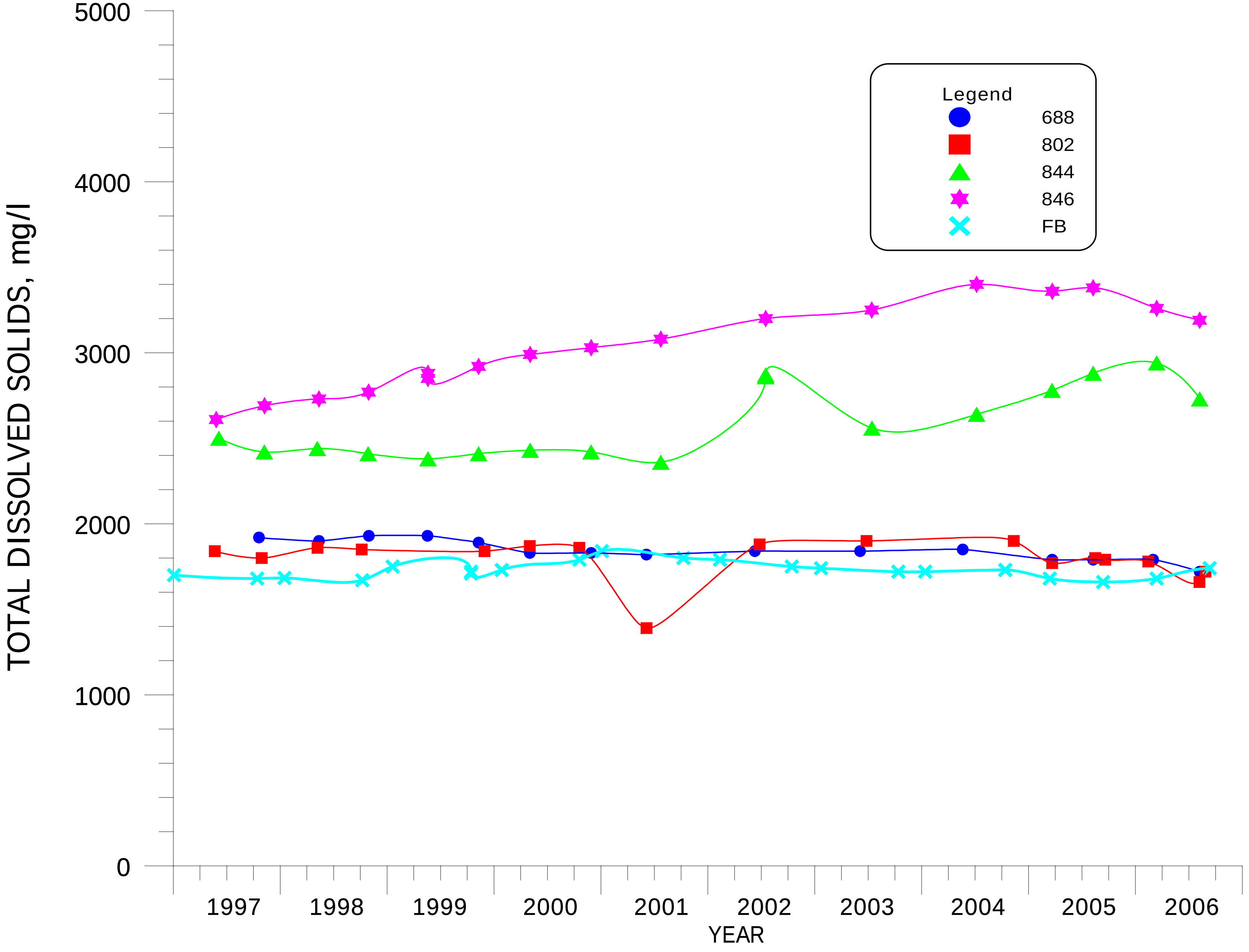


FIGURE 4.3-31. TDS CONCENTRATIONS FOR WELLS 688, 802, 844, 846 AND FB.

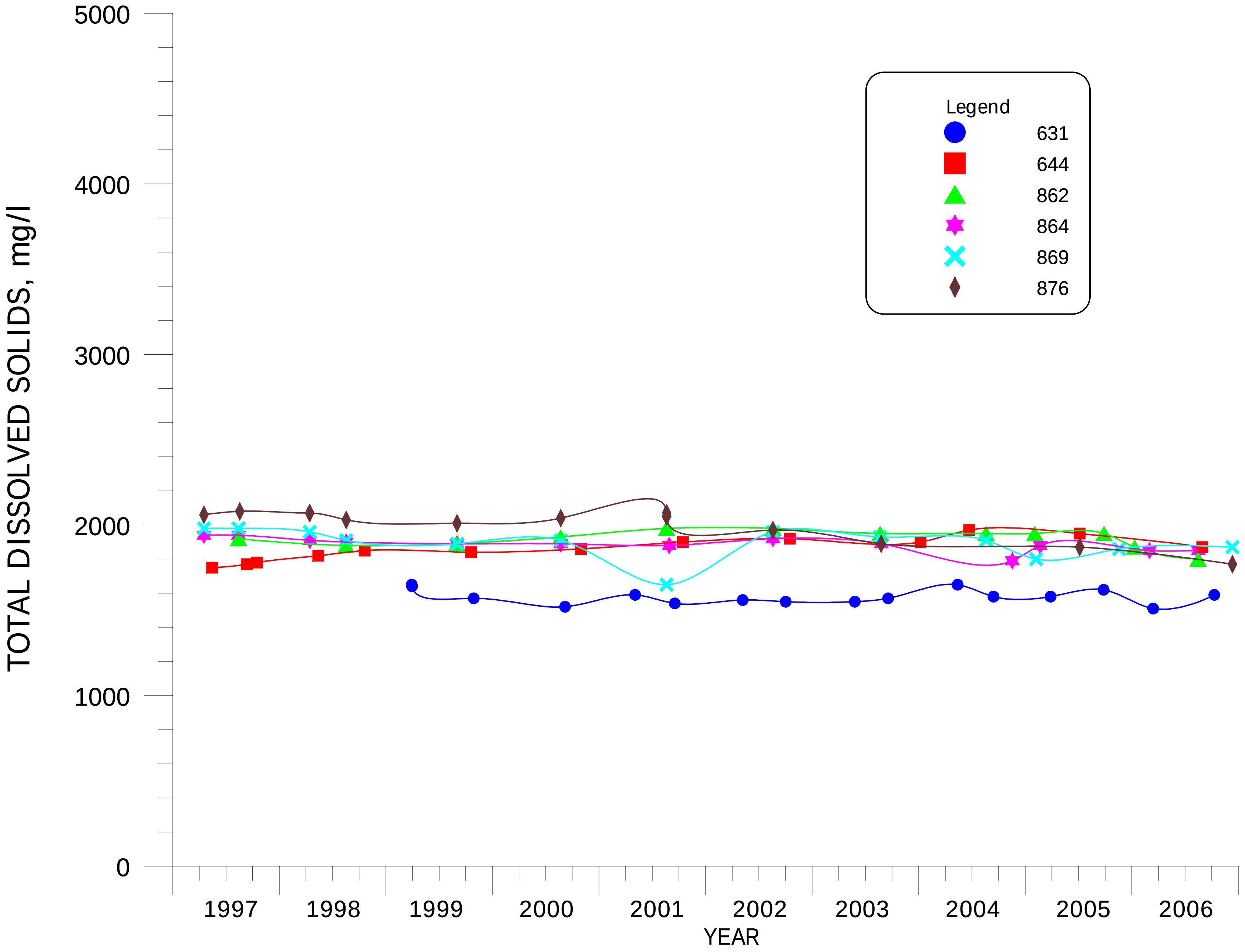


FIGURE 4.3-32. TDS CONCENTRATIONS FOR WELLS 631, 644, 862, 864, 869 AND 876.

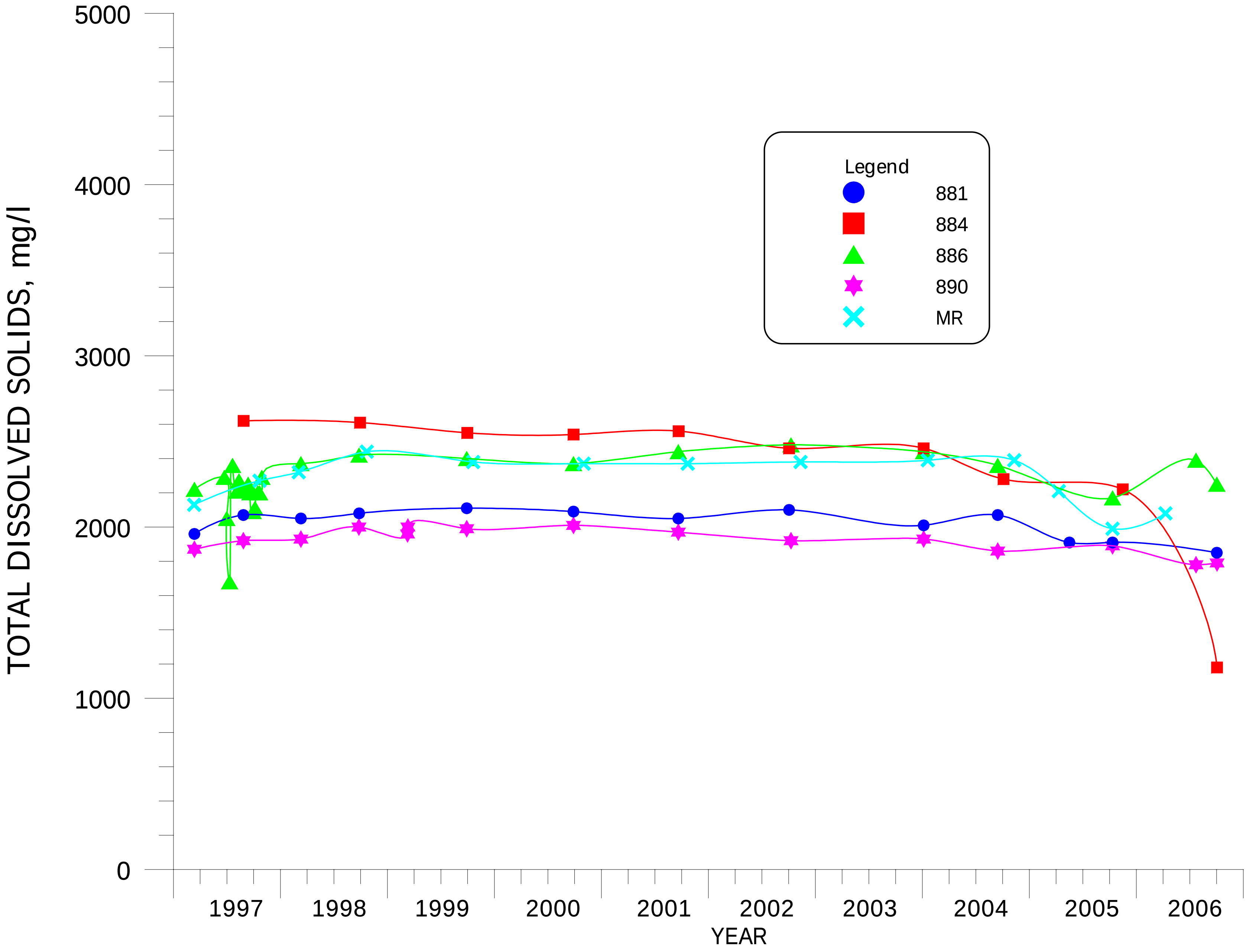


FIGURE 4.3-33. TDS CONCENTRATIONS FOR WELLS 881, 884, 886, 890 AND MR.

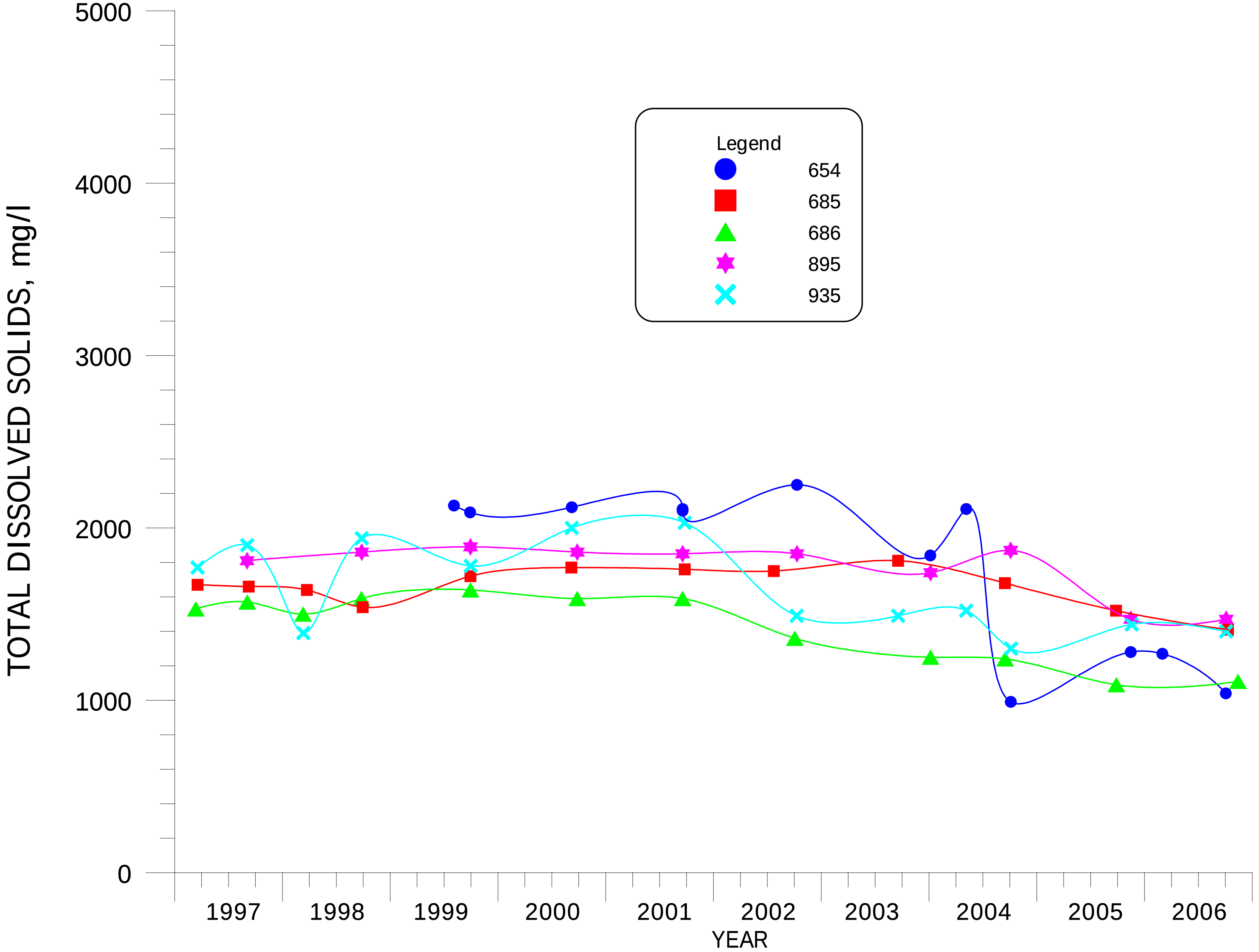


FIGURE 4.3-34. TDS CONCENTRATIONS FOR WELLS 654, 686, 687, 895 AND 935.

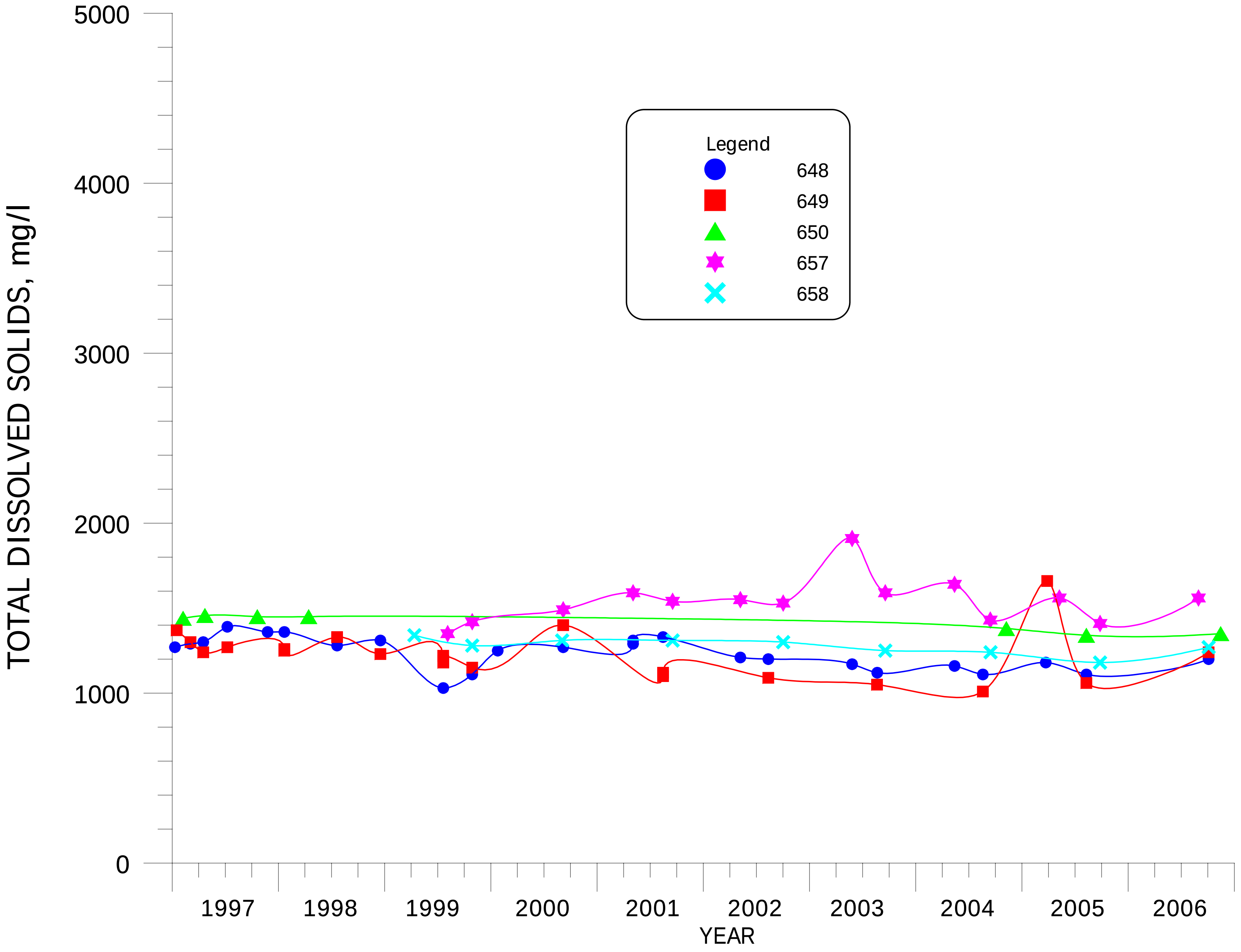
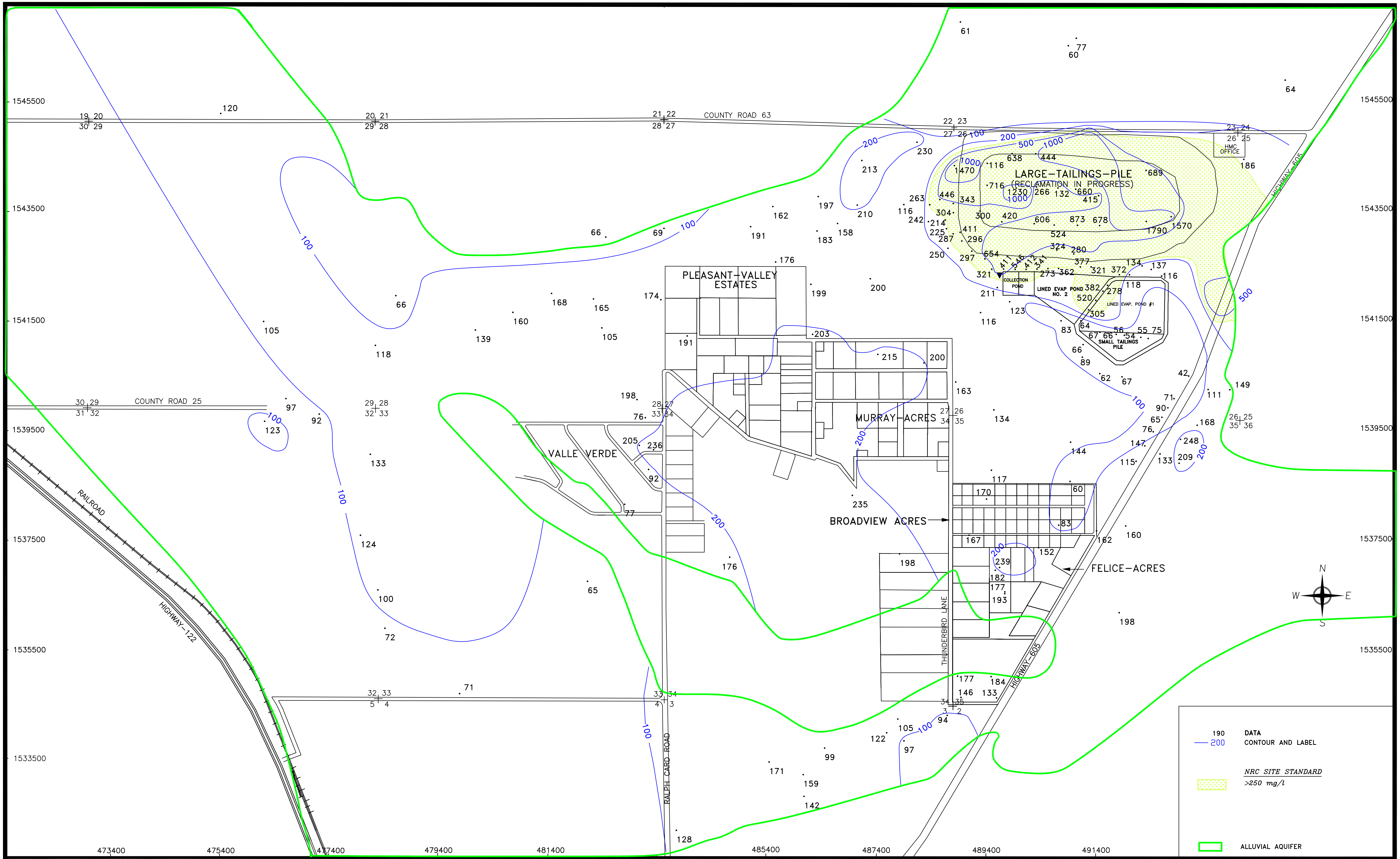


FIGURE 4.3-35. TDS CONCENTRATIONS FOR WELLS 648, 649, 650, 657 AND 658.



SCALE: 1"=1600'

C:\PROJECTS\
2007-06\1600QAL --JDF

DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.3-36. CHLORIDE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, mg/l

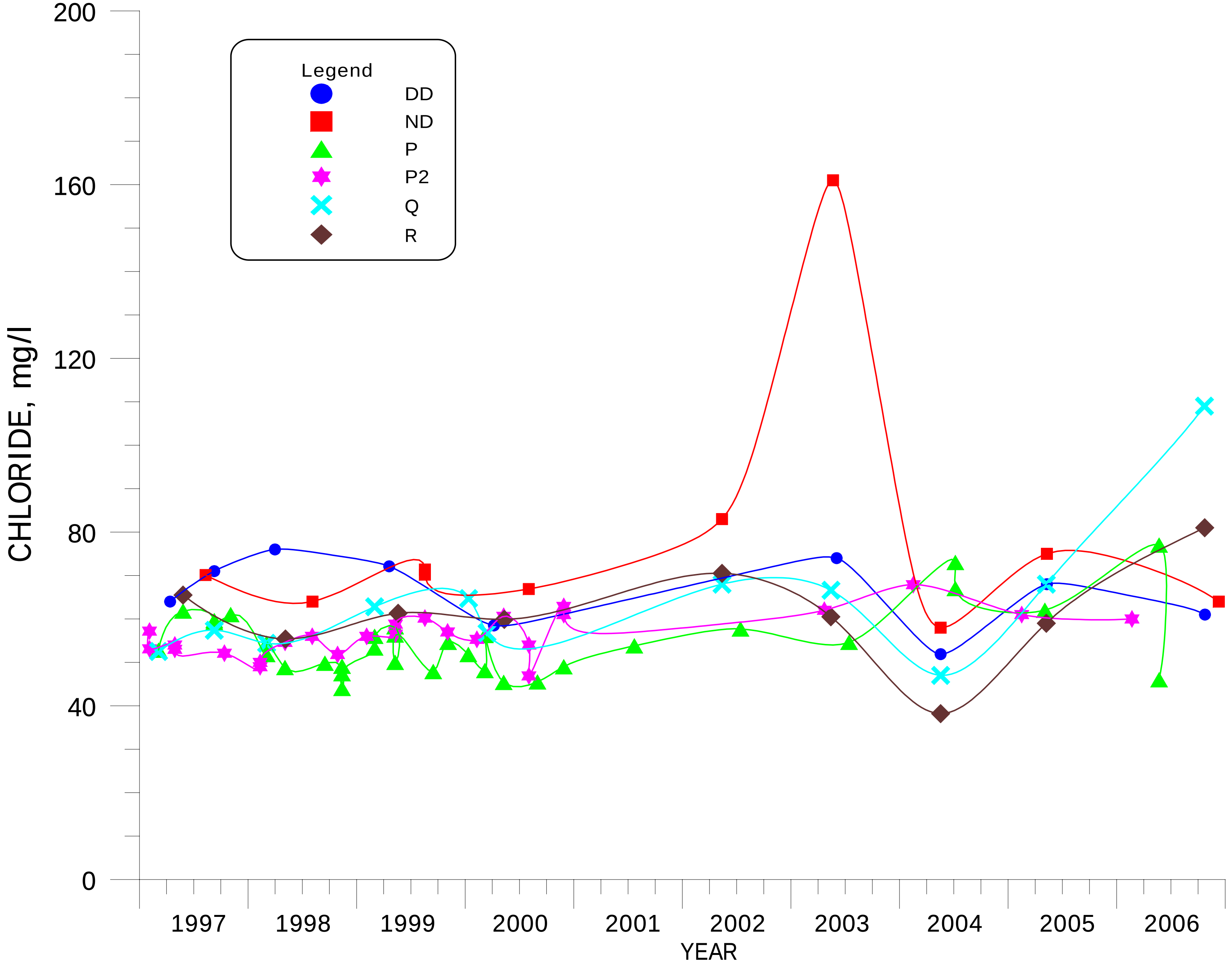


FIGURE 4.3-37. CHLORIDE CONCENTRATIONS FOR WELLS DD, ND, P, P2, Q AND R.

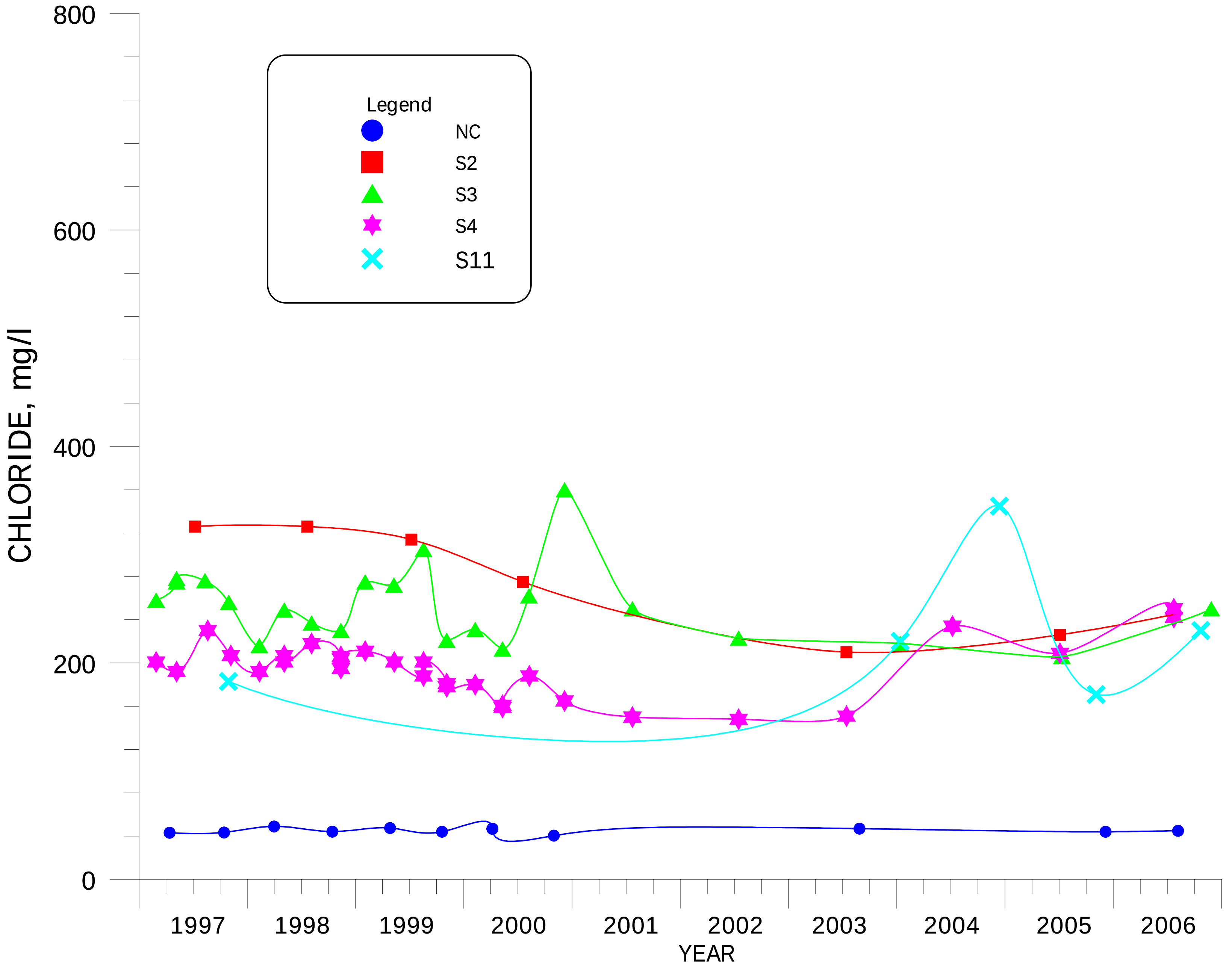


FIGURE 4.3-38. CHLORIDE CONCENTRATIONS FOR WELLS NC, S2, S3, S4 AND S11.

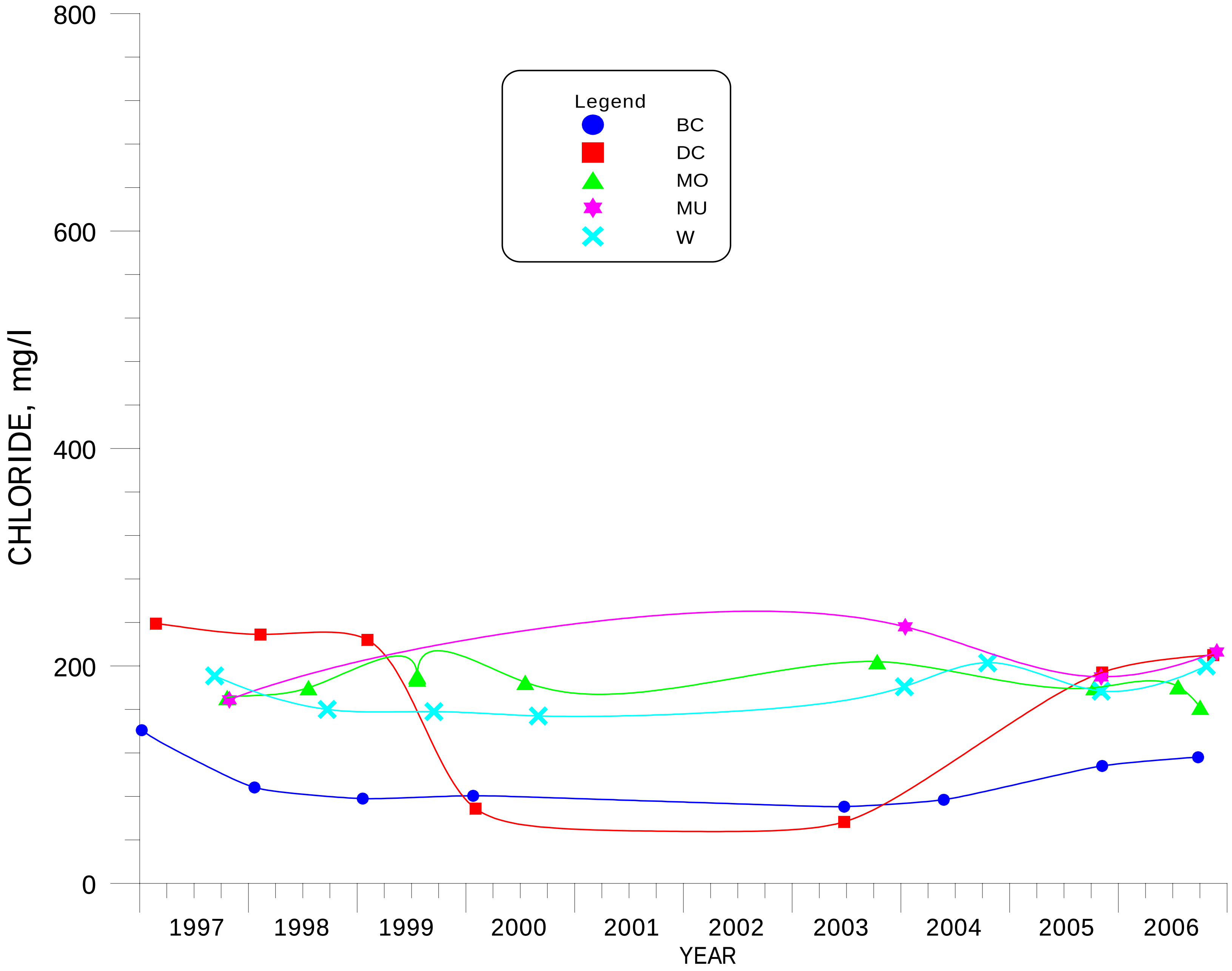


FIGURE 4.3-39. CHLORIDE CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.

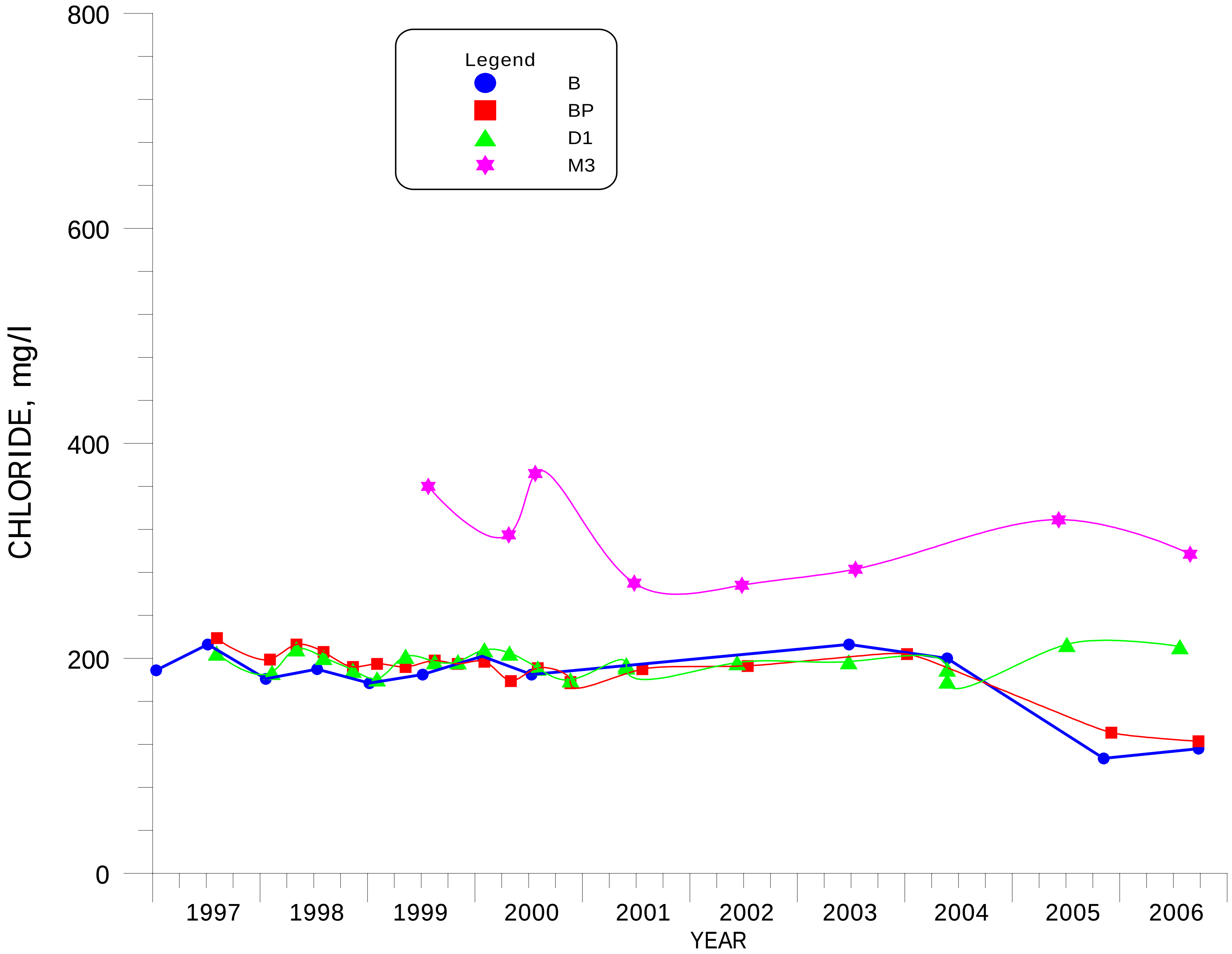


FIGURE 4.3-40. CHLORIDE CONCENTRATIONS FOR WELLS B, BP, D1 AND M3.

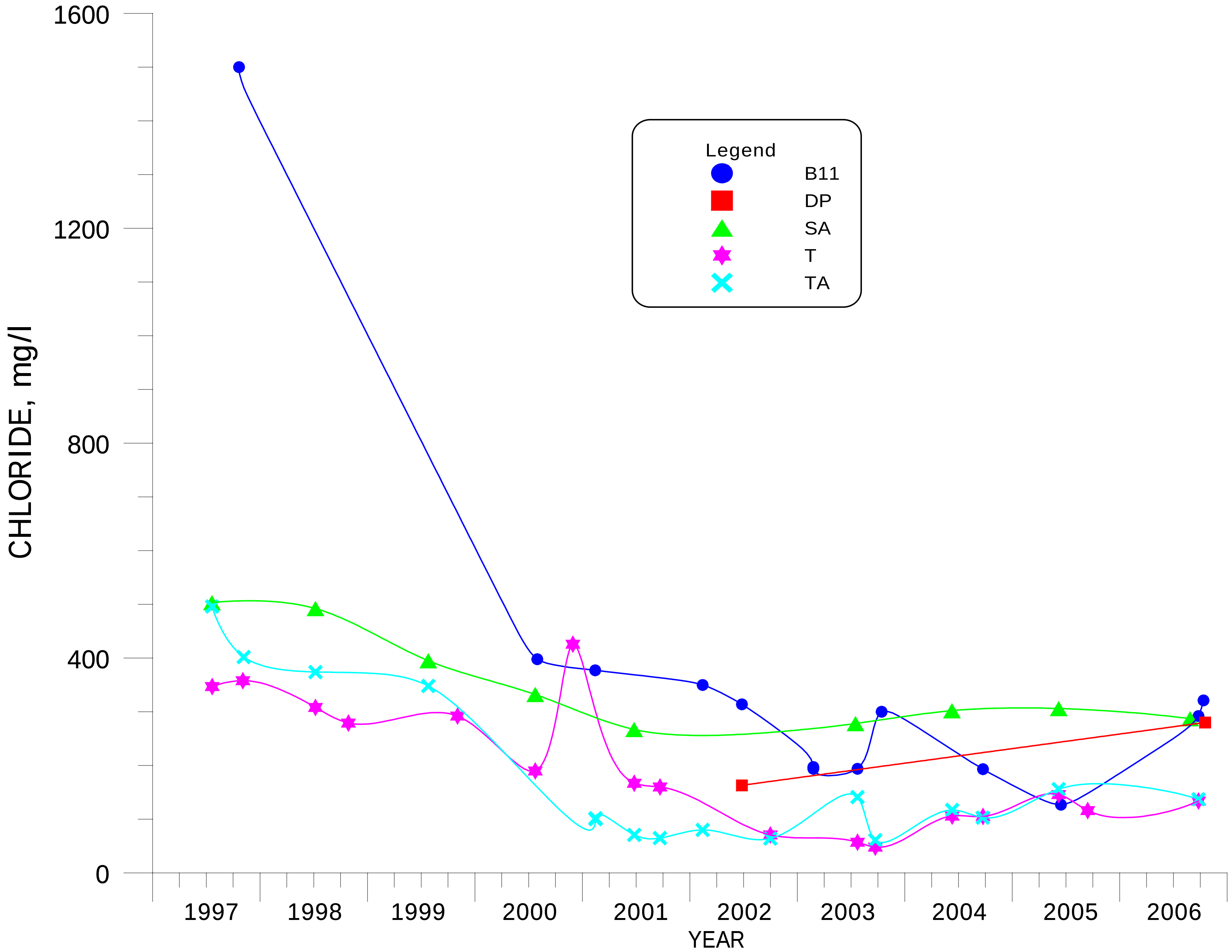


FIGURE 4.3-41. CHLORIDE CONCENTRATIONS FOR WELLS B11, DP, SA, T AND TA.

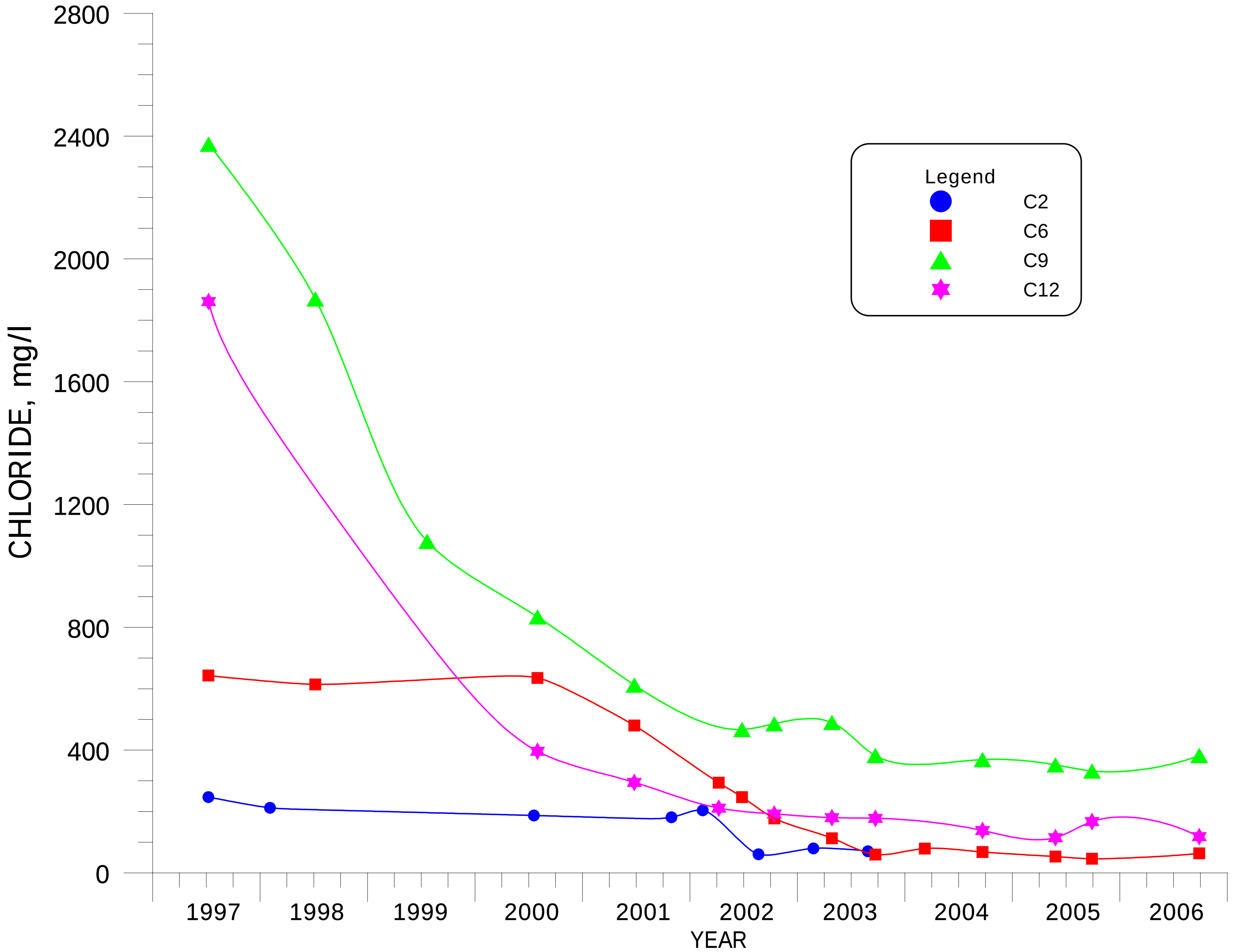


FIGURE 4.3-42. CHLORIDE CONCENTRATIONS FOR WELLS C2, C6, C9 AND C12.

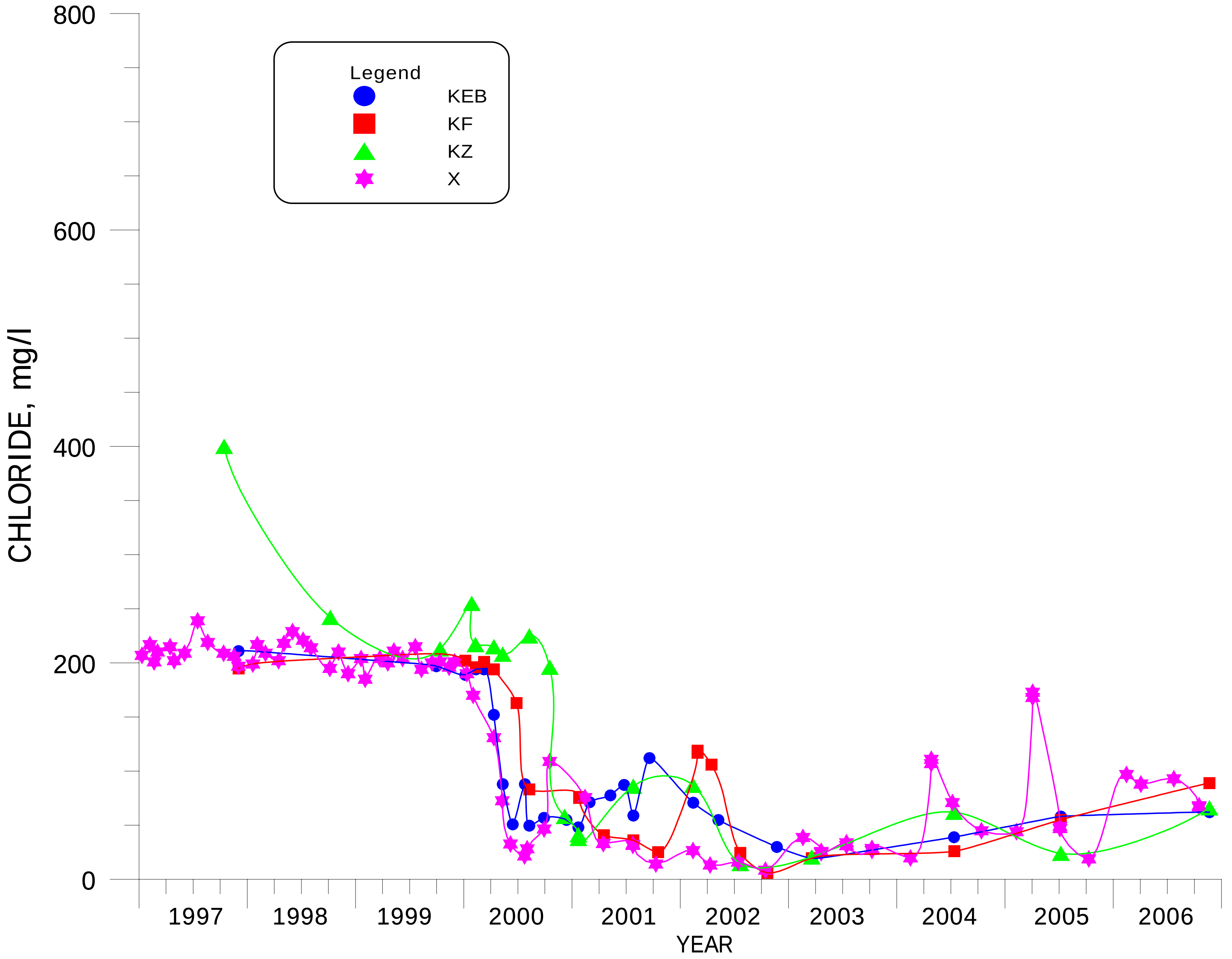


FIGURE 4.3-43. CHLORIDE CONCENTRATIONS FOR WELLS KEB, KF, KZ AND X.

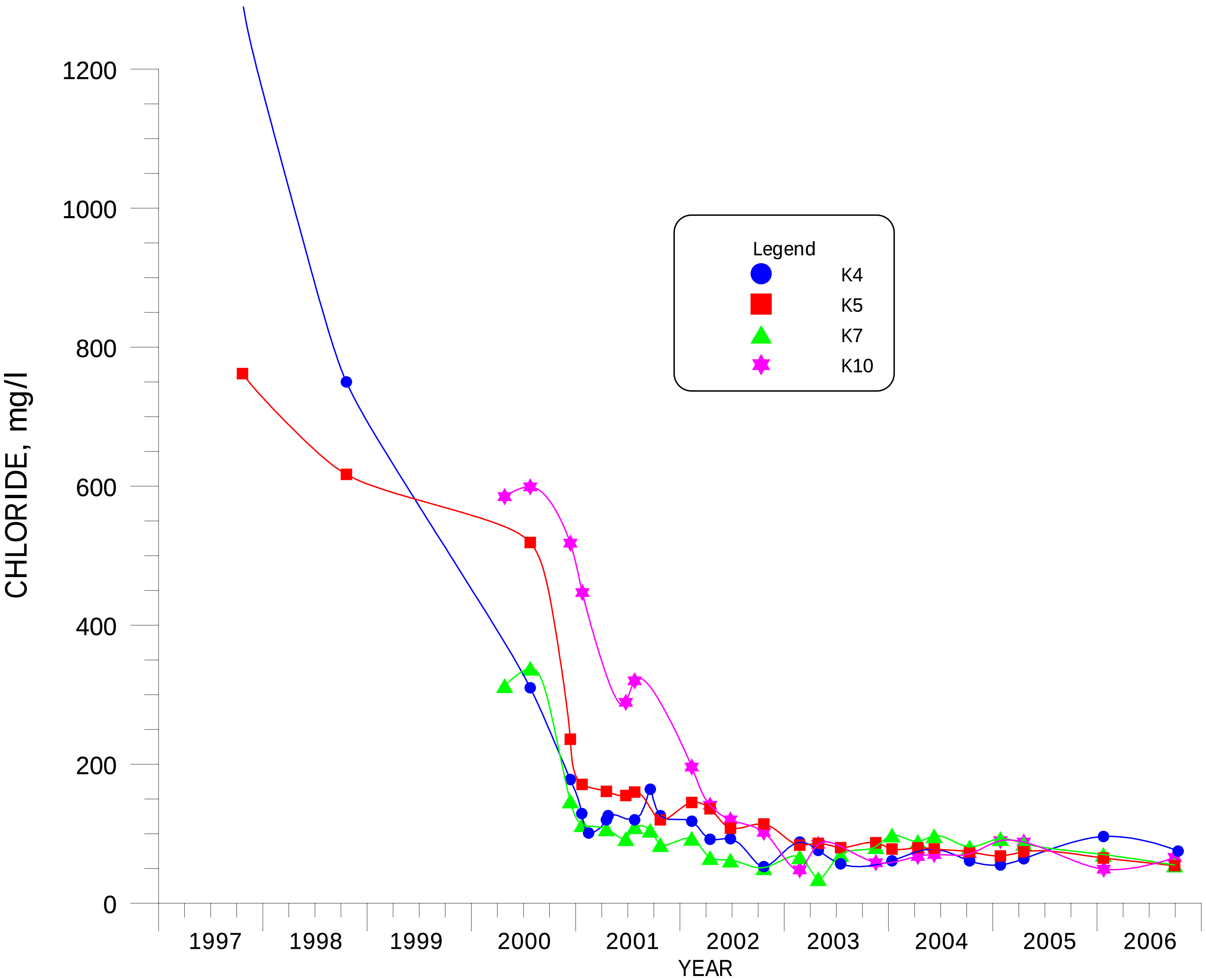


FIGURE 4.3-44. CHLORIDE CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.

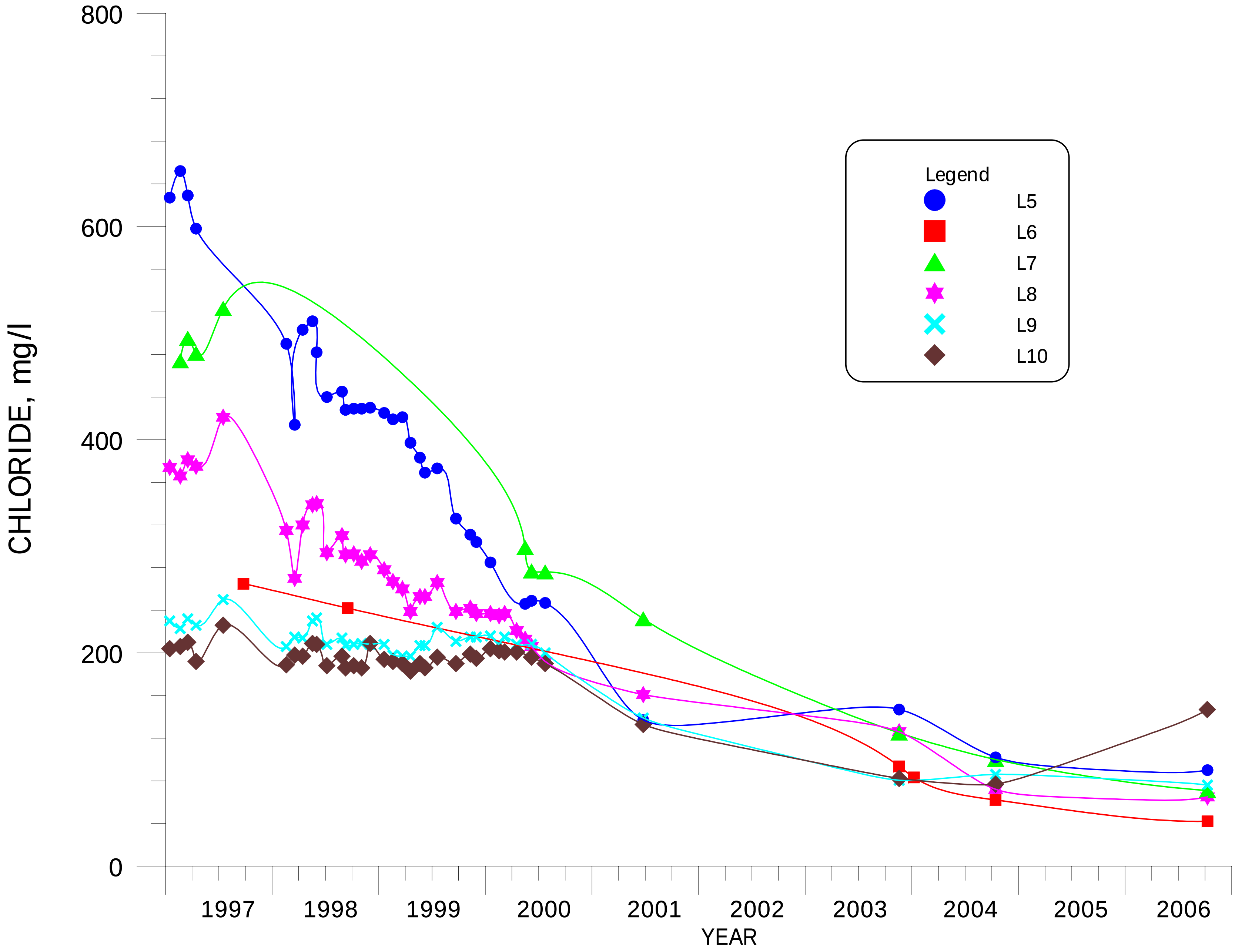


FIGURE 4.3-45. CHLORIDE CONCENTRATIONS FOR WELLS L5, L6, L7, L8, L9 AND L10.

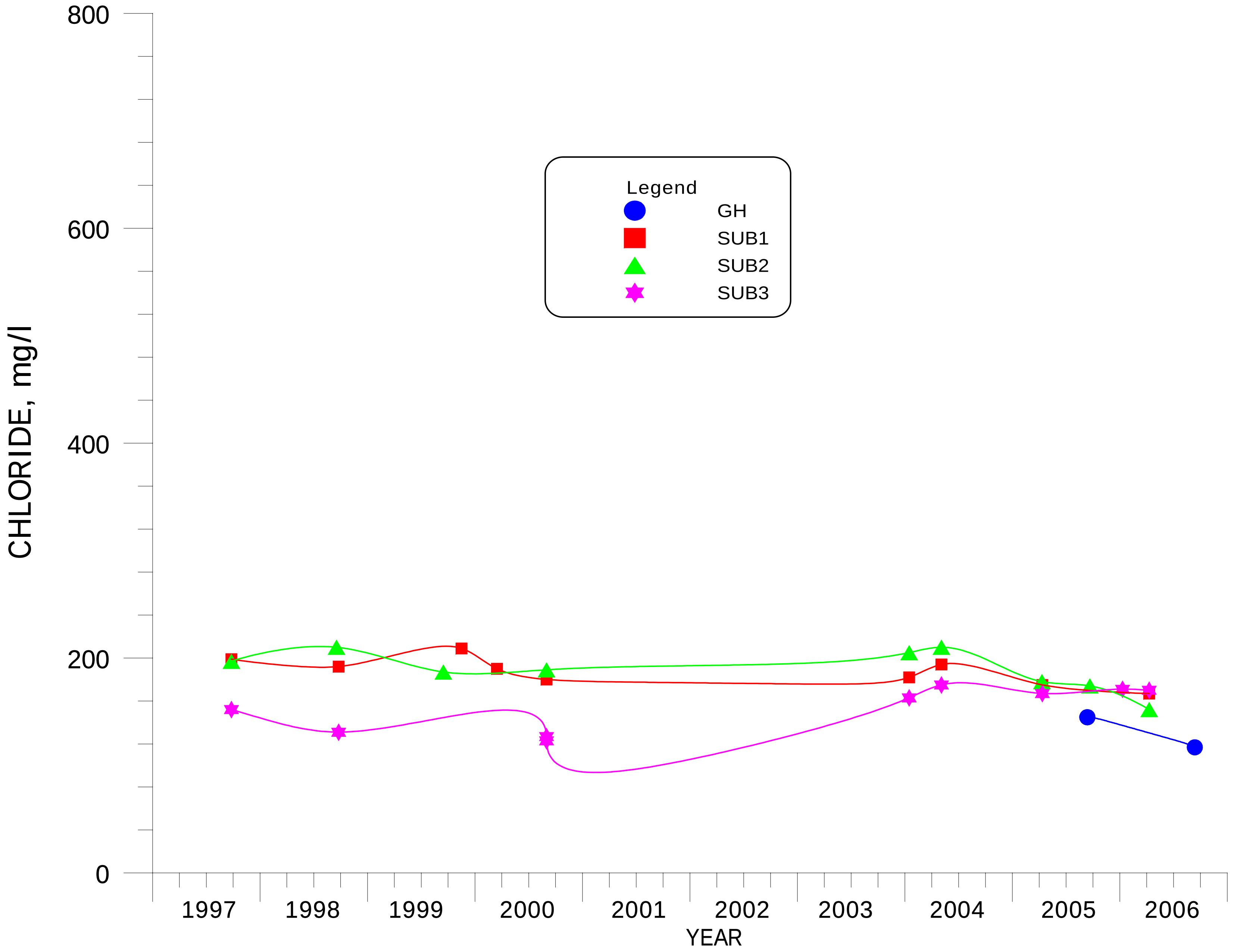


FIGURE 4.3-46. CHLORIDE CONCENTRATIONS FOR WELLS GH, SUB1, SUB2 AND SUB3.

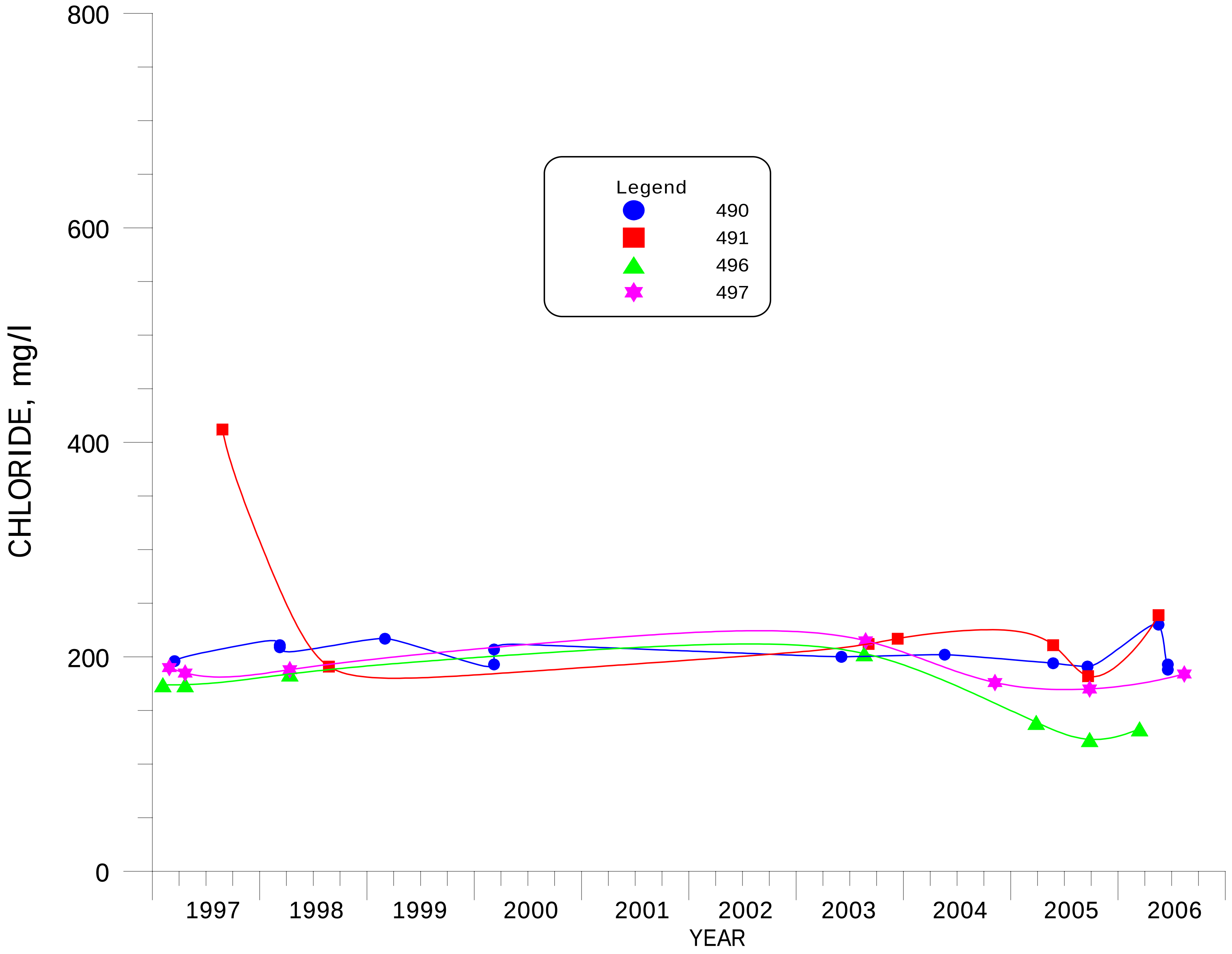


FIGURE 4.3-47. CHLORIDE CONCENTRATIONS FOR WELLS 490, 491, 496 AND 497.

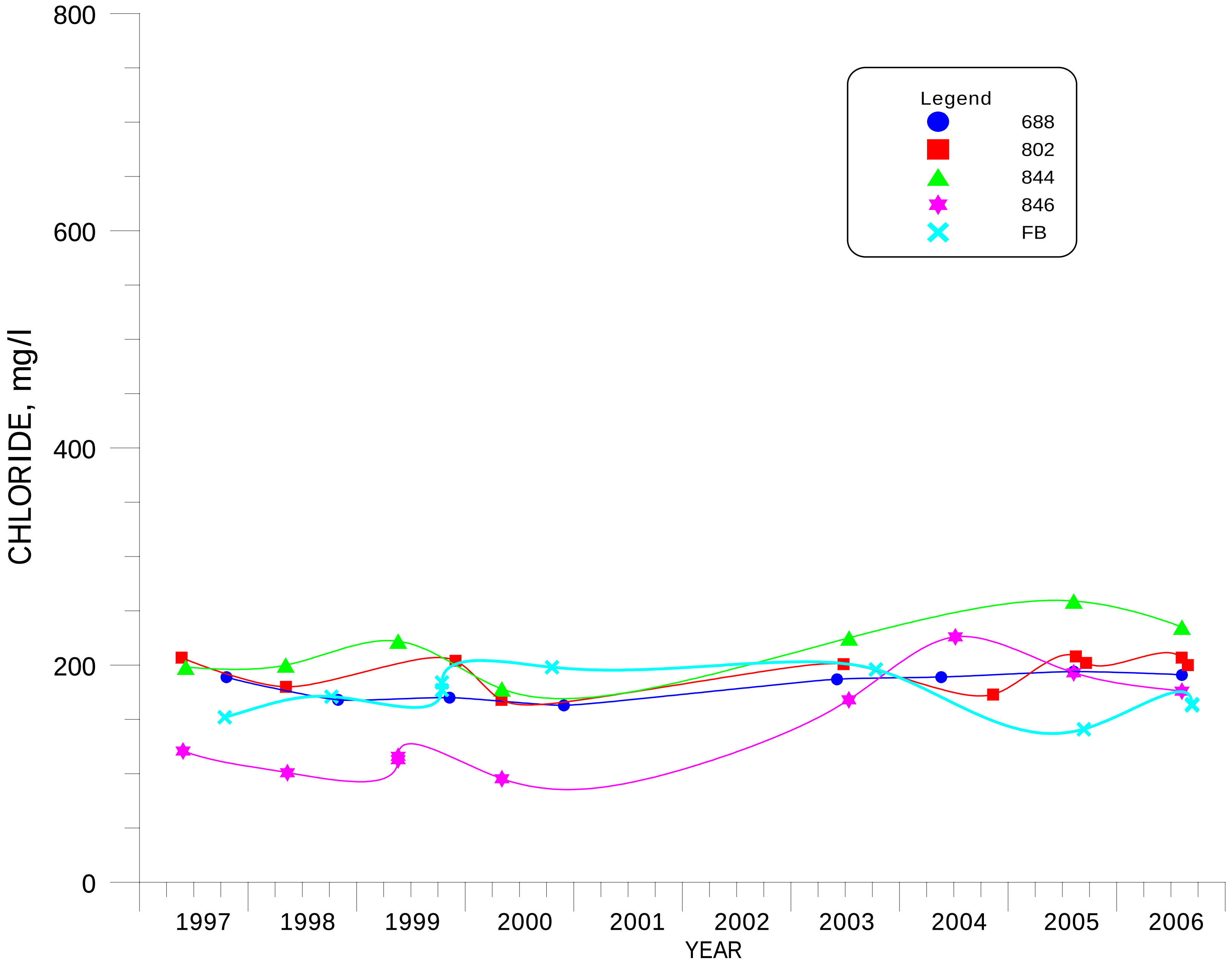


FIGURE 4.3-48. CHLORIDE CONCENTRATIONS FOR WELLS 688, 802, 844, 846 AND FB.

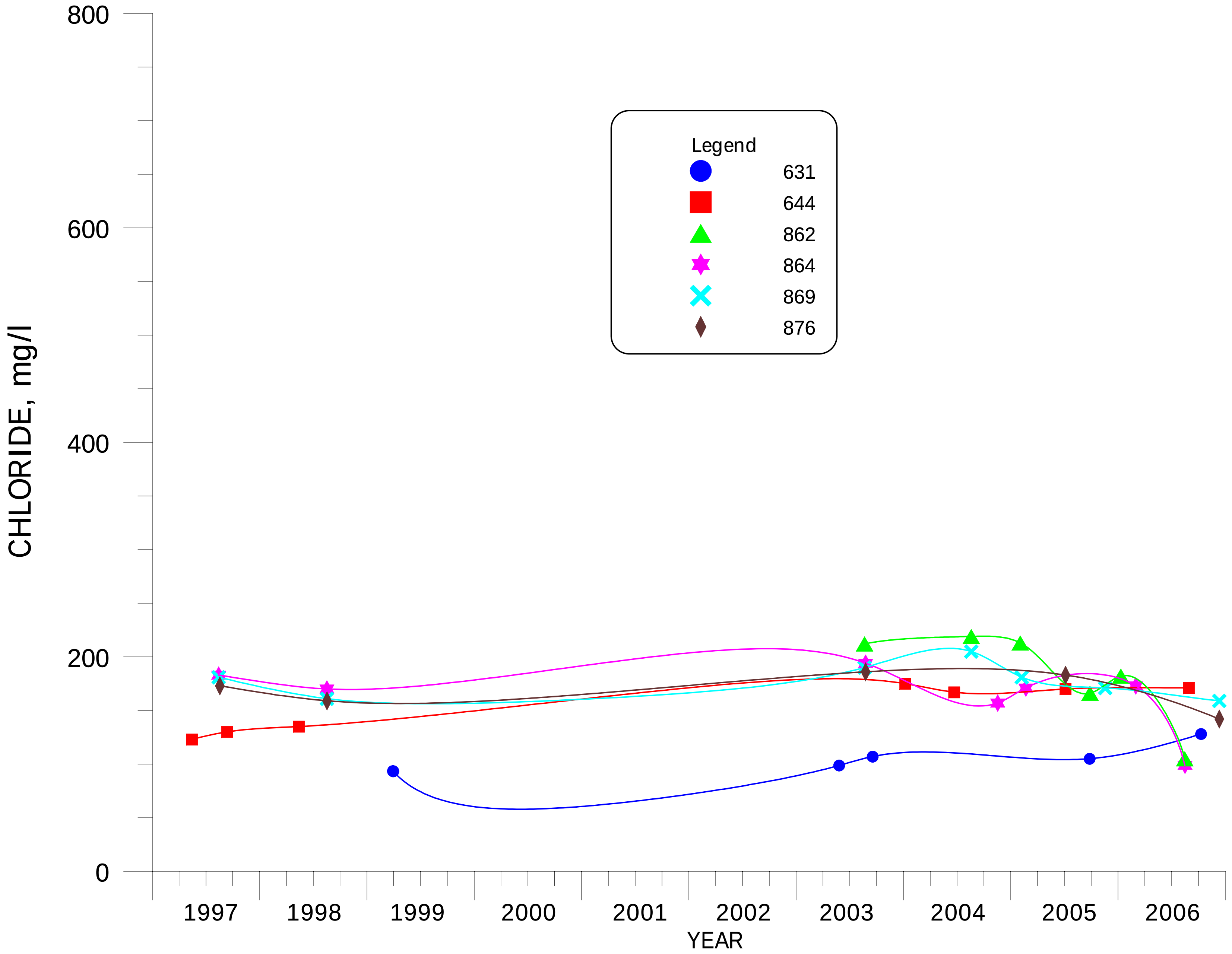


FIGURE 4.3-49. CHLORIDE CONCENTRATIONS FOR WELLS 631, 653, 862, 869 AND 876.

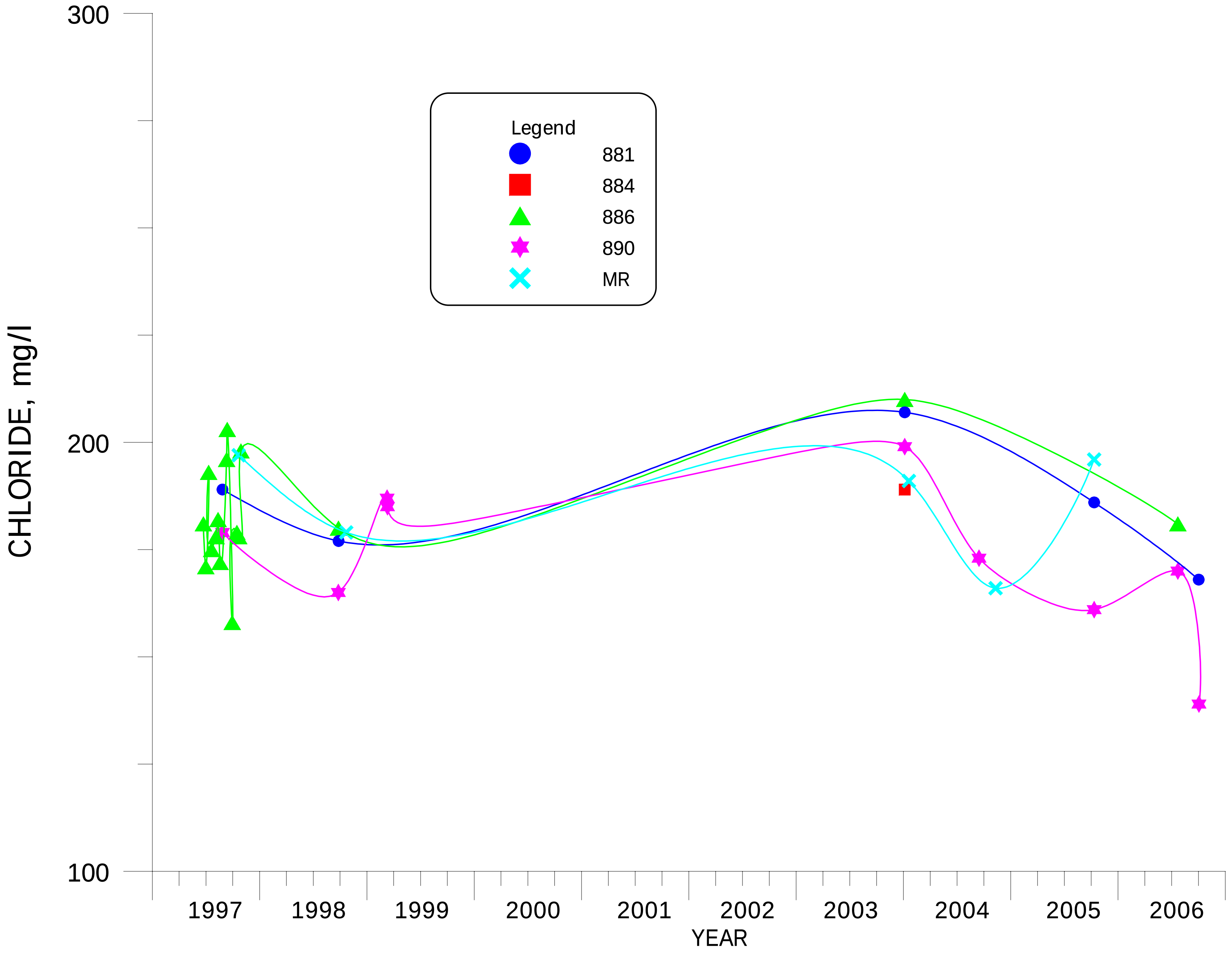


FIGURE 4.3-50. CHLORIDE CONCENTRATIONS FOR WELLS 881, 884, 886, 890 AND MR.

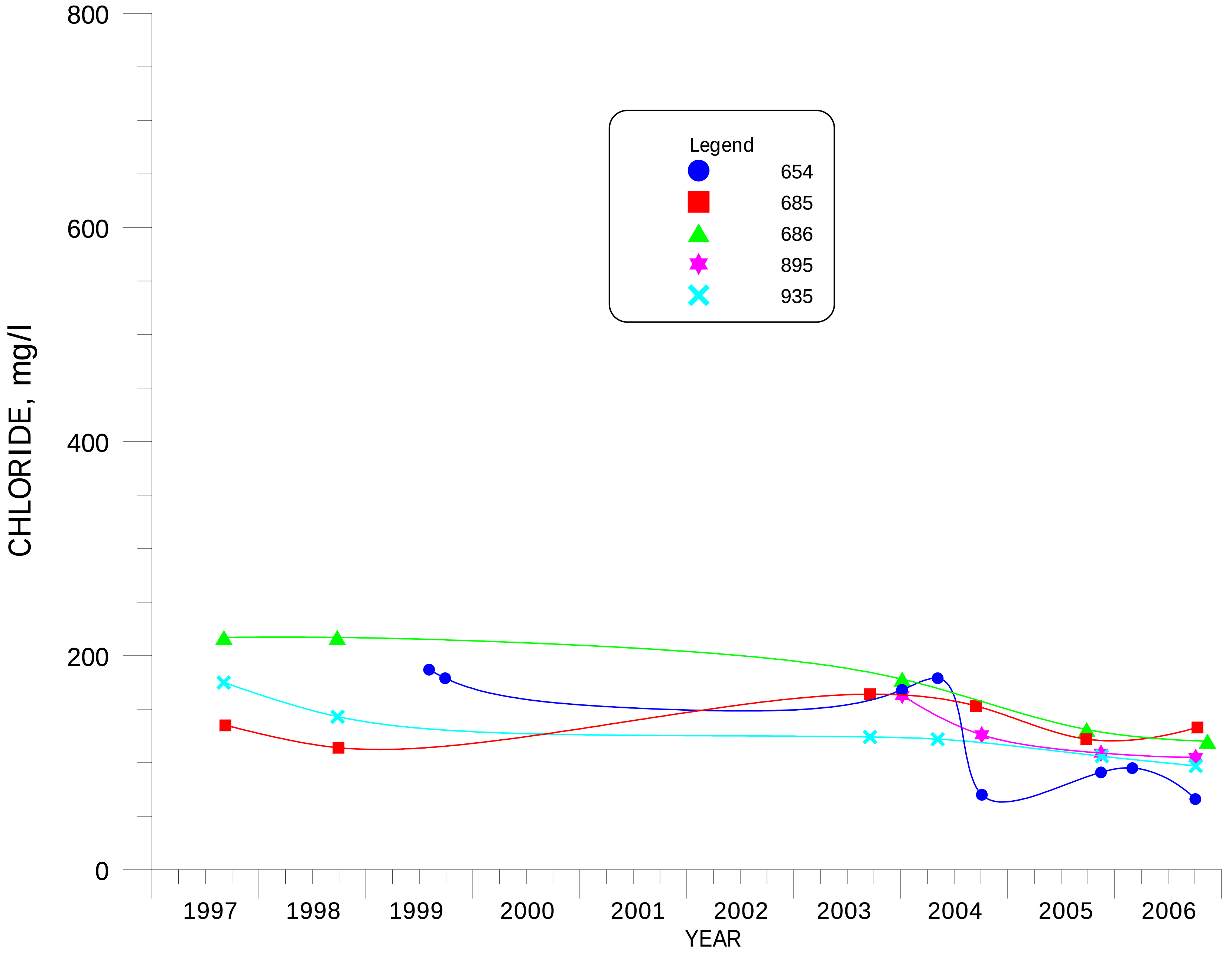


FIGURE 4.3-51. CHLORIDE CONCENTRATIONS FOR WELLS 654, 685, 686, 895 AND 935.

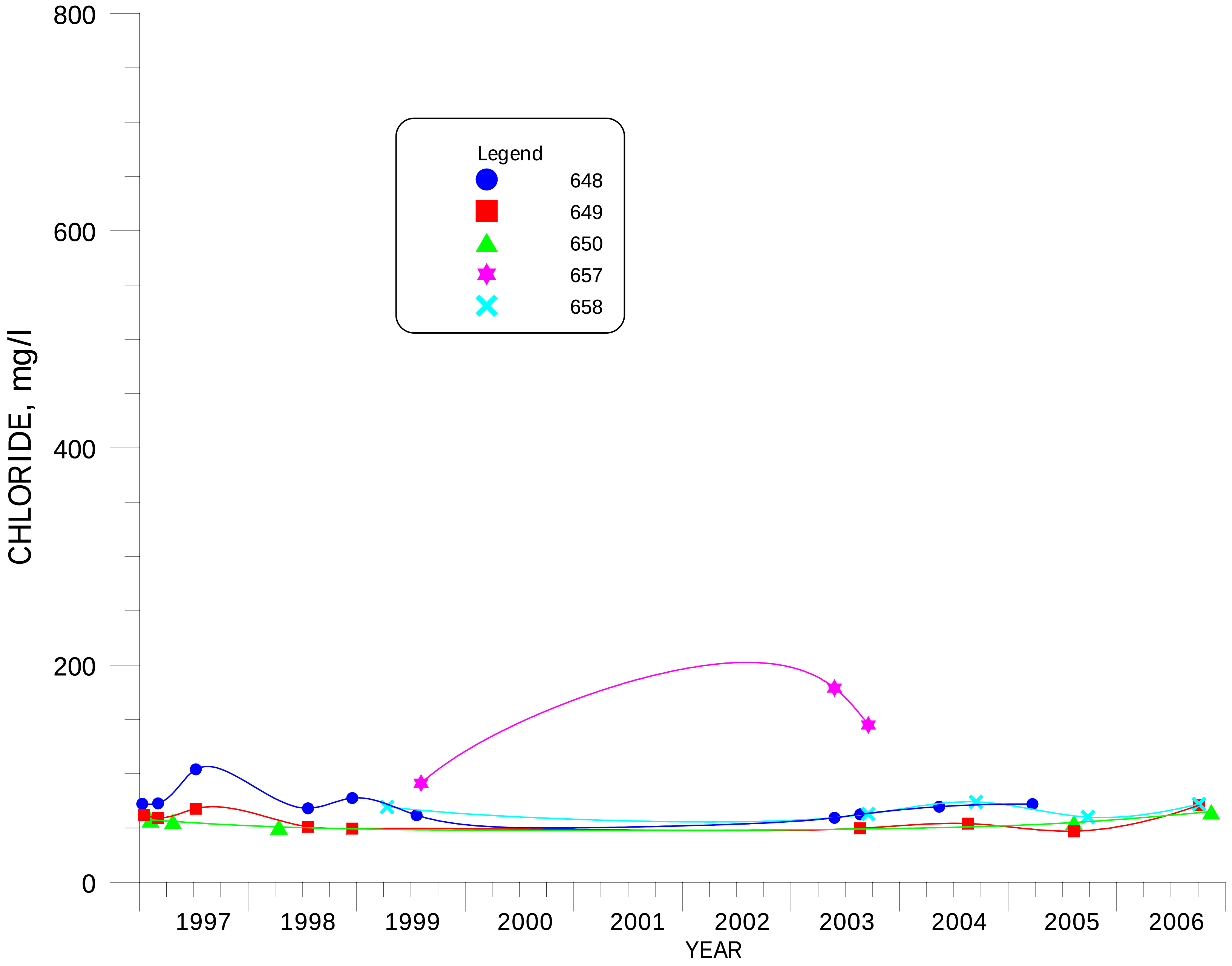
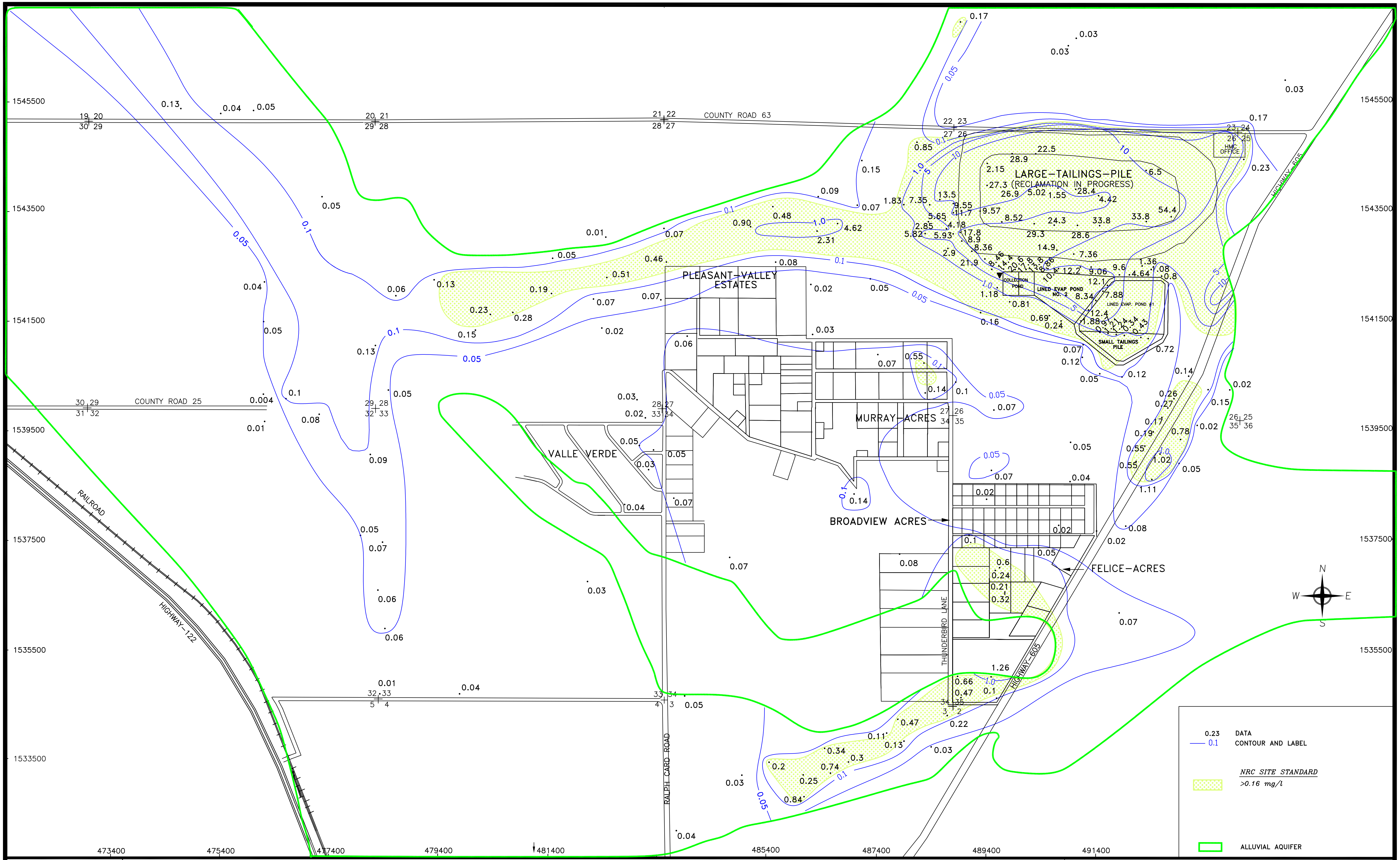


FIGURE 4.3-52. CHLORIDE CONCENTRATIONS FOR WELLS 648, 649, 650, 657 AND 658.



SCALE: 1"=1600'
C:\PROJECTS\2007–06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP–11&12–N–RANGE–10–W

FIGURE 4.3–53. URANIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006 mg/l

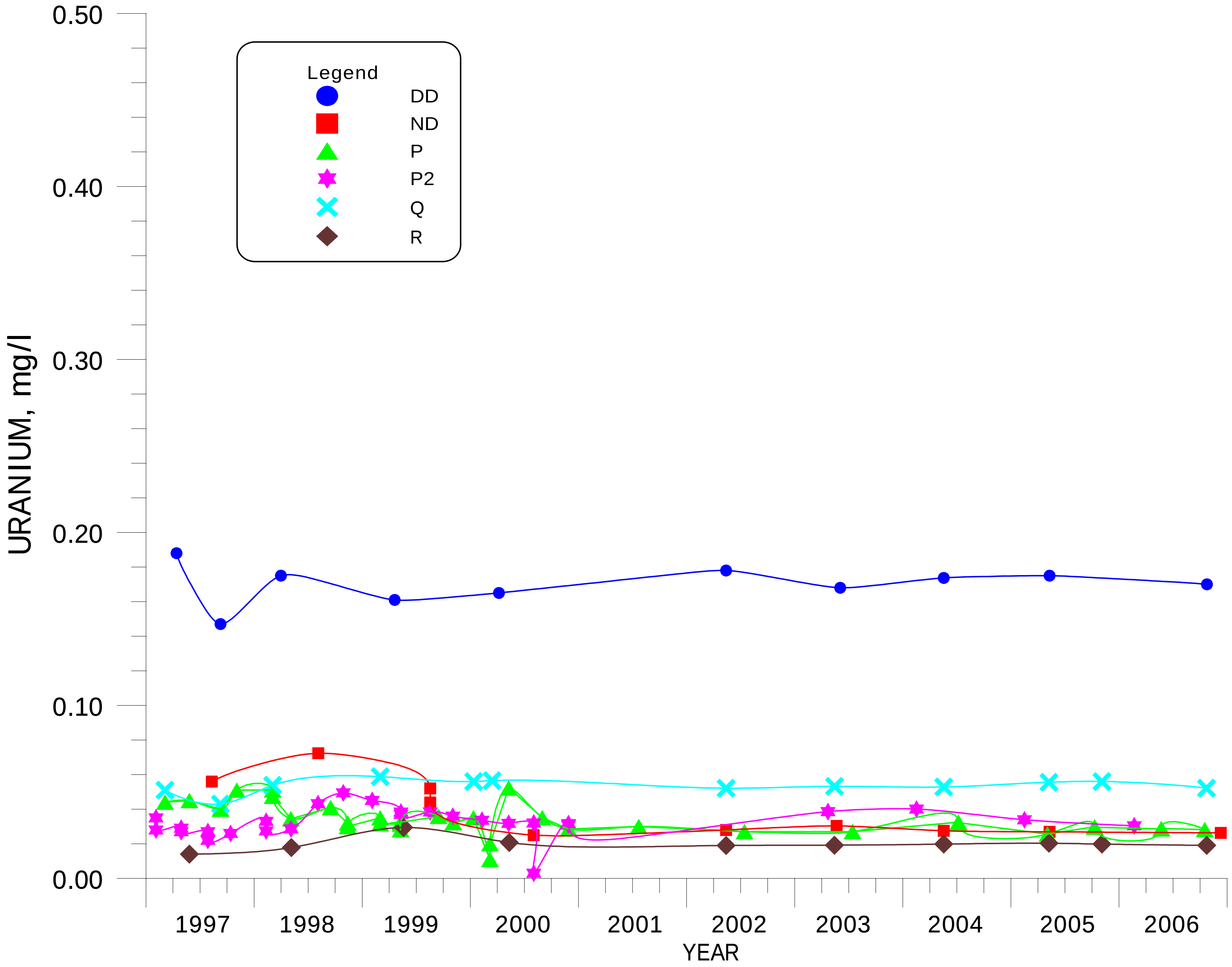


FIGURE 4.3-54. URANIUM CONCENTRATIONS FOR WELLS DD, ND, P, P2, Q AND R.

FIGURE 4.3-55. URANIUM CONCENTRATIONS FOR WELLS NC, S2, S3, S4 AND S11.

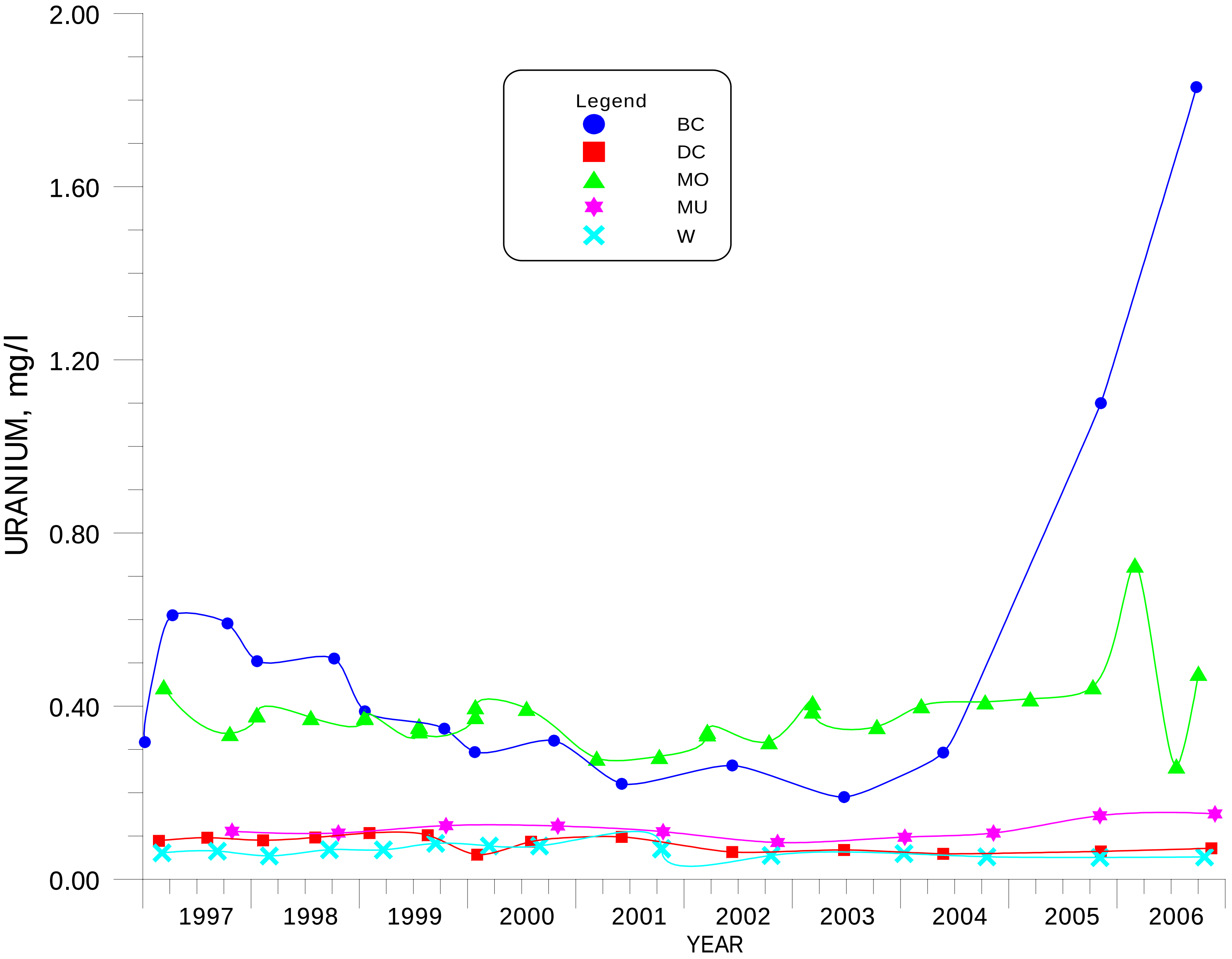


FIGURE 4.3-56. URANIUM CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.

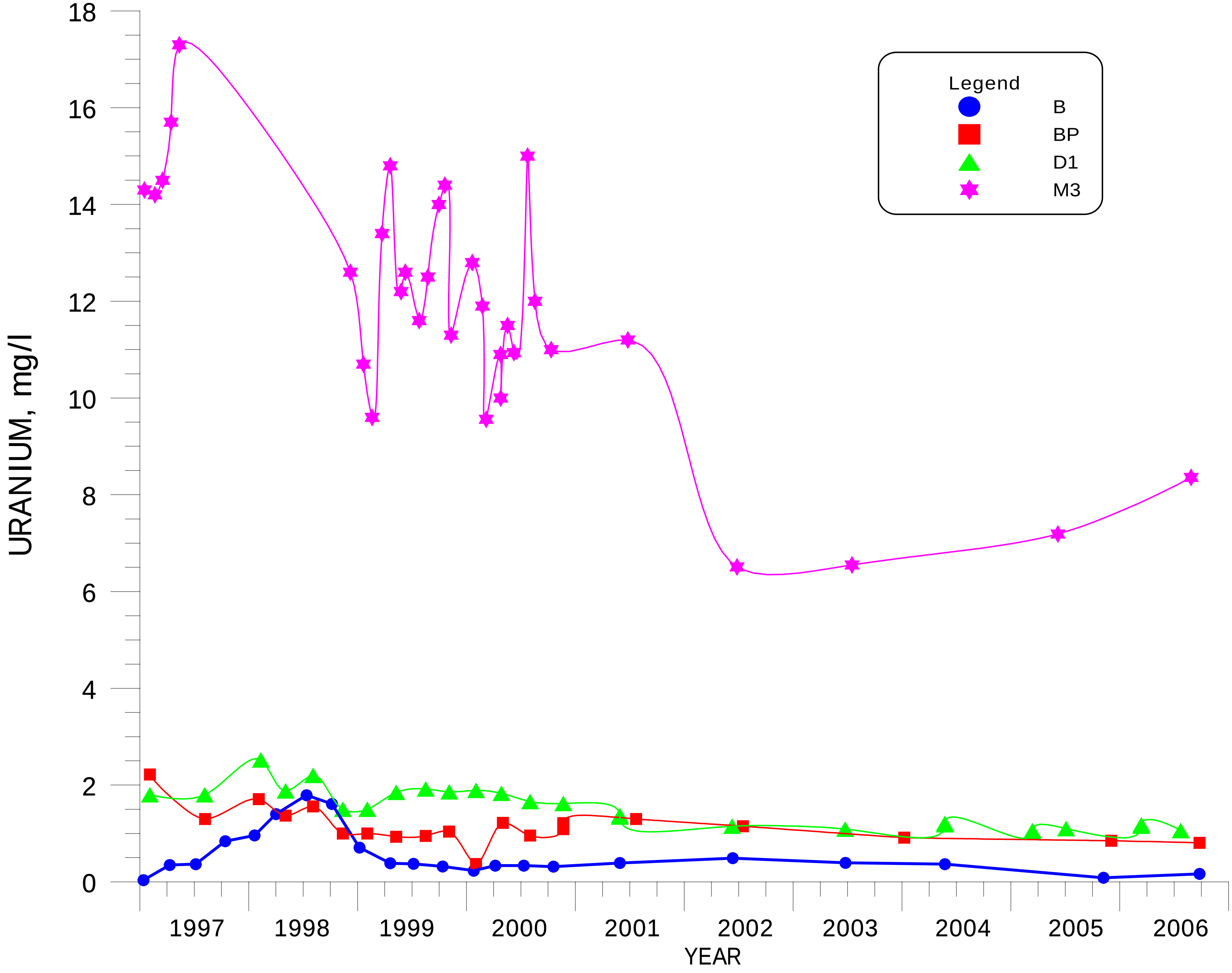


FIGURE 4.3-57. URANIUM CONCENTRATIONS FOR WELLS B, BP, D1 AND M3.

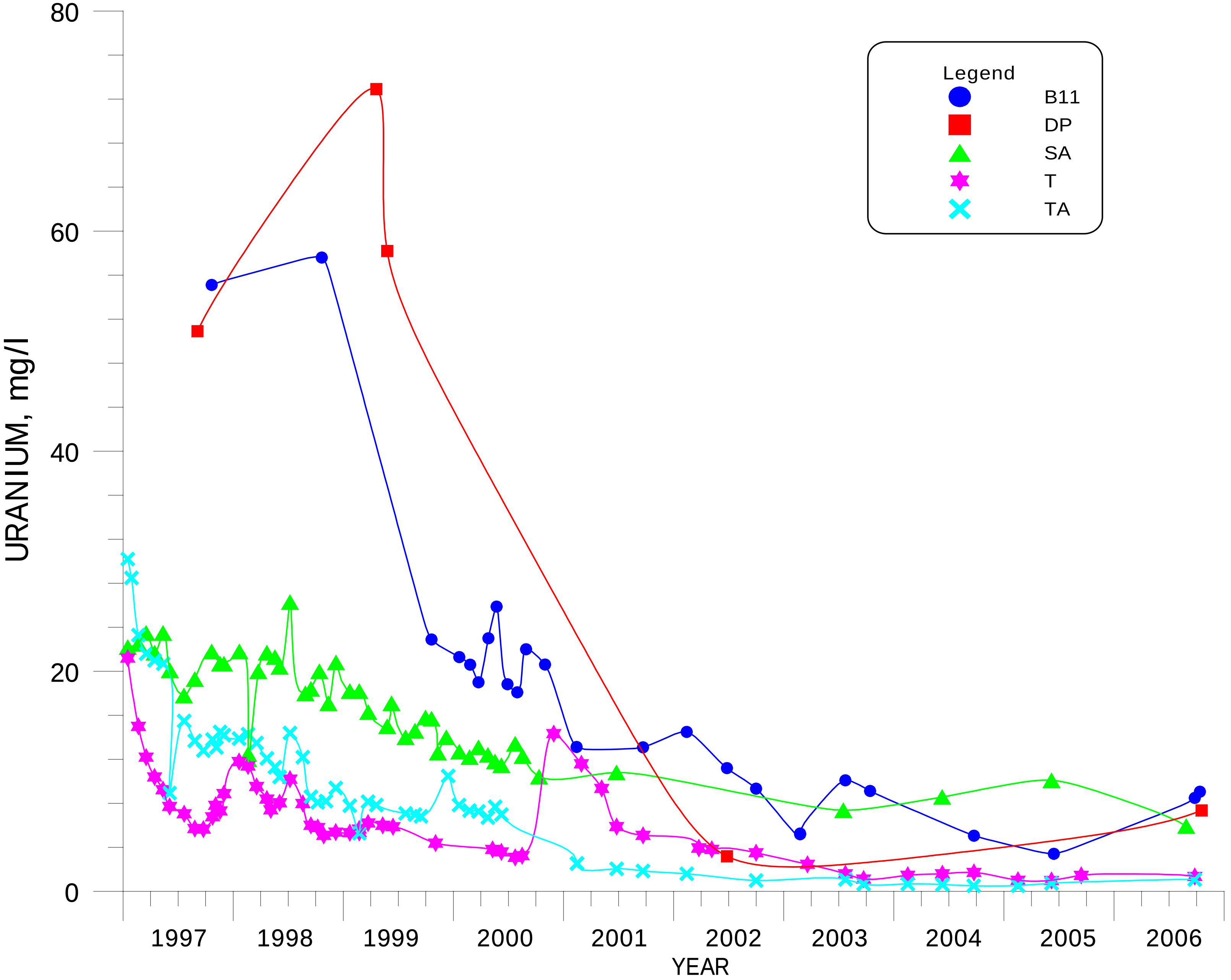


FIGURE 4.3-58. URANIUM CONCENTRATIONS FOR WELLS B11, DP, SA, T AND TA.

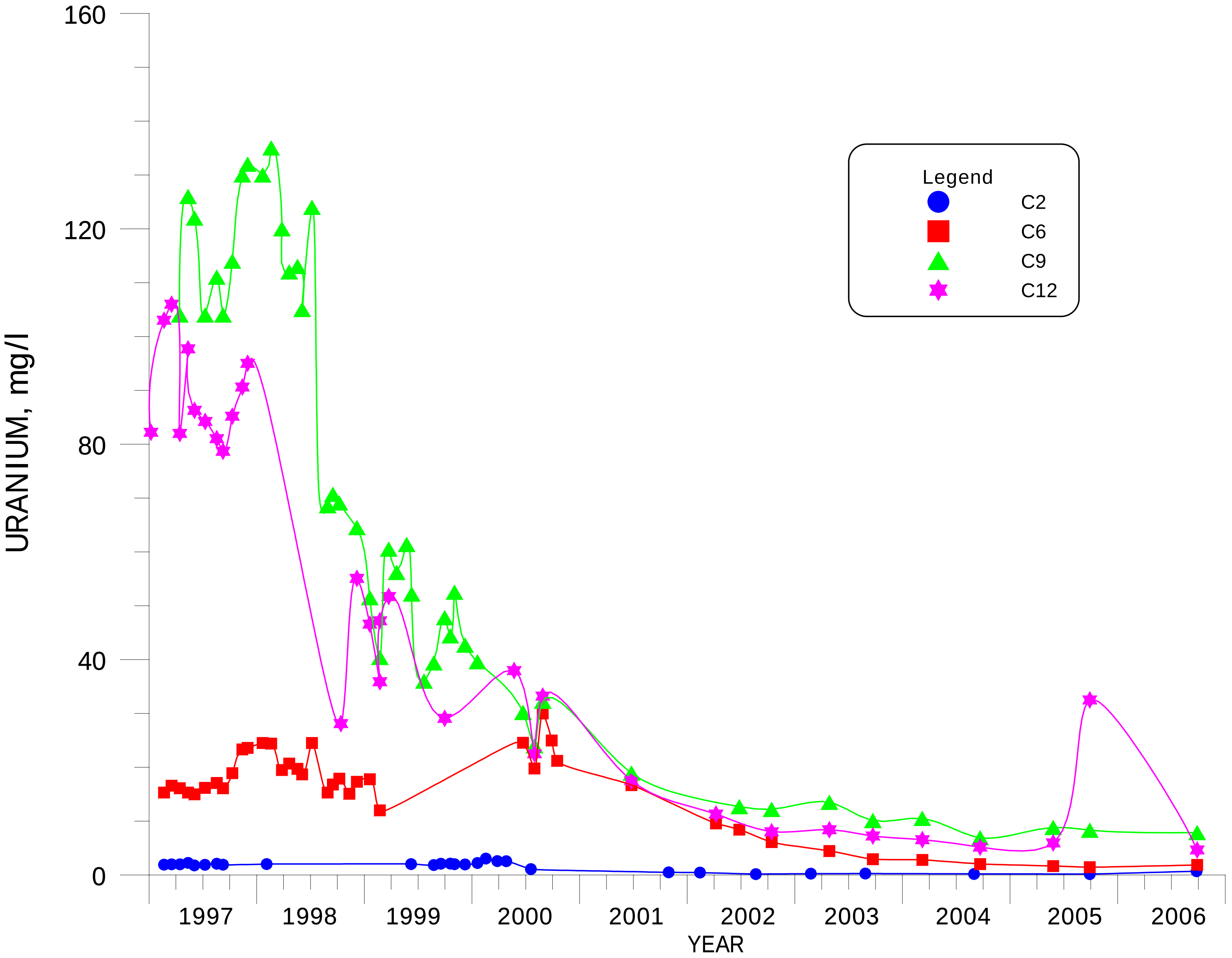


FIGURE 4.3-59. URANIUM CONCENTRATIONS FOR WELLS C2, C6, C9 AND C12.

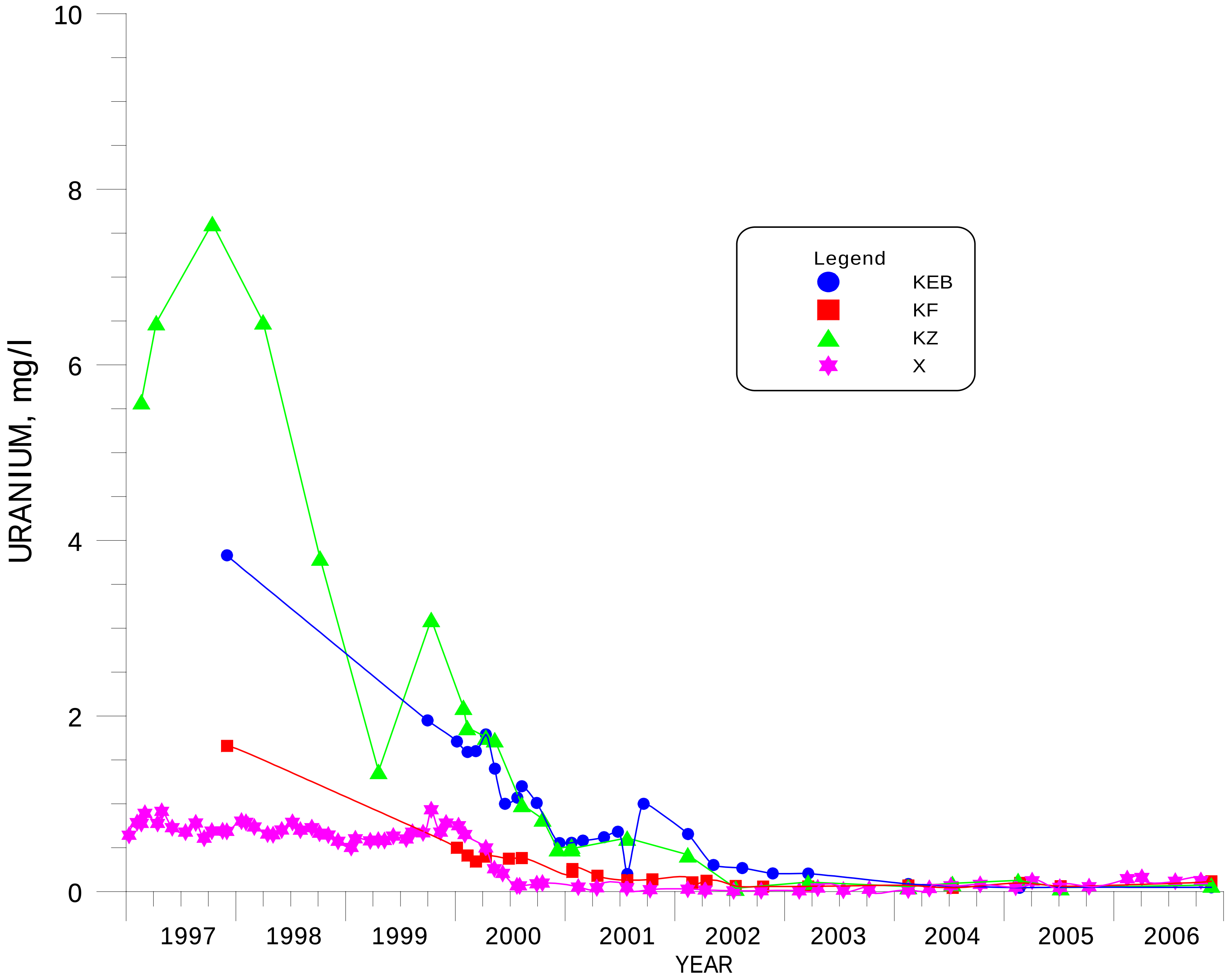


FIGURE 4.3-60. URANIUM CONCENTRATIONS FOR WELLS KEB, KF, KZ AND X.

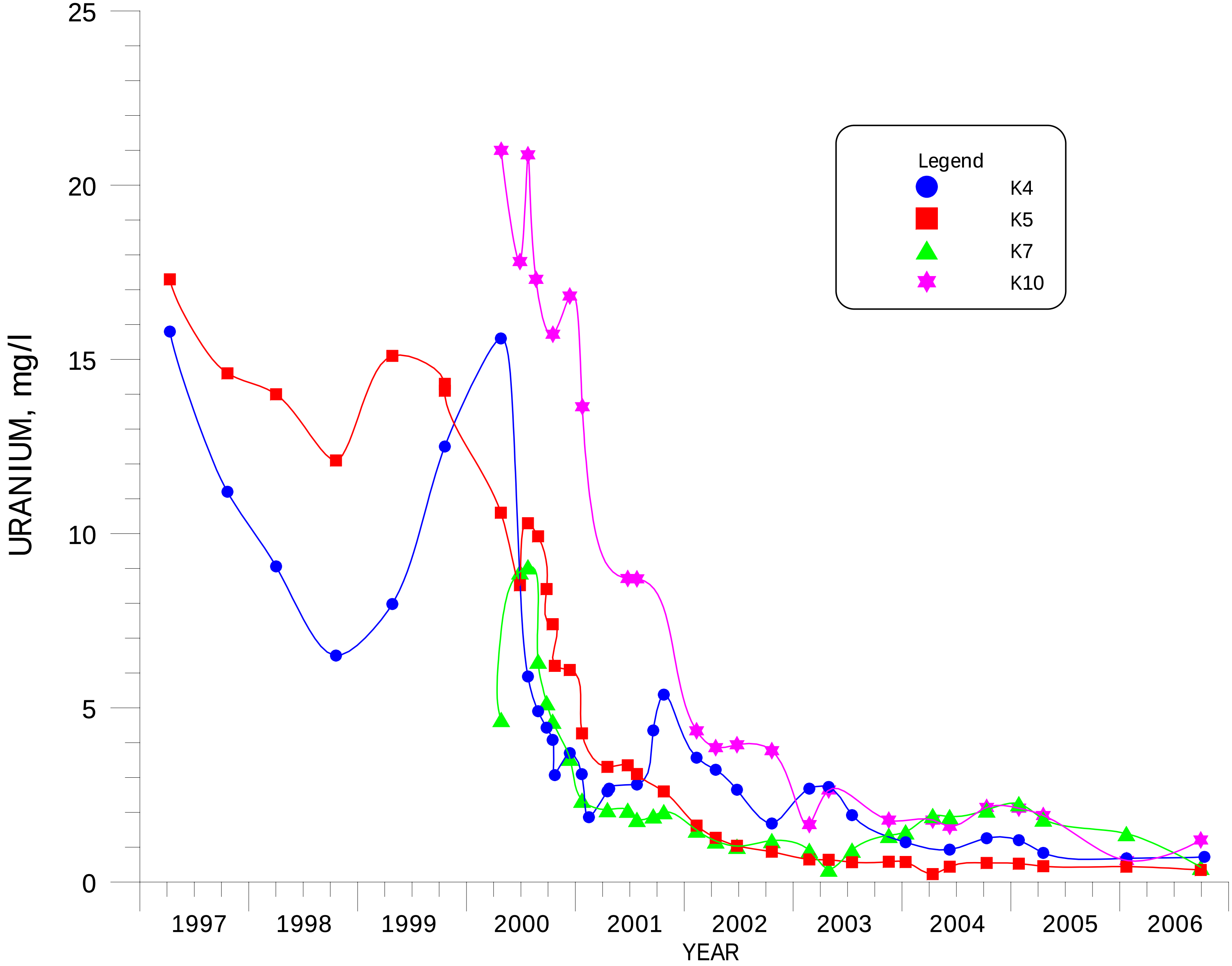


FIGURE 4.3-61. URANIUM CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.

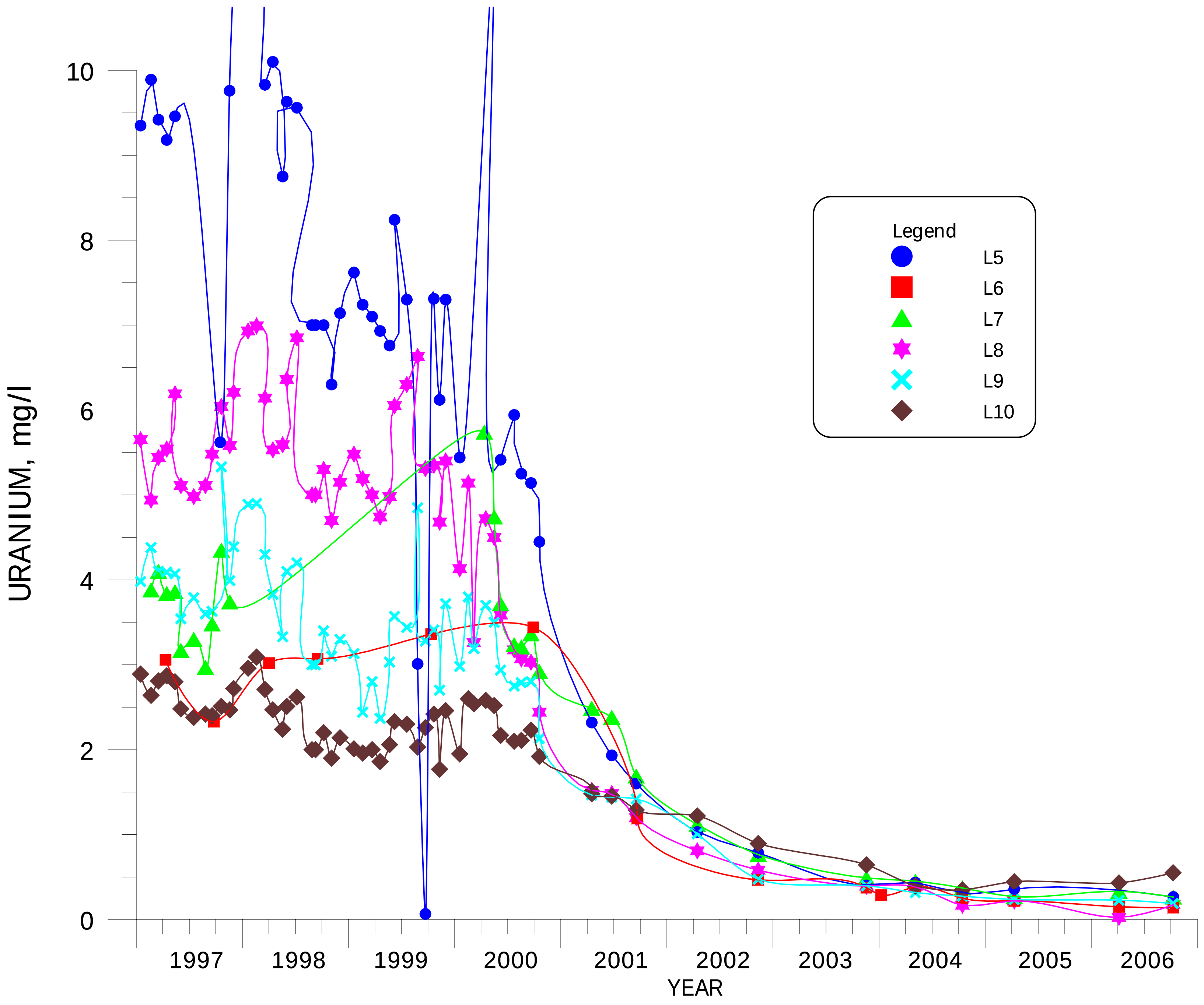


FIGURE 4.3-62. URANIUM CONCENTRATIONS FOR WELLS L5, L6, L7, L8, L9 AND L10.

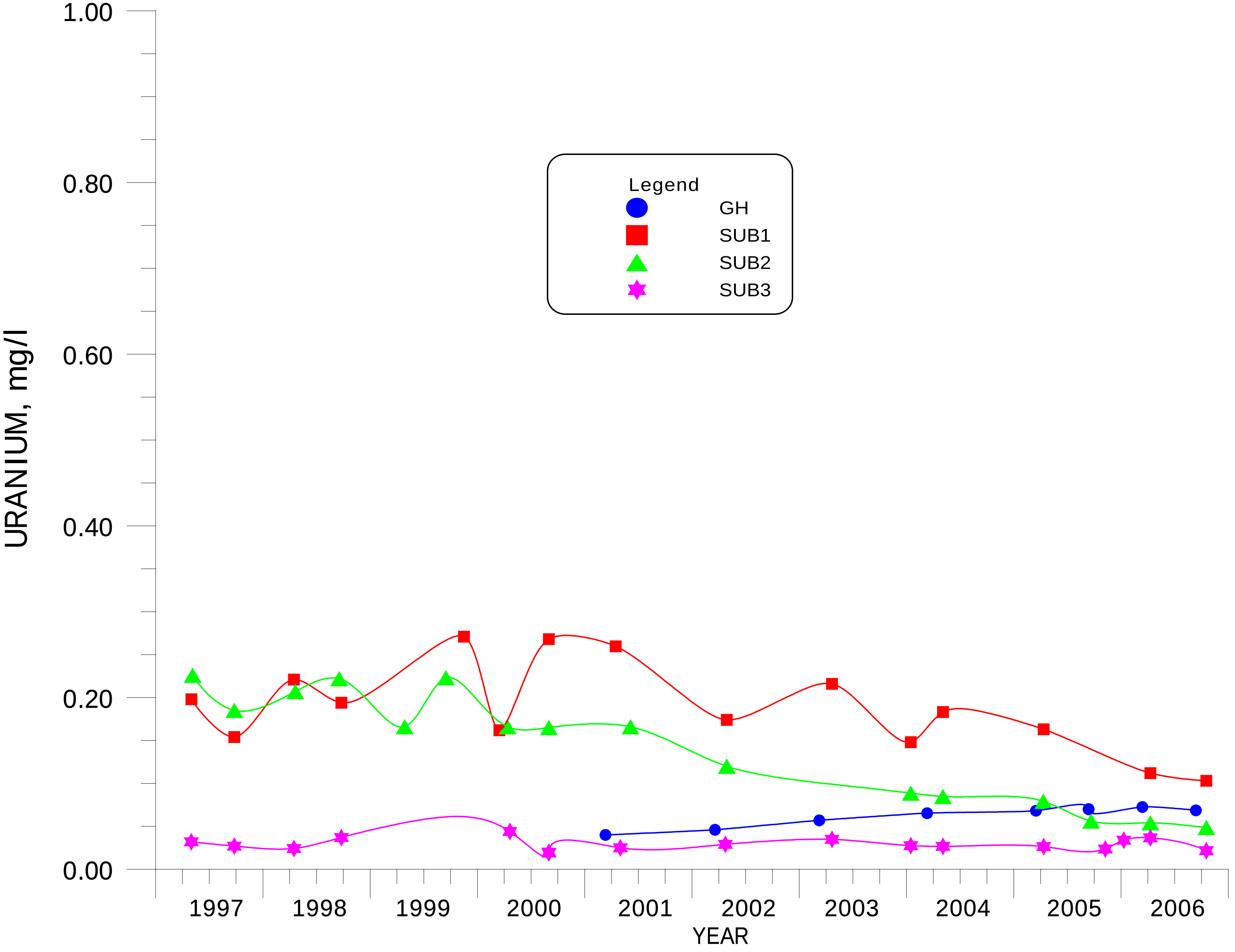


FIGURE 4.3-63. URANIUM CONCENTRATIONS FOR WELLS GH, SUB1, SUB2 AND SUB3.

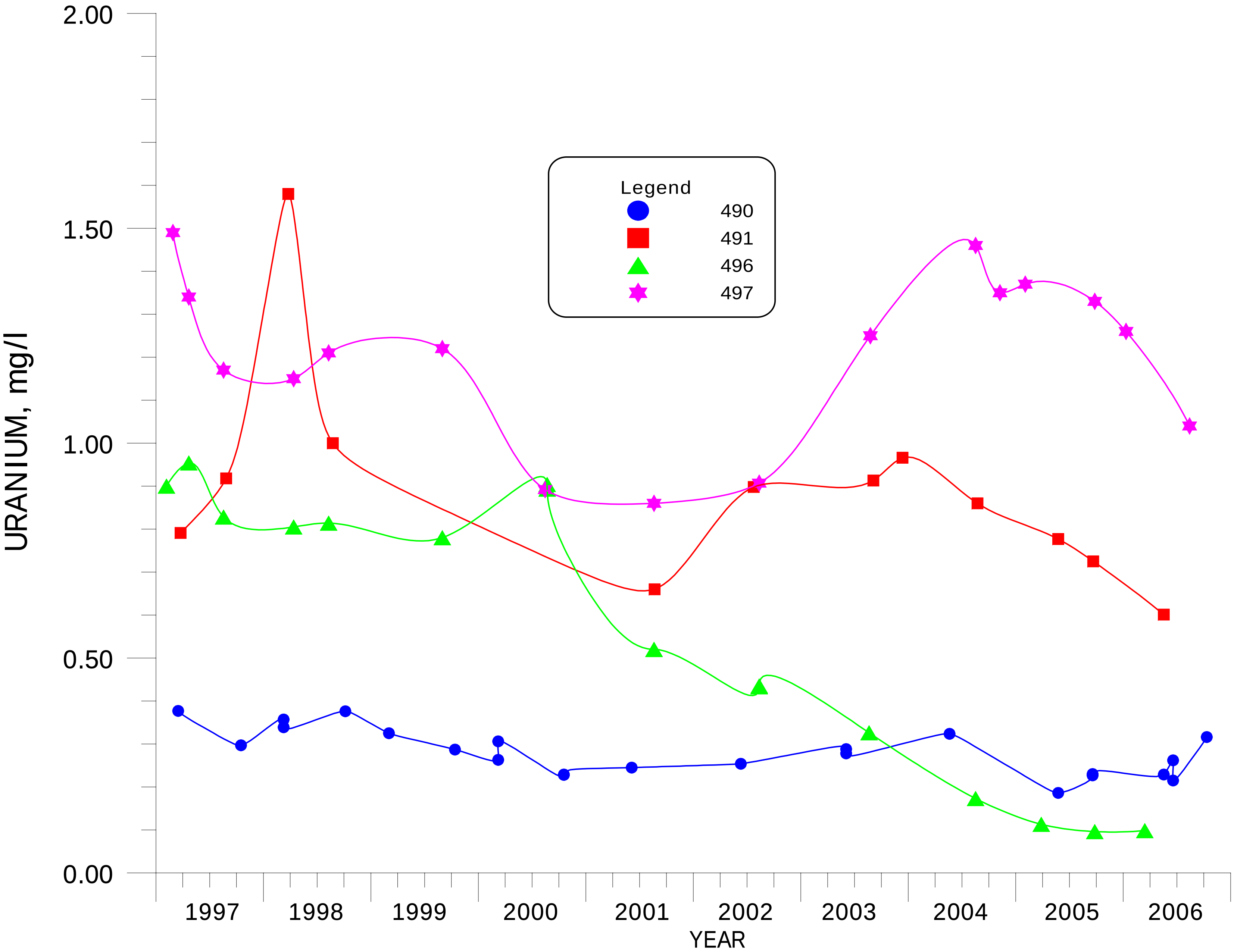


FIGURE 4.3-64. URANIUM CONCENTRATIONS FOR WELLS 490, 491, 496 AND 497.

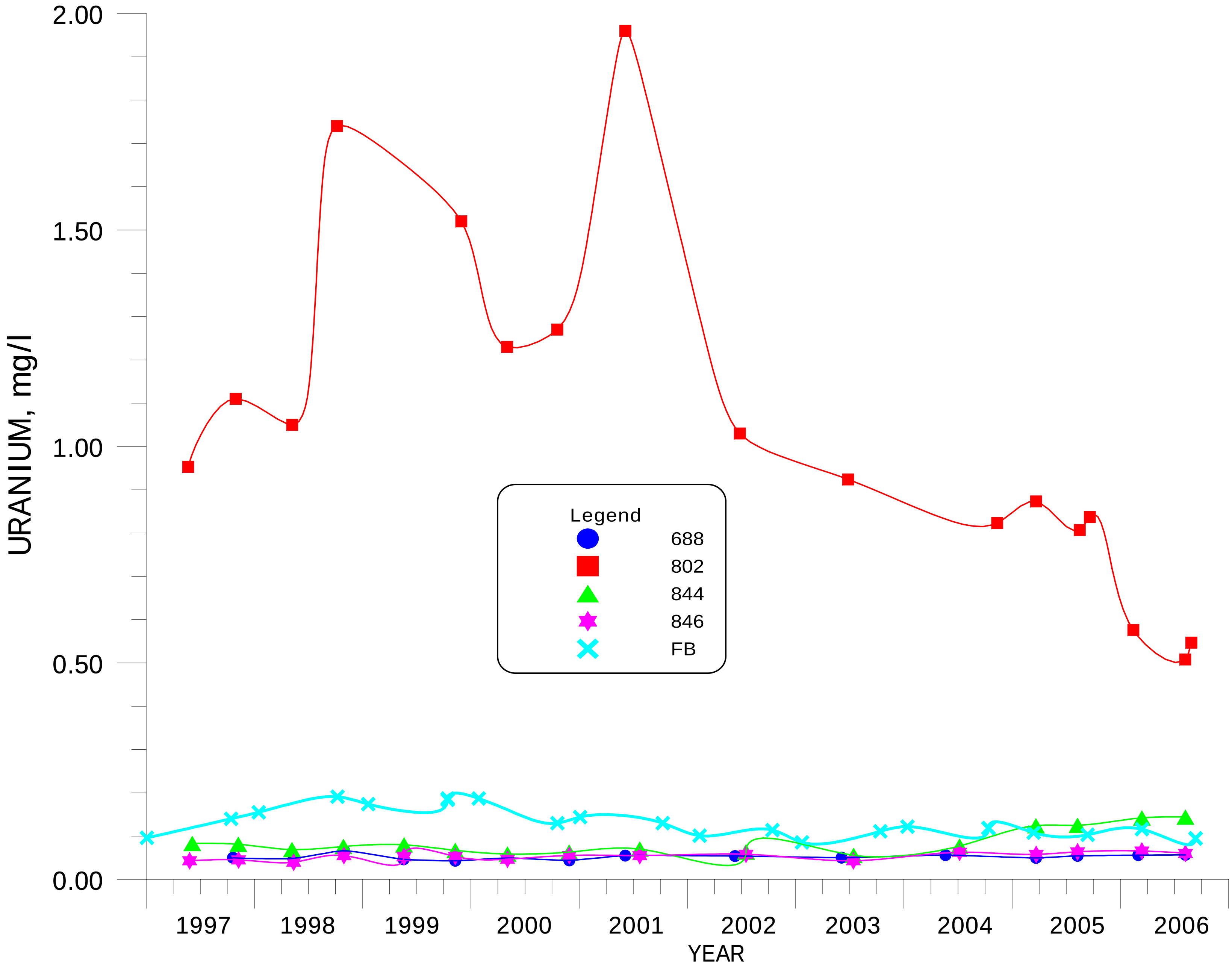


FIGURE 4.3-65. URANIUM CONCENTRATIONS FOR WELLS 688, 802, 844, 846 AND FB.

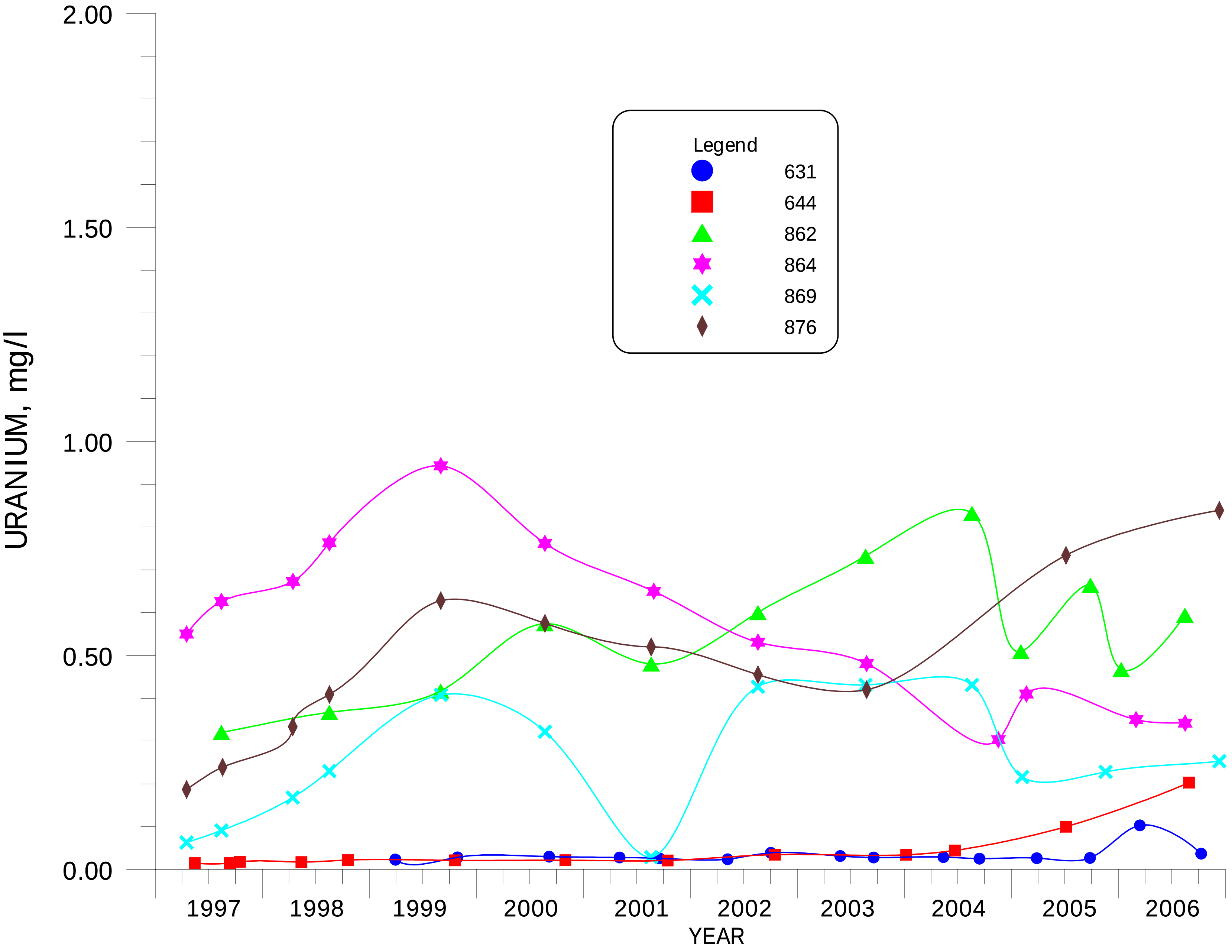


FIGURE 4.3-66. URANIUM CONCENTRATIONS FOR WELLS 631, 644, 862, 864, 869 AND 876.

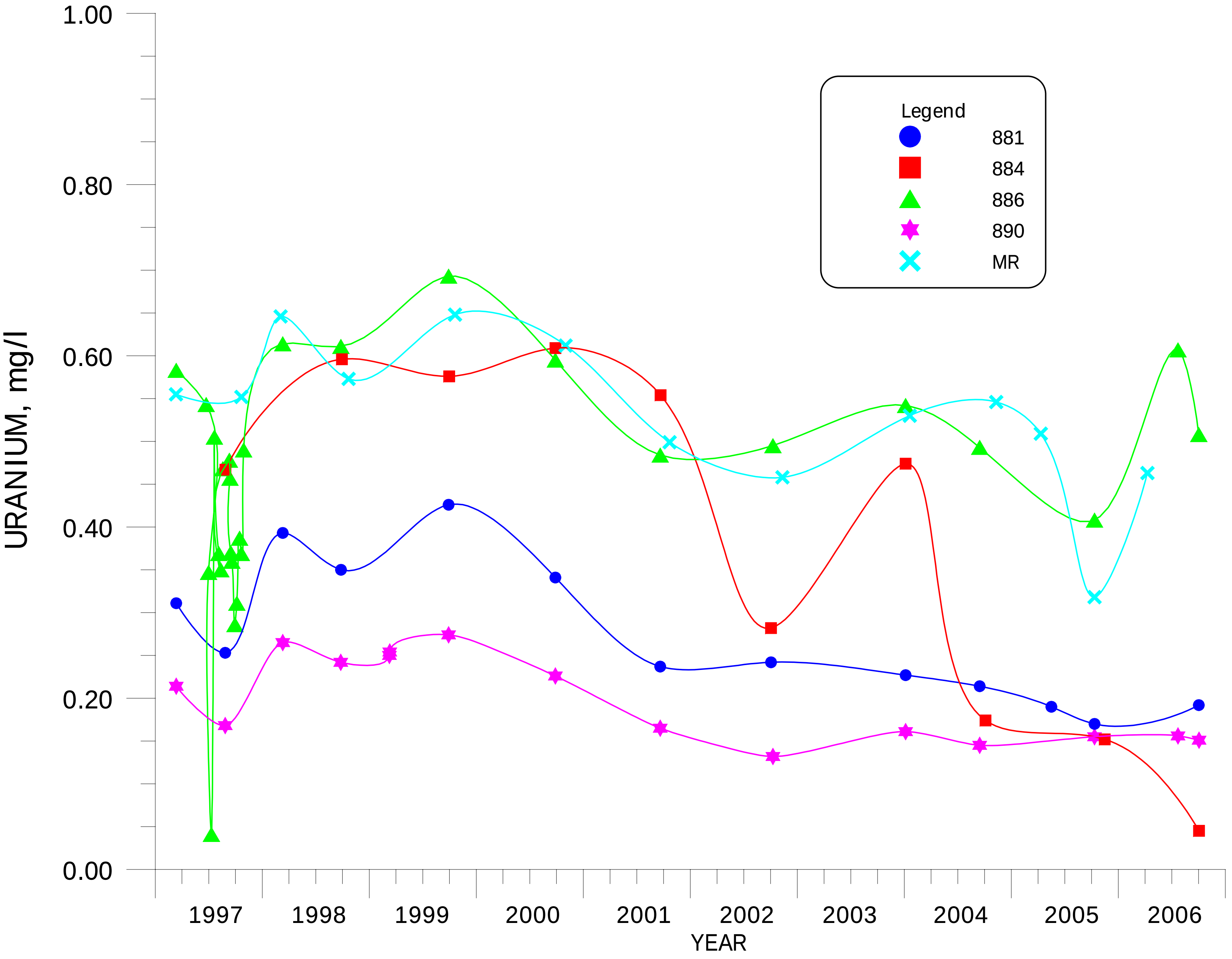


FIGURE 4.3-67. URANIUM CONCENTRATIONS FOR WELLS 881, 884, 886, 890 AND MR.

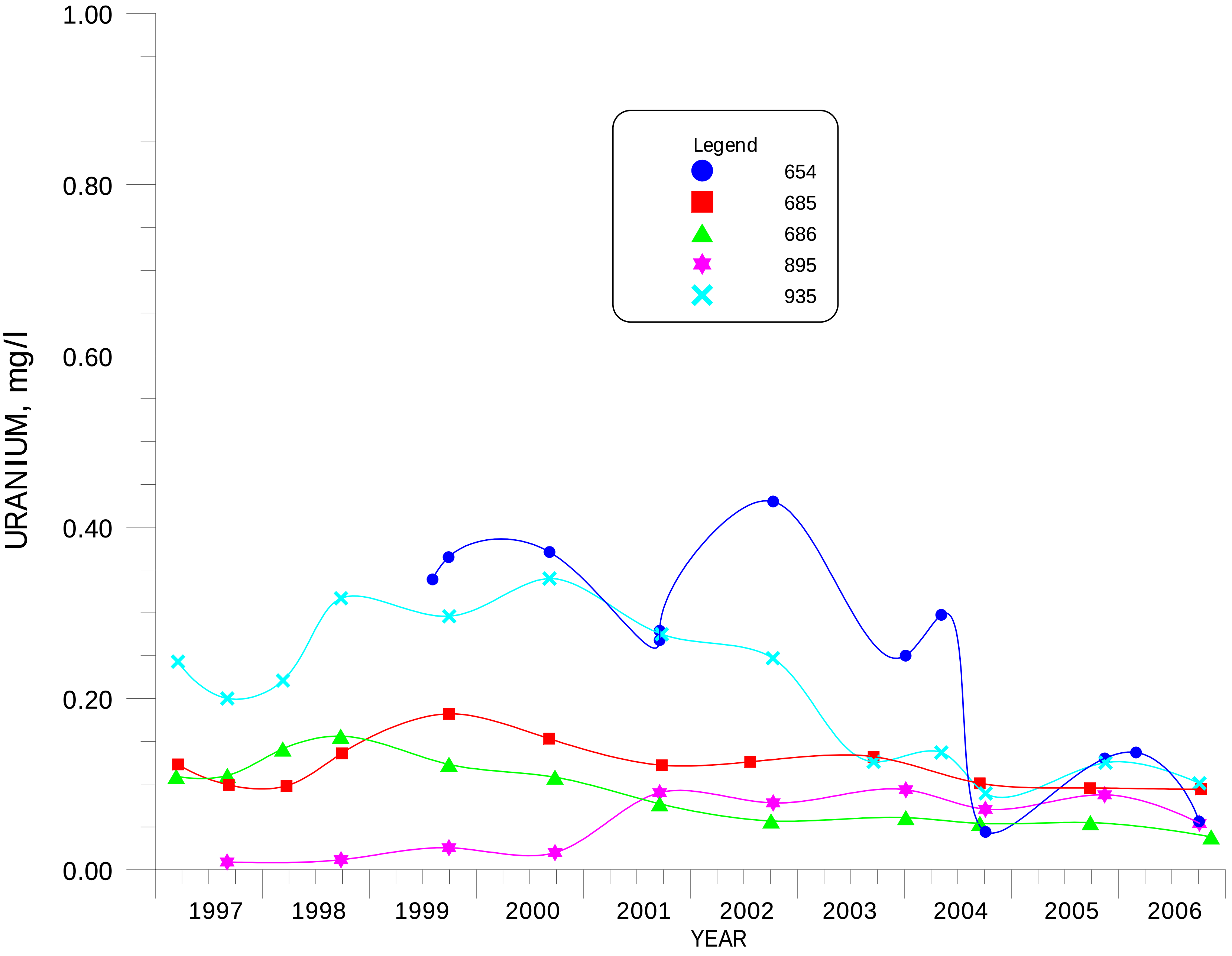


FIGURE 4.3-68. URANIUM CONCENTRATIONS FOR WELLS 654, 686, 687, 895 AND 935.

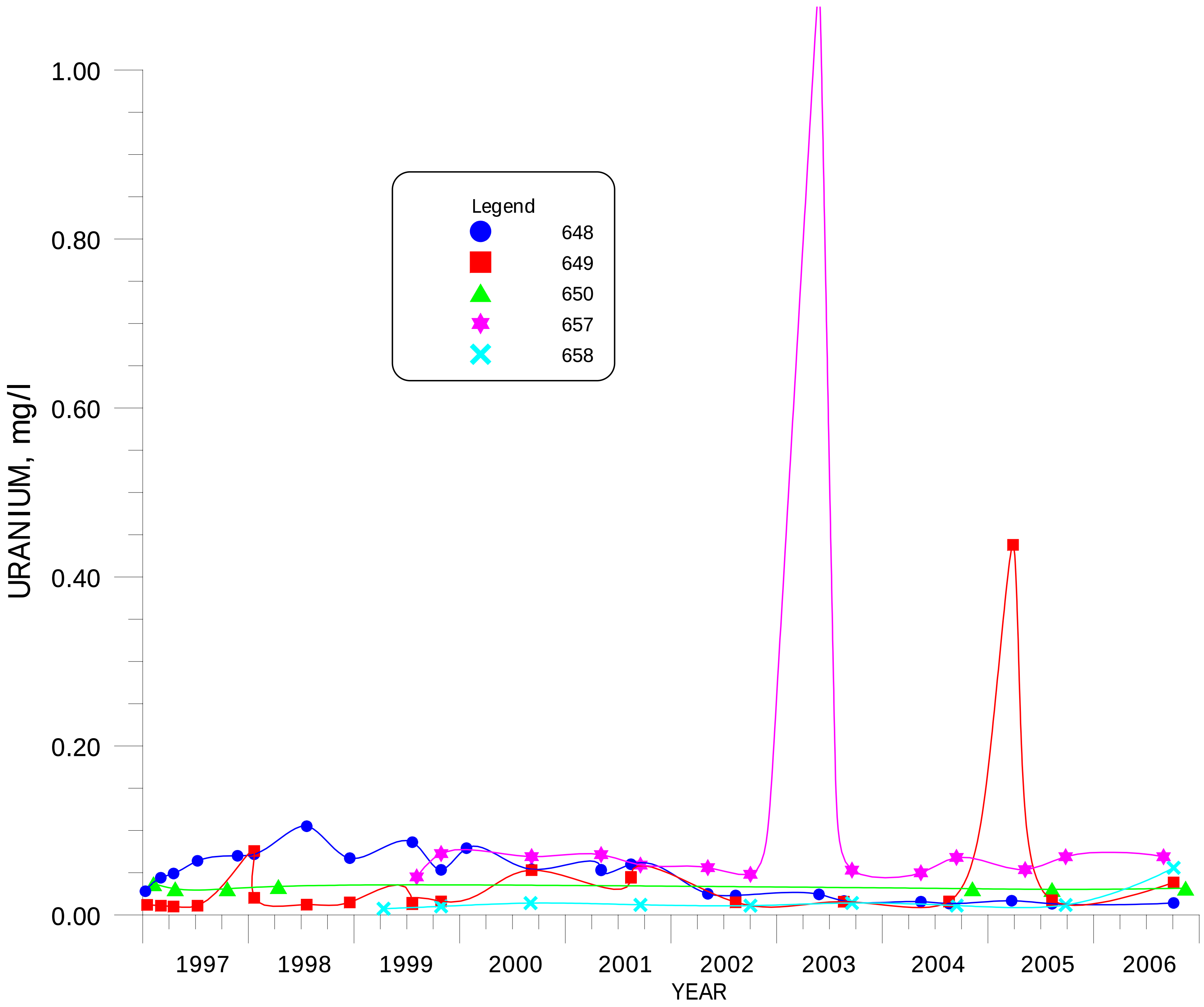
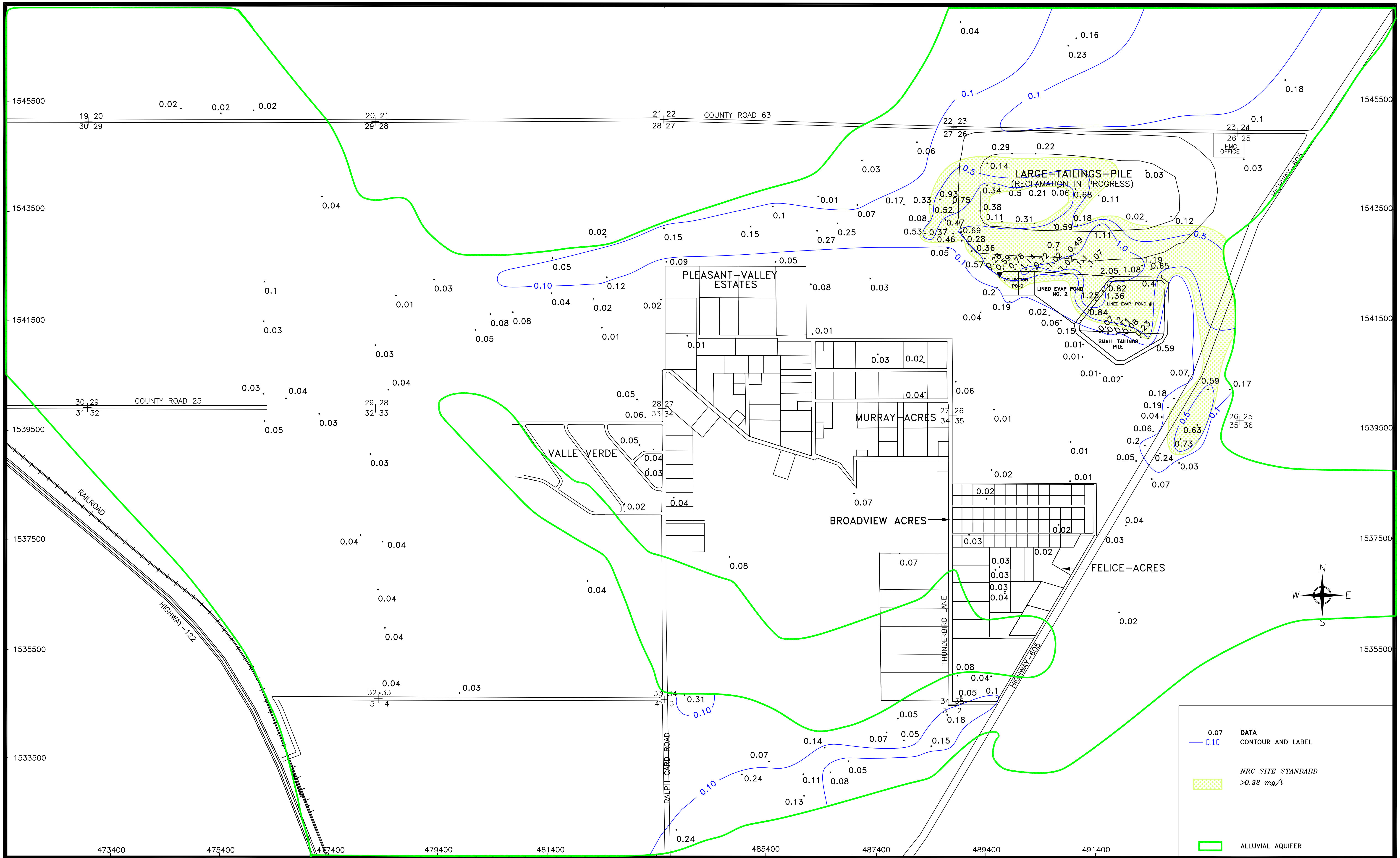


FIGURE 4.3-69. URANIUM CONCENTRATIONS FOR WELLS 648, 649, 650, 657 AND 658.



SCALE: 1"=1600'
C:\PROJECTS\ 2007-06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP–11&12–N–RANGE–10–W

FIGURE 4.3–70. SELENIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, mg/l

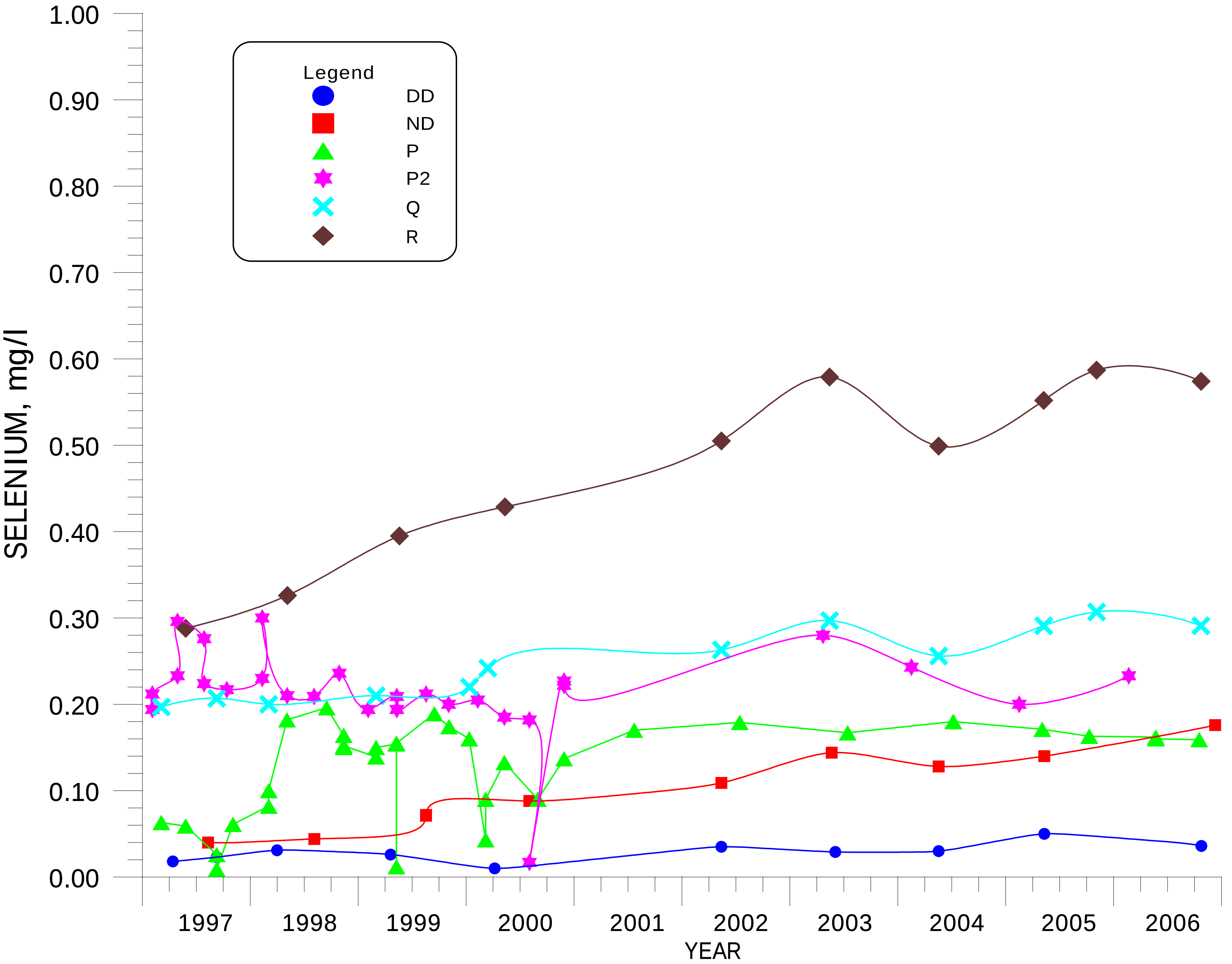


FIGURE 4.3-71. SELENIUM CONCENTRATIONS FOR WELLS DD, ND, P, P2, Q AND R.

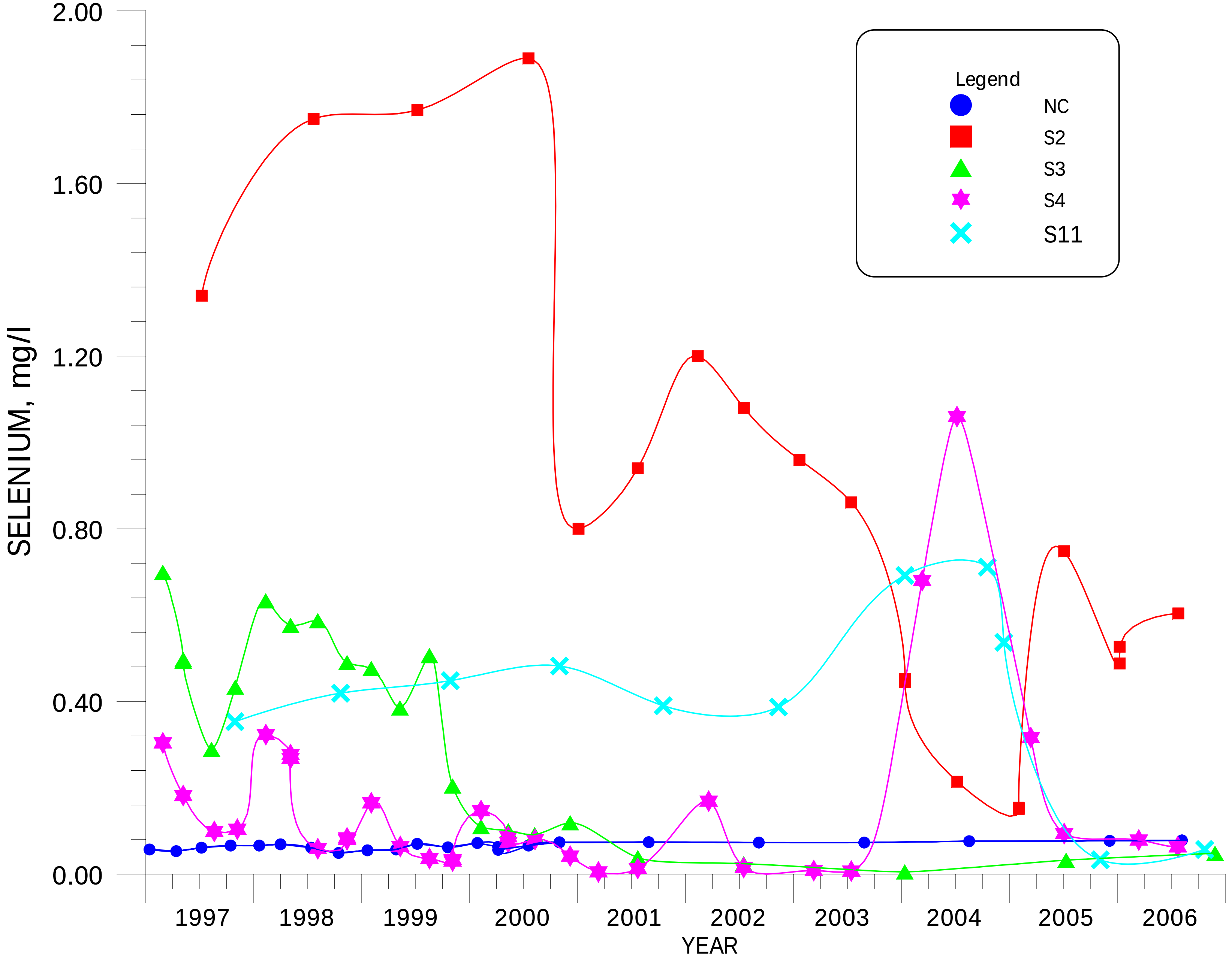


FIGURE 4.3-72. SELENIUM CONCENTRATIONS FOR WELLS NC, S2, S3, S4 AND S11.

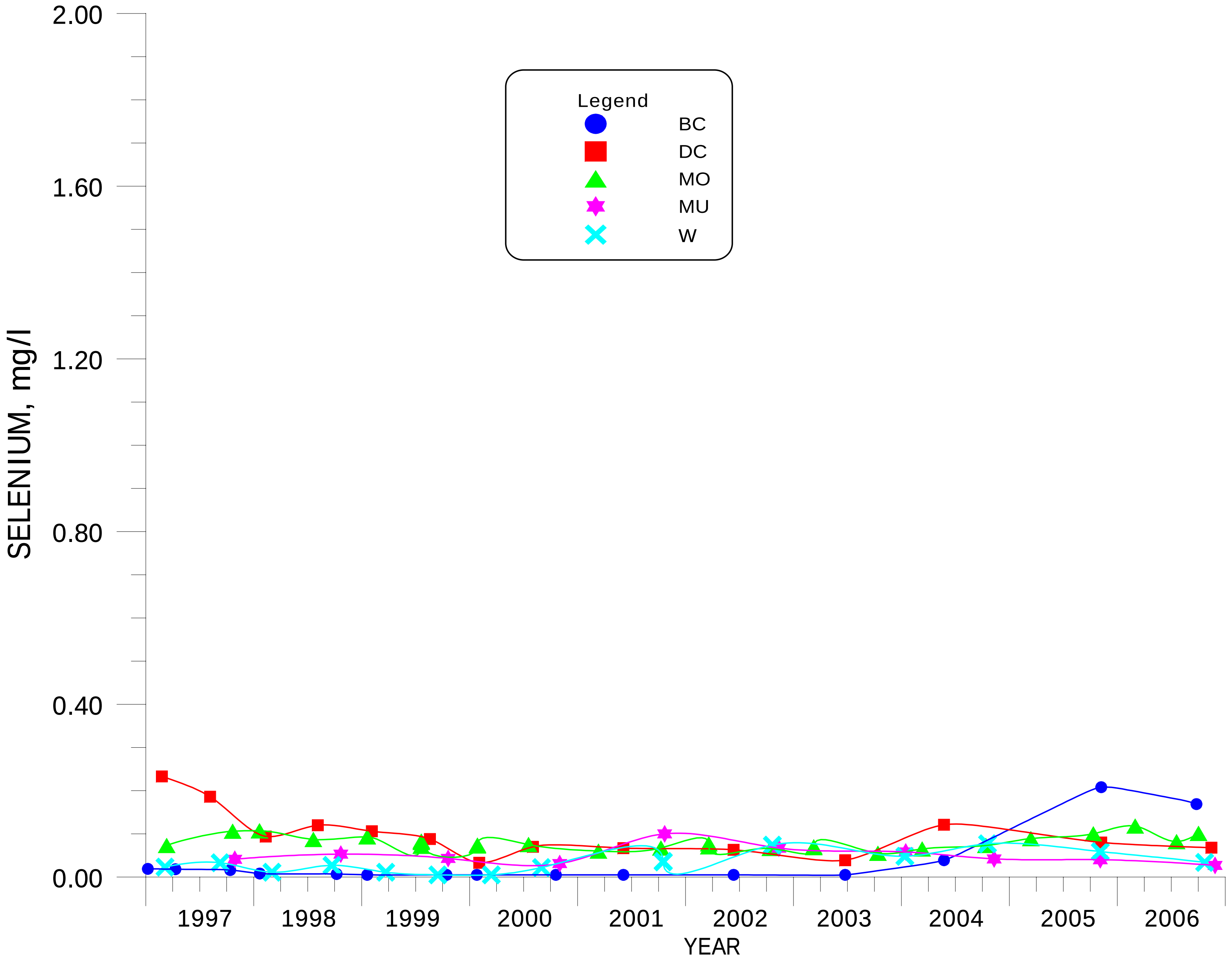


FIGURE 4.3-73. SELENIUM CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.

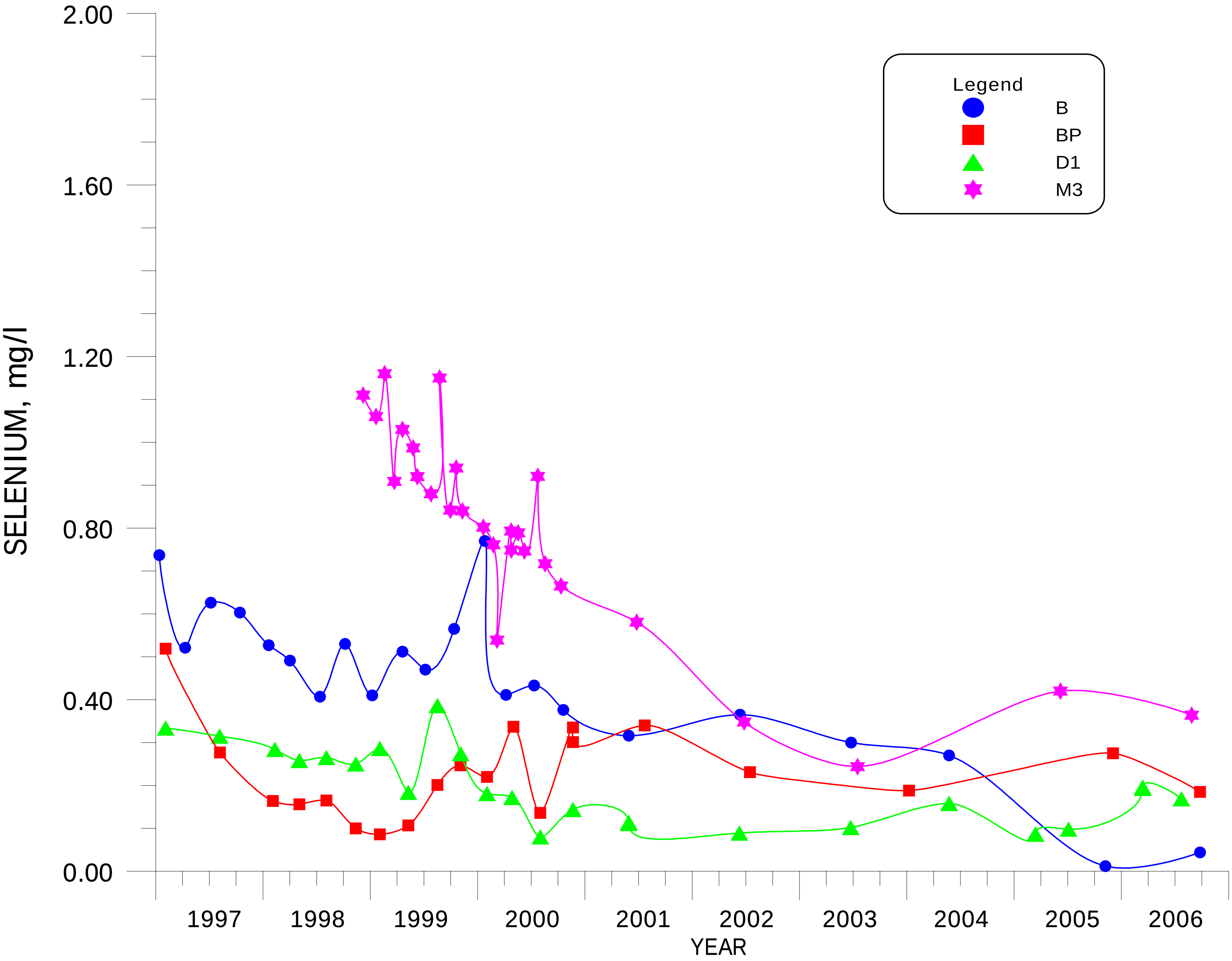


FIGURE 4.3-74. SELENIUM CONCENTRATIONS FOR WELLS B, BP, D1 AND M3.

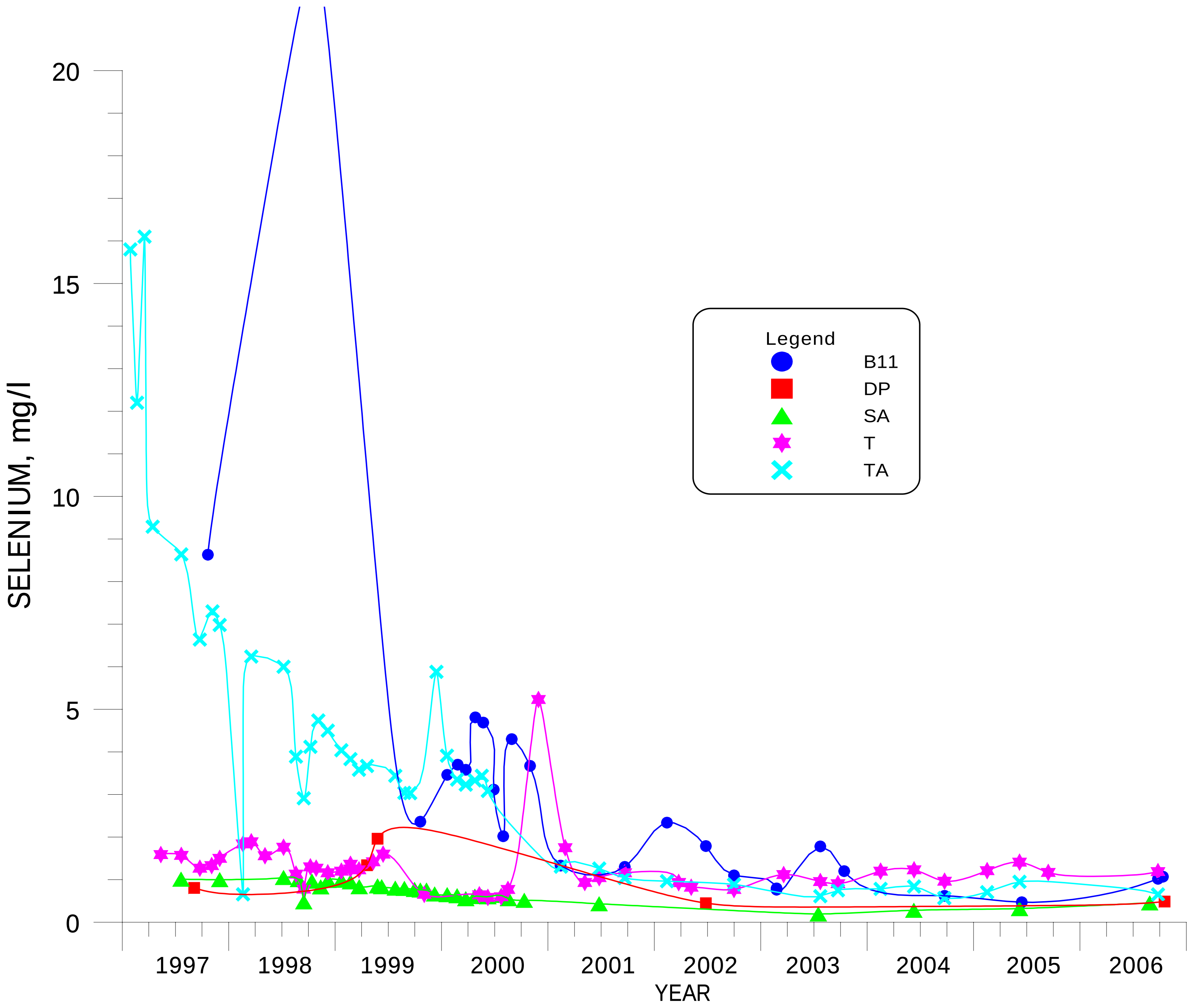


FIGURE 4.3-75. SELENIUM CONCENTRATIONS FOR WELLS B11, DP, SA, T AND TA.

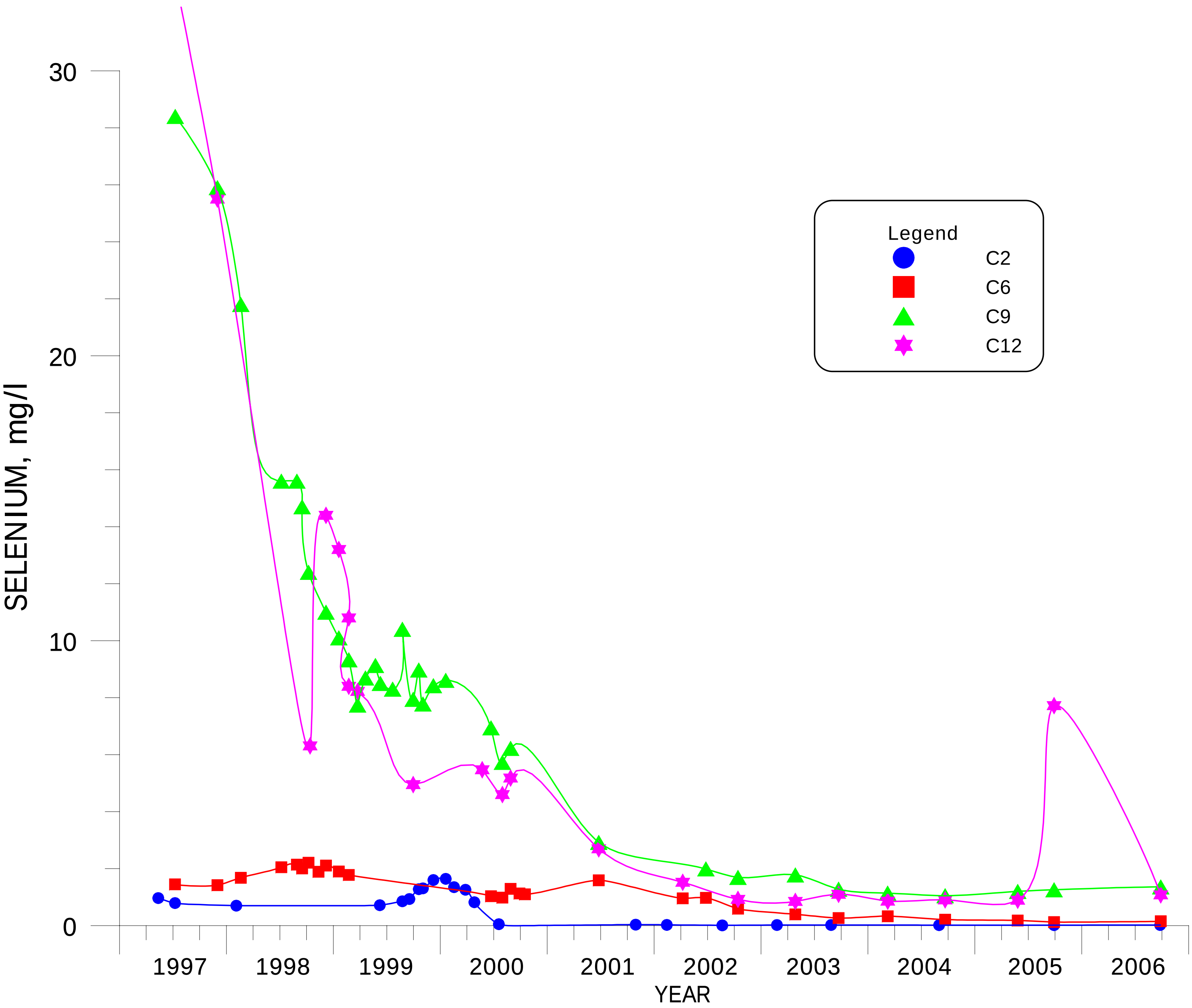


FIGURE 4.3-76. SELENIUM CONCENTRATIONS FOR WELLS C2, C6, C9 AND C12.

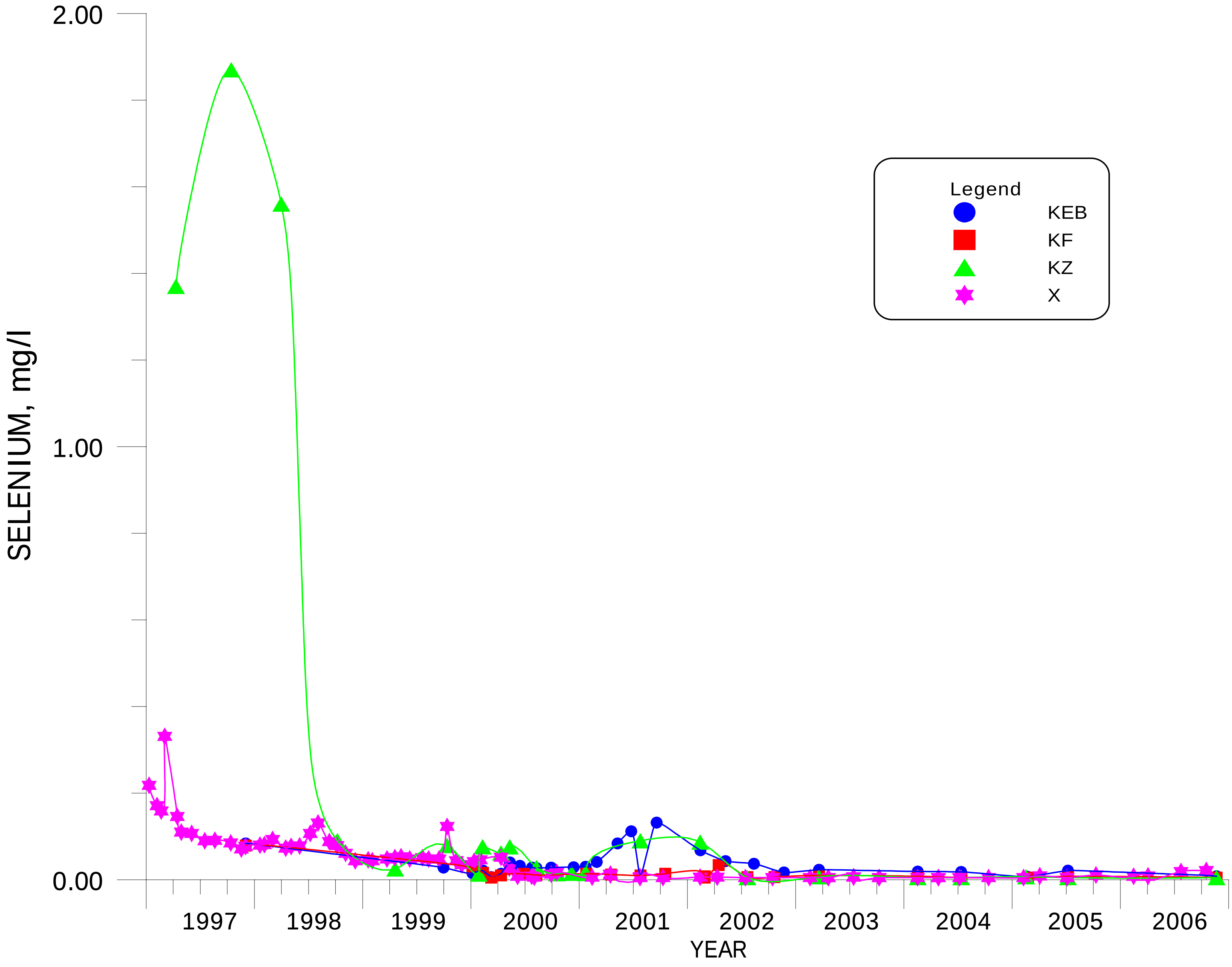


FIGURE 4.3-77. SELENIUM CONCENTRATIONS FOR WELLS KEB, KF, KZ AND X.

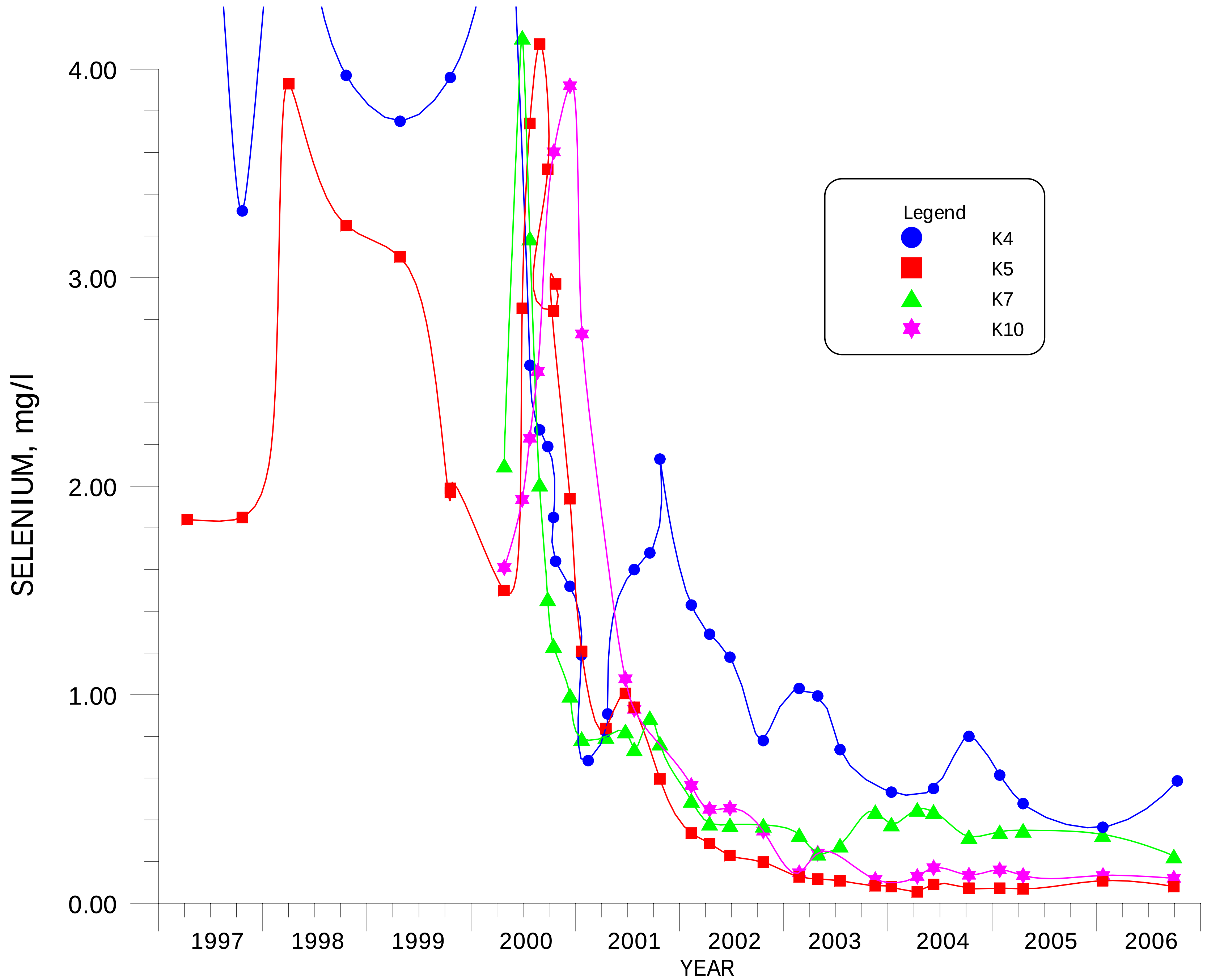


FIGURE 4.3-78. SELENIUM CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.

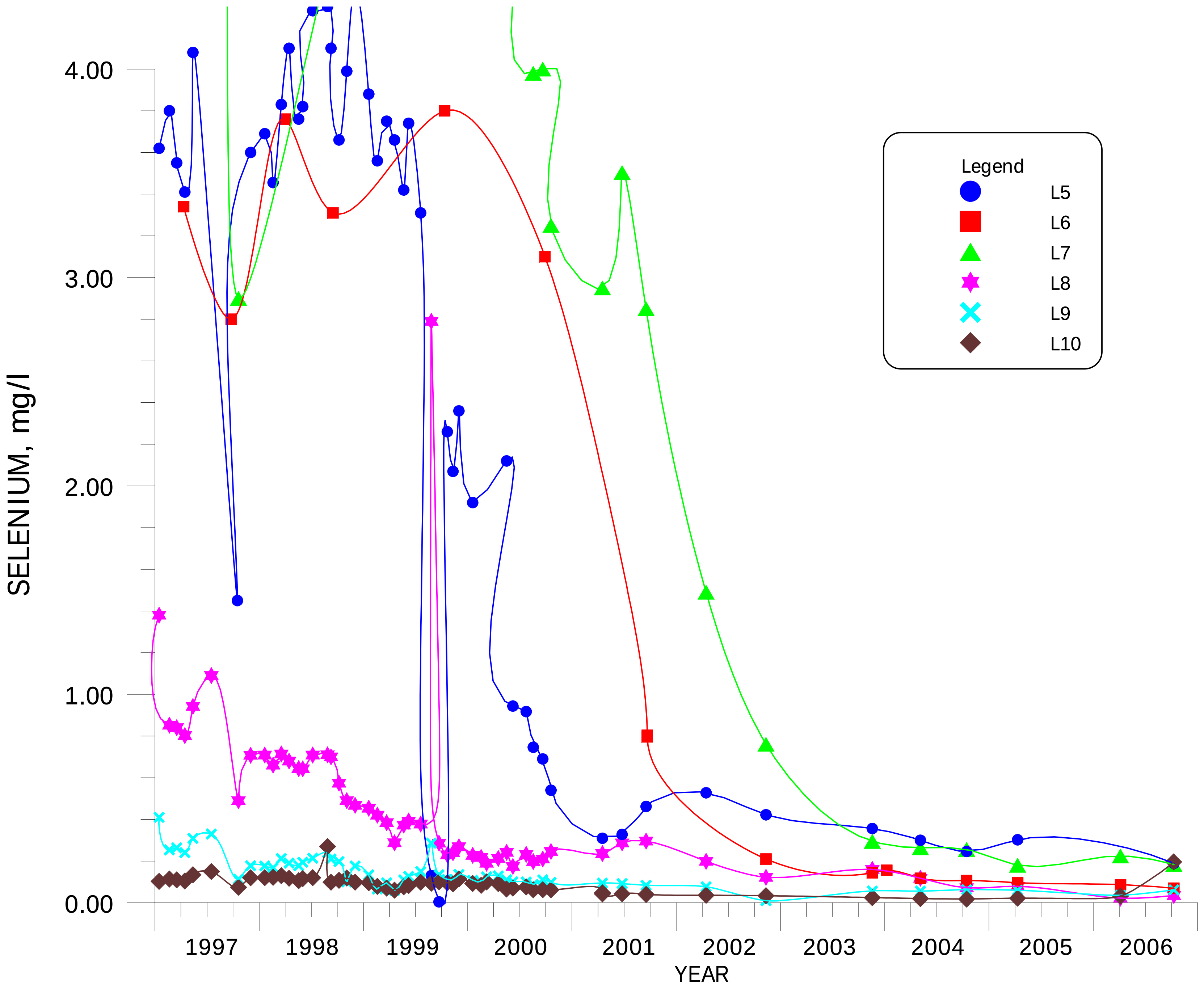


FIGURE 4.3-79. SELENIUM CONCENTRATIONS FOR WELLS L5, L6, L7, L8, L9 AND L10.

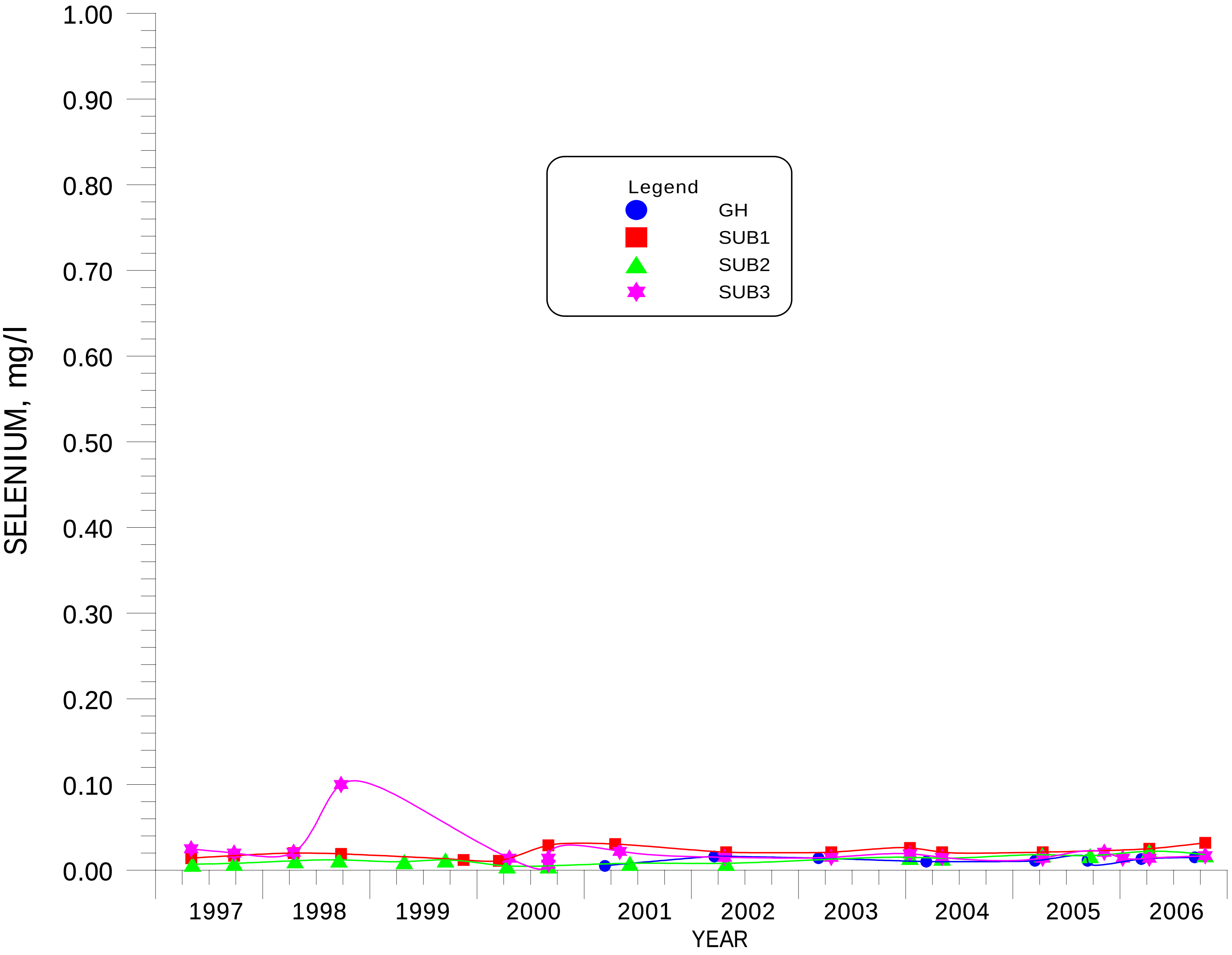


FIGURE 4.3-80. SELENIUM CONCENTRATIONS FOR WELLS GH, SUB1, SUB2 AND SUB3.

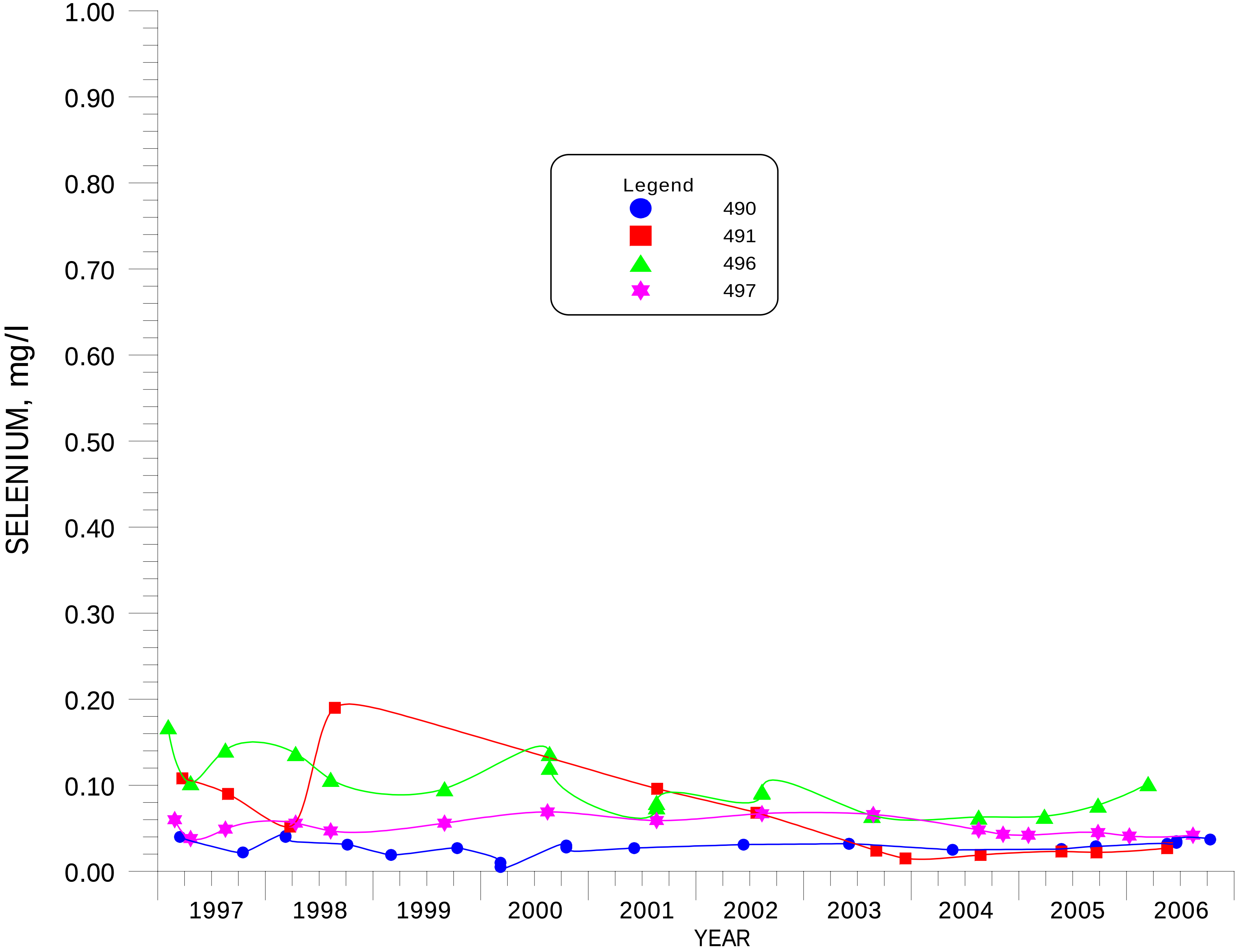


FIGURE 4.3-81. SELENIUM CONCENTRATIONS FOR WELLS 490, 491, 496 AND 497.

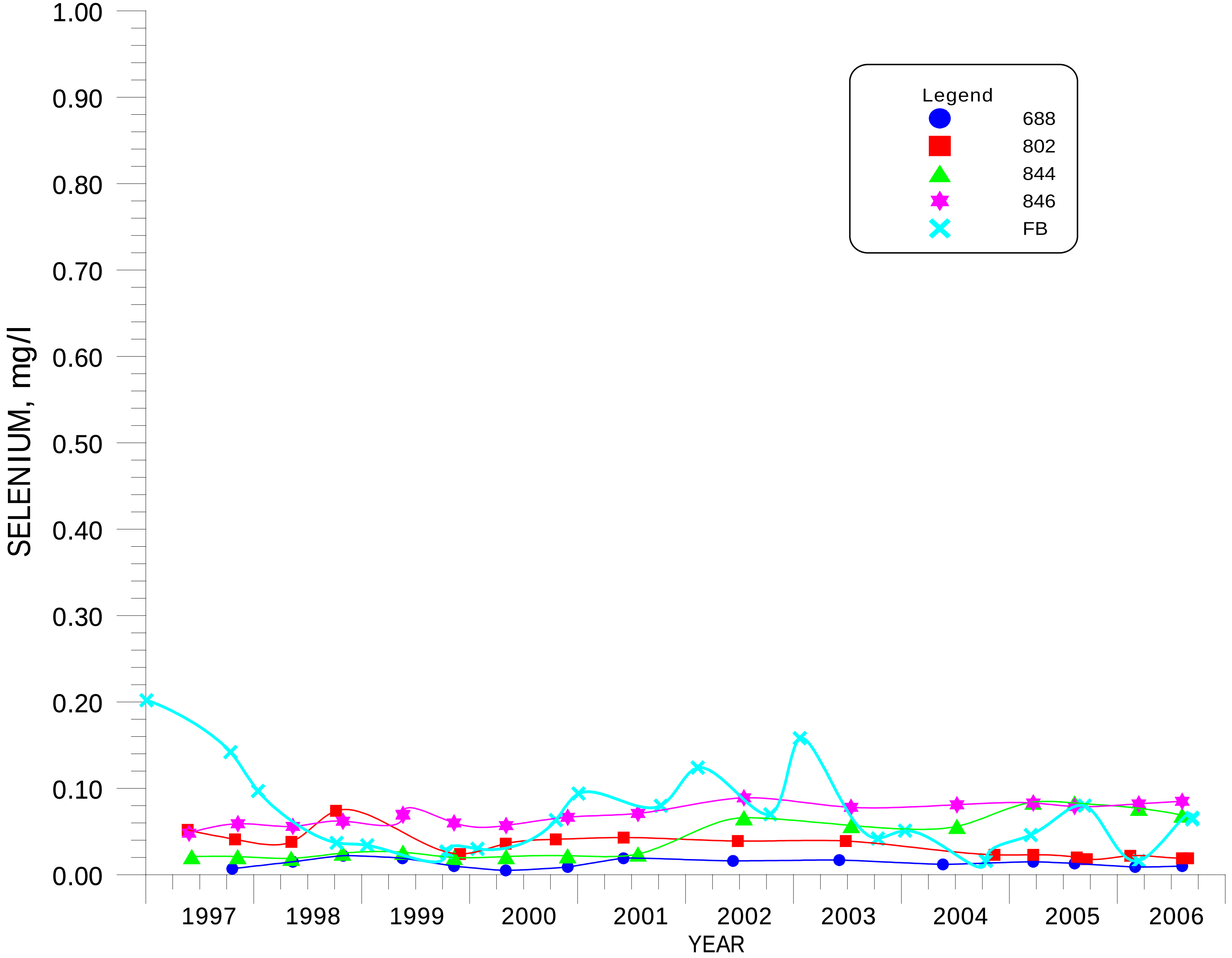


FIGURE 4.3-82. SELENIUM CONCENTRATIONS FOR WELLS 688, 802, 844, 846 AND FB.

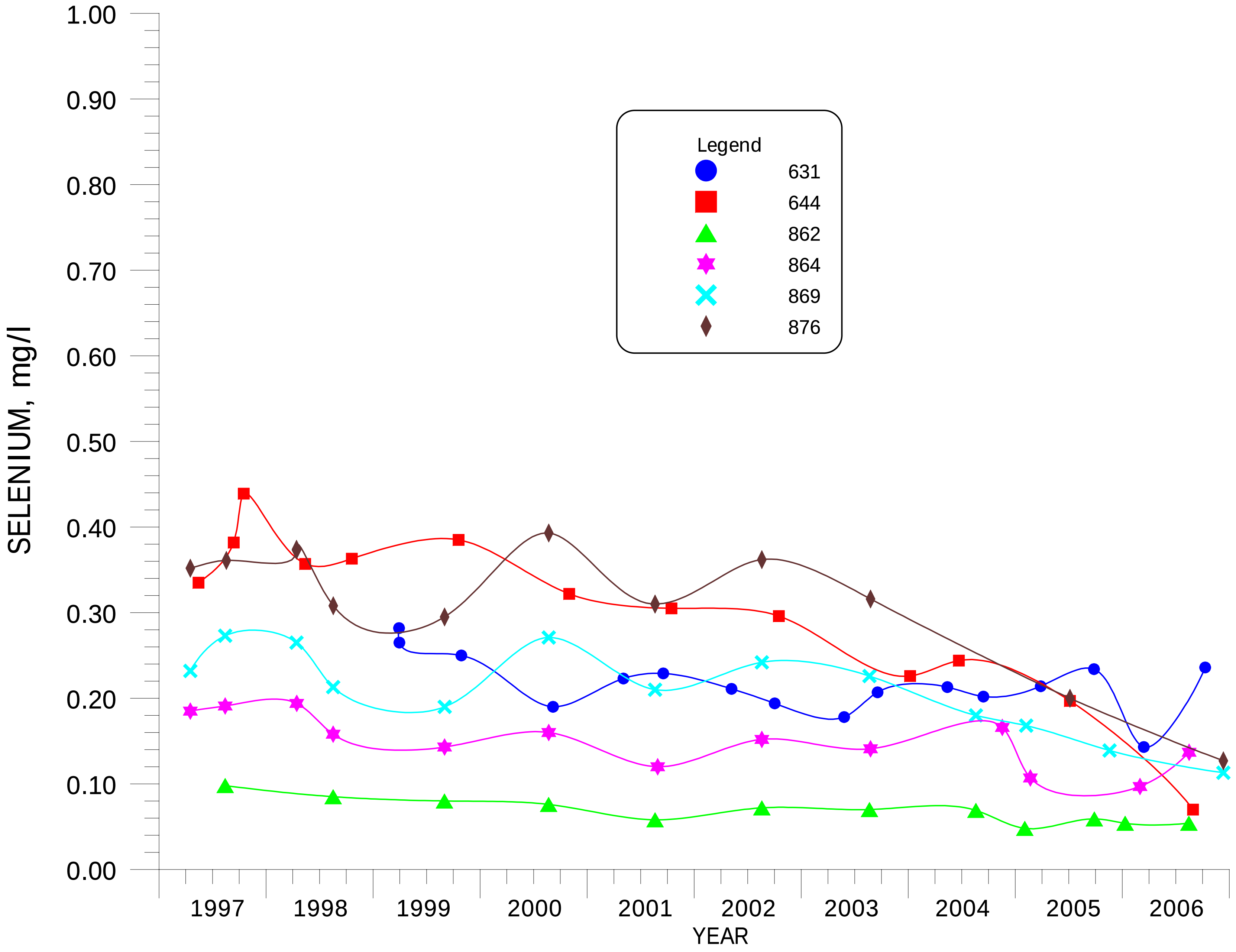


FIGURE 4.3-83. SELENIUM CONCENTRATIONS FOR WELLS 631, 644, 862, 864, 869 AND 876.

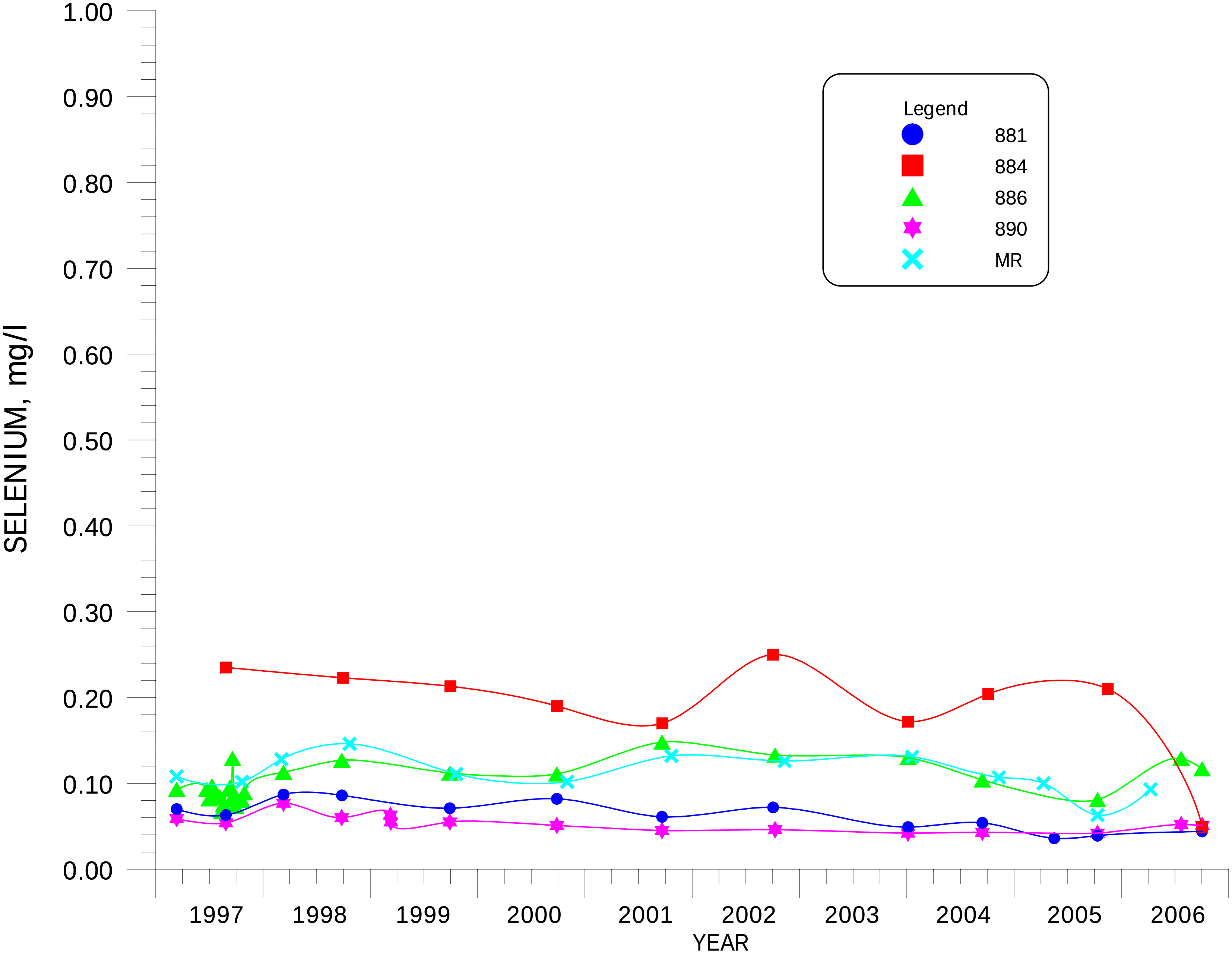


FIGURE 4.3-84. SELENIUM CONCENTRATIONS FOR WELLS 881, 884, 886, 890 AND MR.

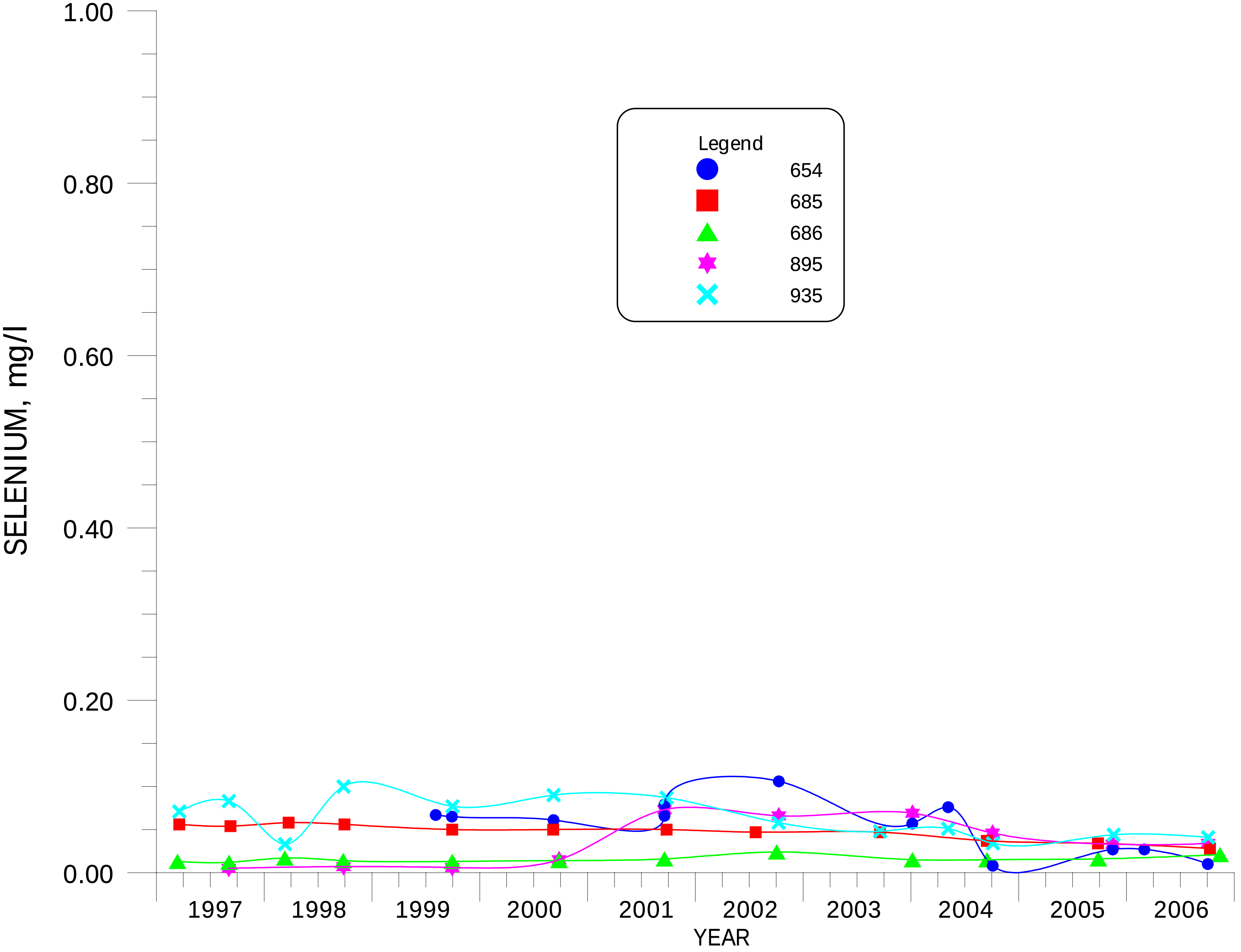


FIGURE 4.3-85. SELENIUM CONCENTRATIONS FOR WELLS 654, 685, 686, 895 AND 935.

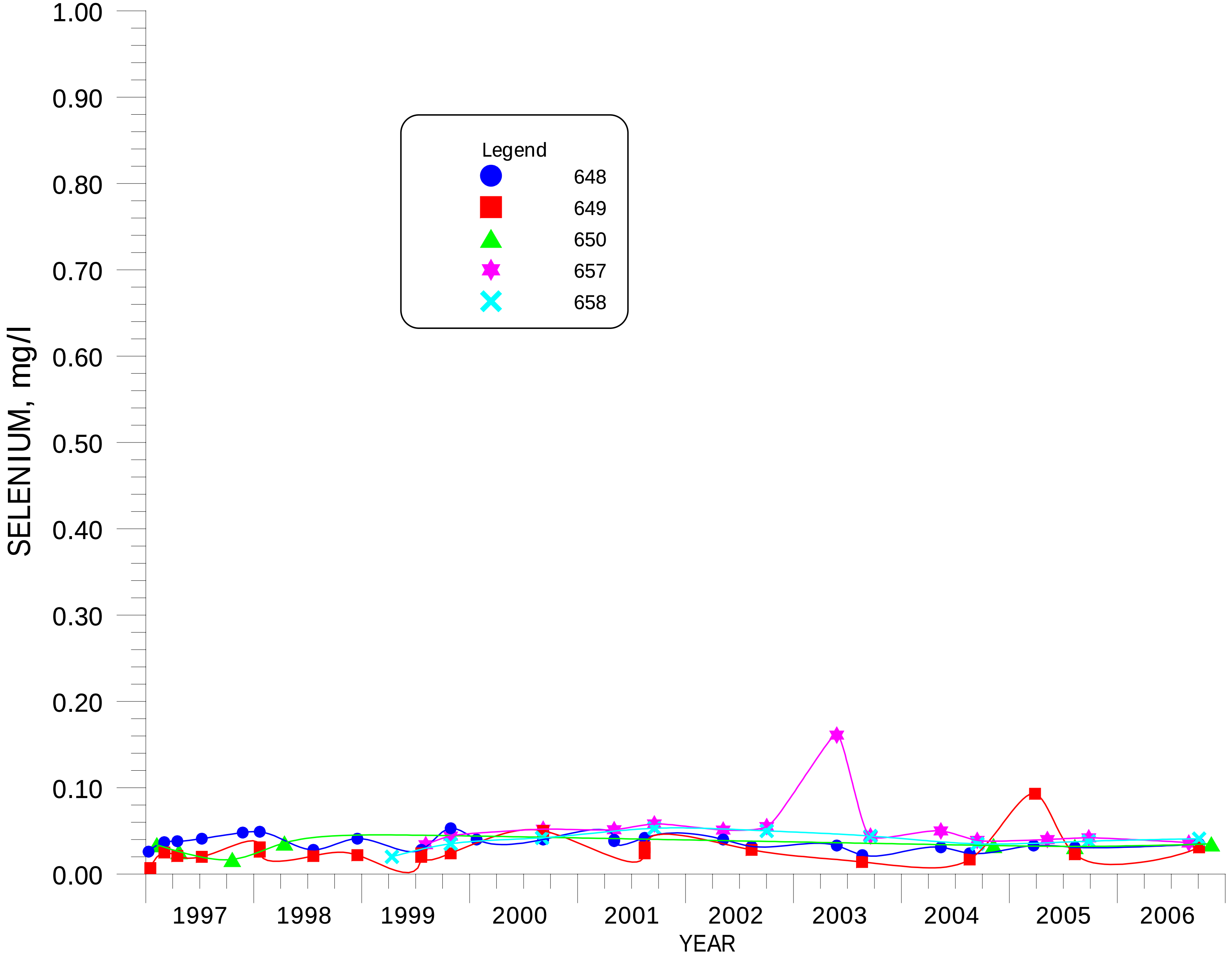
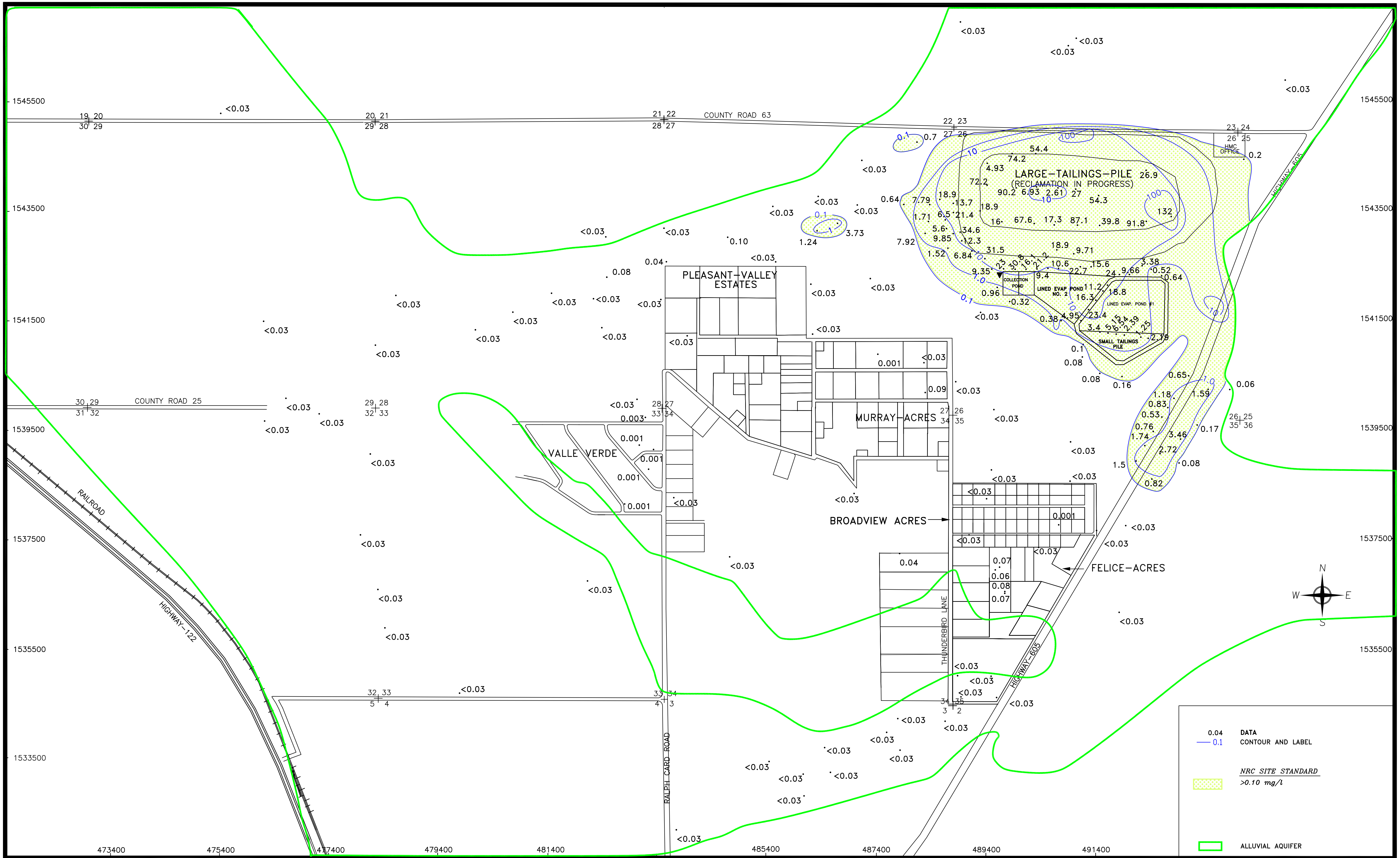


FIGURE 4.3-86. SELENIUM CONCENTRATIONS FOR WELLS 648, 649, 650, 657 AND 658.



SCALE: 1"=1600'

C:\PROJECTS\
2007–06\1600QAL --JDF

DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP–11&12–N–RANGE–10–W

FIGURE 4.3–87. MOLYBDENUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, mg/l

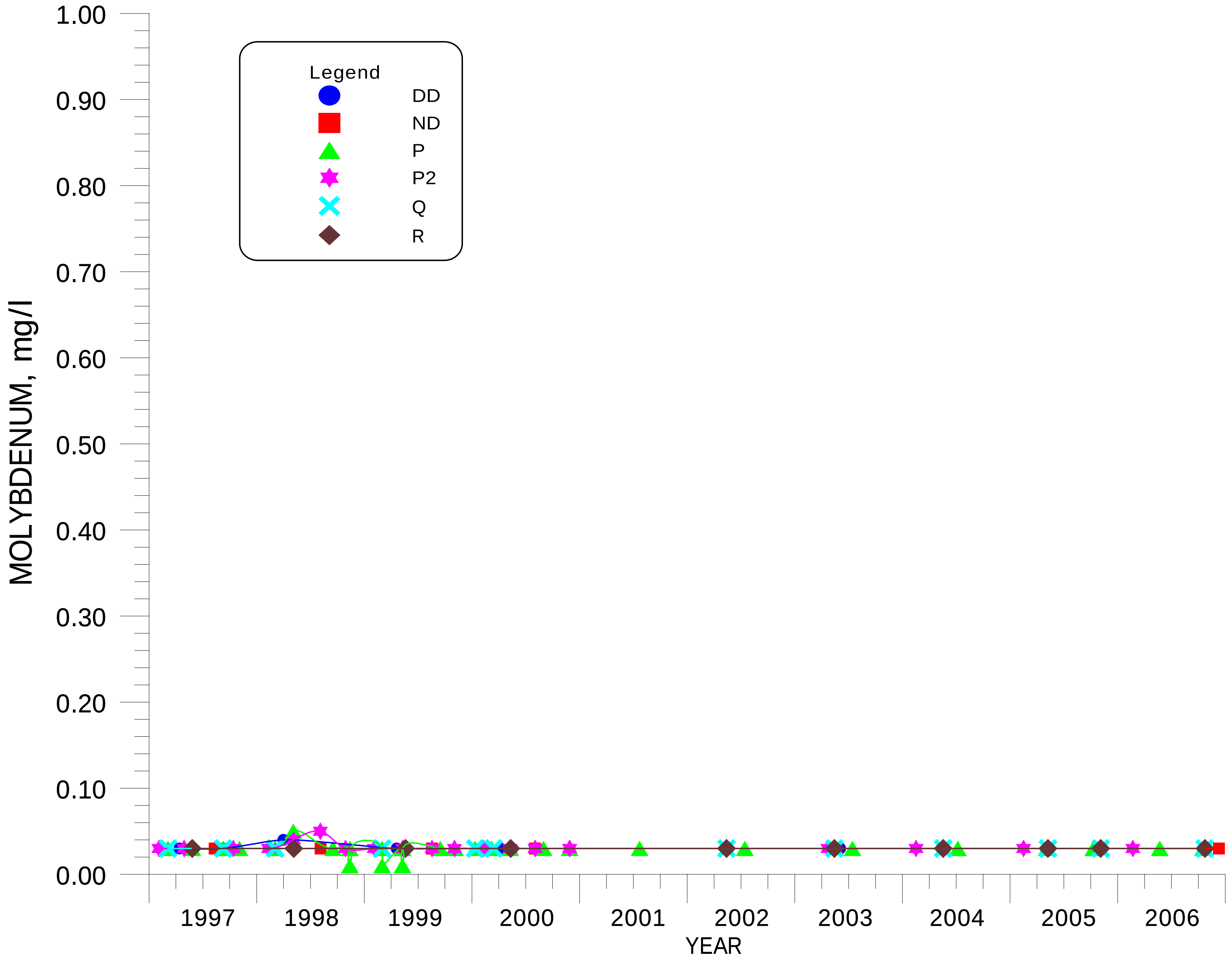


FIGURE 4.3-88. MOLYBDENUM CONCENTRATIONS FOR WELLS DD, ND, P, P2, Q AND R.

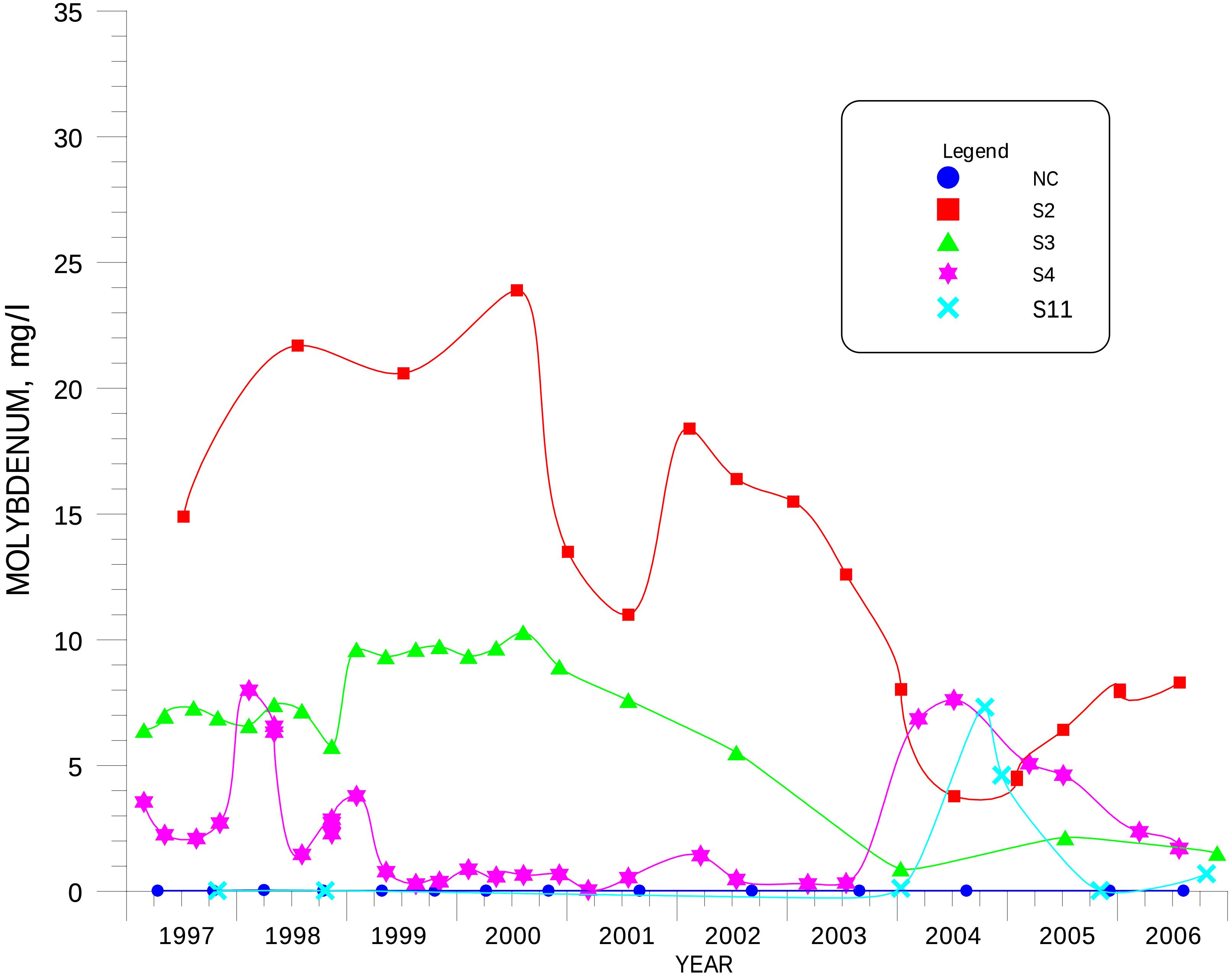


FIGURE 4.3-89. MOLYBDENUM CONCENTRATIONS FOR WELLS NC, S2, S3, S4 AND S11.

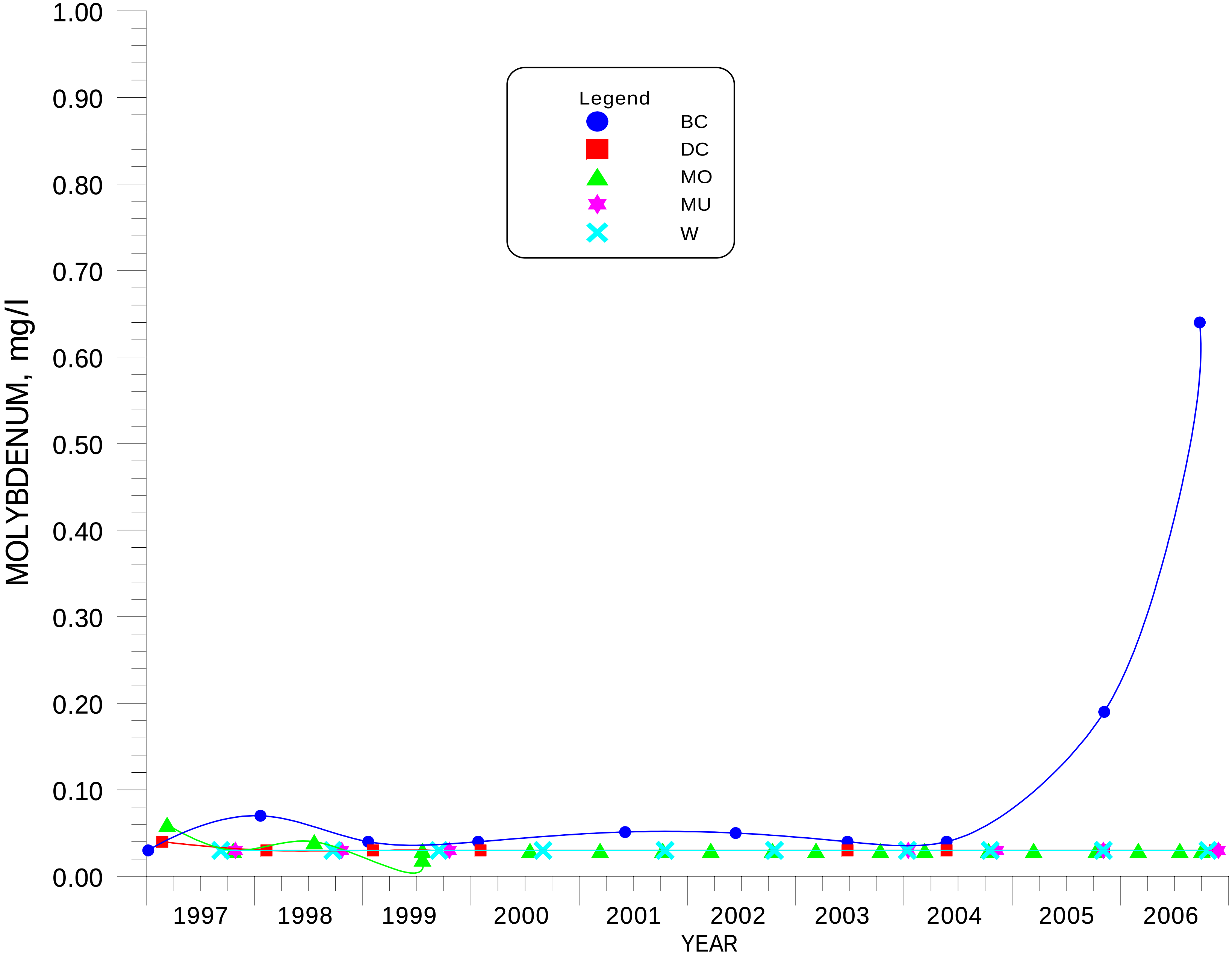


FIGURE 4.3-90. MOLYBDENUM CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.

FIGURE 4.3-91. MOLYBDENUM CONCENTRATIONS FOR WELLS B, BP, D1 AND M3.

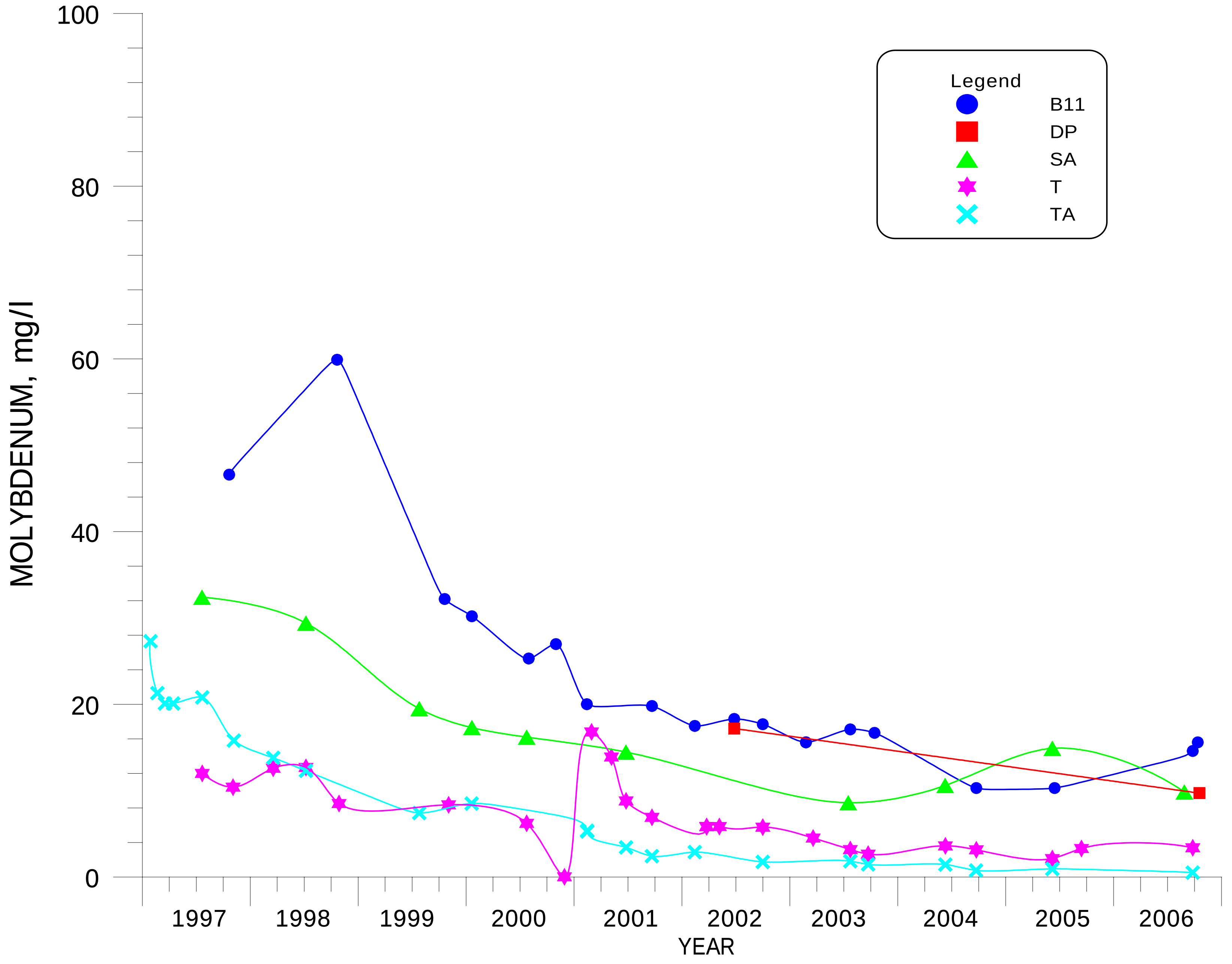


FIGURE 4.3-92. MOLYBDENUM CONCENTRATIONS FOR WELLS B11, DP, SA, T AND TA.

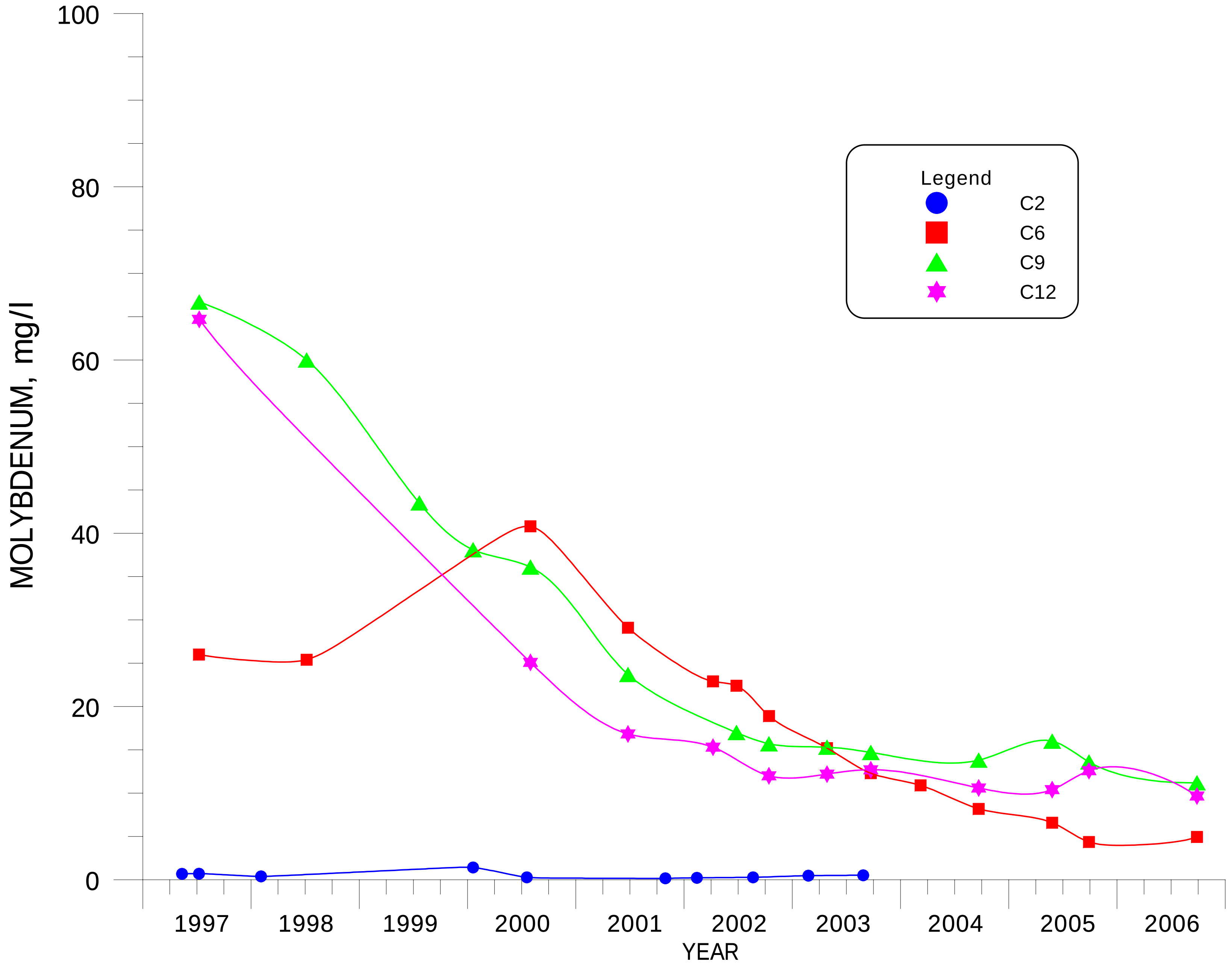


FIGURE 4.3-93. MOLYBDENUM CONCENTRATIONS FOR WELLS C2, C6, C9 AND C12.

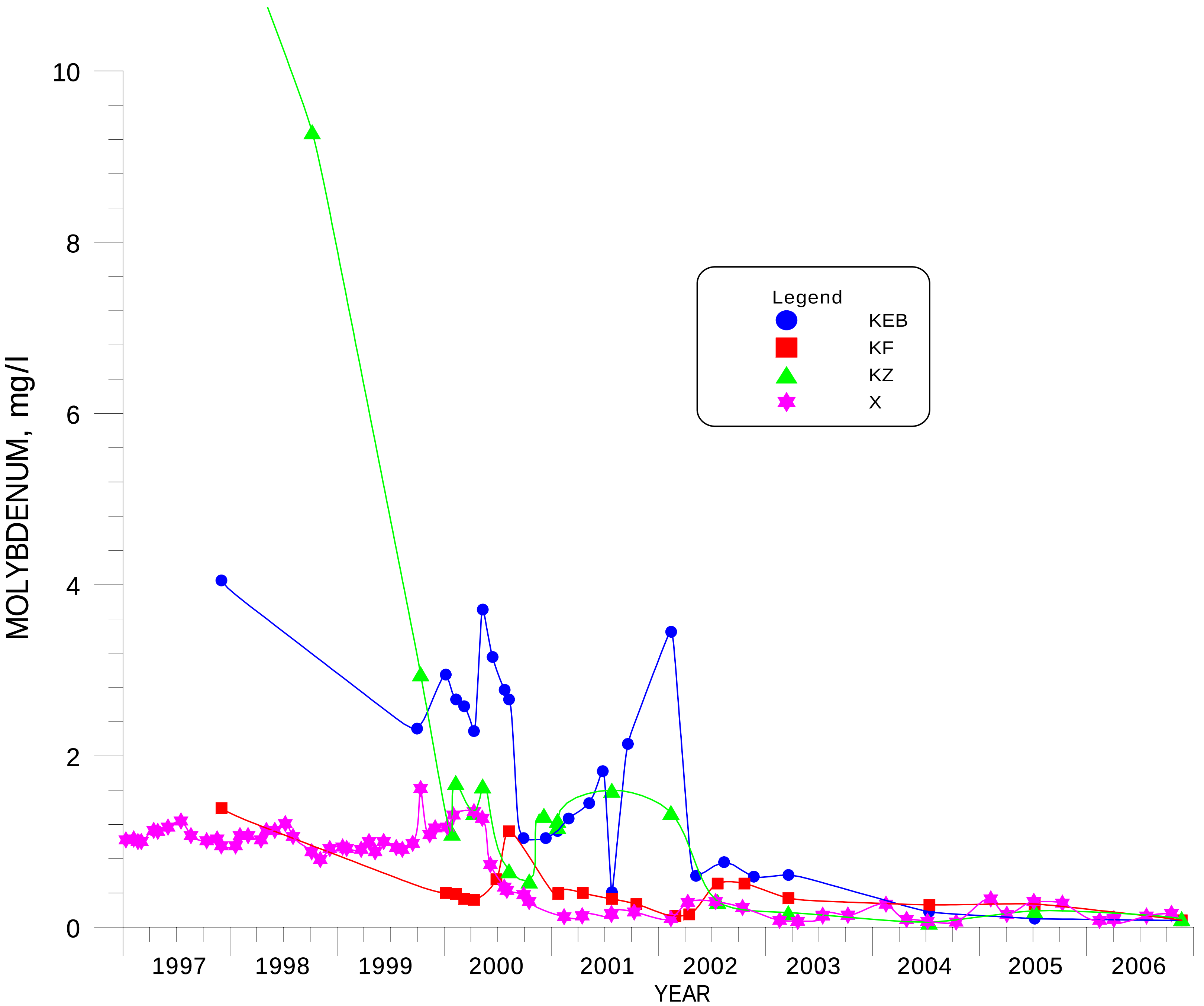


FIGURE 4.3-94. MOLYBDENUM CONCENTRATIONS FOR WELLS KEB, KF, KZ AND X.

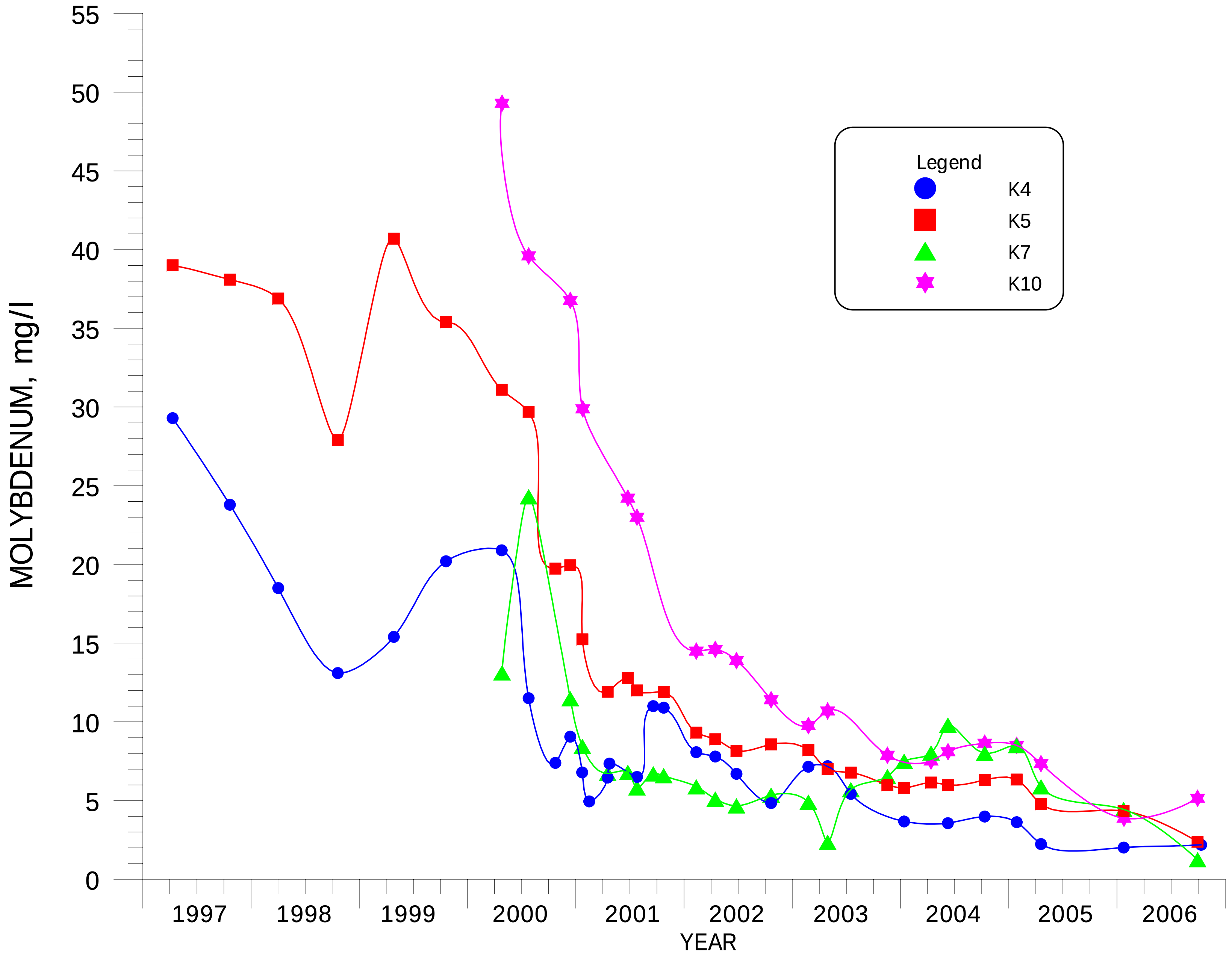


FIGURE 4.3-95. MOLYBDENUM CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.

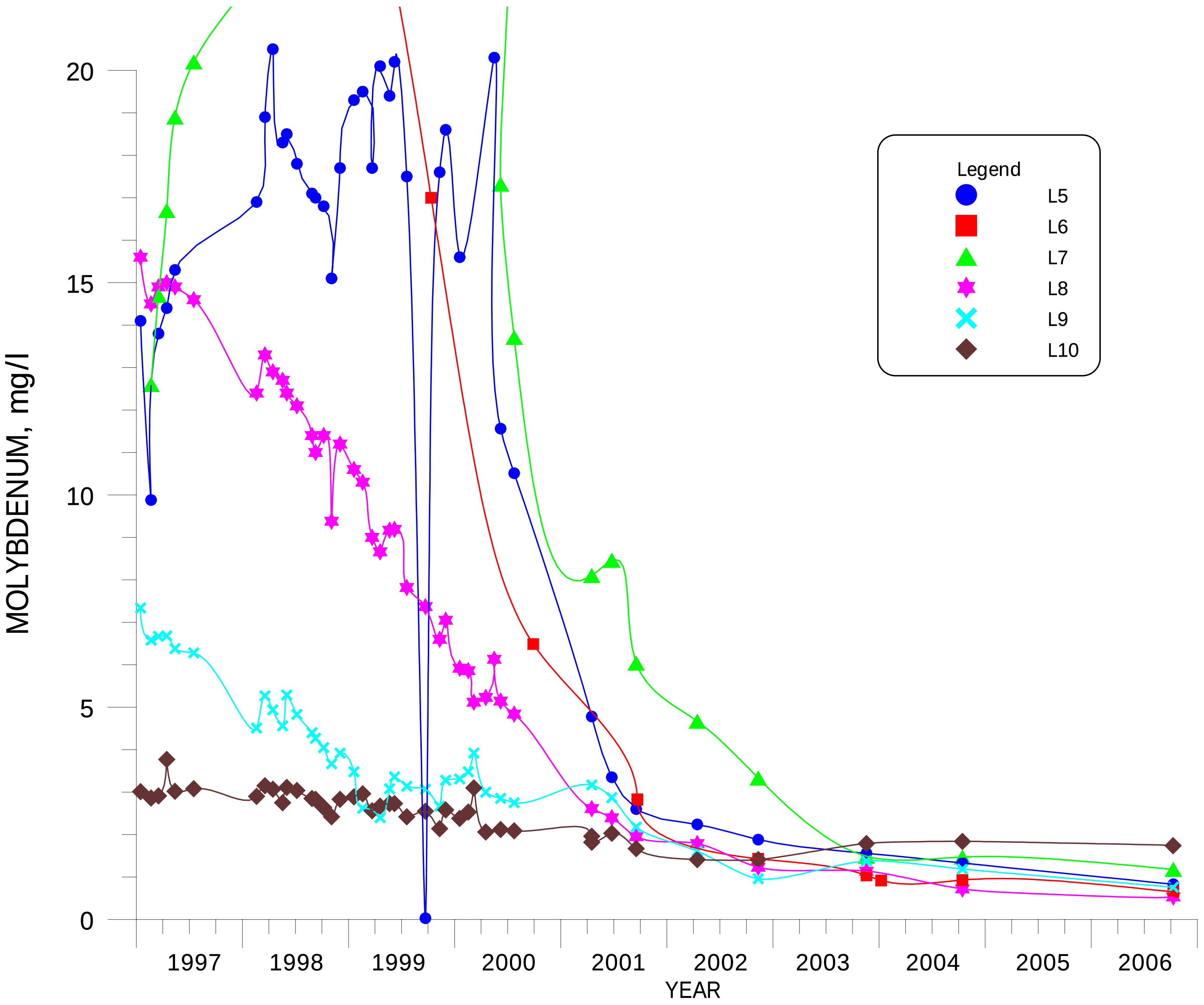


FIGURE 4.3-96. MOLYBDENUM CONCENTRATIONS FOR WELLS L5, L6, L7, L8, L9 AND L10.

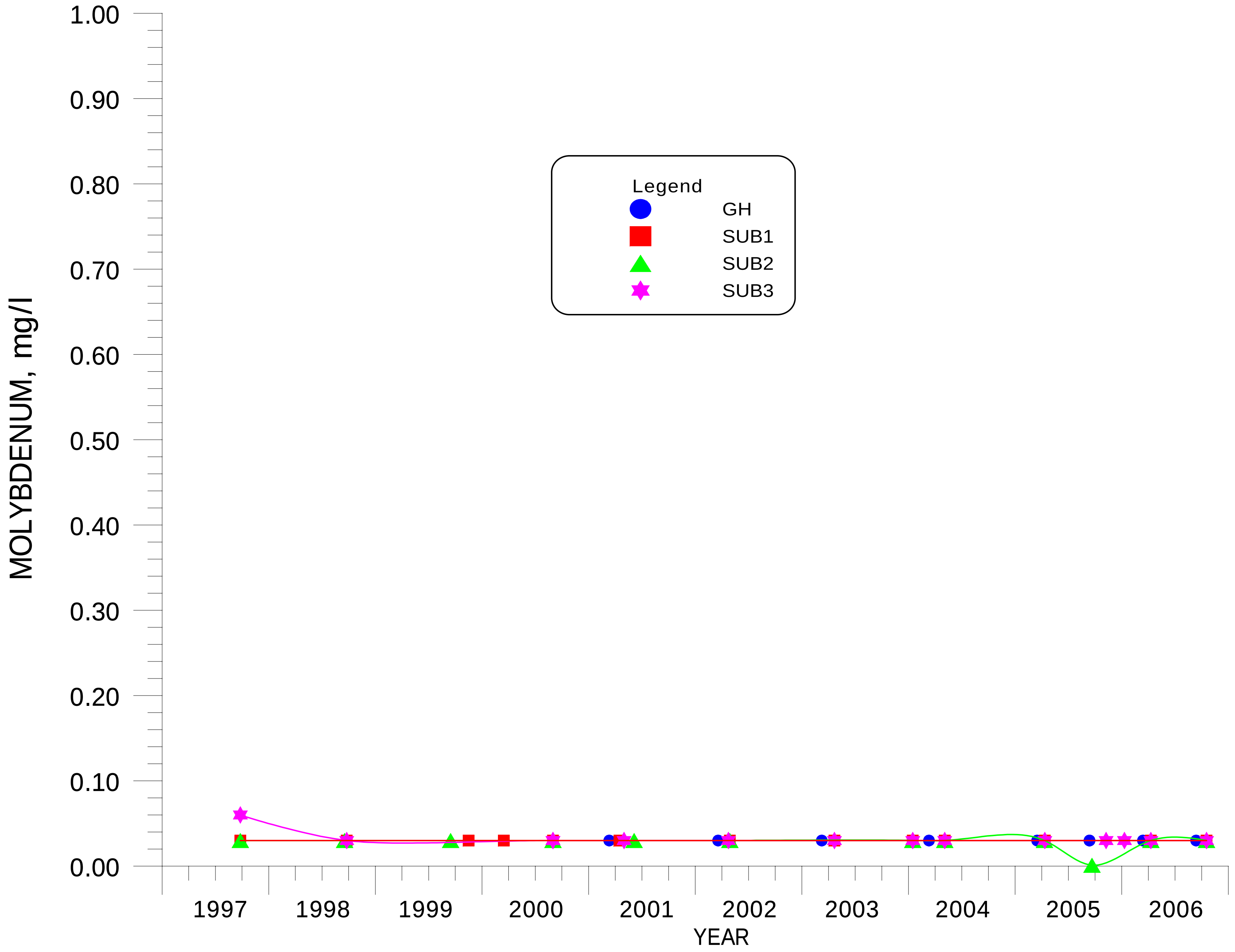


FIGURE 4.3-97. MOLYBDENUM CONCENTRATIONS FOR WELLS GH, SUB1, SUB2 AND SUB3.

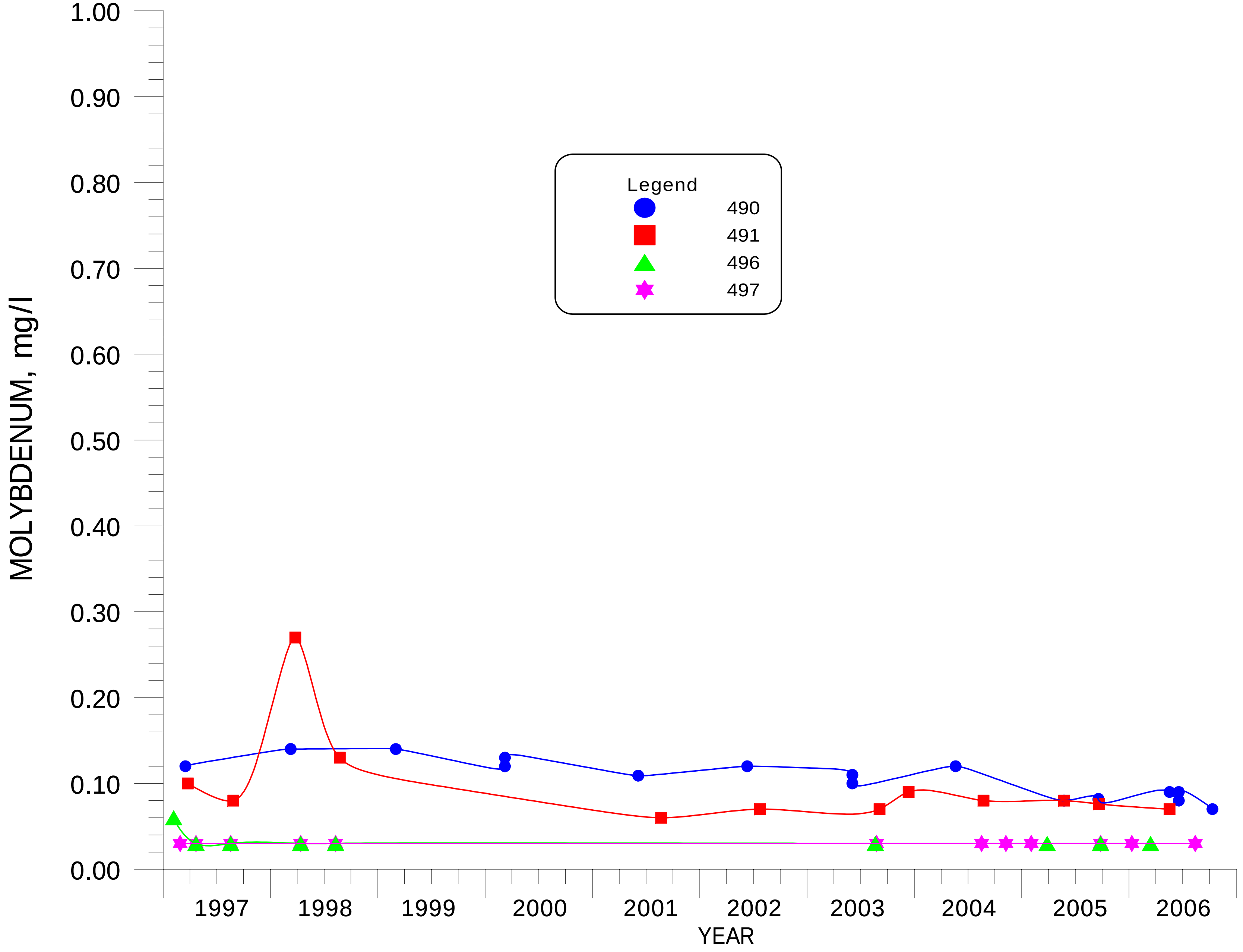


FIGURE 4.3-98. MOLYBDENUM CONCENTRATIONS FOR WELLS 490, 491, 496 AND 497.

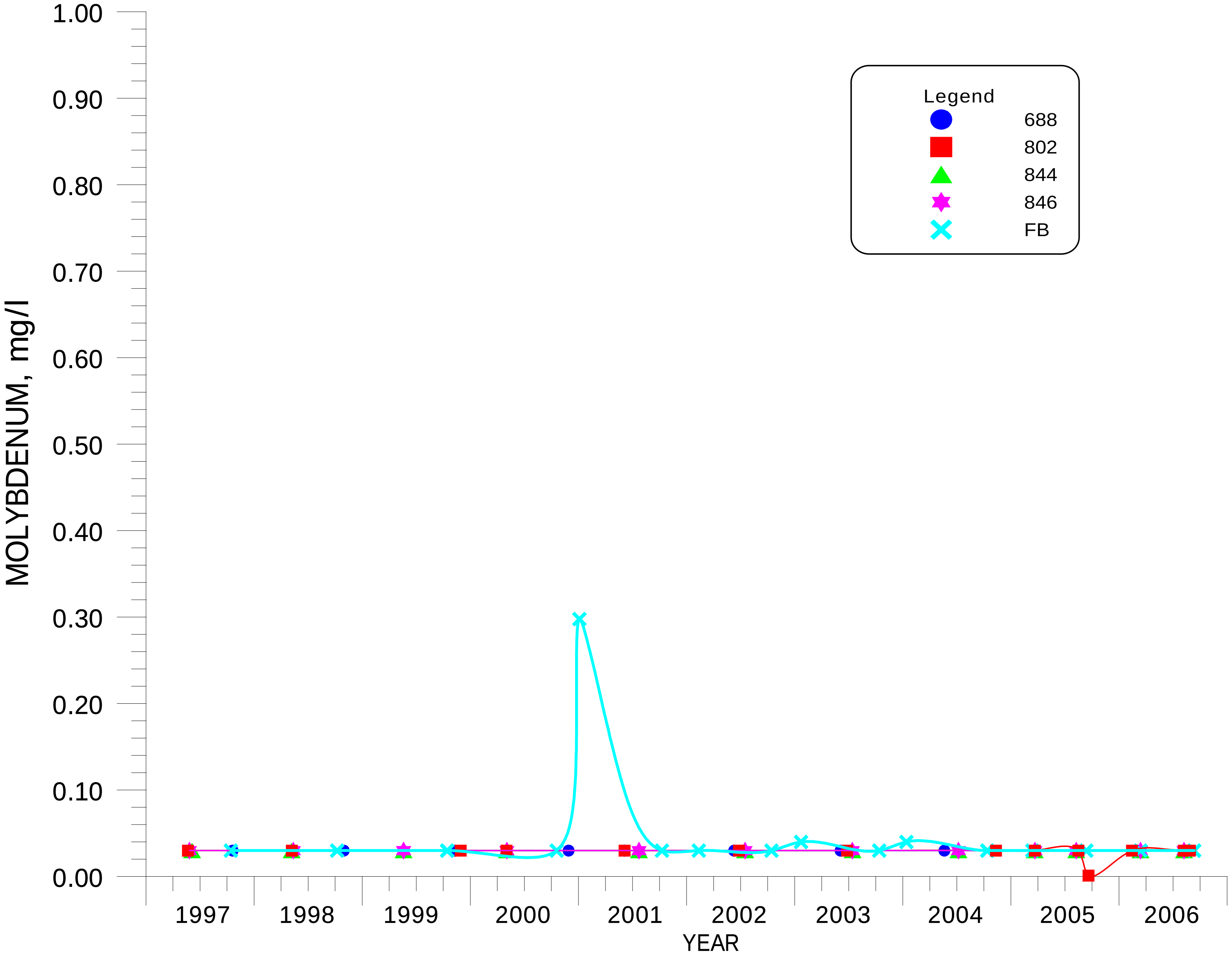


FIGURE 4.3-99. MOLYBDENUM CONCENTRATIONS FOR WELLS 688, 802, 844, 846 AND FB.

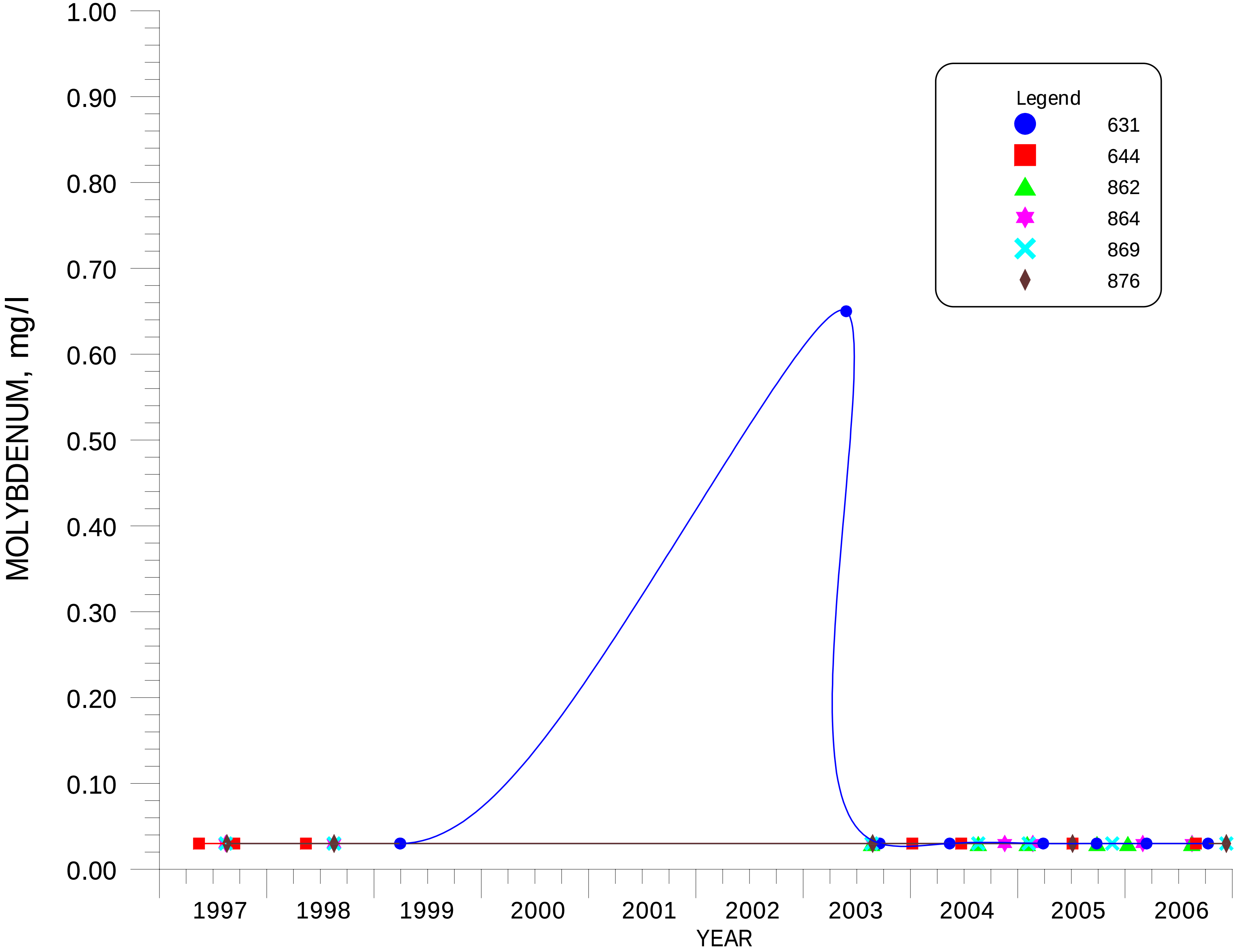


FIGURE 4.3-100. MOLYBDENUM CONCENTRATIONS FOR WELLS 631, 644, 862, 864, 869 AND 876.

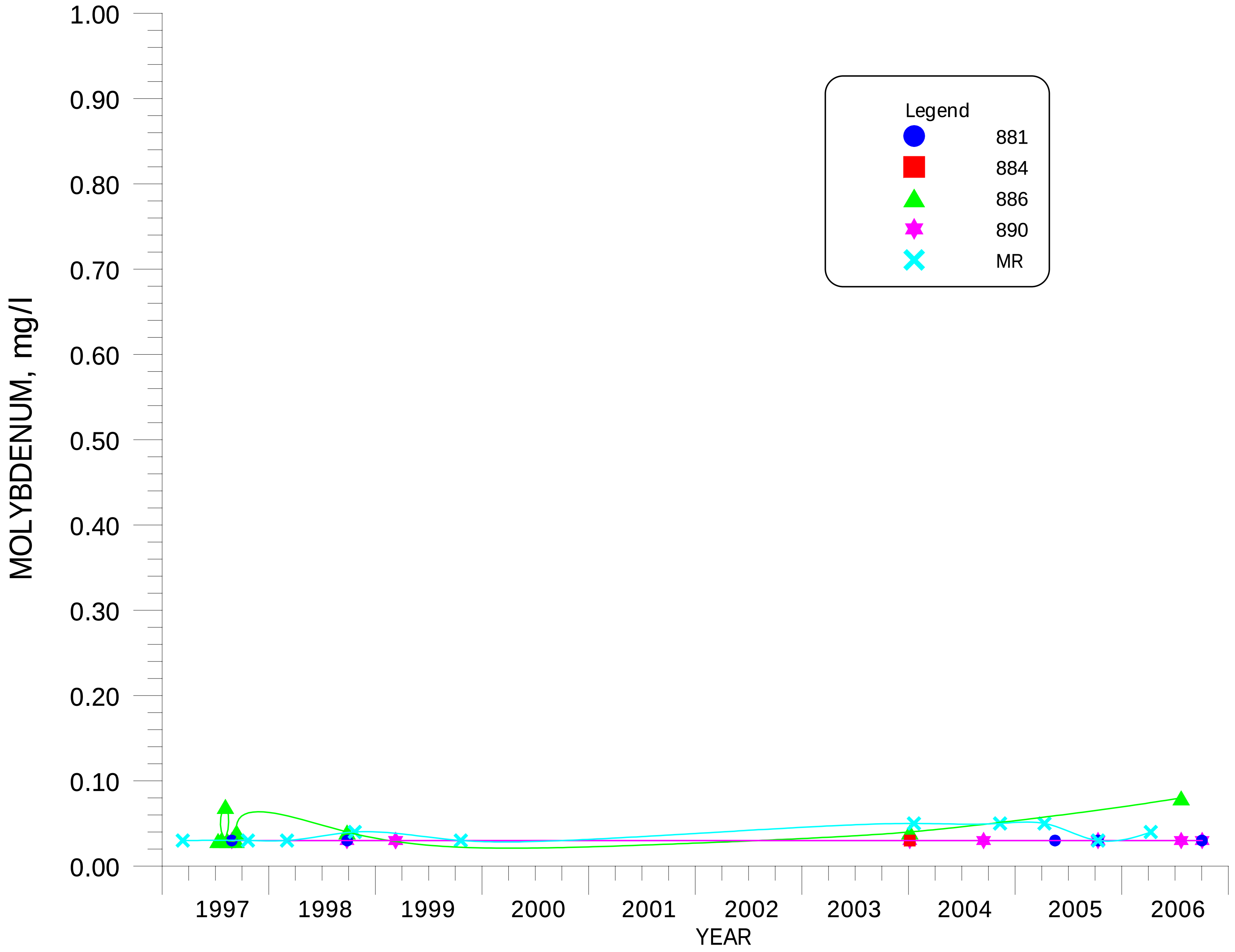


FIGURE 4.3-101. MOLYBDENUM CONCENTRATIONS FOR WELLS 881, 884, 886, 890 AND MR.

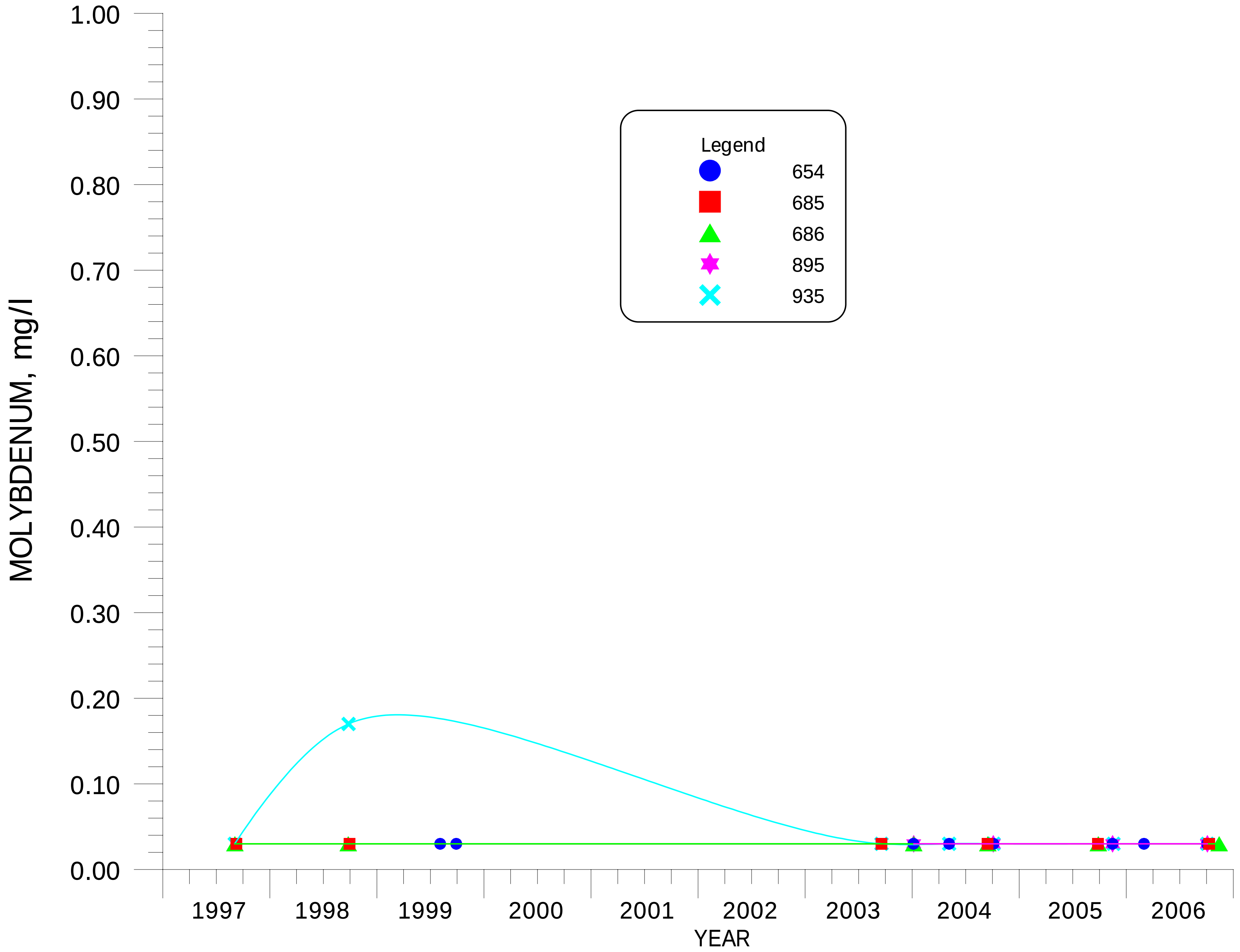


FIGURE 4.3-102. MOLYBDENUM CONCENTRATIONS FOR WELLS 654, 685, 686, 895 AND 935.

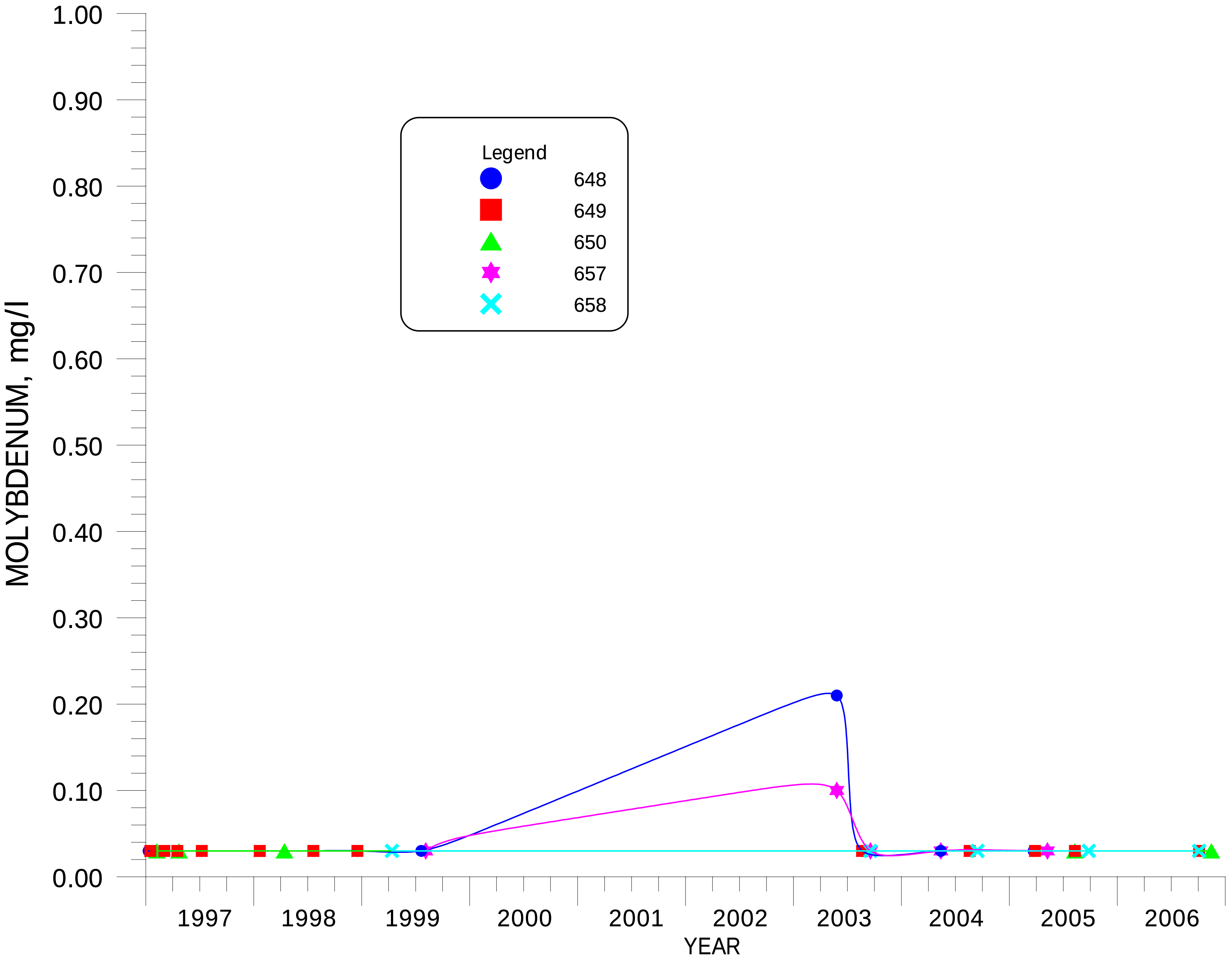
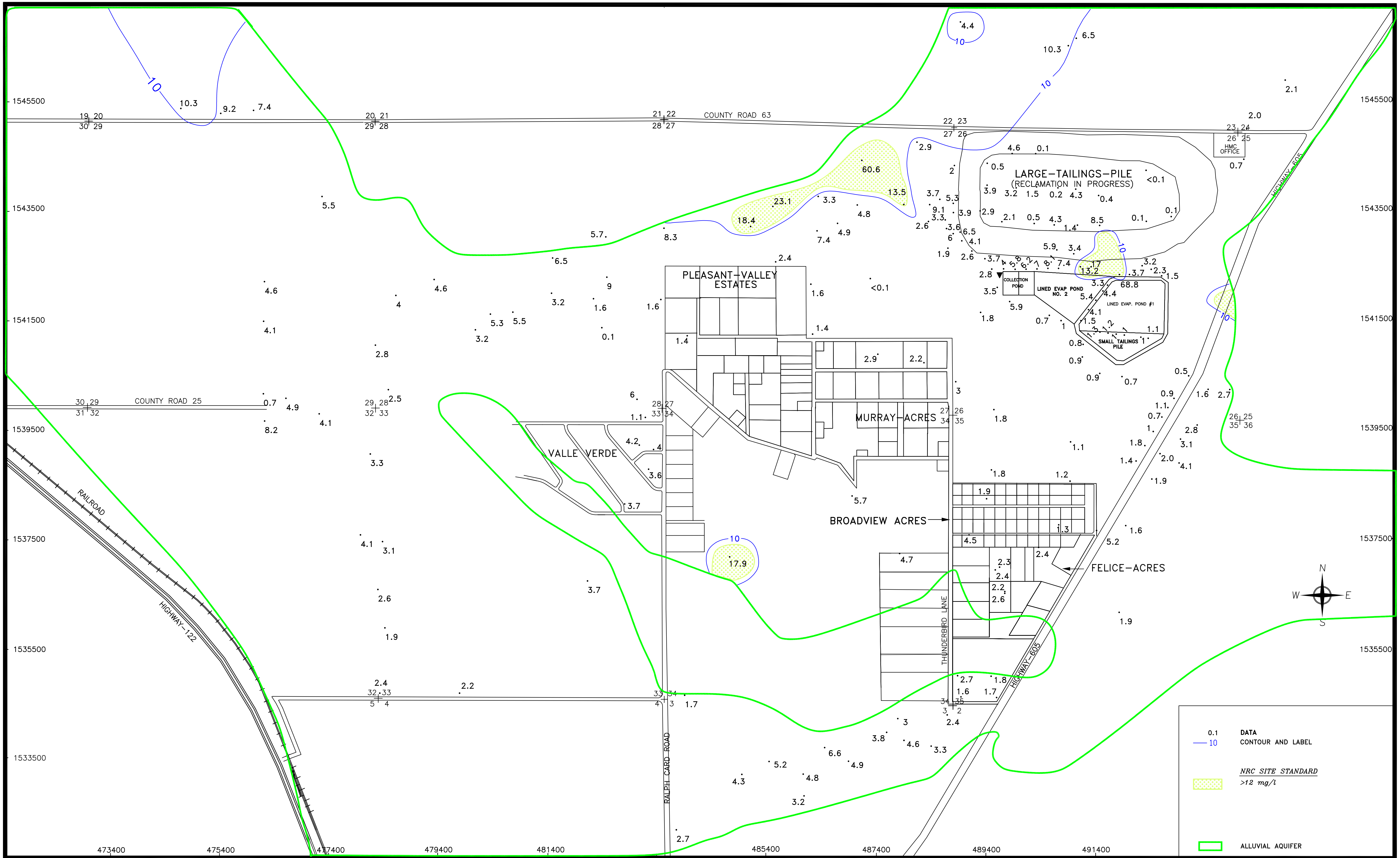


FIGURE 4.3-103. MOLYBDENUM CONCENTRATIONS FOR WELLS 648, 649, 650, 657 AND 658.



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.3-104. NITRATE CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, mg/l

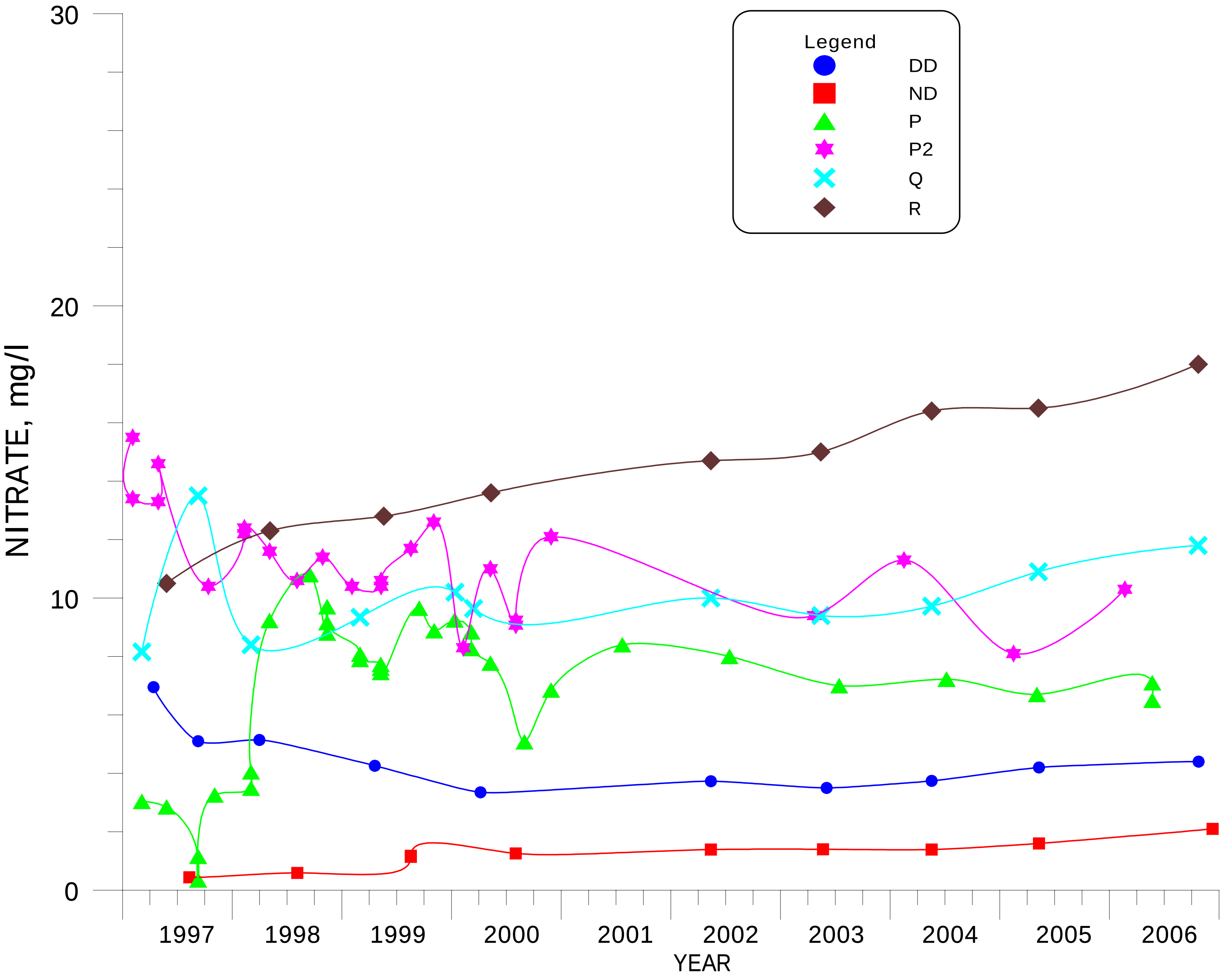


FIGURE 4.3-105. NITRATE CONCENTRATIONS FOR WELLS DD, ND, P, P2, Q AND R.

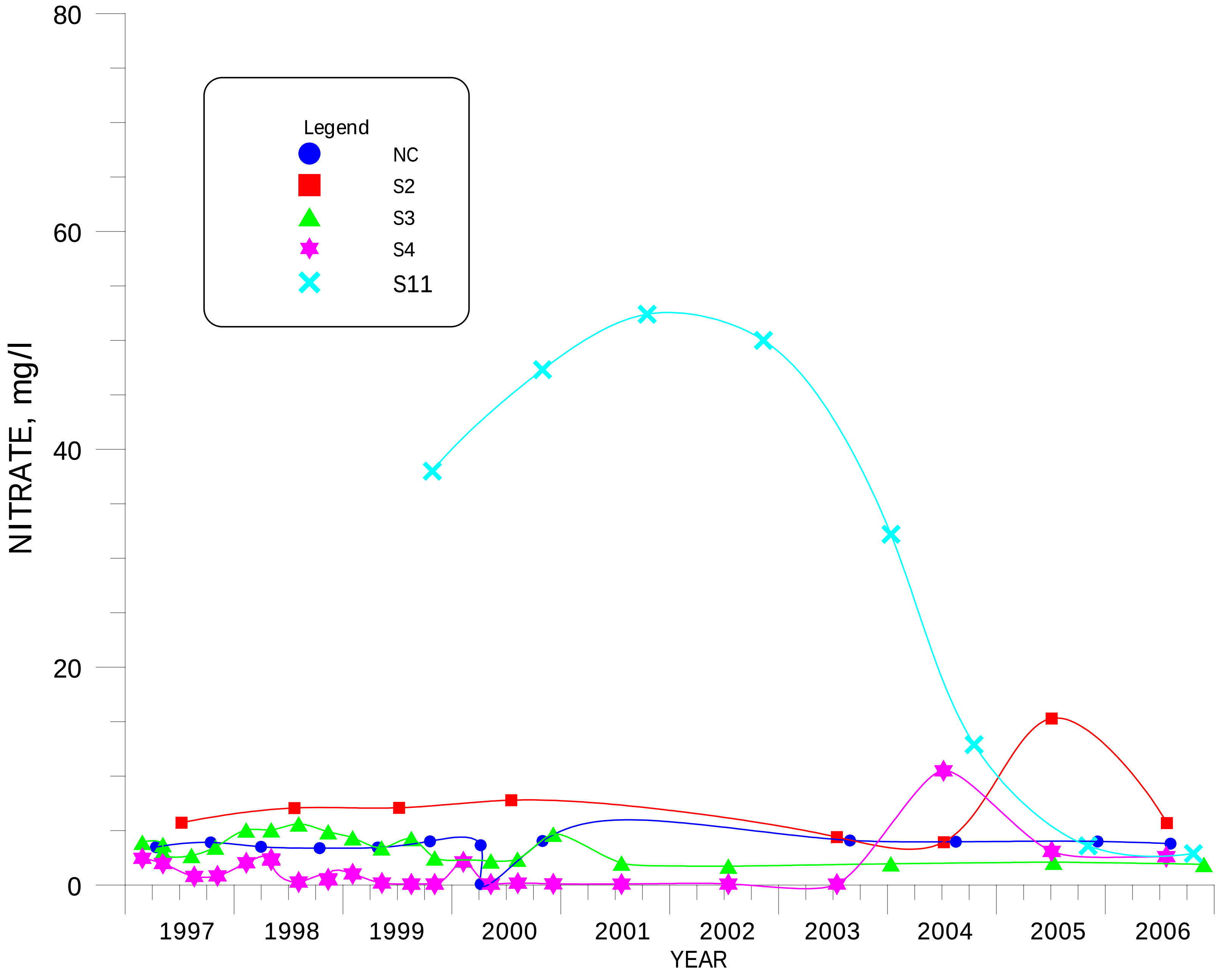


FIGURE 4.3-106. NITRATE CONCENTRATIONS FOR WELLS NC, S2, S3, S4 AND S11.

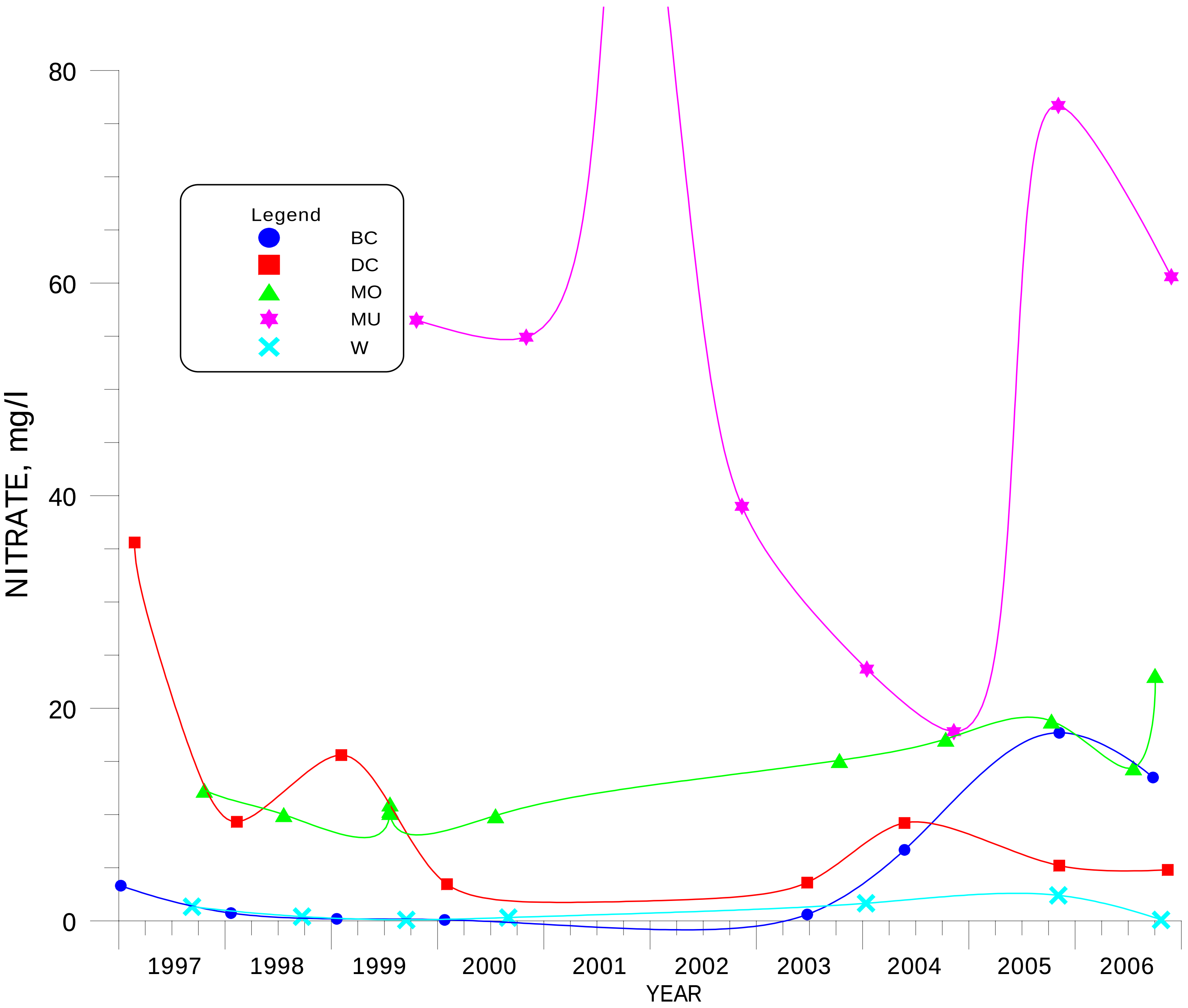


FIGURE 4.3-107. NITRATE CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.

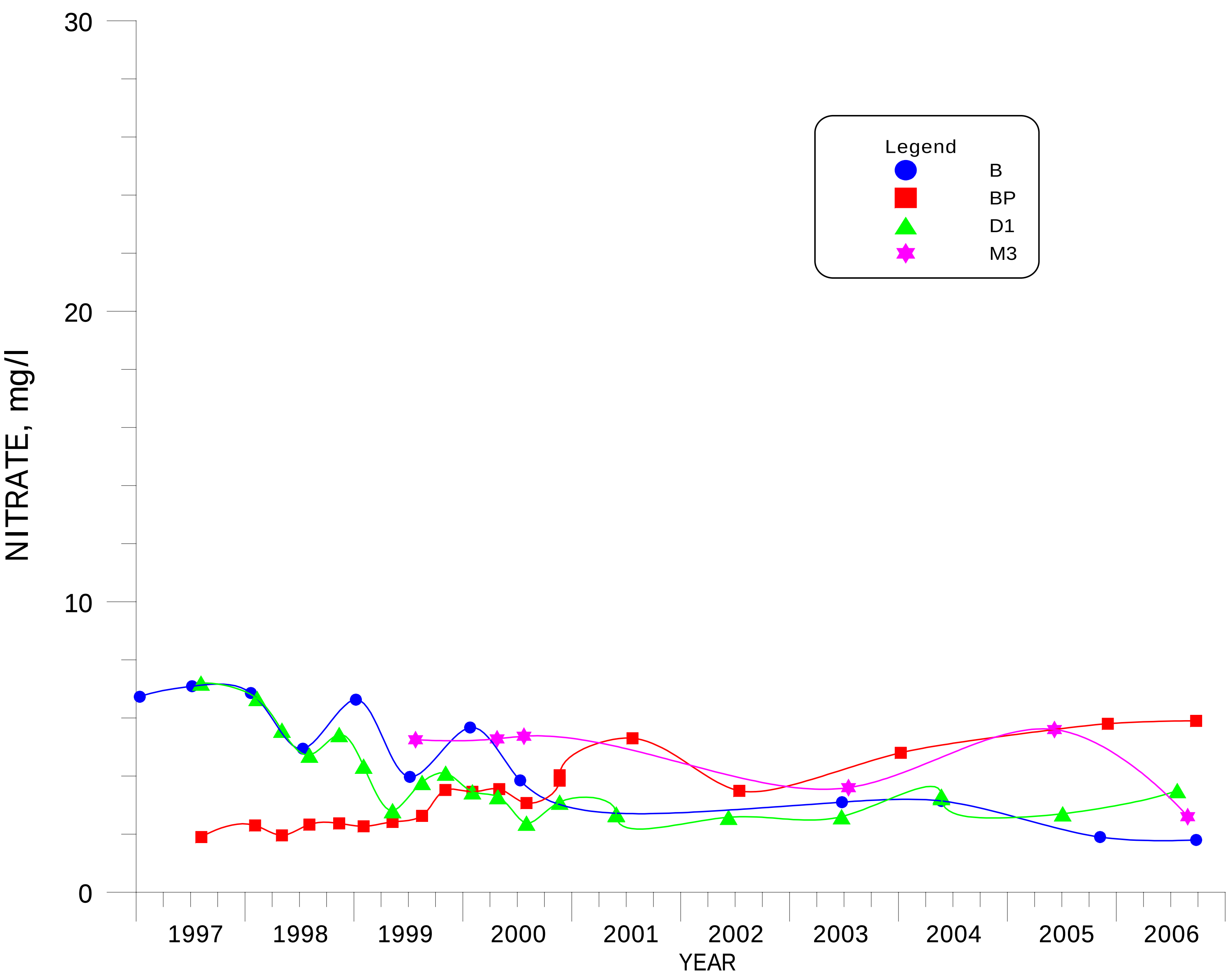


FIGURE 4.3-108. NITRATE CONCENTRATIONS FOR WELLS B, BP, D1 AND M3.

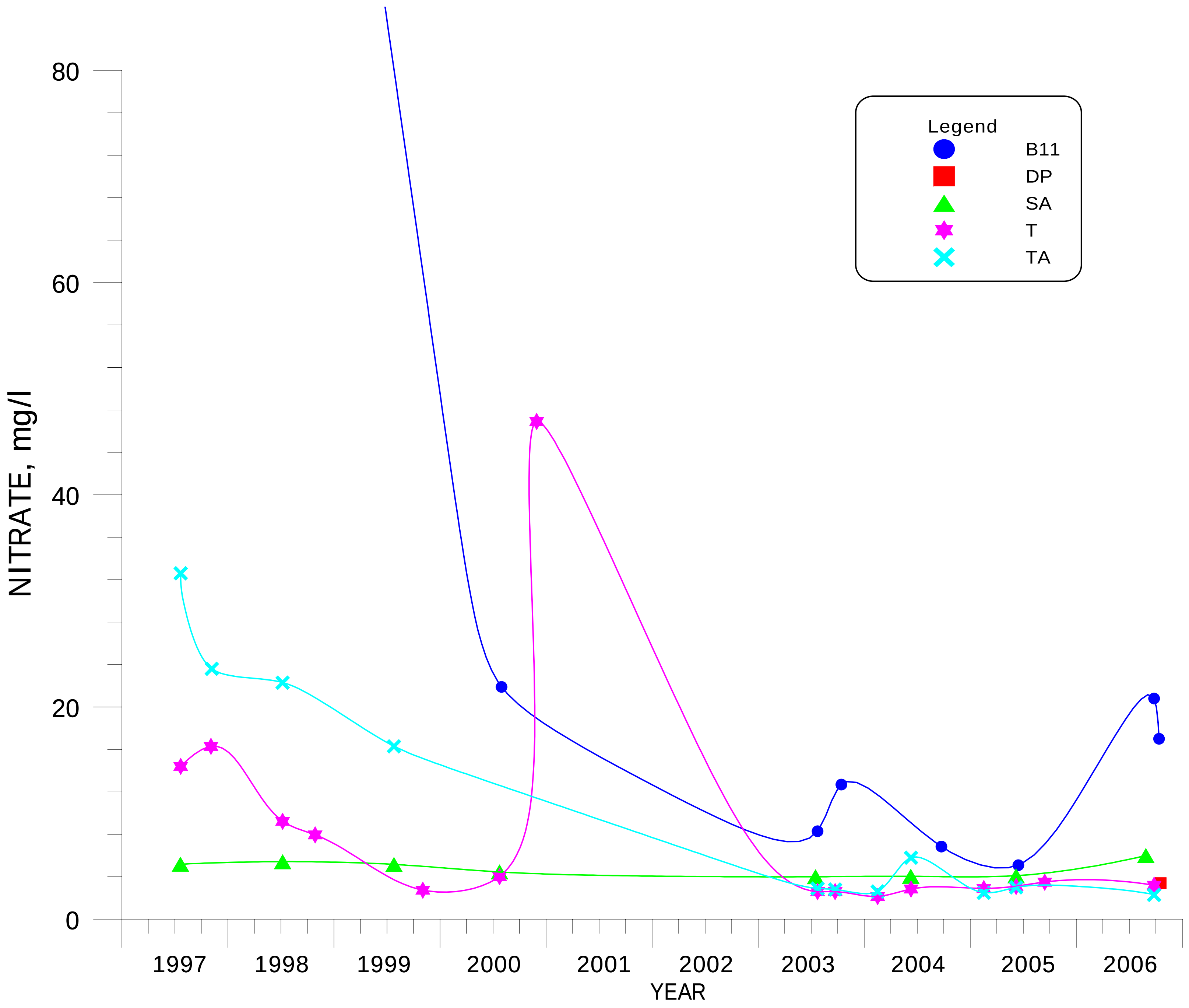


FIGURE 4.3-109. NITRATE CONCENTRATIONS FOR WELLS B11, DP, SA, T AND TA.

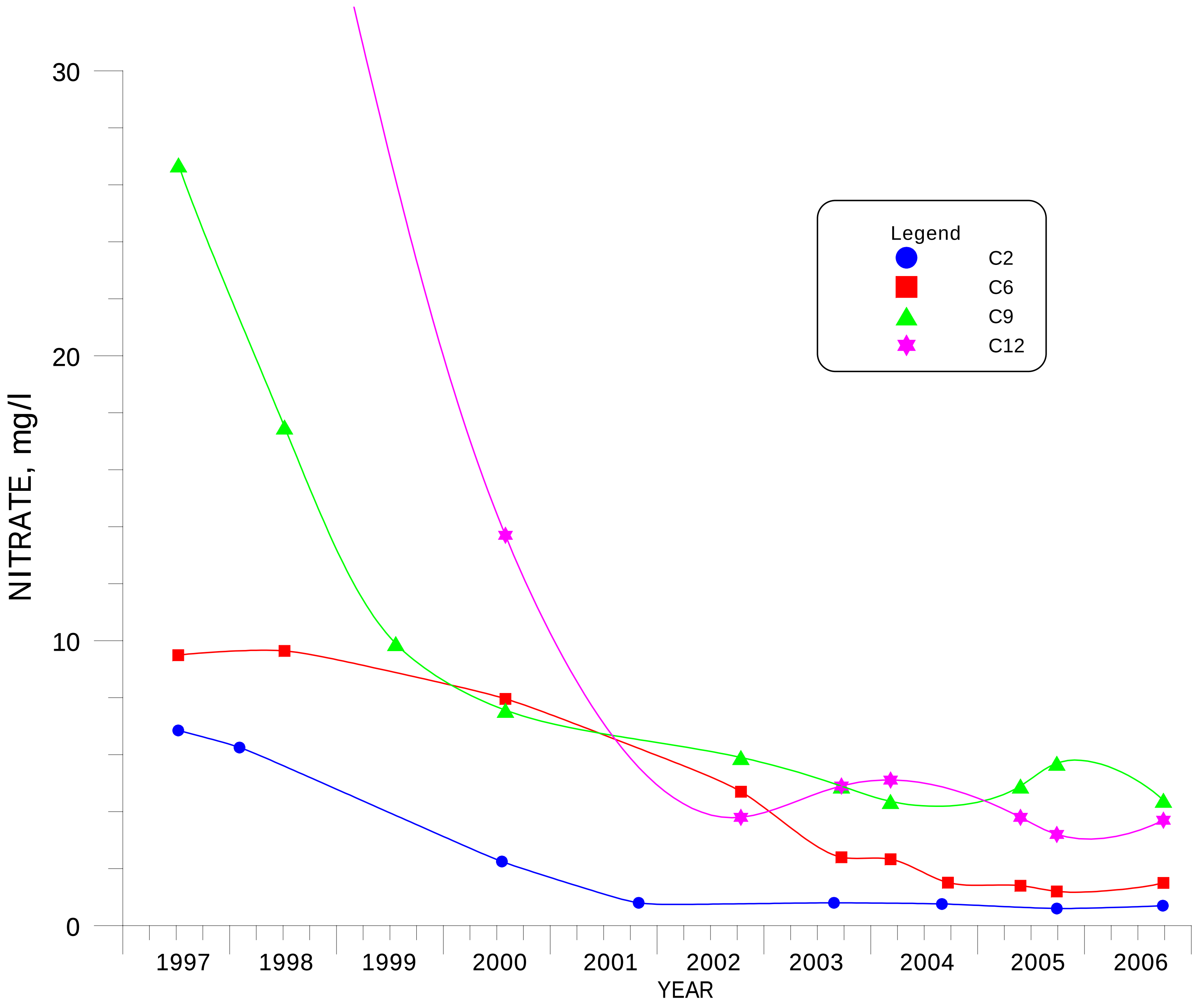


FIGURE 4.3-110. NITRATE CONCENTRATIONS FOR WELLS C2, C6, C9 AND C12.

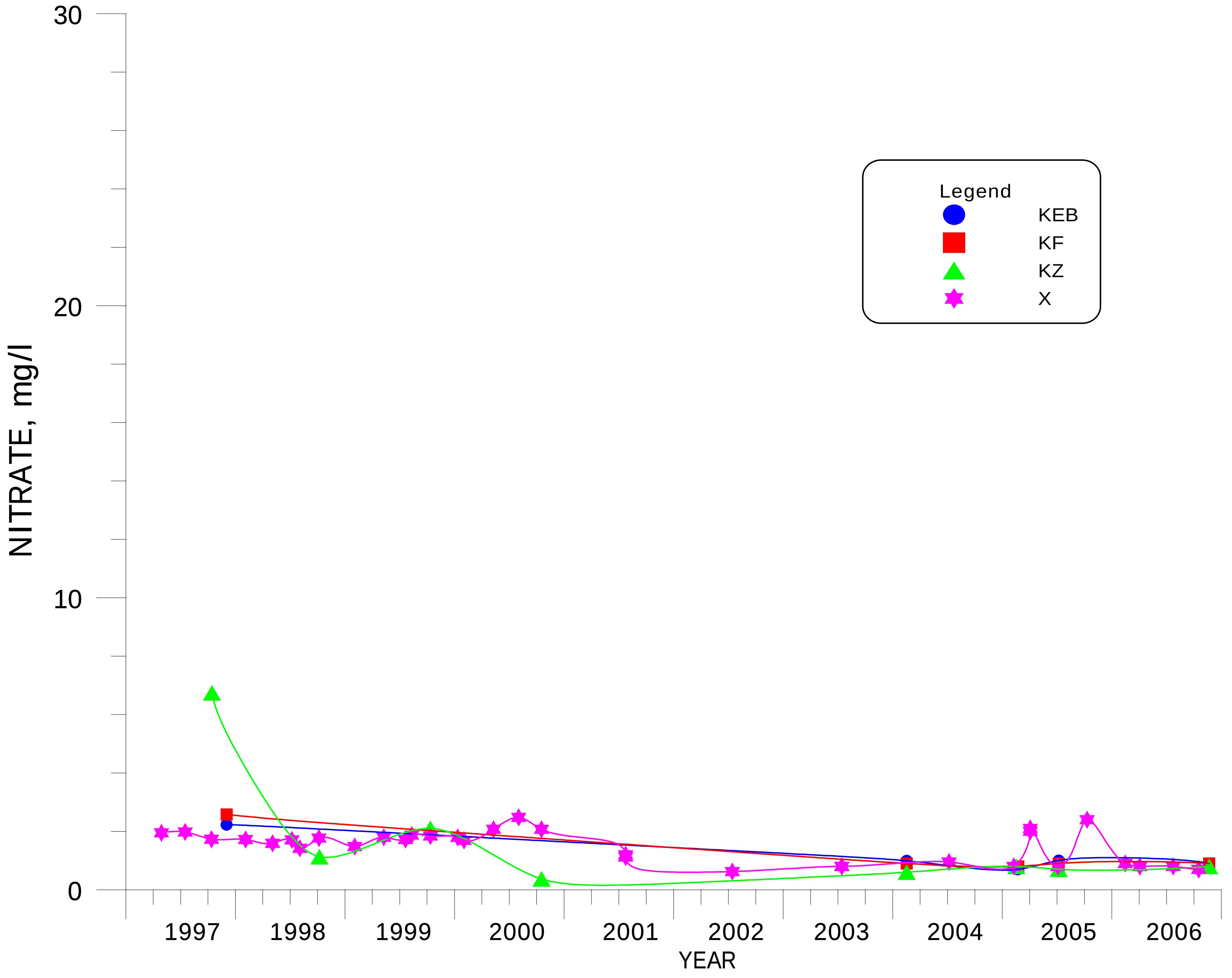


FIGURE 4.3-111. NITRATE CONCENTRATIONS FOR WELLS KEB, KF, KZ AND X.

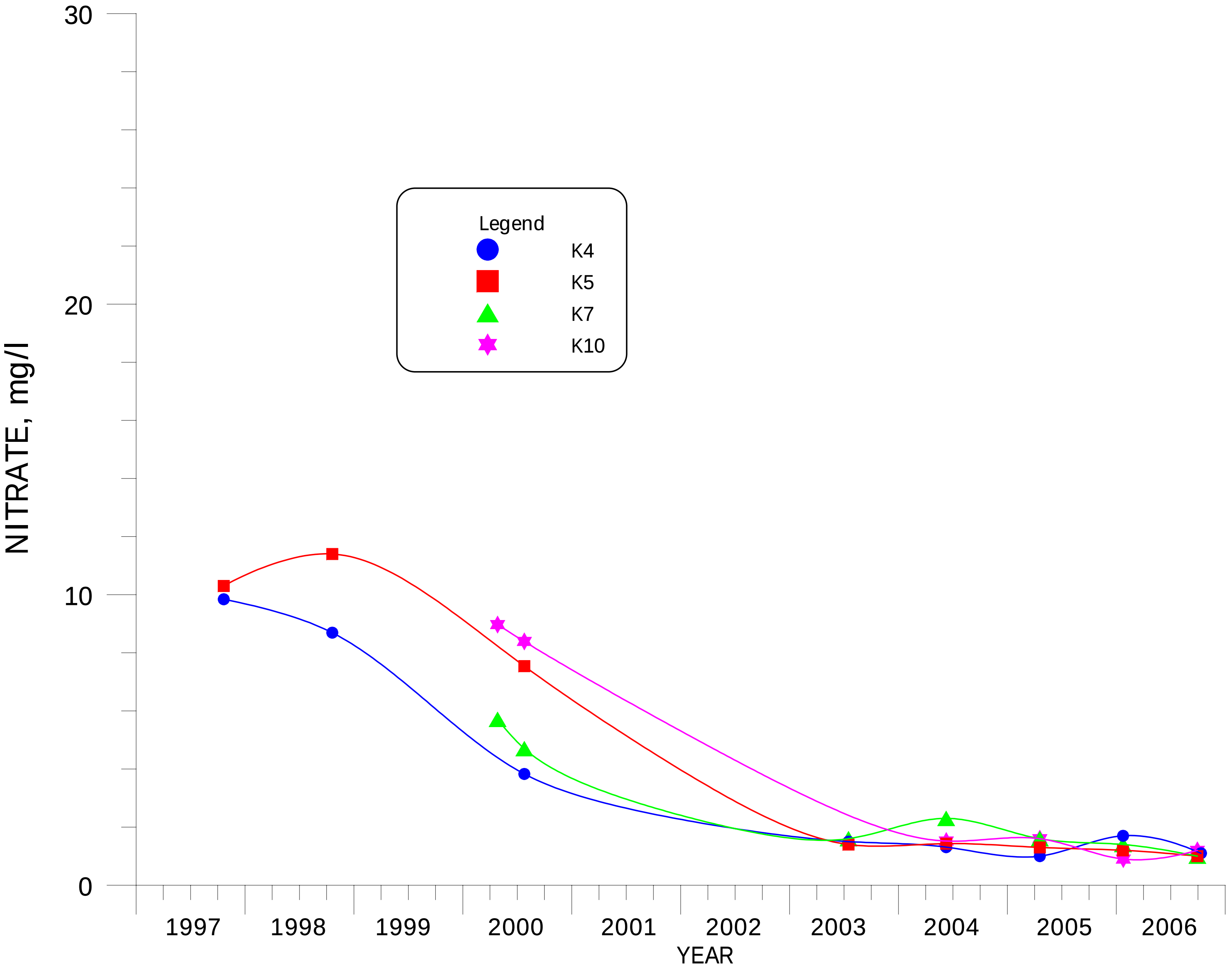


FIGURE 4.3-112. NITRATE CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.

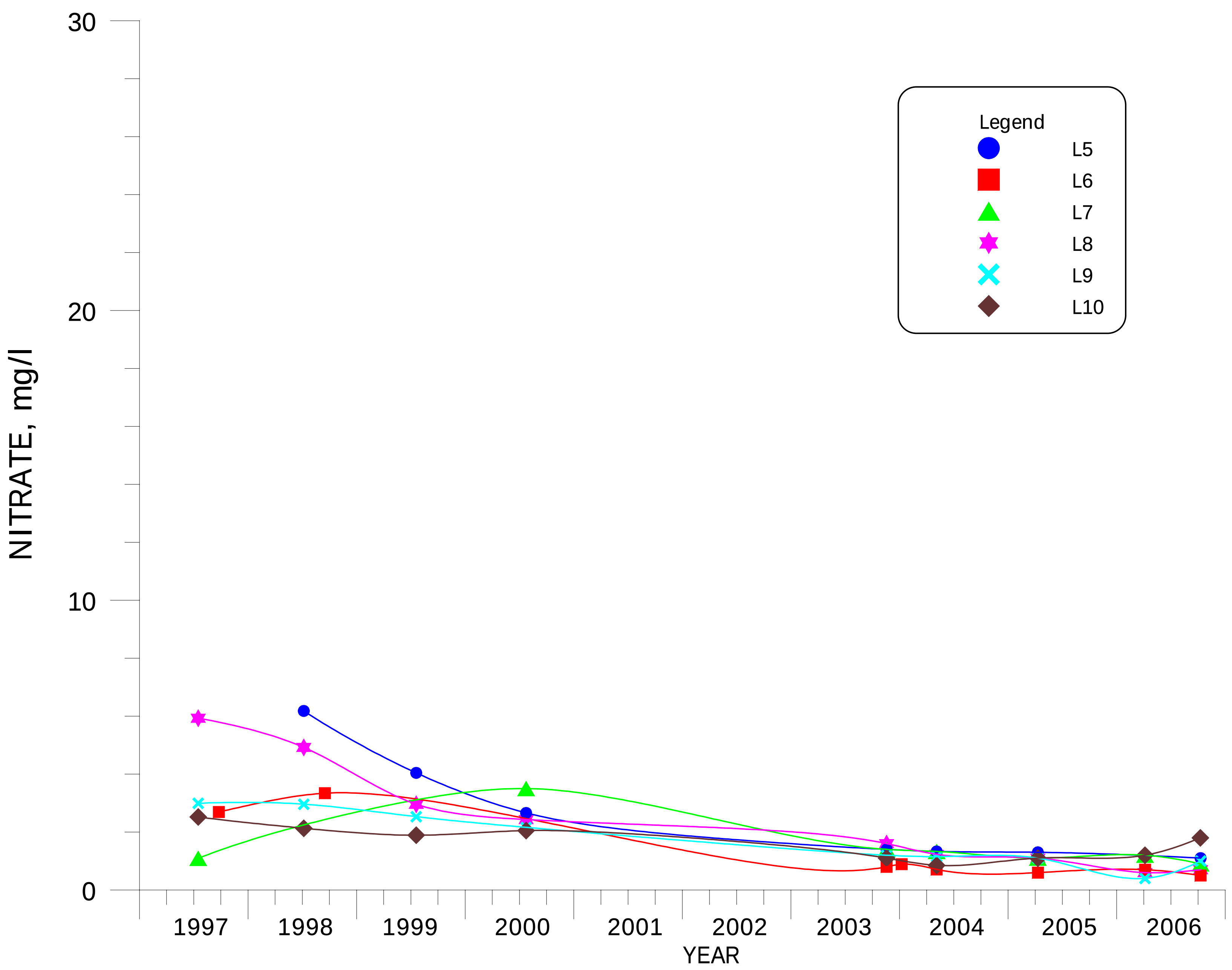


FIGURE 4.3-113. NITRATE CONCENTRATIONS FOR WELLS L5, L6, L7, L8, L9 AND L10.

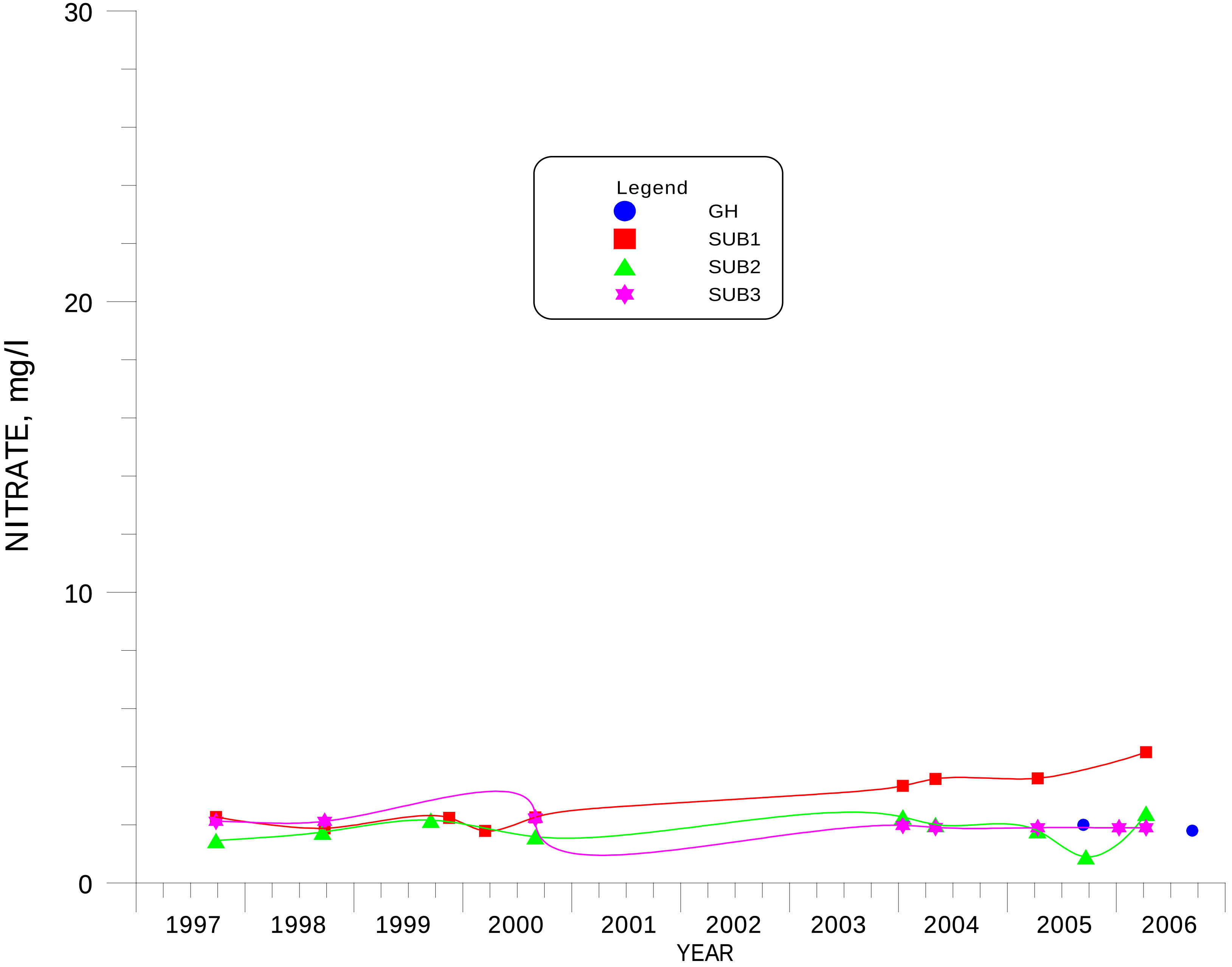


FIGURE 4.3-114. NITRATE CONCENTRATIONS FOR WELLS GH, SUB1, SUB2 AND SUB3.

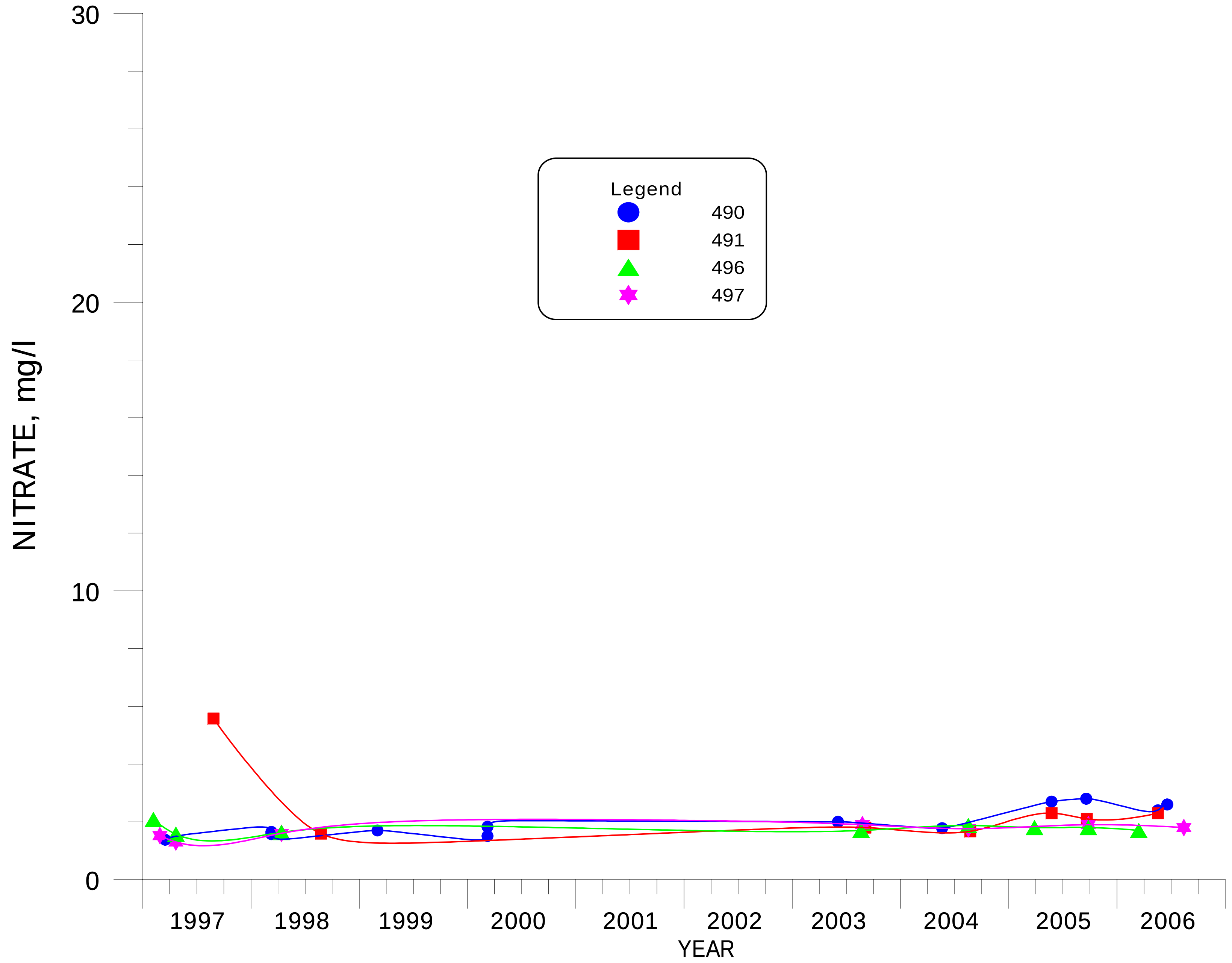


FIGURE 4.3-115. NITRATE CONCENTRATIONS FOR WELLS 490, 491, 496 AND 497.

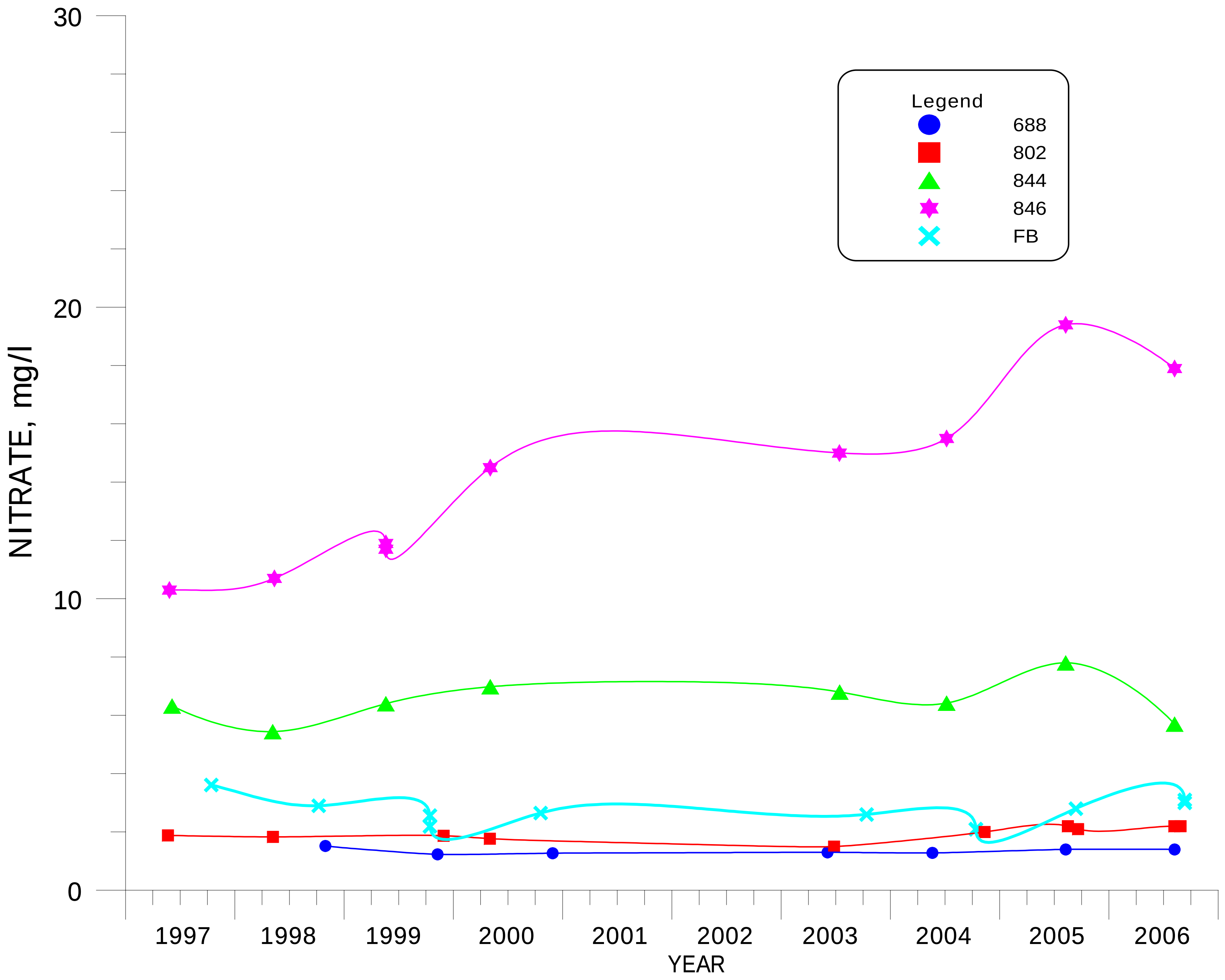


FIGURE 4.3-116. NITRATE CONCENTRATIONS FOR WELLS 688, 802, 844, 846 AND FB.

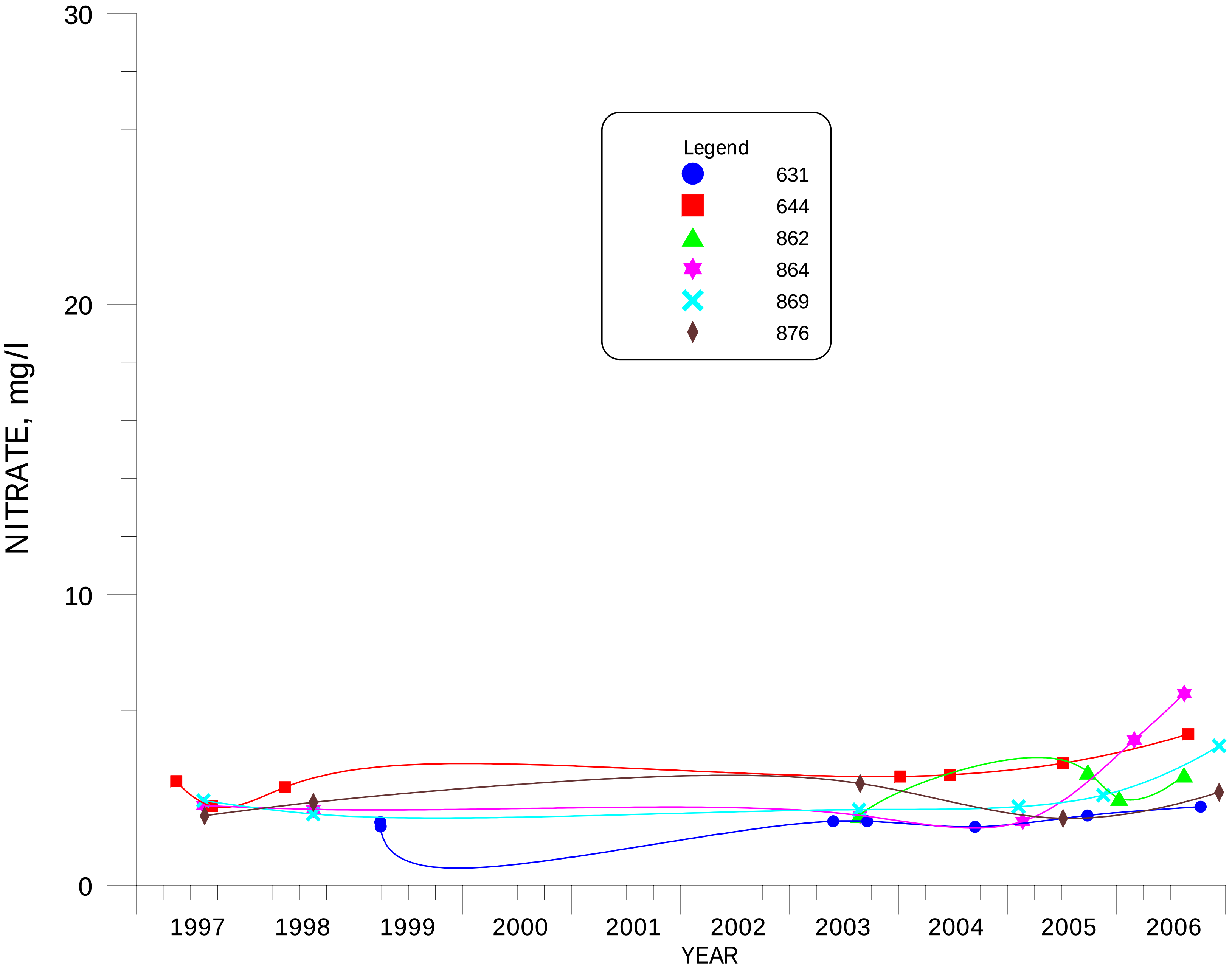


FIGURE 4.3-117. NITRATE CONCENTRATIONS FOR WELLS 631, 644, 862, 864, 869 AND 876.

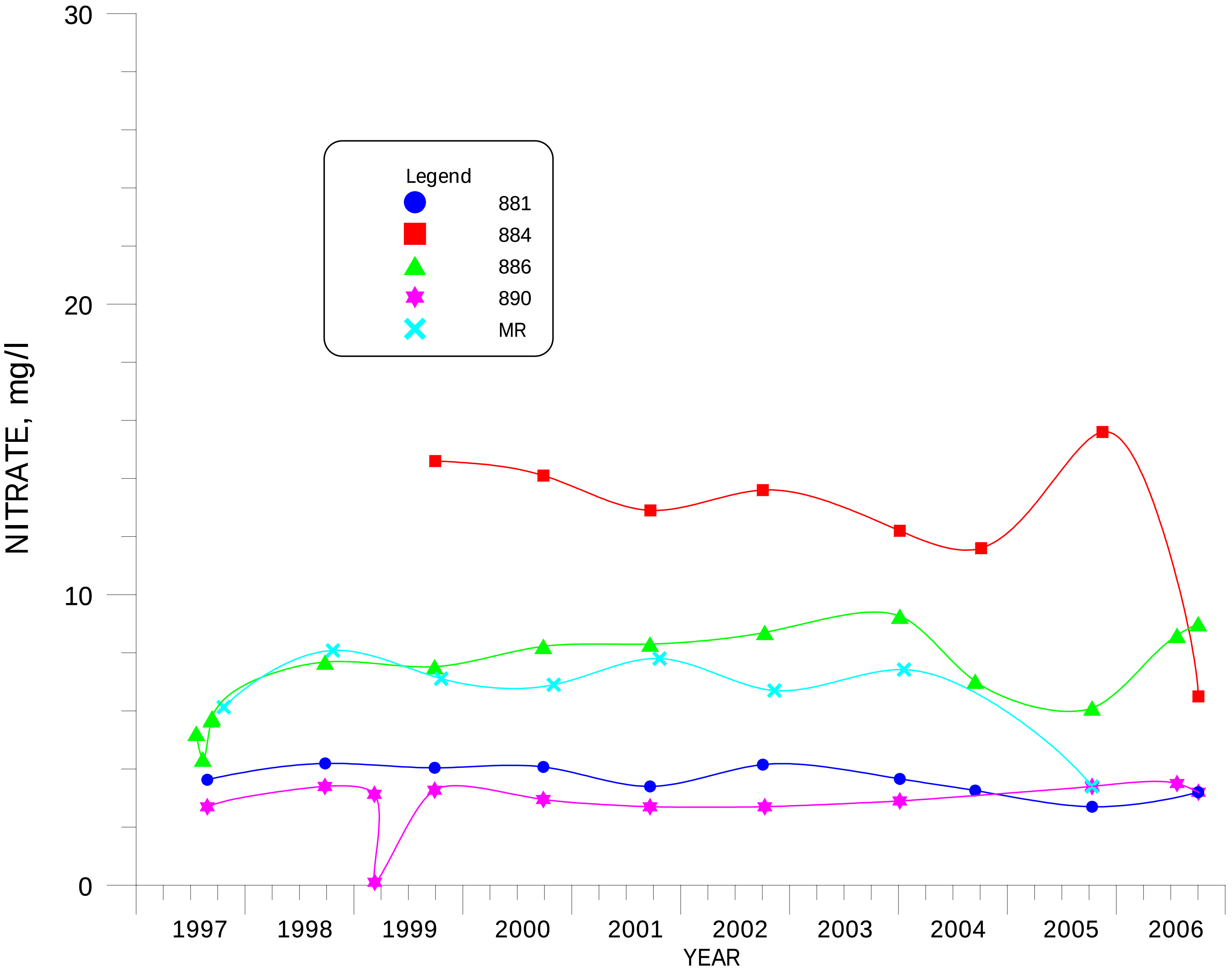


FIGURE 4.3-118. NITRATE CONCENTRATIONS FOR WELLS 881, 884, 886, 890 AND MR.

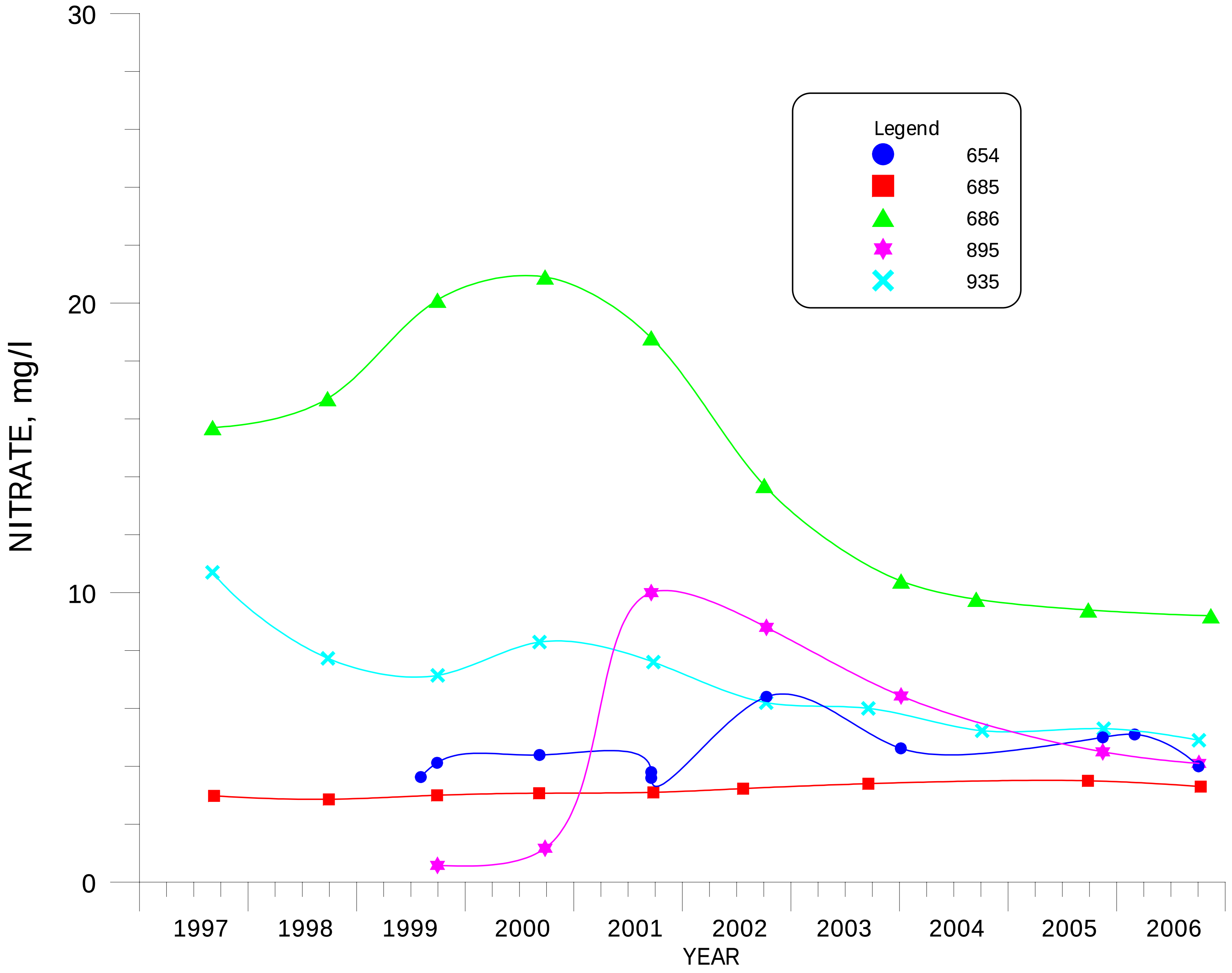


FIGURE 4.3-119. NITRATE CONCENTRATIONS FOR WELLS 654, 686, 687, 895 AND 935.

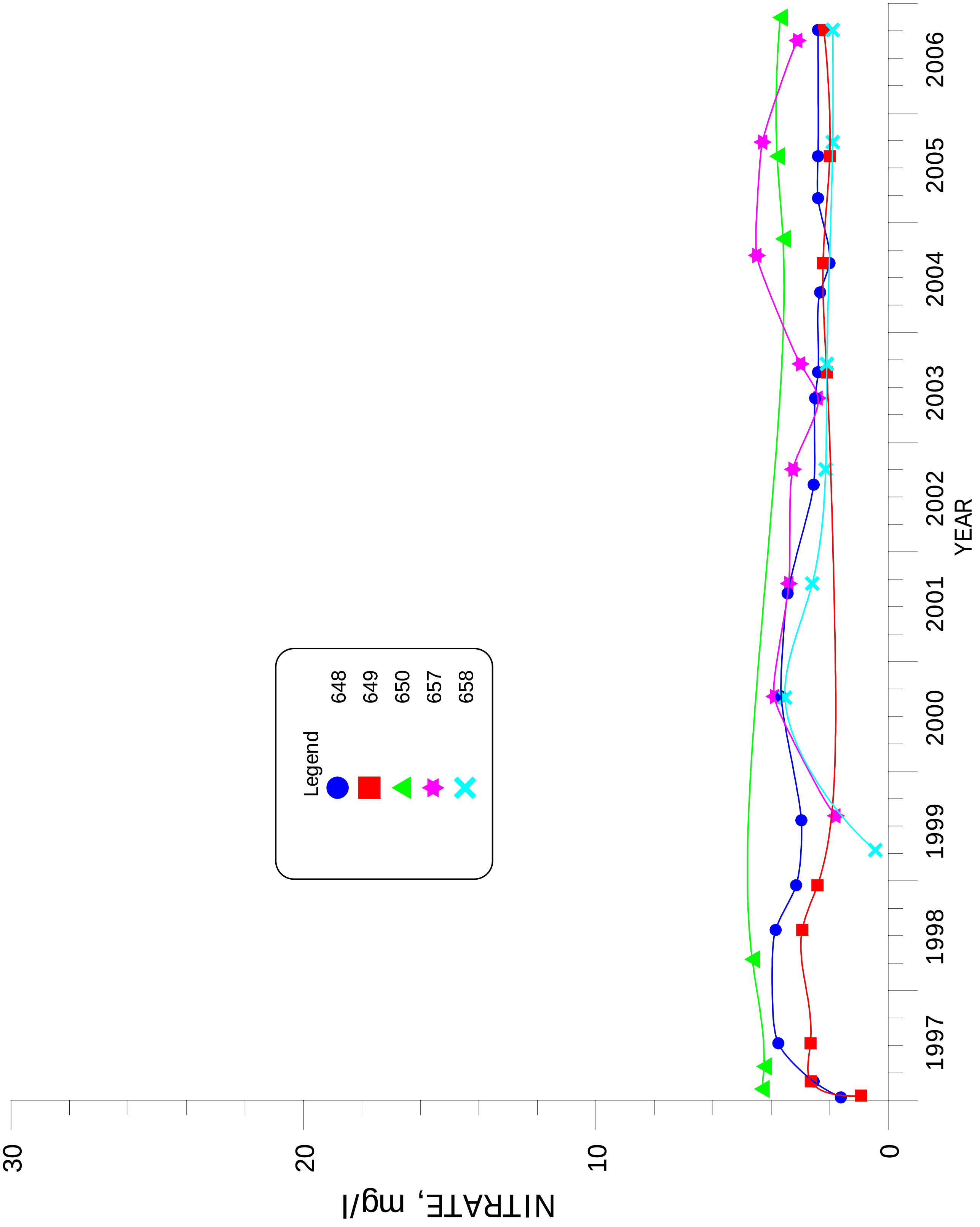
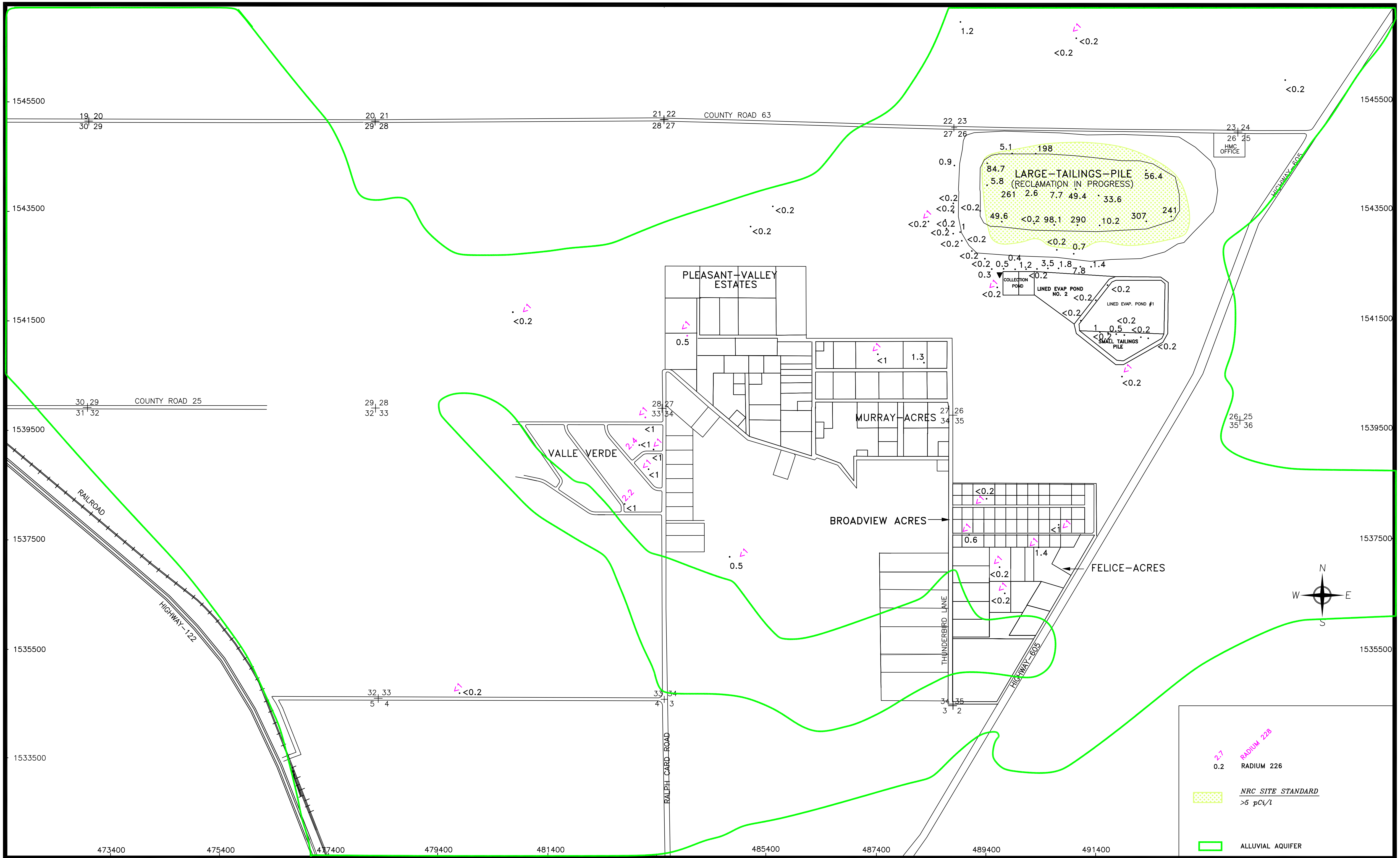


FIGURE 4.3-120. NITRATE CONCENTRATIONS FOR WELLS 648, 649, 650, 657 AND 658.

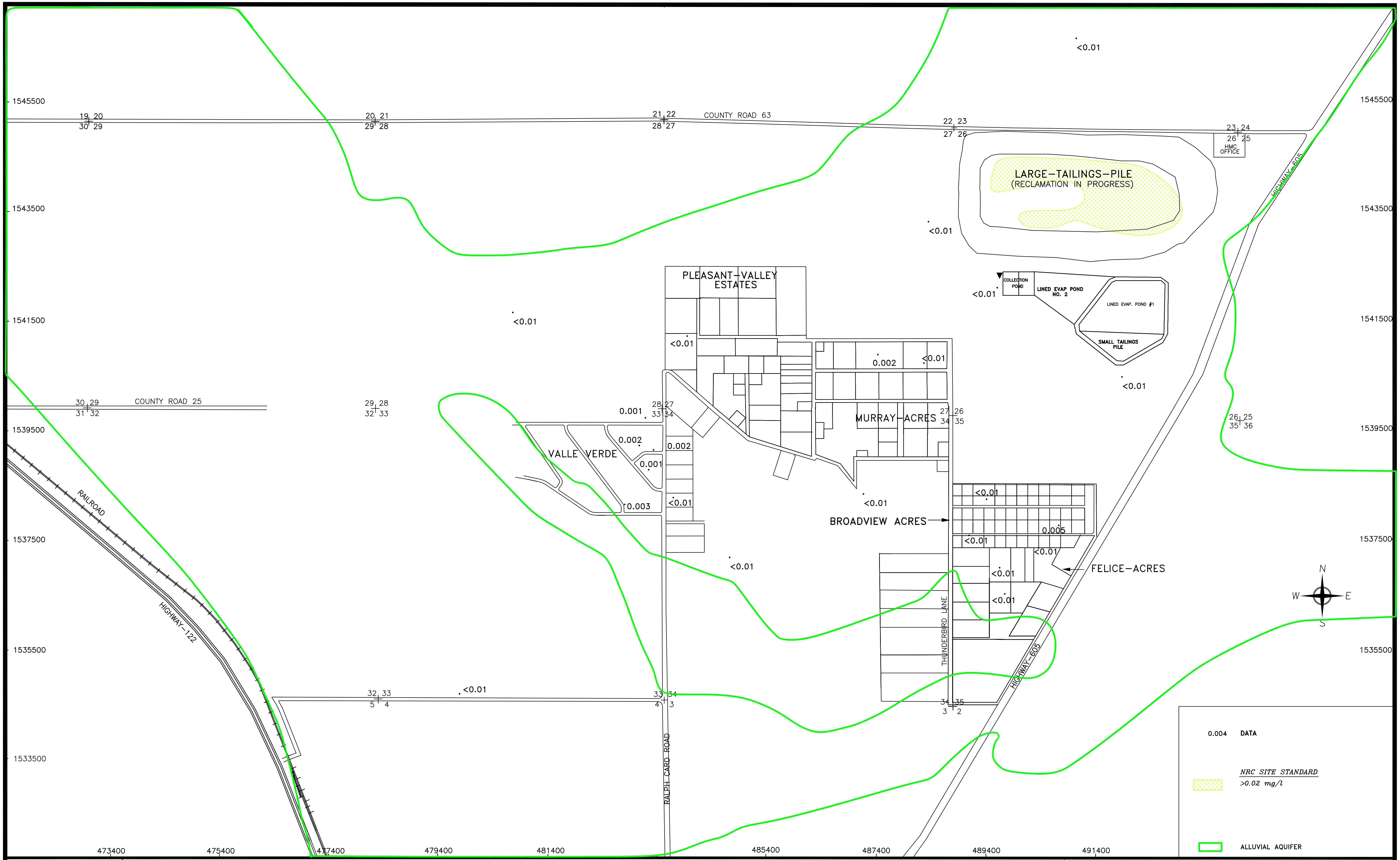


SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.3-121. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, pCi/l

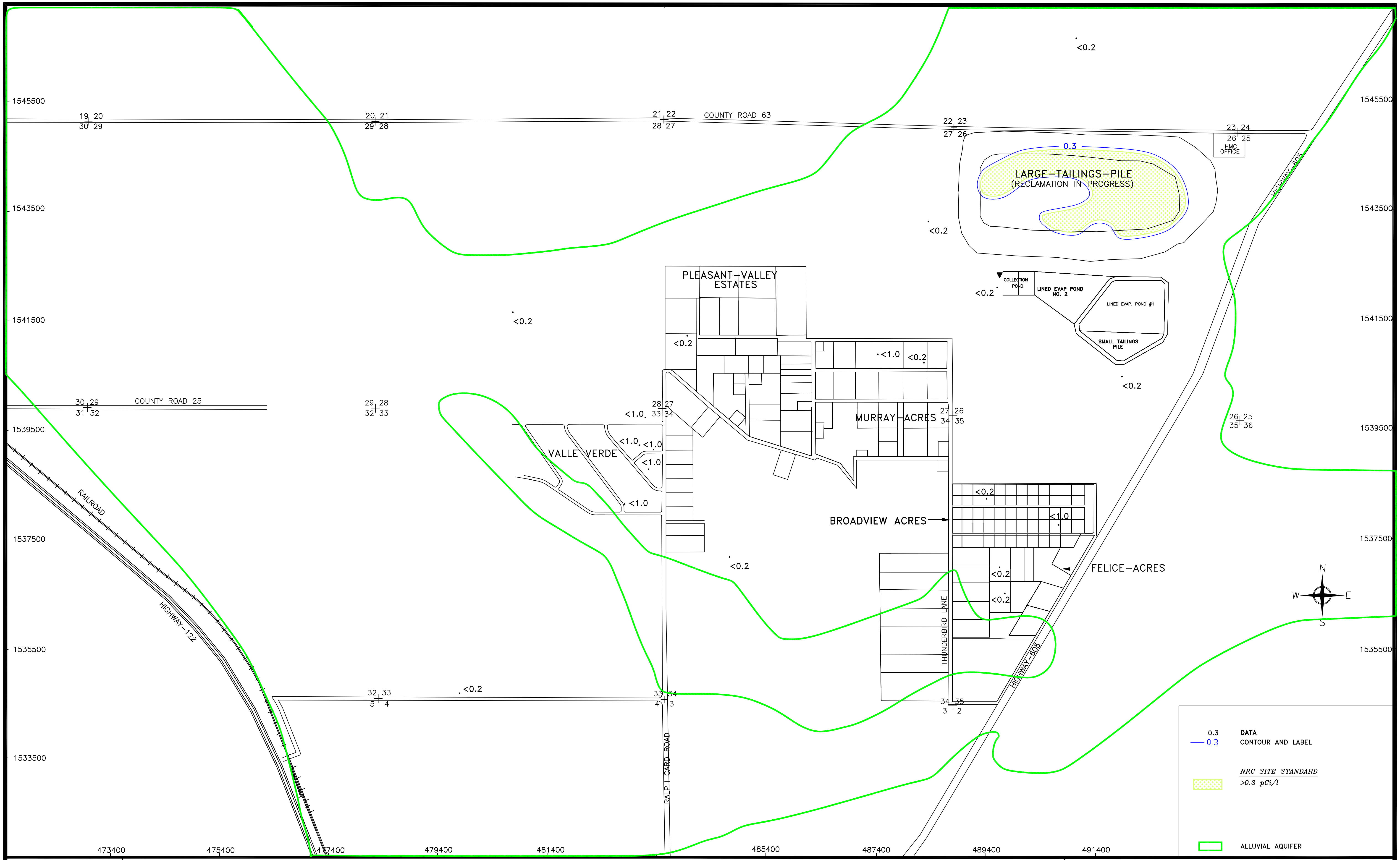


SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.3-122. VANADIUM CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, mg/l



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600QAL --JDF
DATE: 03/28/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 4.3-123. THORIUM-230 CONCENTRATIONS OF THE ALLUVIAL AQUIFER, 2006, pCi/l

SECTION 5

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 5

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

SECTION 5

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

TABLES

5.0 UPPER CHINLE AQUIFER MONITORING

5.1 UPPER CHINLE WELL COMPLETION

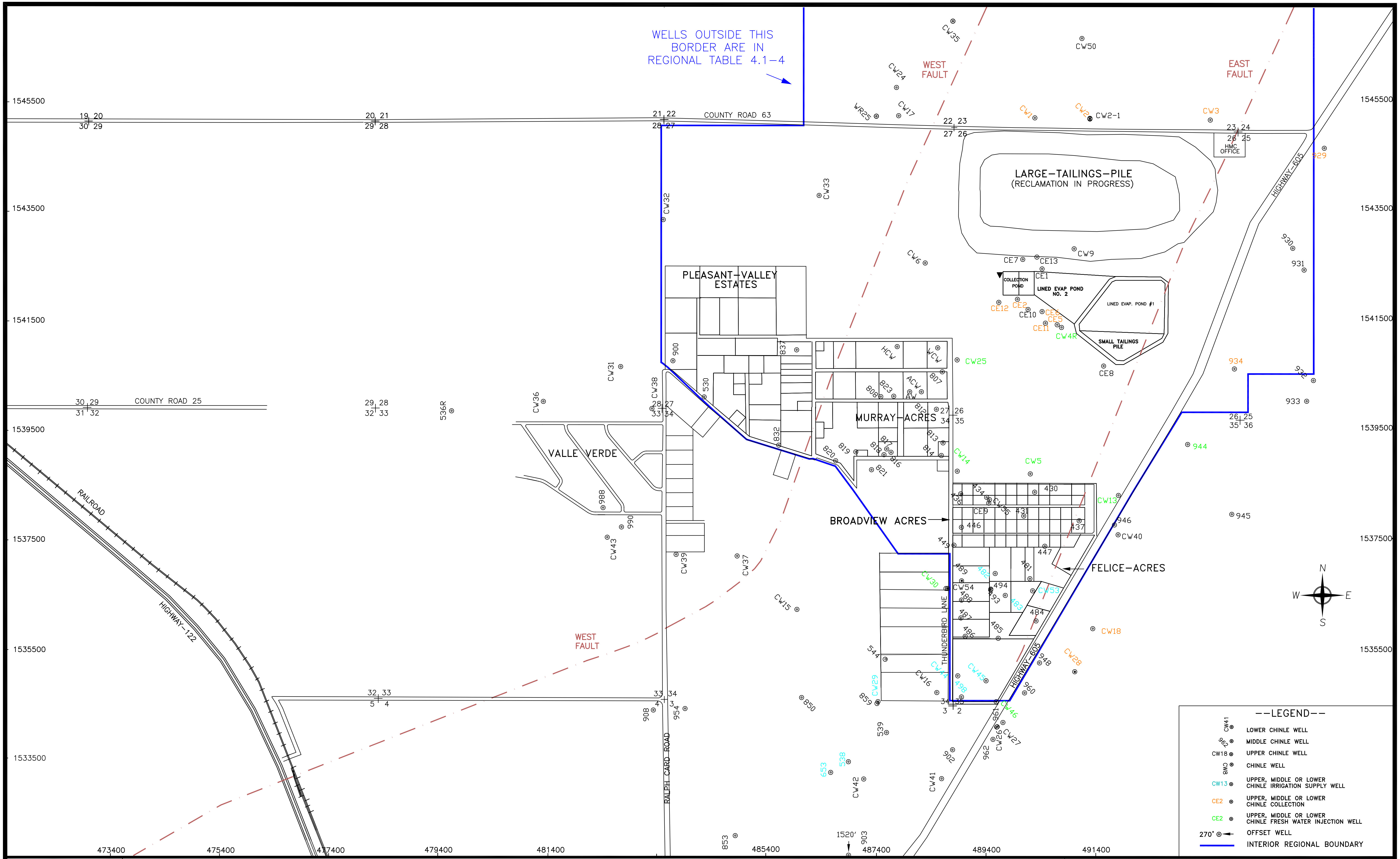
Chinle aquifer well locations are shown on Figure 5.1-1. The Upper and Middle Chinle aquifers do not exist in the area west of Ralph Card Road. Table 5.1-1 presents basic information for the Chinle wells located on the Homestake property. This table indicates well coordinates, well depth, casing diameter, water level, measuring point in feet above land surface and elevation, and depth and elevation to the top of the Chinle aquifers. A "U" follows the elevation of the top of the Upper Chinle aquifer, and an "M" and an "L" have the same meaning for the Middle and Lower Chinle aquifers, respectively. Some of the wells have been used to define the depth to the base of the alluvium, and an "A" is presented following the elevation to denote that these values are for the base of the alluvium. The casing perforation interval and aquifer unit are also presented in this table.

Table 5.1-2 presents basic well data for Chinle wells in Broadview Acres and Felice Acres. Table 5.1-3 presents similar data for Murray Acres and Pleasant Valley Estates Chinle wells. Wells that are not located within the immediate Grants Project property or within the four subdivision boundaries are denoted on Table 5.1-4 as the regional Chinle wells (see Figure 5.1-1 for inner regional boundary shown in blue). Nine new Chinle wells were drilled in 2006. These wells are Upper Chinle wells CE6 through CE13 and Middle Chinle well CW55.

An analysis of the background water quality for the Chinle aquifers was presented in Hydro-Engineering 2003b. Background values for the Chinle mixing zone and the Upper, Middle and Lower Chinle non-mixing zones were also defined in the previously cited report. These site standard values are listed in the title block of the water-quality figures in this report.

The location of Upper Chinle wells is shown on Figure 5.1-2, with the areal extent of the Upper Chinle aquifer at the Grants Project shown on Figure 5.1-2. Four new Upper Chinle wells were installed south of the collection ponds while two were drilled north of the collection ponds. Well CE8 located south of the small tailings and CE9 is located in the northwest portion of Broadview Acres. Upper Chinle wells CW4R, CW5, CW13, CW25 and 944 are shown in green to denote that these are fresh-water injection wells. Upper Chinle wells CE2, CE5, CE6, CE11, CE12, CW3, 929 and 934 were pumped as a source of flushing water for the Large Tailings Pile in 2006 and are shown in orange. Well CW18 is also shown in orange, because this well was used as a supply for fresh-water injection starting in late September of 2002 but was not used continuously after May of 2004. Figure 5.1-2 also shows the location of the West and East Faults. A blue dot pattern is used to show the limits of the Upper Chinle sandstone where Chinle shale exists between the sandstone and the alluvium. Figure 5.1-3 presents a typical geologic cross section to show the relative position of the alluvial and Chinle aquifers (see Figure 5.1-2 for the location of this cross section).

The subcrop of the Upper Chinle sandstone where the alluvium is saturated or unsaturated above the Upper Chinle sandstone is also shown on Figure 5.1-2. The Upper Chinle aquifer does not exist to the west and south of the subcrop area. The Upper Chinle sandstone, therefore, does not exist west of the West Fault.

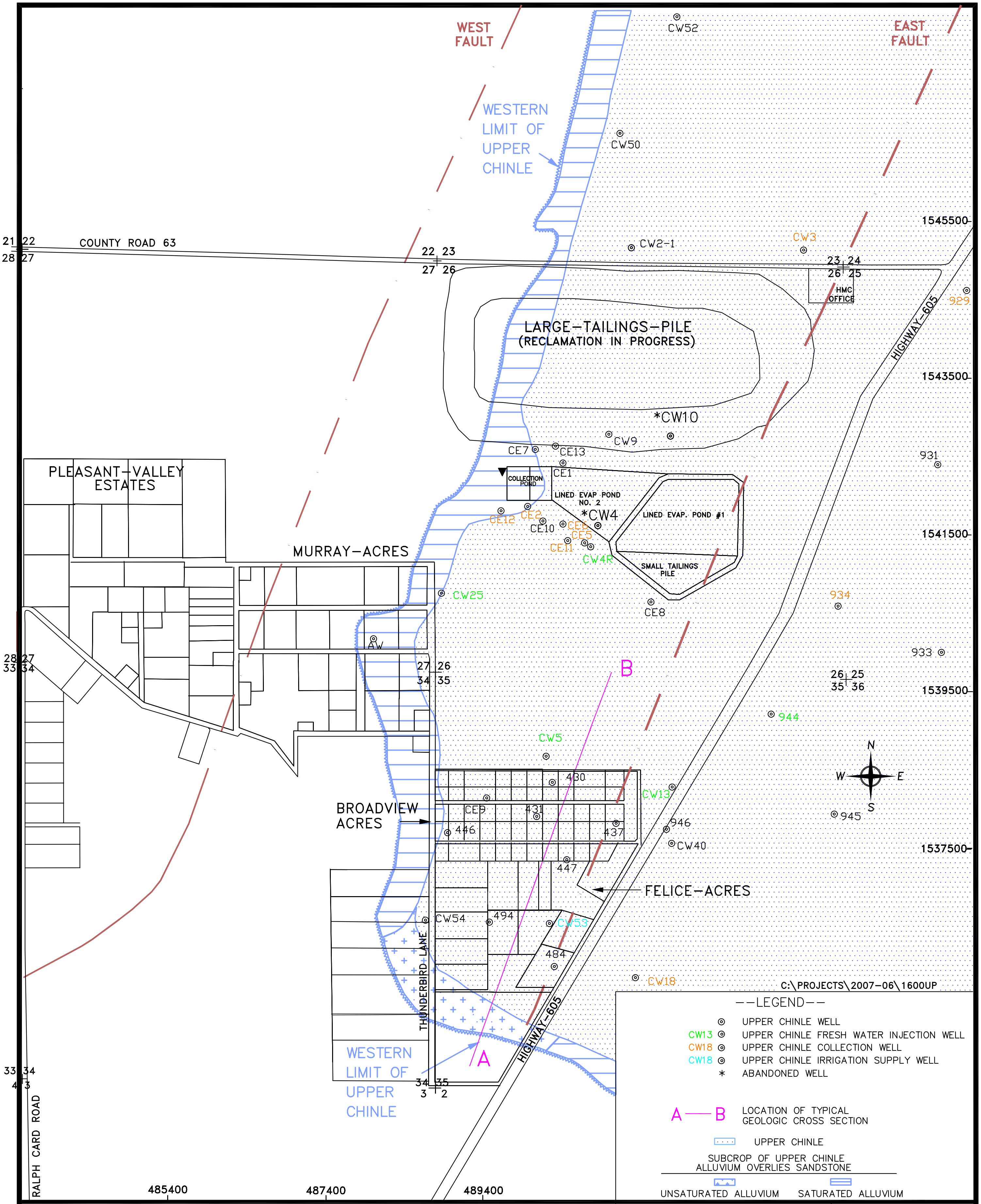


SCALE: 1"=1600'
C:\PROJECTS\
2007-06\BASE07
DATE: 03/14/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 5.1-1. CHINLE AQUIFER WELL LOCATIONS



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

SCALE: 1"=1600'

FIGURE 5.1-2. LIMITS OF UPPER CHINLE AQUIFER AND WELL LOCATIONS

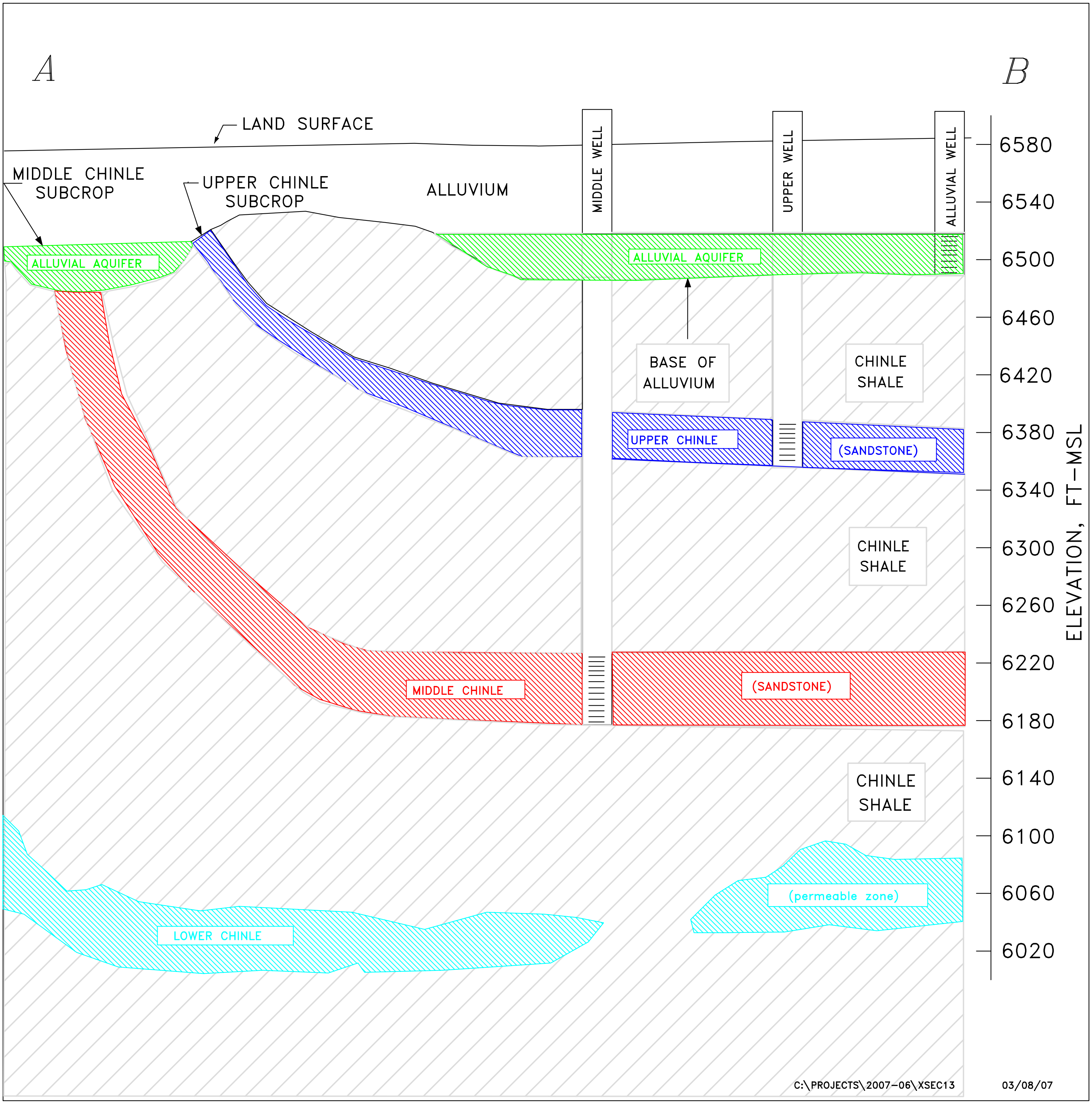


FIGURE 5.1-3. TYPICAL GEOLOGIC CROSS SECTION

TABLE 5.1-1. WELL DATA FOR THE CHINLE HOMESTAKE WELLS.

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)						
0930	1542848	494997	410.0	6.0	11/17/2006	132.24	6466.30	0.0	6598.54	30	6569	A -	---
										335	6264	M 330-400	Middle
0931	1542461	495207	366.7	6.0	12/1/2005	131.79	6478.77	0.9	6610.56	339	6271	U -	Upper
0934	1540641	493941	293.0	6.0	12/27/2006	74.05	6511.54	2.0	6585.59	30	6554	A -	---
										282	6302	U 330-400	Upper
CE1	1541923	489979	137.0	5.0	12/10/2006	38.04	6532.15	4.4	6570.19	75	6491	A -	---
										106	6460	U 98-138	Upper
CE2	1542475	490434	119.7	5.0	12/27/2006	77.54	6498.81	1.8	6576.35	74	6501	A -	---
										74	6501	U 78-118	Upper
CE5	1541453	490695	140.0	5.0	12/27/2006	48.00	6520.55	1.6	6568.55	63	6504	A -	---
										103	6464	U 100-140	Upper
CE6	1541698	490433	140.0	6.0	12/27/2006	125.25	6439.94	1.5	6565.19	75	6489	U -	Upper
CE7	1542652	490079	120.0	6.0	7/20/2006	42.09	6533.90	1.9	6575.99	95	6479	U 100-140	Upper
CE8	1540704	491556	216.6	6.0	9/20/2006	42.51	6527.19	1.7	6569.70	90	6478	U 160-200	Upper
CE10	1541737	490177	130.0	6.0	8/31/2006	48.20	6522.66	2.3	6570.86	75	6494	U 90-130	Upper
CE11	1541487	490494	140.0	6.0	12/27/2006	92.12	6473.30	1.6	6565.42	90	6474	U 100-140	Upper
CE12	1541867	489642	120.0	6.0	12/27/2006	62.78	6509.45	2.1	6572.23	80	6490	U 80-120	Upper
CE13	1542693	490338	129.2	6.0	9/21/2006	44.54	6530.10	1.7	6574.64	95	6478	U 90-130	Upper
CW1	1545235	490295	325.0	5.0	12/27/2006	166.55	6418.67	0.7	6585.22	105	6480	A -	---
										272	6313	M 212-323	Middle
CW2	1545212	491302	355.0	5.0	12/27/2006	161.52	6423.96	1.7	6585.48	85	6499	A -	---
										136	6448	U -	---
										305	6279	M 306-353	Middle
CW2-1	1545212	491302	168.0	5.0	12/21/2006	53.76	6531.72	1.7	6585.48	85	6499	A -	---
										136	6448	U 243-253	Upper
CW3	1545200	493496	235.0	5.0	12/27/2006	95.84	6491.34	0.7	6587.18	70	6516	A -	---
										209	6377	U 210-235	Upper
										348	6238	M -	---
* CW4	1541682	490874	145.0	5.0	9/7/1994	39.06	6531.89	0.8	6570.95	70	6500	A -	---
										112	6458	U 110-145	Upper
CW4R	1541416	490787	138.9	6.0	12/27/2006	1.00	6567.73	1.3	6568.73	61	6506	A -	---
										104	6463	U 102-142	Upper
CW5	1538729	490221	170.0	5.0	12/27/2006	22.75	6546.59	1.6	6569.34	65	6503	A -	---
										137	6431	U 135-170	Upper
CW6	1542588	488301	282.0	4.0	12/20/2006	120.80	6454.84	1.0	6575.64	236	6339	M 246-276	Middle
CW7	1545285	488773	---	---	10/17/1995	60.80	6522.79	0.0	6583.59	---	---	C 120-130	Chinle
CW8	1545009	491238	285.0	6.0	12/5/2000	38.90	6552.93	0.0	6591.83	---	---	C 276-286	Chinle
										85	6507	A -	---
CW9	1542840	491015	180.0	5.0	12/20/2006	62.41	6529.42	0.0	6591.83	---	---	U 130-180	Upper

TABLE 5.1-1. WELL DATA FOR THE CHINLE HOMESTAKE WELLS.

(cont'd.)

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)							
CW9	1542840	491015	180.0	5.0	.2/20/2006	62.41	6529.42	0.0	6591.83	80	6512	A	-	---
* CW10	1542823	491803	185.0	5.0	.1/13/1995	50.03	6537.86	0.0	6587.89	75	6513	A	-	---
										167	6421	U	155-185	Upper
CW13	1538349	491827	267.7	6.0	.2/27/2006	38.23	6538.47	2.7	6576.70	230	6344	U	225-265	Upper
										378	6196	M	-	---
CW14	1538786	488884	360.9	6.0	.2/27/2006	50.02	6516.07	2.9	6566.09	56	6507	A	-	---
										66	6497	U	-	---
										310	6253	M	278-358	Middle
CW17	1545279	487771	108.0	5.0	.1/15/2006	52.20	6537.12	3.1	6589.32	73	6513	A	-	---
										85	6501	M	83-103	Middle
CW24	1545773	487760	118.0	5.0	.1/15/2006	53.80	6534.87	3.0	6588.67	61	6525	A	-	---
										65	6521	M	78-118	Middle
CW25	1540802	488866	102.0	5.0	.2/27/2006	38.90	6528.30	3.0	6567.20	53	6511	A	-	---
										53	6511	U	62-102	Upper
CW32	1543413	483523	300.0	6.0	.1/14/2006	133.54	6433.74	1.7	6567.28	70	6496	A	-	---
										157	6409	L	218-303	---
										157	6409	L	158-188	Lower
CW33	1543814	486347	347.0	6.0	.1/15/2006	106.10	6468.79	1.8	6574.89	83	6490	A	-	---
										272	6301	L	267-287	Lower
										272	6301	L	307-347	---
CW34	1547827	487707	65.7	6.0	8/27/1996	65.65	6528.75	3.2	6594.40	20	6571	A	-	---
										40	6551	M	33-63	Middle
CW35	1547001	488794	120.0	5.0	.0/24/2006	55.70	6535.47	1.9	6591.17	63	6526	A	-	---
										90	6499	M	93-118	Middle
CW50	1546687	491159	170.0	5.0	.2/21/2006	58.32	6530.24	3.0	6588.56	128	6458	U	130-170	Upper
CW51	---	---	300.0	5.0	---	---	---	---	---	180	---	M	-	Middle
CW52	1548171	491887	180.0	5.0	.2/21/2006	74.94	6517.46	2.0	6592.40	138	6452	U	140-180	Upper
CW53	1536668	490262	157.0	5.0	.2/18/2006	51.60	6513.34	3.0	6564.94	110	6452	U	117-157	Upper
CW54	1536645	488675	100.0	5.0	.2/10/2006	33.21	6525.34	2.2	6558.55	70	6486	C	60-100	Chinle
WR25	1545267	487430	113.3	5.0	.1/15/2006	49.61	6536.85	2.8	6586.46	50	6534	A	-	---
										71	6513	M	71-111	Middle

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

E = Estimated Depth

TABLE 5.1-2. WELL DATA FOR THE CHINLE BROADVIEW AND FELICE ACRES WELLS.

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)							
						Broadview								
0430	1538469	490300	145.0	---	---	---	---	0.0	6568.00	72	6496	A	-	Alluvium
										135	6433	U	-	Upper
0431	1538045	490090	130.0	6.0	4/12/1994	35.00	6533.00	0.0	6568.00	60	6508	A	125-130	Alluvium
										118	6450	U	125-130	Upper
0434	1538370	489420	280.0	6.0	.0/26/2006	39.61	6524.07	0.0	6563.68	75	6489	A	-	---
										265	6299	M	-	Middle
0436	1538439	488947	295.0	5.0	.0/29/1996	71.82	6490.91	0.0	6562.73	90	6473	A	-	---
										280	6283	M	280-295	Middle
0437	1537859	491128	340.0	5.0	.0/29/1996	63.23	6508.77	1.8	6572.00	90	6480	A	-	---
										180	6390	U	-	---
										280	6290	M	240-300	Middle
0446	1537830	488960	110.0	6.0	9/8/1983	41.28	6518.72	0.0	6560.00	60	6500	A	60-95	Alluvium
										60	6500	U	60-95	Upper
0447	1537490	490480	142.0	6.0	4/11/1985	41.18	6526.82	0.0	6568.00	80	6488	A	120-142	Alluvium
										138	6430	U	120-142	Upper
0449	1537440	488830	267.0	6.0	12/5/1994	63.42	6496.58	0.0	6560.00	---	---	M	-	Middle
CE9	1538203	489458	130.0	6.0	.2/12/2006	37.50	6525.62	1.2	6563.12	---	---	U	90-130	Upper
CW55	1538283	489471	360.0	6.0	.2/12/2006	32.40	6531.76	2.3	6564.16	80	6482	A	-	Alluvium
										260	6302	C	-	Chinle
						Felice Acres								
0481	1538350	490180	320.0	4.0	---	---	---	0.0	6568.00	110	6458	A	270-310	Alluvium
										270	6298	M	270-310	Middle
0482	1536981	489579	260.0	5.0	.2/18/2006	38.30	6524.36	0.0	6562.66	80	6483	A	220-260	Alluvium
										210	6353	M	220-260	Middle
0483	1536586	489753	280.0	5.0	.0/11/2006	44.64	6518.02	0.0	6562.66	40	6523	A	-	Alluvium
										65	6498	U	-	---
										236	6327	M	270-300	Middle
0484	1536448	490356	320.0	5.0	.2/26/1996	39.43	6524.55	0.0	6563.98	38	6526	A	-	---
										129	6435	U	-	---
										280	6284	M	220-300	Middle
0485	1535800	489630	260.0	6.0	7/18/1996	70.90	6494.10	0.0	6565.00	35	6530	A	-	---
										70	6495	U	-	---
										223	6342	M	220-260	Middle
0486	1535800	489024	260.0	4.0	8/4/2004	90.40	6468.00	0.0	6558.40	---	---	M	200-260	Middle
										21	6537	A	-	---
										21	6537	U	-	---
0487	1536175	488950	260.0	---	7/24/1996	49.20	6511.80	0.0	6561.00	---	---	M	-	Middle
0488	1536500	488950	190.0	6.0	8/19/2003	113.80	6448.20	0.0	6562.00	---	---	M	-	Middle

TABLE 5.1-2. WELL DATA FOR THE CHINLE BROADVIEW AND FELICE ACRES WELLS.

(cont'd.)

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)							
0489	1536850	488950	---	---	---	---	---	0.0	6562.00	---	---	M	-	Middle
0493	1536702	489492	300.0	5.0	.2/18/2006	117.60	6442.68	0.9	6560.28	40	6519	A	-	---
										65	6494	U	-	---
										236	6323	M	270-300	Middle
0494	1536689	489494	85.0	5.0	.2/18/2006	36.50	6523.64	0.6	6560.14	40	6520	A	-	---
										65	6495	U	65-85	Upper
0498	1534661	488953	150.0	6.0	8/14/2006	135.60	6424.99	2.0	6560.59	80	6479	A	70-110	Alluvium
										80	6479	M	130-150	Middle
CW44	1535048	488891	208.0	6.0	.2/18/2006	64.00	6496.74	2.5	6560.74	94	6464	A	-	Alluvium
										130	6428	M	69-208	Middle
CW45	1535036	489494	193.0	5.0	.2/18/2006	61.60	6499.71	0.6	6561.31	90	6471	A	-	---
										166	6395	M	163-193	Middle
CW46	1534642	489595	187.3	5.0	.2/18/2006	72.20	6490.06	1.5	6562.26	88	6473	A	-	---
										112	6449	M	125-185	Middle

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

E = Estimated Depth

TABLE 5.1-3. WELL DATA FOR THE CHINLE MURRAY ACRES AND PLEASANT VALLEY WELLS.

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)						
Murray													
0803	1540800	487430	---	6.0	9/19/1983	84.86	6476.14	0.0	6561.00	---	---	C 85-180	Chinle
										85	6476	A 85-180	Alluvium
0807	1540598	488610	287.0	6.0	---	---	---	0.0	6565.00	63	6502	A -	---
										275	6290	M 275-285	Middle
0808	1540080	487490	290.0	5.0	---	---	---	1.6	6561.00	85	6474	A -	---
										255	6304	M 260-290	Middle
0812	1539910	488505	300.0	6.0	---	---	---	0.6	6566.00	68	6497	A -	---
										268	6297	M 264-284	Middle
0813	1539300	488620	280.0	6.0	---	---	---	0.0	6565.00	63	6502	A -	---
										230	6335	M 235-255	Middle
0814	1539030	488590	280.0	6.0	---	---	---	0.0	6565.00	---	---	M -	Middle
0816	1539110	487705	255.0	6.0	---	---	---	0.0	6557.00	35	6522	A -	---
										240	6317	M 240-250	Middle
0817	1539190	487590	---	---	7/22/1995	70.34	6486.66	0.0	6557.00	---	---	M -	Middle
0818	1539085	487547	243.0	4.0	---	---	---	0.0	6557.00	62	6495	A -	---
										230	6327	M 223-243	Middle
0819	1539000	487000	222.0	6.0	---	---	---	0.0	6557.00	62	6495	A -	---
										210	6347	M 210-220	Middle
0820	1539254	486513	230.0	---	5/9/2002	99.20	6458.80	0.0	6558.00	---	---	M 125-230	Middle
0821	1538810	487320	260.0	7.0	11/1/1994	35.88	6524.12	0.0	6560.00	---	---	M -	Middle
0823	1540150	487720	265.0	6.0	---	---	---	0.0	6561.00	---	---	M 257-267	Middle
										40	6521	A -	---
ACW	1540235	488070	325.0	6.0	1/28/2006	129.90	6433.90	1.2	6563.80	40	6523	A -	---
										57	6506	U -	---
										264	6299	M 265-325	Middle
AW	1540235	488015	156.0	6.0	1/28/2006	36.20	6527.23	0.1	6563.43	63	6500	A -	Alluvium
										100	6463	U 66-155	Upper
HCW	1541060	487785	295.0	6.0	7/20/2000	75.61	6486.39	1.0	6562.00	82	6479	A -	---
										264	6297	M 264-295	Middle
WCW	1541045	488520	307.0	6.0	1/28/2006	133.40	6433.97	0.8	6567.37	83	6484	A -	---
										254	6313	M 257-307	Middle
Pleasant Valley													
0530	1540229	484358	490.0	5.0	0/30/1998	95.78	6463.41	1.5	6559.19	265	6293	L -	Lower
0832	1539263	485629	280.0	4.0	---	---	---	0.0	6557.00	85	6472	A -	---
										240	6317	L 238-278	Lower
0837	1540995	485950	200.0	5.0	9/7/1983	59.87	6507.13	0.0	6567.00	80	6487	A -	---
										160	6407	L 160-200	Lower
* 0842	1541650	483980	250.0	---	---	---	---	0.0	6558.00	---	---	L -	Lower

TABLE 5.1-3. WELL DATA FOR THE CHINLE MURRAY ACRES AND PLEASANT VALLEY WELLS.

(cont'd.)

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)						
0900	1540800	483700	172.1	---	7/24/1995	91.41	6468.59	1.5	6560.00	---	--- L	-	Lower

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

E = Estimated Depth

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

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)						
0536	1539560	479701	160.0	5.0	9/12/2000	144.70	---	-2.0	---	---	---	L -	Lower
0536R	1539888	479654	264.0	4.0	6/1/2001	75.00	6480.00	2.0	6555.00	62	6491	A -	---
										160	6393	L -	Lower
0538	1533486	486899	170.0	6.0	12/11/2006	81.90	6467.04	2.0	6548.94	95	6452	A 50-90	Alluvium
										133	6414	L 130-170	Lower
0539	1534014	487596	210.0	6.0	12/11/2006	79.51	6475.81	2.0	6555.32	---	---	A 80-100	---
										---	---	A 80-100	---
										100	6453	A 50-70	Alluvium
										100	6453	A 50-70	Alluvium
										175	6378	L 170-210	Lower
										175	6378	L 170-210	Lower
0653	1533283	486570	206.0	6.0	12/18/2006	79.63	6465.34	1.6	6544.97	97	6446	A 69-206	Alluvium
										135	6408	L -	Lower
0850	1534652	486044	54.0	5.0	12/18/2006	65.00	6484.15	3.2	6549.15	37	6509	M 29-54	Middle
										37	6509	A -	---
0853	1532124	484824	95.0	5.0	11/14/2006	82.60	6458.78	1.7	6541.38	60	6480	L 55-95	Lower
										60	6480	A -	---
0859	1534549	487426	83.0	5.0	12/10/2006	69.50	6483.26	2.7	6552.76	52	6498	M 50-83	Middle
0901	1531531	492846	270.0	5.0	11/4/1981	46.88	6552.12	0.0	6599.00	40	6559	A -	---
										190	6409	L 240-260	Lower
0902	1533700	488800	150.0	6.0	1/28/1995	52.10	6507.90	0.0	6560.00	72	6488	M 78-102	Middle
										72	6488	A -	---
0903	1530250	486900	281.0	5.0	---	---	---	0.0	6559.00	220	6339	L 120-260	Lower
0904	1531100	487150	200.0	4.0	---	---	---	0.0	6560.00	---	---	L 170-200	Lower
0908	1534430	483325	282.8	5.0	11/3/1998	81.16	6463.21	1.5	6544.37	107	6436	A -	---
										232	6311	L -	Lower
0927	1548300	491700	---	---	12/17/2001	147.94	6447.06	1.0	6595.00	---	---	M -	Middle
0929	1544684	495585	320.0	5.0	12/27/2006	87.00	6505.57	2.0	6592.57	---	---	U 290-320	Upper
0932	1540436	495407	501.0	6.0	4/19/2001	86.73	6515.38	0.0	6602.11	354	6248	U -	---
										492	6110	M 450-490	Middle
0933	1540087	495231	---	5.0	10/25/2006	66.34	6534.17	0.5	6600.51	---	---	U -	Upper
0937	1542180	471478	182.0	5.0	---	---	---	0.0	6578.00	70	6508	A -	---
										160	6418	L 95-182	Lower
0944	1539280	493091	300.0	5.0	12/27/2006	76.90	6511.71	1.6	6588.61	64	6523	A -	---
										252	6335	U 220-280	Upper
0945	1537986	493900	300.0	---	3/21/1985	92.41	6498.08	0.0	6590.49	---	---	U -	Upper
0946	1537804	491754	260.0	5.0	10/17/1996	37.45	6541.59	0.0	6579.04	220	6359	U 230-260	Upper
0948	1535190	490400	255.0	5.0	---	---	---	0.0	6568.10	200	6368	M 200-255	Middle
0949	1540350	483600	551.0	6.0	---	---	---	0.0	6562.30	112	6450	A -	---

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

(cont'd.)

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)						
0949	1540350	483600	551.0	6.0	---	---	---	0.0	6562.30	155	6407	L 260-290	Lower
										460	6102	S 505-551	San Andres
										460	6102	S 400-493	San Andres
0954	1534187	483910	307.0	5.0	2/27/1994	77.22	6467.78	0.0	6545.00	225	6320	L 285-307	Lower
0960	1534730	490110	305.0	6.0	4/5/1995	67.46	6497.54	0.0	6565.00	280	6285	M 285-305	Middle
0961	1534190	489720	240.0	5.0	4/5/1995	67.40	6497.60	6.9	6565.00	200	6358	L 200-240	Lower
0962	1533750	489796	238.0	6.0	---	---	---	0.0	6560.00	225	6335	L 220-238	Lower
0963	1532555	488792	---	4.0	---	---	---	0.0	6557.00	---	---	L -	Lower
0964	1531817	488371	200.0	6.0	---	---	---	0.0	6560.00	170	6390	L 170-200	Lower
0965	1531550	489100	200.0	4.0	8/21/2003	3.00	6572.00	0.0	6575.00	---	---	L 130-200	Lower
0966	1531300	489000	---	---	---	---	---	0.0	6575.00	---	---	L -	Lower
0967	1530500	487600	---	---	---	---	---	0.0	6570.00	---	---	L -	Lower
0968	1529700	488400	---	---	---	---	---	0.0	6630.00	---	---	L -	Lower
0969	1529400	488450	---	---	---	---	---	0.0	6640.00	---	---	L -	Lower
0970	1529100	488500	---	5.0	---	---	---	0.0	6660.00	---	---	L -	Lower
0988	1538124	483423	155.0	5.0	7/18/1996	59.86	6589.14	1.3	6649.00	18	6630	A -	---
										152	6496	L 152-155	Lower
0990	1537600	482750	---	---	---	---	---	0.5	6550.00	---	---	L -	Lower
CW15	1536259	485961	134.6	5.0	1/28/2006	99.22	6452.10	2.6	6551.32	50	6499	A -	---
										91	6458	M 73-133	Middle
										311	6238	L -	---
CW16	1534747	488507	---	5.0	2/26/1996	68.02	6490.52	0.0	6558.54	82	6477	M 112-152	Middle
										82	6477	A -	---
CW18	1535924	491378	230.7	5.0	2/27/2006	54.15	6518.50	1.5	6572.65	90	6481	A -	---
										190	6381	U 177-232	Upper
										340	6231	M -	---
CW26	1534116	489593	300.0	5.0	1/22/2006	103.80	6457.63	0.5	6561.43	50	6511	A -	---
										50	6511	M -	---
										231	6330	L 245-285	Lower
CW27	1534109	489600	110.0	5.0	1/22/2006	74.98	6487.90	1.9	6562.88	50	6511	A -	---
										50	6511	M 80-110	Middle
CW28	1535112	491008	370.0	5.0	2/27/2006	100.44	6471.24	1.9	6571.68	90	6480	A -	---
										110	6460	U -	---
										294	6276	M 280-360	Middle
CW29	1534551	487435	290.0	5.0	2/18/2006	92.50	6459.72	1.7	6552.22	52	6499	A -	---
										52	6499	M -	---
										228	6323	L 230-270	Lower
CW30	1536642	488704	251.5	5.0	2/14/2004	8.00	6550.31	2.0	6558.31	35	6521	A -	---
										220	6336	M 219-249	Middle

TABLE 5.1-4. WELL DATA FOR THE CHINLE REGIONAL WELLS.

(cont'd.)

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)						
CW31	1540689	482738	311.0	6.0	.1/14/2006	86.51	6473.75	2.0	6560.26	111	6447	A -	---
										254	6304	L 291-311	---
										254	6304	L 231-271	---
										254	6304	L 136-156	Lower
CW36	1540053	481329	180.0	5.0	.2/20/2006	77.85	6473.24	2.8	6551.09	96	6452	A -	---
										152	6396	L 155-177	Lower
CW37	1537240	484853	150.1	5.0	.1/28/2006	64.34	6486.83	1.3	6551.17	55	6495	A -	---
										100	6450	L 100-150	Lower
CW38	1540103	483429	174.8	5.0	.1/14/1997	55.18	6500.42	2.1	6555.60	108	6446	A -	---
										130	6424	L 133-173	Lower
CW39	1537260	483754	126.3	5.0	.1/28/2006	66.83	6483.88	3.4	6550.71	40	6507	A -	---
										87	6460	L 90-123	Lower
CW40	1537624	491819	264.0	5.0	.2/12/2006	90.86	6488.08	2.6	6578.94	75	6501	A -	---
										220	6356	U 224-264	Upper
CW41	1533174	488584	206.0	6.0	.2/18/2006	97.40	6458.01	1.5	6555.41	59	6495	A -	---
										138	6416	L 146-206	Lower
CW42	1533169	487177	205.0	6.0	.2/18/2006	86.00	6462.78	0.0	6548.78	98	6451	A -	---
										124	6425	L 125-205	Lower
CW43	1537587	482493	104.1	5.0	.1/14/2006	70.62	6478.17	2.0	6548.79	57	6490	A -	---
										57	6490	L 81-101	Lower

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

E = Estimated Depth

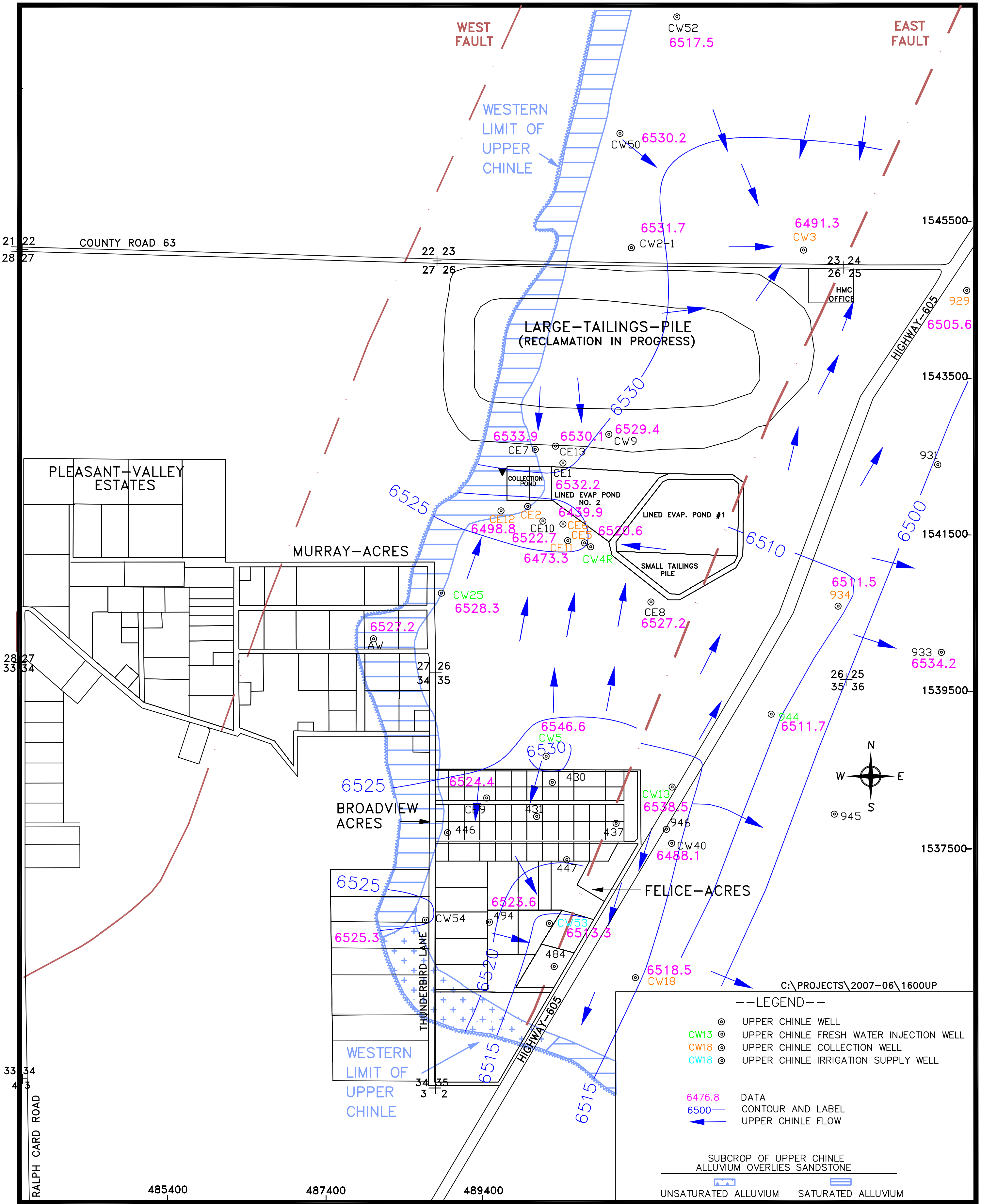
5.2 UPPER CHINLE WATER LEVELS

Measured water levels in Homestake's Upper, Middle and Lower Chinle aquifer wells are presented in Appendix A. Table A.2-1 of Appendix A includes water levels for Homestake, subdivision, and regional Chinle wells. Figure 5.2-1 presents water-level elevation contours of the Upper Chinle aquifer during the Fall of 2006. The blue arrows on Figure 5.2-1 show the direction of ground-water flow, which is greatly influenced by the fresh-water injection into the Upper Chinle at wells CW4R, CW5, CW13, CW25 and 944 and collection from wells CE2, CE5, CE6, CE11, CE12, CW3, CW18, 929 and 934. Well CW13, an injection well on the east side of the East Fault, is in the high permeability zone of the Upper Chinle aquifer that parallels the East Fault. This high permeability zone extends to a distance of at least 1000 feet perpendicular to the East Fault near well CW18. Injection of fresh water has created piezometric-surface mounds along the east side of the East Fault and a depression in the piezometric surface near collection well 929. Wells 934 and CW18 were not being pumped when these water levels were collected. The permeability is much smaller at greater distances to the east of the East Fault and, therefore, an easterly gradient occurs in the Upper Chinle away from the East Fault near injection well CW13. The CW13 injection affects water levels on the west side of the East Fault in the area of new Upper Chinle well CW53. Water level changes in well CW53 respond quickly to change in levels in well CW13 showing that a good connection exists in the Upper Chinle where the East Fault pinches out south of well CW53.

Injection of fresh water into Upper Chinle well CW5 is causing ground water flow to the north and south of this area. The flow that moves to the south discharges to the alluvial aquifer in the subcrop area of the Upper Chinle, and the flow that moves to the north converges toward collection wells CE2, CE5, CE6, CE11, CE12 or CW3. Injection into Upper Chinle well CW25 was started in 2000, and this injection is causing ground water to flow from this well back toward collection well CE2. The naturally occurring flow direction in the Upper Chinle aquifer west of the East Fault is from the north. The collection of water from well CW3 intercepts this flow and also pulls some Upper Chinle water from the south.

Figure 5.2-2 shows the location of the Upper Chinle wells that are used to monitor water-level changes with time. Figure 5.2-3 presents water-level elevations for Upper Chinle wells 494, CE2, CW3, CE5, CW5, CW25 and CW50. Water levels in the Upper Chinle injection wells CW5 and CW25 remained high during most of 2006. The changes in water levels from collection well CE2 are due to an increase in pumping rate in this well and collection from wells CE5, CE6, CE11 and CE12 late in the year. Water levels in well 494 declined in 2006 from the nearby pumping.

Figure 5.2-4 presents the water-level elevation changes for the Upper Chinle wells east of the East Fault. The large water-level variations in wells 929, 934 and CW18 were due to less pumping from these wells in 2006.

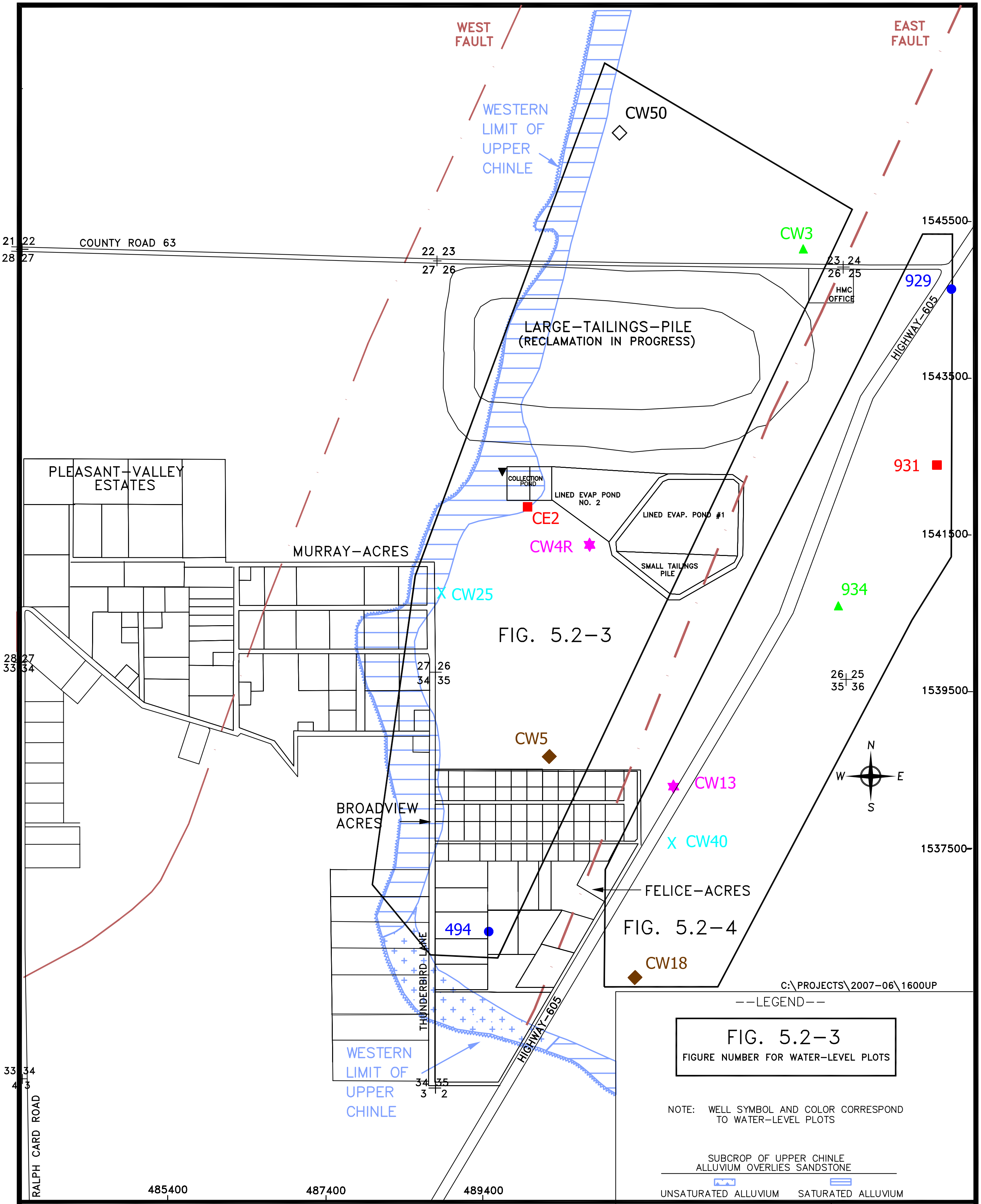


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

FIGURE 5.2–1. WATER–LEVEL ELEVATIONS OF THE UPPER CHINLE AQUIFER, FALL 2006, FT–MSL

DATE: 03/08/07

SCALE: 1”=1600’



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.2-2. LOCATION OF UPPER CHINLE WELLS WITH WATER-LEVEL PLOTS

DATE: 03/08/07

SCALE: 1"=1600'

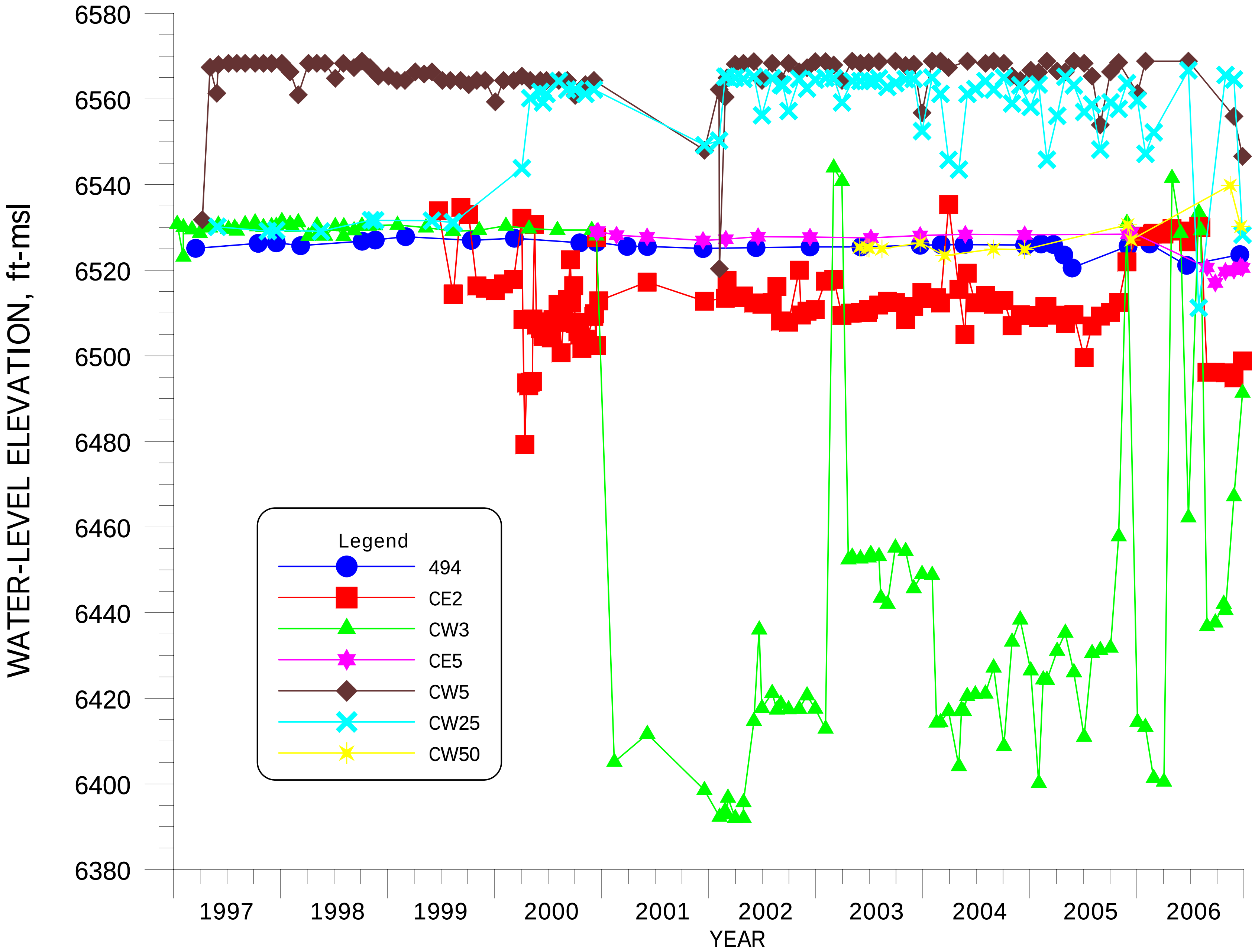


FIGURE 5.2-3. WATER-LEVEL ELEVATION FOR WELLS 494, CE2, CW3, CE5, CW5, CW25, CW50.

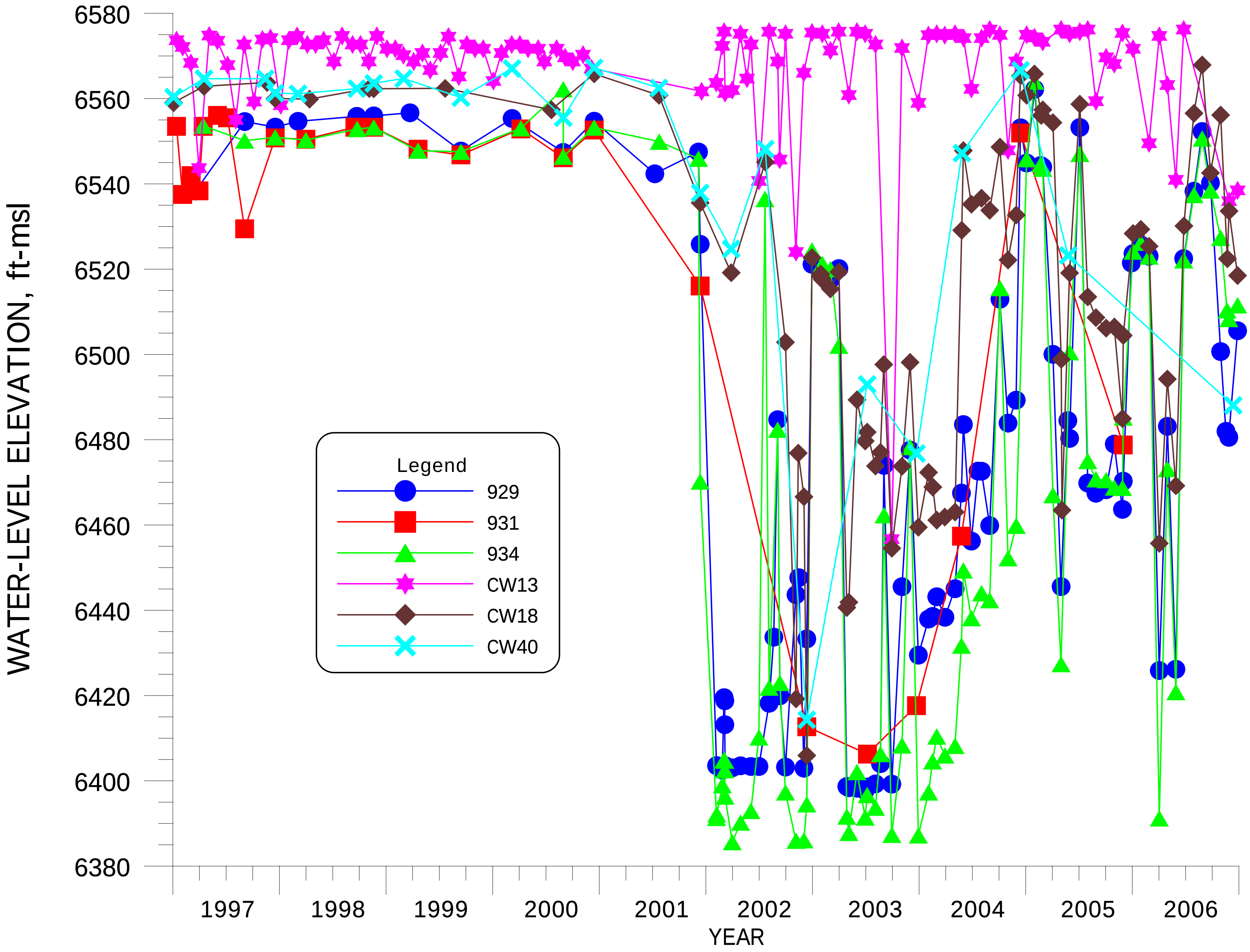


FIGURE 5.2-4. WATER-LEVEL ELEVATION FOR WELLS 929, 931, 934, CW13, CW18 AND CW40

5.3 UPPER CHINLE WATER QUALITY

Water-quality data for 2006 for the Chinle aquifers is presented in Tables B.5-1 and B.5-2 of Appendix B. The basic well data is presented in Tables 5.1-1 through 5.1-4 and Figure 5.1-2 shows locations of the Upper Chinle wells.

Concentrations of key constituents exceed site standards for the Upper Chinle aquifer in only a few locations. Sulfate concentrations have been adequately restored in the Upper Chinle aquifer except for two areas near the Large Tailings Pile. Selenium concentrations during 2006 are less than the NRC site standard in all Upper Chinle wells except wells CE7, CE10, CE12, CE13 and CW3. Uranium concentrations exceed the site standard in ten wells. The slower pace of restoration is attributed to leaching of this constituent from the formation. Molybdenum concentrations in the Upper Chinle aquifer exceed the background level in ten wells near the tailings.

5.3.1 SULFATE - UPPER CHINLE

Figure 5.3-1 presents sulfate concentrations in the Upper Chinle aquifer during 2006. Upper Chinle sulfate concentrations varied from 301 to 6820 mg/l. Only the values from wells CE7, CE13 and CW3 exceeded the site standards for the mixing zone of 1750 mg/l and non-mixing zone of 914 mg/l in the Upper Chinle in 2006 (see Section 3 or the well grouping on Figure 5.3-2 for zone areas). NRC Upper Chinle standards based on background data are presented for sulfate in the legend of Figure 5.3-1. These site standards have a greater than sign in front of the numeric value which is associated with the pattern for the particular zone. Therefore, only a small area near well CW3 requires restoration with respect to sulfate in the non-mixing zone. An area in the western portion of the Large Tailings to the north side of the collection ponds requires restoration in the mixing zone. The information regarding the analysis of background results that were used to develop the background and related NRC standards is presented in Section 3 of this report.

The locations of wells used in the time plots of water quality are presented on Figure 5.3-2. The color and symbol of the individual wells correspond with those used on the various water-quality time plots. Sulfate time-plot figure numbers are also shown on Figure 5.3-2 for each group. The same color and symbol scheme is also used for other constituents in the Upper

Chinle. Notations on Figure 5.3-2 indicate that mixing zone Upper Chinle wells 494, CE2, CE5, CW50 and CW53 are grouped together on the water-quality time plots, and non-mixing zone wells 929, 933, CW3, CW18 and CW40 are grouped together on a second plot.

Figure 5.3-3 presents sulfate concentrations versus time for the mixing zone group of wells listed above. The sulfate concentrations in water sampled from each of these wells are less than the mixing-zone site standard, indicating that restoration of the Upper Chinle is not needed west of the East Fault in the mixing zone (see Figure 5.3-3). Sulfate concentrations in well CE2, near the subcrop area south of the Large Tailings Pile, have declined to a level below those in the remainder of the Upper Chinle wells. A small increase in sulfate concentration in well CE5 was observed in 2006.

A plot of sulfate concentrations versus time for non-mixing zone Upper Chinle wells 929, 933, CW3, CW18 and CW40 is presented on Figure 5.3-4 (see Figure 5.3-2 for location of these wells). This plot shows some minor variability, but overall steady sulfate concentrations in these Upper Chinle wells in 2006. A slightly higher sulfate concentration in 2006 was observed in well CW3 after larger increases in 2002 and 2003 due to the continued pumping of this well that is pulling sulfate concentrations from the Upper Chinle aquifer in the western portion of the Large Tailings Pile. An increase in sulfate concentration was observed in well 933 in 2006 to approximately the fresh water injection value. Well 933 is east of the high permeability zone east of the East Fault where concentrations naturally increase in this slow moving water.

5.3.2 TOTAL DISSOLVED SOLIDS - UPPER CHINLE

Figure 5.3-5 presents contours of total dissolved solids (TDS) concentrations for the Upper Chinle aquifer during 2006. All concentrations are less than 2000 mg/l, with the exception of areas of the Upper Chinle near the Large Tailings Pile, near well CW54 west of Felice Acres and east of State Highway 605 in Sections 35 and 36. The TDS concentration naturally increases with increasing distance east of the East Fault due to the slower movement of ground water in this less transmissive portion of the aquifer. The blue dashed pattern on Figure 5.3-5 shows where the Upper Chinle TDS concentrations are greater than 2010 mg/l, which is the non-mixing zone site standard. The sulfate concentrations exceed the mixing zone standard of 3140 mg/l near the Large Tailings in wells CE7 and CE13. The Upper Chinle aquifer near the Large Tailings Pile still requires restoration with respect to TDS concentration.

Figure 5.3-6 presents TDS concentrations for mixing zone Upper Chinle wells 494, CE2, CE5, CW50 and CW53. The TDS concentrations in well CE2 have continued to decline in 2006 but increased some in the second half of the year. All of these wells contain water with TDS concentrations less than the mixing zone standard of 3140 mg/l.

Time plots of TDS concentrations for wells 929, 933, CW3, CW18 and CW40 are presented in Figure 5.3-7. This figure shows overall steady TDS concentrations in wells 929, 933, CW18 and CW40 for 2006 while the TDS increased in well 933. Well 933 is in this lower permeability zone of the Upper Chinle east of the East Fault and therefore naturally has higher TDS water. Steady TDS concentrations in well CW3 were observed in 2005 and 2006 after increasing for four years.

5.3.3 CHLORIDE – UPPER CHINLE

Chloride concentrations in the Upper Chinle aquifer during 2006 are presented on Figure 5.3-8. In the two up-gradient Upper Chinle wells CW50 and CW52, chloride concentrations are less than 100 mg/l. Typical measured chloride concentrations are between 100 and 220 mg/l in the Upper Chinle aquifer, because this range encompasses natural variations and the range of chloride concentrations in the injection water. Concentrations near the subcrop located under the western portion of the Large Tailings exceed 250 mg/l and require restoration in this area. Chloride concentrations east of the East Fault naturally increase due to the slower movement of ground water with increasing distance east of the East Fault.

The chloride concentrations in water collected from mixing zone Upper Chinle wells 494, CE2, CE5, CW50 and CW53 are presented on Figure 5.3-9. In Upper Chinle well CE2 chloride concentrations have been decreasing the last few years but increased in the second half of 2006. Overall, the chloride concentrations in wells 494, CE5, CW50 and CW53 have not changed significantly except for an increase in values in CE5 and CW53 in 2006.

The chloride concentrations in the wells in the non-mixing zone are presented on Figure 5.3-10. This plot shows variable chloride concentrations but overall steady levels in the last four years in well 929 due to the fresh-water injection into Upper Chinle well CW13. An increase in concentrations in well CW3 has been observed due to the continual pumping of this

Upper Chinle well but the 2005 and 2006 values were steady. The chloride concentrations in Upper Chinle wells CW18 and CW40 were steady and are similar to the fresh-water injection concentration. Fresh water is injected into well CW13 to maintain water levels east of the East Fault in the Upper Chinle aquifer. The higher level in well 933 is due to this well being located far east of the East Fault.

5.3.4 URANIUM - UPPER CHINLE

Uranium is an important parameter for identifying impacts to the Upper Chinle aquifer. Figure 5.3-11 presents contours of uranium concentrations in the Upper Chinle aquifer for 2006. Ten of the uranium concentrations measured in Upper Chinle water in 2006 exceeded the corresponding mixing or non-mixing zone site standards. These concentrations are expected to gradually decrease to below background concentrations with the ongoing ground water-quality restoration efforts in the Large Tailings Pile area and the planned Upper Chinle pumping in Felice Acres. The highest value measured east of the East Fault in 2006 was observed in well 934 with a value of 0.07 mg/l. This value is below the corresponding non-mixing zone standard of 0.09 mg/l.

Plots of uranium concentrations versus time for Upper Chinle wells 494, CE2, CE5, CW50 and CW53 are presented on Figure 5.3-12 (see Figure 5.3-2 for location of these wells). This plot demonstrates that the uranium concentrations in Upper Chinle well CW53 decreased in 2006. Uranium concentrations in well 494 gradually declined in 2006. The uranium concentrations in Upper Chinle collection well CE2 overall declined in 2006. Uranium concentrations for background well CW50 (drilled in 2003) are low and the concentration in well CW53 significantly decreased.

The uranium concentrations in all of the Upper Chinle wells in the non-mixing zone are very low except for a larger value measured in well CW3. The increase in uranium concentration at well CW3 is due to the pumping of this well to supply water for flushing the tailings. Figure 5.3-13 shows uranium concentration plotted versus time for Upper Chinle wells 929, 933, CW3, CW18 and CW40. With the exception of well CW3, concentrations in these wells are less than the NRC site standard.

5.3.5 SELENIUM - UPPER CHINLE

Contours of 2006 selenium concentrations in the Upper Chinle aquifer are presented on Figure 5.3-14. This figure shows that the selenium concentrations are less than the mixing-zone site standard of 0.14 mg/l with the exception of wells CE7, CE10, CE12 and CE13. The non-mixing zone NRC site standard of 0.06 mg/l is slightly exceeded at well CW3 and in the Upper Chinle aquifer in the area near the northeast corner of the Large Tailings Pile.

Figure 5.3-15 presents selenium concentrations for wells 494, CE2, CE5, CW50 and CW53. The selenium concentration in collection well CE2 stabilized at a low value in 2002 through 2006 following a prior steady decline. The selenium concentrations for all of the remaining wells on this plot are low.

Figure 5.3-16 presents the selenium concentrations for Upper Chinle wells 929, 933, CW3, CW18 and CW40. This plot shows that selenium concentrations for these wells have remained low during 2006. The selenium concentration in water collected from Upper Chinle well CW3 was steady in 2006 and has remained reasonably steady since an increase in 2002. The previously observed decreases in selenium concentrations in wells CW40 and CW18 were due to the injection of fresh water in Upper Chinle well CW13 east of the East Fault; selenium concentrations remain low in these wells.

5.3.6 MOLYBDENUM - UPPER CHINLE

Figure 5.3-17 presents the molybdenum concentrations in the Upper Chinle aquifer during 2006. Molybdenum concentrations near and underlying the Large Tailings Pile exceeded both the mixing and non-mixing zone NRC site standards. Concentrations are greater than 1.0 mg/l in a region extending from the Upper Chinle-alluvium subcrop area, below the Large Tailings Pile, and toward well CW3. Additional restoration is needed in this area, and should be easily accomplished after the alluvial aquifer is restored in the subcrop area. All molybdenum concentrations south of the Small Tailings Pile and east of the East Fault in the Upper Chinle aquifer are below the site standards.

Figure 5.3-18 presents molybdenum concentrations for Upper Chinle wells from the mixing zone. In 2006, concentrations in wells 494, CW50 and CW53 were fairly similar to those observed in previous years. Concentrations increased slightly at wells CE2 and CE5 in 2005 and 2006.

Figure 5.3-19 contains time plots of molybdenum concentrations for wells 929, 934, CW3, CW18 and CW40. Small concentrations of molybdenum are generally present in each of these wells except for the larger values observed in well CW3. Molybdenum concentrations in well CW3 increased in 2006 while other parameters were fairly steady. The increases in the CW3 concentrations are due to the continuous pumping of this well.

5.3.7 NITRATE - UPPER CHINLE

Nitrate concentrations for the Upper Chinle aquifer were measured in 2006 to confirm that concentrations are significantly below the site standards of 15 mg/l for the mixing zone. Figure 5.3-20 presents nitrate concentrations in the Upper Chinle aquifer during 2006. The largest nitrate concentration observed in 2006 was 9.6 mg/l in well CE13. Therefore, all of the nitrate concentrations are significantly less than the site standard. Routine monitoring of nitrate concentrations in the Upper Chinle aquifer is not warranted because concentrations are well below levels of concern.

Plots of nitrate concentration versus time were not prepared, because historic values in Upper Chinle wells are similar to the low concentrations measured in 2006. In the future, nitrate concentrations in the Upper Chinle aquifer are not expected to be significant because of the very limited extent of elevated concentrations in the alluvial aquifer. Therefore, a nitrate site standard for the non-mixing zone for the Upper Chinle aquifer is not considered necessary.

5.3.8 RADIUM-226 AND RADIUM-228 - UPPER CHINLE

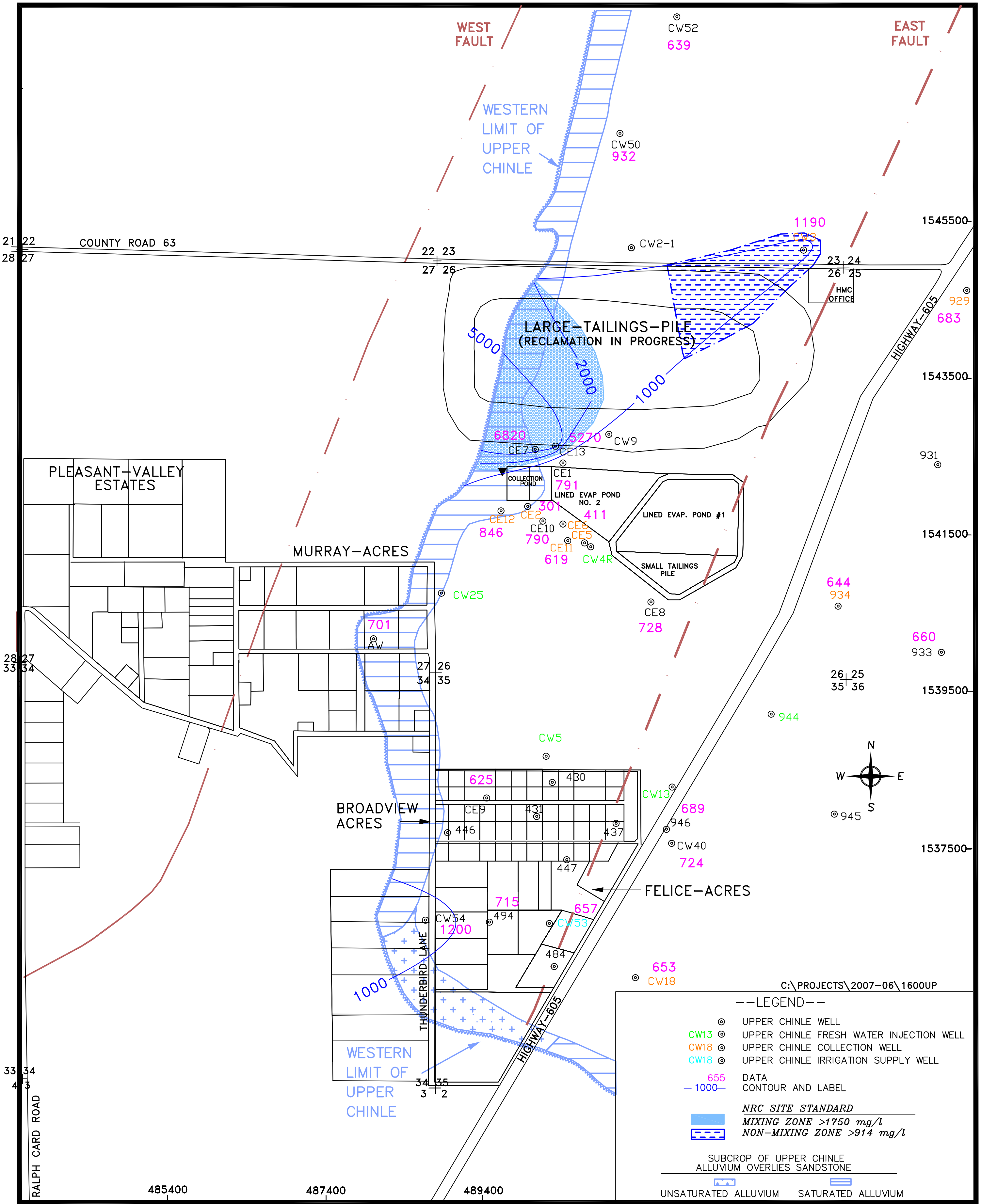
All radium concentrations in the Upper Chinle aquifer have been low in past years. Radium concentrations were analyzed for all Upper Chinle wells in 2003 to update the database. Figure 5.3-21 presents the radium-226 and the radium-228 concentrations measured in 2006. The largest radium-226 concentration measured in the Upper Chinle wells in 2006 was 1.5 pCi/l. All of the radium-228 values were less than the detection limit. This data shows that radium-226 and radium-228 are not present at concentrations that are significant in the Upper Chinle aquifer at the Homestake site. No concentration plots were prepared for radium because observed concentrations have been low and remained so through 2006. A radium site standard is not considered to be necessary for the Upper Chinle aquifer and has therefore not been established.

5.3.9 VANADIUM - UPPER CHINLE

Vanadium concentrations have always been low in the Upper Chinle aquifer except the recent values in well CW3 that have been only slightly elevated above detection limits. The occurrence of significant concentrations in the Upper Chinle aquifer is unlikely because this constituent is not present at elevated concentrations in the alluvial aquifer with the exception of the immediate tailings area. Vanadium concentrations in the Upper Chinle aquifer have been only slightly elevated in well CW3 due to the continuous pumping of this well. Figure 5.3-22 shows that all of the 2006 measured vanadium concentrations are less than 0.01 mg/l. Vanadium was not measured in well CW3 in 2006 but its level is likely above the site standard. A small amount of restoration is needed in the Large Tailings area for the Upper Chinle aquifer. A site standard was set for the Upper Chinle aquifer for vanadium because a small amount of restoration is needed close to the Large Tailings Pile.

5.3.10 THORIUM-230 - UPPER CHINLE

Thorium-230 concentrations have never been significant in the Upper Chinle aquifer. The values measured in 2006 are presented in Figure 5.3-23. This figure shows that all measured thorium-230 concentrations in 2006 were less than detection. None of the concentrations in the last few years exceed the mixing zone or non-mixing zone background values and, therefore, a site standard for thorium has not been set for the Upper Chinle aquifer. No plots of the thorium-230 concentration with time were developed due to the lack of any significant change in the low concentrations over the period of record. Thorium-230 levels do not warrant establishment of a site standard for this constituent.



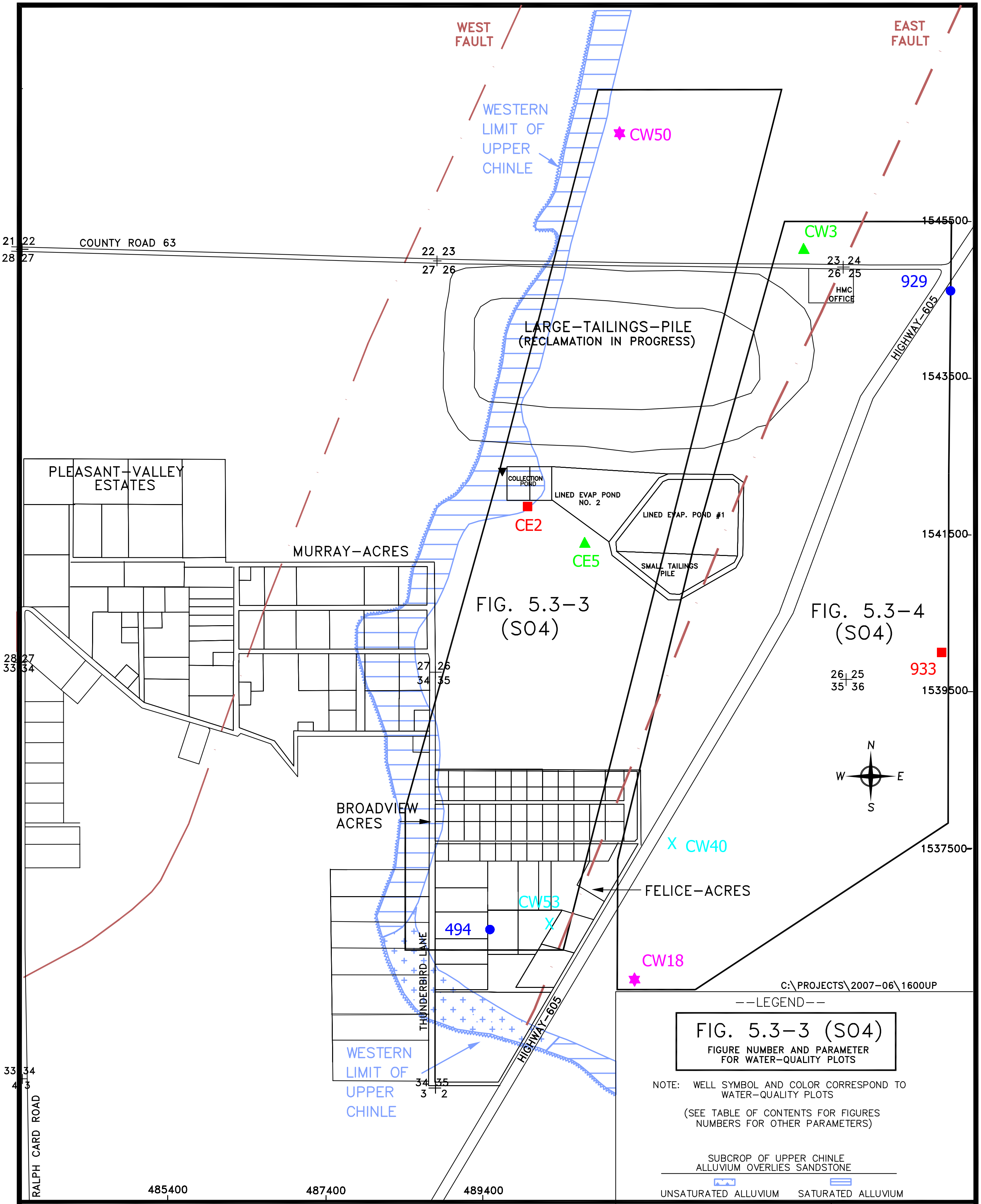
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

FIGURE 5.3–1. SULFATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, mg/l

DATE: 03/08/07

SCALE: 1"=1600'

PAGE: 5.3-8



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

FIGURE 5.3-2. LOCATION OF UPPER CHINLE WELLS WITH WATER-QUALITY PLOTS

SCALE: 1"=1600'

PAGE: 5.3-9

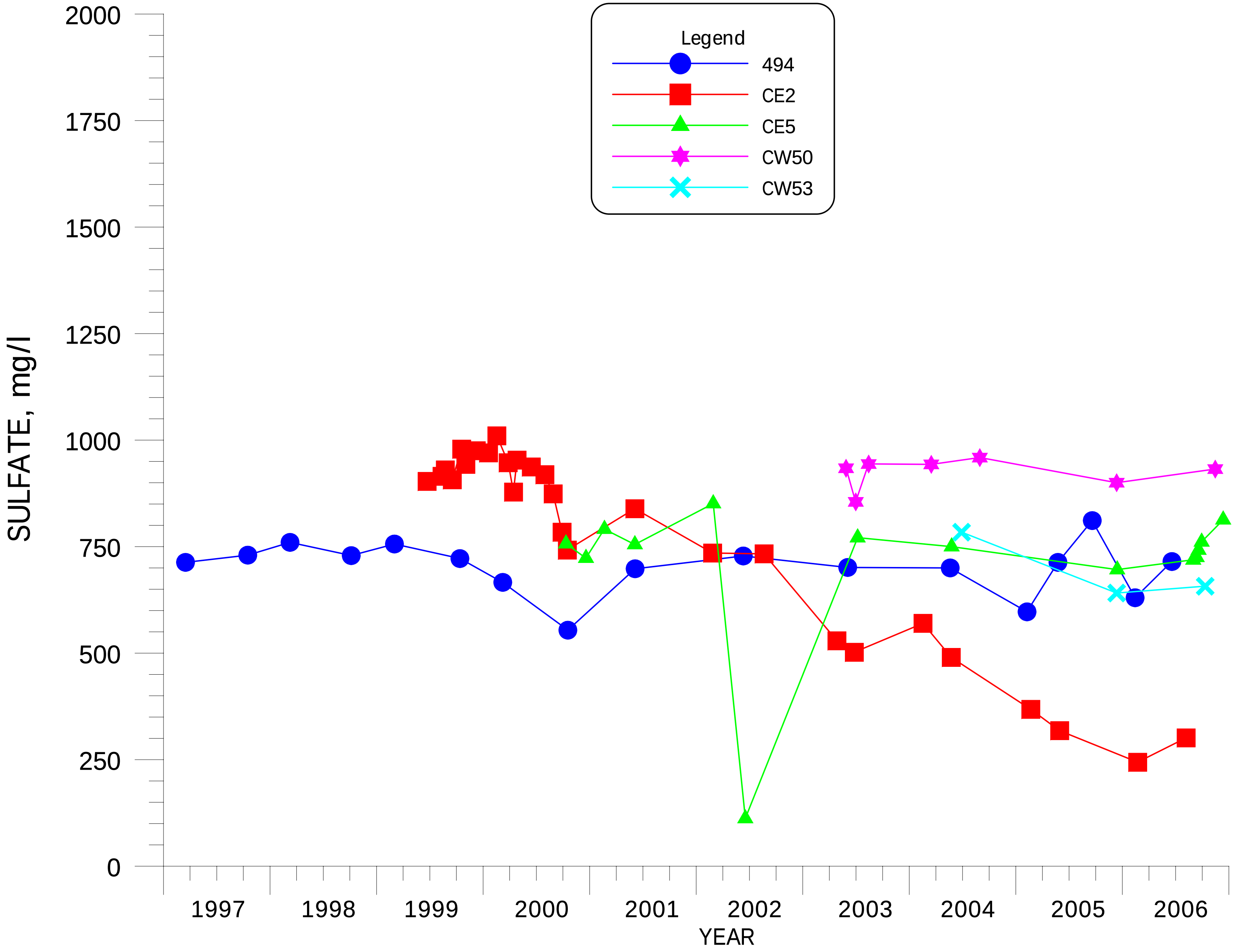


FIGURE 5.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CW50 AND CW53.

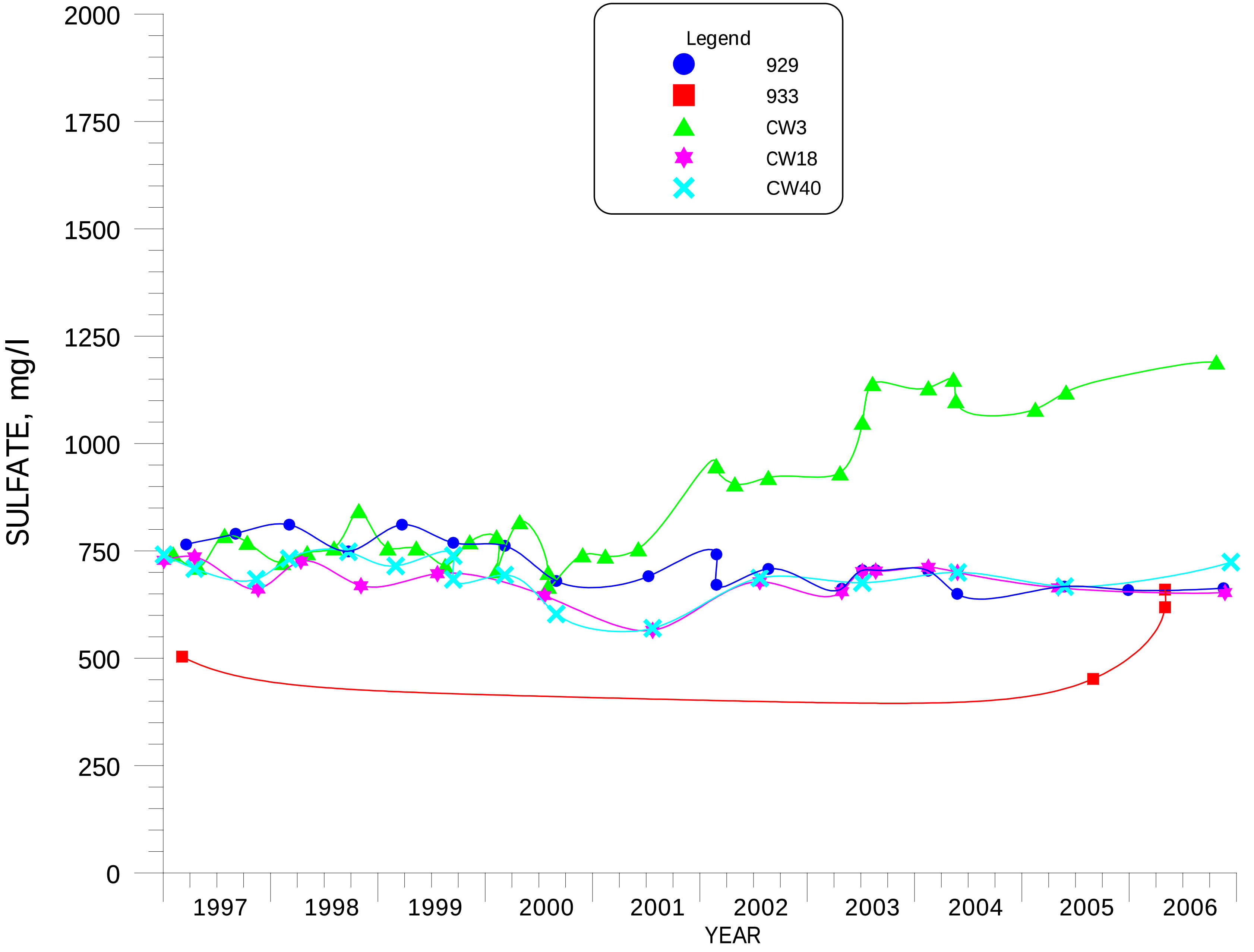
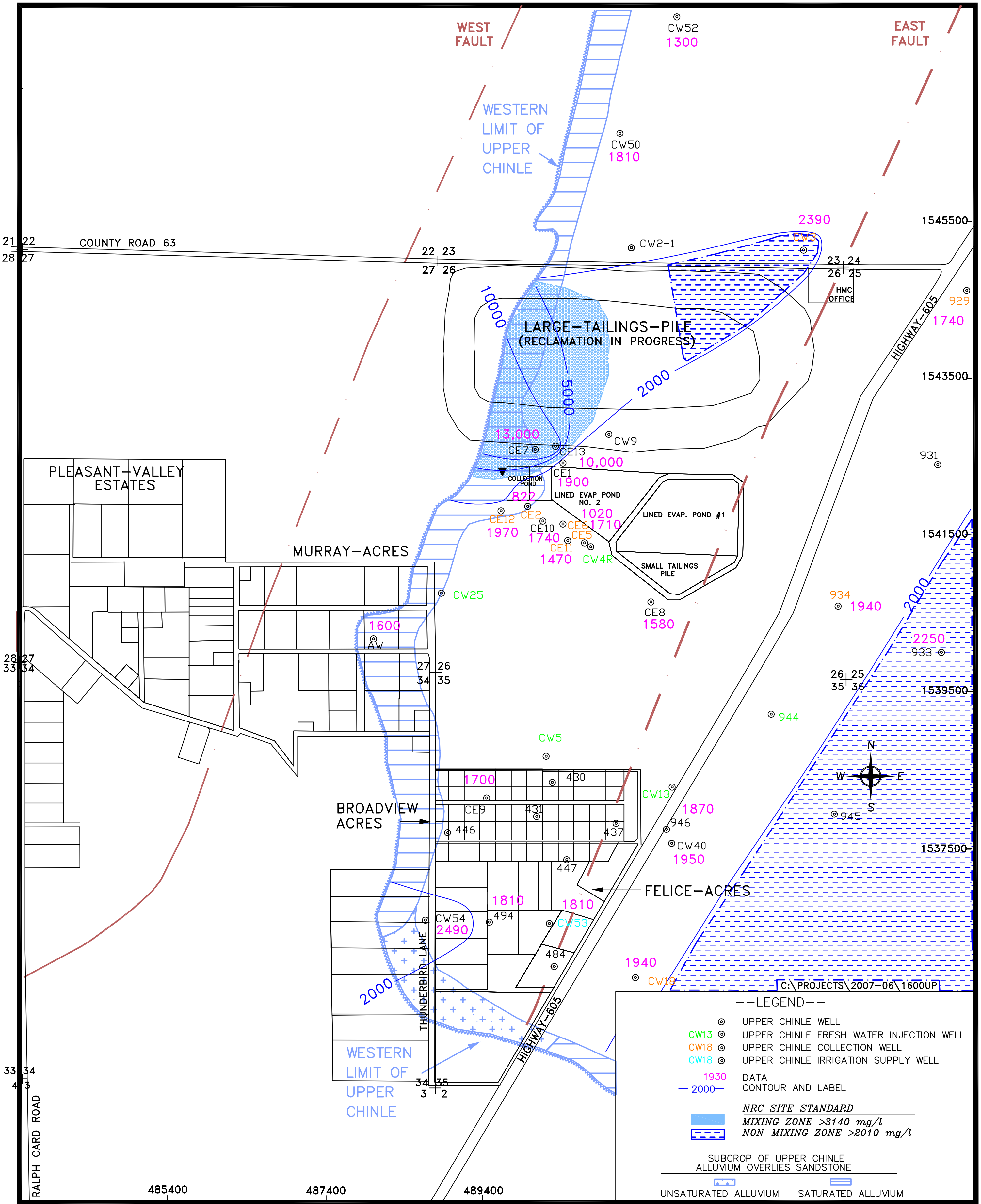


FIGURE 5.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 933, CW3, CW18 AND CW40.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

DATE: 03/08/07

FIGURE 5.3–5. TDS CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, mg/l

SCALE: 1"=1600'

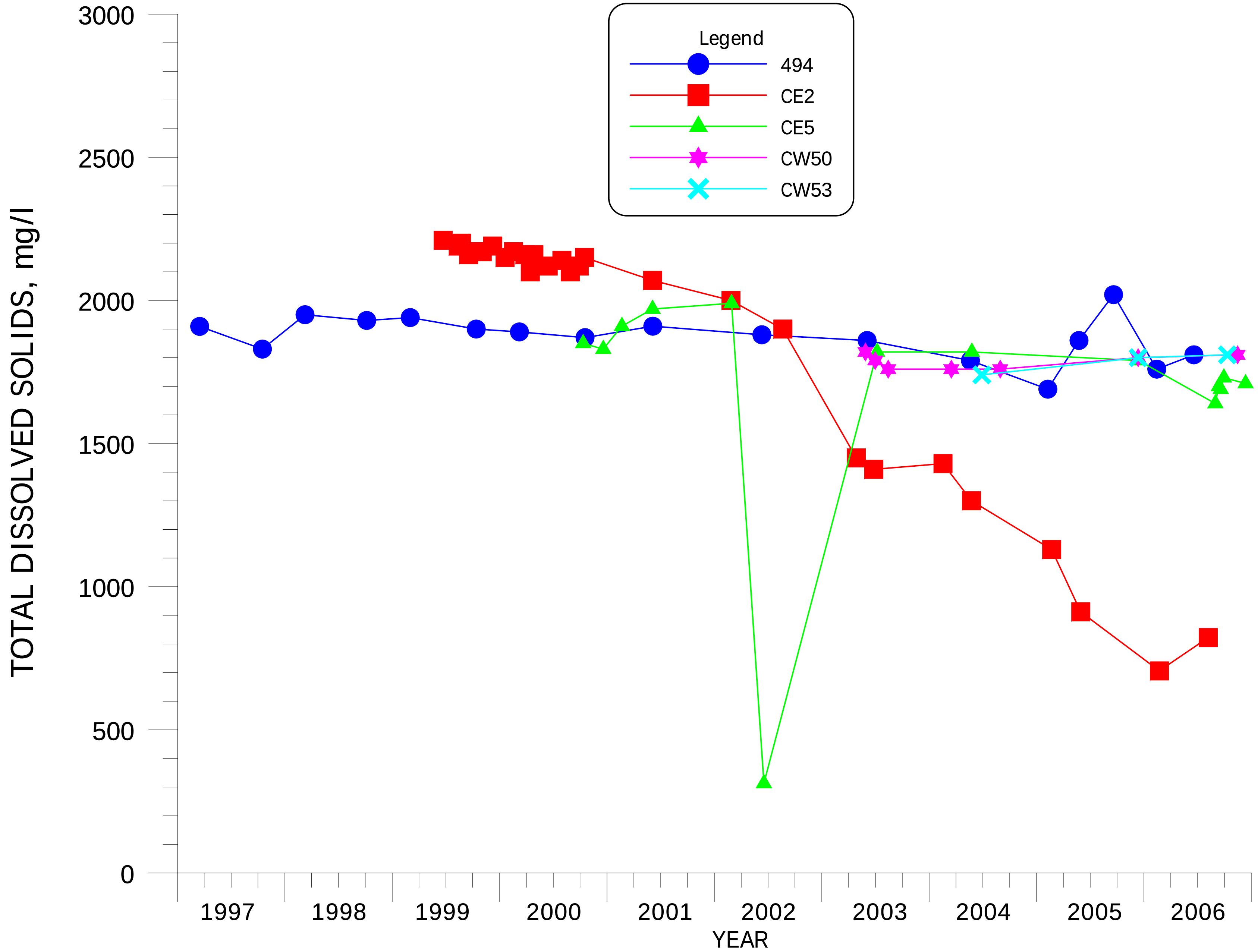


FIGURE 5.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CW50 AND CW53.

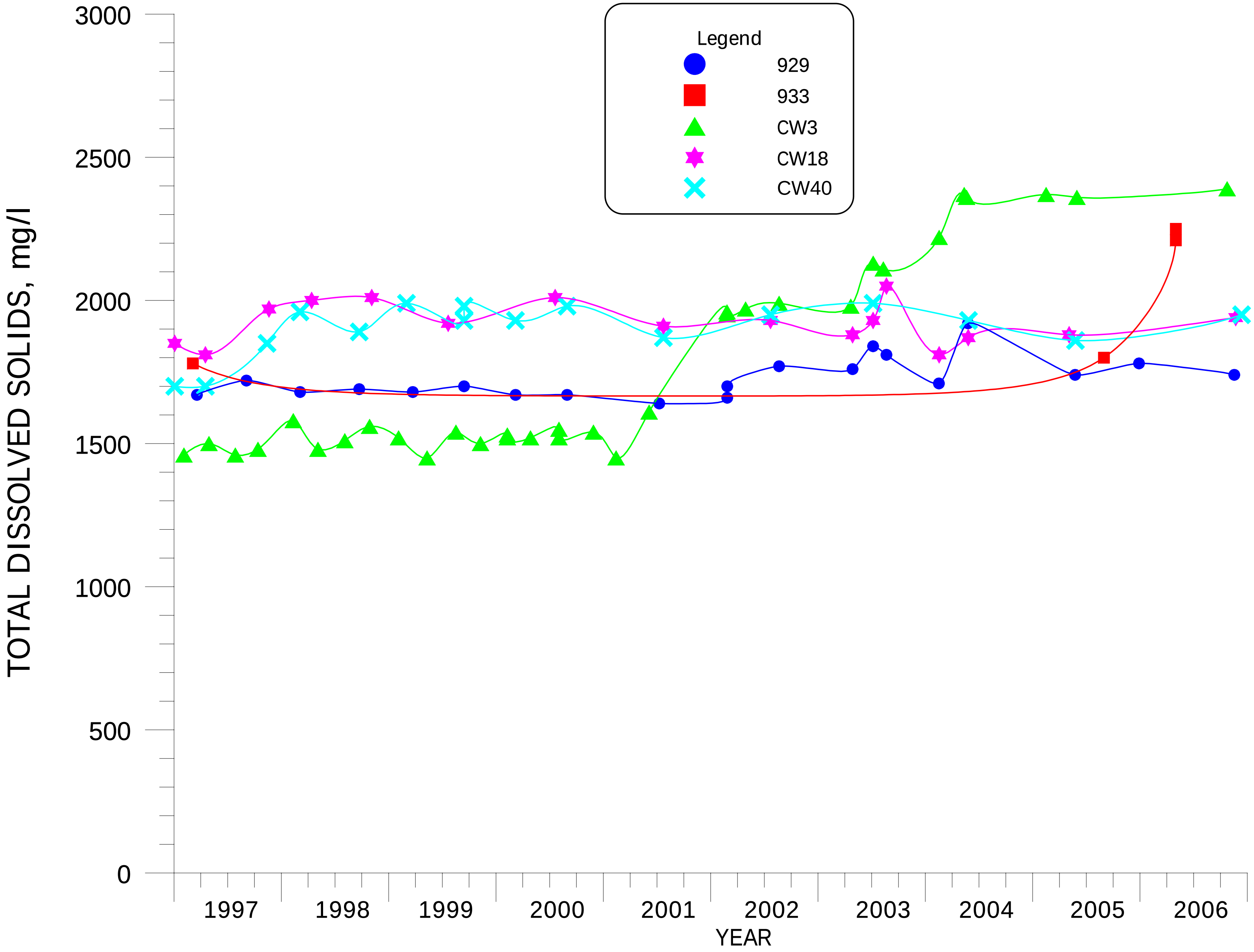
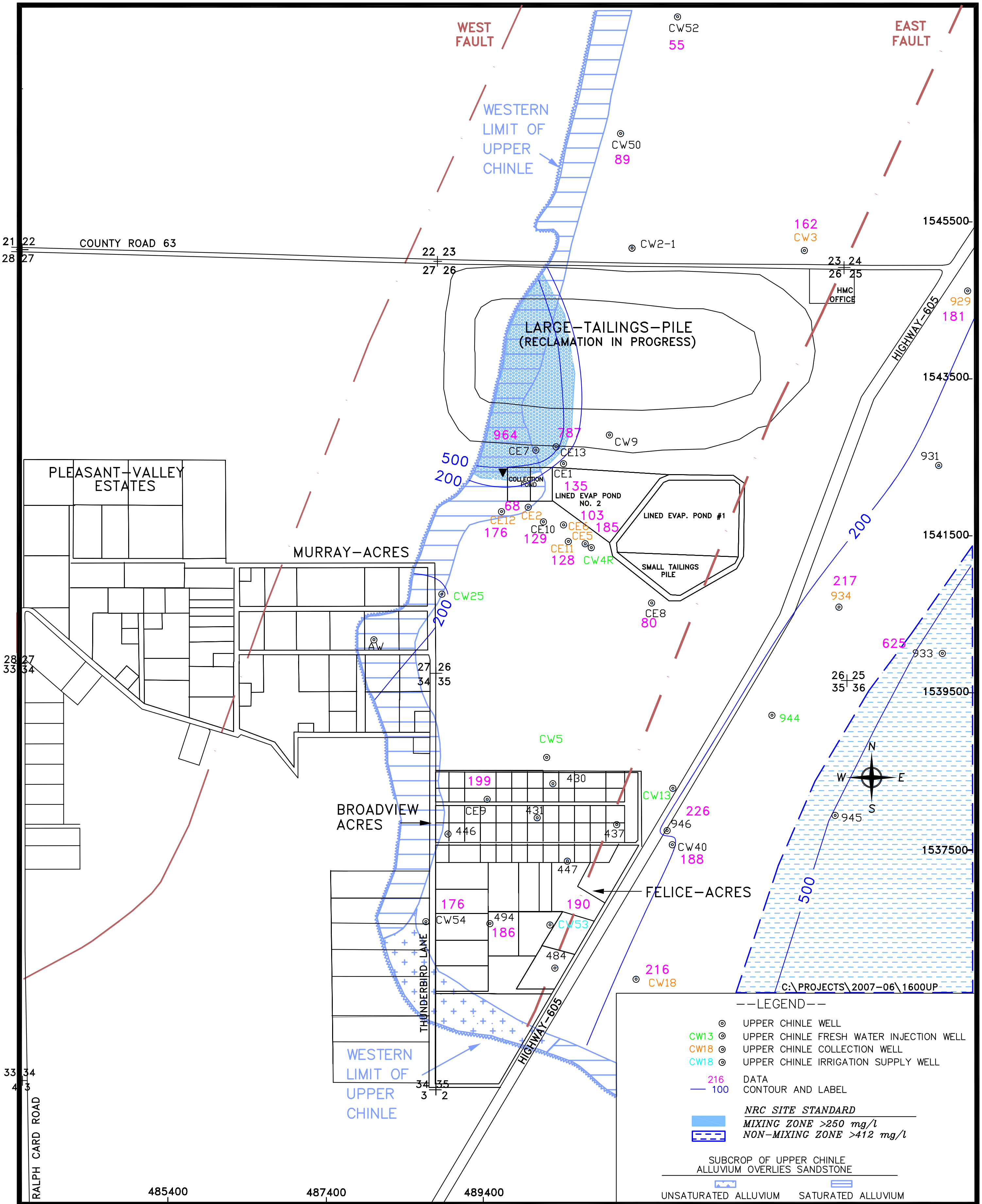


FIGURE 5.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 933, CW3, CW18 AND CW40.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 03/08/07
FIGURE 5.3-8. CHLORIDE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, mg/l	SCALE: 1"=1600'
	PAGE: 5.3-15

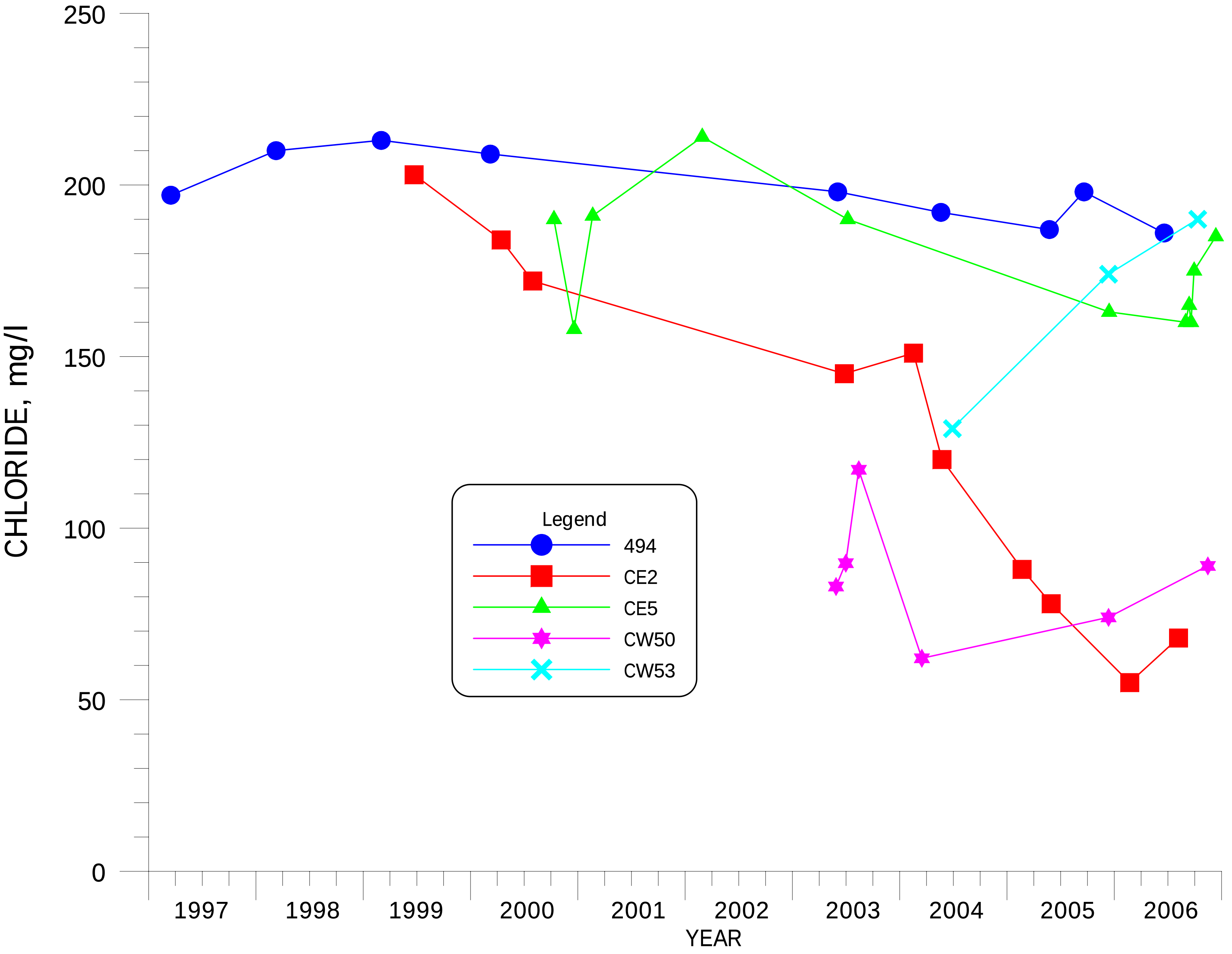


FIGURE 5.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CW50 AND CW53.

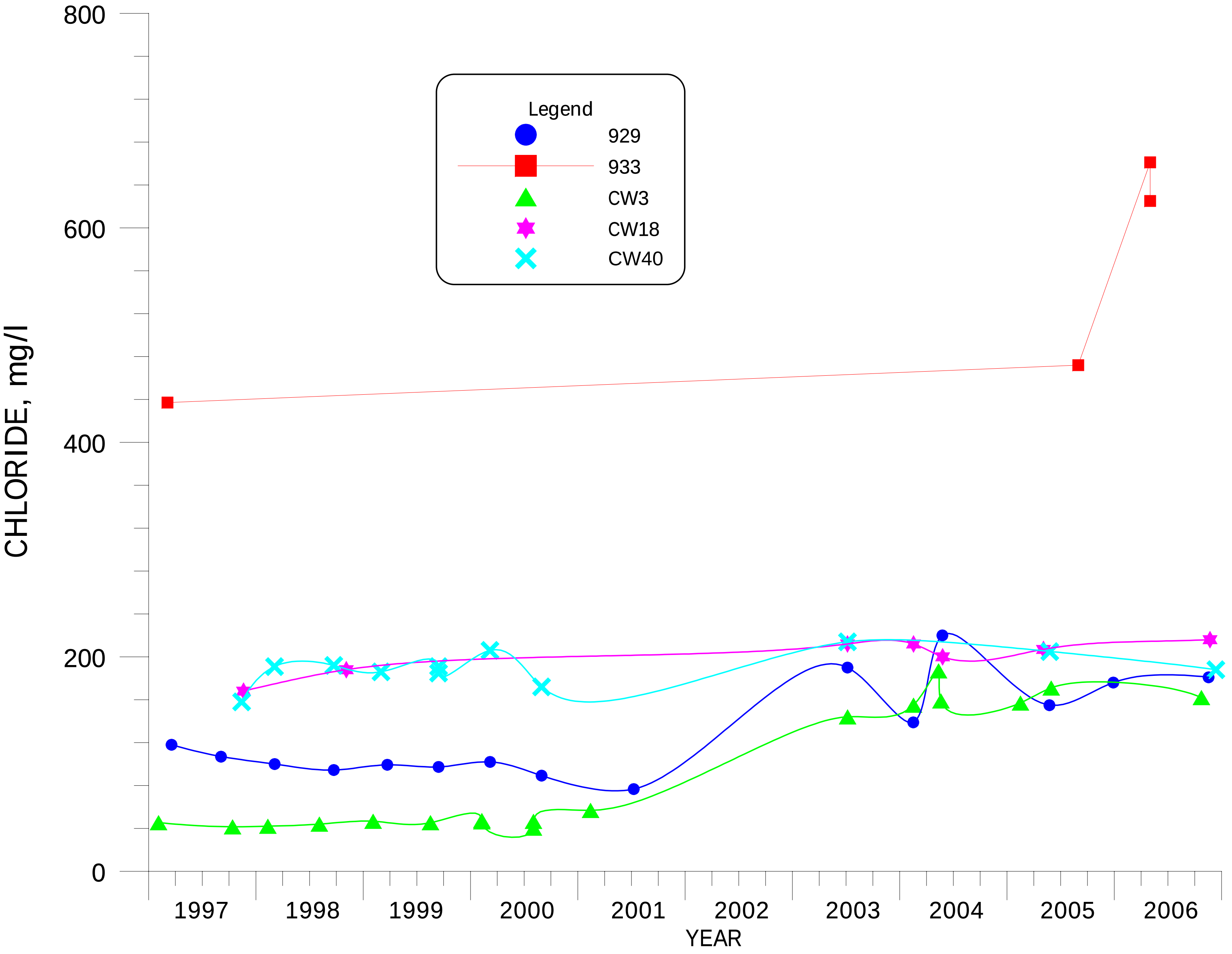
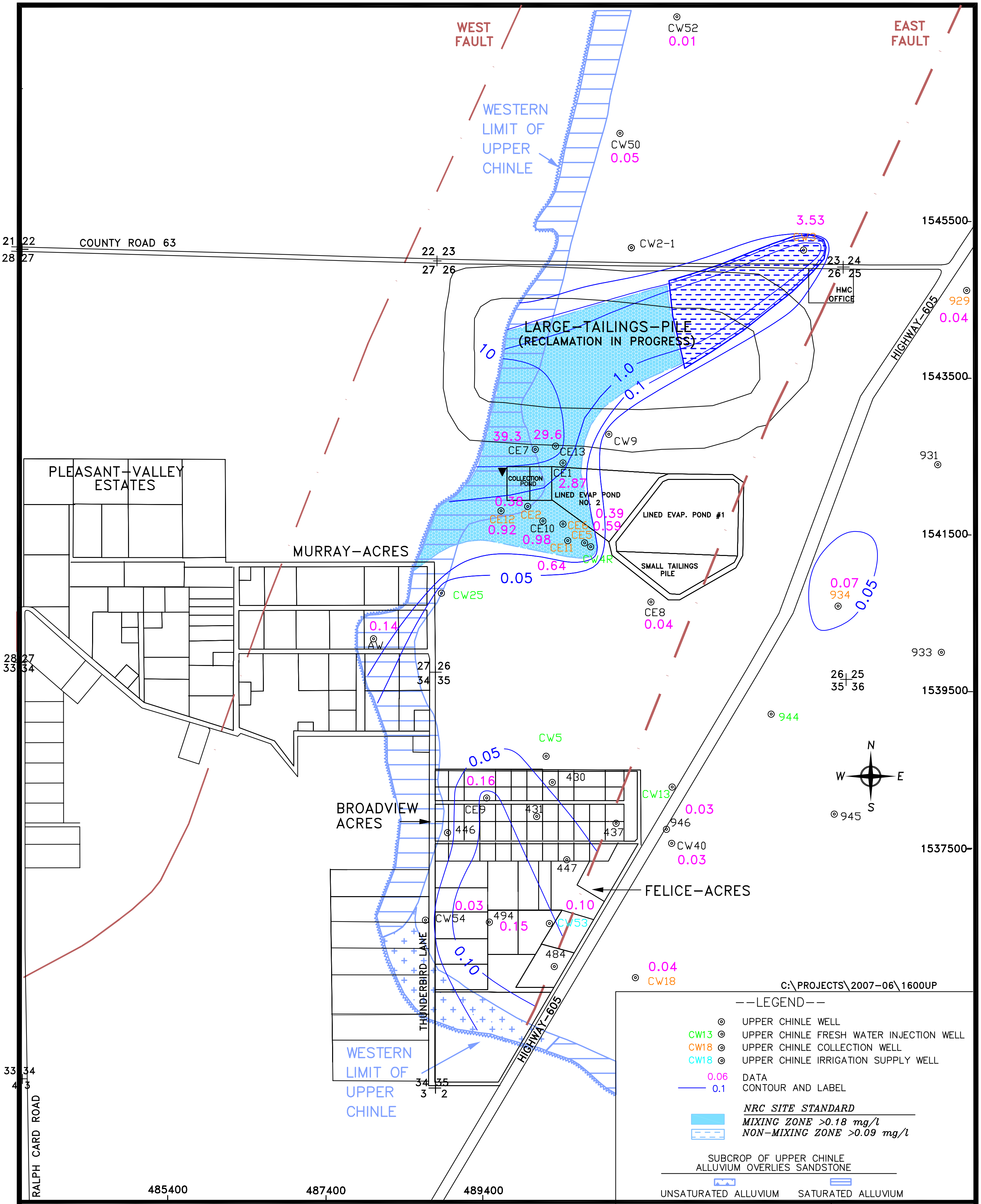


FIGURE 5.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 933, CW3, CW18 AND CW40.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

FIGURE 5.3-11. URANIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, mg/l

SCALE: 1"=1600'

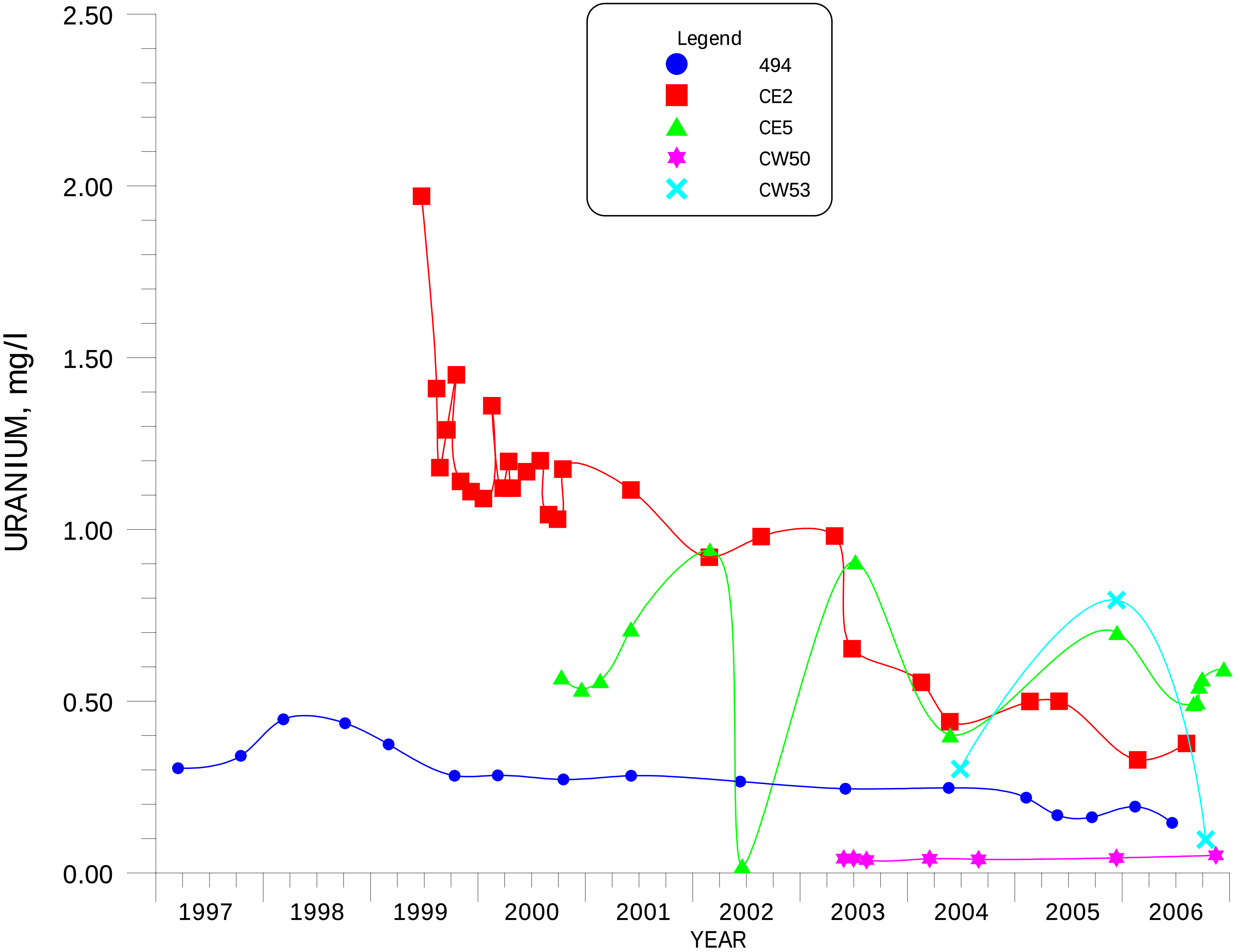


FIGURE 5.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CW50 AND CW53.

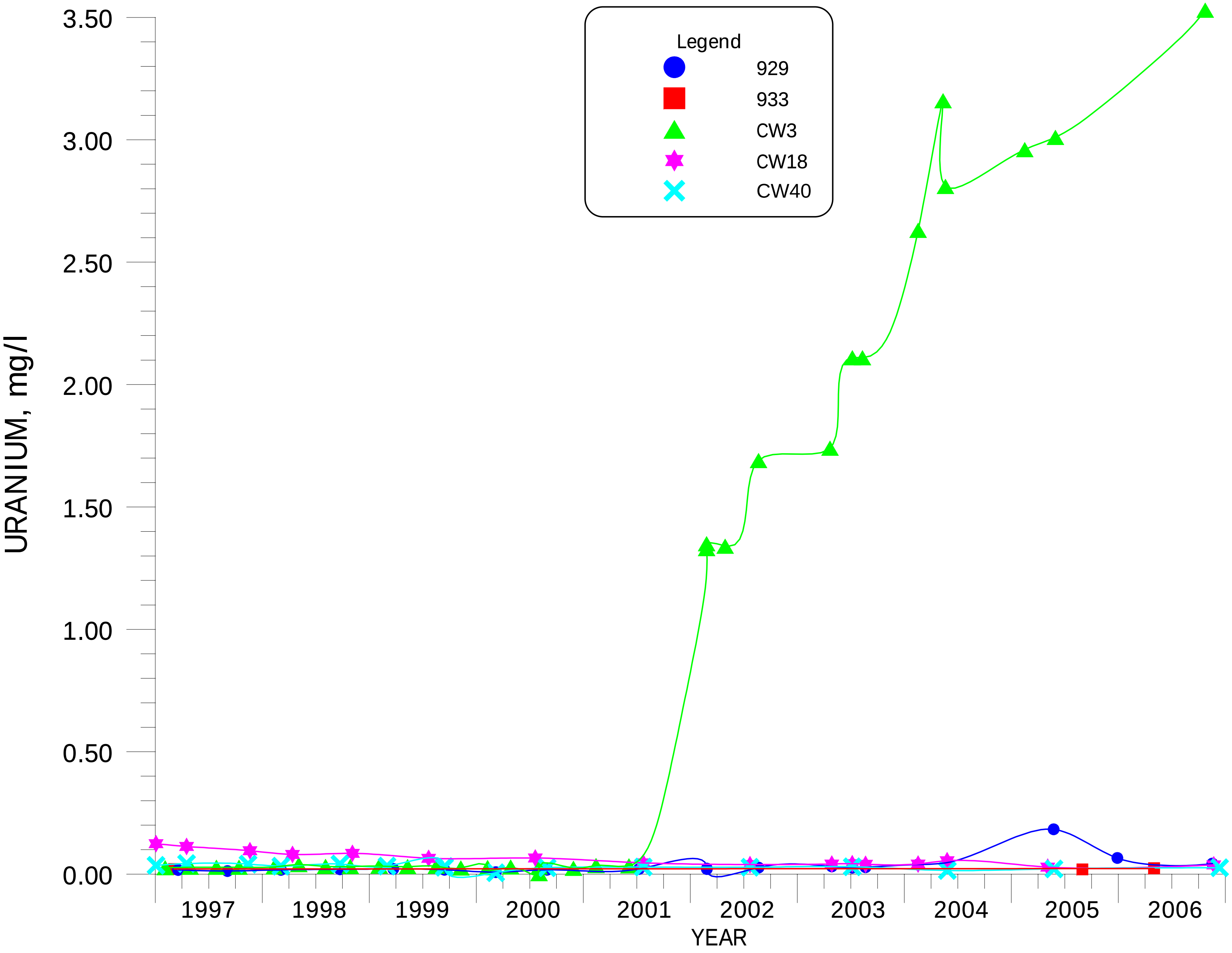
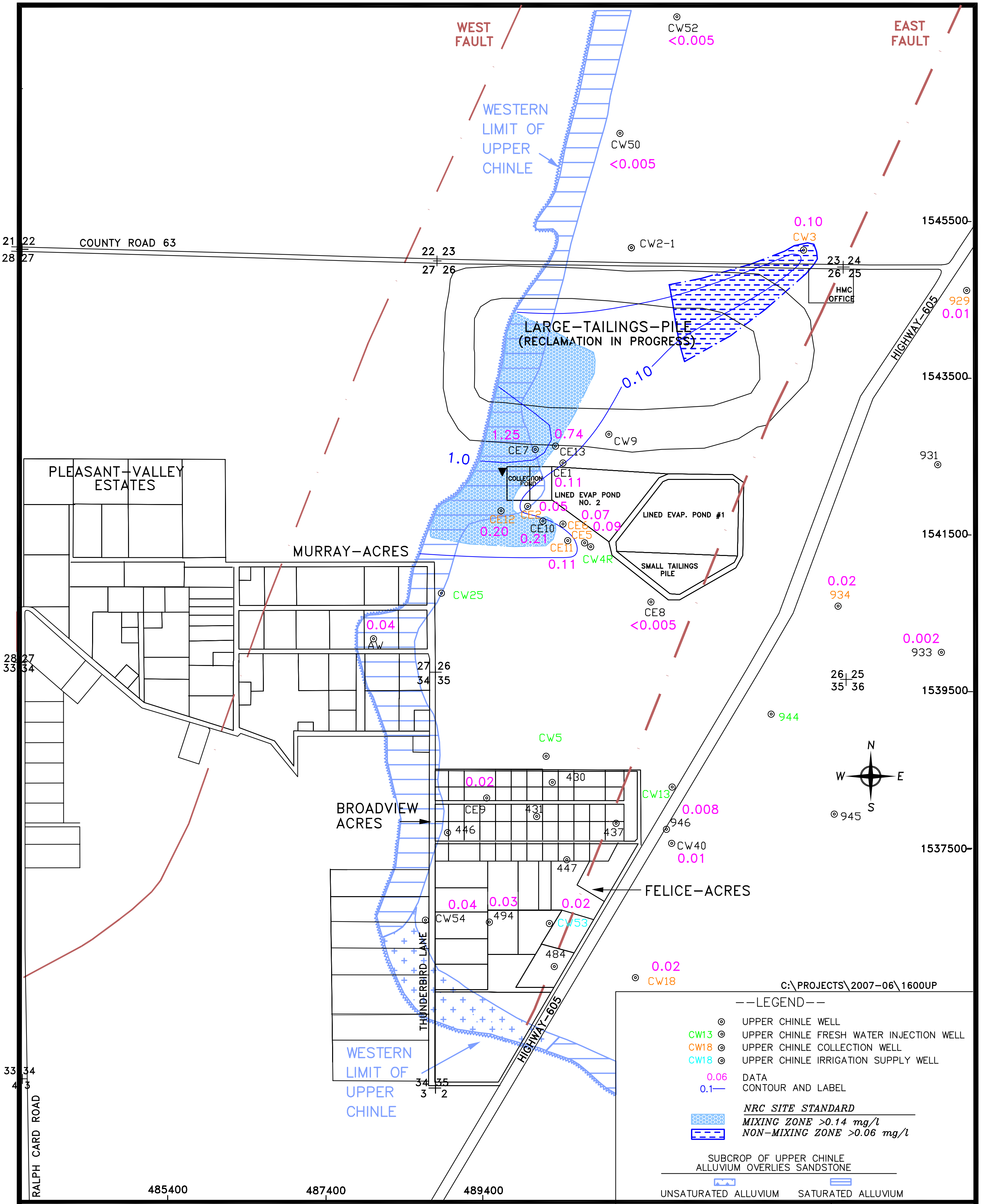


FIGURE 5.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 933, CW3, CW18 AND CW40.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

FIGURE 5.3-14. SELENIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, mg/l

SCALE: 1"=1600'

PAGE: 5.3-21

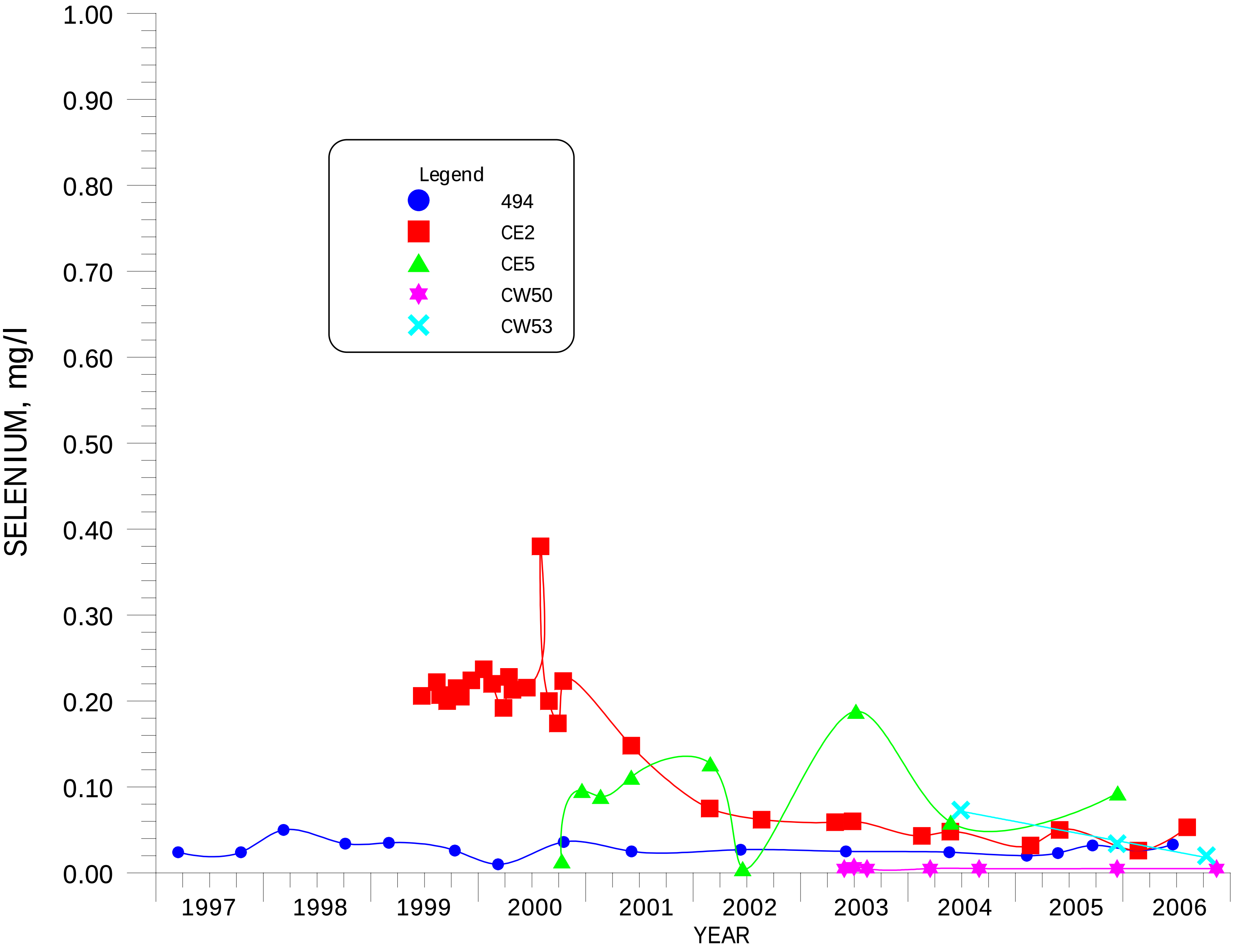


FIGURE 5.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CW50 AND CW53.

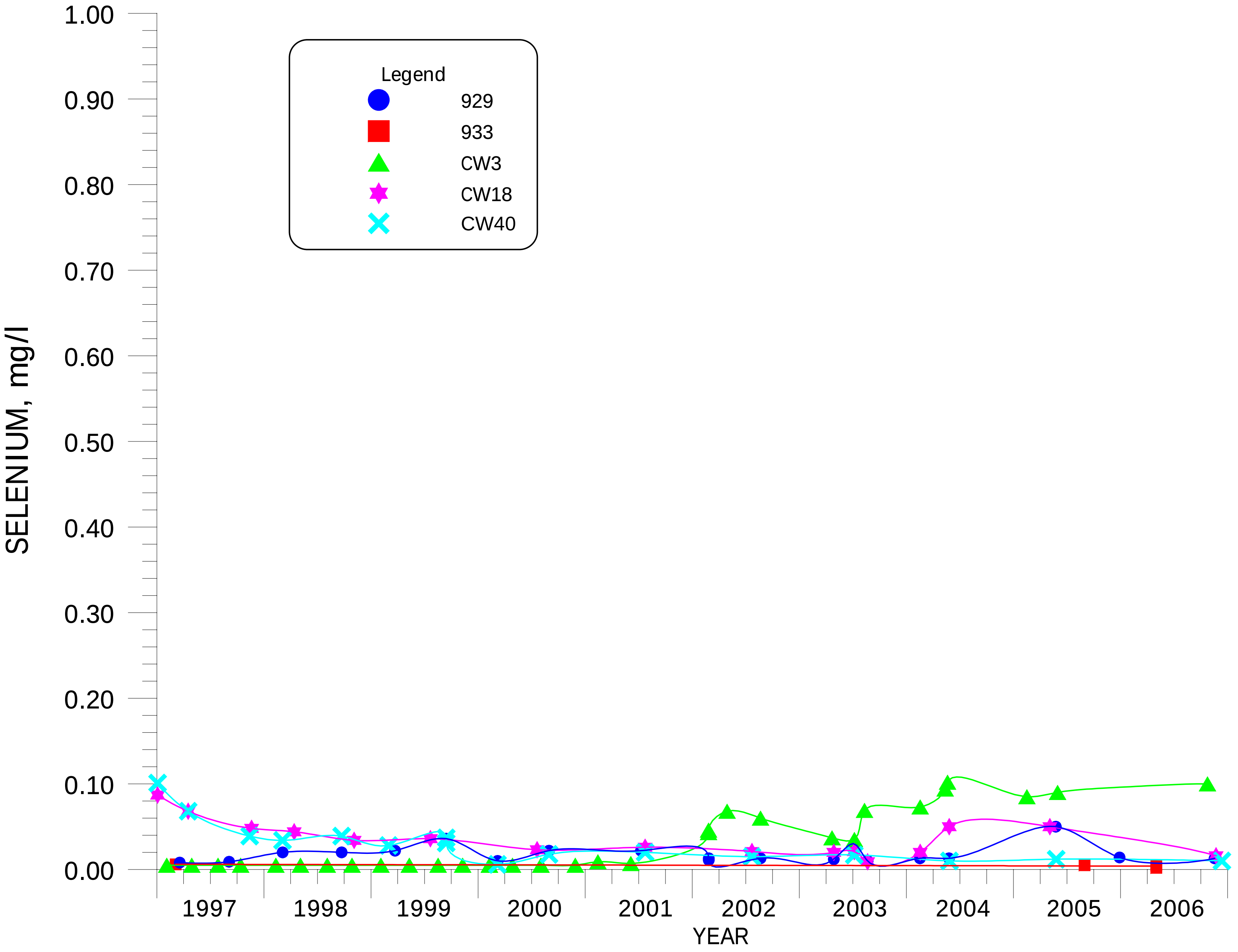
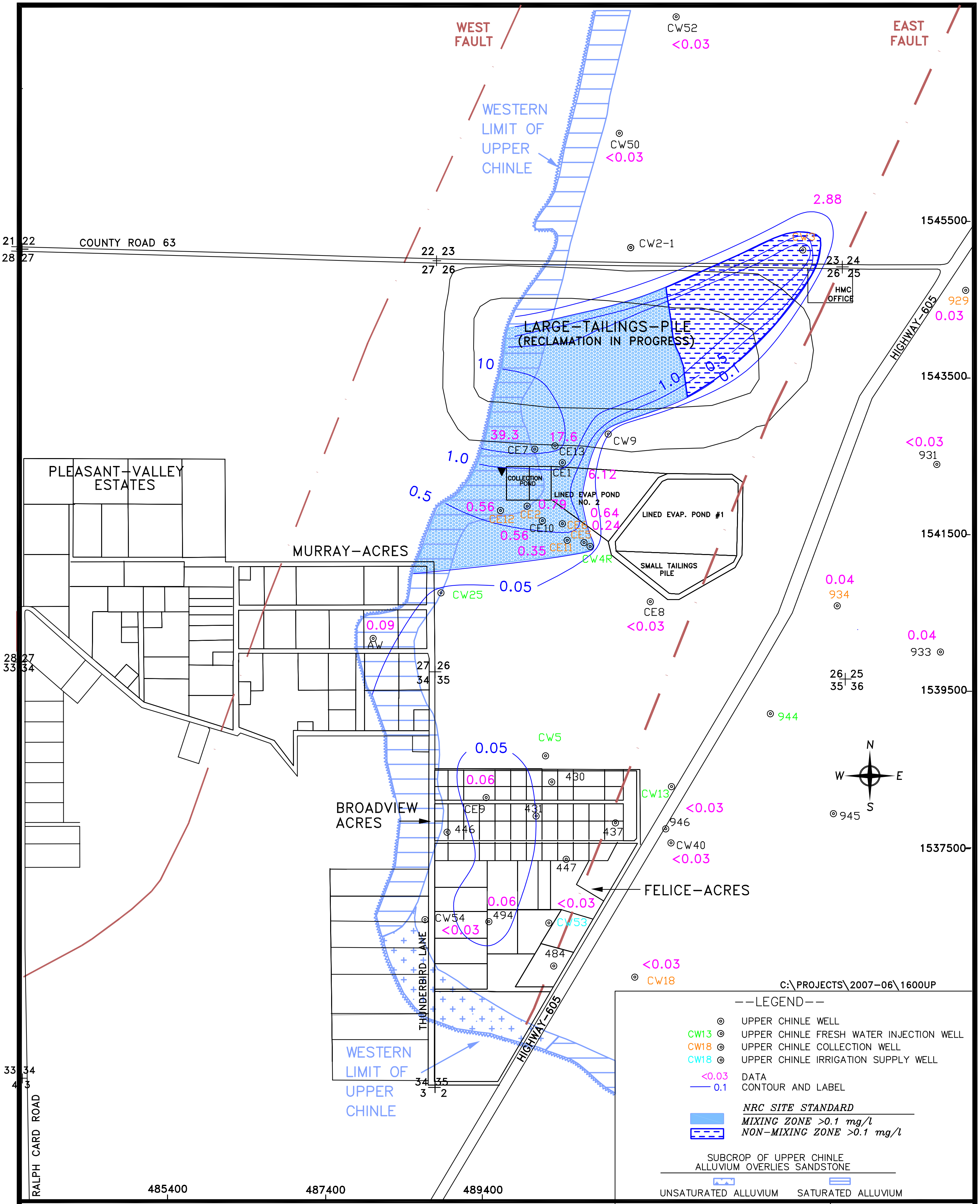


FIGURE 5.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 933, CW3, CW18 AND CW40.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-17. MOLYBDENUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, mg/l

DATE: 03/08/07

SCALE: 1"=1600'

PAGE: 5.3-24

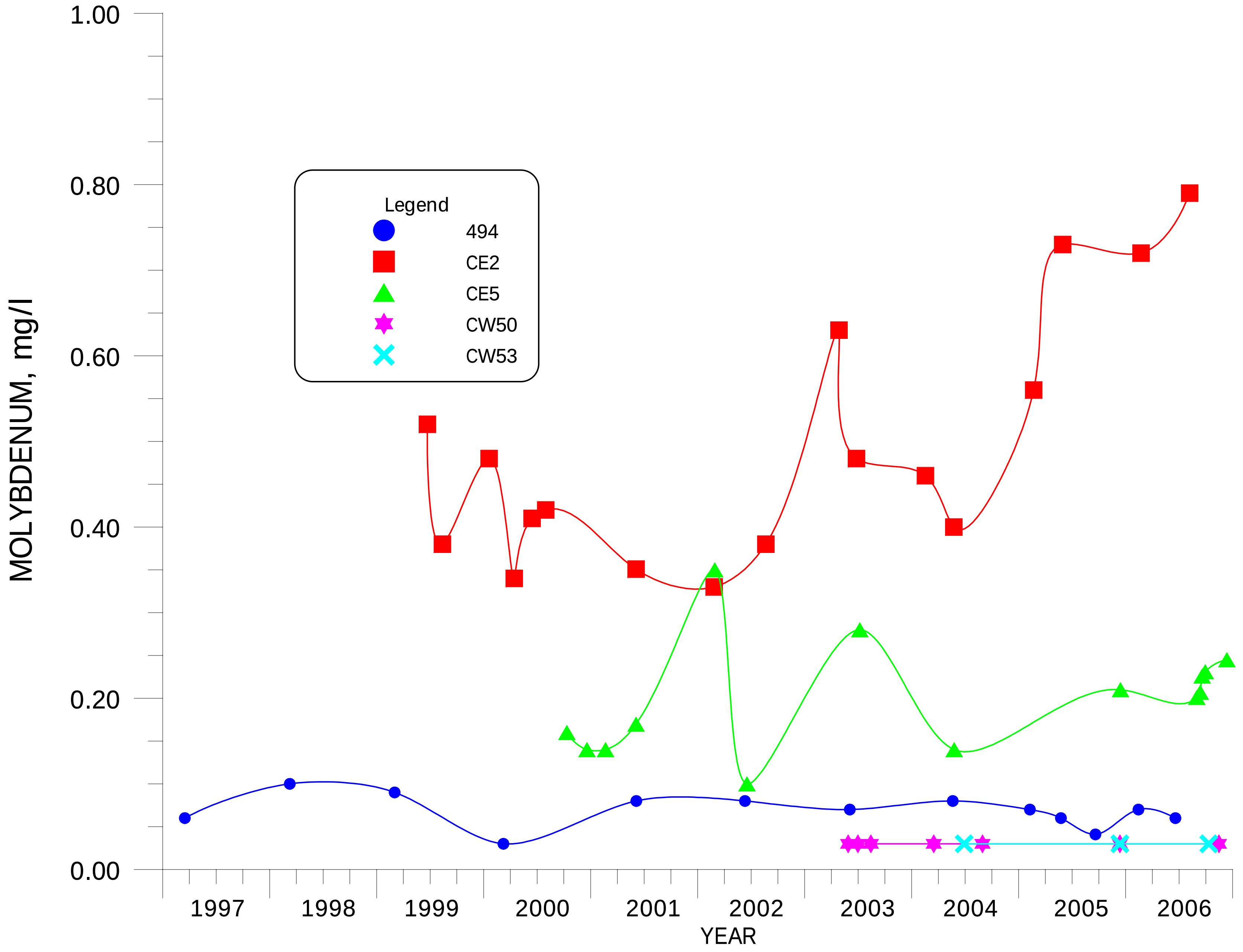


FIGURE 5.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 494, CE2, CE5, CW50 AND CW53.

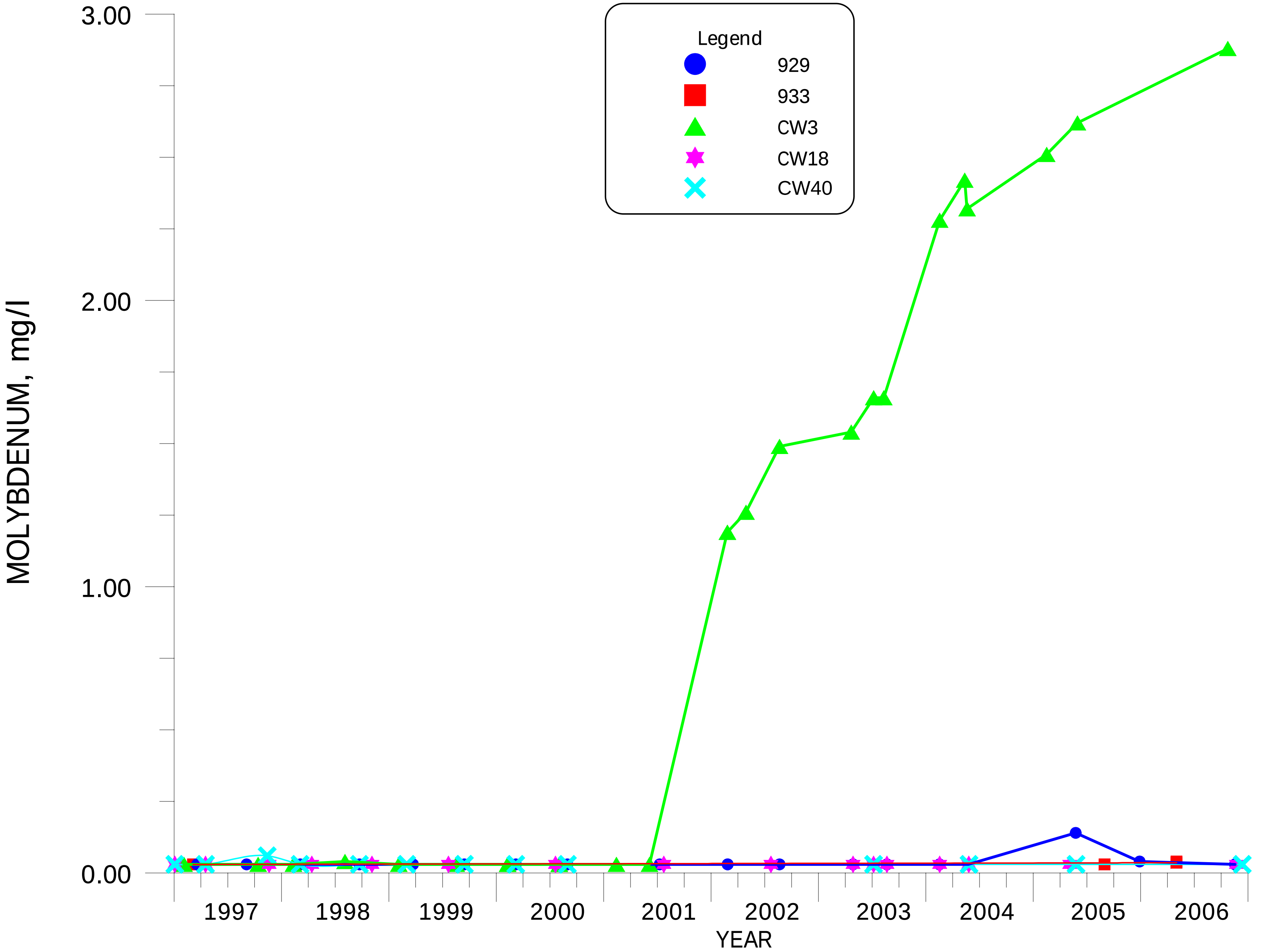
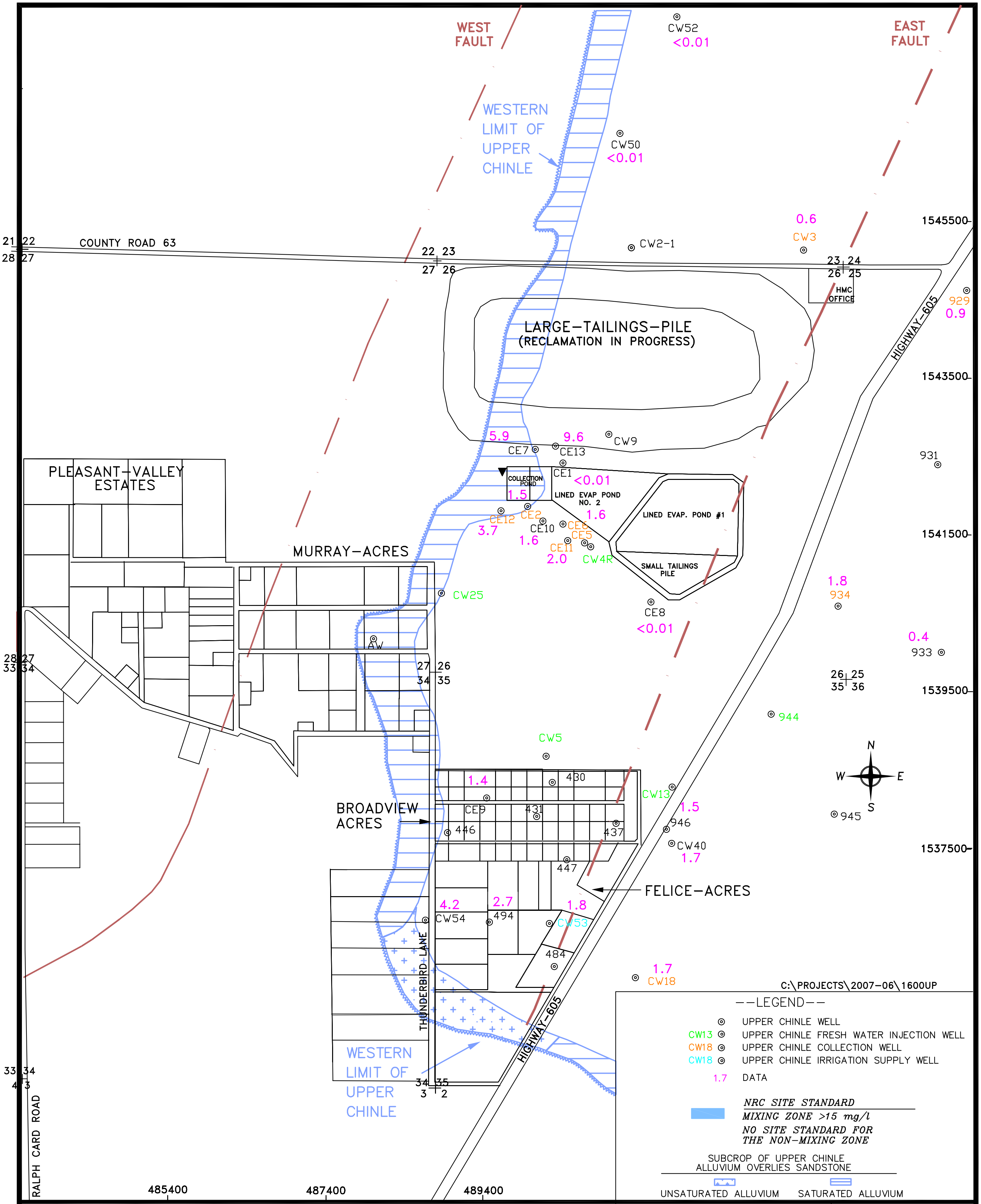


FIGURE 5.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 929, 933, CW3, CW18 AND CW40.

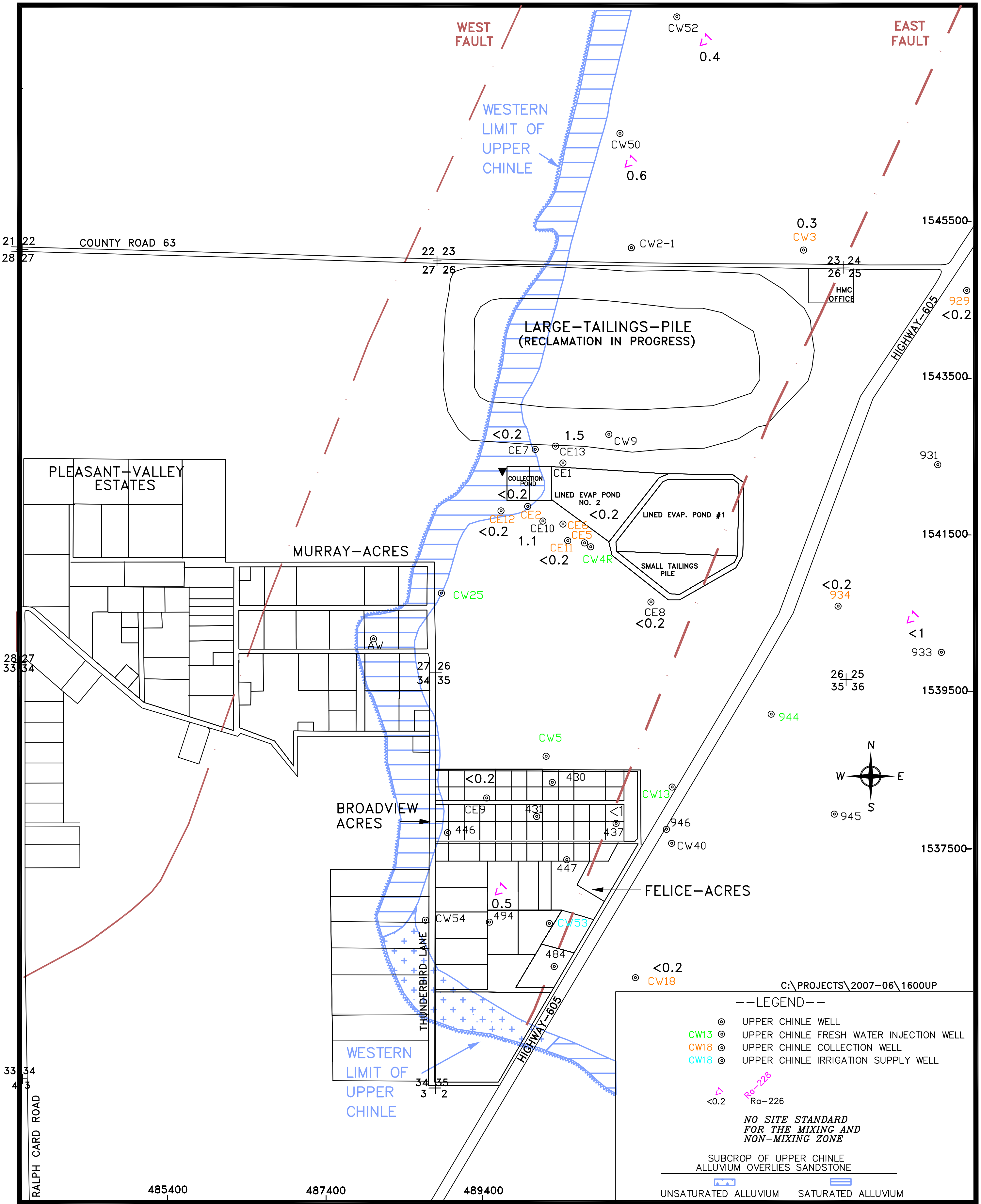


HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-20. NITRATE CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, mg/l

DATE: 03/08/07

SCALE: 1"=1600'



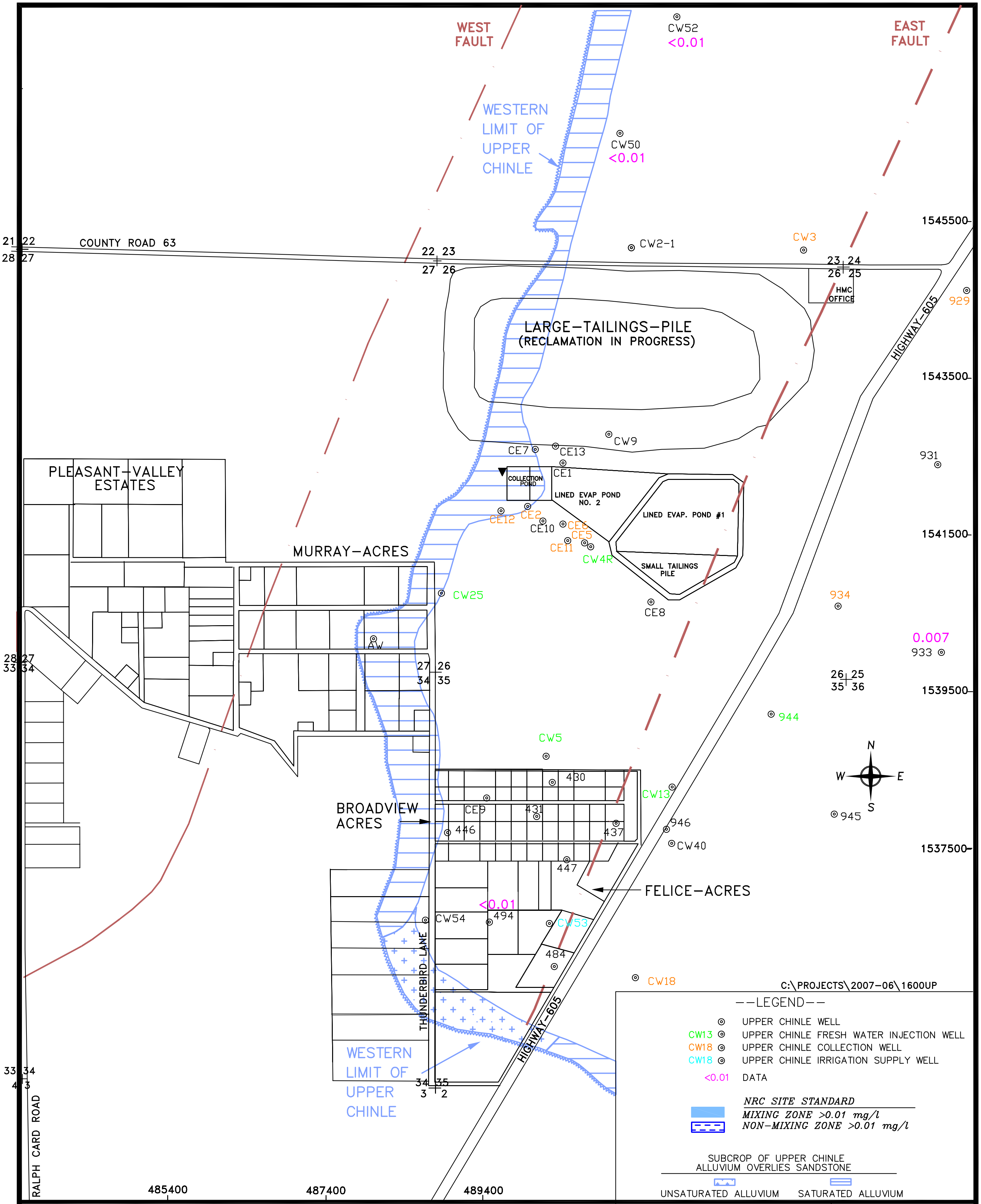
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

FIGURE 5.3-21. RADIUM-226 AND RADIUM-228 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, pCi/l

SCALE: 1"=1600'

PAGE: 5.3-28



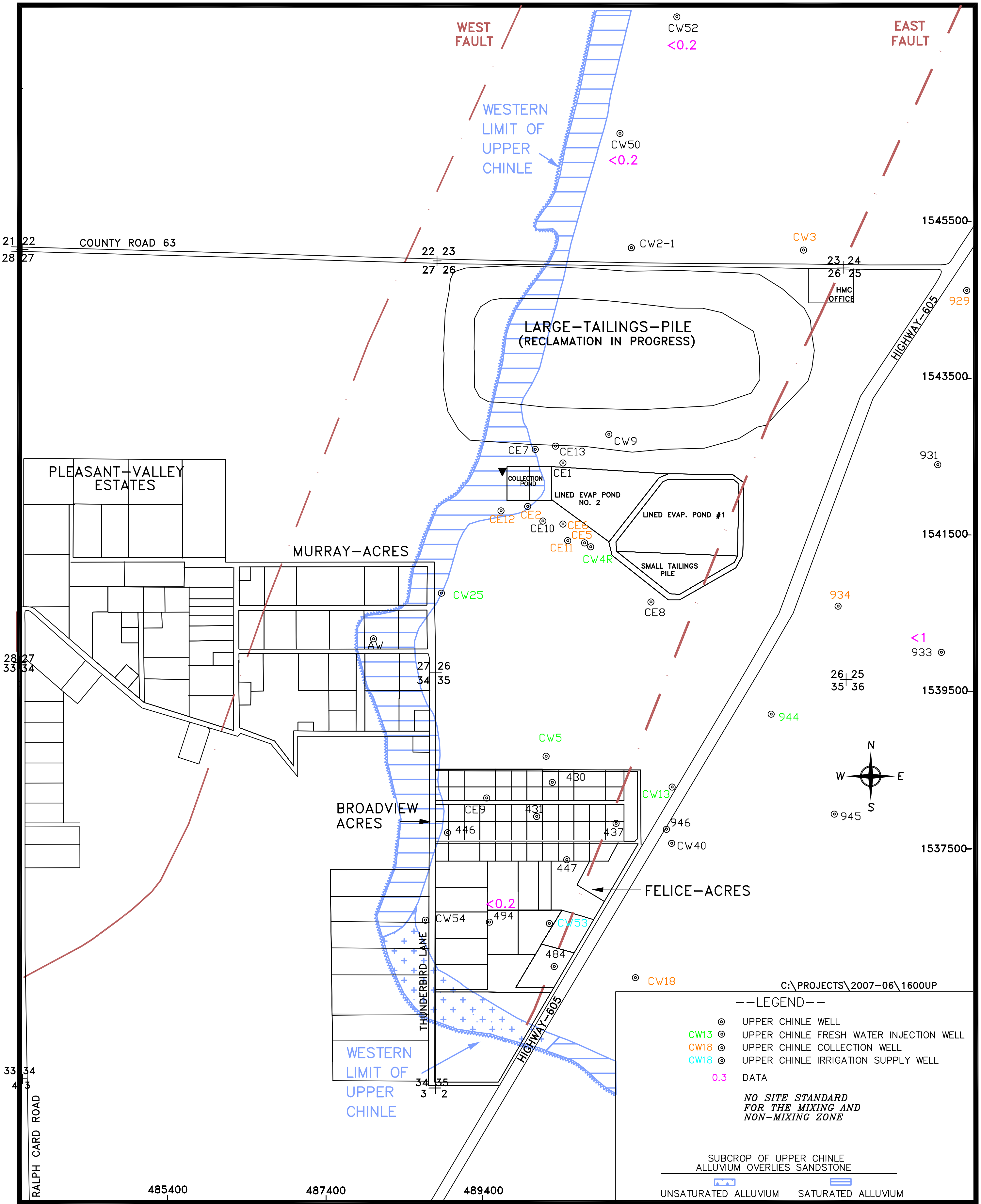
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 5.3-22. VANADIUM CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, mg/l

DATE: 03/08/07

SCALE: 1"=1600'

PAGE: 5.3-29



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

FIGURE 5.3-23. THORIUM-230 CONCENTRATIONS OF THE UPPER CHINLE AQUIFER, 2006, pCi/l

SCALE: 1"=1600'

PAGE: 5.3-30

SECTION 6

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 6

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES
(continued)

Page Number

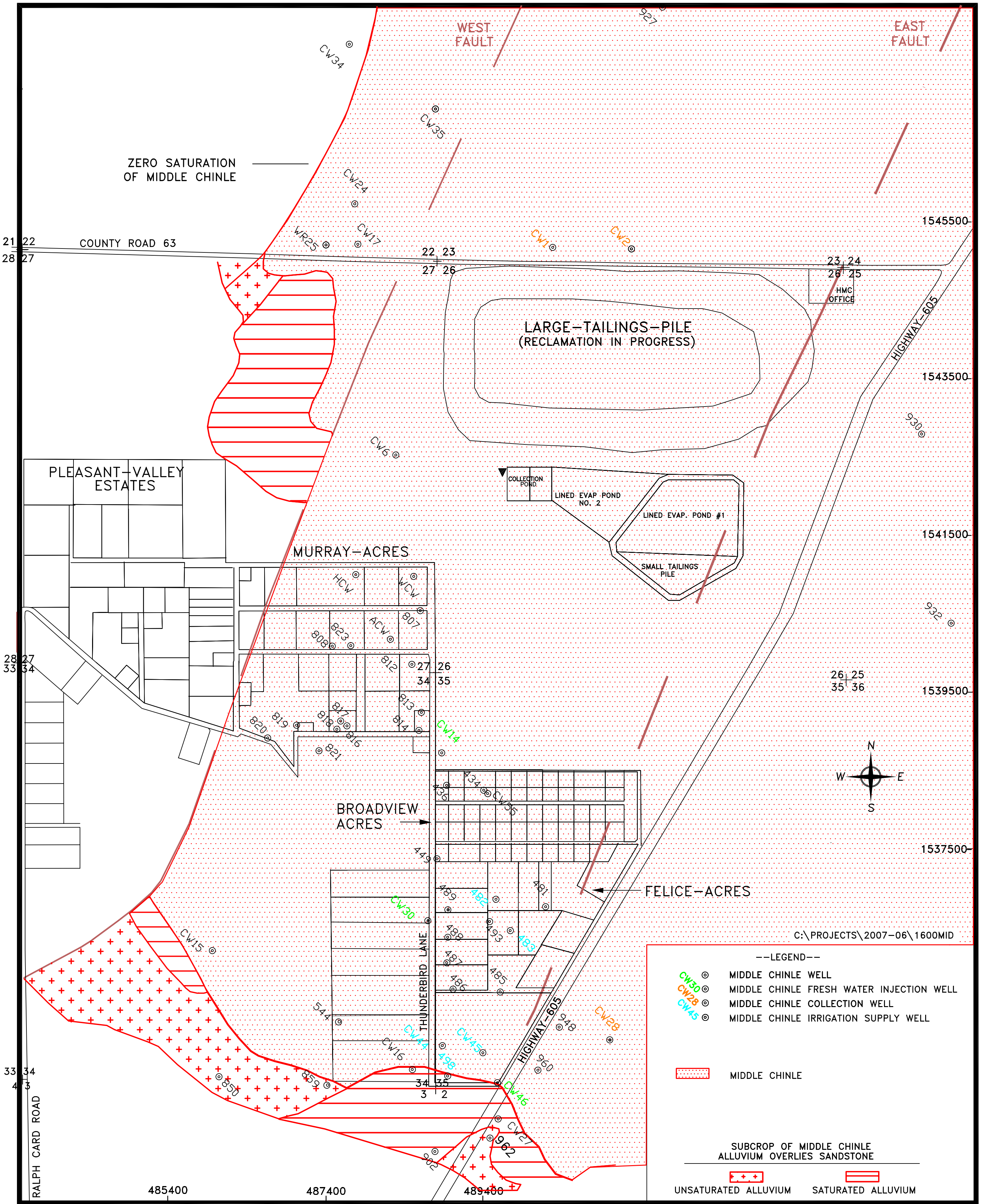
6.0 MIDDLE CHINLE AQUIFER MONITORING

6.1 MIDDLE CHINLE WELL COMPLETION AND LOCATION

Tables 5.1-1 through 5.1-4 (previous section) present the Middle Chinle well data along with other Chinle aquifer wells. Figure 6.1-1 shows the locations of the Middle Chinle wells and areas where the Middle Chinle aquifer exists at the Grants Project. The area where the alluvium is saturated and has direct contact with the Middle Chinle sandstone is very important with respect to transfer of water between these two aquifers and is shown with the red horizontal cross hatch pattern. The area where the Middle Chinle subcrops against alluvium that is not saturated is shown by the red plus (+) pattern.

The Middle Chinle aquifer also exists east of the extension of the East Fault (shown as a red pattern area on Figure 6.1-1) with an alluvium-Middle Chinle subcrop zone on the south side of this area. A limited area of Middle Chinle aquifer exists west of the West Fault. All three of these areas in the Middle Chinle aquifer act as separate ground water systems, except that there is some contact between two of the three areas of the Middle Chinle near the south end of the East Fault in the southwest corner of Section 35.

Middle Chinle wells CW1 and CW2 were used in 2006 as a source of water for the tailings flushing effort, while well CW28 was used as source of fresh water injection in 2006. Wells CW14, CW30 and CW46 were used for fresh-water injection in 2006. Wells 482, 483, 498, CW44 and CW45 were used as irrigation supply wells.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

SCALE: 1"=1600'

FIGURE 6.1-1. LIMITS OF MIDDLE CHINLE AQUIFER AND WELL LOCATIONS

6.2 MIDDLE CHINLE WATER LEVELS

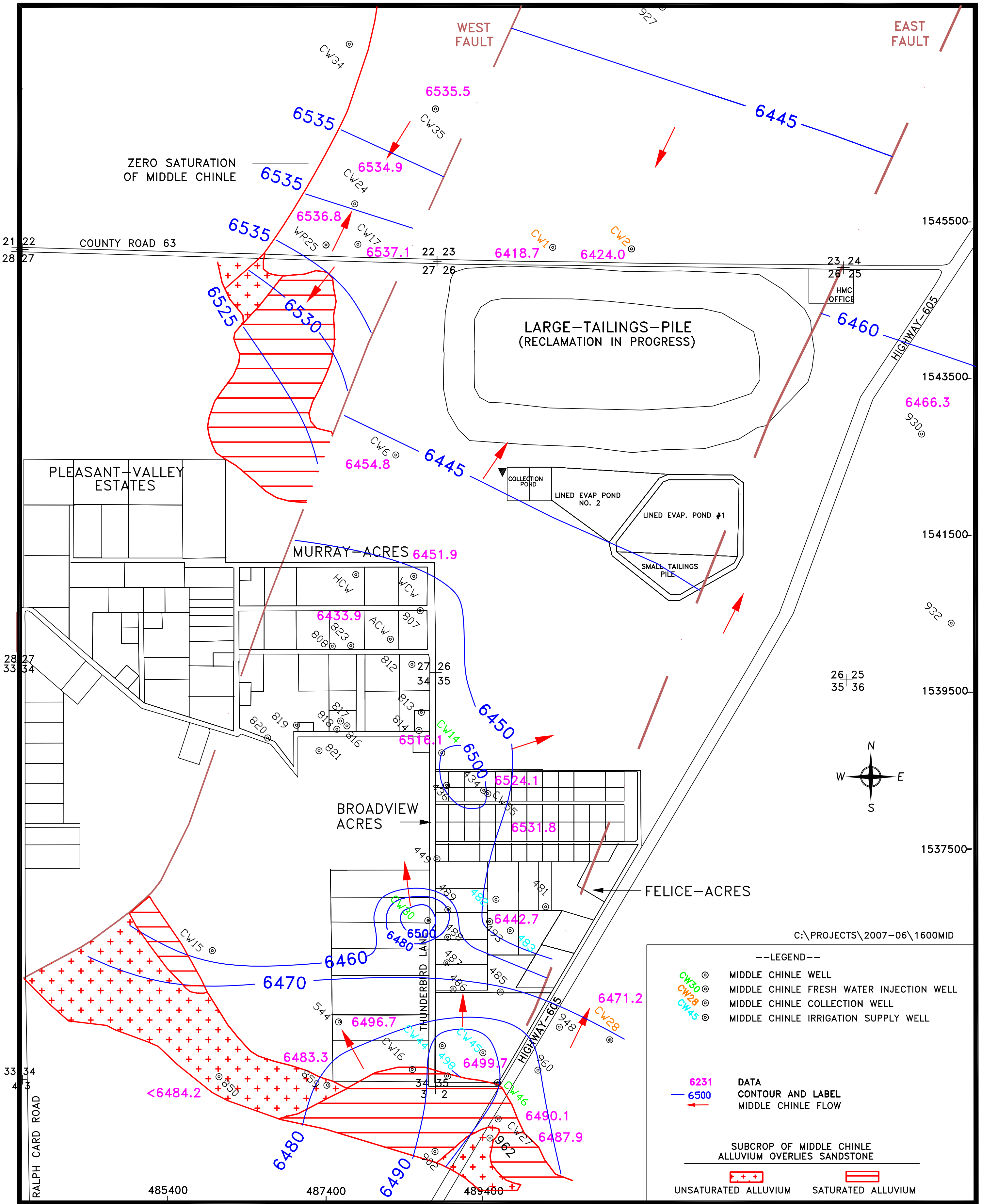
Water levels in Homestake's Upper, Middle and Lower Chinle wells are presented in Appendix A. Fall, 2006 water-level elevation contours for the Middle Chinle aquifer are presented on Figure 6.2-1. The hydraulic gradient in the Middle Chinle aquifer is steeper in its alluvial subcrop area in the southern portion of Felice Acres near wells 498, CW45 and CW46. This increase in gradient is due to an influx of water to the Middle Chinle aquifer from the alluvial aquifer. The red arrows on Figure 6.2-1 show the direction of ground water flow in the Middle Chinle aquifer. Flow on the east side of the East Fault is mainly toward well CW28 near the East Fault.

Ground water flow west of the West Fault in the Middle Chinle aquifer is mainly to the southwest, and it discharges into the alluvial aquifer. This prevents the alluvial aquifer from affecting the water quality of the Middle Chinle aquifer on the west side of the West Fault. This Middle Chinle water flows from up-gradient of the site into the area west of the Large Tailings Pile. The alluvial injection in the northern portion of Section 27 has temporarily reversed the gradient near wells CW17 and CW24 in 2006. This has allowed some movement to the north until the water level elevation is increased in this area above those near wells CW17 and WR25. The remainder of the Middle Chinle aquifer is recharged by the alluvial aquifer south of Felice Acres.

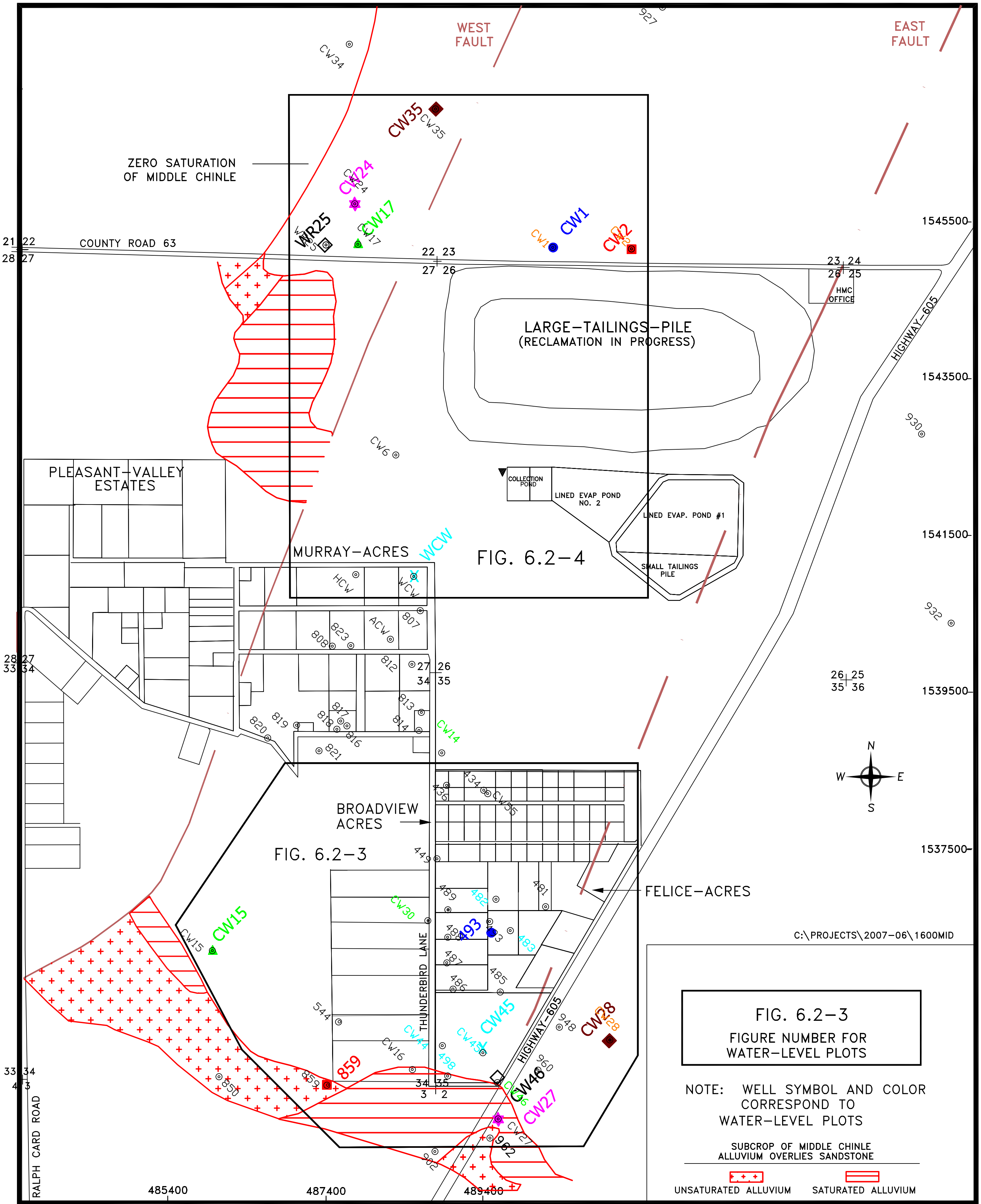
The injection of fresh water into wells CW14 (north of Broadview Acres) and CW30 (west of Felice Acres) has created ground water mounds in their respective areas. These mounds cause the ground water to flow both north and south from these two wells. Collection of ground water from wells CW1 and CW2 intercepts the water flowing from the south in the Middle Chinle aquifer between the two faults. Pumping from these wells also draws water flow from the north. The head in the Middle Chinle aquifer on each side of the two faults is significantly different than the head between the two faults, which demonstrates that the ground water is not readily connected on each side of these faults.

Figure 6.2-2 shows the locations of the Middle Chinle wells that are used to monitor water-level changes with time. The colors and symbols used on this figure are the same as those used on the water-level elevation time plots. Figure 6.2-3 presents the water-level elevation changes versus time in Middle Chinle wells 493, 859, CW15, CW27, CW28, CW45 and CW46. The non-pumping water levels are higher in Middle Chinle well CW45 than they are farther north in well 493. The pumping of irrigation wells 482, 483, 498, CW44 and CW45 has caused the water levels in wells 493, 859 and CW15 to decline. Some of this decline could also be attributable collection of water from wells CW1 and CW2. Variations in the pumping rate of well CW28 contribute to the observed variable water levels. Until late 2006, injection into Middle Chinle well CW46 has caused a rise in water level in this well.

The water-level plots for the Middle Chinle wells located west of the West Fault and wells CW1, CW2 and WCW are presented on Figure 6.2-4. Water levels have been gradually increasing in the Middle Chinle aquifer west of the West Fault. Water levels were variable in pumping wells CW1 and CW2 in 2006 due to their variable pumping rates. Water levels have decreased in well WCW as a result of the pumping of wells CW1 and CW2 since 2001. As expected, water levels west of the West Fault have not responded to the pumping of water from wells CW1 and CW2 situated east of the West Fault.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 03/08/07
FIGURE 6.2-1. WATER-LEVEL ELEVATIONS OF THE MIDDLE CHINLE AQUIFER, FALL 2006, FT-MSL	SCALE: 1"=1600'
	PAGE: 6.2-3



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

SCALE: 1"=1600'

FIGURE 6.2-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-LEVEL PLOTS

PAGE: 6.2-4

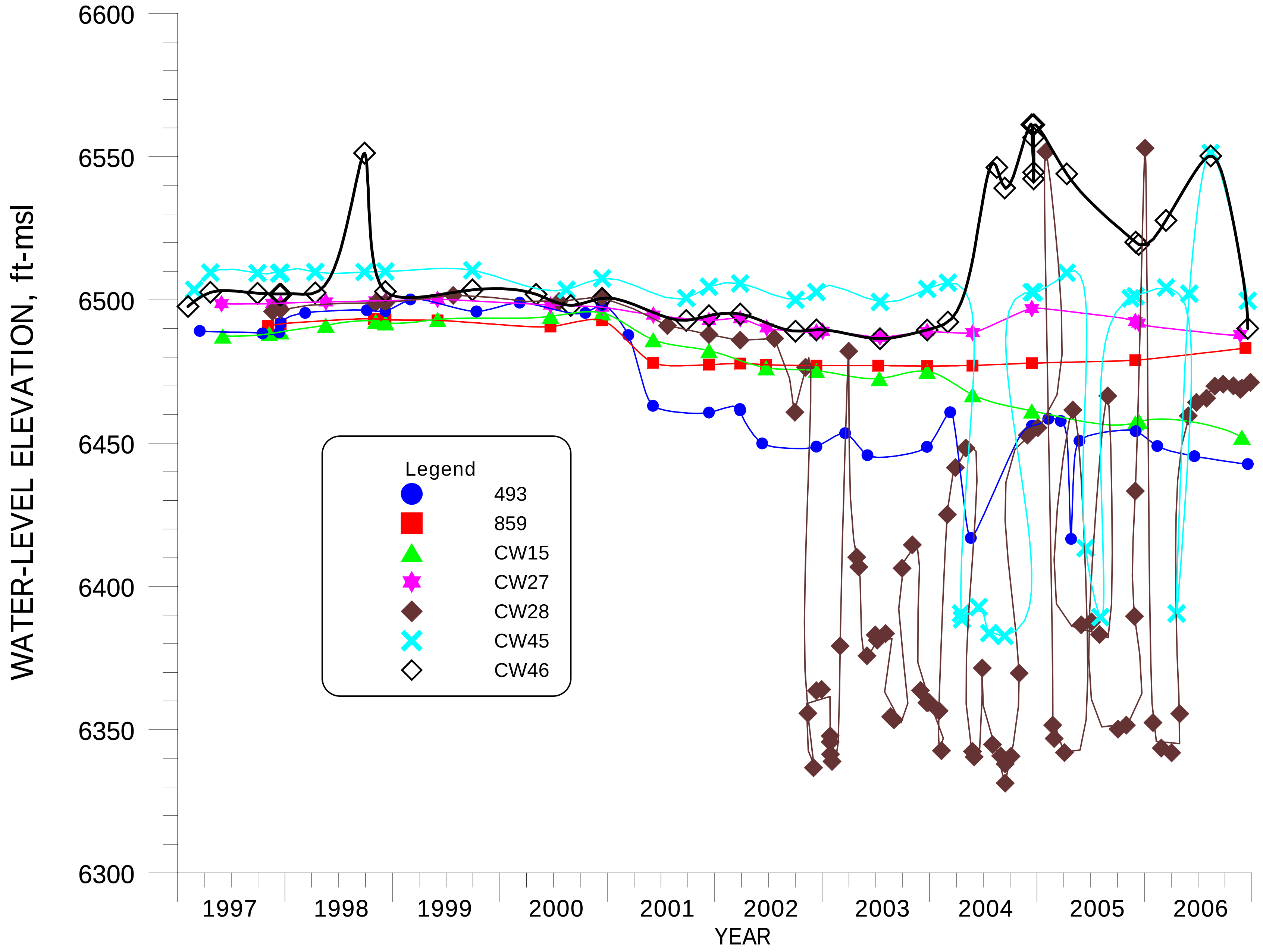


FIGURE 6.2-3. WATER-LEVEL ELEVATION FOR WELLS 493, 859, CW15, CW27, CW28, CW45 AND CW46.

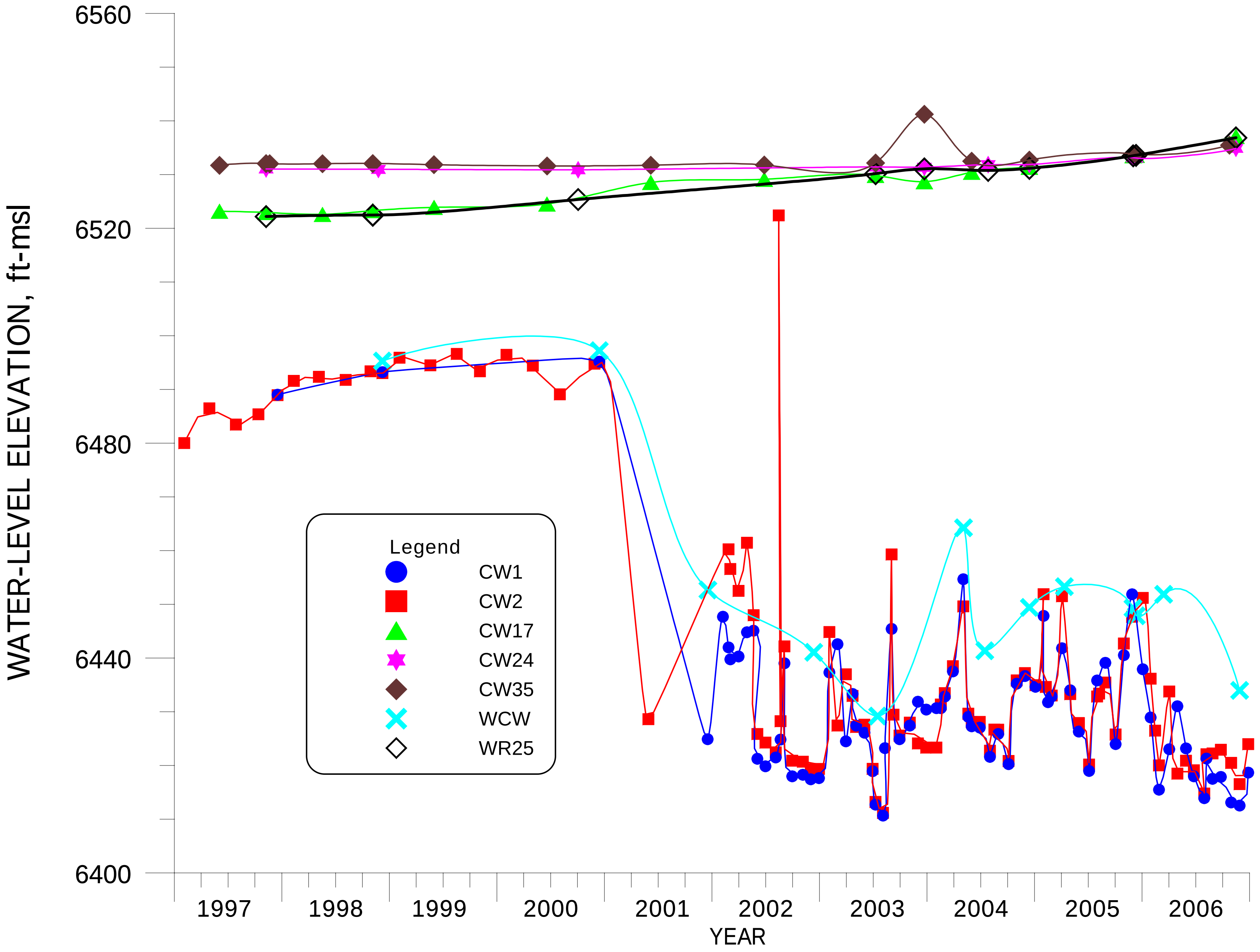


FIGURE 6.2-4. WATER-LEVEL ELEVATION FOR WELLS CW1, CW2, CW17, CW24, CW35, WCW AND WR25.

6.3 MIDDLE CHINLE WATER QUALITY

The water-quality data for Homestake's Middle Chinle aquifer is presented with that of the other Chinle aquifer wells in Tables B.5-1 and B.5-2 of Appendix B. The Chinle aquifer water-quality results for subdivision wells are also presented in these tables. The basic well data for the Middle Chinle aquifer wells is presented in Tables 5.1-1 through 5.1-4 in the Upper Chinle aquifer monitoring section (Section 5).

The area of water-quality concern in the Middle Chinle aquifer exists in the western portion of Broadview Acres and Felice Acres. All sulfate concentrations are within the range of background concentrations except for the concentration from well WR25, located in the mixing zone west of the West Fault where these concentrations are natural and four wells in Felice and Broadview Acres. Uranium concentrations are above site standards only in western Broadview Acres and Felice Acres and immediately to the west and south of Felice Acres. Two natural exceedances in uranium concentrations exist west of the West Fault. Selenium concentrations also exceed the site standard in the Felice Acres area in one well and one well east of Felice Acres. The only significant molybdenum concentration identified in the Middle Chinle aquifer is at well 434.

6.3.1 SULFATE - MIDDLE CHINLE

Figure 6.3-1 presents sulfate concentration contours for the Middle Chinle aquifer for 2006. This figure shows that the Middle Chinle sulfate concentrations range from 304 to a high of 2000 mg/l at well WR25. Sulfate site standard concentrations are given in the legend of Figure 6.3-1. All mixing-zone sulfate concentrations in the Middle Chinle aquifer are below the site standard of 1750 mg/l except for a value in well WR25. Sulfate concentrations in well WR25, which is located west of the West Fault, are natural. The sulfates are naturally occurring in this area, because the ground water flow in the Middle Chinle aquifer west of the West Fault is from the north to the southwest. Sulfate concentrations in the non-mixing zone of the Middle Chinle are within the natural background range and meet the site standards.

Figure 6.3-2 shows the locations of the Middle Chinle wells for which time concentration plots were developed for this report. The sulfate figure number is shown in the group area to define the figure number for each group of wells. Two groups of wells for the

Middle Chinle aquifer are presented. The colors and symbols on Figure 6.3-2 correspond to those used in the concentration time plots.

Figure 6.3-3 presents sulfate concentrations for the mixing zone Middle Chinle wells 498, CW15, CW17, CW35, CW44 and CW45. Fairly stable sulfate concentrations were observed in 2006 in wells 498, CW17, CW35, CW44 and CW45.

Figure 6.3-4 presents the sulfate concentrations for non-mixing zone Middle Chinle wells 434, 493, CW1, CW2 and WCW, located between the two faults, and well CW28, which is located east of the East Fault. Data presented on this plot demonstrate that sulfate concentrations have been fairly steady over time in these wells. A decrease in the sulfate concentration in well WCW was observed in 2005 with a fairly steady value in 2006 and the recent concentrations are below historical values. Concentrations in Middle Chinle well CW28 increased in 2006.

6.3.2 TOTAL DISSOLVED SOLIDS - MIDDLE CHINLE

Total dissolved solids (TDS) and sulfate are used to define changes in major constituents at the Grants Project site. Figure 6.3-5 presents contours of TDS concentrations for the Middle Chinle aquifer during 2006 and shows that a few values are approaching or have exceeded 2000 mg/l near the alluvial subcrop area on the southwest side of Felice Acres.

Background data for the Middle Chinle aquifer were used to determine TDS NRC site standards of 3140 and 1560 mg/l for the mixing and non-mixing zones, respectively. All of the TDS values measured in Middle Chinle aquifer water were less than these values in 2006, except for well WR25, located in the mixing zone, and wells 434, 482, 483, 493 and CW55 in the non-mixing zone. No restoration of TDS is needed in the Middle Chinle aquifer at well WR25 because concentrations from this well are natural.

Plots of TDS concentrations for Middle Chinle wells 498, CW15, CW17, CW35, CW44 and CW45 are presented in Figure 6.3-6. The TDS concentrations have been fairly steady during the last year in these wells, except for some decline in wells 498, CW15 and CW44.

Figure 6.3-7 presents TDS concentration-time plots for non-mixing zone Middle Chinle wells 434, 493, CW1, CW2, CW28 and WCW. Analysis of this data indicates stable TDS concentrations in water collected from these wells in 2006 compared to 2005, with the exception of a modest decrease in TDS concentration in Middle Chinle well WCW.

6.3.3 CHLORIDE - MIDDLE CHINLE

Figure 6.3-8 presents chloride concentrations in the Middle Chinle aquifer during 2006, and observed concentrations varied from roughly 50 to one value above 200 mg/l. None of the concentrations exceeded the NRC site standard of 250 mg/l for the mixing and non-mixing zones of the Middle Chinle aquifer except well 820. Therefore, in general chloride concentrations are not useful for defining the degree of, or the need for, restoration of the Middle Chinle aquifer.

Time plots of chloride concentration are presented on Figure 6.3-9 for Middle Chinle wells 498, CW15, CW17, CW35, CW44 and CW45. Chloride concentrations increased in Middle Chinle well CW17 in 2006 while they decreased in well 498.

A second set of chloride concentration plots for the Middle Chinle aquifer is presented in Figure 6.3-10. Data plotted on this figure shows fairly steady 2006 concentrations, except for a decrease in well WCW and an increase in wells 493 and CW28. These small changes are deemed to be within natural variation in the Middle Chinle aquifer.

6.3.4 URANIUM - MIDDLE CHINLE

Uranium is an important constituent in the Middle Chinle aquifer due to the presence of elevated concentrations in the aquifer in the southern and western portions of Felice Acres. These elevated concentrations are a result of alluvial recharge to the Middle Chinle aquifer in this area. Water in the saturated portion of the alluvial aquifer flows across a subcrop of the Middle Chinle aquifer just south of Felice Acres, and alluvial ground water has entered the Middle Chinle aquifer in this area. Figure 6.3-11 presents contours of uranium concentrations in the Middle Chinle aquifer during 2006. An area of concentrations greater than the mixing-zone site standard exists in the southwestern portion of Felice Acres. Uranium concentrations in the Middle Chinle aquifer, west of the West Fault, northwest of the Large Tailings Pile, naturally exceed 0.1 mg/l. The 2006 values from wells CW35 and WR25 exceed the mixing-zone site standard concentration of 0.18 mg/l, but they are naturally occurring because the West Fault isolates this area from impacts by seepage from the tailings. Flow in the Middle Chinle aquifer west of the West Fault moves from the area near well CW35 toward the subcrop area to the south. Uranium concentrations exceed 0.07 mg/l (non-mixing zone site standard) in an area of the Middle Chinle aquifer, at wells 434, 482, 483, 493 and CW55 in Broadview Acres and Felice Acres.

Figure 6.3-12 presents uranium concentration plots versus time for Middle Chinle wells 498, CW15, CW17, CW35, CW44 and CW45 (see Figure 6.3-2 for well locations). The 2006 uranium concentrations shown on this plot are fairly steady, except for a continuing decline in uranium concentrations in well 498. This plot shows that water taken from Middle Chinle wells CW44 and CW45 contains significant concentrations of uranium, but the concentrations are gradually decreasing and are expected to continue to decrease over the next several years. Additional monitoring of these wells with time will better define this collection-induced trend.

The uranium concentration plots for the Middle Chinle wells in the non-mixing zone are presented on Figure 6.3-13. Uranium concentrations were small in wells CW1, CW2, CW28 and WCW in 2006. The uranium concentration in well 434 water, which had previously been declining during the last few years, increased slightly during 2005 and 2006. Fairly steady uranium concentration occurred in well 493 over the last two years.

6.3.5 SELENIUM - MIDDLE CHINLE

None of the Middle Chinle wells in the mixing zone contained water with selenium concentrations exceeding the 0.14 mg/l site standard in 2006 (see Figure 6.3-14). The selenium concentration in the non-mixing zone wells 493 and CW28 currently exceeds the site standard of 0.07 mg/l. These areas of elevated concentrations have resulted from recharge to the Middle Chinle aquifer from the alluvium in the subcrop area just south of Felice Acres. Flow in the Middle Chinle aquifer in this locale is toward the north causing chemical constituents introduced into the Middle Chinle from the alluvium in the subcrop area to move to the north. Analysis of background selenium concentrations in the mixing and non-mixing zones resulted in NRC site standards of 0.14 and 0.07 mg/l, respectively (see legend of Figure 6.3-14).

Selenium concentrations somewhat less than 0.1 mg/l have been measured in Middle Chinle wells west of the West Fault. These concentrations have been determined to be naturally occurring, because the flow is from the north in this area, and therefore the ground water could not have been influenced by tailings seepage. The higher selenium observed in well CW17 could be due to alluvial water flowing into this area of the Middle Chinle aquifer in 2006. All other selenium concentrations in the Middle Chinle aquifer beyond these areas are low values.

Selenium concentrations with time for the mixing zone Middle Chinle wells 498, CW15, CW17, CW35, CW44 and CW45 are presented in Figure 6.3-15. An overall decline in selenium concentration has been observed in wells CW44 and CW45 for the last few years, while steady levels have been observed in well CW35 in 2006. The changes in well CW35 are naturally caused by upgradient influences. The observed increase in well CW17 is believed to be a short term result of the alluvial injection near subcrop with the Middle Chinle.

Selenium concentrations in wells CW1 and CW2, which are located north of the Large Tailings Pile, have varied over the past few years, but their values are small. Figure 6.3-16 presents the selenium concentrations for Middle Chinle wells in the non-mixing zone. In 2006, selenium concentrations measured in water collected from well 434 and 493 were steady while the selenium concentration from well CW28 increased in 2006. The connection between the alluvial aquifer and the Middle Chinle aquifer south of Felice Acres is the cause for the elevated concentrations in wells 493 and CW28. The injection of fresh water into Middle Chinle wells CW14, CW30 and CW46 and the use of Middle Chinle wells 482, 483, 498, CW44 and CW45 for irrigation should cause these elevated concentrations to decrease.

6.3.6 MOLYBDENUM - MIDDLE CHINLE

The 2006 molybdenum concentrations in the Middle Chinle aquifer are presented on Figure 6.3-17. None of the molybdenum concentrations for 2006 exceed the site standard of 0.10 mg/l except well 434. Some restoration of molybdenum in this area will be needed.

Figure 6.3-18 presents the molybdenum concentrations with time for Middle Chinle wells 498, CW15, CW17, CW35, CW44 and CW45, while Figure 6.3-19 presents the molybdenum concentrations with time for wells 434, 493, CW1, CW2, CW28 and WCW. These plots show that the concentration in each of these wells has been low for 2006 with fairly steady small concentrations in well 434. Additional monitoring with time is needed to demonstrate the restoration of molybdenum concentration in this well.

6.3.7 NITRATE - MIDDLE CHINLE

Nitrate concentrations have always been low in the Middle Chinle aquifer and therefore are not routinely monitored. However, nitrate concentrations were measured in all of the Middle Chinle aquifer wells in 2003 and in a number of the wells in 2006 in order to update the database. Figure 6.3-20 presents the nitrate concentrations in the Middle Chinle aquifer and shows that the only notable levels of nitrate in the Middle Chinle aquifer are west of the West Fault. Nitrate concentrations are greater than 15 mg/l, the mixing zone site standard, in one of the four Middle Chinle wells west of West Fault. Due to the flow direction in the Middle Chinle aquifer west of the West Fault, this concentration is determined to be naturally occurring. Therefore, no restoration of nitrate concentrations in the Middle Chinle aquifer is needed. This constituent does not require a site standard for the non-mixing zone of the Middle Chinle aquifer.

6.3.8 RADIUM-226 AND RADIUM-228 - MIDDLE CHINLE

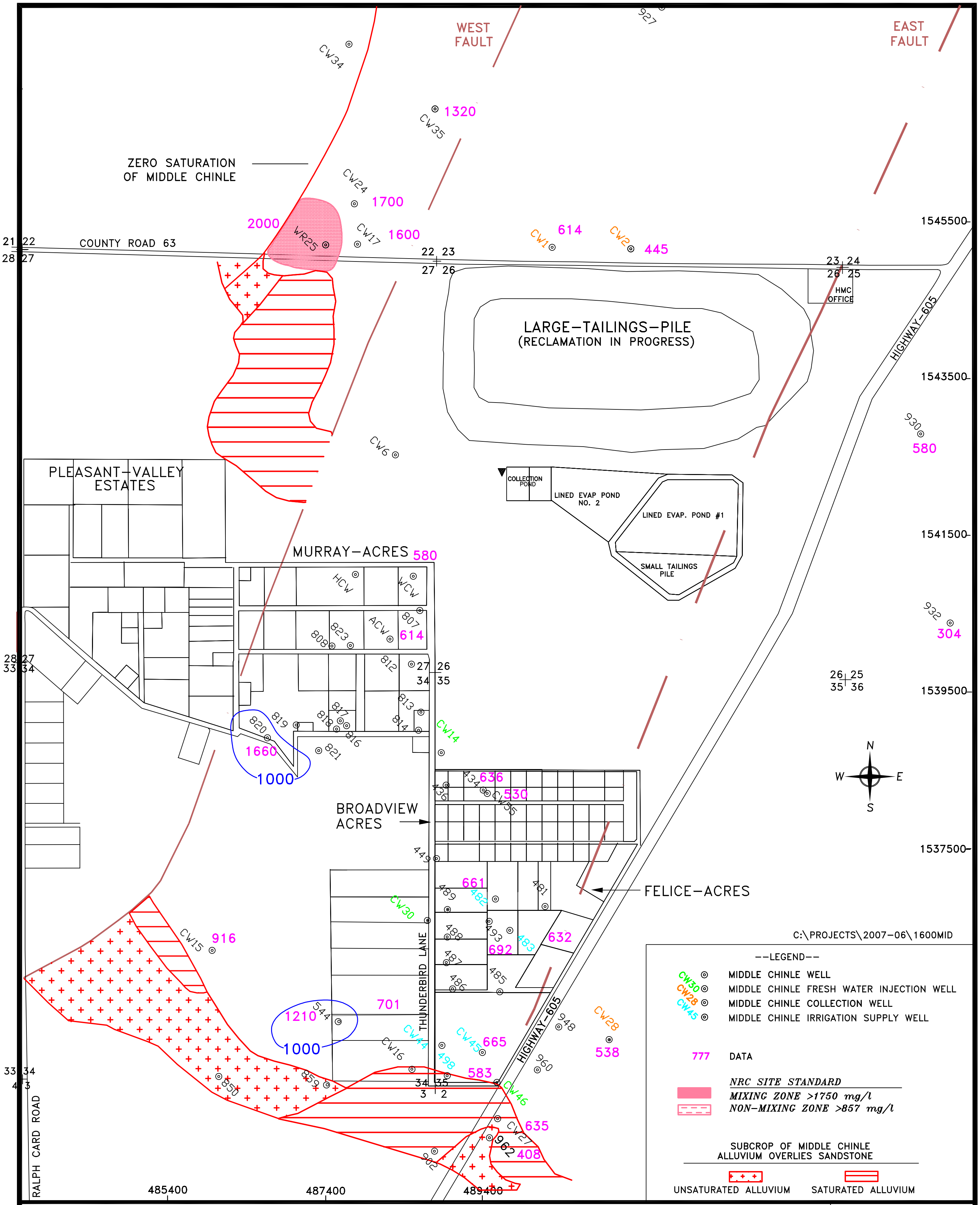
Radium concentrations in the Middle Chinle aquifer have always been low, showing that these two parameters are not important relative to the restoration of the Middle Chinle aquifer. The 2003 updated radium-226 and radium-228 concentrations in the Middle Chinle aquifer showed that radium levels are remaining low. All of the radium-226 and radium-228 values measured in 2006 were less than detection or very small. Radium-226 and radium-228 are not important parameters relative to the Middle Chinle aquifer and a site standard is not warranted and has not been set for these two constituents.

6.3.9 VANADIUM - MIDDLE CHINLE

Vanadium concentrations in the Middle Chinle aquifer have always been low. Previous monitoring of vanadium in the Middle Chinle aquifer has demonstrated that vanadium is not a significant parameter in this aquifer and the 2003 updated vanadium measurements confirmed the low values. Monitoring of vanadium for the Middle Chinle should be eliminated, because only a few low values have previously been detected in the alluvial aquifer near the tailings piles. All of the 2006 vanadium measurements for the Middle Chinle aquifer are low levels near the detection limit. These values are consistent with values observed previously and, therefore, reinforce the conclusion that continued monitoring of vanadium concentrations in the Middle Chinle aquifer should not be required. A site standard for vanadium has therefore not been set for the Middle Chinle aquifer.

6.3.10 THORIUM-230 - MIDDLE CHINLE

Thorium-230 concentrations are not significant in the alluvial aquifer outside of the Large Tailings. Therefore, the Middle Chinle aquifer does not have the potential for containing significant thorium concentrations from the tailings seepage. Thorium-230 is, therefore, not a significant parameter in the Middle Chinle aquifer and should be eliminated from future monitoring in the Middle Chinle aquifer. Thorium-230 concentrations were measured in all wells sampled from Middle Chinle wells in 2003, and all of these values were less than detection. All of the thorium-230 values measured in 2006 were less than the detection limit. These thorium-230 levels are consistent with concentrations previously measured in the Middle Chinle aquifer, which shows that thorium-230 is not an important parameter in the Middle Chinle aquifer and thus a site standard has not been set.



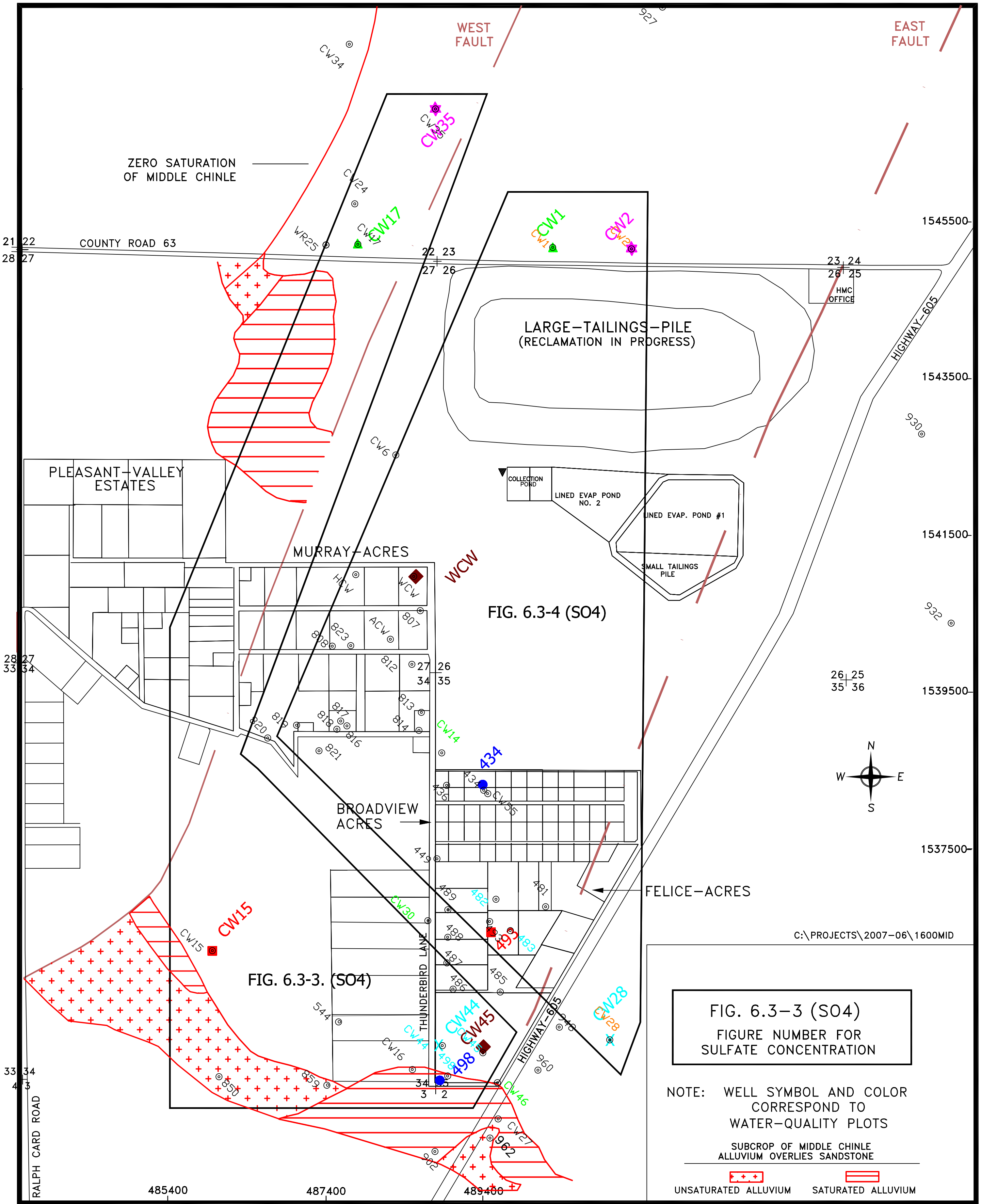
HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

DATE: 03/08/07

FIGURE 6.3–1. SULFATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2006, mg/l

SCALE: 1"=1600'

PAGE: 6.3–8



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W	DATE: 03/08/07
FIGURE 6.3-2. LOCATION OF MIDDLE CHINLE WELLS WITH WATER-QUALITY PLOTS	SCALE: 1"=1600'
	PAGE: 6.3-9

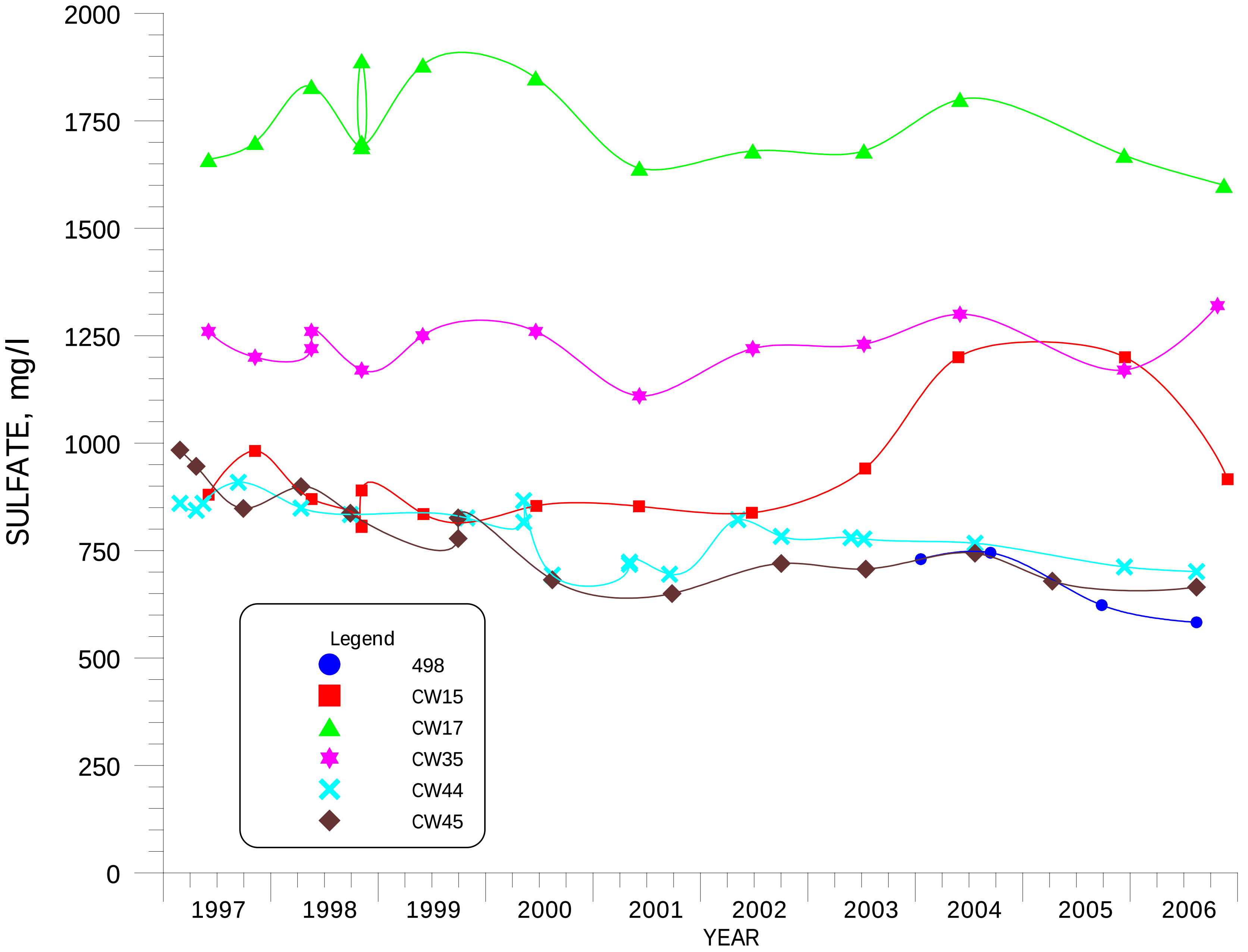


FIGURE 6.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35, CW44 AND CW45.

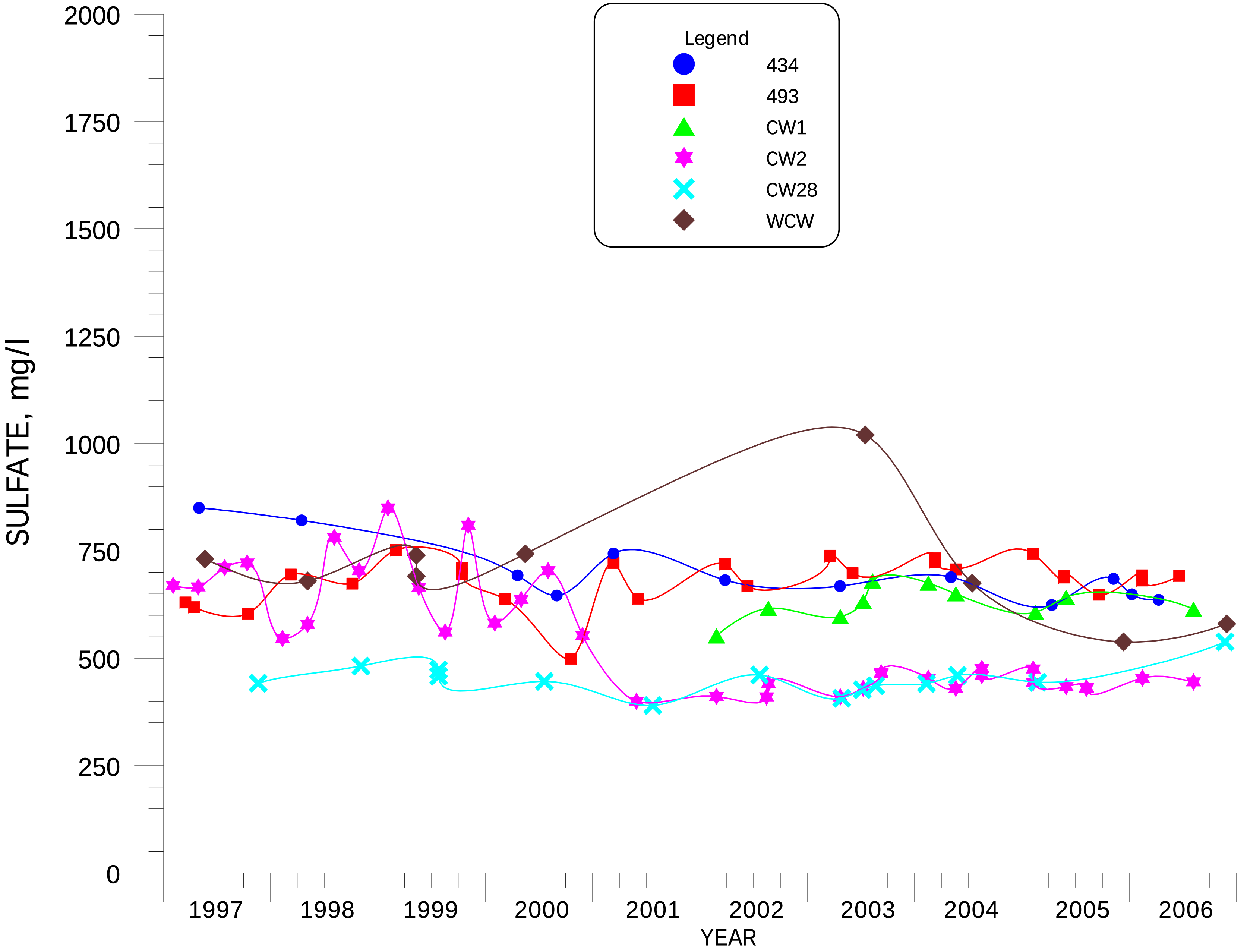
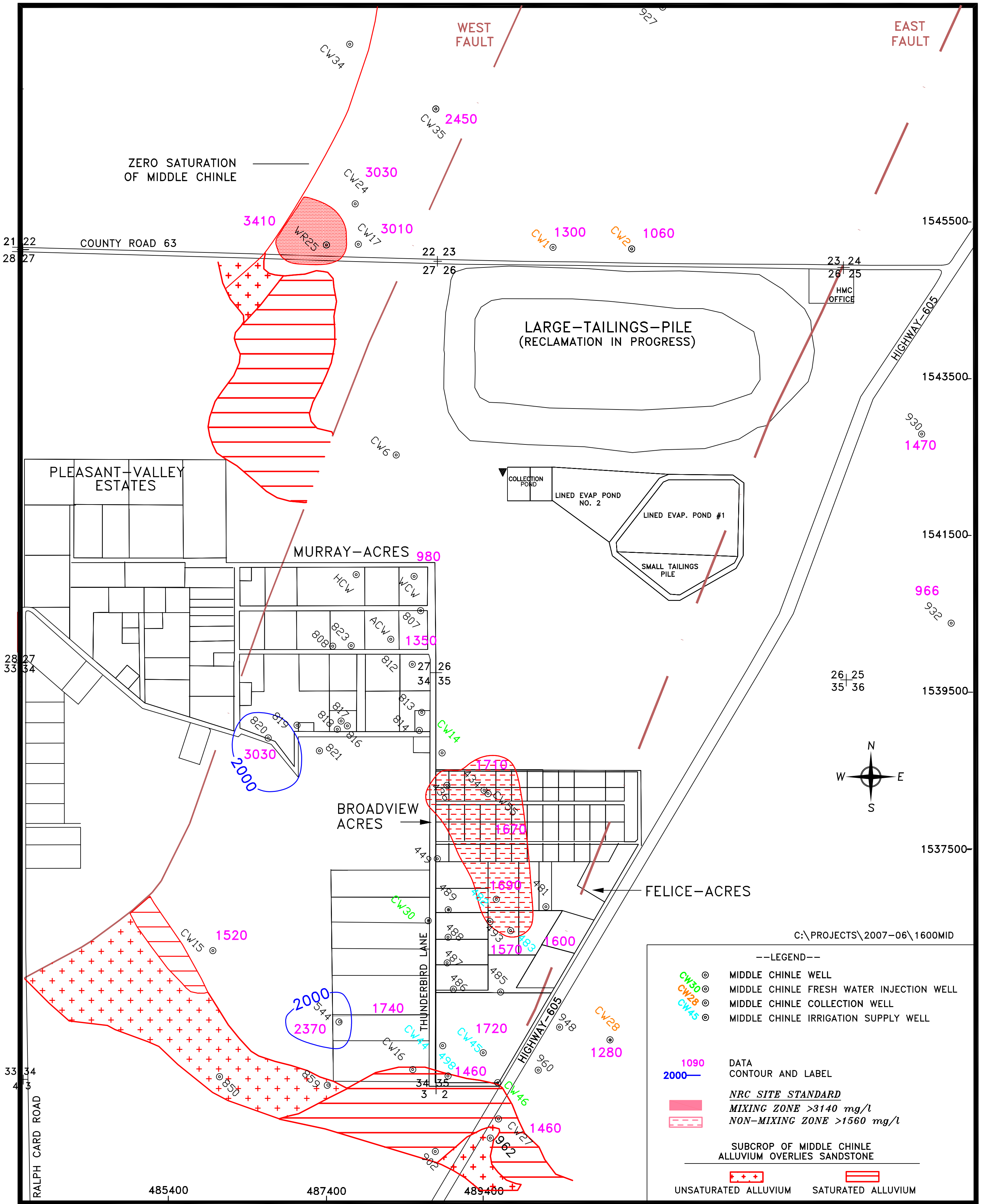


FIGURE 6.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 434, 493, CW1, CW2, CW28 AND WCW.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

SCALE: 1"=1600'

FIGURE 6.3-5. TDS CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2006, mg/l

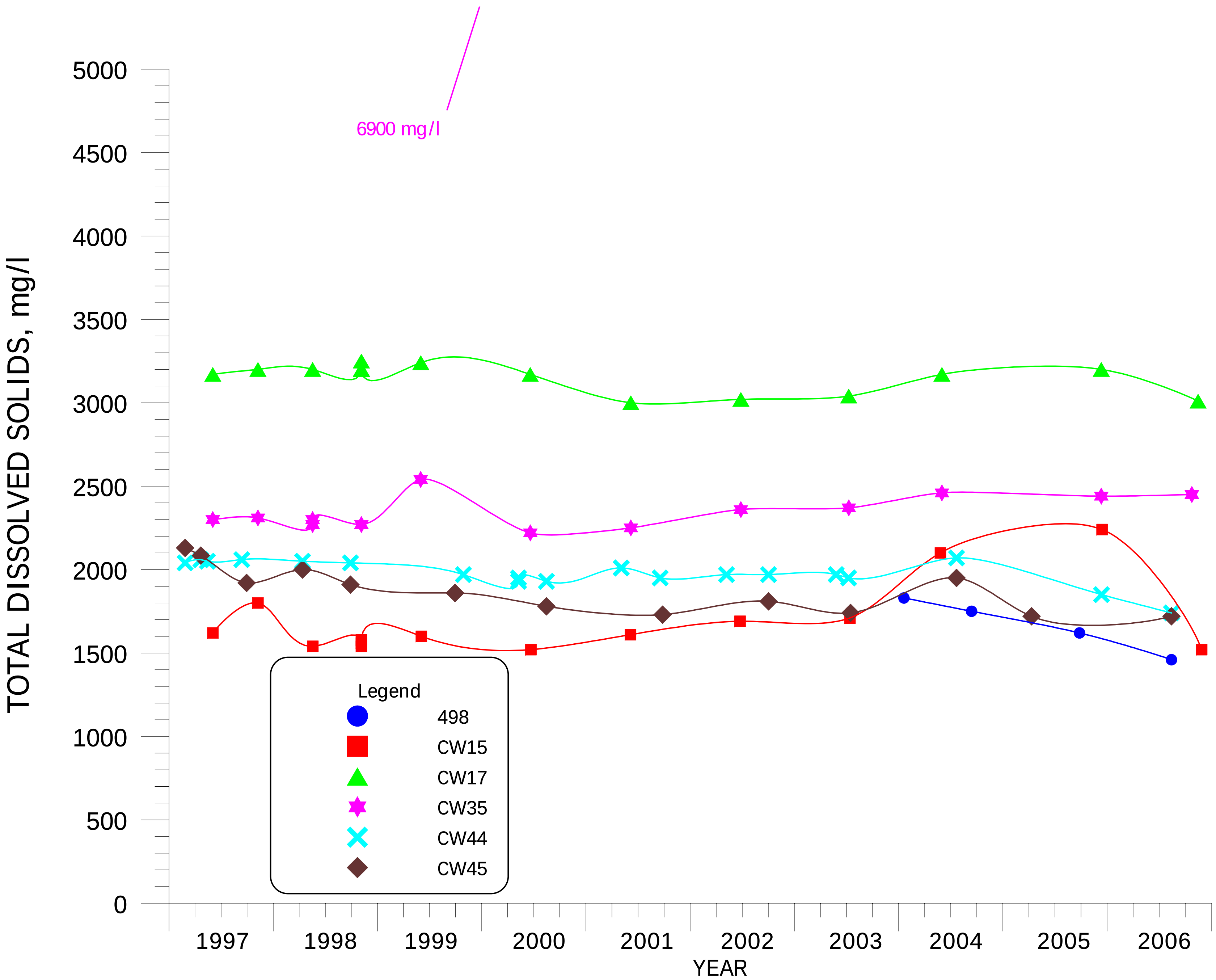


FIGURE 6.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35, CW44 AND CW45.

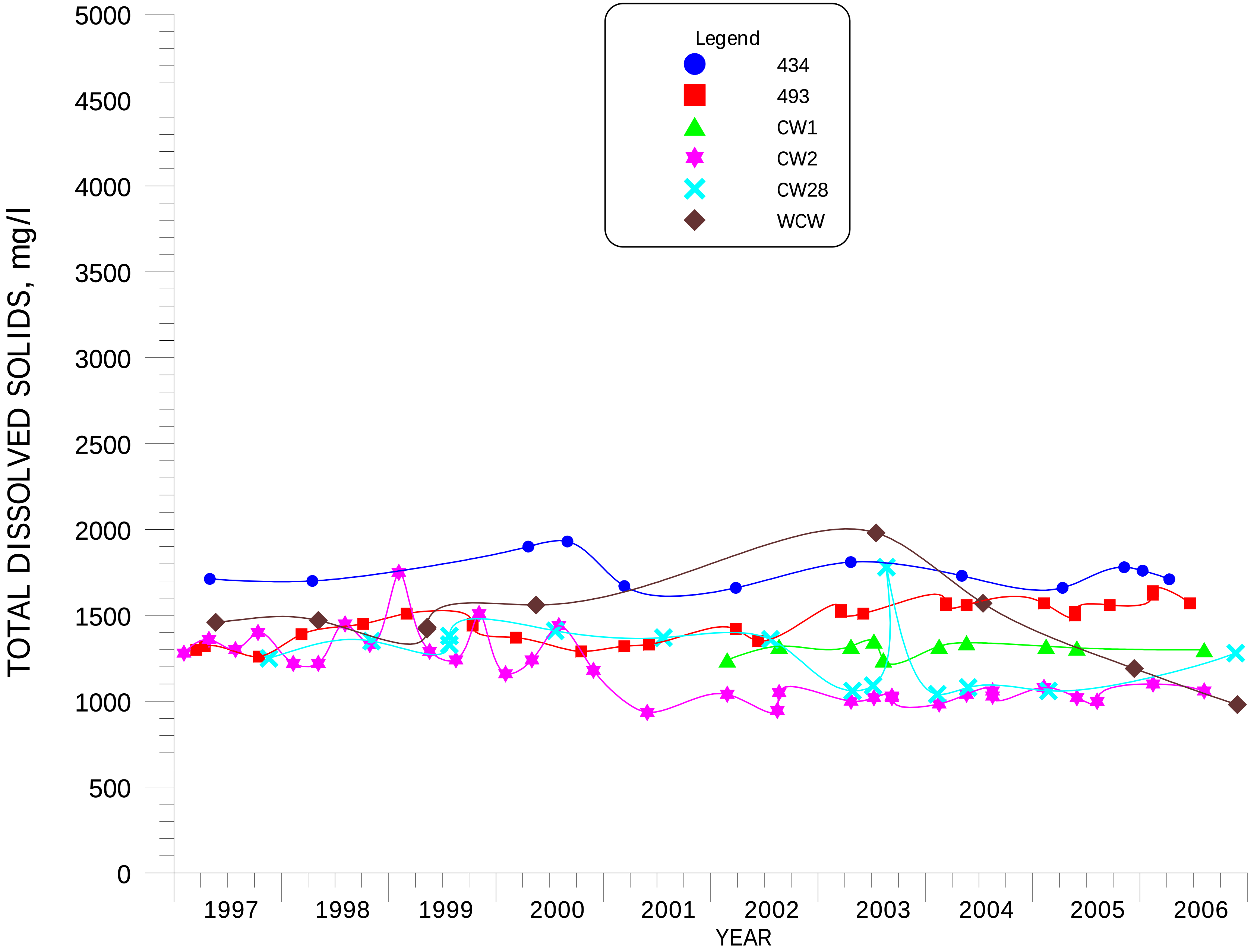
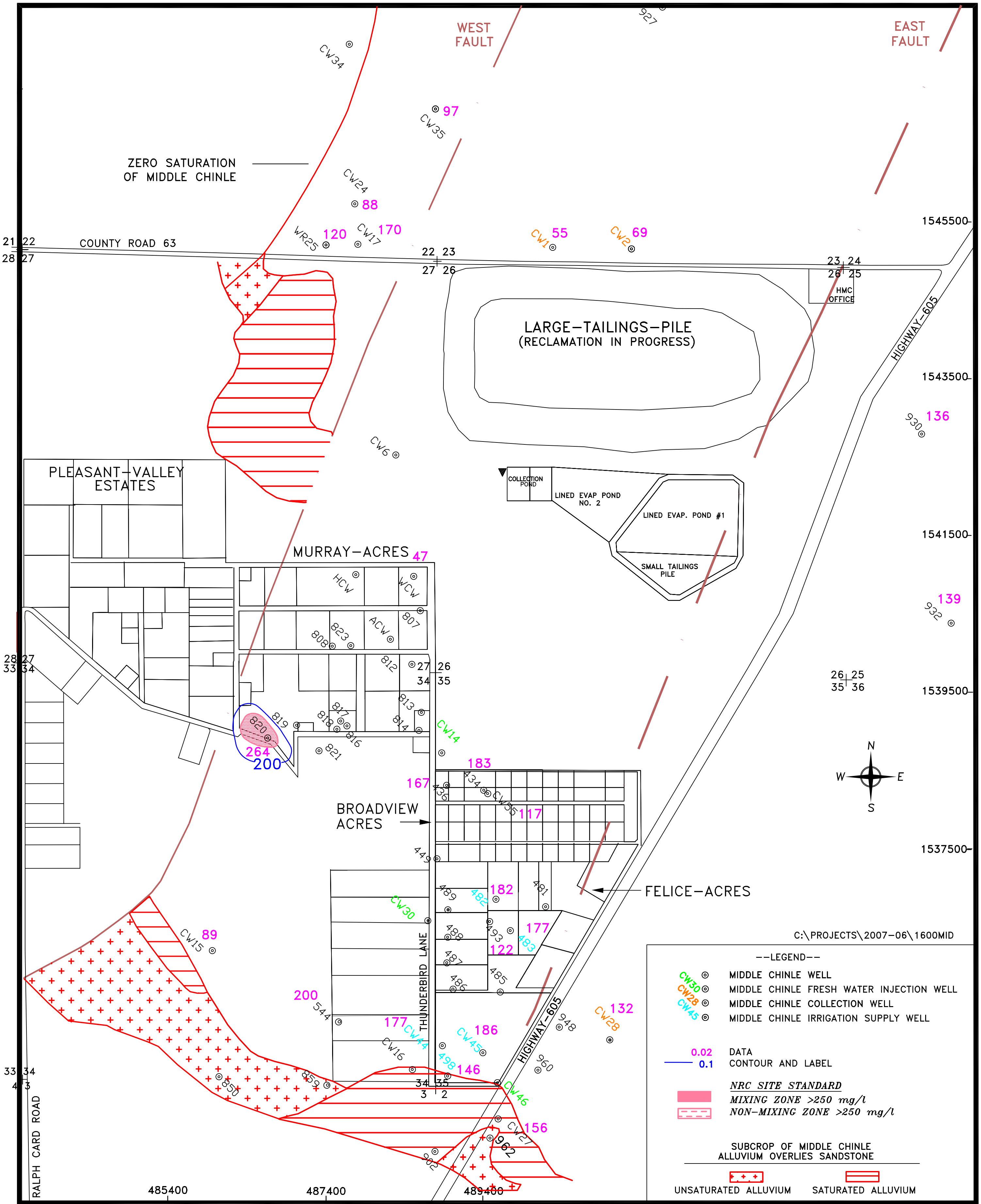


FIGURE 6.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS 434, 493, CW1, CW2, CW28 AND WCW.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

SCALE: 1"=1600'

PAGE: 6.3-15

FIGURE 6.3-8. CHLORIDE CONCENTRATIONS OF THE MIDDLE AQUIFER, 2006, mg/l

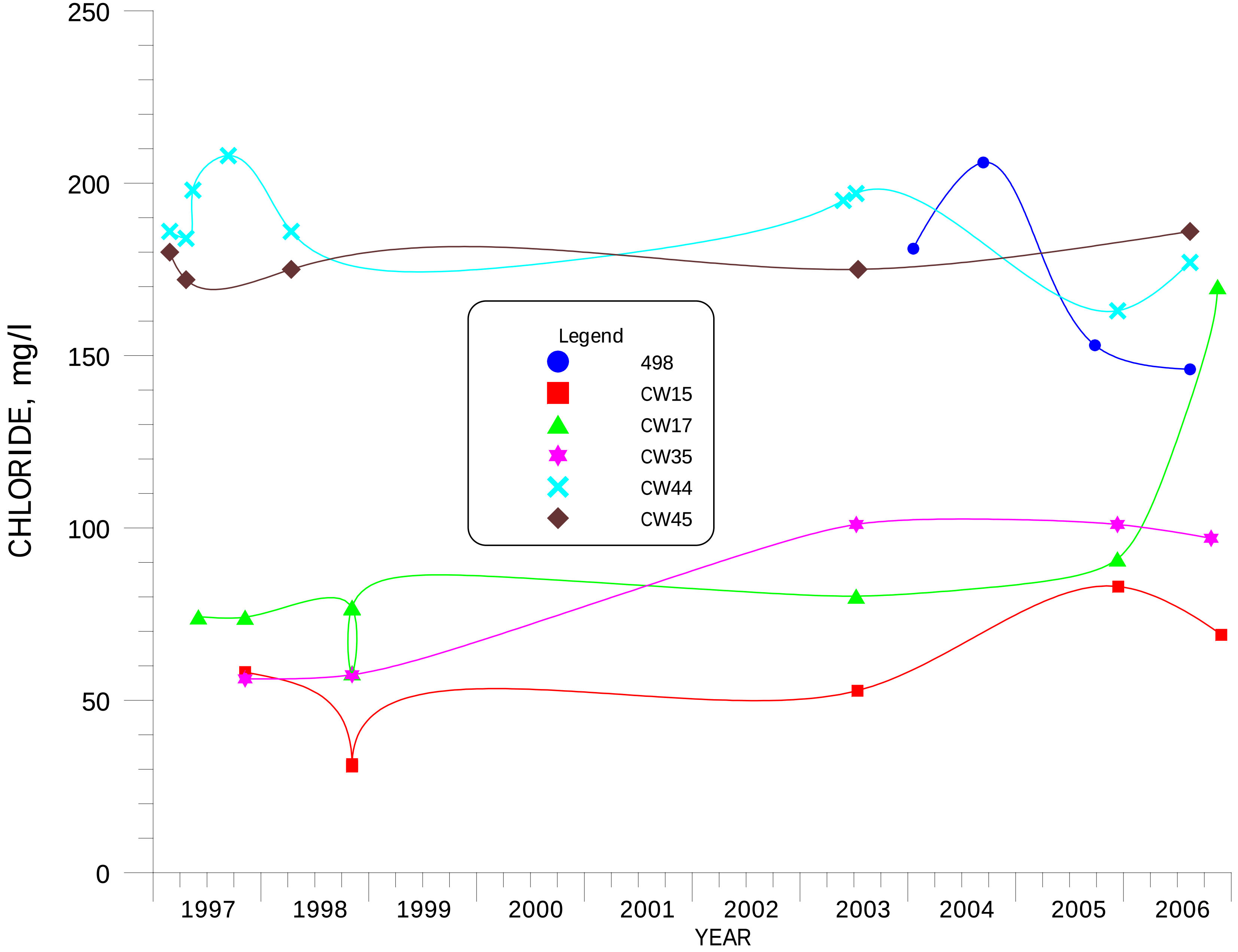


FIGURE 6.3-9. CHLORIDE CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35, CW44 AND CW45.

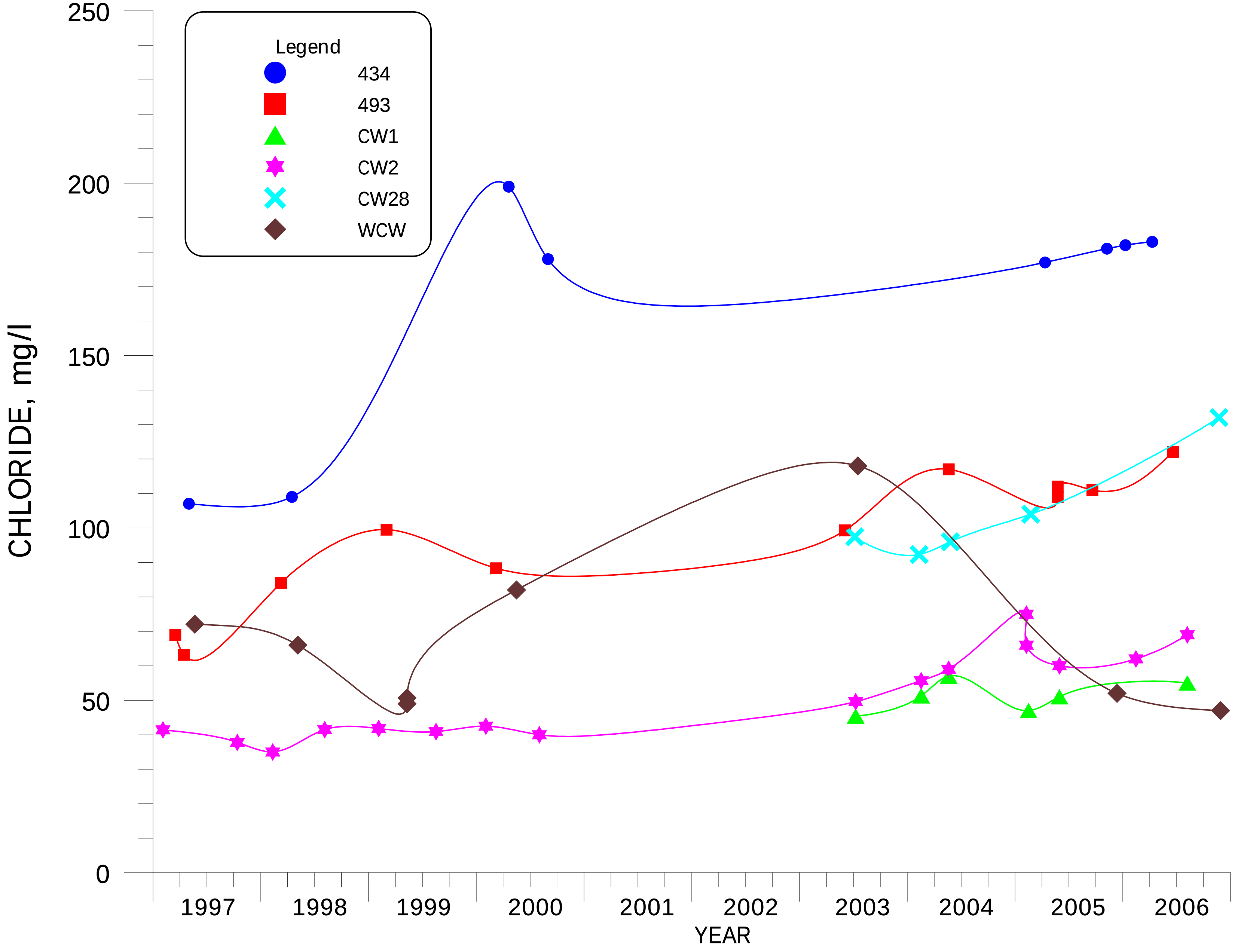
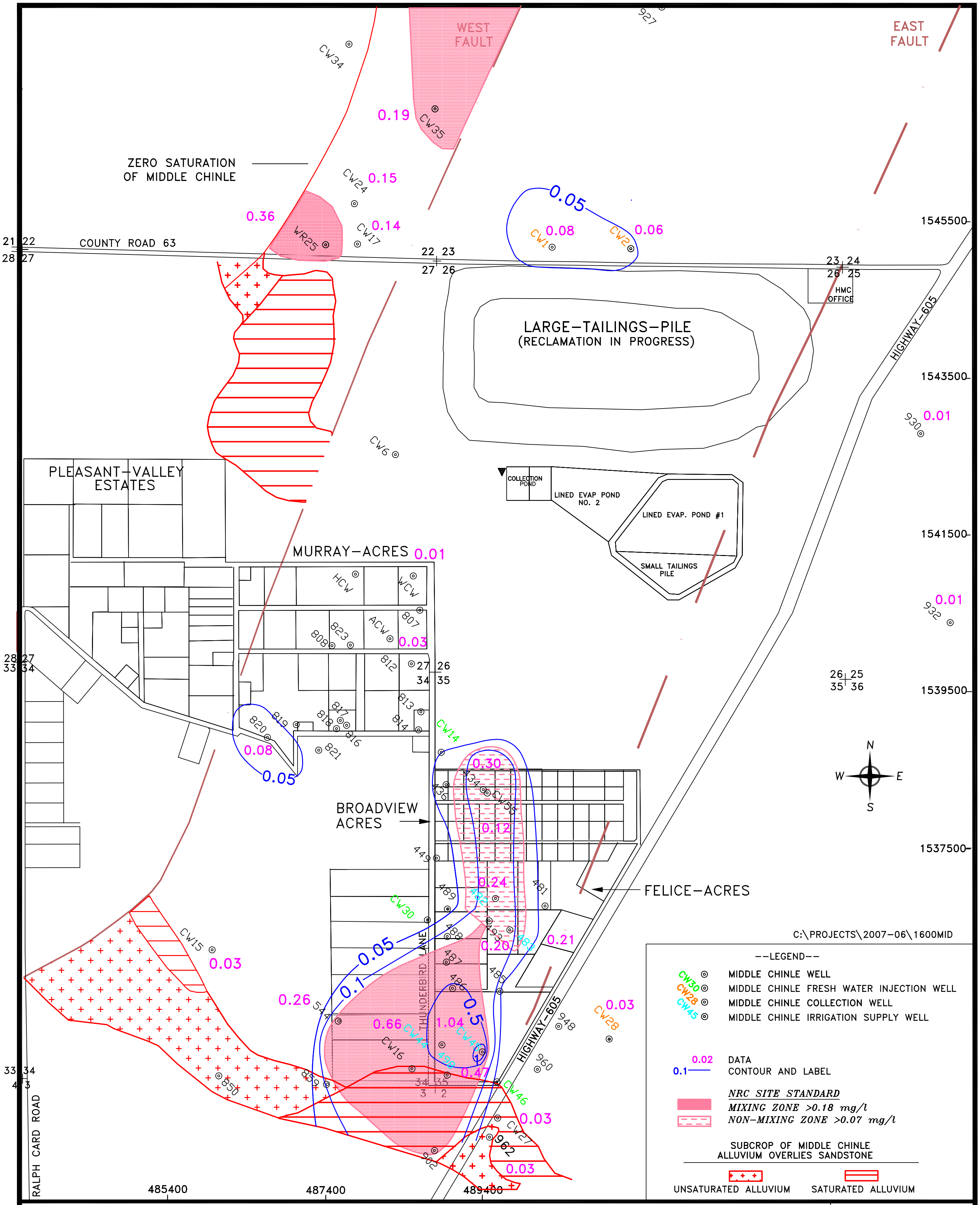


FIGURE 6.3-10. CHLORIDE CONCENTRATIONS FOR NON-MIXING ZONE WELLS 434, 493, CW1, CW2, CW28 AND WCW.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

SCALE: 1"=1600'

FIGURE 6.3-11 URANIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2006, mg/l

PAGE: 6.3-18

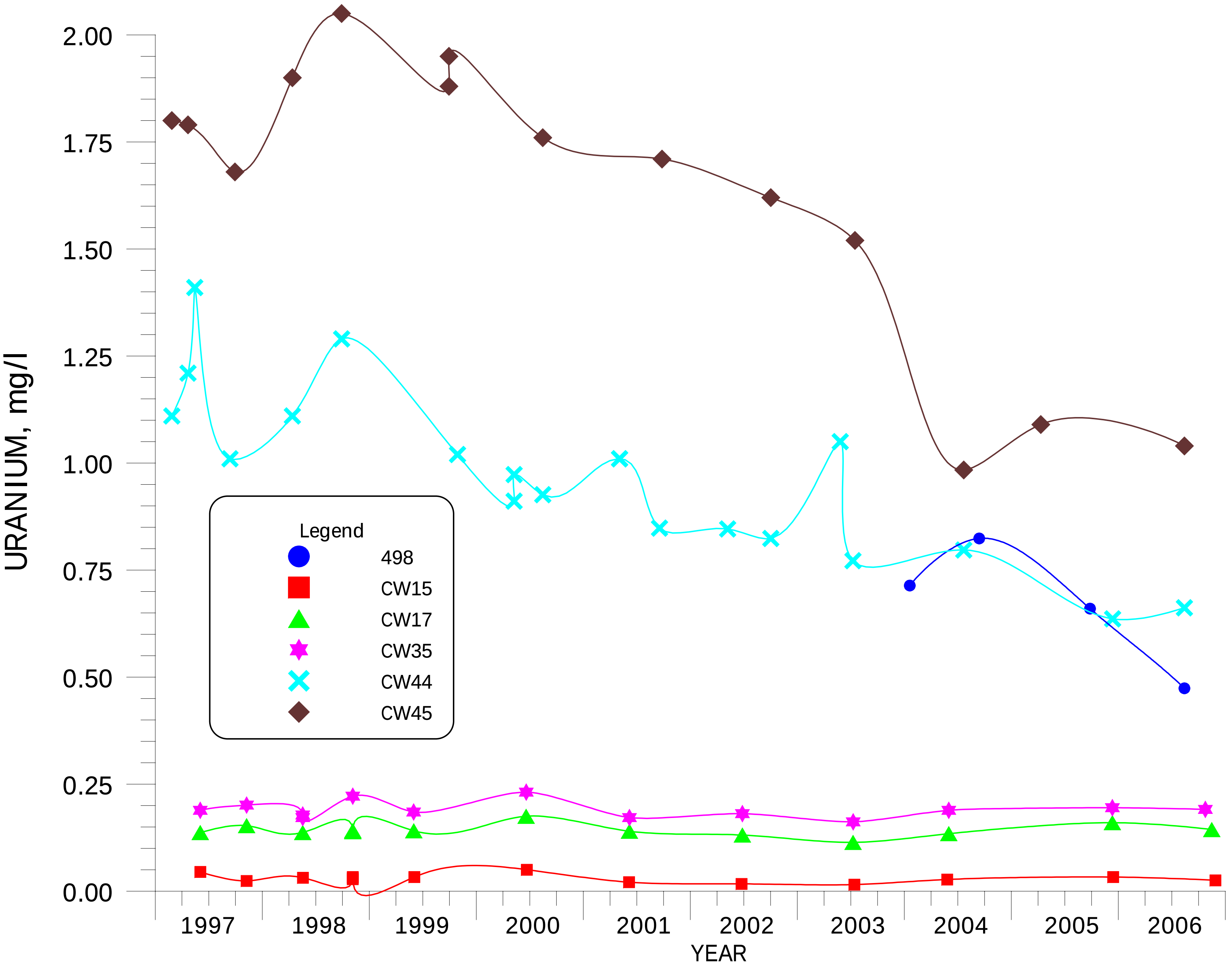


FIGURE 6.3-12. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35, CW44 AND CW45.

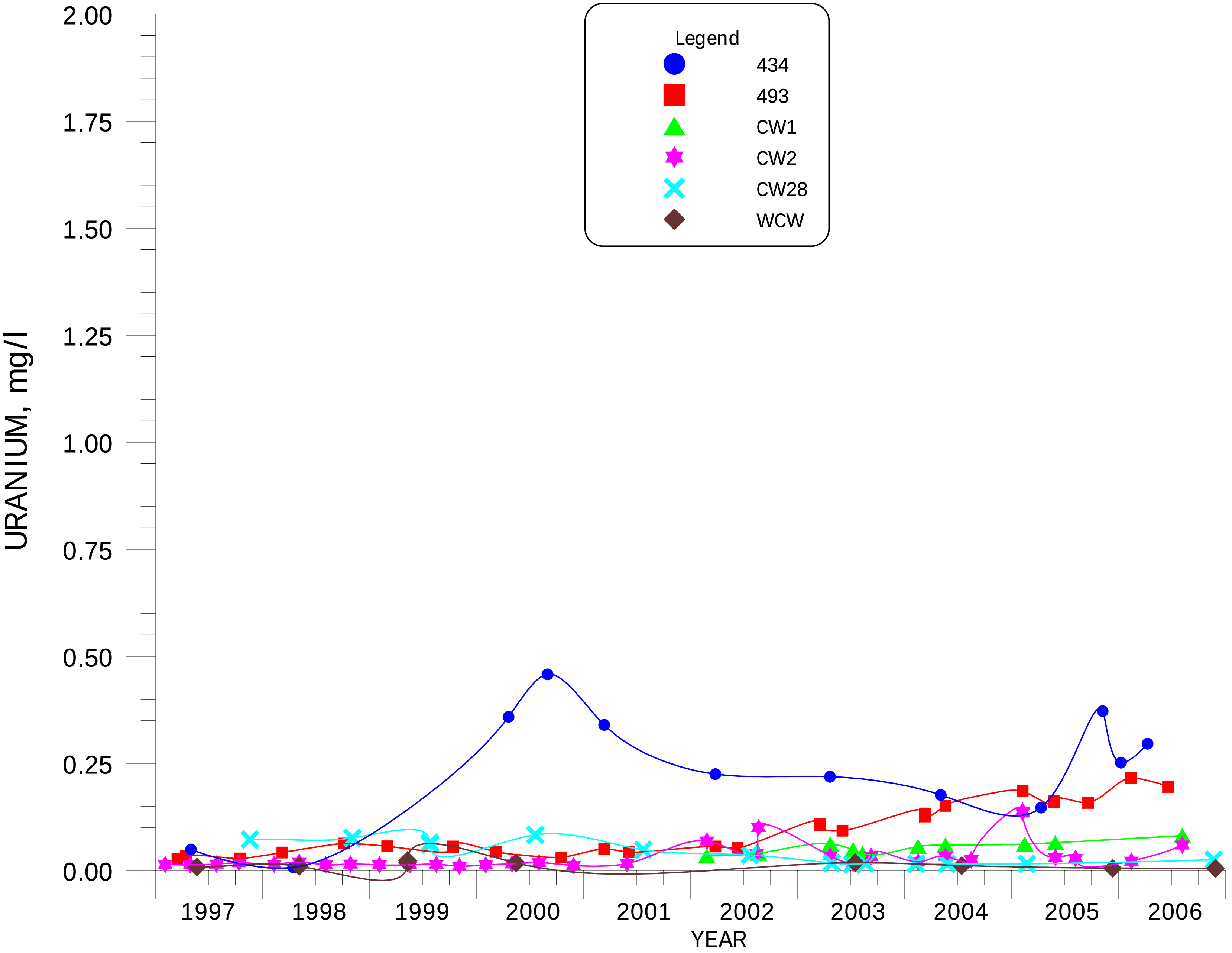
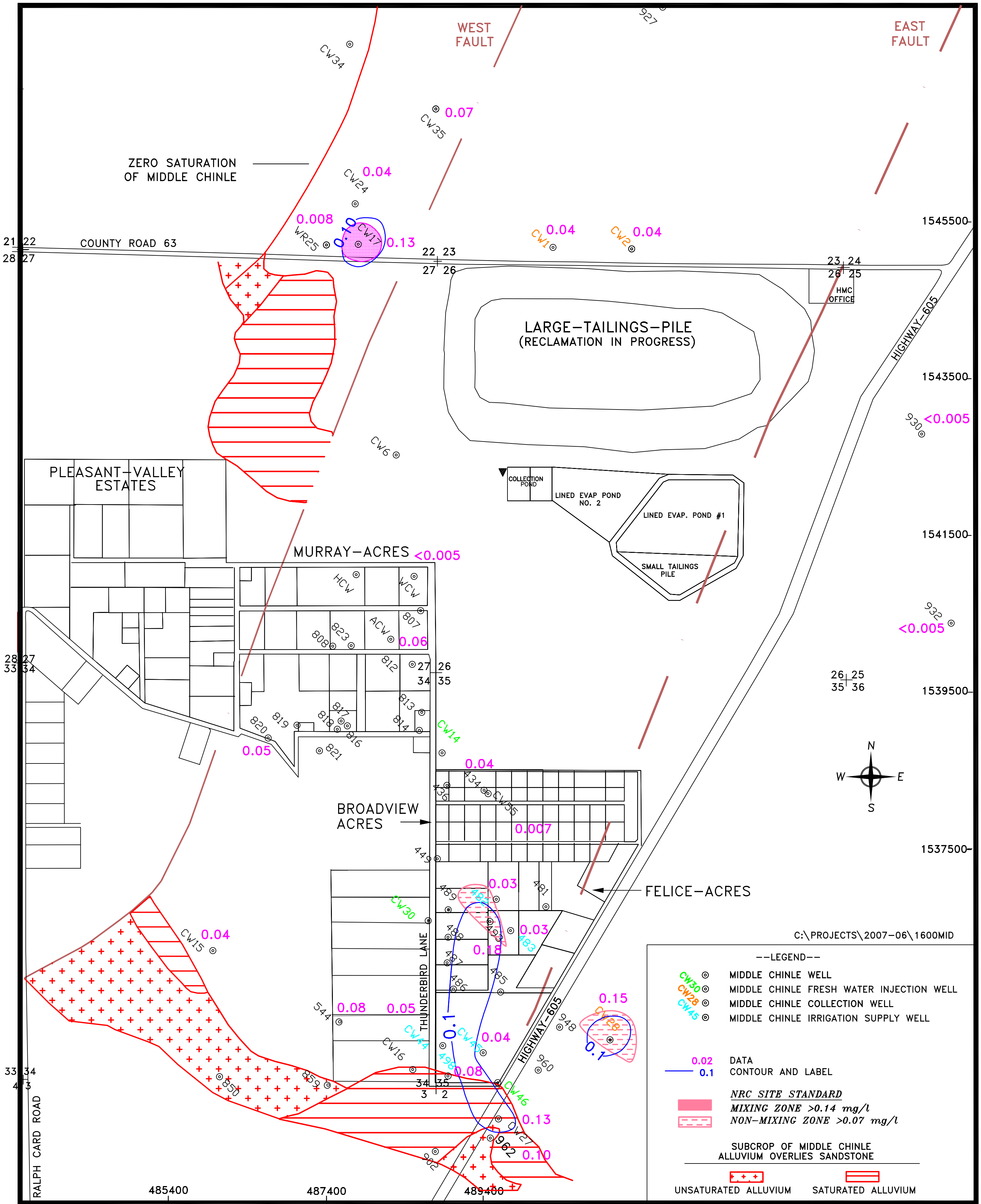


FIGURE 6.3-13. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 434, 493, CW1, CW2, CW28 AND WCW.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

DATE: 03/08/07

SCALE: 1"=1600'

PAGE: 6.3-21

FIGURE 6.3-14. SELENIUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2006, mg/l

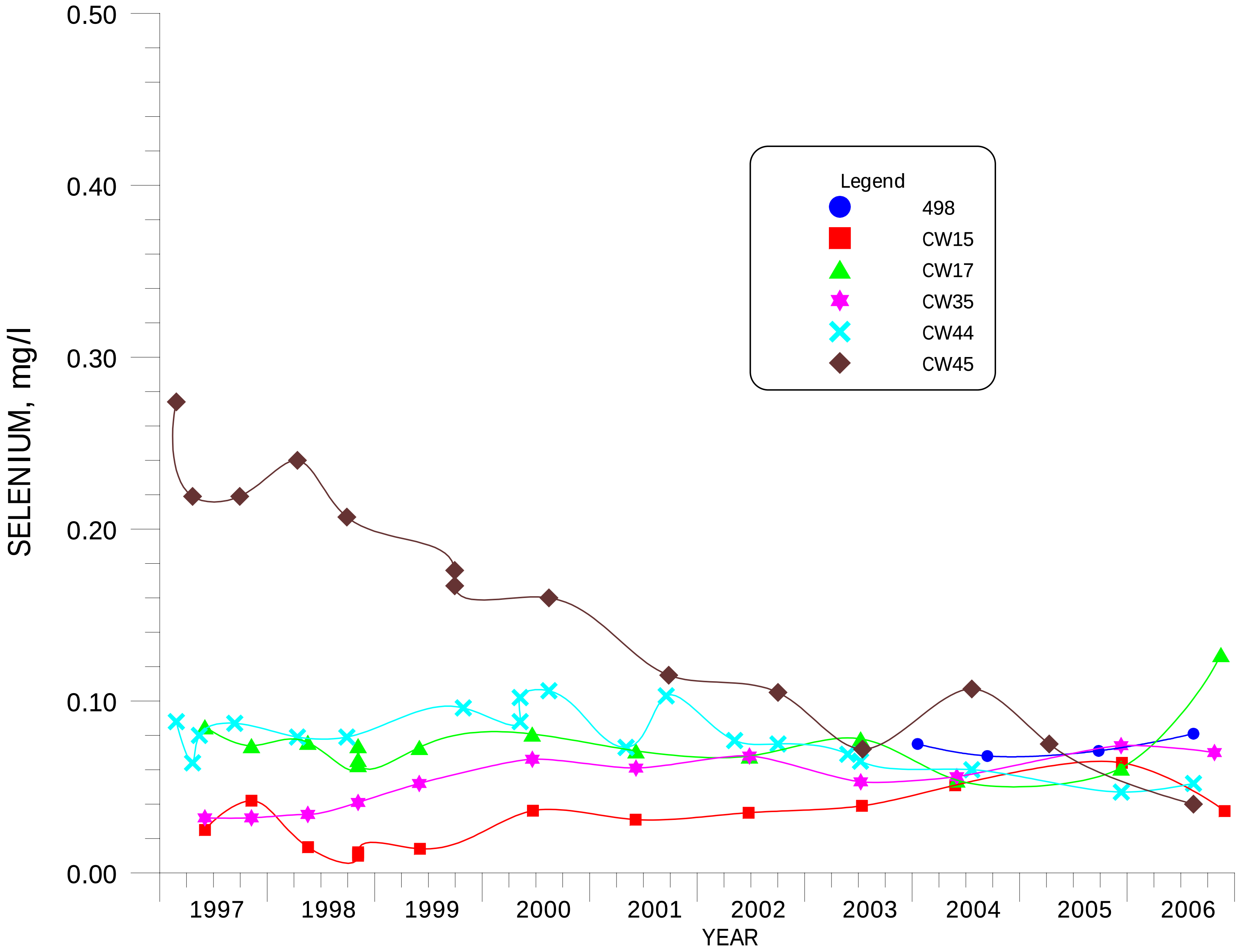


FIGURE 6.3-15. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35, CW44 AND CW45.

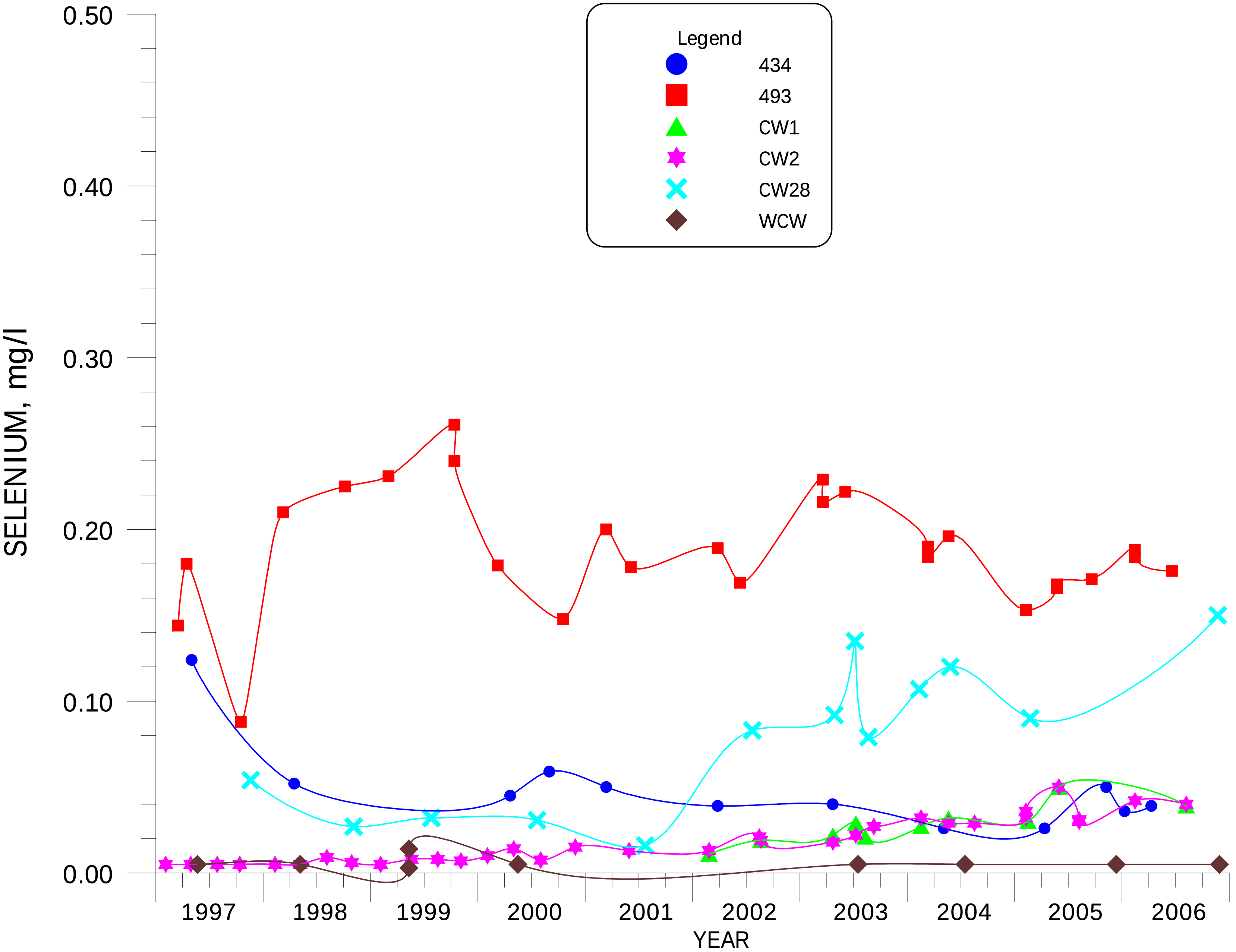
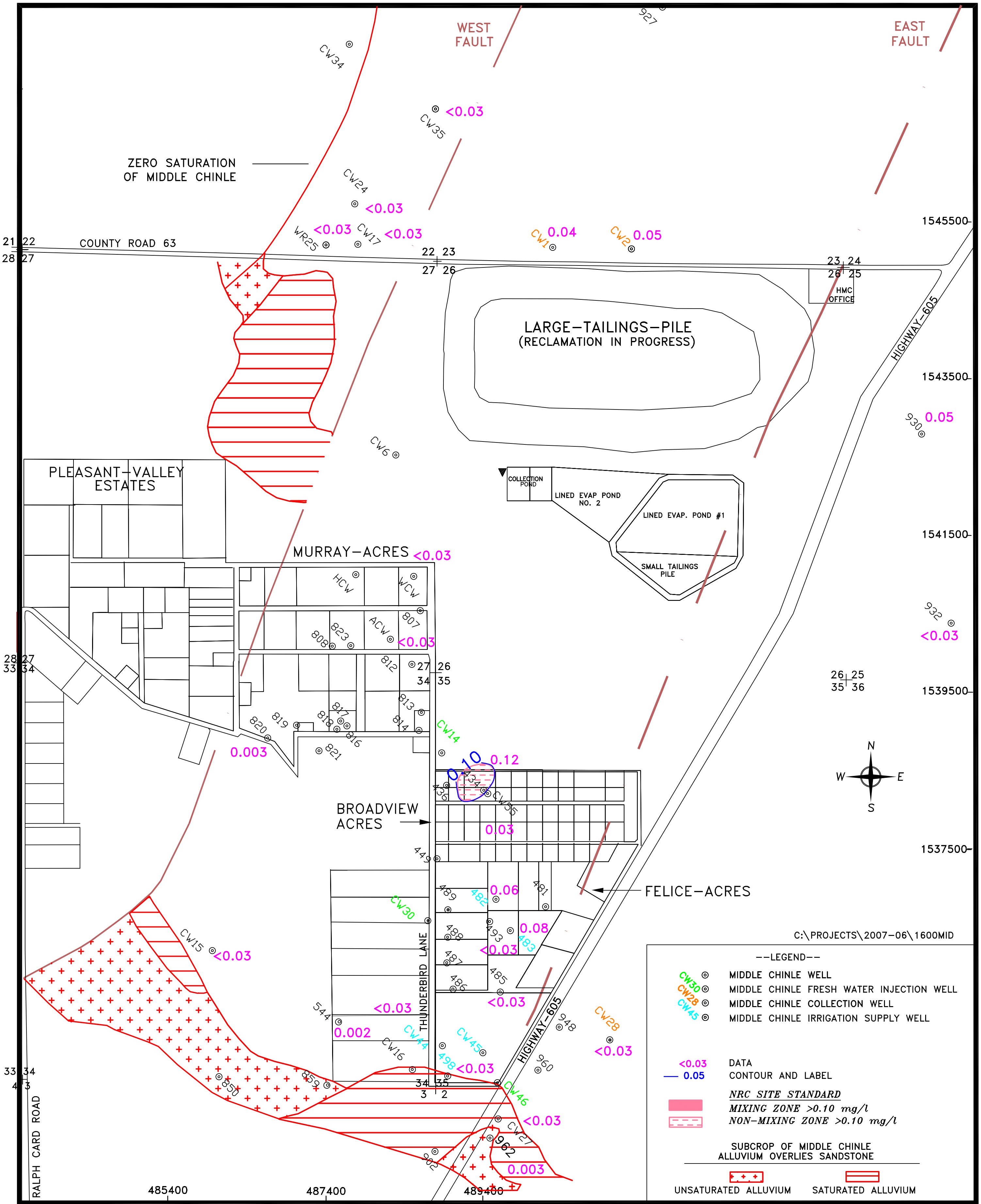


FIGURE 6.3-16. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 434, 493, CW1, CW2, CW28 AND WCW.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 6.3-17. MOLYBDENUM CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2006, mg/l

DATE: 03/08/07

SCALE: 1"=1600'

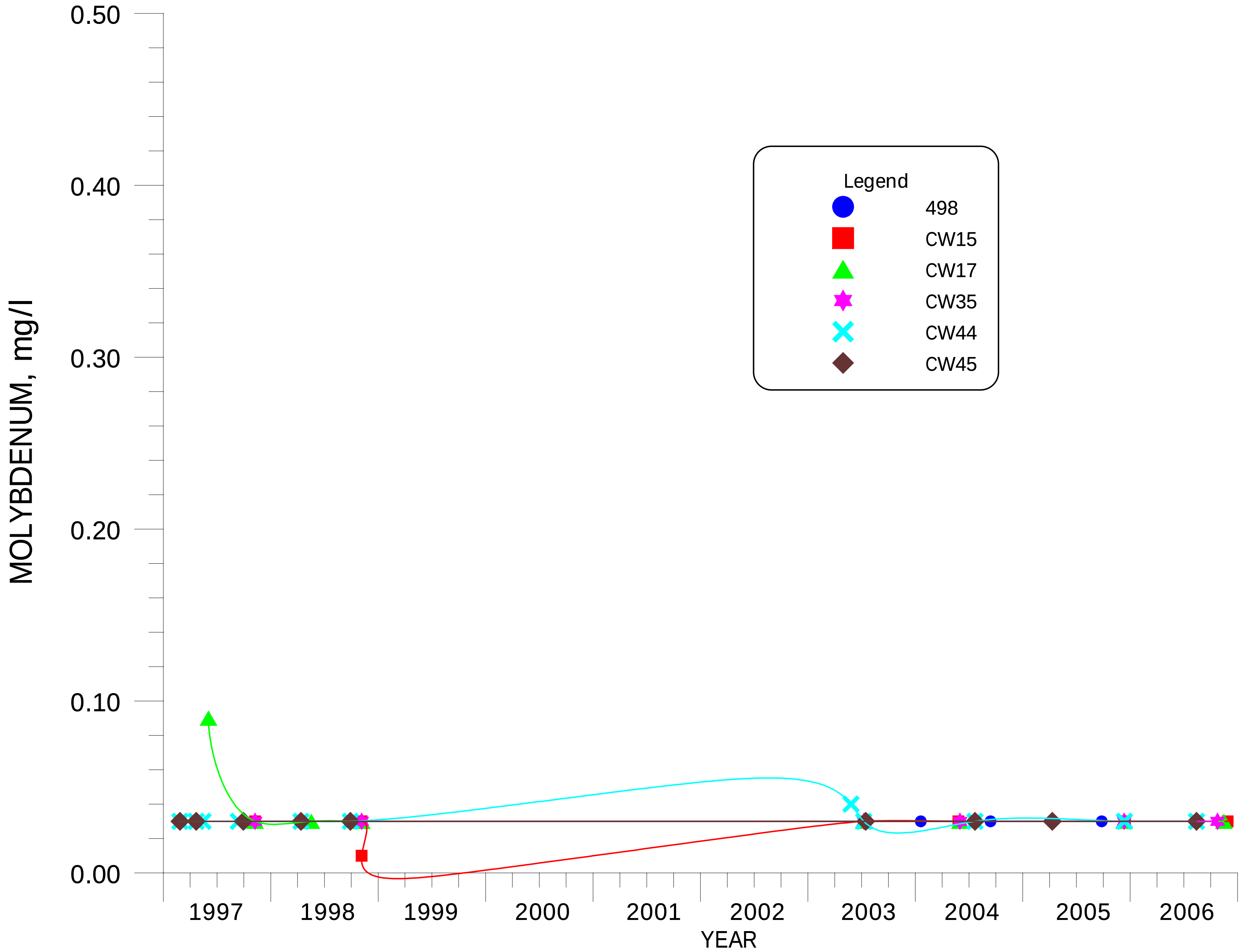


FIGURE 6.3-18. MOLYBDENUM CONCENTRATIONS FOR MIXING ZONE WELLS 498, CW15, CW17, CW35, CW44 AND CW45.

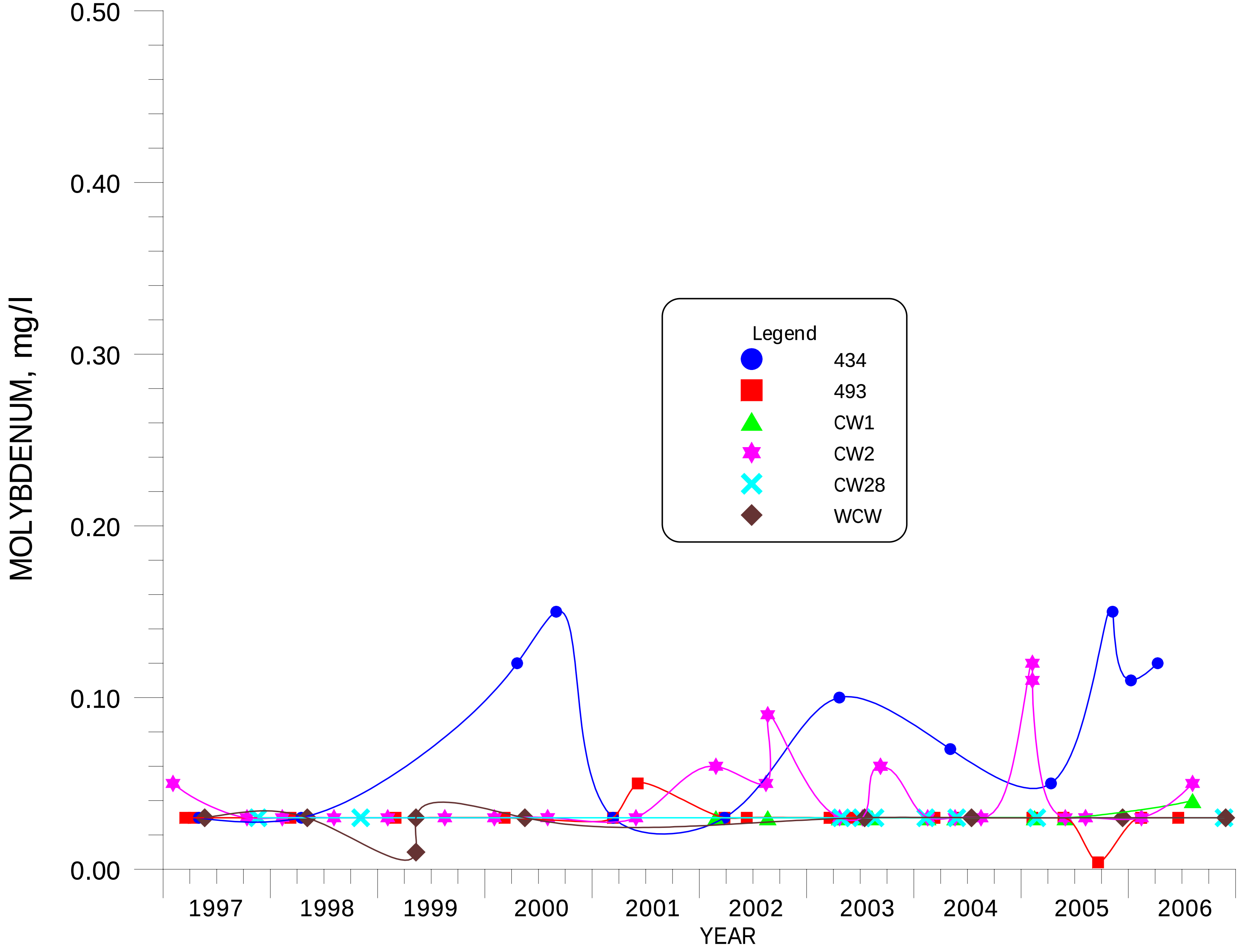
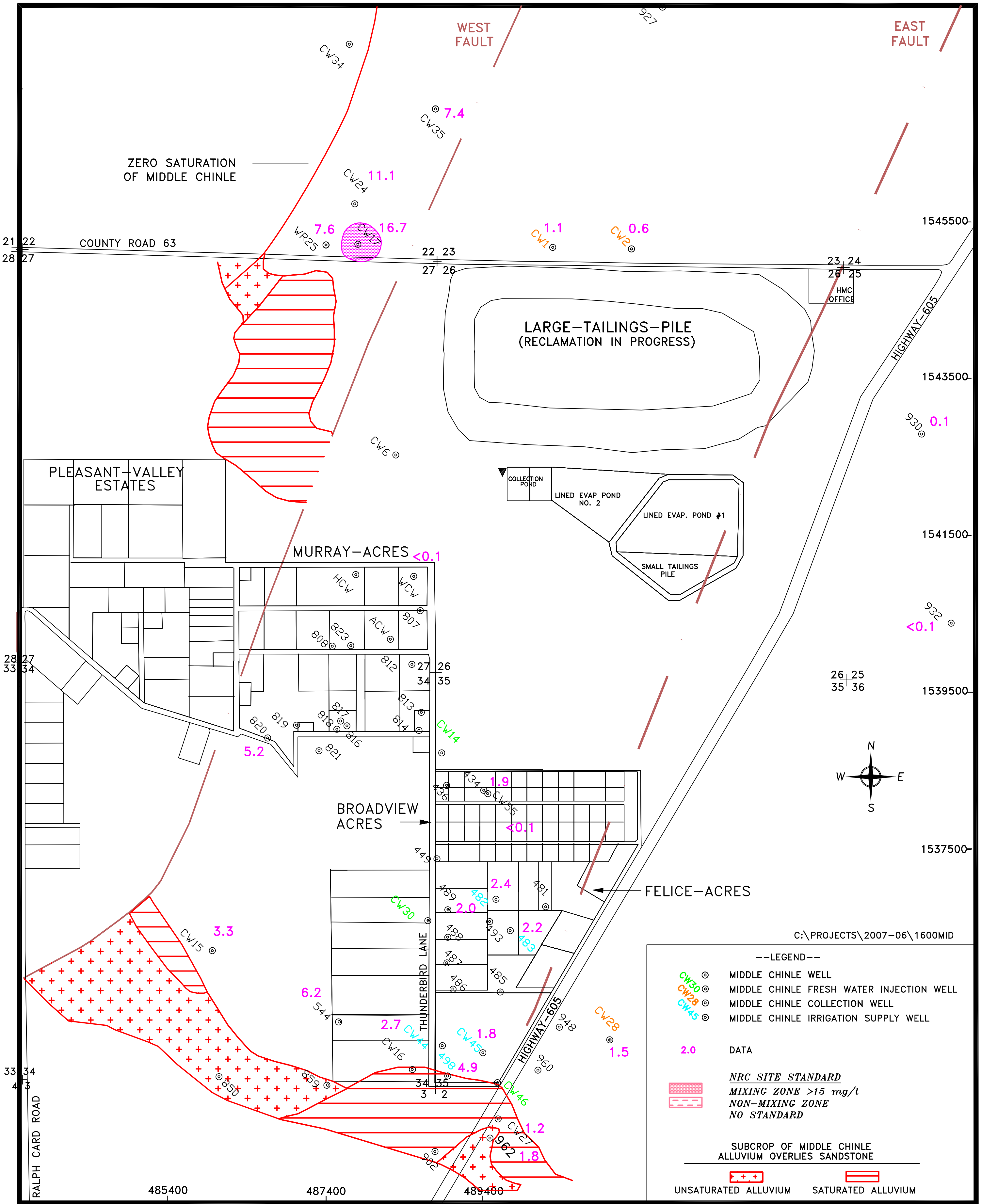


FIGURE 6.3-19. MOLYBDENUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS 434, 493, CW1, CW2, CW28 AND WCW.



HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP–11&12N, RANGE–10W

DATE: 03/08/07

SCALE: 1"=1600'

FIGURE 6.3–20 NITRATE CONCENTRATIONS OF THE MIDDLE CHINLE AQUIFER, 2006, mg/l

SECTION 7

TABLE OF CONTENTS

GROUND WATER MONITORING
FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

SECTION 7

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

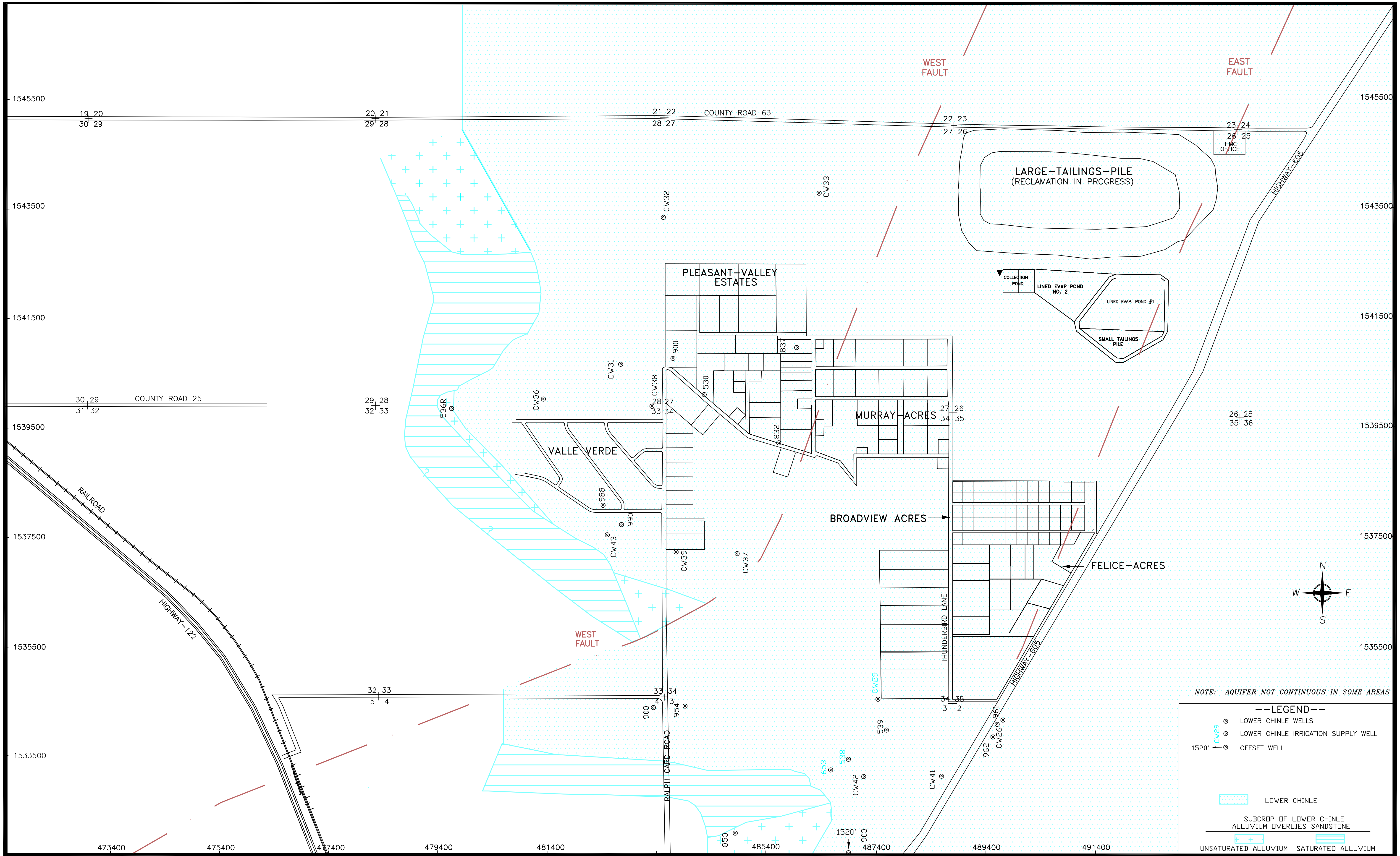
FIGURES
(continued)

7.0 LOWER CHINLE AQUIFER MONITORING

7.1 LOWER CHINLE WELL COMPLETION

The Lower Chinle aquifer is a permeable zone in the Chinle shale which exists below the Middle Chinle sandstone and above the San Andres aquifer. The Lower Chinle aquifer becomes important west and southwest of the Homestake Grants Project area where this unit is present at shallower depths. The general permeability of the Lower Chinle aquifer can vary dramatically, because the transmitting ability of this aquifer depends on the presence of a fractured or altered shale that provides secondary permeability. Tables 5.1-1 through 5.1-4 present the Lower Chinle basic well data along with the other Chinle aquifer wells.

Wells that are completed in the Lower Chinle aquifer are shown on Figure 7.1-1. Chinle shale exists above the top of the Lower Chinle aquifer in the area with the dot pattern. This figure also shows the location of the Chinle shale subcrop. The cyan crosshatch pattern shows where the alluvium is saturated in the subcrop area, while the plus-sign pattern shows where the alluvium is not saturated in the subcrop area. Lower Chinle wells 538, 653 and CW29 were used as irrigation supply wells in 2006.



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600LOW
DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

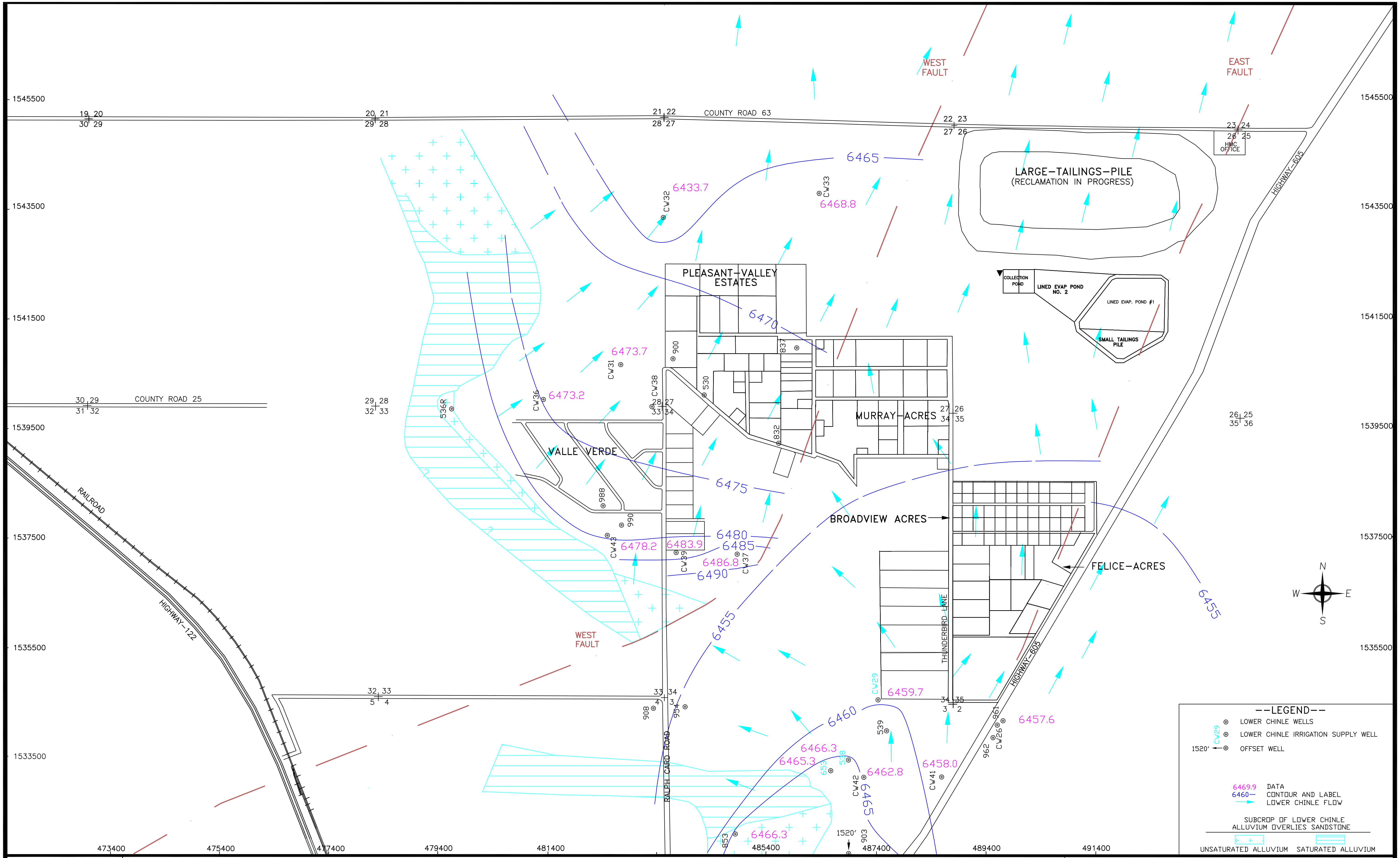
FIGURE 7.1-1. LIMITS OF LOWER CHINLE AQUIFER AND WELL LOCATIONS

7.2 LOWER CHINLE WATER LEVELS

Water-level elevations in the Lower Chinle wells are presented along with the data for the Upper and Middle Chinle wells in Appendix A. Figure 7.2-1 presents water-level elevations in the Lower Chinle wells and the Fall of 2006 water-level elevation contours. The West and East Faults are also shown on this figure. The approximate alluvial-Lower Chinle subcrop areas are also shown on this figure. Flow west of the West Fault in the Lower Chinle is mainly to the northeast. Flow between the two faults is to the northeast in the area of the tailings. The flow is to the northwest in the southern portion of the Lower Chinle aquifer between the faults. The northwesterly flow direction in this area indicates that the Lower Chinle water moves across the West Fault in the area west of Broadview Acres. Lower Chinle water levels in 2006 were lower in Section 3 as a result of continued pumping for the purpose of providing irrigation supply, and because of the drought. Lower water-level elevation exists in the Lower Chinle piezometric surface around irrigation supply wells CW29, 538 and 653 due to pumping from this well during the irrigation season.

The Lower Chinle wells for which water-level time plots were prepared are shown on Figure 7.2-2. Water levels are presented for Lower Chinle wells 653, CW26, CW29, CW41 and CW42 on Figure 7.2-3. Water levels in Lower Chinle well 653, which has been used as an irrigation supply well, vary due to the variable pumping rate but have generally declined during the last few years. Water levels gradually decreased in Lower Chinle well CW29 prior to its use as a fresh-water injection supply well in 2003 and irrigation supply in 2004 through 2006. Small overall water-level decreases had been observed over the last few years in Lower Chinle wells CW26, CW41 and CW42 in 2006.

Figure 7.2-4 presents water-level elevations versus time for Lower Chinle wells CW31, CW32, CW33, CW37 and CW43 (see Figure 7.2-2 for location of these wells). Water levels have gradually declined over the last few years in wells CW31, CW37 and CW43, except for one outlier from well CW31 in 2005. Water levels in 2006 have been fairly steady in well CW33. Water levels have decreased in Lower Chinle well CW32 for several years, and this overall trend continued in 2006 but at a slower rate. The rate and magnitude of decrease in this Lower Chinle well is similar to that observed in the alluvial and San Andres aquifers to the west in Sections 29, 32 and 33. These declines are different than the steady alluvial water levels near well CW32. This indicates that the Lower Chinle aquifer near well CW32 is hydrologically connected to the alluvial aquifer west of this area but is isolated from the alluvial aquifer in its immediate area.



SCALE: 1"=1600'

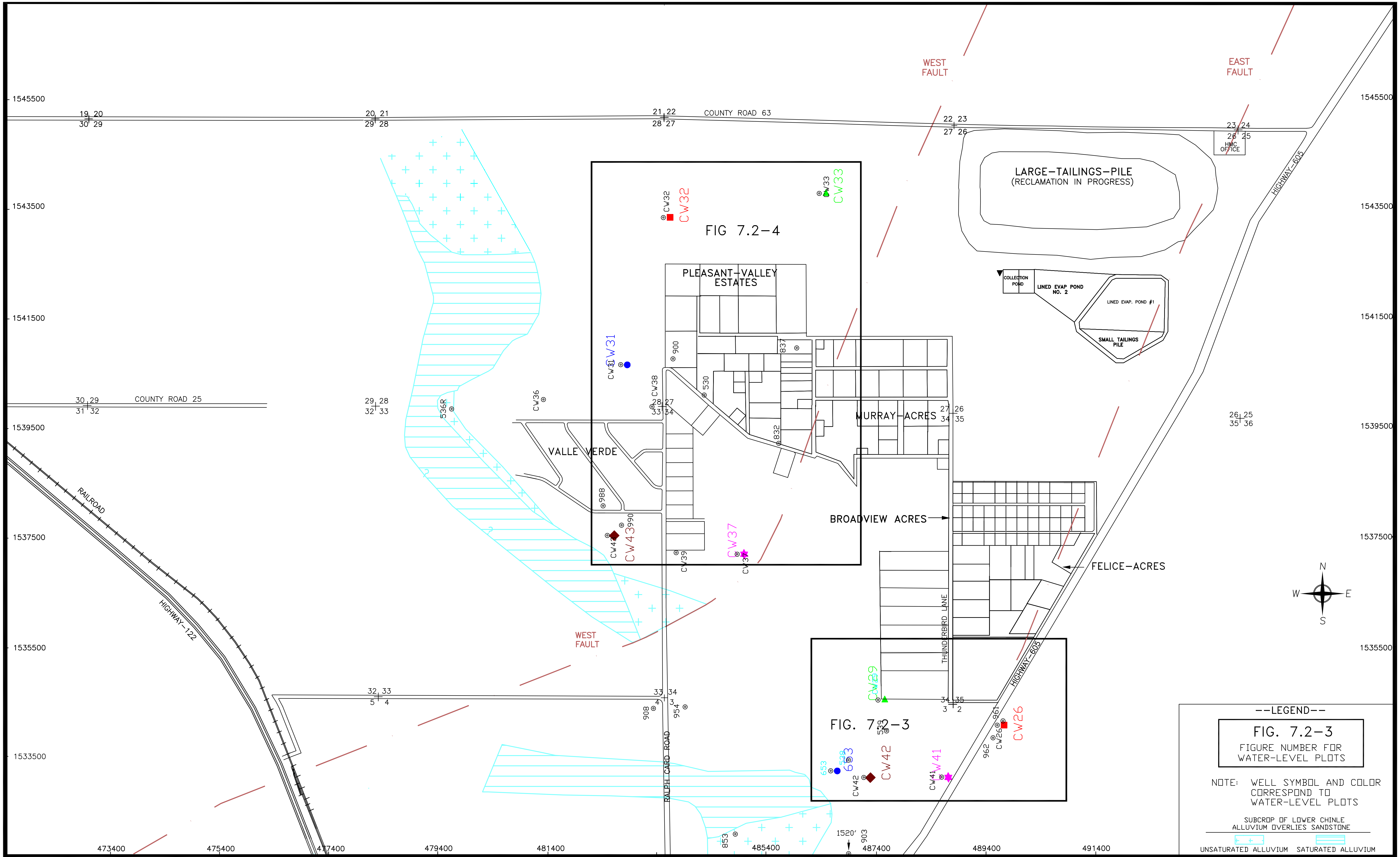
C:\PROJECTS\
2007-06\1600LOW

DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP–11&12–N–RANGE–10–W

FIGURE 7.2–1. WATER–LEVEL ELEVATIONS OF THE LOWER CHINLE AQUIFER, FALL 2006, FT–MSL



SCALE: 1"=1600'
C:\PROJECTS\2007-06\1600LOW
DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 7.2-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-LEVEL PLOTS

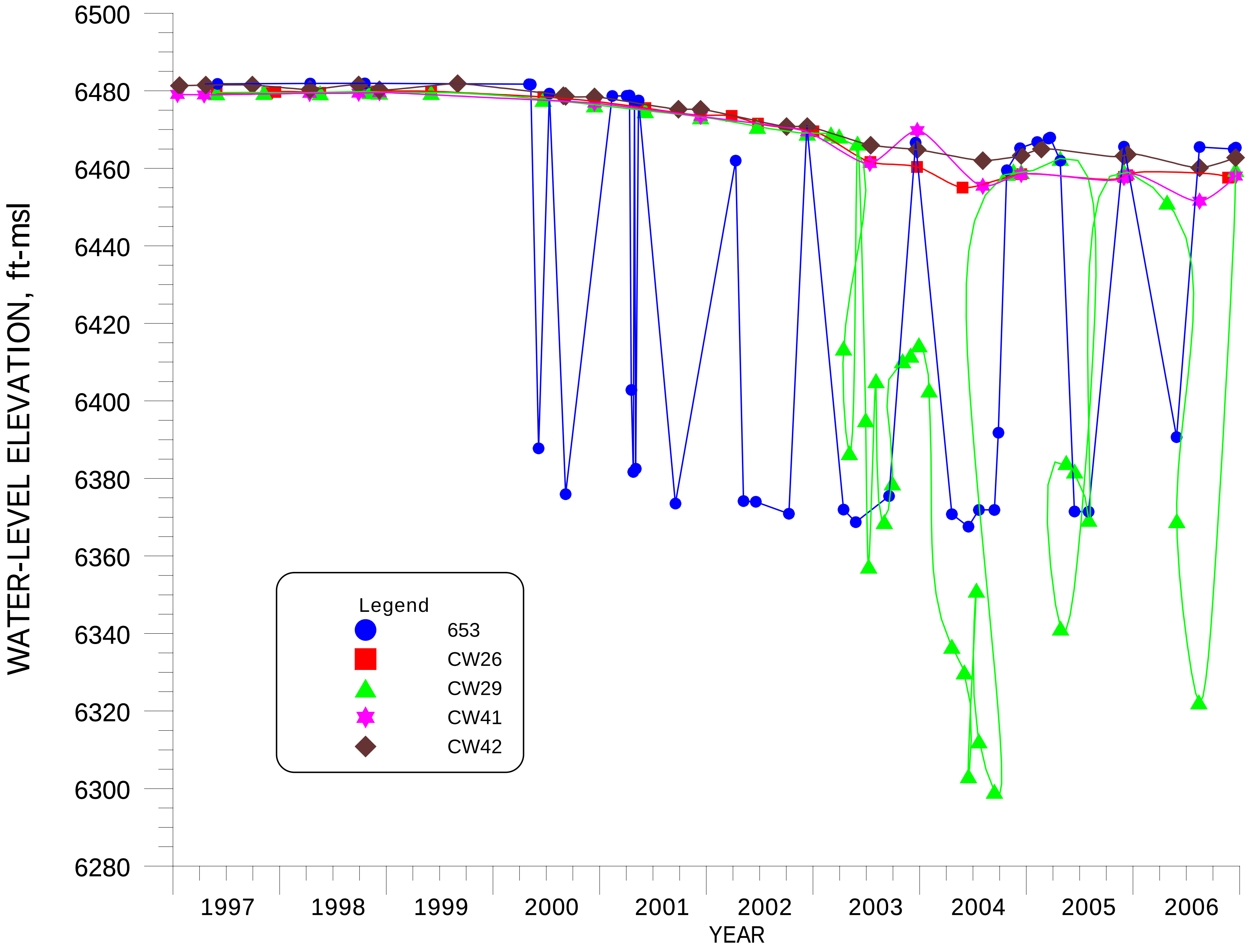


FIGURE 7.2-3. WATER-LEVEL ELEVATION FOR WELLS 653, CW26, CW29, CW41 AND CW42.

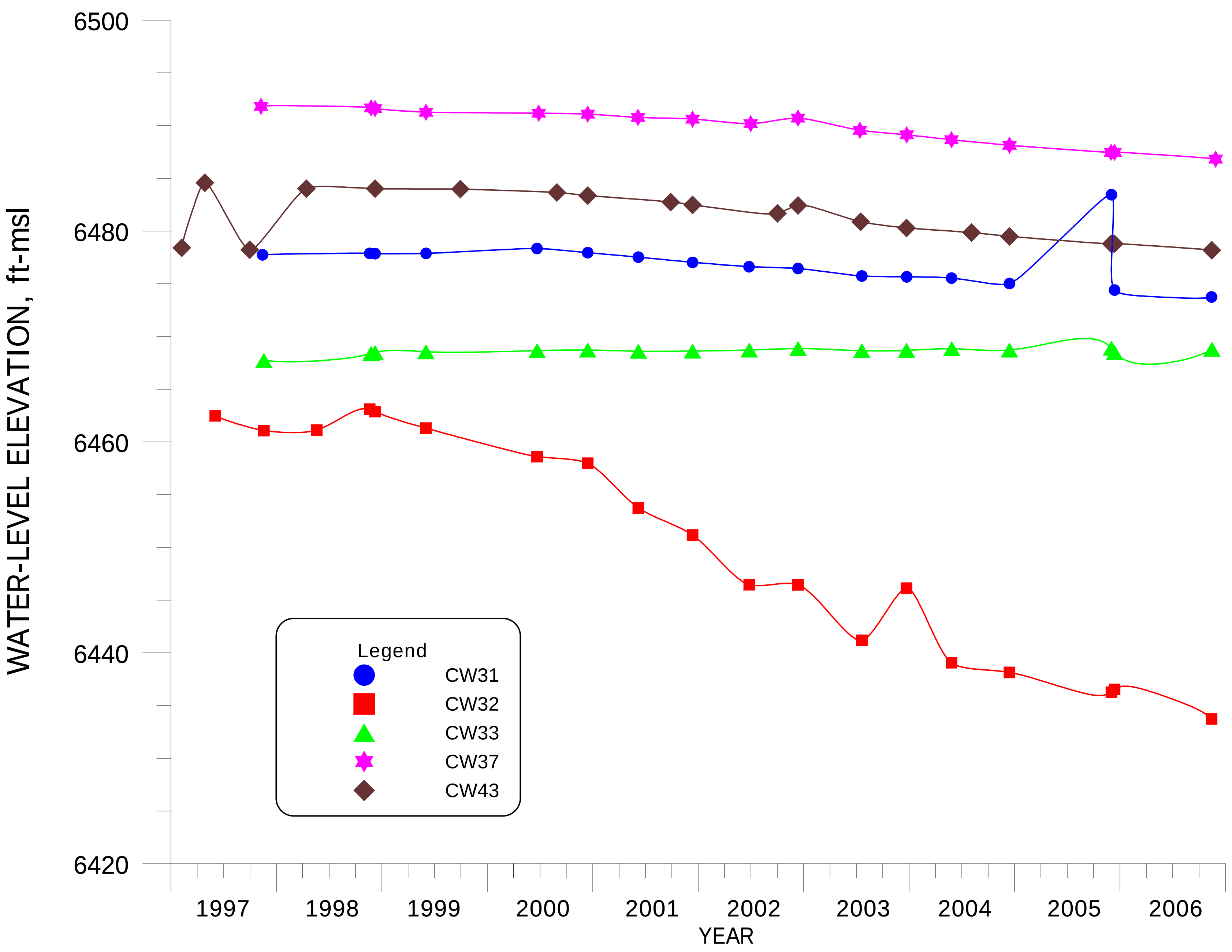


FIGURE 7.2-4. WATER-LEVEL ELEVATION FOR WELLS CW31, CW32, CW33, CW37 AND CW43.

7.3 LOWER CHINLE WATER QUALITY

Water-quality data for 2006 for the Lower Chinle aquifer are presented in Tables B.5-1 and B.5-2 of Appendix B along with water-quality data for the other Chinle aquifer wells. The basic well data presented in Tables 5.1-1 through 5.1-4, and the orientation of the well name on Figure 5.1-1 indicate which of the Chinle wells are completed in the Lower Chinle.

Constituent concentrations in the Lower Chinle aquifer exceed background conditions only in Section 3, except for some natural exceedances in the far down-gradient wells. Sulfate concentrations in the Lower Chinle aquifer are within the NRC standards except in far down-gradient well CW33 where concentrations only slightly exceed the relevant non-mixing background value. These concentrations are deemed to be of natural origin and only slightly exceed the 95th percentile level of the data base. Uranium and selenium concentrations exceed the NRC site standards only in the northeastern and central portions of Section 3. Molybdenum concentrations in the Lower Chinle aquifer are all less than the limit of detection.

7.3.1 SULFATE – LOWER CHINLE

Figure 7.3-1 presents contours of sulfate concentrations in the Lower Chinle aquifer during 2006. NRC Lower Chinle standards based on background data are presented for sulfate in the legend of Figure 7.3-1. The Lower Chinle concentrations varied from 273 to 2100 mg/l. Only the values from well CW33 exceeded the 2000 mg/l upper limit of background for the non-mixing zone. These concentrations are thought to be naturally occurring and likely exceed the full range of background because the data is limited in the downgradient portion of the Lower Chinle aquifer. None of the Lower Chinle concentrations in the mixing zone (see Section 3 and Figure 3.3-3 for zone areas) exceeded the mixing-zone sulfate site standard of 1750 mg/l. Therefore, the Lower Chinle aquifer does not require any restoration with respect to sulfate.

The locations of wells used in the plots of water quality for the Lower Chinle are presented on Figure 7.3-2. Figure 7.3-2 shows that data for mixing zone Lower Chinle wells 653, CW37, CW42 and CW43 are grouped together on the water-quality time plots, and data for non-mixing zone wells CW26, CW29, CW31, CW32, CW33 and CW41 are presented on a second plot.

Figure 7.3-3 presents sulfate concentrations plotted versus time for the Lower Chinle mixing-zone wells. The sulfate concentrations in water collected from each of these wells are less than that in the mixing-zone site standard, showing that sulfate restoration of the Lower Chinle is not needed in the southern portion of the aquifer.

Sulfate concentrations plotted for Lower Chinle wells CW26, CW29, CW31, CW32, CW33 and CW41 are presented on Figure 7.3-4 (see Figure 7.3-2 for location of these wells). Sulfate concentrations have been steady in Lower Chinle wells CW26, CW31 and CW41 over the last few years, while an increasing trend had been observed in water from wells CW29 and CW33. Sulfate concentrations in these two wells in 2006 were steady. The sulfate concentration in well CW32 declined in 2006. The data collected since mid-2003 was not available when the background level was calculated. The exceedance in sulfate values from wells CW32 and CW33 is thought to be natural.

7.3.2 TOTAL DISSOLVED SOLIDS – LOWER CHINLE

Figure 7.3-5 presents the total dissolved solids (TDS) concentrations in the Lower Chinle aquifer during 2006. All concentrations for 2006 sampled wells are less than the non-mixing zone site standard value of 4140 mg/l. Concentrations are thought to naturally exceed this level farther down-gradient as shown by the cyan pattern. The TDS concentration naturally increases down-gradient due to the low permeability and correspondingly slow movement of water through this shale aquifer.

Figure 7.3-6 presents TDS concentrations for Upper Chinle wells 653, CW37, CW42 and CW43. TDS concentrations in these wells have been fairly steady with a small decline in 2006 for three of the wells. All of these concentrations are below the mixing-zone site standard of 3140 mg/l.

TDS concentrations for wells CW26, CW29, CW31, CW32, CW33 and CW41 are presented on Figure 7.3-7. This figure demonstrates that, overall, TDS concentrations have remained fairly stable during the last few years except for the 2005 TDS value for well CW26. The 2006 results show that the 2005 TDS for well CW26 was an outlier. A decline was also observed in the concentration in well CW32 in 2006. Additionally, these historical TDS concentrations are well within the range of natural fluctuation in the non-mixing zone of the Lower Chinle aquifer, except for three values from well CW32.

7.3.3 CHLORIDE – LOWER CHINLE

Chloride concentration data in the Lower Chinle aquifer were updated during 2003 to confirm that restoration for this constituent is not necessary in the Lower Chinle aquifer. The chloride concentrations measured during 2006 continue to support this conclusion and are all less than the NRC standard.

7.3.4 URANIUM – LOWER CHINLE

Uranium concentration in the Lower Chinle aquifer is an important constituent with respect to aquifer restoration in Section 3. Figure 7.3-8 presents the uranium concentrations in the Lower Chinle aquifer for 2006. Only three of the uranium concentrations in the Lower Chinle exceeded the mixing-zone background concentration, and three exceeded the non-mixing zone background concentration. The highest values are in the northeast portion of Section 3 in water collected from wells 538, 653 and CW42. These concentrations should gradually decrease to less than background concentrations with the continuing use of this water in the irrigation program.

Uranium concentrations plotted versus time for Lower Chinle wells 653, CW37, CW42 and CW43 are presented on Figure 7.3-9. The small decreases in uranium concentrations in well CW42 are due to the pumping of wells 538 and 653 to obtain a water supply for the irrigation system. This plot also shows an increase in the uranium concentration in well 653 in 2006 but this level is still below pre-2005 values. Additional results will be needed to show that the restoration of this area has started. Uranium concentrations in wells CW37 and CW43 have stayed low.

The uranium concentrations in all of the Lower Chinle wells with data presented on Figure 7.3-10 have remained at low levels with a small increase in well CW29.

7.3.5 SELENIUM – LOWER CHINLE

Selenium concentrations in the Lower Chinle aquifer for 2006 are presented on Figure 7.3-11. None of the selenium concentrations in water from the Lower Chinle wells exceeded the NRC site standards. The mixing and non-mixing zone NRC site standards are 0.14 and 0.32 mg/l, respectively, for the Lower Chinle aquifer.

Figure 7.3-12 presents selenium concentration versus time plots for wells 653, CW37, CW42 and CW43. The selenium concentrations in these Lower Chinle aquifer wells were fairly similar to levels previously observed except for a decrease in well CW42 in 2006.

Figure 7.3-13 presents selenium concentrations plotted versus time for Lower Chinle wells CW26, CW29, CW31, CW32, CW33 and CW41. Selenium concentrations measured during 2006 were consistent with the 2005 levels for each of these wells except a decrease in well CW26.

7.3.6 MOLYBDENUM – LOWER CHINLE

Molybdenum concentrations in water samples collected from the Lower Chinle wells in 2006 were all low at levels near the detection limit and, therefore, no areal molybdenum concentration figures or time plots were prepared. The 2006 results are consistent with historical measurements of molybdenum in the Lower Chinle aquifer. Molybdenum is not a constituent of concern in the Lower Chinle aquifer.

7.3.7 NITRATE – LOWER CHINLE

Nitrate monitoring of the Lower Chinle aquifer was updated in 2003 to confirm that concentrations remain significantly below the site standard of 15 mg/l for the mixing zone. Nitrate concentrations measured in 2006 are presented in Figure 7.3-14 and are all significantly below the NRC site standard except one value from well 536R which is above the site standard.

Plots of nitrate concentrations versus time were not prepared, because historically, values measured in Lower Chinle wells contained very low concentrations, similar to those measured in 2006. Nitrate concentrations from the tailings seepage are not expected to be significant in the future in the Lower Chinle aquifer due to the very limited extent of elevated concentrations in the alluvial aquifer. Establishment of a site standard for nitrate in the Lower Chinle non-mixing zone therefore has not been set.

7.3.8 RADIUM-226 AND RADUIM-228 – LOWER CHINLE

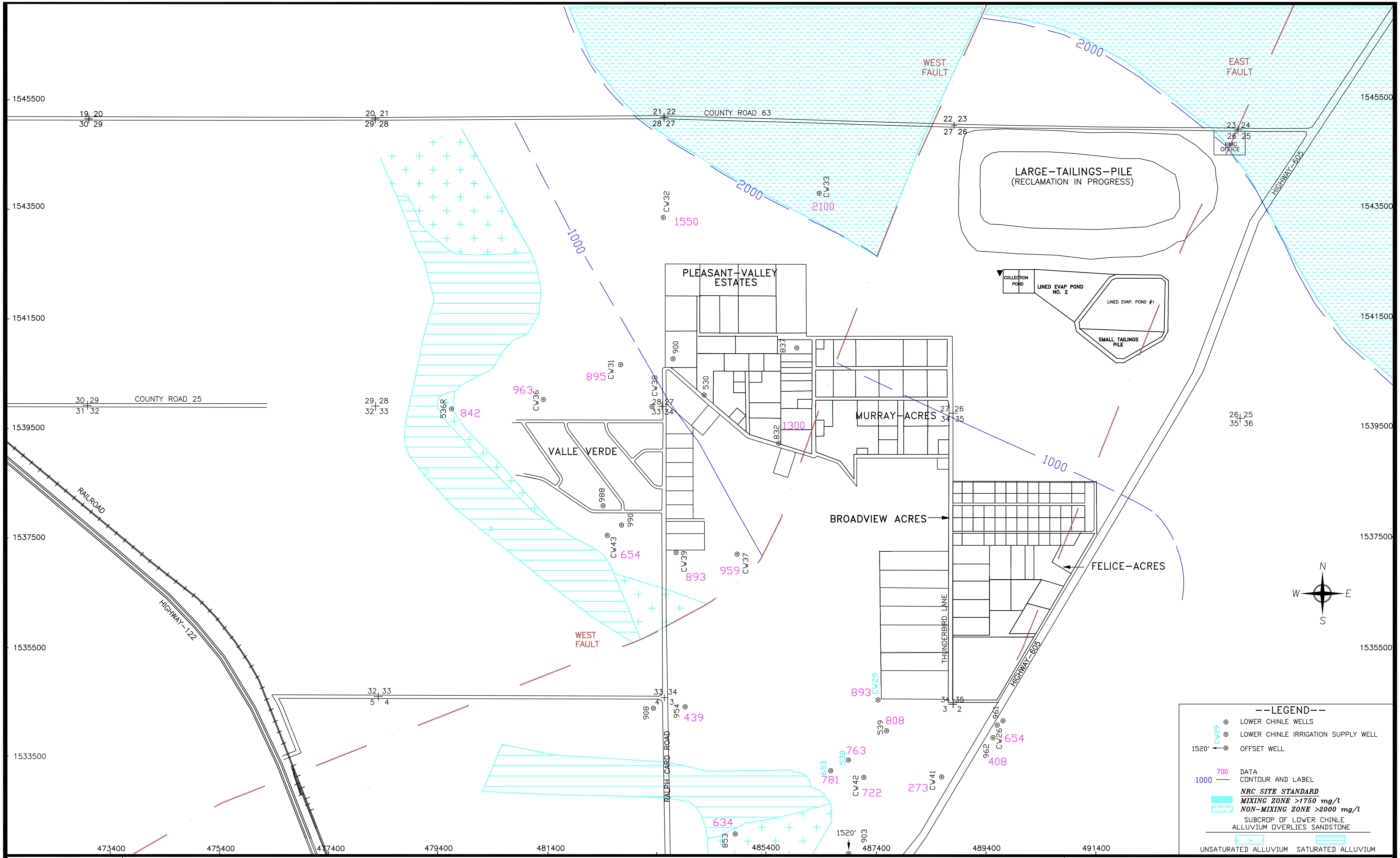
All radium concentrations have been low in past years in the Lower Chinle aquifer. Radium-226 and radium-228 are not important parameters relative to the Lower Chinle aquifer and an NRC site standard for the Lower Chinle and therefore has not been set. Radium concentrations were analyzed in all Lower Chinle wells in the 2003 update. These low levels of radium do not warrant the development of a figure presenting areal distribution of radium. Radium-228 analysis is typically more erratic than other constituents but the available data shows that radium-226 and radium-228 are not significant constituents in the Lower Chinle aquifer at the Homestake site.

7.3.9 VANADIUM - LOWER CHINLE

Vanadium concentrations have always been low in the Lower Chinle aquifer. Significant concentrations in the Lower Chinle aquifer would not be expected because concentrations of this constituent have only been slightly elevated in the alluvial aquifer near the tailings. Vanadium concentrations in the Lower Chinle aquifer have never been large enough to support consideration of this constituent for setting a site standard. The vanadium concentration data was updated in 2003 for the Lower Chinle aquifer. All the measured vanadium concentrations were less than the limit of detection.

7.3.10 THORIUM-230 – LOWER CHINLE

Thorium-230 concentrations have never been significant in the Lower Chinle aquifer and, therefore, should be dropped from the Lower Chinle monitoring list and eliminated from consideration as a Lower Chinle standard. The thorium-230 concentrations measured in the Lower Chinle aquifer during 2003 were all very small. No plots of thorium-230 concentrations with time were prepared, because concentrations have historically been low.

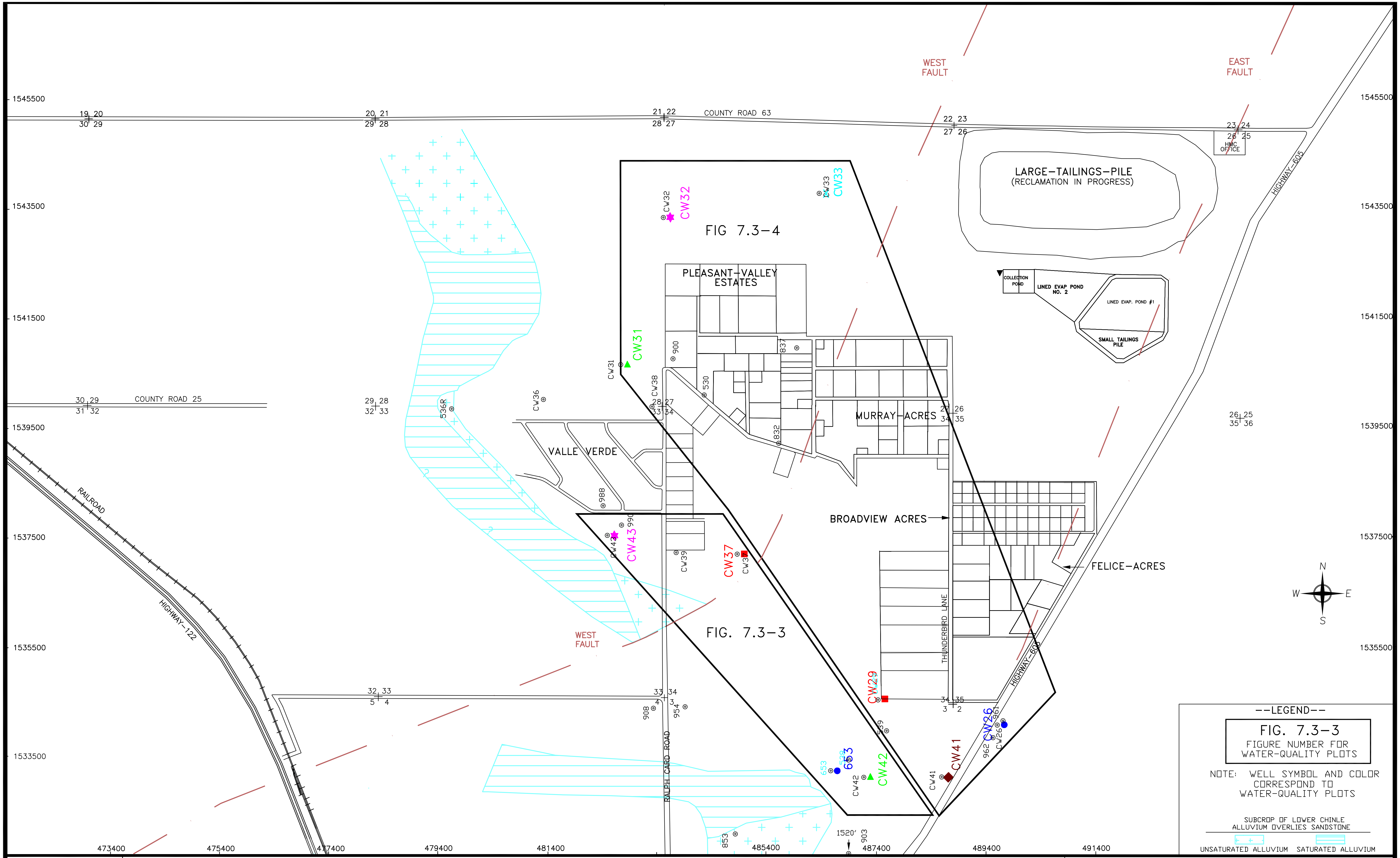


SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600LOW
DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP–11&12–N–RANGE–10–W

FIGURE 7.3–1 SULFATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2006, mg/l



SCALE: 1"=1600'

C:\PROJECTS\
2007-06\1600LOW

DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 7.3-2. LOCATION OF LOWER CHINLE WELLS WITH WATER-QUALITY PLOTS

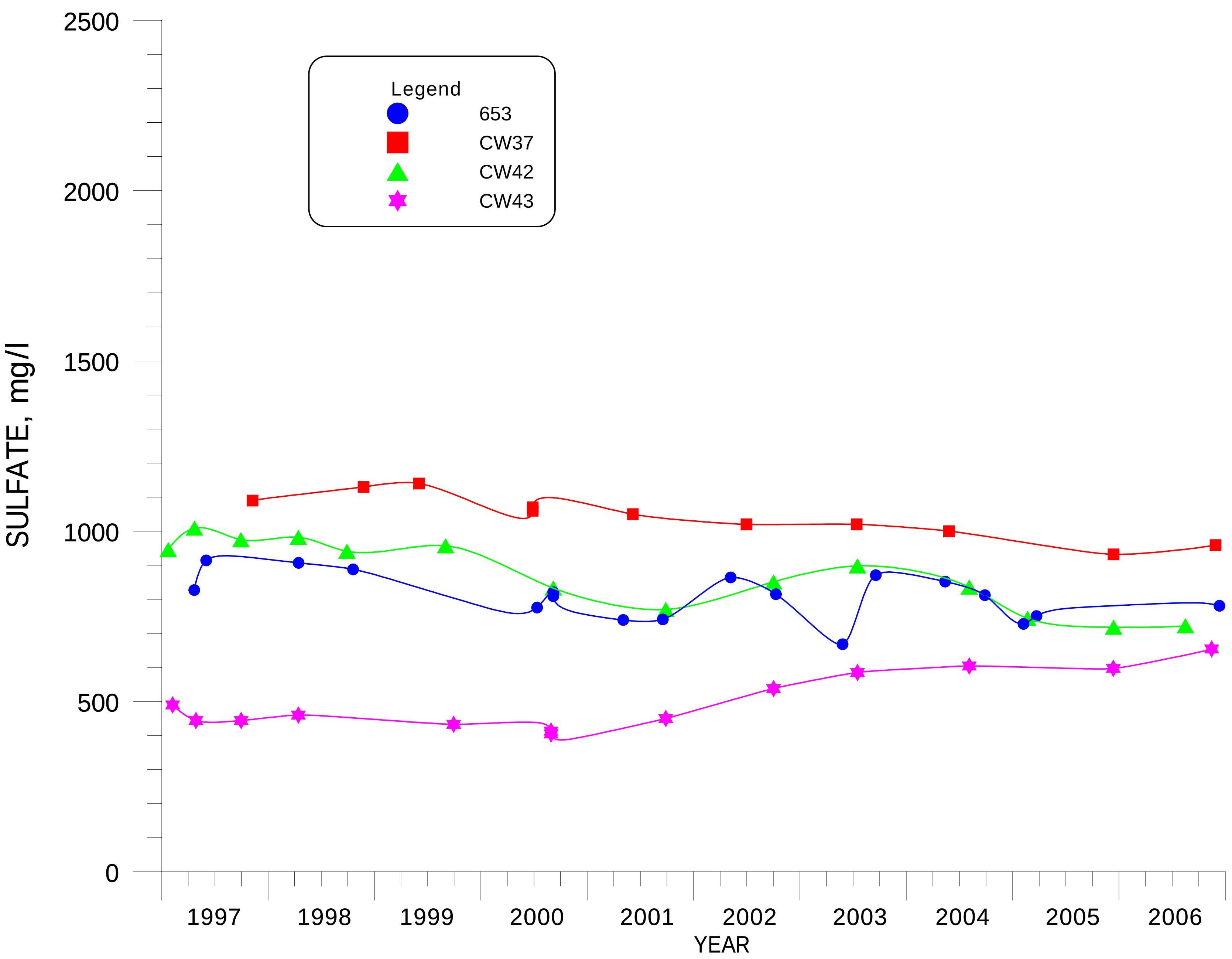


FIGURE 7.3-3. SULFATE CONCENTRATIONS FOR MIXING ZONE WELLS 653, CW37, CW42 AND CW43.

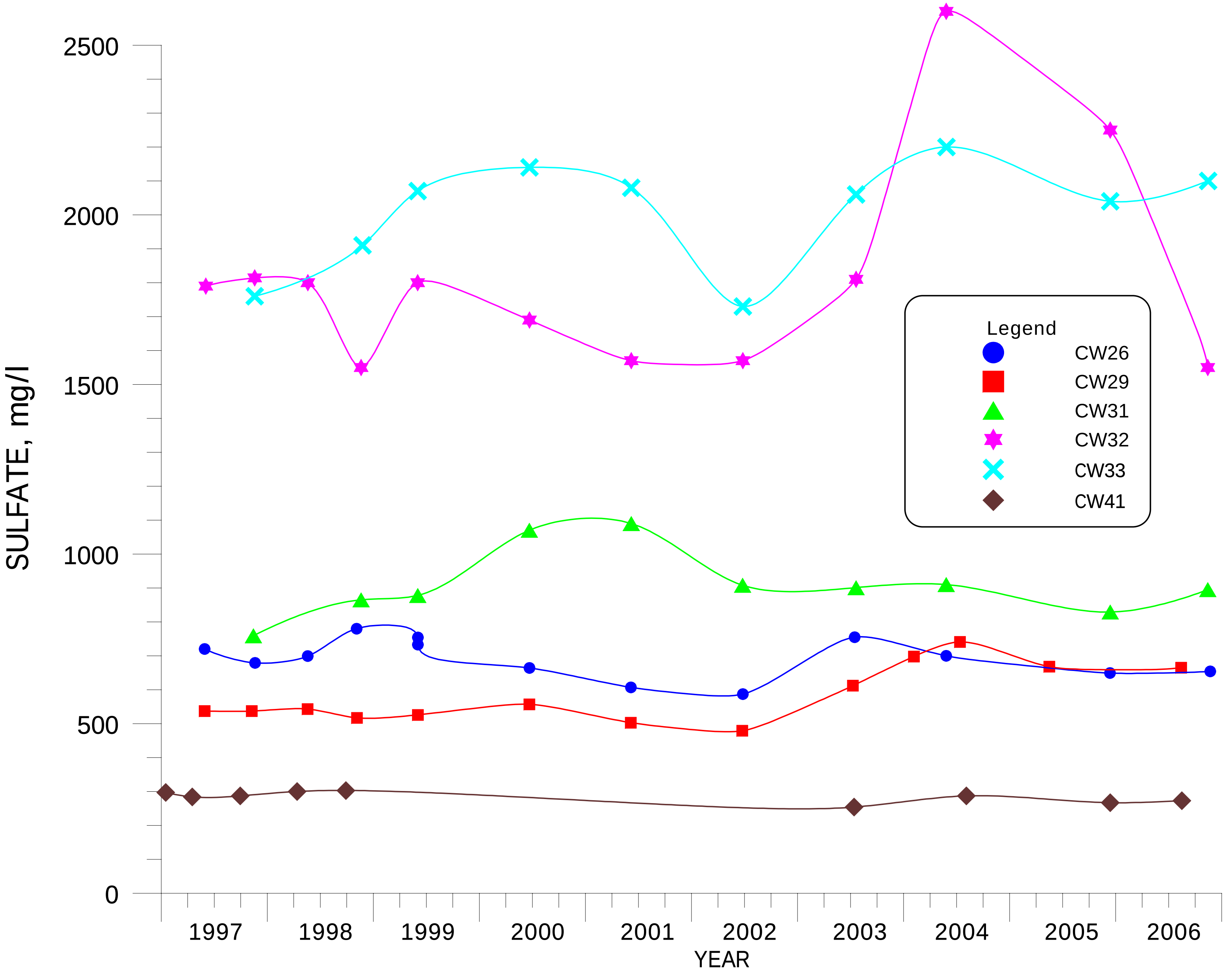
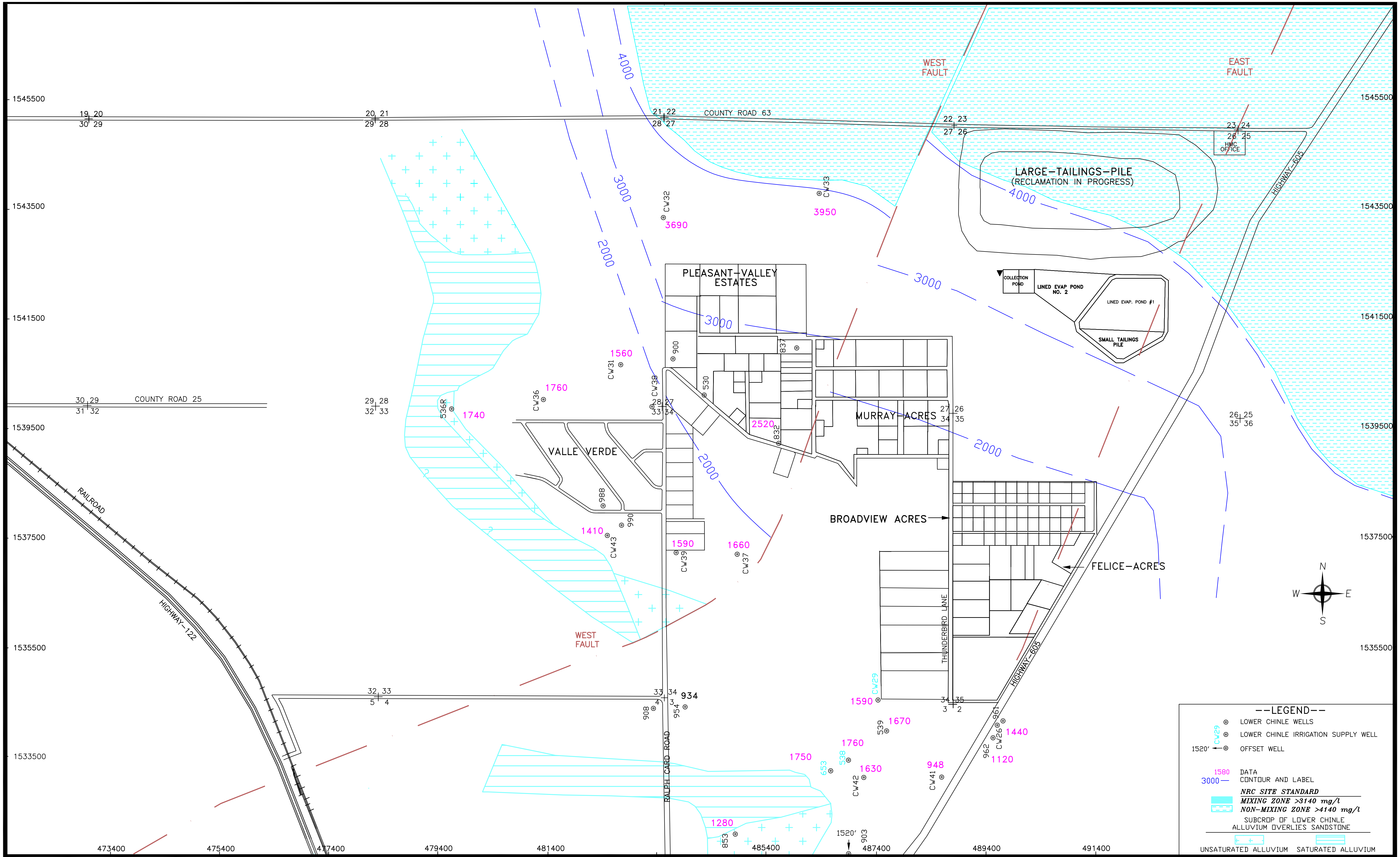


FIGURE 7.3-4. SULFATE CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW26, CW29, CW31, CW32, CW33 AND CW41.



SCALE: 1"=1600'
C:\PROJECTS\2007–06\1600LOW
DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP–11&12–N–RANGE–10–W

FIGURE 7.3–5. TDS CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2006, mg/l

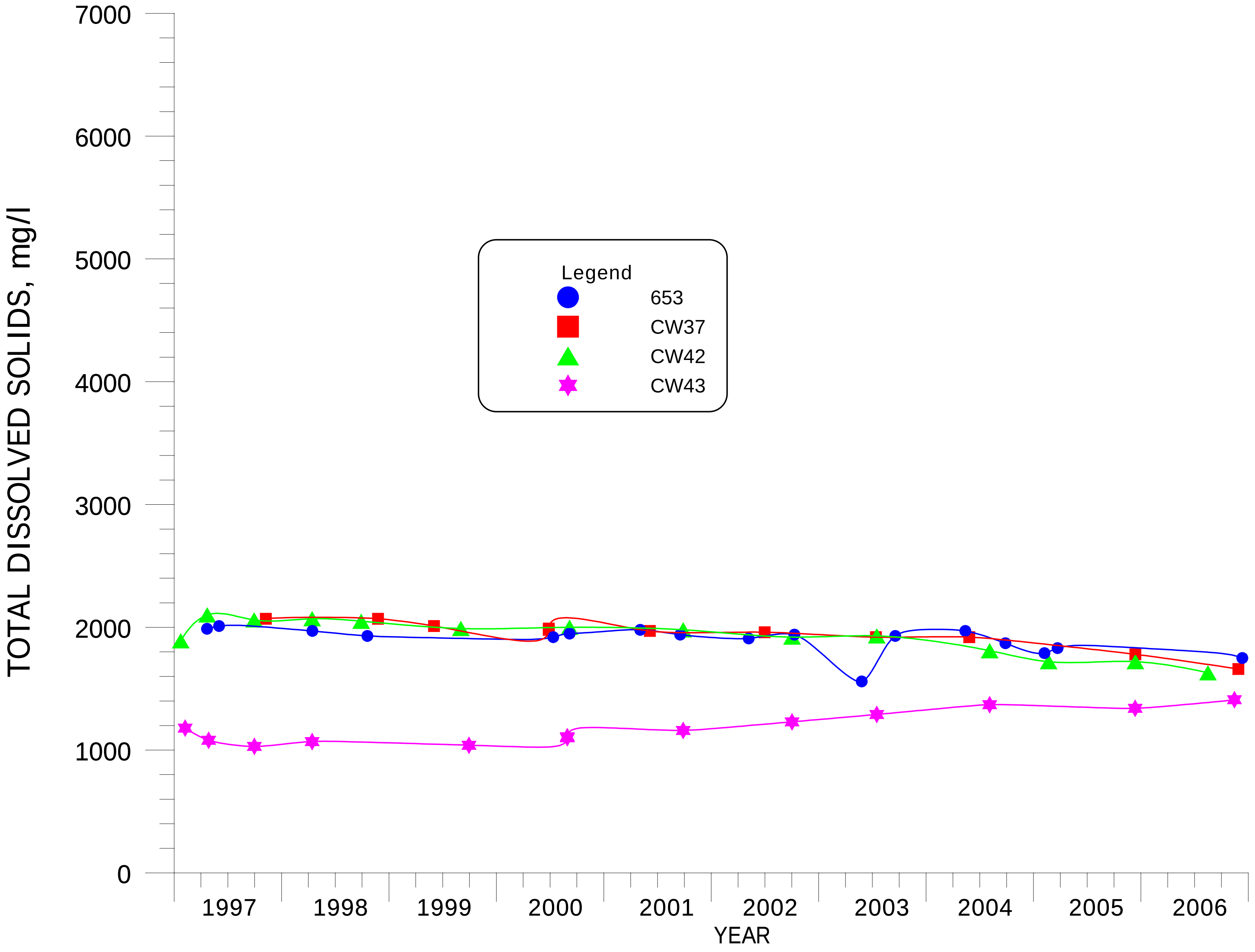


FIGURE 7.3-6. TDS CONCENTRATIONS FOR MIXING ZONE WELLS 653, CW37, CW42 AND CW43.

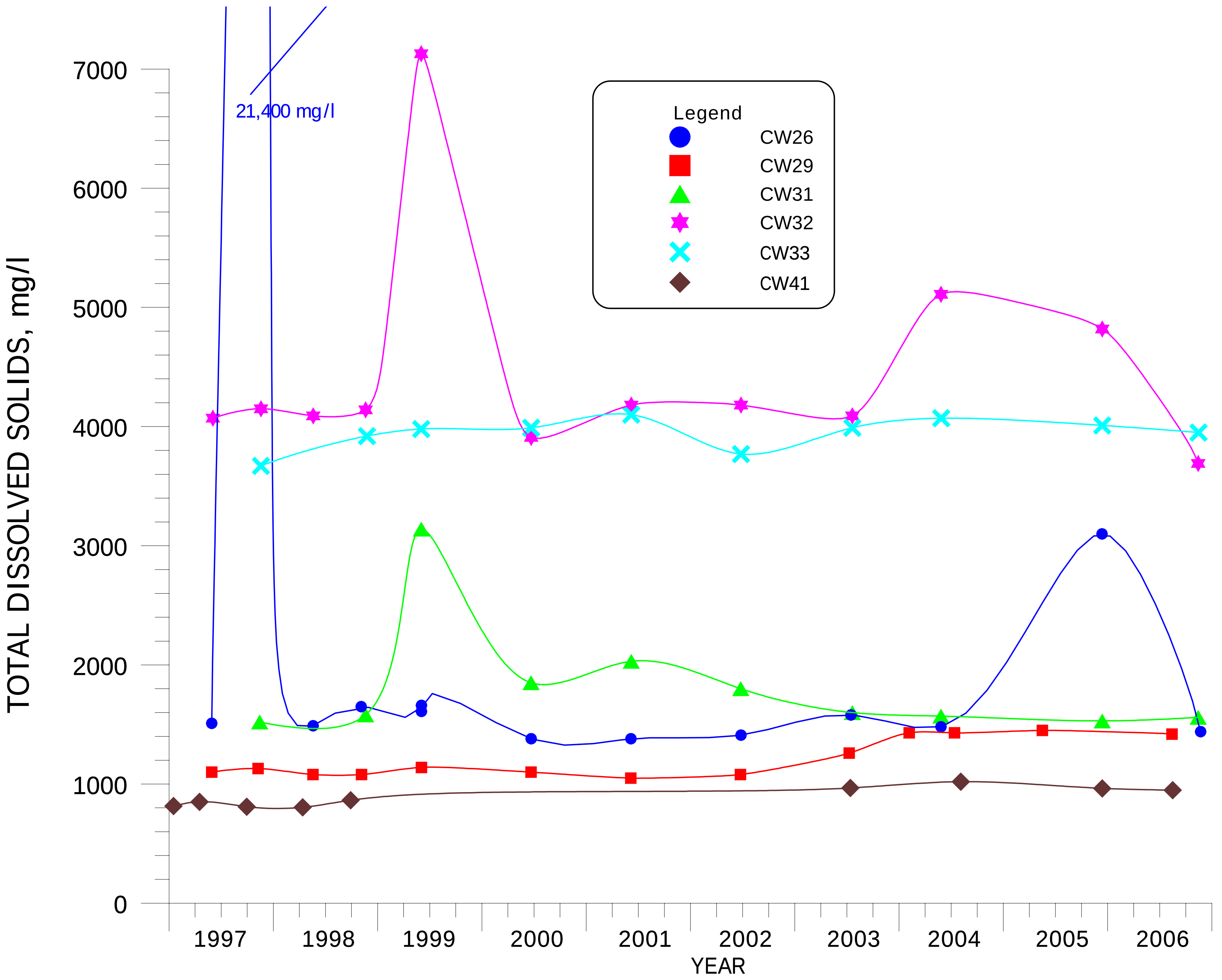
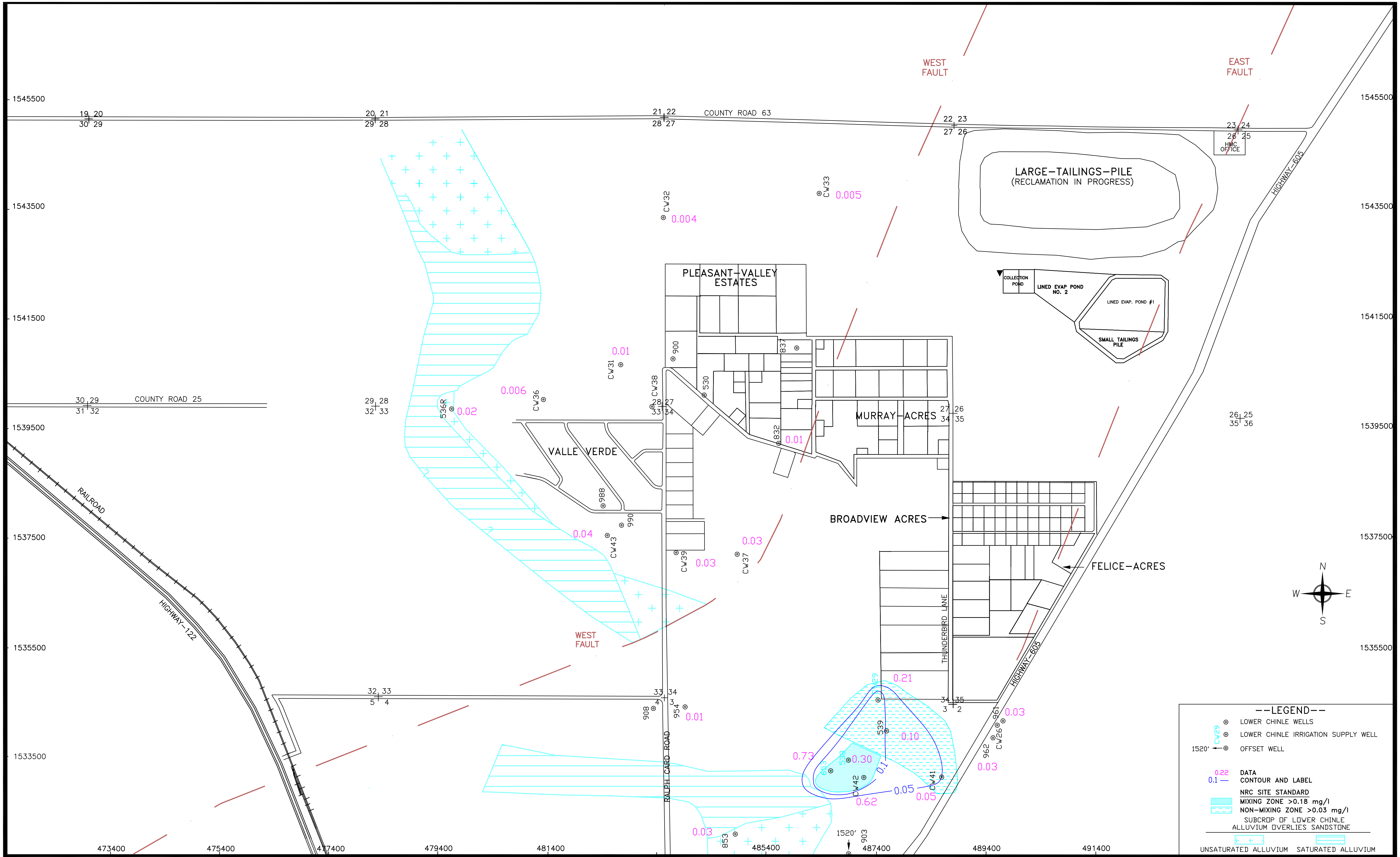


FIGURE 7.3-7. TDS CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW26, CW29, CW31, CW32, CW33 AND CW41.



SCALE: 1"=1600'
C:\PROJECTS\
2007–06\1600LOW
DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP–11&12–N–RANGE–10–W

FIGURE 7.3–8. URANIUM CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2006, mg/l

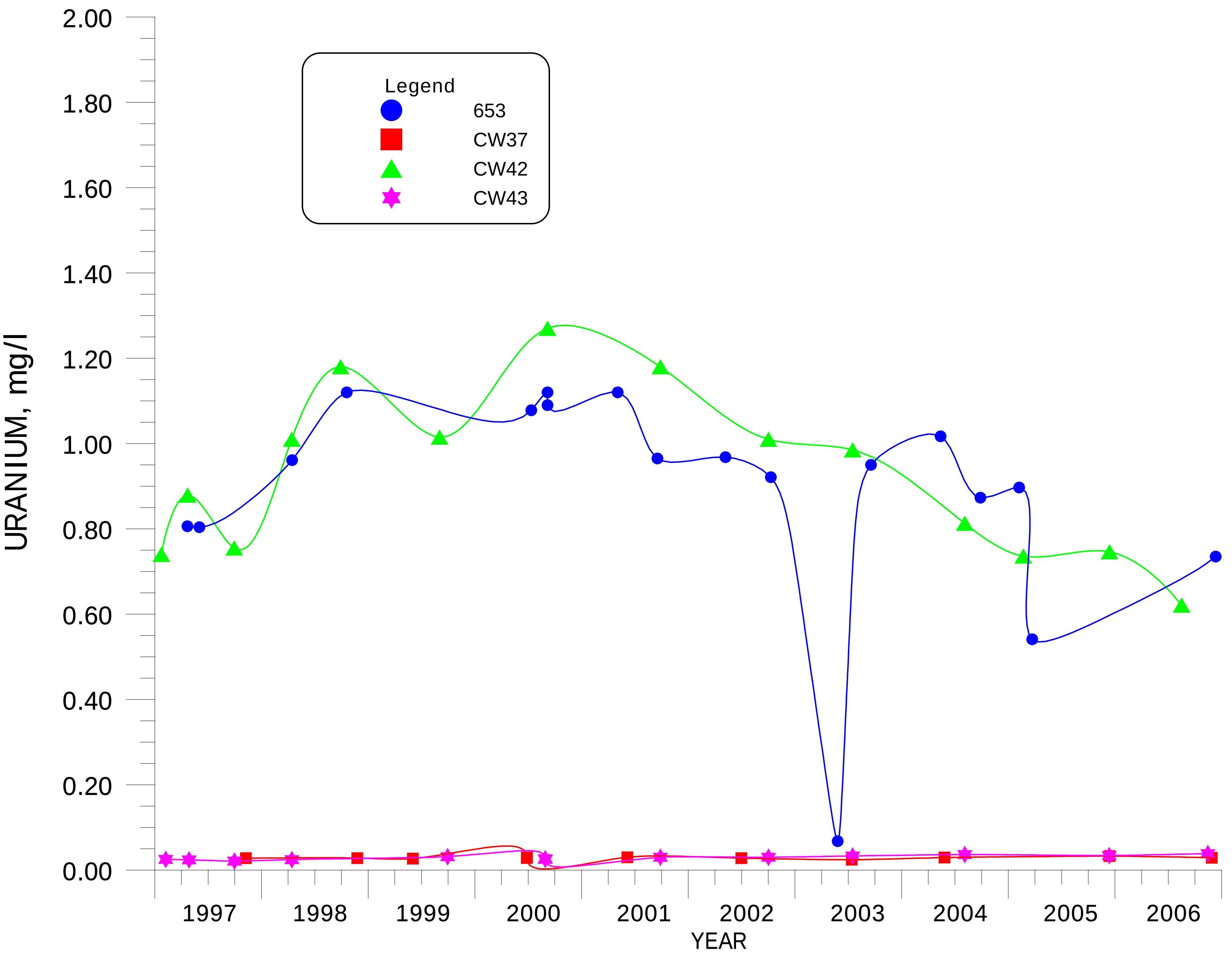


FIGURE 7.3-9. URANIUM CONCENTRATIONS FOR MIXING ZONE WELLS 653, CW37, CW42 AND CW43.

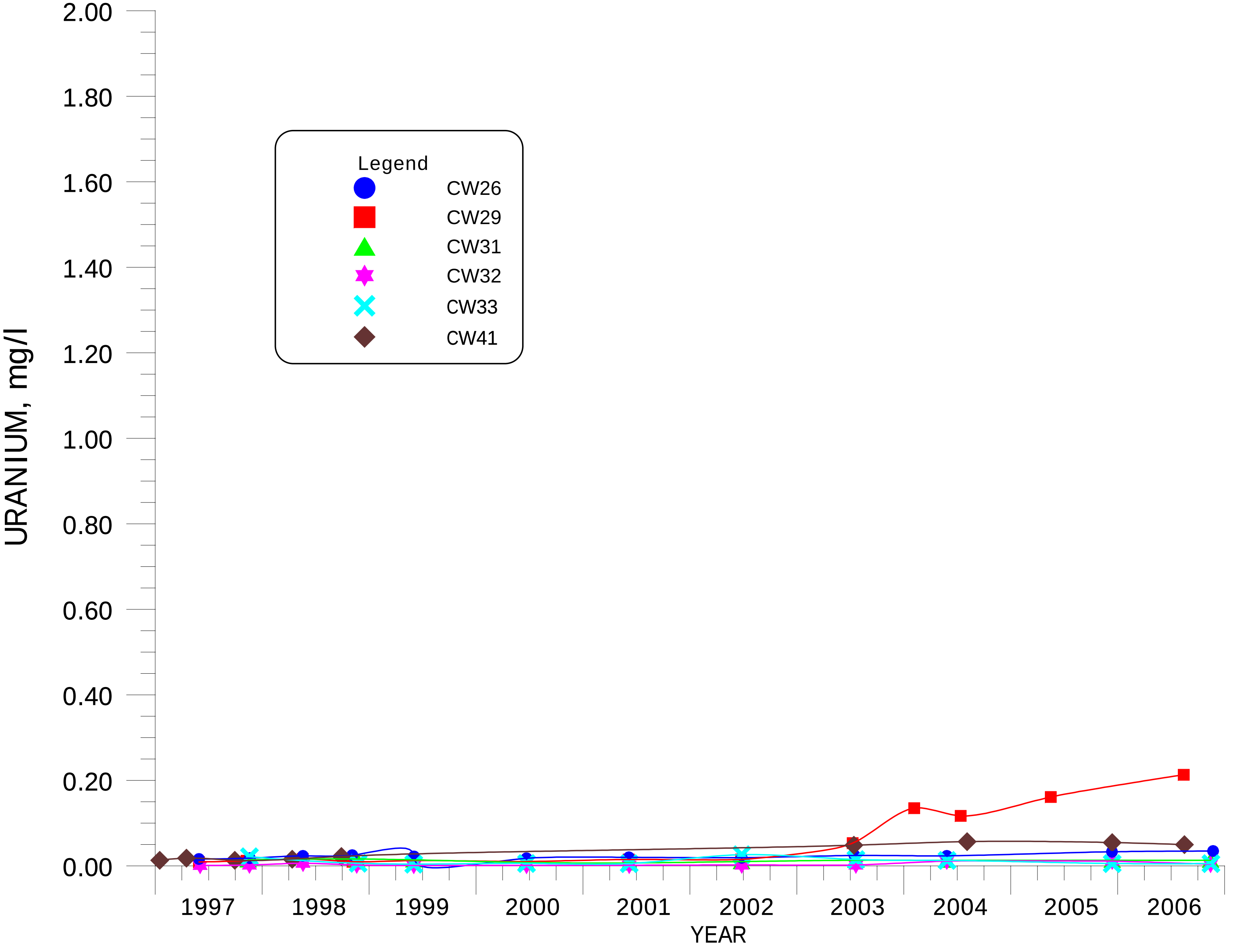
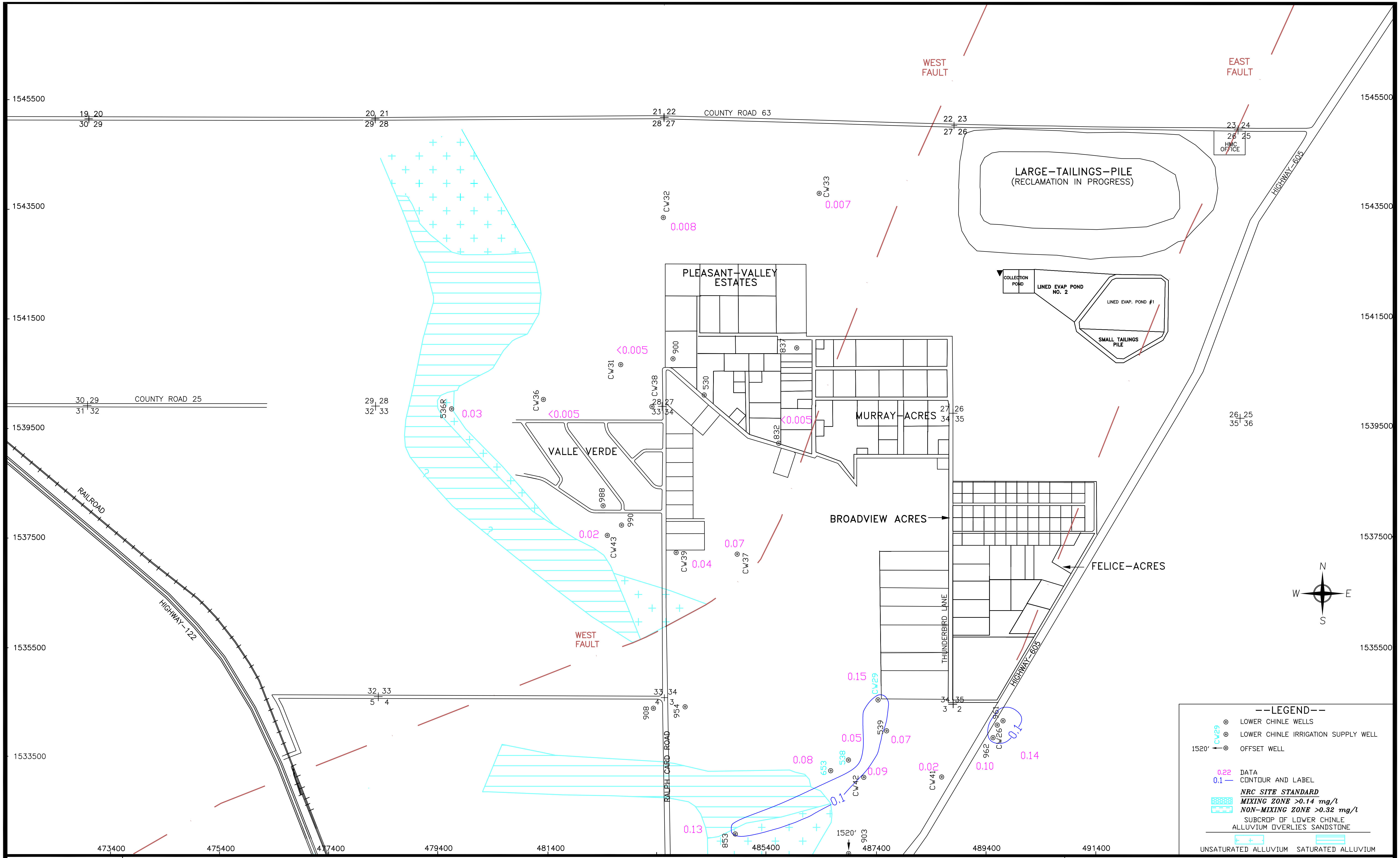


FIGURE 7.3-10. URANIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW26, CW29, CW31, CW32, CW33 AND CW41.



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600LOW
DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 7.3-11. SELENIUM CONCENTRATIONS
OF THE LOWER CHINLE AQUIFER, 2006, mg/l

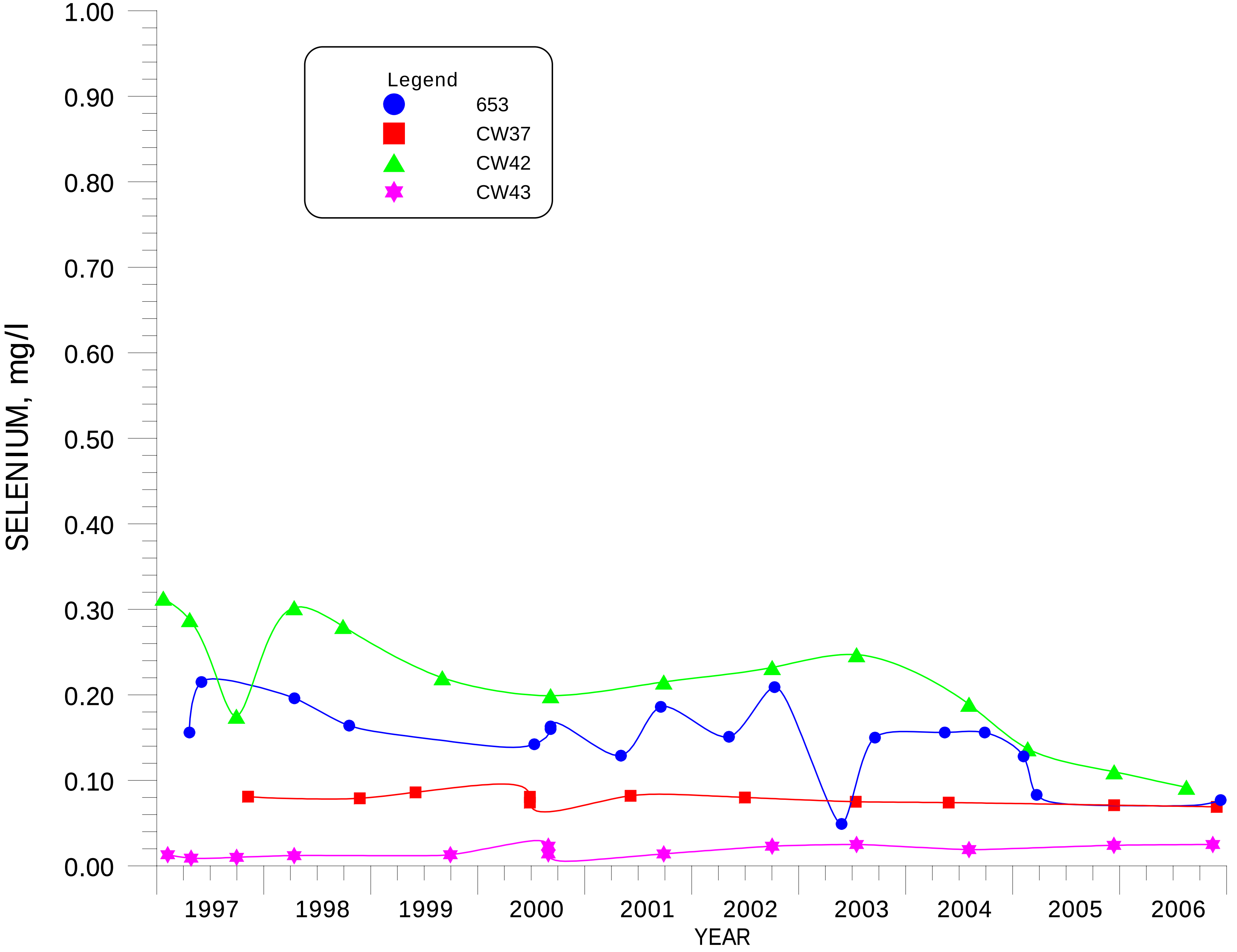


FIGURE 7.3-12. SELENIUM CONCENTRATIONS FOR MIXING ZONE WELLS 653, CW37, CW42 AND CW43.

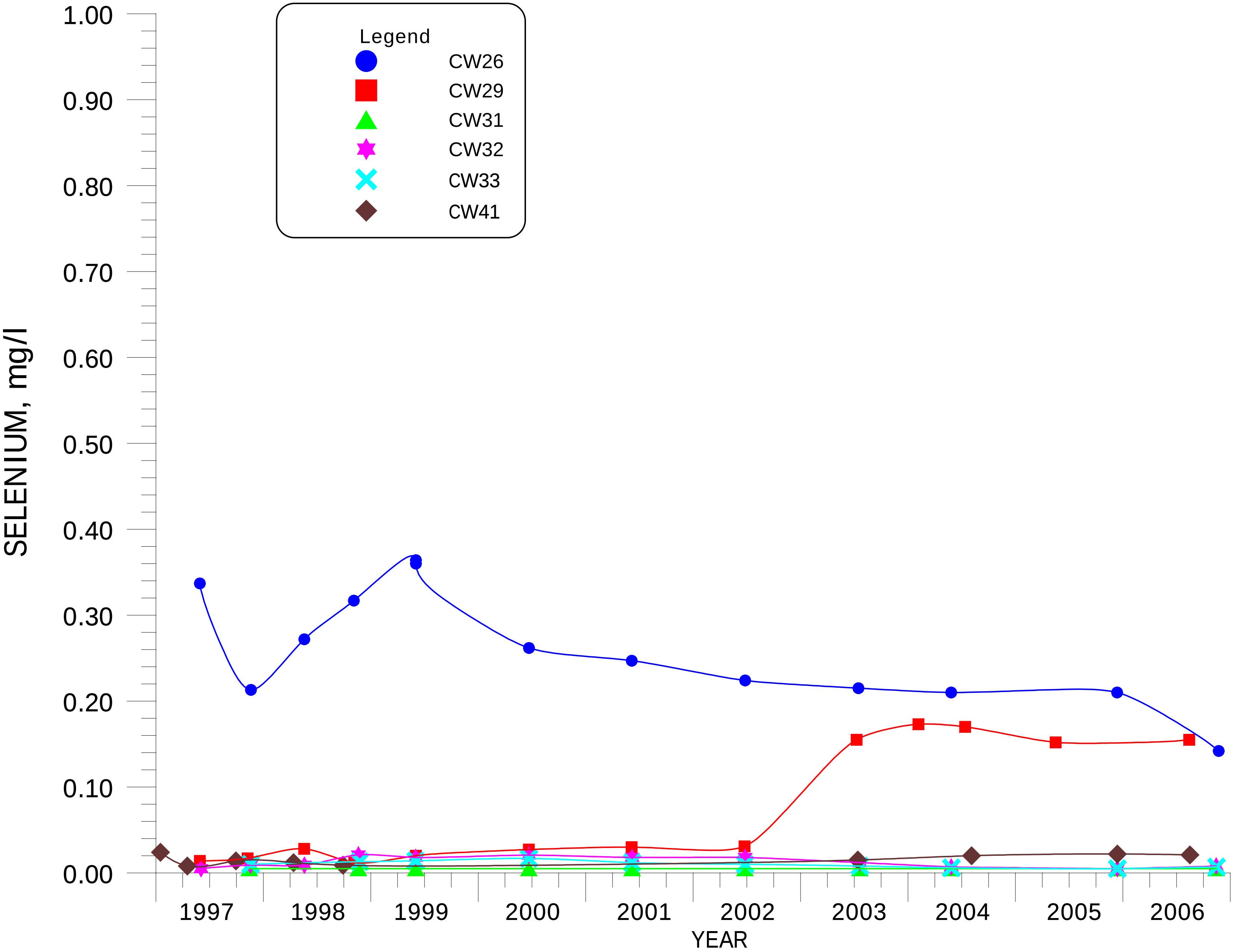
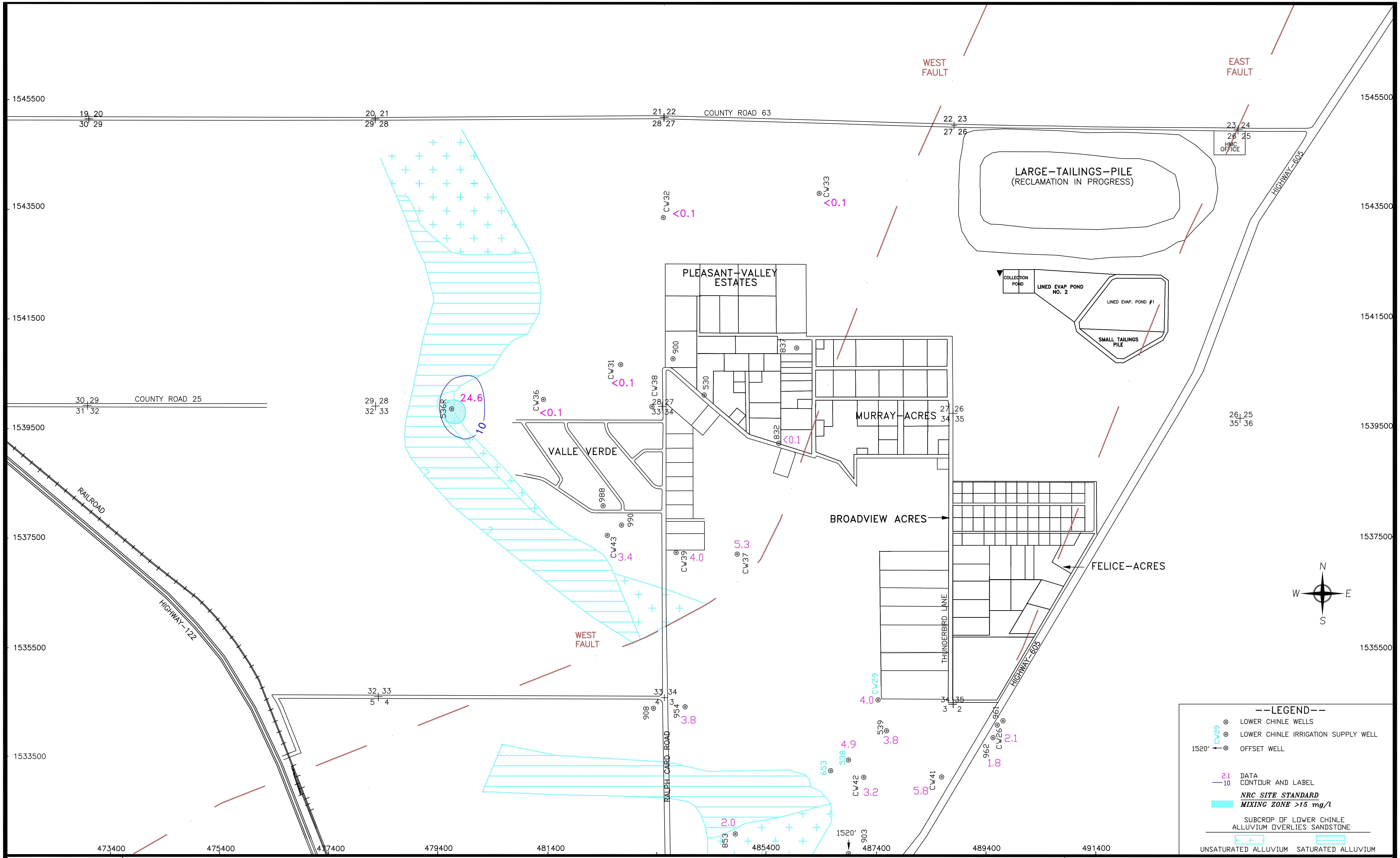


FIGURE 7.3-13. SELENIUM CONCENTRATIONS FOR NON-MIXING ZONE WELLS CW26, CW29, CW31, CW32, CW33 AND CW41.



SCALE: 1"=1600'
C:\PROJECTS\
2007-06\1600LOW
DATE: 03/26/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 7.3-14. NITRATE CONCENTRATIONS OF THE LOWER CHINLE AQUIFER, 2006, mg/l

SECTION 8

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

TABLES

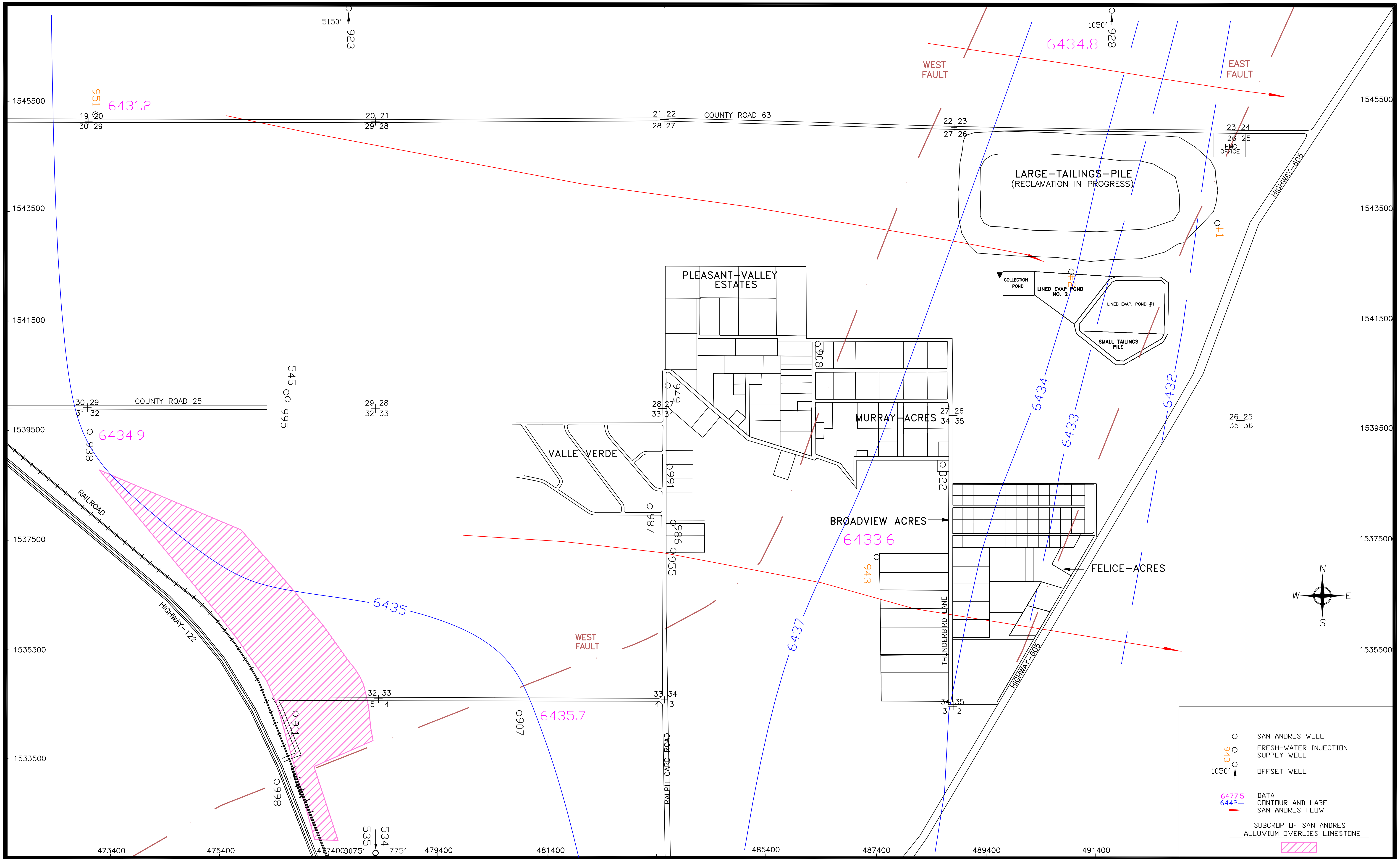
8.0 SAN ANDRES AQUIFER MONITORING

The San Andres aquifer is the most important regional aquifer in the Grants Project area. The Chinle Formation, which exists between the alluvium and the San Andres, is approximately 800 feet thick at the Homestake tailings site and is primarily a shale with a few sandstone lenses. Therefore, the alluvial aquifer and the San Andres aquifer are separated by a very thick aquitard. The difference in piezometric head between the alluvial and San Andres aquifers is in the range of 80 to 100 feet, which confirms that the flow between the two systems is restricted by the limited permeability of the Chinle Formation. The San Andres and alluvial aquifers are only in direct contact in the western portion of the area presented on Figure 8.0-1 (see magenta pattern area). With no areas of direct communication within the area where the alluvial aquifer is impacted by tailings seepage, and only very limited hydraulic communication through the Chinle shale, the San Andres aquifer is not affected by tailings seepage. The San Andres aquifer has been used as the source for fresh-water injection into the alluvium and Chinle aquifers at the Grants Project, and as a result, a monitoring program was established for the San Andres aquifer.

Table 8.0-1 presents well completion information for the San Andres wells in this area. Homestake's two deep wells within the project area are San Andres wells, #1 Deep and #2 Deep. These wells are used to supply the fresh-water injection systems within the collection area. San Andres well 951 is used as the fresh-water injection supply for the injection system in Sections 28 and 29 while San Andres well 943 is used as the fresh water injection supply for the injection system in Sections 3 and 34 and Felice Acres. Figure 8.0-1 shows the locations of the San Andres wells relevant to this area. Recharge to the San Andres aquifer occurs mainly west of the area shown in the figure and in the far western portion of the figure. The structure of the San Andres aquifer dips to the east, and thus the ground water system becomes progressively deeper in the easterly direction. The water-level elevations measured during 2006 (Figure 8.0-1) show a very flat piezometric surface with the gradient being from the west-northwest to the east-southeast. The continuity of the gradient in this area indicates that the East and West faults do not significantly affect the ground water flow in the San Andres aquifer. The displacement at the faults is not large enough to completely displace the entire thickness of this aquifer system. The increase in gradient in the project area also indicates a decrease in transmissivity in the area of the steeper gradient. The faults may cause a decrease in the transmitting ability of the San Andres aquifer in this area.

Figure 8.0-2 presents the most recent water-quality data for the San Andres aquifer. Tables B.6-1 and B.6-2 in Appendix B present the tabulation of the water-quality data for the San Andres aquifer. Figure 8.0-2 shows the 2006 data for sulfate, TDS, uranium and selenium concentrations in the San Andres aquifer. Sulfate concentrations vary from 356 mg/l to 863 mg/l in the San Andres aquifer. Sulfate concentrations are typically near 700 mg/l for Homestake #1 Deep and #2 Deep wells. TDS concentrations have varied from 912 to 1950 mg/l and generally increase in a down-gradient direction. The higher concentrations of sulfate and TDS to the east are natural and typical of a limestone aquifer where the extended contact time with the formation results in ongoing dissolution of major constituents. This increase in concentrations from the recharge area down dip is expected. Uranium concentrations were small in all of the San Andres wells monitored during 2006 with a slightly higher value of 0.09 mg/l from well 928. Selenium concentrations in the San Andres aquifer vary from 0.006 to 0.03 mg/l. All measured molybdenum concentrations are less than 0.03 mg/l.

Figure 8.0-3 presents sulfate concentrations with time for Homestake's wells 943, 951, Deep #1 and #2 wells. This data shows that sulfate concentrations in 2006 for these four San Andres wells were similar to their historical average since injection water supply has occurred.

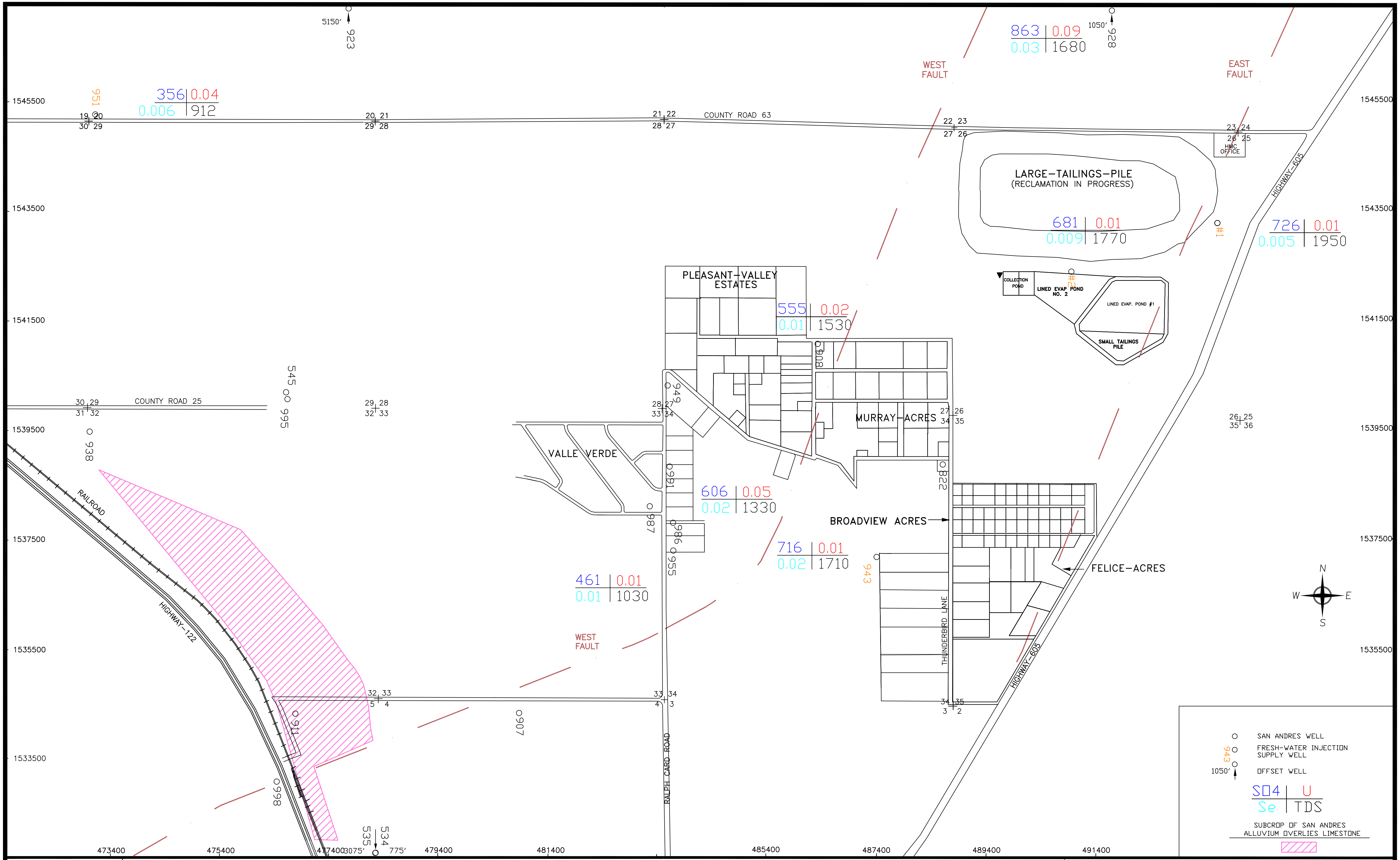


SCALE: 1”=1600’
C:\PROJECTS\
2007–06\1600san
DATE: 03/27/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP–11&12–N–RANGE–10–W

FIGURE 8.0–1. LOCATION OF SAN ANDRES WELLS AND WATER–LEVEL ELEVATION FOR THE SAN ANDRES AQUIFER, 2006, FT–MSL



SCALE: 1"=1600'

C:\PROJECTS\
2007-06\1600san

DATE: 03/27/07

HOMESTAKE MILL AND ADJACENT PROPERTIES

GRANTS, NM TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 8.0-2. WATER QUALITY FOR THE SAN ANDRES AQUIFER, 2006, mg/l

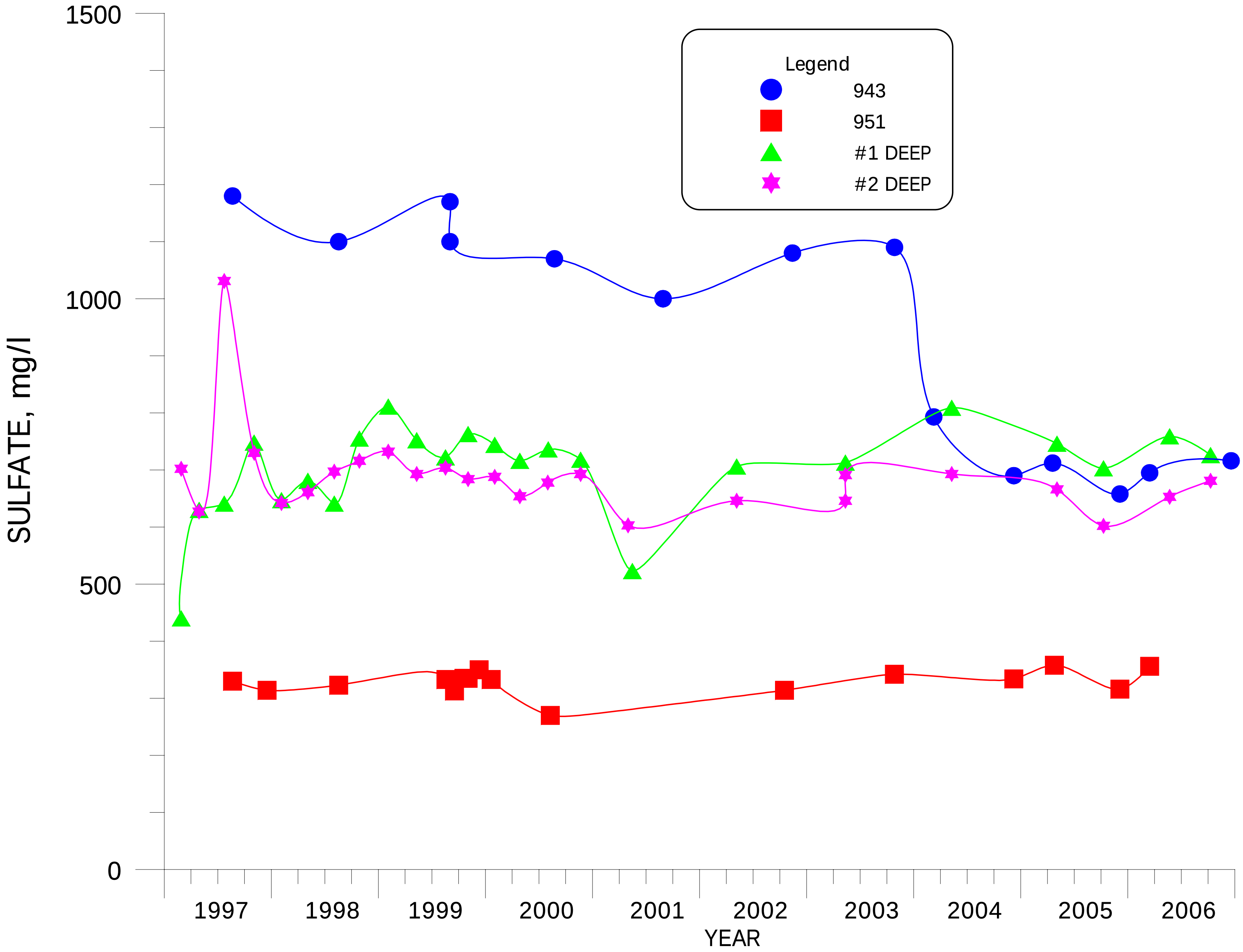


FIGURE 8.0-3. SULFATE CONCENTRATIONS FOR WELLS 943, 951, #1 DEEP AND #2 DEEP.

TABLE 8.0-1. WELL DATA FOR THE SAN ANDRES WELLS.

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 TOP OF SAN ANDRES (FT-LSD)	ELEV. TO TOP OF SAN ANDRES (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)	
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)						
#1 Deep	1543307	493633	1000.0	10.0	12/1/2005	195.60	6388.16	0.0	6583.76	130	6454	A	---
										303	6281	U	---
										433	6151	M	---
										597	5987	L	---
										955	5629	S	919-999
#2 Deep	1542424	490972	870.0	---	5/4/2005	208.80	6366.86	0.0	6575.66	110	6466	A	---
										800	5776	S	-
0806	1541120	486320	584.0	16.0	---	---	---	0.0	6567.00	90	6477	A	---
										520	6047	S	-
0822	1538920	488630	980.0	7.0	---	---	---	0.0	6557.00	790	5767	S	790-875
0534	1534589	476549	1000.0	16.0	12/14/2004	106.70	6445.87	0.0	6552.57	0	6553	S	-
0535	1530100	478450	198.0	12.0	12/14/2004	103.68	6436.32	0.0	6540.00	---	---	S	-
0907	1534250	480800	360.0	16.0	12/20/2006	109.90	6435.70	0.0	6545.60	123	6423	A	---
										262	6284	S	295-360
0911	1534350	476800	188.0	---	---	---	---	0.0	6552.60	---	---	S	-
0918	---	---	725.0	4.0	---	---	---	0.0	6702.40	620	6082	S	635-655
0919	---	---	628.0	5.0	---	---	---	0.0	6684.00	35	6649	A	---
										356	6328	S	364-571
0923	1552400	477900	330.0	5.0	4/6/1994	6464.97	157.63	0.0	6622.60	60	6563	A	---
										229	6394	S	234-330
0928	1548250	491700	864.0	---	12/20/2006	162.79	6434.81	1.2	6597.60	138	6458	A	---
										801	5795	S	-
0938	1539500	473040	---	---	12/20/2006	133.91	6434.89	0.0	6568.80	95	6474	A	---
										120	6449	S	-
0943	1537222	487407	978.0	18.0	11/27/2006	122.30	6433.61	0.0	6555.91	704	5852	S	703-978
0949	1540350	483600	551.0	6.0	---	---	---	0.0	6562.30	112	6450	A	---
										155	6407	L	---
										460	6102	S	400-493
										460	6102	S	505-551
0951	1545500	473200	275.0	10.0	12/27/2006	142.55	6431.15	0.9	6573.70	110	6463	A	---
										227	6346	S	241-275
0955	1537338	483699	498.0	5.0	11/3/1995	78.05	6471.95	0.2	6550.00	40	6510	A	---
										420	6130	S	385-498
0986	1537894	483690	467.0	5.0	11/2/1995	80.75	6569.25	0.8	6650.00	65	6584	A	---
										85	6564	L	---
										415	6234	S	420-467
0987	1538226	483357	500.0	5.0	11/3/1995	54.48	6595.52	1.0	6650.00	70	6579	A	---
										385	6264	S	425-470
0991	1538873	483630	500.0	---	11/8/1995	84.41	6566.59	1.4	6651.00	---	---	S	-
0995	1540115	476594	---	---	---	---	---	0.0	6474.00	---	---	S	-

TABLE 8.0-1. WELL DATA FOR THE SAN ANDRES WELLS.

(cont'd.)

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 TOP OF SAN ANDRES (FT-LSD)	ELEV. TO TOP OF SAN ANDRES (FT-MSL)	CASING PERFOR-ATIONS (FT-LSD)
					DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)					
0998	1533080	476450	145.0	16.0	---	---	---	0.0	6650.00	---	---	S -

NOTE: A = Base of Alluvium
L = Lower Chinle
S = San Andres Aquifer
r = Reported
* = Abandoned

SECTION 9

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

9.0 REFERENCES

Environmental Restoration Group, 1999a, Statistical Evaluation of Alluvial Groundwater Quality Upgradient of the Homestake Site near Grants, NM, Molybdenum, Selenium and Uranium, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Environmental Restoration Group, 1999b, Statistical Evaluation of Alluvial Groundwater Quality Upgradient of the Homestake Site near Grants, NM, Nitrate, Sulfate and Total Dissolved Solids, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Environmental Restoration Group, 2003, Grants Project, Statistical Evaluation of Chinle Aquifer Quality at the Homestake Site, Near Grants, NM, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hoffman, G.L., 1976, Groundwater Hydrology of the Alluvium, Consulting Report to Homestake Mining Company.

Hoffman, G.L., 1977, Modeling, Design and Specifications of the Collection and Injection Systems, Consulting Report to Homestake Mining Company.

Hydro-Engineering, 1981, Ground-Water Discharge Plan for Homestake's Mill near Milan, New Mexico, DP-200, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1983, Ground-Water Discharge Plan for Homestake's Mill near Milan, New Mexico, DP-200, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1983a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1983b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1983c, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Fourth Quarter 1983, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1984a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First Quarter 1984, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1984b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Second Quarter 1984, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1984c, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Third Quarter 1984, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1985a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Fourth Quarter 1984, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1985b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First Quarter 1985, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1985c, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Second Quarter 1985, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1985d, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Third Quarter 1985, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1986a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Fourth Quarter 1985, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1986b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First Quarter 1986, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1986c, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Second Quarter 1986, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1987a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Third and Fourth Quarters 1986, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1987b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First and Second Quarters 1987, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1988a, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, Third and Fourth Quarters 1987, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1988b, Ground-Water Monitoring for Homestake's Mill Discharge Plan, DP-200, First and Second Quarters 1988, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1988c, Renewal Ground-Water Discharge Plan, DP-200 for Homestake's Mill Near Milan, New Mexico, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1989, Corrective Action Plan for Homestake's Tailings, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1990, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1989, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1991, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1990, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1992, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1991, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1993a, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1992, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1993b, Water Quality Changes in the Alluvial Aquifer Adjacent to the Homestake Tailings, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1994, Ground-Water Monitoring for Homestake’s Mill Discharge Plan DP-200 and NRC License SCA-1471, 1993, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1995, Ground-Water Monitoring for Homestake's Mill Discharge Plan DP-200 and NRC License SUA-1471, 1994, Consulting Report for Homestake Mining Company, Grants, New Mexico.

Hydro-Engineering, 1996. Ground-Water Monitoring for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C, 1997. Ground-Water Monitoring for Homestake's Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 1996. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 1998, Ground-Water Monitoring and Performance Review for Homestake’s Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 1997. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 1999, Ground-Water Monitoring and Performance Review for Homestake’s Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 1998. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2000a, Ground-Water Monitoring and Performance Review for Homestake’s Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 1999. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2000b, Ground-Water Hydrology at the Grants Reclamation Site, Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2001a, Ground-Water Monitoring and Performance Review for Homestake’s Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 2000. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2001b, Ground-Water Hydrology and Restoration at the Grants Reclamation Site, 2001, Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2001c, Ground-Water Hydrology for Support of Background Concentrations at the Grants Reclamation Site, 2001, Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2002, Ground-Water Monitoring and Performance Review for Homestake’s Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 2001. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2003a, Ground-Water Monitoring and Performance Review for Homestake’s Grants Project, NRC License SUA-1471, and Discharge Plan DP-200, 2002. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2003b, Grants Reclamation Project, Background Water Quality Evaluation of the Chinle Aquifers. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2004, Grants Reclamation Project, 2003 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2005, Grants Reclamation Project, 2004 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

Hydro-Engineering, L.L.C., 2006, Grants Reclamation Project, 2005 Annual Monitoring Report/Performance Review for Homestake's Grants Project Pursuant to NRC License SUA-1471 and Discharge Plan DP-200. Consulting Report for Homestake Mining Company of California.

APPENDIX A

WATER LEVELS

TABLE OF CONTENTS

GROUND-WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

APPENDIX A

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL) 3/16/2007

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0690		
11/21/2006	35.27	6546.79
0691		
11/21/2006	42.19	6546.62
1E		
12/10/2006	23.03	6561.28
1G		
12/10/2006	40.76	6546.31
B		
1/3/2006	36.03	6534.87
1/9/2006	36.60	6534.30
1/16/2006	35.66	6535.24
1/23/2006	35.55	6535.35
1/30/2006	35.35	6535.55
2/6/2006	35.36	6535.54
2/13/2006	34.96	6535.94
2/20/2006	34.85	6536.05
2/27/2006	34.77	6536.13
3/6/2006	34.88	6536.02
3/13/2006	35.16	6535.74
3/20/2006	35.00	6535.90
3/27/2006	34.97	6535.93
4/3/2006	34.41	6536.49
4/10/2006	34.43	6536.47
4/17/2006	34.93	6535.97
4/24/2006	35.18	6535.72
5/1/2006	35.44	6535.46
5/8/2006	35.51	6535.39
5/15/2006	35.71	6535.19
5/22/2006	35.88	6535.02
5/30/2006	36.31	6534.59
6/5/2006	36.41	6534.49
6/12/2006	36.57	6534.33
6/19/2006	36.65	6534.25
6/26/2006	36.68	6534.22
7/5/2006	36.80	6534.10
7/10/2006	36.70	6534.20
7/17/2006	36.57	6534.33
7/24/2006	36.61	6534.29
7/31/2006	36.59	6534.31
8/7/2006	36.77	6534.13
8/14/2006	36.80	6534.10
8/21/2006	36.75	6534.15
8/28/2006	36.78	6534.12
9/5/2006	37.05	6533.85
9/11/2006	37.05	6533.85
9/18/2006	37.12	6533.78
9/25/2006	37.24	6533.66
10/2/2006	37.33	6533.57
10/9/2006	37.32	6533.58
10/16/2006	37.31	6533.59
10/23/2006	37.60	6533.30
10/30/2006	37.60	6533.30
11/6/2006	37.85	6533.05
11/13/2006	37.64	6533.26
11/20/2006	37.91	6532.99
11/27/2006	37.90	6533.00
12/4/2006	37.94	6532.96
12/11/2006	38.18	6532.72
12/18/2006	38.40	6532.50
12/27/2006	38.26	6532.64
B1		
12/20/2006	20.76	6635.69
B2		
10/17/2006	42.08	6532.17
B3		
8/28/2006	51.18	6523.11
B11		
9/25/2006	39.86	6537.53
B12		
12/20/2006	42.72	6530.30
B13		
12/20/2006	34.56	6535.48
BA		
1/3/2006	39.95	6531.63
1/9/2006	39.92	6531.66
1/16/2006	39.52	6532.06
1/23/2006	39.60	6531.98
1/30/2006	39.41	6532.17
2/6/2006	39.41	6532.17
2/13/2006	39.08	6532.50
2/20/2006	38.97	6532.61
2/27/2006	38.91	6532.67
3/6/2006	38.87	6532.71
3/13/2006	39.06	6532.52
3/20/2006	38.80	6532.78
3/27/2006	38.86	6532.72
4/3/2006	38.80	6532.78
4/10/2006	38.41	6533.17
4/17/2006	38.47	6533.11
4/24/2006	38.42	6533.16
5/1/2006	38.60	6532.98
5/8/2006	38.22	6533.36
5/15/2006	38.20	6533.38
5/22/2006	38.47	6533.11
5/30/2006	38.77	6532.81
6/5/2006	38.86	6532.72
6/12/2006	38.94	6532.64
6/19/2006	39.09	6532.49
6/26/2006	39.39	6532.19
7/5/2006	38.98	6532.60
7/10/2006	38.55	6533.03
7/17/2006	38.60	6532.98
7/24/2006	38.51	6533.07
7/31/2006	38.34	6533.24
8/7/2006	38.53	6533.05
8/14/2006	38.58	6533.00
8/21/2006	38.24	6533.34
8/28/2006	38.89	6532.69
9/5/2006	39.31	6532.27
9/11/2006	39.20	6532.38
9/18/2006	39.47	6532.11
9/25/2006	39.51	6532.07
10/2/2006	39.46	6532.12
10/9/2006	39.50	6532.08
10/16/2006	39.41	6532.17
10/23/2006	39.70	6531.88
10/30/2006	40.17	6531.41
11/6/2006	40.40	6531.18
11/13/2006	40.13	6531.45
11/20/2006	40.47	6531.11
11/27/2006	40.43	6531.15
12/4/2006	40.42	6531.16
12/11/2006	40.61	6530.97
12/18/2006	40.80	6530.78
12/27/2006	40.61	6530.97
BC		
9/25/2006	41.67	6532.94
12/20/2006	42.91	6531.70
BP		
9/25/2006	39.33	6532.97
C1		
9/25/2006	31.16	6540.70
C2		
9/25/2006	26.50	6538.52
C6		
9/27/2006	44.40	6540.49
C7		
9/27/2006	44.30	6540.14
C8		
9/27/2006	44.66	6539.83
C9		
9/27/2006	44.30	6540.25
C10		
9/27/2006	45.00	6540.26
C11		
9/27/2006	39.48	6541.90
C12		
9/27/2006	37.70	6542.85
D1		
3/14/2006	40.19	6530.71
7/24/2006	38.90	6532.00
DA3		
8/28/2006	47.38	6526.98
DC		
11/15/2006	39.16	6532.15
12/20/2006	39.00	6532.31

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/16/2007

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
DD		
10/24/2006	55.66	6536.93
DV		
8/28/2006	54.64	6530.96
DZ		
1/3/2006	51.61	6538.92
1/9/2006	51.56	6538.97
1/16/2006	51.24	6539.29
1/23/2006	51.51	6539.02
1/30/2006	51.88	6538.65
2/6/2006	51.61	6538.92
2/13/2006	51.27	6539.26
2/20/2006	51.21	6539.32
2/27/2006	51.00	6539.53
3/6/2006	50.97	6539.56
3/13/2006	50.14	6540.39
3/20/2006	50.70	6539.83
3/27/2006	50.87	6539.66
4/3/2006	50.97	6539.56
4/10/2006	50.58	6539.95
4/17/2006	50.61	6539.92
4/24/2006	50.63	6539.90
5/1/2006	50.61	6539.92
5/8/2006	50.44	6540.09
5/15/2006	50.91	6539.62
5/22/2006	50.72	6539.81
5/30/2006	51.03	6539.50
6/5/2006	50.91	6539.62
6/12/2006	51.06	6539.47
6/19/2006	51.07	6539.46
6/26/2006	53.35	6537.18
7/5/2006	51.30	6539.23
7/10/2006	50.84	6539.69
7/17/2006	52.34	6538.19
7/24/2006	51.60	6538.93
7/31/2006	51.12	6539.41
8/7/2006	52.46	6538.07
8/14/2006	52.55	6537.98
8/21/2006	51.70	6538.83
8/28/2006	51.54	6538.99
9/5/2006	51.71	6538.82
9/11/2006	51.60	6538.93
9/18/2006	51.03	6539.50
9/25/2006	51.62	6538.91
10/2/2006	51.24	6539.29
10/9/2006	51.64	6538.89
10/16/2006	51.70	6538.83
10/23/2006	52.21	6538.32
10/30/2006	51.80	6538.73
11/6/2006	51.50	6539.03
11/13/2006	51.24	6539.29
11/20/2006	51.38	6539.15
11/27/2006	51.00	6539.53
12/4/2006	51.35	6539.18
12/11/2006	50.90	6539.63
12/18/2006	50.91	6539.62
12/27/2006	50.83	6539.70
F		
3/14/2006	30.48	6534.34
9/14/2006	31.00	6533.82
FB		
3/14/2006	34.48	6531.18
9/11/2006	37.75	6527.91
GA		
12/20/2006	34.20	6528.59
GF		
12/20/2006	38.64	6527.37
GH		
3/14/2006	32.00	6530.76
9/12/2006	35.10	6527.66
12/20/2006	33.75	6529.01
GK		
12/20/2006	34.73	6532.03
GN		
2/22/2006	33.68	6534.29
8/21/2006	35.00	6532.97
GQ		
12/20/2006	< 0.00	> 6568.16
GV		
9/26/2006	51.04	6526.34
12/20/2006	49.86	6527.52
GW1		
12/20/2006	30.91	6534.36
GW2		
12/20/2006	32.21	6533.87
I		
6/26/2006	30.83	6536.37
K4		
1/23/2006	53.55	6548.47
4/10/2006	61.44	6540.58
9/29/2006	55.00	6547.02
10/11/2006	62.00	6540.02
K5		
1/23/2006	63.38	6538.35
4/10/2006	61.40	6540.33
9/29/2006	56.90	6544.83
K7		
1/23/2006	56.10	6545.43
4/10/2006	58.11	6543.42
9/29/2006	54.30	6547.23
K8		
1/23/2006	54.30	6546.19
4/10/2006	54.64	6545.85
9/29/2006	54.70	6545.79
K9		
1/23/2006	63.20	6537.14
4/10/2006	57.70	6542.64
9/29/2006	57.00	6543.34
K10		
1/24/2006	56.20	6544.61
4/10/2006	67.84	6532.97
9/29/2006	58.20	6542.61
K11		
1/23/2006	56.00	6544.61
4/10/2006	59.83	6540.78
9/29/2006	57.60	6543.01
10/11/2006	62.30	6538.31
KEB		
11/21/2006	22.48	6547.25
KF		
11/21/2006	26.35	6543.86

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL)

3/16/2007

KZ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	26.61	6545.11
1/9/2006	26.80	6544.92
1/16/2006	26.52	6545.20
1/23/2006	26.88	6544.84
1/30/2006	27.15	6544.57
2/6/2006	27.03	6544.69
2/13/2006	26.58	6545.14
2/20/2006	26.81	6544.91
2/27/2006	27.03	6544.69
3/6/2006	27.28	6544.44
3/13/2006	27.64	6544.08
3/20/2006	27.56	6544.16
3/27/2006	27.45	6544.27
4/3/2006	27.42	6544.30
4/10/2006	27.28	6544.44
4/17/2006	27.07	6544.65
4/24/2006	27.09	6544.63
5/1/2006	26.72	6545.00
5/8/2006	27.52	6544.20
5/15/2006	27.95	6543.77
5/22/2006	27.42	6544.30
5/30/2006	27.45	6544.27
6/5/2006	27.45	6544.27
6/12/2006	27.47	6544.25
6/19/2006	27.50	6544.22
6/26/2006	27.15	6544.57
7/5/2006	27.92	6543.80
7/10/2006	27.76	6543.96
7/17/2006	27.55	6544.17
7/24/2006	27.47	6544.25
7/31/2006	27.65	6544.07
8/7/2006	27.57	6544.15
8/14/2006	27.45	6544.27
8/21/2006	27.43	6544.29
8/28/2006	27.44	6544.28
9/5/2006	27.57	6544.15
9/11/2006	27.50	6544.22
9/18/2006	27.58	6544.14
9/25/2006	28.08	6543.64
10/2/2006	27.88	6543.84
10/9/2006	27.87	6543.85
10/16/2006	28.11	6543.61
10/23/2006	28.40	6543.32
10/30/2006	28.25	6543.47
11/6/2006	28.35	6543.37
11/13/2006	28.40	6543.32
11/20/2006	28.77	6542.95
11/21/2006	28.75	6542.97
11/27/2006	28.45	6543.27
12/4/2006	28.81	6542.91
12/11/2006	28.91	6542.81
12/18/2006	29.15	6542.57
12/27/2006	29.02	6542.70

L

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/9/2006	56.95	6518.02
4/6/2006	50.40	6524.57
8/18/2006	52.91	6522.06
10/9/2006	43.67	6531.30

L5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/9/2006	31.21	6544.86
4/6/2006	34.00	6542.07
8/18/2006	35.53	6540.54
10/10/2006	59.00	6517.07

L6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/6/2006	24.30	6550.34
8/18/2006	25.33	6549.31
10/10/2006	25.70	6548.94

L7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/9/2006	29.55	6547.06
4/6/2006	64.50	6512.11
8/18/2006	48.26	6528.35
10/10/2006	64.70	6511.91

L8

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/9/2006	34.00	6542.49
4/6/2006	34.90	6541.59
8/18/2006	37.46	6539.03
10/10/2006	71.00	6505.49

L9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/9/2006	38.00	6539.23
4/6/2006	37.98	6539.25
8/18/2006	49.70	6527.53
10/10/2006	50.42	6526.81

L10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/9/2006	53.24	6523.59
4/6/2006	46.71	6530.12
8/18/2006	48.06	6528.77
10/9/2006	42.00	6534.83

M3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/28/2006	57.00	6519.10

M5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	44.89	6530.45

M6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	64.65	6510.39

M7

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	59.60	6513.25

M9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/21/2006	66.00	6510.81
9/14/2006	66.70	6510.11
12/20/2006	65.65	6511.16

M10

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	53.43	6519.93

M16

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
9/19/2006	66.90	6503.69

MA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	45.25	6526.97

MC

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	46.20	6525.86

MF

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	50.65	6521.63

MH

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	54.81	6519.11

MJ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	< 54.15	> 6518.79

ML

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	47.70	6525.00

MO

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/28/2006	66.33	6506.56
2/28/2006	73.41	6499.48
3/2/2006	66.90	6505.99
4/27/2006	74.80	6498.09
7/20/2006	68.00	6504.89
12/20/2006	66.20	6506.69

MQ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/21/2006	67.20	6507.10
2/28/2006	67.30	6507.00
6/2/2006	68.00	6506.30
7/23/2006	68.58	6505.72
12/20/2006	66.81	6507.49

MR

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/28/2006	72.82	6493.44
4/10/2006	74.60	6491.66
4/27/2006	76.50	6489.76
7/23/2006	71.90	6494.36
10/2/2006	74.31	6491.95
12/20/2006	70.10	6496.16

MS

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/28/2006	63.48	6507.19
4/27/2006	69.50	6501.17
7/23/2006	65.20	6505.47
12/20/2006	63.80	6506.87

MT

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/14/2006	70.14	6497.29

MU

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/27/2006	37.86	6536.33
12/20/2006	37.91	6536.28

MW

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
2/22/2006	62.56	6512.35
12/20/2006	68.80	6506.11

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/16/2007

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
MX		
10/23/2006	54.06	6514.55
MY		
10/23/2006	59.76	6513.80
MZ		
12/20/2006	67.75	6508.89
NC		
8/7/2006	49.56	6536.27
ND		
12/10/2006	47.03	6545.86
NE5		
3/13/2006	50.20	6616.80
12/15/2006	51.20	6615.80
NW5		
3/13/2006	56.01	6601.57
P		
5/23/2006	51.26	6536.00
10/17/2006	51.38	6535.88
P2		
2/21/2006	63.40	6526.39
P3		
3/16/2006	53.11	6536.84
P4		
3/16/2006	49.30	6540.22
Q		
10/23/2006	48.60	6545.22
R		
10/23/2006	42.50	6561.53
S		
12/20/2006	46.95	6534.22
S1		
1/3/2006	46.45	6528.74
1/9/2006	46.38	6528.81
1/16/2006	46.18	6529.01
1/23/2006	46.30	6528.89
1/30/2006	45.75	6529.44
2/6/2006	45.58	6529.61
2/13/2006	45.26	6529.93
2/20/2006	44.91	6530.28
2/27/2006	44.65	6530.54
3/6/2006	44.63	6530.56
3/13/2006	44.74	6530.45
3/20/2006	44.68	6530.51
3/27/2006	44.73	6530.46
4/3/2006	44.68	6530.51
4/10/2006	44.41	6530.78
4/17/2006	44.09	6531.10
4/24/2006	43.83	6531.36
5/1/2006	43.21	6531.98
5/8/2006	42.81	6532.38
5/15/2006	42.36	6532.83
5/22/2006	42.22	6532.97
5/30/2006	42.36	6532.83
6/5/2006	42.40	6532.79
6/12/2006	42.35	6532.84
6/19/2006	42.31	6532.88
6/26/2006	42.22	6532.97
7/5/2006	42.00	6533.19
7/10/2006	41.67	6533.52
7/17/2006	41.97	6533.22
7/24/2006	41.72	6533.47
7/31/2006	41.26	6533.93
8/7/2006	42.68	6532.51
8/14/2006	41.74	6533.45
8/21/2006	41.50	6533.69
8/28/2006	41.22	6533.97
9/5/2006	41.18	6534.01
9/11/2006	41.52	6533.67
9/18/2006	41.51	6533.68
9/25/2006	41.71	6533.48
10/2/2006	41.41	6533.78
10/9/2006	41.60	6533.59
10/16/2006	41.68	6533.51
10/23/2006	42.05	6533.14
10/30/2006	42.11	6533.08
11/6/2006	42.46	6532.73
11/13/2006	42.53	6532.66
11/20/2006	42.76	6532.43
11/27/2006	42.86	6532.33
12/4/2006	43.00	6532.19
12/11/2006	43.15	6532.04
12/18/2006	43.30	6531.89
12/27/2006	43.33	6531.86
S2		
1/3/2006	45.18	6528.54
1/9/2006	45.14	6528.58
1/9/2006	45.15	6528.57
1/16/2006	44.94	6528.78
1/23/2006	44.85	6528.87
1/30/2006	44.62	6529.10
2/6/2006	44.46	6529.26
2/13/2006	44.08	6529.64
2/20/2006	43.65	6530.07
2/27/2006	43.48	6530.24
3/6/2006	43.44	6530.28
3/13/2006	43.56	6530.16
3/20/2006	43.48	6530.24
3/27/2006	43.55	6530.17
4/3/2006	43.41	6530.31
4/10/2006	43.14	6530.58
4/17/2006	42.85	6530.87
4/24/2006	42.63	6531.09
5/1/2006	42.28	6531.44
5/8/2006	42.84	6530.88
5/15/2006	41.38	6532.34
5/22/2006	41.21	6532.51
5/30/2006	41.31	6532.41
6/5/2006	41.32	6532.40
6/12/2006	41.32	6532.40
6/19/2006	41.30	6532.42
6/26/2006	41.14	6532.58
7/5/2006	41.10	6532.62
7/10/2006	40.82	6532.90
7/17/2006	40.90	6532.82
7/24/2006	40.73	6532.99
7/26/2006	40.56	6533.16
7/31/2006	40.39	6533.33
8/7/2006	40.66	6533.06
8/14/2006	40.75	6532.97
8/21/2006	40.56	6533.16
8/28/2006	40.32	6533.40
9/5/2006	40.43	6533.29
9/11/2006	40.50	6533.22
9/18/2006	40.53	6533.19
9/25/2006	40.75	6532.97
10/2/2006	40.65	6533.07
10/9/2006	40.90	6532.82
10/16/2006	41.02	6532.70
10/23/2006	41.05	6532.67
10/30/2006	41.43	6532.29
11/6/2006	41.68	6532.04
11/13/2006	41.73	6531.99
11/20/2006	41.98	6531.74
11/27/2006	42.03	6531.69
12/4/2006	42.20	6531.52
12/11/2006	42.31	6531.41
12/18/2006	42.50	6531.22
12/20/2006	42.34	6531.38
12/27/2006	42.50	6531.22
S3		
11/27/2006	44.18	6530.60
12/20/2006	44.22	6530.56
S4		
3/14/2006	44.50	6530.79
7/24/2006	41.38	6533.91
12/20/2006	42.94	6532.35

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL)

3/16/2007

S5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	52.60	6522.09
1/9/2006	52.55	6522.14
1/16/2006	52.25	6522.44
1/23/2006	52.29	6522.40
1/30/2006	52.09	6522.60
2/6/2006	52.09	6522.60
2/13/2006	51.76	6522.93
2/20/2006	51.61	6523.08
2/27/2006	51.36	6523.33
3/6/2006	51.20	6523.49
3/13/2006	51.21	6523.48
3/20/2006	50.98	6523.71
3/27/2006	50.90	6523.79
4/3/2006	50.78	6523.91
4/10/2006	50.70	6523.99
4/17/2006	50.40	6524.29
4/24/2006	49.92	6524.77
5/1/2006	48.70	6525.99
5/8/2006	48.15	6526.54
5/15/2006	47.72	6526.97
5/22/2006	48.30	6526.39
5/30/2006	48.80	6525.89
6/5/2006	48.98	6525.71
6/12/2006	49.04	6525.65
6/19/2006	49.05	6525.64
6/26/2006	49.00	6525.69
7/5/2006	48.20	6526.49
7/10/2006	47.42	6527.27
7/17/2006	48.55	6526.14
7/24/2006	47.94	6526.75
7/31/2006	46.86	6527.83
8/7/2006	48.14	6526.55
8/14/2006	48.50	6526.19
8/21/2006	47.71	6526.98
8/28/2006	47.62	6527.07
9/5/2006	48.15	6526.54
9/11/2006	48.24	6526.45
9/18/2006	48.21	6526.48
9/25/2006	48.31	6526.38
10/2/2006	47.12	6527.57
10/9/2006	47.95	6526.74
10/16/2006	48.01	6526.68
10/23/2006	48.45	6526.24
10/30/2006	48.53	6526.16
11/6/2006	48.90	6525.79
11/13/2006	48.89	6525.80
11/20/2006	49.13	6525.56
11/27/2006	49.15	6525.54
12/4/2006	49.17	6525.52
12/11/2006	49.06	6525.63
12/18/2006	49.02	6525.67
12/27/2006	48.82	6525.87

S5R

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/28/2006	51.20	6529.29

S11

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/23/2006	31.58	6546.81
12/20/2006	31.95	6546.44

S12

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	48.50	6530.35

SA

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/28/2006	56.00	6524.31

SM

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/27/2006	43.20	6535.54
12/20/2006	43.92	6534.82

SN

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	46.30	6532.96

SO

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	48.72	6530.07
1/9/2006	48.76	6530.03
1/16/2006	48.41	6530.38
1/23/2006	48.35	6530.44
1/30/2006	48.02	6530.77
2/6/2006	47.82	6530.97
2/13/2006	47.41	6531.38
2/20/2006	47.15	6531.64
2/27/2006	46.89	6531.90
3/6/2006	46.94	6531.85
3/13/2006	47.16	6531.63
3/20/2006	47.02	6531.77
3/27/2006	47.00	6531.79
4/3/2006	46.84	6531.95
4/10/2006	46.52	6532.27
4/17/2006	46.19	6532.60
4/24/2006	45.98	6532.81
5/1/2006	45.71	6533.08
5/8/2006	45.31	6533.48
5/15/2006	45.00	6533.79
5/22/2006	44.56	6534.23
5/30/2006	44.62	6534.17
6/5/2006	44.55	6534.24
6/12/2006	44.55	6534.24
6/19/2006	44.50	6534.29
6/26/2006	44.44	6534.35
7/5/2006	44.53	6534.26
7/10/2006	44.10	6534.69
7/17/2006	44.30	6534.49
7/24/2006	44.29	6534.50
7/31/2006	43.84	6534.95
8/7/2006	44.16	6534.63
8/14/2006	44.18	6534.61
8/21/2006	43.96	6534.83
8/28/2006	43.72	6535.07
9/5/2006	43.95	6534.84
9/11/2006	43.98	6534.81
9/18/2006	44.01	6534.78
9/25/2006	44.20	6534.59
10/2/2006	44.00	6534.79
10/9/2006	43.97	6534.82
10/16/2006	43.98	6534.81
10/23/2006	44.40	6534.39
10/30/2006	44.35	6534.44
11/6/2006	44.71	6534.08
11/13/2006	44.73	6534.06
11/20/2006	45.02	6533.77
11/27/2006	45.03	6533.76
11/27/2006	44.98	6533.81
12/4/2006	45.26	6533.53
12/11/2006	45.45	6533.34
12/18/2006	45.70	6533.09
12/27/2006	45.71	6533.08

SP

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	48.52	6530.14
1/9/2006	48.51	6530.15
1/16/2006	48.26	6530.40
1/23/2006	48.22	6530.44
1/30/2006	47.96	6530.70
2/6/2006	47.72	6530.94
2/13/2006	47.41	6531.25
2/20/2006	47.13	6531.53
2/27/2006	46.88	6531.78
3/6/2006	46.87	6531.79
3/13/2006	47.04	6531.62
3/20/2006	46.94	6531.72
3/27/2006	46.74	6531.92
4/3/2006	46.64	6532.02
4/10/2006	46.37	6532.29
4/17/2006	46.08	6532.58
4/24/2006	45.87	6532.79
5/1/2006	45.46	6533.20
5/8/2006	45.21	6533.45
5/15/2006	44.86	6533.80
5/22/2006	44.44	6534.22
5/30/2006	44.42	6534.24
6/5/2006	44.39	6534.27
6/12/2006	44.36	6534.30
6/19/2006	44.25	6534.41
6/26/2006	44.31	6534.35
7/5/2006	44.45	6534.21
7/10/2006	43.95	6534.71
7/17/2006	44.20	6534.46
7/24/2006	44.25	6534.41
7/31/2006	43.74	6534.92
8/7/2006	44.04	6534.62
8/14/2006	44.14	6534.52
8/21/2006	43.80	6534.86
8/28/2006	43.62	6535.04
9/5/2006	43.83	6534.83
9/11/2006	43.90	6534.76
9/18/2006	43.85	6534.81
9/25/2006	44.09	6534.57
10/2/2006	43.86	6534.80
10/9/2006	43.75	6534.91
10/16/2006	43.74	6534.92
10/23/2006	44.11	6534.55
10/30/2006	44.10	6534.56
11/6/2006	44.50	6534.16
11/13/2006	44.51	6534.15
11/20/2006	44.75	6533.91
11/27/2006	44.90	6533.76
12/4/2006	44.98	6533.68
12/11/2006	45.16	6533.50
12/18/2006	45.40	6533.26
12/27/2006	45.44	6533.22

SQ

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/28/2006	68.90	6510.30

SS

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/28/2006	50.88	6527.50

ST

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/28/2006	48.10	6531.21

* Drawdown Tube Pressure, # Transducer Reading

Table A.1-1 WATER LEVELS FOR HOMESTAKE'S ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL)

3/16/2007

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
SUR		
8/28/2006	53.00	6527.72
SV		
8/28/2006	51.78	6527.47
SZ		
1/11/2006	39.58	6541.89
12/20/2006	36.90	6544.57
T2		
8/28/2006	125.30	6539.52
T4		
3/20/2006	78.45	6579.29
T5		
3/20/2006	119.48	6537.85
T6		
3/20/2006	122.19	6536.58
T7		
3/21/2006	120.61	6539.06
T8		
3/21/2006	123.00	6538.61
T9		
3/21/2006	96.90	6567.05
T10		
4/3/2006	103.38	6556.58
T11		
4/3/2006	123.00	6533.81
T12		
4/3/2006	82.60	6574.63
T17		
4/3/2006	124.11	6532.80
T18		
4/3/2006	130.22	6534.94
T19		
4/4/2006	130.14	6537.62
T20		
4/4/2006	132.86	6537.83
T21		
4/5/2006	124.88	6545.12
T22		
4/3/2006	119.28	6547.91
T40		
4/5/2006	131.00	6539.27
T41		
3/21/2006	121.75	6538.21
TA		
9/25/2006	35.52	6544.78
TB		
9/26/2006	38.00	6545.57
W		
10/23/2006	47.49	6524.65
12/20/2006	47.95	6524.19
WN4		
3/13/2006	69.36	6593.42
WR12		
12/20/2006	21.75	6546.44
X		
1/3/2006	20.10	6551.51
1/30/2006	20.92	6550.69
2/14/2006	20.66	6550.95
2/27/2006	21.40	6550.21
4/3/2006	27.79	6543.82
4/4/2006	21.70	6549.91
5/1/2006	21.83	6549.78
5/30/2006	22.57	6549.04
6/26/2006	21.71	6549.90
7/24/2006	23.08	6548.53
7/31/2006	24.05	6547.56
8/28/2006	22.68	6548.93
9/25/2006	23.18	6548.43
10/17/2006	23.20	6548.41
10/30/2006	23.40	6548.21
11/28/2006	24.55	6547.06
12/27/2006	24.67	6546.94
X18		
11/17/2006	26.94	6559.14
X19		
11/17/2006	32.46	6552.74
X20		
11/17/2006	40.15	6545.58
X27		
11/17/2006	39.75	6545.55

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-2 WATER LEVELS FOR THE SUBDIVISION ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL)

3/16/2007

Wate	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0482			
	4/28/2006	53.02	6509.64
	6/1/2006	49.63	6513.03
	10/11/2006	41.30	6521.36
	12/18/2006	38.30	6524.36
0483			
	4/28/2006	42.10	6520.56
	6/1/2006	42.87	6519.79
	10/11/2006	44.64	6518.02
0490			
	3/15/2006	36.52	6525.90
	4/28/2006	40.94	6521.48
	5/18/2006	47.00	6515.42
	6/1/2006	47.20	6515.22
	6/19/2006	41.36	6521.06
	10/11/2006	47.90	6514.52
0491			
	4/28/2006	> 59.00	< 6503.62
	5/18/2006	42.70	6519.92
	6/1/2006	41.97	6520.65
	12/18/2006	40.15	6522.47
0492			
	4/12/2006	35.46	6525.22
0496			
	3/15/2006	59.00	6503.52
	4/26/2006	60.20	6502.32
	6/1/2006	57.70	6504.82
	8/14/2006	59.68	6502.84
0497			
	1/10/2006	55.00	6507.62
	3/15/2006	53.90	6508.72
	4/12/2006	54.40	6508.22
	4/26/2006	55.47	6507.15
	6/2/2006	58.31	6504.31
	8/14/2006	77.24	6485.38
0498			
	8/14/2006	135.60	6424.99
0688			
	3/2/2006	63.40	6499.22
	8/8/2006	64.44	6498.18
0802			
	1/3/2006	88.91	6473.81
	1/16/2006	88.99	6473.73
	1/23/2006	88.95	6473.77
	1/30/2006	88.92	6473.80
	2/13/2006	88.89	6473.83
	2/13/2006	90.00	6472.72
	2/20/2006	65.40	6497.32
	2/27/2006	76.11	6486.61
	3/27/2006	76.96	6485.76
	4/3/2006	76.51	6486.21
	5/30/2006	67.30	6495.42
	6/26/2006	68.01	6494.71
	7/10/2006	73.25	6489.47
	7/17/2006	73.57	6489.15
	7/24/2006	74.15	6488.57
	7/31/2006	74.04	6488.68
	8/7/2006	74.04	6488.68
	8/14/2006	72.71	6490.01
	8/21/2006	80.50	6482.22
	8/28/2006	61.05	6501.67
	9/5/2006	68.60	6494.12
	9/11/2006	68.30	6494.42
	9/18/2006	68.53	6494.19
	9/25/2006	69.20	6493.52
	10/16/2006	69.67	6493.05
	10/23/2006	69.98	6492.74
	10/30/2006	70.10	6492.62
	11/6/2006	69.70	6493.02
	11/20/2006	74.10	6488.62
	11/27/2006	73.90	6488.82
	12/4/2006	74.20	6488.52
	12/11/2006	74.11	6488.61
	12/18/2006	74.55	6488.17
0804			
	11/28/2006	47.00	6515.00
0844			
	3/14/2006	35.51	6520.62
0845			
	11/22/2006	35.88	6521.17
AW			
	11/28/2006	36.20	6527.23
CW44			
	3/15/2006	58.74	6502.00
	6/1/2006	156.40	6404.34
	8/14/2006	169.40	6391.34
	12/18/2006	64.00	6496.74
CW55			
	10/26/2006	39.81	6524.35
	12/12/2006	32.40	6531.76
SUB1			
	4/10/2006	36.10	6524.90
	10/18/2006	38.30	6522.70
SUB3			
	1/10/2006	28.80	6528.27
	4/10/2006	29.86	6527.21
	10/18/2006	32.42	6524.65
	10/26/2006	31.98	6525.09

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS

WATER LEVEL ELEVATION (FT-MSL)

3/16/2007

Wate	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0520	3/16/2006	50.40	6535.62
	10/2/2006	50.89	6535.13
0521	1/9/2006	61.90	6522.54
	2/15/2006	57.70	6526.74
	4/10/2006	55.66	6528.78
	8/18/2006	60.63	6523.81
	10/2/2006	59.51	6524.93
0522	1/9/2006	52.45	6528.08
	2/15/2006	51.05	6529.48
	4/10/2006	50.05	6530.48
	8/18/2006	52.16	6528.37
	10/2/2006	52.68	6527.85
0538	5/30/2006	130.60	6418.34
	8/16/2006	82.60	6466.34
	12/11/2006	81.90	6467.04
0539	12/11/2006	79.51	6475.81
0540	4/28/2006	58.31	6497.60
	5/30/2006	68.10	6487.81
	12/18/2006	69.35	6486.56
0541	4/28/2006	95.70	6459.92
	5/31/2006	98.20	6457.42
	7/18/2006	91.60	6464.02
	8/30/2006	99.20	6456.42
0631	3/15/2006	90.70	6450.40
	5/31/2006	105.10	6436.00
	10/10/2006	106.50	6434.60
0632	5/31/2006	91.98	6449.32
	12/18/2006	91.70	6449.60
0633	12/20/2006	74.20	6483.36
0634	2/28/2006	75.55	6484.52
	4/17/2006	80.20	6479.87
	7/23/2006	73.99	6486.08
	10/3/2006	82.20	6477.87
	12/20/2006	71.40	6488.67
0636	11/13/2006	104.18	6469.26
0637	11/13/2006	109.94	6465.26
0638	10/2/2006	44.10	6541.46
0639	1/9/2006	46.51	6541.37
	2/15/2006	50.40	6537.48
	4/10/2006	54.00	6533.88
	8/18/2006	56.43	6531.45
	10/2/2006	56.14	6531.74
0640	12/12/2006	52.40	6527.57
0644	5/30/2006	101.60	6442.30
	8/16/2006	84.00	6459.90
	8/30/2006	96.90	6447.00
	12/18/2006	83.80	6460.10
0645	12/11/2006	80.00	6463.79
0646	10/18/2006	87.08	6456.27
0647	4/28/2006	112.30	6439.61
	5/13/2006	112.90	6439.01
	10/4/2006	111.80	6440.11
	12/20/2006	103.55	6448.36
0648	5/31/2006	116.70	6431.09
	8/18/2006	110.60	6437.19
	12/20/2006	110.05	6437.74
0649	5/31/2006	104.90	6438.39
	8/18/2006	96.68	6446.61
	10/4/2006	105.20	6438.09
	12/20/2006	100.21	6443.08
0650	11/14/2006	82.31	6464.80
0652	12/18/2006	86.03	6452.12
0653	5/30/2006	154.30	6390.67
	8/16/2006	79.49	6465.48
	12/11/2006	80.00	6464.97
	12/18/2006	79.63	6465.34
0654	3/2/2006	72.63	6477.87
	10/3/2006	75.18	6475.32
	12/20/2006	73.03	6477.47
0657	2/28/2006	73.50	6478.31
	4/27/2006	77.90	6473.91
	4/28/2006	102.30	6449.51
	5/31/2006	103.10	6448.71
	8/18/2006	101.52	6450.29
	12/20/2006	100.15	6451.66
0658	10/4/2006	115.00	6435.18
	12/20/2006	105.20	6444.98
0659	7/23/2006	74.15	6486.02
	10/3/2006	80.78	6479.39
	12/20/2006	71.30	6488.87
0683	10/4/2006	92.20	6463.84
0684	10/4/2006	87.91	6465.37
0685	10/10/2006	98.76	6457.81
0686	11/13/2006	112.47	6466.33
0687	4/28/2006	> 97.00	< 6458.96
	5/31/2006	96.90	6459.06
	10/10/2006	97.80	6458.16
0692	11/22/2006	63.60	6521.22
0846	3/14/2006	45.03	6503.89
	8/8/2006	45.11	6503.81
0851	11/22/2006	83.81	6462.63
0855	5/31/2006	90.94	6450.17
	10/10/2006	92.60	6448.51

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.1-3 WATER LEVELS FOR REGIONAL ALLUVIAL WELLS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/16/2007

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0861		
8/16/2006	74.96	6484.89
0862		
1/10/2006	62.50	6493.68
4/27/2006	85.30	6470.88
5/30/2006	82.70	6473.48
8/16/2006	88.46	6467.72
12/18/2006	65.70	6490.48
0863		
2/2/2006	71.26	6485.30
5/30/2006	78.00	6478.56
0864		
3/2/2006	75.71	6471.01
8/16/2006	77.40	6469.32
0865		
1/18/2006	78.40	6478.38
4/27/2006	85.00	6471.78
5/30/2006	77.00	6479.78
0866		
1/18/2006	111.05	6447.07
4/27/2006	65.40	6492.72
8/16/2006	70.10	6488.02
0867		
8/16/2006	72.44	6483.46
12/18/2006	74.40	6481.50
0869		
4/27/2006	80.19	6464.30
5/30/2006	88.70	6455.79
8/16/2006	83.00	6461.49
12/11/2006	82.51	6461.98
12/18/2006	86.50	6457.99
0876		
12/11/2006	83.11	6461.15
12/18/2006	83.05	6461.21
0879		
12/18/2006	69.25	6475.30
0881		
2/28/2006	76.80	6488.24
2/28/2006	76.56	6488.48
4/27/2006	81.40	6483.64
12/20/2006	74.80	6490.24
0882		
10/3/2006	72.06	6489.10
0883		
11/14/2006	63.30	6493.83
0884		
10/3/2006	78.20	6487.90
0885		
10/3/2006	72.28	6492.36
12/20/2006	68.75	6495.89
0886		
2/28/2006	84.80	6479.75
4/27/2006	> 82.50	< 6482.05
7/23/2006	74.86	6489.69
10/2/2006	85.53	6479.02
12/20/2006	71.60	6492.95
0887		
10/3/2006	58.10	6509.63
0888		
10/4/2006	78.50	6478.83
12/20/2006	76.00	6481.33
0890		
2/28/2006	77.70	6480.73
4/27/2006	82.80	6475.63
7/23/2006	77.80	6480.63
12/20/2006	73.90	6484.53
0893		
10/2/2006	77.60	6486.37
12/20/2006	71.50	6492.47
0895		
10/4/2006	86.44	6467.40
0896		
10/4/2006	87.40	6468.21
0899		
10/4/2006	101.70	6469.14
0905		
11/13/2006	0.00	6545.00
0909		
11/13/2006	< 90.22	> 6448.68
0915		
6/19/2006	30.00	6595.00
0935		
10/4/2006	94.00	6464.12
0994		
3/15/2006	92.75	6462.25
4/12/2006	92.74	6462.26
5/15/2006	93.35	6461.65
6/19/2006	93.72	6461.28
7/17/2006	93.97	6461.03
8/15/2006	94.27	6460.73
9/15/2006	94.75	6460.25
10/17/2006	95.05	6459.95
10/24/2006	95.00	6460.00
0996		
5/31/2006	112.90	6439.62
7/18/2006	< 122.00	> 6430.52
8/30/2006	111.90	6440.62
8/30/2006	113.00	6439.52

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS

WATER LEVEL ELEVATION (FT-MSL)

3/16/2007

Wate	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0434	1/9/2006	36.14	6527.54
	4/10/2006	37.42	6526.26
	10/26/2006	39.61	6524.07
0482	4/28/2006	53.02	6509.64
	6/1/2006	49.63	6513.03
	10/11/2006	41.30	6521.36
	12/18/2006	38.30	6524.36
0483	4/28/2006	42.10	6520.56
	6/1/2006	42.87	6519.79
	10/11/2006	44.64	6518.02
0493	2/13/2006	111.30	6448.98
	6/19/2006	114.83	6445.45
	12/18/2006	117.60	6442.68
0494	2/13/2006	34.00	6526.14
	6/19/2006	39.00	6521.14
	12/18/2006	36.50	6523.64
0498	8/14/2006	135.60	6424.99
0538	5/30/2006	130.60	6418.34
	8/16/2006	82.60	6466.34
	12/11/2006	81.90	6467.04
0539	12/11/2006	79.51	6475.81
0653	5/30/2006	154.30	6390.67
	8/16/2006	79.49	6465.48
	12/11/2006	80.00	6464.97
	12/18/2006	79.63	6465.34
0850	12/18/2006	< 65.00	> 6484.15
0853	11/14/2006	82.60	6458.78
0859	12/10/2006	69.50	6483.26
0929	1/3/2006	68.95	6523.62
	1/30/2006	66.87	6525.70
	2/27/2006	69.55	6523.02
	4/3/2006	166.70	6425.87
	5/1/2006	109.45	6483.12
	5/30/2006	166.40	6426.17
	6/26/2006	70.10	6522.47
	7/31/2006	54.30	6538.27
	8/28/2006	40.30	6552.27
	9/25/2006	52.35	6540.22
	10/30/2006	91.90	6500.67
	11/17/2006	110.60	6481.97
	11/27/2006	112.00	6480.57
	12/27/2006	87.00	6505.57
0930	11/17/2006	132.24	6466.30
0933	10/25/2006	66.34	6534.17
0934	1/3/2006	61.50	6524.09
	1/30/2006	59.39	6526.20
	2/27/2006	62.65	6522.94
	4/3/2006	194.40	6391.19
	5/1/2006	112.50	6473.09
	5/30/2006	164.79	6420.80
	6/26/2006	63.51	6522.08
	7/31/2006	48.20	6537.39
	8/28/2006	35.00	6550.59
	9/25/2006	47.15	6538.44
	10/30/2006	58.25	6527.34
	11/21/2006	75.26	6510.33
	11/27/2006	77.30	6508.29
	12/27/2006	74.05	6511.54
0944	1/3/2006	1.00	6587.61
	1/30/2006	0.50	6588.11
	4/3/2006	15.00	6573.61
	5/1/2006	7.00	6581.61
	5/30/2006	61.20	6527.41
	7/31/2006	50.85	6537.76
	8/28/2006	37.70	6550.91
	9/25/2006	50.75	6537.86
	10/30/2006	59.80	6528.81
	11/27/2006	78.80	6509.81
	12/27/2006	76.90	6511.71
ACW	11/28/2006	129.90	6433.90
AW	11/28/2006	36.20	6527.23
CE1	12/10/2006	38.04	6532.15
CE2	1/3/2006	48.39	6527.96
	1/30/2006	48.50	6527.85
	2/22/2006	47.90	6528.45
	2/27/2006	47.69	6528.66
	4/3/2006	47.90	6528.45
	5/1/2006	46.65	6529.70
	5/30/2006	47.20	6529.15
	6/26/2006	49.73	6526.62
	7/31/2006	46.10	6530.25
	8/7/2006	46.38	6529.97
	8/28/2006	80.15	6496.20
	9/25/2006	80.15	6496.20
	10/30/2006	80.31	6496.04
	11/28/2006	81.50	6494.85
	12/27/2006	77.54	6498.81
CE5	8/28/2006	47.91	6520.64
	9/25/2006	51.52	6517.03
	10/30/2006	48.85	6519.70
	11/28/2006	48.55	6520.00
	12/20/2006	47.70	6520.85
	12/27/2006	48.00	6520.55
CE6	2/7/2006	77.06	6488.13
	8/28/2006	25.23	6539.96
	9/25/2006	125.60	6439.59
	10/30/2006	125.30	6439.89
	11/28/2006	125.30	6439.89
	12/27/2006	125.25	6439.94
CE7	7/20/2006	42.09	6533.90
CE8	9/20/2006	42.51	6527.19
	9/20/2006	42.51	6527.19
CE9	10/26/2006	38.74	6524.38
	12/12/2006	37.50	6525.62
CE10	8/31/2006	48.20	6522.66
CE11	8/28/2006	41.46	6523.96
	10/25/2006	42.10	6523.32
	10/30/2006	94.60	6470.82
	11/28/2006	95.15	6470.27
	12/27/2006	92.12	6473.30
CE12	10/25/2006	40.50	6531.73
	10/30/2006	62.70	6509.53
	11/28/2006	64.70	6507.53
	12/27/2006	62.78	6509.45
CE13	9/1/2006	42.08	6532.56
	9/21/2006	44.54	6530.10

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL) 3/16/2007

CW1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	147.30	6437.92
1/30/2006	156.30	6428.92
2/27/2006	169.73	6415.49
4/3/2006	162.20	6423.02
5/1/2006	154.20	6431.02
5/30/2006	162.05	6423.17
6/26/2006	167.25	6417.97
7/31/2006	171.30	6413.92
8/7/2006	163.94	6421.28
8/28/2006	167.70	6417.52
9/25/2006	167.35	6417.87
10/30/2006	172.10	6413.12
11/28/2006	172.70	6412.52
12/27/2006	166.55	6418.67

CW2

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	134.27	6451.21
1/30/2006	149.32	6436.16
2/14/2006	159.00	6426.48
2/27/2006	165.45	6420.03
4/3/2006	151.70	6433.78
5/1/2006	167.00	6418.48
5/30/2006	164.60	6420.88
6/26/2006	166.35	6419.13
7/31/2006	170.70	6414.78
8/7/2006	163.40	6422.08
8/28/2006	163.25	6422.23
9/25/2006	162.55	6422.93
10/30/2006	165.00	6420.48
11/28/2006	168.95	6416.53
12/27/2006	161.52	6423.96

CW2-1

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/21/2006	53.76	6531.72

CW3

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	172.70	6414.48
1/30/2006	173.90	6413.28
2/27/2006	185.86	6401.32
4/3/2006	186.68	6400.50
5/1/2006	45.65	6541.53
5/30/2006	58.48	6528.70
6/26/2006	124.95	6462.23
7/31/2006	53.65	6533.53
8/7/2006	57.90	6529.28
8/28/2006	150.40	6436.78
9/25/2006	149.50	6437.68
10/24/2006	145.16	6442.02
10/30/2006	146.61	6440.57
11/28/2006	120.04	6467.14
12/27/2006	95.84	6491.34

CW4R

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/30/2006	0.50	6568.23
2/27/2006	15.00	6553.73
5/1/2006	14.15	6554.58
5/30/2006	3.60	6565.13
6/26/2006	0.50	6568.23
7/31/2006	1.00	6567.73
10/30/2006	4.00	6564.73
11/28/2006	15.10	6553.63
12/27/2006	1.00	6567.73

CW5

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	8.00	6561.34
1/30/2006	0.50	6568.84
6/26/2006	0.50	6568.84
11/28/2006	13.40	6555.94
12/27/2006	22.75	6546.59

CW6

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	120.80	6454.84

CW9

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
12/20/2006	62.41	6529.42

CW13

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	5.00	6571.70
2/27/2006	27.16	6549.54
4/3/2006	2.00	6574.70
5/1/2006	13.51	6563.19
5/30/2006	35.75	6540.95
6/26/2006	0.50	6576.20
11/28/2006	40.75	6535.95
12/27/2006	38.23	6538.47

CW14

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	4.00	6562.09
1/30/2006	2.00	6564.09
2/27/2006	57.38	6508.71
4/3/2006	14.42	6551.67
6/26/2006	0.50	6565.59
11/28/2006	18.00	6548.09
12/27/2006	50.02	6516.07

CW15

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/28/2006	99.22	6452.10

CW17

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/15/2006	52.20	6537.12

CW18

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	44.30	6528.35
1/30/2006	43.33	6529.32
2/27/2006	47.28	6525.37
4/3/2006	116.95	6455.70
5/1/2006	78.41	6494.24
5/30/2006	103.45	6469.20
6/26/2006	42.50	6530.15
7/31/2006	16.10	6556.55
8/28/2006	4.75	6567.90
9/25/2006	30.10	6542.55
10/30/2006	16.52	6556.13
11/22/2006	50.20	6522.45
11/28/2006	39.00	6533.65
12/27/2006	54.15	6518.50

CW24

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/15/2006	53.80	6534.87

CW25

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	7.50	6559.70
1/30/2006	20.00	6547.20
2/27/2006	15.00	6552.20
6/26/2006	0.50	6566.70
7/31/2006	56.00	6511.20
10/30/2006	1.60	6565.60
11/28/2006	2.65	6564.55
12/27/2006	38.90	6528.30

CW26

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/22/2006	103.80	6457.63

CW27

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/22/2006	74.98	6487.90

CW28

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
1/3/2006	18.72	6552.96
1/30/2006	219.21	6352.47
2/27/2006	228.10	6343.58
4/3/2006	229.80	6341.88
5/1/2006	216.10	6355.58
5/30/2006	112.15	6459.53
6/26/2006	107.42	6464.26
7/31/2006	106.00	6465.68
8/28/2006	101.80	6469.88
9/25/2006	101.10	6470.58
10/30/2006	101.70	6469.98
11/22/2006	102.90	6468.78
11/28/2006	102.50	6469.18
12/27/2006	100.44	6471.24

CW29

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
4/27/2006	100.90	6451.32
5/30/2006	183.10	6369.12
8/14/2006	229.84	6322.38
12/18/2006	92.50	6459.72

CW31

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/14/2006	86.51	6473.75

CW32

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/14/2006	133.54	6433.74

CW33

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/15/2006	106.10	6468.79

CW35

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
10/24/2006	55.70	6535.47

CW36

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
8/1/2006	77.51	6473.58
12/20/2006	77.85	6473.24

CW37

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
11/28/2006	64.34	6486.83

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.2-1 WATER LEVELS FOR CHINLE AQUIFERS (cont.)

WATER LEVEL ELEVATION (FT-MSL)

3/16/2007

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
CW39		
11/28/2006	66.83	6483.88
CW40		
12/12/2006	90.86	6488.08
CW41		
8/16/2006	103.90	6451.51
12/18/2006	97.40	6458.01
CW42		
8/16/2006	88.64	6460.14
12/18/2006	86.00	6462.78
CW43		
11/14/2006	70.62	6478.17
CW44		
3/15/2006	58.74	6502.00
6/1/2006	156.40	6404.34
8/14/2006	169.40	6391.34
12/18/2006	64.00	6496.74
CW45		
3/15/2006	57.00	6504.31
4/20/2006	170.75	6390.56
6/2/2006	59.10	6502.21
8/14/2006	10.00	6551.31
12/18/2006	61.60	6499.71
CW46		
3/15/2006	34.53	6527.73
8/14/2006	12.00	6550.26
12/18/2006	72.20	6490.06
CW50		
11/15/2006	48.74	6539.82
12/21/2006	58.32	6530.24
CW52		
11/15/2006	74.56	6517.84
12/21/2006	74.94	6517.46
CW53		
4/28/2006	66.97	6497.97
10/11/2006	75.10	6489.84
12/18/2006	51.60	6513.34
CW54		
12/10/2006	33.21	6525.34
CW55		
10/26/2006	39.81	6524.35
12/12/2006	32.40	6531.76
WCW		
3/15/2006	115.50	6451.87
11/28/2006	133.40	6433.97
WR25		
11/15/2006	49.61	6536.85

* Drawdown Tube Pressure, # Transducer Reading

TABLE A.3-1 WATER LEVELS FOR THE SAN ANDRES AQUIFER

WATER LEVEL ELEVATION (FT-MSL)

Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)	Date	Water Level (ft-MP)	Water Level Elevation (ft+MSL)
0907											
3/16/2006	110.00	6435.60									
12/20/2006	109.90	6435.70									
0928											
3/16/2006	161.48	6436.12									
12/10/2006	162.90	6434.70									
12/20/2006	162.79	6434.81									
0938											
3/16/2006	133.00	6435.80									
12/20/2006	133.91	6434.89									
0943											
1/3/2006	124.60	6431.31									
1/30/2006	125.00	6430.91									
2/27/2006	122.30	6433.61									
3/16/2006	124.62	6431.29									
4/3/2006	125.50	6430.41									
5/1/2006	123.20	6432.71									
5/30/2006	125.45	6430.46									
6/26/2006	125.50	6430.41									
7/31/2006	124.12	6431.79									
8/28/2006	125.51	6430.40									
9/25/2006	124.55	6431.36									
10/30/2006	124.10	6431.81									
11/27/2006	122.30	6433.61									
0951											
1/3/2006	140.95	6432.75									
1/30/2006	141.14	6432.56									
2/27/2006	141.40	6432.30									
3/16/2006	142.36	6431.34									
4/3/2006	142.36	6431.34									
5/1/2006	141.87	6431.83									
5/30/2006	142.80	6430.90									
6/26/2006	143.12	6430.58									
7/31/2006	144.23	6429.47									
8/28/2006	139.90	6433.80									
9/25/2006	144.30	6429.40									
10/30/2006	143.08	6430.62									
11/27/2006	143.15	6430.55									
12/27/2006	142.55	6431.15									

* Drawdown Tube Pressure, # Transducer Reading

APPENDIX B

WATER QUALITY

TABLE OF CONTENTS

GROUND-WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

APPENDIX B

TABLE B.1-1 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
CN1	12/16/2006	ENER	41.3	39.2	14.2	4620	2820	126	677	6230	12900	* 17170	1.04
CN3	2/23/2006	ENER	---	---	---	---	---	---	360	1960	4450	* 6580	---
	12/16/2006	ENER	2.40	3.10	7.30	1550	953	78.0	353	1960	4390	* 6230	0.986
CS1	12/18/2006	ENER	77.1	25.4	11.4	853	682	< 1.000	157	1360	2700	* 3820	0.986
CS7	10/23/2006	ENER	0.900	< 0.500	5.10	713	791	105	109	647	1980	* 3250	0.946
EC4	3/13/2006	ENER	---	---	---	---	---	---	693	3220	8470	* 12580	---
	12/8/2006	ENER	< 2.00	< 2.00	8.30	1650	1580	190	411	1620	4650	* 7140	0.932
ED1	10/23/2006	ENER	2.00	< 2.00	21.9	2950	855	215	301	4370	12300	* 15600	1.07
EE2	2/23/2006	ENER	---	---	---	---	---	---	548	4890	14600	* 18546	---
	3/3/2006	ENER	---	---	---	---	---	---	1000	6970	20200	* 23700	---
	12/6/2006	ENER	< 2.00	< 2.00	28.2	7230	4320	1760	1140	7410	20000	* 22600	0.999
EG1	2/23/2006	ENER	---	---	---	---	---	---	760	4450	13900	* 18260	---
EG7	3/8/2006	ENER	---	---	---	---	---	---	477	4430	13200	* 18210	---
	10/23/2006	ENER	2.00	< 2.00	13.3	3740	787	154	217	3670	10200	* 13500	1.62
EG9	2/23/2006	ENER	---	---	---	---	---	---	139	1030	2160	* 3135	---
	10/25/2006	ENER	96.0	27.1	3.50	474	445	< 1.000	114	883	1780	* 2700	0.959
EH11	10/23/2006	ENER	< 2.00	< 2.00	19.2	4110	845	177	345	3870	11500	* 14800	1.63
EN1	12/16/2006	ENER	2.50	9.00	17.2	8420	6000	1860	867	9190	22400	* 25490	0.977
EN2	12/16/2006	ENER	< 2.00	< 2.00	22.7	6830	4780	2300	912	6750	18200	* 21730	0.927
EN4B	2/23/2006	ENER	---	---	---	---	---	---	578	3410	13000	* 14380	---
	3/3/2006	ENER	---	---	---	---	---	---	468	2950	9030	* 12100	---
	12/7/2006	ENER	---	---	---	---	---	---	673	3960	12500	* 11900	---
EO6	3/3/2006	ENER	---	---	---	---	---	---	694	3350	11400	* 14500	---
ES1	12/18/2006	ENER	1.50	< 0.500	3.80	570	554	50.0	124	566	1550	* 2400	0.961

* Signifies Specific Conductivity from HMC

TABLE B.1-1 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
ES4	2/23/2006	ENER	---	---	---	---	---	---	555	3210	8250	* 11370	---
NE Tails	3/21/2006	ENER	---	---	---	---	---	---	---	4900	14100	* 19350	---
	8/8/2006	ENER	3.00	2.00	16.3	4360	3050	1370	581	4340	12000	* 15330	0.941
NE1	12/16/2006	ENER	2.70	0.700	5.60	781	562	42.0	144	936	2180	* 3280	1.00
NE5	3/13/2006	ENER	9.40	19.2	19.1	2540	1340	239	586	3480	7530	* 11020	0.951
	12/15/2006	ENER	10.1	17.8	14.7	3050	1390	202	689	3990	8870	* 11570	1.02
NE6	2/23/2006	ENER	---	---	---	---	---	---	987	8300	25000	* 28680	---
NW Tails	3/21/2006	ENER	---	---	---	---	---	---	---	3570	10300	* 14510	---
	8/8/2006	ENER	< 2.00	< 2.00	12.0	3730	2720	1310	529	3770	10100	* 13750	0.896
NW5	3/13/2006	ENER	5.20	1.50	4.60	875	602	230	116	1120	2620	* 4305	0.874
PW1	3/13/2006	ENER	---	---	---	---	---	---	216	1480	3870	* 6196	---
	12/15/2006	ENER	10.3	6.30	7.80	1260	1260	87.0	274	1440	3580	* 5090	0.915
SE Tails	3/21/2006	ENER	---	---	---	---	---	---	---	4250	12700	* 17580	---
	8/8/2006	ENER	< 2.00	< 2.00	20.8	5020	6660	< 1.000	768	4760	13000	* 17180	0.953
SE2	3/13/2006	ENER	---	---	---	---	---	---	689	4800	12700	* 16890	---
	12/8/2006	ENER	< 2.00	< 2.00	19.2	4380	2150	860	812	4690	12400	* 16900	1.04
SW Tails	3/21/2006	ENER	---	---	---	---	---	---	---	3650	9470	* 13570	---
	8/8/2006	ENER	2.30	2.00	10.9	3000	1700	981	485	3130	7800	* 11240	0.940
	8/28/2006	ENER	2.70	2.60	14.9	3000	1800	864	530	3290	7830	* 10900	0.926
SW1	12/15/2006	ENER	3.00	19.0	23.7	6490	4460	1150	1350	7380	17700	* 21050	0.939
WA3	2/23/2006	ENER	---	---	---	---	---	---	363	3250	9750	* 13550	---
	10/25/2006	ENER	2.40	< 0.500	15.4	3500	2390	1230	538	3700	9900	* 13400	0.886
WB3	7/24/2006	ENER	---	---	---	---	---	---	91.0	895	1840	* 2810	---
WC1	2/23/2006	ENER	---	---	---	---	---	---	494	4520	12900	* 16900	---

* Signifies Specific Conductivity from HMC

TABLE B.1-1 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
WC15	3/13/2006	ENER	---	---	---	---	---	---	1380	7500	22700	* 29180	---
	12/7/2006	ENER	< 2.00	< 2.00	31.5	8580	5570	2080	1670	7730	24100	* 27600	1.02
WD3	3/13/2006	ENER	---	---	---	---	---	---	464	2190	5130	* 7640	---
	12/6/2006	ENER	92.0	46.6	13.6	2040	1100	< 1.000	673	2760	6430	* 8350	1.03
WE2	2/23/2006	ENER	---	---	---	---	---	---	443	2870	7690	* 10960	---
	10/23/2006	ENER	< 2.00	< 2.00	11.1	3050	3200	641	255	3060	8630	* 11100	0.921
WE13	3/13/2006	ENER	---	---	---	---	---	---	154	740	1950	* 3282	---
	8/28/2006	ENER	5.00	2.10	11.3	2180	1430	703	372	2160	5690	* 7960	0.934
WF14	3/13/2006	ENER	---	---	---	---	---	---	145	787	2260	* 4147	---
	12/16/2006	ENER	9.60	3.20	5.40	791	753	31.0	185	872	2240	* 3400	0.960
WN1	12/18/2006	ENER	9.40	26.0	39.4	7660	3280	377	1680	10900	21000	* 24720	0.989
WN4	3/13/2006	ENER	6.00	9.00	30.6	6830	3870	2340	1230	8180	20200	* 26216	0.863
WN5A	12/7/2006	ENER	---	---	---	---	---	---	962	6170	12900	* 14200	---
WN6	10/25/2006	ENER	2.30	2.50	19.6	4240	2050	358	878	5960	12000	* 15200	0.953
WN7	2/23/2006	ENER	---	---	---	---	---	---	574	6270	19000	* 23500	---
	12/8/2006	ENER	< 2.00	< 2.00	13.9	5110	3100	1710	522	4820	14400	* 18300	1.00
WO10	12/7/2006	ENER	2.00	< 2.00	19.0	6310	3940	2270	529	5690	17500	* 20600	1.01
WU2	12/6/2006	ENER	< 2.00	< 2.00	16.8	3930	1850	308	1160	4960	11800	* 14400	0.972
WW1	12/15/2006	ENER	100.0	127	40.3	7460	4430	52.0	2040	11500	22400	* 24980	0.918

* Signifies Specific Conductivity from HMC

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
CN1	12/16/2006	ENER	8.90	25.4	47.1	0.114	0.200	17.1	---	---	---
CN3	2/23/2006	ENER	---	4.25	7.81	0.168	0.500	---	---	---	---
	12/16/2006	ENER	9.16	3.09	5.80	0.0830	< 0.100	50.5	---	---	---
CS1	12/18/2006	ENER	8.10	5.70	1.67	1.26	0.100	116	---	---	---
CS7	10/23/2006	ENER	9.37	1.64	4.57	0.0220	< 0.100	60.0	---	---	---
EC4	3/13/2006	ENER	---	6.41	23.9	0.0540	5.20	---	---	---	---
	12/8/2006	ENER	9.33	1.42	6.45	0.0640	< 0.100	15.2	---	---	---
ED1	10/23/2006	ENER	9.65	20.7	65.2	0.0830	1.60	408	---	---	---
EE2	2/23/2006	ENER	---	14.9	85.1	0.220	5.10	---	---	---	---
	3/3/2006	ENER	---	27.3	86.4	0.192	0.200	---	---	---	---
	12/6/2006	ENER	10.00	24.8	71.2	0.181	< 0.100	75.2	---	---	---
EG1	2/23/2006	ENER	---	25.8	46.4	0.0710	7.10	---	---	---	---
EG7	3/8/2006	ENER	---	8.34	70.5	0.0600	1.60	---	---	---	---
	10/23/2006	ENER	9.54	14.1	54.0	0.0760	1.60	49.5	---	---	---
EG9	2/23/2006	ENER	---	2.06	5.08	0.0610	1.000	---	---	---	---
	10/25/2006	ENER	7.91	1.39	1.80	< 0.0050	< 0.100	4.00	---	---	---
EH11	10/23/2006	ENER	9.57	16.4	55.6	0.120	1.70	264	---	---	---
EN1	12/16/2006	ENER	9.74	36.6	112	3.48	1.40	15.5	---	---	---
EN2	12/16/2006	ENER	9.93	25.2	92.4	0.390	0.100	65.0	---	---	---
EN4B	2/23/2006	ENER	---	17.2	30.4	0.120	3.30	---	---	---	---
	3/3/2006	ENER	---	15.2	27.1	0.125	0.200	---	---	---	---
	12/7/2006	ENER	---	15.4	28.8	0.0730	< 0.100	---	---	---	---
EO6	3/3/2006	ENER	---	10.4	31.7	0.106	< 0.100	---	---	---	---
ES1	12/18/2006	ENER	9.20	0.181	1.16	0.141	0.700	41.5	---	---	---

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
ES4	2/23/2006	ENER	---	10.1	29.2	0.0870	3.80	---	---	---	---
NE Tails	3/21/2006	ENER	---	21.9	60.2	0.0900	---	---	---	---	---
	8/8/2006	ENER	9.90	17.6	52.1	0.100	3.70	174	---	---	---
NE1	12/16/2006	ENER	9.12	0.384	2.47	0.127	0.500	49.4	---	---	---
NE5	3/13/2006	ENER	9.50	6.80	23.9	0.0100	< 0.100	99.0	---	---	---
	12/15/2006	ENER	9.41	6.50	26.9	0.0300	< 0.100	56.4	---	---	---
NE6	2/23/2006	ENER	---	51.2	121	0.0600	6.00	---	---	---	---
NW Tails	3/21/2006	ENER	---	13.4	40.1	0.200	---	---	---	---	---
	8/8/2006	ENER	9.93	12.2	42.4	0.240	2.50	101	---	---	---
NW5	3/13/2006	ENER	9.83	2.15	4.93	0.143	0.500	84.7	---	---	---
PW1	3/13/2006	ENER	---	3.47	7.93	0.237	2.20	---	---	---	---
	12/15/2006	ENER	9.09	3.06	6.42	0.500	1.80	45.0	---	---	---
SE Tails	3/21/2006	ENER	---	17.1	56.9	0.105	---	---	---	---	---
	8/8/2006	ENER	7.09	19.6	66.0	0.110	4.40	297	---	---	---
SE2	3/13/2006	ENER	---	18.5	46.5	0.407	1.30	---	---	---	---
	12/8/2006	ENER	9.85	15.3	36.8	0.178	0.500	76.4	---	---	---
SW Tails	3/21/2006	ENER	---	12.9	33.0	0.130	---	---	---	---	---
	8/8/2006	ENER	10.00	10.5	30.9	0.150	2.20	156	---	---	---
	8/28/2006	ENER	---	10.8	29.6	0.100	2.00	181	---	---	---
SW1	12/15/2006	ENER	9.66	28.1	60.6	0.390	1.60	38.3	---	---	---
WA3	2/23/2006	ENER	---	13.8	40.8	0.210	2.80	---	---	---	---
	10/25/2006	ENER	9.96	11.8	26.0	0.130	0.300	249	---	---	---
WB3	7/24/2006	ENER	---	0.837	2.32	1.50	0.300	---	---	---	---
WC1	2/23/2006	ENER	---	18.7	95.8	0.580	3.30	---	---	---	---

TABLE B.1-2 WATER QUALITY ANALYSES FOR THE TAILINGS WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
WC15	3/13/2006	ENER	---	29.8	64.1	0.180	0.500	---	---	---	---
	12/7/2006	ENER	9.82	29.0	53.7	0.158	0.600	288	---	---	---
WD3	3/13/2006	ENER	---	4.75	6.29	3.97	8.00	---	---	---	---
	12/6/2006	ENER	8.14	6.30	7.20	6.82	1.000	23.5	---	---	---
WE2	2/23/2006	ENER	---	10.1	29.4	0.0300	1.90	---	---	---	---
	10/23/2006	ENER	9.55	13.0	39.5	0.152	1.70	91.6	---	---	---
WE13	3/13/2006	ENER	---	0.448	1.07	0.0210	0.400	---	---	---	---
	8/28/2006	ENER	---	6.38	22.1	0.0900	1.60	213	---	---	---
WF14	3/13/2006	ENER	---	2.92	6.37	0.291	< 0.100	---	---	---	---
	12/16/2006	ENER	8.87	1.66	4.39	0.317	0.500	39.6	---	---	---
WN1	12/18/2006	ENER	9.31	20.5	62.1	1.49	0.100	29.4	---	---	---
WN4	3/13/2006	ENER	10.00	26.9	90.2	0.500	3.20	261	---	---	---
WN5A	12/7/2006	ENER	---	35.1	20.3	3.41	0.900	---	---	---	---
WN6	10/25/2006	ENER	9.49	10.5	25.8	0.0430	1.40	139	---	---	---
WN7	2/23/2006	ENER	---	48.6	101	0.287	2.50	---	---	---	---
	12/8/2006	ENER	9.99	23.9	57.4	0.244	2.20	113	---	---	---
WO10	12/7/2006	ENER	10.00	23.1	72.5	0.226	< 0.100	298	---	---	---
WU2	12/6/2006	ENER	9.47	6.18	37.6	0.182	5.30	55.4	---	---	---
WW1	12/15/2006	ENER	8.32	51.9	62.6	3.56	0.100	7.20	---	---	---

TABLE B.2-1 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
East 1 Sump	3/22/2006	ENER	---	---	---	---	---	---	---	10800	28200	* 34300	---
	8/8/2006	ENER	7.00	15.0	38.8	10200	6630	1920	1830	11700	26100	* 31750	0.954
East 2 Sump	3/22/2006	ENER	---	---	---	---	---	---	---	10700	28200	* 33980	---
	8/8/2006	ENER	3.00	19.0	37.0	10400	7950	2150	2280	11400	27600	* 31550	0.904
East Reclaim	3/22/2006	ENER	---	---	---	---	---	---	---	4640	13000	* 17600	---
	8/8/2006	ENER	2.00	7.00	20.6	4820	3330	1160	952	5150	12400	* 16740	0.928
North 1 Sump	3/21/2006	ENER	---	---	---	---	---	---	---	7580	19300	* 25250	---
	8/8/2006	ENER	7.00	10.00	28.8	6980	4640	1250	1130	8310	17900	* 23500	0.947
South 1 Sump	3/21/2006	ENER	---	---	---	---	---	---	---	5450	12100	* 16630	---
	8/8/2006	ENER	14.0	35.0	25.9	3760	2020	57.0	869	5230	10300	* 13980	0.996
West 1 Sump	3/21/2006	ENER	---	---	---	---	---	---	---	6510	18100	* 23020	---
	8/8/2006	ENER	7.00	38.0	17.7	6460	3270	377	1260	9050	17300	* 21560	0.982
West Reclaim	3/21/2006	ENER	---	---	---	---	---	---	---	5950	14300	* 19030	---
	8/8/2006	ENER	15.6	4.10	9.80	795	618	31.0	178	972	2310	* 3474	0.987

* Signifies Specific Conductivity from HMC

TABLE B.2-2 WATER QUALITY ANALYSES FOR THE TOE DRAIN SUMPS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
East 1 Sump	3/22/2006	ENER	---	59.4	119	2.60	---	---	---	---	---
	8/8/2006	ENER	9.71	58.3	122	2.47	0.400	175	---	---	---
East 2 Sump	3/22/2006	ENER	---	95.6	123	0.130	---	---	---	---	---
	8/8/2006	ENER	9.68	92.0	127	0.190	3.30	18.1	---	---	---
East Reclaim	3/22/2006	ENER	---	21.4	50.8	0.290	---	---	---	---	---
	8/8/2006	ENER	9.79	21.8	52.4	0.250	6.40	66.8	---	---	---
North 1 Sump	3/21/2006	ENER	---	44.7	90.0	1.50	---	---	---	---	---
	8/8/2006	ENER	9.68	38.7	85.4	1.12	3.10	67.3	---	---	---
South 1 Sump	3/21/2006	ENER	---	25.6	34.2	0.354	---	---	---	---	---
	8/8/2006	ENER	8.70	22.2	30.1	0.550	2.30	38.7	---	---	---
West 1 Sump	3/21/2006	ENER	---	36.2	67.8	0.930	---	---	---	---	---
	8/8/2006	ENER	9.31	27.8	38.5	0.130	3.90	2.40	---	---	---
West Reclaim	3/21/2006	ENER	---	23.8	48.5	0.490	---	---	---	---	---
	8/8/2006	ENER	8.95	3.67	7.76	0.0900	2.40	3.40	---	---	---

TABLE B.3-1 WATER QUALITY ANALYSES FOR THE LINED PONDS

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
E Coll Pond	2/7/2006	ENER	---	---	---	---	---	---	1130	8310	17600	* 20780	---
	4/4/2006	ENER	---	---	---	---	---	---	1050	7310	16900	* 21700	---
	8/7/2006	ENER	---	---	---	---	---	---	766	5950	12800	* 16140	---
	9/26/2006	ENER	---	---	---	---	---	---	805	6990	14900	* 19170	---
Evap Pond 1	2/7/2006	ENER	18.0	548	184	21600	15400	4670	9050	21100	64900	* 63500	0.898
	4/4/2006	ENER	---	---	---	---	---	---	9660	24800	70800	* 74000	---
	8/7/2006	ENER	19.0	504	159	32900	21200	3140	10400	35200	81800	* 76200	1.000
	9/26/2006	ENER	---	---	---	---	---	---	8160	31400	82100	* 81400	---
Evap Pond 2	2/7/2006	ENER	22.9	206	51.0	10400	4140	1650	2060	14200	29800	---	0.990
	4/4/2006	ENER	---	---	---	---	---	---	2220	14200	30100	* 35550	---
	8/7/2006	ENER	19.0	198	43.1	11800	6020	1290	2550	16300	31800	* 34990	0.961
	9/26/2006	ENER	---	---	---	---	---	---	1880	15600	32100	* 36490	---
W Coll Pond	2/7/2006	ENER	---	---	---	---	---	---	268	2050	3970	* 5560	---
	4/4/2006	ENER	---	---	---	---	---	---	316	2220	4390	* 6670	---
	8/7/2006	ENER	---	---	---	---	---	---	299	2260	4310	* 6100	---
	8/28/2006	ENER	39.8	62.0	8.40	1410	443	13.0	333	2540	4350	* 6230	0.981
	9/26/2006	ENER	---	---	---	---	---	---	231	2220	4880	* 6970	---

* Signifies Specific Conductivity from HMC

TABLE B.3-2 WATER QUALITY ANALYSES FOR THE LINED PONDS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
E Coll Pond	2/7/2006	ENER	---	28.8	63.6	1.61	8.80	59.2	< 1.000	---	---
	4/4/2006	ENER	---	32.8	54.0	1.48	3.80	---	---	---	---
	8/7/2006	ENER	---	23.0	56.3	0.875	8.60	---	---	---	---
	9/26/2006	ENER	---	26.9	51.6	0.703	3.00	---	---	---	---
Evap Pond 1	2/7/2006	ENER	9.73	295	466	1.81	0.100	34.4	< 1.000	0.570	648
	4/4/2006	ENER	---	280	449	2.33	< 0.100	---	---	---	---
	8/7/2006	ENER	9.51	310	517	1.38	< 0.100	94.8	< 1.000	0.600	786
	9/26/2006	ENER	---	339	463	1.63	< 0.100	---	---	---	---
Evap Pond 2	2/7/2006	ENER	9.85	53.7	111	1.69	1.000	57.1	< 1.000	0.310	364
	4/4/2006	ENER	---	60.3	115	1.69	< 0.100	---	---	---	---
	8/7/2006	ENER	9.76	63.4	130	1.33	0.300	64.4	2.00	0.310	341
	9/26/2006	ENER	---	67.5	111	1.11	1.000	---	---	---	---
W Coll Pond	2/7/2006	ENER	---	6.07	11.3	0.378	2.70	1.70	< 1.000	---	---
	4/4/2006	ENER	---	7.68	13.7	0.358	1.50	---	---	---	---
	8/7/2006	ENER	---	6.58	12.1	0.238	1.70	---	---	---	---
	8/28/2006	ENER	---	6.38	12.3	0.233	1.70	2.60	---	---	---
	9/26/2006	ENER	---	7.40	11.0	0.225	1.50	---	---	---	---

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
0690	11/21/2006	ENER	---	---	---	---	---	---	111	328	910	* 1437	---
0691	11/21/2006	ENER	---	---	---	---	---	---	149	311	932	* 1498	---
1E	12/10/2006	ENER	---	---	---	---	---	---	186	627	1830	* 2582	---
1G	12/10/2006	ENER	---	---	---	---	---	---	---	1250	2910	* 3966	---
B	9/25/2006	ENER	---	---	---	---	---	---	116	452	1080	* 1591	---
B2	10/17/2006	ENER	361	94.0	5.70	880	745	< 1.000	321	1940	4000	* 5440	1.04
B3	8/28/2006	ENER	205	69.4	7.80	1790	1660	< 1.000	432	3020	5850	* 7820	0.919
	10/17/2006	ENER	186	64.0	5.40	1790	1130	< 1.000	411	2920	5860	* 7790	1.02
B4	10/17/2006	ENER	154	62.2	5.40	2400	1550	< 1.000	546	3670	7430	* 9820	1.00
B5	10/16/2006	ENER	231	78.2	4.80	1580	988	< 1.000	412	2760	5470	* 7270	1.02
B6	10/16/2006	ENER	163	50.0	3.50	1340	811	< 1.000	341	2310	4580	* 6360	0.994
B7	10/16/2006	ENER	293	82.2	4.10	796	452	< 1.000	273	2080	3850	* 4797	0.960
B8	10/16/2006	ENER	325	88.1	4.20	1160	594	< 1.000	362	2610	4920	* 6640	0.996
B10	10/12/2006	ENER	138	48.8	4.50	1740	872	< 1.000	377	2900	5980	* 7600	1.02
B11	9/25/2006	ENER	263	82.8	9.20	1020	600	< 1.000	292	2290	4540	* 5890	0.981
	10/12/2006	ENER	264	81.4	9.00	1060	623	< 1.000	321	2300	4420	* 7380	0.985
BC	9/25/2006	ENER	---	---	---	---	---	---	116	1460	2570	* 3239	---
BP	9/25/2006	ENER	---	---	---	---	---	---	123	964	1860	* 2444	---
C1	9/25/2006	ENER	---	---	---	---	---	---	83.0	532	1040	* 1653	---
C2	9/25/2006	ENER	---	---	---	---	---	---	---	333	886	* 1437	---
C6	9/27/2006	ENER	41.9	9.30	4.60	316	322	< 1.000	64.0	433	1020	* 1659	1.04
C7	9/27/2006	ENER	---	---	---	---	---	---	305	2420	4590	* 6300	---
C8	9/27/2006	ENER	425	118	9.50	1190	741	< 1.000	520	2610	5370	* 7340	1.02

* Signifies Specific Conductivity from HMC

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
C9	9/27/2006	ENER	---	---	---	---	---	---	382	1960	3950	* 5590	---
C10	9/27/2006	ENER	138	37.8	4.70	985	722	< 1.000	278	1520	3300	* 4596	1.03
C11	9/27/2006	ENER	---	---	---	---	---	---	372	2340	4980	* 7090	---
C12	9/27/2006	ENER	---	---	---	---	---	---	118	665	1680	* 2698	---
D1	3/14/2006	ENER	---	---	---	---	---	---	---	786	1950	* 2926	---
	3/14/2006	ENER	---	---	---	---	---	---	---	# 788	# 1960	---	---
	7/24/2006	ENER	220	52.0	4.80	338	502	< 1.000	211	846	1900	* 2863	0.945
DA3	8/28/2006	ENER	246	93.1	10.4	2620	1580	< 1.000	654	4500	8440	* 11050	0.972
DC	11/15/2006	ENER	---	---	---	---	---	---	210	850	1810	* 2532	---
DD	10/24/2006	ENER	363	88.0	7.00	301	364	< 1.000	61.0	1460	2660	* 3241	1.01
DP	10/18/2006	ENER	246	79.9	5.40	769	528	< 1.000	280	1770	3500	* 4837	0.981
DV	8/28/2006	ENER	218	106	5.90	1310	878	< 1.000	324	2700	5060	* 6400	0.962
F	3/14/2006	ENER	---	---	---	---	---	---	---	474	1400	* 2140	---
	9/14/2006	ENER	---	---	---	---	---	---	134	522	1430	* 2015	---
FB	3/14/2006	ENER	---	---	---	---	---	---	---	597	1680	* 2529	---
	9/11/2006	ENER	---	---	---	---	---	---	164	695	1740	* 2358	---
	9/11/2006	ENER	---	---	---	---	---	---	# 163	# 701	# 1740	---	---
GH	3/14/2006	ENER	---	---	---	---	---	---	---	497	1420	* 2219	---
	9/12/2006	ENER	---	---	---	---	---	---	117	478	1340	* 1967	---
GN	2/22/2006	ENER	---	---	---	---	---	---	60.0	245	770	* 1264	---
	8/21/2006	ENER	---	---	---	---	---	---	112	472	1200	* 1902	---
GV	9/26/2006	ENER	---	---	---	---	---	---	162	673	1590	* 2360	---
I	6/26/2006	ENER	---	---	---	---	---	---	144	337	972	* 1530	---
K4	1/23/2006	ENER	---	---	---	---	---	---	96.0	314	968	* 1534	---

Signifies Quality Control Sample

* Signifies Specific Conductivity from HMC

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
K4	10/11/2006	ENER	14.8	3.90	1.50	279	299	< 1.000	75.0	294	776	* 1382	1.00
K5	1/23/2006	ENER	---	---	---	---	---	---	65.0	689	1390	* 2069	---
	9/29/2006	ENER	42.6	12.3	2.60	285	251	< 1.000	54.0	457	996	* 1561	1.03
K7	1/23/2006	ENER	---	---	---	---	---	---	70.0	473	1090	* 1499	---
	9/29/2006	ENER	44.1	12.3	2.60	160	221	< 1.000	55.0	224	632	* 1031	1.04
K9	1/23/2006	ENER	---	---	---	---	---	---	66.0	655	1460	* 2120	---
	9/29/2006	ENER	28.7	7.50	2.30	271	301	< 1.000	56.0	334	868	* 1399	1.03
K10	1/24/2006	ENER	---	---	---	---	---	---	49.0	237	708	* 1142	---
	9/29/2006	ENER	39.4	9.70	2.90	331	261	< 1.000	66.0	487	1120	* 1646	1.06
K11	1/23/2006	ENER	---	---	---	---	---	---	56.0	350	896	* 1385	---
	10/11/2006	ENER	22.4	5.40	2.10	274	273	< 1.000	67.0	352	828	* 1414	0.986
KEB	11/21/2006	ENER	---	---	---	---	---	---	62.0	240	644	* 1033	---
KF	11/21/2006	ENER	---	---	---	---	---	---	89.0	308	864	* 1253	---
KZ	11/21/2006	ENER	---	---	---	---	---	---	66.0	202	612	* 936	---
L	4/6/2006	ENER	---	---	---	---	---	---	---	415	1130	* 1815	---
	10/9/2006	ENER	---	---	---	---	---	---	115	415	1060	* 1743	---
L5	10/10/2006	ENER	---	---	---	---	---	---	90.0	321	816	* 1380	---
L6	4/6/2006	ENER	---	---	---	---	---	---	---	127	528	* 886	---
	10/10/2006	ENER	---	---	---	---	---	---	42.0	140	504	* 908	---
L7	4/6/2006	ENER	---	---	---	---	---	---	---	302	880	* 1477	---
	10/10/2006	ENER	---	---	---	---	---	---	71.0	260	768	* 1320	---
L8	4/6/2006	ENER	---	---	---	---	---	---	---	243	772	* 1285	---
	10/10/2006	ENER	---	---	---	---	---	---	65.0	242	696	* 1215	---
L9	4/6/2006	ENER	---	---	---	---	---	---	---	330	906	* 1490	---

* Signifies Specific Conductivity from HMC

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
L9	10/10/2006	ENER	---	---	---	---	---	---	76.0	267	718	* 1270	---
L10	4/6/2006	ENER	---	---	---	---	---	---	---	269	778	* 1246	---
	10/9/2006	ENER	---	---	---	---	---	---	147	522	1200	* 2051	---
M3	8/28/2006	ENER	207	92.5	6.10	1010	803	< 1.000	297	2080	3990	* 5340	0.956
M9	2/21/2006	ENER	---	---	---	---	---	---	179	1300	2580	* 3420	---
	9/14/2006	ENER	---	---	---	---	---	---	158	1240	2580	* 3518	---
M16	9/19/2006	ENER	399	105	9.10	340	411	< 1.000	191	1450	3000	* 3756	1.03
MO	3/2/2006	ENER	---	---	---	---	---	---	---	1410	2910	* 3585	---
	7/20/2006	ENER	318	85.7	8.90	356	403	< 1.000	181	1210	2580	* 3270	1.05
	10/2/2006	ENER	---	---	---	---	---	---	162	1470	2820	* 3660	---
MQ	2/21/2006	ENER	---	---	---	---	---	---	183	1240	2520	* 3340	---
	7/23/2006	ENER	---	---	---	---	---	---	190	1180	2410	* 3610	---
MR	4/10/2006	ENER	---	---	---	---	---	---	---	933	2080	* 3010	---
MS	10/2/2006	ENER	---	---	---	---	---	---	176	717	1790	* 2602	---
MT	11/14/2006	ENER	---	---	---	---	---	---	69.0	1010	1820	* 2503	---
MU	11/27/2006	ENER	---	---	---	---	---	---	213	1920	3680	* 4352	---
MW	2/22/2006	ENER	---	---	---	---	---	---	197	1800	3360	* 4022	---
MX	10/23/2006	ENER	---	---	---	---	---	---	203	672	1750	* 2585	---
MY	10/23/2006	ENER	---	---	---	---	---	---	199	693	1750	* 2560	---
NC	8/7/2006	ENER	---	---	---	---	---	---	45.0	616	1220	* 1655	---
ND	12/10/2006	ENER	90.8	25.0	2.50	622	288	< 1.000	64.0	1260	2350	* 3184	1.03
NE5	3/13/2006	ENER	9.40	19.2	19.1	2540	1340	239	586	3480	7530	* 11020	0.951
	12/15/2006	ENER	10.1	17.8	14.7	3050	1390	202	689	3990	8870	* 11570	1.02
NW5	3/13/2006	ENER	5.20	1.50	4.60	875	602	230	116	1120	2620	* 4305	0.874

* Signifies Specific Conductivity from HMC

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
P	5/23/2006	ENER	224	48.9	5.00	234	243	5.00	77.0	1010	1820	* 2450	0.933
	5/23/2006	ENER	# 232	# 49.0	# 5.10	# 239	# 238	# 8.00	# 46.0	# 1020	# 1780	---	# 0.979
	10/17/2006	ENER	---	---	---	---	---	---	---	989	1710	* 2397	---
P2	2/21/2006	ENER	296	60.7	6.60	262	237	< 1.000	60.0	1150	2040	* 2560	1.06
Q	10/23/2006	ENER	331	62.0	6.50	276	236	< 1.000	109	1280	2280	* 2824	1.00
R	10/23/2006	ENER	296	50.2	3.90	283	151	< 1.000	81.0	1220	2210	* 2728	1.04
S2	1/9/2006	ENER	---	---	---	---	---	---	---	1530	3480	* 4369	---
	1/9/2006	ENER	---	---	---	---	---	---	---	# 1600	# 3490	---	---
	7/26/2006	ENER	---	---	---	---	---	---	245	2150	3930	* 5340	---
S3	11/27/2006	ENER	---	---	---	---	---	---	250	948	1990	* 2957	---
S4	3/14/2006	ENER	---	---	---	---	---	---	---	762	2020	* 3068	---
	7/24/2006	ENER	241	65.0	5.90	331	561	< 1.000	250	870	2010	* 2980	0.928
	7/24/2006	ENER	# 239	# 64.0	# 5.90	# 334	# 568	# < 1.000	# 242	# 855	# 2000	---	# 0.938
S5R	8/28/2006	ENER	239	70.1	10.8	2300	1950	< 1.000	411	4000	7590	* 9690	0.930
S11	10/23/2006	ENER	---	---	---	---	---	---	230	919	2110	* 2990	---
SA	8/28/2006	ENER	250	64.1	8.00	1030	840	< 1.000	287	2150	3990	* 5340	0.941
SM	11/27/2006	ENER	---	---	---	---	---	---	446	2890	6140	* 7920	---
SO	11/27/2006	ENER	---	---	---	---	---	---	263	1720	3610	* 4602	---
SQ	8/28/2006	ENER	26.4	24.8	4.90	1700	1310	18.0	304	2420	4770	* 6660	0.956
SS	8/28/2006	ENER	150	49.7	5.20	627	555	< 1.000	214	1150	2340	* 3409	0.997
ST	8/28/2006	ENER	198	53.7	6.20	550	512	< 1.000	225	1110	2320	* 3268	1.01
SUR	8/28/2006	ENER	246	68.5	7.30	1170	997	< 1.000	296	2210	4360	* 5740	0.975
SV	8/28/2006	ENER	90.5	51.8	6.70	1400	822	11.0	343	2260	4540	* 6080	0.990

Signifies Quality Control Sample

* Signifies Specific Conductivity from HMC

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
SZ	1/11/2006	ENER	35.5	126	17.0	8140	5590	112	1470	11600	24100	* 27250	0.969
T	9/25/2006	ENER	---	---	---	---	---	---	134	633	1330	* 2263	---
T2	8/28/2006	ENER	101	38.5	7.30	1450	1100	< 1.000	300	2300	4840	* 6510	0.960
T4	3/20/2006	ENER	5.10	7.30	10.1	2540	1210	667	420	2910	7250	* 10760	0.975
T5	3/20/2006	ENER	16.7	45.9	10.8	4410	2840	1060	606	5020	13000	* 17270	0.967
T6	3/20/2006	ENER	59.5	54.3	18.1	2850	1980	75.0	524	4030	8910	* 12080	0.987
T7	3/21/2006	ENER	372	174	5.90	3280	1750	< 1.000	678	6010	12000	* 15110	1.02
T9	3/21/2006	ENER	3.70	1.80	52.4	9140	5240	2350	1790	10800	27900	* 34280	0.908
T10	4/3/2006	ENER	1.60	2.90	32.8	11100	6220	3280	1570	11700	31900	* 37290	0.970
T11	4/3/2006	ENER	5.30	71.2	8.90	4960	4190	411	638	6020	15800	* 20120	0.984
T12	4/3/2006	ENER	3.80	52.2	5.50	4960	2610	1850	444	5500	14500	* 19680	0.952
T17	4/3/2006	ENER	2.60	1.40	15.0	4300	3270	328	716	4920	13100	* 17300	1.00
T18	4/3/2006	ENER	27.4	7.20	1.10	1290	921	97.0	266	1540	3940	* 5940	1.00
T19	4/4/2006	ENER	11.2	2.60	1.30	984	857	462	132	682	2850	* 4306	0.921
T20	4/4/2006	ENER	150	63.0	8.50	3000	2450	123	660	4580	10500	* 13940	0.906
T40	4/5/2006	ENER	11.0	10.5	18.4	3680	2320	1370	415	3850	10300	* 14580	0.923
T41	3/21/2006	ENER	4.50	8.10	28.9	6550	3280	2610	873	6670	18500	* 24080	0.942
TA	9/25/2006	ENER	---	---	---	---	---	---	137	789	1520	* 2368	---
TB	9/26/2006	ENER	---	---	---	---	---	---	116	681	1400	* 2072	---
W	10/23/2006	ENER	---	---	---	---	---	---	200	646	1730	* 2306	---
WN4	3/13/2006	ENER	6.00	9.00	30.6	6830	3870	2340	1230	8180	20200	* 26216	0.863
X	2/14/2006	ENER	---	---	---	---	---	---	97.0	298	866	* 1278	---
	4/4/2006	ENER	---	---	---	---	---	---	88.0	267	796	* 1307	---

* Signifies Specific Conductivity from HMC

TABLE B.4-1 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
X	4/4/2006	ENER	---	---	---	---	---	---	# 88.0	# 268	# 800	---	---
	7/24/2006	ENER	122	12.0	2.30	99.1	264	< 1.000	93.0	261	736	* 1190	0.922
	10/17/2006	ENER	---	---	---	---	---	---	68.0	237	642	* 1102	---
	10/17/2006	ENER	---	---	---	---	---	---	# 67.0	# 233	# 638	---	---
X18	11/17/2006	HMC	---	---	---	---	---	---	---	---	---	2395	---
X19	11/17/2006	HMC	---	---	---	---	---	---	---	---	---	2829	---
X20	11/17/2006	HMC	---	---	---	---	---	---	---	---	---	3219	---
X27	11/17/2006	HMC	---	---	---	---	---	---	---	---	---	4996	---

Signifies Quality Control Sample

* Signifies Specific Conductivity from HMC

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0690	11/21/2006	ENER	---	0.148	1.59	0.590	1.60	---	---	---	---
0691	11/21/2006	ENER	---	0.0177	0.0600	0.169	2.70	---	---	---	---
1E	12/10/2006	ENER	---	0.225	0.200	0.0250	0.700	---	---	---	---
1G	12/10/2006	ENER	---	0.174	---	0.102	2.00	---	---	---	---
B	9/25/2006	ENER	---	0.164	< 0.0300	0.0440	1.80	---	---	---	---
B2	10/17/2006	ENER	7.56	8.46	9.35	0.279	2.80	0.300	---	---	---
B3	8/28/2006	ENER	---	16.9	22.9	0.524	4.00	< 0.200	---	---	---
	10/17/2006	ENER	7.89	14.4	23.0	0.586	4.00	0.500	---	---	---
B4	10/17/2006	ENER	7.80	20.6	30.8	0.777	5.80	0.400	---	---	---
B5	10/16/2006	ENER	7.70	17.8	16.1	1.14	6.20	1.20	---	---	---
B6	10/16/2006	ENER	7.61	13.8	21.2	0.723	7.00	< 0.200	---	---	---
B7	10/16/2006	ENER	7.70	8.86	9.40	1.02	8.10	3.50	---	---	---
B8	10/16/2006	ENER	7.71	10.4	10.6	1.02	7.40	1.80	---	---	---
B10	10/12/2006	ENER	8.03	12.2	22.7	1.10	13.2	7.80	---	---	---
B11	9/25/2006	ENER	7.87	8.49	14.6	1.02	20.8	1.000	---	---	---
	10/12/2006	ENER	7.75	9.06	15.6	1.07	17.0	1.40	---	---	---
BC	9/25/2006	ENER	---	1.83	0.640	0.169	13.5	---	---	---	---
BP	9/25/2006	ENER	---	0.808	0.320	0.185	5.90	---	---	---	---
C1	9/25/2006	ENER	---	0.240	0.380	0.0590	1.000	---	---	---	---
C2	9/25/2006	ENER	---	0.694	---	0.0220	0.700	---	---	---	---
C6	9/27/2006	ENER	7.80	1.88	4.95	0.153	1.50	< 0.200	---	---	---
C7	9/27/2006	ENER	---	12.4	23.4	0.837	4.10	---	---	---	---
C8	9/27/2006	ENER	7.72	8.34	16.3	1.25	5.40	< 0.200	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
C9	9/27/2006	ENER	---	7.88	11.2	1.36	4.40	---	---	---	---
C10	9/27/2006	ENER	7.90	12.1	18.8	0.816	3.30	< 0.200	---	---	---
C11	9/27/2006	ENER	---	9.60	24.0	2.05	68.8	---	---	---	---
C12	9/27/2006	ENER	---	4.64	9.66	1.08	3.70	---	---	---	---
D1	3/14/2006	ENER	---	1.15	0.950	0.193	---	---	---	---	---
	3/14/2006	ENER	---	# 1.18	# 0.960	# 0.196	---	---	---	---	---
	7/24/2006	ENER	7.43	1.06	0.870	0.169	3.50	< 0.200	< 1.000	< 0.0100	< 0.200
DA3	8/28/2006	ENER	---	21.9	31.5	0.571	3.70	< 0.200	---	---	---
DC	11/15/2006	ENER	---	0.0717	< 0.0300	0.0680	4.80	---	---	---	---
DD	10/24/2006	ENER	7.01	0.170	< 0.0300	0.0360	4.40	1.20	---	---	---
DP	10/18/2006	ENER	7.37	7.36	9.71	0.486	3.40	0.700	---	---	---
DV	8/28/2006	ENER	---	14.9	18.9	0.700	5.90	< 0.200	---	---	---
F	3/14/2006	ENER	---	0.0695	< 0.0300	0.0100	---	---	---	---	---
	9/14/2006	ENER	---	0.0695	< 0.0300	0.0100	1.80	---	---	---	---
FB	3/14/2006	ENER	---	0.116	< 0.0300	0.0160	---	---	---	---	---
	9/11/2006	ENER	---	0.0943	< 0.0300	0.0660	3.10	---	---	---	---
	9/11/2006	ENER	---	# 0.0950	# < 0.0300	# 0.0640	# 3.00	---	---	---	---
GH	3/14/2006	ENER	---	0.0725	< 0.0300	0.0130	---	---	---	---	---
	9/12/2006	ENER	---	0.0687	< 0.0300	0.0150	1.80	---	---	---	---
GN	2/22/2006	ENER	---	0.0355	< 0.0300	0.0110	1.20	---	---	---	---
	8/21/2006	ENER	---	0.0256	< 0.0300	0.0110	1.10	---	---	---	---
GV	9/26/2006	ENER	---	0.0235	< 0.0300	0.0300	5.20	---	---	---	---
I	6/26/2006	ENER	---	0.0511	< 0.0300	0.0120	1.10	---	---	---	---
K4	1/23/2006	ENER	---	0.681	2.02	0.365	1.70	---	---	---	---

Signifies Quality Control Sample

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
K4	10/11/2006	ENER	8.22	0.722	2.19	0.587	1.10	< 0.200	---	---	---
K5	1/23/2006	ENER	---	0.443	4.34	0.108	1.20	---	---	---	---
	9/29/2006	ENER	7.80	0.344	2.39	0.0800	1.000	< 0.200	---	---	---
K7	1/23/2006	ENER	---	1.39	4.44	0.330	1.40	---	---	---	---
	9/29/2006	ENER	7.70	0.425	1.25	0.227	1.000	< 0.200	---	---	---
K9	1/23/2006	ENER	---	1.35	7.28	0.106	1.40	---	---	---	---
	9/29/2006	ENER	7.91	1.24	6.54	0.108	1.000	0.500	---	---	---
K10	1/24/2006	ENER	---	0.618	3.88	0.133	0.900	---	---	---	---
	9/29/2006	ENER	7.74	1.21	5.15	0.120	1.20	< 0.200	---	---	---
K11	1/23/2006	ENER	---	0.597	2.42	0.0720	1.20	---	---	---	---
	10/11/2006	ENER	7.88	0.969	3.40	0.0660	1.30	1.000	---	---	---
KEB	11/21/2006	ENER	---	0.0477	0.0800	0.0080	0.900	---	---	---	---
KF	11/21/2006	ENER	---	0.116	0.0800	0.0050	0.900	---	---	---	---
KZ	11/21/2006	ENER	---	0.0743	0.100	0.0050	0.800	---	---	---	---
L	4/6/2006	ENER	---	0.758	---	0.0530	1.50	---	---	---	---
	10/9/2006	ENER	---	0.553	1.50	0.0460	1.40	---	---	---	---
L5	10/10/2006	ENER	---	0.265	0.830	0.189	1.10	---	---	---	---
L6	4/6/2006	ENER	---	0.149	---	0.0870	0.700	---	---	---	---
	10/10/2006	ENER	---	0.140	0.650	0.0700	0.500	---	---	---	---
L7	4/6/2006	ENER	---	0.331	---	0.225	1.20	---	---	---	---
	10/10/2006	ENER	---	0.263	1.18	0.184	0.900	---	---	---	---
L8	4/6/2006	ENER	---	0.0248	---	0.0220	0.600	---	---	---	---
	10/10/2006	ENER	---	0.174	0.530	0.0350	0.700	---	---	---	---
L9	4/6/2006	ENER	---	0.227	---	0.0360	0.400	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
L9	10/10/2006	ENER	---	0.189	0.760	0.0620	1.000	---	---	---	---
L10	4/6/2006	ENER	---	0.430	---	0.0320	1.20	---	---	---	---
	10/9/2006	ENER	---	0.550	1.74	0.196	1.80	---	---	---	---
M3	8/28/2006	ENER	---	8.36	6.84	0.364	2.60	< 0.200	---	---	---
M9	2/21/2006	ENER	---	4.87	3.82	0.260	3.60	---	---	---	---
	9/14/2006	ENER	---	4.62	3.73	0.254	4.90	---	---	---	---
M16	9/19/2006	ENER	7.51	0.904	0.100	0.146	18.4	< 0.200	---	---	---
MO	3/2/2006	ENER	---	0.726	< 0.0300	0.118	---	---	---	---	---
	7/20/2006	ENER	7.61	0.262	< 0.0300	0.0820	14.4	< 0.200	---	---	---
	10/2/2006	ENER	---	0.476	< 0.0300	0.101	23.1	---	---	---	---
MQ	2/21/2006	ENER	---	2.31	1.24	0.271	7.40	---	---	---	---
	7/23/2006	ENER	---	2.07	1.03	0.238	5.20	---	---	---	---
MR	4/10/2006	ENER	---	0.463	0.0400	0.0930	---	---	---	---	---
MS	10/2/2006	ENER	---	0.0758	< 0.0300	0.0490	2.40	---	---	---	---
MT	11/14/2006	ENER	---	0.0729	< 0.0300	0.154	8.30	---	---	---	---
MU	11/27/2006	ENER	---	0.151	< 0.0300	0.0270	60.6	---	---	---	---
MW	2/22/2006	ENER	---	0.0944	< 0.0300	0.0090	3.30	---	---	---	---
MX	10/23/2006	ENER	---	0.0344	< 0.0300	0.0140	1.40	---	---	---	---
MY	10/23/2006	ENER	---	0.0211	< 0.0300	0.0840	1.60	---	---	---	---
NC	8/7/2006	ENER	---	0.0136	< 0.0300	0.0780	3.80	---	---	---	---
ND	12/10/2006	ENER	8.04	0.0263	< 0.0300	0.176	2.10	< 0.200	---	---	---
NE5	3/13/2006	ENER	9.50	6.80	23.9	0.0100	< 0.100	99.0	---	---	---
	12/15/2006	ENER	9.41	6.50	26.9	0.0300	< 0.100	56.4	---	---	---
NW5	3/13/2006	ENER	9.83	2.15	4.93	0.143	0.500	84.7	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
P	5/23/2006	ENER	8.52	0.0286	< 0.0300	0.162	7.10	< 0.200	< 1.000	< 0.0100	< 0.200
	5/23/2006	ENER	# 8.75	# 0.0288	# < 0.0300	# 0.160	# 6.50	# < 0.200	# < 1.000	# < 0.0100	# < 0.200
	10/17/2006	ENER	---	0.0282	< 0.0300	0.159	---	---	---	---	---
P2	2/21/2006	ENER	7.82	0.0304	< 0.0300	0.233	10.3	< 0.200	---	---	---
Q	10/23/2006	ENER	7.57	0.0522	< 0.0300	0.291	11.8	< 0.200	< 1.000	< 0.0100	0.800
R	10/23/2006	ENER	7.58	0.0191	< 0.0300	0.574	18.0	< 0.200	2.00	< 0.0100	< 0.200
S2	1/9/2006	ENER	---	5.90	8.02	0.488	---	---	---	---	---
	1/9/2006	ENER	---	# 5.82	# 7.92	# 0.527	---	---	---	---	---
	7/26/2006	ENER	---	7.88	8.30	0.604	5.70	---	---	---	---
S3	11/27/2006	ENER	---	2.90	1.52	0.0480	1.90	---	---	---	---
S4	3/14/2006	ENER	---	2.85	2.37	0.0790	---	---	---	---	---
	7/24/2006	ENER	7.56	1.85	1.71	0.0630	2.60	< 0.200	< 1.000	< 0.0100	< 0.200
	7/24/2006	ENER	# 7.56	# 2.01	# 1.70	# 0.0630	# 2.60	# < 0.200	# < 1.000	# < 0.0100	# < 0.200
S5R	8/28/2006	ENER	---	17.8	34.6	0.689	6.50	1.000	---	---	---
S11	10/23/2006	ENER	---	0.850	0.700	0.0570	2.90	---	---	---	---
SA	8/28/2006	ENER	---	5.93	9.85	0.455	6.00	< 0.200	---	---	---
SM	11/27/2006	ENER	---	13.5	18.9	0.926	3.70	---	---	---	---
SO	11/27/2006	ENER	---	7.35	7.79	0.332	9.10	---	---	---	---
SQ	8/28/2006	ENER	---	11.7	21.4	0.521	3.90	< 0.200	---	---	---
SS	8/28/2006	ENER	---	5.65	6.50	0.471	3.30	< 0.200	---	---	---
ST	8/28/2006	ENER	---	4.18	5.60	0.374	3.60	< 0.200	---	---	---
SUR	8/28/2006	ENER	---	8.90	12.3	0.284	4.10	< 0.200	---	---	---
SV	8/28/2006	ENER	---	9.55	13.7	0.754	5.30	< 0.200	---	---	---

Signifies Quality Control Sample

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
SZ	1/11/2006	ENER	8.55	---	---	---	2.00	0.900	---	---	---
T	9/25/2006	ENER	---	1.36	3.38	1.19	3.20	---	---	---	---
T2	8/28/2006	ENER	---	9.57	18.9	0.381	2.90	< 0.200	---	---	---
T4	3/20/2006	ENER	9.99	8.52	16.0	0.112	2.10	49.6	---	---	---
T5	3/20/2006	ENER	9.82	29.3	67.6	0.310	0.500	< 0.200	---	---	---
T6	3/20/2006	ENER	8.83	24.3	17.3	0.590	4.30	98.1	---	---	---
T7	3/21/2006	ENER	7.69	33.8	39.8	1.11	8.50	10.2	---	---	---
T9	3/21/2006	ENER	9.90	33.8	91.8	0.0200	< 0.100	307	---	---	---
T10	4/3/2006	ENER	9.97	54.4	132	0.120	< 0.100	241	---	---	---
T11	4/3/2006	ENER	9.24	28.9	74.2	0.290	4.60	5.10	---	---	---
T12	4/3/2006	ENER	10.1	22.5	54.4	0.220	< 0.100	198	---	---	---
T17	4/3/2006	ENER	9.25	27.3	72.2	0.340	3.90	5.80	---	---	---
T18	4/3/2006	ENER	9.27	5.02	6.93	0.211	1.50	2.60	---	---	---
T19	4/4/2006	ENER	9.98	1.55	2.61	0.0550	0.200	7.70	---	---	---
T20	4/4/2006	ENER	8.95	28.4	27.0	0.680	4.30	49.4	---	---	---
T40	4/5/2006	ENER	10.00	4.42	54.3	0.110	0.400	33.6	---	---	---
T41	3/21/2006	ENER	10.2	28.6	87.1	0.180	1.40	290	---	---	---
TA	9/25/2006	ENER	---	1.08	0.520	0.652	2.30	---	---	---	---
TB	9/26/2006	ENER	---	0.797	0.640	0.406	1.50	---	---	---	---
W	10/23/2006	ENER	---	0.0518	< 0.0300	0.0340	< 0.100	---	---	---	---
WN4	3/13/2006	ENER	10.00	26.9	90.2	0.500	3.20	261	---	---	---
X	2/14/2006	ENER	---	0.147	0.0800	0.0080	0.900	< 0.200	< 1.000	---	---
	4/4/2006	ENER	---	0.162	0.100	0.0090	0.800	---	---	---	---

TABLE B.4-2 WATER QUALITY ANALYSES FOR HOMESTAKE'S ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
X	4/4/2006	ENER	---	# 0.160	# 0.0900	# 0.0080	# 0.800	---	---	---	---
	7/24/2006	ENER	7.78	0.119	0.130	0.0190	0.800	< 0.200	< 1.000	0.0100	< 0.200
	10/17/2006	ENER	---	0.125	0.160	0.0210	0.700	---	---	---	---
	10/17/2006	ENER	---	# 0.124	# 0.160	# 0.0210	# 0.700	---	---	---	---

Signifies Quality Control Sample

TABLE B.4-3 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
0455	5/2/2006	ENER	113	34.4	3.70	198	462	< 1.000	83.0	297	1010	* 998	1.06
0482	10/11/2006	ENER	---	---	---	---	---	---	182	661	1690	* 2675	---
0483	10/11/2006	ENER	---	---	---	---	---	---	177	632	1600	* 2494	---
0490	5/18/2006	ENER	200	58.0	6.10	319	520	7.00	230	701	1730	* 2569	0.965
	6/19/2006	ENER	222	62.6	6.40	293	512	< 1.000	188	718	1820	* 2718	1.02
	6/19/2006	ENER	# 218	# 61.9	# 6.40	# 282	# 513	# < 1.000	# 193	# 711	# 1830	---	# 0.990
	10/11/2006	ENER	---	---	---	---	---	---	---	723	1790	* 2671	---
0491	5/18/2006	ENER	214	61.3	4.80	273	531	7.00	239	619	1670	* 2506	0.970
0496	3/15/2006	ENER	---	---	---	---	---	---	133	534	1360	* 2152	---
0497	1/10/2006	ENER	---	---	---	---	---	---	---	710	1840	* 2553	---
	8/14/2006	ENER	---	---	---	---	---	---	184	671	1740	* 2506	---
0498	8/14/2006	ENER	---	---	---	---	---	---	146	583	1460	* 2134	---
0688	3/2/2006	ENER	---	---	---	---	---	---	---	685	1790	* 2545	---
	8/8/2006	ENER	243	53.2	6.20	276	529	< 1.000	191	691	1720	* 2478	1.01
0802	2/13/2006	ENER	---	---	---	---	---	---	---	618	1780	* 2462	---
	8/7/2006	ENER	232	56.0	4.40	270	533	< 1.000	207	693	1660	* 2405	0.966
	8/28/2006	ENER	228	55.1	4.00	246	504	< 1.000	200	657	1720	* 2392	0.967
0844	3/14/2006	ENER	---	---	---	---	---	---	---	1260	2940	* 3851	---
	8/8/2006	ENER	282	99.0	5.00	449	285	< 1.000	235	1280	2730	* 3566	1.10
0845	11/22/2006	ENER	---	---	---	---	---	---	198	905	2200	* 2844	---
AW	11/28/2006	ENER	---	---	---	---	---	---	---	701	1600	* 2460	---
CW44	8/14/2006	ENER	---	---	---	---	---	---	177	701	1740	* 2479	---
CW55	12/12/2006	ENER	35.0	4.00	2.50	582	703	< 1.000	177	530	1670	* 2149	0.995
HW	5/2/2006	ENER	259	68.3	4.40	293	515	< 1.000	215	857	1970	* 1936	0.970

Signifies Quality Control Sample

* Signifies Specific Conductivity from HMC

TABLE B.4-3 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
SUB1	4/10/2006	ENER	236	66.8	4.90	312	473	< 1.000	167	810	1990	* 2918	1.05
	10/18/2006	ENER	---	---	---	---	---	---	---	1040	2120	* 2980	---
SUB2	4/10/2006	ENER	192	57.0	4.40	247	528	< 1.000	152	536	1550	* 2388	1.04
	10/18/2006	ENER	---	---	---	---	---	---	---	516	1470	* 2174	---
SUB3	1/10/2006	ENER	198	59.8	6.30	372	403	< 1.000	171	976	2180	* 2887	0.980
	4/10/2006	ENER	219	63.4	5.40	373	416	< 1.000	170	991	2080	* 3014	1.01
	10/18/2006	ENER	---	---	---	---	---	---	---	1520	2570	* 3609	---

* Signifies Specific Conductivity from HMC

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0455	5/2/2006	ENER	7.77	0.0151	0.0010	0.0180	1.30	< 1.000	< 1.000	0.0050	< 1.000
0482	10/11/2006	ENER	---	0.236	0.0600	0.0300	2.40	---	---	---	---
0483	10/11/2006	ENER	---	0.210	0.0800	0.0300	2.20	---	---	---	---
0490	5/18/2006	ENER	8.40	0.229	0.0900	0.0320	2.40	< 0.200	< 1.000	< 0.0100	< 0.200
	6/19/2006	ENER	7.42	0.262	0.0800	0.0330	2.60	< 0.200	< 1.000	< 0.0100	< 0.200
	6/19/2006	ENER	# 7.72	# 0.215	# 0.0900	# 0.0350	# 2.60	# < 0.200	# < 1.000	# < 0.0100	# < 0.200
	10/11/2006	ENER	---	0.316	0.0700	0.0370	---	---	---	---	---
0491	5/18/2006	ENER	8.38	0.601	0.0700	0.0270	2.30	< 0.200	< 1.000	< 0.0100	< 0.200
0496	3/15/2006	ENER	---	0.0985	< 0.0300	0.102	1.70	---	---	---	---
0497	1/10/2006	ENER	---	1.26	< 0.0300	0.0410	---	---	---	---	---
	8/14/2006	ENER	---	1.04	< 0.0300	0.0420	1.80	---	---	---	---
0498	8/14/2006	ENER	---	0.474	< 0.0300	0.0810	1.60	---	---	---	---
0688	3/2/2006	ENER	---	0.0559	< 0.0300	0.0090	---	---	---	---	---
	8/8/2006	ENER	7.69	0.0567	< 0.0300	0.0100	1.40	< 0.200	< 1.000	< 0.0100	< 0.200
0802	2/13/2006	ENER	---	0.576	< 0.0300	0.0220	---	---	---	---	---
	8/7/2006	ENER	7.53	0.508	< 0.0300	0.0190	2.20	0.300	< 1.000	< 0.0100	< 0.200
	8/28/2006	ENER	7.68	0.547	< 0.0300	0.0190	2.20	1.30	---	---	---
0844	3/14/2006	ENER	---	0.142	< 0.0300	0.0770	---	---	---	---	---
	8/8/2006	ENER	7.73	0.144	< 0.0300	0.0690	5.70	---	---	< 0.0100	---
0845	11/22/2006	ENER	---	0.0845	0.0400	0.0650	4.70	---	---	---	---
AW	11/28/2006	ENER	---	0.139	0.0900	0.0400	---	---	---	---	---
CW44	8/14/2006	ENER	---	0.662	< 0.0300	0.0520	2.70	---	---	---	---
CW55	12/12/2006	ENER	8.04	0.115	0.0300	0.0070	< 0.100	< 0.200	---	---	---
HW	5/2/2006	ENER	7.65	0.0657	< 0.0010	0.0300	2.90	< 1.000	< 1.000	0.0020	< 1.000

Signifies Quality Control Sample

TABLE B.4-4 WATER QUALITY ANALYSES FOR THE SUBDIVISION ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
SUB1	4/10/2006	ENER	7.66	0.112	< 0.0300	0.0250	4.50	0.600	< 1.000	< 0.0100	---
	10/18/2006	ENER	---	0.103	< 0.0300	0.0320	---	---	---	---	---
SUB2	4/10/2006	ENER	7.77	0.0540	< 0.0300	0.0220	2.40	1.40	< 1.000	< 0.0100	---
	10/18/2006	ENER	---	0.0486	< 0.0300	0.0180	---	---	---	---	---
SUB3	1/10/2006	ENER	7.65	0.0338	< 0.0300	0.0140	1.90	< 0.200	< 1.000	< 0.0100	< 0.200
	4/10/2006	ENER	7.60	0.0366	< 0.0300	0.0140	1.90	< 0.200	< 1.000	< 0.0100	---
	10/18/2006	ENER	---	0.0217	< 0.0300	0.0170	---	---	---	---	---

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
0520	10/2/2006	ENER	---	---	---	---	---	---	209	673	1640	* 2447	---
0521	10/2/2006	ENER	---	---	---	---	---	---	133	589	1390	* 2091	---
0522	1/9/2006	ENER	---	---	---	---	---	---	---	583	1650	* 2330	---
	4/10/2006	ENER	---	---	---	---	---	---	---	653	1620	* 2259	---
	10/2/2006	ENER	---	---	---	---	---	---	---	636	1590	* 2388	---
0531	10/4/2006	ENER	---	---	---	---	---	---	118	685	1560	* 2234	---
0538	12/11/2006	ENER	---	---	---	---	---	---	---	763	1760	* 2405	---
0539	12/11/2006	ENER	---	---	---	---	---	---	122	808	1670	* 2286	---
0541	8/30/2006	ENER	---	---	---	---	---	---	92.0	598	1340	* 1860	---
0631	3/15/2006	ENER	---	---	---	---	---	---	---	634	1510	* 2366	---
	10/10/2006	ENER	---	---	---	---	---	---	128	797	1590	* 2370	---
0634	10/3/2006	ENER	---	---	---	---	---	---	---	870	1910	* 2657	---
0636	11/13/2006	ENER	---	---	---	---	---	---	---	384	1010	* 1555	---
0637	11/13/2006	ENER	---	---	---	---	---	---	---	428	1140	* 1761	---
0638	10/2/2006	ENER	---	---	---	---	---	---	168	427	1170	* 1852	---
0639	10/2/2006	ENER	---	---	---	---	---	---	248	1050	2200	* 3156	---
0640	12/12/2006	ENER	---	---	---	---	---	---	160	651	1640	* 2258	---
0644	8/30/2006	ENER	---	---	---	---	---	---	171	891	1870	* 2570	---
0646	10/18/2006	ENER	---	---	---	---	---	---	---	934	1780	* 2614	---
0647	10/4/2006	ENER	---	---	---	---	---	---	100.0	558	1380	* 1982	---
0648	10/4/2006	ENER	---	---	---	---	---	---	---	538	1200	* 1712	---
0649	10/4/2006	ENER	154	39.0	4.50	177	320	< 1.000	71.0	509	1240	* 1768	1.05
0650	11/14/2006	ENER	---	---	---	---	---	---	65.0	609	1350	* 1966	---

* Signifies Specific Conductivity from HMC

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
0653	12/11/2006	ENER	---	---	---	---	---	---	---	781	1750	* 2388	---
0654	3/2/2006	ENER	---	---	---	---	---	---	95.0	528	1270	* 1797	---
	10/3/2006	ENER	---	---	---	---	---	---	66.0	363	1040	* 1574	---
0657	8/30/2006	ENER	---	---	---	---	---	---	---	691	1560	---	---
0658	10/4/2006	ENER	---	---	---	---	---	---	72.0	527	1270	* 1844	---
0659	10/3/2006	ENER	252	65.7	8.00	292	451	< 1.000	160	859	2020	* 2793	1.04
0683	10/4/2006	ENER	---	---	---	---	---	---	---	458	1040	* 1434	---
0684	10/4/2006	ENER	---	---	---	---	---	---	---	662	1500	* 2152	---
0685	10/10/2006	ENER	---	---	---	---	---	---	133	585	1410	* 2124	---
0686	11/13/2006	ENER	---	---	---	---	---	---	120	401	1110	* 1652	---
0846	3/14/2006	ENER	---	---	---	---	---	---	---	1660	3260	* 4324	---
	8/8/2006	ENER	340	88.0	6.40	498	346	< 1.000	176	1660	3190	* 3976	1.02
0851	11/22/2006	ENER	---	---	---	---	---	---	---	780	1440	* 2049	---
0861	8/16/2006	ENER	---	---	---	---	---	---	94.0	903	1680	* 2336	---
0862	1/10/2006	ENER	---	---	---	---	---	---	182	769	1870	* 2565	---
	8/16/2006	ENER	---	---	---	---	---	---	105	912	1800	* 2539	---
0863	2/2/2006	HMC	---	---	---	---	---	---	---	---	---	2349	---
	8/16/2006	ENER	---	---	---	---	---	---	97.0	893	1660	* 2465	---
0864	3/2/2006	ENER	---	---	---	---	---	---	173	855	1850	* 2689	---
	8/16/2006	ENER	---	---	---	---	---	---	99.0	1060	1850	* 2629	---
0865	1/18/2006	HMC	---	---	---	---	---	---	---	---	---	2030	---
0866	1/18/2006	HMC	---	---	---	---	---	---	---	---	---	2338	---
0867	8/16/2006	ENER	---	---	---	---	---	---	---	522	1240	* 1885	---

* Signifies Specific Conductivity from HMC

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
0869	12/11/2006	ENER	---	---	---	---	---	---	159	878	1870	* 2522	---
0876	12/11/2006	ENER	---	---	---	---	---	---	142	804	1770	* 2375	---
0881	10/2/2006	ENER	---	---	---	---	---	---	168	800	1850	* 2683	---
0882	10/3/2006	ENER	---	---	---	---	---	---	105	773	1660	* 2311	---
0883	11/14/2006	ENER	---	---	---	---	---	---	198	977	2150	* 2978	---
0884	10/3/2006	ENER	---	---	---	---	---	---	---	530	1180	* 1835	---
0885	10/3/2006	ENER	---	---	---	---	---	---	174	665	1810	* 2627	---
0886	7/23/2006	ENER	---	---	---	---	---	---	181	1160	2390	* 2930	---
	10/2/2006	ENER	---	---	---	---	---	---	---	1100	2250	* 3085	---
0887	10/3/2006	ENER	---	---	---	---	---	---	66.0	445	1130	* 1737	---
0888	10/4/2006	ENER	---	---	---	---	---	---	---	449	1140	* 1668	---
0890	7/23/2006	ENER	---	---	---	---	---	---	170	861	1780	* 2410	---
	10/3/2006	ENER	---	---	---	---	---	---	139	710	1790	* 2485	---
0893	10/2/2006	ENER	---	---	---	---	---	---	165	750	1750	* 2590	---
0895	10/4/2006	ENER	---	---	---	---	---	---	105	610	1470	* 2091	---
0896	10/4/2006	ENER	---	---	---	---	---	---	---	922	1870	* 2533	---
0899	10/4/2006	ENER	---	---	---	---	---	---	---	462	1130	* 1628	---
0910	12/12/2006	ENER	---	---	---	---	---	---	35.0	362	898	* 1232	---
0915	6/19/2006	ENER	5.80	1.10	< 0.500	128	254	< 1.000	40.0	45.0	364	* 649	0.952
0920	2/14/2006	ENER	---	---	---	---	---	---	---	1480	2660	* 3005	---
	8/7/2006	ENER	---	---	---	---	---	---	60.0	1420	2570	* 2975	---
	8/7/2006	ENER	---	---	---	---	---	---	# 57.0	# 1390	# 2570	---	---
0935	10/4/2006	ENER	---	---	---	---	---	---	97.0	611	1400	* 2008	---

Signifies Quality Control Sample

* Signifies Specific Conductivity from HMC

TABLE B.4-5 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
0939	5/2/2006	ENER	170	43.3	5.00	218	323	< 1.000	76.0	683	1370	* 1084	0.998
0942	2/14/2006	ENER	---	---	---	---	---	---	---	1080	2380	* 3029	---
	8/8/2006	ENER	260	68.5	6.00	392	387	< 1.000	191	1150	2370	* 3119	1.00
0947	11/22/2006	ENER	---	---	---	---	---	---	198	632	1710	* 2433	---
0979	5/3/2006	ENER	304	67.8	6.30	403	419	< 1.000	236	1120	2390	* 3014	1.04
0980	5/1/2006	ENER	285	62.1	6.10	349	421	< 1.000	205	1210	2290	* 1830	0.915
0983	5/2/2006	ENER	179	45.3	3.70	223	337	< 1.000	97.0	697	1400	* 1065	0.985
	5/2/2006	ENER	173	44.8	4.20	216	349	< 1.000	92.0	794	1400	---	0.877
0989	5/1/2006	ENER	163	43.8	4.10	266	386	< 1.000	77.0	753	1500	* 1826	0.967
0994	3/15/2006	ENER	---	---	---	---	---	---	---	446	1140	* 1614	---
	7/17/2006	HMC	---	---	---	---	---	---	---	---	---	1758	---
	10/24/2006	ENER	---	---	---	---	---	---	123	543	1320	* 1826	---
0996	8/30/2006	ENER	---	---	---	---	---	---	124	614	1470	* 1890	---

* Signifies Specific Conductivity from HMC

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0520	10/2/2006	ENER	---	0.0533	0.0800	0.0250	4.10	---	---	---	---
0521	10/2/2006	ENER	---	1.02	2.72	0.236	2.00	---	---	---	---
0522	1/9/2006	ENER	---	1.05	0.930	0.0810	---	---	---	---	---
	4/10/2006	ENER	---	0.878	0.820	0.0720	---	---	---	---	---
	10/2/2006	ENER	---	1.11	---	0.0730	1.90	---	---	---	---
0531	10/4/2006	ENER	---	0.130	< 0.0300	0.0310	2.80	---	---	---	---
0538	12/11/2006	ENER	---	0.302	---	0.0500	4.90	---	---	---	---
0539	12/11/2006	ENER	---	0.105	< 0.0300	0.0700	3.80	---	---	---	---
0541	8/30/2006	ENER	---	0.0759	< 0.0300	0.0310	4.10	---	---	---	---
0631	3/15/2006	ENER	---	0.103	< 0.0300	0.143	---	---	---	---	---
	10/10/2006	ENER	---	0.0369	< 0.0300	0.236	2.70	---	---	---	---
0634	10/3/2006	ENER	---	0.226	---	0.0750	5.30	---	---	---	---
0636	11/13/2006	ENER	---	0.0488	---	0.0220	7.40	---	---	---	---
0637	11/13/2006	ENER	---	0.127	---	0.0190	10.3	---	---	---	---
0638	10/2/2006	ENER	---	0.0176	0.170	0.634	2.80	---	---	---	---
0639	10/2/2006	ENER	---	0.777	3.46	0.732	3.10	---	---	---	---
0640	12/12/2006	ENER	---	0.0790	< 0.0300	0.0380	1.60	---	---	---	---
0644	8/30/2006	ENER	---	0.203	< 0.0300	0.0700	5.20	---	---	---	---
0646	10/18/2006	ENER	---	0.0320	---	0.244	4.30	---	---	---	---
0647	10/4/2006	ENER	---	0.0552	< 0.0300	0.0380	2.60	---	---	---	---
0648	10/4/2006	ENER	---	0.0142	---	0.0350	2.40	---	---	---	---
0649	10/4/2006	ENER	7.49	0.0385	< 0.0300	0.0310	2.20	< 0.200	< 1.000	< 0.0100	< 0.200
0650	11/14/2006	ENER	---	0.0317	< 0.0300	0.0350	3.70	---	---	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0653	12/11/2006	ENER	---	0.735	< 0.0300	0.0770	---	---	---	---	---
0654	3/2/2006	ENER	---	0.137	< 0.0300	0.0270	5.10	---	---	---	---
	10/3/2006	ENER	---	0.0564	< 0.0300	0.0100	4.00	---	---	---	---
0657	8/30/2006	ENER	---	0.0689	---	0.0360	3.10	---	---	---	---
0658	10/4/2006	ENER	---	0.0559	< 0.0300	0.0410	1.90	---	---	---	---
0659	10/3/2006	ENER	7.47	0.278	< 0.0300	0.0760	5.50	< 0.200	< 1.000	< 0.0100	< 0.200
0683	10/4/2006	ENER	---	0.0044	---	0.0250	0.700	---	---	---	---
0684	10/4/2006	ENER	---	0.0457	---	0.0360	2.50	---	---	---	---
0685	10/10/2006	ENER	---	0.0941	< 0.0300	0.0280	3.30	---	---	---	---
0686	11/13/2006	ENER	---	0.0383	< 0.0300	0.0210	9.20	---	---	---	---
0846	3/14/2006	ENER	---	0.0656	< 0.0300	0.0820	---	---	---	---	---
	8/8/2006	ENER	8.03	0.0601	< 0.0300	0.0850	17.9	0.500	< 1.000	< 0.0100	< 0.200
0851	11/22/2006	ENER	---	0.0467	---	0.307	1.70	---	---	---	---
0861	8/16/2006	ENER	---	0.219	< 0.0300	0.179	2.40	---	---	---	---
0862	1/10/2006	ENER	---	0.467	< 0.0300	0.0540	3.00	---	---	---	---
	8/16/2006	ENER	---	0.594	< 0.0300	0.0540	3.80	---	---	---	---
0863	8/16/2006	ENER	---	0.134	< 0.0300	0.0470	4.60	---	---	---	---
0864	3/2/2006	ENER	---	0.350	< 0.0300	0.0970	5.00	---	---	---	---
	8/16/2006	ENER	---	0.342	< 0.0300	0.137	6.60	---	---	---	---
0867	8/16/2006	ENER	---	0.0271	---	0.147	3.30	---	---	---	---
0869	12/11/2006	ENER	---	0.253	< 0.0300	0.113	4.80	---	---	---	---
0876	12/11/2006	ENER	---	0.839	< 0.0300	0.127	3.20	---	---	---	---
0881	10/2/2006	ENER	---	0.192	< 0.0300	0.0440	3.20	---	---	---	---

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0882	10/3/2006	ENER	---	0.0224	< 0.0300	< 0.0050	< 0.100	---	---	---	---
0883	11/14/2006	ENER	---	0.0323	< 0.0300	0.0510	6.00	---	---	---	---
0884	10/3/2006	ENER	---	0.0451	---	0.0490	6.50	---	---	---	---
0885	10/3/2006	ENER	---	0.0687	< 0.0300	0.0240	1.60	---	---	---	---
0886	7/23/2006	ENER	---	0.607	0.0800	0.129	8.60	---	---	---	---
	10/2/2006	ENER	---	0.508	---	0.117	9.00	---	---	---	---
0887	10/3/2006	ENER	---	0.0092	< 0.0300	0.0160	5.70	---	---	---	---
0888	10/4/2006	ENER	---	0.130	---	0.0260	4.60	---	---	---	---
0890	7/23/2006	ENER	---	0.156	< 0.0300	0.0520	3.50	---	---	---	---
	10/3/2006	ENER	---	0.151	< 0.0300	0.0510	3.20	---	---	---	---
0893	10/2/2006	ENER	---	0.0718	< 0.0300	0.0240	1.60	---	---	---	---
0895	10/4/2006	ENER	---	0.0544	< 0.0300	0.0340	4.10	---	---	---	---
0896	10/4/2006	ENER	---	0.0433	---	0.0960	4.60	---	---	---	---
0899	10/4/2006	ENER	---	0.0532	---	0.0400	5.50	---	---	---	---
0910	12/12/2006	ENER	---	0.0108	< 0.0300	0.0220	4.20	---	---	---	---
0915	6/19/2006	ENER	7.77	0.0105	< 0.0300	0.0200	3.90	< 0.200	---	---	---
0920	2/14/2006	ENER	---	0.187	< 0.0300	0.406	---	---	---	---	---
	8/7/2006	ENER	---	0.200	< 0.0300	0.368	12.1	---	---	---	---
	8/7/2006	ENER	---	# 0.197	# < 0.0300	# 0.360	# 12.2	---	---	---	---
0935	10/4/2006	ENER	---	0.101	< 0.0300	0.0410	4.90	---	---	---	---
0939	5/2/2006	ENER	7.97	0.0202	0.0030	0.0630	1.10	< 1.000	< 1.000	0.0010	< 1.000
0942	2/14/2006	ENER	---	0.0620	< 0.0300	0.0430	---	---	---	---	---
	8/8/2006	ENER	7.74	0.0657	< 0.0300	0.0430	7.50	---	---	< 0.0100	---

Signifies Quality Control Sample

TABLE B.4-6 WATER QUALITY ANALYSES FOR THE REGIONAL ALLUVIAL WELLS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0947	11/22/2006	ENER	---	0.0665	< 0.0300	0.0190	1.90	---	---	---	---
0979	5/3/2006	ENER	7.80	0.0540	< 0.0010	0.0380	4.00	< 1.000	< 1.000	0.0020	< 1.000
0980	5/1/2006	ENER	7.78	0.0462	< 0.0010	0.0540	4.20	< 1.000	2.40	0.0020	< 1.000
0983	5/2/2006	ENER	7.90	0.0312	< 0.0010	0.0250	3.70	< 1.000	< 1.000	0.0010	< 1.000
	5/2/2006	ENER	7.80	0.0317	< 0.0010	0.0270	3.60	< 1.000	< 1.000	0.0010	< 1.000
0989	5/1/2006	ENER	8.02	0.0366	0.0010	0.0240	3.70	< 1.000	2.20	0.0030	< 1.000
0994	3/15/2006	ENER	---	0.0060	---	0.0420	7.00	---	---	---	---
	10/24/2006	ENER	---	0.0063	< 0.0300	0.0510	8.20	---	---	---	---
0996	8/30/2006	ENER	---	0.0450	< 0.0300	0.0390	4.10	---	---	---	---

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
0434	1/9/2006	ENER	---	---	---	---	---	---	182	649	1760	* 2354	---
	4/10/2006	ENER	---	---	---	---	---	---	183	636	1710	* 2602	---
0482	10/11/2006	ENER	---	---	---	---	---	---	182	661	1690	* 2675	---
0483	10/11/2006	ENER	---	---	---	---	---	---	177	632	1600	* 2494	---
0493	2/13/2006	ENER	---	---	---	---	---	---	---	693	1620	* 2460	---
	2/13/2006	ENER	---	---	---	---	---	---	---	# 681	# 1640	---	---
	6/19/2006	ENER	12.0	2.20	2.20	500	364	< 1.000	122	692	1570	* 2589	0.947
0494	2/13/2006	ENER	---	---	---	---	---	---	---	630	1760	* 2404	---
	6/19/2006	ENER	220	61.6	6.50	272	494	< 1.000	186	715	1810	* 2683	0.992
0498	8/14/2006	ENER	---	---	---	---	---	---	146	583	1460	* 2134	---
0536R	5/2/2006	ENER	201	73.9	7.60	248	308	< 1.000	111	842	1740	* 1717	1.05
0538	12/11/2006	ENER	---	---	---	---	---	---	---	763	1760	* 2405	---
0539	12/11/2006	ENER	---	---	---	---	---	---	122	808	1670	* 2286	---
0544	5/1/2006	ENER	224	59.1	7.20	436	523	< 1.000	200	1210	2370	* 1915	0.892
0547	5/3/2006	ENER	129	34.0	3.00	104	262	< 1.000	91.0	323	852	* 765	1.02
0549	5/2/2006	ENER	154	42.6	3.40	59.6	340	< 1.000	34.0	253	814	* 669	1.17
0653	12/11/2006	ENER	---	---	---	---	---	---	---	781	1750	* 2388	---
0820	5/2/2006	ENER	308	77.7	5.60	548	380	< 1.000	264	1660	3030	* 2834	0.948
0832	5/2/2006	ENER	229	63.0	4.70	470	380	< 1.000	215	1300	2520	* 2468	0.944
0853	11/14/2006	ENER	---	---	---	---	---	---	98.0	634	1280	* 2003	---
0901	5/2/2006	HMC	16.3	5.00	3.40	635	439	< 1.000	174	1010	1950	2870	0.872
0929	11/17/2006	ENER	9.60	1.20	0.900	573	517	< 1.000	181	663	1740	* 2618	0.931
0930	11/17/2006	ENER	---	---	---	---	---	---	136	580	1470	* 2249	---

Signifies Quality Control Sample

* Signifies Specific Conductivity from HMC

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
0932	5/3/2006	ENER	3.90	0.800	0.800	337	341	12.0	149	295	970	* 1275	0.915
	5/3/2006	ENER	# 3.20	# < 0.500	# 1.000	# 358	# 335	# 18.0	# 139	# 304	# 966	---	# 0.967
0933	5/3/2006	ENER	15.1	1.90	1.60	787	364	< 1.000	661	619	2210	* 2620	0.938
	5/3/2006	ENER	# 15.5	# 1.70	# 1.90	# 764	# 372	# < 1.000	# 625	# 660	# 2250	---	# 0.912
0934	11/21/2006	ENER	13.6	2.30	1.10	633	506	< 1.000	217	644	1940	* 2900	1.02
0937	5/1/2006	HMC	248	52.1	2.20	40.6	531	< 1.000	35.0	390	1010	1375	1.04
0946	12/12/2006	ENER	152	47.0	7.40	395	571	< 1.000	226	689	1870	* 2719	0.957
0954	5/1/2006	ENER	152	44.4	5.10	97.3	323	< 1.000	48.0	439	934	---	0.986
0962	5/2/2006	ENER	19.8	5.20	2.50	361	292	4.00	101	408	1120	* 1188	1.06
0963	5/1/2006	HMC	5.90	1.10	2.30	250	321	6.00	50.0	245	698	991	0.945
	5/1/2006	HMC	7.50	1.40	2.30	257	308	8.00	50.0	245	700	---	0.992
0964	5/2/2006	HMC	7.60	2.30	1.90	236	301	6.00	48.0	222	658	762	0.980
ACW	11/28/2006	ENER	---	---	---	---	---	---	---	614	1350	* 2208	---
AW	11/28/2006	ENER	---	---	---	---	---	---	---	701	1600	* 2460	---
CE1	12/10/2006	ENER	---	---	---	---	---	---	135	791	1900	* 2750	---
CE2	2/22/2006	ENER	---	---	---	---	---	---	55.0	244	706	* 1135	---
	8/7/2006	ENER	72.3	19.8	2.60	196	326	< 1.000	68.0	301	822	* 1296	1.02
CE6	2/7/2006	HMC	---	---	---	---	---	---	---	---	---	2136	---
	7/20/2006	ENER	104	27.6	3.10	230	342	< 1.000	103	411	1020	* 1630	1.03
CE7	7/20/2006	ENER	298	101	15.4	4140	1530	< 1.000	964	6820	13000	* 17000	1.05
CE8	9/20/2006	ENER	11.9	1.80	1.40	513	367	5.00	80.0	728	1580	* 2372	0.979
CE9	12/12/2006	ENER	204	56.0	5.40	270	512	< 1.000	199	625	1700	* 2351	0.986
CE10	8/31/2006	ENER	123	35.3	3.60	379	353	< 1.000	129	790	1740	* 2430	0.989

Signifies Quality Control Sample

* Signifies Specific Conductivity from HMC

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
CE11	8/28/2006	ENER	142	40.5	2.90	264	380	< 1.000	128	619	1470	* 2190	0.966
CE12	8/31/2006	ENER	219	55.2	4.40	326	470	< 1.000	176	846	1970	2660	0.982
CE13	9/21/2006	ENER	496	190	9.40	2440	1290	< 1.000	787	5270	10000	* 12370	0.959
CW1	8/7/2006	ENER	6.30	1.000	1.30	454	348	4.00	55.0	614	1300	* 2043	1.00
CW2	2/14/2006	ENER	---	---	---	---	---	---	62.0	454	1100	* 1719	---
	8/7/2006	ENER	7.20	1.40	1.10	370	331	5.00	69.0	445	1060	* 1712	0.988
CW3	10/24/2006	ENER	203	52.4	4.40	506	504	< 1.000	162	1190	2390	* 3489	0.971
CW15	11/28/2006	ENER	---	---	---	---	---	---	69.0	916	1520	* 2458	---
CW17	11/15/2006	ENER	---	---	---	---	---	---	170	1600	3010	* 3837	---
CW18	11/22/2006	ENER	43.0	8.70	2.40	614	693	< 1.000	216	653	1940	* 2970	0.953
CW24	11/15/2006	ENER	---	---	---	---	---	---	88.0	1700	3030	* 3719	---
CW26	11/22/2006	ENER	---	---	---	---	---	---	148	654	1440	* 2137	---
CW27	11/22/2006	ENER	---	---	---	---	---	---	156	635	1460	* 2063	---
CW28	11/22/2006	ENER	7.10	1.10	1.20	422	293	< 1.000	132	538	1280	* 2035	0.953
CW29	8/14/2006	ENER	118	32.9	5.00	313	260	< 1.000	110	665	1420	* 2064	1.05
CW31	11/14/2006	ENER	---	---	---	---	---	---	51.0	895	1560	* 2261	---
CW32	11/14/2006	ENER	---	---	---	---	---	---	577	1550	3690	* 5380	---
CW33	11/15/2006	ENER	---	---	---	---	---	---	400	2100	3950	* 5740	---
CW35	10/24/2006	ENER	---	---	---	---	---	---	97.0	1320	2450	* 3133	---
CW36	8/1/2006	ENER	104	35.0	8.20	473	269	< 1.000	69.0	963	1760	* 2686	1.09
CW37	11/28/2006	ENER	---	---	---	---	---	---	98.0	959	1660	* 2420	---
CW39	11/28/2006	ENER	---	---	---	---	---	---	76.0	893	1590	* 2325	---
CW40	12/12/2006	ENER	---	---	---	---	---	---	188	724	1950	* 2925	---

* Signifies Specific Conductivity from HMC

TABLE B.5-1 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
CW41	8/16/2006	ENER	---	---	---	---	---	---	107	273	948	* 1520	---
CW42	8/16/2006	ENER	---	---	---	---	---	---	168	722	1630	* 2354	---
CW43	11/14/2006	ENER	---	---	---	---	---	---	73.0	654	1410	* 2053	---
CW44	8/14/2006	ENER	---	---	---	---	---	---	177	701	1740	* 2479	---
CW45	8/14/2006	ENER	---	---	---	---	---	---	186	665	1720	* 2500	---
CW50	11/15/2006	ENER	203	56.1	3.80	265	320	< 1.000	89.0	932	1810	* 2446	0.970
CW52	11/15/2006	ENER	24.0	4.00	1.40	432	408	< 1.000	55.0	639	1300	* 2198	0.943
CW53	10/11/2006	ENER	---	---	---	---	---	---	190	657	1810	* 3051	---
CW54	12/10/2006	ENER	---	---	---	---	---	---	176	1200	2490	* 3331	---
CW55	12/12/2006	ENER	35.0	4.00	2.50	582	703	< 1.000	177	530	1670	* 2149	0.995
WCW	11/28/2006	ENER	---	---	---	---	---	---	47.0	580	980	* 1786	---
WR25	11/15/2006	ENER	---	---	---	---	---	---	120	2000	3410	* 4146	---

* Signifies Specific Conductivity from HMC

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0434	1/9/2006	ENER	---	0.252	0.110	0.0360	1.90	---	---	---	---
	4/10/2006	ENER	---	0.296	0.120	0.0390	1.90	---	---	---	---
0482	10/11/2006	ENER	---	0.236	0.0600	0.0300	2.40	---	---	---	---
0483	10/11/2006	ENER	---	0.210	0.0800	0.0300	2.20	---	---	---	---
0493	2/13/2006	ENER	---	0.216	< 0.0300	0.188	---	---	---	---	---
	2/13/2006	ENER	---	# 0.216	# < 0.0300	# 0.184	---	---	---	---	---
	6/19/2006	ENER	8.25	0.195	< 0.0300	0.176	2.00	< 0.200	< 1.000	< 0.0100	< 0.200
0494	2/13/2006	ENER	---	0.193	0.0700	0.0260	---	---	---	---	---
	6/19/2006	ENER	7.79	0.146	0.0600	0.0330	2.70	0.500	< 1.000	< 0.0100	< 0.200
0498	8/14/2006	ENER	---	0.474	< 0.0300	0.0810	1.60	---	---	---	---
0536R	5/2/2006	ENER	7.90	0.0230	0.0020	0.0260	24.6	< 1.000	< 1.000	0.0040	< 1.000
0538	12/11/2006	ENER	---	0.302	---	0.0500	4.90	---	---	---	---
0539	12/11/2006	ENER	---	0.105	< 0.0300	0.0700	3.80	---	---	---	---
0544	5/1/2006	ENER	7.60	0.265	0.0020	0.0760	6.20	< 1.000	2.10	0.0060	< 1.000
0547	5/3/2006	ENER	7.93	0.0111	0.0010	0.0260	7.50	< 1.000	< 1.000	0.0050	< 1.000
0549	5/2/2006	ENER	7.87	0.0092	< 0.0010	0.0130	4.60	< 1.000	< 1.000	0.0030	< 1.000
0653	12/11/2006	ENER	---	0.735	< 0.0300	0.0770	---	---	---	---	---
0820	5/2/2006	ENER	7.65	0.0811	0.0030	0.0460	5.20	< 1.000	< 1.000	0.0010	< 1.000
0832	5/2/2006	ENER	7.63	0.0706	0.0040	0.0330	4.30	< 1.000	< 1.000	< 0.0010	< 1.000
0853	11/14/2006	ENER	---	0.0272	< 0.0300	0.133	2.00	---	---	---	---
0901	5/2/2006	HMC	7.86	0.0094	0.0270	0.0030	< 0.100	< 1.000	< 1.000	< 0.0010	< 1.000
0929	11/17/2006	ENER	6.75	0.0431	0.0300	0.0130	0.900	< 0.200	---	---	---
0930	11/17/2006	ENER	---	0.0101	0.0500	< 0.0050	0.100	---	---	---	---

Signifies Quality Control Sample

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
0932	5/3/2006	ENER	8.80	0.0114	< 0.0300	< 0.0050	< 0.100	0.900	< 1.000	0.0100	< 0.200
	5/3/2006	ENER	# 8.99	# 0.0114	# 0.0130	# < 0.0010	# < 0.100	# < 1.000	# < 1.000	# 0.0100	# < 1.000
0933	5/3/2006	ENER	8.12	0.0238	0.0400	< 0.0050	< 0.100	< 0.200	< 1.000	< 0.0100	< 0.200
	5/3/2006	ENER	# 7.98	# 0.0247	# 0.0360	# 0.0020	# 0.400	# < 1.000	# < 1.000	# 0.0070	# < 1.000
0934	11/21/2006	ENER	8.12	0.0726	0.0400	0.0150	1.80	< 0.200	---	---	---
0937	5/1/2006	HMC	7.79	0.0073	< 0.0010	0.0060	2.80	1.10	2.20	0.0080	< 1.000
0946	12/12/2006	ENER	7.48	0.0254	< 0.0300	0.0080	1.50	< 0.200	---	---	---
0954	5/1/2006	ENER	7.83	0.0059	0.0010	0.0180	3.80	< 1.000	1.60	0.0030	< 1.000
0962	5/2/2006	ENER	8.43	0.0252	0.0030	0.101	1.80	< 1.000	< 1.000	0.0120	< 1.000
0963	5/1/2006	HMC	8.50	0.0161	0.0030	0.0120	2.00	< 1.000	3.40	0.0170	< 1.000
	5/1/2006	HMC	8.68	0.0158	0.0030	0.0130	2.00	< 1.000	6.40	0.0170	< 1.000
0964	5/2/2006	HMC	8.56	0.0155	0.0020	0.0110	1.50	< 1.000	< 1.000	0.0130	< 1.000
ACW	11/28/2006	ENER	---	0.0303	< 0.0300	0.0620	---	---	---	---	---
AW	11/28/2006	ENER	---	0.139	0.0900	0.0400	---	---	---	---	---
CE1	12/10/2006	ENER	---	2.87	6.12	0.109	< 0.100	---	---	---	---
CE2	2/22/2006	ENER	---	0.329	0.720	0.0260	1.30	---	---	---	---
	8/7/2006	ENER	7.95	0.377	0.790	0.0530	1.50	< 0.200	---	---	---
CE6	7/20/2006	ENER	7.97	0.386	0.640	0.0680	1.60	< 0.200	---	---	---
CE7	7/20/2006	ENER	8.01	39.3	39.3	1.25	5.90	< 0.200	---	---	---
CE8	9/20/2006	ENER	8.39	0.0361	< 0.0300	< 0.0050	< 0.100	< 0.200	---	---	---
CE9	12/12/2006	ENER	7.52	0.158	0.0600	0.0170	1.40	< 0.200	---	---	---
CE10	8/31/2006	ENER	7.87	0.982	0.560	0.210	1.60	1.10	---	---	---
CE11	8/28/2006	ENER	7.67	0.636	0.350	0.114	2.00	< 0.200	---	---	---

Signifies Quality Control Sample

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
CE12	8/31/2006	ENER	7.60	0.924	0.560	0.202	3.70	< 0.200	---	---	---
CE13	9/21/2006	ENER	7.87	29.6	17.6	0.738	9.60	1.50	---	---	---
CW1	8/7/2006	ENER	8.39	0.0815	0.0400	0.0390	1.10	< 0.200	---	---	---
CW2	2/14/2006	ENER	---	0.0219	< 0.0300	0.0420	0.600	---	---	---	---
	8/7/2006	ENER	8.45	0.0593	0.0500	0.0400	0.600	< 0.200	---	---	---
CW3	10/24/2006	ENER	7.11	3.53	2.88	0.100	0.600	0.300	---	---	---
CW15	11/28/2006	ENER	---	0.0254	< 0.0300	0.0360	3.30	---	---	---	---
CW17	11/15/2006	ENER	---	0.144	< 0.0300	0.127	16.7	---	---	---	---
CW18	11/22/2006	ENER	7.87	0.0382	< 0.0300	0.0160	1.70	< 0.200	---	---	---
CW24	11/15/2006	ENER	---	0.146	< 0.0300	0.0440	11.1	---	---	---	---
CW26	11/22/2006	ENER	---	0.0346	< 0.0300	0.142	1.80	---	---	---	---
CW27	11/22/2006	ENER	---	0.0313	< 0.0300	0.129	1.20	---	---	---	---
CW28	11/22/2006	ENER	7.79	0.0251	< 0.0300	0.150	1.50	< 0.200	---	---	---
CW29	8/14/2006	ENER	7.76	0.213	< 0.0300	0.155	2.40	< 0.200	---	---	---
CW31	11/14/2006	ENER	---	0.0131	< 0.0300	< 0.0050	< 0.100	---	---	---	---
CW32	11/14/2006	ENER	---	0.0036	< 0.0300	0.0080	< 0.100	---	---	---	---
CW33	11/15/2006	ENER	---	0.0054	0.0300	0.0070	< 0.100	---	---	---	---
CW35	10/24/2006	ENER	---	0.191	< 0.0300	0.0700	7.40	---	---	---	---
CW36	8/1/2006	ENER	7.84	0.0055	< 0.0300	< 0.0050	< 0.100	< 0.200	---	---	---
CW37	11/28/2006	ENER	---	0.0290	< 0.0300	0.0690	5.30	---	---	---	---
CW39	11/28/2006	ENER	---	0.0332	< 0.0300	0.0400	4.00	---	---	---	---
CW40	12/12/2006	ENER	---	0.0263	< 0.0300	0.0100	1.70	---	---	---	---
CW41	8/16/2006	ENER	---	0.0496	< 0.0300	0.0210	5.80	---	---	---	---

TABLE B.5-2 WATER QUALITY ANALYSES FOR THE CHINLE AQUIFERS (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
CW42	8/16/2006	ENER	---	0.621	< 0.0300	0.0920	3.80	---	---	---	---
CW43	11/14/2006	ENER	---	0.0386	< 0.0300	0.0250	3.40	---	---	---	---
CW44	8/14/2006	ENER	---	0.662	< 0.0300	0.0520	2.70	---	---	---	---
CW45	8/14/2006	ENER	---	1.04	< 0.0300	0.0400	1.80	---	---	---	---
CW50	11/15/2006	ENER	7.75	0.0512	< 0.0300	< 0.0050	< 0.100	0.600	< 1.000	< 0.0100	< 0.200
CW52	11/15/2006	ENER	8.03	0.0121	< 0.0300	< 0.0050	< 0.100	0.400	< 1.000	< 0.0100	< 0.200
CW53	10/11/2006	ENER	---	0.0972	< 0.0300	0.0200	1.80	---	---	---	---
CW54	12/10/2006	ENER	---	0.0334	< 0.0300	0.0380	4.20	---	---	---	---
CW55	12/12/2006	ENER	8.04	0.115	0.0300	0.0070	< 0.100	< 0.200	---	---	---
WCW	11/28/2006	ENER	---	0.0043	< 0.0300	< 0.0050	< 0.100	---	---	---	---
WR25	11/15/2006	ENER	---	0.364	< 0.0300	0.0080	7.60	---	---	---	---

TABLE B.6-1 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER

Ca THROUGH ION_BAL

Sample Point Name	Date	Lab	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Na (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	TDS (mg/l)	Cond(calc.) (micromhos/	Ion_B (ratio)
#1 Deepwell	5/23/2006	ENER	234	76.0	14.2	320	---	---	307	759	2140	* 2870	---
	10/10/2006	ENER	---	---	---	---	---	---	---	726	1950	* 2852	---
#2 Deepwell	5/23/2006	ENER	206	67.6	12.0	240	---	---	237	653	1970	* 2434	---
	10/10/2006	ENER	---	---	---	---	---	---	---	681	1770	* 2670	---
0806	10/4/2006	ENER	---	---	---	---	---	---	162	555	1530	* 2259	---
0928	12/10/2006	ENER	---	---	---	---	---	---	---	863	1680	* 2335	---
0943	3/16/2006	ENER	167	54.8	10.2	261	412	< 1.000	161	695	1670	* 2551	0.948
	12/19/2006	ENER	191	62.4	9.80	282	298	< 1.000	188	716	1710	---	1.08
0951	3/16/2006	ENER	145	43.4	5.60	79.9	342	< 1.000	83.0	356	912	* 1459	0.937
0955	5/1/2006	ENER	164	51.8	6.60	107	336	< 1.000	68.0	461	1030	* 891	1.01
0986	5/2/2006	ENER	139	39.5	3.10	268	410	< 1.000	48.0	606	1330	---	1.06

* Signifies Specific Conductivity from HMC

TABLE B.6-2 WATER QUALITY ANALYSES FOR THE SAN ANDRES AQUIFER (cont'd.)

pH THROUGH Th-230

Sample Point Name	Date	Lab	pH (std. units)	Unat (mg/l)	Mo (mg/l)	Se (mg/l)	NO3 (mg/l)	Ra226 (pCi/l)	Ra228 (pCi/l)	V (mg/l)	Th230 (pCi/l)
#1 Deepwell	5/23/2006	ENER	8.19	0.0095	< 0.0300	0.0050	0.800	1.50	---	---	---
	10/10/2006	ENER	---	0.0081	< 0.0300	0.0050	---	---	---	---	---
#2 Deepwell	5/23/2006	ENER	8.36	0.0108	< 0.0300	0.0090	2.60	< 0.200	---	---	---
	10/10/2006	ENER	---	0.0118	< 0.0300	0.0090	---	---	---	---	---
0806	10/4/2006	ENER	---	0.0182	< 0.0300	0.0110	3.80	---	---	---	---
0928	12/10/2006	ENER	---	0.0853	---	0.0320	---	---	---	---	---
0943	3/16/2006	ENER	7.80	0.0179	< 0.0300	0.0290	4.00	0.400	---	---	---
	12/19/2006	ENER	7.12	0.0149	< 0.0300	0.0220	3.80	< 0.200	---	---	---
0951	3/16/2006	ENER	7.91	0.0372	< 0.0300	0.0060	4.20	0.800	---	---	---
0955	5/1/2006	ENER	7.84	0.0054	< 0.0010	0.0110	3.60	1.000	1.30	0.0020	< 1.000
0986	5/2/2006	ENER	7.92	0.0458	0.0020	0.0180	2.90	< 1.000	< 1.000	0.0010	< 1.000

APPENDIX C

ANNUAL ALARA AUDIT

Annual ALARA Audit

December 5, 2006

Grants Operations
Homestake Mining Company
P. O. Box 98
Grants, New Mexico 87020

Prepared by:

Kenneth R. Baker
Environmental Restoration Group, Inc.
8809 Washington NE, Suite 150
Albuquerque, NM 87113

1.0 Introduction

On December 4-5, 2006, Kenneth R. Baker conducted the 2006 Annual ALARA Audit for the Grants Uranium Mill site. The audit was conducted in accordance with the United States Nuclear Regulatory Commission (NRC) Regulatory Guide 8.31, "Information Relevant to Ensuring That Occupational Exposure at Uranium Mills Will Be As Low As Reasonably Achievable." Other applicable references included USNRC Materials License Number SUA-1471 issued to Homestake Mining Company, and USNRC Regulatory Guides 8.10, 8.22, and 8.30.

The following topics were covered in the audit:

Follow up on prior ALARA audit
ALARA policy
Radiation exposures
Bioassay results
Environmental monitoring
Self audits
ALARA planning activities
Worker training
Radiation safety meetings
Radiation surveys
Overexposures
Health physics staff
Procedures, Data Collection, and Management

All mill buildings have been removed and the off-pile tailings cleanup was completed in 1995. The side slopes of the main tailings pile and the mill yard area have a permanent radon barrier and an erosion protection cover. An interim cover is being maintained on the top of the large tailings pile and that portion of the small tailings pile that is not covered by the evaporation pond.

Activities at the site during 2006 include the operation of a reverse osmosis (RO) unit that supports the groundwater restoration program, drilling additional wells on the Large Tailing Pile, operating and maintaining the dewatering system for the large tailings pile, and maintaining the groundwater restoration system. Work has started on flushing the large tailings pile which involves injecting water into wells and removing water from nearby collection wells. The groundwater restoration consists of pumping the groundwater collection wells, operating the evaporation ponds, injecting clean water into the contaminated aquifer, and operating the RO plant.

The primary potential radiation exposure results from maintaining the pumps, valves, and piping associated with the tailings dewatering and groundwater collection systems, operating the RO plant, drilling new wells on the tailings pile, and maintaining the spray system on the evaporation ponds.

2. Discussion

The audit process involved scoping the audit, gathering relevant information, review of information, interviewing appropriate personnel, and writing the report. The reviews are briefly summarized below.

2.1 Follow-up on Previous Audit Recommendations

The last NRC audit occurred on July 25-27, 2006. The exit interview revealed no findings although license changes were recommended. They have not produced a report as of this date. The last ALARA Audit occurred on December 8, 2005. The auditor found that procedures were not followed requiring all equipment that had been in contact with collection water be monitored for beta radiation prior to release. At the time, HMC's only instrument for measuring total beta activity was out for calibration. HMC has purchased another instrument which will allow them to always have an instrument on site. This recommendation is considered closed.

2.2 ALARA Policy

The corporate ALARA policy statement is included in Standard Operating Procedure HP-6, revised October 14, 2003. This policy statement commits management and personnel to be continually vigilant for means to reduce exposures. This policy has been implemented as evidenced by discussions with HMC management and staff, and by the incorporation of ALARA principles in worker training and preparation of radiation work permits.

2.3 Radiation Exposures

2.3.1 External Exposures

Dosimetry data for the 2005 showed that 17 people were monitored with the maximum individual receiving 38 mrem/y. Data were available for the first two quarters of 2006. Exposures continue to be low with a maximum quarterly exposure of 9 mrem. Shallow and eye dose equivalents were similar to the deep doses.

Dosimeters are also emplaced at each of the perimeter hi-volume air particulate sampling stations and processed semiannually. The reported semiannual results for the first half of 2006 indicate exposure rates within 6 mrem of that at the background location.

These low exposures reflect the effort that management and the workers have expended in maintaining exposures ALARA as well as the low radiation work environment. The number of people monitored is approximately the same as last year and thus the collective dose equivalent is anticipated to be about the same.

2.3.2 Internal Exposures from Long-Lived Particulate Sources

HMC does not routinely require airborne particulate monitoring since there are no dry exposed tailings. Invasive activities normally involve the use of water to suppress any dust that may be generated.

HMC has a “spot check program” where the most exposed individual working under an RWP will be monitored for a day, normally one per month. RWP-1-2006 was issued in CY-2006 and “spot checks” were performed for surface contamination. No personal air sampler data were collected during these “spot checks”.

A high volume air particulate sampler exists on top of the large tailings pile (Location HMC- 8) and continuous samples were taken. Data for 2005 and the first two quarters of 2006 indicate near background concentrations of uranium, Ra-226, and Th-230. Net concentrations were less than 1 percent of the respective DACs. This is a good indication that the average airborne particulate concentrations during work activities on top of the pile are very low.

2.3.3 Internal Exposure from Radon

The radon concentrations at seven locations on the site perimeter near the tailings pile are monitored by a semi-annual exchange of track-etch detectors. Average concentrations for the year 2006 averaged less than 0.75 pCi/liter above that at the background location. A review of the available 2006 data indicate similar low exposures.

HMC has been aware that the RO building presents a source of concern for radon exposure. Water from collection wells is exposed to the atmosphere in the RO building and dissolved radon will emanate into the building atmosphere. Ventilation fans in the building are operated twice daily prior to shift entry to exhaust this radiation source, and an additional exhaust fan operating continuously was added to the building sump in 2003 to reduce radon concentrations further. Two track-etch detectors were placed in the work areas and read monthly during 2003, where monthly averages ranged from 4.5 to 14.5 pCi/l. This was a significant decrease from the levels measured in 2001 and 2002 prior to full installation of the existing building exhaust system. After review of the data, HMC went to a semiannual exchange of the track-etch detectors. The average radon concentrations in the building for the last half of the 2003 year was 11.6 pCi/l, and 9.1 pCi/l during the first half of 2004. Average levels for 2004 decreased to between 4 and 5 pCi/l. Detectors are changed out quarterly at this time. Readings for 2005 and the first three quarters of 2006 continued to support an annual average concentration between 4-5 pCi/l. These concentrations are below the 2003 and 2004 readings and significantly less than that measured during the first half of 2002 (21 pCi/l) and in the year 2001 (47 pCi/l). This reduction in concentration is likely due to the aforementioned increased ventilation in the RO building.

HMC records the occupancy time employees are in the RO building. WL measurements from prior years showed very low radon daughter concentrations compared to the radon concentrations. In addition, occupancy times for workers are normally a few hours per week. Thus radiation exposures under these occupancy periods are very low.

HMC has made a considerable effort in reducing radiation exposure to workers in the RO building. This downward trend in worker exposure is clearly a demonstration of the company’s commitment to ALARA.

2.4 Bioassay Results

Procedures call for a semi-annual routine urine-sampling schedule for HMC employees. Contractor employees are sampled at the beginning and end of short-term projects. Year to date, 41 individual samples have been submitted. A spike and blank was submitted with each shipment. The vendor laboratory is required to have a lower limit of detection (LLD) of 5 µg/l for uranium. Any measured value of 15 µg/l must be investigated and appropriate mitigation measures taken. Persons with urine samples exceeding 35 µg/l must be placed on work restrictions to limit further intakes of uranium.

All results were below the LLD of 5 µg/l of uranium, except for the spikes. HMC obtained a uranium solution from the vendor laboratory and spikes one blank urine sample in each shipment with either 15 or 30 pCi/l. The laboratory estimates for all spiked samples were within 30% of the known amount, which is the allowable tolerance. The results for the bioassay program support the conclusion that the worker uptake of uranium is low.

Semiannual samples for regular employees have been occurring in December and June.

2.5 Self Audits

The RPA requires that the technicians (Venable/Vigil) prepare a monthly ALARA report. The report consists of radiation protection data reflective of the operations as well as an accounting of the major activities for the month. Any problems encountered are also presented. The reports have not been finalized after June although written. The RPA indicated that the reports need to be reformatted to a more useful form. After reviewing several of the reports, the auditor concluded that the reports provide the RPA with adequate detail to assure that exposures are being maintained ALARA. The auditor agrees with the RPA that a more useful format would save him time in his reviews.

2.6 ALARA Planning Activities

HMC conducts all invasive work (involving tailings) under a radiation work permit (RWP). Only one RWP was prepared in 2006 for drilling additional wells on the Large Tailings Pile. When contract laborers are used, spot checks are conducted to assure that the requirements are appropriate and being followed. These spot checks include frisking working personnel and equipment to determine the levels of contamination, performing exposure rate measurements in the work area, and possibly taking air samples. Spot check records of personnel were maintained.

2.7 Worker Training

All radiation workers receive formal classroom radiation safety training. Workers must pass a written examination. Annual refresher training is required and generally is a repeat of the course material given initially. Kenneth Baker conducted the last annual training on December 4, 2006. The Radiation Protection Administrator (RPA) or Adrian Venable normally gives the contractor training. Use of videotapes and an examination developed for HMC by a consultant is incorporated into the contractor employee training.

Al Cox, the RPA, had the required radiation safety officer training in May 2005 and will require renewal training in 2007.

2.8 Radiation Surveys

A review of the instrument maintenance and calibration records was made. All instruments in use had been calibrated. A calibration schedule is prepared for use in tracking calibrations. The records were found in good order.

Clean area surveys are no longer required per license condition but HMC conducted surveys within the shop, lab, office, and change room on December 4, 2006 as recommended in a prior ALARA audit. Seventeen locations were monitored where the removable alpha contamination was within a range considered acceptable for clean areas. Leak tests were also conducted on the radioactive sources currently in use. All values were within the normal range.

The file containing release surveys was reviewed. Other than drilling equipment and vehicles, only one item was surveyed for release from the site. Adrian Venable indicated that there were no other items released during 2006. The item, a barge motor, was released for repair and return to the site after making alpha and beta activity measurements as required.

2.9 Health Physics Staff

The current health physics staff consists of:

Alan D. Cox, Radiation Protection Administrator
Adrian Venable, Senior Health Physics Technician
Joe Vigil, Site Supervisor and Senior Environmental Technician

A review of the education and experience of the staff indicated that all meet or exceed the requirements of NRC Regulatory Guide 8.31 for working in uranium mills.

2.10 Overexposures

No personnel were overexposed to date during this audit period.

2.11 Procedures, Data Collection, and Management

The HMC Environmental Procedures Manual was reviewed, specifically EM-1 through – EM-4, and HP-1 through HP-16. All procedures appeared current. A recent review of all procedures by the RPA was done, as evidenced by his signature. The training procedure was updated by the RPA during the audit to incorporated new training materials used on December 4, 2006. No other procedures are currently under revision or preparation. Radiation dosimetry, bioassay, environmental monitoring, worker training, instrument maintenance, and other related radiation safety files maintained by Mr. Venable appeared to be complete and well organized. All important data were quickly retrievable and understandable.

3.0 Recommendations

The radiation protection program is effective in reducing exposures to as low as reasonably achievable. Results from external and internal dosimetry monitoring programs demonstrate that the doses received by the HMC staff and contractors are very low and well within the limits allowed by regulations. Also, HMC management and staff continue to make improvements to the program as deficiencies are identified. These additional measures demonstrate adherence to the ALARA policy.

This audit did not result in any further suggestions for improving the radiation protection program.

APPENDIX D

INSPECTION OF TAILINGS PILES AND PONDS

RECEIVED MAR 1 2 2007

KLEINFELDER
An employee owned company

March 7, 2007
File No. 16977.07-3-ALB07RP001

Mr. Al Cox
Homestake Mining Company of California
P.O. Box 98
Grants, NM 87020

Subject: **Report of 2006 Annual Inspection of Tailing Piles and Ponds**
Homestake Grants Project
Grants, New Mexico

Dear Mr. Cox:

On October 23, 2006 the undersigned performed the annual visual inspection of the tailing piles and evaporation ponds at the Homestake Grants Project located at Grants, New Mexico. Subsequently, additional information regarding impoundment piezometer reading and the settlement monument survey was reviewed. This report addresses the observations and findings of the requested inspection performed on October 23 as well as assessment of Homestake's records of settlement and piezometer measurements, sump discharges, and large impoundment reinjection rates.

OBSERVATIONS

The undersigned, Dr. Alan Kuhn of Kleinfelder West, Inc., performed a visual inspection of the tops and outslopes of both tailing impoundments and of the dikes, slopes, and liners of both evaporation ponds. The weather was clear and temperatures were in the 60s.

The surface of the large impoundment remained in good condition with partial cover by volunteer vegetation. The outslopes appeared to be structurally stable; there was no visible indication of mass movement. Routine maintenance has been adequate to control rilling of top surfaces, and the riprap cover on the outslopes was intact and in good condition.

Injection of water into the large impoundment conducted over the past several years for flushing of residual contaminants does not appear to have compromised the stability of the impoundment. Along the north toe of the impoundment, water has ponded at the bottom of the outslope. This water is tea-colored; it appears to be from seepage from the tailings but could also have resulted, at least in part, from the very heavy rains of the recent monsoon season. However, the white crust formed along the toe shows that most of the water is issuing from the tailings. Homestake has been pumping this water down and discharging it to the existing sumps of the toe drain collection system (installed in 1992), which discharges in turn to the evaporation ponds.

The outslopes of the small pile are, in general, durable and only slightly rilled. However, a deep rill has developed on the south corner. This rill, which formed during the heavy monsoon rains of this summer, is several feet deep and wide and extends down the entire length of the slope.

During the site inspection, several possible measures for repairing the rill and controlling runoff from the top of the small impoundment were discussed.

Evaporation pond #1 (EP1) is in generally good order. Except for a tear at the location of an exposed pipe flange on the north inslope, the pond liner is in good condition. The floating pipe energy dissipater remains functional and protects the east inslope from wave run-up. Freeboard at the time of this inspection was about 5 feet. The evaporation sprays and turbomisters were functioning normally. All other liner and earthen surfaces on the small pile/evaporation pond #1 appeared to be in good condition.

Evaporation pond #2 (EP2) liner and outslopes appeared to be in good condition. The pond water surface was about 5 feet below the dikes or about 3 feet below maximum pond level. The evaporation sprays were functioning normally. No leakage has been detected in the leak detection sumps, according to site personnel.

The pile-flushing program has continued during 2006. Piezometer levels have generally increased during the past year in response to injection of water (flushing program). Not all piezometers were measured this year. Only two measured piezometers showed water level decreases, both of which were less than one foot. Phreatic level increases were recorded in other piezometers, the largest being ES2, 7.04 feet increase over the year. No stability analyses were performed for 2006 to model the influence of the increased phreatic levels on the outslopes. Increasing piezometer levels indicate reduction in stability parameters, so the most recent stability analyses may no longer reflect impoundment stability.

The settlement-point survey conducted on 10/05/06 indicates that settlement has essentially stopped in both cells of the impoundment. It is not evident whether the settlement is only suspended due to water injection or has reached completion due to densification of tailings. The latter is unlikely; as long as there is substantial drainable water in the pore spaces of the tailings (a condition that will last as long as injection continues), some additional densification potential remains that could produce more settlement. However, the additional settlement will probably be minor compared to that already observed since 1993 and prior to the injection program.

CONCLUSIONS AND RECOMMENDATIONS

The tailing impoundments and the evaporation ponds are in generally good condition and are being maintained within the operating limits of the NRC license and the respective facility designs. Several conditions were observed that require repair or ongoing observation:

- The deep rill on the south corner of the small impoundment needs to be backfilled with clean radon-barrier material, placed in controlled lifts in accordance with the specification for radon-barrier construction.

- The cause of the rilling on the small impoundment needs to be addressed by either constructing a riprap-protected channel over the repaired rill, regrading the top surface of the impoundment to redirect the runoff water, or placing two or more HDPE pipes in the rill location to convey the runoff to the impoundment toe. The HDPE pipe approach is recommended. It should have a formed sheet-metal intake at the top of the slope and an energy dissipater (e.g.; riprap apron) at the toe of the slope.

- The liner tear on the north inslope of EP1 should be repaired. Other spots showing wear should be capped with additional asphaltic emulsion at the same time.

- Seepage at the north toe of the large impoundment should be intercepted before it emerges at ground surface. This can be accomplished most easily by installing French drains or flexible drainage pipe several feet deep, adjacent and parallel to the toe of the outslope rock cover. The drains should slope to sumps that would collect and discharge water to the existing larger collection sumps.

Until the large impoundment flushing program is concluded, tailing dewatering will be delayed; little or no additional consolidation and settlement of the slimes can occur. Rising phreatic levels reduce the factors of safety against slope movement; injection rates should be controlled to prevent additional increases in piezometer levels in the outslopes. If these levels increase, the stability analyses for the north and south outslopes should be updated.

No other correctives actions in impoundment or pond operations are required.

LIMITATIONS

The recommendations contained in this report are based on Dr. Kuhn's field visit, evaluation of information generated by others and obtained from Homestake, and his understanding of the inspected facilities. If any conditions are encountered at this site which are significantly different than those described in this report, Kleinfelder should be immediately notified so that we may make any necessary revisions to findings or recommendations contained in this report.

This report was prepared in accordance with generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made. It is the Client's responsibility to see that all parties to the project are made aware of this report in its entirety. The information contained in this report should be used at the Owner's and Contractor's option and risk.

We appreciate the opportunity to work with you on this project. If you have any questions or need additional information, please contact this office.

Respectfully submitted,
KLEINFELDER WEST, INC.

Alan K. Kuhn

Alan K. Kuhn, Ph.D., P.E., R.G.
Senior Principal Consultant

AK:ad

ALAN K. KUHN
NEW MEXICO
6798
PROFESSIONAL ENGINEER
Alan K. Kuhn
3/7/07

APPENDIX E

GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

TABLE OF CONTENTS

GRANTS RECLAMATION PROJECT
LAND USE REVIEW / SURVEY

APPENDIX E

Page Number

FIGURES

Page Number

TABLES

Page Number

Grants Reclamation Project

Land Use Review / Survey

Annual Report No. 5 – CY2006

1.0 Background

As part of Amendment 34 to the Grants Reclamation Project Radioactive Materials License – SUA-1471-Docket 40-8903 approved June 19, 2002, License Condition (LC) 42 was amended to require submittal of a land use survey with the License annual report to NRC. This report is the fifth annual land use review / survey pursuant to (LC) 42.

The general focus of the land use survey is to document and summarize the current land uses and any identified changes to land use in proximity to the Grants Reclamation Project, in particular those areas that are proximal to the tailings pile areas undergoing reclamation and closure and immediate surrounding areas where ongoing ground-water restoration continues.

2.0 2006 – Land Use – Homestake Properties

Homestake Mining Company of California (HMC) owns and controls a sizeable land area in and around the Grants Reclamation project. Over the last number of years, additional lands have been acquired as opportunity has arisen and acquisition of such lands are deemed appropriate in relation to ongoing ground-water remediation and restoration activities and final reclamation / closure of the site.

Much of the HMC lands held in the area that are not in immediate proximity to the tailings pile complex have been, and are continuing to be, utilized for livestock grazing on a lessor/lessee tenant arrangement. Most of the current land area within the present Site Boundary has been excluded from livestock grazing and other land use except those areas that are not directly related to the ongoing ground-water restoration activities. As such, livestock grazing is not currently allowed in the immediate tailings pile areas, evaporation pond areas, or the office/maintenance shop locations. These areas have been livestock fenced to exclude grazing; certain small areas in the southern and western portions of land within the Site Boundary are, however, utilized for livestock grazing.

Several small lot / small acreage parcels [e.g. residential lot(s)] held by HMC in the general area of the reclamation site are idle and are essentially not in use except in certain instances where fresh water injection and water collection is underway as part of the ongoing groundwater restoration program. Consideration is being given to possible agricultural use on selected lot(s) in the future; agricultural use, however, was not conducted on these parcels in 2006.

The other significant land use activity situated on HMC-held lands in the area includes land irrigation utilized for crop production. Water used for irrigation is an integral part of the ongoing ground-water restoration and cleanup program for the project. Prior to 2002, HMC had 270 acres of land under irrigation consisting of a flood irrigation area comprising 120 acres and a center pivot spray irrigation area comprising 150 acres. During 2002, an additional center pivot irrigation system was commissioned that comprises 60 acres. In 2003, an additional 24 acres of flood irrigation was added to the irrigation system in Section 33. In 2005, the 60 acre center pivot irrigation system was expanded by 40 acres to a total of 100 acres.

For 2006, total HMC lands available for crop irrigation totaled 394 acres situated in Sections 28, 33 and 34 (see project location Figure 2.1-1 in report Section 2.1 of this annual report for location of the four areas under present irrigation). The 24 acre flood irrigation area was not irrigated or cropped during 2006; therefore, 370 acres were irrigated for hay crop production during the year.

3.0 2006 – Land Use – Pleasant Valley Estates, Murray Acres, Broadview Acres, Felice Acres and Valle Verde Residential Subdivisions

Aside from the land uses on HMC land in the Grants Reclamation Project area described in the previous section above, the other major land use immediately proximal to the Site consists of residential development located in the Pleasant Valley Estates, Murray Acres, Broadview Acres and Felice Acres Residential subdivisions. By way of background, HMC provided these subdivision areas with a potable water supply system as an extension of the Village of Milan water supply in the mid-1980’s. The Village of Milan water supply extension to these areas was provided at that time to address a concern over the quality of ground-water used for domestic purposes in these nearby and adjacent subdivision areas.

An assessment of current land use in these four subdivision areas was undertaken in early 2007 to provide an annual review of the present uses, occupancy and status for the various lots within these subdivisions. Over the years, permanent residential homes, modular homes and mobile homes have been established in the subdivision areas, and immediate adjacent areas, as would typify a rural residential neighborhood. A number of lots remain vacant, or are utilized for uses such as horse barns, corrals, equipment storage, etc. In some cases, dwellings are present on several lots throughout the subdivisions but are currently vacant or have been permanently abandoned and in various states of disrepair.

This year, the annual review included an assessment of the residential areas adjacent to Felice Acres, Pleasant Valley Estates and the Valle Verde residential areas and adjacent lots as was done during 2005.

The primary issue of concern in the residential subdivision areas is to determine whether current occupied dwellings are utilizing water service from the Village of Milan system for potable water consumption and not private wells, particularly private domestic wells that are completed into the underlying shallow alluvial aquifer.

The survey conducted this year consisted of first obtaining the records and customer database from the Village of Milan water district. This information was reviewed to prepare a separate residential customer database for the five subdivision areas that would reflect the lot number, customer, water meter customer ID number and whether the customer utilized Milan water during 2006. See Tables E-1 through E-5 for 2006 database information.

A lot-by-lot reconnaissance was made in each of the subdivisions to determine whether each lot was occupied or vacant, contained a residence(s), and which residences are currently occupied. This information was then checked against the database to determine whether each occupied residence is supplied and metered through the Village of Milan water supply system. Results of this reconnaissance effort are summarized on the subdivision plat maps; see attached Figures E-1 through E-5.

Field review of the five subdivision areas, along with follow-up inquiries as required to confirm the status of water use at each property, indicates that at present all occupied residential sites in, or immediately adjacent to the Felice Acres, Broadview Acres, Murray Acres, and Pleasant Valley subdivisions are on metered water service with the Village of Milan.

In the Valle Verde residential area and immediately adjacent to the subdivision, 10 residences were identified that are not on the Village of Milan water supply system and are therefore obtaining domestic-use water from private well supplies. One of these 10 residences is on a private well supply ¼ mile west of the Valle Verde subdivision. Current information indicates that all other occupied residential lots in the Valle Verde area are on the Village water supply system. Several tours of the Valle Verde subdivision were completed during 2006 and early 2007 to further refine information regarding the number, location and ownership of the residences that are on private well supplies in this area.

New Mexico Environment Department – Superfund Oversight Section personnel continue to evaluate the Valle Verde area regarding private well supplies utilized for domestic household use and, where well water quality issues are identified, developing an action plan to get those residences on the Village of Milan water supply system.

4.0 Conclusion

The review of land use for HMC properties and the five residential subdivision areas (which now includes the Valle Verde area) to the south and west of the Grants Reclamation Project site indicates that present land uses in the area have not changed significantly. As a result of further refinement of the residential occupation information in the Valle Verde area during early 2007, coupled with an expansion of the residential area annual review scope, 10 domestic potable water supplies were identified as being associated with private residential well supplies. These private well supplies are located at residences in the Valle Verde subdivision or lots adjacent to Valle Verde. Survey results indicate that all other water users in Valle Verde and the other four subdivisions are currently being supplied by the Village of Milan water supply.

This land use survey / review is completed on an annual basis to meet annual reporting requirements under the NRC License. This will help in assuring that land use activities in the immediate area surrounding the Grants project are regularly reviewed and assist in determining that those uses do not present a new concern with local ground-water usage until project ground-water restoration activities are completed.

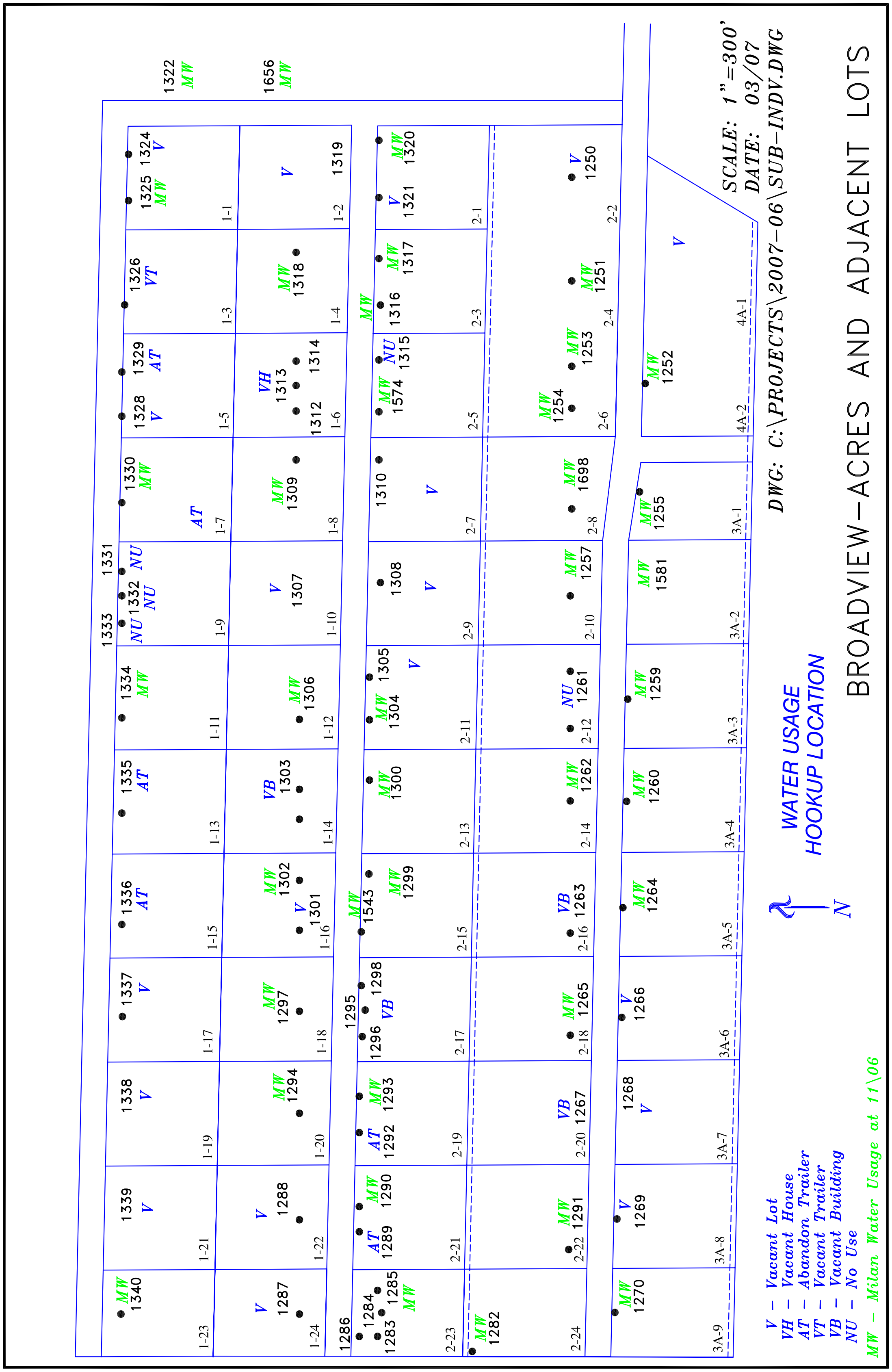


FIGURE E-1. BROADVIEW ACRES-LAND USE STATUS AND WATER USE

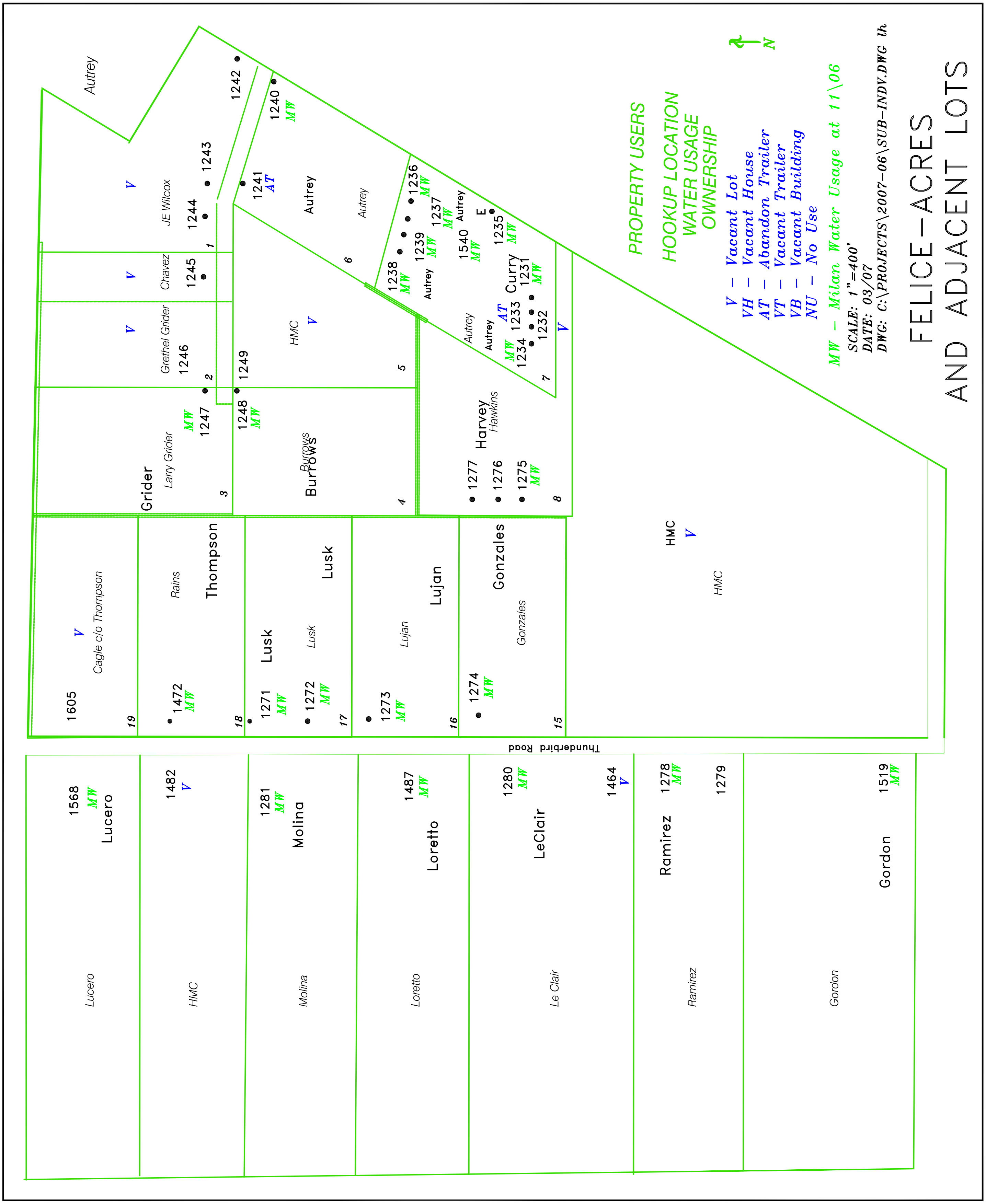


FIGURE E-2. FELICE ACRES – LAND USE STATUS AND WATER USE

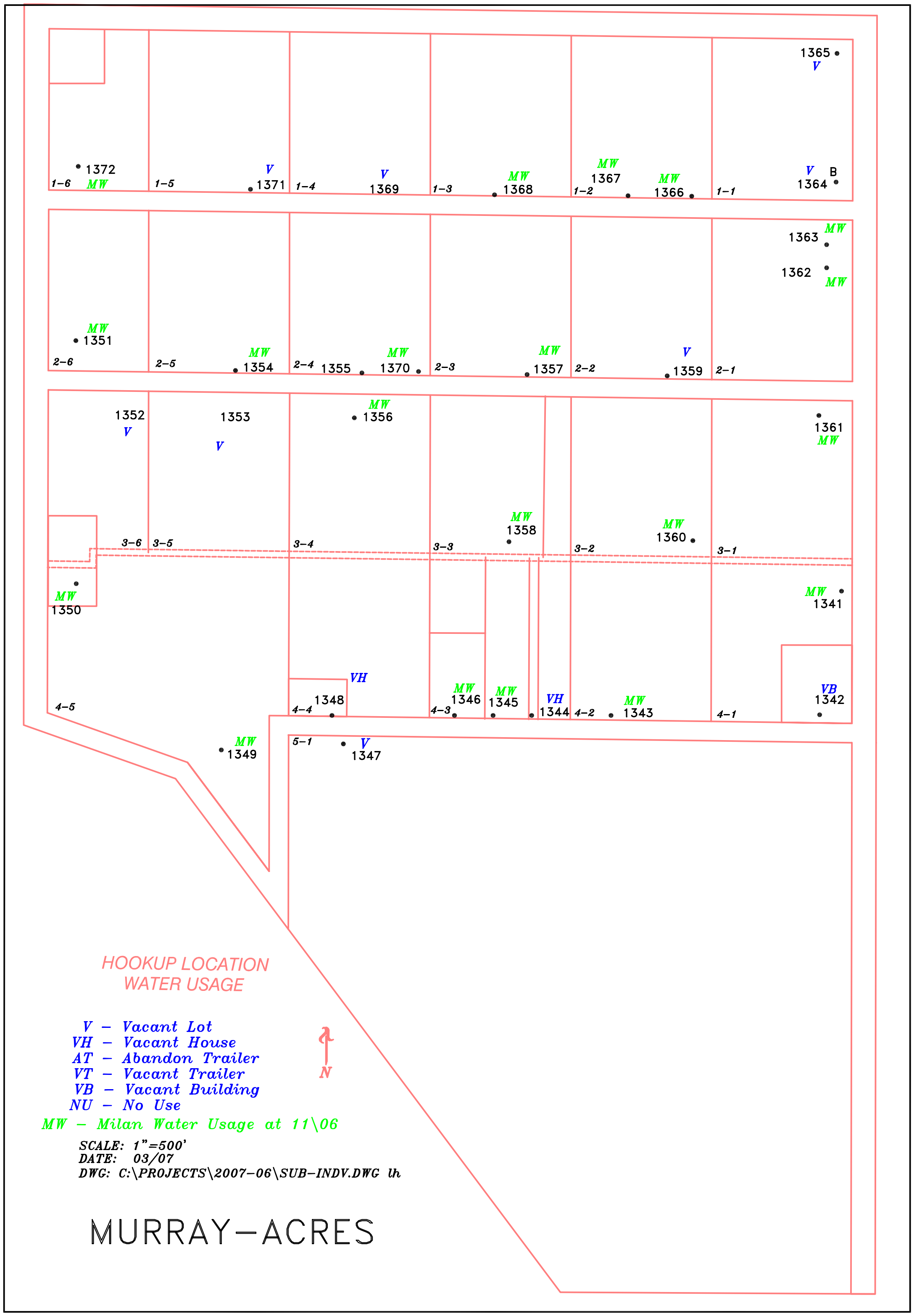


FIGURE E-3. MURRAY ACRES–LAND USE STATUS AND WATER USE

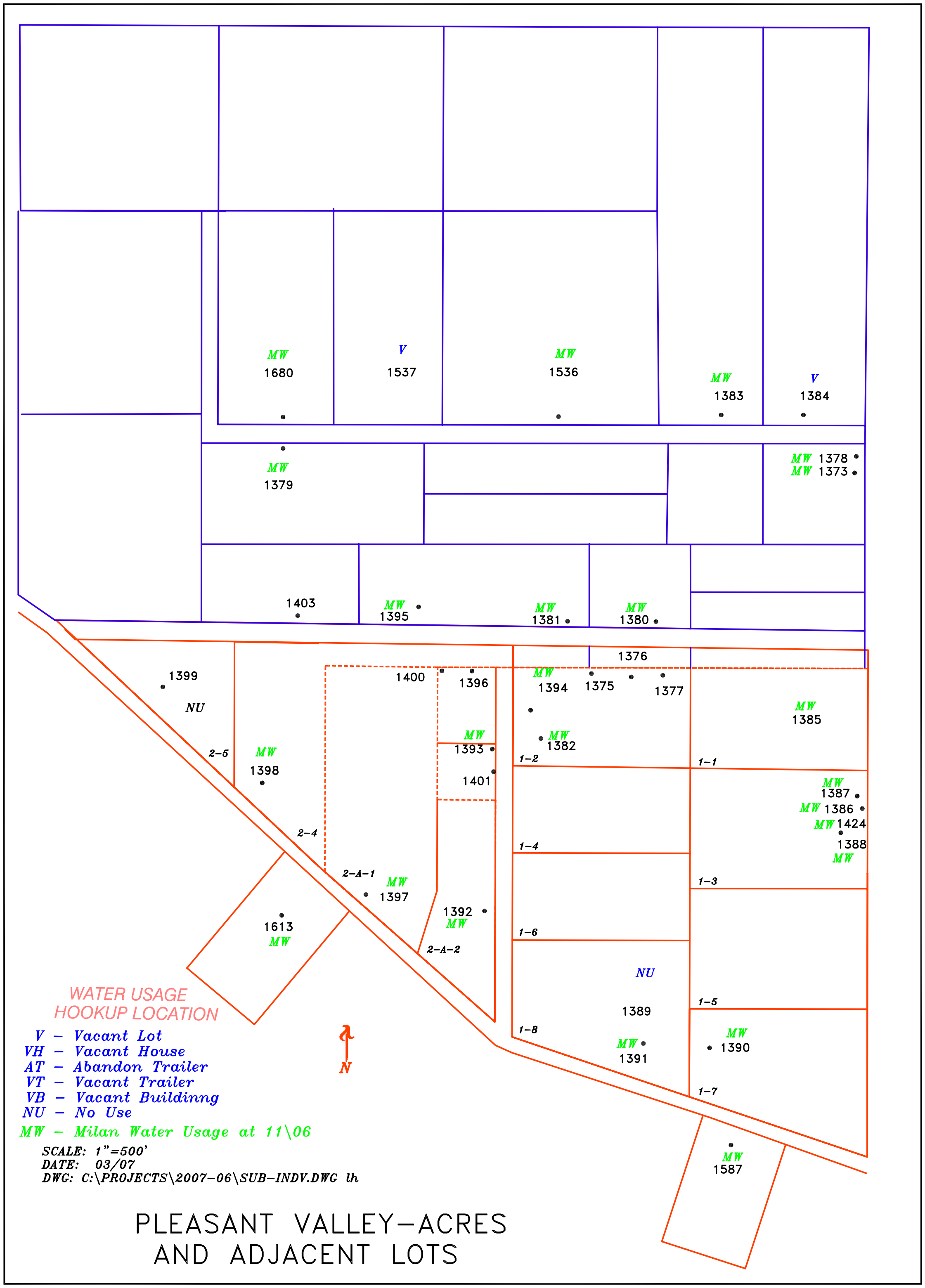


FIGURE E-4. PLEASANT VALLEY ESTATES–
LAND USE STATUS AND WATER USE

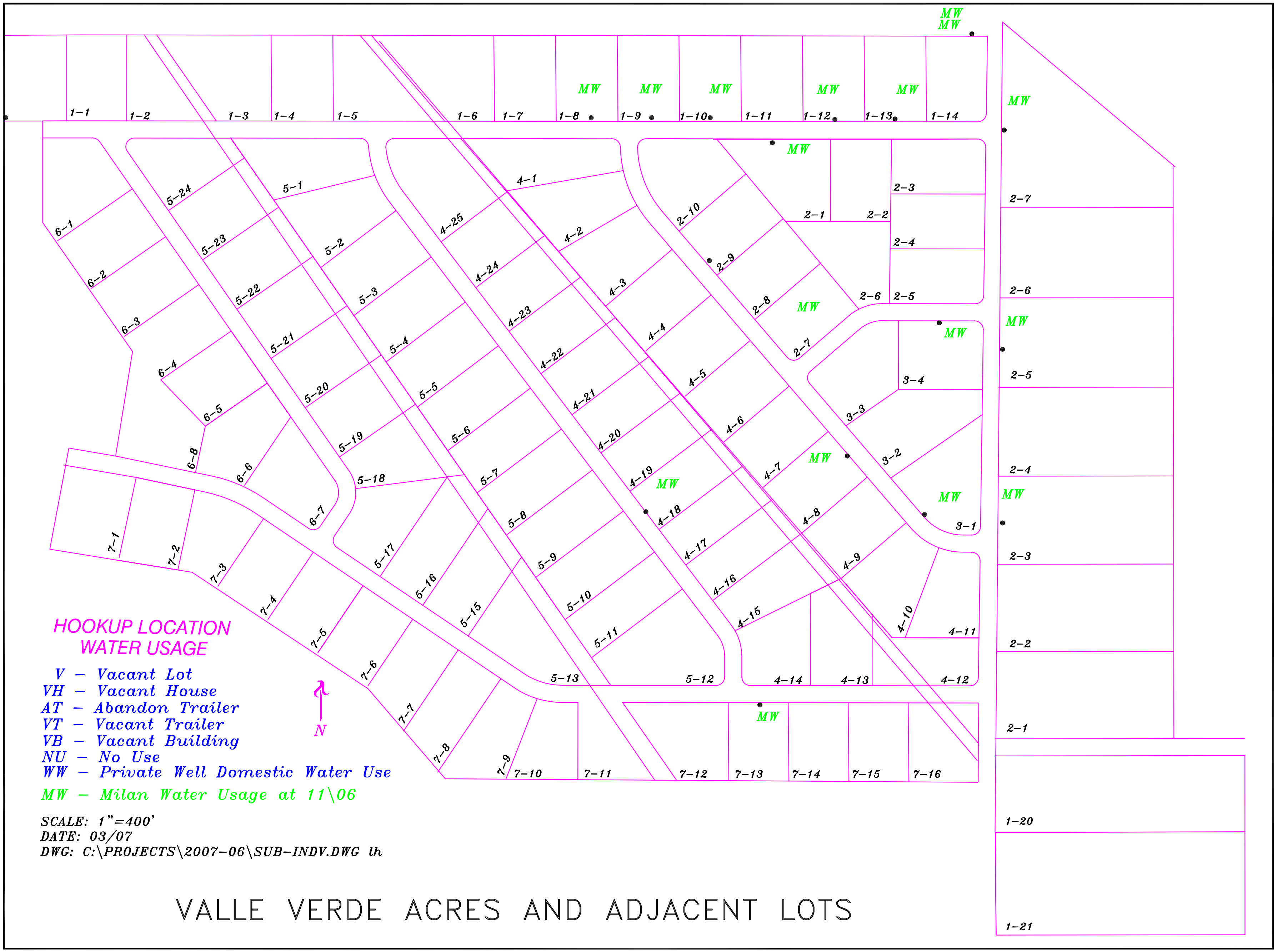


FIGURE E-5. VALLE VERDE ACRES–LAND USE STATUS AND WATER USE

TABLE E-1 WATER USE OF MILAN WATER IN BROADVIEW ACRES AND ADJACENT LOTS (cont'd)

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2005 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2006 WATER USAGE
1 / 1	1324		
1 / 1	1325		X
1 / 2	1319		
1 / 3	1326		
1 / 4	1318	X	X
1 / 5	1328		
1 / 5	1329		
1 / 6	1312		
1 / 6	1313		
1 / 6	1314		
1 / 7	1330	X	X
1 / 8	1309	X	X
1 / 9	1331		
1 / 9	1332		
1 / 9	1333		
1 / 10	1307		
1 / 11	1334	X	X
1 / 12	1306	X	X
1 / 13	1335		
1 / 14	1303		
1 / 15	1336		
1 / 16	1301		
1 / 16	1302	X	X
1 / 17	1337		
1 / 18	1297	X	X
1 / 19	1338		
1 / 20	1294	X	X
1 / 21	1339		
1 / 22	1288		
1 / 23	1340	X	X
1 / 24	1287		
2 / 1	1320	X	X
2 / 1	1321		
2 / 2	1250		
2 / 3	1316	X	X
2 / 3	1317	X	X
2 / 4	1251	X	X

TABLE E-1 WATER USE OF MILAN WATER IN BROADVIEW ACRES AND ADJACENT LOTS (cont'd)

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2005 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2006 WATER USAGE
2 / 5	1315		
2 / 5	1574	X	X
2 / 6	1253	X	X
2 / 6	1254	X	X
2 / 7	1310		
2 / 8	1698	X	X
2 / 9	1308		
2 / 10	1257	X	X
2 / 11	1304	X	X
2 / 11	1305		
2 / 12	1261		
2 / 13	1300	X	X
2 / 14	1262	X	X
2 / 15	1299	X	X
2 / 15	1543	X	X
2 / 16	1263		
2 / 17	1295		
2 / 17	1296		
2 / 17	1298		
2 / 18	1265	X	X
2 / 19	1292		
2 / 19	1293	X	X
2 / 20	1267		
2 / 21	1289		
2 / 21	1290	X	X
2 / 22	1291	X	X
2 / 23	1283		
2 / 23	1284		
2 / 23	1285	X	X
2 / 23	1286		
2 / 24	1282	X	X
3A / 1	1255	X	X
3A / 2	1581	X	X
3A / 3	1259	X	X
3A / 4	1260	X	X
3A / 5	1264	X	X
3A / 6	1266		

TABLE E-1 WATER USE OF MILAN WATER IN BROADVIEW ACRES AND ADJACENT LOTS (cont'd)

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2005 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2006 WATER USAGE
3A / 7	1268		
3A / 8	1269		
3A / 9	1270	X	X
4A / 1	no meter		
4A / 2	1252	X	X

EAST OF BROADVIEW ACRES			
	1322	X	X
	1656	X	X

TABLE E-2 WATER USE OF MILAN WATER IN FELICE ACRES AND ADJACENT LOTS (cont'd)

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2005 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2006 WATER USAGE
1	1242		
1	1243		
1	1244		
2	1245		
2	1246		
3	1247	X	X
4	1248	X	X
5	1249		
6	1240	X	X
6	1241		
7	1231	X	X
7	1232		
7	1233		
7	1234	X	X
7	1235	X	X
7	1236	X	X
7	1237	X	X
7	1238	X	X
7	1239	X	X
7	1540	X	X
8	1275	X	X
8	1276		
8	1277		
9			
10			
11			
12			
13			
14			
15	1274	X	X
16	1273	X	X
17	1271	X	X
17	1272	X	X
18	1472	X	X
19	1605		

TABLE E-2 WATER USE OF MILAN WATER IN FELICE ACRES AND ADJACENT LOTS (cont'd)

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2005 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2006 WATER USAGE
PROPERTY WEST OF FELICE ACRES			
	1519	X	X
	1278	X	X
	1279		
	1280	X	X
	1464		
	1487	X	X
	1281	X	X
	1482		
	1568	X	X

TABLE E-3 WATER USE OF MILAN WATER IN MURRAY ACRES

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2005 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2006 WATER USAGE
1 / 1	1364		
1 / 1	1365		
1 / 2	1366	X	X
1 / 2	1367	X	X
1 / 3	1368	X	X
1 / 4	1369		
1 / 5	1371		
1 / 6	1372	X	X
2 / 1	1362	X	X
2 / 1	1363	X	X
2 / 2	1359		
2 / 3	1357	X	X
2 / 4	1355		
2 / 4	1370	X	X
2 / 5	1354	X	X
2 / 6	1351	X	X
3 / 1	1361	X	X
3 / 2	1360	X	X
3 / 3	1358	X	X
3 / 4	1356	X	X
3 / 5	1353		
3 / 6	1352		
4 / 1	1341	X	X
4 / 1	1342		
4 / 2	1343	X	X
4 / 3	1344		
4 / 3	1345	X	X
4 / 3	1346	X	X
4 / 4	1348		
4 / 5	1349	X	X
4 / 5	1350	X	X
5 / 1	1347		

TABLE E-4 WATER USE OF MILAN WATER IN PLEASANT VALLEY ESTATES AND ADJACAENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2005 WATER USAGE	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2006 WATER USAGE
1 / 1	1385	X	X
1 / 2	1375		
1 / 2	1376		
1 / 2	1377		
1 / 2	1382	X	X
1 / 2	1394	X	X
1 / 3	1386	X	X
1 / 3	1388	X	X
1 / 3	1424	X	X
1 / 7	1390	X	X
1 / 8	1389		
1 / 8	1391	X	X
2 / 4	1398	X	X
2 / 5	1399		
2 / A1	1397	X	X
2 / A2	1392	X	X
2 / A2	1396		
2 / A2	1400		
2 / A2	1401		
	1373	X	X
	1378	X	X
	1379	X	X
	1380	X	X
	1381	X	X
	1383	X	X
	1384		
	1387		X
	1393	X	X
	1395	X	X
	1403		
	1536	X	X
	1537		
	1680	X	X

PROPERTY SOUTH OF PLEASANT VALLEY ESTATES			
17 - 2	1587	X	X
11 - 2	1613	X	X

TABLE E-5 WATER USE IN VALLE VERDE AND ADJACENT LOTS

SUBDIVISION BLOCK / LOT	CUSTOMER NUMBER SITE ID	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2005 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2005	VILLAGE OF MILAN WATER SUPPLY SYSTEM 2006 WATER USAGE	PRIVATE RESIDENTIAL WELL WATER 2006
1 / 8	1696	X		X	
1 / 9	1700	X		X	
1 / 10	1617	X		X	
1 / 12	1475	X		X	
1 / 13	1479	X		X	
2 / 1	1474	X		X	
2/5			X		X
2 / 6			X		X
2 / 7	1473	X		X	
2 / 8					
2 / 9					
3 / 1	1516	X		X	
3 / 2			X		X
3 / 3			X		X
3 / 4	1612	X		X	
4/11			X		X
4 / 8	1592	X		X	
4 / 14			X		X
4 / 18	1556	X		X	
5 / 12			X		X
7 / 13	1506	X		X	
PROPERTY NORTH OF VALLE VERDE					
	1513	X		X	
	1514	X		X	
PROPERTY EAST OF VALLE VERDE					
1/21			X		X
2 / 1			X		X
2 / 5	1493	X		X	
2 / 7	1502	X		X	
2 / 3	1566	X		X	
PROPERTY WEST OF VALLE VERDE					
----			X		X

APPENDIX F

TAILINGS PILES RADON FLUX SURVEY / REPORT

Radon Flux Measurements for the HMC Tailings Piles

September 2006

Prepared for:

Homestake Mining Company of California
P. O. Box 98
Grants, New Mexico 87020

Prepared by:

Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113

Radon Flux Measurements for the HMC Tailings Piles

1. Introduction

Reclamation activities associated with The Large Tailings Pile (LTP) at the Grants Uranium Mill, owned by Homestake Mining Company of California (HMC), were completed in phases. The pile was contoured in 1994 at which time an interim cover was placed on the top of the pile to control the dispersal of tailings by wind and water erosion. Radon barrier was applied to the north, west, and south side slopes, with completion of the work in 1994. Radon flux measurements were made on these side slopes on October 24-25, 1994. Completion of the placement of radon barrier on the east side slope and aprons occurred just prior to making the radon flux measurements on July 24-25, 1995. An evaporation pond was constructed on the Small Tailings Pile (STP) and an interim cover placed on the remainder of the pile. Radon flux measurements were made on the top of the LTP and the interim cover of the Small Tailings Pile (STP) on August 18-19, 1995.

As part of a request for a license amendment extending the milestones in the NRC License, radon flux measurements were repeated in the areas with interim cover on October 21-22, 2003. This license amendment required HMC to repeat these measurements annually. This report presents the data for the Year 2006 flux measurements made on September 26, 2006.

2. Radon Flux and Gamma-Ray Exposure Results

The results of the flux measurements on the LTP and STP are presented in Table 2-1 and Table 2-2, respectively. Ninety-seven canister locations (waypoint numbers) were established on the piles as shown in Figure 2-1. Waypoints 84, 85, 86, 87 and 88 are considered duplicates, with the canisters placed adjacent to one another. A total of 102 flux readings were made on the piles.

The distribution of canisters was allocated so that each canister represented an equal area of the total pile surface. Measurements are reported for 61 locations on the LTP and 36 locations on the STP. The average measured flux was 52.9 pCi/m^{2}s and 27.3 pCi/m^{2}s for the LTP and STP, respectively.

Exposure measurements were made at each canister location using a Ludlum Model 19 microR survey meter. Measurements were made with the survey meter held approximately one meter above the ground surface. Results for the LTP and STP are presented in Figure 2-2 and Table 2-3.

Field and laboratory data sheets for all measurements are located in Appendix A.

3. Average Pile Flux

Since all but the top of the LTP has rock cover, canisters were placed on the top of the pile. The average measured flux was 52.9 pCi/m^{2}s. This compares to 42.1 pCi/m^{2}s measured in 1995. In the earlier data, the average flux on the sides of the pile was 3.27 pCi/m^{2}s, which constitutes 65 percent of the area. If one assumes that the flux on the side slopes remains constant, the average flux for the

Table 2-1

Radon Flux Measurements for HMC Grants Site - LTP

Environmental Restoration Group, Inc.
8809 Washington St. Suite 150
Albuquerque, NM 87113

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Deployed Time (sec)	Count Time (sec)	Peak Counts	Bkg* counts	Detector Efficiency	Canister Activity(pCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
81	9/27/2006	19:25	9/26/2006	10:04	09/27/06	13:09	97500	239	7097	2457	1.14E-02	4.62E+04	15.45	0.20	0.2	OK
97	9/28/2006	06:09	9/26/2006	08:37	09/27/06	08:58	87660	1200	5362	2457	1.14E-02	5.76E+03	1.67	0.05	0.1	OK
70	9/28/2006	06:45	9/26/2006	08:33	09/27/06	08:53	87600	45	11339	2457	1.14E-02	4.70E+05	173.11	1.65	0.7	OK
5	9/28/2006	06:47	9/26/2006	08:30	09/27/06	08:52	87720	64	7774	2457	1.14E-02	1.98E+05	82.64	0.96	0.6	OK
202	9/28/2006	06:49	9/26/2006	07:44	09/27/06	08:03	87540	1200	6316	2457	1.14E-02	7.66E+03	2.25	0.05	0.1	OK
202B	9/28/2006	07:18	9/26/2006	07:44	09/27/06	08:03	87540	1200	6115	2457	1.14E-02	7.26E+03	2.14	0.05	0.1	OK
35	9/28/2006	07:42	9/26/2006	07:42	09/27/06	08:02	87600	65	7360	2457	1.14E-02	1.80E+05	78.06	0.94	0.6	OK
33	9/28/2006	07:45	9/26/2006	07:45	09/27/06	08:05	87600	1200	8185	2457	1.14E-02	1.14E+04	3.36	0.06	0.1	OK
46	9/28/2006	08:05	9/26/2006	07:47	09/27/06	08:07	87600	229	9257	2457	1.14E-02	7.07E+04	27.01	0.30	0.3	OK
103	9/28/2006	08:10	9/26/2006	07:33	09/27/06	07:59	87960	270	8988	2457	1.14E-02	5.76E+04	21.94	0.25	0.3	OK
27	9/28/2006	08:15	9/26/2006	07:39	09/27/06	08:00	87660	412	8991	2457	1.14E-02	3.78E+04	13.94	0.17	0.2	OK
11	9/28/2006	08:25	9/26/2006	07:35	09/27/06	07:56	87660	156	16639	2457	1.14E-02	2.16E+05	73.86	0.59	0.4	OK
59	9/28/2006	08:29	9/26/2006	07:37	09/27/06	07:55	87480	709	7315	2457	1.14E-02	1.63E+04	5.86	0.09	0.2	OK
4	9/28/2006	08:47	9/26/2006	07:28	09/27/06	07:52	87840	1200	3770	2457	1.14E-02	2.61E+03	0.77	0.05	0.1	OK
49	9/28/2006	09:08	9/26/2006	07:31	09/27/06	07:53	87720	381	9450	2457	1.14E-02	4.37E+04	16.15	0.19	0.2	OK
252	9/28/2006	09:19	9/26/2006	07:27	09/27/06	07:51	87840	670	6861	2457	1.14E-02	1.57E+04	5.82	0.10	0.2	OK
252B	9/28/2006	09:31	9/26/2006	07:27	09/27/06	07:51	87840	761	7854	2457	1.14E-02	1.69E+04	5.89	0.09	0.2	OK
256	9/28/2006	09:46	9/26/2006	07:23	09/27/06	07:50	88020	643	9700	2457	1.14E-02	2.68E+04	9.28	0.12	0.2	OK
38	9/28/2006	09:59	9/26/2006	08:50	09/27/06	09:09	87540	45	16397	2457	1.14E-02	7.38E+05	256.80	2.02	0.8	OK
105	9/28/2006	10:01	9/26/2006	08:53	09/27/06	09:07	87240	820	7067	2457	1.14E-02	1.34E+04	4.68	0.08	0.2	OK
261	9/28/2006	10:17	9/26/2006	09:01	09/27/06	09:15	87240	265	10156	2457	1.14E-02	6.92E+04	25.84	0.28	0.3	OK
259	9/28/2006	10:23	9/26/2006	08:36	09/27/06	08:57	87660	45	9953	2457	1.14E-02	3.97E+05	155.82	1.58	0.8	OK
3	9/28/2006	10:25	9/26/2006	08:57	09/27/06	09:12	87300	1200	8111	2457	1.14E-02	1.12E+04	3.36	0.06	0.1	OK
78	9/28/2006	10:47	9/26/2006	09:16	09/27/06	09:29	87180	49	6941	2457	1.14E-02	2.18E+05	99.67	1.22	0.7	OK

Table 2-1 **Radon Flux Measurements for HMC Grants Site - LTP**

Environmental Restoration Group, Inc.
8809 Washington St. Suite 150
Albuquerque, NM 87113

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Deployed Time (sec)	Count Time (sec)	Peak Counts	Bkg* counts	Detector Efficiency	Canister Activity(pCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
18	9/28/2006	10:49	9/26/2006	07:51	09/27/06	08:14	87780	42	7776	2457	1.14E-02	3.02E+05	131.17	1.51	0.8	OK
80	9/28/2006	10:51	9/26/2006	07:55	09/27/06	08:17	87720	93	5985	2457	1.14E-02	9.03E+04	44.66	0.61	0.5	OK
52	9/28/2006	10:54	9/26/2006	08:25	09/27/06	08:42	87420	22	6751	2457	1.14E-02	4.65E+05	218.54	2.69	1.1	OK
52B	9/28/2006	10:55	9/26/2006	08:25	09/27/06	08:42	87420	25	7432	2457	1.14E-02	4.74E+05	211.70	2.48	1.0	OK
76	9/28/2006	10:57	9/26/2006	07:53	09/27/06	08:16	87780	77	6026	2457	1.14E-02	1.10E+05	54.64	0.73	0.6	OK
203	9/28/2006	11:00	9/26/2006	08:11	09/27/06	08:19	86880	1200	5359	2457	1.14E-02	5.76E+03	1.75	0.05	0.1	OK
251	9/28/2006	11:21	9/26/2006	08:14	09/27/06	08:21	86820	1171	9279	2457	1.14E-02	1.39E+04	4.27	0.07	0.1	OK
20	9/28/2006	11:42	9/26/2006	08:28	09/27/06	08:46	87480	1200	6251	2457	1.14E-02	7.53E+03	2.28	0.06	0.1	OK
101	9/28/2006	12:03	9/26/2006	08:15	09/27/06	08:23	86880	35	7062	2457	1.14E-02	3.13E+05	145.61	1.76	0.9	OK
55	9/28/2006	12:05	9/26/2006	08:17	09/27/06	08:24	86820	71	6087	2457	1.14E-02	1.22E+05	61.06	0.81	0.6	OK
90	9/28/2006	12:07	9/26/2006	07:58	09/27/06	08:19	87660	304	6463	2457	1.14E-02	3.14E+04	13.91	0.20	0.3	OK
22	9/28/2006	12:14	9/26/2006	08:21	09/27/06	08:27	86760	1200	5884	2457	1.14E-02	6.80E+03	2.09	0.06	0.1	OK
96	9/28/2006	12:36	9/26/2006	07:48	09/27/06	08:13	87900	465	7455	2457	1.14E-02	2.56E+04	10.15	0.14	0.2	OK
85	9/28/2006	12:45	9/26/2006	08:19	09/27/06	08:26	86820	78	8627	2457	1.14E-02	1.88E+05	79.59	0.88	0.6	OK
85B	9/28/2006	12:47	9/26/2006	08:19	09/27/06	08:26	86820	67	7559	2457	1.14E-02	1.81E+05	81.23	0.96	0.6	OK
1	9/28/2006	12:50	9/26/2006	08:45	09/27/06	09:03	87480	35	7445	2457	1.14E-02	3.39E+05	152.76	1.80	0.9	OK
63	9/28/2006	12:52	9/26/2006	08:49	09/27/06	09:06	87420	1200	3725	2457	1.14E-02	2.52E+03	0.77	0.05	0.1	OK
69	9/28/2006	13:13	9/26/2006	08:58	09/27/06	09:13	87300	263	6286	2457	1.14E-02	3.47E+04	15.91	0.23	0.3	OK
51	9/28/2006	13:19	9/26/2006	09:14	09/27/06	09:22	86880	53	6283	2457	1.14E-02	1.72E+05	85.12	1.10	0.7	OK
50	9/28/2006	13:20	9/26/2006	09:11	09/27/06	09:19	86880	39	6326	2457	1.14E-02	2.36E+05	117.08	1.50	0.8	OK
64	9/28/2006	13:22	9/26/2006	09:20	09/27/06	09:25	86700	91	7070	2457	1.14E-02	1.21E+05	55.38	0.69	0.5	OK
17	9/28/2006	13:25	9/26/2006	09:13	09/27/06	09:24	87060	20	7078	2457	1.14E-02	5.50E+05	256.71	3.08	1.2	OK
100	9/28/2006	13:27	9/26/2006	09:32	09/27/06	09:40	86880	1023	8489	2457	1.14E-02	1.40E+04	4.57	0.07	0.2	OK
109	9/28/2006	13:45	9/26/2006	09:30	09/27/06	09:37	86820	1200	10291	2457	1.14E-02	1.55E+04	4.79	0.07	0.1	OK

Table 2-1

Radon Flux Measurements for HMC Grants Site - LTP

Environmental Restoration Group, Inc.
8809 Washington St. Suite 150
Albuquerque, NM 87113

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Deployed Time (sec)	Count Time (sec)	Peak Counts	Bkg* counts	Detector Efficiency	Canister Activity(pCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
36	9/28/2006	14:10	9/26/2006	10:02	09/27/06	09:52	85800	585	7045	2457	1.14E-02	1.87E+04	7.41	0.12	0.2	OK
36B	9/28/2006	14:20	9/26/2006	10:02	09/27/06	09:52	85800	519	6137	2457	1.14E-02	1.69E+04	7.26	0.12	0.2	OK
42	9/28/2006	14:30	9/26/2006	08:46	09/27/06	09:05	87540	63	6150	2457	1.14E-02	1.40E+05	70.12	0.92	0.7	OK
258	9/28/2006	14:32	9/26/2006	08:42	09/27/06	09:02	87600	1200	5693	2457	1.14E-02	6.42E+03	1.98	0.06	0.1	OK
53	9/28/2006	14:54	9/26/2006	08:55	09/27/06	09:11	87360	1200	4261	2457	1.14E-02	3.58E+03	1.11	0.05	0.1	OK
25	9/28/2006	15:17	9/26/2006	09:23	09/27/06	09:29	86760	122	23889	2457	1.14E-02	4.18E+05	143.75	0.94	0.5	OK
16	9/28/2006	15:20	9/26/2006	09:25	09/27/06	09:30	86700	40	6301	2457	1.14E-02	2.29E+05	115.44	1.48	0.8	OK
98	9/28/2006	15:22	9/26/2006	09:08	09/27/06	09:20	87120	110	6345	2457	1.14E-02	8.42E+04	41.19	0.55	0.5	OK
60	9/28/2006	15:25	9/26/2006	09:41	09/27/06	09:43	86520	45	6069	2457	1.14E-02	1.91E+05	98.71	1.30	0.8	OK
24	9/28/2006	15:26	9/26/2006	08:34	09/27/06	08:55	87660	171	6894	2457	1.14E-02	6.18E+04	28.28	0.37	0.4	OK
8	9/28/2006	15:30	9/26/2006	10:03	09/27/06	09:54	85860	77	6828	2457	1.14E-02	1.35E+05	64.78	0.81	0.6	OK
8B	9/28/2006	15:32	9/26/2006	10:03	09/27/06	09:54	85860	74	6436	2457	1.14E-02	1.28E+05	63.53	0.82	0.6	OK
7	9/28/2006	15:34	9/26/2006	09:36	09/27/06	09:41	86700	182	6001	2457	1.14E-02	4.64E+04	22.97	0.33	0.4	OK
15	9/28/2006	15:39	9/26/2006	09:27	09/27/06	09:37	87000	169	6127	2457	1.14E-02	5.17E+04	25.36	0.35	0.4	OK
34	9/28/2006	15:42	9/26/2006	09:44	09/27/06	09:43	86340	290	6014	2457	1.14E-02	2.92E+04	13.95	0.21	0.3	OK
82	9/28/2006	15:48	9/26/2006	09:34	09/27/06	09:40	86760	103	6062	2457	1.14E-02	8.33E+04	42.25	0.57	0.5	OK
47	9/28/2006	15:51	9/26/2006	09:56	09/27/06	09:44	85680	1200	7322	2457	1.14E-02	9.65E+03	3.05	0.06	0.1	OK
73	9/28/2006	16:27	9/26/2006	09:43	09/27/06	09:48	86700	1200	6940	2457	1.14E-02	8.89E+03	2.79	0.06	0.1	OK
54	9/28/2006	16:57	9/26/2006	09:58	09/27/06	09:54	86160	883	10746	2457	1.14E-02	2.24E+04	7.64	0.10	0.2	OK
54B	9/28/2006	17:11	9/26/2006	09:58	09/27/06	09:54	86160	783	9340	2457	1.14E-02	2.09E+04	7.47	0.10	0.2	OK

Table 2-2

Radon Flux Measurements for HMC Grants Site - STP

Environmental Restoration Group, Inc.
8809 Washington St. Suite 150
Albuquerque, NM 87113

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Deployed Time (sec)	Count Time (sec)	Peak Counts	Bkg* counts	Detector Efficiency	Canister Activity(pCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
45	9/27/2006	16:54	9/26/2006	11:53	09/27/06	11:53	86400	168	36905	2457	1.14E-02	4.88E+05	118.32	0.62	0.3	OK
95	9/27/2006	17:00	9/26/2006	11:58	09/27/06	11:58	86400	50	7696	2457	1.14E-02	2.49E+05	82.51	0.96	0.5	OK
67	9/27/2006	17:06	9/26/2006	11:32	09/27/06	11:30	86280	262	6811	2457	1.14E-02	3.96E+04	13.08	0.18	0.2	OK
263	9/27/2006	17:12	9/26/2006	11:28	09/27/06	11:30	86520	294	6128	2457	1.14E-02	2.97E+04	11.63	0.17	0.2	OK
102	9/27/2006	17:22	9/26/2006	11:35	09/27/06	11:35	86400	209	6010	2457	1.14E-02	4.05E+04	16.55	0.24	0.3	OK
68	9/27/2006	17:32	9/26/2006	11:02	09/27/06	11:00	86280	444	7018	2457	1.14E-02	2.45E+04	8.58	0.13	0.2	OK
87	9/27/2006	17:50	9/26/2006	10:28	09/27/06	12:06	92280	122	6822	2457	1.14E-02	8.52E+04	31.36	0.40	0.4	OK
19	9/27/2006	18:04	9/26/2006	11:07	09/27/06	11:03	86160	206	6566	2457	1.14E-02	4.75E+04	18.65	0.25	0.3	OK
65	9/27/2006	18:08	9/26/2006	11:40	09/27/06	11:43	86580	1200	8564	2457	1.14E-02	1.21E+04	3.16	0.05	0.1	OK
79	9/27/2006	18:34	9/26/2006	11:56	09/27/06	11:57	86460	1200	4980	2457	1.14E-02	5.01E+03	1.31	0.04	0.1	OK
79B	9/27/2006	19:00	9/26/2006	11:56	09/27/06	11:57	86460	1200	4988	2457	1.14E-02	5.02E+03	1.31	0.04	0.1	OK
43	9/27/2006	19:31	9/26/2006	12:00	09/27/06	12:03	86580	358	7122	2457	1.14E-02	3.10E+04	11.09	0.15	0.2	OK
201	9/27/2006	19:40	9/26/2006	11:42	09/27/06	11:40	86280	791	7219	2457	1.14E-02	1.43E+04	4.44	0.07	0.2	OK
72	9/27/2006	19:48	9/26/2006	11:31	09/27/06	11:30	86340	482	6024	2457	1.14E-02	1.76E+04	6.62	0.11	0.2	OK
107	9/27/2006	20:02	9/26/2006	12:00	09/27/06	12:03	86580	650	12600	2457	1.14E-02	3.72E+04	10.94	0.11	0.2	OK
260	9/27/2006	20:15	9/26/2006	11:58	09/27/06	11:58	86400	56	6088	2457	1.14E-02	1.54E+05	67.52	0.89	0.6	OK
56	9/27/2006	21:04	9/26/2006	11:56	09/27/06	11:57	86460	1200	7326	2457	1.14E-02	9.66E+03	2.59	0.05	0.1	OK
30	9/27/2006	21:28	9/26/2006	11:55	09/27/06	11:54	86340	1200	6026	2457	1.14E-02	7.08E+03	1.90	0.05	0.1	OK
30B	9/27/2006	21:49	9/26/2006	11:55	09/27/06	11:54	86340	1200	6041	2457	1.14E-02	7.11E+03	1.92	0.05	0.1	OK
255	9/28/2006	04:53	9/26/2006	11:52	09/27/06	11:47	86100	1094	10899	2457	1.14E-02	1.84E+04	5.38	0.07	0.1	OK
253	9/28/2006	05:12	9/26/2006	11:48	09/27/06	11:45	86220	711	8522	2457	1.14E-02	2.03E+04	6.76	0.10	0.2	OK
6	9/28/2006	05:26	9/26/2006	11:53	09/27/06	11:53	86400	51	11103	2457	1.14E-02	4.04E+05	146.41	1.41	0.7	OK
48	9/28/2006	05:28	9/26/2006	11:55	09/27/06	11:54	86340	1200	5218	2457	1.14E-02	5.48E+03	1.57	0.05	0.1	OK
12	9/28/2006	06:30	9/26/2006	11:50	09/27/06	11:50	86400	683	8443	2457	1.14E-02	2.09E+04	7.07	0.10	0.2	OK
28	9/28/2006	16:49	9/26/2006	10:25	09/27/06	10:28	86580	70	7771	2457	1.14E-02	1.81E+05	81.33	0.95	0.6	OK

Table 2-2

Radon Flux Measurements for HMC Grants Site - STP

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Deployed Time (sec)	Count Time (sec)	Peak Counts	Bkg* counts	Detector Efficiency	Canister Activity(pCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
110	9/28/2006	16:56	9/26/2006	10:33	09/27/06	10:30	86220	67	6784	2457	1.14E-02	1.54E+05	74.37	0.93	0.6	OK
104	9/28/2006	17:25	9/26/2006	10:23	09/27/06	10:28	86700	789	12607	2457	1.14E-02	3.06E+04	10.44	0.11	0.2	OK
86	9/28/2006	17:40	9/26/2006	10:35	09/27/06	10:33	86280	459	7446	2457	1.14E-02	2.59E+04	10.68	0.15	0.2	OK
21	9/28/2006	17:50	9/26/2006	10:33	09/27/06	10:30	86220	712	50114	2457	1.14E-02	1.59E+05	51.62	0.24	0.2	OK
58	9/28/2006	18:03	9/26/2006	10:38	09/27/06	10:34	86160	74	9884	2457	1.14E-02	2.39E+05	99.45	1.02	0.6	OK
99	9/28/2006	18:05	9/26/2006	10:35	09/27/06	10:33	86280	91	9214	2457	1.14E-02	1.77E+05	74.95	0.80	0.6	OK
250	9/28/2006	18:08	9/26/2006	11:00	09/27/06	11:03	86580	516	6899	2457	1.14E-02	2.05E+04	8.50	0.13	0.2	OK
44	9/28/2006	18:19	9/26/2006	10:58	09/27/06	11:00	86520	417	7767	2457	1.14E-02	3.03E+04	12.48	0.17	0.3	OK
84	9/28/2006	18:28	9/26/2006	10:52	09/27/06	11:13	87660	1200	9493	2457	1.14E-02	1.40E+04	4.36	0.07	0.1	OK
9	9/28/2006	18:53	9/26/2006	11:37	09/27/06	11:33	86160	669	7550	2457	1.14E-02	1.81E+04	6.98	0.11	0.2	OK
257	9/28/2006	19:05	9/26/2006	10:49	09/27/06	10:49	86400	208	6837	2457	1.14E-02	5.01E+04	23.39	0.31	0.4	OK
257B	9/28/2006	19:09	9/26/2006	10:49	09/27/06	10:49	86400	261	8385	2457	1.14E-02	5.41E+04	22.84	0.27	0.3	OK
41	9/28/2006	19:15	9/26/2006	10:43	09/27/06	10:45	86520	770	7460	2457	1.14E-02	1.55E+04	5.80	0.09	0.2	OK
254	9/28/2006	19:29	9/26/2006	10:38	09/27/06	10:34	86160	83	7772	2457	1.14E-02	1.52E+05	70.01	0.82	0.6	OK
37	9/28/2006	19:32	9/26/2006	10:40	09/27/06	10:37	86220	303	9446	2457	1.14E-02	5.49E+04	22.25	0.25	0.3	OK
91	9/28/2006	19:38	9/26/2006	11:04	09/27/06	11:03	86340	516	7340	2457	1.14E-02	2.25E+04	9.27	0.14	0.2	OK
92	9/28/2006	19:48	9/26/2006	10:44	09/27/06	10:57	87180	384	8126	2457	1.14E-02	3.52E+04	14.45	0.19	0.3	OK
23	9/28/2006	19:56	9/26/2006	10:41	09/27/06	10:56	87300	705	8876	2457	1.14E-02	2.17E+04	7.97	0.11	0.2	OK
262	9/28/2006	20:10	9/26/2006	10:50	09/27/06	10:50	86400	624	9513	2457	1.14E-02	2.69E+04	10.10	0.13	0.2	OK

Figure 2-1 Canister Locations

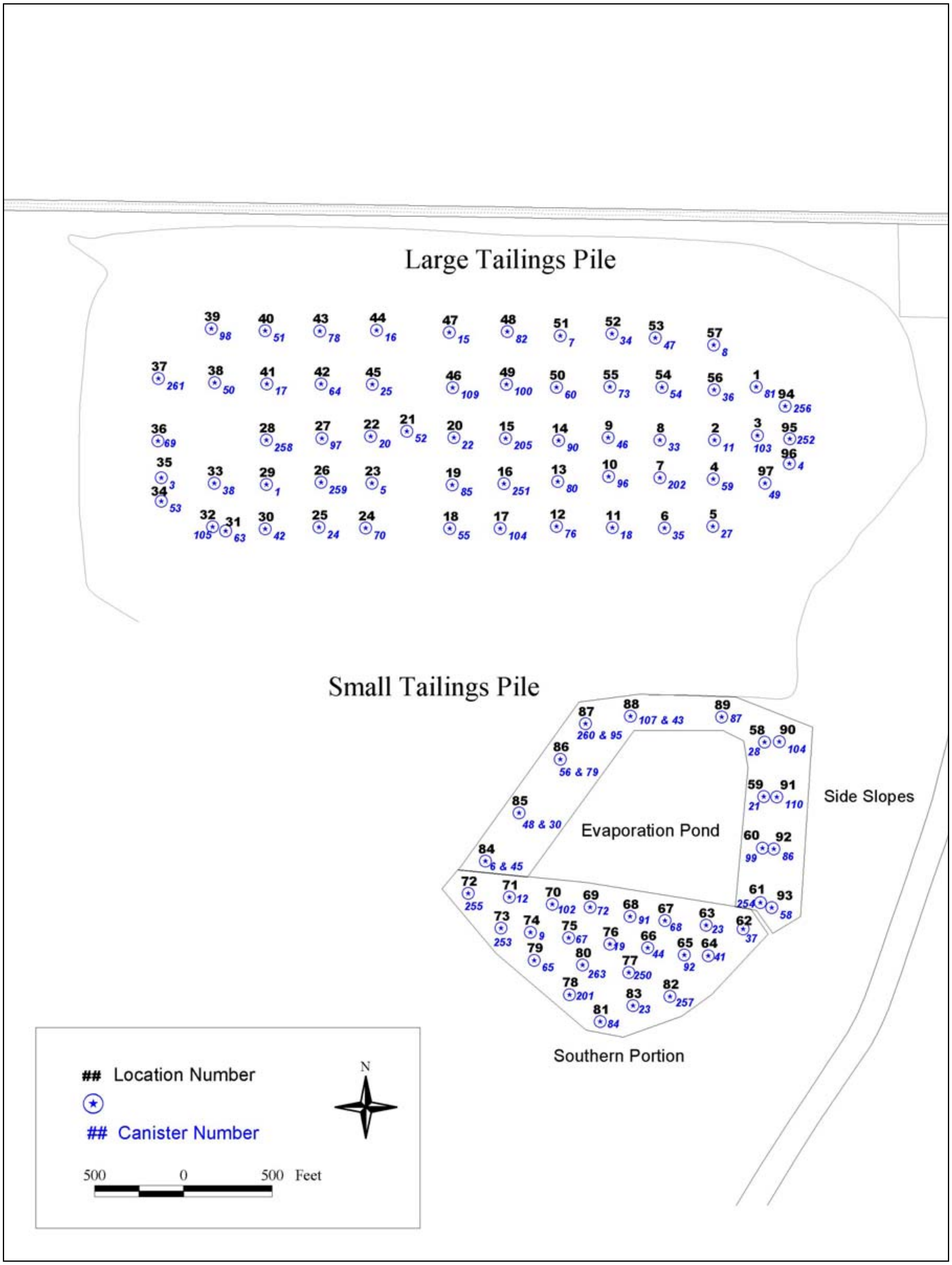


Figure 2-2 Canister Locations with Exposure Readings

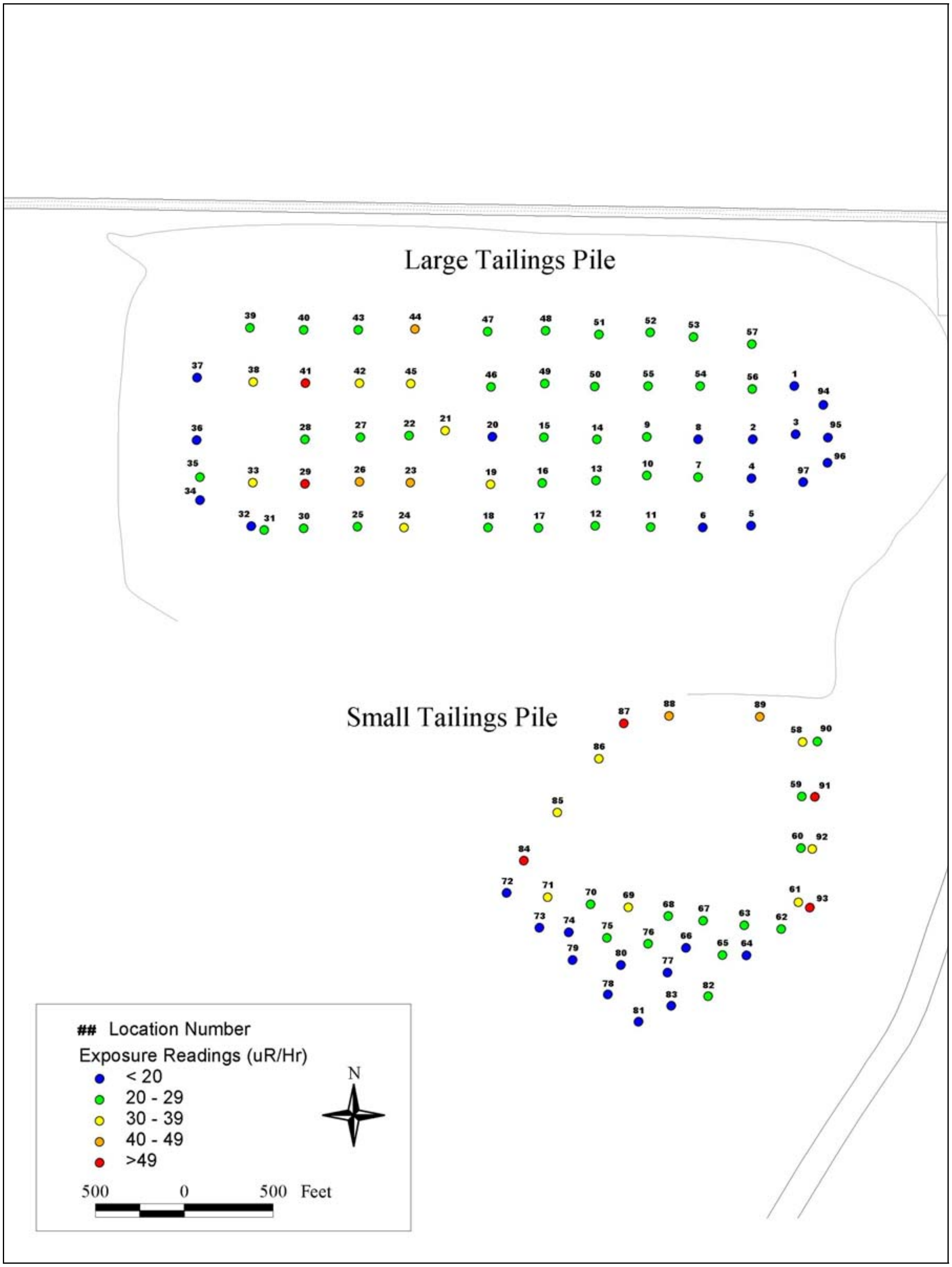


Table 2-3 Exposure Measurement Results

Location	Canister Number	Exposure Reading (uR/Hr)
1	81	15
2	11	16
3	103	12
4	59	15
5	27	15
6	35	19
7	202	23
8	33	19
9	46	21
10	96	25
11	18	25
12	76	23
13	80	26
14	90	21
15	205	22
16	251	24
17	104	26
18	55	27
19	85	36
20	22	17
21	52	35
22	20	20
23	5	44
24	70	37
25	24	23
26	259	42
27	97	22
28	258	21
29	1	75
30	42	21
31	63	20
32	105	15
33	38	34
34	53	15
35	3	20
36	69	17
37	261	18
38	50	33
39	98	25
40	51	26
41	17	130
42	64	34
43	78	28
44	16	42
45	25	37
46	109	22
47	15	25
48	82	22
49	100	21
50	60	24
51	7	25
52	34	23
53	47	26
54	54	25
55	73	22
56	36	22
57	8	22
58	28	33
59	21	28
60	99	26
61	254	36
62	37	23
63	23	23
64	41	17
65	92	20
66	44	19
67	68	28
68	91	29
69	72	31
70	102	23
71	12	32
72	255	11
73	253	19
74	9	18
75	67	24
76	19	20
77	250	16
78	201	16
79	65	17
80	263	16
81	84	17
82	257	24
83	23	15
84	6 & 45	130
85	48 & 30	31
86	56 & 79	34
87	260 & 95	160
88	107 & 43	42
89	87	42
90	104	28
91	110	80
92	86	34
93	58	50
94	256	11
95	252	12
96	4	11
97	49	13

pile now is 20.6 pCi/m^{2}s. This is higher than the 14 pCi/m^2 measured in 2003 and slightly higher than the measurements for the years 2004 (20.3 pCi/m^{2}s) and 2005 (15.3 pCi/m^{2}s).

An evaporation pond is placed on the STP and therefore that portion of the pile has 0 pCi/m^{2}s flux. The flux values for the waypoints corresponding to the other portions of the pile (Side Slopes and Southern Portion) were averaged and the corresponding areas were used to obtain an area weighted average flux of 6.9 pCi/m^{2}s.

The areas for the side slopes, Southern Portion, and Evaporation Pond are 137,000, 874,000, and 1,331,000 square feet, respectively. The corresponding average flux for these areas was 51.9, 10.2, and 0 pCi/m^{2}s, respectively.

The data show that the small tailings average (6.9 pCi/m^{2}s) is below the 20 pCi/m^{2}s standard in 10 CFR 40 Appendix A and the large tailings average (20.6 pCi/m^{2}s) is slightly above the standard.

4. Quality Assurance

The EPA Method 115 requirements were met for the measurements. No rainfall was reported during the 24 hours prior to the measurements. Also the temperature exceeded 35 degrees F.

Two independent sources were used to calibrate the spectrometer, using identical geometry conditions to that of the canisters. Agreement between calibration factors was within five percent of the mean. The results of these measurements are included in Table 4-1.

The comparative analysis of every 10th canister analyzed is shown in Table 4-2. Agreements between measurements were well within ten percent and consistent with state-of-the art gamma spectroscopy results.

Two trip blanks (Canister Nos. 39 and 93) were included in the batch and counted without exposing them to radon. The measured flux of 0.10 and 0.11 pCi/m^{2}s for the canisters is near the expected 0 pCi/m^{2}s value. These results indicate that the canisters had not been exposed, confirming the integrity of the bags.

Four sets of duplicates were placed. Canisters 6 and 45 were placed at Location Number 84. The radon flux results for these two canisters are 118.32 and 146.41 pCi/m^{2}s, respectively. Duplicate canisters 48 and 30 were placed at Waypoint Number 85. The radon flux results for these two canisters are 1.57 and 1.90 pCi/m^{2}s, respectively. Canisters 56 and 79 were placed at Location Number 86. The radon flux results for these two canisters are 2.59 and 1.31 pCi/m^{2}s, respectively. Canisters 260 and 95 were placed at Location Number 87. The radon flux results for these two canisters are 67.52 and 82.51 pCi/m^{2}s, respectively. Canisters 107 and 43 were placed at Location Number 88. The radon flux results for these two canisters are 10.94 and 11.09 pCi/m^{2}s, respectively The agreement is about what can be expected since the canisters were only placed near one another, and weren’t true duplicates.

Table 4-1 Quality Assurance Results of Standard Analysis

Standard	Date	Count Time (seconds)	Standard (nCi)	Counts	Average Bkg Counts	Efficiency	Error (1.00 SD)
STD 1A	09/27/06	1200	80	46222	2457	0.0123	6.2115E-05
STD 3	09/27/06	1200	78.83	40077	2457	0.0107	5.8924E-05
STD 1A	09/28/06	1200	80	44739	2743	0.0118	6.1347E-05
STD 3	09/28/06	1200	78.83	39536	2743	0.0105	5.8747E-05
Mean						0.0114	

Table 4-2 Comparison Data of Every Tenth Sample Analyzed

Cannister	First Analysis (A) pCi/m^{2}s	Second Analysis (B) pCi/m2s	Difference
79	1.31	1.31	0.0%
30	1.9	1.92	1.1%
202	2.25	2.14	4.9%
252	5.82	5.89	1.2%
52	218.54	211.70	3.1%
85	79.59	81.23	2.1%
36	7.41	7.26	2.0%
8	64.78	63.53	1.9%
54	7.64	7.47	2.2%
257	23.39	22.84	2.4%

Appendix A

Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER ENVIRONMENTAL RESTORATION GRP

ORDER NO. 255160/302122

Mfg. Ludlum Measurements, Inc. Model 19 Serial No. 104625

Mfg. Model Serial No.

Cal. Date 8-May-06 Cal Due Date 8-May-07 Cal. Interval 1 Year Meterface 202-016

heck mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 72 °F RH 42 % Alt 696.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck.
☑ F/S Resp. ck
☑ Audio ck.
☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89.

☑ Meter Zeroed
☑ Reset ck.
☐ Alarm Setting ck.

☐ Background Subtract
☐ Window Operation
☑ Batt. ck. (Min. Volt) 2.2 VDC
☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

☐ Input Sens. Linearity
☑ Geotropism

strument Volt Set 550 V Input Sens. 32 mV Det. Oper. V at mV Threshold Dial Ratio = mV

☑ HV Readout (2 points) Ref./Inst. / V Ref./Inst. / V

:OMMENTS: No "As Founds" Due to repairs.

nma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
5000	4000 μR/hr	N/A	4000
5000	1000 μR/hr		1000
500	400 μR/hr = 74 000 cpm		400
500	100 μR/hr		100
250	200 μR/hr = 37000 cpm		200
250	100 μR/hr		100
50	7400 cpm		40
50	1850 cpm		10
25	3700 cpm		20
25	925 cpm		5

*Uncertainty within ± 10% C.F. within ± 20%

50, 25 **Range(s) Calibrated Electronically**

ital
ıdout

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*

Log Scale

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*

ım Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. :alibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1963

ference Instruments and/or Sources:

137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☑ 720 ☐ 734 ☐ 1616 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N ☐ Beta S/N ☐ Other

☑ m 500 S/N 121036 ☐ Oscilloscope S/N ☑ Multimeter S/N 62840682

ılibrated By: Annette Bromley Date 8 ~~4~~ AB -May-06

eviewed By: Michael T Thomas Date 11-May-06

; certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.
RM C22A 11/26/2003

AC Inst. Only ☐ Passed Dielectric (Hi-Pot) and Continuity Test
☐ Failed:

24

6½ blanks

ERG Radon Flux Cannister Data Log

Site: Lg P.6

Page: 1 of 5

Location Number	Cannister Number	Deployment Date (mm/dd/yy)	Deployment Time (24:00)	Collection Date (mm/dd/yy)	Collection Time (24:00)	Comments / Notes
94	256	9-26-06	0723	9-27-06	0750	11
95	252		0727		0751	12
96	4		0728		0752	11
97	49		0731		0753	13
3	103		0733		0759	12
2	11		0735		0756	16
4	59		0737		0755	15
5	27		0739		0800	15
6	35		0742		0802	19
7	202		0744		0803	23
8	33		0745		0805	19
9	46		0747		0807	21
10	90		0748		0813	25
11	18		0751		0814	25
12	76		0753		0816	23
13	80		0755		0817	26
14	90		0758		0819	21
15	205		0811		0819	22
16	251		0814		0821	24
17	104		0815		0823	26
18	55		0817		0824	27
19	85		0819		0826	30
20	22		0821		0827	17
21	52		0825		0842	35

24

ERG Radon Flux Cannister Data Log

Site: Lg P-6

Page: 2 of 5

Location Number	Cannister Number	Deployment Date (mm/dd/yy)	Deployment Time (24:00)	Collection Date (mm/dd/yy)	Collection Time (24:00)	Comments / Notes
22	26	9-26-06	0828	9-27-06	0846	20
23	5	↓	0830	↓	0852	44
24	70		0833		0853	37
25	24		0834		0855	23
26	259		0836		0857	42
27	97		0837		0858	22
28	258		0842		0902	21
29	1		0845		0903	75
30	42		0846		0905	21
31	63		0849		0906	20
33	38		0850	0909	~~0907~~	34
32	105		0853		0907	15
34	53		0855		0911	15
35	3		0857		0912	20
36	69		0858		0913	17
37	261		0901		0915	18
39	98		0908		0920	25
38	50		0911		0919	33
41	17		0913		0924	130
40	51		0914		0922	26
43	78		0916		0929	28
42	64		0920		0925	34
45	25		0923		0929	37
44	16	↓	0925	↓	0930	42

ERG Radon Flux Cannister Data Log

Site: LSP.6

Page: 3 of 5

Location Number	Cannister Number	Deployment Date	Deployment Time	Collection Date	Collection Time	Comments / Notes
		(mm/dd/yy)	(24:00)	(mm/dd/yy)	(24:00)	
47	15	9-26-06	0927	9-27-06	0937	25
46	109		0930		0937	22
49	100		0932		0940	21
48	82		0934		0940	22
51	7		0936		0941	25
50	60		09~~37~~41		0943	24
55	73		0943		0948	22
52	34		0944		0943	23
53	47		0956		0944	26
54	54		0958		0954	25
56	36		1002		0952	22
57	8		1003		0954	22
1	81 x		1004		~~[illegible]~~ 1309	15

16

Blanks 93, 39 8wR
1230

ERG Radon Flux Cannister Data Log

Site: SwP. 6

Page: 4 of 5

Location Number	Cannister Number	Deployment Date (mm/dd/yy)	Deployment Time (24:00)	Collection Date (mm/dd/yy)	Collection Time (24:00)	Comments / Notes
74	9	9-26-06	1137	9-27-06	1133	18
79	65		1140		1143	17
78	201		1142		1140	16
73	253		1148		1145	19
71	12		1150		1150	32
72	255		1152		1147	11
84	6\45		1153		1153	130
85	48\30		1155		1154	31
86	56\79		1156		1157	34
87	260\95		1158		1158	160
88	107		1200		1203	42
~~[illegible]~~	~~[illegible]~~ 43		~~[illegible]~~		1203	42
Blks	93		1220			
	39		1220			

25

ERG Radon Flux Cannister Data Log

Site: Sm Pile Total #41

Page: 5 of 5

Location Number	Cannister Number	Deployment Date (mm/dd/yy)	Deployment Time (24:00)	Collection Date (mm/dd/yy)	Collection Time (24:00)	Comments / Notes
90	104	9.26.06	1023	9.27.06	1028	28
58	~~[illegible]~~28		1025		1028	33
85	67		1028		~~1030~~ 1206	42
91	110		1033		1030	80
59	21		1033		1030	28
92	86		1035		1033	34
60	99		1035		1033	26
93	58		1038		1034	50
61	254		1038		1034	36
62	37		1040		1037	23
63	23		1041		1056	23
~~65~~64	41		1043		1045	17
65	92		1044		1057	20
82	257		~~1046~~ 1049		1049	24
83	262		1050		1050	15
81	84		1052		1113	17
66	~~250~~ 44		1058		1100	19
~~6777~~ 77	~~44~~ 250		1100		1103	16
67 ~~76~~	68		1102		1100	28
68	91		1104		1123	29
76	19		1107		1103	20
86	263		1128		1130	16
69	72		1131		1130	31
75	67		1132		1130	24
70	102		1135		1135	23

HOMESTAKE
GRANTS OFFICE

Alan D. Cox
Project Manager - Grants

23 February 2007

Mr. Ron C. Linton
Senior Groundwater Hydrologist/Project Manager
U.S. Nuclear Regulatory Commission
Office of Federal and State Materials
and Environmental Management Programs
Mail Stop T-7E18
Washington, DC 20555-0001

RE: Homestake Mining Company of California
– **License SUA-1471**
Grants Reclamation Project
2006 Tailings Piles Radon Flux Survey

Dear Mr. Linton:

As discussed with you by telephone initially in January and by telephone and email more recently, the results of the 2006 annual radon flux survey completed on the Large Tailing Pile (LTP) and Small Tailings Pile (STP) at the Grants Reclamation Project site indicate that the average radon flux for the Large Tailings Pile (20.6 pCi/M^{2}s) was very slightly above the 20 pCi/M^{2}s criteria for radon flux in 10 CFR 40 Appendix A. The attached survey report prepared by Environmental Restoration Group Inc. presents the results of the 2006 survey for both tailings piles.

Precipitation and associated soil / ground moisture conditions at the Grants site during much of the 2006 summer season prevented the completion of the annual flux survey according to established sampling protocols until late September. When results from the survey were assembled prior to report preparation, it was determined that the average flux level on the Large Tailings Pile (LTP) was 20.6 pCi/M^{2}s. A decision was made at that time to initiate a remedial plan involving placement of supplemental cover on a portion of the LTP to bring the flux level into conformance with the standard. Unfortunately, adverse Fall weather conditions (snow and freezing ground conditions) in early December prevented completion of the work. A trucking contractor was making final preparations to initiate hauling soil during the week of December 4 when wet / snowy weather conditions prevented continuation of work. Since early December, frozen and wet ground conditions have prevented importing and placing additional soil cover on the LTP.

The current plan is to immediately commence with soil hauling, spreading and compaction of a six (6) inch lift of soil material over an area of the LTP as soon as ground conditions allow this Spring. It is anticipated that approximately 6,500 CYDs of soil cover will be placed. The area will be re-sampled for radon flux levels once the soil cover is placed.

As you are aware, in many cases, scarification and re-compaction of existing cover material will reduce radon flux levels. Unfortunately, this is not a feasible option for the LTP at the Grants site due to the numerous pipelines that are in place on top of the pile. These pipelines are integral to the tailings pile water injection and collection operations being conducted as part of the current closure program.

We trust this information is sufficient at this time to inform you of our plans with respect to the LTP. A copy of this letter and the attached radon flux report will be included in the Annual Performance Review Report which is due in your offices by March 31 2007. If you or any members of the NRC staff have any questions, please feel free to contact me. I can be reached at (505) 287-4456 ext. 25 or via cell phone at (505) 400-2794. I can also be reached via e-mail at acox@barrick.com.

Sincerely yours,

HOMESTAKE MINING COMPANY
OF CALIFORNIA
Alan D. Cox – Project Manager / RSO

Cc: Bob Evans – Region IV NRC, Arlington, TX

R. Chase – SLC (w/o attachment)
D. Deisley – SLC (w/o attachment)
B. Ferdinand – SLC (w/o attachment)