2004 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
GRANTS, NEW MEXICO

AND

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GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

1.0 EXECUTIVE SUMMARY AND INTRODUCTION

1.1 EXECUTIVE SUMMARY

Homestake Mining Company 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 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 2.1-11) has been established and is bounded by a down-gradient perimeter of injection wells. 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 2004. 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 both the Lobo Creek and San Mateo alluvial aquifers. In addition, a second aquifer system is found within the Chinle formation. It is comprised of three separate aquifers designated as the Upper, Middle and Lower Chinle aquifers. Hydro-Engineering 2003b 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 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 drawn the contaminated ground water plume up-gradient of the current hydraulic barrier leaving the restored portions of the aquifer with ground water concentrations at or below background levels.

An average of 501 gallons per minute (gpm) was pumped into the alluvial fresh-water injection systems in 2004. An additional 129 gpm of fresh water was injected into the Upper and Middle Chinle aquifer systems. An average rate of 249 gpm of R.O. product water was injected into the alluvial aquifer in 2004, 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 2004 except during equipment repair periods.

In 2004, the average collection rate for the alluvial aquifer was maintained at 293 gpm. An additional 39 gpm was pumped from the alluvial aquifer and re-injected within the collection area. The Upper Chinle aquifer collection program consisted of pumping well CE2 at an average rate of 27 gpm in 2004. The up-gradient alluvial aquifer collection system averaged 46 gpm in 2004, while average rates of 51 and 85 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 2004 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 the 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 proposed background water quality levels have been submitted to NRC, EPA and NMED for review and concurrence. It should be noted that these proposed standards are utilized throughout this report for comparison purposes in discussing restoration progress.

The only area where sulfate, TDS and chloride concentrations exceed the proposed alluvial background concentrations is in close proximity to the Large and Small Tailings Piles in the Grants Project area.

Uranium concentrations exceed the proposed alluvial background level of 0.15 mg/l within the collection area near the tailings. There are also seven wells in Felice Acres and two wells in Murray Acres subdivision that contain concentrations of uranium exceeding proposed background levels. Ground water withdrawal for irrigation is being used to further reduce uranium levels that exceed background levels in a small area southwest of Felice Acres in Section 3 and in the western half of Section 27 and Section 28.

Selenium concentrations also exceed proposed background levels in the collection area near the Large Tailings Pile and one small area in Section 3. None of the subdivision wells contained selenium concentrations above background.

Molybdenum concentrations slightly above the proposed background level of 0.05 mg/l are present in two subdivision wells in central Felice Acres. The remaining wells exhibiting elevated molybdenum concentrations are all located near the Large and Small Tailings Piles. Migration of this constituent has been limited due to natural retardation within the alluvial aquifer.

Up-gradient background concentrations of nitrate ranged up to 17.2 mg/l in 2004, which illustrates that significant natural levels are present up-gradient of the site. An area to the west of the Large Tailings Pile contains higher nitrate concentrations close to the proposed upper background level, but these levels are likely natural given their location. Nitrate concentrations beyond the immediate Homestake Grants Project area are not at levels of concern. Water quality with respect to

this constituent has been adequately remediated through completed restoration program efforts to date.

All radium activities 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.

Vanadium concentrations exceeded the site standard in wells under the Large Tailings Pile in 2004. Concentrations of this constituent have been adequately restored to below background levels except for levels under the Large Tailings Pile.

The thorium concentration in all wells was less than or equal to the site standard in 2004 except levels in the alluvium under the Large Tailings Pile and for three slightly higher values outside of the tailings area. However, the analytical results for this constituent vary significantly at the low observed levels that are approaching laboratory detection limits. The monitoring records for thorium indicate that it is a minor constituent of concern at the Grants site.

Observed alluvial background concentrations of key constituents at the Grants site were similar to those in previous years with a maximum selenium concentration of 0.61 mg/l and a maximum uranium concentration of 0.21 mg/l. Background sulfate concentrations ranged up to 1600 mg/l in 2004, similar to previous years. All molybdenum concentrations were less than 0.03 mg/l in the alluvial background wells during 2004.

Fresh-water injection into Upper Chinle well CW13, east of the East Fault, continued in 2004. This injection has supported 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 2004 in Upper Chinle well CW5 just north of Broadview Acres and also in Upper Chinle well CW4R. 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 2004. It 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 2004.

All sulfate and TDS concentrations in the Upper Chinle aquifer are below background concentrations except for samples from well CW3, where the concentration is slightly higher than the non-mixing zone Chinle level. 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 six Upper Chinle wells exceeded the proposed Upper Chinle background concentrations in 2004. Restoration of these elevated values should result from CE2 well collection and the CW4R, CW5 and CW25 well injection efforts.

Selenium concentrations in the Upper Chinle aquifer exceed the background concentrations in one well in the non-mixing zone. The proposed 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 proposed site standard in five wells near the tailings in the Upper Chinle aquifer during 2004. Restoration for these locations should occur from continued CE2 well collection and CW4R, CW5 and CW25 well injection activities.

The proposed nitrate background levels for the Upper Chinle zones are greater than any of the concentrations observed in 2004. 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 the Upper Chinle background value of 4 pCi/l. Only one of the vanadium concentrations (well CW3) in the Upper Chinle aquifer exceeds the proposed background level of 0.02 mg/l. None of the measured thorium-230 concentrations exceeded the proposed background levels for this constituent in the Upper Chinle aquifer wells during 2004. With the exception of a slightly elevated vanadium concentration in well CW3, these constituents are not present in the Upper Chinle aquifer at levels of concern. 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 2004 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 also occurred 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 and CW44 are being used for irrigation supply,

which will increase the flow in the Middle Chinle aquifer from Broadview 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 proposed background concentration except for a natural exceedance of the mixing zone background in wells CW17 and WR25. All TDS and chloride concentrations in the Middle Chinle aquifer are less than the background values except for a TDS value in Felice Acres and a TDS value in Murray Acres that are slightly above the non-mixing zone background value and three natural TDS values in wells west of the West Fault. Uranium and selenium concentrations in the western portion of Felice Acres are above proposed background levels 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 well 434 and wells CW35 and WR25 west of the West Fault. The non-mixing zone background selenium concentration is slightly exceeded in well CW28 which is located east of the East Fault and well 493 in Felice Acres. Selenium concentration in mixing zone well CW27 also exceeds the proposed standard. Uranium site standards of 0.18 and 0.07 mg/l, respectively, are proposed for the mixing and non-mixing zones in the Middle Chinle aquifer, while proposed selenium site standards are 0.14 and 0.07 mg/l. Molybdenum concentration in well 434 is slightly above the proposed non-mixing zone standard of 0.05 mg/l.

Nitrate, radium, vanadium and thorium-230 concentrations in the Middle Chinle aquifer all are less than the proposed Middle Chinle background levels. Hence, only uranium and selenium are considered important constituents relative to 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 background levels except in far-down-gradient areas, where natural concentrations exceed the non-mixing zone background level. 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. Background uranium concentrations in the Lower Chinle aquifer are exceeded in six wells. The three wells where concentrations significantly exceed the background mixing zone concentration

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 slightly exceed the very low background level of 0.02 mg/l. Concentration of selenium also exceeds the mixing zone standard in two wells near the subcrop area. All molybdenum concentrations in the Lower Chinle aquifer are less than the background level. Two of the Lower Chinle nitrate concentrations slightly exceed the non-mixing zone background of 3.0 mg/l but are well below 10 mg/l. All radium, vanadium and thorium-230 concentrations in the Lower Chinle aquifer meet the proposed background 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 2004 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 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 the various figures of the Grants Project area.

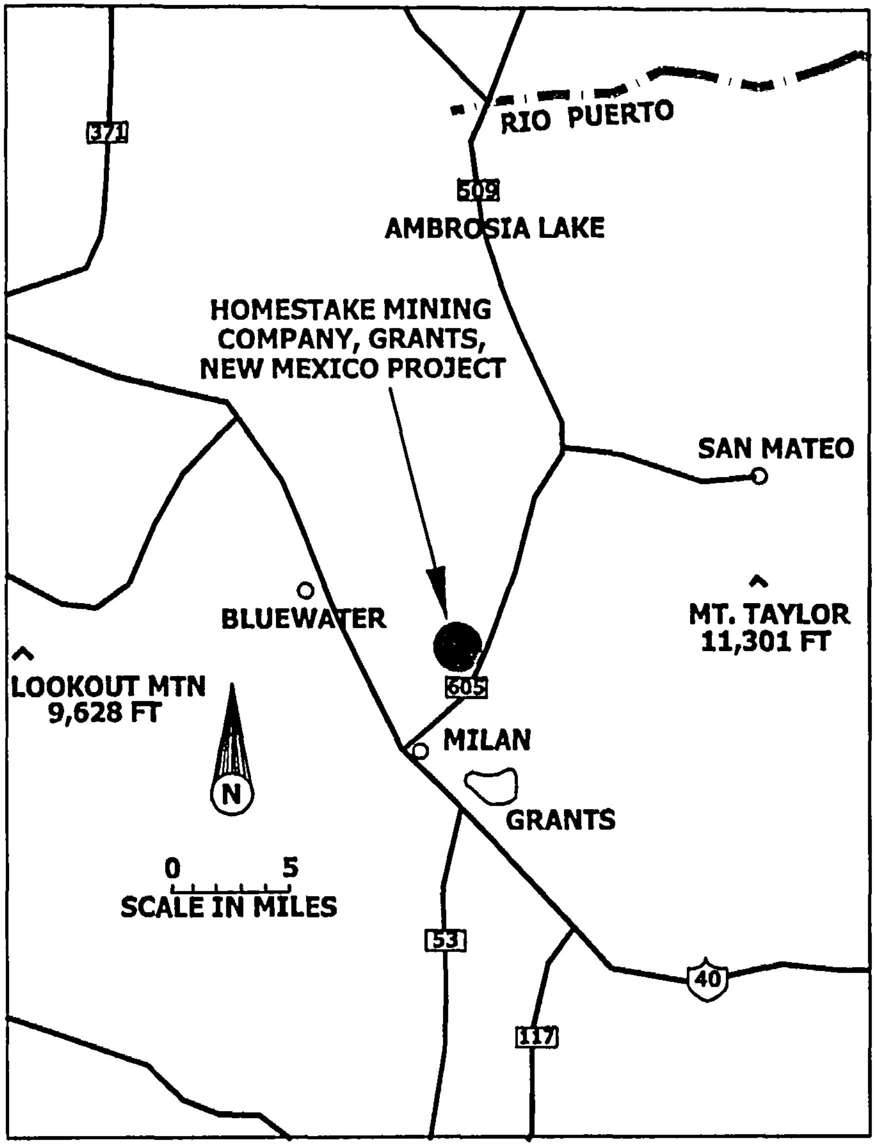
Monitoring data for ground water west of the project site is included in the 1995 through 2004 reports (see Appendix A for water levels and Appendix B for water quality). This area has been designated the "West Area" and was so labeled on the figures in the annual reports prior to 2003. The 2003 and 2004 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 and 2004.

beginning in 2002.

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



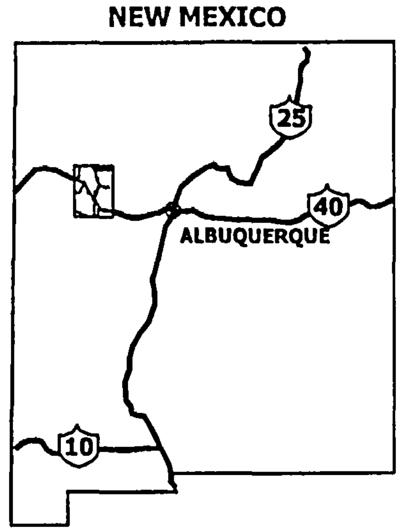


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FIGURE 1.2-1. LOCATION OF THE GRANTS PROJECT

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TABLES

2.0 OPERATIONS

2.1 CURRENT OPERATIONS SUMMARY

The annual precipitation of 11.2 inches on site in 2004 was slightly above the average normal precipitation for Grants, New Mexico. This near 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 injection of fresh water and R.O. product water down-gradient. These collection and injection systems continued to operate in 2004, 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 2.1-11 shows the location of the present (end of 2004) 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 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 – 2004)				
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

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 2004 alluvial aquifer collection rate was slightly less than that in 2003, and both R.O. units were operated during portions of the year. Up-gradient alluvial aquifer collection continues north of County Road 63. Well P2 was used to collect background 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 (gold X symbol located south of the collection ponds), and this water was used as injection supply water for the tailings pile flushing program.

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. Replacement well S5R and well T2 were added to the collection system in 2004. The L-line south of the Small Tailings Pile continued to operate in 2004 and includes collection wells 521, 522 and 639 which are located on the east side of Highway 605. Alluvial water is pumped from these lines of collection wells to the R.O. plant or it is pumped to re-injection wells. Figure 2.1-2 on page 2.1-12 graphically presents collection rates for the last eight years at the Grants Project. The alluvial collection system operated at an average rate of 293 gpm in 2004. Additionally, an average of 39.4 gpm was extracted from the alluvium for re-injection in 2004.

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 2004. Well P2 was the main well pumped in 2004 (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 46 gpm during 2004 (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 2004 on Figure 2.1-2.

2.1.2.3 UPPER CHINLE AQUIFER

Figure 2.1-2 shows the collection rate for Upper Chinle collection well CE2, which is 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. This well was used to supply water to the Large Tailings Pile for the tailings flushing program during 2004. The yearly average collection rate from the Upper Chinle was 27.3 gpm.

2.1.2.4 QUANTITY OF CONSTITUENTS COLLECTED FROM THE ALLUVIAL AQUIFER

Table 2.1-1 (page 2.1-16) 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 2004. 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 2004 was computed by multiplying the average concentration of a particular constituent for each collection well by the volume of water pumped from each well for 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 at three locations. The 2004 injection rate for this horizontal injection line is included in the Broadview and Murray Acres injection rates, and was approximately 200 gpm for the year.

In 2004, two 250 foot sections of injection lines were added in July south of collection well 522 east of Highway 605. The average injection rate for these lines rate is estimated at 23 gpm and is included in the Broadview and Murray Acres injection rate.

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 2004. Alluvial fresh-water injection wells 523 and 524 were added to the Broadview Acres injection system in 2002.

All wells adjacent to the northeast corner and to the north and west 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, was added to this system on August 25, 2003.

Figure 2.1-3 (page 2.1-13) presents fresh-water injection rates for the last eight years. An average of 501 gpm, or a total of 264 million gallons, was injected during 2004.

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. Through the end of 2004, 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, CW4R, C3R and PM. Figure 2.1-3 shows the rates of R.O. product water injection which averaged 249 gpm in 2004 for a total of 131 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 2004 average of 106 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 22.8 gpm in 2004 (see Figure 2.1-3). This injection has prevented the movement of constituents further to the north and allows up-gradient collection from well CW44.

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. 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. This injection rate averaged 383 gpm for 2004 with a total injected volume of 202 million gallons.

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. Figure 2.1-3 presents the monthly injection rates in the wells located in Sections 28 and 29.

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. Seven injection lines in Section 3 and two injection lines in Felice Acres were also added in 2004. These injection wells and lines were supplied by Lower Chinle well CW29 and San Andres well 943 in 2004.

Figure 2.1-3 presents the combined monthly injection rates for Section 35 and Section 3 fresh-water injection wells (see brown diamond symbols on Figure 2.1-3). This injection effort is associated with the ground water restoration of the Section 3 area. Water collected from wells in Section 3 is used for the irrigation program. During 2004, the yearly average injection rate in Sections 35 and 3 was 223 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 with higher concentrations of contaminants in order to enhance restoration of those areas. 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) 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 in 2004. The total re-injection rate into alluvial wells X11, X12, D2 through D4, DAA, DAB, DL, DW, DY, DF, DG, and DX in 2004 averaged 39.4 gpm. The monthly re-injection rates are presented on Figure 2.1-2 as the collection rates for re-injection use (COL/RE-INJ). Some of the collection for re-injection water was re-injected into Large Tailings Pile wells in the second half of 2004. Approximately ten 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 periodically been added through early 2002. 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.

Figure 2.1-4 shows the locations of tailings wells that were pumped in 2004. The cumulative volume of tailings water pumped from 1995 through 2004 is presented on Figure 2.1-5. A total volume of 162 million gallons of water had been removed from the tailings via dewatering wells by the end of 2004. A total of 44.7 million gallons was pumped from the tailings in 2004. The yearly average collection rate from the tailings was 84.9 gpm in 2004.

Wells CE2, CW1, CW2, CW3, 929 and 934 have been used to supply water for flushing the Large Tailings Pile in 2004. A total of 147 million gallons were injected into the tailings in 2004, which is an average rate of 280 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 2004.

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 also 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 200 million gallons of water has been pumped from the toe drains. Approximately 50.7 gpm of water was collected from the toe drains in 2004, which is a 3 gpm

decrease from the 2003 rate. This decrease is due to the increase in pumping from tailings collection wells on the Large Tailings Pile.

Table 2.1-1 also presents the 2004 quantity of constituents collected from the toe drains (see Tables B.2-1 and B.2-2 of Appendix B for water-quality results for 2004).

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.

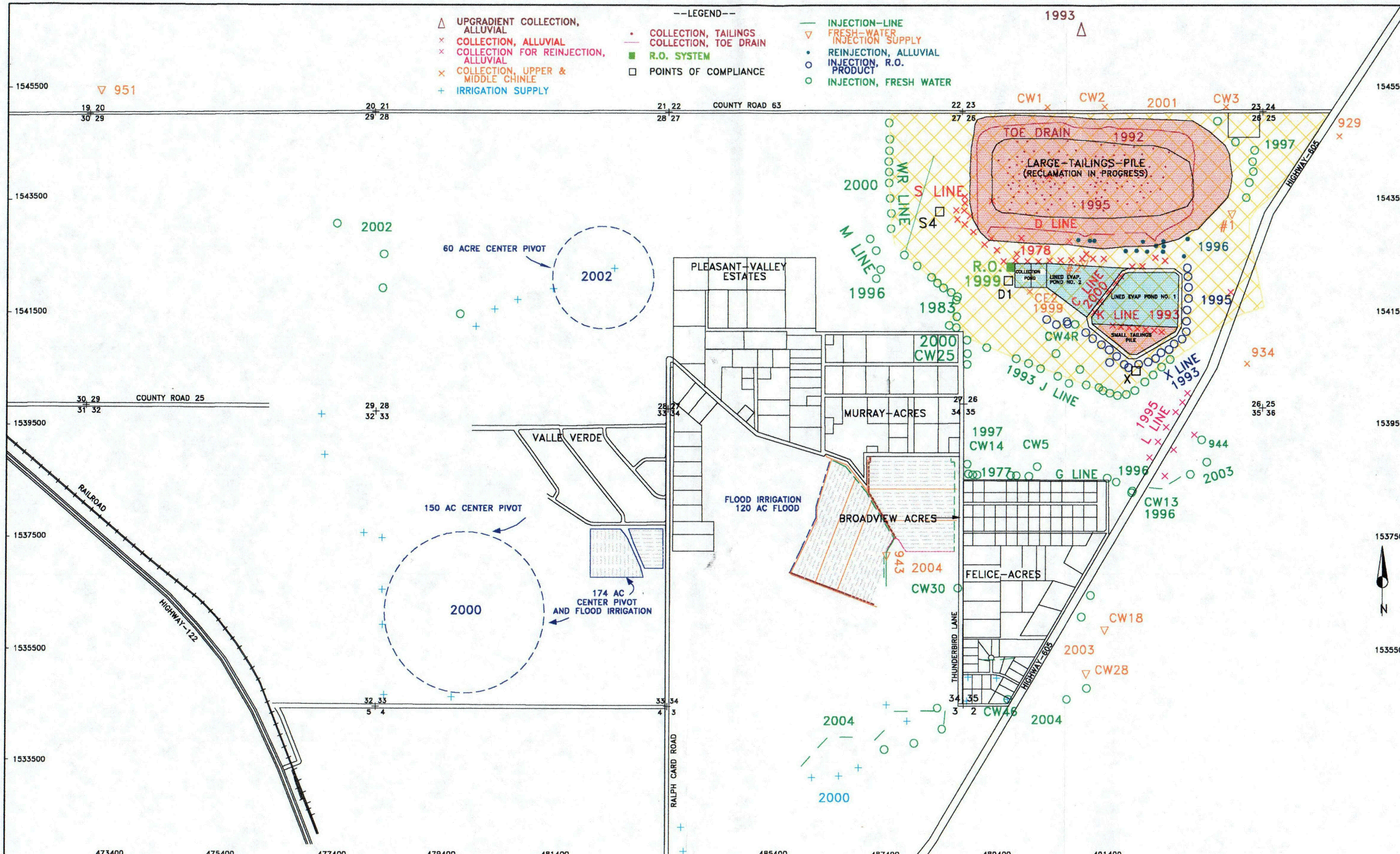
The water from the well collection system and some water from the tailings dewatering wells and toe drains is pumped to the R.O. plant as feed water. The majority of the extracted tailings water is reported directly to the East Collection Pond for subsequent evaporation. Excess water is transferred from 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 99 million gallons (average rate of 188 gpm) of water was delivered to the evaporation pond system in 2004.

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

Four irrigation systems were operated in 2004 (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 fifth full irrigation season; the 60 acre center pivot in Section 28 was operated for the third irrigation season and the 24 acre flood irrigation in the eastern portion of Section 33 was operated for the second year. Figure 4.1-1 shows the supply wells for these irrigated areas. In 2004, wells 496, 498, 538, 541, 631, 632, 647, 648, 649, 653, 657, 658,

687, 862, 869, 996, CW44 and CW45 were used for the irrigation supply to the areas in Sections 33 and 34. Discharge 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 and 890 were used to supply the Section 28 pivot irrigation. These three areas were successfully irrigated during the entire 2004 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 while no hay cuttings were done on the Section 33 flood area. A total of 1028 Ac-Ft of water was applied to the four irrigation areas in 2004. The average uranium and selenium concentrations applied to the Section 33/34 fields were 0.26 and 0.09 mg/l for uranium and selenium respectively in 2004 while the average values for Section 28 were 0.27 and 0.07 mg/l.



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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

C01

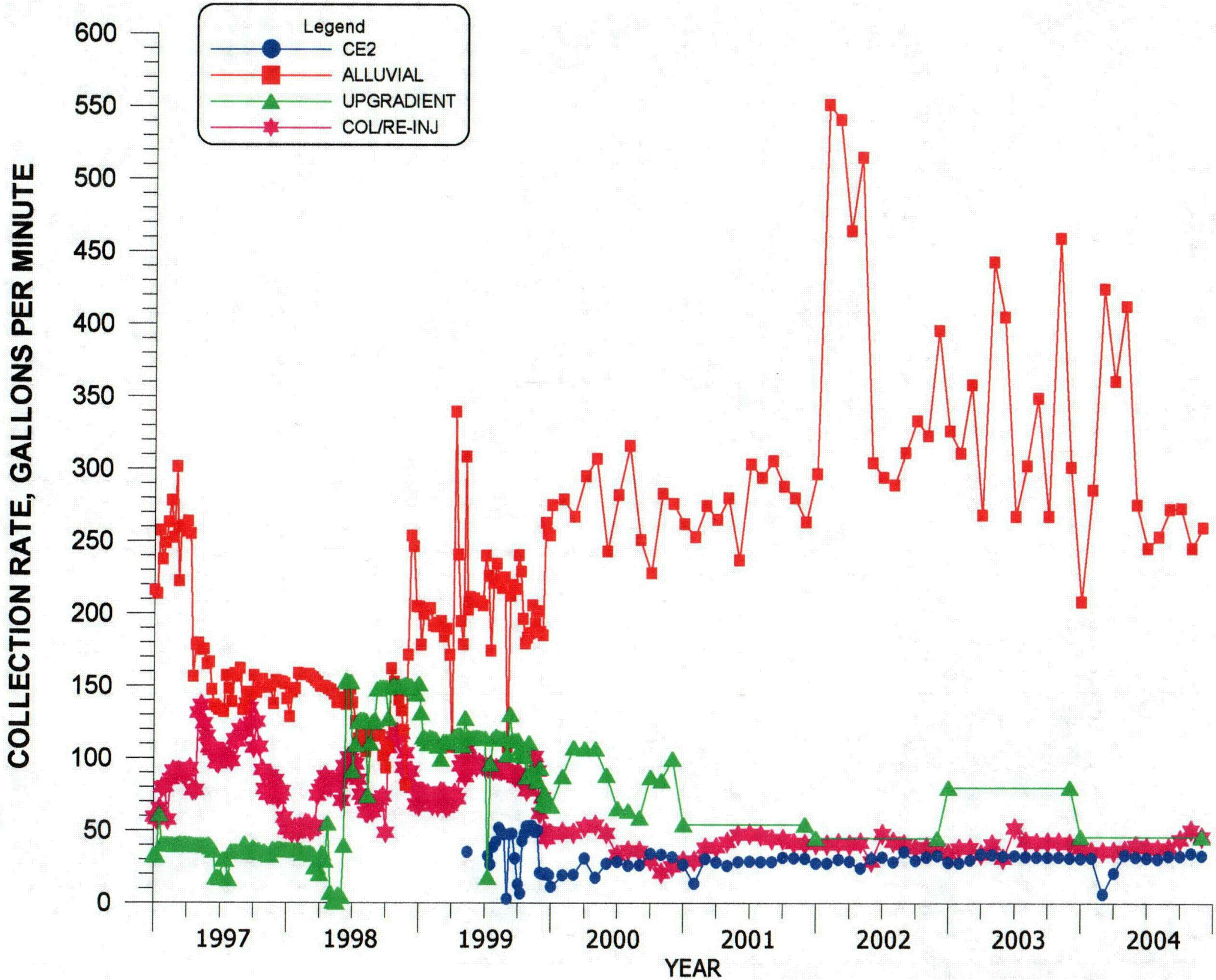

FIGURE 2.1-2. AVERAGE MONTHLY COLLECTION RATES FOR THE ALLUVIAL AND UPPER CHINLE AQUIFERS.

CO2

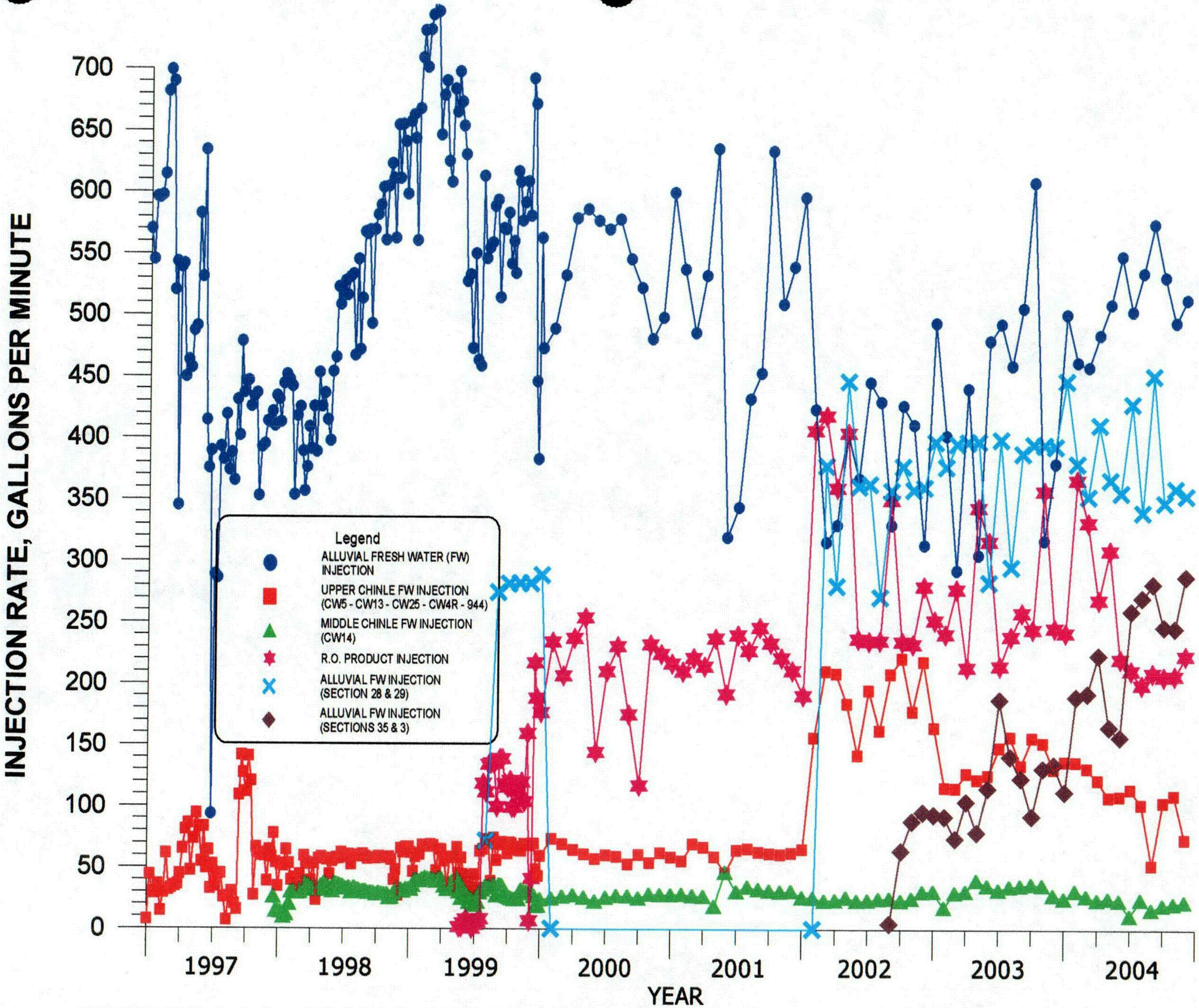

FIGURE 2.1-3. AVERAGE MONTHLY INJECTION RATES FOR THE ALLUVIAL UPPER CHINLE AND MIDDLE CHINLE AQUIFERS.

C03

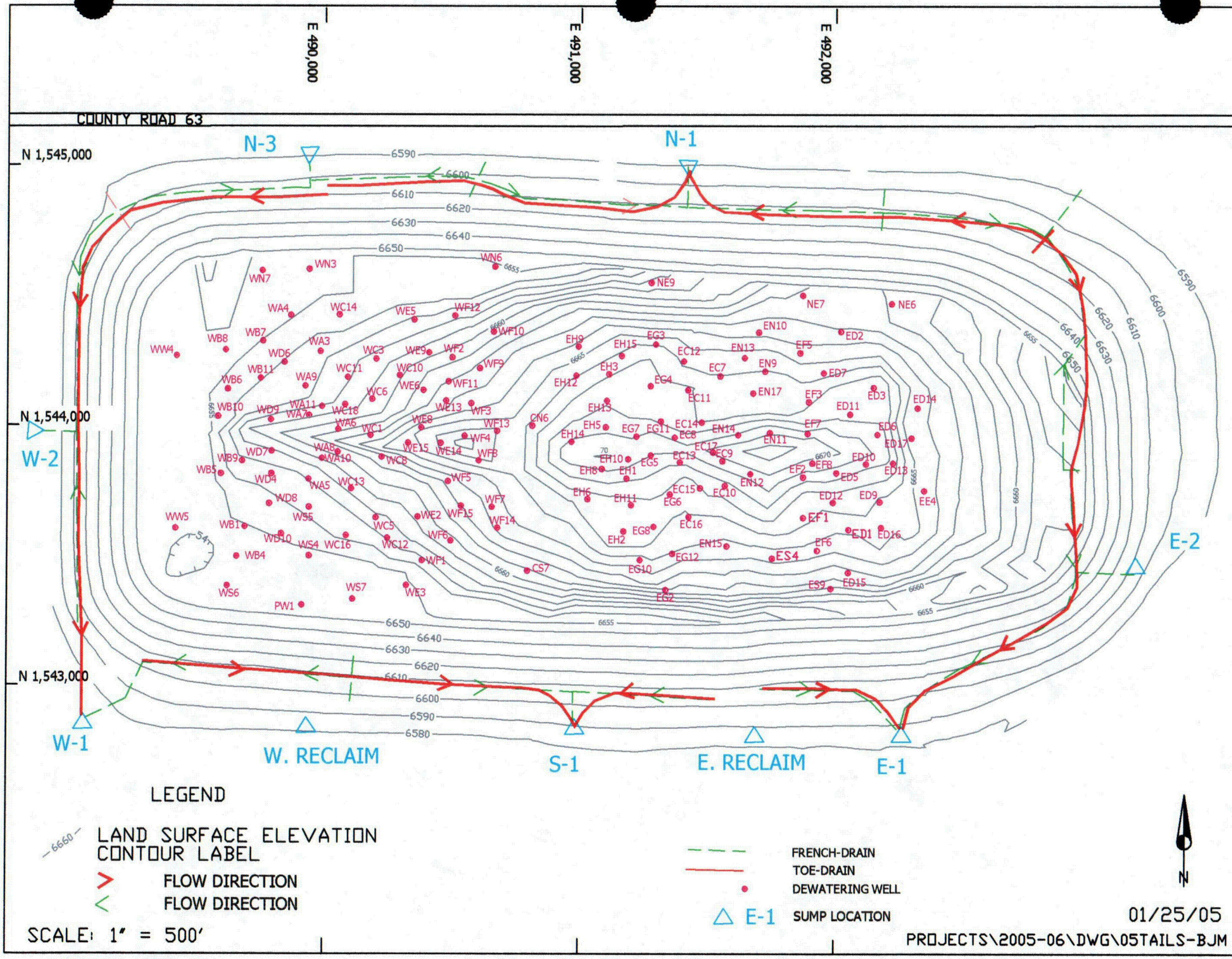

FIGURE 2.1-4. LOCATIONS OF TAILINGS DEWATERING WELLS, TOE DRAINS AND SUMPS

C04

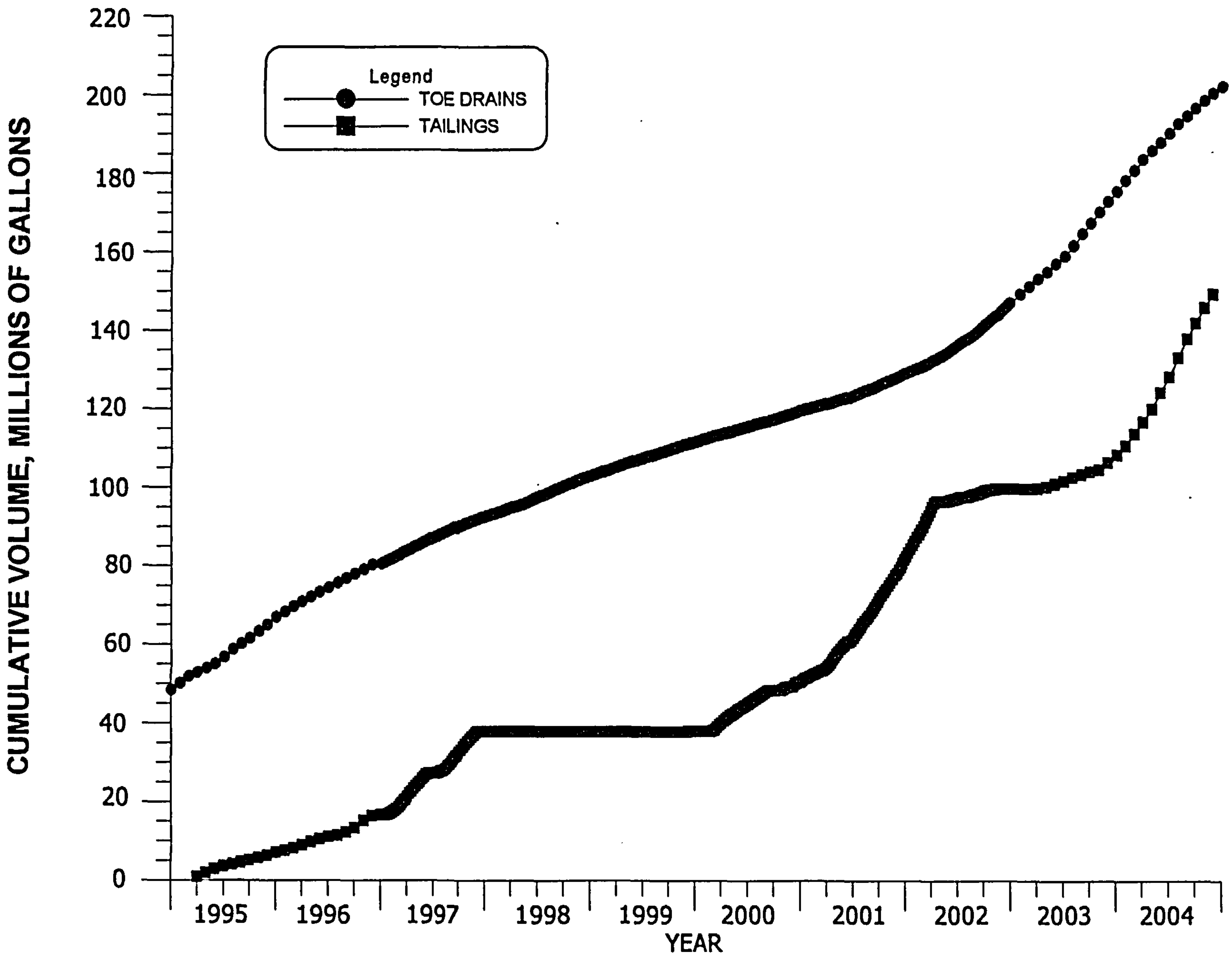

FIGURE 2.1-5. CUMULATIVE VOLUME OF COLLECTION WATER FROM TAILINGS DEWATERING WELLS AND TOE DRAINS.

TABLE 2.1-1. QUANTITIES OF CONSTITUENTS COLLECTED.

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. (MG/L)	SULFATE (SO4) AMT. (LB)	URANIUM (U) CONC. (MG/L)	URANIUM (U) AMT. (LB)	MOLYBDENUM (MO) CONC. (MG/L)	MOLYBDENUM (MO) AMT. (LB)	SELENIUM (SE) CONC. (MG/L)	SELENIUM (SE) AMT. (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
SUM G.W.		3,672,144,259		135,792,784		856,105		998,254		55,084
SUM TOE		200,298,739		17,414,951		70,154		156,413		3,181
SUM TAILS		151,866,372		10,498,665		40,257		101,468		242
COMBINED SUM		4,024,309,370		163,706,399		966,516		1,256,136		58,507

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 2005 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 2005. 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 and blowdown 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, D2 through D4 and DAA, DAB, DL, DW, DY, DF, DG, DQ and DX and a few tailings wells. Additional wells in this area will be included in the re-injection program in 2005.

Collection from Upper Chinle well CE2 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, 28, 32, 33 and 35 is planned for the entire growing season in 2005. Full irrigation of the 24 acres of flood in Section 33 is expected for 2005 and the 60 acre center pivot is expected to be expanded to 100 acres in 2005. Fresh-water well injection lines in Sections 27 and 28 will be commissioned and utilized in 2005 to restore these areas of low level

aquifer contamination. Fresh-water injection will be continued in Sections 35 and 3 in 2005, and additional injection wells or injection lines are planned to be added in Section 35 in 2005 to aid restoration and to complement the use of water for irrigation. Additional irrigation wells and injection lines in Sections 27 and 28 are planned to be added to the Section 28 irrigation system to aid restoration in this area.

SECTION 3

TABLE OF CONTENTS

GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

FIGURES

TABLES

3.0 SITE STANDARDS AND BACKGROUND CONDITIONS

3.1 ALLUVIAL SITE STANDARDS

Six water-quality site standards (U, Se, Mo, Ra226 + Ra228, Th230 and V) were previously set for the alluvial aquifer at the Homestake site by the United States Nuclear Regulatory Commission (NRC). These established site standards are presently exceeded by the full range in alluvial aquifer background values for many of the constituents. Accordingly, naturally occurring concentrations of these elements up-gradient of the Grants site have and will continue to prevent successful ground water restoration to meet those existing standards.

Adjustment of the site standards to account for the full range in natural background concentrations is presently under federal and state review by NRC and NMED. Both agencies have accepted the full range of background values for the alluvial aquifer as presented in Hydro-Engineering 2001c. The new (Proposed NRC Site Standards) agreed upon standards are shown in Table 3.1-1 and will be incorporated in the renewal of the NMED DP-200 permit and the amendment of site license SUA-1471 by NRC.

Site standards for the Grants Project are applicable at three points of compliance; the Point of Compliance (POC) wells are S4, D1, X and (see Figure 2.1-1 for locations).

TABLE 3.1-1. GRANTS PROJECT ALLUVIAL WATER QUALITY STANDARDS.

Constituents	Homestake Standards		
	Existing NRC License Site Standards	Proposed NRC License Site Standards***	Existing New Mexico Site Standards*
Uranium	0.04	0.15	0.15
Selenium	0.1	0.27	0.27
Molybdenum	0.03	0.05	1.0@
Vanadium	0.02	0.02	-----
RA-226 + Ra-228	5	5	30
Thorium-230	0.3	0.3	-----
Sulfate	-----	1870	1870
Chloride	-----	250	250
TDS	-----	3060	3060
Nitrate	-----	23	23

NOTE: All concentrations are in mg/l except: Ra-226 + Ra-228 and Th-230, which are in pCi/l.
@ = Irrigation Standard
* = Pending NMED issuance of DP-200
*** = Pending NRC license amendment

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 at the Homestake site, although neither creek has a well-defined surface flow channel at the site. 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 were sampled in 2004 (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 2004 water-quality data for the near and far-up-gradient alluvial background wells for six parameters: sulfate, uranium, selenium, chloride, TDS and nitrate. Molybdenum concentrations in all up-gradient wells were less than 0.03 mg/l. Sulfate concentrations for the wells varied from 398 to 1600 mg/l in 2004. Uranium concentrations also varied over a large range, from 0.0008 to 0.21 mg/l. Selenium concentrations also varied over a large range, from less than 0.005 to 0.61 mg/l.

Chloride concentrations in water sampled from the up-gradient wells ranged from a low of 38 mg/l to a high of 124 mg/l. The TDS concentrations varied from 1080 to 2740 mg/l. Nitrate concentrations also vary naturally over a large range in the alluvial aquifer, and ranged from less than 0.1 to 17.2 mg/l in 2004. Concentration versus time plots for up-gradient wells DD, ND, P, P3, Q and R are presented 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 is being used to define the upper limit of background. The present NRC standards used average background concentrations for establishing the standards. The 95th percentile is a more appropriate value for use in background discussions, because it better defines the natural full upper limit of background. A tabulation of the 95th percentile background levels for the Grants Project area constituents is included in Figure 3.2-1.

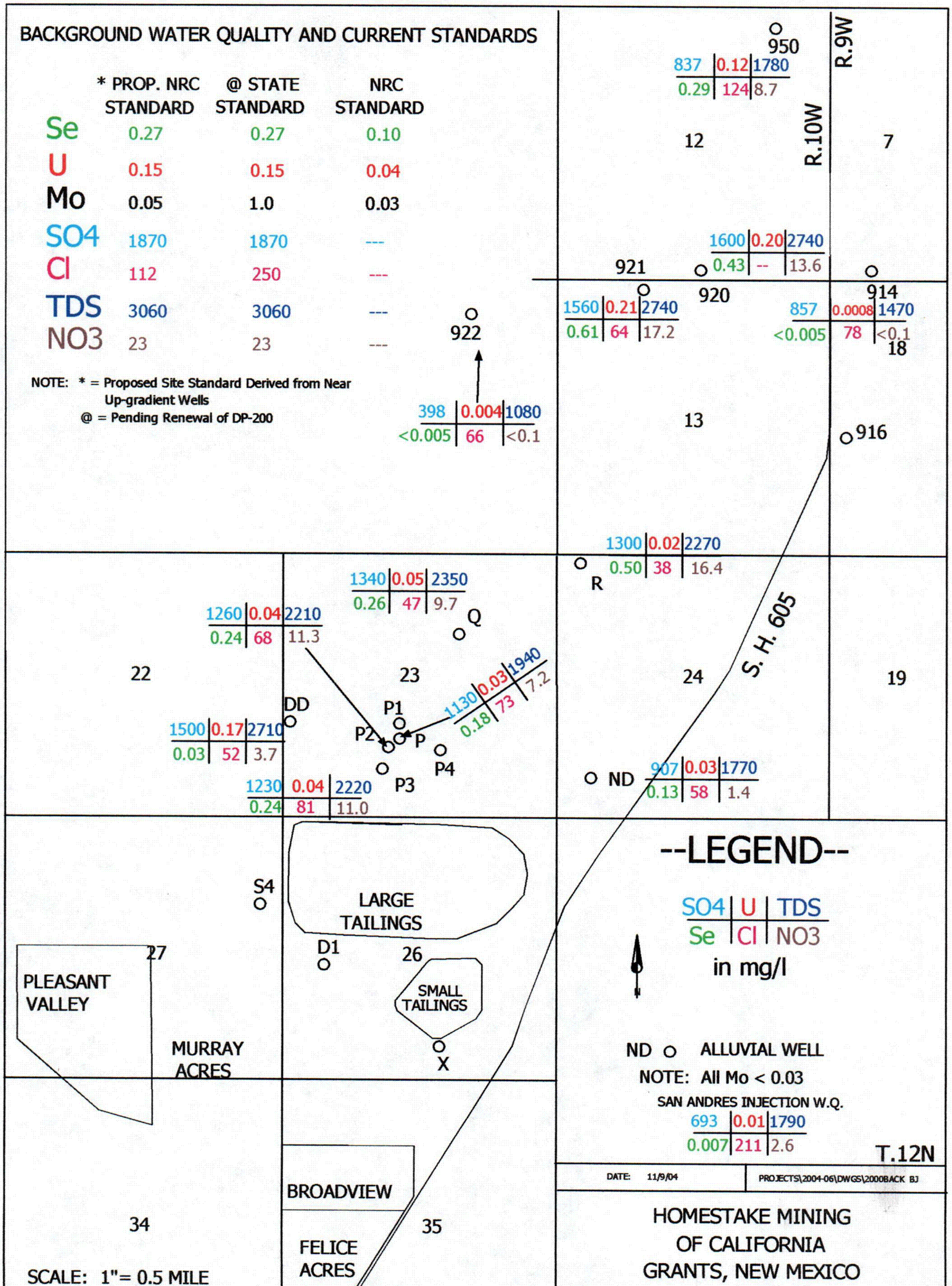

FIGURE 3.2-1. ALLUVIAL BACKGROUND GROUND WATER QUALITY, 2004

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3.3 COMPARISON OF ALLUVIAL SITE STANDARDS TO BACKGROUND

The range in concentrations (see Section 3.2) in the alluvial up-gradient wells during 2004 was such that 9 out of 12 selenium concentrations in background well[1] samples were equal to, or exceeded, the present NRC site standard. Additionally, 7 out of 12 uranium values were equal to, or exceeded, the present NRC site standard. The original site standards were set based on an average of concentrations in three samples[2] collected in December 1988, January 1989 and February 1989 from up-gradient well P. 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 2004 varied from 0.0008 to 0.21 mg/l (see red values on Figure 3.2-1). The higher values are five times greater than the present site standard of 0.04 mg/l.

Table 3.3-1 presents the 95th percentile of background concentrations (see ERG 1999a and 1999b for computation of the 95th percentile levels) for selenium, uranium, molybdenum, sulfate, chloride, TDS and nitrate along with respective proposed State and NRC standards. The sulfate, TDS and nitrate 95th percentile levels are equal to the proposed State standards because the State has accepted the upper limit evaluation.

[1] Wells DD, ND, P, P3, Q, R, 914, 916, 920, 921, 922 and 950.
[2] Average of 3 samples from well P in 1988 and 1989.

TABLE 3.3-1. COMPARISON OF ALLUVIAL UPPER LIMIT OF BACKGROUND GROUND WATER QUALITY AND SITE STANDARDS.

Constituents	95% Background Level	Proposed State Standard	Proposed NRC Standard
Selenium	0.27	0.27	0.27
Uranium	0.15	0.15	0.15
Molybdenum	0.05	1.0@	0.05
Sulfate	1870	1870	1870
Chloride	112	250	250
TDS	3060	3060	3060
Nitrate	23	23	23

NOTE: All values are in mg/l
@ = Irrigation Standard

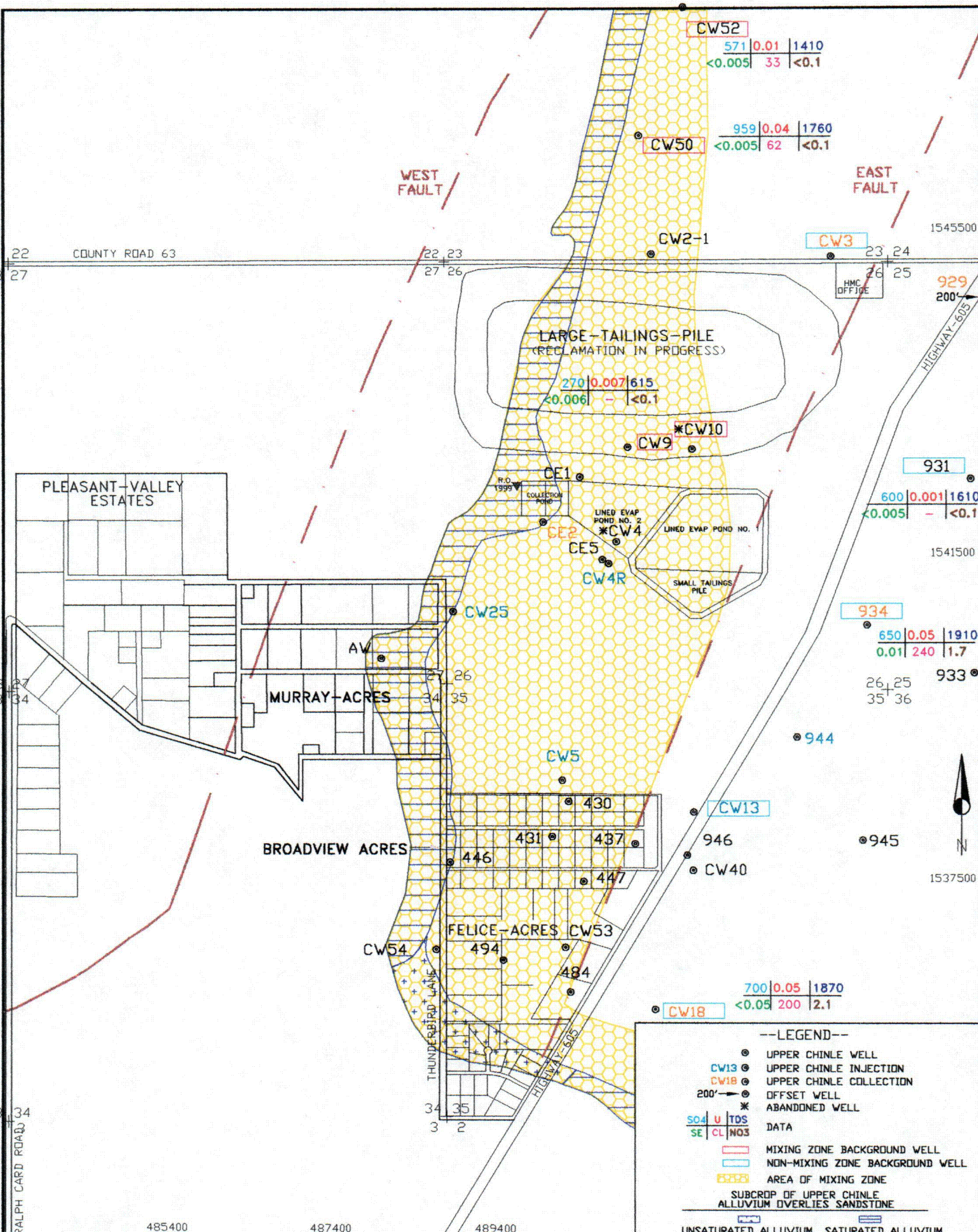
3.4 CHINLE BACKGROUND WATER QUALITY

The Chinle aquifer background water quality has been analyzed and presented to the NRC and NMED in Hydro-Engineering 2003b and ERG 2003. The proposed 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 results from the analysis of the Chinle background data. Figure 3.4-1 presents the location of the Upper Chinle mixing-zone and the wells used in the analysis of background values. The mixing zone is shown with a yellow pattern on Figure 3.4-1. Wells within the mixing zone that were used in the mixing-zone background calculations have a red rectangular 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 well name. Figure 3.4-1 also presents the 2004 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. None of the Upper Chinle background concentrations for 2004 exceed the proposed background levels for this aquifer.

The Middle Chinle mixing zone is presented in Figure 3.4-2 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 3.4-2 were used to establish the Middle Chinle non-mixing zone background levels. This figure also presents the 2004 data collected for these background wells. Two wells, CW17 and WR25, in the mixing zone of the Middle Chinle aquifer exceed the background sulfate concentrations for this aquifer. Both of these wells are west of the West Fault where concentrations in the Middle Chinle aquifer are natural due to natural flow gradient of the aquifer. This indicates that what has previously been considered the range of background sulfate concentrations may not fully define the range of natural concentrations in this aquifer. Likewise, four of the TDS and one of the chloride background concentrations exceeded the proposed background levels for the Middle Chinle aquifer. These exceedances also serve as a reminder that standards established as the 95th percentile will occasionally be exceeded within the range of natural variation. Two of the uranium concentrations west of the West Fault exceeded the proposed mixing zone concentration of 0.18

mg/l, while one of the non-mixing zone selenium concentrations also exceeded this background level. None of the molybdenum, nitrate, radium, vanadium or thorium-230 values exceeded the background concentrations for the Middle Chinle aquifer for these constituents.

Figure 3.4-3 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 2004 data for the Lower Chinle wells previously used to define background concentrations are also presented on Figure 3.4-3. Two of the non-mixing zone sulfate concentrations in the Lower Chinle aquifer slightly exceed this background level. These sulfate values are from the furthest down-gradient wells and indicate that additional data may be needed for some of the farther down-gradient wells. One of the TDS concentrations exceeded the background level in the non-mixing zone. Additional data may be needed to further define the non-mixing zone background concentrations because of the natural deterioration of water in the Lower Chinle aquifer. Two of the non-mixing zone uranium background concentrations exceeded the level of 0.02 mg/l. Pumping of well CW29 may have caused the increase in this well. The nitrate concentration from well CW41 exceeded the non-mixing zone background level. None of the selenium, molybdenum, radium, vanadium or thorium-230 concentrations in the Lower Chinle background wells exceeded their background levels. 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 with the alluvium to a particular point within the aquifer.



SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 03/21/05

FIGURE 3.4-1. UPPER CHINLE MIXING ZONE AND 2004 GROUND WATER QUALITY

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C06

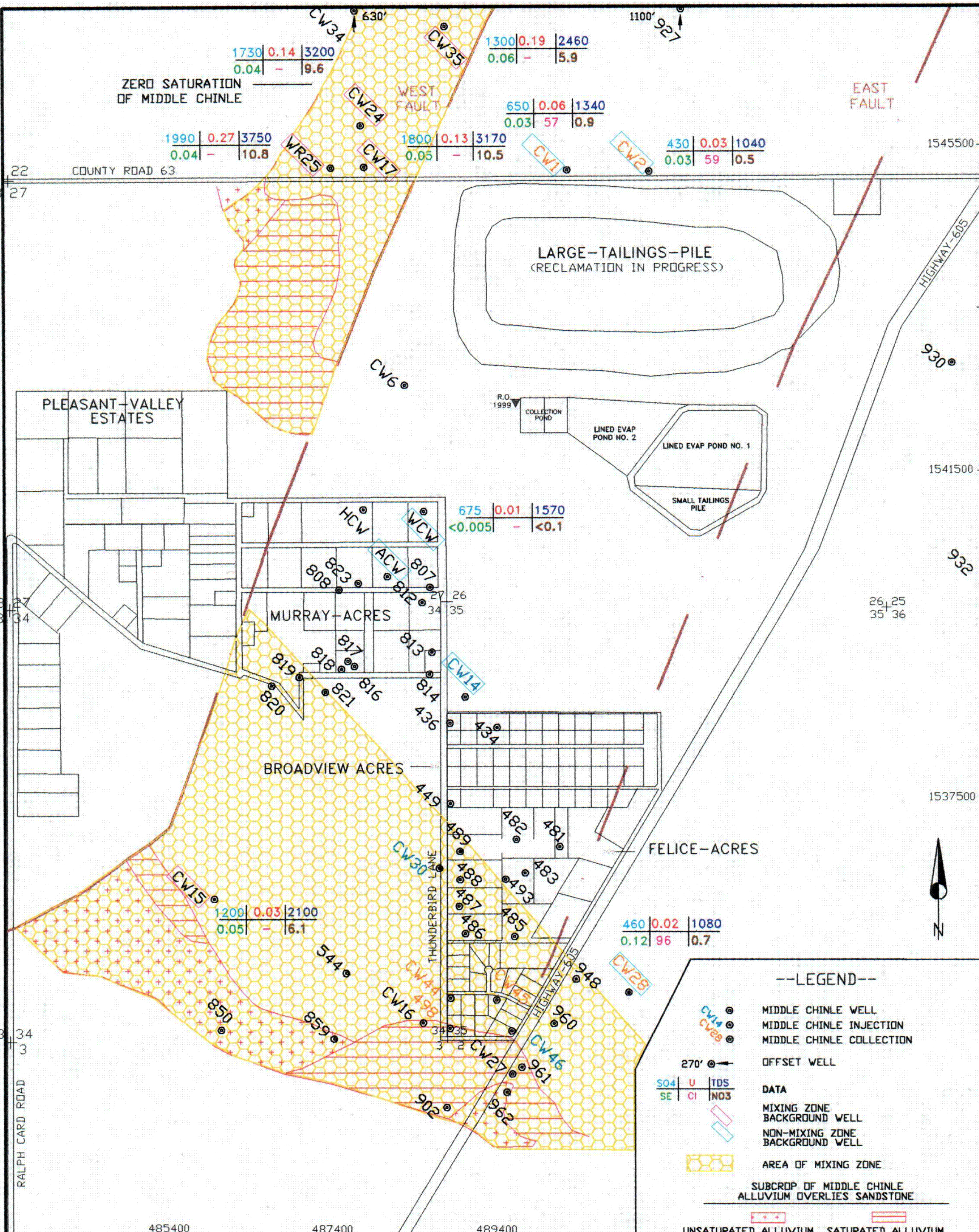

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FIGURE 3.4-2. MIDDLE CHINLE MIXING ZONE AND 2004 GROUND WATER QUALITY

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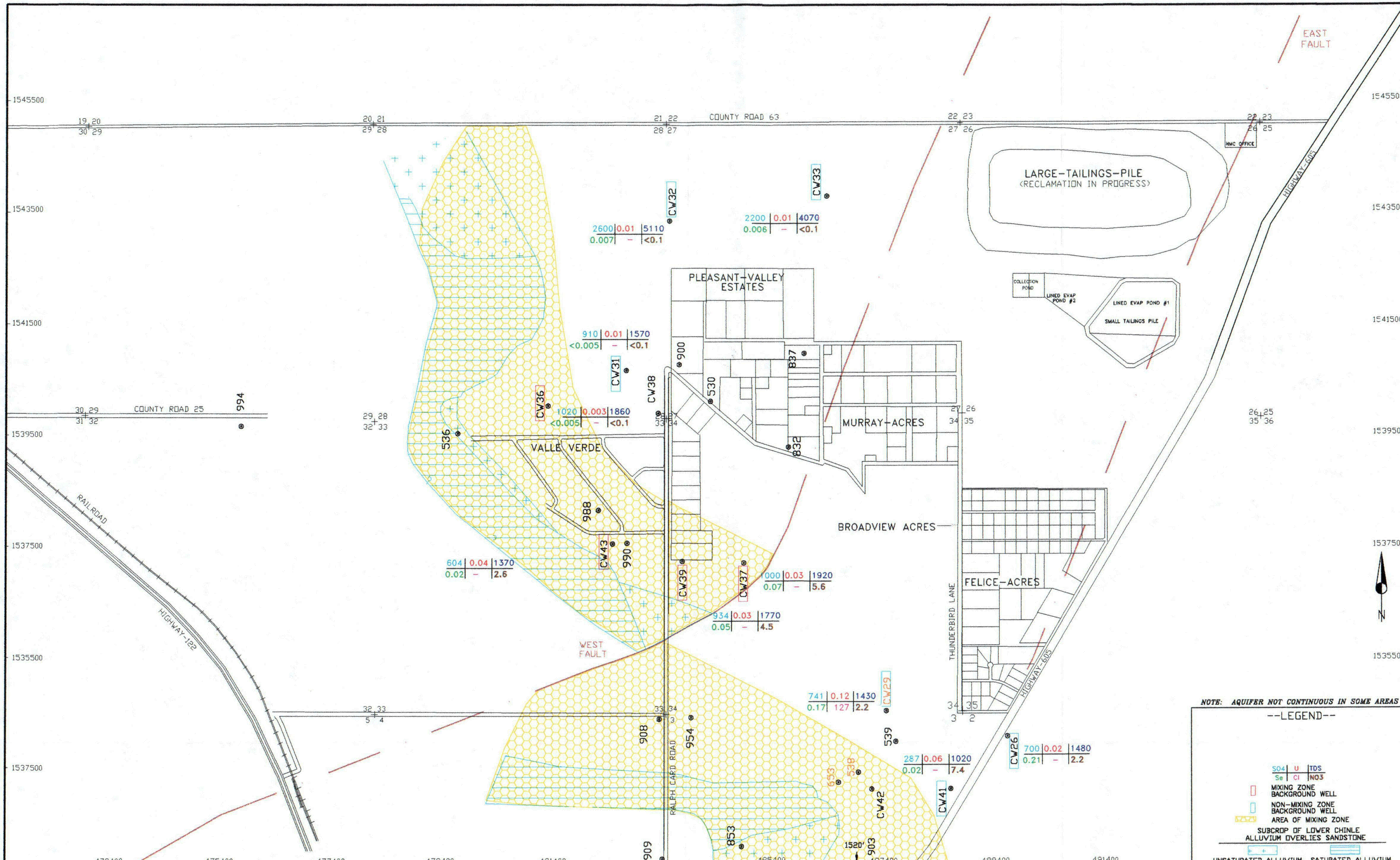

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HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES
GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W

FIGURE 3.4-3. LOWER CHINLE MIXING ZONE AND 2004 GROUND WATER QUALITY

C08

TABLE 3.4-1. GRANTS PROJECT- PROPOSED CHINLE BACKGROUND CONCENTRATIONS

Aquifer Zone	CONSTITUENT, concentrations in mg/l except Thorium-230 and Ra226+Ra228 in pCi/l.									
	Selenium	Uranium	Molybdenum	TDS	Sulfate	Chloride	Nitrate	Vanadium	Thorium-230	Ra-226 +Ra-228
Chinle Mixing	0.14	0.18	0.10	3140	1750	96	15	0.08	0.97	4
Upper Chinle Non-Mixing	0.06	0.09	0.08	2010	914	412	4.9	0.02	0.55	4
Middle Chinle Non-Mixing	0.07	0.07	0.05	1560	857	63	4.0	0.02	0.86	4
Lower Chinle Non-Mixing	0.32	0.02	0.03	4140	2000	634	3.0	0.01	0.72	4

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GROUND WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

TABLES

4.0 ALLUVIAL AQUIFER MONITORING

This section presents 2004 monitoring results for the alluvial aquifer. The alluvial aquifer is the upper and most important ground water system at the Grants Project site. The section describing well completions is presented first, and this is followed by sections presenting water-level and water-quality information.

4.1 ALLUVIAL WELL COMPLETIONS

New alluvial wells drilled in 2004 include 541, 801R, M3R, S5R, T17 and T19 through T22 and T40. Additionally, 3000 feet of injection line was installed in Sections 3 and 35 to a depth of approximately 6 feet. Some of the injection lines in Section 35 were installed in Felice Acres while 500 feet were installed east of Highway 605. These injection lines are presently being used in conjunction with the irrigation program and the collection for re-injection east of Highway 605. Operational status and other characteristics of the new and previously installed alluvial wells are discussed in this section. Well 541 was added as an irrigation supply well in Section 32. Well 801R is a replacement well for Murray Acres well 801 which was abandoned. Wells M3R and S5R were drilled as R.O. collection wells. The new alluvial T wells on the pile are future R.O. collection wells. Figure 4.1-1 shows the locations of the alluvial wells near the Homestake Grants Project. This figure is plotted at a scale of 1" = 1600'. This figure also shows the location of the new injection lines.

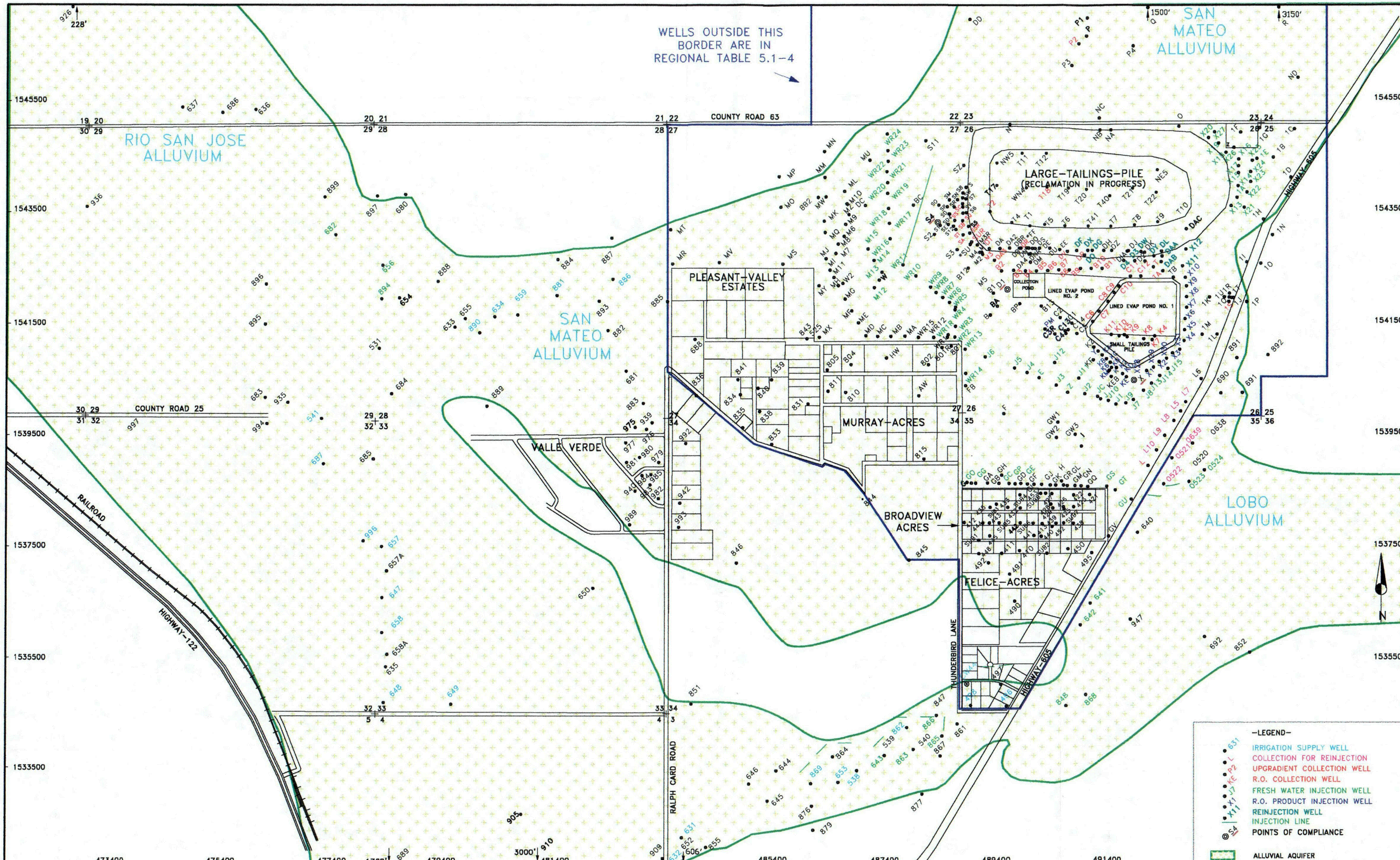
Alluvial wells 914, 920, 921, 922 and 950 are located outside of the area presented on Figure 4.1-1. These upgradient wells are shown on Figure 3.2-1.

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 2004 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 are delineated with a heavy blue boundary line on Figure 4.1-1 and are considered to be regional wells, and 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.



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DATE: 02/07/05

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

FIGURE 4.1-1. ALLUVIAL WELL LOCATIONS

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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 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
0690	1540279	493465	65.0	5.0	12/14/2004	34.34	6547.72	2.5	6582.06	55	6524.6 A	25-65	23.2
0691	1540276	493860	66.0	5.0	12/14/2004	42.28	6546.53	2.9	6588.81	55	6530.9 A	26-66	15.6
0891	1540904	493751	54.0	5.0	2/16/2004	29.49	6551.63	2.1	6581.12	50	6529.0 A	24-54	22.6
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	12/19/2002	29.23	6556.74	2.2	6585.97	40	6543.8 A	22-42	13.0
1E	1544481	494116	51.4	5.0	9/24/2001	2.00	6582.31	2.1	6584.31	43	6539.2 A	34-54	43.1
1F	1544952	493831	61.8	5.0	9/27/2004	44.39	6542.99	1.8	6587.38	54	6531.6 A	30-60	11.4
1G	1545034	494170	57.5	5.0	9/27/2004	42.71	6544.36	2.3	6587.07	48	6536.8 A	35-55	7.6
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	2/17/2004	36.40	6561.95	1.3	6598.35	35	6562.1 A	27-47	0.0
1J	1541986	493695	50.3	5.0	2/17/2004	34.32	6551.08	1.8	6585.40	40	6543.6 A	30-50	7.5
1K	1541992	493275	55.6	5.0	9/28/2004	34.56	6549.57	1.0	6584.13	47	6536.1 A	30-55	13.4
1L	1541256	493416	53.4	5.0	9/27/2004	25.66	6552.95	3.1	6578.61	40	6535.5 A	35-55	17.4
1M	1541327	493133	43.1	5.0	9/28/2004	22.60	6552.93	1.3	6575.53	33	6541.2 A	25-54	11.7
1N	1543100	494396	45.6	5.0	2/17/2004	33.78	6557.07	2.4	6590.85	25	6563.5 A	15-44	0.0
1O	1542592	494175	44.0	5.0	2/17/2004	43.75	6551.19	0.8	6594.94	29	6565.1 A	14-34	0.0
1P	1541902	493924	52.8	5.0	2/17/2004	34.14	6551.10	2.6	6585.24	35	6547.6 A	20-40	3.5
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	11/8/2004	37.90	6544.09	1.8	6581.99	56	6524.2 A	36-56	19.9
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	6525.42	1.1	6573.40	—	— A	27-47	—
B	1541684	489311	68.6	4.0	12/6/2004	41.18	6529.72	2.4	6570.90	60	6508.5 A	49-69	21.2
B1	1542071	489370	90.9	5.0	12/9/2004	45.40	6526.25	0.6	6571.65	82	6489.1 A	62-82	37.2
B2	1542475	489515	83.0	5.0	12/5/2000	49.78	6524.47	2.0	6574.25	72	6500.3 A	55-75	24.2
B3	1542480	489731	87.0	5.0	12/5/2000	62.15	6512.14	2.6	6574.29	77	6494.7 A	58-78	17.4
B4	1542471	489942	88.8	5.0	12/5/2000	59.60	6515.06	7.4	6574.66	82	6485.3 A	63-83	29.8
B5	1542474	490141	91.0	5.0	12/5/2000	57.23	6516.23	1.4	6573.46	81	6491.1 A	62-82	25.2
B6	1542478	490341	90.0	5.0	12/5/2000	48.94	6528.75	2.0	6577.69	80	6495.7 A	63-83	33.1
B7	1542488	490540	87.0	5.0	9/22/1995	43.82	6530.58	2.2	6574.40	77	6495.2 A	53-78	35.4
B8	1542488	490734	87.0	5.0	12/5/2000	49.94	6525.81	2.3	6575.75	77	6496.5 A	53-78	29.4
B9	1542514	490935	86.0	5.0	12/5/2000	50.32	6525.85	2.2	6576.17	76	6498.0 A	51-78	27.9
B10	1542517	491133	84.8	5.0	6/26/2002	63.26	6513.51	2.3	6576.77	75	6499.5 A	51-78	14.0

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 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
B11	1542517	491329	84.9	5.0	9/23/2004	41.28	6536.11	2.2	6577.39	77	6498.2 A	42-80	37.9
B12	1542524	488915	100.0	5.0	12/8/2004	44.20	6528.82	2.2	6573.02	91	6479.8 A	30-100	49.0
B13	1541841	490223	80.0	5.0	12/9/2004	38.99	6531.05	3.1	6570.04	72	6494.9 A	30-80	36.1
BA	1541835	489440	86.0	5.0	12/6/2004	42.38	6529.20	1.7	6571.58	76	6493.9 A	64-78	35.3
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	12/8/2004	44.56	6530.05	2.6	6574.61	75	6497.0 A	63-83	33.0
BP	1541882	489841	85.4	4.0	12/14/2004	44.11	6528.19	3.0	6572.30	75	6494.3 A	40-85	33.9
* 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	8/31/2004	34.39	6537.47	0.8	6571.86	67	6504.1 A	41-68	33.4
C2	1541630	490566	76.0	5.0	8/31/2004	30.04	6534.98	0.9	6565.02	66	6498.1 A	42-67	36.9
* C3	1541344	490481	75.0	5.0	6/20/1994	36.20	6532.33	0.9	6568.53	65	6502.6 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	6531.18	1.3	6570.84	66	6503.5 A	46-66	27.6
C5	1541344	490869	72.0	5.0	11/9/2004	31.28	6538.57	0.8	6569.85	62	6507.1 A	43-63	31.5
C6	1541533	491142	80.8	5.0	9/21/2004	57.71	6527.18	1.6	6584.89	72	6511.3 A	34-74	15.9
C7	1541734	491280	72.4	5.0	9/21/2004	71.00	6513.44	1.5	6584.44	61	6521.9 A	25-65	0.0
C8	1541906	491415	78.1	5.0	9/21/2004	47.48	6537.01	1.6	6584.49	67	6515.9 A	31-71	21.1
C9	1542075	491545	77.0	5.0	9/21/2004	50.43	6534.12	1.5	6584.55	65	6518.1 A	27-67	16.1
C10	1542182	491629	71.6	5.0	9/21/2004	61.30	6523.96	2.7	6585.26	65	6517.6 A	30-70	6.4
C11	1542376	491844	68.2	5.0	9/21/2004	60.88	6520.50	2.4	6581.38	60	6519.0 A	35-65	1.5
C12	1542375	492029	63.5	5.0	9/21/2004	41.20	6539.35	2.6	6580.55	55	6523.0 A	34-64	16.4
C13	1541394	490655	63.0	5.0	10/29/2001	37.58	6532.43	2.0	6570.01	63	6505.0 A	36-70	27.4
C14	1541413	490713	63.0	5.0	3/7/2002	1.50	6568.19	2.0	6569.69	63	6504.7 A	36-70	63.5
* 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	5/24/2004	45.61	6525.29	1.0	6570.90	80	6489.9 A	58-90	35.4
D2	1542641	492107	70.0	5.0	11/29/1999	0.50	6579.67	3.0	6580.17	62	6515.2 A	40-70	64.5
D3	1542646	491917	80.0	5.0	11/29/1999	0.50	6579.63	2.5	6580.13	72	6505.6 A	40-80	74.0
D4	1542652	491724	78.0	5.0	11/29/1999	0.50	6578.93	2.5	6579.43	70	6506.9 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	—	—	—	2.6	6574.36	72	6499.8 A	30-81	—
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
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	12/8/2004	42.71	6528.60	2.7	6571.31	—	— A	45-65	—

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
DD	1546989	488943	78.5	4.0	5/18/2004	58.52	6534.07	1.9	6592.59	83	6507.7 A	40-80	26.4
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	—	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	6/26/2002	83.45	6502.15	2.9	6585.60	77	6505.7 A	60-80	0.0
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	12/6/2004	53.09	6537.44	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	7/7/2004	30.64	6534.18	1.2	6564.82	62	6501.6 A	45-65	32.6
FB	1540417	488857	62.0	4.0	10/13/2004	34.82	6530.84	2.0	6565.66	58	6505.7 A	43-58	25.2
* 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	3/3/2004	34.60	6528.49	2.0	6563.09	75	6486.1 A	50-80	42.4
GA	1538657	489255	—	4.0	12/9/2004	33.00	6529.79	1.8	6562.79	62	6499.0 A	45-65	30.8
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	12/9/2004	34.34	6531.67	1.8	6566.01	67	6497.2 A	50-120	34.5
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

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
GH	1538807	489509	69.2	4.0	12/9/2004	32.16	6530.60	1.3	6562.76	67	6494.5 A	55-65	36.1
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	12/9/2004	33.67	6533.09	2.4	6566.76	67	6497.4 A	50-120	35.7
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	4/3/2000	4.00	6563.97	1.8	6567.97	70	6496.2 A	50-120	67.8
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	12/5/2002	1.77	6566.39	0.9	6568.16	71	6496.3 A	50-70	70.1
GR	1538619	490619	—	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	12/9/2004	48.73	6528.65	2.5	6577.38	74	6500.9 A	62-82	27.8
GW1	1539755	490530	73.0	5.0	12/9/2004	30.75	6534.52	1.0	6565.27	65	6499.3 A	48-73	35.3
GW2	1539471	490497	75.0	5.0	12/9/2004	31.81	6534.27	1.0	6566.08	68	6497.1 A	47-75	37.2
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	5/25/2004	30.80	6536.40	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
J10	1540138	491436	66.0	5.0	12/5/2000	18.00	6552.91	3.5	6570.91	36	6531.4 A	68-	21.5
J11	1540545	490909	68.0	5.0	12/5/2000	12.00	6557.86	2.0	6569.86	55	6512.9 A	38-66	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

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
K2	1540736	491587	58.9	4.0	8/12/2002	14.90	6557.31	2.5	6572.21	58	6511.7 A	46-56	45.6
K3	1540744	491571	56.7	2.0	10/31/1997	43.44	6527.23	1.3	6570.67	—	— A	53-58	—
K4	1541211	492371	86.2	5.0	10/11/2004	65.30	6536.72	2.5	6602.02	80	6519.5 A	65-85	17.2
K5	1541269	491935	86.4	5.0	10/11/2004	59.71	6542.02	2.8	6601.73	80	6518.9 A	55-85	23.1
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	10/11/2004	57.18	6544.35	2.0	6601.53	79	6520.5 A	56-86	23.8
K8	1541250	492081	86.0	1.0	10/11/2004	54.48	6546.01	2.0	6600.49	78	6520.5 A	66-86	25.5
K9	1541287	491787	86.0	5.0	10/11/2004	62.38	6537.96	2.0	6600.34	79	6519.3 A	56-86	18.6
K10	1541305	491638	87.0	5.0	10/11/2004	67.98	6532.83	2.0	6600.81	81	6517.8 A	47-87	15.0
K11	1541325	491490	84.0	5.0	10/11/2004	68.45	6532.16	2.0	6600.61	78	6520.6 A	64-84	11.6
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	7/12/2004	19.70	6550.03	1.5	6569.73	50	6518.2 A	40-60	31.8
KF	1540870	491169	63.5	5.0	7/13/2004	24.80	6545.41	2.2	6570.21	50	6518.0 A	30-60	27.4
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	12/6/2004	28.54	6543.18	1.2	6571.72	—	— A	-	—
L	1538970	492150	67.0	4.0	10/14/2004	46.88	6528.09	0.8	6574.97	59	6515.2 A	46-66	12.9
L5	1539946	492730	60.2	5.0	10/14/2004	38.30	6537.77	1.3	6576.07	50	6524.8 A	25-55	13.0
L6	1540526	493110	51.1	5.0	10/14/2004	23.36	6551.28	2.1	6574.64	50	6522.5 A	25-55	28.7
L7	1540113	492842	67.8	5.0	10/14/2004	40.56	6536.05	2.3	6576.61	62	6512.3 A	36-66	23.7
L8	1539773	492621	73.9	5.0	10/14/2004	46.30	6530.19	2.1	6576.49	65	6509.4 A	32-72	20.8
L9	1539509	492463	74.9	5.0	10/14/2004	46.44	6530.79	2.2	6577.23	64	6511.0 A	43-73	19.8
L10	1539250	492310	74.2	5.0	10/14/2004	47.70	6529.13	2.0	6576.83	63	6511.8 A	53-73	17.3
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
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	6/26/2002	65.80	6510.30	1.0	6576.10	—	— A	79-99	—
M3R	1542926	489078	115.0	5.0	12/15/2004	50.70	6529.56	2.1	6580.26	108	6470.2 A	55-115	59.4
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	12/9/2004	46.78	6528.56	3.2	6575.34	84	6488.1 A	60-90	40.4
M6	1543097	486674	110.0	5.0	12/8/2004	64.83	6510.21	2.2	6575.04	65	6507.9 A	60-110	2.3
M7	1542790	486523	83.0	5.0	12/8/2004	59.94	6512.91	2.4	6572.85	71	6499.4 A	63-83	13.5
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	12/8/2004	64.80	6512.01	3.5	6576.81	78	6495.3 A	63-103	16.7
M10	1543677	486723	88.0	5.0	12/8/2004	55.43	6517.93	2.3	6573.36	86	6485.1 A	58-88	32.9

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
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	6548.35	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
MA	1541290	487767	85.0	4.0	12/8/2004	45.63	6526.59	1.0	6572.22	85	6486.2 A	70-85	40.4
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	12/8/2004	46.06	6526.00	1.0	6572.06	95	6476.1 A	70-100	49.9
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	12/8/2004	50.71	6521.57	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	12/8/2004	54.92	6519.00	1.0	6573.92	110	6462.9 A	90-110	56.1
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	12/8/2004	54.16	6518.78	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	12/8/2004	49.34	6523.36	2.3	6572.70	80	6490.4 A	56-76	33.0
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	10/13/2004	66.31	6506.58	2.0	6572.89	80	6490.9 A	45-85	15.7
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	12/8/2004	66.51	6507.79	1.6	6574.30	88	6484.7 A	58-98	23.1
MR	1542609	483574	100.0	5.0	11/10/2004	71.40	6494.86	1.8	6566.26	100	6464.5 A	54-94	30.4
MS	1542607	485570	82.0	5.0	11/10/2004	63.68	6506.99	1.5	6570.67	89	6480.2 A	52-82	26.8
MT	1543221	483531	98.0	4.5	11/10/2004	71.09	6496.34	2.3	6567.43	87	6478.1 A	34-94	18.2
MU	1544461	487143	80.0	5.0	12/8/2004	43.44	6530.75	1.5	6574.19	72	6500.7 A	50-80	30.1
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	12/8/2004	64.36	6510.55	1.9	6574.91	83	6490.0 A	35-85	20.5
MX	1541287	486244	103.0	5.0	11/9/2004	53.64	6514.97	1.7	6568.61	94	6472.9 A	63-103	42.1
MY	1542200	486213	112.0	5.0	11/9/2004	59.14	6514.42	3.0	6573.56	102	6468.6 A	72-112	45.9
MZ	1543485	486757	92.0	5.0	12/8/2004	67.90	6508.74	3.0	6576.64	84	6489.6 A	60-92	19.1
N	1545101	489665	92.0	4.0	8/31/2004	51.10	6532.87	0.9	6583.97	80	6503.1 A	54-94	29.8
NA	1545000	491488	91.4	5.0	8/31/2004	54.93	6536.05	1.1	6590.98	80	6509.9 A	50-90	26.2
NB	1545000	491296	96.4	5.0	8/31/2004	50.14	6543.16	3.5	6593.30	80	6509.8 A	50-90	33.4
NC	1545220	491282	95.0	4.0	8/17/2004	50.91	6534.92	0.8	6585.83	85	6500.0 A	65-95	34.9
ND	1545927	494872	70.0	4.0	5/18/2004	47.48	6545.41	1.1	6592.89	65	6526.8 A	50-70	18.6
NE5	1544279	492332	156.8	5.0	3/1/2004	51.64	6615.36	3.2	6667.00		— T	50-110	—
										150	6513.8 A	135-155	101.6

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 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
NW5	1544408	489433	149.8	5.0	3/2/2004	62.32	6595.26	2.7	6657.58		— T	39-79	—
										155	6499.9 A	119-159	95.4
O	1545060	492725	69.9	4.0	8/31/2004	47.31	6540.52	1.3	6587.83	77	6509.5 A	40-70	31.0
P	1546691	491058	109.1	4.0	7/7/2004	55.00	6532.26	1.7	6587.26	107	6478.6 A	82-112	53.7
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	2/16/2004	66.00	6523.79	0.9	6589.79	105	6483.9 A	60-105	39.9
P3	1546159	490785	95.0	5.0	3/9/2004	54.58	6535.37	2.2	6589.95	85	6502.8 A	55-95	32.6
P4	1546504	491899	92.0	5.0	3/9/2004	50.81	6538.71	3.6	6589.52	84	6501.9 A	52-92	36.8
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	5/18/2004	49.59	6544.23	2.3	6593.82	100	6491.5 A	72-102	52.7
R	1550372	494514	85.0	4.0	5/18/2004	42.91	6561.12	0.3	6604.03	95	6508.7 A	60-90	52.4
S	1543871	488816	72.2	4.0	12/8/2004	50.03	6531.14	2.0	6581.17	75	6504.2 A	52-72	27.0
S1	1543288	488401	85.0	2.0	12/6/2004	45.53	6529.66	5.3	6575.19	85	6484.9 A	60-85	44.8
S2	1543127	488299	100.0	3.0	12/8/2004	44.35	6529.37	2.0	6573.72	100	6471.7 A	90-100	57.7
S3	1542857	488714	122.6	5.0	12/8/2004	45.76	6529.02	6.2	6574.78	116	6452.6 A	80-120	76.4
S4	1543344	488359	112.4	5.0	12/8/2004	45.40	6529.89	2.3	6575.29	108	6465.0 A	50-110	64.9
S5	1543269	488923	115.0	5.0	12/6/2004	50.02	6524.67	1.0	6574.69	105	6468.7 A	54-106	56.0
S5R	1543150	488938	115.0	5.0	12/15/2004	50.31	6530.18	1.9	6580.49	109	6469.6 A	55-115	60.6
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	12/13/2004	38.68	6539.71	1.9	6578.39	70	6506.5 A	48-78	33.2
S12	1543297	488628	93.0	5.0	12/8/2004	50.21	6528.64	2.1	6578.85	80	6496.7 A	53-93	31.9
SA	1543122	488811	123.7	5.0	12/5/2000	67.24	6513.07	1.0	6580.31	115	6464.3 A	100-130	48.8
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	12/8/2004	46.42	6532.32	0.7	6578.74	—	— A	-	—
SN	1543752	488716	67.5	4.0	12/8/2004	48.07	6531.19	1.1	6579.26	—	— A	-	—
SO	1543652	488381	92.3	5.0	12/6/2004	47.78	6531.01	0.6	6578.79	—	— A	-	—
SP	1543630	488531	94.4	4.0	12/6/2004	47.71	6530.95	2.0	6578.66	—	— A	-	—
SQ	1543507	488814	95.0	5.0	6/26/2002	58.18	6521.02	0.9	6579.20	95	6483.3 A	55-95	37.7
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	6/26/2002	63.87	6514.51	1.2	6578.38	90	6487.2 A	51-101	27.3
ST	1543215	488688	97.0	5.0	6/26/2002	59.31	6520.00	2.2	6579.31	96	6481.1 A	55-97	38.9

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
* 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	6/26/2002	62.86	6517.86	2.6	6580.72	106	6472.1 A	35-115	45.7
SV	1543676	488813	78.2	6.0	6/26/2002	64.60	6514.65	1.7	6579.25	100	6477.6 A	55-105	37.1
SW	1543783	488812	81.9	6.0	5/19/2004	56.44	6524.85	2.9	6581.29	75	6503.4 A	35-80	21.5
SX	1544510	489025	45.0	5.0	—	—	—	1.0	6581.49	40	6540.5 A	20-40	—
SZ	1544367	488833	62.6	5.0	12/8/2004	42.10	6539.37	0.4	6581.47	60	6521.1 A	40-70	18.3
T	1542536	492260	70.2	4.0	2/16/2004	35.90	6543.33	2.4	6579.23	68	6508.8 A	61-71	34.5
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	12/9/2004	128.48	6536.34	1.6	6664.82	180	6483.2 A	100-186	53.1
T4	1543340	489699	205.0	5.0	12/9/2004	98.13	6559.61	2.9	6657.74	175	6479.8 A	145-205	79.8
T5	1543307	490289	182.0	5.0	12/9/2004	123.99	6533.34	3.1	6657.33	151	6503.2 A	122-182	30.1
T6	1543282	490655	160.0	5.0	12/9/2004	124.15	6534.62	3.3	6658.77	156	6499.5 A	130-160	35.1
T7	1543272	491484	160.0	5.0	12/9/2004	123.00	6536.67	2.4	6659.67	142	6515.3 A	130-160	21.4
T8	1543296	491914	162.0	5.0	12/9/2004	124.00	6537.61	2.6	6661.61	158	6501.0 A	132-162	36.6
T9	1543347	492337	141.0	5.0	12/9/2004	98.36	6565.59	3.3	6663.95	138	6522.7 A	121-141	42.9
T10	1543434	492791	148.0	5.0	12/9/2004	109.75	6550.21	2.4	6659.96	142	6515.6 A	108-148	34.7
T11	1544585	489887	193.0	5.0	12/9/2004	124.87	6531.94	2.8	6656.81	160	6494.0 A	113-193	37.9
T12	1544583	490317	200.0	5.0	12/9/2004	96.50	6560.73	2.8	6657.23	170	6484.4 A	120-200	76.3
T17	1544008	489430	183.0	5.0	12/9/2004	125.79	6531.12	3.0	6656.91	170	6483.9 A	143-183	47.2
T18	1543977	490333	195.0	5.0	12/9/2004	145.12	6520.04	2.9	6665.16	162	6500.3 A	115-195	19.8
T19	1543958	490722	167.0	5.0	12/9/2004	133.84	6533.92	2.6	6667.76	162	6503.2 A	137-167	30.8
T20	1543935	491048	170.0	5.0	12/9/2004	135.30	6535.39	1.4	6670.69	162	6507.3 A	140-170	28.1
T21	1543951	491882	170.0	5.0	12/9/2004	131.89	6538.11	1.6	6670.00	163	6505.4 A	140-170	32.7
T22	1543876	492311	165.0	5.0	12/9/2004	64.18	6603.01	2.1	6667.19	160	6505.1 A	120-165	97.9
T40	1543819	491466	170.0	5.0	12/9/2004	133.17	6537.10	2.4	6670.27	165	6502.9 A	140-170	34.2
T41	1543278	491079	160.0	5.0	12/9/2004	124.68	6535.28	3.2	6659.96	155	6501.8 A	130-160	33.5
TA	1542471	492426	62.4	5.0	9/22/2004	35.07	6545.23	2.4	6580.30	55	6522.9 A	35-65	22.3
TB	1542351	492616	64.4	5.0	9/23/2004	37.28	6546.29	1.9	6583.57	55	6526.7 A	35-65	19.6
W	1542302	487297	99.3	4.0	12/8/2004	47.75	6524.39	0.3	6572.14	117	6454.8 A	58-118	69.6
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	3/2/2004	58.10	6604.68	3.0	6662.78		— T	40-100	—
										165	6494.8 A	50-190	109.9
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

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
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	12/8/2004	1.00	6567.19	1.1	6568.19	85	6482.1 A	55-85	85.1
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	11/29/2004	20.88	6550.73	1.7	6571.61	—	— A	-	—
X1	1540671	492129	54.0	5.0	8/12/2002	7.50	6566.04	3.9	6573.54	47	6522.6 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	4/9/2002	29.06	6557.02	3.8	6586.08	49	6533.3 A	37-57	23.8

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 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
X19	1544753	493437	63.0	5.0	4/9/2002	45.56	6539.64	4.5	6585.20	56	6524.8 A	33-63	14.9
X20	1544855	493256	71.0	5.0	4/9/2002	47.00	6538.73	3.5	6585.73	64	6518.2 A	31-71	20.5
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	12/5/2000	46.27	6539.03	5.1	6585.30	64	6516.2 A	31-71	22.8
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

Note: A = Alluvial Aquifer, Base
T = Tailings Aquifer
* = Well Abandoned
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

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 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
					Broadview								
0410	1537440	489840	105.0	6.0	8/26/2003	36.60	6523.06	0.0	6559.66	75	6484.7 A	90-105	38.4
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	1538230	490800	—	—	—	—	—	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	1538280	490390	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	-	—
											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
											6450.0 U	125-130	
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	1537940	490810	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	—	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	1537720	488850	110.0	6.0	9/8/1983	41.28	6518.72	0.0	6560.00	60	6500.0 A	60-95	18.7
											6500.0 U	60-95	
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
											6430.0 U	120-142	
0448	1537400	489100	—	—	—	—	—	0.0	6561.00	—	— A	-	—
0450	1537480	490710	—	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
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	-	—
SUB1	1537620	489100	—	4.0	5/4/2004	33.95	6527.05	0.0	6561.00	—	— A	-	—

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
SUB2	1537395	490320	—	4.0	5/4/2004	40.10	6527.47	0.0	6567.57	—	— A	-	—
SUB3	1538280	489420	84.0	6.0	5/4/2004	28.76	6528.31	0.0	6557.07	72	6485.1 A	56-72	43.2
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	1536985	489604	260.0	5.0	12/12/2003	40.00	6522.66	0.0	6562.66	80	6482.7 A	220-260	40.0
											6352.7 M	220-260	
0483	1536586	489753	280.0	5.0	7/24/1996	36.93	6525.73	0.0	6562.66	40	6522.7 A	-	3.1
											6497.7 U	-	
											6326.7 M	270-300	
0490	1536540	489756	63.0	4.0	5/20/2004	36.54	6525.88	0.0	6562.42	75	6487.4 A	20-80	38.5
0491	1537025	489662	63.0	4.0	8/23/2004	38.30	6524.32	0.0	6562.62	40	6522.6 A	30-63	1.7
0492	1537220	489280	60.0	4.0	5/20/2004	34.10	6526.58	1.2	6560.68	55	6504.5 A	40-60	22.1
0495	1537400	497100	—	—	—	—	—	0.0	6571.00	—	— A	-	—
0496	1534650	489603	94.4	5.0	12/10/2004	55.55	6506.97	1.6	6562.52	86	6474.9 A	53-93	32.1
0497	1535039	489503	94.0	5.0	12/10/2004	54.84	6507.78	2.0	6562.62	89	6471.6 A	64-94	36.2
0498	1534661	488953	150.0	6.0	12/10/2004	58.28	6502.31	2.0	6560.59	80	6478.6 A	70-110	
											6478.6 M	130-150	
CW44	1535048	488891	208.0	6.0	12/14/2004	60.20	6500.54	2.5	6560.74	94	6464.2 A	-	36.3
											6428.2 M	69-208	

Note: A = Alluvial Aquifer, Base
U = Upper Chinle Aquifer, Top
M = Middle Chinle Aquifer, Top
* = Well Abandoned
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

TABLE 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 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
						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	93.2	5.0	11/4/2004	41.01	6528.04	3.0	6569.05	82	6484.1 A	60-90	44.0
0802	1540790	488190	98.0	6.0	5/22/1997	40.20	6522.52	0.0	6562.72	81	6481.7 A	75-81	40.8
0803	1540800	487430	—	6.0	9/19/1983	84.86	6476.14	0.0	6561.00		— C	85-180	—
										85	6476.0 A	85-180	0.1
0804	1540790	486790	137.0	6.0	5/7/2002	46.60	6515.40	0.0	6562.00	85	6477.0 A	125-136	38.4
0805	1540695	486373	140.0	5.0	10/6/1994	59.34	6507.66	0.0	6567.00	110	6457.0 A	100-140	50.7
0810	1540290	486700	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	7/7/2004	34.57	6521.56	1.2	6556.13	70	6484.9 A	35-75	36.6
0845	1537280	487833	65.0	4.0	8/17/2004	34.66	6522.39	1.7	6557.05	55	6500.4 A	45-65	22.0
AW	1540235	488015	156.0	6.0	6/29/2004	36.50	6526.93	0.1	6563.43	63	6500.3 A	-	26.6
											6463.3 U	66-155	
HW	1540900	487430	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	1541270	486020	—	4.5	7/12/2002	55.36	6514.64	—	6570.00	—	— A	-	—
0688	1541257	483955	105.0	5.0	5/20/2004	62.94	6499.68	2.9	6562.62	95	6464.7 A	65-105	35.0
0831	1540090	486030	—	—	9/6/1983	54.95	6506.05	0.0	6561.00	—	— A	-	—
0833	1539250	485350	110.0	6.0	12/10/1996	46.61	6511.39	0.0	6558.00	103	6455.0 A	60-90	56.4
0834	1540260	484800	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	1541120	485465	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	1541265	485995	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
U = Upper Chinle Aquifer, Top
C = Chinle Shale
* = Well Abandoned
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

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 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
0520	1538934	492935	75.0	5.0	12/14/2004	53.26	6532.76	0.3	6586.02	68	6517.7 A	35-75	15.0
0521	1539104	492588	75.0	5.0	10/7/2004	59.88	6524.56	2.5	6584.44	65	6516.9 A	35-75	7.6
0522	1538640	492437	77.0	5.0	10/7/2004	52.64	6527.89	2.8	6580.53	68	6509.7 A	37-77	18.2
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	12/10/2004	81.98	6466.96	2.2	6548.94	95	6451.7 A	50-90	15.2
											6413.7 L	130-170	
0539	1534014	487596	210.0	6.0	12/10/2004	75.60	6479.72	2.0	6555.32	100	6453.3 A	50-70	28.4
										100	A	80-100	
											6378.3 L	170-210	101.4
0540	1534125	488091	90.0	5.0	12/10/2004	66.28	6489.63	2.7	6555.91	80	6473.2 A	30-90	16.4
0541	1539831	477236	118.0	5.0	12/10/2004	88.71	6466.91	2.0	6555.62	112	6441.6 A	78-118	25.3
0631	1532234	483756	118.0	6.0	12/10/2004	90.61	6450.49	2.2	6541.10	109	6429.9 A	58-118	20.6
0632	1531850	483767	110.0	6.0	12/10/2004	90.05	6451.25	3.0	6541.30	102	6436.3 A	70-110	14.9
0633	1541467	479642	83.0	8.0	12/10/2004	75.00	6482.56	0.0	6557.56	95	6462.6 A	11-83	20.0
0634	1541652	480362	103.0	4.5	12/10/2004	72.75	6487.32	2.8	6560.07	95	6462.3 A	80-100	25.1
0635	1535363	478401	63.0	12.0	—	—	—	—	6546.25	—	— A	4-63	—
0636	1545374	476038	123.0	4.5	9/15/2004	100.38	6473.06	2.3	6573.44	119	6452.1 A	103-123	20.9
0637	1545409	474710	124.0	4.5	9/15/2004	106.48	6468.72	2.5	6575.20	118	6454.7 A	104-124	14.0
0638	1539628	493265	75.0	5.0	12/14/2004	49.45	6536.11	0.0	6585.56	65	6520.6 A	35-75	15.5
0639	1539370	492961	80.0	5.0	10/7/2004	63.00	6524.88	2.5	6587.88	71	6514.4 A	35-80	10.5
0640	1537790	491961	84.0	5.0	12/14/2004	51.25	6528.72	2.2	6579.97	77	6500.8 A	64-84	28.0
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	12/10/2004	83.83	6460.07	2.2	6543.90	102	6439.7 A	55-110	20.4
0645	1532924	485282	80.0	5.0	10/19/1998	66.48	6477.31	2.5	6543.79	70	6471.3 A	60-80	6.0
0646	1533246	484953	100.0	5.0	1/7/2004	82.49	6460.86	1.5	6543.35	91	6450.9 A	60-100	10.0
0647	1536623	478308	140.0	4.5	12/10/2004	100.20	6451.71	1.4	6551.91	132	6418.5 A	80-140	33.2
0648	1534730	478343	120.0	4.5	12/10/2004	105.50	6442.29	0.5	6547.79	120	6427.3 A	80-120	15.0
0649	1534730	479798	124.0	4.5	12/10/2004	98.10	6445.19	0.3	6543.29	115	6428.0 A	84-124	17.2
0650	1536779	482135	109.0	4.5	12/14/2004	80.14	6466.97	2.2	6547.11	103	6441.9 A	89-109	25.1
0652	1531170	483779	88.0	5.0	12/10/2004	85.75	6452.40	1.5	6538.15	79	6457.7 A	60-88	0.0

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
0653	1533283	486570	206.0	6.0	12/10/2004	79.76	6465.21	1.3	6544.97	97	6446.7 A	69-206	18.5
											6408.7 L	-	
0654	1541994	478636	120.0	4.5	12/10/2004	73.80	6476.70	1.4	6550.50	106	6443.1 A	60-120	33.6
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	5/2/2000	77.32	6476.75	—	6554.07	88	— A	6-88	—
0657	1537497	478392	128.0	6.0	12/10/2004	96.80	6455.01	2.2	6551.81	120	6429.6 A	87-128	25.4
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	12/10/2004	101.92	6448.26	0.4	6550.18	129	6420.8 A	89-130	27.5
0658A	1535589	478423	30.6	—	—	—	—	—	6546.10	—	— A	14-31	—
0659	1541689	480772	101.0	4.5	12/10/2004	72.72	6487.45	2.0	6560.17	97	6461.2 A	61-101	26.3
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	4/3/2001	80.80	6473.17	2.8	6553.97	102	6449.2 A	54-94	24.0
0683	1540198	476217	120.0	6.0	10/4/2004	88.40	6467.64	2.0	6556.04	140	6414.0 A	80-120	53.6
0684	1540273	478499	143.0	6.0	10/5/2004	84.79	6468.49	2.0	6553.28	118	6433.3 A	83-143	35.2
0685	1539098	478170	100.0	4.5	12/10/2004	93.48	6463.09	1.7	6556.57	116	6438.9 A	60-100	24.2
0686	1545319	475438	115.0	4.5	9/15/2004	108.63	6470.17	1.8	6578.80	136	6441.0 A	75-115	29.2
0687	1539011	477276	102.0	6.0	12/10/2004	92.55	6463.41	2.2	6555.96	120	6433.8 A	62-102	29.6
0689	1530024	478478	80.0	4.5	7/27/2004	73.51	6468.51	2.6	6542.02	75	6464.4 A	60-80	4.1
0692	1535892	493175	90.0	5.0	7/28/2004	65.57	6519.25	2.5	6584.82	80	6502.3 A	58-90	16.9
0846	1537219	484730	75.0	4.0	7/7/2004	44.51	6504.41	1.1	6548.92	65	6482.8 A	40-65	21.6
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	8/19/2004	79.98	6466.46	3.3	6546.44	80	6463.1 A	41-91	3.3
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	8/19/2004	91.52	6449.59	2.1	6541.11	97	6442.0 A	70-105	7.6
0861	1534332	488702	100.0	5.0	8/30/2004	72.84	6487.01	2.3	6559.85	65	6492.6 A	50-100	0.0
0862	1534265	487800	110.0	5.0	12/10/2004	62.75	6493.43	3.3	6556.18	97	6455.9 A	63-103	37.5
0863	1533867	487912	110.0	5.0	8/21/2003	8.00	6548.56	2.5	6556.56	94	6460.1 A	63-103	88.5
0864	1533735	486464	95.0	5.0	11/17/2004	79.20	6467.52	1.9	6546.72	78	6466.9 A	44-84	0.7
0865	1534123	488429	97.0	5.0	12/11/2002	71.98	6484.80	2.2	6556.78	88	6466.6 A	37-97	18.2
0866	1534494	488340	120.0	5.0	8/21/2003	2.60	6555.52	1.8	6558.12	80	6476.3 A	33-113	79.2
0867	1533762	488409	88.0	5.0	12/10/2004	68.45	6487.45	2.0	6555.90	86	6467.9 A	48-88	19.6
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	12/10/2004	82.86	6461.63	2.0	6544.49	99	6443.5 A	44-94	18.1
* 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

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
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	12/10/2004	83.71	6460.55	1.9	6544.26	85	6457.4 A	58-88	3.2
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	12/10/2004	69.18	6475.37	2.2	6544.55	62	6480.4 A	48-68	0.0
0881	1542034	481478	96.0	4.5	12/10/2004	77.00	6488.04	2.0	6565.04	103	6460.0 A	76-96	28.0
0882	1541404	482396	110.0	4.5	10/4/2004	70.64	6490.52	2.0	6561.16	98	6461.2 A	70-110	29.3
0883	1540097	483039	100.0	5.0	10/5/2004	62.16	6494.97	1.9	6557.13	96	6459.3 A	60-90	35.7
0884	1542677	481498	90.0	5.0	10/4/2004	82.36	6483.74	1.0	6566.10	85	6480.2 A	58-88	3.6
0885	1541919	483474	100.0	5.0	12/10/2004	69.38	6495.26	1.5	6564.64	95	6468.1 A	70-100	27.1
0886	1542327	482487	90.0	5.0	12/10/2004	73.25	6491.30	1.5	6564.55	87	6476.1 A	60-90	15.3
0887	1543063	482469	67.0	5.0	3/12/1998	69.21	6498.52	1.5	6567.73	60	6506.2 A	42-67	0.0
0888	1542285	479335	105.0	5.0	12/10/2004	78.00	6479.33	1.1	6557.33	90	6466.2 A	75-105	13.1
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	12/10/2004	74.70	6483.73	1.7	6558.43	93	6463.7 A	81-101	20.0
0893	1541934	482244	98.0	4.5	12/10/2004	72.92	6491.05	2.1	6563.97	93	6468.9 A	78-98	22.2
0894	1541976	478317	78.0	4.5	10/2/2002	77.12	6477.17	3.0	6554.29	97	6454.3 A	58-78	22.9
0895	1541521	476222	104.0	5.0	10/4/2004	82.59	6471.25	2.4	6553.84	116	6435.4 A	61-101	35.8
0896	1542246	476237	113.0	5.0	10/4/2004	83.55	6472.06	2.0	6555.61	117	6436.6 A	73-113	35.4
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	10/4/2004	97.46	6473.38	2.0	6570.84	120	6448.8 A	70-110	24.5
0905	1532700	480850	120.0	5.0	—	—	—	0.0	6545.00	120	6425.0 A	100-120	—
0906	1532900	480450	—	—	8/29/1995	74.65	6462.75	0.0	6537.40	—	— A	-	—
0909	1531900	483400	140.0	4.0	11/19/1982	77.45	6461.45	0.0	6538.90	112	6426.9 L 6426.9 A	80-135 80-135	34.6
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	93.0	6.0	5/17/2004	40.86	6601.14	1.4	6642.00	—	— A	-	—
0915	1552650	499650	100.0	4.0	—	—	—	0.0	6625.00	70	6555.0 A	55-85	—
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	73.0	5.0	5/17/2004	38.02	6585.98	1.9	6624.00	—	— A	-	—
0922	1555200	492500	96.0	6.0	5/17/2004	51.74	6569.96	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	10/5/2004	90.11	6468.01	2.6	6558.12	125	6430.5 A	95-132	37.5
0936	1543621	472978	160.0	5.0	—	—	—	0.0	6573.38	160	6413.4 A	100-160	—
0939	1539750	483200	97.0	8.0	7/25/1996	59.31	6497.69	2.3	6557.00	—	— A	-	—
0940	1537750	482850	70.0	—	7/24/1996	57.30	6495.70	8.8	6553.00	—	— A	-	—
0942	1538300	483710	102.0	—	—	—	—	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	1539640	482880	—	—	—	—	—	0.0	6556.00	—	— A	-	—
0976	1539630	483100	115.0	—	—	—	—	0.0	0.00	—	— A	-	—
0977	1539400	482730	—	—	12/9/1995	61.47	6495.53	1.0	6557.00	—	— A	-	—
0979	1539010	483280	105.0	5.0	7/10/2002	57.56	6593.44	0.0	6651.00	100	6551.0 A	90-100	42.4
0980	1539040	483080	—	—	11/8/1995	57.70	6497.30	0.0	6555.00	—	— A	-	—
0981	1538970	482820	—	—	—	—	—	0.0	6554.00	—	— A	-	—
0982	1538370	483290	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	1538820	483180	115.0	5.0	7/18/1996	58.75	6592.25	0.0	6651.00	102	6549.0 A	90-110	43.3
0989	1537890	482760	—	—	11/2/1995	58.10	6494.90	1.0	6553.00	—	— A	-	—
0992	1539340	483780	100.0	5.0	—	—	—	0.0	6652.00	95	6557.0 A	85-95	—
0993	1537860	483680	102.0	5.0	—	—	—	0.0	6650.00	98	6552.0 A	85-98	—
0994	1539700	476240	144.0	6.0	10/20/2004	92.27	6462.73	0.0	6555.00	—	— L	95-110	—
										—	— A	95-110	—
0996	1537621	477989	138.0	5.0	12/10/2004	98.10	6454.42	1.7	6552.52	136	6414.8 A	126-136	39.6
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	-	—

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
1020	—	—	—	5.0	1/18/1996	15.17		0.0	0.00	—	—A	-	—
1021	—	—	—	—	1/18/1996	18.00		0.0	0.00	—	—A	-	—

Note: A = Alluvial Aquifer, Base
L = Lower Chinle Aquifer, Top
* = Well Abandoned
MP = Measuring Point
LSD = Land Surface Datum
IN = Inches
FT = Feet
MSL = Mean Sea Level

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 2004 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 2004 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. The 2004 ground water flow patterns in the alluvial aquifer are very similar to those observed in the Fall of 2003 However, in 2004 there exists a ridge in the piezometric surface west of the Large Tailings Pile which is attributable to injection of water into the injection line (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 2004 to that which was observed in 2003. 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 of 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 2003 to 2004 as a result of pumping irrigation supply water from seven 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 2004. The water levels in Section 28 were fairly similar to the 2003 levels even though irrigation supply wells were pumped in this area. The injection of water in the western portion of Section 28 probably supported these steady water levels.

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. 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 has been increased somewhat due to irrigation water withdrawal, but it is still relatively flat in the Rio San Jose alluvium due to its large transmitting ability. 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. 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 nine 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 2004 except for a small decline in water levels in wells DD and P.

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 reversed between wells SO and SP. Water-level rises were observed in these two wells in 2003 and 2004 due to injection of fresh water into the injection line. However, an adequate gradient reversal was maintained during this rise.

Wells S1 and S2 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 loss in the reversal of the ground water flow direction due to 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. Water levels from well S5 have been added to demonstrate the reversal between wells S2 and S5. This data shows that a strong reversal has been maintained.

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 increased in 2004 due to the injection into the injection line. The rise in water levels in wells BC, S, S4 and S11 has been greater than three feet in the last year.

The alluvial water levels north of Murray Acres were fairly steady in 2004 in wells MO, MQ, MS and MY. Water levels increased in well W in 2004 (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 generally rose more than one foot over the last year.

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 during 2004 with a larger increase in the wells located northwest of the collection ponds and closer to the injection line.

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 2004, 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 variation in water levels in well B11 is due to fluctuations in the collection rate from this well. Injection of R.O. product and fresh water has caused the higher water-level elevations observed in well L6. A rise in the water level at well TA occurred in 2004.

Figure 4.2-12 shows the water-level elevation plots for wells I, KEB, KF and X. Water levels were fairly steady in these wells in 2004 due to consistent injection with the exception of a gradual decline observed in well X.

Water-level elevations in the alluvial aquifer south of the Broadview Acres injection system were fairly steady during 2004 (see water levels for wells 490, 497, GH and SUB1 on Figure 4.2-13). The seasonal water level changes in well 497 are due to the irrigation program.

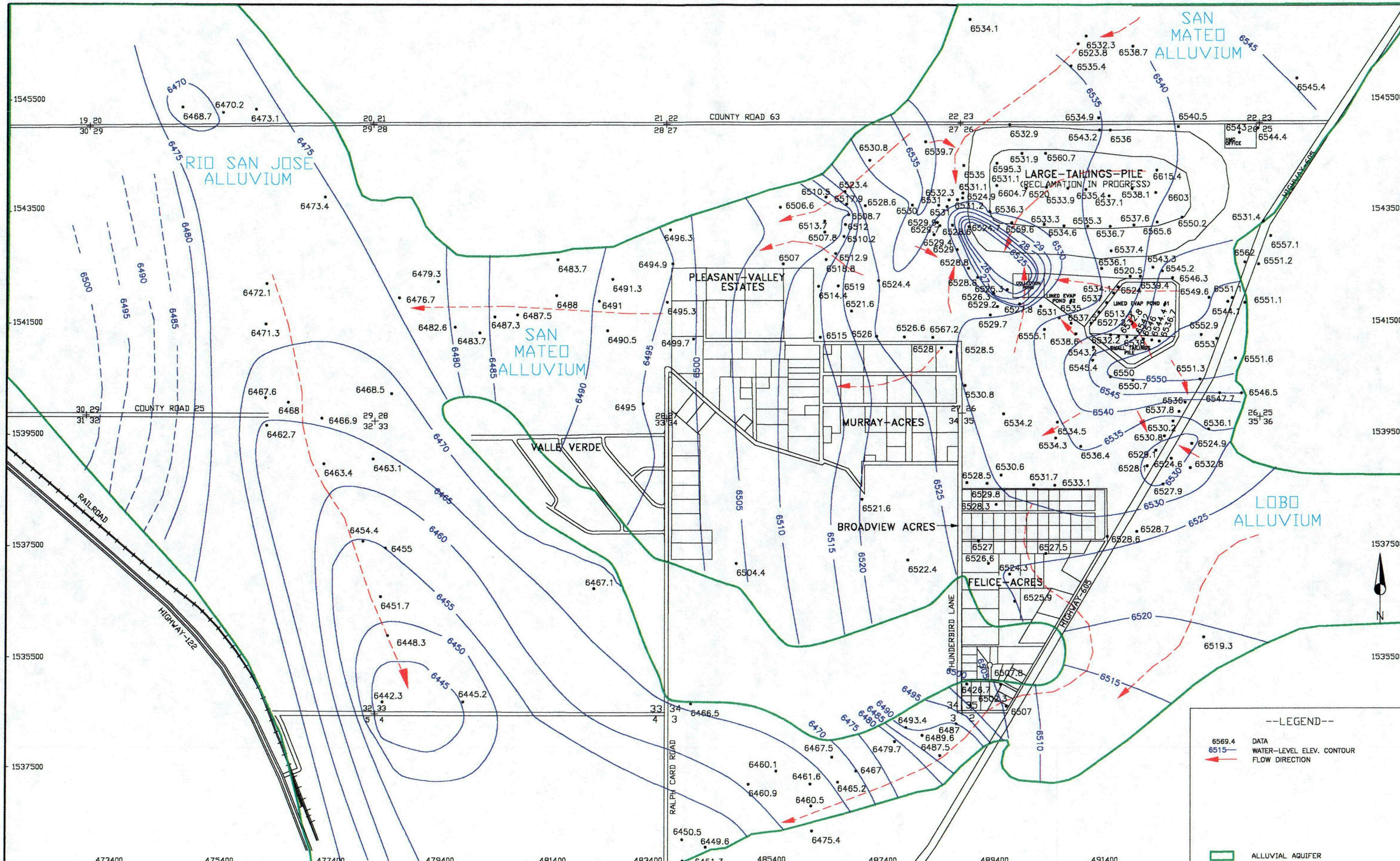
Water levels in the Murray Acres area were also fairly steady in alluvial wells 688, 844, 846, FB and MX during 2004 except for a continued gradual decrease in the water level in well 688 (see Figure 4.2-14).

Figure 4.2-15 presents water-level hydrographs for six wells in Section 3. Wells 653, 855, 862 and 869 are irrigation supply wells, and therefore the dramatic changes in water level reflect periods of pumping. Water levels in alluvial well 652 have gradually declined over the last five 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, 886 and 890 were used as irrigation supply wells. Late season water levels in 2004 were similar to those at a similar time in recent years except for a decline in levels from wells 881 and MR. 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 and 899 was observed in 2004.

Figure 4.2-18 presents the water-level plots for the Section 33 wells shown on Figure 4.2-2. Wells 648, 649, 657, 658 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 2004 are 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.



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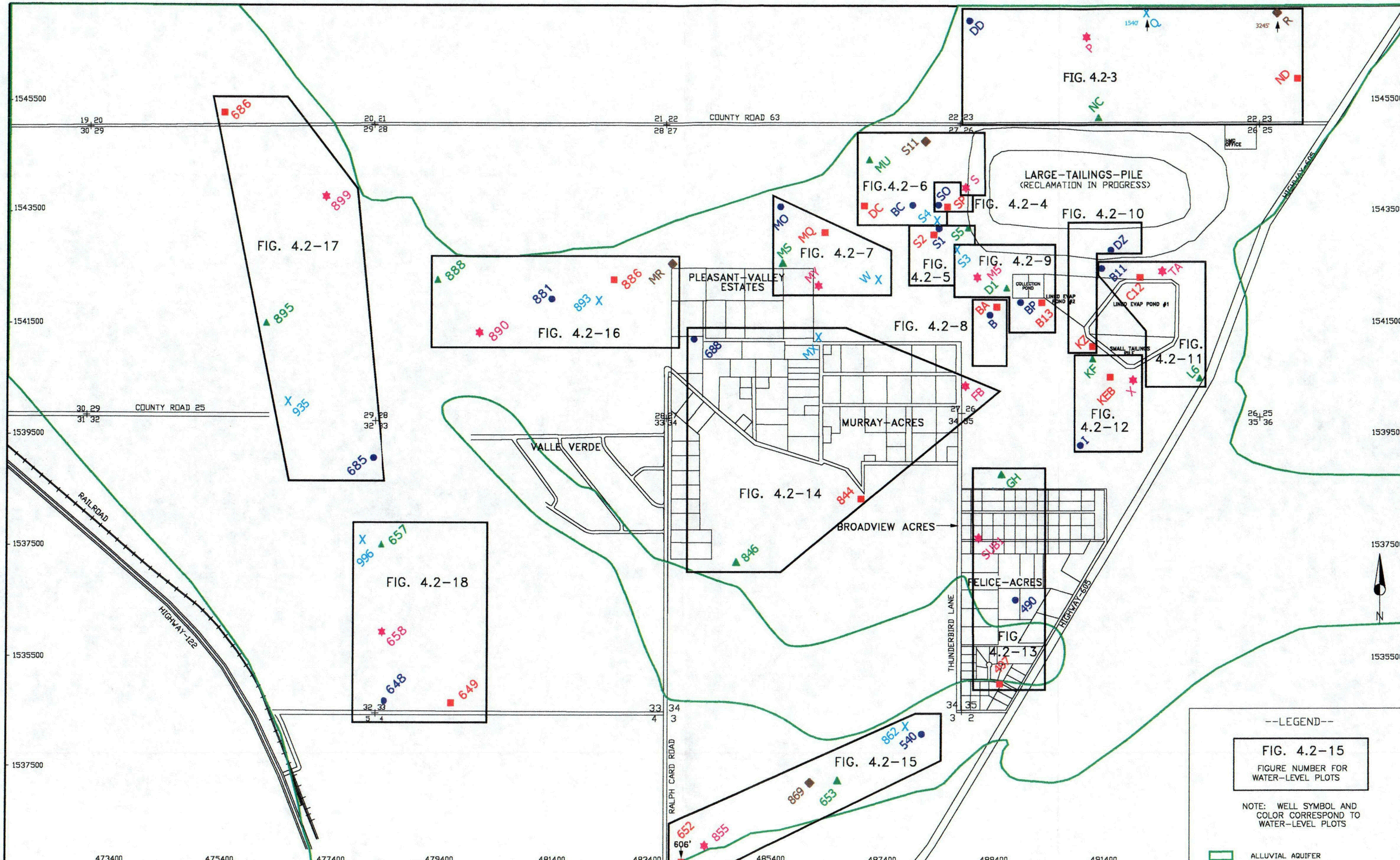
DATE: 03/22/05

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

FIGURE 4.2-1. WATER-LEVEL ELEVATIONS FOR THE ALLUVIAL AQUIFER, FALL 2004, FT-MSL

C10



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DATE: 03/22/05

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

C11

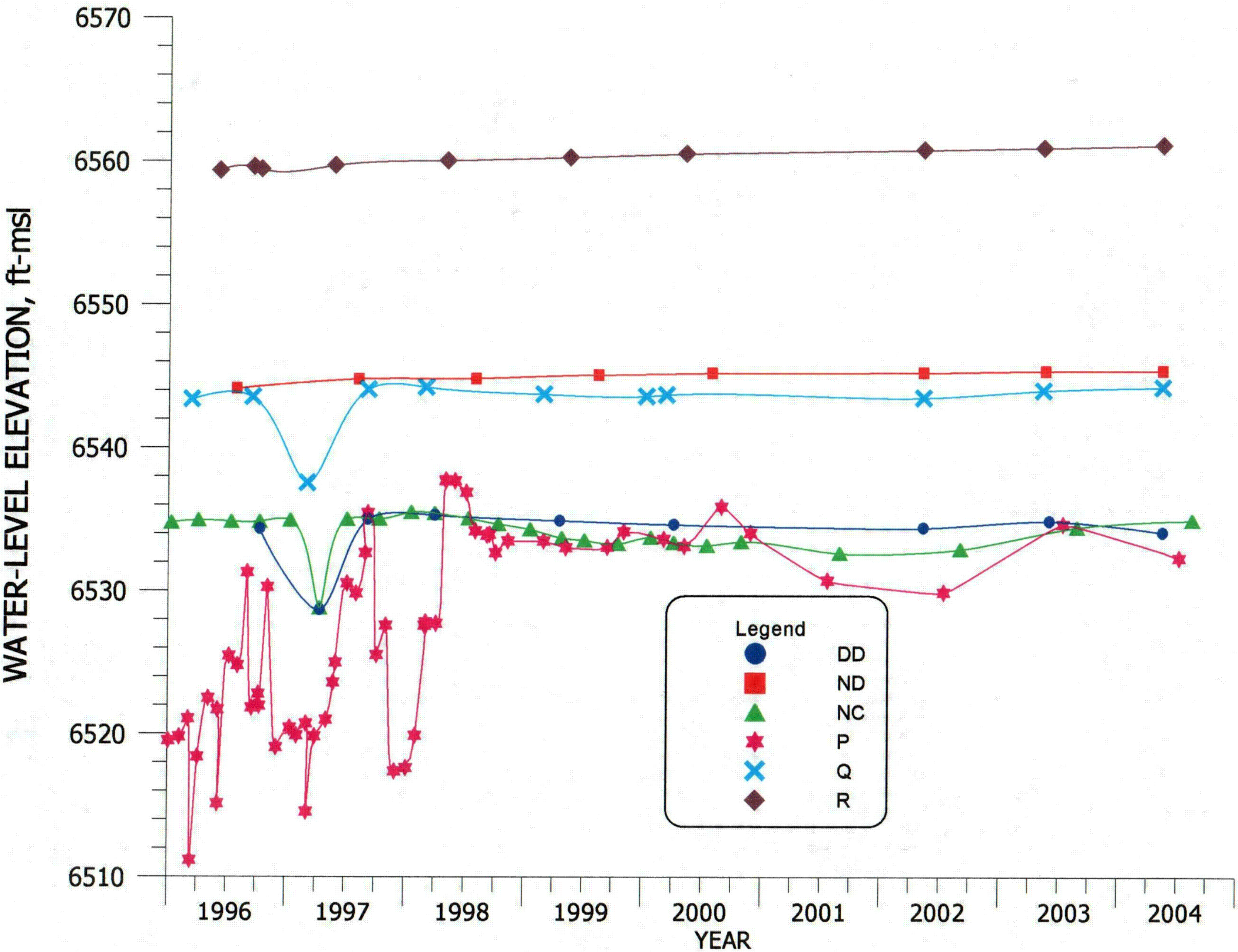


FIGURE 4.2-3. WATER-LEVEL ELEVATION FOR WELLS DD, ND, NC, P, Q AND R.

C12

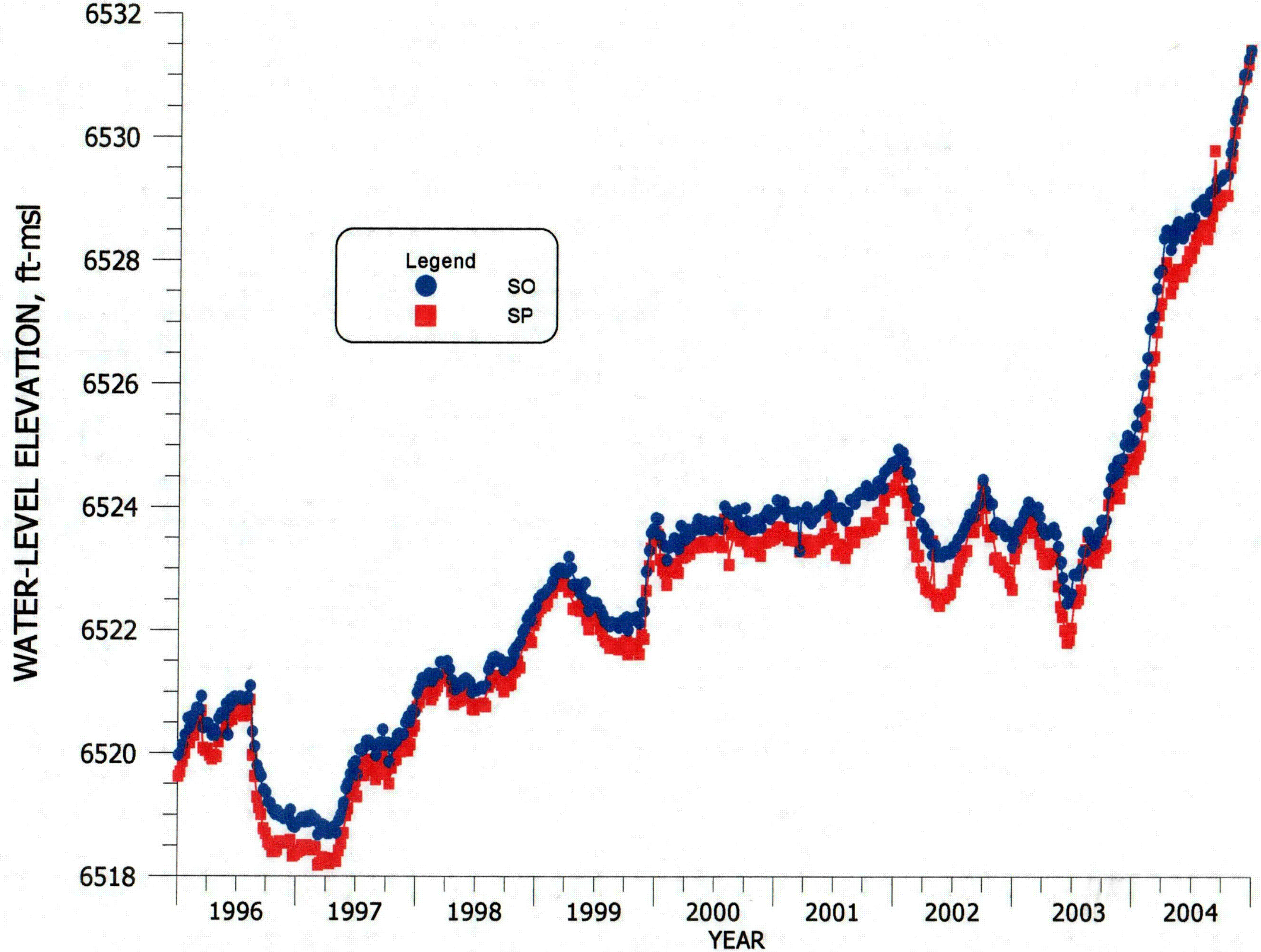


FIGURE 4.2-4. WATER-LEVEL ELEVATION FOR WELLS SO AND SP.

C13

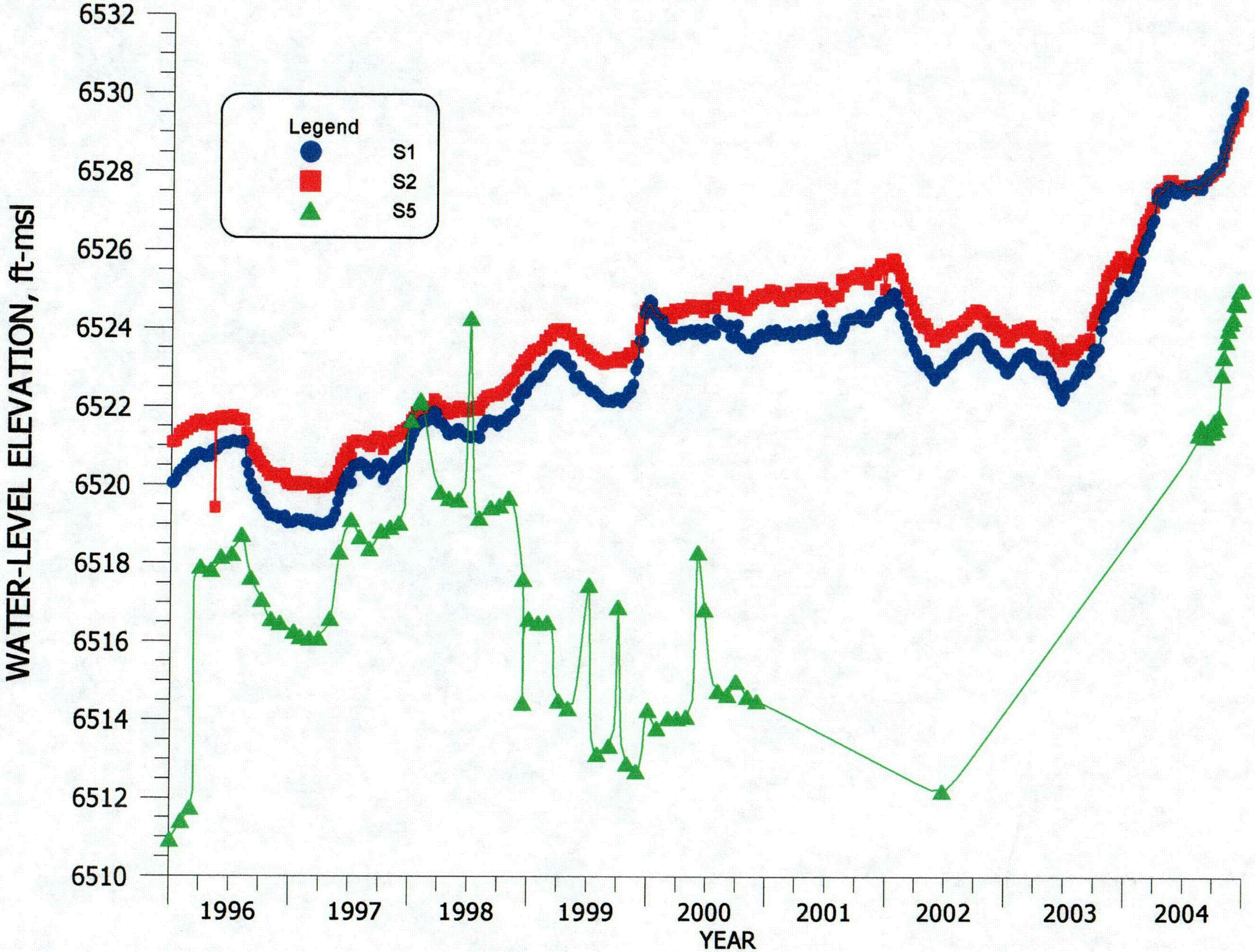


FIGURE 4.2-5. WATER-LEVEL ELEVATION FOR WELLS S1, S2 AND S5.

C14

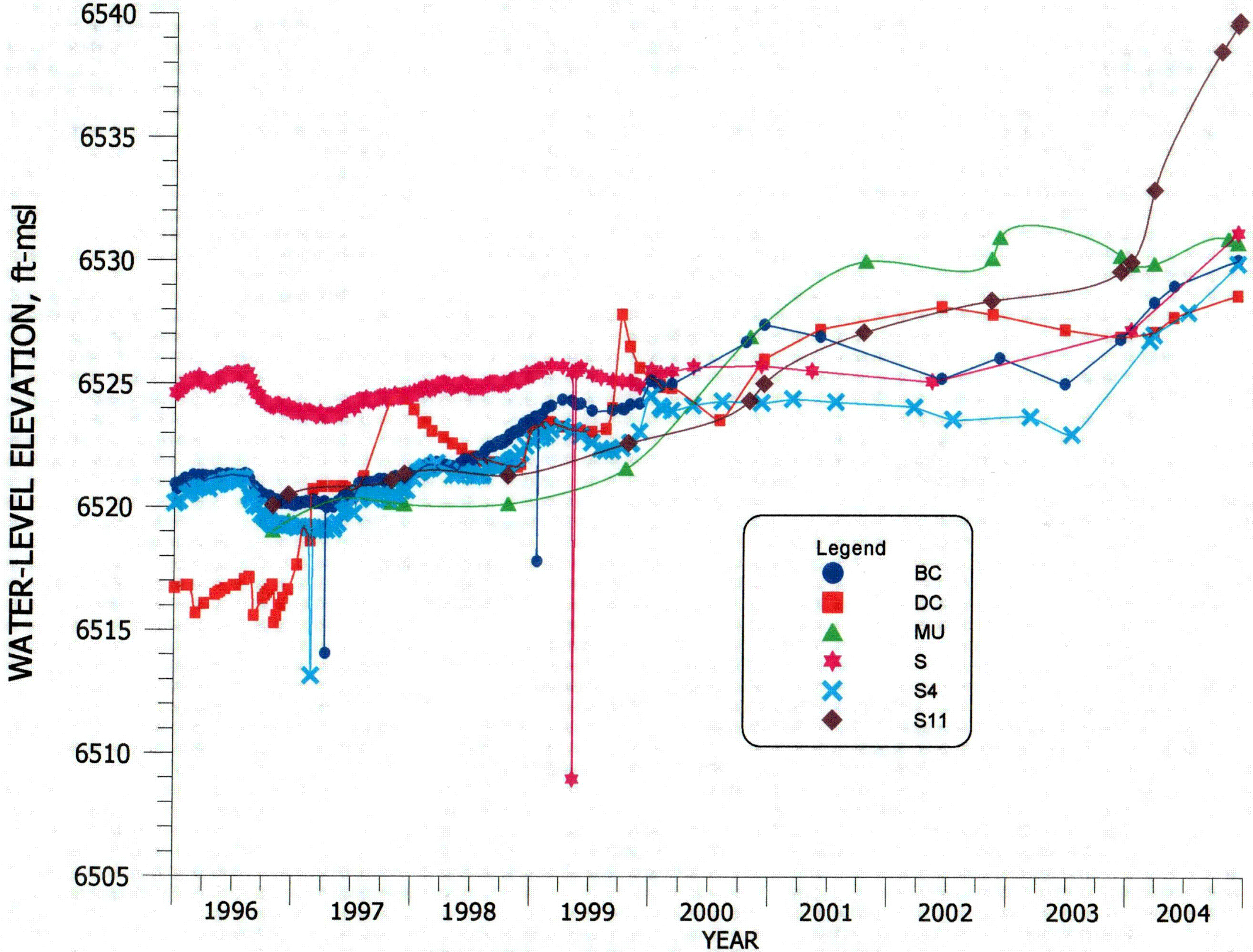


FIGURE 4.2-6. WATER-LEVEL ELEVATION FOR WELLS BC, DC, MU, S, S4 AND S11.

C15

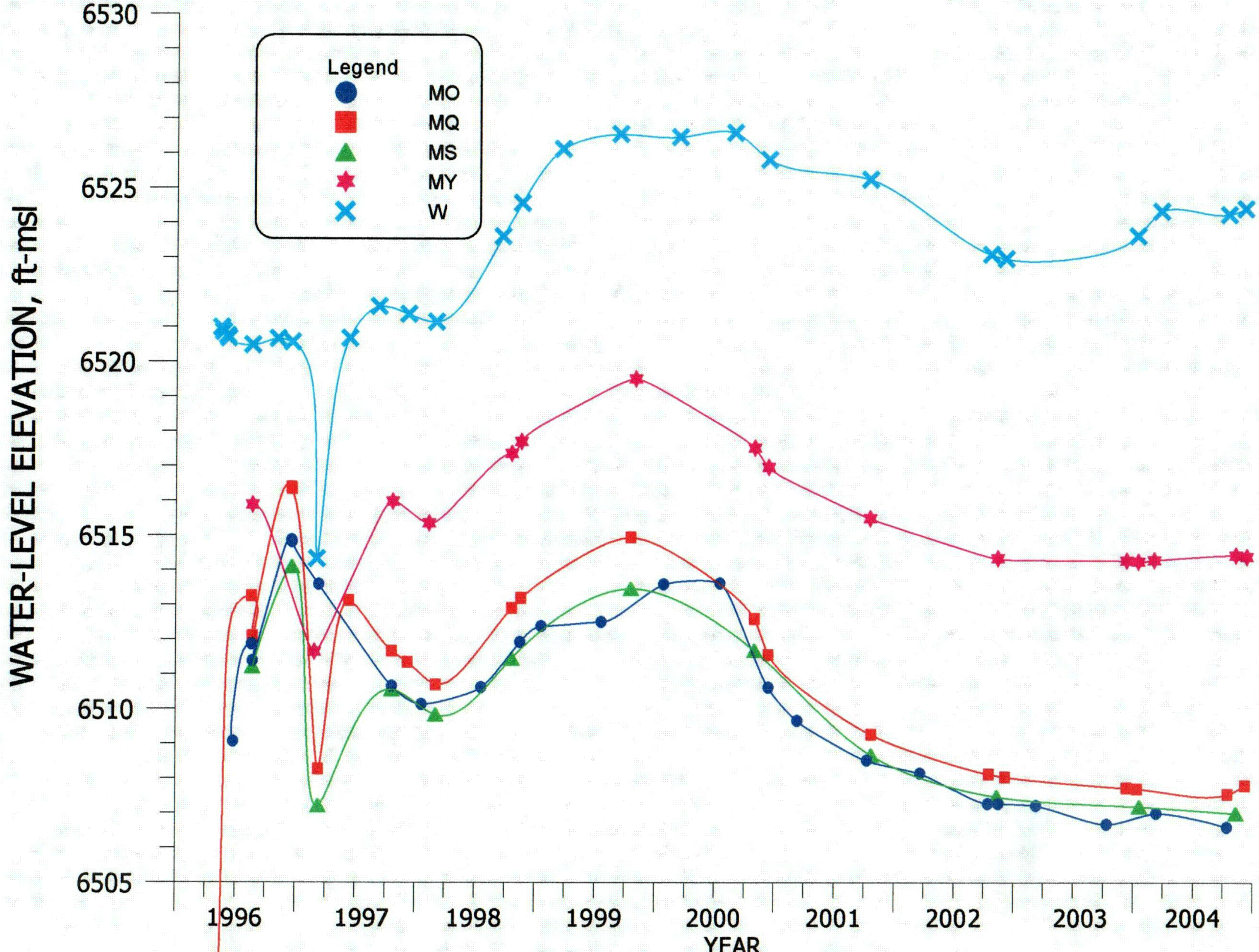
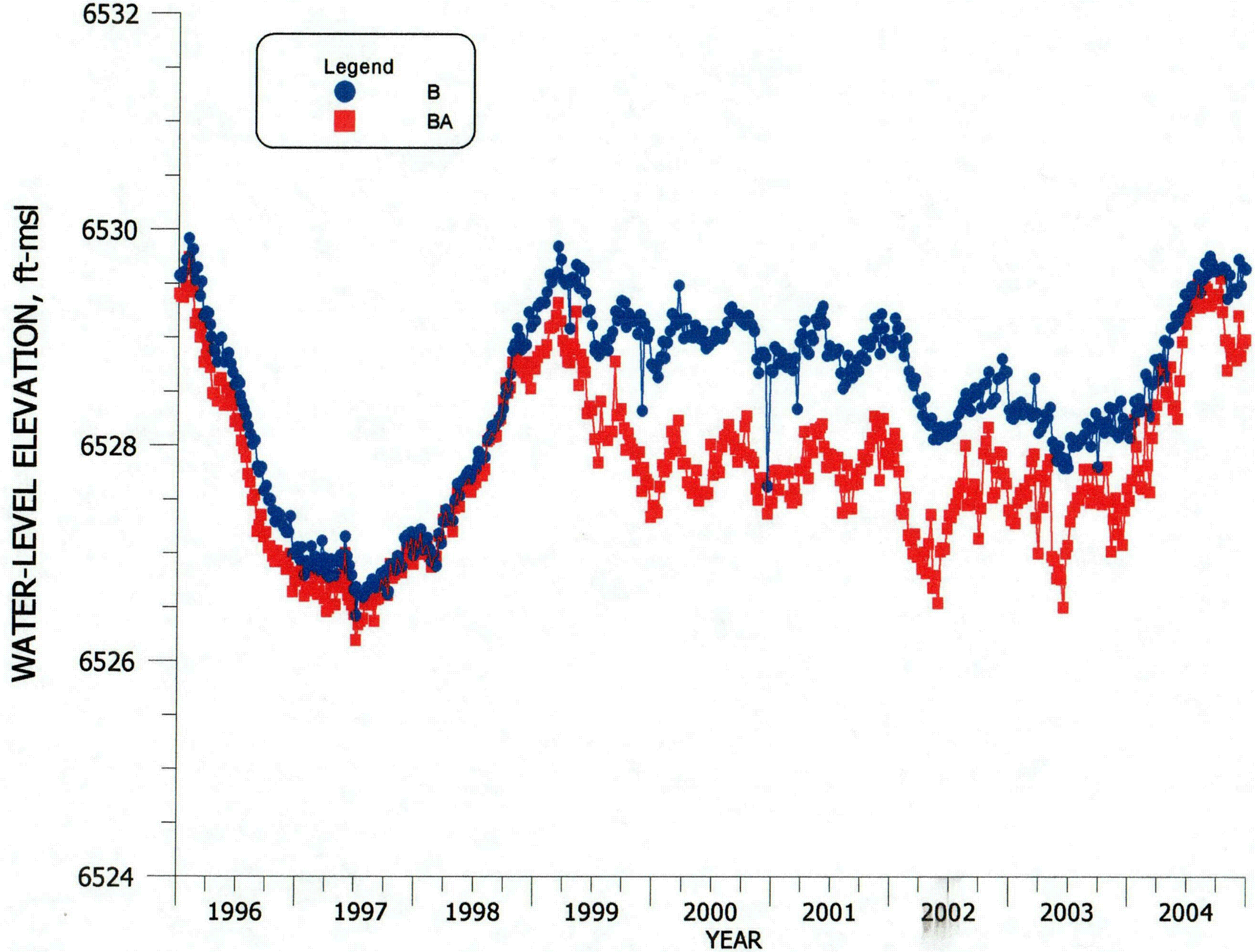


FIGURE 4.2-7. WATER-LEVEL ELEVATION FOR WELLS MO, MQ, MY AND W.

C16



4.2-13

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

c17

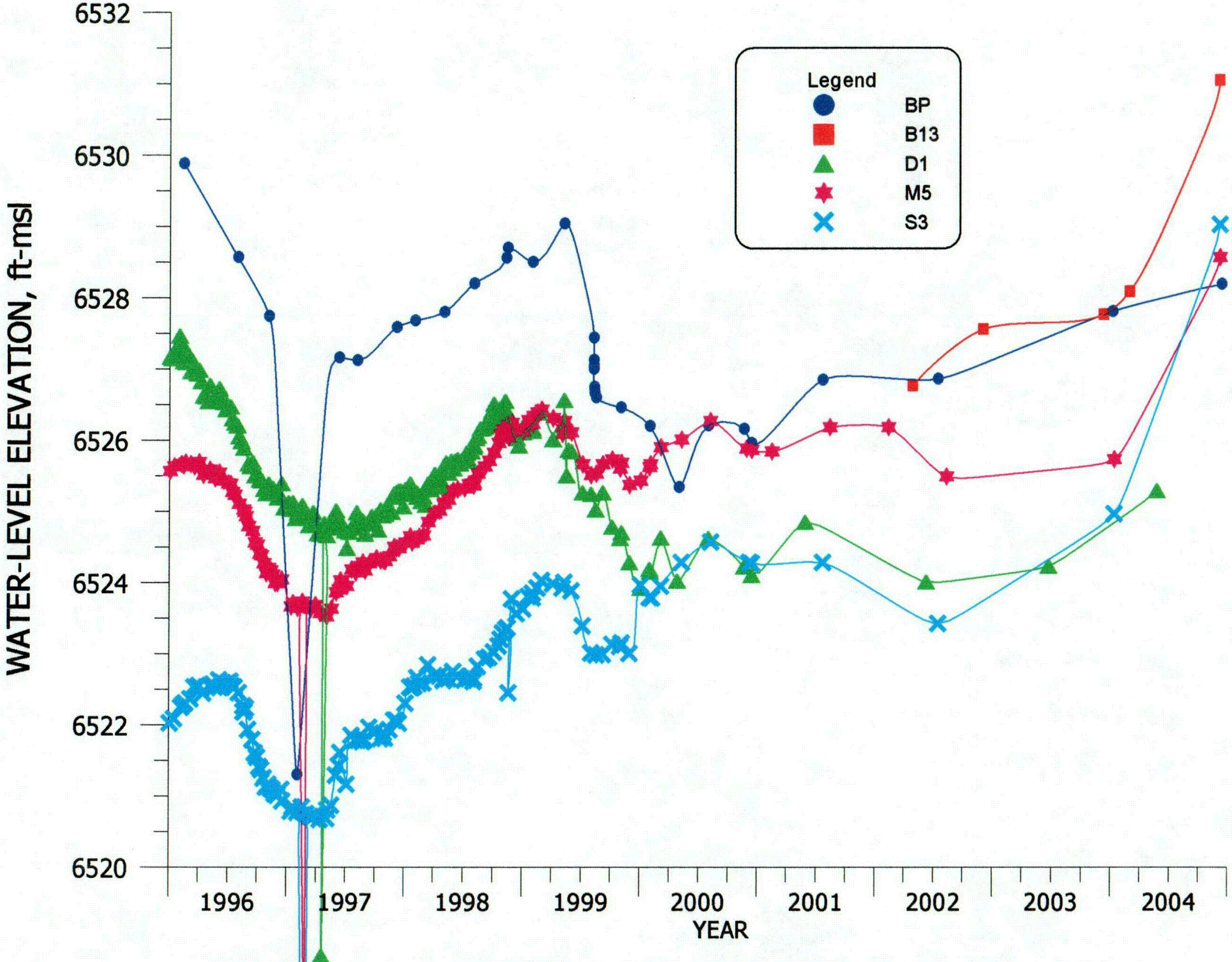


FIGURE 4.2-9. WATER-LEVEL ELEVATION FOR WELLS BP B13, D1, M5 AND S3.

C18

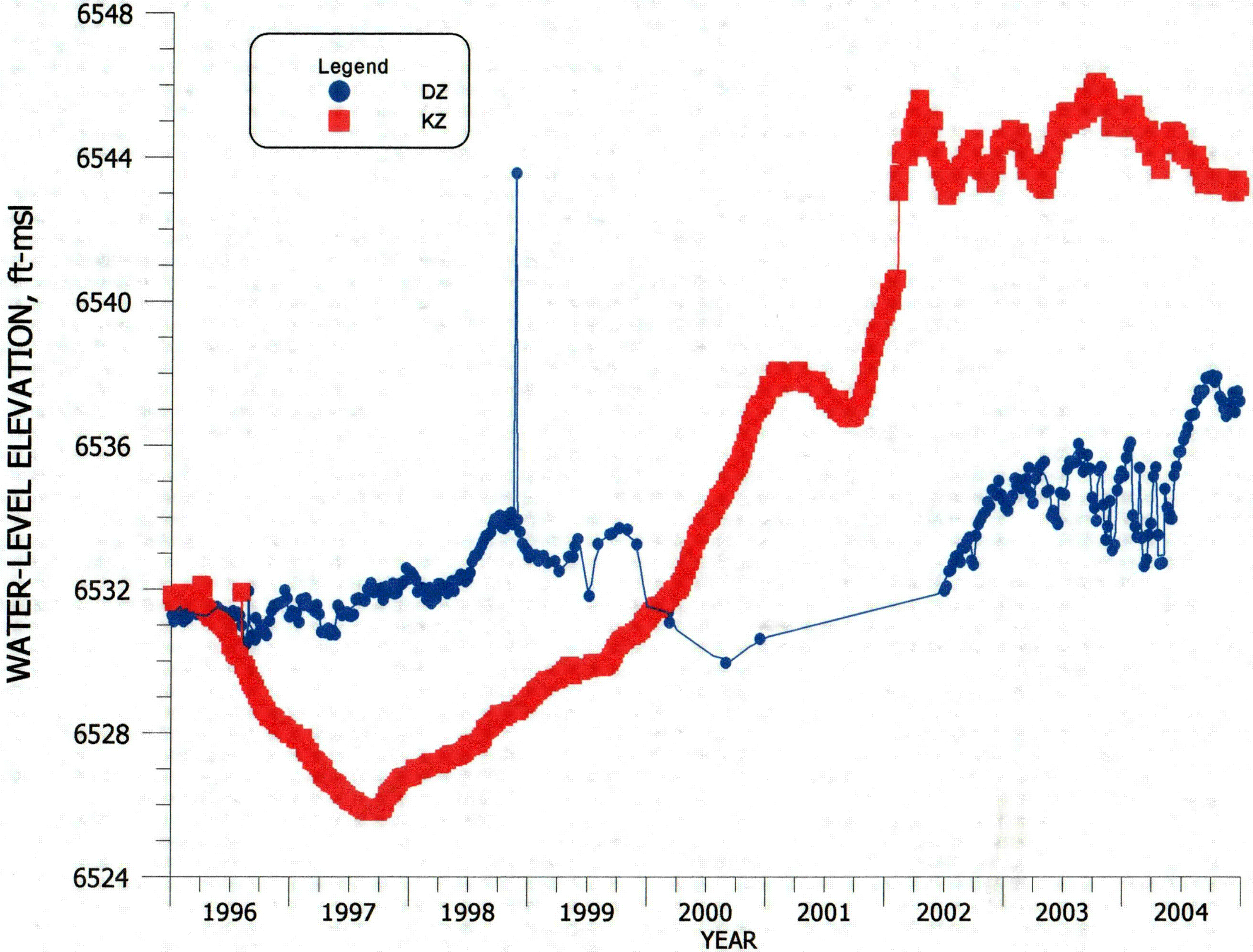


FIGURE 4.2-10. WATER-LEVEL ELEVATION FOR WELLS DZ AND KZ.

C19

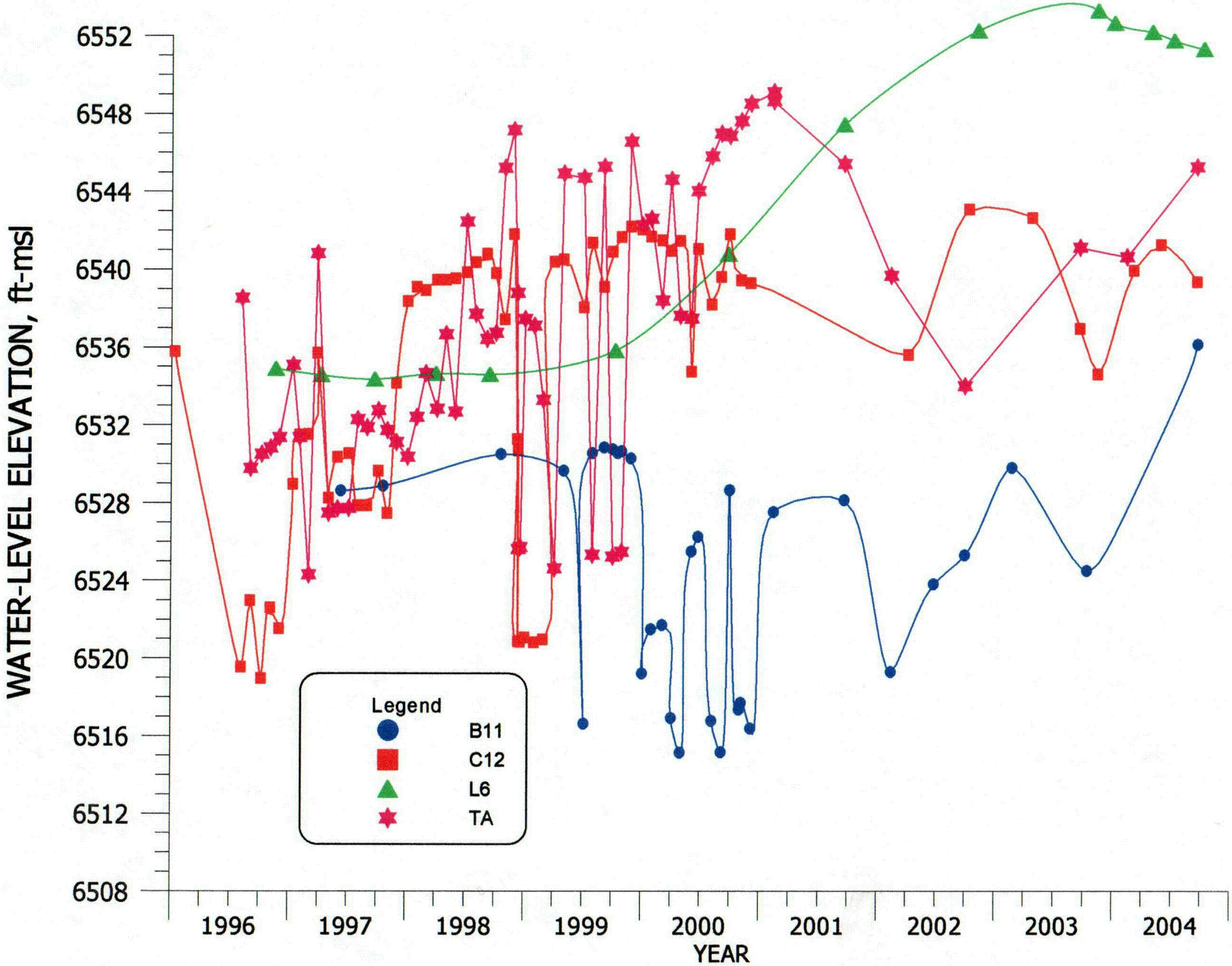


FIGURE 4.2-11. WATER-LEVEL ELEVATION FOR WELLS B11, C12, L6 AND TA.

CZ0

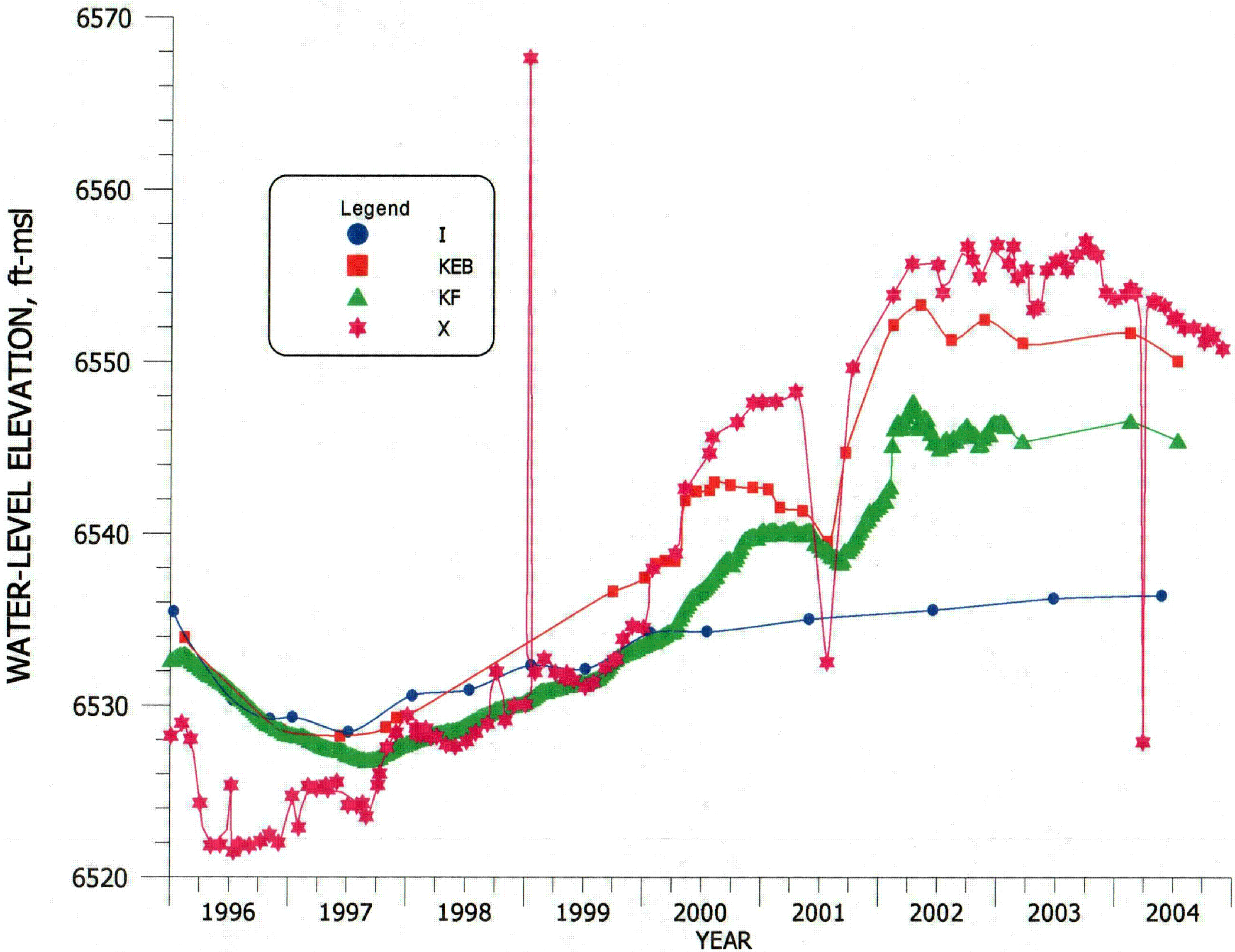


FIGURE 4.2-12. WATER-LEVEL ELEVATION FOR WELLS I, KEB, KF AND X.

C21

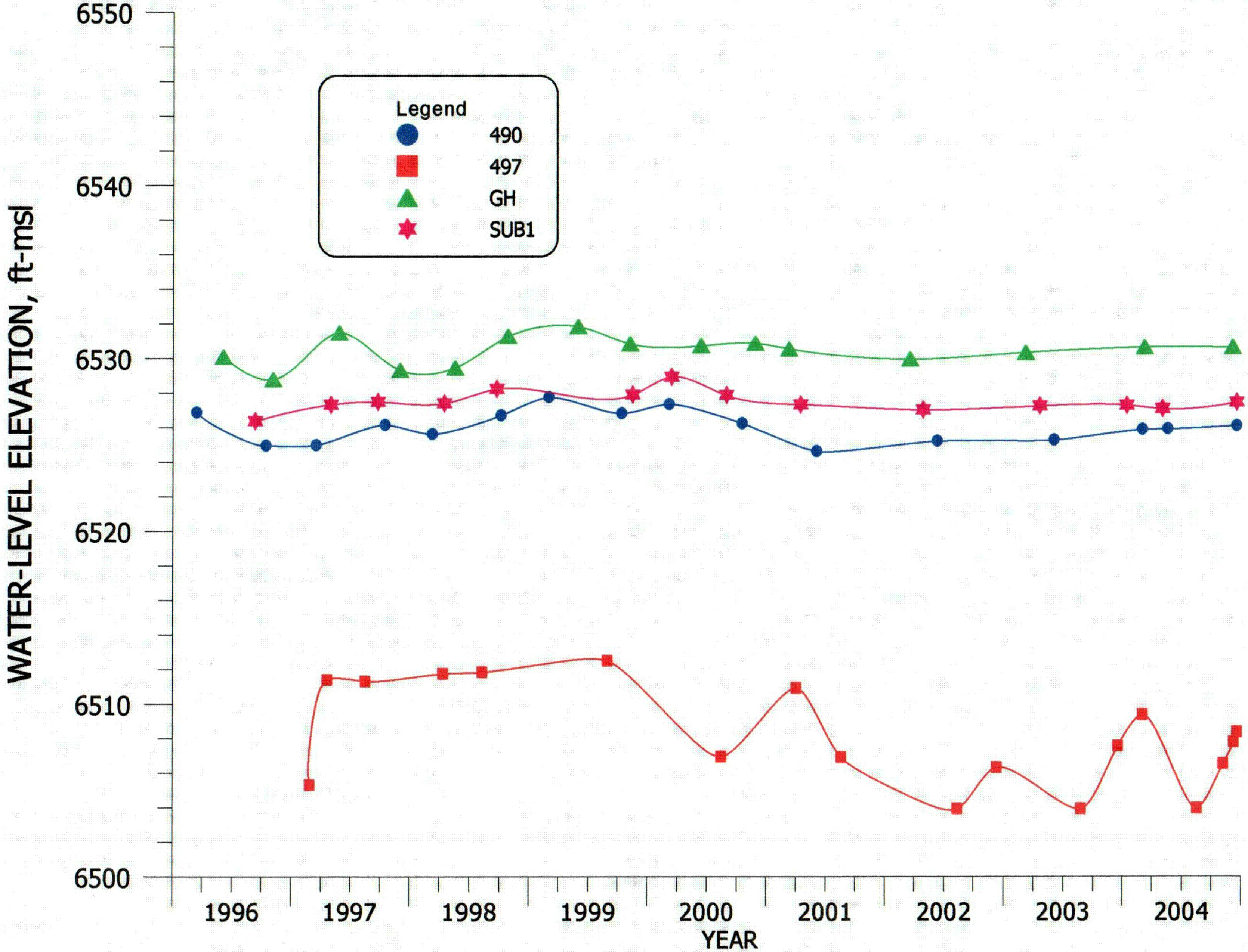


FIGURE 4.2-13. WATER-LEVEL ELEVATION FOR WELLS 490, 497, GH AND SUB1.

C22

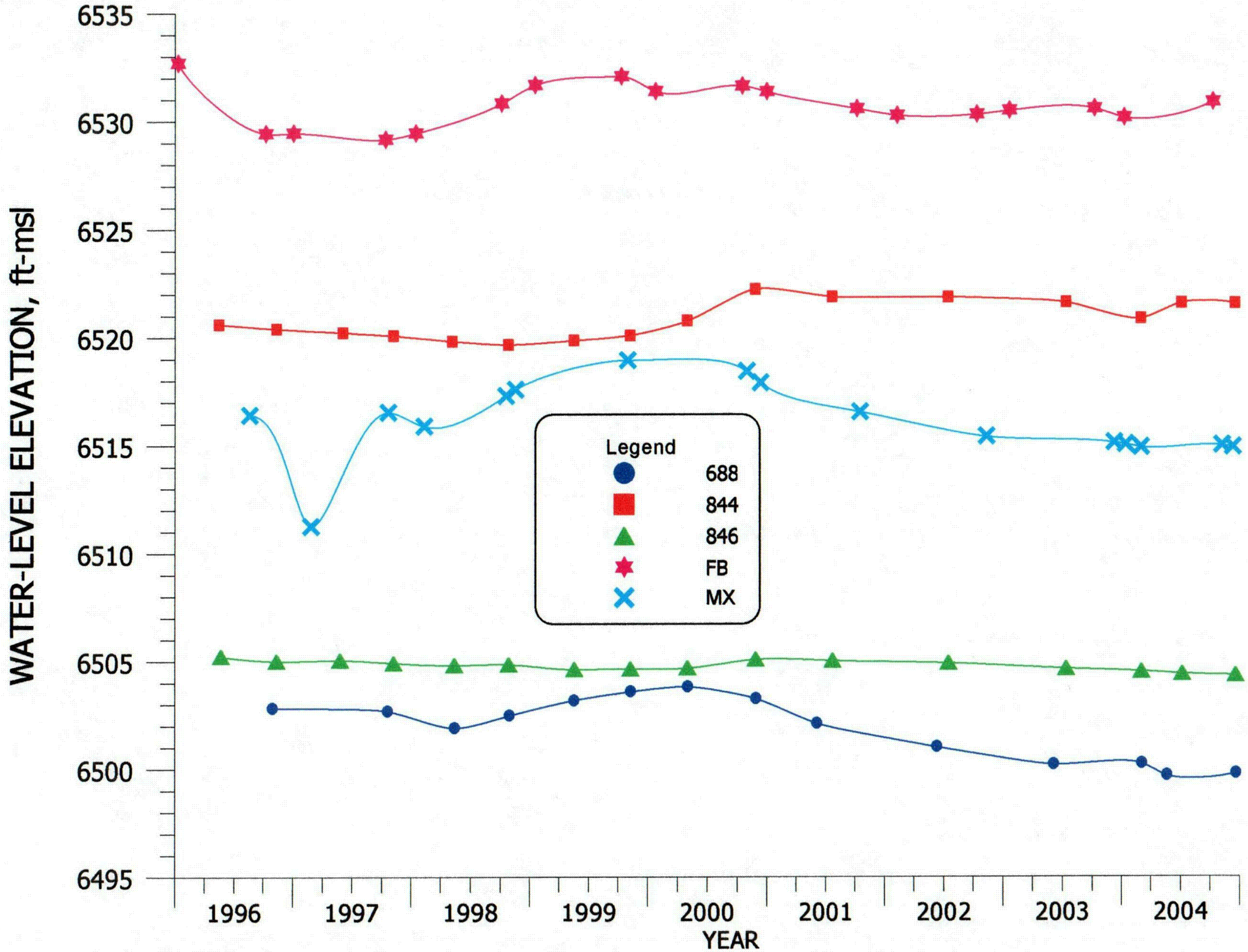


FIGURE 4.2-14. WATER-LEVEL ELEVATION FOR WELLS 688, 844, 846, FB AND MX.

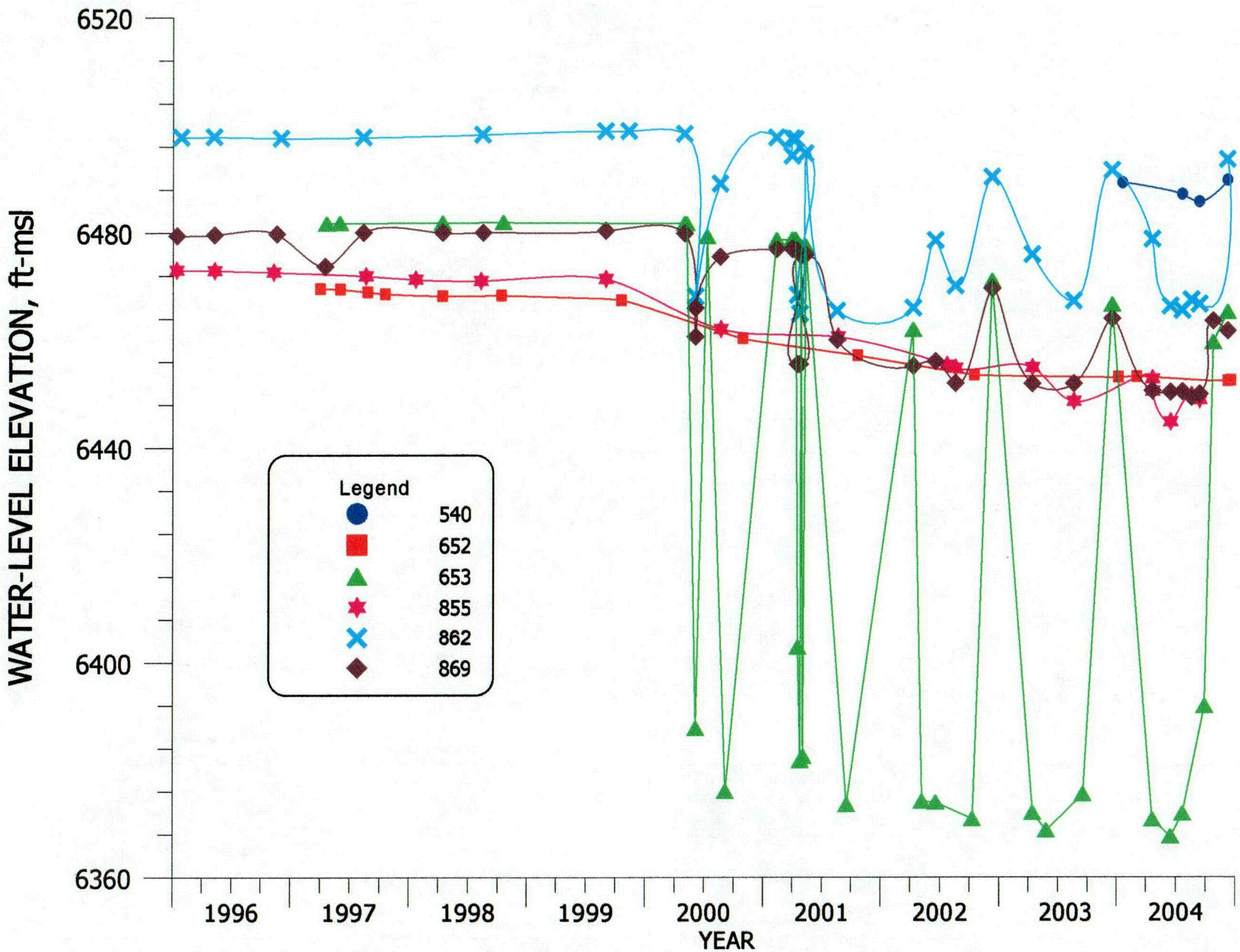


FIGURE 4.2-15. WATER-LEVEL ELEVATION FOR WELLS 540, 652, 653, 855, 862 AND 869.

C24

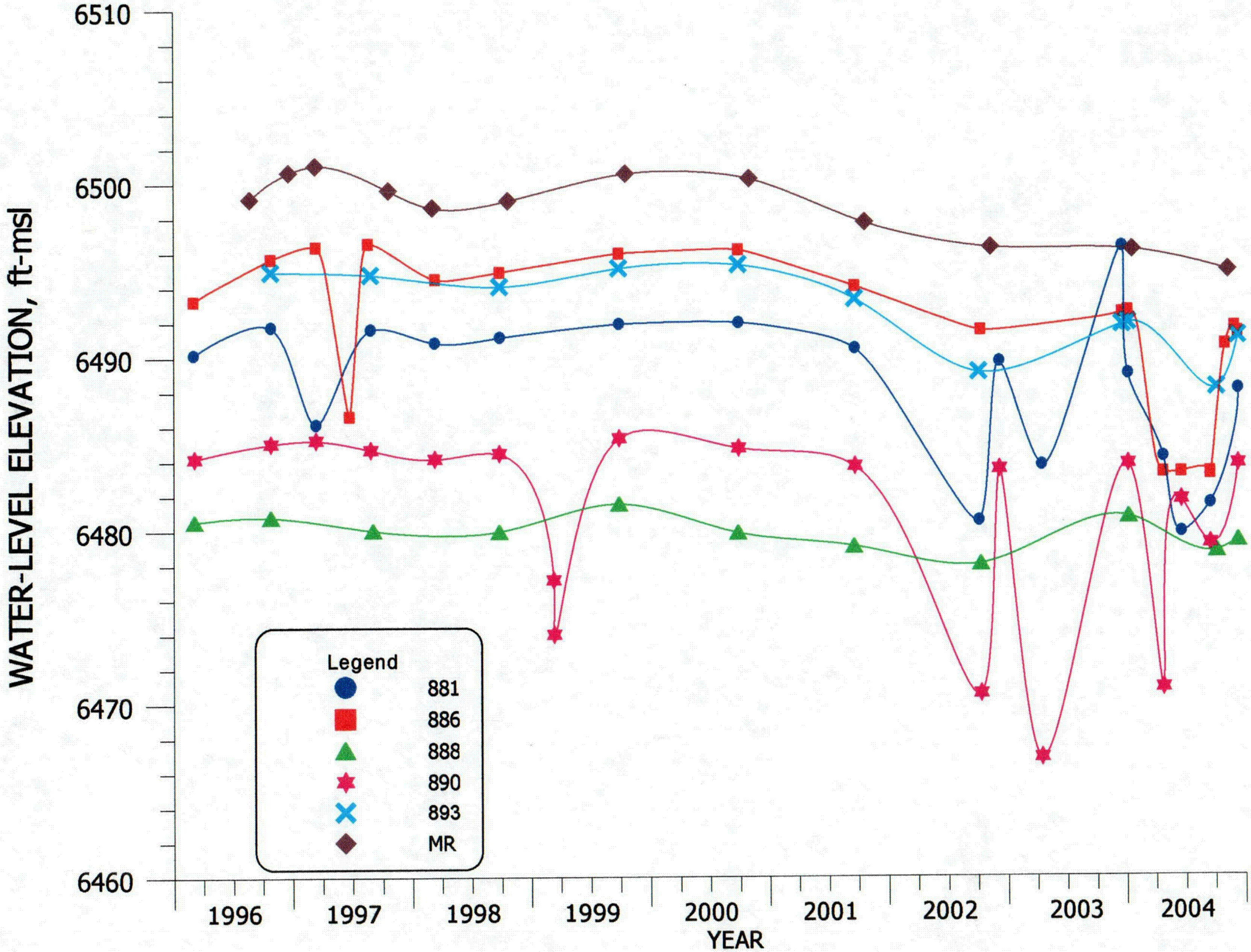


FIGURE 4.2-16. WATER-LEVEL ELEVATION FOR WELLS 881, 886, 888, 890, 893 AND MR.

C25

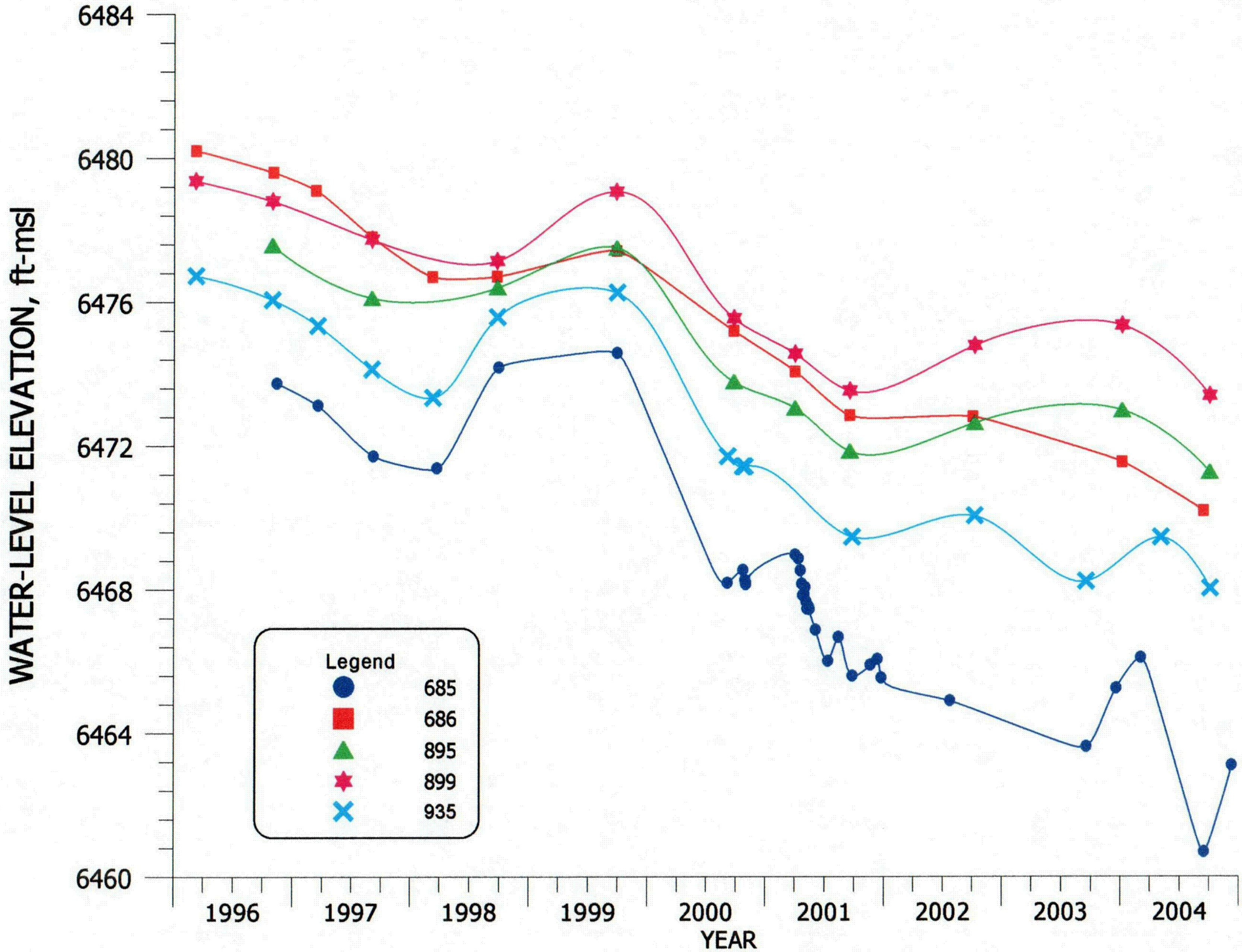


FIGURE 4.2-17. WATER-LEVEL ELEVATION FOR WELLS 685, 686, 895, 899 AND 935.

CZ6

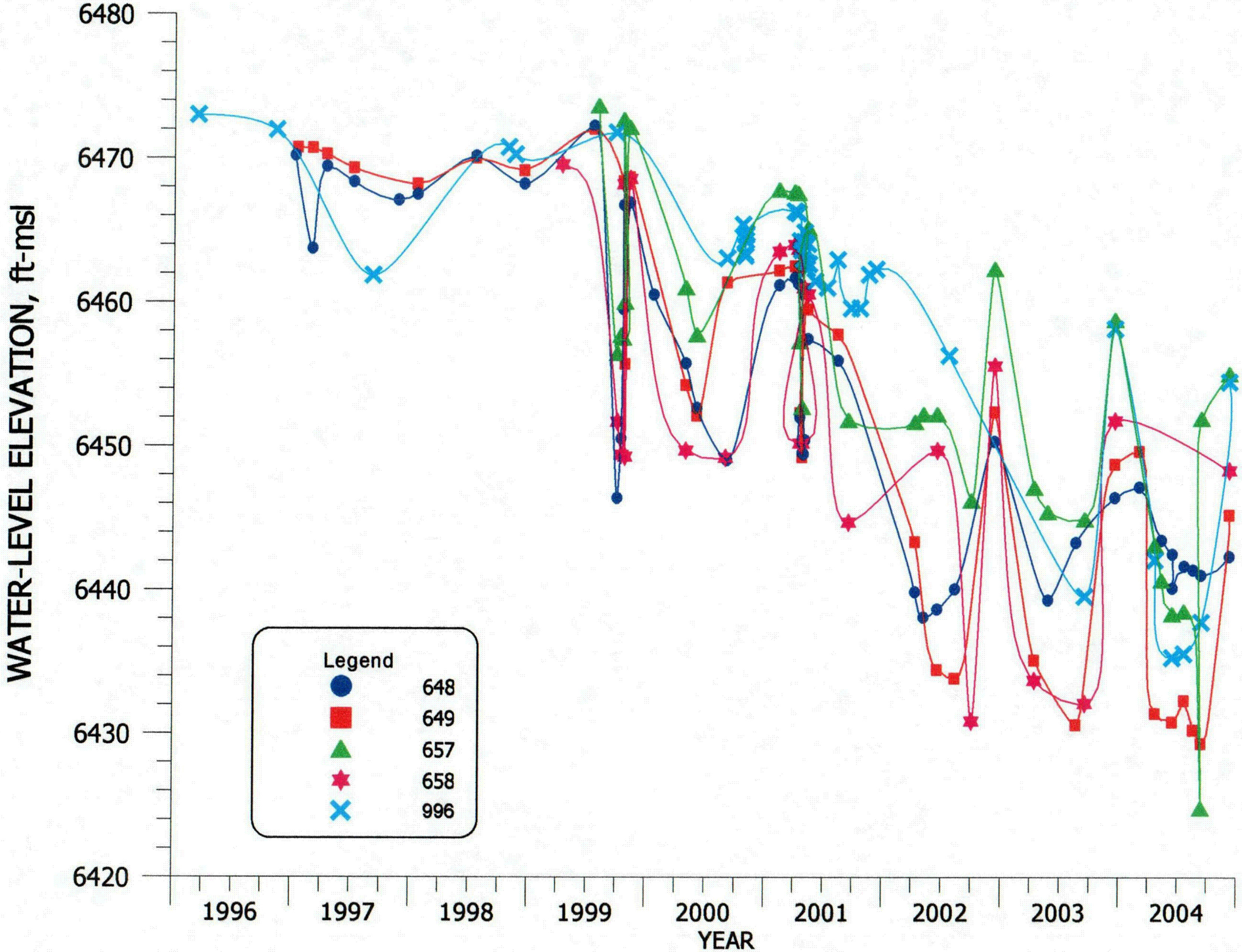


FIGURE 4.2-18. WATER-LEVEL ELEVATION FOR WELLS 648, 649, 657, 658 AND 996.

C27