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August 27, 2008

File No. 030137-0012

VIA FEDEX

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-3
1516 Ninth Street, MS-4
Sacramento, California 95814-5512

Re: CPV Sentinel Energy Project: Docket No. 07-AFC-3

Dear Sir/Madam:

Pursuant to California Code of Regulations, title 20, sections 1209, 1209.5, and 1210, enclosed herewith for filing please find Applicant's Analysis of CEC Staff Alternative Water Supply Plans.

Please note that the enclosed submittal was also filed today via electronic mail to your attention.

Very truly yours,

Paul E. Kihm
Senior Paralegal

Enclosure

cc: CEC 07-AFC-3 Proof of Service List (w/encl. via e-mail)
Michael J. Carroll, Esq. (w/ encl.)

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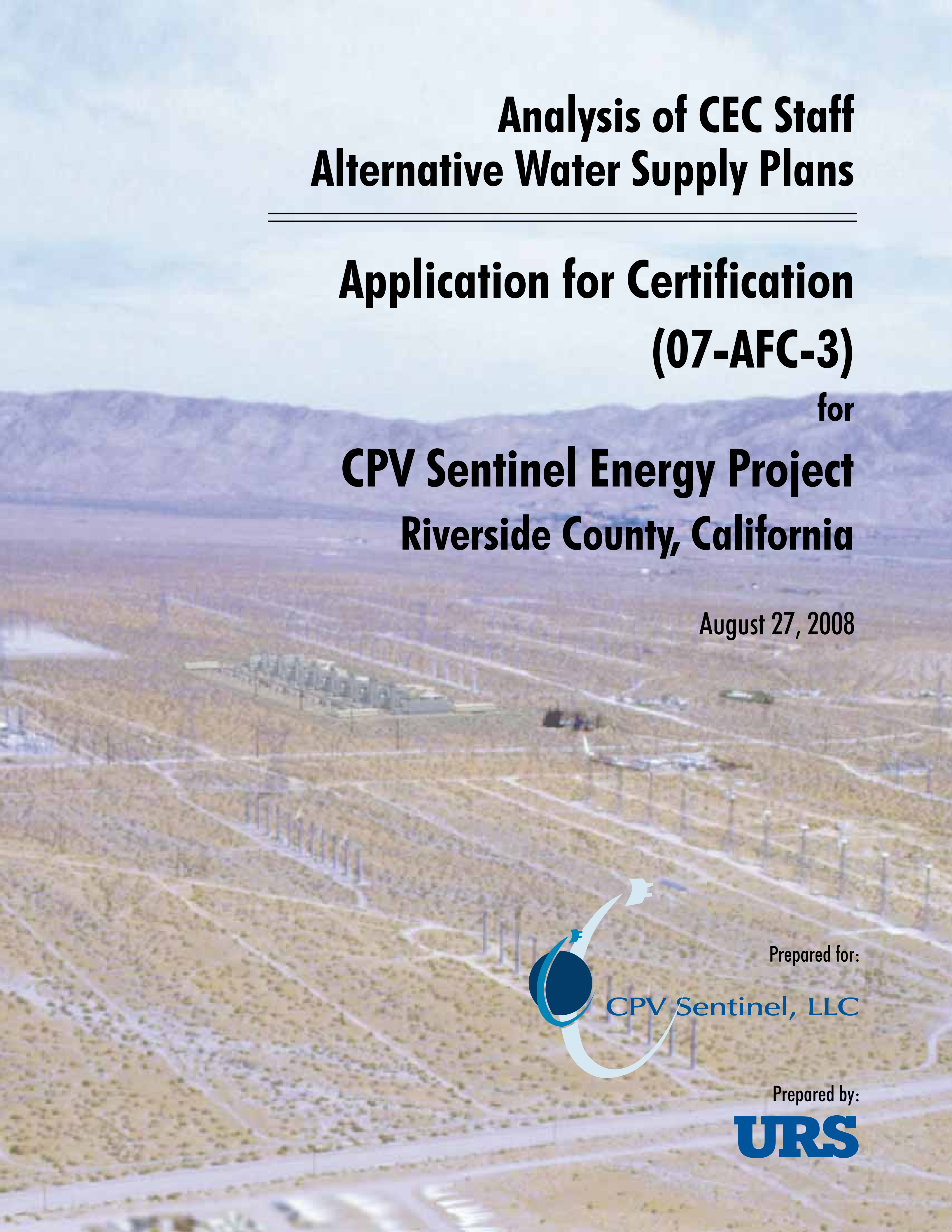

Analysis of CEC Staff Alternative Water Supply Plans

Application for Certification (07-AFC-3)

for

CPV Sentinel Energy Project

Riverside County, California

August 27, 2008

Prepared for:

CPV Sentinel, LLC

Prepared by:

URS

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INTRODUCTION

The purpose of this document is to provide an analysis of the alternative water supply plans presented in the California Energy Commission's (CEC) Preliminary Staff Assessment (PSA) for the CPV Sentinel Energy Project (CPVS) relative to the water supply plan proposed by CPV Sentinel, LLC (CPV Sentinel).

CPVS WATER SUPPLY PLAN

CPV Sentinel has carefully analyzed all aspects of its water supply plan, including alternative options to ensure that the plan will not adversely impact water resources in the State or in the Upper Coachella Valley Groundwater Basin. The plan has several interrelated elements, including importation and conservation, which complement one another to ensure that the CPVS avoids potential adverse impacts and provides benefits to water resources.

Importation

The Upper Coachella Valley Groundwater Basin is a closed system; as such, any water use results in a net loss of water resources that can be mitigated practically only by the importation of new water supplies to the basin. The project will import more than 108 percent of its water demand to ensure that total water supply in the basin is increased. Because the CPVS would use water from the Mission Creek Sub-basin, all of this imported water will be recharged in the Mission Creek Sub-basin. In addition, CPV Sentinel has agreed to pay an extraction fee to Desert Water Agency (DWA), equivalent to the groundwater replenishment assessment paid by other groundwater pumpers in the basin, to contribute to DWA's ongoing replenishment program aimed at correcting the long-term overdraft within the basin. The payment by CPV Sentinel of this fee not only goes to import more water, but under the agreements in place in the Upper Coachella Valley, it shifts water into the Mission Creek Sub-basin. These measures avoid potential exacerbation of the overdraft in the basin and ameliorate the potential overdraft created by water use by others within the basin. This plan is detailed in the water importation agreement between DWA and CPV Sentinel, included as Appendix A.

Conservation

CPV Sentinel's water supply plan also includes a freshwater conservation program developed with DWA that will conserve significantly more freshwater within the Upper Coachella Valley Groundwater Basin than the project will consume. Freshwater conservation will be achieved in two ways. First, CPV Sentinel will fund the installation of a recycled water line to serve Palm Springs National Golf Course (PSNGC) to replace the groundwater currently used by the golf course. Second, CPVS is paying the cost of retrofitting existing retail users' irrigation systems with high-tech evapotranspiration (ET) irrigation controllers that have a proven record of reducing landscape irrigation use by water users. The conversion of the PSNGC to recycled water use will conserve more than 1,000 acre-feet per year (AFY) of freshwater, and the retrofit of existing water users' irrigation systems with ET controllers will save between 480 and 700 additional AFY of freshwater. All of these freshwater savings will be realized within the Upper Coachella Valley Groundwater Basin. Both the Whitewater River Sub-basin and the Mission Creek Sub-basin will benefit from freshwater conserved as a result of CPV Sentinel's water supply plan.

COMPARISON TO STAFF ALTERNATIVES

In the PSA, the CEC staff evaluated alternatives to CPV Sentinel's water supply plan. There are a number of disadvantages that make the CEC staff alternatives less beneficial to regional water resources compared to CPV Sentinel's water supply plan, including:

- The alternatives do not include the importation of new water supplies, which would cause an overdraft of the Upper Coachella Valley Groundwater Basin and the Mission Creek Sub-basin in particular.
- The alternatives achieve far less freshwater conservation compared to the CPV Sentinel water supply plan and, are therefore less effective in implementing policies to conserve freshwater.
- The alternatives impede development of logical future uses of recycled water in the Mission Springs Water District (MSWD) service area.
- The alternatives presume an ability to obtain water supply contracts with the MSWD, and while MSWD claims a willingness to execute an agreement with CPV Sentinel, this has proven impossible to date.
- The alternatives would result in significant adverse environmental impacts that are avoided with the CPV Sentinel water supply plan.
- The alternatives are uneconomical compared to the CPV Sentinel water supply plan.
- The greater costs of the alternatives are economically infeasible in the context of CPV Sentinel's existing contract to supply energy to Southern California Edison (SCE) under the SCE Power Purchase Agreement (PPA).

These comparative disadvantages of the CEC staff alternative water supply plan are discussed in more detail below.

The Alternatives Will Result in Greater Overdraft of the Mission Creek Sub-basin

CEC staff water supply plan Alternatives 1 and 2 each include use of water from the Horton Wastewater Treatment Plant (HWTP) in combination with groundwater supplied from CPVS' onsite wells (Alternative 1) or MSWD Wells 28 and 30 (Alternative 2). Both of these alternatives involve groundwater pumping combined with HWTP water until the end of project year 13, after which time all project water would be supplied by the HWTP.

Currently, all existing wastewater from the HWTP is beneficially recharged into the Mission Creek Sub-basin. Use of this water for the CPVS would reduce the amount of water that is recharged by a factor of one-to-one, resulting in an overall loss of groundwater within the sub-basin and increased drawdown effects within the eastern parts of the sub-basin. Without replacement with imported water, this would lead to an overdraft of the sub-basin. Similarly, the use of water from MSWD Wells 28 and 30, without replacement via water importation, would cause an overdraft and increase drawdown in the sub-basin. The CEC notes in the PSA that this overdraft would contribute cumulatively to a projected overdraft in the sub-basin that would occur with or without the project. As described in the PSA, the overdraft of the sub-basin would contribute to significant environmental impacts including the loss of critical biological habitat, increased pumping lifts for existing groundwater users, and degradation of water quality in the groundwater basin.

CPV Sentinel has developed a project-specific recharge program in which DWA would spread 100 acre-feet of imported water into the sub-basin for every 92 acre-feet of water supplied to the CPVS. This imported water supply replacement is over and above the replacement of groundwater that would result from the ongoing replenishment program of DWA. The CEC raised concerns in the PSA about the amount of evaporation to be experienced at the DWA percolation ponds. Appendix B includes an analysis of this evaporation, which is shown to be minimal and insignificant.

Supply of HWTP wastewater to the CPVS, as proposed in the CEC staff alternatives, would not be levied a replenishment assessment by DWA, in contrast to the CPV Sentinel water supply plan. Thus, none of this beneficially recharged wastewater would be replaced through existing replenishment programs. Groundwater from MSWD Wells 28 and 30 would require payment of the replenishment assessment, and thus contribute to the ongoing replenishment program of DWA. However, a significantly lower portion of the project's water demand would be replaced with imported water under an alternative where a portion of the water supply is supplied with wastewater for which no fee would be assessed.

In contrast to the CEC staff alternatives, CPV Sentinel's water supply plan involves payment of an extraction fee to DWA for all of the water supplied to the CPVS. DWA has been very successful in securing additional imported water for its replenishment program. To the extent that the existing DWA replenishment program does replace this groundwater, and the track record of DWA for securing additional imported water is very impressive, a significantly higher portion of the project's water demand would be replaced with imported water than in the CEC staff alternatives, in which a portion of the water demand is supplied with wastewater for which no replenishment assessment or groundwater extraction fee would be assessed.

More significantly, the Applicant has developed a project-specific recharge program, which will involve spreading 100 acre-feet of imported water into the sub-basin by DWA for every 92 acre-feet of water supplied to the CPVS. This imported water supply replacement is over and above the replacement of groundwater that would result from DWA's ongoing replenishment program.

The Applicant previously submitted groundwater modeling analyses to the CEC to conservatively estimate the effects of the project's pumping and groundwater recharge on groundwater levels within the sub-basin. The simulations were based on the unrealistic assumptions that the project-specific pumping would be at the maximum possible rate, associated with maximum possible dispatch under the PPA throughout its 30-year life, and the project-specific recharge would only equal the groundwater pumping by the CPVS (i.e., 1,100 AFY pumping and 1,100 AFY recharge at DWA). To more accurately portray the expected effects of CPV Sentinel's water supply plan, the groundwater simulations in Appendix C include more realistic project groundwater analyses and also include analyses of the CEC staff water supply plan alternatives. In the more realistic but still conservative scenarios of expected groundwater effects (called Base Case BCA1 in Appendix C), project groundwater pumping is equal to the expected extractions of the CPVS (550 AFY) and the project-specific recharge net of evaporative losses during spreading (593 AFY). Figure 1 shows the estimated contours from this simulation. Table 1 shows the estimated drawdown at various points of interest in the sub-basin.

The Base Case scenarios, while more representative of the expected effects from project-specific pumping and recharge, are still conservative because they do not include the recharge of the basin that will accrue over time from the payment of an extraction fee to DWA (equivalent to the replenishment assessment), and do not include the higher replenishment to the Mission Creek Sub-basin as a result of freshwater conservation at the PSNGC. As shown in the groundwater simulation, CPV Sentinel's water supply plan would have a minimal effect on water levels within the Mission Creek Sub-basin.

In contrast to Base Case scenario, the Applicant has prepared simulations of the effects in the sub-basin from the supply of recycled water from the HWTP, supplemented with groundwater, as proposed in the CEC staff alternatives (included in Appendix C). CEC staff Alternative 1 model simulation parameters and results are listed in Tables 1-1 and 1-2 of Appendix C, respectively. CEC staff Alternative 2 model simulation parameters and results are listed in Tables 2-1 and 2-2 of Appendix C, respectively. The scenarios show the effects of withdrawal of a combined water supply without a project-specific recharge program. As shown, all groundwater producers would be affected by lower water levels within the sub-basin from the overdraft caused by the CEC staff alternative water supply plans. Table 2 presents a comparison of results from the Applicant's Base Case (Scenario BC_A.1) with CEC staff Alternatives 1 and 2 (Scenarios 1A.c and 2A.c), respectively. The estimated contours from these simulations are shown in Figures 2 and 3 (Scenarios 1A.c and 2A.c), respectively. For example, the drawdown at MSWD Well 22 under the Applicant's Base Case, using worst-case modeling parameters and annual recharge, is 0.4 foot (Scenario BC_B.2 in Appendix C). Under the CEC staff alternatives, corresponding drawdowns are as follows:

- CEC Staff Alternative 1: Drawdown in MSWD Well 22 is 4.6 feet (Scenario 1A.c in Appendix C for water consumption of 550 AFY). This equates to a drawdown that is 15.3 times greater than the Applicant's Base Case drawdown of 0.3 foot in MSWD Well 22 (Scenario BC_A.1 in Appendix C).

- CEC Staff Alternative 2: Drawdown in MSWD Well 22 is the same as for Alternative 1 (Scenario 2A.c in Appendix C for water consumption of 550 AFY).

- In most of the July 2008 model runs, and in these August 2008 model runs presented in Appendix C, the drawdown effects from CEC staff Alternatives 1 and 2 were greater (in some cases significantly greater) than the drawdown effects from CPV Sentinel's water supply plan.

To ensure consistency with the simulations of the CPV Sentinel's water supply plan, these scenarios do not include recharge from the existing DWA replenishment program.

It is evident from the discussion above, and review of the groundwater simulations, that the CEC staff alternatives would cause a significant adverse impact to the water supplies of the Upper Coachella

Valley Groundwater Basin and the Mission Creek Sub-basin, whereas CPV Sentinel's water supply plan would not cause a significant adverse impact.

CEC Staff Alternatives Will Conserve Less Freshwater

While direct use of reclaimed water by the CPVS, as proposed in the CEC staff alternatives, avoids CPV Sentinel's direct use of freshwater, the Applicant's water supply plan will conserve far greater freshwater supplies than the CEC staff alternatives. The benefits of the Applicant's proposal, compared to the alternative direct use of reclaimed water, are directly comparable in terms of the freshwater savings that they would achieve.

When evaluating conformance with State and CEC policies, which express a preference that power plants use available recycled water supplies instead of freshwater, one must consider the closed groundwater system in which the project is located, and how such a system affects the "availability" of recycled water. All reclaimed wastewater in the project region (which is not currently treated to be classified as recycled water) is beneficially used for groundwater recharge. Therefore, the use of recycled water does not make beneficial use of a water supply that is otherwise being discharged to waste, as is the case in some regions. In this closed system, use of recycled water would displace the existing beneficial use for groundwater recharge and result in an overdraft of the sub-basin that would cause a significant adverse environmental impact. Therefore, direct use of this wastewater would not meet the objectives of policies favoring the use of recycled water.

Table 3 contains estimates of the freshwater savings that are achieved through CPV Sentinel's water supply plan. As shown, the Applicant's water supply plan will conserve between 1,500 and 1,700 AFY of freshwater in the Upper Coachella Valley Groundwater Basin. Conservation of this freshwater is independent of the pattern of water use by the CPVS. In contrast, freshwater savings that could result from direct use of reclaimed water from the HWTP are dependent on the amount of water that would actually be used by the CPVS, and the portion of those demands that could be supplied with recycled water from HWTP. This is, therefore, a much more complex analysis, requiring an estimate of the water use by the CPVS and an estimate of the amounts of recycled water that could be supplied to the CPVS. Table 4 contains estimates of the freshwater savings that could result from direct use of reclaimed water from the HWTP. As shown, the expected freshwater conservation in the Upper Coachella Valley Groundwater Basin from the CEC staff alternatives is 491 AFY.

CPV Sentinel's water supply plan achieves more than three times the freshwater savings of the CEC staff alternatives. All of the above freshwater conservation occurs within the Upper Coachella Valley Groundwater Basin, and much of the savings from the ET controller retrofit program can be achieved within the Mission Creek Sub-basin. Moreover, to the extent that the Applicant's conservation program reduces pumping within the Whitewater River Sub-basin, under the allocation formulas that exist for imported water, the existing recharge program of DWA would increase in the Mission Creek Sub-basin. Thus, freshwater conservation yields benefits to both sub-basins regardless of where the conservation occurs.

CEC Staff Alternatives Reduce Future Recycled Water Development Opportunities

The best use of wastewater from the HWTP in the future is continued recharge of the sub-basin. This is particularly evident when considering the potential impacts of reducing the beneficial recharge, which are described in this section. Of primary consideration is the fact that the CPVS is a peaking power plant, which would operate relatively infrequently. By contrast, the irrigation demands in the region are relatively stable and constant throughout the year. In the PSA, it is suggested by CEC staff that CPVS would be given a priority over other uses to maximize the recycled water supply that could be provided to the project. This suggestion would reserve recycled water for an infrequent use by the power plant and prevent development of the supply for more efficient uses of recycled water.

CPV Sentinel examined the potential to supply recycled water to both the Desert Dunes Golf Course and the PSNGC. In both cases, the water demands of the golf courses were relatively stable throughout the year. Peak demands of the golf courses were approximately 1.3 to 1.5 times the annual average demand of the golf courses. Both courses use approximately 1,000 to 1,100 AFY of water, with a peak-flow requirement of approximately 1.3 to 1.5 million gallons per day (MGD). Serving this type of demand from a supply of 2.9 MGD recycled water would yield annual recycled water use of approximately 2,000 to 2,200 AFY. In contrast, the CPVS would use water for between zero and 30 percent of the hours in a year. Thus, the average demand of the CPVS, based on a 15 percent on-line time, is only 0.5 MGD (550 AFY), compared to a peak demand of more than 2.9 MGD by the golf courses.

Therefore, the project would only use approximately 15 percent of the supply that is reserved to serve it, whereas a typical golf course would use approximately 65 percent of the annual water supply reserved for its use. So the reservation of recycled water supply for a future irrigation demand, such as an existing or future golf course in the vicinity of HWTP, would result in approximately four times the use that would result from reserving this water supply for the CPVS.

CEC Staff Alternatives Presume a Water Supply Agreement can be Secured with the MSWD

CEC staff presents an evaluation of costs and the feasibility of using recycled water from the HWTP in the PSA, based on representations from MSWD staff that the MSWD is willing and able to enter into an agreement to supply the CPVS with water. While MSWD continues to make statements expressing a willingness to serve CPVS, the actions of MSWD staff and board members over the past year-and-a-half have demonstrated that MSWD is not capable of executing an agreement with CPV Sentinel. As the CEC is aware, during this period of time, CPV Sentinel exerted every effort in its attempts to secure a water supply agreement with MSWD. Although MSWD staff and board members periodically engaged in discussions with CPV Sentinel, certain staff and board members expressed open opposition to the CPVS and any proposal to serve it water. In fact, the Board rejected a proposal from two boardmembers to form a two-member committee to discuss options and negotiate with CPV Sentinel. MSWD staff remains essentially unchanged, and only one boardmember has changed during this time. Thus, notwithstanding the expression of interest set forth by MSWD staff and the recent resolution passed by the MSWD Board, past actions demonstrate that MSWD is either unable or unwilling to identify a feasible alternative for supplying water to the CPVS and to develop an agreement for doing so.

The inability or unwillingness of MSWD to enter into an agreement with CPV Sentinel, and the repeated criticism of the project by MSWD staff and boardmembers, prompted CPV Sentinel to develop an alternative water supply plan that does not require action by MSWD. CPV Sentinel's water supply plan does not result in any significant unmitigated environmental impacts and satisfies the CEC's policy on the use of freshwater. CPV Sentinel is physically located within the DWA service area and is working with the DWA to implement this plan. Both CPV Sentinel and DWA remain open to MSWD's participation in the water conservation program within the MSWD service territory. However, any change in direction from the current water plan, even if a feasible alternative that addresses the factors outlined above could be identified, would result in schedule slippage that CPV Sentinel cannot absorb under its commitment to deliver power in summer 2010.

CEC Staff Alternatives Would Likely Cause a Significant Adverse Environmental Impact

The most obvious adverse impact from the CEC staff's alternatives, as described above, is that the alternatives would cause overdraft and a decline in water levels within the Mission Creek Sub-basin. Beyond this impact, and even presuming that some mitigation plan, such as the Applicant's proposal for project-specific recharge of the Mission Creek Sub-basin, could avoid this significant adverse environmental impact, the alternatives inherently result in significant environmental impacts that are avoided with the Applicant's plan. In the analyses of the environmental impacts of the CEC staff alternatives presented below and in Appendix C, groundwater simulations have been prepared that estimate the groundwater impacts from the CEC staff alternatives, both with the assumption that project-specific recharge would not occur (as proposed by the CEC staff) and with the assumption that the Applicant's project-specific recharge would be implemented in combination with the CEC staff alternatives.

Mesquite Hummocks

The U.S. Fish and Wildlife Service (USFWS) has expressed concern that the cumulative effects from overdraft in the sub-basin are creating significant environmental impacts to the mesquite hummocks in the Willow Hole Conservation Area. The USFWS has employed a method to determine the extent to which the impacts of specific projects are cumulatively considerable, based on the extent to which the projects would contribute to the annual overdraft in the sub-basin. Because the CPVS would mitigate its potential sub-basin overdraft impacts by importing more water than it would extract from the sub-basin, the project does not contribute to cumulative overdraft of the sub-basin, and thus the impacts of the CPVS on the mesquite hummocks is not cumulatively considerable.

Nonetheless, the CEC staff has suggested to the USFWS that the Applicant's groundwater modeling demonstrates that project-specific recharge might not fully offset the drawdown of the sub-basin in the vicinity of the mesquite hummocks caused by the project's groundwater use. The Applicant believes that this concern results from the extreme conservatism that CEC staff requested be utilized in the Applicant's prior groundwater modeling. These assumptions overstate the potential impacts of the CPVS on the groundwater levels near the mesquite hummocks. As presented in the Base Case modeling of Appendix C, the groundwater drawdown caused by the project's pumping of groundwater is temporary and transitory reaching a maximum impact of approximately 0.4 foot (Hummock Observation 1 in the most realistic Base Case Scenario BC_A.1). This drawdown is largely theoretical and, in practice, would be immeasurable because it is far less than the natural fluctuations in water levels that would occur in this area of the sub-basin. Because the transitory, project-specific drawdown is less than the natural water level fluctuations that occur seasonally and between wet and dry years, it is not cumulatively considerable.

Most important, however, is that the CEC staff alternatives have an even greater potential to impact the mesquite hummocks. Without project-specific recharge, as proposed by the CEC staff, the alternatives would contribute to the overdraft in the sub-basin and would be cumulatively considerable. Even if the Applicant's project-specific recharge program is added to the CEC staff alternatives, the beneficial recharge from the HWTP is much closer to the mesquite hummocks than the proposed project pumping wells. Thus, the loss of this HWTP recharge to serve the CPVS would have a greater potential impact on the mesquite hummocks.

The Applicant has conducted groundwater modeling simulations to analyze these effects, which are included in Appendix C. The relevant comparisons are summarized in Table 5, which summarize the results of Simulations BC_A.1 and CEC staff Alternative 1 (Simulations 1A.c and 1B.2b) and Alternative 2 (Simulations 2A.c and 2B.2b). For reference Appendix C compares all the conservative assumptions from CPV Sentinel's water supply plan prior modeling to the same set of assumptions with the CEC staff alternatives. In all cases, the CEC staff alternatives result in significantly greater impact to the mesquite hummocks than the Base Case simulations.

Drawdown at Production Wells

The HWTP beneficial recharge is also in an important place in the sub-basin because the HWTP is much closer to many of the MSWD and Coachella Valley Water District (CVWD) wells in the basin than the CPVS onsite pumping wells. Thus, the loss of recharge from HWTP has a much greater impact on the production wells within the eastern portion of the sub-basin even if the CEC staff alternatives are modified to include the project-specific recharge program proposed by CPV Sentinel. A comparison of the estimated drawdown at production wells from the reductions in recharge at HWTP compared to the potential impacts from the same set of assumptions for the Applicant's water supply plan are summarized in Table 6 which includes the results of Simulations BC_A.1 and CEC staff Alternative 1 (Simulations 1A.c and 1B.2b) and Alternative 2 (Simulations 2A.c and 2B.2b). Together with Figures 1, 2 and 3 introduced earlier, Figures 4 and 5 show the simulated groundwater level changes at 30 years for scenarios 1B.2b and 2B.2b, respectively. Appendix C contains simulations of all prior conservative assumptions and the results from the CEC staff alternatives. In most cases, the drawdown effects from CEC staff Alternatives 1 and 2 are much greater than those proposed by CPV Sentinel.

Water Quality

The location of HWTP recharge is also important for protecting water quality within the sub-basin. At the southeastern end of the sub-basin, there is very poor water quality, which may be attributable to flow from the Desert Hot Springs Basin area or from possible fault system effects. In CPV Sentinel's investigation of possible service to the Desert Dunes Golf Course, it was learned that water quality in the golf course's wells is substantially poorer than that of HWTP wastewater quality. Appendix D includes results from Desert Dunes water quality samples.

These samples exhibit high fluoride and total dissolved solids (TDS) concentrations suggesting that groundwater in this part of the sub-basin may be influenced by the influx of groundwater from the Desert Hot Springs area. Although this poor quality water has historically flowed out of the sub-basin without entering potable water production wells, the lowering of water levels due to over-pumping by existing users has begun to reverse the hydraulic gradients within the sub-basin. Accordingly, absent HWTP recharge, this poor quality water would have a potential to migrate into the high-production areas of the sub-basin where MSWD and CVWD large production wells are located. HWTP recharge appears to provide an important hydraulic mound within the basin that substantially protects these high-production wells from the much poorer water quality to the south and east. The loss of this hydraulic mound from the CEC staff alternatives is pronounced even when they are augmented by the project-specific recharge proposed by the Applicant. Appendix C includes groundwater flow analyses of the effects of depriving the sub-basin of beneficial recharge from HWTP. The loss of HWTP recharge associated with the CEC staff alternatives substantially increases the gradient from the areas of poor water quality with the potential to substantially increase migration of this poor quality water into the productive zones of the sub-basin.

Pipeline/Facility Impacts

CEC staff water supply alternatives also involve the construction of 6 miles of new pipeline from the HWTP to the project site and in the case of Alterative 3, the construction of approximately 6 miles of new pipeline from MSWD Wells 28 and 30 to the project site. The water supply pipelines would both cross intermittent streams as shown on Figure 6.

CEC staff Alternative 2 assumes that new wells would be installed for MSWD at an undetermined location and these wells would be pumped by MSWD in substitution for existing water pumping by MSWD. In the Applicant’s groundwater modeling of the CEC staff alternatives, it is assumed that new pumping would occur at MSWD Wells 28 and 30 to account for the water being supplied by these wells to the CPVS. In reality, the provision of new wells to MSWD could change the pumping patterns by MSWD potentially leading to additional adverse impacts within the sub-basin.

CEC Staff Alternatives are Uneconomical

CPV Sentinel has reviewed the economic analysis presented by CEC staff in the PSA Section 4.9 and Tables 16 and 17. CPV Sentinel agrees with much of the CEC staff economic assessment, but there are several cost items that are significantly omitted or understated in the CEC staff assessment. Table 7 includes CPV Sentinel’s corrected cost data, together with a brief listing of the rationale and bases for each line item. In summary, the CEC staff Alternatives 1 and 2 result in a combined capital cost and annual operating cost, expressed as a net present value cost increase, of approximately $51 million and $58.7 million, respectively. These cost increases are substantial in the abstract, and as discussed further in the next section, not feasible under the current SCE PPA. To meet the guaranteed in-service date under the SCE PPA, the water treatment system detailed design is underway, as it is on the critical path for the CPVS. Under the PPA, delay penalties apply. In addition, engineering is underway for the CPVS, and any delay in the water treatment system design carries an additional delay penalty under the engineering, procurement and construction (EPC) contract resulting in a combined cost of approximately $7.5 million per month. Although it is not clear exactly what delay may be experienced, any change to either of [formatting issue] the CEC staff alternatives carries a risk of incurring delay penalties. The project could easily incur a delay of 6 to 9 months, at a delay cost penalty of an additional $45 million to $67.5 million above the capital cost increase. As a conservative allowance, only a 3-month delay cost penalty has been included in the cost estimate.

Discussion of Table 7 Cost Data

Each line item of Table 7 is discussed in greater detail below.

Line 1: An offsite groundwater supply pipeline would only be needed for CEC staff Alternative 2. It would be 5.25 to 6.4 miles in length, depending on the final route. As illustrated in Figure 6, this pipeline would cross seasonal washes; as such, it may require special engineered provisions to prevent erosion or possibly a directional drill to avoid cutting into the seasonal wash. This pipeline is estimated to cost $900,000 per mile rather than $600,000 per mile in the CEC staff cost estimate.

Line 2: An offsite reclaimed water supply pipeline is required for both CEC staff Alternatives 1 and 2. It will be approximately 6 miles in length, and would cross two seasonal washes, as illustrated in Figure 6. It also is priced at $900,000 per mile rather than $600,000 per mile, as noted in the CEC staff cost estimate.

Line 3: CPV Sentinel and CEC staff cost estimates of the reclaimed water supply pumping station are the same.

Line 4: In prior communications between MSWD and CPV Sentinel, MSWD provided a cost of $3 million for the HWTP tertiary treatment upgrade, which is used in the CPV Sentinel cost estimate rather than the CEC staff cost estimate of $2.5 million.

Line 5: CEC staff included only one well to replace MSWD Wells 28 and 30, but based on prior communications with CPV Sentinel, MSWD has stated that it will require two replacement wells. Each well has been conservatively estimated at $1.3 million each, which is lower than the expected cost of about $1.5 million each.

Line 6: CPV Sentinel presented costs for cooling towers and other equipment in Data Response 38, at $440,000 per LMS100 unit for wet cooling and $2.4 million higher per LMS100 unit for dry cooling. CEC staff used the same $440,000 per unit for wet cooling but a higher number, $3.4 million per unit for dry cooling.

Line 7: CPV Sentinel and CEC staff cost estimates for dry cooling land costs are the same.

Line 8: Line 8 combines water pre-treatment and the ZLD system cost and corrects a significant cost estimate deficiency in the CEC staff cost estimate. CPV Sentinel performed a similar study of direct use of tertiary wastewater in March 2008. The summary of that study is included as Appendix E. Although the two cases studied in March 2008 are not exactly the same as the CEC staff Alternative 1 or 2 versus the Base Case, they are very close in scope. The March 2008 cost estimate shows that the cost increase for direct use of tertiary wastewater is in the range of $18 million. The CEC staff estimate showed only a cost differential of $4 million between the Base Case and CEC staff Alternative 1. CPV Sentinel is re-estimating the cost differential of the specific CEC staff alternative and will report the results of that estimate in the near future. For dry cooling, CPV Sentinel has adopted the CEC staff cost estimate.

Line 9: The actual costs that CPV Sentinel will pay for freshwater conservation under the executed agreement between CPV Sentinel and DWA are included in Line 9. The CEC staff alternatives assumed that freshwater conservation is not required, but CPV Sentinel has already committed to funding the freshwater conservation programs under its base water supply plan. Nevertheless, to be consistent with the CEC staff alternative scope, CPV Sentinel excludes these costs under the assumption that DWA would agree to nullify the agreement.

Line 10: As discussed above, the cost of schedule delay to change water treatment system scope and basis, is conservatively estimated as only a 3-month delay, although this delay could be considerably longer resulting in a significant additional cost increase.

Line 11: The addition of only one dry cooling unit would leave a shortfall under the PPA power supply guarantee, so to avoid contract penalties, two units were added to Line 11. This cost applies only to CEC staff Alternative 3. Two units results in more power than the PPA requires, and the assumption has been made that this additional power can be sold to SCE. No discussions with SCE have taken place on this point, however, so the cost impact to CPV Sentinel could be even higher if this did not occur.

Line 12.1: Line 12.1 is a subtotal of the capital cost lines above.

Line 12.2: Line 12.2 is the capital cost differential from the CPVS.

Line 12.3: Line 12.3 tentatively uses exactly the same economic parameters for the equivalent annual cost of capital as the CEC staff alternatives. However, CPV Sentinel does not believe that the CEC staff method of comparing costs on a dollar per kilowatt-hour (kWh) basis is valid, as further discussed below. CPV Sentinel is further reviewing these parameters.

Between lines 12.3 and 13 is an entry for the lifetime average expected dispatch of the CPVS at 17 percent. This yields the expected average water consumption of 550 AFY.

Line 13: The groundwater cost with recharge assessment in Line 13 only applies to the Base Case and CEC staff Alternative 2, both of which use onsite wells. Like the CEC staff cost estimate, the cost of water from MSWD Wells 28 and 30 is not included. The analysis covers the point in time where 100 percent of the make-up water is supplied by increased flows from the HWTP.

Line 14: The CEC staff cost estimate for reclaimed water purchase is used in Line 14.

Line 15: CPV Sentinel has tentatively used the CEC staff estimate for reclaimed water pumping and operation and management but is still reviewing information on this parameter.

Line 16: CPV Sentinel has tentatively used the CEC staff estimate for groundwater pumping energy and operation and management but is still reviewing information on this parameter.

Line 17: CPV Sentinel has tentatively used the CEC staff estimate for cooling and water treatment chemicals but is still reviewing information on this parameter.

Line 18: CPV Sentinel has tentatively adopted the CEC staff values, cooling tower energy but is still reviewing information on this parameter.

Line 19: The actual costs in 2008 dollars of the water purchase that CPV Sentinel has negotiated for imported water to replace net sub-basin draw is used, plus an estimate of the cost of transportation of the water. CPV Sentinel has assumed that the CPVS will be dispatched at the lifetime average of 17 percent, resulting in 550 AFY of pumping. Although the CEC staff alternatives assumed that water importation was not needed under alternatives 1 and 2, CPV Sentinel believes that the CEQA impacts would require mitigation with imported water. Thus, this cost is included for both CEC staff alternatives.

Line 20: Line 20 uses the same relationship used by the CEC as discussed in Line 12 above for the equivalent present value for annual operation and management expressed as a capital cost.

Line 21: Line 21 is the total equivalent capital cost, which is a summation of the capital cost and the equivalent present value of operation and management from Lines 12.1 and 20.

Line 22: Line 22 is a comparison of the total capital cost differential of the CPVS and the CEC staff alternatives.

Line 23: Line 23, annual energy produced, is based on the capacity factor listed in the spreadsheet, and the final PPA, which limits power production to 34 percent for all 8 units. However, the lifetime annual average expected dispatch is half this amount. This uses 107 degrees Fahrenheit data from Data Response 38 Table 38-1. Two additional LMS100 units are required for the air cooling alternatives to meet the minimum guaranteed power under the PPA. Ten units result in some extra power, which is assumed to be sold under the PPA; however, this would require a change to the PPA and has not been discussed with SCE.

Line 24: Line 24 uses the CEC staff economic parameters to convert the total equivalent capital cost to an annual cost.

Line 25: Line 25 compares the differential equivalent annual cost between the CPVS and the CEC staff alternatives.

Line 26: Line 26 divides Line 24 by Line 23 to calculate the incremental cost of production, which is expressed in mills per kWh (the more common unit for this parameter).

Line 27: Line 27 compares the delta incremental cost of production of the CPVS and the CEC staff alternatives.

Line 28: Line 28 is a ratio of the equivalent water costs to the base water costs.

CEC Staff Alternative 2 Costs

CEC staff Alternative 2 would involve MSWD selling CPV Sentinel freshwater from existing MSWD Wells 28 and 30 rather than CPV Sentinel using its own onsite wells. MSWD Wells 28 and 30 are located remotely from the project site, and would require a new pipeline of approximately 6.4 miles in length at an estimated cost to CPV Sentinel of about $6 million. In addition, CPV Sentinel would be required to install two new wells for MSWD, which based on recent drilling experience in this area, would total $3 million or more. Although the CEC staff alternative listed only one new replacement well, in previous communications between the Applicant and MSWD, two wells were required to satisfy MSWD. CPV Sentinel notes that

MSWD Wells 28 and 30 are 19 and 16 years old, respectively. CPV Sentinel is not aware of the current condition or efficiency of these wells or their pumping systems. In contrast, CPV Sentinel is certain of the excellent condition and efficiency of its new onsite test well and would expect the same if it installed additional new wells to complete its onsite well field. CPV Sentinel also notes that its new well field would have built in redundancy to ensure that pumping at maximum on-demand capacity could be achieved even if one of its wells was out of service. This condition or redundancy is not covered in the CEC staff Alternative 2, which relies on water from only two MSWD wells and the HWTP. Accordingly, CPV Sentinel would be exposed to future arbitrary cost increases, as MSWD could re-set its water rate to CPV Sentinel at any time in the future merely by majority vote of its Board. In addition, should water supplies be interrupted by equipment failure, the CPVS would be reliant on MSWD to repair wells and the pipeline, undercutting the reliability of the project and exposing CPV Sentinel to significant cost penalties under its PPA with SCE. Furthermore, this alternative would include the additional environmental impact of building a 6-mile pipeline.

CEC staff Alternative 2, like CEC staff Alternative 1, increases significantly the initial capital cost to CPV Sentinel, undercuts the reliability of the CPVS, exposes CPV Sentinel to significant contractual cost penalty risks, deprives CPV Sentinel of achieving one of its key objectives of providing competitively priced electricity, and results in increased environmental impacts compared to CPV Sentinel's water supply plan. This is, therefore, not a feasible alternative.

CEC Staff Alternatives are Economically Infeasible under CPV Sentinel's PPA

The pricing in the competitively bid PPA was based on the originally proposed water supply plan, with no importation of water other than indirectly via the replenishment assessment. CPV Sentinel has since incurred the significant additional cost of adding water importation and a freshwater conservation program without any pricing or schedule relief under the PPA. By adopting the CEC staff alternatives, the Applicant would have to absorb the equivalent of an additional $51 to $58.7 million in present value or 5.0 to 5.8 mills per kWh expressed as power pricing. This is more than a tripling of the incremental cost of power. Given the fixed pricing in the PPA, and the fact that the fuel is a direct pass-through cost, the increased cost for the CEC staff alternatives represents a very high percentage of the small remaining non-fuel power pricing. Such a cost increase cannot be tolerated under the present PPA resulting in the failure of the project to get financed and built. This is especially true in today's unprecedented construction cost environment; where power plant construction costs have escalated, and continue to escalate, at rates far in excess of inflation. Even if remaining under the existing PPA were an option, the delays associated with the alternatives would result in a significant project delay, making it impossible to deliver needed power by the summer of 2010, This would result in the schedule penalties under the PPA plus additional EPC and turbine contract delay penalties of approximately $7.5 million per month. A 3-month schedule delay was included in Table 7 of CPV Sentinel's analysis of CEC staff alternative water supply plans, although this is a conservative estimate and the delay could be considerably longer. Costs of these magnitudes result in the failure of the PPA and, consequently, the project going forward. It should also be noted that CPV Sentinel is the only new generation project in the SCE service area scheduled for completion by the summer of 2010.

CONCLUSION

In summary, CPV Sentinel believes that our water supply plan meets the CEC and State water policies, satisfies CEQA, is economically feasible, and is superior to the CEC staff alternatives in each of the above areas.

TABLE 1
SUMMARY OF BASE CASE GROUNDWATER MODELING RESULTS

Location	**Scenario Base Case (BC_A.1) [1]**
Project Pumping Wells [2]	
maximum drawdown (ft)	5.5
time to maximum drawdown (year)	8
drawdown at 35 years (ft)	-0.2
Horton WWTP	
maximum drawdown (ft)	0.3
time to maximum drawdown (year)	14
drawdown at 35 years (ft)	0
DWA Recharge Basin	
maximum water level rise (ft)	8.3
time to maximum water level rise (year)	31
water level rise at 35 years (ft)	1.2
Wells 27 and 31 [3]	
maximum drawdown (ft)	0.6
time to maximum drawdown (year)	8
drawdown at 35 years (ft)	-0.2
Wells 28 and 30 [4]	
maximum drawdown (ft)	0.1
time to maximum drawdown (year)	1
drawdown at 35 years (ft)	-0.5
Well 22	
maximum drawdown (ft)	0.3
time to maximum drawdown (year)	7
drawdown at 35 years (ft)	-0.2
Well 24	
maximum drawdown (ft)	0.3
time to maximum drawdown (year)	8
drawdown at 35 years (ft)	-0.2
Well 29	
maximum drawdown (ft)	0.3
time to maximum drawdown (year)	9
drawdown at 35 years (ft)	-0.2
Well 32	
maximum drawdown (ft)	0.5
time to maximum drawdown (year)	9
drawdown at 35 years (ft)	-0.2

TABLE 1
SUMMARY OF BASE CASE GROUNDWATER MODELING RESULTS
(Continued)

Location	Scenario Base Case (BC_A.1) [1]
CVWD Wells	
maximum drawdown (ft)	0.5
time to maximum drawdown (year)	11
drawdown at 35 years (ft)	-0.1
Hummock Observation 1	
maximum drawdown (ft)	0.4
time to maximum drawdown (year)	13
drawdown at 35 years (ft)	0
Hummock Observation 2	
maximum drawdown (ft)	0.3
time to maximum drawdown (year)	22
drawdown at 35 years (ft)	0.2
Hummock Observation 3	
maximum drawdown (ft)	0.3
time to maximum drawdown (year)	30
drawdown at 35 years (ft)	0.2
Hummock Observation 4	
maximum drawdown (ft)	0.3
time to maximum drawdown (year)	28
drawdown at 35 years (ft)	0.2
Hummock Average	
maximum drawdown (ft)	0.3
time to maximum drawdown (year)	23
drawdown at 35 years (ft)	0.2

Notes:

1. Simulation details:
   Water source = onsite wells
   Water consumption = 550 AFY (constant, for 30 years)
   Recharge = 593 AFY from DWA after 1-year lag
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
2. Data presented are maximum values of data for three project wells.
3. Model data for well 27 presented; Wells 27 and 31 are adjacent to each other.
4. Model data for well 30 presented; Wells 28 and 30 are adjacent to each other.

Abbreviations:

AFY = acre-feet per year
CVWD = Coachella Valley Water District
DWA = Desert Water Agency
ft = foot (feet)
WWTP = Wastewater Treatment Plant

TABLE 2
COMPARISON OF BASE CASE GROUNDWATER MODELING RESULTS TO CEC STAFF ALTERNATIVES 1 AND 2 GROUNDWATER MODELING RESULTS

Location	Scenario		
	Base Case (BC_A.1) [1]	**CEC Alt. 1 (1A.c) [2]**	**CEC Alt. 2 (2A.c) [3]**
Project Pumping Wells [4]			
maximum drawdown (ft)	5.5	4.2	4.2
time to maximum drawdown (year)	8	35	35
drawdown at 35 years (ft)	-0.2	4.2	4.2
Horton WWTP			
maximum drawdown (ft)	0.3	10.4	10.4
time to maximum drawdown (year)	14	30	30
drawdown at 35 years (ft)	0	4.8	4.8
DWA Recharge Basin			
maximum water level rise (ft)	8.3	0	0
time to maximum water level rise (year)	31	-	-
water level rise at 35 years (ft)	1.2	-3.9	-3.9
Wells 27 and 31 [5]			
maximum drawdown (ft)	0.6	4.5	4.6
time to maximum drawdown (year)	8	32	32
drawdown at 35 years (ft)	-0.2	4.5	4.5
Wells 28 and 30 [6,7]			
maximum drawdown (ft)	0.1	4.3	4.4
time to maximum drawdown (year)	1	35	34
drawdown at 35 years (ft)	-0.5	4.3	4.4
Well 22			
maximum drawdown (ft)	0.3	4.6	4.6
time to maximum drawdown (year)	7	31	31
drawdown at 35 years (ft)	-0.2	4.5	4.5
Well 24			
maximum drawdown (ft)	0.3	4.7	4.7
time to maximum drawdown (year)	8	31	31
drawdown at 35 years (ft)	-0.2	4.5	4.5

TABLE 2
COMPARISON OF BASE CASE GROUNDWATER MODELING RESULTS TO CEC STAFF ALTERNATIVES 1 AND 2 GROUNDWATER MODELING RESULTS (Continued)

Location	Scenario		
	Base Case (BC_A.1) [1]	**CEC Alt. 1 (1A.c)** [2]	**CEC Alt. 2 (2A.c)** [3]
Well 29			
maximum drawdown (ft)	0.3	4.9	5.0
time to maximum drawdown (year)	9	30	30
drawdown at 35 years (ft)	-0.2	4.6	4.6
Well 32			
maximum drawdown (ft)	0.5	4.7	4.7
time to maximum drawdown (year)	9	31	31
drawdown at 35 years (ft)	-0.2	4.5	4.5
CVWD Wells			
maximum drawdown (ft)	0.5	4.8	4.8
time to maximum drawdown (year)	11	31	31
drawdown at 35 years (ft)	-0.1	4.6	4.6
Hummock Observation 1			
maximum drawdown (ft)	0.4	5.0	5.0
time to maximum drawdown (year)	13	31	31
drawdown at 35 years (ft)	0	4.7	4.7
Hummock Observation 2			
maximum drawdown (ft)	0.3	4.7	4.7
time to maximum drawdown (year)	22	32	32
drawdown at 35 years (ft)	0.2	4.5	4.5
Hummock Observation 3			
maximum drawdown (ft)	0.3	3.7	3.7
time to maximum drawdown (year)	30	35	35
drawdown at 35 years (ft)	0.2	3.7	3.7
Hummock Observation 4			
maximum drawdown (ft)	0.3	4.2	4.2
time to maximum drawdown (year)	28	34	34
drawdown at 35 years (ft)	0.2	4.2	4.2

TABLE 2
COMPARISON OF BASE CASE GROUNDWATER MODELING RESULTS TO CEC STAFF ALTERNATIVES 1 AND 2 GROUNDWATER MODELING RESULTS (Continued)

Location	Scenario		
	Base Case (BC_A.1) [1]	CEC Alt. 1 (1A.c) [2]	CEC Alt. 2 (2A.c) [3]
Hummock Average			
maximum drawdown (ft)	0.3	4.3	4.3
time to maximum drawdown (year)	23	32	32
drawdown at 35 years (ft)	0.2	4.3	4.3

Notes:
1. Simulation details:
   Water source = onsite wells
   Water consumption = 550 AFY (constant, for 30 years)
   Recharge = 593 AFY from DWA after 1-year lag
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
2. Simulation details:
   Water source = Horton WWTP and onsite wells
   Water consumption = 550 AFY (Horton WWTP: 30 years; onsite wells: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   No recharge
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
3. Simulation details:
   Water source = Horton WWTP and MSWD Wells 28 and 30
   Water consumption = 550 AFY (Horton WWTP: 30 years; MSWD Wells 28 and 30: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   No recharge
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
4. Data presented are maximum values of data for three project wells.
5. Model data for well 27 presented; Wells 27 and 31 are adjacent to each other.
6. Model data for well 30 presented for Base Case and Alternative 1; Wells 28 and 30 are adjacent to each other.
7. Data presented are maximum values of data for Wells 28 and 30 for Alternative 2.

Abbreviations:
AFY = acre-feet per year
CEC = California Energy Commission
CVWD = Coachella Valley Water District
DWA = Desert Water Agency
ft = foot (feet)
WWTP = Wastewater Treatment Plant
yr(s) = year(s)

TABLE 3 FRESHWATER CONSERVATION FROM APPLICANT'S WATER SUPPLY PLAN	
Palm Springs National Country Club Freshwater Conserved By Recycled Water Service in Lieu of Freshwater Pumping	
Year	**Freshwater Conserved (AFY)**
2010	1,005
2015	1,034
2020	1,034
2025	1,034
2030	1,034
2035	1,034
2040	1,034
Average	**1,030**

Irrigation Controller Program Freshwater Conserved by Reductions in Irrigation Application		
Houses Retrofit (AFY)	**Savings Based on 0.1 AFY Retrofit[2] (AFY)**	**Savings Based on 0.147 AFY Retrofit[3] (AFY)**
4,800	480	705.6

Total Savings Irrigation Retrofit plus Palm Springs National Golf Course (AFY)	
Minimum	**Maximum**
1,510	1,735

Notes:
1. From Table 79-3 Applicants Data Responses
2. Savings Estimated by DWA
3. Savings From CVWD Pilot Program

Abbreviations:
AFY acre= acre feet per year

TABLE 4
FRESHWATER CONSERVATION FROM CEC STAFF ALTERNATIVES

Projected Horton Flow from CEC PSA				Freshwater Conserved (in AFY)		
Year	**Flow Rate (gpm)**	**Flow Rate (gpm)[1]**	**% of Horton Flow Rate to Maximum Project Demand**	**Minimum Dispatch (0 AFY)**	**Average Dispatch (550 AFY)**	**Maximum Dispatch (1,100 AFY)**
2008	900	900.0	44%			
2009		981.7	48%			
2010		1,063.3	52%	0	284	568
2011		1,145.0	56%	0	306	612
2012		1,226.7	60%	0	328	655
2013		1,308.3	64%	0	349	699
2014	1390	1,390.0	68%	0	371	743
2015		1,470.8	71%	0	393	786
2016		1,551.7	75%	0	414	829
2017		1,632.5	79%	0	436	872
2018		1,713.3	83%	0	458	915
2019		1,794.2	87%	0	479	959
2020	1875	1,875.0	91%	0	501	1,002
2021		1,955.8	95%	0	522	1,045
2022		2,036.7	99%	0	544	1,088
2023		2,059.0	100%	0	550	1,100
2024		2,059.0	100%	0	550	1,100
2025		2,059.0	100%	0	550	1,100
2026	2360	2,059.0	100%	0	550	1,100
2027		2,059.0	100%	0	550	1,100
2028		2,059.0	100%	0	550	1,100
2029		2,059.0	100%	0	550	1,100
2030		2,059.0	100%	0	550	1,100
2031		2,059.0	100%	0	550	1,100
2032		2,059.0	100%	0	550	1,100
2033		2,059.0	100%	0	550	1,100
2034		2,059.0	100%	0	550	1,100
2035		2,059.0	100%	0	550	1,100
2036		2,059.0	100%	0	550	1,100
2037		2,059.0	100%	0	550	1,100

TABLE 4
FRESHWATER CONSERVATION FROM CEC STAFF ALTERNATIVES
(Continued)

Projected Horton Flow from CEC PSA				**Freshwater Conserved (in AFY)**		
Year	**Flow Rate (gpm)**	**Flow Rate (gpm)**[1]	**% of Horton Flow Rate to Maximum Project Demand**	**Minimum Dispatch (0 AFY)**	**Average Dispatch (550 AFY)**	**Maximum Dispatch (1,100 AFY)**
2038		2,059.0	100%	0	550	1,100
2039		2,059.0	100%	0	550	1,100
Average		1,839	89%		491[2]	982

Notes:

1. Interpolated Data From CEC Projections
2. Expected Value

Abbreviations:

AFY = acre feet per year
gpm = gallons per minute

TABLE 5
SUMMARY OF GROUNDWATER MODELING RESULTS
FOR MESQUITE HUMMOCKS AREA

Location	Scenario				
	Base Case (BC_A.1) [1]	**CEC Alt. 1 (1A.c)** [2]	**CEC Alt. 2 (2A.c)** [3]	**CEC Alt. 1 (1B.2b)** [4]	**CEC Alt. 2 (2B.2b)** [5]
Hummock Observation 1					
maximum drawdown (ft)	0.4	5.0	5.0	1.2	1.3
time to maximum drawdown (year)	13	31	31	22	21
drawdown at 35 years (ft)	0	4.7	4.7	0.3	0.3
Hummock Observation 2					
maximum drawdown (ft)	0.3	4.7	4.7	1.9	1.9
time to maximum drawdown (year)	22	32	32	30	30
drawdown at 35 years (ft)	0.2	4.5	4.5	1.3	1.3
Hummock Observation 3					
maximum drawdown (ft)	0.3	3.7	3.7	1.8	1.8
time to maximum drawdown (year)	30	35	35	32	32
drawdown at 35 years (ft)	0.2	3.7	3.7	1.7	1.7
Hummock Observation 4					
maximum drawdown (ft)	0.3	4.2	4.2	1.9	1.9
time to maximum drawdown (year)	28	34	34	30	30
drawdown at 35 years (ft)	0.2	4.2	4.2	1.6	1.6
Hummock Average					
maximum drawdown (ft)	0.3	4.3	4.3	1.7	1.7
time to maximum drawdown (year)	23	32	32	30	30
drawdown at 35 years (ft)	0.2	4.3	4.3	1.2	1.2

Notes:

1. Simulation details:
   Water source = onsite wells
   Water consumption = 550 AFY (constant, for 30 years)
   Recharge = 593 AFY from DWA after 1-year lag
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
2. Simulation details:
   Water source = Horton WWTP and onsite wells
   Water consumption = 550 AFY (Horton WWTP: 30 years; onsite wells: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   No recharge
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
3. Simulation details:
   Water source = Horton WWTP and MSWD Wells 28 and 30
   Water consumption = 550 AFY (Horton WWTP: 30 years; MSWD Wells 28 and 30: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   No recharge
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
4. Simulation details:
   Water source = Horton WWTP and onsite wells
   Water consumption = 550 AFY (Horton WWTP: 30 years; onsite wells: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   Recharge = 593 AFY from DWA after 1-year lag
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
5. Simulation details:
   Water source = Horton WWTP and MSWD Wells 28 and 30
   Water consumption = 550 AFY (Horton WWTP: 30 years; MSWD Wells 28 and 30: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   Recharge = 593 AFY from DWA after 1-year lag
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years

Abbreviations:
AFY = acre-feet per year
CEC = California Energy Commission
DWA = Desert Water Agency
ft = foot (feet)
WWTP = Wastewater Treatment Plant
yr(s) = year(s)

TABLE 6
SUMMARY OF GROUNDWATER MODELING RESULTS FOR AREA WELLS AND RECHARGE BASINS

Location	Scenario				
	Base Case (BC_A.1) [1]	CEC Alt. 1 (1A.c) [2]	CEC Alt. 2 (2A.c) [3]	CEC Alt. 1 (1B.2b) [4]	CEC Alt. 2 (2B.2b) [5]
Project Pumping Wells [6]					
maximum drawdown (ft)	5.5	4.2	4.2	2.2	0.1
time to maximum drawdown (year)	8	35	35	2	2
drawdown at 35 years (ft)	-0.2	4.2	4.2	-0.9	-0.9
Horton WWTP					
maximum drawdown (ft)	0.3	10.4	10.4	6.9	6.8
time to maximum drawdown (year)	14	30	30	30	30
drawdown at 35 years (ft)	0	4.8	4.8	0.6	0.6
DWA Recharge Basin					
maximum water level rise (ft)	8.3	0	0	9.4	9.4
time to maximum water level rise (year)	31	-	-	31	31
water level rise at 35 years (ft)	1.2	-3.9	-3.9	2.0	2.0
Wells 27 and 31 [7]					
maximum drawdown (ft)	0.6	4.5	4.6	0.4	0.3
time to maximum drawdown (year)	8	32	32	6	6
drawdown at 35 years (ft)	-0.2	4.5	4.5	-0.4	-0.4
Wells 28 and 30 [8,9]					
maximum drawdown (ft)	0.1	4.3	4.4	0.1	1.3
time to maximum drawdown (year)	1	35	34	1	2
drawdown at 35 years (ft)	-0.5	4.3	4.4	-0.9	-0.8
Well 22					
maximum drawdown (ft)	0.3	4.6	4.6	0.3	0.5
time to maximum drawdown (year)	7	31	31	6	5
drawdown at 35 years (ft)	-0.2	4.5	4.5	-0.4	-0.4
Well 24					
maximum drawdown (ft)	0.3	4.7	4.7	0.4	0.6
time to maximum drawdown (year)	8	31	31	9	6
drawdown at 35 years (ft)	-0.2	4.5	4.5	-0.3	-0.3

TABLE 6
SUMMARY OF GROUNDWATER MODELING RESULTS FOR AREA WELLS AND RECHARGE BASINS
(Continued)

Location	Scenario				
	Base Case (BC_A.1) [1]	CEC Alt. 1 (1A.c) [2]	CEC Alt. 2 (2A.c) [3]	CEC Alt. 1 (1B.2b) [4]	CEC Alt. 2 (2B.2b) [5]
Well 29					
maximum drawdown (ft)	0.3	4.9	5.0	0.7	0.8
time to maximum drawdown (year)	9	30	30	14	10
drawdown at 35 years (ft)	-0.2	4.6	4.6	-0.2	-0.2
Well 32					
maximum drawdown (ft)	0.5	4.7	4.7	0.5	0.5
time to maximum drawdown (year)	9	31	31	8	8
drawdown at 35 years (ft)	-0.2	4.5	4.5	-0.2	-0.2
CVWD Wells					
maximum drawdown (ft)	0.5	4.8	4.8	0.8	0.8
time to maximum drawdown (year)	11	31	31	15	14
drawdown at 35 years (ft)	-0.1	4.6	4.6	0	0

Notes:

1. Simulation details:
   Water source = onsite wells
   Water consumption = 550 AFY (constant, for 30 years)
   Recharge = 593 AFY from DWA after 1-year lag
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
2. Simulation details:
   Water source = Horton WWTP and onsite wells
   Water consumption = 550 AFY (Horton WWTP: 30 years; onsite wells: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   No recharge
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
3. Simulation details:
   Water source = Horton WWTP and MSWD Wells 28 and 30
   Water consumption = 550 AFY (Horton WWTP: 30 years; MSWD Wells 28 and 30: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   No recharge
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
4. Simulation details:
   Water source = Horton WWTP and onsite wells
   Water consumption = 550 AFY (Horton WWTP: 30 years; onsite wells: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   Recharge = 593 AFY from DWA after 1-year lag
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
5. Simulation details:
   Water source = Horton WWTP and MSWD Wells 28 and 30
   Water consumption = 550 AFY (Horton WWTP: 30 years; MSWD Wells 28 and 30: decreases linearly from 266 AFY at year 0 to 0 at year 14)
   Recharge = 593 AFY from DWA after 1-year lag
   Tyley's transmissivity
   Anisotropy ratio = 2.0
   Model simulation time = 35 years
6. Data presented are maximum values of data for three project wells.
7. Model data for well 27 presented; Wells 27 and 31 are adjacent to each other.
8. Model data for well 30 presented for Base Case and Alternative 1; Wells 28 and 30 are adjacent to each other.
9. Data presented are maximum values of data for Wells 28 and 30 for Alternative 2.

Abbreviations:
AFY = acre-feet per year
CEC = California Energy Commission
CVWD = Coachella Valley Water District
DWA = Desert Water Agency
ft = foot (feet)
WWTP = Wastewater Treatment Plant
yr(s) = year(s)

TABLE 7
CPV SENTINEL CORRECTIONS TO CEC STAFF SOIL &WATER TABLE 16
ECONOMIC COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES

Refer to numbered notes below for each numbered cost line item 8/21/2008

Cost Parameter	Applicant's Base Project	CEC Staff Alternative 1 (Reclaimed water + site wells)	CEC Staff Alternative 2 (Reclaimed water + Wells 28 and 30)	CEC Staff Alternative 3 (Dry Cooling)
Capital Costs				
1) Groundwater supply pipeline-offsite	$0	$0	$5,400,000	$0
2) Reclaimed water supply pipeline-offsite	$0	$5,400,000	$5,400,000	$0
3) Reclaimed water supply pumping station	$0	$500,000	$500,000	$0
4) Tertiary treatment upgrade of Horton WWTP	$0	$3,000,000	$3,000,000	$0
5) Add wells to replace MSWD Wells 28 and 30	$0	$0	$2,600,000	$0
6) Cooling towers, other equipment costs	$3,520,000	$3,520,000	$3,520,000	$15,680,000
7) Additional land for dry cooling	$0	$0	$0	$3,000,000
8) Pre-treatment, ZLD and water treatment	$10,550,000	$28,000,000	$28,000,000	$1,000,000
9) Fresh water conservation	$2,500,000	$0	$0	$0
10) Cost of project delay	$0	$22,500,000	$22,500,000	$22,500,000
11) Two additional units for dry cooling to meet PPA	$0	$0	$0	$151,360,000
12.1) Subtotals, Capital Cost	**$16,570,000**	**$62,920,000**	**$70,920,000**	**$193,540,000**
12.2) Cost increase from base proposed project	$0	$46,350,000	$54,350,000	$176,970,000
12.3) Equivalent Annual Cost of Capital	$1,757,736	$6,674,517	$7,523,152	$20,530,609

TABLE 7
CPV SENTINEL CORRECTIONS TO CEC STAFF SOIL &WATER TABLE 16
ECONOMIC COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES
(Continued)

Cost Parameter	Applicant's Base Project	CEC Staff Alternative 1 (Reclaimed water + site wells)	CEC Staff Alternative 2 (Reclaimed water + Wells 28 and 30)	CEC Staff Alternative 3 (Dry Cooling)
Annual Variable Operating Costs	Lifetime avg. dispatch =	17%		
	Corresponding makeup water, AFY =	550		
13) Groundwater cost w/recharge assessment	$39,600	$39,600	$0	$0
14) Reclaimed water purchase	$0	$247,500	$247,500	$0
15) Reclaimed water pumping O&M and energy	$0	$200,000	$200,000	$0
16) Groundwater pumping O&M and energy	$75,000	$25,000	$25,000	$50,000
17) Cooling and water treatment chemicals	$75,000	$175,000	$175,000	$25,000
18) Cooling tower energy	$50,000	$50,000	$50,000	$400,000
19) Imported water to replace net sub-basin draw	$451,440	$451,440	$451,440	$0
Subtotal of Annual Variable Operating Costs	**$691,040**	**$1,188,540**	**$1,148,940**	**$475,000**
20) Equivalent capital cost for annual O&M =	$6,514,365	$11,204,248	$10,830,942	$4,477,778
21) Total equiv. capital cost =	**$23,084,365**	**$74,124,248**	**$81,750,942**	**$198,017,778**
22) Total equivalent capital cost differential =	**$0**	**$51,039,883**	**$58,666,578**	**$174,933,413**
Cost per KWH Analysis:				
23) Annual energy at CF listed above, 34% maximum =	1,081,775,450	1,081,775,450	1,081,775,450	1,178,055,375
24) Total equivalent annual cost =	$2,448,776	$7,863,057	$8,672,092	$21,005,609
25) Differential equivalent annual cost =	$0	$5,414,281	$6,223,316	$18,556,833
26) Incremental cost of production, mills/KWH =	2.264	7.269	8.017	17.831
27) Delta incremental cost of production, mills/KWH =	0.000	5.005	5.753	15.567
28) Ratio, cost of water vs. base =	-	321%	354%	788%

TABLE 7
CPV SENTINEL CORRECTIONS TO CEC STAFF SOIL &WATER TABLE 16
ECONOMIC COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES
(Continued)

Cost Parameter	Applicant's Base Project	CEC Staff Alternative 1 (Reclaimed water + site wells)	CEC Staff Alternative 2 (Reclaimed water + Wells 28 and 30)	CEC Staff Alternative 3 (Dry Cooling)

Notes below correspond to cost line items above:

1) Only needed for Alt. 2. Line is 5.25 to 6.4 miles long, depending on the route and will cross seasonal washes. Pricing based on 6 miles @ $900/mile
2) Distance is 6 miles, priced at $900/mi. Will require crossing some seasonal washes.
3) CEC estimated value used here
4) Cost estimate provided by MSWD during prior Sentinel-MSWD discussions is higher than used by CEC
5) MSWD has required both wells be replaced, not one as listed by CEC. Cost per well used here is assumed same as CEC cost.
6) From DR38-page 38-8. $440,000 per unit wet, $2.4 MM per unit increase for dry.
7) We reported land cost in Data Response 38 to be between 3 and 5 million
8) Two line items in CEC Table 16 into one here. Base project cost is $10.55 MM. Alternative 1 and 2 cost is up to 28 MM--detailed estimate in progress. Refer to attached March 2008 study by Aquagenics. For dry cooling, CEC value assumed for water treatment, but needs confirmation
9) Golf course connection =$300K. Irrigation controllers and other infrastructure =$2,200K. CEC position is no conservation needed for all 3. However, CPV Sentinel has already committed to fund conservation upon financial closing.
10) Cost of project delay. PPA delay penalty and EPC Contract delay penalty is a combined ~$7.5 million/month. As a very conservative allowance, only 3 months of delay cost are assumed in this table, if a PPA is possible, CPUC approval would be require and this delay could be much longer
11) Two additional units to meet PPA MW guarantees, assuming the extra power can be sold. $60 million each unit plus dry cooling tower cost.
12.1) Summation of capital costs; 12.2 Capital cost differential
12.3) Uses CEC calculation, w/resulting capital cost ratio to annual cost =9.4269 (i = 10%, 30 years)
13) Based on current $72/AF recharge assessment. No cost assumed for Alt 3, as pricing is based on 100% reclaimed water.
14) Uses CEC costs from Table 16 of $450/AF
15) Uses CEC costs from Table 16 of $400,000 for 1,100 AFY
16), 17), 18) Uses CEC costs from Table 16
19) $570/AF plus $190/AF transportation plus 8% to DWA/sub-basin =$820.80 per AF
20) Uses CEC equivalent ratio of capital cost to annual cost--see line 12 above.
21) Summation of total capital cost and equivalent capital cost of annual costs
22) Differential total capital cost between the CPV Base Case and the CEC staff alternatives
23) Actual maximum dispatch all 8 units under the PPA is 34%. Based on data response 38, Table 38-1, for 107F: 727244 KW wet, 633577 KW dry.(8 units) and 791970 KW dry for 10 units, needed to meet PPA
24) Uses CEC values to convert equivalent capital cost to equivalent annual cost
25) Differential equivalent annual cost
26) Incremental cost of production = annual equivalent cost divided by annual KWH, expressed in mills per KWH. Assumes extra power for dry cooling alternative can be sold under the PPA.
27) Differential from CPV Sentinel base to each of the CEC staff alternatives and 28) ratio of cooling cost relative to base

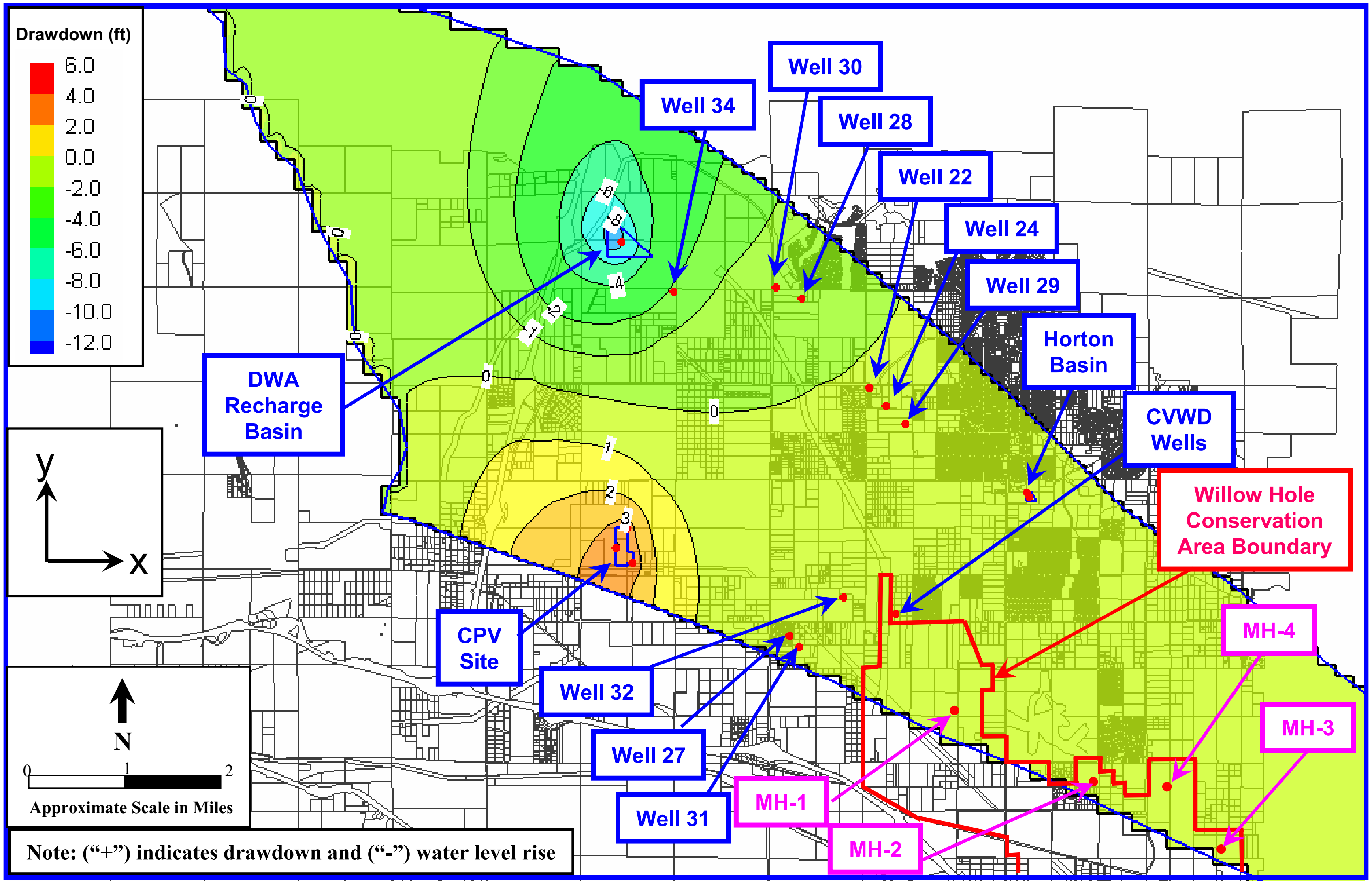


Figure 1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation BC_A.1

(Water consumption = 550 AFY from on-site wells, DWA recharge = 593 AFY, Tyley's T, anisotropy ratio = 2.0)

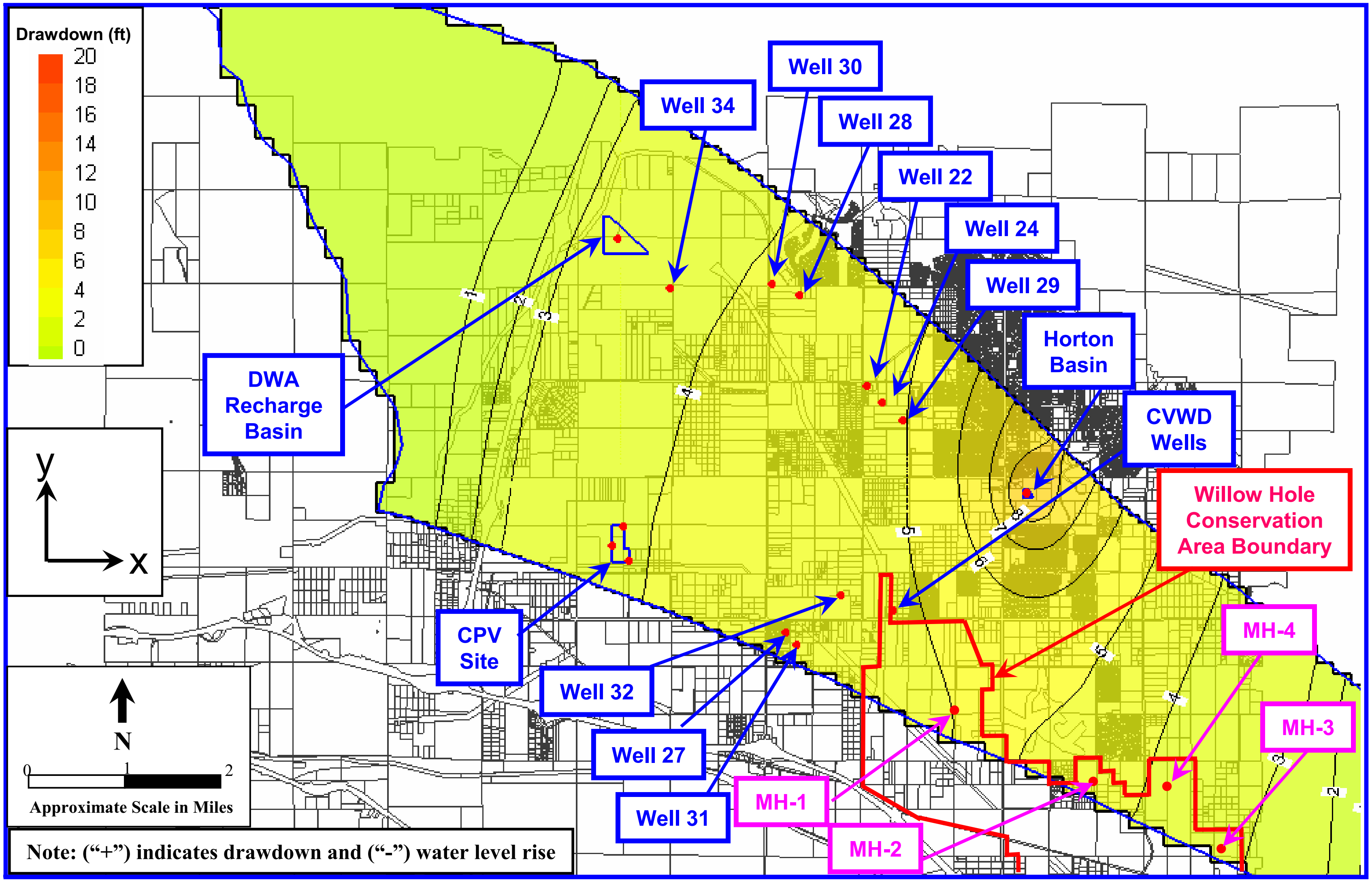


Figure 2: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1A.c

(Water consumption = 550 AFY from Horton WWTP and on-site wells, no DWA recharge, Tyley's T, anisotropy ratio = 2.0)

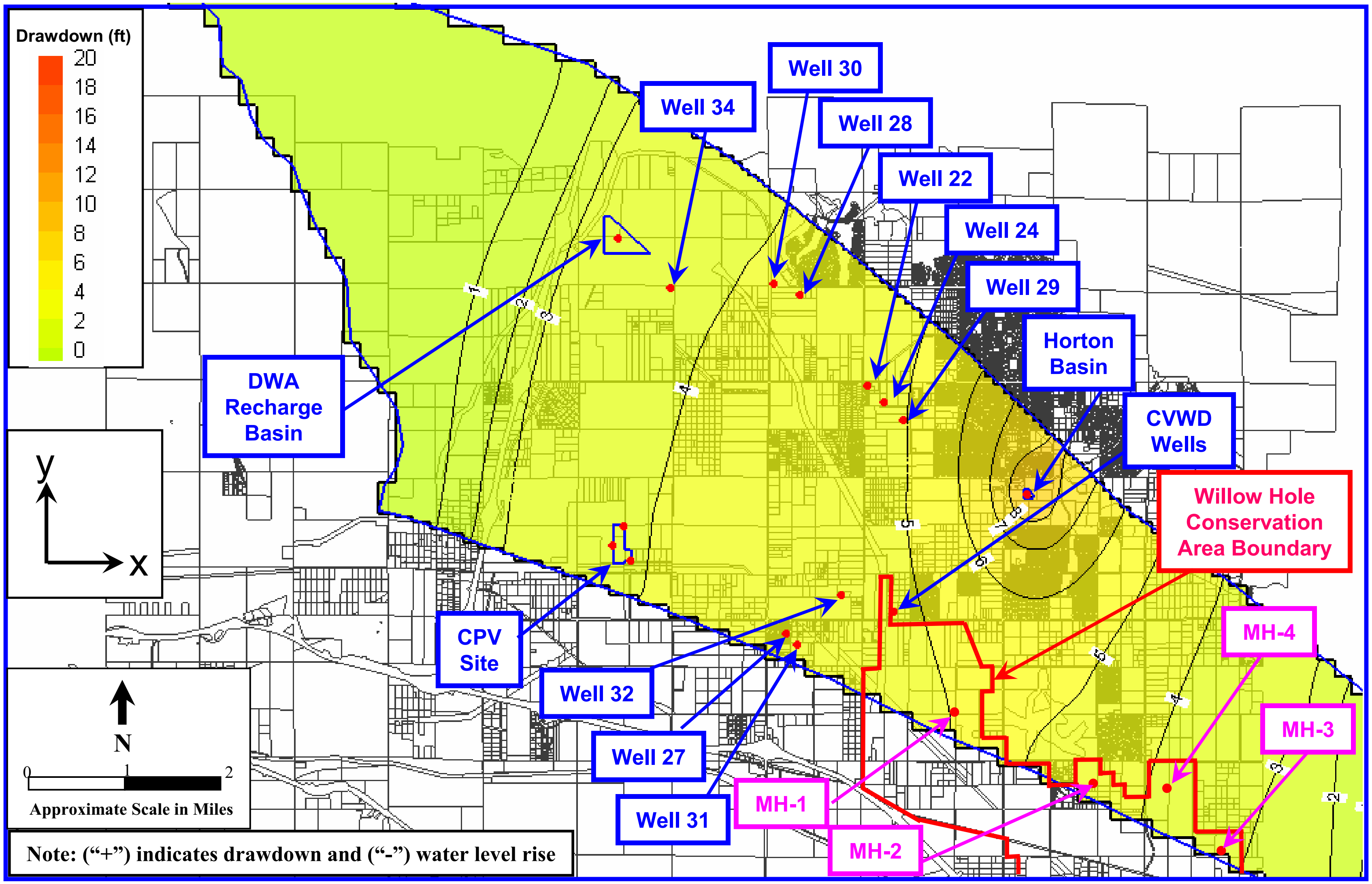


Figure 3: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2A.c

(Water consumption = 550 AFY from Horton WWTP and MSWD wells, no DWA recharge, Tyley's T, anisotropy ratio = 2.0)

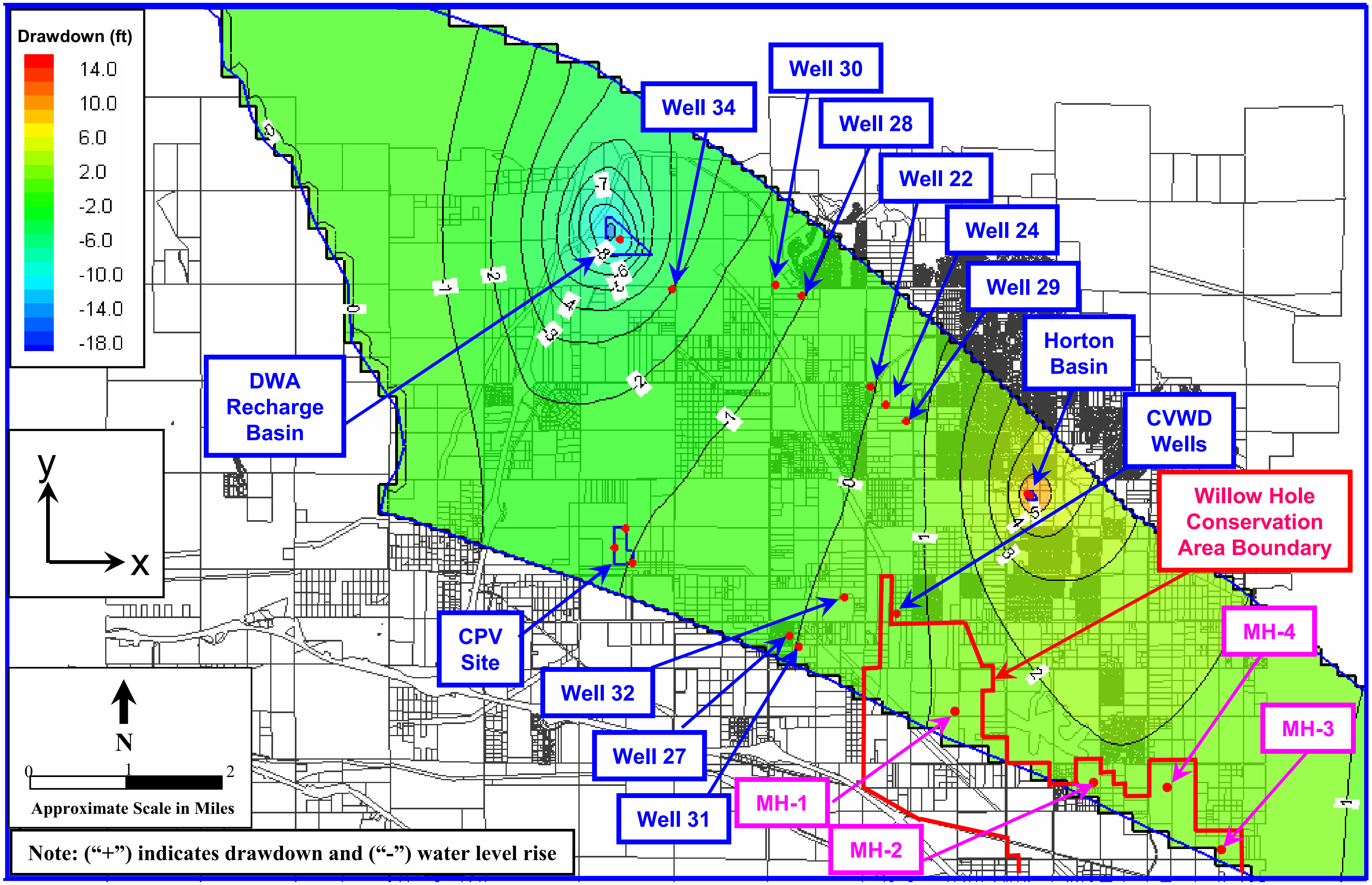


Figure 4: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1B.2b

(Water consumption = 550 AFY from Horton WWTP and on-site wells, DWA recharge = 593 AFY, Tyley's T, anisotropy ratio = 2.0)

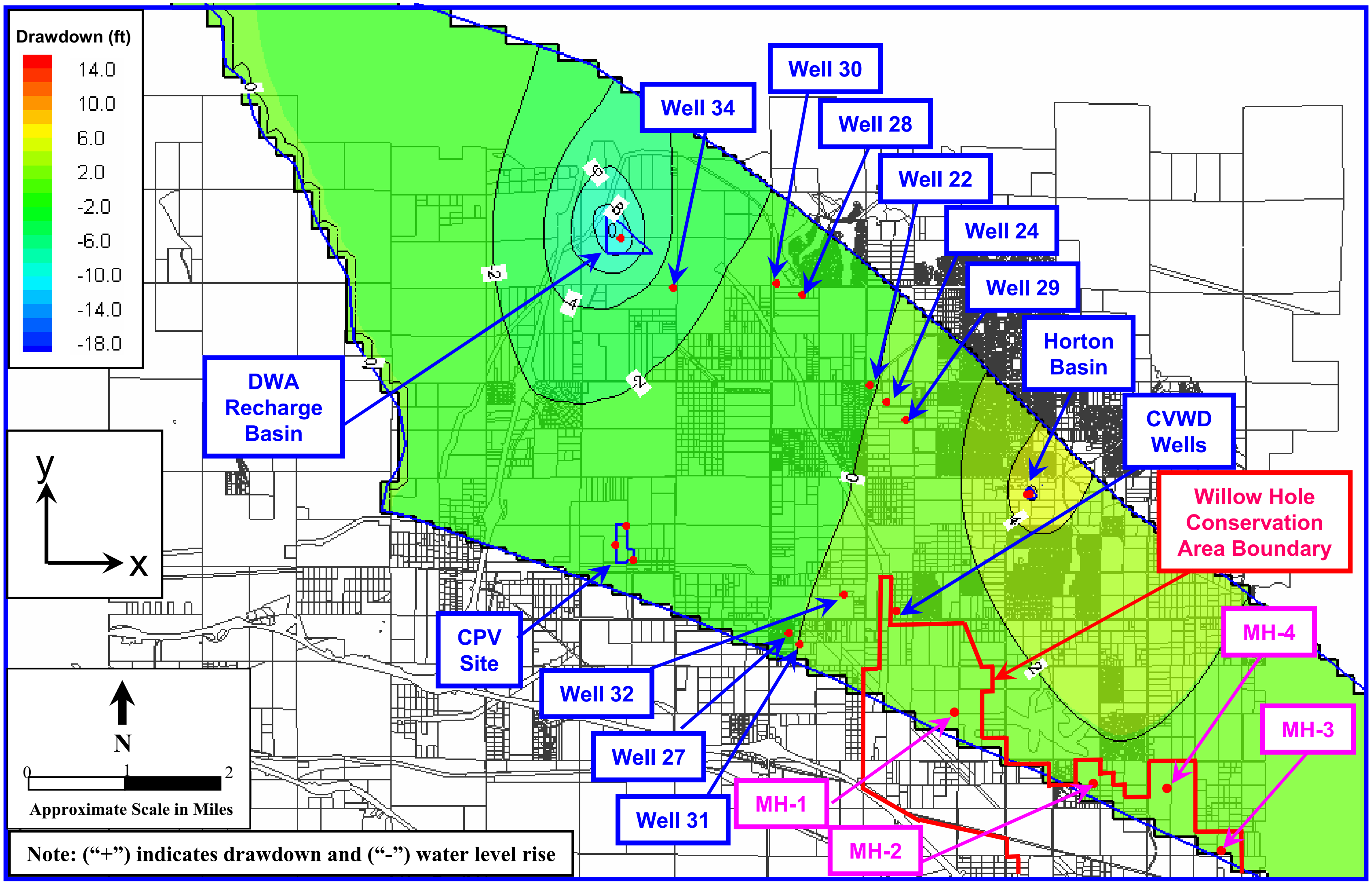
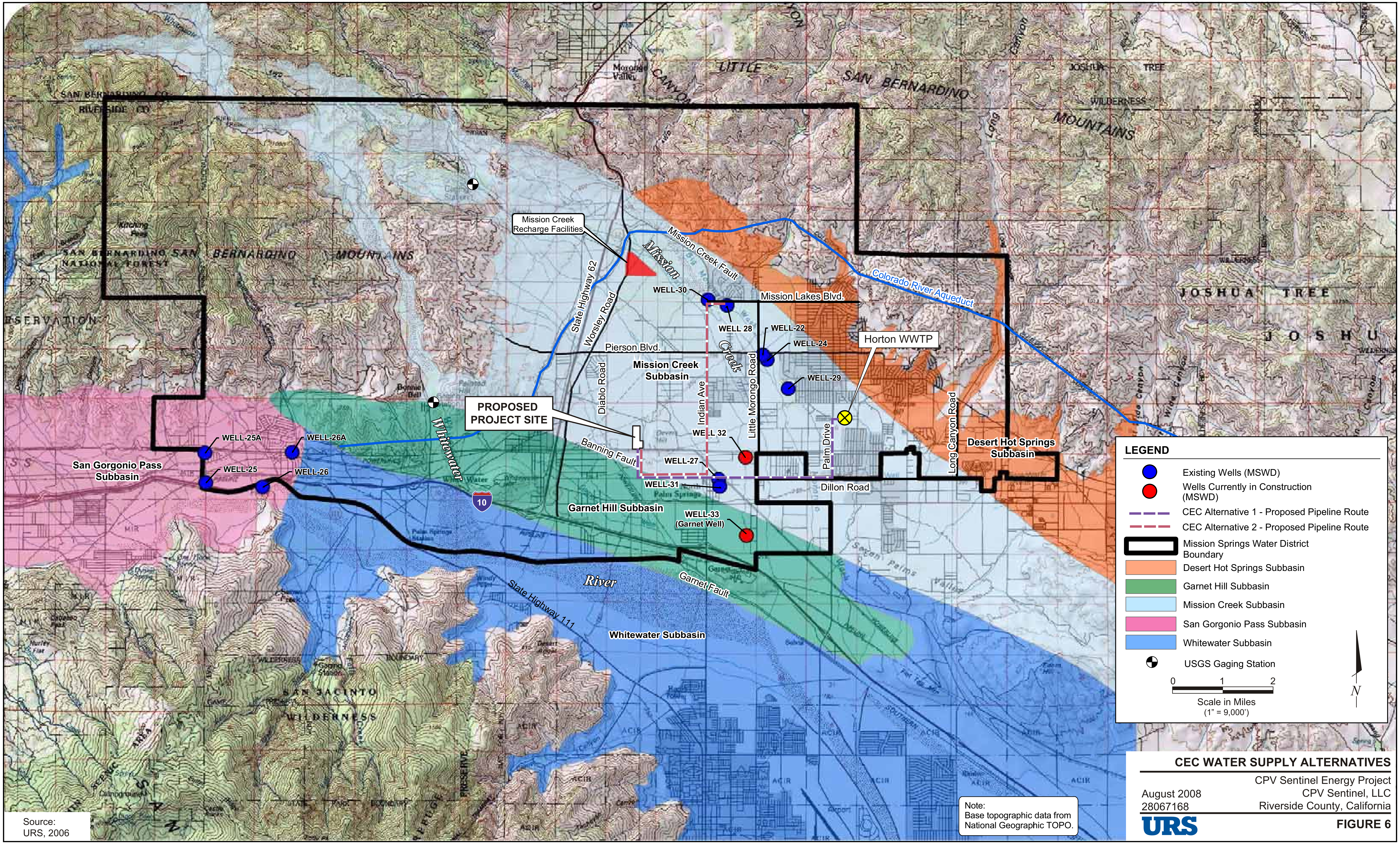


Figure 5: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2B.2b

(Water consumption = 550 AFY from Horton WWTP and MSWD wells 28 and 30, DWA recharge = 593 AFY, Tyley's T, anisotropy ratio = 2.0)



CEC WATER SUPPLY ALTERNATIVES

August 2008
28067168

CPV Sentinel Energy Project
CPV Sentinel, LLC
Riverside County, California

URS

FIGURE 6

8/25/08 vsa ..T:\CPV Sentinel 2008\Graphics\Water Supply Aug08\Fig 6_water supply alts.ai

Appendix A

Desert Water Agency and CPV Sentinel, LLC
Water Supply Agreement

WATER SUPPLY AGREEMENT

The Desert Water Agency ("DWA") and CPV Sentinel, LLC ("CPV") (collectively, the "Parties") enter into this Water Supply Agreement ("Agreement").

I. RECITALS

A. DWA is a non-profit special district created by an act of the California State Legislature on September 15, 1961. DWA relies on State Water Project ("SWP") water, in addition to other sources of supply, to replenish the Mission Creek Subbasin ("Subbasin"), which is located in the Coachella Valley Groundwater Basin and underlies DWA's service area. DWA replenishes the Subbasin through use of the Mission Creek Spreading Grounds ("Spreading Grounds"), which replenishment efforts provide a reliable source of water supply for other local users.

B. Pursuant to Section 15.4 of Chapter 100 of the California Water Code Appendix, DWA levies and collects water replenishment assessments from pumpers of groundwater. The revenue from these replenishment assessments ("RA") is used to purchase water for importation and replenishment of the groundwater.

C. To further its replenishment efforts, in 1983, DWA entered into an agreement with the Metropolitan Water District of Southern California ("MWD") whereby MWD agrees to exchange its Colorado River water with DWA for an equal quantity of water delivered through the SWP system (the "MWD Exchange

Agreement"). When exchanging such water, MWD has the option of delivering Colorado River water directly for exchange with DWA, or alternatively MWD can debit its "advance delivery account," which account was established pursuant to an agreement entered into in 1984 between CVWD, DWA and MWD entitled the 1984 Advance Delivery Agreement.

D. Delivery of the water exchanged with MWD is further facilitated by the Mission Creek Groundwater Replenishment Agreement, entered into between DWA and the Coachella Valley Water District ("CVWD") in April 2003 (the "2003 Replenishment Agreement"). Under the 2003 Replenishment Agreement, on an annual basis, CVWD and DWA (i) calculate the quantity of water produced by pumpers within those portions of the Subbasin and within the Whitewater River Subbasin that lie within the boundaries of CVWD and DWA, and then (ii) allocate their combined imported water supplies delivered as a result of the MWD Exchange Agreement to each subbasin in the same percentages, unless the two agencies agree otherwise.

E. On or about October 3, 2003, the Mission Springs Water District ("MSWD") filed a lawsuit challenging, among other things, the validity of the replenishment assessments levied by DWA and CVWD to recharge the Subbasin and the Whitewater River Subbasin, respectively (the "Mission Springs Action"). On December 7, 2004, DWA, MSWD and CVWD entered into a settlement agreement to resolve the claims brought in the Mission Springs Action (the "Settlement Agreement"). Under the terms of the Settlement Agreement, the parties reserve their right to recapture imported water that is infiltrated and percolated into the Coachella Valley Groundwater Basin.

F. Pursuant to its enabling statute, DWA assesses a RA in order to fund DWA's replenishment activities based on the quantity of each acre-foot ("AF") of groundwater produced from the applicable subbasin. In order to measure the groundwater pumped, DWA enters into well metering agreements with groundwater pumpers whereby those pumpers agree to bear the cost of installing metering facilities. On March 1, 2001, DWA entered into a well metering agreement with Ocotillo Development LLC, ("Ocotillo") in order to provide for a mechanism by which to measure and supply water needed to support Ocotillo's proposed power generation plant. An addendum to that agreement was subsequently executed in 2001. (The well metering agreement and the addendum shall be collectively referred to in this Agreement as the "Ocotillo Well Metering Agreement.")

G. Among other terms, the Ocotillo Well Metering Agreement provided that (i) DWA would cooperate in acquiring additional imported water at Ocotillo's expense for use by Ocotillo on its project, (ii) title to such water and water entitlements acquired by DWA at Ocotillo's expense for operation of its proposed project would be transferred to Ocotillo, and (iii) DWA would retain 8% of the additional imported water acquired at Ocotillo's expense as compensation for the use of DWA's water facilities used to deliver and percolate the water into the Subbasin.

H. In an effort to ensure that the substantive terms of the Ocotillo Well Metering Agreement are made applicable to the importation of water for CPV's proposed project, DWA and CPV entered into a Memorandum of Understanding For Implementation of Well Metering Agreement in February 2008 (the "Well Metering Agreement MOU"), which contemplated the Parties' procurement of additional imported water over and above DWA's existing replenishment deliveries in order to support development of CPV's project. However, in order to provide for all of the terms and conditions concerning the importation of the water described herein for CPV's project in a single agreement, the Parties intend that this Agreement comprehensively contain all of those terms and conditions, independent of the Ocotillo Well Metering Agreement and the Well Metering MOU.

I. CPV is the developer of a proposed power generation facility to be sited within DWA's boundaries and within the Subbasin (the "Project"). CPV is currently undergoing the licensing and approval process of the Project by the California Energy Commission ("CEC"). In connection with that licensing and approval process, the CEC is conducting environmental review pursuant to the applicable provisions of the California Environmental Quality Act (California Public Resources Code Section 21000, et seq.) ("CEQA").

J. The initial quantity of water to be supplied by DWA to support the Project will be purchased from the North Kern Water Storage District ("North Kern") under the terms of a water supply agreement entered into between North

Kern and DWA in August 2008 (the "North Kern Agreement") (a true and correct copy of which is attached as Exhibit "A" hereto). (The water purchased from North Kern shall be referred to in this Agreement as the "North Kern Water.") DWA and CPV intend to continue to work together to secure additional water supplies that will be imported to the Subbasin for use by the Project in addition to the water replenished by DWA for the benefit of other pumpers pursuant to the 2003 Replenishment Agreement.

K. Prior to entering into an agreement to sell the North Kern Water to DWA, and in general contemplation of exporting that water to a third party (not necessarily DWA or CPV), North Kern complied with the provisions of the California Environmental Quality Act (Cal. Public Resources Code §§ 21000 et seq.) ("CEQA") by adopting the "Addendum No. 1 to Subsequent Negative Declaration for Transfer of 10,000 Acre Feet Per Year of Banked Lower Kern River Water" in June 2008 ("Addendum"). Prior to the preparation of the Addendum, the Kern County Water Agency had prepared two Negative Declarations (in 2000 and 2001) concerning its acquisition of certain water rights owned by Nickel Family LLC ("Nickel") and the transfer of certain water to Nickel. The water received by Nickel was subsequently stored with North Kern and is the subject of the North Kern Agreement. The Addendum determined that there were no significant environmental impacts associated with the extraction of the North Kern Water from that groundwater basin and its delivery to the California Aqueduct for exportation.

L. CPV and DWA enter into this Agreement to provide the terms for the purchase of the North Kern Water for delivery by DWA to CPV to support the Project and to provide for the Parties' continued joint efforts to secure additional water supplies for the Project.

II. TERMS OF THE AGREEMENT

For valuable consideration, including the covenants and promises contained in this Agreement, the Parties agree as follows:

A. Well Metering Agreement

The Parties shall enter into the Well Metering Agreement attached hereto as Exhibit "B" concurrently with their execution of this Agreement.

B. Water To Be Exchanged By DWA For The Project

Immediately upon receipt by DWA of the North Kern Water, DWA shall cause the delivery of the North Kern Water to MWD for exchange of an equal quantity of Colorado River water (the "Exchanged NK Water") pursuant to the MWD Exchange Agreement.

C. Quantity Of Water To Be Sold And Purchased

1. Upon (a) DWA's receipt of any Exchanged NK Water from MWD; (b) DWA's delivery of that Exchanged NK Water to the location as described in Section II-(E), below; and (c) CPV's payment for that Exchanged NK Water in accordance with the provisions of this Agreement, DWA shall be deemed to have sold and transferred title to CPV, and CPV shall be deemed to have purchased and received title to, that quantity of Exchanged NK Water multiplied

by ninety-two percent (0.92). Title to the remaining eight percent (0.08) of the Exchanged NK Water not transferred to CPV shall be retained by DWA.

2. DWA and CPV shall cooperate to identify and secure additional sources of supplemental imported water over and above the quantities of imported water normally purchased by DWA for replenishment of the Subbasin. If at any time CPV identifies a source of supplemental water of suitable quality that CPV seeks to purchase and can be purchased by DWA for delivery via the MWD Exchange Agreement, then DWA shall purchase such imported water and CPV shall pay all costs attributable to the purchase and delivery of such water in accordance with an additional water supply agreement to be executed by the Parties that has commercial terms comparable to the terms of this Agreement.

3. If DWA delivers any Exchanged NK Water to the Spreading Grounds prior of its receipt of the payment owed by CPV for such water as provided in this Agreement, DWA shall retain title to such water for the sole benefit of CPV until CPV renders payment for such water in accordance with the applicable provisions of this Agreement. If DWA delivers North Kern Water to MWD pursuant to the MWD Exchange Agreement but has not received Exchanged NK Water from MWD, then DWA shall hold the right to receive such Exchanged NK Water for the sole benefit of CPV until such water is delivered by MWD to DWA.

4. DWA shall keep a written accounting of all Exchanged NK Water received from North Kern and shall provide that accounting to CPV on an semi-annual basis by invoice or other means mutually agreed upon by the Parties.

D. Preservation Of Imported Water Rights

Pursuant to all applicable law, DWA and CPV, in cooperation with one another, shall take all actions necessary to preserve all of their legal rights to recover the Exchanged NK Water imported into the Subbasin for CPV's benefit until DWA transfers title to said water to CPV pursuant to Section II-(C), above. If any legal action is commenced that seeks a determination of rights to produce water from the Subbasin (an "Adjudication"), then DWA shall not consent to relinquish its legal right to recover any and all Exchanged NK Water without CPV's prior written approval, except as may be required of DWA by final court order or applicable law.

E. Delivery Location

DWA shall deliver to CPV the Exchanged NK Water to the Spreading Grounds in the manner ordinarily undertaken by DWA to replenish the Subbasin and shall provide CPV with an accounting on a semi-annual basis of all such water delivered by DWA. Such accounting shall confirm that the amount of Exchanged NK Water so delivered shall be in addition to the replenishment water contemplated by the Settlement Agreement.

F. Water Source

The water to be delivered by DWA to CPV under this Agreement shall be the Exchanged NK Water.

G. Compliance With All Laws

In delivering North Kern Water to MWD pursuant to the MWD Exchange Agreement and delivering Exchanged NK Water to the Spreading Grounds, DWA shall comply with all applicable federal, state and local laws, regulations and agreements.

H. Payments and Purchase Price

1. Deposits

(a) Within twenty (20) calendar days of full execution of this Agreement, CPV shall have paid to DWA a $450,000 non-refundable deposit (the "$450,000 CPV Deposit"). The $450,000 CPV Deposit shall be applied by DWA to satisfy its obligations under the North Kern Agreement, specifically: 1) the outstanding $100,000 DWA Deposit, as referred in the North Kern Agreement at Section II-G (1) (a); and 2) a portion of the purchase price of the North Kern Water as described in Section II-(G) (2) (a) of the North Kern Agreement. DWA acknowledges that CPV already paid $50,000 to North Kern on DWA's behalf to satisfy a portion of the deposit referenced in Section II-(G) (1) (a) of the North Kern Agreement.

2. Purchase Price

(a) Within thirty (30) calendar days after CPV has met all conditions precedent to the initial funding by the lenders under the limited-recourse project finance arranged to finance the construction and operation of the Project ("Financial Close"), CPV shall pay DWA an amount of money equal to (i) the amount of money previously paid by DWA to North Kern for any North Kern Water delivered by North Kern to DWA prior to Financial Close, less (ii) $500,000 (which is the sum of the $450,000 CPV Deposit and the additional $50,000 referenced in Section II-H(1)(a), above) (the "Net Payment"). For any quantity of North Kern Water delivered by North Kern to DWA after Financial Close, DWA shall provide CPV with a written invoice stating the amount of money owing to North Kern from DWA under the North Kern Agreement, and CPV shall pay North Kern directly the amount designated on that invoice within thirty (30) calendar days after receipt of said invoice.

(b) In addition to the monies owed by CPV to DWA referred in Section II-(H) (2) (a), CPV shall pay DWA interest on the Net Payment made by DWA prior to Financial Close. The amount of that interest shall be based on (i) the interest rate provided in the Local Agency Investment Fund of the State of California index (the "Indexed Interest Rate") and (ii) an accrual period starting from the date that DWA pays North Kern for any North Kern Water delivered by North Kern through the thirtieth calendar day after Financial Close (the "Accrual

Period"). The applicable term of the Indexed Interest Rate shall approximate the Accrual Period.

3. Extraction Fees

Although CPV is fully paying for all water needed for the Project through the payments described in this Section II-H and therefore DWA will not need to utilize RA revenue to purchase imported water to replenish the Subbasin to account for the operation of the Project, CPV shall nonetheless pay to DWA an additional fee equal to DWA's RA then in effect for each AF of Exchanged NK Water produced by CPV from the Subbasin (the "CPV Extraction Fee"). If CPV's extraction of water from the Subbasin ever exceeds the quantity of the Exchanged NK Water previously delivered to the Spreading Grounds, then CPV shall be deemed to be extracting the replenishment water that DWA delivers to the Subbasin through its use of replenishment assessment funds (hereinafter referred to as "Temporary Deficit Water"). CPV and DWA shall work diligently together to cause the expeditious delivery of additional Exchanged NK Water to the Spreading Grounds to make up for CPV's extraction of Temporary Deficit Water and thereafter provide for sufficient Exchanged NK Water for future operation of the Project. DWA shall provide for a separate accounting of any Temporary Deficit Water that CPV may produce so as to segregate the production of that water from the production of DWA's other replenishment water by all other users in the Subbasin. If any legal action, including an Adjudication, is ever filed that seeks to quantify or restrict rights to produce any water from the Subbasin, then

DWA shall take all actions to preserve CPV's production of Temporary Deficit Water, including the actions described in Section II-D, above. In consideration for DWA's actions described in this Section, CPV shall pay the CPV Extraction Fee at all times specified herein, except CPV may cease paying that fee, in its sole discretion, if a final court order prohibits CPV from producing Temporary Deficit Water.

4. California Department of Water Resources Charges

For those variable charges assessed to DWA by the California Department of Water Resources ("DWR Charges") under the applicable provision of DWA's State Water Contract for delivery of the North Kern Water, CPV shall reimburse DWA as follows: (1) with respect to such charges paid by DWA prior to Financial Close, CPV shall pay DWA within thirty (30) calendar days after Financial Close the amount of said DWR Charges plus interest calculated in the manner described in Section II-H(2)(b), above, and (b) with respect to such DWR Charges assessed after Financial Close, CPV shall pay DWA the amount of those charges upon thirty (30) days written notice by DWA.

I. Expiration, Termination, Suspension And Specific Performance

1. Expiration. This Agreement shall expire thirty-four (34) years from the execution date provided, however, that this Agreement may be extended by CPV, in its sole discretion, upon written notice to DWA if (a) the full quantity of the Exchanged NK Water has not been delivered by DWA to the Spreading Grounds, or (b) CPV has extended its lease of the land on which the

Project is sited, so that the extended term of this Agreement shall be coterminous with the extended term of said lease.

2. Termination.

(a) Either Party may terminate this Agreement for material breach by the other Party. A termination for material breach shall become effective if the breaching party does not cure its failure to perform within thirty (30) calendar days after receipt of a notice from the other Party of its intent to terminate for material breach. Notwithstanding the preceding sentence, in the event a failure to perform cannot be reasonably cured within such thirty-day period, there shall be no default under or breach of this Agreement unless the breaching Party fails to commence and diligently proceed toward full performance of the cure within thirty (30) calendar days, or such other time period as the Parties mutually agree in writing, following receipt of written notice from the other Party specifying such failure.

(b) DWA may exercise any contractual, statutory or common law right to terminate the North Kern Agreement only upon written approval by CPV, which approval shall not be unreasonable withheld. In the event DWA terminates all or part of the North Kern Agreement pursuant to Section II-I of this Agreement, the Parties shall terminate this Agreement only as it applies to the amount of water covered under the terminated portions of the North Kern Agreement.

(3) Suspension

(a) If the performance, in whole or in part, of either Party to this Agreement is directly hindered, interrupted or prevented by acts of God, acts of war, or other matters beyond the control of the affected Party, which matters shall include the entry of either a final judgment or an injunction against DWA or CPV in any litigation filed by a third party challenging the validity or performance of this Agreement, then the performance and outstanding obligations of all Parties hereto shall be temporarily suspended to the extent and from the time performance thereof is hindered, interrupted or prevented until such time as performance may be resumed thereafter. The affected Party shall exercise its best efforts to cause the removal of the hindrance and to accomplish alternative ways of performing its obligations under this Agreement.

(b) Promptly after a Party's performance is hindered, interrupted or prevented by a cause identified in Section II-(I)(3)(a), above, the affected Party shall provide written notice to the other Party that identifies the cause of the hindrance and the estimated length that such hindrance will likely remain in place. The Parties shall cooperate with each other in attempting to remove the hindrance and determining when the hindrance has been removed. Promptly after the hindrance is removed or ceases, the affected Party shall provide written notice to the non-affected Party that states that the hindrance has been removed or ceased and performance of the Agreement has been renewed.

(c) CPV and DWA shall not enter into any contract with a third party that will hinder the delivery to or payment for water by CPV.

(4) Specific Performance In The Event Of Breach

In event of an intentional default by DWA of any of its obligations provided in Sections II-(B) and (C) of this Agreement, CPV shall have the right to obtain injunctive or other equitable relief to specifically enforce its rights under Sections II-(B) and (C) of this Agreement, including pursuing an action for specific performance without the necessity of posting a bond or other security. DWA and CPV each reserve all other claims and defenses in any action arising from a breach of this Agreement.

J. Representations And Warranties

1. Representations And Warranties By CPV

CPV represents, warrants and covenants that as of the Execution Date (a) CPV is a limited liability company duly organized, validly existing and in a good standing under the laws of the State of California, (b) CPV has all necessary power and authority to perform its obligations under this Agreement, (c) this Agreement is a valid and binding obligation of CPV enforceable against CPV in accordance with its terms, except as the enforcement thereof may be limited by bankruptcy, insolvency, reorganization, or other laws affecting the enforcement of creditor's rights generally, and (d) that, to the best of CPV's knowledge, there is no litigation, proceeding or investigation pending or threatened, to which CPV is or would be a party that relates to any facility, water or other matter encompassed or contemplated by this Agreement.

2. Representations And Warranties Of DWA

DWA represents, warrants and covenants that as of the Execution Date: (a) DWA is a non-profit special district validly existing and in good standing under the laws of the State of California; (b) DWA has all necessary power and authority to perform its obligations under this Agreement; (c) this Agreement is a valid and binding obligation of DWA enforceable against DWA in accordance with its terms, except as the enforcement thereof may be limited by bankruptcy, insolvency, reorganization, or other laws affecting the enforcement of creditor's rights generally; (d) that, to the best of DWA's knowledge, there is no litigation, proceeding or investigation pending or threatened, to which DWA is a party that relates to any facility, water or other matter encompassed or contemplated by this Agreement; (e) that, to the best of DWA's knowledge, the following contracts are valid and enforceable: (i) the MWD Exchange Agreement; (ii) the 2003 Replenishment Agreement; and (iii) the Settlement Agreement; and (f) that, to the best of DWA's knowledge, the Settlement Agreement does not preclude or prevent DWA from executing or performing this Agreement.

K. Dispute Resolution

This Section II-(K) shall govern all disputes, claims and controversies between the Parties arising from or relating to this Agreement ("Disputes").

1. Meet And Confer

In the event of a Dispute, the Parties agree to meet and confer in person to attempt to reach a resolution. The meeting shall be attended by representatives of the Parties having full authority to resolve the Dispute in question. A Party may initiate the meet and confer process by service of a written notice referencing this Section II-(K), describing the nature of the Dispute, and requesting a meeting. The meeting shall thereafter be held at a mutually agreeable date and time, but in no event more than seven (7) calendar days after the date of the foregoing notice. If the Parties cannot resolve the Dispute within sixty (60) calendar days after the first meeting, the parties shall engage in a non-binding mediation, with the parties to equally share in the costs of such mediation. Said mediation shall be completed no later than sixty (60) calendar days after the completion of the original meet and confer process. No party shall file a lawsuit over a Dispute until the mediation process is completed.

L. Additional Provisions

1. Each Party's obligations under this Agreement are subject to compliance with all applicable federal, state and local laws, rules and regulations.

2. Each Party shall use its best efforts to promptly discharge its obligations under this Agreement.

3. The Parties shall cooperate with each other in preparing and executing any other agreements, whether between each other or with a third party, reasonably necessary to effectuate the purpose and objectives of this Agreement.

4. This Agreement may be modified only by a writing signed by the Parties hereto.

5. All notices required by or regarding this Agreement shall be in writing and shall be sent by first-class mail and facsimile transmission as follows:

To: CPV Sentinel, LLC
Attention: John H. Foster
Manager
35 Braintree Hill Office Park, Suite 400
Braintree, MA 02184

Telephone No: (781) 848-0253
Facsimile No: (781) 848-5804

With a Copy to: Edward J. Casey, Esq.
Weston Benshoof Rochefort Rubalcava & MacCuish LLP
333 S. Hope Street, 16th Floor
Los Angeles, CA 90071

Telephone No: (213) 576-1000
Facsimile No: (213) 576-1100

To: Desert Water Agency
Attention: David K. Luker
General Manager/Chief Engineer
Desert Water Agency
1200 Gene Autry Trail South
Palm Springs, CA 92263-1710

Telephone No: (760) 323-4971
Facsimile No: (760) 325-6505

With a Copy to: Michael T. Riddell, Esq.
Best, Best & Krieger LLP
3750 University Avenue, Suite 400
Riverside, CA 92501-3369

Telephone No: (951) 686-1450
Facsimile No: (951) 686-3083

6. This Agreement shall be binding on and inure to the benefit of the successors and permitted assigns of the Parties.

7. This Agreement is intended by the Parties as a final, complete and exclusive expression of their agreement, and supersedes any and all other agreements, either oral or in writing, including but not limited to the Well Metering Agreement MOU, between the Parties with respect to the subject matter hereof, and no other agreement, statement, or promise relating to the subject matter hereof which is not contained herein shall be valid and binding.

8. The prevailing Party in any action to enforce, or for breach of, this Agreement shall recover from the other Party its reasonable attorneys' fees.

9. The Parties acknowledge that their obligations under this Agreement are unique, that each Party would suffer irreparable harm and have no adequate remedy at law if the other Party breaches its obligations hereunder.

10. If any provision of this Agreement is found to be invalid or unenforceable, then the remaining provisions shall remain in full force and effect.

11. Each person signing the Agreement represents that he or she has the authority to do so on behalf of the Party for whom he or she is signing.

12. This Agreement has been negotiated at arm's length and between Parties represented by experienced and knowledgeable legal counsel. Accordingly, any rule of law (including Civil Code Section 1654) or legal decision that would require interpretation of any ambiguities in this Agreement against the

Party that has drafted the applicable provision is not applicable and is hereby waived.

13. This Agreement is made and entered into in the State of California, and this Agreement shall in all respects be interpreted, enforced and governed under the laws of this State.

14. This Agreement may be executed in counterparts with the same force and effect as if executed in complete documents. The "Execution Date" of this Agreement shall be the day that the last Party signs the Agreement.

15. A failure by either Party to enforce any provision of this Agreement shall not be construed as a continuing waiver, or as a waiver of the right to compel enforcement of any provision of this Agreement.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed and deemed as of the Execution Date.

DATED: ___________, 2008

CPV SENTINEL, LLC

By:_______________________
John H. Foster
Its: Manager

Approved As To Form:
WESTON BENSHOOF ROCHEFORT RUBALCAVA & MacCUISH LLP

By:___________________________
Edward J. Casey
Attorneys for CPV Sentinel, LLC

DATED: 8/19, 2008

DESERT WATER AGENCY

By: [signature]
David K. Luker
Its: General Manager/Chief Engineer

Approved As To Form:
BEST, BEST & KRIEGER LLP

By: [signature]
Michael T. Riddell
Attorneys for Desert Water Agency

WELL METERING AGREEMENT

THIS AGREEMENT, made this _______ day of__________________, 20_____ by the **DESERT WATER AGENCY** (Agency) and __________________________________ (Pumper).

A. Pumper is the owner of a certain well or wells identified as __________________, ___________________________, and _________________________, which is/are used for ___________________________________ purposes. This/these well(s) is/are located within the Agency's boundaries and is/are used to extract groundwater.

B. Pursuant to Section 15.4 of Chapter 100 of the California Water Code Appendix, the Agency levies and collects water-replenishment assessments from private pumpers for the purpose of replenishing groundwater supplies within the Agency. These assessments are based upon the quantity of groundwater pumped.

C. In order to measure and record the quantity of groundwater extracted by private pumpers within the Agency, it is necessary to install and maintain metering facilities. The Agency has agreed to operate, maintain and replace meters at its own expense, provided that each pumper bear the initial cost of installing the metering facilities.

NOW, THEREFORE, the parties agree as follows:

1. Pumper hereby authorizes the Agency to install metering facilities and necessary appurtenances, at Pumper's expense, at each of Pumper's wells. The Agency will operate, maintain and replace such meters and appurtenances at its own expense. Pumper also agrees that the title to said meters and appurtenances will remain in the Agency.

2. It is the desire of the parties that each such well be equipped with a meter for each discharge outlet; that each such meter be checked for accuracy periodically; and that mechanical and/or mathematical adjustments be made for any such inaccuracy, all for the purpose of determining well production.

3. Pumper authorizes the Agency and its employees, agents and representatives to enter Pumper's property at reasonable times and to install, operate, maintain and replace meters

and appurtenances on said wells as Agency, in its discretion, deems prudent and necessary and to enter Pumper's property at reasonable times to perform any pertinent work in accordance with the provisions of this Agreement.

4. Agency, through its employees, agents and representatives, shall have the right to read said water meters at periodic intervals as deemed necessary by the Agency. Such meter readings shall be the property of the Agency, but copies will be made available to Pumper.

5. Pumper shall notify Agency before making any changes or modifications to the pump and/or piping between a well and the meter and before adding any discharge outlet to a well.

6. Pumper hereby authorizes Agency to install, operate, maintain, and replace such meters and appurtenances on Pumper's wells should the Pumper make any change to an existing well which would require any additional metering devices to render the well fully metered. The cost of installation of such metering devices shall be borne by the Pumper. Pumper also agrees that the title to said meters and appurtenances shall remain in the Agency.

7. Pumper hereby authorizes Agency to obtain pump test data and electrical consumption records pertaining to any well described herein directly from the electrical utility serving power to such well.

8. Pumper hereby authorizes Agency to collect water samples for groundwater quality analysis pertaining to any well described herein.

9. Pumper hereby authorizes Agency to take water level measurements pertaining to any well described herein.

10. Pumper hereby requests and authorizes said electrical utility and/or Agency to perform hydraulic pump tests on each well on a periodic basis as determined to be necessary by Agency. Pumper hereby grants the right of ingress and egress over Pumper's land by the employees and agents of the electrical utility and Agency for the purpose of performing said tests and releases the Agency from claims for damages to Pumper's equipment or other property resulting from said tests unless caused intentionally or by the negligence of

the employees or agents of the Agency. Pumper shall provide any personnel necessary to ensure the safe and correct operation of its pumping equipment during any such test.

11. Agency shall make arrangements for such hydraulic pump testing as it determines to be necessary.

12. This Agreement shall be binding upon and inure to the benefit of the heirs, successors and assigns of the parties.

13. In the event of any legal action to enforce or interpret the provisions of this Agreement, the prevailing party shall be entitled to reimbursement of costs and reasonable attorneys' fees expended in such proceedings.

DESERT WATER AGENCY

By: ______________________________

Title: ______________________________

Pumper: CPV Sentinel LLC

By: ______________________________

Title: ______________________________

WATER SUPPLY AGREEMENT

North Kern Water Storage District ("North Kern") and Desert Water Agency ("DWA") (collectively, the "Parties") enter into this Water Supply Agreement ("Agreement") as of the last date that either Party signs this Agreement (the "Execution Date").

I. RECITALS

A. North Kern is a water storage district formed and operating pursuant to California Water Code Sections 39000 et seq. North Kern water supplies principally include local Kern River water and pumped groundwater. In addition to those sources of supply, North Kern obtains State Water Project ("SWP") water through exchanges with various SWP contractors, including the Kern County Water Agency ("KCWA") or member units of KCWA.

B. North Kern has an agreement with Nickel Family LLC ("Nickel") to store Nickel's water in North Kern and to extract and deliver that water on Nickel's behalf.

C. KCWA is a political subdivision of the State of California created by an Act of the California State Legislature (Statutes 1961, Chapter 1003 or as amended). KCWA is a SWP contractor entitled to receive SWP water delivered by the California Department of Water Resources ("DWR") via the California Aqueduct. Various member units of KCWA are contractually entitled to receive SWP water from KCWA.

D. DWA is a non-profit special district created by an act of the California State Legislature on September 15, 1961. DWA relies on SWP water, in addition to other sources or supply, to replenish the groundwater basins underlying its service area, which provides a reliable source of water supply for other local users.

E. KCWA stores water in various storage accounts, including the Pioneer Groundwater Recharge and Recovery Project (the "Pioneer Project") and other local banking facilities.

F. In connection with KCWA's storage accounts, KCWA certified a Subsequent Negative Declaration pursuant to the California Environmental Quality Act (California Public Resources Code Section 21000, et seq.) ("CEQA") in 2001 (the "2001 Negative Declaration"). The 2001 Negative Declaration updated KCWA's September 2000 Negative Declaration for the "Kern River Restoration and Water Supply Program" relative to the acquisition of the Lower Kern River water right ("Hacienda") by KCWA. In updating the 2000 Negative Declaration, the 2001 Negative Declaration analyzed the potential impacts associated with transferring on an annual basis 10,000 acre-feet ("AF") of Hacienda Water from KCWA's groundwater banking account to Nickel in exchange for the Lower River water right by KCWA. Once transferred, the banked water supply is to be recovered from KCWA's Pioneer Project or other local banking facilities either directly or by exchange and delivered back to the California Aqueduct either directly or by exchange. In 2006, North Kern stored, in its groundwater banking project on behalf of Nickel, 8,350 AF of such 10,000 AF made available to Nickel in 2006.

G. On June 17, 2008, North Kern certified Addendum No. 1 to the 2001 Negative Declaration (the "Negative Declaration Addendum"). The Negative Declaration Addendum analyzed the potential impacts associated with recovering the water transferred by KCWA to Nickel, which water has been temporarily banked by North Kern in 2006 for subsequent recovery and delivery. The Negative Declaration Addendum further analyzed the impacts associated with the transport of the recovered water to the California Aqueduct by either direct delivery or delivery by exchange. If direct delivery, the recovered water can be conveyed directly to the California Aqueduct through the Friant-Kern Canal, the Cross Valley Canal or the Arvin-Edison Canal or through existing and future interties with Shafter-Wasco Irrigation District and Semitropic Water Storage District. If exchanged, the recovered water will be used inside North Kern and exchanged for North Kern's Kern River water normally delivered inside North Kern. The exchanged Kern River water would then be exchanged with and used within the KCWA or member units of KCWA, for water delivered to the California Aqueduct.

H. DWA now seeks to purchase from North Kern the Nickel water stored for Nickel in 2006, which water was analyzed under both the 2001 Negative Declaration and the Negative Declaration Addendum.

II. TERMS OF THE AGREEMENT

For valuable consideration, including the covenants and promises contained in this Agreement, the Parties agree as follows:

A. Quantity of Water to be Sold and Purchased

North Kern shall transfer and deliver to DWA, and DWA shall purchase 8,350 AF of the 2006 Nickel water analyzed under both the 2001 Negative Declaration and the Negative Declaration Addendum (the "Nickel Water").

B. Conditions Subsequent

1. Government Approvals

(a) By September 15, 2008, or as expeditiously thereafter as commercially practicable, North Kern shall obtain at their sole cost, all permits, approvals and agreements from any other governmental agency, including but not limited to DWR and KCWA ("Government Approvals"), that are necessary for North Kern to deliver the Nickel Water to the Point(s) of Delivery identified in Section II-(D), below.

(b) In the event that North Kern seeks to deliver any water under this Agreement through the Friant-Kern Canal, North Kern shall secure at their sole cost, any necessary Bureau of Reclamation Warren Act contract by the applicable dates described in this Section II-(B).

C. Delivery of Water

North Kern shall cause the delivery of the Nickel Water to DWA in accordance with the preliminary delivery schedule attached hereto as Exhibit A, which schedule shall be subject to revision based on delivery conditions, provided that the Nickel Water shall be scheduled for delivery no later than September 30, 2009.

D. Point(s) of Delivery

1. Delivery by local exchange. If North Kern causes the delivery of the Nickel Water to the California Aqueduct by exchange for SWP water of KCWA or its member units, the Point of Delivery shall be in the California Aqueduct upstream of the Buena Vista Pump Station and within Kern County. The specific California Aqueduct reach for the Point of Delivery shall be identified at the time the exchange is determined.

2. Direct Delivery to California Aqueduct. The Point(s) of Delivery for Nickel Water delivered by direct delivery to the California Aqueduct shall be the Semitropic WSD Turnout (Reach 10A), the Cross Valley Canal or Kern Water Bank Canal Turnouts (Reach 12E) or the Arvin-Edison WSD Turnout (Reach 14C).

3. North Kern shall be responsible for all costs and liabilities related to the delivery of Nickel Water to the Point(s) of Delivery referred to in this Section II-(D) and DWA shall be responsible for all costs and liabilities incurred beyond those Point(s) of Delivery.

4. In accordance with practices and procedures as required by DWR, North Kern shall cause the delivery of all Nickel Water shall be scheduled, measured and delivered to the Point(s) of Delivery referred to in this Section II-(D). Beyond the Point(s) of Delivery referred to in Section II-(D), the Nickel Water shall be scheduled, measured and delivered by DWA.

E. Water Quality

1. All water delivered pursuant to this Agreement for pumping into the California Aqueduct shall equal or exceed the water quality requirements established by DWR.

2. If North Kern is notified or becomes aware that the quality of water that it causes to be delivered for pumping into the California Aqueduct fails to satisfy any applicable water quality requirements, then North Kern shall expeditiously: (i) send a written notice to DWA and all other appropriate agencies required by law; and (ii) take all actions that are necessary to expeditiously cure said failure and thereafter deliver water to the California Aqueduct that satisfies said water quality requirements.

F. Water Source

1. The original source of water to be delivered by North Kern shall be the 8,350 AF of Nickel Water currently banked in North Kern.

G. Payments and Purchase Price

1. Deposits

(a) Within five (5) business days of full execution of this Agreement, DWA shall have paid to North Kern a $150,000 non-refundable deposit, which deposit shall be decreased to recognize a $50,000 deposit previously paid for the benefit of DWA prior to the execution of this Agreement (collectively, the "$150,000 DWA Deposit"). Said deposit may be used by North Kern to pay its costs incurred in obtaining the Government Approvals described in Section II-(B)(1)(a), above.

2. Purchase Price

(a) Thirty (30) calendar days after delivery, DWA shall pay North Kern $570 per AF for each AF of Nickel Water delivered ("Nickel Water Purchase Price"), less the $150,000 DWA Deposit to North Kern.

(b) In addition to the Nickel Water Purchase Price, to the extent that the Nickel Water is delivered after September 2008, DWA shall pay North Kern 5% annual interest on the Nickel Water Purchase Price from September 1, 2008 pro-rated until the date of delivery of the Nickel Water, provided that the Nickel Water is delivered prior to September 30, 2009, unless the failure to deliver said water prior to that date was caused by DWA or its representatives.

3. Costs

(a) North Kern shall be responsible for all costs incurred in the recovery and delivery of water to the Point(s) of Delivery described above in Section II-(D) including, but not limited to, costs associated with securing

Government Approvals, energy costs to recover the water, treatment costs, and costs associated with transferring the water to that Point(s) of Delivery.

(b) DWA shall be responsible for all costs and liabilities incurred in transporting the water beyond the Point(s) of Delivery described in Section II-(D).

(c) DWA and North Kern shall each be responsible for its own costs related to the preparation and execution of this Agreement.

H. Infrastructure

(1) North Kern represents and warrants that it either: (i) owns and operates all facilities and infrastructure that are necessary to cause the water to be delivered to the Point(s) of Delivery as provided under Section II-D, above; and/or (ii) will enter into the agreements with third parties or other governmental agencies that are necessary to allow North Kern to use the facilities and infrastructure under the control of such other parties and agencies that are necessary for water to be delivered to the Point(s) of Delivery provided under Section II-(D).

(2) If any new or replacement facilities must be constructed by North Kern to deliver the water, such facilities and infrastructure shall be permitted and constructed at North Kern's expense in accordance with all applicable laws and regulations.

I. Expiration, Termination and Suspension

(1) Expiration. This Agreement shall expire on September 30, 2010 ("Expiration Date"), provided, however, that this Agreement may be extended by mutual written agreement of the Parties in the event that the full amount of Nickel Water has not been delivered.

(2) Termination. Prior to the expiration of the term of this Agreement, this Agreement may be terminated by either party only for material breach by the other Party. A termination for material breach shall become effective if the breaching party does not cure its failure to perform within thirty (30) calendar days after receipt of a notice from the other Party of its intent to terminate for material breach.

(3) Suspension

(a) If the performance, in whole or in part, of either Party to this Agreement is directly hindered, interrupted or prevented by acts of God, acts of war, or other matters beyond the control of the affected Party, which: (i) shall not include drought or the amount of any SWP exchange water that may be made available to North Kern or to Nickels; and (ii) shall include any litigation filed by a third party challenging North Kern's or DWA's approval of this Agreement, then the performance and outstanding obligations of all parties hereto shall be temporarily suspended to the extent and from the time performance thereof is hindered, interrupted or prevented until such time as performance may be resumed thereafter. The affected Party shall exercise its best efforts to cause the removal of the hindrance and to accomplish alternative ways of performing its obligations under this Agreement.

(b) Promptly after a Party's performance is hindered, interrupted or prevented by a cause identified in Section II-(I)(3)(a), above, the affected Party shall provide written notice to the other Party that identifies the cause of the hindrance and the estimated length that such hindrance will likely remain in place. The Parties shall cooperate with each other in attempting to remove the hindrance and determining when the hindrance has been removed. Promptly after the hindrance is removed or ceases, the affected Party shall provide written notice to the non-affected Party that states that the hindrance has been removed or ceased and performance of the Agreement has been renewed.

(c) North Kern and DWA shall not enter into any contract with a third party that will hinder the delivery to or payment for water by DWA.

J. <u>Specific Performance in the Event of Breach</u>

In event of an intentional default by North Kern of any of its obligations provided in Section II-(C) of this Agreement, DWA shall have the right to obtain injunctive or other equitable relief to specifically enforce its rights under Section II-(C) of this Agreement, including pursuing an action for specific performance without the necessity of posting a bond or other security. North Kern and DWA each reserve all other claims and defenses in any action arising from a breach of this Agreement.

K. <u>Representations and Warranties</u>

1. <u>Representations and Warranties by North Kern</u>

As a material inducement to DWA to enter into this Agreement, North Kern represents, warrants and covenants that (a) North Kern is a water storage district duly organized, validly existing and in a good standing under the laws of the State of California, (b) North Kern has all necessary power and authority to perform its obligations under this Agreement, (c) this Agreement is a valid and binding obligation of North Kern enforceable against North Kern in accordance with its terms, except as the enforcement thereof may be limited by bankruptcy, insolvency, reorganization, or other laws affecting the enforcement of creditor's rights generally, (d) that, to the best of North Kern's knowledge, there is no litigation, proceeding or investigation pending or threatened, to which North Kern is or would be a party that relates to any facility, water or other matter encompassed or contemplated by this Agreement, and (e) North Kern has a right to withdraw the 2006 Nickel Water from storage for delivery to DWA, in accordance with this Agreement.

2. <u>Representations and Warranties of DWA</u>

As a material inducement to North Kern to enter into this Agreement, DWA represents, warrants and covenants that (a) DWA is a non-profit special district validly existing and in good standing under the laws of the State of California, (b) DWA has all necessary power and authority to perform its obligations under this Agreement, (c) this Agreement is a valid and binding obligation of DWA enforceable against DWA in accordance with its terms, except as the enforcement thereof may be limited by bankruptcy, insolvency, reorganization, or other laws affecting the enforcement of creditor's rights generally, (d) that, to the best of DWA's knowledge, there is no litigation, proceeding or investigation pending or threatened, to which DWA is (or with respect to threatened litigation, would be) a party that relates to any facility, water or other matter encompassed or contemplated by this Agreement.

L. Dispute Resolution

This Section II-(L)(1) shall govern all disputes, claims and controversies between the Parties arising from or relating to this Agreement ("Disputes").

1. Meet and Confer

In the event of a Dispute, the Parties agree to meet and confer in person to attempt to reach a resolution. The meeting shall be attended by representatives of the Parties having full authority to resolve the Dispute in question. A Party may initiate the meet and confer process by service of a written notice referencing this Section II-(L), describing the nature of the Dispute, and requesting a meeting. The meeting shall thereafter be held at a mutually agreeable date and time, but in no event more than seven (7) calendar days after the date of the foregoing notice. If the Parties cannot resolve the Dispute within sixty (60) calendar days after the first meeting, the parties shall engage in a non-binding mediation, with the parties to equally share in the costs of such mediation. Said mediation shall be completed no later than sixty (60) calendar days after the completion of the original meet and confer process. No party shall file a lawsuit over a Dispute until the mediation process is completed.

M. Additional Provisions

1. Each Party's obligations under this Agreement are subject to compliance with all applicable federal, state and local laws, rules and regulations.

2. Each Party shall use its best efforts to promptly discharge its obligations under this Agreement.

3. The Parties shall cooperate with each other in preparing and executing any other agreements, whether between each other or with a third party, that are reasonably necessary to effectuate the purpose and objectives of this Agreement.

4. This Agreement may be modified only by a writing signed by the Parties hereto.

5. All notices required by or regarding this Agreement shall be in writing and shall be sent by first-class mail and facsimile transmission as follows:

To: North Kern Water Storage District
Attention: Richard A. Diamond
General Manager
33380 Cawelo Avenue
Bakersfield, CA 93308
Telephone No: (661) 393-2696
Facsimile No: (661) 393-6884

With a Copy to: Ernest A. Conant Esq.
Young Wooldridge, LLP
1800 30th Street, 4th Fl.

Bakersfield, CA 93301
Telephone No: (661) 327-9661
Facsimile No: (661) 327-0720

To:	Desert Water Agency
Attention:	David K. Luker General Manager/Chief Engineer 1200 Gene Autry Trail South Palm Springs, CA 92263-1710 Telephone No: (760) 323-4971 Facsimile No: (760) 325-6505
With a Copy to:	Michael T. Riddell, Esq. Best, Best & Krieger LLP 3750 University Avenue, Suite 400 Riverside, CA 92501-3369 Telephone No: (951) 686-1450 Facsimile No: (951) 686-3083

6. This Agreement shall be binding on and inure to the benefit of the successors and permitted assigns of the Parties.

7. This Agreement is intended by the Parties as a final, complete and exclusive expression of their agreement, and supersedes any and all other agreements, either oral or in writing, between the Parties with respect to the subject matter hereof, and no other agreement, statement, or promise relating to the subject matter hereof which is not contained herein shall be valid and binding.

8. The prevailing Party in any action to enforce, or for breach of, this Agreement shall recover from the other Party its reasonable attorneys' fees.

9. The Parties acknowledge that their obligations under this Agreement are unique, that each Party would suffer irreparable harm and have no adequate remedy at law if the other Party breaches its obligations hereunder.

10. If any provision of this Agreement is found to be invalid or unenforceable, then the remaining provisions shall remain in full force and effect.

11. Each person signing the Agreement represents that he or she has the authority to do so on behalf of the Party for whom he or she is signing.

12. This Agreement has been negotiated at arm's length and between Parties represented by experienced and knowledgeable legal counsel. Accordingly, any rule of law (including Civil Code Section 1654) or legal decision that would require interpretation of any ambiguities in this Agreement against the Party that has drafted the applicable provision is not applicable and is hereby waived.

13. This Agreement is made and entered into in the State of California, and this Agreement shall in all respects be interpreted, enforced and governed under the laws of this State.

14. This Agreement may be executed in counterparts with the same force and effect as if executed in complete documents.

15. A failure by either Party to enforce any provision of this Agreement shall not be construed as a continuing waiver, or as a waiver of the right to compel enforcement of any provision of this Agreement.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed and deemed in effect as of the Effective Date.

DATED: ___________, 2008

NORTH KERN WATER STORAGE DISTRICT

By: ______________________
Richard A. Diamond
Its: General Manager

Approved As To Form:
Law Offices of Young Wooldridge, LLP

By: ______________________
Ernest A. Conant
Attorneys for North Kern Water Storage District

DATED: 8/19, 2008

DESERT WATER AGENCY

By: ______________________
David K. Luker
Its: General Manager/Chief Engineer

Approved As To Form:
Best, Best & Krieger, LLP

By: ______________________
Michael T. Riddell
Attorneys for Desert Water Agency

Appendix B

Calculation of Evaporative Losses from Project-specific Recharge Operations

APPENDIX B
CALCULATION OF EVAPORATIVE LOSSES FROM PROJECT-SPECIFIC RECHARGE OPERATIONS

The Preliminary Staff Assessment (PSA) estimates evaporative losses associated with project-specific recharge for the CPV Sentinel Energy Project (CPVS), based on a ratio of estimated evaporation to estimated percolation rates. The PSA's estimate of evaporative losses from open water surfaces is based on the average evapotranspiration rate of 4.76 feet per year (ft/yr) reported by the Department of Water Resources at California Irrigation Management System Station 118 (Cathedral City) and a multiplier of 1.1, which results in an estimated evaporation rate of 5.24 ft/yr from the spreading grounds. The Applicant accepts this methodology as a reasonable estimate of evaporation.

However, the PSA estimates the percolation rates at the Desert Water Agency (DWA) spreading grounds from Slade's 2000 report to be between 0.1 and 2.0 feet per day (ft/day). There also is an assumption that the spreading grounds have a flooded basin area of 145 acres. Although this value is not used in the calculation of evaporative losses, it is an incorrect estimate. Based on the ratio of evaporation rates to percolation rates, the PSA estimates that evaporative losses are between 0.7 and 14 percent of applied water for spreading.

The DWA spreading grounds used for imported water recharge have a bottom surface area of 46.7 acres. The side slopes are 3 to 1; therefore, the surface area of fully flooded basins is 56.7 acres. The percolation rates at the DWA spreading grounds vary depending on conditions of the grounds and the time period over which they are flooded. With dry grounds and a very brief period of recharge, the percolation rates are approximately 100 cubic feet per second (cfs). With spreading over extended periods of time, percolation rates decrease to between 50 and 60 cfs. These percolation rates correspond to between 2.12 and 2.55 ft/day through the bottom of the grounds. However, depending on the depth of water in the grounds during the spreading operation, the surface area from which evaporative losses would occur would be higher. With fully flooded grounds, the surface area of the wetted surface would be 56.7 acres. The percolation rates would be between 1.75 and 2.10 ft/day when expressed as a function of this larger surface area.

Presuming that the project-specific recharge for the CPVS would occur during periods when the spreading grounds are being used for extended periods of time in conjunction with other spreading, the percolation rates for the project-specific recharge would be between 50 and 60 cfs for fully flooded spreading grounds, or between 1.75 and 2.10 acre-feet per surface acre per day.

The evaporative losses from the exposed surface area of the flooded basins, expressed in ft/yr per surface area; and divided by the percolation rates, expressed in ft/yr per equivalent surface area, represent the portion of water that would be lost to evaporation during the spreading operation. Expressed in acre-feet per year (AFY) per acre, the evaporative losses would be 5.23 AFY per acre and the percolation rates would be between 639 and 766 AFY per acre. Thus, evaporative losses would be between 0.68 and 0.82 percent of the water that is spread for percolation.

Because the project-specific recharge is based on actual production of water for the CPVS, with 100 acre-feet (AF) spread in the basin for each 92 AF of production (i.e., pumping) by the project from the sub-basin, the actual amounts of evaporative losses during spreading will vary with production rates at the CPVS. With an average production of 550 AFY by the CPVS, project-specific recharge would be 597.8 AFY. Accounting for evaporative losses, project-specific percolation would be between 592.9 and 593.7 AFY. In years of maximum power production and maximum water demand of 1,100 AFY, project-specific recharge would be 1,195.7 AFY. Accounting for evaporative losses, percolation of this water would be between 1,185.9 and 1,187.5 AFY.

Appendix C

Model Simulations of CEC Staff Alternative Water Supply Plans

APPENDIX C
MODEL SIMULATIONS OF CEC STAFF ALTERNATIVE WATER SUPPLY PLANS

INTRODUCTION

Two new water supply alternatives were proposed by California Energy Commission (CEC) staff in the Preliminary Staff Assessment for the CPV Sentinel Energy Project (CPVS).

- **Alternative 1** simulates pumping from the onsite project wells and water contribution from the Horton Wastewater Treatment Plant (HWTP).
- **Alternative 2** simulates pumping from Mission Springs Water District (MSWD) Wells 28 and 30 and water contribution from the HWTP.

In response to the CEC alternatives, CPV Sentinel, LLC (CPV Sentinel) conducted additional simulations using the existing groundwater flow model to evaluate the impacts on groundwater levels in the Mission Creek Sub-basin (MCSB). Simulations for three cases were conducted: Base Case, CEC staff Alternative 1 and CEC staff Alternative 2. The Base Case simulated pumping from the onsite wells and recharging at the Desert Water Agency (DWA) basins only (i.e., no contribution from HWTP) at rates that CPV Sentinel believes are more realistic of actual power plant operation.

For the two CEC alternatives, nine scenarios were simulated that evaluated the net effects on MCSB groundwater levels of variable water consumption, anisotropy ratio, transmissivity, and recharge at the DWA recharge basin. The CEC alternatives were compared to the Base Case. Water consumption for 30 years and groundwater flow for 35 years was simulated for each of the three cases.

A summary of the three model cases is presented below.

BASE CASE

Setup

Model parameters for the four Base Case scenarios are presented in Table BC-1. Each scenario involved a constant water consumption of 550 acre-feet per year (AFY) for 30 years from onsite wells only, with an equal contribution from each of three simulated wells, 593 AFY of DWA recharge, and a 1-year lag between when water is applied at the surface recharge basins and when it infiltrates and reaches the water table. Anisotropy and transmissivity were varied among the four scenarios. Scenario BC_B.2, with an anisotropy ratio of 1 and half Tyley's transmissivity, was considered the most conservative (i.e., most drawdown), and scenario BC_A.1, with an anisotropy ratio of 2 and Tyley's transmissivity, was considered the most realistic (but still conservative) case with respect to actual aquifer parameters and responses to pumping/recharge.

Results

Results for the four Base Case scenario simulations are presented in Table BC-2 and on the figures with "BC" prefixes, and are summarized in this section.

Project Pumping Wells

- Project pumping induced drawdown for 30 years
- The largest drawdown was in scenarios using half Tyley's transmissivity (i.e., Scenarios BC_A.2 and BC_B.2)
- The highest of the maximum drawdown values was 15.2 feet (Scenario BC_B.2) at CPVS pumping wells, and as expected was from the most conservative scenario
- The lowest of the maximum drawdown values was 5.5 feet (Scenario BC_A.1) at CPVS pumping wells, and as expected was from the least conservative and most realistic scenario
- Water levels recovered after pumping ended at year 30
- At 35 years, the range of drawdown values was -0.2 foot (rise; Scenario BC_A.1) to 1.9 feet (Scenario BC_B.2)

Mesquite Hummocks Area

- Project pumping induced drawdown for 30 years, but was partially offset by recharge
- The largest drawdown was in scenarios with anisotropy ratio of 1 (i.e., Scenarios BC_B.1 and BC_B.2)
- The highest of the maximum drawdown values was 1.5 feet (Hummocks Observation 1; Scenario BC_B.2), and as expected was from the most conservative scenario
- The lowest of the maximum drawdown values was 0.3 foot (Hummocks Observation 2, 3, and 4; Scenario BC_A.1), and as expected was from the least conservative and most realistic scenario
- Water levels partially recovered after pumping ended at year 30
- At 35 years, the range of drawdown values was 0 foot (Scenario BC_A.1) to 1.2 feet (Scenario BC_B.2). Both values were at Hummock Observation 1, which is closest to the CPVS pumping wells

CEC STAFF ALTERNATIVE 1

Setup

Model parameters for the nine Alternative 1 scenarios are presented in Table 1-1. Each scenario involved water consumption of either 550 or 1,100 AFY from the onsite wells and the HWTP, with HWTP water being conveyed to the project site instead of being recharged to the aquifer. This resulted in the same net effect as pumping from HWTP (negative recharge was used in the model). Project pumping was scheduled for the first 13 years (i.e., pumping rates decrease linearly from approximately half of water consumption at the beginning to zero at year 14, as summarized in Table 1-3). Recharge, anisotropy, and transmissivity were varied among the eight scenarios. DWA recharge either was zero, constant, or every 5 years.

Results

Results for the nine Alternative 1 scenario simulations are presented in Table 1-2 and on the figures with "1" prefixes, and are summarized in this section.

Project Pumping Wells

- The largest drawdown was in scenarios with no recharge (i.e., Scenarios 1A and 1A.b) and in Scenarios 1B.1 (water consumption of 1,100 AFY) and 1C (water consumption of 1,110 AFY with 5,500 AF recharge at DWA every 5 years)
- The maximum drawdowns were observed in year 2 and year 3
- The highest of the maximum drawdown values was 10.1 feet (Scenarios 1A, 1B.1, and 1C; water consumption of 1,100 AFY)
- The lowest of the maximum drawdown values was 2.2 feet (Scenario 1B.2b; water consumption of 550 AFY with recharge of 593 AFY at DWA)
- A doubling of water consumption (i.e., 550 AFY versus 1,100 AFY) resulted in each simulation following similar spatial and temporal patterns, but drawdown was generally doubled
- In scenarios with recharge every 5 years (i.e., Scenarios 1C and 1C.b), large drawdown was observed, but recovery was better than without any recharge (i.e., Scenarios 1A and 1A.b)
- Water levels recovered after diversion of HWTP to the project ended at year 30
- At 35 years, the range of drawdown values was -1.0 foot (rise; Scenario 1B.2) to 8.8 feet (Scenario 1A)

Mesquite Hummocks Area

- The largest drawdown was in the scenarios with no recharge (i.e., Scenario 1A with 1,100 AFY water consumption, Scenarios 1A.b and 1A.c with water consumptions of 550 AFY for each) and in Scenarios 1B.1 (water consumption of 1,100 AFY) and 1C (water consumption of 1,110 AFY with 5,500 AF recharge at DWA every 5 years)

- Maximum drawdown was generally observed in year 30 or later in large part to cumulative loss of recharge from HWTP as it is routed to the project for consumption.
- The highest of the maximum drawdown values was 10.8 feet (Hummocks Observation 1; Scenario 1A), which is more than 7 times greater than the Base Case
- The lowest of the maximum drawdown values was 1.2 feet (Mesquite Hummocks Observation 1; Scenario 1B.2b)
- A doubling of water consumption (i.e., 550 versus 1,100 AFY) resulted in each simulation following similar spatial and temporal patterns, but drawdown was generally doubled
- Water levels recovered slightly in Scenarios 1B.2 and 1B.2b, and there was generally no to very slight recovery in the other seven scenarios
- At 35 years, the range of drawdown values was 0.3 foot (Scenario 1B.2b) to 10.8 feet (Scenario 1A)
- Hummocks Observation 1 had the most extreme simulated water levels (i.e., largest drawdown, most rapid recovery, etc.), likely due to proximity to project pumping wells and HWTP

CEC STAFF ALTERNATIVE 2

Setup

Model parameters for the nine Alternative 2 scenarios are presented in Table 2-1. Each scenario involved water consumption of either 550 or 1,100 AFY from MSWD Wells 28 and 30 and the HWTP, with HWTP water being conveyed to the project site instead of being recharged to the aquifer. This resulted in the same net effect as pumping from HWTP (negative recharge was used in the model). Project pumping from MSWD Wells 28 and 30 was scheduled for the first 13 years (i.e., pumping rates decrease linearly from approximately half of water consumption at the beginning to zero at year 14, as summarized in Table 2-3). Recharge, anisotropy, and transmissivity were varied among the eight scenarios. Finite-difference discretization (grid cell) was revised such that model cells were refined in the area of MSWD Wells 28 and 30 (necessary due to pumping from MSWD Wells 28 and 30). Recharge, anisotropy, and transmissivity were varied among the nine scenarios. DWA recharge either was zero, constant, or every 5 years.

Results

Results for the nine Alternative 2 scenario simulations are presented in Table 2-2 and on the figures with “2” prefixes, and are summarized in this section.

MSWD Wells 28 and 30

- The largest drawdowns were in the scenarios with no recharge (i.e., Scenarios 2A, 2A.b, and 2A.c) and in Scenarios 2B.1 (water consumption of 1,100 AFY) and 2C (water consumption of 1,110 AFY with 5,500 AF recharge at DWA every 5 years)
- Maximum drawdown was observed in year 35 (Scenarios 2A and 2A.b), year 34 (Scenario 2A.c), or year 2 or year 3 (all other scenarios)
- The highest of the maximum drawdown values was 8.8 feet (Scenario 2A)
- The lowest of the maximum drawdown values was 1.3 feet (Scenario 2B.2b)
- A change in water consumption (i.e., 550 AFY versus 1,100 AFY) resulted in each simulation following similar spatial and temporal patterns, but drawdown was approximately doubled with a doubling of water consumption
- In the scenarios with recharge every 5 years (i.e., Scenarios 2C and 2C.b), large drawdown was observed, but recovery was much better than without any recharge (i.e., Scenarios 2A and 2A.b)
- At 35 years, the range of drawdown values was -3.9 feet (rise; Scenario 2C) to 8.8 feet (Scenario 2A)

Mesquite Hummocks Area

- The largest drawdown was in the scenarios with no recharge (i.e., Scenarios 2A) with 1,100 AFY water consumption, 2A.b and 2A.c (with water consumptions of 550 AFY for each) and in Scenarios 1B.1 (water consumption of 1,100 AFY) and 1C (water consumption of 1,110 AFY with 5,500 AF recharge at DWA every 5 years)
- The maximum drawdown was generally observed in year 30 or later in large part to cumulative loss of recharge from HWTP as it is routed to the project for consumption.
- The highest of the maximum drawdown values was 10.8 feet (Hummocks Observation 1; Scenario 2A), which is more than 7 times greater than in the Base Case
- The lowest of the maximum drawdown values was 1.3 feet (Hummocks Observation 1; Scenario 2B.2b)
- A doubling of water consumption (i.e., 550 versus 1,100 AFY) resulted in each simulation following similar spatial and temporal patterns, but drawdown was generally doubled

- Water levels recovered slightly in Scenarios 2B.2 and 2B.2b, and there was generally no to very slight recovery in the other seven scenarios

- At 35 years, the range of drawdown values was 0.3 foot (Scenario 2B.2b) to 10.8 feet (Scenario 2A)

- Hummocks Observation 1 had the most extreme simulated water levels (i.e., largest drawdown, most rapid recovery, etc.), likely due to proximity to MSWD Wells 28 and 30 and HWTP

SUMMARY AND CONCLUSIONS

The results of the analysis of the Base Case and Alternatives 1 and 2 presented above can be summarized as follows.

- **Base Case**

  – Drawdowns were less across the sub-basin compared to Alternatives 1 and 2

  – Although drawdown at the pumping wells was higher than in Alternatives 1 or 2, shutting pumps off in year 30 resulted in recovery to pre-pumping water levels by year 35

  – Drawdown in the mesquite hummocks area was less than in Alternatives 1 or 2 (i.e., 1.5 feet or less), and partially recovered after the pumps were shut off in year 30

- **Alternatives 1 and 2**

  – Drawdowns were greater across the sub-basin compared to the Base Case

  – Water levels in the pumping wells (onsite wells in Alternative 1, and MSWD Wells 28 and 30 in Alternative 2) recovered to pre-pumping levels by year 35 by shutting off the pumps in year 14 and stopping water supply from HWTP in year 30 (i.e., stopping negative recharge)

  – Drawdown in the mesquite hummocks area was up to 10.8 feet and had very limited recovery, if any, following pump shut-off in year 14 and stopping water supply from HWTP in year 30 (i.e., stopping negative recharge)

The additional model simulations show that CEC staff Alternatives 1 and 2 result in higher drawdown across the sub-basin compared to the Base Case. In these two CEC alternatives, HWTP is used for project water supply in addition to onsite project wells (Alternative 1) or MSWD Well 28 and Well 30 (Alternative 2). The impact is especially pronounced in the mesquite hummocks area. This is mainly due to the fact that the HWTP is located far from the DWA recharge basin (thereby decreasing the effectiveness of recharge) and is much closer to the mesquite hummocks area than the onsite project wells (thereby resulting in more drawdown in the mesquite hummocks area).

Therefore, to have less net impact on groundwater levels in the sub-basin, and in the mesquite hummocks area in particular, it is important that the project uses water from onsite project wells instead of from the HWTP. Overall, the CPV Sentinel Water Supply Plan is superior to the CEC staff Alternatives and has far less impact on water levels (drawdowns) in the MCSB. For the most part, there were few modeled cases where the CEC staff Alternatives had less impact from purely a drawdown perspective on wells within the sub-basin. In all modeled cases, the CEC staff Alternatives induced significantly greater water level declines in the Mesquite Hummocks area than those of the Base Case simulations (CPV Sentinel Water Supply Plan). Loss of recharge water from the HWTP (by routing it to the CPVS site) with or without recharge at the DWA recharge basins has a greater impact on water levels in the eastern part of the sub-basin than that proposed by CPV Sentinel.

TABLE BC-1
ADDITIONAL ALTERNATIVES ANALYSIS MODEL SIMULATIONS - BASE CASI
CPV Sentinel Energy Project
Riverside County, California

Note: Alternative 3 water source = on-site wells

Model Parameter	Model Simulation			
	BC_A.1	BC_A.2	BC_B.1	BC_B.2
Water source	On-site wells	On-site wells	On-site wells	On-site wells
Water consumption	550 AFY	550 AFY	550 AFY	550 AFY
On-site wells				
Pumping rate	550 AFY	550 AFY	550 AFY	550 AFY
Pumping schedule	constant	constant	constant	constant
Pumping duration	30 years	30 years	30 years	30 years
Horton contribution				
Rate (neg. recharge)	--	--	--	--
Schedule	--	--	--	--
Duration	--	--	--	--
Recharge (y/n)	yes	yes	yes	yes
Location	DWA	DWA	DWA	DWA
Rate	593 AFY	593 AFY	593 AFY	593 AFY
Timing	1 year lag	1 year lag	1 year lag	1 year lag
Anisotropy ratio	2 (anisotropic)	2 (anisotropic)	1 (isotropic)	1(isotropic)
Transmissivity	Tyley	1/2 Tyley	Tyley	1/2 Tyley
Model sim time	35 years	35 years	35 years	35 years
Notes	Compare Results to Fig 3 (30 yrs) and Fig 4 (35 yrs) in July 9, 2008, CEC submittal	Compare Results to Fig 22 (30 yrs) and Fig 23 (35 yrs) in July 9, 2008, CEC submittal	Compare Results to Fig 1 (30 yrs) and Fig 2 (35 yrs) in July 9, 2008 CEC submittal	Compare Results to Fig 20 (30 yrs) and Fig 21 (35 yrs) in July 9, 2008 CEC submittal

TABLE BC-2
SUMMARY OF SIMULATION RESULTS - BASE CASE
CPV Sentinel Energy Project
Riverside County, California

Location	Scenario [1]			
	BC_A.1	**BC_A.2**	**BC_B.1**	**BC_B.2**
Project Pumping Wells [2]				
maximum drawdown (ft)	5.5	10.8	7.7	15.2
time to maximum drawdown (year)	8	16	14	27
drawdown at 35 years (ft)	-0.2	0.5	0.2	1.9
Horton WWTP				
maximum drawdown (ft)	0.3	0.6	0.6	1.1
time to maximum drawdown (year)	14	27	20	31
drawdown at 35 years (ft)	0	0.4	0.3	0.9
DWA Recharge Basin				
maximum water level rise (ft)	8.3	16.0	12.1	23.3
time to maximum water level rise (year)	31	31	31	31
water level rise at 35 years (ft)	1.2	3.3	2.4	6.4
Wells 27 and 31 [3]				
maximum drawdown (ft)	0.6	1.1	1.2	2.2
time to maximum drawdown (year)	8	15	15	30
drawdown at 35 years (ft)	-0.2	0.2	0.2	1.1
Wells 28 and 30 [4]				
maximum drawdown (ft)	0.1	0.1	0.1	0
time to maximum drawdown (year)	1	1	1	1
drawdown at 35 years (ft)	-0.5	-0.7	-0.9	-1.8
Well 22				
maximum drawdown (ft)	0.3	0.4	0.3	0.4
time to maximum drawdown (year)	7	12	7	13
drawdown at 35 years (ft)	-0.2	0	-0.3	-0.1
Well 24				
maximum drawdown (ft)	0.3	0.5	0.3	0.5
time to maximum drawdown (year)	8	14	9	17
drawdown at 35 years (ft)	-0.2	0	-0.2	0.1
Well 29				
maximum drawdown (ft)	0.3	0.5	0.4	0.7
time to maximum drawdown (year)	9	16	12	22
drawdown at 35 years (ft)	-0.2	0.1	-0.1	0.3
Well 32				
maximum drawdown (ft)	0.5	0.9	1.0	1.8
time to maximum drawdown (year)	9	17	15	30
drawdown at 35 years (ft)	-0.2	0.2	0.2	1.0

TABLE BC-2
SUMMARY OF SIMULATION RESULTS - BASE CASE
CPV Sentinel Energy Project
Riverside County, California

Location	Scenario [1]			
	BC_A.1	BC_A.2	BC_B.1	BC_B.2
CVWD Wells				
maximum drawdown (ft)	0.5	0.8	0.9	1.7
time to maximum drawdown (year)	11	20	18	30
drawdown at 35 years (ft)	-0.1	0.3	0.2	1.1
Hummock Observation 1				
maximum drawdown (ft)	0.4	0.7	0.8	1.5
time to maximum drawdown (year)	13	24	22	30
drawdown at 35 years (ft)	0	0.4	0.4	1.2
Hummock Observation 2				
maximum drawdown (ft)	0.3	0.5	0.7	1.0
time to maximum drawdown (year)	22	31	30	34
drawdown at 35 years (ft)	0.2	0.5	0.5	1.0
Hummock Observation 3				
maximum drawdown (ft)	0.3	0.3	0.5	0.5
time to maximum drawdown (year)	30	35	34	35
drawdown at 35 years (ft)	0.2	0.3	0.5	0.5
Hummock Observation 4				
maximum drawdown (ft)	0.3	0.4	0.6	0.7
time to maximum drawdown (year)	28	34	32	35
drawdown at 35 years (ft)	0.2	0.4	0.5	0.7
Hummock Average				
maximum drawdown (ft)	0.3	0.4	0.6	0.9
time to maximum drawdown (year)	23	31	30	32
drawdown at 35 years (ft)	0.2	0.4	0.5	0.9

Notes:

1. Alternative 3 water source = on-site wells
   Scenario BC_A.1: Pump = 550 afy, recharge = 593 afy (DWA only), Tyley's T, anisotropy ratio = 2.0
   Scenario BC_A.2: Pump = 550 afy, recharge = 593 afy (DWA only), half Tyley's T, anisotropy ratio = 2.0
   Scenario BC_B.1: Pump = 550 afy, recharge = 593 afy (DWA only), Tyley's T, anisotropy ratio = 1.0
   Scenario BC_B.2: Pump = 550 afy, recharge = 593 afy (DWA only), half Tyley's T, anisotropy ratio = 1.0
2. Data presented are maximum values of data for three project wells.
3. Model data for well 27 presented; wells 27 and 31 are adjacent to each other.
4. Model data for well 30 presented; wells 28 and 30 are adjacent to each other.

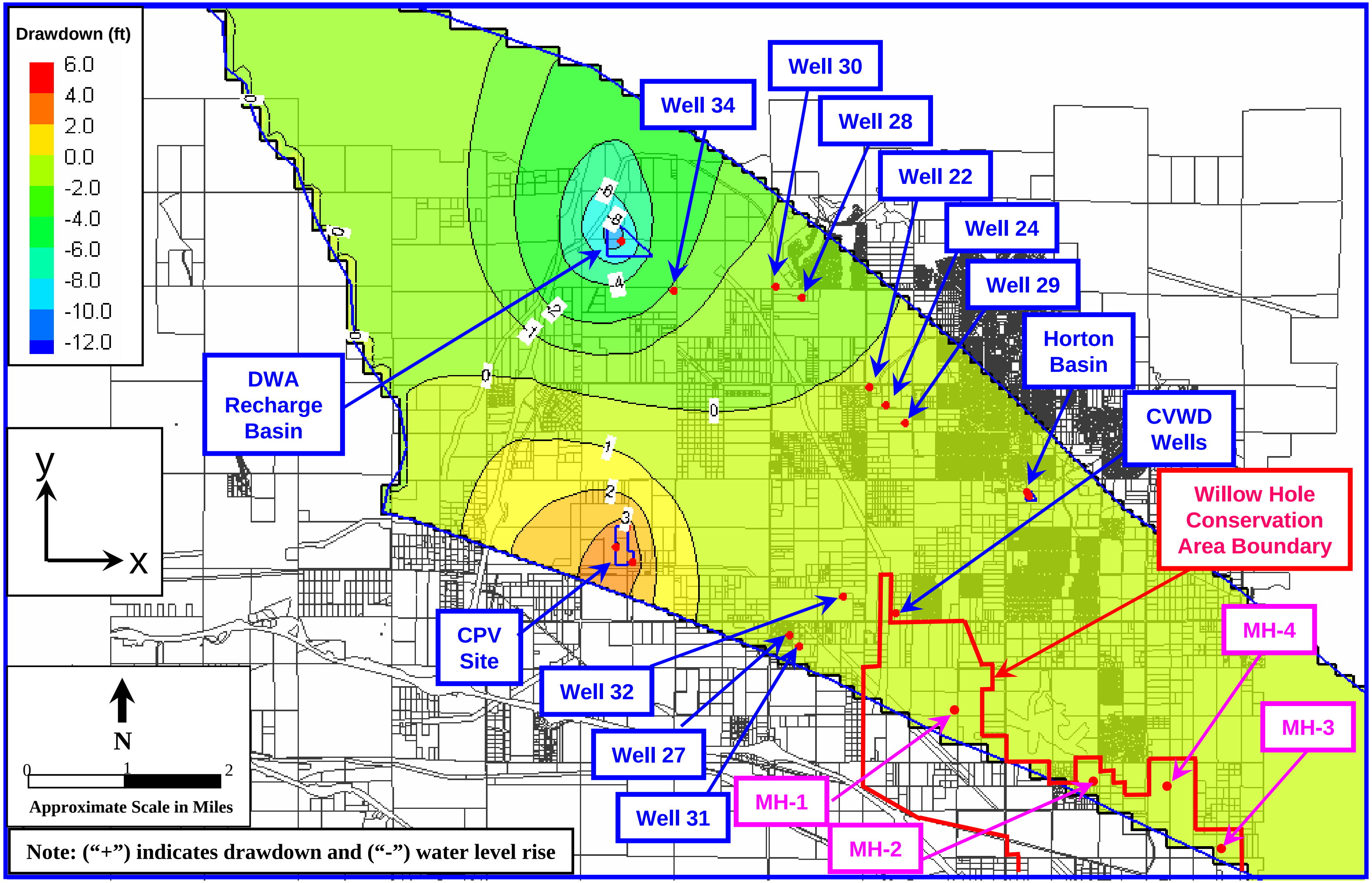


Figure BC_A.1-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation BC_A.1

(Water consumption = 550 afy, DWA recharge=593 afy, Tyley's T, anisotropy ratio = 2.0)

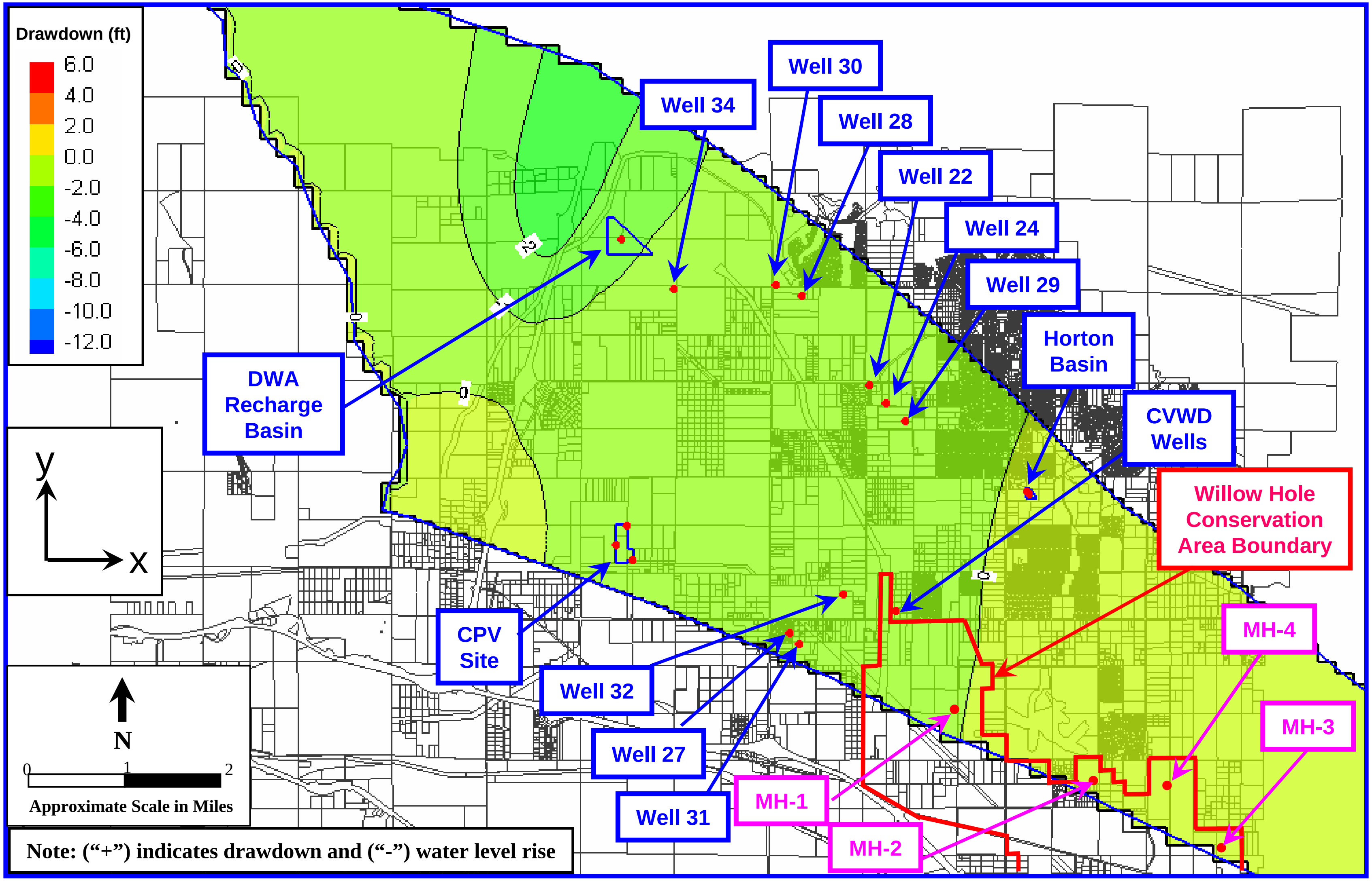
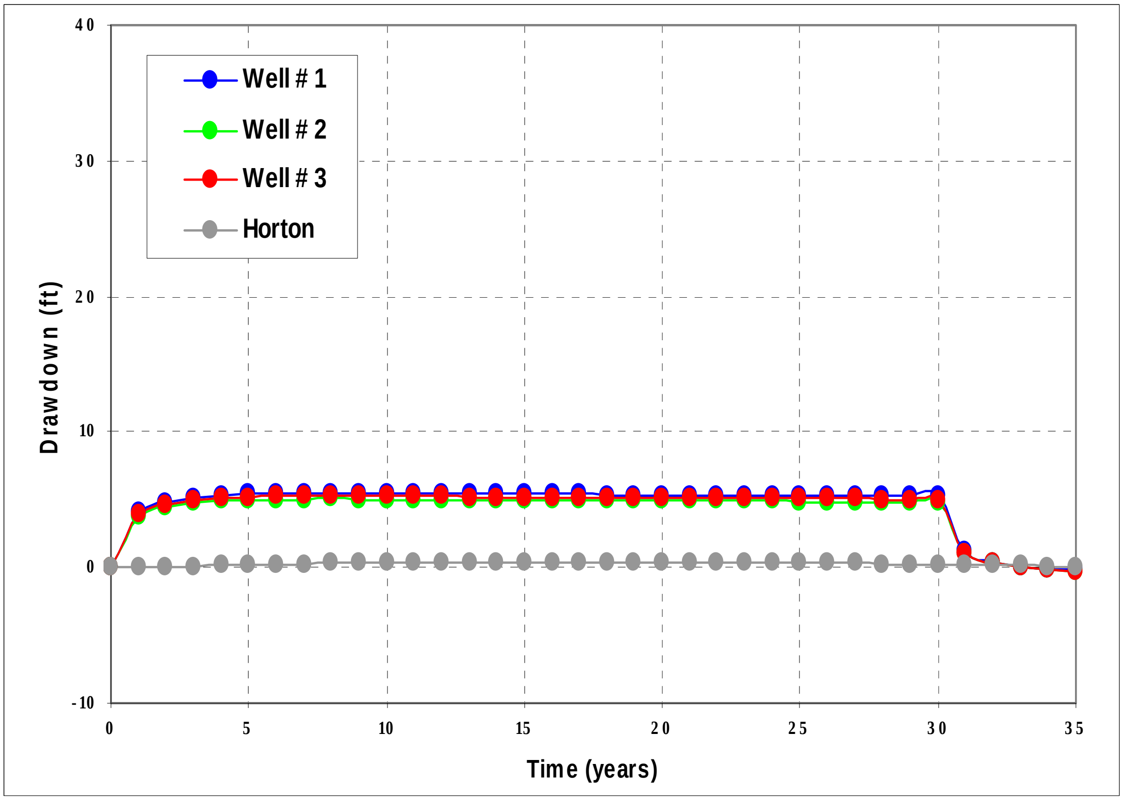


Figure BC_A.1-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation BC_A.1

(Water consumption = 550 afy, DWA recharge=593 afy, Tyley's T, anisotropy ratio = 2.0)



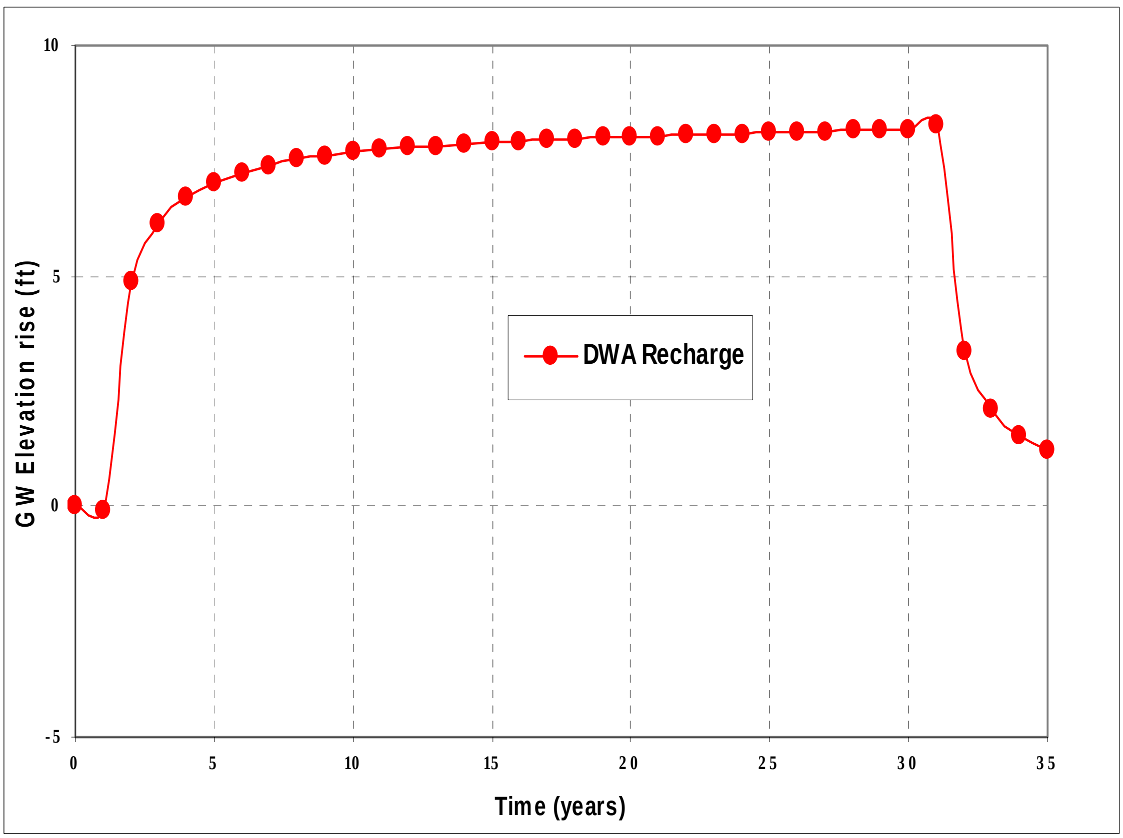


Figure BC_A.1-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario BC_A.1
(Water consumption = 550 afy from on-site wells, 593 afy recharge)

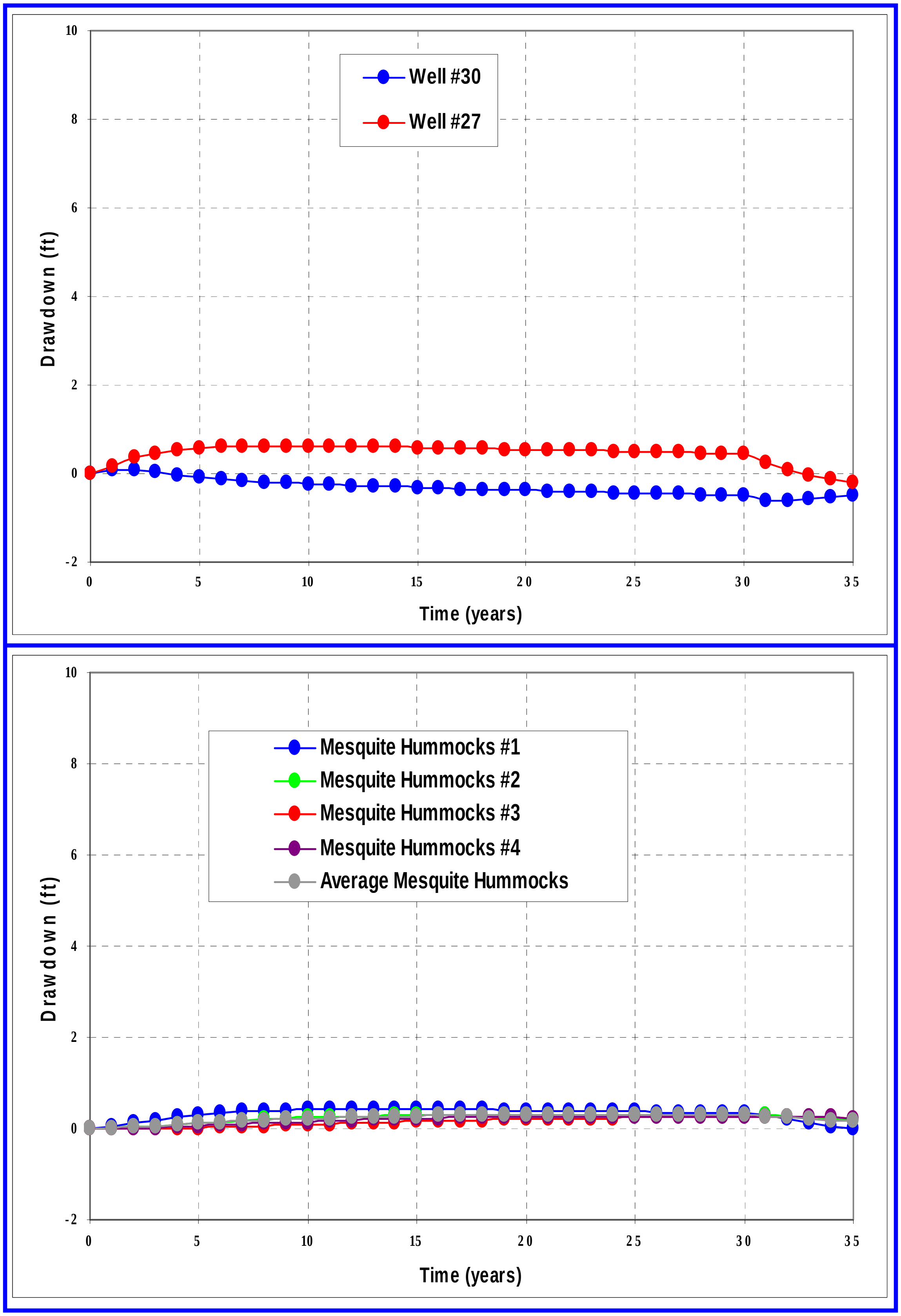


Figure BC_A.1-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario BC_A.1
(Water consumption = 550 afy from on-site wells, 593 afy recharge)

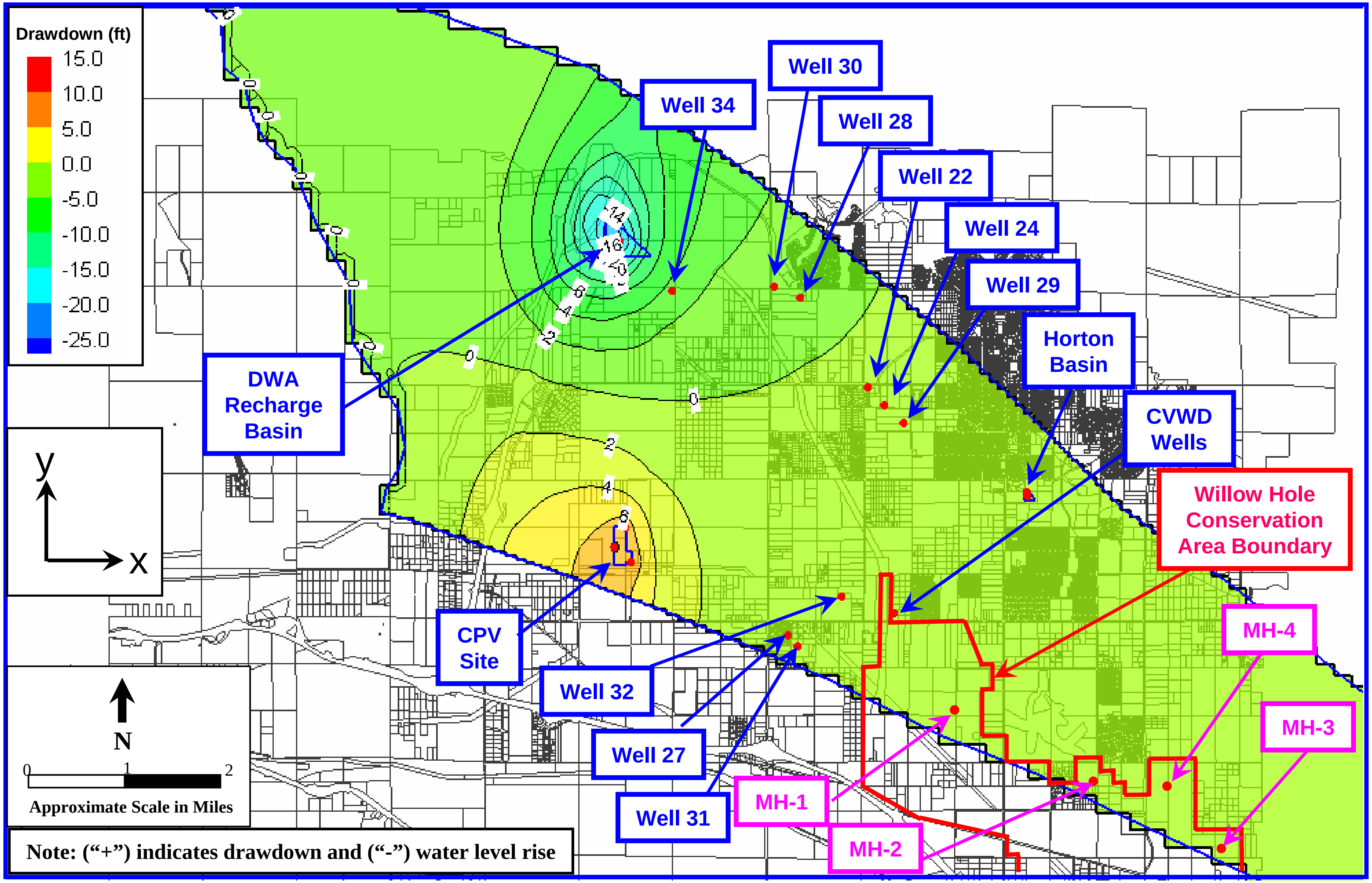


Figure BC_A.2-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation BC_A.2

(Water consumption = 550 afy, DWA recharge=593 afy, half Tyley's T, anisotropy ratio = 2.0)

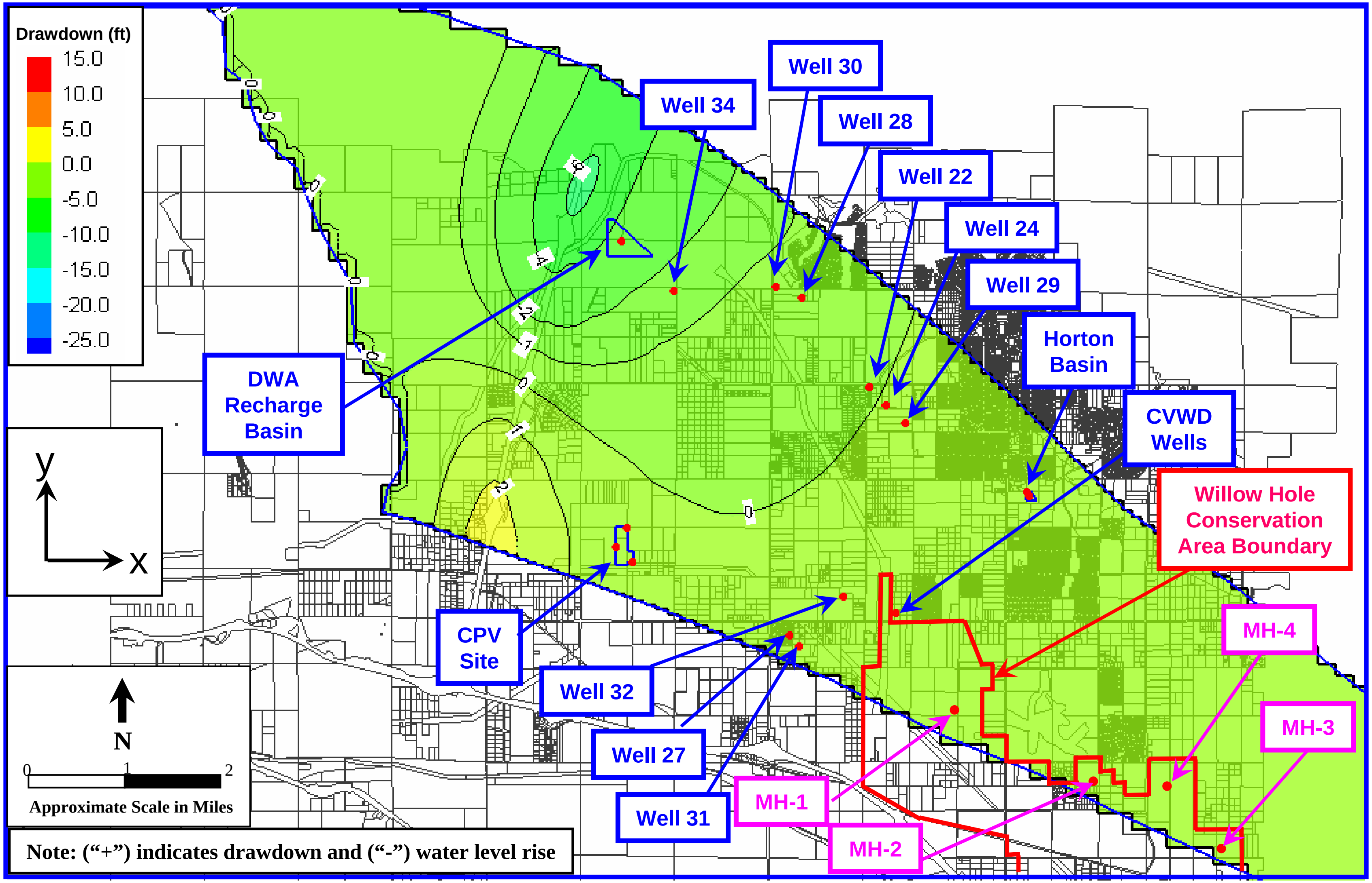


Figure BC_A.2-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation BC_A.2

(Water consumption = 550 afy, DWA recharge=593 afy, half Tyley's T, anisotropy ratio = 2.0)

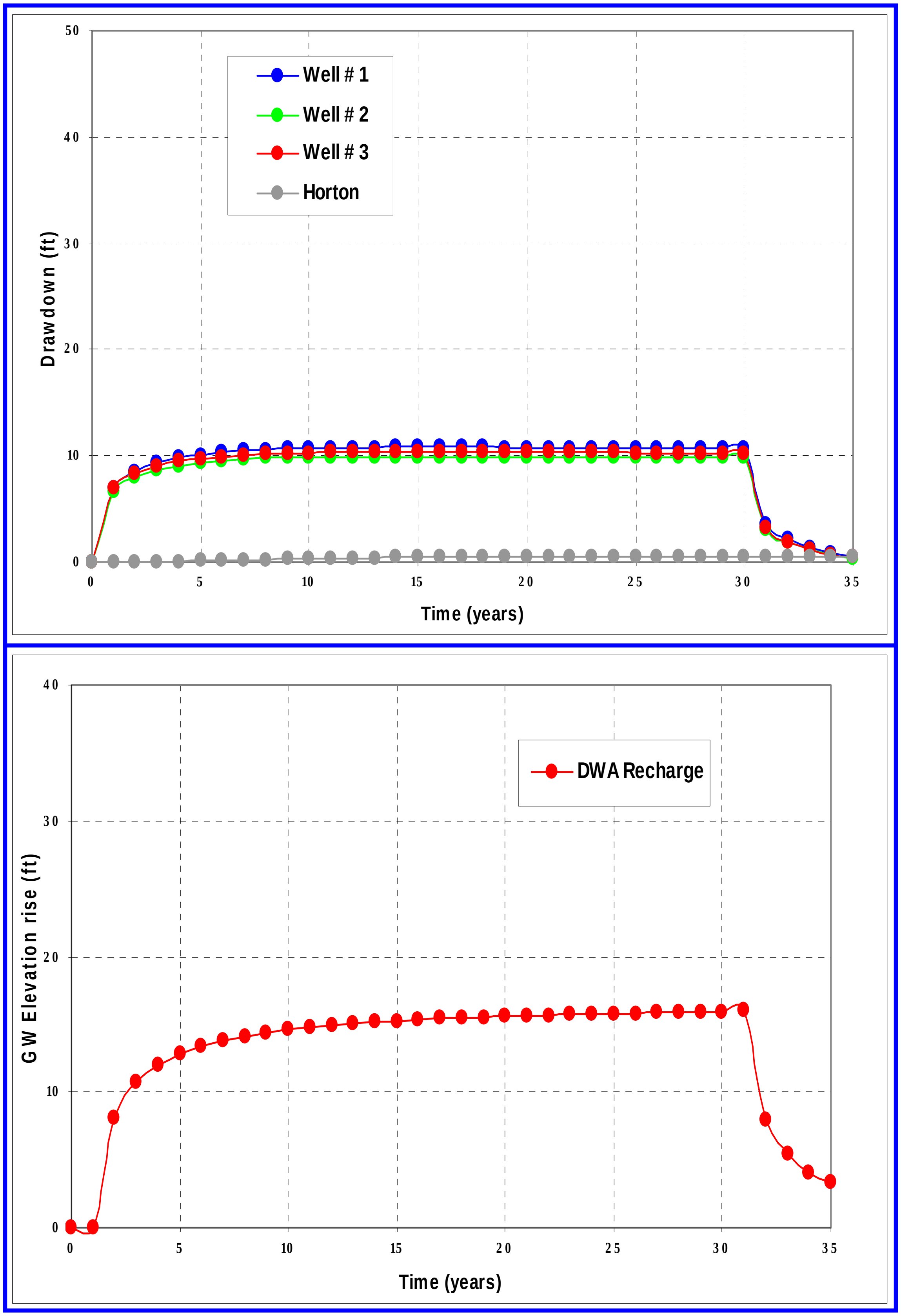


Figure BC_A.2-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario BC_A.2
(Water consumption = 550 afy from on-site wells, 593 afy recharge)

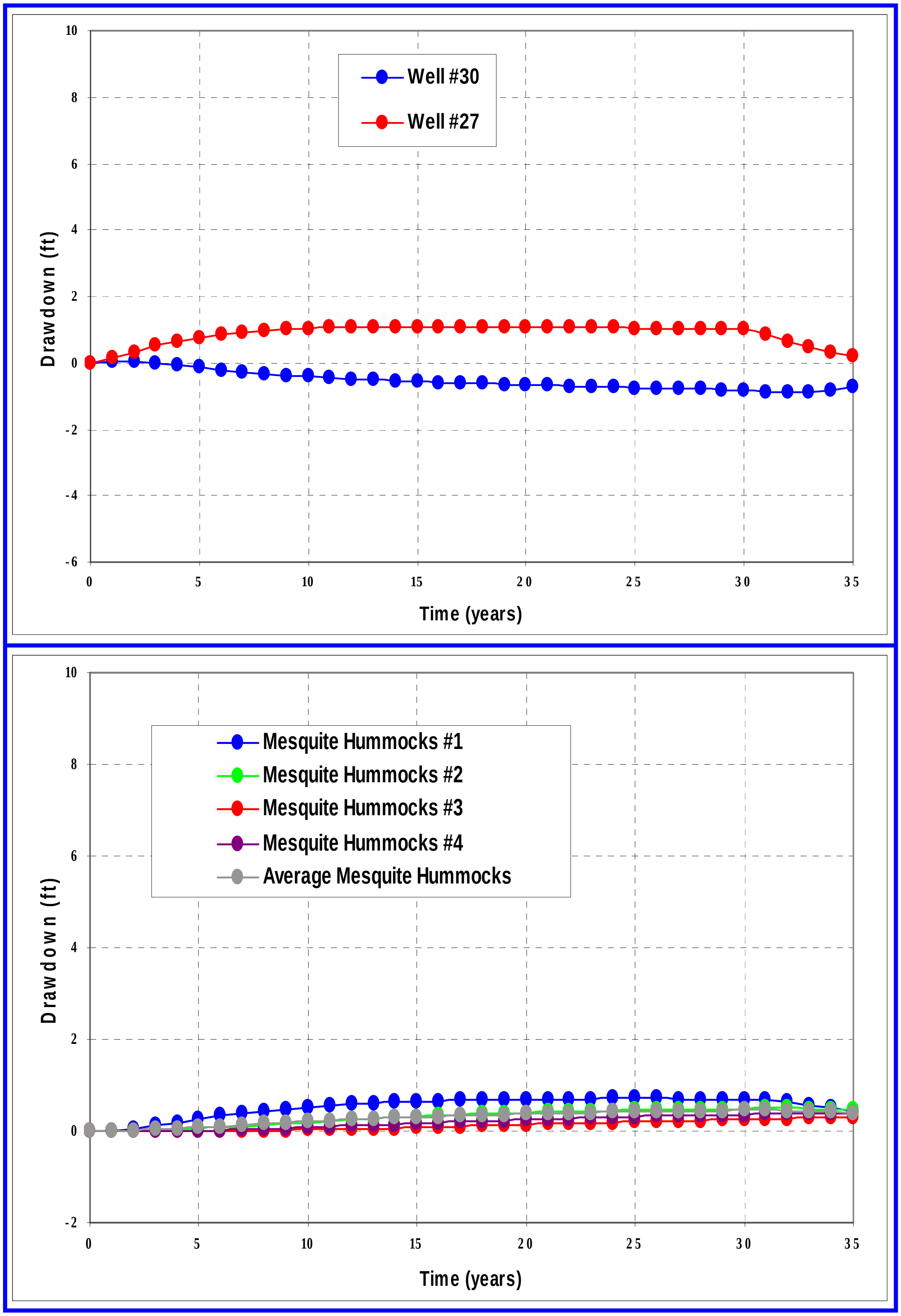


Figure BC_A.2-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario BC_A.2 (Water consumption = 550 afy from on-site wells, 593 afy recharge)

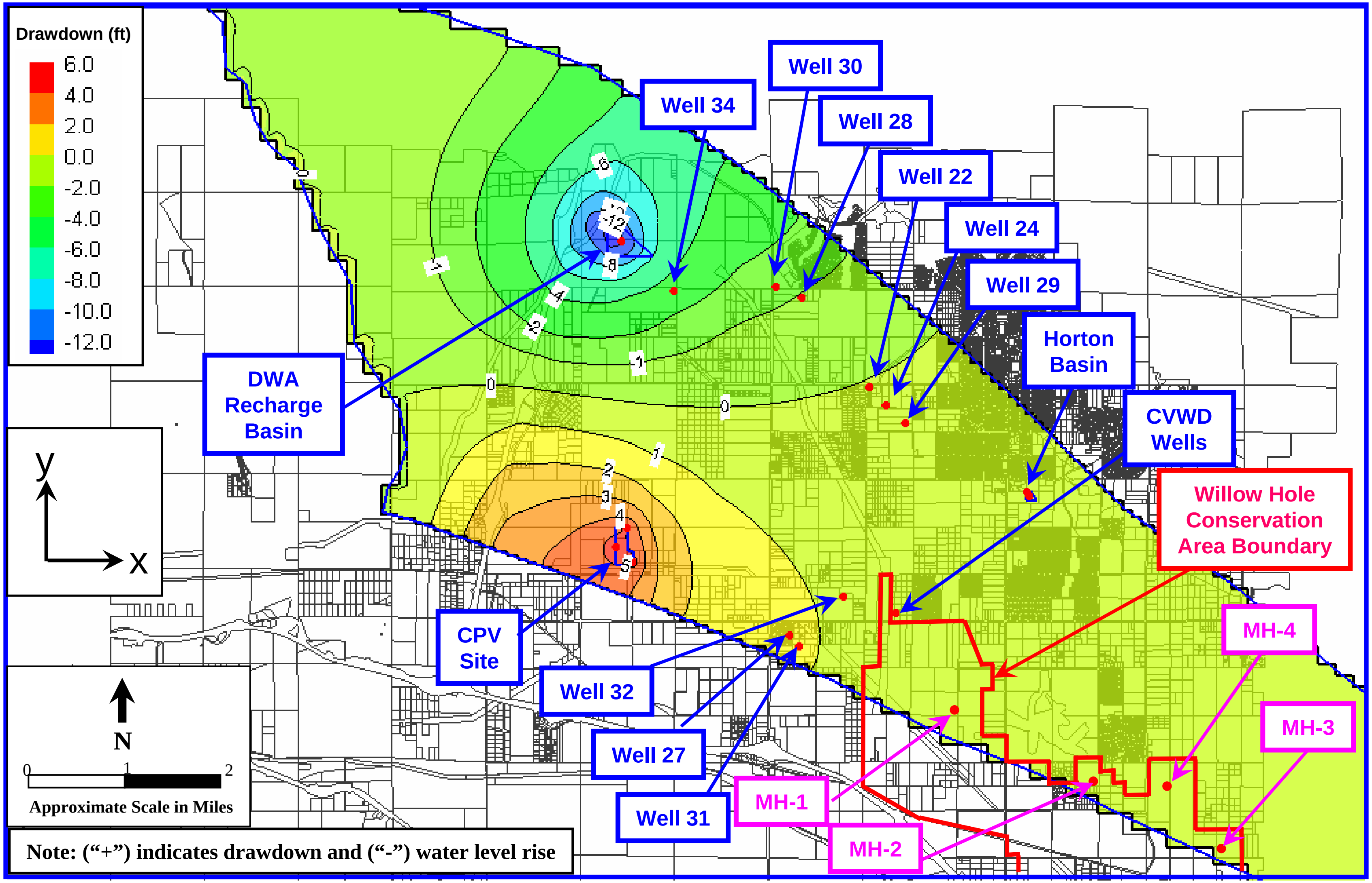


Figure BC_B.1-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation BC_B.1

(Water consumption = 550 afy, DWA recharge=593 afy, Tyley's T, anisotropy ratio = 1.0)

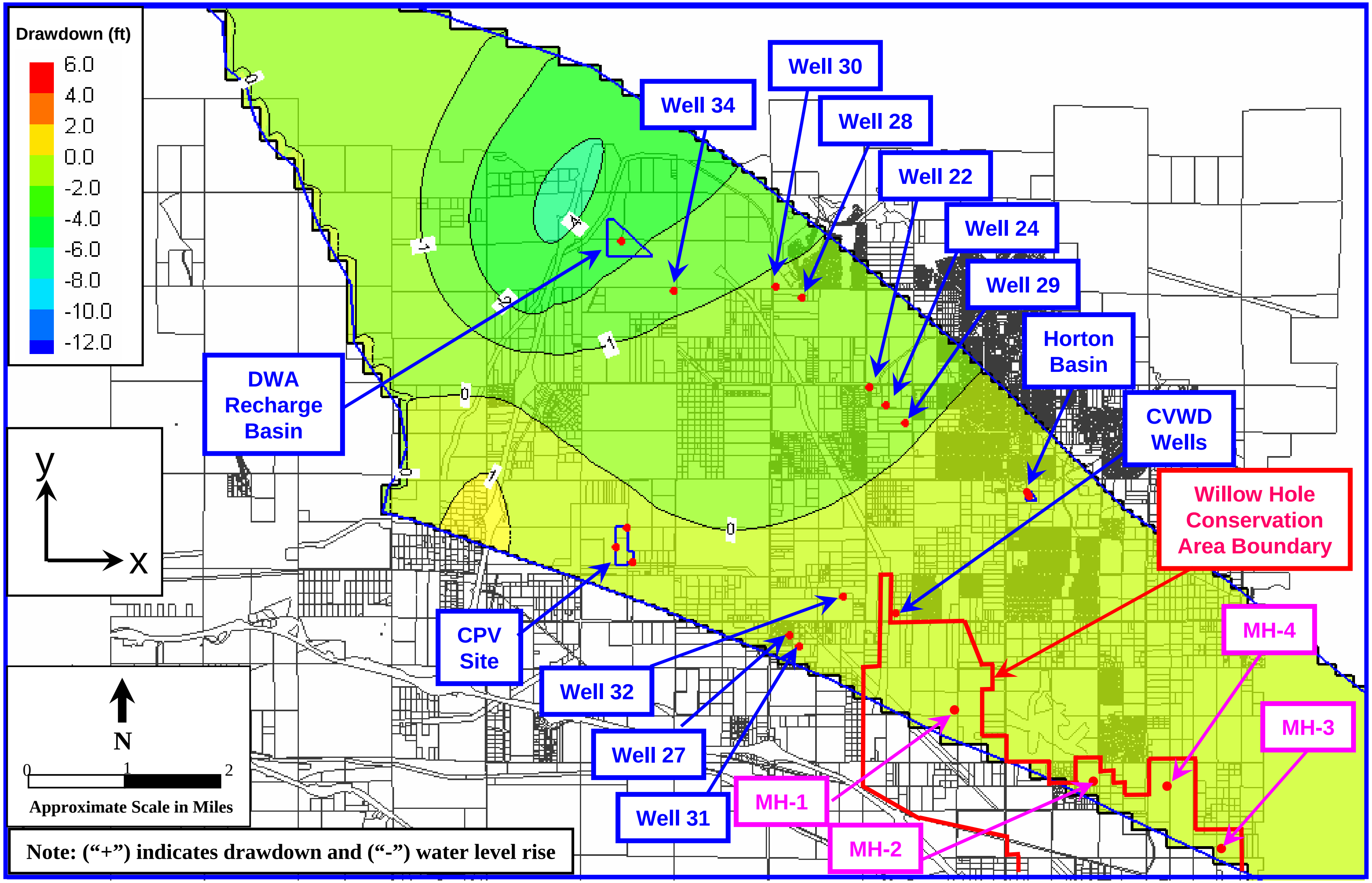


Figure BC_B.1-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation BC_B.1

(Water consumption = 550 afy, DWA recharge=593 afy, Tyley's T, anisotropy ratio = 1.0)

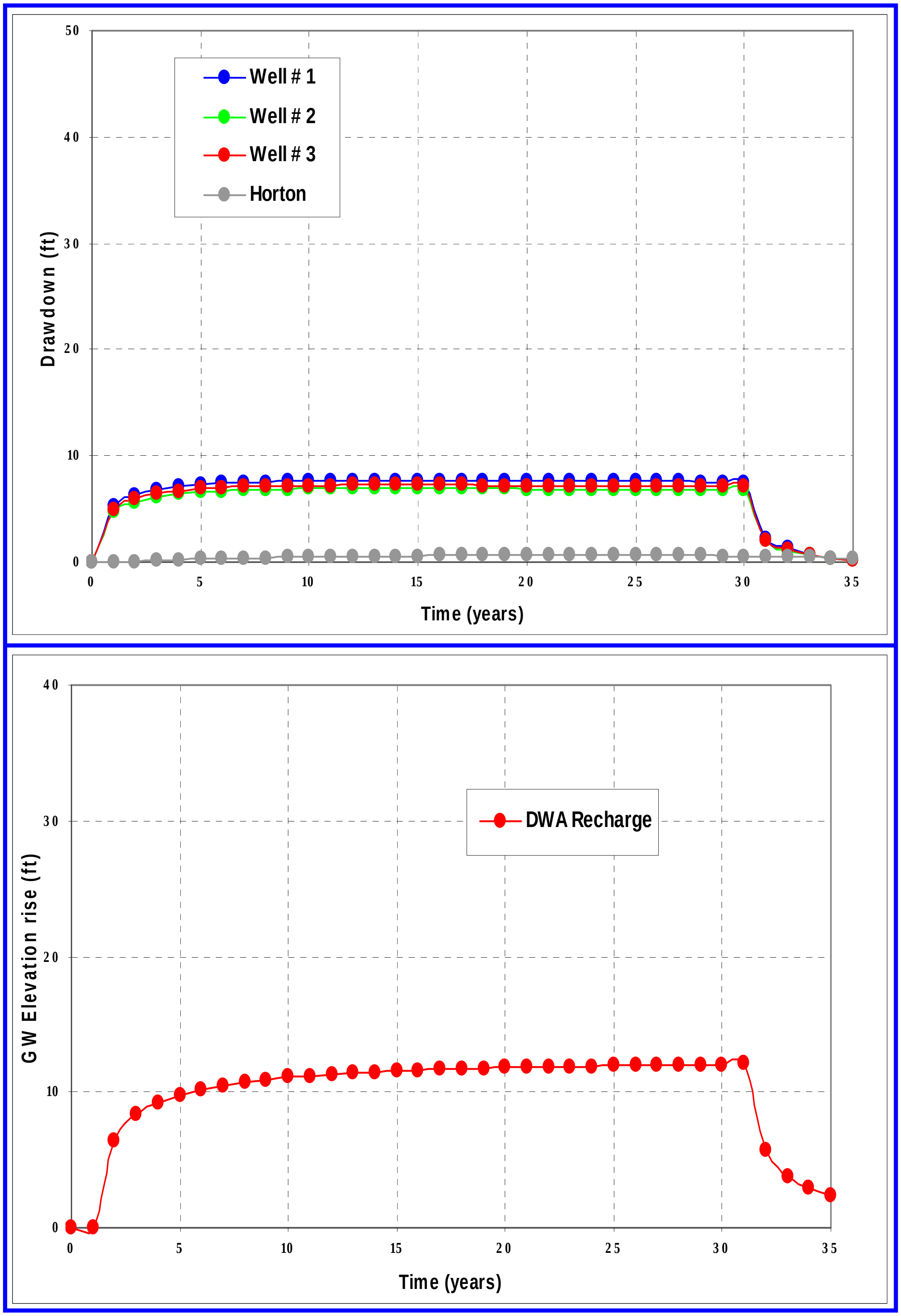


Figure BC_B.1-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario BC_B.1 (Water consumption = 550 afy from on-site wells, 593 afy recharge)

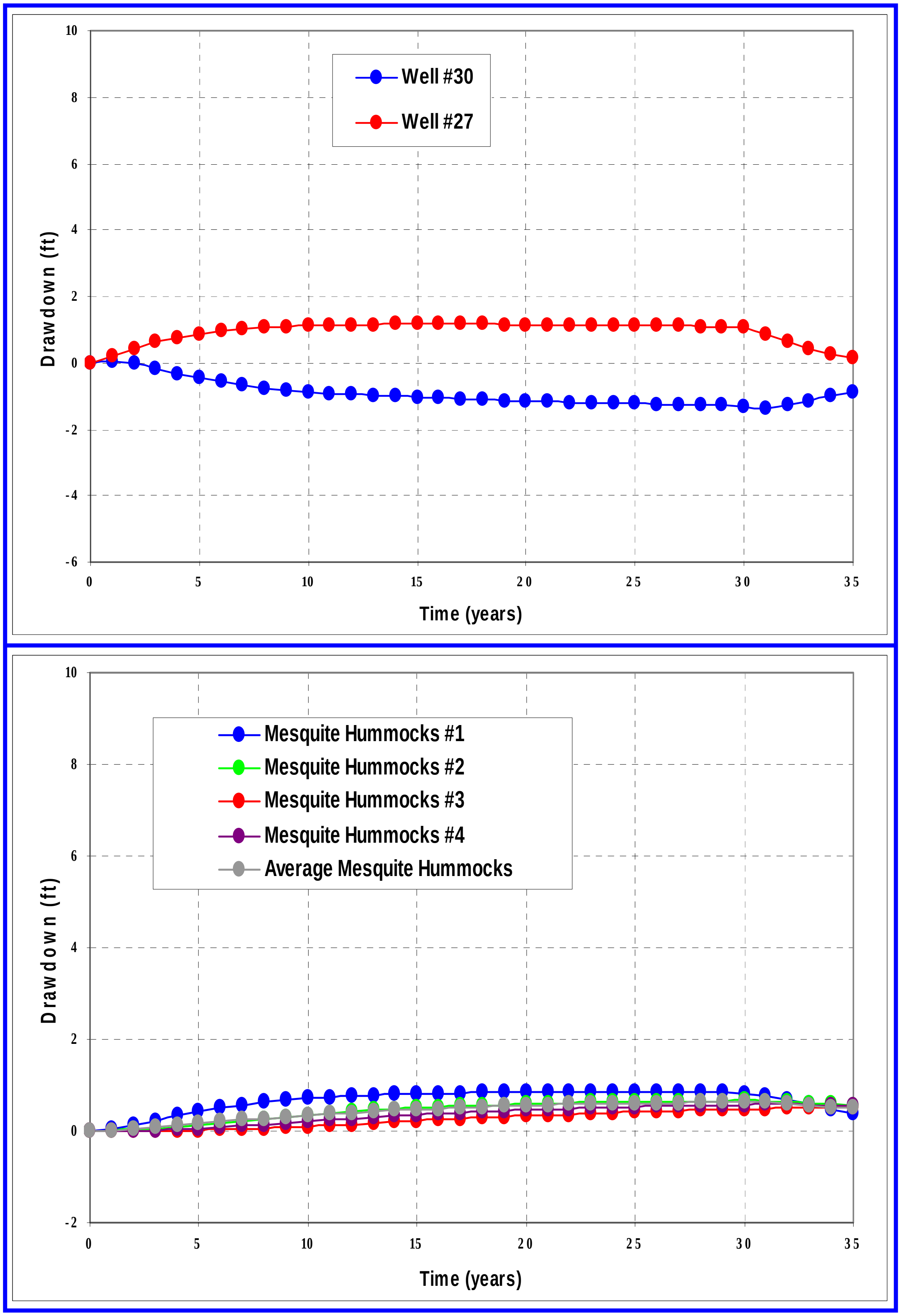


Figure BC_B.1-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario BC_B.1 (Water consumption = 550 afy from on-site wells, 593 afy recharge)

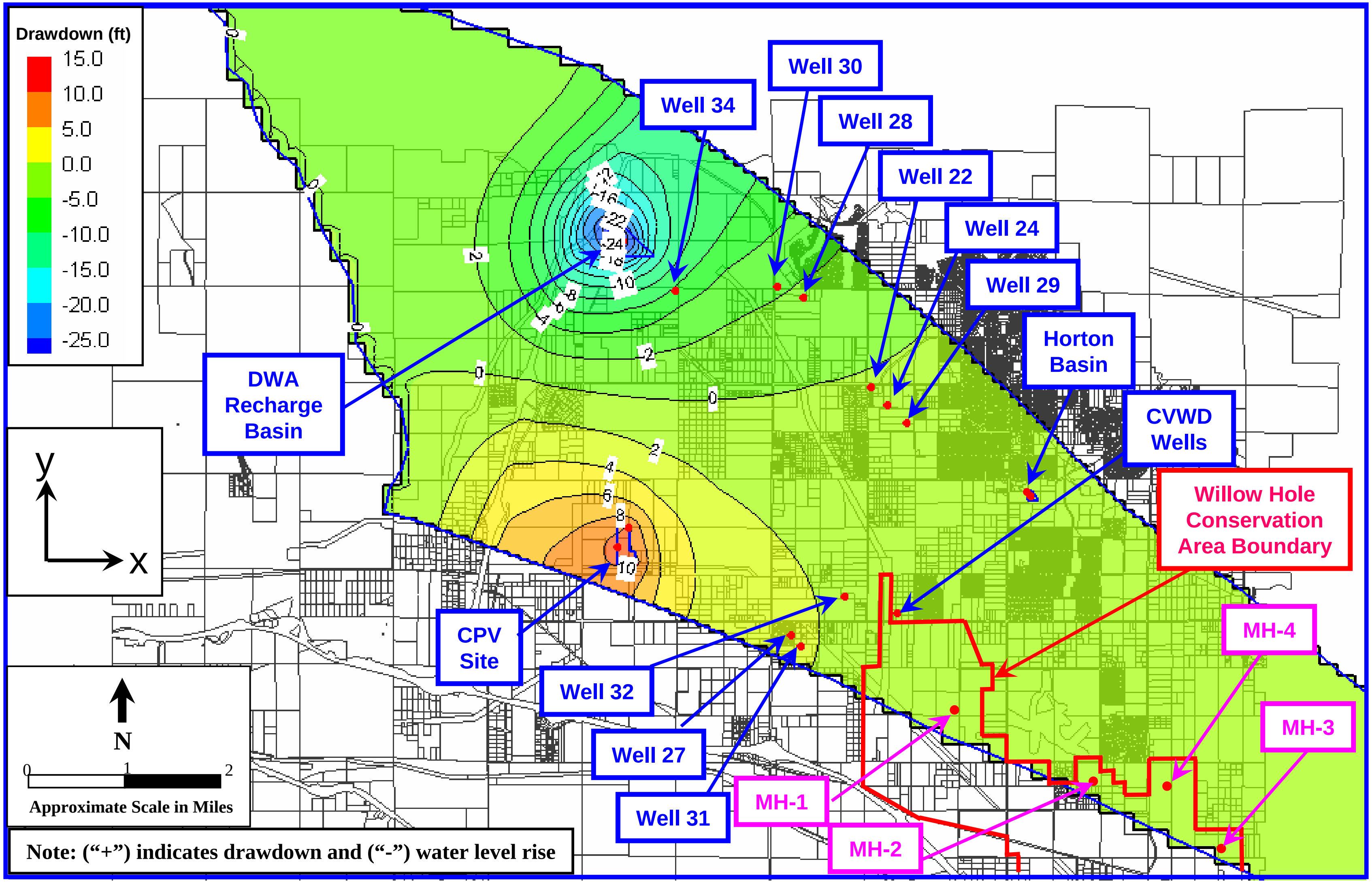


Figure BC_B.2-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation BC_B.2

(Water consumption = 550 afy, DWA recharge=593 afy, half Tyley's T, anisotropy ratio = 1.0)

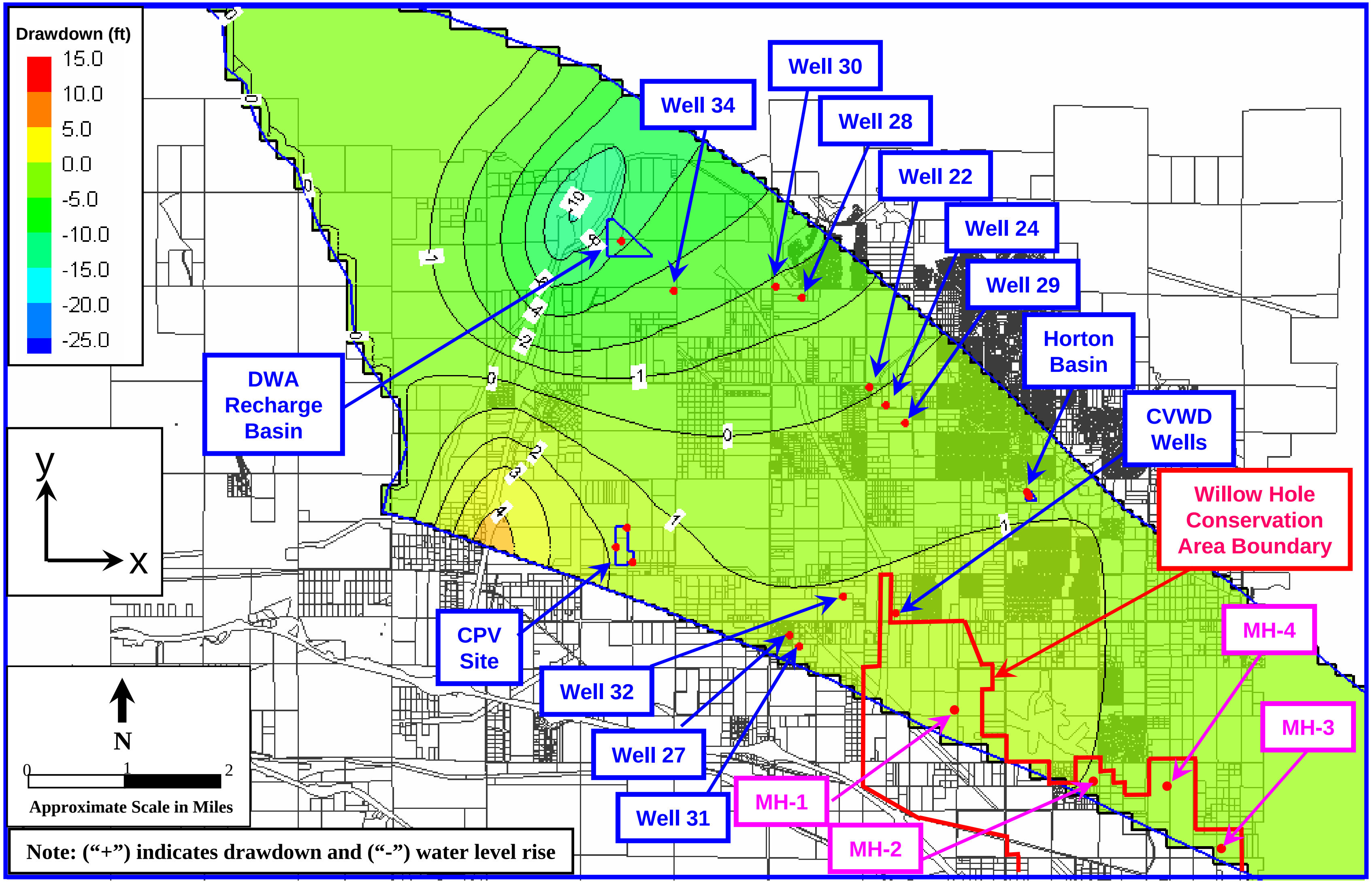


Figure BC_B.2-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation BC_B.2

(Water consumption = 550 afy, DWA recharge=593 afy, half Tyley's T, anisotropy ratio = 1.0)

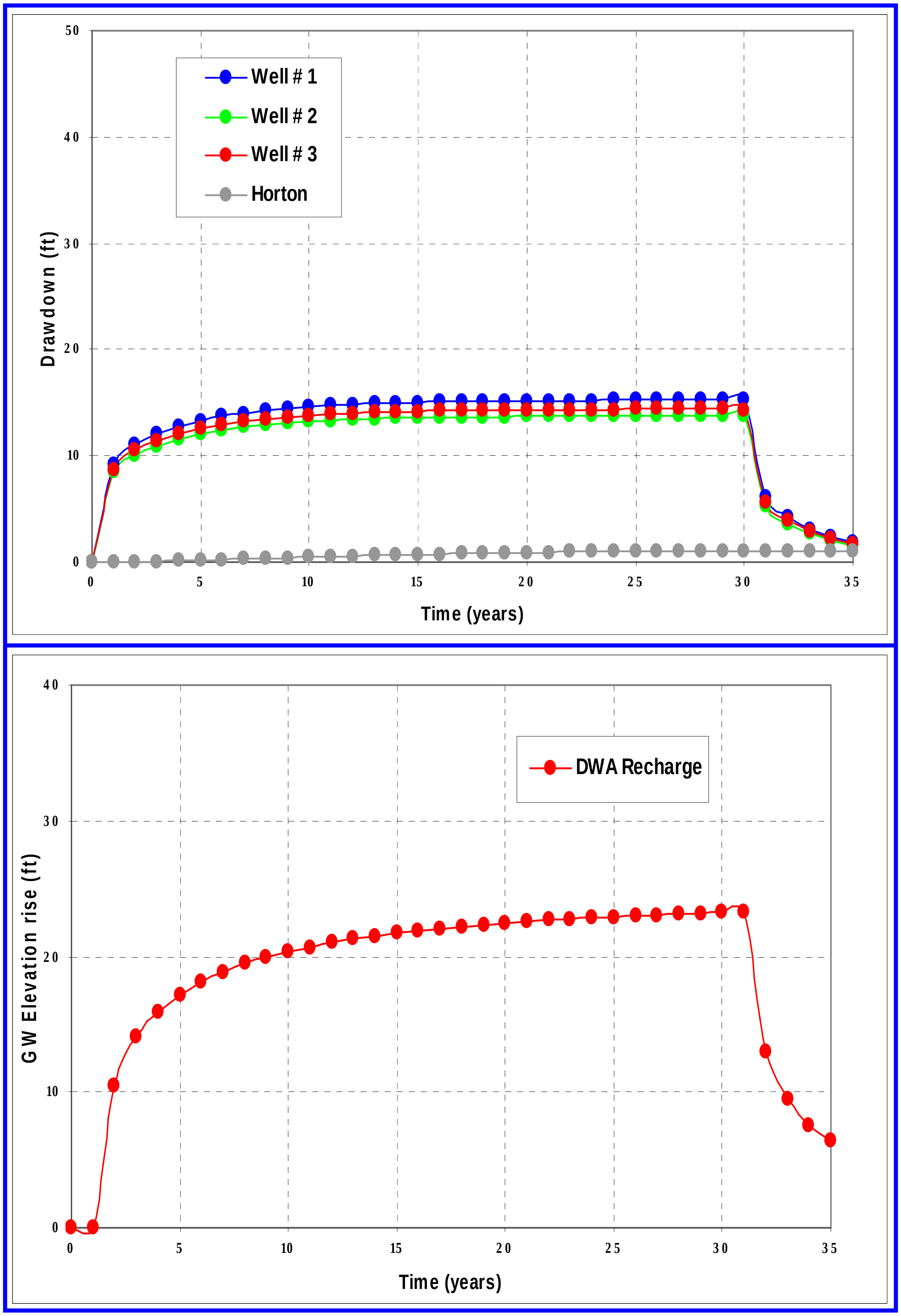


Figure BC_B.2-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario BC_B.2
(Water consumption = 550 afy from on-site wells, 593 afy recharge)

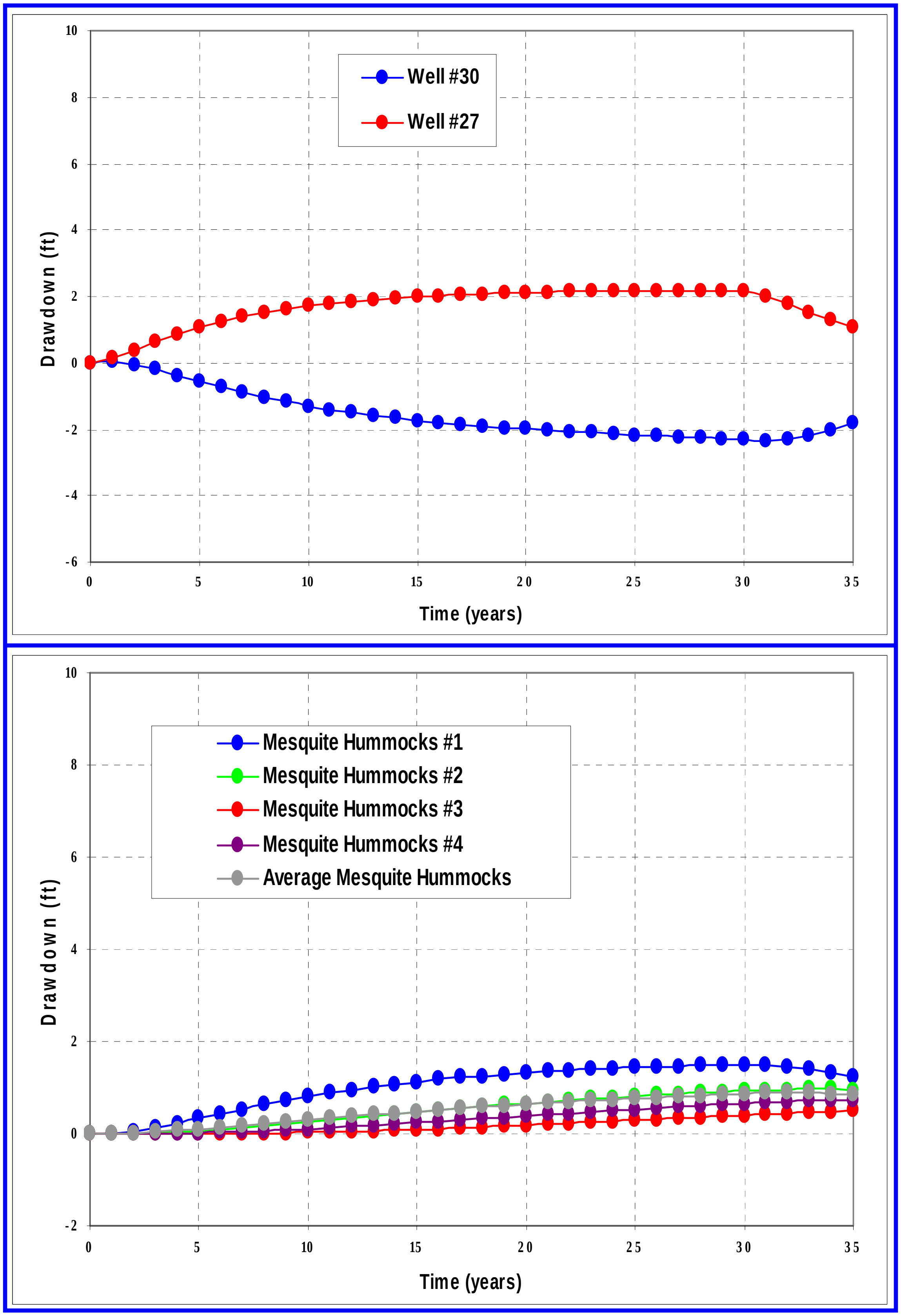


Figure BC_B.2-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario BC_B.2 (Water consumption = 550 afy from on-site wells, 593 afy recharge)

TABLE 1-1
ADDITIONAL ALTERNATIVES ANALYSIS MODEL SIMULATIONS - ALTERNATIVE 1
CPV Sentinel Energy Project
Riverside County, California

Note: Alternative 1 water source = on-site wells and Horton WWTP

Model Parameter	Model Simulation								
	1A	**1A.b**	**1A.c**	**1B.1**	**1B.1b**	**1B.2**	**1B.2b**	**1C**	**1C.b**
Water source	On-site wells and Horton WWTP	On-site wells and Horton WWTP	On-site wells and Horton WWTP	On-site wells and Horton WWTP	On-site wells and Horton WWTP	On-site wells and Horton WWTP	On-site wells and Horton WWTP	On-site wells and Horton WWTP	On-site wells and Horton WWTP
Water consumption	1,100 AFY	550 AFY	550 AFY	1,100 AFY	550 AFY	1,100 AFY	550 AFY	1,100 AFY	550 AFY
On-site wells									
Pumping rate	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3
Pumping schedule	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3
Pumping duration	13 years	13 years	13 years	13 years	13 years	13 years	13 years	13 years	13 years
Horton contribution									
Rate	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3
Schedule	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3	see Table 1-3
Duration	30 years	30 years	see Table 1-3	30 years	30 years	30 years	30 years	30 years	30 years
Recharge (yes/no)	no	no	no	yes	yes	yes	yes	yes	yes
Location	--	--	--	DWA	DWA	DWA	DWA	DWA	DWA
Rate	--	--	--	1,100 AFY	593 AFY	1,100 AFY	593 AFY	5,500 AFY	2,965 AF
Timing	--	--	--	1 year lag	1 year lag	1 year lag	1 year lag	every 5 years	every 5 years
Anisotropy ratio	1 (isotropic)	1 (isotropic)	2 (anisotropic)	1 (isotropic)	1 (isotropic)	2 (anisotropic)	2 (anisotropic)	1 (isotropic)	1 (isotropic)
Transmissivity	1/2 Tyley	1/2 Tyley	Tyley	1/2 Tyley	1/2 Tyley	Tyley	Tyley	1/2 Tyley	1/2 Tyley
Model sim time	35 years	35 years	35 years	35 years	35 years	35 years	35 years	35 years	35 years
Notes	Compare results to Fig. 20 (30 yrs) and Fig. 21 (35 yrs) in July 9, 2008, CEC submittal	Compare results to 1A runs and Fig. 20 (30 yrs) and Fig. 21 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to scenario 1A.b.	Compare results to Fig. 20 (30 yrs) and Fig. 21 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to 1B.1 runs and Fig. 20 (30 yrs) and Fig. 21 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to scenario 1B.2b.	Compare results to scenario 3A.1.	Compare results to Fig. 27 (31 yrs) and Fig. 28 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to 1C runs and Fig. 27 (31 yrs) and Fig. 28 (35 yrs) in July 9, 2008, CEC submittal.

TABLE 1-2
SUMMARY OF SIMULATION RESULTS - ALTERNATIVE 1
CPV Sentinel Energy Project
Riverside County, California

Location	Scenario [1]								
	1A	**1A.b**	**1A.c**	**1B.1**	**1B.1b**	**1B.2**	**1B.2b**	**1C**	**1C.b**
Project Pumping Wells [2]									
maximum drawdown (ft)	10.1	5.0	4.2	10.1	5.0	4.3	2.2	10.1	5.0
time to maximum drawdown (year)	3	3	35	3	3	2	2	3	3
drawdown at 35 years (ft)	8.8	4.4	4.2	-0.2	-0.4	-1.0	-0.9	0.2	-0.2
Horton WWTP									
maximum drawdown (ft)	41.8	20.7	10.4	36.8	18.1	14.3	6.9	37.4	18.4
time to maximum drawdown (year)	30	30	30	30	30	30	30	30	30
drawdown at 35 years (ft)	13.8	6.9	4.8	7.6	3.5	1.9	0.6	8.1	3.8
DWA Recharge Basin									
maximum water level rise (ft)	0	0	0	44.8	24.6	16.9	9.4	107	58.9
time to maximum water level rise (year)	-	-	-	31	31	31	31	31 (5-yr cycle)	31 (5-yr cycle)
water level rise at 35 years (ft)	-6.5	-3.3	-3.9	13.7	7.6	3.1	2.0	17.5	9.7
Wells 27 and 31 [3]									
maximum drawdown (ft)	10.2	5.1	4.5	2.9	1.2	0.8	0.4	3.5	1.5
time to maximum drawdown (year)	35	35	32	30	26	7	6	30	26
drawdown at 35 years (ft)	10.2	5.1	4.5	2.2	0.8	0	-0.4	2.6	1.0
Wells 28 and 30 [4]									
maximum drawdown (ft)	8.5	4.3	4.3	0	0	0.1	0.1	0.6	0.3
time to maximum drawdown (year)	35	35	35	1	-	1	1	5	5
drawdown at 35 years (ft)	8.5	4.3	4.3	-4.6	-2.8	-1.1	-0.9	-5.2	-3.1
Well 22									
maximum drawdown (ft)	10.2	5.1	4.6	1.2	0.5	0.7	0.3	2.0	0.9
time to maximum drawdown (year)	33	33	31	17	12	9	6	15	15
drawdown at 35 years (ft)	10.1	5.1	4.5	0.2	-0.3	-0.1	-0.4	0.4	-0.2
Well 24									
maximum drawdown (ft)	10.8	5.4	4.7	2.4	1.0	1.1	0.4	3.1	1.4
time to maximum drawdown (year)	32	32	31	24	18	15	9	21	20
drawdown at 35 years (ft)	10.5	5.2	4.5	1.1	0.2	0	-0.3	1.3	0.3
Well 29									
maximum drawdown (ft)	11.9	5.9	4.9	4.2	1.9	1.8	0.7	4.9	2.2
time to maximum drawdown (year)	31	31	30	30	23	19	14	30	21
drawdown at 35 years (ft)	11.0	5.5	4.6	2.1	0.1	0.3	-0.2	2.5	0.9
Well 32									
maximum drawdown (ft)	10.5	5.2	4.7	3.5	1.5	1.1	0.5	4.1	1.8
time to maximum drawdown (year)	33	33	31	30	29	15	8	30	30
drawdown at 35 years (ft)	10.4	5.2	4.5	2.6	1.0	0.2	-0.2	3.0	1.2

TABLE 1-2
SUMMARY OF SIMULATION RESULTS - ALTERNATIVE 1
CPV Sentinel Energy Project
Riverside County, California

Location	Scenario [1]								
	1A	1A.b	1A.c	1B.1	1B.1b	1B.2	1B.2b	1C	1C.b
CVWD Wells									
maximum drawdown (ft)	10.9	5.5	4.8	4.8	2.2	1.9	0.8	5.3	2.5
time to maximum drawdown (year)	32	32	31	30	30	30	15	30	30
drawdown at 35 years (ft)	10.8	5.4	4.6	3.5	1.5	0.6	0	4.0	1.7
Hummock Observation 1									
maximum drawdown (ft)	10.8	5.4	5.0	5.7	2.7	3.0	1.2	6.2	2.9
time to maximum drawdown (year)	33	33	31	31	30	30	22	31	30
drawdown at 35 years (ft)	10.8	5.4	4.7	4.9	2.2	1.3	0.3	5.4	2.5
Hummock Observation 2									
maximum drawdown (ft)	8.7	4.3	4.7	5.6	2.7	4.3	1.9	6.0	2.9
time to maximum drawdown (year)	35	35	32	34	33	30	30	34	33
drawdown at 35 years (ft)	8.7	4.3	4.5	5.6	2.7	3.0	1.3	5.9	2.9
Hummock Observation 3									
maximum drawdown (ft)	4.7	2.3	3.7	3.6	1.8	3.8	1.8	3.8	1.9
time to maximum drawdown (year)	35	35	35	35	35	32	32	35	35
drawdown at 35 years (ft)	4.7	2.3	3.7	3.6	1.8	3.6	1.7	3.8	1.9
Hummock Observation 4									
maximum drawdown (ft)	6.9	3.5	4.2	5.0	2.4	4.1	1.9	5.2	2.6
time to maximum drawdown (year)	35	35	34	35	35	31	30	35	35
drawdown at 35 years (ft)	6.9	3.5	4.2	5.0	2.4	3.5	1.6	5.2	2.6
Hummock Average									
maximum drawdown (ft)	7.8	3.9	4.3	4.8	2.3	3.8	1.7	5.1	2.5
time to maximum drawdown (year)	35	35	32	33	33	30	30	33	33
drawdown at 35 years (ft)	7.8	3.9	4.3	4.8	2.3	2.9	1.2	5.1	2.4

Notes:
1. Alternative 1 water source = on-site wells and Horton WWTP
   Scenario 1A: Pump = 1,100 afy, no recharge, half Tyley's T, anisotropy ratio = 1.0
   Scenario 1A.b: Pump = 550 afy, no recharge, half Tyley's T, anisotropy ratio = 1.0
   Scenario 1A.c: Pump = 550 afy, no recharge, Tyley's T, anisotropy ratio = 2.0
   Scenario 1B.1: Pump = 1,100 afy, recharge = 1,100 afy (DWA only), half Tyley's T, anisotropy ratio = 1.0
   Scenario 1B.1b: Pump = 550 afy, recharge = 593 afy (DWA only), half Tyley's T, anisotropy ratio = 1.0
   Scenario 1B.2: Pump = 1,100 afy, recharge = 1,100 afy (DWA only), Tyley's T, anisotropy ratio = 2.0
   Scenario 1B.2b: Pump = 550 afy, recharge = 593 afy (DWA only), Tyley's T, anisotropy ratio = 2.0
   Scenario 1C: Pump = 1,100 afy, recharge = 5,500 af (every 5 years, DWA only), half Tyley's T, anisotropy ratio = 1.0
   Scenario 1C.b: Pump = 550 afy, recharge = 2,965 af (every 5 years, DWA only), half Tyley's T, anisotropy ratio = 1.0
2. Data presented are maximum values of data for three project wells.
3. Model data for well 27 presented; wells 27 and 31 are adjacent to each other.
4. Model data for well 30 presented; wells 28 and 30 are adjacent to each other.

TABLE 1-3

WATER CONSUMPTION DISTRIBUTION FOR CEC WATER SUPPLY ALTERNATIVES 1 AND 2

CPV Sentinel Energy Project

Riverside County, California

Project Year	Calendar Year	From CEC		550 AFY Demand			1,100 AFY Demand		
					Alt 1	Alt 2		Alt 1	Alt 2
				Horton WWTP	On-site wells	MSWD wells 28 & 30	Horton WWTP	On-site wells	MSWD wells 28 & 30
	2008	900	900						
	2009		981.67						
1	2010		1063.33	284	266		568	532	
2	2011		1145.00	306	244		612	488	
3	2012		1226.67	328	222		655	445	
4	2013		1308.33	349	201		699	401	
5	2014	1390	1390.00	371	179		743	357	
6	2015		1470.83	393	157		786	314	
7	2016		1551.67	414	136		829	271	
8	2017		1632.50	436	114		872	228	
9	2018		1713.33	458	92		915	185	
10	2019		1794.17	479	71		959	141	
11	2020	1875	1875.00	501	49		1002	98	
12	2021		1955.83	522	28		1045	55	
13	2022		2036.67	544	6		1088	12	
14	2023		2059	550	0		1100	0	
15	2024		2059	550	0		1100	0	
16	2025		2059	550	0		1100	0	
17	2026	2360	2059	550	0		1100	0	
18	2027		2059	550	0		1100	0	
19	2028		2059	550	0		1100	0	
20	2029		2059	550	0		1100	0	
21	2030		2059	550	0		1100	0	
22	2031		2059	550	0		1100	0	
23	2032		2059	550	0		1100	0	
24	2033		2059	550	0		1100	0	
25	2034		2059	550	0		1100	0	
26	2035		2059	550	0		1100	0	
27	2036		2059	550	0		1100	0	
28	2037		2059	550	0		1100	0	
29	2038		2059	550	0		1100	0	
30	2039		2059	550	0		1100	0	

Notes:

1. Base table supplied by Kris Helm in 8/6/08 8:59 a.m. e-mail.
2. Only focus on 550 AFY and 1,100 AFY demand columns. The CEC column was developed from AFC Table 13.
3. CEC Alternative 1: no recharge, water supply from tertiary-treated reclaimed water from MSWD, Horton WWTP, and an on-site well field. Use of groundwater from the well field will be eventually replaced (year 14) by full supply of treated water from Horton WWTP.
4. CEC Alternative 2: no recharge, water supply from tertiary-treated reclaimed water from MSWD, Horton WWTP, and MSWD wells 28 & 30. Use of groundwater from MSWD wells 28 & 30 will be eventually replaced (year 14) by full supply of treated water from Horton WWTP.

Abbreviations:

AFY = acre-feet per year

CEC = California Energy Commission

MSWD = Mission Springs Water District

WWTP = Wastewater Treatment Plant

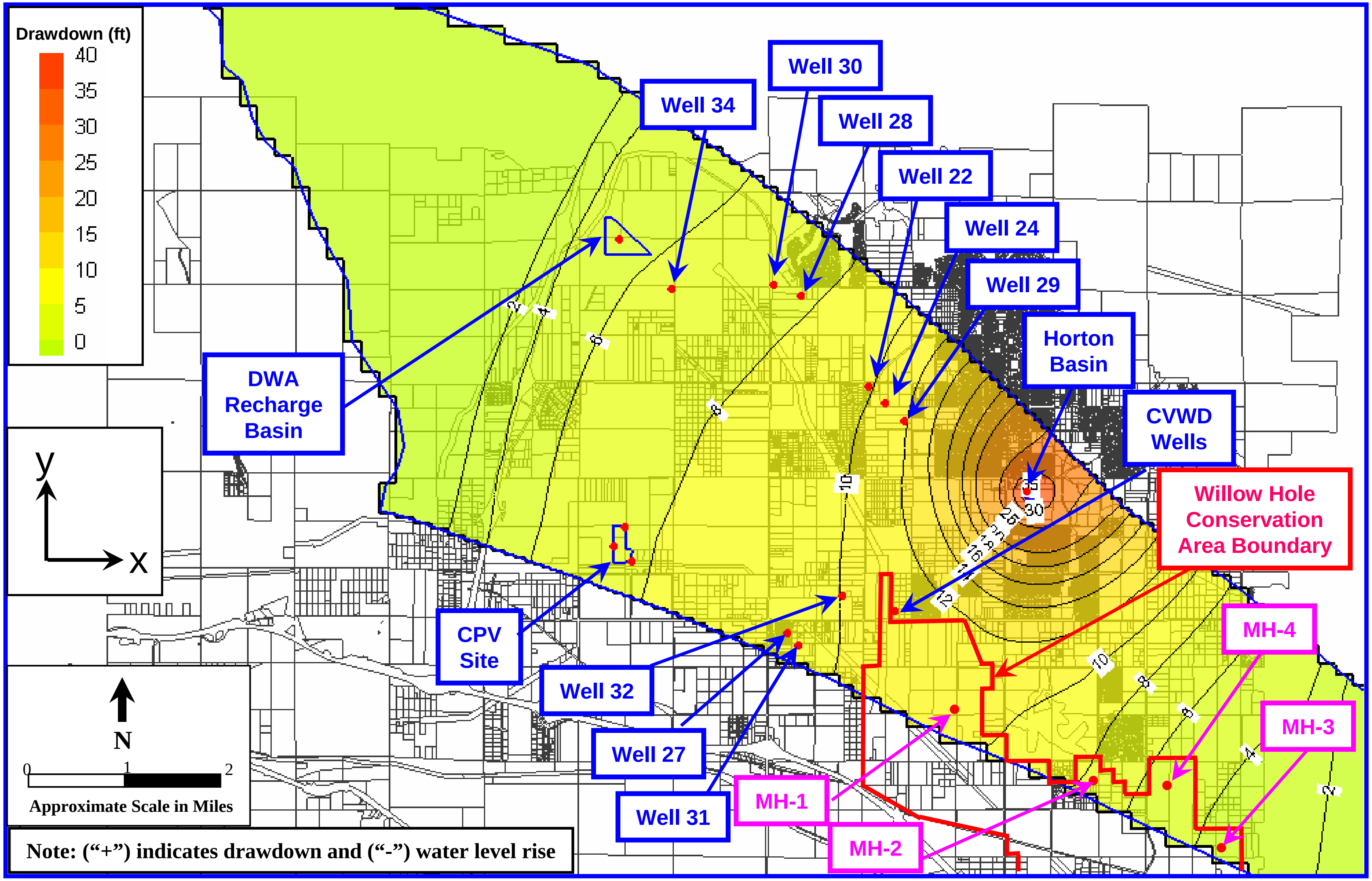


Figure 1A-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1A

(Water consumption = 1,100 afy, no DWA recharge, half Tyley's T, anisotropy ratio = 1.0)

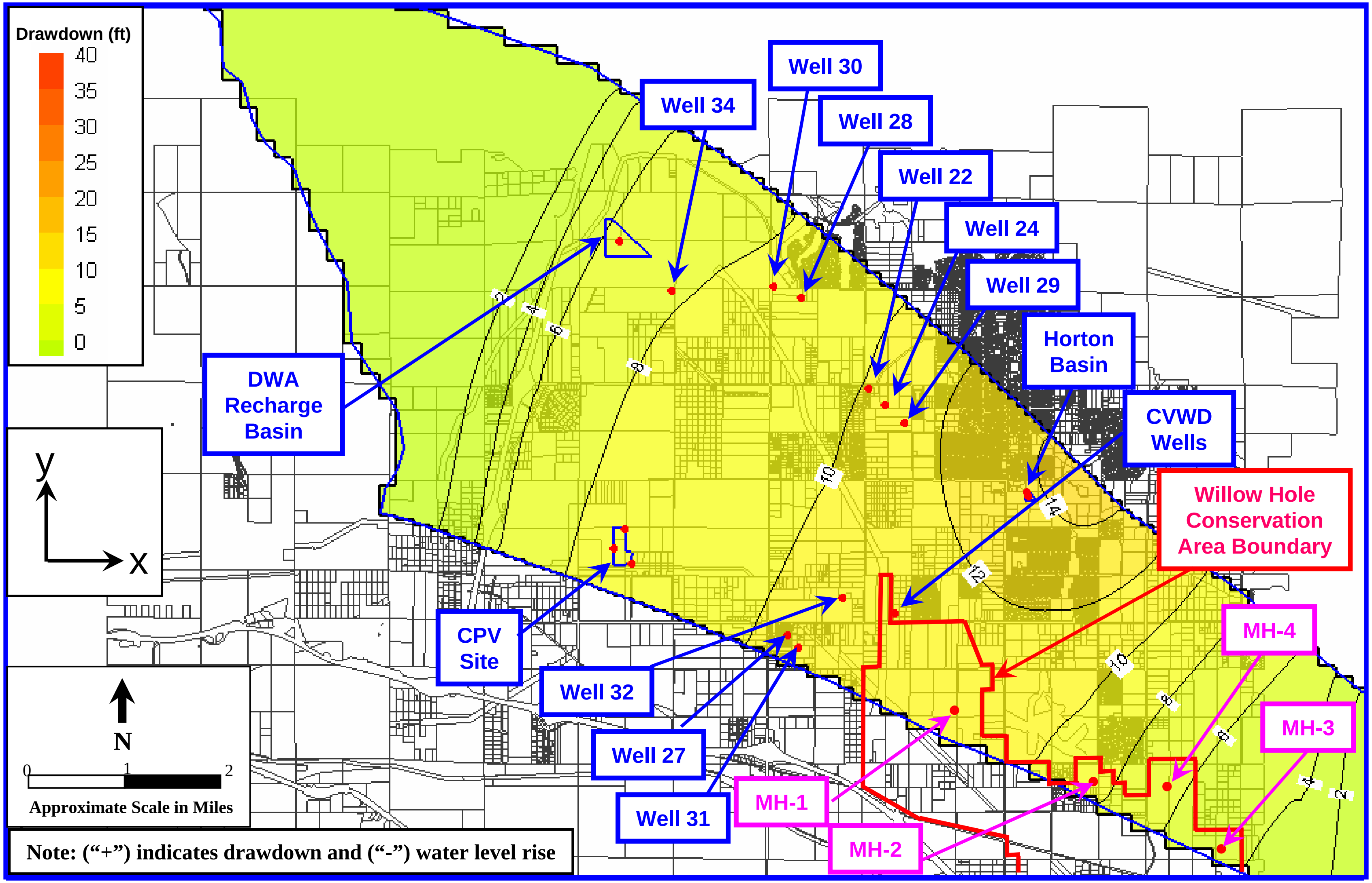


Figure 1A-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1A

(Water consumption = 1,100 afy, no DWA recharge, half Tyley's T, anisotropy ratio = 1.0)

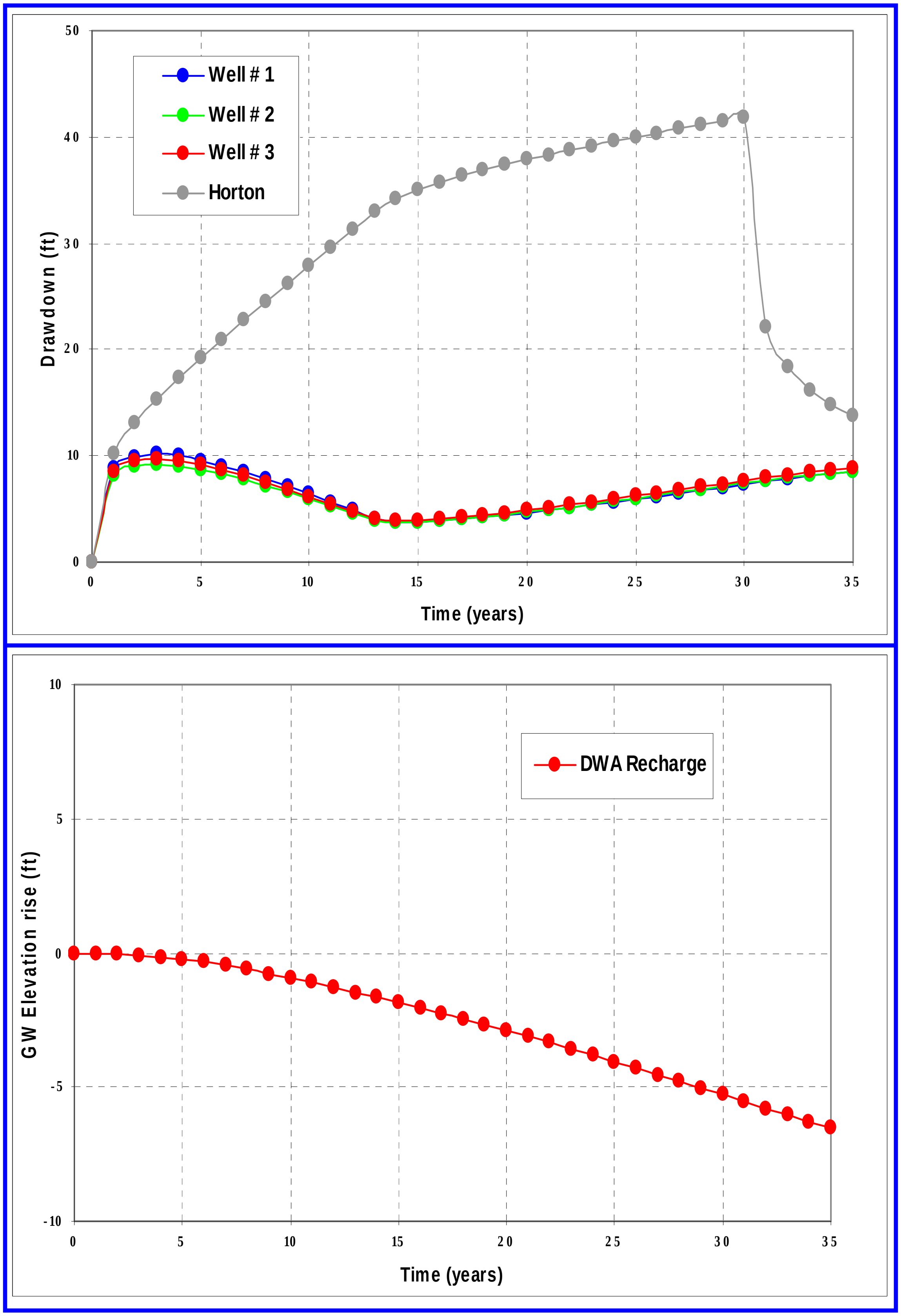


Figure 1A-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1A
(Water consumption = 1,100 afy from on-site wells and Horton WWTP, no recharge)

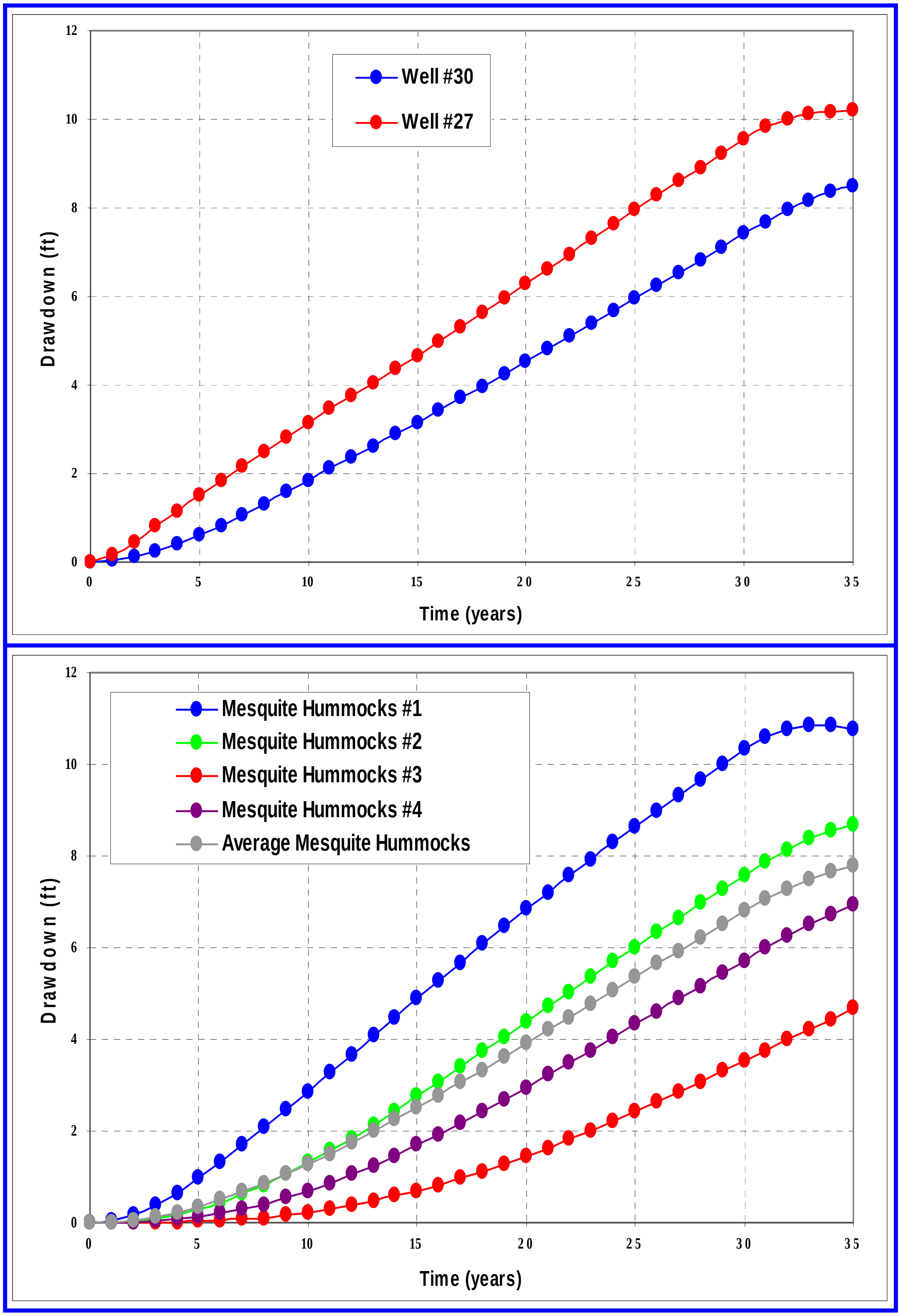


Figure 1A-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1A
(Water consumption = 1,100 afy from on-site wells and Horton WWTP, no recharge)

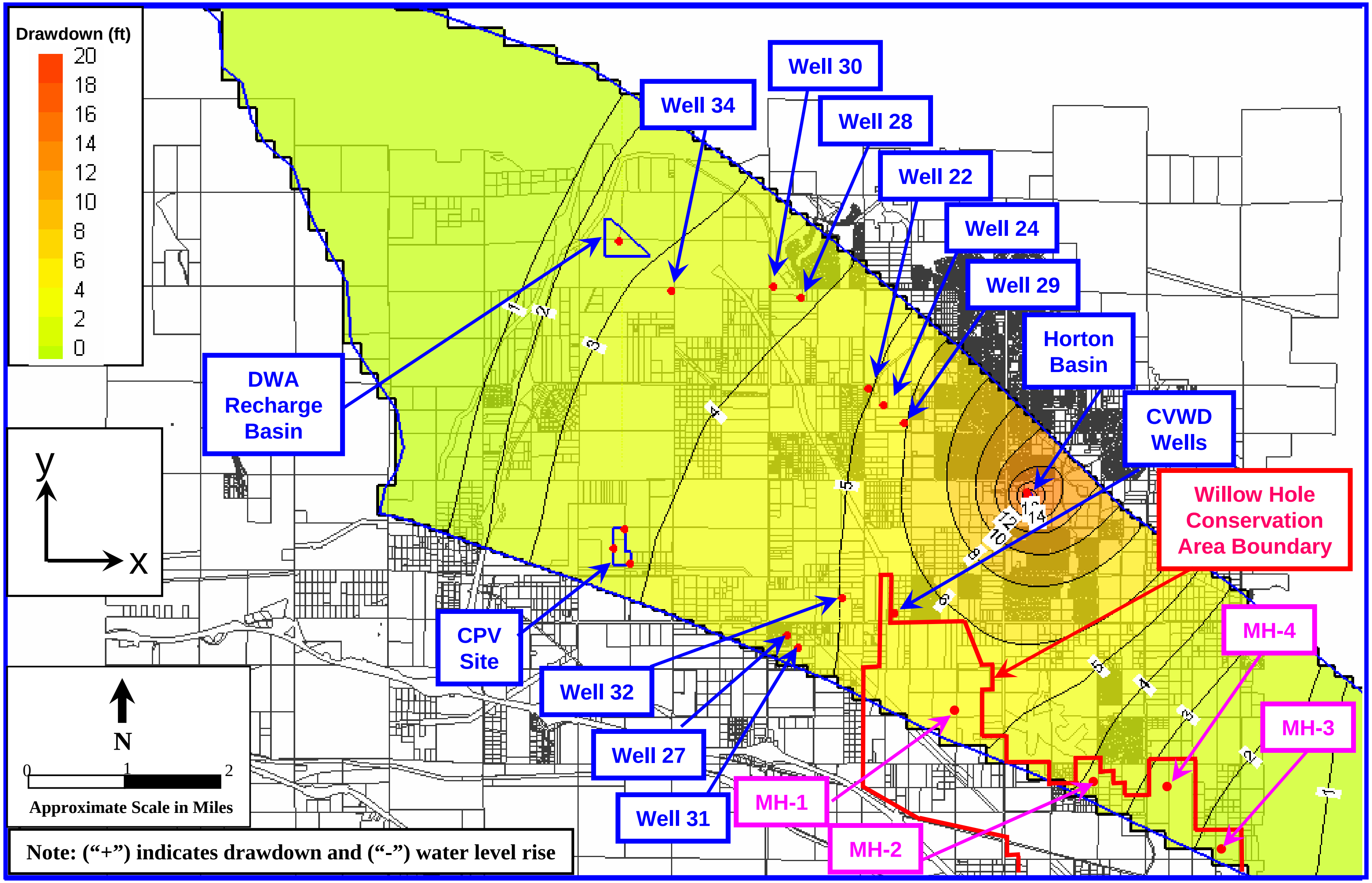


Figure 1A.b-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1A.b

(Water consumption = 550 afy, no DWA recharge, half Tyley's T, anisotropy ratio = 1.0)

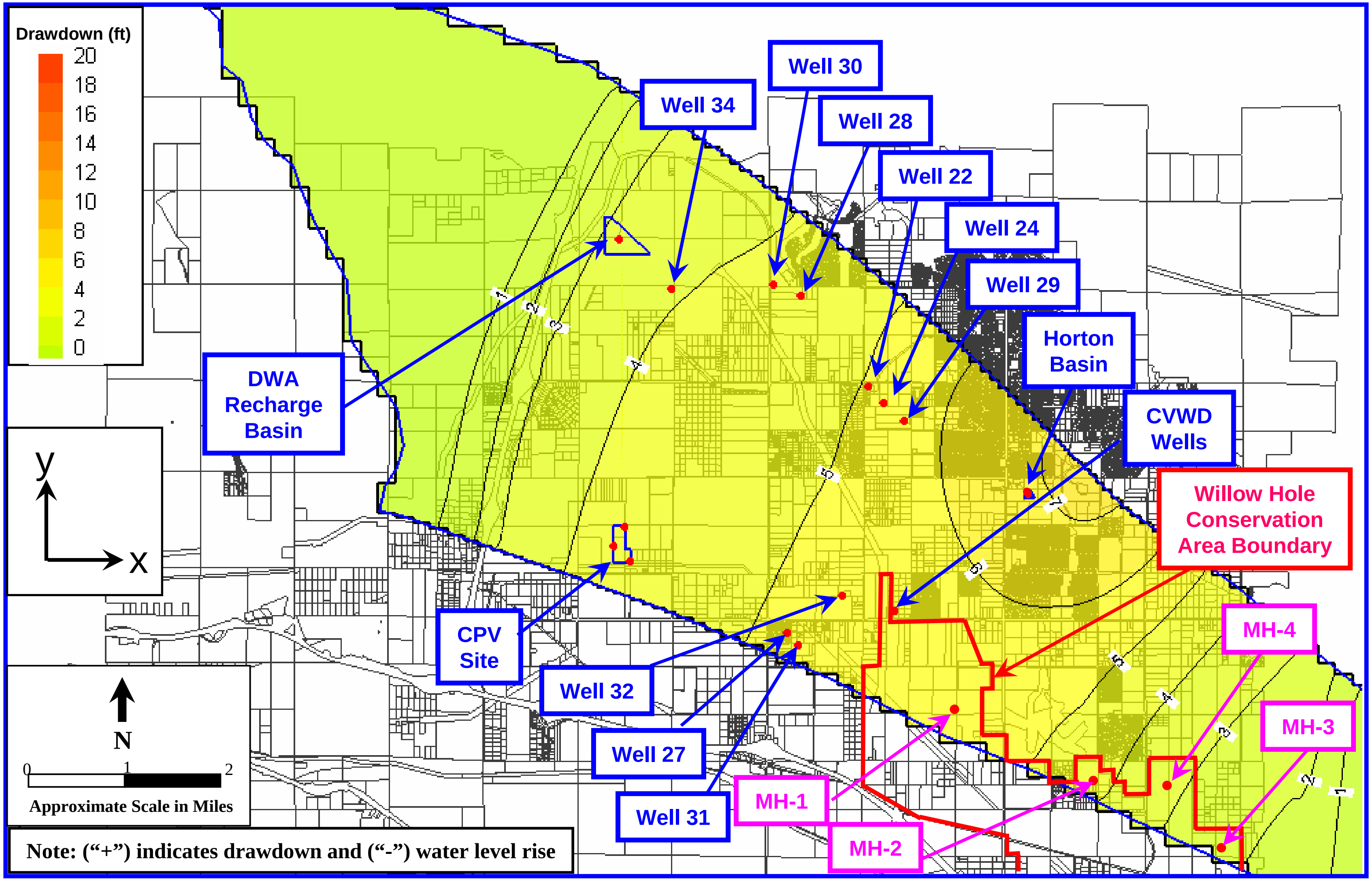


Figure 1A.b-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1A.b

(Water consumption = 550 afy, no DWA recharge, half Tyley's T, anisotropy ratio = 1.0)

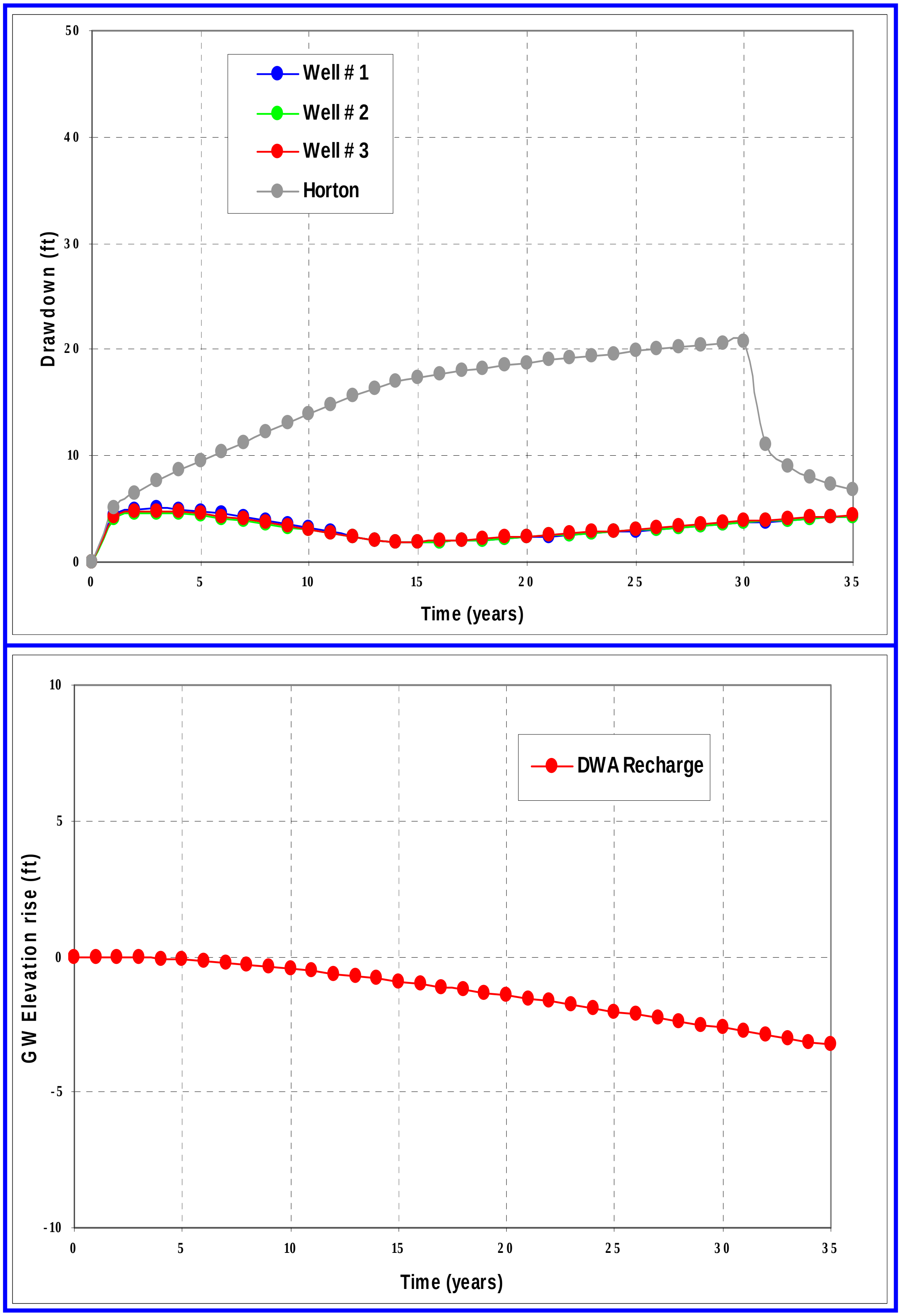


Figure 1A.b-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1A.b (Water consumption = 550 afy from on-site wells and Horton WWTP, no recharge)

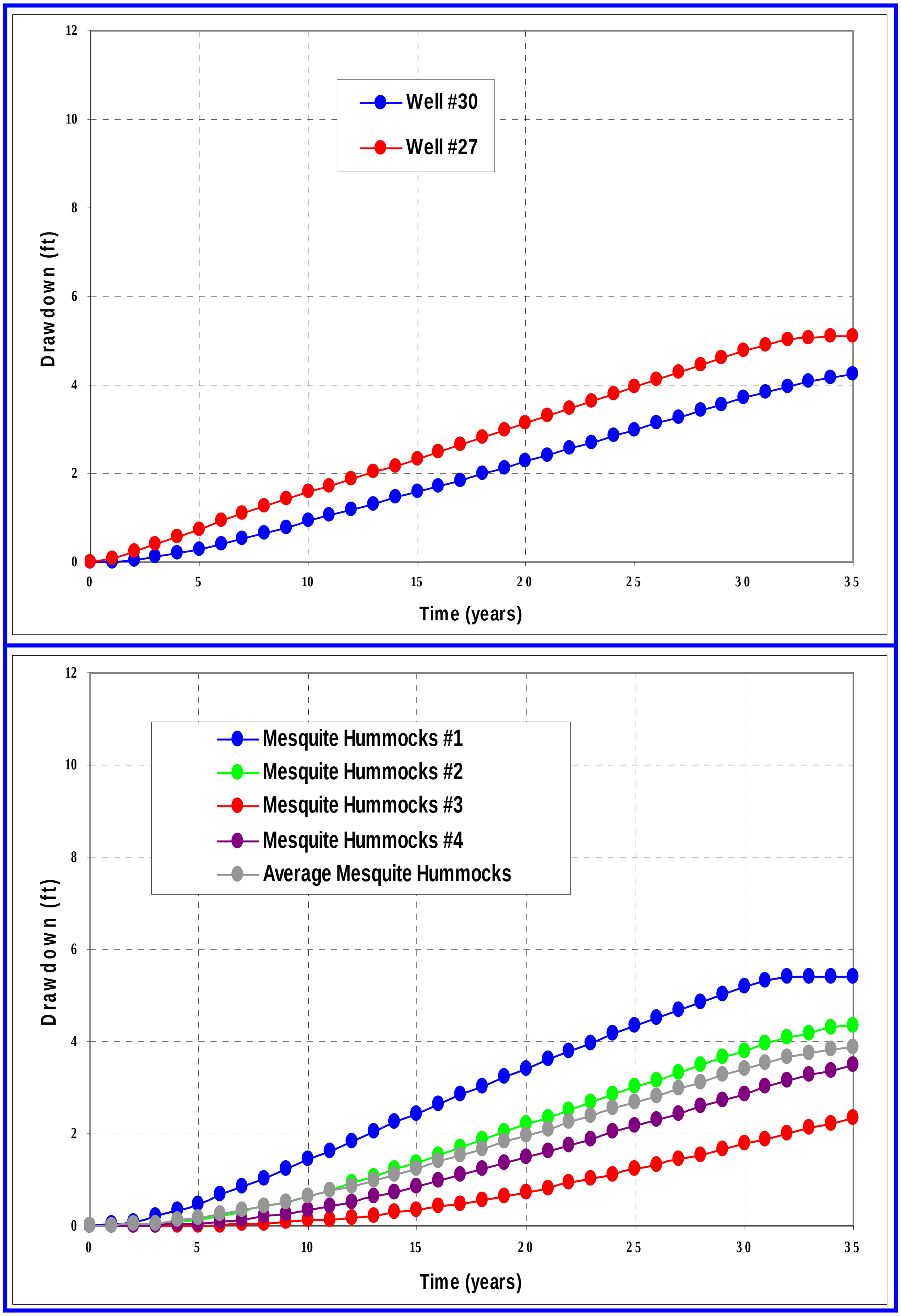


Figure 1A.b-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1A.b (Water consumption = 550 afy from on-site wells and Horton WWTP, no recharge)

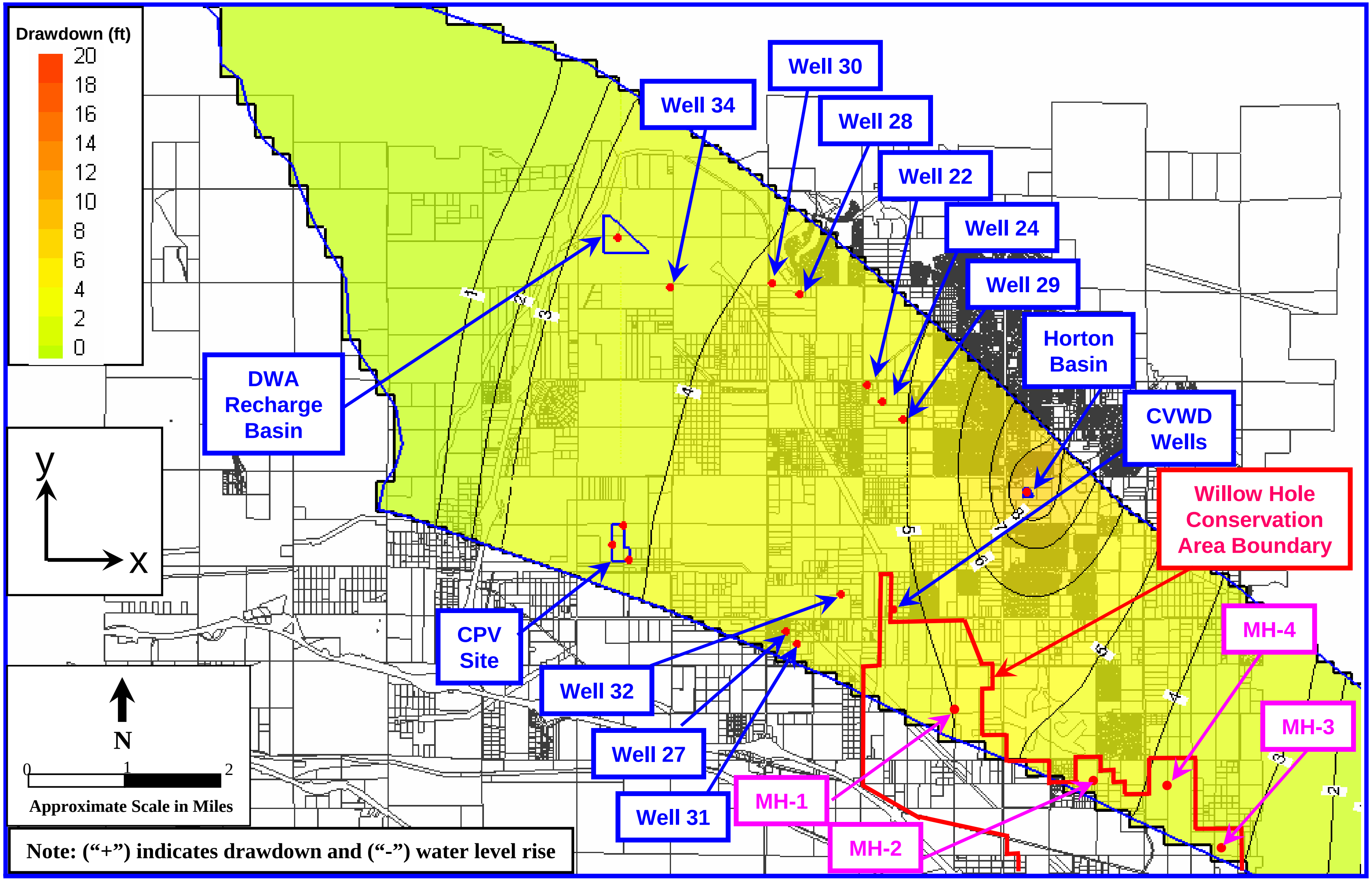


Figure 1A.c-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1A.c

(Water consumption = 550 afy, no DWA recharge, Tyley's T, anisotropy ratio = 2.0)

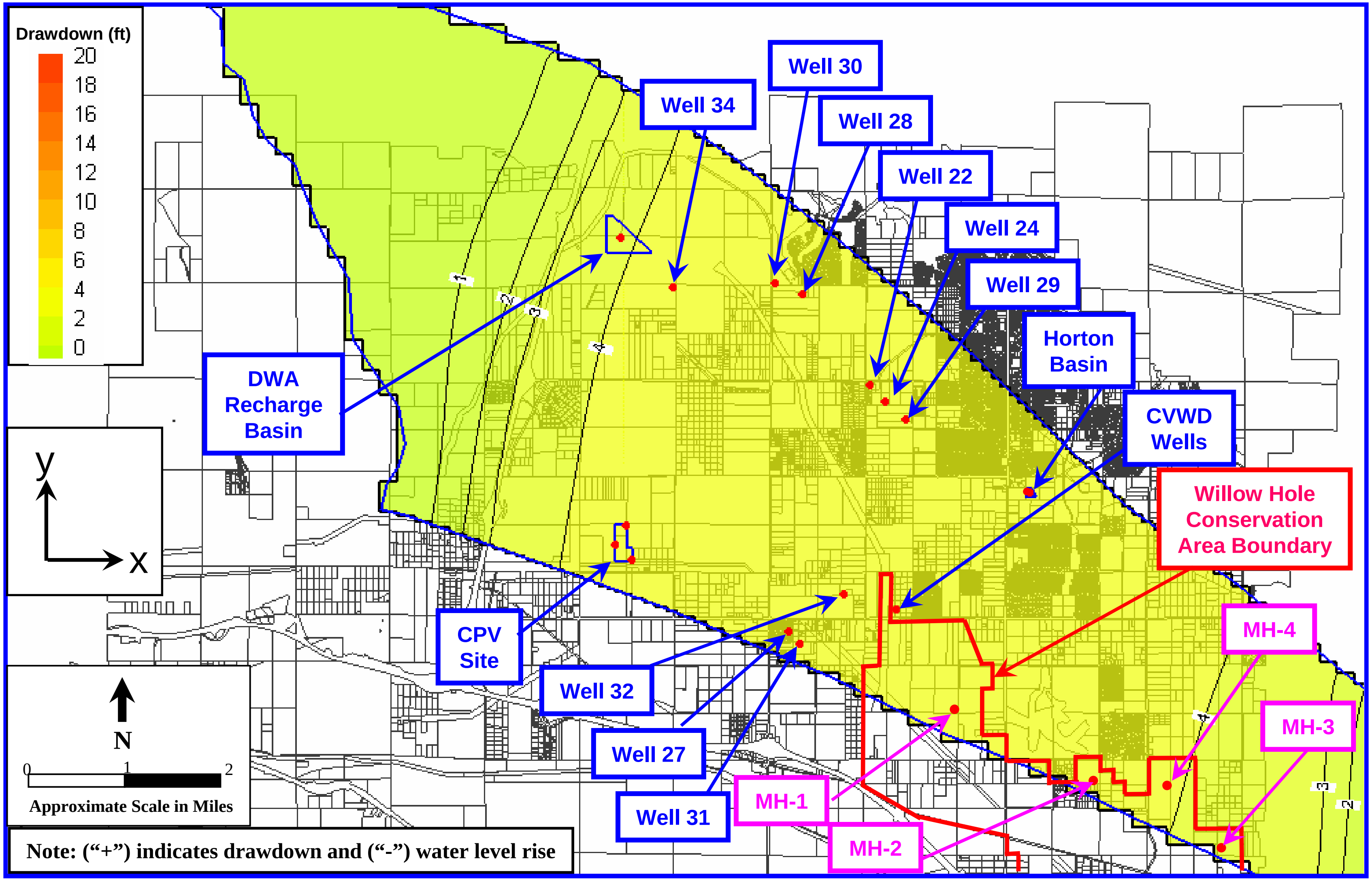


Figure 1A.c-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1A.c

(Water consumption = 550 afy, no DWA recharge, Tyley's T, anisotropy ratio = 2.0)

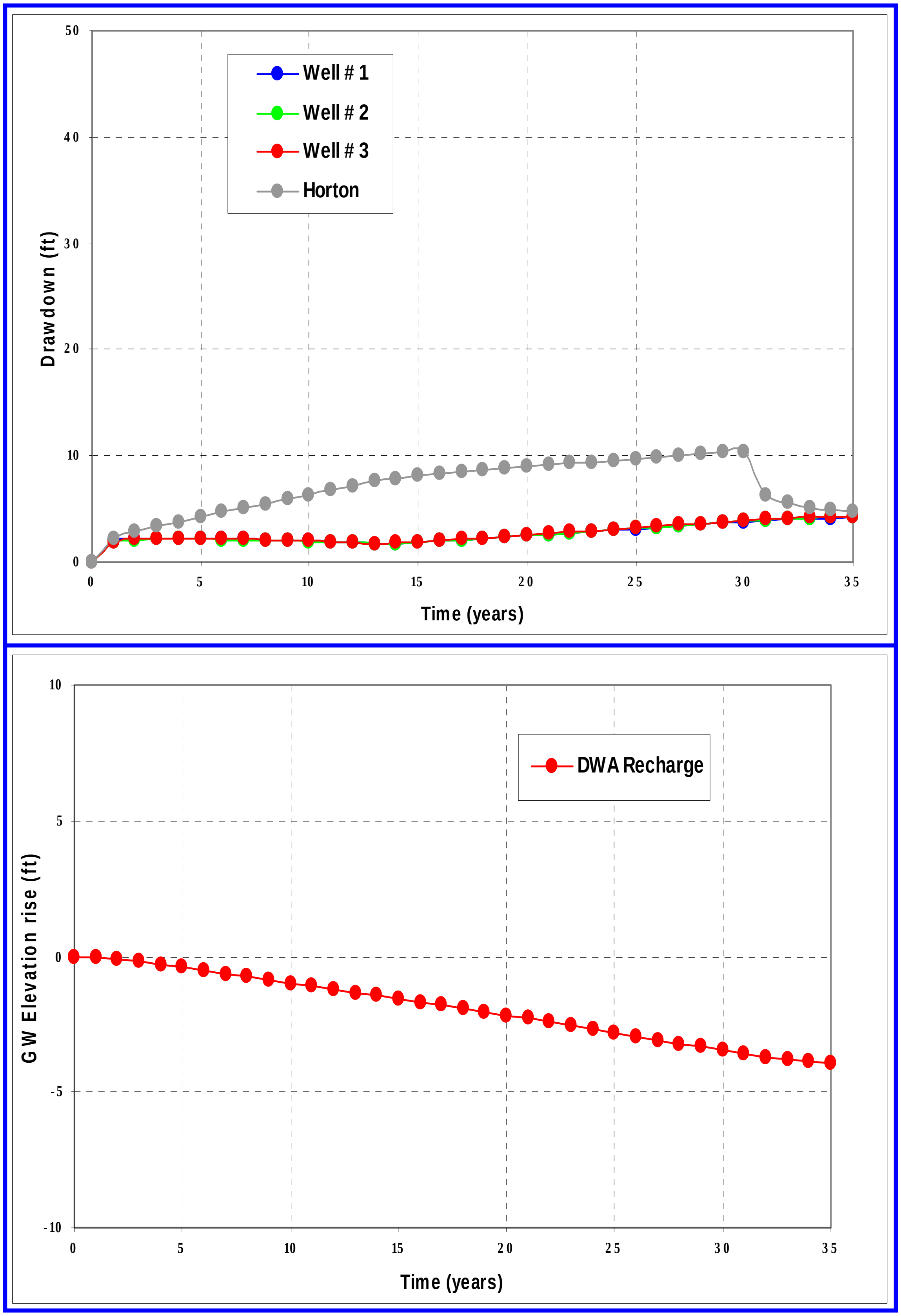


Figure 1A.c-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1A.c
(Water consumption = 550 afy from on-site wells and Horton WWTP, no recharge)

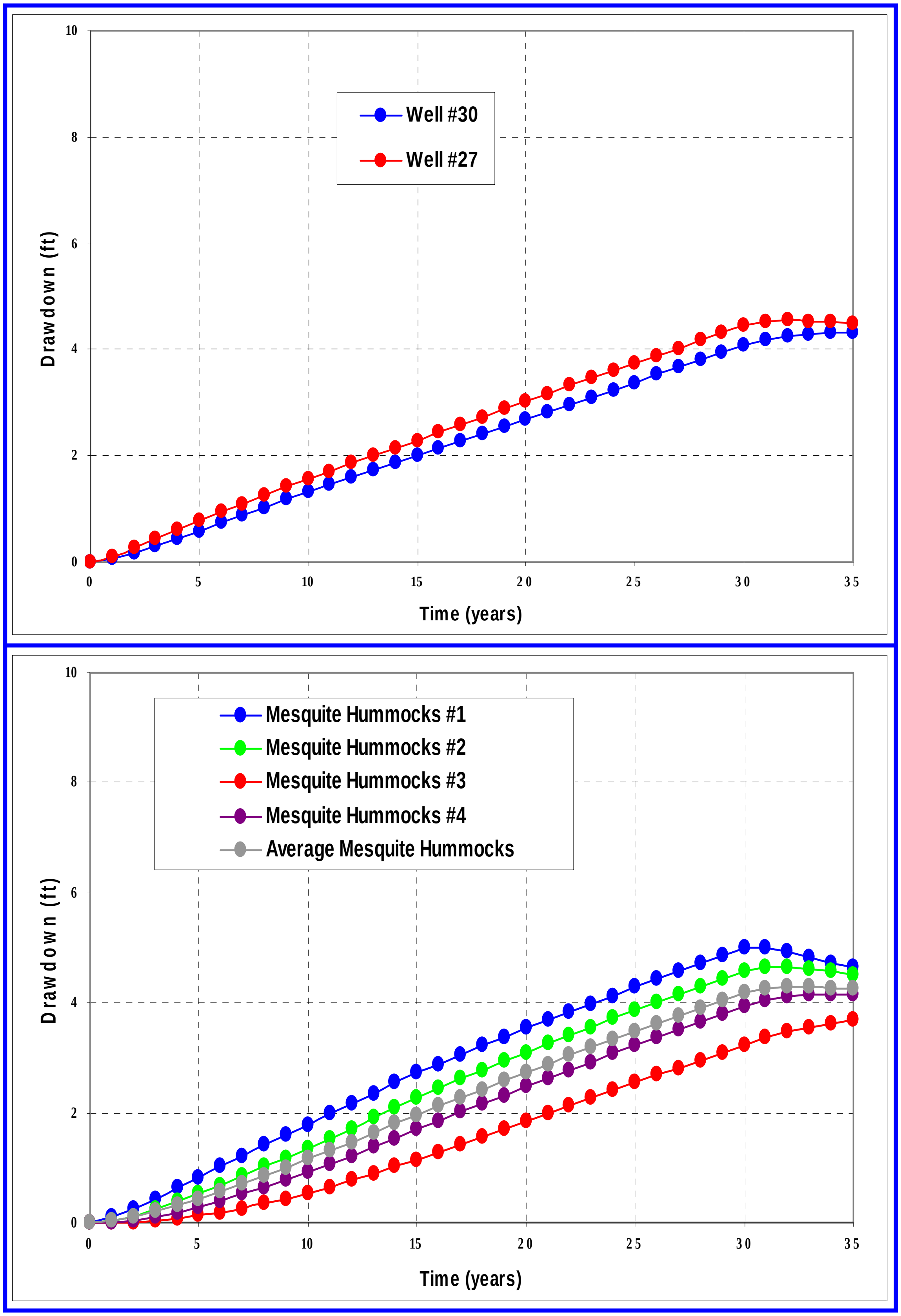


Figure 1A.c-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1A.c
(Water consumption = 550 afy from on-site wells and Horton WWTP, no recharge)

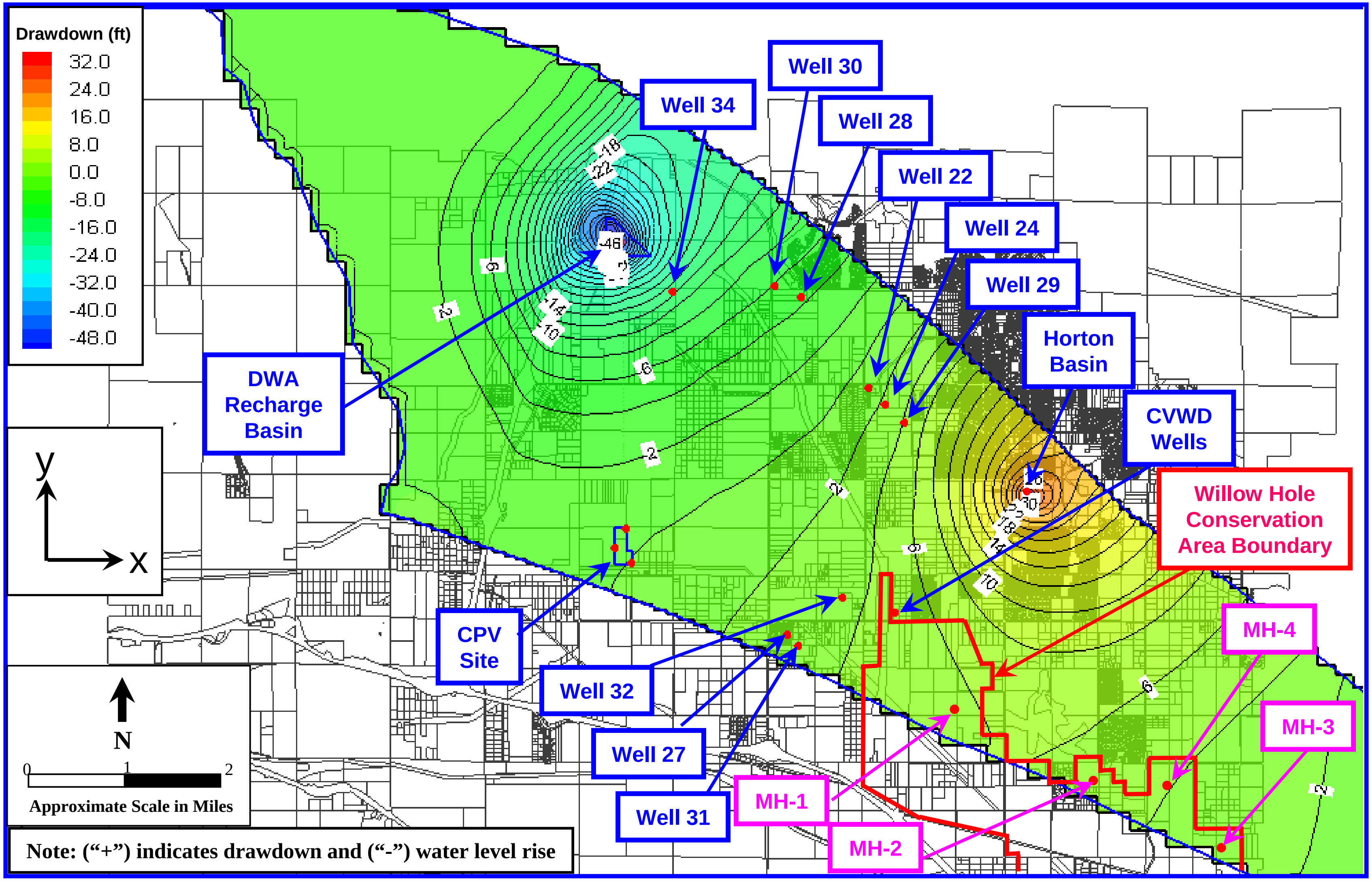


Figure 1B.1-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1B.1

(Water consumption = 1,100 afy, DWA recharge=1,100 afy, half Tyley's T, anisotropy ratio = 1.0)

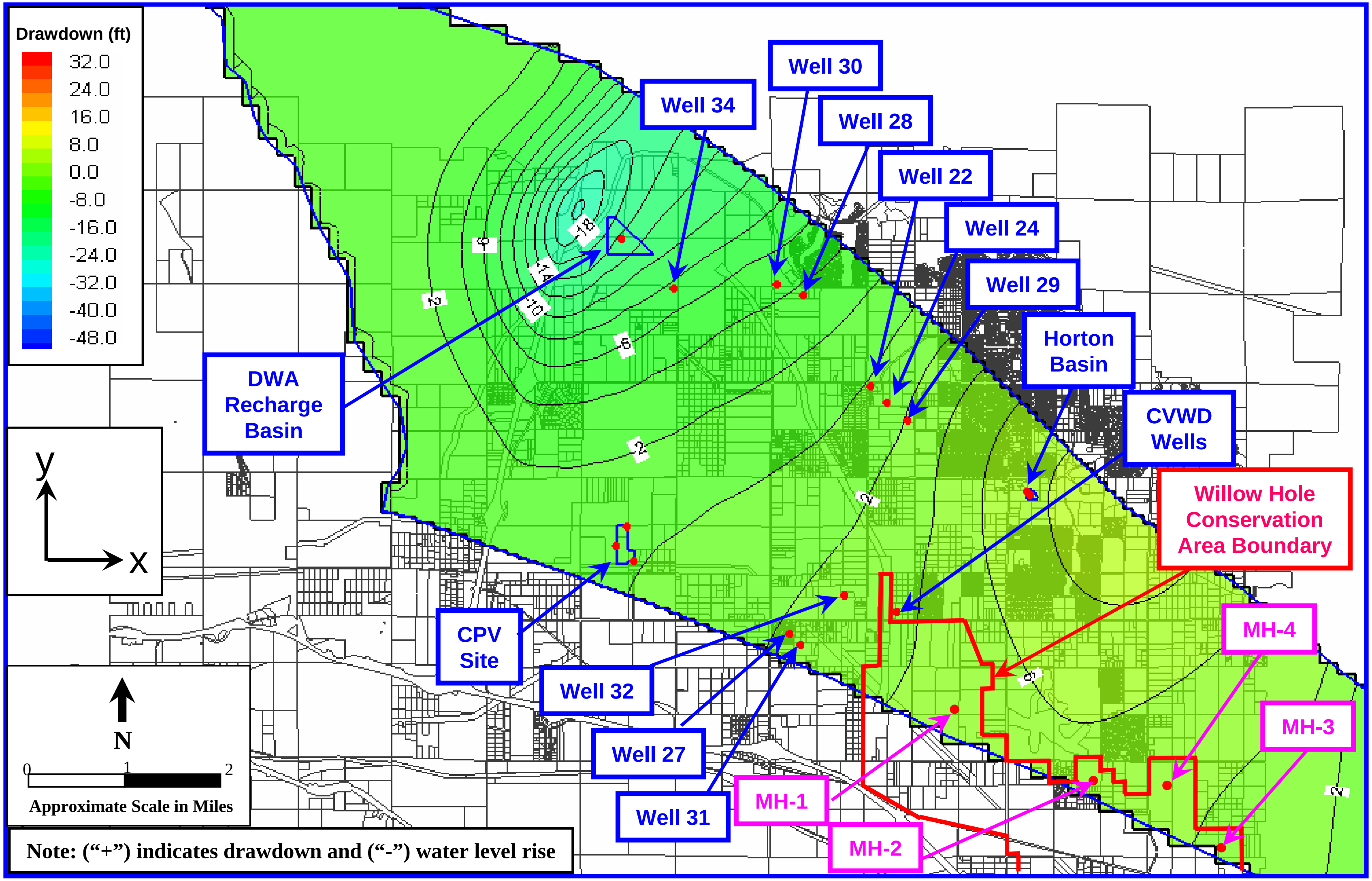


Figure 1B.1-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1B.1

(Water consumption = 1,100 afy, DWA recharge=1,100 afy, half Tyley's T, anisotropy ratio = 1.0)

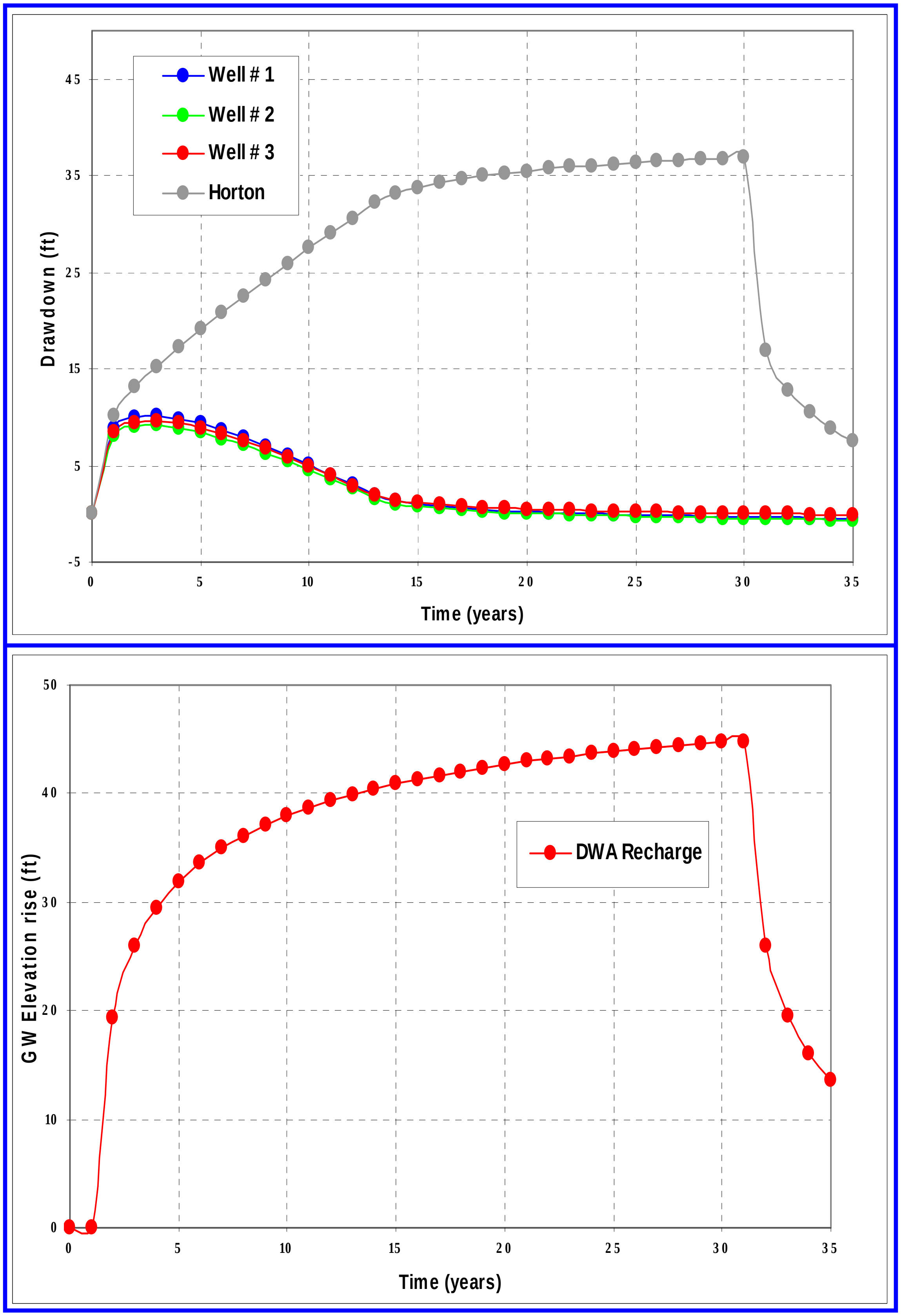


Figure 1B.1-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1B.1
(Water consumption = 1,100 afy from on-site wells and Horton WWTP, 1,100 afy recharge)

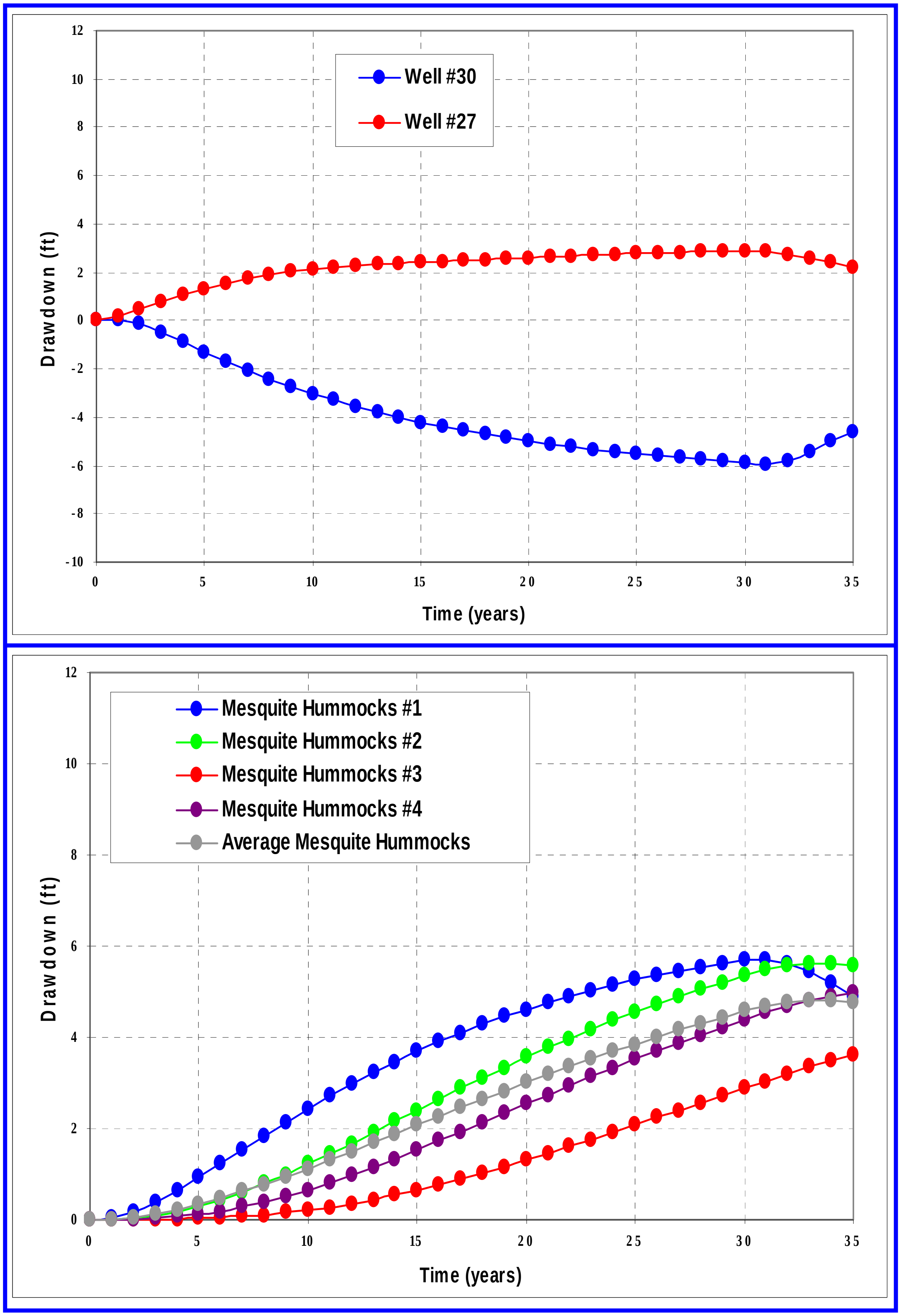


Figure 1B.1-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1B.1
(Water consumption = 1,100 afy from on-site wells and Horton WWTP, 1,100 afy recharge)

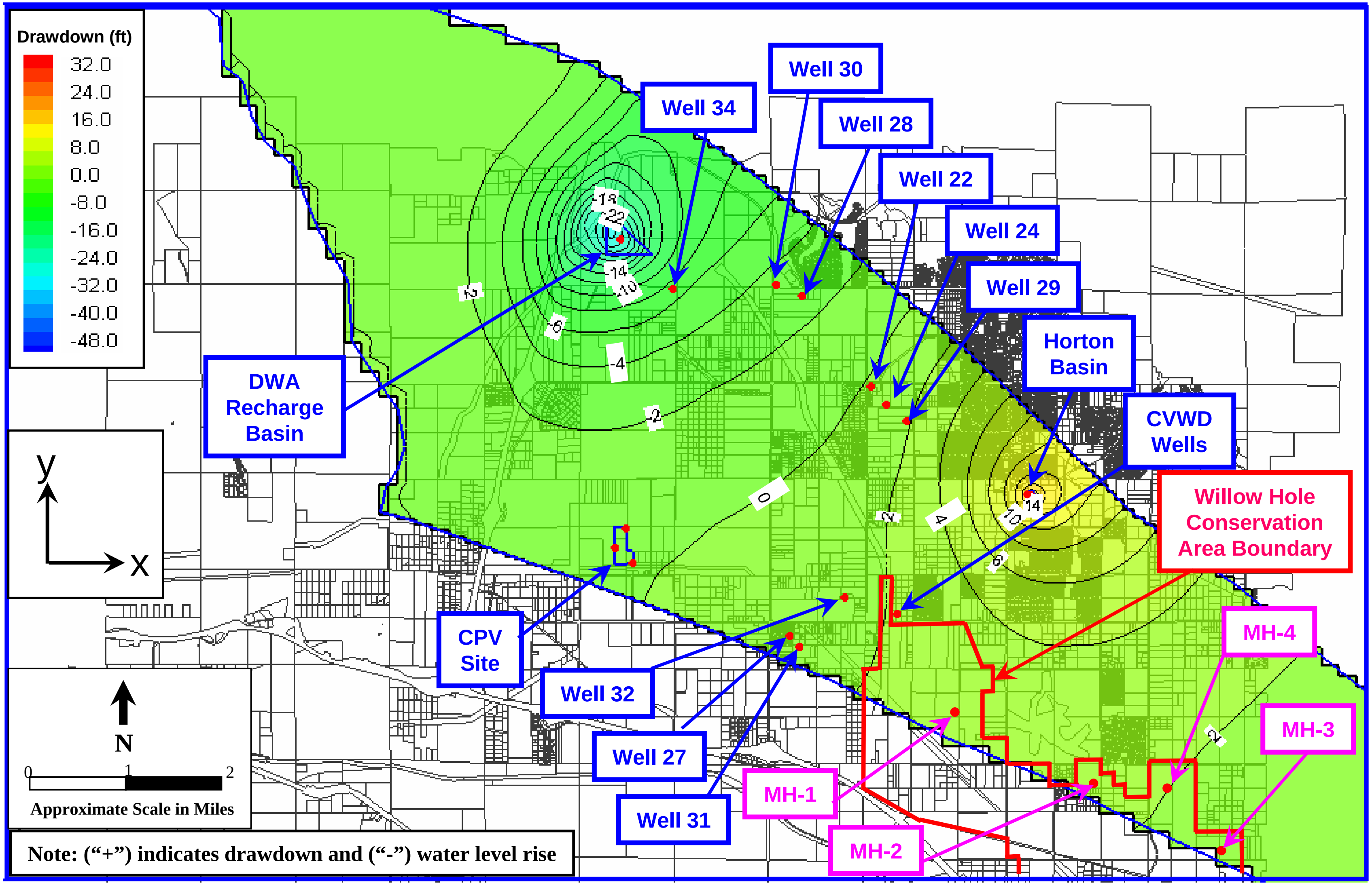


Figure 1B.1b-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1B.1b

(Water consumption = 550 afy, DWA recharge=593 afy, half Tyley's T, anisotropy ratio = 1.0)

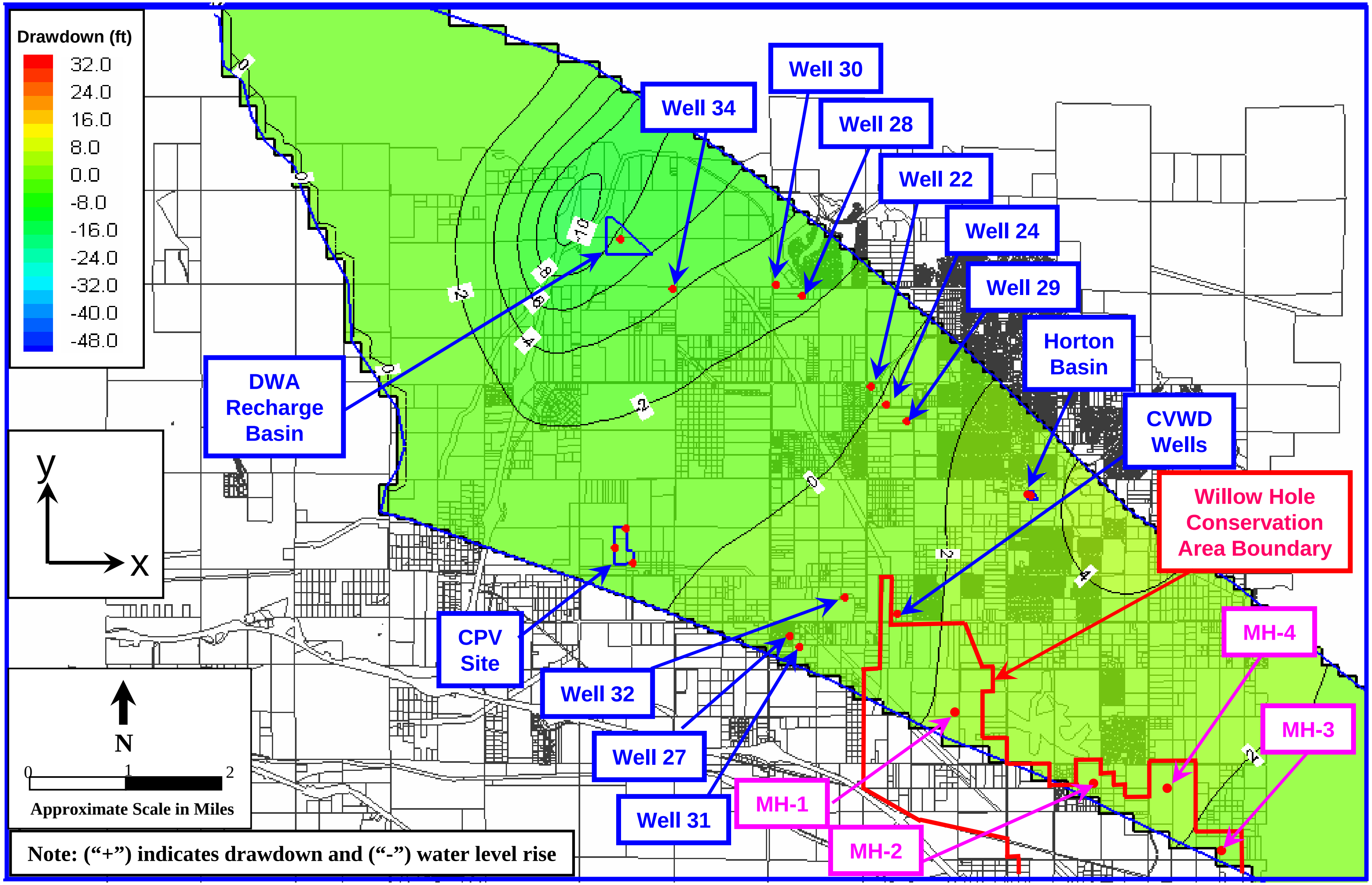


Figure 1B.1b-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1B.1b

(Water consumption = 550 afy, DWA recharge=593 afy, half Tyley's T, anisotropy ratio = 1.0)

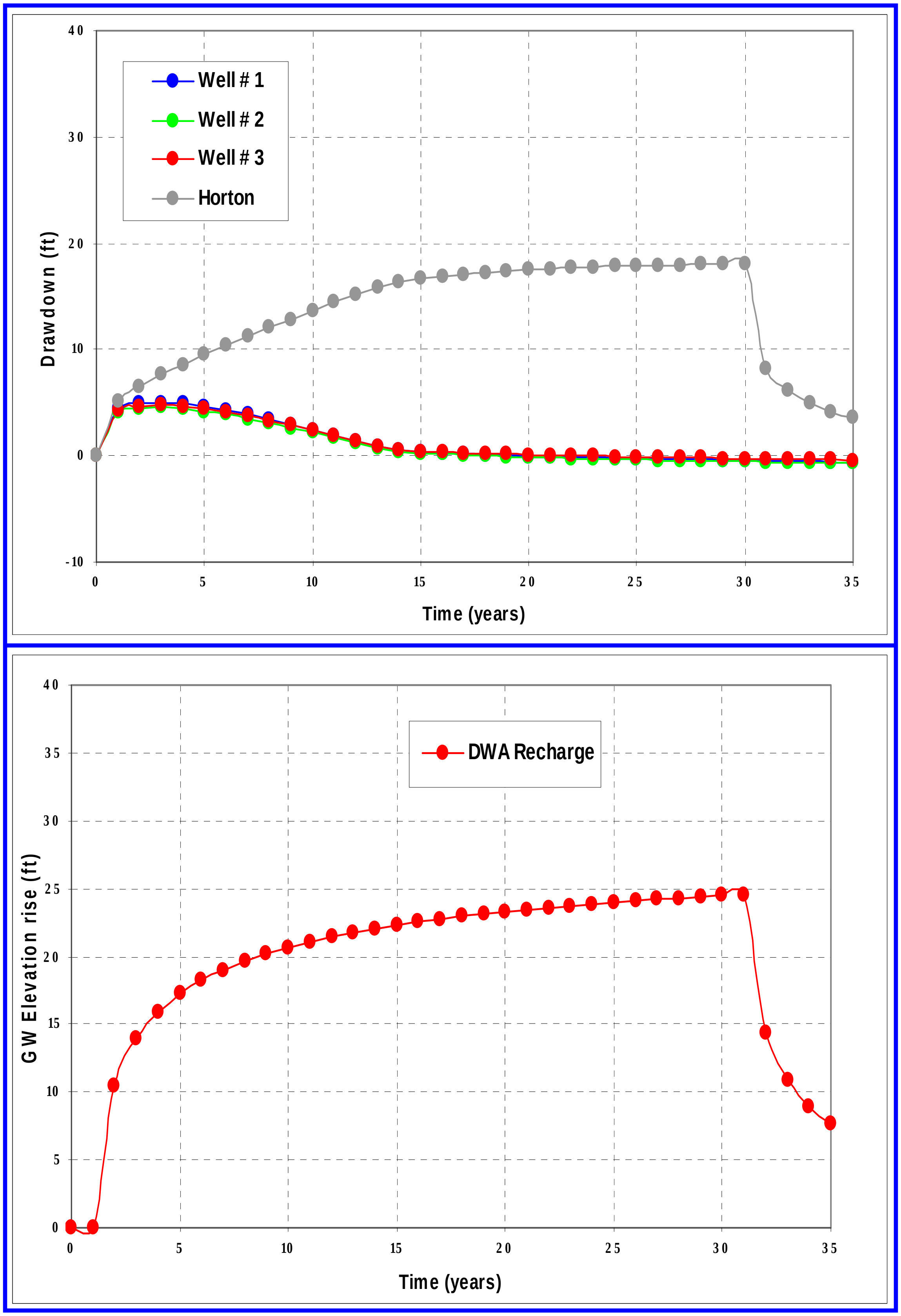


Figure 1B.1b-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1B.1b
(Water consumption = 550 afy from on-site wells and Horton WWTP, 593 afy recharge)

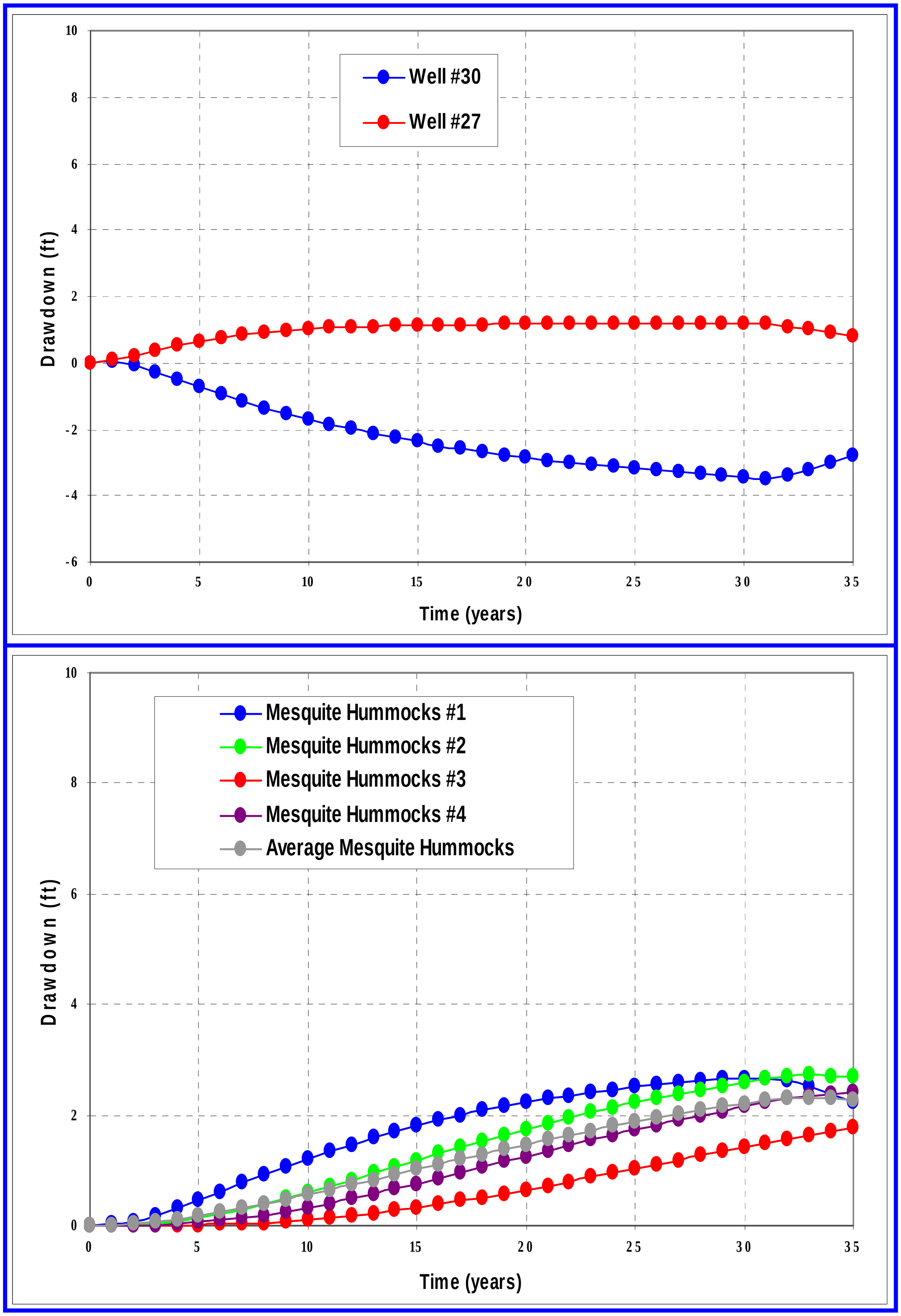


Figure 1B.1b-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1B.1b
(Water consumption = 550 afy from on-site wells and Horton WWTP, 593 afy recharge)

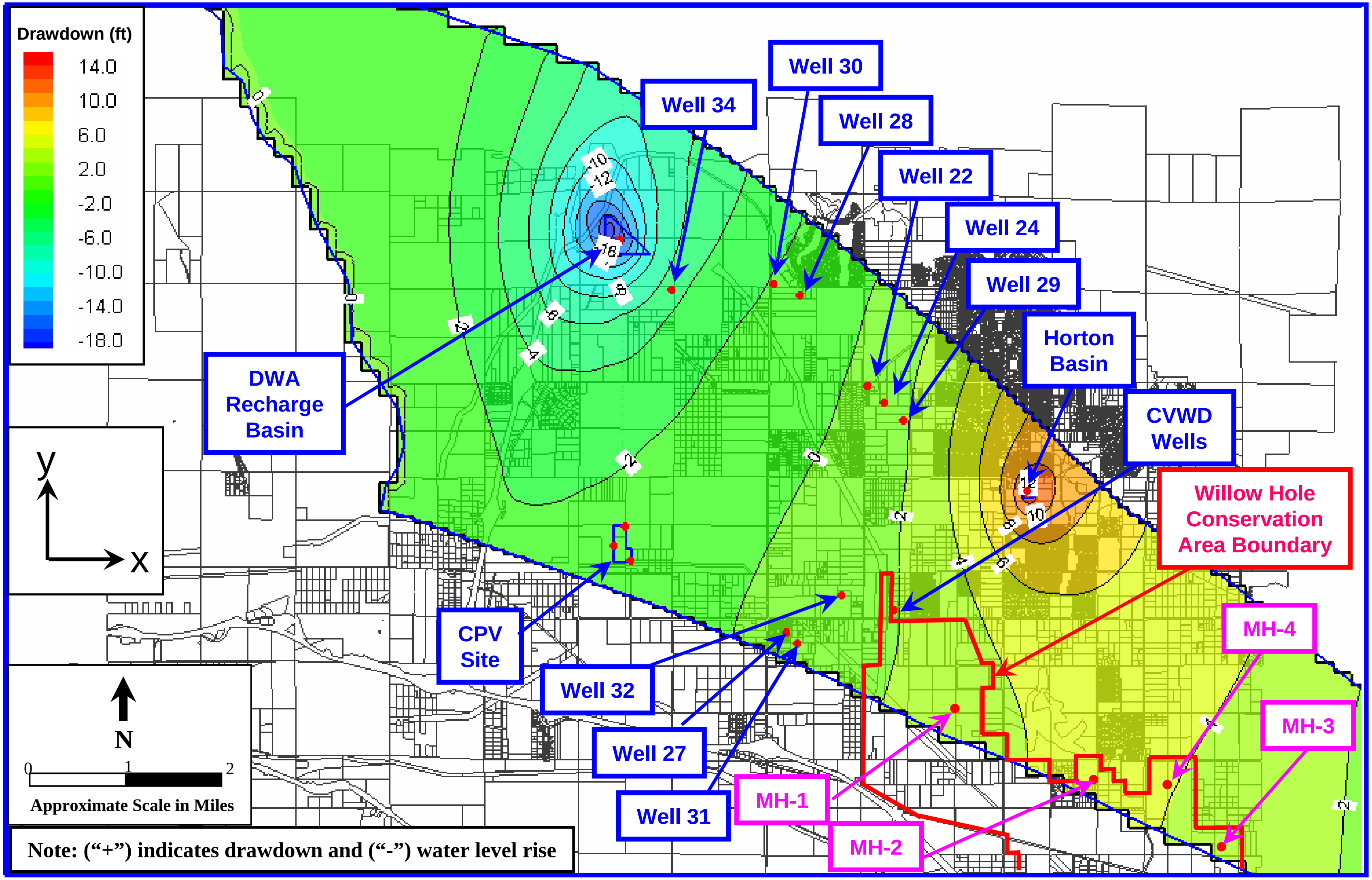


Figure 1B.2-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1B.2

(Water consumption = 1,100 afy, DWA recharge=1,100 afy, Tyley's T, anisotropy ratio = 2.0)

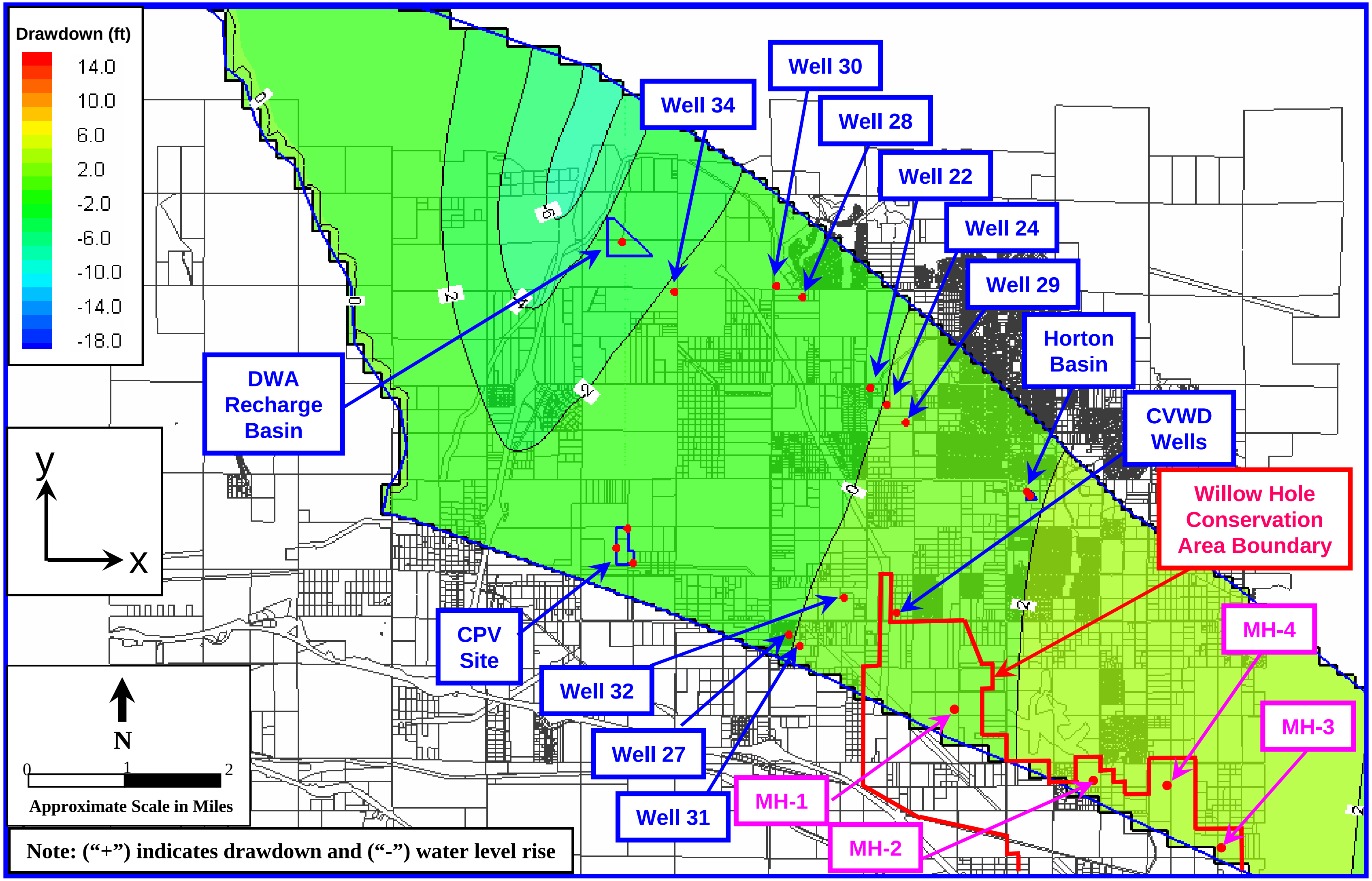


Figure 1B.2-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1B.2

(Water consumption = 1,100 afy, DWA recharge=1,100 afy, Tyley's T, anisotropy ratio = 2.0)

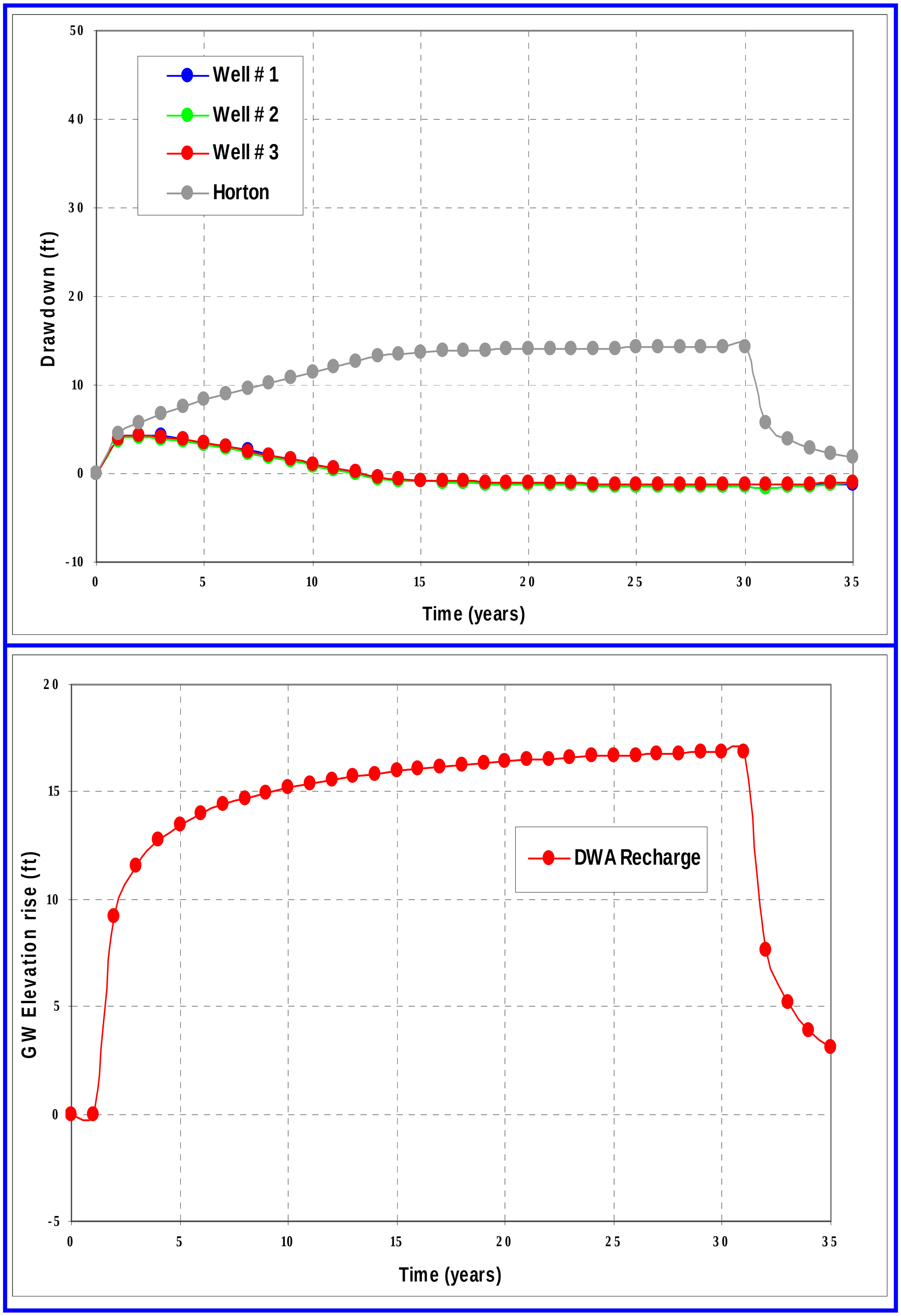


Figure 1B.2-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1B.2
(Water consumption = 1,100 afy from on-site wells and Horton WWTP, 1,100 afy recharge)

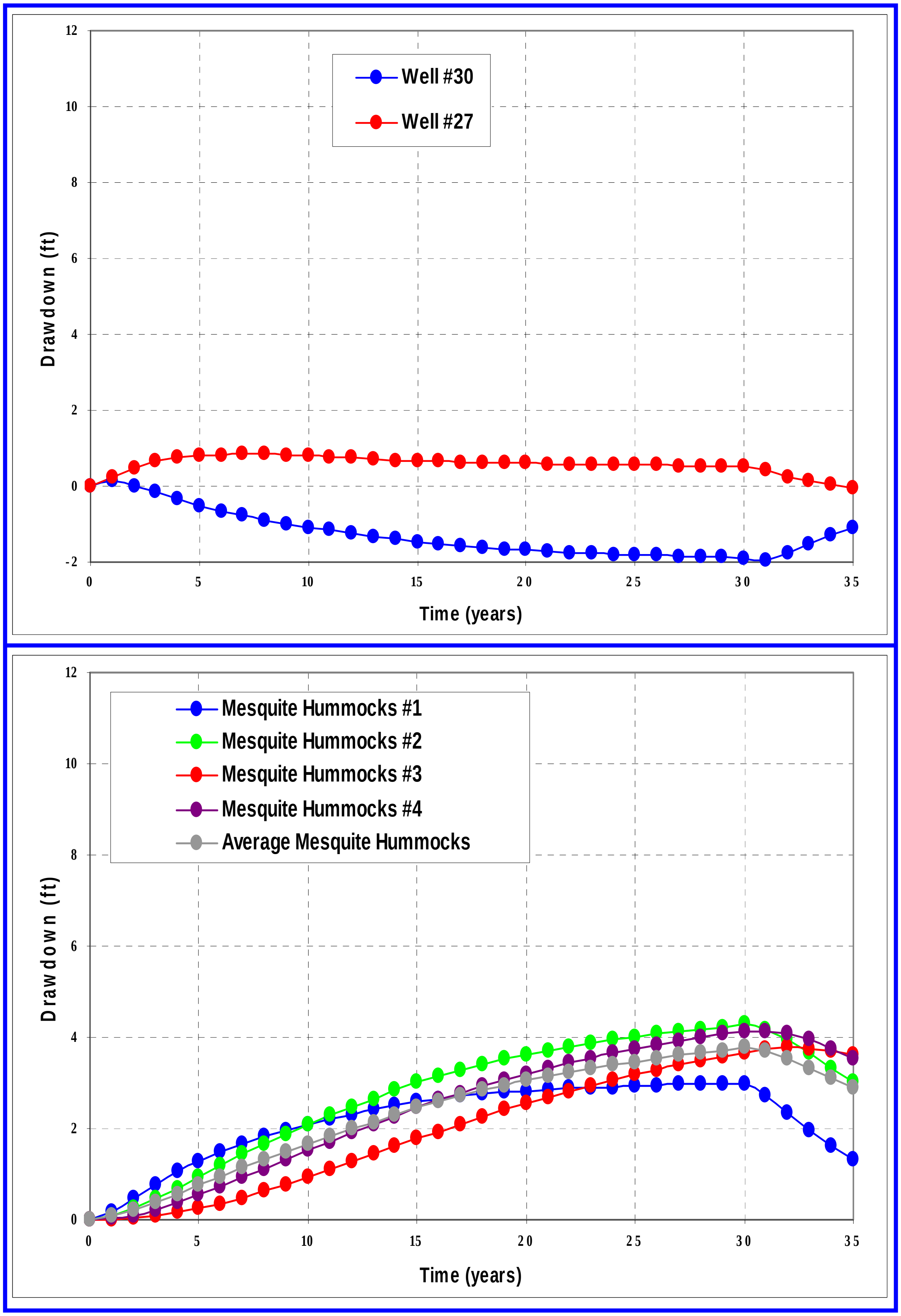


Figure 1B.2-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1B.2
(Water consumption = 1,100 afy from on-site wells and Horton WWTP, 1,100 afy recharge)

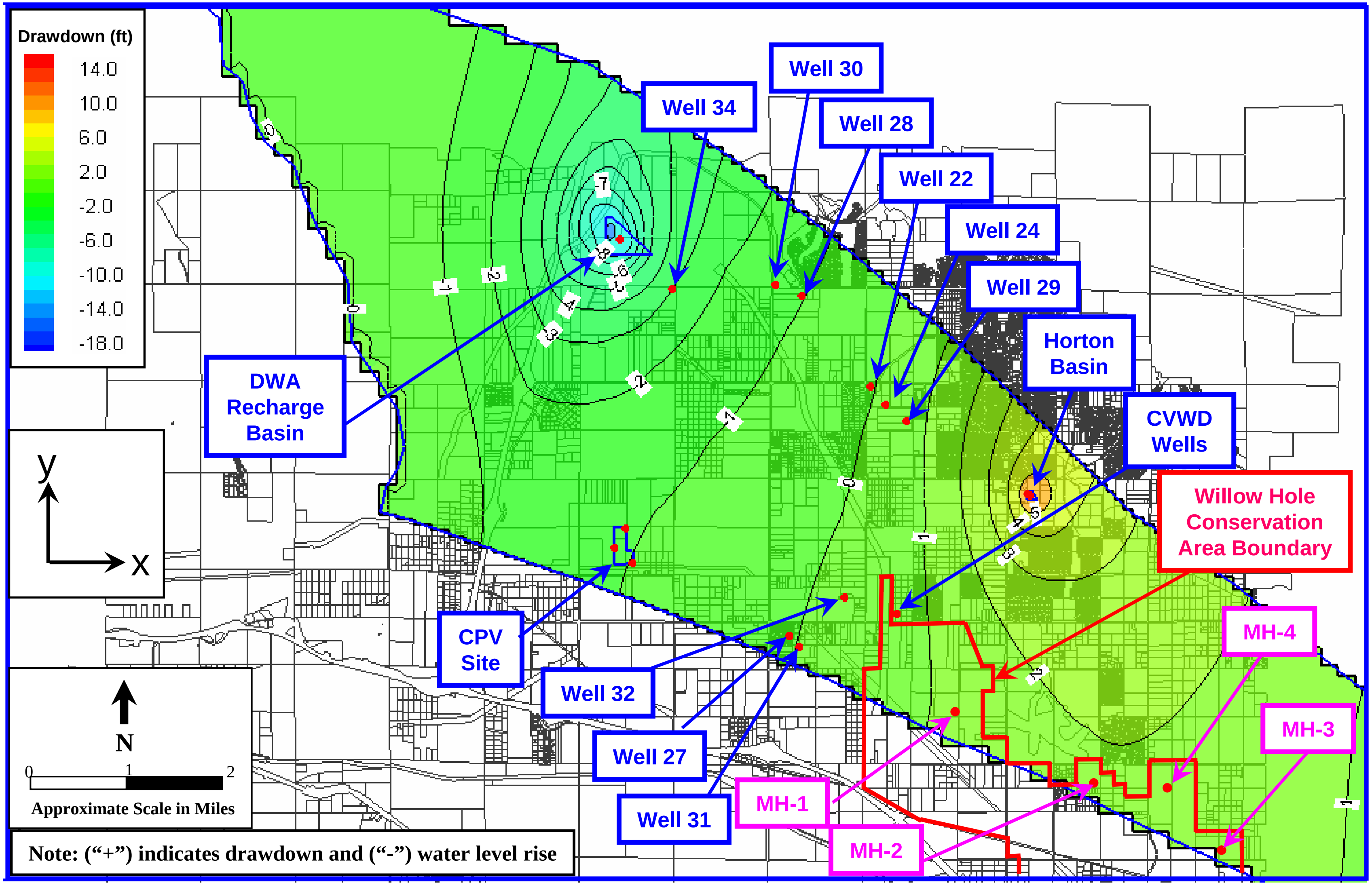


Figure 1B.2b-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1B.2b

(Water consumption = 550 afy, DWA recharge=593 afy, Tyley's T, anisotropy ratio = 2.0)

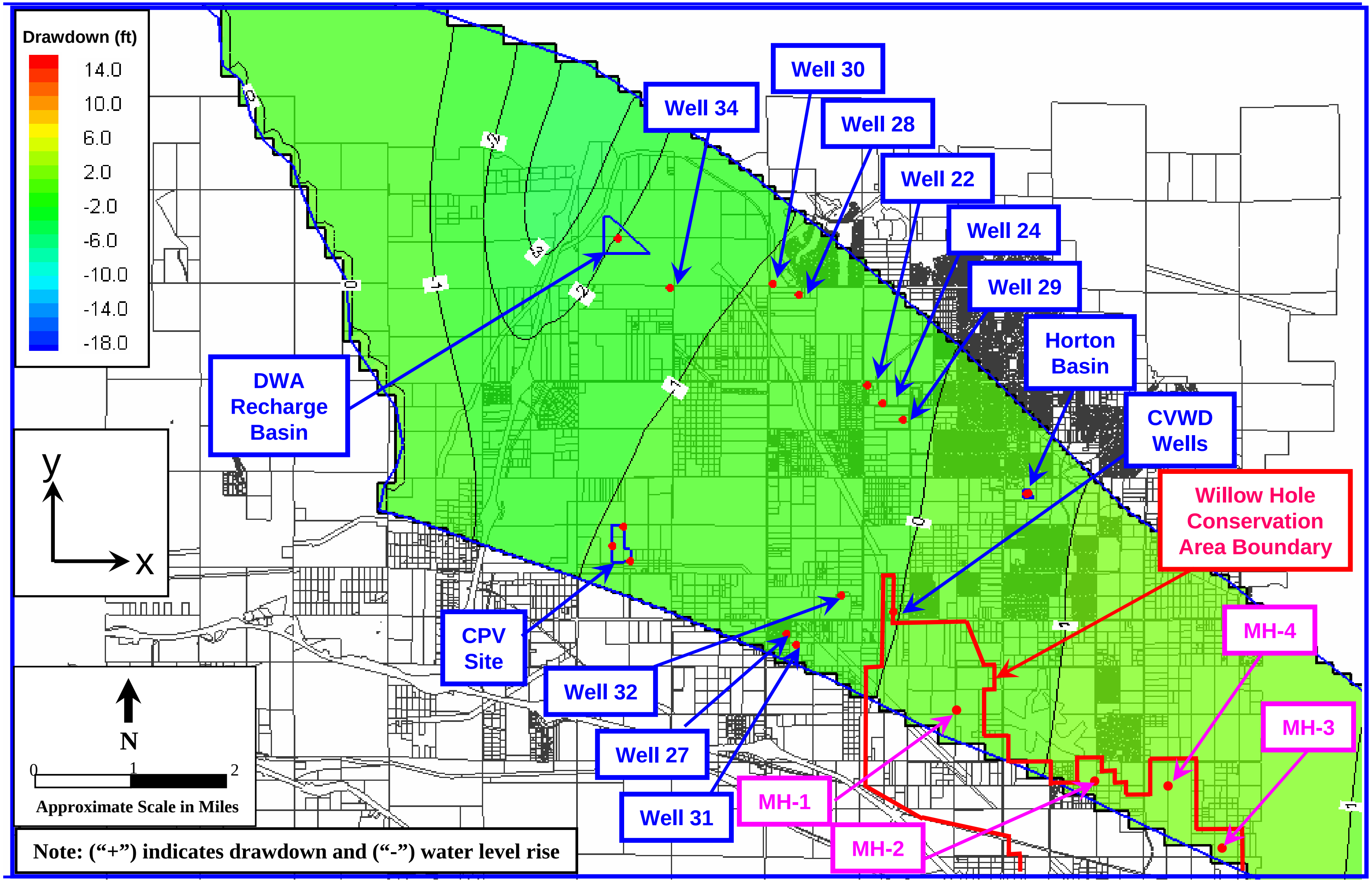
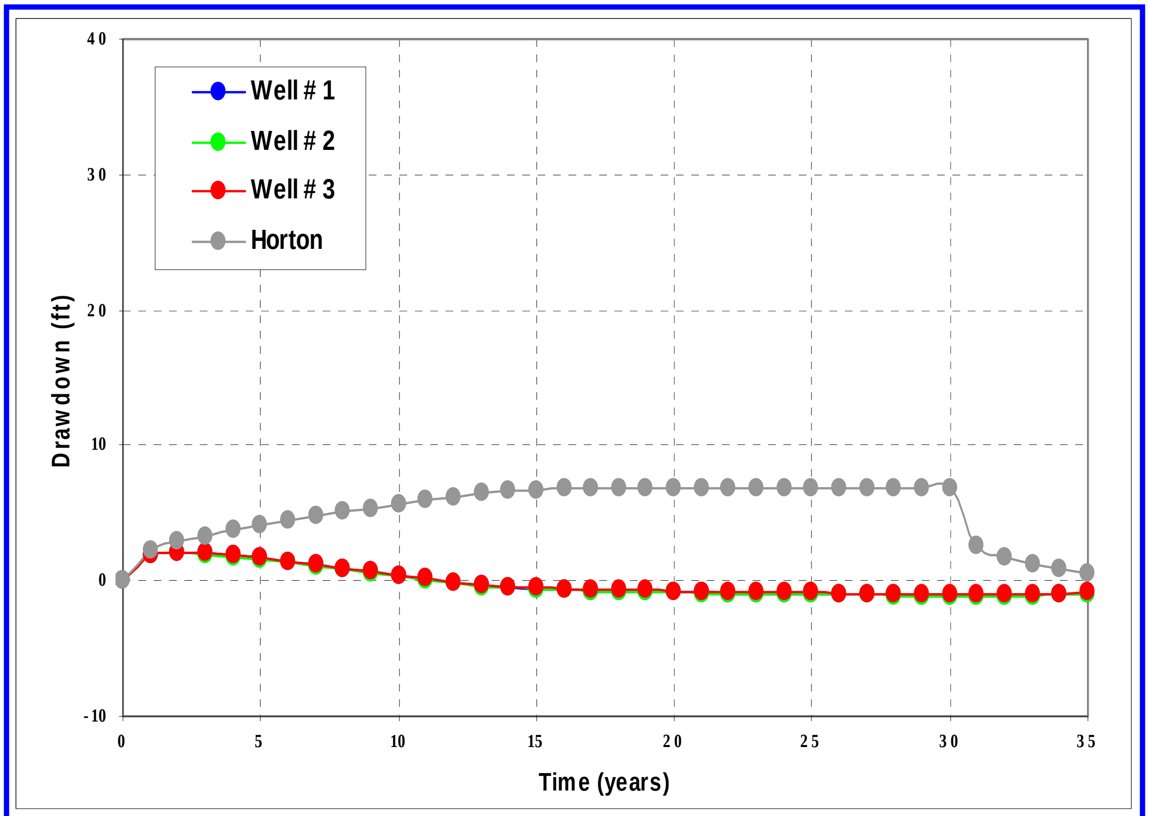


Figure 1B.2b-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1B.2b

(Water consumption = 550 afy, DWA recharge=593 afy, Tyley's T, anisotropy ratio = 2.0)



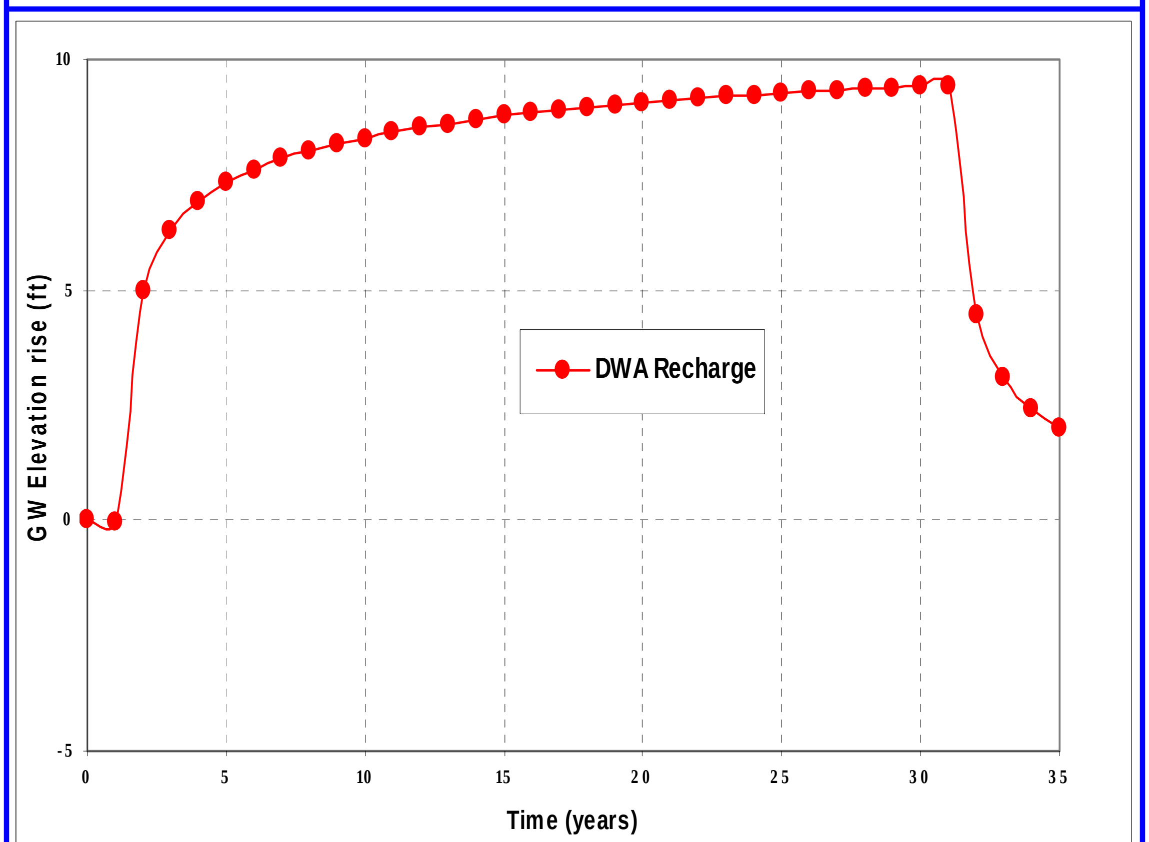


Figure 1B.2b-3: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1B.2b
(Water consumption = 550 afy from on-site wells and Horton WWTP, 593 afy recharge)

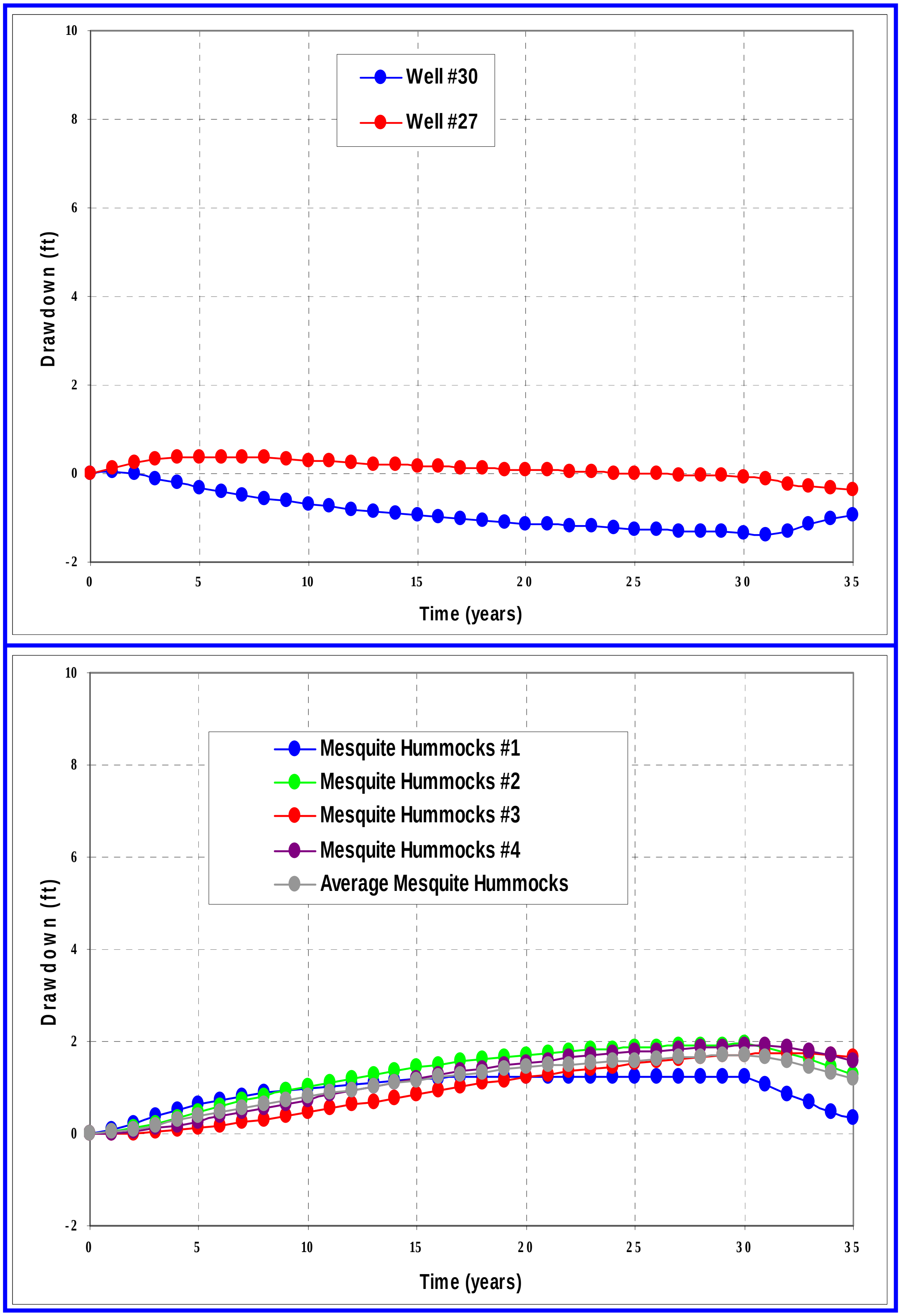


Figure 1B.2b-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1B.2b
(Water consumption = 550 afy from on-site wells and Horton WWTP, 593 afy recharge)

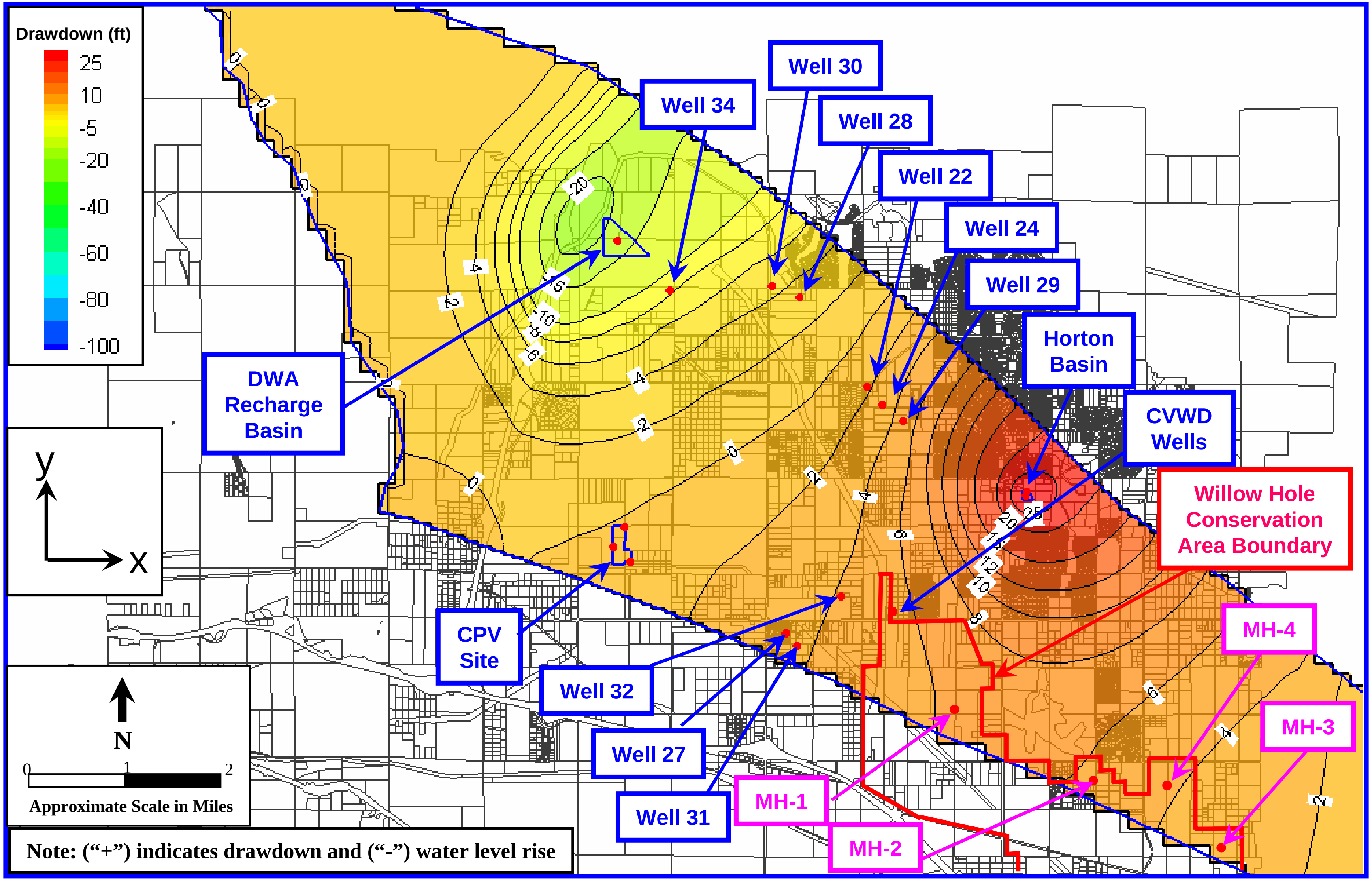


Figure 1C-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1C

(Water consumption = 1,100 afy, DWA recharge=5,500 af every 5 years, half Tyley's T, anisotropy ratio = 1.0)

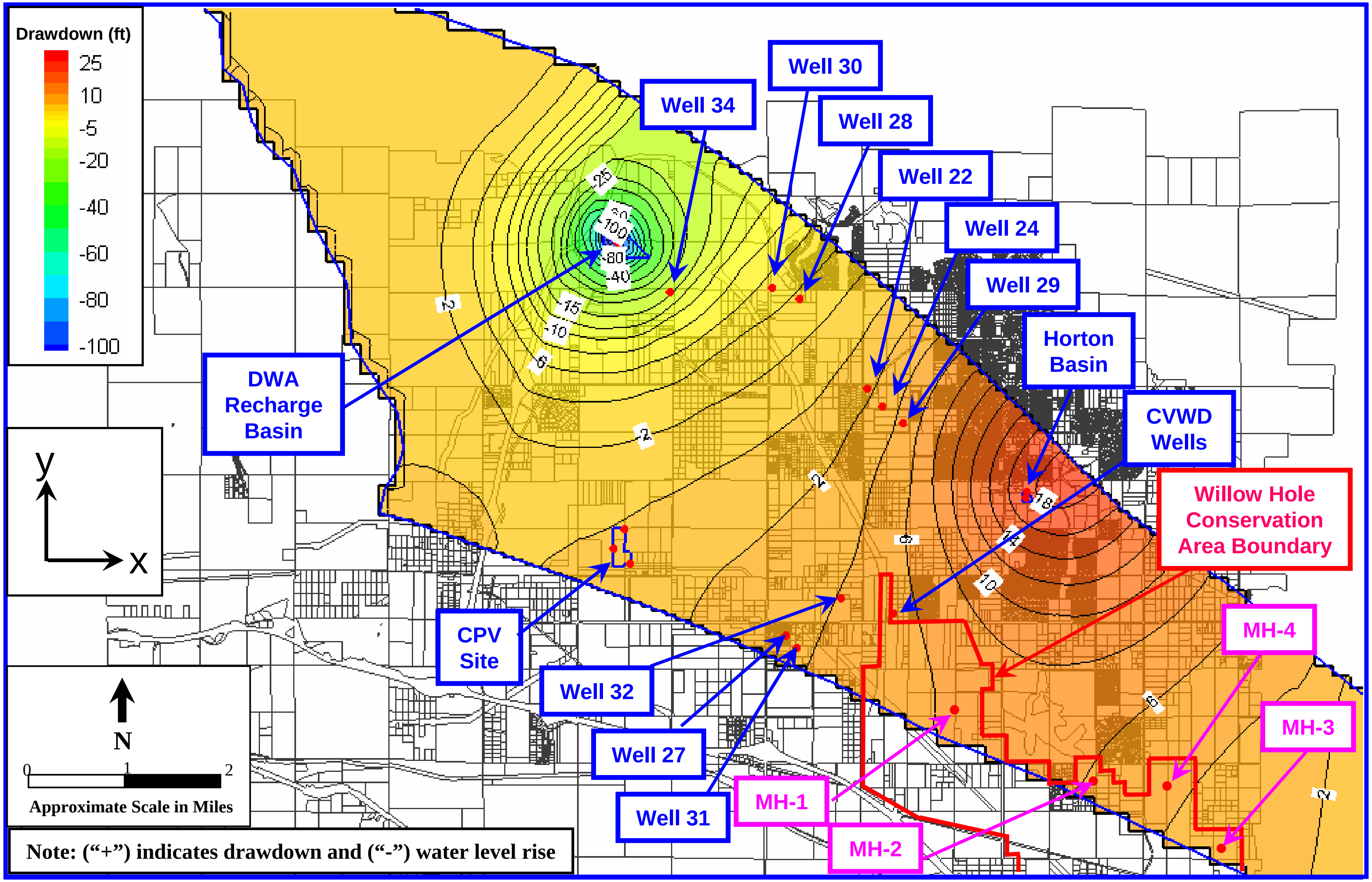


Figure 1C-2: Contour Map of Simulated Groundwater Level Changes at 31 Years – Simulation 1C

(Water consumption = 1,100 afy, DWA recharge=5,500 af every 5 years, half Tyley's T, anisotropy ratio = 1.0)

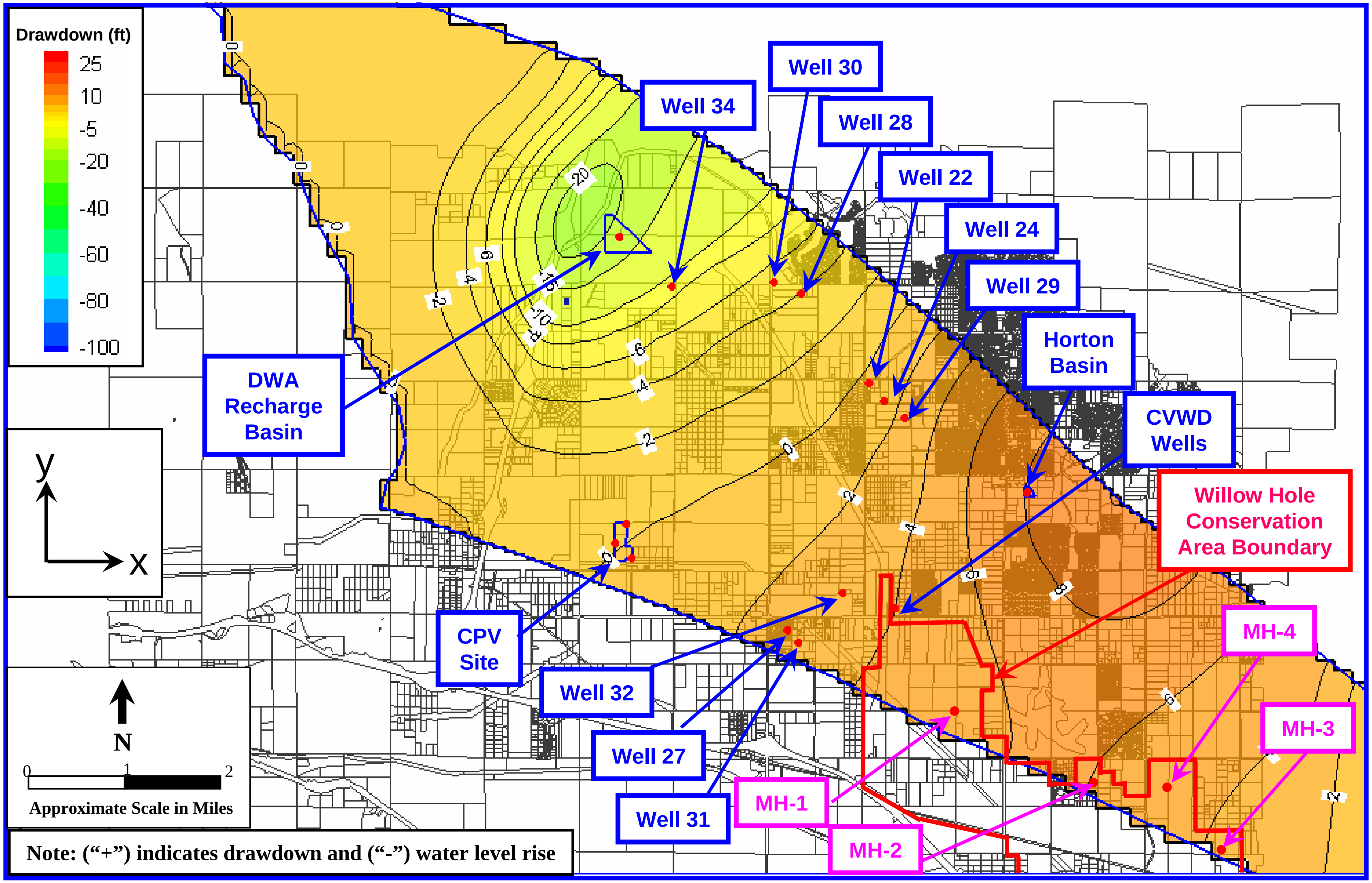


Figure 1C-3: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1C

(Water consumption = 1,100 afy, DWA recharge=5,500 af every 5 years, half Tyley's T, anisotropy ratio = 1.0)

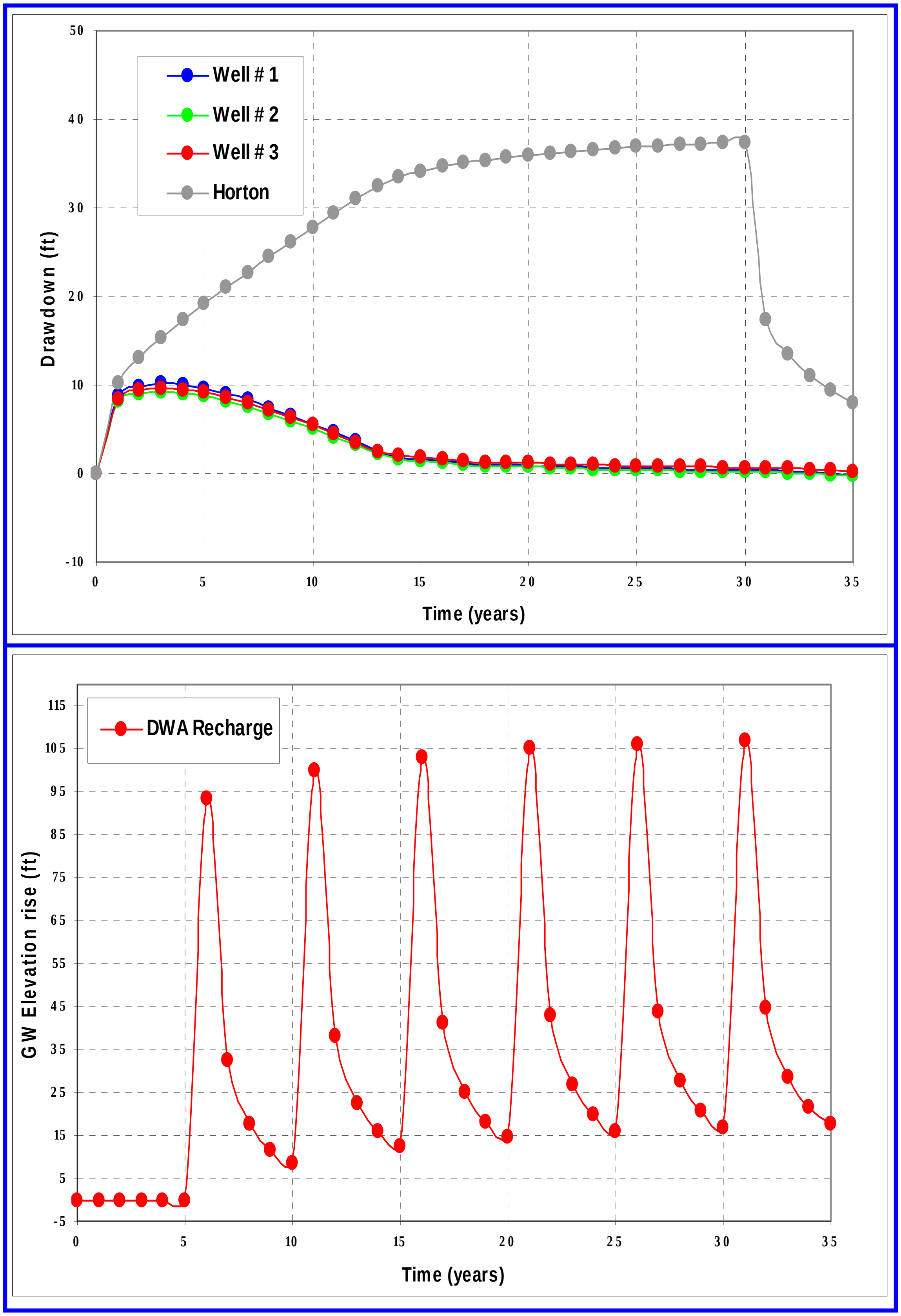


Figure 1C-4: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1C
(Water consumption = 1,100 afy from on-site wells and Horton WWTP, 5,500 af recharge every 5 yrs)

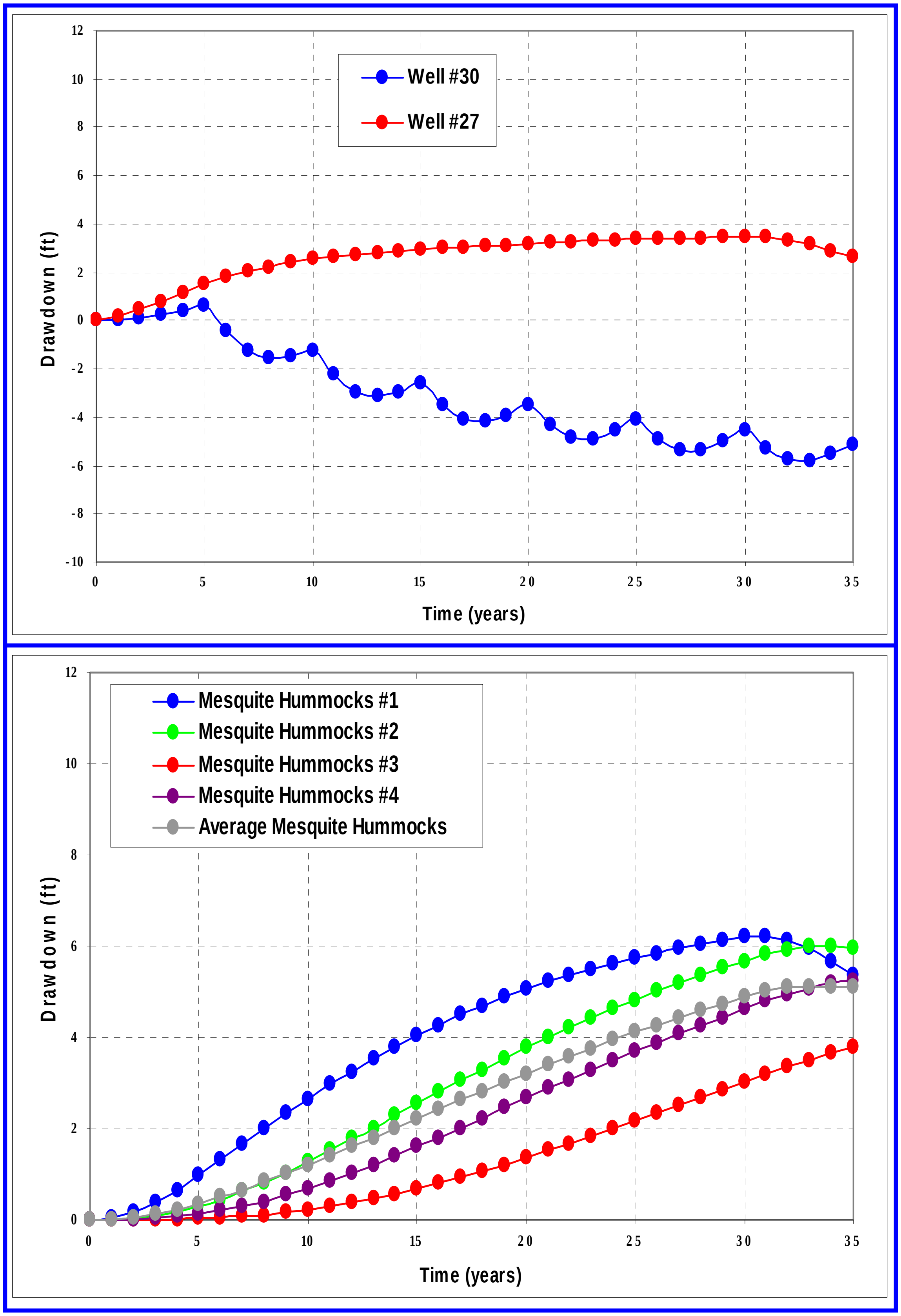


Figure 1C-5: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1C
(Water consumption = 1,100 afy from on-site wells and Horton WWTP, 5,500 af recharge every 5 yrs)

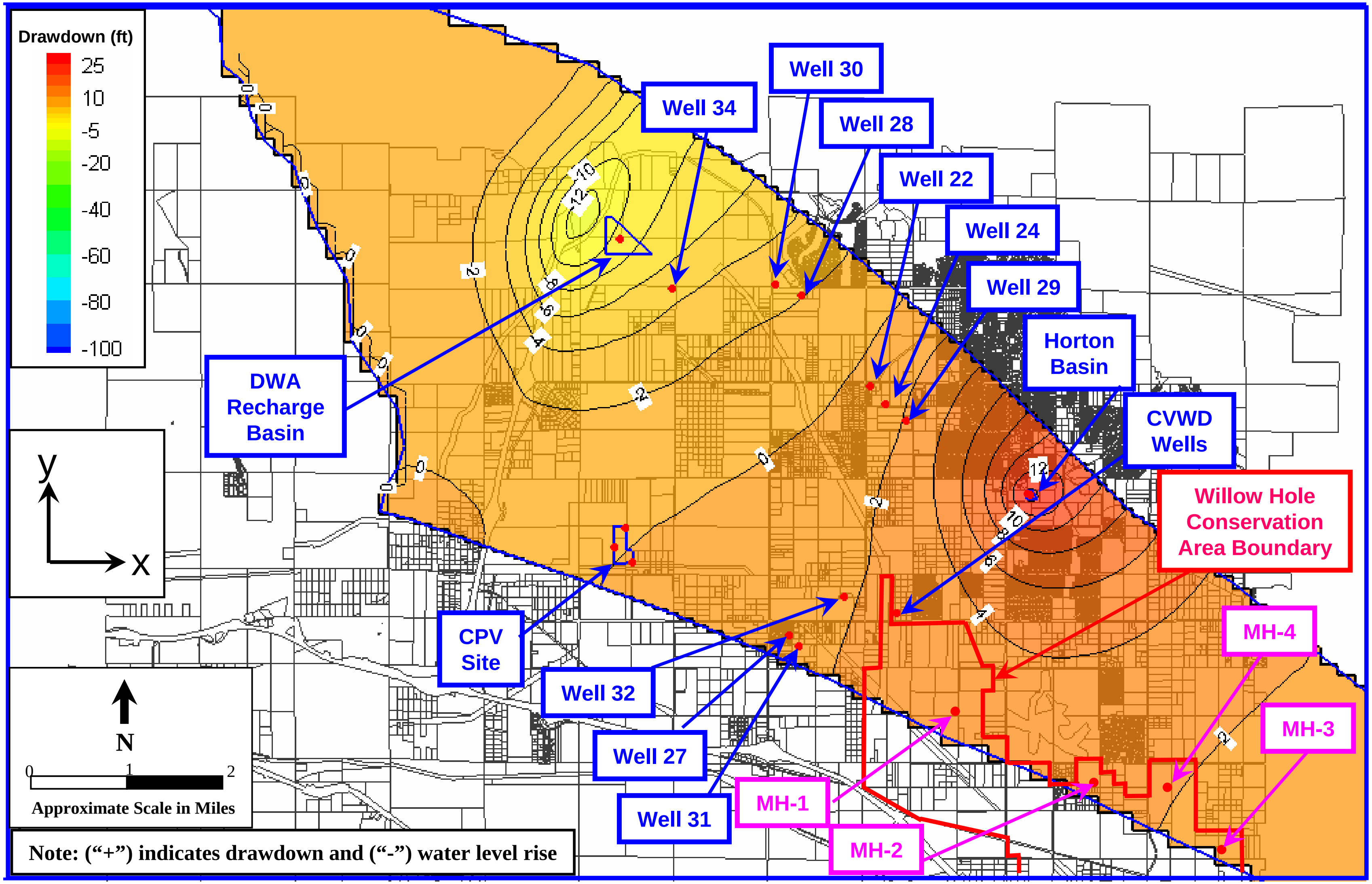


Figure 1C.b-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 1C.b

(Water consumption=550 afy, DWA recharge=2,965 af every 5 years, half Tyley's T, anisotropy ratio=1.0)

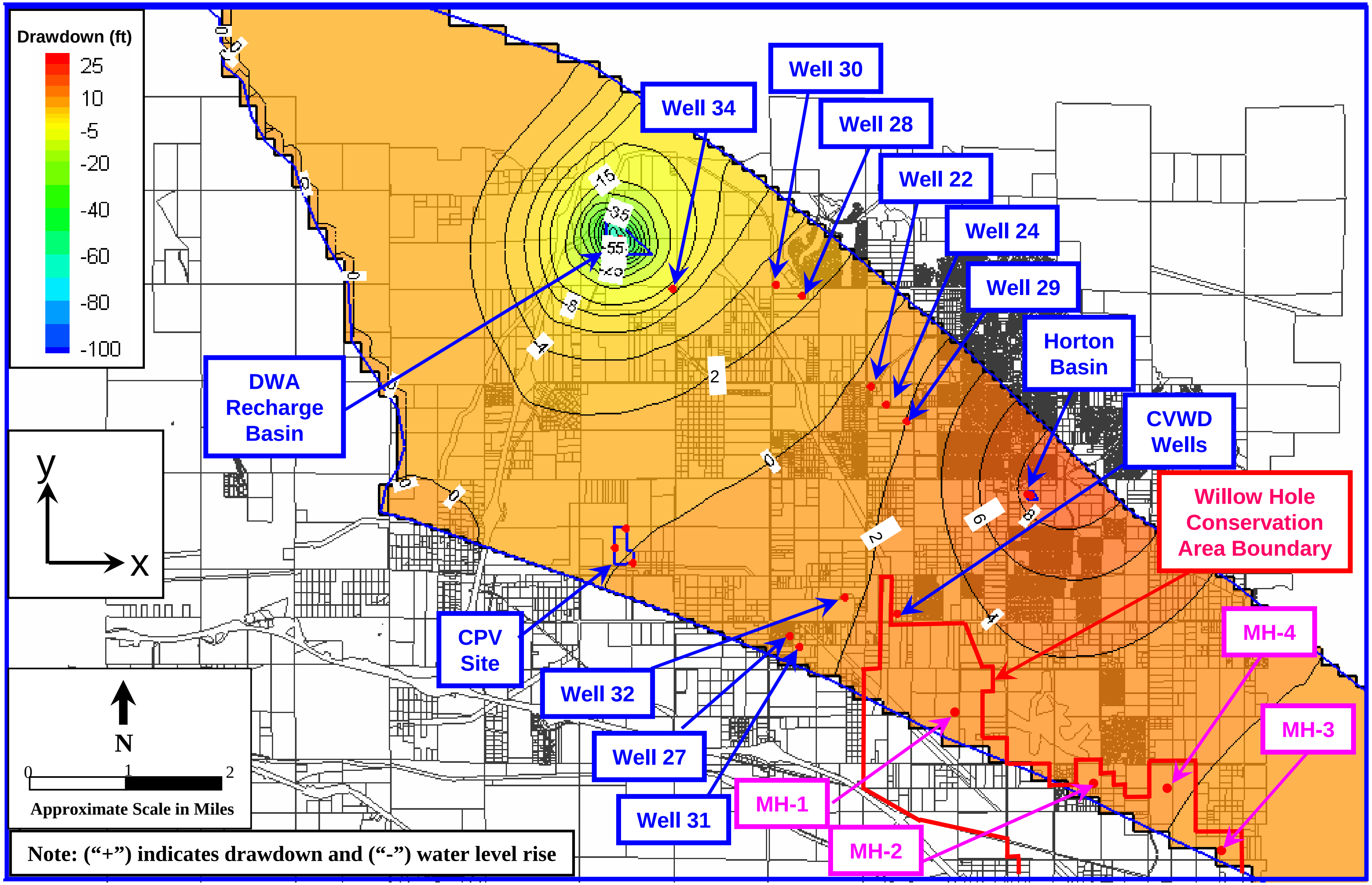


Figure 1C.b-2: Contour Map of Simulated Groundwater Level Changes at 31 Years – Simulation 1C.b

(Water consumption=550 afy, DWA recharge=2,965 af every 5 years, half Tyley's T, anisotropy ratio = 1.0)

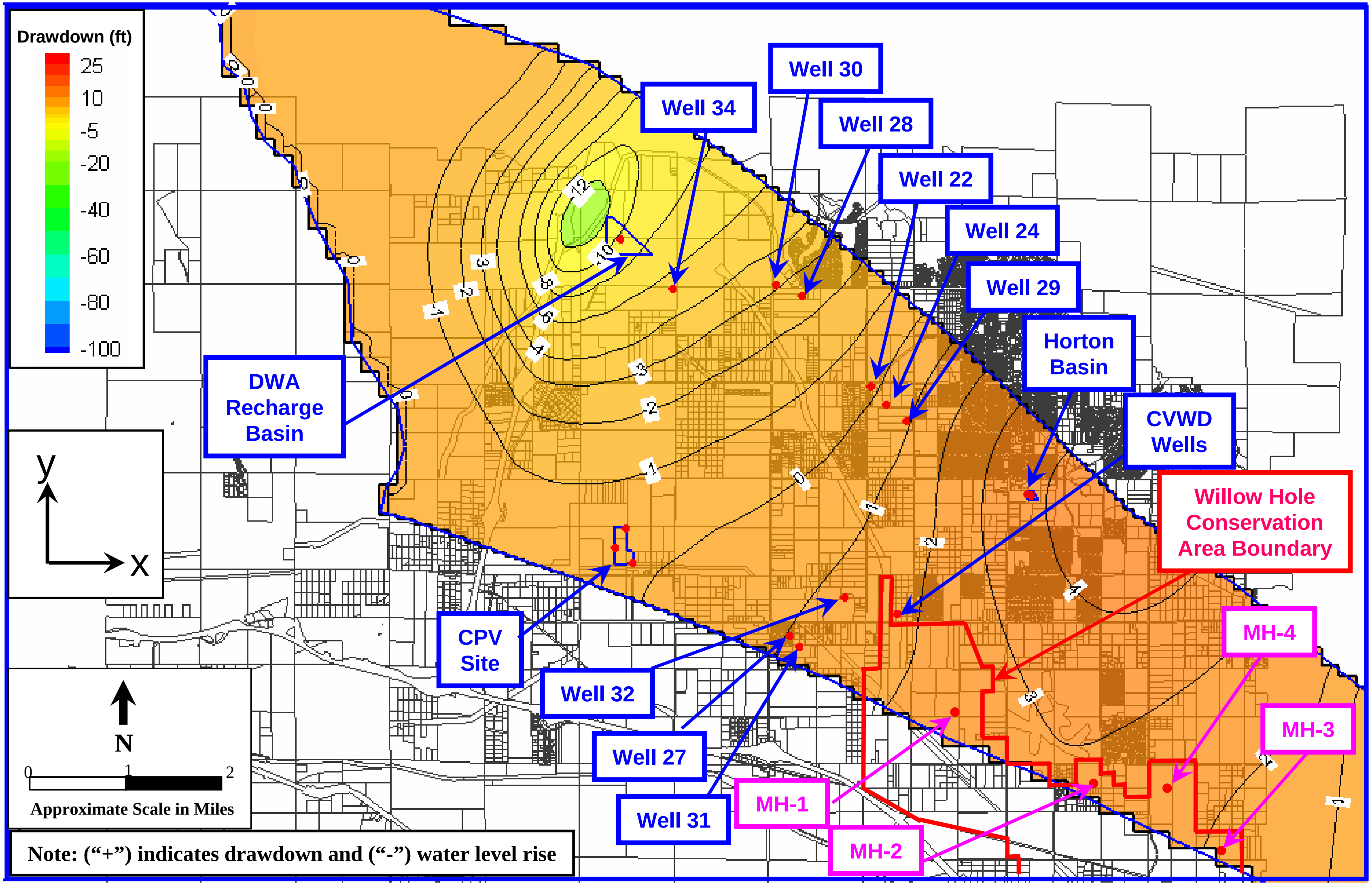


Figure 1C.b-3: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 1C.b

(Water consumption=550 afy, DWA recharge=2,965 af every 5 years, half Tyley's T, anisotropy ratio = 1.0)

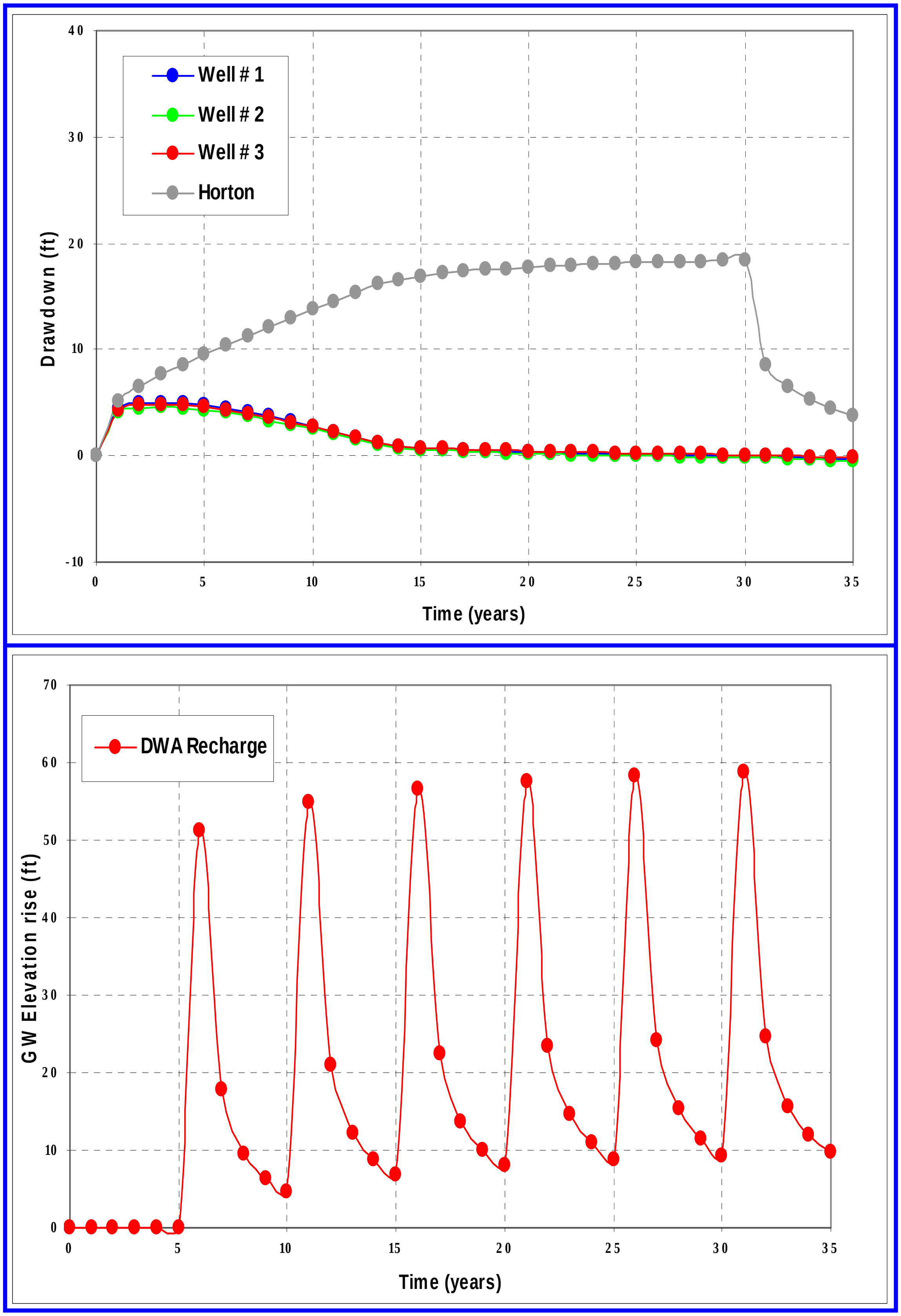


Figure 1C.b-4: Simulated Groundwater Level Change versus Time at Project Pumping Wells, Horton WWTP, and DWA Recharge Basin - Scenario 1C.b
(Water consumption = 550 afy from on-site wells and Horton WWTP, 2,965 af recharge every 5 yrs)

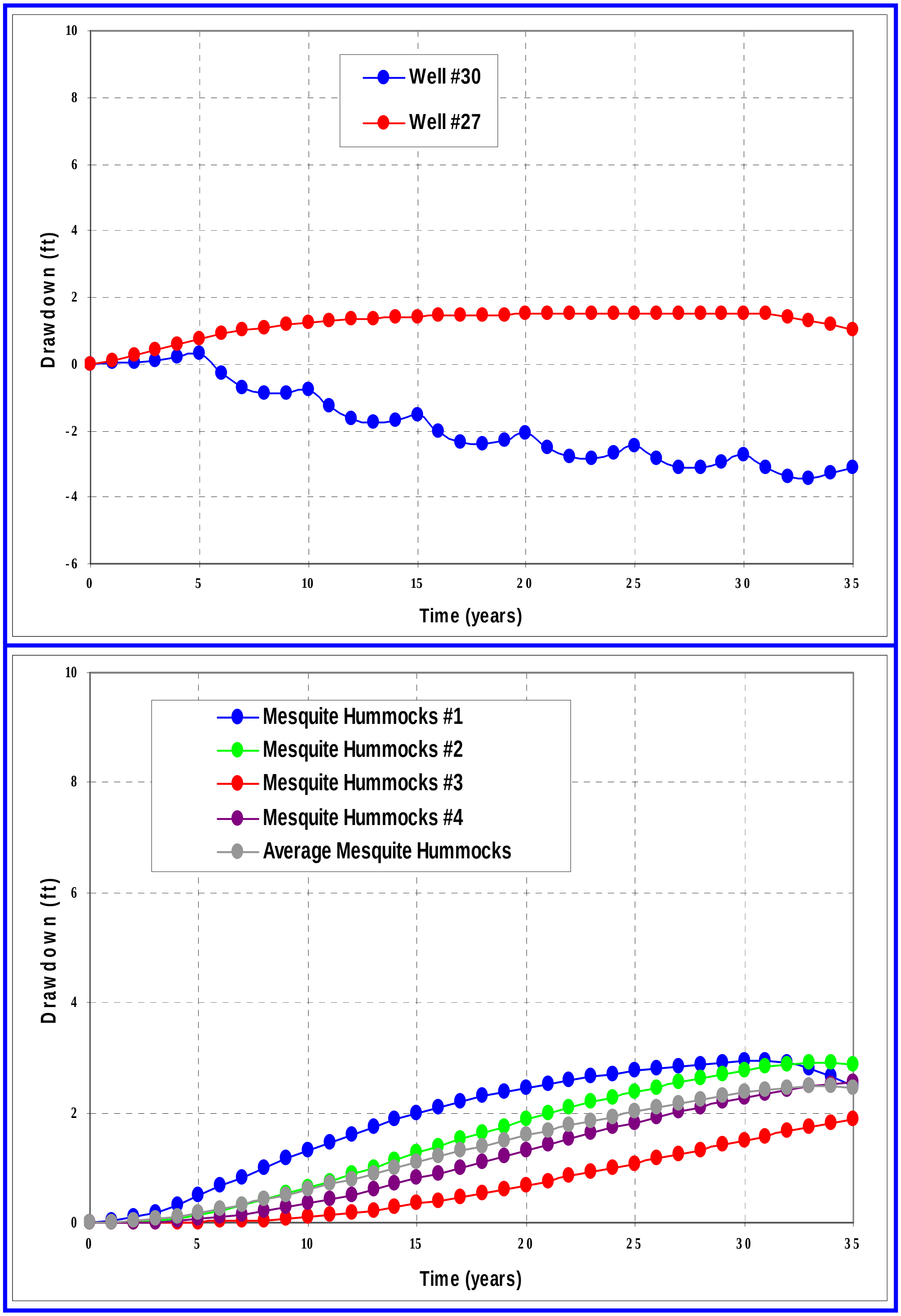


Figure 1C.b-5: Simulated Groundwater Level Change versus Time at MSWD Wells 27 and 30 and Mesquite Hummocks Area - Scenario 1C.b
(Water consumption = 550 afy from on-site wells and Horton WWTP, 2,965 af recharge every 5 yrs)

TABLE 2-1
ADDITIONAL ALTERNATIVES ANALYSIS MODEL SIMULATIONS - ALTERNATIVE 2
CPV Sentinel Energy Project
Riverside County, California

Note: Alternative 2 water source = MSWD wells 28 & 30 and Horton WWTP

Model Parameter	Model Simulation								
	2A	**2A.b**	**2A.c**	**2B.1**	**2B.1b**	**2B.2**	**2B.2b**	**2C**	**2C.b**
Water source	MSWD 28 & 30 and Horton WWTP	MSWD 28 & 30 and Horton WWTP	MSWD 28 & 30 and Horton WWTP	MSWD 28 & 30 and Horton WWTP	MSWD 28 & 30 and Horton WWTP	MSWD 28 & 30 and Horton WWTP	MSWD 28 & 30 and Horton WWTP	MSWD 28 & 30 and Horton WWTP	MSWD 28 & 30 and Horton WWTP
Water consumption	1,100 AFY	550 AFY	550 AFY	1,100 AFY	550 AFY	1,100 AFY	550 AFY	1,100 AFY	550 AFY
On-site wells									
Pumping rate	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3
Pumping schedule	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3
Pumping duration	13 years	13 years	13 years	13 years	13 years	13 years	13 years	13 years	13 years
Horton contribution									
Rate (neg. recharge)	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3
Schedule	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3	see Table 2-3
Duration	30 years	30 years	30 years	30 years	30 years	30 years	30 years	30 years	30 years
Recharge (yes/no)	no	no	no	yes	yes	yes	yes	yes	yes
Location	--	--	--	DWA	DWA	DWA	DWA	DWA	DWA
Rate	--	--	--	1,100 AFY	593 AFY	1,100 AFY	593 AFY	5,500	2,965 AF
Timing	--	--	--	1 year lag	1 year lag	1 year lag	1 year lag	every 5 years	every 5 years
Anisotropy ratio	1 (isotropic)	1 (isotropic)	2 (anisotropic)	1 (isotropic)	1 (isotropic)	2 (anisotropic)	2 (anisotropic)	1 (isotropic)	1 (isotropic)
Transmissivity	1/2 Tyley	1/2 Tyley	Tyley	1/2 Tyley	1/2 Tyley	Tyley	Tyley	1/2 Tyley	1/2 Tyley
Model sim time	35 years	35 years	35 years	35 years	35 years	35 years	35 years	35 years	35 years
Notes	Compare results to figures from 1A runs and Fig. 20 (30 yrs) and Fig. 21 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to runs 2A and 1A.b and Fig. 20 (30 yrs) and Fig. 21 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to scenario 2A.b.	Compare results to figures from 1B.1 runs and Fig. 20 (30 yrs) and Fig. 21 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to runs 2B.1 and 1B.1b and Fig. 20 (30 yrs) and Fig. 21 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to simulation 1B.2.	Compare results to 2B.2 and 1B.2b.	Compare results to figures from 1C runs and Fig. 27 (31 yrs) and Fig. 28 (35 yrs) in July 9, 2008, CEC submittal.	Compare results to runs 2C and 1C.b and Fig. 27 (31 yrs) and Fig. 28 (35 yrs) in July 9, 2008, CEC submittal.

TABLE 2-2
SUMMARY OF SIMULATION RESULTS - ALTERNATIVE 2
CPV Sentinel Energy Project
Riverside County, California

Location	Scenario [1]								
	2A	2A.b	2A.c	2B.1	2B.1b	2B.2	2B.2b	2C	2C.b
Project Wells [2]									
maximum drawdown (ft)	8.8	4.4	4.2	0.5	0.2	0.2	0.1	1.1	0.5
time to maximum drawdown (year)	35	35	35	10	9	3	2	11	11
drawdown at 35 years (ft)	8.8	4.4	4.2	-0.2	-0.4	-1.0	-0.9	0.2	-0.2
Horton WWTP									
maximum drawdown (ft)	41.7	20.6	10.4	36.6	18.0	14.2	6.8	37.2	18.3
time to maximum drawdown (year)	30	30	30	30	30	30	30	30	30
drawdown at 35 years (ft)	13.7	6.8	4.8	7.5	3.5	1.9	0.6	8.0	3.8
DWA Recharge Basin									
maximum water level rise (ft)	0	0	0	44.4	24.4	16.8	9.4	106.5	58.6
time to maximum water level rise (year)	-	-	-	31	31	31	31	31 (5-yr cycle)	31 (5-yr cycle)
water level rise at 35 years (ft)	-6.6	-3.3	-3.9	13.4	7.6	3.1	2.0	17.2	9.6
Wells 27 and 31 [3]									
maximum drawdown (ft)	10.2	5.1	4.6	2.9	1.2	0.8	0.3	3.5	1.5
time to maximum drawdown (year)	35	35	32	30	27	8	6	30	26
drawdown at 35 years (ft)	10.2	5.1	4.5	2.2	0.8	0	-0.4	2.6	1.0
Wells 28 and 30 (pumping) [4]									
maximum drawdown (ft)	8.8	4.4	4.4	6.6	3.3	2.7	1.3	6.9	3.4
time to maximum drawdown (year)	35	35	34	2	2	2	2	3	3
drawdown at 35 years (ft)	8.8	4.4	4.4	-3.5	-2.3	-0.9	-0.8	-3.9	-2.4
Well 22									
maximum drawdown (ft)	10.2	5.1	4.6	1.7	0.8	1.0	0.5	2.4	1.2
time to maximum drawdown (year)	33	33	31	8	8	6	5	10	10
drawdown at 35 years (ft)	10.1	5.1	4.5	0.2	-0.3	-0.1	-0.4	0.4	-0.2
Well 24									
maximum drawdown (ft)	10.8	5.4	4.7	2.4	1.1	1.3	0.6	3.1	1.4
time to maximum drawdown (year)	32	32	31	19	12	8	6	16	11
drawdown at 35 years (ft)	10.5	5.2	4.5	1.0	0.1	0	-0.3	1.3	0.3
Well 29									
maximum drawdown (ft)	11.9	6.0	5.0	4.2	1.9	1.8	0.8	4.9	2.2
time to maximum drawdown (year)	31	31	30	30	21	16	10	30	21
drawdown at 35 years (ft)	11.0	5.5	4.6	2.1	0.7	0.3	-0.2	2.4	0.9
Well 32									
maximum drawdown (ft)	10.5	5.2	4.7	3.5	1.5	1.1	0.5	4.1	1.8
time to maximum drawdown (year)	33	33	31	30	30	12	8	30	30
drawdown at 35 years (ft)	10.4	5.2	4.5	2.6	1.0	0.2	-0.2	3.0	1.2

TABLE 2-2
SUMMARY OF SIMULATION RESULTS - ALTERNATIVE 2
CPV Sentinel Energy Project
Riverside County, California

Location	Scenario [1]								
	2A	**2A.b**	**2A.c**	**2B.1**	**2B.1b**	**2B.2**	**2B.2b**	**2C**	**2C.b**
CVWD Wells									
maximum drawdown (ft)	10.9	5.5	4.8	4.7	2.1	1.9	0.8	5.3	2.4
time to maximum drawdown (year)	32	32	31	30	30	30	14	30	30
drawdown at 35 years (ft)	10.8	5.4	4.6	3.5	1.5	0.6	0	4.0	1.7
Hummock Observation 1									
maximum drawdown (ft)	10.8	5.4	5.0	5.7	2.7	3.0	1.3	6.2	2.9
time to maximum drawdown (year)	33	33	31	31	30	30	21	31	30
drawdown at 35 years (ft)	10.8	5.4	4.7	4.9	2.2	1.3	0.3	5.3	2.5
Hummock Observation 2									
maximum drawdown (ft)	8.6	4.3	4.7	5.6	2.7	4.3	1.9	5.9	2.9
time to maximum drawdown (year)	35	35	32	34	33	30	30	34	33
drawdown at 35 years (ft)	8.6	4.3	4.5	5.6	2.7	3.0	1.3	5.9	2.9
Hummock Observation 3									
maximum drawdown (ft)	4.6	2.3	3.7	3.5	1.7	3.8	1.8	3.7	1.8
time to maximum drawdown (year)	35	35	35	35	35	32	32	35	35
drawdown at 35 years (ft)	4.6	2.3	3.7	3.5	1.7	3.6	1.7	3.7	1.8
Hummock Observation 4									
maximum drawdown (ft)	6.9	3.5	4.2	4.9	2.4	4.2	1.9	5.2	2.5
time to maximum drawdown (year)	35	35	34	35	35	31	30	35	35
drawdown at 35 years (ft)	6.9	3.5	4.2	4.9	2.4	3.5	1.6	5.2	2.5
Hummock Average									
maximum drawdown (ft)	7.7	3.9	4.3	4.8	2.3	3.8	1.7	5.1	2.5
time to maximum drawdown (year)	35	35	32	33	33	30	30	33	33
drawdown at 35 years (ft)	7.7	3.9	4.3	4.7	2.2	2.9	1.2	5.0	2.4

Notes:

1. Alternative 2 water source = MSWD wells 28 and 30 and Horton WWTP
   Scenario 2A: Pump = 1,100 afy, no recharge, half Tyley's T, anisotropy ratio = 1.0
   Scenario 2A.b: Pump = 550 afy, no recharge, half Tyley's T, anisotropy ratio = 1.0
   Scenario 2A.c: Pump = 550 afy, no recharge, Tyley's T, anisotropy ratio = 2.0
   Scenario 2B.1: Pump = 1,100 afy, recharge = 1,100 afy (DWA only), half Tyley's T, anisotropy ratio = 1.0
   Scenario 2B.1b: Pump = 550 afy, recharge = 593 afy (DWA only), half Tyley's T, anisotropy ratio = 1.0
   Scenario 2B.2: Pump = 1,100 afy, recharge = 1,100 afy (DWA only), Tyley's T, anisotropy ratio = 2.0
   Scenario 2B.2b: Pump = 550 afy, recharge = 593 afy (DWA only), Tyley's T, anisotropy ratio = 2.0
   Scenario 2C: Pump = 1,100 afy, recharge = 5,500 af (every 5 years, DWA only), half Tyley's T, anisotropy ratio = 1.0
   Scenario 2C.b: Pump = 550 afy, recharge = 2,965 af (every 5 years, DWA only), half Tyley's T, anisotropy ratio = 1.0
2. Data presented are maximum values of data for three project wells.
3. Model data for well 27 presented; wells 27 and 31 are adjacent to each other.
4. Data presented are maximum values of data for wells 28 and 30.

TABLE 2-3
WATER CONSUMPTION DISTRIBUTION FOR CEC WATER SUPPLY ALTERNATIVES 1 AND 2
CPV Sentinel Energy Project
Riverside County, California

Project Year	Year	From CEC		550 AFY Demand: Horton WWTP	550 AFY Demand: Alt 1 On-site wells	550 AFY Demand: Alt 2 MSWD wells 28 & 30	1,100 AFY Demand: Horton WWTP	1,100 AFY Demand: Alt 1 On-site wells	1,100 AFY Demand: Alt 2 MSWD wells 28 & 30
	2008	900	900						
	2009		981.67						
1	2010		1063.33	284	266		568	532	
2	2011		1145.00	306	244		612	488	
3	2012		1226.67	328	222		655	445	
4	2013		1308.33	349	201		699	401	
5	2014	1390	1390.00	371	179		743	357	
6	2015		1470.83	393	157		786	314	
7	2016		1551.67	414	136		829	271	
8	2017		1632.50	436	114		872	228	
9	2018		1713.33	458	92		915	185	
10	2019		1794.17	479	71		959	141	
11	2020	1875	1875.00	501	49		1002	98	
12	2021		1955.83	522	28		1045	55	
13	2022		2036.67	544	6		1088	12	
14	2023		2059	550	0		1100	0	
15	2024		2059	550	0		1100	0	
16	2025		2059	550	0		1100	0	
17	2026	2360	2059	550	0		1100	0	
18	2027		2059	550	0		1100	0	
19	2028		2059	550	0		1100	0	
20	2029		2059	550	0		1100	0	
21	2030		2059	550	0		1100	0	
22	2031		2059	550	0		1100	0	
23	2032		2059	550	0		1100	0	
24	2033		2059	550	0		1100	0	
25	2034		2059	550	0		1100	0	
26	2035		2059	550	0		1100	0	
27	2036		2059	550	0		1100	0	
28	2037		2059	550	0		1100	0	
29	2038		2059	550	0		1100	0	
30	2039		2059	550	0		1100	0	

Notes:

1. Base table supplied by Kris Helm in 8/6/08 8:59 a.m. e-mail.
2. Only focus on 550 AFY and 1,100 AFY demand columns. The CEC column was developed from AFC Table 13.
3. CEC Alternative 1: no recharge, water supply from tertiary-treated reclaimed water from MSWD, Horton WWTP, and an on-site well field. Use of groundwater from the well field will be eventually replaced (year 14) by full supply of treated water from Horton WWTP.
4. CEC Alternative 2: no recharge, water supply from tertiary-treated reclaimed water from MSWD, Horton WWTP, and MSWD wells 28 & 30. Use of groundwater from MSWD wells 28 & 30 will be eventually replaced (year 14) by full supply of treated water from Horton WWTP.

Abbreviations:

AFY = acre-feet per year
CEC = California Energy Commission
MSWD = Mission Springs Water District
WWTP = Wastewater Treatment Plant

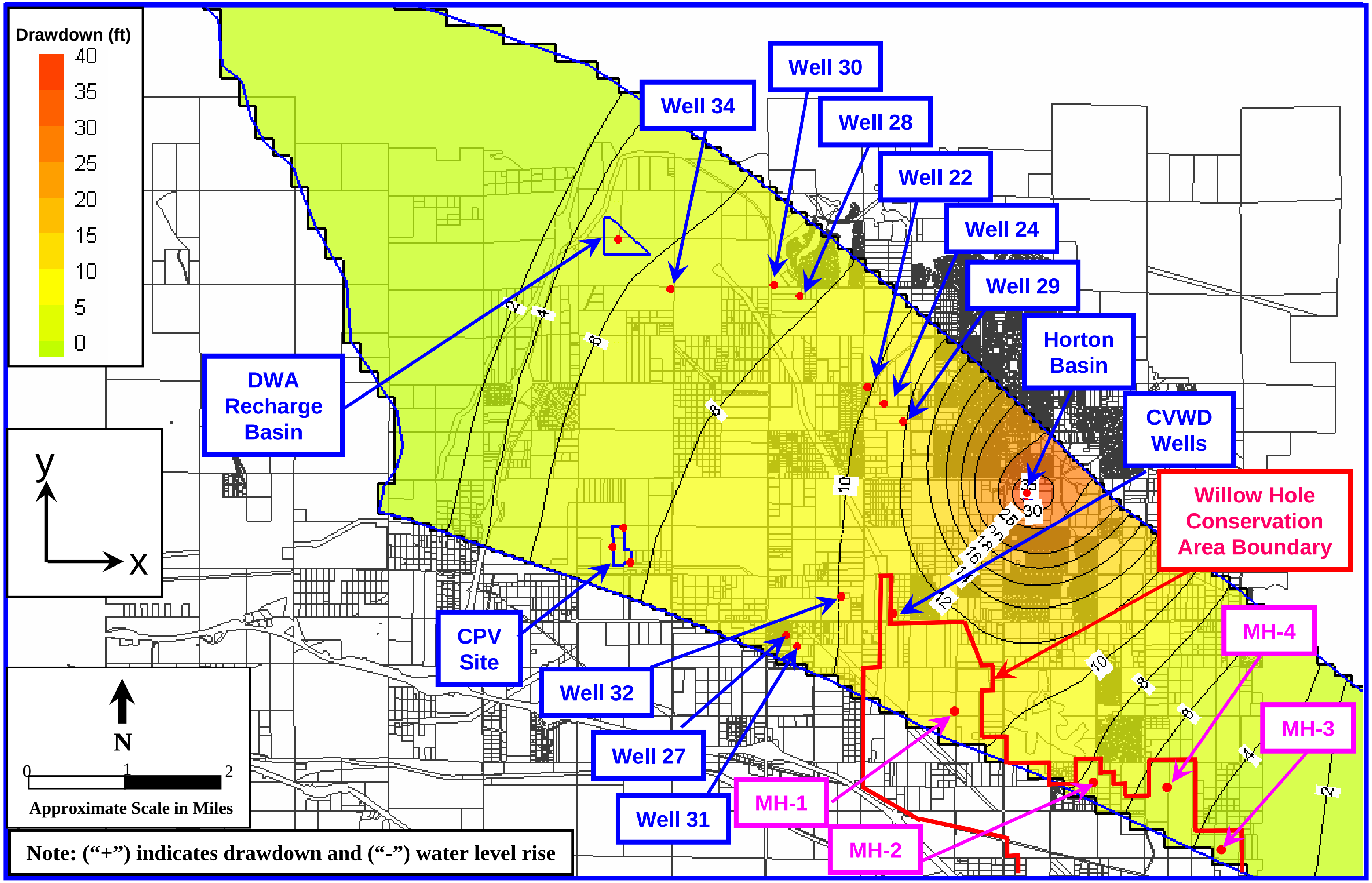


Figure 2A-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2A

(Water consumption = 1,100 afy, no DWA recharge, half Tyley's T, anisotropy ratio = 1.0)

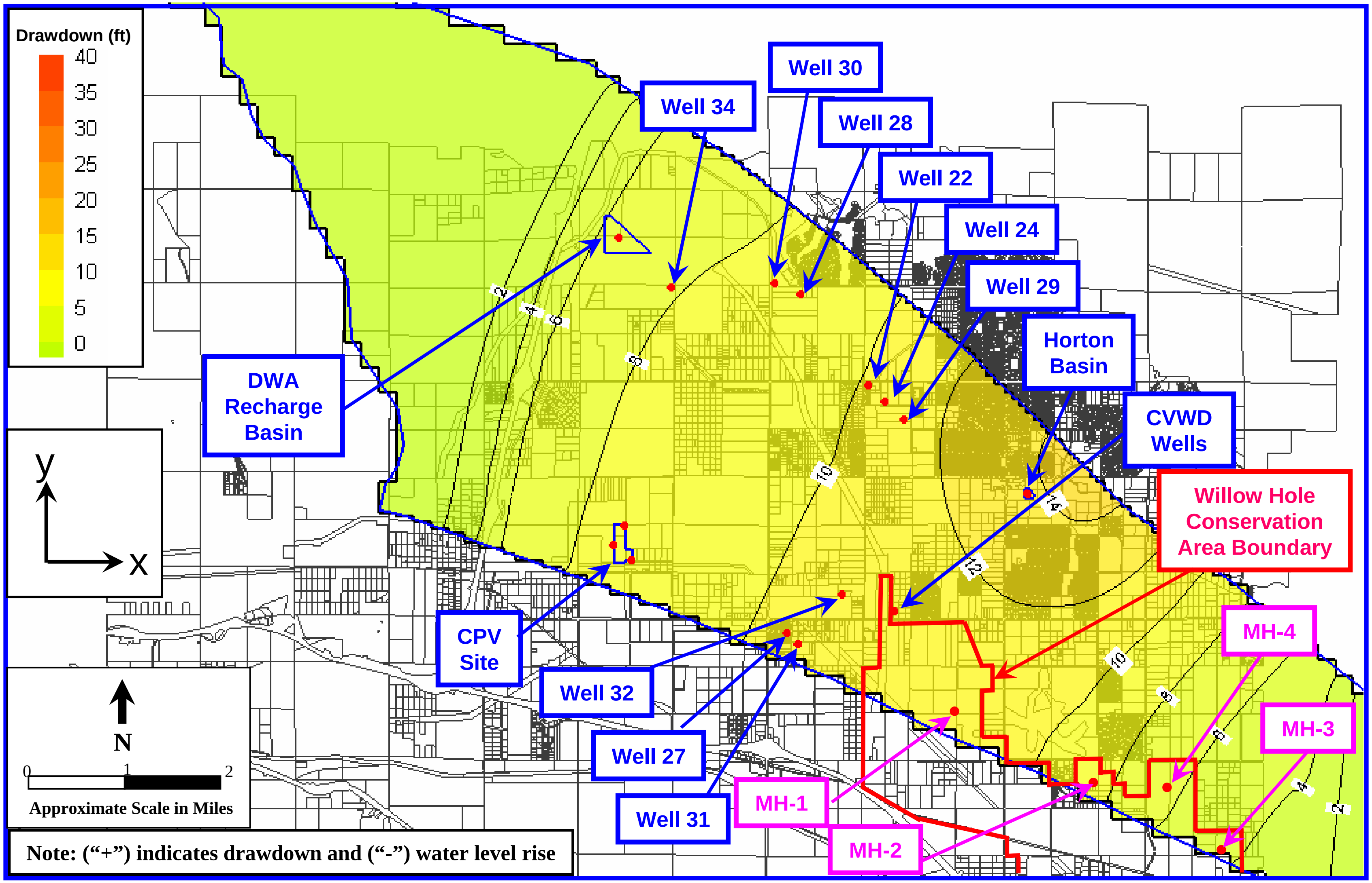


Figure 2A-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2A

(Water consumption = 1,100 afy, no DWA recharge, half Tyley's T, anisotropy ratio = 1.0)

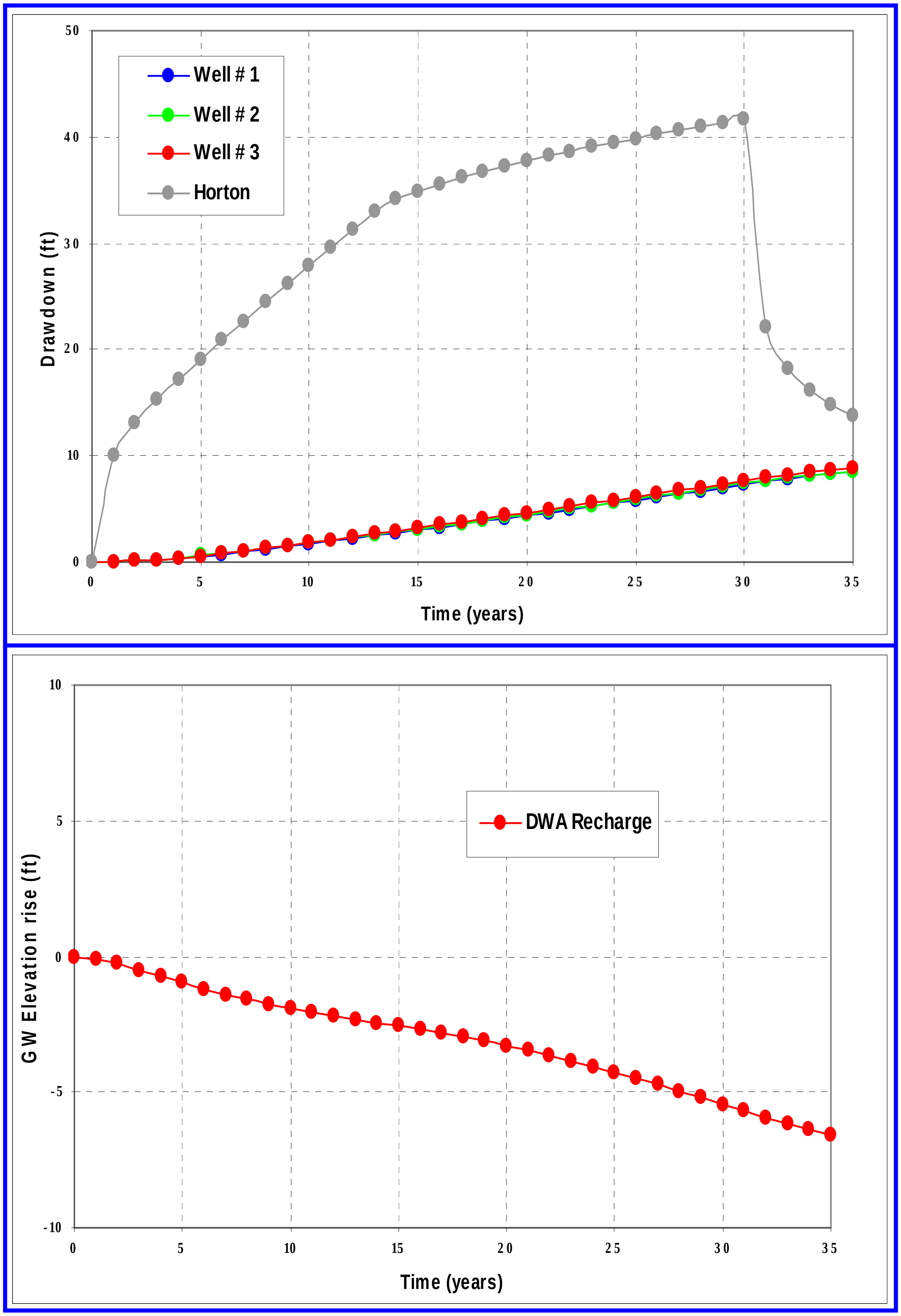


Figure 2A-3: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2A
(Water consumption = 1,100 afy from MSWD wells 28 and 30 and Horton WWTP, no recharge)

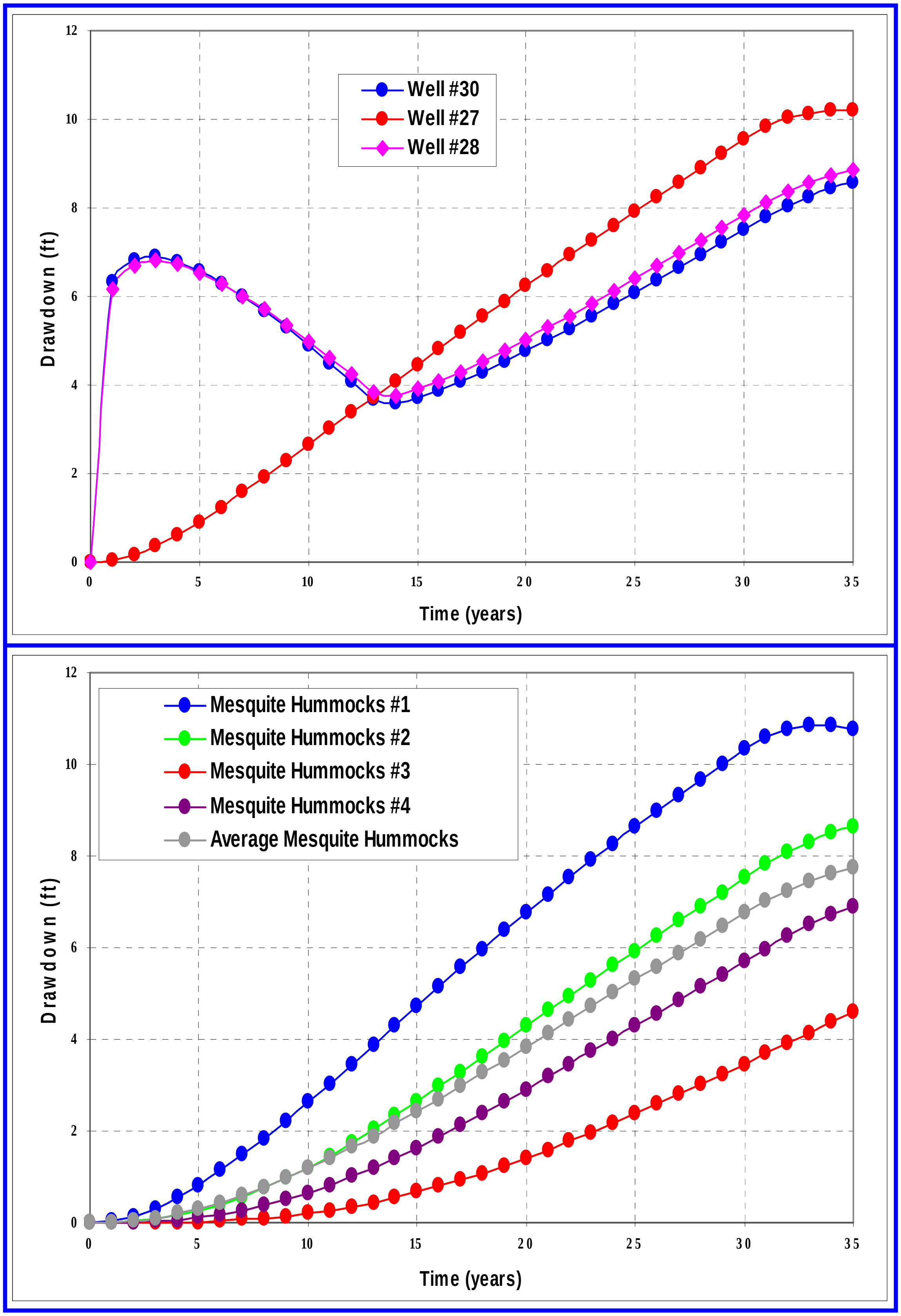


Figure 2A-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2A
(Water consumption = 1,100 afy from MSWD wells 28 and 30 and Horton WWTP, no recharge)

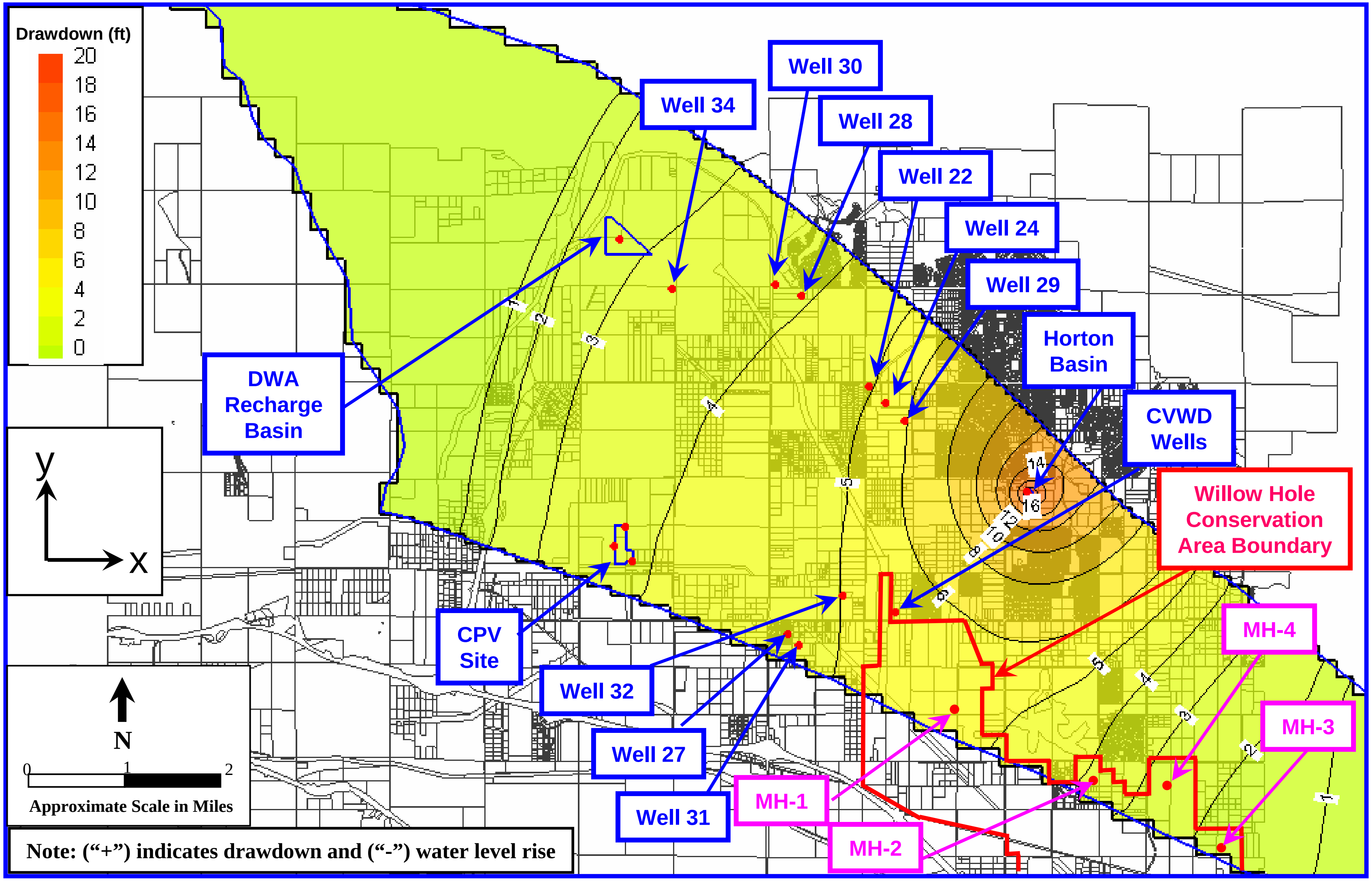


Figure 2A.b-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2A.b

(Water consumption = 550 afy, no DWA recharge, half Tyley's T, anisotropy ratio = 1.0)

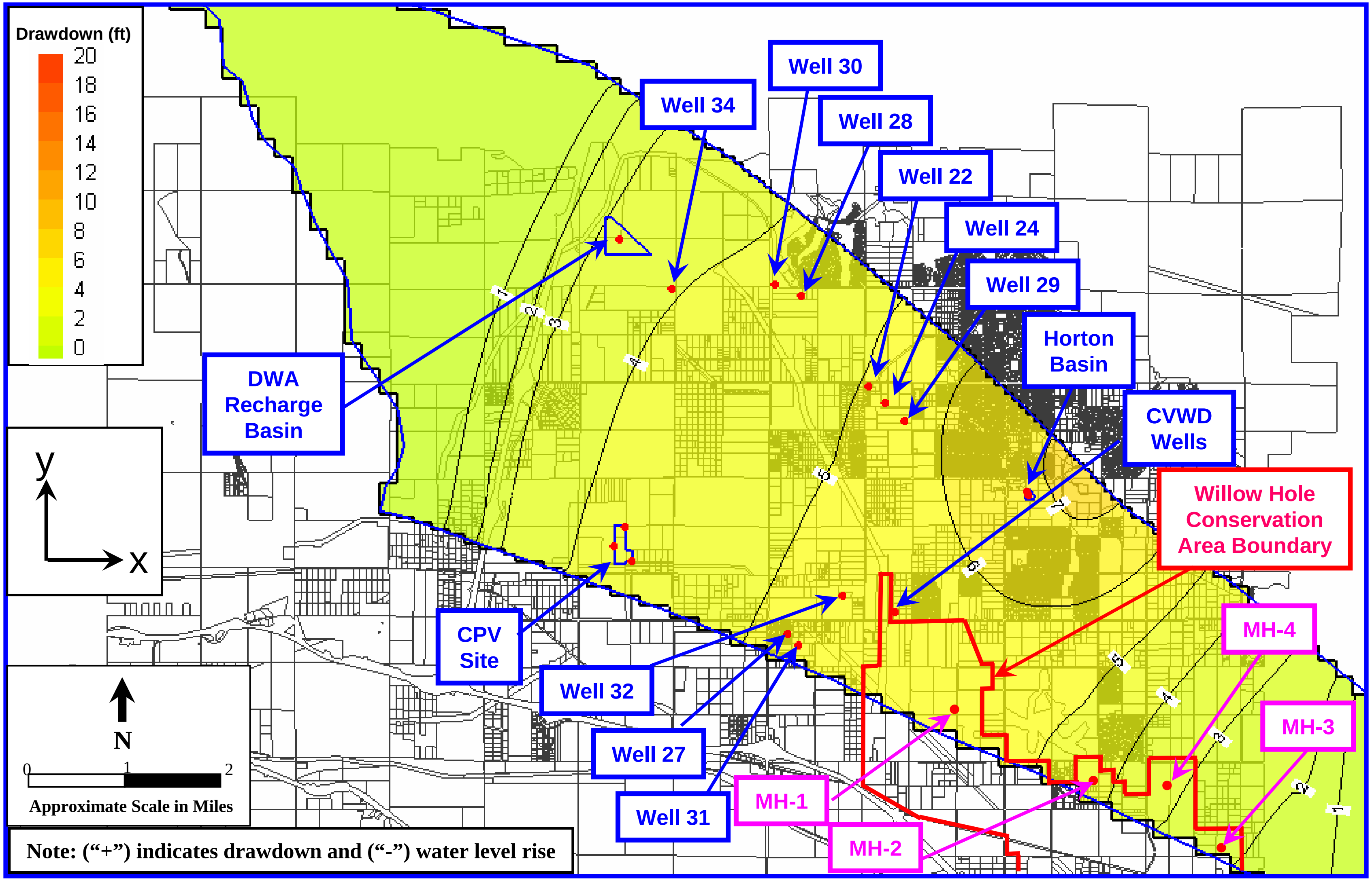


Figure 2A.b-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2A.b

(Water consumption = 550 afy, no DWA recharge, half Tyley's T, anisotropy ratio = 1.0)

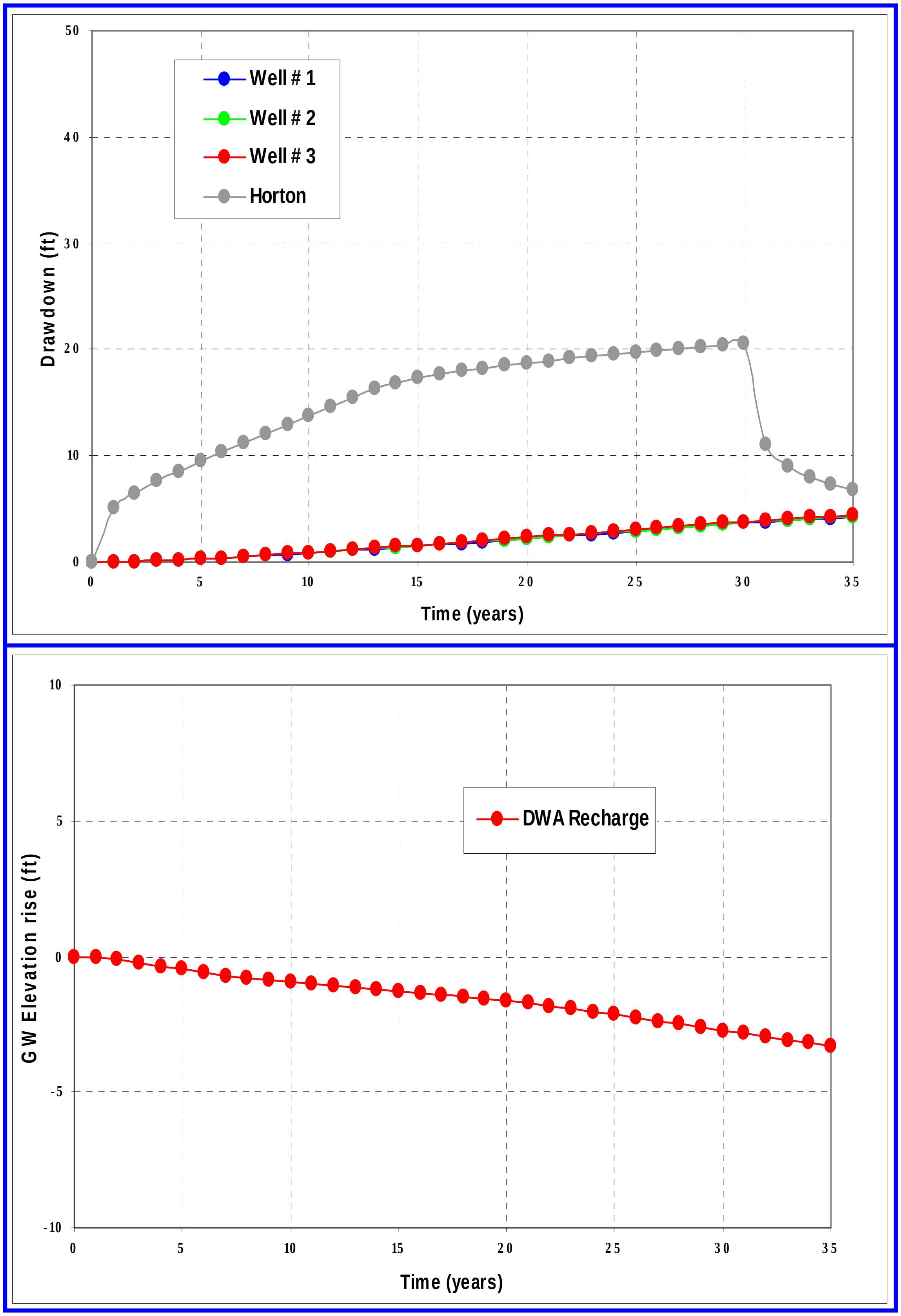


Figure 2A.b-3: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2A.b
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, no recharge)

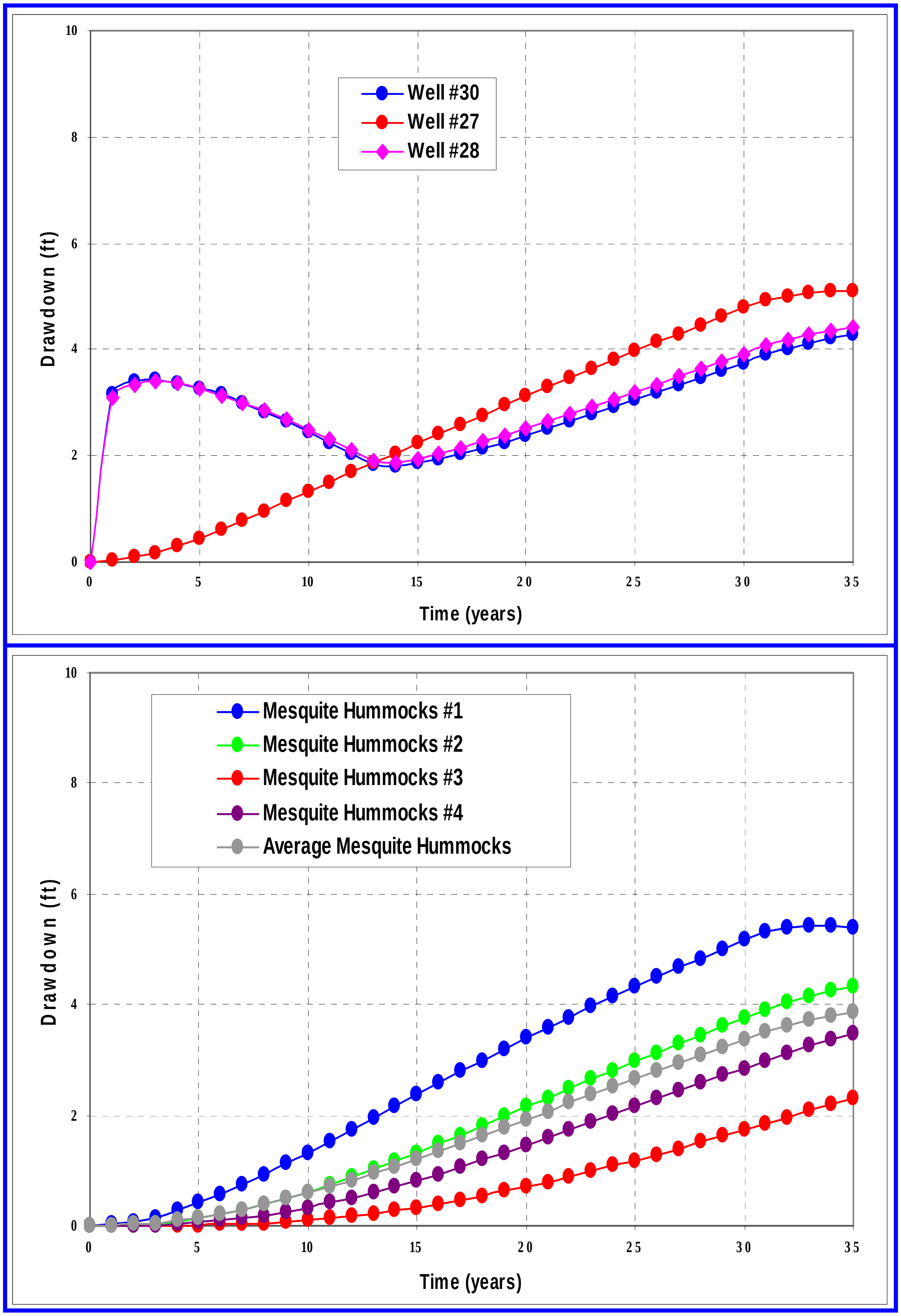


Figure 2A.b-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2A.b
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, no recharge)

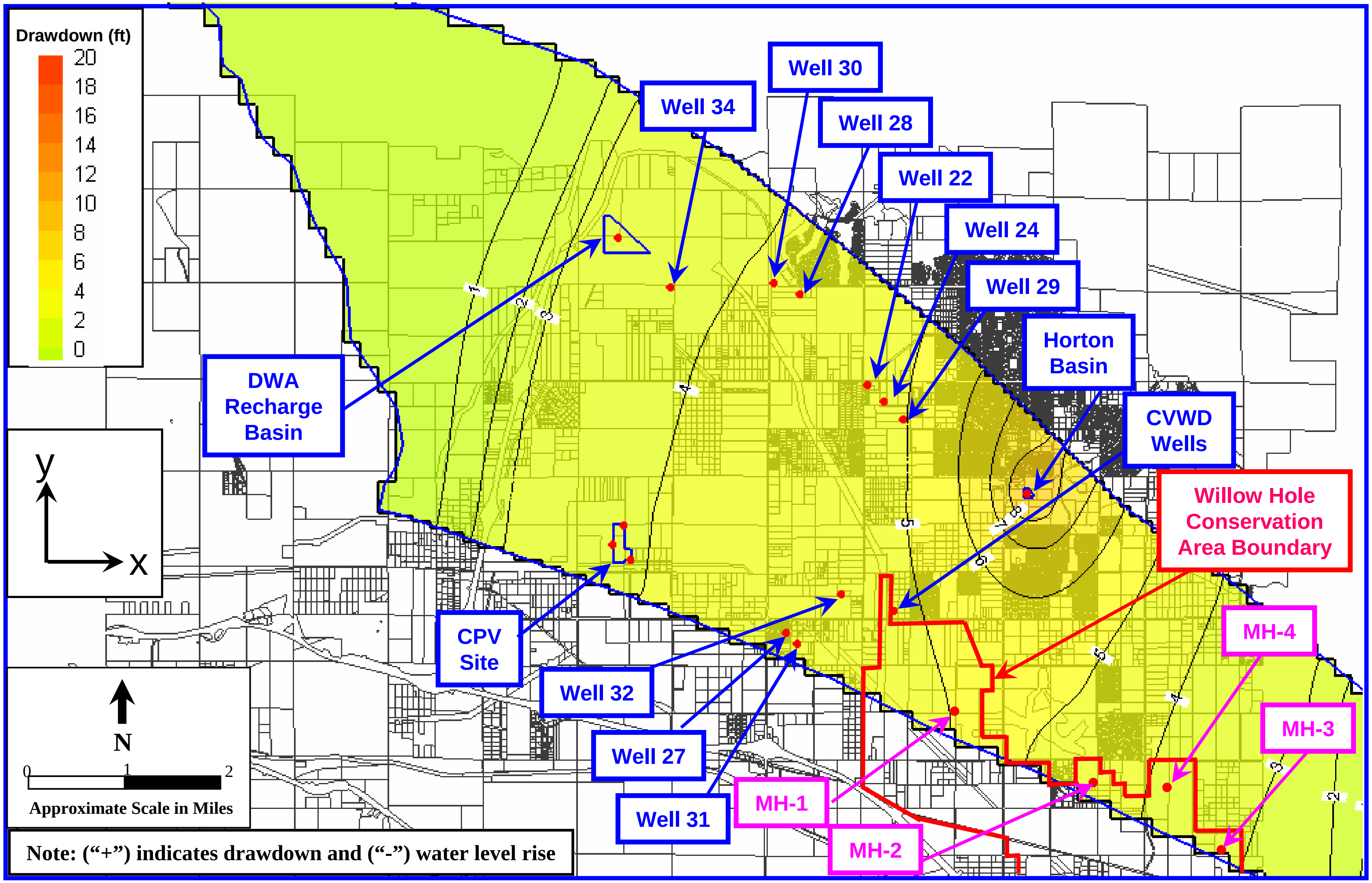


Figure 2A.c-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2A.c

(Water consumption = 550 afy, no DWA recharge, Tyley's T, anisotropy ratio = 2.0)

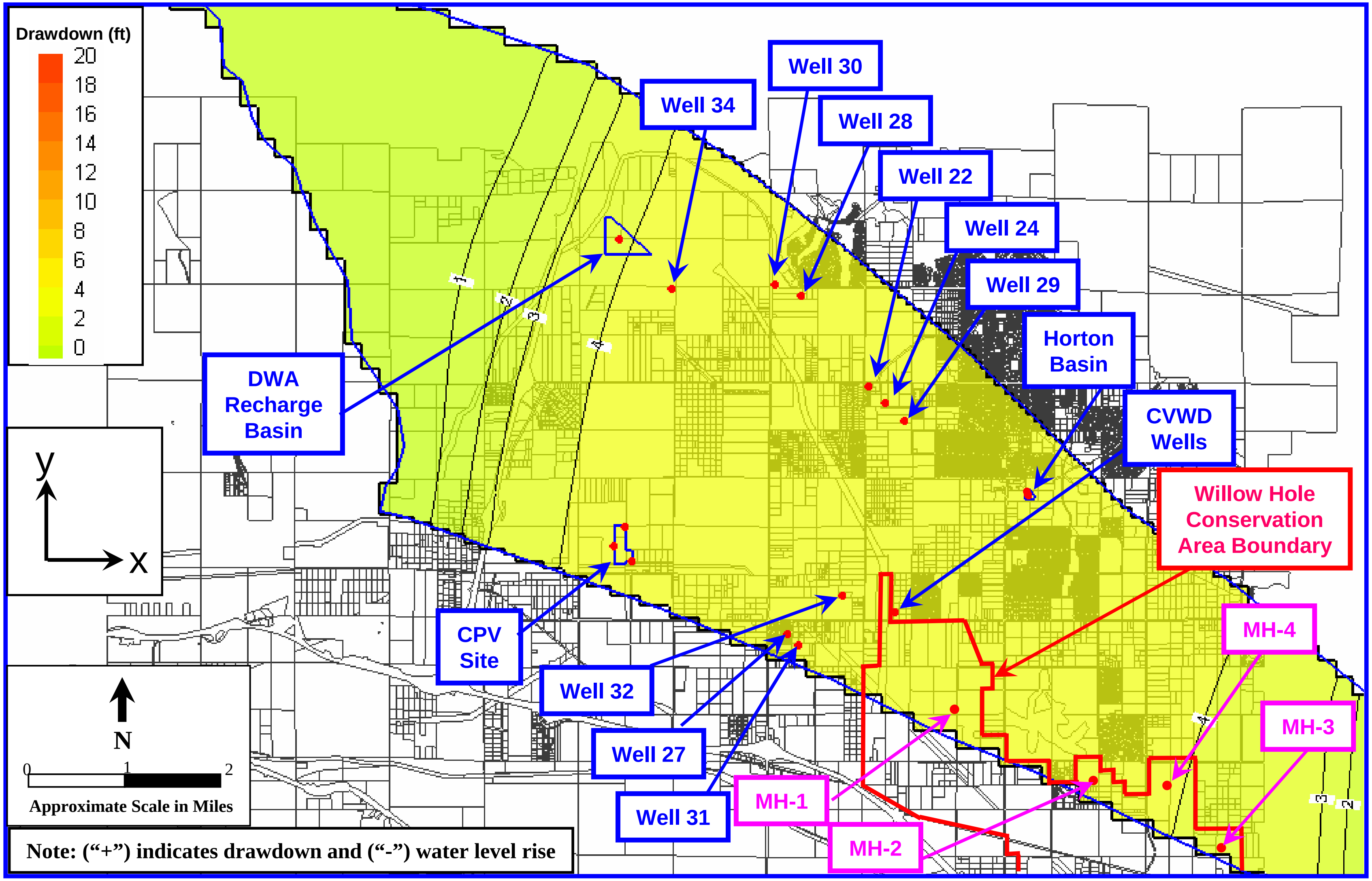


Figure 2A.c-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2A.c

(Water consumption = 550 afy, no DWA recharge, Tyley's T, anisotropy ratio = 2.0)

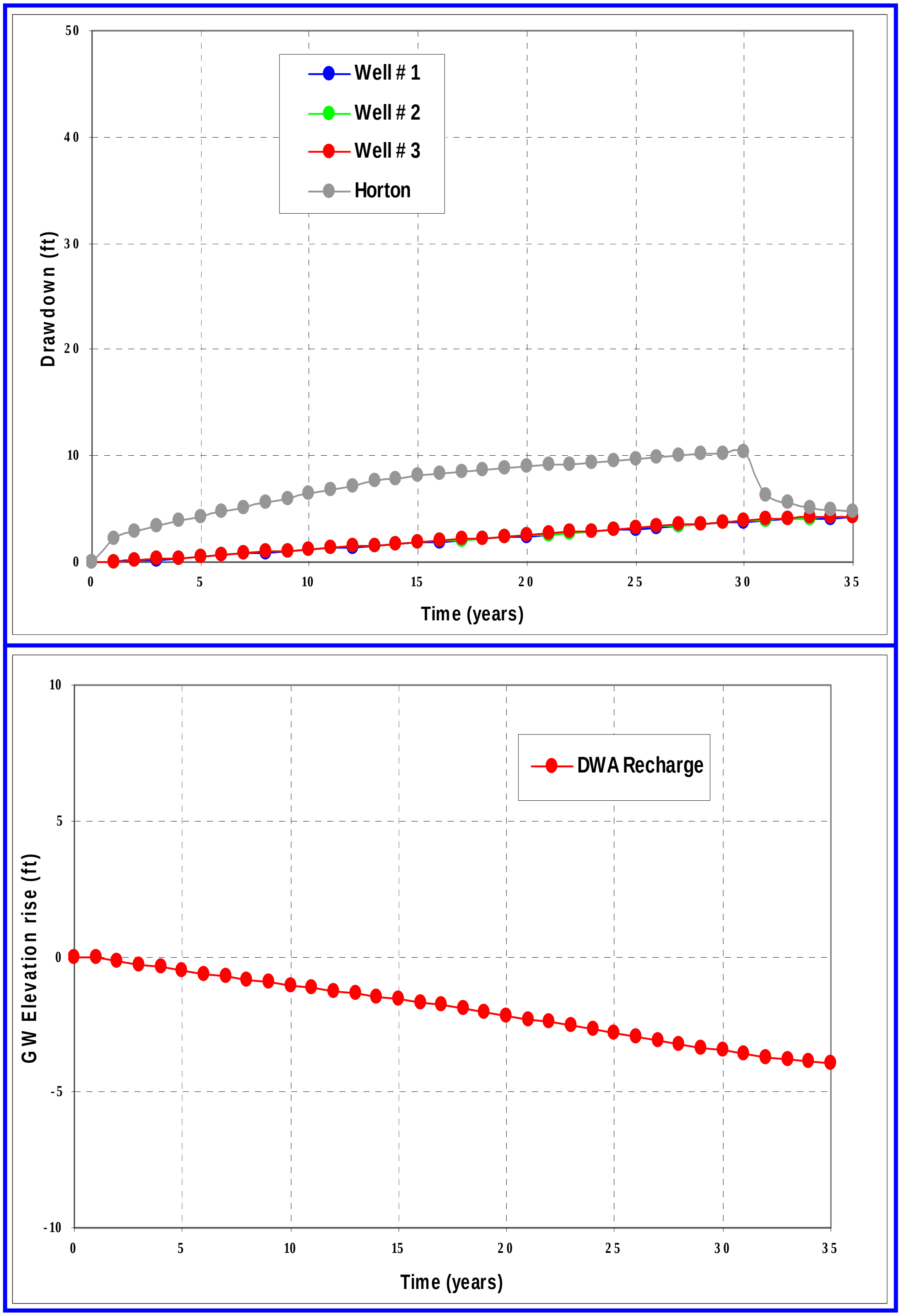


Figure 2A.c-3: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2A.c
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, no recharge)

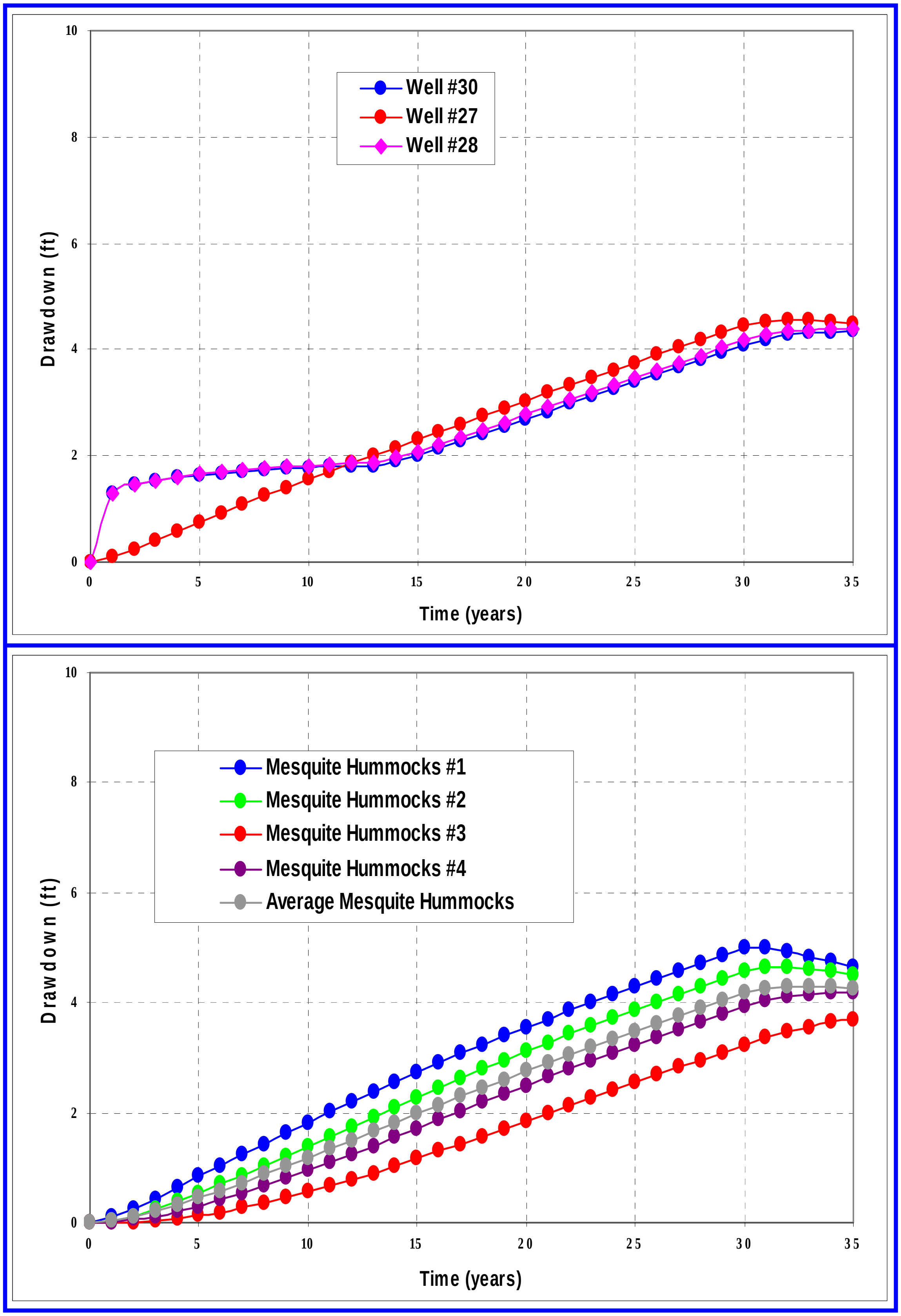


Figure 2A.c-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2A.c
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, no recharge)

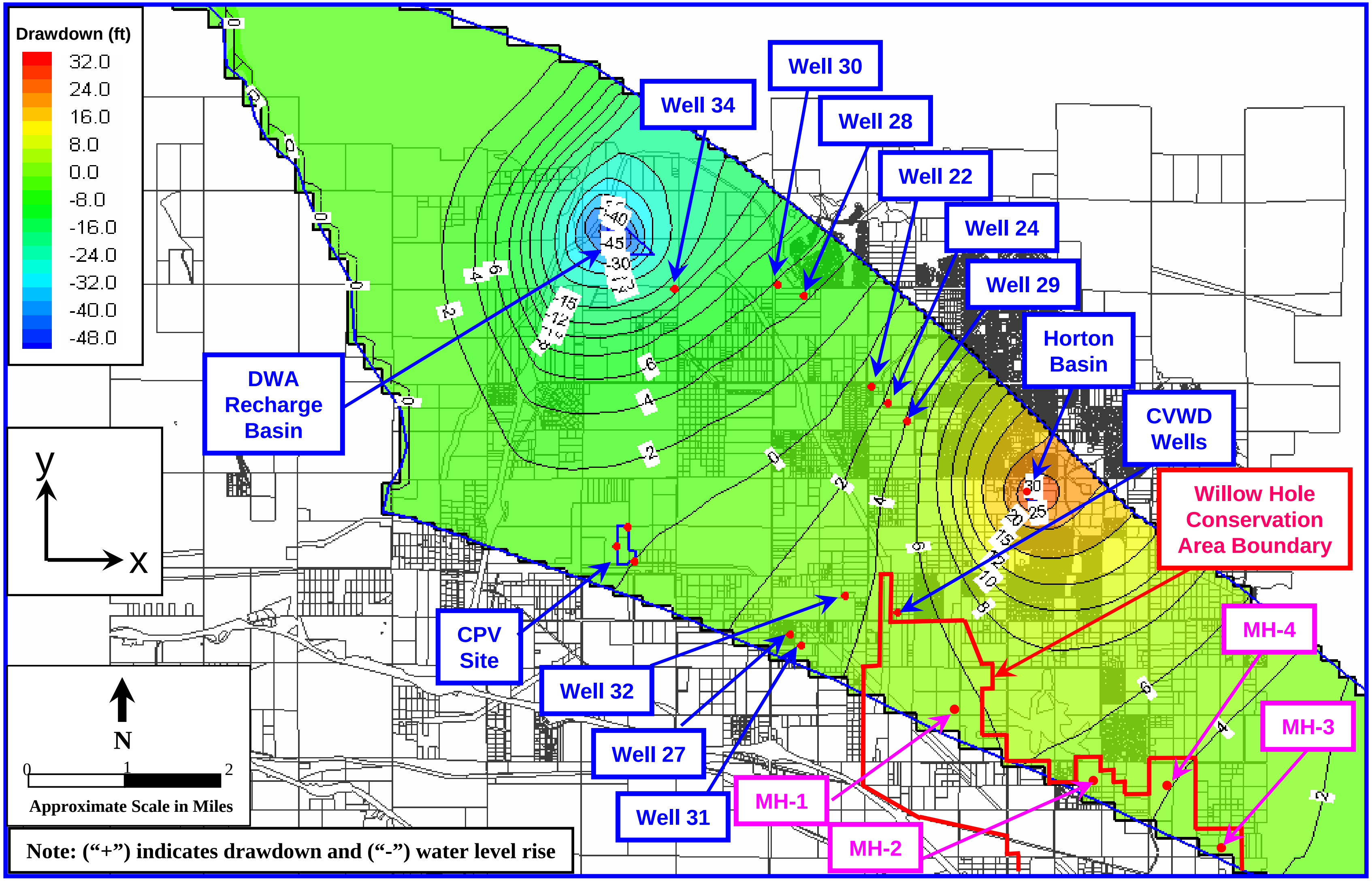


Figure 2B.1-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2B.1

(Water consumption = 1,100 afy, DWA recharge=1,100 afy, half Tyley's T, anisotropy ratio = 1.0)

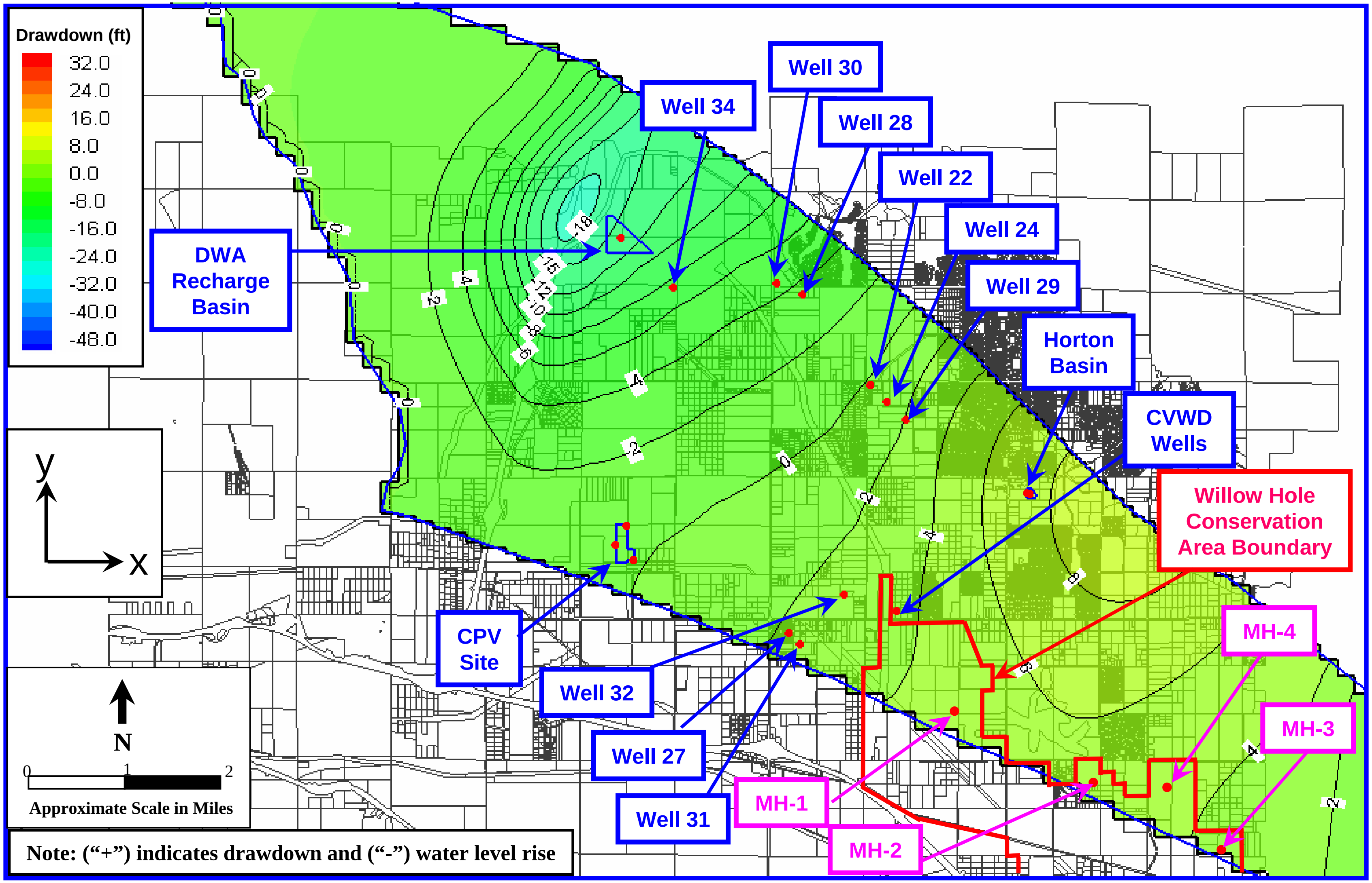


Figure 2B.1-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2B.1

(Water consumption = 1,100 afy, DWA recharge=1,100 afy, half Tyley's T, anisotropy ratio = 1.0)

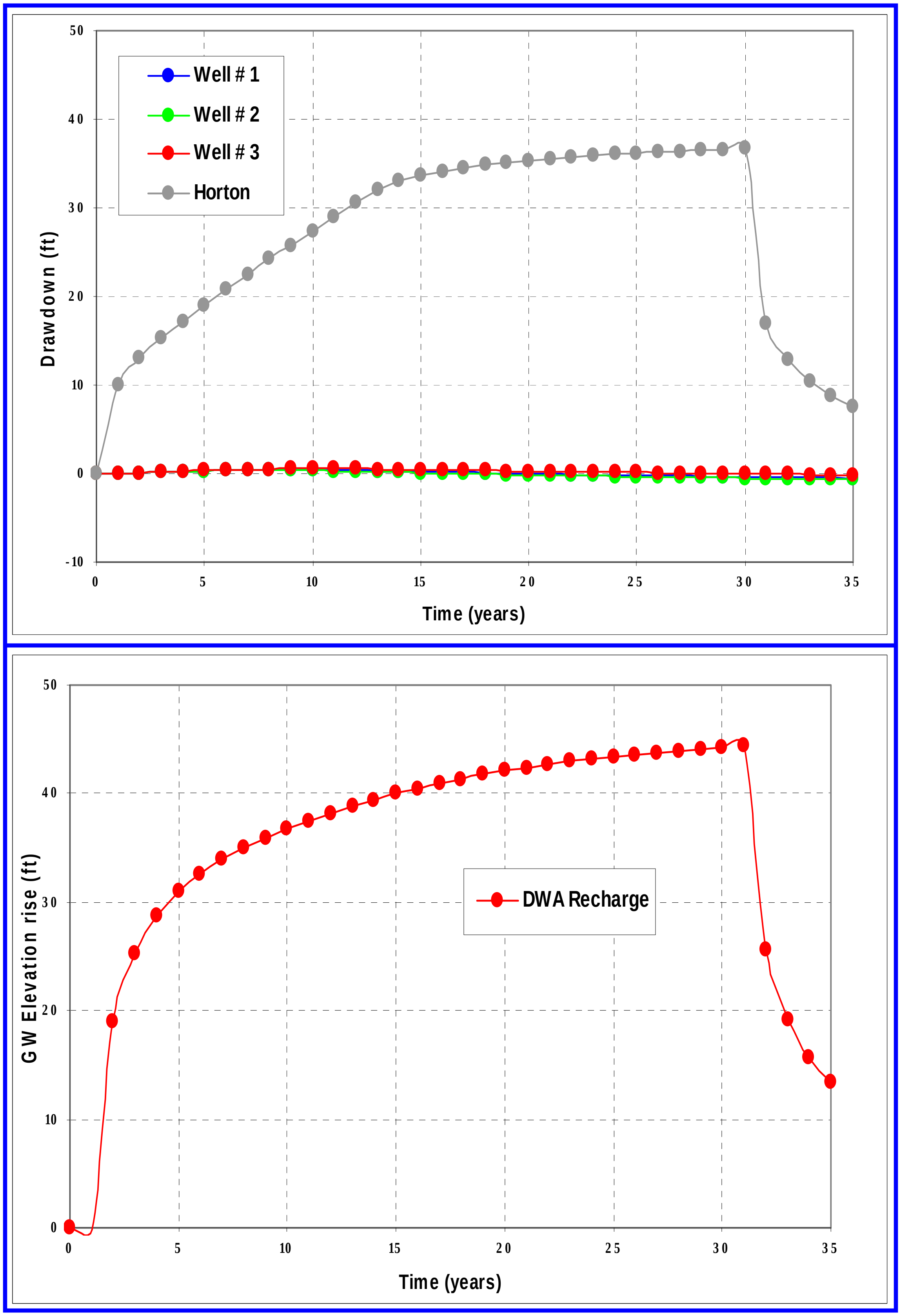


Figure 2B.1-3: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2B.1
(Water consumption = 1,100 afy from MSWD wells 28 and 30 and Horton WWTP, 1,100 afy recharge)

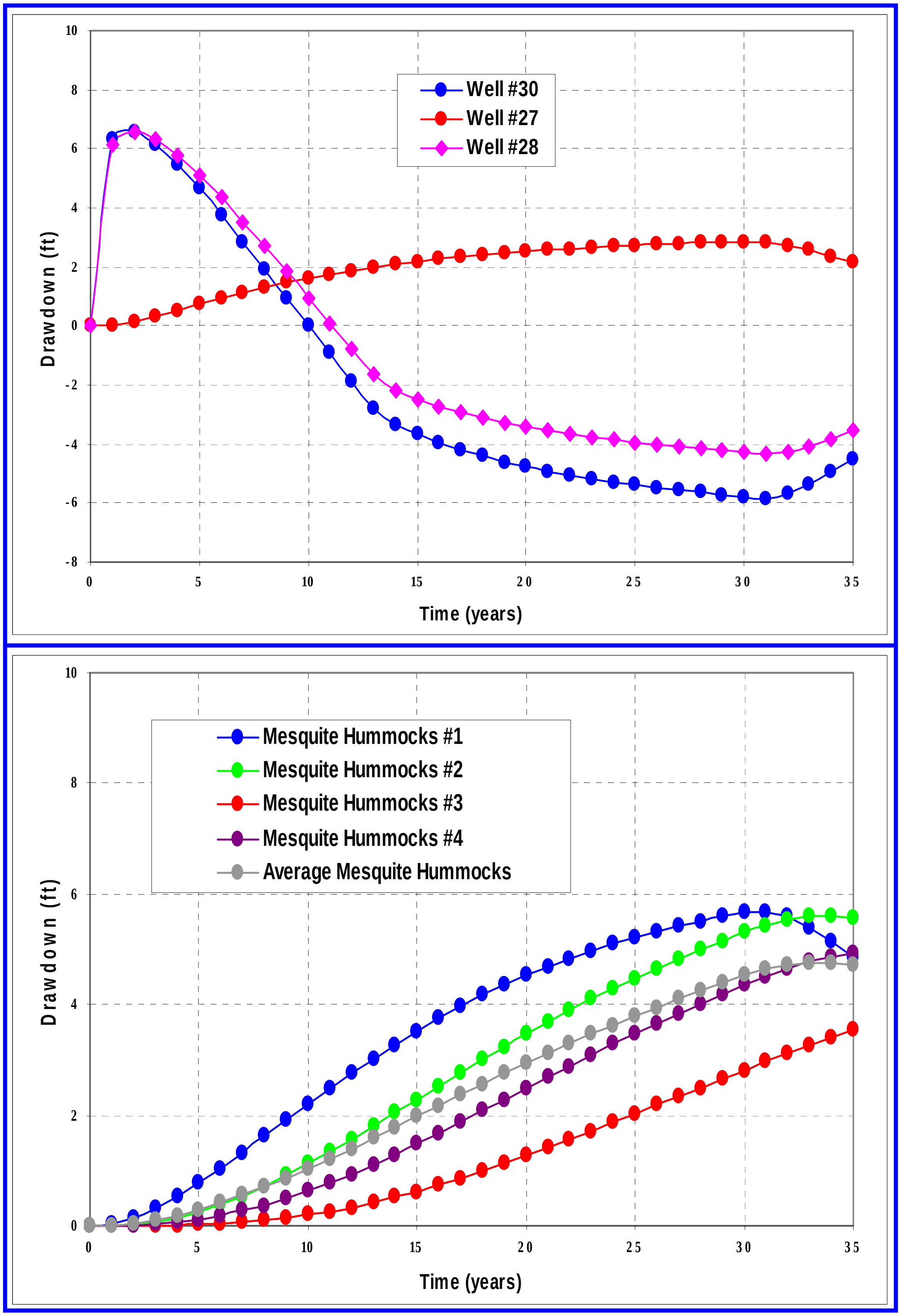


Figure 2B.1-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2B.1
(Water consumption = 1,100 afy from MSWD wells 28 and 30 and Horton WWTP, 1,100 afy recharge)

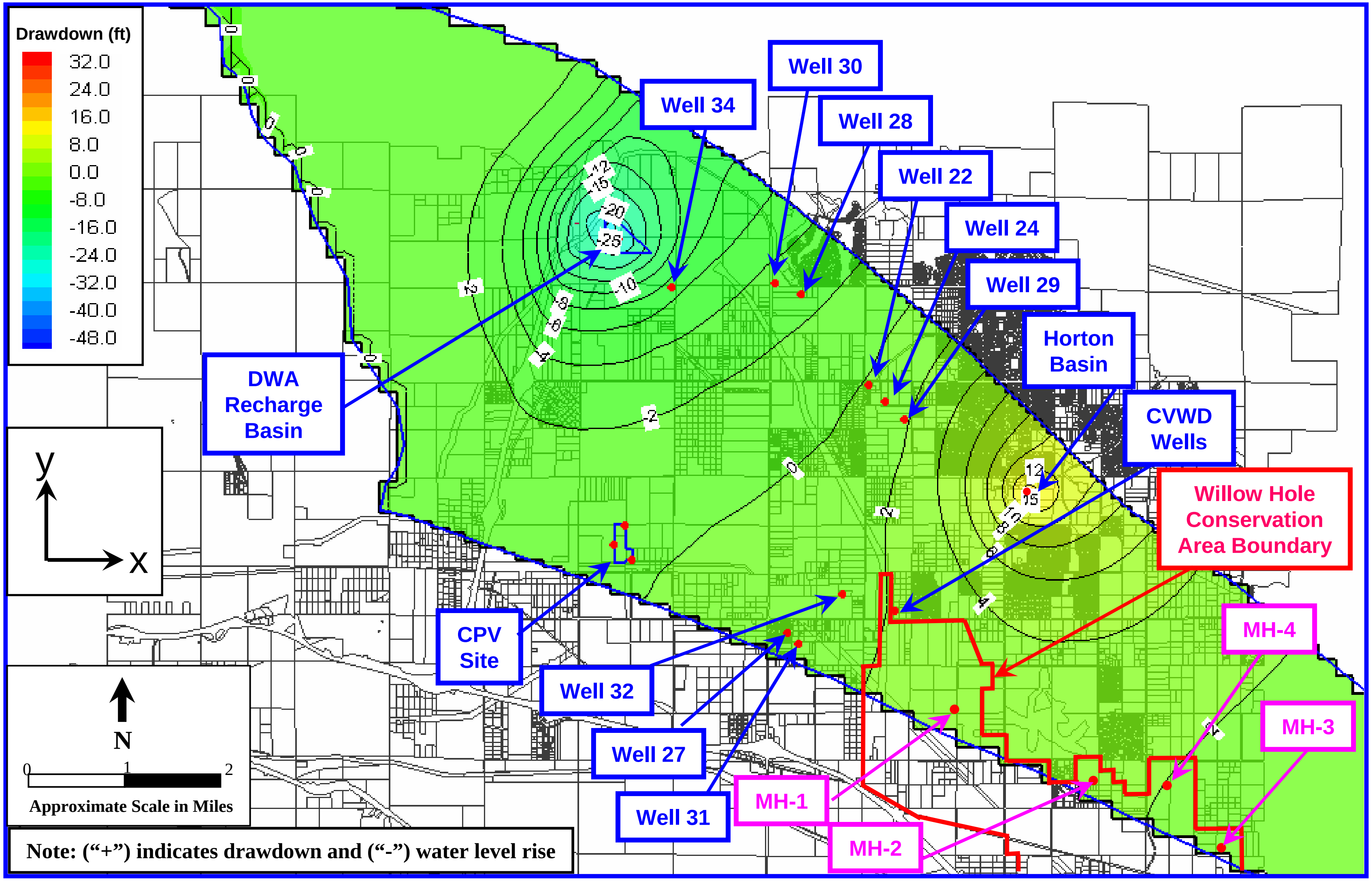


Figure 2B.1b-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2B.1b

(Water consumption = 550 afy, DWA recharge=593 afy, half Tyley's T, anisotropy ratio = 1.0)

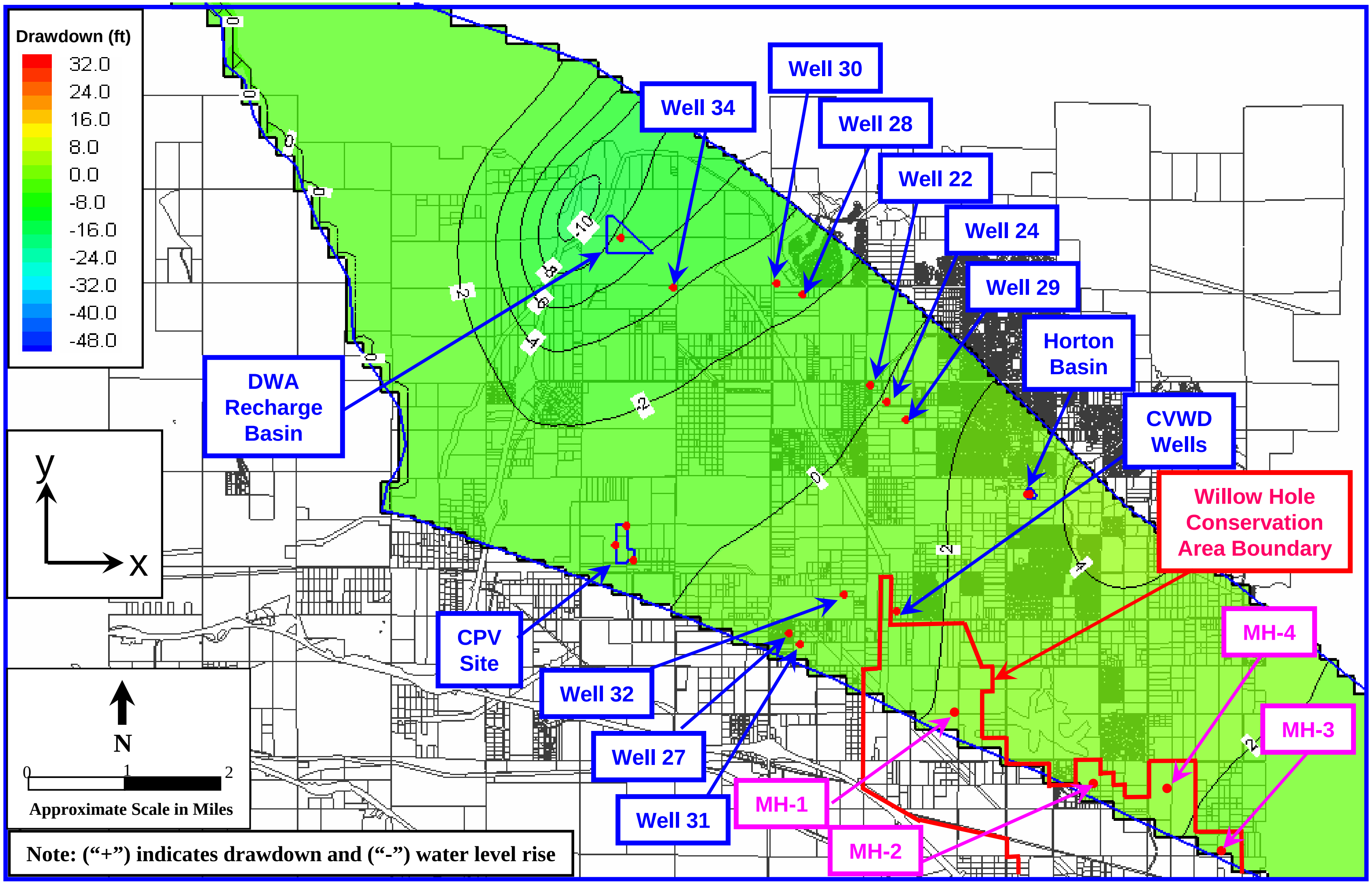


Figure 2B.1b-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2B.1b

(Water consumption = 550 afy, DWA recharge=593 afy, half Tyley's T, anisotropy ratio = 1.0)

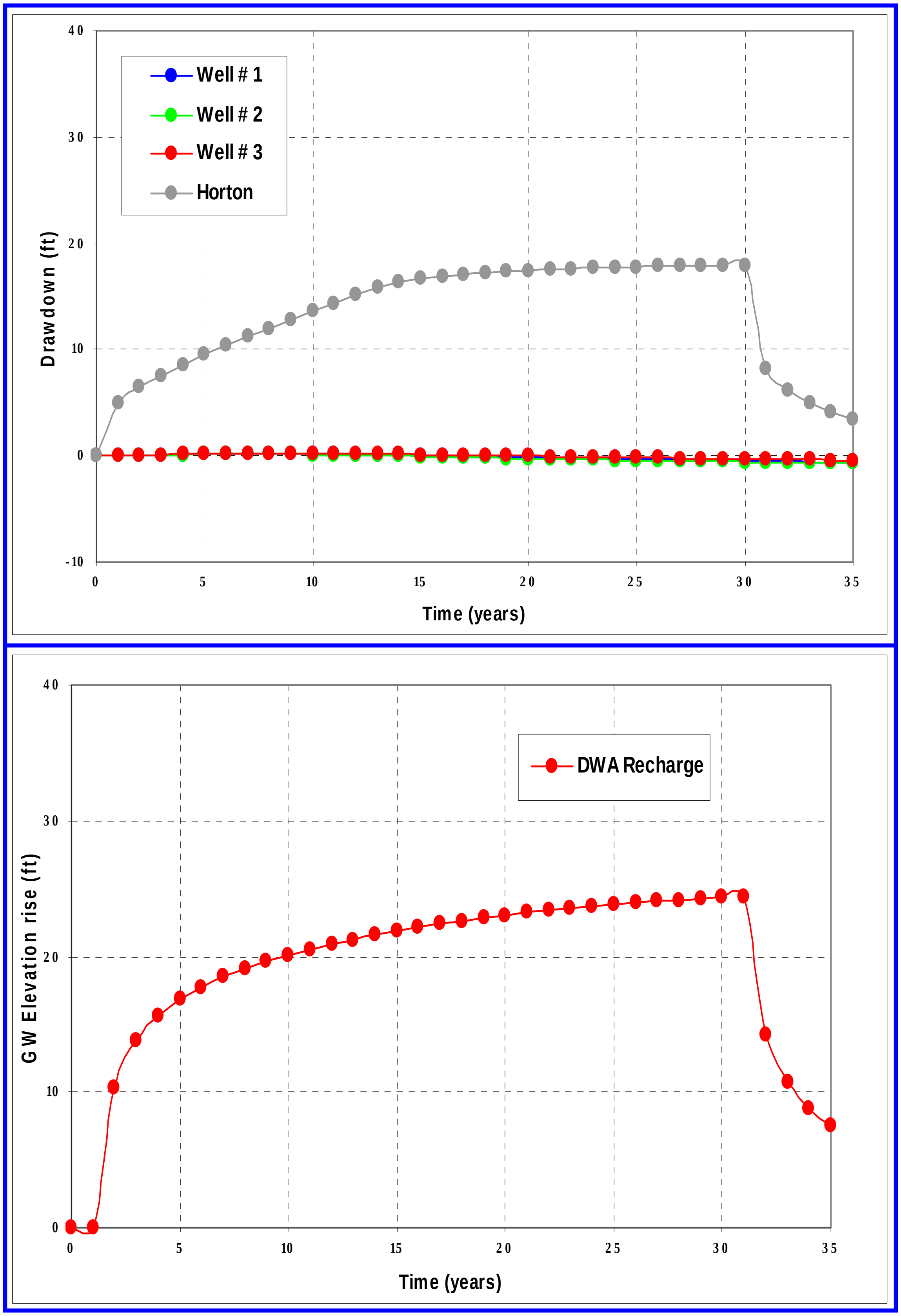


Figure 2B.1b-3: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2B.1b
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, 593 afy recharge)

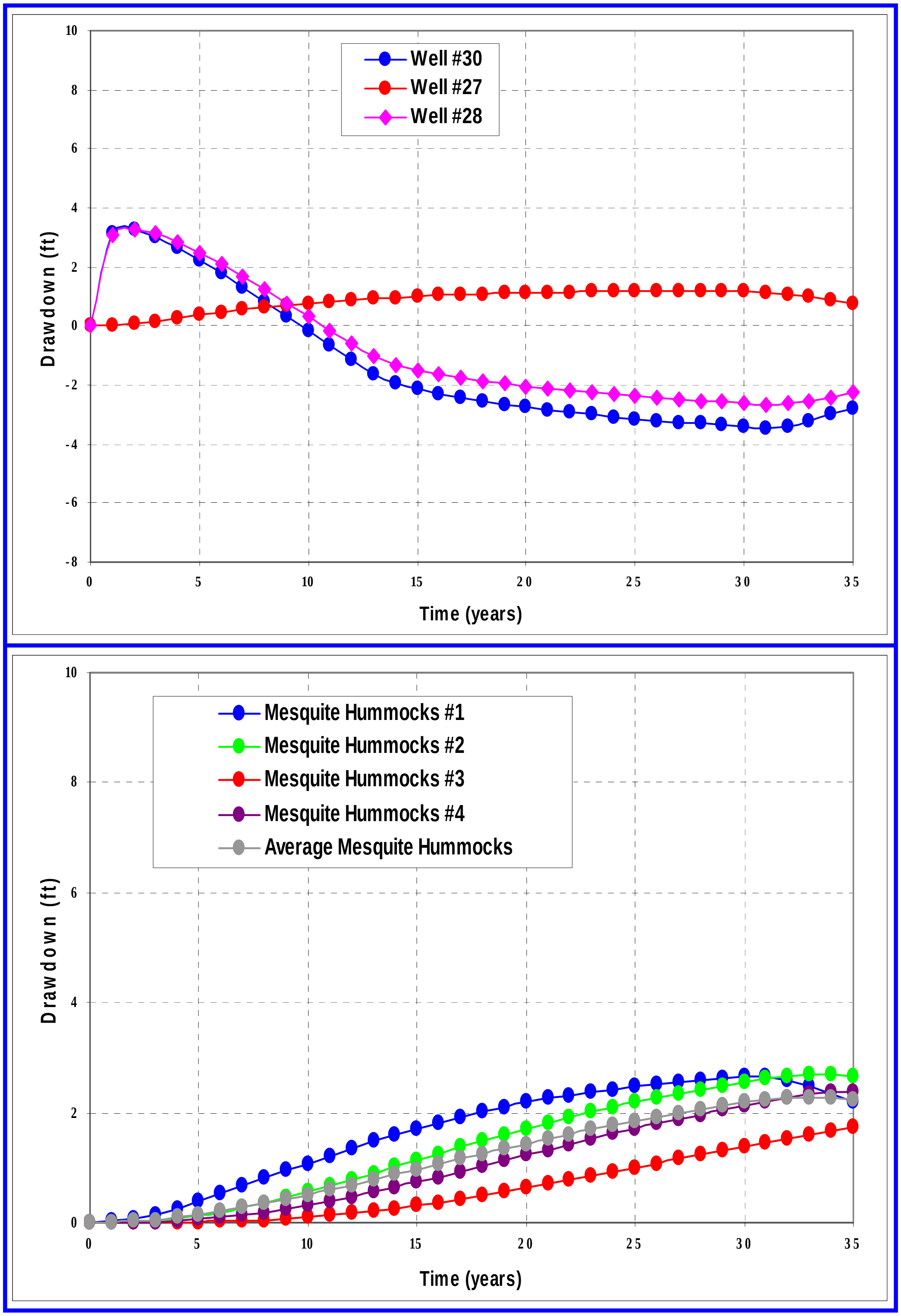


Figure 2B.1b-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2B.1b (Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, 593 afy recharge)

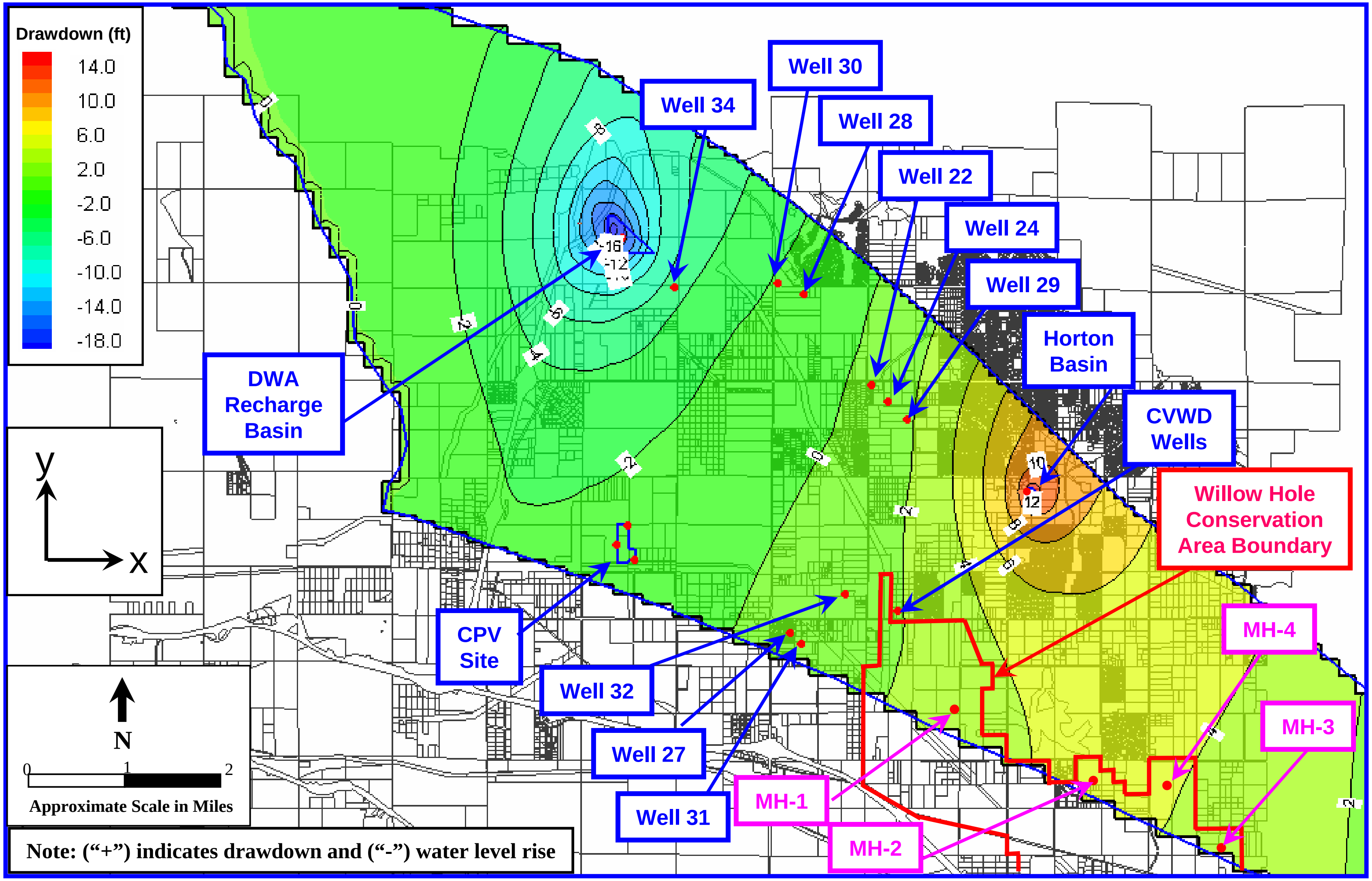


Figure 2B.2-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2B.2

(Water consumption = 1,100 afy, DWA recharge=1,100 afy, Tyley's T, anisotropy ratio = 2.0)

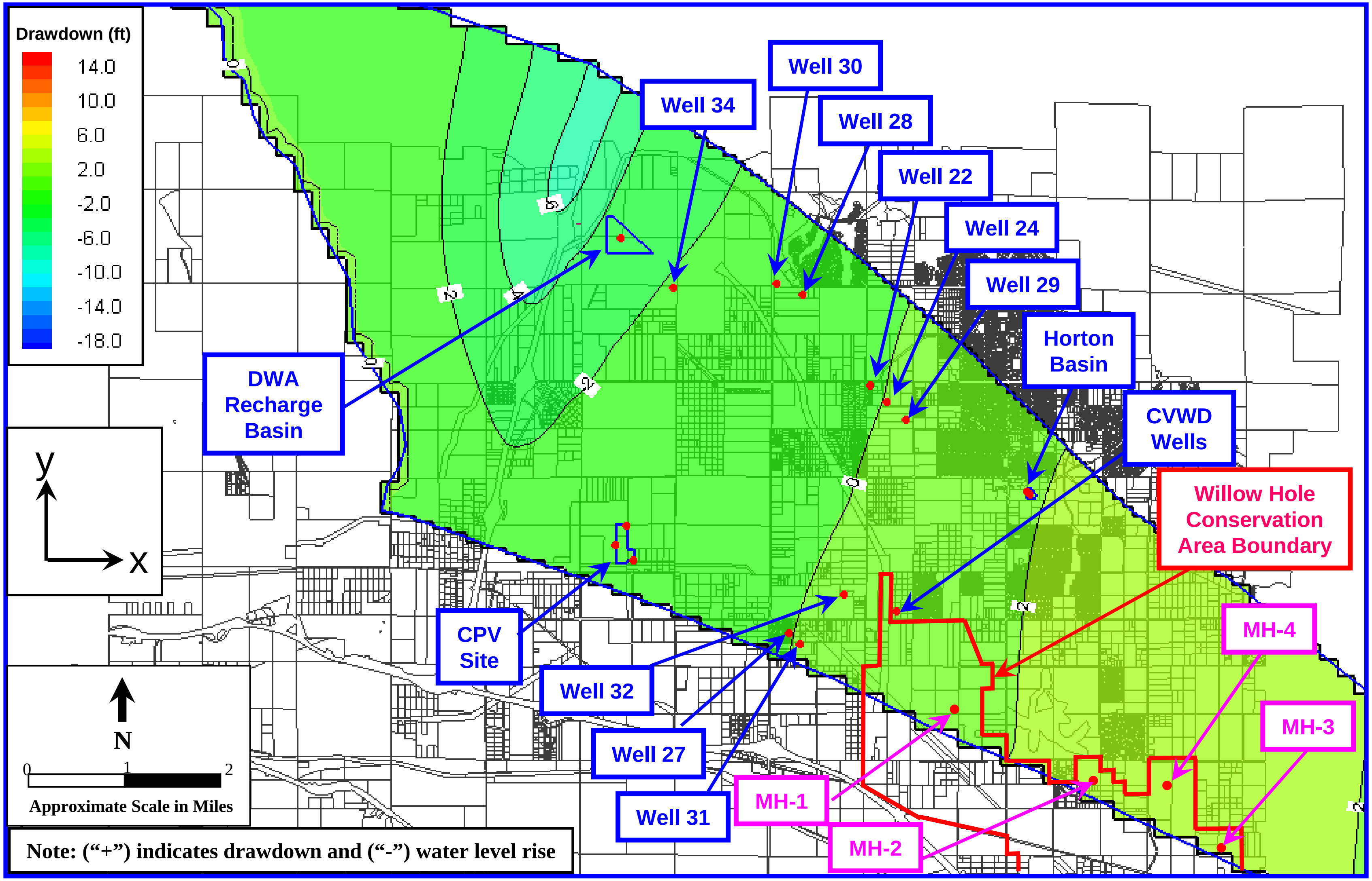


Figure 2B.2-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2B.2

(Water consumption = 1,100 afy, DWA recharge=1,100 afy, Tyley's T, anisotropy ratio = 2.0)

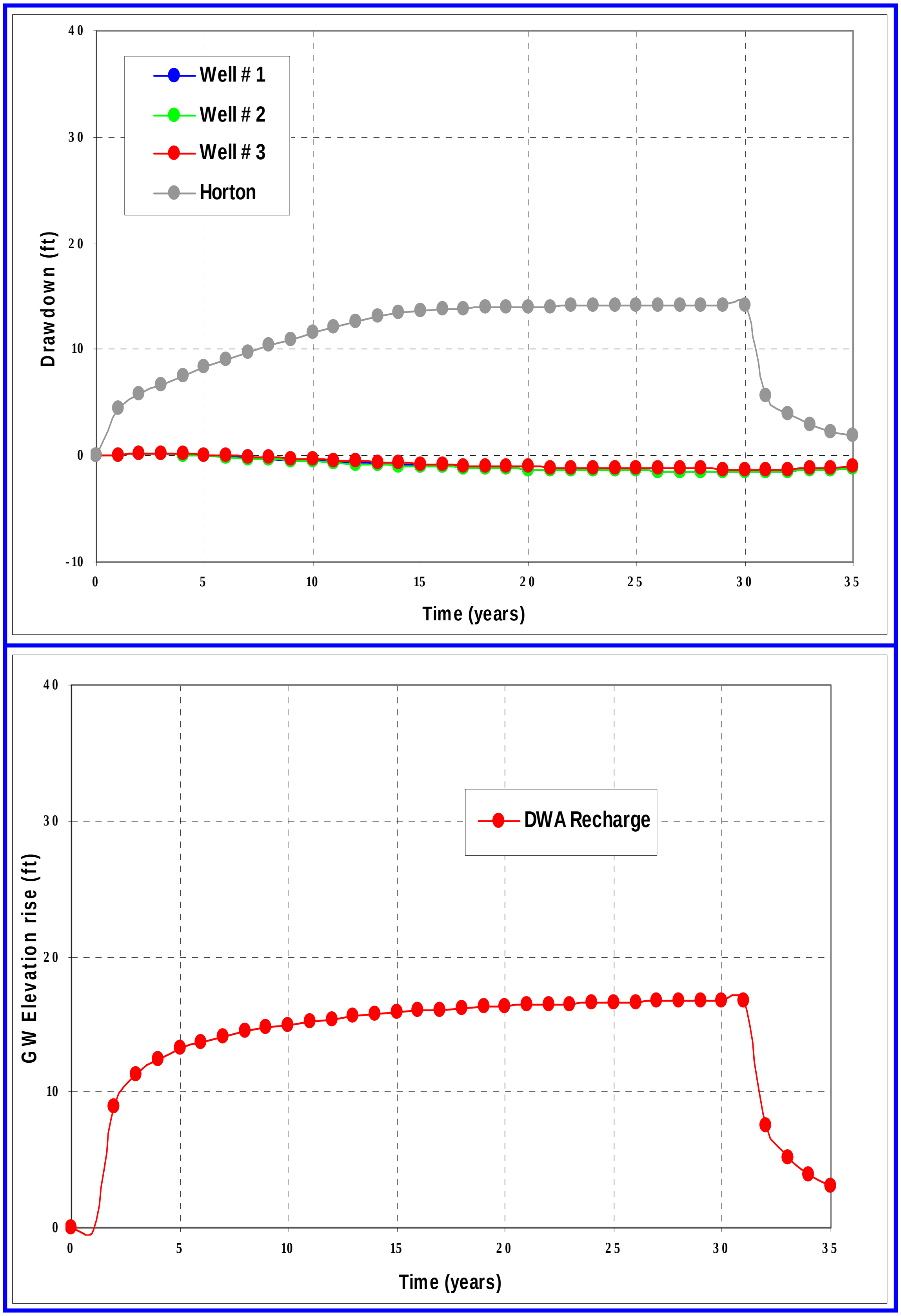


Figure 2B.2-3: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2B.2
(Water consumption = 1,100 afy from MSWD wells 28 and 30 and Horton WWTP, 1,100 afy recharge)

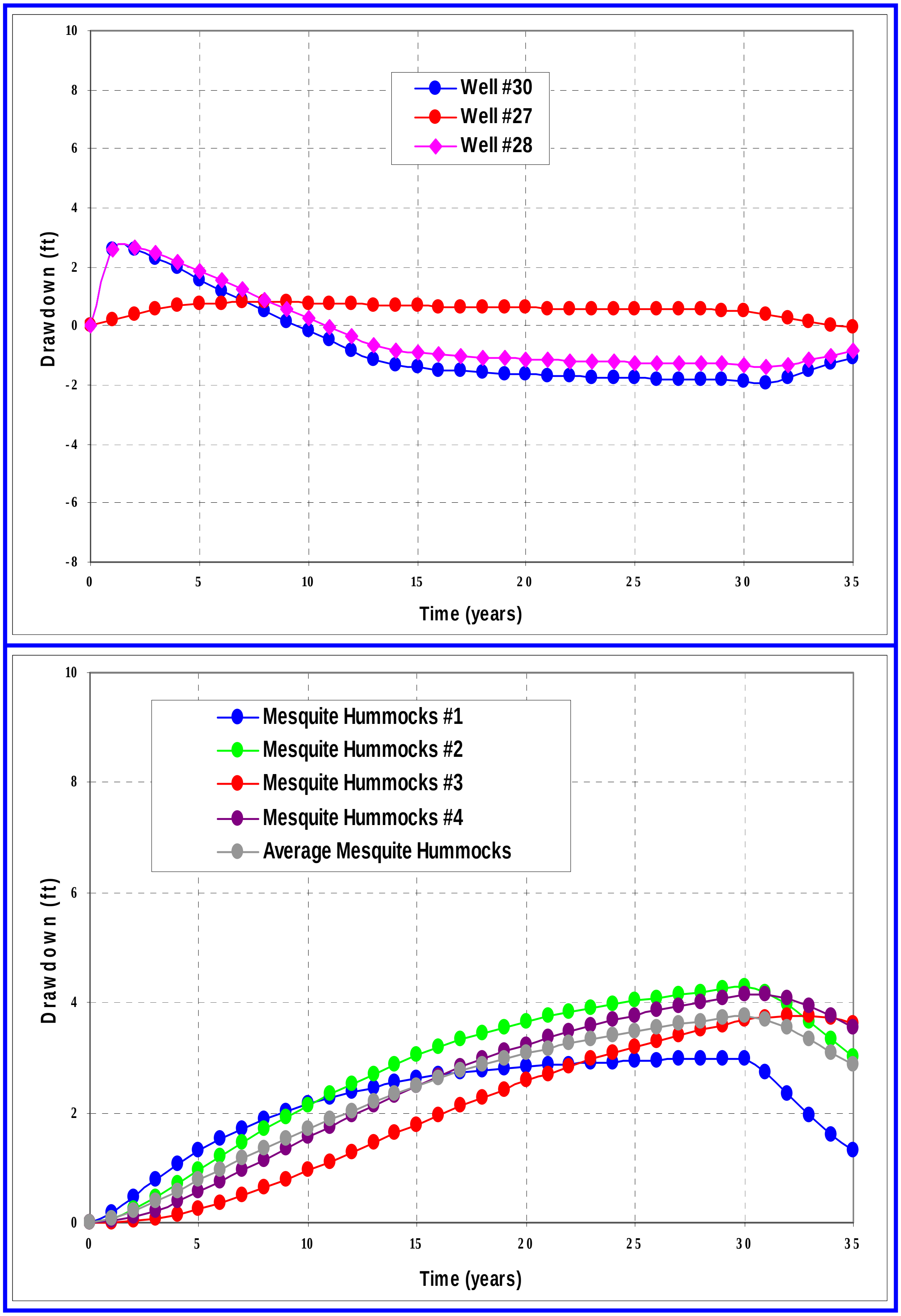


Figure 2B.2-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2B.2
(Water consumption = 1,100 afy from MSWD wells 28 and 30 and Horton WWTP, 1,100 afy recharge)

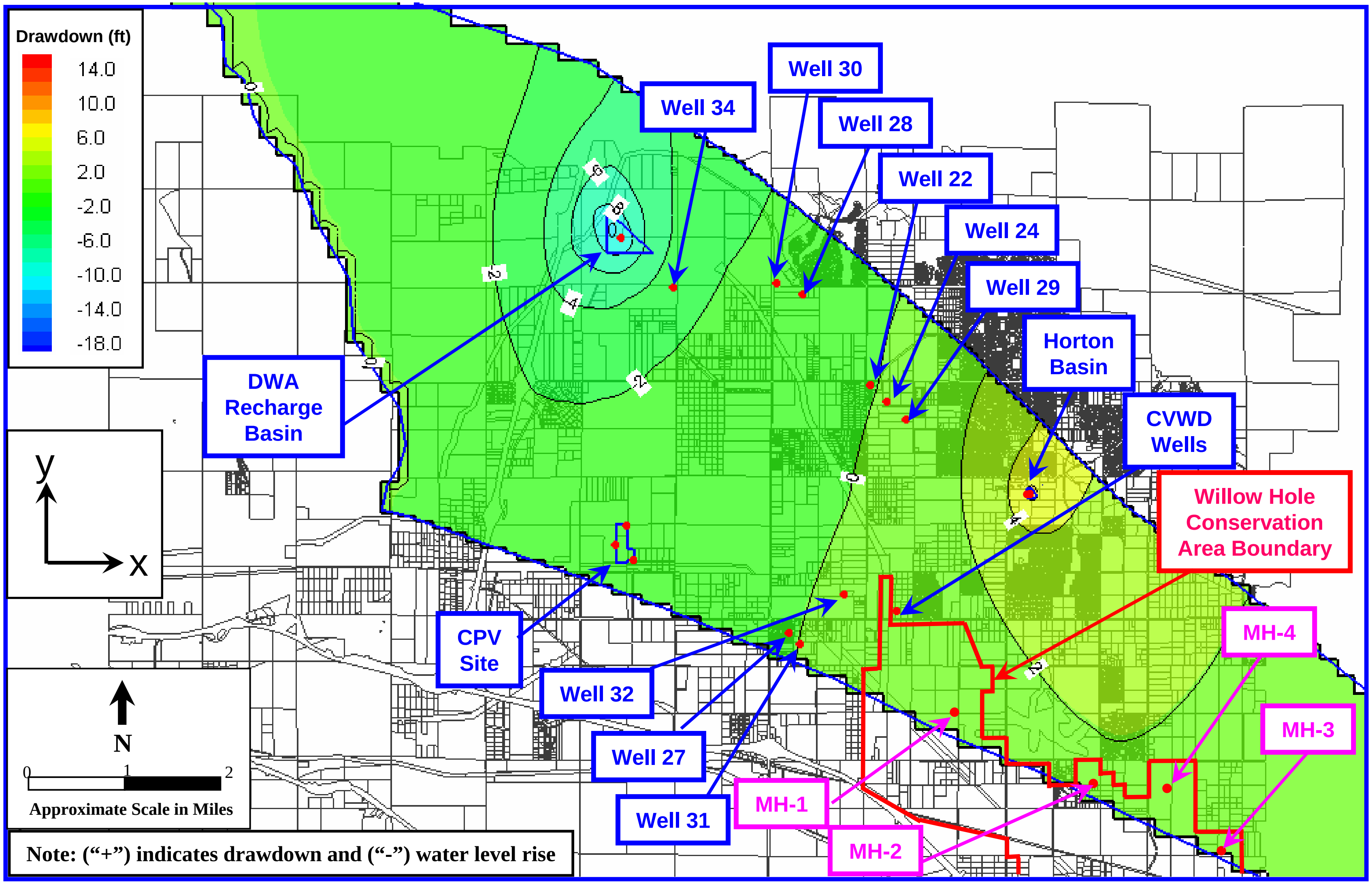


Figure 2B.2b-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2B.2b

(Water consumption = 550 afy, DWA recharge=593 afy, Tyley's T, anisotropy ratio = 2.0)

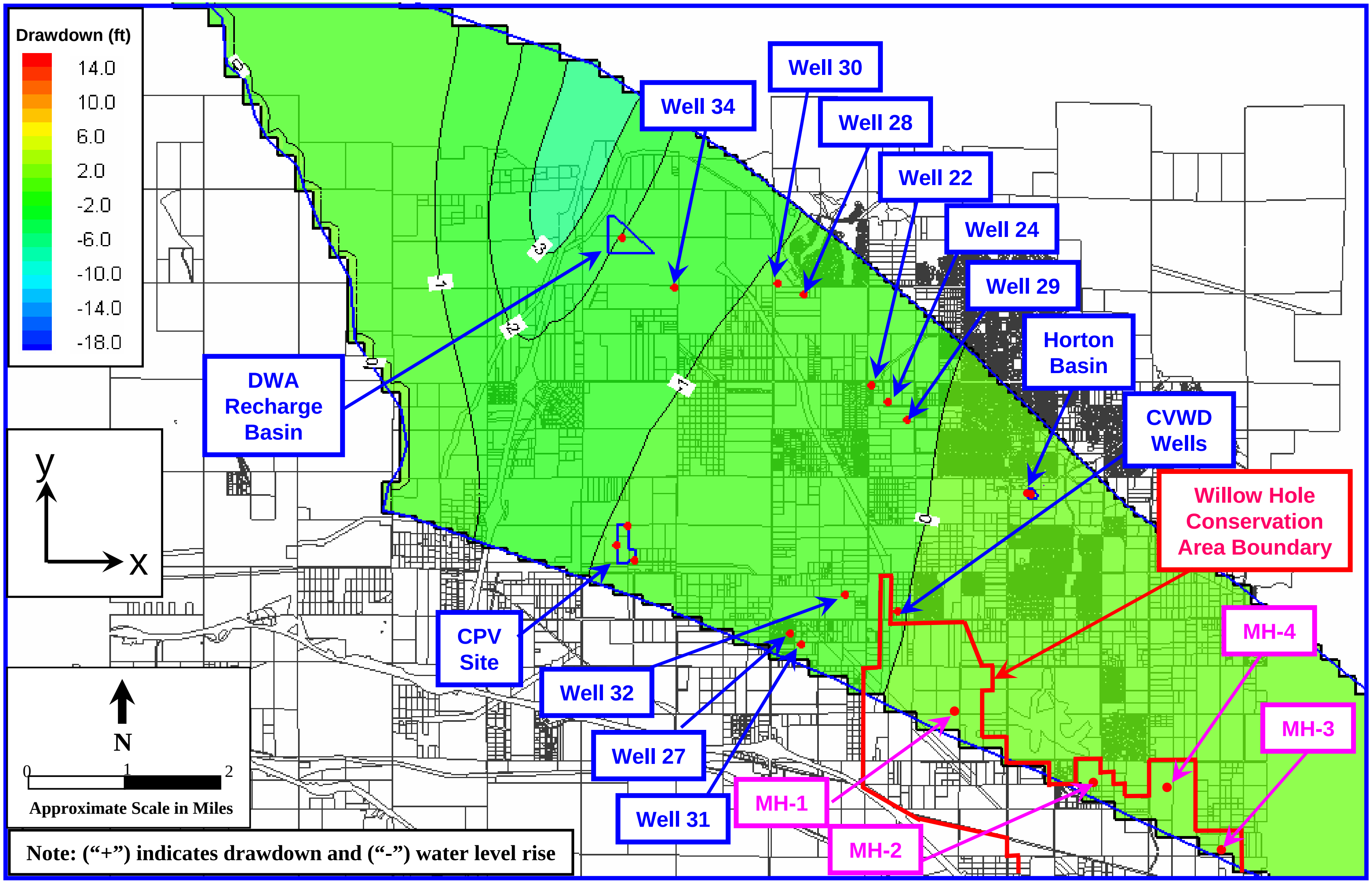


Figure 2B.2b-2: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2B.2b

(Water consumption = 550 afy, DWA recharge=593 afy, Tyley's T, anisotropy ratio = 2.0)

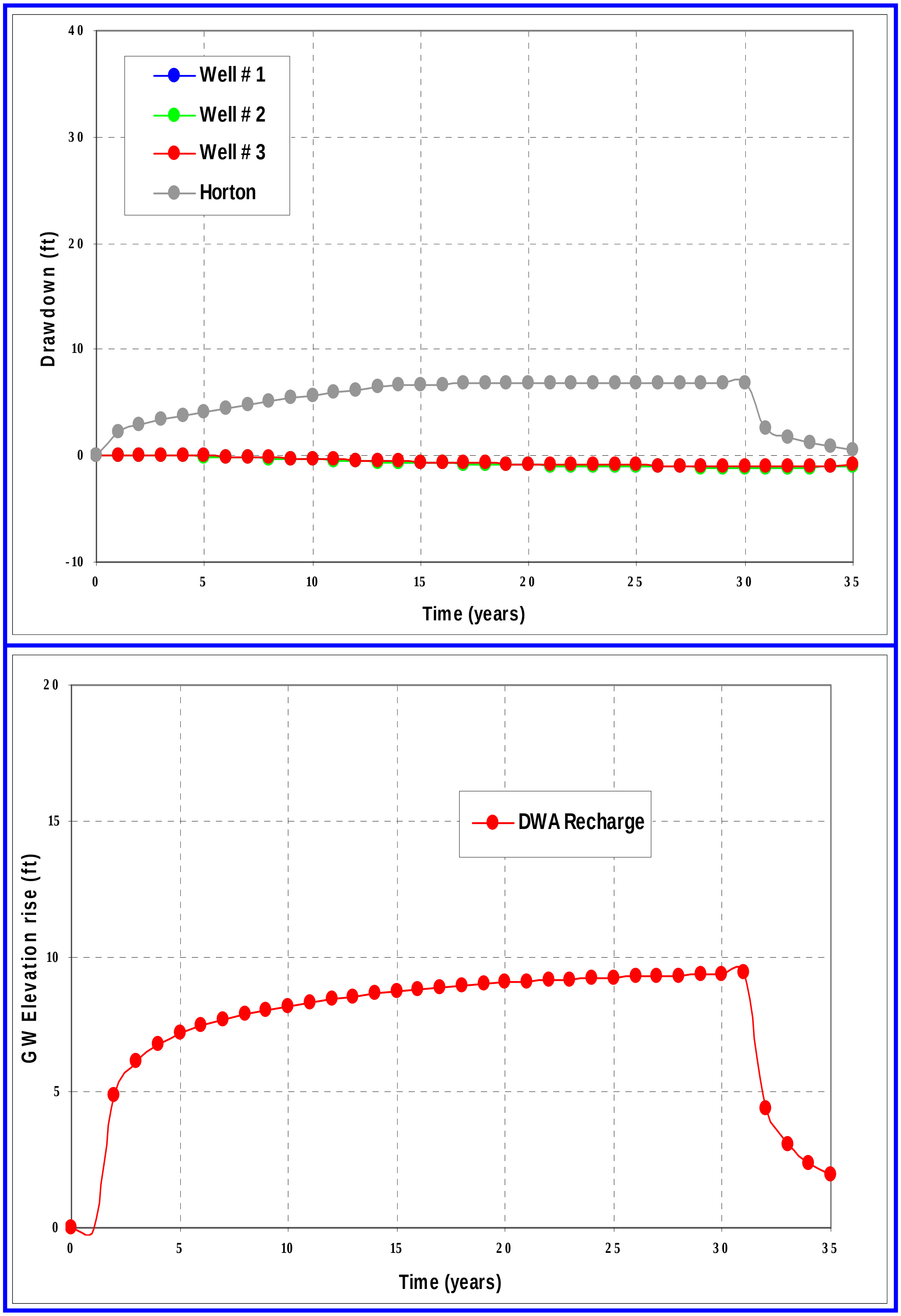


Figure 2B.2b-3: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2B.2b
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, 593 afy recharge)

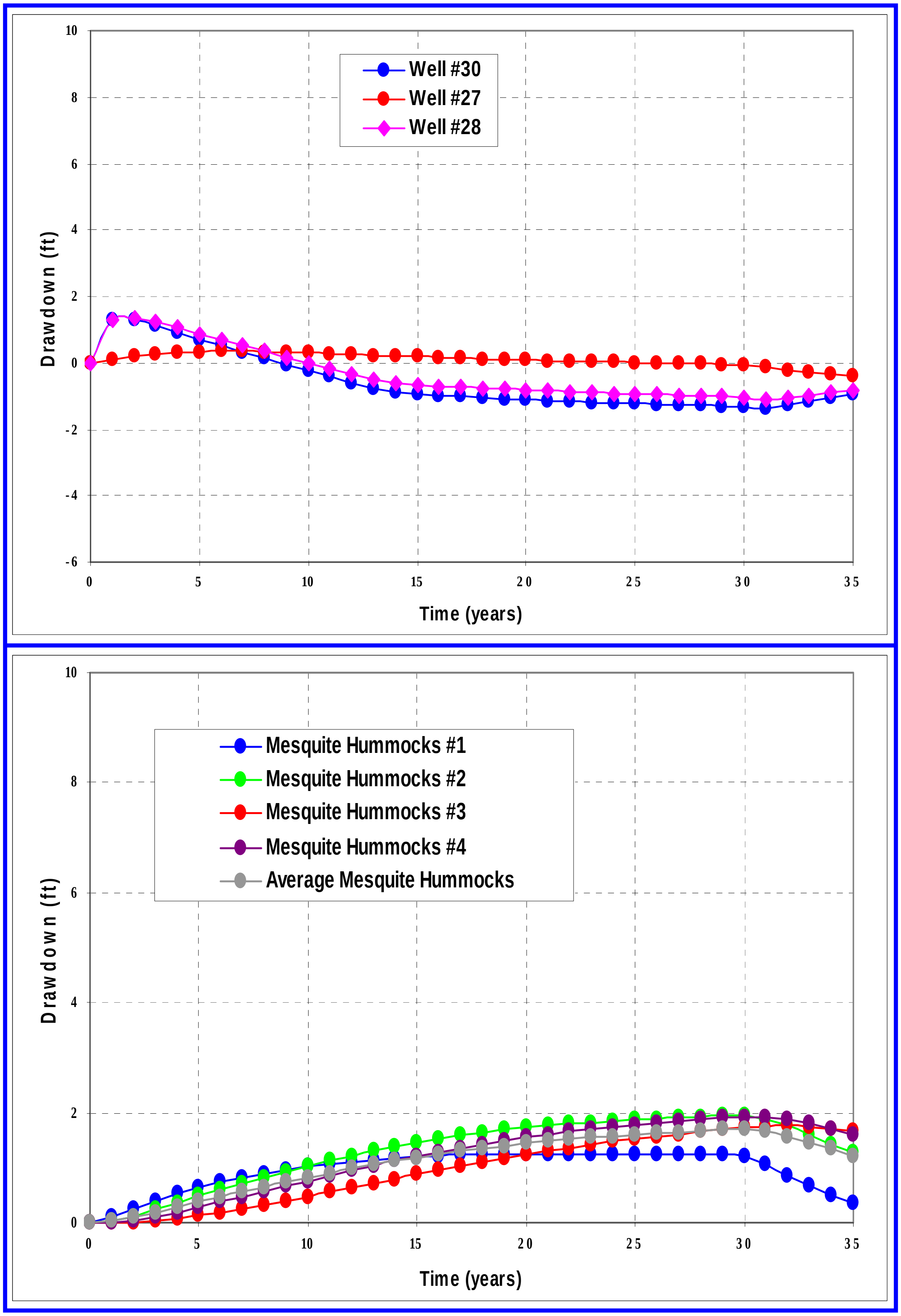


Figure 2B.2b-4: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2B.2b
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, 593 afy recharge)

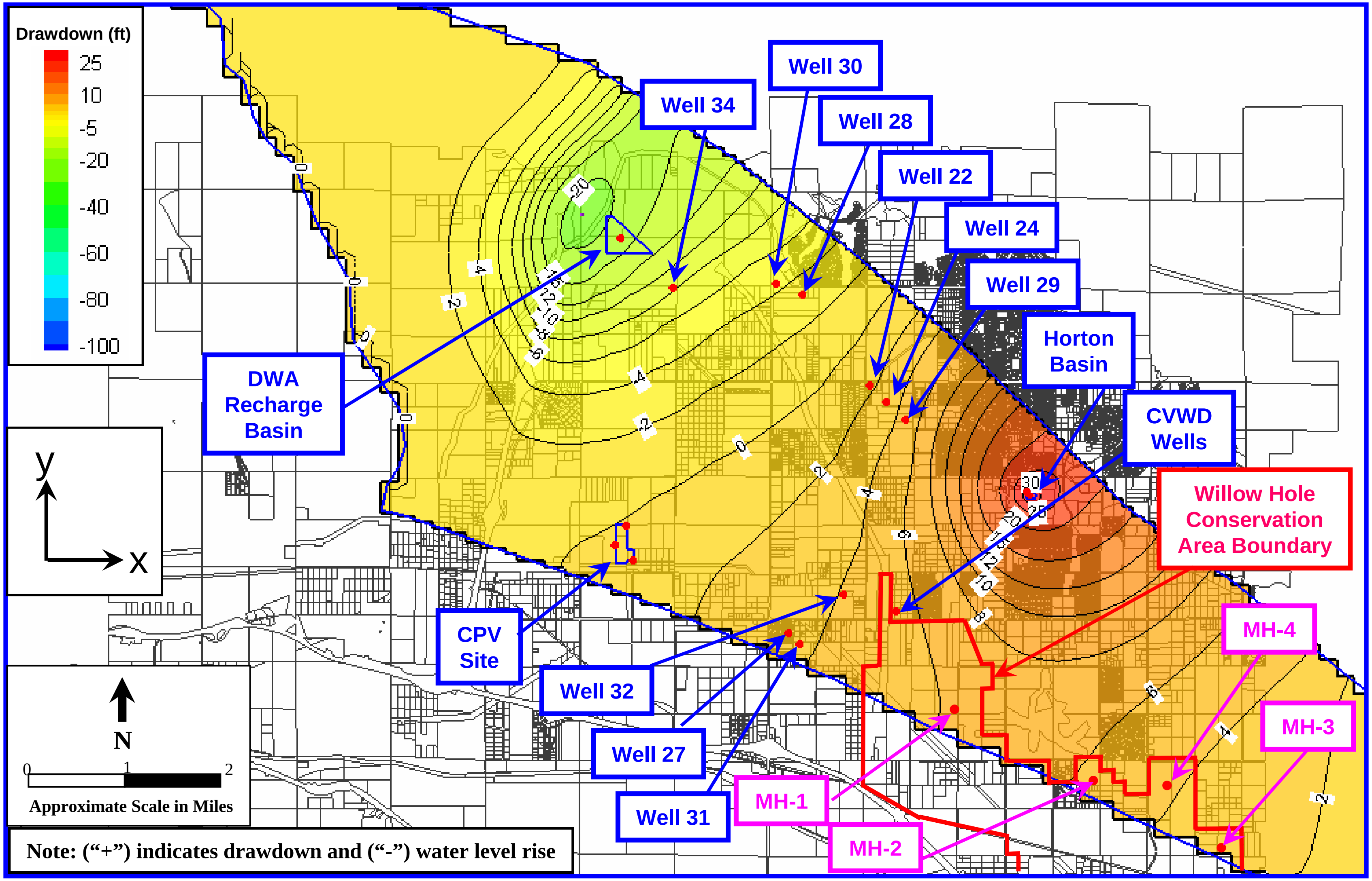


Figure 2C-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2C

(Water consumption=1,100 afy, DWA recharge=5,500 af every 5 years, half Tyley's T, anisotropy ratio=1.0)

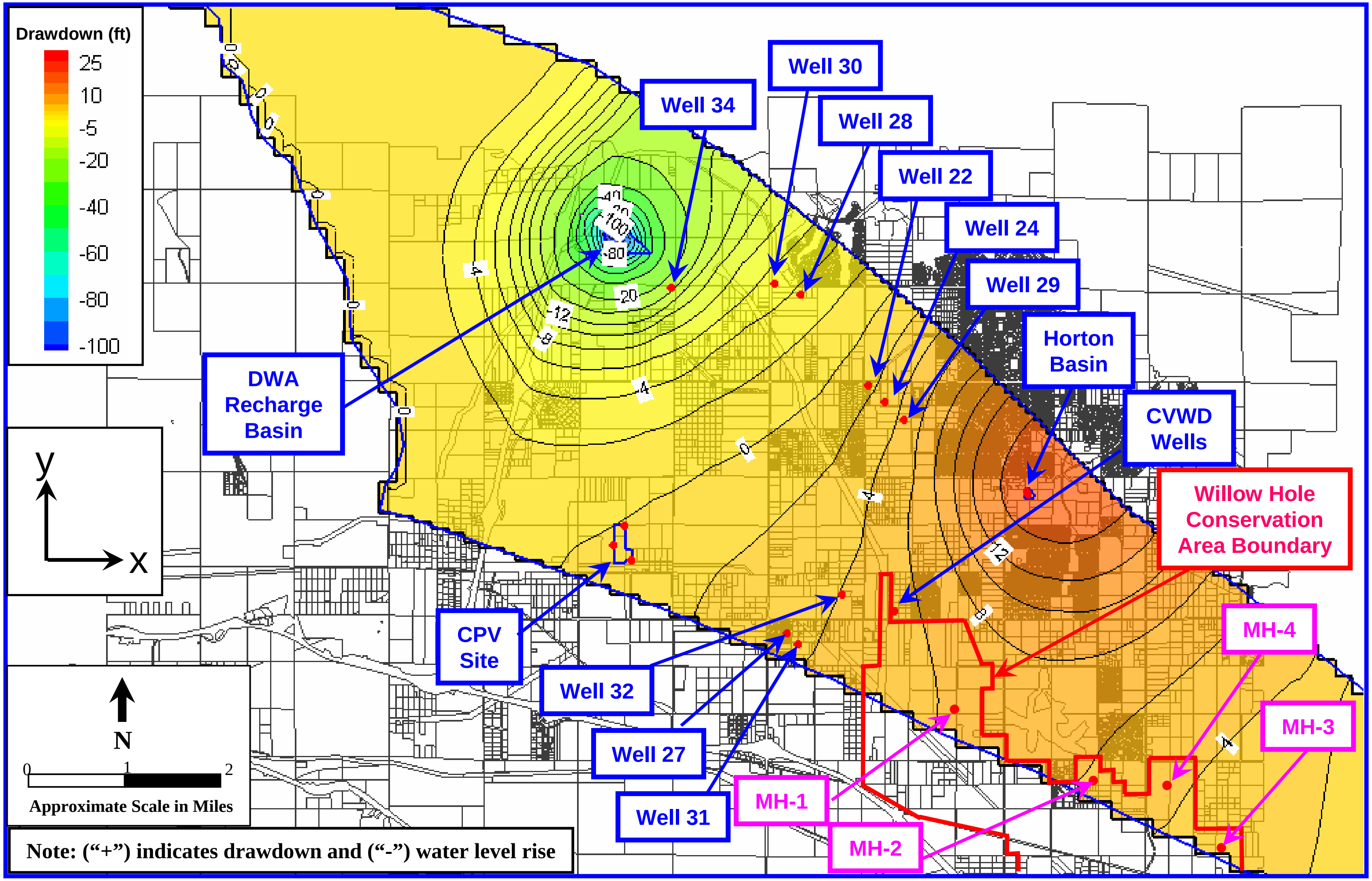


Figure 2C-2: Contour Map of Simulated Groundwater Level Changes at 31 Years – Simulation 2C

(Water consumption=1,100 afy, DWA recharge=5,500 af every 5 years, half Tyley's T, anisotropy ratio=1.0)

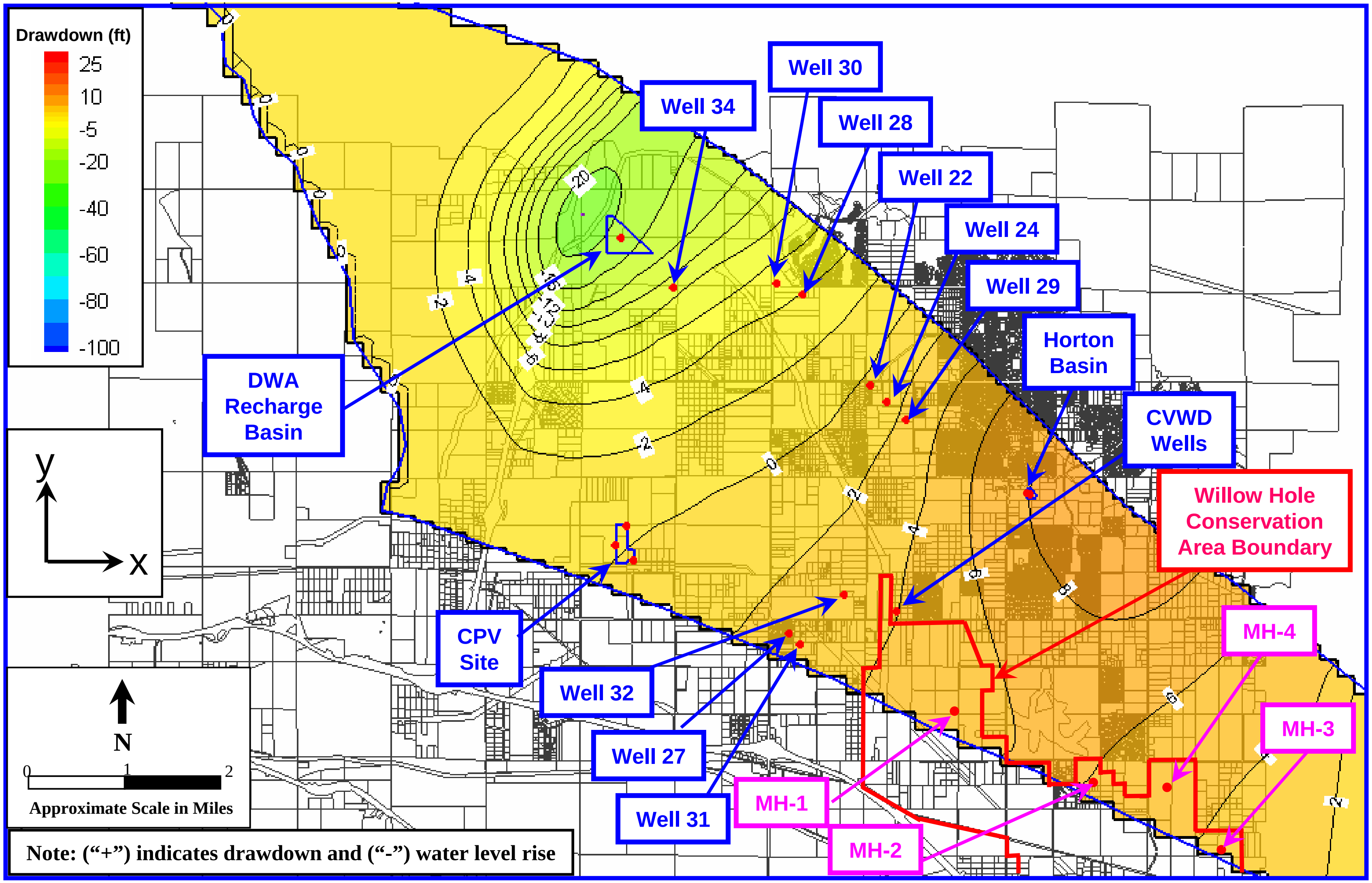


Figure 2C-3: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2C

(Water consumption=1,100 afy, DWA recharge=5,500 af every 5 years, half Tyley's T, anisotropy ratio=1.0)

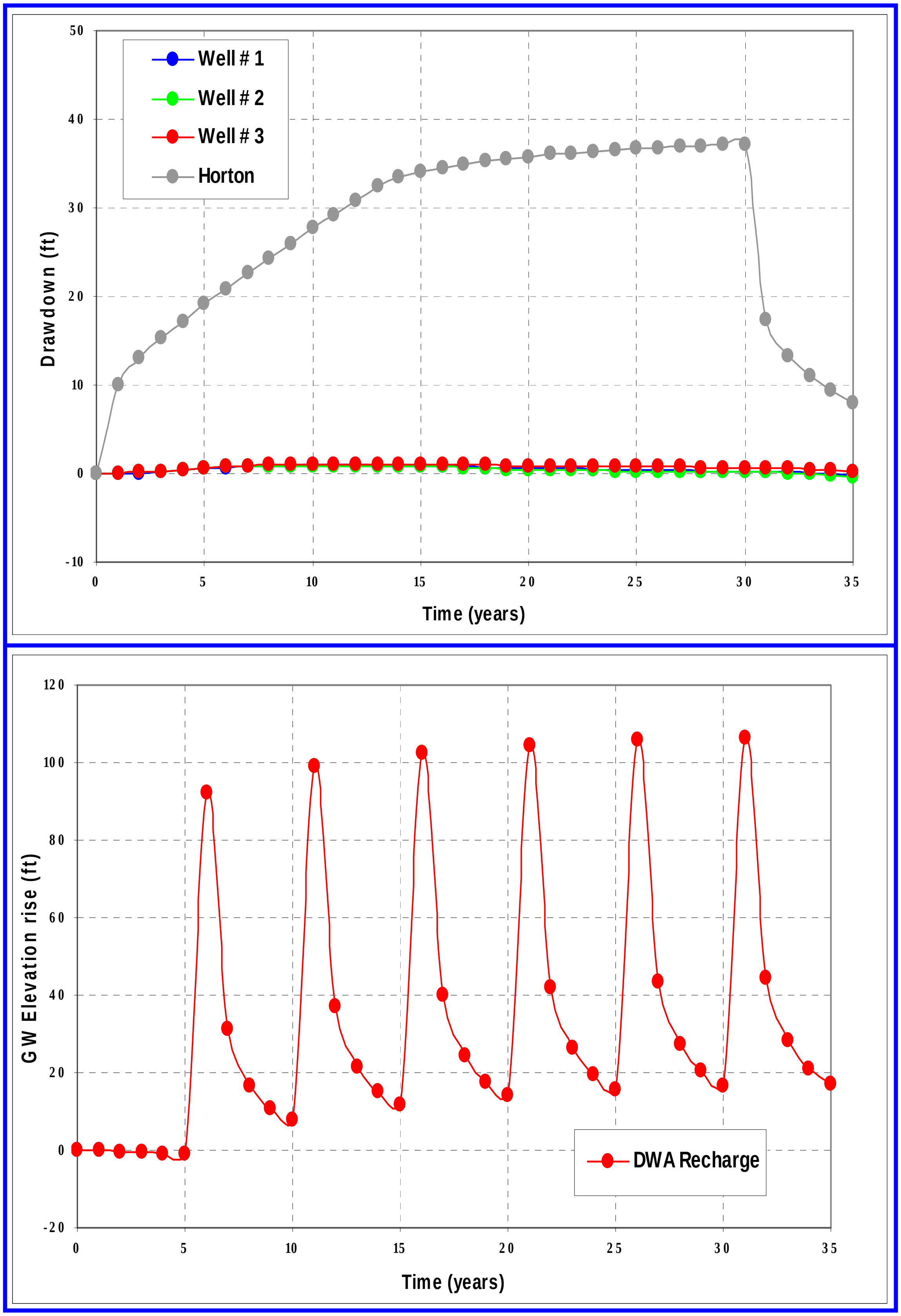


Figure 2C-4: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2C
(Water consumption = 1,100 afy from MSWD wells 28 and 30 and Horton WWTP, 5,500 af recharge every 5 yrs)

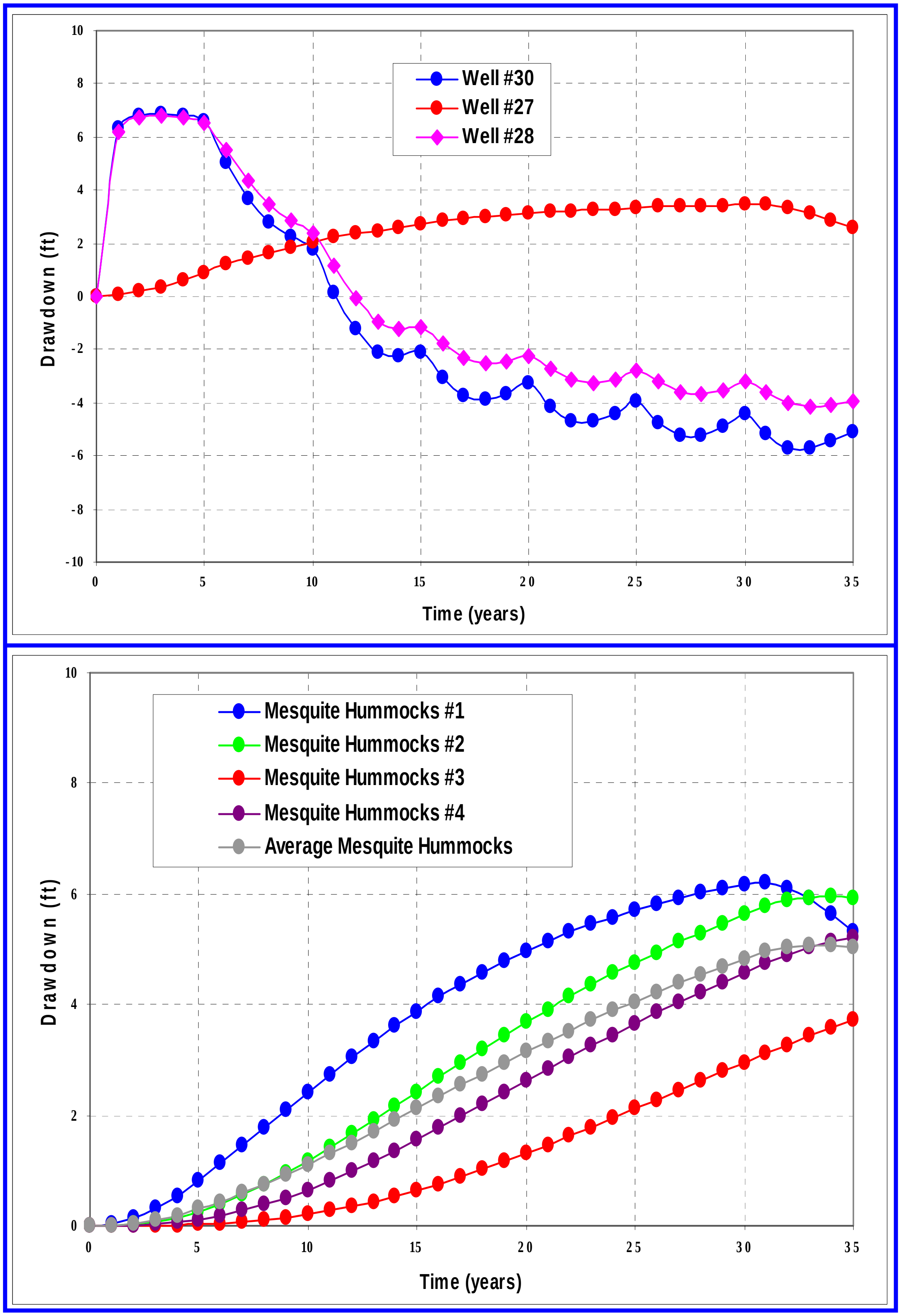


Figure 2C-5: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2C
(Water consumption = 1,100 afy from MSWD wells 28 and 30 and Horton WWTP, 5,500 af recharge every 5 yrs)

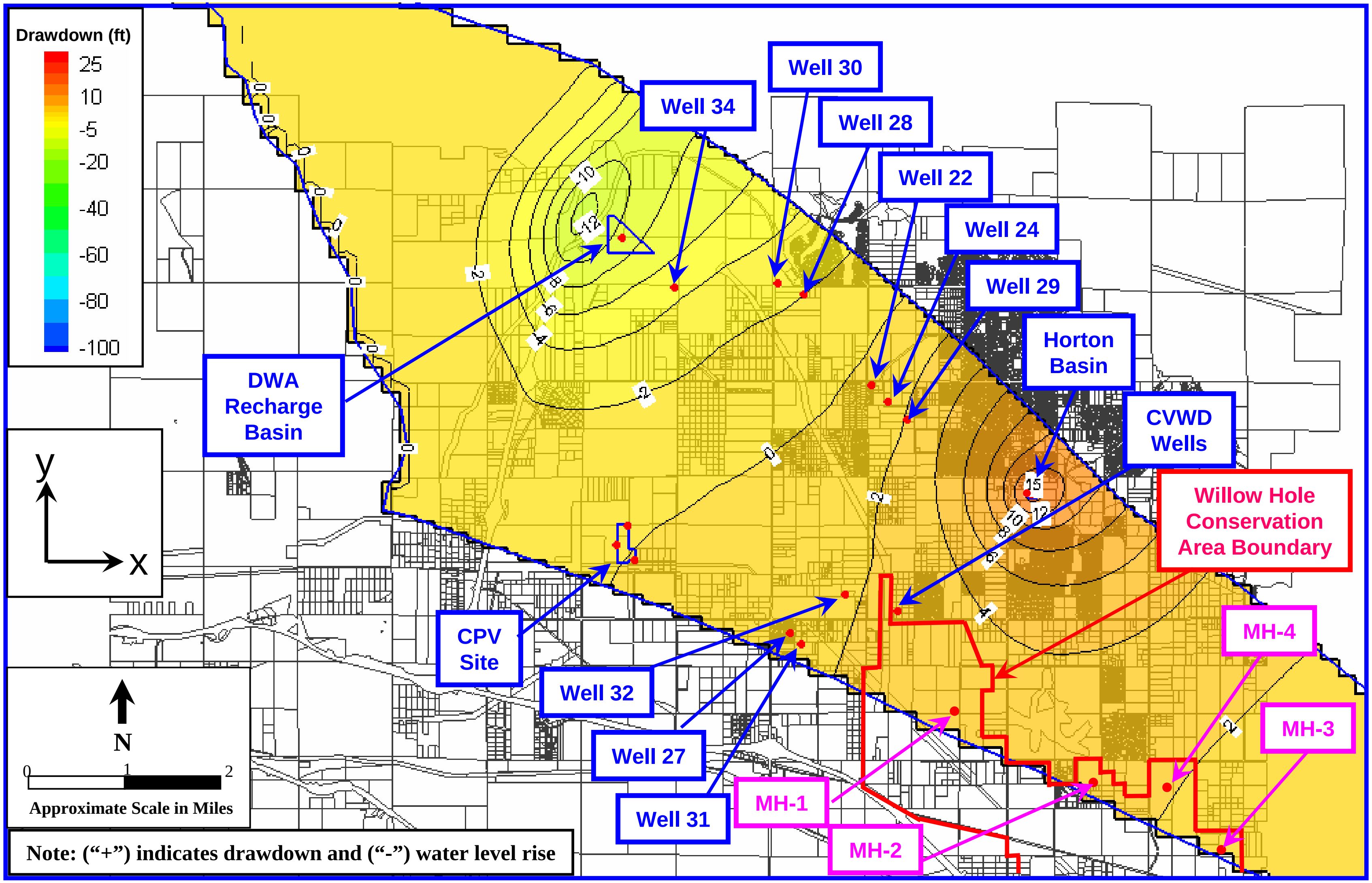


Figure 2C.b-1: Contour Map of Simulated Groundwater Level Changes at 30 Years – Simulation 2C.b

(Water consumption=550 afy, DWA recharge=2,965 af every 5 years, half Tyley's T, anisotropy ratio=1.0)

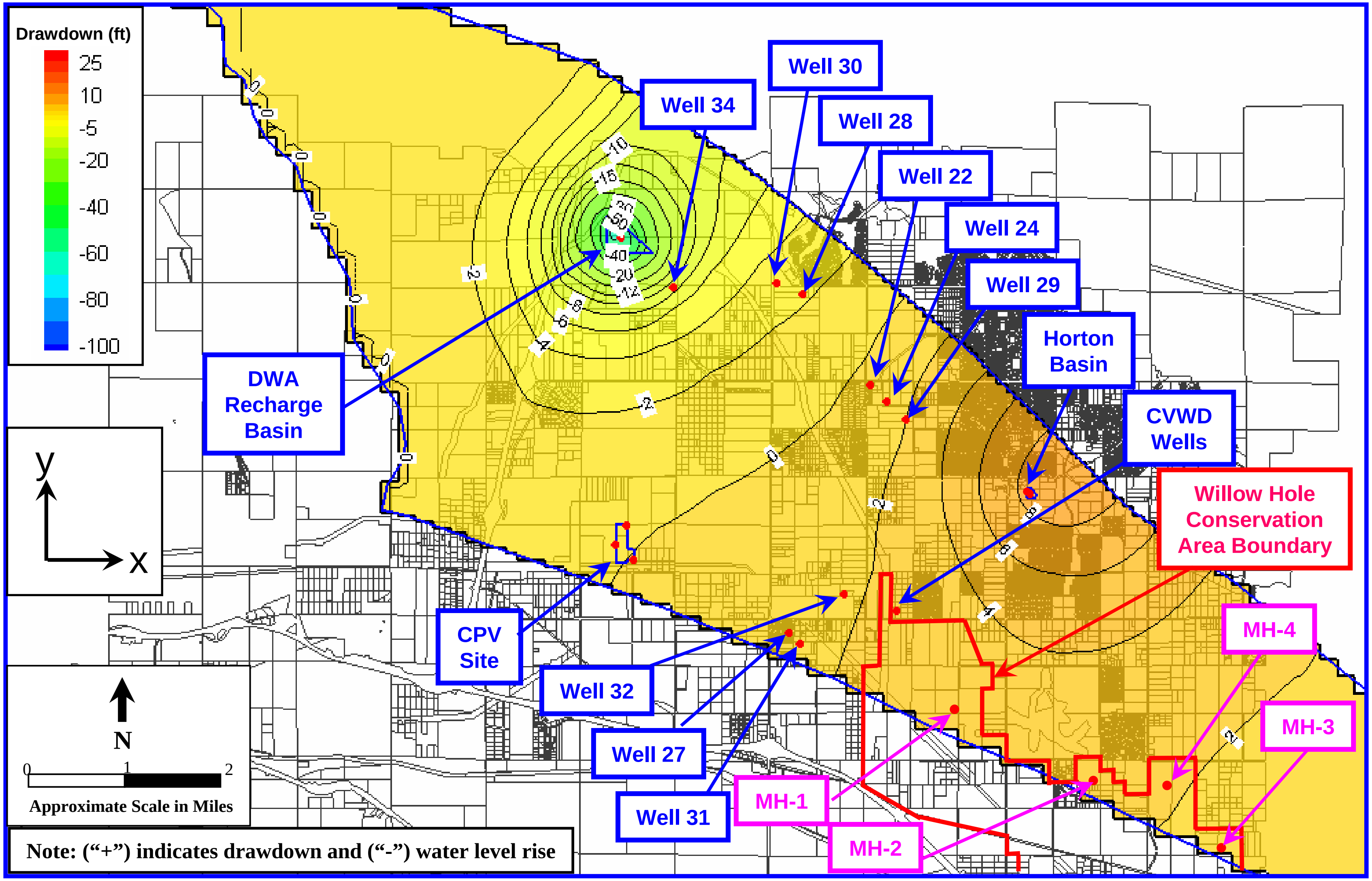


Figure 2C.b-2: Contour Map of Simulated Groundwater Level Changes at 31 Years – Simulation 2C.b

(Water consumption=550 afy, DWA recharge=2,965 af every 5 years, half Tyley's T, anisotropy ratio=1.0)

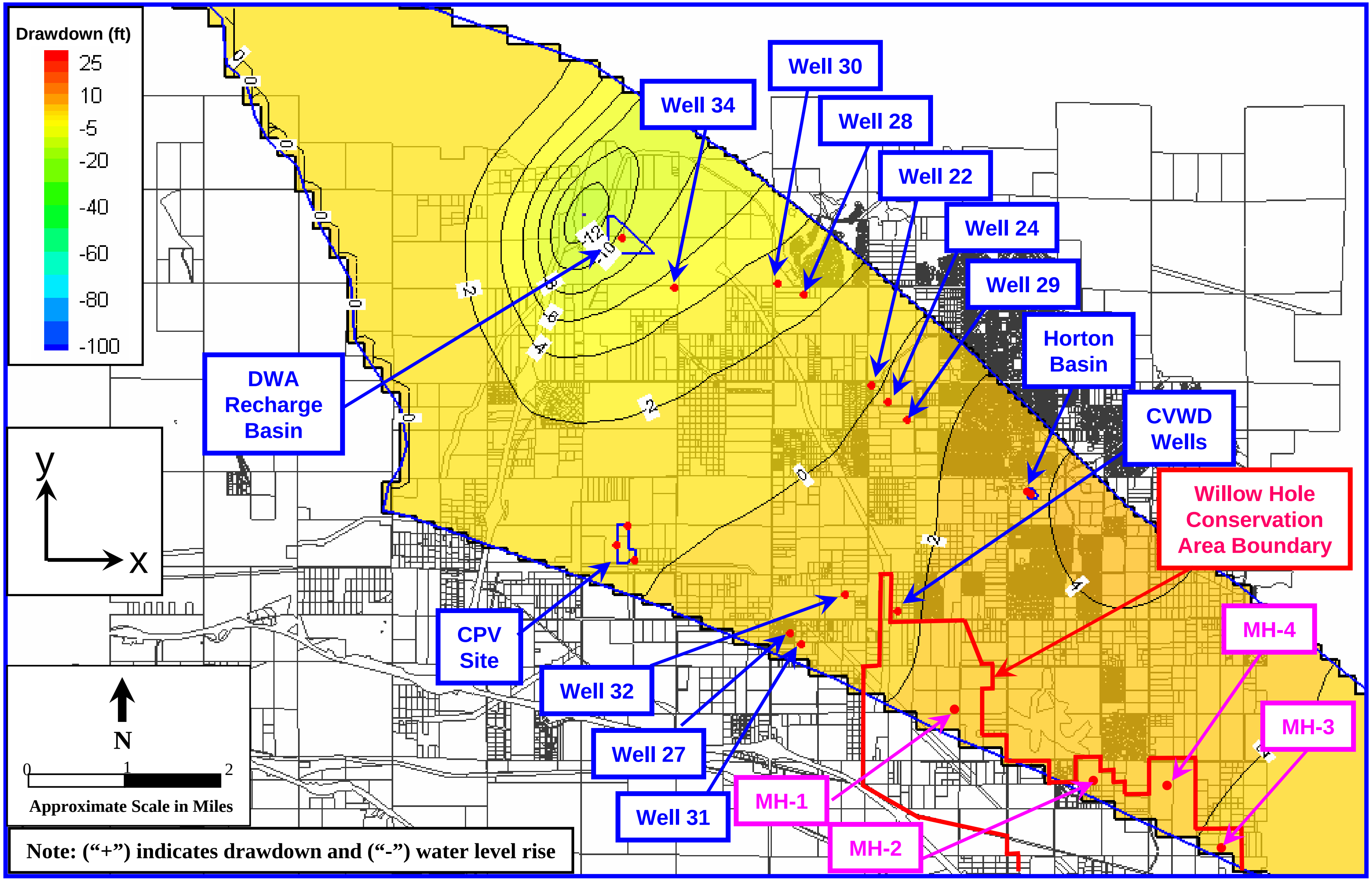


Figure 2C.b-3: Contour Map of Simulated Groundwater Level Changes at 35 Years – Simulation 2C.b

(Water consumption=550 afy, DWA recharge=2,965 af every 5 years, half Tyley's T, anisotropy ratio=1.0)

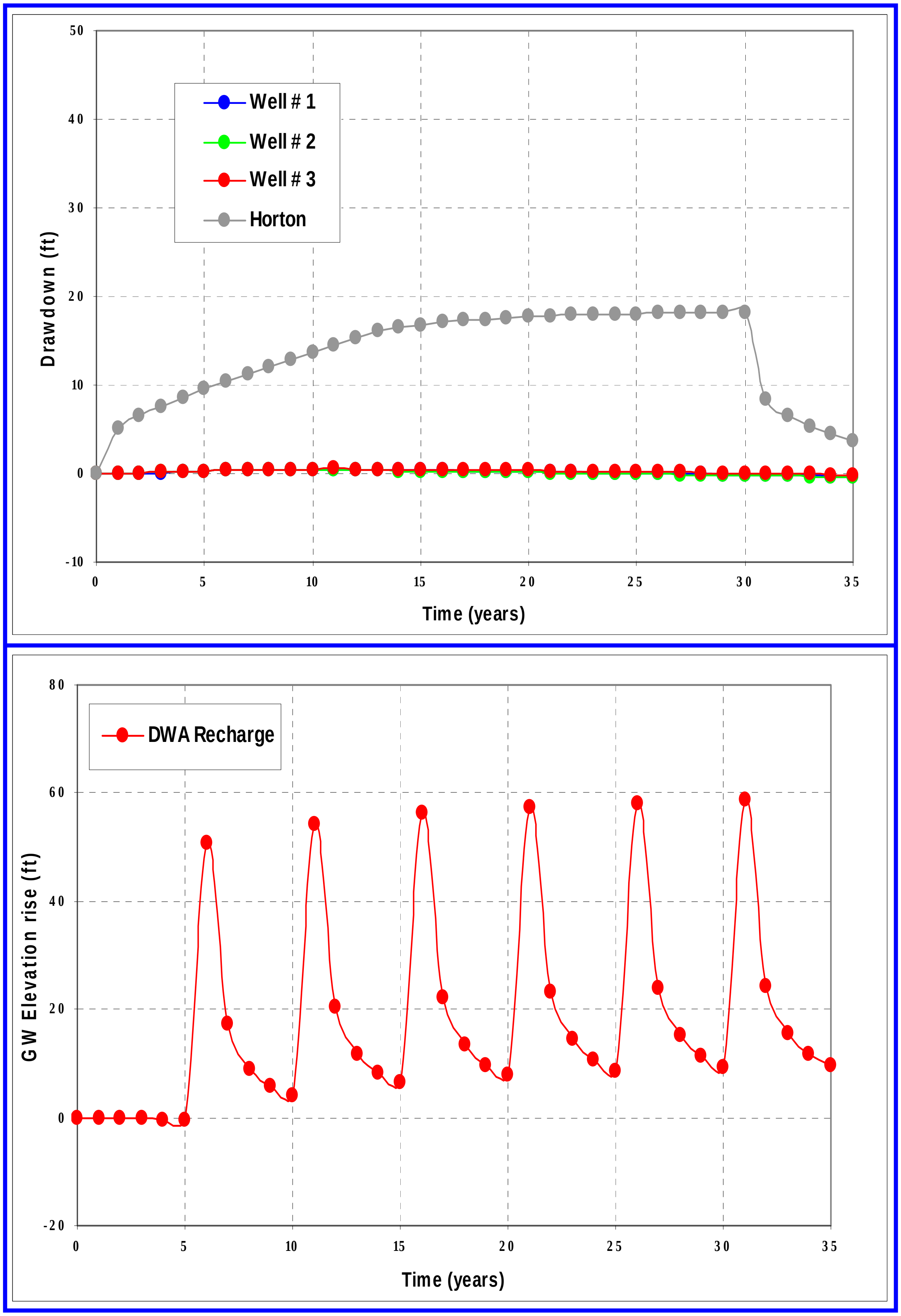
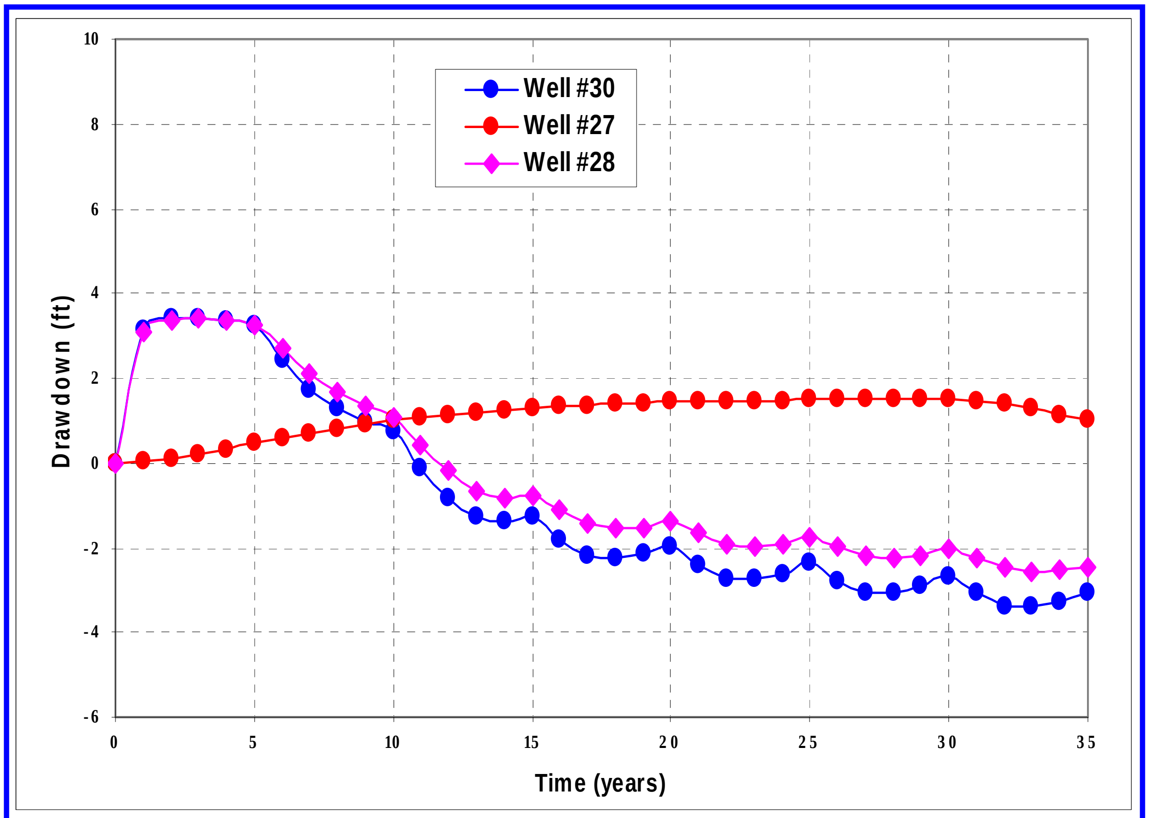


Figure 2C.b-4: Simulated Groundwater Level Change versus Time at Project Wells, Horton WWTP, and DWA Recharge Basin - Scenario 2C.b
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, 2,965 af recharge every 5 yrs)



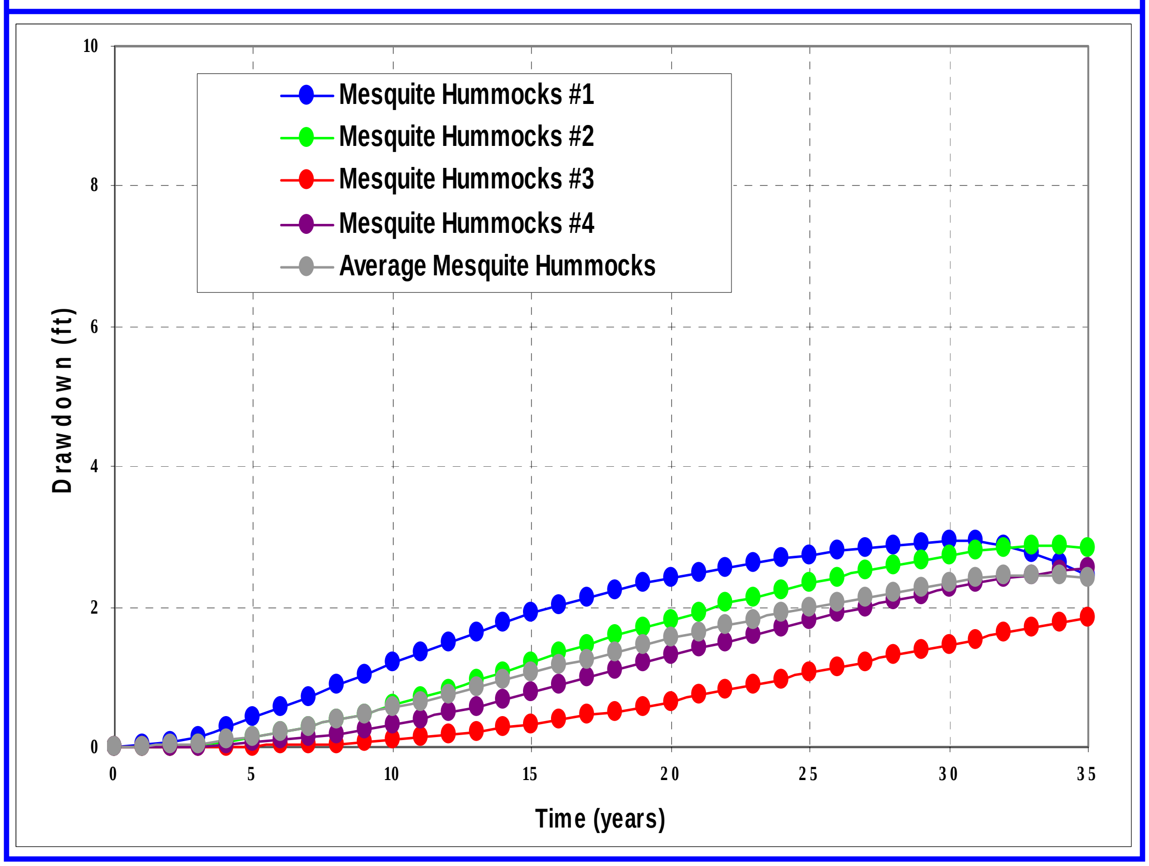


Figure 2C.b-5: Simulated Groundwater Level Change versus Time at MSWD Wells 27, 28, and 30 and Mesquite Hummocks Area - Scenario 2C.b
(Water consumption = 550 afy from MSWD wells 28 and 30 and Horton WWTP, 2,965 af recharge every 5 yrs)

Appendix D

Desert Dunes Water Quality

CHM140 DATE: 1/21/08
WG0282 S1

COACHELLA VALLEY WATER DISTRICT
CHEMICAL REPORT

Location:

Collection
Date: 10/18/05 State No.: 03S05E17M01S

Lab Number: 051018 CVWD No.:

CATIONS:	mg/L	ANIONS:	mg/L
Calcium	83.6	Hydroxide	0.
Magnesium	18.3	Carbonate	0.
Sodium	181.	Bicarbonate	129.
Potassium	9.5	Sulfate	447.
Ammonium	-0-	Chloride	65.4
		Nitrate	3.76
		Nitrite	<0.011
		Fluoride	0.84
Cation Sum	13.80	Anion Sum	13.36

PHYSICAL/CHEMICAL CHARACTERISTICS:

	mg/L		Units
TDS (Evap.)	869.	EC	1290
TDS (USGS)	872	Field pH	8.00
TDS (USSL)	938	Lab pH	8.00
TDS (TAF)	1.182	Percent Sodium	57.04
Tot. Hardness	284.	SAR	4.670
Tot. Alkalinity	105	Boron	-0-

SANITATION/MISC.:	Units	METALS:	ug/L
Field Temp.	106.02	Aluminum	-0-
Turbidity	-0-	Arsenic	-0-
Color	-0-	Barium	-0-
Odor	-0-	Cadmium	-0-
BOD	-0-	Chromium	-0-
TOC	-0-	Copper	-0-
Tot. Susp. Solids	-0-	Iron	-0-
Vol. Susp. Solids	-0-	Lead	-0-
MBAS	-0-	Manganese	-0-
		Mercury	-0-
Radioactivity:	pCi/L	Nickel	-0-
Alpha	-0-	Selenium	-0-
Beta	-0-	Silver	-0-
Ra-226	-0-	Strontium	-0-
Radon	-0-	Zinc	-0-
Uranium	-0-	Antimony	-0-
Cr+6	-0-	Beryllium	-0-
NUTRIENTS:	mg/L	Molybdenum	-0-
Tot. Nitrogen:		Thallium	-0-
Organic	-0-	Vanadium	-0-
Kieldahl	-0-	Lithium	-0-
Tot. Phosphorous	-0-		
Phosphate	-0-	CORRESIVITY INDICES:	Units
		Langlier	0.385
ION BALANCE:	Units	Aggressive	12.517
Observed	-0-	Ryznar's	7.23
Expected	-0-	Larson-Skold	5.27

CHM140
WG0282 S1

DATE: 1/21/08

COACHELLA VALLEY WATER DISTRICT
CHEMICAL REPORT

Location:GRID WELL

Collection
Date: 10/18/05

State No.: 03S05E17M01S

Lab Number: 051018-13

CVWD No.:

CATIONS:	mg/L	ANIONS:	mg/L
Calcium	-0-	Hydroxide	-0-
Magnesium	-0-	Carbonate	-0-
Sodium	-0-	Bicarbonate	-0-
Potassium	-0-	Sulfate	-0-
Ammonium	-0-	Chloride	-0-
		Nitrate	-0-
		Nitrite	-0-
		Fluoride	-0-
Cation Sum	-0-	Anion Sum	-0-

PHYSICAL/CHEMICAL CHARACTERISTICS:

	mg/L		Units
TDS (Evap.)	-0-	EC	-0-
TDS (USGS)	-0-	Field pH	-0-
TDS (USSL)	-0-	Lab pH	-0-
TDS (TAF)	-0-	Percent Sodium	-0-
Tot. Hardness	-0-	SAR	-0-
Tot. Alkalinity	-0-	Boron	-0-

SANITATION/MISC.:	Units	METALS:	ug/L
Field Temp.	-0-	Aluminum	-0-
Turbidity	-0-	Arsenic	<0.1
Color	-0-	Barium	-0-
Odor	-0-	Cadmium	-0-
BOD	-0-	Chromium	-0-
TOC	-0-	Copper	-0-
Tot. Susp. Solids	-0-	Iron	-0-
Vol. Susp. Solids	-0-	Lead	-0-
MBAS	-0-	Manganese	-0-
		Mercury	-0-
Radioactivity:	pCi/L	Nickel	-0-
Alpha	-0-	Selenium	-0-
Beta	-0-	Silver	-0-
Ra-226	-0-	Strontium	-0-
Radon	-0-	Zinc	-0-
Uranium	-0-	Antimony	-0-
Cr+6	-0-	Beryllium	-0-
NUTRIENTS:	mg/L	Molybdenum	-0-
Tot. Nitrogen:		Thallium	-0-
Organic	-0-	Vanadium	-0-
Kieldahl	-0-	Lithium	-0-
Tot. Phosphorous	-0-		
Phosphate	-0-	CORRESIVITY INDICES:	Units
		Langlier	-0-
ION BALANCE:	Units	Aggressive	-0-
Observed	-0-	Ryznar's	-0-
Expected	-0-	Larson-Skold	-0-

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PH (951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client Name: Southwest Pump & Drilling
Contact: Chris Wassdorp
Address: 53-381 Hwy 111
Coachella, CA 92236

Report Date: 15-Sep-2006

Analytical Report: Page 1 of 9
Project Name: No Project
Project Number: No Project

Work Order Number: A6H2833

Received on Ice (Y/N): Yes Temp: 3 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department at the phone number above.

Sample Identification

Lab Sample #	Client Sample ID	Matrix	Date Sampled	By	Date Submitted	By
A6H2833-01	Desert Dunes	Water	08/31/06 11:04	597	08/31/06 14:30	K. Snyder

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Contact: Chris Waesdorp
Address: 53-381 Hwy 111
Coachella, CA 92236

Report Date: 15-Sep-2006

Analytical Report: Page 2 of 9
Project Name: No Project
Project Number: No Project

Work Order Number: A6H2833
Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number
A6H2833-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
Desert Dunes	Water	08/31/06 11:04	08/31/06 14:30

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Cations								
Total Hardness	180	3.0		mg/L	SM 2120B	09/08/06 19:17	lmt	
Calcium	54	1.0		mg/L	EPA 200.7	09/08/06 19:17	lmt	
Magnesium	10	1.0		mg/L	EPA 200.7	09/08/06 19:17	lmt	
Sodium	140	1.0		mg/L	EPA 200.7	09/08/06 19:17	lmt	
Potassium	7.4	1.0		mg/L	EPA 200.7	09/08/06 19:17	lmt	
Total Cations	9.7	0.05		me/L	Calculation			
Anions								
Total Alkalinity	110	3.0		mg/L	SM 2320B	09/08/06 14:00	ctn	
Hydroxide	ND	3.0		mg/L	SM 2320B	09/08/06 14:00	ctn	
Carbonate	ND	3.0		mg/L	SM 2320B	09/08/06 14:00	ctn	
Bicarbonate	140	3.0		mg/L	SM 2320B	09/08/06 14:00	ctn	
Chloride	48	1.0		mg/L	EPA 300.0	08/31/06 20:24	PN	
Sulfate	330	0.50		mg/L	EPA 300.0	08/31/06 20:24	PN	
Fluoride	1.4	0.1		mg/L	SM 4500F C	09/07/06 16:30	dlg	
Nitrate	4.8	1.0		mg/L	EPA 300.0	08/31/06 20:24	PN	
Total Anions	10.57	0.05		me/L	Calculation			
Aggregate Properties								
pH	7.8	1.0		pH Units	SM 4500H+ B	08/31/06 20:00	jaf	
Specific Conductance	1100	1.0		umhos/cm	SM 2510 B	08/31/06 20:00	jaf	
Aggressive Index	12.0			N/A	Calculation			
Solids								
Total Dissolved Solids	880	20		mg/L	SM 2540C	08/31/06 19:29	af	

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Contact: Chris Wassdorp
Address: 53-381 Hwy 111
Coachella, CA 92236

Report Date: 15-Sep-2006

Analytical Report: Page 3 of 9
Project Name: No Project
Project Number: No Project

Work Order Number: A6H2833
Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number
A6H2833-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
Desert Dunes	Water	08/31/06 11:04	08/31/06 14:30

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
General Physical								
Color	ND	3.0		Color Units	SM 2120B	09/01/06 19:05	af	
Odor	ND	1.0		T.O.N.*	SM 2150	09/01/06 19:05	af	
Turbidity	0.71	0.20		NTU	SM 2130 B	09/01/06 19:05	af	
Surfactants								
MBAS	ND	0.05		mg/L	SM 5540C	09/01/06 15:55	jaf	
General Inorganics								
Cyanide	ND	100		ug/L	SM 4500CN E	09/06/06 11:44	dlg	
Perchlorate	ND	4.0	1.4	ug/L	EPA 314.0	09/01/06 21:39	AA	
Nutrients								
Nitrite as N	ND	100		ug/L	SM 4500NO2 B	08/31/06 20:20	pn	
Metals and Metalloids								
Aluminum	ND	50		ug/L	EPA 200.7	09/08/06 19:18	lmt	
Antimony	ND	6.0		ug/L	EPA 200.8	09/06/06 18:23	krv	
Arsenic	ND	2.0		ug/L	EPA 200.8	09/08/06 16:07	la	
Barium	ND	100		ug/L	EPA 200.8	09/06/06 18:23	krv	
Beryllium	ND	1.0		ug/L	EPA 200.8	09/06/06 18:23	krv	
Boron	210	100		ug/L	EPA 200.7	09/08/06 19:18	lmt	
Cadmium	ND	1.0		ug/L	EPA 200.8	09/06/06 18:23	krv	
Total Chromium	23	1.0		ug/L	EPA 200.8	09/08/06 14:50	la	
Copper	ND	50		ug/L	EPA 200.8	09/06/06 18:23	krv	
Iron	ND	100		ug/L	EPA 200.7	09/08/06 19:18	lmt	
Lead	ND	5.0		ug/L	EPA 200.8	09/06/06 18:23	krv	
Manganese	ND	20		ug/L	EPA 200.8	09/06/06 18:23	krv	

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Client Name: Southwest Pump & Drilling
Contact: Chris Waasdorp
Address: 53-381 Hwy 111
Coachella, CA 92236

Report Date: 15-Sep-2006

Project Name: No Project
Project Number: No Project

Work Order Number: A6H2833
Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number
A6H2833-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
Desert Dunes	Water	08/31/06 11:04	08/31/06 14:30

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Metals and Metalloids								
Mercury	ND	1.0		ug/L	EPA 200.8	09/06/06 18:23	krv	
Nickel	ND	10		ug/L	EPA 200.8	09/06/06 18:23	krv	
Selenium	ND	5.0		ug/L	EPA 200.8	09/06/06 16:07	la	
Silver	ND	10		ug/L	EPA 200.8	09/06/06 18:23	krv	
Thallium	ND	1.0		ug/L	EPA 200.8	09/06/06 18:23	krv	
Vanadium	18	3.0		ug/L	EPA 200.8	09/08/06 14:50	la	
Zinc	ND	50		ug/L	EPA 200.8	09/06/06 18:23	krv	
EDB and DBCP by EPA 504								
Ethylene dibromide	ND	0.020		ug/L	EPA 504.1	09/11/06 23:12	kos	
Dibromochloropropane	ND	0.010		ug/L	EPA 504.1	09/11/06 23:12	kos	
Nitrogen-Phosphorus Pesticides by EPA 507								
Alachlor	ND	1.0		ug/L	EPA 507	09/08/06 17:54	CMP	
Atrazine	ND	0.50		ug/L	EPA 507	09/08/06 17:54	CMP	
Butachlor	ND	0.38		ug/L	EPA 507	09/08/06 17:54	CMP	
Diazinon	ND	0.25		ug/L	EPA 507	09/08/06 17:54	CMP	
Metolachlor	ND	1.0		ug/L	EPA 507	09/08/06 17:54	CMP	
Metribuzin	ND	1.0		ug/L	EPA 507	09/08/06 17:54	CMP	
Molinate	ND	0.90		ug/L	EPA 507	09/08/06 17:54	CMP	
Prometryn	ND	2.0		ug/L	EPA 507	09/08/06 17:54	CMP	
Simazine	ND	1.0		ug/L	EPA 507	09/08/06 17:54	CMP	
Thiobencarb	ND	1.0		ug/L	EPA 507	09/08/06 17:54	CMP	
Surrogate: 1,3-Dimethyl-2-Nitrobenzene	*82.8 %*	*70-130*			EPA 507	09/08/06 17:54	CMP	

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Client Name: Southwest Pump & Drilling
Contact: Chris Wassdorp
Address: 53-381 Hwy 111
Coachella, CA 92236

Report Date: 15-Sep-2006

Analytical Report: Page 5 of 9
Project Name: No Project
Project Number: No Project

Work Order Number: A6H2833
Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number
A6H2833-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
Desert Dunes	Water	08/31/06 11:04	08/31/06 14:30

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Chlorinated Herbicides by EPA 515.3								
2,4,5-TP Silvex	ND	1.0		ug/L	EPA 515.3	09/07/06 01:52	DTI	
2,4-D	ND	10		ug/L	EPA 515.3	09/07/06 01:52	DTI	
Bentazon	ND	2.0		ug/L	EPA 515.3	09/07/06 01:52	DTI	
Dalapon	ND	10		ug/L	EPA 515.3	09/07/06 01:52	DTI	
Dicamba	ND	1.5		ug/L	EPA 515.3	09/07/06 01:52	DTI	
Dinoseb	ND	2.0		ug/L	EPA 515.3	09/07/06 01:52	DTI	
Pentachlorophenol	ND	0.20		ug/L	EPA 515.3	09/07/06 01:52	DTI	
Pichloram	ND	1.0		ug/L	EPA 515.3	09/07/06 01:52	DTI	
Surrogate: DCAA	*88.4 %*	*70-130*			EPA 515.3	09/07/06 01:52	DTI	
Volatile Organic Compounds by EPA 524.2								
1,1,1,2-Tetrachloroethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,1,1-Trichloroethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,1,2,2-Tetrachloroethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,1,2-Trichloroethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,1-Dichloroethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,1-Dichloroethene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,1-Dichloropropene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,2,3-Trichlorobenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,2,4-Trichlorobenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,2,4-Trimethylbenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,2-Dichlorobenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,2-Dichloroethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,2-Dichloropropane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,3,5-Trimethylbenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	

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Report Date: 15-Sep-2006

Analytical Report: Page 6 of 9
Project Name: No Project
Project Number: No Project

Work Order Number: A6H2833
Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number
A6H2833-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
Desert Dunes	Water	08/31/06 11:04	08/31/06 14:30

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Volatile Organic Compounds by EPA 524.2								
1,3-Dichlorobenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,3-Dichloropropane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
1,4-Dichlorobenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
2,2-Dichloropropane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
2-Butanone(MEK-EPA 8260)	ND	5.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
2-Chlorotoluene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
4-Chlorotoluene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
4-Methyl-2-Pentanone(MIBK)	ND	5.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
Benzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Bis(2-chloroethyl)ether (Non-NELAP)	ND	5.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
Bromobenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Bromochloromethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Bromodichloromethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Bromoform	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Bromomethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Carbon Tetrachloride	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Chlorobenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Chloroethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Chloroform	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Chloromethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
cis-1,2-Dichloroethene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
cis-1,3-Dichloropropene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Dibromochloromethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Dibromomethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	

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Report Date: 15-Sep-2006

Analytical Report: Page 7 of 9
Project Name: No Project
Project Number: No Project

Work Order Number: A6H2833

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

A6H2833-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
Desert Dunes	Water	08/31/06 11:04	08/31/06 14:30

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Volatile Organic Compounds by EPA 524.2								
Dichlorodifluoromethane	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Diisopropyl ether	ND	3.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
Ethyl tert-Butyl Ether	ND	3.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
Ethylbenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Hexachlorobutadiene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Isopropylbenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Methyl tert butyl Ether	ND	3.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
Methylene Chloride	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
n-Butylbenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
n-Propylbenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Naphthalene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
p-Isopropyltoluene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
sec-Butylbenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Styrene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
tert-Amyl Methyl Ether	ND	3.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
tert-Butyl alcohol	ND	2.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
tert-Butylbenzene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Tetrachloroethene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Toluene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
trans-1,2-Dichloroethene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
trans-1,3-Dichloropropene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Trichloroethene	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Trichlorofluoromethane	ND	5.0		ug/L	EPA 524.2	09/02/06 00:57	JES	
Trichlorotrifluoroethane	ND	10		ug/L	EPA 524.2	09/02/06 00:57	JES	
Vinyl Chloride	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	

ACCREDITED IN ACCORDANCE WITH nelac

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6100 Quail Valley Court Riverside, CA 92507-0704
P.O. Box 432 Riverside, CA 92502-0432
PH (951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client Name: Southwest Pump & Drilling
Contact: Chris Waasdorp
Address: 53-381 Hwy 111
Coachella, CA 92236

Report Date: 15-Sep-2006

Analytical Report: Page 8 of 9
Project Name: No Project
Project Number: No Project

Work Order Number: A6H2833
Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number
A6H2833-01

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
Desert Dunes	Water	08/31/06 11:04	08/31/06 14:30

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Volatile Organic Compounds by EPA 524.2								
Xylenes (m+p)	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Xylenes (ortho)	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Xylenes (Total)	ND	0.50		ug/L	EPA 524.2	09/02/06 00:57	JES	
Surrogate: 1,2-Dichloroethane-d4	*112 %*	*50-150*			EPA 524.2	09/02/06 00:57	JES	
Surrogate: Bromofluorobenzene	*84.6 %*	*50-150*			EPA 524.2	09/02/06 00:57	JES	
Surrogate: Toluene-d8	*97.0 %*	*50-150*			EPA 524.2	09/02/06 00:57	JES	
1,2,3-TCP by Purge & Trap GC/MS								
1,2,3-Trichloropropane	ND	0.005		ug/L	CA DHS-SRL	09/05/06 12:51	JES	

* NELAP does not offer accreditation for this analyte/method/matrix combination

E.S. BABCOCK & SONS, INC.
Established 1906

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Notes and Definitions

ND: Analyte NOT DETECTED at or above the Method Detection Limit (if MDL is reported), otherwise at or above the Reporting Limit (RL)

NR: Not Reported

RDL: Reportable Detection Limit

MDL: Method Detection Limit

* / (Non-NELAP): NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted. Babcock Laboratories and its officers and employees assume no responsibility and make no warranty, express or implied, for uses or interpretations made by any recipients, intended or unintended, of this report.

☒ James K. Babcock, President
☐ Allison Mackenzie, General Manager
☐ Lawrence J. Chrystal, Laboratory Director

cc:

Coachella Valley W[illegible] [illegible]strict – Chain of Custody

To: E.S. Babcock & Sons Laboratory
6100 Quail Valley Court
Riverside, CA 92507

Route: 49 | PLEASE RETURN ___ CLIENT ICE CHEST(S)

Sample Date	Sample Time	ID	Sample Site # / Cyc, Sys	Sample Site Location / Sampling Instructions	Requested Analysis / Container(s): No., Type	SM	ST	PRES	#	pH	EC (µS/cm)	Temp (° __)	Cl₂ Free	Cl₂ Total	Comments
060831	1055	597	.	Desert Dunes Test Zone= ______	Gen. Min./Phys., ClO4 (J), Aggres. Index 1ea, 2L, poly	GW	GR	1	1	7.6	1033	28.8			Turbidity 0.84
	1056		"	" "	Inorganic chemical (w/F & Boron) 1ea, 1L, poly	GW	GR	N	1						
	1057		"	" "	Method 524.2 2ea, 40 ml., VOA	GW	GR	C	2	"	"	"	"		
	1058		"	" "	Method 504.3 2ea, 40 ml., VOA	GW	GR	I	2						
	1059		"	" "	Method 507 1ea, 1L, amber glass	GW	GR	I	1	"	"				
	1100		"	" "	Method 515.3 1ea, 1L, amber glass	GW	GR	I	1						
	1101		"	" "	Method 547 (Glyphosate) 2ea, 40 ml., VOA	GW	GR	I	2						
	1102		"	" "	Method 549.1 (Diquat) 1ea, 2L, poly	GW	GR	I	1						
	1103		"	" "	Gross Alpha 1ea, 1L, poly	GW	GR	N	1	"	"	"	"		
	1104				1,2,3 TCP 2ea, 40ml, VOA	GW	GR	I	2						

- ○ 48 Rush
- ✓ Standard turn around
- ✓ No Title 22 Report
- ○ Title 22 Report
- ○ File EDT as exempt for this proposed source
- ✓ Direct delivery (courier)
- ○ Overnight shipment
- ○ Standard shipment

Preservation Codes: I=Ice, N=HNO3, S=H2SO4, O=NaOH, C=HCl, P=Provided
Sample Matrix Codes: GW=Groundwater, SW=Surface water, W=Wastewater, SO=Soil, SL=Sludge, O=Other
Sample Type Codes: GR=Grab, FD=First Draw, CO=Composite-24hr, FI=Filtered, RT=Routine, RE=Repeat, RA=Replacement, SP=Special, TE=Test, IN=Inspection ...

Released By	Employee ID No.	Company	Date	Time	Received By	Employee ID No.	Company	Date	Time
[signature]	597	CVWD	060831	1159	[signature]	541	CVWD	060831	1157
[signature]	541	CVWD	060831	1247	[signature]		ESB	060831	1247
		ESB	060831	1430	[signature]			8/31/06	1430

Page 1

CB83

A6H2833AB

AUG 3 1 2006

Appendix E

Water Treatment Cost Study

EVALUATION OF THE USE OF HORTON WWTP RECLAIM WATER FOR PLANT MAKEUP

SENTINEL POWER PLANT (Competitive Power Ventures)

March 2008

AQUAGENICS Incorporated
Woburn, Massachusetts

March 2008

EVALUATION OF THE USE OF HORTON WWTP RECLAIM WATER FOR PLANT MAKEUP

SENTINEL POWER PLANT (CPV)
March 2008

INTRODUCTION

The Sentinel Power Project (‘Project’) is being developed in Southern California by Competitive Power Ventures (CPV), near the Palm Springs area. The Project will consist of eight simple-cycle, gas-fired combustion turbines and will generate approximately 800 MW. The plant requires makeup water for various uses including cooling tower makeup, plant service water, makeup for the production of demineralized water for use as injection water (NO_X control), and for combustion turbine inlet air cooling. The plant is being designed as a zero liquid discharge (ZLD) facility. No wastewaters will be discharged from the site. Solid wastes from the plant will be collected for off-site disposal at suitable, licensed facilities.

Prior water supply and treatment evaluations had primarily focused on using well waters. Use of the Horton Wastewater Treatment Plant (HWWTP) plant effluent, upgraded to tertiary standards, has been considered but its capacity is currently insufficient to instantaneously supply the Sentinel plant’s entire makeup water requirements. Therefore, use of on-site reclaim water storage would be required to make up this reclaim water shortfall otherwise its use would need to be supplemented with groundwater. The cost of these storage tanks is not included in this evaluation.

Regardless of the HWWTP capacity at this time, this report assesses the potential design and associated cost impacts to the various water treatment system designs of using 100% tertiary-treated reclaim water from the HWWTP as plant makeup to the Project assuming that sufficient supply is available from the HWWTP. This evaluation also assumes that the HWWTP will provide reclaim water of tertiary-treated quality meeting the CA Title 22 requirements for industrial reuse of reclaim waters.

This evaluation was done from the perspective of treating part of the tertiary-treated reclaim water from the HWWTP to achieve a final blended plant makeup water supply of 300 mg/L total dissolved solids (TDS). The HWWTP tertiary-treated effluent TDS has been estimated to be approximately 650 mg/L, as further discussed below.

The 300 mg/L TDS value was considered to be a conservative estimate of the on-site well water supply to be developed. Earlier analysis of an existing, on-site domestic well indicated a TDS level of approximately 150 mg/L.

No data has been received on the HWWTP effluent TDS, but the permit for the facility allows water to be discharged in a range of up to 400 mg/L TDS above the existing sub-basin TDS levels. Existing sub-basin TDS values from MSWD wells range from about

240 to 530 mg/L. Given the concentrations that typically occur in wastewater flows, and the permitting limits of the HWWTP, it was conservatively assumed that the effluent TDS would be approximately 650 mg/L. Other HWWTP effluent parameters are discussed below.

EVALUATION

The proposed water treatment and wastewater ZLD processes are illustrated on the attached Water Balance Process Diagram. A table of the expected process flow rates at a high summer operating condition (107 ^{o}F DBT) is also attached. This summer operating condition represents a sufficiently high plant makeup water usage to provide an appropriate basis for sizing the water and wastewater treatment equipment. The major treatment processes include the following systems:

Plant Makeup Pretreatment

A portion of the reclaim water supply will be treated using a reverse osmosis (RO) system. The product water from the RO system will be blended with the balance of the reclaim water supply to achieve the desired 300 mg/L TDS level, to match the assumed well water TDS. The RO system will require pretreatment to protect the membrane elements from fouling. A multimedia pressure filtration system is included for this purpose. However, it should be noted that a multimedia filtration system may be inadequate to properly pretreat the RO feedwater. In this case a significantly more expensive microfiltration (MF) system would be required. However, this evaluation has, at this time, assumed the more optimistic choice, i.e., multimedia filtration use.

Wastewater (RO reject and multimedia filter backwash) will be forwarded to the ZLD system for processing.

Demineralized Water Makeup System (MDS)

A permanently installed MDS is used to provide demineralized water. The system is designed to be capable of operating with a feedwater of up to 100% untreated reclaim water supply (that is, no reclaim pretreatment, a resultant TDS of 650 mg/L). However, the system will normally operate on the 300 mg/L TDS blended plant makeup water. The system includes MF, RO, and electrodeionization (EDI).

Some of the wastewater generated in this system will be recovered for reuse (RO reject to the cooling tower and EDI concentrate recycled in the MDS or sent to the cooling tower) while the balance (MF backwash) is forwarded to the ZLD system for processing.

ZLD System

The cooling tower blowdown, along with the previously mentioned plant wastewaters, will be processed through the ZLD system to eliminate the plant liquid waste streams. The ZLD processes include softening MF, RO, and a crystallizer. RO product water is recovered as makeup to the cooling tower. Distillate from the crystallizer is recovered as makeup to the MDS. The ZLD system produces two solid waste streams, i.e., approximately 25% to 40% dry solids cake from the softening MF process and approximately 90% dry solids cake from the crystallizer.

In addition, the evaluation included the following assumptions:

1. A water quality characterization has not been received for the HWWTP secondary-treated reclaim water. Therefore an estimated water quality characterization was prepared based on several assumptions. It is assumed that the ratio of the individual ions in the reclaim water is similar to that as in the Mission Springs well water. In addition, estimates were made for various other currently unknown constituents that may be present in the reclaim water and could adversely affect treatment equipment design and performance. These include - phosphate (5 mg/L), barium (0.1 mg/L), strontium (0.3 mg/L), iron (0.1 mg/L), manganese (0.02 mg/L), silica (25 mg/L), ammonia-N (2.0 mg/L), and total organic carbon (5 to 10 mg/L).

2. The HWWTP currently produces a secondary-treated effluent quality. Tertiary-treatment, including phosphate reduction, will be added to the Horton WWTP plant to provide makeup water for the Project. The cost for the HWWTP upgrades is not included in this cost estimate.

3. It is assumed the plant will use the total tertiary-treated effluent from the HWWTP (up to 2 MGD) for the Sentinel plant operation. Plant makeup water shortfalls will be made up from large on-site storage tanks. These tanks have not been sized or their costs included in this evaluation. These tanks will need to be designed with the ability to add sodium hypochlorite (for disinfection and biofilm control), with high recirculation rates, with internal collection and distribution headers, and with the ability to periodically pump out deposited solids from the tank bottoms and filter these solids out. Wastewater from these filters would be added to the MF/RO blowdown treatment system (ZLD system), perhaps slightly increasing the size of this system. These potential intermittent wastewaters have not been included in the attached water balance. Equipment cost estimates for the chlorination and filtration systems are included in this evaluation.

4. A mass balance to verify the circulating water chemistry for the case examined here has not yet been done. Based on earlier work, it is assumed that the circulating water chemistry will be acceptable.

5. Cleaning Wastewaters - The water treatment equipment membrane-based components will require periodic, infrequent chemical cleaning, i.e., RO membranes, MF membranes, and EDI stacks. It is anticipated that the MF, RO, and EDI cleaning wastewaters will be collected and neutralized by equipment provided with the ZLD system. These neutralized wastewaters would then be bled into the ZLD system for disposal. In addition, the crystallizer may require a chemical cleaning on an infrequent basis and may also require regular purges (perhaps weekly). The need for purges depends on the final nitrate concentrations achieved in the crystallizer. Purge volume could be as much as 3% of the feed rate (in this case, approximately 1.9 gpm). These crystallizer purge and chemical cleaning wastewaters cannot be fed back into the ZLD system. Both would most likely require collection, perhaps dewatering, and off-site disposal at a suitable licensed facility. None of these membrane cleaning wastewaters or crystallizer wastewaters are included in the attached water balance.

RESULTS

Based on the criteria established in this evaluation and the process flow rates determined from the plant water balance, the following treatment equipment (each with its ancillary equipment) is proposed:

Process	Capacity	Configuration
Multimedia Filters	1250 gpm (feed)	5 x 25%
Reclaim Water RO System	950 gpm (product)	3 x 50%
MDS MF System	950 gpm (product)	3 x 50%
MDS RO System	760 gpm (product)	3 x 50%
MDS EDI System	690 gpm (product)	3 x 50%
ZLD MF System (with dewatering equipment)	1020 gpm (product)	Multiple trains - TBD
ZLD RO System	690 gpm (product)	3 x 50%
ZLD Crystallizer (with dewatering equipment)	60 gpm	1 x 100%
Reclaim Water Storage Tank	TBD	TBD
Reclaim Water Storage Tank – Chlorination System	TBD	1 x 100%
Reclaim Water Storage Tank – Filtration System	TBD	1 x 100%

Based on these estimated equipment sizes and configurations, the following equipment cost estimates are provided. These estimates do not include installation cost or a contingency factor.

Process	**Estimated Capital Cost ($MM)**	**Comment**
Multimedia Filters	0.30	In-house estimate
Reclaim Water RO System	1.50	In-house estimate
MDS System (MF, RO, EDI)	3.75	In-house estimate
ZLD MF/RO System	6.60	Scaled up based on previous quotation and flow increase (0.6 exponential factor)
ZLD Crystallizer (with dewatering equipment)	5.90	Scaled up based on previous quotation and flow increase (0.6 exponential factor)
Reclaim Water Storage Tank	By Others	Cost by Others
Reclaim Water Storage Tank – Chlorination System	0.15	In-house estimate
Reclaim Water Storage Tank – Filtration System	0.25	In-house estimate
TOTAL	**18.45**	

Please note the following background items concerning the development of this cost estimate:

1. The cost estimates provided above are based on extrapolations of various cost estimates obtained in the earlier base case evaluation. More detailed engineering is required to refine this cost estimate.

2. The tertiary-treatment equipment cost estimate was included in the earlier base case evaluation. This was not included here because these items outside of the site boundary (including pipelines) are separately estimated elsewhere.

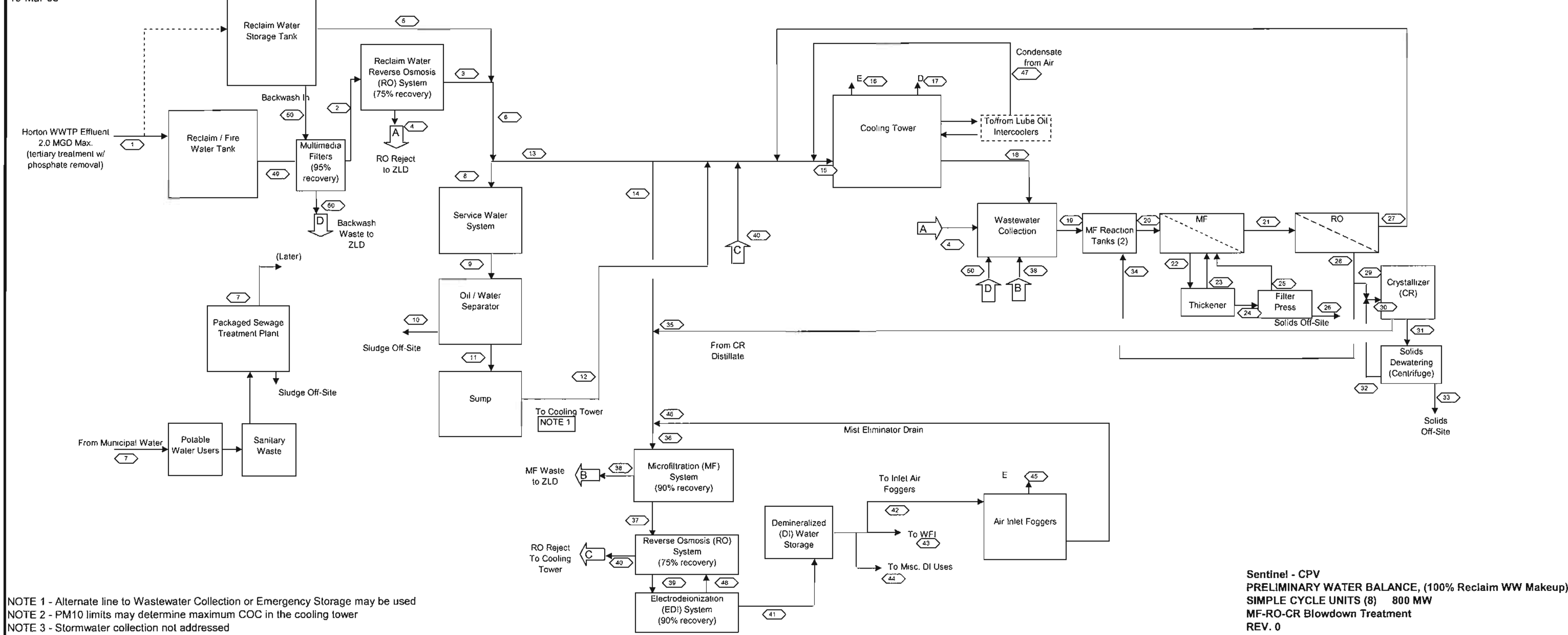
3. The earlier base case evaluation used a mobile (rental ion exchange) makeup demineralizer system. This evaluation used a permanently installed MDS (a conservative capital cost design) and also designed it for operation with the worst case water – reclaim water at 650 mg/L to allow production of demineralized water under all plant conditions and circumstances.

Considering the items discussed above, the earlier base case equipment capital cost estimate (excluding costs for installation, contingency, the tertiary treatment equipment, and using mobile DI for the MDS) is approximately $6.8 MM (vs. $18.45 MM estimated in this evaluation]

Using an installation factor of 55% of the equipment cost, the total installed cost for this evaluation is $28.60 MM as compared with the total installed cost of $10.55 MM for the base case evaluation. The installed cost differential is therefore estimated to be $18.05 MM.

Operating cost differentials are not included in this capital cost assessment and need to be considered elsewhere in the overall cost comparison.

19-Mar-08



NOTE 1 - Alternate line to Wastewater Collection or Emergency Storage may be used
NOTE 2 - PM10 limits may determine maximum COC in the cooling tower
NOTE 3 - Stormwater collection not addressed
NOTE 4 - The MF membranes, RO membranes, EDI stacks, and crystallizer require periodic chemical cleanings.
The disposition of each of these cleaning wastewaters is not yet determined.
NOTE 5 - Mass balances have not yet been done to confirm the final circulating water chemistry

Sentinel - CPV
PRELIMINARY WATER BALANCE, (100% Reclaim WW Makeup)
SIMPLE CYCLE UNITS (8) 800 MW
MF-RO-CR Blowdown Treatment
REV. 0
March 19, 2008

Prepared by: Aquagenics Incorporated

	B	C	D	E	F
1	19-Mar-08				
2					
3		PROCESS FLOWS, GPM (Daily Average Flow Rate Each Case)			
4					
5		CASES	A	B	Comments
6		DUCT FIRING	NA		
7		SC	ON		
8		Fogger	ON		
9		CC	NA		
10		Evaporative Cooler	NA		
11		DBT, deg F	107 oF		
12		REL. Humidity, %	18.4%		
13		WBT, deg F			
14		Number of CTG's	8		
15	Stream Numbers				
16	1	Horton WWTP Reclaim Water	1252.0		2.0 MGD (1388.9 gpm) Max Flow Available
17	2	Reclaim Water Tank Feed to Reclaim RO	1252.0		
18	3	Reclaim RO System Product	939.0		Assume 10 mg/L TDS in product water
19	4	Reclaim RO System Reject	313.0		75% Recovery
20	5	Untreated Reclaim Water from Storage	778.0		Assume 650 mg/L TDS
21	6	Total Reclaim Water Makeup	1717.1		300 mg/L TDS
22	7	Potable Water / Sanitary Waste	4.0		
23	8	Service Water	2.0		
24	9	Service Water Wastewater	2.0		
25	10	OWS Sludge Water	0.0		Assume average is negligible
26	11	OWS Wastewater	2.0		
27	12	OWS Recovered Wastewater	2.0		
28	13	Reclaim Water Makeup To Cooling Tower & Makeup Demin. System (MDS)	1715.1		
29	14	Reclaim Water Makeup to MDS	964.7		
30	15	Cooling Tower Makeup	1786.3		
31	16	Cooling Tower Evaporation	1524.0		
32	17	Cooling Tower Drift	0.3		
33	18	Cooling Tower Blowdown to Wastewater Collection	262.0		From USF Balance (9-Apr-07)
34	19	Wastewater Feed to MF Reaction Tanks	741.9		
35	20	Total Feed to MF (excludes high rate feed recirculation - internal loop)	1047.3		
36	21	MF Filtrate (RO Feed)	1018.2		
37	22	MF Reject Stream	29.1		Use USF ratio in balance
38	23	Recovered Thickener Decant	11.6		Use USF ratio in balance
39	24	Filter Press Feed	17.5		USF assume 3% solids thickened to 5% solids
40	25	Filter Press Filtrate	14.3		Assume 5% solids to 25% solids
41	26	Filter Press Solids	3.2		Assume 25% dry solids
42	27	RO Product (Recovered to Cooling Tower)	682.2		67% Recovery
43	28	RO Reject	336.0		
44	29	RO Reject Feed to Crystallizer	56.6		Used USF Flow Ratio-20 gpm to Crysl. for each 360 gpm RO feed
45	30	Total Crystallizer Feed	62.1		
46	31	Crystallizer Sludge (Centrifuge feed)	8.3		Assume 30% dry solids (from 4% solids feed)
47	32	Centrifuge Liquid (Recover to crystallizer)	5.5		
48	33	Centrifuge Solids	2.8		Assume 90% dry solids
49	34	RO Reject Recirculated	279.4		
50	35	Crystallizer Distillate (to MDS feed)	53.8		
51	36	MDS MF Feed	1043.3		90% MF Recovery
52	37	MDS MF Product	939.0		75% RO recovery
53	38	MDS MF Wastewater	104.3		
54	39	MDS RO Product (EDI Feed)	761.3		90% EDI recovery
55	40	MDS RO Reject	253.8		
56	41	DM Water Storage Tank Feed (EDI Product)	685.2		
57	42	Inlet Fogger Feed	189.6		
58	43	WFI Feed	493.6		
59	44	Misc. DM Water Use	2.0		Estimate
60	45	Fogger Evaporation	164.8		
61	46	Fogger Mist Eliminator Drains	24.8		
62	47	Condensed Moisture from Intercooler	98.0		
63	48	EDI Concentrate Stream	76.1		
64	49	Multimedia Filter Feed	1252 0		
65	50	Multimedia Filter Backwash	62.6		Assume 95% Recovery

STATE OF CALIFORNIA
ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:	)	Docket No. 07-AFC-3
	)	
Application for Certification, for the CPV SENTINEL ENERGY PROJECT	)	**ELECTRONIC PROOF OF SERVICE LIST**
	)	
	)	(July 24, 2008]
	)	

☒ Transmission via electronic mail and by depositing one original signed document with FedEx overnight mail delivery service at Costa Mesa, California with delivery fees thereon fully prepaid and addressed to the following:

DOCKET UNIT

CALIFORNIA ENERGY COMMISSION
Attn: DOCKET NO. 07-AFC-3
1516 Ninth Street, MS-15
Sacramento, California 95814-5512
docket@energy.state.ca.us

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CPV SENTINEL ENERGY PROJECT
CEC Docket No. 07-AFC-3

DECLARATION OF SERVICE

I, Paul Kihm, declare that on August 27, 2008, I deposited a copy of the attached:

APPLICANT'S ANALYSIS OF CEC STAFF ALTERNATIVE WATER SUPPLY PLANS

with FedEx overnight mail delivery service at Costa Mesa, California with delivery fees thereon fully prepaid and addressed to the California Energy Commission. I further declare that transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service List above.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 27, 2008, at Costa Mesa, California.

Paul Kihm

OC\968750.1