La Cienega and La Cieneguilla Domestic Well Monitoring Program

Prepared for

Santa Fe County, New Mexico

Prepared by

DBS&A
a Geo-Logic Company

6020 Academy NE, Suite 100
Albuquerque, New Mexico 87109
www.dbstephens.com

DB22.1144

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
Earth Science for the 21st Century

March 27, 2023

Table of Contents

List of Figures

List of Tables

List of Appendices

Executive Summary

Daniel B. Stephens & Associates, Inc. (DBS&A) and the New Mexico Bureau of Geology and Mineral Resources (NMBGMR) have worked together with Santa Fe County (the County) on the first phase of domestic well monitoring program planning services for the La Cienega and La Cieneguilla area. The project has been focused on documenting current conditions in the La Cienega and La Cieneguilla (LCLC) planning area, and summarizing the previous and existing County requirements and procedures for domestic wells. The County selected a consultant to complete the domestic well monitoring program review in order to solicit third-party recommendations on how to implement and improve the existing program.

Santa Fe County has an existing domestic well monitoring program; however, staff resources and well owner engagement have been limited to date. The current project objectives were to document the area's groundwater levels and trends, estimate current and project future water demand, initiate community member involvement in the project, identify the existing requirements that apply to domestic wells in the LCLC planning area, review and develop recommendations for how to improve the existing domestic well management program. Examples of other well management programs were also reviewed. The overarching goal of the project is to develop a functional and efficient process to monitor, conserve, and protect the local groundwater resource. County staff seek to collaborate on the domestic well monitoring program at the local, County, and state levels, and to leverage existing resources for the greatest benefit.

NMBGMR prepared a summary of the hydrogeologic setting for the LCLC planning area, which is included as an appendix to this report. This region is hydrologically unique, with numerous springs, seeps, and wetlands emerging in the valleys and along the river channels. Repeat groundwater elevation measurements are important for understanding changes in water volume stored in an aquifer. Groundwater level records in the area stretch back more than 50 years for some area wells. These long-term records of water levels in the area show consistent declines by as much as 0.3 foot per year. Since 2012, water levels in the La Cienega area have begun to stabilize and, in some cases, even begun to recover. This is likely the result of efforts to connect upgradient water users to the County water utility and to transition to using more surface water and less groundwater. Ongoing monitoring is crucial for continuing to assess the trends in groundwater levels, especially as population increases and drought persists.

The LCLC planning area includes 1,341 parcels, and based on information from the Office of the State Engineer New Mexico Water Rights Reporting System (NMWRRS), a total of 934 permitted wells. These include 823 domestic wells permitted under NM Stat §72-12-1. Permitted groundwater diversions total 2,332.00 acre-feet per year (ac-ft/yr) in the LCLC planning area. This total includes 1,658.00 ac-ft/yr for 72-12-1 NMSA domestic one-household wells and 292.00 ac ft/yr for 72-12-1 NMSA domestic multiple-household wells. Domestic water demand in the LCLC planning area is not well constrained, as there are very few domestic well meter readings available. Current domestic water demand could range anywhere from approximately 150 to 1,100 ac-ft/yr, depending on the per-household demand and number of households served by each shared domestic well. Future water demand was also projected. Assuming that current domestic water demand is 250, 500, or 750 ac-ft/yr, and that the LCLC planning area domestic water demands increase by 5, 10, or 15 percent per decade (population growth in the LCLC planning area was more than 8 percent between 2010 and 2020), projected 2060 domestic water demand in the LCLC planning area ranges from approximately 300 to 1,300 ac-ft/yr.

DBS&A discussed the current project's outreach methods and media platforms with County staff, and one project open house was held. The project open house event was held at the La Cienega Community Center on September 14, 2022; approximately 60 people attended. Open house participants expressed concern over local water supplies, nearby development (e.g., car washes), the cost of connecting to the County water utility and the subsequent costs for County water utility customers, and water quality. Participant questions were answered, and feedback was gathered regarding participants top water resource issues of interest. The water resource issue with the most interest (highest priority and total votes) was domestic groundwater supply, followed by water quality and growth management. A total of 15 well surveys were turned in at the project open house. Feedback received from the returned well surveys included:

- Concern over the long-term sustainability of the local groundwater resources
- Desire for development to be controlled in this area
- Concern over acequia water supply due to upstream development
- Interest in having any new development be served by the County water utility
- Opposition to any new large water users in the area
- Concern about groundwater quality
- Desire that the domestic well monitoring program be funded and that the County staff the program to allow for actual monitoring

The County also set up a project-specific website to post the open house materials and recording, update participants on the project progress, and announce future project events.

Previous and existing requirements that apply to domestic wells in the LCLC planning area were reviewed. The 2016 Sustainable Land Development Code (SLDC) supersedes the earlier requirements; however, the earlier requirements were reviewed and summarized to show what requirements have been adopted over time, which may have affected water usage. Specific SLDC requirements include:

- A shared well system or an individual well shall be capable of providing the water requirements of the proposed development for up to 99 years.
- All plats and non-residential development shall file signed water restrictions and covenants with the plat or site development plan. Total water use shall not exceed that specified in the development order, plat note, or the SLDC.
- The annual water use for domestic purposes for new residential dwellings constructed on any lot created after the effective date of the SLDC shall not exceed 0.25 ac-ft/yr, or such lower amount as may be established in the development order approving the land division.
- All development using a well shall participate in the well use metering program. Santa Fe County-approved meters are required to be installed on wells for any development subject to the SLDC. The meter shall be read by the property owner and meter readings shall be provided annually.
- All properties that are required to have water meters shall also be required to test their water meter for reading accuracy every ten years and replace it if necessary.
- A County domestic well permit is required in order to drill a new domestic well within the service area of the County water utility after the effective date of the SLDC. A County permit is not required if the well owner will be replacing, supplementing, or deepening an existing domestic well.
- In the LCLC Community District Overlay area, all new lots created as part of residential land divisions and subdivisions and all new non-residential development shall be required to connect to the County water utility when the system is extended to within 200 feet of the property line of a lot, unless that lot has previously connected to a community water system, provided that adequate capacity exists in the system and that water taps are available.

Plat notes and the SLDC both govern new development on the lots with well restrictions under the La Cienega Watershed Conditions. If the plat notes are stricter than the SLDC or require a connection to the County water utility sooner than the SLDC, and the notes have never been vacated by the Board of County Commissioners (BCC), the plat notes control the requirements for a specific property. If the SLDC is stricter or requires a connection to County water utility sooner than the plat notes, then the SLDC will control the requirements for a specific property. Some lots may be subject to restrictive covenants that are stricter than the SLDC; however, the County does not enforce restrictive covenants. Development of lots with restrictive covenants is governed by the SLDC.

The County's existing domestic well monitoring program has been implemented intermittently as staff resources have been available. The program has been moved between different County departments, and has not had consistent staffing or support. Moving forward, County staff resources and program funding will need to be dedicated to the program in order for it to be successful. We recommend:

- Moving the program to the Public Works Department where staff have experience with the subject matter (e.g., hydrogeology), and creating a new full-time position to serve as the lead in implementing the program.
- County staff from Public Works, Growth Management, and Sustainability collaborate on a 6-month work planning process to identify the program's next steps.
- Working with domestic well owners in the LCLC planning area to implement a domestic well metering and meter reading program, collecting the data necessary to estimate current local groundwater demand.
- Adding a final inspection requirement for all new domestic wells to verify that meters have been installed, and requiring that all new domestic wells participate in the domestic well monitoring program going forward. This will increase the number of monitored domestic wells and the amount of groundwater diversion data collected for this area.
- Expanding the existing water level measurement program to include a total of 50 locations, to be measured once per year, within and upgradient (northeast) of the LCLC planning area. This will allow for better assessment of trends in the groundwater elevations over time, especially as conditions are projected to become warmer and drier in the future.
- Reviewing which parcels in the LCLC planning area are connected to the County water utility, evaluating the possibility of connecting additional parcels using existing infrastructure, and

potentially extending the water lines to connect additional parcels. This would reduce the number of domestic wells being used as the source of water supply in the LCLC planning area, and would help to conserve the local groundwater resource.

- The County water utility providing water supply to the La Cienega MDWCA and Wild and Wooley Trailer Park to help conserve the local groundwater resource. The La Cienega MDWCA is the largest community water system in the planning area, and it has an emergency connection with the County water utility, but obtains its water supply from wells. The Wild and Wooley Trailer Park is not currently connected.
- Addressing water quality in future outreach to County domestic well owners, potentially distributing educational materials that give recommendations for the parameters that should be monitored and options for where samples can be analyzed.
- Including a series of public outreach events in the next phase of the project, with an outside mediator/facilitator.
- Making this report available to the Water Policy Advisory Committee (WPAC), La Cienega Valley Association, City/County Water Conservation Committee, and public for review.

Funding for the program will need to be identified. DBS&A and the NMBGMR are not aware of any grant programs that will support annual recurring costs for the proposed domestic well monitoring program, but the report identifies some potential funding sources that could be used to help get the program established. We recommend that a new full-time position be created for the County's domestic well monitoring program, and that this new position lead the program moving forward. In the event that the project lead leaves the County, a replacement will need to be hired. As the program is implemented and domestic well meter readings are obtained, the estimates for current and projected future water demand should be refined. In addition, the County should work with the community to evaluate whether the demand projections reflect desired future conditions.

1. Introduction

Daniel B. Stephens & Associates, Inc. (DBS&A) and the New Mexico Bureau of Geology and Mineral Resources (NMBGMR) have worked together with Santa Fe County (the County) on the first phase of domestic well monitoring program planning services for the La Cienega and La Cieneguilla area (Figure 1). The project has been focused on documenting current conditions in the La Cienega and La Cieneguilla (LCLC) planning area and summarizing the previous and existing County requirements and procedures for domestic wells.

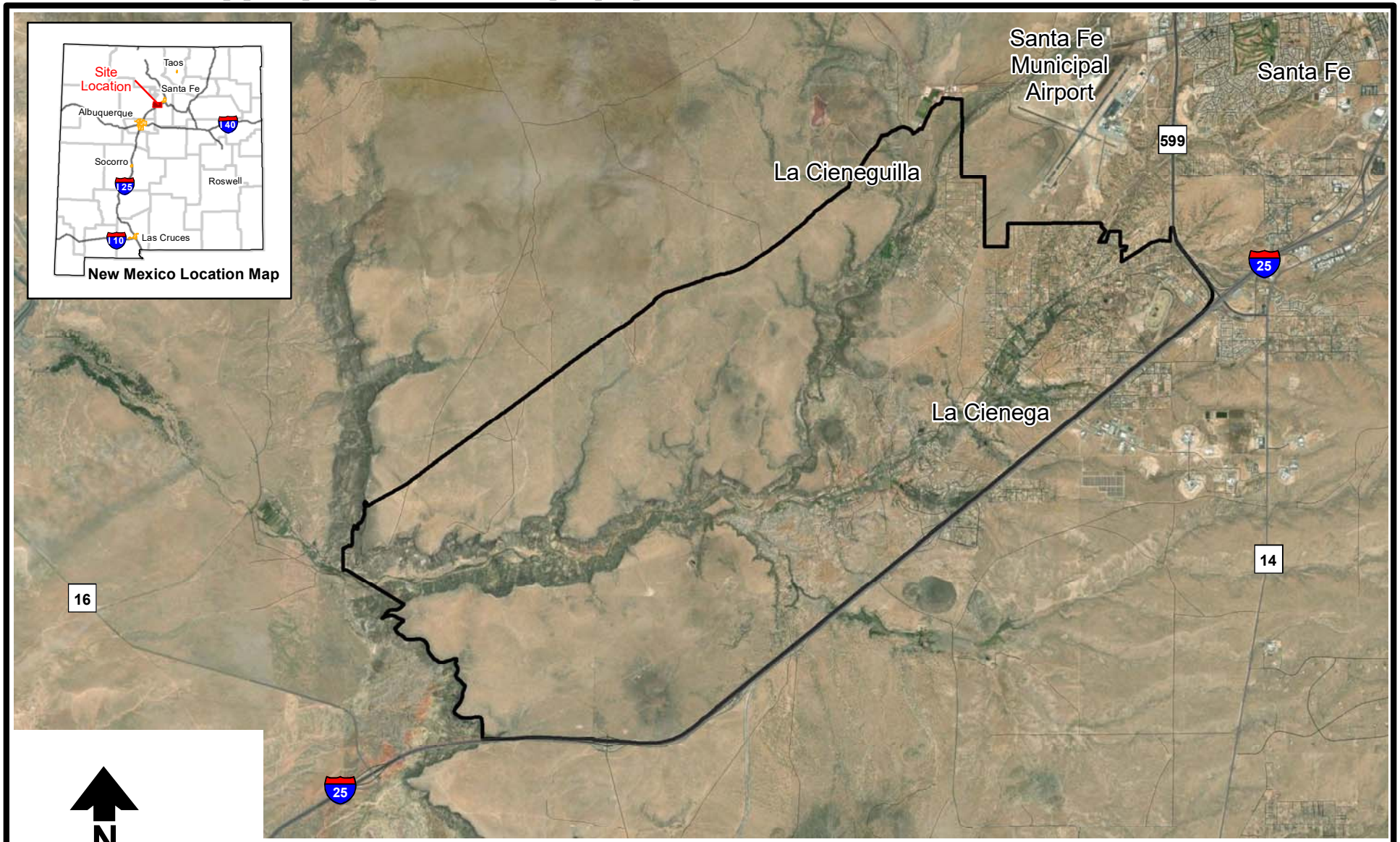
Santa Fe County has an existing domestic well monitoring program; however, staff resources and well owner engagement have been limited to date. The current project objectives were to document the area's groundwater levels and trends, estimate current and project future water demand, initiate community member involvement in the project, identify the existing requirements that apply to domestic wells in the LCLC planning area, review the existing domestic well management program, and develop recommendations for how to improve the existing domestic well management program. The overarching goal of the project is to develop a functional and efficient process to monitor, conserve, and protect the local groundwater resource. This report discusses the tasks completed and project findings, and provides recommendations for the project's next phase.

2. Hydrogeologic Setting

In 2003, NMBGMR began a hydrogeological investigation of the Española Basin, with a special focus on the wetlands at La Cienega, with the goal of understanding groundwater flow in the area and potential influences on the wetlands. NMBGMR implemented a groundwater monitoring network around La Cienega beginning in 2015. NMBGMR supported DBS&A on this project, and prepared a summary of the hydrogeologic setting for the LCLC planning area (Appendix A). Figure 2 shows the geology of the area.

The study area covers the lower reach of the Santa Fe River, including several of its major tributaries and arroyos, including Arroyo Calabasas, Arroyo de los Chamisos, Arroyo Hondo, Cienega Creek, Guicu Creek, and Alamo Creek. This region is hydrologically unique, with numerous springs, seeps, and wetlands emerging in the valleys and along the river channels. Regional groundwater elevation maps for the area show that groundwater in the southern

\\SS6ABQ\DATAS\PROJECTS\DB22.1144_LA_CIENEGA_DOMESTIC_WELLS\GIS\MXDS\REPORT\F01_STUDY_AREA_MAP.MXD



Base image source: Maxar, Vivid 2019-2021 composite

Explanation

La Cienega and La Cieneguilla planning area

Figure 1

DBS&A a Geo-Logic Company

1/13/2023 DB22.1144

LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

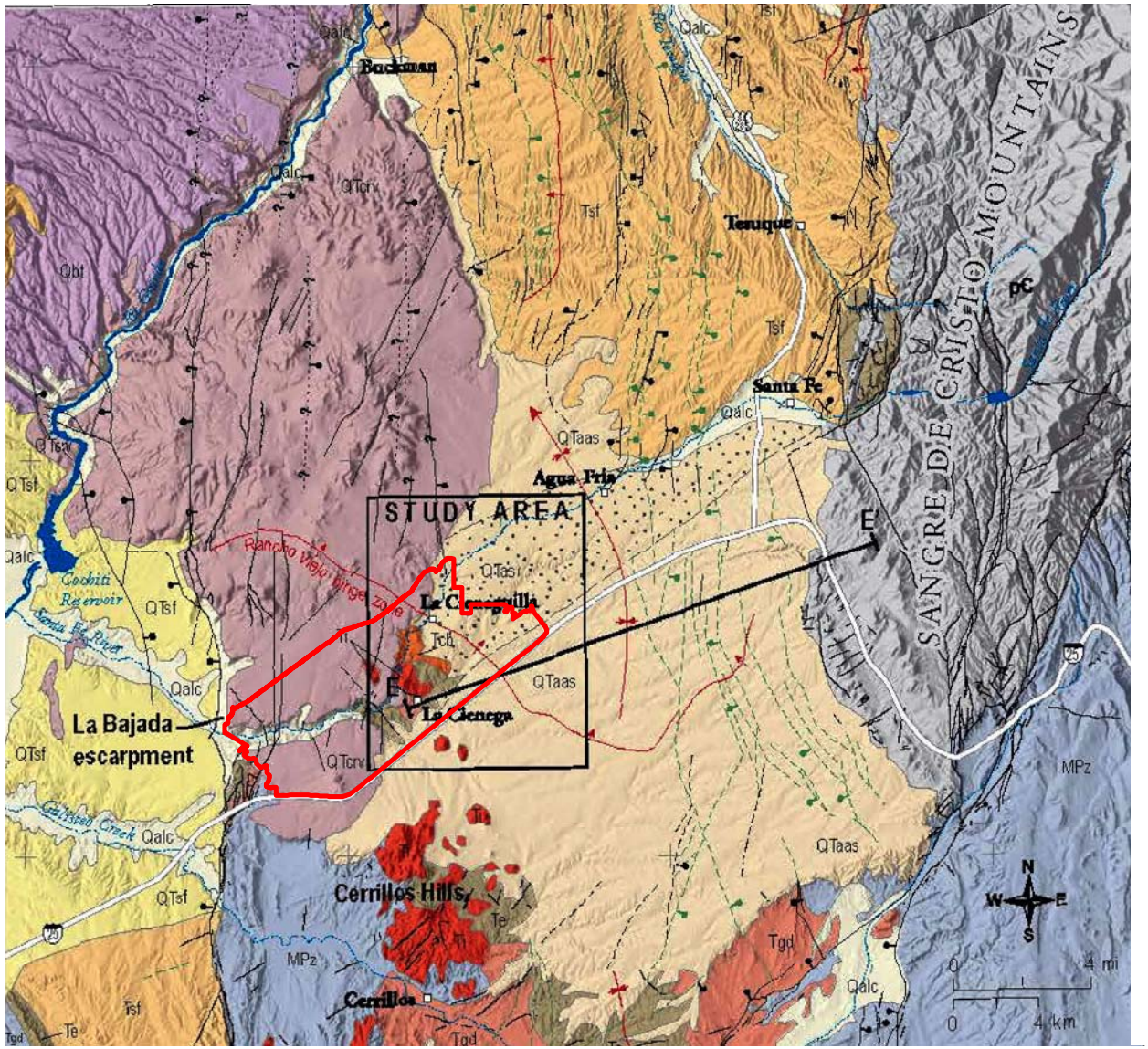
Location

\\SS6ABQ\DATAS\PROJECTS\DB22.1144_LA_CIENEGA_DOMESTIC_WELLS\GIS\MXDS\REPORT\F02_GEOLOGY_MAP.MXD

Explanation

La Cienega and La Cieneguilla planning area

	Qalc	Quaternary alluvium, landslides, and colluvium
	Qbt	Bandelier Tuff (Pleistocene)
	QTcrv	Cerros del Rio volcanic rocks (Plio-Pleistocene)
	QTa	Ancha Formation, Santa Fe Group (Plio-Pleistocene-includes alluvial slope (QTaas) deposits and ancestral Santa Fe River (QTasr)
	QTsf	Santa Fe Group, undivided (Plio-Pleistocene)
	Tsf	Santa Fe Group, undivided (Oligocene -Miocene)
	Tcb	Cieneguilla basanite (Oligocene)
	Te	Espinaso Formation (Late Eocene-Oligocene)
	Ti	Intrusive rocks (late Eocene-Oligocene)
	Tgd	Galisteo and Diamond Tail Formation (Late Paleocene-Eocene)
	MPz	Undivided Mesozoic and Paleozoic rocks
	pC	Undivided Proterozoic rocks



Adapted from Johnson (2016) et al.

Figure 2

LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

Geology Map

DBS&A a Geo-Logic Company

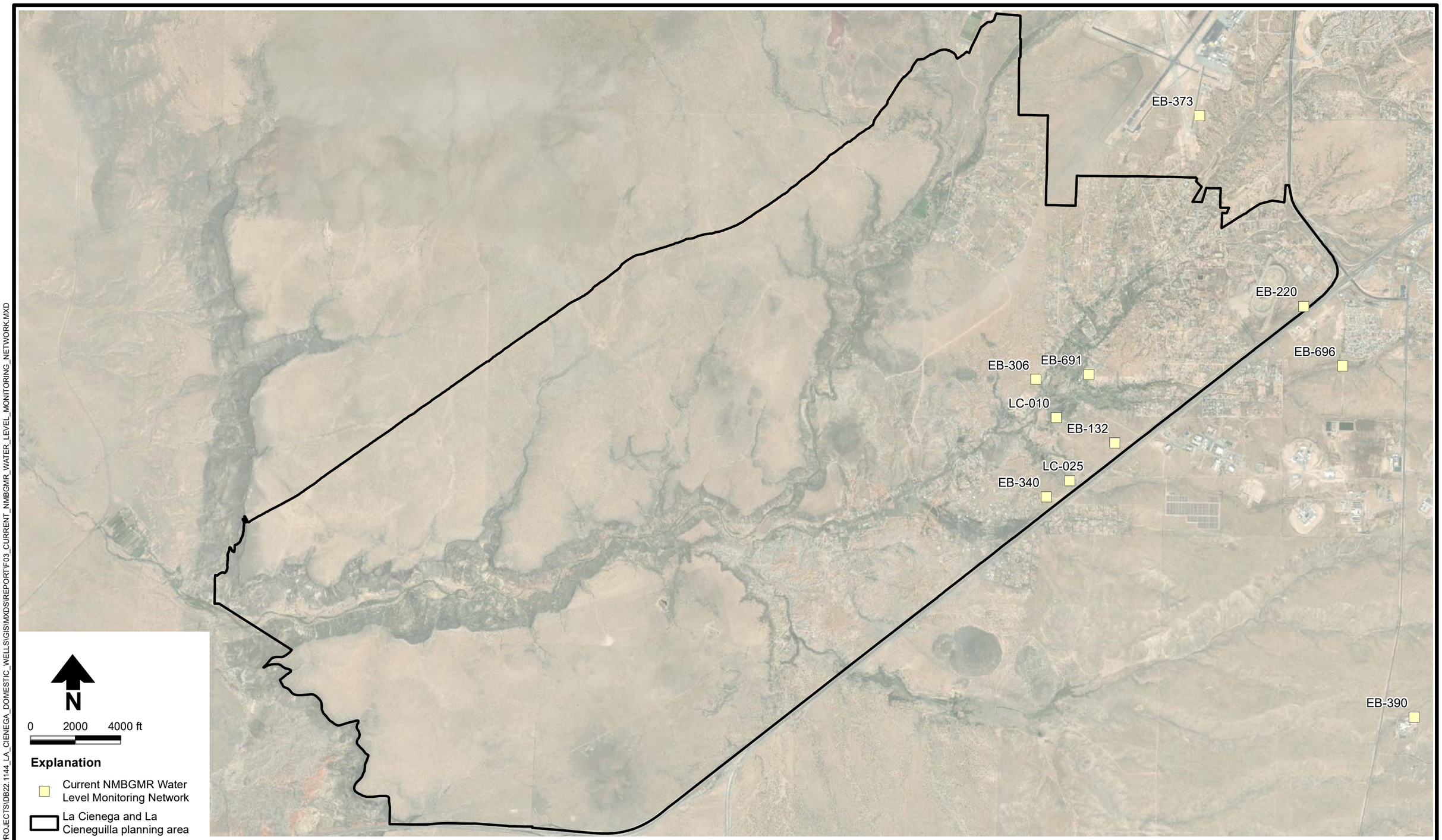
1/13/2023 DB22.1144

Española Basin flows west-southwest through the Santa Fe Group aquifer from the Sangre de Cristo Mountains in the east. Sources of recharge to the Santa Fe Group aquifer include mountain-front and stream channel recharge near the western border of the Sangre de Cristo Mountains, small amounts of areal recharge through coarse surface materials, and focused recharge in the southern Española Basin via streambed infiltration along ephemeral channels. The groundwater that feeds springs and wetlands in the study area is sourced from the Santa Fe Group aquifer, which is a regional aquifer system of thick alluvial deposits of the Tesuque Formation, overlain by shallow, thin (less than 250 feet), coarse deposits of the Ancha Formation.

The La Cienega area has been the subject of numerous groundwater level studies over the past 60 years; as a result there is a robust dataset of groundwater levels in this area. Repeat measurements of the groundwater levels are important to understand changes in water volume stored in an aquifer. Compiled water level data from previous reports show that water levels in the Ancha aquifer have consistently dropped from the beginning of the records until the early 2010s as a result of long-term groundwater depletion upgradient (east) of the wetlands. A comparison of Ancha water levels in the mid-1970s and 1980s with water levels measured in the same wells between 2004 and 2012 show long-term water table declines up to 8.9 feet. The largest depletions and decline rates have occurred in the Valle Vista area and south of the New Mexico State Penitentiary, near the northern and southern edges of the Ancha zone of saturation.

Repeat groundwater elevation measurements are important for understanding changes in water volume stored in an aquifer. Groundwater level records in the area stretch back more than 50 years for some area wells. These long-term records of water level in the area show consistent declines by as much as 0.3 foot per year. Since 2012, water levels in the La Cienega area have begun to stabilize and, in some cases, even begun to recover. This is likely the result of efforts to connect upgradient water users to the County water utility and to transition to using more surface water and less groundwater. Ongoing monitoring is crucial for continuing to assess the trends in groundwater levels, especially as population increases and drought persists.

The NMBGMR currently monitors water levels in 10 wells in the La Cienega area, 7 of which are located within the LCLC planning area (Figure 3). Of these 10 wells, 5 are equipped with continuous dataloggers, and the data are collected when the sites are visited annually in April. Water levels are measured in the other 5 wells at that time. Table 1 provides recent water level measurements and groundwater elevation data for the wells that are monitored by the NMBGMR. In April 2022, depth to water in the currently monitored wells located within the



BASE IMAGE SOURCE: MAXAR, VIVID 2019-2021 COMPOSITE

\\SS6ABQ\DATA\PROJECTS\DB22.1144_LA_CIENEGA_DOMESTIC_WELLS\GIS\MXDS\REPORT\F03_CURRENT_NMBGMR_WATER_LEVEL_MONITORING_NETWORK.MXD

DBS&A a Geo-Logic Company

1/13/2023 DB22.1144

LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

Current NMBGMR Water Level Monitoring Network

Figure 3

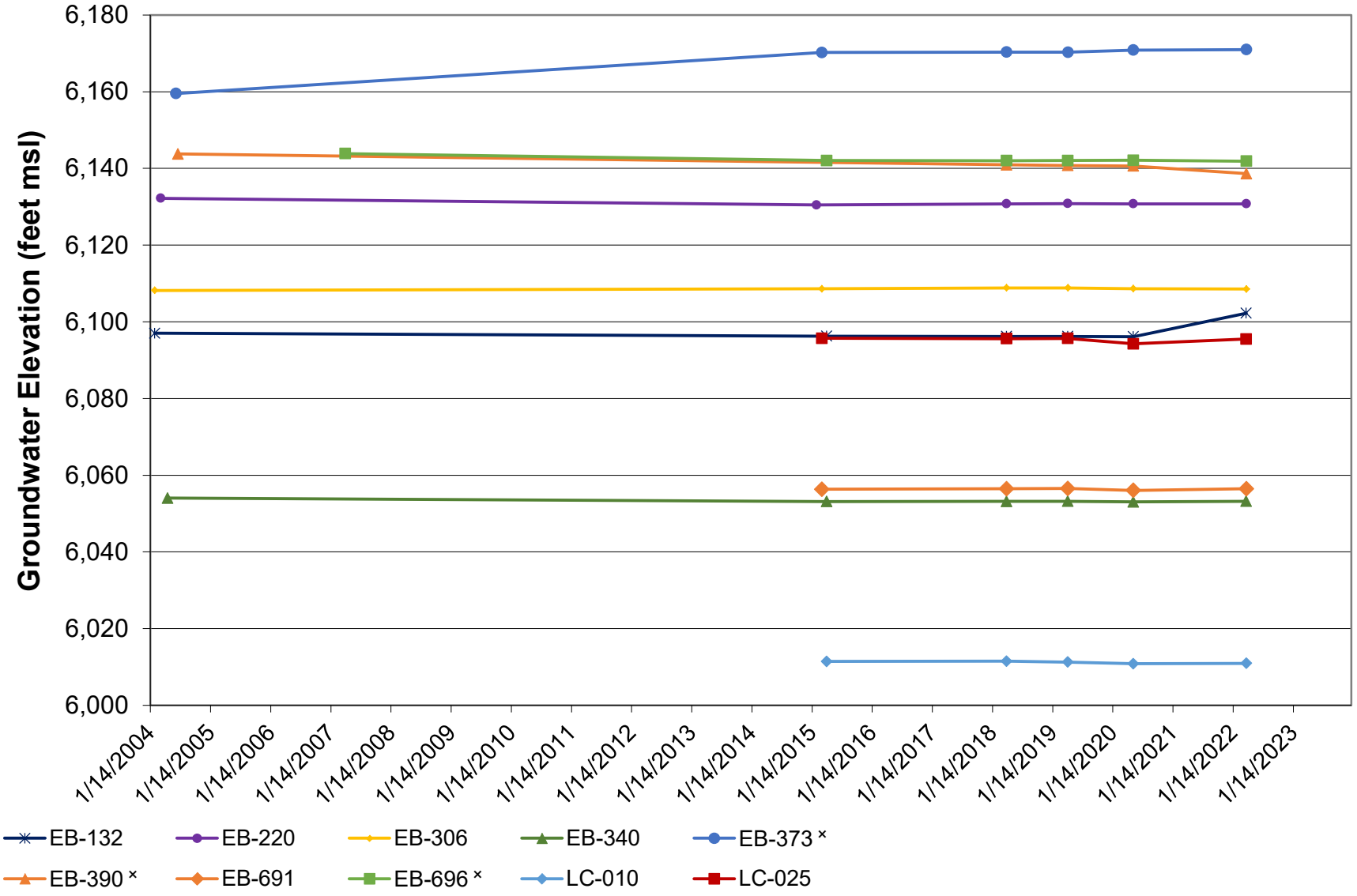
LCLC planning area ranged from less than 10 feet below ground surface (feet bgs) to approximately 130 feet bgs, yielding water level elevations of approximately 6,011 to 6,131 feet above mean sea level (feet msl) (Table 1). NMBGMR previously visited the monitored wells in this network twice per year (before leaf-out in spring, when water levels are the highest, and in late fall after the first freeze, when they are the lowest), but they have found that monitoring once per year in April is most effective. Figure 4 shows the groundwater elevations for the current NMBGMR monitoring network based on measurements collected between 2004 and 2022. The 2023 water level measurements will be collected in April 2023. Appendix A includes a larger table of water levels and groundwater elevations for wells in the area that have previously been monitored by NMBGMR, additional NMBGMR groundwater elevation illustrations, and discussion.

3. Community Planning

The LCLC planning area includes Lower La Cienega, Upper La Cienega, La Cieneguilla, and the surrounding areas (Santa Fe County, 2015). The original LCLC community plan was prepared between 1997 and 2001, and was adopted in 2001. A community plan update was completed in 2015 (Santa Fe County, 2015). The LCLC community plan was completed to (1) develop recommendations to guide zoning and development standards for incorporation into the County's Sustainable Land Development Code (SLDC), (2) identify projects, programs, and strategies that support the community's vision and goals, and (3) provide a community action plan to further the community's vision, solve problems, and develop collaborative relationships between residents, local and state government, public agencies, and community organizations (Griego, 2023).

The community planning process included a community planning committee; the plan identified a common set of concerns, goals to address them, and policies to achieve the goals (Santa Fe County, 2015). The LCLC community plan update calls for preserving the rural character of the area and protecting the agricultural and livestock water uses (Santa Fe County, 2015). The plan update references a diverse community, and says that the community wants decisions to be made jointly "with a realistic understanding of the available resources." The plan calls for controlled and sensible growth, with a focus on quality of life (Santa Fe County, 2015).

The LCLC community plan update cites planning area populations of 1,775 in 1990, 3,007 in 2000, and 3,819 in 2010 (Santa Fe County, 2015). The U.S. Census American Community Survey



x Well outside of the LCLC planning area

LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

Groundwater Elevations for the Current NMBGMR Monitoring Network

Figure 4

DBS&A a Geo-Logic Company

3/10/2023 DB22.1144

2017-2021 demographic and housing estimates give a 2021 population of 4,110 for the La Cienega census-designated place (CDP) (U.S. Census, 2021). This population estimate is approximately 8 percent higher than the 2010 population, 37 percent higher than the 2000 population, and over double the 1990 population, as given in the LCLC community plan update (Santa Fe County, 2015), although the La Cienega CDP area is smaller than the LCLC planning area (Figure 5) and does not include La Cieneguilla. This means that the growth in the LCLC planning area has exceeded these growth rates (growth in the LCLC planning area exceeded 8 percent between 2010 and 2020).

The LCLC planning area includes three acequia associations (La Cienega, El Guicu, and El Molino/ La Capilla), and there are four private acequias in the valley (El Canon, La Capilla Vieja, Los Pinos, and Romero ditches). Citing the New Mexico Office of the State Engineer (OSE) 1976 Hydrographic Survey, the LCLC community plan update says that an area of approximately 150 acres is potentially irrigable by the community acequias (Santa Fe County, 2015). The community plan cites conversion of irrigable agricultural land to residential uses, along with declines in available flows in the acequias, as causing the decrease in agricultural production in the area. Acequia water demands are supplemented in the LCLC planning area using supplemental wells (Santa Fe County, 2015).

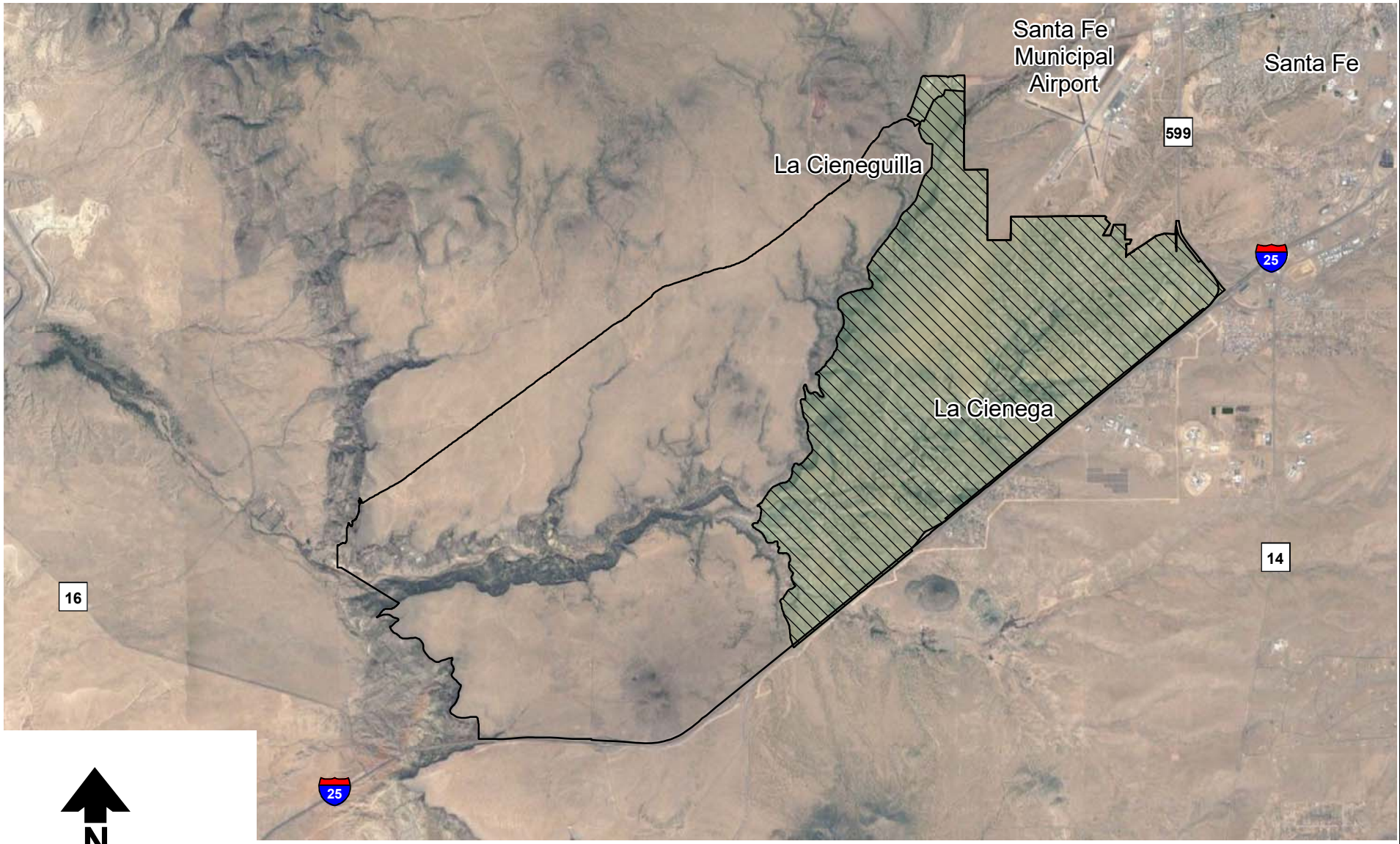
The LCLC community plan update included a strategy calling for expediting implementation of the La Cienega Watershed Conditions, and sought to have available County water prioritize existing water users over new development. The LCLC community plan update recommended a water connection priority area in the Upper La Cienega area, in close proximity to existing County water utility infrastructure, in order to reduce local groundwater depletions (Santa Fe County, 2015).

4. Current Conditions

4.1 Land Parcels and Existing Wells

DBS&A obtained current parcel data from the Office of the Santa Fe County Assessor web portal on May 9, 2022. Using the LCLC planning area boundary, the parcel data were clipped to include those parcels located partially or entirely within the LCLC planning area. These include 1,341 parcels (Appendix B). DBS&A downloaded information about permitted wells from the OSE New Mexico Water Rights Reporting System (NMWRRS), and clipped these data to include

\\SS6ABQ\DATAS\PROJECTS\DB22.1144_LA_CIENEGA_DOMESTIC_WELLS\GIS\MXDS\REPORT\F05_LA_CIENEGA_CDP_AND_LCLC_PLANNING_AREA_COMPARISON.MXD



Base image source: Maxar, Vivid 2019-2021 composite

Explanation

- La Cienega and La Cieneguilla planning area
- La Cienega CDP

Figure 5

LA CIENEGA AND LA CIENEGUILLA
DOMESTIC WELL PROGRAM

La Cienega CDP and LCLC Planning Area Comparison

DBS&A a Geo-Logic Company

3/9/2023 DB22.1144

the permitted wells located within the LCLC planning area (Appendix C). The NMWRRS data had been updated on April 5, 2022.

Using data from the OSE NMWRRS, two columns were added to the parcel database (Appendix B) to show whether any wells are located on each parcel and, for those parcels with a well or wells, the number of wells. A column indicating the parcel number where the well(s) are located was added to Appendix C. As discussed below, the older well location data available in the NMWRRS are not as accurate as the location data for newer wells, so there may be errors in the information that was added to Appendices B and C regarding the locations of permitted wells.

Information from NMWRRS indicates that there are a total of 934 permitted wells in the planning area. Table 2 shows the number of permitted wells by type and their permitted diversion volumes. These include 823 domestic wells permitted under NM Stat §72-12-1 (this value is the sum of the permitted 72-12-1 NMSA wells for the domestic and livestock watering, domestic one household, and multiple domestic household well types). Figure 6 shows the land parcels and permitted wells that are located within the LCLC planning area. Wells with no water right (e.g., closed file, exploration, monitor well) and wells where the use is unknown are not shown on Figure 6.

As shown on Table 2, permitted water diversions in the LCLC planning area total 2,682.34 acre-feet per year (ac-ft/yr), including 2,332.00 ac-ft/yr in permitted groundwater diversions. This total includes 1,658.00 ac-ft/yr for 72-12-1 NMSA domestic one-household wells and 292.00 ac-ft/yr for 72-12-1 NMSA domestic multiple-household wells. Table 3 provides more detail from NMWRRS for the irrigation water rights in the LCLC planning area. Permitted irrigation diversions total 482.17 ac-ft/yr, including 350.34 ac-ft/yr for surface declarations and 131.83 ac-ft/yr for permitted groundwater diversions. The focus of this project is on domestic water use; however, the water rights for all uses are presented to allow for estimation of the total permitted water diversions in the LCLC planning area.

The OSE point of diversion (POD) Locations Online Mapping Tool includes a local ordinance area for the City of Santa Fe's domestic well ordinance, but does not include a similar local ordinance area for Santa Fe County. We recommend that the County provide their 2016 SLDC, with specific limitations and requirements, to OSE so that they may add it to the online mapping tool.

Per DBS&A discussions with the OSE's Upper Rio Grande Basin Manager, the number of pre-basin (unpermitted) wells is expected to be low in the La Cienega and La Cieneguilla areas. This

N

0 2000 4000 ft

Explanation

La Cienega and La Cieneguilla well

- 72-12-1 domestic and livestock watering
- 72-12-1 domestic one household
- Irrigation
- Community type use - mdwca, private or commercial supplied
- Mobile home parks
- 72-12-1 multiple domestic households
- Non 72-12-1 domestic and livestock watering
- Non 72-12-1 domestic one household
- 72-12-1 Construction of public works
- 72-12-1 Sanitary in conjunction with a commercial use
- 72-12-1 livestock watering
- La Cienega and La Cieneguilla planning area
- Parcel

WELL DATA: APR 5, 2022, NEW MEXICO OFFICE OF THE STATE ENGINEER
DOWNLOADED MAY 27, 2022

LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

Permitted Wells

DBS&A a Geo-Logic Company

3/9/2023 DB22.1144

Figure 6

\\SS6ABQDATA\PROJECTS\DB22.1144_LA_CIENEGA_DOMESTIC_WELLS\GIS\MXDS\REPORT\F06_PERMITTED_WELLS.MXD

area was declared by the OSE as part of the Rio Grande underground water basin (UWB) in November 1956. As such, DBS&A assumes that the online NMWRRS system is complete for the area. The OSE does not have any flow meter reading and/or depth to water measurements for the area (turned in by well owners), but they said that they were familiar with a number of specific studies and publications with these types of information (Garcia, 2022). The NMBGMR was also familiar with these publications.

The OSE Upper Rio Grande Basin Manager said that the older well location data available in the NMWRRS system are not as accurate as the location data for newer wells (Garcia, 2022). This is as would be expected. Before it was common to collect global positioning system (GPS) coordinates for new wells, well locations were notated using the New Mexico Public Land Survey System (PLSS). Locations were recorded using township, range, section, and subsection (¼ ¼ ¼) information. For older wells, the OSE has used the existing PLSS information to generate location coordinates. This method should yield well locations within the correct quarter, quarter quarter, or quarter quarter quarter section (depending on the location detail recorded for a specific well), but not the well's actual location. Using PLSS location data for wells may cause their locations to plot within the incorrect parcels. Newer wells will have more accurate location coordinates.

The LCLC community plan update indicates that most homes and businesses in the planning area receive water from private domestic wells, and that in the Upper La Cienega area and parts of La Cieneguilla, shared domestic wells are common, with wells shared by two, three, or four homes (Santa Fe County, 2015). The LCLC community plan update also indicates that several households are still supplied by springs. Citing OSE data from July 2011, the LCLC community plan update states that the planning area included approximately 146 one-household domestic wells, 28 multi-household wells, and 30 irrigation/stock/sanitary wells as of that date (Santa Fe County, 2015). DBS&A did not attempt to verify the cited information from 2011; however, these estimates are much lower than the current number of permitted wells in the LCLC planning area, which include nearly 700 domestic one-household and more than 100 domestic multiple-household wells (Table 2).

4.2 Domestic Wells

Domestic well statutes direct the State Engineer to issue permits for certain types of temporary or low volume wells, including wells for household use; domestic wells are the only feasible source of water supply in some rural areas of the state (Utton Center, 2014). As population has increased, domestic wells have become more concentrated near urban areas, increasing

pressure on local water supplies (Utton Center, 2014). Domestic well rights are "inherently conditional on the availability of water" (Utton Center, 2014).

Subdivision development outside of municipalities is governed by local county commissions through their zoning authority and the Subdivision Act, which requires counties to develop rules and procedures for subdivision review and approvals (Utton Center, 2014). The Subdivision Act was amended in 1995 to require that counties develop rules for quantifying subdivision water needs, water availability, and conservation (Utton Center, 2014).

New regulations for the administration of domestic well permits were adopted by the OSE on August 15, 2006 (Utton Center, 2014). Under the 2006 regulations, domestic well permits allow for the use of up to 1.0 ac-ft/yr for a single household, or up to 1.0 ac-ft/yr per household up to a maximum of 3.0 ac-ft/yr for shared wells (Utton Center, 2014). Conditions may be imposed on domestic well permits (e.g., distance from other wells, metering, monitoring, compliance with local ordinances) (Utton Center, 2014).

4.3 County Water System

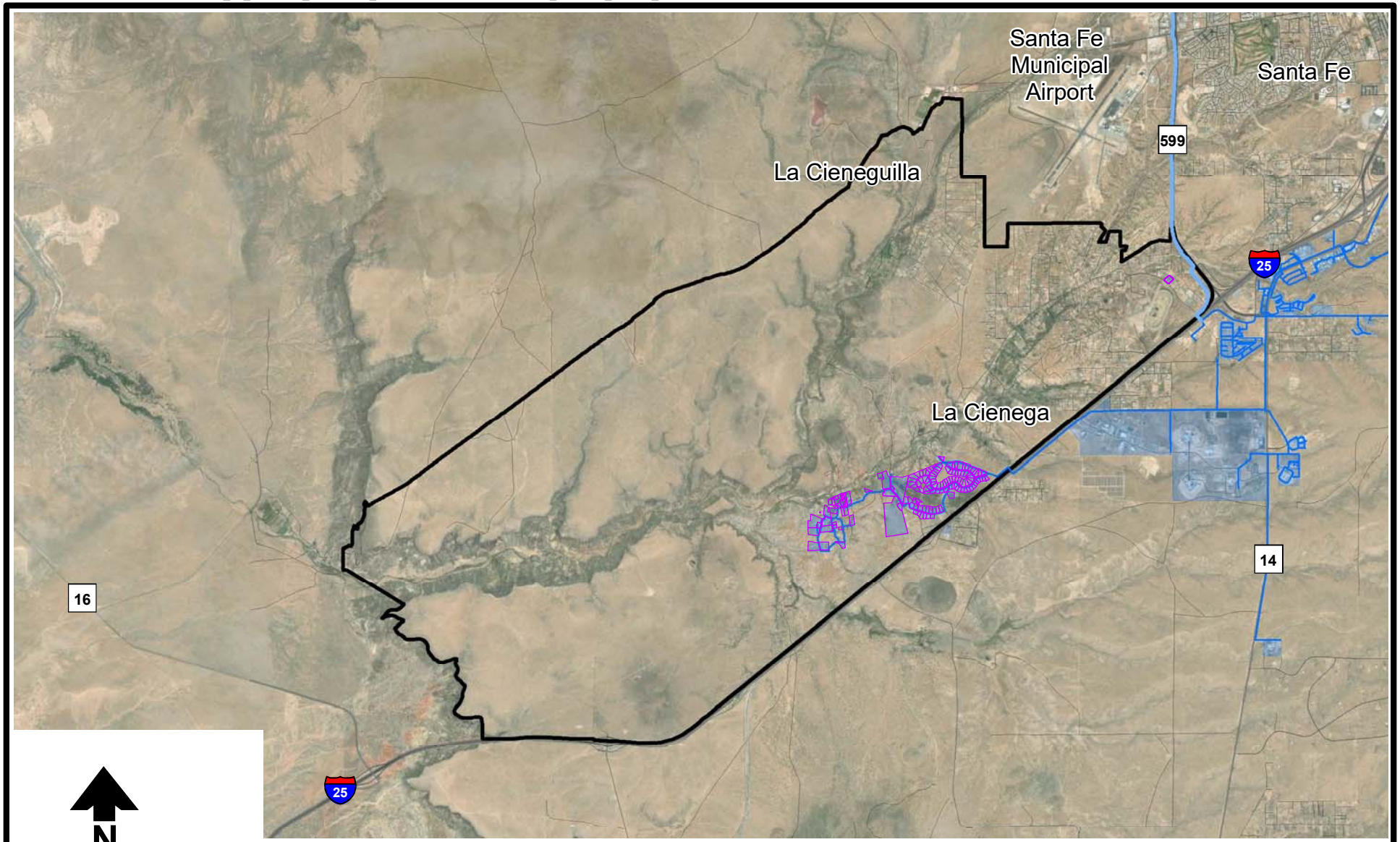
The County water utility's regional water system has water lines in the vicinity of and within the LCLC planning area, and provides water service to some areas near and within the LCLC planning area (Figure 7). The LCLC community plan update (Santa Fe County, 2015) says that County water service was extended to serve the Las Lagunitas subdivision, Fire Station, and La Cienega Community Center in 1998, and that service was extended further to include the Paseo C de Baca area to La Lomita in 2004. In 2015, the County water utility served approximately 98 connections within the LCLC planning area, with 73 connections in the Las Lagunitas subdivision and 25 connections along Paseo C de Baca (Santa Fe County, 2015).

The LCLC community plan update (Santa Fe County, 2015) says that the County had nearly completed the design of a looped water service line in Lower La Cienega (Camino Loma, La Lomita, and Cielo Del Oeste areas). The project was completed and those areas are now supplied by County water (Hunter, 2022). When well owners are connected to the County water utility, they are required to plug their domestic well, but there is no tracking or enforcement of this requirement (Hunter, 2022).

4.4 Community Water Systems

The LCLC community plan update (Santa Fe County, 2015) includes information about three community water systems: La Cienega Mutual Domestic Water Consumers Association

\\SS6ABQ\DATAS\PROJECTS\DB22.1144_LA_CIENEGA_DOMESTIC_WELLS\GIS\MXDS\REPORT\F07_COUNTY_WATER_SYSTEM.MXD



Base image source: Maxar, Vivid 2019-2021 composite

N

0 0.75 1.5 Miles

Explanation

- Santa Fe County Buckman Line
- Santa Fe County waterline (updated October/November 2019)
- La Cienega and La Cieneguilla planning area
- Santa Fe County water service
- Parcel connected to county water system

DBS&A a Geo-Logic Company

3/9/2023 DB22.1144

LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

County Water System

Figure 7

(MDWCA), La Cienega Water Users Association, and Wild and Wooley Trailer Park. The LCLC community plan update indicates that La Cienega MDWCA provides residential water supply to a large portion of Lower La Cienega and uses approximately 21.7 ac-ft/yr. It also notes that to become a member of the system, groundwater rights must be contributed to the system. The LCLC community plan update indicates that the system served 135 households in 2012, with an average per connection water demand of 0.16 ac-ft/yr (Santa Fe County, 2015).

The LCLC community plan update indicates that the La Cienega Water Users Association is located in Lower La Cienega, at the end of Paseo C de Baca, and is associated with the former Lakeside Mobile Home Park (Santa Fe County, 2015). A water delivery agreement was entered into between the La Cienega Lakeside Mobile Home Park and Santa Fe County that took effect in March 2018. The agreement includes an average diversion volume of 3.45 ac-ft/yr for the system for the previous 16 years. The agreement says that the system's 5.1 ac-ft/yr of water rights were to be transferred to the County, and that the four wells owned by the La Cienega Lakeside Mobile Home Park were to be plugged following connection to the County water utility. The LCLC community plan update indicates that the Wild and Wooley Trailer Park has a 72-12-1 NMSA well with a diversion right of up to 3 ac-ft/yr, that connection to the County water utility is anticipated in the future, and that the system was connected to the County's wastewater system in 2012 (Santa Fe County, 2015).

The OSE publishes a Water Use by Categories report presenting water use data every five years, and the most recent available report presents data for 2015 (Magnuson et al., 2019). These reports include lists of the public water systems in New Mexico by county. There are a number of public water systems located within the LCLC planning area. The largest of these systems is the La Cienega MDWCA, and the OSE Water Use by Categories report indicates that this system served a population of 525, and diverted 16 acre-feet of groundwater in 2015 (Magnuson et al., 2019). This groundwater diversion volume is likely in error, as it yields a per capita use volume of only 27 gallons per day (Magnuson et al., 2019). The La Cienega MDWCA system is connected to the County water utility; however, the connection is used as an emergency connection, and the County water utility does not provide their primary source of water supply (Hunter, 2022).

The LCLC community plan update (Santa Fe County, 2015) indicated that there were plans to connect two community water systems located within the LCLC planning area to the County water utility. Since then, the La Cienega Water Users Association has been connected, which now provides the system's sole source of water supply (Hunter, 2022). The Wild and Wooley

Trailer Park has not yet been connected to the County water utility (Hunter, 2022). The OSE Water Use by Categories report gives the populations served by these two systems in 2015 as 60 and 93 people, respectively (Magnuson et al., 2019). Water use in 2015 by these entities was 28 and 8 acre-feet, respectively (Magnuson et al., 2019). The groundwater diversion volume given for the La Cienega Water Users Association is likely in error, as it yields a per capita use volume of 410 gallons for this system. The estimated 2015 per capita volume for the Wild and Wooley Trailer Park is 80 gallons per day (Magnuson et al., 2019).

5. Estimated Water Demand

5.1 Domestic Well Water Demand

As discussed in Section 4.1, NMWRRS information indicates that there are 934 permitted wells located in the LCLC planning area. These wells include 823 domestic wells permitted under NM Stat §72-12-1 (this value is the sum of the permitted 72-12-1 NMSA wells for domestic and livestock watering, domestic one household, and multiple domestic household well types). There are nearly 700 permitted domestic one-household wells, and more than 100 permitted domestic multiple-household wells (Table 2). Current domestic well water production has been estimated for the LCLC planning area, as discussed in this section.

Total permitted groundwater diversions for the wells in the LCLC planning area total 2,332.00 ac-ft/yr, including 1,658.00 ac-ft/yr for domestic one-household wells and 292.00 ac-ft/yr for domestic multiple-household wells permitted under NM Stat §72-12-1 (Table 2). The per well permitted diversion volumes for domestic one-household wells in the LCLC planning area range from 0 to 3.0 ac-ft/yr, depending on when the well was permitted. As discussed in Section 4.2, current OSE regulations allow up to 1.0 ac-ft/yr for a single household, or up to 1.0 ac-ft/yr per household up to a maximum of 3.0 ac-ft/yr for shared domestic wells. Wells that were permitted prior to the change in OSE regulations have permitted diversion volumes of 3.0 ac-ft/yr. Domestic well water demand is likely less than the permitted diversions.

The County provided all of the domestic well meter reading reports they have on file; Table 4 summarizes the information from these reports. The reports span the 8-year period of 2015 through 2022, and include a total of 43 meter reading reports for 24 wells (for some wells, the owner filed reports in more than one year). Of the 24 wells, 15 were domestic wells serving one residence. Some of the meter reading reports were not for domestic wells that supply residences (instead supplying a private school or various retreat centers), and those data were

not used to estimate domestic water demand. As shown on Table 4, none of these meter reading reports are for wells located within the LCLC planning area. In some cases, the County's meter reading form was filled out and returned; in other cases, one meter reading value was e-mailed to County staff. In the 21 cases where there was enough information, DBS&A calculated annual water demand. Calculated domestic demand ranges from 0.05 to 2.0 ac-ft/yr; however, meter multiplier issues are suspected for the smallest volumes. Notes included with the meter readings for one well indicate that the house supplied is not occupied year-round. Information obtained from the meter reading reports was not used to estimate or project LCLC planning area water demand.

The U.S. Census American Community Survey 2017-2021 demographic and housing estimates give a population of 4,110 for the La Cienega CDP, and an estimated 1,397 households (U.S. Census, 2021). Based on these two values, the average household size was calculated to be approximately 2.94 people. The number of households for the La Cienega CDP was not used to estimate domestic water demand, as the La Cienega CDP covers a smaller area than the LCLC planning area (Figure 5), and because some households are supplied by the County water utility or another community water system.

The OSE uses a per capita volume estimate for rural self-supplied users (residences served by domestic wells) in Santa Fe County of 80 gallons per day (Magnuson et al., 2019). Using an average household size of 2.94 people (calculated based on data for the La Cienega CDP from U.S. Census, 2021), the OSE's per capita volume estimate converts to an estimated household demand of 0.26 ac-ft/yr. The LCLC community plan update states that average domestic use for households supplied by the La Cienega MDWCA was 0.16 ac-ft/yr (Santa Fe County, 2015). The Utton Center estimates that average household water use in New Mexico is approximately 0.25 to 0.33 ac-ft/yr (Utton Center, 2014). As discussed in Section 4.2, the current OSE regulations allow permitted diversions of up to 1.0 ac-ft/yr for domestic wells.

Table 5 presents a range for estimated current domestic water demand in the LCLC planning area based on the per household water demand estimates described above and the estimated total number of households based on the number of permitted domestic wells. The estimated number of households in the LCLC planning area that are supplied by domestic wells ranges from 929 (assuming that each shared domestic well supplies two households) to 1,141 (assuming that each shared domestic well supplies four households). As shown on Table 5, estimated domestic well water demand spans a wide range. Domestic water demand could range anywhere from approximately 150 to 1,100 ac-ft/yr depending on the per-household

demand and number of households served by each shared domestic well. Assuming that per-household demand is 0.16 ac-ft/yr and shared domestic wells supply an average of two households each, domestic demand is estimated to be approximately 150 ac-ft/yr. Assuming that per household demand is 0.33 ac-ft/yr and shared domestic wells supply an average of three households each, domestic demand is estimated to be approximately 350 ac-ft/yr. Assuming that per household demand is 1.0 ac-ft/yr and shared domestic wells supply an average of three households each, domestic demand is estimated to be approximately 1,000 ac-ft/yr.

5.2 Community Water System Demand

Permitted diversion volumes for community water systems total 68.07 ac-ft/yr (Table 2), or 88.47 ac-ft/yr if mobile home parks are included. This is an overestimate of actual water demand, as the La Cienega Water Users Association is now being served by the County water utility.

5.3 Irrigation Water Demand

The LCLC community plan update (Santa Fe County, 2015) says that water from La Acequia de La Cienega is delivered to 98.6 acres of irrigated land, 40 acres of which is currently being farmed, and that a supplemental well has been used since 1998. La Acequia de El Guicu traditionally served 41 irrigated acres, currently irrigates approximately 25 acres, and uses a supplemental well (Santa Fe County, 2015). La Acequia de El Molino (also known as La Acequia de La Capilla) is used to irrigate approximately 15 acres. The LCLC community plan does not estimate irrigation water demands.

As shown on Tables 2 and 3, total permitted irrigation diversions in the LCLC planning area are 482.17 ac-ft/yr. This includes 350.34 ac-ft/yr in surface declarations and 131.83 ac-ft/yr in permitted groundwater diversions.

5.4 Livestock Water Demand

Permitted diversion volumes for livestock wells in the LCLC planning area are low; permitted diversions total 57 ac-ft/yr for 72-12-1 Domestic and livestock watering wells, 15 ac-ft/yr for 72-12-1 livestock watering wells, and 9 ac-ft/yr for Non 72-12-1 Domestic and livestock watering wells (Table 2). Two of the use types include domestic demand, so the total water demand for livestock use is an overestimate.

5.5 Total Estimated Groundwater Demand

The permitted groundwater diversion volumes for each sector and their magnitudes relative to each other are shown on Figure 8. Table 6 presents a range for estimated total groundwater demand in the LCLC planning area assuming that the community water system, irrigation, and livestock demands are equal to the permitted diversions for these sectors (likely an overestimate of actual water demand). As discussed in Section 5.1, there is a range of potential volumes for current domestic water demand (Table 5). Total estimated groundwater demand in the LCLC planning area ranges from approximately 550 to 1,300 ac-ft/yr.

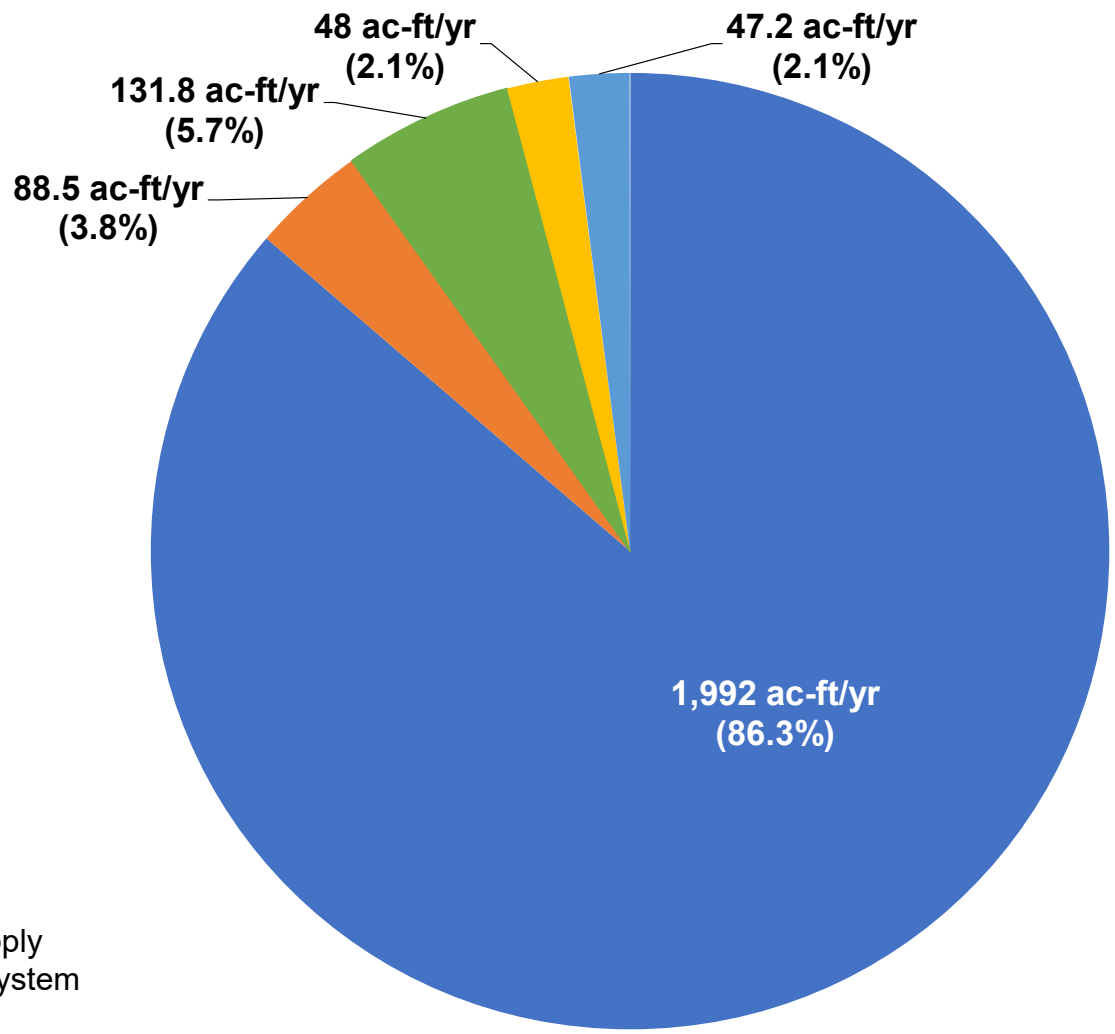
5.6 Groundwater Demand Projections

Future groundwater demand has been projected (Table 7). As for the estimation of current water demand, the community water system, irrigation, and livestock water demands are assumed to be equal to the permitted diversions (likely an overestimate of actual water demand). Domestic water demand would generally be projected using per capita water demand multiplied by population growth estimates. However, because per capita water use is not known, a range of potential domestic water demand volumes have been projected from a range of estimated current domestic water demand volumes (Table 5).

Assuming that current domestic water demand is 250, 500, or 750 ac-ft/yr, and that the LCLC planning area domestic water demands increase by 5, 10, or 15 percent per decade (population growth in the LCLC planning area was more than 8 percent between 2010 and 2020), projected 2060 domestic water demand in the LCLC planning area ranges from approximately 300 ac-ft/yr, projecting from a 2020 demand of 250 ac-ft/yr and assuming growth of 5 percent per decade, to 1,300 ac-ft/yr, projecting from a 2020 demand of 750 ac-ft/yr and assuming growth of 15 percent per decade (Figure 9). Adding in the permitted groundwater diversion volumes for the other sectors (a total of 315.5 ac-ft/yr) yields total projected groundwater demand of approximately 600 to 1,600 ac-ft/yr for the LCLC planning area.

6. Project Public Involvement

DBS&A discussed the current project's outreach methods and media platforms with County staff, and one project open house was included in the project scope. The purpose of the project open house was to introduce the project and project team, outline the project's objectives, initiate community member involvement in the project, and ask for input on the best methods



See Table 6 for explanation of what is included in each category.

Figure 8

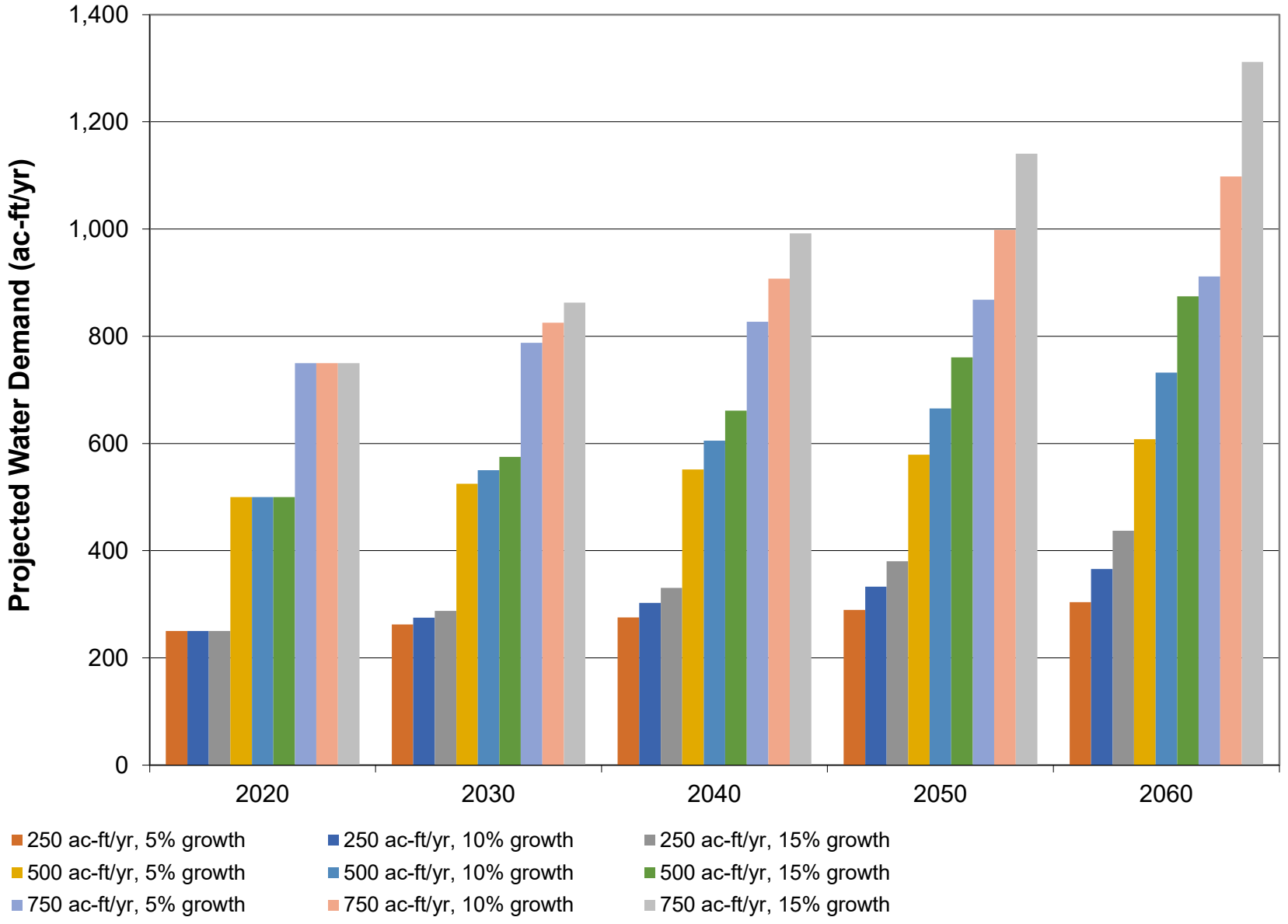
LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

Permitted Groundwater Diversions in the LCLC Planning Area

DBS&A
a Geo-Logic Company

3/10/2023 DB22.1144

P:_DB22-1144\La Cienega Report.3-23\Figures\Word\F09_Estimated Demand.docx



LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

Estimated Current and Range in Potential Future Domestic Groundwater Demand in the LCLC Planning Area

Figure 9

DBS&A a Geo-Logic Company

3/10/2023 DB22.1144

for obtaining water use data. The County also set up a project-specific website to post the open house materials and recording, update participants on the project progress, and announce future project events.

6.1 Open House Announcement

As discussed in Section 4.1, current parcel data were obtained and were clipped to include those parcels located partially or entirely within the LCLC planning area. A project open house announcement was developed (Appendix D), and was posted to the Santa Fe County website on August 23, 2022. This announcement was mailed to the owners of all land parcels located in the LCLC planning area (1,458 mailings) on August 24, 2022. The announcement was also e-mailed to the Water Policy Advisory Committee (WPAC) members by County staff. Based on public comment, the open house announcement was translated into Spanish, and the Spanish version was added to the Santa Fe County website posting. With the focus of the project on domestic wells and domestic water use within the LCLC planning area, the community water systems and acequias were not contacted separately in advance of the open house; however, as landowners in the LCLC planning area, they would have received the project open house announcement in the mail.

6.2 Project Open House

The project open house event was held at the La Cienega Community Center on September 14, 2022; approximately 60 people attended. County staff recorded the event. There was an open house sign-in sheet that was used to develop an e-mail list for updating participants on the project progress and announcing future project events.

The event was opened with a welcome, and the project consultant team (DBS&A and NMBGMR) and County staff in attendance were introduced. Amy Ewing (DBS&A) provided a project overview. Jacqueline Beam (Santa Fe County Sustainability Manager) provided the project's context, and indicated that the project's goal is for the County to work together with planning area residents on the shared concern of limited groundwater supply and a growing community. Jacqueline Beam outlined the goals of the project and open house event, and offered Spanish language translation during the open house.

Posters were displayed on the walls showing the LCLC planning area, geology, parcel outlines and locations of permitted wells, and current extent of the County water utility (water lines and parcels served). Stacy Timmons and Ethan Mamer (NMBGMR) gave a hydrogeologic overview

for the project area, and a well survey was provided as a handout for participants to fill out and return (Appendix E). The remainder of the open house was spent answering participant questions about the project and discussing other water resource concerns and the project's next steps. Public input was solicited from the open house attendees to inform and help define the project's future public outreach methods.

Posters listing six key water resource issues were also displayed at the open house, and each participant was given three stickers to use to vote for their top issues of interest. "Other" was one category, and participants were asked to list their issue of concern when voting for "Other." This category received a total of 7 votes, and the water resource issue that was indicated was retiring septic tank use and reusing treated wastewater. Table 8 shows the results of the water resources issues of interest feedback; as shown, the water resource issue with the most interest (highest priority and total votes) was domestic groundwater supply, followed by water quality and growth management.

Open house participants expressed concern over local water supplies, nearby development (e.g., car washes), the cost of connecting to the County water utility and the subsequent costs for County water utility customers, and water quality (especially due to proximity of septic systems). There was a question about why the LCLC planning area was selected as the pilot area for this project. This area was selected for the pilot project because of the community's interest, as defined by the LCLC community plan. The program may potentially be expanded to other areas throughout the County in the future.

There was a question about whether the County or City of Santa Fe have plans to complete large supply wells in the area (they do not). There was a question of whether the County's wastewater system might be expanded to serve this area (wastewater service expansion to serve this area is not currently planned). Participants said that they felt threatened by the discussion of domestic wells and water restrictions. Issues with shared domestic wells were also raised (Section 6.3). Camilla Bustamante, District 5 County Commissioner elect, suggested that a follow-up community meeting be held to continue the discussion of water issues.

A total of 15 well surveys were turned in at the project open house. Feedback received from the returned well surveys included the following:

- Desire for development to be controlled in this area
- Opposition to any new large water users in the area (e.g., water bottling, dairy operations)

- Interest in involving the New Mexico Environment Department (NMED) Drinking Water Bureau (DWB) and New Mexico Department of Health (NMDOH) in the domestic well monitoring project (for water quality monitoring)
- Concern over the long-term sustainability of the local groundwater resources; concern that there are too many people and too little water
- Concern over acequia water supply due to upstream development
- Interest in having any new development be served by the County water utility
- Suggestion that the domestic well monitoring program be funded and that the County staff the program to allow for actual monitoring (there were questions about how the County will staff this program going forward when it has not been to date)
- Support for metering water use in this area
- There was a response to "keep it up," with a note that the well owner is open to monitoring
- Desire to protect the historical water uses in the area and to address new development
- Interest to know the potential impact of the City of Santa Fe discontinuing discharge of treated effluent to the Santa Fe River, as proposed
- Concern over the lack of water resources and the continuation of development

The project open house was recorded, and the event's recording was posted to the County's project-specific website (https://www.santafecountynm.gov/public_works/utilities/meter_reading), along with the posters that were displayed and the open house handouts. The project-specific website was located under utilities, as water meter readings have historically been submitted through the utilities section of the County's website (formerly to the County hydrologist). The project-specific website went live on January 3, 2023, and the project was featured in the Santa Fe Sustainability's January 2023 newsletter. An e-mail was sent to the project e-mail list on February 1, 2023, providing this link and an update on the project. Another e-mail will be sent once the project report has been issued. The project methods, findings, and recommendations will be presented to the BCC on March 28, 2023.

6.3 Public Feedback

DBS&A received phone calls and e-mail messages from well owners in the LCLC planning area, especially in response to the project open house announcement. Feedback that was received

included that project-specific public outreach events should be recorded, and that meeting announcements and handouts should be in English and Spanish.

Well share issues were raised, and there was a request to cover these issues and for the County to offer support at the project open house. This was outside the scope of the current project, but DBS&A provided the OSE's contact information as the best avenue for assistance, at least related to well permitting. The OSE is unlikely to get involved in the well share agreements and conditions, and wells ultimately belong to the landowners of the properties where they are located. DBS&A asked the OSE for any guidance to give landowners about navigating shared well issues (e.g., when the party they share a well with is not cooperative). The OSE said that shared wells are tricky because many of them do not have legal well share documents in place and often just run off of verbal agreements. In addition, OSE stated that well sharing disputes are outside the jurisdiction of the State Engineer and must be resolved elsewhere.

There were comments that suggested commercial water use would be a better focus than domestic use. DBS&A was also contacted about historical context and background regarding mistrust in the planning area between La Cieneguilla and La Cienega.

7. Previous and Existing Requirements

The following subsections summarize the previous and existing Santa Fe County requirements pertaining to domestic wells and water use. The 2016 SLDC supersedes the earlier requirements; however, a summary of the earlier requirements follows to show what requirements have been adopted over time, which may have affected water usage. The earlier requirements also informed the plat notes that were developed for specific properties.

7.1 1980 Land Development Code

The County's original Land Development Code was adopted by Ordinance No. 1980-6 on October 28, 1980, and took effect on January 1, 1981 (Santa Fe County, 1980). The version of the 1980 Land Development Code available online includes amendments adopted by County Ordinance Numbers 1981-2, 1984-3, 1987-1, 1987-3, 1987-7, 1988-8, 1988-9, 1989-3, and 1989-5.

The 1980 Land Development Code purpose is given as

> . . . to implement the policies of the Santa Fe County General Plan and to combine the regulation of various aspects of land development and use of natural resources into a common system of administration and appeals, in order to simplify the application process for the public and conserve personnel resources of County government.

It states that in adopting and enforcing the code, the Board intends to exercise all relevant powers conferred on it by the laws of the State of New Mexico, including NMSA 1978 Sections 3-53-1 through 3-53-5 (Water Use and Water Facilities), as amended. These sections outline municipal authority over domestic wells and the regulation of water use, irrigation, and public acequias.

The 1980 Land Development Code includes the following relevant requirements:

- Article III Zoning Regulations, Submittals, and Reviews, Section 10 Lot Size Requirements
  - Section 10.1: "The General Plan sets forth the policy that future population growth in the County should be supported by adequate long term water availability and concentrate population growth in Urban and Metropolitan Areas and Traditional Communities," with development being generally served by one or more regional water systems or community water systems.
  - Section 10.1: Development outside of the Urban and Metropolitan Areas and Traditional Communities using 72-12-1 NMSA domestic wells "should consider estimated long term water availability and protect water resources for existing County residents having domestic wells."
  - Section 10.1: Development may be permitted if the applicant for a development permit demonstrates that they have water rights, excluding those permitted under 72-12-1 NMSA 1978 or 75-11-1 NMSA 1953, which are approved for transfer to the site of development and that those water rights are sufficient to support the proposed development.
  - Section 10.1.2 outlines water policies governing lot sizes where developments will not utilize permitted water rights, with minimum lot size calculated as follows for the various zones (with more detail provided in the Land Development Code subsections that follow).

- For the basin and basin fringe zones, minimum lot size shall be calculated based on groundwater storage, requiring a 100-year water supply without considering recharge.
- For the homestead and mountain zones, minimum lot size shall be calculated based on groundwater storage (requiring a 100-year water supply) or groundwater recharge (with recharge sufficient to provide a 100-year water supply), but not both.
- For the basin and basin fringe zones within a metropolitan area shown on Code Maps 12, 14, and 15, the County anticipates regional water systems to be eventually developed to serve this area, so the groundwater storage requirement is 40 years, without considering recharge.
- For the homestead and mountain zones within a metropolitan area, minimum lot size shall be calculated based on groundwater storage (requiring a 40-year water supply) or groundwater recharge (with recharge sufficient to provide a 40-year water supply), but not both.

◇ Article VII Environmental Requirements, Section 6 Water Supply

- Section 6.6.2 states that "densities set forth in Section 10 of Article III of the Code are based on an average residential water use of 1.0 acre foot per year per dwelling unit. Residential development involving greater or lesser water use may have these densities varied accordingly. Non-residential development must establish estimates of water use." This section goes on to outline the water budget requirement for proposed developments.
- Section 6.6.2 includes examples of water conservation measures which may be approved as part of a development permit, including "limitation of water use and measurement of the limitation by clustering of dwelling units on a metered well, with the annual meter reading reported to the State Engineer, or hookup to a metered community water system" (Subsection 6.6.2c).

- Article II Administration, Section 4 Special Procedure for Approval of Development on Lots Which Do Not Meet Lot Size Requirements of Code.

◇ Section 4.3 Inheritance and Family Transfer

- Section 4.3.4a Density: Lots may be created by inheritance or family transfer that do not meet the lot size requirements of the code provided that no lot shall be smaller than one half of the standard minimum lot size allowed in the particular location or

hydrologic zone, and no lot shall be smaller than ¾ acre except as provided in Article III, Sections 10.3.3 and 10.3.4 for lots using both an approved community water and sewer system, with these requirements applying to the parcels retained and transferred.

- Section 4.3.4b Water Supply: Article VII Environmental Requirements, Section 6 Water Supply addresses water supply restrictions that apply to inheritance and family transfer lots according to the standards of Code, as follows: water restrictive covenants, metering and allocations for the particular hydrologic zone; authorized extension of an existing community water system or the regional water system; or creation of a new community or cluster well water system.

7.2 1996 La Cienega Watershed Conditions

A copy of the 1996 La Cienega Watershed Conditions was obtained, and is provided in Appendix F. The La Cienega Watershed Conditions include the following:

1. Require lot owners to connect to the County water utility when service is available within 200 feet of the property line of land being divided.
2. Encourage shared wells to minimize expenses related to interim water supply.
3. Require that distribution systems be designed and constructed to meet the County's minimum fire flow requirements, when line extensions are being made to connect lots to the County water utility, exclusive of reservoir capacity.
4. Require that lot owners disconnect from any 72-12-1 NMSA domestic wells at the time that connection is made to the County water utility, discontinuing their use except under emergency circumstances.
5. Require a 15-foot utility easement along all property lines for the installation of County water utility infrastructure.
6. Require that wells be installed 50 feet into the Tesuque Formation, and that they include a seal to prevent the mixing of groundwater between the Tesuque and Ancha Formations.

The LCLC community plan (Santa Fe County, 2015) says that all property owners with wells who have requested building or development permits with Santa Fe County since 1996 are required to install water meters on new wells, to record their meter readings on a monthly basis, and turn them in to the County hydrologist annually. This metering requirement was not substantiated, and does not originate from the 1996 La Cienega Watershed Conditions (Appendix F).

7.3 Santa Fe County Ordinance 2002-9

Santa Fe County Ordinance No. 2002-9 amended the Santa Fe County Land Development Code (Ordinance No. 1996-10) Article XIV, Traditional and Contemporary Community Zoning Districts, to add a new section for the La Cienega and La Cieneguilla Traditional Community Planning Area and La Cienega Traditional Community Zoning District. This ordinance was filed on June 27, 2002, and codified many of the water resources strategies identified in the 2001 LCLC community plan, including the La Cienega Watershed Conditions (Santa Fe County, 2015).

This ordinance imposed residential water use restrictions, stating that all new residential land division and subdivisions using groundwater from a domestic well shall limit water consumption to 0.25 ac-ft/yr dwelling unit for domestic consumption (Santa Fe County, 2002). This included all indoor and outdoor household water use, but did not apply to agricultural or private water rights. The ordinance states that applicants for new residential development using domestic wells for water supply could request up to an additional 0.50 ac-ft/yr, for a total demand of 0.75 ac-ft/yr per dwelling unit; however, requests for additional water supply were required to be accompanied by a water budget and proof of a 100-year water supply (Santa Fe County, 2002).

Per Ordinance No. 2002-9, new lots created as part of residential land divisions and subdivisions were required to connect to the County water utility when the water system was extended to within 200 feet of the property line, unless the lot was already connected to a community water system that had the necessary capacity and water taps available to supply it (Santa Fe County, 2002). The ordinance indicated that property zoned commercial at the time of the ordinance's adoption would be permitted; however, no new commercial zoning would be allowed within the La Cienega and La Cieneguilla Traditional Community Planning Area and La Cienega Traditional Community Zoning District (Santa Fe County, 2002). If connection to the County water utility was not possible, water demand was to be limited to 0.35 ac-ft/yr per acre (Santa Fe County, 2002). All new commercial establishments or expansions were required to submit a water resources plan at the time of their application. Any large outdoor recreation or landscaping areas, such as ball fields, were required to use treated effluent for irrigation rather than potable water (Santa Fe County, 2002).

The ordinance required all new wells and buildings being supplied either fully or partially by groundwater from wells located within the planning area to install meters on the wells (Santa Fe County, 2002). All new development using shared wells or community water systems was required to install meters for each dwelling unit or primary structure that is supplied by the well

(Santa Fe County, 2002). Well meter readings were required to be recorded on a monthly basis and provided to the County in an annual report (Santa Fe County, 2002).

Landowners were required to provide documentation supporting water availability and the potential impact on other nearby wells with applications for commercial development and residential subdivision master plans (Santa Fe County, 2002).

Attachment 1 of Ordinance No. 2002-9 lists six conditions that replaced the 1996 La Cienega Watershed Conditions in the area recognized as the LCLC planning area. The conditions are the same as the versions from 1996 (Section 7.2), except the following:

- Condition 3 added the Fire Department's minimum fire flow requirements to this condition.
- Condition 4 added (A) to the NMSA 1978, Section 72-12-1 requirement of this condition, making it NMSA 1978, Section 72-12-1 (A).
- Condition 5 was expanded to say that the required utility easements were for the installation, operation, maintenance, access and egress of County water utility infrastructure; required easement width was at least 15 feet along all property lines, unless shared between two adjacent properties, when a minimum of 10 feet in width on each property was required, and the easement requirement could be waived on one or more property line if it is demonstrated that adequate utility access was provided.

7.4 Santa Fe County Ordinances 2002-13 and 2004-7

Santa Fe County Ordinance 2002-13 updated indoor and outdoor water conservation requirements, and was adopted on December 10, 2002. The ordinance applied to all residential and commercial water users in Santa Fe County, but water use on land designated as farmland or ranchland by the County Assessor was exempt from this ordinance, as was water derived from rainwater catchment or reuse systems and water being used from an acequia or other agricultural irrigation system. The ordinance states that it is imperative that the County's water resources are conserved in order to allow "our children and grandchildren to live in our community." This ordinance includes a schedule for fines for violations of this ordinance, and a listing of the County personnel authorized to issue fines.

The outdoor conservation requirements included restrictions on time of day, watering methods, and plant types (no Kentucky bluegrass was permitted), and included swimming pool restrictions and requirements for repairing leaks. The indoor conservation requirements addressed new and replacement fixture requirements, and required retrofits of plumbing

fixtures by January 1, 2005, although this requirement did not apply to single-family or multi-family residential water users. The ordinance also included water waste and fugitive water provisions.

This ordinance outlined a domestic well use metering program, but says that it applied only to residents of lots where restricted water usage and water meter reporting requirements were voluntarily accepted as a condition of plat approval. This program's requirements included a final inspection field report (to show that a meter was installed) and a meter testing/replacement provision that applied every 10 years.

Ordinance 2002-13 was amended by Santa Fe County Ordinance 2004-7, which was adopted on November 9, 2004. This ordinance states that water resources in Santa Fe County are limited and are vulnerable to depletion by drought, and that the water conservation requirements outlined in Ordinance 2004-7 apply to "all residents of Santa Fe County and all businesses operating in Santa Fe County at all times of the year." The outdoor and indoor conservation, domestic well use metering program (voluntary), water waste, and fugitive water requirements track those included in Ordinance 2002-13, except that the date the indoor conservation requirements require plumbing fixture retrofits by was changed from January 1, 2005 to July 1, 2005. This requirement still did not apply to single family or multi-family residential water users. The schedule of fines was also revised, with the fine for the fourth and subsequent violations being reduced from $400.00 to $300.00.

7.5 2016 Sustainable Land Development Code

The Santa Fe County SLDC was adopted by Ordinance No. 2016-9 on December 13, 2016. Its purpose is "to implement and be consistent with the goals, objectives, policies, and strategies of the Sustainable Growth Management Plan (SGMP) through comprehensive, concurrent, consistent, integrated, effective, time limited and concise land development approvals." Specific items it was designed to provide include conservation of water resources, prevention of adverse climate change, and promotion of sustainability. Applicable 2016 SLDC requirements are discussed below.

- Section 7.13 Water Supply, Wastewater and Water Conservation
  - Section 7.13.1 Water Supply and Distribution
    - The water supply and distribution system required of any development is dependent on the nature of the development, the Sustainable Development Area (SDA) in which

the development is located, and the proximity of the development to public water and wastewater infrastructure.

- Section 7.13.2.4 Required Connection to the County Water Utility
  - Section 7.13.2.4 includes requirements by SDA for new residential dwellings to connect to the County water utility; however, these requirements do not apply to the LCLC planning area, where the Section 9.8 LCLC Community District Overlay requirements apply instead.

- Section 7.13.7 Self-Supplied Water Systems
  - Section 7.13.7.2 Shared Wells Systems and Individual Wells
    - A shared well system or an individual well shall provide all water needed for domestic use and fire protection.
    - A shared well system or an individual well shall be capable of providing the water requirements of the proposed development for up to 99 years respectively.
    - An applicant proposing to use a shared well system or an individual well shall perform a hydrologic/reconnaissance report that conforms to the requirements of the SLDC. Exemptions to this requirement include applicants proposing to develop a single family residential or accessory dwelling unit on a lot existing prior to the effective date of the SLDC using a domestic well as the water supply, divide land through a land division or exempt subdivision, or create a minor subdivision or no more than five lots. In these cases, the applicant is required to provide a copy of the statutory domestic well permit issued by the Office of the State Engineer.

- Section 7.13.11 Water Conservation
  - Section 7.13.11.1 General Requirements
    - All plats and non-residential development shall file signed water restrictions and covenants included in this Section with the plat or site development plan. All applications subject to water restrictions and conservation requirements shall file a declaration with the County Clerk memorializing the restrictions of this Section. These restrictions shall run with the land and any violations shall be enforceable by the County pursuant to 2016 SLDC Section 14.3.
    - Total water use shall not exceed that specified in the development order, plat note, or the SLDC.

- Except for water harvested using rainwater catchment systems and gray water, the annual water use for domestic purposes for new residential dwellings constructed on any lot created after the effective date of this Ordinance shall not exceed 0.25 ac-ft/yr or such lower amount as may be established in the development order approving the land division.

- Section 7.13.11.2 Outdoor Conservation: Except as otherwise provided in specific subsections, this Section is applicable to all property within the County, regardless of when the lot was created (e.g., new sod or grass seed that contains Kentucky bluegrass is not permitted. Lawns of non-native grasses shall not exceed 800 square feet and shall only be watered with harvested water or grey water).
- Section 7.13.11.3 Indoor Conservation: Except as otherwise provided in specific subsections below, this Section is applicable to all property within the County, regardless of when the lot was created (e.g., fixture and appliance requirements when replaced).
- Section 7.13.11.5 Domestic Well Use Metering Program
  - All development using a well shall participate in the well use metering program.
  - Santa Fe County-approved meters are required to be installed on wells for any development subject to the SLDC. The meter shall be read by the property owner annually and meter readings shall be provided to the Administrator no later than April 30 of the same calendar year. Submissions shall include name and address of well owner, location of well, OSE well permit number, meter reading, date of meter reading, number of residences served by the well, make and model of meter and photograph of the meter. If a property is required to submit meter readings to the OSE, these readings may be sent to the Administrator in lieu of the above requirement.
  - All properties that are required to report water meter readings as a condition of plat approval shall have the name and address of the property owner entered into the database when the building permit is issued.
  - All properties that are required to have water meters shall also be required to test their water meter for reading accuracy every 10 years and replace if necessary.
  - Failure to submit the meter reading will result in the same penalties as outlined in 2016 SLDC Section 14.4.

- When water is used in excess of the amount allocated to the property, the first year a letter with educational/informational materials on how to reduce water use will be sent to the water user and they will be required to submit water meter readings every six months to track their progress. All subsequent water usage violations will result in the same penalties as outlined in 2016 SLDC Section 14.4.

- Section 7.13.12 County Permit Required to Drill New Domestic Well Within County Utility Service Area
  - A County domestic well permit is required in order to drill a new domestic well within the service area of the County water utility after the effective date of this Ordinance. A County permit is not required if the well owner will be replacing, supplementing, or deepening an existing domestic well.
  - The County may not issue a permit to drill a new domestic well if connection to the County water utility is required under 2016 SLDC Section 7.13 and applicable law.
- Section 9.8 LCLC Community District Overlay - The 2016 SLDC includes a La Cienega and La Cieneguilla Community District Overlay that is intended to implement the land use goals, objectives, policies, and strategies of the LCLC community plan (2015), and the SGMP. The requirements of the 2016 SLDC's Section 7 apply to the LCLC planning area, with the following exceptions (where the requirements of Section 9.8 apply instead).
  - Section 9.8.2.1.1 Residential Connection to County Utility Water System
    - All new lots created as part of residential land divisions and subdivisions shall be required to connect to the County water utility when the system is extended to within 200 feet of the property line of a lot, unless that lot has previously connected to a community water system, provided that adequate capacity exists in the system and that water taps are available. This requirement has a number of conditions:
      - i. If the water system is already in place and capable of providing service or if the County can provide an estimated time of completion of six months or less, connection to the system will be required immediately upon the time of service capability within the system.
      - ii. If the County cannot provide an estimated time for waterline completion and capacity for service of six months or less, the new land division will be granted a 2-year grace period from the time the water line is actually installed

and taps are available before the agreement to connect to the system will be effective.

- iii. If connection to a county or community water system is not possible at the time of land division for new residential development of two or more lots of 2.5 acres or less, all lots will be required to use shared wells where new lots are adjoining, providing adequate water is available for both lots. The requirement to connect to the County or community water system will still be in effect and the property owners will be granted a 2-year grace period from the time the water line is actually installed and has adequate capacity, before the connection to the system will be required.
- In all cases, the requirement for connection shall be duly noted on the survey plat prior to final approval.

- Section 9.8.2.1.2 Non-Residential Connection to County Utility Water System
  - All new non-residential development shall be required to connect to the County water utility when said system is extended to within 200 feet of the property line, unless that lot has previously connected to a community water system, provided that adequate capacity exists in the system and that water taps are available. If connection to the County water utility is not possible, the development must limit water consumption to 0.35 acre-feet per year. This requirement also includes conditions i and ii discussed under the Section 9.8.2.1.1 Residential Connection requirements above.

The 2016 SLDC includes sections addressing water waste, fugitive water, and water harvesting (2016 SLDC Sections 7.13.11.6 and 7.13.11.7) that have not been summarized here.

7.6 Summary of Existing Requirements

Plat notes and the SLDC both govern new development on the lots with well restrictions under the La Cienega Watershed Conditions. If the plat notes are stricter than the SLDC or require a connection to the County water utility sooner than the SLDC, and the notes have never been vacated by the BCC, the plat notes control the requirements for a specific property. If the SLDC is stricter or requires a connection to County water utility sooner than the plat notes, then the SLDC will control the requirements for a specific property. Some lots may be subject to restrictive covenants that are stricter than the SLDC; however, the County does not enforce restrictive covenants. Development of lots with restrictive covenants is governed by the SLDC.

Per the 2016 SLDC adopted on December 13, 2016:

- The Section 7.13.2.4 requirements for new residential dwellings to connect to the County water utility by SDA do not apply to the LCLC planning area, in favor of the Section 9.8 LCLC Community District Overlay requirements.
- A shared well system or an individual well shall be capable of providing the water requirements of the proposed development for up to 99 years (2016 SLDC Section 7.13.7.2).
- All plats and non-residential development shall file signed water restrictions and covenants with the plat or site development plan. Total water use shall not exceed that specified in the development order, plat note, or the SLDC (2016 SLDC Section 7.13.11.1).
- The annual water use for domestic purposes for new residential dwellings constructed on any lot created after the effective date of this Ordinance shall not exceed 0.25 ac-ft/yr or such lower amount as may be established in the development order approving the land division (2016 SLDC Section 7.13.11.1).
- The Outdoor Conservation and Indoor Conservation sections are applicable to all property within the County, regardless of when the lot was created (2016 Sections 7.13.11.2 and 7.13.11.3).
- All development using a well shall participate in the well use metering program. Santa Fe County-approved meters are required to be installed on wells for any development subject to the SLDC. The meter shall be read by the property owner and meter readings shall be provided annually (2016 SLDC Section 7.13.11.5).
- All properties that are required to report water meter readings as a condition of plat approval shall have the name and address of the property owner entered into the database when the building permit is issued (2016 SLDC Section 7.13.11.5).
- All properties that are required to have water meters shall also be required to test their water meter for reading accuracy every ten years and replace it if necessary (2016 SLDC Section 7.13.11.5).
- A County domestic well permit is required in order to drill a new domestic well within the service area of the County water utility after the effective date of this Ordinance. A County permit is not required if the well owner will be replacing, supplementing, or deepening an existing domestic well (2016 SLDC Section 7.13.12).

- In the LCLC Community District Overlay area, all new lots created as part of residential land divisions and subdivisions shall be required to connect to the County water utility when the system is extended to within 200 feet of the property line of a lot, unless that lot has previously connected to a community water system, provided that adequate capacity exists in the system and that water taps are available (2016 SLDC Section 9.8.2.1.1).
- In the LCLC Community District Overlay area, all new non-residential development shall be required to connect to the County water utility when the system is extended to within 200 feet of the property line, unless that lot has previously connected to a community water system, provided that adequate capacity exists in the system and that water taps are available (2016 SLDC Section 9.8.2.1.2).

7.7 Review of Example Plats and Covenants

DBS&A reviewed 141 plat documents that were provided electronically; this subset of electronic files had been saved to the County computer network. These plats recorded lot splits, and the date range covered by these documents was August 4, 1994 to December 27, 2005. The La Cienega Watershed Conditions were printed on all but 4 of these documents, and all but 11 of the plats reference covenants that restrict water well withdrawals. The references give the book, pages, and document number for where the covenants were recorded, and do not provide the actual covenants that restrict water well withdrawals.

DBS&A met with County staff to look through a box of hardcopy documents from the previous domestic well monitoring program's activities. The box included copies of many plats. These were not reviewed, as they would include references to where applicable covenants were recorded, but not actual water well withdrawal limitations. It was not clear why these plats had been copied and kept. Other documents that were included in the box and were reviewed are discussed below and in Section 8. This includes examples of actual covenants and water restrictions dated January 2007, July 2004, March 2010, November 2010, and September 2018.

An amended declaration of covenants and water restrictions for 20 lots totaling over 450 acres, recorded on January 3, 2007, was reviewed. The covenants cite requirements of the Santa Fe County Land Development Code and Ordinance 2002-13, and they state that the provisions shall run and bind with the land (applying to the owners, heirs, successors, etc.). The water use restrictions that are listed on this document include the following:

- Maximum 0.5 ac-ft/yr for each lot *as required by the SLDC* (*italicized* text per the covenant document; this volume limitation does not match the SLDC)

- Water conserving appliances and fixtures as outlined in Ordinance 2002-13 must be used when installing/replacing appliances/fixtures. The covenants also list maximum water use for toilets, urinals, and faucets.
- Require insulation of hot water pipes
- Require evaporative cooler recirculation of bleed-off water
- Limit the number of dish and clothes washing machines that are allowed, and the water use of these appliances
- States that water leaks must be fixed within 15 days of knowledge of the leak (and proof of repair is required, if requested)
    - Low water using landscaping is required; drip irrigation and mulching recommended.
    - Prohibits the planting of Kentucky bluegrass. Limits the area allowed for other grasses, and states that those areas must be watered using rainwater and/or graywater.
    - Prohibits new swimming pools, and gives specifications for small wading pools that are allowed. Requires that existing swimming pools, hot tubs, and spas be covered when not in use, and limits swimming pools to being drained once per year.
    - Requires that all wells be metered using a Santa Fe County approved totalizing meter, and that annual meter readings be recorded and submitted to the County. States that proof of meter installation is required with a Santa Fe County Development Permit application, and that failure to meter water use may be grounds for fines and denial of future land use development permits.

The covenants prohibit outdoor irrigation between 11:00 a.m. and 7:00 p.m. for May through September each year, with listed exemptions from this requirement (e.g., plants being irrigated for retail or wholesale transactions, manual watering by landscaping personnel, water from an acequia, rainwater or graywater).

The other example declaration of covenants and water restrictions that were reviewed are similar to those outlined in the January 2007 example, except for the domestic water use restriction volumes. In the July 2004 example, the limitation is 1.0 ac-ft/yr for each lot. In the March 2010 example, it is 0.25 ac-ft/yr for each lot. In the November 2010 example, the limitation is for 0.25 ac-ft/yr for each lot, and it requires water conserving appliances and fixtures "as outlined in Ordinance 2002-13." A document including water restrictive covenants dated September 25, 2018 and with the Santa Fe County Sustainability Division identified as the author was also

reviewed. These covenants were not part of a legal document like the other examples. The document lists a domestic water use restriction of 0.25 acre-feet per year per lot "as required by the Santa Fe County Land Development Code," and water conserving appliances and fixtures "as outlined in Ordinance 2002-13."

In summary, DBS&A reviewed five example covenants documents that listed the domestic water use restrictions applicable to specific parcels, and the volume limitations included were as follows:

- July 2004: 1.0 ac-ft/yr for each lot
- January 2007: 0.5 ac-ft/yr for each lot
- March 2010: 0.25 ac-ft/yr for each lot
- November 2010: 0.25 ac-ft/yr for each lot
- September 2018: 0.25 ac-ft/yr for each lot

County Ordinance 2002-9 was filed on June 27, 2002 and required that domestic wells limit water consumption to 0.25 ac-ft/yr per dwelling unit for domestic consumption. Following this requirement, the July 2004 and January 2007 domestic water use limitations on the example covenants discussed above should have been 0.25 ac-ft/yr instead of 1.0 and 0.5 ac-ft/yr, respectively.

Per a legal opinion received from the County regarding existing requirements, the County does not enforce restrictive covenants, and development of lots with restrictive covenants is governed by the SLDC. The 2016 SLDC was adopted on December 13, 2016, and states that the annual water use for domestic purposes for new residential dwellings constructed on any lot created after the effective date of the SLDC shall not exceed 0.25 ac-ft/yr, or such lower amount as may be established in the development order approving the land division.

8. Existing Domestic Well Program

DBS&A obtained information about the existing domestic well monitoring program and its activities from County staff; the program's history and the current program are discussed in this section. Much of this information came from materials in a box of hardcopy documents, as discussed in Section 7.7.

In a document dated October 2017, County staff summarized the history of the domestic well monitoring program, citing various County ordinances that required water use restrictions for specific development permit applications, and outlined options for monitoring domestic well use and complying with other water conservation related SLDC requirements. It says that between 2006 and 2009, the County increased their efforts to track and verify water use in the La Cienega area. This document says that staff was dedicated to the program during 2005 to 2011, and the land use department sent every permit with water use restrictions to this staff person. The Water Meter Tracks database was created, and domestic well meter reading data were solicited from County residents. Postcards were sent to residents soliciting domestic well meter readings; however, half of the notices that were sent were returned to sender. Of the total number of postcards that were sent, approximately 10 percent reported water use; however, approximately 60 percent of the reported readings could not be used because the numbers were either too high, too low, or lower than the previous reading.

The October 2017 document cites 2,044 entries in the Water Meter Tracks database, but says that some of them are for land parcels without a well. This is consistent with DBS&A's review of the Water Meter Tracks database. The Water Meter Tracks database includes worksheets for Owner, Meters, and Readings. The Owners tab includes 2,046 rows of parcel data, and a column of water restriction volumes is included. Those range between 0 and 12 ac-ft/yr, with the bulk of the parcels having water restrictions of 0 (545 records), 0.25 (752 records), or 1.0 (435) ac-ft/yr entered into this column. The Meter worksheet includes 2,044 rows of data, and columns for meter type (this appears to be the meter size), meter serial number, initial meter reading and date. The Readings tab includes 196 meter reading entries, with read dates ranging between December 28, 2004 and January 17, 2012. Of the 196 entries, 71 show zero usage; 22 entries say that there is no well located on the property and, in some cases, the entry says that the property is served by a water system.

It appears that the Water Meter Track Spreadsheet Readings entries resulted from the County's mailing to parcel owners asking for meter readings to be submitted. The Readings worksheet has 196 entries. Comparing this to the total number of parcels in the Owners spreadsheet (2,046) indicates an approximately 10 percent response rate on the requests for meter readings. A few of the Water Meter Track Spreadsheet Readings entries say that the properties are supplied by the Eldorado Area Water and Sanitation District, suggesting that these properties are not located within the LCLC planning area. For 9 entries, the spreadsheet says that there is no meter installed. There are a few well owners with multiple meter readings for different years (2, 3, and 7 years). Some of the entries say that the property is vacant land, or that there is no

one living there. The spreadsheet includes some duplicate entries, either with the same owner, read date, and volume listed (a true duplicate), or with different volumes for the same owner and date, suggesting that more than one meter was read. It would be useful to add meter numbers to any meter reading database going forward to allow for differentiation between different meters. DBS&A did not use the Water Meter Track spreadsheet information due to its age, the quality of the data, and the parcels that were included (a larger number of parcels than the LCLC planning area includes).

The October 2017 document states that a process was established between permitting review and the metering program where relevant development permit applications (those with water restrictions) were copied and provided to the metering program for review. It says that in 2010, approximately 65 permit applications were flagged and sent to the metering program, but that these permit applications were not added to the database. The staff person responsible for the database and metering program left the County around 2010. Assuming that 2010 was an average year, the document estimates that approximately 500 additional properties would have had water restrictions added between 2010 and 2017, when this document was prepared.

A County domestic well meter program status report memorandum was issued on February 16, 2012 outlining the program's background, current status, and constraints. In April 2011, the domestic well monitoring project was assigned to the Public Works Department, and in 2012, the County's water conservation specialist position was moved into the Energy Efficiency program and responsibilities were transferred to staff in that department. The program status report memorandum says that County Ordinance 2002-13 established a program that required reporting of domestic well water usage, and reproduces part of that ordinance. This includes the requirement that all properties required to report water meter readings as a condition of plat approval will be entered into a database when the building permit is issued, and that water meter installation is required in order to receive final inspection approval.

DBS&A and County staff spoke to Karen Torres, former Santa Fe County hydrologist, about work she did that related to the LCLC planning area. Karen Torres left the County sometime between 2014 and 2016 (Torres, 2022). Karen Torres said that working together with staff from the land use department, electronic plats and deeds were pulled and reviewed for the La Cienega area, and these data were used to identify which land parcels were required to connect to the County water utility. GIS coverage was made to reflect the findings. The GIS data show 385 parcels as being required to connect to County water as of July 2012. Parcel groundwater diversion limitations were not evaluated as part of this analysis (Torres, 2022). Karen Torres said that at

the time of this analysis, the County was focused on identifying which water users could be connected to the County water utility (Torres, 2022).

The box of hardcopy domestic well monitoring program documents includes a letter from Carl Dickens, President of the La Cienega Valley Association, dated June 15, 2017. The letter references the adoption of Ordinance 2002-9 and the lack of enforcement, specifically the water use and metering (Section 6.15) and water meter recording and auditing (Section 6.15.2) requirements. It states that Ordinance 2002-9 required all new wells (in the LCLC planning area) that supply groundwater for partial or total water supply to have water meters installed. The letter says that the ordinance required monthly meter readings, and for these readings to be submitted to the County hydrologist on an annual basis. The letter expresses concern that the ordinance requirements are not being complied with. It references the declining water table, drying up springs, and population growth in the area. The letter formally requests that the County enforce Ordinance 2002-9 by reading all water meters as provided in Section 6.15.2, requiring meters be installed on wells for all new developments that have been built since the ordinance was adopted, and that meter readings be submitted to the County. The 2016 SLDC adopted on December 13, 2016 supersedes the previous requirements (e.g., Ordinance 2002-9), so it is the 2016 SLDC requirements that apply; however, the SLDC includes well metering, meter reading, and pumping limitations for new development.

The domestic well monitoring and meter reading reporting program moved to the Sustainability Division in 2017, when Claudia Borchert became the Sustainability Manager. She was formerly the Utilities Division Director, and had been assigned as the project lead because of her background as a hydrologist (the County did not have another full-time hydrologist at that time). In 2017, approximately 6 boxes of paper files were reviewed by staff, and the well reporting records from 2012 to 2017 were entered into the database. The County received two public inquiries regarding the program; as of the date of the October 2017 document, it says that the County was receiving about 6 to 10 water use reports annually.

The October 2017 document cites Section 7.13.11 of the SLDC, and states that the SLDC expanded the definition from 0.25 ac-ft/yr per property to 0.25 ac-ft/yr per dwelling unit. Section 7.13.11.5 (the Domestic Well Use Metering Program) is attached to the memorandum, and states that while the SLDC included water conservation requirements (Section 7.13.11) and identified enforcement penalties (Section 14.4), there is no process for following up post-construction to see whether the requirements have been followed. This document questions whether the program includes any internal recording, verification process, or County follow-up.

County staff developed a proposal to monitor domestic well use restrictions, manage utility water use restrictions, and comply with other water conservation-oriented ordinance requirements in October 2017. This proposal outlines the County's desired outcomes, which include decreasing water use in Santa Fe County, continuing policies that promote water conservation, reducing impacts to sensitive aquifers in the County, enforcing the land use code with requirements dating back to the 1980s, and providing more certainty for water resource management and planning. This proposal includes four parts:

1. Pilot groundwater well monitoring in focused groundwater areas (specifically 6 townships), education, outreach, and training, collection of data, and outlining next steps.
2. Require radio-read meters where meters are required going forward, allowing meter readings to be collected remotely.
3. Enforce water use restrictions for County utility customers.
4. Education and enforcement, creating a new FTE position.

In an e-mail dated April 19, 2018 discussing the County's domestic well metering program, the Sustainability Division's proposed La Cienega-La Cieneguilla pilot project is mentioned. The e-mail says that the pilot project would be used to develop an understanding of how closely reported water use tracks with the allocations, and that the pilot program findings would be used to inform and possibly modify County-wide regulations. The e-mail mentions that a request for proposals was under development, and requested feedback on it from other County staff. The e-mail includes text on the task of developing a web-based reporting portal where parcel owners could set up a profile and report water use.

In 2018, a summer intern was dedicated to work on the domestic well monitoring project. The summer intern spent 8 weeks working on the project and, as part of this effort, a new meter reading reporting form was developed and 2018 well reporting records were entered into the database. This task included obtaining 2018 data from the County Assessor, and removing vacant land, public lands, and mobile homes from the database, leaving 1,121 parcels for review. The 2018 analysis found that 290 parcels had water restriction information via Clerk Track and 13 showed no water restrictions. A total of 604 properties had book and page citations, but the information was not available through Clerk Track. A total of 226 properties did not have any plat or deed record information. Meetings were held with other departments as part of this effort, but there was no follow-up after the 8-week period of work.

The box of hardcopy domestic well monitoring program documents includes a Santa Fe County Sustainability handout dated September 25, 2018 (example Water Restrictive Covenants [Section 7.7] are also part of this document) that presents information about totalizing meters (e.g., how to read a water meter, water meter accuracy decreases with age, the County requires meters to be calibrated every 10 years, how to calculate your water use). The document gives an example of the text that has been included on plats for over 25 years, directing the reader to the book and page for water use restrictions specific to the lot.

In 2019, County materials indicate that the 2019 well reporting records were entered into the database, and that domestic well development permits were requested from Growth Management but were not received. Part-time staffing was available for the program at this time. In 2020, County materials indicate that the 2020 well reporting records were entered into the database, and a work plan for domestic well monitoring was prepared.

The County's previous and existing requirements pertaining to domestic wells and their monitoring are discussed in Section 7. All new wells and buildings using groundwater drawn from wells located in the LCLC planning area must install a County-approved water meter on their wells and, where meters are required, meter readings must be collected on a monthly basis and submitted annually to the County hydrologist. The County has an existing Domestic Well Report Form (Appendix G); however, very few well owners submit this information. As shown on Table 4, County staff receive very few meter reading reports from well owners each year. As discussed in Section 5.1, the County provided all of the domestic well meter reading reports that they have, and none of these are for wells located within the LCLC planning area. All properties that are required to have water meters are also required to test their water meter for reading accuracy every 10 years and replace it if necessary. This requirement is not enforced. All properties that are required to report water meter readings as a condition of plat approval are to have the name and address of the property owner entered into the database when the building permit is issued; however, this is not done.

The available water level data are discussed in Section 2 and Appendix A. Current water level monitoring is conducted annually by the NMBGMR monitoring 10 locations in the LCLC planning area.

9. Current Growth Management Process

The current Growth Management process involves first verifying that the applicant is allowed to subdivide the subject property (Quintana, K., 2023). Growth Management staff also verify water supply for the proposed development by requiring that the applicant has a valid well permit from OSE (Quintana, K., 2023). The OSE permit indicates whether the permit is for an individual or shared domestic well (Quintana, K., 2023).

Each development permit application is assigned a code for the applicable development permit type (Quintana, K., 2023). These development permit types are discussed further in Section 10. Development permit applications are routed to other departments for review, including the County Fire Department and Public Works Department (roads), as required; there is no coordination with the water and wastewater utilities unless connection to the County water utility is proposed or required (Quintana, K., 2023). In the case of large subdivisions, Growth Management also coordinates with NMED (Quintana, K., 2023).

The County has a Technical Advisory Committee (TAC) made up of members from many departments, including the water and wastewater utilities. The 2016 SLDC Section 4.4.3 requires a pre-application meeting with the County prior to submitting a non-residential or multi-family permit application, in order to allow the County to assess compliance with the SLDC. Residential and family transfer applications do not go before the TAC (Quintana, K., 2023).

Growth Management attach the applicable water withdrawal limitations to every development permit (0.25 ac-ft/yr dwelling unit), as required by the 2016 SLDC, and the plats and water restrictive covenants are filed (Quintana, K., 2023). The current water restriction and conservation covenants that are used are provided in Appendix H (Quintana, K., 2023).

The 2016 SLDC requires that all properties that are required to report water meter readings as a condition of plat approval have the name and address of the property owner entered into the database when the building permit is issued (2016 SLDC Section 7.13.11.5) (Section 7.5). This is not done; however, Growth Management does have a development permit tracking system that includes the permit number and whether the parcel is supplied by a domestic well or community water system (Quintana, K., 2023). A column could be added to this existing development permit tracking system for the applicable water withdrawal limitations. It would be useful to also have the required database of well owners required to submit meter readings, and for Growth Management to provide this information to the domestic well monitoring program staff on a routine basis.

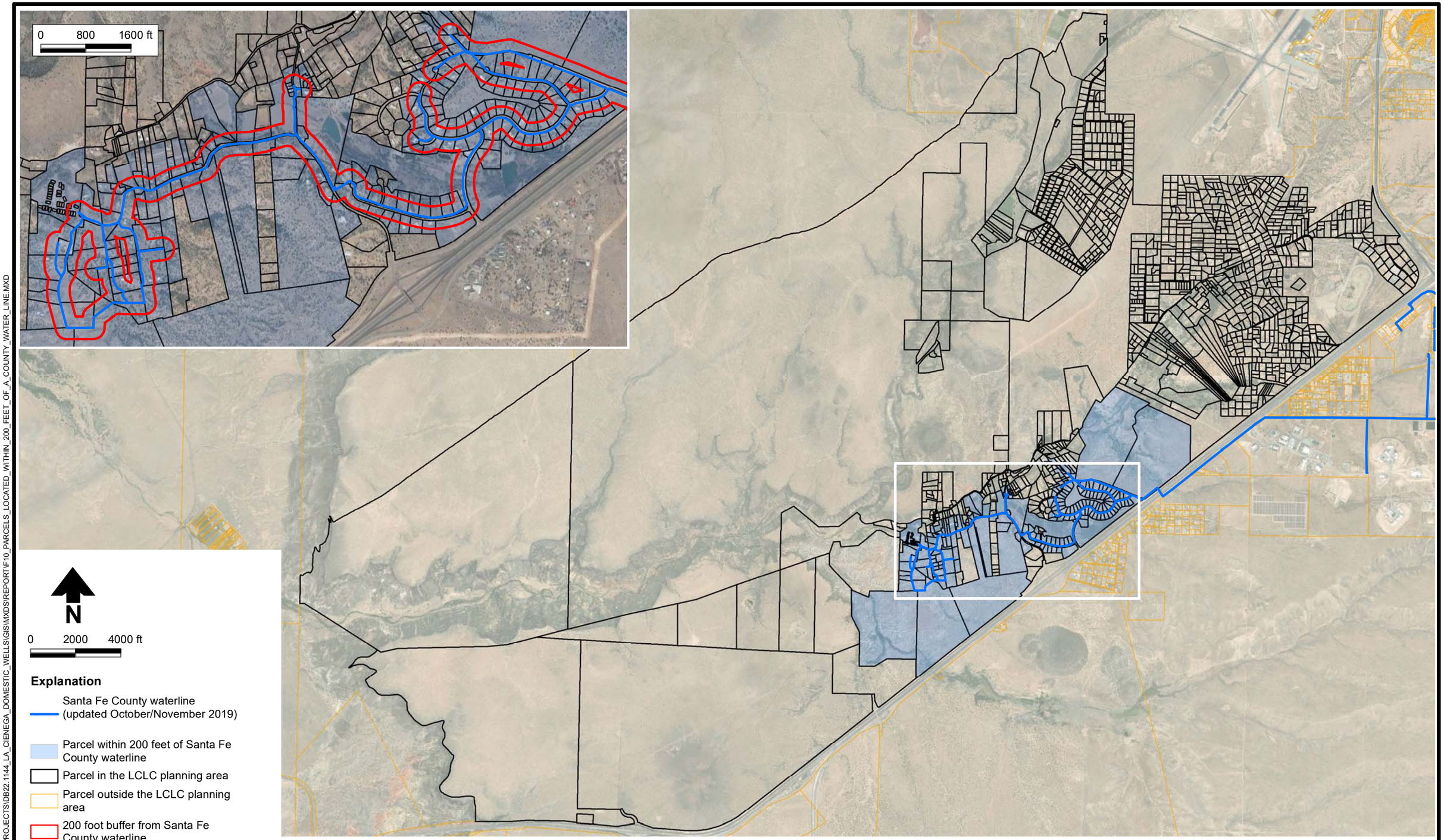
Ordinance 2002-13 outlined a domestic well use metering program, which only applied to residents of lots where restricted water usage and water meter reporting requirements were voluntarily accepted as a condition of plat approval (Section 7.4). This program's requirements included a final inspection field report to show that well meters have been installed. The current development permit process does not include any type of field inspection to verify that meters have been installed on domestic wells (Quintana, K., 2023).

10. Estimate of Where Existing Requirements Apply

As discussed in Section 7.6, the 1996 La Cienega Watershed Conditions required lot owners to connect to the County water utility when service was available within 200 feet of the property line of land being divided. Ordinance 2002-9 required new lots created as part of residential land divisions and subdivisions to connect to the County water utility when the water system was extended to within 200 feet of the property line, unless the lot was already connected to a community water system. In the LCLC Community District Overlay area, the 2016 SLDC requires all new lots created as part of residential land divisions and subdivisions to connect to the County water utility when the system is extended to within 200 feet of the property line of a lot, unless that lot has previously connected to a community water system.

As discussed in Section 7.6, plat notes and the SLDC both govern new development on the lots with well restrictions under the La Cienega Watershed Conditions. If the plat notes are stricter than the SLDC or require a connection to the County water utility sooner than the SLDC, and the notes have never been vacated by the BCC, the plat notes control the requirements for a specific property. If the SLDC is stricter or requires a connection to County water utility sooner than the plat notes, then the SLDC will control the requirements for a specific property. Specific requirements cannot be identified by property without reviewing the applicable plat notes; however, at a minimum, the 2016 SLDC requirements apply to all new development and properties being divided since it was adopted on December 13, 2016.

Figure 10 shows the parcels that are located within 200 feet of existing County water utility water lines based on the GIS coverage for the County water utility that was last updated in October/November 2019; Appendix I lists the parcel information for these parcels. Figure 10 does not differentiate between parcels that have and have not had development permit activity since 1996, and DBS&A does not know which parcels are connected to community water systems. Development permits and permit types issued in the LCLC planning area since the La



\\SS6ABQIDATA\PROJECTS\DB22.1144_LA_CIENEGA_DOMESTIC_WELLS\GIS\MXDS\REPORT\F10_PARCELS_LOCATED_WITHIN_200_FEET_OF_A_COUNTY_WATER_LINE.MXD

BASE IMAGE SOURCE: MAXAR, VIVID 2019-2021 COMPOSITE

DBS&A a Geo-Logic Company

3/9/2023 DB22.1144

LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

Parcels Located Within 200 feet of a County Water Line

Figure 10

Cienega Watershed Conditions were adopted in 1996, which can be used to further narrow down which parcels may be required to connect to the County water utility as a result of the plat notes for specific properties, are discussed further below.

DBS&A provided a table listing all parcels in the LCLC planning area to the County (Appendix B), and County Information Technology (IT) staff ran a query for all activity for these parcels for 2002 through 2022. The results of the query are provided in Appendix J. As shown in Table 9, there were a total of 918 development permits in the LCLC planning area in 2002 through 2022, or between 26 and 71 per year. Table 10 includes the complete list of development permit types for this period (55 development permit types), and the number of permits by type in the LCLC planning area for 2002 through 2022.

Prior to adoption of the SLDC in 2016, Ordinance 2002-9 applied to all new development. The results of the IT query were used to estimate the number of parcels in the LCLC planning area that were subject to the Ordinance 2002-9 requirements, which took effect on June 27, 2002, as well as those parcels that are subject to the 2016 SLDC requirements. Ordinance 2002-9 included metering, meter reading, and pumping limitation requirements; the 2016 SLDC includes the same metering, meter reading, and pumping limitation requirements as Ordinance 2002-9. Table 10 includes a column estimating which development permit types these requirements may apply to (16 development permit types). Summing the number of development permits for these development permit types yields an estimate of 488 development permits for parcels in the LCLC planning area for 2002 through 2022 where the Ordinance 2002-9 requirements may have applied and where the 2016 SLDC requirements may apply. We recommend that the County review the development permit types, assessing whether the requirements apply to these development permit types.

The 488 identified development permits for the period of 2002 through 2022 are associated with 396 parcels (some parcels have had multiple development permits associated with them over this time frame). The parcels in the LCLC planning area that are associated with development permit activity since 2002 for the 16 development permit types where the Ordinance 2002-9 requirements may have applied and 2016 SLDC requirements may apply are shown on Figure 11.

County IT staff ran a second query for all activity for the LCLC planning area parcels for 1996 through 2021 to capture the rest of the develop permit activity where the 1996 La Cienega Watershed Condition requirements (including the requirement to connect to the County water utility) may have applied. The results of the query are provided in Appendix K. As shown in

N

0 2000 4000 ft

Explanation

- Parcel where metering, meter reading, and pumping limitations may apply
- Parcel in the LCLC planning area
- Parcel outside the LCLC planning area

BASE IMAGE SOURCE: MAXAR, VIVID 2019-2021 COMPOSITE

DBS&A
a Geo-Logic Company

3/9/2023 DB22.1144

LA CIENEGA AND LA CIENEGUILLA DOMESTIC WELL PROGRAM

Estimation of Parcels Where Metering, Meter Reading, and Pumping Limitations May Apply

Figure 11

\\SS6ABQ\DATAS\PROJECTS\DB22.1144_LA_CIENEGA_DOMESTIC_WELLS\GIS\MXDS\REPORT\F11_ESTIMATION_OF_PARCELS_WHERE_METERING_METER_READING_AND_PUMPING_LIMITATIONS_MAY_APPLY.MXD

Table 11, there were a total of 420 development permits in the LCLC planning area in 1996 through 2001, or between 51 and 91 per year. Table 12 includes the complete list of development permit types for this period (28 development permit types) and the number of permits by type in the LCLC planning area for 1996 through 2001.

The 1996 La Cienega Watershed Conditions applied to land being divided, and required lot owners to connect to the County water utility when service was available within 200 feet of the property line. Table 12 includes a column estimating which development permit types the 1996 La Cienega Watershed Conditions requirements may have applied to (4 development permit types during this time frame). Summing the number of development permits for these development permit types yields an estimate of 37 development permits for parcels in the LCLC planning area for 1996 through 2001 where the 1996 La Cienega Watershed Conditions requirements may apply. These requirements may still apply, per plat notes for specific properties that have not been vacated by the BCC. Table 13 presents the development permit types where the 1996 La Cienega Watershed Conditions requirements may apply for both time periods. Adding the development permits from 2002 through 2022 where the 1996 La Cienega Watershed Conditions requirements are estimated to apply to the 1996 through 2001 subtotal gives a total of 81 development permits for 1996 through 2022.

As discussed in Section 7.7, DBS&A reviewed 141 plat documents that recorded lot splits, covering the date range of August 4, 1994 to December 27, 2005. This subset of plats is unlikely to be complete for this date range. The number of development permits identified where the 1996 La Cienega Watershed Conditions requirements may apply for the complete date range of 1996 to 2022 based on the IT queries totals 81 development permits (Table 13). Considering the number of plat documents that were reviewed that reflected lot splits for a smaller date range (141 plat documents), the number of development permits identified on Table 13 is an underestimate for the number of development permits where the La Cienega Watershed Conditions may apply.

11. Well Management Program Examples

Examples of other well management programs are discussed in the following subsections.

11.1 City of Santa Fe

The City of Santa Fe Municipal Charter and Code of Ordinances includes regulations that address the drilling of new domestic water wells. Installation of new domestic wells within the municipal boundaries is prohibited, unless a domestic well permit has been issued by the City's water division director (City of Santa Fe, 2022). Domestic well permit applications are denied if the applicant's property is located within the city's municipal boundaries, and if the nearest property boundary is located within 300 feet of an existing water distribution line (City of Santa Fe, 2022). If the nearest property boundary is located within 300 feet of an existing water distribution line, the City must provide water service within 90 days. If the City is unable to provide water service within 90 days, the domestic well permit will be approved.

If the applicant's total cost of connection to the water system (not including utility expansion charges) exceeds the cost of drilling a new domestic well, the domestic water well permit application will be approved regardless of the property's distance from the city water distribution lines. The applicant is responsible for demonstrating the costs, and after completion of a well, a sworn affidavit showing the actual well installation costs from the well driller is required. If the actual cost of drilling the well exceeds the total cost of connection to the City water system, the well must be abandoned and connection to the City system is required, with all applicable fees and costs of connection the applicant's responsibility.

For domestic well permits that are issued for wells located within the municipal boundaries, the following is required:

- Well metering to City specifications, with monthly meter readings reported to the City's water division on an annual basis.
- In certain areas, the City will require that the well be drilled a minimum of 50 feet into the Tesuque Formation, and that a seal be constructed to prevent the mixing of groundwater between the Tesuque and Ancha Formations.
- The well must be constructed to City standards and be drilled by well driller licensed in the State of New Mexico.
- The well owner is required to dedicate a 10- to 20-foot-wide easement delineated by the City's water division along the necessary property lines for the installation of future infrastructure.

- The well owner is subject to all City ordinances and penalties governing the usage of water from domestic wells.
- The well owner is subject to subsection 14-8.12F(3) SFCC 1987, requiring the well owner to demonstrate that the water demand created by the use of the structures for which the domestic water well is used will be entirely offset in accordance with the annual water budget procedures and subsection 14-8.13F prior to use of the well.
- The City may impose further conditions, as necessary.

As discussed with former City staff in 2022, the City has fewer than 100 domestic well permits, and receives very few meter readings from domestic well owners (Erdmann, 2022).

11.2 Bernalillo County

Bernalillo County has a water level monitoring program focused on the East Mountains and North Albuquerque Acres areas, where domestic wells provide the source of water supply and that are experiencing rapid water level declines (Bernalillo County, 2022a). The water level monitoring program is voluntary, and Bernalillo County is conducting this project in order to be able to advise area residents about changes in water levels (Bernalillo County, 2022a). The Bernalillo County water level measurement program is funded primarily through the County's general revenue stream, generated from property and sales tax (McGregor, 2023). Bernalillo County also has a ⅛-cent environmental gross receipts tax, which serves as a limited but additional funding source (McGregor, 2023). The environmental gross receipts tax funds may only be used for construction, acquisition, and operation and maintenance of water and wastewater facilities, and in Bernalillo County's experience, some of their water level measurement program expenses have met these criteria (McGregor, 2023).

The Bernalillo County water level measurement program was started in 2008; water levels are measured on a quarterly basis in almost 350 wells (McGregor, 2023). Most of the monitored wells are domestic wells, but a few are wells that supply County facilities (e.g., irrigation, fire house wells) (McGregor, 2023). Bernalillo County has a water level monitoring project application and participation agreement available for download on their website. This form asks for the OSE permit number, well construction details, well location, and owner's information, and outlines the conditions and requirements of the program (Bernalillo County, 2022a). The program is larger than County staff can keep up with, and the County plans to transition to an index well monitoring program in the near future (rather than continuing to monitor all of the wells), likely continuing to monitor some of the other wells on a rotating basis (McGregor, 2023).

The Bernalillo County Code of Ordinances were reviewed, specifically the Subdivision ordinance (Article IX Development Standards, Sections 74-96 and 74-97), as well as requirements for Water Wells (Article IV Environmental Health Code, Division 11). Section 74-96 of the Subdivision ordinance addresses the water availability assessment requirements for all Type 1, Type 2, and Type 4 subdivisions, and all Type 3 and Type 5 subdivisions containing six or more parcels. For subdivisions where the source of water will be individual domestic wells or shared wells permitted pursuant to §72-12-1 NMSA 1978 or new community wells, the subdivider is required to demonstrate a 70-year water supply, and to submit a geohydrologic report in accordance with the requirements outlined in the Subdivision ordinance (Bernalillo County, 2022b). These requirements include presenting hydrologic information for the area from past studies, drilling sufficient exploratory wells to characterize the aquifer, providing a calculated schedule of effects on surface water resources (e.g., acequias, springs, and streams) and other wells, and calculating the lowest practical pumping water level of the new well by one of the methods outlined in the ordinance (Bernalillo County, 2022b).

Section 74-97 of the Subdivision ordinance addresses the water availability assessment requirements for Type 3 and Type 5 subdivisions containing fewer than six parcels. If the subdivider proposes that the source of water supply will be individual domestic wells or multiple household wells pursuant to §72-12-1 NMSA 1978, the subdivider is required to submit a water availability assessment containing (1) at least one well log from an on-site well or from an existing well located within 1 mile of the property boundary completed in geologic conditions representative of the conditions within the proposed subdivision, (2) a description of the water-bearing formation including a statement of the maximum and minimum depths to water in the subdivision and the basis for these statements, and (3) a statement of the estimated yield of wells in gallons per minute based on well logs from existing nearby wells (Bernalillo County, 2022b). Where certain groundwater conditions exist, a water supply plan and geohydrologic report may also be required (Bernalillo County, 2022b).

Bernalillo County's requirements for water wells (Article IV Environmental Health Code, Division 11) apply to all wells in the unincorporated areas of Bernalillo County, and the County may order that wells be abandoned if they do not comply with the requirements (Bernalillo County, 2022b). A well permit must be obtained from the County for individual or multiple household wells (Bernalillo County, 2022b).

Bernalillo County has well construction requirements, which address well building materials, drilling equipment, site grading for stormwater, the well's concrete pad and sanitary seal, and

sealing off of any contributing zones with undesirable water quality. Water quality sampling is required for any new or modified well, and the sampling results must meet applicable water quality standards before final approval will be granted (Bernalillo County, 2022b). Parameters required for testing include total coliform bacteria, total Kjeldahl nitrogen (TKN), ammonia, nitrate, nitrite, sodium, potassium, calcium, magnesium, chlorine, bicarbonate, total dissolved solids (TDS), pH, and sulfate; additional water sampling parameters may be required based on site conditions. Water sample collection, analysis, and analytical costs are the responsibility of the owner (Bernalillo County, 2022b).

Multiple household wells may not have more than five connections, and a totalizing meter is required on all multiple-household wells (Bernalillo County, 2022b). The owner of a multiple-household well is required to submit annual microbiological sampling results to the County, and the County may require the abandonment of a well, at the owner's expense, if the annual microbiological sampling results are not submitted (Bernalillo County, 2022b). Multiple household wells and all associated water lines are required to be placed within an easement granting access to the well (Bernalillo County, 2022b).

Bernalillo County will not issue a business license, building permit, zoning permit, wastewater permit, or grant any other approval associated with any lot that necessitates the use of a well, unless the County has determined that the well meets all of the applicable requirements (Bernalillo County, 2022b). No certificate of occupancy will be issued to a structure that will be served by a well that is regulated under these requirements or the NMED unless that well has received final approval from the County or NMED (Bernalillo County, 2022b).

All existing wells on properties proposed to be subdivided or replatted must meet all applicable requirements before the subdivision or replat will be approved by Bernalillo County, and wells that cannot meet the requirements will be abandoned (Bernalillo County, 2022b). Wells that are no longer capable of producing sufficient water for the intended use or wells that do not have sufficient water quality must be abandoned unless the well is included in a water level or water quality monitor program, and wells that will be used in this type of program must obtain a monitor well permit (Bernalillo County, 2022b).

Bernalillo County may require well casing inspections of existing wells and abandonment of any well with a deteriorating casing that is not repaired within the time period ordered by the County (Bernalillo County, 2022b). If an existing well or borehole is found to be a threat to public health, safety or water quality, the owner is required to repair and/or abandon the well immediately. Issues that meet these criteria include if (1) the annular space around well casing is

open at or near the land surface, (2) there is subsidence or caving around the well casing, (3) there is significant deterioration of the well casing, (4) there is inadequate covering and drainage protection, and (5) there is contaminated water (Bernalillo County, 2022b). Wells and boreholes are required to be abandoned in accordance with the technical guidance provided by the Bernalillo County Office of Environmental Health (Bernalillo County, 2022b).

Any newly constructed or modified well must receive a final inspection and be granted final approval by Bernalillo County prior to use (Bernalillo County, 2022b). Items inspected during final inspection include (1) a copy of the well record submitted to the OSE, (2) documentation of well disinfection, (3) receipts showing materials used for grouting and construction, (4) a copy of a valid electrical permit from Bernalillo County for the well system, if required, (5) submission of the required water quality results, (6) inspection of the wellhead area, concrete pad, and other wellhead protection measures, (7) verification that setback requirements are met, and (8) compliance with any well permit conditions. Wells are subject to inspection at any time during or after construction by Bernalillo County with reasonable notice to the owner, and the County may issue a corrective action notice if any deficiencies are identified (Bernalillo County, 2022b). The County is required to maintain a file of all documents pertaining to well installation, modification, inspection, and approval.

If the County establishes that a violation of the requirements has occurred, the County will serve notice to the owner of the property where the well is located, and will order the property owner to make proper corrections within a specified timeframe (Bernalillo County, 2022b). The County may also refer the violation to the OSE, NMED, or another regulatory agency, as appropriate. Any well driller who has constructed or modified a well that is in violation of the County's requirements may have their Bernalillo County business license revoked until such time as the violation is resolved (Bernalillo County, 2022b). Any person who violates any provision of the requirements will be punished by a fine not exceeding $300.00, imprisonment for a term not exceeding 90 days, or both, with each day the violation exists considered a separate violation.

Bernalillo County is currently in the process of updating their Subdivision ordinance (McGregor, 2023). The separate Water Well requirements will also be updated this year, to bring them in line with the updated Subdivision ordinance (McGregor, 2023).

11.3 NMBGMR Aquifer Mapping

The NMBGMR Aquifer Mapping Program conducts hydrogeologic studies of New Mexico's aquifers in cooperation with state, federal, and local water agencies and using funding from a

variety of sources; project partners are project specific (NMBGMR, 2023a). Data are collected to support the development of groundwater flow models in aquifers around the state in order to provide information about groundwater in New Mexico (NMBGMR, 2023a). Aquifer Mapping Program research areas include groundwater level monitoring, water data management and compilation, water quality characterization, groundwater/surface water interactions, groundwater movement and recharge, assessment of brackish water resources, and outreach and communication (NMBGMR, 2023a).

Using funding from the Healy Foundation, the NMBGMR Aquifer Mapping Program monitors the statewide Healy Collaborative Groundwater Monitoring Network (NMBGMR, 2023b). This network was created in 2016 to supplement the existing U.S. Geological Survey and OSE groundwater level monitoring programs, and is focused on rural and under-monitored regions (NMBGMR, 2023b). The NMBGMR and their project partners collect groundwater level data from over 140 locations on an annual basis, and makes these data available to the public to be used by small water systems, domestic well owners, and water managers to support informed decision making (NMBGMR, 2023b). The 10 wells that are currently monitored by the NMBGMR in the LCLC planning area and the surrounding region are part of the Healy Collaborative Groundwater Monitoring Network (current water level measurements for these wells are supported by funding from the Healy Foundation) (Timmons, 2023).

The NMBGMR monitors water levels in about 90 wells in the Clovis, New Mexico area once per year, compiles the data, and updates maps showing the changes in saturated thickness of the aquifer (Timmons, 2023). Working with the Ogallala Land & Water Conservancy, the NMBGMR will be monitoring a number of irrigation wells located in a paleochannel near Clovis, New Mexico over a 5-year period, with measurements to be collected starting in 2023 (Timmons, 2023). The Ogallala Land & Water Conservancy has leased the water rights in these wells, and they will not be pumped over the 5-year period (Timmons, 2023). The NMBGMR will monitor water levels once per year, and will remap the saturated thickness of the remaining aquifer following each water level event (Timmons, 2023).

11.4 Pecos Valley Artesian Conservancy District

The Pecos Valley Artesian Conservancy District (PVACD), located in Roswell, New Mexico, was created in 1932 by the district court, as authorized by the New Mexico legislature, with the authority to levy taxes within its boundaries (Balok, 2023). The PVACD was adjudicated in 1966, with a final decree in 1969, and was required to install meters on all irrigation points of diversion by January 1, 1967. The OSE District II water master reads the PVACD meters, usually once per

month, and does the water rights accounting (Balok, 2023). The PVACD installs, owns, and maintains all meters, and reimburses the OSE for the water master expenses (Balok, 2023). Meters are installed on approximately 1,600 irrigation wells (Balok, 2023).

The PVACD has 10 monitor wells and they manually measure water levels in these wells three times per month (Balok, 2023). The monitor wells were recently equipped with transducers with a cellular connection, and water level measurements will be recorded twice per day and sent once per day going forward (Balok, 2023). The program works due to the PVACD's taxing authority, which provides the funding mechanism for the program, in addition to the requirement that all wells be metered (Balok, 2023).

11.5 City of Rio Rancho

The City of Rio Rancho requires property owners to connect to the City water system at the property owner's expense if there is an existing City water distribution line located within 200 feet of the property (City of Rio Rancho, 2022). If there are no water distribution lines located within 200 feet of the property, the property owner may apply for a City domestic well permit after receiving a domestic well permit from OSE (City of Rio Rancho, 2022). The City has a City well permit application form, which indicates that a field inspection is required, and that the well meter must pass final inspection before the certificate of occupancy will be released (City of Rio Rancho, 2022).

11.6 State of Colorado

The Colorado Department of Water Resources has a groundwater monitoring program that involves the collection of water level measurements in a number of designated basins (Donegan, 2023). The programs are continuations of several monitoring programs that were inherited from the U.S. Geological Survey and Colorado State University. In most cases, the wells being monitored are irrigation wells, but some domestic wells are monitored, especially in the Denver Basin (Donegan, 2023).

The wells that are monitored are selected based on whether there are historical data available; in many cases, monitoring began in the 1960s (Donegan, 2023). The monitoring program focus is on areas with human impacts due to development pressure, potential impacts to wildlife, or water resource management (e.g., areas experiencing decreases in water levels, where recharge projects are being implemented). The number of wells that are monitored differs by basin, with the number of monitored wells often ranging between approximately 40 and 70 wells each,

although Colorado's North High Plains (Ogallala) aquifer monitoring program includes over 700 wells (Donegan, 2023). Water levels are typically measured once per year in the spring (before the start of irrigation season); however, Colorado is moving toward collection of continuous measurements (using pressure transducers) and data collection by cellular read (Donegan, 2023).

Water rights are not required for domestic wells in Colorado, and it is assumed that their pumping is offset by return flows from the associated septic systems (Donegan, 2023). Although there are some exceptions, in most cases, if a household is connected to a wastewater treatment system (rather than a septic system), they cannot have a domestic well (Donegan, 2023). Domestic well usage is limited to 15 gallons per minute in Colorado. The State requires that pump installation reports be turned in to the Colorado Department of Water Resources, and pumps with capacity exceeding 15 gallons per minute may not be installed (Donegan, 2023). Colorado also has statewide requirements for well construction, and they collect this information via well completion reports that are filed for new wells (Donegan, 2023).

Domestic well permits say that well owners are to collect and keep meter readings, turning them in to the State if asked, but the State does not ask for these records (Donegan, 2023). Separate from the Colorado Department of Water Resources groundwater level monitoring program, there is a program that evaluates meter readings for wells, but this is done to assess whether water right permit volumes are exceeded, not to track water use (Donegan, 2023). Meter readings are not collected for domestic wells. The Colorado Department of Water Resources does not monitor water quality, but some water quality monitoring is conducted by other departments (Donegan, 2023).

11.7 State of California

In response to climate-driven severe drought conditions, the California Department of Water Resources is providing tools and resources for domestic well owners to help them understand local groundwater conditions, and prepare for potential well outages and other drought impacts (California DWR, 2022). The California DWR has a Dry Well Reporting System, which notifies county officials and local water agencies when domestic well owners report water supply issues within their jurisdictions (California DWR, 2022). Together with the California State Water Resources Control Board, the California DWR has also launched a Dry Well Susceptibility Tool that may be used by domestic well owners to help forecast water supply problems in specific areas before they occur (California DWR, 2022). California groundwater condition data, including current water level data, seasonal groundwater level changes, groundwater level

trends, and information about drought conditions and available assistance are also available online (California DWR, 2022). These tools and resources have been developed and made available in order to plan ahead, track the impacts of drought, and work with local entities to identify and implement solutions (California DWR, 2022).

The groundwater level data available on the California Groundwater Live's Domestic Well dashboard originates from well completion reports filed by well drillers with the California Department of Water Resources, and users may search the posted data by county or groundwater basin (Springhorn, 2023). Groundwater monitoring efforts are more robust in some groundwater basins, especially for irrigated areas; however, the State does not have a good inventory of the number and locations of domestic wells statewide, and California does not have an active domestic well monitoring program (Springhorn, 2023). The Dry Well Susceptibility Tool uses total well depth and water level data from well completion reports to project where wells are susceptible to going dry, and the available data are used to extrapolate to other areas (Springhorn, 2023).

California defines domestic wells that use less than 2 ac-ft/yr as de minimis wells, and well owners are not required to report their water use to the State; however, the State's Sustainable Groundwater Management Act (SGMA) requires groundwater basins to take domestic wells into account, and to work with domestic well owners to manage their collective demands (Springhorn, 2023). California's SGMA was passed in 2014 (California DWR, 2023), and sets forth a statewide framework to protect groundwater resources, focusing on local groundwater management. Local agencies are required to form groundwater sustainability agencies (GSAs) in high and medium priority groundwater basins, and to develop and implement groundwater sustainability plans (GSPs).

The GSPs were reviewed for two California groundwater subbasins with high numbers of domestic wells (Sonoma Valley and Santa Rosa Plain), to see how the GSAs are approaching domestic well management in these areas. The goal of the Sonoma Valley and Santa Rosa Plain GSPs is to adaptively and sustainably manage the groundwater resource, allowing for reasonable and managed growth, by monitoring groundwater conditions, coordinating with other entities and agencies, and implementing projects and management actions that support the sustainability indicators that are identified by the plans (Sonoma Water, 2021a and Sonoma Water, 2021b). The Sonoma Valley GSP estimates that there are between 900 and 1,250 domestic wells within the groundwater subbasin (Sonoma Water, 2021a). The Santa Rosa

Plain GSP estimates that there are between 4,000 and 5,500 domestic wells within the groundwater subbasin (Sonoma Water, 2021b).

The Santa Rosa Plain GSP says that the GSP planning process included a campaign targeted to informing domestic well owners, including website posting, social media messaging, newspaper advertisements, and lawn signs, and that a survey was mailed to all domestic well owners in the subbasin, in English and Spanish, to assess their priorities regarding groundwater sustainability and to identify key issues related to groundwater resources (Sonoma Water, 2021b). Both plans state that County government has an important role in representing the unincorporated areas, in particular domestic well owners, and that rural domestic well owners should be represented and participate in the planning process, due to the large number of domestic wells and their significant groundwater use (Sonoma Water, 2021a and Sonoma Water, 2021b).

Both plans outline their proposed monitoring networks, and say that dedicated monitor wells are the preferred well type for monitoring, with the lowest preference for well type for monitoring given to any type of active supply wells (e.g., domestic, irrigation, municipal). In the event that supply wells are used for monitoring, the plans stress the importance of taking special precautions to ensure that representative measurements are collected (Sonoma Water, 2021a and 2021b).

The plans outline specific projects and management actions to be undertaken to help communities achieve groundwater sustainability, based on current and projected future groundwater conditions (Sonoma Water, 2021a and 2021b). The list of management actions identified in the Santa Rosa Plain GSP includes a potential policy option of implementing a domestic well mitigation program should stronger demand management actions need to be adopted in the future, but says that this is not considered to be needed in the near-term based on current conditions (Sonoma Water, 2021b). The only specific domestic well monitoring discussed in the Santa Rosa Plain GSP is for water quality (e.g., sampling for nitrate and total dissolved solids) in areas near existing dairies (Sonoma Water, 2021b).

In response to a comment calling for a domestic well mitigation plan, the Sonoma Valley GSP states that the major focus of the first five years of plan implementation will be to gather data to improve the understanding of potential impacts associated with groundwater conditions to sensitive beneficial users, primarily shallow domestic well users (Sonoma Water, 2021a). The plan states that the data collected will be used to inform any necessary revisions to the plan, and that for the initial implementation period, the focus will be on projects that will raise

groundwater levels, benefitting these users (e.g., water-use efficiency and alternate water source projects and aquifer storage and recovery) (Sonoma Water, 2021a).

11.8 Thornburg Foundation

The Thornburg Foundation, located in Santa Fe, invests in solutions to help solve problems; they have a number of strategic initiatives, including education, food and agriculture, good government reforms, and water. One of their goals is to develop robust water research, data, monitoring, and decision-support systems to support water resources planning and management (Thornburg Foundation, 2022).

The Thornburg Foundation has been working to identify what groundwater monitoring is being done and where more monitoring is needed within New Mexico, and is focused on areas that are not currently being monitored and that have significant irrigation demands (Timmons, 2023). The current project includes 10 priority regions, and will span a period of one year (Timmons, 2023). After the monitoring evaluations have been done, the project partners will work to identify funding to build the recommended monitoring networks (Timmons, 2023). The monitoring networks will likely include completing new monitor wells, and installing instrumentation to allow for the collection of real-time data (Chudnoff, 2022). The Santa Fe area is not included in the project's current priority area monitoring evaluation, due to the existing monitoring efforts in the area; however, the project could be expanded to evaluate additional areas in the future (Timmons, 2023).

12. Summary and Recommendations

DBS&A and the NMBGMR have worked together with the County on the first phase of domestic well monitoring program planning services for the LCLC planning area. The project objectives were as follows:

- Document the area's groundwater levels and trends (Section 2)
- Estimate current use and project future water demand (Section 5)
- Identify the existing requirements that apply to domestic wells in the LCLC planning area (Section 7)
- Hold a project open house and initiate public outreach (Section 6)
- Develop recommendations for how to improve the existing well management program

The program recommendations follow in this section.

12.1 Existing Program

The existing domestic well and water use requirements that apply to the LCLC planning area (Section 7) include the following:

- All plats and non-residential development shall file signed water restrictions and covenants with the plat or site development plan; total water use shall not exceed that specified in the development order, plat note, or the SLDC (SLDC, December 13, 2016).
- The annual water use for domestic purposes for new residential dwellings constructed on any lot created after the effective date of the 2016 SLDC shall not exceed 0.25 ac-ft/yr, or such lower amount as may be established in the development order approving the land division (SLDC, December 13, 2016)
- All development using a well shall participate in the well use metering program; Santa Fe County-approved meters are required to be installed on wells for any development subject to the SLDC; meters shall be read by the property owner and meter readings shall be provided annually (SLDC, December 13, 2016).
- All properties that are required to have water meters are also required to test their water meter for reading accuracy every 10 years and replace it if necessary (SLDC, December 13, 2016).
- All new lots created as part of residential land divisions and subdivisions, and all new non-residential development, are required to connect to the County water utility when the system is extended to within 200 feet of the property line of a lot, unless that lot has previously connected to a community water system (SLDC, December 13, 2016).

The County's existing domestic well monitoring program has been implemented intermittently as staff resources have been available. The program has been moved between different County departments, and has not had consistent staffing or support. Compliance with the existing requirements is not being tracked or enforced, and the program currently receives very few meter reading reports from well owners each year (Section 8). The County does not send out reminders asking for meter readings to be turned in and, with past mailings, there have been large numbers that were returned to sender. The County recently posted a project-specific website (Section 6), and this will be a good place to post future project updates.

12.2 Growth Management Process Recommendations

The current Growth Management development permit process (Section 9) includes verifying that the applicant has a valid well permit from OSE. For non-residential and multi-family permit applications, a pre-application meeting with the County TAC is required, and that committee includes water and wastewater utilities representation; however, residential and family transfer applications do not go before the TAC. There is typically little or no current coordination between Growth Management and the water and wastewater utilities for individual lot divisions or small-scale divisions that do not involve interconnection to utility infrastructure.

The 2016 SLDC requires that all properties required to report water meter readings as a condition of plat approval have the name and address of the property owner entered into the database when the building permit is issued (Section 7.5). It is unclear how frequently this is done. We recommend that this information be required to be entered and tracked for future development permits, and that the tracking form include the parcel's applicable water withdrawal limitation, with Growth Management providing this information to the domestic well monitoring program staff on a routine basis.

Ordinance 2002-13 outlined a domestic well use metering program, which only applied to residents of lots where restricted water usage and water meter reporting requirements were voluntarily accepted as a condition of plat approval (Section 7.4). This program's requirements included a final inspection field report to show that well meters have been installed. The current development permit process does not include any type of field inspection to verify that meters have been installed on domestic wells. We recommend that field inspection be added to each permit prior to final approval.

Growth Management staff said that they frequently have well owners say that the County cannot limit their water use, and that they believe they can withdraw groundwater up to the OSE well permit volume. We recommend that the County coordinate with OSE regarding language to be added to future well permits, stating that local restrictions apply to new domestic wells.

Better tracking of the water metering, meter reading, and pumping limitation requirements are needed going forward. This will involve coordination between Growth Management in its role of permit review and processing, along with the County office and/or staff working on the domestic well monitoring program.

12.3 New Mexico Water Task Force Recommendations

The State of New Mexico convened a water policy and infrastructure task force made up of water and natural resources experts, senior state agency staff, and stakeholders to discuss New Mexico's water management and governance challenges/opportunities and make recommendations. The task force met between June and November 2022, and issued a report in December 2022 (NM Water Task Force, 2022). The New Mexico Water Task Force broke into three work groups, focusing on (1) community drinking water, wastewater, and stormwater infrastructure capacity and finance, (2) water resources management and planning, and (3) river, aquifer, and watershed health (NM Water Task Force, 2022). The report includes recommendations made by each of the work groups, including some items to be undertaken during the 2023 legislative session and others to be implemented over the next several years (NM Water Task Force, 2022).

The problems identified by the water resources management and planning work group include the need for increased monitoring, including metering wells, and a clear understanding of the volume of groundwater in aquifers (NM Water Task Force, 2022). The water resources management and planning work group recommended that state agencies and regional/local water planning entities set clear goals for reductions in water use over the coming decades (NM Water Task Force, 2022). One of the long-term opportunities that was identified by this effort is to fund community-led initiatives to create plans for periods of severe drought, and then require and fund water-use measuring or metering to inform and implement agreements (NM Water Task Force, 2022). The goals and objectives of the County's domestic well monitoring program are in line with the New Mexico Water Task Force's findings and recommendations.

12.4 Recommended Domestic Well Monitoring Program

Based on the information that was available for review, the volume of groundwater produced from the LCLC planning area is not well constrained. As discussed in Section 5.1, DBS&A estimates that domestic well water demand in the LCLC planning area ranges between approximately 150 and 1,100 ac-ft/yr. Adding in the permitted groundwater diversion volumes for other sectors, total estimated groundwater demand ranges between approximately 550 and 1,300 ac-ft/yr (Section 5.5). Projected future domestic well water demand ranges between approximately 300 and 1,300 ac-ft/yr, and total projected groundwater demand ranges between approximately 600 and 1,600 ac-ft/yr for the LCLC planning area (Section 5.6).

DBS&A understands that the County's goals for the domestic well monitoring program are to monitor, conserve, and protect the local groundwater resource, ensuring the sustainability of the local water supply. The recommended domestic well monitoring program is outlined in the following subsections.

12.4.1 Water Level Monitoring

Water level monitoring allows well owners to track water level trends in their wells over time. Increasing depth to water measurements indicate that the resource is being mined (more water is being pumped than recharges). Water level data can provide warning before the water level in a well goes below the pump intake, allowing well owners to plan ahead should they need to lower the pump and/or replace the well. Evaluated on a larger scale, water level data provide information about the local groundwater resource, and the effects of both local and upgradient management decisions.

NMBGMR currently monitors water levels in 10 wells in and in the vicinity of the LCLC planning area on an annual basis (Section 2). We recommend that the existing water level measurement program be expanded to include a total of 50 locations, to be measured once per year, within and upgradient (northeast) of the LCLC planning area. This will allow for better assessment of trends in the groundwater elevations over time, especially as conditions are projected to become warmer and drier in the future. It is important to include monitoring of upgradient wells, as groundwater conditions in these areas affect the LCLC planning area.

We recommend monitoring wells where the NMBGMR has historical data, as long-term data are necessary to be able to evaluate trends. It would also be helpful to resume monitoring of wells where the NMBGMR has relationships with the existing well owners; however, new wells and/or well owners could be added to the program, as necessary. Wells that are candidates for the expanded monitoring network include about 12 wells in the LCLC planning area that were included in the 2015 to 2020 NMBGMR monitoring network that are no longer being monitored, more than 50 wells in the LCLC planning area where water levels have been previously measured by NMBGMR, and more than 60 wells upgradient of the LCLC planning area where water levels have been previously measured by NMBGMR. In particular, NMBGMR recommends that wells in the La Cieneguilla area be added to the monitoring network, in addition to wells located between the Santa Fe River and Cienega Creek. This region will be important to monitor when and if the City of Santa Fe's effluent discharges to the Santa Fe River are eliminated, as proposed.

Another option would be to install a monitor well network owned by the County. New wells would not have the benefit of having historical data, but long-term access for collecting water level measurements would be ensured. The number of new monitor wells that could be installed would be limited by the available funding, but new County-owned monitor wells could be installed to supplement the existing monitor well network (monitoring the new wells in addition to existing, privately owned wells).

Funding for the expansion of the water level monitoring network would need to be identified (Section 12.4.8), and we envision the water level monitoring task being coordinated by the County's domestic well monitoring program project lead. In the event that the water level measurement program is expanded to other areas outside of the LCLC planning area, the County may want to consider developing their own capacity for collecting water level measurements (if the water level monitoring program is expanded to include hundreds of wells, it may be more cost effective to have County staff support the program).

12.4.2 Domestic Well Metering and Meter Reading

DBS&A recommends that the County subject matter experts (e.g., County hydrologist or Public Works Department staff) work with domestic well owners in the LCLC planning area to implement a domestic well metering and meter reading program in order to collect the data necessary to estimate current local groundwater demand. The County provided the domestic well metering reports that they have but, as discussed in Section 5.1, these reports do not provide very much information.

We recommend that a volunteer well metering program be implemented during the next phase of the domestic well monitoring program, with well owners installing new meters for the participating wells. Well owner participation in the program would likely be higher if some or part of the cost of the meter purchase and installation could be covered. We recommend that the County research possible resources to direct well owners for assistance with such costs. DBS&A spoke to the County water utility's Infrastructure Manager, who said that the connections to County water utility infrastructure use Neptune MACH10 water meters and drive-by data collection using a MRX collector, but the meters have advanced metering infrastructure (AMI) capability and will evolve to AMI (Alvarado, 2023). The County water utility recommended that well owners install new meters rather than calibrating or testing any existing meters (Alvarado, 2023). Some domestic wells have existing meters; however, it will be less expensive to replace the existing meters than to test and calibrate the existing meters. In addition, the existing meters would likely need to be manually read (on private property). As an example, the

County water utility said that approximately 70 connections in Chupadero were recently upgraded to MACH10 meters by the Chupadero Mutual Domestic Water Consumers Association (CMDWCA) for another project, and that an MRX collector was purchased for data collection for that project, which worked well (Alvarado, 2023).

The County water utility is short staffed, and will not be able to install new meters or collect meter readings for the domestic well monitoring program at the start; however, meter reading for this program could potentially be taken over by the County water utility at a later time (Alvarado, 2023). We recommend that an MRX collector be purchased to allow for data collection, and that County domestic well monitoring program staff or a contractor collect the meter readings on a monthly basis. We recommend that 50 to 100 new meters be installed during the initial phase of the project, and that data be collected for these meters on a monthly basis going forward. Additional meters could be installed during a subsequent project phase. As discussed in Section 4.1, there are 823 domestic wells permitted under NM Stat §72-12-1 located in the LCLC planning area. Installing 50 well meters would allow for data collection for approximately 6 percent of the domestic wells in the LCLC planning area. Installing 100 well meters would allow for data collection for approximately 12 percent of the domestic wells in the LCLC planning area.

Resources to direct well owners to for assistance with the costs of purchase and installation of new meters will need to be identified, and we envision this work being coordinated by the County's domestic well monitoring program project lead. In addition, the County will need to determine who will collect meter readings on a monthly basis.

We recommend that all new domestic wells in the LCLC planning area be required to install meters and participate in the domestic well monitoring program going forward. Additional domestic well meters should be installed each year, increasing the number of wells that are monitored and the amount of groundwater diversion data collected for this area. We recommend that the initial focus of the project be on collecting meter readings to assess the current water demands.

The La Cienega Valley Association's letter to the County dated June 15, 2017 formally requested that the County enforce Ordinance 2002-9 by "reading all water meters (in the LCLC planning area), requiring meters be installed on wells for all new developments that have been built since the ordinance was adopted, and that meter readings be submitted." Growth Management staff indicated that there is not a current enforcement mechanism for the existing requirements (Ellis-Green, 2022). In light of the current limitations, we recommend that the County implement a

volunteer well metering program during the next phase of the domestic well monitoring program, with County staff collecting the meter readings on a monthly basis. We also recommend that the County add a field inspection requirement for all new domestic wells in order to verify that meters have been installed, and that all new domestic wells be added to the domestic well monitoring program following their field inspections. The methods for the subsequent phases of the project should be reassessed based on the level of volunteer participation achieved during the initial phase of domestic well monitoring program implementation.

12.4.3 Connection to the County Water Utility

We recommend that the County review which parcels in the LCLC planning area are connected to the County water utility, evaluate the possibility of connecting additional parcels using existing infrastructure, and potentially extend the water lines to connect additional parcels. This would reduce the number of domestic wells being used as the source of water supply in the LCLC planning area, and would help to conserve the local groundwater resource. As discussed in Section 4.1, there are 823 domestic wells permitted under NM Stat §72-12-1 in the LCLC planning area. DBS&A recommends that the County identify opportunities to consolidate and regionalize the water supply in this area, to the extent that is practical.

Figure 10 shows the LCLC planning area parcels that are located within 200 feet of an existing County water utility water line, based on the current GIS water line coverage (updated in October/November 2019). Properties that are located within 200 feet of an existing County water utility water line are required to connect if the property has been divided since 1996, when the La Cienega Watershed Conditions went into effect. We do not have enough information to say which properties are required to connect to the County water utility.

There are 238 parcels located within 200 feet of an existing water line (Appendix I). The County should identify which of these parcels are already connected to the County water utility, and should consider approaching the owners of the other parcels about connecting to the regional water system, whether or not connection is required. The County might also consider offering funding to help domestic well owners connect to the County water utility (paying all or part of the cost for connection).

DBS&A recommends that the County update the GIS coverage for the County water utility's water lines, if the water system has been extended since October/November 2019. Whenever

the GIS coverage is updated, the list of parcels located within the LCLC planning area that are located within 200 feet of existing County water utility water lines should be updated.

The La Cienega MDWCA is the largest community water system in the planning area. It has an emergency connection with the County water utility, but obtains its water supply from wells located in the LCLC planning area. This water system serves over 500 people, and if the County water utility were to serve this water system, that would reduce local groundwater demand. The water system's wells are not domestic wells, but rather have private water rights. DBS&A received a number of calls about the location of the La Cienega MDWCA's well in La Cieneguilla. There is local concern over the location of this well, and the potential impacts of its pumping on local domestic wells. Another community water system that could be connected to the County water utility is the Wild and Wooley Trailer Park. Connection of this system was discussed in the LCLC community plan update (Santa Fe County, 2015). This system serves approximately 100 people.

12.4.4 Water Quality Monitoring

There were questions about water quality and whether water quality monitoring is a component of the current domestic well monitoring project at the project open house (it is not). Well owners also asked about what parameters they should be monitoring for. DBS&A gave contact information for the NMDOH private wells epidemiologist to a few project open house attendees, for them to contact about conducting their own domestic well water quality monitoring. The NMDOH can provide recommendations for the parameters to monitor (e.g., nitrate, arsenic, total coliform bacteria), and then well owners would coordinate directly with an analytical laboratory for analysis of the samples they collect.

DBS&A recommends that the County include water quality in their future outreach to County domestic well owners, potentially distributing educational materials that give recommendations for the parameters that should be monitored and options for where samples can be analyzed. County staff is already working with the NMED Drinking Water Bureau to hold a water fair in the area. This will allow well owners to bring samples of their water in for analysis by NMED.

As discussed in Section 11.2, Bernalillo County requires water quality sampling for new or modified domestic wells for a specific list of analytes, and the sampling results must meet applicable water quality standards before final approval (Bernalillo County, 2022b). Bernalillo County also requires annual bacteriological (total coliform) sampling in multiple household wells and submission of the results. Water sample collection, analysis, and analytical costs are the

responsibility of the well owner (Bernalillo County, 2022b). The County could consider implementing similar requirements, or could provide the resources discussed above to local domestic well owners to assist in accessing available services from other agencies.

12.4.5 Water Conservation

As outlined in the 2016 SLDC, the County's existing water conservation requirements are comprehensive, and no new water conservation requirements are recommended. The County could consider making and distributing public outreach materials to educate residents on the existing water conservation requirements. DBS&A recommends that the County review educational and outreach materials for the following other water conservation programs as example materials: Albuquerque Bernalillo County Water Utility Authority, City of Santa Fe, Tucson Water (Arizona), and San Antonio Water System (Texas). The County could offer conservation rebates, if desired. Indoor water use is not the best target for rebates, because low-water-use appliances and fixtures are already required, and higher-water-use appliances and fixtures are being phased out and are not available for purchase. As such, there is no real need to incentivize their selection. Outdoor water conservation rebates are generally associated with turf removal and rainwater catchment. Developing a water conservation rebate program is not recommended, as it is likely not the best use of the County's resources.

12.4.6 Public Outreach

DBS&A recommends that the next phase of this project includes a series of public outreach events, and that the events include an outside mediator/facilitator. Based on the attendance at the project open house and public interest in the project, the venue for future public outreach events will likely need to be larger than the La Cienega Community Center.

12.4.7 Program Staffing

In order for the program to be successful, County staff resources and program funding will need to be dedicated to the program. Domestic well owners will need to be identified to participate, and County staff will need to coordinate with these well owners, as well as collect and review the data that are collected. We recommend that a new full-time position be created for this purpose. No new ordinances are currently recommended; rather, the County should take steps to implement the existing program before identifying and/or adding additional requirements.

We recommend that the program begin with volunteer participation, collecting additional water level data and installing new meters on domestic wells located in the LCLC planning area, with

County staff collecting meter readings on a monthly basis. Depending on the level of participation and the amount of data the County is able to collect, the means and options for enforcement of the existing requirements should be determined.

12.4.8 Potential Funding Sources

DBS&A and the NMBGMR are not aware of any grant programs that will support annual recurring costs for the proposed domestic well monitoring program, but there are some potential funding sources that could be used to help get the program established. As discussed in Section 11.2, the Bernalillo County water level measurement program is funded primarily through the County's general revenue stream, generated from property and sales tax, with some limited but additional funding from their ⅛-cent environmental gross receipts tax (McGregor, 2023). A similar funding scheme will likely be needed for this program.

One potential source of funding for the LCLC domestic well monitoring program would be a WaterSMART grant from the U.S. Bureau of Reclamation (USBR). There are two categories of WaterSMART grants that might be applicable: Water and Energy Efficiency and Small-Scale Water Efficiency Project Grants. WaterSMART grants have a non-federal cost share of at least 50 percent of the total project cost (USBR, 2023). Water and Energy Efficiency Grants are primarily for projects that will result in quantifiable and sustained water savings (USBR, 2023). Projects that promote sustainability and address the impacts of climate change are given priority (USBR, 2023). Water and Energy Efficiency Grants may request up to $500,000 for projects to be completed within 2 years, or up to $5 million for longer term projects (USBR, 2023). Small-Scale Water Efficiency Project grants are awarded to projects that conserve, improve management, or increase the efficient use of water supplies. Small-Scale Water Efficiency Project grant applicants may request up to $100,000 in federal funding for projects with total project costs of up to $225,000, and these grants have more simplified criteria and a more streamlined application compared to the other WaterSMART grant categories (USBR, 2023). The federal fiscal year 2022 WaterSMART grant funding opportunity was posted on May 2, 2022, with applications due by July 28, 2022 and selections to be announced in spring 2023 (USBR, 2023). The fiscal year 2023 WaterSMART funding opportunity is expected in spring 2023 (USBR, 2023).

Pursuant to the Water Project Finance Act, the New Mexico Finance Authority (NMFA) provides administrative support to the 16-member Water Trust Board and manages the Water Project Fund on its behalf (NMFA, 2023). NMFA makes loans and grants for projects recommended by the Water Trust Board and authorized by the legislature, and Water Trust Board awards are a combination of grants and loans, based upon the financial capacity of the applicants (NMFA,

2023). Under the Water Project Finance Act, five project types eligible for financial assistance: (1) water conservation or recycling, treatment or water reuse projects, (2) flood prevention projects, (3) Endangered Species Act (ESA) collaborative projects, (4) water storage, conveyance, or delivery projects, and (5) watershed restoration and management projects (NMFA, 2023). The proposed domestic well monitoring program will not be eligible for Water Trust Board funding from NMFA because domestic wells are privately owned and this funding source is for political subdivisions (Quintana, A., 2023). If the wells to be monitored or metered were owned by the County, the project would be eligible for this funding source (Quintana, A., 2023). As discussed in Section 12.4.1, the County could consider drilling a monitor well network, with the wells being owned by the County, instead of (or in addition to) monitoring privately owned wells. These wells could be used for water level and/or water quality monitoring. Installation of new County owned wells would be eligible for Water Trust Board funding.

12.5 Next Steps

At the project open house, there was vocal concern about the County monitoring groundwater use in the LCLC planning area, but there was also support for monitoring. In addition to the comments made in support of monitoring during the project open house, a number of the well surveys that were collected expressed support for monitoring, as well as the desire for the program to be staffed and funded to ensure its success.

In order to implement the proposed domestic well monitoring program, the County needs to identify who will spearhead the effort. We recommend a new position be created within the Public Works Department to serve as the lead for the program's implementation. We recommend that the person hired for this role have experience with the subject matter (e.g., hydrogeology). The lack of past implementation of the existing domestic well and water use requirements has largely been due to not having adequate staff resources or County support for the efforts. Conditions are projected to become warmer and drier in the future, and the area is experiencing significant growth (over 8 percent growth between 2010 and 2020). We recommend that the County do the following:

- Implement the domestic well monitoring program, expanding the water level monitoring network to allow for the evaluation of water level elevation trends over time, installing new meters, and beginning to collect domestic well meter readings. Metering data will be necessary in order to assess current and project future groundwater demands.

- Contract with NMBGMR to expand the water level monitoring network, before the April 2023 monitoring event if possible. This would require contacting well owners and obtaining permission to monitor their wells before the field event, so it should be done as soon as possible.

As discussed in Section 4.1, the OSE POD Locations Online Mapping Tool includes a local ordinance area for the City of Santa Fe domestic well ordinance, but does not include a similar local ordinance area for Santa Fe County. The County should provide the OSE with information about the 2016 SLDC, and the specific domestic well limitations and requirements, so that it may be added to the OSE's online mapping tool. The County should coordinate with the OSE regarding the existing County requirements, and ask the OSE to include metering and meter reading reporting requirements and County water withdrawal limitations in their conditions of approval for any new domestic well permits in the LCLC planning area.

We recommend that the County coordinate with local groups, such as the La Cienega Valley Association, for assistance with outreach, and soliciting volunteers to participate in the water level monitoring and domestic well metering projects. For further project outreach, we recommend that the project-specific website link be posted on the County's social media page, and that project related information be sent to the WPAC and City/County Water Conservation Committee members, posted to the project-specific website, e-mailed to the project e-mail list, and sent to local groups.

We recommend that a cooperative six-month work planning project be undertaken between Public Works, Growth Management, and Sustainability to outline the project's next steps and responsibilities, with a subject matter expert acting as the project lead. Rather than serving as the project lead, we recommend that the Sustainability Division's role be to focus on supporting water conservation education and project outreach. We recommend that this report and the cooperative work plan to be developed be made available to the WPAC, La Cienega Valley Association, City/County Water Conservation Committee, and the public for review.

As the domestic well monitoring program is implemented and domestic well meter readings are obtained, the estimates for current water demand and projected future water demand for the LCLC planning area should be refined. In addition, the County should work with the community to evaluate whether the demand projections reflect desired future conditions.

References

Alvarado, L. 2023. Personal communication between LeRoy Alvarado, Santa Fe County Utilities Infrastructure Manager, and Amy Ewing, Daniel B. Stephens & Associates, Inc. (DBS&A). January 3, 2023.

Balok, A. 2023. Personal communication between Aron Balok, Pecos Valley Artesian Conservancy District Superintendent, and Amy Ewing, DBS&A. January 6, 2023.

Bernalillo County. 2022a. Groundwater Resources. <https://www.bernco.gov/public-works/public-works-services/water-wastewater-stormwater/groundwater-resources/>.

Bernalillo County. 2022b. Bernalillo County, New Mexico Code of Ordinances. December 21, 2022. <https://library.municode.com/nm/bernalillo_county/codes/code_of_ordinances?nodeId=BECOCO_CH74SU>.

California Department of Water Resources (California DWR). 2022. DWR Encourages Counties, Communities to be "Well Prepared" to Support Dry Drinking Water Wells. <https://water.ca.gov/News/News-Releases/2022/June-22/Dry-Wells-Tool>.

California DWR. 2023. California Sustainable Groundwater Management Act. <https://water.ca.gov/programs/groundwater-management/sgma-groundwater-management>.

Chudnoff, S. 2022. Personal communication between Sara Chudnoff, American Ground Water Trust Hydrogeologist, and Amy Ewing, DBS&A. December 30, 2022.

City of Rio Rancho. 2022. Private Well Program. <https://rrnm.gov/2215/Private-Well-Program>.

City of Santa Fe. 2022. City of Santa Fe Municipal Charter and Code of Ordinances, Chapter XXV – Water, 25-1.10 Regulations for the drilling of new domestic water wells. Version dated December 16, 2022. <https://library.municode.com/nm/santa_fe/codes/code_of_ordinances?nodeId=CHXXVWA_25-1GE_25-1.10REDRNEDOWAWE>.

Donegan, K. 2023. Personal communication between Kevin Donegan, Colorado Division of Water Resources Senior Hydrogeologist, and Amy Ewing, DBS&A. January 10, 2023.

Ellis-Green, P. 2022. Personal communication between Penny Ellis-Green, Santa Fe County Growth Management Director, and Amy Ewing, DBS&A. June 23, 2022.

Erdmann, A. 2022. Personal communication between Andrew Erdmann, New Mexico Interstate Stream Commission Water Planning Program Manager, and Amy Ewing, DBS&A. February 2, 2022.

Garcia, L. 2022. Personal communication between Lorraine Garcia, New Mexico Office of the State Engineer Upper Rio Grande Basin Manager, and Amy Ewing, DBS&A. June 28, 2022.

Griego, R. 2023. Personal communication between Robert Griego, Santa Fe County Planning Manager, and Amy Ewing, DBS&A. February 21, 2023.

Hunter, M. 2022. Personal communication between Michelle Hunter, Santa Fe County Water Resources Manager, and Amy Ewing, DBS&A. August 11, 2022.

McGregor, D. 2023. Personal communication between Daniel MacGregor, Bernalillo County Natural Resources Services Manager, and Amy Ewing, DBS&A. January 9 and March 2, 2023.

Magnuson, M.L., J.M. Valdez, C.R. Lawler, M. Nelson, and L. Petronis. 2019. *New Mexico water use by categories, 2015*. NM OSE Technical Report 55. May 2019.

New Mexico Bureau of Geology and Mineral Resources (NMBGMR). 2023a. Aquifer Mapping Program. <https://geoinfo.nmt.edu/resources/water/amp/home.html>.

NMBGMR. 2023b. Healy Collaborative Groundwater Monitoring Network. <https://geoinfo.nmt.edu/resources/water/cgmn/home.cfml>.

New Mexico Finance Authority (NMFA). 2023. Water Project Fund. <https://www.nmfinance.com/water-project-fund/>.

New Mexico Water Policy and Infrastructure Task Force (NM Water Task Force). 2022. Facing New Mexico's 21st century water challenges. Available at <https://nmwater.org/wp-content/uploads/2023/01/new-mexico-water-policy-and-infrastructure-task-force-final-report-2022.pdf>.

Office of the State Engineer (OSE) New Mexico Water Rights Reporting System (NMWRRS). 2022a. New Mexico Water Rights Reporting System. <http://nmwrrs.ose.state.nm.us/nmwrrs/index.html>.

OSE NMWRRS. 2022b. OSE POD Locations Online Mapping Tool. <https://gis.ose.state.nm.us/gisapps/ose_pod_locations/>.

Quintana, A. 2023. Personal communication between Angela Quintana, New Mexico Finance Authority Senior Program Administrator, and Amy Ewing, DBS&A. March 10, 2023.

Quintana, K. 2023. Personal communication between Kenneth Quintana, Santa Fe County Growth Management Senior Development Review Specialist, and Amy Ewing, DBS&A. January 17, 2023.

Santa Fe County. 1980. Land Development Code. Adopted on October 28,1980 as Ordinance 1980-6, and effective on January 1, 1981. <https://www.santafecountynm.gov/documents/ordinances/LandDevelCode1980.pdf>.

Santa Fe County. 2001. *La Cienega and La Cieneguilla Community Plan*. <https://www.santafecountynm.gov/userfiles/LaCienegaPlan-Resolution2001-117.pdf>.

Santa Fe County. 2002. Ordinance No. 2002-9 regarding La Cienega and La Cieneguilla Traditional Community Planning Area and La Cienega Traditional Community Zoning District. Filed June 27, 2002.

Santa Fe County. 2015. *La Cienega and La Cieneguilla Community Plan Update*. <https://www.santafecountynm.gov/media/files/2015LaCienegaandLaCieneguillaPlanUpdate.pdf>.

Santa Fe County. 2016. Sustainable Land Development Code. Adopted by Ordinance 2016-9 on December 13, 2016. <https://www.santafecountynm.gov/documents/ordinances/Ordinance_2016-9-p0001_-_p0769.pdf>.

Sonoma Water. 2021a. *Groundwater Sustainability Plan, Sonoma Valley Groundwater Subbasin*. December 2021. <https://sgma.water.ca.gov/portal/gsp/preview/101>.

Sonoma Water. 2021b. *Groundwater Sustainability Plan, Santa Rosa Plain Subbasin*. December 2021. <https://sgma.water.ca.gov/portal/gsp/preview/136>.

Springhorn, S. 2023. Personal communication between Steven Springhorn, California Department of Water Resources Sustainable Groundwater Management Office Program Manager, and Amy Ewing, DBS&A. January 6, 2023.

Thornburg Foundation. 2022. Strategic Initiatives, Water. <https://www.thornburgfoundation.org/strategic-initiatives/water/>.

Timmons, S. 2023. Personal communication between Stacy Timmons, New Mexico Bureau of Geology & Mineral Resources, Associate Director of Hydrogeology Programs, and Amy Ewing, DBS&A. January 6, 2023.

Torres, K. 2022. Personal communication between Karen Torres, New Mexico Environment Department Drinking Water Bureau Community Services Program Manager, and Amy Ewing, DBS&A. December 29, 2022.

U.S. Census Bureau (U.S. Census). 2021. 2017-2021 American Community Survey 5-Year Estimates. <https://data.census.gov/table?q=la+cienega+cdp+new+mexico&tid=ACSDP5Y2021.DP05>.

U.S. Bureau of Reclamation (USBR). 2023. WaterSMART Grants. <https://www.usbr.gov/watersmart/>.

Utton Transboundary Resources Center (Utton Center). 2014. Water Matters! Domestic Wells. Available at <https://uttoncenter.unm.edu/resources/research-resources/water-matters-.html>.

Tables

Table 1. Water Level Elevations, Current NMBGMR Monitoring Network

Point ID	Coordinates (NAD 83 UTM 13 N)		Date Measured	Depth to Water (feet)	Groundwater Elevation (feet msl)
	Easting	Northing			
LC-025	400000	3936280	4/4/2022	8.05	6,095.51
LC-010	399811	3937131	4/5/2022	16.59	6,010.95
EB-306	399537	3937647	4/5/2022	19.02	6,108.55
EB-691	400249	3937717	4/5/2022	23.1	6,056.46
EB-340 [a]	399686	3936057	4/4/2022	52.35	6,053.21
EB-132 [a]	400609	3936794	4/4/2022	62.31	6,102.27
EB-696 [b]	403679	3937857	4/5/2022	91.72	6,141.88
EB-373 [b]	401729	3941231	4/5/2022	115.62	6,170.99
EB-220	403153	3938661	4/5/2022	132.83	6,130.77
EB-390 [a,b]	404686	3933111	4/5/2022	162.98	6,138.63

[a] Well measured manually once per year
[b] Well outside of the LCLC planning area
msl = Above mean sea level

Table 2. Number of Permitted Wells and Permitted Diversions in the LCLC Planning Area

OSE Use Code	Use Description	Number of Wells	Permitted Diversions (ac-ft/yr)
DOL	72-12-1 Domestic and livestock watering	24	57
DOM	72-12-1 Domestic one household	693	1,658
MUL	72-12-1 Multiple domestic households	106	292
STK	72-12-1 Livestock watering	5	15
IRR	Irrigation [a]	15	482.17
MDW	Community type use - MDWCA, private or commercial supplied	4	68.07
MOB	Mobile home parks	4	20.4
PDL	Non 72-12-1 Domestic and livestock watering	3	9
PDM	Non 72-12-1 Domestic one household	3	9
PUB	72-12-1 Construction of public works	2	0
SAN	72-12-1 Sanitary in conjunction with a commercial use	12	47.2
BPW	Brine production well	3	0
CLS	Closed file	1	0
EXP	Exploration	6	0
MON	Monitoring	2	0
NOT	No use of right or POD	1	0
TBD	To be determined	1	0.5
	Unknown	49	24
	Total	934	2,682.34
	Total permitted groundwater diversions		2,332.00

Source: OSE NMWRRS, 2022a

[a] Includes surface water declarations totaling 350.34 acre-feet per year (ac-ft/yr)

Table 3. Irrigation Water Rights in the LCLC Planning Area

POD	Status	Use	Total Diversion (ac-ft/yr)	Ditch Name	Sub-File	Owner Name
RG-00590 [a]	ADJ	IRR	0.00		58.1	Public Service Company of New Mexico
RG-32048	DCL	IRR	12.48		SUMP 42, MAP 13 TRACT 42.1	Raymond Ulibarri, Delfina Ulibarri
RG-70212	DCL	IRR	5.70			Bill Schenck
RG-70213	ADJ	IRR	1.20		36A.1	Bill Schenck
SD-02125	DCL	IRR	70.89	Los Tanques		Lalo Enriquez, Henry Gonzales, Y.A. Paloheimo
RG-31961	DCL	IRR	20.22		TRACT 42.43.45.1	Herman Pino
RG-31961-SUMP 42	DCL	IRR				Raymond Ulibarri
RG-31961-SUMP 43	DCL	IRR				Facudono Pino
RG-07767-H	DCL	IRR	0.75			Maurice R. McDonald
RG-29242 [b]	LIC	IRR	28.60			Frank Mancuso, Kimberly Mancuso
SD-06667	OOJ	IRR	6.00		SF HYDRO SURVEY MAP 13, TRACT 35.1	William C. Schenck
SD-00869	PMT	IRR	273.45	Acequia de La Cienega	6.2829 & 11.28.18B	Acequia de la Cienega
RG-88082	DCL	IRR	46.47		12-13-14.1	Jesusita P. Larranaga, Edward J. Sceery
RG-90070	ADJ	IRR	4.50		9.A1	Toribio Lopez, Nellie Lopez
RG-94801	PMT	IRR	11.91		41.1	Gable S Corporation
Total permitted diversion (ac-ft/yr)			482.17			
Total permitted groundwater diversion (ac-ft/yr)			131.83			

Source: OSE NMWRRS, 2022a

[a] NMWRSS lists 2 PODs (RG-00590 and RG-00590 POD1)

[b] NMWRSS lists 3 PODs (RG-29242, RG-29242-S, and RG-61187 POD1)

ac-ft/yr = Acre-feet per year
ADJ = Adjudicated
OOJ = Offer of judgment
SD = Surface declaration
POD = Point of diversion
DCL = Declared
PMT = Permit
IRR = Irrigation
LIC = License
RG = Rio Grande

Table 4. Santa Fe County Meter Reading Report Summary

Year	Number of Wells for which Reports Received	Number within the LCLC Planning Area	Number that are Domestic Wells	Calculated Annual Water Use (acre-feet)
2015	1	0	0	— [a]
2016	3	0	1	2.0
2017	4	0	2	1.0, — [b]
2018	3	0	1	— [b]
2019	11	0	10 [c]	0.05, 0.09, 0.14, 0.20, 0.26, 0.29, 0.30, 0.52, — [d]
2020	9	0	5 [c]	0.06, 0.10, 0.17, 0.30, 0.35, — [b]
2021	6	0	5	0.06, 0.30, 0.32, 0.34, — [b]
2022	6	0	3	0.06, 0.30, — [b]

[a] Demand not calculated (well not for domestic use)

[b] Only one meter reading was provided for a well, so volume was not calculated.

[c] Two meter readings received for one well (the two residences this well serves are separately metered).

[d] Three wells had only one meter reading, so volumes were not calculated.

Table 5. Estimated Domestic Well Water Demand in the LCLC Planning Area

Total Water Demand	Total Demand at Specified Per-Household Demand (ac-ft/yr)					Comments
	0.16	0.25	0.26	0.33	1.0 (current OSE regulation volume)	
929 households	148.6	232.3	241.5	306.6	929.0	Number of households estimated by summing the number of permitted 72-12-1 Domestic and livestock watering (24), Domestic one household (693), and Multiple domestic household (106) wells, assuming that each shared domestic well supplies two households.
1,035 households	165.6	258.8	269.1	341.6	1,035.0	Number of households estimated as above, except for the assumption that each shared domestic well supplies three households.
1,141 households	182.56	285.25	296.66	376.53	1,141.0	Number of households estimated as above, except for the assumption that each shared domestic well supplies four households.

ac-ft/yr = Acre-feet per year

Table 6. Estimated Current Groundwater Demand

Sector	Permitted Groundwater Diversion (ac-ft/yr) [a]	Estimated Current Groundwater Demand (ac-ft/yr)
Domestic water supply [b]	1,992.00	250–1,000
Community water system [c]	88.47	— [e]
Irrigation [d]	131.83	— [e]
Livestock	48	— [e]
Commercial	47.2	— [e]
Total	2,307.50	566–1,316

[a] Permitted groundwater diversions from Table 2. Permitted diversions for combined well types (e.g., domestic and livestock watering) were split between the two sectors.

[b] See Table 4 for the range in potential domestic demands and the associated assumptions.

[c] Including mobile home park permitted diversions.

[d] Does not include 350.34 acre-feet per year (ac-ft/yr) in surface declarations.

[e] Assumed to be equal to permitted groundwater diversions (no data on actual demand).

Table 7. Projected Domestic Groundwater Demand

Decadal Increase	Projected Demand (ac-ft/yr)				
	2020	2030	2040	2050	2060
Low Estimate					
5 percent	250	262.5	275.6	289.4	303.9
10 percent	250	275.0	302.5	332.8	366.0
15 percent	250	287.5	330.6	380.2	437.3
Middle Estimate					
5 percent	500	525.0	551.3	578.8	607.8
10 percent	500	550.0	605.0	665.5	732.1
15 percent	500	575.0	661.3	760.4	874.5
High Estimate					
5 percent	750	787.5	826.9	868.2	911.6
10 percent	750	825.0	907.5	998.3	1,098.1
15 percent	750	862.5	991.9	1,140.7	1,311.8

ac-ft/yr = Acre-feet per year

Table 8. Water Resource Issues of Interest

Water Resource Issue	Priority 1	Priority 2	Priority 3	Total
Domestic groundwater supply	15	3	2	20
Irrigation groundwater supply	3	0	1	4
Water quality	3	4	9	16
Growth management	1	10	4	15
Well metering and requirement enforcement	0	5	2	7
Other (retiring septic tank use and reusing treated wastewater)	3	2	2	7

Feedback gathered at project open house on September 14, 2022.

Table 9. Number of Development Permits in LCLC Planning Area by Year, 2002–2022

Year	Number of Permits
2002	41
2003	71
2004	62
2005	71
2006	56
2007	48
2008	38
2009	27
2010	26
2011	30
2012	41
2013	31
2014	30
2015	36
2016	62
2017	37
2018	42
2019	53
2020	51
2021	38
2022	27
Total	918

Table 10. Number of Development Permits in LCLC Planning Area by Permit Type, 2002–2022, Page 1 of 2

Type	Type Description	Number of Permits	Ordinance 2002-9 Requirements Applicable?
SPAD	Accessory Dwelling	20	Yes
APP	Appeal	2	Unknown
PCBS	Boundary Survey	2	No
BPCS	Building Permit, Comm Serv Facility	1	No
BPCX	Building Permit, Comm/Ind Access Struct	1	No
BPCR	Building Permit, Comm/Ind Renv/Remodel	1	No
BPOD	Building Permit, Other Development	5	No
BPRX	Building Permit, Res. Access Structure	89	Yes
BPRA	Building Permit, Res. Addition	103	No
BPRR	Building Permit, Res. Renv/Repair	7	No
BPRS	Building Permit, Res. Single Family Home	86	Yes
ABBL	Business License	6	No
DDEM	Demolition	1	No
DCOM	Development Plan Commercial	1	Yes
DNCU	Development Plan Non-Conforming Use	1	Yes
LDDL	Division of Land	1	Yes
PCES	Easement Survey	2	No
PCEV	Easement Vacation	2	No
EXFT	Family Transfer	15	Yes
EXFY	Five Year Exemption	3	Unknown
AHBL	Home Occupation Business License	30	No
SIVP	Itinerate Vendor Permit	1	No
PCLC	Lot Consolidation	3	No
PCLA	Lot Line Adjustments	59	No
MIS	Miscellaneous	20	Unknown
DMHP	Mobile Home Placement	111	Yes
PCPA	Plat Amendment	2	No
DROC	Road Construction/Grading	29	No
DSIG	Sign Permit	1	No
SCUP	SLDC Conditional Use Permit	1	Unknown
SDPP	SLDC Demolition Permit	4	No

Table 10. Number of Development Permits in LCLC Planning Area by Permit Type, 2002–2022, Page 2 of 2

Type	Type Description	Number of Permits	Ordinance 2002-9 Requirements Applicable?
SPNA	SLDC Dev Permit Non-Res/Multi/Mu-Ad	2	Unknown
SGSF	SLDC Grading Clearing-Single	9	No
SHOL	SLDC Home Occupation Low Impact	4	No
SHON	SLDC Home Occupation No Impact	16	No
SPMH	SLDC Manufactured Home	64	Yes
SLMS	SLDC Minor Subdivision	4	Yes
SPVS	SLDC PV Solar - Private	39	No
SPAS	SLDC Residential Assessory Structure	53	Yes
SPRA	SLDC Residential Remodel/Addition	34	No
SRDC	SLDC Road or Driveway Cut Permit	4	No
SPSR	SLDC Single Family Residence	19	Yes
SSDP	SLDC Site Development Permitted Use	1	Yes
SVAR	SLDC Variance	2	Unknown
SZCS	SLDC Zoning / Condominium Statement	1	Unknown
LDFT	Small Lot Family Transfer	19	Yes
ASE	Special Event	2	No
SRES	Subdivision, Residential	3	Yes
SRS	Subdivision, Summary Review Sub-Division	1	Yes
DUAC	Utility Authorization (Commercial)	1	Unknown
DUAR	Utility Authorization (Residential)	6	Unknown
DUAW	Utility Authorization (Well)	9	Unknown
VAR	Variance	13	Unknown
ZCOM	Zoning, Commercial	1	Unknown
ZOD	Zoning, Other Development	1	Unknown
	Total	918	

Table 11. Number of Development Permits in LCLC Planning Area by Year, 1996–2001

Year	Number of Permits
1996	66
1997	51
1998	70
1999	91
2000	61
2001	81
Total	420

Table 12. Number of Development Permits in LCLC Planning Area by Permit Type, 1996–2001

Type	Type Description	Number of Permits	La Cienega Watershed Conditions Requirements Applicable?
ABBL	Business License	2	No
AHBL	Home Occupation Business License	27	No
APP	Appeal	3	No
BPOD	Building Permit, Other Development	16	No
BPRA	Building Permit, Res. Addition	40	No
BPRR	Building Permit, Res. Renv/Repair	1	No
BPRS	Building Permit, Res. Single Family Home	58	Unknown
BPRX	Building Permit, Res. Access Structure	57	No
DBLA	Blasting	1	No
DCOM	Development Plan Commercial	1	No
DMHP	Mobile Home Placement	130	No
DOD	Development Plan Other Development	1	No
DRCU	Road Cut Permit	7	No
DROC	Road Construction/Grading	10	No
DUAR	Utility Authorization (Residential)	6	No
DUAW	Utility Authorization (Well)	6	No
EXFT	Family Transfer	10	Yes
LAND	Land Divisions, Multiple	2	Yes
LDDL	Division of Land	8	Yes
LDFT	Small Lot Family Transfer	17	Yes
MIS	Miscellaneous	3	No
PCBS	Boundary Survey	2	No
PCLA	Lot Line Adjustments	7	Unknown
SVAR	SLDC Variance	1	Unknown
TUPO	Temporary Use Permit, Other	1	No
ZCOM	Zoning, Commercial	1	Unknown
ZOD	Zoning, Other Development	1	Unknown
ZVAR	Zoning, Variance	1	No
	Total	420	

Table 13. Estimated Number of Development Permits in LCLC Planning Area Where the La Cienega Watershed Conditions Requirements May Apply, 1996–2022

Type	Type Description	1996-2001 Development Permits	2002-2022 Development Permits	Total
EXFT	Family Transfer	10	15	25
LAND	Land Divisions, Multiple	2	0	2
LDDL	Division of Land	8	1	9
LDFT	Small Lot Family Transfer	17	19	36
SLMS	SLDC Minor Subdivision	0	4	4
SRES	Subdivision, Residential	0	3	3
SRS	Subdivision, Summary Review Sub-Division	0	1	1
SSDP	SLDC Site Development Permitted Use	0	1	1
			Total	81

Appendix A

Hydrogeologic Setting

DBS&A
a Geo-Logic Company

Introduction

The study area for the pilot project covers the lower reach of the Santa Fe River, including several of its major tributaries and arroyos; Arroyo Calabasas, Arroyo de los Chamisos, Arroyo Hondo, Cienega Creek, Guicu Creek and Alamo Creek. This region is hydrologically unique with numerous springs, seeps and wetlands emerging in the valleys and along the river channels. The study area stretches southwest, following the Santa Fe River as it flows through La Cieneguilla, southwest of the Santa Fe Airport, to the edge of the La Bajada Escarpment (Figure 1). There have been numerous detailed hydrologic studies that have characterized this unique groundwater discharge region. This review will draw upon these previous works to briefly describe the geologic setting, how it controls the complex hydrologic system, and the long-term groundwater trends observed in the region.

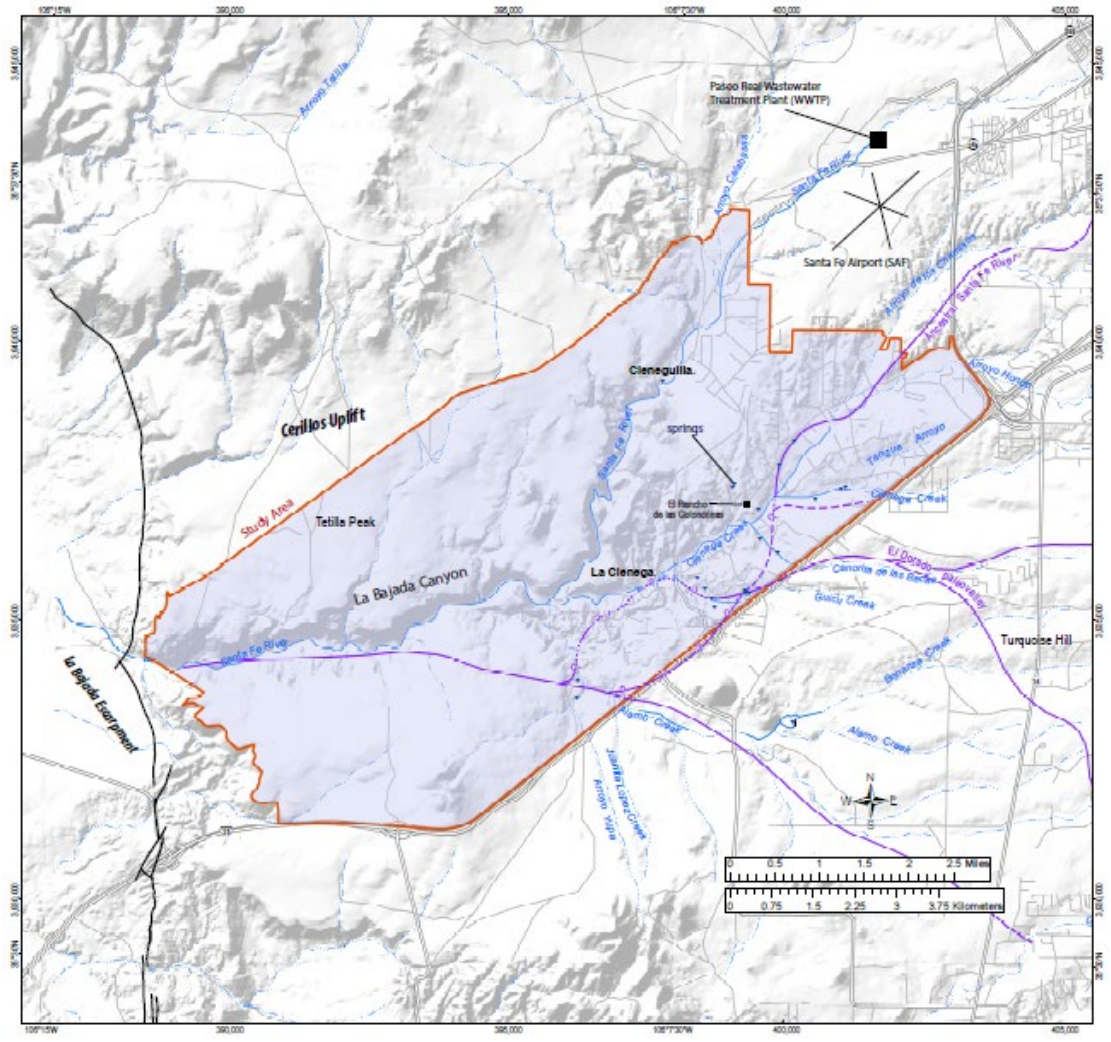


Figure 1. Study area roughly follows the Santa Fe River and includes the surrounding communities of La Cienega and La Cieneguilla.

Geology and hydrologic units

Located within the Rio Grande Rift, the Santa Fe River flows over a bedrock structural high separating two structural basins formed by rift-related faulting; the southern Española Basin and the northern Santo Domingo Basin. This block is called the Cerrillos Uplift (Sawyer and Minor, 2006), which is bounded on the west by the La Bajada fault and its surficial expression, the La Bajada Escarpment. The western boundary of this project's study area is the La Bajada Escarpment of the Cerrillos Uplift. The Cerrillos Uplift is considered a 'rift-flank' uplift with the Española block being lifted while the Santo Domingo block drops down along the La Bajada Escarpment (Sawyer and Minor, 2006). For reference, this feature is structurally similar to the Sandia Mountains uplift bounding the northeast side of the Albuquerque basin, but has much lower structural relief. To the east of the Cerrillos Uplift is a structural ramp that dips northwards towards the Española Basin (Figure 2).

In the Cerrillos Uplift, older, pre-rift sedimentary units that underlie the southern Española basin are exposed: the Galisteo and Espinaso Formations (Sawyer and Minor, 2006). The Galisteo Formation (Eocene) is composed of sandstone and pebbly sandstone channel fills, interbedded with mudstone-rich floodplain deposits (Sun and Baldwin, 1958; Spiegel and Baldwin, 1963; Koning and Hallett, 2002). Overlying the Galisteo Formation, the Espinaso Formation (Oligocene) mostly consists of well-cemented, alluvial fan deposits of volcanic-derived conglomerates and sandstones (Sun and Baldwin, 1958; Sawyer et al., 2002; Koning and Hallett, 2002). These older Eocene and Oligocene sediments have low hydraulic conductivity owing to their cementation and are generally considered barriers to groundwater flow (Johnson et al., 2016).

Within the Española Basin and the study area, the primary water bearing units are the Tesuque and Ancha Formations, which are within the Santa Fe Group (SFG). The Tesuque Formation consists of alluvial sediments that were eroded from the Cerrillos Uplift to the west and the Sangre de Cristo Mountains to the east. In the Santa Fe area, the Tesuque Formation (upper Oligocene to upper Miocene) consists of silty-clayey sand and sand, with minor gravel, silt, and clay (Spiegel and Baldwin, 1963; Koning and Read, 2010). The Tesuque Formation exhibits significant lateral and spatial heterogeneity, in part because it was deposited by different-sized paleo-drainages with distinctive sources of sediment. As a reflection of this heterogeneity, the Tesuque has been subdivided into interfingering units called lithosomes (Cavazza, 1986; Koning and Read, 2010) that correspond to deposits of different regional paleo-drainage systems and have distinct properties such as color and

clast composition. For a more detailed description of the lithosomes found in the area, please refer to Koning and Read, 2010.

The Ancha Formation unconformably overlies the Tesuque and older formations. Prior to the deposition of the Ancha Formation, the area underwent a period of significant erosion in the late Miocene-Pliocene that left a network of eroded paleo-valleys carved into the surface of the exposed Tesuque, Espinaso, and Galisteo Formations (Johnson and Koning, 2012). During the deposition of the Ancha Formation (Pliocene to lower Pleistocene), these paleo-valleys were filled with gravel-rich, highly transmissive aquifer material. This network of transmissive aquifer channels scoured into the older, less permeable underlying formations help direct groundwater flow westward through the Española Basin to the La Cienega Wetlands (Spiegel, 1975; Johnson et al., 2016). The Ancha Formation deposits contain abundant, laterally extensive, thick, sandy pebble-cobble channel-fills interspersed with fine-grained floodplain sediments of clayey-silty sand. In general, Ancha sediments are coarser, less consolidated, and more permeable than underlying strata (Johnson and Koning, 2012). Thin Ancha deposits are mapped on top of the Cerrillos uplift and below more recent Pleistocene basalt flows. This indicates the ancestral Santa Fe River deposited a wide lobe of gravelly sediment here before incision occurred, subsequent to the emplacement of the basalts (~2.5mya). The incision, known as the La Bajada Canyon, may have been a response to higher slip rates along the La Bajada fault in the early to middle Pleistocene (Daniel Koning, pers. commun., June 2022). The Ancha Formation forms a locally important, shallow aquifer for the Santa Fe area, especially in the region of this study.

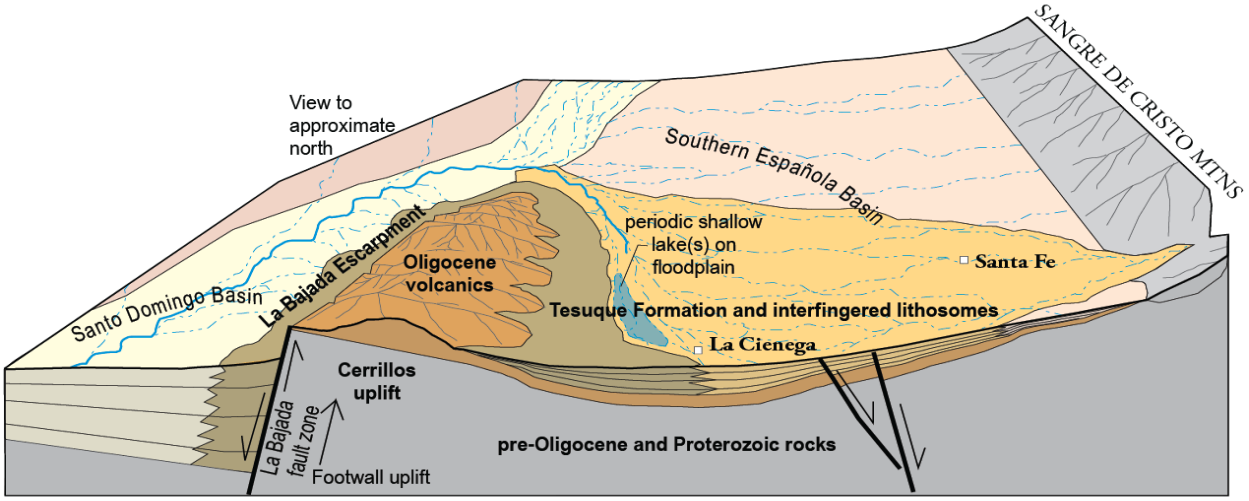


Figure 2. Conceptual block diabram showing the stratigraphy, Tesuque Formation, paleo-geography, and the depositional setting of the Española Basin 15 to 25 million years ago.

Conceptual groundwater flow model

Regional groundwater-level maps for the area (Spiegel and Baldwin, 1963; Mourant, 1980; Johnson, 2009; Johnson et al., 2016) show that groundwater in the southern Española Basin flows west-southwest through the Santa Fe Group aquifer from the Sangre de Cristo Mountains in the east. Sources of recharge to the Santa Fe Group (SFG) aquifer include mountain-front and stream channel recharge near the western border of the Sangre de Cristo Mountains, small amounts of areal recharge through coarse surface materials, and focused recharge in the southern Española Basin via streambed infiltration along ephemeral channels (Wasiolek, 1995). Focused recharge has been demonstrated by various methods and noted in studies that include the Santa Fe River, Arroyo Hondo, and Cañada Ancha (Johnson et al., 2013; Manning, 2009; Moore, 2007; Thomas et al., 2000). Focused recharge beneath losing reaches of the Santa Fe River create a groundwater mound that extends west from Agua Fria toward the Santa Fe WWTP. This groundwater high—a product of recharge from streambed infiltration—has been a persistent feature in historic groundwater maps representing 1952 conditions (Spiegel and Baldwin, 1963), 1977 conditions (Mourant, 1980), and 2000–2005 conditions (Johnson, 2009). The modern shape and extent of the recharge mound may be affected by discharge from the WWTP, which has been functioning since the early 1960s. Spiegel and Baldwin (1963) proposed that surface drainage from the river probably provides some recharge to the La Cieneguilla groundwater unit. The groundwater map of Johnson (2009) supports a similar interpretation.

The effluent that is discharged from the WWTP has a unique chemical signature. By preforming chemical analysis on the springs and wells in the La Cienega area, Johnson et al. (2016) was able to demonstrate that the wetlands in the La Cienega were not chemically influenced by discharge from the WWTP. Johnson et al. (2016) also found that the saturated Ancha Formation that is present downstream of the WWTP, in the La Cieneguilla, is hydrologically separated from the La Cienega Wetlands by a subsurface high of lower permeability Tesuque Formation. Ancha Formation sediments that overlie the high Tesuque surface are entirely above the water table and the coarser deposits are unsaturated. While effluent from the WWTP and the springs that discharge to La Cienega are not chemically linked, the groundwater recharge mound downstream of the WWTP supports a higher water table that likely helps maintain the springs discharging to the west of the La Cienega wetlands (Figure 3).

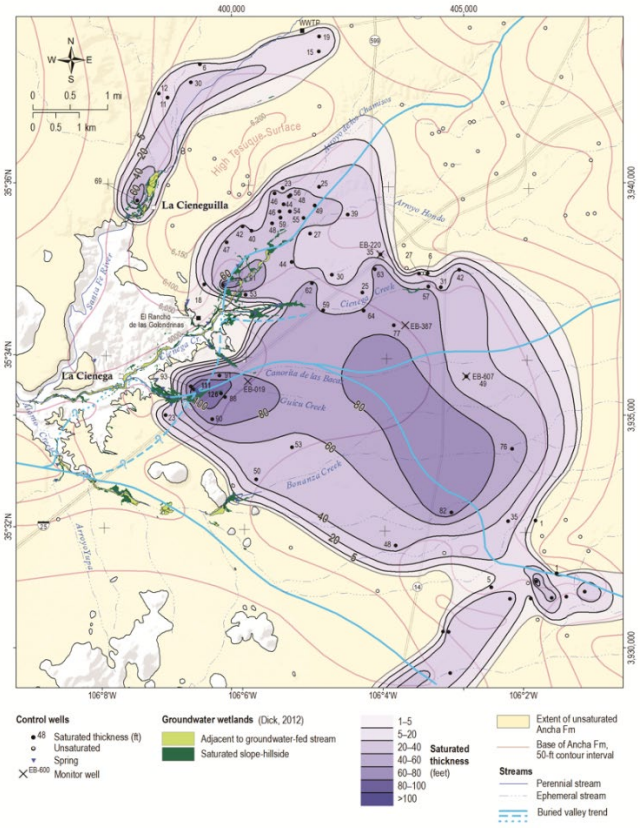


Figure 3. Saturated thickness map of the Ancha Formation, in feet and approximate locations of paleo- valleys (modified from Johnson and Koning, 2012).

The groundwater that feeds springs and wetlands in the study area is sourced from the SFG aquifer, which is a regional aquifer system of thick alluvial deposits of the Tesuque Formation, overlain by shallow, thin (<250 ft), coarse deposits of the Ancha Formation (Johnson et al., 2016). Near the southwestern margin of the Española Basin, the Tesuque and Ancha aquifers pinch out westwards near the eastern boundary of the Cerrillos Uplift, where they are underlain by the less permeable Galisteo and Espinaso Formations (Figure 4). At this contact, groundwater discharges via springs, wetlands and gaining reaches in rivers. Thinning of the aquifer forces groundwater to the surface where it emerges from buried valleys in the Ancha Formation to discharge via springs, seeps, and gaining reaches in rivers that support the wetlands (Johnson et al., 2016). Groundwater stored in the Ancha Formation is the primary source of water for the wetlands. The accretion and storage of groundwater in the Ancha Formation depends on local recharge, upflow of deep groundwater to the east of the pinchout zone, permeability contrasts between the Ancha and underlying formations, and the buried valleys at the base of the formation that direct groundwater flow and control wetland location (Johnson et al., 2016).

It is important to emphasize how the aforementioned paleo-valleys at the base of the Ancha aquifer act as a sort of "hydrogeologic French drain" which gather groundwater from the surrounding aquifer, concentrate flow, and direct discharge to the springs and wetlands. These sinuous, narrow aquifers are important sources of groundwater, but are subject to large and unusual drawdown responses to pumping. A pumping well in or adjacent to a buried valley will extract most of its water directly from the buried valley and concentrate large water-level drawdowns along the valley's axis (Johnson et al., 2016).

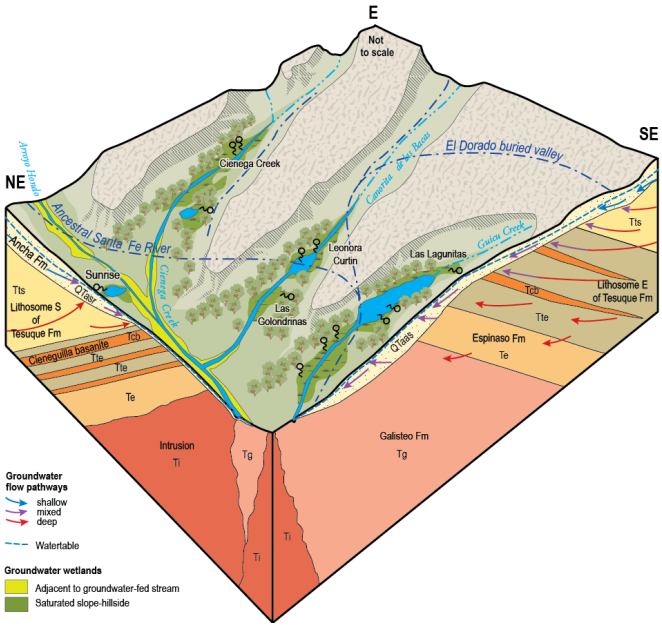


Figure 4. Perspective block diagram of groundwater-fed wetlands at La Cienega illustrating the hydrogeologic setting of the aquifer (modified from Johnson et al., 2016).

Lower Santa Fe River and La Cienega Wetland hydrology

The Santa Fe River historically flowed 74 km from its headwaters to its confluence with the Rio Grande. Currently, however, flows from the lower Santa Fe River to its confluence with the Rio Grande are intermittent; its termination (drying out) often occurs after the La Bajada Escarpment, where it eventually runs dry before reaching the river (Mann, 2020). The City of Santa Fe relies heavily on the Santa Fe River for its potable drinking water supply, accounting for 32% or 2,800 ac-ft/yr of the City's drinking water (annual average from 2013-2019) (santafenm.gov/where_does_our_water_come_from). As result, the Upper Santa Fe River typically runs dry before it reaches the Lower Santa Fe River reach. At present, city water treated at the Paseo Real Wastewater Treatment Plant (WWTP) is discharged back

into the lower Santa Fe River as effluent (however, this may soon change as the City has plans to reuse this water as a non-potable water source (Carollo Engineers, Inc., 2016).

In addition to the discharge provided from the WWTP, surface water in the area is supported by numerous groundwater-fed springs and wetlands that emerge in the valleys cut deep in the alluvium. Near La Cienega where the SFG aquifer thins and the water table rises to land surface, as previously described, the incised drainages contain perennial streams that flow continuously throughout the year. Perennial stream-flow in Cienega Creek and its tributaries (Arroyo Hondo, Cañorita de las Bacas, Guicu Creek, and Alamo Creek) is sustained by groundwater emerging as springs along the valley slopes and channel bottoms (Johnson et al., 2016).

Several recent studies have attempted to quantify groundwater discharge to the stream networks by stream gauging. These studies have identified gaining and losing reaches along the Santa Fe River and its tributaries. A study by NM Hydrologic, LLC and the New Mexico Office of the State Engineer (2012a, b) provides estimates of stream gains and losses by stream reach along the Santa Fe River, Cienega Creek and its tributaries (Figure 5). Additionally, a master's thesis preformed similar stream gauging along the lower Santa Fe River, extending through the La Bajada Canyon and into the Santo Domingo Basin (Mann, 2020). Both studies identified similar gaining and losing reaches. Between the WWTP and La Cieneguilla the river is losing water to streambed infiltration. Between La Cieneguilla and the mouth of the La Bajada Canyon, the Santa Fe River gains flow from the La Cienega wetlands, other tributaries, and upwelling groundwater discharge (Figure 5). The river is fairly neutral as it flows through the La Bajada Canyon, shifting to losing during the summer months. The majority of the water lost from the Santa Fe River occurs at the margin of the Santo Domingo basin, immediately west of the La Bajada Escarpment, where the river flows over thick Rio Grande sediments on the down dropped block of the La Bajada fault (Mann, 2020).

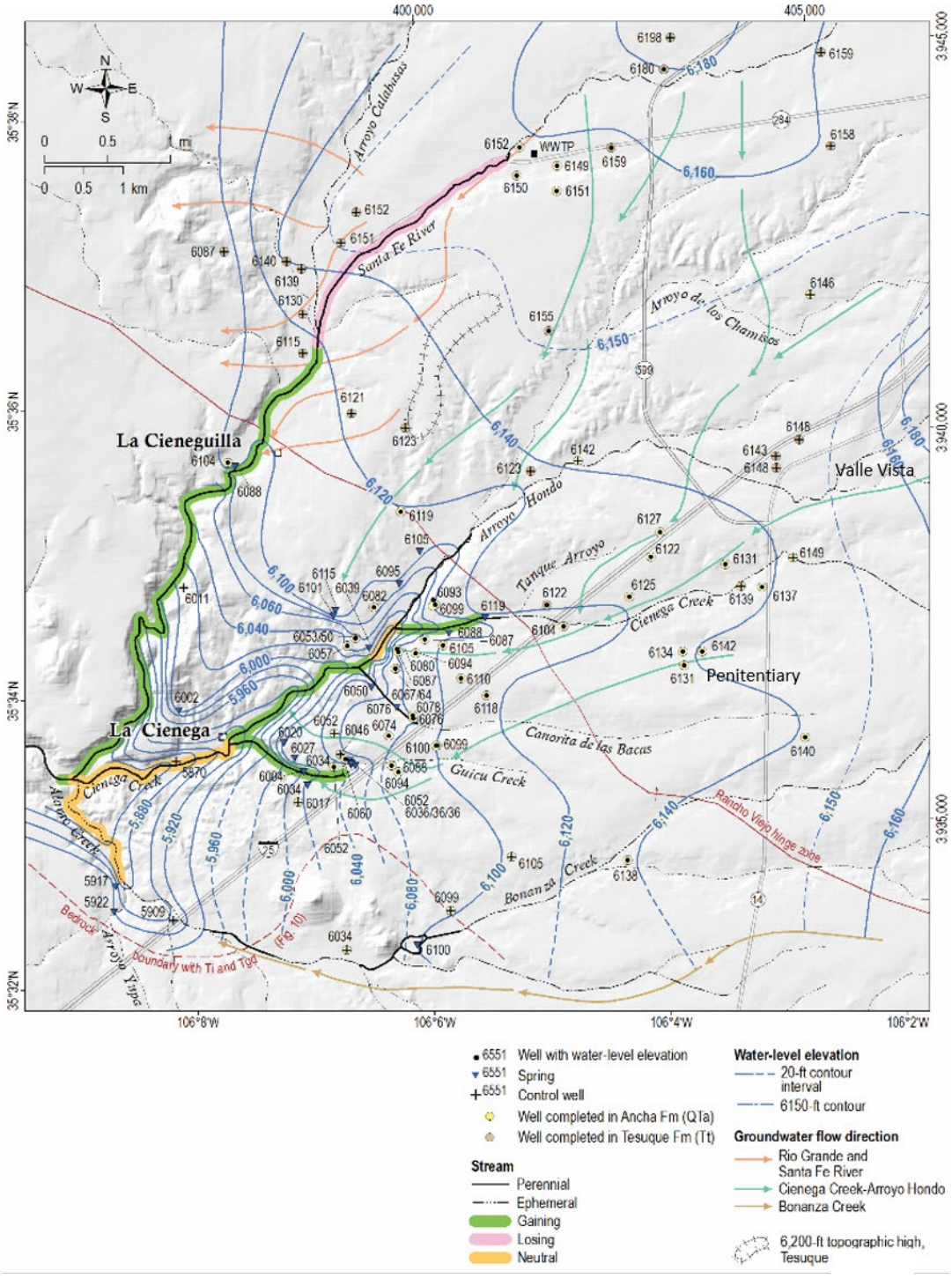


Figure 5. Groundwater map showing water table and groundwater flow paths. Gaining, neutral and losing stream reaches are delineated from data in NM Hydrologic, LLC and NMOSE (2012a, b).

Long-term water level fluctuation and current conditions

The La Cienega area has been the subject of numerous groundwater-level studies over the past 60 years, and as a result there is a robust dataset of groundwater levels in this area. Repeat measurements of the groundwater level are important to understand changes in water volume stored in an aquifer. Compiled water level data from previous reports (Spiegel and Baldwin, 1963; Mourant, 1980; Johnson, 2009; Johnson et al., 2016) show water levels in the Ancha aquifer have dropped from the beginning of the records consistently until the early 2010s as a result of long-term groundwater depletion up-gradient (east) of the wetlands. A comparison of Ancha water levels in the mid-1970s and 1980s with levels measured in the same wells between 2004 and 2012 show long-term water-table declines up to 8.9 ft. The largest depletions and decline rates have occurred in the Valle Vista area and south of the New Mexico State Penitentiary, near the northern and southern edges of the Ancha zone of saturation (Johnson et al., 2016).

Following the completion of research published by Johnson et al. (2016), the New Mexico Bureau of Geology implemented a long-term groundwater-level monitoring network and conducted groundwater-level monitoring in wells in the area with funding from El Rancho de Las Golondrinas. Results from this monitoring found that between 2010 and 2013 there was a reversal in groundwater-level trends in most wells in the La Cienega area. Groundwater-levels in most of the wells in the La Cienega monitoring network have stabilized, and in some cases, have begun to recover (Figure 6) (Mamer, 2020).

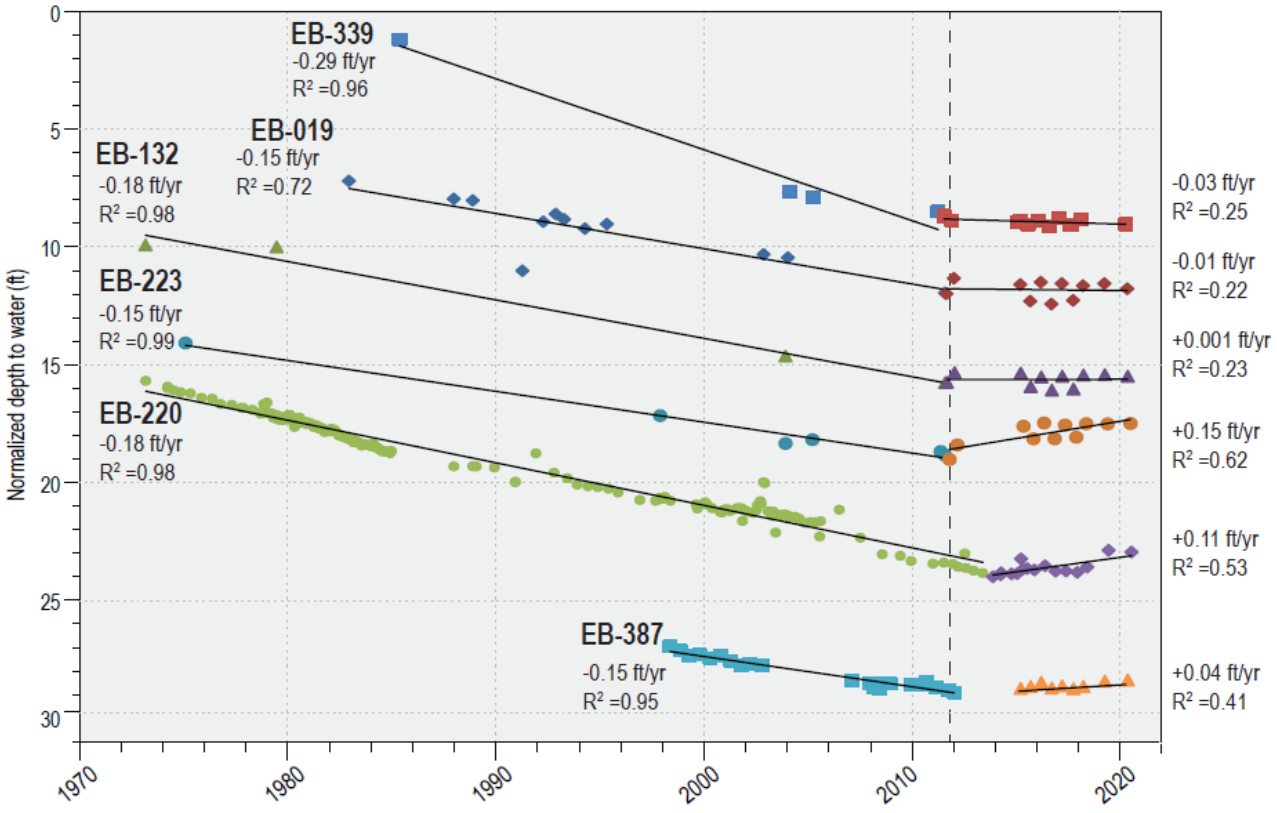


Figure 6. Groundwater hydrographs from six wells in the study area that show significant decline for several decades through 2011. In 2012 the rate of decline seen in the same wells was significantly reduced, or began to recover.

Using groundwater levels collected during the late 2010s, an updated groundwater table map was contoured (Figure 7). Using such a groundwater table map, groundwater flow paths can be drawn by tracing lines perpendicular to the groundwater contours. The groundwater flow paths show the direction of groundwater flow within an aquifer. The groundwater flow paths delineated in the area indicate that La Cienega is located at the termination of several flowpaths, at least some of which correspond to buried paleo-valleys. These flowpaths originate from both the city of Santa Fe to the northeast and the Eldorado region to the east (Figure 7). Land and/or water use changes in the region up gradient likely affect groundwater-level changes observed in the wells around La Cienega (Mamer, 2020).

One of the most significant upgradient changes that has occurred in the area was the City of Santa Fe transitioning away from pumping groundwater within the city limits. Instead, relying on San

Juan/Chama water and the Buckman Well field in 2011. Additionally, in 2013 the National Guard, State Penitentiary, and the Turquoise Trail Elementary school were connected to the Santa Fe County water pipeline, allowing them to stop pumping their wells up gradient of La Cienega.

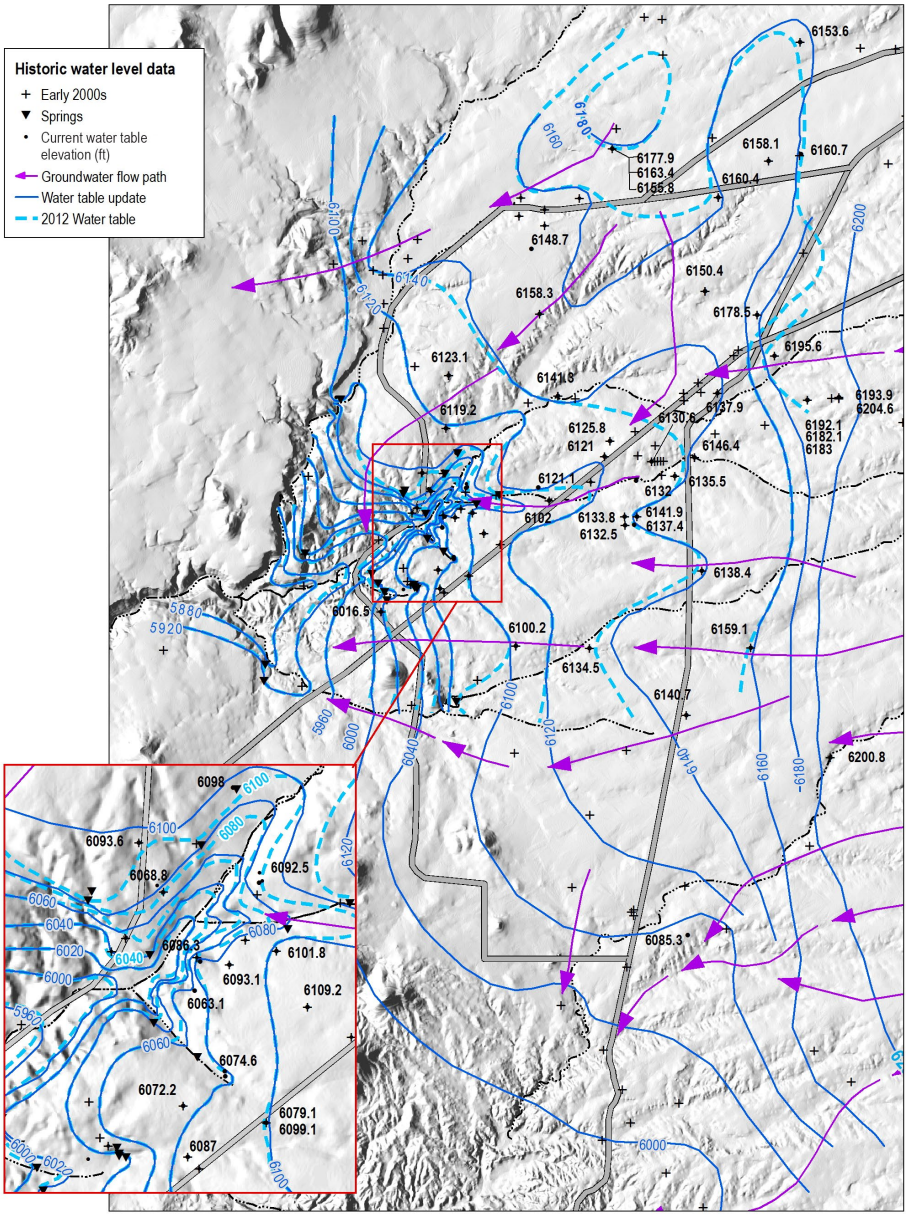


Figure 7. Updated water table map from Mamer (2020), constructed using water levels collected between 2015 and 2019, showing the change from the Johnson et al. (2016) water table map. The contours were modified to show change from the Johnson et al. (2016) water table, which used water level data collected from 2006 to 2012.

Summary of hydrologic setting

The wetland system southwest of Santa Fe, New Mexico is supported by a unique hydrogeologic system that controls groundwater discharge to the area. The primary aquifer that supports the wetlands in La Cienega is the Ancha Formation, which is overlying and connected to the Tesuque Formation. The eroded upper surface of the Tesuque Formation has a network of paleo-valleys that were incised by ancestral rivers. The Ancha Formation aquifer fills these valleys with coarse sediments that are highly transmissive. The wetlands are positioned on the southwestern edge of the Española Basin where the Tesuque and Ancha aquifers thin and pinch-out over older, low-permeability rock units. The thinning of the aquifer forces groundwater to the surface, where it discharges at springs and seeps that support the wetlands and creeks.

The majority of the flow in the Santa Fe River is currently made up of effluent discharged at the Paseo Real Wastewater Treatment Plant. Upwelling groundwater discharge to the wetlands also helps support flow in the river. The Lower Santa Fe River in the study area is a gaining river between La Cieneguilla, until it flows into La Bajada Canyon. The river is fairly neutral to slightly losing as it flows through the canyon. Once the river flows out of the canyon, it flows over the porous Rio Grande Rift sediments, where the majority of the flow infiltrates into the stream bed.

Repeat measurements of the groundwater level are important to understand changes in water volume stored in an aquifer. Groundwater level records in the area stretch back more than 50 years in some wells in the area. These long-term records of water level in the area show consistent declines by as much as 0.3 ft/year. Since 2012 water levels in the La Cienega area have begun to stabilize and, in some cases, even begun to recover. This is likely the result of conservation efforts to connect upgradient water users to the Santa Fe County water supply, and to use more surface water. However, as population and demand for water grows, and worsening drought conditions persist, it will be crucial to continue monitoring this unique groundwater system.

References

Cavazza, W., 1986, Miocene sediment dispersal in the central Española Basin, Rio Grande rift, New Mexico, USA: Sedimentary Geology, v. 51, p. 119–135.

Carollo Engineers, Inc., 2016 Santa Fe Water Reuse Feasibility Study: City of Santa Fe, Santa Fe County and the U.S. Department of the Interior Bureau of Reclamation, p. 168.

City of Santa Fe, 2022. Where Does Our Water Come From? Available at <https://www.santafenm.gov/where_does_our_water_come_from>.

Johnson, P., 2009, Water-level elevation contours and groundwater-flow conditions (2000 to 2005) for the Santa Fe Area, southern Española Basin, New Mexico: New Mexico Bureau of Geology and Mineral Resources, Open- file report 520.

Johnson, P.S., and Koning, D.J., 2012, Geologic and hydrologic maps of the Ancha Formation, Santa Fe County, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open- File Report 550.

Johnson, P.S., Koning, D.J., and Partey, F.K., 2013, Shallow groundwater geochemistry in the Española Basin, Rio Grande rift, New Mexico: Evidence for structural control of a deep thermal source; *in* Hudson, M.R. and Grauch, V.J.S., eds., New Perspectives on Rio Grande Rift Basins: From Tectonics to Groundwater: Geological Society of America Special Paper 494, p. 261–301.

Johnson, P., Koning, D., Timmons, S., and Felix, B., 2016, Geology and Hydrology of Groundwater-Fed Springs and Wetlands at La Cienega, Santa Fe County, New Mexico: New Mexico Bureau of Geology and Mineral Resources, Bulletin 161.

Koning, D.J., and Hallett, R.B., 2002, Geologic map of the Turquoise Hill quadrangle, Santa Fe County, New Mexico: New Mexico Bureau of Geology and Mineral Resources, Open- file geologic map OF-GM-41, scale 1:24,000.

Koning, D.J., and Read, A.S., 2010, Geologic map of the southern Española Basin: New Mexico Bureau of Geology and Mineral Resources, Open- file report 531, scale 1:48,000.

Mamer, E.A., 2020, La Cienega Groundwater Level Monitoring, Santa Fe County, New Mexico: 2020 Summary of Findings: New Mexico Bureau of Geology and Mineral Resources, Open- file report 613.

Mann, R., 2020, 2018-2019 Water quantity and quality study of the lower Santa Fe River, Santa Fe County, New Mexico: Masters of Science in Natural Sciences, New Mexico Highlands University.

Manning, A.H., 2009, Ground-Water Temperature, Noble Gas, and Carbon Isotope Data from the Española Basin, New Mexico: U.S. Geological Survey Scientific Investigations Report 2008–5200, 69 p.

Moore, S.J., 2007, Chapter F, Streamflow, infiltration, and recharge in Arroyo Hondo, New Mexico, *in* Stonestrom, D.A., Constantz, J., Ferré, T.P.A., and Leake, S.A. eds., Ground-Water Recharge in the Arid and Semiarid Southwestern United States: U.S. Geological Survey Professional Paper 1703, p. 137–155.

Mourant, W.A., 1980, Hydrologic maps and data for Santa Fe County, New Mexico: New Mexico State Engineer Basic Data Report, Santa Fe.

NM Hydrologic, LLC and the New Mexico Office of the State Engineer, 2012a, Streamflow Measurement Study of the Lower Santa Fe River, Santa Fe County, NM: City of Santa Fe Wastewater Treatment Plant to the USGS Gage, Santa Fe River above Cochiti Lake, NM, report for the New Mexico Office of the State Engineer Hydrology Bureau, December 2012.

NM Hydrologic, LLC and the New Mexico Office of the State Engineer, 2012b, Streamflow Measurement Study of the Cienega Creek and tributaries and the lower Santa Fe River, Santa Fe County, NM: New Mexico Environment Department Surface Water Quality Bureau and the New Mexico Office of the State Engineer Hydrology Bureau, December 2012.

Sawyer, D.A., Shroba, R.R., Minor, S.A., and Thompson, R.A., 2002, Geologic map of the Tetilla Peak quadrangle, Santa Fe and Sandoval Counties, New Mexico: U. S. Geological Survey Miscellaneous Field Studies Map MF-2352, scale 1:24,000.

Sawyer, D.A., and Minor, S.A., 2006, Hydrogeologic Framework of the La Bajada Constriction Area, New Mexico - Integration of Subsurface and Surface Geology. U.S. Geological Survey. Chapter G of: The Cerrillos Uplift, the La Bajada Constriction, and Hydrogeologic Framework of the Santo Domingo Basin, Rio Grande Rift, New Mexico.

Spiegel, Z., and Baldwin, B., 1963, Geology and Water Resources of the Santa Fe area, New Mexico: U.S. Geological Survey Water-Supply Paper 1525, 258 p. plus plates.

Spiegel, Z., 1975, Preliminary Report on the Hydrology of the Cienega Area, Santa Fe County, New Mexico: Consultant's report prepared for Santa Fe Downs, Inc., 34 p. plus appendices.

Sun, M., and Baldwin, B., 1958, Volcanic rocks of the Cienega area, Santa Fe County, New Mexico: New Mexico Bureau of Geology and Mineral Resources, Bulletin 54, 80 p., map scale 1:15,840.

Thomas, C.L., Stewart, A.E., and Constantz, J., 2000, Determination of infiltration and percolation rates along a reach of the Santa Fe River near La Bajada, New Mexico: U.S. Geological Survey Water-Resources Investigations Report 00–4141, 65 p.

Wasiolek, M., 1995, Subsurface recharge to the Tesuque aquifer system from selected drainage basins along the western side of the Sangre de Cristo Mountains near Santa Fe, New Mexico: U.S. Geological Survey Water-Resources Investigations Report 94–4072, 57 p.

Appendix A2. Water Level Elevations, NMBGMR's Previously Monitored Wells

				2004-2007			2015			2018			2019			2020			2022		
Point ID	Easting	Northing	Measuring Point Elevation (ft msl)	Date Measured	Depth to Water (ft)	GW Elevation (ft msl)	Date Measured	Depth to Water (ft)	GW Elevation (ft msl)	Date Measured	Depth to Water (ft)	GW Elevation (ft msl)	Date Measured	Depth to Water (ft)	GW Elevation (ft msl)	Date Measured	Depth to Water (ft)	GW Elevation (ft msl)	Date Measured	Depth to Water (ft)	GW Elevation (ft msl)
EB-001	398529	3935208	6,046.55	1/9/2004	48.41	5,998.14	4/14/2015	48.03	5,998.52	4/9/2018	48.03	5,998.52	4/17/2019	48.02	5,998.53	5/19/2020	48.35	5,998.20			
EB-016	406470	3940387	6,428.96	3/24/2004	228.06	6,200.90	2/11/2015	228.04	6,200.92												
EB-019	400304	3935932	6,109.56	3/23/2004	43.34	6,066.22	4/14/2015	44.46	6,065.10	4/10/2018	44.51	6,065.05	4/17/2019	44.42	6,065.14	5/19/2020	44.64	6,064.92			
EB-102	402734	3934466	6,195.57	3/31/2004	60.35	6,135.22	2/18/2015	62.07	6,133.50												
EB-115	405319	3939633	6,356.30	3/14/2006	215.06	6,141.24	2/11/2015	215.77	6,140.53												
EB-132	400609	3936794	6,164.58	2/10/2004	67.56	6,097.02	4/14/2015	68.30	6,096.28	4/10/2018	68.39	6,096.19	4/17/2019	68.37	6,096.21	5/19/2020	68.44	6,096.14	4/4/2022	62.31	6,102.27
EB-171	406350	3944331	6,505.49	3/31/2005	347.26	6,158.23	2/20/2015	344.53	6,160.96												
EB-172	405330	3943594	6,463.66	3/31/2005	305.00	6,158.66				4/11/2018	303.10	6,160.56	4/30/2019	300.22	6,163.44	5/19/2020	300.09	6,163.57			
EB-218	406118	3941215	6,406.07	3/25/2004	264.03	6,142.04	2/11/2015	232.12	6,173.95												
EB-220	403153	3938661	6,263.60	3/18/2004	131.39	6,132.21	2/11/2015	133.15	6,130.45	4/9/2018	132.85	6,130.75	4/17/2019	132.79	6,130.81	5/19/2020	132.86	6,130.74	4/5/2022	132.83	6,130.77
EB-222	404457	3937957	6,263.53	2/11/2004	131.32	6,132.21	2/11/2015	132.10	6,131.43												
EB-223	399840	3938918	6,175.58	2/11/2004	46.31	6,129.27	4/14/2015	45.42	6,130.16	4/9/2018	45.31	6,130.27	4/18/2019	45.32	6,130.26	5/19/2020	45.3	6,130.28			
EB-240	406983	3946736	6,591.72	5/12/2005	435.49	6,156.23	2/17/2015	437.12	6,154.60												
EB-305	400377	3937211	6,076.56	1/9/2004	22.17	6,054.39	4/13/2015	22.78	6,053.78	4/9/2018	22.78	6,053.78	4/17/2019	22.81	6,053.75	5/19/2020	22.98	6,053.58			
EB-306	399537	3937647	6,127.57	2/10/2004	19.40	6,108.17	3/16/2015	18.97	6,108.60	4/9/2018	18.72	6,108.85	4/18/2019	18.74	6,108.83	5/19/2020	18.94	6,108.63	4/5/2022	19.02	6,108.55
EB-308	399358	3938016	6,172.58	2/11/2004	52.54	6,120.04	4/16/2015	52.22	6,120.36	4/9/2018	51.97	6,120.61	4/16/2019	51.95	6,120.63	5/19/2020	51.96	6,120.62			
EB-309	399896	3939990	6,253.60	2/11/2004	106.50	6,147.10	4/16/2015	104.76	6,148.84				4/16/2019	104.48	6,149.12	5/19/2020	104.53	6,149.07			
EB-310	402100	3939571	6,234.60	2/11/2004	38.07	6,196.53	4/16/2015	37.49	6,197.11	4/9/2018	37.27	6,197.33	4/30/2019	37.24	6,197.36	5/19/2020	37.42	6,197.18			
EB-315	400028	3937110	6,110.26	2/10/2004	19.91	6,090.35	4/14/2015	20.47	6,089.79												
EB-321	403986	3938251	6,292.61	2/20/2004	132.89	6,159.72	4/13/2015	132.17	6,160.44	4/10/2018	132.10	6,160.51	4/16/2019	132.02	6,160.59	5/19/2020	132.2	6,160.41			
EB-332	399720	3935678	6,107.56	2/21/2004	30.00	6,077.56	4/14/2015	8.83	6,098.73	4/10/2018	8.75	6,098.81	4/17/2019	8.62	6,098.94	5/19/2020	9	6,098.56			
EB-334	401921	3937456	6,167.58	2/27/2004	38.42	6,129.16	4/13/2015	39.65	6,127.93	4/10/2018	39.63	6,127.95	4/17/2019	39.61	6,127.97	5/19/2020	39.74	6,127.84			
EB-336	403199	3944575	6,357.89	5/14/2004	209.57	6,148.32	3/23/2015	208.83	6,149.06												
EB-337	403199	3944575	6,357.89	5/14/2004	203.87	6,154.02	3/23/2015	201.21	6,156.68												
EB-338	403199	3944575	6,357.89	5/14/2004	185.47	6,172.42	3/23/2015	186.77	6,171.12												
EB-339	403035	3938347	6,240.60	4/29/2004	136.53	6,104.07	4/14/2015	137.72	6,102.88	4/9/2018	137.60	6,103.00				6/2/2020	137.8	6,102.80			
EB-340	399686	3936057	6,105.56	4/29/2004	51.53	6,054.03	4/14/2015	52.41	6,053.15	4/9/2018	52.40	6,053.16	4/16/2019	52.34	6,053.22	5/19/2020	52.52	6,053.04	4/4/2022	52.35	6,053.21
EB-346	407590	3932255	6,371.63	6/3/2004	151.77	6,219.86				5/4/2018	132.37	6,239.26	4/16/2019	132.83	6,238.80						
EB-352	405988	3934482	6,321.62	7/14/2004	138.10	6,183.52	4/13/2015	141.58	6,180.04	5/4/2018	140.76	6,180.86	4/16/2019	141.54	6,180.08						
EB-373	401729	3941231	6,286.61	6/18/2004	127.10	6,159.51	3/16/2015	116.38	6,170.23	4/10/2018	116.30	6,170.31	4/18/2019	116.31	6,170.30	5/19/2020	115.75	6,170.86	4/5/2022	115.62	6,170.99
EB-379	401253	3934512	6,204.59	6/24/2004	101.77	6,102.82	4/13/2015	103.15	6,101.44	4/11/2018	103.33	6,101.26	4/17/2019	103.34	6,101.25	5/19/2020	103.43	6,101.16			
EB-387	403690	3937134	6,254.60	4/12/2007	98.47	6,156.13	4/13/2015	98.95	6,155.65	4/9/2018	98.87	6,155.73	4/16/2019	98.64	6,155.96	5/19/2020	98.59	6,156.01			
EB-388	403442	3937136	6,238.60	4/12/2007	88.95	6,149.65	4/13/2015	88.99	6,149.61	4/9/2018	88.92	6,149.68	4/16/2019	88.81	6,149.79	5/19/2020	88.75	6,149.85			
EB-389	403458	3936959	6,220.59	4/12/2007	107.94	6,112.65	4/13/2015	108.39	6,112.20	4/9/2018	108.31	6,112.28	4/16/2019	108.10	6,112.49	5/19/2020	108.04	6,112.55			
EB-390	404686	3933111	6,301.61	7/1/2004	157.85	6,143.76				4/10/2018	160.70	6,140.91	4/17/2019	160.86	6,140.75	5/19/2020	161	6,140.61	4/5/2022	162.98	6,138.63
EB-392	404853	3938331	6,284.61	7/15/2004	125.21	6,159.40	4/13/2015	125.26	6,159.35	4/9/2018	125.21	6,159.40	4/16/2019	125.23	6,159.38	5/19/2020	125.07	6,159.54			
EB-407	405069	3941697	6,390.64	3/23/2004	217.60	6,173.04	4/14/2015	214.98	6,175.66	4/10/2018	213.57	6,177.07	4/18/2019	213.17	6,177.47	5/19/2020	212.29	6,178.35			
EB-607	405006	3936039	6,347.05	3/28/2006	198.65	6,148.40	3/26/2015	200.18	6,146.87												
EB-661	407765	3939546	6,461.65	8/24/2006	291.45	6,170.20	4/13/2015	292.07	6,169.58	5/4/2018	292.56	6,169.09	4/16/2019	292.53	6,169.12						
EB-662	407765	3939546	6,461.65	8/24/2006	290.70	6,170.95	4/13/2015	290.58	6,171.07	5/4/2018	290.78	6,170.87									
EB-663	407765	3939546	6,461.65	8/24/2006	286.71	6,174.94	4/13/2015	282.67	6,178.98	5/4/2018	280.05	6,181.60									
EB-666	407135	3939493	6,443.65	8/24/2006	231.53	6,212.12	4/13/2015	237.62	6,206.03	5/4/2018	235.21	6,208.44	4/16/2019	244.62	6,199.03						
EB-667	407135	3939493	6,443.65	8/24/2006	246.62	6,197.03	4/13/2015	245.20	6,198.45	5/4/2018	245.55	6,198.10									
EB-691	400249	3937717	6,079.56				3/16/2015	23.21	6,056.35	4/10/2018	23.10	6,056.46	4/17/2019	23.02	6,056.54	5/19/2020	23.53	6,056.03	4/5/2022	23.1	6,056.46
EB-695	403641	3936964	6,228.60				4/13/2015	110.54	6,118.06	4/9/2018	110.43	6,118.17	4/16/2019	110.17	6,118.43	5/19/2020	110.13	6,118.47			
EB-696	403679	3937857	6,233.60	4/12/2007	89.75	6,143.85	4/13/2015	91.55	6,142.05	4/9/2018	91.57	6,142.03	4/16/2019	91.56	6,142.04	5/19/2020	91.47	6,142.13	4/5/2022	91.72	6,141.88
LC-009	399771	3936914	6,064.55				4/14/2015	15.79	6,048.76	4/9/2018	16.07	6,048.48	4/16/2019	14.42	6,050.13	5/19/2020	15.49	6,049.06			
LC-010	399811	3937131	6,027.54				4/14/2015	16.10	6,011.44	4/9/2018	16.05	6,011.49	4/16/2019	16.28	6,011.26	5/19/2020	16.68	6,010.86	4/5/2022	16.59	6,010.95
LC-025	400000	3936280	6,103.56				3/16/2015	7.87	6,095.69	4/9/2018	7.97	6,095.59	4/17/2019	7.90	6,095.66	5/19/2020	9.32	6,094.24	4/4/2022	8.05	6,095.51
LC-026	399995	3936316	6,102.56				3/16/2015	8.02	6,094.54	4/9/2018	6.44	6,096.12	4/17/2019	6.48	6,096.08	5/19/2020	6.66	6,095.90			
LC-027	401705	3937727	6,165.58							4/10/2018	40.57	6,125.01	4/17/2019	40.50	6,125.08	5/19/2020	40.74	6,124.84			
LC-036	400055	3938426	6,128.57				4/14/2015	11.24	6,117.33	4/9/2018	11.44	6,117.13	4/18/2019	11.60	6,116.97	5/19/2020	11.28	6,117.29			
LC-038	401562	3942555	6,325.62							4/9/2018	171.18	6,154.44	4/18/2019	171.93	6,153.69	5/19/2020	171.45	6,154.17			
LC-039	404716	3928667	6,226.59							4/10/2018	137.76	6,088.83	4/17/2019	138.26	6,088.33	5/19/2020	138.6	6,087.99			
LC-040	407004	3944472	6,526.67										4/18/2019	363.94	6,162.73	5/19/2020	363.16	6,163.51			

Coordinates are in NAD 83 UTM 13 N

Appendix B

Parcel Data

DBS&A
a Geo-Logic Company

This appendix is provided electronically on the report flash drive.

Appendix C

Permitted Wells

DBS&A
a Geo-Logic Company

This appendix is provided electronically on the report flash drive.

Appendix D

Project Open House Announcement

DBS&A
a Geo-Logic Company




La Cienega Domestic Well Program Planning Project Introduction and Open House

Date: Wednesday, September 14, 2022

Time: 5:30 to 7:00 p.m.

Location: La Cienega Community Center
136 Camino San Jose, Santa Fe, NM 87507

Purpose:

- Introduce La Cienega Domestic Well Program Planning Project
- Meet the team
- Gather feedback to inform the project's future phases and public outreach methods

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
Earth Science for the 21st Century

DBS&A
Daniel B. Stephens & Associates, Inc.
a Geo-Logic Company

SANTA FE COUNTY SUSTAINABILITY

La Cienega Domestic Well Program Planning
Project Introduction and Open House

Join Us!

You are invited to a La Cienega Domestic Well Program Planning project introduction and open house, to be held from 5:30 to 7:00 p.m. on Wednesday, September 14, 2022 at the La Cienega Community Center (136 Camino San Jose, Santa Fe, NM 87507).

At this open house, Daniel B. Stephens & Associates, Inc. (DBS&A), the New Mexico Bureau of Geology and Mineral Resources (NMBGMR), and staff from the Santa Fe County Sustainability Office will introduce ourselves and the project. Feedback received in response to this event will be used to inform the project's future phases and public outreach methods.

Project Background

Santa Fe County has an existing domestic well management program; however, staff resources and well owner engagement have been limited to date. The objectives of the current project are to understand the area's groundwater levels and trends, identify the existing requirements that apply to different wells in the planning area, estimate current and project future water demand, solicit community member involvement in the project and input on the best methods for obtaining water use data, and develop recommendations for how to improve the existing well management program.

What's Next?

Initial project tasks include preparing a map showing the land parcels and existing wells located within the La Cienega and La Cieneguilla planning area, summarizing the area's hydrogeologic setting, reviewing Santa Fe County ordinance 2002-9 and the 2016 Sustainable Land Development Code (SLDC) to identify which plats their respective requirements apply to, and gathering available water level and metered pumping data for existing domestic wells in the area.

As the domestic well monitoring program is developed and domestic well information are obtained, water demand projections for the planning area will be refined. The County will work with the community to evaluate whether the projections reflect desired future conditions. Depending on the current project's findings, water conservation goals, enforcement of existing requirements, new ordinances, and/or other programs may be recommended.

We hope to see you at this event!

Please contact Amy Ewing with DBS&A (505-822-9400; aewing@geo-logic.com) or Jacqueline Beam with Santa Fe County (505-992-9832; jybeam@santafecountynm.gov) with any questions.

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
Earth Science for the 21st Century

DBS&A
Daniel B. Stephens & Associates, Inc.
a Geo-Logic Company

SANTA FE COUNTY SUSTAINABILITY

Planificación del Programa de Pozos Domésticos la Ciénega Proyecto Introducción y Jornada de Puertas Abiertas

Date: miércoles 14 de septiembre de 2022

Time: 5:30 a 7:00 p.m.

Localidad: el Centro Comunitario La Ciénega
136 Camino San José, Santa Fe, NM 87507

Objetivos:

- Presentarán al proyecto
- Introducción el personal
- Solicitar la participación de los miembros de la comunidad en el proyecto y contribución sobre los mejores métodos

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
Earth Science for the 21st Century

DBS&A
Daniel B. Stephens & Associates, Inc.
a Geo-Logic Company

SANTA FE COUNTY SUSTAINABILITY

Planificación del Programa de Pozos Domésticos la Ciénega
Proyecto Introducción y Jornada de Puertas Abiertas

Únete a nosotros

Usted está invitado a una introducción y jornada de puertas abiertas al proyecto de Planificación del Programa de Pozos Domésticos la Ciénega, que se llevará a cabo de 5:30 a 7:00 p.m. el miércoles 14 de septiembre de 2022 en el Centro Comunitario La Ciénega (136 Camino San José, Santa Fe, NM 87507). En esta jornada de puertas abiertas, Daniel B. Stephens & Associates, Inc. (DBS&A), la Oficina de Geología y Recursos Minerales de Nuevo México (NMBGMR) y el personal de la Oficina de Sostenibilidad del Condado de Santa Fe nos presentarán a nosotros mismos y al proyecto. El comentario recibido en respuesta a este evento se utilizará para informar las fases futuras del proyecto y los métodos del compromiso al la comunidad.

Antecedentes del proyecto

El Condado de Santa Fe tiene un programa nacional de manejo de pozos existente; sin embargo, los recursos de personal y la participación de los propietarios de pozos han sido limitados hasta la fecha. Los objetivos del proyecto actual son comprender los niveles y tendencias de las aguas subterráneas del área, identificar los requisitos existentes que se aplican a los diferentes pozos en el área de planificación, estimar la demanda de agua actual y la del futuro, solicitar la participación de los miembros de la comunidad en el proyecto y contribución sobre los mejores métodos para obtener datos del uso del agua, y desarrollar recomendaciones sobre cómo mejorar el programa de gestión de pozos.

¿Y ahora qué?

Las tareas iniciales del proyecto incluyen la preparación de un mapa que muestre las parcelas de tierra y los pozos existentes ubicados dentro del área de planificación de La Ciénega y La Cieneguilla , el resumen del entorno hidrogeológico del área, la revisión de la ordenanza del Condado de Santa Fe 2002-9 y el Código de Desarrollo Sostenible de la Tierra (SLDC) de 2016 para identificar a qué placas se aplican sus respectivos requisitos, y la recopilación del nivel de agua disponible y los datos de bombeo medido para los pozos domésticos existentes en el área.

A medida que se desarrolle el programa de vigilancia de pozos nacionales y se obtenga información sobre los pozos nacionales, se perfeccionarán las proyecciones de demanda para el área de planificación. El Condado trabajará con la comunidad para evaluar si las proyecciones reflejan las condiciones futuras deseadas. Dependiendo de los hallazgos del proyecto actual, se pueden recomendar objetivos de conservación, cumplimiento de los requisitos existentes, nuevas ordenanzas y / u otros programas.

¡Esperamos verte en este evento!

Comuníquese con Amy Ewing con DBS&A (505-822-9400; aewing@geo-logic.com) o Jacqueline Beam con el condado de Santa Fe (505-992-9832; jybeam@santafecountynm.gov) con cualquier pregunta.

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
Earth Science for the 21st Century

DBS&A
Daniel B. Stephens & Associates, Inc.
a Geo-Logic Company

SANTA FE COUNTY SUSTAINABILITY

Appendix E

Well Survey

DBS&A
a Geo-Logic Company

La Cienega Domestic Well Program Planning Project

Survey

Name: _____

Address: _____

Phone: _____

Email: _____

1. Do you live within the La Cienega and La Cieneguilla community planning area?

2. If so, are there any wells on your property?

3. If yes:
   a. How many?
   b. Are they active/used?
   c. Are they permitted with the New Mexico Office of the State Engineer (and if so, what are the file numbers)?
   d. What are they used for (e.g., irrigation, domestic use)? If domestic use, does the well supply one household or multiple households?
   e. Is the groundwater pumping metered?
   f. Do you collect depth to water measurements?

4. Is your property connected to County water?

5. What are your thoughts on future water use in this area?

6. What are your suggestions for the County's domestic well management program?

7. What is the best way to contact you with domestic well program project updates?

Encuesta del Proyecto de Planificación del Programa de Pozos Domésticos en La Ciénega

Nombre: _____

Dirección: _____

Teléfono: _____

Correo electrónico: _____

1. ¿Vive Usted dentro del área de planificación comunitaria de La Ciénega y La Cieneguilla?

_____

2. Si es así, ¿hay algún pozo en su propiedad?

_____

3. En caso afirmativo,
   a. How many?

   _____

   b. ¿Están activos/utilizados?

   _____

   c. ¿Tienen permisos obtenidos de la Oficina de Ingeniería del Estado de Nuevo México (y si es así, cuáles son los números de archivo)?

   _____

   d. ¿Para qué se utilizan (por ejemplo, riego, uso doméstico)? Si es de uso doméstico, ¿el pozo sirve a un hogar o a varios hogares?

   _____

   e. ¿Se mide el bombeo de agua subterránea?

   _____

   f. ¿Recolectan mediciones de profundidad al agua?

_____

4. ¿Su propiedad está conectada al agua del Condado?

_____

5. ¿Qué opina sobre el uso futuro del agua en esta área?

_____

6. ¿Cuáles son sus sugerencias para el programa nacional de manejo de pozos del Condado?

_____

7. ¿Cuál es la mejor manera de contactarlo con actualizaciones de proyectos de programas de pozos nacionales?

_____

Appendix F

1996 La Cienega Watershed Conditions

DBS&A
a Geo-Logic Company

LA CIENEGA WATERSHED CONDITIONS

1) **CONNECTION TO COUNTY WATER UTILITY** LOT OWNERS, THEIR SUCCESSORS AND ASSIGNEES SHALL AGREE TO CONNECT TO THE COUNTY WATER UTILITY WHEN SERVICE IS AVAILABLE WITHIN 200 FEET OF THE PROPERTY LINE OF THE LAND BEING DIVIDED, WHICH 200 FEET SHALL BE MEASURED ALONG PLATTED EASEMENTS TO THE NEAREST PROPERTY LINE. THE LANDOWNERS, SUCCESSORS, AND ASSIGNEES AGREE NOT OT OPPOSE THE CREATION OF AN IMPROVEMENT DISTRICT PURSUANT TO SECTION 4-55A-1 ET. SEQ. NMSA 1978 (1997 REPL. PAMP.), AS THOSE SECTIONS MAY BE APPROPRIATE. ALTERNATIVELY, THIS CONDITION DOES NOT PRECLUDE ANY OTHER MEANS OF FINANCING THAN THE IMPROVEMENT DISTRICT METHOD. THE LINE EXTENSION WITHIN SAID 200 FEET SHALL BE DONE IN ACCORDANCE WITH THE APPLICABLE RULES AND REGULATIONS AND TARIFFS OF THE SANTA FE COUNTY WATER COMPANY.

2) **ENCOURAGEMENT FOR SHARED WELLS** TO THE GREATEST EXTENT FEASIBLE, LOT OWNERS SHOULD USE SHARED WELLS TO MINIMIZE EXPENSES RELATED TO THE INTERIM WATER SUPPLIES.

3) **DESIGN AND CONSTRUCTION** AT THE TIME A LINE EXTENSION IS MADE PURSUANT TO PARAGRAPH 1 ABOVE. THE DISTRIBUTION SYSTEM WITHIN THE LAND DIVIDED SHALL BE DESIGNED TO MEET THE MINIMUM FIRE FLOW REQUIREMENTS OF THE SANTA FE COUNTY WATER UTILITY, EXCLUSIVE OF ANY RESERVOIR CAPACITY.

4) **DISCONNECTION FROM DOMESTIC WELLS** AT THE TIME THE CONNECTION IS MADE TO THE SANTA FE WATER UTILITY, LOT OWNERS, THEIR HEIRS, SUCCESSORS, AND ASSIGNEES, AGREE TO DISCONNECT ANY DOMESTIC WELLS CREATED UNDER NMSA SECTION 72-12-1 NMSA 1978 (1997 REPL. PAMP.) AND TO DISCONTINUE USE OF SAID WELLS EXCEPT IN EMERGENCY CIRCUMSTANCES.

5) **EASEMENTS** LOT OWNERS SHALL DEDICATE A 15 FOOT WIDE UUTILITY EASEMENT ALONG ALL PROPERTY LINES FOR THE INSTALLATION OF INFRASTRUCTURE AND WATER DISTRIBUTIONLINES FOR THE COUNTY UTILITY SYSTEM.

6) **WELL DESIGN** A GOOD FAITH EFFORT SHALL BE MADE TO DRILL ALL WELLS 50 FEET INTO THE TESUQUE FORMATION AND TO CONNECT A SEAL TO PREVENT MIXING OF WATERS BETWEEN THE TESUQUE AND ANCHA FORMATIONS. A SUGGESTED WELL DESIGN IS AVAILABLE FROM THE COUNTY LAND USE DEPARTMENT.

Appendix G

Existing Santa Fe County Domestic Well Report Form

DBS&A
a Geo-Logic Company

SANTA FE COUNTY
TOTALIZING METER REPORT

Due to the limited nature of water resources in Santa Fe County (SFCo), the vulnerability to depletion by drought, and to provide a sustainable resource for future generations, the Board of County Commissioners adopted SFCo Ordinance 2004-7 to address water conservation for all residential and commercial uses of water within SFCo. Ordinance 2004-7 requires residents of SFCo living or operating businesses on lots where restricted water usage and water meter reporting requirements apply, submit well metering data on an annual basis.

Year-end data must be submitted to SFCo Utilities on or before January 15th immediately following the reporting year.

1. CUSTOMER INFORMATION

Name: _____ Work Phone: _____
Home/Cell Phone: _____
Address: _____
City: _____ State: _____ Zip: _____
Email Address _____

2. WELL INFORMATION (Please attach a copy of your well permit and plat if not previously submitted.)

Office of the State Engineer Well Number: _____
Latitude: _____ Longitude: _____
Use the following link to Google Maps to find Latitude and Longitude by imputing your street address:
http://www.mapcoordinates.net/en

3. TOTALIZING METER INFORMATION

Serial Number: _____ Make: _____
Model: _____ Multiplier: _____
Units: ( ) cubic-feet ( ) gallons

4. METER READINGS Previous reading _____

(Reading of the meter totalizer should be recorded once each month on or near the same date)

Month	Reading Date	Meter Reading	Month	Reading Date	Meter Reading
January			July		
February			August		
March			September		
April			October		
May			November		
June			December		

5. PHOTOGRAPH OF METER

Please Attach

6. CALCULATE USAGE

See back for calculation sheet

7. ADDITIONAL STATEMENTS OR EXPLANATIONS:

(Please include any pertinent information concerning repair of meter, dates out of service, etc.)

_____
_____
_____

Submitted by: _____ Date: _____

Return Form to: Via Regular Mail - Santa Fe County Utilities Department
424 NM Hwy 599 Frontage Road Santa Fe, New Mexico 87507
Electronically - jybeam@santafecountynm.gov

If you have any questions call Jacqueline Beam at: 992-9832

Revision Date: March 8, 2021

Water Use Calculation Worksheet

A. Average Daily Water Use (for use with meter that reads in cubic feet):

1. Meter Readings:

Reading #2 Reading #1

Date: _____ Date: _____ _____ # of days between readings

Odometer Reading: _____ - Odometer Reading: _____ = _____ Cubic feet used

2. Water Use (convert to gallons):

Cubic feet used: _____ x 7.48 gallons

= _____ (Gallons used)

3. Average Daily Water Use:

Gallons used: _____

÷ _____ (# of days between readings)

= _____ (Average gallons per day)

B. Average Daily Water Use (for use with meter that reads in gallons):

1. Meter Readings:

Reading #2 Reading #1

Date: _____ Date: _____ _____ # of days between readings

Odometer Reading: _____ - Odometer Reading: _____ = _____ Gallons used

2. Average Daily Water Use:

Gallons used: _____

÷ _____ (# of days between readings)

= _____ (Average gallons per day)

C. Total Annual Usage

Average gallons per day _____ x 350* = _____ Total gallons/year used

*reduced total number of days to account for 14 day vacation

Revision Date: March 8, 2021

How to Read Your Water Meter

STEP 1: Locate Your Meter

Figure 1

Your water meter is generally located near the curb in front of your home although in some areas it may be inside your home, usually in the basement. Outside meters are typically housed in a concrete box marked "water" (as shown in Figure 1) or in a meter pit with a cast iron lid. Carefully remove the lid by using a tool such as a large screwdriver or pliers and visually examine the area around the meter to make sure there are no harmful insects or other animals.

STEP 2: Read Your Water Meter

Water meters in Santa Fe County (SFCo) measure volume in gallons or cubic feet (one cubic foot = 7.48 gallons and 100 cubic feet = 748 gallons). Water charges are typically based on 100 cubic feet or on 1000 gallon units. There is one type of water meter used throughout SFCo, the digital-reading meter which resembles the meter in Figure 2.

In the meter shown in Figure 2 and 3, the reading is taken directly from the display. The meter reads the total number of gallons of water recorded since the meter was installed. Open lid to expose face of meter in order to read the meter.

Figure 2

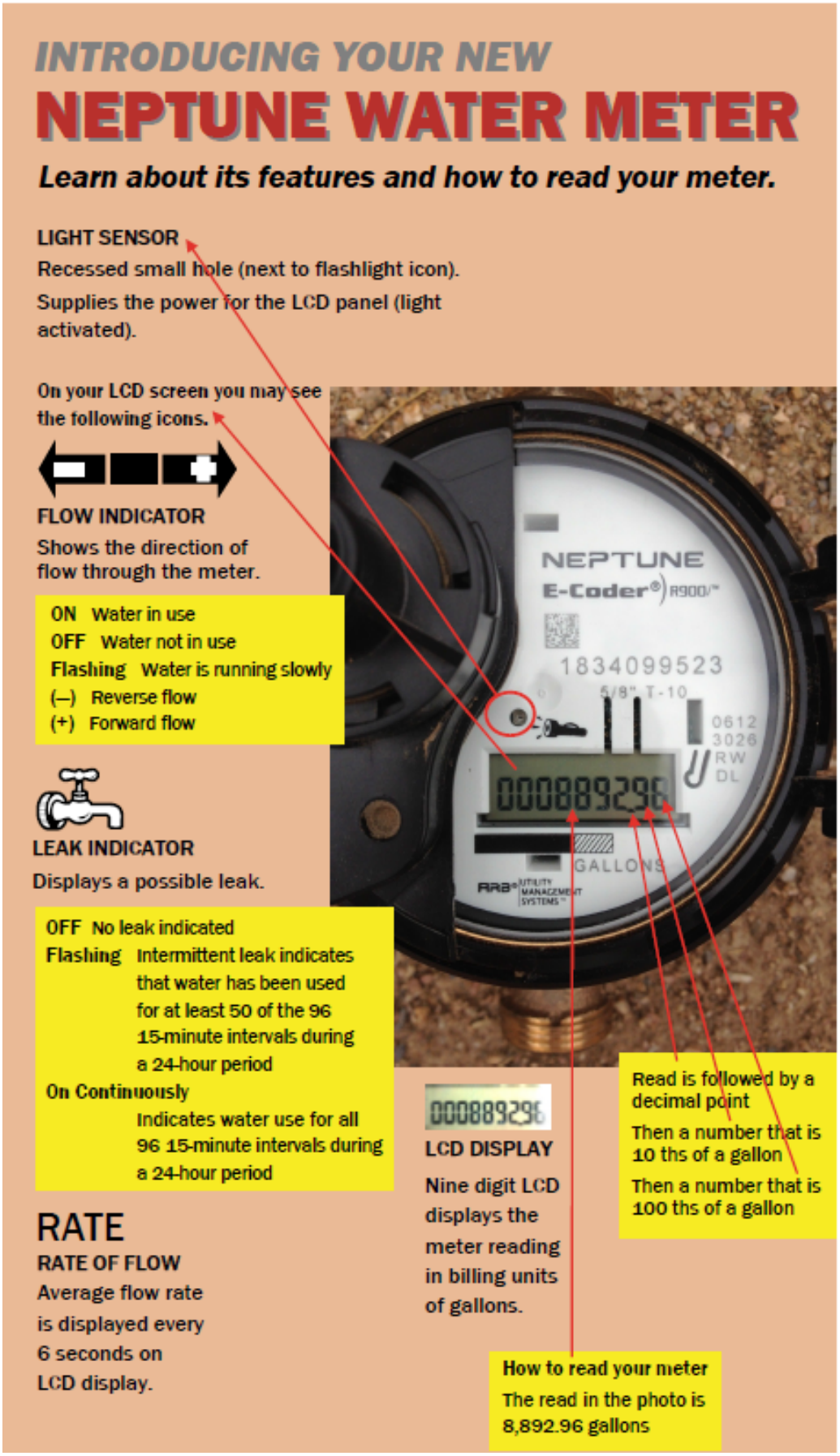


Figure 3

Revision Date: March 8, 2021

Appendix H

Current Water Restriction and Conservation Covenants

DBS&A
a Geo-Logic Company

DECLARATION OF WATER RESTRICTIONS AND CONSERVATION COVENANTS FOR_____ FOR_____

(Section 11, T16N, R 9E)

THIS DECLARATION is made in Santa Fe, New Mexico, this _____ day of _____, 20____ by _____ hereinafter for convenience referred to as the "Owners".

WITNESSED THAT:

WHEREAS _____ are the owners of real property in Santa Fe County, New Mexico, which property includes __ lots containing a combined total of _____ acres, more or less, according to the plat entitled "_____".

WHEREAS, the Owner is required to provide for certain water conserving covenants and measures as required per the Santa Fe County Land Development Code; and

WHEREAS, the Owners desire and intend that the owners, tenants, mortgagees, occupants and other persons hereinafter acquiring any interest in said property shall at all times enjoy the benefits of, and shall hold their interest subject to, the rights and restrictions hereinafter set forth, all of which are declared to be in furtherance of a plan for the proper and beneficial use of the property.

NOW THEREFORE, the Owners declare, covenant, and agree as follows:

ARTICLE I

Property Subject to this Declaration

The real property which is and shall be held, transferred, sold, conveyed and occupied subject to this Declaration is legally described as _____ and containing a combined total of _____ acres, more or less, in **Section 11, Township 16 North, Range 9 East** N.M.P.M., Santa Fe County, New Mexico, according to the Plat of Survey for _____ by _____ N.M.L.S. #_____ dated _____ recorded _____, 20____, under reception No._____ Plat Book _____, Page _____, in the records of Santa Fe County, New Mexico (the "Plat").

ARTICLE II

Water Restrictions and Conservation Covenants

The following water restriction and conservation covenants shall apply to the use and occupancy of all lots on the plat noted above.

General Requirements under the Sustainable Land Development Code, Santa Fe County Ordinance 2015-11 (SLDC) Chapter 7, Section 7.13.11

1 Annual water use for domestic purposes for any new single family residential dwellings shall not exceed 0.25-acre foot per year. Except for water harvested using rainwater catchment systems and gray water, the annual water use for domestic purposes for new residential dwellings constructed on any lot created after the effective date of Ordinance No.2016-9, Santa Fe County Land Development Code (SLDC) shall not exceed 0.25-acre foot per year or such lower amount as may be established in the development order approving the land division.

2. Meters shall be installed on each dwelling unit for any development subject to the Sustainable Land Development Code, Santa Fe County Ordinance No. 2015-11(SLDC). All meters shall be Santa Fe County Approved. The meter shall be read by the property owner annually within the first two weeks of

each calendar year. Meter readings shall be provided to the Administrator no later than April 30 of the same calendar year. SLDC, Chapter 7, Section 7.13.11.5.2

Outdoor/Indoor Conservation
SLDC Chapter, 7, Section 7.13.11.2 and 7.13.11.3

1. Low water use landscaping techniques or xeriscaping shall be utilized for all development. Drip irrigation and landscape mulching shall be provided.

2. Only low water use grasses, shrubs and trees that are appropriate to the New Mexico climate shall be used. Sod or grass seed that contains Kentucky bluegrass is not permitted.

3. Lawns of non-native grasses shall not exceed 800 square feet and shall only be watered with harvested water or grey water.

4. Landscaping may be watered as needed during the first and second years of growth to become established; thereafter landscaping may be watered as is needed to maintain viability.

5. Watering or irrigation shall be provided through a timed drip irrigation system that ensures that landscaping is not watered between the hours of 11 a.m. and 7 p.m. between the months of May and November. Irrigation systems shall be equipped with a rain sensor so that the irrigation system does not operate when it is raining or has recently rained. Such approved systems include but are not limited to evapotranspiration-based controllers. This paragraph does not apply to gardens or agricultural uses.

6. Outdoor watering or irrigation is prohibited between 11 a.m. and 7 p.m. from May to September of each year, except for the following:

   a. Plants being prepared for sale;
   b. Manual watering by landscape maintenance and contracting personnel;
   c. Water derived from rainwater catchment systems or a grey water re-use system; and
   d. Water derived from an acequia or other agricultural irrigation.

7. Vehicle washing is only allowed with the use of a shut-off hose nozzle.

8. An outdoor irrigation system may not be operated if leaking.

9. Water leaks shall be repaired promptly and in no event more than ten (10) days from the beginning of the leak. Proof of repair shall be provided upon request.

10. Water saving fixtures shall be installed in all new construction, remodels and in all remodels and renovations when a fixture is being replaced.

   a. All toilets and flush urinals shall be EPA WaterSense certified or equivalent standard.
   b. All lavatory faucets shall be EPA WaterSense certified or equivalent standard.
   c. All showerheads shall be EPA WaterSense certified or equivalent standard.

11. Water conserving appliances shall be installed in all new construction and in all remodels or renovations when an appliance is being replaced.

   a. Residential dishwashers shall be EPA Energy Star certified or equivalent.
   b. Residential clothes washers shall be EPA Energy Star certified or equivalent.

12. Water conserving fixtures shall be installed in strict accordance with the manufacturer's instructions to maintain their rated performance.

13. Hot water systems shall ensure that hot water is delivered within five seconds of a tap being opened. This requirement can be achieved through the use, either alone or in combination, of the following devices or designs: (i) an on demand circulation system; (ii) a centrally located water heater; (iii) a point-of-use water heater; (iv) short hot water pipe runs; (v) small diameter piping; (vi) "instant hot" hot water fixtures; or (vii) super insulation methods.

14. A certificate of compliance by a licensed mechanical contractor or plumber that new construction meets the requirements of the SLDC shall be provided.

15. Evaporative coolers shall circulate bleed-off water.

16. Greywater recycling, if provided, shall reduce the annual amount of water needed for the use, by the amount of the anticipated greywater recycling.

17. All permanent swimming pools, and any temporary pools with a fill capacity over 3,000 gallons, shall be prohibited in accordance with Section 7.24 of the SLDC.

18. All swimming pools, hot tubs and spas must be covered to prevent evaporation when not in use. Swimming pools may only be emptied once per year.

ARTICLE III

General Provisions

3.1 Duration; Covenants Running with the Land. The covenants of this Declaration shall run with and bind the land, shall inure to the benefit of and be enforceable by the owner of any land subject to this Declaration, their respective legal representatives, heirs, successors and assigns and the County Land Use Administrator.

3.2 Enforcement, SLDC Chapter 7, Section 7.13.11.5. Enforcement of these covenants and restrictions shall be by the County Land Use Administrator. Failure to submit meter readings will result in the same penalties as outlined in the SLDC Chapter 14. When water is used in excess of the amount allocated to the property, the first year a letter with educational/information materials on how to reduce water use will be sent to the water user and they will be required to submit water meter readings every six months to track their progress. All subsequent water usage violations will result in the same penalties as outlined in the SLDC Chapter 14.

3.3 Severability. The invalidity or unenforceability of any covenant, restriction, term or other provision hereof as determined by a court of competent jurisdiction shall not impair or adversely affect the validity or enforceability of any other covenant, restriction, term or provision hereof, which shall be and remain valid and enforceable to the fullest extent permitted by law.

3.4 Miscellaneous. This Declaration shall be governed by and interpreted under the laws of the State of New Mexico. This Declaration shall be binding upon each tract owner, his successors and assigns.

IN WITNESS WHEREOF, the Owners have caused this Declaration to be signed as of the date first above written.

_____ Date

_____ Date

_____ Print Name

_____ Print name

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

On this _____ day of _____, 20____, the foregoing instrument was acknowledged before me by the person(s) whose name(s) appear above.

_____ My commission expires:

APPROVED BY THE SANTA FE COUNTY LAND USE DEPARTMENT

_____
Penny Ellis-Green Date
Santa Fe County Land Use Administrator

Appendix I

Parcels Located within 200 feet of Existing County Water Lines

DBS&A
a Geo-Logic Company

This appendix is provided electronically on the report flash drive.

Appendix J

Development Permit Activity for 2002 through 2022

DBS&A
a Geo-Logic Company

This appendix is provided electronically on the report flash drive.

Appendix K

Development Permit Activity for 1996 through 2001

DBS&A
a Geo-Logic Company

This appendix is provided electronically on the report flash drive.