City of Portales Domestic Water System
Source Water Protection Plan
Public Water System # NM3528522

Prepared for **City of Portales, New Mexico**

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1. Introduction

The New Mexico Environment Department (NMED) Drinking Water Bureau (DWB) assists communities in the protection of their drinking water system through the Source Water Protection Program. By participating in the program, communities can assess a water system to identify and manage actual or potential sources of contamination to the drinking water supply. The program consists of a process that involves identifying the area(s) to be protected, identifying actual and potential contamination sources, and evaluating the susceptibility of the drinking water source area to contamination.

NMED encourages communities to then complete the second step of the planning process of developing and implementing a source water protection plan (SWPP). The plan benefits the public water system by providing management and implementation strategies to ensure the security of the drinking water supply. Preventing contamination is much less expensive and easier than cleaning up a contaminated source or finding a new source.

This SWPP for the City of Portales, New Mexico (the City) has been developed by Daniel B. Stephens & Associates, Inc. (DBS&A) using the *New Mexico Source Water and Wellhead Protection Toolkit* (NMED DWB, 2013). The plan identifies a community planning team that has the responsibility of program development and implementation, thereby providing the community with the tools needed to prevent contamination of the city's source water protection areas.

1.1 Purpose

The purpose of the Source Water Protection Program is to protect drinking water sources before they become contaminated. The SWPP provides the management tool for current and future

approaches to prevent source water contamination, thereby protecting the drinking water system and the health of its customers.

1.2 Source Water Protection Program Background

U.S. Congress amended the Safe Drinking Water Act in 1996 to provide for the assessment and protection of sources of public water supply. The U.S. Environmental Protection Agency (EPA) provides information and encourages partnerships for source water protection planning. States completed source water assessments in 2002 for all public water systems, and are now implementing strategies to help local communities use the information obtained from these assessments. States also may provide resources to help fund local protection activities, such as wellhead protection programs for groundwater and watershed management programs for surface water.

2. Source Water Protection Team

Table 1 lists the members of the source water protection team.

Table 1. Source Water Protection Team

Name	Affiliation	E-mail
Dianne Parker, City Councilor	City of Portales	
Sammy Standefer, City Manager	City of Portales	sstandefer@portalesnm.gov
John DeSha, Public Works Director	City of Portales	jdesha@portalesnm.gov
Matthew Wilson, Utility Superintendent	City of Portales	mwilson@portalesnm.gov
Orlando Ortega, Executive Director	Roosevelt County Community Development Corporation	ortegao@portales.com
Clarence Smith, Director	Roosevelt County Water Co-op	
Joey Martin, Plant Manager	Dairy Farmers of America	
Ted Fares, Director of Physical Plant	Eastern New Mexico University	ted.fares@enmu.edu
Mark Vigil, Owner	Vines/Marks' Restaurant/Sands	
John Bridges, Safety Office	Roosevelt General Hospital	

3. Water System Information

The City of Portales was incorporated in 1906. The City's location in eastern New Mexico is shown on Figure 1. The water system dates back to 1913, with most of it built in the 1930s and 1940s. The water system serving the center of the City is 60 to 70 years old. Water line pipe materials vary from cast iron to polyvinyl chloride (PVC) to asbestos cement pipe. The water system is shown on Figure 2.

The City obtains most of its water supply from the Blackwater Well Field, with additional supply provided from the smaller and older Sandhill Well Field. The City purchased the Blackwater Farm and adjacent Las Lomas properties in 2001 and retired agriculture in those areas to expand the Blackwater Well Field and create a groundwater reserve (Wilson, 2013).

Historically, wells were located in town and were constructed in a perched aquifer. Later, the City developed the Sandhill Well Field, and subsequently the Blackwater Well Field. The City has three 3 million-gallon tanks plus an elevated tank that is not currently being used. Water is conveyed through approximately 39 miles of transmission lines from the well fields to the tanks and is distributed from the tanks to the customers through approximately 105 miles of 6-inch to 36-inch waterlines.

During the winter of 2015, the combined pumping capacity of active Blackwater production wells was 3,680 gpm. The 2014 *Water Conservation and Use Report* (Wilson, 2014) estimated that the 2013 water service area population was 12,648 in the City, 3,888 people in the surrounding rural areas, and 5,855 students at Eastern New Mexico University (ENMU), for a total of 22,391. The average annual growth rate since year 2000 has been approximately 2 percent. The total annual average daily water use in 2000 was 3.9 million gallons per day (mgd), decreasing to 3.0 mgd in 2013 due to conservation measures.

The City water system has 5,705 water connections plus approximately 100 meters in manual billing for a total of 5,805, per the City of Portales Billing Department (2016). The total benefiting population in 2014 was estimated as 23,891, which included 14,529 in the City service area, 4,024 in the Roosevelt County Water Co-op service area, and 5,338 at ENMU.

Declining groundwater levels and reductions in the saturated thickness of the aquifer mean that the Portales water supply is dwindling. Portales has pursued an aggressive program of conservation and is implementing treated wastewater effluent reuse for irrigation. However, even with these measures, action is needed to supplement existing supplies in order to continue to meet local demands.

4. Hydrogeology

4.1 Regional Hydrogeology

In the New Mexico Bureau of Geology and Mineral Resources (NMBGMR) recently published Open-File Report 580 (Rawlings, 2016), a detailed discussion of hydrogeology of the region states:

> In Curry and Roosevelt counties, irrigated agriculture is a major basis of the regional economy. Virtually all of the water used for agricultural, commercial, municipal, and domestic purposes in the two-county area is groundwater withdrawn from the High Plains Aquifer within the Miocene- to early Pliocene-age (~20 to ~5 million years old) Ogallala Formation. Regionally, groundwater flows east and southeast, except where flow is diverted into northwest-southeast trending groundwater troughs. These coincide with paleochannels eroded into bedrock at the base of the Ogallala Formation. Very low water table gradients result in slow groundwater flow velocities and long travel times. Based on the depth to water, some of the large playas appear to be sites of groundwater discharge. The maximum depth to water of greater than 450 ft occurs north of Clovis. The depth to bedrock and the ground surface elevation are the main regional controls on the depth to water.

Groundwater for the City of Portales is primarily extracted from the Ogallala regional aquifer, which underlies eastern New Mexico and extends into portions of Texas, Oklahoma, Kansas, Colorado, Nebraska, and South Dakota. The Ogallala aquifer consists primarily of alluvial and aeolian sediments. Sediments range in size from clay to cobble-sized gravel and are variably cemented by calcium carbonate and silica (Rawlings, 2016).

Water in the Ogallala is recharged at a much slower rate than current consumption and is considered a non-renewable resource. The Ogallala aquifer at Portales is experiencing

decreasing water levels and reduced saturated thickness as water is pumped at a much faster rate than it is being recharged. Between 2000 and 2015, average aquifer saturated thickness decreased from about 80 feet to 36 feet in the Blackwater Well Field (Wilson, 2015e). U.S. Geological Survey (USGS) historical water level measurements from just outside the Blackwater Well Field can go back over 50 years, and show a steady increase in depth to water since at least the early to mid 1940s.

Selected figures from a recent hydrogeologic study for eastern New Mexico are provided in Appendix A.

4.2 Water Sources

The City of Portales relies solely on the Ogallala aquifer for its water supply as pumped from well fields of the area. The Sandhill Well Field is currently inactive. The majority of water for the City now comes from the Blackwater Well Field (DBS&A, 2015).

4.2.1 Source Water Quality

Water extracted from the Portales water system currently meets quality standards set by the Safe Drinking Water Act. Between 2011 and 2013, total dissolved solids (TDS) concentrations measured in the Blackwater Well Field ranged from about 305 to 425 milligrams per liter (mg/L), with one outlying measurement of 3,280 mg/L. Specific conductance ranged from about 439 to 630 micromhos per centimeter (µmhos/cm). Aquifer sensitivity maps prepared for NMED by Lee Wilson and Associates (1989) classify the Ogallala aquifer underlying Portales as a highly sensitive aquifer based on its shallow depth to water and low TDS (NMED, 2016). No coliform detections have occurred since December 2012 (NMED DWW, 2014a and 2015).

Water sample data for all of the wells within the City of Portales water system were gathered from the NMED Drinking Water Watch reports (NMED DWW, 2014a and 2015) and compared to the U.S. EPA maximum contaminant levels (MCLs) where applicable (Appendix B). The data gathered cover the years 1994 through 2011 as available for the wells. Data were not available for all of the wells over the entire time range. Data for one USGS well are also included in Appendix B. Fluoride was detected in 2004 at one well (BW #4) at a concentration of 4.62 parts per million (ppm), above the MCL. No other wells showed background levels of contaminants

above the MCL, including nitrate, a potential contaminant from area dairy farms, or arsenic, a contaminant that is known to be naturally occurring in the region. Chloride and TDS were detected in some of the wells, but have no MCLs.

4.2.2 Measured Water Levels, Production Rates, and Well Pump Tests

According to 2014 data, depth to static water in the winter at the Blackwater Well Field averages 151.89 feet; pumping drawdown for winter of 2014 averaged 18.7 feet (Wilson, 2014). The production rate for winter of 2014 averaged 137 gallons per minute (gpm). 2014 well data from Wilson (2014) are provided in Appendix B.

Measurements taken in winter of 2015 at the Blackwater Well Field show an average depth to water of 152.85 feet and average pumping drawdown of 15.2 feet. The production rate for winter of 2015 was 108 gpm (Wilson, 2015e). Winter 2015 well data from Wilson (2015e) are provided in Appendix B. Wilson (2015e) notes:

> The 2015 specific capacity values for some wells were unrealistically high and the overall average of 19.7 gpm/foot may be in error. The production pumping rate ranged from 20 gpm at BW-23 to a healthy 284 gpm at BW-42 and averaged 108 gpm. However, a comparison with 2014 data shows BW-42 at 368 gpm and an overall average of 137 gpm.

Wilson (2015e) also summarizes the City's total 2014 well field pumping as follows:

> The City's total wellfield pumping in 2014, including exports to Roosevelt County Coop, was approximately 1,125 million gallons, or about 25 million gallons more than in 2013. This increase occurred despite the City's water conservation efforts and was primarily due to an increase of 70 million gallons in unmetered use and industrial water demands that more than offset the decrease of 48 million gallons in water use by City residents and Eastern New Mexico University (ENMU). The substantial reductions in water demand by City residents (29 million gallons) and ENMU (19 million gallons) are testimony to the success of the water conservation measures implemented by these customers and they are to be congratulated. The 43 million gallon increase in industrial water use, while high, represents both beneficial use and Water Utility Department revenue gains while most of the remaining 27 million gallon increase in unmetered use is from non-beneficial water losses. The non-beneficial use increase can be attributed to proper and accurate metering of wellfield pumping and major breaks in the City's aging water

mains. The increase in the industrial use is due to the replacement of some industrial meters. In the past, the City estimated production by hours run time and billing. The more accurate metering reduced underestimates of the City's actual groundwater pumping. As a result of those underestimates the City's wellfield pumping and unmetered water losses were actually greater than had been previously thought. The combination of underestimates and water main breaks led to a significant increase in unmetered and unaccounted-for water use within the City's water utility service area because unmetered use is calculated as the difference between total pumping and total metered use (Wilson, 2014). The extent to which improved metering played a role in this increase is not known but if it was significant, large water losses in Portales' distribution system may have been ongoing and undetected for years.

Pump test data are not available at this time.

5. City of Portales Water Production

The average annual growth rate of the Portales water service area since 2000 has been approximately 2 percent. While the population has grown steadily, the City has implemented water conservation measures, and the overall water consumption has declined. Total annual average daily water use in 2000 was 3.9 mgd, decreasing to 3.0 mgd in 2013. This decline is equivalent to a reduction from 232 gallons per capita per day (gpcd) in 2000 to 135 gpcd in 2013. The most effective water conservation measures include enhancing public education and awareness and increasing water rates. Other measures include seasonal watering restrictions, inverted block water rates, a free water use survey program, low water use landscaping regulations, and reducing unaccounted for water losses. The City's wastewater reuse program can also be considered a conservation measure because it results in a beneficial reduction in well field demand (Wilson, 2014). Figure 3 of the draft preliminary engineering report (PER) (DBS&A, 2015) shows the historical (through 2013) and projected service area population and corresponding water use. Population projections are based on 2 percent growth per year; water use projections are based on a 1 percent reduction in per capita use per year. This figure is provided in Appendix C, along with Figure 9 from the PER, which shows supply projections for the Blackwater Well Field.

6. Water Supply Changes and Impacts

6.1 Historical Change and Impacts

As discussed in previous sections, the Ogallala aquifer at Portales is experiencing decreasing water levels and reduced saturated thickness as water is pumped at a much faster rate than it is being recharged (Wilson, 2015e; DBS&A, 2015). The impact of the decreasing water levels and production rates has serious consequences for the future of the City if measures are not taken to address the issue.

On a regional level, groundwater flows east and southeast, except where flow is diverted into northwest-southeast trending groundwater troughs (Rawling, 2016). Groundwater flow direction at a local level is directly influenced by groundwater pumping, much of which occurs north of Portales within the Portales Valley, where pumping occurs for agricultural purposes. This is an issue of concern due to dairy farms in the region, some of which are in close proximity to the Blackwater Well Field. These dairies are regularly monitored for nitrate, chloride, and TDS, and most have had background levels of contaminants that exceed the state water quality standard at one or more monitor wells (Wilson, 2015a, 2015b, 2015c, 2015d). Groundwater flow direction has been away from the Blackwater Well Field in the area of the closest dairies, but future changes to pumping in the Portales Valley have the potential to shift the groundwater flow direction. Continued annual groundwater monitoring of the area dairy farms is therefore needed.

No data showing historical changes in water chemistry or microbiological detections were encountered during data gathering for this SWPP. Water chemistry on a regional level is discussed in the NMBGMR report (Rawlings, 2016) as follows:

> Water chemistry shows regional differences, with homogeneous chemistry north of the Portales Valley, and great variety to the south. Processes affecting water chemistry may include dissolution of solutes in the soil and unsaturated zone, evapotranspiration of recharge water prior to infiltration, reaction with aquifer materials during groundwater flow, and mixing with water derived from bedrock units beneath the Ogallala Formation. Evaluating the relative importance of

these processes is difficult, and they probably vary spatially. There have not been large changes in groundwater chemistry since the 1950s.

6.2 Need For Future Water Sources

A long-term regional solution to water supply shortages in eastern New Mexico is being developed to address the aquifer depletion not only for the City of Portales, but for the region as a whole. This project, the Eastern New Mexico Rural Water System (ENMRWS) project, will deliver water from Ute Reservoir to a number of communities, including Portales, through a 151-mile pipeline. This project represents a long-term solution to the City's water supply problems; however, the project will not meet the immediate needs or future projected demands by itself. In addition, the City must develop a contingency plan to ensure that current and future water demands can be met. The City is therefore evaluating alternatives for meeting water supply needs for the next 20 years (DBS&A, 2015). The preferred alternative would include (1) rehabilitation of existing wells and drilling new wells, as well as expanding the well fields, (2) storage of treated effluent during seasonal low-demand months and recovery of that water during high-demand times using aquifer storage and recovery (ASR), and (3) continuation and expansion of the City's conservation program (DBS&A, 2015).

7. Source Water Protection Area

The Source Water Protection Area was defined by outlining the area of the Blackwater and Sandhill Well Fields, expanding the outline by 1 mile, and identifying wells located in the City to also establish a 1-mile radius around the wells. This defined area meets the criteria of the NMED DWB guidance for establishing an area to evaluate for potential sources of contamination (PSOCs). DBS&A requested and received geographical information system (GIS) data used in NMED DWB's Source Water Protection Atlas (NMED DWB, 2016a), an interactive mapping tool that contains active and inactive drinking water sources, regulated sites, and other information. These GIS data were used to generate a map showing the City's source water protection area and PSOCs (Figure 3). The information included in the Source Water Protection Atlas does not include all potential sources of contamination. Appendix D provides a comprehensive list of PSOCs with highlighted categories signifying the sources that are not included in the Source Water Protection Atlas.

8. Assessment of Potential Contamination Sources

As described in Section 7, PSOCs were identified within the protection area as potential threats to the water supply. Natural and human sources of contamination were then identified and evaluated for their proximity to supply wells in the City's water system.

As part of development of a regional SWPP, the NMBGMR conducted a technical review of existing hydrogeology studies in Curry and Roosevelt Counties in east-central New Mexico (Rawlings, 2016). Several wells were tested for groundwater quality, and groundwater levels were examined to provide up-to-date information on the availability of groundwater in the region (Rawlings, 2016). The results of that study are incorporated in this section.

8.1 Natural Sources of Contamination

There are no major natural sources of contamination present within the Portales water system. There are no uranium or other mines in the region (NMED, 2016). Water quality sample results indicate that the area just north of the City has the simplest water chemistry (calcium-bicarbonate) of the region north and south of the valley, with sample results among the lowest in TDS (Rawlings, 2016). As stated in the report:

> These waters appear to have undergone the smallest amount of water-rock interaction, probably only with the $CaCO_3$ caliche layer and/or carbonate cements at the top of and within the Ogallala Formation. However, their chemical characteristics, shallow source (both well total depths = 120 ft), and occurrence adjacent to the sand dunes of the Portales Valley are consistent with relatively young water that has undergone little water-rock interaction compared to the other samples.

The trend beyond to the north is for greater proportions of chloride plus sulfate, with relatively little change in major cations (Rawlings, 2016). In general, waters from the thickest sections of Ogallala Formation throughout the High Plains Aquifer are commonly of mixed cation-bicarbonate type. Waters south of the Portales Valley are typically found in areas where the Ogallala Formation saturation is very thin (less than 30 feet) and/or discontinuous, or where the formation is absent (Rawlings, 2016). Sample results in this area trended toward higher levels

of sulfate, sodium, chloride, and magnesium. High arsenic levels can result from dissolution or leaching of silicic volcanic rocks that may be present as clasts in the sand and gravel beds of the Ogallala Formation. Elevated levels of arsenic were found more commonly in the region south of Portales Valley, outside of the Portales water system (Rawlings, 2016).

8.2 Human Sources of Contamination

The primary sources of potential contamination to the source water system are regional dairy farms. The area of Portales and the Blackwater Well Field contain numerous dairy farm operations, although most are more than 1 mile from any well in the system. There are two dairy farms within 1 mile of the Blackwater Well Field system: the Greenfield Dairy (northwest of the Blackwater Well Field) and the Crosswinds Dairy (north of the Blackwater Well Field). Other dairy farms appear to be farther than 1 mile from any well in the Portales water system. Several investigations of the nearest dairy operations, including the Crosswinds and Greenfield Dairies, have been conducted for the City of Portales (Wilson, 2015a and 2015b). Two other dairies (Red Roof and Sunridge) (Wilson, 2015c and 2015d) were investigated; these dairies are more than 1 mile from the Blackwater Well Field, but are included in this evaluation. Each of the four dairies studied undergoes groundwater sampling on a quarterly basis as part of permit requirements issued by the NMED. Groundwater monitoring is problematic for the dairies, primarily due to the rapidly declining water table. Many wells have gone dry and could not be sampled during regularly scheduled monitoring. Much of the assessment of potential threat to the water supply from these dairies is based on the direction of groundwater flow. Regional groundwater flow direction is based primarily on pumping of water for crop irrigation, and could change in the future depending on the continuation of pumping. This could prove to be a critical factor in the evaluation of contaminants found at the regional dairies and their potential impact to the Portales water supply. Therefore, the conclusions of this evaluation may change in the future; annual monitoring is recommended.

8.2.1 Red Roof Dairy (NMED Discharge Permit 963 [DP-963])

This dairy is located northeast of Portales on the north side of NM 202 in the southern half of Section 6 T01S R36E. The dairy is approximately 1 mile northwest of two of the City's Blackwater municipal supply wells (Wilson, 2015c). The Red Roof Dairy was originally constructed as Ryan Dairy in spring of 1995, beginning discharge in the same year. The dairy

ended operations in 2012 (Wilson, 2015c). As part of the 2007 wastewater permit renewal requirements of the NMED, installation of a second lined effluent lagoon was completed in 2008. Monitor wells for the dairy show that groundwater flow is generally to the northeast, away from the Blackwater Well Field. The rapidly declining water table in the area has complicated groundwater measurements, but NMED-required groundwater monitoring at the dairy since 1995 shows that detected nitrate concentrations have been equal to or greater than the state standard of 10 mg/L in two of six wells on several occasions (Wilson, 2015c). The concerns over nitrate surges at the dairy have been alleviated by the cessation of operations in 2012 and the subsequent drop in nitrate detections. This combined with the groundwater flow to the northeast, away from the Blackwater Well Field, makes this site a low potential threat to the water supply. However, future levels of pumping could alter the groundwater flow direction, therefore requiring a reassessment of the potential for contamination of the City's water system.

8.2.2 Greenfield Dairy (DP-1286)

This dairy is located northeast of Portales on the north side of NM 202 in the western half of Section 4 and the eastern half of Section 5, T01S R36E. The dairy is across the road from the City's Blackwater Well Field and is approximately ½ mile north of two of the City's Blackwater wells, BW-20 and BW-22, in Section 9, T01S R36E. The Greenfield Dairy was originally constructed as Jorde Dairy 1 in 2000, beginning wastewater discharge in the same year. During the most recent permit renewal process, the dairy, in response to the NMED review, stated that the dairy facility was "vacant" and no longer in operation as of 2012 (Wilson, 2015b). Monitor wells for the dairy show that groundwater flow is generally to the northeast, away from the Blackwater Well Field. Groundwater monitoring results at the dairy (through 2012) showed a progressive increase in the levels of nitrogen and chloride that exceeded the state water quality standards (Wilson, 2015b). The northeast directional groundwater flow is dictated by groundwater pumping of the Portales Valley to the north for agricultural purposes. As long as the flow direction remains to the northeast, away from the well field, the Greenfield Dairy site is not a major potential threat to the water supply; however, future levels of pumping could alter the groundwater flow direction, therefore requiring a reassessment of the potential for contamination of the City's water system.

8.2.3 Crosswinds Dairy (DP-1251)

This dairy is located northeast of Portales on the north and south sides of NM 202, approximately 8 miles east of the junction with US 70. The dairy originally occupied 320 acres in the northern half of Section 12, T01S R36E, and is approximately ½ mile north of Blackwater wells BW-13, BW-14, and BW-18. These are among the City's best producing wells. Crosswinds Dairy was originally constructed as Stanley R. and Valerie Jones Dairy in 1999, beginning wastewater discharge in the same year. The dairy is currently in operation and undergoes quarterly groundwater sampling. The groundwater flow direction was initially thought to be to the southeast, but was subsequently determined to be to the northeast (Wilson, 2015a). The most recent groundwater monitoring results (2014) show that one of the wells had elevated nitrate levels; however, detected concentrations of all indicator constituents in all other wells have remained below the state water quality standards since June 2006 (Wilson, 2015a). As long as the flow direction remains to the northeast, away from the well field, Crosswinds Dairy is not a major potential threat to the water supply; however, future levels of pumping could alter the groundwater flow direction, therefore requiring a reassessment of the potential for contamination of the City's water system.

8.2.4 Sunridge Dairy (DP-1517)

This dairy is located at 1299 South Roosevelt County Road 4 in Sections 26 and 27 of T1S R35E, about 4 miles east of Portales. The dairy is also about 3 miles west of Blackwater Well Field in T1S R36E, Sections 20, 21, 28, and 29. Sunridge Dairy was constructed in 2008, beginning wastewater discharge in early 2009. The dairy is currently in operation and undergoes quarterly groundwater sampling. The groundwater flow direction is variable, but generally to the south/southwest (Wilson, 2015d). The most recent groundwater monitoring results (2014) showed elevated nitrate levels in one well and elevated nitrate and chloride levels in two other wells. Groundwater flow direction is to the southwest, away from the Blackwater Well Field; however, groundwater flow directions can change over time due to changes in pumping patterns in neighboring wells. Depending on any change to future groundwater flow direction, a reassessment of the potential threat to the City's water system may be necessary.

Other sites are centered within the City limits within 1 mile of two wells that are currently inactive. The sites consist of two leaking underground storage tank (LUST) sites, Brownfields sites, and numerous underground storage tank (UST) sites. The LUST sites are (1) the

Portales Chevron, 321 W 2nd St.; status as of 2005 is Cleanup, Responsible Party, and (2) Gas Card, 100 Chicago; status is Investigation, Responsible Party. These sites are all regulated or, if a release is known, responsible parties have been identified. Depending on the site status, these sites are considered to have a low potential threat to the City's water supply.

Table 2 summarizes the findings of this PSOC evaluation.

Table 2. Potential Sources of Contamination

Description of PSOC	Distance from Well or Well Field	Vulnerability Risk
Red Roof Dairy	1 mile northwest of the Blackwater Well Field	Moderate
Greenfield Dairy	½ mile north of the Blackwater Well Field	Moderate
Crosswinds Dairy	½ mile north of the Blackwater Well Field	Moderate
Sunridge Dairy	3 miles west of the Blackwater Well Field	Moderate
Gas Card #1281 (LUST)	1 mile north of City well 62222012	Low
Portales Chevron (LUST)	½ mile southeast of City well 62222001	Low
Portales Inn (Brownfields)	¾ mile north of City well 62222001	Low
ENMU - DeBaca Hall (Brownfields)	0.9 mile northwest of City well 62222001	Low
Chavez Hall (Brownfields)	¾ mile west/northwest of City well 62222001	Low
Lincoln Hall (Brownfields)	¾ mile west of City well 62222001	Low
C and S Credit Card (UST)	¾ mile southeast of City well 62222001	Low
Portales Butane (UST)	¼ mile south of City well 62222001	Low
Super Save Discount Food (UST)	0.15 mile south of City well 62222001	Low
Stripes (UST)	0.1 mile north of City well 62222001	Low
Allsup's (UST)	½ mile west of City well 62222001	Low
Allsup's N08 (UST)	0.6 mile southwest of City well 62222001	Low
Taco Box Shell (UST)	0.7 mile southwest of City well 62222001	Low
Allsup's No. 127 (UST)	0.3 mile north of City well 62222001	Low
Diesel Express (UST)	0.9 mile north of City well 62222001	Low

9. Source Water Monitoring Plan

The City of Portales currently conducts water monitoring at the entry points of the system. Water quality sampling and analysis are conducted as new wells come online. The City samples at entry points to the public water system for heavy metals, radionuclides, synthetic

organic contaminants (SOCs), volatile organic compounds (VOCs), cyanide, fluoride, nitrates, and nitrites. Appendix E provides the sampling schedule as shown on the NMED Drinking Water Watch website (NMED DWW, 2014b). The well field is monitored daily for well operations and maintenance issues. The capacity of each well is monitored monthly. On an annual basis, a 24-hour drawdown test and specific capacity are conducted. A monthly measurement of production is kept in gallons per month in a dedicated file in the field and in the office.

The goal of the City is to continue to automate the well field by putting all flow meters onto the automatic meter reading (AMR) system and to upgrade the supervisory control and data acquisition (SCADA) system.

10. PSOC Monitoring and Control Plan

The City of Portales will continue to review the monitoring data from federal, state, and local regulatory agencies for the area dairy farms that are within the Source Water Protection Area. Other sites that either have permits or are being cleaned up and that are within the Source Water Protection Area will also continue to be reviewed on an annual basis.

The City of Portales Source Water Protection Team will participate in regulatory meetings and hearings on facilities within the Protection Area as necessary.

The City of Portales will conduct periodic field surveys and update map of PSOCs on an annual basis.

11. Conclusions

The largest looming threat to the City of Portales water system is the currently declining water supply. The City of Portales has taken many steps to address this issue; however, it will continue to be an issue until the region at a whole can decrease water use and other projects can be implemented (i.e., the ENMRWS project). Another threat to the water supply is posed by the potential for groundwater contamination from area dairy farms. If groundwater pumping patterns change, especially in the Portales Valley where pumping occurs for agricultural use,

there is a potential for a shift in the groundwater flow direction. Groundwater flow direction in the area of dairy farms near the Blackwater Well Field is currently such that contamination at the farms is not a threat; however, if the flow direction shifts in the future, there is a potential that documented contaminants could move toward the City's water supply. The wells within Blackwater Well Field will continue to be monitored for PSOCs including nitrates, total Kjeldahl nitrogen (TKN), chloride, and TDS.

No additional major threats were determined. Sites including Brownfields and LUST sites are located within the City of Portales; however, these sites are being regulated and the majority of the wells within the City are inactive. The inactive wells in the system will be reevaluated, and a determination will be made as to whether or not the wells should be plugged and abandoned.

This SWPP and the incorporated plans will serve to develop plans of action for continued monitoring and updates to address the two major threats to the water source.

The Source Water Protection Team should meet annually, at a minimum to identify the following:

- Changes in the water system
- Changes in the water source(s)
- Changes to the PSOC map, and corresponding protective measures that should be taken

The Team should update the City's Emergency Response Plan to incorporate emergency measures related to the Portales water system, using guidance provided by the NMED DWB from their toolkit of resources (NMED DWB, 2016b) and the EPA (U.S. EPA, 2004), as appropriate.

The Team should update the City of Portales water conservation plan to review and assess existing programs and policies. The plan should be updated on an annual basis.

The Team should build on the existing public outreach that the City has conducted and create a Public Outreach and Education Plan with a schedule for implementation.

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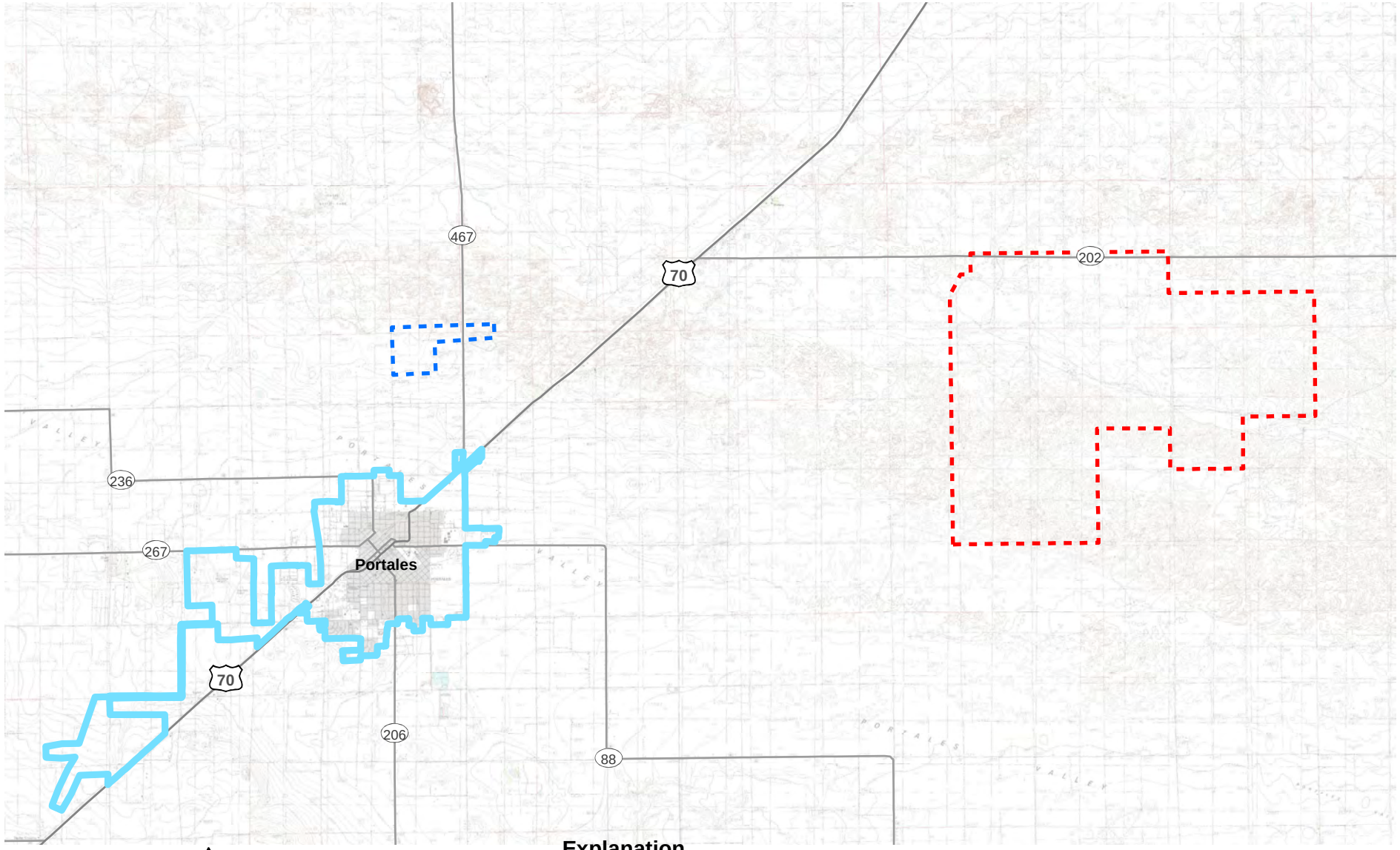
Figures

S:\PROJECTS\NM15.0090_NMED_DWB_CAP_DEV\GIS\PORTALES\MXDS\FIGURES\FIG01_VICINITY.MXD



Explanation

- Road
- Water service area
- Blackwater Well Field
- Sandhill Well Field

N

0 1 2 Miles

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3/25/2016

JN NM15.0090

CITY OF PORTALES
SOURCE WATER PROTECTION PLAN

Vicinity Map

Figure 1

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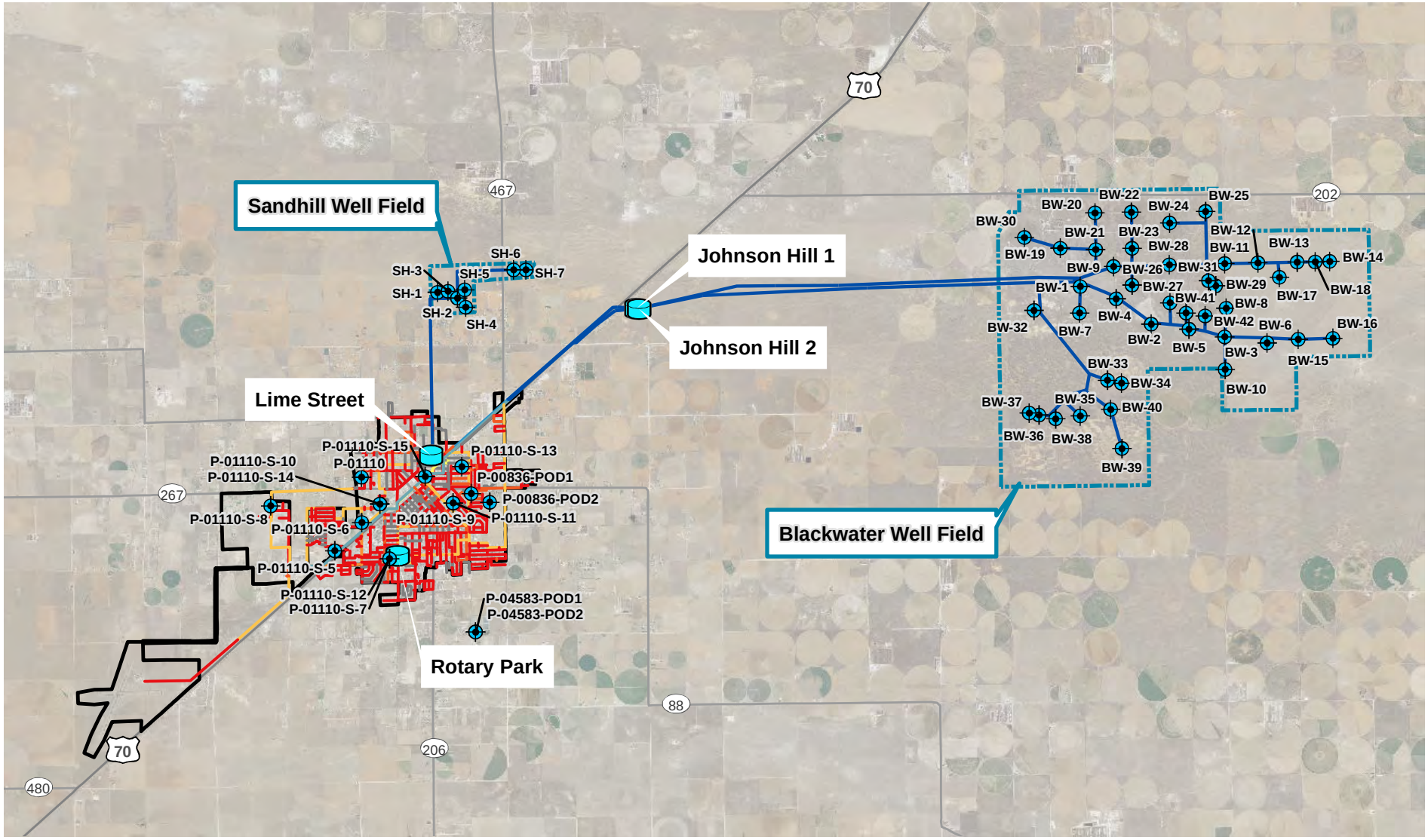


Source: City of Portales

N

0 1 2 Miles

Explanation

- City of Portales well
- Water tank
- Transmission line

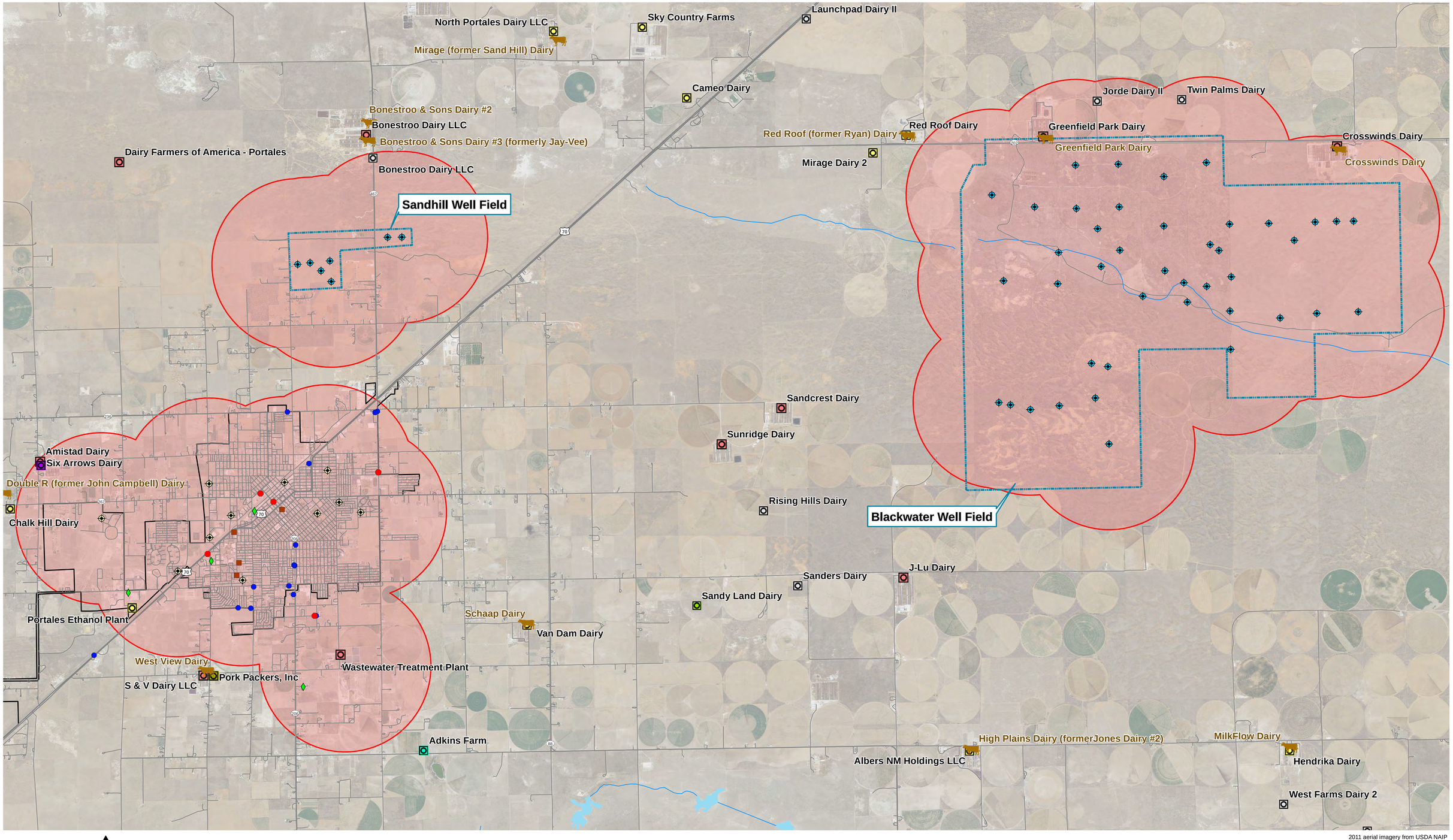
Water pipeline Diameter (in)

- 6
- 8
- 10
- 12
- 16
- 18
- 22
- 24
- 36

CITY OF PORTALES
SOURCE WATER PROTECTION PLAN
Portales Water System

Daniel B. Stephens & Associates, Inc.
3/25/2016 JN NM15.0027

Figure 2



2011 aerial imagery from USDA NAIP

N

0 0.5 1 Miles

Explanation

- City of Portales well
- City of Portales well (inactive)
- City of Portales
- Source water protection area

Source Water Protection Atlas

- Animal feeding operation
- AST facility
- Brownfield
- Underground storage tank facility
- Leaking underground storage tank site

Groundwater permit (status)

- Active
- Ceased
- Combined with DP-514
- DP Pending
- Inactive
- Terminated
- Withdrawn

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JN NM15.0027

CITY OF PORTALES

SOURCE WATER PROTECTION PLAN

Potential Sources of Contamination

Figure 3

S:\PROJECTS\NM15.0090_NMED_DWB_CAP_DEV\GIS\PORTALES\MXDS\FIGURES\FIG03_POTENTIAL_CONTAM_SOURCES.MXD

Appendix A

Hydrogeologic Maps

III. REGIONAL GEOLOGY

The study area of Curry and Roosevelt counties lies within the Southern High Plains subdivision of the Great Plains physiographic province (Figures 1 and 2). The Portales Valley, an abandoned channel of the ancestral Pecos River (Pazzaglia and Hawley, 2004), bisects the study area into two disconnected, gently east-southeast sloping upland surfaces, together referred to as the Llano Estacado. Surface drainage development is almost nonexistent on these surfaces other than Running Water Draw and Frio Draw north of Clovis. However, shallow surface depressions (playas) are ubiquitous and often fill with ephemeral lakes after rainfall (Osterkamp and Wood, 1987; Wood and Osterkamp, 1987; Gustavson et al., 1995).

Within the study area, the High Plains Aquifer occurs within the Miocene to early Pliocene-age (~20 to ~5 million years old) Ogallala Formation and overlying unconsolidated sandy and silty Quaternary (<1.8 million years old) deposits that are hydraulically connected to the Ogallala Formation (Cronin, 1969; Hart and McAda, 1985) (Figure 3). Hart and McAda (1985) identified regions where the High Plains Aquifer is not saturated, or the saturation is discontinuous. The Ogallala Formation is a vertically and laterally complex rock unit consisting of pebble- to cobble-gravel, sand, silt, and clay that is variably cemented by calcium carbonate and silica. Gravel clasts are composed of quartz and quartzite, chert, igneous and metamorphic rocks, and lesser limestone and abraded fossils. Cemented gravels forming conglomerate are common at the base of the unit (Bureau of Economic Geology, 1974; Bureau of Economic Geology, 1978). Sandy, pisolitic calcium carbonate soil, or caliche, is abundant at the top of the unit and may be up to several meters thick.

In Curry County the Ogallala is not exposed except along the valley flanks of Frio and Running Water Draws, and along

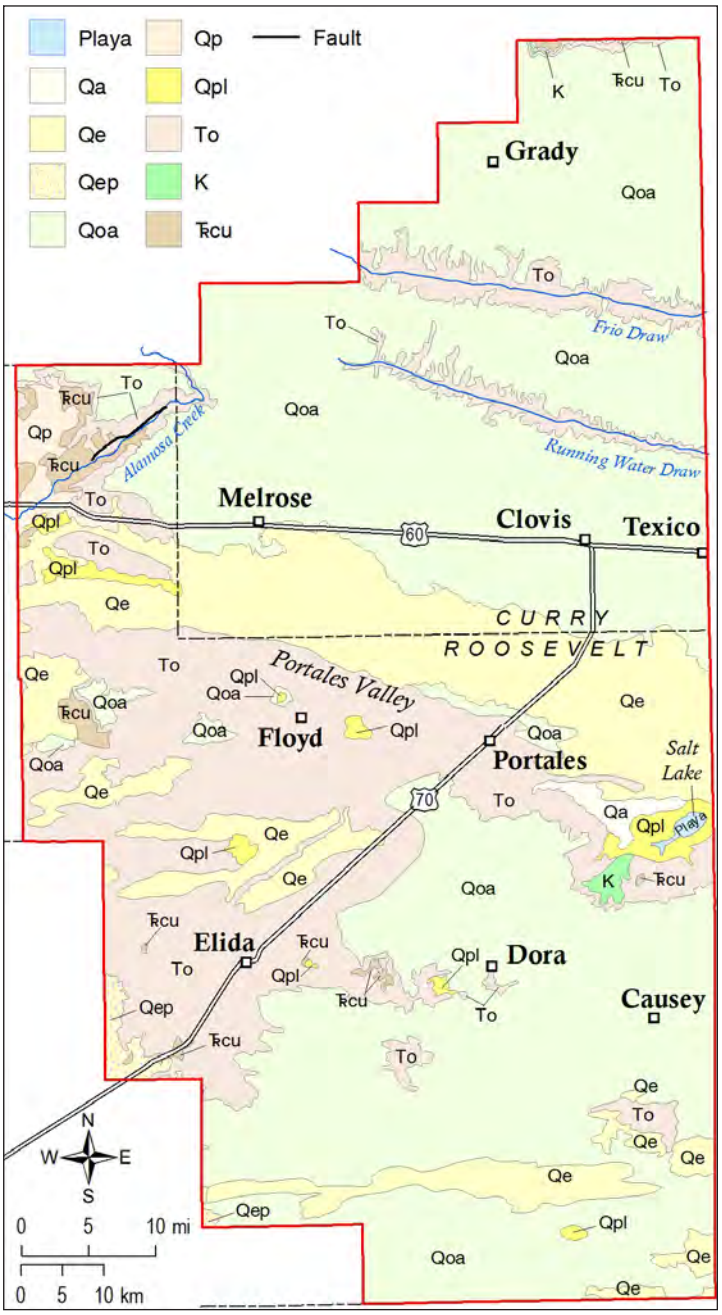


Figure 3. Geology of the study area from New Mexico Bureau of Geology and Mineral Resources (2003). Units: Qa = Quaternary alluvium; Qe = Quaternary dunes and sand sheets; Qep = Quaternary eolian and piedmont deposits, undivided; Qoa = Quaternary older alluvium; Qp = Quaternary pediment deposits; Qpl = Quaternary playa deposits; To = Miocene/Pliocene Ogallala Formation; K = Cretaceous rocks, undivided; Ŧcu = Triassic Chinle Group, undivided.

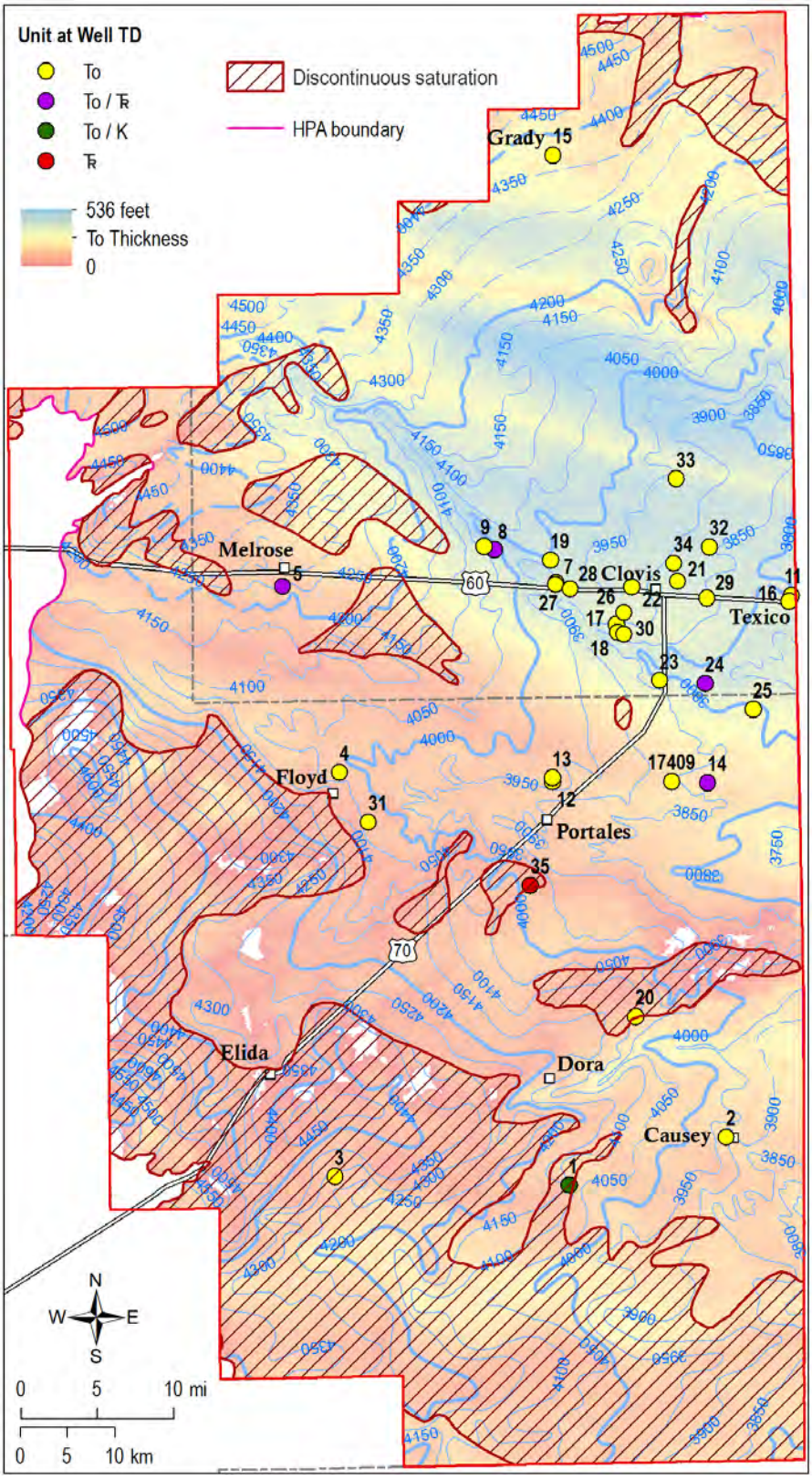


Figure 4. Elevation of the bedrock surface at the base of the Ogallala Formation (blue contours, elevations in feet above mean sea level) and thickness of the Ogallala Formation (color scale). Boundary of the High Plains Aquifer (HPA) and areas of discontinuous saturation (disc. saturation) in the Ogallala Formation (diagonals) in this and subsequent figures from Hart and McAda (1985). Wells from which water samples were collected for this study are shown with ID number (minus "CP-" prefix, see Table 2) and colors indicating geologic unit at base of well, as follows: To = Ogallala Formation; To/Ŧ = Ogallala Formation or Triassic rocks; To/K = Ogallala Formation or Cretaceous rocks; Ŧ = Triassic rocks.

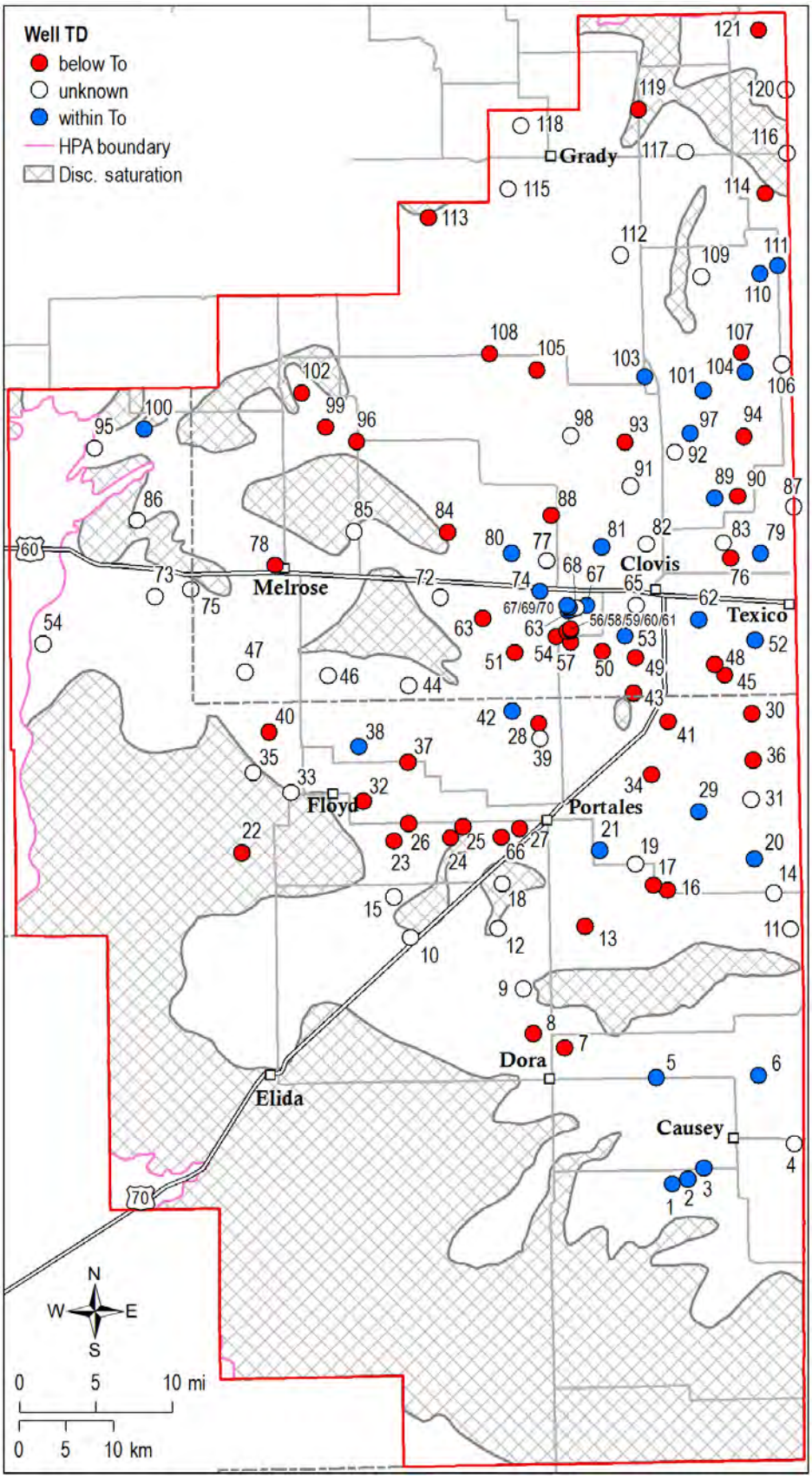


Figure 6. Wells with water levels used by Tillery (2008) and in this study. ID numbers correspond to Table 1. Wells are color-coded for the elevation of the bottom of the well relative to the base of the Ogallala Formation (To).

appeared to be computational artifacts not supported by data were removed. Finally, the contours were edited by hand along the western and southern boundaries of the study area to match the general trend of the contours of Tillery (2008). The kriging results in these areas predicted large changes in water levels that are unsupported by data. These edited contours are shown in a different color in Figure 8. The edited, smoothed contours of the water level surface were then clipped to the extent of the saturated regions of the High Plains Aquifer as defined by Hart and McAda (1985), and a water level surface raster was generated from them using the ArcGIS command Topo to Raster. Although kriging is an exact interpolator, it is conservative to estimate cumulative errors in the 2010–2015 surface comparable to those of the 2004–2007 surface of Tillery (2008), on the order of a few feet to a few tens of feet.

Changes water levels since 2004–2007 were calculated as the difference of the two water level surfaces for the two time periods, and as the difference of actual measurements at the wells. The former approach was preferred, and presented here, as it produced smoother patterns of water level change and is believed to give a better picture of regional patterns of water level change based on the limited data. Errors introduced during contouring water level surfaces result in water level changes derived from them usually being slightly different from values derived from subtraction of the actual measurements at the wells, in most cases by less than a few feet (Table 1).

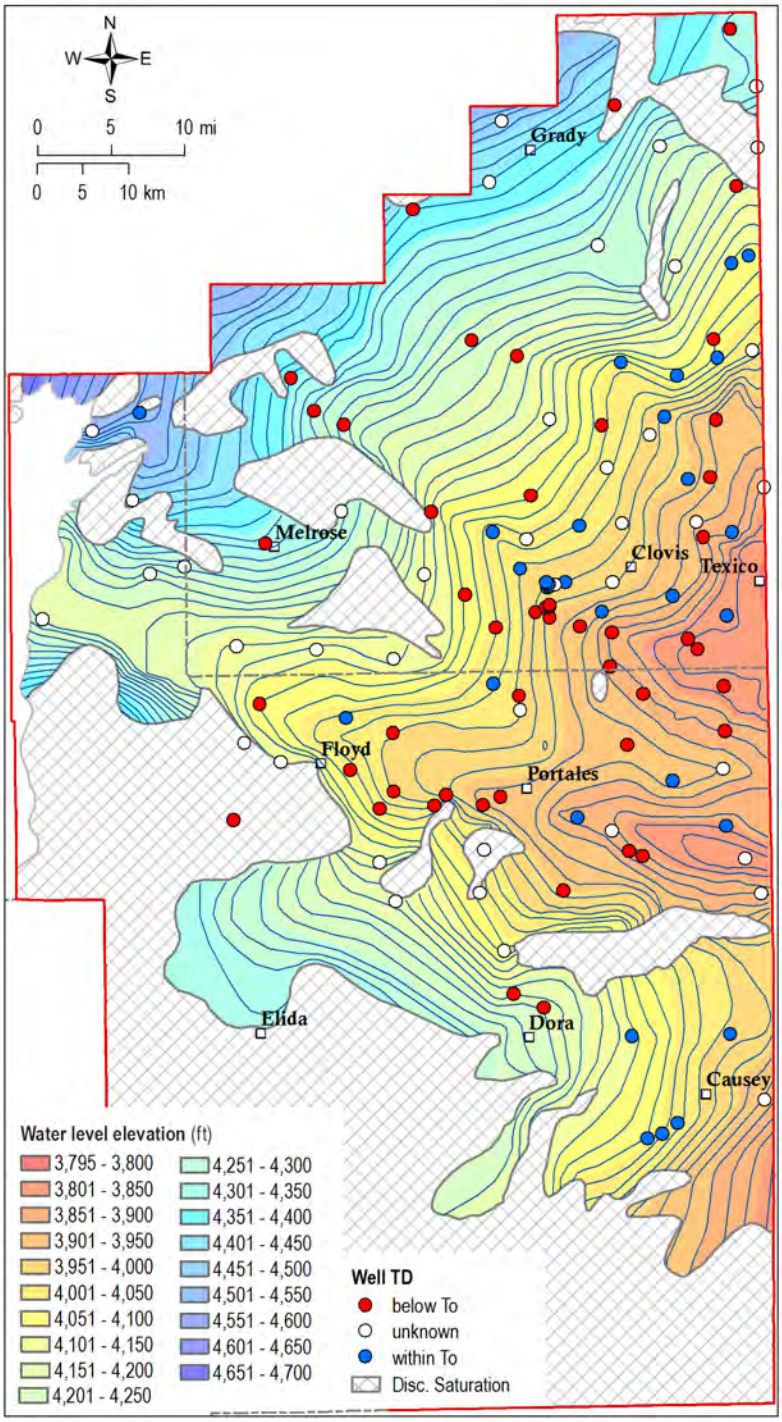


Figure 7. Water level elevation contours and surface from Tillery (2008) for the time period 2004–2007. Contour interval is 20 ft. Wells are color-coded for the elevation of the bottom of the well relative to the base of the Ogallala Formation (To).

The elevation of the bedrock surface at the base of the Ogallala Formation (Figure 4) was subtracted from the composite 2004–2007 and 2010–2015 water level elevation surfaces to yield the saturated thickness of the High Plains Aquifer for these two composite time periods. Errors in the bedrock surface elevation may be up to ±25 feet based on the 50 ft contour interval (Hart and McAda, 1985; Tillery, 2008). The saturated thickness is simply that portion of the Ogallala Formation that is saturated with groundwater. Derivative calculations based on the water-level data involved addition, subtraction, or multiplication of rasters and/or constants. Additional details of derivative calculations are described in the results section where appropriate.

Appendix B

Water Quality and Aquifer Characteristics

Analyte	Unit	MCL	BLACKWATER #1 05-10-1994	BLACKWATER #1 05-15-1995	BLACKWATER #2 05-10-1994	BLACKWATER #2 05-15-1995	BLACKWATER #2A 03-24-2003	BLACKWATER #3 05-10-1994	BLACKWATER #3 05-15-1995	BLACKWATER #4 05-10-1994	BLACKWATER #4 05-15-1995	BLACKWATER #4 06-29-2004	BLACKWATER #5 05-10-1994
Calcium	mg/L	-					37.3						
Magnesium	mg/L	-					22.8						
Sodium	mg/L	-					27.1						
Potassium	mg/L	-					5.2						
Chloride	mg/L	-					6.3						
Sulfate	mg/L	-	43		32		49	40		45			48
Alkalinity, bicarbonate	mg/L	-					233						
Fluoride	mg/L	4	3.1		3.8		3.44	3.7		2.9		**4.62**	3.3
Nitrate	mg/L as N	10											
Arsenic	mg/L	0.01	0.004		0.007		6e-06			0.006			0.005
Uranium, combined	mg/L	0.03											
Conductivity (at 25°C)	umho/cm	-					518						
TDS	mg/L	-											

Source: NMED DDW, 2014 and 2015

*mg/L as $CaCO_3$

Analyte	Unit	MCL	BLACKWATER #5 05-15-1995	BLACKWATER #6 05-10-1994	BLACKWATER #7 05-10-1994	BLACKWATER #8 05-10-1994	BLACKWATER #9 05-10-1994	BLACKWATER #10 09-14-1994	BLACKWATER #10 02-14-1995	BLACKWATER #11 09-14-1994	BLACKWATER #12 09-14-1994	BLACKWATER #13 02-26-1996	BLACKWATER #14 09-14-1998
Calcium	mg/L	-											
Magnesium	mg/L	-											
Sodium	mg/L	-											
Potassium	mg/L	-											
Chloride	mg/L	-											
Sulfate	mg/L	-		59	50	34	25		60	27	27	27	32
Alkalinity, bicarbonate	mg/L	-											
Fluoride	mg/L	4		3	3.3	3.2	2.5		3.9	2.96	2.7	2.4	2.58
Nitrate	mg/L as N	10											
Arsenic	mg/L	0.01		0.007	0.005	0.008	0.007	0.0156	0.004		0.015	0.009	0.0062
Uranium, combined	mg/L	0.03											
Conductivity (at 25°C)	umho/cm	-											
TDS	mg/L	-											

Source: NMED DDW, 2014 and 2015

*mg/L as $CaCO_3$

Analyte	Unit	MCL	BLACKWATER #15 04-13-1998	BLACKWATER #16 04-13-1998	BLACKWATER #17 04-14-2003	BLACKWATER #18 04-14-2003	BLACKWATER #19 11-29-2006	BLACKWATER #19 08-15-2007	BLACKWATER #20 11-28-2006	BLACKWATER #20 08-15-2007	BLACKWATER #21 11-28-2006	BLACKWATER #21 08-15-2007
Calcium	mg/L	-			34.9	33.3						
Magnesium	mg/L	-			20.7	21						
Sodium	mg/L	-			33.6	21.8						
Potassium	mg/L	-			4.7	4.4						
Chloride	mg/L	-			9.8	9.2						
Sulfate	mg/L	-	65	24	55	31						
Alkalinity, bicarbonate	mg/L	-			237.3	230						
Fluoride	mg/L	4	3.1	2.8	2.87	2.48	2.53		1.71		2.72	
Nitrate	mg/L as N	10					4.55		5.71		5.92	
Arsenic	mg/L	0.01	0.006	0.0063	0.0077	0.0073	0.00615		0.00651		0.00639	
Uranium, combined	mg/L	0.03						0.00626		0.00546		0.00546
Conductivity (at 25°C)	umho/cm	-			504	439						
TDS	mg/L	-										

Source: NMED DDW, 2014 and 2015

*mg/L as $CaCO_3$

Analyte	Unit	MCL	BLACKWATER #22 11-28-2006	BLACKWATER #22 08-15-2007	BLACKWATER #23 11-28-2006	BLACKWATER #23 08-15-2007	BLACKWATER #24 06-14-2011	BLACKWATER #25 06-14-2011	BLACKWATER #26 06-14-2011	BLACKWATER #27 06-14-2011	BLACKWATER #28 06-14-2011	BLACKWATER #29 09-26-2011
Calcium	mg/L	-					36	37	37	40	41	49
Magnesium	mg/L	-					26	27	24	25	26	32
Sodium	mg/L	-					23	25	24	31	27	37
Potassium	mg/L	-					5.1	5.5	5.4	5.5	5.4	6
Chloride	mg/L	-					13	11	8.8	9.2	12	10
Sulfate	mg/L	-					30	37	42	51	39	46
Alkalinity, bicarbonate	mg/L	-										
Fluoride	mg/L	4	1.75		2.06							
Nitrate	mg/L as N	10	7.07		2.97							
Arsenic	mg/L	0.01	0.00699		0.00675							
Uranium, combined	mg/L	0.03		0.00429		0.00435						
Conductivity (at 25°C)	umho/cm	-					500	500	480	510	510	530
TDS	mg/L	-					317	319	305	330	3280	353

Source: NMED DDW, 2014 and 2015

*mg/L as $CaCO_3$

Analyte	Unit	MCL	BLACKWATER #30 09-26-2011	BLACKWATER #31 09-26-2011	BLACKWATER #32 09-26-2011	BLACKWATER #41 09-11-2012	BLACKWATER #42 09-11-2012	USGS (341349103083401) 2/19/2015
Calcium	mg/L	-	36	50	11			34.1
Magnesium	mg/L	-	23	30	3.3			25.5
Sodium	mg/L	-	34	40	64			40.6
Potassium	mg/L	-	5.5	6.2	1.7			6.57
Chloride	mg/L	-	19	8.3	16	10	11	11.9
Sulfate	mg/L	-	86	50	94	56	56	35.7
Alkalinity, bicarbonate	mg/L	-						189*, 229
Fluoride	mg/L	4						2.59
Nitrate	mg/L as N	10						3.27
Arsenic	mg/L	0.01						7.4
Uranium, combined	mg/L	0.03						0.00425
Conductivity (at 25°C)	umho/cm	-	630	490	630			475
TDS	mg/L	-	423	326	425	355	355	315 - 331

Source: NMED DDW, 2014 and 2015

*mg/L as $CaCO_3$

Table 7. Estimated Winter 2014 Aquifer Characteristics in the City of Portales Blackwater Wells

Well Number	(1) Depth to Static Water in Winter 2014[1] (ft)	(2) Depth to Top of Redbeds[4] (ft)	(3) = (2) – (1) Total Saturated Thickness in Winter 2014 (ft)	(4) Pumping Drawdown in Winter 2014[1] (ft)	(5) = (4) / (3) Ratio of Pumping Drawdown to Saturated Thickness	(6) Production Pumping Rate in Winter 2014[1] (gpm)	(7) = (6) / (4) Specific Capacity of Well in Winter 2014 (gpm/ft)	(8) = (3) – (4) – 5 ft Unutilized Saturated Thickness Remaining in Winter 2014[2] (ft)
BW-1[3]	Out of Service	170	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-2	135.03	172	37.0	26.3	0.71	173	6.6	5.7
BW-3	146.75	190	43.3	12.8	0.30	52	4.1	25.5
BW-4	142.77	180	37.2	In Repair	In Repair	In Repair	In Repair	In Repair
BW-5	158.59	198	39.4	22.5	0.57	Bad meter	Bad meter	11.9
BW-6	141.72	198	56.3	27.0	0.48	105	3.9	24.3
BW-7	162.84	205	42.2	In Repair	In Repair	In Repair	In Repair	In Repair
BW-8	165.93	205	39.1	15.9	0.41	100	6.3	18.2
BW-9	153.71	179	25.3	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-10	154.53	202	47.5	20.8	0.44	20	1.0	21.6
BW-11	165.76	196	30.2	25.4	0.84	85	3.3	-0.2
BW-12	167.98	195	27.0	15.3	0.57	53	3.5	6.7
BW-13	179.81	223	43.2	33.8	0.78	140	4.1	4.4
BW-14	176.77	212	35.2	In Repair	In Repair	In Repair	In Repair	In Repair
BW-15	134.84	200	65.2	In Repair	In Repair	In Repair	In Repair	In Repair
BW-16	133.52	200	66.5	29.3	0.44	160	5.5	32.2
BW-17	172.26	211	38.7	21.7	0.56	160	7.4	12.1
BW-18	168.98	210	41.0	In Repair	In Repair	In Repair	In Repair	In Repair
BW-19	154.57	172	17.4	7.8	0.45	98	12.6	4.7
BW-20	163.04	180	17.0	9.0	0.53	41	4.6	3.0
BW-21	152.01	170	18.0	In Repair	In Repair	In Repair	In Repair	In Repair
BW-22	167.33	190	22.7	2.9	0.13	Bad meter	No Data	14.7
BW-23	158.70	182	23.3	15.0	0.64	20	1.3	3.3
BW-24	168.52	185	16.5	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-25	178.51	200	21.5	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-26	162.67	180	17.3	6.0	0.35	194	32.1	6.3
BW-27	147.42	185	37.6	10.1	0.27	288	28.5	22.5
BW-28	166.35	199	32.7	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-29	172.15	206	33.9	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-30	146.62	179	32.4	0.0	0.00	In Repair	In Repair	27.4
BW-31	171.06	190	18.9	2.5	0.13	26	10.6	11.5

Table 7. Estimated Winter 2014 Aquifer Characteristics in the City of Portales Blackwater Wells (Continued)

Well Number	(1) Depth to Static Water in Winter 2014[1] (ft)	(2) Depth to Top of Redbeds[4] (ft)	(3) = (2) – (1) Total Saturated Thickness in Winter 2014 (ft)	(4) Pumping Drawdown in Winter 2014[1] (ft)	(5) = (4) / (3) Ratio of Pumping Drawdown to Saturated Thickness	(6) Production Pumping Rate in Winter 2014[1] (gpm)	(7) = (6) / (4) Specific Capacity of Well in Winter 2014 (gpm/ft)	(8) = (3) – (4) – 5 ft Unutilized Saturated Thickness Remaining in Winter 2014[2] (ft)
BW-32	127.30	170	42.7	28.2	0.66	255	9.0	9.5
BW-33	137.90	No Data	No Data	33.2	No Data	110	3.3	No Data
BW-34	137.41	168	30.6	31.4	1.03	128	4.1	-5.8
BW-35	125.42	170	44.6	18.7	0.42	185	9.9	20.9
BW-36	121.05	168	47.0	13.0	0.28	115	8.9	29.0
BW-37	124.99	165	40.0	38.1	0.95	172	4.5	-3.1
BW-38	130.78	197	66.2	19.3	0.29	220	11.4	41.9
BW-39	131.07	178	46.9	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-40	132.72	No Data	No Data	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-41	136.52	175	38.5	21.1	0.55	148	7.0	12.4
BW-42	151.48	200	48.5	17.1	0.35	368	21.6	26.5
BW-43								
BW-44								
BW-45								
2014 Total						3416		
2014 Average	151.89	189	36.6	18.7	0.49	137	8.6	14.3

Note: Blank cells indicate no data.
1. Information from City of Portales well logs and monitoring data. Water levels and production pumping rates were measured in January 2014.
2. Residual saturated zone thickness during pumping taken as 5 feet.
3. Well BW-1 was taken out of service in 2004.
4. Depth to top of redbeds estimated based on total well depth for BW-31 (193 ft), BW-34 (170 ft), BW-38 (200 ft), and BW-39 (180 ft). No driller's logs are available for these wells.

Table 10. Estimated Winter 2015 Aquifer Characteristics in the City of Portales Blackwater Wells

Well Number	(1) Depth to Static Water in Winter 2015[1] (ft)	(2) Depth to Top of Redbeds[4] (ft)	(3) = (2) – (1) Total Saturated Thickness in Winter 2015 (ft)	(4) Pumping Drawdown in Winter 2015[1] (ft)	(5) = (4) / (3) Ratio of Pumping Drawdown to Saturated Thickness	(6) Production Pumping Rate in Winter 2015[1] (gpm)	(7) = (6) / (4) Specific Capacity of Well in Winter 2015 (gpm/ft)	(8) = (3) – (4) – 5 ft Unutilized Saturated Thickness Remaining in Winter 2015[2] (ft)
BW-1[3]	Out of Service	170	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-2	137.75	172	34.3	5.1	0.15	133	26.3	24.2
BW-3	141.91	190	48.1	In Repair	In Repair	82	In Repair	In Repair
BW-4	145.45	180	34.6	0.7	0.02	70	94.6	28.8
BW-5	163.48	198	34.5	1.5	0.04	128	86.5	28.0
BW-6	142.54	198	55.5	27.0	0.49	90	3.3	23.5
BW-7	No Data	205	No Data	No Data	No Data	120	No Data	No Data
BW-8	166.86	205	38.1	14.2	0.37	100	7.0	18.9
BW-9	152.90	179	26.1	Out of Service	Out of Service	Pumps Air	Out of Service	Out of Service
BW-10	154.07	202	47.9	19.3	0.40	50	2.6	23.7
BW-11	166.24	196	29.8	Data Questioned	Data Questioned	108	Data Questioned	Data Questioned
BW-12	167.76	195	27.2	13.3	0.49	40	3.0	8.9
BW-13	180.69	223	42.3	31.5	0.74	145	4.6	5.8
BW-14	176.97	212	35.0	No Data	No Data	No Data	No Data	No Data
BW-15	141.03	200	59.0	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-16	130.49	200	69.5	31.1	0.45	82	2.6	33.4
BW-17	177.18	211	33.8	18.0	0.53	165	9.2	10.8
BW-18	167.27	210	42.7	No Data	No Data	135	No Data	No Data
BW-19	154.38	172	17.6	Data Questioned	Data Questioned	30	Data Questioned	Data Questioned
BW-20	No Data	180	In Repair	In Repair	In Repair	42	In Repair	In Repair
BW-21	152.38	170	17.6	8.2	0.47	21	2.6	4.4
BW-22	167.22	190	22.8	In Repair	In Repair	30	In Repair	In Repair
BW-23	158.35	182	23.7	No Data	No Data	20	No Data	No Data
BW-24	168.15	185	16.9	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-25	179.47	200	20.5	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-26	160.45	180	19.6	5.5	0.28	180	32.7	9.1
BW-27	150.55	185	34.5	4.6	0.13	170	36.6	24.8
BW-28	168.23	199	30.8	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-29	173.25	206	32.8	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-30	146.11	179	32.9	2.0	0.06	52	25.6	25.9
BW-31	172.31	190	17.7	No Data	No Data	42	No Data	No Data

Table 10. Estimated Winter 2015 Aquifer Characteristics in the City of Portales Blackwater Wells (Continued)

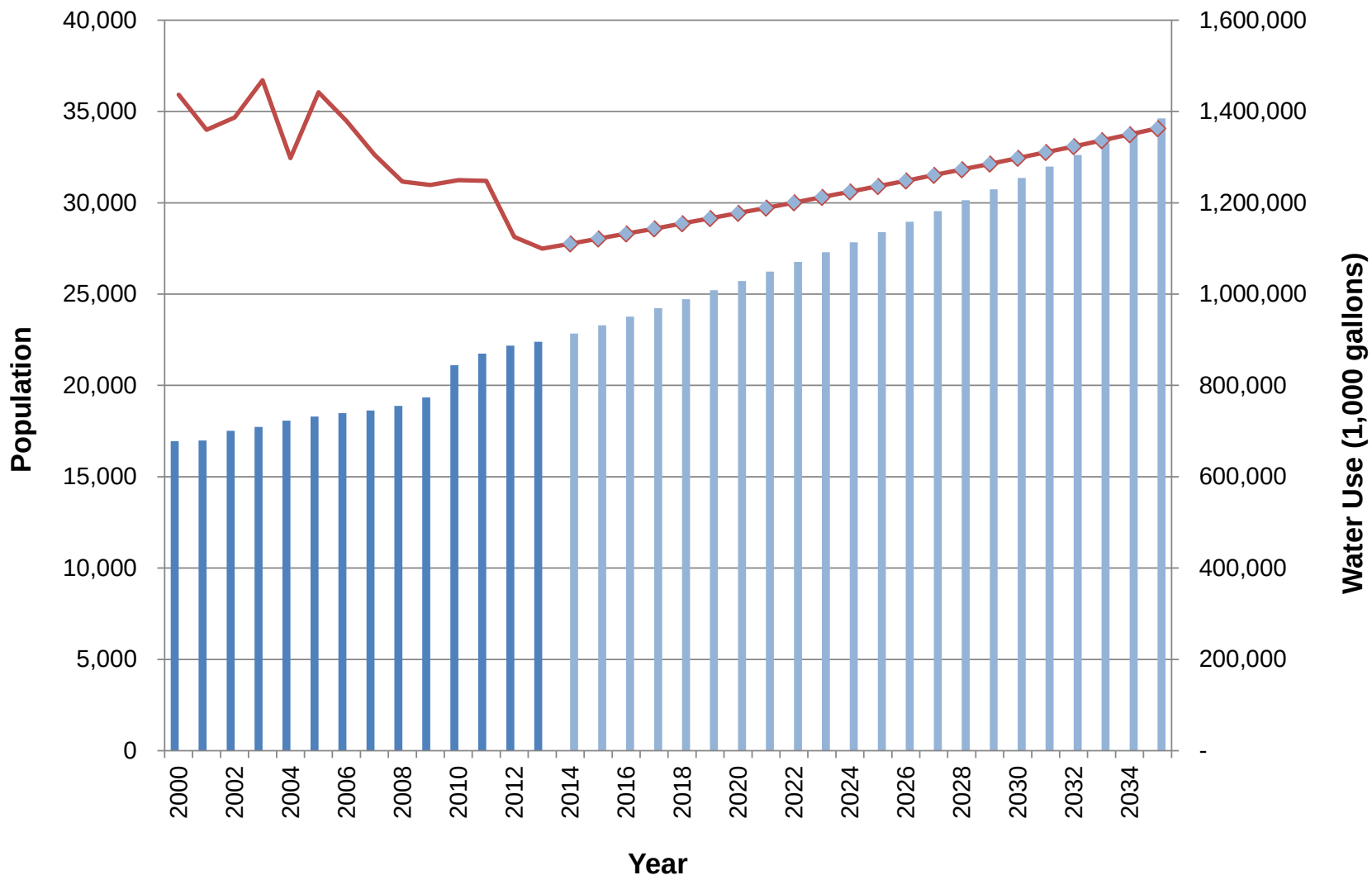
Well Number	(1) Depth to Static Water in Winter 2015[1] (ft)	(2) Depth to Top of Redbeds[4] (ft)	(3) = (2) – (1) Total Saturated Thickness in Winter 2015 (ft)	(4) Pumping Drawdown in Winter 2015[1] (ft)	(5) = (4) / (3) Ratio of Pumping Drawdown to Saturated Thickness	(6) Production Pumping Rate in Winter 2015[1] (gpm)	(7) = (6) / (4) Specific Capacity of Well in Winter 2015 (gpm/ft)	(8) = (3) – (4) – 5 ft Unutilized Saturated Thickness Remaining in Winter 2015[2] (ft)
BW-32	131.76	170	38.2	22.6	0.59	225	9.9	10.6
BW-33	141.31	No Data	No Data	27.2	No Data	31	1.1	No Data
BW-34	136.23	168	31.8	29.9	0.94	50	1.7	-3.1
BW-35	128.92	170	41.1	Data Questioned	Data Questioned	155	Data Questioned	Data Questioned
BW-36	124.11	168	43.9	Data Questioned	Data Questioned	95	Data Questioned	Data Questioned
BW-37	124.32	165	40.7	12.7	0.31	150	11.8	23.0
BW-38	135.43	197	61.6	Data Questioned	Data Questioned	185	Data Questioned	Data Questioned
BW-39	130.36	178	47.6	12.4	0.26	270	21.8	30.2
BW-40	135.80	No Data	No Data	13.1	No Data	90	6.9	No Data
BW-41	141.83	175	33.2	27.9	0.84	110	3.9	0.2
BW-42	167.83	200	32.2	7.4	0.23	284	38.3	19.8
2015 Total						3680		
2015 Average	152.85	189	35.6	15.2	0.39	108	19.7	17.5

Note: Blank cells indicate no data.

1. Information from City of Portales well logs and monitoring data. Water levels and production pumping rates were measured in January 2014.
2. Residual saturated zone thickness during pumping taken as 5 feet.
3. Depth to top of redbeds estimated based on total well depth for BW-31 (193 ft), BW-34 (170 ft), BW-38 (200 ft), and BW-39 (180 ft). No driller's logs are available for these wells.
4. Pumping drawdown and related values were of questionable accuracy for BW-4, -5, -11, -19, -35, -36, and -38 (insufficient time apparently allowed for accurate drawdowns) and were not included in the 2015 average. Some remaining specific capacity and unused saturated thickness values may also be too high. See text discussion.

Appendix C

Projected Water Demand and Supply



* Calculated based on a 2% growth rate and 1% reduction in per capita use per year.

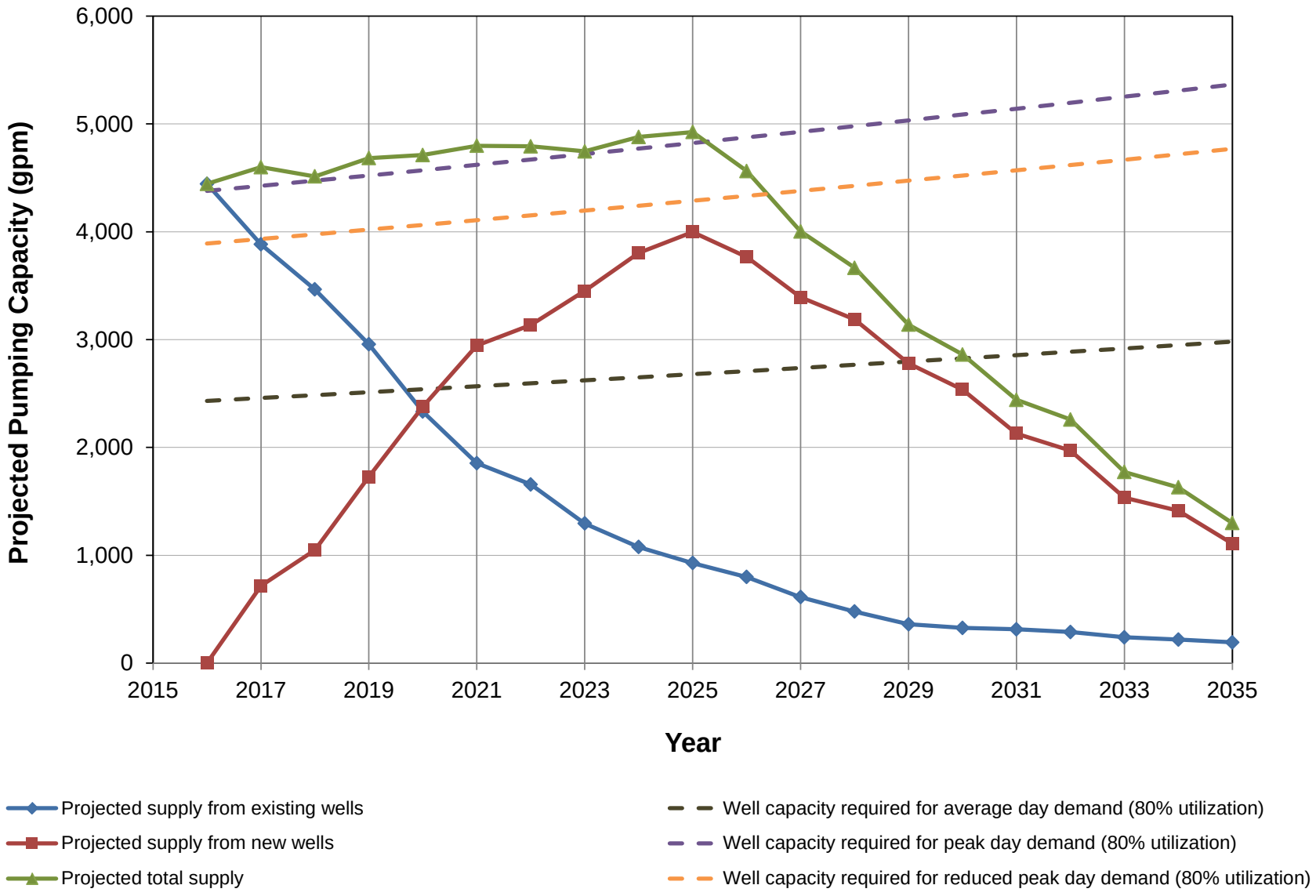
CITY OF PORTALES WATER SUPPLY
PRELIMINARY ENGINEERING REPORT

Historical and Projected Population and Water Use

Figure 3

Daniel B. Stephens & Associates, Inc.

9/11/15



CITY OF PORTALES WATER SUPPLY
PRELIMINARY ENGINEERING REPORT

Blackwater Well Field Supply Projections

Figure 9

Daniel B. Stephens & Associates, Inc.

9/8/15

Appendix D

NMED List of Potential Sources of Contamination

APPENDIX D: POTENTIAL SOURCES OF CONTAMINATION

Map Code	Land Use	Description	Contaminants of Concern*
AGRICULTURAL LAND USE			
AAP	Animal Processing or Rendering Plants	Commercial Operations/Waste Storage/Disposal Facility	Nitrates, Pathogens, Organic/Inorganic Chemicals
ACS	Farm/Ranch Agrochemical Storage Facilities or Sites	Farm/Ranch Storage Site	Pesticides, Herbicides, Fertilizers
ADC	Drainage Canals, Ditches or Acequias-Unlined, Wells (Private, Stock wells, and Irrigation)	Runoff and Infiltration	Pesticides, Herbicides, Fertilizers, Nitrate, Pathogens
ADF	Livestock Production-Dairies	Livestock Wastes, Runoff and Infiltration	Nitrate, Phosphate, Chloride, Pathogens, Pharmaceuticals
AFI	Farming-Irrigated Croplands	Runoff and Infiltration	Nitrate, Ammonia, Chloride, Fertilizers, Pesticides, Herbicides
AFL	Confined Animal Feeding Operations	Runoff and Infiltration of Livestock Wastes	Nitrate, Phosphate, Chloride, Pathogens, Pharmaceuticals
AFM	Farm Machinery Storage or Maintenance Areas	Farm Machinery Maintenance Areas	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants
AFN	Farming-Non-irrigated Croplands	Runoff and Infiltration Operations	Nitrate, Ammonia, Chloride, Fertilizers, Pesticides, Herbicides
AHC	Horticultural/Gardens/Nurseries/Greenhouses	Operations/Storage	Pesticides, Herbicides, Fertilizers
AHF	Hay/Feed and Veterinary Product Storage Sites	Farm/Ranch Storage Site	Fungicides, Pesticides, Nitrates, Pharmaceuticals
AMA	Manure or Livestock Waste-Land Application Areas	Land Application of Manure	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
AMS	Manure or Livestock Waste-Storage Facilities or Sites	Lined and Unlined Manure Storage Facilities	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
AOA	Livestock Production-Other Animal	Livestock Wastes	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
APF	Livestock Production -Poultry	Poultry Sewage Wastes	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
APP	Processing Plants or Mills- Hay, Grain, or Produce	Operations, Waste Storage and Disposal	Organic/Inorganic Chemicals, Lubricants, Machinery Wastes
ARL	Animal Rangeland	Rangeland and Pasturage	Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens
ASC	Bulk Agrochemical Storage-Petroleum/Chemicals	Storage-500 gallons or more	Petroleum Products, Inorganic/Organic Chemicals
ASF	Bulk Agrochemical Storage-Fertilizers	Feed Mill, Agricultural Co-op	Fertilizers
ASG	Bulk Agricultural Product Storage-Grain or Produce	Grain Elevator, Warehouse or Storage Site	Fungicides, Oils, Lubricants, Machinery Wastes
ASH	Livestock Production -Sheep	Livestock Sewage Wastes	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals

APPENDIX D: POTENTIAL SOURCES OF CONTAMINATION

Map Code	Land Use	Description	Contaminants of Concern*
ASP	Bulk Agrochemical Storage-Pesticides	Feed Mill, Agricultural Co-op	Pesticides
ASW	Livestock Production -Swine	Livestock Sewage Wastes	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
COMMERCIAL LAND USE			
CAI	Airports (Active/Inactive)	Operations/Maintenance/Construction	Aircraft Fuels, Deicers, Batteries, Diesel Fuel, Chlorinated Solvents, Automobile Wastes, Heating Oil, Building Wastes, Sewage, Septage, Pathogens, Pesticides, Fertilizers
CAR	Automotive Repair Shops	Operations/Maintenance/Storage	Solvents, Metals, Automotive Waste, Oils, Gasoline
CAW	Abandoned/Improperly Closed Wells	Storage/Disposal	Organic/Inorganic Chemicals, Brines, Waste Oil, Treated Sewage Effluent, Storm Water Runoff, Process Waste Water, Metals, Pathogens, Nitrate
CBS	Automotive Body Shops	Operations/Maintenance	Paints, Solvents
CBY	Boat Yards/Marinas	Operations/Maintenance	Gasoline, Diesel Fuels, Septage, Wood Treatment Chemicals, Paints, Varnishes, Automotive Wastes, Solvents, Building Wastes
CCG	Camp Grounds - Unsewered	Untreated Domestic Wastewater	Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals
CCE	Cemeteries	Operations/Maintenance	Leachate, Arsenic, Pesticides, Fertilizers
CCW	Car Washes	Unsewered, Without Total Recycling System	Soaps, Detergents, Waxes, Organic/Inorganic Chemicals
CCY	Construction/Demolition Yard/Staging Areas	Storage/Maintenance	Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Automotive Wastes, Solvents, Building Wastes, Explosives, Oil
CDC	Dry Cleaning Shops	Operations/Maintenance	Chlorinated Solvents, Organic/Inorganic Chemicals
CFA	Fuel Storage Tanks-Above Ground	Non-Service Station Tanks	Gasoline, Diesel Fuel, Organic/Inorganic Chemicals
CFB	Fuel Storage Tanks-Below Ground	Non-Service Station Tanks	Gasoline, Diesel Fuel, Organic/Inorganic Chemicals
CFC	Funeral Homes/Crematories	Operations	Biohazard Waste, Organic/Inorganic Chemicals, Septage
CFR	Furniture Repair/Refinishing	Operations	Paints, Solvents, Organic Chemicals
CGC	Golf Courses	Operations/Maintenance	Fertilizers, Pesticides, Gasoline, Automotive Wastes, Batteries, Septage
CHG	Historic Gasoline Service Stations	Above/Below Ground Storage Tanks/Operations	Gasoline, Oils, Solvents, Automotive Wastes, Septage
CHM	Home Manufacturing	Operations/Maintenance/Storage	Paints, Solvents, Organic/Inorganic Chemicals

APPENDIX D: POTENTIAL SOURCES OF CONTAMINATION

Map Code	Land Use	Description	Contaminants of Concern*
CHN	Hospitals/Nursing Homes - Unsewered	Wastewater Discharge to Septic Tank/Leach Field	Biohazard Waste, Organic/Inorganic Chemicals, Septage, Radiological Waste
CHW	Hardware/Lumber/Parts Stores	Operations/Storage	Pesticides, Fertilizers, Organic/Inorganic Chemicals
CLD	Laundromats - Unsewered	Wastewater Discharge	Detergents, Soaps, Septage
CPP	Photo Processing Laboratories	Operations/Storage	Organic/Inorganic Chemicals
CPR	Printing Shops	Operations/Storage	Solvents, Inks, Dyes, Organic/Inorganic Chemicals
CPS	Paint Stores	Storage	Paint, Solvents
CRL	Research Laboratories	Operations/Maintenance/Storage	Biohazard Waste, Radiological Materials and Waste, Metals, Organic/Inorganic Chemicals
CRY	Railroad Yards and Tracks	Operations/Maintenance/Storage	Diesel Fuel, Pesticides, Organic/Inorganic Chemicals
CSS	Gasoline Service Stations	Above/Below Ground Storage Tanks/Operations	Gasoline, Oils, Solvents, Automotive Wastes, Septage
CST	Commercial Septic Tanks/Leachfields/Leachpits/Cesspools	Storage/Disposal	Septage, Septic Effluent, Pathogens, Nitrate, Ammonia, Chloride
CVS	Veterinary Facilities	Operations/Maintenance	Biohazard Waste, Organic/Inorganic Chemicals, Septage, Radiological Waste
INDUSTRIAL LAND USE			
IAS	Asphalt Plants	Production/Storage	Petroleum Derivatives
ICC	Cement/Concrete Plants	Operations/Maintenance/Storage	Organic/Inorganic Chemicals, Oils, Natural Gas, Propane,
ICE	Communications Equipment Manufacturers	Production/Maintenance/Storage	Solvents, Organic/Inorganic Chemicals, Oils, Waste Oils, Metals
ICL	Chemical Landfills	Storage/Disposal	Leachate of Organic/Inorganic Chemicals, Acids, Bases, Metals, Solvents, Gasoline, Diesel Fuel, Pesticides, PCB's
ICP	Chemical Production Plants	Production/Maintenance/Storage	Organic/Inorganic Chemicals, Solvents, Oils, Metals
IEE	Electronic/Electrical Equipment Manufacturers	Production/Maintenance/Storage	Solvents, Organic/Inorganic Chemicals, Oils, Waste Oils, Metals, Acids, Bases
IFM	Furniture and Fixture Manufacturers	Production/Maintenance/Storage	Paints, Solvents, Organic/Inorganic Chemicals
IFW	Foundry/Smelting Plants	Production/Maintenance/Storage	Organic/Inorganic Chemicals, Metals, Solvents, Acids, Bases, Oils

APPENDIX D: POTENTIAL SOURCES OF CONTAMINATION

Map Code	Land Use	Description	Contaminants of Concern*
IGO	Gas/Oil Wells-Active/Abandoned/Test, Wells Geothermal and Industrial	Production	Oil, Natural Gas, Organic/Inorganic Chemicals, Acids, Bases, Drilling Wastes
IHD	Historic Dumps/Landfills	Storage/Disposal	Leachate of Organic/Inorganic Chemicals, Acids, Bases, Metals, Solvents, Gasoline, Diesel Fuel, Pesticides, PCB's, Automotive Wastes
IHM	Historic Mining Operations	Production Waste/Storage	Metals, Inorganic Chemicals, Acids, Bases, Radiological Materials
IMI	Primary Metal Industries	Steel/Metal Works, Rolling/Wire Mills	Metals, Inorganic Chemicals, Acids, Bases
IMO	Mining Operations (Surface And Subsurface)	Production Waste/Storage	Metals, Inorganic Chemicals, Acids, Bases, Radiological Materials
IMP	Metal Plating/Processing Facilities	Operations/Maintenance/Storage	Organic/Inorganic Chemicals, Acids, Bases, Metals
IMW	Machine/Metal Working Shops	Operations/Maintenance/Storage	Cutting Oils, Metals, Solvents, Organic/Inorganic Chemicals, Detergents
IOG	Oil/Gas Pipelines	Transport	Oils, Gasoline, Volatile Organic Chemicals, Natural Gas, Propane
IPL	Plastics Manufacturing/Molder	Operations/Maintenance/Storage	Solvents, Oils, Organic/Inorganic Chemicals, Acids, Bases
IPM	Paper Mills	Operations/Maintenance/Storage	Acids, Metals, Organic/Inorganic Chemicals
IPP	Petroleum Production/Refining/ Bulk Plants	Operations/Maintenance/Storage	Oils, Gasoline, Diesel Fuels, Organic Chemicals, Oil Drilling/Refining Wastes
IPU	Public Utilities	Power Generating Stations	PCB's, Solvents, Diesel Fuel, Propane, Natural Gas, Oil, Acids, Bases, Organic/Inorganic Chemicals, Metals
IRG	RCRA Waste Generators - Other	Storage/Disposal	Organic/Inorganic Chemicals, Solvents, Metals, PCB's, Acids, Bases, Radiological Materials
IRW	Radioactive Waste Disposal Sites	Storage/Disposal	High and Low Level Radiological Wastes
ISD	Sumps/Dry Wells	Storage/Disposal	Storm Water Runoff, Organic/Inorganic Chemicals, Solvents, Process Wastewater, Pesticides, Oils
ISF	Superfund Sites	Storage/Disposal	Organic/Inorganic Chemicals, Solvents, Metals, PCB's, Acids, Bases, Radiological Materials
ISM	Primary Wood Industries	Saw Mills, Planers, Wood Treatment	Organic/Inorganic Chemicals, Metals, Solvents
IST	Stone, Tile, Glass Manufacturing	Operations/Maintenance/Storage	Solvents, Oils, Metals, Organic/Inorganic Chemicals
ITS	Treatment/Storage/Disposal Ponds/Lagoons	Treatment/Storage	Organic/Inorganic Chemicals, Metals, Acids, Bases, Sewage
ITT	Transport/Distribution, Warehouses, Truck Terminals	Operations/Maintenance/Storage	Gasoline, Diesel Fuels, Automotive Wastes, Metals, Organic/Inorganic Chemicals, Acids, Bases
IUD	Unregulated Dumps/Excavated Sites, Snow Dumps	Storage/Collection/Disposal	Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites

APPENDIX D: POTENTIAL SOURCES OF CONTAMINATION

Map Code	Land Use	Description	Contaminants of Concern*
IUI	Underground Injection (UIC) Wells	Storage/Disposal	Organic/Inorganic Chemicals, Brines, Waste Oil, Treated Sewage Effluent, Storm Water Runoff, Process Wastewater, Metals, Pathogens, Nitrate
IUR	Utility/Transportation Right of Ways, major transportation corridor	Power Lines, Gas/Oil Pipelines	Pesticides, Gasoline, Diesel Fuels, Automotive Wastes, Organic/Inorganic Chemicals, PCB's, Sewage, Metals, Storm water Runoff, Pathogens
MUNICIPAL/RESIDENTIAL LAND USE			
MHM	Highway/Road Maintenance Yards	Operations/Maintenance/Storage	Gasoline, Diesel Fuels, Solvents, Road Salt, Asphalt, Pesticides, Automotive Wastes,
MHR	Highway Rest Areas	Operations/Maintenance/Storage/Disposal	Automotive Wastes, Septage, Gasoline, Diesel Fuels, Pesticides
MIN	Incinerators - Commercial or Municipal	Operations/Disposal	Metals, Organic/Inorganic Chemicals
MLF	Municipal Waste Landfills	Storage/Disposal	Leachate, Organic/Inorganic Chemicals, Pesticides, Metals, Oils
MMF	Military Facilities	Operations/Maintenance/Storage/Disposal	Gasoline, Aircraft Fuels, Diesel Fuels, Automotive Wastes, Metals, Organic/Inorganic Chemicals, Explosives, Radiological Materials, Pesticides, Sewage/Septage, Oils, Solvents, Fertilizers, Batteries, Deicers
MMP	Motor Pools	Operations/Maintenance/Storage/Disposal	Gasoline, Diesel Fuel, Oils, Waste Oils, Automotive Waste, Batteries, Metals
MPS	Sewage Pump Stations	Operations/Storage	Sewage, Pathogens, Nitrate, Metals, Organic/Inorganic Chemicals
MPW	Polluted Surface Water Sources	Naturally Occurring/Anthropogenic	Sewage, Pathogens, Nitrate, Metals, Acids, Bases, Organic/Inorganic Chemicals
MRF	Recycling Facilities	Operations/Storage/Disposal	Metals, Organic/Inorganic Chemicals, Pesticides, Automotive Wastes, Oils
MSC	Schools – Unsewered	Wastewater Discharge to Septic Tank/Leach Field	Septage, Septic Effluent, Pathogens, Nitrate, Ammonia, Chloride
MSD	Storm Drainage Collection Areas or Outlets-Unlined	Storage/Disposal	Runoff, Pesticides, Fertilizer, Pathogens, Nitrate, Phosphate, Oil
MSL	Sewer Lines	Transport	Sewage, Pathogens, Nitrate, Metals, Organic/Inorganic Chemicals
MSP	Wastewater Seepage/Retention Ponds (Unlined/Lined)	Storage/Disposal	Sewage Effluent, Nitrate, Ammonia, Pathogens, Organic/Inorganic Chemicals, Pesticides
MSS	Sewage Effluent/Sludge Land Application Areas	Storage/Disposal	Sewage/Sewage Sludge, Nitrate, Pathogens, Organic/Inorganic Chemicals, Metals
MST	Sewage Treatment Plants	Operations/Maintenance/Storage/Disposal	Sewage, Sewage Sludge, Metals, Pathogens, Organic/Inorganic Chemicals
MSW	Solid Waste Transfer Stations	Storage/Disposal	Metals, Organic/Inorganic Chemicals, Pesticides, Automotive Wastes, Oils
MWP	Water Treatment Plants and Water Supply Wells	Operations/Maintenance/Storage/Disposal	Organic/Inorganic Chemicals, Chlorine

APPENDIX D: POTENTIAL SOURCES OF CONTAMINATION

Map Code	Land Use	Description	Contaminants of Concern*
RSF	Single Family Residences - Unsewered	Wastewater Discharge to Septic Tank/Leach Field or Cesspool	Septage, Pathogens, Nitrate, Ammonia, Chloride, Heavy Metals, Household Pesticides, Herbicides, Cleaning Agents and Solvents, Fuels
* Contaminants of Concern include substances that are commonly, but not always, associated with the Contaminant Source listed in column 2			

Appendix E

Sampling Schedules

Return Links

Water System Detail

Water Systems

Water System Search

County Map

Glossary

Drinking Water Branch

Sample Schedules

Water System No. :	NM3528522	**Federal Type :**	C
Water System Name :	PORTALES WATER SYSTEM	**State Type :**	C
Principal County Served :	ROOSEVELT	**Primary Source :**	GW
Status :	A	**Activity Date :**	06-01-1977

TCR Schedules

Sample Count	Sample Type	Sample Frequency	Effective Begin Date	Effective End Date	Seasonal Start MM/DD	Seasonal End MM/DD	Analyte Code	Analyte Name
15	RT	MN	09-01-2014		1/1	12/31	3100	COLIFORM (TCR)

Total Number of Records Fetched = 1

Frequent Field Sample Schedules

Water System Facility State Asgn ID	Water System Facility Name	Analyte Code	Analyte Name	Days to Monitor per month	Samples Required per day	Effective Begin Date	Effective End Date	Summary Type

Total Number of Records Fetched = 0

Non-TCR Group Schedules

Water System Facility State Asgn ID	Water System Facility Name	Analyte Group Code	Analyte Group Name	Sample Count	Sample Type	Sample Frequency	Effective Begin Date	Effective End Date	Seasonal Start MM/DD	Seasonal End MM/DD
28522000	DIST	DBP2	DBP STAGE 2	2	RT	YR	01-01-2013		11/1	11/30
28522000	DIST	PBCU	LEAD AND COPPER	30	RT	3Y	01-01-2011		6/1	9/30
28522021	HILL ENTRY POINT	HM	HEAVY METALS	1	RT	3Y	01-01-2002		0/0	0/0
28522021	HILL ENTRY POINT	NRAD	NEW RAD RULE	1	RT	6Y	01-01-2017		0/0	0/0
28522021	HILL ENTRY POINT	RSOC	REGULATED SOCS	2	RT	3Y	01-01-2014		0/0	0/0
28522021	HILL ENTRY POINT	VOC1	VOLATILE ORGANICS	1	RT	3Y	01-01-2017		0/0	0/0
28522021	HILL ENTRY	VOC1	VOLATILE	1	RT	YR	01-01-	12-31-	0/0	0/0

	POINT		ORGANICS				2014	2015		
28522022	LIME ENTRY POINT	HM	HEAVY METALS	1	RT	3Y	01-01-2002		0/0	0/0
28522022	LIME ENTRY POINT	NRAD	NEW RAD RULE	1	RT	6Y	01-01-2008		0/0	0/0
28522022	LIME ENTRY POINT	RSOC	REGULATED SOCS	2	RT	3Y	01-01-2017		0/0	0/0
28522022	LIME ENTRY POINT	RSOC	REGULATED SOCS	1	RT	3Y	01-01-2014	12-31-2016	0/0	0/0
28522022	LIME ENTRY POINT	VOC1	VOLATILE ORGANICS	1	RT	3Y	01-01-2002		0/0	0/0

Total Number of Records Fetched = 12

Non-TCR Individual Schedules

Water System Facility State Asgn ID	Water System Facility Name	Analyte Code	Analyte Name	Sample Count	Sample Type	Sample Frequency	Effective Begin Date	Effective End Date	Seasonal Start MM/DD	Seasonal End MM/DD
28522021	HILL ENTRY POINT	1024	CYANIDE	1	RT	3Y	01-01-2002		0/0	0/0
28522021	HILL ENTRY POINT	1025	FLUORIDE	1	RT	3Y	01-01-2002		0/0	0/0
28522021	HILL ENTRY POINT	1038	NITRATE-NITRITE	1	RT	YR	01-01-2002		0/0	0/0
28522022	LIME ENTRY POINT	1024	CYANIDE	1	RT	3Y	01-01-2002		0/0	0/0
28522022	LIME ENTRY POINT	1025	FLUORIDE	1	RT	3Y	01-01-2002		0/0	0/0
28522022	LIME ENTRY POINT	1038	NITRATE-NITRITE	1	RT	YR	01-01-2002		0/0	0/0

Total Number of Records Fetched = 6