Source Water Protection Plan

Buckman Direct Diversion

2023

Buckman Direct Diversion

Source Water Protection Plan

Public Water System # 3502826

COLLABORATORS

New Mexico Environment Department Drinking Water Bureau (NMED DWB) assisted greatly with this plan.

BDD staff reviewed and revised the BDD DRAFT Plan 2017.

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1. INTRODUCTION

The original source water protection plan (SWPP) was prepared by Daniel B. Stephens & Associates, Inc. (DBS&A) for the Buckman Direct Diversion (BDD) (Figure 1) under contract with the New Mexico Environment Department (NMED) Drinking Water Bureau (DWB) in 2017.

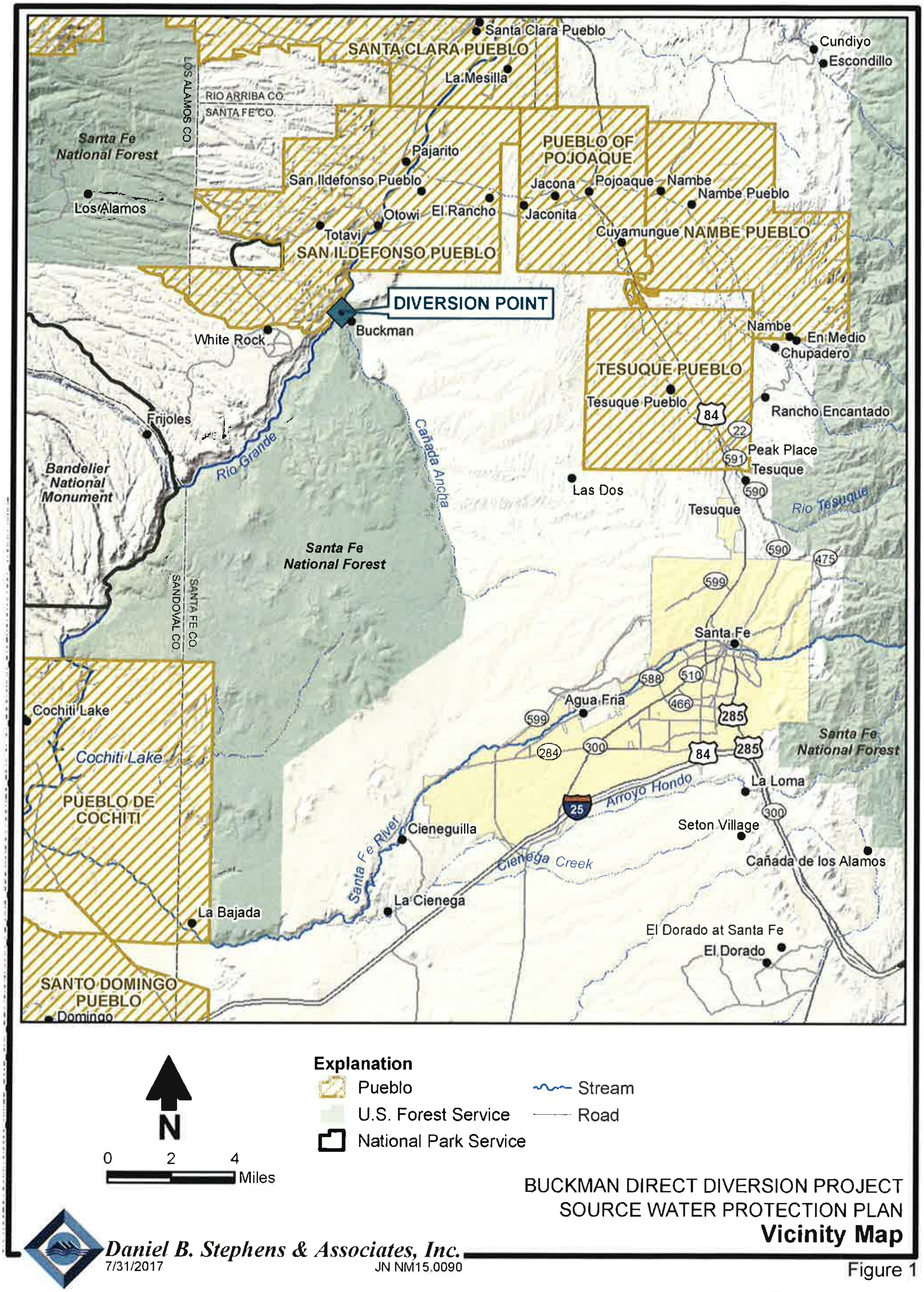
The NMED DWB assists communities in the protection of their drinking water systems through the Source Water Protection Program. By participating in this voluntary program, communities can assess a water system to identify and manage actual or potential sources of contamination to the drinking water supply. The program consists of a two-step process. The first step in the process is developing a SWPP by describing the area(s) to be protected, identifying actual and potential contamination sources, and evaluating the risk each source of contamination poses to the drinking water source area.

The second step of the process is implementing the developed SWPP. The SWPP benefits the public water system by providing management and implementation strategies to ensure the protection of the drinking water supply. Preventing contamination is much easier and less expensive than cleaning up a contaminated source or finding a new source.

The original (2017) SWPP for the BDD was developed using the *New Mexico Source Water and Wellhead Protection Toolkit* (NMED DWB, 2013). That SWPP was updated by BDD staff using a revised risk assessment approach in order to produce the 2023 version. The plan identifies a Source Water Protection Team that has the responsibility of program development and implementation, thereby providing the community with the tools needed to prevent contamination of BDD's Source Water Protection Area.

This document identifies actual and potential sources of contamination to BDD's water sources and makes an action plan for preventing future contamination. BDD Board and the BDD Source Water Protection Team are responsible for implementing the SWPP and updating the plan on a regular basis.

Figure 1. BDD and Vicinity Map



1.1 Purpose

The Source Water Protection Plan (SWPP) is a tool for BDD to ensure clean and high-quality drinking water sources for current and future generations. This Source Water Protection Plan is designed to:

- Create an awareness of the community's drinking water sources and the potential risks to surface water and/or groundwater quality within the watershed;
- Encourage education and voluntary solutions to alleviate pollution risks;
- Promote management practices to protect and enhance the drinking water supply; and
- Provide for a comprehensive action plan in case of an emergency that threatens or disrupts the community water supply.

Developing and implementing source water protection measures at the local level (i.e. county and municipal) will complement existing regulatory protection measures implemented at the state and federal governmental levels by filling protection gaps that can only be addressed at the local level.

1.2 Source Water Protection Program Background

The 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 for all public water systems between 2002 and 2006. States are now implementing strategies to help local communities use the information obtained from these assessments. States may also provide resources to help fund local protection activities, such as wellhead protection programs for groundwater and watershed management programs for surface water.

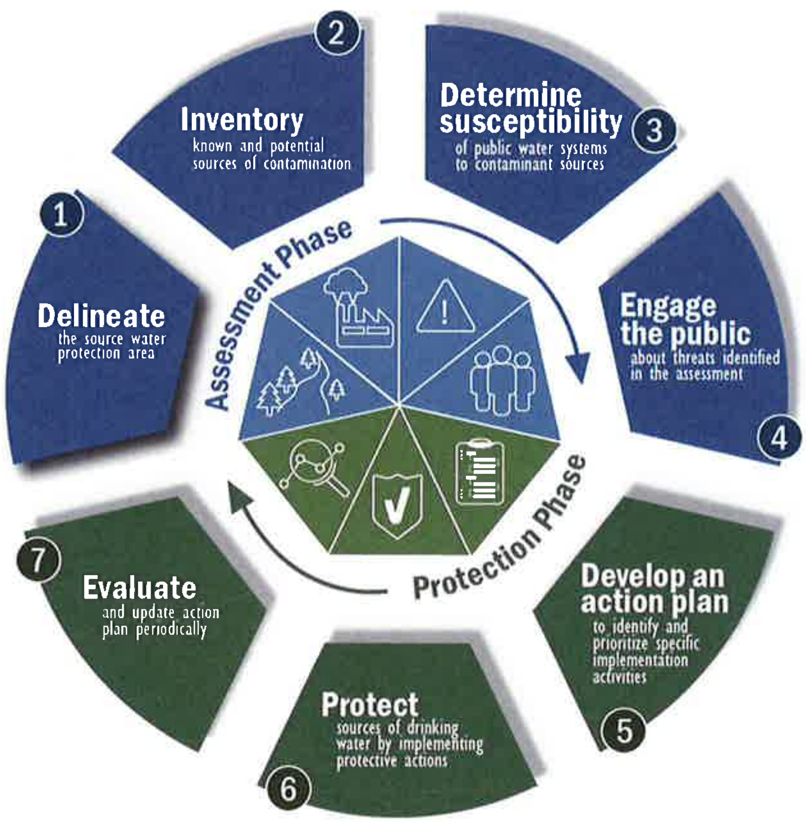
1.3 Components of a Source Water Protection Program

The primary objective of a source water protection program is to safeguard and improve source water quality for current and future use. A program may include several fundamental components, such as:

- An inventory and characterization of the contaminant threads in the source water protection area;
- An action plan outlining strategies and resources required for the long-term management of the source to prevent contamination; and
- Implementation of the management measures identified in the planning process.

When developing a program, partners should account for a variety of factors such as local environmental conditions, the needs and capacity of water providers, stakeholder interests, and other site-specific factors. See Figure 2.

Figure 2. Phases in development and implementation of SWPP
https://www.epa.gov/sourcewaterprotection/assess-plan-and-protect-source-water#components



1.4 Assessment Phase

1.4.1 Step 1 - Delineate the source water protection area (SWPA).

A source water protection plan includes a delineated area that shows the area to be assessed and protected based on where the public water system draws drinking water supplies.

1.4.2 Step 2 – Inventory known and potential sources of contamination (PSOC).

A contaminant source inventory lists all documented and potential contaminant sources or activities of concern within the SWPA that may pose a threat to drinking water supplies.

1.4.3 Step 3 – Determine the susceptibility of the public water system to contaminant sources or activities within the SWPA.

Determining the susceptibility of the public water system to threats included on the contaminant source inventory list is an important step for connecting the nature and severity of the threat to the likelihood of the threat contaminating source water.

1.4.4 Step 4 – Engage the public about threats identified in the assessment.

Effective source water protection programs ensure that the public has the information necessary to act to prevent contamination. Early involvement in the planning process helps build consensus on the need for action, leading to more comprehensive source water protection.

1.5 Protection Phase

1.5.1 Step 5 - Develop an action plan to identify and prioritize specific implementation activities.

Communities can use the information gathered from the source water assessment process to develop action plans identifying long-term management strategies for preventing contamination of sources of drinking water.

1.5.2 Step 6 – Protect source of drinking water by implementing protective actions.

Communities use many different source water protection practices to prevent contamination of their drinking water supplies. These measures can be tailored to address each threat or an array of risks specific to each public water system.

1.5.3 Step 7 – Evaluate and update action plan periodically.

Plans should be evaluated and, if necessary, revised in response to new information, such as changes to the watershed or source water protection area or other factors that could affect the relevance and efficacy of the plan.

1.6 Revisions

1.6.1 Revision 2019

In 2019 BDD revised the original SWPP dated October 2017. The revision of February 2019 included revising the Source Water Protection Team members, updating the BDD production rates for 2017 and 2018 and the corresponding tables and graphs, updating the Santa Fe County per capita daily use for 2017 and its corresponding table and graph, and selecting the BDD Actions Items.

1.6.2 Revision 2023

In 2023 BDD revised a few sections of the 2019 SWPP including Section 4.2 and the risk assessment of the PSOCs in Section 7. A search of the NMED database of PSOCs revealed the same PSOCs present in 2017.

2. SOURCE WATER PROTECTION TEAM

The Source Water Protection Team has the responsibility for input to the SWPP and also for the implementation of the recommended action items in the SWPP. The BDD serves Santa Fe County (the County), the City of Santa Fe (the City), and Las Campanas, and members from each of these entities are represented on the Source Water Protection Team. Members of the Source Water Protection Team are identified in Table 1.

Table 1. Source Water Protection Team

Name	Affiliation	E-mail
Rick Carpenter	Buckman Direct Diversion	rrcarpenter@santafenm.gov
Randy Sugrue	Buckman Direct Diversion	rcsugrue@santafenm.gov
Danny Carter	Buckman Direct Diversion	djcarter@santafenm.gov
Jill Turner	New Mexico Environment Department	jill.turner@state.nm.us
Alan Hook	City of Santa Fe	aghook@santafenm.gov
Melissa McDonald	City of Santa Fe	mamcdonald@santafenm.gov
Michelle Hunter	County of Santa Fe	mghunter@santafecountynm.gov
Tom Egelhoff	Las Campanas	tegelhoff@clublc.com

3. Water System Information

BDD is jointly owned by the City and the County of Santa Fe, with Las Campanas as a limited partner. By agreement between the City and County, the City currently provides financial and administrative support.

The BDD is governed by the BDD Board, established in 2005 by the Joint Powers Agreement. According to the agreement, "[g]overnance will be through a five member board consisting of two County Commissioners and two City Councilors and a qualified person (to serve a one year term but without term limits) appointed by a majority of the four elected officials." The board also includes a non-voting member that represents Las Campanas.

The BDD Board's powers include:

- The authority to enter into a contract with an entity to maintain and operate the BDD. The current contract to maintain and operate the BDD is with the City of Santa Fe.
- The authority to enter into a contract with an entity to act as the fiscal agent the BDD. The City of Santa Fe is currently contracted with the BDD to serve as the BDD's fiscal agent. The fiscal agent must receive the BDD Board's approval for expenditures over an amount specified in the contract.
- Entering into a Facility Operations and Procedures Agreement with Las Campanas.

The BDD Board's authority and duties do not encompass:

- The distribution of water to customers;
- The assessment or collection of water charges;
- The regulation of water use by customers or the ownership;
- Acquisition or permitting of use of water rights or contract rights.

The BDD diverts water from the Rio Grande for use by its customers. The water is ultimately derived from two sources:

- San Juan-Chama (SJC) Project water. This is water that is artificially transferred from the Colorado River basin to the Rio Grande basin. The rights to this water are primarily regulated by the U.S. Bureau of Reclamation (BOR), and

- Native Rio Grande water. This is water that naturally occurs in the Rio Grande watershed. The rights to this water are primarily regulated by the New Mexico Office of the State Engineer (OSE).

BDD began supplying water to its customers in 2011. The BDD's customers and BDD water system are discussed in more detail in Sections 3.2 and 3.3, respectively.

3.1 San Juan-Chama Project

The SJC Project is a U.S. Bureau of Reclamation (BOR) trans-basin transfer project and makes New Mexico's 11 percent allocation of Colorado River Basin water available to users in the north-central part of the state (namely, the Middle Rio Grande Basin). This project diverts water from three different headwater streams of the San Juan River in Colorado (Rio Blanco, Little Navajo River, and Navajo River). Diversions can occur anytime during the year as long as streamflow exceeds the minimum allowable amount, and total diversions cannot exceed 1,350,000 acre-feet in any 10-year period. The average annual yield is 96,200 acre-feet per year (ac-ft/yr). Diverted water travels underground for 27 miles across the Continental Divide into Heron Reservoir, located in Rio Arriba County, New Mexico at the confluence of Willow Creek and Rio Chama. The reservoir has a capacity of 400,000 acre-feet, approximately 4 years supply for its designated downstream contractors (Table 2). Water flows from Heron Reservoir southeast on the Rio Chama until it reaches the Rio Grande, approximately 5 miles north of Española (30 miles north of Santa Fe). Rio Grande water used by the City and County of Santa Fe under the SJC Project is diverted at the BDD and treated at the Buckman Regional Water Treatment Plant (BRWTP). Appendix A shows how water is transferred from Colorado into Heron Reservoir and into the Rio Grande.

Table 2. Contractors of San Juan-Chama Project Water

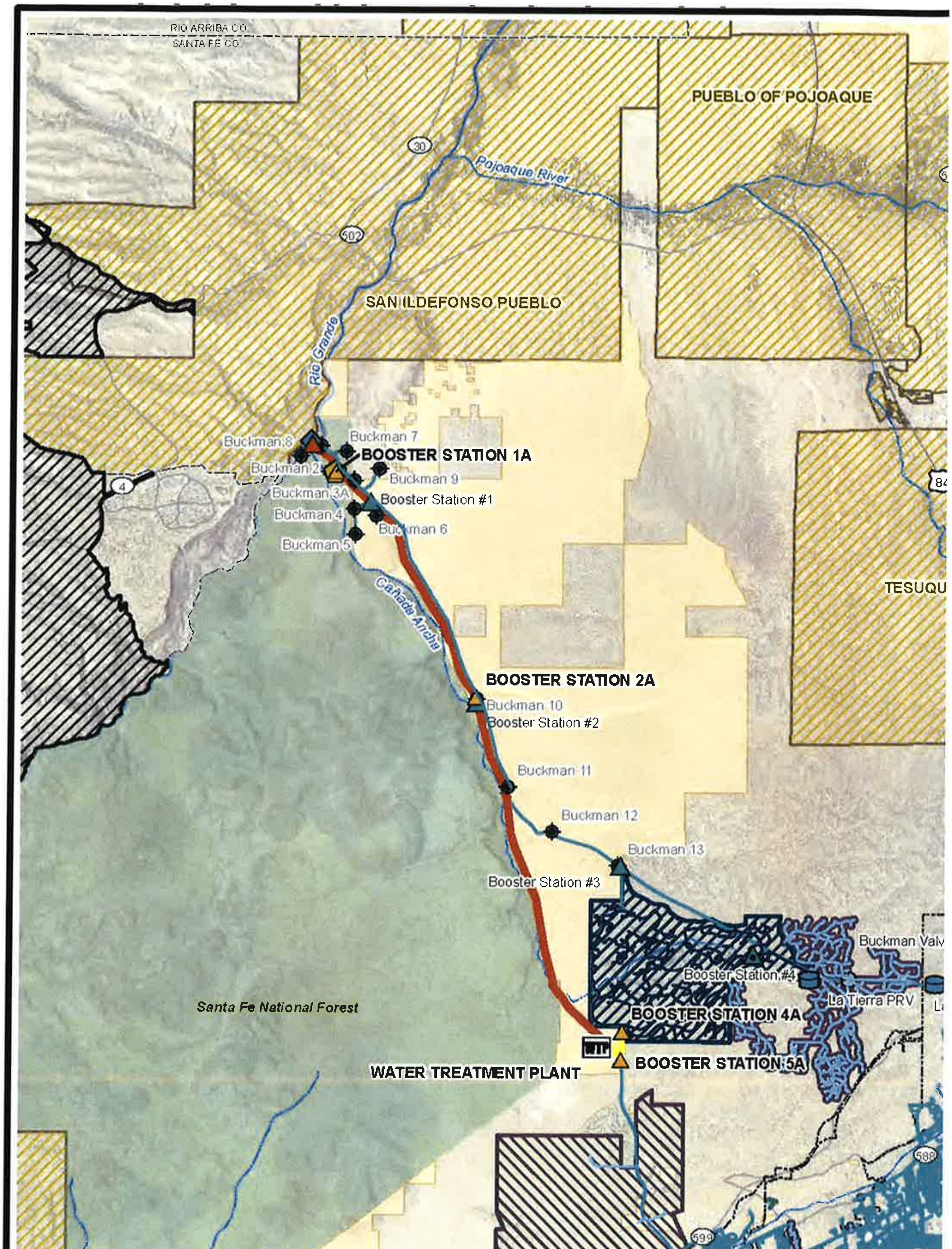
Contractor	SJC Allocation (ac-ft/yr*)
Municipal	
Albuquerque	48,200
City of Santa Fe	5,230
Santa Fe County	375
Los Alamos	1,200

Contractor	SJC Allocation (ac-ft/yr*)
Los Lunas	400
Twining Water and Sanitation District	15
Española	1,000
Taos	400
Belen	500
Bernalillo	400
Jicarilla Apache Nation	6,500
Ohkay Owingeh Pueblo	2,000
Irrigation	
Middle Rio Grande Conservancy District	20,900
Pojoaque Valley Irrigation District	1,030
Other	
Cochiti Reservoir (U.S. Army Corps of Engineers)	5,000
Taos Pueblo Settlement	2,990

*ac-ft/yr = acre-feet per year

In 1976, the City, the Public Service Company of New Mexico (PNM) (which owned and operated the Santa Fe public water system at the time), and the County signed a 40-year contract with the BOR. The contract allotted 5,230 ac-ft/yr of SJC Project water to the City and 375 ac-ft/yr to the County, 5,605 ac-ft/yr total. In 2006, two permanent but separate contracts were signed between BOR and the City and County of Santa Fe for the same allocations of water.

Figure 3. City and County of Santa Fe Water System



3.2 BDD Customers

BDD has three customers: the City of Santa Fe, the County of Santa Fe, and Las Campanas. BDD's total annual allocations are 8,730 ac-ft/yr of which large percent belongs to the City of Santa Fe.

3.2.1 City of Santa Fe

The City of Santa Fe water system serves approximately 78,200 customers through 33,297 metered connections. The bulk of these customers are within the City limits. In total, the City of Santa Fe system serves a population of 90,810, making it the fourth-largest system in New Mexico. (Hook, 2021)

Also, the City has several water service agreements to serve customers within Santa Fe County. The City of Santa Fe Water System is unique among public water systems in the Southwest due to its diverse portfolio of source waters, including two groundwater well fields, surface water from the Santa Fe River stored in two reservoirs, and surface water from the San Juan-Chama Project obtained from the Rio Grande at the Buckman Direct Diversion. The City purchases water from the latter, a separate public water system. See (Hook, 2021).

- Surface water from the Santa Fe River stored in two reservoirs,
- Surface water from the Rio Grande River from Buckman Direct Diversion, and
- Groundwater from the Tesuque Formation at
    - City Well Field (CWF), and
    - Buckman Well Field (BWF).

From 2013 to 2019, the approximate average contributions of Santa Fe River surface water, Rio Grande surface water, and ground water were 35%, 45%, and 20%, respectively. However, as much as 80% of the City's water is derived from BDD at certain times of the year. The 2013-2019 average annual production by the City of Santa Fe Water System from all sources was 8,600 ac-ft.

3.2.2 Santa Fe County

The Santa Fe County water system is divided into two sectors, West and South, and serves approximately 3,500 accounts. The County's consumer confidence reports (CCRs) (https://www.santafecountynm.gov/public_works/utilities) describe the sectors as follows:

The West Sector supplies potable water to users outside of the western boundary of the City of Santa Fe and within the boundary of the Historic Village of Agua Fria. These users are located in the areas of: Las Campanas Estates I & II, Aldea, Tessera, El Prado, La Serena, Los Sueños, Sonrisa, Northwest Ranches, and Vista Aurora Subdivisión. Water is also provided to the Las Campanas Water and Sewer Cooperative and to the Agua Fria Community Water System.

The South Sector supplies potable water to users outside of the boundary of the City of Santa Fe in the areas including Campo Conejos, Turquoise Trail South, Rancho Viejo, Oshara Village, La Pradera, Valle Vista, the County Public Safety Complex, Turquoise Trail School, Las Lagunitas, and parts of La Cienega. Water is also provided to other systems, including the New Mexico National Guard, the New Mexico State Penitentiary, and the La Cienega Mutual Domestic Water Consumers Association.

The 2010 Census estimated that there were 6,992 housing units in the County water system, with an average household size of 2.52, giving a population of 17,620 served by the County water system. The Census estimated that 6,104 of these houses were occupied (888 were not), with a vacancy rate of 12.7 percent.

In addition to BDD, the County relies on the City of Santa Fe's water sources. The County uses much of the City's water system infrastructure, although the County also owns and maintains its own storage tank, booster station, and pipelines (Figure 3).

The 2017 County's system-wide average daily demand (ADD) was 833,365 gallons of which the residential 2017 ADD was 529,904 gallons. Figure 4 shows the County's per capita daily use from 2010 to 2017. The system-wide per capita daily use during this period ranged from 62 to 140 gallons per capita per day (gpcd) (Table 3), with an average of 86 gpcd.

Table 3. Santa Fe County Per Capita Daily Use, 2010-2017

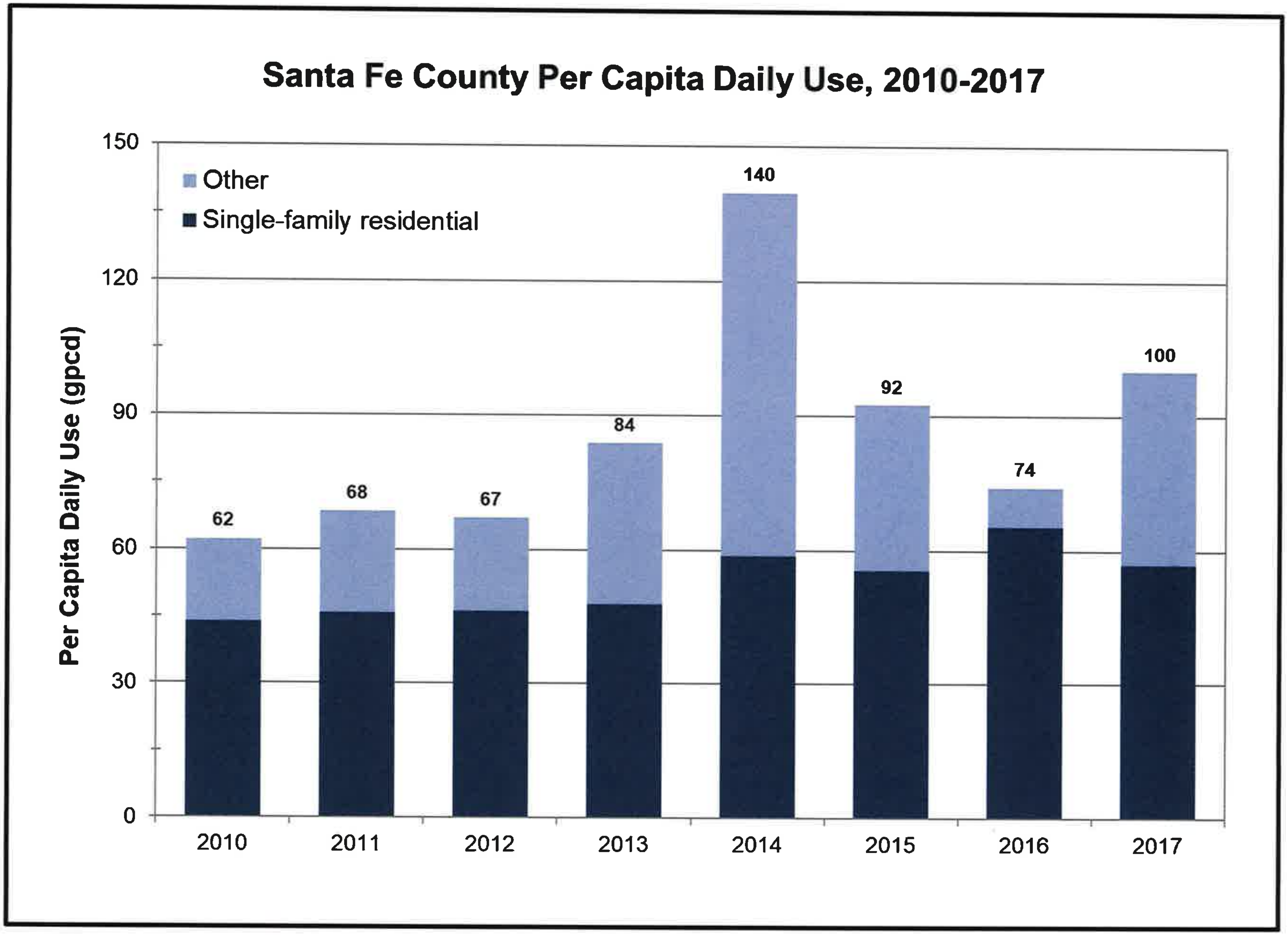
Year	Per Capita Daily Use (gpcd*)
2010	62
2011	68
2012	67
2013	84
2014	140
2015	92
2016	74
2017	100
Average	**86**

*gpcd = Gallons per capita per day

In the future, the County's water system commitments will be expanding in accordance with the Aamodt Settlement. The following excerpts from *Water Matters!* (2015) provide a brief overview of this case:

> The "Aamodt case" is a complex, long-running adjudication of water rights in the Pojoaque River watershed northwest of Santa Fe. In 1966, it was filed in federal court as State of New Mexico, ex rel. State Engineer, et al. v. Aamodt, et al. The parties include the State, through the State Engineer, about 5,600 non-Indian claimants, the Pueblos of Nambé, Pojoaque, San Ildefonso, and Tesuque, and governmental entities such as the county of Santa Fe, many acequias, the Pojoaque Valley Irrigation District, and several federal and state agencies. The rights being adjudicated include, but are not limited to, State water rights of non-Indians and government agencies for irrigation, domestic and commercial uses as well as the federal water rights of the Pueblos to historic, present, and future uses.

Figure 4. Santa Fe County Per Capita Daily Use, 2010-2017



[Aamodt Settlement highlights continues]

The Aamodt settling parties, seven governmental entities, including the state, and representatives from the non-Indian community, began negotiations in 2000. By 2004, a settlement was drafted and presented to the public. The settlement featured a regional water supply system for both Pueblos and non-Indians. In this first version of the settlement, all non-Indians had to hook up to the water system. After review and public discussion, the settling parties returned to the table to address non-Indian communities' concerns and to remove the mandatory provision for water-system hookup. The State of New Mexico, Santa Fe County, City of Santa Fe, representatives from non-Indian communities, and the four Pueblos signed the 2006 Settlement Agreement and sent it to Congress. For more information about the settlement process, please see the chapter "American Indian Water Right Settlements" in this edition of Water Matters!.

In the spring of 2010, the Stell Ombudsman Program conducted eleven public meetings for the County of Santa Fe to explain the settlement agreement. In December of 2010, Congress passed the Claims Resolution Act, which approved the Aamodt and other settlements, and the President signed it into law. The parties then adjusted the 2006 Settlement Agreement to conform to the Act, and in March of 2013, the agreement was formally signed by the Secretary of the Interior, Pueblo leaders, and state officials. In the early months of 2014, the Stell Ombudsman Program held thirty public meetings and office hours for the county of Santa Fe to explain the settlement agreement. Other interests also held public meetings.

The key provisions of the Aamodt settlement include:

- constructing a regional water system;
- providing non-Indians with a choice of whether to join the settlement, and upon joining, a choice of whether to hook up to the regional water system;
- relinquishing existing Pueblo claims against non-Indians who join the settlement;
- closing the basin to new water right development following the entry of a Pueblo final decree by the court;
- metering all water uses in the basin;
- limiting Pueblo water use; and
- protecting existing uses.

The Regional Water System is a pipeline and water-distribution system which will have capacity to deliver water from the Rio Grande to the four Pueblos and to non-Indian residents. The system provides 2,500 acre-feet per year for Pueblo consumptive use. Santa Fe County is allowed to "piggy back" on the system with an extension to serve non-Pueblo domestic well owners who choose to connect and all future water development. The county portion of the system will accommodate up to 1,500 acre feet per year. Water for the regional water system will be diverted from the Rio Grande through infiltration well structures along the river banks on San Ildefonso Pueblo land above Otowi gage. This project is separate from Santa Fe's Buckman Diversion Project. The Bureau of Reclamation will build the system.

Prior to the passage of the Aamodt Litigation Settlement Act, the cost estimate for the settlement in 2006 dollars was $177.3 million ($106.4 million for the federal contribution, $49.5 million for the state contribution, and $21.4 million for the county's contribution). This cost estimate is indexed to accommodate economic changes. The majority of the funding is for the construction of the regional water system and for the acquisition of water rights for the Pueblos. In the Claims Resolution Act, Congress appropriated $81.8 million of the federal contribution and authorized an additional $92.5 million.

3.2.3 Las Campanas

BDD has two customers from the Las Campanas community: Las Campanas Water and Sewer Cooperative (the Co-op) and the Club at Las Campanas (the Club).

3.2.3.1 Las Campanas Water and Sewer Cooperative

The Co-op provides treated drinking water for domestic use in Las Campanas and serves 656 water connections — an estimated population of 1,500 people (656 connections x 2.3 people per household). In 2016, the Co-op's ADD was 236,921 gallons, with a peak daily demand of 498,379 gallons.

Finished treated water travels via gravity flow from the City's 10 million-gallon storage tank to the Co-op's receiving station, where it is treated with sodium hypochlorite. The Co-op owns and maintains two underground storage tanks (0.75 million-gallon and 0.5 million-gallon) and 45 miles of pipeline, sized 4 to 18 inches, distributed among four pressure zones.

Table 4 shows the monthly water flow into the Las Campanas receiving station for the period of 2011 to 2016.

Table 4. Water Flow at Las Campanas Co-op Receiving Station, 2011-2016

Month	Flow (million gallons)					
	2011	2012	2013	2014	2015	2016
January	2.5	1.9	2.4	2.4	1.9	2.0
February	2.5	1.4	1.6	2.1	1.4	1.8
March	1.7	2.5	2.4	2.5	2.2	2.7
April	6.7	5.0	5.3	5.6	4.2	4.8
May	9.7	9.7	10.2	8.9	7.5	9.2
June	11.9	11.2	12.7	10.9	10.4	12.0
July	13.0	11.0	13.0	11.0	9.7	14.5
August	11.2	11.5	11.5	10.2	10.8	10.2
September	8.6	9.6	8.4	9.6	10.3	12.4
October	5.5	7.0	5.7	7.1	6.9	11.5
November	2.0	2.3	2.2	2.5	1.9	3.3
December	2.0	2.6	2.3	2.3	2.2	2.1
Total Annual	**77.3**	**75.6**	**77.9**	**75.0**	**69.5**	**86.5**

3.2.3.2 The Club at Las Campanas

The Club has two 18-hole golf courses and a driving range that make up a total of 140 acres of irrigated turf grass. On average, from 2010 to 2016, the Club has applied just shy of 600 acre-feet (200 million gallons) of raw (untreated) water per year to maintain the turf grass. The water used for irrigation is a combination of treated effluent from the Co-op and untreated, raw water diverted from the Rio Grande by the BDD. Table 5 shows the Club's monthly raw water usage from 2010 to 2021.

The Club derives its water rights to water diverted from the Rio Grande from several sources:

- The Club has access to around 250 ac-ft/yr of native Rio Grande raw (untreated) water purchased through the Las Campanas and Sewer Water Co-op.
- The Club leases 600 ac-ft/yr of SJC water from the Jicarilla Apache Tribe.
- The Club has a contract with the County for up to 600 ac-ft/yr of native Rio Grande water.

- In addition, the city has occasionally supplied the Club with water from the city's Buckman wells during emergencies.

Table 5. Water Usage by the Club at Las Campanas, 2010-2016

Month	Irrigation Water Use (million gallons)												Average
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
January	0.3	0.8	0.6	0.1	3.0	0.0	0.0	0.0	1.6	1.6	3.6	0.0	1.0
February	0.0	1.1	1.2	2.7	5.1	0.3	1.3	1.1	4.2	1.6	0.0	0.0	1.5
March	0.7	9.2	10.6	6.9	9.2	11.7	18.9	14.4	13.2	0.0	1.7	0.0	8.0
April	12.2	20.9	18.9	23.7	25.8	22.9	17.9	20.6	32.3	16.3	20.4	13.5	20.4
May	25.3	29.6	32.6	31.2	29.4	22.8	29.0	24.7	36.2	33.9	41.3	20.0	29.7
June	35.0	41.2	40.6	43.3	36.1	35.6	36.9	39.4	44.1	38.3	38.9	22.4	37.7
July	19.2	38.3	27.8	29.5	29.8	19.6	33.0	37.1	28.7	33.5	35.6	14.4	28.9
August	21.8	22.1	26.9	22.5	23.7	26.7	13.9	25.6	20.1	27.2	28.5	14.1	22.8
September	23.6	18.2	21.0	15.7	21.3	22.1	20.3	19.8	17.8	27.6	24.2	9.0	20.1
October	11.2	11.4	17.9	15.3	16.0	14.6	22.1	0.0	11.1	18.0	17.0	5.4	13.3
November	3.1	4.6	5.1	3.7	6.7	5.4	3.4	14.2	1.8	0.6	0.0	0.2	4.1
December	1.6	0.1	0.0	0.6	1.2	0.5	0.9	0.0	0.0	0.0	0.0	0.0	0.4
Total Annual	**154.1**	**197.6**	**203.1**	**195.3**	**207.0**	**182.2**	**197.6**	**196.7**	**211.0**	**198.6**	**211.2**	**99.0**	**187.8**

The Club has one booster station (BS2A), three irrigation system pump-houses, two transfer pump stations, and five holding ponds. The holding ponds provide approximately 100 acre-feet of combined water storage capacity. Approximately 10 miles of 12-inch pipelines connect BS2A to the holding ponds. Watering requirements for the turf grass are determined by three on-site weather stations.

3.3 BDD Water System

The intake for the BDD system is located on the east bank of the Rio Grande in the historic ghost town of Buckman, approximately 3.5 miles downstream of the Otowi Bridge. The U.S. Forest Service owns the land at the BDD intake. The surrounding area is a mix of Bureau of Land Management (BLM), San Ildefonso Pueblo, and private land (Figure 3). One lift station and two booster stations pump the raw water uphill approximately 1,100 feet in altitude and 11 miles in length via a 30-inch pipeline from the river to the BRWTP. The BRWTP is an advanced treatment facility. As shown in Appendix A, BDD applies the following water treatment processes (BDD, 2017):

- River water is diverted through a riverside structure with fish screens. Larger sand particles are separated from the pumped raw water and returned to the Rio Grande. The remaining raw water is pumped to the BRWTP.

- At BRTWP, raw water passes through three pre-sedimentation basins which allow remaining larger particles to settle to the bottom of the basins via gravity.

- After the pre-sedimentation basins, water is mixed with a coagulant (ferric chloride) which causes even the finest particles to clump together. Ozone is added to oxidize organic material and improve the coagulation process.

- Next, flocculation is achieved through gentle mixing. The tiny individual particles collide, stick together, and become larger and heavier. Contaminants and impurities are swept up and removed with the flocculated particles.

- Plate settlers are used to provide very still conditions to separate by gravity the heavier floc particles from the water. The settled solids from this process are concentrated and dewatered in a centrifuge, and then disposed of appropriately.

- After the plate settling the clarified water is filtered under low pressure through membranes with small pore size. This membrane filtration removes all of the particulate matter larger than 0.1 micrometer.

- Ozone is applied once again to the clean water. It oxidizes dissolved organic material not previously removed and kills microbes. Residual ozone is then destroyed.

- The water passes through granular activated carbon (GAC) contactors. The oxidized organics are removed by the biologically active carbon, which also works as a "polishing" process.

- Chlorine and sodium hydroxide are added to disinfect the water and to correct the pH of the treated water. This protects against any contamination that might occur downstream in the pipes. Fluoride is added for dental health. Lastly, a corrosion inhibitor is included to help control lead and copper release from the pipes. The finished drinking water is stored in a 4 million-gallon tank. Two booster stations pump the treated water north and south sending it to the City and County drinking water distribution systems for consumption by the public.

Finished water is pumped from BRWTP to BDD's booster station 4A (BS-4A), where it goes to the City's Buckman Wellfield Booster Station 3 and eventually on to the City's 10 million-gallon storage tank, or to booster station 5A (BS-5A), where it travels directly into the City's and County's distribution systems (Appendix A). The maximum daily capacity of the BDD water treatment facility is about15 million gallons. The BDD typically operates at an average of bout 6 mgd.

4. HYDROGEOLOGY

4.1 Regional Hydrogeology

Santa Fe County is located between the Jemez Mountains to the west and the Sangre de Cristo Mountains to the northeast. Both surface water and groundwater are available in the area.

BDD obtains surface water from the Rio Grande. The 2016 Jemez y Sangre Regional Water Plan (NM ISC and OSE, 2016) provides the following description of rivers in the area:

> The Rio Grande, which drains south through the region from Embudo to Cochiti Reservoir, is the major surface water feature (Figure 3-1), although use of this water is limited by provisions of the Rio Grande Compact. The provisions of the Rio Grande Compact effectively split the available surface water supply for the Rio Grande Basin above Elephant Butte Reservoir into the part north of the Otowi gage and the part south of the gage (see Section 5 for discussion of the Rio Grande Compact). The Rio Chama, which flows into the Rio Grande near the northwest boundary of the planning region, also contributes a significant amount of water to the region, much of it imported water from the San Juan-Chama Project. The Santa Fe River, which supplies a portion of the City of Santa Fe water supply, Galisteo Creek south of Santa Fe, and the Rio Nambe, Rio Tesuque and Pojoaque River north of Santa Fe are also important tributaries in the region. The quality of the surface water in the region is generally very good to excellent.

The Tesuque Formation, part of the Santa Fe Group aquifer, underlies the BDD area. Spiegel and Baldwin (1963) provides the following description of the Tesuque Formation:

> The Tesuque formation of middle Miocene to early Pliocene age, here named for the town of Tesuque, 5 miles north of Santa Fe ..., consists of several thousand feet of pinkish-tan soft arkosic, silty sandstone and minor conglomerate and siltstone...
>
> In the Santa Fe area, the Tesuque formation is generally exposed north of the Santa Fe River, and it is best exposed along the north edge of the Santa Fe area. The Tesuque, which represents the greater part of the Santa Fe group in the Santa Fe area, rests with at least local angular unconformity on the volcanic rocks of Oligocene and Miocene age and is overlain with angular unconformity by the Ancha formation. Although near its base the Tesuque includes sediments derived from Tertiary igneous rocks, it consists principally of debris from Precambrian rocks.

> The color of the Tesuque formation ranges from grayish orange to moderate reddish orange and light brown. The usual pinkish color is due largely to the predominance of reddish grains of microcline. Crossbedding is common, and molds of desiccation cracks have been noted on the under surfaces of sandstones that rest on siltstones. Cementation by calcium carbonate is common, and in many specimens the cement is crystalline. The conglomerate, which is coarse, is common near the mountain front but less common farther west, partly because in general the lower beds are exposed only near the mountains. Clay is present only in very small amounts, but silt and very fine sand form a large proportion of the unit. The sand in many of the sandstone beds is fairly well sorted.

Due to the depth of the City's Buckman wells and the hydrogeology of the area, there has been no evidence of any Buckman wells being under the influence of surface water, despite close proximity of several wells to the river, namely Buckman wells (BW) 1 and 8.

4.2 Water Sources

4.2.1 Rio Grande Source Water Quality

According to BDD (Bowman, 2017):

> The water quality of the Upper and Middle Rio Grande under base flow ("normal" or ambient) conditions is good overall, with few and occasional minor exceedances of individual water quality standards (NMED/DOE/OB, 2012). Sediments carried in stormwater flow conditions generally exhibit concentrations that are elevated above ambient levels for certain constituents that are attached to soil and sediment particles. Stormwater studies show a strong correlation between certain surface water contaminants such as radionuclides, polychlorinated biphenyls (PCBs), metals and suspended sediment concentrations. That is, many of the contaminants of concern and other chemical compounds have a strong affinity for and are bound to the particles and organic matter in suspended sediments. Storm flow events are short lived, transient, and their sediment loads fluctuate proportionately with changing flow.
>
> The quality of the surface water in the Rio Grande is subject to the Clean Water Act (CWA), and thus subject to the water quality standard listed in 20.6.4 NMAC. Specifically, BDD falls under the 20.6.4.114 NMAC segment of the river, and potential uses are listed in that subsection of the rules, which includes "public water supply." As such, even though the general water quality of this stretch is "good overall," this segment of the Rio Grande is impaired for uses such as irrigation and livestock watering due to the presence of contaminants at concentrations exceeding certain standards. The

2018-2020 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated List (pg. 190) https://www.env.nm.gov/wp-content/uploads/2018/03/Appendix-A-Integrated-List.pdf details all impaired uses and exceedances from standards for this stretch of the river. The figure below depicts many other stretches impaired for different uses in the region of BDD (NM ISC and OSE, 2016.)

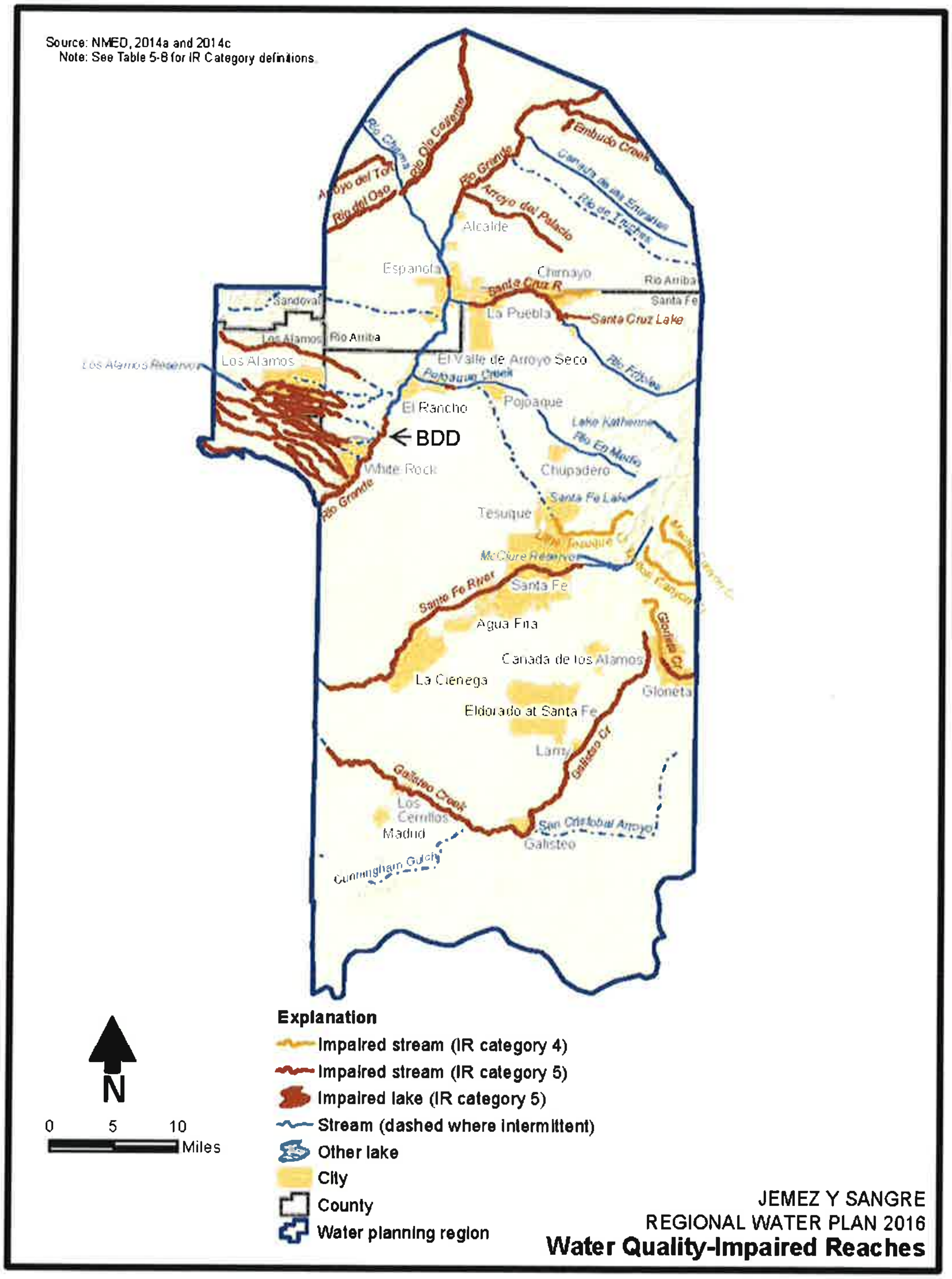


Figure 5-13

BDD monitors the quality of the Rio Grande as part of their National Pollutant Discharge Elimination System (NPDES) permit. EPA Region 6 was satisfied with the results of the first three years of BDD's monitoring of the Rio Grande. In subsequent renewals of the NPDES permit, the EPA has reduced the initial lengthy list of monitored constituents to a more limited list of turbidity, pH, and Whole Effluent Toxicity (WET). However, water quality of the Rio Grande continues to be monitored by other environmental entities, some of them being USGS and NMED under the CWA 303(d) program.

4.2.2 Drinking Water Quality Reports

Drinking water quality is monitored by the NMED DWB under the Safe Drinking Water Act. To protect public health, drinking water quality is checked against the national primary standards (maximum contaminant levels [MCLs]) for 87 constituents and secondary standards (secondary MCLs [SMCLs]) for 15 constituents.

U.S. EPA (2017b) defines primary and secondary standards as follows:

> EPA has established National Primary Drinking Water Regulations (NPDWRs) that set mandatory water quality standards for drinking water contaminants. These are enforceable standards called "maximum contaminant levels" (MCLs) which are established to protect the public against consumption of drinking water contaminants that present a risk to human health. An MCL is the maximum allowable amount of a contaminant in drinking water which is delivered to the consumer.
>
> In addition, EPA has established National Secondary Drinking Water Regulations (NSDWRs) that set non-mandatory water quality standards for 15 contaminants. EPA does not enforce these "secondary maximum contaminant levels" (SMCLs). They are established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the SMCL.

As required by the Safe Drinking Water Act, NMED DWB samples BDD's finished drinking water. Of the 70 primary contaminants monitored by the NMED DWB, none have ever been detected at levels exceeding the MCL. A summary of the results from 158 monitored constituents at BDD from 2011 to 2016 is presented in Appendix B. For each tested constituent, the table provides the number of detected results, and the minimum, maximum and average value of all detected values.

Public water systems report the results of required water quality sampling to their customers in a consumer confidence report (CCR.) due July 1st of every year. Results of BDD water quality testing are published under the Santa Fe City's CCR. The CCRs for 2019, 2020, and 2021 are provided in Appendix B, and show concentrations of the monitored constituents in comparison to MCLs. The results from the additional and voluntary drinking water testing are reported on the BDD web site. BDD had not exceeded any MCL for primary contaminant since its start of operation in 2011.

4.2.3 Production Rates

Table 6 summarizes the BDD monthly production of finished water from BS-4A and BS-5A from 2011 to 2021. Figure 5 depicts the total annual production over this time period, while Figure 6 shows these data split by production from BS-4A and BS-5A. The lowest annual production since BDD opening was 1,271 million gallons in 2019; the highest was 2,035 million gallons in 2021.

Table 6. BDD Monthly Production, 2011-2021

Month	Production (million gallons)																	
	2011			2012			2013			2014			2015			2016		
	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total
January	63.7	0	63.7	101.9	25.9	127.8	100.4	48.7	149.1	88.7	34.5	123.2	49.4	45.1	94.5	87.2	27.3	114.4
February	97.3	0	97.3	56.9	21.8	78.7	33.7	43.1	76.8	79.9	30.6	110.5	68.8	30	98.7	65.8	32.9	98.8
March	117.9	1.1	119	60.9	43.3	104.2	74.3	49.2	123.5	111.1	45.4	156.5	65.1	32.9	98	121	44.7	165.7
April	194.8	4.7	199.5	118.2	57.9	176.1	159.2	56.2	215.4	43.9	53.5	97.4	4.5	6.4	10.9	162.1	42.6	204.7
May	130.8	11.3	142.1	155.4	68.9	224.3	230.4	68.8	299.2	174.5	63.9	238.4	66.6	37.8	104.4	103.6	48.7	152.2
June	243.8	6	249.8	131	81.7	212.7	209.1	83.8	292.9	117.9	70.3	188.3	127.7	53.8	181.5	38.2	30.1	68.3
July	110.4	28.3	138.7	22.8	17.9	40.7	71.7	55.6	127.3	68.2	58.6	126.8	70.3	49	119.3	53.6	61.3	114.9
August	10	23.9	33.9	34.3	43.3	77.6	0.0	8.2	8.2	91.1	65	156.1	83.8	46.6	130.4	18.4	27.9	46.3
September	92.9	63.3	156.2	157.7	57.2	214.9	7.9	9.8	17.7	109.4	75.4	184.8	134	60.3	194.2	121.2	56.2	177.4
October	118.6	59.1	177.7	179	57.5	236.5	30.4	56.4	86.8	81.2	69	150.1	151.9	49.7	201.5	181.6	32.1	213.7
November	95.2	47.6	142.8	128.1	40.3	168.4	47.9	43.6	91.5	71.7	60.3	131.9	109.3	43.6	152.9	113	18.1	131.1
December	97	39.2	136.2	129.2	44.6	173.8	53.2	32.6	85.8	81.8	59.7	141.5	69.3	23.7	92.9	101.2	12.8	114
Total Annually	**1372.4**	**284.5**	**1656.9**	**1275.4**	**560.3**	**1835.7**	**1018.2**	**556.0**	**1574.2**	**1119.4**	**686.2**	**1805.5**	**1000.7**	**478.9**	**1479.2**	**1166.9**	**434.7**	**1601.5**

Month	Production (million gallons)														
	2017			2018			2019			2020			2021		
	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total	BS-4A	BS-5A	Total
January	90.3	34.1	124.3	65.1	47.6	112.7	70.9	28.3	99.2	128.9	6.4	135.3	86.3	31.4	117.7
February	85.1	33.6	118.7	61.8	42.5	104.3	54.1	25.4	79.5	102.3	21.8	124.1	95.0	31.2	126.2
March	104.9	50.8	155.7	41.1	50.1	91.2	20.9	21.0	41.9	79.2	28.2	107.4	102.0	36.7	138.7
April	99.8	64.5	164.3	133.3	43.6	176.9	12.1	13.6	25.7	67.1	35.0	102.1	133.1	47.2	180.3
May	64.0	65.0	129.0	204.5	52.9	257.4	92.9	41.3	134.2	103.1	55.0	158.1	194.3	56.5	250.8
June	82.1	71.3	153.4	170.9	59.3	230.2	81.5	49.1	130.6	94.9	65.2	160.1	178.8	70.0	248.8
July	85.6	74.0	159.7	166.9	61.8	228.7	111.6	59.4	171.0	141.3	66.0	207.3	100.9	59.9	160.8
August	81.4	68.9	150.2	140.2	56.6	196.7	60.7	44.6	105.3	180.0	71.0	251.0	158.4	65.7	224.1
September	117.2	66.7	183.9	95.0	45.0	139.9	111.3	26.7	138.0	155.7	50.0	205.7	118.1	43.7	161.8
October	79.3	54.8	134.1	119.1	34.6	153.8	115.3	30.4	145.7	121.1	50.0	171.1	146.4	19.6	166.0
November	47.4	47.8	95.2	99.3	26.8	126.0	69.8	26.7	96.5	87.1	27.8	114.9	100.0	31.7	131.7
December	61.8	48.7	110.5	86.3	26.4	112.7	94.4	9.1	103.5	92.4	28.7	121.1	97.5	30.4	127.9
Total Annually	**998.8**	**680.1**	**1679.0**	**1383.3**	**547.2**	**1930.5**	**895.5**	**375.6**	**1271.1**	**1353.1**	**505.1**	**1858.2**	**1510.8**	**524.0**	**2034.8**

Figure 5. BDD Total Annual Production, 2011-2021

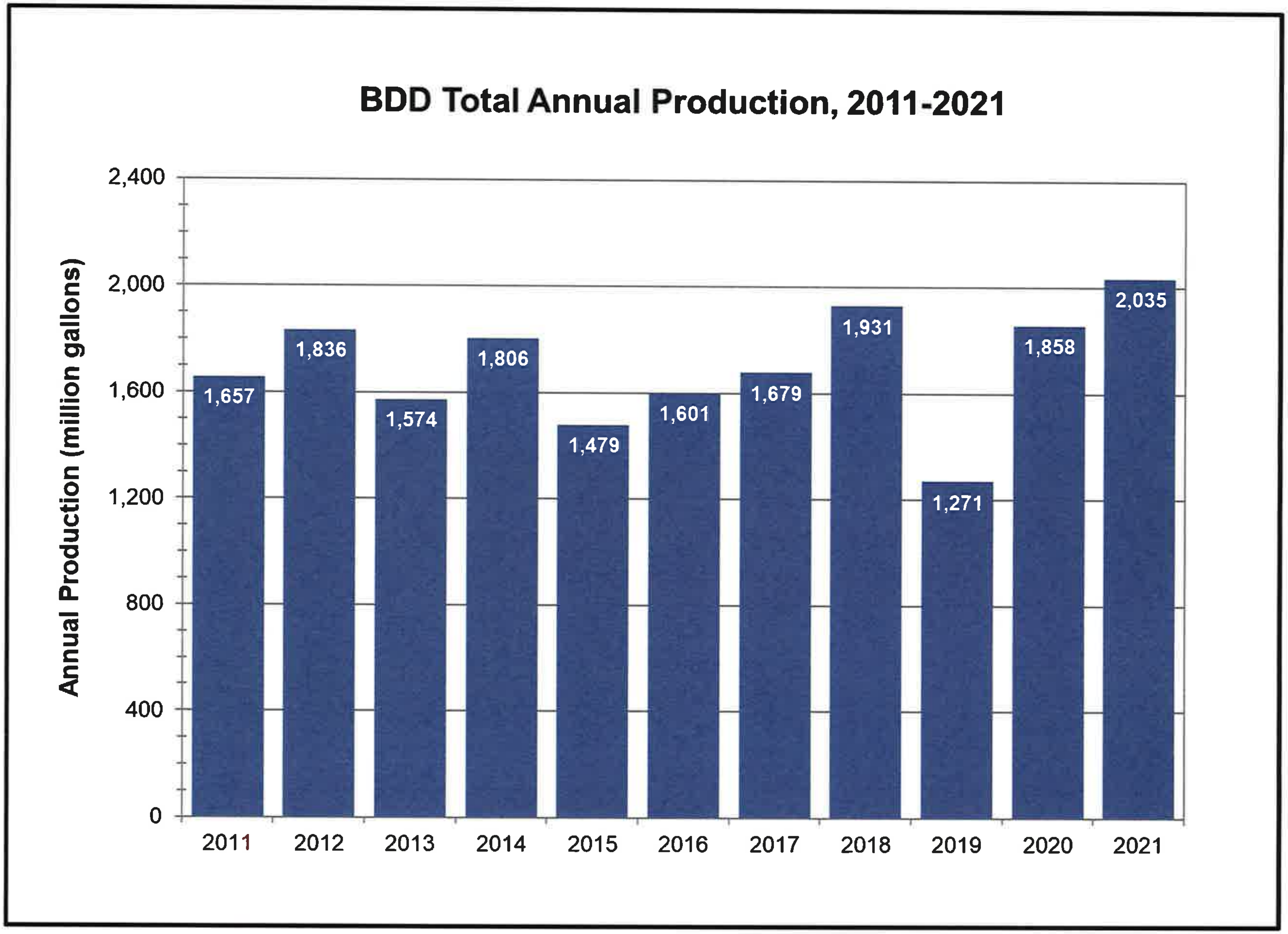
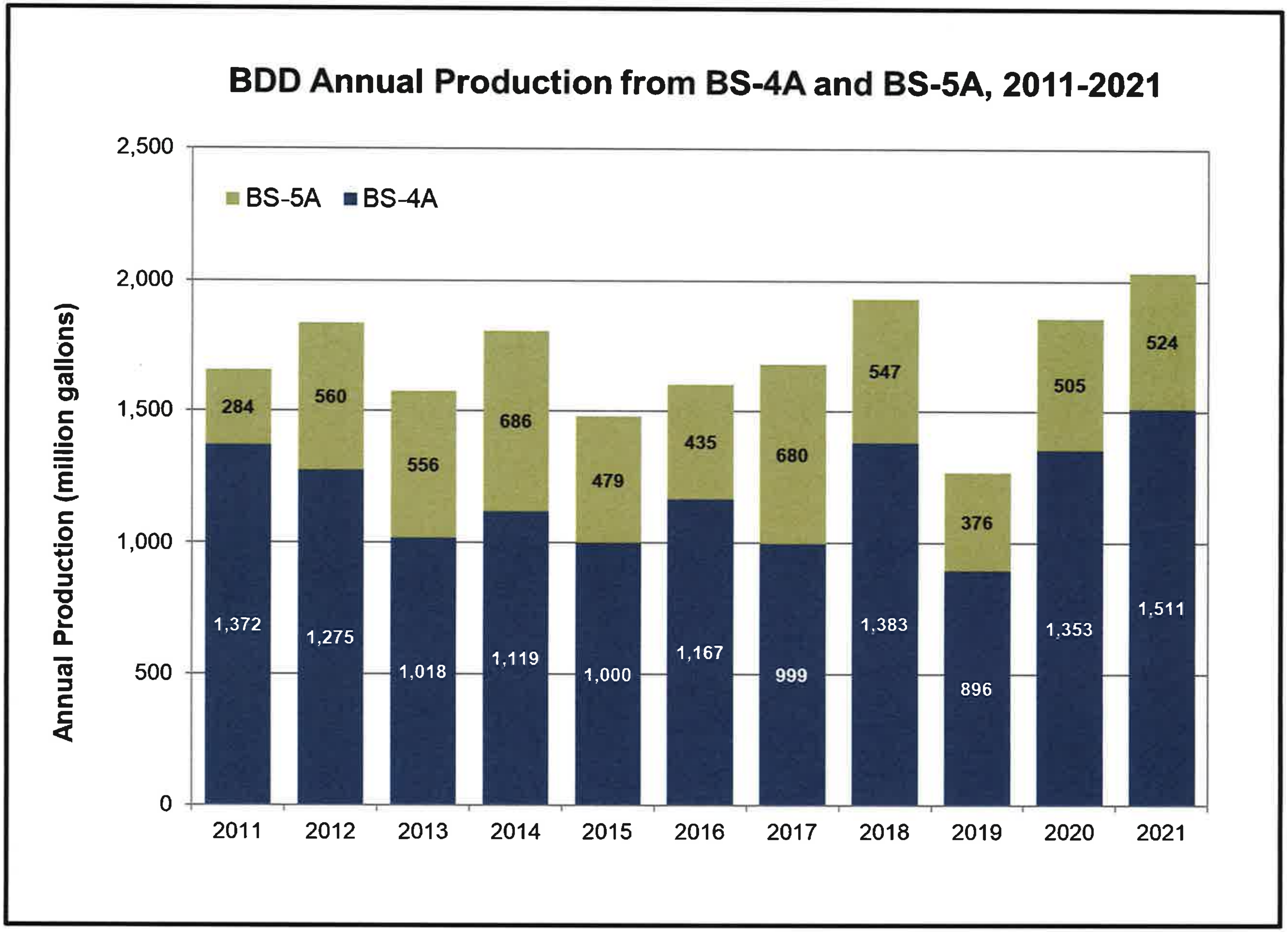


Figure 6. BDD Annual Production from BS-4A and BS-5A, 2011-2021



5. WATER SUPPLY CHANGES AND IMPACTS

5.1 Historical Change and Impacts

During the severe drought experienced by Santa Fe from the late 1990s to 2002, and despite ongoing and very successful water conservation programs, the Santa Fe region did not have enough reliable and sustainable drinking water sources to meet the growing needs. The City of Santa Fe and the County of Santa Fe designed a sustainable water supply project, the BDD project, to help protect our region from running out of water during a drought.

The project was needed to supplement the two sources of water the local community depended on – groundwater wells and reservoirs on the Santa Fe River. The groundwater wells were not sustainable at the pre-BDD pumping levels due to increasing demand, and the local reservoirs can run out of water during a dry year. The BDD promised to provide a new source of surface water in addition to the existing supplies of surface water and help the regional aquifer rest and recharge (refill) so that it will be here for the future generations. The City or Santa Fe and the County of Santa Fe constructed the BDD to add this source of water by diverting and treating water available from the Rio Grande that they cannot access through groundwater pumping.

The BDD came online in January 2011. In May 2011, after nearly a decade in development, the Buckman Direct Diversion Board (BDDB) assumed responsibility for the day-to-day operations, management and maintenance of the Buckman Regional Water Treatment Plant (BRWTP) and facilities. This new water supply source is reliable, sustainable and provides flexibility in how the city and county choose to use the different supply sources for water consumption. Operation of all four sources (Section 3.2.1) will continue to meet the needs of city and county water system customers, improve the regional public water supply under drought conditions, and replace unsustainable groundwater pumping making a drought reserve possible.

5.2 Need for Future Water Sources

BDD is currently able to meet the demand of its customers. There are no plans for expanding the BDD system or water rights holdings.

6. Source Water Protection Area

The source water protection area (SWPA) is described as a buffer around wells, reservoirs, and on either side of rivers, streams, and canals for use in identifying potential contamination from sources within close proximity. For the purposes of BDD's SWPP, the SWPA begins 500 feet downstream of the intake and ends 10 miles upstream. In reality, catastrophic contaminations occurring upstream from BDD of even more than 10 miles may influence the river water quality and may influence the BDD operations. However, in order to make this plan practical and feasible, the limit of 10 miles upstream will be accepted as the upper limit of the SWPA. Tributaries within this SWPA are included even if not specifically delineated on Figure 7.

For purposes of delineating surface water SWPAs, NMED distinguishes between two different types of watersheds, Type A and Type B, defined as follows:

Type A watersheds are defined as having an area under 30 square miles. Buffer zones within the watershed are defined as follows:

- Buffer Zone A is a 200-foot wide strip of land paralleling either bank of an active stream channel and/or extending from the mouth or inlet of an impoundment to the uppermost boundary of the watershed.
- Buffer Zone B is a 300-foot wide strip of land beginning at the outside margin of buffer Zone A.
- Buffer Zone C is the balance of the land area extending to the topographic boundary.

Type B watersheds are defined as having an area over 30 square miles. Potential source of contamination (PSOC) inventories and susceptibility analysis are applied only to that portion of the watershed defined as "critical stream segments," as follows:

- Buffer Zone A is a 200-foot wide strip of land paralleling either bank of an active stream channel.
- Buffer Zone B is a 300-foot wide strip of land paralleling an active stream channel and beginning at the outside margin of Buffer Zone A.
- Buffer Zone C is a ½-mile wide corridor of land paralleling either bank of an active stream channel.

The Rio Grande has a Type B watershed; therefore, the SWPA is subdivided into the following three zones:

- Zone A: radius of 0 to 200 feet from each stream bank
- Zone B: radius of 201 to 500 feet from each stream bank
- Zone C: radius of 501 to 2,640 feet from each stream bank

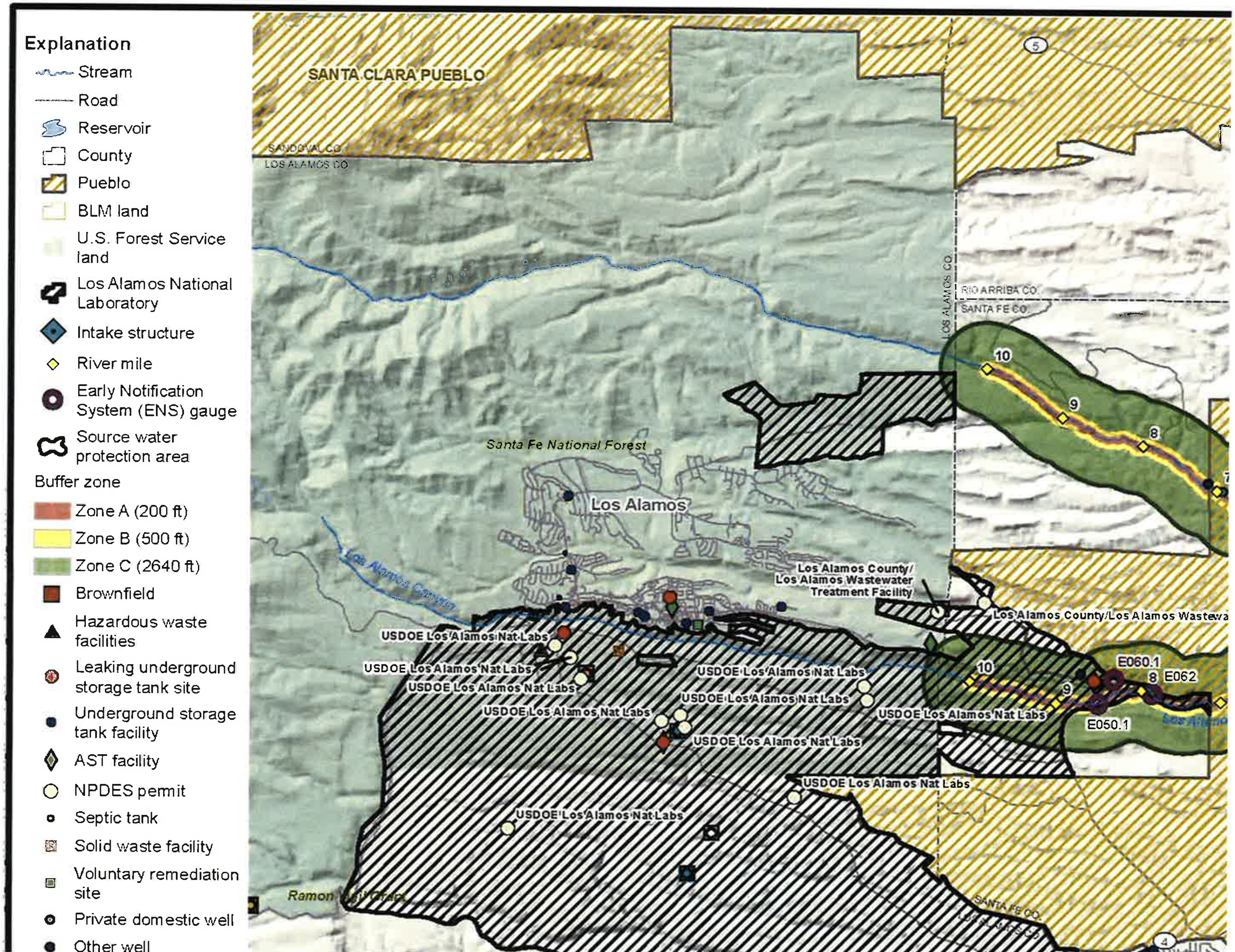
In addition to the Rio Grande, two other large tributaries have been added to the BDD SWPA: Los Alamos Canyon and Guaje Canyon, both being dry canyons (ephemeral) and part of the Los Alamos Canyon watershed. When these ephemeral streams flow, they may carry the LANL legacy waste contaminated sediments to the Rio Grande. Over the years, LANL-contaminated sediments have settled along the banks of Los Alamos Canyon, especially in its lower portion. Englert (NMED DOE OB, 2011) found that most contaminated sediments transported to the lower Los Alamos Canyon from the contaminated sources (upper Los Alamos Canyon and Pueblo Canyon) settle in the lower Los Alamos Canyon and only small part (19%) of the mobilized contaminated sediments discharge to the Rio Grande. While Guaje Canyon is not known to be affected by LANL contamination, it flows into the lower Los Alamos Canyon, and can therefore remobilize contaminated sediments from the lower Los Alamos Canyon and discharge them to the Rio Grande.

The BDD SWPA for the Rio Grande, including the delineated portions of Los Alamos Canyon watershed, is shown in Figure 7. The total area of the delineated SWPA is 22.03 square miles: 5.76 square miles in Los Alamos Canyon, 5.41 square miles in Guaje Canyon, and 10.86 square miles in the Rio Grande. For ease in identifying and tracing PSOCs, river miles have been added to the map, starting 500 feet downstream of the intake and moving upstream. Guaje Canyon meets Los Alamos Canyon between Los Alamos Canyon river miles 4 and 5; the convergence of Los Alamos Canyon into the Rio Grande occurs between Rio Grande river miles 3 and 4. The stream and river mile will be stated in all text and table references (e.g., Los Alamos Canyon river mile 7 versus Guaje Canyon river mile 7 or Rio Grande river mile 7).

The delineated SWPA meets the criteria of the NMED DWB guidance for establishing an area to evaluate for PSOCs. DBS&A requested and received geographical information system (GIS) data used in NMED DWB's Source Water Protection Atlas (NMED DWB, 2017), an interactive mapping tool that contains active and inactive drinking water sources, regulated sites, and other information.

These GIS data were used to generate the maps showing the river's SWPA and PSOCs. A map encompassing the PSOCs in all watersheds upstream from BDD is included in Appendix E.

Figure 7. BDD SWPA and PSOCs



7. Potential Sources Of Contamination (PSOC)

7.1 Overview of Potential Contaminant Sources and Risk Assessment

Potential sources of contamination (PSOCs) are defined as any possible site or event that could, under any circumstance and time frame, lead to contamination of drinking water sources. Not all sites identified as PSOCs pose the same level of risk. Depending on the type of PSOC, some sites may pose little to no contamination risk, while others may pose an imminent threat. Sources of contamination (SOCs) are considered those activities or environmental accidents that are currently threatening or contaminating the source water

The source water protection area (SWPAs) for BDD was described in the previous section and delineated on Figure 7.

Following the identification of PSOCs, a risk assessment was performed for each contaminant. This methodology is based on a technique developed by the Colorado Rural Water Association (e.g., CRWA 2017) and involves estimation of risk using two parameters: the "probability of impact" and the level of "impact to the water system."

The "probability of impact" changes in increasing order from "rare" to "certain", and the "impact to the water system" changes in increasing order from "insignificant" to "catastrophic." For definition of each level of these parameters, see the table below. When determining the risk for a source of contamination, one will find the "impact to the water system" along the x-axis and then along the vertical y-axis find the level of "probability of impact" in order to determine the overall risk of that specific source of contamination. The factors influencing both parameters will be how close the source is to the water resource, how large the contamination is or could be, how potent or toxic the contaminant of concern is and how fast the contamination could be transported toward the water resource.

Table 7. Risk Assessment Decision Table

SWAP Risk Assessment Matrix

Risk

Probability of Impact	Insignificant	Minor	Significant	Major	Catastrophic
Certain	Low	Moderate	High	Very High	Very High
Likely	Low	Moderate	High	High	Very High
Possible	Low	Moderate	Moderate	High	High
Unlikely	Very Low	Low	Moderate	Moderate	Moderate
Rare	Very Low	Very Low	Low	Low	Low

Impact to Water System

Instructions: Use this matrix like a graph. Identify the "Impact to Water System" on the X axis, then identify the "Probability of Impact" on the Y axis. The risk is determined by the intersection of these two lines.

Probability of Impact: The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within one to ten years.	
Certain:	>95% probability of impact
Likely:	>70% to <95% probability of impact
Possible:	>30% to <70% probability of impact
Unlikely:	>5% to <30% probability of impact
Rare:	<5% probability of impact

Impact to Water System: The following descriptions provide a framework to estimate the impact to the public water system.	
Catastrophic:	Irreversible damage to the water source(s). This could include the need for new treatment technologies and/or the replacement of existing water source(s).
Major:	Substantial damage to the water source(s). This could include a loss of use for an extended period of time and/or the need for new treatment technologies.
Significant:	Moderate damage to the water source(s). This could include a loss of use for an extended period of time and/or the need for increased monitoring and/or maintenance activities.
Minor:	Minor damage resulting in minimal, recoverable, or localized efforts. This could include temporarily shutting off an intake or well and/or the issuance of a boil order.
Insignificant:	Damage that may be too small or unimportant to be worth consideration, but may need to be observed for worsening conditions. This could include the development of administrative procedures to maintain awareness of changing conditions.

After determining the risk a source of contamination poses to the water system, it is important to determine whether the water system can *control* the source by any means or *control* the contamination from the source by any means. The level of water system *control* describes the ability of the water system to take measures to prevent contamination or minimize impact. A potential contaminant source that falls within a water system's jurisdiction (i.e. direct control), may be of higher priority since they can take direct measures to prevent contamination or minimize the impact.

- **Direct Control** – The water system can take direct measures to prevent.
- **Indirect Control** – The water system cannot directly control the issue, but can work with another person or entity to take measures to prevent.
- **No Control** – The PSOC or issue of concern is outside the control of the public water system and other entities.

Several different resources were used to compile a list of all possible PSOCs within BDD's SWPA. The Source Water Protection Atlas is a database maintained by the NMED DWB (2017) containing information on sites that are registered with the state, such as wastewater discharge permits and fuel storage tanks. Because information included in the Source Water Protection Atlas is not inclusive of all potential sources of contamination, the assessment also included the EPA interactive map (U.S. EPA, 2017a), geologic reports, previous reports provided by BDD, the City of Santa Fe, and Santa Fe County, and input from the Source Water Protection Team and the public.

PSOCs can be either human-caused or naturally occurring. Both types of PSOC are found within BDD's SWPA, as discussed in the following subsections and shown on Figure 7.

7.2 Human Sources of Contamination

The human-caused PSOCs that can be mapped and are known to occur in BDD's SWPA and the types of those PSOCs are listed in Table 8. NMED has compiled an extensive database of human sources of contamination and that database was used to generate the PSOCs on Figure 7 and Figure 8. GIS data for septic tanks (map code RSF) were not included in any of the state's databases. Because no sewer service is available in the area, RSF sites were added for each building using aerial imagery from the U.S. Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) (dated 2014).

Table 8. Human-Caused Potential Sources of Contamination

Map Code	Land Use	Description	Contaminants of Concern
ADC	Drainage canals, ditches or acequias (unlined)	Runoff and infiltration	Pesticides, herbicides, fertilizers, nitrate, pathogens
Arroyo	Ephemeral stream	Runoff and infiltration	Pesticides, herbicides, fertilizers, nitrate, pathogens
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
CHG	Historic gasoline service station	Above/below ground storage tanks/operations	Gasoline, oils, solvents, automotive wastes, septage
CSS	Gasoline service station	Above/below ground storage tanks/operations	Gasoline, oils, solvents, automotive wastes, septage
ICC	Cement/concrete plant	Operations/maintenance/ storage	Organic/Inorganic chemicals, oils, natural gas, propane
MPW	Polluted Surface Water Sources	Naturally occurring/ anthropogenic	Sewage, pathogens, nitrate, metals, acids, bases, organic/inorganic chemicals
MRP	Primary road, highway, or arterial	Public street, thoroughfare, highway, or main road	Gasoline, diesel fuels, metals, stormwater runoff, hazardous materials, radiological materials
NPDES permit	National Pollutant Discharge Elimination System (NPDES) permit	Discharge from a point source into waters of the United States	Sewage, sewage sludge, metals, pathogens, organic/inorganic chemicals
PDW	Private domestic well	Private domestic well that is registered with the OSE	Conduit for any contaminant to enter aquifer
RSF	Residential septic system	Wastewater discharge to septic tank, leach field, or cesspool	Septage, pathogens, nitrate, ammonia, chloride, heavy metals, household pesticides, herbicides, cleaning agents and solvents, fuels

Note: The human-caused PSOCs listed in this table include only those that can be mapped. See the following subsections for discussion of others known to exist for the BDD system.

7.2.1 Los Alamos National Laboratory (LANL)

The Los Alamos and Pueblo canyons (LA/P canyons) are located on the Pajarito Plateau where for decades Los Alamos National Laboratory had discharged contaminated waste and wastewater as part of the "Manhattan Project" and later LANL's nuclear weapons program. The confluence of these canyons with the Rio Grande is located nearby Otowi Bridge, 3.5 miles upstream from BDD. The LA/P canyons are ephemeral streams and when they flow, their run off may carry contaminants from the canyons and discharge them into the Rio Grande near Otowi Bridge and transport them downstream to BDD.

ASTDR (2006).

(Page 3) **Site Description and Operational History**

LANL covers approximately 28,000 acres in north central New Mexico. Most of the laboratory lies within Los Alamos County; a smaller portion is in Santa Fe County. Albuquerque is approximately 60 miles to the southwest and Santa Fe is approximately 25 miles to the southeast. The Bandelier National Monument borders LANL's southwestern boundary. Los Alamos is adjacent to LANL's northern boundary and White Rock is adjacent to the southeastern boundary. The San Ildefonso Pueblo is to the east; national forest lands border the northwestern, the northern, and the southeastern LANL boundaries (Figure 1). Large parts of these areas remain undeveloped (LANL 1999).

(Page 5) **Environmental Setting**

The Jemez Mountains to the west and the Sangre de Cristo Mountains to the east dominate the vast, naturally beautiful landscape in which LANL is situated. The Rio Grande flows north to south, dividing the mountain ranges and, over geological time, contributing to the creation of the Pajarito Plateau, a volcanic shelf on the eastern slope of the Jemez Mountains on which LANL is situated. The plateau comprises finger-like mesas separated by steeply sloped canyons. Cut by intermittent streams, the canyons are oriented east-to-west, at right angles to the Rio Grande. The mesa elevations range from 7,800 feet (ft) at the base of the Jemez Mountains to 6,200 ft at their eastern end, where they rise above the Rio Grande Valley (LANL 1999).

Of all canyons on the Pajarito Plateau, Los Alamos Canyon and its tributaries (DP Canyon, Pueblo Canyon, Pueblo's tributary Acid Canyon, Bayo Canyon, and Guaje Canyon) drain into the Rio Grande River near the Otowi Bridge, approximately 3.5 miles upstream of the BDD Intake structure. The rest of the Pajarito Plateau canyons drain downstream from BDD.

Wastes discharged in Los Alamos watershed are listed in Reneau (1998):

TA-45 was the site of the first radioactive liquid waste treatment plant at the Laboratory, and radioactive effluent was discharged from TA-45 into Acid Canyon, a small tributary of Pueblo Canyon, between 1944 and 1964 (LANL 1981, 6059; LANL 1992, 7668). This effluent was untreated before 1951, when the first treatment plant became operational, and the highest concentrations of radionuclides were probably discharged before this time. TA-45 was the source for most of the plutonium-239, 240 within the Los Alamos Canyon watershed and was also the source for other radionuclides present at much lower concentrations, including americium-241, cesium-137, plutonium-238, strontium-90, and tritium.

TA-21 was established in 1945 on DP Mesa and was the site of a plutonium processing plant and radionuclide research laboratories (LANL 1991, 7528). Treated radioactive liquid waste was discharged at the 21-011(k) outfall into DP Canyon, a small tributary of upper Los Alamos Canyon, between 1956 and 1985. The 21-011(k) outfall was the source for most of the americium-241, cesium-137, and strontium-90 within the Los Alamos Canyon watershed and was also the source for other radionuclides at much lower concentrations, including plutonium-238; plutonium-239,240; tritium; and several isotopes of uranium and thorium. Discharges of cesium-137 and strontium-90 from the 21-011(k) outfall were apparently highest before 1968, and discharges of americium-241 were apparently highest after 1978.

According to ASTDR (2006):

(Page ix) Past activities have released radioactive and chemical wastes to the soil, air, and water surrounding the LANL. Historically, laboratory personnel discharged liquid wastes into canyons, buried solid wastes in the ground, and released air emissions into the atmosphere. On occasion, accidental spills also occurred.

(Page 18) **Waste Received**
In addition to the natural run-off produced by precipitation and springs, surface water flow in the canyons is augmented by effluent from LANL activities. Since LANL's opening in the 1940s the canyons adjacent to LANL have received treated and untreated radioactive and sanitary waste. Acid, Pueblo, and Los Alamos Canyons were the primary recipients of untreated radioactive liquid waste.

(Page 20 and 21) The highest levels of radioactivity for surface water were found in Los Alamos Canyon (total uranium and gross alpha). For sediment, the highest levels were typically detected in Los Alamos Canyon (americium-241, cesium-137, strontium-90, and total uranium). Acid Pueblo Canyon had the highest level of plutonium-239/240. The highest values of water quality parameters and inorganics (in surface water and sediment) were distributed primarily throughout Los Alamos and Acid Pueblo Canyon. Overall, strontium-90, chloride, fluoride, sodium, and arsenic were detected above CVs [comparison values] with the greatest frequency. Acid Pueblo Canyon had the only detections of organics in surface water and Los Alamos Canyon had the only detections of organics in sediment. Specific contaminants found in each area is discussed below and summarized in Tables 7 to 10.

Acid Pueblo Canyon

From this canyon, gross alpha radiation was the only radiological test result detected above its CV in surface water. At least twice in the sediment cesium-137, plutonium-239/240, and strontium-90 were all detected above their CVs. Strontium-90 (to 5 pCi/g) was the only 20 Los Alamos National Laboratory Public Health Assessment radionuclide to exceed its CV by more than a factor of 10. Two organics, five water quality parameters, and eight inorganics were also detected above CVs in the surface water. Chloride (to 300 ppm) and arsenic (to 0.019 ppm) were the only two to exceed their CV by more than a factor of 10. Fluoride, nitrate, sodium, and boron were detected above their CVs with the greatest frequency (more than three times). Three inorganics were also detected above CVs in the sediment, but only arsenic was detected more than once. None of the inorganics detected in the sediment exceeded their CV by more than a factor of seven.

Los Alamos Canyon

In the surface water, both total uranium (to 576 pCi/L) and gross alpha (to 520 pCi/L) were detected above their CVs. Three water quality parameters and seven inorganics were also measured above CVs. The maximum detected concentration of all four water quality parameters exceeded CVs by at least 30 times. Arsenic (to 0.017 ppm) was the only inorganic with the maximum detected concentrations greater than 10 times its CV. In sediment, americium-241, cesium-137, plutonium-239/240, and strontium-90 were detected above CVs. Arsenic, benz(a)anthracene, and benzo(a)pyrene were also found above CVs.

The LANL legacy contaminants of highest concern are the following radionuclides: plutonium-239/240, plutonium-238, americium-241, strontium-90, cesium-137, and uranium isotopes since those contaminants have been identified as contaminants in the Los Alamos Canyon watershed in multiple studies by different agencies (federal and state). All of these contaminants are transported predominantly via suspended sediments. This characteristic makes these contaminants likely to be transported downstream to the BDD during storm events when a lot of sediments are agitated and mobilized. The BDD treatment processes are focused on removal of solids from the raw water, and therefore, many contaminants with affinity to solid particles would be managed by the BDD treatment system.

As described in BDD (2016), contamination from LANL reaches BDD as follows:

> Periodic floods during the 1950s and 1960s of the Los Alamos/Pueblo Canyons watershed transported the discharged contaminants downstream from the source of release and ultimately to

> the Rio Grande, and hence to the BDD Intake location. This fact was researched and documented in the works of (Graf, 1994), (Graf, 1996), and (Englert, Dale, Granzow, & Mayer, 2007). By the 1970s the flood frequencies and magnitudes diminished and transported contaminants were stored in sediments in and along the dry stream channels and floodplains of the canyons that run through the Laboratory. Since then and until the Cerro Grande Fire, the frequency of flooding from canyons at LANL diminished and clean sediments along the Rio Grande have covered contaminants that have reached the river.
>
> According to NMED/DOE Oversight Bureau, since the Cerro Grande fire in 2000, canyon floods have increased in intensity and frequency and are eroding the emplaced sediments, exposing and carrying legacy contaminants to the Rio Grande at rates not seen since the discharges of the wastes in the 1950s and 1960s (NMED/DOE/OB, 2012).

LANL has taken some remedial actions in Los Alamos and Pueblo Canyons since the Cerro Grande fire pursuant to the requirements of NMED Order on Consent (2005 and 2016). These actions include installation of sediment retention structures, enhancement of riparian conditions that stabilize sediments, and enhancement and management of a large wetland in Pueblo Canyon that minimizes sediment and contaminant transport. LANL reports that the post-fire (Cerro Grande in 2000, and later, Las Conchas in 2011) watershed hydrology has recovered, partly because of the remedial actions described above.

BDD Board and DOE/LANL

In 2010, prior to coming online, BDD entered into a Memorandum of Understanding (MOU), a legally non-binding agreement, with DOE/LANL to monitor and sample surface water from Los Alamos and Pueblo Canyons in order to determine the storm water quality at the BDD (BDD and DOE, 2015). Under this agreement, which was renewed in 2015 and 2017, the following programs have been maintained:

- Early notification system (ENS), a preventive program with the following objectives:

Two or three gaging stations relay real-time stage height data in 5-minute intervals to the BDD Control Room through SCADA, and another video station relays images only. The participating LANL stations are described in the 2017 renewed MOU (Figure 7): (1) LANL gaging station E050.1 in Los Alamos Canyon above the Pueblo Canyon confluence, (2) LANL gaging station

E060 in Pueblo Canyon above the Los Alamos confluence, (3) video station E062 in the Los Alamos Canyon below the confluence of Los Alamos and Pueblo Canyons, and (4) LANL gaging station E099 (not depicted on Figure 5), the farthest downstream from LANL gaging station within the ENS, located in Guaje Canyon above the confluence of Guaje Canyon and Los Alamos Canyon. The previously participating gaging station E109.9 (shown on Figure 7) was located in the lower Los Alamos Canyon, 0.7 miles from the Rio Grande. That station was buried by sediment carried by strong storm flow in September 2013.

When storm flows exceed 5 cubic feet per second (cfs) at the LANL gages, BDD is notified. The trigger flow of 5 cfs was selected by LANL (under the Los Alamos/Pueblo Canyons Stormwater Monitoring Plans) as a flow with the potential to reach the Rio Grande: "Samples at E050, E060, and E110 will be triggered by 5-cfs flows to ensure sampling at flows that may extend to the Rio Grande." Page 3 of LANL (2009). When such storm flows are streaming in Los Alamos Canyon, the diversion will close for 10 to 12 hours or until the storm has subsided.

- Surface water sampling program of stormwater and baseflow of the Rio Grande at BDD.

When storm run offs of 5 cfs or greater flow in the Los Alamos and Guaje Canyons as measured by the LANL gages, water quality sampling will be triggered at BDD. Costs for sampling, equipment, and maintenance are shared between the BDD Board and DOE/LANL.

Samples collected from this program are tested for the following constituents: suspended sediment concentration, total and dissolved metals (23) plus mercury, gross alpha, gross beta, strontium-90, americium-241, radionuclides by gamma spectroscopy (including cesium-137), plutonium (isotopic), uranium (isotopic), neptunium-237, dioxin/furans, PCBs, radium-226 and -228, and perchlorate.

Pursuant to the 2017 MOU, DOE funds costs up to a certain dollar amount for BDD sampling at the intake, after which BDD funds the costs.

- The Contaminant Fate Analysis (CFA) Program and The Removal Efficiency and Assessment of Treatments (TREAT) Study.

The CFA program was initiated in 2010 to determine the effectiveness of the BDD treatment technologies at treating contaminants diverted from the Rio Grande.

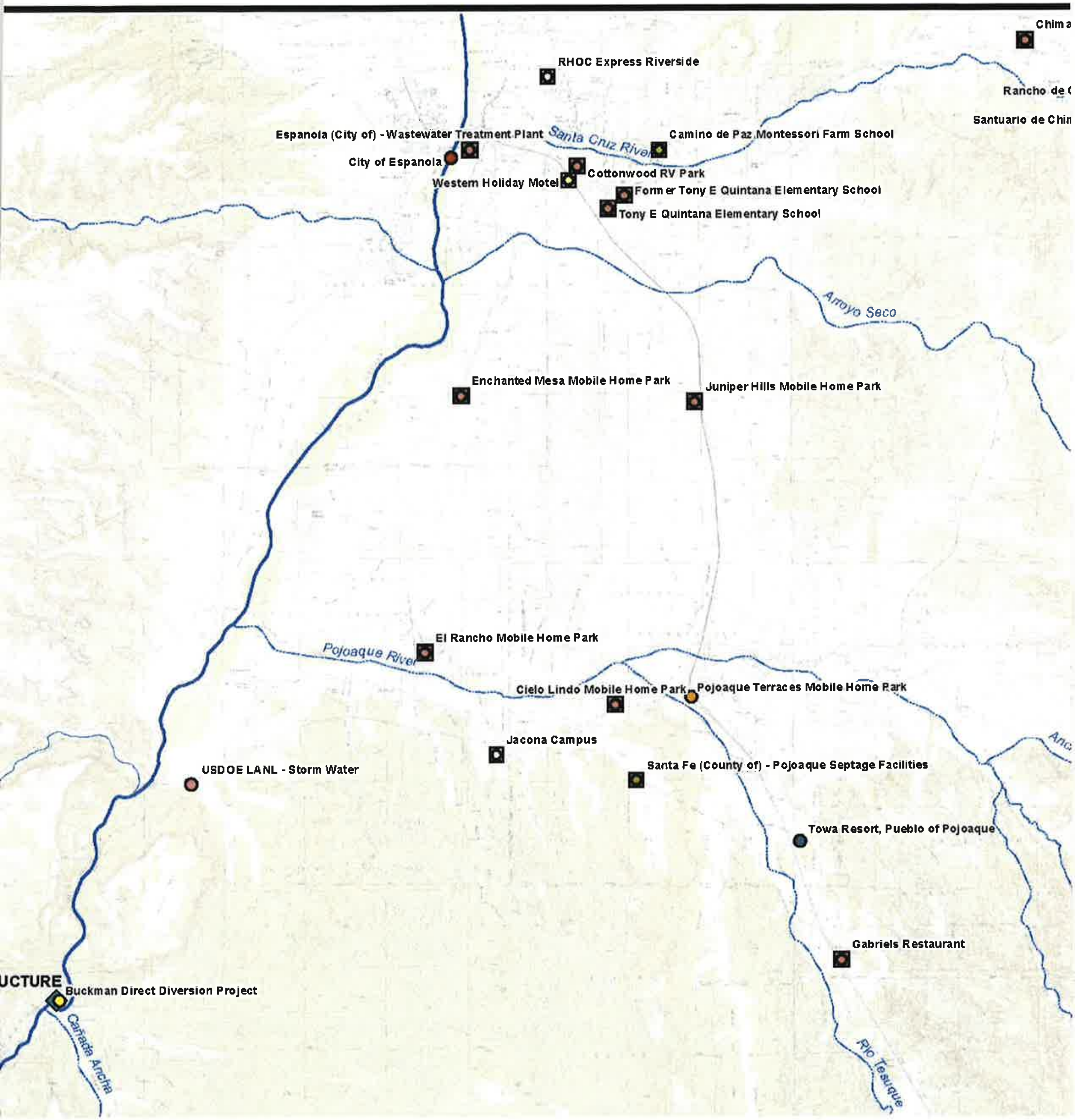
In 2015, the CFA Program was replaced with a similar but updated and improved program called the TREAT Study (BDD and DOE, 2015) with the similar objectives as the CFA program. TREAT Study is entirely funded by the BDD Board.

City of Santa Fe and DOE/LANL

Sampling for contaminants at the Buckman wells (City of Santa Fe) shows that contamination from LANL waste disposal activities has not affected groundwater in the Buckman area. While ChemRisk (2010) found that "[t]here are no contributions from LANL groundwater to the Buckman well field," in an abundance of caution, LANL has conducted sampling since 2001 at Buckman wells 1, 6, and 8 and piezometers SF-4A and SF-3A, providing the data to the City for identification of possible groundwater contamination from past activity at LANL. From the 2015 CCR (Appendix B) regarding possible LANL groundwater contamination:

> In cooperation with Los Alamos National Laboratory (LANL) and the New Mexico Environment Department, the City currently monitors Buckman Wells 1, 6 and 8 for LANL derived contamination on a quarterly basis. Samples are analyzed for radionuclides, general inorganic chemicals, metals, high explosives and organics. This repeat sampling has occurred during the years 2001 – 2015 and has indicated that Laboratory-derived radionuclides are not present in the Buckman Wells 1, 2, 6 and 8. The results do indicate detectable levels of radionuclides associated with natural sources. These wells are part of the 13 wells that make-up the Buckman Wellfield. When these wells are used, water from these wells is delivered to the [10 Million Gallon] prior to distribution into the system.

Figure 8. Wastewater Facilities around BDD



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7.2.2 *National Pollutant Discharge Elimination System (NPDES) Permits*

Wastewater treatment plants (WWTPs), stormwater and industrial discharges must obtain a NPDES permit in order to discharge effluent water into a stream. The EPA, who administers NPDES program, describes the permits as follows (U.S. EPA, 2016):

> As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) Permit Program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Since its introduction in 1972, the NPDES permit program is responsible for significant improvements to our Nation's water quality.

Figure 8 shows WWTPs upstream of BDD. Table 9 lists the holders of NPDES permits within 15 miles of the BDD intake

Table 9. NPDES Permits within 15 miles Upstream of BDD Intake

NPDES Permit Holder	Distance Upstream of BDD Intake (miles)
Towa Resort (WWTP)	14.3
Pojoaque (WWTP)	12.6
Pojoaque Terraces Mobile Home Park (WWTP)	12.0
Los Alamos Co. – Bayo Canyon (WWTP)	9
Los Alamos National Laboratory (stormwater, industrial)	3 (stormwater)/ 9 (industrial)
Española (WWTP)	13.2

In addition to those listed in Table 9, the two next closest WWTPs are the Abiquiu MDWCA & MSWA and the Town of Taos. Abiquiu's plant is approximately 41 miles upstream of the BDD intake via the Rio Grande and Rio Chama. Taos's WWTP is approximately 57 miles upstream of the BDD intake via the Rio Grande and the Rio Pueblo.

Wastewater, stormwater or other industrial effluent discharged into U. S. waters must meet state and federal effluent water quality standards (U.S. EPA, 2016):

> An NPDES permit will generally specify an acceptable level of a pollutant or pollutant parameter in a discharge (for example, a certain level of bacteria). The permittee may choose which technologies to use to achieve that level. Some permits, however, do contain certain generic 'best management practices' (such as installing a screen over the pipe to keep debris out of the waterway). NPDES permits make sure that a state's mandatory standards for clean water and the federal minimums are being met.

However, levels of pharmaceuticals and personal care products (PPCPs) and other emerging contaminants in effluent are currently not monitored. PPCPs are not subject to regulatory limits and removal of the traces of those products requires advanced treatment. Given the relative volume of flows in the Rio Grande, it is expected that adequate dilution of these contaminants occurs before the water reaches the BDD intake.

7.2.3 Groundwater Discharge Permits

Active, ceased, pending, inactive, terminated, and withdrawn groundwater discharge permits are shown on Figure 8. Groundwater discharge permits are managed by NMED. The NMED Groundwater Pollution Prevention Section describes groundwater discharge permits as follows (NMED GWQB, 2017):

> The Ground Water Pollution Prevention Section (GWPPS) reviews and approves ground water Discharge Permits for discharges that have the potential to impact ground water quality pursuant to Subparts III and V of the Water Quality Control Commission (WQCC) regulations (20.6.2 NMAC). Ground water Discharge Permits address a wide variety of discharges including:
>
> - Domestic wastewater facilities
> - Large capacity septic tank leachfields
> - Reclaimed wastewater reuse
> - Power generating plants
> - Commercial laundries (when not served by sanitary sewers)
> - Commercial land farms for treatment of contaminated soil
> - Industrial discharges
> - Groundwater remediation systems

- Groundwater Discharge Permits for dairies and non-dairy agricultural facilities, such as cheese plants and chile processors, are managed by the Agriculture Compliance Section.

This program also addresses unauthorized discharges, such as spills, for facilities that it regulates. Section 20.6.2.1203 of the NMAC provides a description of how to proceed with notifying the Pollution Prevention Program (GWPPS) in case of a spill.

Permits are issued for 5-year terms and must be renewed to provide continuous coverage. The GWPPS currently manages approximately 1,000 active permits.

7.2.4 Septic Systems

Septic systems are typically installed 3 to 5 feet below the ground surface. Such system may become a PSOC when a septic system's leach field is not operating properly and the effluent from the septic tank may runoff into nearby waterways. DBS&A mapping efforts estimate that there are nearly 200 septic systems in BDD's SWPA.

7.2.5 Security

To deter tampering and damage at BDD-owned facilities, BDD contracts Chavez Security Inc. (CSI), a security company, to monitor on a regular basis the Diversion intake, lift station, and booster pump stations.

7.3 Natural Sources of Contamination

Arroyos, drainage canals, ditches, and acequias are known natural features that can convey natural or anthropogenic contaminants into the Rio Grande. These features can be mapped in the SWPA for BDD. Wildfires and turbidity are two other natural sources of contamination that are not easily mapped.

7.3.1 Wildfires

Wildfire is a natural PSOC that represents a very real and significant threat to BDD's water source. Wildfires affect the type and quantity of nutrients (especially nitrogen) in the river, as well as the turbidity and total suspended solids (TSS) entering surface water sources. Wildfires can also impact the rate of runoff and sedimentation into surface water sources. In 2013, the Water Research Foundation published *Effects of Wildfire on Drinking Water Utilities and Best Practices for Wildfire Risk Reduction and Mitigation* (Sham et al., 2013), which discusses in detail the potential damage wildfires can cause for utilities.

Since the 1970s, there have been four stand-replacing fires in the Jemez Mountains: the La Mesa fire (1977), the Dome fire (1996), the Cerro Grande fire (2000), and the Las Conchas fire (2011) (BDD, 2016). The La Mesa and Dome fires affected watersheds downstream of the BDD. The BDD was not yet built in 2000 during the Cerro Grande fire. The Las Conchas fire, the largest wildfire in northern New Mexico history, burned 163,000 acres. The fire drastically changed the Los Alamos and Pueblo Canyon watersheds, and the distribution of contaminated sediments in that area, and is cited as the cause for increased quantities of LANL contaminants in stormwater at the BDD intake during the fire and some years afterwards.

7.3.2 Turbidity

Storm events in the upper Rio Grande watershed lead to increased turbidity at the BDD intake. Because the high sediment content in the raw water can cause serious damage to the BDD equipment, diversions are stopped during periods of high turbidity. There is not a pre-determined turbidity threshold at which diversions are ceased; rather, the Operations Superintendent monitors river turbidity daily to balance the need to supply water to customers with the need to protect equipment life. In the past, high sediment loads have led to shutoff periods ranging from one hour to three months.

7.4 Risk Assessment

To assess potential contamination risks from the known PSOCs to a water system, a "probability of impact" ranking is assigned to each water source. A "probability of impact" ranking of rare, unlikely, possible, likely, certain is assigned based on professional opinion from the available infrastructure, geology, and PSOC information. These rankings are meant to serve only as a method to identify and prioritize risks to a system's water sources for planning purposes.

The "impact to water system" ranking is based on an inventory of the type, number, and proximity of PSOCs near a water source, and is a subjective ranking based on that inventory. An "impact to water system" ranking of insignificant, minor, significant, major, catastrophic is assigned to each PSOC.

The first consideration in "impact to water system" ranking is the types of PSOC present. The mapping effort for Los Alamos Canyon revealed eight PSOC types in this river segment: aboveground storage tank facility (CFA), arroyos, gasoline service station (CSS), a leaking underground storage tank (CFB), polluted surface water sources (MPW), major roads (MRP), private domestic wells (PDW), and septic systems (RSF). Furthermore, while they cannot be mapped, LANL legacy contaminants are known to exist in this canyon. Polluted surface water sources (MPW) and arroyos and private domestic wells (PDW) were the two identified PSOC types in Guaje Canyon. Although not identified on the map when Guaje Canyon flows, it picks up LANL-contaminated sediments in lower Los Alamos Canyon and carries them to the Rio Grande. There are eight mapped PSOC types in the SWPA for the Rio Grande: canals, drainage ways and acequias (ADC), historic gasoline service stations (CHG), cement/concrete plants (ICC), arroyos, major roads (MRP), NPDES permits, private domestic wells (PDW), and septic systems (RSF). Sedimentation (turbidity) is a significant PSOC caused by storm events for all three river segments. Wildfires are a major PSOC for all three river segments as well.

The number of PSOC occurrences is another consideration in determining the "impact to water system" ranking of a water source. Table 11 shows the PSOC count by river segment. Guaje Canyon has 15 mapped PSOC occurrences, while Los Alamos Canyon has 53 and the Rio Grande has 291.

Table 10 lists the PSOCs occurrence by river segment and mile for BDD's SWPA and shows each PSOC rankings, including the level of control.

Table 10. PSOC Inventory and Risk Rankings for the BDD SWPA

River Mile	Zone	PSOC Code	PSOC Description	Number of Occurrences	A[1] or P	Probability of Impact	Impact to PWS	Risk	Control[2]
Rio Grande River									
500ft–0	B	Arroyo	Ephemeral stream	1	A	Unlikely	Insignificant	Very Low	NC
	C	Arroyo	Ephemeral stream	2	A	Unlikely	Insignificant	Very Low	NC
0–1	A	Arroyo	Ephemeral stream	3	A	Possible	Insignificant	Low	NC
		NPDES permit	Buckman Direct Diversion Project	1	A	Unlikely	Insignificant	Very Low	D
		PDW	Private domestic well	3	P	Unlikely	Insignificant	Very Low	ID
	B	PDW	Private domestic well	2	P	Unlikely	Insignificant	Very Low	ID
	C	PDW	Private domestic well	3	P	Unlikely	Insignificant	Very Low	ID
1–2	A	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
2–3	None	—	—	—					
3–4	A	Arroyo	Ephemeral stream – Los Alamos Canyon confluence	3	A	Likely	Significant	High	NC
		MRP	Primary road, highway, or arterial	1	P	Unlikely	Minor	Low	NC
		NPDES permit	U.S. DOE LANL - Stormwater	1	A	Likely	Significant	High	NC
	B	PDW	Private domestic well	1	P	Unlikely	Insignificant	Very Low	ID
	C	PDW	Private domestic well	21	P	Unlikely	Insignificant	Very Low	ID
		RSF	Septic system	9	P	Unlikely	Insignificant	Very Low	ID
4–5	C	PDW	Private domestic well	1	P	Unlikely	Insignificant	Very Low	ID

1 "A" for active and "P" for potential
2 "D" for direct control, "ID" for indirect control, and "NC" for no control

River Mile	Zone	PSOC Code	PSOC Description	Number of Occurrences	A[1] or P	Probability of Impact	Impact to PWS	Risk	Control[2]
		RSF	Septic system	4	P	Unlikely	Insignificant	Very Low	ID
5–6	A	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
	B	PDW	Private domestic well	1	P	Rare	Insignificant	Very Low	ID
	C	ADC	Drainage canals, ditches, or acequias - unlined	1	A	Possible	Insignificant	Low	NC
		PDW	Private domestic well	12	P	Rare	Insignificant	Very Low	ID
		RSF	Septic system	60	P	Rare	Insignificant	Very Low	ID
6–7	A	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
	B	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
		PDW	Private domestic well	2	P	Rare	Insignificant	Very Low	ID
		RSF	Septic system	1	P	Rare	Insignificant	Very Low	ID
	C	ADC	Drainage canals, ditches, or acequias - unlined	1	A	Possible	Insignificant	Low	NC
		Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
		PDW	Private domestic well	10	P	Rare	Insignificant	Very Low	ID
		RSF	Septic system	38	P	Rare	Insignificant	Very Low	ID
7–8	A	ADC	Drainage canals, ditches, or acequias - unlined	1	A	Possible	Insignificant	Low	NC
		Arroyo	Ephemeral stream	3	A	Possible	Insignificant	Low	NC
		RSF	Septic system	1	P	Rare	Insignificant	Very Low	ID
	B	RSF	Septic system	1	P	Rare	Insignificant	Very Low	ID
	C	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
		PDW	Private domestic well	1	P	Rare	Insignificant	Very Low	ID
		RSF	Septic system	6	P	Rare	Insignificant	Very Low	ID
8–9	A	Arroyo	Ephemeral stream	3	A	Possible	Insignificant	Low	NC

River Mile	Zone	PSOC Code	PSOC Description	Number of Occurrences	A[1] or P	Probability of Impact	Impact to PWS	Risk	Control[2]
	C	ADC	Drainage canals, ditches, or acequias - unlined	1	A	Possible	Insignificant	Low	NC
		PDW	Private domestic well	2	P	Rare	Insignificant	Very Low	ID
		RSF	Septic system	20	P	Rare	Insignificant	Very Low	ID
9–10	B	PDW	Private domestic well	1	P	Rare	Insignificant	Very Low	ID
		RSF	Septic system	1	P	Rare	Insignificant	Very Low	ID
	C	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
		PDW	Private domestic well	9	P	Rare	Insignificant	Very Low	ID
		RSF	Septic system	50	P	Rare	Insignificant	Very Low	ID
10+	A	ICC	Cement/concrete plant	1	P	Rare	Insignificant	Very Low	ID
	C	CHG	Leaky underground storage tank site – Kokoman Discount Liquors	1	A	Rare	Insignificant	Very Low	ID
Los Alamos Canyon									
3–4	B	PDW	Private domestic well	1	P	Rare	Insignificant	Very Low	ID
	C	PDW	Private domestic well	21	P	Rare	Insignificant	Very Low	ID
		MRP	Primary road, highway, or arterial	1	A	Unlikely	Insignificant	Very Low	NC
4–5	A	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
		MRP	Primary road, highway, or arterial	1	A	Unlikely	Insignificant	Very Low	NC
5–6	A	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
		CSS/CFB	Underground storage tank facility - Totavi Phillips 66	1	P	Unlikely	Insignificant	Very Low	ID
		RSF	Septic system	1	P	Rare	Insignificant	Very Low	ID
	B	MRP	Primary road, highway, or arterial	1	A	Unlikely	Insignificant	Very Low	NC

River Mile	Zone	PSOC Code	PSOC Description	Number of Occurrences	A[1] or P	Probability of Impact	Impact to PWS	Risk	Control[2]
6–7	A	MRP	Primary road, highway, or arterial	1	A	Unlikely	Insignificant	Very Low	NC
7–8	A	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
		MRP	Primary road, highway, or arterial	1	A	Unlikely	Insignificant	Very Low	NC
	B	Arroyo	Ephemeral stream	2	A	Possible	Insignificant	Low	NC
8–9	A	MRP	Primary road, highway, or arterial	2	A	Unlikely	Insignificant	Very Low	NC
	C	Arroyo	Ephemeral stream	2	A	Possible	Insignificant	Low	NC
		CFA	NMDOT Los Alamos Patrol Yard Seasonal	1	P	Unlikely	Insignificant	Very Low	ID
		CFB	NMDOT Los Alamos Patrol Yard Seasonal	1	P	Rare	Insignificant	Very Low	ID
		MPW	Polluted surface water source (Impaired Stream for aluminum, gross alpha and PCBs: Los Alamos Canyon, Pueblo Canyon)	2	A	Possible	Significant	Moderate	NC
		PDW	Private domestic well	4	P	Rare	Insignificant	Very Low	ID
		RSF	Septic system	1	P	Rare	Insignificant	Very Low	ID
9–10	C	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
		MRP	Primary road, highway, or arterial	2	A	Unlikely	Insignificant	Very Low	NC
Guaje Canyon									
5–6	A	PDW	Private domestic well	1	P	Rare	Insignificant	Very Low	ID
6–7	A	Arroyo	Ephemeral stream	2	A	Possible	Insignificant	Low	NC
		MPW	Polluted surface water source (Impaired Stream for Aluminum: Guaje Canyon)	1	A	Possible	Significant	Moderate	NC
		PDW	Private domestic well	1	P	Rare	Insignificant	Very Low	ID

River Mile	Zone	PSOC Code	PSOC Description	Number of Occurrences	A[1] or P	Probability of Impact	Impact to PWS	Risk	Control[2]
	C	Arroyo	Ephemeral stream	1	A	Possible	Insignificant	Low	NC
7–8	B	PDW	Private domestic well	1	P	Rare	Insignificant	Very Low	ID
	C	Arroyo	Ephemeral stream	3	A	Possible	Insignificant	Low	NC
8–9	A	Arroyo	Ephemeral stream	2	A	Possible	Insignificant	Low	NC
9–10	A	Arroyo	Ephemeral stream	3	A	Possible	Insignificant	Low	NC

Table 11. PSOC Occurrence by River Segment

PSOC* Type	Count	Percent
Rio Grande River		
ADC	4	1.4
Arroyo	22	7.6
CHG	1	0.3
ICC	1	0.3
MRP	1	0.3
NPDES permit	2	0.7
PDW	69	23.7
RSF	191	65.6
Rio Grande River total	**291**	
Los Alamos Canyon		
Arroyo	8	15
CFA	1	2
CFB	1	2
CSS/CFB	1	2
MPW	2	4
MRP	9	17
NPDES Permit	3	6
PDW	26	49
RSF	2	4
Los Alamos Canyon total	**53**	
Guaje Canyon		
Arroyo	11	73.3
MPW	1	6.7
PDW	3	20.0
Guaje Canyon total	**15**	

*See Table 8 for PSOC code descriptions

8. Managing for Source Water Protection

The purpose of NMED's Source Water Protection Program is to protect drinking water sources before they become contaminated. The most significant PSOCs for the BDD are LANL legacy contaminants, NPDES discharges, sediment transport, and wildfires.

Wildfires affect the type and quantity of nutrients (especially nitrogen) in the river, as well as the turbidity and TSS entering surface water sources. Wildfires can also impact the rate of runoff and sedimentation into surface water sources.

Storm events in the upper Rio Grande watershed lead to increased turbidity at the BDD intake. Because the high sediment content in the raw water can cause serious damage to the BDD equipment, diversions are stopped during periods of high turbidity. There is not a pre-determined turbidity threshold at which diversions are ceased; rather, the Operations Superintendent monitors river turbidity daily to balance the need to supply water to customers with the need to protect equipment life. In the past, high sediment loads have led to shutoff periods ranging from one hour to three months.

LANL legacy contaminants are transported to the BDD intake mainly via suspended sediments. This characteristic makes these contaminants likely to be transported downstream to the BDD during storm events, but their strong sorption to sediments allows them to be treated by the BDD treatment technologies. The BDD currently conducts extensive monitoring of the source water for legacy contaminants from LANL. This practice is comprehensive, should be continued, and provides significant protection to customers.

NPDES (includes WWTPs) and groundwater discharge permit holders discharge effluent into waterways. These permit holders must meet all state and federal effluent water quality standards. Pharmaceuticals and personal care products, however, are currently not regulated and monitored and can be hard to treat due to their solubility properties. Given the size of the Rio Grande, these contaminants are likely to be strongly diluted before reaching the BDD intake.

8.1 Specific Sources of Contamination

The potential and actual contamination sources with the highest risk (high and moderate) listed in Table 10 are summarized below along with proposed remediation efforts and strategies to mitigate or prevent contamination.

U.S. DOE LANL – Stormwater, NPDES Permit Ephemeral stream – Los Alamos Canyon confluence, Arroyo	
Risk	High
Source Affected	Rio Grande River watershed – affected directly
Contaminants of Concern	Turbidity, radionuclides mostly alpha and beta emitters, gross alpha/beta, metals, organics mostly PCBs (see Section 7.2.1)
Issues	Discharges from Los Alamos canyon during storm events will mobilize and transport any contaminants (legacy and wastewater facilities) settled in the low Los Alamos canyon into the Rio Grande. The legacy contamination has been documented for decades, and the discharges of storm water containing the contaminants has been documented by NMED and BDD over the last 20 years.
Concerns	Stormwater from Los Alamos watershed will discharge into the Rio Grande and will contaminate the raw water which is the source of raw water for BDD intake at the river. Neither BDD nor any other entity has any control over the frequency or strength of the storm events in nature.
Strategies	

Polluted surface water source (Impaired Stream for aluminum, gross alpha and PCBs: Los Alamos Canyon, Pueblo Canyon)	
Risk	Moderate
Source Affected	Los Alamos watershed (Los Alamos and Guaje canyons) – affected directly Rio Grande River watershed – affected indirectly
Contaminants of Concern	Turbidity, radionuclides mostly alpha and beta emitters, gross alpha/beta, metals, organics mostly PCBs (see Section 7.2.1)
Issues	Contaminated sediments will be settled into the canyon beds and may be mobilize by stormwater to reach the Rio Grande. Not all stormwater may reach the Rio Grande.

Polluted surface water source (Impaired Stream for aluminum, gross alpha and PCBs: Los Alamos Canyon, Pueblo Canyon)	
	Discharges from Los Alamos canyon during storm events will mobilize and transport any contaminants (legacy and wastewater facilities) settled in the low Los Alamos canyon into the Rio Grande.
Concerns	Stormwater from Los Alamos watershed may discharge into the Rio Grande and may contaminate the raw water which is the source of raw water for BDD intake at the river. Neither BDD nor any other entity has any control over the frequency or strength of the storm events in nature.
Strategies	

8.2 General Action Items

Based on NMED guidelines and the conclusions from this evaluation, BDD would adapt the following general management practices as part of its Source Water Protection Program:

- The Source Water Protection Team would meet annually to review the State's Source Water Protection EnviroMap, PSOCs within the delineated SWPAs, and any changes to the system's sources.
- The Source Water Protection Team should participate as necessary in regulatory meetings and hearings on facilities within the SWPAs.
- This SWPP and the map of PSOCs will be updated on an annual basis; or as changes occur.
- As the members of the Source Water Protection Team change over time, the new members would be informed of the plan and its implementation actions.

- BDD will continue surface water monitoring and sampling efforts related to LANL legacy contaminants.

- BDD will evaluate on a regular basis the ENS and BDD system of gages in the Los Alamos watershed to determine if any additional gaging stations are needed to provide more accurate information on flows potentially carrying LANL legacy contaminants to the Rio Grande and BDD intake.

- Given that turbidity levels in the Rio Grande can cause the BDD to cease diverting for significant periods of time, BDD may consider additional sediment removal options and methods for clearing sediment from intake cells.

- BDD would initiate communication with upstream NPDES, WWTP and groundwater discharge permit holders to discuss notification procedures and emergency plans in case of a major contamination event.

- The BDD intake is on U.S. Forest Service (USFS) land, and public access cannot be restricted. BDD would continue to contract private security and work with USFS to ensure the protection of the intake structure and pump stations from public tampering and vandalism.

- A public information program could be developed related to source water protection. This program would educate the public about BDD's water sources, potential threats to those sources, measures that the public can take to protect sources, and means to encourage the public to report PSOCs to the Source Water Protection Team. Options for communicating with the public include meetings, advertisements, flyers, brochures, posters, questionnaires, and community and school events.

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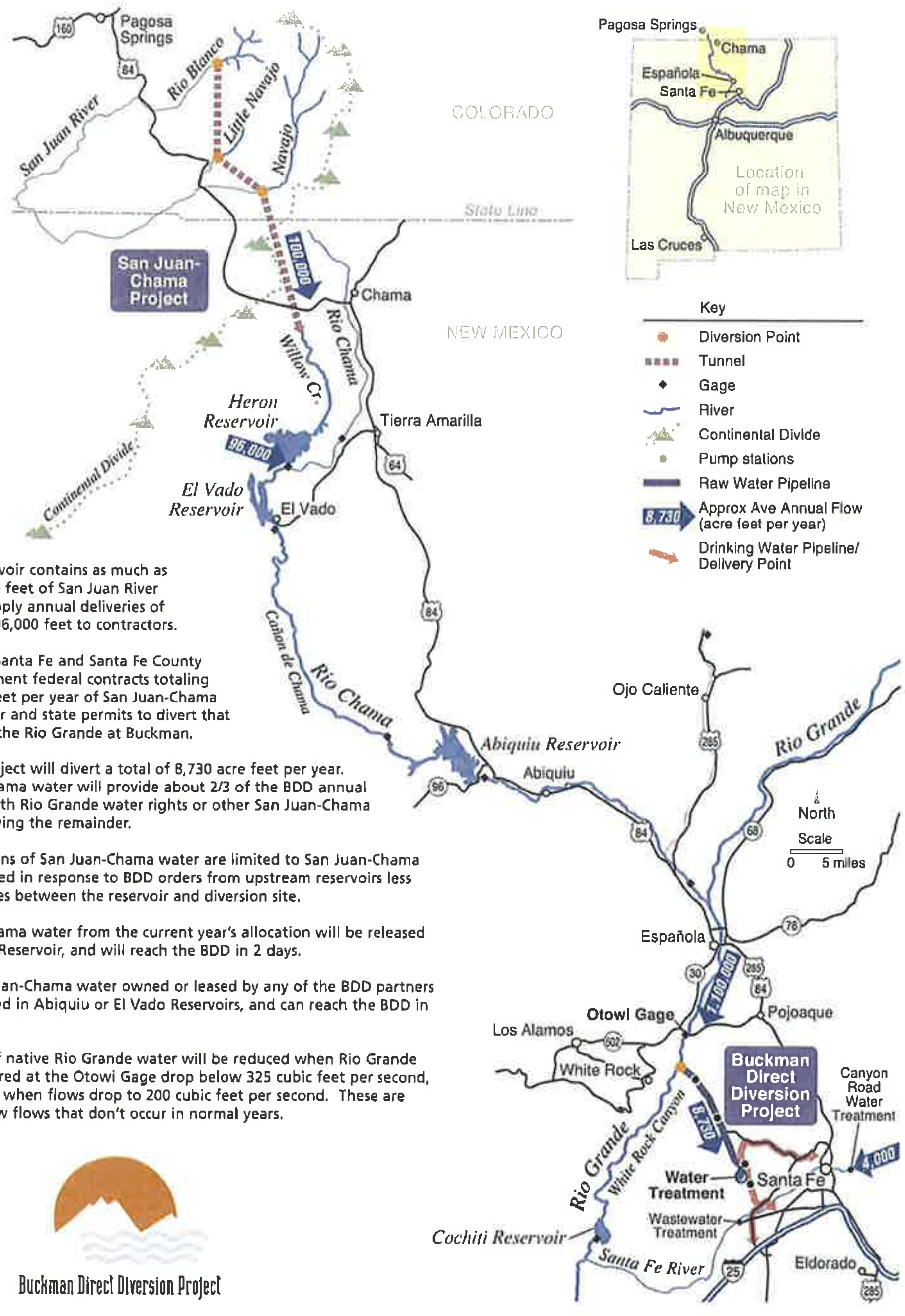
Appendix A

BDD System Information

Buckman Direct Diversion Project and the San Juan-Chama Project



- Heron Reservoir contains as much as 400,000 acre feet of San Juan River water to supply annual deliveries of as much as 96,000 feet to contractors.
- The City of Santa Fe and Santa Fe County have permanent federal contracts totaling 5,605 acre feet per year of San Juan-Chama Project water and state permits to divert that water from the Rio Grande at Buckman.
- The BDD Project will divert a total of 8,730 acre feet per year. San Juan-Chama water will provide about 2/3 of the BDD annual diversion, with Rio Grande water rights or other San Juan-Chama water supplying the remainder.
- BDD diversions of San Juan-Chama water are limited to San Juan-Chama water released in response to BDD orders from upstream reservoirs less transfer losses between the reservoir and diversion site.
- San Juan-Chama water from the current year's allocation will be released from Heron Reservoir, and will reach the BDD in 2 days.
- Other San Juan-Chama water owned or leased by any of the BDD partners may be stored in Abiquiu or El Vado Reservoirs, and can reach the BDD in 1 or 2 days.
- Diversions of native Rio Grande water will be reduced when Rio Grande flows measured at the Otowi Gage drop below 325 cubic feet per second, and stopped when flows drop to 200 cubic feet per second. These are unusually low flows that don't occur in normal years.

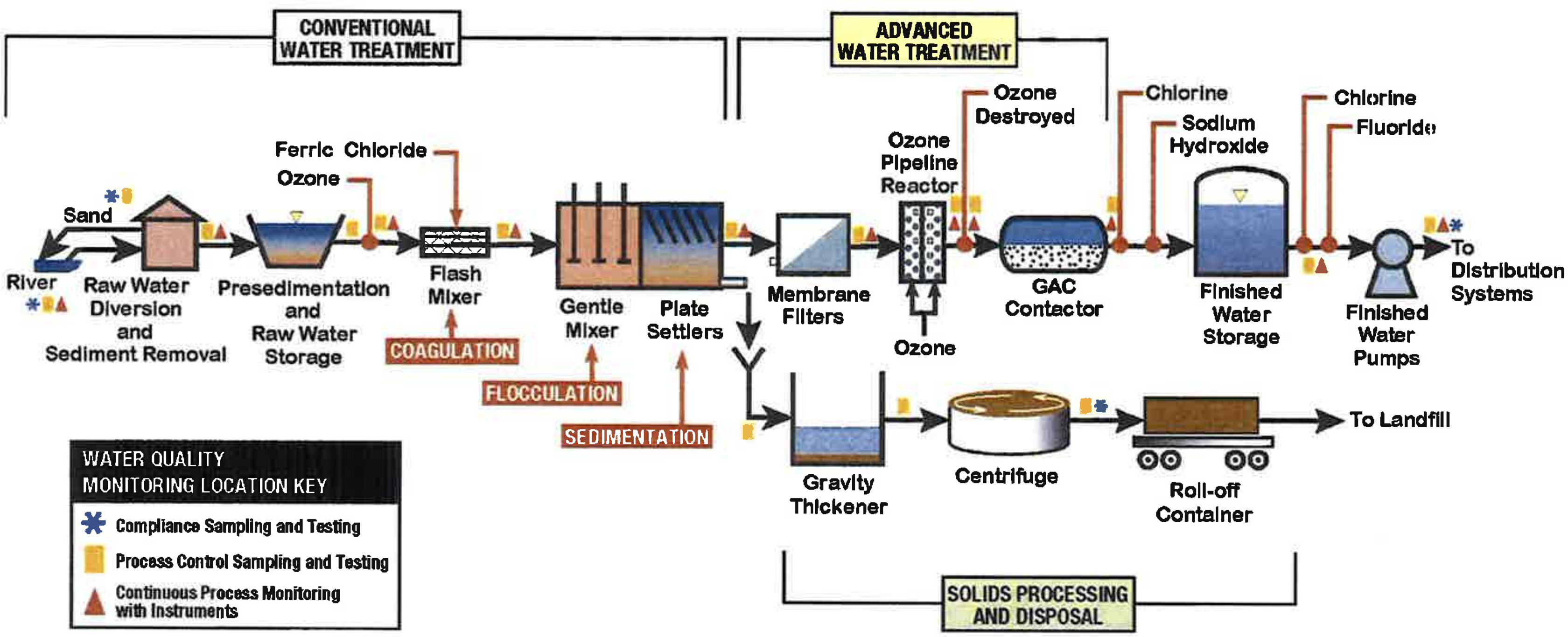
Buckman Direct Diversion Project

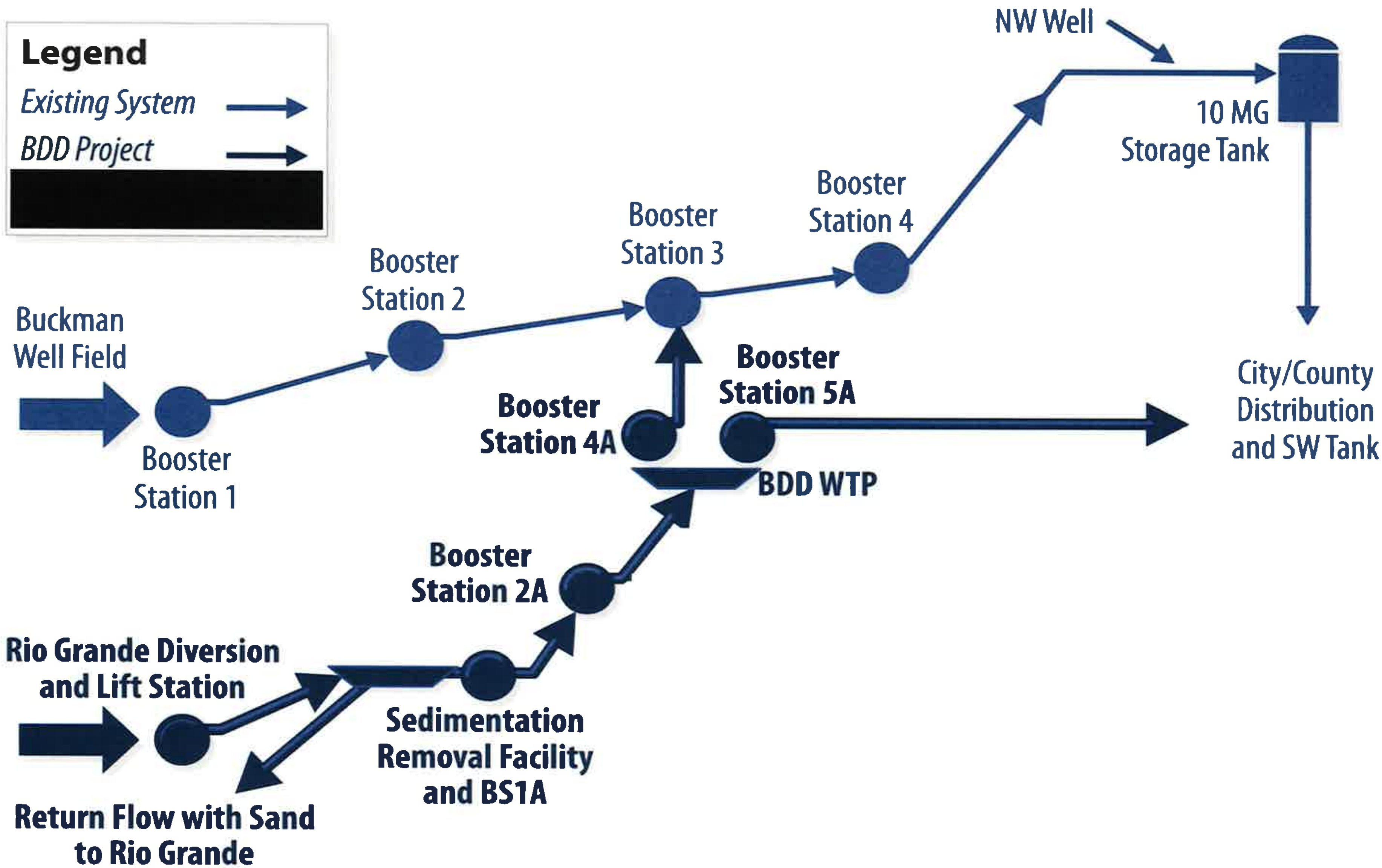
Buckman Regional Water Treatment Plant Processes

Buckman Direct Diversion

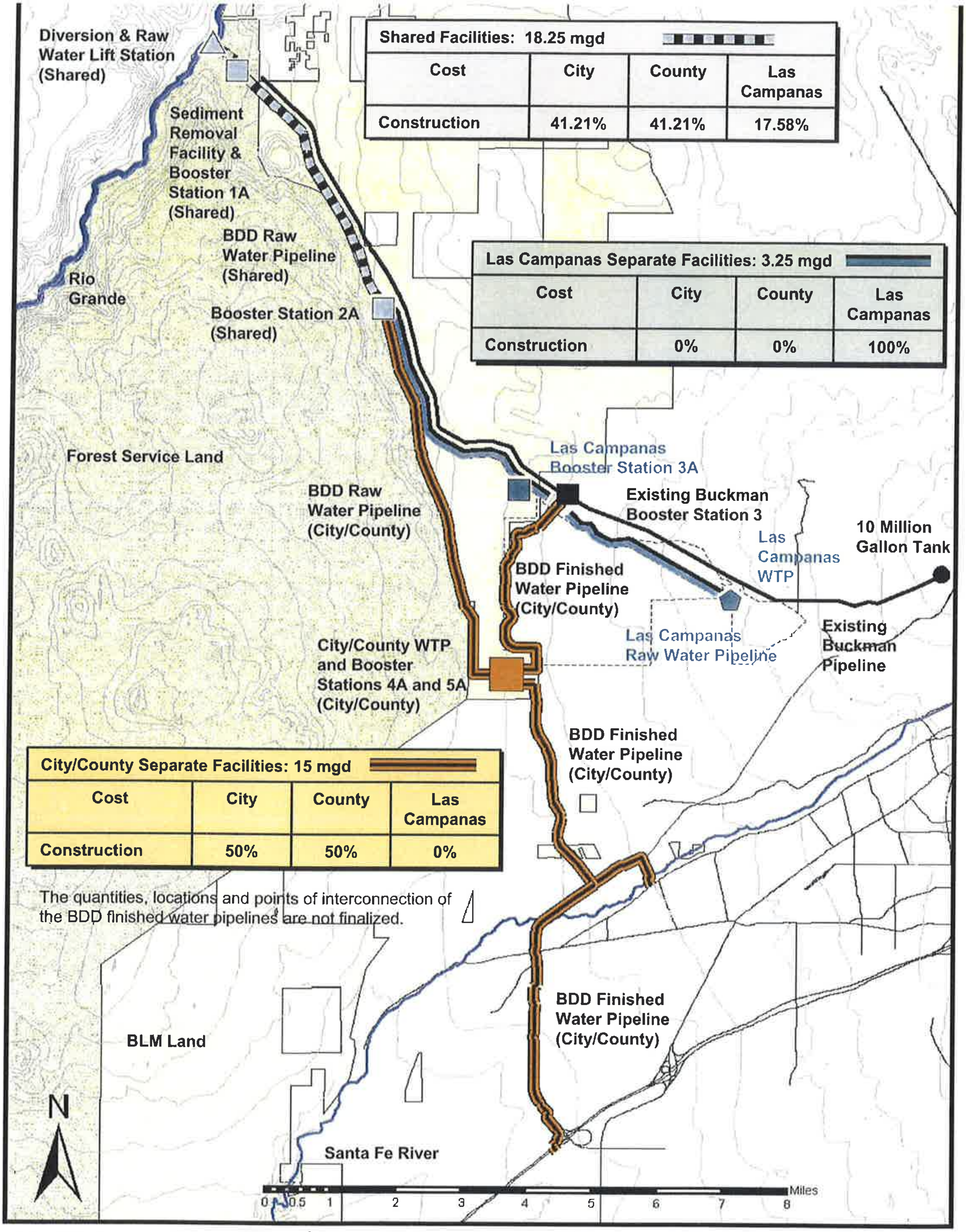
The Buckman Regional Water Treatment Plant includes a series of conventional and advanced water treatment processes. The conventional processes remove the vast majority of contaminants. The advanced processes provide additional treatment and polishing of the finished drinking water.

Conventional treatment processes include coagulation, flocculation, sedimentation and disinfection. Raw water ozonation improves the effectiveness of conventional treatment. Advanced treatment is provided by membrane filters, ozone and granular activated carbon contactors. Disinfection is accomplished with lower amounts of chlorine because the high-quality water does not need as much chlorine.





Legend
Existing System
BDD Project
[redacted]
Buckman Well Field
Booster Station 1
Booster Station 2
Booster Station 3
Booster Station 4
NW Well
10 MG Storage Tank
City/County Distribution and SW Tank
Booster Station 4A
Booster Station 5A
BDD WTP
Booster Station 2A
Rio Grande Diversion and Lift Station
Sedimentation Removal Facility and BS1A
Return Flow with Sand to Rio Grande



Shared Facilities: 18.25 mgd			
Cost	City	County	Las Campanas
Construction	41.21%	41.21%	17.58%

Las Campanas Separate Facilities: 3.25 mgd			
Cost	City	County	Las Campanas
Construction	0%	0%	100%

City/County Separate Facilities: 15 mgd			
Cost	City	County	Las Campanas
Construction	50%	50%	0%

City of Santa Fe
Santa Fe County
Las Campanas LP

Facility Operations and Procedures Agreement Exhibit A
Buckman Direct Diversion Project

2006

Appendix B

City of Santa Fe Consumer Confidence Reports

Why are there Contaminants in my Drinking Water?

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants in drinking water may include:

Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Pesticides and herbicides, may come from a variety of sources, such as agriculture, urban storm-water runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring, man-made from nuclear facilities and atmospheric deposition from former above ground testing, or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Nitrates

City of Santa Fe drinking water meets the federal drinking water standard of 10 ppm for nitrates (10 mg/L as N). Nitrates have been detected in some of the City Wells up to 6.7 ppm. Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

Arsenic

The drinking water standard for arsenic is 10 µg/L. The City's drinking water continued to meet this standard throughout 2015. Arsenic occurs naturally in the earth's crust. When these arsenic-containing rocks, minerals, and soil erode, they release arsenic into ground water. While our drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. The EPA standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

In cooperation with Los Alamos National Laboratory (LANL) and the New Mexico Environment Department, the City currently monitors Buckman Wells 1, 6 and 8 for LANL derived contamination on a quarterly basis. Samples are analyzed for radionuclides, general inorganic chemicals, metals, high explosives and organics. This repeat sampling has occurred during the years 2001 – 2015 and has indicated that Laboratory-derived radionuclides are not present in the Buckman Wells 1, 2, 6 and 8. The results do indicate detectable levels of radionuclides associated with natural sources. These wells are part of the 13 wells that make-up the Buckman Wellfield. When these wells are used, water from these wells is delivered to the Buckman Tank prior to distribution into the system.

Cryptosporidium

Cryptosporidium is a protozoan parasite that is common in surface waters. The oocyst is the transmission stage of the organism. Cryptosporidium is introduced into our source waters via wild animal populations. Although the organism is readily removed by the conventional treatment process utilized at the Canyon Road Water Treatment facility, the oocyst is resistant to chemical disinfectants like chlorine and the primary reason to determine if additional treatment is required. Ingestion of Cryptosporidium may cause cryptosporidiosis, an abdominal infection.

In April 2007 the City began a two-year study to determine the average Cryptosporidium concentration in source water entering the Canyon Road Water Treatment facility. The sampling portion of the study was completed in March of 2009. The study is part of the requirements contained in the 2006 USEPA Long-Term Enhanced Surface Water Treatment Rule. Cryptosporidium was detected in a single untreated sample in each of the following months: December of 2007, September 2008 and October 2008. The highest 12-month consecutive mean for this study was 0.018 oocysts/L. Since the concentration is <0.075 oocysts/L, no additional treatment at the Canyon Road Water Treatment Facility was necessary. The City began a second round of sampling, one sample a month, starting in October 2015 and scheduled to end in September 2017. No Cryptosporidium oocysts were detected in three samples collected in calendar year 2015 (October, November, and December). As with Cryptosporidium oocysts, no Giardia Lamblia cysts were detected in the three samples collected during the last three months of 2015.

Any new water system treating surface water such as BDD is required to monitor Cryptosporidium for 24 consecutive months. At the BDD the untreated raw Rio Grande water Cryptosporidium test results range from 0 to 0.4 oocysts/L.

Voluntary Monitoring

The attached "Voluntary Monitoring" Table lists results from voluntary monitoring at entry points into the distribution system associated with BRWTP, and the Canyon Road WTP. Since these samples are collected at the point of entry of water into the City's distribution system, the reported concentrations of contaminants may be further diluted in the distribution system through mixing with water from other City sources.

EPA has established secondary maximum contaminant levels (SMCL) for certain contaminants. Secondary Standards are non-enforceable standards that serve as guidelines to assist public water systems in managing their drinking water. The presence of these contaminants typically results from the erosion of natural deposits. Aluminum and manganese containing materials are used as treatment aids in the water treatment process. Other constituents without SMCLs were monitored in 2015 and are reported in the "Voluntary Monitoring" Table (these have an "NA" in SMCL column).

VOLUNTARY MONITORING

Contaminant	Units	SMCL	Result	Sample Date
Buckman RWTP				
Chloride	ppm	250	20	2015
pH		6.5 - 8.5	8.22	2015
Sulfate	ppm	250	48	2015
Total Dissolved Solids	ppm	500	223	2015
Strontium-90	pCi/L		0.01	2015
Nickel	ppm	10	ND	2015
Tritium	pCi/L		ND	2015
Uranium-234	pCi/L		0.549	2015
Uranium-235/236	pCi/L		0.447	2015
Uranium-238	pCi/L		0.476	2015
Conductivity	µmhos/cm		340	2015
Total Haloacetic acids	ppm		0.0094	2015
Total Trihalomethanes	ppm		0.0209	2015
Chlorine (as Cl2)	ppm		0.75	2015
Sodium	ppm		24	2015
Canyon Road WTP				
Sodium	ppm		18	2015

Contacts for Additional Information:

If you have any questions, comments, or suggestions regarding this report please contact Alex Puglisi at 505-955-4232 or write to:

City of Santa Fe Water Division
P.O. Box 909, Santa Fe, NM 87504

Microbial and Disinfection Byproducts Rule

The Microbial and Disinfection Byproducts (M/DBP) Rules are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/ disinfection byproducts (DBPs). The Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) focuses on public health protection by limiting exposure to DBPs (known carcinogens), specifically total trihalomethanes (TTHM) and five haloacetic acids (HAA5), which can form in water through disinfectants used to control microbial pathogens.

The City of Santa Fe system has eight compliance sampling locations for TTHM and HAA5. Each location is sampled once per quarter. The average of analytical results for DBPs at a given location during the previous four quarterly samples is called the locational running annual average (LRAA). The LRAA at each location must be below the MCL (0.060 mg/L for HAA5 and 0.080 mg/L for TTHM). Results shown in the Table below indicate that the individual quarterly values during 2015 ranged from 0.001 to 0.027 mg/L for HAA5 and 0.029 to 0.069 mg/L for TTHM. The highest LRAA was 0.0101 mg/L for HAA5 and 0.0245 mg/L for TTHM, indicating that the system is in compliance.

	MCL†	MCLG†	Sample Year	Highest LRAA†	Range 2015 ‡ Low ‡	High ‡	Typical Source
Haloacetic Acids (HAA5s)	.060	NA	2015	.0101	0.0013	0.0270	By-product of drinking water chlorination
Total Trihalomethane (TTHMs)	.080	NA	2015	.0245	0.0289	0.0690	By-product of drinking water chlorination

† = units are ppm (mg/L) ‡ = individual samples at all locations

The Stage 2 DBPR also regulates the maximum residual for disinfectants: chlorine dioxide, free chlorine, and chloramines. The disinfectants are water additives used to control microorganisms, particularly as a residual disinfectant in distribution system pipes.

The City of Santa Fe water system uses free chlorine as a disinfectant. For the year 2015, sampling was performed at 80 monitoring locations each month. The results are summarized in the table below:

	MRDL†	MRDLG†	Sample Year	Highest Level Detected†	Range 2015 Low†	High†	Violation	Typical Source
Chlorine Residual	4.0	4	2015	1.19	0.00	1.19	No	Water additives used to control microbes

† = units are ppm (mg/L)

Asbestos

The most recent sample for asbestos in the distribution system was collected on December 16, 2013. No asbestos fibers were detected in the sample collected (detection limit 0.2 million fibers per liter or MFL). Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.

Contaminants	MCLG*	MCL*	Result*	Sample Year	Violation	Typical Source
Asbestos	7	7	ND (<0.2)	2013	No	Decay of asbestos cement in water mains; erosion of natural deposits

* units are MFL (million fibers per liter) for fibers >10um

Lead and Copper Rule

Tests for lead and copper are taken from customer taps located throughout the City once every three years. The most recent round of lead and copper testing took place in August 2015. The next survey will be performed in 2018. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

Inorganic Contaminants	MCLG	AL**	City Water Levels (90th percentile)*	# of Samples >AL	Sample Date	Exceeds AL	Typical Source
Copper (ppm)	1.3	1.3	0.60	30 of 30	August 2015	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems
Lead (ppm)	0	.015	0.0022	30 of 30	August 2015	No	Corrosion of household plumbing systems; Erosion of natural deposits

* Results of monitoring are used to determine the concentration at the 90th percentile (e.g., if 100 samples analyzed, the concentration at the 90th highest sample). Based on the number of samples analyzed in 2015 the 90th percentile is the 27th sample for copper and lead.

** AL = Action Level

Unregulated Contaminant Monitoring Rule (UCMR)

EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) to collect data for contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (SDWA). Unregulated contaminant monitoring helps EPA to determine where certain contaminants occur and whether the Agency should consider regulating those contaminants in the future. UCMR sampling for the EPA required four quarterly periods was completed in the Santa Fe water system between March and December 2015.

UNREGULATED CONTAMINANT MONITORING

NAME	UNIT	REPORTED LEVELS*	RANGE LOW	RANGE HIGH
1,4-Dioxane	ppb	0.080	0.078	0.082
Chlorate	ppb	127	23	380
Chromium	ppb	0.75	0.22	2.0
Hexavalent Chromium (Dissolved)	ppb	0.46	0.03	1.9
Molybdenum	ppb	3.7	2.1	5.3
Strontium	ppb	166	35	430
Vanadium	ppb	2.9	0.2	9.2

* Average of all of 2015 UCMR results

The average of all of the monitoring results and the range of detections for any detected unregulated contaminants for which state or federal rules require monitoring are presented in the table. Other contaminants were collected and analyzed, as required by EPA, but they were not found above detection limits in any City of Santa Fe samples, and therefore are not included in the above table.

Conserve Water... every drop counts

2015 City of Santa Fe Water Quality Table

The table on the following page lists contaminants which:

1. have associated primary Maximum Contaminant Levels (MCLs) that are regulated and
2. were detected in testing conducted by the City and New Mexico Environment Department.

The table includes only those constituents found above detection limits during 2015 sampling, or during sampling in previous years if not analyzed during 2015. The EPA requires monitoring for certain contaminants less than once per year because the concentrations are not expected to vary significantly from year to year. The City is required to test for over 80 contaminants, and the vast majority of these contaminants were not found above detection limits Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800) 426-4791, or visiting www.epa.gov/safewater.

Please view separate 2015 Water Quality Table

City of Santa Fe 2015 Water Quality Table
Regulated Compliance Monitoring

Contaminant	Units	MCL	MCLG	City Well Field[c]	Sample Date	Buckman Tank[d]	Sample Date	Canyon Road WTP	Sample Date	Buckman RWTP	Sample Date	Violation	Typical Source
Organic Contaminants													
1,1,1-Trichloroethane	ppb	200	200	0.1 (ND - 0.1)	2014	ND	2014	ND	2014	ND	2014	No	Discharge from metal degreasing sites and other factories
1,1-Dichloroethylene	ppb	7	7	0.21 (ND - 0.21)	2014	ND	2014	ND	2014	ND	2014	No	Discharge from industrial chemical factories
1,2-Dichloroethane	ppb	5	zero	0.20 (ND - 0.20)	2014	ND	2014	ND	2014	ND	2014	No	Discharge from industrial chemical factories
Tetrachloroethylene	ppb	5	zero	0.28 (ND - 0.28)	2014	ND	2014	ND	2014	ND	2014	No	Discharge from factories and dry cleaners
Synthetic Organic Contaminants													
Ethylene Dibromide	ppb	0.05	zero	0.007 (ND - 0.007)	2014	ND	2014	ND	2014	ND	2014	No	Discharge from petroleum refineries
Inorganic Contaminants													
Arsenic	ppb	10	0	ND	2015	ND	2015	ND	2015	ND	2015	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	ppm	2	2	0.8 (0.1 - 0.8)	2014	ND	2014	ND	2014	ND	2015	No	Discharge from drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Bromate	ppb	10	zero	NA	NA	NA	NA	NA	NA	7.3 (ND - 7.3)	2015	No	Byproduct of drinking water disinfection
Chromium	ppb	100	100	1 (ND - 1)	2014	ND	2014	ND	2015	ND	2015	No	Discharge from steel and pulp mills; erosion of natural deposits
Fluoride	ppm	4	4	0.16 (0.14 - 0.16)	2014	0.4	2014	0.11	2015	0.37	2015	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate [as N]	ppm	10	10	6.65 (3.03 - 6.65)	2015	0.18	2015	0.12	2015	0.19	2015	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion from natural deposits
Radioactive Contaminants													
Gross Alpha Emitters	pCi/L	15	0	4.4 (1.8 - 4.4)	2014	4.2	2014	ND	2014	1.2	2014	No	Erosion of natural deposits
Gross Beta/Photon Emitters	pCi/L	50[a]	NA	1.5 (ND - 1.5)	2014	2.3	2014	1.4	2014	2.3	2014	No	Decay of natural and man-made deposits
Radium 226/228	pCi/L	5	0	0.77 (0.18 - 0.77)	2014	0.07	2014	0.18	2014	0.1	2014	No	Erosion of natural deposits
Uranium	ppb	30	0	2.0 (ND - 2.0)	2014	2.0	2014	ND	2014	1	2014	No	Erosion of natural deposits;
Surface Water Contaminants													
Turbidity[b] (highest single measurement)	NTU	TT = 1.0	0	NA	NA	NA	NA	0.33	2015	0.18	2015	No	Soil Runoff
Turbidity[b] (lowest monthly % meeting limits)	NTU	TT = % <0.3 NTU	0	NA	NA	NA	NA	100.0%	2015	100.0%	2015	No	Soil Runoff
Total Organic Carbon (TOC)	NA	TT (35%-45% Removal)	NA	NA	NA	NA	NA	53% to 64% removal	2015	NA	NA	No	Naturally present in the environment

Note:

a) EPA considers 50 pCi/L to be the level of concern for beta particles.

b) Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

c) City wellfield: Alto, Agua Fria, Ferguson, Osage, Santa Fe, St. Mikes & Torreon.

d) Buckman Wells 1-13 and Northwest Well.

Key to Units, Terms and Abbreviations

NA: Not Applicable.

ND: Not Detected.

NTU: Nephelometric Turbidity Units

ppm: parts per million, or milligrams per liter (mg/L).

ppb: parts per billion, or micrograms per liter (µg/L).

pCi/L: picocuries per liter (a measure of radioactivity).

µg/L: Number of micrograms of substance per liter of water.

mg/L: Number of milligrams of substance per liter of water.

µmhos/cm: Micromhos per centimeter or µS/cm (microsiemens per centimeter) – a measure of electrical conductivity in water due to the presence of dissolved inorganic ions (e.g., calcium, chloride, sodium, etc.).

Pt-Co units: Platinum–Cobalt color units – a measure of color also called the "Hazen Scale" or "APHA color", as defined in ASTM International Standard D1209

(Range): The range represents the highest and low values. Range values are not provided if only one sample was taken during the range period.

AL: Action level: The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements, which a water system must follow.

LRAA: Locational running annual average - the average of analytical results for samples at a particular monitoring location during the previous four calendar quarters. LRAA at each sampling location must be below the MCL (0.060 mg/L for Total Haloacetic Acids and 0.080 mg/L for Total Trihalomethanes)

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) – The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Secondary MCL (SMCL): Non-mandatory water quality standards for certain contaminants established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the SMCL.

TT: Treatment Technique: a required process intended to reduce the level of a contaminant in drinking water.

2015 Water Quality Report

City of Santa Fe Water Division P.O. Box 909, Santa Fe, NM 87504 Customer Service (505) 955-4333 Administration (505) 955-4200

The City of Santa Fe's Water Division (the City) is pleased to provide the 2015 Water Quality Report. A safe and dependable water supply is vital to our community and is the primary mission of the City. This report is provided annually and contains information on the quality of water obtained throughout the calendar year. In 2015, the City's drinking water met all U.S. Environmental Protection Agency (EPA) and State drinking water quality limits. The report contains additional details about where your water comes from, what it contains, and how it compares to standards set by federal and state regulatory agencies. It also provides educational information on contaminants which may be a concern.

Sources of Supply

The City was served by four distinct sources of supply in 2015. The 17,000 acre Santa Fe Watershed provides surface runoff to the Santa Fe River where it is stored in the McClure and Nichols Reservoir prior to treatment. Surface water from the Santa Fe River and Rio Grande is treated through conventional and advanced treatment processes at the Canyon Road Water Treatment Plant and Buckman Regional Water Treatment Plant (BRWTP), respectively. The City Well Field is mostly located in close proximity to the Santa Fe River and consists of 8 active wells located within the City limits of Santa Fe. The Buckman Well Field consists of 13 wells located near the Rio Grande, approximately 15 miles northwest of Santa Fe. All four sources are treated with chlorine for protection of customers against disease-causing microorganisms (pathogens), including bacteria and viruses. Fluoride is added to the water supply to benefit the community as recommended by public health professionals.

In 2011, the Buckman Direct Diversion (BDD) Project surface water supply was successfully integrated into the municipal distribution system and operated in conjunction with the City's pre-existing sources of supply throughout 2015. The surface water treated at the BRWTP is taken directly from the Rio Grande. BDD not only improves sustainability for the area but also increases the City's resilience under drought conditions, replacing current groundwater pumping that cannot be sustained, and making the City's wells available as drought and emergency reserves rather than sources used to meet daily water demands.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These individuals should seek advice about the safety of their drinking water supply from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Map of Water Sources

Source Water Assessment and its Availability

The New Mexico Environment Department (NMED) completed a Source Water Assessment for the City of Santa Fe. This assessment includes a determination of source water protection areas and an inventory of pollution sources within the areas of concern. NMED concluded: "The Susceptibility Analysis of the City of Santa Fe water utility reveals that the utility is well maintained and operated, and the sources of drinking water are generally protected from potential sources of contamination based on an evaluation of the available information. The susceptibility rank of the entire water system is **"moderately low"**. A copy of the Assessment is available by contacting NMED at 505-476-8620.

City ordinances adopted in 2005 built upon the recommendations in the Source Water Assessment. The "Safe Drinking Water and Source Water Protection" and the "Stormwater Illicit Discharge Control" ordinances provide additional controls and protections for the City's ground and surface water supplies. In addition, the City established a Stormwater Program with the goal of reducing pollutant discharged to the Santa Fe River. Please contact 955-2134 to report illegal dumping in storm drains, streets and arroyos.

En Espanol

Este reporte contiene información importante sobre la calidad del agua en Santa Fe. Si tiene alguna pregunta o duda sobre este reporte puede hablarle a Victor Archuleta al teléfono 505-955-4370.

City of Santa Fe 2016 Water Quality Table

Regulated Compliance Monitoring

Contaminant	Units	MCL	MCLG	City Well Field[c]	Sample Date	Buckman Tank[b]	Sample Date	Canyon Road WTP	Sample Date	Buckman RWTP	Sample Date	Violation	Typical Source
Inorganic Contaminants													
Arsenic	ppb	10	0	4	2016	2	2014	ND	2016	ND	2015	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	ppm	2	2	0.6	2016	ND	2014	ND	2016	ND	2015	No	Discharge from drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Bromate	ppb	10	zero	NA	NA	NA	NA	NA	NA	1.7 (ND - 4.7)	2016	No	Byproduct of drinking water disinfection
Chromium	ppb	100	100	ND	2016	ND	2014	ND	2016	1	2016	No	Discharge from steel and pulp mills; erosion of natural deposits
Fluoride	ppm	4	4	0.19	2016	0.4	2014	0.13	2016	0.28	2016	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate [as N]	ppm	10	10	7.15 (2.95 - 7.15)	2016	0.1	2016	ND	2016	0.12	2016	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion from natural deposits
Radioactive Contaminants													
Gross Alpha Emitters	pCi/L	15	0	4.4 (1.9 - 4.4)	2014	4.2	2014	ND	2014	1.2	2014	No	Erosion of natural deposits
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Notes:
a. EPA considers 50 pCi/L to be the level of concern for beta particles.
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2016 Water Quality Table Report

City of Santa Fe Water Division
Post Office Box 909, Santa Fe, NM 87504
Customer Service – 505.955.4333
Administration – 505.955.4202

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City ordinances adopted in 2005 built upon the recommendations in the Source Water Assessment. The "Safe Drinking Water and Source Water Protection" and the "Stormwater Illicit Discharge Control" ordinances provide additional controls and protections for the City's ground and surface water supplies. In addition, the City established a Stormwater Program with the goal of reducing pollutant discharged to the Santa Fe River. Please contact (505) 955-5644 to report illegal dumping in storm drains, streets and arroyos.

Contacts for Additional Information

If you have any questions, comments, or suggestions regarding this report please contact Alex Puglisi at (505) 955-4232 or write to the above address.

En Español – Este reporte contiene información importante sobre la calidad del agua en Santa Fe. Si tiene alguna pregunta o duda sobre este reporte puede hablarle a Patricio Pacheco al teléfono (505) 955-4225.

Why are there Contaminants in my Drinking Water?

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants in drinking water may include:

Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Pesticides and herbicides, may come from a variety of sources, such as agriculture, urban storm-water runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring, man-made from nuclear facilities and atmospheric deposition from former above ground testing, or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Nitrates

City of Santa Fe drinking water meets the federal drinking water standard of 10 ppm for nitrates (10 mg/L as N). Nitrates have been detected in some of the City Wells up to 7.15 ppm. Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

Arsenic

The drinking water standard for arsenic is 10 µg/L. The City's drinking water continued to meet this standard throughout 2016. Arsenic occurs naturally in the earth's crust. When these arsenic-containing rocks, minerals, and soil erode, they release arsenic into ground water. While our drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. The EPA standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Microbial and Disinfection Byproducts Rule

The Microbial and Disinfection Byproducts (M/DBP) Rules are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/ disinfection byproducts (DBPs). The Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) focuses on public health protection by limiting exposure to DBPs (known carcinogens), specifically total trihalomethanes (TTHM) and five haloacetic acids (HAA5), which can form in water through disinfectants used to control microbial pathogens.

The City of Santa Fe system has eight compliance sampling locations for TTHM and HAA5. Each location is sampled once per quarter. The average of analytical results for DBPs at a given location during the previous four quarterly samples is called the locational running annual average (LRAA). The LRAA at each location must be below the MCL (0.060 mg/L for HAA5 and 0.080 mg/L for TTHM). Results shown in the Table below indicate that the individual quarterly values during 2016 ranged from 0.001 to 0.036 mg/L for HAA5 and 0.0069 to 0.063 mg/L for TTHM. The highest LRAA was 0.0263 mg/L for HAA5 and 0.0547 mg/L for TTHM, indicating that the system is in compliance.

	MCL†	MCLG†	Sample Year	Highest LRAA†	Range 2016‡		Typical Source
					Low†	High†	
Haloacetic Acids (HAA5s)	0.060	NA	2016	0.0263	0.0014	0.0362	By-product of drinking water chlorination
Total Trihalomethane (TTHMs)	0.080	NA	2016	0.0547	0.0069	0.0634	By-product of drinking water chlorination

† = units are ppm (mg/L)
‡ = Individual samples at all locations

The Stage 2 DBPR also regulates the maximum residual for disinfectants: chlorine dioxide, free chlorine, and chloramines. The disinfectants are water additives used to control microorganisms, particularly as a residual disinfectant in distribution system pipes.

The City of Santa Fe water system uses free chlorine as a disinfectant. For the year 2016, sampling was performed at 80 monitoring locations each month. The results are summarized in the table below:

	MRDL†	MRDLG†	Sample Year	Highest Level Detected†	Range 2016		Violation	Typical Source
					Low†	High†		
Chlorine Residual	4.0	4	2016	2.20	0.80	2.20	No	Water additives used to control microbes

† = units are ppm (mg/L)

Cryptosporidium

Cryptosporidium is a protozoan parasite that is common in surface waters. The oocyst is the transmission stage of the organism. *Cryptosporidium* is introduced into our source waters via wild animal populations. Although the organism is readily removed by the conventional treatment process utilized at the Canyon Road Water Treatment facility, the oocyst is resistant to chemical disinfectants like chlorine and the primary reason to determine if additional treatment is required. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection.

In April 2007 the City began a two-year study to determine the average *Cryptosporidium* concentration in source water entering the Canyon Road Water Treatment facility. The sampling portion of the study was completed in March of 2009. The study is part of the requirements contained in the 2006 USEPA Long-Term Enhanced Surface Water Treatment Rule. *Cryptosporidium* was detected in a single untreated sample in each of the following months: December of 2007, September 2008 and October 2008. The highest 12-month consecutive mean for this study was 0.018 oocysts/L. Since the concentration is <0.075 oocysts/L, no additional treatment at the Canyon Road Water Treatment Facility was necessary. The City began a second round of sampling, one sample a month, starting in October 2015 and scheduled to end in September 2017. No *Cryptosporidium* oocysts have been detected since monitoring began in October 2015 (through December 2016). As with *Cryptosporidium* oocysts, no *Giardia Lamblia* cysts have been detected in the same time period.

Any new water system treating surface water such as BDD is required to monitor *Cryptosporidium* for 24 consecutive months. At the BDD the untreated raw Rio Grande water *Cryptosporidium* test results range from 0 to 0.4 oocysts/L. BDD began a second round of sampling, one sample a month, starting in October 2015 and scheduled to end in September 2017. *Cryptosporidium* oocysts were only detected in one of twelve monthly raw water samples at BRWTP, and the only detection was 0.1 oocyst/L.

Unregulated Contaminant Monitoring Rule (UCMR)

EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) to collect data for contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (SDWA). Unregulated contaminant monitoring helps EPA to determine where certain contaminants occur and whether the Agency should consider regulating those contaminants in the future. UCMR sampling for the EPA required four quarterly periods was completed in the Santa Fe water system between March and December 2015.

The average of all of the monitoring results and the range of detections for any detected unregulated contaminants for which state or federal rules require monitoring are presented in the table. Other contaminants were collected and analyzed, as required by EPA, but they were not found above detection limits in any City of Santa Fe samples, and therefore are not included in the above table.

Unregulated Contaminant Monitoring-

Name	Units	Reported Level*	Range 2016	
			Low	High
1,4-Dioxane	ppb	0.080	0.078	0.082
Chlorate	ppb	127	23	380
Chromium	ppb	0.75	0.22	2.0
Hexavalent Chromium (Dissolved)	ppb	0.46	0.03	1.9
Molybdenum	ppb	3.7	2.1	5.3
Strontium	ppb	166	35	430
Vanadium	ppb	2.9	0.3	9.2

* Average of all of 2015 UCMR results

Conserve Water... every drop counts

Lead and Copper Rule

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Santa Fe is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Tests for lead and copper are taken from customer taps located throughout the City once every three years. The most recent round of lead and copper testing took place in August 2015. The next survey will be performed in 2018. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

Inorganic Contaminants	MCLG	AL**	City Water Levels (90th Percentile)*	# of Samples <AL	Sample Date	Exceeds AL	Typical Source
Copper (ppm)	1.3	1.3	0.60	30 of 30	August 2015	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems
Lead (ppm)	0	0.015	0.0022	30 of 30	August 2015	No	Corrosion of household plumbing systems; Erosion of natural deposits

*Results of monitoring are used to determine the concentration at the 90th percentile (e.g., if 100 samples analyzed, the concentration at the 90th highest sample). Based on the number of samples analyzed in 2015 the 90th percentile is the 27th sample for copper and lead.
** AL = Action Level

Monitoring for LANL-derived contaminants

In cooperation with Los Alamos National Laboratory (LANL) and the New Mexico Environment Department, the City currently monitors Buckman Wells 1, 6 and 8 for LANL derived contamination on a quarterly basis. Samples are analyzed for radionuclides, general inorganic chemicals, metals, high explosives and organics. This repeat sampling has occurred during the years 2001 – 2016 and has indicated that Laboratory-derived radionuclides are not present in the Buckman Wells 1, 6 and 8. The results do indicate detectable levels of radionuclides associated with natural sources. These wells are part of the 13 wells that make-up the Buckman Wellfield. When these wells are used, water from these wells is delivered to the Buckman Tank prior to distribution into the system.

2016 City of Santa Fe Water Quality Table

The table on the following page lists contaminants which:

1) have associated primary Maximum Contaminant Levels (MCLs) that are regulated and

2) were detected in testing conducted by the City and New Mexico Environment Department.

The table includes only those constituents found above detection limits during 2016 sampling, or during sampling in previous years if not analyzed during 2016. The EPA requires monitoring for certain contaminants less than once per year because the concentrations are not expected to vary significantly from year to year. The City is required to test for over 80 contaminants, and the vast majority of these contaminants were not found above detection limits Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800) 426-4791, or visiting www.epa.gov/safewater.

Please view separate City of Santa Fe 2016 Water Quality Table

Why are there Contaminants in my Drinking Water?

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants in drinking water may include:

Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Pesticides and herbicides, may come from a variety of sources, such as agriculture, urban storm-water runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring, man-made from nuclear facilities and atmospheric deposition from former above ground testing, or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Nitrates

City of Santa Fe drinking water meets the federal drinking water standard of 10 ppm for nitrates (10 mg/L as N). Nitrates have been detected in some of the City Wells up to 7 ppm. Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

Arsenic

The drinking water standard for arsenic is 10 µg/L. The City's drinking water continued to meet this standard throughout 2017. Arsenic occurs naturally in the earth's crust. When these arsenic-containing rocks, minerals, and soil erode, they release arsenic into ground water. While our drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. The EPA standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Cryptosporidium

Cryptosporidium is a protozoan parasite that is common in surface waters. The oocyst is the transmission stage of the organism. *Cryptosporidium* is introduced into our source waters via wild animal populations. Although the organism is readily removed by the conventional treatment process utilized at the Canyon Road Water Treatment facility, the oocyst is resistant to chemical disinfectants like chlorine and the primary reason to determine if additional treatment is required. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection.

In April 2007 the City began a two-year study to determine the average *Cryptosporidium* concentration in source water entering the Canyon Road Water Treatment facility. The sampling portion of the study was completed in March of 2009. The study was part of the requirements contained in the 2006 USEPA Long-Term Enhanced Surface Water Treatment Rule. *Cryptosporidium* was detected in a single untreated sample in each of the following months: December of 2007, September 2008 and October 2008. The highest 12-month consecutive mean for this study was 0.018 oocysts/L. Since the concentration is <0.075 oocysts/L, no additional treatment at the Canyon Road Water Treatment Facility was necessary. The City began a second round of sampling, one sample a month, starting in October 2015 and completed in September 2017. No *Cryptosporidium* oocysts were detected during the second round of sampling during the October 2015 to September 2017 period, and consequently no additional treatment at the Canyon Road Water Treatment Facility is necessary. As with *Cryptosporidium* oocysts, no Giardia Lamblia cysts have been detected in the October 2015 to September 2017 time period at the Canyon Road WTP.

Any new water system treating surface water such as BDD is required to monitor *Cryptosporidium* for 24 consecutive months. At the BDD the untreated raw Rio Grande water *Cryptosporidium* test results ranged from 0 to 0.4 oocysts/L. BDD began a second round of sampling, one sample a month, starting in October 2015 and ending September 2017. No *Cryptosporidium* oocysts were detected during the second round of sampling (October 2015 to September 2017, except July 2017 (0.1 oocysts/L), and consequently no additional treatment at the Buckman Regional Water Treatment Facility is necessary.

Voluntary Monitoring

For the results of additional voluntary monitoring for the Canyon Road WTP, Buckman Wells and City Wells, please see the City's Water Quality page at www.santafenm.gov/water_quality. Annual Voluntary Monitoring data Results will be available starting in July 2018 for each previous calendar year. "Voluntary Monitoring" data on the website lists results from voluntary monitoring at entry points into the distribution system associated with BRWTP, and the Canyon Road WTP. Since these samples are collected at the point of entry of water into the City's distribution system, the reported concentrations of contaminants may be further diluted in the distribution system through mixing with water from other City sources.

EPA has established secondary maximum contaminant levels (SMCL) for certain contaminants. Secondary Standards are non-enforceable standards that serve as guidelines to assist public water systems in managing their drinking water. The presence of these contaminants typically results from the erosion of natural deposits. Aluminum and manganese containing materials are used as treatment aids in the water treatment process.

For the results of additional voluntary monitoring see the Buckman Direct Diversion website at www.bddproject.org. To view voluntary monitoring results click the "Quality" tab and then go to "Monitoring, Testing, and Reporting" followed by "Water Quality Sampling Reports."

Monitoring for LANL Derived Contaminants

In cooperation with Los Alamos National Laboratory (LANL) and the New Mexico Environment Department, the City currently monitors Buckman Wells 1, 6 and 8 for LANL derived contamination on a quarterly basis. Samples are analyzed for radionuclides, general inorganic chemicals, metals, high explosives and organics. This repeat sampling has occurred during the years 2001 – 2015 and has indicated that Laboratory-derived radionuclides are not present in the Buckman Wells 1, 2, 6 and 8. The results do indicate detectable levels of radionuclides associated with natural sources. These wells are part of the 13 wells that make-up the Buckman Wellfield. When these wells are used, water from these wells is delivered to the Buckman Tank prior to distribution into the system.

Microbial and Disinfection Byproducts Rule

The Microbial and Disinfection Byproducts (M/DBP) Rules are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/disinfection byproducts (DBPs). The Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) focuses on public health protection by limiting exposure to DBPs (known carcinogens), specifically total trihalomethanes (TTHM), five haloacetic acids (HAA5), and bromate which can form in water through disinfectants used to control microbial pathogens.

The City of Santa Fe system has eight compliance sampling locations for TTHM and HAA5. Each location is sampled once per quarter. The average of analytical results for DBPs at a given location during the previous four quarterly samples is called the locational running annual average (LRAA). The LRAA at each location must be below the MCL (0.060 mg/L for HAA5 and 0.080 mg/L for TTHM). Results shown in the Table below indicate that the individual quarterly values during 2017 ranged from 0.004 to 0.035 mg/L for HAA5 and 0.022 to 0.069 mg/L for TTHM. The highest LRAA was 0.028 mg/L for HAA5 and 0.057 mg/L for TTHM, indicating that the system is in compliance.

	MCL†	MCLG†	Sample Year	Highest LRAA†	Range 2017 † Low‡	High‡	Typical Source
Haloacetic Acids (HAA5s)	.060	NA	2017	0.028	0.004	0.035	By-product of drinking water chlorination
Total Trihalomethane (TTHMs)	.080	NA	2017	0.057	0.022	0.069	By-product of drinking water chlorination

† = units are ppm (mg/L) ‡ = individual samples at all locations

Bromate monitoring is required at the entrance to the distribution system whenever ozone is used to treat drinking water. BRWTP is the only treated water source that supplies ozonated water to the City of Santa Fe. Compliance is based on the running annual average (RAA) of monthly samples collected from BRWTP finished water. In 2017 the highest RAA was 0.005 mg/L, which is lower than the 0.010 mg/L MCL, indicating that the system was in compliance with bromate requirements for all of 2017.

	MCL†	MCLG†	Sample Year	Highest LRAA†	Range 2017 † Low‡	High‡	Typical Source
Bromate§	.010	ZERO	2017	0.0056	0.003	0.005	By-product of drinking water disinfection

† = units are ppm (mg/L)
‡ = individual monthly samples
§ = monitoring required at BRWTP only. Compliance value is based on running annual average (RAA) of monthly finished water results.

The Stage 2 DBPR also regulates the maximum residual for disinfectants: chlorine dioxide, free chlorine, and chloramines. The disinfectants are water additives used to control microorganisms, particularly as a residual disinfectant in distribution system pipes.

The City of Santa Fe water system uses free chlorine as a disinfectant. For the year 2017, sampling was performed at 80 monitoring locations each month. The results are summarized in the table below:

	MRDL†	MRDLG†	Sample Year	Maximum RAA†	Range 2017 Low†	High†	Violation	Typical Source
Chlorine Residual	4.00	4	2017	0.5	0.01	1.52	NO	Water additives used to control microbes

† = units are ppm (mg/L)

Lead and Copper Rule

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Santa Fe is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Tests for lead and copper are taken from customer taps located throughout the City once every three years. The most recent round of lead and copper testing took place in August 2015. A new round of Lead and Copper sampling is scheduled for completion in 2018. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

Inorganic Contaminants	MCLG	AL**	City Water Levels (90th percentile)*	# of Sample <AL	Sample Date	Exceeds AL	Typical Source
Copper (ppm)	1.3	1.3	0.68	30 of 30	August 2015	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems
Lead (ppm)	0	.015	0.0022	30 of 30	August 2015	No	Corrosion of household plumbing systems; Erosion of natural deposits

* Results of monitoring are used to determine the concentration at the 90th percentile (e.g., if 100 samples analyzed, the concentration at the 90th highest sample). Based on the number of samples analyzed in 2015 the 90th percentile is the 27th sample for copper and lead.

** AL = Action Level

2017 City of Santa Fe Water Quality Table

The table on the following page lists contaminants which:

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Please view separate 2017 Water Quality Table

Unregulated Contaminant Monitoring Rule (UCMR)

EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) to collect data for contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (SDWA). Unregulated contaminant monitoring helps EPA to determine where certain contaminants occur and whether the Agency should consider regulating those contaminants in the future. UCMR sampling for the EPA required four quarterly periods was completed in the Santa Fe water system between March and December 2015.

UNREGULATED CONTAMINANT MONITORING

NAME	UNIT	REPORTED LEVELS*	RANGE LOW	RANGE HIGH
1,4-Dioxane	ppb	0.080	0.078	0.082
Chlorate	ppb	127	23	380
Chromium	ppb	0.75	0.22	2.0
Hexavalent Chromium (Dissolved)	ppb	0.46	0.03	1.9
Molybdenum	ppb	3.7	2.1	5.3
Strontium	ppb	166	35	430
Vanadium	ppb	2.9	0.2	9.2

* Average of all of 2015 UCMR results

The average of all of the monitoring results and the range of detections for any detected unregulated contaminants for which state or federal rules require monitoring are presented in the table. Other contaminants were collected and analyzed, as required by EPA, but they were not found above detection limits in any City of Santa Fe samples, and therefore are not included in the above table.

Conserve Water... every drop counts

City of Santa Fe 2017 Water Quality Table

Regulated Compliance Monitoring

Contaminant	Units	MCL	MCLG	City Well Field[e]	Sample Date	Buckman Tank[f]	Sample Date	Canyon Road WTP	Sample Date	Buckman RWTP	Sample Date	Violation	Typical Source
Inorganic Contaminants [c]													
Arsenic	ppb	10	0	3.5 (ND - 3.5)	2017	ND	2017	ND	2017	ND	2017	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	ppm	2	2	0.73 (ND - 0.73)	2017	0.02	2017	0.07	2017	0.04	2017	No	Discharge from drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Selenium	ppb	50	50	2 (0 - 2)	2017	ND	2017	ND	2017	ND	2017	No	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Fluoride	ppm	4	4	0.1 (ND - 0.1)	2017	0.4	2017	0.5	2017	0.3	2017	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate (as N)	ppm	10	10	7 (2 - 7)	2017	ND	2017	ND	2017	ND	2017	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion from natural deposits
Synthetic Organic Contaminants [c]													
Di(2-Ethylhexyl) Phthalate	ppm	0.006	0	0.001 (ND - 0.001)	2017	ND	2017	ND	2017	ND	2017	No	Discharge from rubber and chemical factories
Radioactive Contaminants [c]													
Gross Alpha Emitters	pCi/L	15	0	1.5 (0.2 - 1.5)	2017	1.8	2017	NA	NA	ND	2017	No	Erosion of natural deposits
Gross Beta/Photon Emitters	pCi/L	50[a]	NA	1.4 (ND - 1.4)	2017	3.5	2017	NA	NA	1.7	2017	No	Decay of natural and man-made deposits.
Radium 226/228	pCi/L	5	0	0.75 (0.39 - 0.75)	2017	0.03	2017	NA	NA	0.03	2017	No	Erosion of natural deposits
Uranium	ppb	30	0	1	2017	2	2017	NA	NA	ND	2017	No	Erosion of natural deposits;
Surface Water Contaminants [c]													
Turbidity[d] (highest single measurement)	NTU	TT = 1.0	0	NA	NA	NA	NA	0.22	2017	0.99	2017	No	Soil Runoff
Turbidity[d] (lowest monthly % meeting limits)	NTU	TT = % <0.3 NTU	0	NA	NA	NA	NA	100%	2017	99.4%	2017	No	Soil Runoff
Total Organic Carbon (removal ratio) (TOC) - TREATED	NA	TT[b]	NA	NA	NA	NA	NA	1.2[g] (1.2 - 1.3)	2017	NA	NA	No	Naturally present in the environment

Note:

a) EPA considers 50 pCi/L to be the level of concern for beta particles.
b) Alternative compliance criteria used to meet TOC removal requirements (running annual average of TOC removal ratio must be >1 each month).
c) The range represents the highest and low values within the Compliance Period indicated, if more than one sample was collected.
d) Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.
e) City wellfield: Alto, Agua Fria, Ferguson, Osage, Santa Fe, St. Mikes & Torreon.
f) Buckman Wells 1-13 and Northwest Well.
g) Running annual average (RAA) of TOC removal ratio for each month during 2017 - minimum ratio was 1.2 (as per 40 CFR 141.135 (c) 2006).

Key to Units, Terms and Abbreviations

NA: Not Applicable.
ND: Not Detected.
NTU: Nephelometric Turbidity Units.
ppm: parts per million, or milligrams per liter (mg/L).
ppb: parts per billion, or micrograms per liter (µg/L).
pCi/L: picocuries per liter (a measure of radioactivity).
µg/L: Number of micrograms of substance per liter of water.
mg/L: Number of milligrams of substance per liter of water.

µmhos/cm: Micromhos per centimeter or µS/cm (microsiemens per centimeter) – a measure of electrical conductivity in water due to the presence of dissolved inorganic ions (e.g., calcium, chloride, sodium, etc.).

Pt-Co units: Platinum–Cobalt color units – a measure of color also called the "Hazen Scale" or "APHA color", as defined in ASTM International Standard D1209

(Range): The range represents the highest and low values. Range values are not provided if only one sample was taken during the range period.

AL: Action level: The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements, which a water system must follow.

LRAA: Locational running annual average - the average of analytical results for samples at a particular monitoring location during the previous four calendar quarters. LRAA at each sampling location must be below the MCL (0.060 mg/L for Total Haloacetic Acids and 0.080 mg/L for Total Trihalomethanes)

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) – The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Secondary MCL (SMCL): Non-mandatory water quality standards for certain contaminants established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the SMCL.

TT: Treatment Technique: a required process intended to reduce the level of a contaminant in drinking water.

2017 Water Quality Report

City of Santa Fe Water Division P.O. Box 909, Santa Fe, NM 87504 Customer Service (505) 955-4333 Administration (505) 955-4201

The City of Santa Fe's Water Division (the City) is pleased to provide the 2017 Water Quality Report. A safe and dependable water supply is vital to our community and is the primary mission of the City. This report is provided annually and contains information on the quality of water obtained throughout the calendar year. In 2017, the City's drinking water met all U.S. Environmental Protection Agency (EPA) and State drinking water quality limits. The report contains additional details about where your water comes from, what it contains, and how it compares to standards set by federal and state regulatory agencies. It also provides educational information on contaminants which may be a concern.

Sources of Supply

The City was served by four distinct sources of supply in 2017. The 17,000 acre Santa Fe Watershed provides surface runoff to the Santa Fe River where it is stored in the McClure and Nichols Reservoir prior to treatment. Surface water from the Santa Fe River and Rio Grande is treated through conventional and advanced treatment processes at the Canyon Road Water Treatment Plant and Buckman Regional Water Treatment Plant (BRWTP), respectively. The City Well Field is mostly located in close proximity to the Santa Fe River and consists of 8 active wells located within the City limits of Santa Fe. The Buckman Well Field consists of 13 wells located near the Rio Grande, approximately 15 miles northwest of Santa Fe. All four sources are treated with chlorine for protection of customers against disease-causing microorganisms (pathogens), including bacteria and viruses. Fluoride is added to the water supply to benefit the community as recommended by public health professionals.

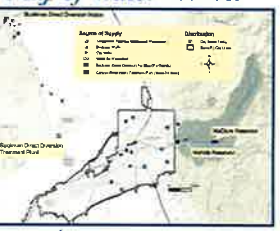
In 2011, the Buckman Direct Diversion (BDD) Project surface water supply was successfully integrated into the municipal distribution system and operated in conjunction with the City's pre-existing sources of supply throughout 2017. The surface water treated at the BRWTP is taken directly from the Rio Grande. BDD not only improves sustainability for the area but also increases the City's resilience under drought conditions, replacing current groundwater pumping that cannot be sustained, and making the City's wells available as drought and emergency reserves rather than sources used to meet daily water demands.

The City has prepared a revision of its 2003 Source Water Protection Plan for finalization and approval by the governing body this year.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Map of Water Sources



Source Water Assessment and its Availability

The New Mexico Environment Department (NMED) completed a Source Water Assessment for the City of Santa Fe. This assessment includes a determination of source water protection areas and an inventory of pollution sources within the areas of concern. NMED concluded: "The Susceptibility Analysis of the City of Santa Fe water utility reveals that the utility is well maintained and operated, and the sources of drinking water are generally protected from potential sources of contamination based on an evaluation of the available information. The susceptibility rank of the entire water system is "moderately low". A copy of the Assessment is available by contacting NMED at 505-476-8638.

City ordinances adopted in 2005 built upon the recommendations in the Source Water Assessment. The "Safe Drinking Water and Source Water Protection" and the "Stormwater Illicit Discharge Control" ordinances provide additional controls and protections for the City's ground and surface water supplies. In addition, the City established a Stormwater Program with the goal of reducing pollutant discharged to the Santa Fe River. Please contact 505-955-5644 to report illegal dumping in storm drains, streets and arroyos.

En Espanol

Este reporte contiene información importante sobre la calidad del agua en Santa Fe. Si tiene alguna pregunta o duda sobre este reporte puede hablarle a Patricio Pacheco al teléfono (505) 955-4220 o Mario Torres at (505) 955-4228.

Contacts for Additional Information:

If you have any questions, comments, or suggestions regarding this report please contact Alex Puglisi at 505-955-4232 or write to the above address.

Why are there Contaminants in my Drinking Water?

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants in drinking water may include:

Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

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Organic chemical contaminants, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring, man-made from nuclear facilities and atmospheric deposition from former above ground testing, or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Nitrates

City of Santa Fe drinking water meets the federal drinking water standard of 10 ppm for nitrates (10 mg/L as N). Nitrates have been detected in some of the City Wells up to 8.4 ppm. Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

Arsenic

The drinking water standard for arsenic is 10 µg/L. The City's drinking water continued to meet this standard throughout 2018. Arsenic occurs naturally in the earth's crust. When these arsenic-containing rocks, minerals, and soil erode, they release arsenic into ground water. While our drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. The EPA standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Cryptosporidium

Cryptosporidium is a protozoan parasite that is common in surface waters. The oocyst is the transmission stage of the organism. *Cryptosporidium* is introduced into our source waters via wild animal populations. Although the organism is readily removed by the conventional treatment process utilized at the Canyon Road Water Treatment facility, the oocyst is resistant to chemical disinfectants like chlorine and the primary reason to determine if additional treatment is required. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection.

In April 2007 the City began a two-year study to determine the average Cryptosporidium concentration in source water entering the Canyon Road Water Treatment facility. The sampling portion of the study was completed in March of 2009. The study was part of the requirements contained in the 2006 USEPA Long-Term Enhanced Surface Water Treatment Rule. *Cryptosporidium* was detected in a single untreated sample in each of the following months: December of 2007, September 2008 and October 2008. The highest 12-month consecutive mean for this study was 0.018 oocysts/L. Since the concentration is <0.075 oocysts/L, no additional treatment at the Canyon Road Water Treatment Facility was necessary. The City began a second round of sampling, one sample a month, starting in October 2015 and completed in September 2017. No *Cryptosporidium* oocysts were detected during the second round of sampling during the October 2015 to September 2017 period, and consequently no additional treatment at the Canyon Road Water Treatment Facility is necessary. As with *Cryptosporidium* oocysts, no Giardia Lamblia cysts have been detected in the October 2015 to September 2017 time period at the Canyon Road WTP.

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Voluntary Monitoring

For the results of additional voluntary monitoring for the Canyon Road WTP, Buckman Wells and City Wells, please see the City's Water Quality page at www.santafenm.gov/water_quality. To view voluntary monitoring results, go to link for "2015 Water Quality Report" on - https://www.santafenm.gov/water_quality then click the "Water Quality and Compliance" link and go to "2015 Water Quality Report". "Voluntary Monitoring" data on the website lists results from voluntary monitoring at entry points into the distribution system associated with BRWTP, and the Canyon Road WTP. Since these samples are collected at the point of entry of water into the City's distribution system, the reported concentrations of contaminants may be further diluted in the distribution system through mixing with water from other City sources.

EPA has established secondary maximum contaminant levels (SMCL) for certain contaminants. Secondary Standards are non-enforceable standards that serve as guidelines to assist public water systems in managing their drinking water. The presence of these contaminants typically results from the erosion of natural deposits. Aluminum and manganese containing materials are used as treatment aids in the water treatment process.

For the results of additional voluntary monitoring see the Buckman Direct Diversion website at www.bddproject.org. To view voluntary monitoring results click the "Quality" tab and then go to "Monitoring, Testing, and Reporting" followed by "Water Quality Sampling Reports."

Monitoring for LANL Derived Contaminants

In cooperation with Los Alamos National Laboratory (LANL) and the New Mexico Environment Department, the City currently monitors Buckman Wells 1, 6 and 8 for LANL derived contamination on a quarterly basis. Samples are analyzed for radionuclides, general inorganic chemicals, metals, high explosives and organics. This repeat sampling has occurred during the years 2001 – 2015 and has indicated that Laboratory-derived radionuclides are not present in the Buckman Wells 1, 2, 6 and 8. The results do indicate detectable levels of radionuclides associated with natural sources. These wells are part of the 13 wells that make-up the Buckman Wellfield. When these wells are used, water from these wells is delivered to the Buckman Tank prior to distribution into the system.

Microbial and Disinfection Byproducts Rule

The Microbial and Disinfection Byproducts (M/DBP) Rules are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/ disinfection byproducts (DBPs). The Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) focuses on public health protection by limiting exposure to DBPs (known carcinogens), specifically total trihalomethanes (TTHM), five haloacetic acids (HAA5), and bromate which can form in water through disinfectants used to control microbial pathogens.

The City of Santa Fe system has eight compliance sampling locations for TTHM and HAA5. Each location is sampled once per quarter. The average of analytical results for DBPs at a given location during the previous four quarterly samples is called the locational running annual average (LRAA). The LRAA at each location must be below the MCL (0.060 mg/L for HAA5 and 0.080 mg/L for TTHM). Results shown in the Table below indicate that the individual quarterly values during 2018 ranged from 0.003 to 0.032 mg/L for HAA5 and 0.004 to 0.060 mg/L for TTHM. The highest LRAA was 0.023 mg/L for HAA5 and 0.058 mg/L for TTHM, indicating that the system is in compliance.

	MCL†	MCLG†	Sample Year	Highest LRAA†	Range 2018 ‡ Low ‡	High ‡	Typical Source
Haloacetic Acids (HAA5s)	.060	NA	2018	0.023	0.003	0.032	By-product of drinking water chlorination
Total Trihalomethane (TTHMs)	.080	NA	2018	0.058	0.004	0.060	By-product of drinking water chlorination

† = units are ppm (mg/L) ‡ = individual samples at all locations

Bromate monitoring is required at the entrance to the distribution system whenever ozone is used to treat drinking water. BRWTP is the only treated water source that supplies ozonated water to the City of Santa Fe. Compliance is based on the running annual average (RAA) of monthly samples collected from BRWTP finished water. In 2018 the highest RAA was 0.0052 mg/L, which is lower than the 0.010 mg/L MCL, indicating that the system was in compliance with bromate requirements for all of 2018.

	MCL†	MCLG†	Sample Year	Highest LRAA†	Range 2018 ‡ Low ‡	High ‡	Typical Source
Bromate§	.010	ZERO	2018	0.0052§	0.0045	0.0052	By-product of drinking water disinfection

† = units are ppm (mg/L)
‡ = individual monthly samples
§ = monitoring required at BRWTP only. Compliance value is based on running annual average (RAA) of monthly finished water results.

The Stage 2 DBPR also regulates the maximum residual for disinfectants: chlorine dioxide, free chlorine, and chloramines. The disinfectants are water additives used to control microorganisms, particularly as a residual disinfectant in distribution system pipes.

The City of Santa Fe water system uses free chlorine as a disinfectant. For the year 2018, sampling was performed at 80 monitoring locations each month. The results are summarized in the table below:

	MRDL†	MRDLG†	Sample Year	Maximum RAA†	Range 2018 Low †	High †	Violation	Typical Source
Chlorine Residual	4.0	4	2018	0.4	0.01	1.04	NO	Water additives used to control microbes

† = units are ppm (mg/L)

Lead and Copper Rule

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Santa Fe is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (800) 426-4791or at http://www.epa.gov/safewater/lead.

Tests for lead and copper are taken from customer taps located throughout the City once every three years. The most recent round of lead and copper testing took place in September 2018. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

Inorganic Contaminants	MCLG	AL**	City Water Levels (90th percentile)*	# of Sample <AL	Sample Date	Exceeds AL	Typical Source
Copper (ppm)	1.3	1.3	0.37	31 of 31	September 2018	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems
Lead (ppm)	0	.015	0.0018	31 of 31	September 2018	No	Corrosion of household plumbing systems; Erosion of natural deposits

*Results of monitoring are used to determine the concentration at the 90th percentile (e.g., if 100 samples analyzed, the concentration at the 90th highest sample). Based on the number of samples analyzed in 2018 the 90th percentile is the 28th ranked sample for copper and lead.

** AL = Action Level

2018 City of Santa Fe Water Quality Table

The table on the following page lists contaminants which:

1) have associated primary Maximum Contaminant Levels (MCLs) that are regulated and
2) were detected in testing conducted by the City and New Mexico Environment Department.

The table includes only those constituents found above detection limits during 2018 sampling, or during sampling in previous years if not analyzed during 2018. The EPA requires monitoring for certain contaminants less than once per year because the concentrations are not expected to vary significantly from year to year. The City is required to test for over 80 contaminants, and the vast majority of these contaminants were not found above detection limits. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800) 426-4791, or visiting www.epa.gov/safewater.

Please view separate 2018 Water Quality Table

Conserve Water... every drop counts

For information regarding the City's water conservation program, ways to conserve, and rebates, please contact the City's Water Conservation Hotline at (505) 955-4225.

City of Santa Fe 2018 Water Quality Table

Regulated Compliance Monitoring

Contaminant	Units	MCL	MCLG	City Well Field[e]	Sample Date	Buckman Tank[f]	Sample Date	Canyon Road WTP	Sample Date	Buckman RWTP	Sample Date	Violation	Typical Source
Synthetic Organic Contaminants (SOCs)[c]													
Di(2-ethylhexy) Phthalate	ppb	6	0	1.14 (ND-1.14	2017	ND	2017	ND	2018	ND	2018	No	Discharge from rubber and chemical factories
Inorganic Contaminants[c]													
Arsenic	ppb	10	0	3.5 (ND - 3.5)	2017	ND	2017	ND	2018	ND	2017	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	ppm	2	2	0.73 (ND - 0.73)	2017	0.039	2017	0.03	2018	0.05	2018	No	Discharge from drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride	ppm	4	4	0.1 (ND - 0.1)	2017	0.37	2017	0.17	2018	0.37	2017	No	Erosion of natural deposits; Water additive which promotes strong teeth. Discharge from fertilizer and aluminum factories
Nitrate (as N)	ppm	10	10	8.4 (2.4 - 8.4)	2018	ND	2018	ND	2018	ND	2018	No	Runoff from fertilizer use; Leaching from septic tanks, sewage. Erosion from natural deposits
Selenium	ppb	50	50	2 (0 - 2)	2017	ND	2017	ND	2018	ND	2017	No	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Radioactive Contaminants[c]													
Gross Alpha Emitters[d]	pCi/L	15	0	0.8 (0.2 - 0.8)	2017	0.5	2017	NA	NA	5.9 (0.5 - 5.9)	2018	No	Erosion of natural deposits
Gross Beta/Photon Emitters	pCi/L	50[a]	NA	1.4 (ND - 1.4)	2017	3.5	2017	NA	NA	2.6	2018	No	Decay of natural and man-made deposits.
Radium 226/228	pCi/L	5	0	0.75 (0.39 - 0.75)	2017	0.03	2017	NA	NA	0.03	2018	No	Erosion of natural deposits
Uranium	ppb	30	0	1	2017	2	2017	NA	NA	8	2018	No	Erosion of natural deposits;
Surface Water Contaminants[c]													
Turbidity (highest single measurement)	NTU	TT = 1.0	0	NA	NA	NA	NA	0.26	2018	0.19	2018	No	Soil Runoff
Turbidity (lowest monthly % meeting limits)	NTU	TT = % <0.3 NTU	0	NA	NA	NA	NA	100%	2018	100%	2018	No	Soil Runoff
Total Organic Carbon (removal ratio) (TOC) - TREATED	NA	TT[b]	NA	NA	NA	NA	NA	1.2[g] (1.2 - 1.2)	2018	NA	NA	No	Naturally present in the environment.

Note:

a) EPA considers 50 pCi/L to be the level of concern for beta particles.

b) Alternative compliance criteria used to meet TOC removal requirements (running annual average of TOC removal ratio must be >1 each month).

c) The range represents the highest and low values within the Compliance Period indicated, if more than one sample was collected.

d) Gross Alpha Emitters, excluding Radon and Uranium

e) City wellfield: Alto, Agua Fria, Ferguson, Osage, Santa Fe, St. Mikes & Torreon.

f) Buckman Wells 1-13 and Northwest Well.

g) Running annual average (RAA) of TOC removal ratio for each month during 2018 - minimum ratio was 1.2 (as per 40 CFR 141.135 (c) 2006).

Key to Units, Terms and Abbreviations

NA: Not Applicable.

ND: Not Detected.

NTU: Nephelometric Turbidity Units.

ppm: parts per million, or milligrams per liter (mg/L).

ppb: parts per billion, or micrograms per liter (µg/L).

pCi/L: picocuries per liter (a measure of radioactivity).

µg/L: Number of micrograms of substance per liter of water.

mg/L: Number of milligrams of substance per liter of water.

TT: A Treatment Technique standard was set instead of an Maximum Contaminant Level

(Range): The range represents the highest and low values. Range values are not provided if only one sample was taken during the range period.

AL: Action level: The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements, which a water system must follow.

LRAA: Locational running annual average - the average of analytical results for samples at a particular monitoring location during the previous four calendar quarters. LRAA at each sampling location must be below the MCL (0.060 mg/L for Total Haloacetic Acids and 0.080 mg/L for Total Trihalomethanes)

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) – The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Secondary MCL (SMCL): Non-mandatory water quality standards for certain contaminants established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the SMCL.

TT: Treatment Technique: a required process intended to reduce the level of a contaminant in drinking water.

2018 Water Quality Report

City of Santa Fe Water Division P.O. Box 909, Santa Fe, NM 87504 Customer Service (505) 955-4333 Administration (505) 955-4200

The City of Santa Fe's Water Division (the City) is pleased to provide the 2018 Water Quality Report. A safe and dependable water supply is vital to our community and is the primary mission of the City. This report is provided annually and contains information on the quality of water obtained throughout the calendar year. In 2018, the City's drinking water met all U.S. Environmental Protection Agency (EPA) and State drinking water quality limits. The report contains additional details about where your water comes from, what it contains, and how it compares to standards set by federal and state regulatory agencies. It also provides educational information on contaminants which may be a concern.

Sources of Supply

The City was served by four distinct sources of supply in 2018. The 17,000 acre Santa Fe Watershed provides surface runoff to the Santa Fe River where it is stored in the McClure and Nichols Reservoir prior to treatment. Surface water from the Santa Fe River and Rio Grande is treated through conventional and advanced treatment processes at the Canyon Road Water Treatment Plant and Buckman Regional Water Treatment Plant (BRWTP), respectively. The City Well Field is mostly located in close proximity to the Santa Fe River and consists of 8 active wells located within the City limits of Santa Fe. The Buckman Well Field consists of 13 wells located near the Rio Grande, approximately 15 miles northwest of Santa Fe. All four sources are treated with chlorine for protection of customers against disease-causing microorganisms (pathogens), including bacteria and viruses. Fluoride is added to the water supply to benefit the community as recommended by public health professionals.

In 2011, the Buckman Direct Diversion (BDD) Project surface water supply was successfully integrated into the municipal distribution system and operated in conjunction with the City's pre-existing sources of supply throughout 2018. The surface water treated at the BRWTP is taken directly from the Rio Grande. BDD not only improves sustainability for the area but also increases the City's resilience under drought conditions, replacing current groundwater pumping that cannot be sustained, and making the City's wells available as drought and emergency reserves rather than sources used to meet daily water demands.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Map of Water Sources

Source Water Assessment and its Availability

The New Mexico Environment Department (NMED) completed a Source Water Assessment for the City of Santa Fe. This assessment includes a determination of source water protection areas and an inventory of pollution sources within the areas of concern. NMED concluded: "The Susceptibility Analysis of the City of Santa Fe water utility reveals that the utility is well maintained and operated, and the sources of drinking water are generally protected from potential sources of contamination based on an evaluation of the available information. The susceptibility rank of the entire water system is "moderately low". A copy of the Assessment is available by contacting NMED at 505-476-8638.

City ordinances adopted in 2005 built upon the recommendations in the Source Water Assessment. The "Safe Drinking Water and Source Water Protection" and the "Stormwater Illicit Discharge Control" ordinances provide additional controls and protections for the City's ground and surface water supplies. In addition, the City established a Stormwater Program with the goal of reducing pollutant discharged to the Santa Fe River. Please contact 505-955-5644 to report illegal dumping in storm drains, streets and arroyos.

En Espanol

Este reporte contiene información importante sobre la calidad del agua en Santa Fe. Si tiene alguna pregunta o duda sobre este reporte puede hablarle a Patricio Pacheco al teléfono 505-955-4220 o Mario Torres at 505-955-4228 o escribe a la dirección de arriba.

Contacts for Additional Information:

If you have any questions, comments, or suggestions regarding this report please contact Alex Puglisi at 505-955-4232 or write to the above address.

Why are there Contaminants in my Drinking Water?

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants in drinking water may include:

Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Pesticides and herbicides, may come from a variety of sources, such as agriculture, urban storm-water runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring, man-made from nuclear facilities and atmospheric deposition from former above ground testing, or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Nitrates

City of Santa Fe drinking water meets the federal drinking water standard of 10 ppm for nitrates (10 mg/L as N). Nitrates have been detected in some of the City Wells up to 8.4 ppm. Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

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Inorganic Contaminants	MCLG	AL**	City Water Levels (90th percentile)*	# of Sample <AL	Sample Date	Exceeds AL	Typical Source
Copper (ppm)	1.3	1.3	0.37	31 of 31	September 2018	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems
Lead (ppm)	0	.015	0.0018	31 of 31	September 2018	No	Corrosion of household plumbing systems; Erosion of natural deposits

*Results of monitoring are used to determine the concentration at the 90th percentile (e.g., if 100 samples analyzed, the concentration at the 90th highest sample). Based on the number of samples analyzed in 2018 the 90th percentile is the 28th ranked sample for copper and lead.

** AL = Action Level

2018 City of Santa Fe Water Quality Table

The table on the following page lists contaminants which:

1) have associated primary Maximum Contaminant Levels (MCLs) that are regulated and
2) were detected in testing conducted by the City and New Mexico Environment Department.

The table includes only those constituents found above detection limits during 2018 sampling, or during sampling in previous years if not analyzed during 2018. The EPA requires monitoring for certain contaminants less than once per year because the concentrations are not expected to vary significantly from year to year. The City is required to test for over 80 contaminants, and the vast majority of these contaminants were not found above detection limits Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800) 426-4791, or visiting www.epa.gov/safewater.

Please view separate 2018 Water Quality Table

Conserve Water… every drop counts

For information regarding the City's water conservation program, ways to conserve, and rebates, please contact the City's Water Conservation Hotline at (505) 955-4225.

City of Santa Fe 2018 Water Quality Table

Regulated Compliance Monitoring

Contaminant	Units	MCL	MCLG	City Well Field[e]	Sample Date	Buckman Tank[f]	Sample Date	Canyon Road WTP	Sample Date	Buckman RWTP	Sample Date	Violation	Typical Source
Synthetic Organic Contaminants (SOCs)[c]													
Di(2-ethylhexyl) Phthalate	ppb	6	0	1.14 (ND-1.14)	2017	ND	2017	ND	2018	ND	2018	No	Discharge from rubber and chemical factories.
Inorganic Contaminants[c]													
Arsenic	ppb	10	0	3.5 (ND - 3.5)	2017	ND	2017	ND	2018	ND	2017	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	ppm	2	2	0.73 (ND - 0.73)	2017	0.039	2017	0.03	2018	0.05	2018	No	Discharge from drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride	ppm	4	4	0.1 (ND - 0.1)	2017	0.37	2017	0.17	2018	0.37	2017	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate [as N]	ppm	10	10	8.4 (2.4 - 8.4)	2018	ND	2018	ND	2018	ND	2018	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion from natural deposits
Selenium	ppb	50	50	2 (2 - 2)	2017	ND	2017	ND	2018	ND	2017	No	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Radioactive Contaminants[c]													
Gross Alpha Emitters[d]	pCi/L	15	0	0.8 (0.2 - 0.8)	2017	0.5	2017	NA	NA	5.9 (0.5 - 5.9)	2018	No	Erosion of natural deposits
Gross Beta/Photon Emitters	pCi/L	50[a]	NA	1.4 (ND - 1.4)	2017	3.5	2017	NA	NA	2.6	2018	No	Decay of natural and man-made deposits.
Radium 226/228	pCi/L	5	0	0.75 (0.39 - 0.75)	2017	0.03	2017	NA	NA	0.03	2018	No	Erosion of natural deposits
Uranium	ppb	30	0	1	2017	2	2017	NA	NA	6	2018	No	Erosion of natural deposits;
Surface Water Contaminants[c]													
Turbidity (highest single measurement)	NTU	TT = 1.0	0	NA	NA	NA	NA	0.25	2018	0.19	2018	No	Soil Runoff
Turbidity (lowest monthly % meeting limits)	NTU	TT = % <0.3 NTU	0	NA	NA	NA	NA	100%	2018	100%	2018	No	Soil Runoff
Total Organic Carbon (removal ratio) (TOC) - TREATED	NA	TT[b]	NA	NA	NA	NA	NA	1.3[g] (1.2 - 1.3)	2018	NA	NA	No	Naturally present in the environment

Note:

a) EPA considers 50 pCi/L to be the level of concern for beta particles.

b) Alternative compliance criteria used to meet TOC removal requirements (running annual average of TOC removal ratio must be >1 each month).

c) The range represents the highest and low values within the Compliance Period indicated, if more than one sample was collected.

d) Gross Alpha Emitters, excluding Radon and Uranium

e) City wellfield: Alto, Agua Fria, Ferguson, Osage, Santa Fe, St. Mikes & Torreon.

f) Buckman Wells 1-13 and Northwest Well.

g) Running annual average (RAA) of TOC removal ratio for each month during 2018 - minimum ratio was 1.2 (as per 40 CFR 141.135 (c) 2006).

Key to Units, Terms and Abbreviations

NA: Not Applicable.

ND: Not Detected.

NTU: Nephelometric Turbidity Units.

ppm: parts per million, or milligrams per liter (mg/L).

ppb: parts per billion, or micrograms per liter (µg/L).

pCi/L: picocuries per liter (a measure of radioactivity).

µg/L: Number of micrograms of substance per liter of water.

mg/L: Number of milligrams of substance per liter of water.

TT: A Treatment Technique standard was set instead of an Maximum Contaminant Level

(Range): The range represents the highest and low values. Range values are not provided if only one sample was taken during the range period.

AL: Action level: The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements, which a water system must follow.

LRAA: Locational running annual average - the average of analytical results for samples at a particular monitoring location during the previous four calendar quarters. LRAA at each sampling location must be below the MCL (0.060 mg/L for Total Haloacetic Acids and 0.080 mg/L for Total Trihalomethanes)

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) – The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Secondary MCL (SMCL): Non-mandatory water quality standards for certain contaminants established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the SMCL.

TT: Treatment Technique: a required process intended to reduce the level of a contaminant in drinking water.

2018 Water Quality Report

City of Santa Fe Water Division P.O. Box 909, Santa Fe, NM 87504 Customer Service (505) 955-4333 Administration (505) 955-4202

The City of Santa Fe's Water Division (the City) is pleased to provide the 2018 Water Quality Report. A safe and dependable water supply is vital to our community and is the primary mission of the City. This report is provided annually and contains information on the quality of water obtained throughout the calendar year. In 2018, the City's drinking water met all U.S. Environmental Protection Agency (EPA) and State drinking water quality limits. The report contains additional details about where your water comes from, what it contains, and how it compares to standards set by federal and state regulatory agencies. It also provides educational information on contaminants which may be a concern.

Sources of Supply

The City was served by four distinct sources of supply in 2018. The 17,000 acre Santa Fe Watershed provides surface runoff to the Santa Fe River where it is stored in the McClure and Nichols Reservoir prior to treatment. Surface water from the Santa Fe River and Rio Grande is treated through conventional and advanced treatment processes at the Canyon Road Water Treatment Plant and Buckman Regional Water Treatment Plant (BRWTP), respectively. The City Well Field is mostly located in close proximity to the Santa Fe River and consists of 8 active wells located within the City limits of Santa Fe. The Buckman Well Field consists of 13 wells located near the Rio Grande, approximately 15 miles northwest of Santa Fe. All four sources are treated with chlorine for protection of customers against disease-causing microorganisms (pathogens), including bacteria and viruses. Fluoride is added to the water supply to benefit the community as recommended by public health professionals.

In 2011, the Buckman Direct Diversion (BDD) Project surface water supply was successfully integrated into the municipal distribution system and operated in conjunction with the City's pre-existing sources of supply throughout 2018. The surface water treated at the BRWTP is taken directly from the Rio Grande. BDD not only improves sustainability for the area but also increases the City's resilience under drought conditions, replacing current groundwater pumping that cannot be sustained, and making the City's wells available as drought and emergency reserves rather than sources used to meet daily water demands.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Map of Water Sources

Source Water Assessment and its Availability

The New Mexico Environment Department (NMED) completed a Source Water Assessment for the City of Santa Fe. This assessment includes a determination of source water protection areas and an inventory of pollution sources within the areas of concern. NMED concluded: "The Susceptibility Analysis of the City of Santa Fe water utility reveals that the utility is well maintained and operated, and the sources of drinking water are generally protected from potential sources of contamination based on an evaluation of the available information. The susceptibility rank of the entire water system is "moderately low". A copy of the Assessment is available by contacting NMED at 505-476-8638.

City ordinances adopted in 2005 built upon the recommendations in the Source Water Assessment. The "Safe Drinking Water and Source Water Protection" and the "Stormwater Illicit Discharge Control" ordinances provide additional controls and protections for the City's ground and surface water supplies. In addition, the City established a Stormwater Program with the goal of reducing pollutant discharged to the Santa Fe River. Please contact 505-955-5644 to report illegal dumping in storm drains, streets and arroyos.

En Espanol

Este reporte contiene información importante sobre la calidad del agua en Santa Fe. Si tiene alguna pregunta o duda sobre este reporte puede hablarle a Patricio Pacheco al teléfono 505-955-4220 o Mario Torres at 505-955-4228 o escribe a la dirección de arriba.

Contacts for Additional Information:

If you have any questions, comments, or suggestions regarding this report please contact Alex Puglisi at 505-955-4232 or write to the above address.

City of Santa Fe 2019 Water Quality Table

Regulated Compliance Monitoring

Contaminant	Units	MCL	MCLG	City Well Field[a]	Sample Date	Buckman Wells[b]	Sample Date	Canyon Road WTP	Sample Date	Buckman BWTP	Sample Date	Violation	Typical Source
Synthetic Organic Contaminants (SOCs)[c]													
Di(2-ethylhexyl) Phthalate	PPB	6	0	1 (ND-1)	2017	ND	2017	ND	2016	ND	2019	No	Discharge from rubber and chemical factories.
Inorganic Contaminants[c]													
Arsenic	PPB	10	0	3.5 (ND - 3.5)	2017	ND	2017	1.5	2019	ND	2019	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	PPM	2	2	0.7 (ND - 0.7)	2017	0.04	2017	0.04	2019	0.05	2019	No	Discharge from drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride	PPM	4	4	0.1 (ND - 0.1)	2017	0.37	2017	0.19	2019	0.26	2019	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate [as N]	PPM	10	10	5.7 (ND - 5.7)	2019	ND	2019	ND	2019	ND	2019	No	Runoff from fertilizer use, Leaching from septic tanks, sewage; Erosion from natural deposits
Selenium	PPM	50	50	2 (ND - 2)	2017	ND	2017	ND	2019	ND	2019	No	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
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Gross Alpha Emitters[d]	PCi/L	15	0	0.8 (0.2 - 0.8)	2017	0.5	2017	NA	NA	5.9	2018	No	Erosion of natural deposits
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d) Gross Alpha Emitters excluding Radon and Uranium

e) EPA considers 50 pCi/L to be the level of concern for beta particles.

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Contacts for Additional Information:

If you have any questions, comments, or suggestions regarding this report please contact Alex Puglisi at 505-955-4232 or write to the above address.

Why are there Contaminants in my Drinking Water?

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants in drinking water may include:

- **Microbial contaminants**, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- **Pesticides and herbicides**, may come from a variety of sources, such as agriculture, urban storm-water runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants**, which can be naturally occurring, man-made from nuclear facilities and atmospheric deposition from former above ground testing, or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Nitrates

City of Santa Fe drinking water meets the federal drinking water standard of 10 PPM for nitrates (10 mg/L as N). Nitrates have been detected in some of the City Wells up to 5.7 PPM. Nitrate in drinking water at levels above 10 PPM is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

Arsenic

The drinking water standard for arsenic is 10 PPB. The City's drinking water continued to meet this standard throughout 2019. Arsenic occurs naturally in the earth's crust. When these arsenic-containing rocks, minerals, and soil erode, they release arsenic into ground water. While our drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. The EPA standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Cryptosporidium

Cryptosporidium is a protozoan parasite that is common in surface waters. The oocyst is the transmission stage of the organism. Cryptosporidium is introduced into our source waters via wild animal populations. Although the organism is readily removed by the conventional treatment process utilized at the Canyon Road Water Treatment facility, the oocyst is resistant to chemical disinfectants like chlorine and the primary reason to determine if additional treatment is required. Ingestion of Cryptosporidium may cause cryptosporidiosis, an abdominal infection.

In April 2007 the City began a two-year study to determine the average Cryptosporidium concentration in source water entering the Canyon Road Water Treatment facility. The sampling portion of the study was completed in March of 2009. The study was part of the requirements contained in the 2006 USEPA Long-Term Enhanced Surface Water Treatment Rule. Cryptosporidium was detected in a single untreated sample in each of the following months: December of 2007, September 2008 and October 2008. The highest 12-month consecutive mean for this study was 0.018 oocysts/L. Since the concentration is <0.075 oocysts/L, no additional treatment at the Canyon Road Water Treatment Facility was necessary. The City began a second round of sampling, one sample a month, starting in October 2015 and completed in September 2017. No Cryptosporidium oocysts were detected during the second round of sampling during the October 2015 to September 2017 period, and consequently no additional treatment at the Canyon Road Water Treatment Facility is necessary. As with Cryptosporidium oocysts, no Giardia Lamblia cysts have been detected in the October 2015 to September 2017 time period at the Canyon Road WTP.

Any new water system treating surface water such as BDD is required to monitor Cryptosporidium for 24 consecutive months. At the BDD the untreated raw Rio Grande water Cryptosporidium test results ranged from 0 to 0.4 oocysts/L. BDD began a second round of sampling, one sample a month, starting in October 2015 and ending September 2017. No Cryptosporidium oocysts were detected during the second round of sampling (October 2015 to September 2017, except July 2017 (0.1 oocysts/L)), and consequently no additional treatment at the Buckman Regional Water Treatment Facility is necessary.

Sodium

Sodium levels for all Santa Fe entry points range from 7.5 to 26 PPM. The system-wide average is 8.9 PPM.

Voluntary Monitoring

For the results of additional voluntary monitoring for the Canyon Road WTP, Buckman Wells and City Wells, please see the City's Water Quality page at www.santafenm.gov/water_quality. To view voluntary monitoring results, go to link for "2015 Water Quality Report" on - https://www.santafenm.gov/water_quality then click the "Water Quality and Compliance" link and go to "2015 Water Quality Report". "Voluntary Monitoring" data on the website lists results from voluntary monitoring at entry points into the distribution system associated with BRWTP, and the Canyon Road WTP. Since these samples are collected at the point of entry of water into the City's distribution system, the reported concentrations of contaminants may be further diluted in the distribution system through mixing with water from other City sources.

EPA has established secondary maximum contaminant levels (SMCL) for certain contaminants. Secondary Standards are non-enforceable standards that serve as guidelines to assist public water systems in managing their drinking water. The presence of these contaminants typically results from the erosion of natural deposits. Aluminum and manganese containing materials are used as treatment aids in the water treatment process.

For the results of additional voluntary monitoring see the Buckman Direct Diversion website at www.bddproject.org. To view voluntary monitoring results, click the "Quality" tab and then go to "Monitoring, Testing, and Reporting" followed by "Water Quality Sampling Reports."

Monitoring for LANL Derived Contaminants

In cooperation with Los Alamos National Laboratory (LANL) and the New Mexico Environment Department, the City currently monitors Buckman Wells 1, 6 and 8 for LANL derived contamination on a quarterly basis. Samples are analyzed for radionuclides, general inorganic chemicals, metals, high explosives and organics. This repeat sampling has occurred during the years 2001 – 2019 and has indicated that Laboratory-derived radionuclides are not present in the Buckman Wells 1, 2, 6 and 8. The results do indicate detectable levels of radionuclides associated with natural sources. These wells are part of the 13 wells that make-up the Buckman Wellfield. When these wells are used, water from these wells is delivered to the Buckman Tank prior to distribution into the system.

Microbial and Disinfection Byproducts Rule

The Microbial and Disinfection Byproducts (M/DBP) Rules are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/ disinfection byproducts (DBPs). The Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) focuses on public health protection by limiting exposure to DBPs (known carcinogens), specifically total trihalomethanes (TTHM), five haloacetic acids (HAA5), and bromate which can form in water through disinfectants used to control microbial pathogens.

The City of Santa Fe system has eight compliance sampling locations for TTHM and HAA5. Each location is sampled once per quarter. The average of analytical results for DBPs at a given location during the previous four quarterly samples is called the locational running annual average (LRAA). The LRAA at each location must be below the MCL (60 PPB for HAA5 and 80 PPB for TTHM). Results shown in the Table below indicate that the system is in compliance.

	MCL	MCLG	Sample Year	Highest LRAA†	Range 2019 Low ‡	Range 2019 High ‡	Typical Source
Haloacetic Acids (HAA5s)	60	NA	2019	36	8.8	48	By-product of drinking water chlorination
Total Trihalomethane (TTHMs)	80	NA	2019	31	2.9	62	By-product of drinking water chlorination

† = units are PPB (ug/L) ‡ = individual samples at all locations

Bromate monitoring is required at the entrance to the distribution system whenever ozone is used to treat drinking water. BRWTP is the only treated water source that supplies ozonated water to the City of Santa Fe. Compliance is based on the running annual average (RAA) of monthly samples collected from BRWTP finished water. The results are summarized in the table below and indicate that the levels were in compliance with bromate requirements for all of 2019.

	MCL	MCLG	Sample Year	Highest LRAA	Range 2019 Low †	Range 2019 High †	Typical Source
Bromate‡	10	ZERO	2019	3.9‡	1.3	3.9	By-product of drinking water disinfection

† units are PPB (ug/L)
‡ monitoring required at BRWTP only. Compliance value is based on running annual average (RAA) of quarterly averages of the monthly finished water results.

The Stage 2 DBPR also regulates the maximum residual for disinfectants: chlorine dioxide, free chlorine, and chloramines. The disinfectants are water additives used to control microorganisms, particularly as a residual disinfectant in distribution system pipes.

The City of Santa Fe water system uses free chlorine as a disinfectant. For the year 2019, sampling was performed at 80 monitoring locations each month. The results are summarized in the table below:

	MRDL	MRDLG	Sample Year	Maximum RAA	Range 2019 Low †	Range 2019 High †	Violation	Typical Source
Chlorine Residual	4.0	4	2019	0.4	0.01	1.53	NO	Water additive used to control microbes

† = units are PPM (mg/L)

Lead and Copper Rule

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Santa Fe is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Tests for lead and copper are taken from customer taps located throughout the City once every three years. The most recent round of lead and copper testing took place in September 2018. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

Inorganic Contaminants	MCLG	AL*	City Water Levels	90th percentile** # of Sample >AL	Sample Date	Exceeds AL	Typical Source
Copper (PPM)	1.3	1.3	0.37	31 of 31	September 2019	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems
Lead (PPB)	0	15	1.6	31 of 31	September 2019	No	Corrosion of household plumbing systems; Erosion of natural deposits

* AL = Action Level

** Results of monitoring are used to determine the concentration at the 90th percentile (e.g. if 100 samples analyzed, the concentration at the 90th highest sample). Based on the number of samples analyzed in 2018 the 90th percentile is the 29th highest sample for copper and lead.

2019 City of Santa Fe Water Quality Table

The table on the following page lists contaminants which:

1) have associated primary Maximum Contaminant Levels (MCLs) that are regulated and
2) were detected in testing conducted by the City and New Mexico Environment Department.

The table includes only those constituents found above detection limits during 2019 sampling, or during sampling in previous years if not analyzed during 2019. The EPA requires monitoring for certain contaminants less than once per year because the concentrations are not expected to vary significantly from year to year. The City is required to test for over 80 contaminants, and the vast majority of these contaminants were not found above detection limits. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800) 426-4791, or visiting www.epa.gov/safewater.

Please view separate 2019 Water Quality Table
(on the reverse side of this page)

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City of Santa Fe 2020 Water Quality Table

Regulated Compliance Monitoring

Contaminant	Units	MCL	MCLG	City Well Field a	Sample Year	Buckman Tank b	Sample Year	Canyon Road WTP	Sample Year	Buckman BRWTP	Sample Year	Violation	Typical Source
Synthetic Organic Contaminants c													
Dichloromethane	PPB	5	0	ND	2020	0.7	2020	ND	2020	ND	2020	No	Discharge from pharmaceutical and chemical factories
Inorganic Contaminants c													
Arsenic	PPB	10	0	1.9 (1.1 - 1.9)	2020	1.8	2020	ND	2020	ND	2020	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	PPM	2	2	0.6 (0.2 - 0.6)	2020	0.03	2020	0.006	2020	0.04	2020	No	Discharge from drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride	PPM	4	4	0.2 (ND - 0.2)	2020	0.39	2020	ND	2020	0.37	2020	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate (as N)	PPM	10	10	5.4 (2.5 - 5.4)	2020	ND	2020	ND	2020	ND	2020	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion from natural deposits
Selenium	PPM	50	50	0.004 (ND - 0.004)	2020	ND	2020	ND	2020	ND	2020	No	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Radioactive Contaminants c													
Gross Alpha Emitters d	pCi/L	15	0	0.9 (0.2 - 0.9)	2017 - 2020	0.9	2020	ND	2020	ND	2020	No	Erosion of natural deposits
Gross Beta/Photon Emitters	pCi/L	50 e	NA	1.4 (ND - 1.4)	2017 - 2020	2.8	2020	ND	2020	2.7	2020	No	Decay of natural and man-made deposits
Radium 226/228	pCi/L	5	0	0.8 (0.4 - 0.8)	2017 - 2020	0.04	2020	0.06	2020	0.25	2020	No	Erosion of natural deposits
Uranium	PPB	30	0	1	2017 - 2020	2	2020	ND	2020	2	2020	No	Erosion of natural deposits
Surface Water Contaminants c													
Turbidity (highest single measurement)	NTU	TT = 1.0	0	NA	NA	NA	NA	0.26	2020	0.26	2020	No	Soil Runoff
Turbidity (lowest monthly % meeting limits)	NTU	TT = % <0.3 NTU	0	NA	NA	NA	NA	100%	2020	100%	2020	No	Soil Runoff
Total Organic Carbon (removal ratio)	NA	TT f	NA	NA	NA	NA	NA	1.0 g (1.0 - 1.8)	2020	NA	NA	No	Naturally present in the environment

Note:

a) City wellfield: Alto, Agua Fria, Ferguson, Osage, St. Mikes & Torreon.
b) Buckman Wells 1-13 and Northwest Well.
c) The range represents the highest and lowest values within the Compliance Period indicated, if more than one sample was collected.
d) Gross Alpha Emitters excluding Radon and Uranium.
e) EPA considers 50 pCi/L to be the level of concern for beta particles.
f) Alternative compliance criteria used to meet TOC removal requirements (running annual average of TOC removal ratio must be >1 each month).
g) Running annual average (RAA) of TOC removal ratio for each month during 2020 - minimum ratio was 1.0 (as per 40 CFR 141.135).

Key to Units, Terms and Abbreviations

NA: Not Applicable.
ND: Not Detected.
NTU: Nephelometric Turbidity Units.
PPM: parts per million, or milligrams per liter (mg/L).
PPB: parts per billion, or micrograms per liter (µg/L).
pCi/L: picocuries per liter (a measure of radioactivity).
µg/L: Number of micrograms of substance per liter of water.
mg/L: Number of milligrams of substance per liter of water.

(Range): The range represents the highest and lowest values. Range values are not provided if only one sample was taken during the range period.

AL: Action level: The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements, which a water system must follow.

LRAA: Locational running annual average - the average of analytical results for samples at a particular monitoring location during the previous four calendar quarters. LRAA at each sampling location must be below the MCL (60 µg/L for Total Haloacetic Acids and 80 µg/L for Total Trihalomethanes).

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) – The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

TT: Treatment Technique: a required process intended to reduce the level of a contaminant in drinking water.

2020 Water Quality Report

City of Santa Fe Water Division P.O. Box 909 Santa Fe, NM 87504 Customer Service (505) 955-4333 Administration (505) 955-4202

The City of Santa Fe's Water Division (the City) is pleased to provide the 2020 Water Quality Report for Water System NM3505126. A safe and dependable water supply is vital to our community and is the primary mission of the City. This report is provided annually and contains information on the quality of water obtained throughout the calendar year or most recent monitoring period. In 2020, the City's drinking water met all U.S. Environmental Protection Agency (EPA) and State drinking water quality limits. The report contains additional details about where your water comes from, what it contains, and how it compares to standards set by federal and state regulatory agencies. It also provides educational information on contaminants which may be a concern.

Sources of Supply

The City was served by four distinct sources of supply in 2020. The 17,000 acre Santa Fe Watershed provides surface runoff to the Santa Fe River where it is stored in the McClure and Nichols Reservoir prior to treatment. Surface water from the Santa Fe River and Rio Grande is treated through conventional and advanced treatment processes at the Canyon Road Water Treatment Plant and Buckman Regional Water Treatment Plant (BRWTP) (separate Water System NM3502626), respectively. The City Well Field is mostly located in close proximity to the Santa Fe River and consists of 6 active wells located within the City limits of Santa Fe. The Buckman Well Field consists of 13 wells located near the Rio Grande, approximately 15 miles northwest of Santa Fe. All four sources are treated with chlorine for protection of customers against disease-causing microorganisms (pathogens), including bacteria and viruses. Fluoride is added to the water supply to benefit the community as recommended by public health professionals.

In 2011, the Buckman Direct Diversion (BDD) Project surface water supply was successfully integrated into the municipal distribution system and operated in conjunction with the City's pre-existing sources of supply throughout 2020. The surface water treated at the BRWTP is taken directly from the Rio Grande. BDD not only improves sustainability for the area but also increases the City's resilience under drought conditions, replacing current groundwater pumping that cannot be sustained, and making the City's wells available as drought and emergency reserves rather than sources used to meet daily water demands.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Map of Water Sources

Source Water Assessment and its Availability

The New Mexico Environment Department (NMED) completed a Source Water Assessment for the City of Santa Fe. This assessment includes a determination of source water protection areas and an inventory of pollution sources within the areas of concern. NMED concluded: "The Susceptibility Analysis of the City of Santa Fe water utility reveals that the utility is well maintained and operated, and the sources of drinking water are generally protected from potential sources of contamination based on an evaluation of the available information. The susceptibility rank of the entire water system is "moderately low". A copy of the Assessment is available by contacting NMED at (505) 476-8634.

City ordinances adopted in 2005 built upon the recommendations in the Source Water Assessment. The "Safe Drinking Water and Source Water Protection" and the "Stormwater Illicit Discharge Control" ordinances provide additional controls and protections for the City's ground and surface water supplies. In addition, the City established a Stormwater Program with the goal of reducing pollutants discharged to the Santa Fe River. Please contact (505) 955-5944 to report illegal dumping in storm drains, streets and arroyos.

En Espanol

Este reporte contiene información importante sobre la calidad del agua en Santa Fe. Si tiene alguna pregunta o duda sobre este reporte puede hablarle a Patricio Pacheco al teléfono (505) 955-4220 o escribe a la dirección de arriba.

Contacts for Additional Information:

If you have any questions, comments, or suggestions regarding this report please contact Jonathan Montoya at (505) 955-4373 or write to the above address.

Why are there Contaminants in my Drinking Water?

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants in drinking water may include:

- **Microbial contaminants**, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- **Pesticides and herbicides**, may come from a variety of sources, such as agriculture, urban storm-water runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants**, which can be naturally occurring, man-made from nuclear facilities and atmospheric deposition from former above ground testing, or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Nitrates

City of Santa Fe drinking water meets the federal drinking water standard of 10 PPM for nitrates (10 mg/L as N). Nitrates have been detected in some of the City Wells up to 5.4 PPM. Nitrate in drinking water at levels above 10 PPM is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

Arsenic

Arsenic is a mineral that occurs naturally in the earth's crust. When arsenic-containing rocks dissolve and erode, they release arsenic into the groundwater. The drinking water standard for arsenic is 10 PPB, and the City's drinking water continued to meet this standard throughout 2020. While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Cryptosporidium

Cryptosporidium is a protozoan parasite that is common in surface waters. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection. *Cryptosporidium* is introduced into our source waters via wild animal populations and potentially via domestic livestock. Although the organism is readily removed by the conventional treatment process utilized at the Canyon Road Water Treatment facility, the oocyst, or transmission stage of the organism, is resistant to chemical disinfectants like chlorine and is the primary reason to determine if additional treatment is required.

In April 2007 the City began a two-year study to determine the average *Cryptosporidium* concentration in source water entering the Canyon Road Water Treatment facility. The sampling portion of the study was completed in March of 2009. The study was part of the requirements contained in the 2006 USEPA Long-Term Enhanced Surface Water Treatment Rule. *Cryptosporidium* was detected in a single untreated sample in each of the following months: December of 2007, September 2008 and October 2008. The highest 12-month consecutive mean for this study was 0.018 oocysts/L. Since the concentration is <0.075 oocysts/L, no additional treatment at the Canyon Road Water Treatment Facility was necessary. The City began a second round of sampling, one sample a month, starting in October 2015 and completed in September 2017. No *Cryptosporidium* oocysts were detected during the second round of sampling during the October 2015 to September 2017 period, and consequently no additional treatment at the Canyon Road Water Treatment Facility is necessary. As with *Cryptosporidium* oocysts, no *Giardia Lamblia* cysts have been detected in the October 2015 to September 2017 time period at the Canyon Road WTP.

Any new water system treating surface water is required to monitor *Cryptosporidium* for 24 consecutive months. At the BDD the initial monitoring of untreated Rio Grande water for *Cryptosporidium* resulted in measured concentrations ranging from 0 to 0.4 oocysts/L. BDD began a second round of sampling starting in October 2015 and ending September 2017. No *Cryptosporidium* oocysts were detected during the second round of sampling except in a single measurement in July 2017 of 0.1 oocyst/L. Consequently no additional treatment at the Buckman Regional Water Treatment Facility is necessary.

Sodium

Sodium levels for all Santa Fe entry points range from 8.5 to 33 PPM. The system-wide average is 16 PPM.

Voluntary Monitoring

For the results of additional voluntary monitoring for the Canyon Road WTP and the BRWTP, please see the City's Water Quality page at www.santafenm.gov/water_quality. To view voluntary monitoring results, go to the link for "2019 Water Quality Report". Data in the report lists results from voluntary monitoring at entry points into the distribution system associated with BRWTP and the Canyon Road WTP. Since these samples are collected at the point of entry of water into the City's distribution system, the reported concentrations of contaminants may be further diluted in the distribution system through mixing with water from other City sources.

EPA has established secondary maximum contaminant levels (SMCL) for certain contaminants. Secondary Standards are non-enforceable standards that serve as guidelines to assist public water systems in managing their drinking water. The presence of these contaminants typically results from the erosion of natural deposits. Aluminum and manganese containing materials are used as treatment aids in the water treatment process.

For the results of additional voluntary monitoring see the Buckman Direct Diversion website at www.bddproject.org. To view voluntary monitoring results click the "Quality" tab and then go to "Monitoring, Testing, and Reporting" followed by "Water Quality Sampling Reports."

Monitoring for LANL Derived Contaminants

In cooperation with Los Alamos National Laboratory (LANL) and the New Mexico Environment Department, the City currently monitors Buckman Wells 1, 6 and 8 for Laboratory-derived contamination on a quarterly basis. Samples are analyzed for radionuclides, general inorganic chemicals, metals, high explosives and organics. This repeat sampling has occurred during the years 2001 – 2020 and has indicated that Laboratory-derived radionuclides are not present in the Buckman Wells 1, 2, 6 and 8. The results do indicate detectable levels of radionuclides associated with natural sources. These wells are part of the 13 wells that make-up the Buckman Wellfield. When these wells are used, water from these wells is delivered to the Buckman Tank prior to distribution into the system.

Microbial and Disinfection Byproducts Rule

The Microbial and Disinfection Byproducts (M/DBP) Rules are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/ disinfection byproducts (DBPs). The Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) focuses on public health protection by limiting exposure to DBPs (known carcinogens), specifically total trihalomethanes (TTHM), five haloacetic acids (HAA5), and bromate which can form in water through disinfectants used to control microbial pathogens.

The City of Santa Fe system has eight compliance sampling locations for TTHM and HAA5. Each location is sampled once per quarter. The average of analytical results for DBPs at a given location during the previous four quarterly samples is called the locational running annual average (LRAA). The LRAA at each location must be below the MCL (60 PPB for HAA5 and 80 PPB for TTHM). Results shown in the Table below indicate that the system is in compliance.

	MCL †	MCLG †	Sample Year	Highest LRAA †	Range 2020 Low ‡	Range 2020 High ‡	Typical Source
Haloacetic Acids (HAA5s)	60	NA	2020	28	6.8	28	By-product of drinking water chlorination
Total Trihalomethane (TTHMs)	80	NA	2020	53	19	60	By-product of drinking water chlorination

† = units are PPB (ug/L) ‡ = individual samples at all locations

Bromate monitoring is required at the entrance to the distribution system whenever ozone is used to treat drinking water. BRWTP is the only treated water source that supplies ozonated water to the City of Santa Fe. Compliance is based on the running annual average (RAA) of monthly samples collected from BRWTP finished water. The results are summarized in the table below and indicate that the levels were in compliance with bromate requirements for all of 2020.

	MCL †	MCLG †	Sample Year	Average LRAA †	Range 2020 Low †	Range 2020 High †	Typical Source
Bromate§	10	ZERO	2020	1.5	1.4	1.6	By-product of drinking water disinfection

† = units are PPB (ug/L)

§ = monitoring required at BRWTP only. Compliance value is based on running annual average (RAA) of quarterly averages of the monthly finished water results.

The Stage 2 DBPR also regulates the maximum residual for disinfectants: chlorine dioxide, free chlorine, and chloramines. The disinfectants are water additives used to control microorganisms, particularly as a residual disinfectant in distribution system pipes.

The City of Santa Fe water system uses free chlorine as a disinfectant. For the year 2020, sampling was performed at 80 monitoring locations each month. The results are summarized in the table below.

	MRDL †	MRDLG †	Sample Year	Maximum RAA †	Range 2020 Low †	Range 2020 High †	Violation	Typical Source
Chlorine Residual	4.0	4	2020	0.47	0.34	0.47	NO	Water additives used to control microbes

† = units are PPM (mg/L)

Lead and Copper Rule

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Santa Fe is responsible for providing high quality drinking water, and removing lead pipes, but cannot control the variety of materials used in plumbing components in your home. You share the responsibility for protecting yourself and your family from the lead in your home plumbing. You can take responsibility by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Before drinking tap water, flush your pipes for several minutes by running your tap, taking a shower, doing laundry or a load of dishes. You can also use a filter certified by an American National Standards Institute accredited certifier to reduce lead in drinking water. If you are concerned about lead in your water and wish to have your water tested, contact the City of Santa Fe at (505) 955-4373. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at http://www.epa.gov/safewater/lead.

Tests for lead and copper are taken from customer taps located throughout the City once every three years. The most recent round of lead and copper testing took place in September 2018. Results for both lead and copper, summarized in the following table, were below the required Action Level (AL) - the concentration which, if exceeded, triggers additional treatment or other requirements.

Inorganic Contaminants	MCLG	AL*	City Water Levels (90th percentile)**	# of Sample <AL	Sample Date	Exceeds AL	Typical Source
Copper (PPM)	1.3	1.3	0.37	31 of 31	[illegible] 2018	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems
Lead (PPB)	0	15	1.8	31 of 31	[illegible] 2018	No	Corrosion of household plumbing systems; Erosion of natural deposits

* AL = Action Level

** Results of monitoring are used to determine the concentration at the 90th percentile (e.g., if 100 samples analyzed, the concentration at the 90th highest sample). Based on the number of samples analyzed in 2018 the 90th percentile is the 28th ranked sample for copper and lead.

2020 City of Santa Fe Water Quality Table

The table on the following page lists contaminants which:

1) have associated primary Maximum Contaminant Levels (MCLs) that are regulated and

2) were detected in testing conducted by the City and New Mexico Environment Department.

The table includes only those constituents found above detection limits during 2020 sampling, or during sampling in previous years if not analyzed during 2020. The EPA requires monitoring for certain contaminants less than once per year because the concentrations are not expected to vary significantly from year to year. The City is required to test for over 80 contaminants, and the vast majority of these contaminants were not found above detection limits. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800) 426-4791, or visiting www.epa.gov/safewater.

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City of Santa Fe 2021 Water Quality Table

Regulated Compliance Monitoring

Contaminant	Units	MCL	MCLG	City Well Field [a]	Sample Year	Buckman Tank [b]	Sample Year	Canyon Road WTP	Sample Year	Buckman BWTP	Sample Year	Violation	Typical Source
Volatile Organic Contaminants [c]													
Dichloromethane	PPB	5	0	ND	2020	0.7	2020	ND	2021	ND	2021	No	Discharge from pharmaceutical and chemical factories
Inorganic Contaminants [c]													
Arsenic	PPB	10	0	1.9 (1.1 - 1.9)	2020	1.8	2020	ND	2021	ND	2021	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	PPM	2	2	0.6 (0.2 - 0.6)	2020	0.03	2020	0.01	2021	0.04	2021	No	Discharge from drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride	PPM	4	4	0.2 (ND - 0.2)	2020	0.39	2020	ND	2021	0.47	2021	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate [as N]	PPM	10	10	6.7 (0.6 - 6.7)	2021	1.1	2021	ND	2021	ND	2021	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion from natural deposits
Selenium	PPM	50	50	0.004 (ND - 0.004)	2020	ND	2020	ND	2021	ND	2021	No	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Radioactive Contaminants [c]													
Gross Alpha Emitters [d]	pCi/L	15	0	0.9 (0.2 - 0.9)	2017 - 2020	0.9	2020	ND	2020	0.8	2021	No	Erosion of natural deposits
Gross Beta/Photon Emitters	pCi/L	50 [e]	NA	1.4 (ND - 1.4)	2017 - 2020	2.8	2020	ND	2020	3.9	2021	No	Decay of natural and man-made deposits
Radium 226/228	pCi/L	5	0	0.8 (0.4 - 0.8)	2017 - 2020	0.04	2020	0.06	2020	0.03	2021	No	Erosion of natural deposits
Uranium	PPB	30	0	1	2017 - 2020	2	2020	ND	2020	2	2021	No	Erosion of natural deposits
Surface Water Contaminants [c]													
Turbidity (highest single measurement)	NTU	TT = 1.0	0	NA	NA	NA	NA	0.12	2021	0.17	2021	No	Soil Runoff
Turbidity (lowest monthly % meeting limits)	NTU	TT = % <0.3 NTU	0	NA	NA	NA	NA	100%	2021	100%	2021	No	Soil Runoff
Total Organic Carbon (removal ratio)	NA	TT [f]	NA	NA	NA	NA	NA	1.1 [g] (1.1 - 1.5)	2021	NA	NA	No	Naturally present in the environment

Note:

a) City wellfield: Alto, Agua Fria, Ferguson, Osage, St. Mikes & Torreon.
b) Buckman Wells 1-13 and Northwest Well.
c) The range represents the highest and lowest values within the Compliance Period indicated, if more than one sample was collected.
d) Gross Alpha Emitters excluding Radon and Uranium.
e) EPA considers 50 pCi/L to be the level of concern for beta particles.
f) Alternative compliance criteria used to meet TOC removal requirements (running annual average of TOC removal ratio must be >1 each month)
g) Running annual average (RAA) of TOC removal ratio for each month during 2021 - minimum ratio was 1.1 (as per 40 CFR 141.135)

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2021 Water Quality Report

City of Santa Fe Water Division P.O. Box 909, Santa Fe, NM 87504 Customer Service (505) 955-4333 Administration (505) 955-4302

The City of Santa Fe's Water Division (the City) is pleased to provide the 2021 Water Quality Report for Water System NM3505126. A safe and dependable water supply is vital to our community and is the primary mission of the City. This report is provided annually and contains information on the quality of water obtained throughout the calendar year or most recent monitoring period. In 2021, the City's drinking water met all U.S. Environmental Protection Agency (EPA) and State drinking water quality limits. The report contains additional details about where your water comes from, what it contains, and how it compares to standards set by federal and state regulatory agencies. It also provides educational information on contaminants which may be a concern.

Sources of Supply

The City was served by four distinct sources of supply in 2021. The 17,000 acre Santa Fe Watershed provides surface runoff to the Santa Fe River where it is stored in the McClure and Nichols Reservoir prior to treatment. Surface water from the Santa Fe River and Rio Grande is treated through conventional and advanced treatment processes at the Canyon Road Water Treatment Plant and Buckman Regional Water Treatment Plant (BRWTP) (separate Water System NM3502826), respectively. The City Well Field is mostly located in close proximity to the Santa Fe River and consists of 6 active wells located within the City limits of Santa Fe. The Buckman Well Field consists of 13 wells located near the Rio Grande, approximately 15 miles northwest of Santa Fe. All four sources are treated with chlorine for protection of customers against disease-causing microorganisms (pathogens), including bacteria and viruses. Fluoride is added to the water supply as needed to benefit the community as recommended by public health professionals.

In 2011, the Buckman Direct Diversion (BDD) Project surface water supply was successfully integrated into the municipal distribution system and operated in conjunction with the City's pre-existing sources of supply throughout 2021. The surface water treated at the BRWTP is taken directly from the Rio Grande. BDD not only improves sustainability for the area but also increases the City's resilience under drought conditions, replacing current groundwater pumping that cannot be sustained, and making the City's wells available as drought and emergency reserves rather than sources used to meet daily water demands.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Map of Water Sources

Source Water Assessment and its Availability

The New Mexico Environment Department (NMED) completed a Source Water Assessment for the City of Santa Fe. This assessment includes a determination of source water protection areas and an inventory of pollution sources within the areas of concern. NMED concluded: "The Susceptibility Analysis of the City of Santa Fe water utility reveals that the utility is well maintained and operated, and the sources of drinking water are generally protected from potential sources of contamination based on an evaluation of the available information. The susceptibility rank of the entire water system is "moderately low". A copy of the Assessment is available by contacting NMED at (505) 476-8620.

City ordinances adopted in 2005 built upon the recommendations in the Source Water Assessment. The "Safe Drinking Water and Source Water Protection" and the "Stormwater Illicit Discharge Control" ordinances provide additional controls and protections for the City's ground and surface water supplies. In addition, the City established a Stormwater Program with the goal of reducing pollutants discharged to the Santa Fe River. Please contact (505) 955-5644 to report illegal dumping in storm drains, streets and arroyos.

En Espanol

Este reporte contiene información importante sobre la calidad del agua en Santa Fe. Si tiene alguna pregunta o duda sobre este reporte puede hablarle a Patricio Pacheco al teléfono (505) 955-4220 o escribe a la dirección de arriba.

Contacts for Additional Information:

If you have any questions, comments, or suggestions regarding this report please contact Jonathan Montoya at (505) 955-4373 or write to the above address.

Why are there Contaminants in my Drinking Water?

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants in drinking water may include:

- **Microbial contaminants,** such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants,** such as salts and metals can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- **Pesticides and herbicides,** may come from a variety of sources, such as agriculture, urban storm-water runoff, and residential uses.
- **Organic chemical contaminants,** including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems
- **Radioactive contaminants,** which can be naturally occurring, man-made from nuclear facilities and atmospheric deposition from former above ground testing, or be the result of oil and gas production and mining activities

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Nitrates

City of Santa Fe drinking water meets the federal drinking water standard of 10 PPM for nitrates (10 mg/L as N). Nitrates have been detected in some of the City Wells up to 6.7 PPM. Nitrate in drinking water at levels above 10 PPM is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

Arsenic

Arsenic is a mineral that occurs naturally in the earth's crust. When arsenic-containing rocks dissolve and erode, they release arsenic into the groundwater. The drinking water standard for arsenic is 10 PPB, and the City's drinking water continued to meet this standard throughout 2021. While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Cryptosporidium

Cryptosporidium is a protozoan parasite that is common in surface waters. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection. *Cryptosporidium* is introduced into our source waters via wild animal populations and potentially via domestic livestock. Although the organism is readily removed by the conventional treatment process utilized at the Canyon Road Water Treatment facility, the oocyst, or transmission stage of the organism, is resistant to chemical disinfectants like chlorine and is the primary reason to determine if additional treatment is required.

In April 2007 the City began a two-year study to determine the average *Cryptosporidium* concentration in source water entering the Canyon Road Water Treatment facility. The sampling portion of the study was completed in March of 2009. The study was part of the requirements contained in the 2006 USEPA Long-Term Enhanced Surface Water Treatment Rule. *Cryptosporidium* was detected in a single untreated sample in each of the following months: December of 2007, September 2008 and October 2008. The highest 12-month consecutive mean for this study was 0.018 oocysts/L. Since the concentration is <0.075 oocysts/L, no additional treatment at the Canyon Road Water Treatment Facility was necessary. The City began a second round of sampling, one sample a month, starting in October 2015 and completed in September 2017. No *Cryptosporidium* oocysts were detected during the second round of sampling during the October 2015 to September 2017 period, and consequently no additional treatment at the Canyon Road Water Treatment Facility is necessary. As with *Cryptosporidium* oocysts, no *Giardia Lamblia* cysts have been detected in the October 2015 to September 2017 time period at the Canyon Road WTP.

Any new water system treating surface water is required to monitor *Cryptosporidium* for 24 consecutive months. At the BDD the initial monitoring of untreated Rio Grande water for *Cryptosporidium* resulted in measured concentrations ranging from 0 to 0.4 oocysts/L. BDD began a second round of sampling starting in October 2015 and ending September 2017. No *Cryptosporidium* oocysts were detected during the second round of sampling except in a single measurement in July 2017 of 0.1 oocysts/L. Consequently no additional treatment at the Buckman Regional Water Treatment Facility is necessary.

Sodium

Sodium levels for all Santa Fe entry points range from 8.5 to 33 PPM. The system-wide average is 16 PPM.

Voluntary Monitoring

For the results of additional voluntary monitoring for the Canyon Road WTP and the BRWTP, please see the City's Water Quality page at www.santafenm.gov/water_quality. To view voluntary monitoring results, go to the link for "2015 Water Quality Report". Data in this report lists results from voluntary monitoring at entry points into the distribution system associated with BRWTP and the Canyon Road WTP. Since these samples are collected at the point of entry of water into the City's distribution system, the reported concentrations of contaminants may be further diluted in the distribution system through mixing with water from other City sources.

EPA has established secondary maximum contaminant levels (SMCL) for certain contaminants. Secondary Standards are non-enforceable standards that serve as guidelines to assist public water systems in managing their drinking water. The presence of these contaminants typically results from the erosion of natural deposits. Aluminum and manganese containing materials are used as treatment aids in the water treatment process.

For the results of additional voluntary monitoring see the Buckman Direct Diversion website at www.bddproject.org. To view voluntary monitoring results click the "Quality" tab and then go to "Monitoring, Testing, and Reporting" followed by "Water Quality Sampling Reports."

Monitoring for LANL Derived Contaminants

In cooperation with Los Alamos National Laboratory (LANL) and the New Mexico Environment Department, the City currently monitors Buckman Wells 1, 6 and 8 for Laboratory-derived contamination on a quarterly basis. Samples are analyzed for radionuclides, general inorganic chemicals, metals, high explosives and organics. This robust sampling has occurred during the years 2001 - 2021 and has indicated that Laboratory-derived radionuclides are not present in the Buckman Wells 1, 6 and 8. The results do indicate detectable levels of radionuclides associated with natural sources. These wells are part of the 13 wells that make-up the Buckman Wellfield. When these wells are used, water from these wells is delivered to the Buckman Tank prior to distribution into the system.

Microbial and Disinfection Byproducts Rule

The Microbial and Disinfection Byproducts (M/DBP) Rules are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/ disinfection byproducts (DBPs). The Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) focuses on public health protection by limiting exposure to DBPs (known carcinogens), specifically total trihalomethanes (TTHM), five haloacetic acids (HAAS), and bromate which can form in water through disinfectants used to control microbial pathogens.

The City of Santa Fe system has eight compliance sampling locations for TTHM and HAAS. Each location is sampled once per quarter. The average of analytical results for DBPs at a given location during the previous four quarterly samples is called the locational running annual average (LRAA). The LRAA at each location must be below the MCL (60 PPB for HAAS and 80 PPB for TTHM). Results shown in the Table below indicate that the system is in compliance.

	MCL†	MCLG†	Sample Year	Highest LRAA†	Range 2021 Low†	Range 2021 High‡	Typical Source
Haloacetic Acids (HAA5s)	60	NA	2021	25	4.7	31	By-product of drinking water chlorination
Total Trihalomethane (TTHMs)	80	NA	2021	63	12	77	By-product of drinking water chlorination

† = units are PPB (ug/L) ‡ = individual samples at all locations

Bromate monitoring is required at the entrance to the distribution system whenever ozone is used to treat drinking water. BRWTP is the only treated water source that supplies ozonated water to the City of Santa Fe. Compliance is based on the running annual average (RAA) of monthly samples collected from BRWTP finished water. The results are summarized in the table below and indicate that the levels were in compliance with bromate requirements for all of 2021.

	MCL†	MCLG†	Sample Year	Average LRAA	Range 2021 Low†	Range 2021 High†	Typical Source
Bromate§	10	ZERO	2021	2.0	1.7	2.3	By-product of drinking water disinfection

† = units are PPB (ug/L)
§ = monitoring required at BRWTP only. Compliance value is based on running annual average (RAA) of quarterly averages of the monthly finished water results.

The Stage 2 DBPR also regulates the maximum residual for disinfectants: chlorine dioxide, free chlorine, and chloramines. The disinfectants are water additives used to control microorganisms, particularly as a residual disinfectant in distribution system pipes.

The City of Santa Fe water system uses free chlorine as a disinfectant. For the year 2021, sampling was performed at 80 monitoring locations each month. The results are summarized in the table below.

	MRDL*	MRDLG*	Sample Year	Maximum RAA	Range 2021 Low*	Range 2021 High*	Violation	Typical Source
Chlorine Residual	4.0	4	2021	0.5	0.02	1.31	NO	Water additives used to control microbes

* = units are PPM (mg/L)

Lead and Copper Rule

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Santa Fe is responsible for providing high quality drinking water, and removing lead pipes, but cannot control the variety of materials used in plumbing components in your home. You share the responsibility for protecting yourself and your family from the lead in your home plumbing. You can take responsibility by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Before drinking tap water, flush your pipes for several minutes by running your tap, taking a shower, doing laundry or a load of dishes. You can also use a filter certified by an American National Standards Institute accredited certifier to reduce lead in drinking water. If you are concerned about lead in your water and wish to have your water tested, contact the City of Santa Fe at (505) 955-4373. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at http://www.epa.gov/safewater/lead.

Tests for lead and copper are taken from customer taps located throughout the City once every three years. The most recent round of lead and copper testing took place in September 2021. Results for both lead and copper, summarized in the following table, were below the required Action Level (AL) - the concentration which, if exceeded, triggers additional treatment or other requirements.

Inorganic Contaminants	MCLG	AL*	City Water Levels (90th percentile)**	# of Sample >AL	Sample Date	Exceeds AL	Typical Source
Copper (PPM)	1.3	1.3	0.16	30 of 30	September 2021	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems
Lead (PPB)	0	15	0.93	30 of 30	September 2021	No	Corrosion of household plumbing systems; Erosion of natural deposits

* AL = Action Level

** Results of monitoring are used to determine the concentration at the 90th percentile (e.g., if 100 samples analyzed, the concentration at the 90th highest sample). Based on the number of samples analyzed in 2021 the 90th percentile is the 28th ranked sample for copper and lead.

2021 City of Santa Fe Water Quality Table

The table on the following page lists contaminants which:

1) have associated primary Maximum Contaminant Levels (MCLs) that are regulated and

2) were detected in testing conducted by the City and New Mexico Environment Department.

The table includes only those constituents found above detection limits during 2021 sampling, or during sampling in previous years if not analyzed during 2021. The EPA requires monitoring for certain contaminants less than once per year because the concentrations are not expected to vary significantly from year to year. The City is required to test for over 80 contaminants, and the vast majority of these contaminants were not found above detection limits. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800) 426-4791, or visiting *www.epa.gov/safewater*.

Please view separate 2021 Water Quality Table
(on the reverse side of this page)

Conserve Water... every drop counts

For information regarding the City's water conservation program, ways to conserve, and rebates, please contact the City's Water Conservation Hotline at (505) 955-4225.

Appendix C

NMED List of Potential Sources of Contamination

APPENDIX C: 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 C: 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 C: 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

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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 C: 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 C: 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 D

Sampling Schedule from Drinking Water Watch

New Mexico Environment Department	UOCP Operator Lookup	Drinking Water Program
County Map of NM	Water System Search	Help

Water System Detail Information

Water System No.:	NM3502826	Federal Type:	C
Water System Name:	BUCKMAN REGIONAL WATER TREATMENT PLANT	Federal Source:	SW
Principal County Served:	SANTA FE	System Status:	A
Principal City Served:	SANTA FE	Activity Date:	01-01-2011

Expanded Sample Schedules / FANLs / Plans

Routine TCR Sample Schedules

Begin/End Date	Seasonal Period	Requirements

RP TCR Schedules From [ ] **To** [ ] SEARCH

Repeat TCR Sample Schedules

Begin Date	End Date	Requirements	Original Sample ID/Date

GWR Triggered Source Sample Schedules (Last 6 Months)

Facility	Schedule	Begin Date	End Date	Initial MP Begin Date

GWR Follow-up Triggered Source Sample Schedules (Last 6 Months)

Facility	Schedule	Begin Date	End Date

Group Non-TCR Sample Schedules

Facility	Begin End Date	Seas.	Init. MP Begin Dt	Req's	Analyte Group
02826005	01-01-2011 Continuous		01-01-2011	1 RT/YR	HM - HEAVY METALS
02826005	01-01-2014 Continuous		01-01-2014	1 RT/3Y	NRAD - NEW RAD RULE
02826005	01-01-2014 Continuous		01-01-2014	2 RT/3Y	RSOC - REGULATED SOCS
02826005	01-01-2012 Continuous		01-01-2012	1 RT/YR	VOC1 - VOLATILE ORGANICS

Individual Non-TCR Sample Schedules

Facility	Begin End Date	Seas	Init MP Begin Dt	Req.	Analyte

02826005	01-01-2011 Continuous		01-01-2011	1 RT/YR	1024-CYANIDE
02826005	01-01-2011 Continuous		01-01-2011	1 RT/YR	1025-FLUORIDE
02826005	01-01-2012 Continuous		01-01-2012	1 RT/YR	1038-NITRATE-NITRITE
02826005	01-01-2014 Continuous		01-01-2014	1 RT/3Y	4100-GROSS BETA PARTICLE ACTIVITY
02826005	01-01-2012 Continuous		01-01-2012	1 RT/YR	4102-TRITIUM
02826005	01-01-2012 Continuous		01-01-2012	1 RT/YR	4174-38-STRONTIUM-90

Facility Analyte Levels(FANLS)

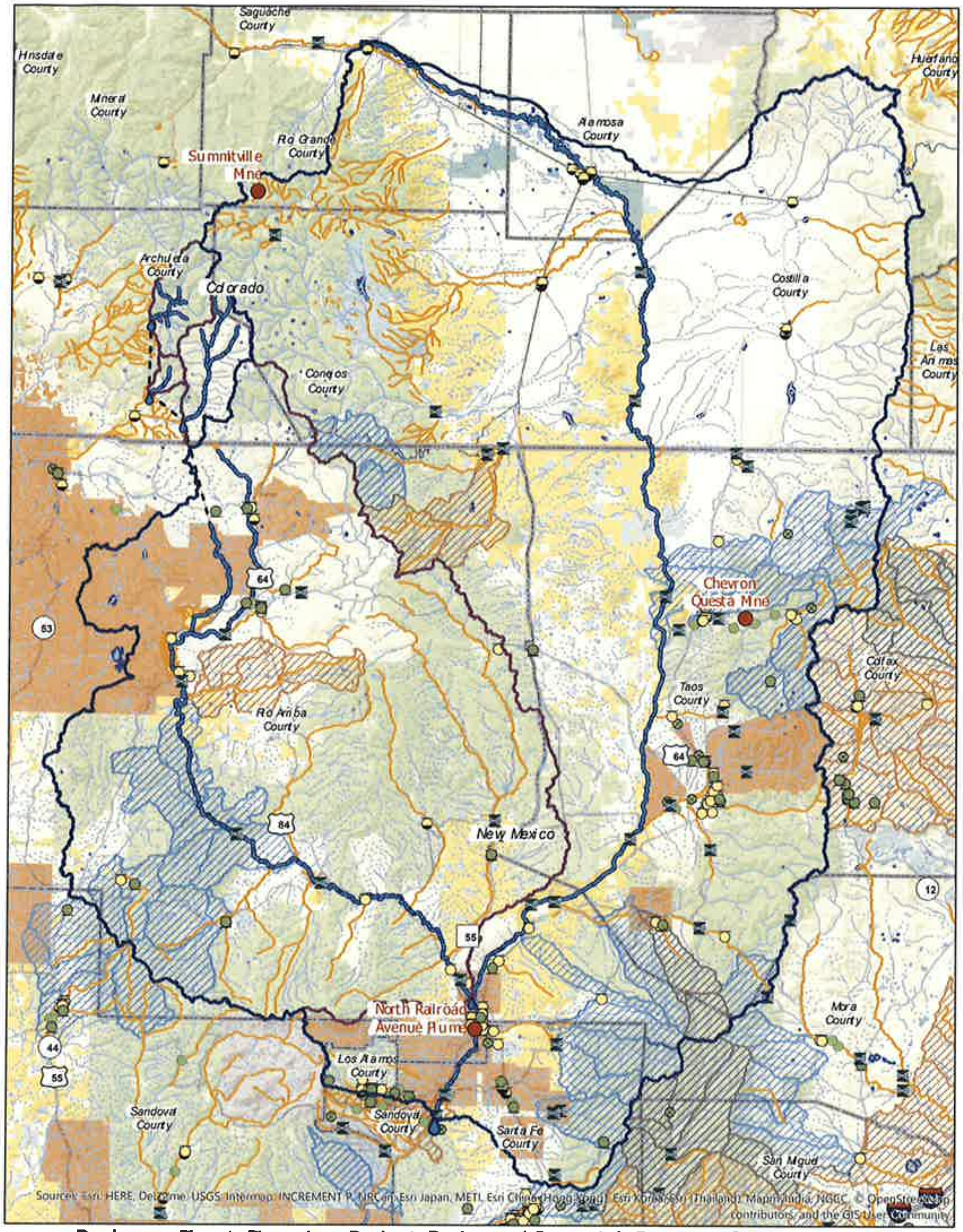
Site	Analyte	Level Type	Value	Units	Days/Month	Samples/Day	Begin Date	End Date	MDBP Type
02826002	0100	MAX	1	NTU	31	6	01-01-2011	Continuous	MAXT
02826002	0100	95P	0.3	NTU	31	6	01-01-2011	Continuous	95PT
02826002	0999	MIN	0.2	MG/L	31	24	01-01-2011	Continuous	EPRD

Sample Plans

Rule	Analyte/Analyte Group	Eff. Begin	Eff. End	App. Date	For Comp.

Appendix E

BDD Basin PSOCs Map



Buckman Direct Diversion Project Basin and Potential Sources of Contamination

Publication date: August 21st, 2017. Data sources: USEPA, NMENV, CO DNR, CO DPHE, USGS, BLM. Cartographer: Zachary L. Stauber.

N

Scale 1:800,000

0 5 10 20 Miles

Legend

- Buckman Direct Diversion Project
- San Juan Chama Diversion Points
- Superfund Sites
- Basin for Buckman Direct Diversion Project
- Basin for San Juan Chama Diversion Project
- USGS Gages

Petroleum Storage Tank Facilities
- Aboveground Storage Tank Facilities
- Underground Storage Tank Facilities
- Leaking Underground Storage Tank Sites

NM NPDES Permits
- Active NPDES Permits
- Nonactive NPDES Permits
- Rio Grande

San Juan Chama
- Pipeline
- Stream

Impaired Waters 2016
- Impaired Streams 2016
- Impaired Lakes 2016

NM Nonpoint Source Program
- Priority Watersheds - Implementation
- Priority Watersheds - Protection

National Hydrography Dataset Lines

Feature Code
- Connector
- Canal/Ditch
- Aqueduct: At or Near Surface
- Aqueduct: Underground
- Pipeline: Siphon
- Intermittent Stream
- Perennial Stream
- Artificial Path

Waterbodies

Feature Code
- Playa
- Intermittent Lake
- Perennial Lake
- High Water Stage Intermittent Lake
- Average Water Stage Intermittent Lake
- Normal Pool Stage Perennial Lake
- Aquaculture Reservoir
- Disposal Reservoir
- Evaporator Reservoir
- Treatment Reservoir
- Wetland

BLM Surface Ownership
- Bureau of Land Management
- Bureau of Reclamation
- Department of Agriculture
- Department of Defense
- Department of Energy
- Fish and Wildlife Service
- Forest Service
- National Park Service
- Other Federal Agency
- Private
- State
- State Game and Fish
- State Park
- Tribal