HAZARD RANKING SYSTEM (HRS)
DOCUMENTATION RECORD - REVIEW COVER SHEET

Name of Site:	Lea and West Second Street	
EPA ID No.:	NMN000607057	

Contact Persons

Site Investigation:	Brenda Nixon Cook, NPL Coordinator, EPA Reg.6 (Name)	(214) 665-7436 (Telephone)
Documentation Record:	Brenda Nixon Cook, NPL Coordinator, EPA Reg.6 (Name)	(214) 665-7436 (Telephone)

Pathways, Components, or Threats Not Scored

1) Soil Exposure Pathway: The soil exposure pathway has not been scored because although there is sampling to show a release has occurred, there are not a sufficient number of targets to impact the site score. Furthermore, although there are indications of contaminated soil present that could threaten targets, it has not been scored as an evaluation of the soil exposure pathway would not affect the listing decision (Ref. 1, Sec. 2.2.3).

2) Air Pathway: Based on information available at this time, evaluation of the air migration pathway would not affect the listing decision (Ref. 1, Sec. 2.2.3).

3) Surface Water Pathway: Based on information available at this time, evaluation of the surface water migration pathway would not affect the listing decision (Ref. 1, Sec. 2.2.3).

HRS DOCUMENTATION RECORD

Name of Site:	Lea and West Second Street
Site Spill Identifier No.:	A6U9
EPA Site ID No.:	NMN000607057
EPA Region:	6
Date Prepared:	September 2015
Street Addresses of Sites*:	Lea and West Second Street (510 and 514 West Second Street) Site 1 - 510 and 514 West Second Street Site 2 - 507 East Second Street Site 3 - Intersection of West Second and Montana Site 4 - Intersection of South Virginia Avenue and East Alameda Street
City, County, and State:	Roswell, Chaves County, New Mexico 88202*
General Location within the State:	The site is located in the City of Roswell, Chaves County, New Mexico. Roswell is located in southeast New Mexico (Ref. 3, p. 1).
Topographic Map(s):	The following U.S. Geological Survey (USGS) 7.5-minute series topographic map was used in locating the facility: Roswell North, New Mexico (2013) (Ref. 3, p. 1).
Latitude/Longitude*:	Lea and West Second Street (33° 23’ 38.684” N, 104° 31’ 47.822” W) Site 1 - 33° 23’ 38.684” N, 104° 31’ 47.822” W Site 2 – 33° 23' 41.103" N, 104° 30' 57.078" W Site 3 – 33° 23' 38.237" N, 104° 32' 34.556" W Site 4 - 33° 23' 29.129" N, 104° 31' 17.068" W

Latitude and Longitude coordinates were measured from within each source area and were determined using a scaled topographic map and Geographic Information System (GIS) software (Ref. 3, p. 1; Ref. 4, pp. 1, 2).

Scores	
Air Pathway	Not Scored
Ground Water Pathway	100
Soil Exposure Pathway	Not Scored
Surface Water Pathway	Not Scored
HRS SITE SCORE	**50.00**

*The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed, or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under CERCLA. Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

NOTES TO THE READER

1. The following rules were applied when citing references in this documentation record:

   Tracking numbers are assigned by the region to every page of every reference. The tracking number consists of the reference number followed by the page number within that reference. A tracking number has a two-digit number followed by the sequential number (e.g., Reference 4, Page 1 is expressed as 040001 in Reference 4).

2. Hazardous substances are often listed by the names used in the Superfund Chemical Data Matrix (SCDM) (Ref. 2).

3. Attachment A of this documentation record consists of the following figures:

   - A-1 Site Location Map
   - A-2 Source Location Map
   - A-3 4-Mile Target Distance Limit
   - A-4 4-Mile Target Distance Limit for Site and Sources
   - A-5 Sample Location Map
   - A-6 Ground Water Plumes

4. Attachment B of this document contains scoring information for Site 1 – Denio's.

5. Attachment C of this document contains scoring information for Site 2 – 507 East Second.

6. Attachment D of this document contains scoring information for Site 3 – West Second and Montana.

7. Attachment E of this document contains scoring information for Site 4 – Parks Underground Storage Tank (UST).

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SITE SUMMARY

Lea and West Second Street is a group listing which contains four separate sites being evaluated for the release of hazardous substances to ground water predominantly from historical dry cleaning operations within the City of Roswell, Chaves County, New Mexico (Ref. 3, p. 1; Ref. 4, p. 2). These sites each have sources and/or associated contaminated ground water associated with them, and they aggregate near the intersection of Lea Street and West Second Street in an area of commercial and residential use near the center of downtown Roswell as shown in Attachment A-2 of this HRS documentation record (Ref. 3, p. 1; Ref. 4, p. 2).

To simplify the scoring of these sites, this HRS Documentation Record presents an HRS evaluation of the grouping of the four sites: Denio's (also known as the Lea and West Second Street Site), 507 East Second Street, West Second and Montana (also known as West Second Street and North Montana Avenue), and Parks Underground Storage Tank (UST). These sites contain sources that have contained hazardous substances that have released into the ground water and were chosen as the primary sources for this HRS based on high concentrations of the contaminants of concern originating from these locations (Ref. 57, pp. 1-5). In addition, to demonstrate that each of these sites qualify for the National Priorities List (NPL) individually, with an HRS score above 28.50, an HRS evaluation of each, including separate observed releases, is presented in Attachments B through E of this HRS documentation record.

The New Mexico Environment Department (NMED) has been the primary agency involved in the investigation of the ground water plume resulting from the operations occurring at the sites.

Site 1 (which includes Source 1) is called Denio's and consists of soil contaminated with tetrachloroethylene (PCE) (also known as tetrachloroethene) (Ref. 8, p. 5) and an associated ground water plume contaminated with trichloroethene (TCE) (also known as trichloroethylene), PCE, and cis-1,2-dichloroethene (cis-1,2-DCE) (also known as cis-1,2-dichloroethylene). The contamination is associated with drainage of wastes from dry cleaning operations which had been occurring on the property since 1931 (Ref. 7, p. 12; Ref. 8, p. 8). The contamination has entered the ground water and created a plume associated with the release into the Roswell Basin Aquifer (Section 3.1.1 of this HRS documentation record). The NMED discovered the ground water contamination associated with the Denio's property (Source 1) in 2006 and 2007 from monitoring wells sampled during Leaking Underground Storage Tank (LUST) investigations of the Allsups and Sawey Gulf Petroleum facilities (Ref. 7, p. 12).

Site 2 (which includes Source 2) is called 507 East Second Street and consists of leakage from a private sewer line contaminated with PCE, TCE, and cis-1,2-DCE (Ref. 5, pp. 14, 31, 67) and an associated ground water plume contaminated with PCE and TCE. The subject property has historically been the location of a machine shop between 1930 and 1955, a dry cleaner between 2007 and 2011, and a lawn mower service and repair shop between 2007 and 2011 (Ref. 5, p. 6). The contamination within the private sewage line is associated with drainage of wastes from former dry cleaning operations (Ref. 5, pp. 7, 8). The contamination has entered the ground water and created a plume associated with the release into the Roswell Basin Aquifer (Section 3.1.1 of this HRS documentation record). Site 2 is located approximately 0.8 miles due east of Site 1, and was discovered during a 30 December 2011 Phase 1 Environmental Site Assessment (ESA) conducted as part of a property transfer of a former dry cleaner property (Ref. 5, p. 5; Attachment A-2 of this HRS documentation record). A Phase 2 ESA and Vapor Encroachment Screen report was issued for Site 2 on February 3, 2012 (Ref. 5, p. 1). PCE was detected in seven soil samples and two ground water grab samples collected at the site in January 2012 (Ref. 7, pp. 9, 14).

Site 3 (which includes Source 3) is called West Second and Montana and consists of an in-ground separator tank connected to the sanitary sewer system and contaminated with PCE, TCE, cis-DCE, and trans-1,2-dichloroethene (trans-1,2-DCE) (also known as trans-1,2-dichloroethylene) (Ref. 16, p. 9; Ref. 22, p. 49, 50, 51; Ref. 30, p. 4) and an associated ground water plume contaminated with the same hazardous substances. The contamination within the in-ground separator tank is associated with drainage of wastes from former dry cleaning operations (Ref. 30, p. 10). The contamination has entered the ground water and created a plume associated with the release into the Roswell Basin Aquifer (Section 3.1.1 of this HRS documentation record). In 2008, Site 3 was discovered by the NMED Superfund Oversight Section (SOS) during a site inspection (SI) (Ref. 30, pp. 5, 7). Two dry cleaning businesses operated from 1985 through 2001 at the source location (Ref. 30, p. 6). Chlorinated solvent contamination has been detected in ground water samples from source monitoring wells at two adjacent properties on the northeast corner of the intersection of West Second Street and North Montana Avenue (Ref. 30, pp. 5, 6).

Site 4 (which includes Source 4) is called Parks UST and consists of a ground water plume contaminated with PCE and TCE with no identified source (Ref. 32, pp. 8, 9; Section 2.4.1 of this HRS documentation record). Contamination normally associated with dry cleaning operations has been found in the ground water at this site, but efforts to identify a source have been unsuccessful. In 2005, Site 4 was discovered when a change in analysis being conducted in association with a LUST investigation, detected PCE and TCE (Ref. 32, p. 8). As part of the June 2009 Preliminary Assessment (PA), NMED SOS reviewed data to evaluate the distribution of chlorinated solvent contamination in ground water in the vicinity of the Park's property in an effort to identify potential source areas of chlorinated solvents. At that time, ground water samples from 5 out of 16 LUST sites within a 0.5-mile radius of the property (with full volatile organic compound (VOC) analysis) exhibited PCE and/or TCE contamination (Ref. 32, p. 8).

Although sampling data currently available indicates that the sites (sources and releases) may not overlap, the potentially threatened target populations significantly overlap. Therefore, the risk to the population from the combined releases is sufficient to warrant a single listing. To illustrate this, the ground water data collected from the four Roswell Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) SI sites from 2009 through 2011 and the 2014 CERCLA Site Reassessment (SR) were used to generate composite isoconcentration maps to aid in data interpretation (Ref. 7, pp. 59-61, 66-68; Ref. 57, pp. 1-5). The maps indicate that chlorinated solvent contamination from Site 3 (the farthest western-source location) has migrated southeast toward Site 4 (the farthest southeastern source location) and east-northeast towards Site 2, such that the chlorinated solvent plumes are either comingling or likely to comingle (Ref. 7, pp. 22, 23, 26; Ref. 57; Attachment A-4 of this HRS documentation record). This data interpretation uses modeling software to show contamination throughout the alluvial ground water and artesian aquifer as a plume that extends for approximately 2 miles in an easterly direction (Ref. 57; Attachments A-5 and A-6 of this HRS documentation record).

The two drinking water aquifers which underlie all the sites are combined into one hydrogeological unit for HRS purposes and their interconnection is described in Section 3.0.1 of this HRS documentation record. These two aquifers form the Roswell Basin Aquifer System and include the shallow ground water alluvial aquifer and an underlying artesian aquifer.

Contamination associated with the four sources which contained PCE (and often daughter products TCE, cis-1,2-DCE, and trans-1,2-DCE) is documented by the chemical analyses of soil samples collected from direct-push method borings and ground water samples collected from monitoring wells during the NMED SIs conducted at Site 1, Site 3, and Site 4, as well as Phase II sampling at Site 2 (Ref. 5; Ref. 7; Ref. 30; Ref. 32; see Sections 2.4.1 for Sources 1 through 4 and Section 3.1.1 of this HRS documentation record). Multiple observed releases of PCE (and daughter products) to a shallow aquifer, which is interconnected to a deeper drinking water aquifer is also documented by the chemical analyses of ground water samples collected from monitoring wells and domestic wells located on or near each site (Ref. 5; Ref. 7; Ref. 30; Ref. 32; Sections 3.0.1 and 3.1.1 of this HRS documentation record). Drinking water within the each site's 4-mile radius is obtained from public supply wells and private wells screened in the Roswell Basin Aquifer System (which includes the shallow ground water and artesian aquifer), which is the aquifer being evaluated (Ref. 47, pp. 1-28; Ref. 48, p. 1; Attachment A-4 of this HRS documentation record). In addition, several wellhead protection areas exist within the 4-mile target distance limits for each individual site (Ref. 51, p. 7; Attachment A-3 of this HRS documentation record).

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	100	10,000
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	NS	NS
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	NS
2c.	Surface Water Migration Pathway Score (S_{sw}) (Enter the larger of lines 2a and 2b as the pathway score)	NS	NS
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	NS
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	NS
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
	HRS Site Score: Divide the value on line 5 by 4 and take the square root.	**50.00**	

Notes:

S	Score
S^2	Score squared
NS	Not scored

Table 3-1, refers to score sheets presented in the HRS Rule (Ref. 1). Table 3-1 is reproduced on the following page of this HRS documentation record for the convenience of the reader.

HRS Table 3-1 – Ground Water Migration Pathway Scoresheet

Factor Categories and Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer:		
1. Observed Release	550	550
2. Potential to Release:		
2a. Containment	10	Not Evaluated
2b. Net Precipitation	10	Not Evaluated
2c. Depth to Aquifer	5	Not Evaluated
2d. Travel Time	35	Not Evaluated
2e. Potential to Release [lines 2a x (2b + 2c + 2d)]	500	Not Evaluated
3. Likelihood of Release (higher of lines 1 and 2e)	550	550
Waste Characteristics:		
4. Toxicity/Mobility	(a)	1,000
5. Hazardous Waste Quantity	(a)	100
6. Waste Characteristics	100	18
Targets:		
7. Nearest Well	50	45
8. Population:		
8a. Level I Concentrations	(b)	0
8b. Level II Concentrations	(b)	4
8c. Potential Contamination	(b)	1,361
8d. Population (lines 8a + 8b + 8c)	(b)	1,365
9. Resources	5	5
10. Wellhead Protection Area	20	5
11. Targets (lines 7 + 8d + 9 + 10)	(b)	1,420
Ground Water Migration Score For An Aquifer:		
12. Aquifer Score [(lines 3 x 6 x 11) ÷ 82,500] (c)	100	100
Ground Water Migration Pathway Score:		
13. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c]	100	100

(a) Maximum value applies to waste characteristics category.
(b) Maximum value not applicable.
(c) Do not round to nearest integer.

SOURCE 1: SOURCE DESCRIPTION

2.2 Source Characterization

2.2.1 Source Identification

Source Description: Source 1 - Denio's

Source Type: Contaminated Soil

Source 1 is the contaminated soil that resulted from dry cleaner operations that have been occurring on the property located at 514 West 2nd Street since 1931. The dry cleaning operations that have occurred under different names and owners since 1931 include: from 1931 to 1952, Adams Cleaners operated on the property; from 1949 to 1973, Vogue Cleaners was in operation; from 1980 to 2001 One-Hour Martinizing was in operation; Denio's Cleaners was operating from 2001 to 2009; and All American Cleaners has been operating since 2009 (Ref. 7, p. 12; Ref. 8, pp. 4, 8). The area of Source 1 encompasses contaminated soil adjacent to a single building, which encompasses the addresses between 510 and 514 West Second Street. These addresses are part of a single building (Ref. 8, pp. 4, 11).

A PCE release on the property at the 510 and 514 West 2nd Street building is documented due to the detection of PCE contamination within vadose zone soils (Ref. 8, pp. 2-4; Section 2.4.1 of this HRS documentation record) and, as such, the source type for Source 1 is "contaminated soil" (Ref. 1, Table 2-5).

Location of Source

Source 1 is located on the south side of a building that includes addresses 510 and 514 West Second Street, on the southeast corner of Missouri Avenue and West Second Street (See Attachment A-2 of this HRS documentation record) (Ref. 8, pp. 4, 11).

Source Containment

A PCE release on the property is documented due to the detection of PCE contamination within vadose zone soils (Ref. 7, p. 16). No liner was present and native soil contained contamination. Surface and subsurface soil samples collected from four boreholes at Source 1, as well as a waste sample from Denio's operations have revealed the presence of PCE (Ref. 8, pp. 5, 9, 15-20). Evidence of migration from the contaminated soil to the ground water is shown through the sampling conducted during the Phase II sampling event in 2008 and discussed in Section 3.1.1 of this HRS documentation record. Ground water samples SB-2 and SB-4 collected from the source area document the presence of PCE and TCE (Ref. 8, p. 8; Ref. 9, pp. 32, 74; Section 3.1.1 of this HRS documentation record). In addition, TCE is a degradation product of PCE (Ref. 46, p. 1).

A containment value of 10 was selected for Source 1 – Contaminated Soil based on the evidence of hazardous substance migration to the vadose zone soils and the absence of a liner (Ref. 1, Table 3-2).

Containment Value: 10

2.4.1 Hazardous Substances

Dry cleaning machines historically have had leaks, spills and discharges associated with their operation. Most discharges have been associated with dry cleaning equipment failure, followed by machine operation, solvent transfer or storage, machine maintenance, and discharges of dry cleaning wastes (Ref. 6, p. 2).

Historically, some dry cleaners have discarded wastes by pouring wastewater into sewers or dumping wastewater on the ground near facilities (Ref. 11, p. 1). PCE released to soil is subject to leaching to the ground water. PCE is expected to exhibit low-to-medium mobility in soil and leach slowly to the ground water (Ref. 10, p. 2). PCE can persist for decades and travel in plumes with the ground water flow (Ref. 11, p. 1).

In August 2008, in response to a NMED abatement plan request, a Phase II ESA was conducted and samples of waste generated by the Denio's Cleaners operation, as well as soil samples were collected and analyzed for volatiles per USEPA Method 8260B (Ref. 8, p. 4; Ref. 9, pp. 8, 74, 75). Four soil borings (SB-1 through SB-4) were advanced to ground water along the private sewer line that runs from west to east along the south side of the building and from the drain located near the dry cleaning machine and PCE storage tank (SB-2) to the city sewer connection (Ref. 8, p. 5).

Although not required by the HRS, in order to establish relative concentrations for surrounding soils, the sample point furthest from the point of release was used for comparison purposes. SB-4 was located approximately 60 feet east of the point of release (SB-2) on the southeast corner of the facility building (Ref. 8, pp. 5, 7, 12).

Source 1 samples were collected during the same event, from similar depths, and analyzed using the same analytical method as the background sample. The samples had the same physical characteristics, and sampling and handling methods were all similar (Ref. 8, pp. 5, 15-21; Ref. 9, pp. 74-75).

Summarized below are the background sample results.

Soil

Hazardous Substance	Evidence			References
	Client Sample ID	PQL* (mg/kg)	Concentration (mg/kg)	
Tetrachloroethylene	SB-4 (2-4')	0.050	ND	Ref. 9, pp. 44, 75
Tetrachloroethylene	SB-4 (6-8')	0.050	0.11	Ref. 9, pp. 46, 75
Tetrachloroethylene	SB-4 (10-12')	0.050	ND	Ref. 9, pp. 48, 75
Tetrachloroethylene	SB-4 (14-16')	0.050	0.069	Ref. 9, pp. 50, 75
Tetrachloroethylene	SB-4 (16-18')	0.050	ND	Ref. 9, pp. 52, 75

Note:
mg/kg – milligrams per kilogram
ND – Not detected at the reporting limit (Ref. 9, pp. 44, 48, 52)
PQL – Practical Quantitation Limit (Ref. 55)
* - The Practical Quantitation Limit is equal to the Sample Quantitation Limit (SQL) and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).

Summarized in the following tables is analytical evidence of the contamination in samples associated with Source 1.

Hazardous Substances Associated With Source 1

Soil

Hazardous Substance	Evidence			References
	Station Location No.	PQL* (mg/kg)	Concentration (mg/kg)	
Tetrachloroethylene	SB-1 (0-2')	0.050	0.44	Ref. 9, pp. 14, 74
Tetrachloroethylene	SB-1 (16-18')	0.050	4.4	Ref. 9, pp. 20, 74
Tetrachloroethylene	SB-2 (4-6')	0.050	1.8	Ref. 9, pp. 22, 74
Tetrachloroethylene	SB-2 (6-8')	0.050	1.3	Ref. 9, pp. 24, 74
Tetrachloroethylene	SB-2(10-12')	0.50	7.4	Ref. 9, pp. 26, 74
Tetrachloroethylene	SB-2 (14-16')	0.50	11	Ref. 9, pp. 28, 74
Tetrachloroethylene	SB-2 (16-18')	0.050	1.6	Ref. 9, pp. 30, 74
Tetrachloroethylene	SB-3 (2-4')	0.050	0.46	Ref. 9, pp. 34, 75
Tetrachloroethylene	SB-3 (10-12')	0.050	1.9	Ref. 9, pp. 38, 75
Tetrachloroethylene	SB-3 (14-16')	0.050	3.0	Ref. 9, pp. 40, 75
Tetrachloroethylene	SB-3 (16-18')	0.50	11	Ref. 9, pp. 42, 75

Note:
mg/kg – milligrams per kilogram
PQL – Practical Quantitation Limit (Ref. 55)
* - The Practical Quantitation Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).

Additional supporting analytical evidence of the presence of PCE at the property is provided in the table below. Two samples were collected on August 5, 2008 of waste generated by the Denio's Cleaners operation, which were composited into one sample (Ref. 8, pp. 4, 5).

Waste

Hazardous Substance	Evidence			References
	Client Sample ID	PQL* (mg/kg)	Concentration (mg/kg)	
Tetrachloroethylene	Still BTMS Composite	12,000	880,000	Ref. 9, pp. 4, 8

Note:
mg/kg – milligram per kilogram
PQL – Practical Quantitation Limit (Ref. 55)
* - The Practical Quantitation Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity – Not Evaluated (NE)

The total Hazardous Constituent Quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, pp. 51590-51591 (Section 2.4.2.1.1)]. Insufficient historical and current data [manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.] are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity estimate for Source No. 1 with reasonable confidence.

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity – Not Evaluated (NE)

The total Hazardous Wastestream Quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, p. 51591 (Section 2.4.2.1.2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for Source No. 1 with reasonable confidence.

2.4.2.1.3 Tier C: Volume

Samples demonstrating contamination were collected within an area 40 feet (ft) long, 18 ft deep and from a 2 inch (0.17 ft) diameter boring (Ref. 8, pp. 5, 12, 15-21). Therefore, the total volume of known contaminated soil is 40 ft x 18 ft x 0.17 ft or 122.4 cubic ft (ft^3). To convert this number to cubic yards (yd^3) equals 122.4 ft^3 times 0.037037 ft^3 to 1 yd^3 or 4.53 yd^3. The Tier C equation for assigning a value for volume of Contaminated Soil is V/2,500 (Ref. 1, Table 2-5).

Volume of Source 1 (yd^3): 4.53
Volume Assigned Value: 4.53 yd^3/2,500
Volume Assigned Value: 0.001812

2.4.2.1.4 Tier D: Area

Because information was available to adequately determine the volume of Source 1, the area for this source was not used (Ref. 1, Section 2.4.2.1.3). Therefore, 0 is the area assigned value for Tier D (Ref. 1, Section 2.4.2.1.).

Area Assigned Value = 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 1 Values
A	Not Evaluated
B	Not Evaluated
C	0.001812
D	0

Source Hazardous Waste Quantity Value: 0.001812

SOURCE 2: SOURCE DESCRIPTION

2.2 Source Characterization

2.2.1 Source Identification

Source Description: Source 2– Private Sewer Line (underground pipeline)

Source Type: Other

The 507 East 2nd Street source (Source 2), located approximately 0.8 miles due east of Source 1, was discovered during a December 30, 2011 Phase 1 ESA, conducted as part of a property transfer of a former dry cleaner property. A Phase 2 ESA and Vapor Encroachment Screen report was issued for the 507 East 2nd Street property on 3 February 2012. PCE was detected in seven soil samples collected at the site in January 2012, at a maximum concentration of 540 mg/kg (Ref. 5, p. 4; Ref. 7, p. 14).

The private sewer line (underground pipeline) which led to contaminated soil is the result of operations by a machine shop between 1930 and 1955, a dry cleaners between 1966 and 1986, or by a lawn mower service and repair shop between 2007 and 2011 (Ref.5, pp. 4, 6).

PCE, trichloroethylene and cis-1,2-DCE were found in concentrations exceeding regulatory limits in soil located along the private sewer line (Source 2) (Ref. 5, p. 10) and, as such, the source type for Source 2 is “Other” (Ref. 1, Table 2-5).

Location of Source

Source 2 is a pipeline that runs about 10 feet due north from where it exists 507 East Second Street, and connects with the public sewer line (Ref. 5, p., 4). 507 East Second Street is associated with a building that historically contained tenants that were assigned address designations 505, 507, 509, and 511 East Second Street (Ref. 5, p. 5).

Source Containment

Surface and subsurface soil samples collected from the two boreholes at Source 2 have revealed the presence of PCE. The fact that PCE was found in the soil in both boreholes at each depth interval also presents an argument that this contamination originated from at least one facility that operated on the subject property (Ref. 5, p. 10). There is no evidence of a liner (Ref. 5, pp. 17, 18) and the native soil adjacent to Source 2 is contaminated. Evidence of migration from the private sewer line to native contaminated soil and then to the ground water is shown through the observed release sampling conducted during Phase II sampling in 2012 and discussed in Section 3.1.1 of this HRS documentation record. In addition, degradation products of PCE have also been detected, such as TCE and cis-1,2-DCE (Ref. 5, p. 10; Ref. 46, pp. 1-2).

A containment value of 10 was selected for Source 2 – Private Sewer Line (underground pipeline) based on the evidence of hazardous substance migration to the vadose zone soils and the absence of a liner (Ref. 1, Table 3-2).

Containment Value: 10

2.4.1 Hazardous Substances

Dry cleaning machines historically have had leaks, spills, and discharges associated with their operation. Most discharges have been associated with dry cleaning equipment failure, followed by machine operation, solvent transfer or storage, machine maintenance, and discharges of dry cleaning wastes (Ref. 6, p. 2). In addition, metal cleaning and degreasing operations typically performed in machine and repair shops have also been identified as sources of releases of PCE to the environment (Ref. 10, p. 1; Ref. 12, p. 9).

Historically, some dry cleaners have discarded wastes by pouring wastewater into sewers, or dumping wastewater on the ground near facilities (Ref. 11, p. 1). PCE released to soil is subject to leaching to the ground water. PCE is expected to exhibit low-to-medium mobility in soil and leach slowly to the ground water (Ref. 10, p. 2). PCE can persist for decades and travel in plumes with the ground water flow (Ref. 11, p. 1).

In August 2008, in response to a NMED abatement plan request, a Phase II ESA was conducted at the property located at 514 West Second Street in Roswell, NM, with soil samples collected and analyzed for volatiles per USEPA Method 8260B (Ref. 8, p. 4; Ref. 9, p. 75). Four soil borings were advanced to ground water along the private sewer line that runs from west to east along the south side of the building and from the drain located near the dry cleaning machine and PCE storage tank (SB-2) to the city sewer connection (Ref. 8, p. 5).

Although not required by the HRS, to establish relative background concentrations for surrounding soils, the sample point (SB-4) used for Source 1 to establish a background level was also used for comparison purposes here. Sample SB-4 was located approximately 60 feet east of the point of release (SB-2) on the southeast corner of the facility building located at 514 West Second Street (Source 1) (Ref. 8, pp. 5, 7, 12; Attachment A-2 of this HRS documentation record). The background sample and Source 2 samples were collected from similar depths, analyzed with the same method, and had similar soil characteristics (Ref. 5, pp. 8, 17, 18; Ref. 8, p. 5, 20; Ref. 9, p. 75).

Summarized in the following table are the background sample results associated with SB-4.

Soil

Hazardous Substance**	Evidence			References
	Client Sample ID	**PQL* (mg/kg)**	**Concentration (mg/kg)**	
Tetrachloroethylene	SB-4 (2-4')	0.050	ND	Ref. 9, pp. 44, 75
Tetrachloroethylene	SB-4 (6-8')	0.050	0.11	Ref. 9, pp. 46, 75
Tetrachloroethylene	SB-4 (10-12')	0.050	ND	Ref. 9, pp. 48, 75
Tetrachloroethylene	SB-4 (14-16')	0.050	0.069	Ref. 9, pp. 50, 75

Hazardous Substance**	Evidence			References
	Client Sample ID	PQL* (mg/kg)	Concentration (mg/kg)	
Tetrachloroethylene	SB-4 (16-18')	0.050	ND	Ref. 9, pp. 52, 75

Note:
mg/kg – milligrams per kilogram
ND – Not detected at the reporting limit (Ref. 9, pp. 44, 48, 52)
PQL – Practical Quantitation Limit (Ref. 55)
* - The Practical Quantitation Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 55).
**TCE and cis-1,2-DCE were not detected at the reporting limit of 0.050 mg/kg (Ref. 9, pp. 43-52).

In January 2012, a Phase II Environmental Site Assessment (ESA) was conducted at the property located at 507 East Second Street. During the Phase II ESA two soil borings were installed at Source 2. One just outside the building near an interior drain used by the dry cleaning business that operated on the property (SB-1), and the other next to the City of Roswell sewer line that intersected Source 2 (SB-2) (Ref. 5, pp. 7, 8; Attachment A-2 of this HRS documentation record). Soil, and soil gas samples were collected from each boring and analyzed for volatiles per USEPA Method 8260B (Ref. 5, p. 8). Soil samples were collected at intervals of 0 – 4 feet, 8 – 12 feet, and 12 – 16 feet from borehole SB-1, and at intervals of 0 – 4 feet, 4 – 8 feet, 8 – 12 feet, and 12 – 16 feet from borehole SB-2 (Ref. 5, p. 8). Summarized in the following tables is analytical evidence of the contamination in samples associated with Source 2. The analytical results for the soil gas samples are provided as additional supporting evidence of the presence of PCE and TCE on the property and are not scored in the HRS evaluation.

Hazardous Substances Associated With Source 2

Soil

Hazardous Substance	Evidence			References
	Client Sample ID	RL* (mg/kg)	Concentration (mg/kg)	
Tetrachloroethylene	SB-1 (0-4')	0.05	3.0	Ref. 5, pp. 14, 22, 67
Tetrachloroethylene	SB-1 (8-12')	0.05	3.1	Ref. 5, pp. 14, 24, 67
Tetrachloroethylene	SB-1 (12-16')	10	540	Ref. 5, pp. 14, 26, 67
Trichloroethylene	SB-1 (12-16')	1.0	31	Ref. 5, pp. 14, 26, 67
Tetrachloroethylene	SB-2 (0-4')	0.048	1.0	Ref. 5, pp. 14, 31, 67
Trichloroethylene	SB-2 (0-4')	0.048	0.052	Ref. 5, pp. 14, 31, 67
Tetrachloroethylene	SB-2 (4-8')	0.048	0.11	Ref. 5, pp. 14, 33, 67
Tetrachloroethylene	SB-2 (8-12')	0.048	0.85	Ref. 5, pp. 14, 35, 67
Tetrachloroethylene	SB-2 (12-16')	0.049	0.77	Ref. 5, pp. 14, 37, 67
Trichloroethylene	SB-2 (12-16')	0.049	0.079	Ref. 5, pp. 14, 37, 67
cis-1,2-Dichloroethylene	SB-2 (12-16')	0.049	0.35	Ref. 5, pp. 14, 36, 67

Note:
mg/kg – milligrams per kilogram
RL – Reporting Detection Limit (Ref. 5, pp. 22, 24, 26, 31, 33, 35, 36, 37)
* - The Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 55).

Soil Gas

Hazardous Substance	Evidence			References
	Client Sample ID	RL (ug/L)	Concentration (ug/L)	
Tetrachloroethylene	SB-1	0.10	8.8	Ref. 5, pp. 15, 70, 77
Trichloroethylene	SB-1	0.10	0.14	Ref. 5, pp. 15, 70, 77
Tetrachloroethylene	SB-2	0.50	10	Ref. 5, pp. 15, 72, 77
Trichloroethylene	SB-2	0.10	0.56	Ref. 5, pp. 15, 72, 77

Note:
ug/L– micrograms per liter
RL – Reporting Detection Limit
* - The Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The total Hazardous Constituent Quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [1, pp. 51590-51591 (Section 2.4.2.1.1)]. Insufficient historical and current data [manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.] are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity estimate for Source No. 1 with reasonable confidence.

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The total Hazardous Wastestream Quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source is not known and cannot be estimated with reasonable confidence [1, p. 51591 (Section 2.4.2.1.2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for Source No. 1 with reasonable confidence.

2.4.2.1.3 Tier C: Volume

The volume of the private sewer line (underground pipeline) cannot be adequately determined based on the information available. Thus, the volume will be assigned a value of greater than (>) 0, but unknown, for Source 2 (Ref. 1, Section 2.4.2.1.3). Tier C, Volume (Ref. 1, Section 2.4.2.1.3).

Volume Assigned Value: >0, but unknown

2.4.2.1.4 Tier D: Area

Because a volume of greater than 0, but unknown, was assigned to Source 2, 0 is the area assigned value for Tier 0 (Ref. 1, Section 2.4.2.1.3).

Area Assigned Value = 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 2 Values
A	Not Evaluated
B	Not Evaluated
C	>0, but unknown
D	0

Source Hazardous Waste Quantity Value: >0, but unknown

SOURCE 3: SOURCE DESCRIPTION

2.2 Source Characterization

2.2.1 Source Identification

Source Description: Source 3 – West Second and Montana

Source Type: Tank

Source 3 is located at 1400 West Second Street where two dry cleaning businesses operated from 1985 through 2001. Sunshine Cleaners operated at this location from 1985 through 1993, while Denio’s Sunshine Cleaner’s operated from 1993 through 2001. NMED discovered an in-ground concrete separator tank connected to the sanitary sewer system during SI activities in 2009. Soil contamination was identified during an emergency removal action of the tank and its contents in December 2009 (Ref. 16, p. 9; Ref. 30, pp. 4-5).

Source 3 was an in-ground concrete separator tank measuring approximately 5 ft x 2.5 ft x 3 ft deep, separated into two roughly 2.5 ft chambers (one north chamber and one south chamber) by a center concrete wall with a 3-to 4-inch diameter opening in its center. Three influent pipes entered the east wall of the tank from the former dry cleaner tenant space (Ref. 30, p. 10).

The waste contents were kept in an in-ground concrete tank associated with the former dry cleaning facilities at the property (Ref. 30, p. 7) and, as such, the source type category for Source 3 is “Tanks and Containers Other Than Drums” (Ref. 1, Table 2-5).

Location of Source

Source 3 was located at 1400 West Second Street and was connected to a tenant space within a shopping center at the southwest corner of the intersection of West Second Street and Montana Avenue. The concrete separator tank was located about 6 feet from the west wall of the building, near the rear door of the former dry cleaning business (Ref. 30, pp. 4, 10, 37, 40).

Source Containment

Release to Ground Water

Source 3 contained one effluent line that extended to the south wall of the tank and was attached to the main sanitary sewer line of the shopping center building (Ref. 30, p. 10).

Waste sediment from the tank, as well as two soil samples from a hand-auger sample, and soil samples collected after the removal of the tank have revealed the presence of PCE. In addition, TCE, the degradation product of PCE has also been detected (Ref. 30, pp. 11, 12).

A containment value of 10 was selected for Source 3 – Tank based on the evidence of hazardous substance migration from the tank area (Ref. 1, Table 3-2).

Containment Value: 10

2.4.1 Hazardous Substances

Dry cleaning machines historically have had leaks, spills and discharges associated with their operation. Most discharges have been associated with dry cleaning equipment failure, followed by machine operation, solvent transfer or storage, machine maintenance, and discharges of dry cleaning wastes (Ref. 6, p. 2).

Historically, some dry cleaners have discarded wastes by pouring wastewater into sewers, or dumping wastewater on the ground near facilities (Ref. 11, p. 1). PCE released to soil is subject to leaching to the ground water. PCE is expected to exhibit low-to-medium mobility in soil and leach slowly to the ground water (Ref. 10, p. 2). PCE can persist for decades and travel in plumes with the ground water flow (Ref. 11, p. 1).

Source 3 sampling was conducted in June 2009 as part of the NMED SOS SI. One waste source sediment sample and a duplicate sample were collected from the bottom of the in-ground concrete tank by using a shovel, then manually transferring the sediment to sample containers (Ref. 30, p. 11). The samples collected were analyzed for VOCs by methods in the Contract Laboratory Program (CLP) Statement of Work For Organics Analysis, Multi-Media, Multi-Concentration (OLM04.2) (Ref. 22, p. 5). Summarized in the following tables is analytical evidence of the contamination in samples associated with Source 3.

Hazardous Substances Associated With Source 3

Waste Sediment

Hazardous Substance	Evidence			References
	Station ID**	RL (ug/kg)	Concentration (ug/kg)	
Tetrachloroethylene	1400-W2-11-S	99,900	6,440,000	Ref. 22, pp. 50, 107
Trichloroethylene	1400-W2-11-S	9,990	458,000	Ref. 22, pp. 49, 107
cis-1,2-Dichloroethene	1400-W2-11-S	999	49,200	Ref. 22, pp. 49, 107
trans-1,2-Dichloroethene	1400-W2-11-S	99.9	1,750	Ref. 22, pp. 49, 107
Tetrachloroethylene	1400-W2-1-S	1,000,000	38,300,000 J	Ref. 22, pp. 52, 107
Trichloroethylene	1400-W2-1-S	100,000	965,000	Ref. 22, pp. 51, 107
cis-1,2-Dichloroethene	1400-W2-1-S	10,000	145,000	Ref. 22, pp. 51, 107
tran-1,2-Dichloroethene	1400-W2-1-S	100	7,150	Ref. 22, pp. 51, 107

Note:
ug/kg - micrograms per kilogram
RL – Reporting Limit
J – The identification of the analyte is acceptable; reported value is an estimate (Ref. 22, p. 109),
* - The Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).
** - Sample 1400-W2-11-S is a field duplicate of 1400-W2-1-S (Ref. 30, p. 11).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The total Hazardous Constituent Quantity for Source No. 3 could not be adequately determined according to the HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [1, pp. 51590-51591 (Section 2.4.2.1.1)]. Insufficient historical and current data [manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.] are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity estimate for Source No. 1 with reasonable confidence.

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The total Hazardous Wastestream Quantity for Source No. 3 could not be adequately determined according to the HRS requirements; that is, the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source is not known and cannot be estimated with reasonable confidence [1, p. 51591 (Section 2.4.2.1.2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for Source No. 1 with reasonable confidence.

2.4.2.1.3 Tier C: Volume

Source 3 is an in-ground concrete separator tank measuring approximately 5 ft x 2.5 ft x 3 ft deep = 37.5 ft^3 (1 ft^3 = 0.037037037 yd3) = 1.3889 yd^3 (Ref. 30, p. 10). The Tier C equation for assigning a value for Volume (V) of a tank is V/2.5 (Ref. 1, Section 2.4.2.1.4). Therefore, Source 3 is assigned a value of 0.55556 for the volume measure.

Volume Assigned Value = 0.55556

2.4.2.1.4 Tier D: Area

Tier C, Volume, has already been calculated and is being used in scoring; therefore, the value assigned for Tier D is 0 (Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 3 Values
A	Not Evaluated
B	Not Evaluated
C	0.55556
D	0

Source Hazardous Waste Quantity Value: 0.55556

SOURCE 4: SOURCE DESCRIPTION

2.2 Source Characterization

2.2 Source Characterization

2.2.1 Source Identification

Source Description: Source 4 –

Source Type: Other – Ground Water Plume/No Identified Source(s)

Source 4 is characterized as a ground water plume of chlorinated solvents with no identified source(s). Ground water contamination has been detected in monitoring wells at the Source, located at the southeast corner of South Grand Avenue and East Alameda Street in central Roswell, New Mexico. The former Roswell Parks Department Yard Property, which is located at this intersection, was reported to the NMED Petroleum Storage Tank Bureau (PSTB) as a LUST release in 1991 (Ref. 32, p. 8). A soil vapor extraction (SVE) system was operated at the property from 1993 through 1997 to remediate petroleum hydrocarbons associated with the LUST. The SVE system was decommissioned in 2008. Ground water monitoring has been performed for the LUST release from 1997 to September 2008 (Ref. 33, p. 2). PCE and TCE were first detected in May 2005 when a change in the analysis performed by the PSTB program was implemented and full EPA Method 8260 analysis was applied to Source ground water samples (Ref. 32, p. 8).

Dry cleaning facilities are considered to be a potential source of the chlorinated solvent contamination because PCE is the primary chlorinated solvent detected at the property. In an effort to identify potential dry cleaning sources during the PA, NMED SOS conducted a review of the 1955-1957, 1959-1964, 1966-1971, 1974-1976, 1978, 1979, 1981-1985, 1987-1990, 1993, 1996, 1998, 2001, 2003, and 2007 Roswell city business directories. NMED SOS identified a total of 39 dry cleaning businesses that operated from 31 cleaning facilities within a 1-mile radius of the property (Ref. 32, p. 9). Three of the nearest dry cleaner locations that are upgradient from the property are College Cleaners II, Excelsior, and Holiday Drive-In. College Cleaners II was located approximately one-quarter mile southwest of the ground water plume at 511 South Main Street from 2003 through 2007. It was only in business for a few recent years when the handling and use of PCE has been regulated. Excelsior and Holiday Drive-In Cleaners were located one-quarter mile west-northwest from the ground water plume at 116 South Main Street and 126 South Main Street, respectively. Excelsior operated from 1955 to 1959 and Holiday operated from 1964 to 1976, both prior to the regulation of PCE handling and use (Ref. 32, p. 9). Ground water flow direction is north-northeast and therefore the focus of potential sources was facilities located to the west of the plume (Ref. 31, p. 3; Ref. 32, p. 9). The level of effort undertaken to identify the sources of contamination was at the level of expanded site inspection due to the potential co-mingling of plumes which includes Source 1 and Source 3 located up-gradient of Source 4. The investigation of Source 4 was conducted as part of an overall assessment which included all sources included in this report.

Chlorinated solvent compounds have been found in the ground water monitoring wells at concentrations above state ground water quality standards, federal drinking water standards, or health-based benchmarks (Ref. 32, p. 11).

Source 4 is characterized as a ground water plume of chlorinated solvents with no identified source(s) (Ref. 32, p. 11) and, as such, the source type for Source 4 is “Other” (Ref. 1, Table 2-5).

Location of Source

Source 4 is located south of East Walnut Street and north of West Alameda Street, between South Main Street to the west and South Virginia Avenue to the east in central Roswell, New Mexico (Attachment A-6 of this HRS documentation record). The plume is defined by sample Shamrock MW-4 to the northwest and samples Shamrock MW-9 to the east and Shamrock MW-10 to the southeast (Attachments A-5 and A-6 of this HRS documentation record).

Source Containment

There are no containment features associated with this source as it is a ground water plume. Further, evidence of migration of contaminants associated with the plume to the ground water pathway has been documented in 3 monitoring wells associated with the source area (See Section 3.1.1, Observed Release, of this HRS documentation record).

Considering that analytical results obtained from ground water samples collected in 2010 revealed the presence of PCE and TCE and that no containment features are present to limit the migration of hazardous substances associated with the source, a containment factor value of 10 was assigned to Source 4 (Ref. 1, Table 3-2).

Containment Value: 10

2.4.1 Hazardous Substances

Source 4 sampling was conducted in February 2010 as part of the Roswell CERCLA SI (Ref. 32, p. 17). Ground water samples were collected from LUST monitoring wells (Ref. 32, p. 17). The samples collected were analyzed for VOCs by EPA CLP OLM04.2 (Ref. 21). Summarized in the following tables is analytical evidence of the contamination in samples associated with Source 4.

Hazardous Substances Associated With Source 4

Background Monitoring Wells

Even though monitoring wells Firestone MW-8A, Firestone MW-4A, and Shamrock MW-8 are located very near the estimated boundaries of the ground water plume, they are considered to be located outside the influence of potential contamination (Attachments A2, A-5, A-6 of this HRS documentation record). Local ground water flow is toward the northeast which would be away from these wells (Ref. 31, pp. 3, 4). Further, since PCE and TCE concentrations were either non-detect or below the detection limit established by the laboratory, combined with the fact that PCE and TCE are not naturally occurring substances within the environment, these wells are considered representative of background conditions for the area (Ref. 21, pp. 5, 6, 11, 12, 19, 20; Ref. 46, pp. 1, 2; Ref. 53, p. 1).

As shown in the tables below, the background and release samples are similar and their contaminant concentrations can be compared because they were collected during similar sampling events using similar sampling and analysis procedures and from a similar range of depths. Ground water samples were collected from LUST and CERCLA site monitoring wells using certified clean disposable hand bailers. Each well was purged a minimum of three well casing volumes and/or until field parameters (pH, conductivity, temperature, ORP) stabilized prior to sample collection (Ref. 32, p. 16). Ground water samples for volatile organic compound analysis were collected in 40 ml vials. Samples collected were unpreserved (Ref. 32, p. 16). All samples were stored on ice for delivery to the laboratory. Samples were analyzed by the EPA Region 6 Laboratory (Ref. 32, p. 16).

Background Monitoring Wells in Alluvial Aquifer Associated with Parks UST – Source 4

Station ID/ Laboratory ID	Well Depth (feet bgs)/ Screened Interval (feet)	Date (military time)	References
Firestone MW-8A / 1002017-04/	32.10 / 10	02/15/2010 (1010)	Ref. 13, pp. 20, 22; Ref. 21, pp. 4, 108, 112, 113; Ref. 54, pp. 3, 7
Firestone MW-4A / 1002017-01	35.67 / 10	02/15/2010 (1210)	Ref. 13, pp. 20, 23; Ref. 21, pp. 4, 108; Ref. 54, pp. 3, 7
Shamrock MW-8 / 1002017-08	23.30 / 10	02/15/2010 (1330)	Ref. 13, pp. 20, 23; Ref. 21, pp. 4, 108; Ref. 54, pp. 3, 7

Notes:
bgs – below ground surface

Background Results – Monitoring Wells in Alluvial Aquifer Associated with Parks UST– Source 4

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Firestone MW-8A / 1002017-04	Tetrachloroethylene	0.5 U	0.5	Ref. 21, p. 12
	Trichloroethylene	0.5 U	0.5	Ref. 21, p. 11
Firestone MW-4A / 1002017-01	Tetrachloroethylene	0.5 U	0.5	Ref. 21, p. 6
	Trichloroethylene	0.5 U	0.5	Ref. 21, p. 5
Shamrock MW-8 / 1002017-08	Tetrachloroethylene	0.5 U	0.5	Ref. 21, p. 20
	Trichloroethylene	0.5 U	0.5	Ref. 21, p. 19

Notes:
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 21, p. 2; Ref. 55).
µg/L - micrograms per liter
U – Undetected (Ref. 21, p. 119).

For all hazardous substances the background level is 0.5 µg/L.

Release Samples:

Ground water samples identified as “contaminated” are those that meet observed release criteria as defined by the HRS (Ref. 1, Table 2-3). Observed release criteria is met when analytical evidence of a hazardous substance significantly above background exists and some portion of that increase is attributable to a release from the site. Additional criteria include that the sample concentration exceeds the Sample Quantitation Limit (SQL; including the background SQL) or another HRS-defined limit, and is at least three times greater than the background concentration when the background concentration equals or exceeds its detection limit (Ref. 1, Table 2-3).

Observed release contamination was found in wells sampled at depths ranging from 20 to 24 feet bgs (Ref. 54, pp. 1-5). Depth to water is about 14.26 to 17.65 feet below grade at the Source (Ref. 32, p. 13).

Ground water sampling locations with levels meeting observed release criteria are presented below and depicted on Attachments A-2, A-5, and A-6 of the HRS documentation record.

February 2010 Monitoring Well Investigation

The second SI sampling event involving the Roswell CERCLA SI sites took place in Spring (February through April) 2010. Ground water samples were collected from 47 LUST site monitoring wells and 3 domestic wells in the geographic vicinity of Lea and West Second Street, Parks UST, and West Second and Montana CERCLA sites as part of SI efforts for each site (Ref. 7, p. 21). The wells used to establish observed release from Source 4 are presented below.

February through April 2010 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
Shamrock MW-4/ 1002017-07	22.65/ 10.00	02/15/2010 (0955)	Ref. 13, p. 22; Ref. 21, pp. 1-4, 108; Ref. 54, pp.3, 7, 41
Shamrock MW-9/ 1002017-09	23.35/ 10.00	02/15/2010 (1253)	Ref. 13, p. 23; Ref. 21, pp. 1-4, 109; Ref. 54, pp. 3, 7, 42
Shamrock MW-10/ 1002017-06	22.03/ 10.00	02/15/2010 (1302)	Ref. 13, p. 23; Ref. 21, pp. 1-4, 111; Ref. 54, pp. 3, 7, 43

February through April 2010 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Shamrock MW-4/ 1002017-07	Tetrachloroethylene	0.7	0.5	Ref. 21, p. 18
Shamrock MW-9/ 1002017-09	Tetrachloroethylene	0.6	0.5	Ref. 21, p. 22
Shamrock MW-10/ 1002017-06	Tetrachloroethylene	4.7	0.5	Ref. 21, p. 16
	Trichloroethene	0.7	0.5	Ref. 21, p. 15

Notes:

* - The Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 21, p. 2; Ref. 26, p. 1; Ref. 55).

µg/L - micrograms per liter

In addition to the wells shown above, there have been several sampling events that have spanned different dates that indicate other releases to ground water associated with Source 4. Ground water samples during these sampling events were collected from monitoring wells as shown below.

2009 Monitoring Well Investigation

The first SI sampling event involving the Roswell CERCLA sites took place in June 2009. Ground water samples were collected from 15 CERCLA site monitoring wells, 9 direct push borings, and 4 domestic wells in the geographic vicinity of the North Main and 9th CERCLA site and the Parks UST and West Second and Montana sources (Ref. 7, p. 21).

2009 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth (feet bgs) / Screened Interval (feet)	Date (military time)	References
ROW-A-200B-SStanton/ 0906037-12	24.00/ not screened	06/16/2009 (1212)	Ref. 29, pp. 1-4, 46; Ref. 54, pp. 33
ROW-300B-SVA/ 0906037-10	20.00/ not screened	06/16/2009 (1030)	Ref. 29, pp. 1-4, 46; Ref. 54, pp. 32
ROW-100B-EHendricks/ 0906037-09	26.00 / not screened	06/16/2009 (1600)	Ref. 29, pp. 1-4, 46; Ref. 54, pp. 35
ROW-400B-SGrand/ 0906037-11	21.5/ not screened	06/16/2009 (1420)	Ref. 29, pp. 1-4, 46; Ref. 54, pp. 34

2009 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit*	References
ROW-A-200B-SStanton/ 0906037-12	Tetrachloroethylene	41.4	1	Ref. 29, p. 28
	Trichloroethene	3.9	1	Ref. 29, p. 27
ROW-300B-SVA/ 0906037-10	Tetrachloroethylene	2.1	1	Ref. 29, p. 24
	Trichloroethene	4.7	1	Ref. 29, p. 23
ROW-100B-EHendricks/ 0906037-09	Tetrachloroethylene	67.3	1	Ref. 29, p. 22
	Trichloroethene	1.1	1	Ref. 29, p. 21
	cis-1,2-Dichloroethene	2.1	1	Ref. 29, p. 21
ROW-400B-SGrand/ 0906037-11	Tetrachloroethylene	30.9 J	1	Ref. 29, p. 26
	Trichloroethene	1.1	1	Ref. 29, p. 25

Notes:
J – The identification of the analyte is acceptable; reported value is an estimate (Ref. 29, p. 47),
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).
µg/L - micrograms per liter

March 2010 Monitoring Well Investigation

Ground water analytical data was collected by a NMED PSTB contractor in March 2010 from 7 monitoring wells at the Wakefield Oil LUST site (Ref. 7, p. 21).

February through April 2010 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
Wakefield MW-2/ 1003320-04	33.30/ 20.00	03/09/2010 (1620)	Ref. 26, pp. 3, 12, 28
Wakefield MW-3/ 1003320-05	30.70/ 20.00	03/09/2010 (1645)	Ref. 26, pp. 3, 13, 31
Wakefield MW-4/ 1003320-03	32.70/ 20.00	03/09/2010 (1525)	Ref. 26, pp. 3, 14, 25
Wakefield MW-6/ 1003320-06	29.90/ 20.00	03/10/2010 (1100)	Ref. 26, pp. 3, 15, 34
Wakefield MW-7/ 1003320-02	30.05/ 20.00	03/09/2010 (1355)	Ref. 26, pp. 3, 16, 22
Wakefield MW-8/ 1003320-01	31.00/ 20.00	03/09/2010 (1315)	Ref. 26, pp. 3, 17, 19

February through April 2010 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	PQL* (µg/L)	References
Wakefield MW-2/ 1003320-04	Trichloroethene	26	10	Ref. 26, p. 30
Wakefield MW-3/ 1003320-05	Tetrachloroethylene	24	10	Ref. 26, p. 32
	Trichloroethene	36	10	Ref. 26, p. 33
Wakefield MW-4/ 1003320-03	Tetrachloroethylene	43	1	Ref. 26, p. 26
	Trichloroethene	26	1	Ref. 26, p. 27
	cis-1,2-Dichloroethene	3.5	1	Ref. 26, p. 26
Wakefield MW-6/ 1003320-06	Tetrachloroethylene	42	20	Ref. 26, p. 20
	Trichloroethene	40	20	Ref. 26, p. 21
Wakefield MW-7/ 1003320-02	Tetrachloroethylene	49	5	Ref. 26, p. 23
	Trichloroethene	13	5	Ref. 26, p. 24
Wakefield MW-8/ 1003320-01	Tetrachloroethylene	130	10	Ref. 26, p. 20
	Trichloroethene	24	1	Ref. 26, p. 21
	cis-1,2-Dichloroethene	4.2	1	Ref. 26, p. 20

Notes:
PQL – Practical Quantitation Limit (Ref. 26, p. 19).

* - The Practical Quantitation Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).
µg/L - micrograms per liter

June 2011 Monitoring Well Investigation

In June 2011, NMED collected ground water samples from monitoring wells at the Parks UST CERCLA site (Ref. 7, p. 21; Ref. 20, pp. 3, 6, 10, 13, 22).

June 2011 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth (feet bgs)/ Screened Interval (feet)	Date (military time)	References
Parks MW-12/ 201101239	29.92/ 10.00	06/29/2011 (1040)	Ref. 20, p. 3; Ref. 54, pp. 3, 6, 36
Parks MW-14/ 201101238	28.47/ 10.00	06/29/2011 (0855)	Ref. 20, p. 6 ; Ref. 54, pp. 3, 7, 37
Parks MW-15/ 201101237	33.65/ 10.00	06/29/2011 (0925)	Ref. 20, p. 10; Ref. 54, pp.3, 7, 38
Parks MW-16/ 201101243	27.34/ 10.00	06/29/2011 (unknown)	Ref. 20, p. 13; Ref. 54, pp. 3, 7, 39
Parks MW-17/ 201101240	25.38/ 10.00	06/29/2011 (1000)	Ref. 20, p. 22 ; Ref. 54, pp. 3, 7, 40

June 2011 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	SDL* (µg/L)	References
Parks MW-12/ 201101239	Tetrachloroethylene	64.3	0.07	Ref. 20, p. 2
	Trichloroethene	18.3	0.06	Ref. 20, p. 2
	trans-1,2-Dichloroethene	0.1	0.09	Ref. 20, p. 1
	cis-1,2-Dichloroethene	2.9	0.43	Ref. 20, p. 1
Parks MW-14/ 201101238	Tetrachloroethylene	27.1	0.07	Ref. 20, p. 5
	Trichloroethene	29.8	0.06	Ref. 20, p. 5
	trans-1,2-Dichloroethene	1.8	0.09	Ref. 20, p. 4
	cis-1,2-Dichloroethene	5.1	0.43	Ref. 20, p. 4
Parks MW-15/ 201101237	Tetrachloroethylene	42.5	0.07	Ref. 20, p. 8
	Trichloroethene	18.9	0.06	Ref. 20, p. 8
	cis-1,2-Dichloroethene	1.7	0.43	Ref. 20, p. 7

June 2011 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	SDL* (µg/L)	References
Parks MW-16/ 201101238	Tetrachloroethylene	40.2	0.07	Ref. 20, p. 12
Parks MW-16/ 201101238	Trichloroethene	17.8	0.06	Ref. 20, p. 12
	cis-1,2-Dichloroethene	2.9	0.43	Ref. 20, p. 11
Parks MW-17/ 201101240	Tetrachloroethylene	60.6	0.07	Ref. 20, p. 21
Parks MW-17/ 201101240	Trichloroethene	10.4	0.06	Ref. 20, p. 21
	cis-1,2-Dichloroethene	1.2	0.43	Ref. 20, p. 20

Notes:
SDL – Sample Detection Limit (Ref. 20, p. 2)
* - The Sample Detection Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 20, p. 2; Ref. 55).
µg/L - micrograms per liter

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The total Hazardous Constituent Quantity for Source No. 4 could not be adequately determined according to the HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, pp. 51590-51591 (Section 2.4.2.1.1)]. Insufficient historical and current data [manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.] are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity estimate for Source No. 4 with reasonable confidence.

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The total Hazardous Wastestream Quantity for Source No. 4 could not be adequately determined according to the HRS requirements; that is, the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, p. 51591 (Section 2.4.2.1.2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for Source No. 4 with reasonable confidence.

2.4.2.1.3 Tier C: Volume

The vertical and horizontal extent of the ground water plume has not yet been adequately determined. Therefore, based on available information it is not possible to determine a volume in cubic yards for Source 4. Thus, the volume of contamination will be assigned a volume hazardous waste quantity value of greater than (>) 0, but exact amount unknown (Ref. 1, Section 2.4.2.1.3).

Volume Assigned Value: Unknown, but > 0

2.4.2.1.4 Tier D: Area

Tier C, Volume, has already been calculated and is being used in the HRS scoring; therefore, the value assigned for Tier D is 0 (Ref. 1, Sections 2.4.2.1.3 and 2.4.2.1.4).

Area Assigned Value = 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) is assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	**Source 4 Values**
A	Not Evaluated
B	Not Evaluated
C	>0
D	0

Source Hazardous Waste Quantity Value: >0

SITE SUMMARY OF SOURCE DESCRIPTIONS

		Containment Factor Value by Pathway				
			Surface Water (SW)		**Air**	
Source No.	**Source Hazardous Waste Quantity Value**	**Ground Water (GW) (Ref. 1, Table 3-2)**	**Overland/ flood (Ref. 1, Table 4-2)**	**GW to SW (Ref. 1, Table 3-2)**	**Gas (Ref. 1, Table 6-3)**	**Particulate (Ref. 1, Table 6-9)**
1	0.001812	10	NS	NS	NS	NS
2	>0, but unknown	10	NS	NS	NS	NS
3	0.55556	10	NS	NS	NS	NS
4	>0, but unknown	10	NS	NS	NS	NS
TOTAL	0.557372					

NS = Not Scored

Other Possible Sources

Another possible source associated with the Lea and West Second Street site includes contaminated soil near the location of Source 3. This other possible source was not evaluated separately or used in the scoring of the grouped site, but is added to demonstrate the potential release of the contaminants of concern as indicated from the sampling results below. Based on analytical evidence associated with Tank 1 sampling of Source 3, it was concluded by the NMED SOS, that Tank 1 was actively releasing to the environment (Ref. 30, p. 11).

Sampling associated with Source 3 was conducted in June and August 2009 as part of the NMED SOS SI. On August 5, 2009, two soil samples were collected at 5 feet and 6 feet below grade, located approximately 2 feet west of the tank (Ref. 30, p. 11) evaluated as Source 3 in this HRS documentation record. The samples collected were analyzed for VOCs by Method SW8260B (Ref. 56, p. 4).

In December 2009, approximately 25 cubic yards of the accessible contaminated soil around Tank 1 was excavated and disposed of at an off-site facility (Ref. 30, pp. 11, 12). Sidewall and floor samples were collected after to excavation to characterize soil contamination remaining in the ground after excavation (Ref. 30, p. 11). PCE, TCE, and DCE was detected in most of the samples collected (Ref. 30, p. 12).

Soil

Hazardous Substance	**Evidence**			**References**
	Station Location No.	**PQL* (mg/kg)**	**Concentration (mg/kg)**	
Tetrachloroethylene	1400-W2-2-6	0.0009	0.0093	Ref. 56, p. 7
Trichloroethylene	1400-W2-2-6	0.0009	0.0024	Ref. 56, p. 8
cis-1,2-Dichloroethene	1400-W2-2-6	0.0009	0.0047	Ref. 56, p. 7
Tetrachloroethylene	1400-W2-2-5	0.0011	0.0091	Ref. 56, p. 9
Trichloroethylene	1400-W2-2-5	0.0011	0.0038	Ref. 56, p. 10
cis-1,2-Dichloroethene	1400-W2-2-5	0.0011	0.0093	Ref. 56, p. 9

Note:
PQL – Practical Quantitation Limit (Ref. 56, p. 5)
* - The Practical Quantitation Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).
mg/kg - milligrams per kilogram

3.0 GROUND WATER MIGRATION PATHWAY SCORE

3.0.1 General Considerations

The City of Roswell is located in the northern portion of the Roswell Ground Water Basin, which is within the lower Pecos River Valley in southeastern New Mexico (Ref. 14, pp. 8, 9). The Roswell area has long and hot summers and precipitation is sparse, averaging less than 13 inches per year, most of which occurs as intense, localized thunderstorms during the summer monsoon season. For more than 100 years the Roswell Basin has also been one of the most intensively farmed areas in the state, the principle crops being alfalfa, cotton, sorghum, and chiles (Ref. 14, p. 8). The Basin derives virtually all of its irrigation water from ground water. Large volumes of ground water are withdrawn from shallow alluvial ground water and an underlying carbonate-rock (artesian) aquifer in the Roswell Basin. These two ground water systems form the Roswell Basin Aquifer system (Ref. 49, p. 14). The aquifer system underlies part of the Pecos River and extends through an area of about 2,200 square miles from north of Roswell to northwest of Carlsbad, New Mexico (Ref. 49, p. 14).

Regional Geology

The Roswell Artesian Basin system consists of an eastward-dipping carbonate aquifer overlain by a leaky evaporitic confining unit, which is in turn overlain by an unconfined alluvial ground water (Ref. 14, p. 11). Historically, the carbonate aquifer in the Roswell Basin is referred to as the “artesian aquifer” and the alluvial aquifer is commonly referred to as the “shallow aquifer” (Ref. 14, p. 11).

Ground water in the carbonate-rock aquifer in the Roswell Basin primarily is present in solution-altered zones in the San Andres Limestone and the overlying Queen and Grayburg Formations (Ref. 49, p. 15).

The San Andres Limestone is found at depths ranging from 300 to 1,300 feet below ground surface (bgs). Limestone and dolomite are the principle rocks in the San Andres Limestone, although 100- to 200-feet thick sandstone (the Glorieta Sandstone) is located near the base of the formation. The San Andres Limestone is 1,200 to 1,500 feet thick along the eastern margin of the Roswell Basin, but thins to 700 to 1,000 feet in the northwestern part of the basin where dissolution and collapse have decreased the thickness of the formation (Ref. 49, p. 15). The Grayburg and Queen Formations overlie the San Andres Limestone. The Grayburg Formation predominantly consists of dolomite and gypsum with interbedded sandstone and shale. The Queen Formation consists of fine-grained sandstone and siltstone with interbedded gypsum. The two formations are between 400 and 800 feet thick along the eastern margin of the basin and thin westward as the result of erosion and dissolution (Ref. 49, p.15). The Seven Rivers, Yates, and Tansil Formations overlie the Queen Formation and crop out at higher altitude than the alluvium in the northern part of the Roswell Basin. These three formations consist of dolomite, limestone, and gypsum with interbedded sandstone and siltstone (Ref. 49, p. 15).

Quaternary alluvium that consists of unconsolidated gravel, sand, silt, and clay unconformably overlies the Permian-aged rocks in the Roswell Basin. Alluvium and associated terrace deposits form a 10- to 20-mile-wide band, primarily to the west of the Pecos River. The alluvium generally is about 150 to 300-feet thick near the Pecos River and thins to the west (Ref. 49, p. 15). The alluvium, present at the surface, contains water under unconfined (water table) conditions. The alluvial aquifer is hydraulically connected to the underlying carbonate-rock aquifer by leakage through the upper confining unit of the carbonate-rock aquifer. The water table in the alluvial aquifer is at or near land surface along most of the Pecos River (Ref. 49, p. 16).

Regional Hydrogeology

Solution-altered zones in the San Andres Limestone and the Grayburg Formation form the principal carbonate-rock aquifer in the Roswell Basin. The carbonate-rock aquifer is 200 to 500 feet thick in the eastern one-half of the Roswell Basin and thins northward and westward (Ref. 49, p. 16). The lower boundary of the aquifer is formed by the unaltered lower part of the San Andres Limestone or Glorieta Sandstone, or the underlying Yeso Formation. The upper part of the Grayburg and Queen Formations generally are little altered and have low permeability. The zones of low permeability in these two formations form the upper confining unit of the carbonate-rock aquifer and separate it from the overlying alluvial aquifer (Ref. 49, p. 16).

Interaquifer leakage occurs between the carbonate-rock aquifer and the overlying alluvial aquifer through the Queen aquitard (Ref 50, pp. 1, 8). Leakage is generally greatest in the vicinity of Roswell and decreases to the south and southwest. Prior to the development of irrigation wells, water leaked vertically upward from the carbonate-rock aquifer to the alluvial aquifer. In a 1982 report it was noted that the large drawdown of the potentiometric surface in the carbonate-rock aquifer during the summer irrigation season reversed the direction of vertical leakage (i.e., leakage is downward from the alluvial aquifer into the carbonate-rock aquifer) (Ref. 50, pp. 8-9).

Ground water in the Permian-aged carbonate rocks is present in openings formed by dissolution of part of the limestone, dolomite, and gypsum that are prevalent in the rock. The most permeable and extensively utilized aquifer in the carbonate rocks is in the Roswell Basin. This carbonate-rock aquifer and the hydraulically connected aquifer in the alluvium have been studied extensively because of the importance of this source of groundwater (Ref. 49, p. 14).

Ground water that flows through joints, fractures, or faults in soluble rocks composed of carbonate (limestone or dolomite) or evaporite (gypsum or halite) minerals can dissolve the surrounding rock and enlarge the openings. Over geologic time, a vast network of interconnected openings can develop in the rock, and large volumes of ground water can flow through the openings (Ref. 49, p. 14). When solution-altered rock becomes sufficiently porous, it may lack the strength to support the weight of overlying materials, and a broad gradual collapse of the rock can occur. The collapse reduces the thickness of the formation and creates additional fractures that are subject to further dissolution. A local, and sometimes rapid, collapse of the rock can produce sinkholes and create a crater-like appearance known as karst topography of the land surface (Ref. 49, p. 14).

The end result of carbonate-rock dissolution is expressed at the land surface in features characteristic of karst topography. Because water enters the carbonate-rock aquifers rapidly through sinkholes and other large openings, any contaminants present in the water can rapidly enter and spread through the aquifer(s) (Ref. 49, p. 10). According to available U.S. Geological Survey (USGS) documents reviewed, the Roswell Basin Aquifer system is considered a karst aquifer (Ref. 49, p. 14). The karstic nature of the artesian aquifer is well-illustrated by the breccia zones, particularly common in the upper San Andres, where they consist of tilted and rotated blocks of carbonate rock up to 2 feet in diameter, interbedded in a silt matrix (Ref. 14, p. 13).

Historically, regional ground water flow in the Roswell area has been to the southeast toward the Pecos River. However, both vertical and horizontal flow directions have been altered locally by ground water withdrawal (Ref. 49, p. 18).

Site-specific Hydrogeology

In the vicinity of the grouped site, the subsurface soils consist of discontinuous layers of clay, sandy clay, clayey sand, poorly graded sand, and gravel to approximately 25 ft bgs (Ref. 30, p. 4; 52, pp. 1, 6). The thickness of the shallow alluvial in the vicinity of the site is approximately 50 feet. Depth to ground water ranges from approximately 15 to 20 feet bgs (Ref. 30, p. 14). As previously stated, the confining unit is not completely impermeable and leakage is known to occur. Deposits of the San Andres Limestone underlie the confining unit beneath the site and consist largely of limestone and dolomite (Ref. 49, pp. 15, 21). The San Andres Limestone and the Grayburg and Queen Formations were subject to extensive erosion prior to the deposition of the much younger alluvium in the Roswell Basin. Extensive dissolution of near-surface parts of these carbonate formations likely occurred during this period and may have continued after deposition of the alluvium (Ref. 49, p. 15). The aquifer beneath the site sources and continuing out to the target wells is considered a karst aquifer, the altitude of the base of the alluvium reveals the presence of depressions in the buried surface of the bedrock that are similar to those in areas of karst topography (Ref. 49, pp. 14, 15, 24).

The ground water flow at each source varies; from east-northeast near Source 2 (Ref. 5, p. 9), and Source 3 (Ref. 34, pp. 13, 21), to north-northeast at Source 4 (Ref. 31, p. 3), and to generally eastward, varying from northeast southeast at Source 1 (Ref. 7, p. 17; Ref. 45, p. 28). In general, the overall flow in the vicinity of all sources is east and southeast toward the Pecos River (Ref. 14, pp. 18, 21).

Ground Water Resources

The City of Roswell is a large agriculture area (Ref. 14, p. 8; Ref. 49, p. 26). In 1978, approximately 95 percent of the ground water withdrawn from the Roswell Basin was used for irrigation (Ref. 49, p. 20). In 1985, approximately 88 percent of the ground water withdrawn from the basin was used for irrigation and approximately 8 percent was used for public supply (Ref. 49, p. 20). Large-capacity wells completed in the carbonate-rock aquifer generally yield in excess of 3,000 gallons per minute (gpm). Smaller capacity wells commonly yield 500 to 1,000 gpm (Ref. 49, p. 20).

The City of Roswell's primary drinking water supply resides in the carbonate-rock (artesian) aquifer (Ref. 48, p.1). The City of Roswell's public water supply system and most of the water utilized for irrigation purposes in the Pecos Valley is from the carbonate-rock aquifer (Ref. 14, p. 8; Ref. 48, p. 1; Ref. 49, p. 20). Several private domestic wells are located within the identified ground water plume(s). Additionally, 6 municipal supply wells are located within 4 miles of the identified ground water plume(s) (Attachment A-3 of this HRS documentation record). All of the municipal supply wells for the City of Roswell are completed within the carbonate-rock (artesian) aquifer (Ref. 48, p. 1).

The most permeable and extensively utilized aquifer in the carbonate rocks is in the Roswell Basin. This aquifer and the hydraulically connected ground water in the alluvium are an important source of ground water (Ref. 49, p. 14). Natural leakage of the artesian water from the San Andres limestone is believed to be the principal source of the shallow ground water (Ref. 62, pp. 4, 5). Shallow ground water has been utilized for many years for domestic and stock-water supplies (Ref. 62, p. 6). Although the shallow alluvial ground water is not used as a source of drinking water within the City of Roswell limits, it is used outside of the city limits as a source of drinking water in private domestic wells (Ref. 47, pp. 1-77; Ref. 62, p. 6; Attachment A-3 of this HRS documentation record).

Aquifer Interconnection and Discontinuities

The Roswell Basin alluvial ground water and underlying carbonate-rock aquifer are hydraulically interconnected within 2-miles of each of the four identified sources and underlie the entire city of Roswell, extending from north Roswell to northwest of Carlsbad (Ref. 49, pp. 14, 16, 21, 22, 23, 24). Fractures and cracks between fragments of collapse breccia, solution openings along bedding planes and fractures, and solution cavities in honeycomb limestone constitute the main types of permeability in the artesian aquifer. Erratic permeability hinders correlation of individual water-producing zones from well to well (Ref. 63, p. 15). Because of the dissolution cavities and the channels that comprise them, karst aquifers are considered extremely vulnerable to contamination. Because water enters the carbonate-rock aquifers rapidly through large openings, any contaminants in the water can rapidly enter and spread through the aquifers (Ref. 49, pp. 10, 14, 24). The alluvium, present at the surface, contains water under unconfined (water table) conditions. The alluvial aquifer is hydraulically connected to the underlying carbonate-rock aquifer by leakage through the upper confining unit of the carbonate-rock aquifer. The water table in the alluvial aquifer is at or near land surface along most of the Pecos River (Ref. 49, pp. 15, 16). Ground water withdrawals are the principal means of discharge from the aquifer system. Water-level declines caused by withdrawal have altered water-level relations between the alluvial and carbonate-rock aquifers and between the alluvial aquifer and the Pecos River. Before the development of the area's ground-water resources began in 1891, ground water moved from the western recharge areas through the carbonate-rock aquifer upward into the alluvial aquifer and then into the Pecos River. Water-level declines caused by withdrawal from the carbonate-rock aquifer locally have decreased, halted, or reversed the normal upward discharge from that aquifer. Withdrawals from the alluvial aquifer can have the same effect on the natural discharge to the Pecos River and also can induce upward discharge of water from the carbonate-rock aquifer (Ref. 49, p. 17).

Further evidence of a hydraulic connection between the alluvial ground water and the carbonate-rock aquifer within two miles of each source present at the grouped site being evaluated is also supported by the migration of contamination from the shallow alluvial ground water to the carbonate-rock aquifer. The Roswell Municipal Water System (RMWS) operates a public drinking water supply well, City Well 13 (CW13), which is located less than two miles from Sources 1 through 4 and is screened within the carbonate-rock aquifer (Ref. 48; see Section 3.3.2.4 and Attachment A-3 of this HRS documentation record). During an October 1999 sampling event, PCE was detected in a sample collected from CW13 (Ref. 25, pp. 7, 8). The same hazardous substance, PCE, has been documented to be present in all site sources and in ground water release samples meeting HRS observed release criteria, as was detected in City Well 13 (Ref. 25, p. 8; see Sections 2.4.1 and 3.1.1 of this HRS documentation record). Although greater than two miles from the grouped site being evaluated, City Wells 12 (CW12), 15 (CW15), and 16 (CW16), also operated by the RWMS, had sampling results documenting the presence of PCE in 1999, 2012, and 2011 respectively (Ref. 25, pp. 3, 4, 175, 177; Attachment A-3 of this HRS documentation record).

Approximately one mile from Source 1 another Superfund site is present, McGaffey and Main Ground Water Plume, which also documented the presence of the same hazardous substances, including PCE, in ground water samples collected from the shallow alluvial ground water aquifer and the underlying carbonate-rock aquifer (Ref. 7, pp. 14, 18, 19; Ref. 64, p. 5). These hazardous substances were detected in the same city wells, CW15 and CW16 (called SRW 15 and SRW 16 in the McGaffey and Main Groundwater Plume HRS documentation record), currently being evaluated as subject to potential contamination (Ref. 65, pp. 13, 14, 15; see Section 3.3.2.4 of this HRS documentation record). This information demonstrates that contamination has moved from the shallow alluvial ground water into the underlying carbonate-rock aquifer; therefore, the two aquifers may be combined into one hydrogeological unit for HRS purposes (Ref. 1, Section 3.0.1.2.1).

There are no aquifer discontinuities within each individual site TDL or the grouped site TDL. There are no geologic or hydrologic features that appear to transect the aquifer that would disrupt the flow of ground water (Ref. 14, pp. 9, 13, 14, 18; Ref. 49, p. 21; Attachment A-3 of the HRS documentation record). The three buckles near Roswell are beyond the grouped site TDL and the TDLs for each source, and have no significant impact on the aquifer system (Ref. 14, pp. 26, 27). The influence of the Pecos Buckles on ground water movement within the artesian aquifer is less obvious, but this may be due to the small number of wells measured in the western part of the Basin. The influence of the YO Buckle is shown by a trough in the potentiometric surface southeast of the Buckle near the center of the Basin (Ref. 14, pp. 20, 21). There is no obvious change in hydraulic gradient associated with the Border and Six-Mile Buckles (Ref. 14, pp. 20, 21, 24).

3.1 LIKELIHOOD OF RELEASE

3.1.1 OBSERVED RELEASE

Aquifer Being Evaluated: Shallow Alluvial/Artesian Aquifer - Roswell Basin Aquifer system.

Based on the geology/hydrogeology within the vicinity of the grouped site and the geological strata, the Alluvial ground water and Artesian Aquifer are interconnected within two miles of the site sources and form one single hydrologic unit for HRS scoring purposes (see Section 3.0.1 of this HRS documentation record; Ref. 1, Sec. 3.0.1.2.1). For purposes of this HRS evaluation this single hydrologic unit is also referred to as the "combined aquifer."

Chemical Analysis

An observed release by chemical analysis has been established for each of the four sites being grouped into one site for purposes of placement on the National Priorities List (NPL) separately, as each contains a ground water plume associated with a release of hazardous substances. Each investigation of the ground water pathway consisted of collecting ground water level measurements and ground water samples. Water levels and ground water elevation data were obtained from CERCLA-site and LUST-site monitoring wells. Ground water samples were collected from direct push borings, existing CERCLA and LUST site monitoring wells, and domestic wells in each site area to evaluate ground water pathway targets (Ref. 7, p. 20).

The background wells, background sample results, release wells, and observed release samples associated with each source are presented below.

Source 1 – Denio's

Background Wells

Ground water samples used to establish background levels for PCE, TCE, cis-1,2-DCE, and trans-1,2-DCE for the monitoring wells associated with Source 1 in the alluvial ground water were based on analytical results from the Lea and West Second SI sampling events conducted in March 2010 by the NMED (Ref. 7, pp. 21, 36).

Locally, ground water flow at Source 1 is generally eastward, varying from northeast to southeast at a gradient of approximately 0.001 feet/foot (Ref. 7, p. 17; Ref. 45, pp. 2, 6). Thus, ground water wells representative of background conditions for Source 1 were chosen based on their location being upgradient or west of the source and identified ground water plume (Ref. 3, pp. 1; Attachments A-6 of this HRS documentation record).

PCE is a manufactured chlorinated solvent and does not occur naturally within the environment (Ref. 53, p. 1). An observed release to the ground water will be established when the sample measurement equals or exceeds the sample-specific SQL or another applicable HRS-defined limit and one of the two following conditions occurs: 1) If the background concentration is not detected (or is less than the detection limit), the sample measurement equals or exceeds the sample quantitation limit or another HRS-defined limit or 2) If the background concentration equals or exceeds the detection limit, the sample measurement is three times or more above the background concentration (Ref. 1, Table 2-3, Sec.2.3).

Background Monitoring Wells

Even though monitoring wells Union Plaza (Union) MW-23 and Union MW-6 to the west, are located very near the estimated boundaries of the ground water plume, they are considered to be located outside the influence of potential contamination (Attachments A-5 and A-6 of this HRS documentation record). Local ground water flow is toward the northeast and southeast which would be away from these wells (Ref. 7, p. 17; Ref. 14, pp. 18, 21; Ref. 45, p. 6). Further, since PCE, TCE, cis-1,2-DCE, and trans-1,2-DCE concentrations have predominantly not been detected, combined with the fact that PCE, TCE, cis-1,2-DCE and trans-1,2-DCE are not naturally occurring substances within the environment, these wells are considered representative of background conditions for the area (Ref. 23, pp. 31, 32; Ref. 46, pp. 1, 2; Ref. 53, p. 1).

As shown in the tables below, the background and release samples are similar and their contaminant concentrations can be compared because they were collected during the same sampling event (March 2010) using the same sampling and analysis (CLP OLM04.2) procedures and from a similar range of depths as shown below. Ground water samples were collected from the LUST site monitoring wells using certified clean disposable hand bailers. Each well was purged a minimum of three well casing volumes and/or until field parameters (pH, conductivity, temperature, ORP) stabilized prior to sample collection. Ground water samples for volatile organic compound analysis (VOA) were collected in 40 ml vials. Samples collected were unpreserved and all samples were stored on ice for delivery to the laboratory. Samples were analyzed by the EPA Region 6 Laboratory (Ref. 7, p. 21).

Background Monitoring Well in Alluvial Aquifer Associated with Denio's – Source 1

Station ID/ Laboratory ID	Well Depth (feet bgs)/ Screened Interval (feet)	Date (military time)	References
Union MW-23 (Union Plaza MW-23)/ 1003013-08	24.45 / 10	03/15/2010 (0955)	Ref. 23, pp. 4, 163; Ref. 54, pp. 2, 6
Union MW-6 (Union Plaza MW-6)/ 1003013-13	26.28/ 10	03/16/2010 (1045)	Ref. 23, pp. 4, 166; Ref. 54, pp. 2, 6

Background Results – Monitoring Well in Alluvial Aquifer Associated with Denio's – Source 1

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Union MW-23 (Union Plaza MW-23)/ 1003013-08	Tetrachloroethylene	0.5 U	0.5	Ref. 23, p. 32
	Trichloroethylene	0.5 U	0.5	Ref. 23, p. 31
	trans-1,2-Dichloroethene	0.5 U	0.5	Ref. 23, p. 31
	cis-1,2-Dichloroethene	0.5 U	0.5	Ref. 23, p. 31
Union MW-6 (Union Plaza MW-23)/ 1003013-13	Tetrachloroethylene	0.6 (1.8**)	0.5	Ref. 23, p. 88
	Trichloroethylene	0.5 U	0.5	Ref. 23, p. 87
	trans-1,2-Dichloroethene	0.5 U	0.5	Ref. 23, p. 87
	cis-1,2-Dichloroethene	0.5 U	0.5	Ref. 23, p. 87

Notes:

* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 23, p. 2; Ref. 55).

** - As the analyte was detected, per the HRS, release samples will be compared against a level three times (i.e., 1.8) the concentration detected (Ref. 1, Table 2-3).

µg/L - micrograms per liter

U – Undetected (Ref. 23, p. 173).

For all hazardous substances other than PCE, the background level is 0.5 µg/L. The background level for PCE is 0.6 µg/L and the level to show a significant increase is 1.8 µg/L.

Release Wells

Ground water samples collected from monitoring wells used to document an observed release from Source 1 to the alluvial portion of the combined aquifer are presented in the following tables by sampling event. Background samples were considered comparable and appropriate based on a similar sample date sampled and similar screened interval of the well.

Release Samples:

Ground water samples identified as "contaminated" are those that meet observed release by chemical analysis criteria as defined by the HRS (Ref. 1, Table 2-3). Observed release criteria is met when analytical evidence of a hazardous substance significantly above background exists and some portion of that increase is attributable to a release from the site. Additional criteria include that the sample concentration exceeds the Sample Quantitation Limit (SQL; including the background SQL) or another HRS-defined limit, and is at least three times greater than the background concentration when the background concentration equals or exceeds its detection limit (Ref. 1, Table 2-3).

Observed release contamination was found in wells sampled at depths ranging from 19.6 to 26.5 feet bgs (Ref. 54, pp. 15, 53-57; see analytical data tables presented below). Depth to water is about 16 feet below grade at the Source (Ref. 7, p. 17). Soil boring logs from the environmental investigation at the Denio's property (Source 1) indicate that vadose zone soils typically consist of clay with variable amounts of sand and occasional sand lenses, while the water bearing zone typically consists of gravel and gravel-sand mixtures (Ref. 7, p. 17; Ref. 12, pp. 17-20).

Ground water sampling locations with levels meeting observed release criteria that were collected during the same sampling events as the background samples are presented below.

March 2010 Monitoring Well Investigation

The ground water sampling locations identified below were sampled during the second SI sampling event involving the Roswell CERCLA SI sites that took place in Spring (February through April) 2010. Ground water samples were collected by NMED from a total of 47 LUST site monitoring wells and 3 domestic wells in the geographic vicinity of Lea and West Second Street, Parks UST, and West Second and Montana CERCLA sites as part of SI efforts for each site (Ref. 7, p. 21). The wells that meet observed release criteria from Source 1 are presented below (Attachments A-5 and A-6 of this HRS documentation record).

March 2010 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth (feet bgs) / Screened Interval (feet)	Date (military time)	References
Sawey MW-11/ 1003013-06	19.60/ 10.00	03/16/2010 (1125)	Ref. 23, pp. 1-4, 165; Ref. 54, pp. 2, 6, 53
Sawey MW-12/ 1003013-07	20.31/ 10.00	03/16/2010 (1037)	Ref. 23, pp. 1-4, 165; Ref. 54, pp. 2, 6, 54
Sawey MW-13/ 1003013-08	20.70/ 10.00	03/16/2010 (1245)	Ref. 23, pp. 1-4, 165; Ref. 54, pp. 2, 6, 55
J and J MW-4/ 1003013-01	26.50/ 10.00	03/16/2010 (1300)	Ref. 23, pp. 1-4, 165; Ref. 54, pp. 2, 6, 56
J and J MW-5/ 1003013-02	24.50/ 10.00	03/16/2010 (1150)	Ref. 23, pp. 1-4, 165; Ref. 54, pp. 2, 6, 57
Miller MRMW-4/ 1003015-04	21.95/ 10.00	03/17/2010 (1032)	Ref. 23, pp. 1-4, 171; Ref. 54, pp. 2, 6, 15

Station ID/ Laboratory ID	Well Depth (feet bgs) / Screened Interval (feet)	Date (military time)	References
Miller MRMW-5/ 1003015-05	20.75/ 10.00	03/17/2010 (1055)	Ref. 23, pp. 1-4, 171; Ref. 54, pp. 2, 6, 16
Miller ETMW-8/ 1003015-03	21.50/ 10.00	03/17/2010 0915)	Ref. 23, pp. 1-4, 171; Ref. 54, pp. 3, 6, 17

March 2010 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Sawey MW-11/ 1003013-06	Trichloroethene	1.2	0.5	Ref. 23, p. 67
	cis-1,2-Dichloroethene	0.6	0.5	Ref. 23, p. 67
Sawey MW-12/ 1003013-07	Tetrachloroethylene	21.1	0.5	Ref. 23, p. 70
	Trichloroethene	88.6	1	Ref. 23, p. 69
	cis-1,2-Dichloroethene	1.1	0.5	Ref. 23, p. 69
Sawey MW-13/ 1003013-08	Trichloroethene	1.5	0.5	Ref. 23, p. 71
	cis-1,2-Dichloroethene	0.6	0.5	Ref. 23, p. 71
J and J MW-4/ 1003013-01	Trichloroethene	2.5	0.5	Ref. 23, p. 39
J and J MW-5/ 1003013-02	Trichloroethene	2.6	0.5	Ref. 23, p. 41
Miller MRMW-4/ 1003015-04	Tetrachloroethylene	3.8	0.5	Ref. 23, p. 102
	Trichloroethene	2.1	0.5	Ref. 23, p. 101
Miller MRMW-5/ 1003015-05	Trichloroethene	2.8	0.5	Ref. 23, p. 103
Miller ETMW-8/ 1003015-03	Trichloroethene	2.1	0.5	Ref. 23, p. 93
	cis-1,2-Dichloroethene	0.5	0.5	Ref. 23, p. 93

Notes:

* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 21, p. 2; Ref. 23, p. 2; Ref. 55).

µg/L - micrograms per liter

In addition to the wells shown above, there have been several sampling events that have spanned different dates that indicate other releases to ground water associated with Source 1. Ground water samples during these sampling events were collected from monitoring wells and domestic wells as shown below.

2008 Phase II ESA Ground Water Sampling

In 2008, environmental contractors collected two ground water grab samples from boreholes SB-2 and SB-4 during assessment sampling that was conducted in response to NMED's abatement plan request (Ref. 8, pp. 4, 8).

2008 Phase II ESA Sampling Event

Station ID/ Laboratory ID	Well Depth (feet bgs) / Screened Interval (feet)	Date (military time)	References
SB-2 GW/0808338-11	22.00/ 5.00	08/19/2008 (1350)	Ref. 8, pp. 16, 18; Ref. 9, p. 74
SB-4 GW/0808338-22	22.0/ unknown	08/19/2008 (1625)	Ref. 8, p. 20; Ref. 9, p. 75

2008 Phase II ESA Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	**Hazardous Substance**	**Concentration (µg/L)**	**PQL* (µg/L)**	**References**
SB-2 GW/0808338-11	Tetrachloroethylene	28,000	400	Ref. 9, pp. 32, 74
	Trichloroethylene	30	1	Ref. 9, pp. 32, 74
SB-4 GW/0808338-22	Tetrachloroethylene	1,900	50	Ref. 9, pp. 54, 75
	Trichloroethylene	2.8	1	Ref. 9, pp. 54, 75

Note:
PQL – Practical Quantitation Limit
* - The Practical Quantitation Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).
ug/L - micrograms per liter

2009 Monitoring Well Investigation

The first SI sampling event involving the Roswell CERCLA sites took place in June 2009. Ground water samples were collected from 15 CERCLA site monitoring wells, 9 direct push borings, and 4 domestic wells in the geographic vicinity of the North Main and 9th, Parks UST, and West Second and Montana sites (Ref. 7, p. 21).

2009 Monitoring Well Sampling Event

Station ID/ Laboratory ID	**Well Depth (feet bgs) / Screened Interval (feet)**	**Date (military time)**	**References**
N Main CC-3/ 0906029-02	19.34/ 10.00	06/14/2009 (1500)	Ref. 19. pp. 1-3; Ref. 54, pp. 4,7, 30
N Main CC-5/ 0906029-04	18.6/ 10.00	06/14/2009 (1416)	Ref. 19. pp. 1-3; Ref. 54, pp. 4,7, 31

2009 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
N Main CC-3/ 0906029-02	Tetrachloroethylene	0.6	0.5	Ref. 19, p. 7
N Main CC-5/ 0906029-04	Tetrachloroethylene	0.5	0.5	Ref. 19, p. 11

Notes:
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 19, p. 1; Ref. 55).
µg/L - micrograms per liter

February through April 2010 Monitoring Well Investigation

Additional samples collected during the second SI sampling event, which indicate other releases are shown below (Ref. 7, p. 21).

February through April 2010 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
Firestone MW-6A/ 1002017-02	32.65/ 10.00	02/15/2010 (1110)	Ref. 21, pp. 1-4, 108; Ref. 54, pp. 3, 7, 44
Firestone MW-7A/ 1002017-03	33.75/ 10.00	02/15/2010 (1354)	Ref. 21, pp. 1-4, 108; Ref. 54, pp. 3, 7, 45
311-W7-DW/ 1003013-03	100.00/ 50.00	03/16/2010 (1340)	Ref. 23, pp. 1-4; Ref. 54, pp. 4, 7

February through April 2010 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Firestone MW-6A/ 1002017-02	Tetrachloroethylene	5.3	0.5	Ref. 21, p. 8
	Trichloroethene	0.9	0.5	Ref. 21, p. 7
Firestone MW-7A/ 1002017-03	Tetrachloroethylene	1	0.5	Ref. 21, p. 10
	Trichloroethene	0.6	0.5	Ref. 21, p. 9
311-W7-DW/ 1003013-03	Tetrachloroethylene	4.7	0.5	Ref. 23, p. 50

Notes:
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 21, p. 2; Ref. 23, p. 2; Ref. 55, p.1).
µg/L - micrograms per liter

August through October 2010 Monitoring Well Investigation

The third SI sampling event involving the Roswell CERCLA sites took place in the Fall (August and October) of 2010. Ground water samples were collected from 13 LUST-site monitoring wells and 1 domestic well in central Roswell as part of SI efforts at Lea and West Second Street (Ref. 7, p. 21).

August through October 2010 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
Conoco MW-4/ 1010020-04	15.65/ 10.00	10/20/2010 (1300)	Ref. 18, pp. 1-4, 87; Ref. 54, pp. 3, 6, 58
Wool MW-9/ 101008-06	15.33/ 10.00	10/18/2010 (1345)	Ref. 18, pp. 1-4, 84; Ref. 54, pp. 3, 6, 59
Wool MW-12/ 101008-03	24.70/ 10.00	10/17/2010 (1610)	Ref. 18, pp. 1-4, 84; Ref. 54, pp. 3, 6, 60
Wool MW-13/ 101008-04	24.59/ 10.00	10/17/2010 (1705)	Ref. 18, pp. 1-4, 85; Ref. 54, pp. 3, 4, 61
Century RMW-1/ 1010014-03	22.56/ 10.00	10/19/2010 (0920)	Ref. 18, pp. 1-4, 86; Ref. 54, pp. 3, 6, 62
Century NMW-9/ 1010014-02	26.71/ 10.00	10/19/2010 (1015)	Ref. 18, pp. 1-4, 86; Ref. 54, pp. 3, 4, 63

August through October 2010 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Conoco MW-4/ 1010020-04	Trichloroethene	0.5	0.5	Ref. 18, p. 43
Wool MW-9/ 101008-06	Trichloroethene	0.6	0.5	Ref. 18, p. 21
Wool MW-12/ 101008-03	Tetrachloroethylene	3.2	0.5	Ref. 18, p. 10
	Trichloroethene	0.8	0.5	Ref. 18, p. 9
Wool MW-13/ 101008-04	Tetrachloroethylene	2.6	0.5	Ref. 18, p. 12
	Trichloroethene	0.7	0.5	Ref. 18, p. 11
Century RMW-1/ 1010014-03	Tetrachloroethylene	0.6	0.5	Ref. 18, p. 28
	Trichloroethene	0.5	0.5	Ref. 18, p. 27
Century NMW-9/ 1010014-02	Tetrachloroethylene	0.8	0.5	Ref. 18, p. 26
	Trichloroethene	0.6	0.5	Ref. 18, p. 25

Notes:
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 18, p. 2; Ref. 55).
µg/L - micrograms per liter

June 2014 Monitoring Well Investigation

In June 2014, environmental contractors for Allsup Petroleum collected ground water samples from 9 of 14 monitoring wells located at the Allsup's 289 facility for LUST monitoring (Ref. 7, p. 17; Ref. 45; p. 4). These wells are the nearest downgradient monitoring wells to Source 1 (Attachment A-5 of this HRS documentation record; Attachment B, Figure 1).

June 2014 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)*	Date (military time)	References
Allsups289 MW-5/ 1406609-001	25.90/10.00	06/11/2014 (1340)	Ref. 45, pp. 40, 77
Allsups289 MW-6/ 1406609002	27.00/10.00	06/11/2014 (1135)	Ref. 45, pp. 41, 77
Allsups289 MW-7/ 1406609-003	25.90/10.00	6/11/2014 (1320)	Ref. 45, pp. 42, 77
Allsups289 MW-9/ 1406609-004	25.60/10.00	6/11/2014 (1110)	Ref. 45, pp. 44, 77
Allsups289 MW-10/ 1406609-005	27.80/10.00	6/11/2014 (1155)	Ref. 45, pp. 45, 77
Allsups289 MW-11/ 1406609-006	25.95/10.00	6/11/2014 (1245)	Ref. 45, pp. 46, 77
Allsups289 MW-12/ 1406609-007	26.00/10.00	6/11/2014 (1245)	Ref. 45, pp. 47, 77
Allsups289 MW-13/ 1406609-008	27.55/ 10.00	6/11/2014 (1220)	Ref. 45, pp. 48, 77
Allsups289 MW-14/ 1406609-009	21.30/ 10.00	6/11/2014 (1300)	Ref. 45, pp. 49, 77

Notes:

* - Screened Interval derived from the height of fluid column reported for each well (Ref. 45, pp. 40. 41, 42, 44, 45, 46, 47, 48, 49).

June 2014 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Allsups289 MW-5/ 1406609-001	Tetrachloroethylene	240	10	Ref. 45, p. 53
	Trichloroethene	80	1	Ref. 45, p. 53
	cis-1,2-Dichloroethene	4.9	1	Ref. 45, p. 52
	trans-1,2-Dichloroethene	1.3	1	Ref. 45, p. 53
Allsups289 MW-6/ 1406609002	Tetrachloroethylene	32	1	Ref. 45, p. 55
	Trichloroethene	14	1	Ref. 45, p. 55
	cis-1,2-Dichloroethene	2.3	1	Ref. 45, p. 54
	trans-1,2-Dichloroethene	1.6	1	Ref. 45, p. 55
Allsups289 MW-7/ 1406609-003	Tetrachloroethylene	660	10	Ref. 45, p. 57
	Trichloroethene	120	1	Ref. 45, p. 57
	cis-1,2-Dichloroethene	4.1	1	Ref. 45, p. 56
	trans-1,2-Dichloroethene	2.0	1	Ref. 45, p. 57
Allsups289 MW-9/ 1406609-004	Tetrachloroethylene	18	1	Ref. 45, p. 59
	Trichloroethene	19	1	Ref. 45, p. 59
Allsups289 MW-10/ 1406609-005	Tetrachloroethylene	220	10	Ref. 45, p. 61
	Trichloroethene	70	1	Ref. 45, p. 61
	cis-1,2-Dichloroethene	1.4	1	Ref. 45, p. 60
Allsups289 MW-11/ 1406609-006	Tetrachloroethylene	76	1	Ref. 45, p. 63
	Trichloroethene	110	10	Ref. 45, p. 63
	cis-1,2-Dichloroethene	8.6	1	Ref. 45, p. 62
	trans-1,2-Dichloroethene	2.4	1	Ref. 45, p. 63
Allsups289 MW-12/ 1406609-007	Tetrachloroethylene	45	1	Ref. 45, p. 65
	Trichloroethene	17	1	Ref. 45, p. 65
Allsups289 MW-13/ 1406609-008	Tetrachloroethylene	200	10	Ref. 45, p. 67
	Trichloroethene	280	10	Ref. 45, p. 67
	cis-1,2-Dichloroethene	18	1	Ref. 45, p. 66
	trans-1,2-Dichloroethene	1.3	1	Ref. 45, p. 67
Allsups289 MW-14/ 1406609-009	Tetrachloroethylene	15	1	Ref. 45, p. 69
	Trichloroethene	98	10	Ref. 45, p. 69

June 2014 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
	cis-1,2-Dichloroethene	13	1	Ref. 45, p. 68
	trans-1,2-Dichloroethene	14	1	Ref. 45, p. 69

Notes:

* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 55).

µg/L - micrograms per liter

Source 2 – 507 East Second Street

Background Wells

Ground water samples used to establish background levels for PCE and TCE for the domestic wells associated with the 507 East Second Street site (Source 2) in the alluvial ground water were based on analytical results from the site reassessment sampling event that took place in April 2014 (Ref. 7, p. 21).

Locally, ground water flow at Source 2 is to the east northeast (Ref. 5, pp. 5, 9). Thus, the ground water wells representative of background conditions for Source 2 were chosen based on their location being slightly upgradient and to the south of the identified ground water plume (Ref. 3, p. 1; Attachments A-5 and A-6 of this HRS documentation record).

PCE is a manufactured chlorinated solvent and does not occur naturally within the environment (Ref. 53, p. 1). Therefore, the background level of 0 for PCE can be considered representative of background conditions of the area. An observed release to the ground water will be established when the sample measurement equals or exceeds the sample-specific SQL or another HRS-defined and one of the two following conditions occurs: 1) If the background concentration is not detected (or is less than the detection limit), the sample measurement equals or exceeds the sample quantitation limit or another HRS-defined limit or 2) If the background concentration equals or exceeds the detection limit, the sample measurement is three times or more above the background concentration (Ref. 1, Table 2-3, Sec. 2.3).

Background Domestic Wells

Domestic wells PW-1 and AWS-2 are located up-gradient or side-gradient of the estimated boundaries of the ground water plume and are considered to be located outside the influence of potential contamination (Attachments A-5, A-6 of this HRS documentation record). Local ground water flow is toward the northeast which would be away from these wells (Ref. 5, p. 9). Therefore, these wells are considered representative of background conditions for the area.

As shown in the tables below, the background and release samples are similar and their contaminant concentrations can be compared because they were collected during the same sampling event using similar sampling and analysis procedures and from a similar range of depths as shown below. Ground water sampling was conducted from 21 through 23 April 2014. Private domestic wells were purged for a minimum of 15 minutes using the existing pumps with samples collected from the tap closest to the wellhead. Two of the private wells with direct wellhead access and inoperable pumps (PW-6, and AWS-2) were sampled with either a disposable bailer or with a peristaltic pump. Ground water samples for VOA were collected in 40 ml vials preserved with HCl. All samples were stored on ice for delivery to the EPA Region 6 Laboratory for analysis by EPA Method 8260 (Ref. 7, p. 23; Ref. 37, p. 5).

2014 Domestic Well Investigation

The investigation of the ground water pathway during the April 21 through 23, 2014 SR consisted of collecting ground water samples from existing private domestic and irrigation wells. The SR sampling event was designed primarily to evaluate additional potential downgradient targets of the contaminated ground water plume. Private domestic and irrigation wells were identified from previous investigations conducted by NMED and through a limited well survey performed by Atkins Engineering on behalf of NMED (Ref. 7, p. 22; Ref. 39). The well identification effort was focused within a distance of approximately two miles east of Source 1 at 514 West Second Street (Ref. 7, p. 19). The wells used to establish an observed release from Source 2 are presented below.

Background Monitoring Wells in Alluvial Aquifer Associated with 507 East Second – Source 2

Station ID*** / Laboratory ID	Well Depth (feet bgs)/ Screened Interval (feet)	Date (military time)	References
PW-1/ 1404031-01	30.00/ 4.00	04/22/2014 (1523)	Ref. 28, pp. 1-3, 71; Ref. 54, p. 13
AWS-2/ 1404031-06	100/ 40	04/22/2014 (1807)	Ref. 28, pp. 1-3, 71; Ref. 54, p. 66

Background Results – Monitoring Wells in Alluvial Aquifer Associated with 507 East Second – Source 2

Station ID*/ Laboratory ID**	**Hazardous Substance**	**Concentration (µg/L)**	**Reporting Limit* (µg/L)**	**References**
PW-1/ 1404031-01	Tetrachloroethene	0.5 U	0.5	Ref. 28, p. 35
	Trichloroethene	2.8 (**8.4)	0.5	Ref. 28, p. 34
AWS-2/ 1404031-06	Tetrachloroethene	0.5 U	0.5	Ref. 28, p. 45

Notes:

* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 28, p. 1; Ref. 55).

** - As the analyte was detected, per the HRS, release samples will be compared against a level three times (i.e., 8.4) the concentration detected (Ref. 1, Table 2-3).

*** - The Station ID for private addresses has been changed to protect personal information (Ref. 66, p. 1).

µg/L - micrograms per liter

U – Undetected (Ref. 28, p. 73).

For PCE the background level is 0.5 µg/L. The background level for TCE is 2.8 µg/L and the level to show a significant increase is 8.4 µg/L.

Release Wells

Ground water samples collected from private domestic wells used to document an observed release from Source 2 to the alluvial portion of the combined aquifer are presented in the following table. Background samples were considered comparable and appropriate based on a similar sample date sampled and similar screened interval of the well.

Ground water well locations have been depicted on Attachments A-5 and A-6 of this HRS documentation record.

Release Samples:

Ground water samples identified as "contaminated" are those that meet observed release by chemical analysis criteria as defined by the HRS (Ref. 1, Table 2-3). Observed release criteria is met when analytical evidence of a hazardous substance significantly above background exists and some portion of that increase is attributable to a release from the site. Additional criteria include that the sample concentration exceeds the Sample Quantitation Limit (SQL; including the background SQL) or another HRS-defined limit, and is at least three times greater than the background concentration when the background concentration equals or exceeds its detection limit (Ref. 1, Table 2-3).

Observed release contamination was found in wells sampled at depths ranging from 20 to 100 feet bgs (Ref. 54, pp. 9, 11, 12, 14, 67-69; see analytical data tables presented below). Depth to water is about 16.5 feet below grade at the Source (Ref. 5, pp. 17, 18). Soil boring logs from the environmental investigation at 507 East Second Street property (Source 2) indicate that vadose zone soils typically consist of clay with variable amounts of sand and occasional sand lenses, while the water bearing zone typically consists of gravel and gravel-sand mixtures (Ref. 5, pp. 17, 18).

Ground water sampling locations with levels meeting observed release criteria are presented below.

2014 Domestic Well Investigation

The investigation of the ground water pathway during the April 21 through 23, 2014 SR consisted of collecting ground water samples from existing private domestic and irrigation wells. The SR sampling event was designed primarily to evaluate additional potential downgradient targets of the contaminated ground water plume. Private domestic and irrigation wells were identified from previous investigations conducted by NMED and through a limited well survey performed by Atkins Engineering on behalf of NMED (Ref. 7, p. 22). The well identification effort was focused within a distance of approximately two miles east of Source 1 at 514 West Second Street (Ref. 7, p. 19). The wells used to establish observed release from Source 2 are presented below.

2014 Domestic Well Sampling Event (NMED Lea and West Second Street SR)

Station ID*/ Laboratory ID	Well Depth (feet bgs)/ Screened Interval (feet)	Date (military time)	References
PW-2/ 1404028-06	20.00/ 4.0	04/22/2014 (1033)	Ref. 28, pp. 1-3, 69, Ref. 54, p. 67
PW-3/ 1404028-07	21.00/ 4.0	04/22/2014 (0959)	Ref. 28, pp. 1-3, 69; Ref. 54, p. 14
PW-4/ 1404028-08	20.00/ 2.0	04/22/2014 (0920)	Ref. 28, pp. 1-3, 69; Ref. 54, p. 9
PW-5/ 1404028-10	27.00/ 3.0	04/22/2014 (1811)	Ref. 28, pp. 1-3, 71; Ref. 54, p. 68
PW-6/ 1404031-02	27.00/ 7.0	04/23/2014 (1345)	Ref. 28, pp. 1-3, 71; Ref. 54, p. 69
PW-7/ 1404031-03	23.0/5.0	04/23/2014 (0825)	Ref. 28, pp. 1-3, 71; Ref. 54, p. 12
AWS-55 (Thunderbird)/ 1404031-09	100.00/ 100.00	04/22/2014 (1440)	Ref. 28, pp. 1-3, 71; Ref. 54, p. 11

* - The Station ID for private addresses has been changed to protect personal information (Ref. 66, p. 1).

2014 Domestic Well Sampling Event (NMED Lea and West Second Street SR) – Sample Results

Station ID/ Laboratory ID**	**Hazardous Substance**	**Concentration (µg/L)**	**Reporting Limit* (µg/L)**	**References**
PW-2/ 1404028-06	Tetrachloroethylene	76.5	0.5	Ref. 28, p. 15
	Trichloroethene	11.7	0.5	Ref. 28, p. 14
PW-3/ 1404028-07	Tetrachloroethylene	76.7	0.5	Ref. 28, p. 17
	Trichloroethene	12.7	0.5	Ref. 28, p. 16
PW-4/ 1404028-08	Tetrachloroethylene	38.5	0.5	Ref. 28, p. 19
PW-5/ 1404028-10	Tetrachloroethylene	1.9	0.5	Ref. 28, p. 23
PW-6/ 1404031-02	Tetrachloroethylene	0.7	0.5	Ref. 28, p. 37
PW-7/ 1404031-03	Tetrachloroethylene	52.0	0.5	Ref. 28, p. 39
AWS-55 (Thunderbird)/ 1404031-09	Tetrachloroethylene	0.9	0.5	Ref. 28, p. 51

Notes:

* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 28, p. 1; Ref. 55).

** - The Station ID for private addresses has been changed to protect personal information (Ref. 66, p. 1).

µg/L - micrograms per liter

In addition to the wells shown above, there was the initial sampling event conducted when the source was discovered which indicated a release from the source to ground water. Ground water samples collected during this event are shown below.

2012 Phase II ESA Ground Water Sampling

In January 2012, a Phase II ESA was conducted by environmental contractors on the Source 2 property. Although the samples were not collected by the NMED, they were collected by environmental contractors during environmental assessments conducted by property owners and indicate a release in connection with the 507 East Second Street property (Source 2) (Ref. 5, p. 4).

2012 Phase II ESA Sampling Event

Station ID	Well Depth (feet bgs) / Screened Interval (feet)	Date (military time)	References
SB-2 GW (507 E Second Ph 2 GW Grab)	20.00/ 5.00	01/04/2012 (1420)	Ref. 5, pp. 18, 67: Ref. 54, pp. 5, 7
SB-1 GW (507 E Second Ph 2 GW Grab)	20.00/ 5.00	01/04/2012 (1230)	Ref. 5, pp. 17, 67; Ref. 54, pp. 5, 7

2012 Phase II ESA Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
SB-2 GW (1201167-009)	Tetrachloroethylene	16,000	200	Ref. 5, p. 39
	Trichloroethene	2,100	100	Ref. 5, p. 40
	cis-1,2-Dichloroethene	2,100	100	Ref. 5, p. 39
SB-1 GW (1201167-004)	Tetrachloroethylene	7,100	100	Ref. 5, p. 28
	Trichloroethene	3,900	100	Ref. 5, p. 28
	cis-1,2-Dichloroethene	1,800	100	Ref. 5, p. 28

Notes:

* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).

µg/L - micrograms per liter

Source 3 – West Second and Montana

Background Wells

Ground water samples used to establish background levels for PCE, TCE, cis-1,2-DCE, and trans-1,2-DCE for the monitoring wells associated with West Second and Montana (Source 3) in the alluvial ground water were based on analytical results from the West Second and Montana SI sampling event conducted in June 2009 by the NMED (Ref. 30, p. 18).

Locally, ground water flow at Source 3 is generally east-northeast at a gradient of 0.006 feet/foot (Ref. 30, p. 15; Ref. 34, p. 19). Thus, the ground water well representative of background conditions for Source 3 was chosen based on its location being upgradient or west of the identified ground water plume and side gradient to the source (Ref. 3, p.1; Attachments A-6 of this HRS documentation record).

PCE is a manufactured chlorinated solvent and does not occur naturally within the environment (Ref. 53, p. 1). Therefore, the background level of 0 for PCE can be considered representative of background conditions of the area. An observed release to the ground water will be established when the sample measurement equals or exceeds the sample-specific SQL or another HRS-defined limit and one of the two following conditions occurs: 1) If the background concentration is not detected (or is less than the detection limit), the sample measurement equals or exceeds the sample quantitation limit or another HRS-defined limit or 2) If the background concentration equals or exceeds the detection limit, the sample measurement is three times or more above the background concentration (Ref. 1, Table 2-3, Sec.2.3).

Background Monitoring Wells

Even though monitoring well FCS-MW-1 is located very near the estimated boundaries of the ground water plume, it is considered to be located outside the influence of potential contamination (Attachment A-5 and A-6 of this HRS documentation record). Local ground water flow is toward the northeast which would be away from this well (Ref. 14, pp. 18, 21; Ref. 30, pp. 4, 14). Further, since PCE, TCE, cis-1,2-DCE, and trans-1,2-DCE concentrations have either been non-detect or below the detection limit established by the laboratory, combined with the fact that PCE, TCE, cis-1,2-DCE, and trans-1,2-DCE are not naturally occurring substances within the environment, this well is considered representative of background conditions for the area (Ref. 22, pp. 13, 14; Ref. 46, pp. 1, 2; Ref. 53, p. 1).

As shown in the tables below, the background and release samples are similar and their contaminant concentrations can be compared because they were collected during similar sampling events (June 2009) using similar sampling and analysis procedures and from a similar range of depths as shown below. As part of the SI, NMED SOS collected ground water samples from five monitoring wells and the well FCS-MW-1 at 1415 West Second Street that was historically presumed to be upgradient of the monitoring wells associated with the contaminated ground water plume. Using certified clean disposable hand bailers, each well was purged a minimum of three well casing volumes and/or until field parameters (pH, conductivity, temperature, ORP) stabilized prior to sample collection (Ref. 30, p. 18). In addition, direct push borings were drilled in the residential neighborhood just north and east of the contaminated ground water plume associated with Source 3 to collect ground water grab samples from beneath the water table at each boring location. To obtain ground water grab samples, a screen point ground water sampler was threaded onto the leading end of a rod and advanced into the subsurface with a direct push rig. 0-ring seals at each rod joint, the drive head, and the expendable drive point provided a watertight system. Once the saturated zone was reached, the tool string was retracted approximately 44 inches while the screen was held in place using internal extension rods. Ground water entered the screen and was allowed to stabilize. The ground water samples were collected with peristaltic pump or with a tubing and check-valve assembly. Ground water samples were collected in 40 ml vials and submitted for VOC analysis (Ref. 30, p. 19).

Background Monitoring Well in Alluvial Aquifer Associated with West Second and Montana – Source 3

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
FCS-MW-1/ 0906032-05	29.28 / 10	06/15/2009 (1000)	Ref. 16, p. 24; Ref. 22, pp. 4, 102; Ref. 54, pp. 2, 6

Background Results – Monitoring Wells in Alluvial Aquifer Associated with West Second Street and North Montana Avenue – Source 3

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
FCS-MW-1/ 0906032-05	Tetrachloroethylene	1.0 U	1.0	Ref. 22, p. 14
	Trichloroethylene	1.0 U	1.0	Ref. 22, p. 13
	trans-1,2-Dichloroethene	1.0 U	1.0	Ref. 22, p. 13
	cis-1,2-Dichloroethene	1.0 U	1.0	Ref. 22, p. 13

Notes:
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 22, p. 2; Ref. 55).
µg/L - micrograms per liter
U – Undetected (Ref. 22, p. 109).

For all hazardous substances the background level is 1.0 µg/L.

Release Wells

Ground water samples collected from monitoring wells used to document an observed release from Source 3 to the alluvial portion of the combined aquifer are presented in the following table. The background sample is considered comparable and appropriate based on a similar sample date, well depth, and similar screened interval of the well.

Ground water well locations have been depicted on Attachment A-5 of this HRS documentation record.

Release Samples:

Ground water samples identified as “contaminated” are those that meet observed release by chemical analysis criteria as defined by the HRS (Ref. 1, Table 2-3). Observed release criteria is met when analytical evidence of a hazardous substance significantly above background exists and some portion of that increase is attributable to a release from the site. Additional criteria include that the sample concentration exceeds the Sample Quantitation Limit (SQL; including the background SQL) or another HRS-defined limit, and is at least three times greater than the background concentration when the background concentration equals or exceeds its detection limit (Ref. 1, Table 2-3).

Observed release contamination was found in wells sampled at depths ranging from 23.98 to 30.31 feet bgs (Ref. 54, pp. 1-5). Depth to water is about 15 to 20 feet below grade in the Source area (Ref. 30, p. 15). Subsurface soils beneath the area of the Source consist of discontinuous layers of clay, sandy clay, clayey sand, poorly graded sand, and gravel to approximately 25 ft bgs (Ref. 30, p. 14).

Ground water sampling locations with levels meeting observed release criteria are presented below.

2009 Monitoring Well Investigation

The first SI sampling event involving the Roswell CERCLA sites took place in June 2009. Ground water samples were collected from 15 CERCLA site monitoring wells, 9 direct push borings, and 4 domestic wells in the geographic vicinity of the North Main and 9th, Parks UST, and West Second and Montana (Ref. 7, p. 21). The wells used to establish an observed release from Source 3 are presented below.

2009 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
W Second MW-1 (MW1)/ 0906032-07	24.86/ 10.00	06/15/2009 (1127)	Ref. 16, p. 25; Ref. 22, pp. 1-4, 102; Ref. 27, pp. 1-2, 5; Ref. 54, pp. 2,6, 21
W Second MW-2 (MW2)/ 0906032-09	30.31/ 10.00	06/15/2009 (1204)	Ref. 16, p. 25; Ref. 22, pp. 1-4, 103; Ref. 27, pp. 1-2, 5; Ref. 54, pp. 2,4, 22
W Second MW-3 (MW3)/ 0906032-10	24.55/ 10.00	06/15/2009 (1455)	Ref. 16, p. 25; Ref. 22, pp. 1-4, 103; Ref. 27, pp. 1-2, 5; Ref. 54, pp. 2,6, 23
W Second SMW-2 (SMW2)/ 0906032-11	24.85/ 10.00	06/15/2009 (1348)	Ref. 16, p. 25; Ref. 22, pp. 1-4, 103; Ref. 27, pp. 1-2, 5; Ref. 54, pp. 2,6, 24
W Second SMW-3 (SMW3)/ 0906032-11	23.98/ 10.00	06/15/2009 (1421)	Ref. 16, p. 25; Ref. 22, pp. 1-4, 103; Ref. 27, pp. 1-2, 5; Ref. 54, pp. 2,6, 25
ROW-A-1200B-W3/ 0906039-02	25.00/ not screened	06/17/2009 (0930)	Ref. 16, p. 27; Ref. 22, pp. 1-4, 106; Ref. 54, p. 26
ROW-A-1100B-W2-W3/ 0906039-03	28.00/ 4.00	06/17/2009 (1109)	Ref. 16, pp. 28, 29; Ref. 22, pp. 1-4, 106; Ref. 54, pp. 27

2009 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
W Second MW-1 (MW1)/ 0906032-07	Tetrachloroethylene	52.2	1	Ref. 22, p. 18
	Trichloroethene	48	1	Ref. 22, p. 17
	trans-1,2-Dichloroethene	4.5	1	Ref. 22, p. 17
	cis-1,2-Dichloroethene	299	5	Ref. 22, p. 17
W Second MW-2 (MW2)/ 0906032-09	cis-1,2-Dichloroethene	198	12.5	Ref. 22, p. 21
W Second MW-3 (MW3)/ 0906032-10	Trichloroethene	9.3	1	Ref. 22, p. 23
	cis-1,2-Dichloroethene	27.7	1	Ref. 22, p. 23
W Second SMW-2 (SMW2)/ 0906032-11	Tetrachloroethylene	55.2	1	Ref. 22, p. 26
	Trichloroethene	35.5	1	Ref. 22, p. 25
	trans-1,2-Dichloroethene	1.9	1	Ref. 22, p. 25
	cis-1,2-Dichloroethene	36.9	1	Ref. 22, p. 25
W Second SMW-3 (SMW3)/ 0906032-	Tetrachloroethylene	95.7	5	Ref. 22, p. 28
	Trichloroethene	50.7	1	Ref. 22, p. 27

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
12	trans-1,2-Dichloroethene	1.8	1	Ref. 22, p. 27
	cis-1,2-Dichloroethene	32.4	1	Ref. 22, p. 27
ROW-1200B-W3/ 0906039-02	Tetrachloroethylene	26.5	1	Ref. 22, p. 44
	Trichloroethene	9.7	1	Ref. 22, p. 43
	cis-1,2-Dichloroethene	5.5	1	Ref. 22, p. 43
ROW-A-1100B-W2-W3/ 0906039-03	Tetrachloroethylene	5.4	1	Ref. 22, p. 46
	Trichloroethene	5.1	1	Ref. 22, p. 45
	cis-1,2-Dichloroethene	2.2	1	Ref. 22, p. 45

Notes:
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 22, p. 2; Ref. 55).
µg/L - micrograms per liter

Source 4 – Parks UST

Background Wells

Ground water samples used to establish background levels for PCE and TCE for the monitoring wells associated with Parks UST (Source 4) in the alluvial ground water were based on analytical results from the West Second and Montana SI sampling event conducted in March 2010 by the NMED (Ref. 7, pp. 21, 36).

Locally, ground water flow at Source 4 is north-northeast at a gradient of 0.01 feet/foot (Ref. 31, pp. 3, 4). Thus, ground water wells representative of background conditions for Source 4 were chosen based on their location being upgradient or west of the source and identified ground water plume (Ref. 3, p. 1; Attachments A2, A-5, and A-6 of this HRS documentation record).

PCE is a manufactured chlorinated solvent and does not occur naturally within the environment (Ref. 53, p. 1). Therefore, the non-detect background level for PCE and its daughter product TCE (Ref. 46, pp. 1, 2) can be considered representative of background conditions of the area. An observed release to the ground water will be established when the sample measurement equals or exceeds the sample-specific SQL or another HRS-defined limit and one of the two following conditions occurs: 1) If the background concentration is not detected (or is less than the detection limit), the sample measurement equals or exceeds the sample quantitation limit or another HRS-defined limit or 2) If the background concentration equals or exceeds the detection limit, the sample measurement is three times or more above the background concentration (Ref. 1, Table 2-3, Sec.2.3).

Background Monitoring Wells

Even though monitoring wells Firestone MW-8A, Firestone MW-4A, and Shamrock MW-8 are located very near the estimated boundaries of the ground water plume, they are considered to be located outside the influence of potential contamination (Attachments A-5 and A-6 of this HRS documentation record). Local ground water flow is toward the northeast which would be away from these wells (Ref. 31, p. 3). Further, since PCE and TCE have either been non-detect or below the detection limit established by the laboratory, combined with the fact that PCE and TCE are not naturally occurring substances within the environment, these wells are considered representative of background conditions for the area (Ref. 21, pp. 5, 6, 11, 12, 19, 20; Ref. 46, pp. 1, 2; Ref. 53, p. 1).

As shown in the tables below, the background and release samples are similar and their contaminant concentrations can be compared because they were collected during the same sampling event (February 2010) using the same sampling and analysis procedures and from a similar range of depths. Ground water samples were collected from the LUST site monitoring wells using certified clean disposable hand bailers. Each well was purged a minimum of three well casing volumes and/or until field parameters (pH, conductivity, temperature, ORP) stabilized prior to sample collection. Ground water samples for volatile organic compound analysis (VOA) were collected in 40 ml vials. Samples collected were unpreserved and all samples were stored on ice for delivery to the laboratory. Samples were analyzed by the EPA Region 6 Laboratory (Ref. 32, p. 16).

Background Monitoring Wells in Alluvial Aquifer Associated with Parks UST – Source 4

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
Firestone MW-8A / 1002017-04/	32.10 / 10	02/15/2010 (1010)	Ref. 13, pp. 20, 22; Ref. 21, pp. 4, 112, 113; Ref. 54, pp. 3, 7
Firestone MW-4A / 1002017-01	35.67 / 10	02/15/2010 (1210)	Ref. 13, pp. 20, 23; Ref. 21, pp. 4, 108; Ref. 54, pp. 3, 7
Shamrock MW-8 / 1002017-08	23.30 / 10	02/15/210 (1330)	Ref. 13, pp. 20, 23; Ref. 21, pp. 4, 108; Ref. 54, pp. 3, 7

Background Results – Monitoring Wells in Alluvial Aquifer Associated with Parks UST– Source 4

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Firestone MW-8A / 1002017-04	Tetrachloroethylene	0.5 U	0.5	Ref. 21, p. 12
	Trichloroethylene	0.5 U	0.5	Ref. 21, p. 11
Firestone MW-4A / 1002017-01	Tetrachloroethylene	0.5 U	0.5	Ref. 21, p. 6
	Trichloroethylene	0.5 U	0.5	Ref. 21, p. 5
Shamrock MW-8 / 1002017-08	Tetrachloroethylene	0.5 U	0.5	Ref. 21, p. 20
	Trichloroethylene	0.5 U	0.5	Ref. 21, p. 19

Notes:
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 21, p. 2; Ref. 55).
µg/L - micrograms per liter
U – Undetected (Ref. 21, p. 119).

For all hazardous substances the background level is 0.5 µg/L.

Release Wells

Ground water samples collected from monitoring wells used to document an observed release from Source 4 to the alluvial portion of the combined aquifer are presented in the following tables by sampling event. Background samples were considered comparable and appropriate based on a similar sampling date and similar screened intervals of the wells.

Ground water well locations have been depicted on Attachments A-5 and A-6 of this HRS documentation record.

Release Samples:

Ground water samples identified as "contaminated" are those that meet observed release criteria as defined by the HRS (Ref. 1, Table 2-3). Observed release criteria is met when analytical evidence of a hazardous substance significantly above background exists and some portion of that increase is attributable to a release from the site. Additional criteria include that the sample concentration exceeds the Sample Quantitation Limit (SQL; including the background SQL) or another HRS-defined limit, and is at least three times greater than the background concentration when the background concentration equals or exceeds its detection limit (Ref. 1, Table 2-3).

Observed release contamination was found in wells sampled at depths ranging from 22.03 to 23.35 feet bgs (Ref. 54, pp. 41-43). Depth to water is about 14.26 to 17.65 feet below grade at the Source (Ref. 32, p. 13).

Ground water sampling locations with levels meeting observed release criteria are presented below.

February 2010 Monitoring Well Investigation

The second SI sampling event involving the Roswell CERCLA SI sites took place in Spring (February through April) 2010. Ground water samples were collected from 47 LUST site monitoring wells and 3 domestic wells in the geographic vicinity of Lea and West Second Street, Parks UST, and West Second and Montana CERCLA sites as part of SI efforts for each site (Ref. 7, p. 21). The wells used to establish observed release from Source 4 are presented below.

February through April 2010 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
Shamrock MW-4/ 1002017-07	22.65/ 10.00	02/15/2010 (0955)	Ref. 13, p. 22; Ref. 21, pp. 1-4, 108; Ref. 54, pp. 3, 7, 41
Shamrock MW-9/ 1002017-09	23.35/ 10.00	02/15/2010 (1253)	Ref. 13, p. 23; Ref. 21, pp. 1-4, 109; Ref. 54, pp. 3, 7, 42
Shamrock MW-10/ 1002017-06	22.03/ 10.00	02/15/2010 (1302)	Ref. 13, p. 23; Ref. 21, pp. 1-4, 111; Ref. 54, pp. 3, 7, 43

February through April 2010 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
Shamrock MW-4/ 1002017-07	Tetrachloroethylene	0.7	0.5	Ref. 21, p. 18
Shamrock MW-9/ 1002017-09	Tetrachloroethylene	0.6	0.5	Ref. 21, p. 22
Shamrock MW-10/	Tetrachloroethylene	4.7	0.5	Ref. 21, p. 16

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit* (µg/L)	References
1002017-06	Trichloroethene	0.7	0.5	Ref. 21, p. 15

Notes:
* - The Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 21, p. 2; Ref. 55).
µg/L - micrograms per liter

In addition to the wells shown above, there have been several sampling events that have spanned different dates that indicate other releases to ground water associated with Source 4. Ground water samples during these sampling events were collected from monitoring wells as shown below.

2009 Monitoring Well Investigation

The first SI sampling event involving the Roswell CERCLA sites took place in June 2009. Ground water samples were collected from 15 CERCLA site monitoring wells, 9 direct push borings, and 4 domestic wells in the geographic vicinity of the North Main and 9th CERCLA site and the Parks UST and West Second and Montana sources (Ref. 7, p. 21). The wells used to indicate a release to ground water are presented below.

2009 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
ROW-A-200B-SStanton/ 0906037-12	24.00/ not screened	06/16/2009 (1212)	Ref. 29, pp. 1-4, 46; Ref. 54, pp. 33
ROW-300B-SVA/ 0906037-10	20.00/ not screened	06/16/2009 (1030)	Ref. 29, pp. 1-4, 46; Ref. 54, pp. 32
ROW-100B-EHendricks/ 0906037-09	26.00 / not screened	06/16/2009 (1600)	Ref. 29, pp. 1-4, 46; Ref. 54, pp. 33
ROW-400B-SGrand/ 0906037-11	21.5/ not screened	06/16/2009 (1420)	Ref. 29, pp. 1-4, 46; Ref. 54, pp. 32

2009 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit*	References
ROW-A-200B-SStanton/ 0906037-12	Tetrachloroethylene	41.4	1	Ref. 29, p. 28
	Trichloroethene	3.9	1	Ref. 29, p. 27
ROW-300B-SVA/ 0906037-10	Tetrachloroethylene	2.1	1	Ref. 29, p. 24
	Trichloroethene	4.7	1	Ref. 29, p. 23
ROW-100B-	Tetrachloroethylene	67.3	1	Ref. 29, p. 22

2009 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	Reporting Limit*	References
EHendricks/ 0906037-09	Trichloroethene	1.1	1	Ref. 29, p. 21
	cis-1,2-Dichloroethene	2.1	1	Ref. 29, p. 21
ROW-400B-SGrand/ 0906037-11	Tetrachloroethylene	30.9 J	1	Ref. 29, p. 26
	Trichloroethene	1.1	1	Ref. 29, p. 25

Notes:
J – The identification of the analyte is acceptable; reported value is an estimate (Ref. 29, p. 47),
* - Reporting Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).
µg/L - micrograms per liter

March 2010 Monitoring Well Investigation

Ground water analytical data was collected by a NMED PSTB contractor in March 2010 from 7 monitoring wells at the Wakefield Oil LUST site (Ref. 7, p. 21). The wells used to indicate other releases from Source 4 are presented below.

February through April 2010 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
Wakefield MW-2/ 1003320-04	33.30/ 20.00	03/09/2010 (1620)	Ref. 26, pp. 3, 12, 28
Wakefield MW-3/ 1003320-05	30.70/ 20.00	03/09/2010 (1645)	Ref. 26, pp. 3, 13, 31
Wakefield MW-4/ 1003320-03	32.70/ 20.00	03/09/2010 (1525)	Ref. 26, pp. 3, 14, 25
Wakefield MW-6/ 1003320-06	29.90/ 20.00	03/10/2010 (1100)	Ref. 26, pp. 3, 15, 34
Wakefield MW-7/ 1003320-02	30.05/ 20.00	03/09/2010 (1355)	Ref. 26, pp. 3, 16, 22
Wakefield MW-8/ 1003320-01	31.00/ 20.00	03/09/2010 (1315)	Ref. 26, pp. 3, 17, 19

February through April 2010 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	PQL* (µg/L)	References
Wakefield MW-2/ 1003320-04	Trichloroethene	26	10	Ref. 26, p. 30
Wakefield MW-3/	Tetrachloroethylene	24	10	Ref. 26, p. 32

1003320-05	Trichloroethene	36	10	Ref. 26, p. 33
Wakefield MW-4/ 1003320-03	Tetrachloroethylene	43	1	Ref. 26, p. 26
	Trichloroethene	26	1	Ref. 26, p. 27
	cis-1,2-Dichloroethene	3.5	1	Ref. 26, p. 26
Wakefield MW-6/ 1003320-06	Tetrachloroethylene	42	20	Ref. 26, p. 20
	Trichloroethene	40	20	Ref. 26, p. 21
Wakefield MW-7/ 1003320-02	Tetrachloroethylene	49	5	Ref. 26, p. 23
	Trichloroethene	13	5	Ref. 26, p. 24
Wakefield MW-8/ 1003320-01	Tetrachloroethylene	130	1	Ref. 26, p. 20
	Trichloroethene	24	1	Ref. 26, p. 21
	cis-1,2-Dichloroethene	4.2	1	Ref. 26, p. 20

Notes:
PQL – Practical Quantitation Limit (Ref. 26, p. 19)
* - The Practical Quantitation Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 55).
µg/L - micrograms per liter

June 2011 Monitoring Well Investigation

In June 2011, NMED collected ground water samples from monitoring wells at the Parks UST CERCLA site (Ref. 7, p. 21; Ref. 20, pp. 3, 6, 10, 13, 22). The wells used to indicate other releases from Source 4 are presented below.

June 2011 Monitoring Well Sampling Event

Station ID/ Laboratory ID	Well Depth/ Screened Interval (feet bgs)	Date (military time)	References
Parks MW-12/ 201101239	29.92/ 10.00	06/29/2011 (1040)	Ref. 20, p. 3; Ref. 54, pp. 3, 7, 36
Parks MW-14/ 201101238	28.47/ 10.00	06/29/2011 (0855)	Ref. 20, p. 6 ; Ref. 54, pp. 3, 7, 37
Parks MW-15/ 201101237	33.65/ 10.00	06/29/2011 (0925)	Ref. 20, p. 10 ; Ref. 54, pp. 3, 7, 38
Parks MW-16/ 201101243	27.34/ 10.00	06/29/2011 (unknown)	Ref. 20, p. 13; Ref. 54, pp. 3, 7, 39
Parks MW-17/ 201101240	25.38/ 10.00	06/29/2011 (1000)	Ref. 20, p. 22 ; Ref. 54, pp. 3, 7, 40

June 2011 Monitoring Well Sampling Event – Sample Concentrations

Station ID/ Laboratory ID	Hazardous Substance	Concentration (µg/L)	SDL* (µg/L)	References
Parks MW-12/ 201101239	Tetrachloroethylene	64.3	0.07	Ref. 20, p. 2
	Trichloroethene	18.3	0.06	Ref. 20, p. 2
	trans-1,2-Dichloroethene	0.1	0.09	Ref. 20, p. 1
	cis-1,2-Dichloroethene	2.9	0.43	Ref. 20, p. 1
Parks MW-14/ 201101238	Tetrachloroethylene	27.1	0.07	Ref. 20, p. 5
	Trichloroethene	29.8	0.06	Ref. 20, p. 5
	trans-1,2-Dichloroethene	1.8	0.09	Ref. 20, p. 4
	cis-1,2-Dichloroethene	5.1	0.43	Ref. 20, p. 4
Parks MW-15/ 201101237	Tetrachloroethylene	42.5	0.07	Ref. 20, p. 8
	Trichloroethene	18.9	0.06	Ref. 20, p. 8
	cis-1,2-Dichloroethene	1.7	0.43	Ref. 20, p. 7
Parks MW-16/ 201101238	Tetrachloroethylene	40.2	0.07	Ref. 20, p. 12
Parks MW-16/ 201101238	Trichloroethene	17.8	0.06	Ref. 20, p. 12
	cis-1,2-Dichloroethene	2.9	0.43	Ref. 20, p. 11
Parks MW-17/ 201101240	Tetrachloroethylene	60.6	0.07	Ref. 20, p. 21
Parks MW-17/ 201101240	Trichloroethene	10.4	0.06	Ref. 20, p. 21
	cis-1,2-Dichloroethene	1.2	0.43	Ref. 20, p. 20

Notes:

SDL – Sample Detection Limit

* - Sample Detection Limit is equal to the SQL and is adjusted for sample volume and dilutions as defined in the HRS (Ref. 1, Section 1.1; Ref. 20, p. 2; Ref. 55).

µg/L - micrograms per liter

The NMED has been the primary agency involved in the investigation of these ground water plumes. The investigations that identified chlorinated solvents in ground water were NMED PSTB LUST site investigations. Following the identification of chlorinated solvents, the NMED ROS conducted investigations under the authority of the New Mexico Water Quality Control Commission (NMWQCC) which led to investigation by the NMED SOS under CERCLA (Ref. 7, p. 12).

NMED SOS measured ground water levels from 80 existing monitoring wells in the CERCLA SI investigation areas, consisting of 15 CERCLA site monitoring wells and 65 LUST site monitoring wells. Water levels were measured 25-26 April and 7-8 September 2011 to provide potentiometric surface and ground water flow data relevant to the site. Depth to water was measured in the wells using a water level probe with readings recorded to the nearest hundredth of a foot (0.01 ft) (Ref. 35, p. 3; Ref. 38, pp. 1-7). The water level probe was decontaminated prior to use in each well using a soap (Liquinox) wash followed by a deionized water rinse (Ref. 35, p. 3; Ref. 38, pp. 1-7). NMED SOS hired a land surveyor to survey the geographic coordinates and top of casing elevations for the 80 wells; the survey was completed in August 2011 (Ref. 27). The potentiometric surface maps demonstrate a generally eastward ground water flow direction from Source 3 eastward across central Roswell. There is a somewhat radial aspect to the eastward ground water flow in the vicinity of the site. (Ref. 7, pp. 20, 46, 47).

NMED SOS collected ground water samples from 91 sample points: 9 direct push borings, 60 LUST site monitoring wells, 15 CERCLA site monitoring wells, and 7 domestic wells. In addition, ground water analytical data collected by a NMED PSTB contractor in March 2010 from 7 monitoring wells at the Wakefield Oil LUST site was used in data evaluation, as well as data from Phase II sampling conducted by environmental contractors (Ref. 5, p. 4; Ref. 7, p. 20; Ref. 8, p. 4).

The CERCLA SI/SR sampling events were conducted by NMED and samples were collected according to work plans developed by the NMED (Ref. 35; Ref. 36; Ref. 37).

To obtain the ground water grab samples from direct push borings, a screen-point ground water sampler was threaded onto the leading end of a direct push rod and advanced into the subsurface with a direct push rig. O-ring seals at each rod joint, the drive head, and the expendable drive point provided a watertight system. Once the saturated zone was reached, the tool string was retracted approximately 44 inches while the screen was held in place using internal extension rods. Ground water entered the screen and was allowed to stabilize. The ground water sample was collected with a stainless steel mini bailer or peristaltic pump (Ref. 36, p. 3).

Ground water samples were collected from LUST monitoring wells using certified clean disposable hand bailers. Each well was purged a minimum of three well casing volumes and/or until field parameters (pH, conductivity, temperature, and oxidation-reduction potential [ORP]) stabilized prior to sample collection (Ref. 35, p. 3).

Private domestic wells were purged for a minimum of 15 minutes using the existing pumps with samples collected from the tap closest to the wellhead. Two of the private wells with direct wellhead access and inoperable pumps (PW-6, and AWS-2) were sampled with either a disposable bailer or with a peristaltic pump. Field parameters were measured during the purging using a multi-probe instrument for measuring pH, conductivity, temperature, dissolved oxygen, and ORP (Ref. 7, p. 23; Ref. 35, pp. 3, 4, 5; Ref. 66, p. 1).

Ground water samples for VOA by EPA Method 8260 were collected in 40 milliliter vials. Samples collected prior to October 2010 were unpreserved while samples collected during or after October 2010 were preserved with hydrochloric acid (HCl). All samples were stored on ice for delivery to the laboratory. Samples collected in 2009, 2010, and 2014 SR were analyzed by the EPA Region 6 Laboratory, in Houston, Texas, while 2011 samples were analyzed by the New Mexico Department of Health, State Laboratory Division (SLD) (Ref. 7, p. 21; Ref. 15; Ref. 35, pp. 3, 4; Ref. 36, p. 3; Ref. 37, p. 5). Samples collected by environmental contractors during the Phase II ESAs and the samples collected from the RMWS municipal supply wells were analyzed by Hall Environmental Analysis Laboratory located in Santa Fe, New Mexico (Ref. 5, pp. 20-77; Ref. 9; Ref. 43; Ref. 44).

Attribution:

The Lea and West Second Street site is located in Roswell, Chaves County, New Mexico near the intersection of West Second Street and Lea Avenue. The grouped site is located in an area of mixed commercial and residential use. There are residential properties located within the boundaries identified as the grouped site (Ref. 3, p. 1; Attachment A-2 of this HRS documentation record).

Source 1 contamination was released from dry cleaning facility activities which used PCE in their operations and released PCE into a drain at the far end of the facility building and through a private sewer line (Ref. 8, p. 4). Leakage from the drain and private sewer line has been found based on the documentation of native soil contaminated with elevated levels of PCE (see Section 2.4.1 of this HRS documentation record for Source 1). Evidence of the origins of the contamination can be demonstrated by how concentrations of PCE in native soil are most concentrated at the drain from the dry cleaning facility (SB-2), and become increasingly lower the further away from the release point (SB-3, SB-1, and SB-4) (Ref. 8, pp. 4, 11, 12). PCE has been found to have entered the alluvial ground water at the site (Section 3.1.1 of this HRS documentation record). In addition to PCE being released to the combined aquifer being evaluated for HRS purposes at the site, TCE and cis-1,2-DCE degradation products of PCE are also present (Section 3.1.1 of this HRS documentation record). PCE undergoes biodegradation through anaerobic organisms that change the PCE to TCE and then further degradation of TCE to cis-1,2-DCE and trans-1,2-DCE (Ref. 46, pp. 1, 2).

Source 2 contamination was released from a private sewer line that runs from an interior drain used by the dry cleaning business which used PCE in their operations (Ref. 5, p. 4). Leakage from the private sewer line has been found based on native soil contaminated with PCE (see Section 2.4.1 of this HRS documentation record for Source 2). Evidence of the origins of the contamination can be demonstrated by how concentrations of PCE in native soil are most concentrated at the drain from the dry cleaning facility (SB-1), and are lower further from the release (SB-2) (Ref. 8, pp. 8, 14). PCE has been found to have entered the alluvial ground water at the site (Section 3.1.1 of this HRS documentation record). In addition to PCE being released to the combined aquifer being evaluated for HRS purposes at the site, TCE, a degradation product of PCE are also present (Section 3.1.1 of this HRS documentation record). PCE undergoes biodegradation through anaerobic organisms that change the PCE to TCE and then further degradation of TCE to cis-1,2-DCE (Ref. 46, pp. 1, 2).

Source 3 contamination was released from an in-ground concrete separator tank (Ref. 30, p. 4). Spent PCE was found in the tank and leakage from the tank has been found based on native soil collected around the tank contaminated with PCE (Ref. 30, p. 11; see Section 2.4.1 of this HRS documentation record for Source 3). Evidence of the origins of the contamination can be demonstrated by how concentrations of PCE in native soil were most concentrated within the tank pit and contained lower concentrations further from the tank location (Ref. 30, p. 11). PCE has been found to have entered the alluvial ground water at the site (Section 3.1.1 of this HRS documentation record). In addition to PCE being released to the combined aquifer being evaluated for HRS purposes at the site, TCE, cis-1,2-DCE, and trans-1,2-DCE degradation products of PCE are also present (Section 3.1.1 of this HRS documentation record). PCE undergoes biodegradation through anaerobic organisms that change the PCE to TCE and then further degradation of TCE to cis-1,2-DCE and trans-1,2-DCE (Ref. 46, pp. 1, 2).

Source 4 contamination is the result of a release from an unidentified source (Ref. 32, p. 11). The alluvial ground water plume which contains PCE and TCE is evidence of a release (see Section 2.4.1 of this HRS documentation record for Source 4). Although the origins of the release has not been established, dry cleaning activities are considered to be a potential source since PCE is the primary chlorinated solvent detected within the plume. In an effort to identify potential dry cleaning sources, NMED SOS identified a total of 39 dry cleaning businesses that operated from 31 cleaning facilities within a 1-mile radius of the source (Ref. 32, p. 9). In addition to PCE being present in the ground water at the site, TCE, a degradation product of PCE is also present (Section 3.1.1 of this HRS documentation record). PCE undergoes biodegradation through anaerobic organisms that change the PCE to TCE (Ref. 46, pp. 1, 2).

PCE contamination as well as contamination from PCE's biodegradation products, TCE, cis-1,2-DCE and trans-1,2-DCE has been identified throughout the alluvial aquifer in multiple ground water plumes that extends from beneath the intersection of North Montana Avenue and West Second Street in northeasterly and southeasterly directions (Ref. 46, p. 2; Ref. 57; Attachment A-6 of this HRS documentation record).

The NMED has been the primary agency involved in the investigation of this ground water plume. The NMED first discovered the ground water plume in 2005 following the investigation of a leaky underground storage tank at the Parks Department Yard property (Source 4). PCE and TCE were first detected in May 2005 when a change in the analysis performed by the PSTB program was implemented and full EPA Method 8260 analysis was applied to the ground water samples (Ref. 32, p. 8). The other identified sources were discovered in 2006 (Source 1), 2009 (Source 3), and 2011 (Source 2) (Ref. 5, p. 6; Ref. 7, p. 12; Ref. 30, p. 4).

PCE is widely used for dry cleaning fabrics and textiles and for metal degreasing operations. Other uses include: an intermediate in the synthesis of fluorocarbons, an insulating/cooling fluid in electric transformers, in typewriter correction fluids, as veterinary medication against worms. Major environmental releases are primarily attributed to dry cleaning and industrial metal cleaning or finishing (Ref. 10, p. 1). Historically, some dry cleaners may have discarded wastes by pouring wastewater in to sewers, throwing used filters and sludge into the trash, or by simply dumping wastewater on the ground near the facility (Ref. 11, p. 1).

In ground water PCE is catalyzed by anaerobic bacteria and produces TCE. TCE undergoes reductive dehalogenase by anaerobic bacteria and produces cis-1,2-DCE, trans-1,2-DCE and vinyl chloride (Ref. 46, pp. 1, 2). Therefore, the presence of TCE, cis-1,2-DCE, and trans-1,2-DCE can be directly linked to the release of PCE into the ground water.

The NMED has conducted several soil and ground water investigations in the area; however, the precise extent of the PCE contamination in the ground water has not yet been determined. PCE is a manufactured product and the primary solvent used in commercial and industrial dry cleaning Ref. 53, p. 1).

A search for possible offsite contamination sources located up-gradient of the sources did not identify any facilities within the EPA's Toxic Release Inventory (Ref. 58, pp. 1-4). EPA's EnviroMapper identified five dry cleaning facilities within the Roswell zip code. The dry cleaners listed include: 1-Hour Martinizing, which is currently operating where Source 1 is located; American Linen Supply, which is located within the site area; and College Cleaners-Roswell, College Cleaners II, and Klassic Cleaners-Roswell which are all located down-gradient of the ground water plumes and identified sources (Ref. 59, pp. 1-5).

The McGaffey and Main Ground Water Plume Superfund site is located approximately 1 mile south-southeast of the grouped sources and although it also has the documented the presence of PCE in ground water samples collected from the shallow alluvial ground water aquifer and the underlying carbonate-rock aquifer, the site is generally cross-gradient or down-gradient of the identified plumes, and is therefore not a contributing factor to this grouped site's contamination (Ref. 7, p. 14; Ref. 64, pp. 5, 8; Attachment A-6 of this HRS documentation record).

Hazardous Substances Released:

PCE
TCE
cis-1,2-DCE
trans-1,2-DCE

Ground Water Observed Release Factor Value: 550

3.2 WASTE CHARACTERISTICS

3.2.1 Toxicity/Mobility

Hazardous Substance	Source No. (and/or Observed Release)	Toxicity Factor Value	Mobility Factor Value*	Does Hazardous Substance Meet Observed Release by Chemical Analysis? (Y/N)	Toxicity/ Mobility (Ref. 1, Table 3-9)	References
cis-1,2-Dichloroethylene	2, 3, OR1, OR3	1,000	1	Y	1,000	Ref. 2, p. 12
trans-1,2-Dichloroethylene	3, OR3	100	1	Y	100	Ref. 2, p. 12
Tetrachloroethylene	1, 2, 3, 4, OR1, OR2, OR3, OR4	100	1	Y	100	Ref. 2, p. 17
Trichloroethylene	2, 3, 4, OR1, OR2, OR3, OR4	1,000	1	Y	1,000	Ref. 2, p. 18

Note:
OR – Observed Release
* – Hazardous substances meeting the criteria for an observed release by chemical analysis to an aquifer underlying a source are assigned a mobility factor value of 1 (Ref. 1, Section 3.2.1.1).

Toxicity/Mobility Factor Value (Ref. 1, Section 3.2.1.3, Table 3-9): 1,000

3.2.2 HAZARDOUS WASTE QUANTITY

Source No.	Source Type	Current Source Hazardous Waste Quantity
1	Contaminated Soil	0.001828
2	Private Sewer Line (Other)	> 0, but unknown
3	Tank (In-ground Separator Tank)	0.55556
4	Contaminated Ground Water Plume/No Identified Source (Other)	> 0, but unknown

Sum of Values: 0.557388

A hazardous waste quantity of 0.557388 is estimated for sources at the Lea and West Second Street site which, when applied in HRS Table 2-6, yields a pathway hazardous waste quantity of 1. For Source 2, a Level II target well (AWS-55 Thunderbird) exists, as shown below in section 3.3.2.3 of this HRS documentation record, so this factor value is subject to a minimum value of 100 (Ref. 1, Sec. 2.4.2.2).

Hazardous Waste Quantity Factor Value (Ref. 1, Section 2.4.2.2): 100

3.2.3 Waste Characteristics Factor Category Value

Toxicity/Mobility Factor Value: 1,000
Hazardous Waste Quantity Factor Value: 100

Toxicity/Mobility Factor Value (1,000) × Hazardous Waste Quantity Factor Value (100) = 1×10^5

Waste Characteristics Factor Category Value (Ref. 1, Table 2-7): 18

3.3 Ground Water Pathway Targets

3.3.1 Nearest Well

There is a Level II drinking water well within the TDL (AWS-55) (Ref. 54, pp. 5, 11; Ref. 68, p. 1; See Attachment C, Figure 2 of this HRS documentation record); therefore, a nearest well factor of 45 is assigned (Ref. 1, Section 3.3.1).

Nearest Well Factor Value: 45

3.3.2 Population

3.3.2.1 Level of Contamination

3.3.2.2 Level I Concentrations

To date, no known ground water targets subject to Level I concentration levels have been identified for the ground water pathway.

Level I Concentrations Factor Value: 0

3.3.2.3 Level II Concentrations

Level II concentrations have been detected in domestic well AWS-55 (Thunderbird) as shown in Source 2, Section 3.1.1 of this HRS documentation record. AWS-55 is located outside of the City of Roswell city limits, and therefore drinking water is not supplied by the municipal supply wells (Ref. 48, p. 1; Ref. 54, pp. 5, 11; Ref. 68, p. 1; Attachment C, Figure 2 of this HRS documentation record). There are 4 people who work at the location which AWS-55 provides water to (Ref. 69, p. 1).

Contamination has also been detected in four municipal supply wells (CW12, CW13, CW15, CW16) within the 4-mile TDL. The contamination found in these wells cannot be attributed to one individual source, and therefore are only considered potential contamination as shown in Section 3.3.2.4 of this HRS documentation record.

Level II Concentrations Factor Value: 4

3.3.2.4 Potential Contamination

Roswell Municipal Water System

In addition to each source having an observed release and contaminated ground water plume associated with it as described above, the populations served by is the City of Roswell Municipal Water System (RMWS) wells are considered subject to potential contamination.

The City of Roswell has four historically and/or currently contaminated municipal supply wells located within a 4-mile radius of the grouped sources: City Well 12 (CW12), City Well 13 (CW13), City Well 15 (CW15), and City Well 16 (CW16) (Ref. 7, pp. 18-19). These four wells are active municipal supply wells for the City of Roswell that provide drinking water to the residents of Roswell (Ref. 17, p. 1). All of the City of Roswell municipal supply wells obtain their water from the artesian aquifer, which is hydraulically connected to the shallow alluvial ground water (Ref. 48, p. 1; Ref. 49, p. 14). Further, the artesian aquifer and the hydraulically connected alluvial ground water together comprise the Roswell Basin Aquifer System (Ref. 49, p. 14). This system has been designated as a karst aquifer by the USGS (Ref. 14, p. 13; Ref. 49, pp. 10, 14).

Ground water samples were collected from the municipal supply wells as part of routine compliance sampling mandated by the Safe Drinking Water Act (Ref. 24, pp. 1-12). The five municipal supply wells used to evaluate this site under the HRS are all completed within the artesian aquifer at total depths of 344 feet (CW12), 348 feet (CW13), 365 feet (CW15), 363 feet (CW16), and 850 (for CW18) feet bgs. Depth to water in the five municipal wells have been measured at 85 feet, 80 feet, 99 feet, 124 feet, and 105 feet (Ref. 17, pp. 4, 5, 6).

PCE and TCE were detected in municipal supply wells CW12 and CW13 in 1999. PCE and TCE have been detected frequently in municipal supply wells CW15 and CW16 since at least 1999 (Ref. 25, pp. 1, 4, 8, 10, 20, 26, 28, 38, 40, 42, 46, 48, 52, 54, 56, 64, 66, 74, 76, 78, 80, 86, 88, 95, 111, 117, 123, 147, 154, 156, 164, 167, 172, 175, 177-179). However, the concentrations of PCE and TCE detected in the municipal supply wells have been below the Federal Maximum Contaminant Level (MCL) of 5 ug/L for these compounds (Ref. 67, p. 5). Ground water samples were collected from municipal supply well CW18 between the years of 1999 and 2014 (Ref. 24, pp.1, 3, 5, 7, 9, 12).

The nearest active public drinking water ground water supply well (CW13) operated by the RMWS is located approximately 1.2 mile south of the Lea and West Second Street site (see Attachment A-3 of this HRS documentation record for drinking water well target locations) (Ref. 7, p. 19; Ref. 17, p. 3). The RMWS (Public Water System [PWS] ID No. NM3520203) is a blended water system that serves 48,611 people in the City of Roswell, New Mexico (Ref. 42, p. 1; Ref. 48, p. 1). The system consists of 33 ground water wells, 20 of which are active (Ref. 40, pp. 3-5). Of the 20 active wells, four wells, which are part of the Roswell International Air Center (RIAC) operate as a standalone system and only tie into the city system during an emergency (Ref. 48, p. 1). Therefore, there are 16 wells that actively supply the City of Roswell.

In addition to CW13, five RMWS wells are located within the 4-mile target distance limit (TDL) for the grouped site, including CW12, CW15, CW16, CW17, and CW18 (Ref. 7, pp. 18, 19; Ref. 17, p. 3; Attachment A-3 of this HRS documentation record).

City Wells #10, #11, and #18 are located west of the City of Roswell near US Highway 70, while City Wells #12, #13, #15, #16, and #17 are located within the southwestern quadrant of Roswell. Each of these eight wells has an associated gas chlorination treatment facility and a sampling point that is a designated entry point into the system's distribution lines. Three large storage tanks (the 5-million-gallon capacity Third Reservoir Storage Tank and Country Club Storage Tanks #3 and #4, each with 7.5-million-gallon capacities) float on the distribution lines and receive water from these City Wells. Water derived from these eight wells serves the main part of the City of Roswell (Ref. 41, p. 2).

Since the RMWS is blended and no single water supply source supplies more than 40 percent of the system, the population served is apportioned equally to each water supply source in the system (Ref.1, Section 3.3.2; Ref. 48, p. 1). As a result, the City of Roswell population of 48,611 is equally divided by the 16 water wells that supply the city (Ref. 42, p. 1; Ref. 48, p. 1). An estimated 3,038 persons are served by each water supply source (Ref. 17, p. 3; Ref. 48, p.1).

Other wells that could be potentially contaminated include private domestic wells, and privately owned supply wells that are outside of the City of Roswell boundary, but within the site TDL. The nearest private water wells are located within 1-mile of the identified sources (see Attachment A-3 of this HRS documentation record for drinking water well target locations) (Ref. 47, pp. 1, 4). Based on the U. S. Census Bureau, the persons per household in 2009-2013 for Chaves County is 2.70 (Ref. 61, p. 1). The total estimated population potentially served by private domestic ground water wells outside of the City of Roswell city limits and within 4 radial miles of the site is 3,070 persons, with a total of 1,137 domestic wells identified within 4 radial miles of the site and outside of city limits (Ref. 47, pp. 1-32; Attachment A-3 of this HRS documentation record). Two privately owned supply wells located within the 4-mile TDL include one at the Outside Inn RV Park, which consists of a non-transient population in the greater than 2 to3 miles distance interval and one at Generations of Learning in the greater than 3 to 4 miles distance interval (Ref. 17, p. 3, Attachment A-3 of this HRS documentation record). The Outside Inn RV Park well serves a population of 45, and the Generations of Learning well serves a population of 256 (Ref. 17, p. 4). Each of these wells is completed at 190 feet depth and 300 feet depth respectively (Ref. 17, p. 5).

Potential Population Targets

	Domestic Wells (non-karst)**			Domestic Wells (karst)**		Public Supply Wells (karst)		City of Roswell Municipal Wells (karst)				
TDL from Site	Number of Wells (Ref. 47)	Total non-karst Population Served*	Distance Weighted Population Values (non-karst) (Ref. 1, Table 3-12)	Number of Wells (Ref. 47)	Karst Domestic Well Population Served*	Number of Wells (Ref. 17)	Population Served (Ref. 17)	Number of Wells (Ref. 17)	Population Served (Ref. 48)	Total karst Population Served	Distance Weighted Population Values (karst) (Ref. 1, Table 3-12)	References
0.25	0	0	0	0	0	0	0	0	0	0	0	Ref. 47, p. 4
0.5	0	0	0	0	0	0	0	0	0	0	0	Ref. 47, p. 4
1	1	3	1	1	3	0	0	0	0	3	2	Ref. 47, p. 4; Ref. 61, p. 1
2	51	138	30	22	59	0	0	City Well 13	3,038	3,097	2,607	Ref. 17, p. 5, Ref. 47, pp. 4-5; Ref. 48; Ref. 61, p. 1
3	241	651	68	86	232	Outside Inn RV	45	City Wells 12,15,16,17	12,152	12,429	8,163	Ref. 17, pp. 4-5, Ref. 47, pp. 5-14; Ref. 48; Ref. 61, p. 1
4	576	1,555	131	159	429	Generations of Learning	256	City Well 18	3,038	3,723	2,607	Ref. 17, pp. 4-5, Ref. 47, pp. 14-31; Ref. 48; Ref. 61, p. 1
Total	869	2,347	**230**	268	724		301		18,228	19,252	**13,379**	

Notes:
* Based on 2.70 per household (Ref. 61, p. 1)
** Calculations of karst and non-karst private domestic wells were based on shallow and artesian classifications of the water source for each well identified from the New Mexico Water Rights Reporting system website. Wells which did not contain source information were conservatively identified as non-karst (Ref. 47).

Sum of Distance-Weighted Population Values: 230 (non-karst) + 13,379 (karst) = 13,609
Sum of Distance-Weighted Population Values/10: 1,360.9

Potential Contamination Factor Value: 1,361

Population Factor Value (Ref. 1, Section 3.3.2.5)
Level II Concentrations Factor Value + Potential Factor Value: 4 + 1,361 = 1,365

3.3.3 Resources

For more than 100 years the Roswell Basin has been one of the most intensively farmed areas in the state, the principle crops being alfalfa, cotton, sorghum, and chiles. The Roswell Basin derives virtually all of its irrigation water from ground water stored in the artesian and shallow alluvial aquifer (Ref. 14, p. 8). One such farm within the site's TDL is Kaywal, Inc. Kaywal receives its irrigation water from the shallow ground water used to irrigate its cotton, corn, sorghum, wheat and oat crops on more than 100 acres of land (Ref. 60, pp.1, 2, 64, 91; Attachment A-3 of this HRS documentation record). Another commercial farm which supplies feeder crops for commercial sale is Pirtle Farms which uses artesian ground water for irrigation of over 100 acres of agriculture land (Ref. 60, pp. 1, 2, 79, 93-96; Attachment A-3 of this HRS documentation record). As such, under the HRS, a resources value of 5 is assigned to any target well drawing water from the aquifer being evaluated or eligible overlying aquifers being used for irrigation (5-acre minimum) of commercial food crops or commercial forage crops (Ref. 1, Section 3.3.3).

Resources Factor Value: 5

3.3.4 Wellhead Protection Area

A Wellhead Protection Area (WHPA) is defined as the area designated by states according to Section 1428 of the Safe Drinking Water Act (SDWA), as amended, to protect wells and recharge areas that supply public drinking water systems (Ref. 1, Sec. 3.3.4).

For the State of New Mexico, a radius of 1,000 feet has been designated as a WHPA around all municipal supply wells (Ref. 51, p. 7). Six municipal supply wells subject to potential contamination are located within a 4-mile radius of the sources; therefore there is a WHPA within the TDL of the interconnected aquifer being evaluated for HRS purposes (Sec. 3.1.1 and Attachment A-3 of this HRS documentation record; Ref. 1, Sec. 3.3.4).

Wellhead Protection Area Factor Value: 5

3.3.5 Calculation of Targets Factor Category Value

The target factor category value is calculated by determining the sum of the factor values for the nearest well (45), population (1,365), resources (5), and Wellhead Protection Area (5) (Ref. 1, Section 3.3.5).

Calculations: 45 + 1,365+ 5 + 5 = 1,420

3.4 Ground Water Migration Score for an Aquifer

The ground water migration score for an aquifer is calculated by multiplying the factor category values for likelihood of release (550), waste characteristics (18), and targets (1,420). Divide by 82,500, the resulting value (maximum value 100) is assigned as the ground water migration pathway score (Ref.1, Section 3.4).

Calculations: (550 × 18 × 1,420) ÷ 82,500 = 170.4 (100)

3.5 Calculation of Ground Water Migration Pathway Score

The Ground Water Migration Pathway Score assigned based on the highest ground water migration score calculated for an aquifer underlying sources at the site. For the combined aquifer being evaluated for HRS purposes, a value of 100 is assigned.

4.0 SURFACE WATER MIGRATION PATHWAY – NOT SCORED

The surface water migration pathway is not scored because it is not expected to contribute significantly to the site score. The site score exceeds 28.50 based only on the evaluation of the ground water pathway.

5.0 SOIL EXPOSURE PATHWAY SCORE - NOT SCORED

The soil exposure pathway is not scored because it is not expected to contribute significantly to the site score. Further, the site score exceeds 28.50 based only on the evaluation of the ground water pathway.

6.0 AIR MIGRATION PATHWAY SCORE - NOT SCORED

The air migration pathway is not scored because it is not expected to contribute significantly to the site score. Further, the site score exceeds 28.50 based only on the evaluation of the ground water pathway.

Figure References for Attachments

Attachment A-1:
Base Map Source* 2013 National Geographic Society, i-cubed

*Map annotated by EPA START-3 on 08/11/2015

Attachment A-2:
Base Map Source* Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

*Map annotated by EPA START-3 on 08/11/2015 to depict site and source locations (Ref. 4, pp. 1-2; Ref. 5, p. 8; Ref. 8, p. 12; Ref. 30, pp. 11, 37, 40; Ref. 32, p. 39; Ref. 54, p. 3)

Attachment A-3:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

*Map Annotated by EPA START-3 on 08/11/2015 to depict well locations, source locations, and the Roswell City Boundary (Ref. 5, p. 8; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 32, p. 39; Ref. 45, p. 27; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5; Ref. 70, pp. 1-3)

Attachment A-4:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, source locations, and the Roswell City Boundary (Ref. 5, p. 8; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 32, p. 39; Ref. 45, p. 27; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5; Ref. 70, pp. 1-3)

Attachment A-5:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

*Map Annotated by EPA START-3 on 08/11/2015 to depict well locations (Ref. 17, pp. 1-6; Ref. 45, p. 27; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5)

Attachment A-6:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

.
*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and ground water gradient (Ref. 4, pp. 1-2; Ref. 5, pp. 8, 9; Ref. 7; p. 17; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 31, p, 3; Ref. 32, p. 39; Ref. 34, pp. 13, 21; Ref. 45, pp. 27, 28; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5)

Attachment B Figure 1:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

.
*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and ground water gradient (Ref. 4, pp. 1-2; Ref. 5, pp. 8, 9; Ref. 7; p. 17; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 31, p, 3; Ref. 32, p. 39; Ref. 34, pp. 13, 21; Ref. 45, pp. 27, 28; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5)

Attachment B Figure 2:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

.
*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and the Roswell City Boundary (Ref. 5, p. 8; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 32, p. 39; Ref. 45, p. 27; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5; Ref. 70, pp. 1-3)

Attachment C Figure 1:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

.
*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and ground water gradient (Ref. 5, p. 8; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 32, p. 39; Ref. 45, p. 27; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5)

Attachment C Figure 2:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and the Roswell City Boundary (Ref. 5, p. 8; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 32, p. 39; Ref. 45, p. 27; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5; Ref. 70, pp. 1-3)

Attachment D Figure 1:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

.
*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and ground water gradient (Ref. 4, pp. 1-2; Ref. 5, pp. 8, 9; Ref. 7; p. 17; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 31, p, 3; Ref. 32, p. 39; Ref. 34, pp. 13, 21; Ref. 45, pp. 27, 28; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5)

Attachment D Figure 2:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and the Roswell City Boundary (Ref. 5, p. 8; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 32, p. 39; Ref. 45, p. 27; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5; Ref. 70, pp. 1-3)

Attachment E Figure 1:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

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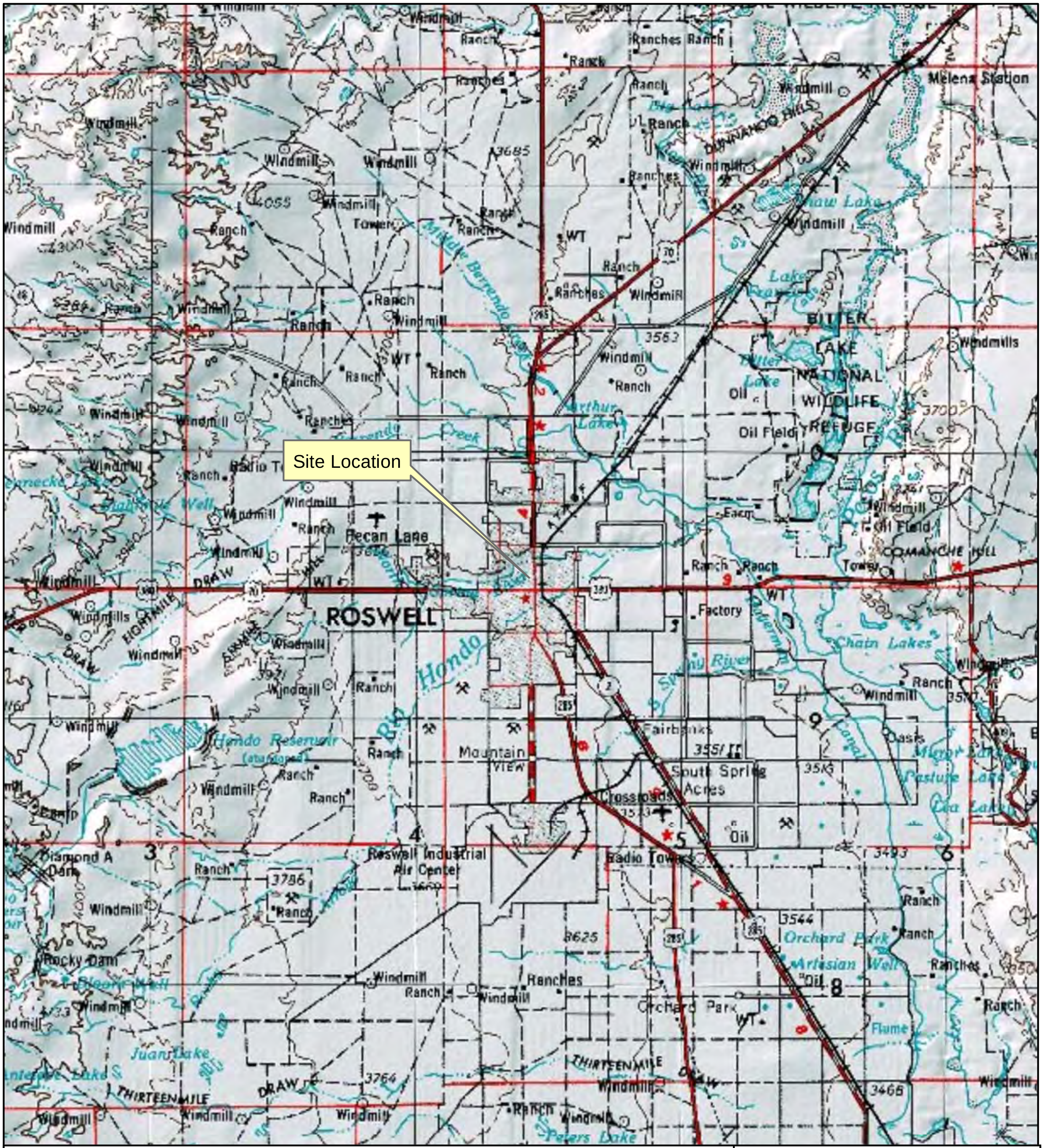
*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and ground water gradient (Ref. 4, pp. 1-2; Ref. 5, pp. 7, 8; Ref. 7; p. 17; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 31, p, 3; Ref. 32, p. 39; Ref. 34, pp. 13, 21; Ref. 45, pp. 27, 28; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5)

Attachment E Figure 2:
Base Map Source* Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, OpenStreetMap contributors, and the GIS User Community

*Map annotated by EPA START-3 on 08/11/2015 to depict well locations, site and source locations, and the Roswell City Boundary (Ref. 5, p. 8; Ref. 8, p. 12; Ref. 17, pp. 1-6; Ref. 30, pp. 11, 37, 40; Ref. 32, p. 39; Ref. 45, p. 27; Ref. 47, pp. 4- 31; Ref. 54, pp. 2-5; Ref. 70, pp. 1-3)

Attachment A



US EPA REGION 6

ATTACHMENT A-1
SITE LOCATION MAP
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY
NEW MEXICO

TDD NO:19/WESTON-042-15-003
EPA ID NO: NMN000607057
CONTRACT NO: EP-W-06-042

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0927.01	AS SHOWN

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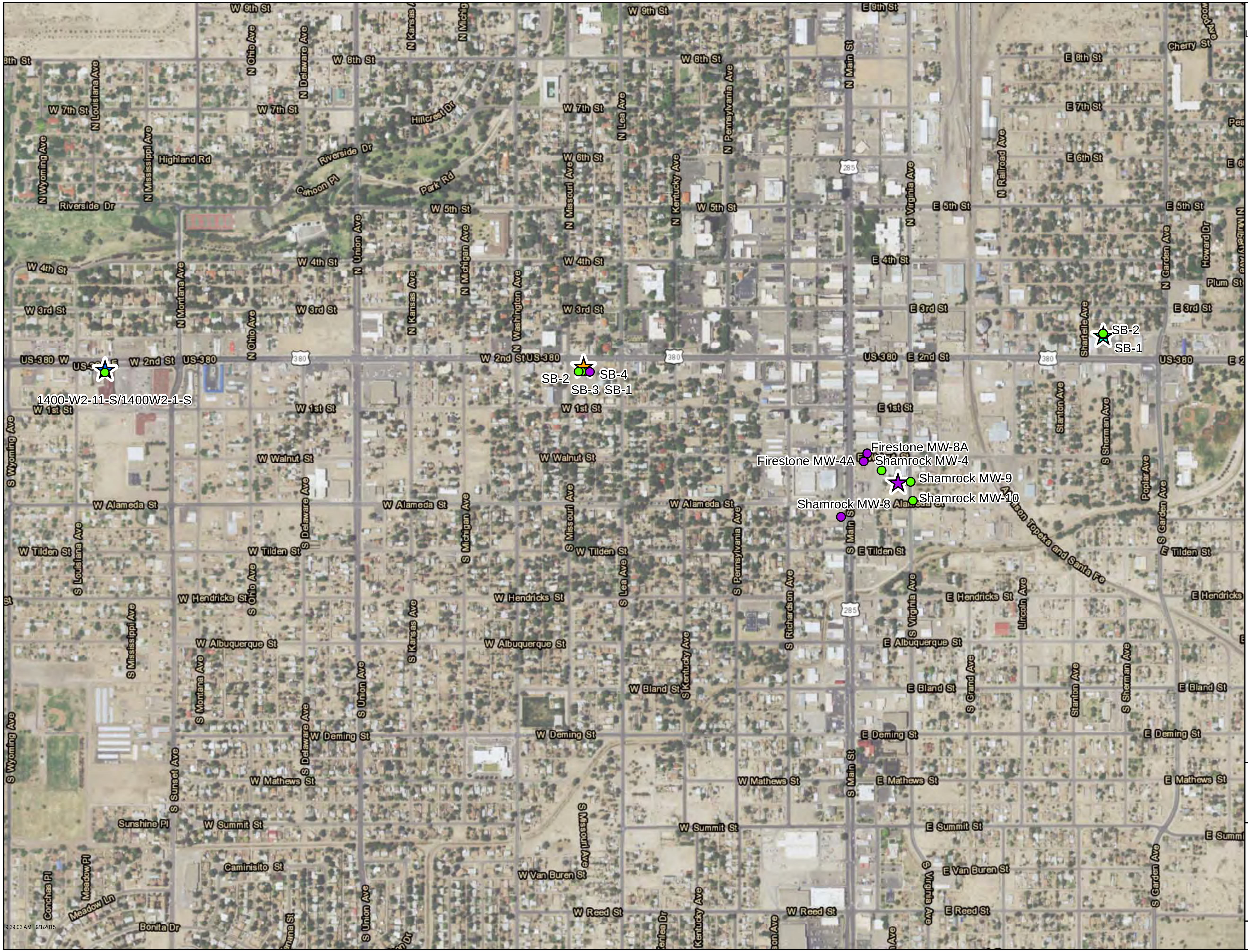

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN000607057
CONTRACT NO: EP-W-06-042

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US EPA REGION 6

ATTACHMENT A-2
SOURCE LOCATION MAP
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY,
NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0927.01	AS SHOWN

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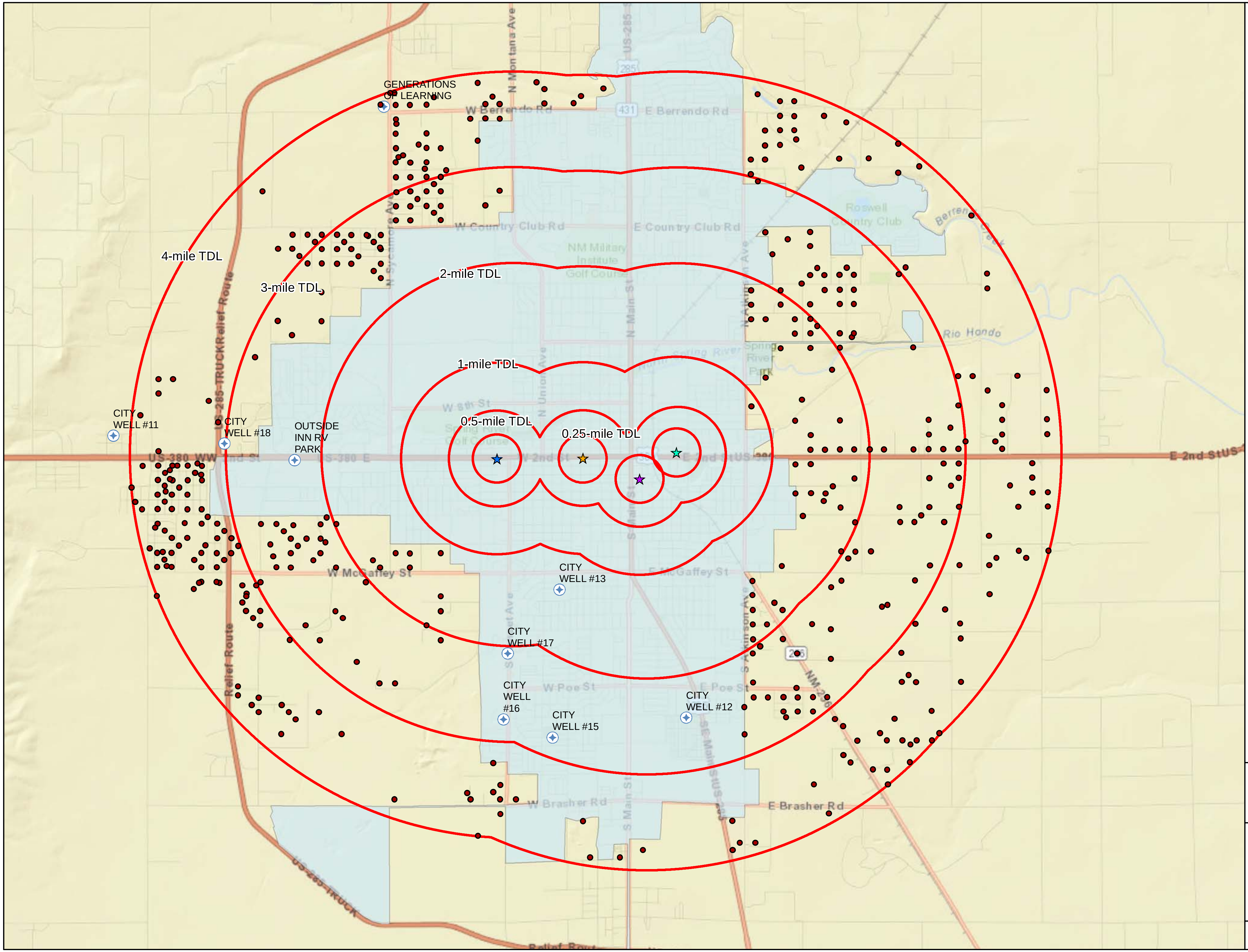

LEGEND

☆	Source 1
☆	Source 2
☆	Source 3
☆	Source 4
●	Domestic Wells
⊕	Public Water Supply Wells
▭	Target Distance Limit Rings
▭	Roswell City Boundary

N

0 0.5 1 1.5 2

Miles

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN000607057
CONTRACT NO: EP-W-06-042

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US EPA REGION 6

ATTACHMENT A-3
4-MILE TARGET DISTANCE LIMIT
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0927.01	AS SHOWN

9:45:33 AM 9/1/2015

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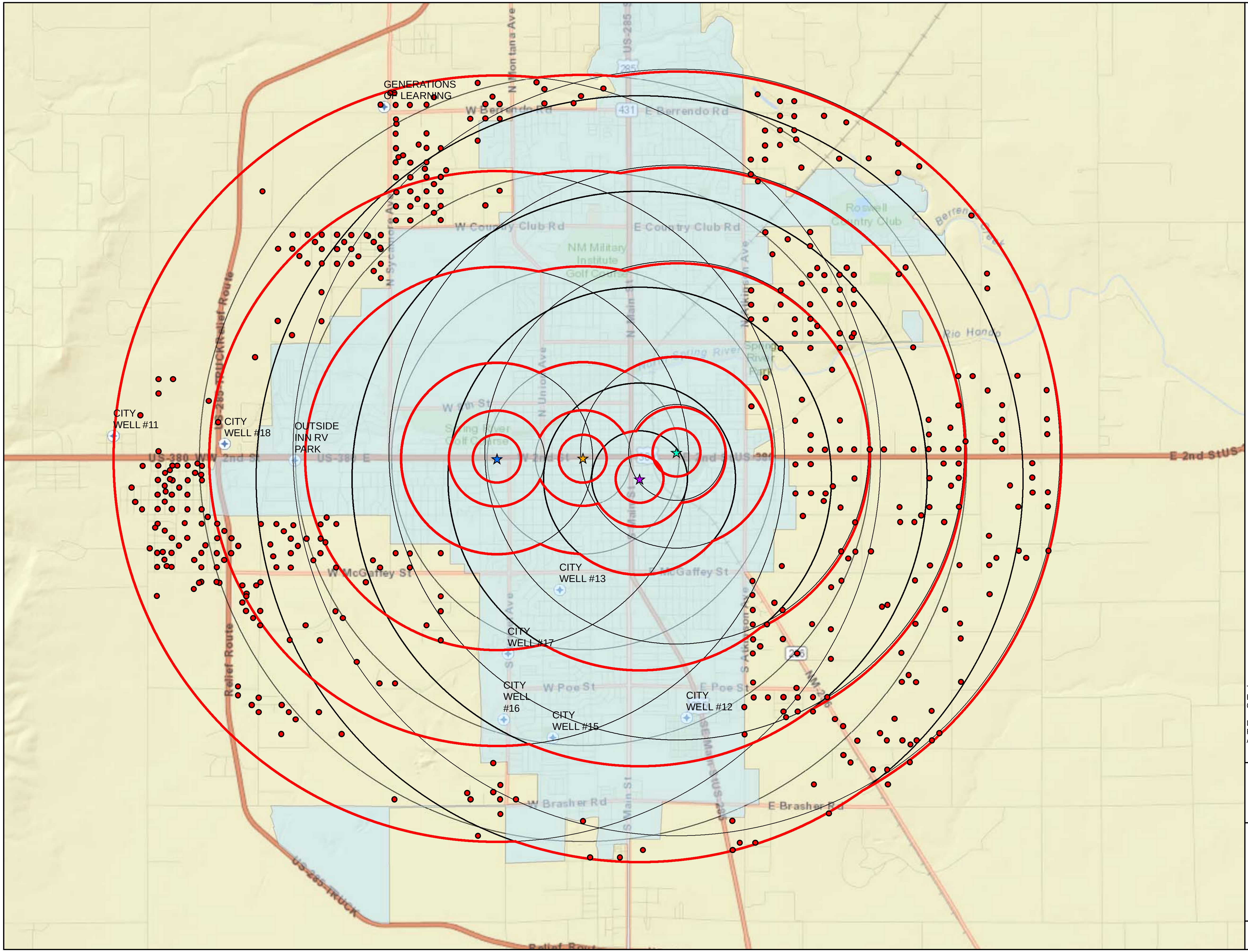

LEGEND

- ☆ Source 1
- ☆ Source 2
- ☆ Source 3
- ☆ Source 4
- ● Domestic Wells
- ✦ Public Water Supply Wells
- ☐ TDLs for Individual Sources
- ☐ Roswell City Boundary
- ☐ TDLs for Grouped Site

N

0 0.5 1 1.5 2

Miles

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN000607057
CONTRACT NO: EP-W-06-042

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US EPA REGION 6

ATTACHMENT A-4
4-MILE TDL FOR SITE AND SOURCES
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY,
NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0927.01	AS SHOWN

9:48:40 AM 9/1/2015

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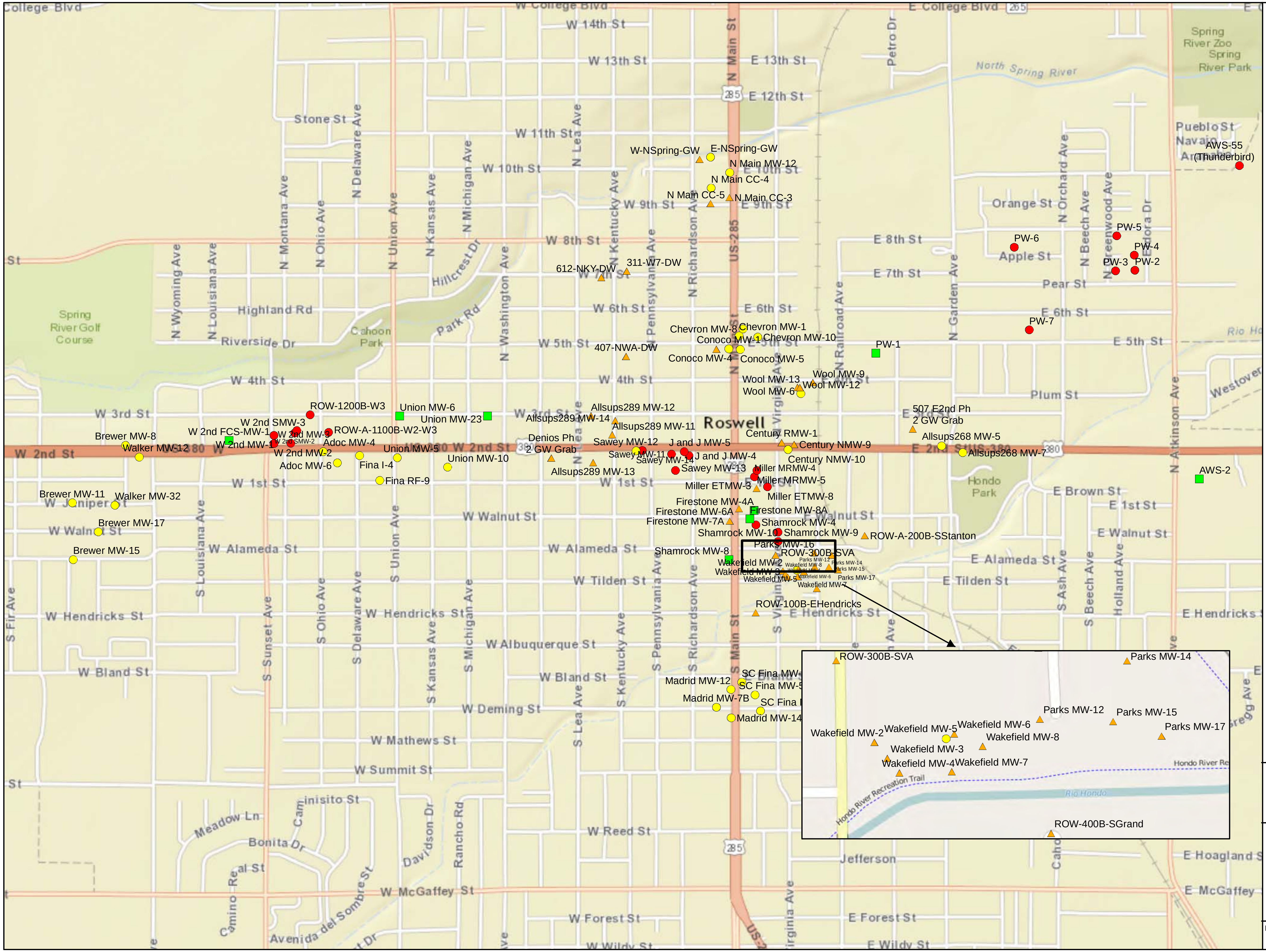

LEGEND

🔴 Observed Release
🟩 Background
🟡 Observation
▲ Contaminted

N

0 1,300 2,600

Feet

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN000607057
CONTRACT NO: EP-W-06-042

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US EPA REGION 6

ATTACHMENT A-5
SAMPLE LOCATION MAP
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY,
NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0927.01	AS SHOWN

9:56:44 AM 9/1/2015

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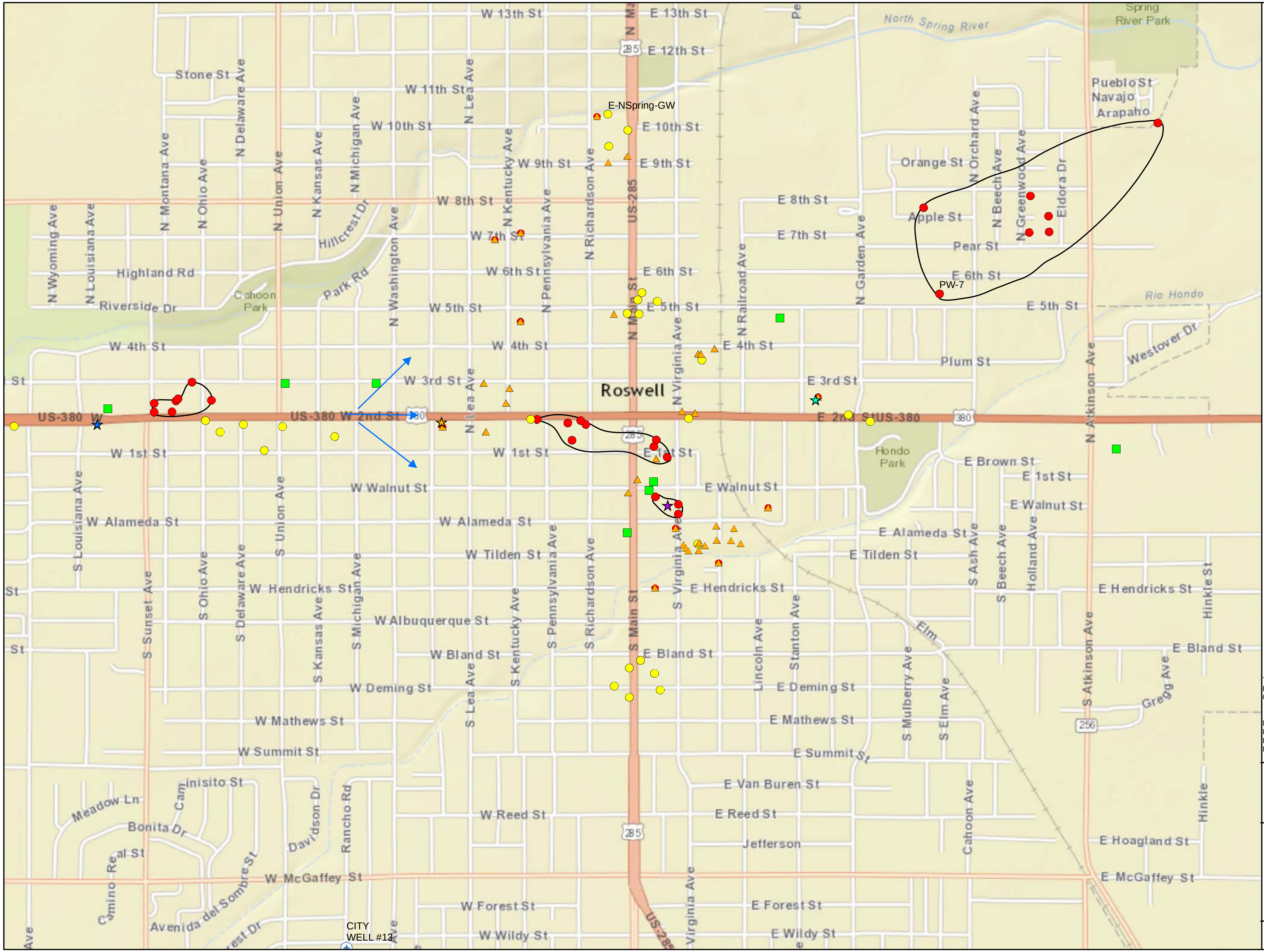

LEGEND
- ☆ Source 1
- ☆ Source 2
- ★ Source 3
- ★ Source 4
- ⊕ PWS Wells
- → Ground Water Gradient

Types of Wells
- 🟩 Background
- ▲ Contaminated
- ● Observation
- 🟥 Observed Release

N

0 1,250 2,500
Feet

TDD NO: 19/WESTON-042-15-063
EPA ID NO: NMN000607057
CONTRACT NO: EP-W-06-042

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US EPA REGION 6

ATTACHMENT A-6
GROUND WATER PLUMES
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY,
NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0927.01	AS SHOWN

ATTACHMENT B

SITE 1 – DENIO'S SITE SCORING

HRS Table 3-1 – Ground Water Migration Pathway Scoresheet for Site 1

Factor Categories and Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer:		
1. Observed Release (Section 3.1.1 of the HRS Documentation Record)	550	550
2. Potential to Release:		
2a. Containment	10	Not Evaluated
2b. Net Precipitation	10	Not Evaluated
2c. Depth to Aquifer	5	Not Evaluated
2d. Travel Time	35	Not Evaluated
2e. Potential to Release [lines 2a (2b + 2c + 2d)]	500	Not Evaluated
4. Likelihood of Release (higher of lines 1 and 2e)	550	550
Waste Characteristics:		
4. Toxicity/Mobility (see Section 2.4.1, 3.1.1 and 3.2.1of the HRS Documentation Record)*	(a)	1,000
5. Hazardous Waste Quantity (see Section 2.4.2.1.5 and 3.2.2 of the HRS Documentation Record)	(a)	10
6. Waste Characteristics (see Section 3.2.3 of the HRS Documentation Record)	100	10
Targets:		
7. Nearest Well (see Section 3.3.1 of the HRS Documentation Record)	50	20
8. Population:		
8a. Level I Concentrations	(b)	0
8b. Level II Concentrations	(b)	0
8c. Potential Contamination (see Table 1 in Attachment B of HRS Documentation Record)	(b)	1,353
8d. Population (lines 8a + 8b + 8c)	(b)	1,353
9. Resources (see Section 3.3.3 of the HRS Documentation Record)	5	5
10. Wellhead Protection Area (see Section 3.3.4 of the HRS Documentation Record)	20	5
11. Targets (lines 7 + 8d + 9 + 10)	(b)	1,383
Ground Water Migration Score For An Aquifer:		
12. Aquifer Score [(lines 3 x 6 x 11) ÷ 82,500] [c]	100	92.20
Ground Water Migration Pathway Score:		
14. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c] **HRS SITE SCORE: 46.10**	100	92.20

(a) Maximum value applies to waste characteristics category.
(b) Maximum value not applicable.
(c) Do not round to nearest integer.

Notes: * TCE and cis-1,2-DCE were used in the evaluation of the toxicity/mobility factor value.

Site 1 (which includes Source 1) is called Denio's and consists of soil contaminated with tetrachloroethylene (PCE) and an associated ground water plume contaminated with PCE, trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) (Ref. 8, p. 5; Section 2.4.1 and 3.1.1 of the HRS documentation record). The contamination is associated with drainage of wastes from dry cleaning operations which had been occurring on the property since 1931 (Ref. 7, p. 12; Ref. 8, p. 8). The contamination has entered the ground water and created a plume associated with the release into the Roswell Basin Aquifer (Section 3.1.1 of the HRS documentation record). The NMED discovered the ground water contamination associated with the Denio's site (Source 1) in 2006 and 2007 from monitoring wells sampled during LUST investigations of the Allsups and Sawey Gulf Petroleum facilities (Ref. 7, p. 12).

Potential targets for Source 1 include the populations served by City of Roswell Municipal Wells, (RMWS), public supply wells, and private domestic wells. The wells included in each distance category of the site's target distance limit (TDL) and the resulting potential contamination factor value can be seen in the attached figures and table. (Note: The number of private wells identified in Figure 2 of this attachment may not equal the number of private wells identified below. Due to the proximity of private well locations, one icon on the figure may represent multiple private wells.)

Since the RMWS is blended and no single water supply source supplies more than 40 percent of the system, the population served is apportioned equally to each water supply source in the system (Ref.1, Section 3.3.2; Ref. 48). As a result, the City of Roswell population of 48,611 is equally divided by the 16 water wells that supply the city (Ref. 42, p. 1; Ref. 48, p. 1). An estimated 3,038 persons are served by each water supply source (Ref. 17, p. 2; Ref. 48, p.1).

Based on the U. S. Census Bureau, the persons per household in 2009-2013 for Chaves County is 2.70 (Ref. 61, p. 1). The total estimated population served by private domestic ground water wells outside of the City of Roswell city limits and within 4 radial miles of the site is 1,693 persons, with a total of 627 domestic wells identified within 4 radial miles of the site and outside of the city limits (Ref. 47, pp. 32-43). One privately owned supply well located within the 4-mile TDL includes the Outside Inn RV Park, in the greater than 3 to 4 miles distance interval (Ref. 17, p. 3, Figure 2 of this attachment). The Outside Inn RV Park well serves a population of 45 (Ref. 17, p. 4). The well is completed at 190 feet depth (Ref. 17, p. 5).

ATTACHMENT B
TABLE 1

Site 1 Denio's

	Domestic Wells (non-karst)**			Domestic Wells (karst)**		Public Supply Wells (karst)**		City of Roswell Municipal Wells (karst)**				
TDL from Site	Number of Wells (Ref. 47, p. 1)	Total non-karst Population Served*	Distance Weighted Population Values non-karst (Ref. 1, Table 3-12)	Number of Wells (Ref. 47, p. 1)	Karst Domestic Well Population Served*	Number of Wells (Ref. 17, p. 3)	Population Served (Ref. 17, p. 2)	Number of Wells (Ref. 17, p. 3)	Population Served (Ref. 17, p. 2)	Total karst Population Served	Distance Weighted Population Values-karst (Ref. 1, Table 3-12)	References
0.25	0	0	0	0	0	0	0	0	0	0	0	Ref. 47, p. 32
0.5	0	0	0	0	0	0	0	0	0	0	0	Ref. 47, p. 32
1	0	0	0	0	0	0	0	0	0	0	0	Ref. 47, p. 32; Ref. 61,p. 1
2	1	3	0.7	2	5	0	0	City Well 13	3,038	3,043.4	2,607	Ref. 17, p. 5; Ref. 47, p. 32; Ref. 48; Ref. 61, p. 1
3	87	235	21	33	89	0	0	City Wells 12, 15,16,17	12,152	12,241.1	8,163	Ref. 17, p. 5; Ref. 47, pp. 32-35; Ref. 48; Ref. 61, p. 1
4	403	1,088	131	101	273	Outside Inn RV	45	City Well 18	3,038	3,355.7	2,607	Ref. 17, pp. 4, 5; Ref. 47, pp. 35-43; Ref. 48; Ref. 61, p. 1
Total	491	1361	152.7	136	367		45		18,228	18,640	13,377	

*Based on 2.70 per household (Ref. 61, p. 1). The population served is also rounded to the nearest integer per HRS Table 3-12 (Ref. 1, Section 3.3.2.4).

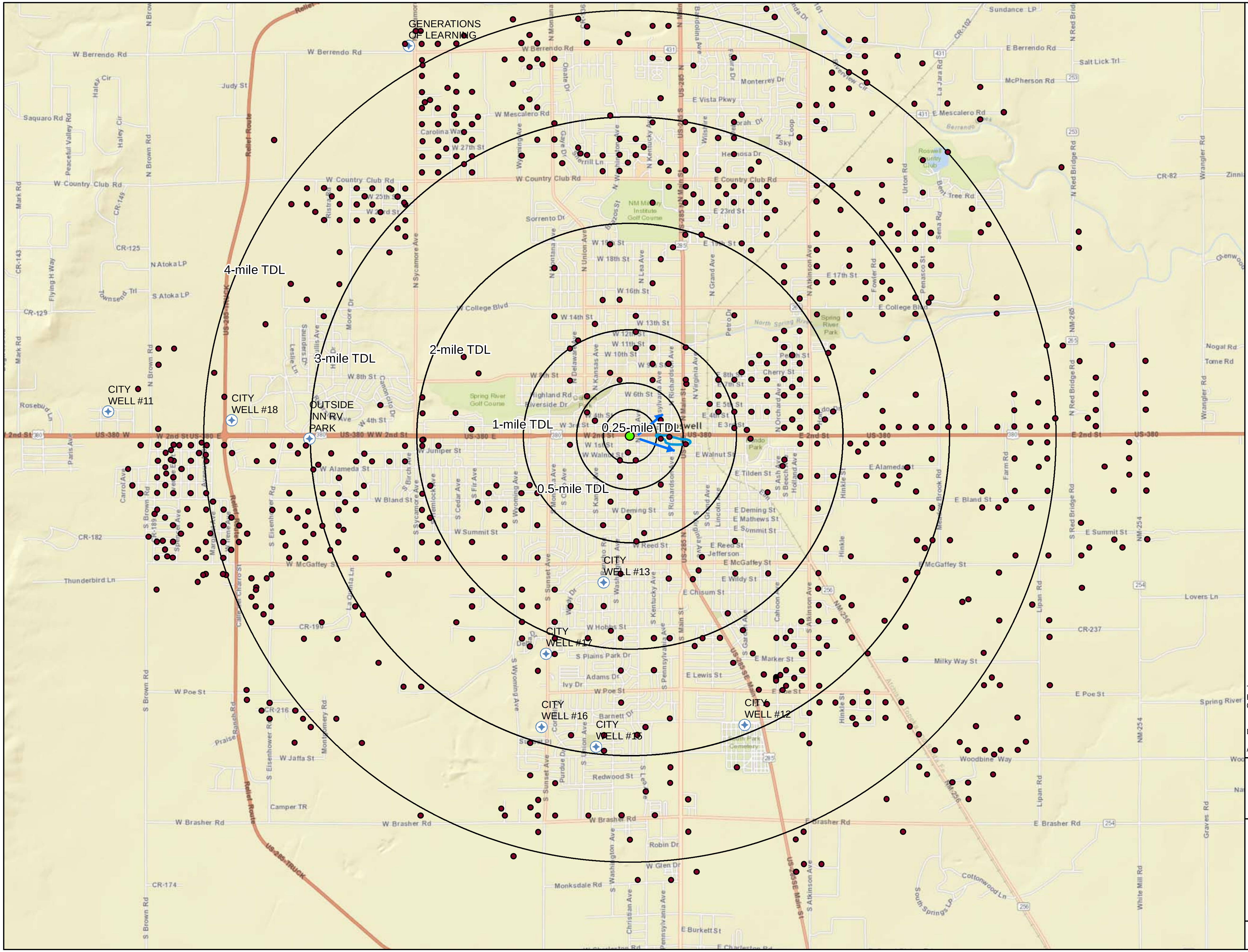
** Calculations of karst and non-karst private domestic wells were based on shallow (non-karst) and artesian (karst) classifications of the water source for each well identified from the New Mexico Water Rights Reporting system website. Wells which did not contain source information were conservatively identified as non-karst (Ref. 47).

Calculation (Ref. 1, Sec 3.3.2.4)

Sum of Distance-Weighted Population Values: 152.7 (non-karst) + 13,377 (karst) = 13,529.7

Sum of Distance-Weighted Population Values/10: 1,352.97

Potential Contamination Factor Value: 1,353



LEGEND

- ● Denio's
- ✦ Public Water Supply Wells
- ● Domestic Wells
- ☐ Target Distance Limit Rings
- — Ground Water Plume
- → Ground Water Gradient

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN00607057
CONTRACT NO: EP-W-06-042

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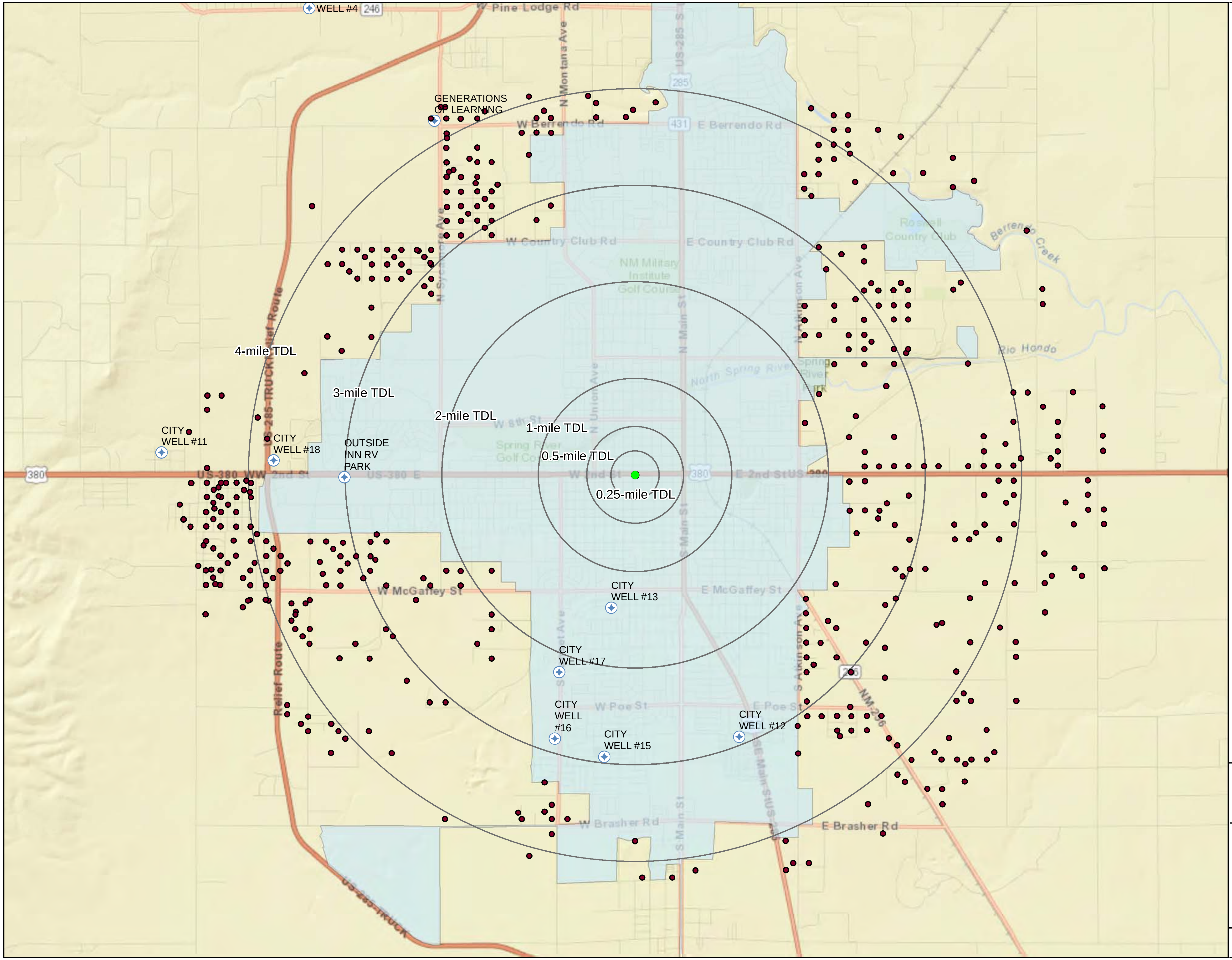
US EPA REGION 6

ATTACHMENT B
FIGURE 1
DENIOS (SOURCE 1)
4-MILE TARGET DISTANCE LIMIT
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY,
NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0870.01	AS SHOWN



LEGEND

●	Denio's
⊕	Public Water Supply Wells
•	Domestic Wells
▭	Roswell City Boundary
▭	Target Distance Limit Rings

N

0 0.5 1 1.5 2

Miles

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN00607057
CONTRACT NO: EP-W-06-042

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US EPA REGION 6

ATTACHMENT B
FIGURE 2
DENIO'S (SOURCE 1)
DOMESTIC WELLS
OUTSIDE CITY LIMITS
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0870.01	AS SHOWN

10:10:38 AM 9/1/2015

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ATTACHMENT C

SITE 2 – 507 EAST SECOND SITE SCORING

HRS Table 3-1 – Ground Water Migration Pathway Scoresheet for Site 2

Factor Categories and Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer:		
1. Observed Release (Section 3.1.1 of the HRS Documentation Record)	550	550
2. Potential to Release:		
2a. Containment	10	Not Evaluated
2b. Net Precipitation	10	Not Evaluated
2c. Depth to Aquifer	5	Not Evaluated
2d. Travel Time	35	Not Evaluated
2e. Potential to Release [lines 2a (2b + 2c + 2d)]	500	Not Evaluated
5. Likelihood of Release (higher of lines 1 and 2e)	550	550
Waste Characteristics:		
4. Toxicity/Mobility (see Section 2.4.1, 3.1.1 and 3.2.1of the HRS Documentation Record)*	(a)	1,000
5. Hazardous Waste Quantity (see Section 2.4.2.1.5 and 3.2.2 of the HRS Documentation Record)	(a)	100
6. Waste Characteristics (see Section 3.2.3 of the HRS Documentation Record)	100	18
Targets:		
7. Nearest Well (see Section 3.3.1 of the HRS Documentation Record)	50	45
8. Population:		
8a. Level I Concentrations	(b)	0
8b. Level II Concentrations (see Section 3.3.2.3 of the HRS Documentation Record)	(b)	4
8c. Potential Contamination (see Table 1 in Attachment C of the HRS Documentation Record)	(b)	794
8d. Population (lines 8a + 8b + 8c)	(b)	798
9. Resources (see Section 3.3.3 of the HRS Documentation Record)	5	5
10. Wellhead Protection Area (see Section 3.3.4 of the HRS Documentation Record)	20	5
11. Targets (lines 7 + 8d + 9 + 10)	(b)	853
Ground Water Migration Score For An Aquifer:		
12. Aquifer Score [(lines 3 x 6 x 11) ÷ 82,500] [c]	100	102.36 (100)
Ground Water Migration Pathway Score:		
15. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c] **HRS SITE SCORE: 50.00**	100	100

(a) Maximum value applies to waste characteristics category.
(b) Maximum value not applicable.
(c) Do not round to nearest integer.
Notes: * TCE was used in the evaluation of the toxicity/mobility factor value.

Site 2 (which includes Source 2) is called 507 East Second and consists of a release from a private sewer line containing tetrachloroethylene (PCE), trichloroethylene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) and an associated ground water plume contaminated with PCE, and TCE (Ref. 5, pp. 14, 31, 67; Section 2.4.1 and 3.1.1 of the HRS documentation record). The contamination is associated with wastes from dry cleaning operations (Ref. 5, pp. 7, 8). Site 2 is located approximately 0.8 miles due east of Site 1, and was discovered during a 30 December 2011 Phase 1 Environmental Site Assessment (ESA) conducted as part of a property transfer of a former dry cleaner property (Ref. 5, p. 5; Attachment A-2 of the HRS documentation record). A Phase 2 ESA and Vapor Encroachment Screen report was issued for Site 2 on February 3, 2012 (Ref. 5, p. 1). PCE was detected in seven soil samples and two ground water grab samples collected at the site in January 2012 (Ref. 7, pp. 9, 13).

Potential targets for Source 2 include the populations served by City of Roswell Municipal Wells, (RMWS), public supply wells, and private domestic wells. The wells included in each distance category of the site's target distance limit (TDL) and the resulting Level II well and potential contamination factor value can be seen in the attached figures and table. (Note: The number of private wells identified in Figure 2 of this attachment may not equal the number of private wells identified below. Due to the proximity of private well locations, one icon on the figure may represent multiple private wells.)

One Level II well was identified within the site's TDL, but outside of the city limits (Figure 2 of this attachment). Private well AWS-55 was sampled in April 2014 and found to contain PCE above background levels, but below EPA's Maximum Contaminant Level (Ref. 67, p. 5; Section 3.1.1 of the HRS documentation record). AWS-55 is a private well which is the sole source of water for a business which employs four people (Ref. 68; Ref. 69).

Since the RMWS is blended and no single water supply source supplies more than 40 percent of the system, the population served is apportioned equally to each water supply source in the system (Ref.1, Section 3.3.2; Ref. 48). As a result, the City of Roswell population of 48,611 is equally divided by the 16 water wells that supply the city (Ref. 42, p. 1; Ref. 48, p. 1). An estimated 3,038 persons are served by each water supply source (Ref. 17, p. 2; Ref. 48, p.1).

Based on the U. S. Census Bureau, the persons per household in 2009-2013 for Chaves County is 2.70 (Ref. 61, p. 1). The total estimated population served by private domestic ground water wells outside of the City of Roswell city limits and within 4 radial miles of the site is 1,401 persons, with a total of 519 domestic wells identified within 4 radial miles of the site and outside of the city limits (Ref. 47, pp. 44-54). One privately owned supply well located within the 4-mile TDL includes the Outside Inn RV Park, in the greater than 3 to 4 miles distance interval (Ref. 17, p. 3, Figure 2 of this attachment). The Outside Inn RV Park well serves a population of 45 (Ref. 17, p. 4). The well is completed at 190 feet depth (Ref. 17, p. 5).

ATTACHMENT C
TABLE 1

Site 2 507 East Second

	Domestic Wells (non-karst)**			Domestic Wells (karst)**		Public Supply Wells (karst)**		City of Roswell Municipal Wells (karst)**				
TDL from Site	Number of Wells (Ref. 47, p. 1)	Population Served*	Distance Weighted Population Values non-karst (Ref. 1, Table 3-12)	Number of Wells (Ref. 47, p. 1)	Population Served*	Number of Wells (Ref. 17, p. 3)	Population Served (Ref. 17, p. 2)	Number of Wells (Ref. 17, p. 3)	Population Served (Ref. 17, p. 2)	Total karst Population Served	Distance Weighted Population Values-karst (Ref. 1, Table 3-12)	References
0.25	0	0	0	0	0	0	0	0	0	0	0	Ref. 47, p. 44
0.5	0	0	0	0	0	0	0	0	0	0	0	Ref. 47, p. 44
1	1	3	1	1	3	0	0	0	0	2	2	Ref. 47, p. 44; Ref. 61, p. 1
2	35	95	10	18	49	0	0	City Well 13	3,038	3,086.6	2,607	Ref. 17, p. 5; Ref. 47, pp. 44-45; Ref. 48; Ref. 61, p. 1
3	115	311	68	22	59	0	0	City Wells 12, 17	6,076	6,135.4	2,607	Ref. 17, p. 5; Ref. 47, pp. 45-48; Ref. 48; Ref. 61, p. 1
4	229	618	42	98	265	Outside Inn RV	45	City Well 15,16	6,076	6,385.6	2,607	Ref. 17, pp. 4, 5; Ref. 47, pp. 48-54; Ref. 48; Ref. 61, p. 1
Total	380	1027	121	139	376		45		15,190		7,823	

*Based on 2.70 per household (Ref. 61, p. 1). The population served value is also rounded to the nearest integer per HRS Table 3-12 (Ref. 1, Section 3.3.2.4).

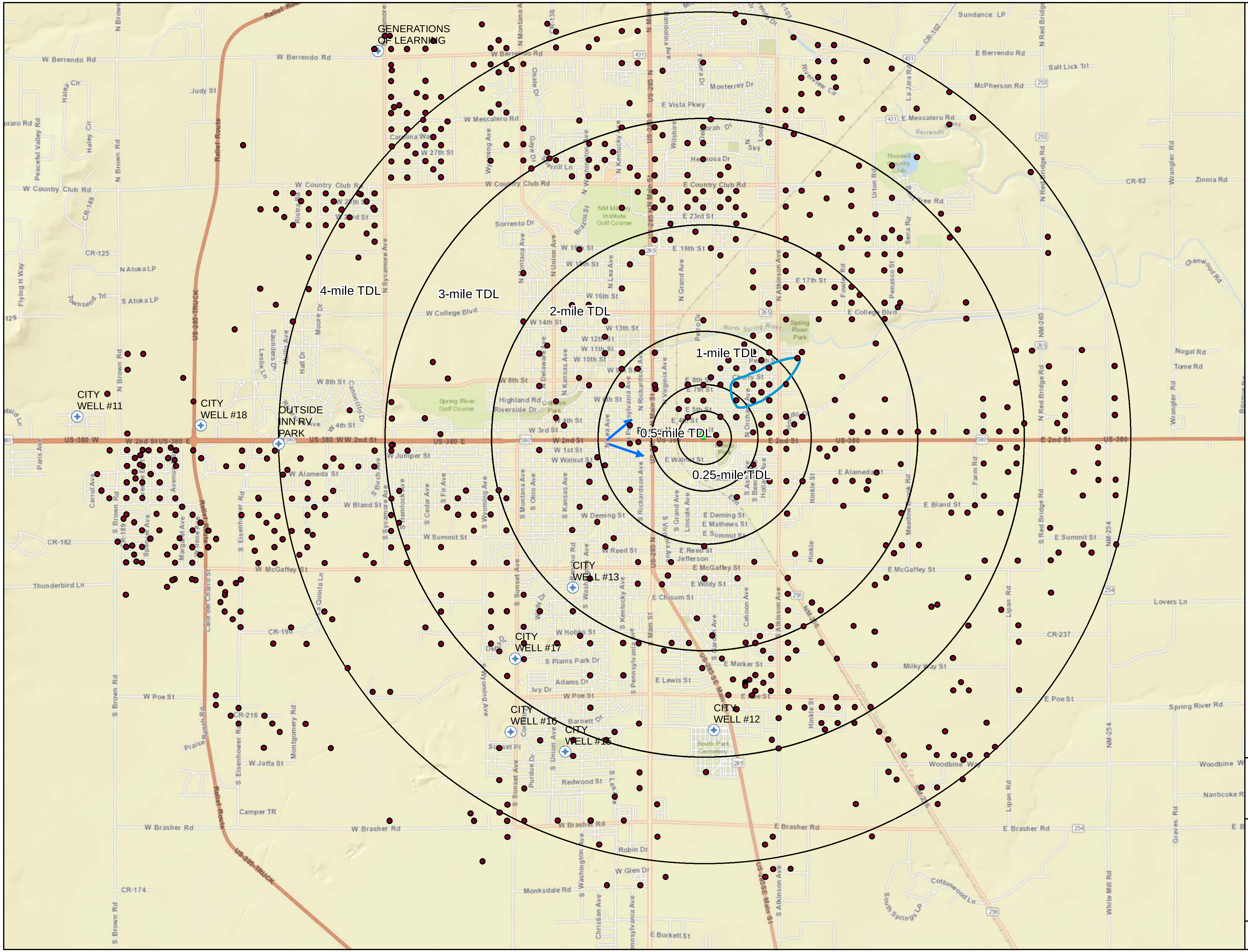
** Calculations of karst and non-karst private domestic wells were based on shallow (non-karst) and artesian (karst) classifications of the water source for each well identified from the New Mexico Water Rights Reporting system website. Wells which did not contain source information were conservatively identified as non-karst (Ref. 47).

Calculation (Ref. 1, Sec 3.3.2.4)

Sum of Distance-Weighted Population Values: 121 (non-karst) + 7,823(karst) = 7,944

Sum of Distance-Weighted Population Values/10: 794.4

Potential Contamination Factor Value: 794



LEGEND

- ● 507 East Second
- ● Domestic Wells
- ✦ Public Water Supply Wells
- — Ground Water Plume
- → Ground Water Gradient
- ☐ Target Distance Limit

N

0 0.5 1 1.5

Miles

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN00607057
CONTRACT NO: EP-W-06-042

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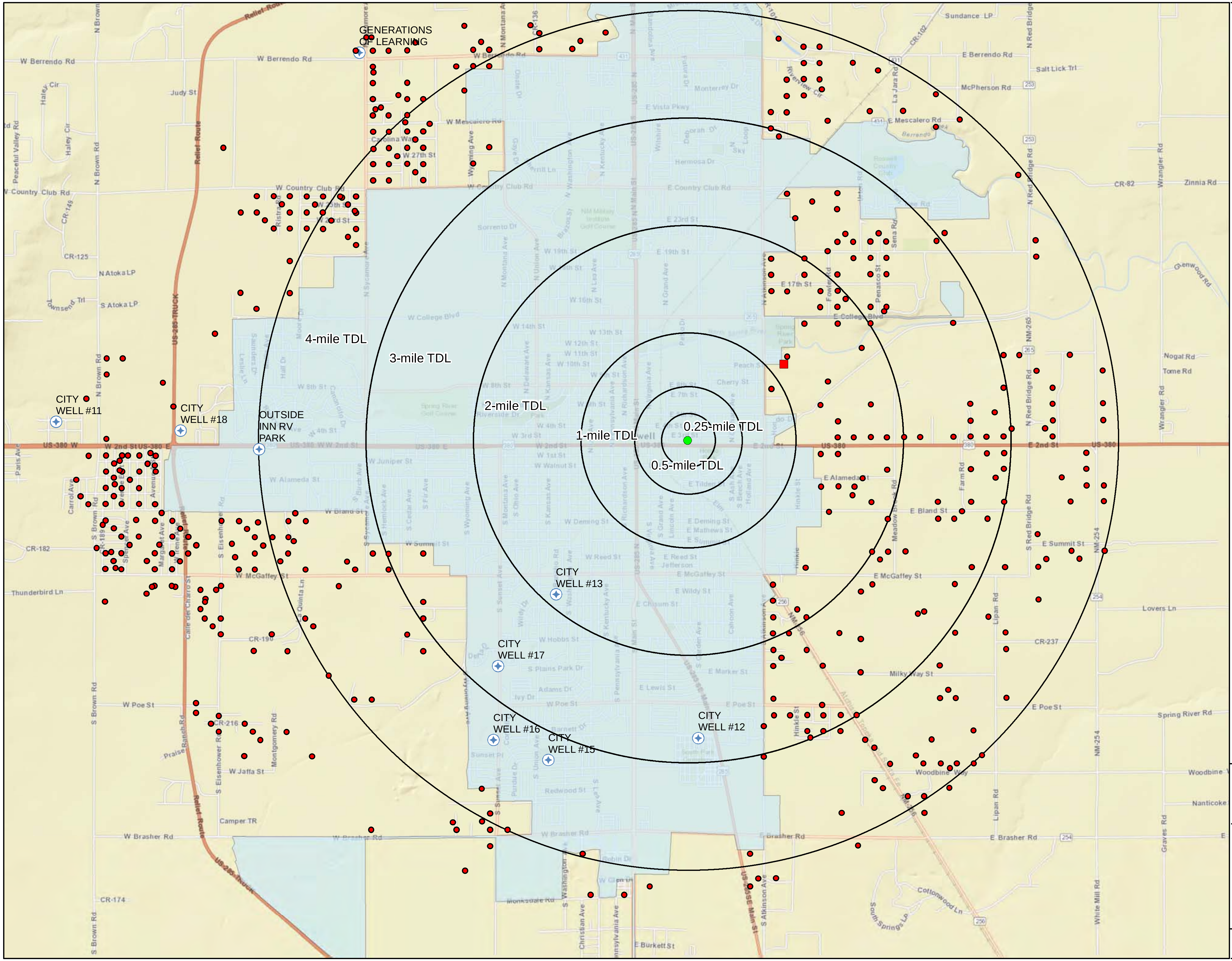
ATTACHMENT C
FIGURE 1
507 EAST SECOND (SOURCE 2)
4-MILE TARGET DISTANCE LIMIT
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY,
NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0870.01	AS SHOWN



LEGEND

- ● 507 East Second
- ✦ Public Water Supply Wells
- ● Domestic Wells
- ■ Level II Well (AWS-55)
- ▭ Roswell City Boundary
- ▭ Target Distance Limit Rings

N

0 0.5 1 1.5

Miles

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN00607057
CONTRACT NO: EP-W-06-042

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US EPA REGION 6

ATTACHMENT C
FIGURE 2
507 EAST SECOND (SOURCE 2)
DOMESTIC WELLS
OUTSIDE CITY LIMITS
LEA AND WEST SECOND
ROSWELL, CHAVES COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0870.01	AS SHOWN

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ATTACHMENT D

SITE 3 – WEST SECOND AND MONTANA SITE SCORING

HRS Table 3-1 – Ground Water Migration Pathway Scoresheet for Site 3

Factor Categories and Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer:		
1. Observed Release (Section 3.1.1 of the HRS Documentation Record)	550	550
2. Potential to Release:		
2a. Containment	10	Not Evaluated
2b. Net Precipitation	10	Not Evaluated
2c. Depth to Aquifer	5	Not Evaluated
2d. Travel Time	35	Not Evaluated
2e. Potential to Release [lines 2a (2b + 2c + 2d)]	500	Not Evaluated
6. Likelihood of Release (higher of lines 1 and 2e)	550	550
Waste Characteristics:		
4. Toxicity/Mobility (see Section 2.4.1, 3.1.1 and 3.2.1 of the HRS Documentation Record)*	(a)	1,000
5. Hazardous Waste Quantity (see Section 2.4.2.1.5 and 3.2.2 of the HRS Documentation Record)	(a)	10
6. Waste Characteristics (see Section 3.2.3 of the HRS Documentation Record)	100	10
Targets:		
7. Nearest Well (see Section 3.3.1 of the HRS Documentation Record)	50	20
8. Population:		
8a. Level I Concentrations	(b)	0
8b. Level II Concentrations	(b)	0
8c. Potential Contamination (see Table 1 in Attachment D of the HRS Documentation Record)	(b)	1,345
8d. Population (lines 8a + 8b + 8c)	(b)	1,345
9. Resources (see Section 3.3.3 of the HRS Documentation Record)	5	5
10. Wellhead Protection Area (see Section 3.3.4 of the HRS Documentation Record)	20	5
11. Targets (lines 7 + 8d + 9 + 10)	(b)	1,375
Ground Water Migration Score For An Aquifer:		
12. Aquifer Score [(lines 3 x 6 x 11) ÷ 82,500] [c]	100	91.66
Ground Water Migration Pathway Score:		
16. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c] **HRS SITE SCORE: 45.83**	100	91.66

(a) Maximum value applies to waste characteristics category.
(b) Maximum value not applicable.
(c) Do not round to nearest integer.

Notes: * TCE and cis-1,2-DCE were used in the evaluation of the toxicity/mobility factor value.

Site 3 (which includes Source 3) is called West Second and Montana and consists of a release from an in-ground separator tank and an associated ground water plume contaminated with tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-DCE), and trans-1,2-dichloroethene (trans-1,2-DCE) (Ref. 16, p. 9; Ref. 22, p. 49, 50, 51; Ref. 30, p. 4; Sections 2.4.1 and 3.3.1 of this HRS documentation record). The contamination within the in-ground separator tank is associated with drainage of wastes from former dry cleaning operations (Ref. 30, p. 10). The contamination has entered the ground water and created a plume associated with the release into the Roswell Basin Aquifer (Section 3.1.1 of this HRS documentation record). In 2008, Site 3 was discovered by NMED SOS during Site Inspection (SI) (Ref. 30, p. 5, 7). Two dry cleaning businesses operated from 1985 through 2001 at the source location (Ref. 30, p. 6). Chlorinated solvent contamination has been detected in ground water samples from source monitoring wells at two adjacent properties on the northeast corner of the intersection of West Second Street and North Montana Avenue (Ref. 30, p. 5, 6).

Potential targets for Source 3 include the populations served by City of Roswell Municipal Wells (RMWS), public supply wells, and private domestic wells. The wells included in each distance category of the site's target distance limit (TDL) and the resulting potential contamination factor value can be seen in the attached figures and table. (Note: The number of private wells identified in Figure 2 of this attachment may not equal the number of private wells identified below. Due to the proximity of private well locations, one icon on the figure may represent multiple private wells.)

Since the RMWS is blended and no single water supply source supplies more than 40 percent of the system, the population served is apportioned equally to each water supply source in the system (Ref.1, Section 3.3.2; Ref. 48). As a result, the City of Roswell population of 48,611 is equally divided by the 16 water wells that supply the city (Ref. 42, p. 1; Ref. 48, p. 1). An estimated 3,038 persons are served by each water supply source (Ref. 17, p. 2; Ref. 48, p.1).

Based on the U. S. Census Bureau, the persons per household in 2009-2013 for Chaves County is 2.7 (Ref. 61, p. 1). The total estimated population served by private domestic ground water wells outside of the City of Roswell city limits and within 4 radial miles of the site is 883 persons, with a total of 327 domestic wells identified within 4 radial miles of the site and outside of city limits (Ref. 47, pp. 55-67). Two privately owned supply wells located within the 4-mile TDL include the Outside Inn RV Park in the greater than 2 to 3 miles distance interval and Generations of Learning in the 3 to4 miles distance interval (Ref. 17, p. 3; Figure 2 of this attachment). Outside Inn RV Park serves a population of 45, and Generations of Learning serves a population of 256 (Ref. 17, p. 4). Each of these wells is respectively completed at 190 feet depth and 300 feet depth (Ref. 17, p. 5).

ATTACHMENT D
TABLE 1

Site 3 West 2nd and Montana

	Domestic Wells (non-karst)**			Domestic Wells (karst)**		Public Supply Wells (karst)**		City of Roswell Municipal Wells (karst)**				
TDL from Site	Number of Wells (Ref. 47, p. 1)	Population Served*	Distance Weighted Population Values non-karst (Ref. 1, Table 3-12)	Number of Wells (Ref. 47, p. 1)	Population Served*	Number of Wells (Ref. 17, p. 3)	Population Served (Ref. 17, p. 2)	Number of Wells (Ref. 17, p. 3)	Population Served (Ref. 17, p. 2)	Total karst Population Served	Distance Weighted Population Values-karst (Ref. 1, Table 3-12)	References
0.25	0	0	0	0	0	0	0	0	0	0		Ref. 47, p. 55
0.5	0	0	0	0	0	0	0	0	0	0		Ref. 47, p. 55
1	0	0	0	0	0	0	0	0	0	0		Ref. 47, p. 55
2	12	32	10	3	8	0	0	City Well 13	3,038	3,046	2,607	Ref. 17, p. 5; Ref. 47, p. 55; Ref. 48; Ref. 61, p. 1
3	102	275	21	50	135	Outside Inn RV	45	City Well 15,16,17,18	12,152	12,332	8,163	Ref. 17, pp. 4, 5; Ref. 47, pp. 55-59; Ref. 48; Ref. 61, p. 1
4	346	934	42	88	238	Generations of Learning	256	City Wells 12	3,038	3,531.6	2,607	Ref. 17, pp. 4, 5; Ref. 47, pp. 59-67; Ref. 48; Ref. 61, p. 1
Total	460	1241	73	141	381						13,377	

*Based on 2.70 per household (Ref. 61, p. 1). The population served is also rounded to the nearest integer per HRS Table 3-12 (Ref. 1, Section 3.3.2.4).

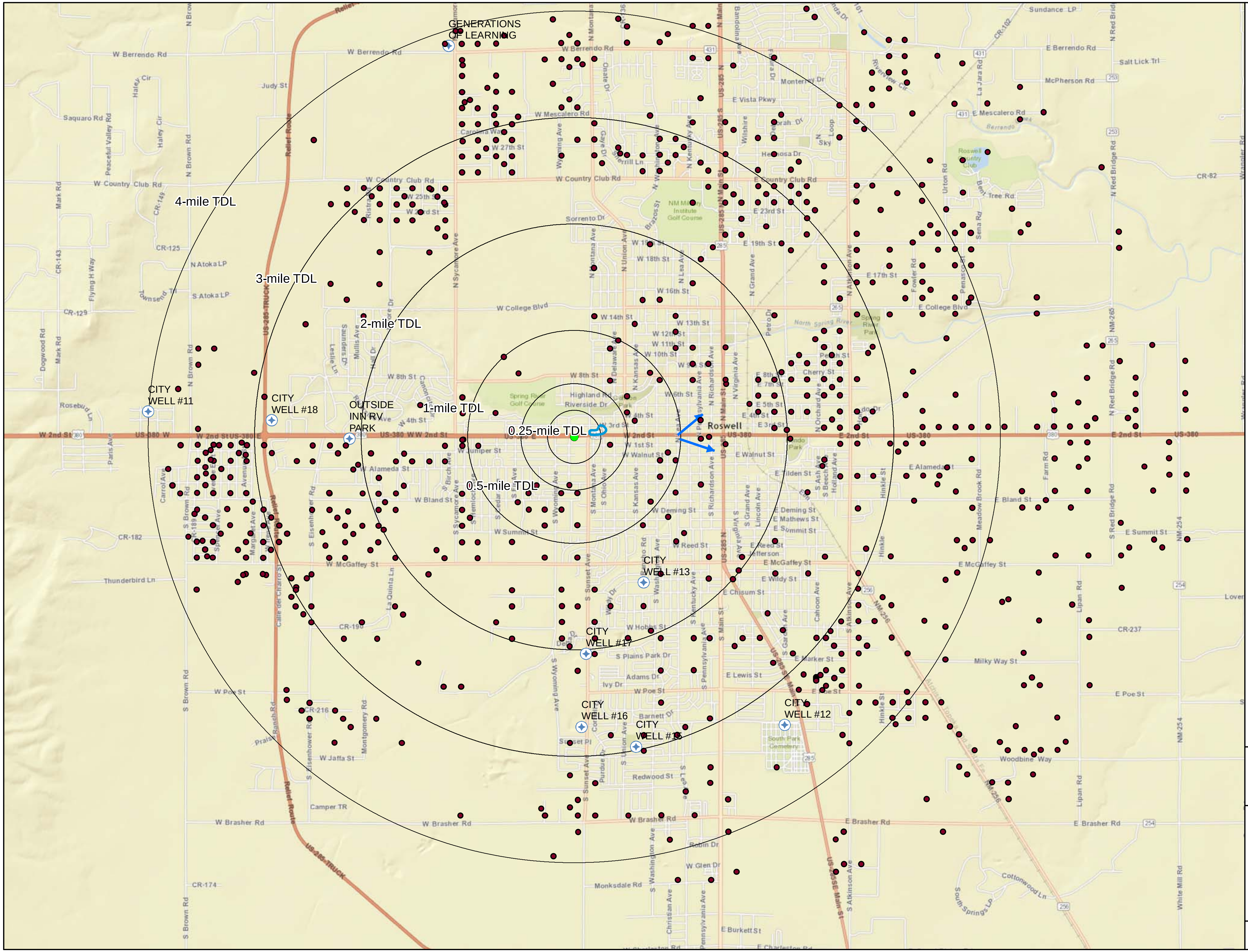
** Calculations of karst and non-karst private domestic wells were based on shallow (non-karst) and artesian (karst) classifications of the water source for each well identified from the New Mexico Water Rights Reporting system website. Wells which did not contain source information were conservatively identified as non-karst (Ref. 47).

Calculation (Ref. 1, Sec 3.3.2.4)

Sum of Distance-Weighted Population Values: 73 (non-karst) + 13,377(karst) = 13,450

Sum of Distance-Weighted Population Values/10: 1,345

Potential Contamination Factor Value: 1,345



LEGEND

- ● West Second and Montana
- ● Domestic Wells
- ✦ Public Water Supply Wells
- Ground Water Plume
- → Ground Water Gradient
- ☐ Target Distance Limit Rings

N

0 0.5 1 1.5
Miles

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EPA ID NO: NMN00607057
CONTRACT NO: EP-W-06-042

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US EPA REGION 6

ATTACHMENT D
FIGURE 1
WEST SECOND AND MONTANA
(SOURCE 3)
4-MILE TARGET DISTANCE LIMIT
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY,
NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0870.01	AS SHOWN

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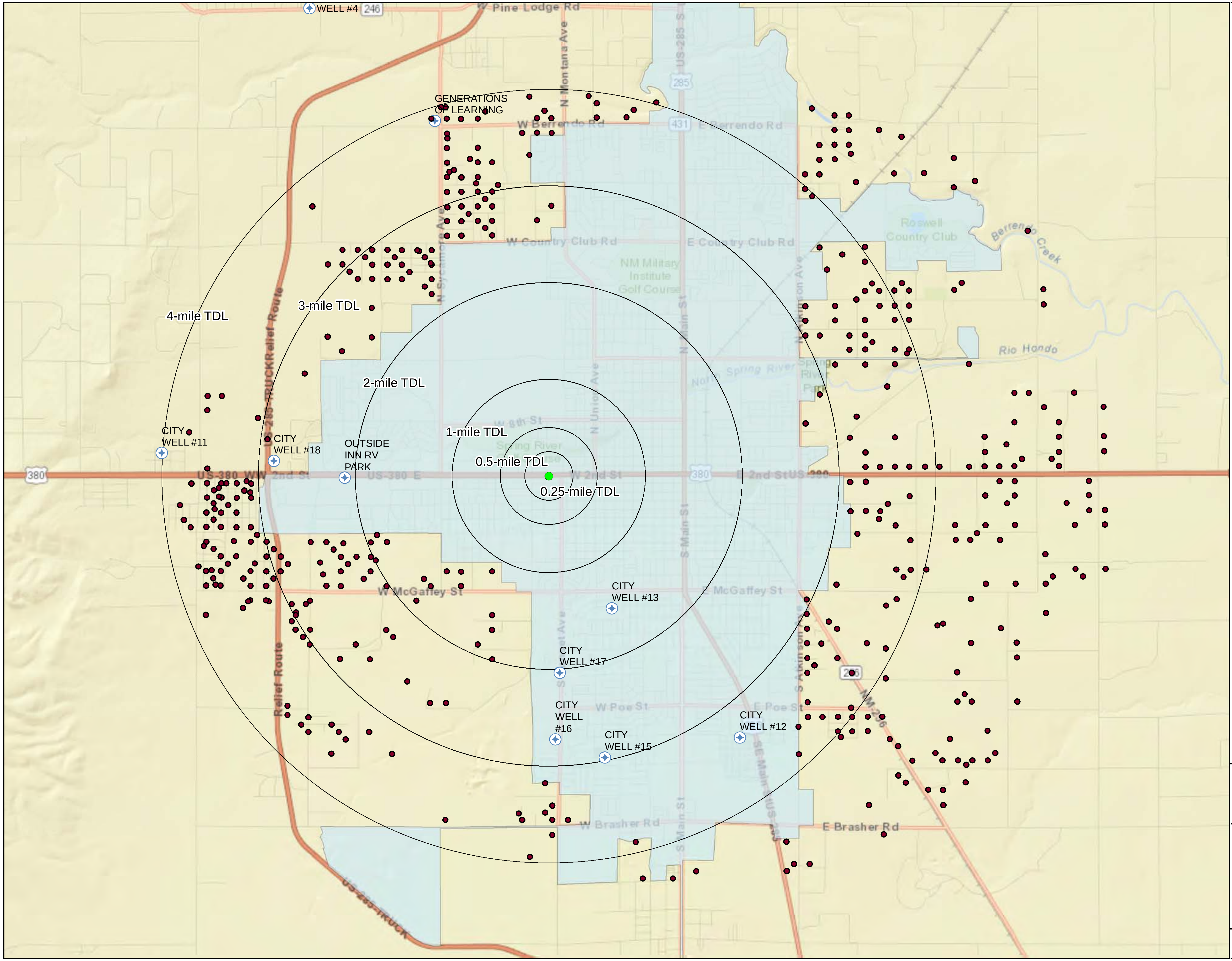

LEGEND

● West Second and Montana

✦ Public Water Supply Wells

● Domestic Wells

▨ Roswell City Boundary

☐ Target Distance Limit Rings

N

0 0.5 1 1.5 2

Miles

TDD NO: 19/WESTON-042-15-003
EPA ID NO: NMN00607057
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US EPA REGION 6

ATTACHMENT D
FIGURE 2
WEST SECOND AND MONTANA (SOURCE 3)
DOMESTIC WELLS
OUTSIDE CITY LIMITS
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0870.01	AS SHOWN

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ATTACHMENT E

SITE 4 – PARKS UNDERGROUND STORAGE TANK SITE SCORING

HRS Table 3-1 – Ground Water Migration Pathway Scoresheet for Site 4

Factor Categories and Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer:		
1. Observed Release (Section 3.1.1 of the HRS Documentation Record)	550	550
2. Potential to Release:		
2a. Containment	10	Not Evaluated
2b. Net Precipitation	10	Not Evaluated
2c. Depth to Aquifer	5	Not Evaluated
2d. Travel Time	35	Not Evaluated
2e. Potential to Release [lines 2a (2b + 2c + 2d)]	500	Not Evaluated
7. Likelihood of Release (higher of lines 1 and 2e)	550	550
Waste Characteristics:		
4. Toxicity/Mobility (see Section 2.4.1, 3.1.1 and 3.2.1 of the HRS Documentation Record)*	(a)	1,000
5. Hazardous Waste Quantity (see Section 2.4.2.1.5 and 3.2.2 of the HRS Documentation Record)	(a)	10
6. Waste Characteristics (see Section 3.2.3 of the HRS Documentation Record)	100	10
Targets:		
7. Nearest Well (see Section 3.3.1 of the HRS Documentation Record)	50	20
8. Population:		
8a. Level I Concentrations	(b)	0
8b. Level II Concentrations	(b)	0
8c. Potential Contamination (see Table 1 in Attachment E of this HRS Documentation Record)	(b)	1,097
8d. Population (lines 8a + 8b + 8c)	(b)	1,097
9. Resources (see Section 3.3.3 of HRS Documentation Record)	5	5
10. Wellhead Protection Area (see Section 3.3.4 of this HRS Documentation Record)	20	5
11. Targets (lines 7 + 8d + 9 + 10)	(b)	1,127
Ground Water Migration Score For An Aquifer:		
12. Aquifer Score [(lines 3 x 6 x 11) ÷ 82,500] [c]	100	75.13
Ground Water Migration Pathway Score:		
17. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c] **HRS SITE SCORE: 37.56**	100	75.13

(a) Maximum value applies to waste characteristics category.
(b) Maximum value not applicable.
(c) Do not round to nearest integer.

Notes: * TCE was used in the evaluation of the toxicity/mobility factor value.

Site 4 (which includes Source 4) is called Parks UST and consists of a ground water plume contaminated with tetrachloroethene (PCE) and trichloroethene (TCE) with no identified source (Ref. 32, pp. 8, 9; Section 2.4.1 of the HRS documentation record). Contamination normally associated with dry cleaning operations has been found in the ground water at this site, but efforts to identify a source have been unsuccessful. In 2005, Site 4 was discovered when a change in analysis being conducted in association with a Leaking Underground Storage Tank (LUST) investigation, detected PCE and TCE (Ref. 32, p. 8). As part of the June 2009 Preliminary Assessment (PA), the New Mexico Environment Department (NMED) Superfund Oversight Section (SOS) reviewed data to evaluate the distribution of chlorinated solvent contamination in ground water in the vicinity of the Park's property in an effort to identify potential source areas of chlorinated solvents. At that time, ground water samples from 5 out of 16 LUST sites within a 0.5-mile radius of the property (with full VOC analysis) exhibited PCE and/or TCE contamination (Ref. 32, p. 8).

Potential targets for Source 4 include the populations served by City of Roswell Municipal Wells (RMWS), public supply wells, and private domestic wells. The wells included in each distance category of the site's target distance limit (TDL), and the resulting potential contamination factor value can be seen in the attached figures and table. (Note: The number of private wells identified in Figure 2 of this attachment may not equal the number of private wells identified below. Due to the proximity of private well locations, one icon on the figure may represent multiple private wells.)

Since the RMWS is blended and no single water supply source supplies more than 40 percent of the system, the population served is apportioned equally to each water supply source in the system (Ref.1, Section 3.3.2; Ref. 48). As a result, the City of Roswell population of 48,611 is equally divided by the 16 water wells that supply the city (Ref. 42, p. 1; Ref. 48, p. 1). An estimated 3,038 persons are served by each water supply source (Ref. 17, p. 2; Ref. 48, p.1).

Based on the U. S. Census Bureau, the persons per household in 2009-2013 for Chaves County is 2.70 (Ref. 61, p. 1). The total estimated population served by private domestic ground water wells outside of the City of Roswell city limits and within 4 radial miles of the site is 1,180 persons, with a total of 437 domestic wells identified within 4 radial miles of the site and outside of the city limits (Ref. 47, pp. 68-77). One privately owned supply wells located within the 4-mile TDL includes Outside Inn RV Park in a greater than 3 to 4 miles distance interval (Ref. 17, p. 1; Figure 2 of this attachment). Outside Inn RV Park serves a population of 45 (Ref. 17, p. 2). The well is completed at 190 feet depth (Ref. 17, p. 5).

ATTACHMENT E
TABLE 1

Site 4 Parks UST

	Domestic Wells (non-karst)**			Domestic Wells (karst)**		Public Supply Wells (karst)**		City of Roswell Municipal Wells (karst)**				
TDL from Site	Number of Wells (Ref. 47, p. 1)	Population Served*	Distance Weighted Population Values non-karst (Ref. 1, Table 3-12)	Number of Wells (Ref. 47, p. 1)	Population Served*	Number of Wells (Ref. 17, p. 3)	Population Served (Ref. 17, p. 2)	Number of Wells (Ref. 17, p. 3)	Population Served (Ref. 17, p. 2)	Total karst Population Served	Distance Weighted Population Values-karst (Ref. 1, Table 3-12)	References
0.25	0	0	0	0	0	0	0	0	0	0		Ref. 47, p. 68
0.5	0	0	0	0	0	0	0	0	0	0		Ref. 47, p. 68
1	0	0	0	0	0	0	0	0	0	0		Ref. 47, p. 68
2	24	65	10	9	24	0	0	City Well 13	3,038	3062	2,607	Ref. 17, p. 5; Ref. 47, p. 68; Ref. 48; Ref. 61, p. 1
3	121	327	68	41	111	0	0	City Wells 12, 15,16,17	12,152	12263	8,163	Ref. 17, p. 5; Ref. 47, pp. 68-72; Ref. 48; Ref. 61, p. 1
4	171	462	42	71	192	Outside Inn RV Park	45	0	0	237	82	Ref. 17, pp. 4, 5; Ref. 47, pp. 72-77; Ref. 48; Ref. 61, p. 1
Total	316	854	120	121	327				15,190		10,852	

*Based on 2.70 per household (Ref. 61, p. 1). The population served value is also rounded to the nearest integer per HRS Table 3-12 (Ref. 1, Section 3.3.2.4).

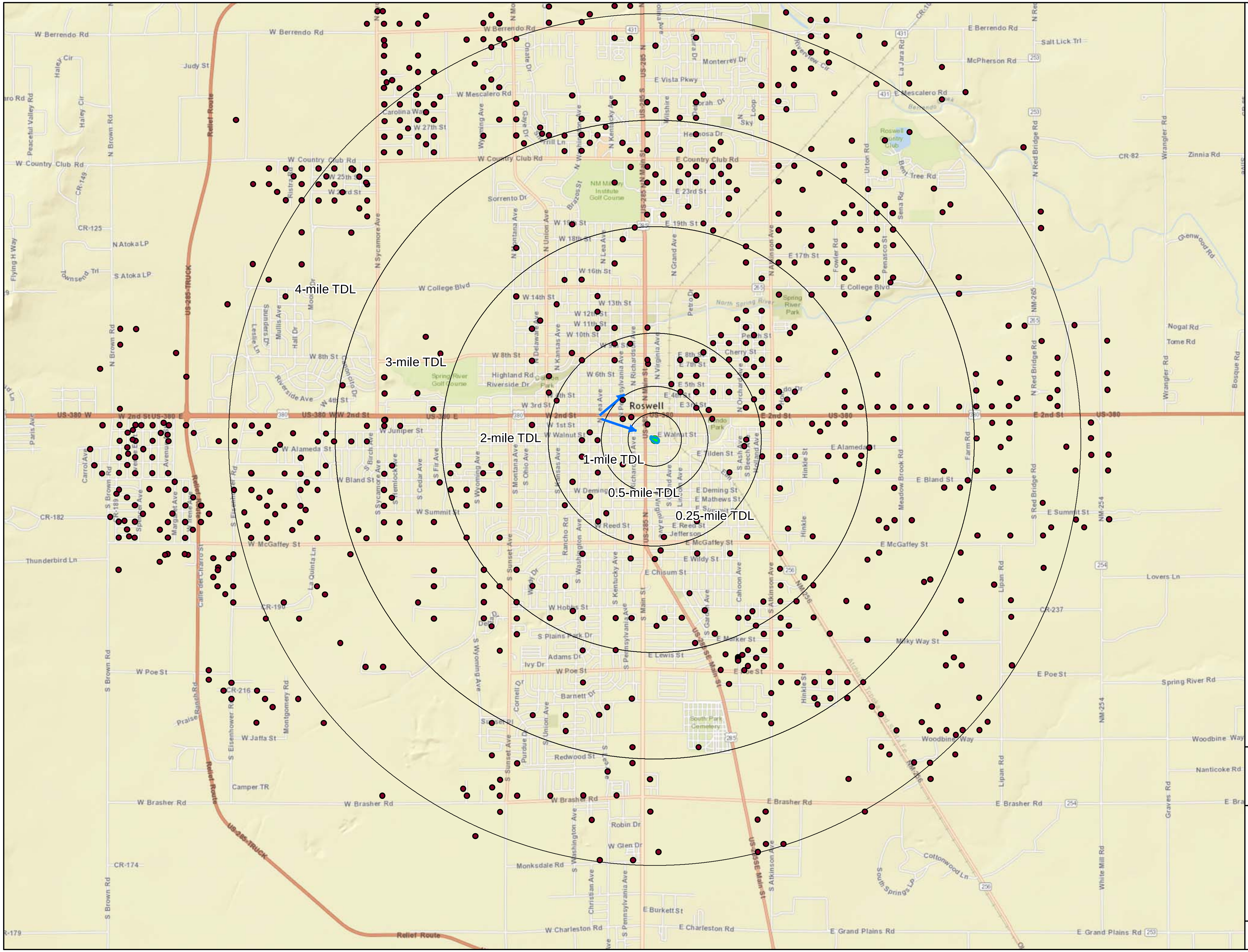
** Calculations of karst and non-karst private domestic wells were based on shallow (non-karst) and artesian (karst) classifications of the water source for each well identified from the New Mexico Water Rights Reporting system website. Wells which did not contain source information were conservatively identified as non-karst (Ref. 47).

Calculation (Ref. 1, Sec 3.3.2.4)

Sum of Distance-Weighted Population Values: 120 (non-karst) + 10,852(karst) = 10,972

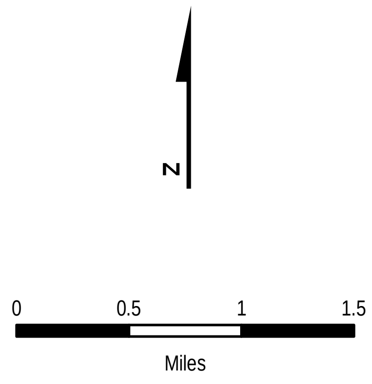
Sum of Distance-Weighted Population Values/10: 1,097.2

Potential Contamination Factor Value: 1,097



LEGEND

- 🟢 Parks UST
- ✦ Public Water Supply Wells
- ● Domestic Wells
- ☐ Target Distance Limit Rings
- — Ground Water Plume
- → Ground Water Gradient



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EPA ID NO: NMN00607057
CONTRACT NO: EP-W-06-042

US EPA REGION 6

ATTACHMENT E
FIGURE 1
PARKS UST
(SOURCE 4)
4-MILE TARGET DISTANCE LIMIT
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY,
NEW MEXICO

DATE	PROJECT NO	SCALE
SEPTEMBER, 2015	20406.012.019.0870.01	AS SHOWN

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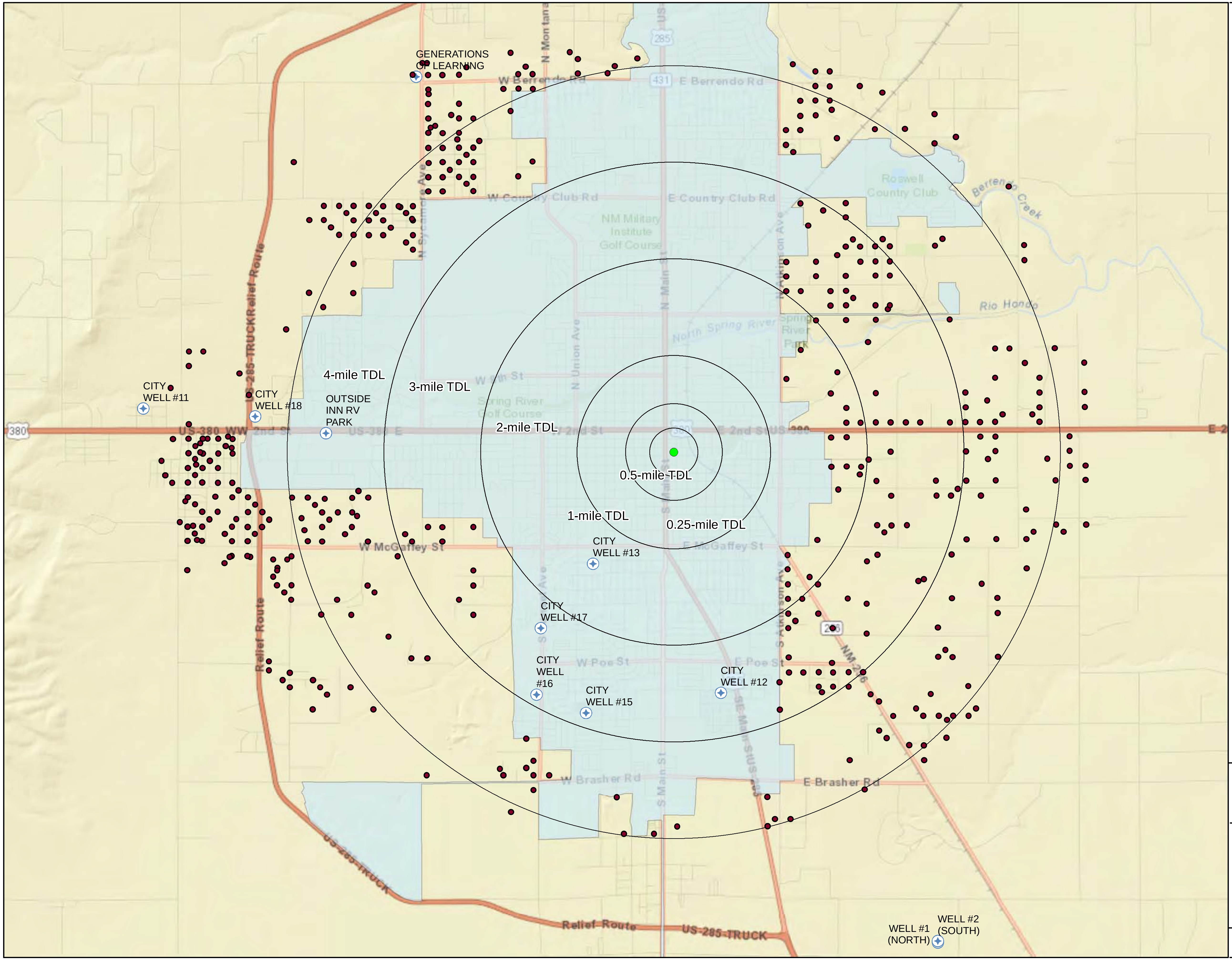

LEGEND

- ● Parks UST
- ✦ Public Water Supply Wells
- ● Domestic Wells
- 🟦 Roswell City Boundary
- ☐ Target Distance Limit Rings

N

0 0.5 1 1.5 2
Miles

TDD NO: 19/WESTON-042-15-003
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ATTACHMENT E
FIGURE 2
PARKS UST (SOURCE 4)
DOMESTIC WELLS
OUTSIDE CITY LIMITS
LEA AND WEST SECOND STREET
ROSWELL, CHAVES COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
AUGUST, 2015	20406.012.019.0870.01	AS SHOWN