2018
Site Monitoring Report

North
Indian Bend Wash
Superfund Site

Prepared for:

U.S. Environmental Protection Agency
Region IX

Prepared by:

NIBW Participating Companies

February 28, 2019

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Appendix

LIST OF ACRONYMS

ACD	Amended Consent Decree
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADWR	Arizona Department of Water Resources
AF	acre-feet
AFY	acre-feet per year
APP	Aquifer Protection Permit
ARV	Air Relief Valve
AWC	Arcadia Water Company
AWQS	Aquifer Water Quality Standard
AZPDES	Arizona Pollutant Discharge Elimination System
CD	Consent Decree
CERP	Contingency and Emergency Response Plan
CGTF	Central Groundwater Treatment Facility
CMR	Compliance Monitoring Report
COC	Contaminant of Concern
COS	City of Scottsdale
COT	City of Tempe
CWTP	Chaparral Water Treatment Plant
DCE	1,1- Dichloroethene
DMR	Discharge Monitoring Report
EPA	U.S. Environmental Protection Agency
EPCOR	EPCOR Water USA
ESD	Explanation of Significant Differences
FSA	Feasibility Study Addendum
GAC	Granular Activated Carbon
gpm	gallons per minute
GMEP	Groundwater Monitoring and Evaluation Plan
GWETS	Groundwater Extraction and Treatment System
LAU	Lower Alluvium Unit
MAU	Middle Alluvium Unit
MCL	Maximum Contaminant Level
MG	Million Gallons
MRL	Method Reporting Limit
MRTF	Miller Road Treatment Facility
NGTF	NIBW Granular Activated Carbon Treatment Facility
NIBW	North Indian Bend Wash
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethene
PCs	Participating Companies

LIST OF ACRONYMS (continued)

PE	Performance Evaluation
PV	Paradise Valley
PVARF	Paradise Valley Arsenic Removal Facility
QA	quality assurance
RAO	Remedial Action Objective
RD/RA	Remedial Design / Remedial Action
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SGS	Soil Gas Sampling
SMR	Site Monitoring Report
SOW	Statement of Work
SRP	Salt River Project
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
TDS	Total Dissolved Solids
UAU	Upper Alluvium Unit
UIC	Underground Injection Control
UV/OX	Ultraviolet Oxidation
VOC	Volatile Organic Compound
µg/L	micrograms per liter

North Indian Bend Wash Superfund Site

SITE MONITORING REPORT

January - December 2018

North Indian Bend Wash Superfund Site
Scottsdale, Arizona

February 28, 2019

This 2018 Site Monitoring Report (SMR) summarizes remedial activities performed and data collected by the North Indian Bend Wash (NIBW) Participating Companies (PCs) (i.e., Motorola Solutions, Inc., Siemens, and GlaxoSmithKline) pursuant to the Amended Consent Decree, CV-91-1835-PHX-FJM, entered by the U.S. District Court for the District of Arizona on June 5, 2003. A detailed summary of the components and work requirements of the remedial action program can be found in the Record of Decision Amendment – Final Operable Unit (OU), Indian Bend Wash Area (Amended ROD), dated September 27, 2001, and Statement of Work (SOW), Appendix A to the Amended Consent Decree (Amended CD). An organizational chart identifying the key parties involved at the NIBW Superfund Site (the Site) is provided in **Appendix A**, along with current personnel having assigned roles and responsibilities for operations and emergency responses.

Additional information describing remedial activities conducted at the NIBW Site in 2018 was provided in Quarterly Reports submitted to the U.S. Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ) on May 24, August 29, and November 21, 2018. Consistent with requirements defined in the Amended CD and SOW, operational summaries and updates for fourth quarter 2018 are included in the annual SMR, as discussed later in the report (**Appendix F**).

This SMR presents a summary and overview of compliance monitoring data collected and acquired to demonstrate performance of the remedial action program. In conjunction with development of the 2018 SMR, the NIBW PCs compiled compliance monitoring data, laboratory analytical reports, quality assurance reports, and other monitoring data required by the Amended CD, SOW, governing work plans, and agency requests. This information is submitted in supplemental data reports that will be issued under separate cover. The supplemental data reports will be submitted as electronic files on compact disks and include:

- Level 4 data analytical reports and a quality assurance (QA) report issued by TestAmerica (primary NIBW laboratory analytical contractor) for analysis conducted for the NIBW groundwater monitoring program during 2018.

- Level 4 data analytical reports and a QA report issued by TestAmerica for: analysis of compliance process water samples obtained at NIBW groundwater treatment systems during 2018. The supplemental data reports also include results of the NIBW PCs annual audit activities at TestAmerica, a summary of performance evaluation sample results, and Level 4 analytical reports issued by TestAmerica for NIBW Granular Activated Carbon Treatment Facility (NGTF) Arizona Pollutant Discharge Elimination System (AZPDES) permit samples and by Trans West Analytical Services, LLC (dba XENCO Laboratories, and back-up NIBW laboratory analytical contractor) for split sampling conducted at the Area 7 Groundwater Extraction Treatment System (GWETS).

- Data summary and TestAmerica laboratory analytical reports for inorganic water quality samples collected from four (4) Area 7 Upper Alluvium Unit (UAU) wells (PG-10UA, PG-16UA, PG-28UA and PG-29UA) and the Area 7 GWETS effluent sample port (SP-105).

- 2018 air sampling data summary and Air Toxics laboratory reports for the Area 7 GWETS and Area 12 GWETS.

1.0 GROUNDWATER MONITORING PROGRAM

Groundwater monitoring at the NIBW Superfund Site includes collection, analysis, and reporting of extensive water level, water quality, and production data from a network of groundwater monitor, extraction, and production water wells completed in the Upper Alluvium Unit (UAU), Middle Alluvium Unit (MAU), and Lower Alluvium Unit (LAU). Locations of production and extraction wells (active, inactive, and abandoned), and monitor wells (active and recently abandoned), in the vicinity of the NIBW Site are shown on **Figure 1**.

The UAU in the vicinity of the NIBW site consists primarily of sand, coarse gravel, cobbles, and boulders. Saturated thickness in the UAU ranges from about 40 to 100 feet in the area south of Indian School Road. The MAU is comprised primarily of silt and clay, with interbedded fine sands that transmit much of the water that occurs in the unit. The MAU is fully saturated across much of the NIBW site and thickness is up to approximately 660 feet in some areas. The LAU consists of weakly to strongly cemented gravel, boulders, sand, sandy clay, and silty sand, with some interbedded clayey zones. Total thickness of the LAU generally ranges from 500 to more than 700 feet. All of the units thin significantly at the basin margins. The LAU, which is coarser grained, thicker, and more productive than the MAU, constitutes the principal alluvial aquifer in the region.

Groundwater monitoring requirements for the NIBW Site are specified in the EPA-approved *Groundwater Monitoring and Evaluation Plan* (GMEP), prepared by the NIBW PCs and dated October 8, 2002. The GMEP defines the: 1) scope and frequency of monitoring activities; 2) requirements for data reporting and preparation of interpretive work products; 3) approach to conducting groundwater flow model updates; and 4) performance criteria, achievement measures, contingency initiation criteria, and contingency response actions for evaluation of the ongoing effectiveness of remedial actions. Changes to the UAU monitoring program are documented in the EPA-approved Work Plan for Updated Long-term Groundwater Monitoring Program, Upper Alluvium Unit Groundwater, dated December 13, 2012 (NIBW PCs, 2012). Other monitoring program changes reviewed and approved by EPA have occurred over time, including abandonment of a total of 43 UAU monitor wells in 2006, 2007, 2010 2013, 2014, and 2018 (see appropriate annual SMRs for details). With approval from EPA, one UAU well (PG-3UA) was abandoned in 2018.

For some years, the NIBW PCs and EPA have acknowledged that changes and updates to some of the GMEP performance evaluation criteria and metrics are warranted. The GMEP was developed about 16 years ago, and the progress of data collection and remedy implementation have significantly advanced our understanding of site conditions over that time period. Similarly, our understanding of the specific data and analyses that are most critical to ensuring achievement of Amended ROD remedial action objectives and Amended CD SOW performance standards has also improved during that time.

A process is underway to work with the NIBW Technical Committee to make targeted updates to the GMEP to streamline data collection and analysis, as well as to focus performance metrics on the most critical current and long-term remedy concerns. In addition, the PCs propose to align the performance evaluation process more directly to the Site remedial action objectives and performance standards. The GMEP update process is on-going. Until a revised document is available, the PCs will continue to use the structure laid out in the 2002 GMEP to evaluate progress and performance of the various remedy components. Where applicable, areas where specific metrics warrant updating or modification will be noted in the SMR.

Test America, Inc. was the Analytical Laboratory Supervising Contractor for groundwater monitoring program activities and Verdad Group LLC (Verdad) was the Groundwater Monitoring Program Supervising Contractor for the NIBW Site in 2018. **Appendix A** contains contact information, roles, and responsibilities for parties involved in key aspects of the NIBW Site remedial actions.

1.1 GROUNDWATER LEVEL MONITORING

Groundwater level monitoring was conducted semi-annually in a network of 76 monitor wells in April and 105 monitor wells in October 2018. Water level measurements obtained and reported by Montgomery & Associates in April and October are summarized in **Tables 1 and 2**, respectively. Water level monitoring for the UAU has been discontinued for April (as approved by EPA and ADEQ in 2013) and is now conducted annually in October at the remaining network of 28 UAU monitor wells. April 2018 water level contour maps for the MAU and LAU are shown on **Figures 2 and 3**, respectively. October 2018 water level contour maps for the UAU, MAU, and LAU are shown on **Figures 4, 5, and 6**, respectively.

In addition to periodic water level monitoring conducted at unit-specific monitor wells, continuous water level monitoring was conducted during 2018 at a group of LAU monitor wells and one extraction well in the vicinity of the EPCOR well field (referred to as the Paradise Valley [PV] well field) as part of the enhanced northern LAU monitoring program. Hydrographs showing continuous water level data for wells in the northern LAU monitoring program are provided in **Appendix B**. Additional non-compliance continuous water level data was obtained during 2018 at selected MAU and LAU monitor wells.

Pumping, chiefly in the MAU and LAU, influences water levels and patterns of groundwater movement in the three alluvial units. The principal pumping centers are discussed in Section 1.4. While introduced in Section 1.4, **Table 6**, which summarizes monthly pumping and **Figure 16**, which shows annual pumping, for wells in the vicinity of the NIBW Site, may also be helpful references with regard to the water level discussion below. As in previous years, the PCs coordinated closely with water providers in an attempt to ensure that, to the extent possible based on demand and operational constraints, key extraction wells were pumping during the April and/or October compliance water level monitoring events. Wells located within or close to the site that were pumping during the April and October 2018 water level rounds are noted below.

Based on the October 2018 water level contour map (**Figure 4**), direction of groundwater movement in the UAU is from east to west in the area south of McDowell Road and from northeast to southwest in the area north of McDowell Road. Little to no pumping occurs from the UAU within or in the immediate vicinity of the Site. UAU groundwater migrates toward the western margin of the Site, where it moves vertically into the LAU, either directly or through the MAU. Downward vertical hydraulic gradients are known to exist across the Site and the conceptual model for the site acknowledges vertical migration of groundwater from the UAU to the MAU and from the MAU to LAU in response to these gradients. In October 2018, UAU horizontal hydraulic gradients, expressed as feet per foot (unitless), ranged from about 0.0019 in the north to about 0.0025 in the south.

The complex pattern of groundwater movement observed in the MAU is the result of competing influences between the various pumping centers and the western margin, where vertical movement of groundwater into the LAU occurs. During the April 2018 water level monitoring round, pumping was occurring at the following wells located within or adjacent to the site that extract part or all of their water from the MAU: 1) Area 12 GWETS wells Salt River Project [SRP] 23.6E,6.0N (the Granite Reef well) and MEX-1MA; 2) Area 7 GWETS wells 7EX-3aMA and 7EX-6MA; and 3) the Arcadia Water Company (AWC) wells. Based on April 2018 conditions (**Figure 2**) cones of depression are apparent in the MAU in the vicinity of these pumping wells.

October 2018 MAU water level data displayed on **Figure 5** show that patterns of groundwater movement were generally similar to those observed in April. In the south part of the Site, Area 12 extraction wells MEX-1MA and the Granite Reef well were both pumping fairly continuously in April and October. Horizontal hydraulic gradients in the MAU in the immediate vicinity of the Area 12 extraction center ranged from about 0.0060 in April to the northeast to 0.0064 in October to the northeast. To the north, Area 7 extraction wells 7EX-3aMA and 7EX-6MA were both pumping during the April and October monitoring periods. Horizontal hydraulic gradients in the MAU immediately northeast of the Area 7 extraction center ranged from 0.0124 in April to 0.009 in October. In the area between the southern and northern pumping centers, where water migrates toward the western margin, horizontal hydraulic gradients ranged from 0.0030 in April to 0.0040 in October.

Groundwater movement in the LAU is generally from recharge areas in the south and southwest parts of the Site to points of discharge at extraction and production wells to the north, as shown for April and October 2018 on **Figures 3 and 6**, respectively. Numerous wells withdraw groundwater from the LAU throughout the NIBW Site, including Central Groundwater Treatment Facility (CGTF) extraction wells, Miller Road Treatment Facility (MRTF) extraction wells (PV-15 and PV-14), NGTF extraction well PCX-1, and production wells operated by SRP, AWC, EPCOR, and the City of Scottsdale (COS). For both the April and October 2018 water level monitoring rounds, CGTF extraction well COS-75A, one of the lead LAU extraction wells for the remedy, was operating. Similarly, key LAU extraction wells PCX-1, PV-15, and PV-14 were pumping during both the April and October water level rounds. Other wells pumping from the LAU during the two monitoring rounds include selected AWC wells and Paradise Valley PV-11. As shown on **Figures 3 and 6**, pumping at MRTF extraction wells PV-14 and PV-15 and NGTF extraction well PCX-1, combined with pumping at nearby SRP and PV production wells, results in a regional sink for LAU groundwater to the north.

Horizontal hydraulic gradients in the LAU generally increase from south to north toward extraction well COS-75A, and then decrease sharply in the area down-gradient from COS-75A (**Figures 3 and 6**). Horizontal hydraulic gradients ranged from a maximum of about 0.015 in both April and October, in the area immediately upgradient from CGTF extraction well COS-75A to a minimum of about 0.0035 and 0.0036 in April and October, respectively, in the area between extraction wells COS-75A and PCX-1.

Groundwater level trends over time are evaluated by comparing short-term and long-term changes in water levels at UAU, MAU, and LAU monitor wells. **Table 3** summarizes the difference in water level between October 2017 and October 2018 for all monitor wells included in the water level monitoring programs for both years. Water level change is shown on maps and illustrated on associated inset bar graphs on **Figures 7, 8 and 9** for the UAU, MAU, and LAU, respectively. Wells are generally arranged based on location (north to south) on the inset bar graphs. It should be noted that water level differences computed at individual wells using October 2017 and October 2018 data are representative of changes between two point measurements, which may not be reflective of long-term trends. In addition, water level changes on the order of 10 feet or more observed in monitor wells adjacent to extraction wells are usually attributed to production well cycling rather than to water level conditions in the aquifer. Water level data trends are more accurately tracked by reviewing a larger set of water level data obtained over a longer time period. Hydrographs showing water level data for the 10-year period from 2009 through 2018 for wells included in the monitoring program are provided in

Appendix C. Note that hydrographs for specific wells show only water level data while others display both water level and TCE data, depending on monitoring requirements.

Comparing data from October 2017 and October 2018, observed water level changes in the UAU were all less than 3 feet (**Figure 7**). Water levels in the UAU generally rose across the Site between the two time periods, except in the area east of Indian Bend Wash, in the vicinity of Area 12, and at PG-10UA, adjacent to Area 7 extraction well 7EX-3aMA, where water levels declined. The magnitude of rise in the UAU north of Thomas Road was generally smaller than to the south, ranging from 0.10 to 0.41 feet, the magnitude of rise in the UAU south of Thomas Road ranged from 0.07 to 2.08 feet. The magnitude of declines in the UAU ranged from -0.01 to -1.00 feet.

Water level change in the MAU between October 2017 and October 2018 was variable (**Figure 8**). Water levels generally declined between October 2017 and October 2018 in wells north, northeast, and in the immediate vicinity of the Area 12 GWETS, south of Thomas Road. Water level decline is attributed to increased pumping of the MEX-1MA and Granite Reef wells in the time leading up to the October 2018 monitoring round relative to the lead up to the October 2017 round. The magnitude of decline ranged from -1.56 to -13.33 feet in this area. Water levels rose for most wells west of Hayden Road and south of Thomas Road, and also at wells M-2MA and M-3MA. Rise at all of these wells is attributed to heavy pumping at City of Tempe (COT) well COT-6 prior to and during the October 2017 monitoring round, but very little pumping in 2018. Well COT-6 is known to have a large impact on neighboring wells when in operation. Well E-8MA is believed to have been in the immediate cone of depression from pumping well COT-6 in 2017, and the apparent large-scale rise (>30 feet) at this well is a result of recovery from 2017 pumping. The magnitude of rise ranged from 0.81 to 31.27 feet in this area. Water levels north of Thomas Road generally declined between October 2017 and October 2018, with the exception of wells in the immediate vicinity and northeast from vicinity and northeast from the Area 7 GWETS extraction wells. Localized rise at the Area 7 GWETS is attributed to decreased pumping prior to and during the October 2018 monitoring round relative to October 2017.

Water levels in the LAU rose in all LAU monitor wells with the exception of M-9LA (**Figure 9**). The magnitude of rise in the LAU north of about Indian School Road was generally larger than to the south, ranging from 6.52 to 11.44 feet. The magnitude of rise in the LAU south of about Indian School Road ranged from 1.83 to 5.31 feet. The rise of 18.8 feet at M-17MA/LA and the decline of -2.18 feet at M-9LA, shown on **Figure 9,** are based on anomalous 2017 data points, and, therefore these values are not considered representative. This overall trend of rising LAU water levels is likely regional in nature and is further enhanced by decreased LAU pumping prior to and during the 2018 monitoring event relative to the 2017 event at the Paradise Valley production wellfield, MRTF extraction wells, and PCX-1.

1.2 GROUNDWATER QUALITY MONITORING

Groundwater quality monitoring of specific volatile organic compounds (VOCs) designated as NIBW contaminants of concern (COCs), including trichloroethene (TCE), tetrachloroethene (PCE), 1,1,1-trichloroethane (TCA), 1,1-dichloroethene (DCE), and chloroform, was conducted in accordance with requirements of the GMEP. Water quality monitoring results for the five NIBW COCs for 2018 are shown on **Table 4** and **Table 5** and included the following components:

- monthly sampling (when operating) at the four (4) CGTF extraction wells, two (2) MRTF extraction wells, and one (1) NGTF extraction well;
- quarterly sampling (when operating) at the two (2) Area 7 extraction wells that were operational in 2018 and two (2) Area 12 extraction wells, along with at a network of 25 selected MAU and LAU monitor wells (including well M-2MA, which was sampled quarterly in 2018 as a contingency action);
- semi-annual sampling at one (1) LAU monitor well; and,
- annual sampling at the remaining 59 UAU, MAU, and LAU monitor wells.

In general, monitoring is conducted in accordance with the Sampling and Analysis Plan (SAP) for the NIBW Site, developed by SRP and approved by EPA in 2003. However, in October 2015 the PCs prepared and submitted to EPA an addendum to the SAP to describe standard operating procedures for collection of groundwater samples at monitor wells using the HydraSleeve^{TM} method (HydraSleeve). Under the original SAP for the NIBW Site, groundwater samples are obtained from monitor wells using dedicated pumps. A standard volume-based purge method, requiring stabilization of water quality field parameters is specified, with treatment of purge water prior to discharge for wells where COCs exceed regulatory limits. The HydraSleeve sampling approach was integrated into the SAP to provide the opportunity to use this passive sampling method at the Site for monitor wells where dedicated pumps either failed or their use was deemed impractical. In practice, when dedicated pumps have failed, HydraSleeve sampling has been used as a sampling strategy on a case by case basis, considering both logistical and technical advantages and disadvantages. HydraSleeve samples have generally shown a good agreement with historical results from traditional purge samples. However, where results were determined to be inconsistent, and inconsistencies could not be explained based on known conditions or trends, dedicated pumps were re-installed in the wells.

Monthly and quarterly groundwater quality monitoring is generally conducted during the first week of the month, beginning in January. The annual groundwater quality monitoring program is initiated at the beginning of October. Annual sampling operations for wells experiencing problems continued into November and December 2018 and January 2019.

A summary of laboratory results of COCs for NIBW monitor wells for 2018 is provided in **Table 4**. Production and extraction well COC results are summarized in **Table 5**. As is evident from the data, TCE is the principal COC at the site and is, therefore depicted in SMR plume maps and time-series graphs. TCE concentration contours for October 2018 for the UAU, MAU, and LAU are shown on **Figures 10**, **11, and 12**, respectively. Hydrographs, showing TCE concentrations and water levels for the 10-year period from 2009 through 2018, are shown for all monitor wells included in the monitoring program in **Appendix C**. Changes in the magnitude and extent of TCE concentrations between the baseline data set, which is defined as October 2001 and coincides with the release of the Amended ROD, and

October 2018, the current monitoring period, are shown for the UAU, MAU, and LAU on **Figures 13, 14, and 15**, respectively.

To support the interpretation of changes in TCE concentration over time for the SMR, the PCs voluntarily conducted a trend analysis of TCE in monitor wells in the UAU, MAU, and LAU. The Mann-Kendall trend test was performed, using EPA's ProUCL software, to determine if there is a statistically significant trend in TCE concentrations over time. This method is being considered for potential use in evaluating remedy performance in the GMEP update. Mann-Kendall is a non-parametric trend test that relies on computing an "S" statistic. The Mann-Kendall S statistic is calculated by scoring each sequential pair of data points to determine if a significant slope exists in the data set. If the earlier concentration in a pair is lower than the later concentration, the pair is assigned a value of 1. Conversely, if the earlier concentration is higher than the later concentration, the pair is assigned a value of -1. If the two concentrations are equal, the pair is assigned a value of zero. The S statistic is computed by summing the values for each pair in the series. Assessing the S statistic, along with the number of statistically independent samples, provides the probability of rejecting the null hypothesis (no trend) for a given level of significance, or confidence. The trend test for the SMR was conducted at the 99% confidence level. The Mann-Kendall method assumes that non-detect values are always less than the lowest detected value; as such the reporting limit is used. If the dataset has greater than 50% non-detect values, then use of the Mann-Kendall test is not recommended. For the SMR, TCE data from 2014 through 2018 (5 years) was used to determine if there is a statistically significant trend in monitor wells in recent time; TCE data from 2009 through 2018 (10 years) was used to evaluate longer-term trends. Field duplicate results were averaged with original sample results to ensure statistically independent values. *Trends, or lack of trends, in TCE concentrations discussed in this SMR refer to statistically significant trends identified using the Mann-Kendall trend test method described above.*

TCE concentrations in UAU monitor wells are generally low and show decreasing or no trends. An increasing trend is observed in one UAU monitor well (PG-31UA); increasing concentrations at this well on the down-gradient portion of the small TCE plume in the UAU at Area 7 is indicative of the remaining mass migrating toward the western margin in accordance with the OU-2 remedy. The maximum TCE concentration detected was 29 micrograms per liter (µg/L) at monitor well PG-31UA in October 2018. Well PG-31UA is located southwest of Area 7 **(Figure 10)**. The occurrence of TCE concentrations in UAU groundwater at or in excess of the Federal Maximum Contaminant Level (MCL)[1] of 5 µg/L is now limited to this single monitor well. While an increasing TCE concentration trend has been observed at PG-31UA in recent years, longer-term declines in UAU wells are otherwise fairly ubiquitous. The magnitude of TCE concentrations in UAU groundwater has decreased significantly with time, as reflected in **Appendix C** hydrographs. The extent of the UAU plumes has also decreased over time, as depicted in **Figure 13**, which compares the extent of TCE concentrations in UAU groundwater observed in October 2001 and October 2018. The area of impact, as defined by the TCE plumes in the UAU, has decreased by about 93 percent from October 2001 to October 2018.

TCE concentrations in MAU groundwater are generally higher than in the other two units, with a 2018 maximum concentration of 1,900 µg/L detected in July 2018 at monitor well W-2MA, located down-gradient from Area 7. The TCE concentration at well W-2MA in October was 1,600 µg/L **(Figure 11)**. The maximum concentration of TCE detected in October 2018 in a monitor well in the vicinity of Area 12 was 44 µg/L at M-10MA2, located down-gradient from Area 12. Samples collected from Area 12 Granite Reef extraction well [SRP23.6E,6N] had a maximum TCE concentration of 120 µg/L in November 2018 and Area 12 extraction well MEX-1MA had a maximum TCE concentration of 53 µg/L in October 2018. The third area of elevated TCE concentrations in MAU groundwater coincides with a localized region associated with monitor well PG-6MA, located in the vicinity of the southwest margin. As shown on **Figure 14**, the vicinity of PG-6MA has historically had elevated TCE concentrations in the MAU that have not decreased over time. The presence of elevated PCE and TCE concentrations suggest an alternate VOC

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[1] As set forth in the Amended ROD, cleanup standards for all NIBW COCs except chloroform are equivalent to MCLs adopted by EPA pursuant to the Safe Drinking Water Act (42 U.S.C. §§ 300f-300j-11). The chloroform cleanup standard is 6 µg/L.

source unrelated to the NIBW site. The agencies have concurred with this interpretation and recently suggested that the PCs modify MAU plume maps to distinguish the plume in the PG-6MA area as being attributed to an alternate source. Such a notation was made beginning in 2018 (**Figure 11**). TCE concentration at PG-6MA was 82 µg/L in October 2018.

Significant longer-term declines in TCE concentrations have been observed at many MAU monitor wells (**Appendix C**). In the past 5 years, TCE concentrations in MAU monitor wells generally show decreasing or no trends; an increasing trend was observed in one MAU monitor well (PA-10MA). This recent increasing trend at MAU monitor well PA-10MA (**Appendix C**) is believed to be due to a shift in Area 7 pumping from well 7EX-4MA to well 7EX-6MA in the last 3 years (**Table 7**) and reduction of pumping at COS extraction wells COS-71A, COS-72, and COS-31. It should be noted that the extent of the west flank of the MAU plume is more accurately represented in maps generated after the October 2001 baseline, due to the availability of data at monitor well M-17MA/LA following its installation in 2002.

TCE concentrations in LAU groundwater are generally intermediate between the UAU and the MAU, with a maximum concentration of 160 µg/L detected in both April and July 2018 at monitor well PA-6LA. The highest concentrations of TCE in LAU groundwater occur in the north-central part of the Site (PA-6LA and PA-13LA), as shown on **Figure 12**. Changes in the extent of TCE concentrations in LAU groundwater observed between October 2001 and October 2018 are generally small and attributable to northward migration of the plume toward remedial extraction wells (**Figure 15**). TCE concentrations in all LAU monitor wells show either a decreasing or no trend for the last 5 years; decreasing trends are observed mostly in the northern half of the LAU plume (PA-6LA, PA-5LA, PG-40LA, and PA-13LA). Over the longer-term (10 years), decreasing trends can be seen across the LAU. Decreasing trends in the southern half of the LAU are attributed to less mass entering the LAU at the western margin over time. Hydrographs for LAU monitor wells can be found in **Appendix C.** Overall, the areas where TCE concentrations exceed 50 and 100 µg/L in the LAU have decreased significantly since 2001 (**Figure 15**).

A predictable migration of the LAU plume to the north in response to the regional gradient (**Figure 6**) and implementation of the LAU groundwater remedy through extraction at CGTF, NGTF, and MRTF wells is also apparent on **Figure 15**. As shown on **Appendix C** hydrographs, monitor wells PG-42LA and S-2LA in the northern LAU plume area have shown increasing trends in TCE concentration over the longer-term (10-year trends). While increasing TCE concentrations in the northern LAU are anticipated as LAU mass migrates toward PCX-1 and the MRTF extraction wells, the PCs monitor concentrations closely at these wells. More recently, TCE concentrations at S-2LA and PG-42LA have leveled off and no longer show an increasing trend based on the last 5 years of data. These encouraging trends are attributed to consistent pumping at PCX-1, PV-14, and PV-15. Coordinated pumping of other PV wells north of the MRTF, in accordance with the optimal plume containment strategy, which prioritizes pumping from south to north, is also critical. The western flank of the LAU plume in the vicinity of S-2LA and PG-42LA is being closely monitored and will be discussed in the following section and in Section 4.2.2.

1.3 CONTINGENCY ACTIONS

1.3.1 M-2MA

On October 10, 2017, contingency actions were initiated for well M-2MA when TCE was detected at concentrations in exceedance of GMEP metrics associated with monitoring containment of the MAU plume. Specifically, a water quality sample collected at M-2MA on October 5, 2017, during the annual monitoring round, had a TCE concentration of 30 µg/L, which exceeded the GMEP performance metric of 10 µg/L. Well M-2MA is one of the four MAU wells (referred to as indicator wells) used to evaluate hydraulic capture of the zone where TCE concentrations exceed the drinking water standard of 5 µg/L (the plume) in the MAU in the vicinity of Area 12 (**Figure 11**).

The NIBW PCs responded to the elevated TCE concentration at M-2MA as required by the GMEP. Prescribed early response actions were taken, such as re-analysis of the October 5, 2017 sample, increasing remedial extraction pumping at

Area 12, and obtaining a follow-up sample from well M-2MA. Early response actions were summarized in the 2017 SMR.

The PCs prepared an M-2MA Monitoring and Contingency Evaluation Technical Memorandum that was submitted to the NIBW Technical Committee on November 10, 2017 (NIBW PCs, 2017). Additional contingency actions proposed by the PCs in the contingency evaluation memorandum included increasing the sampling frequency from annual to quarterly at M-2MA and, to the extent possible, committing to a program to pump both of the Area 12 extraction wells during time periods when COT-6 is pumping, since water level data indicate that sustained pumping of this well has an impact on plume migration near M-2MA.

As documented in the PCs technical memorandum, dated February 21, 2019, the PCs have completed all actions recommended in the November 2017 contingency initiation memorandum and concluded that M-2MA is no longer in contingency status. Water quality sampling results at M-2MA indicate TCE concentrations have are again below the contingency criterion of 10 µg/L for all of the samples collected since the October 5, 2017 sample. The PCs have returned to monitoring groundwater level and water quality at well M-2MA annually, as prescribed in the GMEP. In addition, although there are no peripheral production wells in the vicinity of M-2MA that were not already impacted by COCs at the time of the Amended Record Decision and Amended Consent Decree, the PCs will maintain close contact with the City of Tempe regarding the operating schedule for well COT-6. The PCs will make efforts to pump both of the Area 12 extraction wells during periods when sustained pumping is planned at well COT-6.

1.3.2 S-2LA and PG-42LA

Water quality data obtained in 2018 indicate that TCE concentrations observed at monitor wells S-2LA and PG-42LA exceeded GMEP metrics associated with groundwater containment of the LAU plume. Data showed that well PG-42LA exceeded the GMEP TCE performance metric of 2 µg/L and well S-2LA exceeded the GMEP TCE performance metric of 15 µg/L during all sampling rounds conducted in 2018 (**Table 4**).

GMEP exceedances and trends were initially observed and reported at monitor wells S-2LA and PG-42LA, as well as at extraction well PV-14, in 2011, triggering contingency response actions and preparation of three separate Technical Memoranda. These response actions were summarized in the 2011 SMR. Subsequently, the NIBW PCs proposed, in a letter dated May 24, 2012, to suspend further contingency response actions until the NIBW Technical Committee could reassess GMEP performance measures and, as appropriate, establish updated metrics. EPA agreed to the temporary suspension of contingency response actions in an email dated June 1, 2012, but asked for continued reporting of data to the Technical Committee. In 2018, the NIBW PCs conducted and reported on quarterly sampling of S-2LA and PG-42LA and monthly sampling of PV-14. While increasing trends exist at both S-2LA and PG-42LA over the longer-term (10 years of data), increasing trends do not exist based on analysis of recent (last 5 years) data. Additionally, short-term (5-year) and long-term (10-year) decreasing TCE concentration trends at PV-14, the absence of detections of COCs north of extraction well PV-14, and groundwater flow model capture zones that encompass the LAU plume, as shown on **Figure 25**, all indicate that the LAU containment program is operating in accordance with Amended Consent Decree (ACD) requirements. The PCs will continue to track and report quarterly on TCE concentrations trends at S-2LA and PG-42LA and other monitor wells along the western flank of the LAU plume throughout 2019.

1.4 GROUNDWATER PRODUCTION DATA

Monthly data for total groundwater production were compiled for all wells that pump at rates greater than 35 gallons per minute (gpm) and are located in the area bounded by Indian Bend Road to the north, one mile south of McKellips Road to the south, Dobson Road to the east, and Invergordon Road to the west (**Figure 1**). Monthly production data for 2018 are summarized in **Table 6**. Annual well production data for 1991 through 2018 are summarized in **Table 7**, and 2018 well production data is shown graphically on **Figure 16**, with circle size increasing with pumping volume. **Figure 16** and **Table 6** also show the estimated percent pumping distribution between the UAU, MAU, and LAU for production wells in the vicinity of the Site. Production data were obtained from municipal and private water providers, SRP, and the Arizona Department of Water Resources (ADWR).

Review of monthly production data (**Table 6**) indicates seasonal trends in pumping in response to fluctuations in demand for groundwater. In general, maximum production for municipal demand corresponds to summer months while minimum production for municipal demand corresponds to winter months. Combined monthly pumping for all wells at the NIBW Site ranged from 1,552 acre-feet (AF), which is equivalent to about 506 million gallons (MG), in November 2018, to 2,610 AF (about 850 MG) in August 2018.

Review of the spatial distribution of groundwater production for 2018 (**Figure 16**) indicates the presence of several pumping centers. The predominant pumping center is associated with the PV well field, located along the Arizona Canal in the vicinity of McDonald Road to the north. Total production for 2018 at the six (6) PV wells was 10,596 AF (3,453 MG). This pumping is principally from the LAU. NGTF Extraction well SRP well 22.5E,9.3N (also known as PCX-1) pumped a total of 3,830 AF (1,248 MG) from the LAU in 2018. Combined pumping at PV wells and PCX-1 in the northern LAU causes a regional cone of depression that controls groundwater movement in the LAU across the NIBW Site. Extraction and treatment of TCE at key remedial action wells in this cone of depression (i.e., at PCX-1, PV-14, and PV-15) is critical to the LAU remedy.

Outside of the northern LAU pumping center described above, production at the CGTF extraction wells is the most significant pumping that occurs within the boundaries of the NIBW Site. Wells COS-75A and COS-71A pump exclusively and primarily from the LAU, respectively. Wells COS-72A and COS-31 pump from both the MAU and LAU. Total production for 2018 at the four CGTF extraction wells (COS-31, COS-71A, COS-72, and COS-75A) was 4,329 AF (1,411 MG), which was about 24 percent more than in 2018 (1,138 MG). CGTF pumping in 2018 was principally focused at well COS-75A, which accounted for approximately 75 percent of CGTF extraction, with about 3,262 AF of the 4,329 AF pumped.

Pumping associated with the Area 7 and Area 12 groundwater extraction and treatment programs is also fairly substantial, totaling 489 AF (159 MG) and 1,672 AF

(545 MG) for 2018, respectively. Groundwater extraction for the Area 7 and Area 12 source control programs is exclusively from the MAU. The AWC well field comprises another pumping center in the vicinity of the NIBW Site. Total production for 2018 at the five (5) AWC wells, which pump from the MAU and LAU, was 2,813 AF (917 MG). When operating, well COT-6 comprises another significant pumping center. A total of 1,647 AF (537 MG) was pumped from well COT-6 in 2017; however, in 2018 COT-6 only pumped 103 AF (34 MG). Well COT-6 pumps principally from the MAU.

Table 7 summarizes annual groundwater production for wells in the vicinity of the NIBW Site for the period 1991 through 2018. From 1991 through 1995, annual groundwater production in the vicinity of the NIBW Site ranged from 18,887 AF (6,154 MG) to 31,824 AF (10,370 MG). From 1996 through 2004, groundwater production in the vicinity of the NIBW Site increased to an average of just over 40,165 AF (13,088 MG) per year. The increased groundwater withdrawals from the mid-1990s correlate to, among other factors, implementation of the NIBW groundwater remedy, which allowed water providers to return wells to service. Additionally, groundwater pumping increased in this period due to drier than normal Arizona weather conditions. In recent years, however, groundwater production in this area has declined, averaging 28,333 acre-feet per year (AFY) (9,232 MG) for the period from 2006 through 2018. The recent decline in groundwater production is likely correlated to an increase in surface water supply available to users such as SRP and COS. In this same period, COS started up the Chaparral Water Treatment Plant (CWTP) to use SRP surface water supply and shut down some local COS wells due to implementation of the revised arsenic maximum contaminant level. More recently, COS reduced pumping from CGTF extraction wells, particularly wells COS-71A and COS-72, due to elevated concentrations of inorganic constituents that contribute to scaling and other customer concerns. Annual pumping in the vicinity of the NIBW Site for 2018 totaled 24,784 AF, or 8,076 MG, which is less than the average since 2005.

2.0 GROUNDWATER REMEDIATION PROGRAM

As provided by the Amended CD, the NIBW remedy requires containment of the MAU/LAU plumes and restoration of groundwater to drinking water standards. The groundwater remediation program consists of groundwater extraction and treatment at the CGTF, MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS. The locations of the five (5) GWETS are shown on **Figure 17**. The NIBW PCs are responsible for operation of the Area 7 GWETS and Area 12 GWETS; and COS is responsible for the CGTF. The NIBW PCs own and are responsible for NGTF operations, maintenance, and performance; however, COS operates the treatment facility under contract to the NIBW PCs as the treated water may be used in its system. EPCOR Water USA (EPCOR), as owner of the MRTF, is responsible for operation of treatment for water produced from wells PV-14 and PV-15.

A monthly summary of groundwater production and estimated TCE mass removed from each NIBW extraction well is presented on **Table 8**. Mass removal estimates for individual extraction wells are computed by using a single (or average) TCE concentration value for each month in which a given well operated, and the total pumping from that well during the month. **Table 8** also provides computed monthly and annual percent operating time for each of the extraction wells tied into treatment. Percent operation time for extraction wells is computed using higher frequency daily or hourly pumping data sets provided by well operators. Time Available for the associated treatment facilities is summarized in the Inspection Report (**Appendix D**). Results of samples obtained by the NIBW PCs are used where available; however, samples obtained by other parties, such as COS, are used when no PCs' data are available. The PCs have no sample results when extraction wells are not operational during their monthly monitoring round. If no TCE concentrations are available for a particular well for a particular month, values from previous or subsequent months are used.

To assure data quality and consistency associated with collection of compliance monitoring data at the treatment plants, the NIBW PCs and COS have contracted with TestAmerica (designated as primary analytical laboratory) and Trans West Analytical Services, LLC (dba XENCO Laboratories and designated as back-up to TestAmerica), both located in Phoenix, Arizona. TestAmerica and Trans West Analytical are licensed by the Arizona Department of Health Services (ADHS) under analytical laboratory license numbers AZ0728 and AZ0757, respectively. To help assure laboratory performance and data quality, COS and the NIBW PCs conducted the annual audit of TestAmerica on November 7, 2018. Results of analyses of process and treated groundwater from the MRTF, NGTF, Area 7, and Area 12 conducted by TestAmerica are summarized in **Table 9**. Process and treated groundwater sampling results for the CGTF are reported quarterly by COS.

The NIBW PCs coordinated inspections of the Area 7 GWETS, Area 12 GWETS, CGTF, NGTF, and MRTF, that were conducted between December 18 and 20, 2018, in accordance with Section VI.B.4.d of the SOW. Representatives of EPA were present for the annual inspections at each of the treatment facilities and submitted questions related to the inspections to the PCs and COS on December 5, 2018. Questions relevant to the inspections were discussed and addressed during the NIBW Technical Committee meeting on December 18, 2018, and during the field inspections conducted on the following two days. The Technical Committee agreed that broader remedy-related questions are addressed as appropriate in monthly Technical Committee meetings, the SMR, the updated GMEP, and/or the Five-Year Review. The groundwater treatment and extraction systems were inspected for malfunctions, deterioration, issues with operator practices and protocols, and discharges that could result in a release of untreated groundwater. At each facility, the major system components were identified and examined for operability, condition of operating equipment, and management of untreated groundwater and residual materials. Additionally, data related to routine operation, system startup and shutdown, routine and non-routine maintenance, and sampling were made available for review during the inspections. No hazards, significant deterioration, procedural or equipment malfunctions were noted in the course of the inspections at the CGTF, MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS that would affect groundwater treatment performance standards or compliance with the Amended CD/SOW. Additional details of the NIBW Site inspections are described in the *Inspection Report* provided in **Appendix D**.

2.1 GROUNDWATER REMEDIATION AT THE CENTRAL GROUNDWATER TREATMENT FACILITY

The CGTF was the first GWETS constructed at the NIBW Site. The CGTF is located at 8650 East Thomas Road (**Figure 17**). As required by the first NIBW Consent Decree, the NIBW PCs constructed the CGTF and transferred ownership to COS on March 18, 1994, at which time the treatment plant came into service. The NIBW PCs and COS subsequently modified the CGTF, and it has operated continuously (except for scheduled maintenance shutdowns) since December 1995 to treat groundwater according to EPA-approved design specifications. All samples of treated water obtained over the past 24 years have met cleanup goals and drinking water standards, and are routinely below the respective laboratory Method Reporting Limits (MRLs) for the NIBW COCs.

Groundwater extraction is performed at up to four COS-owned or contract supply wells designated as COS-31, COS-71A, COS-72, and COS-75A (the CGTF extraction wells). Extracted groundwater is pumped through buried transmission pipelines to the CGTF where it is treated by air stripping. Treated groundwater from the CGTF is primarily used in the COS drinking water system, but may be discharged to the SRP water distribution system via an irrigation lateral.

In late 2016, COS approached EPA and the NIBW PCs to request changes to routine operations for CGTF extraction wells to address issues arising from their need to balance water quality for inorganic constituents unrelated to the Site COCs. In a letter to EPA, dated December 7, 2016, COS pointed out that fiscal impacts of treating groundwater extracted from the CGTF wells (particularly wells COS-71A and COS-75A) for non-Site constituents (nitrate, total dissolved solids [TDS], and arsenic) had become significant, and operational changes were required. While a new reverse osmosis system to address inorganics is under construction, it will only have a treatment capacity of about 2,350 gpm, or the equivalent of one CGTF extraction well. After consideration of its drinking water provider obligations, review of groundwater flow model results, and discussions with the Technical Committee regarding remedial action priorities, COS now follows a regimen to prioritize pumping at well COS-75A and make well COS-71A available for the remedy only as a last priority during an emergency or other contingency situation. Wells COS-72 and COS-31 are operated as needed based on system demands. Overall, the impact of COS's operational adjustments on the NIBW remedy has been that total CGTF well pumping in 2017 (3,494 AF) was about half of rates in 2016 (6,894 AF). CGTF pumping in 2018 (4,329 AF) increased somewhat, but is still well below recent historical rates. As intended, CGTF pumping was focused on well COS-75A in 2018 (**Table 8**). In 2019, the PCs will continue to work with COS to achieve plume containment and mass removal objectives in a manner that supports municipal supply needs.

COS owns and operates the CGTF and reports results of laboratory testing and plant operations directly to EPA and ADEQ. A summary of the key operational results follows. Detailed reporting of the 2018 operational status, laboratory data, and system performance was provided by COS in CGTF Compliance Monitoring Reports (CMRs) submitted on May 16, August 15, November 13, 2018, and February 15, 2019.

2.1.1 2018 Overview

During 2018, groundwater extraction associated with the CGTF contributed to capture and containment of the MAU/LAU plume (as discussed in Section 4.2.2) and treatment provided water for beneficial use that met groundwater treatment performance standards (as discussed in Section 4.3.1).

COS reported that approximately 4,329 AF (or 1,411 MG) of groundwater were pumped and treated at the CGTF in 2018. CGTF operated fairly consistently over 2018. Downtime was primarily attributed to column cleaning, and routine maintenance. Of the total, 190 MG were extracted from well COS-31, 7 MG from well COS-71A, 151 MG from well COS-72, and 1,063 MG from well COS-75A (**Table 6**). Based on extraction well data presented in **Table 8**, an estimated 407 pounds of TCE were removed by the CGTF during 2018. Concentrations for NIBW COCs in samples obtained at CGTF extraction wells in 2018 are summarized in **Table 5**. Historical groundwater production and TCE concentrations at CGTF extraction wells are graphed in **Appendix E**. TCE concentrations at COS-75A show a decreasing trend for both recent time (5 years) and longer-term (10 years). Well COS-72 TCE concentrations show a decreasing trend over the longer-term; and wells COS-71A and COS-31 do not have statistically significant trends in TCE concentrations for either recent or longer-term data sets. As demonstrated in operations reports and CMRs provided by COS, NIBW COCs were not detected in groundwater treated at the CGTF during 2018.

2.2 GROUNDWATER REMEDIATION AT THE MILLER ROAD TREATMENT FACILITY

The MRTF was constructed to capture and treat groundwater containing NIBW COCs in the northern LAU, to provide beneficial use of groundwater pumped from remedy extraction/production wells, and to prevent migration of the LAU plume to peripheral production wells. The MRTF is located at 5975 North Miller Road, Scottsdale, as shown on **Figure 17**. Groundwater extraction and treatment is currently performed at two groundwater production wells, designated as PV-14 and PV-15, which are individually connected to MRTF. COCs in extracted groundwater are reduced by air stripping at the MRTF. Treated groundwater from wells PV-14 and PV-15 is pumped to the Paradise Valley Arsenic Removal Facility (PVARF). MRTF began operation in 1997 and is owned and operated by EPCOR.

2.2.1 2018 Overview

Groundwater extraction associated with MRTF contributed to capture and containment of the LAU plume (as discussed in Section 4.2.5) and treatment provided water for beneficial use by SRP and EPCOR. Approximately 6,683 AF (or 2,178 MG) of groundwater were pumped and treated at MRTF in 2018, including 1,111 MG of groundwater extracted at PV-14 and 1,067 MG extracted at PV-15 (**Table 8**). The MRTF extraction wells (PV-14 and PV-15) operated consistently, with down time limited to PV-15 pump removal, inspection, and reinstallation in mid-January 2018. Based on production totals and reported TCE concentrations, an estimated 59 pounds of TCE were removed from groundwater at MRTF during 2018 or approximately 73 grams of TCE per day.

According to procedures developed in the EPA-approved *Phase 2 Sampling and Analysis Plan* (SAP) and *MRTF Operation and Maintenance* (O&M) *Plan*, extraction well samples were collected during the first week of each month at PV-14 and PV-15 (when the wells were operating) and analyzed by TestAmerica for NIBW COCs.

Concentrations of NIBW COCs in samples obtained in MRTF extraction wells in 2018 are summarized in **Table 5**. Historical groundwater production and TCE concentrations at MRTF extraction wells are presented graphically in **Appendix E**. TCE concentrations at well PV-14 show a decreasing trend for recent time (5 years) as well as over the longer-term (10 years); well PV-15 has an increasing trend over the longer-term and no statistically significant trend for recent time. Results of laboratory analysis of samples collected from treated groundwater effluent at MRTF are summarized in **Table 9**. Fourth quarter compliance reporting for the MRTF is provided in **Appendix F**.

A very small fraction of treated water from MRTF (approximately 0.55 MG) was delivered to the SRP Arizona Canal. Discharges to the Arizona Canal are regulated by an AZPDES permit. EPCOR is responsible for monitoring and reporting associated with the AZPDES permit for MRTF. Routine operation, maintenance, and monitoring at the MRTF are anticipated to continue by EPCOR throughout 2019.

2.3 GROUNDWATER REMEDIATION AT THE NIBW GAC TREATMENT FACILITY

NGTF was constructed by the NIBW PCs to treat groundwater extracted from well PCX-1 to provide hydraulic capture at the leading edge of the northern LAU plume, and limit migration of the plume toward the EPCOR well field. NGTF is located at 5985 Cattletrack Road, at the southeast corner of the intersection of Miller Road and McDonald Drive in Scottsdale (**Figure 17**). NGTF includes a pre-filter located upstream of a granular activated carbon (GAC) treatment system that can remove entrained solids to prevent accumulation of sediment in the media bed. Groundwater extracted from PCX-1 is treated using four (4) parallel treatment trains each consisting of two GAC contactors in lead/lag configuration. Treated water from NGTF is delivered to the CWTP for use by COS in its system, however, in the event

COS does not need or cannot take PCX-1 treated water, it is delivered to the SRP Arizona Canal.

2.3.1 2018 Overview

Well PCX-1 has operated on a fairly consistent basis in 2018 (**Table 8**), with down-time generally being attributable to electrical work at the Chaparral Treatment Plant in early 2018 and other routine maintenance activities. TCE concentrations at well PCX-1 are fairly stable, ranging between 44 and 52 µg/L in 2018 (**Table 5, Appendix C**).

Most of the treated water from NGTF was discharged to the CWTP for municipal use by COS in 2018 (**Table 8**). Treated water from NGTF that was not discharged to CWTP was discharged to the SRP Arizona Canal under the NGTF AZPDES permit. Treated water discharged to the Arizona Canal is monitored as required by the AZPDES permit. The results of sample analyses were summarized in monthly Discharge Monitoring Reports (DMRs), and submitted directly to the EPA and ADEQ under separate cover.

The NGTF consistently reduced NIBW COC concentrations in treated groundwater to below cleanup standards in 2018. Compliance monitoring was performed in accordance with the NGTF O&M Plan, dated March 31, 2016, to demonstrate removal of NIBW COCs from extracted groundwater and to assure groundwater treatment standards are achieved. Treatment system influent and effluent samples were collected each week (when the treatment system was operational) and submitted to TestAmerica for analysis of NIBW COCs.

The total volume of groundwater extracted and treated at NGTF during 2018 was 3,830 AF (1,248 MG), with approximately 17% of the total volume discharged to the Arizona Canal and 83% to the CWTP (see **Table 8**). An estimated 498 pounds of TCE were removed from the groundwater treated at NGTF. A summary of NIBW COC concentrations in samples obtained from well PCX-1 during 2018 is included in **Table 5**. Historical groundwater production and TCE concentrations at PCX-1 are presented graphically in **Appendix E**. TCE concentrations at well PCX-1 show a decreasing trend for both recent time (5 years) and over the longer-term (10 years).

Results of analyses of NGTF process and treated groundwater samples conducted by TestAmerica are summarized in **Table 9**. All treated groundwater samples analyzed in 2018 for water discharged from NGTF were below the MRL of 0.50 µg/L for TCE. Fourth quarter compliance reporting for the NGTF is provided in **Appendix F**. Routine operation, maintenance, and monitoring are anticipated to continue at NGTF throughout 2019.

2.4 GROUNDWATER REMEDIATION AT AREA 7

Area 7 is a former electronics manufacturing site located at the southeast corner of 75th and 2nd Streets in Scottsdale, as shown on **Figure 17**. Siemens installed the Area 7 GWETS to enhance the NIBW groundwater remedy by extracting and treating MAU groundwater containing relatively higher COC concentrations associated with the source area, reducing COC mass allowed to migrate to the LAU extraction wells for removal and treatment. In 2018, groundwater extraction was performed using two MAU groundwater extraction wells designated as 7EX-3aMA and 7EX-6MA.

The Area 7 MAU source control GWETS was initially started in 1999. Well 7EX-5MA became inoperable in 2012 and replacement well 7EX-6MA was added to the system in 2015. While well 7EX-6MA was principally installed to replace well 7EX-5MA, it was also located and designed to replace well 7EX-4MA in the future, if needed. After rehabilitation efforts were no longer effective, well 7EX-4MA was removed from service in October 2016 due to poor performance. Well 7EX-6MA and 7EX-4MA share a common pipeline that connects the wells to the treatment system. As such, increased pumping from well 7EX-6MA is possible with well 7EX-4MA off-line (**Table 7**). The PCs have no plans at present to return well 7EX-4MA to service.

Groundwater from the Area 7 extraction wells is treated by ultraviolet oxidation (UV/OX) followed by air stripping. Treated water is discharged to the UAU using two up-gradient groundwater injection wells (7IN-1UA and 7IN-2UA). The Area 7 GWETS operated fairly consistently during 2018. Down time was attributed to weather-related power outages, replacement of an air compressor head, 7EX-3aMA vault modifications, UV lamp replacement, and other routine maintenance.

2.4.1 2018 Overview

During 2018, groundwater extraction tied into the Area 7 GWETS was effective in localized MAU source control (as discussed in Section 4.2.3), treating groundwater for beneficial use to levels safely below drinking water and aquifer water quality standards for all NIBW COCs (as discussed in Section 4.3.4). Compliance monitoring was conducted in accordance with an EPA-approved *Area 7 GWETS O&M Plan* to verify removal of COCs from the extracted groundwater and assure groundwater treatment standards are achieved.

A total of approximately 489 AF (or 159 MG) of groundwater were pumped and treated at the Area 7 GWETS in 2018 (**Table 8**). Of the total, approximately 54 MG was pumped from well 7EX-3aMA and approximately 105 MG was pumped from well 7EX-6MA. Treatment system performance data provided by the Area 7 Mass removal estimates derived from quarterly monitoring of extraction wells indicate approximately 685 pounds of TCE mass were removed by the Area 7 GWETS (**Table 8**).

In 2018, process samples, including treated groundwater discharged from the Area 7 GWETS, were collected monthly by the Area 7 GWETS Operator (Arcadis) and submitted to TestAmerica for analyses of NIBW COCs. Samples from the Area 7 extraction wells were typically collected during the first week of the quarter by Arcadis. A summary of NIBW COC concentrations in samples collected from Area 7 extraction wells during 2018 is included in **Table 5**. Historical groundwater production and TCE concentrations at Area 7 extraction wells are presented graphically in **Appendix E**. TCE concentrations at Area 7 extraction well 7EX-3aMA show a decreasing trend for both recent time (5 years) and over the longer-term (10 years); no statistically significant trend is observed in 7EX-6MA TCE concentrations. Results of analysis of Area 7 process and treated groundwater conducted by TestAmerica are summarized in **Table 9**. All treated groundwater samples analyzed in 2018 from the Area 7 GWETS were below the MRL of 0.50 µg/L for TCE and all other NIBW COCs, with the exception of the sample collected on December 19, 2018, which had a TCE value of 0.62 µg/L. This TCE concentration is significantly below the cleanup standard of 5.0 µg/L. Fourth quarter compliance reporting for the Area 7 GWETS is provided in **Appendix F**.

Performance Evaluation (PE) samples (designated with sample identifier SP-104) were submitted to TestAmerica during January and August, 2018, and process water split samples were submitted to Trans West Analytical. A summary of the PE sample results and laboratory reports are included with other GWETS data and quality control reporting submitted under separate cover as a supplemental data report (issued concurrently with this SMR).

2.4.2 Sampling for Inorganic Constituents

In addition to testing for NIBW COCs, sampling for inorganic water quality was conducted during 2018 to monitor potential impacts of injection of treated water from the Area 7 GWETS on UAU groundwater. Inorganic water quality was monitored in groundwater samples obtained at four UAU monitor wells in the vicinity of Area 7 (i.e., PG-10UA, PG-16UA, PG-28UA, and PG-29UA) and in treated water that is recharged to the UAU through vadose zone injection wells. Results of 2018 inorganic water quality analyses are provided in an attachment to a letter titled, "*Supplemental Data Collection at the Area 7 GWETS During October 2018, NIBW Superfund Site*" that will be submitted by the NIBW PCs concurrent with this SMR as a supplemental data report. The data indicate that treated groundwater from the Area 7 GWETS generally had similar or better inorganic water quality constituents than observed at UAU monitor wells in the vicinity of Area 7. The inorganic data indicate UAU and MAU groundwater at Area 7 was generally of poor quality; however, the data confirm that injection of treated groundwater from the Area 7 GWETS does not contribute to degradation of inorganic water quality in the UAU. Routine operation, maintenance, and monitoring are anticipated to continue at the Area 7 GWETS throughout 2018.

2.5 GROUNDWATER REMEDIATION AT AREA 12

The Area 12 GWETS is located at the former Motorola facility at 8201 East McDowell Road, Scottsdale, as shown on **Figure 17**. Motorola installed the Area 12 GWETS to enhance the NIBW groundwater remedy by extracting and treating MAU groundwater containing relatively higher COC concentrations at the source area, reducing COC mass allowed to migrate to the southwest margin for removal and treatment at the LAU extraction wells. Groundwater extraction is performed using two MAU groundwater extraction wells designated as MEX-1MA and SRP well 23.6E,6.0N, also known as the Granite Reef well. The extracted groundwater is treated by air stripping and delivered to the SRP system for irrigation use. The Area 12 MAU source control GWETS was implemented beginning in early 1999 with start-up of well MEX-1MA. The Area 12 GWETS was fully functional when the Granite Reef well was connected in late 1999.

2.5.1 2018 Overview

During 2018, groundwater extraction tied into the Area 12 GWETS was effective in localized MAU source control (as discussed in Section 4.2.4) and groundwater treatment provided water for beneficial use that consistently met water quality standards for all NIBW COCs (as discussed in Section 4.3.5).

Compliance monitoring was conducted during 2018 in accordance with an EPA-approved *Area 12 GWETS O&M Plan* to verify removal of COCs from the extracted groundwater and assess whether groundwater treatment standards were achieved.

A total of 1,671 AF (or 545 MG) of groundwater was pumped and treated at the Area 12 GWETS in 2018 (**Table 8**). The Area 12 GWETS operated fairly consistently during 2018. Down time was primarily attributed to annual maintenance during SRP canal dry up, upgrades to the air ducting, and short term power outages due to weather. Of the total, 240.3 MG were extracted from well MEX-1MA and 304.4 MG from the Granite Reef well. Treatment system performance data provided by the Area 12 GWETS Operator based on monthly sampling of extraction wells (when operating) indicates an estimated 388 pounds of TCE were removed from groundwater during 2018 (**Table 8**).

In 2018, process samples including influent and treated groundwater, were collected monthly by the Area 12 GWETS Operator and submitted to TestAmerica for analysis of NIBW COCs. Samples from the Area 12 extraction wells were generally collected during the first week of the month by the Operator (when the treatment system was operational). A summary of NIBW COC concentrations in samples obtained from Area 12 extraction wells in 2018 is included in **Table 5**. Historical groundwater production and TCE concentrations at Area 12 extraction wells are presented graphically in **Appendix E**. Both Area 12 extraction wells (MEX-1MA and Granite Reef) show a decreasing trend in TCE concentrations for recent time (last 5 years). Over the longer-term (10 years), TCE concentrations at MEX-1MA show a decreasing trend; however, Granite Reef TCE data does not show a statistically significant trend. Results of analysis of Area 12 process and treated groundwater samples conducted by TestAmerica are summarized in **Table 9**. Although the Area 12 GWETS presently provides treated water for irrigation use, the treatment system is consistently operated to ensure TCE is below the more stringent drinking water MCL. Fourth quarter compliance reporting for the Area 12 GWETS is provided in **Appendix F**.

Treated groundwater from the Area 12 GWETS is delivered to an SRP irrigation lateral in accordance with the AZPDES permit. Sampling and testing for limited inorganic water quality is conducted in accordance with the permit and the results are transmitted in monthly DMRs to ADEQ.

Following SRP completion of canal dry-up activities and maintenance operations, routine operations and monitoring are anticipated to continue at the Area 12 GWETS throughout 2019. To the extent feasible, pumping will be conducted at both the Granite Reef well and MEX-1MA, especially when well COT-6 is pumping, in accordance with recommendations in the M-2MA contingency response memorandum.

3.0 SOIL AND VADOSE ZONE

3.1 SOIL REMEDIATION PROGRAM

Soil remediation was conducted and all Amended CD requirements have been completed at NIBW Areas 6, 7, 8, and 12. A closure certification letter, documenting EPA concurrence that all vadose zone and UAU groundwater work at Area 7 has been completed, was received on March 3, 2016.

3.2 POST FIVE-YEAR REVIEW SOIL GAS INVESTIGATIONS

In its second Five-Year Review for the NIBW Superfund Site, published in September 2016, EPA deferred making a formal protectiveness determination at the Site pending vapor intrusion assessments in the vicinity of historical source areas and revised emission exposure assessments for groundwater treatment facilities (USACE on behalf of EPA, 2016).

To evaluate the potential risk of vapor intrusion from shallow soil gas, the PCs initiated efforts during the last quarter of 2016 to compile soil gas data for the historical source areas, evaluate these data relative to EPA soil vapor intrusion screening levels, and propose locations for installing shallow soil gas sampling (SGS) points. In 2017, a total of about 50 shallow SGS points were installed at seven of the historical source areas (**Figure 1**: Area 3, Area 5C, Area 7, Area 8, Area 9, Area 11 and Area 12). With the exception of a few SGS points at Area 7, TCE soil gas concentrations were all below land-use-specific EPA screening levels. Results were reviewed with EPA as they were received and following approval by EPA, all SGS points at Area 3, Area 5C, Area 8, Area 9, Area 11 and Area 12 were abandoned in 2017. At Area 7, 16 of the 21 SGS points installed were abandoned in 2018. A report summarizing SGS point sampling, installation methods, procedures, results, and abandonment status was submitted to EPA on September 27, 2018 (NIBW PCs, 2018).

In addition to shallow soil gas sampling, indoor air was sampled at Area 7 to further evaluate the potential for vapor intrusion. A report summarizing results from the indoor air sampling was submitted to EPA on June 8, 2018 (NIBW PCs, 2018). Follow-up actions, including collection of additional shallow soil gas and indoor air samples, have been conducted and results have been shared with the Technical Committee as they have been received (see submittals). Tasks that may be conducted in 2019 include additional sampling of indoor air and SGS points, as requested by EPA. Close out of Area 7 vapor intrusion investigations will occur following EPA evaluation of any remaining risk.

4.0 EVALUATION OF NIBW REMEDIAL ACTION PERFORMANCE

Evaluation of the NIBW remedy is based on Performance Standards set forth in the SOW. Performance Standards are defined in the SOW for groundwater monitoring, containment, treatment, and eventual restoration. In the sections that follow, monitoring data obtained during 2018 will be evaluated to assess achievement of performance criteria.

4.1 ASSESSMENT OF GROUNDWATER MONITORING PERFORMANCE STANDARDS

The GMEP requires an annual assessment of the scope and frequency of monitoring activities to optimize program effectiveness over time. In the first Five-Year Review of the NIBW Superfund Site (2011), EPA comprehensively reviewed groundwater monitoring data obtained pursuant to the GMEP and concluded significant progress has been achieved toward restoration of the UAU. Based on this finding, EPA and the NIBW PCs agreed to reassess and revise the UAU groundwater monitoring program as part of an optimized approach to be adopted in an updated GMEP. Results of this assessment are detailed below. Revisions to the scope and frequency of the MAU and LAU groundwater monitoring program will be evaluated as appropriate in future years.

The current monitoring program consists of 121 wells, 110 of which are monitoring wells (29 UAU wells, 49 MAU wells, 3 MAU/LAU wells, and 30 LAU wells) and 11 of which are extraction wells.

4.1.1 Assessment of Long Term UAU Groundwater Monitoring Program

Based on discussions with the NIBW Technical Committee regarding implementation of a more streamlined approach for UAU groundwater monitoring, the NIBW PCs prepared a revised long-term UAU groundwater monitoring program proposal entitled, *Final Technical Memorandum - Recommendations for Upper Alluvial Unit Aquifer Long-Term Groundwater Monitoring Program, North Indian Bend Wash Superfund Site, Scottsdale, Arizona*, dated March 11, 2013. This proposal, which was approved by EPA, recommended formal abandonment of 30 UAU monitoring wells that were no longer needed to define either water level or water quality conditions in the UAU. The UAU wells were successfully abandoned in accordance with all ADWR requirements in 2013 and 2014. One additional UAU well (PG-3UA) was abandoned on March 12, 2018, in accordance with EPA approval received on October 17, 2017. Well PG-3UA was in an area of planned construction and the landowner had requested that the well be removed. EPA concurred with the PCs that it was no longer needed as part of the UAU monitoring network.

Water quality data indicate the UAU groundwater system has for the most part been cleaned up and is soon anticipated to achieve the remedial action objective of aquifer restoration (see Section 1.2). The current, more targeted monitoring program provides the necessary data to track patterns of groundwater movement and VOC concentration declines, as well as to estimate the rate of VOC mass reduction over time, or other achievement measure agreed-upon by the Technical Committee in the future, until UAU aquifer restoration is achieved. Recommendations for abandonment of most/all of the UAU monitoring network will be made in the future after a demonstration that performance standards have been met and maintained at all UAU monitor wells.

4.1.2 Assessment of MAU Source Control Performance Measures

The MAU source control programs at Area 7 and Area 12 have been operating since 1999 to locally contain, pump, and treat groundwater where TCE concentrations are higher relative to the surrounding areas, reducing TCE mass that migrates from the source areas to the western margin, in accordance with requirements of the Amended CD. The effectiveness of MAU source control is evidenced by the approximately 28,100 pounds of TCE mass removed by groundwater extraction and treatment at Area 7 and Area 12 to date. The fact that TCE concentrations show no significant trends or are slowly declining at most MAU monitor wells in the vicinity of and down-gradient from the source areas provides further evidence of source control program success (**Appendix C**). The only MAU well with an increasing trend based on the last 5 years of TCE concentration data is PA-10MA, located southwest from Area 7. As indicated above, this recent increasing trend at PA-10MA is believed to be due to a shift in Area 7 pumping toward higher capacity extraction well 7EX-6MA in the last 3 years (**Table 7**) and reduction of pumping at COS extraction wells COS-71A, COS-72, and COS-31. It should be noted that changes in pumping patterns can result in increasing trends in specific wells in the vicinity of the MAU source areas, as described in Section 1.2.

Although the NIBW PCs believe the results to date indicate the MAU source control programs are effective, some of the performance measures defined in the GMEP have not been achieved for Area 7 and/or Area 12 on several occasions since implementation of the GMEP in 2002. Specifically, performance criteria related to demonstration of capture extending down-gradient to a specified location and/or documentation of declining average TCE concentrations in wells in the immediate vicinity of the source areas have been found, in practice, to be unsuitable as measures of remedy performance relative to either the Amended ROD remedial action objectives or the Amended CD SOW performance standards. Work to review, analyze, and, where appropriate, work with the Technical Committee to develop updated MAU source control metrics is on-going.

4.1.3 Assessment of LAU Groundwater Containment Performance Measures

Over the past several years, a small subset of the northern LAU groundwater monitoring data has not consistently met GMEP metrics associated with plume containment. Specifically, TCE concentrations at LAU monitor wells S-2LA and PG-42LA, and at times at extraction well PV-14, have exceeded GMEP metrics. In response, the NIBW PCs have comprehensively assessed and continue to evaluate the mechanisms associated with each specific GMEP metric exceedance. Overall, the NIBW PCs' evaluations consistently show that the NIBW remedy is containing the LAU plume. The NIBW PCs have also proposed to the Technical Committee that some of the GMEP-specified criteria used to demonstrate effectiveness may not be meaningful measures of LAU hydraulic containment and may warrant re-evaluation. Use of Mann-Kendall trend analyses, introduced voluntarily in the 2018 SMR for assessment of remedy status, has been suggested by EPA and may prove to be a more suitable tool for evaluating achievement of ACD containment performance standards. Results indicate that there are no short term (5-year) increasing TCE concentration trends in LAU monitor wells. However, consistent with observations over the last several years, longer term (10-year) increasing trends exist at S-2LA and PG-42LA along the northwestern flank of the LAU plume. TCE concentrations at extraction well PV-14 show declining trends both for short- (5-year) and longer-term (10-year) data sets.

While the NIBW PCs continue to closely monitor water quality at specific LAU wells where metric exceedances have occurred, along with overall containment of the LAU plume using water level data and modeling, EPA has approved suspension of formal contingency actions associated with northern LAU containment. In conjunction with ongoing data evaluation, the NIBW PCs will continue to work with the Technical Committee to consider potential revised GMEP performance measures and, as appropriate, updated metrics for the LAU.

4.2 ASSESSMENT OF GROUNDWATER CONTAINMENT PERFORMANCE STANDARDS

Performance of the NIBW remedy is evaluated based on a rigorous approach established in the GMEP. In the GMEP, monitoring program objectives are matched with specific performance criteria, a methodology for measuring achievement of performance criteria, a definition of when contingency evaluations or actions would be initiated, and alternative contingency response actions that may be taken. As described above, a process is underway to work with the NIBW Technical Committee to make targeted updates to the GMEP to align the performance metrics more directly to the Site remedial action objectives and performance standards. While progress was made in 2018, the PCs will continue discussion of GMEP metrics with the Technical Committee with the goal of completing an updated GMEP in 2019. In the meantime, the PCs will continue to use the structure laid out in the 2002 GMEP for the 2018 SMR to evaluate progress and performance of the various remedy components. The exception is that Mann-Kendall trend analyses, which were voluntarily conducted and have been proposed for possible use as part of the updated GMEP metrics evaluation, will be referenced as appropriate.

Based on review of 2018 monitoring data, five specific aspects of the remedy were evaluated with respect to groundwater containment performance standards, in accordance with achievement measures established in the 2002 GMEP. Aspects of the remedy that were evaluated include: 1) UAU mass flux and restoration; 2) MAU/LAU containment and restoration; 3) Area 7 MAU source control; 4) Area 12 MAU source control; 5) northern LAU hydraulic capture.

4.2.1 Evaluation of UAU Mass Flux and Restoration

The assessment of remedy performance for the UAU plumes involves monitoring both VOC mass reduction over time and progress toward aquifer restoration. For the 2018 VOC mass flux analysis, total mass of VOCs present in UAU groundwater was computed using data for saturated thickness from the October 2018 water level monitoring round and VOC concentration data from the October 2018 water quality monitoring round. **Table 10** summarizes VOC mass estimates for UAU groundwater for 2018. Based on 2018 data, a total of about

16.7 gallons, or 201 pounds, of VOCs are estimated to remain in the saturated portion of the UAU as of 2018 (**Table 10**). **Figure 18** illustrates the decline in total VOC mass in UAU groundwater over time. Estimated total mass of VOCs present in the saturated portion of the UAU has decreased substantially over the past 25 years, declining from a high of over 11,000 pounds in 1993 to the current estimate of 201 pounds. In recent years the VOC mass reduction with time has become fairly asymptotic.

The inset table in **Figure 18** summarizes the calculated 5-year running average of VOC mass in UAU groundwater since annual mass estimates were initiated in 1996. The most recent 5-year running average of 208 pounds represents a decrease in average UAU mass relative to the previous 5-year average of 211 pounds, indicating the performance measure for UAU mass reduction has been achieved.

4.2.2 Evaluation of MAU/LAU Hydraulic Containment and Restoration

The assessment of remedy performance for the MAU/LAU plume involves demonstrating that: 1) direction of groundwater movement along the periphery of the plume is toward extraction wells or the western margin; 2) the estimated location of the 5 µg/L contour for the TCE plume does not shift outward more than 1,000 feet relative to plume interpretations for the baseline time period, October 2001; and 3) TCE concentrations at a set of sentinel MAU and LAU monitor wells do not exceed specified levels. For 2018, compliance with most of these achievement measures was attained. The exception was that GMEP TCE concentration thresholds at monitor wells S-2LA and PG-42LA were exceeded during all of the sampling rounds. This issue and associated contingency response actions are discussed in Section 1.2 and again as follows.

Assessment of data for the MAU and LAU relative to GMEP metrics is principally focused on hydraulic containment. However, since hydraulic containment is achieved through effective operation of extraction and treatment programs that were established to both contain and clean up the MAU and LAU plumes, GMEP evaluations for the MAU and LAU also support a demonstration that the remedy is making progress toward restoration. Further evidence of restoration may be found in extraction well and treatment system mass removal and percent operating time estimates summarized in **Table 8** and described in Section 2.0.

Water level and TCE concentration data for October 2018, with arrows indicating direction of groundwater movement, are shown for the MAU and LAU on **Figures 19 and 20**, respectively. Where arrows are not present, direction of groundwater movement is inferred as perpendicular to water level contours. Containment of the MAU and LAU plumes is based on direction of groundwater movement along the periphery of all areas with TCE concentrations in excess of 5 µg/L (**Figures 19 and 20**). In accordance with the GMEP, containment is assessed by demonstrating that direction of groundwater movement is toward extraction wells tied into treatment (MAU and LAU) and/or toward the southwest margin (MAU outside of source areas). **Figure 19** provides further interpretation of hydraulic capture for the MAU at Area 7 and Area 12, with hydraulic capture zones for the Area 7 and Area 12 GWETS being inferred based on October 2018 water level contours.

Coordinated pumping of remedial action wells results in groundwater flow patterns across the MAU and LAU plumes that meet GMEP performance criteria. For the MAU (**Figure 19**), October 2018 data demonstrate that direction of groundwater movement within and along the periphery of the plume is toward the two remedial pumping centers associated with groundwater extraction (Area 7: wells 7EX-3aMA and 7EX-6MA; Area 12: wells MEX-1MA and SRP 23.6E,6.0N) or the western margin[2]. Demonstrating that MAU mass outside of source area capture zones flows toward the western margin is consistent with ACD containment performance standards, since this mass moves vertically into the LAU where it is directed toward and captured at LAU extraction wells. For the LAU (**Figure 20**), October 2018 data demonstrate that direction of groundwater movement within and along the periphery of the plume is toward LAU extraction wells associated with the

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[2] As indicated on in Section 1.2, the extent of the west flank of the MAU plume was more accurately delineated following installation of monitor well M-17MA/LA in 2002. Hydrogeologic data obtained from the installation of M-17 and other nearby MAU and LAU monitor wells indicate MAU sediments coarsen and pinch out along the basin margin. Consequently, lateral groundwater flow and COC migration is limited along the mid-western and southwest flank of the MAU plume. Instead groundwater and associated COCs are inferred to move downward into the LAU in this area.

NIBW remedy, principally CGTF extraction well COS-75A, NGTF extraction well PCX-1, and MRTF extraction wells PV-15 and PV-14.

Figures 14 and 15 illustrate 5 µg/L TCE contours for the October 2001 and October 2018 plumes in MAU and LAU groundwater, respectively. The illustrations demonstrate that generally very little change in the location of the 5 µg/L contour over the period has occurred in the MAU or the LAU, with the exception of anticipated migration of the LAU plume toward the MRTF and NGTF extraction wells. Between 2001 and 2018, outward shifts in the location of the 5 µg/L TCE contour in the MAU and LAU are less than the 1,000-foot performance measure, with the exception of the northern LAU, where the plume is migrating toward extraction wells tied into treatment. Along the northern and northwestern edge of the LAU plume, shifts of the 5 µg/L TCE concentration contour ranging from about 1,000 to 1,500 feet are observed between 2001 and 2018. These changes are indicative of northern migration of the LAU plume for capture by the MRTF extraction wells and not indicative of a lack of hydraulic containment (see Section 4.2.5 for further information). TCE concentrations in wells in the northern part of the LAU have generally decreased or remained constant compared to 2017 measurements (**Appendix C**: PA-6LA, PG-40LA, PG-1LA, PG-44LA, and PA-5LA). Changes in the northwestern part of the LAU plume continue to be closely monitored relative to exceedance of GMEP performance measures at S-2LA and PG-42LA, as discussed in Section 1.3.2 and again below.

The final performance measure for MAU/LAU plume containment is a comparison of observed TCE concentrations from the October 2018 sampling round to numerical TCE concentrations specified in the GMEP at selected MAU and LAU peripheral monitor wells, as summarized in the following table:

Achievement Measures and Observed TCE Concentrations in Selected NIBW Monitor Wells

	TCE Concentration (in µg/L)	
Well Name	**Achievement Measure**	**October 2018 Sampling Round Results**
MAU Monitor Wells		
M-2MA	10	1.6
M-7MA	10	<0.50
S-1MA	2	<0.50
S-2MA	3	<0.50
LAU Monitor Wells		
M-5LA	10	1.2
PA-2LA	3	<0.50
PA-15LA	10	<0.50
PA-18LA	10	0.88
PG-1LA	15	<0.50
PG-44LA	5	<0.50
S-1LA	3	<0.50
S-2LA	15	**26/32***

*Duplicate sample

As discussed in Section 1.3, TCE concentrations at well S-2LA exceeded the GMEP-established performance criterion in 2018. Well S-2LA has consistently exceeded achievement measure of 15 µg/L since 2011. The PCs have conducted significant investigation work to characterize LAU groundwater conditions in the vicinity of well S-2LA and update the assessment of plume containment. Results of initial contingency evaluations were summarized in the 2011 SMR. Findings of the 2011 evaluation indicated that the increase in TCE concentrations at well S-2LA may be attributable to migration of TCE mass from an upgradient portion of the LAU plume that is located within the combined hydraulic capture zone created by pumping of CGTF, NGTF, and MRTF extraction wells. After contingency response actions were initiated at well S-2LA in 2011, TCE concentrations at this well continued to increase at a similar rate until 2014, then appeared to stabilize (**Appendix C and Figure 25**). In fact, Mann-Kendall trend analyses show that while a long-term (10 years) increasing trend in TCE concentrations at well S-2LA is apparent, no increasing trend exists in the more recent data set (5 years). Trend analyses, in conjunction with analysis of water level data and groundwater flow model projections of hydraulic capture (**Figure 25**) indicate that the observed trends at well S-2LA do not signify a concern regarding achievement of groundwater containment performance standards. Further discussion of hydraulic capture of the northern LAU plume is provided in Section 4.2.5.

Restoration of the MAU/LAU plumes is the overriding goal of the remediation program. As mentioned in Section 4.2.1, restoration of UAU groundwater has progressed significantly, with TCE concentrations above the MCL in only one monitoring well in 2018. While restoration in the MAU and the LAU will take longer, information presented previously demonstrates that significant progress is being made. Mann-Kendall trend analyses voluntarily conducted for the SMR in 2018 provide additional support for progress toward MAU/LAU restoration. Only one MAU monitor well (PA-10MA) and no LAU wells show short-term (5-year) increasing trends. A total of 18 the 62 MAU and LAU monitor wells that could be evaluated using Mann-Kendall showed statistically significant declining trends over the 5-year period. A greater number of wells showed declining trends when the last 10 years of data were considered. Several of the extraction wells, including well 7EX-3aMA, the Granite Reef well, wells MEX-1MA, COS-75A, PCX-1, and PV-14 also show 5-year declining TCE concentration trends. Several of these extraction wells also show 10-year declines. Overall, multiple lines of evidence demonstrate that the MAU/LAU remediation program is operating to achieve the long-term goal of restoration.

4.2.3 Evaluation of Area 7 MAU Source Area Program

The assessment of remedy performance for the Area 7 MAU source area program involves demonstrating: 1) hydraulic capture, such that the direction of groundwater movement from the vicinity of monitor well PA-12MA is toward the cone of depression associated with Area 7 pumping; and 2) a decline in 5-year running average TCE concentrations for monitor wells located within the hydraulic capture zone associated with Area 7 pumping. The 5-year running average is calculated for the time period following full implementation of the Area 7 remedy using indicator wells located within the Area 7 hydraulic capture zone, as defined in the GMEP to include: D-2MA, E-10MA, PA-10MA, PA-12MA, W-1MA, and W-2MA.

Figure 21 includes graphs of water level and TCE concentration data for indicator wells in the vicinity of Area 7. Data from these indicator wells are used to evaluate long-term trends and overall effectiveness of the Area 7 GWETS. Water levels in the vicinity of Area 7 display some seasonal patterns in response to pumping but are otherwise fairly consistent with regional trends, increasing slightly through 2011 and then showing stable to declining trends. TCE concentrations in the MAU indicator wells in the vicinity of Area 7 are generally stable or declining. TCE concentration increases observed at monitor well W-1MA beginning in 2012 reversed beginning in late 2014. TCE concentrations have been variable at well PA-10MA beginning in late 2015, showing an increasing trend based on the last 5 years of data. Trends at this well can be attributed to changes in local patterns of groundwater movement resulting from changes in pumping at Area 7 GWETS and CGTF extraction wells.

Figure 21 also shows the estimated extent of hydraulic capture associated with MAU extraction in the vicinity of Area 7. MAU remedial extraction wells 7EX-3aMA, and 7EX-6MA were pumping intermittently when water level data were obtained in October 2018, but were pumping relatively consistently throughout most of 2018. Review of the interpreted hydraulic capture for the Area 7 MAU GWETS indicates that the program is achieving the Amended CD SOW performance standard of providing sufficient hydraulic control to prevent migration away from the source area of MAU groundwater with COC concentrations that are higher relative to TCE concentrations in the surrounding vicinity. The hydraulic capture data indicate that the MAU source control system is also fulfilling the Area 7 GWETS EPA-approved design objective of capturing and removing groundwater with higher concentrations of COCs in the upper MAU near the Area 7 source. The 2002 GMEP specifies an achievement measure that the hydraulic capture zone from Area 7 pumping extends south to the vicinity of well PA-12MA. This achievement measure was not met in 2018 and may not be achievable using available MAU extraction wells tied into treatment at the Area 7 GWETS or the CGTF, without a significant increase in pumping at well COS-71A. As indicated above, COS is unable to prioritize use of well COS-71A for extraction and treatment at the CGTF due to elevated concentrations of constituents unrelated to the site. However, the PCs believe that the current pumping configuration will continue to provide sufficient capture to prevent migration of relatively higher COC concentrations associated with Area 7 from migrating to the western margin and into the LAU, achieving the performance standard of the Amended CD SOW. Support for this interpretation is found in short-term (5-year) and long-term (10-year) declining TCE concentrations in down-gradient monitor well PA-12MA, as well as in wells W-1MA and W-2MA, which are located within the Area 7 capture zone (**Figure 21**). The increasing concentration trend at well PA-10MA may be related to prioritized pumping at higher-capacity extraction well 7EX-6MA beginning in late 2015 and/or reductions in pumping at well COS-71A.

The second evaluation tool for the Area 7 MAU source control program is demonstration of a decline in the 5-year running average of TCE concentrations for the relevant monitor wells for the period following full implementation of the Area 7 groundwater remedy. **Table 11** summarizes annual average TCE concentrations for the period 1995 through 2018 at the following MAU indicator monitor wells, located within the capture zone as specified in the GMEP for MAU extraction in the vicinity of Area 7: D-2MA, E-10MA, PA-10MA, PA-12MA, W-1MA, and W-2MA. Annual average TCE concentrations at each of the specified Area 7 MAU indicator wells were computed for each year during the period 1995 through 2018; and then a total combined annual TCE average (for all wells) was determined for each year. For the running average calculation, the 2015 average TCE concentration was used for well D-2MA for 2016 through 2018 because analytical results for these years have not been representative of historical trends. The cause for anomalously low concentrations at D-2MA over the past 3 years has not been definitively identified. Annual average concentrations in three of the five remaining Area 7 indicator wells (E-10MA, W-1MA, and W-2MA) were stable to decreasing between 2017 and 2018. Wells PA-10MA and PA-12MA showed increases in average annual TCE concentration, which are likely attributable to changes in pumping of Area 7 GWETS extraction wells. The combined average TCE concentration for the Area 7 MAU indicator wells for 2018 was 622 µg/L. Using this combined annual average TCE value, the 5-year average TCE concentration was calculated to be 752 µg/L for the period 2014 through 2018. This concentration represents a decrease relative to the 5-year average of 826 µg/L computed for 2013 through 2017. Accordingly, compliance with the mass reduction component of the Area 7 remedy performance was achieved in 2018.

Figure 22 depicts the computed 5-year running average TCE concentrations for Area 7 indicator wells. These data indicate that, except for the 5-year periods ending in 2011 and 2012, a declining trend has been observed since this performance measure came into effect in 2004. Increases in the 5-year running averages for these two periods are directly correlated to variations in TCE concentrations reported at monitor well W-2MA. Since TCE concentrations at well W-2MA are significantly higher than other Area 7 indicator wells, slight variations in TCE concentrations can have a substantial effect on the combined annual averages. TCE concentrations at W-2MA have varied considerably over time and have both statistically significant short-term (5-year) and long-term (10-year) declining trends (**Figure 21 and Appendix C**). Well W-2MA is within the capture zone created by pumping of MAU remedial extraction wells. As pumping regimens for the extraction wells vary, TCE concentrations at W-2MA vary from year to year; however, these changes in TCE concentrations are not particularly meaningful for evaluating the effectiveness of the remedy. As such, use of the 5-year running average for wells located within the capture zone for Area 7 as a performance metric is problematic. This issue has been raised in GMEP update discussions with the Technical Committee.

In conclusion, the performance measure involving a decline in 5-year running average TCE concentrations was achieved at Area 7 in 2018. However, demonstration of hydraulic capture, such that the direction of groundwater movement from the vicinity of monitor well PA-12MA is toward the cone of depression associated with Area 7 pumping was not achieved. As indicated above, capture zones interpreted from water level data show that the current pumping configuration provides sufficient capture to prevent migration of relatively higher COC concentrations associated with Area 7 from migrating to the western margin and into the LAU, achieving the Amended CD SOW performance standard.

4.2.4 Evaluation of Area 12 MAU Source Area Program

The assessment of remedy performance for the Area 12 MAU source area program involves demonstrating: 1) hydraulic capture with the direction of groundwater movement from the vicinity of Hayden Road toward the cone of depression associated with Area 12 pumping; and 2) a declining, or non-increasing trend, in 5-year running average TCE concentrations for monitor wells located within the hydraulic capture zone associated with Area 12 pumping. The 5-year running average is calculated for the time period following full implementation of the Area 12 groundwater remedy using indicator wells located within the Area 12 hydraulic capture zone, as defined in the GMEP, including: E-1MA, M-4MA, M-5MA, M-6MA, M-7MA, M-9MA, M-15MA, and PA-21MA. The groundwater remedy at Area 12 was fully operational in 1999, once both extraction wells MEX-1MA and SRP 23.6E,6.0N were brought on-line in 1999, and 2004 was the first year when 5 years of data were available to conduct the running average performance assessment.

Figure 23 includes graphs of water level and TCE concentration data for indicator wells in the vicinity of Area 12. Data from these indicator wells help to evaluate long-term trends and confirm overall effectiveness of the Area 12 groundwater extraction and treatment system. Water levels in the vicinity of Area 12 display seasonal patterns in response to pumping. Water level trends at the Area 12 indicator wells were generally increasing through 2011, declining in 2012 and 2013, and then stable to increasing from 2014 through 2018, as shown on **Figure 23**. Although TCE concentration trends at all MAU monitoring wells in the vicinity of Area 12 are stable or declining both over the short-term (5 years) and long-term (10 years), some wells exhibit TCE concentration variability attributed to local groundwater pumping influences. For example, TCE concentrations at MAU monitoring well M-10MA2 (located directly west from Area 12) have been variable since late 2013. It is likely that changes in the operational strategy at Area 12 to focus extraction on well MEX-1MA, the Granite Reef well, or both wells simultaneously are responsible for the observed variability at well M-10MA2. Area 12 GWETS operational strategies are modified during the year to balance the objectives of containment and mass removal in response to water supply needs for SRP. While pumping at well MEX-1MA provides additional hydraulic capture benefits in the vicinity of Hayden Road to achieve GMEP metrics, pumping of the Granite Reef well provides mass removal benefits, since TCE concentrations are higher at this well. Pumping of both extraction wells is sometimes implemented to enhance source control, particularly when well COT-6 to the southwest of Area 12 is pumping.

Figure 23 also shows MAU TCE concentration contours for October 2018 and the estimated extent of hydraulic capture associated with Area 12 MAU extraction. MAU water level contours and the associated interpretation of MAU hydraulic capture for the Area 12 GWETS for October 2018 are also shown on **Figure 19**. Review of patterns of groundwater movement and the extent of hydraulic capture for the vicinity of Area 12 indicates that cones of depression occur as a result of MAU pumping at Area 12 extraction wells (MEX-1MA and SRP 23.6E,6.0N). Consistent with the achievement measure, direction of groundwater movement from the general vicinity of Hayden Road is to the east toward these cones of depression. Accordingly, compliance with the hydraulic capture component of the Area 12 remedy performance was achieved in 2018.

Table 12 summarizes annual average TCE concentrations for the period 1994 through 2018 at the following MAU indicator wells located within the capture zone specified in the GMEP for MAU extraction at the Area 12 GWETS: E-1MA, M-4MA, M-5MA, M-6MA, M-7MA, M-9MA, M-15MA, and PA-21MA. Annual average TCE concentrations at each of the specified Area 12 MAU monitor wells were computed for the period 1994 through 2018. Next, the annual, individual monitoring well average TCE concentrations were averaged to arrive at a combined Area 12 average for each year. The combined average TCE concentration for the Area 12 MAU indicator wells for 2018 was 5 µg/L. **Figure 24** depicts the computed 5-year running average TCE concentrations for Area 12 indicator wells. Using this combined annual average TCE value, the 5-year average was calculated to be 9 µg/L for the period 2014 through 2018. This value is lower than the average of 13 µg/L that was computed for the previous 5-year period (**Figure 24**). Accordingly, compliance with the mass reduction component of the Area 12 remedy performance was achieved in 2018.

As evidenced by data trends, some of which pre-date the 10-year hydrographs shown on **Figure 23**, substantial declines in TCE concentrations have been observed over time at monitor wells within the Area 12 zone of hydraulic containment corresponding to implementation of the Area 12 groundwater remedy. These data indicate that on-going groundwater extraction since 1999 has removed substantial TCE mass that was present in MAU groundwater in the vicinity of

Area 12. Data also show that trends in 5-year running average TCE concentrations in the groundwater zone captured by the Area 12 extraction wells, which were previously stable, have been declining fairly steadily over the last 4 years (**Figure 24**). While results demonstrate achievement of the mass removal component of the Area 12 remedy performance evaluation, they also suggest that looking at average TCE concentrations in wells within the capture zone for the Area 12 GWETS may no longer be a meaningful performance measure for assessment of the Area 12 remedy.

4.2.5 Evaluation of Northern LAU Hydraulic Capture

Assessment of hydraulic capture is predicated on a systematic process established in the GMEP to collect and track key groundwater monitoring program data to ensure achievement of groundwater containment performance standards. Performance standards for groundwater containment are defined in the SOW and require that the remedial action provide sufficient hydraulic control to prevent groundwater with TCE concentrations above clean-up standards from impacting peripheral wells outside of the plume. Specific GMEP performance criteria are intended to provide objective and protective indicators of containment and enable appropriate response actions to maintain plume containment.

The assessment of remedy performance for the northern LAU program involves demonstrating: 1) the consistent presence of a cone of depression in the vicinity of the northern LAU extraction wells tied into treatment (MRTF extraction wells and PCX-1); and 2) TCE concentrations at monitor wells PG-42LA and PG-43LA, and at extraction well PV-14, that are less than or equal to 2 µg/L.

The outline of the October 2018 LAU TCE plume is shown with October 2018 LAU water level contours on **Figure 20**. Arrows are provided to infer direction of groundwater movement along the periphery of and within the plume. While water level contours indicate that groundwater flow from the southwest margin to the north is controlled by regional pumping, the plume is ultimately captured at a broad cone of depression that occurs as a result of focused LAU pumping at the MRTF extraction wells (PV-15 and PV-14) and PCX-1. Additional capture is also provided by LAU pumping at CGTF extraction well COS-75A, and to a lesser extent at CGTF wells COS-71A and COS-72. Consistent with the specified performance measure, this groundwater flow pattern directs water from the LAU plume toward extraction wells tied into treatment. Capture zones were developed using the NIBW groundwater flow model and assume that future groundwater pumping is the same as was reported for 2018. Modeling was conducted to evaluate the extent to which operation of the NIBW remedy over the last year was consistent with hydraulic capture of the LAU plume to the north. Model-projected capture of the northern LAU plume is depicted on **Figure 25**.

With regard to reported TCE levels, compliance with the second achievement measure was not fully attained in 2018. As indicated in **Table 4**, as well as in **Appendix C**, TCE concentrations were above the 2 µg/L performance metric at monitor well PG-42LA for each of the quarterly samples obtained in 2018. TCE concentrations in all samples obtained at wells PG-43LA (**Table 4**) and PV-14 (**Table 5**), the other northern LAU indicator wells, were below the 2 µg/L performance metric. Changes in the northwestern part of the LAU plume continue to be closely monitored in relation to exceedance of GMEP performance measures at wells S-2LA and PG-42LA, as discussed in Section 1.3.2 and again below.

TCE concentrations were first reported to exceed the GMEP metric of 2 µg/L at well PG-42LA in 2011, and contingency response actions included data acquisition and analyses to further characterize LAU groundwater conditions. The overall findings from this nearly year-long effort indicated that the NIBW remedy was performing effectively to contain the northern LAU plume. Low-level TCE concentrations at well PV-14, which in 2018 ranged from <0.50 to 0.68 µg/L, continue to be relatively predictable and display a decreasing trend over the last 5 years (**Appendix C**). Further, TCE concentration trends at PV-15, which were increasing through 2014, have stabilized and begun to decline since that time (**Appendix C**). These positive responses are attributable to operation of the MRTF extraction wells and other PV production wells consistent with the optimized pumping strategy. Containment and capture of the leading edge of the northern LAU plume are demonstrated by multiple lines of evidence, including evaluation of water quality data, water level data, and groundwater modeling analyses. As indicated above, contingency actions associated with northern LAU capture were temporarily suspended in 2012 pending review and analysis by the NIBW Technical Committee to reassess GMEP performance measures and, as appropriate, establish updated metrics.

The effectiveness of the NIBW remedy in containing the northern part of the LAU plume hinges on the focused and consistent pumping of MRTF and NGTF extraction wells. The combined actions of other remedy components, such as groundwater extraction at CGTF, Area 7, and Area 12, are also critical to limit movement of TCE mass to the PV pumping center. Water quality trends in LAU monitor and extraction wells substantiate the effectiveness of the remedy. Based on the last 5 years of data, there are no statistically significant increasing TCE concentration trends in LAU monitor or extraction wells. Comparison of TCE mass removed over time at MRTF extraction wells PV-14 and PV-15 and NGTF extraction well PCX-1 shows that groundwater extraction from well PCX-1 has been responsible for over 90 percent of the historical TCE mass captured in the northern LAU, preventing a large portion of the LAU plume from reaching the PV wellfield. In 2018, extraction from well PCX-1 was responsible for about 89 percent of the combined mass removed at MRTF and NGTF extraction wells (**Table 8**).

Hydraulic capture of the northern LAU plume is strongly controlled by the distribution of pumping between the various wells in the vicinity of the PV well field and coordinated efforts to pump key extraction wells (PCX-1, PV-15, and PV-14) that are tied into treatment. **Figure 26** is a stacked bar chart showing total annual pumping volume for PV wells and PCX-1 for the time period 1990 through 2018. Wells are stacked in order of their position from south to north in the well field, such that annual pumpage for well PCX-1, the southern-most well, is on the bottom and annual pumpage for well PV-17, the northern-most well, is near the top of each bar. At the very top of each bar, pumping from SRP well 22.6E,10.0N, which is located southeast from well PV-14, has been added. Although this well is completed across both the MAU and LAU, it contributes to LAU pumping in this region when operated by SRP. Pumping volumes contributed by well PCX-1 and the MRTF extraction wells are shown in shades of red. Pumping volumes for wells without treatment are shown in shades of blue and green. A dashed line is provided to group the three southern wells that are tied into treatment (PCX-1, PV-15, and PV-14). SRP well 22.6E,10.0N is shown in pink.

Data displayed on **Figure 26** show that focused pumping of extraction wells PCX-1, PV-15, and PV-14 began in 1998 and continued over the subsequent 10 years. This pumping pattern effectively contained the northern LAU plume and limited impacts to peripheral production wells (including the more northerly PV wells and SRP 22.6E,10.0N). However, beginning in 2007, a decrease in the amount of pumping by MRTF extraction wells occurred and resulted in the first instance where TCE concentrations exceeded performance metrics at northern LAU indicator monitor well PG-42LA and then later at extraction well PV-14. Focused pumping of MRTF extraction wells was restored midway through 2010 and since that time EPCOR has, to the extent practicable, maintained a south to north pumping strategy. This pumping approach has been shown through model projections to optimize plume containment (**Figure 25**).

Based on all available data and model projections, and notwithstanding the performance measure issues at wells S-2LA and PG-42LA, the northern LAU remedy is operating effectively through implementation of a coordinated extraction and treatment strategy that optimizes plume containment. The findings indicate the northern LAU remedy meets overall groundwater containment performance standards defined in the Amended CD and SOW. More meaningful LAU performance measures may also be considered during the GMEP re-evaluation process.

4.2.6 Evaluation of Need for Modeling Analyses

The remedy for the NIBW Site established in the Amended ROD includes periodic use of modeling analyses to "assess the accuracy over time of projections in the Feasibility Study Addendum (FSA)". In the GMEP, the NIBW PCs presented, and EPA and ADEQ approved, an approach to determining when modeling analyses would be considered, what the scope of modeling analyses would comprise, and how results of modeling analyses would be used.

The NIBW model has been a useful tool for specific analyses over time, such as predicting patterns of groundwater movement and hydraulic capture associated with groundwater pumping occurring at the Site or changes to the pumping regime. The model was used in 2012 to support decisions regarding pumping changes associated with COS end-use of water extracted from well PCX-1 and replacement of existing CGTF extraction well COS-71 with new extraction well COS-71A. It was also used in 2013 and 2014 to evaluate alternate locations for installation of replacement well 7EX-6MA to enhance the Area 7 MAU source control program. In early 2016, the NIBW PCs used the model to evaluate hydraulic capture for the MAU and LAU remedial systems to provide the EPA Five-Year Review team with information to evaluate remedy performance. The groundwater flow model was updated at the time, with modifications made to hydraulic properties, model boundaries, and groundwater pumping rates and distributions (where appropriate). Particle tracking was used to delineate individual capture zones for each remedial action extraction well. If changes are proposed to specific components of the remedial action or if contingency conditions at selected wells warrant further evaluation, the NIBW model will be updated and utilized to support the decision making process in 2019.

4.3 ASSESSMENT OF GROUNDWATER TREATMENT PERFORMANCE STANDARDS

Performance of the NIBW groundwater treatment systems is evaluated based on criteria established in the SOW and compliance with Groundwater Cleanup Standards specified in the Amended ROD. The following sections summarize monitoring data obtained during 2018 with respect to groundwater treatment performance standards at the five treatment facilities.

As described previously, the second Five-Year Review completed for the NIBW Site in 2016 concluded that the overall remedy was both protective and effective. With respect to the groundwater extraction and treatment systems, however, EPA noted that “based on the revised toxicity values for TCE and the increase in TCE air emissions concentrations at Area 12, the air emissions exposure pathway for [treatment] facilities should be reassessed”. EPA recommended collection of ambient air samples from the vicinity of the treatment facilities and completion of updated exposure assessments for air emissions. In 2017, the PCs collected ambient air and extra treatment system air samples and conducted air modeling to evaluate potential inhalation risks to commercial and/or residential receptors in the vicinity of the treatment facilities that utilize air stripping (Area 7, Area 12, CGTF, and MRTF). The PCs coordinated closely with EPA prior to and during the course of this work, including sharing results and discussing appropriate next steps. Ambient air investigations continued in 2018, and the PCs summarized combined 2017 and 2018 work in the following two reports: 1) *Air Dispersion Modeling Approach and Results*, and 2) *Results of Ambient Air Monitoring 2017-2018*, both dated August 24, 2018. Any further ambient air data collected or air modeling conducted by the PCs in 2019 will be shared with EPA and the Technical Committee.

4.3.1 Evaluation of the Central Groundwater Treatment Facility

Section III.C of the SOW requires that treated groundwater from the CGTF meet cleanup standards for NIBW COCs, as set forth in Table 3 of the Amended ROD. Cleanup standards defined in Table 3 are shown as follows.

Contaminants of Concern	**Cleanup Standard (µg/L)**
Trichloroethene (TCE)	5.0
Tetrachloroethene (PCE)	5.0
1,1-Dichloroethene (DCE)	6.0
1,1,1-Trichloroethane (TCA)	200
Chloroform	6.0*

* Chloroform produced as a byproduct of municipal water supply disinfection is exempt from the treatment standard for chloroform identified in Table 3 of the Amended ROD.

Throughout 2018, samples of treated groundwater were collected from the common sump at the CGTF and analyzed for the NIBW COCs on a weekly basis when the treatment facility was in operation. NIBW COC concentrations in all common sump samples consistently achieved and exceeded the cleanup standards set forth in Table 3 of the Amended ROD. Compliance monitoring data indicate all common sump samples were at or below the 0.50 µg/L MRL for TCE and the other NIBW COCs. Quarterly results for treatment system performance sampling conducted by COS at the CGTF are reported to EPA and ADEQ under separate cover.

4.3.2 Evaluation of the Miller Road Treatment Facility

Section III.C of the SOW requires that treated groundwater from the MRTF meet the cleanup standards set forth in Table 3 of the Amended ROD. Further, treated groundwater from the MRTF discharged to SRP's system through an Arizona Canal outfall is required to meet requirements of an AZPDES permit.

Results of MRTF sampling and analysis are included in **Table 9**. NIBW COC concentrations in all treated groundwater samples from MRTF treatment trains for wells PV-14 and PV-15 consistently achieved the cleanup standards set forth in Table 3 of the Amended ROD in 2018. Compliance monitoring data, presented in Level 4 data analytical reports as part of the supplemental data reports submittal, indicate all samples were below the 0.50 µg/L MRL for TCE and the other NIBW COCs.

4.3.3 Evaluation of NIBW GAC Treatment Facility

EPA selected GAC treatment of groundwater at the NGTF as the long-term solution for extraction well PCX-1 in the Explanation of Significant Differences (ESD) dated March 2012. The ESD does not change any of the Applicable or Relevant and Appropriate Requirements previously identified by EPA and therefore requires that treated groundwater from the NGTF meet the cleanup standards set forth in Table 3 of the Amended ROD. Further, treated groundwater from the NGTF that is discharged to the SRP water supply system at the Arizona Canal is required to meet the requirements of an AZPDES permit.

Results of NGTF sampling and analysis are included in **Table 9**. As evidenced from the laboratory data for treatment plant discharges to both the CWTP (NGTF CP) and to the SRP Arizona Canal (referred to Outfall 001 for AZPDES samples and AZCO for COS samples), NIBW COC concentrations in all treated water samples were below their respective MCLs in 2018. The NGTF consistently achieved the cleanup standards set forth in Table 3 of the Amended ROD. In fact, performance monitoring data indicate all treated water samples were below the 0.50 µg/L MRL for TCE, PCE, 1,1-DCE, and TCA in 2018.

Treated groundwater discharged to the SRP water supply system at the Arizona Canal outfall was tested monthly for TCE, PCE, and pH; quarterly for inorganic water quality parameters; and at least semi-annually for 1,1-DCE, TCA, and Chloroform, as required by the AZPDES permit. The results of sampling and analyses, presented in monthly DMRs submitted to ADEQ, document that the discharge met the requirements of the AZPDES permit throughout the 2018 operating period.

4.3.4 Evaluation of the Area 7 Groundwater Treatment System

Section III.C of the SOW requires that treated groundwater from the Area 7 GWETS meet cleanup standards set forth in Section XII.B.7.b of the Amended ROD. Specifically, in the case of Area 7, treated water used to recharge the UAU aquifer must meet substantive requirements of the Underground Injection Control (UIC) Program.

Discharges of treated water to the UAU aquifer via injection wells at Area 7 that are subject to the UIC Program are regulated in Arizona by ADEQ under the Aquifer Protection Permit (APP) Program. The APP Program requires that any discharges to an aquifer must not cause or contribute to a violation of the Aquifer Water Quality Standards (AWQS). In Arizona, all groundwater is classified for drinking water protected use, so the AWQS are primary drinking water standards by rule. If an AWQS is already exceeded at the point of compliance in groundwater, then the discharge must not cause further degradation of the aquifer with respect to the parameter that exceeds the standard.

Throughout 2018, samples of treated groundwater were collected from air stripper effluent at the Area 7 GWETS and analyzed for NIBW COCs on a monthly frequency when the system was in operation. The results of sampling and analysis are included in **Table 9**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from the Area 7 GWETS (SP-105) were below their respective MCLs in 2018; therefore, the discharge meets Arizona AWQS for these parameters. Results for treated groundwater from the Area 7 GWETS in 2018 showed that all of the NIBW COCs were below the MRL of 0.50 µg/L (**Table 9**), with the exception of the sample collected on December 19, 2018, which had a TCE value of 0.62 µg/L. This is below the cleanup standard of 5.0 µg/L. Treatment system adjustments were made in response to the TCE detection. No other detections occurred in treated water samples collected at SP-105 in 2018.

Treated groundwater that is discharged to Area 7 injection wells recharges the UAU groundwater system. Inorganic water quality in the UAU is typically poorer than that of treated groundwater from the Area 7 GWETS, which is derived from the MAU. As discussed in Section 2.4.2 of this report and evidenced by inorganic water quality data reported in the supplemental data submittal for October 2018 (issued under separate cover), injection of treated water from the Area 7 GWETS does not contribute to further degradation of inorganic water quality in UAU groundwater.

4.3.5 Evaluation of the Area 12 Groundwater Treatment System

Section III.C of the SOW requires that treated groundwater from the Area 12 GWETS meet cleanup standards set forth in Section XII.B.7.b of the Amended ROD. Specifically, in the case of Area 12, treated water that is discharged to the SRP water supply system must meet substantive requirements of the governing AZPDES permit.

Throughout 2018, samples of treated groundwater were collected from air stripper effluent at the Area 12 GWETS and analyzed for NIBW COCs on a monthly frequency when the system was in service. The results of sampling and analysis are included in **Table 9**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from the Area 12 GWETS (WSP-2) were below their respective MCLs in 2018. Therefore, discharges from Area 12 GWETS met the requirements of the AZPDES permit. Results for treated groundwater from the Area 12 GWETS in 2018 showed that all of the NIBW COCs were below method detection limits, with the exception of the sample collected on August 1, 2018, which had a TCE value of 1.4 µg/L. Although this concentration is significantly below the cleanup standard of 5.0 µg/L, and was considered anomalous, the treated water was re-sampled on August 11, 2018. Re-sample results were below the method detection limit (**Table 9**). Additional sampling and analysis for physical and inorganic water quality parameters is reported in monthly DMRs submitted to ADEQ and EPA.

4.4 PROGRESS TOWARD ACHIEVEMENT OF REMEDIAL ACTION OBJECTIVES

EPA established seven Remedial Action Objectives (RAOs) for the NIBW Site in the September 2001 Amended ROD. The following is a qualitative discussion of the progress achieved in satisfying RAOs, based on review of data through 2018. Details regarding data that provide a more quantitative basis to support the following qualitative statements regarding specific aspects of the remedy are provided in earlier sections of the report.

Remedial Action Objective #1:

Restore the Upper, Middle, and Lower Aquifers to drinking water quality by decreasing the concentrations of the contaminants of concern to below the cleanup standards.

Significant progress has been made towards the removal of NIBW COCs and restoration of groundwater to drinking water quality with respect to these COCs. In 2018, the NIBW remedial actions resulted in the extraction and treatment of 5.5 billion gallons of groundwater and removal of over 2,000 pounds of TCE, as shown in **Table 8**. From the inception of the NIBW groundwater remedy in 1994, about 125 billion gallons of groundwater have been extracted to remove an estimated 93,000 pounds of TCE. Furthermore, soil remedial actions (as discussed in RAO #6) have eliminated the threat to groundwater from historical sources of TCE at EPA-identified source areas. As a consequence, TCE concentrations have dramatically decreased in the UAU and significantly decreased in portions of the MAU and LAU.

The most significant declines observed in TCE concentrations are in UAU groundwater. According to UAU mass flux calculations, the estimated VOC mass in the UAU has declined from about 11,100 pounds in 1993 to approximately 200 pounds in 2018, representing a decrease of about 98 percent in the past 25 years (**Figure 18**). TCE concentrations in the UAU have decreased correspondingly. In 2018, the MCL for TCE was exceeded at only one monitoring well, with a TCE concentration of 29 µg/L at well PG-31UA. Historically, TCE concentrations in UAU groundwater were two to three orders of magnitude higher than at present. The extent of VOC impact in the UAU has also been greatly reduced, as evident in **Figure 10**, where only a small, localized TCE plume remains down-gradient from Area 7. Based on the widespread decrease of TCE in UAU groundwater throughout the NIBW Site, EPA approved and the NIBW PCs conducted formal abandonment of a total of 43 UAU monitor wells, including one in 2018.

Evidence of progress toward restoration in the MAU and LAU is also significant. Based on the last 5 years of data, stable to declining TCE concentrations are evident in all but one (PA-10MA) of the MAU monitor wells, all LAU monitor wells, and all extraction wells (**Appendix C**). Within the MAU, these data point to the impact of significant mass removal that has taken place since initiation of the MAU source control programs. Since non-increasing 5-year trends are seen throughout the MAU, water quality data demonstrate the effectiveness of MAU source control in both containing and treating relatively higher TCE concentrations and limiting TCE mass migration to the western margin (**Figures 21 and 23**).

Within the LAU, non-increasing 5-year trends demonstrate that consistent operation of CGTF extraction wells, particularly COS-75A, has captured and limited the migration of higher TCE concentrations to the northern LAU extraction wells connected to the NGTF and MRTF. With the exception of wells S-2LA and PG-42LA, which show increasing trends based on the last 10 years of data, TCE concentrations observed in the northern LAU are showing stable to declining trends (**Figure 25 and Appendix C**). While increases at some wells are anticipated based on the remedy design for migration of LAU mass toward PCX-1 and the MRTF extraction wells, stabilizing and/or declining trends at other wells indicate that mass migration toward the northern LAU is being effectively controlled by extraction wells COS-75A and PCX-1. Monitoring data reported on an on-going basis in **Table 8** indicate that, consistent with previous years, pumping of well PCX-1 captured about 89 percent of the TCE mass extracted and treated by northern LAU extraction wells in 2018.

Remedial Action Objective #2:

Protect human health and the environment by eliminating exposure to contaminated groundwater.

As discussed in Section 4.3, groundwater that is extracted as part of the NIBW Site remedy has been treated to meet the groundwater cleanup standards specified in the Amended ROD.

Remedial Action Objective #3:

Provide the City of Scottsdale with a water source that meets MCLs for NIBW contaminants of concern.

The CGTF was constructed to provide treatment of TCE-impacted groundwater for COS beneficial use. Since the CGTF began operation under COS in 1994, the CGTF has treated about 65 billion gallons of groundwater to levels safely below drinking water MCLs for the NIBW COCs. The treated groundwater is blended with other potable sources and used as a supply to the COS municipal water system.

Although not COCs, increasing concentrations of inorganic constituents have impacted COS's ability to pump, treat, and serve water from certain key remedial extraction wells through its municipal system (see Section 2.1). A post treatment acid feed system at the CGTF was brought on-line in 2017 to adjust the pH of the treated water from CGTF to address calcium carbonate scale in COS's system. The PCs collaborated with COS in 2017 and 2018 to develop solutions that enabled COS to manage its inorganic challenges, while continuing to support extraction and treatment to provide for TCE plume containment. By prioritizing pumping between CGTF extraction wells, COS was able to maintain near-continuous pumping at critical LAU extraction well COS-75A (**Table 8**). This was achieved by shifting pumping away from well COS-71A, which has less favorable water quality, to wells COS-31 and COS-72, which have more favorable inorganic water quality; shifting was done as needed based on demand. While prioritizing pumping at wells COS-31 and COS-72 over well COS-71A has an impact on the remedy, the PCs will continue to work with COS in 2019 to achieve plume containment and mass removal objectives in a manner that supports municipal supply needs.

Remedial Action Objective #4:

Achieve containment of the groundwater contamination plume by preventing any further lateral migration of contaminants in groundwater.

As discussed in Section 4.2, the combined groundwater extraction tied to treatment at the CGTF, MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS has achieved hydraulic containment throughout the MAU/LAU plume. Water level data continue to demonstrate that the direction of groundwater movement within the MAU/LAU plume is generally toward NIBW extraction wells or the western margin. TCE concentrations at monitor wells located near the edge or along the periphery of the MAU/LAU plume show decreasing trends in many parts of the Site. In cases where increasing trends at specific wells have been noted (wells S-2LA and PG-42LA), the NIBW PCs continue to evaluate and report trends to the Technical Committee to ensure that the overall objectives of the LAU remedy are maintained.

Remedial Action Objective #5:

Reuse of the water treated at the Site to the extent possible in accordance with Arizona's Groundwater Management Act.

Treated water produced by all five NIBW groundwater treatment facilities is beneficially used. The CGTF and NGTF provide treated groundwater as a supply to the COS potable water system, or may alternately deliver treated water to SRP. The MRTF treats groundwater for use by EPCOR. At Area 7, treated groundwater is delivered to shallow injection wells that recharge the UAU aquifer. At Area 12, treated groundwater is provided to the SRP water system for irrigation use. All NIBW end-uses are consistent with beneficial use designations of ADWR and in accordance with the Groundwater Management Act. Furthermore, the NIBW remedy has incorporated COS, SRP, and EPCOR as end users of treated groundwater in lieu of groundwater pumping they have historically conducted and would have otherwise relied upon in this area.

Remedial Action Objective #6:

Mitigate any soil contamination that continues to impact groundwater.

As described in Section 3.0, the NIBW PCs have implemented soil remediation at four EPA-identified source areas, including Areas 6, 7, 8, and 12. The collective soil remediation has resulted in the removal of over 10,000 pounds of TCE from the unsaturated zone and eliminated these sources as an ongoing threat for groundwater impacts.

Remedial Action Objective #7:

Provide long-term management of contaminated groundwater to improve the regional aquifer's suitability for potable use.

The NIBW PCs have closely coordinated the planning and implementation of NIBW remedial actions with the key water providers, including COS, SRP, and EPCOR. The efforts have strongly focused on defining mutually beneficial objectives for all parties involved in the remedy. For example, the NIBW remedy requires consistent and reliable groundwater extraction in the areas most favorable for capture and containment of the MAU/LAU plumes. The water providers have considerable, but variable, water demands in the NIBW Site area and a system of existing wells and infrastructure available for groundwater production.

Through technical discussions and cooperation, the parties have taken a number of steps to focus groundwater extraction and end uses for optimum water resource management. For example, the NIBW PCs have installed, modified, and replaced, as needed, a number of the water provider wells to improve groundwater plume capture and mass removal. To assure that the water providers can utilize the treated groundwater, the NIBW PCs have upgraded treatment systems and enhanced infrastructure and control systems for the water providers. The water providers have cooperated by prioritizing pumping to meet water demands using those wells most beneficial to the remedy.

In 2018, the PCs continued to work with COS to help balance inorganic loading to their municipal system. Although not COCs, increasing concentrations of inorganic constituents have impacted COS's ability to accept water from certain key remedial extraction wells. Through discussions with the Technical Committee, solutions were developed and are being implemented that enable COS to manage inorganic challenges, while continuing to support extraction and treatment to provide for TCE plume containment. As mentioned previously, this balancing has been achieved through prioritized pumping of specific CGTF extraction wells.

4.5 MANAGEMENT OF UNTREATED GROUNDWATER

Section VI.B.4.n of the SOW requires COS, SRP, and the NIBW PCs to provide a report describing the creation and maintenance of records to document compliance with Section VI.B.4.a through VI.B.4.m of the SOW. Section VI.B.4 specifies provisions for managing untreated groundwater extracted from NIBW wells as part of the remedy and requires that groundwater be managed as if it were a hazardous waste by following the requirements set forth in Sections VI.B.4.a through VI.B.4.m. The NIBW PCs, SRP, and COS are submitting the following information to fulfill the requirements for annual reporting of compliance with Section VI.B.4 of the SOW. For ease of reference, information regarding COS, SRP, and the NIBW

PCs management practices pertaining to applicable requirements of Section VI.B.4 are referenced in the order listed in the SOW.

Section VI.B.4.a – normal operation, maintenance, and monitoring activities:

The NIBW PCs have specified procedures for management of untreated groundwater associated with sampling activities at the MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS and well equipment maintenance in O&M Plans that were approved by EPA and ADEQ, as follows:

- MRTF on August 26, 2014
- NGTF on June 24, 2013, updated March 31, 2016
- Area 7 GWETS on April 7, 2014
- Area 12 GWETS on April 7, 2014

The NIBW PCs followed procedures described in the Phase I SAP for managing untreated groundwater during monitor well sampling. In 2018, access was restricted at times during maintenance activities conducted at SRP NIBW extraction well sites. There were no accidental releases of untreated groundwater from SRP wells tied into treatment at the Site in 2018, including PCX-1, COS-31, or the Granite Reef well.

COS has specified procedures for management of untreated groundwater associated with sampling activities at the CGTF and well equipment maintenance in the most-recent O&M Plan (submitted for EPA approval on August 3, 2018).

One minor incidental release of untreated groundwater from well COS-75A occurred in 2018. On January 20, 2018 while conducting routine monthly inspections of air relief valves on the raw water pipelines, Air Relief Valve (ARV) #16 was found to be leaking. Testing was not performed due to insufficient sample volume and rain immediately followed the leak.

Section VI.B.4.c – well access:

The Final Remedial Design/Remedial Action (RD/RA) Work Plan, prepared by the NIBW PCs, dated July 11, 2007, provides information concerning well access at the extraction well sites.

Section VI.B.4.d – annual treatment facility inspections:

Each NIBW groundwater treatment facility is inspected on a routine basis, as part of the normal O&M procedures, for equipment malfunction and deterioration that could result in the release of untreated groundwater.

As explained in Section 2 and **Appendix D** of this SMR, the NIBW PCs coordinated inspections of the NGTF, CGTF, and Area 7 on December 19, 2018, and MRTF and Area 12 GWETS on December 20, 2018, in accordance with Section VI.B.4.d of the SOW. Representatives of EPA were present for the annual inspections at each of the treatment facilities. The treatment facilities were inspected for malfunctions, deterioration, and operator practices or errors that could result in a release of untreated groundwater. At each facility, the major system components were identified and examined for operability, condition of operating equipment, and management of untreated groundwater and residual materials. Additionally, data related to routine operation, system startup and shutdown, routine and non-routine maintenance, and sampling were available for review.

The inspections indicate that the facilities are in good working condition and are operated proficiently. Based on these findings, the NIBW PCs conclude the facility operations comply with the Amended CD/SOW. No hazardous waste is generated, handled, or stored at the NIBW groundwater treatment plants. A summary report documenting the site inspection for each facility is provided in **Appendix D**.

Section VI.B.4.e – training for responding to releases of untreated groundwater:

The NIBW PCs submitted a plan for health and safety training of GWETS Operators and Emergency Coordinators to EPA as part of materials included in an August 1, 2003, "Submittal of Information Required, Section VI of the Statement of Work" provided to EPA and ADEQ. The plan specified steps to be conducted for personnel at all groundwater treatment facilities to assure that they will have appropriate health and safety training to respond to releases of untreated groundwater in a manner to protect public health and the environment.

In 2018, COS provided on-line emergency response and incident management training for an untreated groundwater release for CGTF, NGTF, and Area 7 GWETS raw water pipelines. The training sessions are performed on-line and the training is tracked within the COS training management program.

The Contingency and Emergency Response Plan (CERP) for Accidental Releases of Untreated Groundwater from SRP North Indian Bend Wash Site Extraction Wells, prepared by SRP, dated January 2007, and updated September 2012, describes the training to be conducted for personnel responding to an accidental release of untreated groundwater from an SRP facility. SRP employee training records are maintained on site.

Section VI.B.4.f and g – land disposal of untreated groundwater:

The NIBW PCs, SRP, and COS have not placed untreated groundwater in any salt dome formation, salt bed formation, underground mine or cave, surface impoundments, waste piles, land treatment units, incinerators, or landfills.

Section VI.B.4.h – emergency and contingency response plans:

The EPA approved CERPs for the CGTF, MRTF, Area 7 GWETS, Area 12 GWETS, and SRP Extraction Wells in 2007. The NIBW PCs prepared updated CERPs for the MRTF (updated August 2014), Area 7 GWETS (updated May 2014) and Area 12 GWETS (updated May 2014); COS prepared the CGTF CERP (updated August 2012); and SRP prepared an updated CERP for SRP extraction wells used in the NIBW Site remedial actions (updated September 2012 and again in May 2014). The NIBW PCs submitted a CERP for NGTF in May 2014.

The CERPs describe the procedures for handling an accidental release of untreated groundwater from an extraction well in the NIBW site.

<u>Section VI.B.4.i – emergency coordinators:</u>

The NIBW PCs, COS, and SRP list designated emergency response coordinators for the groundwater treatment facilities and the extraction well network. Currently identified personnel responsible for emergency response at the NIBW groundwater treatment facilities and extraction well sites are listed in **Appendix A**.

<u>Section VI.B.4.j – evidence of Holocene faults:</u>

The NIBW PCs and SRP provided written verification in submittals dated August 1, 2003 and September 3, 2003, respectively, to EPA and ADEQ indicating the existing NIBW extraction wells and treatment facilities are not located within 200 feet of a fault, which has exhibited displacement in Holocene time. There are no recognized Holocene faults in the metropolitan Phoenix area. COS also provided this verification in July 2003.

<u>Section VI.B.4.k – floodplains:</u>

COS, NIBW PCs, and SRP provided information in submittals dated July, August, and September, 2003, respectively, to EPA and ADEQ to confirm that four NIBW extraction wells are in locations that would be inundated by a 100-year flood. The NIBW PCs described measures for operating the wells in the draft Groundwater Extraction Well Network O&M Plan to ensure that there will not be a release of untreated groundwater during a 100-year storm.

Section VI.B.4.l – closure:

NIBW PCs, SRP and COS did not abandon any extraction or production wells associated with the NIBW project in 2018. There were no facility closure activities in 2018. One monitor well, PG-3UA, was abandoned following approval from EPA.

Section VI.B.4.m – containment:

The Remedial Design/Remedial Action (RD/RA) Work Plan provides information concerning containment at the extraction well sites.

5.0 SUMMARY

As set forth herein and consistent with the conclusions reached by EPA in the second Five-Year Review report that was issued in 2016, the NIBW Superfund Site remedial actions continue to result in an effective groundwater remedy that is operating as designed. **Table 8** summarizes the estimated rates and volumes of groundwater extracted and TCE mass removed in 2018 at each of the extraction wells connected to treatment. The collective remediation efforts through 2018 have achieved significant progress toward the long-term goal of aquifer restoration while providing plume containment and beneficial use of vital groundwater resources. Continued progress is anticipated through ongoing operation and monitoring of the NIBW remedial action program in 2019.

6.0 DOCUMENTS SUBMITTED IN 2018

During the period January through December 2018, the NIBW PCs and SRP provided the following documents to EPA and ADEQ.

Results of Winter Indoor Air Monitoring at NIBW Area 7 (to date), electronic mail submitted by NIBW PCs on January 18, 2018.

Air Sampling Results Request (7531 E. 2nd St), electronic email submitted by NIBW PCs February 5, 2018.

Results Map, electronic mail submitted by NIBW PCs on February 16, 2018.

Draft Area 7 Indoor Air Results Figure from February Technical Committee Meeting, February 21, 2018.

2017 Site Monitoring Report, North Indian Bend Wash Superfund Site, Volume I: Text, Tables, and Illustrations and Volume II: Appendix A-F, technical report submitted on February 28, 2018.

Groundwater Monitoring Program Supplemental Data, North Indian Bend Wash Superfund Site, data submittal on February 28, 2018.

Groundwater Extraction and Treatment System Supplemental Data, North Indian Bend Wash Superfund Site, data submitted on February 28, 2018.

Supplemental Data Collection at the Area 7 GWETS During October 2016, NIBW Superfund Site, data submitted on February 28, 2018.

Summary of 2016 Air Sampling Data, North Indian Bend Wash Superfund Site, data submitted on February 28, 2018.

NIBW Indoor Air Results – 7608 E. 4th Street, electronic mail submitted by NIBW PCs on March 9, 2018; revised from submittal March 7, 2018.

NIBW Area 2, electronic mail submitted by NIBW PCs on March 9, 2018.

3620 N. Miller Road – Indoor Air and Sub-slab Soil Vapor Sampling Results – NIBW Area 7, electronic mail submitted by NIBW PCs on March 23, 2018.

NIBW - AREA 7 RESULTS FOR INDOOR AIR AND RELATED INVESTIGATIONS – two files containing results for indoor air monitoring conducted during 2017 and 2018 at NIBW Area 7, electronic mail submitted by NIBW PCs on April 3, 2018.

NIBW Area 7 Soil Gas Sampling Points - Results and Recommendation for Abandonment, electronic mail submitted by NIBW PCs on April 19, 2018.

NIBW Tech Committee Meeting Presentation Materials – May 10, 2018, electronic mail submitted by NIBW PCs on May 14, 2018.

EPCOR Water 2017 Water Quality Report for Paradise Valley, consumer confidence report submitted via electronic mail by NIBW PCs on May 18, 2018.

Quarterly Report, January through March 2018, North Indian Bend Wash Superfund Site, report submitted by NIBW PCs on May 24, 2018.

Indoor Air Investigations to Evaluate Potential for Vapor Intrusion, North Indian Bend Wash Superfund Site, report submitted by NIBW PCs on June 8, 2018.

Vapor Mitigation System Installation Report North Indian Bend Wash Site The Tides Apartments Miller Road Scottsdale, Arizona, North Indian Bend Wash Superfund Site, June 2018, report submitted by NIBW PCs on June 8, 2018.

Request for Determination on Air Emissions Controls at the North Indian Bend Wash (NIBW) Central Groundwater Treatment Facility (CGTF), June 22, 2018, electronic mail submitted by NIBW PCs on June 22, 2018.

NIBW Technical Committee Meeting - SGS Point Map Shown, electronic mail submitted by NIBW PCs on June 28, 2018.

NIBW Overview, Groundwater Remediation Status, and Vapor Intrusion, July 20, 2018, electronic mail submitted by NIBW PCs on July 23, 2018.

NIBW Overview Presentation - Plume Animation, electronic mail submitted by NIBW PCs on July 24, 2018.

NIBW Treatment System & Ambient Air Data Package #2: Treatment System Air Monitoring and Ambient Air Data Summary, Area 12 Data Package and Ambient Air Monitoring Sampling and Analysis Plan (2006), electronic mail submitted by NIBW PCs on July 27, 2018, an email containing five documents originally submitted to EPA on September 30, 2016.

> **Sampling and Analysis Plan – Ambient Air Monitoring**, prepared by NIBW PCs on December 8, 2006.
>
> **Area 12 Groundwater Extraction and Treatment System Ambient Air Sampling**, map, tables and graph prepared by NIBW PCs in 2016.

> **Area 7 Groundwater Extraction and Treatment System Ambient Air Sampling**, map, tables and graph prepared by NIBW PCs in 2016.
>
> **Central Groundwater Extraction and Treatment System Ambient Air Sampling**, map, tables and graph prepared by NIBW PCs in 2016.
>
> **Miller Road Treatment Facility Ambient Air Sampling**, map, tables and graph prepared by NIBW PCs in 2016.

Follow-up to Request for Letter of Determination, electronic mail containing five files submitted by NIBW PCs on August 1, 2018.

> **Follow-up to Request for Letter of Determination at the CGTF**, letter prepared by NIBW PCs on August 1, 2018.
>
> **Revised Human Health Risk Assessments for Central Groundwater Treatment Facility and Area 7 Groundwater Extraction and Treatment System**, letter submitted by NIBW PCs on February 23, 2007.
>
> **Estimated Associated Emissions for Granular Activated Carbon Treatment 2016/2017: Central Groundwater Treatment Facility**, table prepared by NIBW PCs.
>
> **Cost Estimates for CGTF GAC Upgrades**, zip file containing separate cost estimates from Gannett Fleming and Currier Construction.

Summary of Ambient Air Modeling and Sampling at NIBW Treatment Facilities, electronic mail submitted by NIBW PCs on August 9, 2018.

NIBW Sampling Results for 7620 E 4th Street, electronic mail submitted by NIBW PCs on August 10, 2018.

Air Dispersion Modeling Approach and Results, NIBW Groundwater Treatment Facilities, electronic mail submitted by NIBW PCs on August 24, 2018.

Results of Ambient Air Monitoring 2017-2018, electronic mail submitted by NIBW PCs on August 24, 2018.

Work Plan 2017-2018 Ambient Air Monitoring, electronic mail submitted by NIBW PCs on August 24, 2018.

Quarterly Report, April through June 2018, North Indian Bend Wash Superfund Site, report submitted by NIBW PCs on August 29, 2018.

NIBW Contact List, electronic mail submitted by NIBW PCs on August 30, 2018.

NIBW Contact List (updated), electronic mail submitted by NIBW PCs on September 4, 2018.

Indoor Air and VI Mitigation Reports, electronic mail containing six documents submitted by NIBW PCs on September 18, 2018, and re-submitted on September 27, 2018.

> **Vapor Mitigation System Installation Report, North Indian Bend Wash Site, The Tides Apartments, Miller Road, Scottsdale, AZ**, report prepared by Vapor Mitigation Sciences, LLC June 2018.
>
> **Letter Report for the Baseline Monitoring Event for the Recently Installed Vapor Intrusion Mitigation System at the Tides at Old Town Apartments, 3620 N. Miller Road, Scottsdale, AZ**, letter report prepared by Vapor Mitigation Sciences, LLC on September 18, 2018.
>
> Summary tables for private residences: **North Indian Bend Wash – Area 7 – Results for Indoor Air and Related Investigations, 3620 N. Miller Rd. – Units 49, 51, 52, and 53**, tables prepared by NIBW PCs.

Shallow Soil Gas Investigations to Evaluate Potential for Vapor Intrusion, electronic mail containing a master report and seven area-specific attachments (Area 3, 5C, 7, 8, 9, 11, and 12) submitted by NIBW PCs on September 27, 2018.

Groundwater Monitoring and Evaluation Plan Update Discussion Presentation, electronic mail submitted by NIBW PCs on October 16, 2018.

NIBW Area 7 Indoor Air Sampling Results – 3719 N. 75th Street, electronic mail submittal of map and summary table by NIBW PCs on October 19, 2018.

Quarterly Report, July through September 2018, North Indian Bend Wash Superfund Site, report submitted by NIBW PCs on November 21, 2018.

Response to September 18, 2018 Letter, electronic mail submittal of letter and attachments by NIBW PCs on November 29, 2018.

> **Response to September 18, 2018 Letter from EPA relative to Request for Determination on Air Emissions Controls at the North Indian Bend Wash (NIBW) Central Groundwater Treatment Facility (CGTF)**, letter and figures from NIBW PCs on November 29, 2018.

The September 18, 2018 Letter of the Environmental Protection Agency (EPA) Responding to Motorola's June 22, 2018 Letter Regarding Removal of Carbon Treatment at the Central Groundwater Treatment Facility, letter from Shook Hardy & Bacon on November 29, 2018.

Letter from Hazardous Substance & Waste Management Research, Inc. on November 27, 2018.

2018 NIBW Technical Committee Meeting Minutes:

January 23rd, 2018 Technical Committee Meeting Minutes, electronic mail submitted by NIBW PCs on February 13, 2018.

February 14th, 2018 Technical Committee Meeting Minutes, electronic mail submitted by NIBW PCs on March 16, 2018.

March 23rd, 2018 Technical Committee Meeting Minutes, electronic mail submitted by NIBW PCs on April 2, 2018.

May 10th, 2018 Technical Committee Meeting Minutes, electronic mail submitted by NIBW PCs on May 17, 2018.

June 27th, 2018 Technical Committee Meeting Minutes, electronic mail submitted by NIBW PCs on July 23, 2018.

July 25th, 2018 Technical Committee Meeting Minutes, electronic mail submitted by PCs on August 27, 2018.

August 28th Technical Committee Meeting Minutes, electronic mail submitted by PCs on September 12, 2018.

September 24th Technical Committee Meeting Minutes, electronic mail submitted by PCs on October 1, 2018.

October 15th Technical Committee Meeting Minutes, electronic mail submitted by PCs on November 7, 2018.

November 5h Technical Committee Meeting Minutes, electronic mail submitted by PCs on December 5, 2018.

TABLES

TABLE 1. SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS TAKEN BY MONTGOMERY & ASSOCIATES, NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA, APRIL 2018

MONITOR WELL IDENTIFIER	MEASUREMENT DATE	DEPTH TO WATER (ft, bls)	GROUNDWATER ALTITUDE (ft, amsl)
B-1MA	4/25/18 16:27	89.73	1,100.53
B-1UA	Not included in April monitoring event		
B-J	Not included in April monitoring event		
D-2MA	4/24/18 9:23	116.71	1,123.32
E-1LA	4/26/18 12:44	140.49	1,074.51
E-1MA	4/26/18 12:31	130.66	1,083.71
E-1UA	Not included in April monitoring event		
E-2UA	Not included in April monitoring event		
E-5MA	4/25/18 17:41	106.39	1,093.04
E-5UA	Not included in April monitoring event		
E-6UA	Not included in April monitoring event		
E-7LA	4/25/18 11:43	113.99	1,083.80
E-7UA	Not included in April monitoring event		
E-8MA	4/25/18 17:54	96.45	1,096.44
E-10MA	4/23/18 17:53	145.69	1,098.18
E-12UA	Not included in April monitoring event		
E-13UA	Not included in April monitoring event		
E-14LA	4/24/18 15:00	168.10	1,085.85
M-1MA	4/25/18 14:14	120.92	1,089.97
M-2LA	4/26/18 16:59	129.58	1,080.65
M-2MA	4/26/18 17:48	117.43	1,092.63
M-2UA	Not included in April monitoring event		
M-3MA	4/26/18 16:11	107.60	1,097.95
M-4MA	4/26/18 14:26	125.52	1,089.38
M-5LA	4/26/18 14:40	137.76	1,079.70
M-5MA	4/26/18 14:50	137.93	1,079.50
M-6MA	4/26/18 15:54	131.46	1,085.53
M-7MA	4/26/18 14:02	126.03	1,087.84
M-9LA	4/25/18 14:00	151.88	1,068.64
M-9MA	4/25/18 14:06	119.57	1,100.95
M-10LA2	4/26/18 11:19	136.45	1,083.25
M-10MA2	4/26/18 11:47	128.88	1,091.17
M-11MA	4/25/18 10:42	110.40	1,101.19
M-12MA2	4/24/18 17:10	129.09	1,098.84
M-14LA	4/25/18 10:20	154.22	1,070.96
M-14MA	4/24/18 10:28	122.94	1,102.26
M-15MA	4/26/18 12:11	127.84	1,091.07
M-16LA	4/25/18 10:09	162.33	1,065.75
M-16MA	4/25/18 9:58	120.55	1,107.60
M-17MA/LA	4/24/18 15:35	149.94	1,087.76
PA-1MA	4/25/18 9:42	109.94	1,115.56
PA-2LA	4/23/18 13:46	260.92	992.84

TABLE 1. SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS TAKEN BY MONTGOMERY & ASSOCIATES, NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA, APRIL 2018

MONITOR WELL IDENTIFIER	MEASUREMENT DATE	DEPTH TO WATER (ft, bls)	GROUNDWATER ALTITUDE (ft, amsl)
PA-3MA	4/23/18 13:52	123.04	1,130.40
PA-4MA	4/23/18 12:53	109.48	1,121.44
PA-5LA	4/23/18 12:46	241.10	988.35
PA-6LA	4/23/18 14:18	265.90	987.03
PA-7MA	4/23/18 14:30	126.33	1,126.73
PA-8LA2	4/24/18 17:35	174.17	1,054.16
PA-9LA	4/23/18 18:35	182.91	1,053.87
PA-10MA	4/23/18 18:49	141.20	1,095.60
PA-11LA*	4/24/18 18:15	152.18	1,072.78
PA-12MA**	4/24/18 18:22	131.27	1,093.69
PA-13LA	4/23/18 15:10	250.16	998.83
PA-14MA	4/23/18 15:23	136.52	1,112.57
PA-15LA	4/25/18 16:02	108.04	1,096.24
PA-16MA	4/25/18 15:50	104.73	1,099.75
PA-17MA2	4/25/18 9:12	114.75	1,123.95
PA-18LA	4/25/18 9:27	209.86	1,029.00
PA-19LA	4/25/18 12:12	132.23	1,089.23
PA-20MA	4/25/18 12:07	129.71	1,091.57
PA-21MA	4/25/18 14:40	119.00	1,106.19
PA-22LA	4/25/18 16:45	91.63	1,092.37
PA-23MA	4/25/18 17:07	82.15	1,102.27
PG-1LA	4/23/18 12:29	269.39	980.27
PG-2LA	4/23/18 12:10	304.28	966.78
PG-3UA	Not included in April monitoring event		
PG-4MA	4/25/18 12:30	134.04	1,093.50
PG-4UA	Not included in April monitoring event		
PG-5MA	4/25/18 15:06	120.15	1,094.12
PG-5UA	Not included in April monitoring event		
PG-6MA	4/25/18 15:36	105.41	1,107.29
PG-6UA	Not included in April monitoring event		
PG-7MA	4/25/18 16:16	95.95	1,101.91
PG-7UA	Not included in April monitoring event		
PG-8UA	Not included in April monitoring event		
PG-10UA	Not included in April monitoring event		
PG-11UA	Not included in April monitoring event		
PG-16UA	Not included in April monitoring event		
PG-18UA	Not included in April monitoring event		
PG-19UA	Not included in April monitoring event		
PG-22UA	Not included in April monitoring event		
PG-23MA/LA	4/25/18 12:51	123.10	1,099.43
PG-23UA	Not included in April monitoring event		
PG-24UA	Not included in April monitoring event		

TABLE 1. SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS TAKEN BY MONTGOMERY & ASSOCIATES, NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA, APRIL 2018

MONITOR WELL IDENTIFIER	MEASUREMENT DATE	DEPTH TO WATER (ft, bls)	GROUNDWATER ALTITUDE (ft, amsl)
PG-25UA	Not included in April monitoring event		
PG-28UA	Not included in April monitoring event		
PG-29UA	Not included in April monitoring event		
PG-30UA	Not included in April monitoring event		
PG-31UA	Not included in April monitoring event		
PG-38MA/LA	4/24/18 19:01	143.39	1,093.85
PG-39LA	4/24/18 15:57	144.42	1,088.16
PG-40LA	4/23/18 10:45	303.32	972.01
PG-42LA	4/23/18 10:19	321.04	971.27
PG-43LA	4/23/18 9:19	292.99	972.02
PG-44LA	4/23/18 11:28	324.41	973.18
PG-47MA	4/26/18 15:10	128.93	1,087.76
PG-48MA	4/26/18 15:23	136.93	1,079.91
PG-50MA	4/24/18 9:35	129.68	1,111.28
PG-51MA	4/24/18 9:31	147.91	1,093.00
PG-57MA	No longer included in compliance monitoring; Approved by EPA for abandonment		
S-1LA	4/23/18 17:32	243.20	1,017.25
S-1MA	4/23/18 17:40	154.66	1,105.68
S-2LA	4/23/18 16:39	267.34	992.63
S-2MA	4/23/18 17:10	157.53	1,102.96
W-1MA	4/24/18 10:16	110.57	1,119.81
W-2MA	4/24/18 14:10	141.24	1,093.84

ABBREVIATIONS:

ft, bls = feet below land surface
ft, amsl = feet above mean sea level

NOTES:

* = collected from LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA

** = collected from MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA

TABLE 2. SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS TAKEN BY MONTGOMERY & ASSOCIATES, NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA, OCTOBER 2018

MONITOR WELL IDENTIFIER	MEASUREMENT DATE & TIME	DEPTH TO WATER (ft, bls)	GROUNDWATER ALTITUDE (ft, amsl)
B-1MA	10/3/18 9:35	86.96	1,103.30
B-1UA	10/3/18 9:48	57.86	1,132.45
B-J	10/3/18 14:41	62.17	1,130.07
D-2MA	10/3/18 12:26	115.63	1,124.40
E-1LA	10/4/18 12:56	142.13	1,072.87
E-1MA	10/4/18 13:10	126.51	1,087.86
E-1UA	10/4/18 13:04	79.45	1,135.91
E-2UA	10/3/18 16:00	94.21	1,130.83
E-5MA	10/3/18 15:35	105.31	1,094.12
E-5UA	10/3/18 13:55	71.64	1,127.92
E-6UA	10/4/18 8:55	99.96	1,122.34
E-7LA	10/4/18 11:19	116.47	1,081.32
E-7UA	10/4/18 11:27	73.68	1,123.73
E-8MA	10/3/18 14:33	95.48	1,097.41
E-10MA	10/3/18 11:12	145.33	1,098.53
E-12UA	10/4/18 11:53	71.57	1,132.05
E-13UA	10/4/18 12:15	76.43	1,132.20
E-14LA	10/4/18 17:22	171.72	1,082.23
M-1MA	10/1/18 13:18	116.68	1,094.21
M-2LA	10/1/18 15:57	131.56	1,078.67
M-2MA	10/1/18 14:54	114.38	1,095.68
M-2UA	10/1/18 15:46	77.92	1,132.25
M-3MA	10/1/18 16:12	103.87	1,101.68
M-4MA	10/1/18 13:28	121.37	1,093.53
M-5LA	10/1/18 16:28	142.76	1,074.70
M-5MA	10/1/18 16:34	132.14	1,085.29
M-6MA	10/1/18 12:50	125.19	1,091.80
M-7MA	10/1/18 13:05	120.03	1,093.84
M-9LA	10/4/18 14:13	153.68	1,066.84
M-9MA	10/4/18 14:19	116.38	1,104.14
M-10LA2	10/1/18 17:28	141.74	1,077.96
M-10MA2	10/1/18 16:55	126.65	1,093.40
M-11MA	10/4/18 8:34	110.79	1,100.79
M-12MA2	10/3/18 15:46	136.08	1,091.84
M-14LA	10/3/18 16:25	157.27	1,067.91
M-14MA	10/3/18 16:06	122.47	1,102.73
M-15MA	10/3/18 17:30	124.26	1,094.65
M-16LA	10/10/18 13:48	165.14	1,062.94
M-16MA	10/3/18 14:47	120.36	1,107.78
M-17MA/LA	10/4/18 9:39	134.52	1,103.18
PA-1MA	10/5/18 13:40	108.07	1,117.43
PA-2LA	10/3/18 18:12	268.60	985.16

TABLE 2. SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS TAKEN BY MONTGOMERY & ASSOCIATES, NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA, OCTOBER 2018

MONITOR WELL IDENTIFIER	MEASUREMENT DATE & TIME	DEPTH TO WATER (ft, bls)	GROUNDWATER ALTITUDE (ft, amsl)
PA-3MA	10/3/18 18:27	123.26	1,130.18
PA-4MA	10/8/18 12:30	107.71	1,123.21
PA-5LA	10/8/18 12:21	247.71	981.74
PA-6LA	10/3/18 17:27	272.54	980.39
PA-7MA	10/3/18 17:44	127.15	1,125.91
PA-8LA2	10/3/18 15:57	178.43	1,049.90
PA-9LA	10/1/18 18:54	188.36	1,048.42
PA-10MA	10/1/18 18:48	143.46	1,093.34
PA-11LA*	10/3/18 10:24	156.10	1,068.86
PA-12MA**	10/3/18 10:00	132.40	1,092.56
PA-13LA	10/5/18 10:23	253.87	995.12
PA-14MA	10/5/18 10:13	136.12	1,112.97
PA-15LA	10/3/18 11:58	110.20	1,094.08
PA-16MA	10/3/18 12:05	105.68	1,098.80
PA-17MA2	10/5/18 13:13	113.41	1,125.29
PA-18LA	10/5/18 13:25	213.18	1,025.68
PA-19LA	10/4/18 11:50	134.94	1,086.53
PA-20MA	10/4/18 12:05	132.40	1,088.89
PA-21MA	10/5/18 13:53	115.40	1,109.79
PA-22LA	10/3/18 11:00	92.83	1,091.16
PA-23MA	10/3/18 10:40	79.92	1,104.50
PG-1LA	10/12/18 10:21	276.45	973.21
PG-2LA	10/4/18 17:52	311.63	959.43
PG-3UA	Well Abandoned 3/12/2018		
PG-4MA	10/4/18 10:23	138.92	1,088.63
PG-4UA	10/4/18 10:32	112.42	1,115.41
PG-5MA	10/4/18 7:56	122.26	1,092.01
PG-5UA	10/4/18 8:03	93.75	1,120.45
PG-6MA	10/3/18 11:32	107.29	1,105.40
PG-6UA	10/3/18 11:40	94.27	1,118.82
PG-7MA	10/3/18 10:25	96.88	1,100.98
PG-7UA	10/3/18 9:55	75.04	1,122.51
PG-8UA	10/4/18 10:40	103.60	1,118.40
PG-10UA	10/3/18 12:39	109.25	1,131.59
PG-11UA	10/10/18 8:32	103.84	1,126.56
PG-16UA	10/3/18 11:26	113.36	1,128.53
PG-18UA	10/3/18 12:25	76.70	1,125.43
PG-19UA	10/10/18 8:52	79.19	1,125.11
PG-22UA	10/5/18 14:49	81.48	1,128.81
PG-23MA/LA	10/4/18 7:10	125.75	1,096.78
PG-23UA	10/4/18 6:50	105.75	1,117.21
PG-24UA	10/4/18 7:50	92.00	1,120.22

TABLE 2. SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS TAKEN BY MONTGOMERY & ASSOCIATES, NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA, OCTOBER 2018

MONITOR WELL IDENTIFIER	MEASUREMENT DATE & TIME	DEPTH TO WATER (ft, bls)	GROUNDWATER ALTITUDE (ft, amsl)
PG-25UA	10/4/18 8:15	82.09	1,124.44
PG-28UA	10/3/18 14:48	104.75	1,130.20
PG-29UA	10/2/18 15:36	101.56	1,131.47
PG-30UA	10/2/18 15:52	97.26	1,129.10
PG-31UA	10/2/18 13:57	107.74	1,127.71
PG-38MA/LA	10/4/18 10:05	146.82	1,090.42
PG-39LA	10/4/18 9:48	147.81	1,084.77
PG-40LA	10/4/18 18:33	311.48	963.85
PG-42LA	10/5/18 8:55	330.10	962.21
PG-43LA	10/5/18 9:38	299.58	965.43
PG-44LA	10/5/18 16:53	332.95	964.64
PG-47MA	10/1/18 12:38	122.89	1,093.80
PG-48MA	10/1/18 12:15	133.56	1,083.28
PG-50MA	10/3/18 12:57	126.14	1,114.82
PG-51MA	10/3/18 12:52	151.71	1,089.20
PG-57MA	No longer included in compliance monitoring; Approved by EPA for abandonment		
S-1LA	10/3/18 16:50	246.94	1,013.51
S-1MA	10/3/18 16:57	155.37	1,104.97
S-2LA	10/1/18 10:41	275.50	984.47
S-2MA	10/1/18 11:23	158.49	1,102.00
W-1MA	10/3/18 16:27	108.73	1,121.65
W-2MA	10/3/18 14:30	132.33	1,102.75

ABBREVIATIONS:

ft, bls = feet below land surface
ft, amsl = feet above mean sea level

NOTES:

* = collected from LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA

** = collected from MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA

TABLE 3. SUMMARY OF GROUNDWATER LEVEL DIFFERENCE BETWEEN OCTOBER 2017 AND OCTOBER 2018 NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

MONITOR WELL IDENTIFIER(1)	ALLUVIUM UNIT	OCTOBER 2017 DEPTH TO GROUNDWATER LEVEL (ft, bls)	OCTOBER 2018 DEPTH TO GROUNDWATER LEVEL (ft, bls)	CHANGE IN DEPTH TO GROUNDWATER LEVEL (feet)
B-1	U	58.28	57.87	0.41
B-1	M	108.64	86.96	21.68
B-J	U	63.92	62.17	1.75
D-2	M	116.79	115.63	1.16
E-1	U	78.45	79.45	-1.00
E-1	M	113.18	126.51	-13.33
E-1	L	145.02	142.13	2.89
E-2	U	94.04	94.21	-0.17
E-5	U	71.53	71.64	-0.11
E-5	M	117.03	105.31	11.72
E-6	U	100.28	99.96	0.32
E-7	U	73.79	73.68	0.11
E-7	L	119.96	116.47	3.49
E-8	M	126.75	95.48	31.27
E-10	M	145.42	145.33	0.08
E-12	U	71.20	71.57	-0.37
E-13	U	75.71	76.43	-0.72
E-14	L	173.86	171.72	2.14
M-1	M	111.93	116.68	-4.75
M-2	U	77.06	77.92	-0.86
M-2	M	120.61	114.38	6.23
M-2	L	134.00	131.56	2.44
M-3	M	105.10	103.87	1.23
M-4	M	118.53	121.37	-2.84
M-5	M	134.42	132.14	2.28
M-5	L	144.59	142.76	1.83
M-6	M	117.94	125.19	-7.25
M-7	M	112.76	120.03	-7.27
M-9	M	112.12	116.38	-4.26
M-9	L	151.50	153.68	-2.18
M-10LA2	L	147.05	141.74	5.31
M-10MA2	M	130.08	126.65	3.43
M-11	M	111.60	110.79	0.81
M-12MA2	M	129.76	136.08	-6.33
M-14	M	120.82	122.47	-1.65
M-14	L	159.88	157.27	2.60
M-15	M	122.70	124.26	-1.56
M-16	M	116.93	120.37	-3.43
M-16	L	168.42	165.14	3.28
M-17MA/LA	L	153.32	134.52	18.80
PA-1	M	105.01	108.07	-3.06
PA-2	L	275.12	268.60	6.52
PA-3	M	121.43	123.26	-1.83
PA-4	M	108.39	107.71	0.68
PA-5	L	255.93	247.71	8.22
PA-6	L	282.10	272.54	9.56
PA-7	M	125.27	127.15	-1.88
PA-8LA2	L	181.89	178.43	3.46
PA-9	L	191.73	188.36	3.37
PA-10	M	143.18	143.46	-0.28
PA-11LA2*	L	158.66	156.10	2.56
PA-12MA2**	M	135.16	132.40	2.76

TABLE 3. SUMMARY OF GROUNDWATER LEVEL DIFFERENCE BETWEEN OCTOBER 2017 AND OCTOBER 2018 NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

MONITOR WELL IDENTIFIER(1)	ALLUVIUM UNIT	OCTOBER 2017 DEPTH TO GROUNDWATER LEVEL (ft, bls)	OCTOBER 2018 DEPTH TO GROUNDWATER LEVEL (ft, bls)	CHANGE IN DEPTH TO GROUNDWATER LEVEL (feet)
PA-13	L	265.31	253.87	11.44
PA-14	M	134.32	136.12	-1.80
PA-15	L	114.62	110.20	4.42
PA-16	M	118.21	105.68	12.53
PA-17MA2	M	112.48	113.41	-0.93
PA-18	L	218.10	213.18	4.92
PA-19	L	138.48	134.94	3.54
PA-20	M	136.22	132.40	3.82
PA-21	M	110.83	115.40	-4.57
PA-22	L	96.39	92.83	3.56
PA-23	M	104.65	79.92	24.73
PG-1	L	285.12	276.45	8.67
PG-2	L	321.50	311.63	9.87
PG-3	U	82.10	Well Abandoned	
PG-4	U	113.37	112.42	0.95
PG-4	M	140.22	138.92	1.30
PG-5	U	94.08	93.75	0.33
PG-5	M	128.84	122.26	6.58
PG-6	U	95.22	94.27	0.95
PG-6	M	111.28	107.29	3.99
PG-7	U	75.77	75.04	0.73
PG-7	M	107.90	96.88	11.03
PG-8	U	104.17	103.60	0.57
PG-10	U	109.14	109.25	-0.11
PG-11	U	104.17	103.84	0.33
PG-16	U	113.77	113.36	0.41
PG-18	U	76.79	76.70	0.09
PG-19	U	79.92	79.19	0.73
PG-22	U	81.47	81.48	-0.01
PG-23	U	107.83	105.75	2.08
PG-23MA/LA	L	128.95	125.75	3.20
PG-24	U	92.47	92.00	0.47
PG-25	U	82.16	82.09	0.07
PG-28	U	104.98	104.75	0.23
PG-29	U	101.66	101.56	0.10
PG-30	U	97.43	97.26	0.17
PG-31	U	108.14	107.74	0.40
PG-38MA/LA	L	149.99	146.82	3.17
PG-39	L	150.24	147.81	2.43
PG-40	L	320.57	311.48	9.09
PG-42	L	337.69	330.10	7.59
PG-43	L	310.35	299.58	10.77
PG-44	L	340.97	332.95	8.02
PG-47	M	118.37	122.89	-4.52
PG-48	M	121.17	133.56	-12.39
PG-50	M	144.65	126.14	18.51
PG-51	M	151.37	151.71	-0.34
PG-57	M	107.99	Not monitored	
S-1	M	147.03	155.37	-8.34
S-1	L	256.16	246.94	9.22
S-2	M	150.49	158.49	-8.00
S-2	L	283.82	275.50	8.32

TABLE 3. SUMMARY OF GROUNDWATER LEVEL DIFFERENCE
BETWEEN OCTOBER 2017 AND OCTOBER 2018
NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

MONITOR WELL IDENTIFIER(1)	ALLUVIUM UNIT	OCTOBER 2017 DEPTH TO GROUNDWATER LEVEL (ft, bls)	OCTOBER 2018 DEPTH TO GROUNDWATER LEVEL (ft, bls)	CHANGE IN DEPTH TO GROUNDWATER LEVEL (feet)
W-1	M	110.44	108.73	1.71
W-2	M	142.43	132.33	10.10

ABBREVIATIONS:

ft, bls = feet below land surface
U = Upper Alluvium Unit monitor well
M = Middle Alluvium Unit monitor well
L = Lower Alluvium Unit monitor well

NOTES:

(1) Wells arranged alphabetically, then by unit.
* = collected from LAU completed well at piezometer PA-11LA2/12MA2 located approximately 80 feet northwest of original well PA-11LA
** = collected from MAU completed well at piezometer PA-11LA2/12MA2 located approximately 70 feet northwest of original well PA-12MA

TABLE 4. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	6	6	5	5	
Monitoring	B-J	B-J	10/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.66	550-112060
Monitoring	D-2MA	D-2 MA	1/10/2018	Original	TA	<0.50	<0.50	1.0	<0.50	**52**	550-96040
Monitoring	D-2MA	D-2MA	5/1/2018	Original	TA	<0.50	<0.50	0.90	<0.50	**48**	550-102064
Monitoring	D-2MA	D-2MA	7/11/2018	Original	TA	<0.50	<0.50	0.59	<0.50	**41**	550-105800
Monitoring	D-2MA	D-2MA	10/17/2018	Original	TA	<0.50	<0.50	1.1	<0.50	**37**	550-111869
Monitoring	E-1MA	E-1MA	1/10/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.1	550-96040
Monitoring	E-1MA	C	1/10/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	3.3	550-96040
Monitoring	E-1MA	E-1MA	5/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.0	550-102191
Monitoring	E-1MA	N	5/2/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.1	550-102191
Monitoring	E-1MA	E-1MA	7/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.3	550-105800
Monitoring	E-1MA	V	7/11/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	3.3	550-105800
Monitoring	E-1MA	E-1MA	10/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.0	550-112060
Monitoring	E-1MA	AM	10/19/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.5	550-112060
Monitoring	E-5MA	E-5MA	1/10/2018	Original	TA	<0.50	<0.50	1.4	0.62	**31**	550-96040
Monitoring	E-5MA	E-5MA	5/2/2018	Original	TA	<0.50	<0.50	1.1	0.94	**26**	550-102191
Monitoring	E-5MA	E-5MA	7/11/2018	Original	TA	<0.50	<0.50	1.1	0.95	**28**	550-105800
Monitoring	E-5MA	E-5MA	10/10/2018	Original	TA	<0.50	<0.50	1.1	0.75	**25**	550-111406
Monitoring	E-5UA	E-5UAHS	10/11/2018	Original	TA	<0.50	<0.50	0.50	<0.50	4.5	550-111537
Monitoring	E-7LA	E-7LA	10/16/2018	Original	TA	<0.50	<0.50	1.0	1.6	**14**	550-111762
Monitoring	E-7UA	E-7UAHS	10/30/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.3	550-112554
Monitoring	E-8MA	E-8MA	10/10/2018	Original	TA	<0.50	<0.50	0.82	<0.50	**18**	550-111406
Monitoring	E-10MA	E-10 MAHS	1/11/2018	Original	TA	<0.50	<0.50	0.62	2.6	3.6	550-96162
Monitoring	E-10MA	D	1/11/2018	Duplicate	TA	<0.50	<0.50	0.53	3.1	3.5	550-96162
Monitoring	E-10MA	E-10MAHS	5/3/2018	Original	TA	<0.50	<0.50	0.59	3.5	3.9	550-102299
Monitoring	E-10MA	O	5/3/2018	Duplicate	TA	<0.50	<0.50	0.56	3.4	4.0	550-102299
Monitoring	E-10MA	E-10MA HS	7/12/2018	Original	TA	<0.50	<0.50	<0.50	2.0	3.0	550-105905
Monitoring	E-10MA	W	7/12/2018	Duplicate	TA	<0.50	<0.50	<0.50	2.1	3.3	550-105905
Monitoring	E-10MA	E-10MAHS	10/15/2018	Original	TA	<0.50	<0.50	0.63	3.3	3.9	550-111677
Monitoring	E-12UA (A)	E-12UAHS	1/8/2019	Original	TA	<0.50	<0.50	0.52	<0.50	1.6	550-115938
Monitoring	E-13UA	E-13UA	10/19/2018	Original	TA	<0.50	<0.50	0.55	<0.50	0.93	550-112060
Monitoring	M-2MA	M-2MAHS	1/12/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.9	550-96243
Monitoring	M-2MA	F	1/12/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	4.6	550-96243
Monitoring	M-2MA	M-2MAHS	4/30/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.9	550-102006
Monitoring	M-2MA	K	4/30/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.9	550-102006
Monitoring	M-2MA	M-2MAHS	7/13/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.7	550-106012
Monitoring	M-2MA	Y	7/13/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	1.6	550-106012
Monitoring	M-2MA	M-2MAHS	10/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.6	550-110946
Monitoring	M-2MA	AC	10/4/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	1.6	550-110946
Monitoring	M-2UA	M-2UA	10/19/2018	Original	TA	<0.50	<0.50	0.61	<0.50	0.58	550-112060
Monitoring	M-4MA	M-4 MAHS	1/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**7.2**	550-96162
Monitoring	M-4MA	M-4 MAHS	5/3/2018	Original	TA	<0.50	<0.50	<0.50	0.61	**11**	550-102299
Monitoring	M-4MA	M-4MA HS	7/12/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.8**	550-105905
Monitoring	M-4MA	M-4MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.5**	550-111677

TABLE 4. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
Monitoring	M-5LA	M-5LA	10/18/2018	Original	TA	<0.50	<0.50	1.5	<0.50	1.2	550-112013
Monitoring	M-5MA	M-5MA	1/10/2018	Original	TA	<0.50	<0.50	1.2	0.78	**28**	550-96040
Monitoring	M-5MA	M-5MA	5/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**11**	550-102191
Monitoring	M-5MA	M-5MA	7/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**12**	550-105800
Monitoring	M-5MA	M-5MA	10/18/2018	Original	TA	<0.50	<0.50	0.53	<0.50	**12**	550-112013
Monitoring	M-6MA	M-6MA	1/10/2018	Original	TA	<0.50	<0.50	0.55	<0.50	**10**	550-96040
Monitoring	M-6MA	M-6MA	5/2/2018	Original	TA	<0.50	<0.50	0.82	<0.50	**15**	550-102191
Monitoring	M-6MA	M-6MA	7/11/2018	Original	TA	<0.50	<0.50	0.53	<0.50	**9.8**	550-105800
Monitoring	M-6MA	M-6MA	10/18/2018	Original	TA	<0.50	<0.50	0.53	<0.50	**9.4**	550-112013
Monitoring	M-6MA	AL	10/18/2018	Duplicate	TA	<0.50	<0.50	0.58	<0.50	**9.5**	550-112013
Monitoring	M-7MA	M-7MA	10/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112060
Monitoring	M-9MA	M-9MA	10/19/2018	Original	TA	REJ	REJ	REJ	REJ	REJ	550-112060
Monitoring	M-9MA	M-9MA	12/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.4	550-114691
Monitoring	M-10LA2	M-10LA2HS	10/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**7.2**	550-110946
Monitoring	M-10MA2	M-10MA2	1/12/2018	Original	TA	<0.50	<0.50	0.56	<0.50	**19**	550-96200
Monitoring	M-10MA2	E	1/12/2018	Duplicate	TA	<0.50	<0.50	0.59	<0.50	**22**	550-96200
Monitoring	M-10MA2	M-10MA2	5/4/2018	Original	TA	<0.50	<0.50	0.72	0.61	**30**	550-102310
Monitoring	M-10MA2	Q	5/4/2018	Duplicate	TA	<0.50	<0.50	0.69	0.61	**30**	550-102310
Monitoring	M-10MA2	M-10MA2	7/11/2018	Original	TA	<0.50	<0.50	0.57	<0.50	**24**	550-105800
Monitoring	M-10MA2	M-10MA2	10/16/2018	Original	TA	<0.50	0.76	1.1	0.59	**44**	550-111762
Monitoring	M-11MA	M-11MA	10/30/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112554
Monitoring	M-12MA2	M-12MA2	10/10/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**12**	550-111406
Monitoring	M-14LA	M-14LA	10/11/2018	Original	TA	<0.50	<0.50	1.2	3.4	**17**	550-111537
Monitoring	M-15MA	M-15MA	1/10/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.5	550-96040
Monitoring	M-15MA	M-15MA	5/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.4	550-102191
Monitoring	M-15MA	M-15MA	7/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.2	550-105800
Monitoring	M-15MA	M-15MA	10/18/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.5	550-112013
Monitoring	M-16LA	M-16LA	10/15/2018	Original	TA	<0.50	<0.50	1.3	3.7	**14**	550-111677
Monitoring	M-16MA	M-16MA	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.9**	550-111677
Monitoring	M-17MA/LA	M-17 MA/LAHS	1/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-96162
Monitoring	M-17MA/LA	M-17 MA/LAHS	5/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102299
Monitoring	M-17MA/LA	M-17MA/LA HS	7/12/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105905
Monitoring	M-17MA/LA	M-17 MA/LAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111677
Monitoring	PA-2LA	PA-2LA	10/17/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111919
Monitoring	PA-5LA	PA-5LA	1/9/2018	Original	TA	<0.50	0.82	3.1	2.9	**63**	550-95934
Monitoring	PA-5LA	PA-5LA	5/1/2018	Original	TA	<0.50	0.57	3.1	3.3	**61**	550-102063
Monitoring	PA-5LA	PA-5LA	7/10/2018	Original	TA	<0.50	<0.50	3.1	2.9	**58**	550-105682
Monitoring	PA-5LA	PA-5LA	10/16/2018	Original	TA	<0.50	0.64	3.2	2.4	**58**	550-111759
Monitoring	PA-5LA	AJ	10/16/2018	Duplicate	TA	<0.50	<0.50	3.0	2.0	**49**	550-111759
Monitoring	PA-6LA	PA-6LA	1/9/2018	Original	TA	<0.50	3.3	3.9	**15**	**140**	550-95934
Monitoring	PA-6LA	PA-6LA	4/30/2018	Original	TA	<0.50	3.4	3.8	**20**	**160**	550-102004
Monitoring	PA-6LA	PA-6LA	7/10/2018	Original	TA	<0.50	3.1	3.3	**18**	**160**	550-105682
Monitoring	PA-6LA	PA-6LA	10/8/2018	Original	TA	<0.50	4.5	4.0	**22**	**140**	550-111205

TABLE 4. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	6	6	5	5	
Monitoring	PA-8LA2	PA-8LA2	10/9/2018	Original	TA	<0.50	<0.50	0.57	<0.50	3.8	550-111287
Monitoring	PA-9LA	PA-9LAHS	10/16/2018	Original	TA	<0.50	<0.50	1.8	<0.50	**21**	550-111762
Monitoring	PA-10MA	PA-10 MAHS	1/11/2018	Original	TA	<0.50	<0.50	<0.50	0.97 / 0.97	**68 / 61**	550-96162
Monitoring	PA-10MA	PA-10MAHS	5/3/2018	Original	TA	<0.50	<0.50	<0.50	1.0	**48**	550-102299
Monitoring	PA-10MA	PA-10MA HS	7/12/2018	Original	TA	<0.50	<0.50	<0.50	0.89	**50**	550-105905
Monitoring	PA-10MA	PA-10MAHS	10/16/2018	Original	TA	<0.50	<0.50	<0.50	1.1	**56**	550-111762
Monitoring	PA-11LA	PA-11LA	10/17/2018	Original	TA	<0.50	<0.50	1.1	<0.50	<0.50	550-111869
Monitoring	PA-12MA	PA-12MA	1/10/2018	Original	TA	<0.50	<0.50	0.59	3.0	**240**	550-96040
Monitoring	PA-12MA	PA-12MA	5/2/2018	Original	TA	<0.50	<0.50	0.55	3.3	**250**	550-102191
Monitoring	PA-12MA	PA-12MA	7/11/2018	Original	TA	<0.50	<0.50	0.56	2.8	**300**	550-105800
Monitoring	PA-12MA	PA-12MA	10/11/2018	Original	TA	<0.50	<0.50	0.65	3.3	**290**	550-111537
Monitoring	PA-13LA	PA-13LA	1/12/2018	Original	TA	<0.50	<0.50	1.4	0.86	**100**	550-96202
Monitoring	PA-13LA	PA-13LA	5/3/2018	Original	TA	<0.50	<0.50	1.2	1.1	**88**	550-102300
Monitoring	PA-13LA	PA-13LA	7/10/2018	Original	TA	<0.50	<0.50	1.4	1.2	**100**	550-105682
Monitoring	PA-13LA	PA-13LA	10/9/2018	Original	TA	<0.50	<0.50	1.3	0.77	**80**	550-111285
Monitoring	PA-15LA	PA-15LA	10/18/2018	Original	TA	<0.50	<0.50	1.9	0.65	<0.50	550-112013
Monitoring	PA-16MA	PA-16MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.9	550-111677
Monitoring	PA-16MA	AI	10/15/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	1.8	550-111677
Monitoring	PA-18LA	PA-18LA	10/19/2018	Original	TA	<0.50	<0.50	1.9	<0.50	0.88	550-112060
Monitoring	PA-19LA	PA-19LA	10/17/2018	Original	TA	<0.50	1.8	2.1	4.0	**76**	550-111869
Monitoring	PA-20MA	PA-20MA	10/17/2018	Original	TA	<0.50	0.53	1.2	2.3	**46**	550-111869
Monitoring	PA-21MA	PA-21MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111677
Monitoring	PG-1LA	PG-1LA	1/9/2018	Original	TA	<0.50	<0.50	0.70	<0.50	<0.50	550-95934
Monitoring	PG-1LA	PG-1LA	4/30/2018	Original	TA	<0.50	<0.50	0.69	<0.50	<0.50	550-102004
Monitoring	PG-1LA	L	4/30/2018	Duplicate	TA	<0.50	<0.50	0.72	<0.50	<0.50	550-102004
Monitoring	PG-1LA	PG-1LA	7/12/2018	Original	TA	<0.50	<0.50	0.69	<0.50	<0.50	550-105872
Monitoring	PG-1LA	PG-1LA	10/16/2018	Original	TA	<0.50	<0.50	0.77	<0.50	<0.50	550-111759
Monitoring	PG-2LA	PG-2LA	5/1/2018	Original	TA	<0.50	0.53	1.0	2.4	**63**	550-102063
Monitoring	PG-2LA	PG-2LA	10/8/2018	Original	TA	<0.50	<0.50	1.0	1.8	**65**	550-111205
Monitoring	PG-2LA	AD	10/8/2018	Duplicate	TA	<0.50	0.50	1.2	1.9	**66**	550-111205
Monitoring	PG-4MA	PG-4MA	10/16/2018	Original	TA	<0.50	<0.50	0.57	<0.50	1.5	550-111762
Monitoring	PG-4UA	PG-4UAHS	10/16/2018	Original	TA	<0.50	<0.50	0.75	**15**	0.75	550-111762
Monitoring	PG-5MA	PG-5MA	10/16/2018	Original	TA	<0.50	<0.50	1.1	0.60	**23**	550-111762
Monitoring	PG-5UA	PG-5UA	10/18/2018	Original	TA	<0.50	<0.50	0.55	<0.50	1.8	550-112013
Monitoring	PG-6MA	PG-6MA	10/16/2018	Original	TA	<0.50	0.88	2.6	2.4	**82**	550-111762
Monitoring	PG-6UA	PG-6UA	10/18/2018	Original	TA	<0.50	<0.50	0.64	<0.50	0.68	550-112013
Monitoring	PG-7MA	PG-7MA	10/15/2018	Original	TA	<0.50	<0.50	0.64	<0.50	<0.50	550-111677
Monitoring	PG-8UA	PG-8UA	10/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112060
Monitoring	PG-10UA	PG-10UAHS	10/30/2018	Original	TA	<0.50	<0.50	0.67	<0.50	0.69	550-112554
Monitoring	PG-10UA (B)	PG-10UA	12/11/2018	Original	TA	<0.50	<0.50	1.3	<0.50	0.92	550-114691
Monitoring	PG-11UA	PG-11UAHS	10/30/2018	Original	TA	<0.50	<0.50	0.79	<0.50	<0.50	550-112554
Monitoring	PG-11UA	AO	10/30/2018	Duplicate	TA	<0.50	<0.50	0.81	<0.50	<0.50	550-112554
Monitoring	PG-16UA	PG-16UAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111677

TABLE 4. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
Monitoring	PG-16UA (B)	PG-16UA	12/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.76	550-114691
Monitoring	PG-18UA	PG-18UA	10/19/2018	Original	TA	<0.50	<0.50	0.69	<0.50	0.74	550-112060
Monitoring	PG-19UA	PG-19UA	10/10/2018	Original	TA	<0.50	<0.50	0.62	<0.50	2.5	550-111406
Monitoring	PG-19UA	AF	10/10/2018	Duplicate	TA	<0.50	<0.50	0.59	<0.50	2.4	550-111406
Monitoring	PG-22UA	PG-22UAHS	10/11/2018	Original	TA	<0.50	<0.50	0.58	1.1	4.4	550-111537
Monitoring	PG-23MA/LA	PG-23MA/LA	10/17/2018	Original	TA	<0.50	<0.50	1.0	0.71	**10**	550-111869
Monitoring	PG-23UA	PG-23UAHS	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.6	550-111537
Monitoring	PG-24UA	PG-24UAHS	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111537
Monitoring	PG-25UA	PG-25UAHS	10/11/2018	Original	TA	<0.50	<0.50	0.74	<0.50	2.1	550-111537
Monitoring	PG-28UA	PG-28UA	10/17/2018	Original	TA	<0.50	<0.50	1.3	<0.50	1.5	550-111869
Monitoring	PG-28UA	AK	10/17/2018	Duplicate	TA	<0.50	<0.50	1.3	<0.50	1.5	550-111869
Monitoring	PG-29UA	PG-29UAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.4	550-111677
Monitoring	PG-29UA (B)	PG-29UA	12/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.64	550-114691
Monitoring	PG-29UA (B)	AR	12/11/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	0.58	550-114691
Monitoring	PG-31UA	PG-31UAHS	10/4/2018	Original	TA	<0.50	<0.50	2.8	<0.50	**29**	550-110946
Monitoring	PG-38MA/LA	PG-38MA/LAHS	10/16/2018	Original	TA	<0.50	<0.50	<0.50	3.7	0.60	550-111762
Monitoring	PG-39LA	PG-39LA	10/17/2018	Original	TA	<0.50	<0.50	0.94	2.1	3.8	550-111869
Monitoring	PG-40LA	PG-40LA	1/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**11**	550-96163
Monitoring	PG-40LA	PG-40LA	5/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**10**	550-102300
Monitoring	PG-40LA	P	5/3/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	**10**	550-102300
Monitoring	PG-40LA	PG-40LA	7/12/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**14**	550-105872
Monitoring	PG-40LA	X	7/12/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	**14**	550-105872
Monitoring	PG-40LA	PG-40LA	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**8.9**	550-111536
Monitoring	PG-42LA	PG-42LA	1/11/2018	Original	TA	<0.50	<0.50	0.67	<0.50	3.4	550-96163
Monitoring	PG-42LA	PG-42LA	5/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.2	550-102300
Monitoring	PG-42LA	PG-42LA	7/12/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.5	550-105872
Monitoring	PG-42LA	PG-42LA	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.3	550-111536
Monitoring	PG-42LA	AG	10/11/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.5	550-111536
Monitoring	PG-43LA	PG-43LA	1/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-96163
Monitoring	PG-43LA	PG-43LA	5/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102300
Monitoring	PG-43LA	PG-43LA	7/12/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105872
Monitoring	PG-43LA	PG-43LA	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111536
Monitoring	PG-44LA	PG-44LA	1/11/2018	Original	TA	<0.50	<0.50	3.0	<0.50	0.52	550-96163
Monitoring	PG-44LA	PG-44LA	5/3/2018	Original	TA	<0.50	<0.50	2.7	<0.50	<0.50	550-102300
Monitoring	PG-44LA	PG-44LA	7/12/2018	Original	TA	<0.50	<0.50	3.0	<0.50	<0.50	550-105872
Monitoring	PG-44LA	PG-44LA	10/11/2018	Original	TA	<0.50	<0.50	3.1	<0.50	<0.50	550-111536
Monitoring	PG-48MA	PG-48MA	1/10/2018	Original	TA	<0.50	<0.50	1.4	0.66	**25**	550-96040
Monitoring	PG-48MA	PG-48MA	5/2/2018	Original	TA	<0.50	<0.50	1.7	1.1	**36**	550-102191
Monitoring	PG-48MA	PG-48MA	7/13/2018	Original	TA	<0.50	<0.50	1.1	0.61	**24**	550-106005
Monitoring	PG-48MA	PG-48MA	10/18/2018	Original	TA	<0.50	<0.50	1.2	0.56	**23**	550-112013
Monitoring	PG-49MA	PG-49MA	10/18/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112013
Monitoring	PG-50MA	PG-50MA	10/22/2018	Original	TA	<0.50	<0.50 (1)	2.7	<0.50	**12**	550-112140
Monitoring	PG-50MA	AN	10/22/2018	Duplicate	TA	<0.50	<0.50 (1)	2.7	<0.50	**11**	550-112140

TABLE 4. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
Monitoring	PG-54MA	PG-54MA	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.5	550-111677
Monitoring	PG-54MA	AH	10/15/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.4	550-111677
Monitoring	PG-55MA	PG-55MA	10/18/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.2	550-112013
Monitoring	PG-56MA	PG-56MA	10/19/2018	Original	TA	<0.50	<0.50	0.56	<0.50	2.3	550-112060
Monitoring	S-1LA	S-1LA	10/9/2018	Original	TA	<0.50	<0.50	1.3	**38**	<0.50	550-111287
Monitoring	S-1MA	S-1MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	4.6	<0.50	550-111677
Monitoring	S-2LA	S-2LA	1/9/2018	Original	TA	<0.50	<0.50	0.64	0.57	**33**	550-95934
Monitoring	S-2LA	B	1/9/2018	Duplicate	TA	<0.50	<0.50	0.77	<0.50	**36**	550-95934
Monitoring	S-2LA	S-2LA	5/1/2018	Original	TA	<0.50	<0.50	0.62	0.54	**35**	550-102063
Monitoring	S-2LA	M	5/1/2018	Duplicate	TA	<0.50	<0.50	0.61	0.50	**33**	550-102063
Monitoring	S-2LA	S-2LA	7/10/2018	Original	TA	<0.50	<0.50	0.53	<0.50	**30**	550-105682
Monitoring	S-2LA	U	7/10/2018	Duplicate	TA	<0.50	<0.50	0.55	<0.50	**31**	550-105682
Monitoring	S-2LA	S-2LA	10/9/2018	Original	TA	<0.50	<0.50	0.52	<0.50	**26**	550-111285
Monitoring	S-2LA	AE	10/9/2018	Duplicate	TA	<0.50	<0.50	0.59	<0.50	**32**	550-111285
Monitoring	S-2MA	S-2MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111679
Monitoring	W-1MA	W-1 MA	1/11/2018	Original	TA	<0.50	<0.50	0.79	1.4	**390**	550-96162
Monitoring	W-1MA	W-1MA	5/1/2018	Original	TA	<0.50	<0.50	0.84	1.8	**360**	550-102064
Monitoring	W-1MA	W-1MA	7/13/2018	Original	TA	<0.50	<0.50	0.84	1.5	**350**	550-106005
Monitoring	W-1MA	W-1MA	10/17/2018	Original	TA	<0.50	<0.50	0.81	1.2	**300**	550-111869
Monitoring	W-2MA	W-2MA	1/12/2018	Original	TA	<0.50	<0.50	0.67	**5.1**	**1,600**	550-96200
Monitoring	W-2MA	W-2MA	5/3/2018	Original	TA	<0.50	<0.50	0.68	**6.3**	**1,600**	550-102299
Monitoring	W-2MA	W-2MA	7/10/2018	Original	TA	<0.50	<0.50	0.77	**6.3**	**1,900**	550-105679
Monitoring	W-2MA	W-2MA	10/17/2018	Original	TA	<0.50	<0.50	0.71	**5.1**	**1,600**	550-111869
--	QC	FRB (Trip)	1/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-95934
--	QC	FRB (Trip)	1/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-96040
--	QC	FRB (Trip)	1/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-96162
--	QC	FRB (Trip)	1/12/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-96200
--	QC	FRB (Trip)	4/30/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102004
--	QC	FRB (Trip)	4/30/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102006
--	QC	FRB (Trip)	5/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102064
--	QC	FRB (Trip)	5/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102191
--	QC	FRB (Trip)	5/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102299
--	QC	FRB (Trip)	5/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102310
--	QC	FRB (Trip)	7/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105679
--	QC	FRB (Trip)	7/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105800
--	QC	FRB (Trip)	7/12/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105905
--	QC	FRB (Trip)	7/13/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106005
--	QC	FRB (Trip)	10/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110946
--	QC	FRB (Trip)	10/8/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111205
--	QC	FRB (Trip)	10/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111285
--	QC	FRB (Trip)	10/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111406
--	QC	FRB(Trip)	10/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111537
--	QC	FRB(Trip)	10/15/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111677
--	QC	FRB (Trip)	10/16/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111762
--	QC	FRB (Trip)	10/17/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111869
--	QC	FRB (Trip)	10/18/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112013
--	QC	FRB (Trip)	10/19/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112060

TABLE 4. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
--	QC	FRB (Trip)	10/22/2018	TB	TA	<0.50	<0.50 (1)	<0.50	<0.50	<0.50	550-112140
--	QC	FRB (Trip)	10/30/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112554
--	QC	FRB (Trip)	12/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114691
--	QC	FRB (Trip)	1/8/2019	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115938

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene

ID = Identifier
TA = TestAmerica, Inc.
<0.50 = Analytical result is less than laboratory detection limit
QC = Quality Control
TB = Trip Blank
FRB = Field Reagent Blank
REJ = Data rejected because contractor reported that samples were switched during collection. Re-sampled.

NOTES:

<0.50 =	Non-Detect
5	Cleanup Standards for Treated Water (µg/L)
5.1	Sample result exceeds Cleanup Standards for Treated Water

** If duplicate is greater than the original value, the duplicate was used for contouring on the plume maps.

(A) Samplers were unable to collect E-12UA sample in Q4 of 2018. Sample was collected on 1/8/2019.

(B) Additional monitoring results are available because VOC analyses were mistakenly conducted on samples obtained for inorganic purposes only.

(1) R6 Flag: Laboratory Fortified Blank / Laboratory Fortified Blank Duplicate (LFB / LFBD) relative percent difference (RPD) exceeded method control limit. Recovery met acceptance criteria.

TABLE 5. 2018 LABORATORY RESULTS FOR GROUNDWATER EXTRACTION WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA *200*	DCE *6*	TCM *6*	PCE *5*	TCE *5*	REPORT
AREA 7 GWETS											
Extraction	7EX-3aMA	7EX-3MA	1/10/2018	Original	TA	<0.50	<0.50	1.2	2.1	**300**	550-96011
Extraction	7EX-3aMA	7EX-3MA	6/7/2018	Original	TA	<0.50	<0.50	1.2	1.8	**280**	550-104049
Extraction	7EX-3aMA	7EX-3MA	7/20/2018	Original	TA	<0.50	<0.50	0.97	2.3	**390**	550-106485
Extraction	7EX-3aMA	7EX-3MA	10/25/2018	Original	TA	<0.50	<0.50	0.93	3.4	**450**	550-112439
Extraction	7EX-6MA	7EX-6MA	1/10/2018	Original	TA	<0.50	<0.50	0.99	3.0	**610**	550-96011
Extraction	7EX-6MA	7EX-6MA	6/7/2018	Original	TA	<0.50	<0.50	0.76	3.1	**600**	550-104049
Extraction	7EX-6MA	7EX-6MA	7/20/2018	Original	TA	<0.50	<0.50	0.76	3.6	**600**	550-106485
Extraction	7EX-6MA	7EX-6MA	10/25/2018	Original	TA	<0.50	<0.50	0.78	3.0	**580**	550-112439
CGTF											
Extraction	COS-31	COS-31	1/31/2018	Original	TA	<0.50	<0.50	0.66	1.3	**9.9**	550-97178
Extraction	COS-31	G	1/31/2018	Duplicate	TA	<0.50	<0.50	0.64	1.1	**10**	550-97178
Extraction	COS-71A	COS-71A-1	5/17/2018	Original	TA	<0.50	<0.50	0.89	0.87	**39**	550-103091
Extraction	COS-71A	COS-71A-2	5/17/2018	Duplicate	TA	<0.50	<0.50	0.85	0.81	**36**	550-103091
Extraction	COS-72	COS-72	1/31/2018	Original	TA	<0.50	<0.50	0.62	<0.50	**6.2**	550-97178
Extraction	COS-72	COS-72	6/5/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.8**	550-103830
Extraction	COS-72	COS-72	7/2/2018	Original	TA	<0.50	<0.50	0.61	0.74	**7.6**	550-105195
Extraction	COS-72	COS - 72	8/6/2018	Original	TA	<0.50	<0.50	0.62	0.86	**7.7**	550-107345
Extraction	COS-75A	COS-75A	1/31/2018	Original	TA	<0.50	0.98	2.1	4.8	**41**	550-97178
Extraction	COS-75A	COS-75A	3/5/2018	Original	TA	<0.50	0.76	1.9	**5.7**	**39**	550-98878
Extraction	COS-75A	I	3/5/2018	Duplicate	TA	<0.50	0.72	1.9	**5.6**	**39**	550-98878
Extraction	COS-75A	COS-75A	5/7/2018	Original	TA	<0.50	0.75	2.0	**6.9**	**41**	550-102428
Extraction	COS-75A	R	5/7/2018	Duplicate	TA	<0.50	0.81	2.0	**7.2**	**42**	550-102428
Extraction	COS-75A	COS-75A	6/5/2018	Original	TA	<0.50	0.68	1.9	**5.0**	**37**	550-103830
Extraction	COS-75A	S	6/5/2018	Duplicate	TA	<0.50	0.73	1.9	**5.1**	**38**	550-103830
Extraction	COS-75A	COS-75A	7/2/2018	Original	TA	<0.50	0.80	2.2	**6.4**	**45**	550-105195
Extraction	COS-75A	T	7/2/2018	Duplicate	TA	<0.50	0.88	2.2	**6.3**	**44**	550-105195
Extraction	COS-75A	COS - 75A	8/6/2018	Original	TA	<0.50	0.67	2.0	**5.6**	**41**	550-107345
Extraction	COS-75A	Z	8/6/2018	Duplicate	TA	<0.50	0.60	2.0	**5.3**	**40**	550-107345
Extraction	COS-75A	COS-75A	9/10/2018	Original	TA	<0.50	0.67	2.0	**5.6**	**40**	550-109424
Extraction	COS-75A	AA	9/10/2018	Duplicate	TA	<0.50	0.58	1.9	**5.6**	**40**	550-109424
Extraction	COS-75A	COS - 75A	10/1/2018	Original	TA	<0.50	0.90	2.0	**5.8**	**41**	550-110644
Extraction	COS-75A	AB	10/1/2018	Duplicate	TA	<0.50	1.0	2.1	**6.1**	**44**	550-110644
Extraction	COS-75A	COS-75A	12/19/2018	Original	TA	<0.50	0.62	1.7	**5.4**	**41**	550-115171
Extraction	COS-75A	AS	12/19/2018	Duplicate	TA	<0.50	0.58	1.8	**5.7**	**42**	550-115171
AREA 12 GWETS											
Extraction	MEX-1MA	MEX-1-1A-04102018	4/10/2018	Original	TA	<0.50	2.6	1.7	**6.1**	**60**	550-100897
Extraction	MEX-1MA	MEX-1-1A-05022018	5/2/2018	Original	TA	<0.50	1.7	1.6	3.7	**47**	550-102124
Extraction	MEX-1MA	MEX-1-1A-06042018	6/4/2018	Original	TA	<0.50	1.3	1.4	2.5	**40**	550-103719
Extraction	MEX-1MA	MEX-1-1A-07022018	7/2/2018	Original	TA	<0.50	1.5	1.6	3.1	**47**	550-105184
Extraction	MEX-1MA	MEX-1-1A-08012018	8/1/2018	Original	TA	<0.50	1.3	1.5	2.6	**42**	550-106983
Extraction	MEX-1MA	MEX-1-1A- 09042018	9/4/2018	Original	TA	<0.50	1.0	1.5	2.6	**43**	550-109042
Extraction	MEX-1MA	MEX-1-1A-10012018	10/1/2018	Original	TA	<0.50	2.0	1.8	3.3	**53**	550-110666
Extraction	MEX-1MA	MEX-1-1A-11012018	11/1/2018	Original	TA	<0.50	1.7	1.5	2.8	**47**	550-112667
Extraction	MEX-1MA	MEX-1-1A-12032018	12/3/2018	Original	TA	<0.50	1.1	1.5	2.9	**46**	550-114183

TABLE 5. 2018 LABORATORY RESULTS FOR GROUNDWATER EXTRACTION WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
Extraction	Granite Reef	GR-1-1A-04102018	4/10/2018	Original	TA	<0.50	0.74	2.8	1.8	**68**	550-100897
Extraction	Granite Reef	GR-1-1A-05022018	5/2/2018	Original	TA	<0.50	1.7	4.7	3.3	**120**	550-102124
Extraction	Granite Reef	GR-1-1A-06042018	6/4/2018	Original	TA	<0.50	1.9	5.3	3.1	**120**	550-103719
Extraction	Granite Reef	GR-1-1A-07022018	7/2/2018	Original	TA	<0.50	1.9	5.8	3.3	**140**	550-105184
Extraction	Granite Reef	GR-1-1A-08012018	8/1/2018	Original	TA	<0.50	1.5	5.2	2.9	**130**	550-106983
Extraction	Granite Reef	GR-1-1A- 09042018	9/4/2018	Original	TA	<0.50	1.7	5.3	3.5	**130**	550-109042
Extraction	Granite Reef	GR-1-1A-10012018	10/1/2018	Original	TA	<0.50	1.5	2.3	2.9	**61**	550-110666
Extraction	Granite Reef	GR-1-1A-11012018	11/1/2018	Original	TA	<0.50	2.0	5.1	3.0	**120**	550-112667
Extraction	Granite Reef	GR-1-1A-12032018	12/3/2018	Original	TA	<0.50	1.5	4.5	2.9	**130**	550-114183
NGTF											
Extraction	PCX-1	PCX-1	1/4/2018	Original	TA	<0.50	0.92	1.6	4.2	**51**	550-95635
Extraction	PCX-1	PCX-1	2/15/2018	Original	TA	<0.50	0.67	1.5	3.8	**44**	550-98101
Extraction	PCX-1	PCX-1	3/9/2018	Original	TA	<0.50	0.72	1.6	3.7	**44**	550-99248
Extraction	PCX-1	PCX-1	4/11/2018	Original	TA	<0.50	0.76	1.7	4.0	**48**	550-101042
Extraction	PCX-1	PCX-1	5/16/2018	Original	TA	<0.50	0.83	1.8	3.5	**48**	550-103022
Extraction	PCX-1	PCX-1	6/26/2018	Original	TA	<0.50	0.84	1.8	3.9	**48**	550-104933
Extraction	PCX-1	PCX-1	7/9/2018	Original	TA	<0.50	0.77	1.9	4.3	**50**	550-105577
Extraction	PCX-1	PCX-1	8/15/2018	Original	TA	<0.50	<0.50	1.7	3.7	**45**	550-108007
Extraction	PCX-1	PCX-1	9/11/2018	Original	TA	<0.50	0.60	1.7	4.0	**47**	550-109527
Extraction	PCX-1	PCX-1	10/3/2018	Original	TA	<0.50	0.92	2.0	4.2	**52**	550-110818
Extraction	PCX-1	PCX-1	11/16/2018	Original	TA	<0.50	0.81	1.8	3.9	**49**	550-113514
Extraction	PCX-1	PCX-1	12/7/2018	Original	TA	<0.50	0.64	1.6	3.9	**47**	550-114583
MRTF											
Extraction	PV-14	PV14	1/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.63	550-95633
Extraction	PV-14	PV14	2/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-97267
Extraction	PV-14	PV14	3/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98770
Extraction	PV-14	PV 14	4/6/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.50	550-100761
Extraction	PV-14	PV14	5/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.59	550-102125
Extraction	PV-14	PV14	6/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.60	550-103720
Extraction	PV-14	PV 14	7/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.68	550-105185
Extraction	PV-14	PV14	8/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.55	550-106984
Extraction	PV-14	PV14	9/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.55	550-109043
Extraction	PV-14	PV14	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.61	550-110668
Extraction	PV-14	PV14	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.51	550-112668
Extraction	PV-14	PV14	12/3/2018	Original	TA	REJ	REJ	REJ	REJ	REJ	550-114182
Extraction	PV-14	PV 14	12/7/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114582
Extraction	PV-15	PV15	1/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.8**	550-95633
Extraction	PV-15	PV15	2/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.7**	550-97267
Extraction	PV-15	PV15	3/2/2018	Original	TA	REJ	REJ	REJ	REJ	REJ	550-98770
Extraction	PV-15	PV 15	3/9/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.8**	550-99247
Extraction	PV-15	PV 15	4/6/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.0**	550-100761
Extraction	PV-15	PV15	5/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.5**	550-102125
Extraction	PV-15	PV15	6/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.0**	550-103720
Extraction	PV-15	PV 15	7/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**7.2**	550-105185
Extraction	PV-15	PV15	8/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.0**	550-106984
Extraction	PV-15	PV15	9/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.2**	550-109043

TABLE 5. 2018 LABORATORY RESULTS FOR GROUNDWATER EXTRACTION WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
Extraction	PV-15	PV15	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.3**	550-110668
Extraction	PV-15	PV15	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.8**	550-112668
Extraction	PV-15	PV15	12/3/2018	Original	TA	REJ	REJ	REJ	REJ	REJ	550-114182
Extraction	PV-15	PV 15	12/7/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.2**	550-114582
Trip/Field Blanks											
--	QC - CGTF	FRB (Trip)	1/31/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-97178
--	QC - CGTF	FRB (Trip)	3/5/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98878
--	QC - CGTF	FRB (Trip)	5/7/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102428
--	QC - CGTF	FRB (Trip)	5/17/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103091
--	QC - CGTF	FRB (Trip)	6/5/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103830
--	QC - CGTF	FRB (Trip)	7/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105195
--	QC - CGTF	FRB (Trip)	8/6/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-107345
--	QC - CGTF	FRB (Trip)	9/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109424
--	QC - CGTF	FRB (Trip)	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110644
--	QC - CGTF	FRB (Trip)	12/19/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115171
--	QC - Area12	TB	4/10/2018	TB	TA	See treatment facility samples in Table 9					550-100874
--	QC - Area12	TB	5/2/2018	TB	TA	See treatment facility samples in Table 9					550-102108
--	QC - Area12	TB	6/4/2018	TB	TA	See treatment facility samples in Table 9					550-103718
--	QC - Area12	TB	7/2/2018	TB	TA	See treatment facility samples in Table 9					550-105181
--	QC - Area12	TB	8/1/2018	TB	TA	See treatment facility samples in Table 9					550-106982
--	QC - Area12	TB	9/4/2018	TB	TA	See treatment facility samples in Table 9					550-109012
--	QC - Area12	TB	10/1/2018	TB	TA	See treatment facility samples in Table 9					550-110660
--	QC - Area12	TB	11/1/2018	TB	TA	See treatment facility samples in Table 9					550-112666
--	QC - Area12	TB	12/3/2018	TB	TA	See treatment facility samples in Table 9					550-114150
--	QC - NGTF	TB	1/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-95635
--	QC - NGTF	TB	2/15/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98101
--	QC - NGTF	TB	3/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-99248
--	QC - NGTF	TB	4/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-101042
--	QC - NGTF	TB	5/16/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103022
--	QC - NGTF	TB	6/26/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-104933
--	QC - NGTF	TB	7/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105577
--	QC - NGTF	TB	8/15/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-108007
--	QC - NGTF	TB	9/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109527
--	QC - NGTF	TB	10/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110818
--	QC - NGTF	TB	11/16/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113514
--	QC - NGTF	TB	12/7/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114583
--	QC - MRTF	TB	1/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-95633
--	QC - MRTF	TB	2/2/2018	TB	TA	<0.50	<0.50$^{(1,2)}$	<0.50	<0.50	<0.50	550-97267
--	QC - MRTF	TB	3/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98770
--	QC - MRTF	TB	3/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-99247
--	QC - MRTF	TB	4/6/2018	TB	TA	<0.50$^{(3)}$	<0.50$^{(3)}$	<0.50$^{(3)}$	<0.50$^{(3)}$	<0.50$^{(3)}$	550-100761
--	QC - MRTF	TB	5/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102125
--	QC - MRTF	TB	6/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103720
--	QC - MRTF	TB	7/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105185
--	QC - MRTF	TB	8/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106984
--	QC - MRTF	TB	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110668

TABLE 5. 2018 LABORATORY RESULTS FOR GROUNDWATER EXTRACTION WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
--	QC - MRTF	TB	11/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112668
--	QC - MRTF	TB	12/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114182
--	QC - MRTF	TB	12/7/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114582

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene

ID = Identifier
TA = TestAmerica, Inc.
<0.50 = Analytical result is less than laboratory detection limit
QC = Quality Control
TB = Trip Blank
FB = Field Blank
FRB = Field Reagent Blank
REJ = Data rejected because contractor reported that samples were switched during collection. Re-sampled.

NOTES:

<0.50 =	Non-Detect
5	Cleanup Standards for Treated Water (µg/L)
5.1	Sample result exceeds Cleanup Standards for Treated Water

** If duplicate is greater than the original value, the duplicate was used for contouring on the plume maps.

(1) L5 Flag: The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.

(2) V1 Flag: Continuing calibration verification (CCV) recovery was above method acceptance limits. This target analyte was not detected in the sample.

(3) N1 Flag: Due to the BFB tune failure in the batch 550-143911, all affected samples were re-analyzed except for TB sample (trip blank) since the trip blank could not be re-analyzed due to insufficient sample volume with only one vial provided. The data have been qualified with N1 and reported.

TABLE 6. SUMMARY OF 2018 MONTHLY GROUNDWATER PRODUCTION
NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

Production Well ID	Estimated Pumping Distribution Percentage			Gallons (x1000)													Total In Acre-Feet	Calculated Pumping Distribution (Acre-Feet)		
	UAU	MAU	LAU	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total		UAU	MAU	LAU
7EX-3aMA	0	100	0	4,752	3,243	4,032	4,937	5,009	4,426	6,028	5,012	3,466	2,371	5,192	5,734	54,202	166.3	0.0	166.3	0.0
7EX-4MA	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
7EX-6MA[a]	0	100	0	9,795	6,708	8,208	9,832	10,282	8,892	10,734	8,541	7,218	5,332	9,391	10,090	105,021	322.3	0.0	322.3	0.0
PV-11	0	18	82	42,122	23,446	44,147	23,213	34,065	73,065	74,711	74,761	60,999	47,733	62,393	14,234	574,889	1,764.3	0.0	317.6	1,446.7
PV-12B[b]	0	0	100	7,809	2,385	2,016	19,136	42,216	114,508	102,228	83,744	43,380	29,715	5,246	48	452,431	1,388.5	0.0	0.0	1,388.5
PV-14	0	0	100	94,560	84,663	96,002	92,046	95,716	92,522	96,006	94,950	91,599	90,712	87,591	94,545	1,110,912	3,409.3	0.0	0.0	3,409.3
PV-15	0	18	82	60,645	81,573	91,111	90,988	93,748	90,947	94,224	93,154	89,733	93,957	91,576	95,217	1,066,873	3,274.1	0.0	589.3	2,684.8
PV-16	0	0	100	1,346	356	1,821	4,551	17,478	2,359	0	2,008	42,829	1,118	206	48	74,120	227.5	0.0	0.0	227.5
PV-17	0	0	100	718	498	1,290	59,852	64,336	6,444	25,174	11,011	2,885	0	1,270	37	173,515	532.5	0.0	0.0	532.5
AVI **	0	100	0	3,116	3,116	3,116	3,116	3,116	3,116	3,116	3,116	3,116	3,116	3,116	3,116	37,393	114.8	0.0	114.8	0.0
AWC 7A	0	0	100	17,699	11,919	23,005	25,877	26,134	20,822	26,372	24,316	21,723	19,504	15,084	14,296	246,750	757.2	0.0	0.0	757.2
AWC 8/8B***	0	75	25	11,790	4,330	18,302	22,182	22,727	23,073	32,579	28,138	23,646	22,651	16,953	14,983	241,356	740.7	0.0	555.5	185.2
AWC 8A	0	65	35	8,219	6,254	14,979	17,295	2,411	1,569	0	3,065	13,747	13,909	11,408	8,821	101,678	312.0	0.0	202.8	109.2
AWC 9A	0	45	55	6,895	6,021	4,390	0	20,045	22,861	14,366	19,907	17,476	11,159	1,459	10,626	135,204	414.9	0.0	186.7	228.2
AWC 12A	0	66	34	14,003	10,304	23,003	21,143	23,538	23,898	23,048	20,302	11,418	10,212	4,754	6,084	191,707	588.3	0.0	388.3	200.0
COS 3	0	32	68	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS 4	0	95	5	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS 14	0	53	47	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS 25 *	0	70	30	145	115	0	992	2,528	3,269	2,225	1,623	1,755	87	88	6	12,834	39.4	0.0	27.6	11.8
COS 70	0	75	25	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS 71A[c]	0	19	81	348	0	0	0	6,564	0	0	0	0	0	0	99	7,011	21.5	0.0	4.1	17.4
COS 72	0	50	50	7,675	0	0	0	0	19,590	16,732	53,595	13,030	8,761	0	31,647	151,031	463.5	0.0	231.7	231.7
COS 73	2	77	21	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS 74	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
COS 75A	0	0	100	77,172	94,500	101,269	101,135	103,098	99,802	102,135	101,781	96,625	100,747	2,360	82,176	1,062,801	3,261.6	0.0	0.0	3,261.6
COS 76	0	0	100	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COT 6	0	70	30	0	0	0	0	0	0	0	15,020	0	0	18,503	0	33,524	102.9	0.00	72.02	30.86
IBGC	10	90	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LAIRD 2	4	66	30	0	14	30	16	0	65	65	0	18	0	0	0	207	0.6	0.0	0.4	0.2
MDWC	0	70	30	2,597	2,135	2,428	2,400	3,684	6,046	4,832	5,700	4,629	2,911	2,349	0	39,710	121.9	0.0	85.3	36.6
MEX-1MA	0	100	0	0	0	0	21,470	31,500	29,860	29,290	28,440	24,180	25,890	25,280	24,370	240,280	737.4	0.0	737.4	0.0
QRIA	0	66	34	0	0	270	1,404	1,215	1,188	1,188	675	1,242	270	0	0	7,450	22.9	0.0	15.1	7.8
SRIR SCC	0	40	60	3,266	2,966	3,632	5,710	5,231	7,250	8,161	7,006	6,392	4,158	3,686	2,703	60,161	184.6	0.0	73.9	110.8
SRIR 4	0	100	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
SRIR 10	2	68	30	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0

TABLE 6. SUMMARY OF 2018 MONTHLY GROUNDWATER PRODUCTION NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

Production Well ID	Estimated Pumping Distribution Percentage			Gallons (x1000)													Total In Acre-Feet	Calculated Pumping Distribution (Acre-Feet)		
	UAU	MAU	LAU	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total		UAU	MAU	LAU
SRP 21.5E,8N	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP 21.6E,8N[d]				0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP 22.1E,8.5N	0	100	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
SRP 22.3E,7N	2	98	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
SRP 22.4E,9N	NA	NA	NA	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	NA	NA	NA
SRP 22.5E,5.5N	0	100	0	0	0	0	42	0	0	0	3	0	0	55	0	101	0.3	0.0	0.3	0.0
SRP 22.5E,6N	0	100	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
SRP 22.5E,9.3N (PCX 1)	0	0	100	98,036	82,285	111,691	106,595	109,243	104,004	106,931	107,324	103,812	106,709	101,919	109,546	1,248,095	3,830.3	0.0	0.0	3,830.3
SRP 22.6E,10N	0	32	68	1,466	16	0	11,170	4,959	0	1,919	1,675	0	0	81	0	21,288	65.3	0.0	20.9	44.4
SRP 22.9E,10.8N[e]	0	50	50	3,451	11,304	0	0	0	0	1,134	1,069	0	0	0	0	16,957	52.0	0.0	26.0	26.0
SRP 23.3E,7.3N (COS 31)	0	57	43	88,420	79,897	2,810	0	0	0	0	13,620	0	278	0	4,882	189,906	582.8	0.0	332.2	250.6
SRP 23.3E,7.5N (COS 6)	1	79	20	153	0	808	0	0	0	0	0	3	78	39	0	1,082	3.3	0.0	2.6	0.7
SRP 23.5E,5.3N	0	70	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.00	0.00
SRP 23.5E,8.8N	0	53	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.00	0.00
SRP 23.5E,9.5N	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP 23.5E,10.6N[f]	0	32	68	2,444	7,820	0	13,252	9,714	0	0	143	0	0	0	0	33,374	102.4	0.0	32.8	69.6
SRP 23.6E,6N (Granite Reef)	0	100	0	0	0	0	28,030	39,690	38,150	36,370	39,610	35,810	26,420	35,580	24,710	304,370	934.1	0.0	934.1	0.0
SRP 24E,10.5N	0	52	48	14,419	11,333	0	12,799	26,850	8,661	4,295	1,072	0	94	0	0	79,524	244.1	0.0	126.9	117.1
Total Monthly Discharge (Gallons x 1,000)				**583,061**	**537,201**	**558,359**	**699,185**	**805,098**	**806,387**	**823,862**	**850,381**	**720,729**	**627,894**	**505,579**	**558,018**	**8,075,756**				
Total Monthly Discharge (Acre-Feet)				**1,789**	**1,649**	**1,714**	**2,146**	**2,471**	**2,475**	**2,528**	**2,610**	**2,212**	**1,927**	**1,552**	**1,713**	**24,784**	**24,784**	**0**	**5,567**	**19,217**

ABBREVIATIONS:

7EX = Area 7 Extraction Wells
AB = Well Abandoned
AVI = Arcadia Vista Improvement
AWC = Arcadia Water Company
COS = City of Scottsdale
COT = City of Tempe
IBGC = Indian Bend (Rio Salado) Golf Course
LAIRD = Tempe School District No. 3
MDWC = McDowell Water Company
MEX = Motorola Extraction Well
NA = Not Available
N.I.S. = Not in Service
PV = Paradise Valley
QRIA = Quail Run Irrigation Association
SRIR = Salt River Indian Reservation
SRP = Salt River Project
SCC = Scottsdale Community College

NOTES:

* All water from Well 25 goes directly to McKellips Park irrigation and does not go to City of Scottsdale's water delivery system.

** Monthly values are based on an average of the annual total.

*** Has pumping for AWC 8 and AWC 8B and is now AWC 8B

[a] Replacement well for 7EX-5MA

[b] Replacement well for PV-12

[c] Replacement well for COS-71

[d] Replacement well for SRP 21.5E,8N (not active yet)

[e] Replacement well for SRP 23E,10.8N

[f] Replacement well for SRP 23.4E,10.6N

TABLE 7. SUMMARY OF ANNUAL GROUNDWATER PRODUCTION
FROM 1991 THROUGH 2018
NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

Production Well ID	Gallons (x1000)																											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
7EX-1UA (1)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13,514	13,654	14,585	12,966	12,627	0	0	0	AB	AB	AB
7EX-3aMA (2)	---	---	---	---	---	---	---	---	13,170	87,375	76,401	64,048	77,690	83,654	72,475	73,094	74,020	64,062	70,290	73,227	68,454	89,646	82,936	85,411	75,046	50,426	55,354	54,202
7EX-4MA (2)	---	---	---	---	---	---	---	---	12,498	57,645	50,958	29,736	35,822	27,685	19,076	22,205	12,790	12,225	19,259	24,851	30,447	46,901	51,448	35,461	28,280	16,720	0	0
7EX-5MA (3)	---	---	---	---	---	---	---	---	---	---	---	42,094	96,280	85,914	102,191	95,534	103,234	78,932	88,997	72,160	69,657	19,315	0	0	0	0	AB	AB
7EX-6MA (4)[a]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	25,524	76,991	107,116	105,021
PV-11	141,681	10,008	6,048	49,440	147,437	191,702	314,834	234,419	477,245	308,005	541,897	479,842	272,363	317,251	234,580	388,303	237,616	525,273	353,453	108,631	584,592	769,961	823,065	610,793	587,317	667,557	673,419	574,889
PV-12	78,760	161,849	160,265	197,764	442,311	766,800	302,222	224,958	317,991	242,826	292,758	269,215	255,925	181,905	190,159	235,528	177,350	415,980	478,840	182,527	416,242	72,486	0	AB	AB	AB	AB	AB
PV-12B[b]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	464,884	769,618	438,959	422,165	809,273	558,911	452,431
PV-14	697,184	578,435	747,760	670,253	556,129	387,737	203,056	584,633	575,456	512,210	487,780	593,518	632,011	677,341	771,890	387,497	632,798	232,191	149,512	451,695	854,265	930,498	696,185	1,031,782	1,097,813	1,067,856	1,024,432	1,110,912
PV-15	607,810	653,910	616,805	404,378	204,347	289,088	629,291	950,086	1,066,526	996,539	811,431	913,461	1,017,488	1,082,598	1,059,244	1,066,791	281,022	418,495	890,424	997,698	1,053,100	1,022,323	831,104	1,078,491	1,006,058	620,398	1,089,449	1,066,873
PV-16	1,170,129	1,019,287	1,131,036	1,048,376	981,234	1,067,411	1,051,729	583,415	423,634	541,894	699,049	475,143	414,571	319,872	341,430	246,221	567,698	831,067	704,898	842,941	314,954	253,545	184,509	89,102	84,721	125,342	156,143	74,120
PV-17	---	---	7,080	715,206	711,787	711,787	906,660	568,588	358,059	54,352	105,121	57,730	128,252	102,762	38,113	173,522	451,742	1,015,459	1,297,930	1,005,540	221,181	10,293	35,513	12,581	12,304	31,554	10,217	173,515
AVI	78,763	79,074	89,128	95,840	91,608	88,372	93,030	79,825	84,295	75,740	79,388	76,049	70,533	78,501	68,605	62,650	54,663	67,011	57,627	60,168	60,117	54,030	51,308	48,633	44,140	43,214	40,492	37,393
AWC 7A	77,412	338,402	401,431	424,251	374,819	340,712	190,891	223,939	298,585	305,173	276,139	220,294	229,397	170,813	176,534	45,049	40,934	51,903	63,065	38,430	155,622	261,554	229,121	280,630	299,937	221,472	236,670	246,750
AWC 8	363,078	418,945	410,874	417,285	233,147	341,332	270,555	370,570	319,651	292,498	138,800	279,501	212,209	321,431	293,885	254,674	365,994	353,379	326,794	313,350	311,522	323,744	153,290	129,982	138,410	83,095	130,116	241,356
AWC 8A	0	0	0	215,398	394,624	265,618	271,981	266,446	271,888	184,594	136,050	226,063	257,184	245,347	156,650	195,585	3,353	112,147	117,745	195,986	34,276	54,811	113,073	44,916	67,315	106,568	99,776	101,678
AWC 9A	434,580	128,063	97,615	136,891	210,374	226,053	236,429	180,337	166,739	214,811	323,119	213,268	168,569	159,197	133,705	278,127	403,515	221,656	259,969	304,614	280,265	275,173	308,515	263,003	229,236	233,041	196,193	135,204
AWC 12A	242,769	182,413	171,403	174,068	329,099	241,366	331,889	272,153	232,164	309,621	329,926	295,895	321,098	312,606	370,420	406,087	405,590	426,091	349,362	365,767	391,746	233,788	337,512	309,414	274,882	297,279	231,665	191,707
COS 2	250,311	366,789	246,573	32,587	0	0	0	0	0	0	0	0	0	0	0	0	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS 3	226,940	237,611	371,887	410,270	406,218	322,974	386,618	363,730	260,750	91,100	156,906	142,948	129,909	95,897	162,641	2,062	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS 4	42,215	39,244	47,984	95,807	56,487	28,646	84,058	146,211	159,421	328,716	411,993	310,812	347,167	308,158	445,980	17,765	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS 14	116,505	71,871	214,611	317,726	343,300	265,520	238,930	229,608	306,935	396,650	91,174	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS 25	260,701	199,541	48,721	484,574	551,724	242,256	25,618	8,730	0	0	6,482	15,627	14,628	15,460	9,442	25,372	15,728	14,472	12,850	10,148	14,398	14,801	11,768	9,929	11,903	11,450	13,771	12,834
COS 69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS 70	133,678	2,553	43,066	390,067	110,774	55,201	93,123	2,709	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS 71	0	0	6,480	502,719	234,943	1,126,972	958,101	946,903	631,967	787,926	1,013,550	432,044	764,771	638,982	387,740	826,102	492,646	697,198	725,001	557,523	371,970	475,775	370,408	12,211	AB	AB	AB	AB
COS 71A[c]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	52,797	505,229	559,816	4,064	7,011
COS 72	0	0	4,991	394,796	299,685	699,937	662,468	779,085	953,964	763,436	556,347	821,780	560,773	1,028,060	1,016,259	927,729	460,529	327,703	1,087,912	820,643	1,022,055	82,907	169,017	16,847	285,438	380,588	13,068	151,031
COS 73	3,271	649,298	1,007,101	3,252	795	9,743	3,157	527	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS 74	42,763	38,042	635,564	733,867	825,076	460,914	396,669	790,408	918,226	1,092,783	1,165,908	1,003,371	955,818	1,098,504	1,172,087	424,447	325,721	318,930	426,465	469,534	139,478	382,838	155,871	193,017	65	0	0	0
COS 75A	0	0	0	0	452,657	796,408	892,870	951,517	830,739	896,406	979,506	836,006	933,512	926,306	936,472	929,487	559,788	821,026	878,726	841,481	848,597	917,870	1,108,302	987,970	777,406	933,858	977,609	1,062,801
COS 76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS 77	0	3,088	1,103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS 78	999,204	328	1,029	650	0	0	3,099	0	0	0	0	0	0	0	0	0	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COT 6	150	1,668	2,777	10,122	3,441	160,308	4,197	0	0	446,480	734,304	221,080	26,831	0	22,571	390	0	153	1,666	389,936	355,018	9	506,354	369,685	385,707	417,507	536,592	33,524
IBGC	69,987	59,242	65,845	66,839	61,266	79,697	75,740	68,887	344	28,365	64,996	69,982	62,855	65,938	59,087	63,778	63,778	69,938	59,199	60,546	56,053	37,910	68,382	119	0	0	NA	NA
LAIRD 2	8,178	1,453	1,827	964	1,655	1,655	4,650	1,573	8,432	9,857	0	0	0	0	0	3,853	3,853	322	530	357	285	365	558	412	119	0	104	207
MDWC	27,289	27,835	53,587	62,535	58,707	66,855	62,060	59,829	67,278	72,475	59,485	53,208	51,864	45,985	1,352	50,081	50,046	54,355	46,873	48,614	42,379	43,956	37,426	36,964	39,853	54,486	51,438	39,710
MEX-1MA (5)	---	---	---	---	---	---	---	---	34,348	256,586	361,409	227,273	119,380	315,708	309,919	311,978	332,752	405,260	394,010	407,090	398,980	273,270	318,740	223,710	200,600	283,710	164,430	240,280
QRIA	17,503	16,001	13,437	12,768	13,407	14,166	17,274	16,544	19,832	8,863	16,435	15,212	14,628	13,541	12,883	15,665	14,333	14,718	12,962	10,837	12,140	10,965	11,727	10,510	10,921	9,382	9,234	7,450
SRIR SCC	86,231	86,231	78,736	91,777	79,599	84,063	77,791	36,374	69,629	78,217	76,349	76,153	65,411	68,046	76,319	82,780	61,274	68,592	74,861	42,721	67,924	74,567	56,762	65,405	60,768	56,972	61,068	60,161
SRIR 4	60,580	7,771	0	31,631	3	0	248	38	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
SRIR 10	47,583	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.

TABLE 7. SUMMARY OF ANNUAL GROUNDWATER PRODUCTION FROM 1991 THROUGH 2018 NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

Production Well ID	Gallons (x1000)																											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SRP 21.5E,8N	74,479	2,829	5,090	59,887	17,536	19,600	0	1,302	213,170	454,442	247,362	160,470	166,324	254,063	28,797	0	0	0	3,397	5,321	13,803	114,214	116,117	208,382	73,131	18,104	0	0
SRP 21.6E,8N[d]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SRP 22.1E,8.5N	147,778	103,488	14,221	78,782	3,189	21,219	25	1,051	8	488,285	214,764	3,126	0	7,299	0	0	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.
SRP 22.3E,7N	0	0	0	0	756	22	0	0	0	0	0	0	0	0	0	0	0	N.I.S.	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.
SRP 22.4E,9N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
SRP 22.5E,5.5N	0	0	0	0	0	0	0	0	0	0	123,673	264,377	0	0	0	0	0	0	0	0	0	0	64,101	0	88	212	0	101
SRP 22.5E,6N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N.I.S.	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
SRP 22.5E,9.3N (PCX 1)(6)	---	---	---	---	---	---	744,308	1,169,490	928,957	1,094,148	709,461	1,080,881	1,032,519	1,002,262	1,003,406	1,109,259	983,481	856,322	1,012,745	1,008,500	891,933	971,762	1,000,902	478,633	1,076,158	1,194,001	1,293,066	1,248,095
SRP 22.6E,10N	195,626	9,773	4,636	184,709	22,836	99,731	0	85	261,217	613,096	583,486	699,074	935,270	828,047	97,937	103,237	289,257	79,268	62,767	30,503	66,444	290,043	68,455	228,571	63,629	6,207	81	21,288
SRP 22.9E,10.8N[e]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	128,034	173,499	305,492	183,239	29,066	91	16,957
SRP 23E,10.8N (COS5W)	137,618	60,933	6,744	33,979	115,096	7,607	15,747	5,701	154,864	350,263	337,880	148,376	447,267	174,920	14,322	21,004	120,014	N.I.S.	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
SRP 23.3E,7.3N (COS 31)	0	1,305	21,834	1,007,196	15,974	1,222,373	973,894	493,236	916,864	748,167	983,356	1,091,407	1,019,344	516,934	826,859	560,651	309,239	655,172	5,133	118,375	454,664	713,491	257,409	489,661	208,113	372,149	143,659	189,906
SRP 23.3E,7.5N (COS 6)	156,795	24,127	-3	35,527	47,921	192,207	168,263	246,769	101,318	62,194	102,249	80,341	138,380	88,935	1,638	1,769	175,013	0	0	0	0	0	0	0	7,723	4,054	0	1,082
SRP 23.4E,10.6N (COS5E)	507,724	565,069	578,233	658,438	663,544	757,582	723,706	779,598	832,331	566,682	392,775	278,701	470,274	576,706	30,001	0	0	N.I.S.	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
SRP 23.5E,5.3N	122,870	3,077	4,077	3,271	4,920	2,856	0	34,473	111,366	144,215	126,690	226,058	128,631	255,259	3,348	0	78,673	0	2,941	0	0	0	0	7	6,194	1,776	0	0
SRP 23.5E,8.8N	66,487	1,775	557	2,556	7,176	52	49	685	1,499	132,274	70,905	21,050	213,020	241,944	1,505	2,922	134,579	0	1,551	0	965	0	531	3	101	935	0	0
SRP 23.5E,9.5N	0	0	0	0	0	0	0	85	502	117,592	131	99,548	30,042	256,542	2,051	1,988	163,479	0	2,021	0	1,303	33	15,054	163	0	352	0	0
SRP 23.5E,10.6N[f]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	83,907	191,216	217,193	115,912	20,369	0	33,374
SRP 23.6E,6N (Granite Reef)	0	0	0	0	0	0	0	0	104,439	287,660	174,199	319,110	180,870	42,938	58,781	173,699	44,516	99,160	79,599	70,470	79,880	70,110	77,410	195,150	305,880	348,810	184,350	304,370
SRP 24E,10.5N	113,065	3,151	578,233	113,496	16,493	122,709	2,124	2,397	381,364	470,577	408,894	616,127	528,528	428,180	31,260	45,701	188,758	11,621	9,319	0	411	204,488	323,257	332,586	138,399	34,931	173	79,524
Total Discharge (Gallons x1000)	7,807,696	6,154,481	7,898,386	10,369,940	9,092,091	11,779,250	11,417,355	11,676,917	12,887,663	14,970,743	14,519,488	13,549,998	13,527,407	13,461,492	10,741,611	9,632,587	8,679,775	9,333,593	10,142,344	9,944,770	9,698,086	9,786,891	9,770,464	8,894,575	8,849,725	9,189,521	8,062,751	8,075,756
Total Discharge (Acre-Feet)	23,961	18,887	24,239	31,824	27,903	36,149	35,039	35,835	39,551	45,943	44,559	41,583	41,514	41,312	32,965	29,561	26,637	28,644	31,126	30,519	29,762	30,035	29,984	27,296	27,159	28,202	24,744	24,784

ABBREVIATIONS:

7EX = Area 7 Extraction Wells
AB = Well Abandoned
AVI = Arcadia Vista Improvement
AWC = Arcadia Water Company
COS = City of Scottsdale
COT = City of Tempe
IBGC = Indian Bend (Rio Salado) Golf Course
LAIRD = Tempe School District No. 3
MDWC = McDowell Water Company
MEX = Motorola Extraction Well
NA = Not available
N.I.S. = Not in Service
PV = Paradise Valley
QRIA = Quail Run Irrigation Association
SRIR = Salt River Indian Reservation
SRP = Salt River Project
--- = No Data

NOTES:

(1) Extraction well 7EX-1UA went into service in 2008.
(2) Extraction wells 7EX-3MA and 7EX-4MA went into service in September 1999.
(3) Extraction well 7EX-5MA went into service in February 2002.
(4) Extraction well 7EX-6MA went into service in October 13, 2015.
(5) Well MEX-1MA went into service in October 1999.
(6) Well 22.5E,9.3N (PCX-1) went into service in April 1997.

[a] Replacement well for 7EX-5MA
[b] Replacement well for PV-12
[c] Replacement well for COS 71
[d] Replacement well for SRP 21.5E,8N
[e] Replacement well for SRP 23E,10.8N
[f] Replacement well for SRP 23.4E,10.6N

TABLE 8. SUMMARY OF 2018 NIBW EXTRACTION WELL PUMPAGE AND ESTIMATED TCE MASS REMOVED
NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

			UNITS	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	TOTALS	ANNUAL PUMPAGE (in acre-feet)	ANNUAL PUMPAGE (in gpm)
CGTF	COS-31	pumpage	x 1,000 gal	88,419.8	79,896.8	2,809.7	-	-	-	-	13,620.	-	278.4	-	4,881.8	189,906	583	361
		Operating time	%	77%	77%	3%	0%	0%	0%	0%	12%	0%	0%	0%	4%	14%		
		[TCE conc.]	µg/L	9.9	13.9	6.	-	-	-	-	5.8	-	48.	-	4.9	7		
		Est. TCE mass	pounds	7.3	9.3	0.1	-	-	-	-	0.7	-	0.1	-	0.2	18		
	COS-71A	pumpage	x 1,000 gal	347.8	-	-	-	6,563.7	-	-	-	-	-	-	99.1	7,011	22	13
		Operating time	%	1%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	1%		
		[TCE conc.]	µg/L	51.7	-	-	-	39.	-	-	-	-	-	-	39.	11		
		Est. TCE mass	pounds	0.2	-	-	-	2.1	-	-	-	-	-	-	0.	2		
	COS-72	pumpage	x 1,000 gal	7,675.3	-	-	-	-	19,589.9	16,732.1	53,595.4	13,029.6	8,761.3	-	31,647.	151,031	463	287
		Operating time	%	8%	0%	0%	0%	0%	21%	17%	54%	13%	9%	0%	32%	13%		
		[TCE conc.]	µg/L	6.2	-	-	-	-	5.8	7.6	7.7	7.7	7.4	-	5.8	4		
		Est. TCE mass	pounds	0.4	-	-	-	-	0.9	1.1	3.4	0.8	0.5	-	1.5	9		
	COS-75A	pumpage	x 1,000 gal	77,172.4	94,499.6	101,269.4	101,135.4	103,097.6	99,802.	102,134.7	101,781.5	96,624.9	100,747.3	2,359.9	82,176.2	1,062,801	3,262	2,022
		Operating time	%	88%	100%	97%	99%	100%	100%	100%	100%	98%	98%	2%	79%	88%		
		[TCE conc.]	µg/L	41.	56.3	39.	46.9	41.	37.	45.	41.	40.	41.	41.	41.	43		
		Est. TCE mass	pounds	26.4	44.4	33.	39.6	35.3	30.8	38.4	34.8	32.3	34.5	0.8	28.1	378		
	TOTAL	pumpage	x 1,000 gal	173,615.3	174,396.3	104,079.1	101,135.4	109,661.3	119,391.9	118,866.8	168,996.9	109,654.4	109,787.1	2,359.9	118,804.2	**1,410,749**	**4,329**	**2,684**
		Est. TCE mass	pounds	34.3	53.7	33.1	39.6	37.4	31.8	39.4	38.9	33.1	35.1	0.8	29.9	**407**		
MRTF	PV-14	pumpage	x 1,000 gal	94,560.	84,663.	96,002.	92,046.	95,716.	92,522.	96,006.	94,950.	91,599.	90,712.	87,591.	94,545.	1,110,912	3,409	2,114
		Operating time	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	97%	100%	100%		
		[TCE conc.]	µg/L	0.6	0.5	0.5	0.5	0.6	0.6	0.7	0.6	0.6	0.6	0.5	0.5	1		
		Est. TCE mass	pounds	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.4	5		
	PV-15	pumpage	x 1,000 gal	60,645.	81,573.	91,111.	90,988.	93,748.	90,947.	94,224.	93,154.	89,733.	93,957.	91,576.	95,217.	1,066,873	3,274	2,030
		Operating time	%	65%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	97%		
		[TCE conc.]	µg/L	5.8	5.7	5.8	6.	6.5	6.	7.2	6.	6.2	6.3	5.8	5.2	6		
		Est. TCE mass	pounds	2.9	3.9	4.4	4.6	5.1	4.6	5.7	4.7	4.6	4.9	4.4	4.1	54		
	TOTAL	pumpage	x 1,000 gal	155,205.	166,236.	187,113.	183,034.	189,464.	183,469.	190,230.	188,104.	181,332.	184,669.	179,167.	189,762.	**2,177,785**	**6,683**	**4,143**
		Est. TCE mass	pounds	3.4	4.2	4.8	4.9	5.6	5.	6.2	5.1	5.1	5.4	4.8	4.5	**59**		
NGTF	PCX-1	pumpage	x 1,000 gal	98,035.9	82,284.7	111,691.	106,595.1	109,243.3	104,004.2	106,931.2	107,323.5	103,812.1	106,708.8	101,918.9	109,545.7	1,248,095	3,830	2,375
		Operating time	%	80%	81%	100%	99%	100%	100%	100%	100%	100%	99%	97%	100%	96%		
		Discharge$_{\text{Canal}}$	x 1,000 gal	6,218.8	523.1	100,585.3	3,487.9	267.3	7,630.	9,047.7	552.	2,046.9	19,709.5	3,493.5	56,942.8	210,505	646	401
		Discharge$_{\text{CWTP}}$	x 1,000 gal	91,739.9	81,575.7	10,696.7	102,802.5	108,659.5	96,135.4	97,521.5	106,592.2	101,654.	86,840.3	98,313.3	52,186.5	1,034,717	3,175	1,969
		[TCE conc.]	µg/L	51.	44.	44.	48.	48.	48.	50.	45.	47.	52.	49.	47.	48		
		Est. TCE mass	pounds	41.7	30.2	41.	42.7	43.8	41.7	44.6	40.3	40.7	46.3	41.7	43.	**498**		
AREA 7 GWETS	7EX-3aMA	pumpage	x 1,000 gal	4,752.	3,242.8	4,032.1	4,937.1	5,009.1	4,425.7	6,028.3	5,011.5	3,466.	2,371.3	5,192.2	5,733.9	54,202	166	103
		Operating time	%	87%	67%	74%	92%	100%	84%	87%	71%	56%	44%	83%	99%	79%		
		[TCE conc.]	µg/L	300.	300.	300.	280.	280.	280.	390.	390.	390.	450.	450.	450.	355		
		Est. TCE mass	pounds	11.9	8.1	10.1	11.5	11.7	10.3	19.6	16.3	11.3	8.9	19.5	21.5	161		
	7EX-4MA	pumpage	x 1,000 gal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Operating time	%	-	-	-	-	-	-	-	-	-	-	-	-	0%		
		[TCE conc.]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Est. TCE mass	pounds	-	-	-	-	-	-	-	-	-	-	-	-	-		
	7EX-6MA	pumpage	x 1,000 gal	9,794.6	6,708.4	8,207.6	9,831.9	10,282.5	8,891.6	10,733.6	8,540.8	7,217.8	5,332.	9,390.9	10,089.8	105,021	322	200
		Operating time	%	87%	67%	74%	90%	100%	84%	87%	71%	62%	51%	83%	99%	80%		
		[TCE conc.]	µg/L	610.	610.	610.	600.	600.	600.	600.	600.	600.	580.	580.	580.	598		
		Est. TCE mass	pounds	49.9	34.1	41.8	49.2	51.5	44.5	53.7	42.8	36.1	25.8	45.5	48.8	524		
	TOTAL	pumpage	x 1,000 gal	14,546.6	9,951.2	12,239.7	14,769.	15,291.5	13,317.3	16,761.9	13,552.3	10,683.7	7,703.2	14,583.	15,823.7	**159,223**	**489**	**303**
		Est. TCE mass	pounds	61.8	42.3	51.9	60.8	63.2	54.9	73.4	59.1	47.4	34.7	65.	70.4	**685**		
AREA 12 GWETS	MEX-1MA (SRP 23.1E6N)	pumpage	x 1,000 gal	-	-	-	21,470.	31,500.	29,860.	29,290.	28,440.	24,180.	25,890.	25,280.	24,370.	240,280	737	457
		Operating time	%	0%	0%	0%	68%	100%	99%	92%	100%	100%	99%	97%	92%	71%		
		[TCE conc.]	µg/L	-	-	-	60.	47.	40.	47.	42.	43.	53.	47.	46.	35		
		Est. TCE mass	pounds	-	-	-	10.8	12.4	10.	11.5	10.	8.7	11.5	9.9	9.4	94		
	Granite Reef (SRP 23.6E6N)	pumpage	x 1,000 gal	-	-	-	28,030.	39,690.	38,150.	36,370.	39,610.	35,810.	26,420.	35,580.	24,710.	304,370	934	579
		Operating time	%	0%	0%	0%	71%	100%	99%	88%	100%	100%	71%	97%	69%	67%		
		[TCE conc.]	µg/L	-	-	-	68.	120.	120.	140.	130.	130.	61.0	120.	130.	85		
		Est. TCE mass	pounds	-	-	-	15.9	39.7	38.2	42.5	43.	38.8	13.4	35.6	26.8	294		
	TOTAL	pumpage	x 1,000 gal	-	-	-	49,500.	71,190.	68,010.	65,660.	68,050.	59,990.	52,310.	60,860.	49,080.	**544,650**	**1,671**	**1,036**
		Est. TCE mass	pounds	-	-	-	26.7	52.1	48.2	54.	52.9	47.5	24.9	45.5	36.2	**388**		
															Total Pumping (in million gallons):	**5,541**	--	--
															Total Pumping (in acre-feet):	--	**17,003**	--
															TCE Mass Removal (in pounds):	**2,036**	--	--
															Total Pumping (in gpm):	--	--	**10,541**

EXPLANATION:

1) [TCE] = Concentration of trichloroethene, in micrograms per liter (µg/L) .
2) Most TCE results listed are as reported from TestAmerica; where PCs samples(s) not available, City of Scottsdale (COS) sample results may be used. Where multiple samples were collected during the same month, the value shown is the average of those results. Where samples were not able to be collected (e.g., extraction well was offline during scheduled sampling date), but a well operated during the month, TCE value used comprises the results (or average results) of samples obtained during previous or subsequent months.
3) Estimated TCE mass reported is in pounds.
4) Pumpage values reported is in thousands of gallons (x1000).
5) gpm = gallons per minute
6) CWTP = Chaparral Water Treatment Plant
7) Area 12 was not operating in January due to annual SRP canal dry-up.

TABLE 9. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	*6*	*6*	*5*	*5*	
AREA 7 GWETS										
SP-102 (influent)	SP-102	1/10/2018	Original	TA	<0.50	<0.50	0.95	2.5	**500**	550-96012
SP-102 (influent)	SP-102	2/15/2018	Original	TA	<0.50	<0.50	0.92	2.8	**440**	550-98120
SP-102 (influent)	SP-102	3/5/2018	Original	TA	<0.50	<0.50	0.86	2.7	**450**	550-98894
SP-102 (influent)	SP-102	4/2/2018	Original	TA	<0.50	<0.50	0.86	2.7	**480**	550-100327
SP-102 (influent)	SP-102	5/7/2018	Original	TA	<0.50	<0.50	0.92	3.3	**540**	550-102458
SP-102 (influent)	SP-102	6/7/2018	Original	TA	<0.50	<0.50	0.93	2.8	**510**	550-104047
SP-102 (influent)	SP-102	7/20/2018	Original	TA	<0.50	<0.50	0.85	3.0	**530**	550-106471
SP-102 (influent)	SP-102	8/10/2018	Original	TA	<0.50	<0.50	0.87	2.6	**530**	550-107758
SP-102 (influent)	SP-102	9/17/2018	Original	TA	<0.50	<0.50	0.90	2.6	**500**	550-109883
SP-102 (influent)	SP-102	10/25/2018	Original	TA	<0.50	<0.50	0.79	2.9	**540**	550-112440
SP-102 (influent)	SP-102	11/20/2018	Original	TA	<0.50	<0.50	0.90	3.4	**630**	550-113731
SP-102 (influent)	SP-102	12/19/2018	Original	TA	<0.50	<0.50	0.84	3.3	**570**	550-115244
SP-103 (UV/Ox effluent)	SP-103	1/10/2018	Original	TA	<0.50	<0.50	1.0	0.78	**62**	550-96012
SP-103 (UV/Ox effluent)	SP-103	2/15/2018	Original	TA	<0.50	<0.50	0.89	0.90	**63**	550-98120
SP-103 (UV/Ox effluent)	SP-103	3/5/2018	Original	TA	<0.50	<0.50	0.80	0.93	**69**	550-98894
SP-103 (UV/Ox effluent)	SP-103	4/2/2018	Original	TA	<0.50	<0.50	0.82	1.3	**130**	550-100327
SP-103 (UV/Ox effluent)	SP-103	5/7/2018	Original	TA	<0.50	<0.50	0.88	2.2	**240**	550-102458
SP-103 (UV/Ox effluent)	SP-103	6/7/2018	Original	TA	<0.50	<0.50	0.90	0.62	**33**	550-104047
SP-103 (UV/Ox effluent)	SP-103	7/20/2018	Original	TA	<0.50	<0.50	0.80	1.0	**67**	550-106471
SP-103 (UV/Ox effluent)	SP-103	8/10/2018	Original	TA	<0.50	<0.50	0.82	0.86	**65**	550-107758
SP-103 (UV/Ox effluent)	SP-103	9/17/2018	Original	TA	<0.50	<0.50	0.80	0.88	**79**	550-109883
SP-103 (UV/Ox effluent)	SP-103	10/25/2018	Original	TA	<0.50	<0.50	0.78	0.87	**64**	550-112440
SP-103 (UV/Ox effluent)	SP-103	11/20/2018	Original	TA	<0.50	<0.50	0.84	1.5	**120**	550-113731
SP-103 (UV/Ox effluent)	SP-103	12/19/2018	Original	TA	<0.50	<0.50	0.88	2.2	**260**	550-115244
SP-105 (Air Stripper Effluent)	SP-105	1/10/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-96012
SP-105 (Air Stripper Effluent)	SP-105	2/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98120
SP-105 (Air Stripper Effluent)	SP-105	3/5/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98894
SP-105 (Air Stripper Effluent)	SP-105	4/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100327
SP-105 (Air Stripper Effluent)	SP-105	5/7/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102458
SP-105 (Air Stripper Effluent)	SP-105	6/7/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-104047
SP-105 (Air Stripper Effluent)	SP-105	7/20/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106471
SP-105 (Air Stripper Effluent)	SP-105	8/10/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-107758
SP-105 (Air Stripper Effluent)	SP-105	9/17/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109883
SP-105 (Air Stripper Effluent)	SP-105	10/25/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112440
SP-105 (Air Stripper Effluent)	SP-105	11/20/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113731
SP-105 (Air Stripper Effluent)	SP-105	12/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.62	550-115244

TABLE 9. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	6	6	5	5	
AREA 12 GWETS										
WSP-1 (Influent)	WSP-1-1A-04102018	4/10/2018	Original	TA	<0.50	1.1	2.2	3.5	**62**	550-100897
WSP-1 (Influent)	WSP-1-1A-05022018	5/2/2018	Original	TA	<0.50	1.4	3.3	3.6	**88**	550-102124
WSP-1 (Influent)	WSP-1-1A-06042018	6/4/2018	Original	TA	<0.50	1.5	3.6	3.1	**90**	550-103719
WSP-1 (Influent)	WSP-1-1A-07022018	7/2/2018	Original	TA	<0.50	1.6	4.2	3.4	**99**	550-105184
WSP-1 (Influent)	WSP-1-1A-08012018	8/1/2018	Original	TA	<0.50	1.5	3.9	3.0	**89**	550-106983
WSP-1 (Influent)	WSP-1-1A- 09042018	9/4/2018	Original	TA	<0.50	1.2	3.7	2.8	**84**	550-109042
WSP-1 (Influent)	WSP-1-1A-10012018	10/1/2018	Original	TA	<0.50	1.5	1.8	3.4	**54**	550-110666
WSP-1 (Influent)	WSP-1-1A-11012018	11/1/2018	Original	TA	<0.50	1.8	3.5	2.9	**93**	550-112667
WSP-1 (Influent)	WSP-1-1A-12032018	12/3/2018	Original	TA	<0.50	1.6	3.5	3.0	**90**	550-114183
WSP-2 (Air Stripper Effluent)	WSP-2-1A - 04102018	4/10/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100874
WSP-2 (Air Stripper Effluent)	WSP-2-1A-0522018	5/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102108
WSP-2 (Air Stripper Effluent)	WSP-2-1A-06042018	6/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103718
WSP-2 (Air Stripper Effluent)	WSP-2-1A-07022018	7/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105181
WSP-2 (Air Stripper Effluent)	WSP-2-1A-08012018	8/1/2018	Original	TA	<0.50 [a]	<0.50 [a]	<0.50 [a]	<0.50 [a]	1.4 [a]	550-106982
WSP-2 (Air Stripper Effluent)	WSP-2-1A-08112018	8/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-107806
WSP-2 (Air Stripper Effluent)	WSP-2-1A-09042018	9/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109012
WSP-2 (Air Stripper Effluent)	WSP-2-1A-10012018	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110660
WSP-2 (Air Stripper Effluent)	WSP-2-1A-11012018	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112666
WSP-2 (Air Stripper Effluent)	WSP-2-1A-12032018	12/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114150
MRTF										
Tower 1 Effluent	Tower 1	3/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98770
Tower 1 Effluent	Tower 1	4/6/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100761
Tower 1 Effluent	Tower 1	5/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102125
Tower 1 Effluent	Tower 1	6/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103720
Tower 1 Effluent	Tower 1	7/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105185
Tower 1 Effluent	Tower 1	8/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106984
Tower 1 Effluent	Tower 1	9/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109043
Tower 1 Effluent	Tower 1	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110668
Tower 1 Effluent	Tower 1	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112668
Tower 1 Effluent	Tower 1	12/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114182
Tower 2 Effluent	Tower 2	1/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-95633
Tower 2 Effluent	Tower 2	2/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-97267
Tower 2 Effluent	Tower 2	3/2/2018	Original	TA	REJ	REJ	REJ	REJ	REJ	550-98770
Tower 2 Effluent	Tower 2	3/9/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-99247
Tower 2 Effluent	Tower 2	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110668
Tower 2 Effluent	Tower 2	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112668
Tower 2 Effluent	Tower 2	12/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114182

TABLE 9. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	*6*	*6*	*5*	*5*	
Tower 3 Effluent	Tower 3	1/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-95633
Tower 3 Effluent	Tower 3	2/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-97267
Tower 3 Effluent	Tower 3	4/6/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100761
Tower 3 Effluent	Tower 3	5/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102125
Tower 3 Effluent	Tower 3	6/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103720
Tower 3 Effluent	Tower 3	7/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105185
Tower 3 Effluent	Tower 3	8/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106984
Tower 3 Effluent	Tower 3	9/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109043
NGTF										
NGTF Influent*	NGTF-INF	1/2/2018	Original	TA	<0.50	0.81	1.6	4.1	**52**	550-95488
NGTF Influent*	NGTF-INF	1/8/2018	Original	TA	<0.50	1.1	1.6	4.3	**54**	550-95805
NGTF Influent*	NGTF-INF	1/16/2018	Original	TA	<0.50	0.75(1)	1.9	4.3	**52**	550-96401
NGTF Influent*	NGTF-INF	1/22/2018	Original	TA	<0.50	0.87	1.7	3.6	**45**	550-96649
NGTF Influent*	NGTF-INF	2/6/2018	Original	TA	<0.50	1.2	1.9	3.2	**53**	550-97457
NGTF Influent*	NGTF-INF	2/13/2018	Original	TA	<0.50	0.61	1.6	3.8	**45**	550-97879
NGTF Influent*	NGTF-INF	2/20/2018	Original	TA	<0.50	0.75	1.6	3.8	**45**	550-98246
NGTF Influent*	NGTF-INF	2/26/2018	Original	TA	<0.50	0.76	1.7	4.0	**48**	550-98522
NGTF Influent*	NGTF-INF	3/5/2018	Original	TA	<0.50	0.76	1.5	3.8	**44**	550-98872
NGTF Influent*	NGTF-INF	3/12/2018	Original	TA	<0.50	0.77	1.6	3.9	**46**	550-99358
NGTF Influent*	NGTF-INF	3/19/2018	Original	TA	<0.50	0.64	1.6	3.4	**44**	550-99708
NGTF Influent*	NGTF-INF	3/26/2018	Original	TA	<0.50	0.63	1.6	3.4	**43**	550-100022
NGTF Influent*	NGTF-INF	4/2/2018	Original	TA	<0.50	0.73	1.6	3.7	**46**	550-100313
NGTF Influent*	NGTF-INF	4/9/2018	Original	TA	<0.50	0.73	1.5	4.2	**45**	550-100839
NGTF Influent*	NGTF-INF	4/16/2018	Original	TA	<0.50	0.73	1.6	3.7	**45**	550-101281
NGTF Influent*	NGTF-INF	4/23/2018	Original	TA	<0.50	0.77	1.7	4.0	**47**	550-101663
NGTF Influent*	NGTF-INF	4/30/2018	Original	TA	<0.50	0.73	1.7	3.9	**45**	550-101993
NGTF Influent*	NGTF-INF	5/7/2018	Original	TA	<0.50	0.83	1.8	**5.1**	**51**	550-102426
NGTF Influent*	NGTF-INF	5/14/2018	Original	TA	<0.50	0.83	2.0	3.8	**53**	550-102875
NGTF Influent*	NGTF - INF	5/21/2018	Original	TA	<0.50	0.81	1.8	3.7	**48**	550-103211
NGTF Influent*	NGTF - INF	5/29/2018	Original	TA	<0.50	0.73	1.6	3.6	**45**	550-103533
NGTF Influent*	NGTF-INF	6/4/2018	Original	TA	<0.50	0.79	1.7	3.9	**48**	550-103737
NGTF Influent*	NGTF-INF	6/11/2018	Original	TA	<0.50	0.76	1.7	4.0	**47**	550-104189
NGTF Influent*	NGTF-INF	6/18/2018	Original	TA	<0.50	0.82	1.7	4.2	**49**	550-104544
NGTF Influent*	NGTF-INF	6/25/2018	Original	TA	<0.50	<0.50	1.7	3.7	**46**	550-104913
NGTF Influent*	NGTF-INF	7/2/2018	Original	TA	<0.50	0.58	1.6	3.9	**45**	550-105203
NGTF Influent*	NGTF - INF	7/9/2018	Original	TA	<0.50	0.73	1.8	4.3	**50**	550-105598
NGTF Influent*	NGTF - INF	7/23/2018	Original	TA	<0.50	<0.50	1.5	3.6	**42**	550-106550

TABLE 9. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	6	6	5	5	
Outfall 001 (Effluent)	NGTF-CP	1/2/2018	Original	TA	<0.50	<0.50	0.57	<0.50	<0.50	550-95488
Outfall 001 (Effluent)	NGTF-CP	1/8/2018	Original	TA	<0.50	<0.50	0.74	<0.50	<0.50	550-95805
Outfall 001 (Effluent)	NGTF-CP	1/16/2018	Original	TA	<0.50	<0.50	0.58	<0.50	<0.50	550-96401
Outfall 001 (Effluent)	NGTF-CP	1/22/2018	Original	TA	<0.50	<0.50	0.73	<0.50(2)	<0.50	550-96649
Outfall 001 (Effluent)	NGTF-CP	2/6/2018	Original	TA	<0.50	<0.50	0.52	<0.50	<0.50	550-97457
Outfall 001 (Effluent)	NGTF-CP	2/13/2018	Original	TA	<0.50	<0.50	0.60	<0.50	<0.50	550-97879
Outfall 001 (Effluent)	NGTF-CP	2/20/2018	Original	TA	<0.50	<0.50	0.81	<0.50	<0.50	550-98246
Outfall 001 (Effluent)	NGTF-CP	2/26/2018	Original	TA	<0.50	<0.50	0.53	<0.50	<0.50	550-98522
Outfall 001 (Effluent)	AZCO	3/5/2018	Original	TA	<0.50	<0.50	0.68	<0.50	<0.50	550-98872
Outfall 001 (Effluent)	NGTF-CP	3/12/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-99358
Outfall 001 (Effluent)	AZCO	3/19/2018	Original	TA	<0.50	<0.50	0.52	<0.50	<0.50	550-99708
Outfall 001 (Effluent)	AZCO	3/26/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100022
Outfall 001 (Effluent)	NGTF-CP	4/2/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100313
Outfall 001 (Effluent)	NGTF-CP	4/9/2018	Original	TA	<0.50	<0.50	0.55	<0.50	<0.50	550-100839
Outfall 001 (Effluent)	NGTF-CP	4/16/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-101281
Outfall 001 (Effluent)	NGTF-CP	4/23/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-101663
Outfall 001 (Effluent)	NGTF-CP	4/30/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-101993
Outfall 001 (Effluent)	NGTF-CP	5/7/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102426
Outfall 001 (Effluent)	CP	5/14/2018	Original	TA	<0.50	<0.50	0.66	<0.50	<0.50	550-102875
Outfall 001 (Effluent)	NGTF-CP	5/21/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103211
Outfall 001 (Effluent)	NGTF-CP	5/29/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103533
Outfall 001 (Effluent)	NGTF-CP	6/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103737
Outfall 001 (Effluent)	NGTF-CP	6/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-104189
Outfall 001 (Effluent)	NGTF-CP	6/18/2018	Original	TA	<0.50	<0.50	0.53	<0.50	<0.50	550-104544
Outfall 001 (Effluent)	NGTF-CP	6/25/2018	Original	TA	<0.50	<0.50	0.69	<0.50	<0.50	550-104913
Outfall 001 (Effluent)	AZCO	7/2/2018	Original	TA	<0.50	<0.50	0.60	<0.50	<0.50	550-105203
Outfall 001 (Effluent)	NGTF-CP	7/9/2018	Original	TA	<0.50	<0.50	0.60	<0.50	<0.50	550-105598
Outfall 001 (Effluent)	NGTF-CP	7/16/2018	Original	TA	<0.50	<0.50	0.65	<0.50	<0.50	550-106049
Outfall 001 (Effluent)	NGTF-CP	7/23/2018	Original	TA	<0.50	<0.50	0.88	<0.50	<0.50	550-106550
Outfall 001 (Effluent)	NGTF-CP	7/30/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106950
Outfall 001 (Effluent)	NGTF-CP	8/6/2018	Original	TA	<0.50	<0.50	0.74	<0.50	<0.50	550-107342
Outfall 001 (Effluent)	NGTF-CP	8/13/2018	Original	TA	<0.50	<0.50	0.99	<0.50	<0.50	550-107838
Outfall 001 (Effluent)	NGTF-CP	8/20/2018	Original	TA	<0.50	<0.50	0.53	<0.50	<0.50	550-108271
Outfall 001 (Effluent)	NGTF-CP	8/27/2018	Original	TA	<0.50	<0.50	0.81	<0.50	<0.50	550-108649
Outfall 001 (Effluent)	NGTF-CP	9/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109037
Outfall 001 (Effluent)	NGTF-CP	9/10/2018	Original	TA	<0.50	<0.50	0.56	<0.50	<0.50	550-109431
Outfall 001 (Effluent)	NGTF-CP	9/17/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109885
Outfall 001 (Effluent)	NGTF-CP	9/24/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110274
Outfall 001 (Effluent)	NGTF-CP	10/1/2018	Original	TA	<0.50	<0.50	0.64	<0.50	<0.50	550-110642
Outfall 001 (Effluent)	NGTF-CP	10/8/2018	Original	TA	<0.50	<0.50	0.50	<0.50	<0.50	550-111178
Outfall 001 (Effluent)	NGTF-CP	10/15/2018	Original	TA	<0.50	<0.50	0.70	<0.50	<0.50	550-111669

TABLE 9. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	*6*	*6*	*5*	*5*	
Outfall 001 (Effluent)	NGTF-CP	10/22/2018	Original	TA	<0.50	<0.50	0.52	<0.50	<0.50	550-112138
Outfall 001 (Effluent)	NGTF-CP	10/29/2018	Original	TA	<0.50	<0.50	0.63	<0.50	<0.50	550-112490
Outfall 001 (Effluent)	NGTF-CP	11/5/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112838
Outfall 001 (Effluent)	NGTF-CP	11/13/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113326
Outfall 001 (Effluent)	NGTF-CP	11/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113670
Outfall 001 (Effluent)	NGTF-CP	11/27/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113906
Outfall 001 (Effluent)	NGTF-CP	12/3/2018	Original	TA	<0.50	<0.50	0.56	<0.50	<0.50	550-114184
Outfall 001 (Effluent)	AZCO	12/10/2018	Original	TA	<0.50	<0.50	0.82	<0.50	<0.50	550-114631
Outfall 001 (Effluent)	AZCO	12/17/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115043
Outfall 001 (Effluent)	NGTF-CP	12/24/2018	Original	TA	<0.50	<0.50	0.65	<0.50	<0.50	550-115438
Outfall 001 (Effluent)	AZCO	12/31/2018	Original	TA	<0.50	<0.50	0.64	<0.50	<0.50	550-115604
Trip/Field Blanks										
QC - Area 7	Field Blank	1/10/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-96012
QC - Area 7	Trip Blank	1/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-96012
QC - Area 7	Field Blank	2/15/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98120
QC - Area 7	Trip Blank	2/15/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98120
QC - Area 7	Field Blank	3/5/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98894
QC - Area 7	Trip Blank	3/5/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98894
QC - Area 7	Field Blank	4/2/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100327
QC - Area 7	Trip Blank	4/2/2018	TB	TA	<0.50$^{(3,4)}$	<0.50$^{(3,4)}$	<0.50$^{(3,4)}$	<0.50$^{(3,4)}$	<0.50$^{(3,4)}$	550-100327
QC - Area 7	Field Blank	5/7/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102458
QC - Area 7	Trip Blank	5/7/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102458
QC - Area 7	FIELD BLANK	6/7/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-104047
QC - Area 7	Trip Blank	6/7/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-104047
QC - Area 7	FIELD BLANK	7/20/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106471
QC - Area 7	TRIP BLANK	7/20/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106471
QC - Area 7	FIELD BLANK	8/10/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-107758
QC - Area 7	TRIP BLANK	8/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-107758
QC - Area 7	Field Blank	9/17/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109883
QC - Area 7	Trip Blank	9/17/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109883
QC - Area 7	Field Blank	10/25/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112440
QC - Area 7	Trip Blank	10/25/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112440
QC - Area 7	Field Blank	11/20/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113731
QC - Area 7	Trip Blank	11/20/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113731
QC - Area 7	FIELD BLANK	12/19/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115244
QC - Area 7	TRIP BLANK	12/19/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115244

TABLE 9. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	*6*	*6*	*5*	*5*	
QC - Area 12	FB-1-1A - 04102018	4/10/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100874
QC - Area 12	TB	4/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100874
QC - Area 12	FB-1-1A-05022018	5/2/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102108
QC - Area 12	TB	5/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102108
QC - Area 12	FB-1-1A-06042018	6/4/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103718
QC - Area 12	TB	6/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103718
QC - Area 12	FB-1-1A-07022018	7/2/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105181
QC - Area 12	TB	7/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105181
QC - Area 12	FB-1-1A-08012018	8/1/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106982
QC - Area 12	TB	8/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106982
QC - Area 12	TB	8/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-107806
QC - Area 12	FB-1-1A-09042018	9/4/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109012
QC - Area 12	TB	9/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109012
QC - Area 12	FB-1-1A-10012018	10/1/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110660
QC - Area 12	TB	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110660
QC - Area 12	FB-1-1A-11012018	11/1/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112666
QC - Area 12	TB	11/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112666
QC - Area 12	FB-1-1A- 12032018	12/3/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114150
QC - Area 12	TB	12/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114150
QC -MRTF	TB	1/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-95633
QC -MRTF	TB	2/2/2018	TB	TA	<0.50	<0.50(2,5)	<0.50	<0.50	<0.50	550-97267
QC -MRTF	TB	3/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98770
QC -MRTF	TB	3/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-99247
QC -MRTF	TB	4/6/2018	TB	TA	<0.50(6)	<0.50(6)	<0.50(6)	<0.50(6)	<0.50(6)	550-100761
QC -MRTF	TB	5/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102125
QC -MRTF	TB	6/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103720
QC -MRTF	TB	7/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105185
QC -MRTF	TB	8/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106984
QC -MRTF	TB	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110668
QC -MRTF	TB	11/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112668
QC -MRTF	TB	12/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114182
QC - NGTF	TB	1/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-95488
QC - NGTF	TB	1/8/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-95805
QC - NGTF	TB	1/16/2018	TB	TA	<0.50(7)	<0.50(7)	<0.50(7)	<0.50(7)	<0.50(7)	550-96401
QC - NGTF	TB	1/22/2018	TB	TA	<0.50(7)	<0.50(7)	<0.50(7)	<0.50(7)	<0.50(7)	550-96649
QC - NGTF	TB	2/6/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-97457
QC - NGTF	TB	2/13/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-97879
QC - NGTF	TB	2/20/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98246
QC - NGTF	TB	2/26/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98522
QC - NGTF	TB	3/5/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-98872
QC - NGTF	TB	3/12/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-99358

TABLE 9. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	*6*	*6*	*5*	*5*	
QC - NGTF	TB	4/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100313
QC - NGTF	TB	4/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-100839
QC - NGTF	TB	4/16/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-101281
QC - NGTF	TB	4/23/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-101663
QC - NGTF	TB	4/30/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-101993
QC - NGTF	TB	5/7/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102426
QC - NGTF	TB	5/14/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-102875
QC - NGTF	TB	5/21/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103211
QC - NGTF	TB	5/29/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-103533
QC - NGTF	TB	6/4/2018	TB	TA	<0.50(3)	<0.50(3)	<0.50(3)	<0.50(3)	<0.50(3)	550-103737
QC - NGTF	TB	6/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-104189
QC - NGTF	TB	6/18/2018	TB	TA	<0.50(3)	<0.50(3)	<0.50(3)	<0.50(3)	<0.50(3)	550-104544
QC - NGTF	TB	6/25/2018	TB	TA	<0.50(3)	<0.50(3)	<0.50(3)	<0.50(3)	<0.50(3)	550-104913
QC - NGTF	TB	7/2/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105203
QC - NGTF	TB	7/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-105598
QC - NGTF	TB	7/16/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106049
QC - NGTF	TB	7/23/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106550
QC - NGTF	TB	7/30/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-106950
QC - NGTF	TB	8/6/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-107342
QC - NGTF	TB	8/13/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-107838
QC - NGTF	TB	8/20/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-108271
QC - NGTF	TB	8/27/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-108649
QC - NGTF	TB	9/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109037
QC - NGTF	TB	9/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109431
QC - NGTF	TB	9/17/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-109885
QC - NGTF	TB	9/24/2018	TB	TA	<0.50(8)	<0.50(8)	<0.50(8)	<0.50(8)	<0.50(8)	550-110274
QC - NGTF	TB	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110642
QC - NGTF	TB	10/8/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111178
QC - NGTF	TB	10/15/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111669
QC - NGTF	TB	10/22/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112138
QC - NGTF	TB	10/29/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112490
QC - NGTF	TB	11/5/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112838
QC - NGTF	TB	11/13/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113326
QC - NGTF	TB	11/19/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113670
QC - NGTF	TB	11/27/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113906
QC - NGTF	TB	12/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114184
QC - NGTF	TB	12/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114631
QC - NGTF	TB	12/17/2018	TB	TA	<0.50 (1,9,10)	<0.50 (1,9,10)	<0.50 (1,9,10)	<0.50 (1,9,10)	<0.50 (1,9,10)	550-115043

TABLE 9. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	*6*	*6*	*5*	*5*	
QC - NGTF	TB	12/24/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115438
QC - NGTF	TB	12/31/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115604

EXPLANATION:

TCA = 1,1,1-Trichloroethane

DCE = 1,1-Dichloroethene

TCM = Chloroform

PCE = Tetrachloroethene

TCE = Trichloroethene

AZCO = Arizona Canal Outfall

ID = Identifier

TA = TestAmerica, Inc.

<0.50 = Analytical result is less than laboratory detection limit

QC = Quality Control

TB = Trip Blank

FB = Field Blank

REJ = Data rejected because contractor reported that samples were switched during collection. Re-sampled.

NOTES:

<0.50 =	Non-Detect
5	Cleanup Standards for Treated Water (µg/L)
5.1	Sample result exceeds Cleanup Standards for Treated Water

* Influent sampling results at the NGTF are not compliance data; however, they are reported here for completeness.

(1) V9 Flag: Continuing calibration verification (CCV) recovery was below method acceptance limits

(2) V1 Flag: Continuing calibration verification (CCV) recovery was above method acceptance limits. This target analyte was not detected in the sample.

(3) N1 Flag: The following sample was collected in a properly preserved vial for analysis of volatile organic compounds (VOCs). However, the pH was outside the required criteria when verified by the laboratory, and corrective action was not possible. The sample was analyzed within the EPA recommended seven day hold time specified for unpreserved samples; therefore, the data is not impacted. The sample will be reported with an N1 qualifier.

(4) Q2 Flag: Sample received with headspace.

(5) L5 Flag: The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.

(6) N1 Flag: Due to the BFB tune failure in the batch 550-143911, all affected samples were re-analyzed except for TB sample (trip blank) since the trip blank could not be re-analyzed due to insufficient sample volume with only one vial provided. The data have been qualified with N1 and reported.

(7) N1 Flag: Due to an auto sampler error closing continuing calibration verification (CCV) and laboratory control sample duplicate (LCSD) was not analyzed. The trip blank could not be re-analyzed due to insufficient sample volume, only one vial was provided. The data has been qualified with N1 and reported.

(8) N1 Flag: The closing continuing calibration verification (CCV and laboratory spike duplicate (LCSD) for analytical batch 550-157626 failed to run due to autosampler error. There was insufficient sample to perform a re-extraction or re-analysis; therefore, the data have been reported.

(9) R1 Flag: Relative Percent Difference/Relative Standard Deviation (RPD/RSD) exceeded the method acceptance limit.

(10) L4 Flag: The associated blank spike recovery was below method acceptance limits.

[a] A dection was noted on the initial Area 12 sample on 8/1/2018 at WSP-2. This is an anamolous result.

Location was re-sampled on 8/11/2018 and results came back non-detect.

TABLE 10. SUMMARY OF VOC MASS ESTIMATES IN UAU GROUNDWATER FOR OCTOBER 2018
NORTH INDIAN BEND WASH SITE, SCOTTSDALE, ARIZONA

POLYGON (WELL NAME)	TOTAL VOCs (micrograms per liter)[a]	ELEVATION BASE OF UAU (feet, amsl)	ELEVATION UAU WATER TABLE (feet, amsl)	SATURATED THICKNESS (feet)	POLYGON AREA (square feet)	SATURATED POLYGON VOLUME (cubic feet)	SATURATED PORE VOLUME (liters)	VOC MASS (gallons)	VOC MASS (pounds)[b]
B-J	0.66	1,065	1,130.07	65	1,312,017	85,376,008	725,328,947	0.09	1.06
E-5UA	5	1,067	1,127.92	61	1,563,483	95,248,296	809,200,952	0.74	8.92
E-7UA	1.3	1,079	1,123.73	45	2,135,156	95,505,350	811,384,802	0.19	2.33
E-12UA[c]	2.12	1,075	1,132.05	57	1,868,432	106,597,938	905,624,103	0.35	4.23
E-13UA	1.48	1,080	1,132.20	52	851,113	44,428,028	377,447,195	0.10	1.23
M-2UA	1.19	1,081	1,132.25	51	1,081,841	55,445,433	471,047,766	0.10	1.24
PG-3UA					Abandoned				
PG-4UA	16.5	1,055	1,115.41	60	2,867,709	173,244,992	1,471,837,479	4.47	53.55
PG-5UA	2.35	1,036	1,120.45	84	1,729,659	146,062,784	1,240,905,593	0.54	6.43
PG-6UA	1.32	1,043	1,118.82	76	2,363,199	179,168,689	1,522,163,433	0.37	4.43
PG-8UA	0	1,060	1,118.40	58	1,631,115	95,265,000	809,342,858	0.00	0.00
PG-10UA	1.36	1,089	1,131.59	43	693,947	29,554,509	251,086,240	0.06	0.75
PG-11UA	0.79	1,076	1,126.56	51	2,167,731	109,604,815	931,169,625	0.14	1.62
PG-16UA	0	1,079	1,128.53	50	1,327,719	65,761,922	558,693,561	0.00	0.00
PG-18UA	1.43	1,045	1,125.43	80	1,953,438	157,122,995	1,334,869,828	0.35	4.21
PG-19UA	3.12	1,049	1,125.11	76	1,407,810	107,151,235	910,324,745	0.52	6.26
PG-22UA	6.08	1,067	1,128.81	62	1,764,305	109,058,749	926,530,416	1.04	12.42
PG-23UA	1.6	1,055	1,117.21	62	1,753,035	109,063,319	926,569,243	0.27	3.27
PG-24UA	0	1,054	1,120.22	66	1,535,896	101,700,890	864,020,247	0.00	0.00
PG-25UA	2.84	1,056	1,124.44	68	1,538,241	105,279,137	894,419,963	0.47	5.60
PG-28UA	2.8	1,061	1,130.20	69	1,669,714	115,540,869	981,600,564	0.51	6.06
PG-29UA	1.4	1,080	1,131.47	51	1,345,997	69,282,504	588,603,366	0.15	1.82
PG-31UA	31.8	1,081	1,127.71	47	2,706,853	126,447,931	1,074,263,688	6.28	75.33
TOTALS							**19,386,434,614**	**16.74**	**200.76**

ABBREVIATIONS:

feet, amsl = feet, above mean seal level

NOTES:

[a] Includes total concentration of TCE, PCE, 1,1,1-TCA, DCE, and Chloroform from October 2018 water quality data set. "0" indicates either that concentrations of all VOCs were below the detection limit, the well was dry, or the well is no longer included in the NIBW Monitoring Program due to long-term ND levels of VOCs.

[b] Formula for calculation of VOC mass in pounds: (Total VOCs [micrograms per liter] * Saturated Pore Volume [liters] * 0.000000002205 [conversion from micrograms to pounds]

[c] Well was sampled in January 2019.

TABLE 11. AVERAGE TCE CONCENTRATIONS FOR MONITOR WELLS IN THE VICINITY OF AREA 7, MIDDLE ALLUVIUM UNIT

	AVERAGE TCE CONCENTRATIONS (micrograms per liter)																							
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
D-2MA	---	5,600	4,650	3,500	2,200	2,369	2,533	2,180	2,200	1,650	1,650	1,145	828	1,015	1,550	1,675	1,825	1,725	1,650	1,303	1,375	1,375	1,375	1,375
E-10MA	6	6	6	11	15	15	15	14	10	8	7	6	5	6	5	5	6	5	5	6	4	3	3	4
PA-10MA	12	15	26	68	96	68	39	39	46	39	41	36	35	41	34	31	36	24	22	21	22	24	45	56
PA-12MA	190	135	175	360	760	608	586	581	580	483	483	400	407	360	400	370	343	348	303	355	300	245	245	270
W-1MA	2,800	1,045	560	200	497	1,432	707	389	495	270	335	151	129	95	88	44	70	195	387	575	468	368	368	350
W-2MA	3,000	1,950	2,050	1,950	2,900	3,844	3,875	4,490	4,875	4,725	5,275	4,325	4,225	4,900	4,325	4,100	3,925	4,450	3,575	3,700	2,850	2,075	1,725	1,675
ANNUAL AVERAGE	**1,202**	**1,458**	**1,245**	**1,015**	**1,078**	**1,390**	**1,292**	**1,282**	**1,368**	**1,196**	**1,298**	**1,010**	**938**	**1,069**	**1,067**	**1,038**	**1,034**	**1,124**	**990**	**993**	**837**	**682**	**627**	**622**

NOTES:

1) Duplicates were not used in the calculation of 5-Year Average TCE Concentrations.
2) 2015 average TCE concentration was used for D-2MA because 2016-2018 data were not representative of historical trends.

Five-Year Average TCE Concentrations (micrograms per liter)

1995-1999	**1,199**	**Start-Up of 7EX-3MA and 7EX-4MA Extraction Wells**
1996-2000	**1,237**	
1997-2001	**1,204**	
1998-2002	**1,211**	**Start-Up of 7EX-5MA Extraction Well**
1999-2003	**1,282**	**Area 7 GWETS Fully Operational**
2000-2004	**1,305**	**Performance Measure Became Effective**
2001-2005	**1,287**	
2002-2006	**1,231**	
2003-2007	**1,162**	
2004-2008	**1,102**	
2005-2009	**1,077**	
2006-2010	**1,024**	
2007-2011	**1,029**	
2008-2012	**1,066**	**Beginning in 2012 7EX-5MA Extraction Well Inoperable**
2009-2013	**1,051**	
2010-2014	**1,036**	
2011-2015	**996**	**Start-Up of 7EX-6MA Extraction Well**
2012-2016	**925**	
2013-2017	**826**	
2014-2018	**752**	

TABLE 12. AVERAGE TCE CONCENTRATIONS FOR MONITOR WELLS
WITHIN ZONE OF HYDRAULIC CAPTURE, MIDDLE ALLUVIUM UNIT, AREA 12

	AVERAGE TCE CONCENTRATIONS (micrograms per liter)																								
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
E-1MA	367	440	490	370	350	370	18	3	130	3	56	73	42	22	63	21	34	37	27	55	37	4	6	5	3
M-4MA	29	20	32	31	32	28	27	20	24	21	25	26	20	21	20	19	20	23	23	23	20	17	13	8	8
M-5MA	377	365	295	120	43	65	79	115	105	45	53	54	68	65	50	65	58	48	33	34	19	13	18	20	16
M-6MA	333	315	180	113	120	125	22	7	55	2	40	69	43	49	68	38	63	52	60	77	48	20	12	11	11
M-7MA	11	7	6	8	9	3	0	1	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
M-9MA	150	113	72	52	24	15	10	8	5	6	7	7	4	4	5	5	4	4	5	5	4	3	3	4	2
M-15MA	105	14	115	83	40	75	40	25	19	14	13	11	12	12	12	12	11	10	10	9	8	6	5	4	3
PA-21MA	44	14	8	7	3	2	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNUAL AVERAGE	**177**	**161**	**150**	**98**	**78**	**85**	**24**	**22**	**42**	**12**	**24**	**30**	**24**	**22**	**27**	**20**	**24**	**22**	**20**	**25**	**17**	**8**	**7**	**7**	**5**

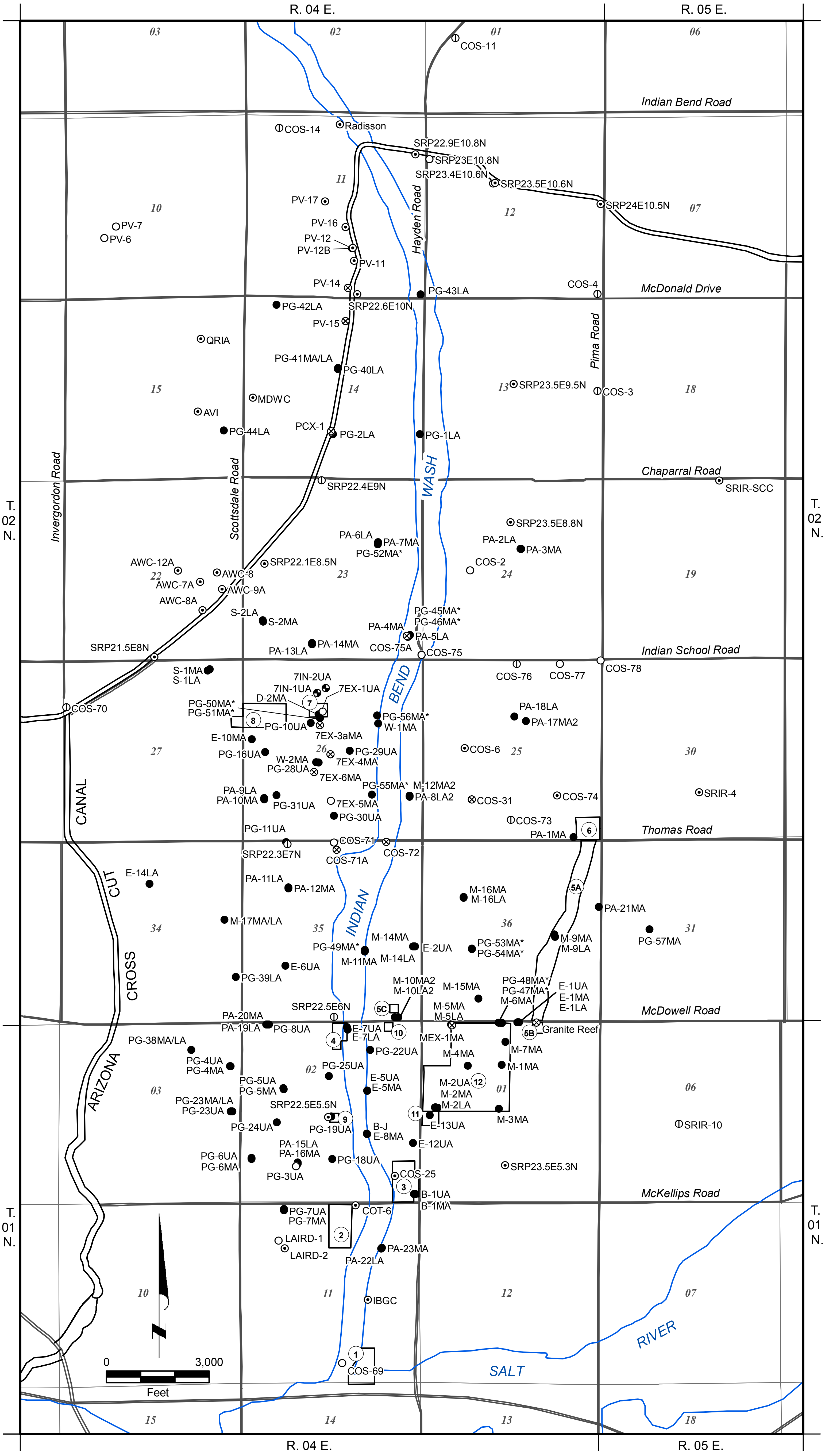
NOTES:

1) Duplicates were not used in the calculation of 5-Year Average TCE Concentrations.

Five-Year Average TCE Concentrations (micrograms per liter)

1994-1998	**133**	
1995-1999	**114**	**Start-Up of MEX-1 and SRP Granite Reef Extraction**
1996-2000	**87**	**Area 12 GWETS Fully Operational**
1997-2001	**62**	
1998-2002	**50**	
1999-2003	**37**	
2000-2004	**25**	**Performance Measure Became Effective**
2001-2005	**26**	
2002-2006	**26**	
2003-2007	**22**	
2004-2008	**25**	
2005-2009	**25**	
2006-2010	**23**	
2007-2011	**23**	
2008-2012	**23**	
2009-2013	**22**	
2010-2014	**22**	
2011-2015	**18**	
2012-2016	**15**	
2013-2017	**13**	
2014-2018	**9**	

FIGURES



EXPLANATION

PA-15LA	●	Monitor Well Location and Identifier * denotes Lower MAU well
COS-75A	⊗	Extraction Water Well Location and Identifier
COS-74	⊙	Production Water Well Location and Identifier
SRP22.4E9N	⦶	Inactive Production or Monitor Water Well Location and Identifier
7IN-1UA	⊕	Injection Well and Identifier
COS-69	○	Abandoned Well and Identifier
	3	NIBW Historical Source Area Location and Identifier

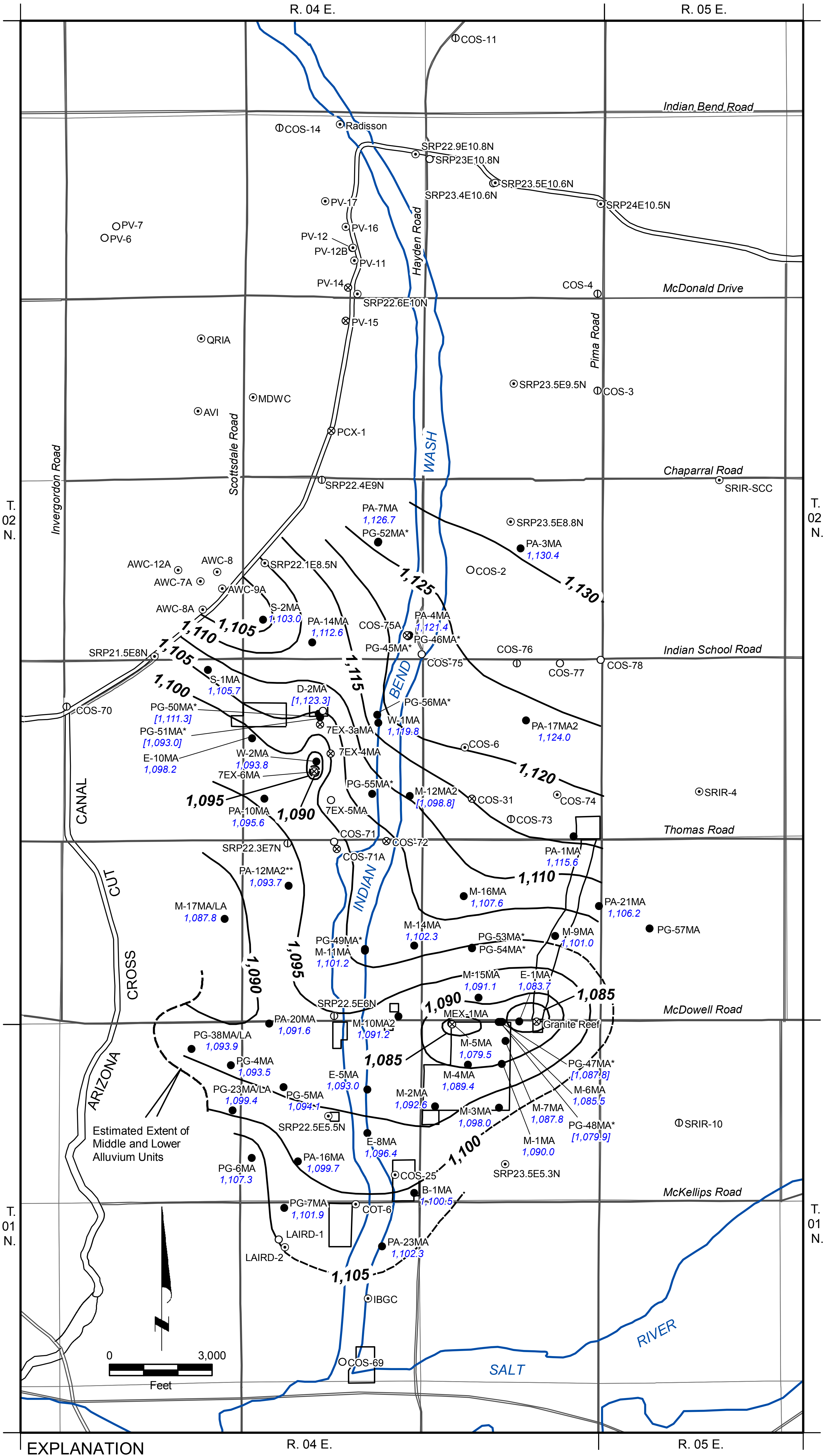
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

WELL LOCATION MAP

North Indian Bend Wash Superfund Site

FIGURE 1

GIS-TUC\366AnnualReport\2018\ALL_WELLS_2018_locmap\25Feb2019



EXPLANATION

PG-7MA ● 1,101.9	Middle Alluvium Monitor Well (MAU) Location and Identifier * Denotes the Well is or responds as a Lower MAU Well Groundwater Level Altitude, in feet above mean sea level [ ] Indicates Data Not Used for Contouring
COS-75A ⊗	Extraction Water Well Location and Identifier
COS-74 ⊙	Production Water Well Location and Identifier
SRP22.5E6N ⦶	Inactive Production Water Well Location and Identifier
COS-69 ○	Abandoned Production Water Well or Monitor Well Location and Identifier
— 1,090 —	Groundwater Level Altitude Contour, in feet above mean sea level Dashed where approximate

NOTE: **Water level collected from MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA

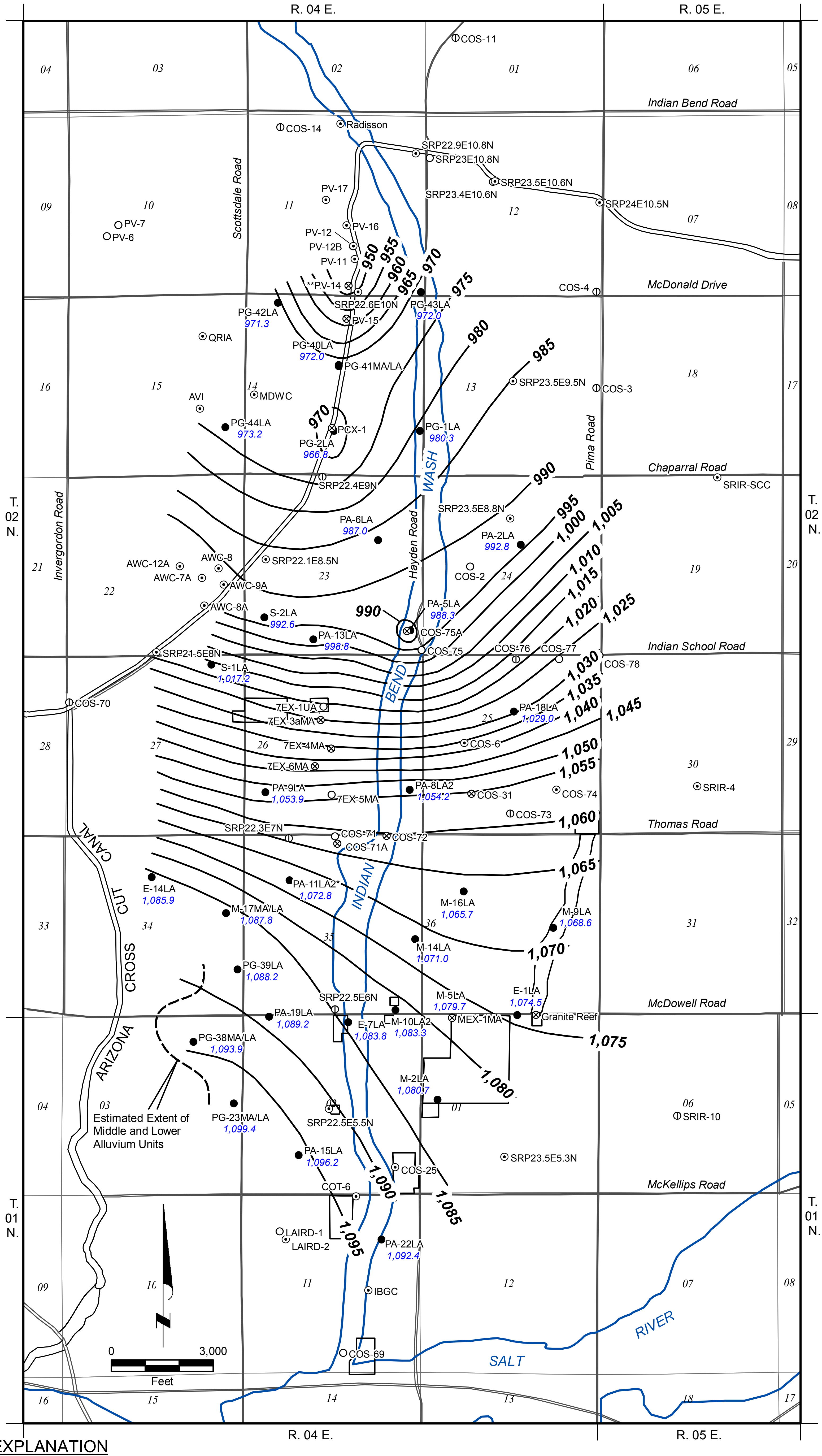
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

GROUNDWATER LEVEL CONTOURS
MIDDLE ALLUVIUM UNIT WELLS
APRIL 2018

North Indian Bend Wash Superfund Site

FIGURE 2

GIS-Tuc\366\AnnualReport\2018\MAU_WLApr2018\25Feb2019



EXPLANATION

PA-15LA ● Lower Alluvium Monitor Well Location and Identifier

1,096.2 Groundwater Level Altitude, in feet above mean sea level
**PV-14 water level inferred from pressure transducer data.

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-74 ⊙ Production Water Well Location and Identifier

SRP22.5E6N ⦶ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Production Water Well or Monitor Well Location and Identifier

—1,090— Groundwater Level Altitude Contour, in feet above mean sea level

NOTE: *Water level was collected from LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA.

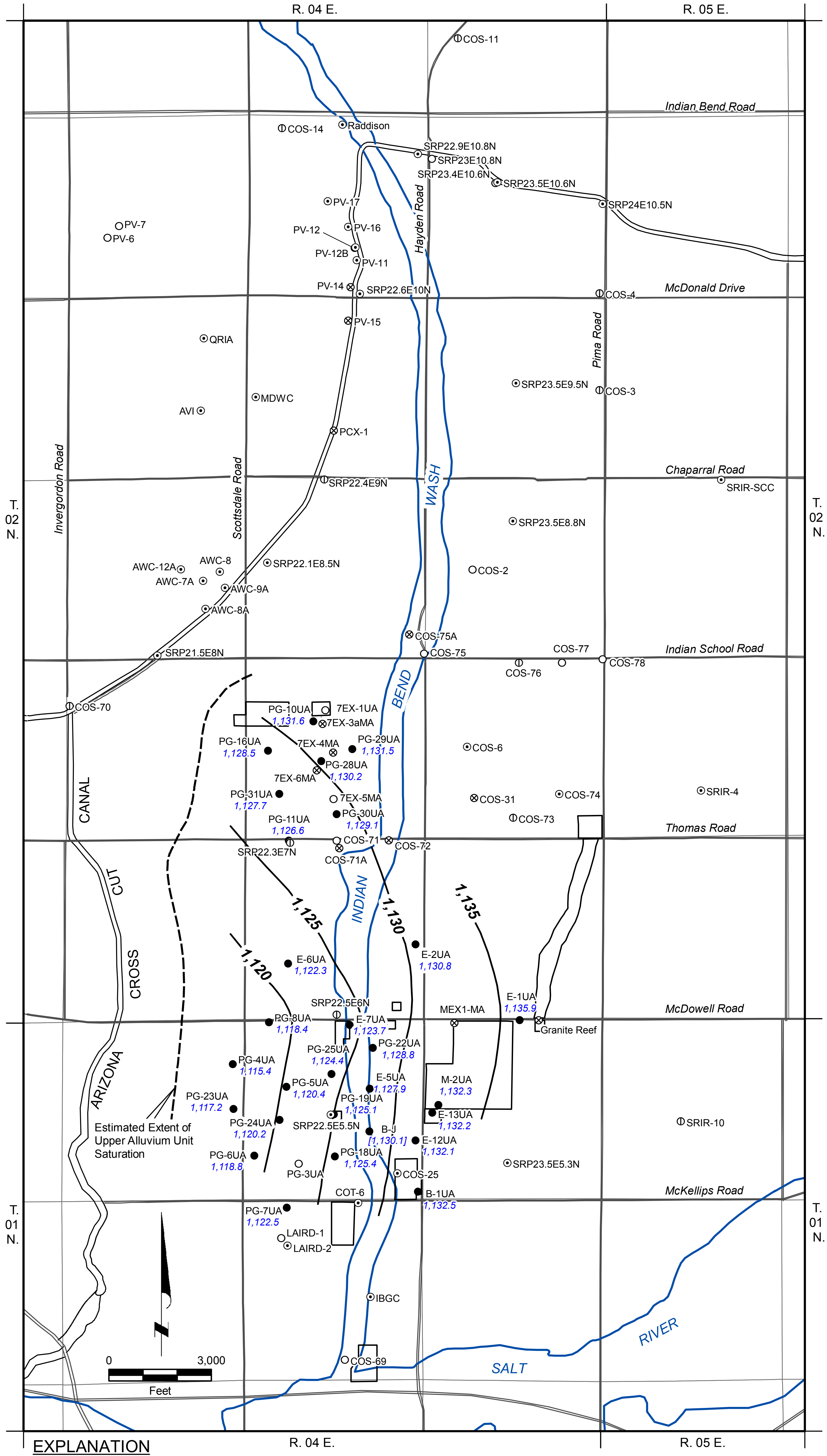
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

GROUNDWATER LEVEL CONTOURS LOWER ALLUVIUM UNIT WELLS APRIL 2018

North Indian Bend Wash Superfund Site

FIGURE 3

GIS-TUC\366\AnnualReport\2018\LAU_WLApr2018\25Feb2019



EXPLANATION

PG-7UA ● 1,122.5	Upper Alluvium Monitor Well Location and Identifier Groundwater Level Altitude, in feet above mean sea level
COS-75A ⊗	Extraction Water Well Location and Identifier
COS-74 ⊙	Production Water Well Location and Identifier
SRP22.5E6N ⏀	Inactive Production Water Well Location and Identifier
COS-69 ○	Abandoned Production Water Well or Monitor Well Location and Identifier
— 1,120 —	Groundwater Level Altitude Contour, in feet above mean sea level

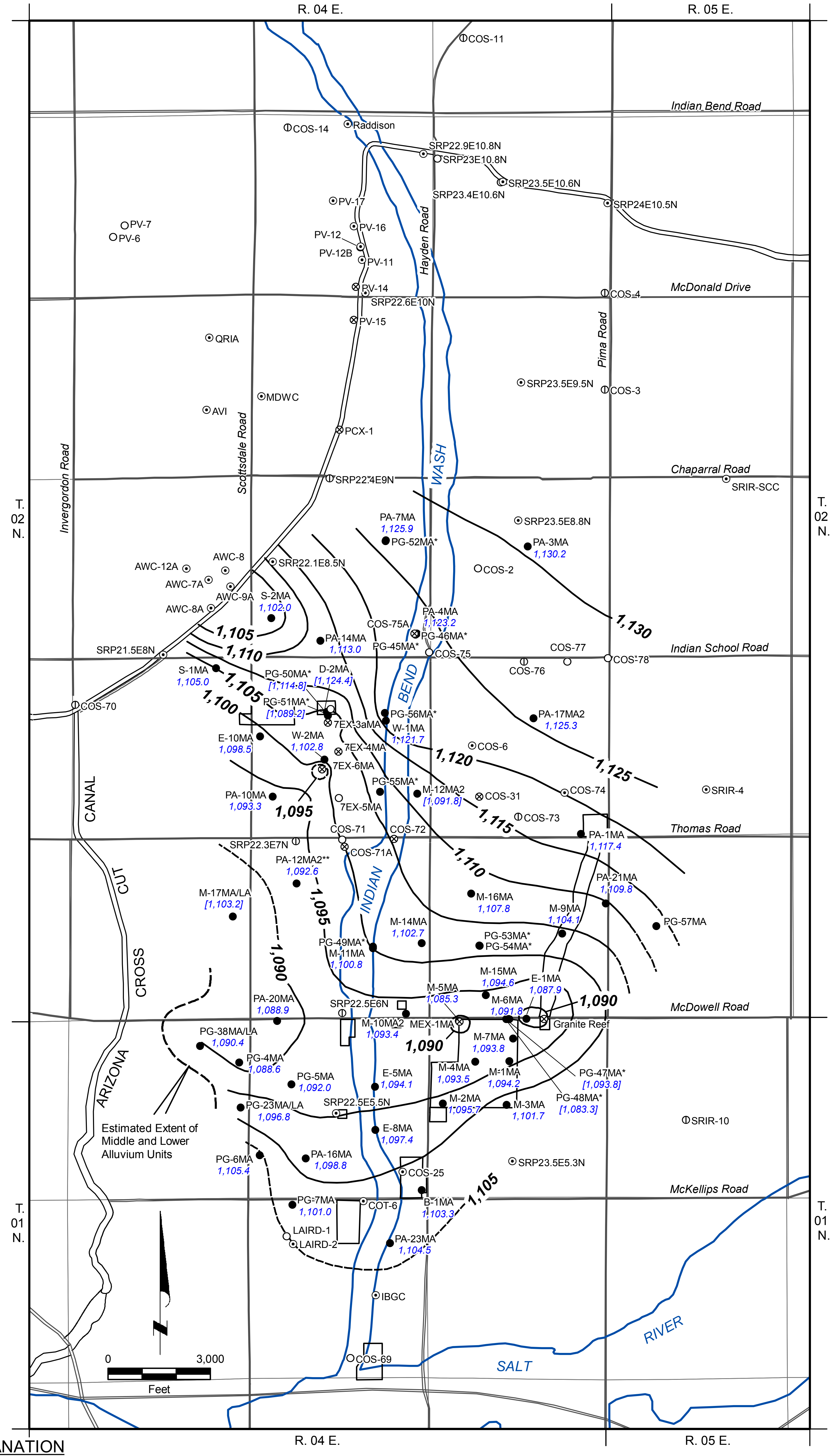
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

GROUNDWATER LEVEL CONTOURS
UPPER ALLUVIUM UNIT WELLS
OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 4

GIS-TUC\366\AnnualReport\2018\UAU_WLOct2018\25Feb2019



EXPLANATION

PG-7MA ● 1,101.0 Middle Alluvium Monitor Well (MAU) Location and Identifier
* Denotes the Well is or responds as a Lower MAU Well
Groundwater Level Altitude, in feet above mean sea level
[ ] Indicates Data Not Used for Contouring

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-74 ⊙ Production Water Well Location and Identifier

SRP22.5E6N ⏀ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Production Water Well or Monitor Well Location and Identifier

– – 1,090 —— Groundwater Level Altitude Contour, in feet above mean sea level
Dashed where approximate

NOTE: **Water level collected from MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA

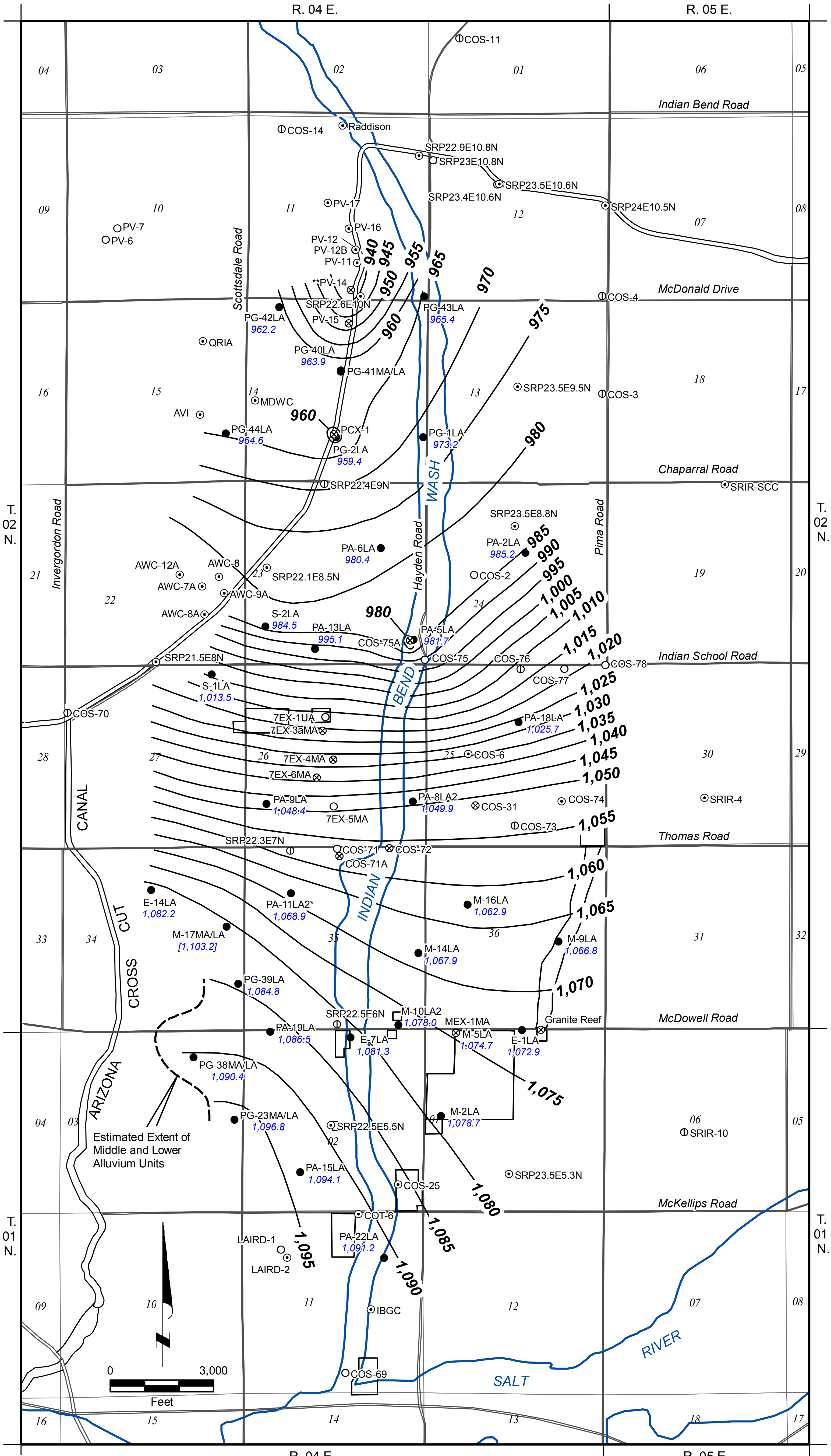
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

GROUNDWATER LEVEL CONTOURS
MIDDLE ALLUVIUM UNIT WELLS
OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 5

GIS-TUC\366\AnnualReport\2018\MAU_WLOct2018\25Feb2019



EXPLANATION

PA-15LA ● Lower Alluvium Monitor Well Location and Identifier

1,094.1 Groundwater Level Altitude, in feet above mean sea level
[ ] Indicates data not used in contouring

**PV-14 water level contour inferred from pressure transducer data

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-74 ⊙ Production Water Well Location and Identifier

SRP22.5E6N ⏀ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Production Water Well or Monitor Well Location and Identifier

—1,085— Groundwater Level Altitude Contour, in feet above mean sea level

NOTE: *Water level was collected from LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA.

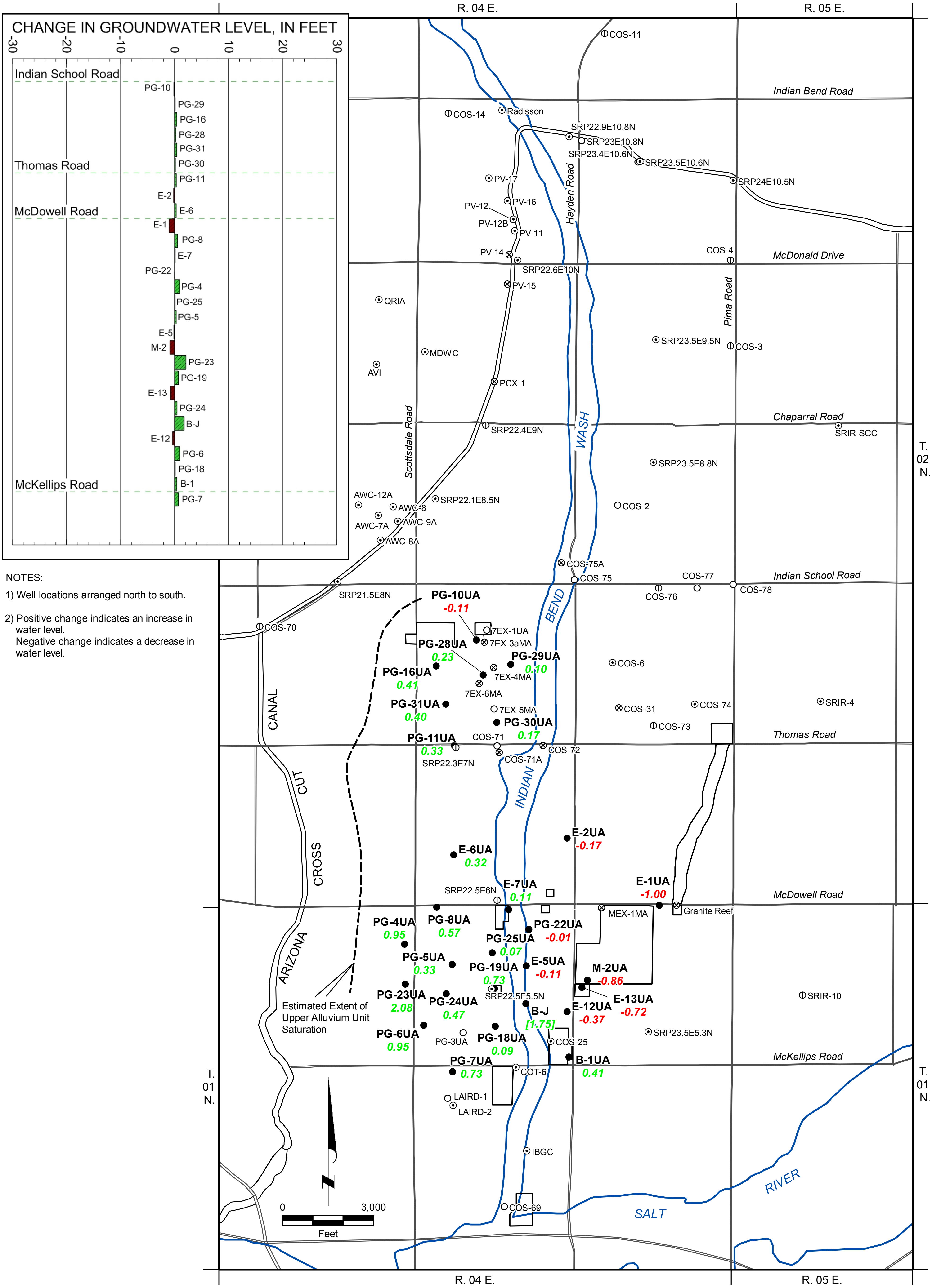
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

GROUNDWATER LEVEL CONTOURS
LOWER ALLUVIUM UNIT WELLS
OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 6

GIS-TUC\366\AnnualReport\2018\LAU_WLOct2018\27Feb2019



NOTES:

1) Well locations arranged north to south.

2) Positive change indicates an increase in water level.
Negative change indicates a decrease in water level.

EXPLANATION

PG-7UA 0.73 ● Upper Alluvium Monitor Well Location and Identifier

Groundwater Level Rise, in feet

Groundwater Level Decline, in feet

[ ] Bracketed where 2017, 2018 or both measurements were not used in contouring

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-74 ⊙ Production Water Well Location and Identifier

SRP22.5E6N ⦶ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Production Water Well or Monitor Well Location and Identifier

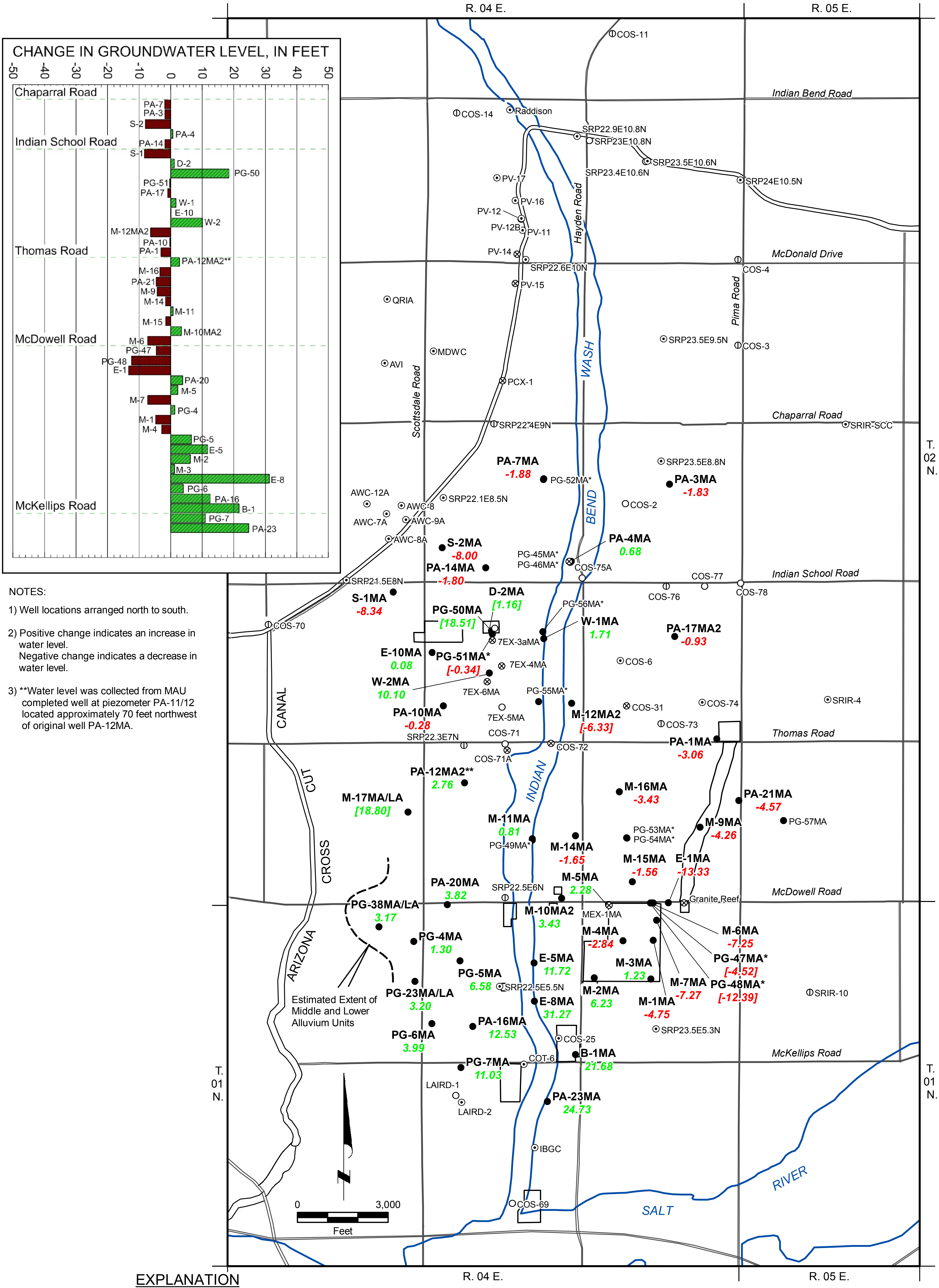
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

CHANGE IN UPPER ALLUVIUM UNIT GROUNDWATER LEVEL OCTOBER 2017 TO OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 7

GIS-TUC\366\AnnualReport\2018\UAU_WLOct2018_DIFFERENCE\25Feb2019



NOTES:

1) Well locations arranged north to south.

2) Positive change indicates an increase in water level.
Negative change indicates a decrease in water level.

3) **Water level was collected from MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA.

EXPLANATION

PG-7MA ● Middle Alluvium Monitor Well (MAU) Location and Identifier
* Denotes the Well is or responds as a Lower MAU Well

11.03 Groundwater Level Rise, in feet
Groundwater Level Decline, in feet

[ ] Bracketed where 2017, 2018, or both measurements were not used in contouring

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-74 ⊙ Production Water Well Location and Identifier

SRP22.5E6N ⦶ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Production Water Well or Monitor Well Location and Identifier

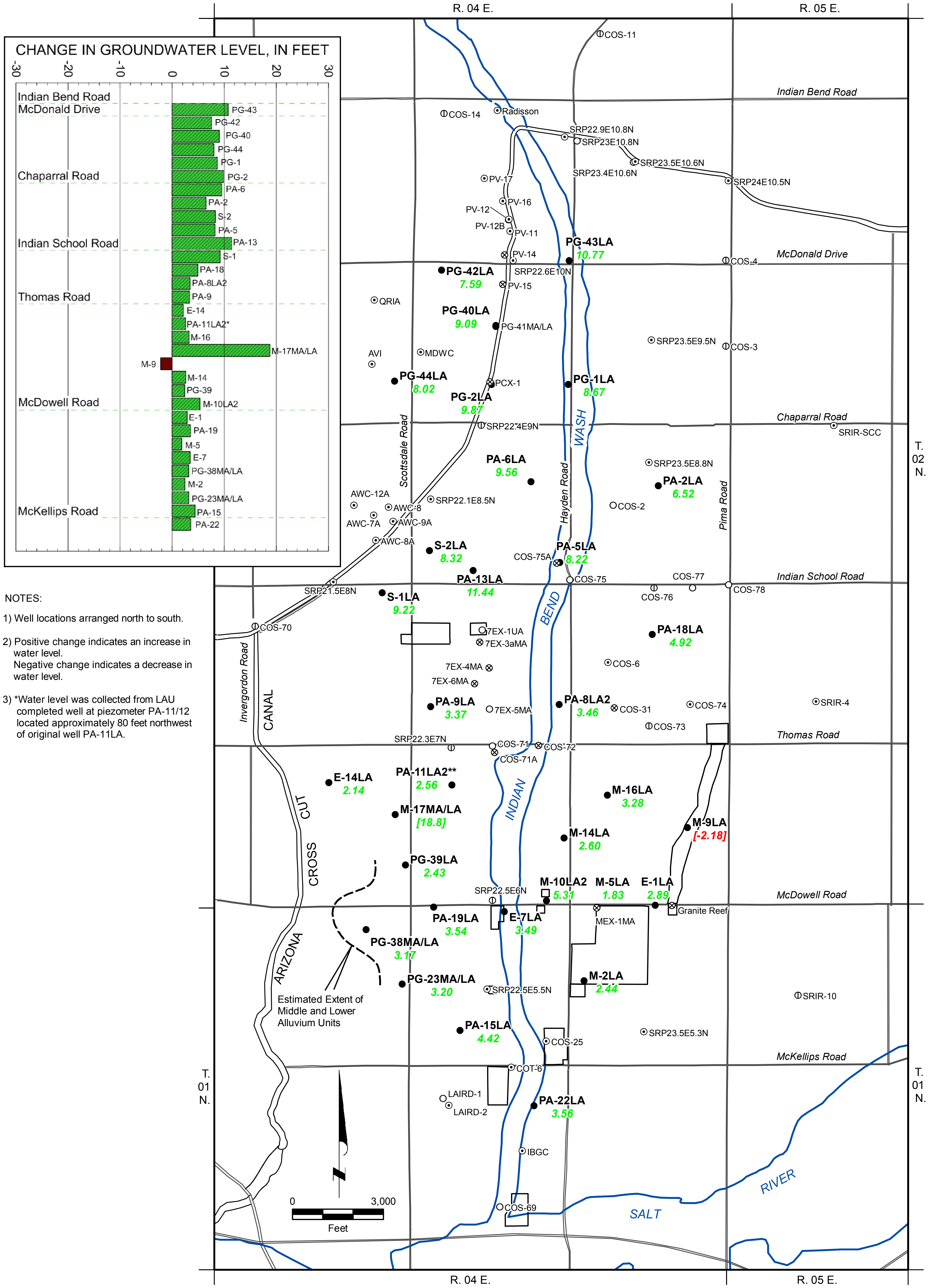
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

CHANGE IN MIDDLE ALLUVIUM UNIT GROUNDWATER LEVEL OCTOBER 2017 TO OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 8

GIS-TUC\366\AnnualReport\2018\\MAU_WLOct2018_DIFFERENCE\25Feb2019



NOTES:

1) Well locations arranged north to south.

2) Positive change indicates an increase in water level.
Negative change indicates a decrease in water level.

3) *Water level was collected from LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA.

EXPLANATION

PA-15LA ● 4.42	Lower Alluvium Monitor Well Location and Identifier Groundwater Level Rise, in feet Groundwater Level Decline, in feet [ ] Bracketed where 2017, 2018, or both measurements were not used in contouring
COS-75A ⊗	Extraction Water Well Location and Identifier
COS-74 ⊙	Production Water Well Location and Identifier
SRP22.5E6N ⦶	Inactive Production Water Well Location and Identifier
COS-69 ○	Abandoned Production Water Well or Monitor Well Location and Identifier

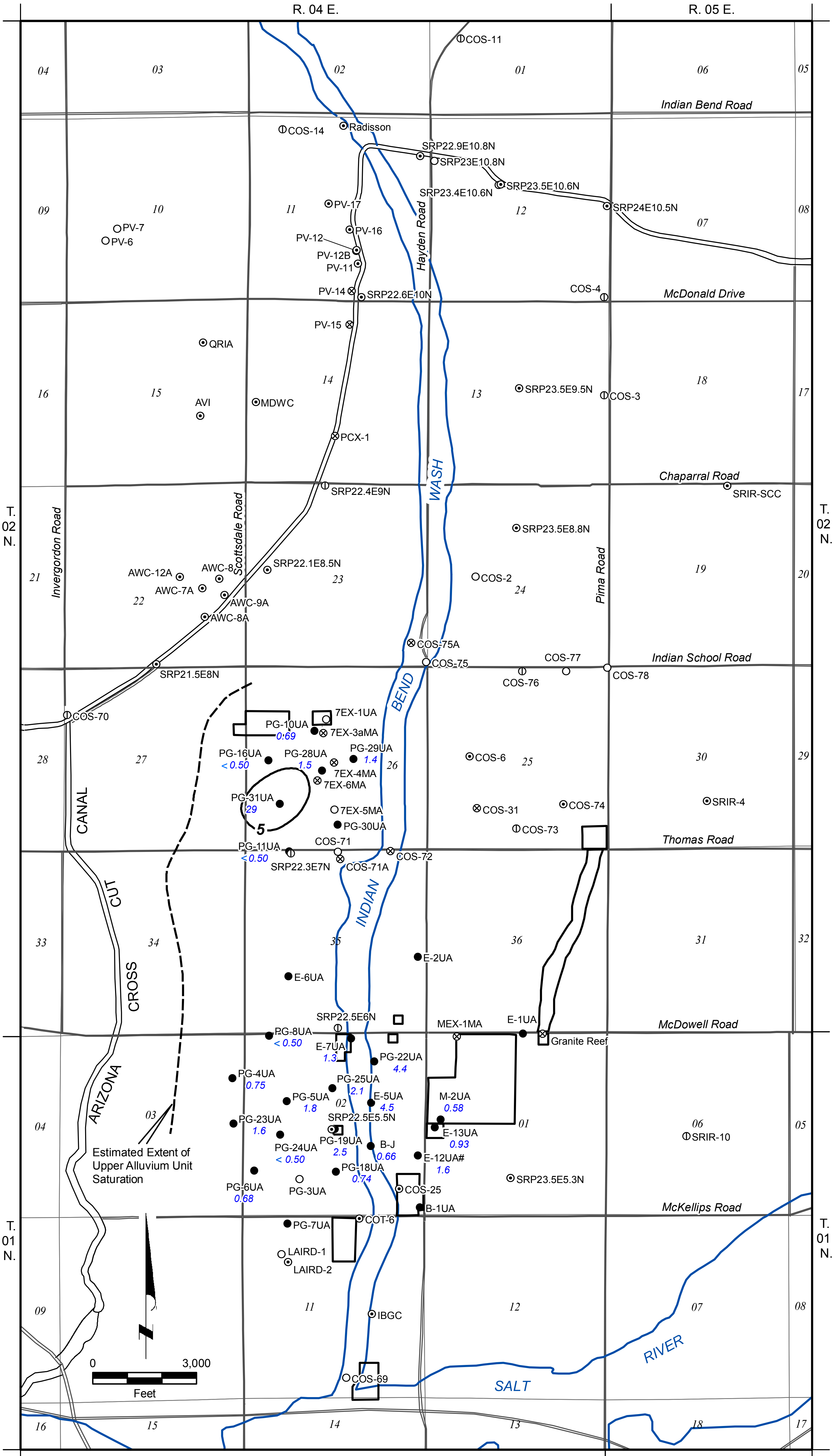
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

CHANGE IN LOWER ALLUVIUM UNIT GROUNDWATER LEVEL OCTOBER 2017 TO OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 9

GIS-TUC\366\AnnualReport\2018\LAU_WLOct2018_DIFFERENCE\25Feb2019



EXPLANATION

PG-6UA ● Upper Alluvium Monitor Well Location and Identifier
# denotes sampled January 2019
0.68 Concentration of TCE, micrograms per liter

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-74 ⊙ Production Water Well Location and Identifier

SRP22.5E6N ⦶ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Well Location and Identifier

— 5 — TCE Concentration Contour, in micrograms per liter

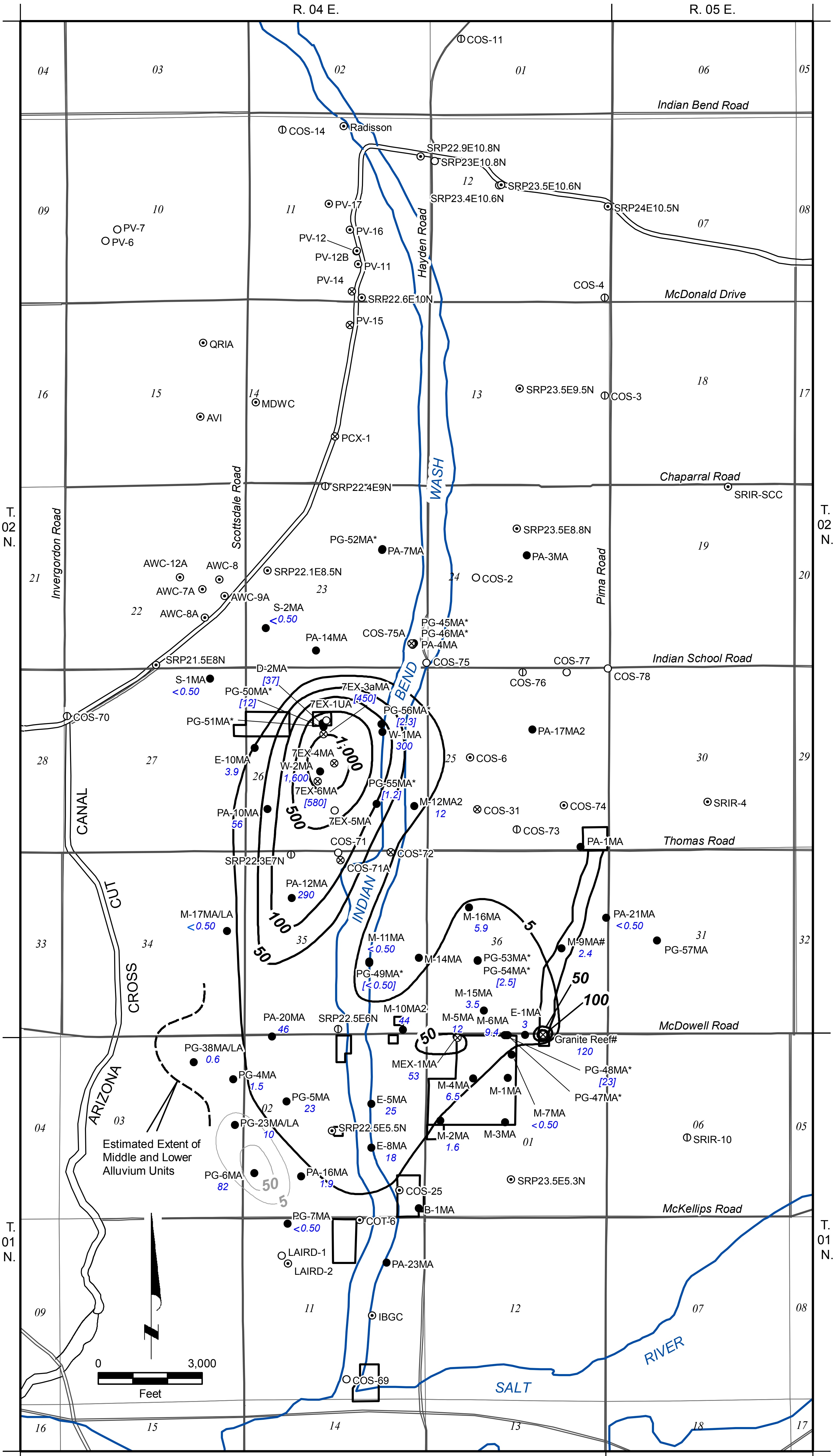
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

CONCENTRATION OF TCE IN UPPER ALLUVIUM UNIT WELLS OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 10

GIS-TUC\366\AnnualReport\2018\\UAU_TCE_Oct2018\25Feb2019



EXPLANATION

PG-6MA ●	Middle Alluvium (MAU) Monitor Well Location and Identifier * denotes Lower MAU well # denotes sampled November or December 2018
82	Concentration of TCE, micrograms per liter; [ ] indicates data not used for contouring
COS-75A ⊗	Extraction Water Well Location and Identifier
COS-74 ⊙	Production Water Well Location and Identifier
SRP22.5E6N ⦶	Inactive Production Water Well Location and Identifier
COS-69 ○	Abandoned Well Location and Identifier
— 5 —	TCE Concentration Contour, in micrograms per liter
— 50 —	TCE Concentration Contour, in micrograms per liter (source not related to site)

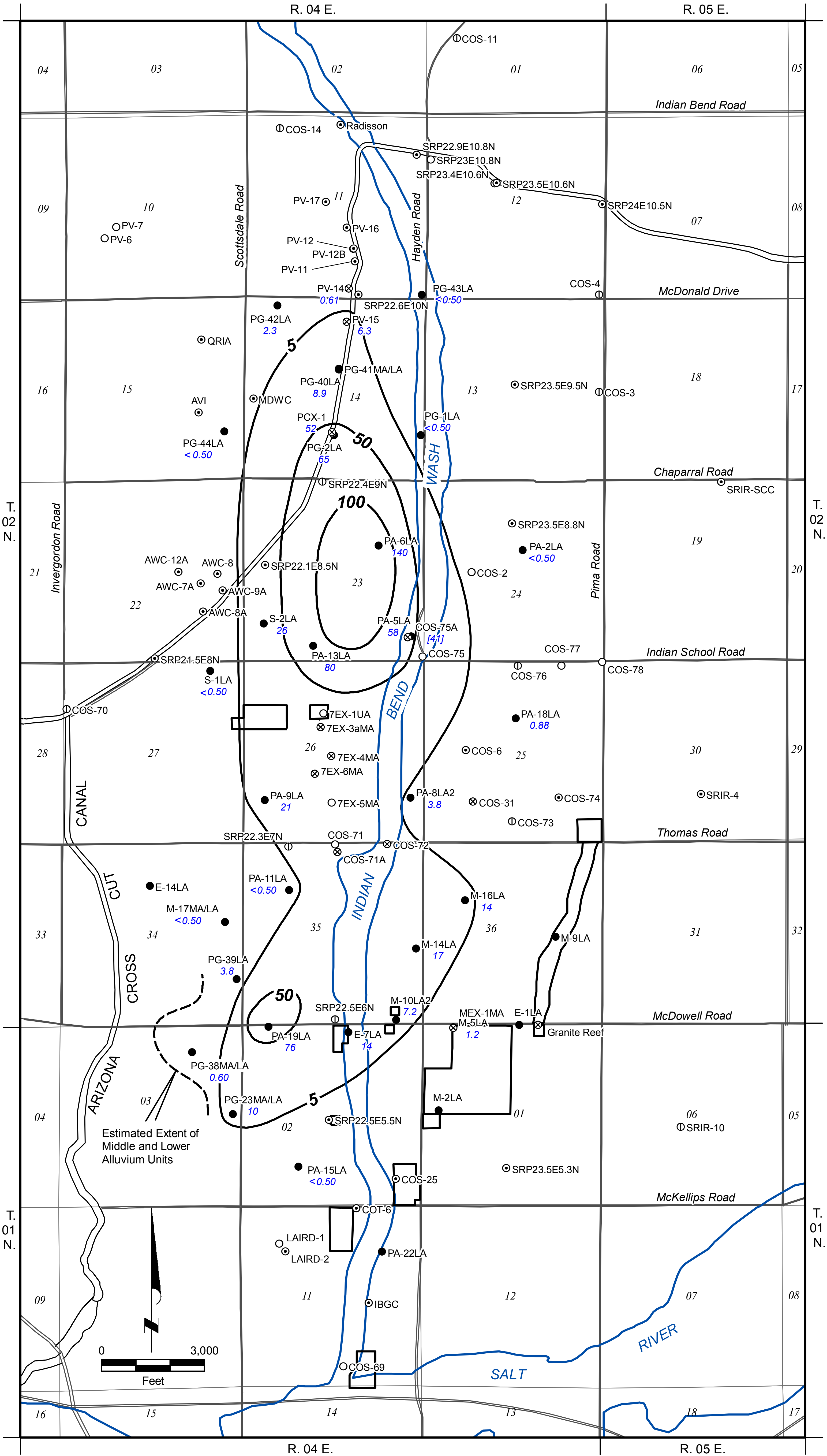
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

CONCENTRATION OF TCE IN MIDDLE ALLUVIUM UNIT WELLS OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 11

GIS-TUC\366\AnnualReport\2018\MAU_TCE_Oct2018\25Feb2019



EXPLANATION

PA-19LA ● Lower Alluvium Monitor Well Location and Identifier

76 Concentration of TCE, micrograms per liter
[ ] indicates data not used for contouring

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-74 ⊙ Production Water Well Location and Identifier

SRP22.5E6N ⦶ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Well Location and Identifier

—50— TCE Concentration Contour, in micrograms per liter

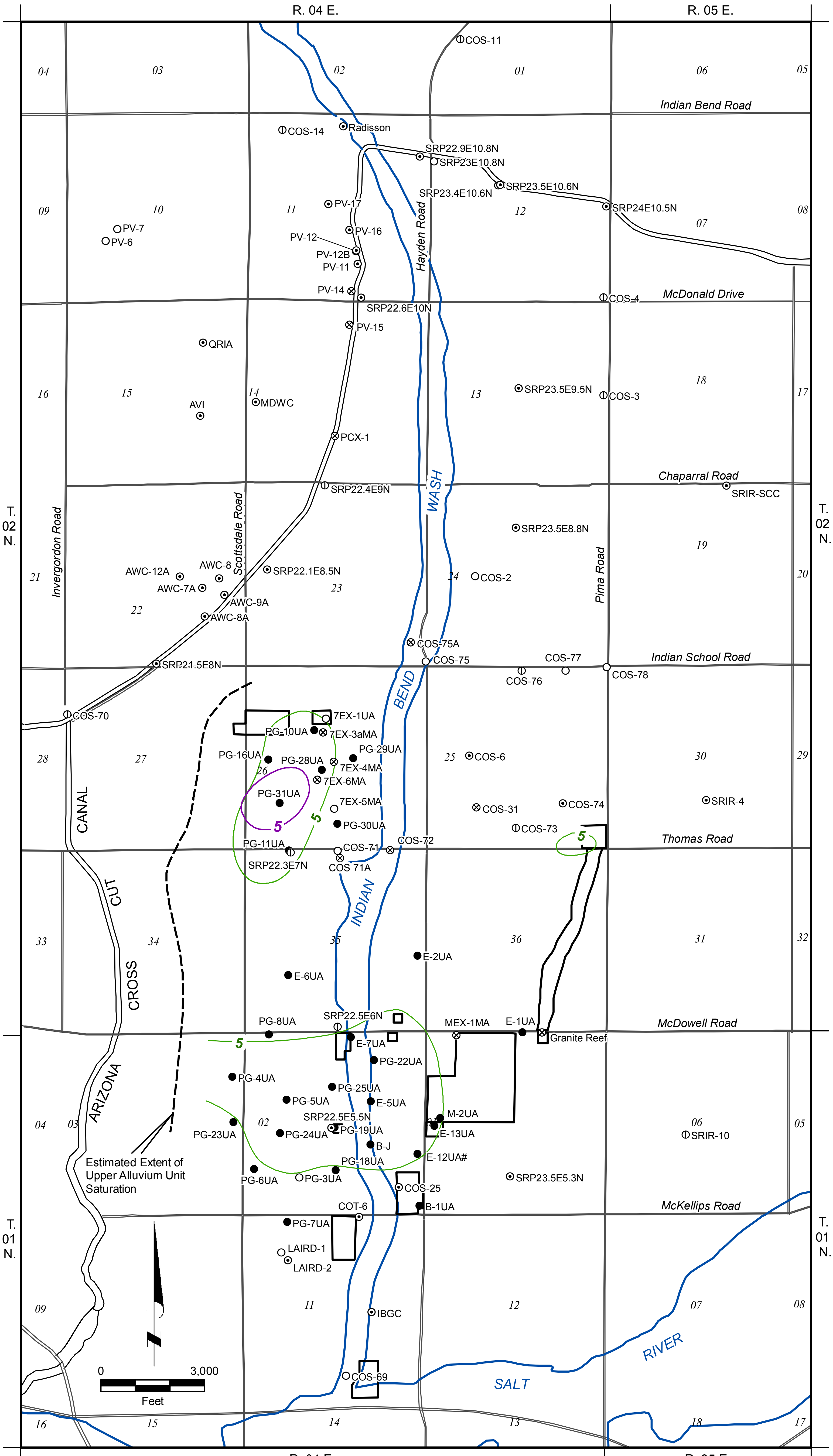
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

**CONCENTRATION OF TCE IN
LOWER ALLUVIUM UNIT WELLS
OCTOBER 2018**

North Indian Bend Wash Superfund Site

FIGURE 12

GIS-TUC\36AnnualReport\2018\LAU_TCE_Oct2018\25Feb2019



EXPLANATION

PG-5UA ●	Upper Alluvium Monitor Well Location and Identifier # denotes sampled January 2019
COS-75A ⊗	Extraction Water Well Location and Identifier
COS-74 ⊙	Production Water Well Location and Identifier
SRP22.5E6N ⦶	Inactive Production Water Well Location and Identifier
COS-69 ○	Abandoned Production Location and Identifier
—5—	TCE Concentration Contour, in micrograms per liter (October 2001)
—5—	TCE Concentration Contour, in micrograms per liter (October 2018)

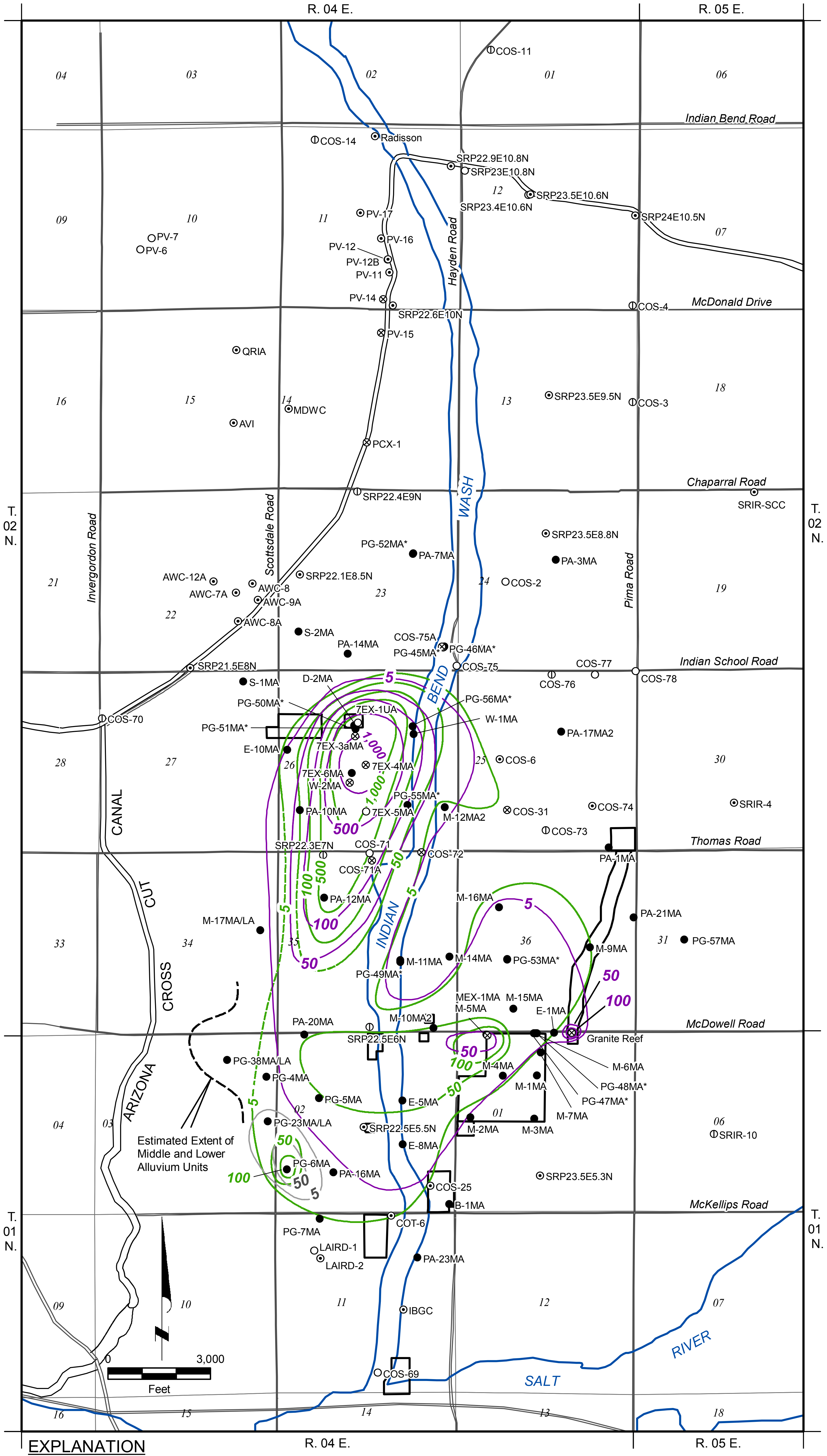
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

CONCENTRATION OF TCE IN UPPER ALLUVIUM UNIT WELLS OCTOBER 2001 - OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 13

GIS-TUC\366\AnnualReport\2018\UAU_TCE_Oct2001-2018\25Feb2019



EXPLANATION

PG-6MA	●	Middle Alluvium (MAU) Monitor Well Location and Identifier * denotes the well is a Lower MAU well
COS-75A	⊗	Extraction Water Well Location and Identifier
COS-74	⊙	Production Water Well Location and Identifier
SRP22.5E6N	⦶	Inactive Production Water Well Location and Identifier
COS-69	○	Abandoned Well Location and Identifier
50		TCE Concentration Contour, in micrograms per liter (October 2001)
- - - -		Contour approximate; no data available for M-17MA/LA in 2001
50		TCE Concentration Contour, in micrograms per liter (October 2018)
50		TCE Concentration Contour, in micrograms per liter (source not related to site)

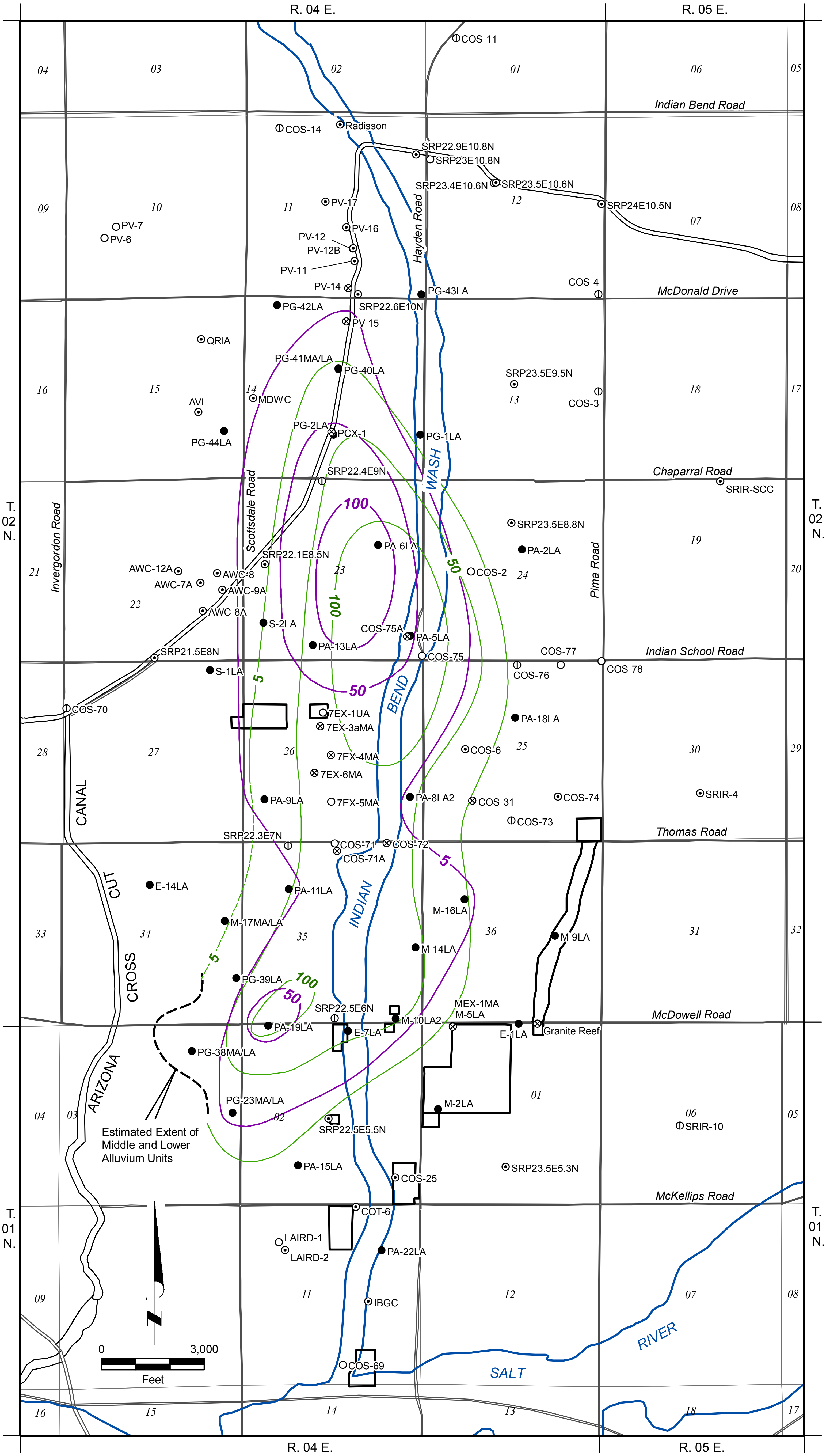
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

CONCENTRATION OF TCE IN MIDDLE ALLUVIUM UNIT WELLS OCTOBER 2001 - OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 14

GIS-TUC\366\AnnualReport\2018\MAU_TCE_Oct2001-2018\25Feb2019



EXPLANATION

PA-13LA ● Lower Alluvium Monitor Well Location and Identifier

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-74 ⊙ Production Water Well Location and Identifier

SRP22.5E6N ⦶ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Well Location and Identifier

—— 50 —— TCE Concentration Contour, in micrograms per liter (October 2001)
– – – – Contour approximate; no data available for M-17MA/LA in 2001

—— 50 —— TCE Concentration Contour, in micrograms per liter (October 2018)

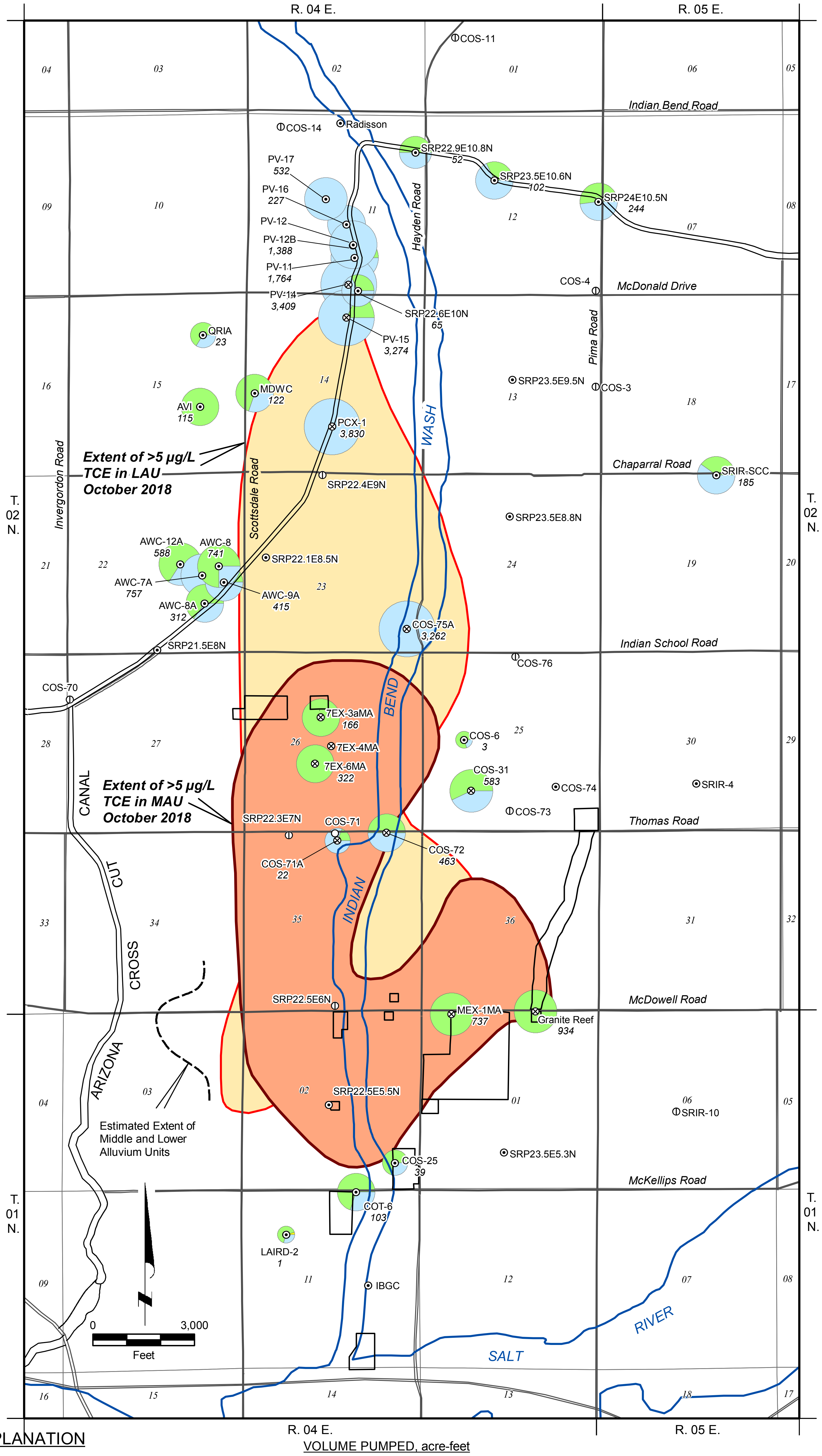
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

CONCENTRATION OF TCE IN LOWER ALLUVIUM UNIT WELLS OCTOBER 2001 - OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 15

GIS-TUC\366\AnnualReport\2018\LAU_TCE_Oct2001-2018\25Feb2019



EXPLANATION

COS-75A ⊗ Extraction Water Well Location and Identifier

COS-25 ⊙ Production Water Well Location and Identifier
39 Annual Production for 2018, in acre-feet

SRP22.4E9N ⦶ Inactive Production Water Well Location and Identifier

COS-69 ○ Abandoned Production Water Well or Monitor Well Location and Identifier

PUMPING DISTRIBUTION

🟨 Estimated Relative Percent Pumping from UAU

🟩 Estimated Relative Percent Pumping from MAU

🟦 Estimated Relative Percent Pumping from LAU

VOLUME PUMPED, acre-feet

○ 1 -10
○ 11 - 50
○ 51 - 100
○ 101 - 500
○ 501 - 1,000
○ 1,001 - 2,000
○ 2,001 - 3,000
○ >3,000

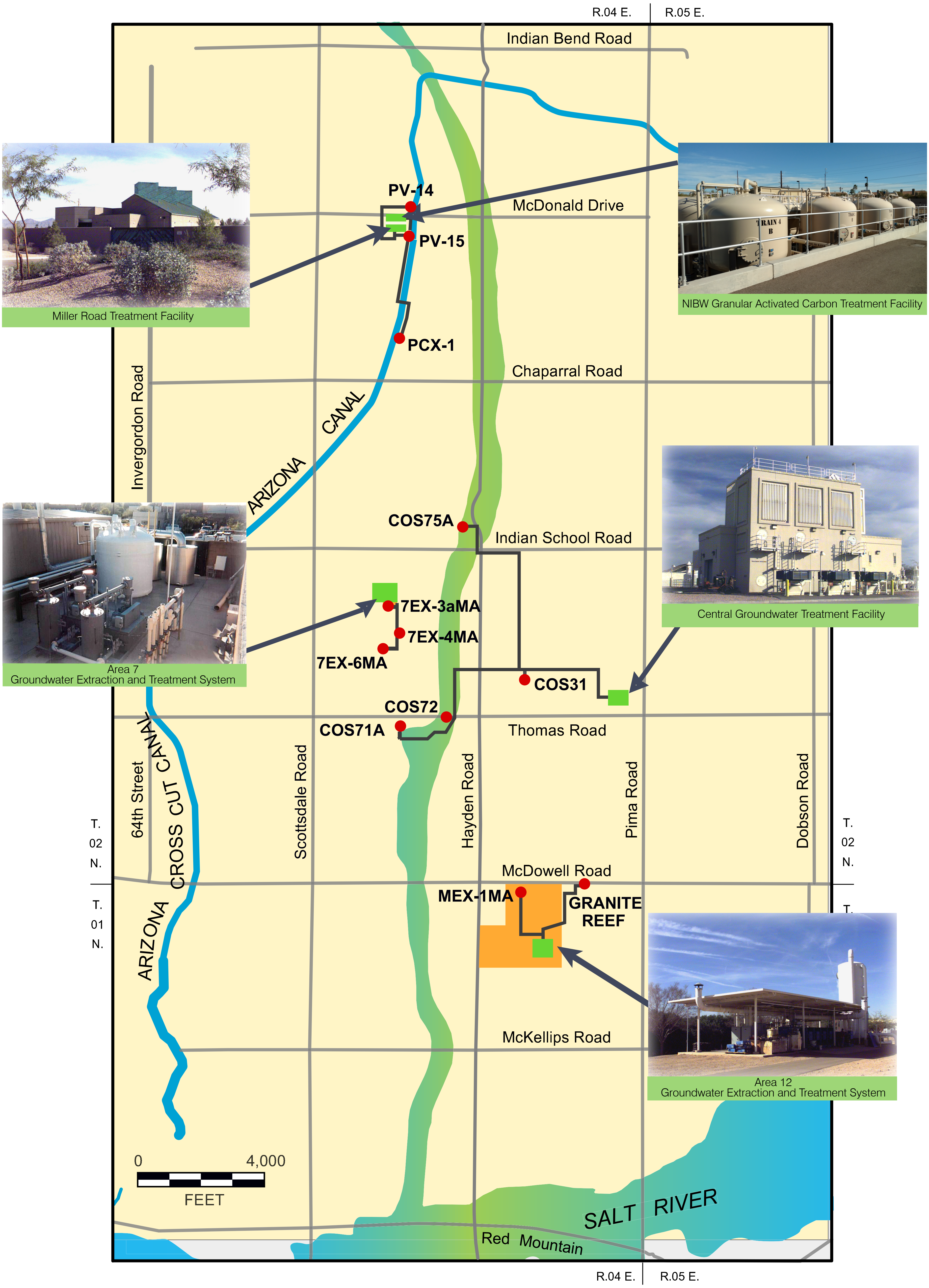
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

ANNUAL WELL PRODUCTION 2018

North Indian Bend Wash Superfund Site

FIGURE 16

GIS-TUC\366\AnnualReport\2018\\AnnualWellProduction_2018\27Feb2019



NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

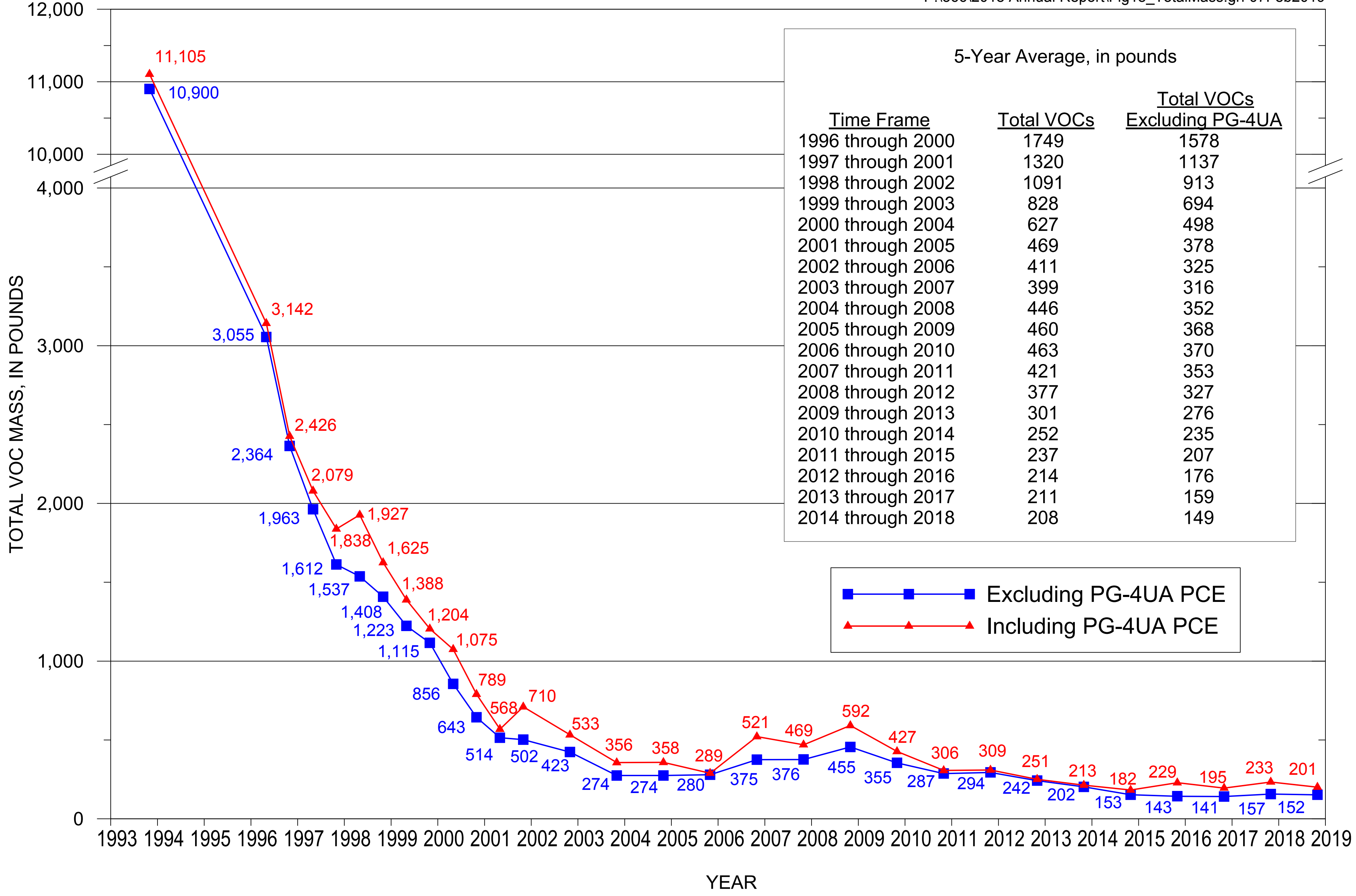
LOCATIONS FOR ACTIVE EXTRACTION WELLS, PIPELINES AND TREATMENT FACILITIES NIBW SUPERFUND SITE

North Indian Bend Wash Superfund Site

FIGURE 17

GIS_Tuc\366\AnnualReport\2018\ExtracWells_Pipelines_TreatFacilities_NIBW_Superfund Site_FIG17.ai\25Feb2019

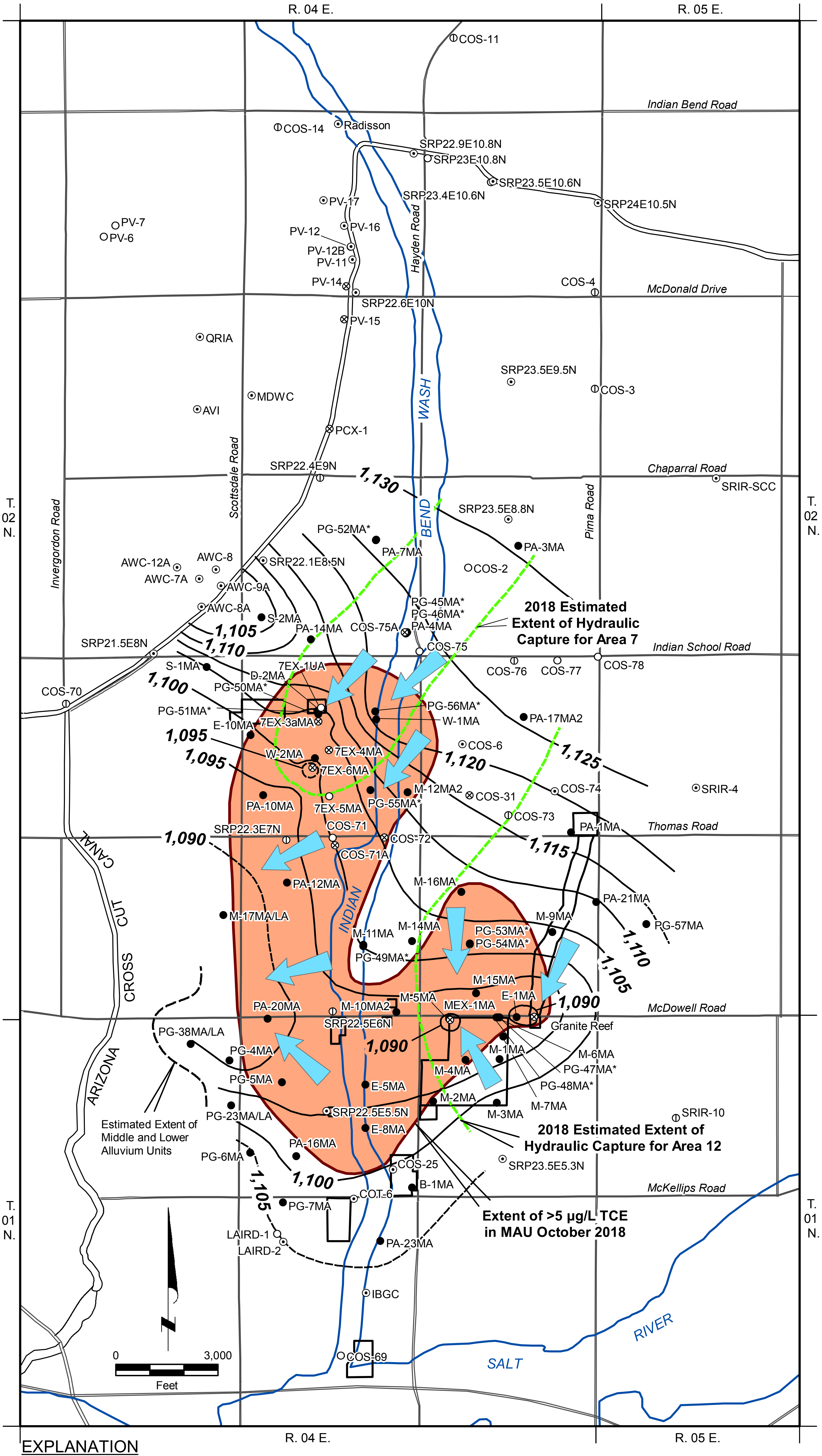
P:\366\2018 Annual Report\Fig18_TotalMass.grf 07Feb2019



5-Year Average, in pounds

Time Frame	Total VOCs	Total VOCs Excluding PG-4UA
1996 through 2000	1749	1578
1997 through 2001	1320	1137
1998 through 2002	1091	913
1999 through 2003	828	694
2000 through 2004	627	498
2001 through 2005	469	378
2002 through 2006	411	325
2003 through 2007	399	316
2004 through 2008	446	352
2005 through 2009	460	368
2006 through 2010	463	370
2007 through 2011	421	353
2008 through 2012	377	327
2009 through 2013	301	276
2010 through 2014	252	235
2011 through 2015	237	207
2012 through 2016	214	176
2013 through 2017	211	159
2014 through 2018	208	149

FIGURE 18. TOTAL MASS OF VOLATILE ORGANIC COMPOUNDS IN SATURATED PORTION OF UPPER ALLUVIUM UNIT



EXPLANATION

PG-6MA	●	Middle Alluvium (MAU) Monitor Well Location and Identifier * denotes the well is a Lower MAU well
COS-75A	⊗	Extraction Water Well Location and Identifier
COS-74	⊙	Production Water Well Location and Identifier
SRP22.5E6N	⏀	Inactive Production Water Well Location and Identifier
COS-69	○	Abandoned Production Water Well or Monitor Well Location and Identifier
— 1,090 —		Groundwater Level Altitude Contour, in feet above mean sea level Dashed where approximate
⇨		Direction of Groundwater Movement

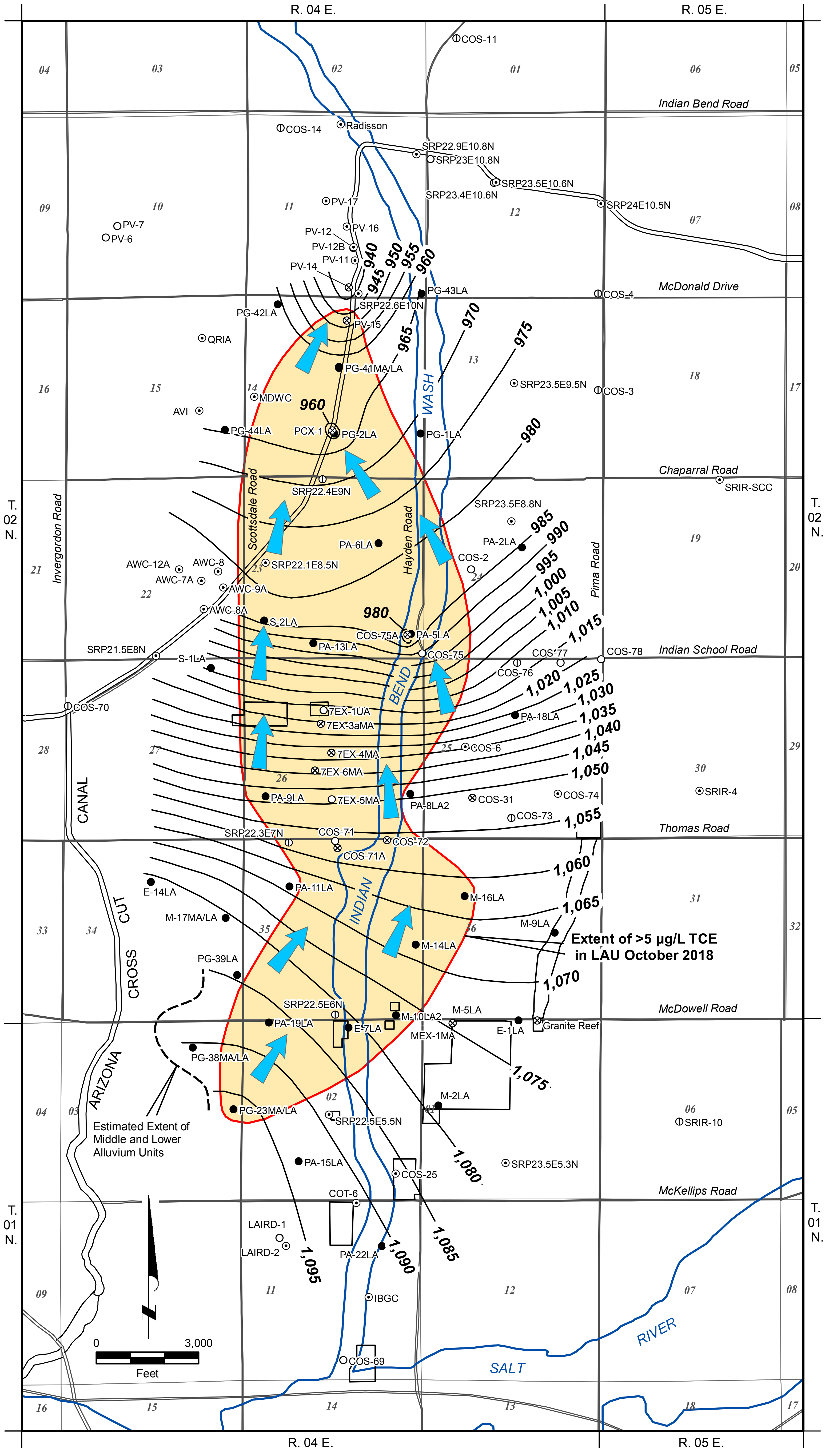
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

ESTIMATED HYDRAULIC CONTAINMENT OF MIDDLE ALLUVIUM UNIT PLUME OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 19

GIS-TUC\366\AnnualReport\\MAU_WLOct2018_CAPTURE\25Feb2019



EXPLANATION

PA-15LA ●	Lower Alluvium Monitor Well Location and Identifier
COS-75A ⊗	Extraction Water Well Location and Identifier
COS-74 ⊙	Production Water Well Location and Identifier
SRP22.5E6N ⦶	Inactive Production Water Well Location and Identifier
COS-69 ○	Abandoned Production Water Well or Monitor Well Location and Identifier
— 1,090 —	Groundwater Level Altitude Contour, in feet above mean sea level
⇨	Direction of Groundwater Movement

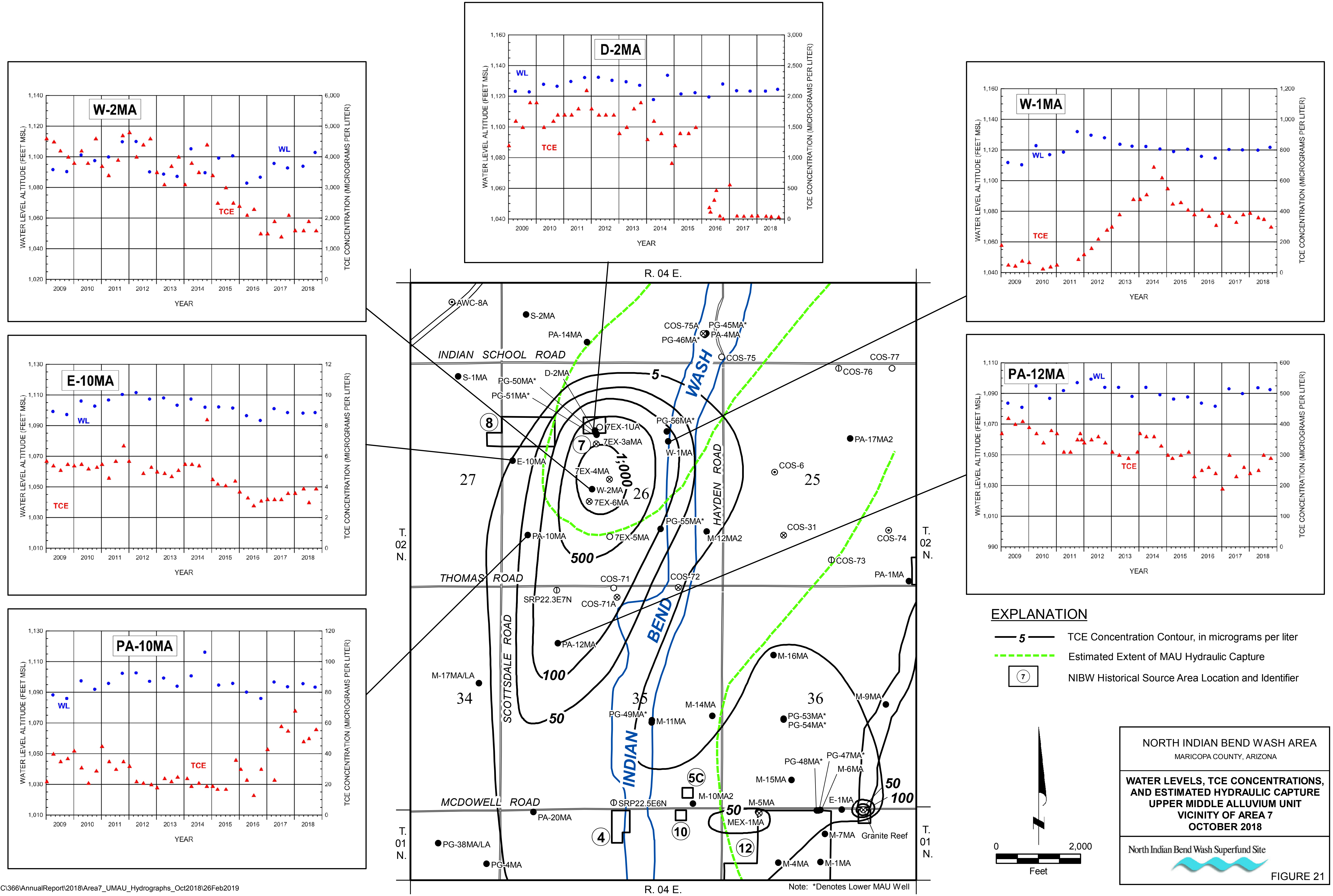
NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

ESTIMATED HYDRAULIC CONTAINMENT OF LOWER ALLUVIUM UNIT PLUME OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 20

GIS-TUC\366\AnnualReport\2018\LAU_WLOct2018_CAPTURE\25Feb2019



NORTH INDIAN BEND WASH AREA

MARICOPA COUNTY, ARIZONA

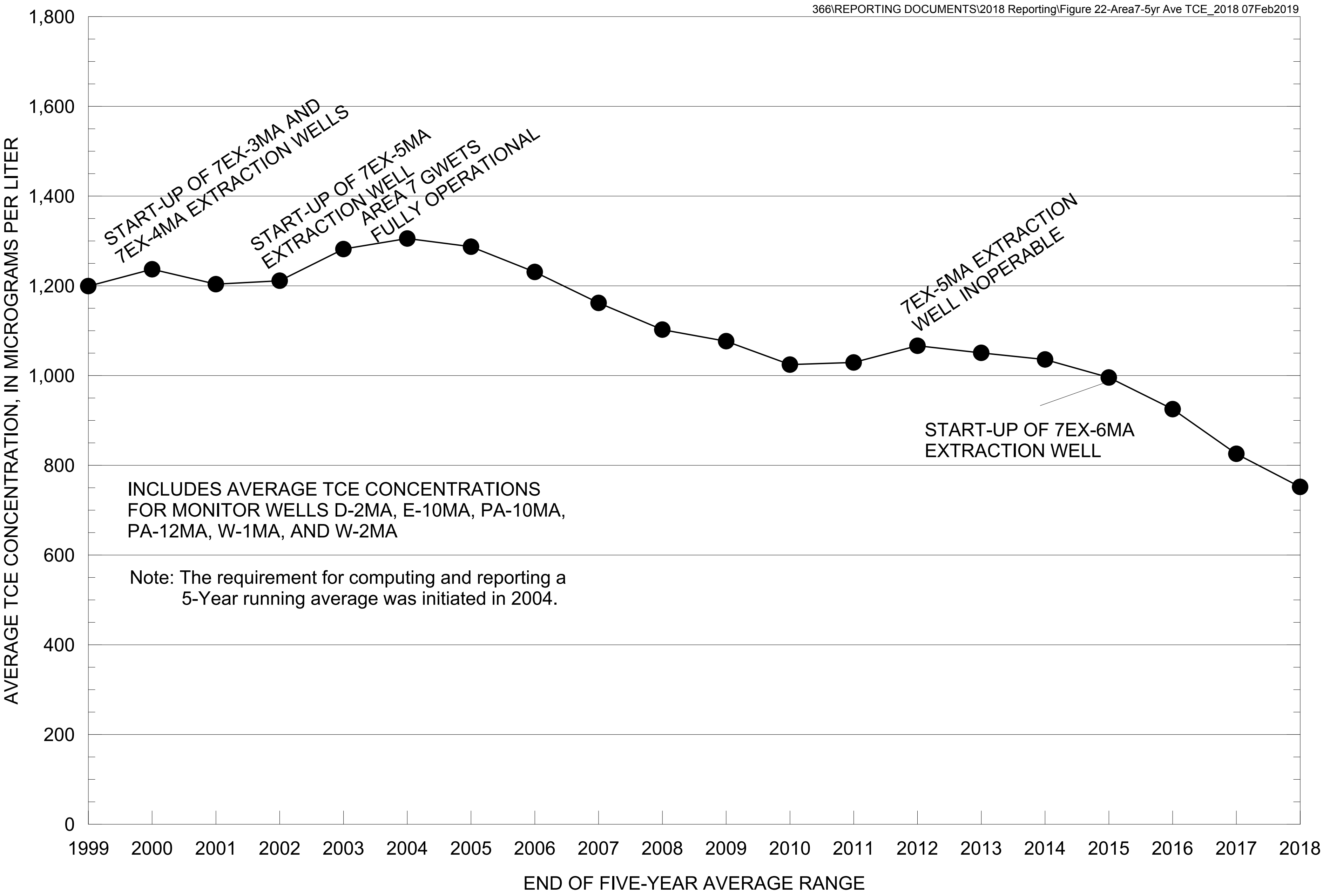
WATER LEVELS, TCE CONCENTRATIONS, AND ESTIMATED HYDRAULIC CAPTURE UPPER MIDDLE ALLUVIUM UNIT VICINITY OF AREA 7 OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 21

GIS-TUC\366\AnnualReport\2018\Area7_UMAU_Hydrographs_Oct2018\26Feb2019

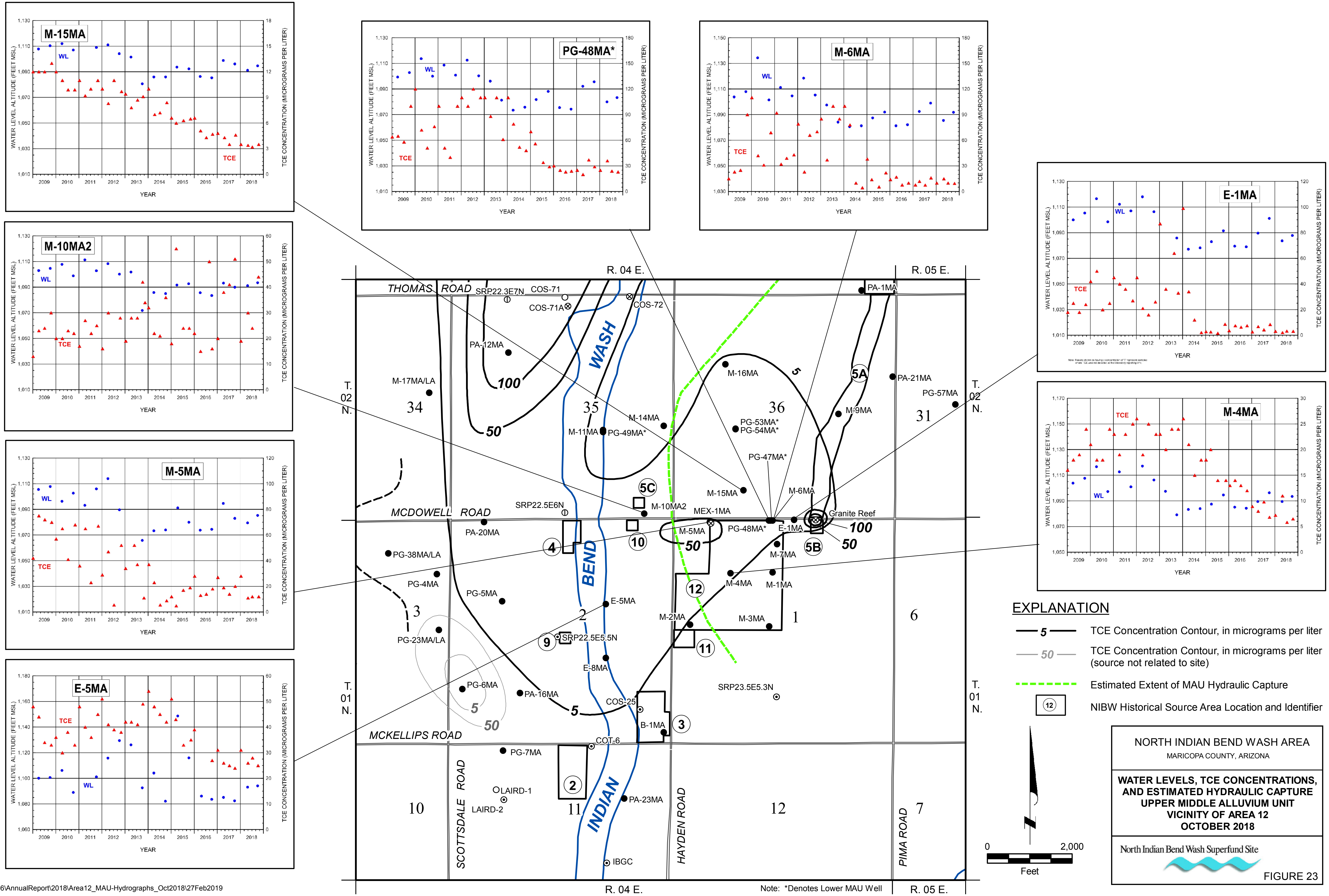
366\REPORTING DOCUMENTS\2018 Reporting\Figure 22-Area7-5yr Ave TCE_2018 07Feb2019



INCLUDES AVERAGE TCE CONCENTRATIONS FOR MONITOR WELLS D-2MA, E-10MA, PA-10MA, PA-12MA, W-1MA, AND W-2MA

Note: The requirement for computing and reporting a 5-Year running average was initiated in 2004.

FIGURE 22. FIVE-YEAR RUNNING AVERAGE TCE CONCENTRATIONS UPPER MIDDLE ALLUVIUM UNIT VICINITY OF AREA 7



EXPLANATION

5	TCE Concentration Contour, in micrograms per liter
50	TCE Concentration Contour, in micrograms per liter (source not related to site)
- - - -	Estimated Extent of MAU Hydraulic Capture
12	NIBW Historical Source Area Location and Identifier

NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

WATER LEVELS, TCE CONCENTRATIONS, AND ESTIMATED HYDRAULIC CAPTURE UPPER MIDDLE ALLUVIUM UNIT VICINITY OF AREA 12 OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 23

Note: *Denotes Lower MAU Well

GIS-TUC\366\AnnualReport\2018\Area12_MAU-Hydrographs_Oct2018\27Feb2019

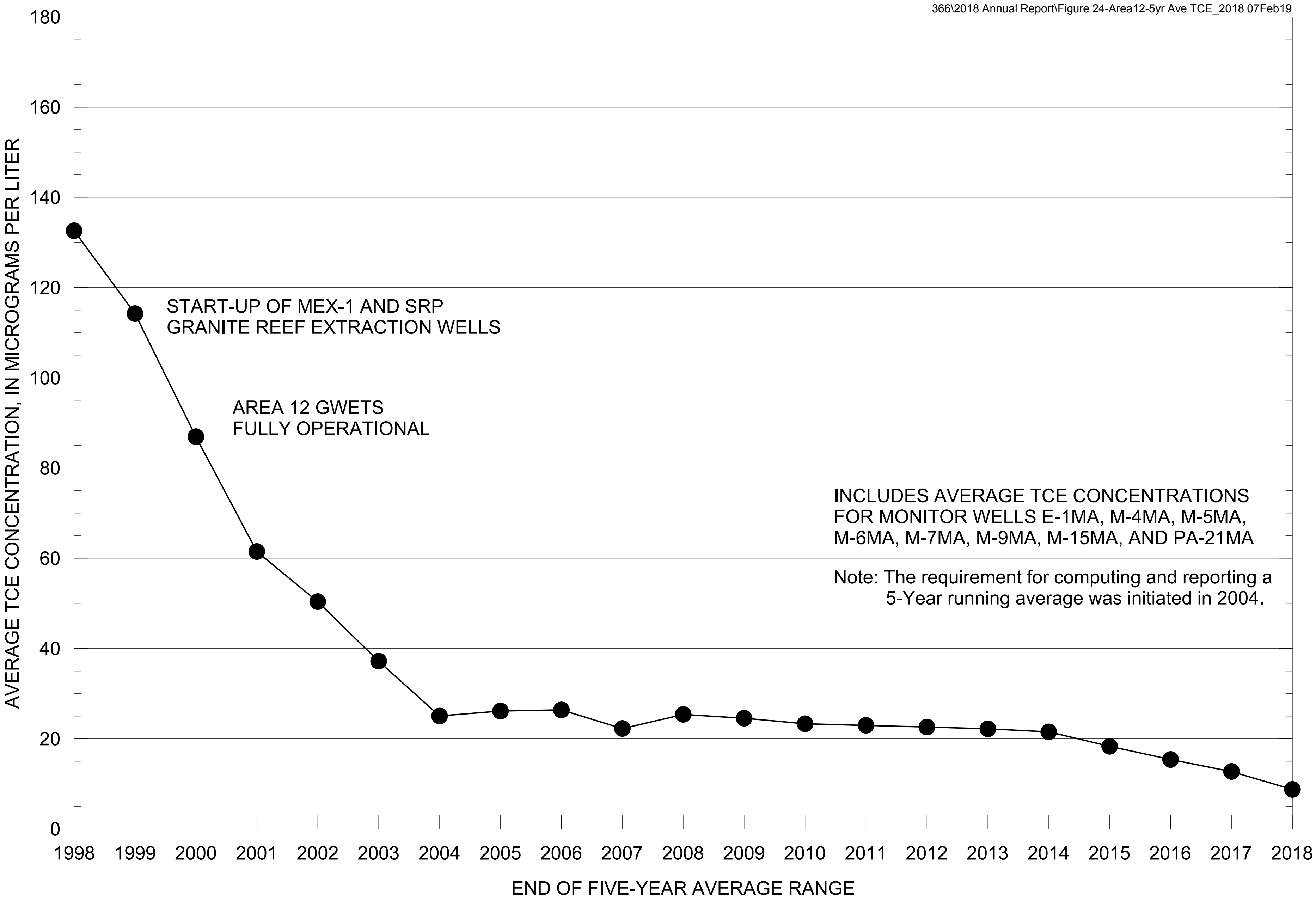
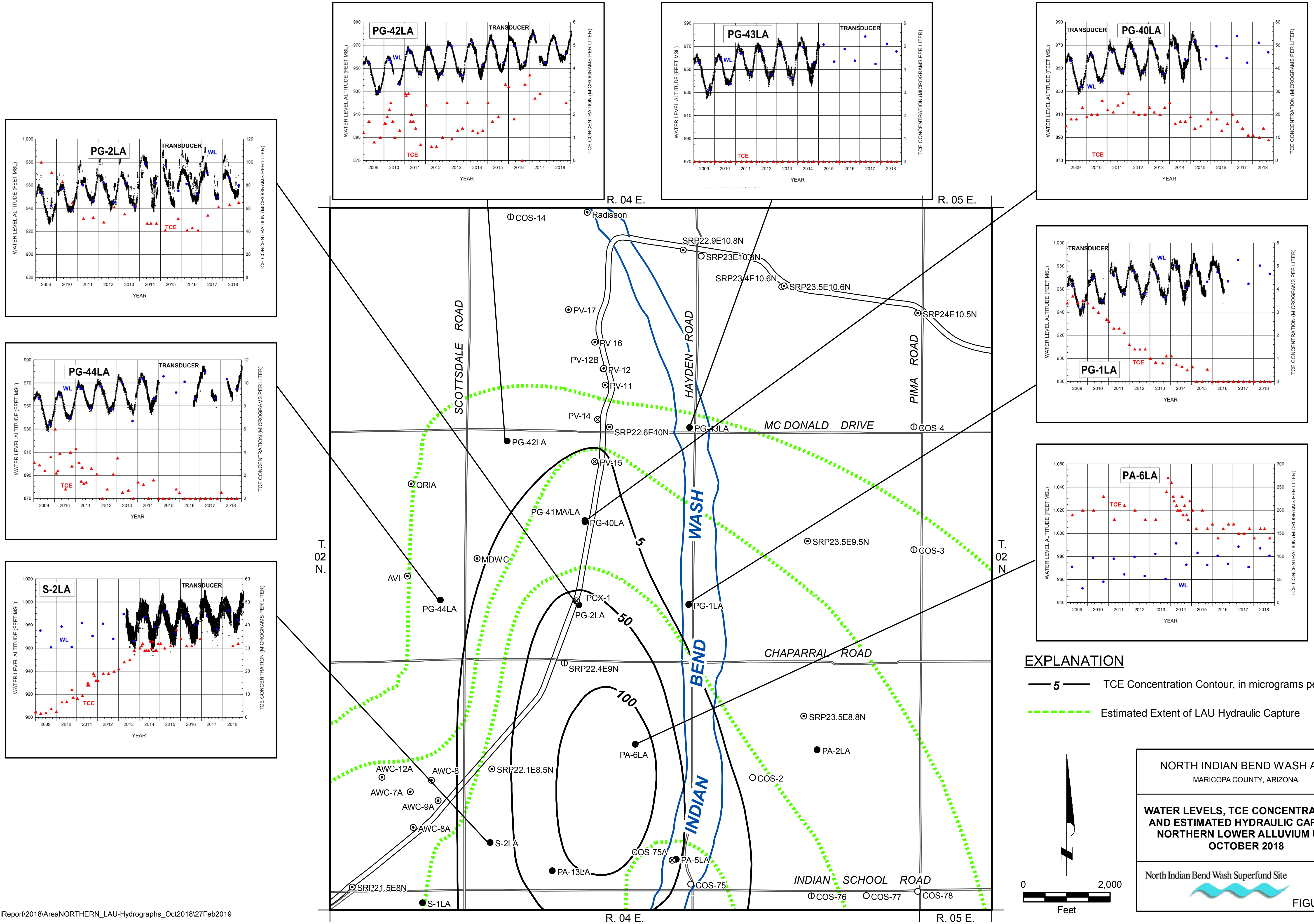


**FIGURE 24. FIVE-YEAR RUNNING AVERAGE TCE CONCENTRATIONS
UPPER MIDDLE ALLUVIUM UNIT, VICINITY OF AREA 12**



EXPLANATION

—5— TCE Concentration Contour, in micrograms per liter

Estimated Extent of LAU Hydraulic Capture

NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

WATER LEVELS, TCE CONCENTRATIONS, AND ESTIMATED HYDRAULIC CAPTURE NORTHERN LOWER ALLUVIUM UNIT OCTOBER 2018

North Indian Bend Wash Superfund Site

FIGURE 25

GIS-TUC\366\AnnualReport\2018\AreaNORTHERN_LAU-Hydrographs_Oct2018\27Feb2019

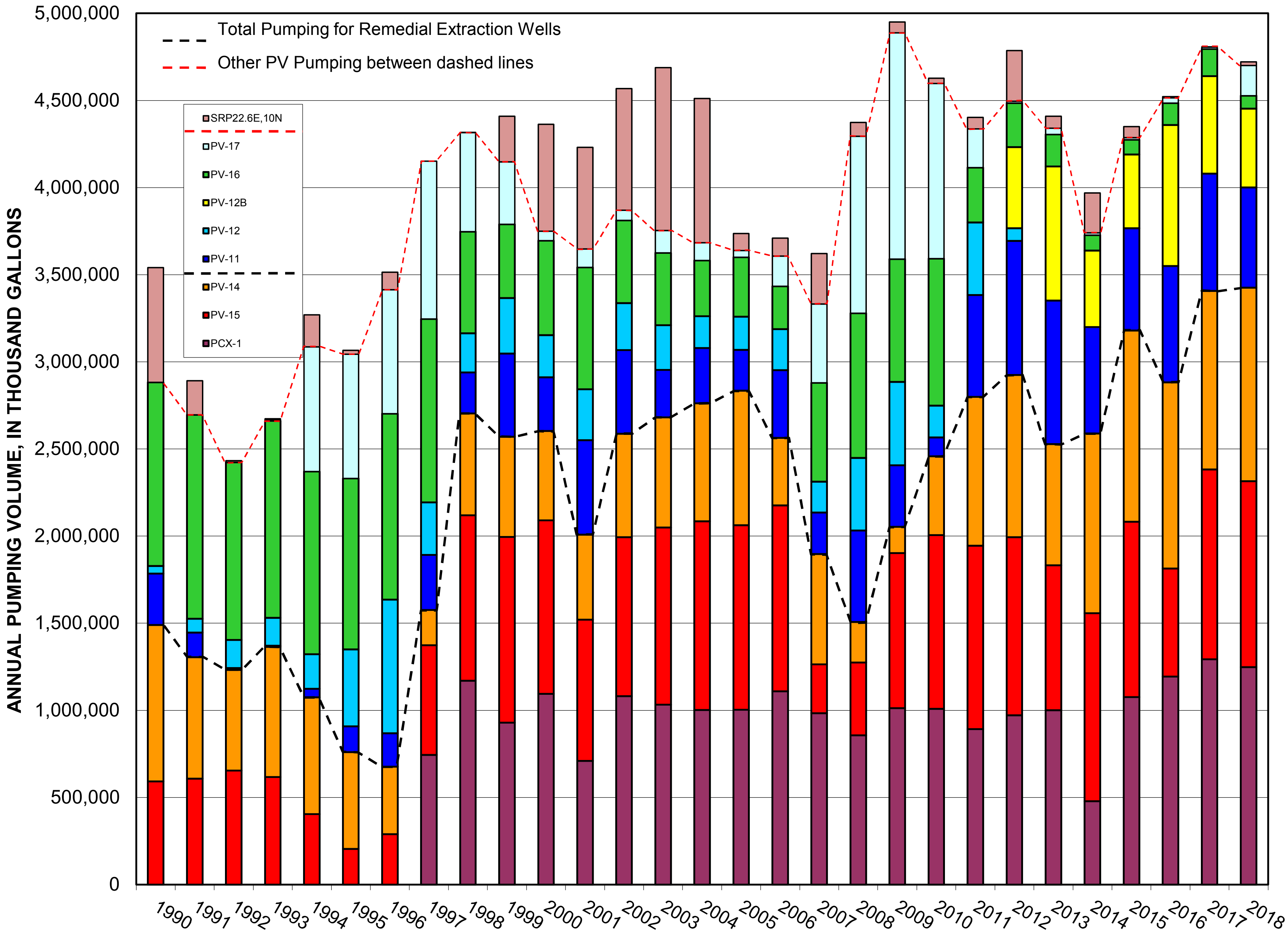
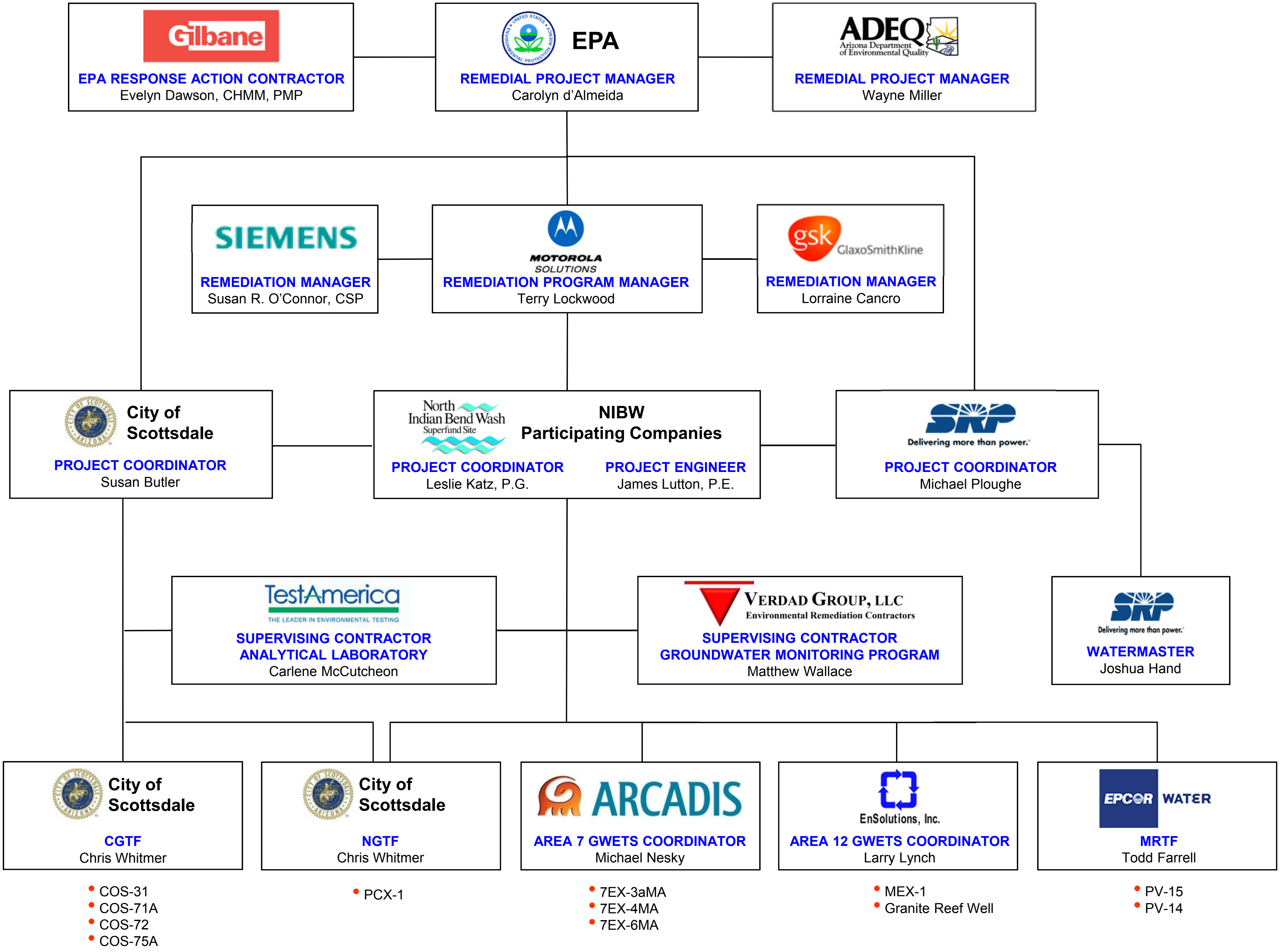


FIGURE 26. DISTRIBUTION OF PUMPING IN VICINITY OF PV PUMPING CENTER

APPENDIX A

ROLES AND RESPONSIBILITIES FOR NIBW SUPERFUND SITE REMEDIAL ACTIONS



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ADEQ Arizona Department of Environmental Quality
REMEDIAL PROJECT MANAGER
Wayne Miller

SIEMENS
REMEDIATION MANAGER
Susan R. O'Connor, CSP

MOTOROLA SOLUTIONS
REMEDIATION PROGRAM MANAGER
Terry Lockwood

gsk GlaxoSmithKline
REMEDIATION MANAGER
Lorraine Cancro

City of Scottsdale
PROJECT COORDINATOR
Susan Butler

North Indian Bend Wash Superfund Site
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PROJECT ENGINEER
James Lutton, P.E.

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PROJECT COORDINATOR
Michael Ploughe

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING
SUPERVISING CONTRACTOR
ANALYTICAL LABORATORY
Carlene McCutcheon

Verdad Group, LLC Environmental Remediation Contractors
SUPERVISING CONTRACTOR
GROUNDWATER MONITORING PROGRAM
Matthew Wallace

SRP Delivering more than power.™
WATERMASTER
Joshua Hand

City of Scottsdale
CGTF
Chris Whitmer

- COS-31
- COS-71A
- COS-72
- COS-75A

City of Scottsdale
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Chris Whitmer

- PCX-1

ARCADIS
AREA 7 GWETS COORDINATOR
Michael Nesky

- 7EX-3aMA
- 7EX-4MA
- 7EX-6MA

EnSolutions, Inc.
AREA 12 GWETS COORDINATOR
Larry Lynch

- MEX-1
- Granite Reef Well

EPCOR WATER
MRTF
Todd Farrell

- PV-15
- PV-14

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    Mobile: 602-402-3223
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    Juan Celis Phone: 480-848-5737
3. Brian Paulson, Treatment Manager
    Phone: 480-312-8941
    Mobile: 602-319-2931

After Hours:

1. Chris Whitmer, CGTF Senior Operator
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2. Water Campus Control Room Operator
    Mobile: 480-312-8708
3. Water Production Operator on call
    Mobile: 480-421-8884
4. Telemetry SCADA Specialist
    Pager: 602-312-8474
5. Brian Paulson, Treatment Manager
    Mobile: 602-319-2931

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480-225-6557 mobile, after hours

B.) Carie Wilson, COS Regulatory Compliance Manager
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C.) Suzanne Grendahl, Water Quality Director
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City of Scottsdale Incident Coordinator

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Operators on staff
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  Juan Celis Phone: 480-848-5737
Brian Paulson, Treatment Manager
  Phone: 480-312-8941
  Mobile: 602-319-2931

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   Mobile: 602-402-3223
2. Operators on staff
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City of Scottsdale

NIBW GAC Treatment Facility

Tom Byers
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Miller Road Treatment Facility

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Area 7 GWETS

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Area 12 GWETS

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CONTACT LIST AND KEY ROLES

Call-Out for any Reported Release of Untreated Groundwater at:

SRP 22.5E-9.3N (PCX-1)

SRP 23.3E-7.3N (COS-31)

SRP 23.6E-6N (Granite Reef)

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terry.lockwood@motorolasolutions.com

APPENDIX B

NORTHERN LAU CONTINUOUS WATER LEVEL MONITORING GRAPHS, 2018

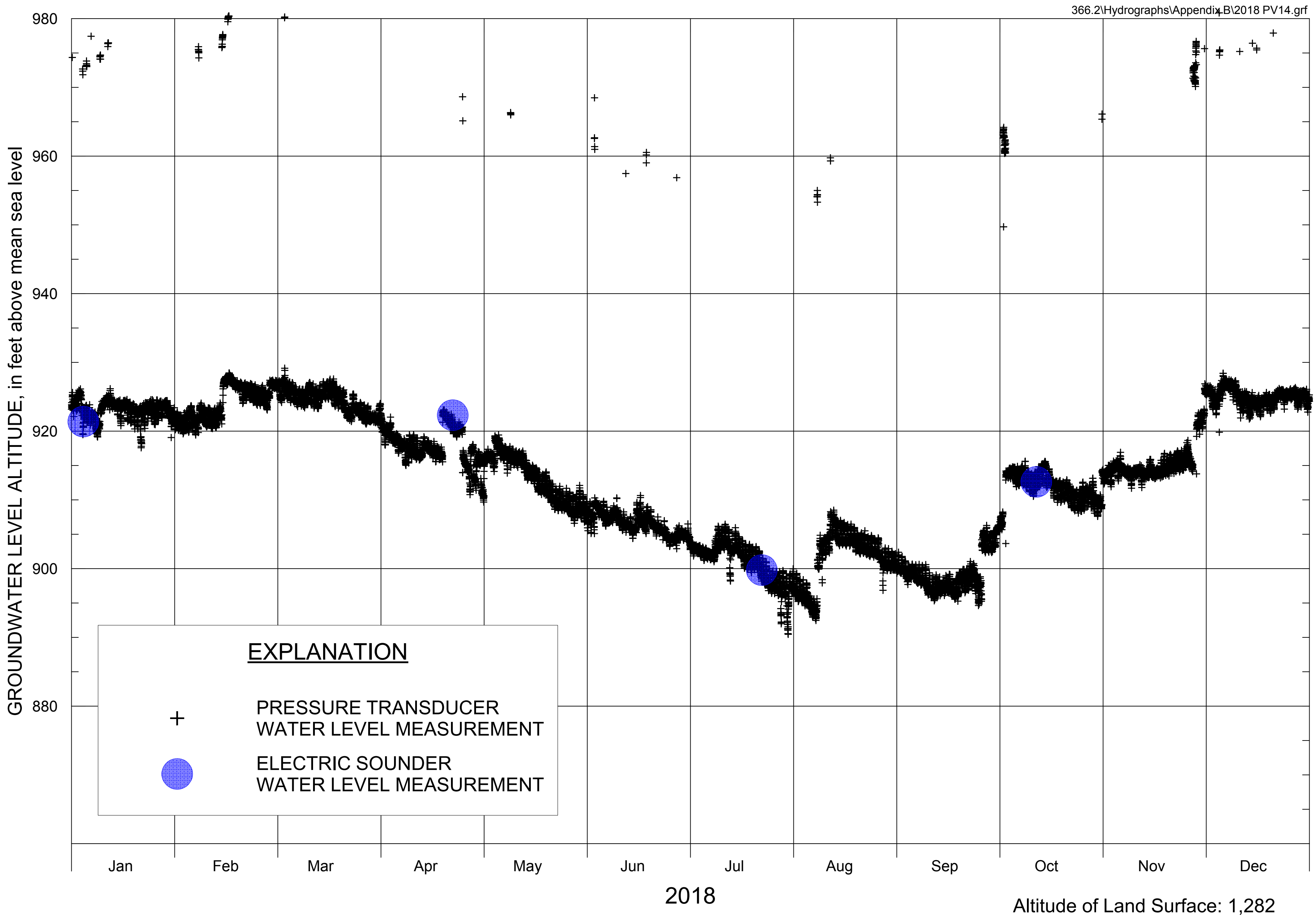


FIGURE B-1. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-14

Note: 1) Higher water levels are representative of non-pumping conditions;
lower water levels are representative of pumping conditions.

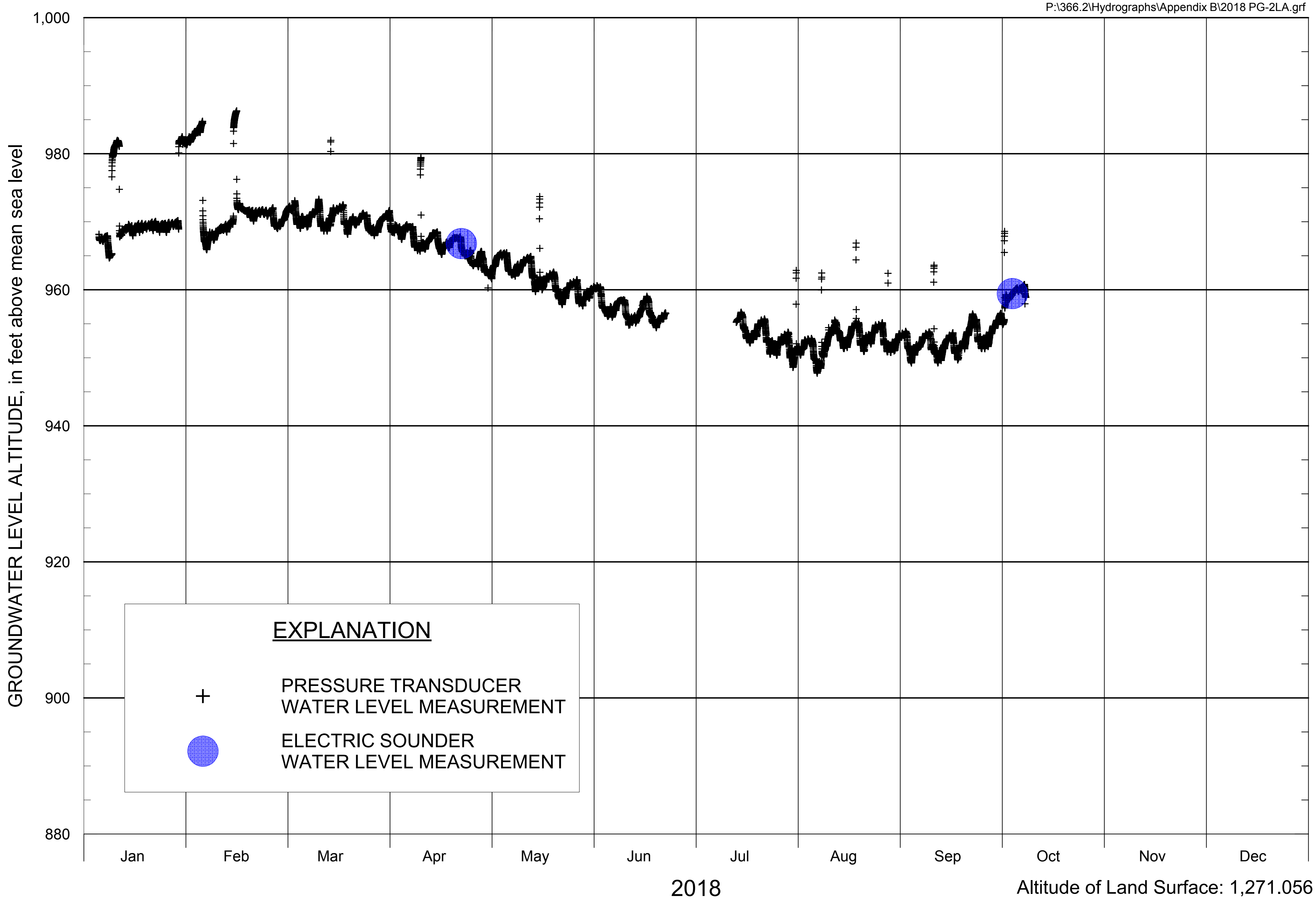


FIGURE B-2. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-2LA

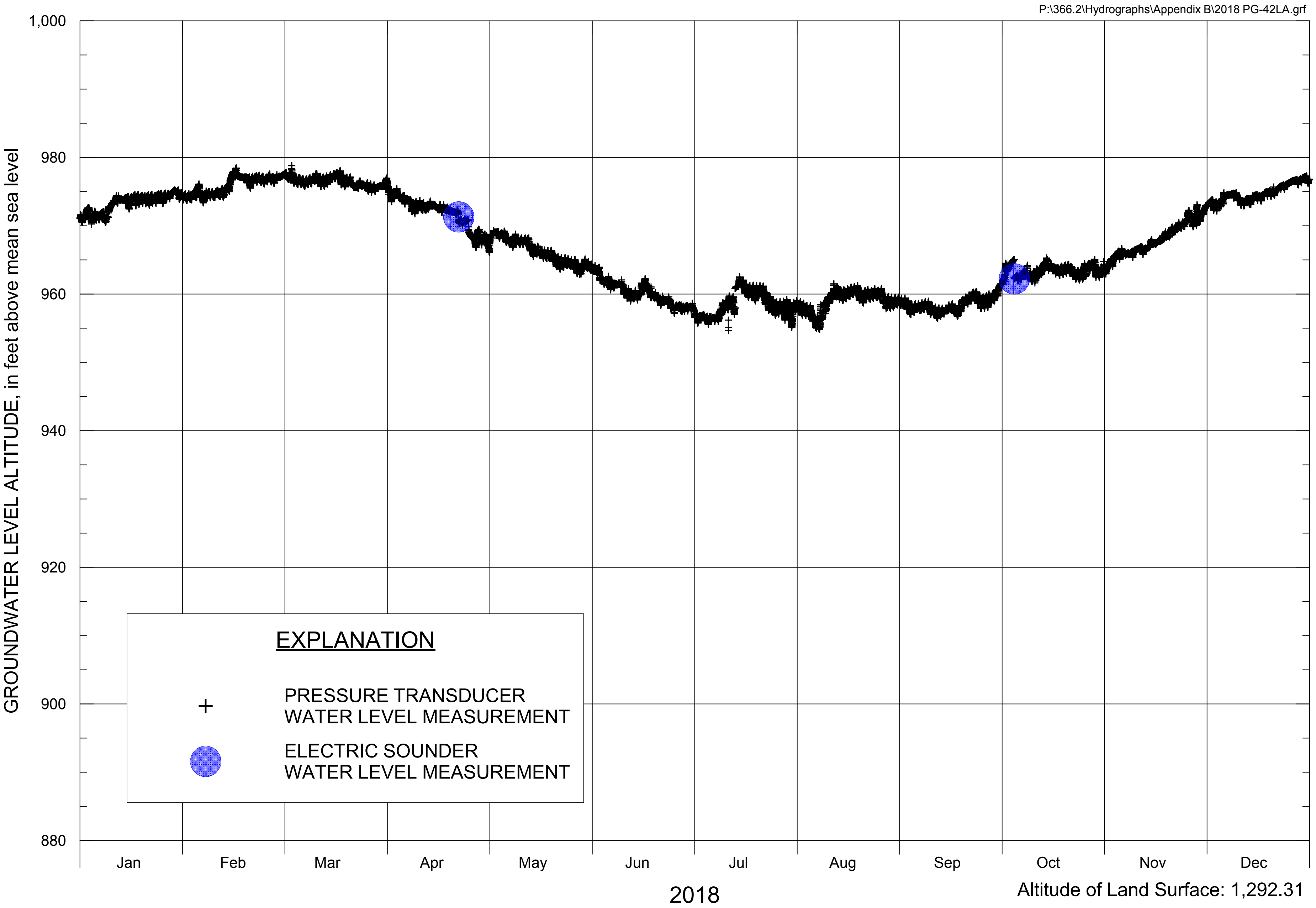


FIGURE B-3. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-42LA

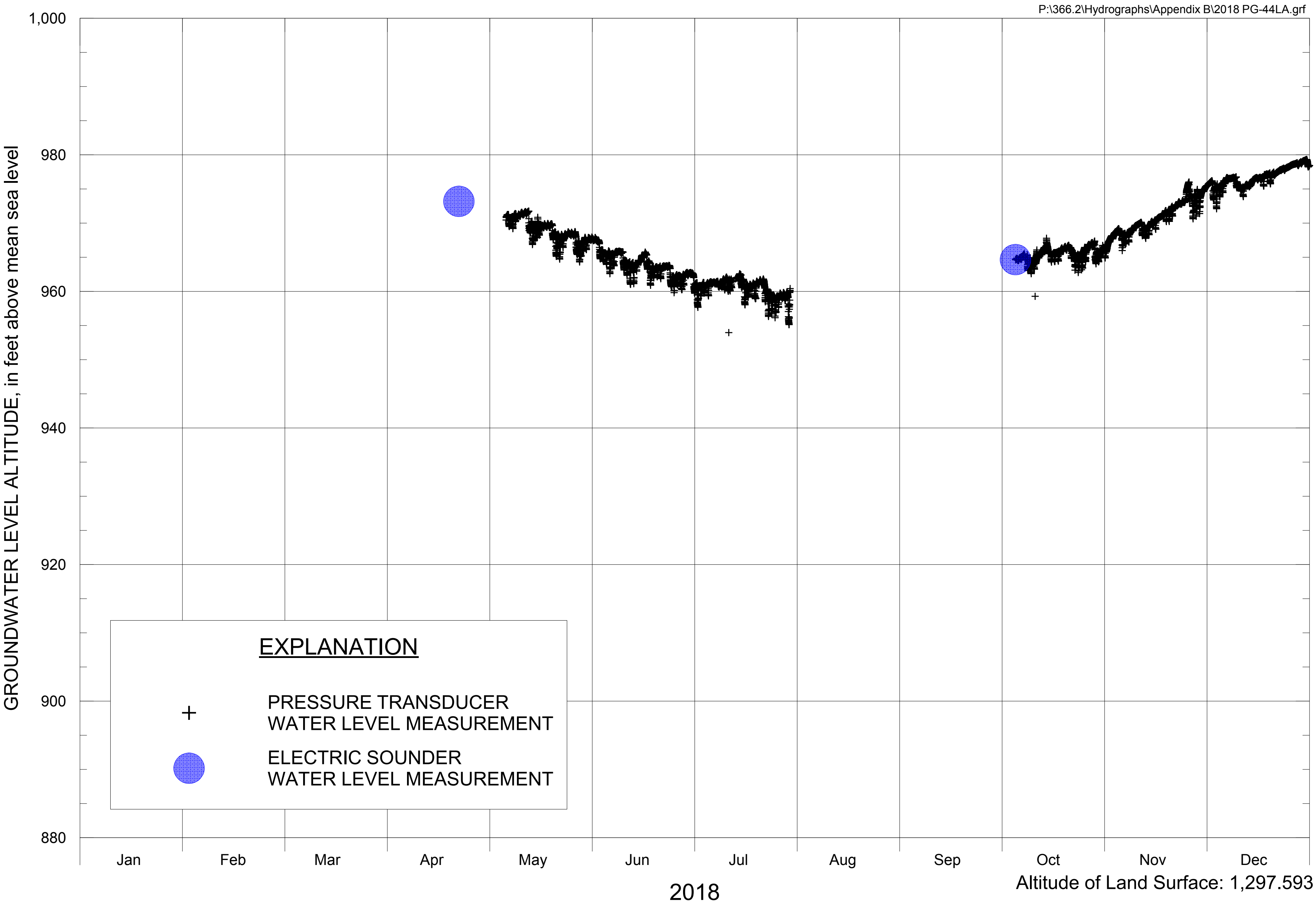
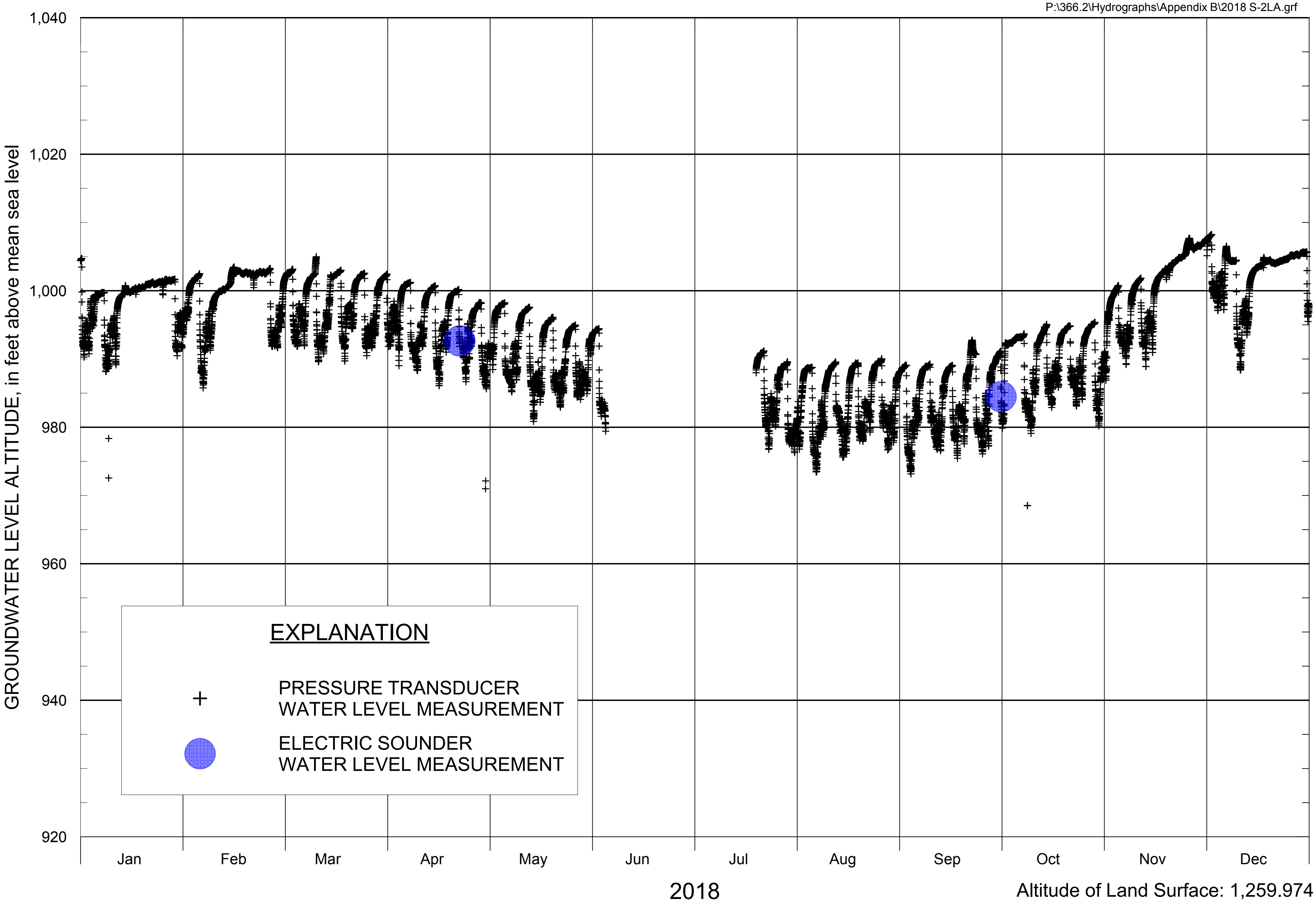


FIGURE B-4. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-44LA

North Indian Bend Wash Superfund Site

P:\366.2\Hydrographs\Appendix B\2018 S-2LA.grf



Altitude of Land Surface: 1,259.974

FIGURE B-5. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-2LA

North Indian Bend Wash Superfund Site

APPENDIX C

WATER LEVEL HYDROGRAPHS AND TCE TIME-SERIES DATA FOR NIBW MONITOR, PRODUCTION AND EXTRACTION WELLS

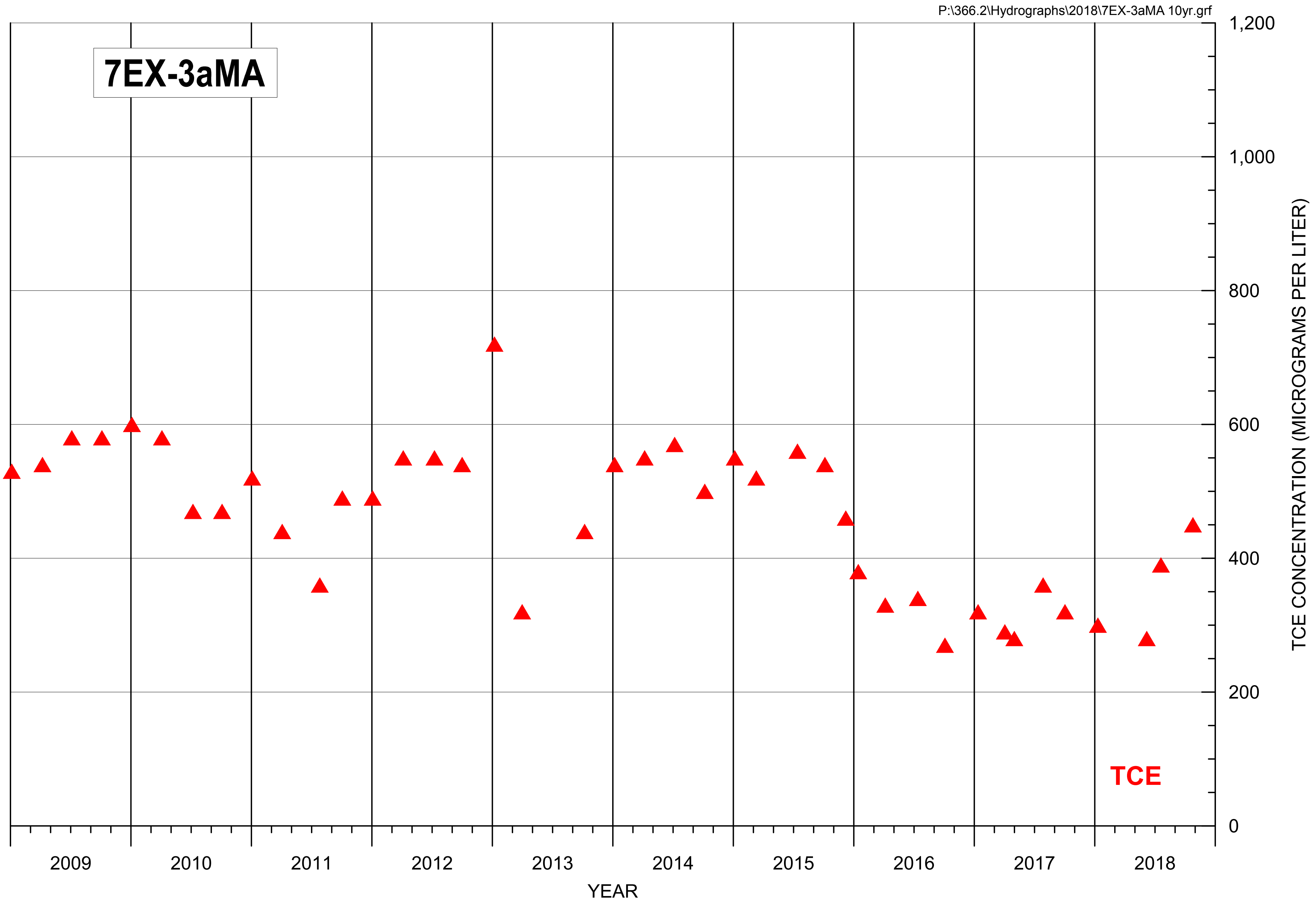


FIGURE C-1. TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-3aMA

North Indian Bend Wash Superfund Site

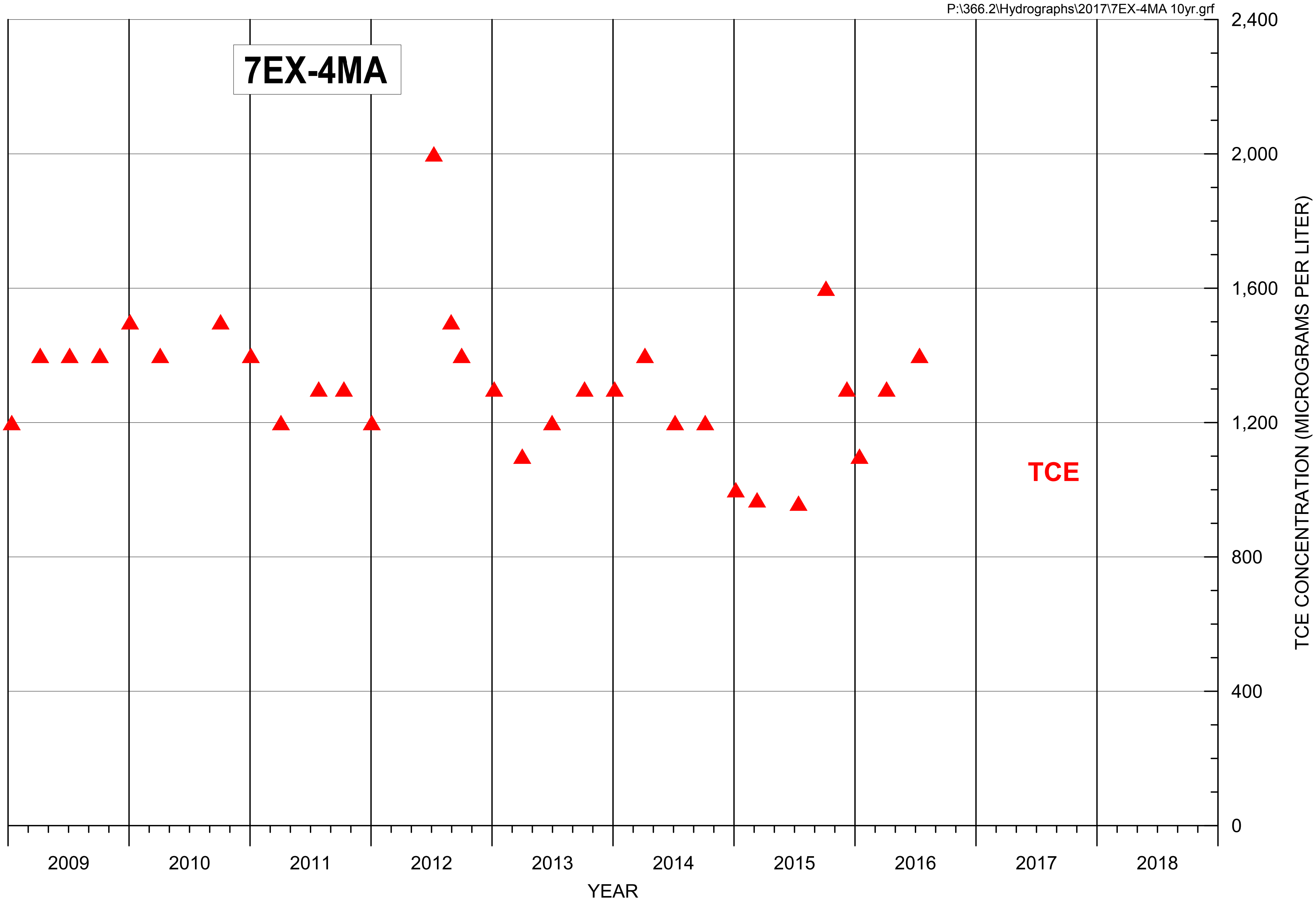


FIGURE C-2. TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-4MA

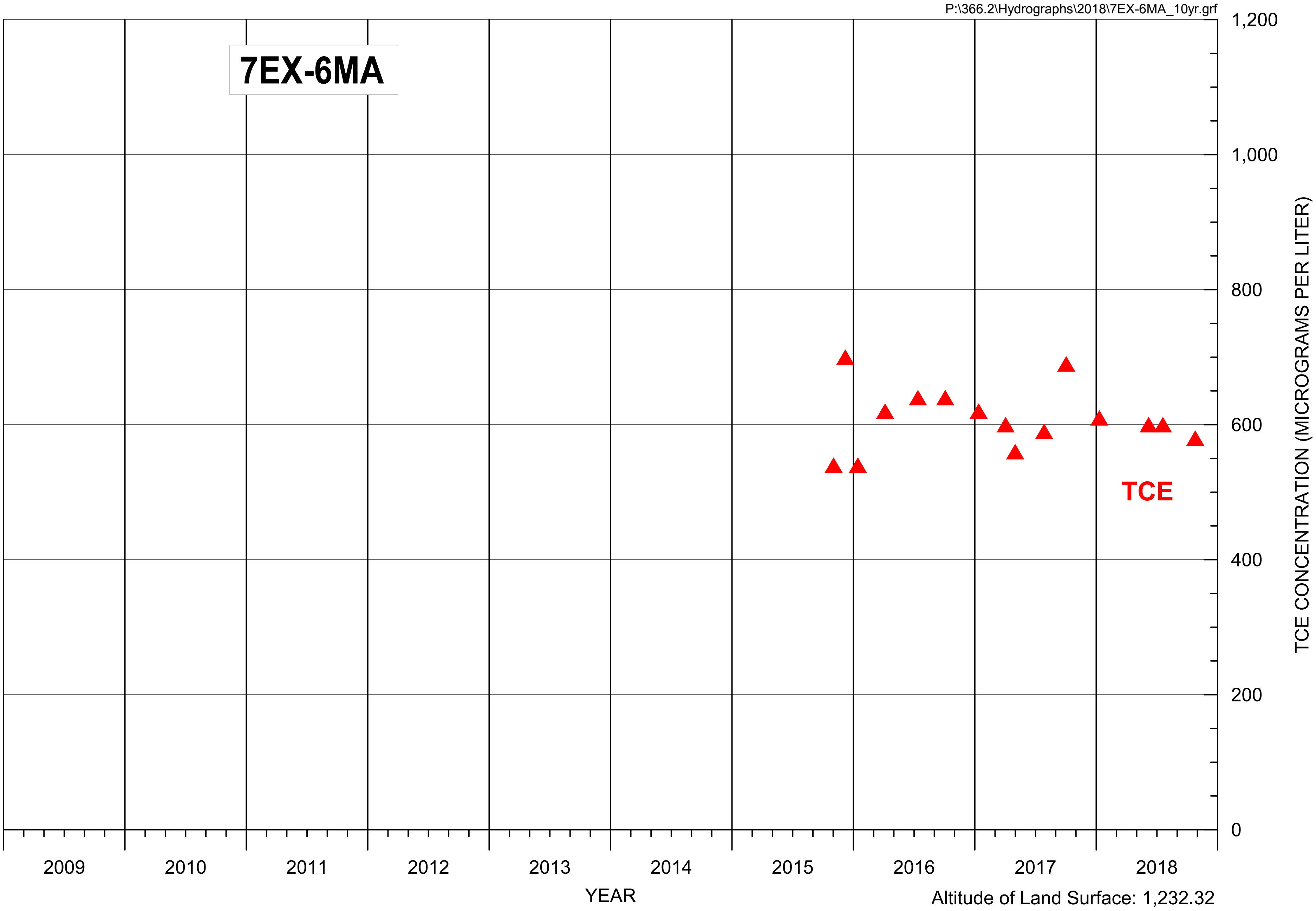


FIGURE C-3. TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-6MA

North Indian Bend Wash Superfund Site

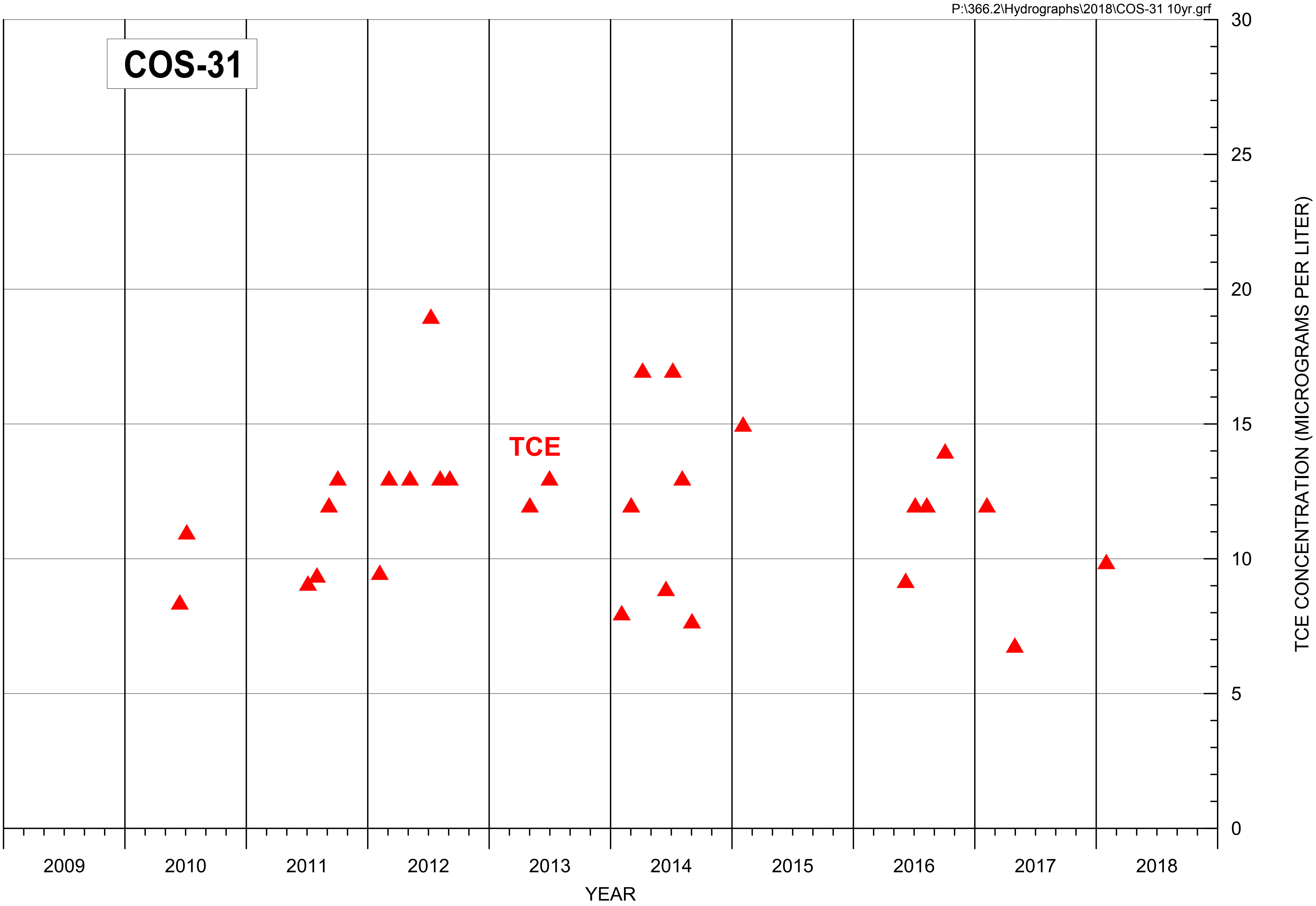


FIGURE C-4. TCE CONCENTRATIONS FOR EXTRACTION WELL COS-31

North Indian Bend Wash Superfund Site

P:\366.2\Hydrographs\2018\COS-71 10yr.grf

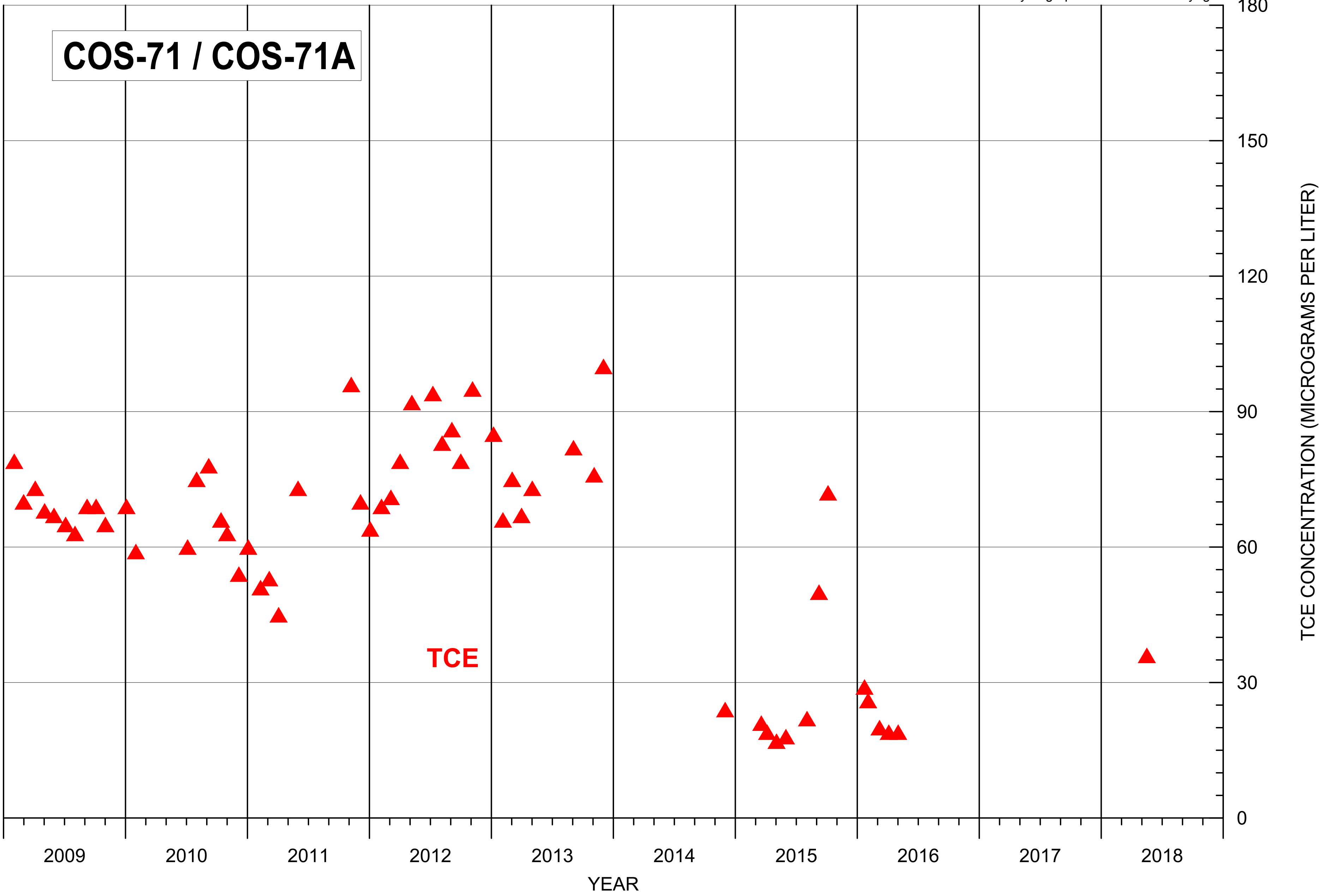


FIGURE C-5. TCE CONCENTRATIONS FOR EXTRACTION WELL COS-71 & COS-71A

Note: Well COS-71 was abandoned April 10, 2014 and was replaced by Well COS-71A.

North Indian Bend Wash Superfund Site

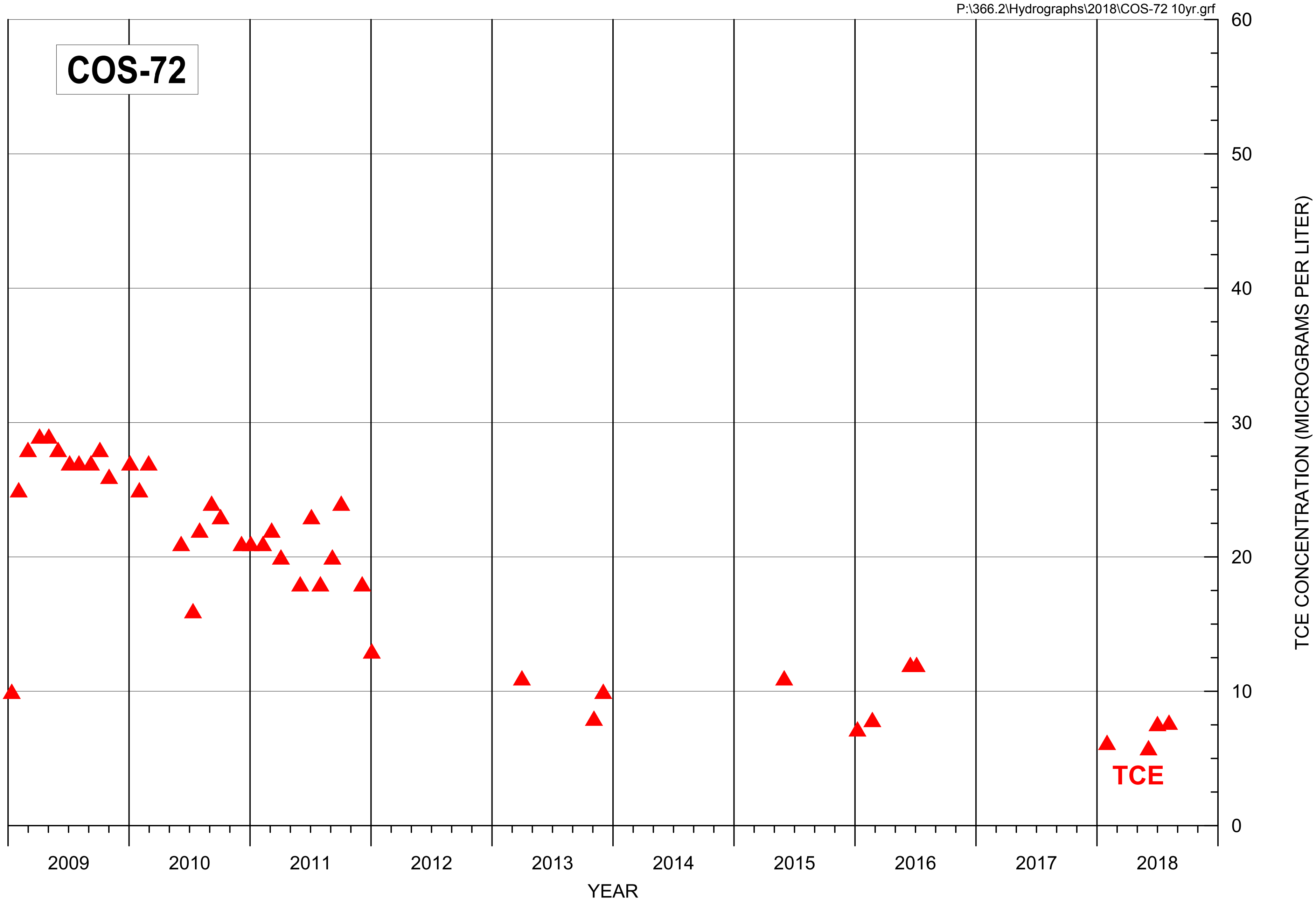


FIGURE C-6. TCE CONCENTRATIONS FOR EXTRACTION WELL COS-72

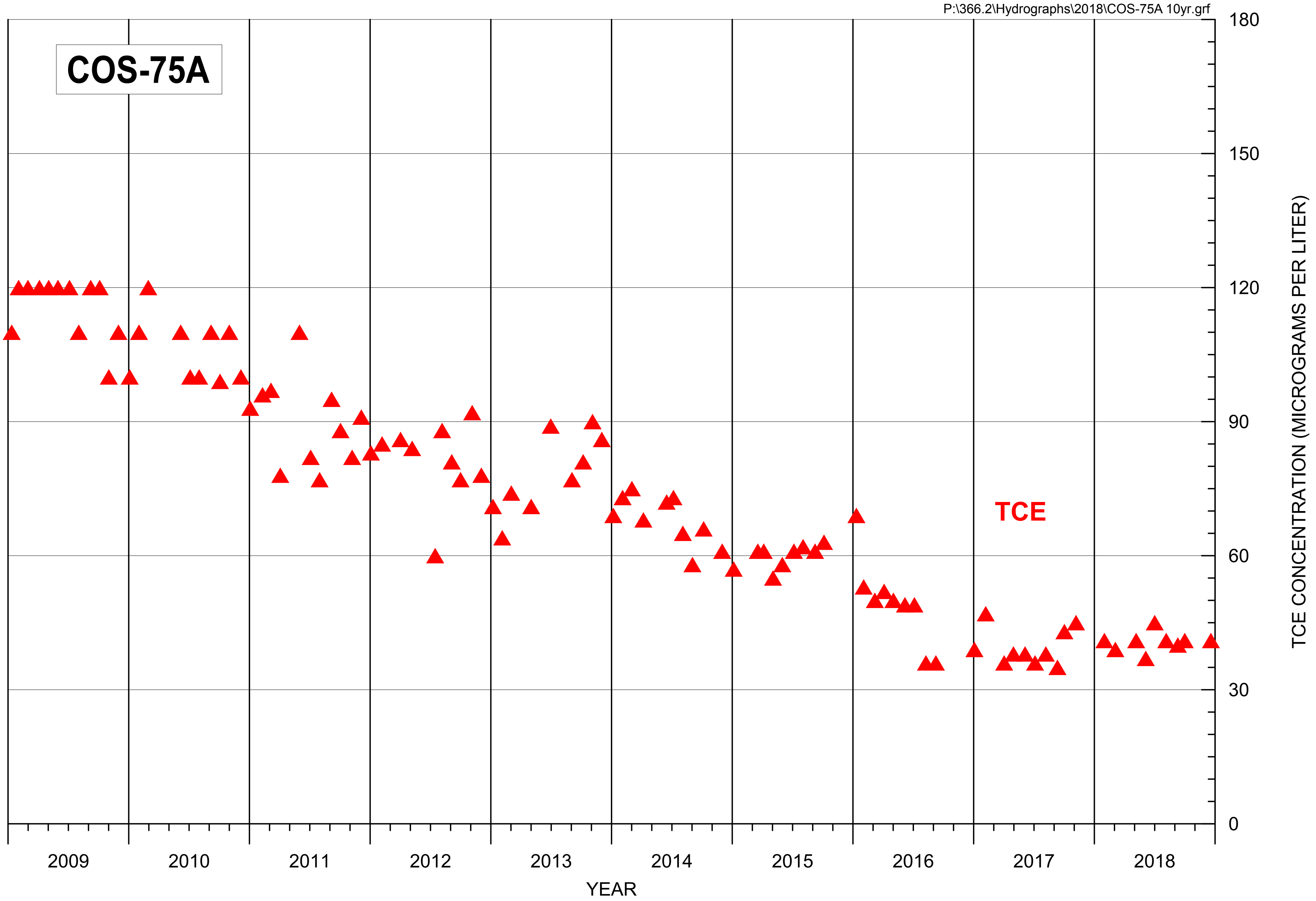


FIGURE C-7. TCE CONCENTRATIONS FOR EXTRACTION WELL COS-75A

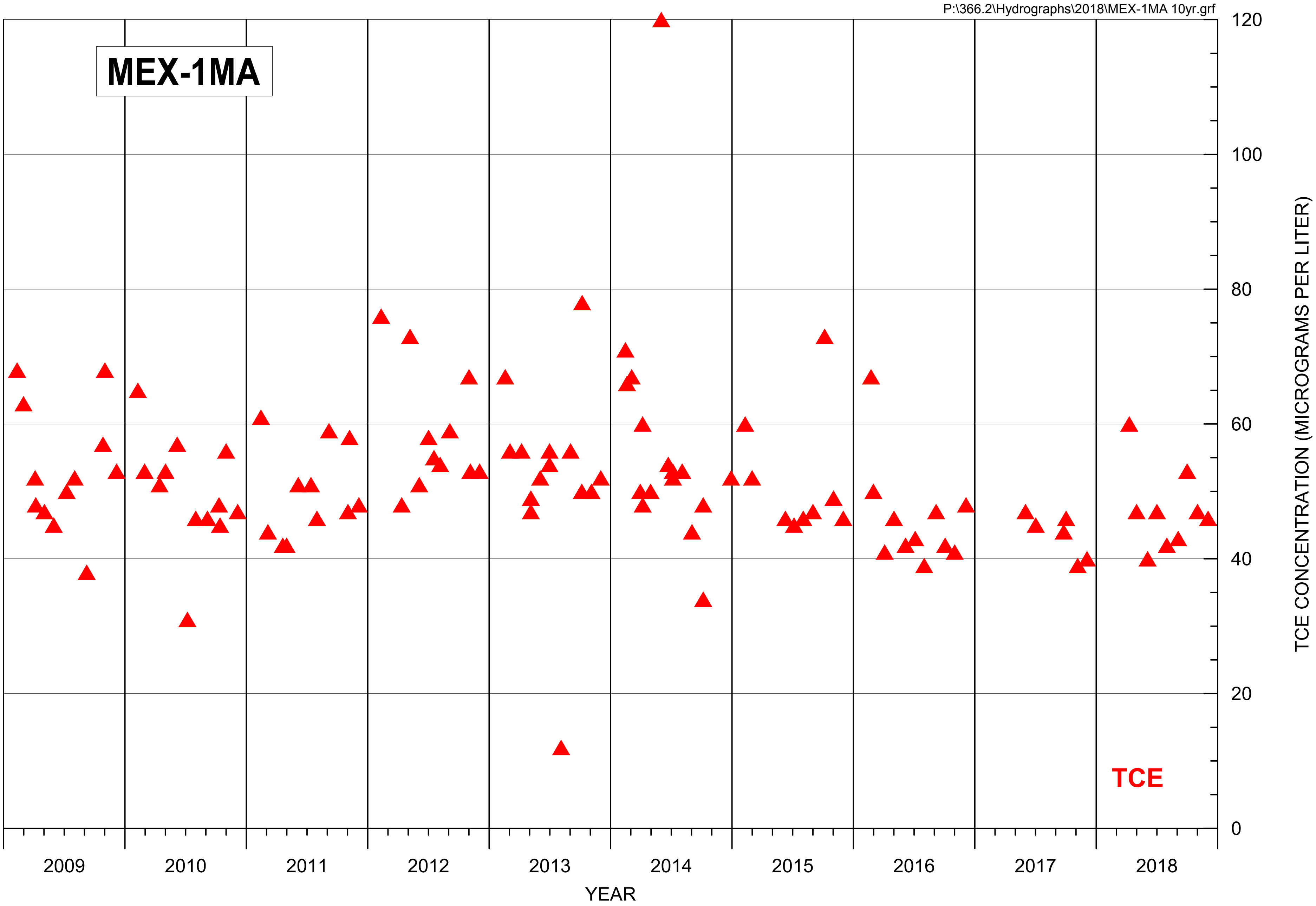


FIGURE C-8. TCE CONCENTRATIONS FOR EXTRACTION WELL MEX-1MA

P:\366.2\Hydrographs\2018\PCX-1 10yr.grf

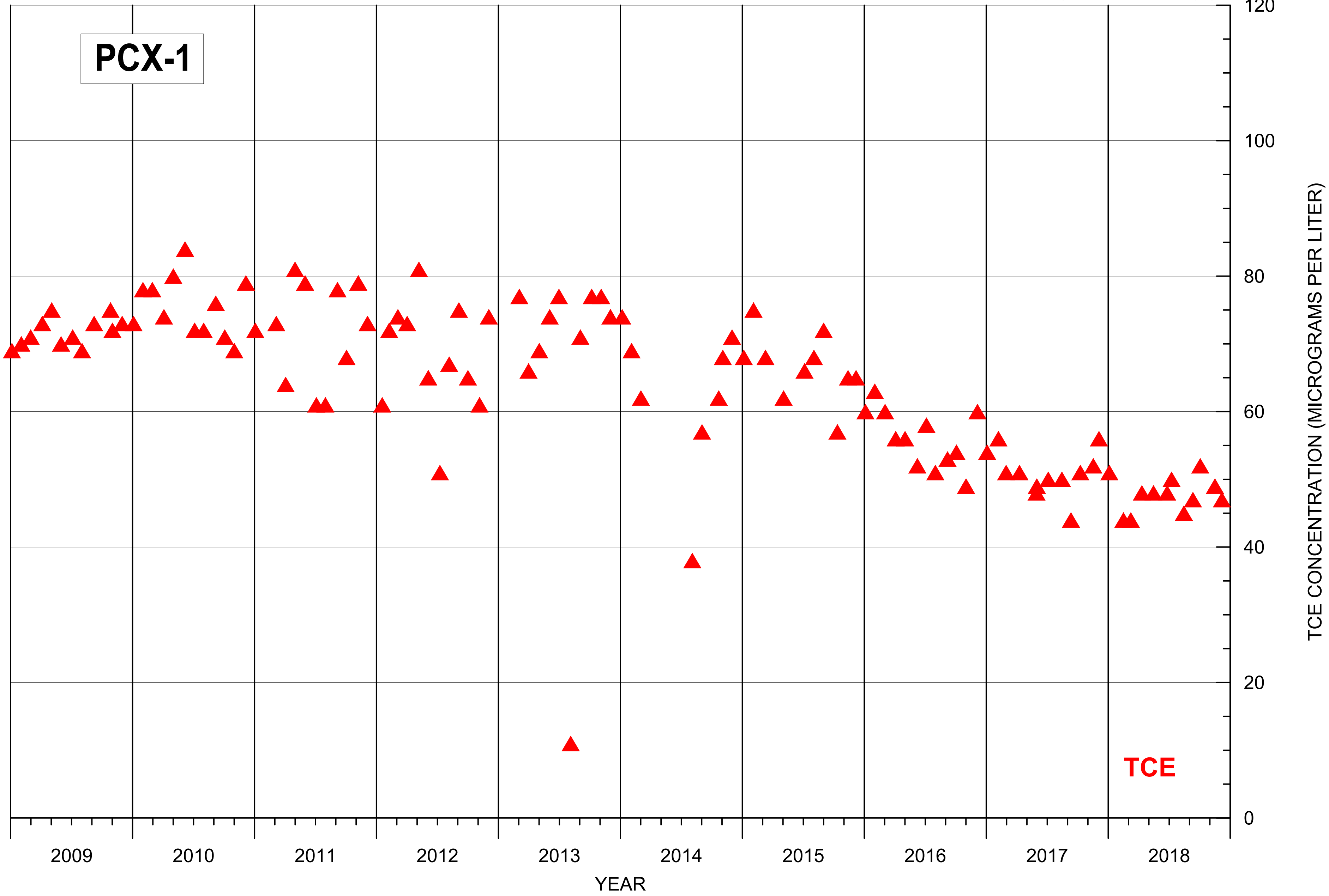


FIGURE C-9. TCE CONCENTRATIONS FOR EXTRACTION WELL PCX-1

North Indian Bend Wash Superfund Site

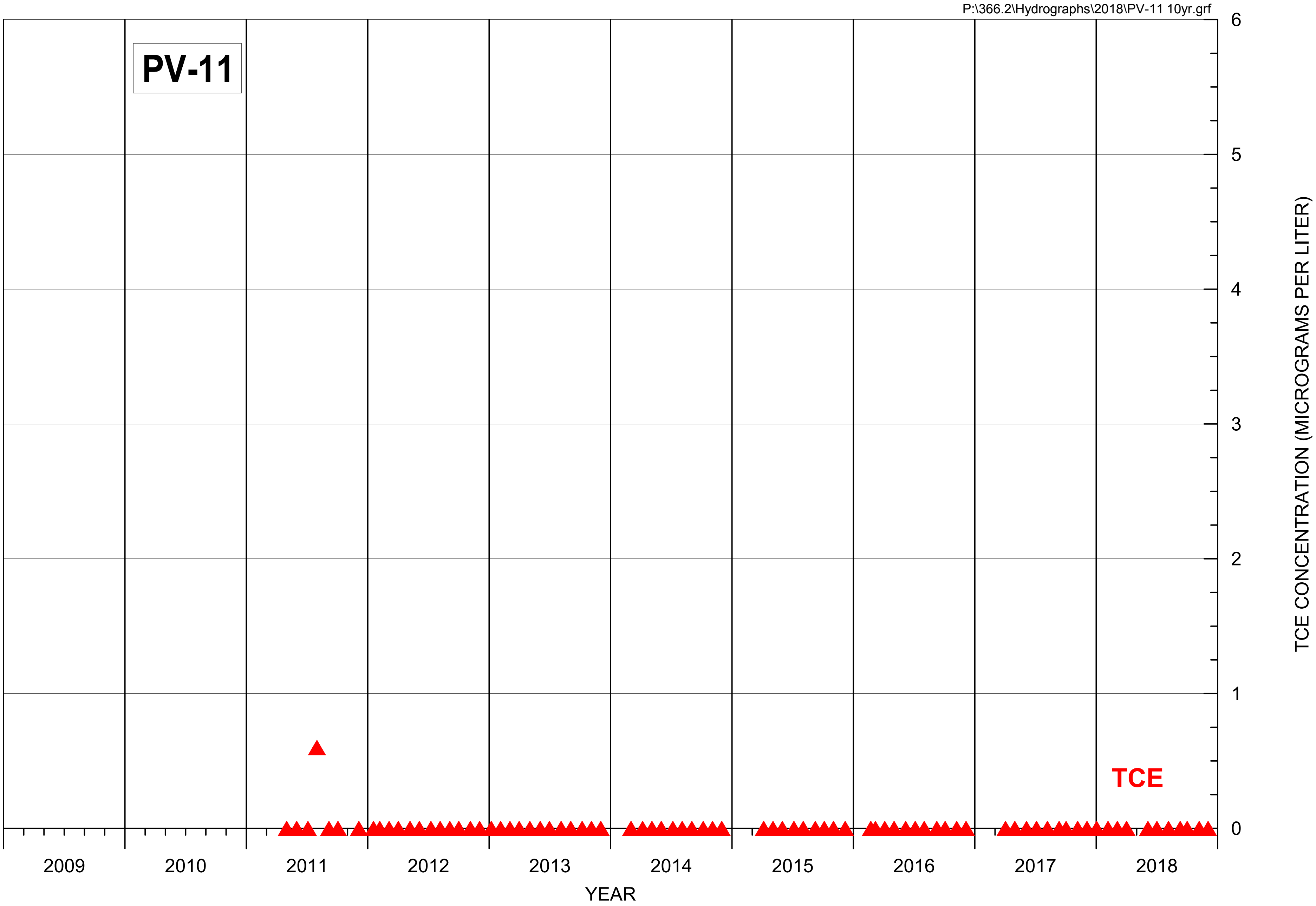


FIGURE C-10. TCE CONCENTRATIONS FOR PRODUCTION WELL PV-11

Note: Results shown as having a concentration of '0' represent samples
where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

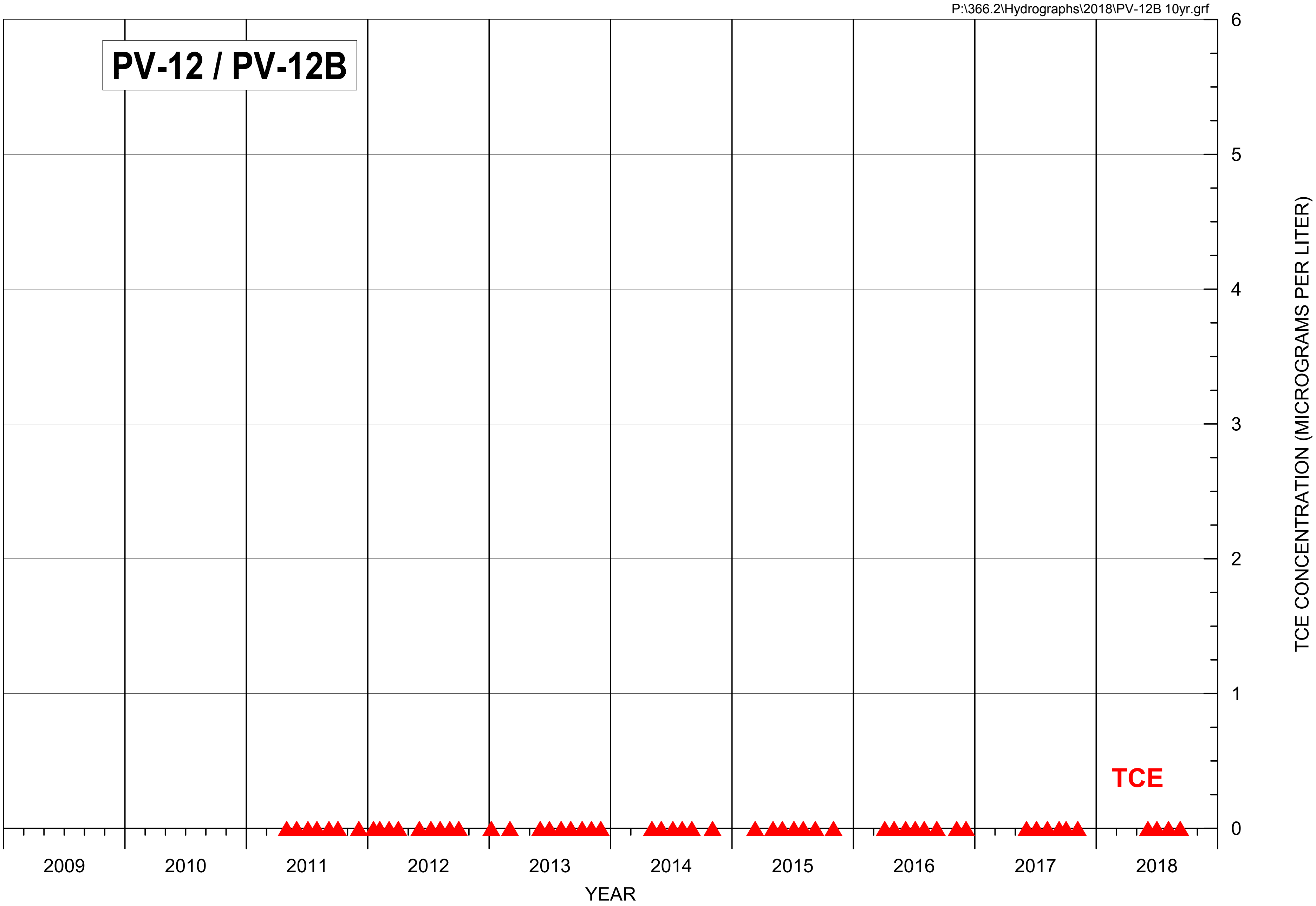


FIGURE C-11. TCE CONCENTRATIONS FOR PRODUCTION WELL PV-12B

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

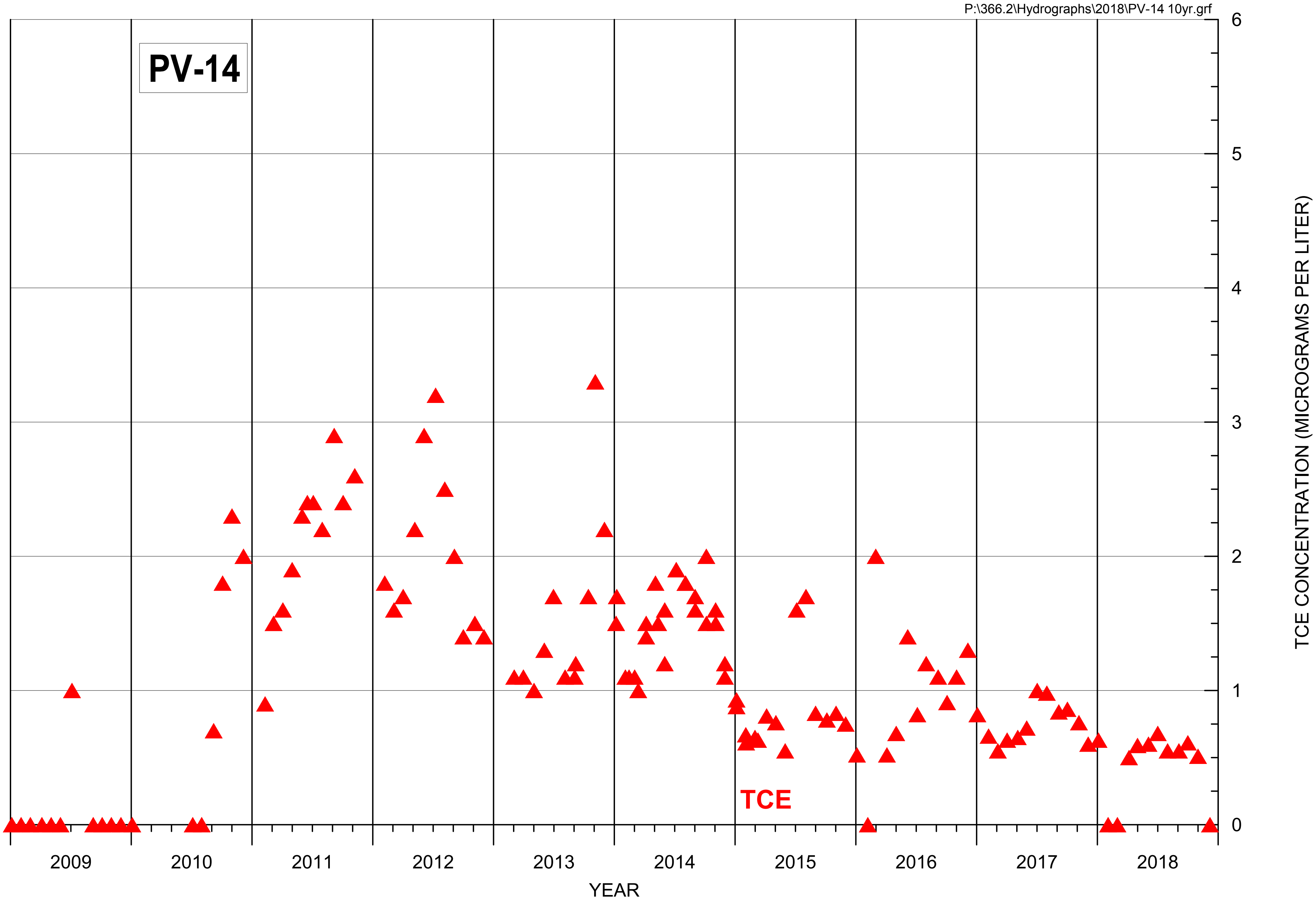


FIGURE C-12. TCE CONCENTRATIONS FOR PRODUCTION WELL PV-14

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

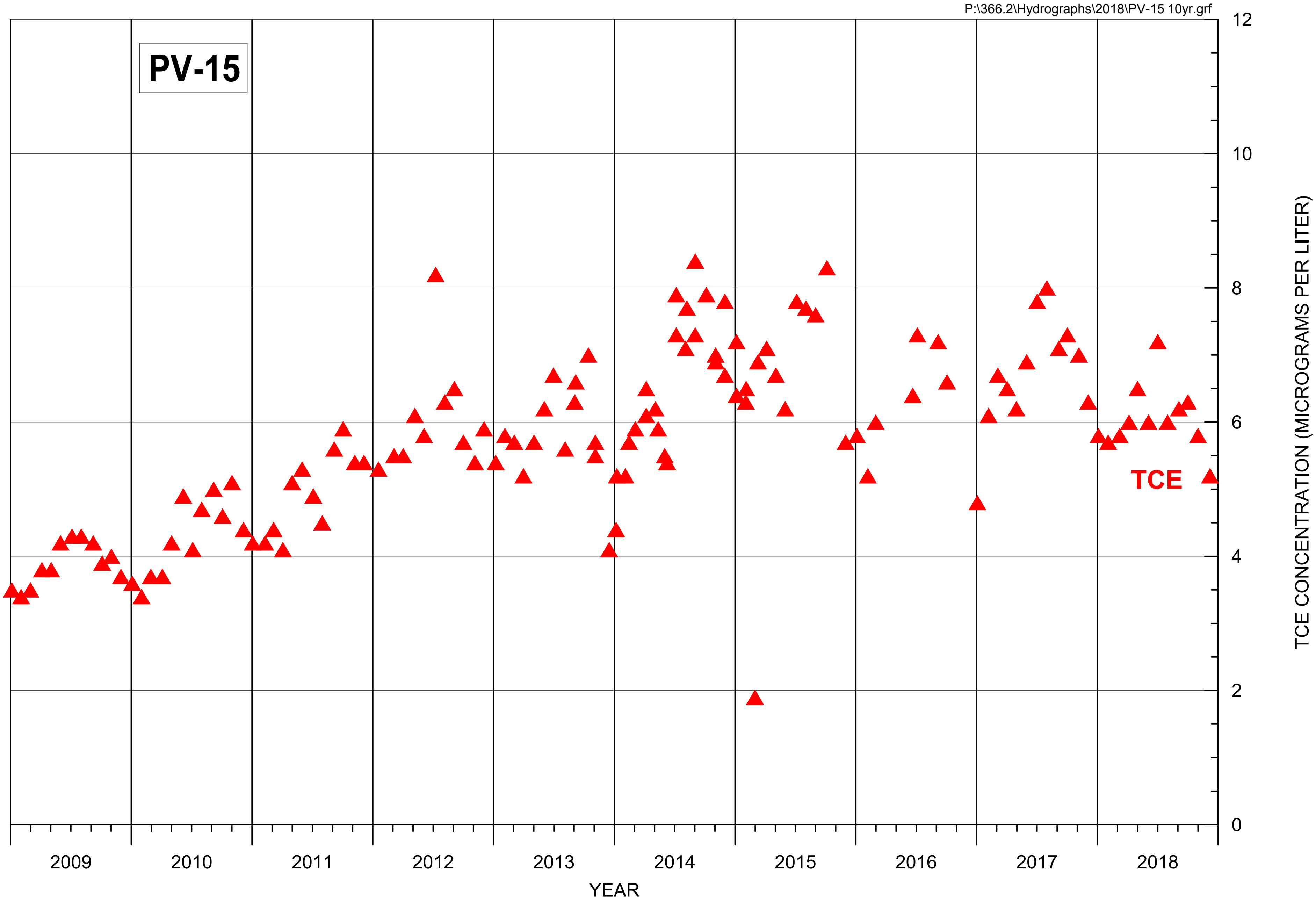


FIGURE C-13. TCE CONCENTRATIONS FOR PRODUCTION WELL PV-15

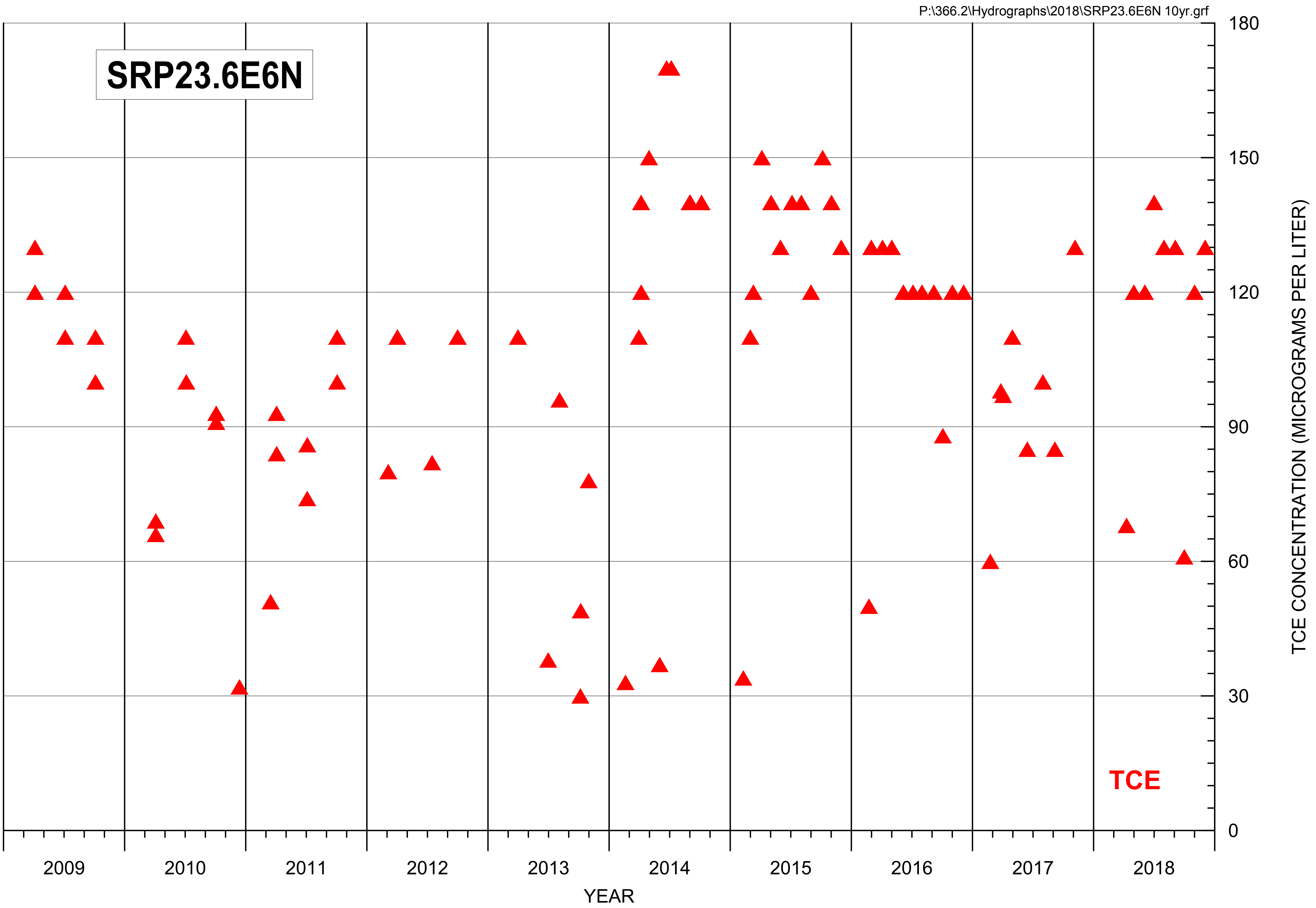


FIGURE C-14. TCE CONCENTRATIONS FOR EXTRACTION WELL SRP23.6E6N

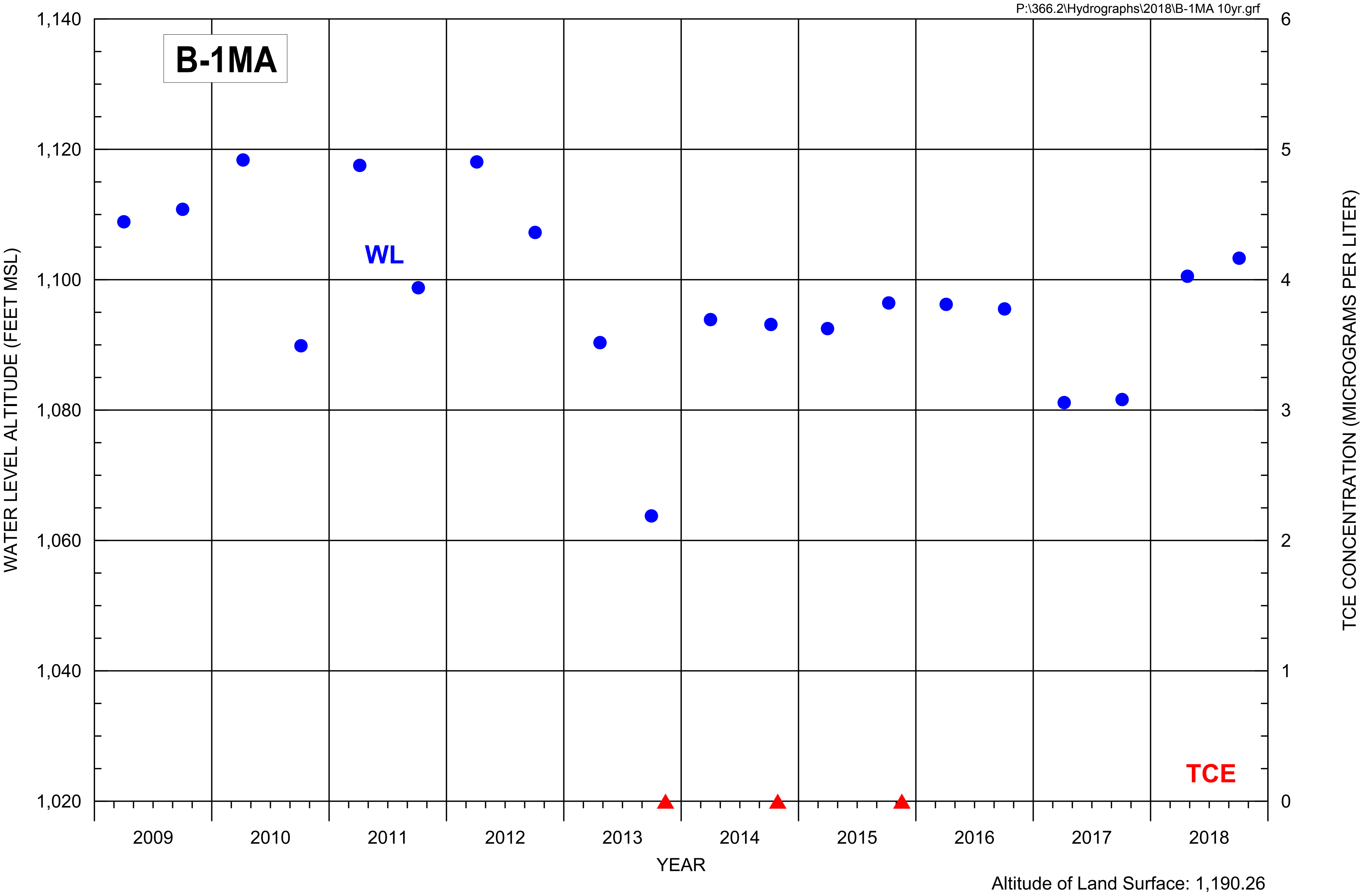
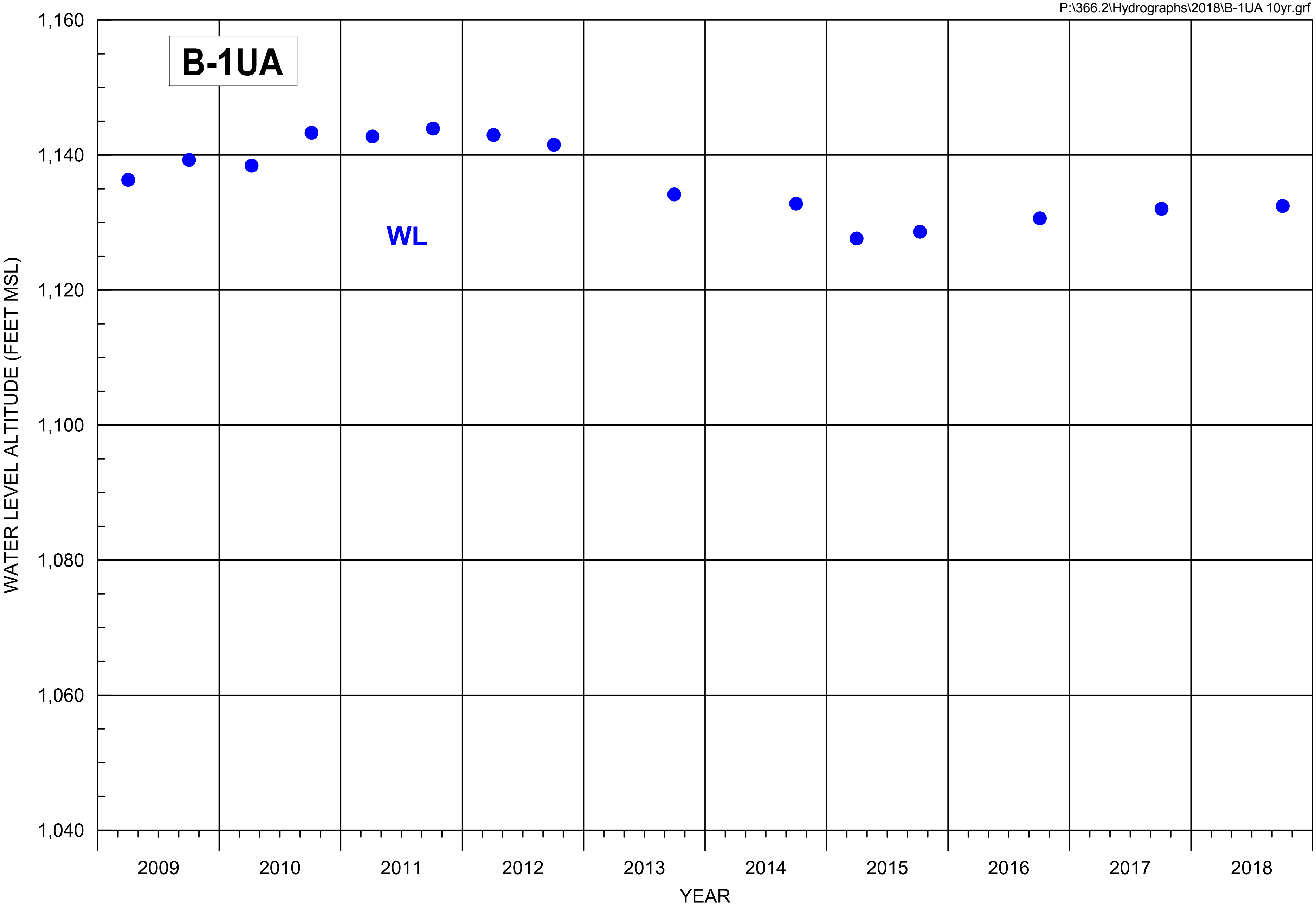


FIGURE C-15. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL B-1MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,190.32

FIGURE C-16. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL B-1UA

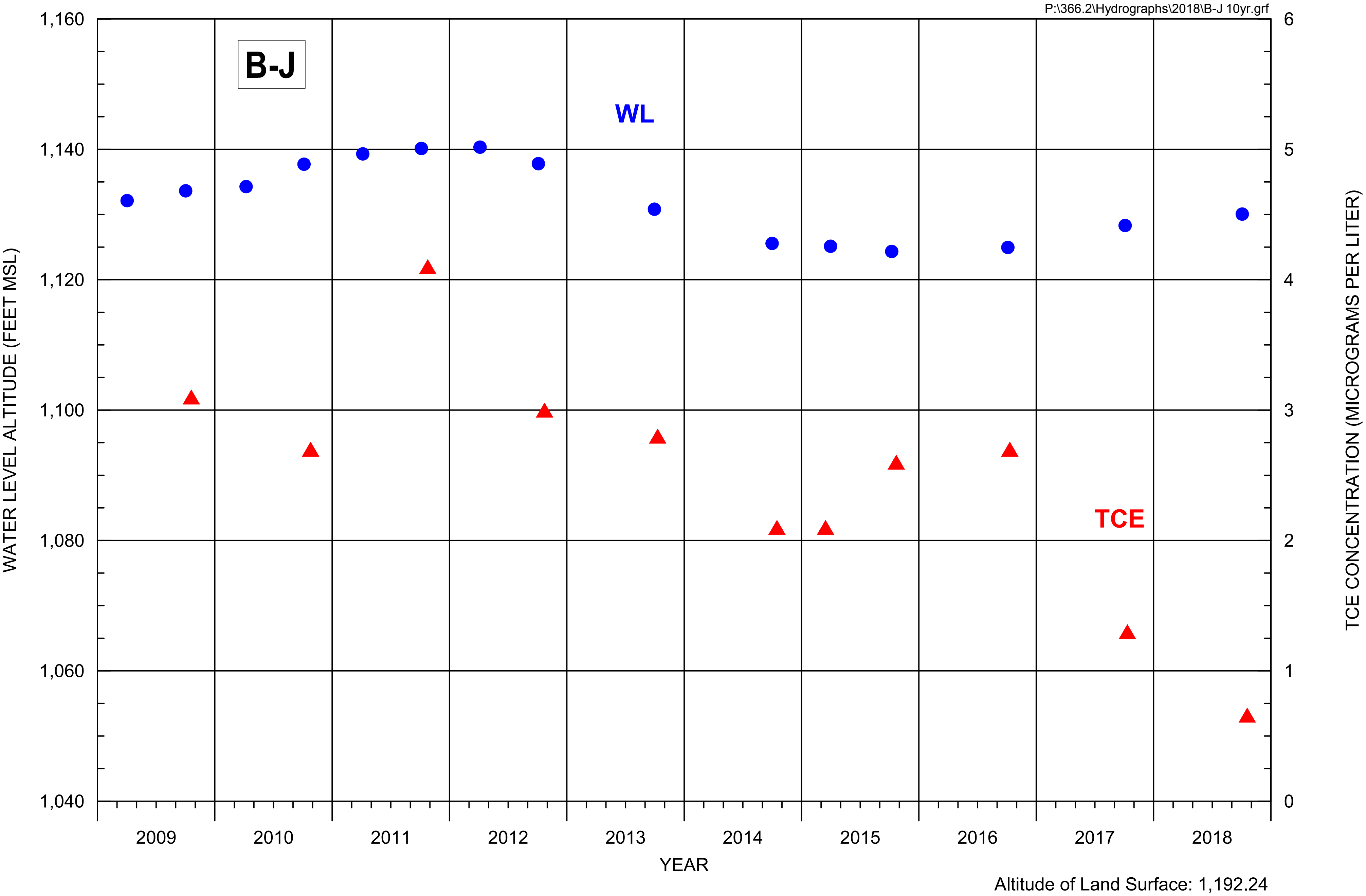


FIGURE C-17. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL B-J

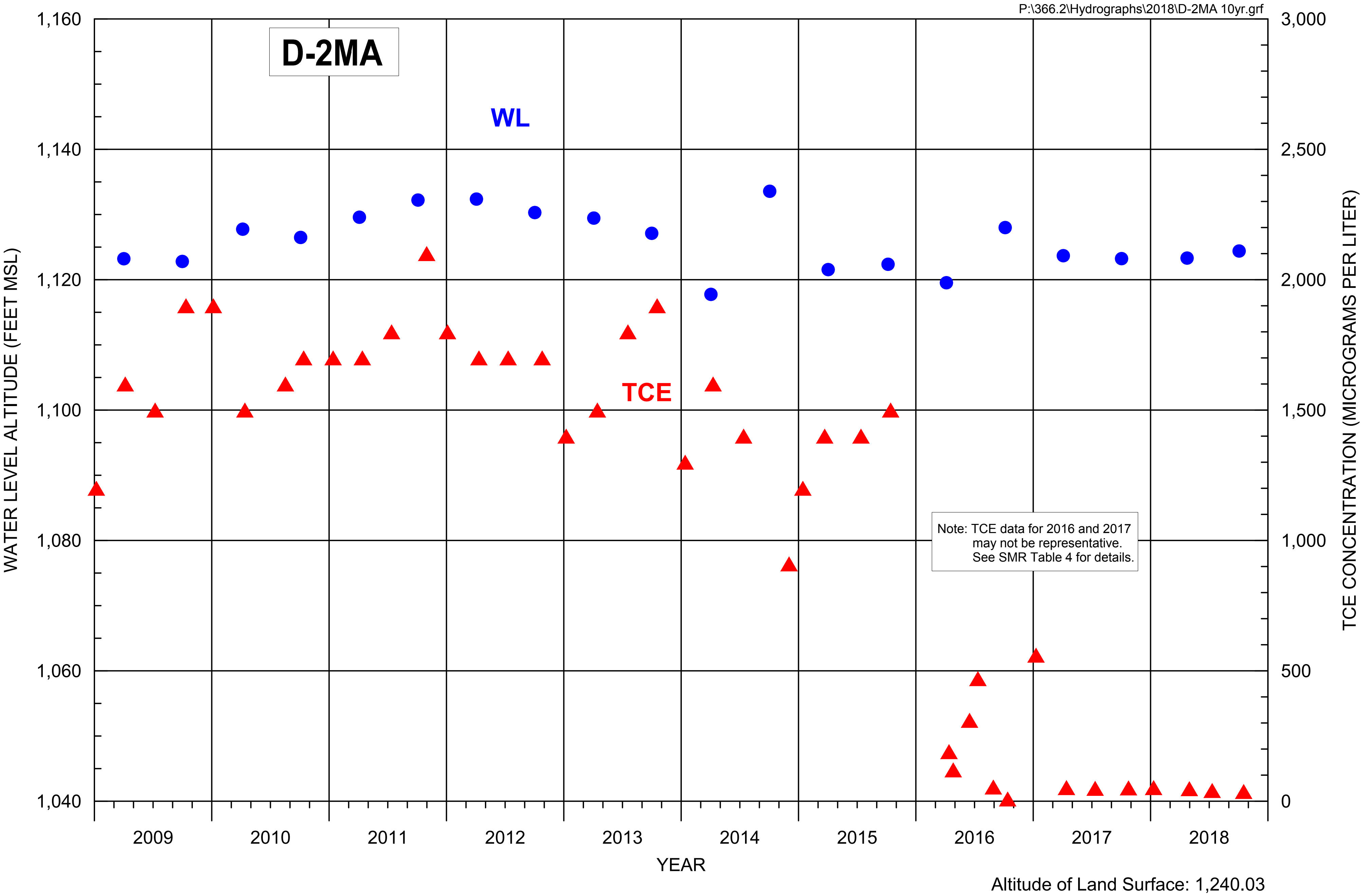


FIGURE C-18. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL D-2MA

North Indian Bend Wash Superfund Site

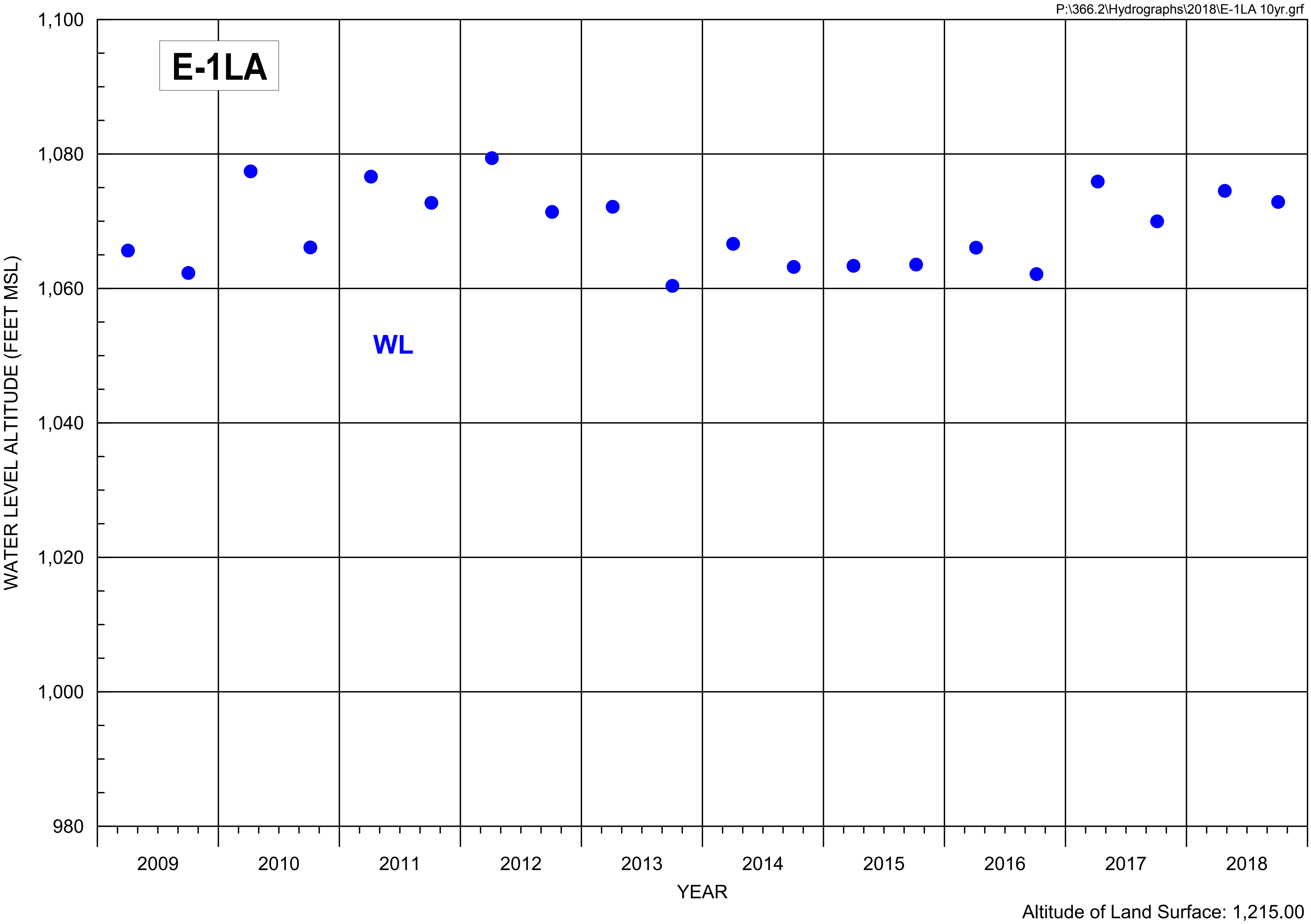


FIGURE C-19. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-1LA

North Indian Bend Wash Superfund Site

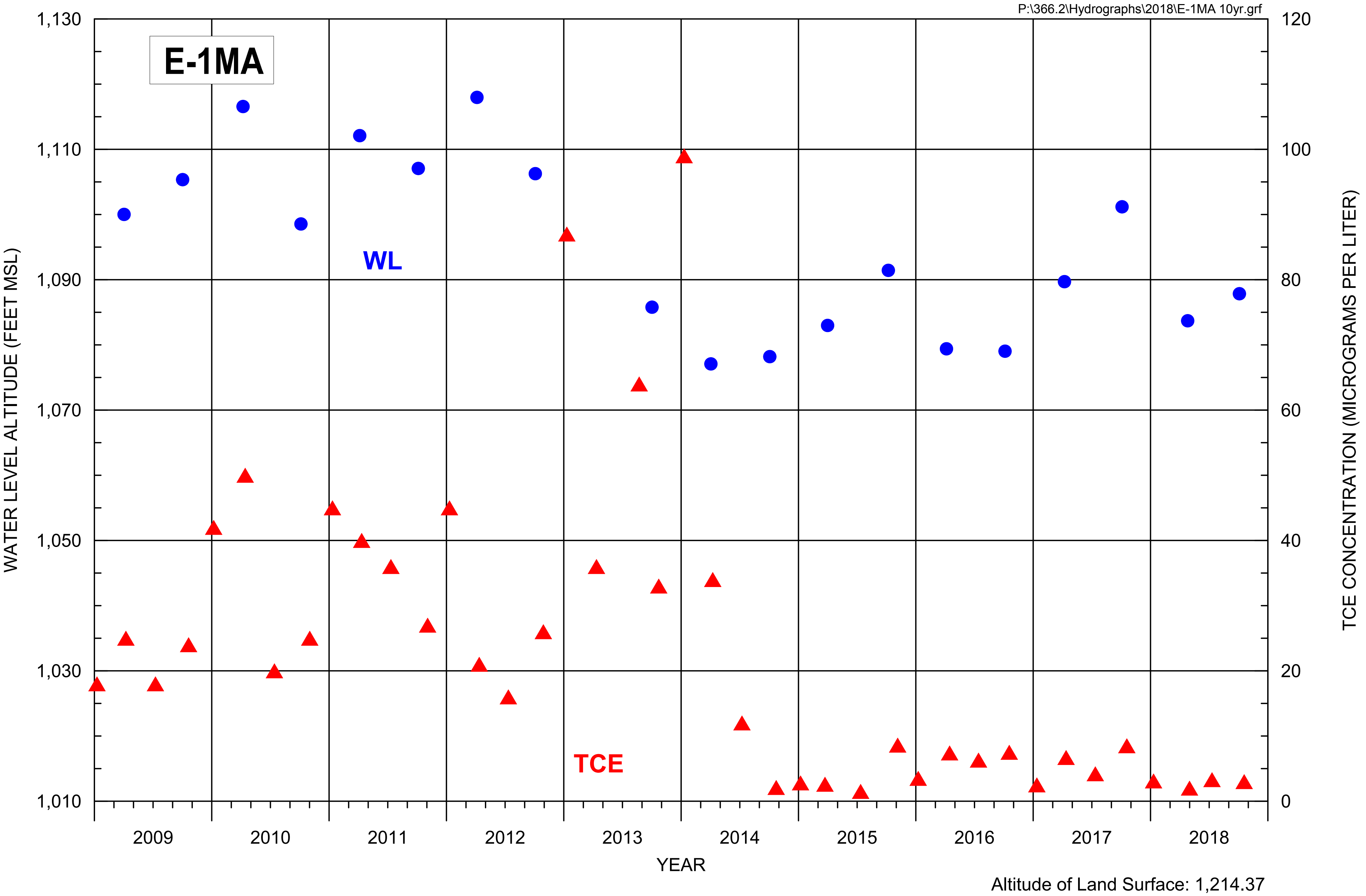


FIGURE C-20. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-1MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

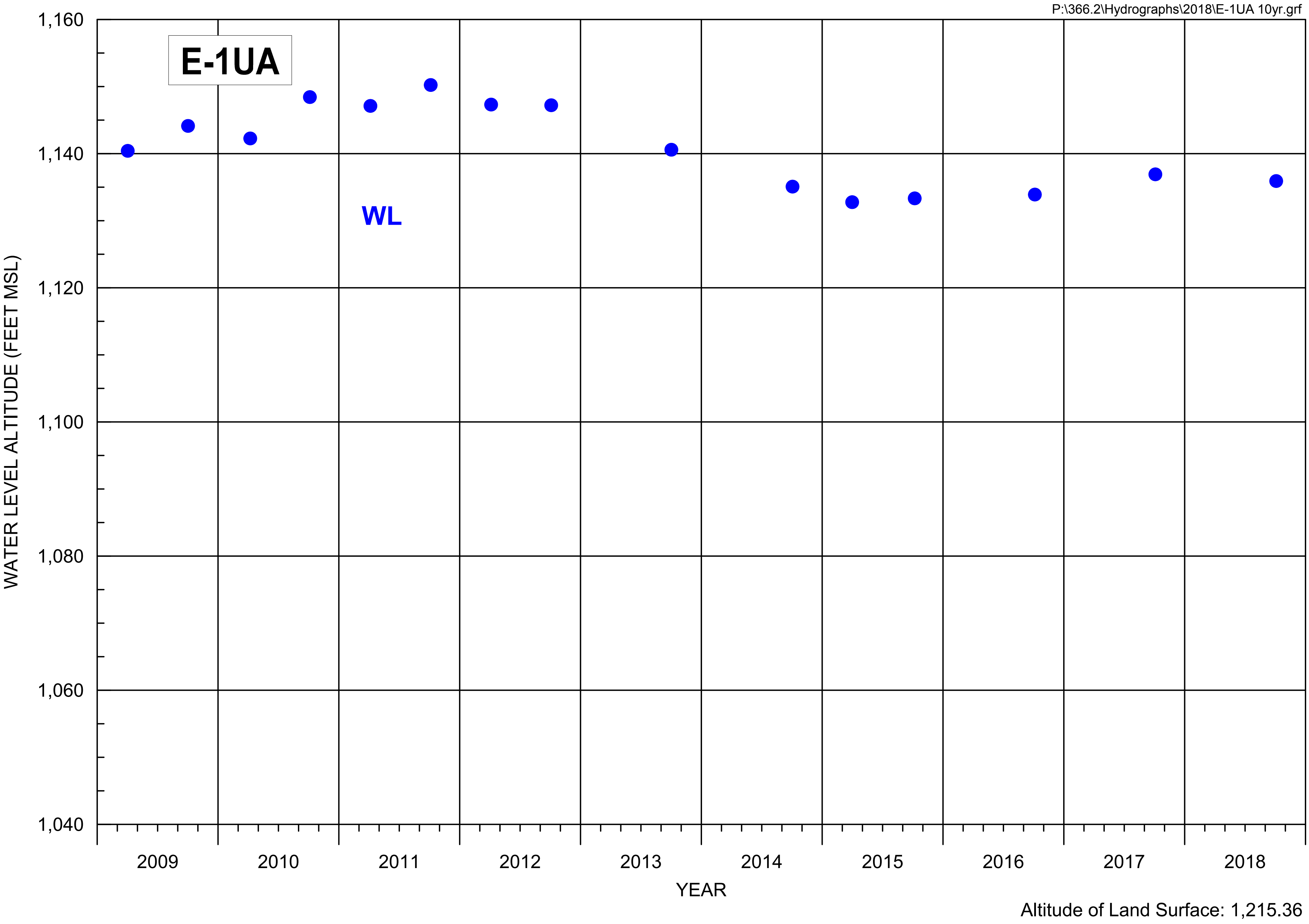
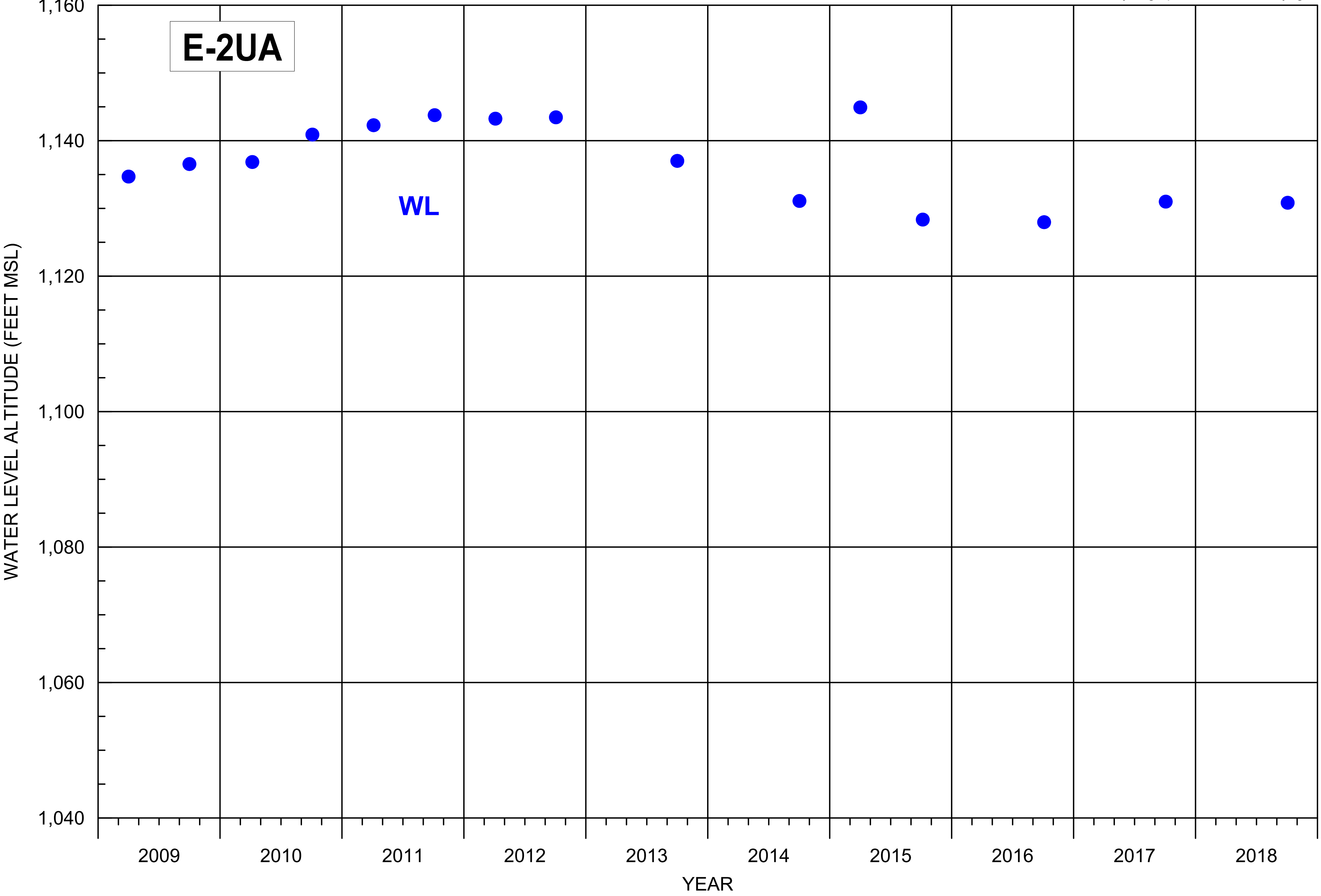


FIGURE C-21. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-1UA

P:\366.2\Hydrographs\2018\E-2UA 10yr.grf



Altitude of Land Surface: 1,225.03

FIGURE C-22. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-2UA

North Indian Bend Wash Superfund Site

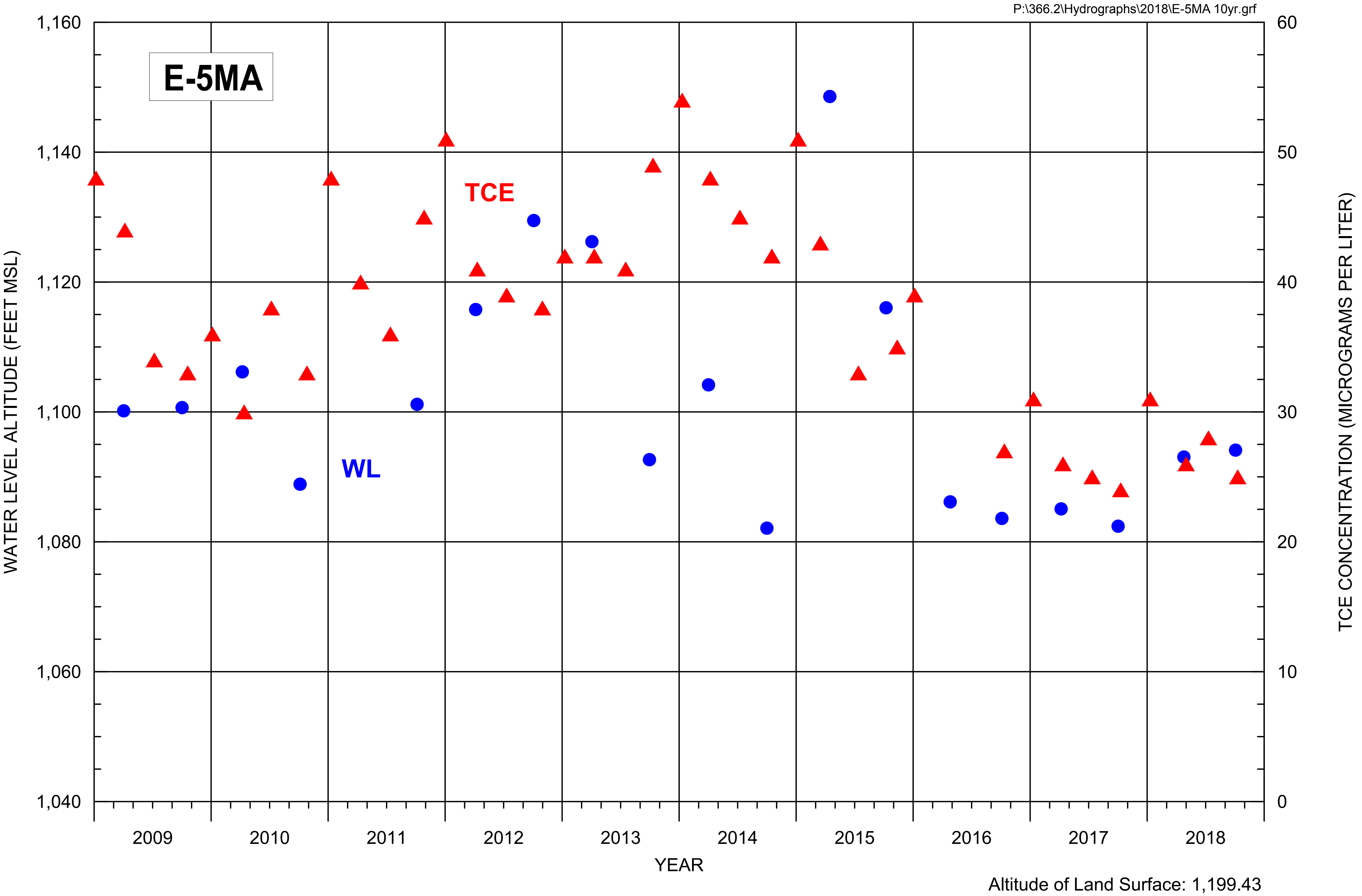
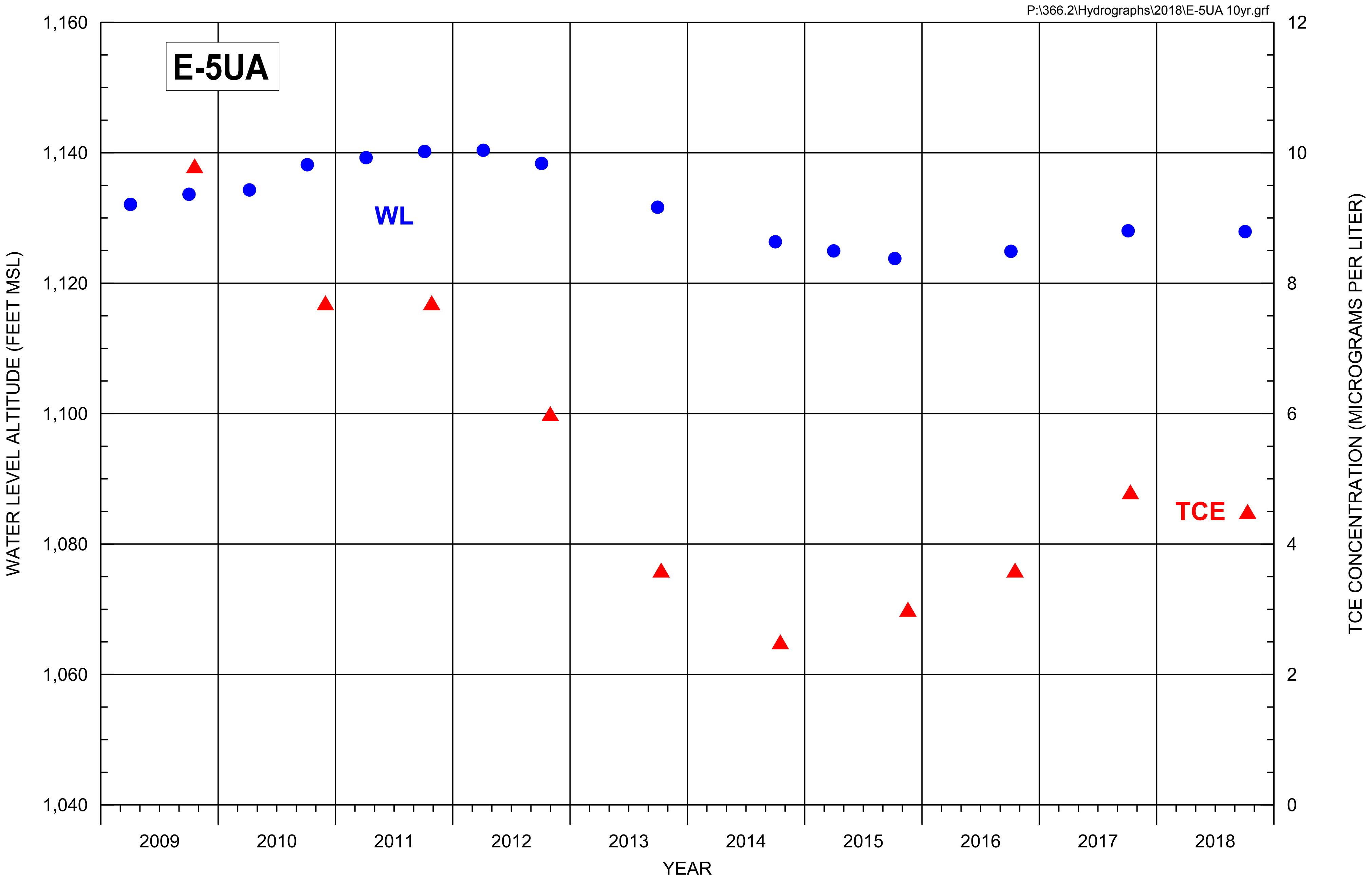


FIGURE C-23. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-5MA



Altitude of Land Surface: 1,199.56

FIGURE C-24. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-5UA

North Indian Bend Wash Superfund Site

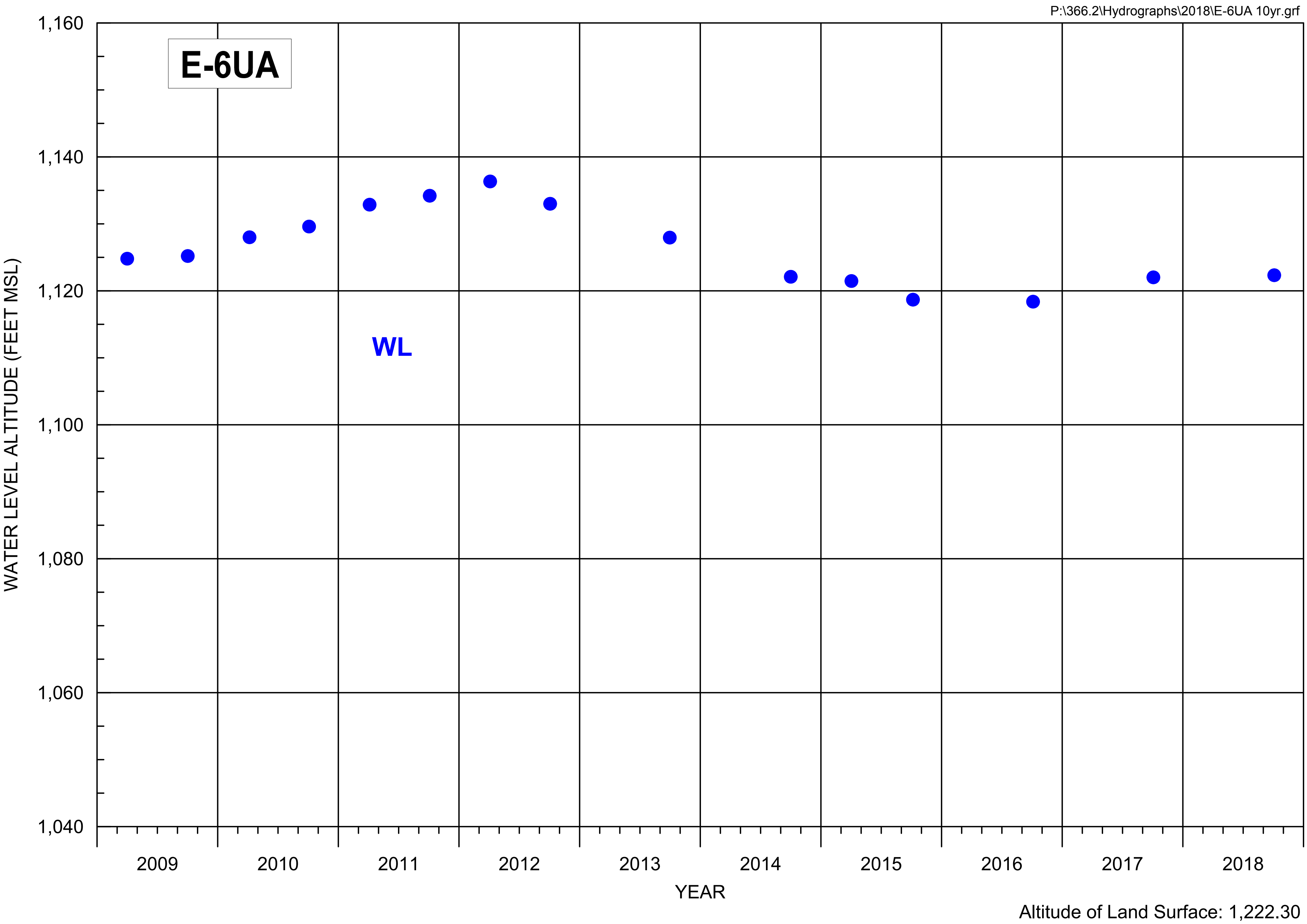
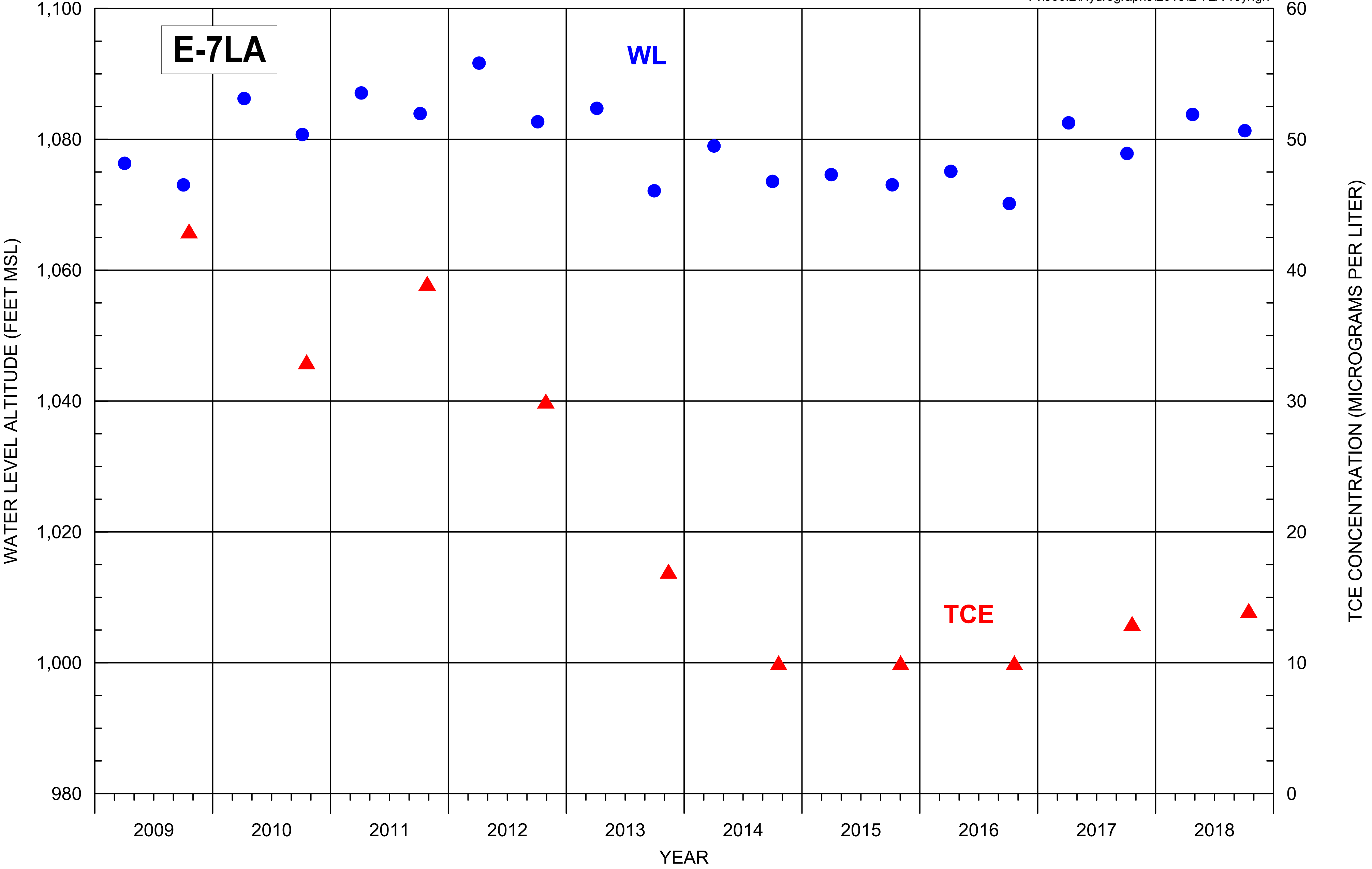


FIGURE C-25. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-6UA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,197.79

FIGURE C-26. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-7LA

North Indian Bend Wash Superfund Site

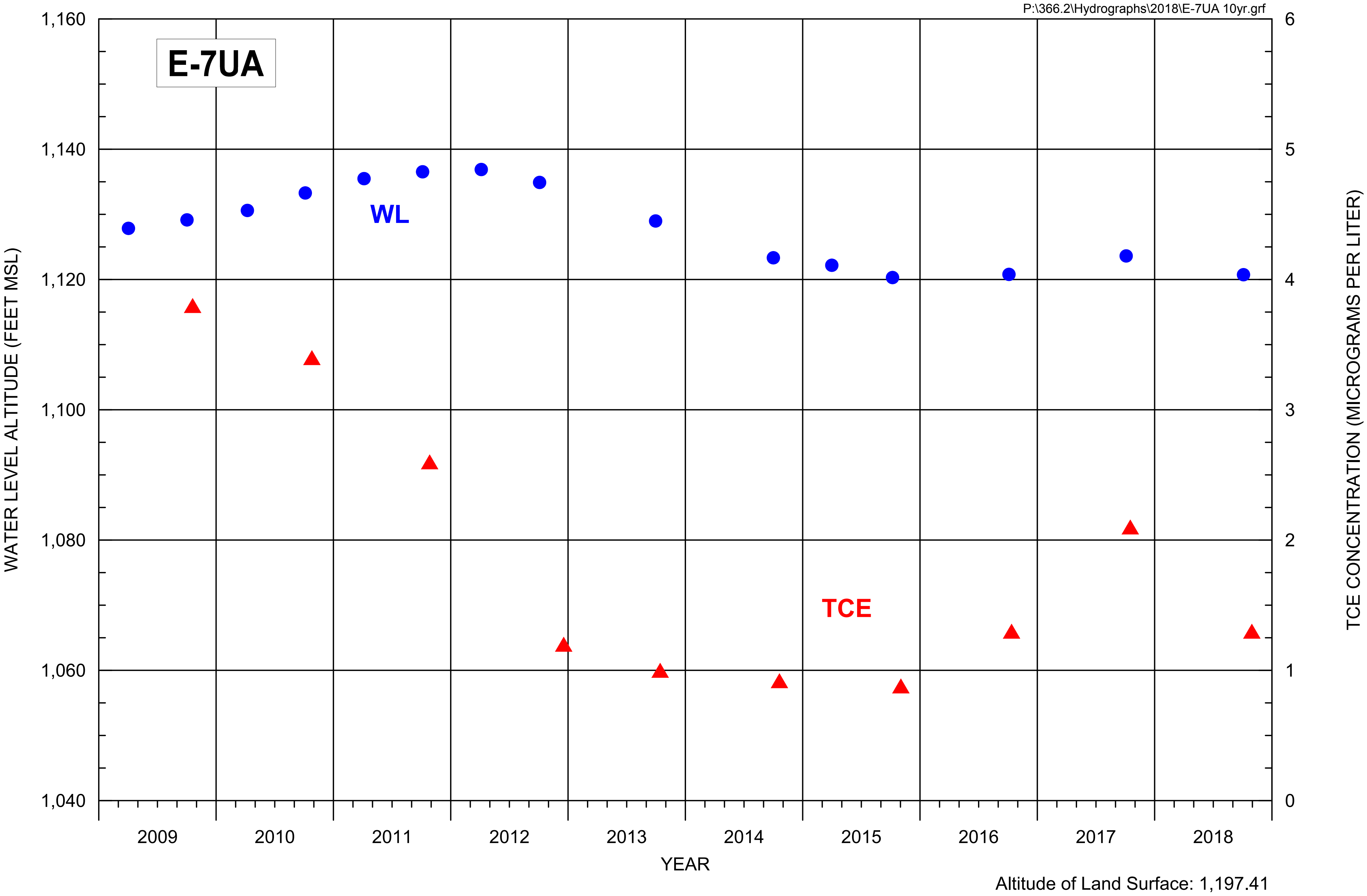


FIGURE C-27. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-7UA

North Indian Bend Wash Superfund Site

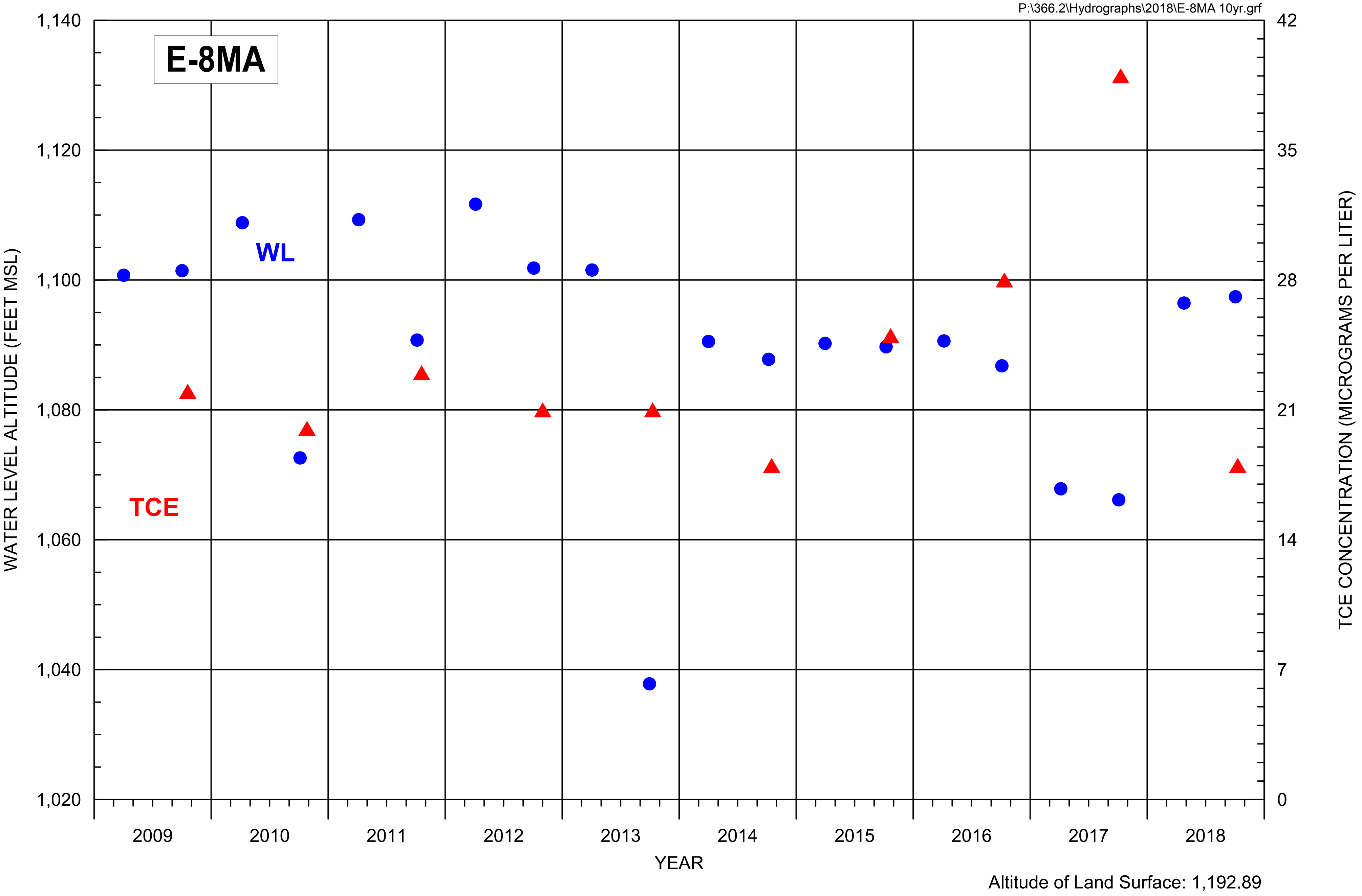
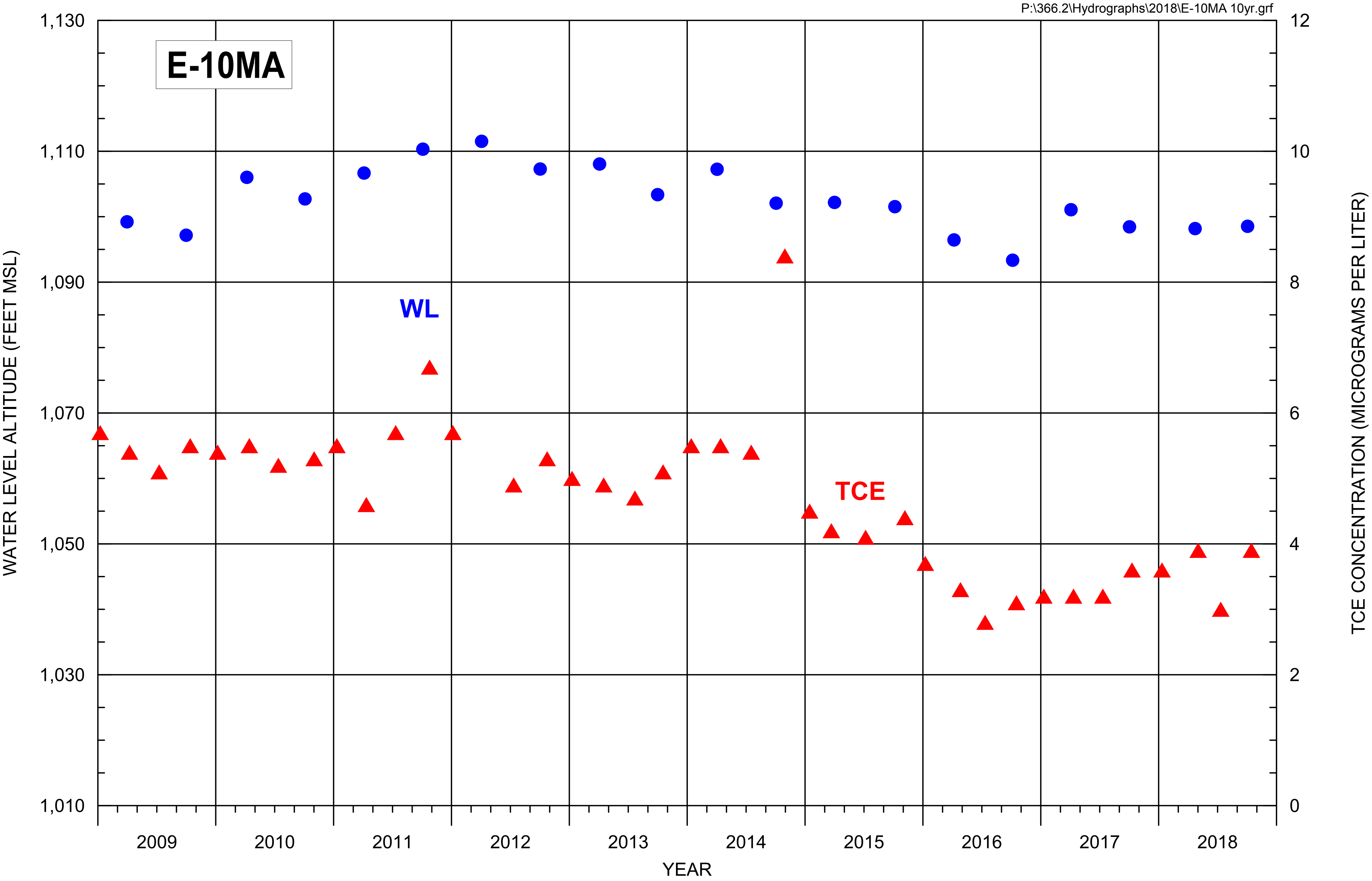


FIGURE C-28. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-8MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,243.86

FIGURE C-29. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-10MA

North Indian Bend Wash Superfund Site

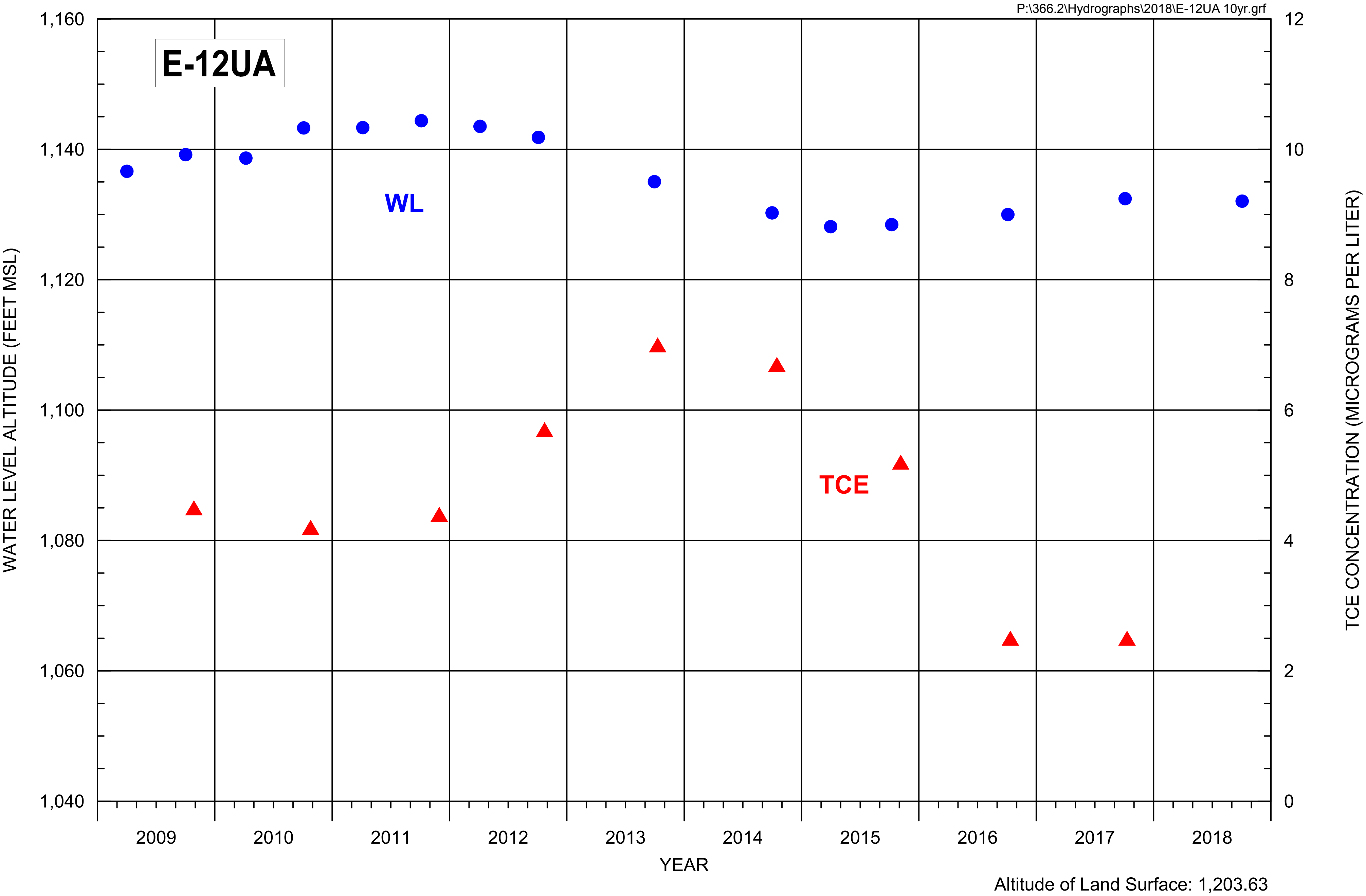


FIGURE C-30. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-12UA

North Indian Bend Wash Superfund Site

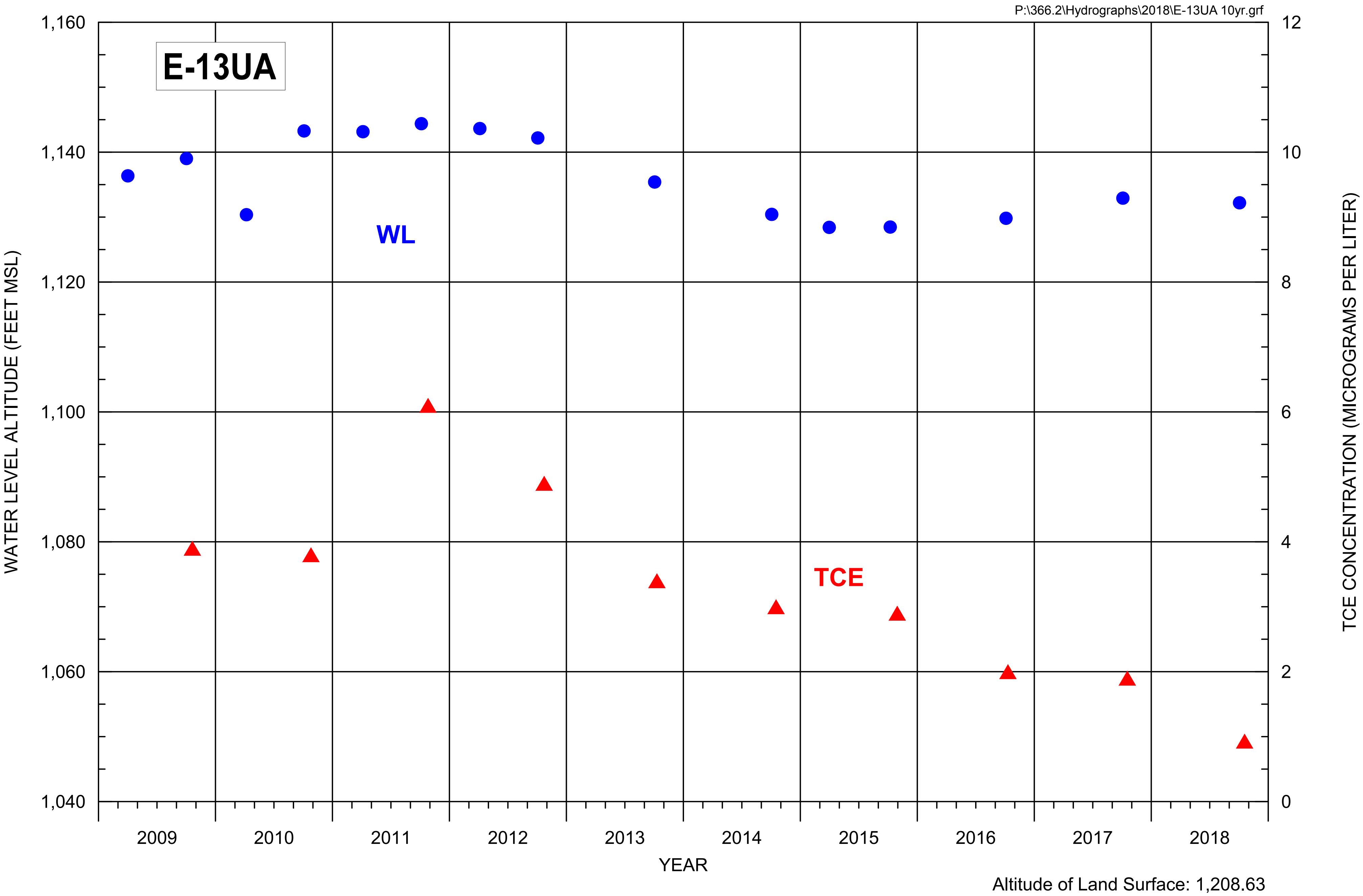
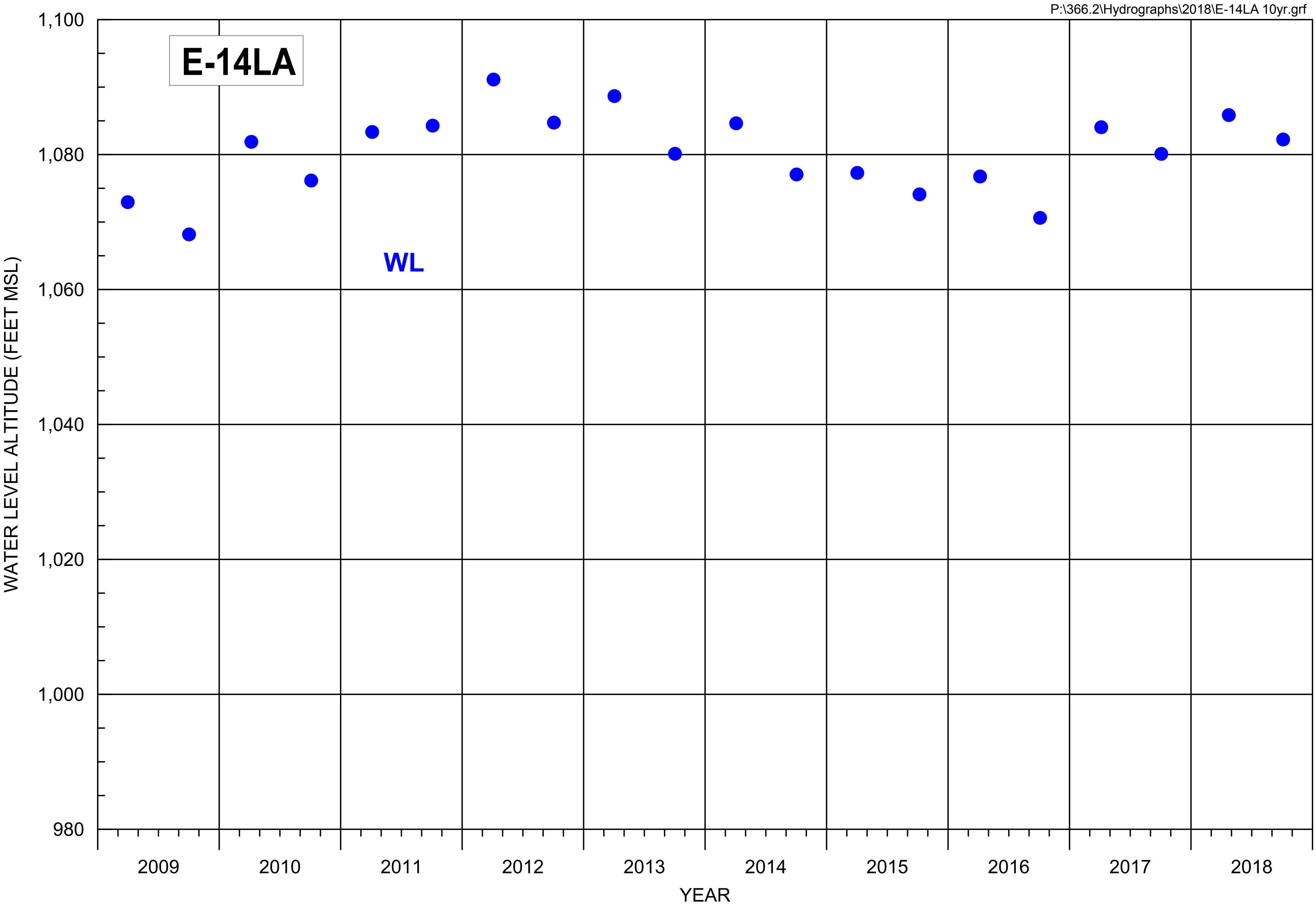


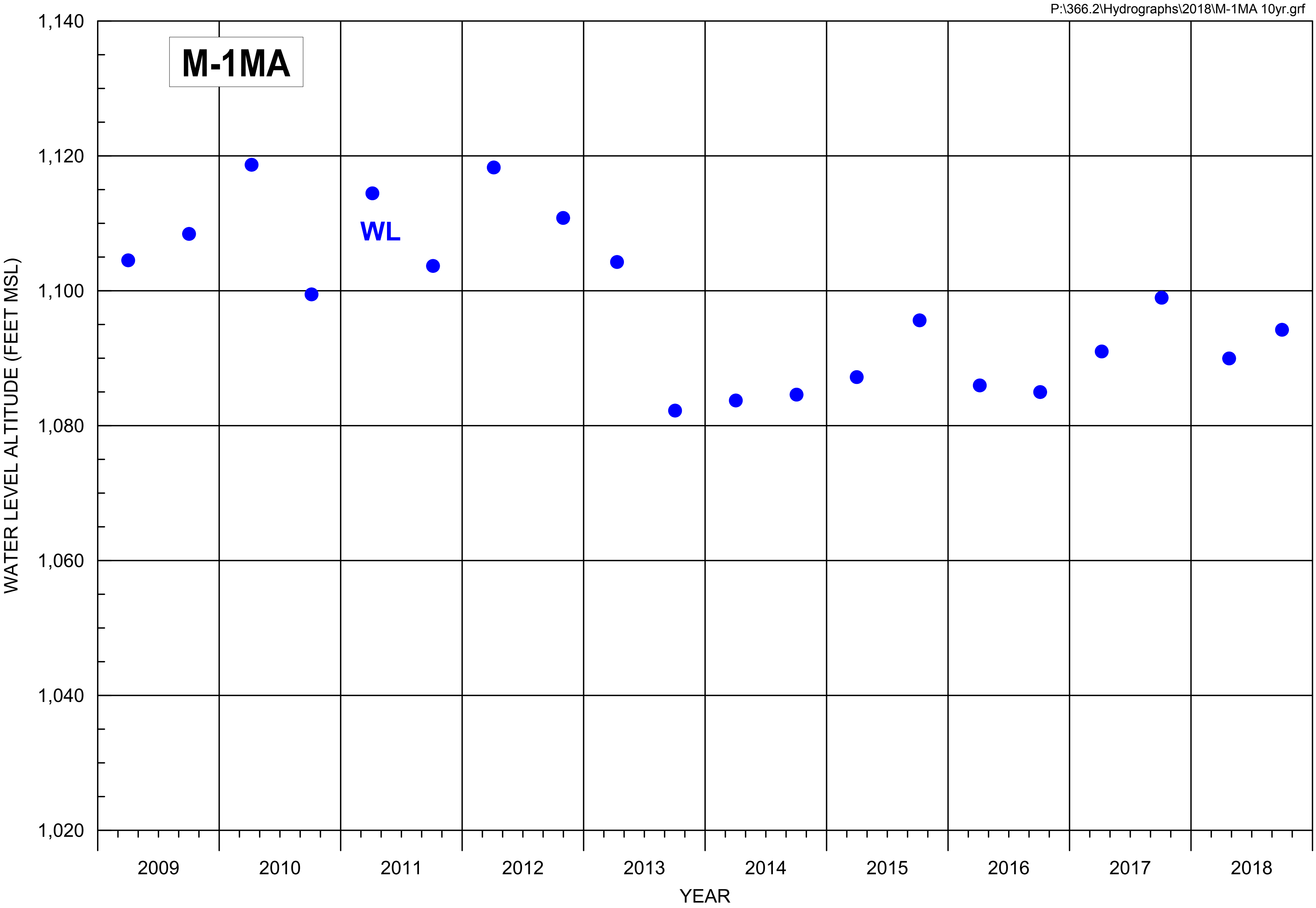
FIGURE C-31. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-13UA



Altitude of Land Surface: 1,253.95

FIGURE C-32. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-14LA

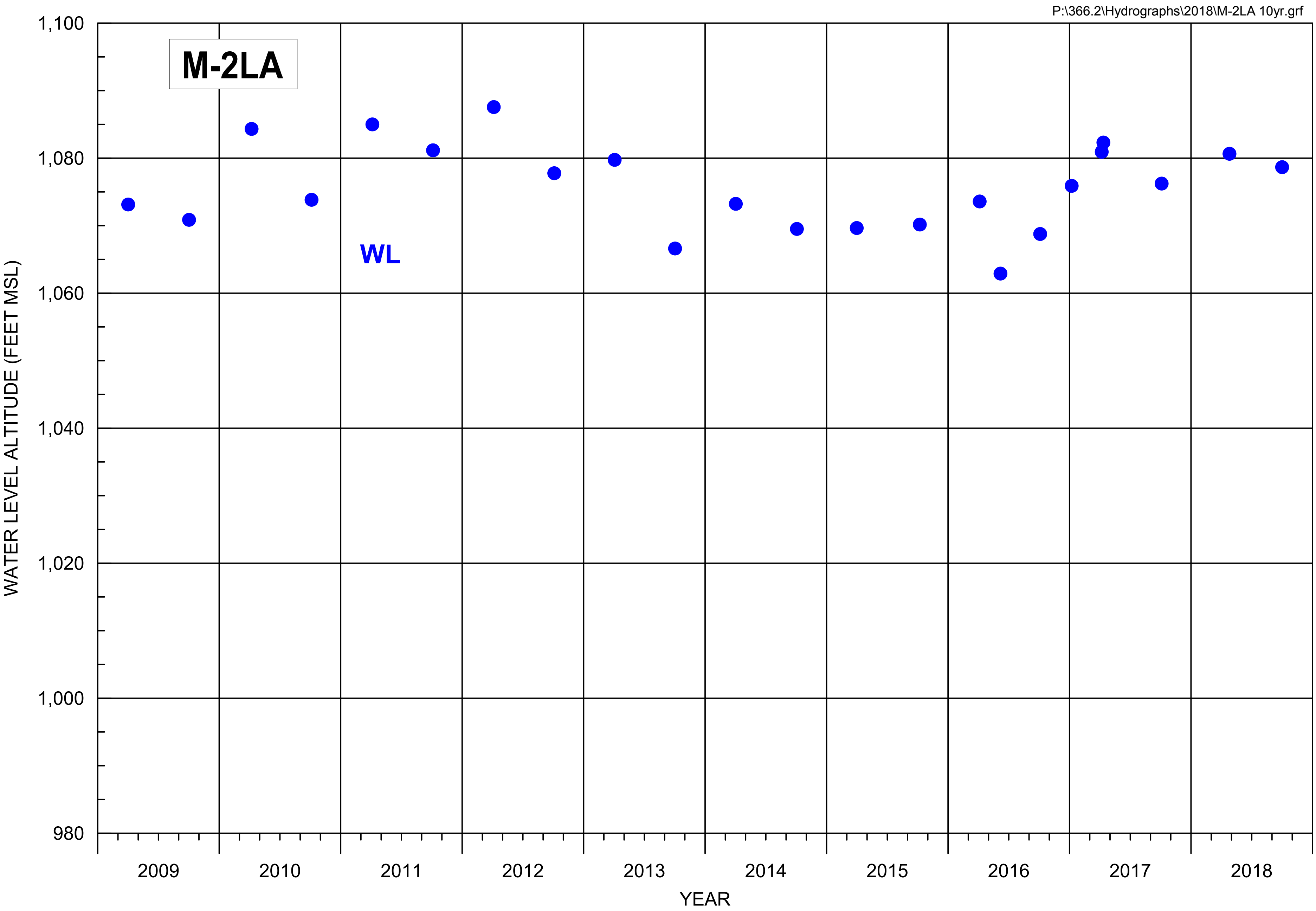
North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,210.89

FIGURE C-33. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-1MA

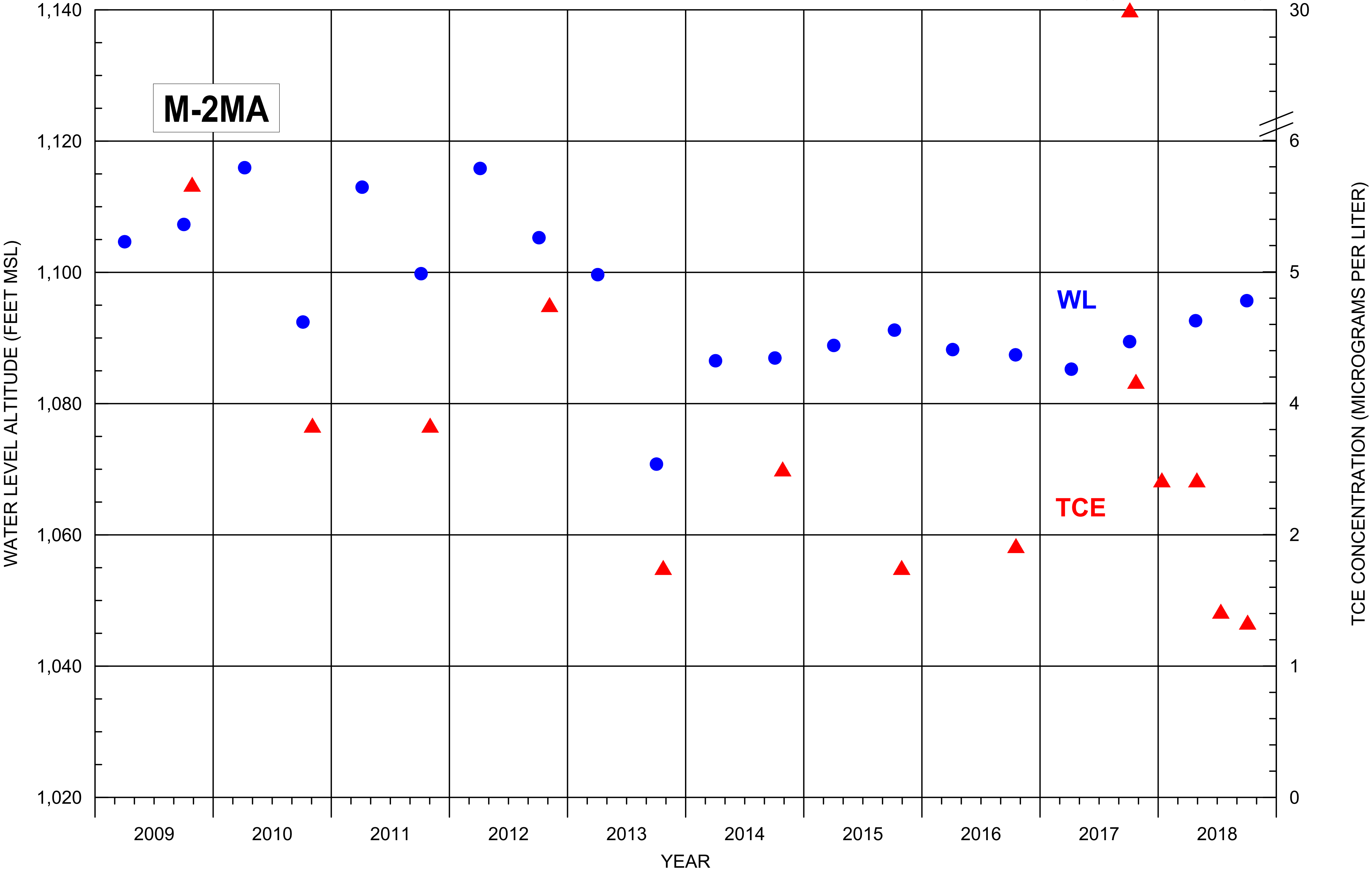
North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,210.23

FIGURE C-34. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-2LA

P:\366.2\Hydrographs\2018\M-2MA 10yr.grf



Altitude of Land Surface: 1,210.06

FIGURE C-35. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-2MA

North Indian Bend Wash Superfund Site

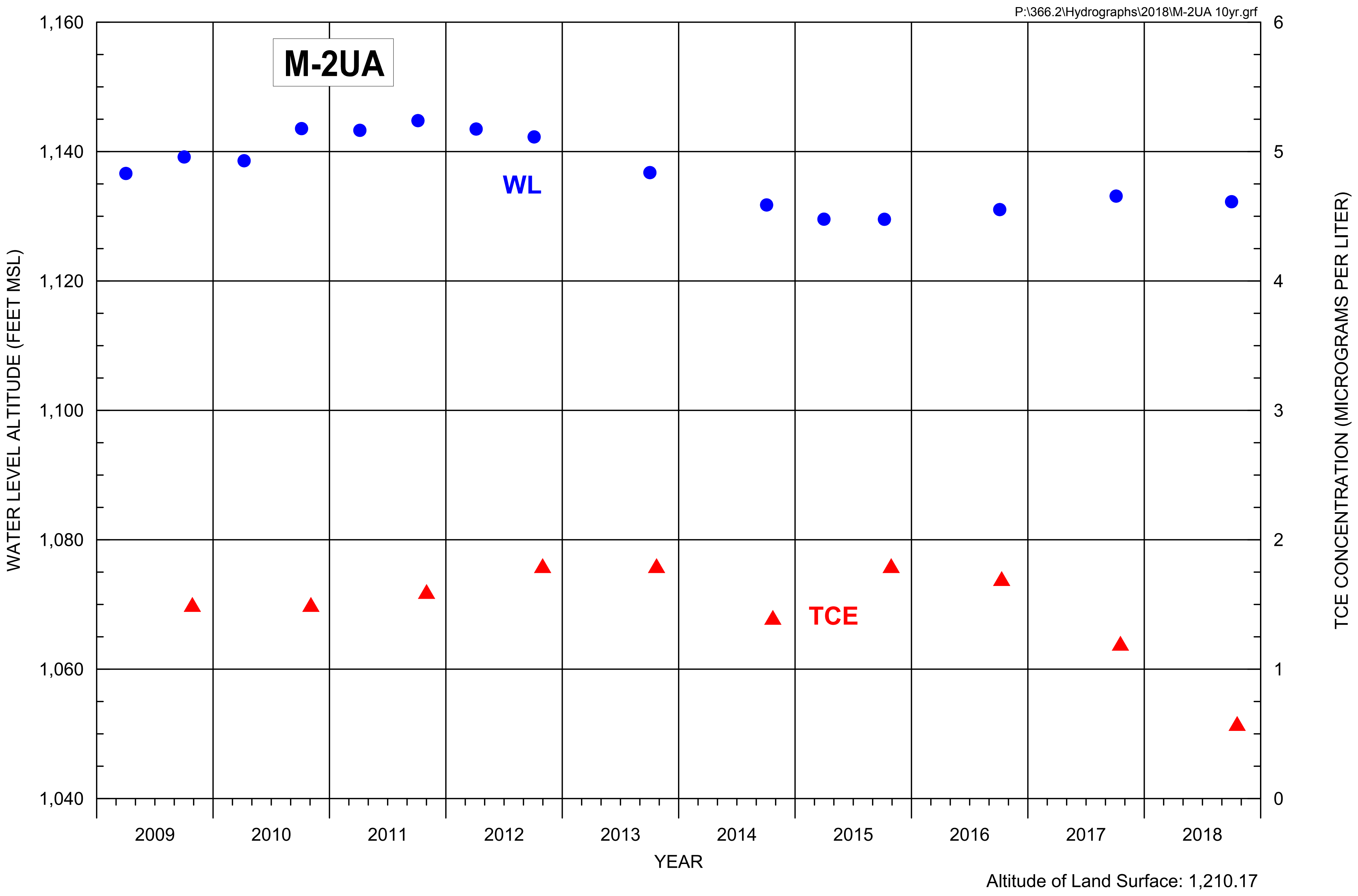


FIGURE C-36. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-2UA

North Indian Bend Wash Superfund Site

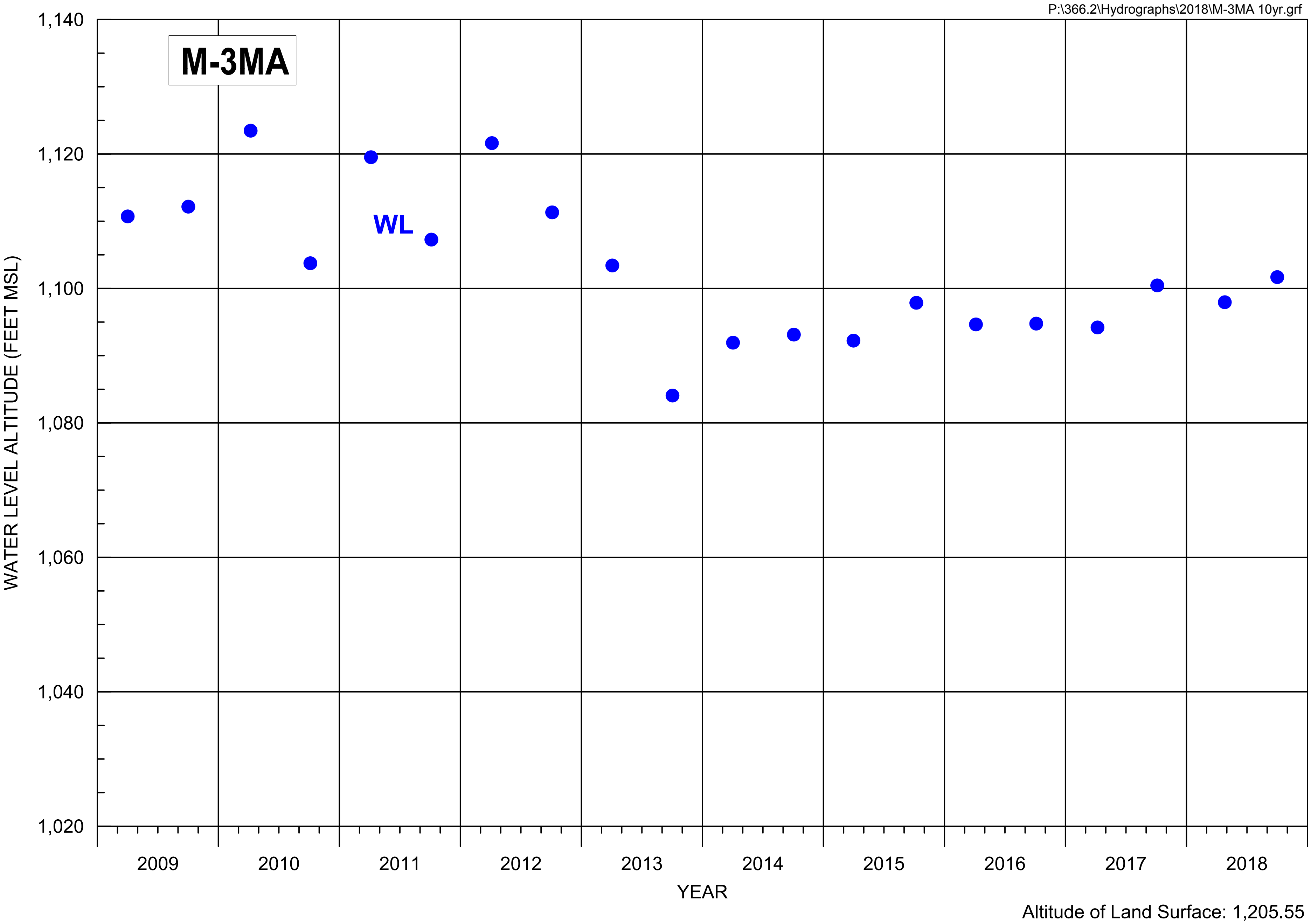


FIGURE C-37. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-3MA

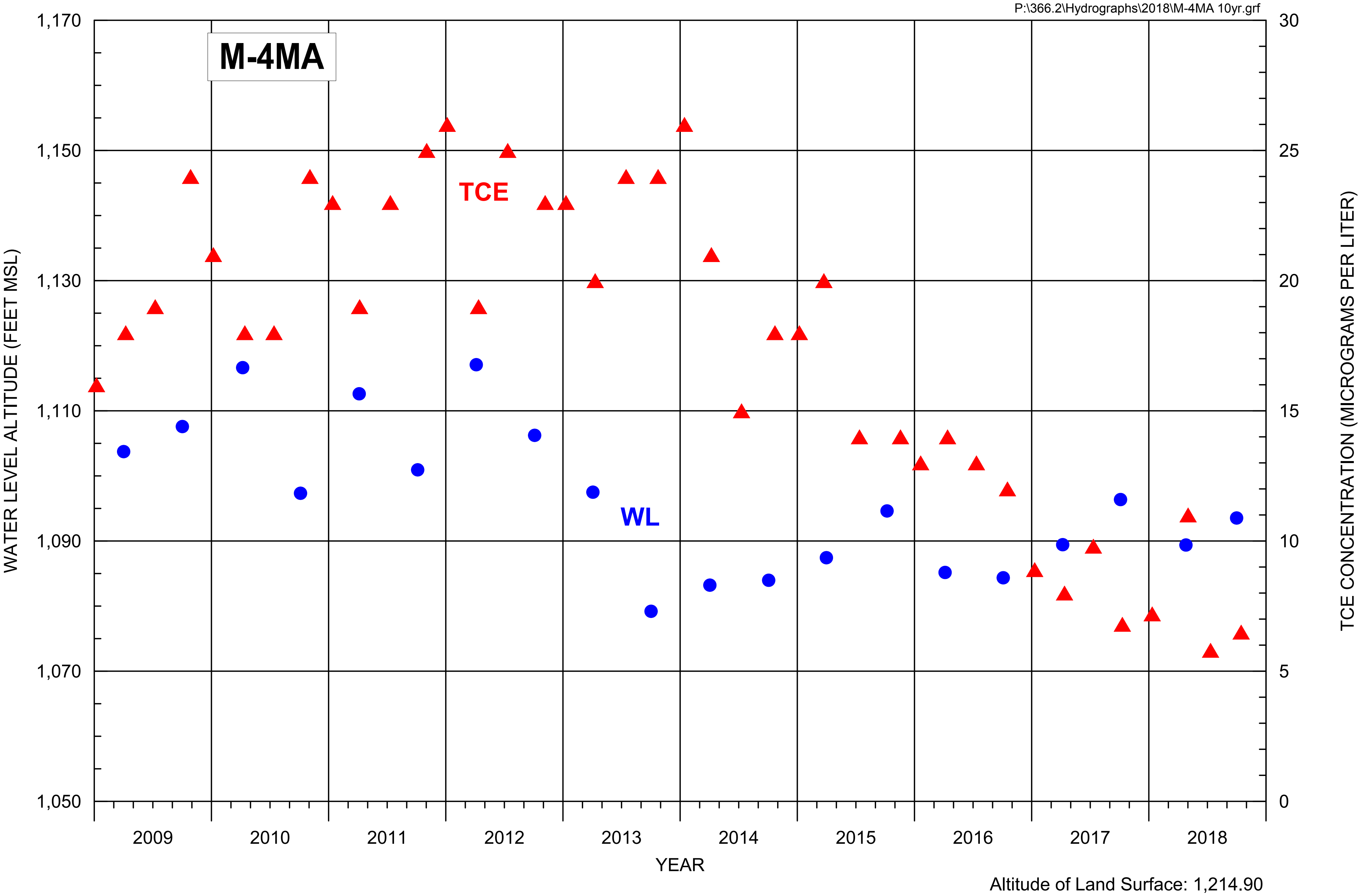
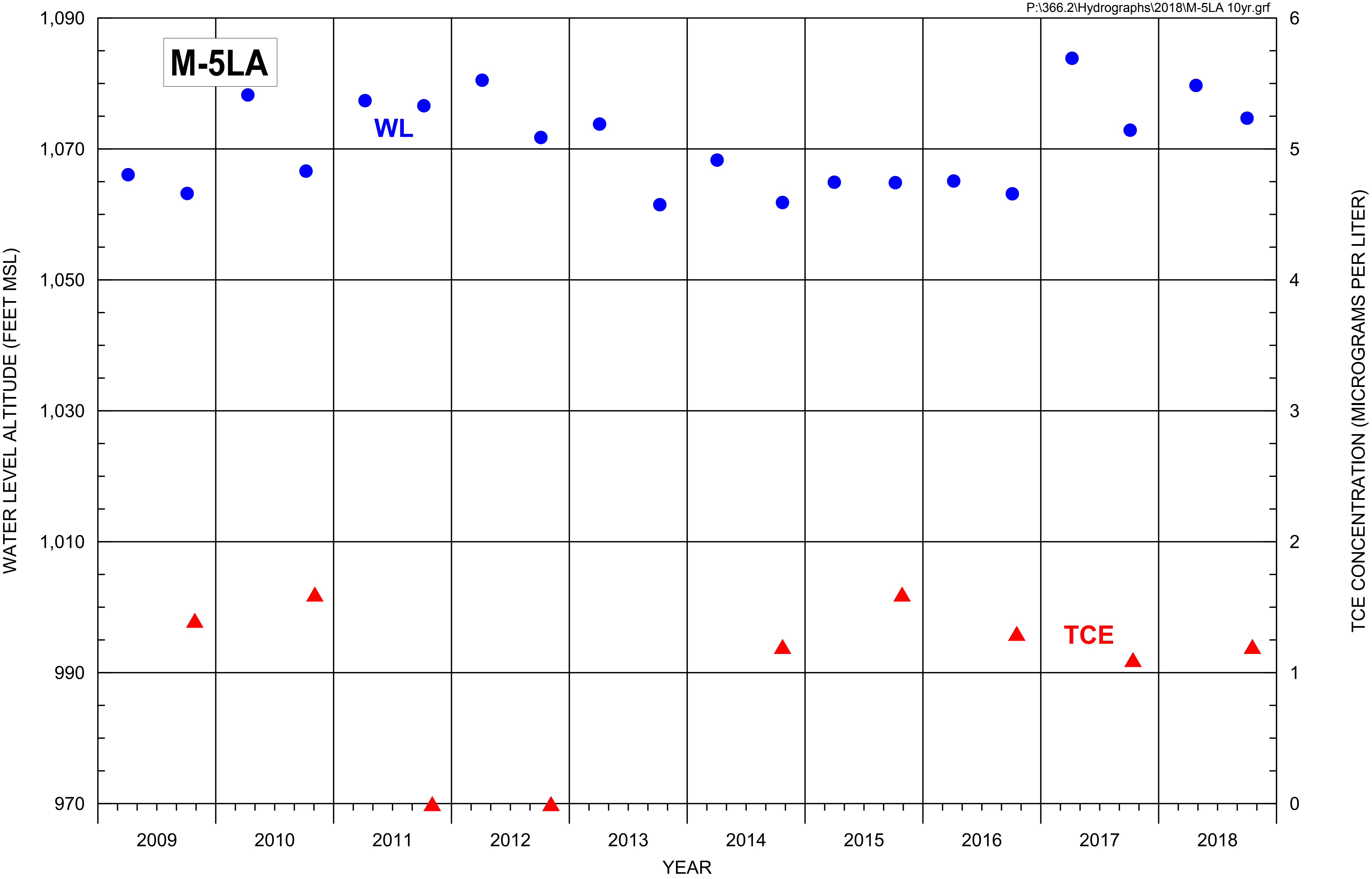


FIGURE C-38. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-4MA

North Indian Bend Wash Superfund Site

P:\366.2\Hydrographs\2018\M-5LA 10yr.grf

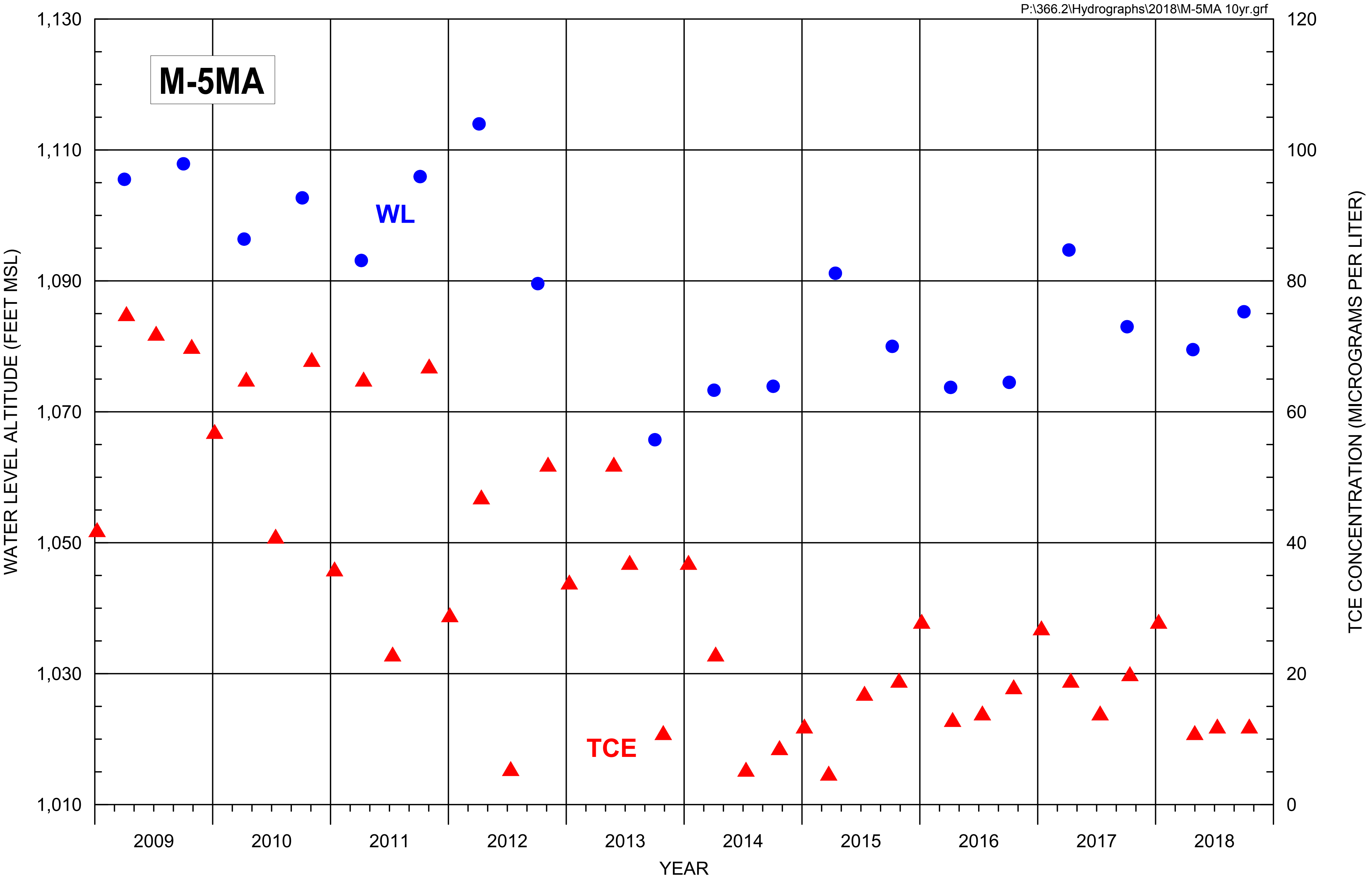


Altitude of Land Surface: 1,217.46

FIGURE C-39. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-5LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,217.43

FIGURE C-40. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-5MA

North Indian Bend Wash Superfund Site

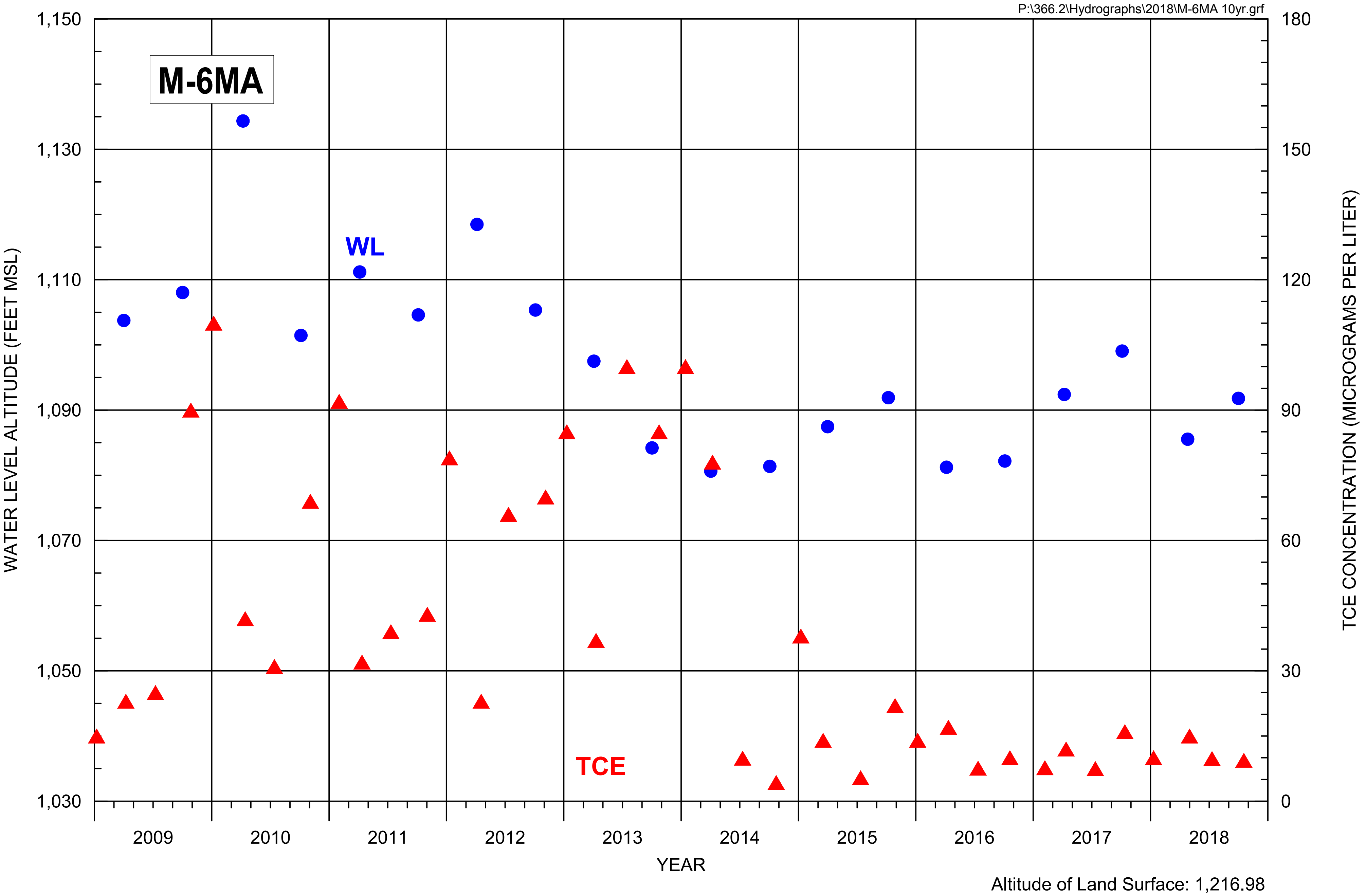
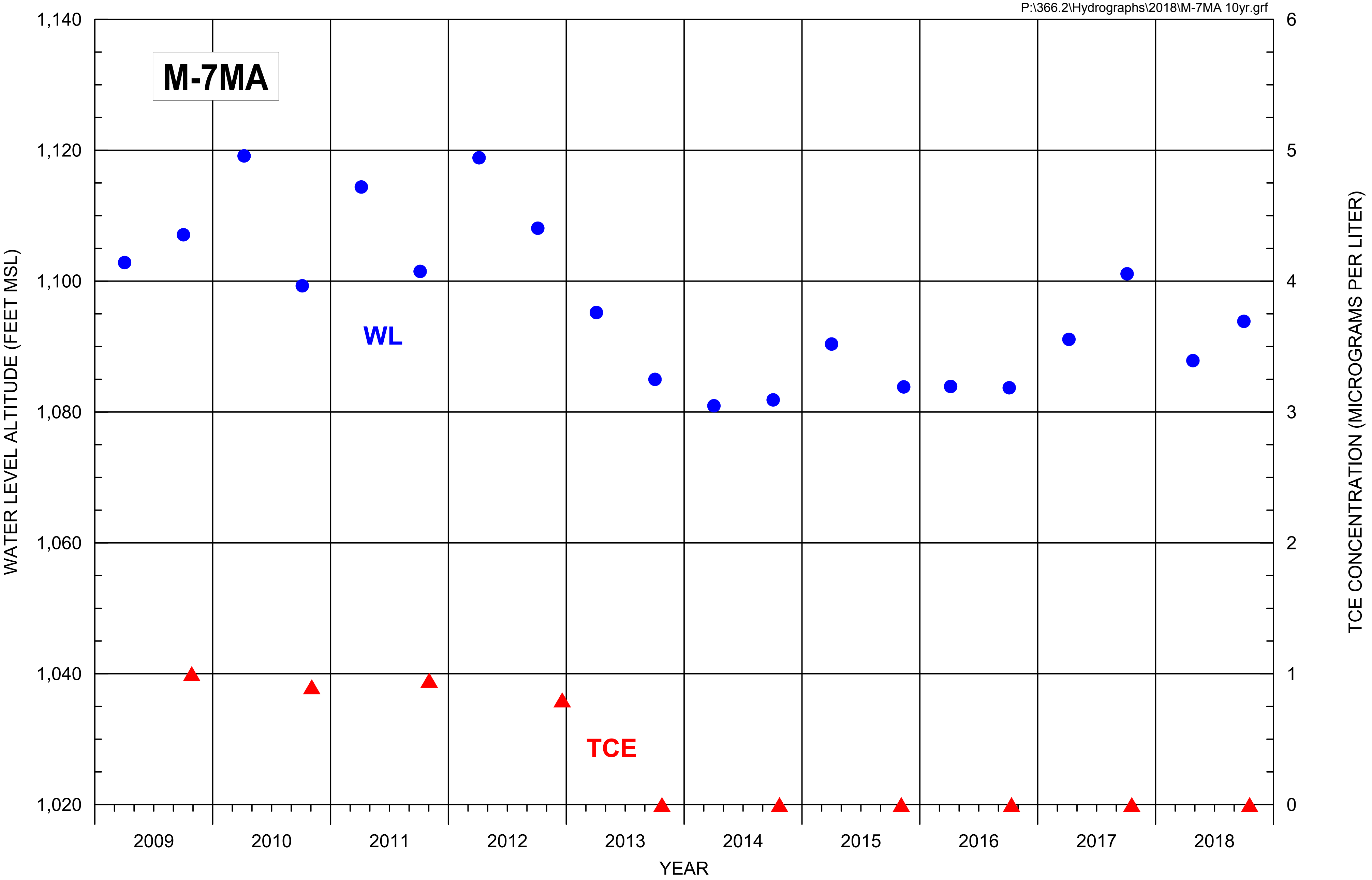


FIGURE C-41. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-6MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,213.87

FIGURE C-42. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-7MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

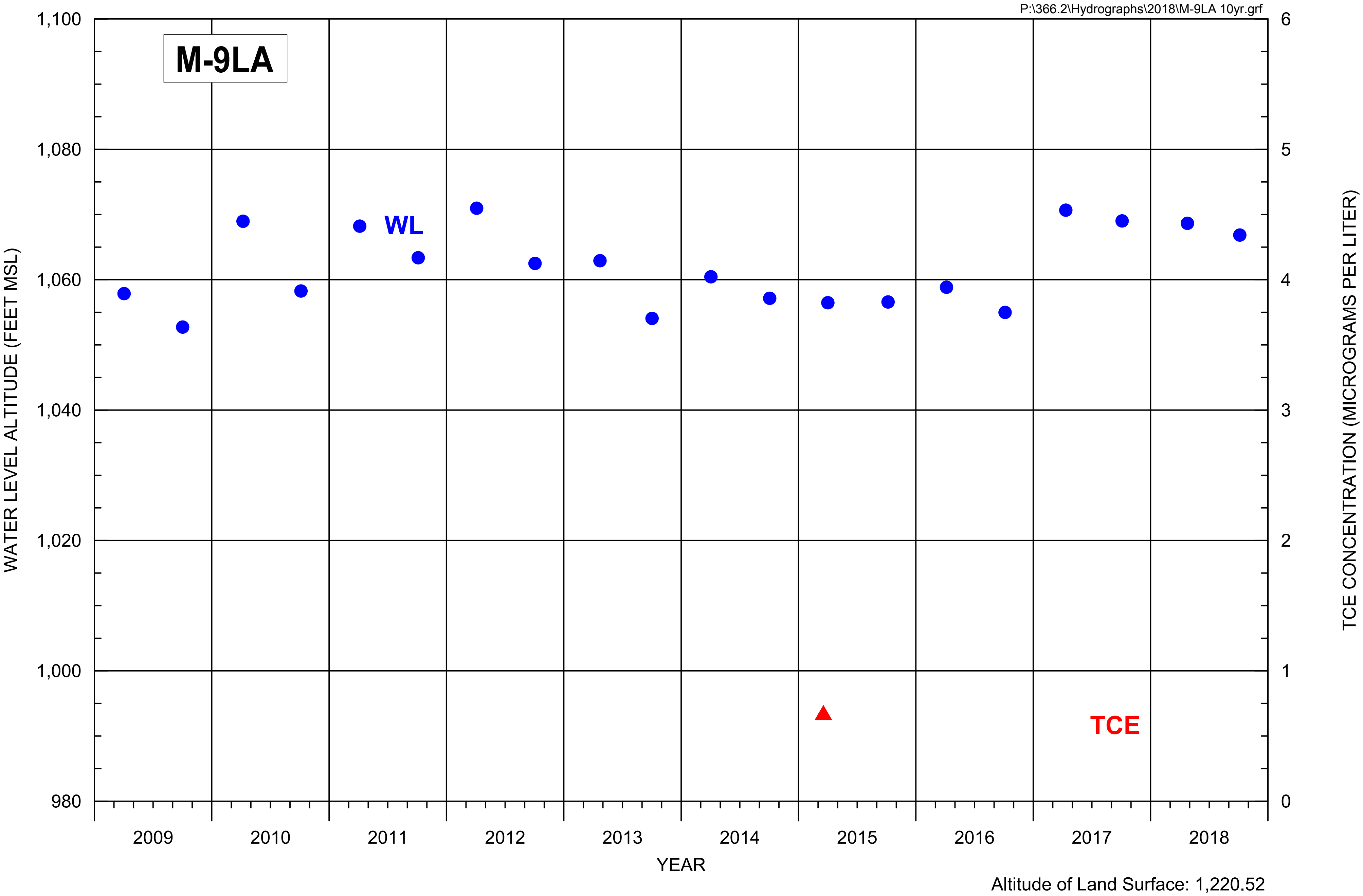
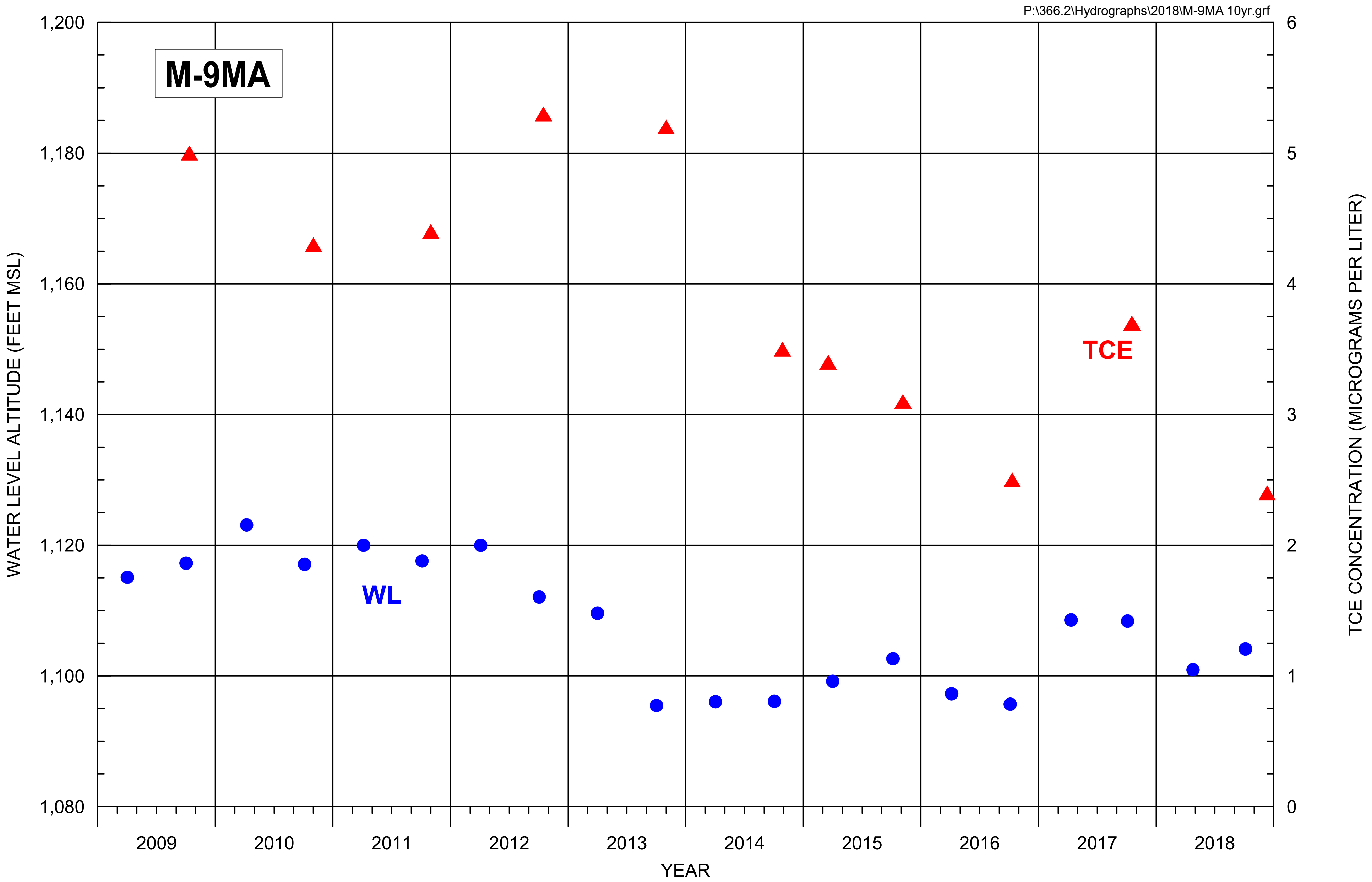


FIGURE C-43. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-9LA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,220.52

FIGURE C-44. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-9MA

North Indian Bend Wash Superfund Site

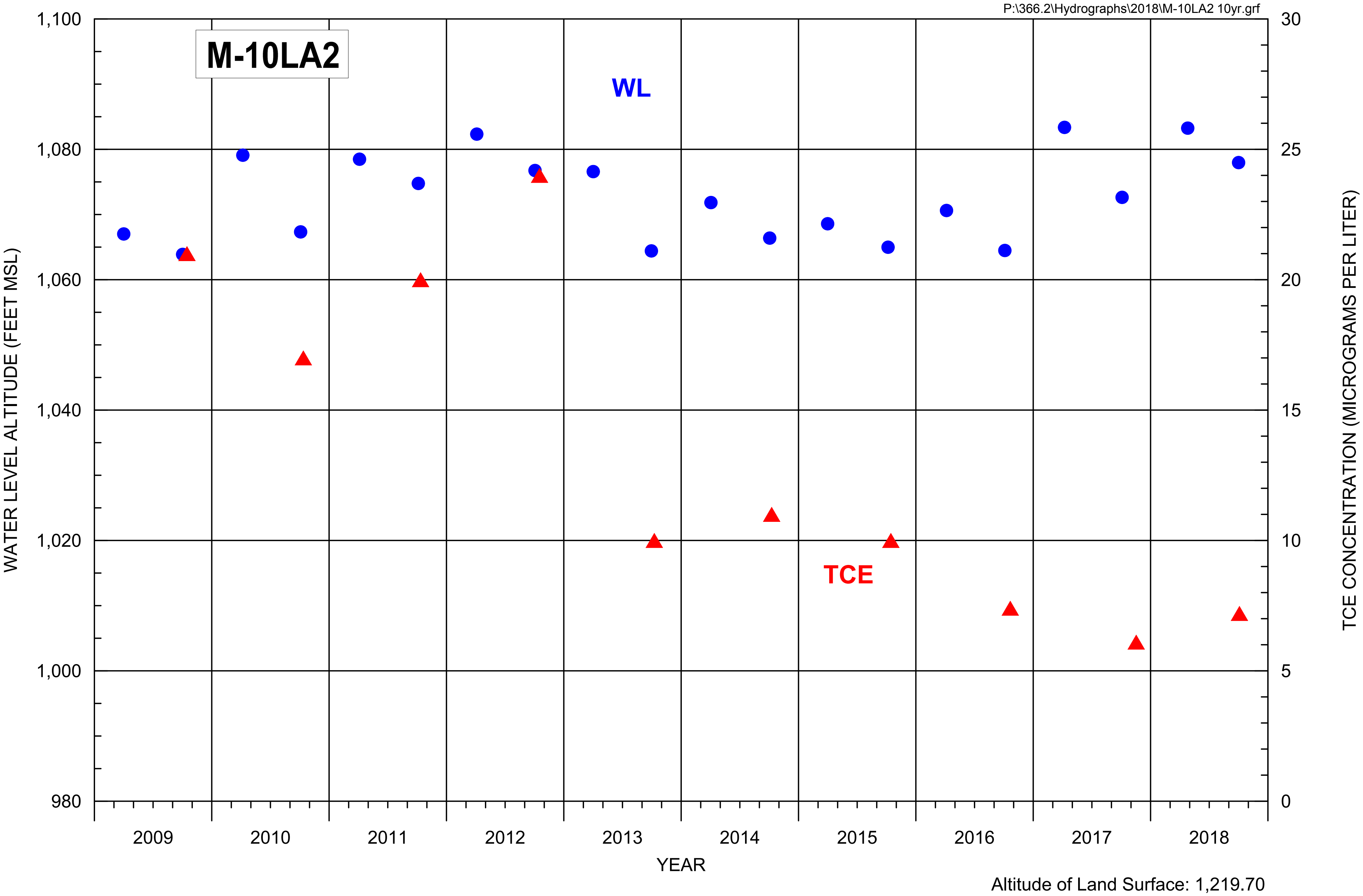


FIGURE C-45. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-10LA2

North Indian Bend Wash Superfund Site

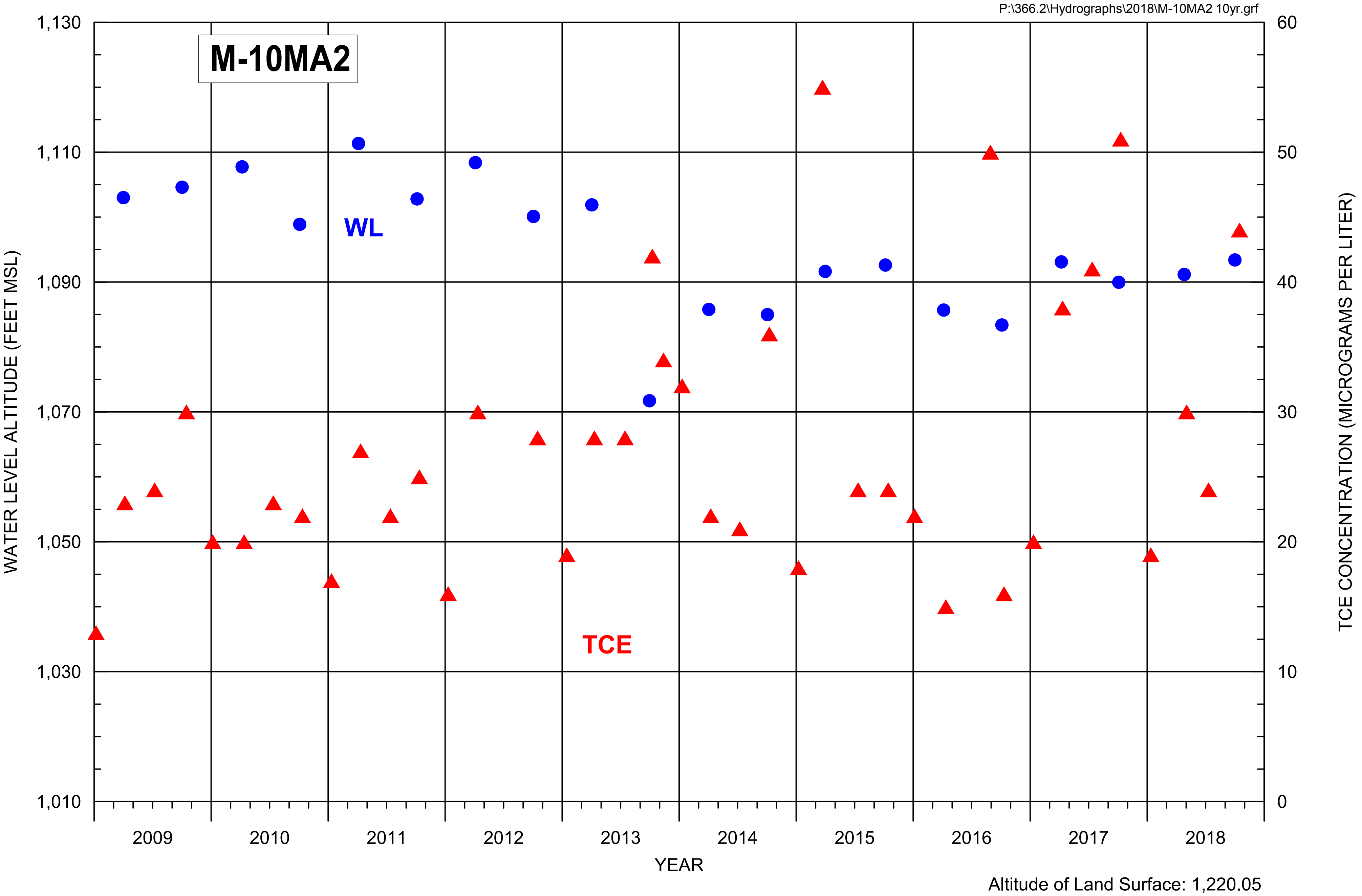
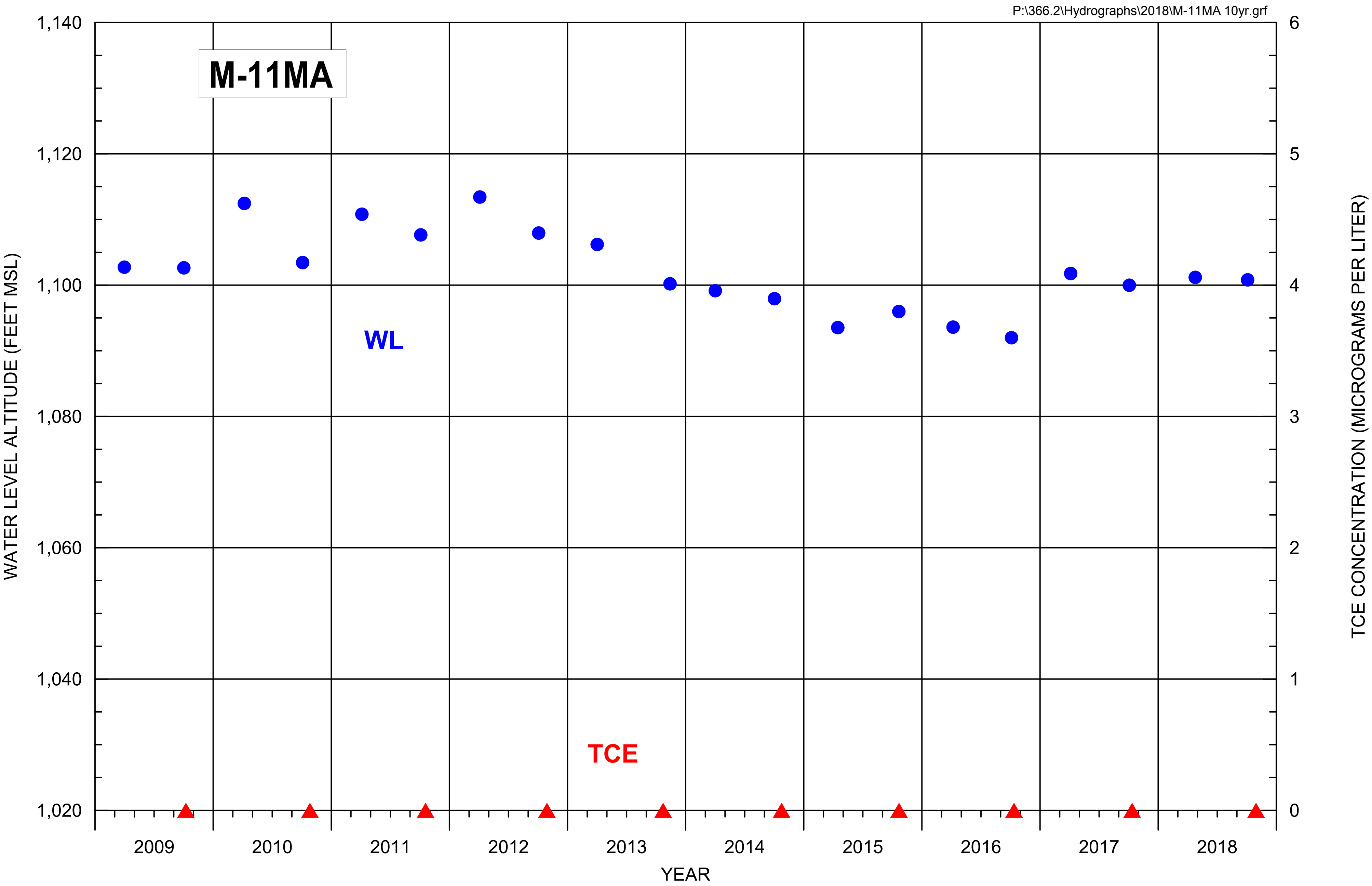


FIGURE C-46. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-10MA2

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,211.59

FIGURE C-47. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-11MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

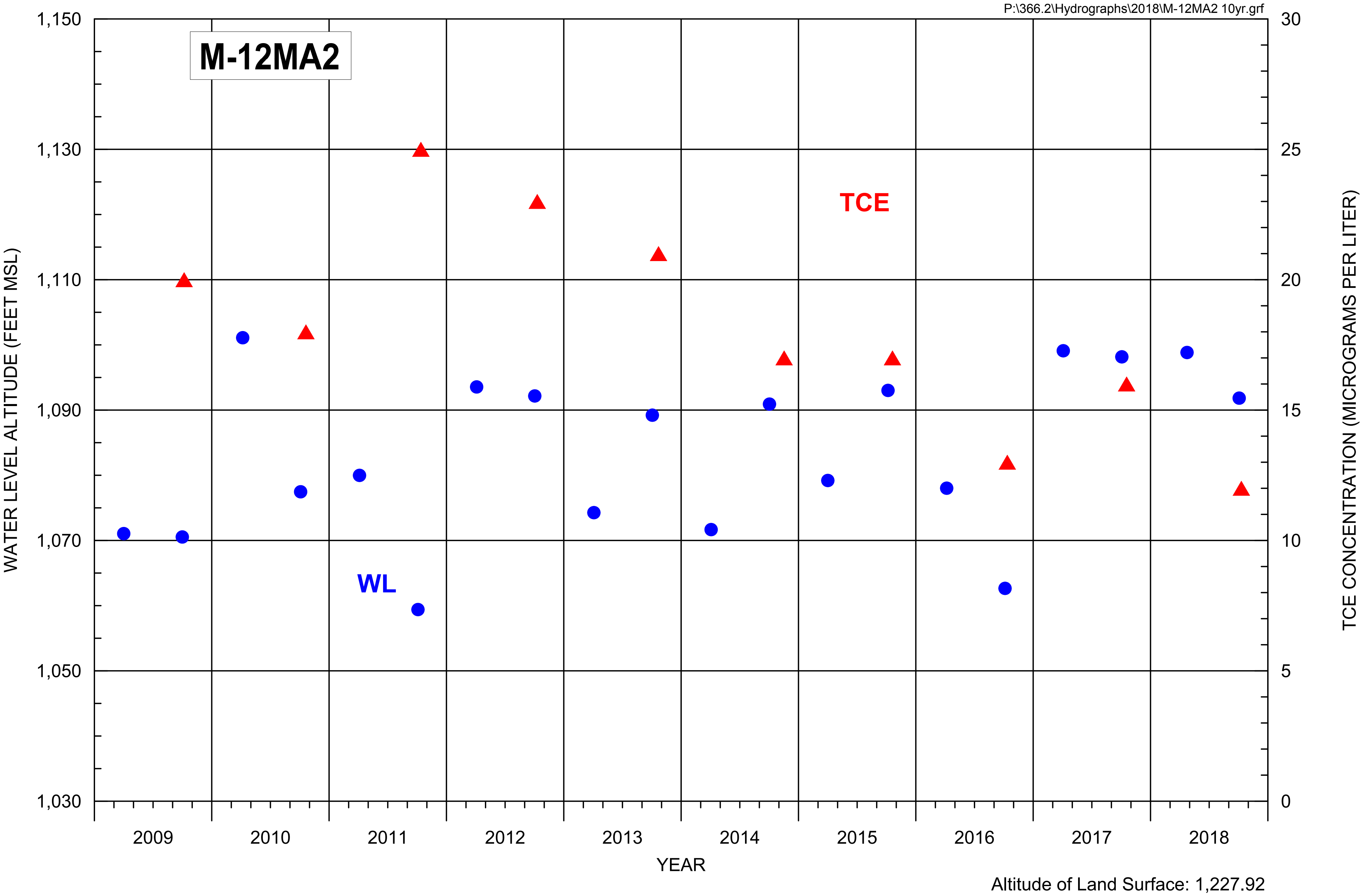


FIGURE C-48. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-12MA2

North Indian Bend Wash Superfund Site

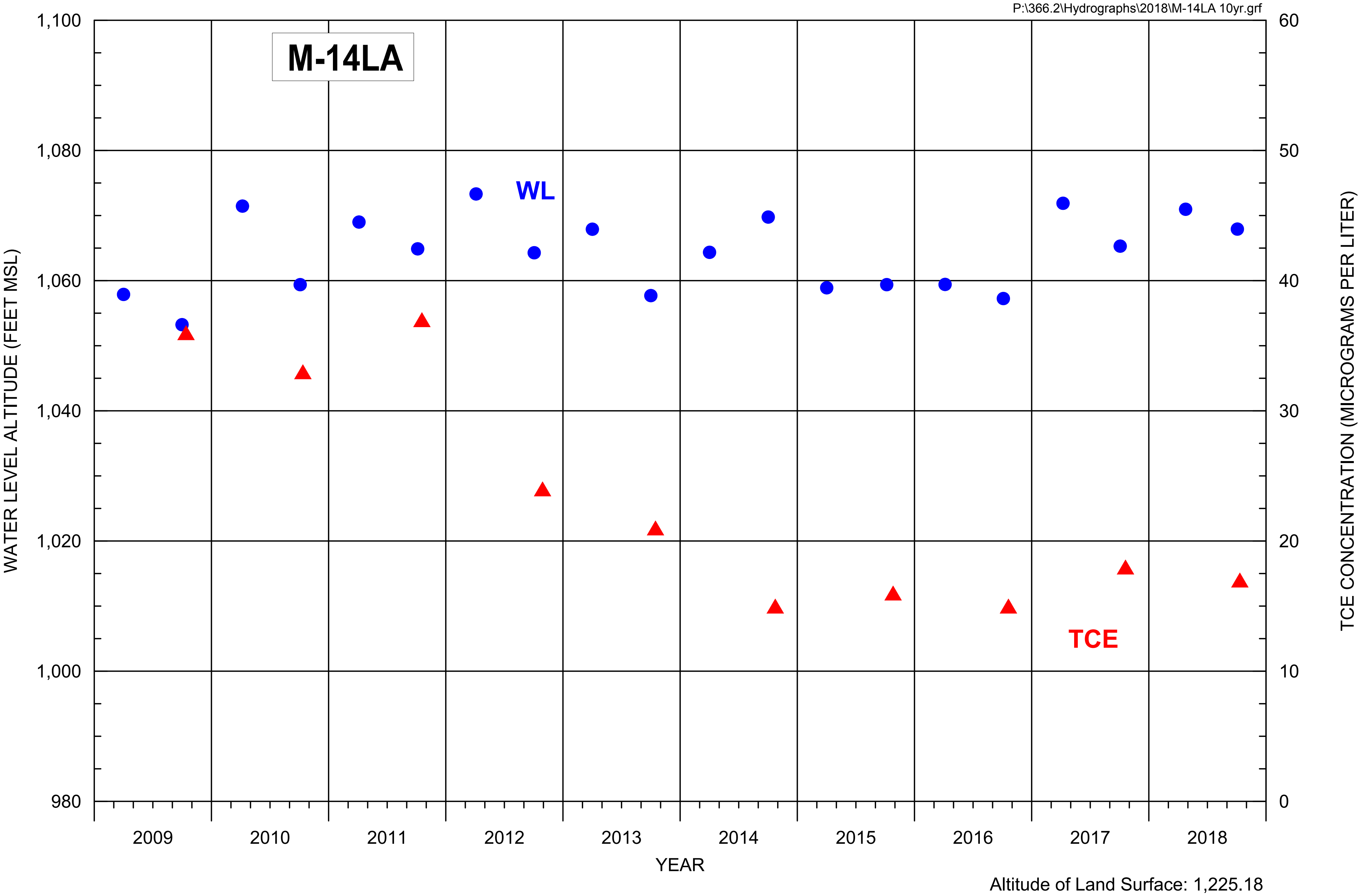
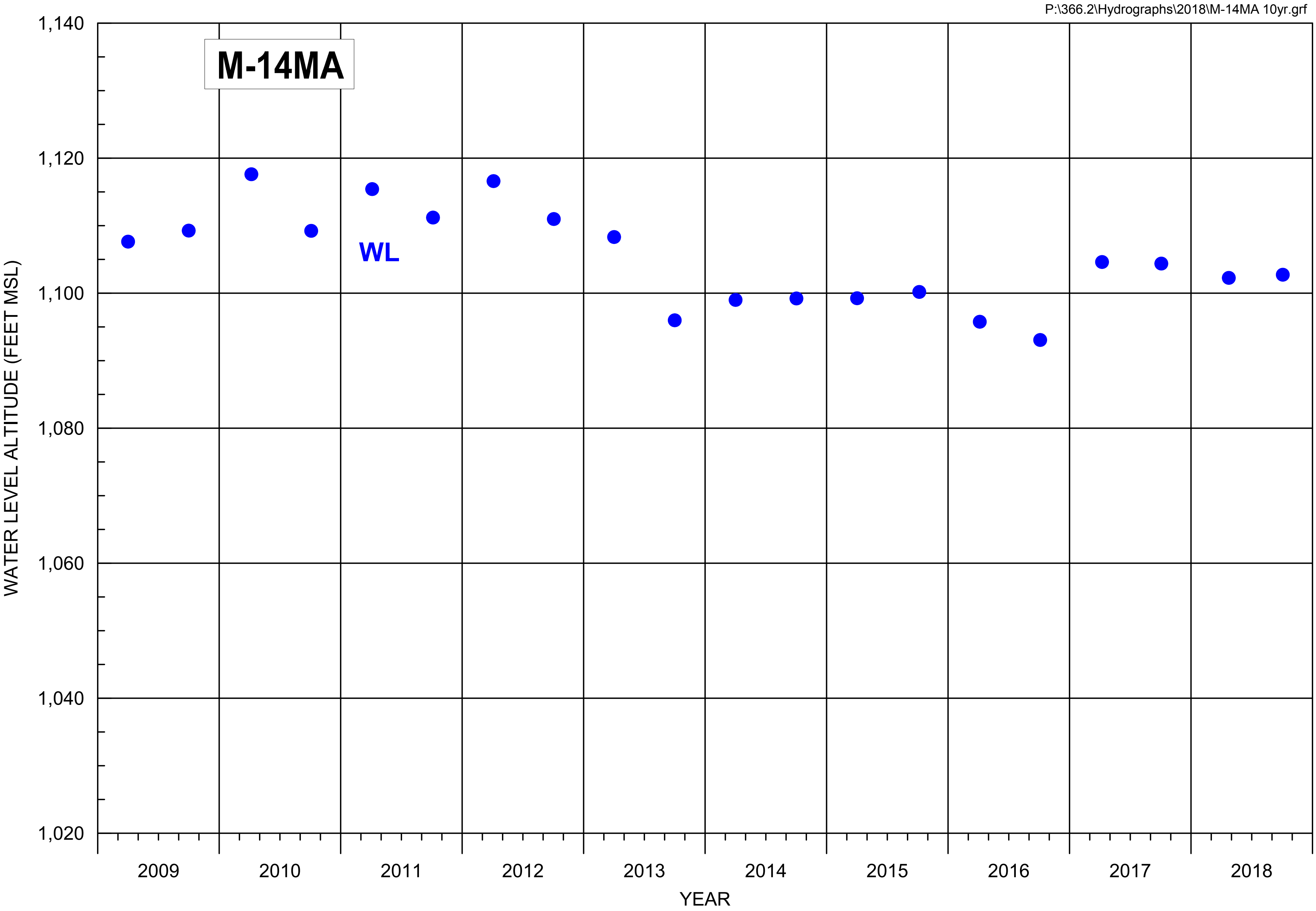


FIGURE C-49. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-14LA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,225.20

FIGURE C-50. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-14MA

North Indian Bend Wash Superfund Site

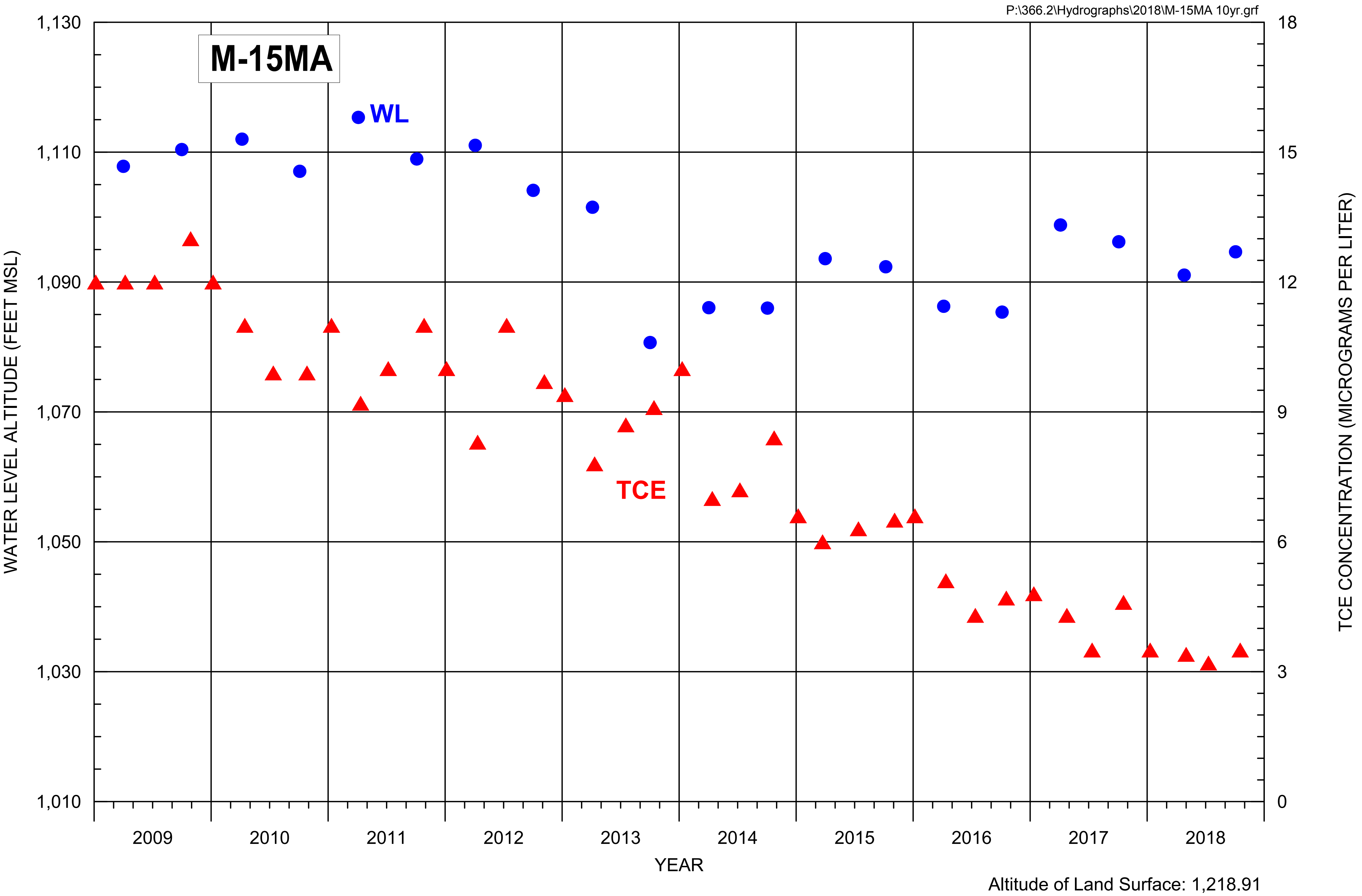


FIGURE C-51. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-15MA

North Indian Bend Wash Superfund Site

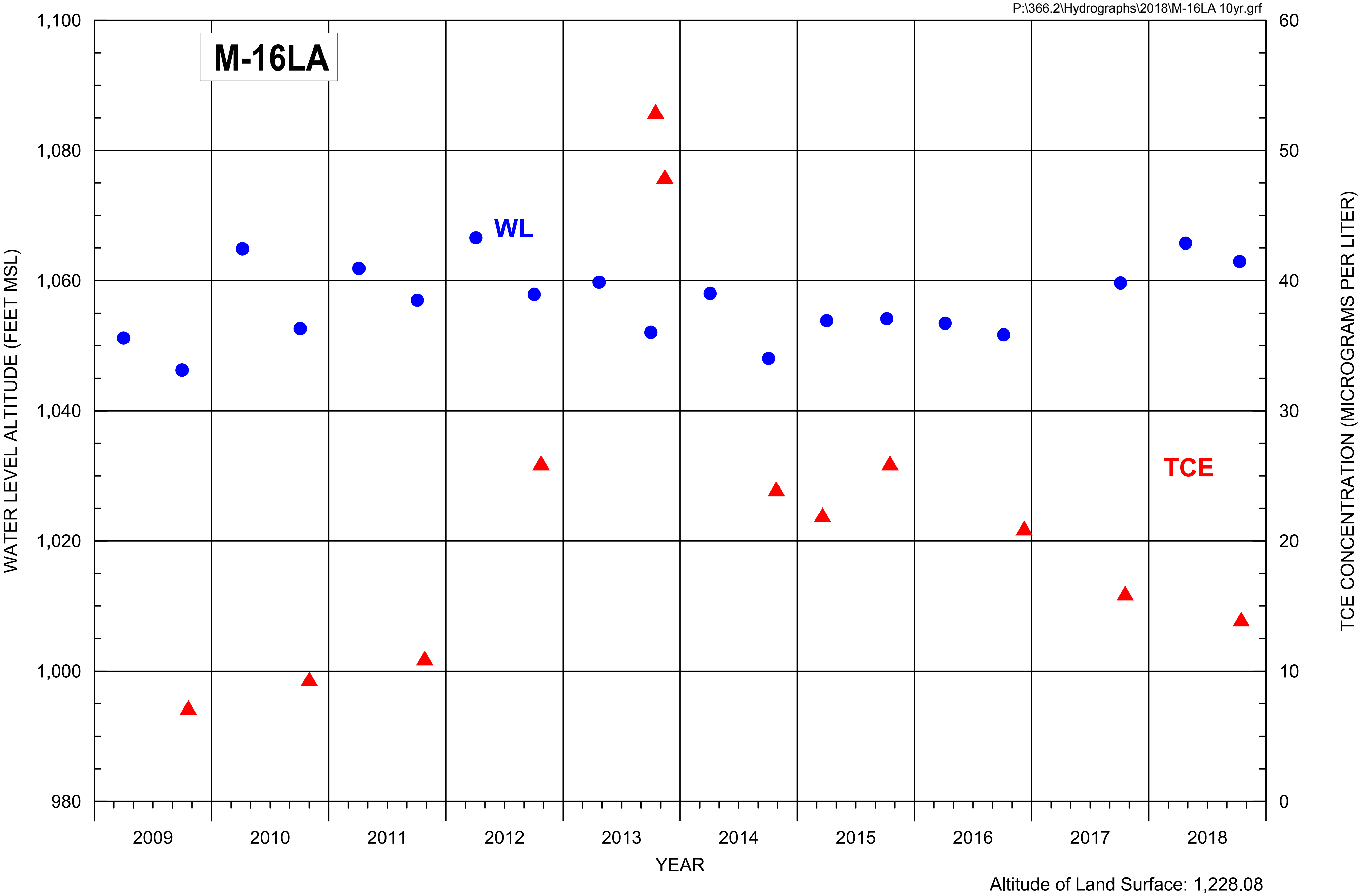


FIGURE C-52. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-16LA

North Indian Bend Wash Superfund Site

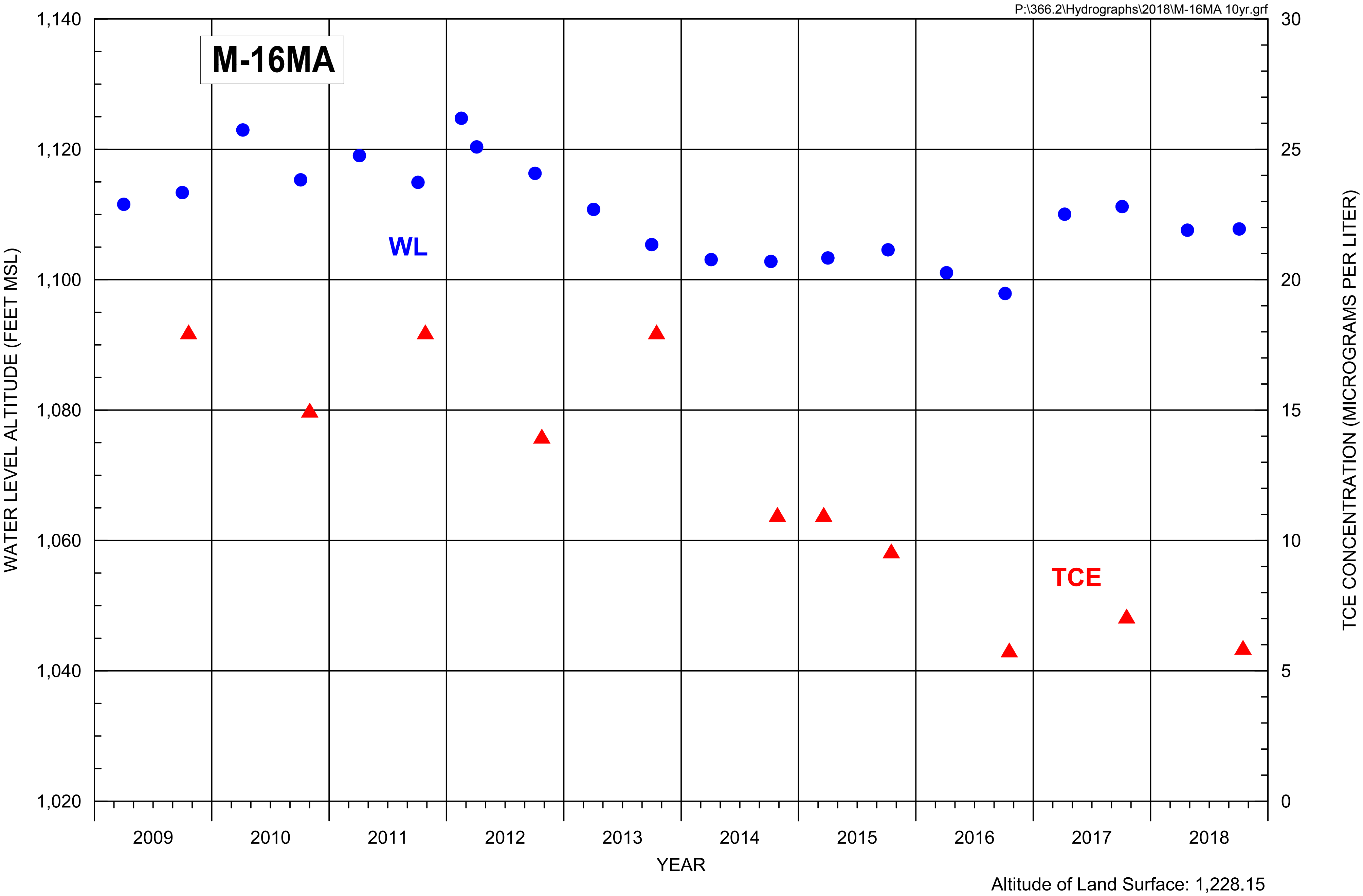


FIGURE C-53. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-16MA

North Indian Bend Wash Superfund Site

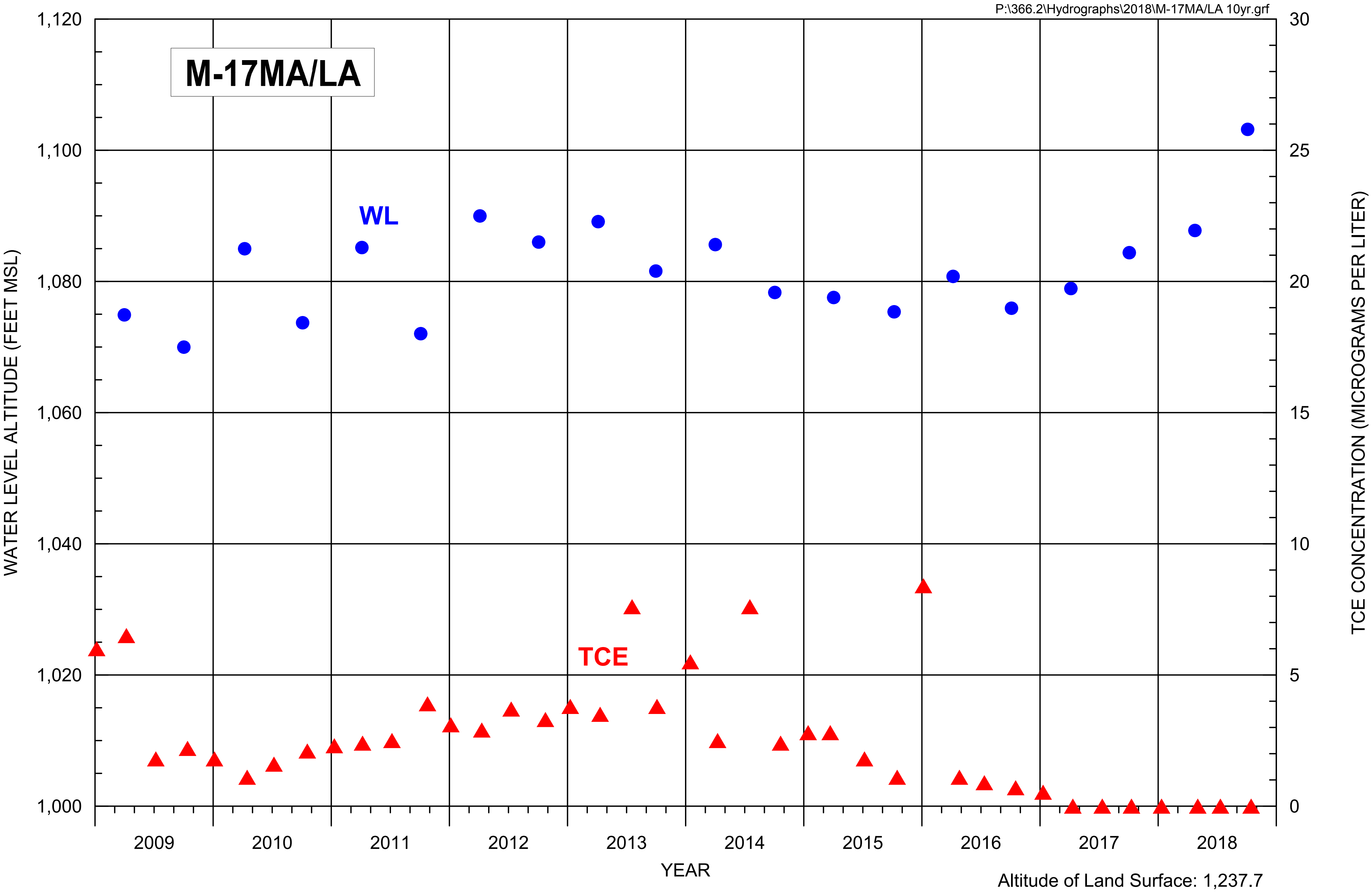
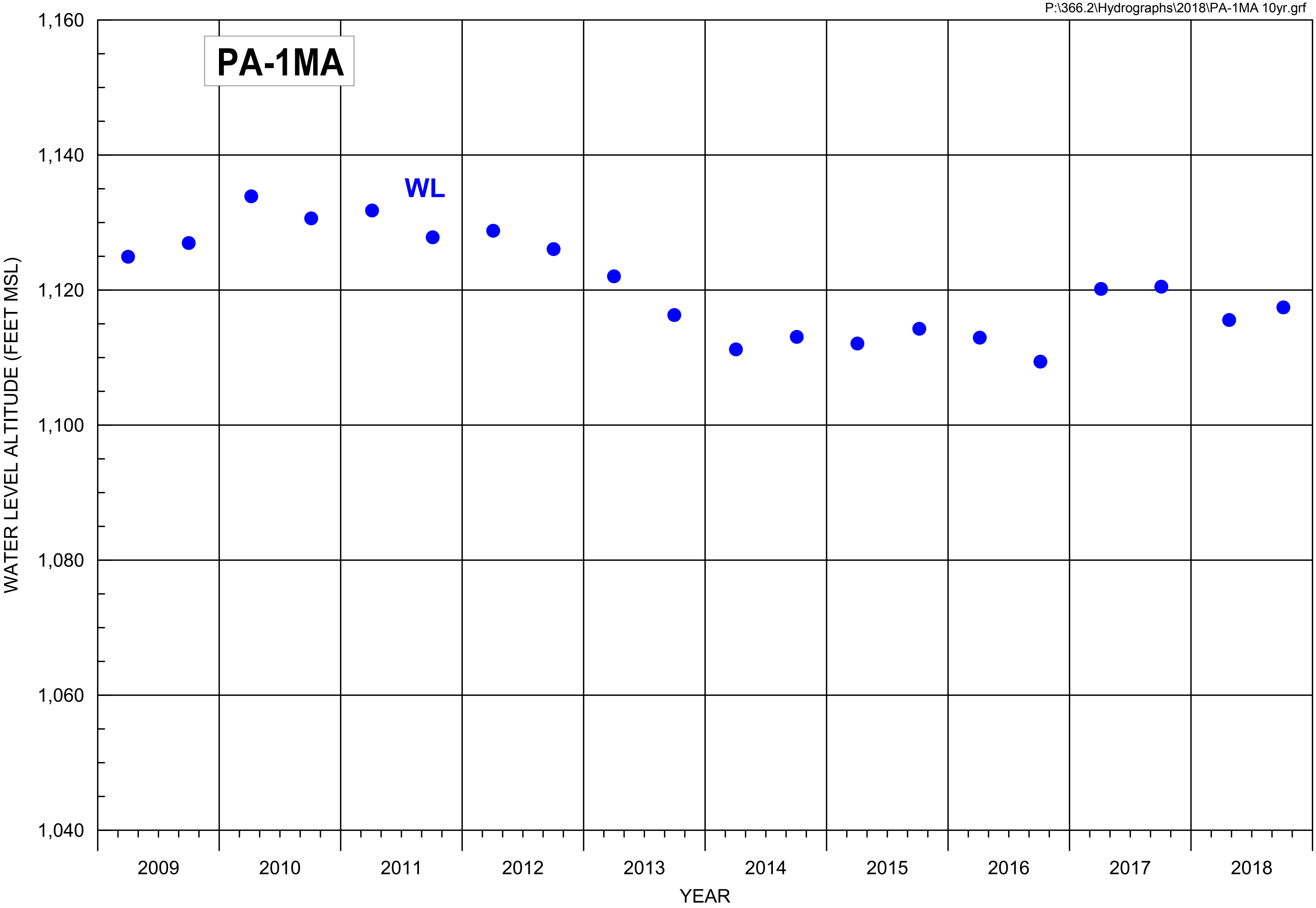


FIGURE C-54. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-17MA/LA

North Indian Bend Wash Superfund Site

P:\366.2\Hydrographs\2018\PA-1MA 10yr.grf



Altitude of Land Surface: 1,225.50

FIGURE C-55. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-1MA

North Indian Bend Wash Superfund Site

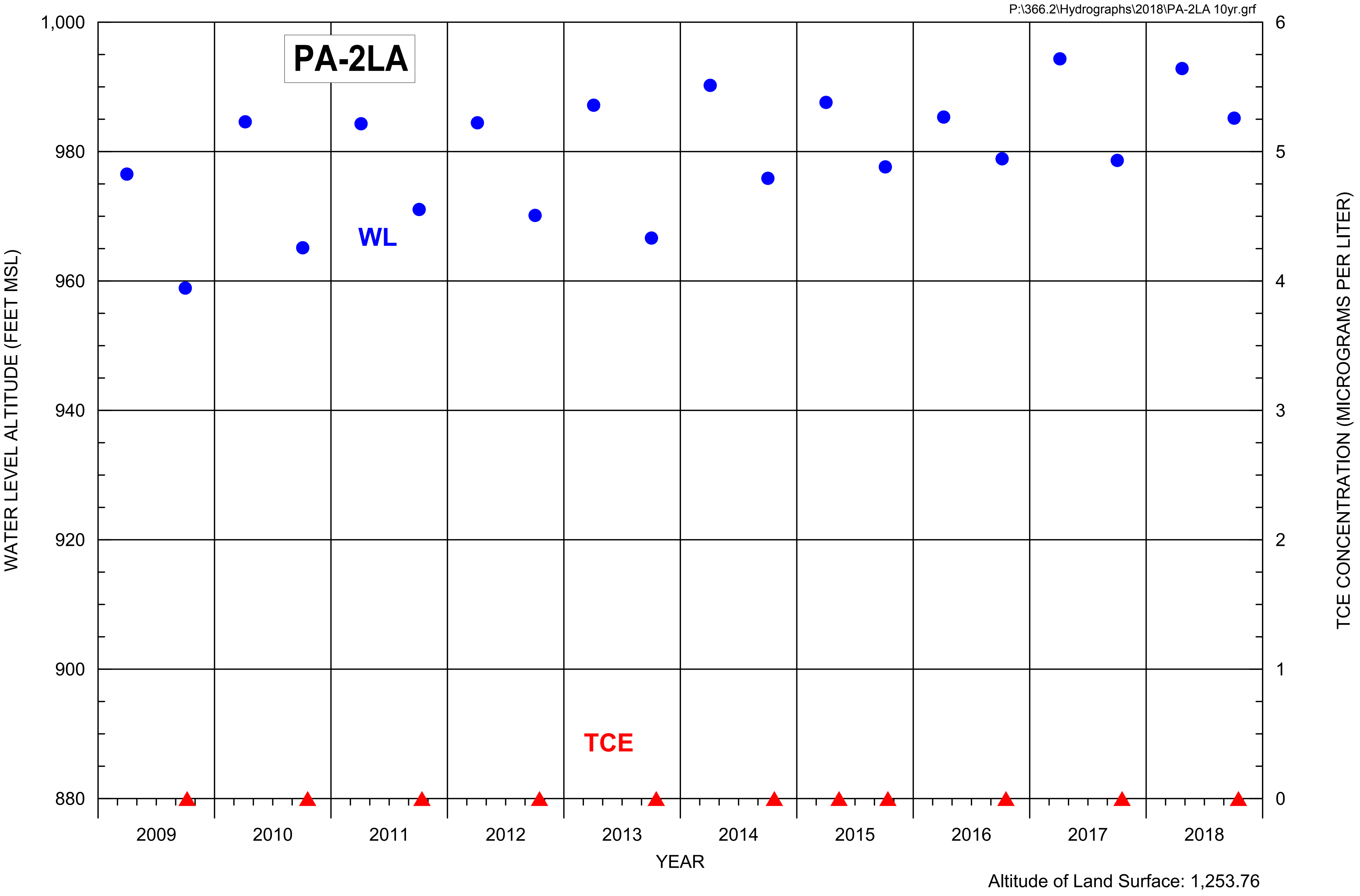


FIGURE C-56. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-2LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

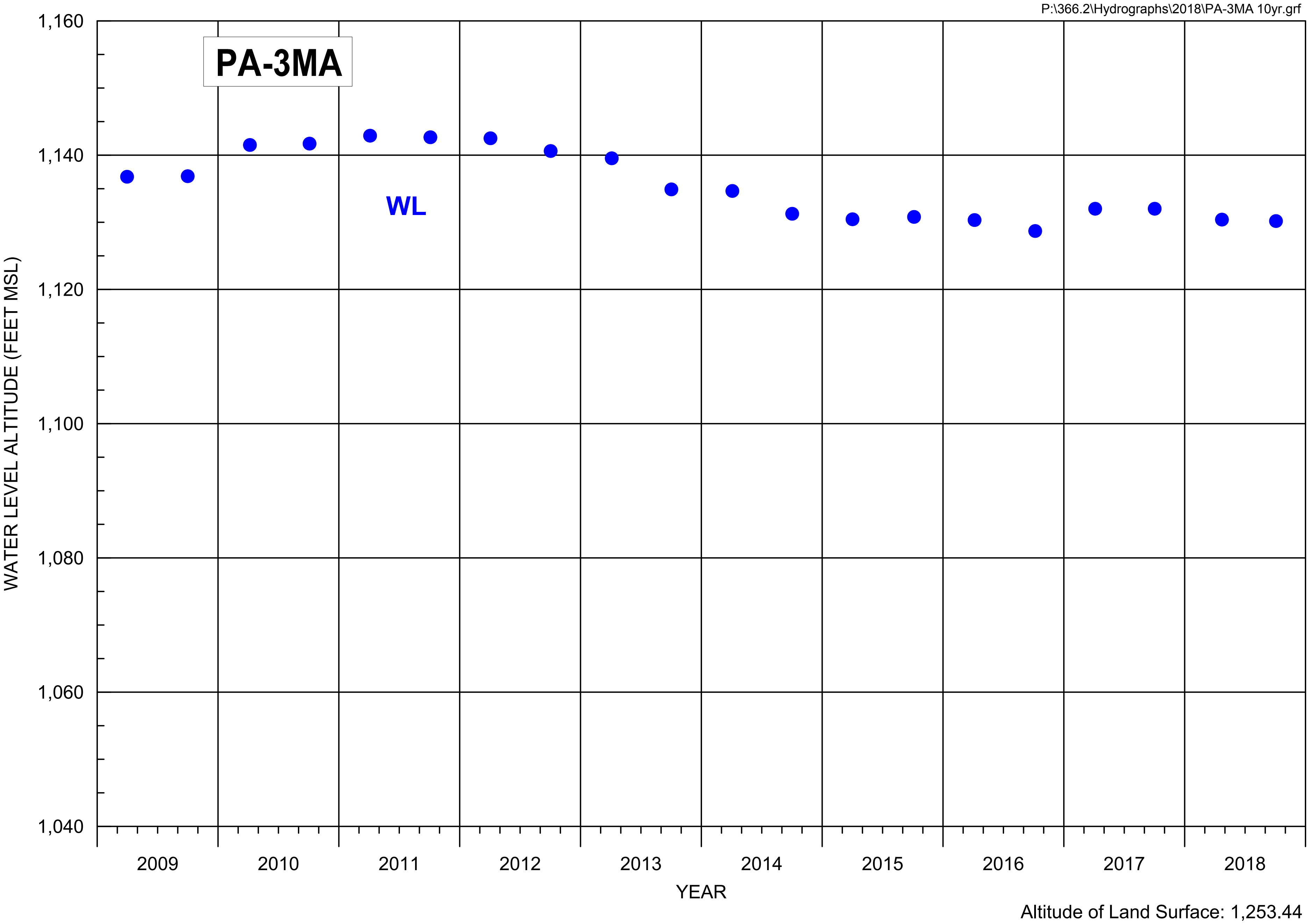
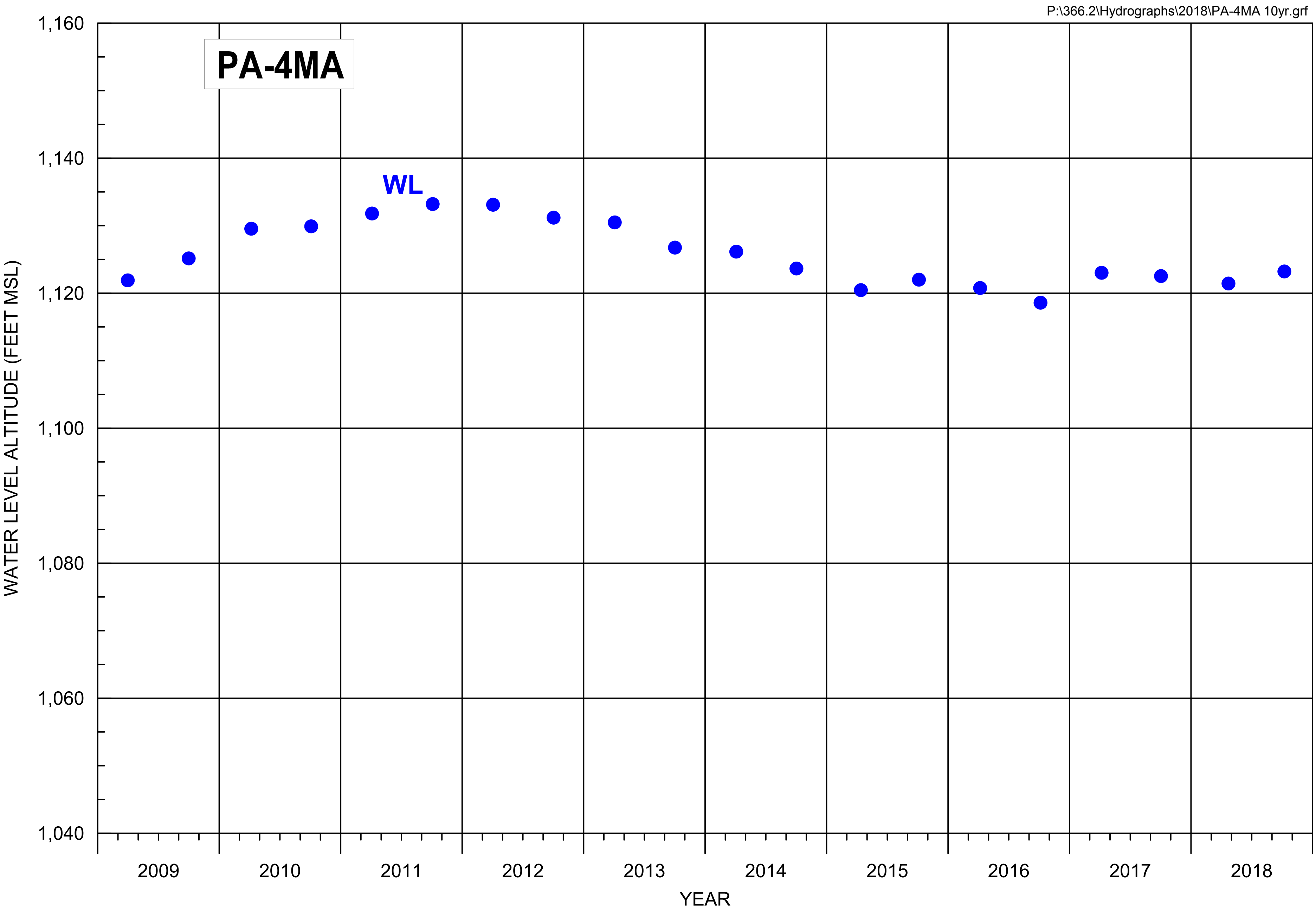


FIGURE C-57. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-3MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,230.92

FIGURE C-58. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-4MA

North Indian Bend Wash Superfund Site

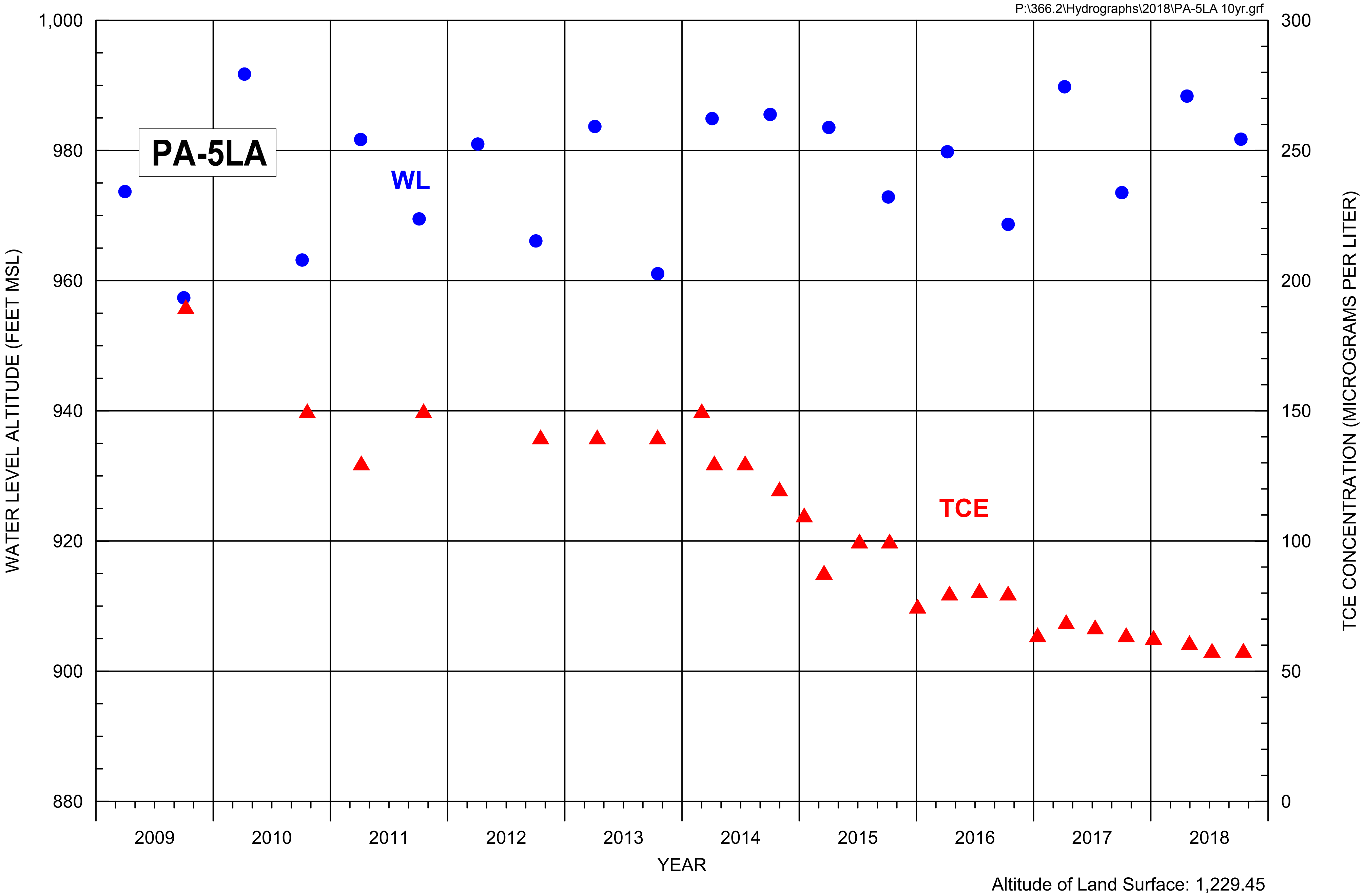


FIGURE C-59. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-5LA

North Indian Bend Wash Superfund Site

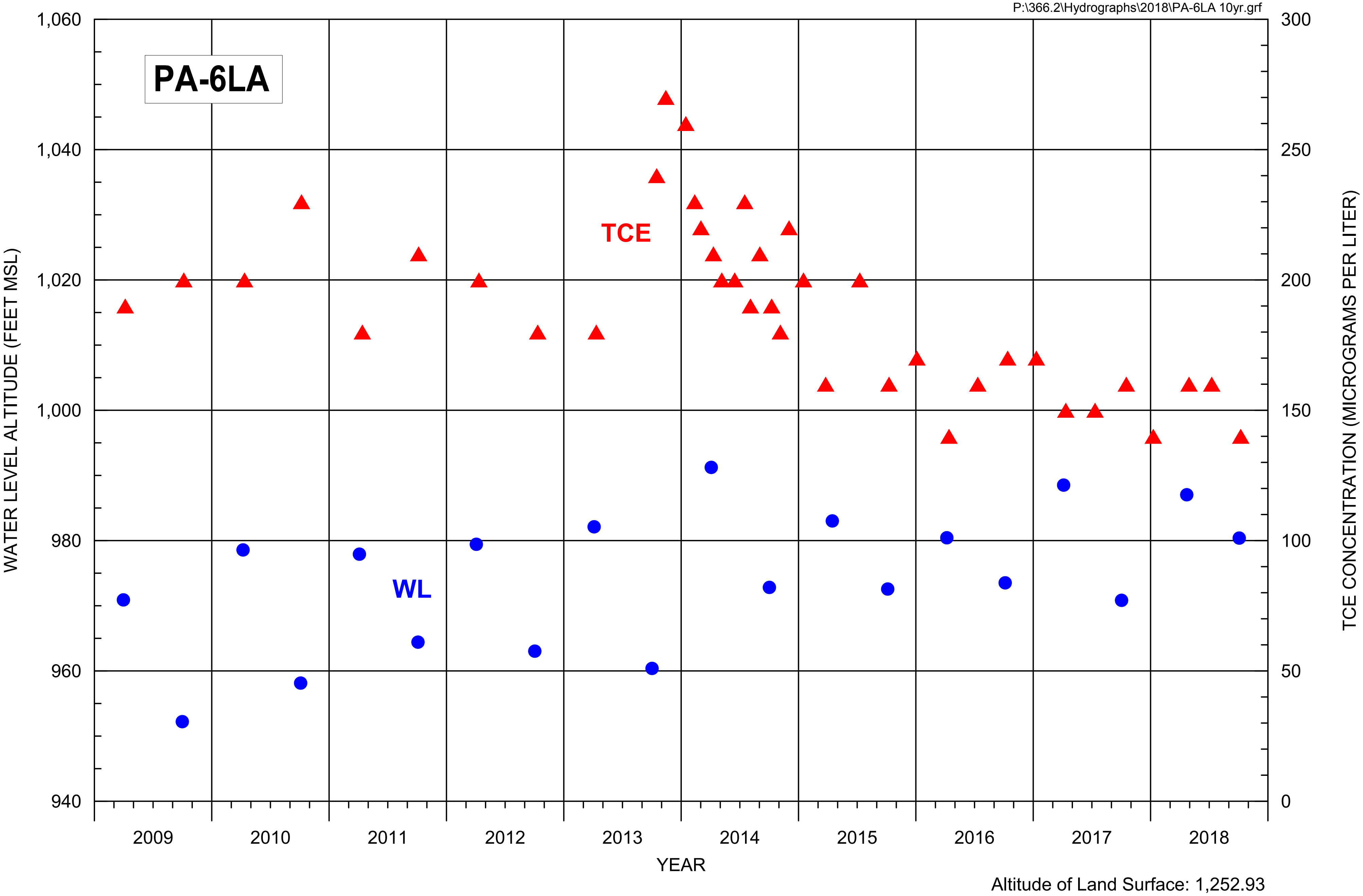
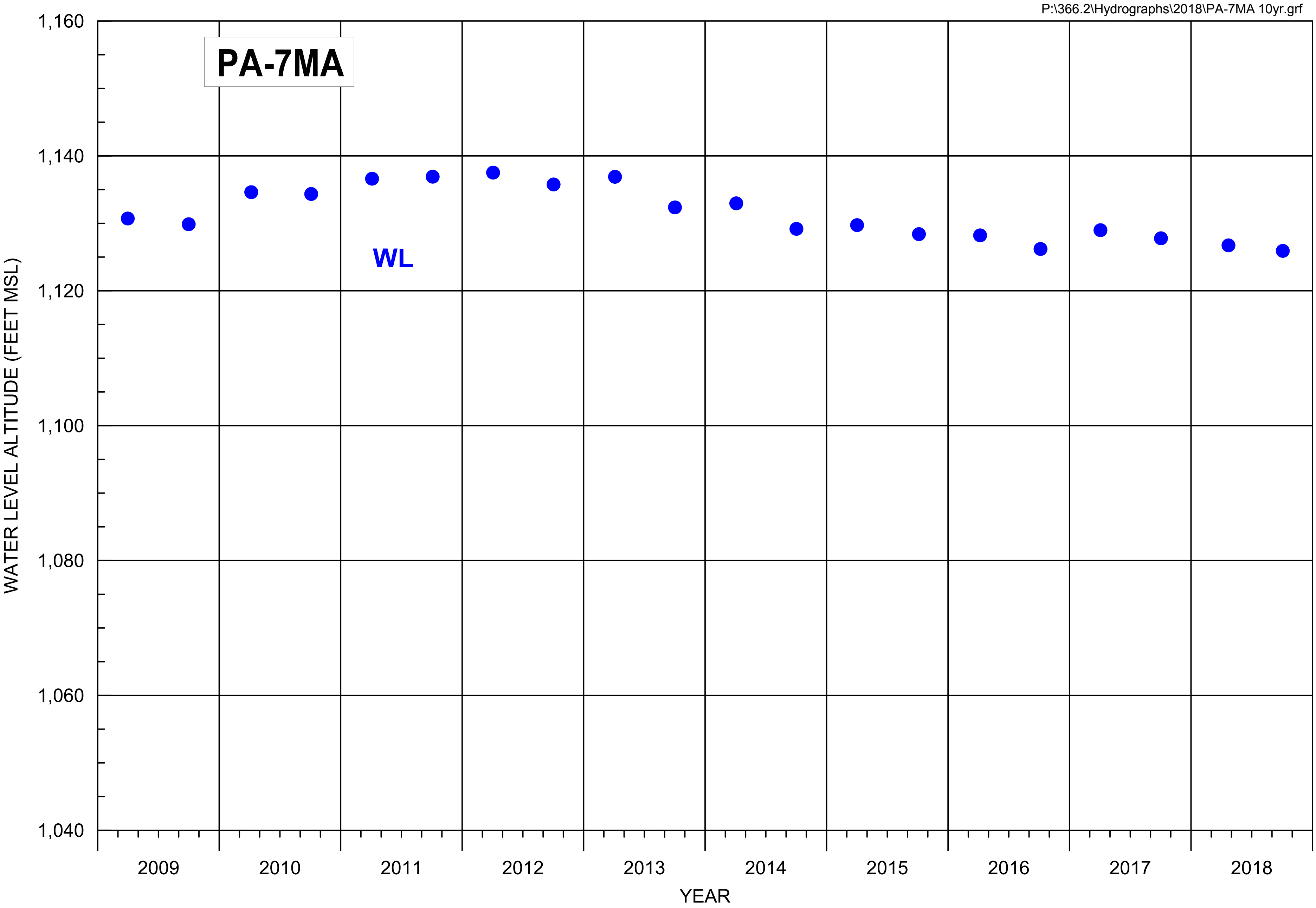


FIGURE C-60. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-6LA



Altitude of Land Surface: 1,253.06

FIGURE C-61. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-7MA

North Indian Bend Wash Superfund Site

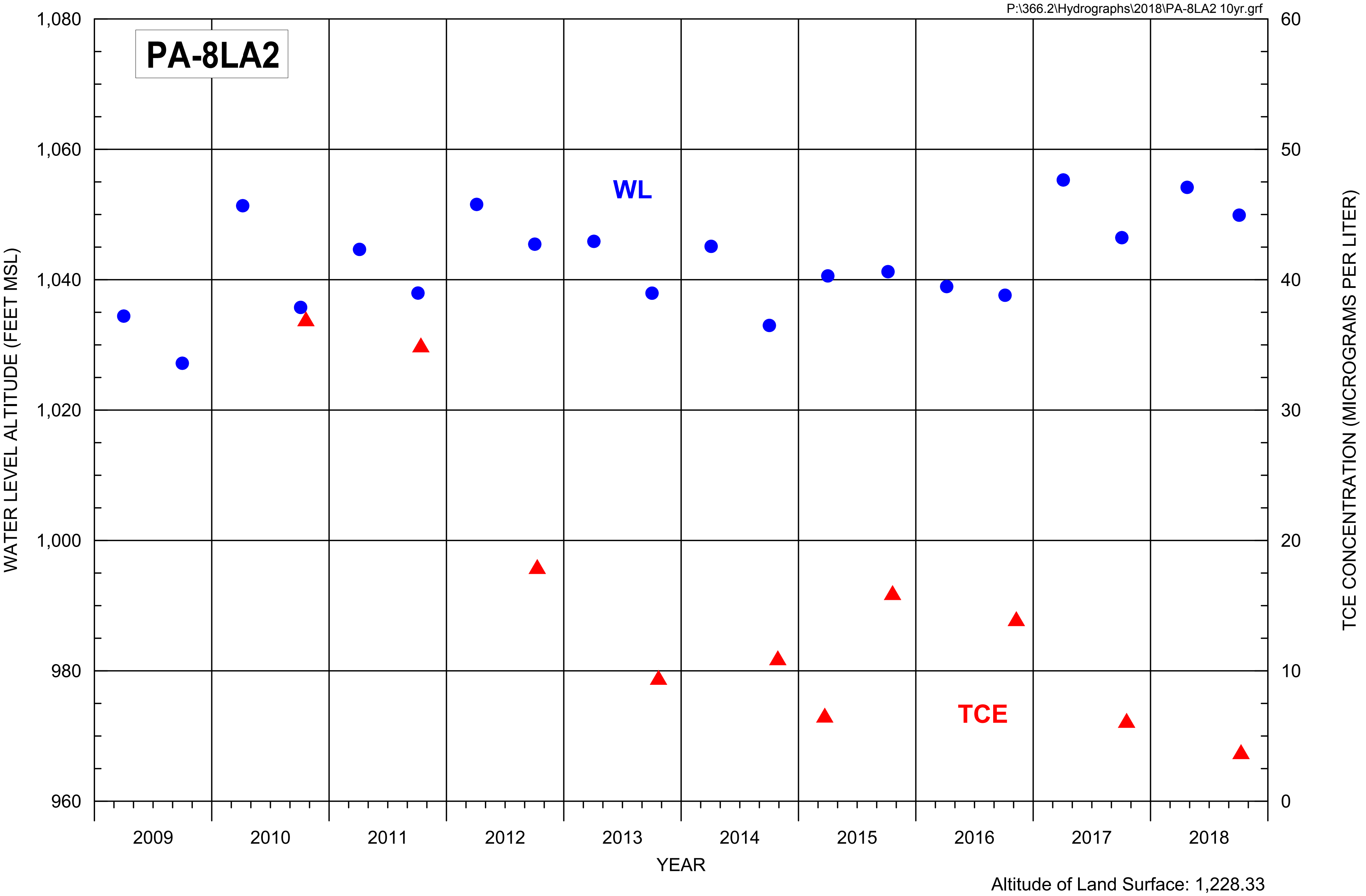


FIGURE C-62. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-8LA2

North Indian Bend Wash Superfund Site

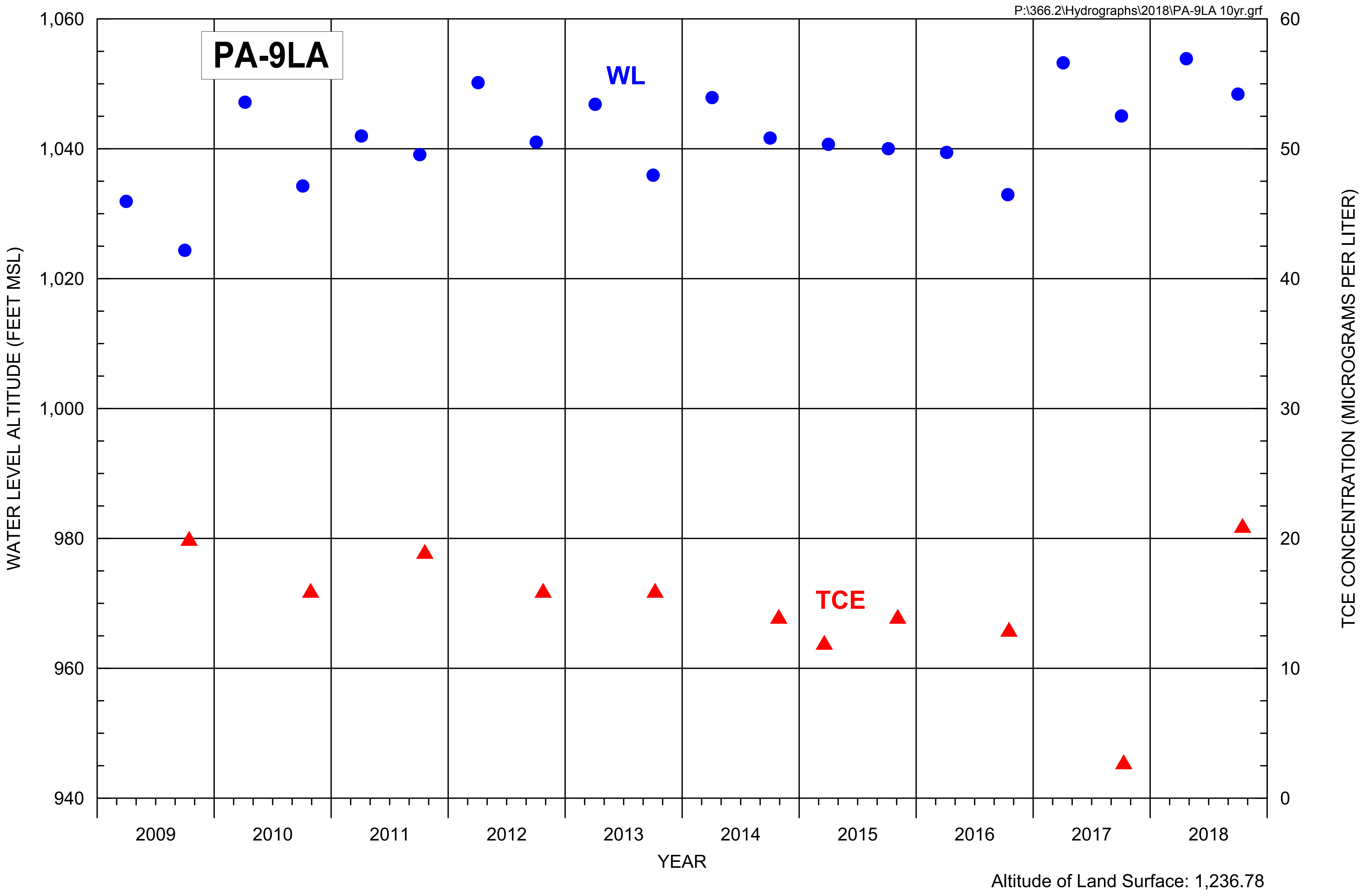


FIGURE C-63. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-9LA

North Indian Bend Wash Superfund Site

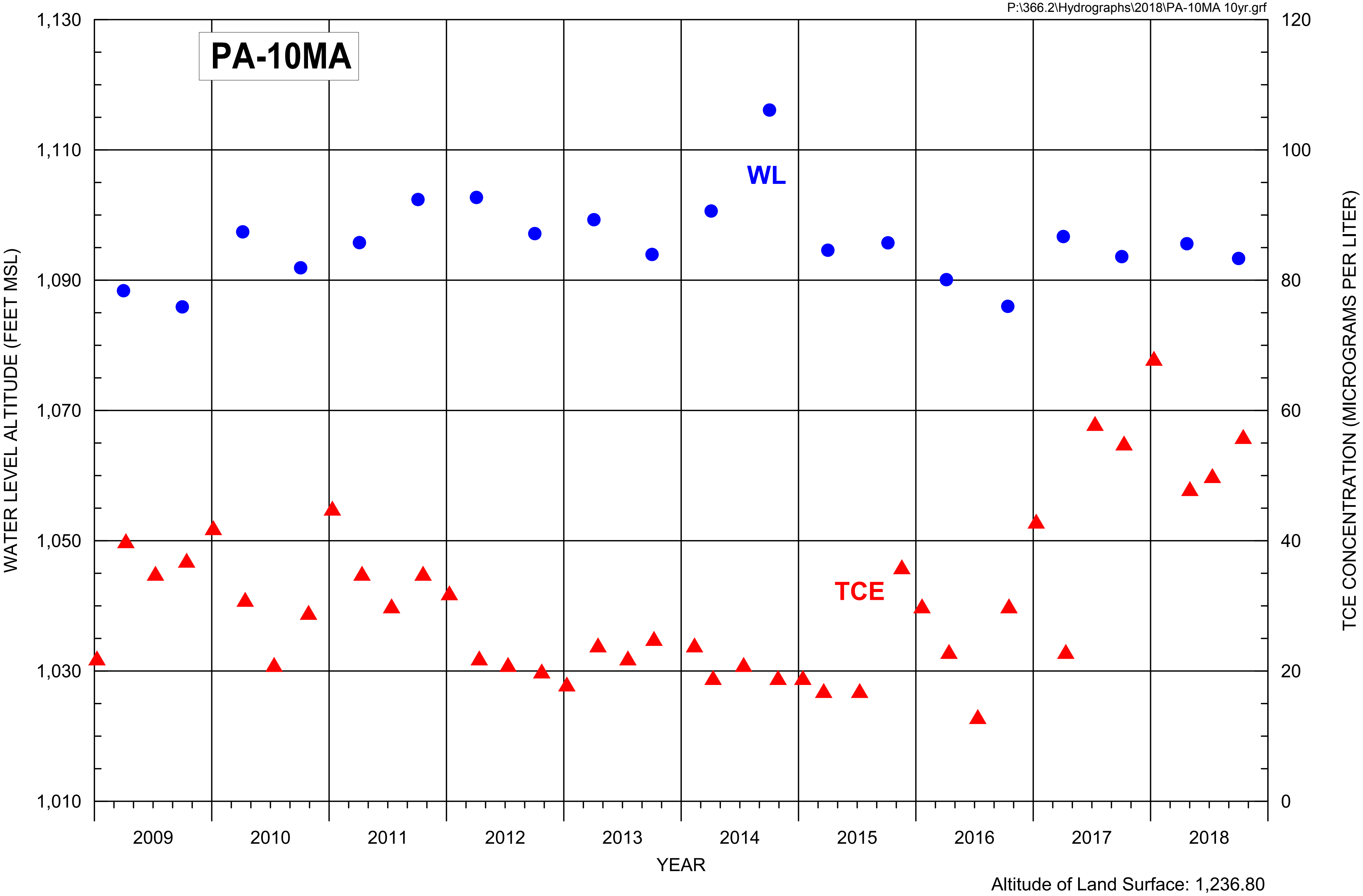
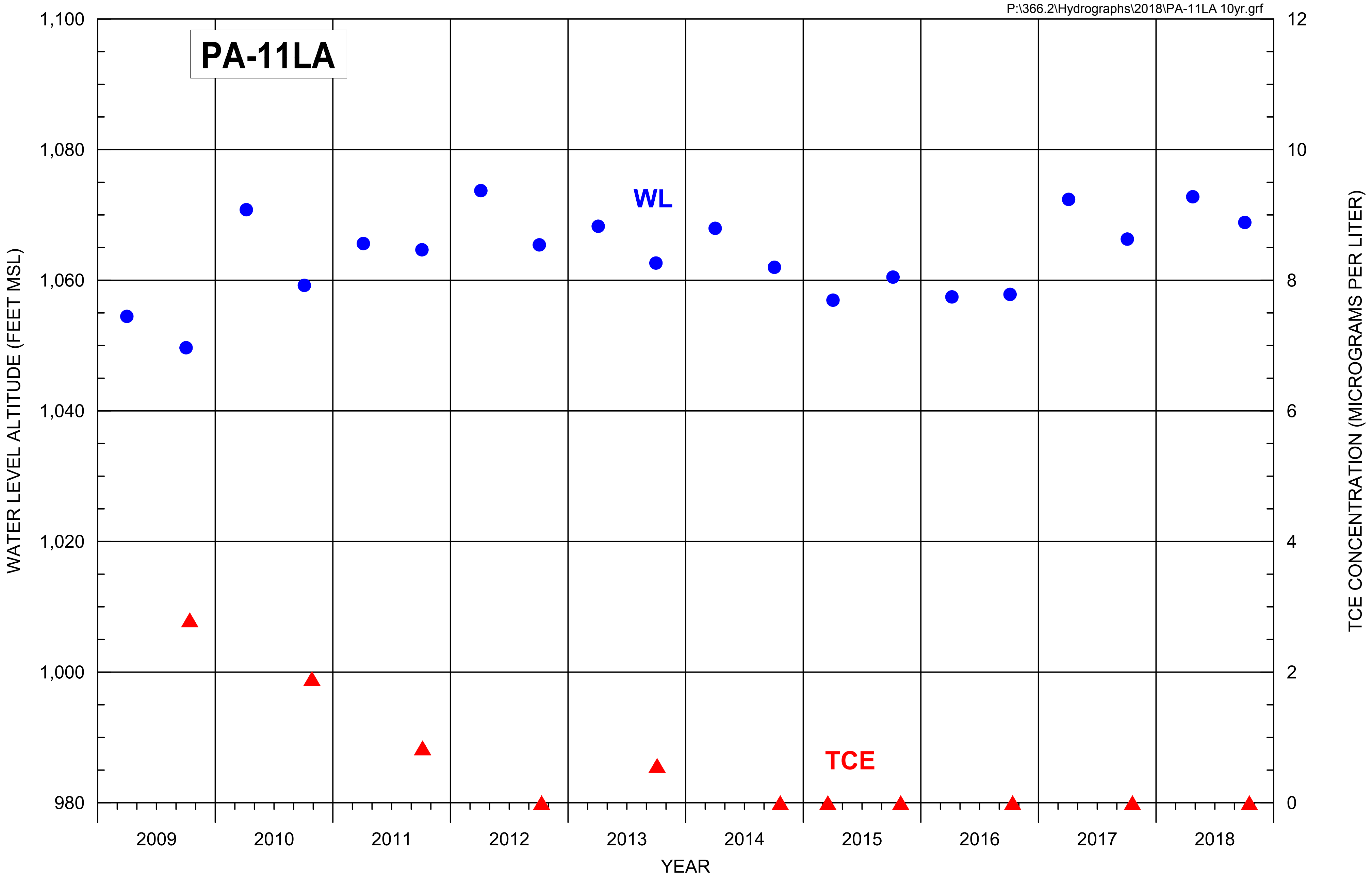


FIGURE C-64. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-10MA

North Indian Bend Wash Superfund Site

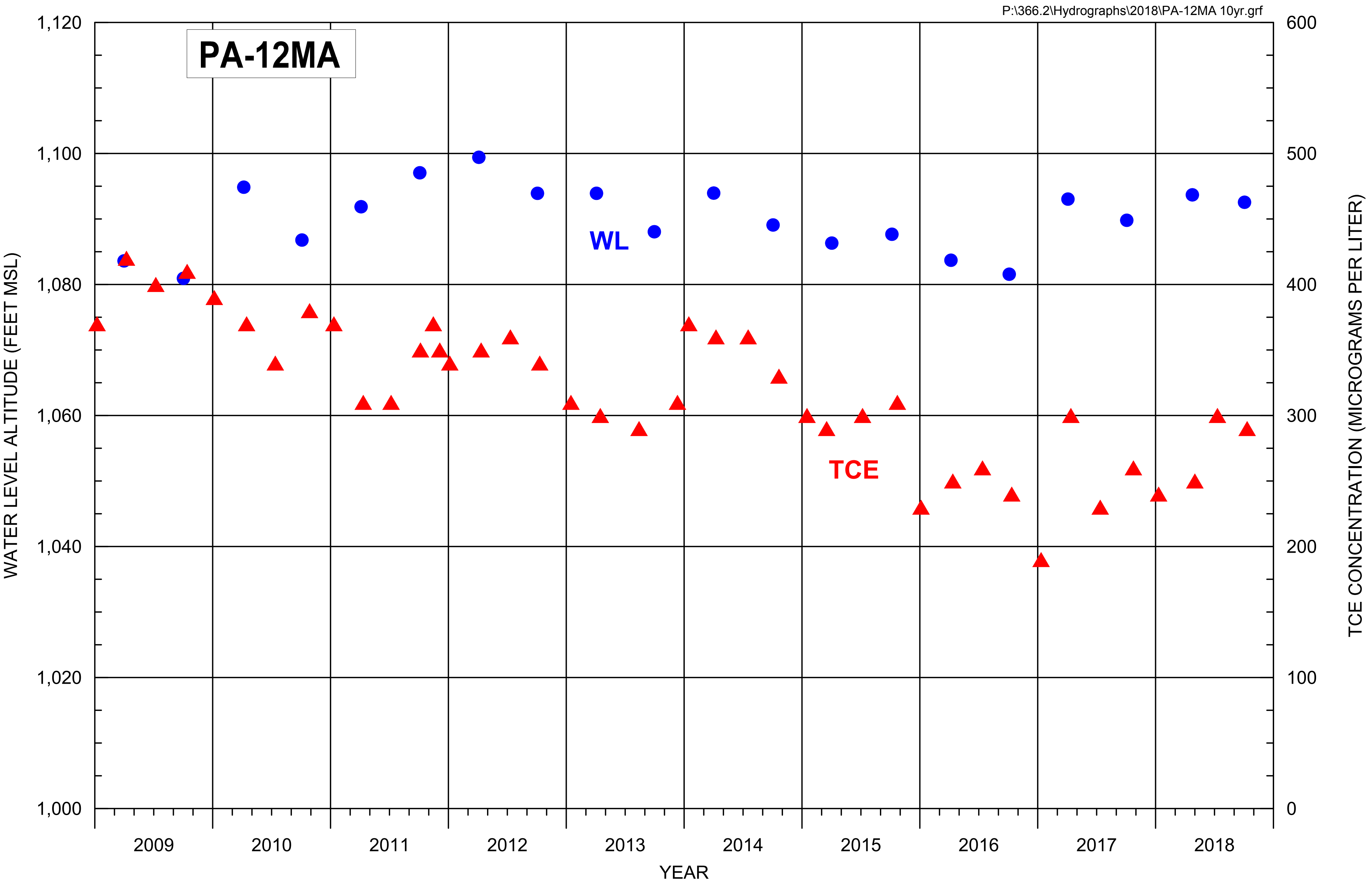


Altitude of Land Surface: 1,224.96

FIGURE C-65. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-11LA

Note: Water level collected from LAU completed well at piezometer PA-11/12
located approximately 80 feet northwest of original well PA-11LA.
Results shown as having a concentration of '0' represent samples
where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,224.96

FIGURE C-66. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-12MA

Note: Water level collected from MAU completed well at piezometer PA-11/12
located approximately 70 feet northwest of original well PA-12MA.

North Indian Bend Wash Superfund Site

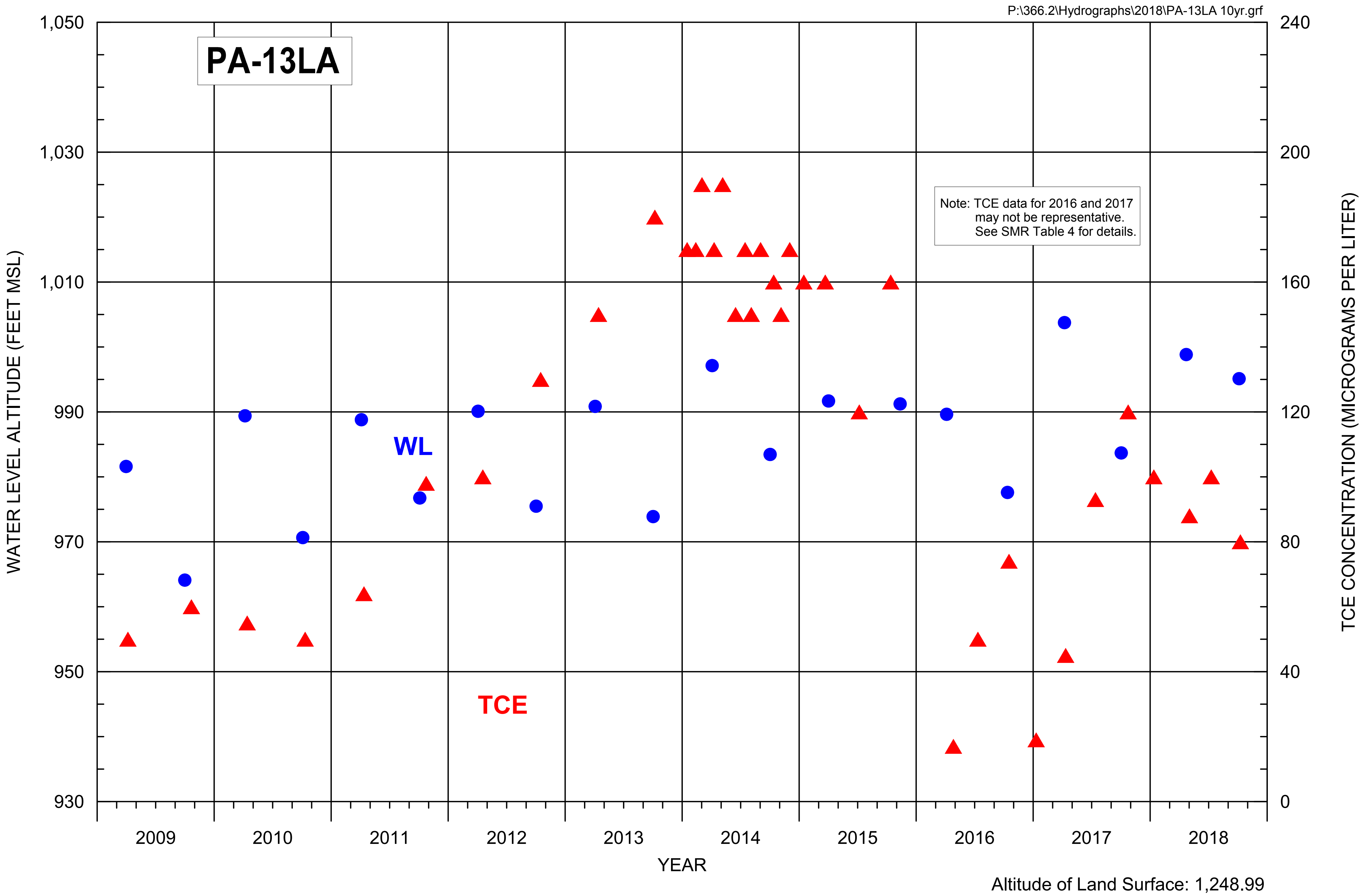
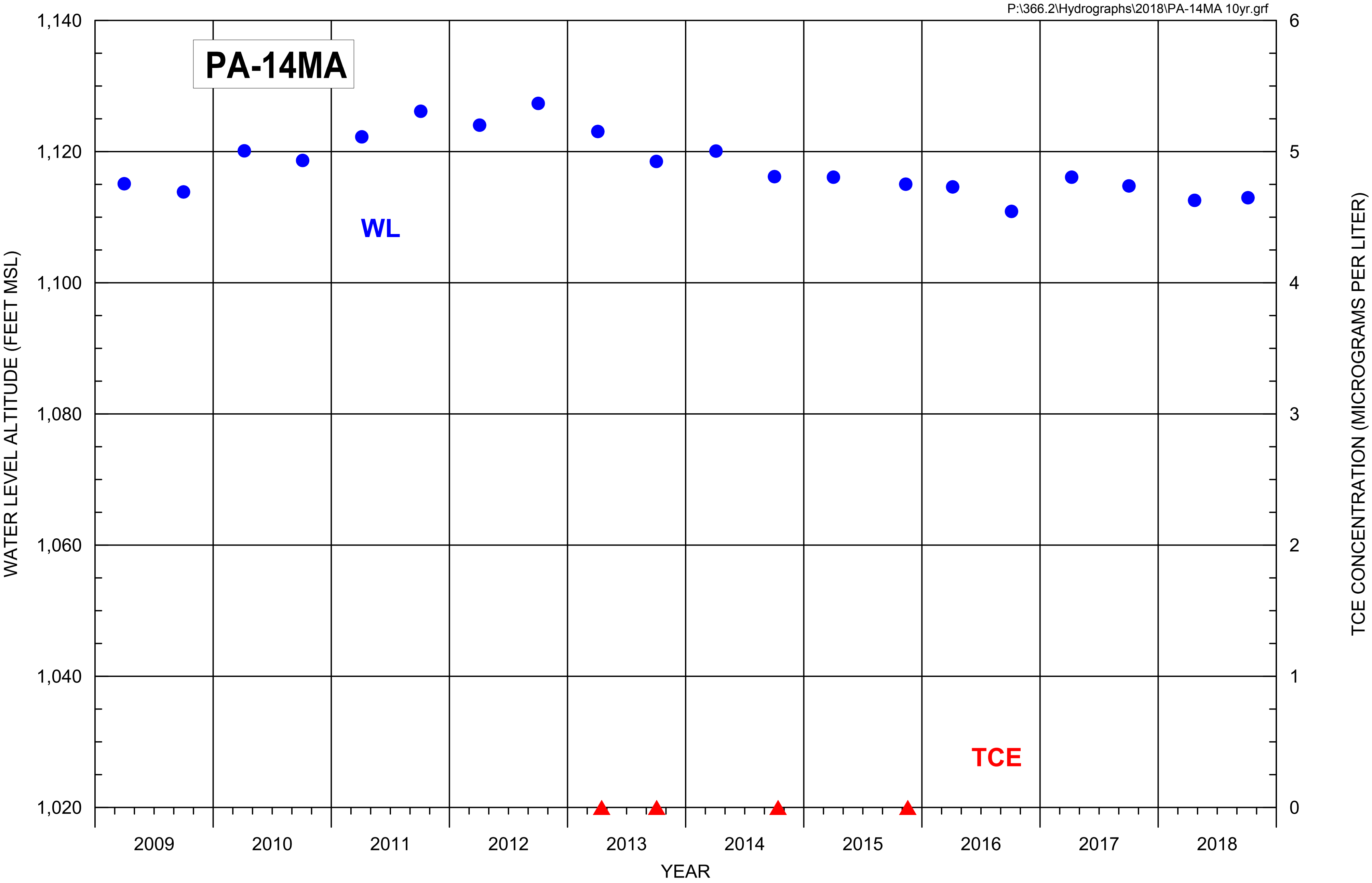


FIGURE C-67. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-13LA

North Indian Bend Wash Superfund Site

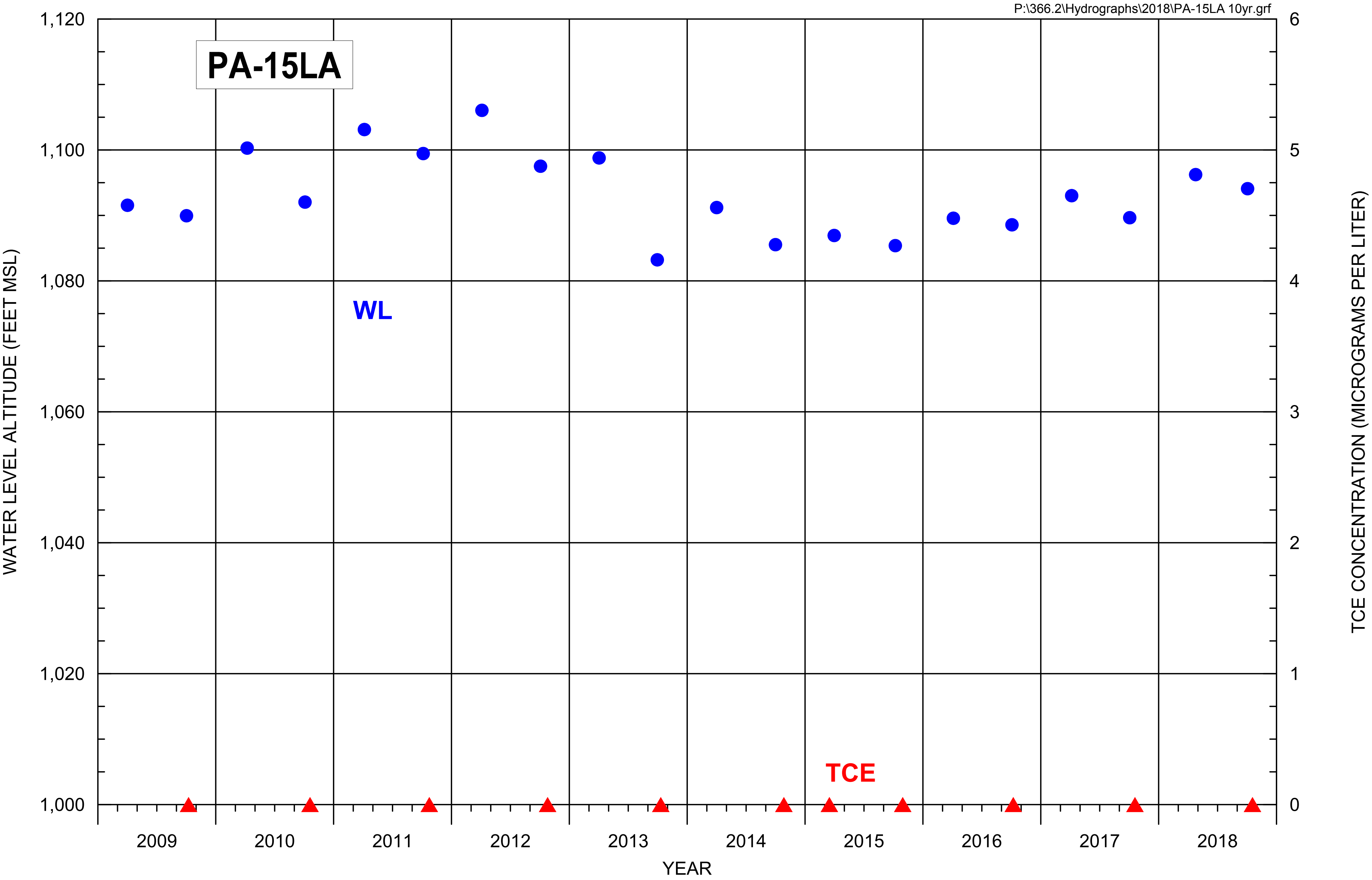


Altitude of Land Surface: 1,249.09

FIGURE C-68. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-14MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,204.28

FIGURE C-69. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-15LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

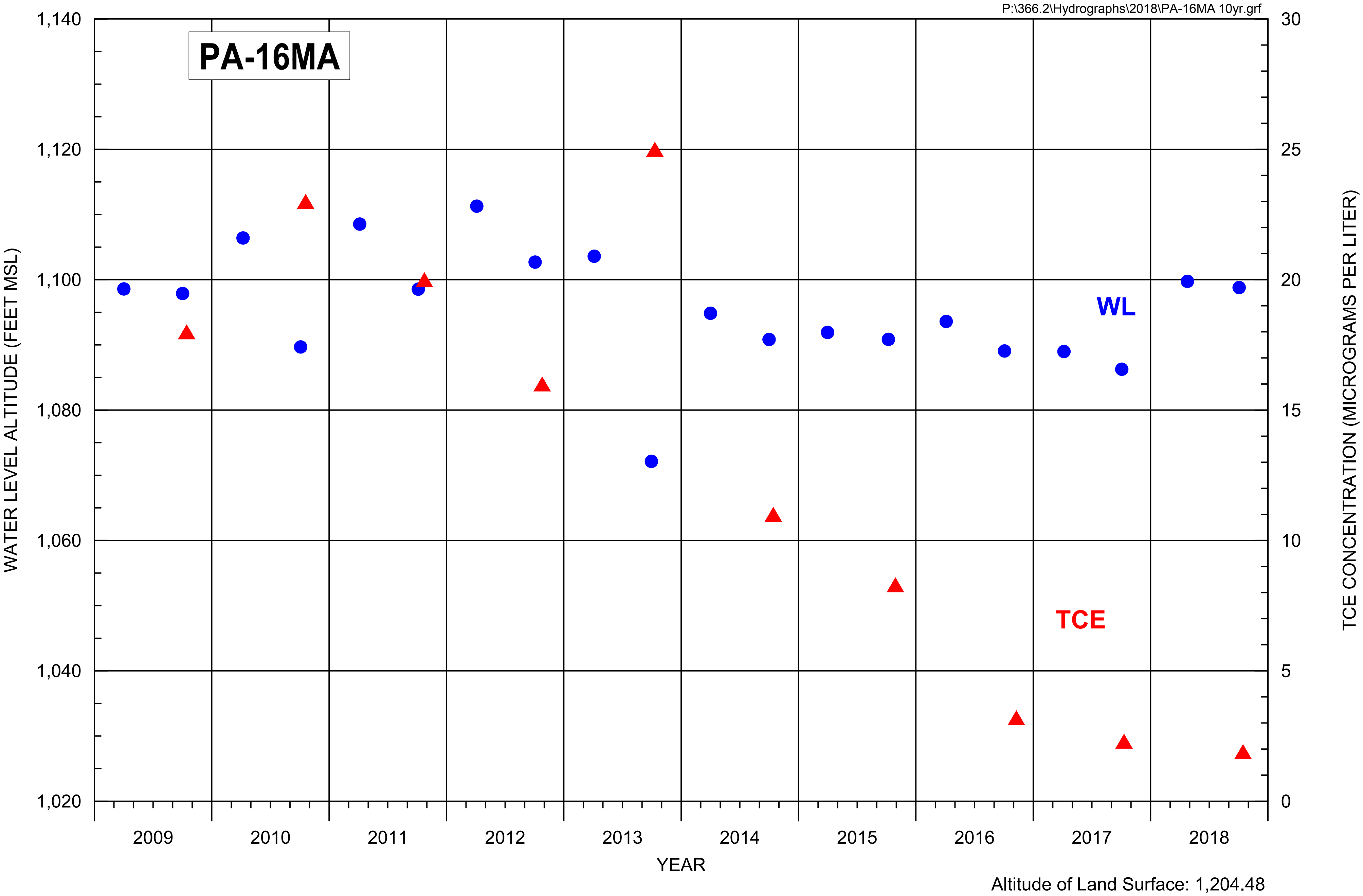
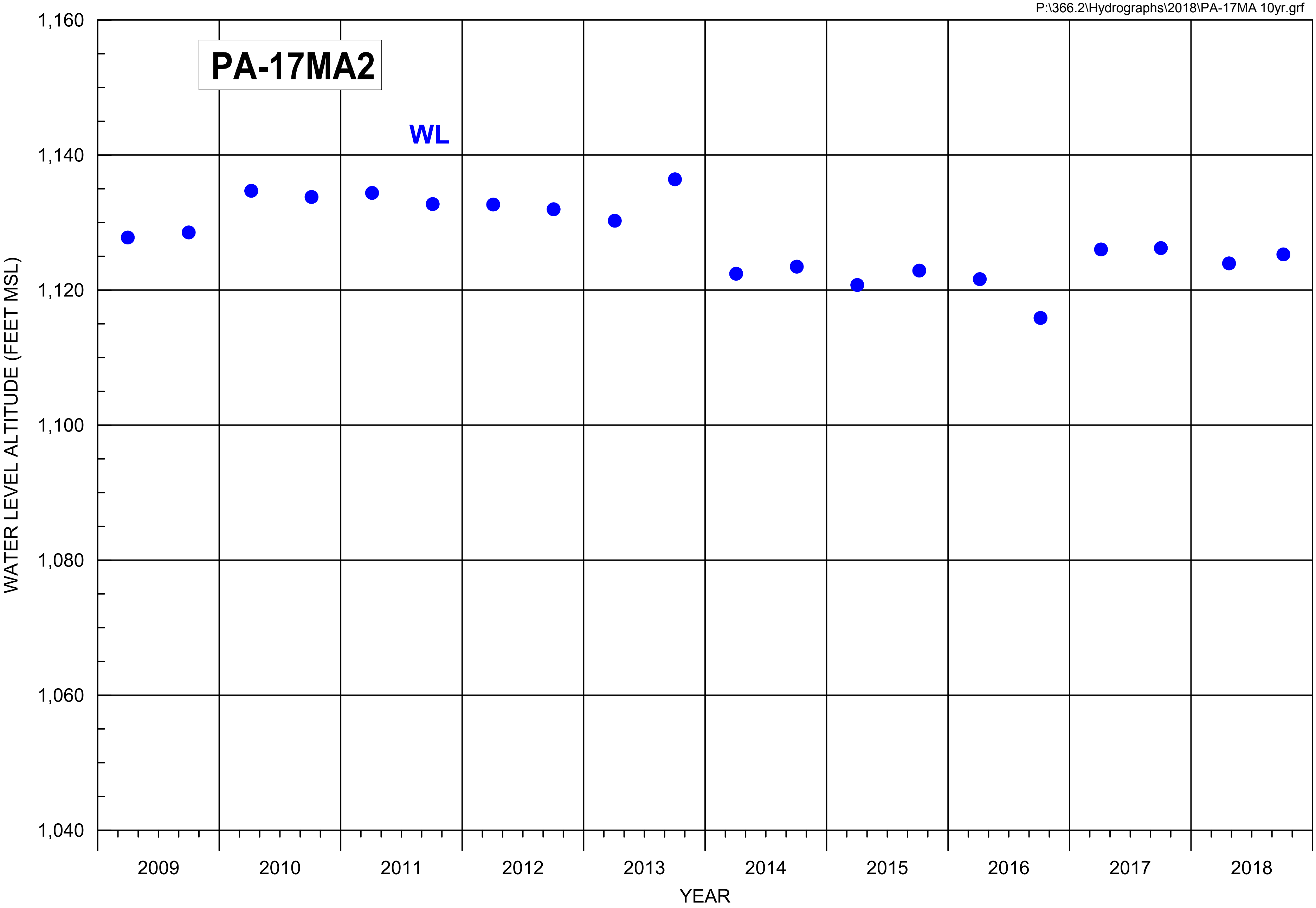


FIGURE C-70. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-16MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,238.70

FIGURE C-71. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-17MA2

North Indian Bend Wash Superfund Site

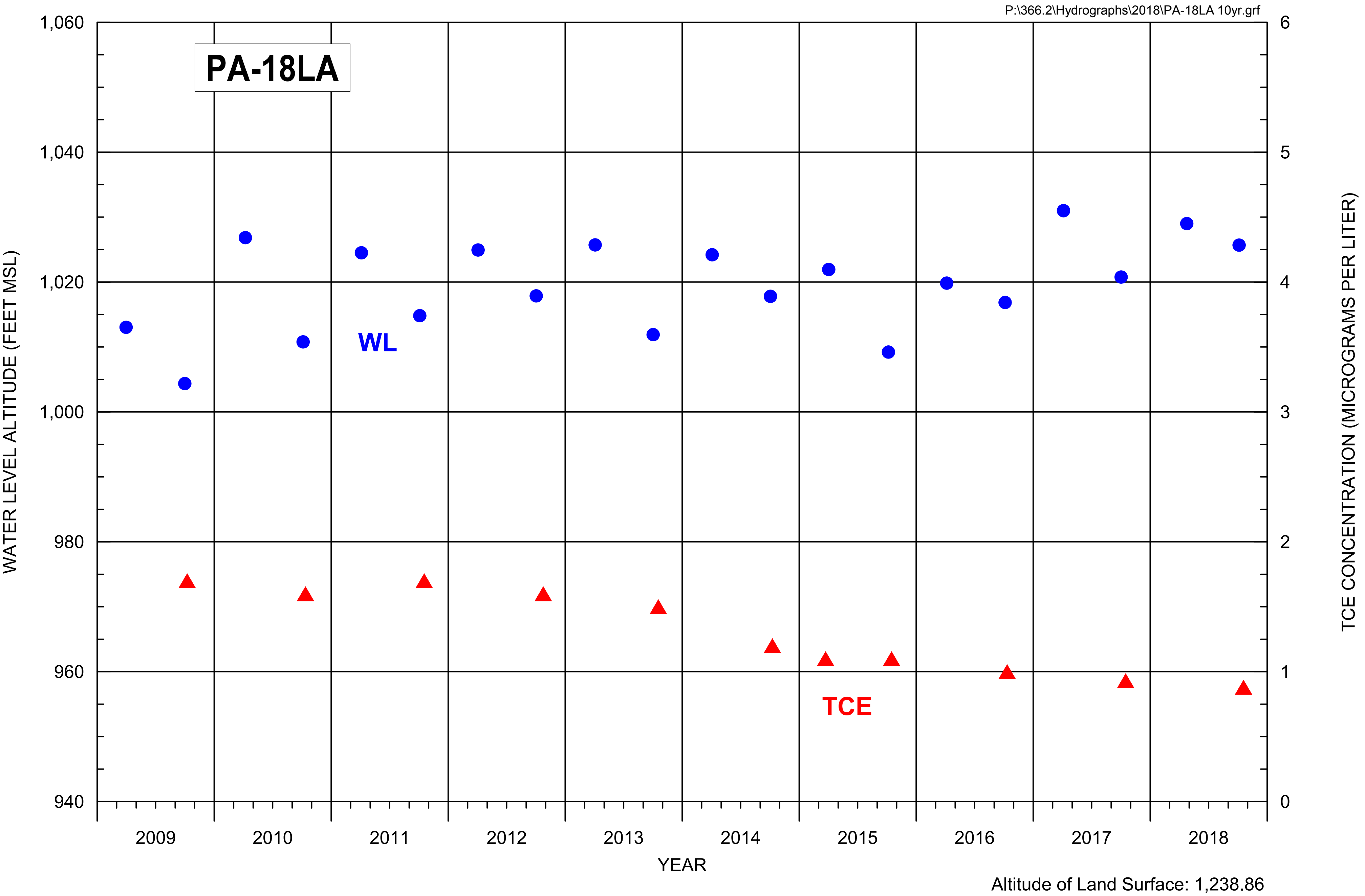
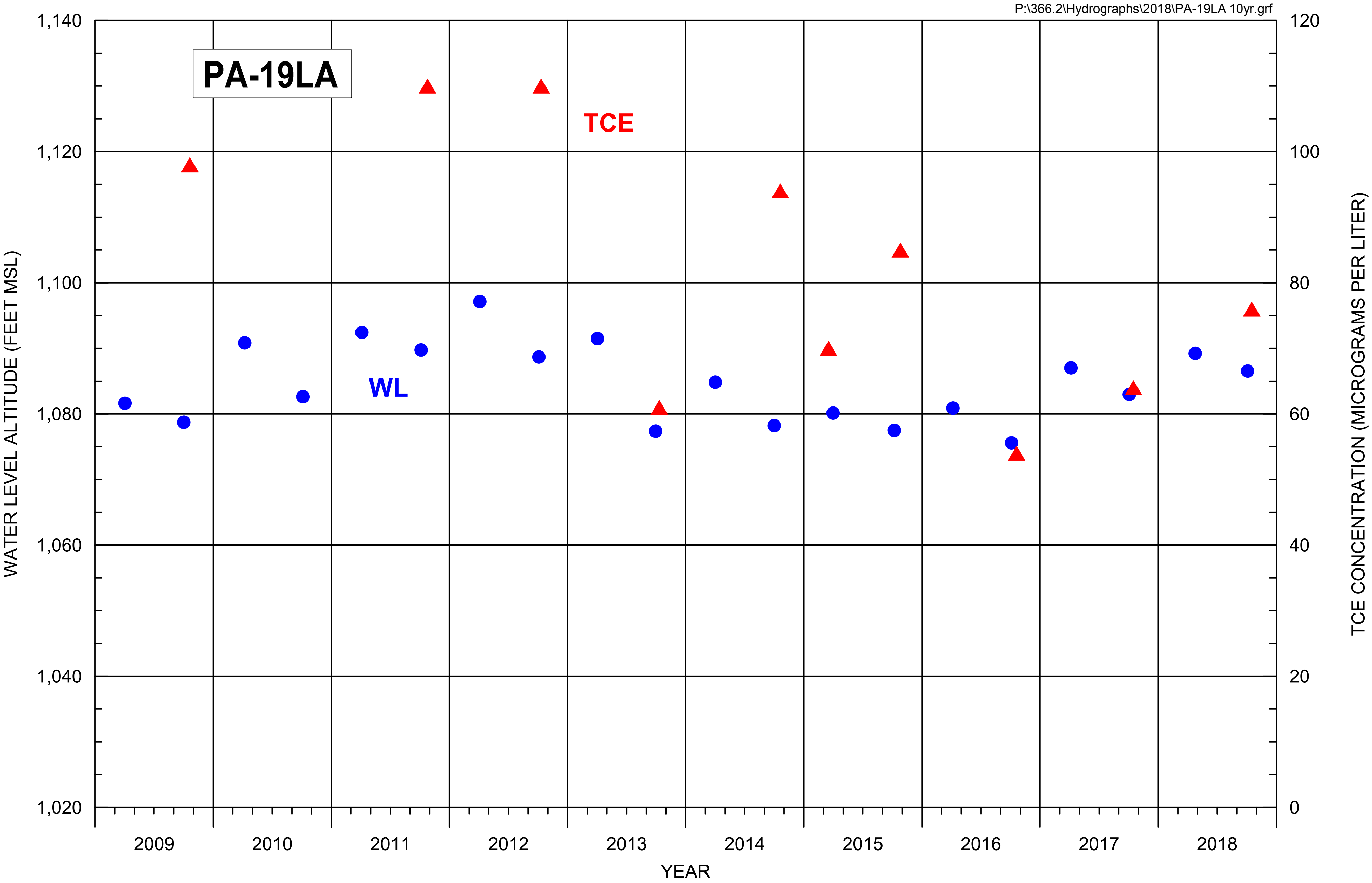


FIGURE C-72. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-18LA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,221.46

FIGURE C-73. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-19LA

North Indian Bend Wash Superfund Site

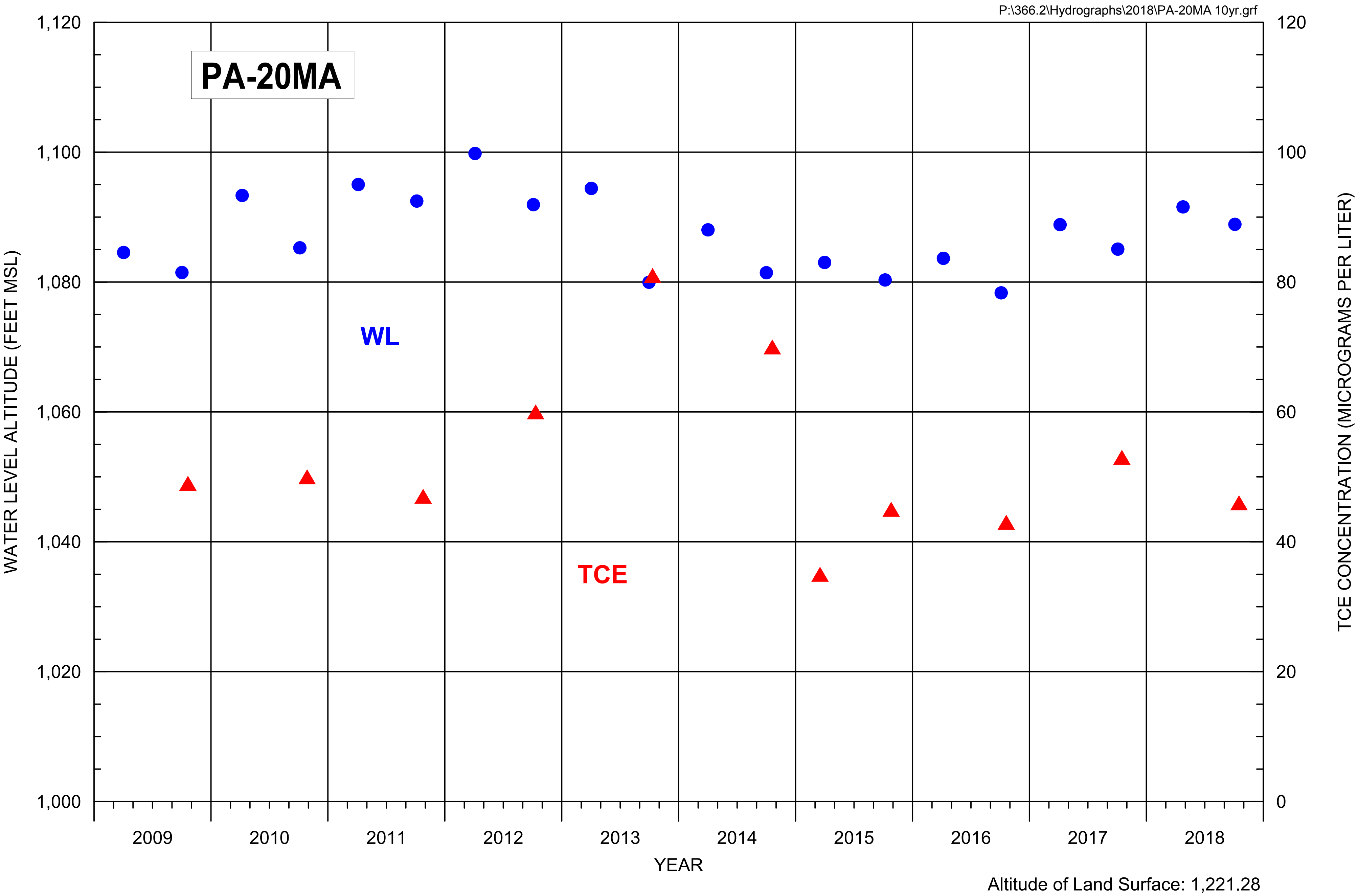


FIGURE C-74. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-20MA

North Indian Bend Wash Superfund Site

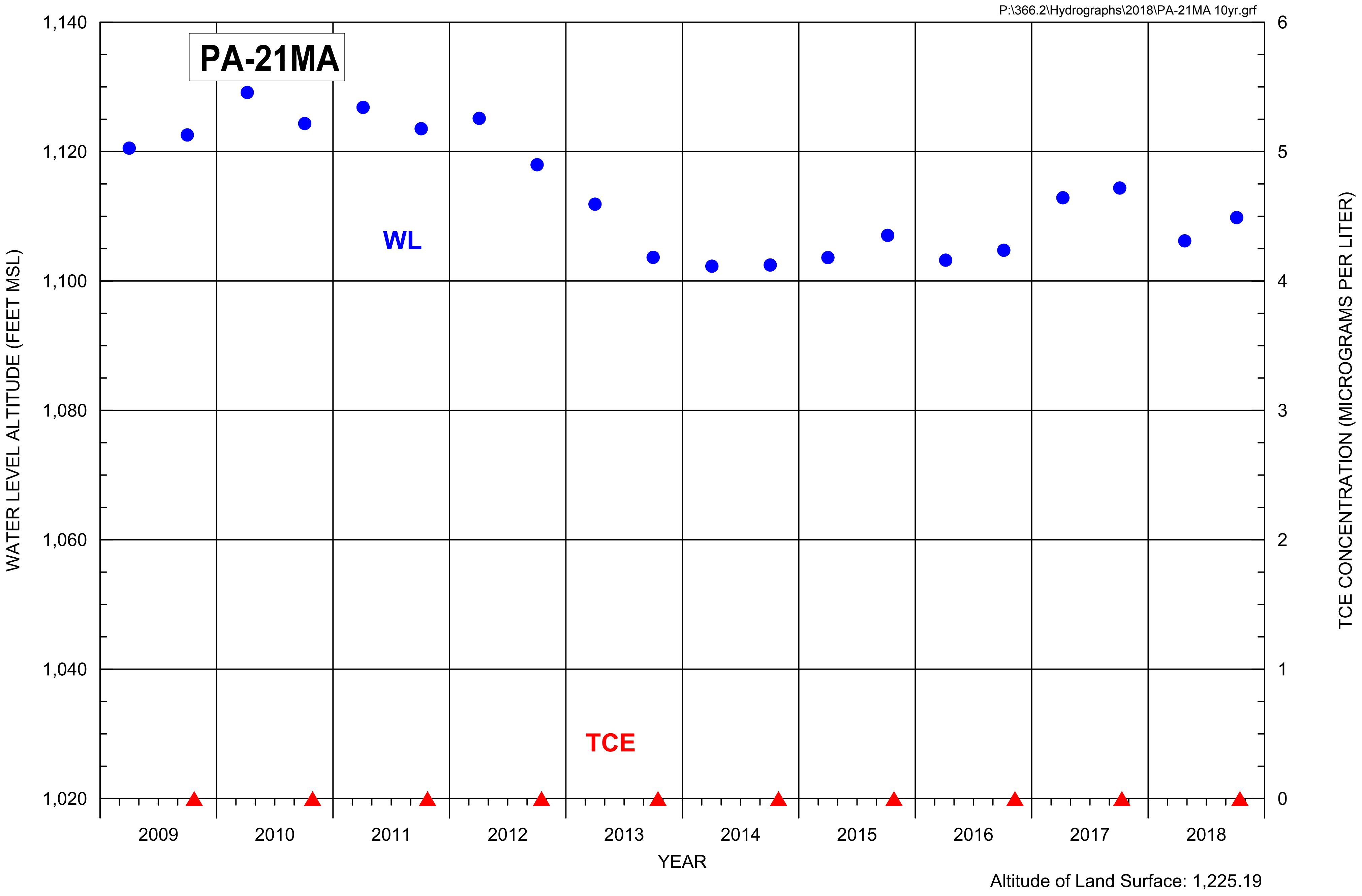


FIGURE C-75. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-21MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

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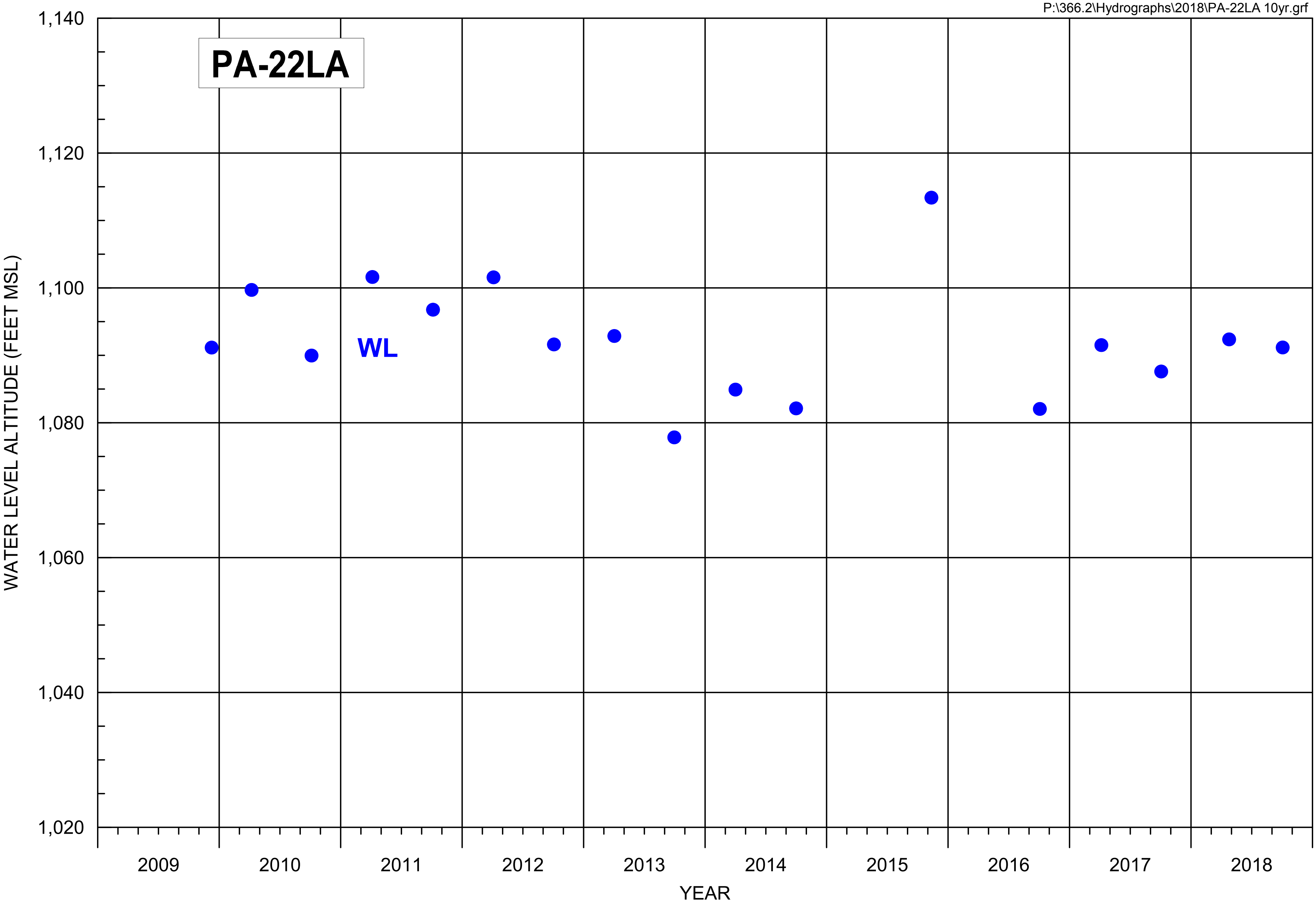


Altitude of Land Surface: 1,184.00

FIGURE C-76. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-22LA

North Indian Bend Wash Superfund Site

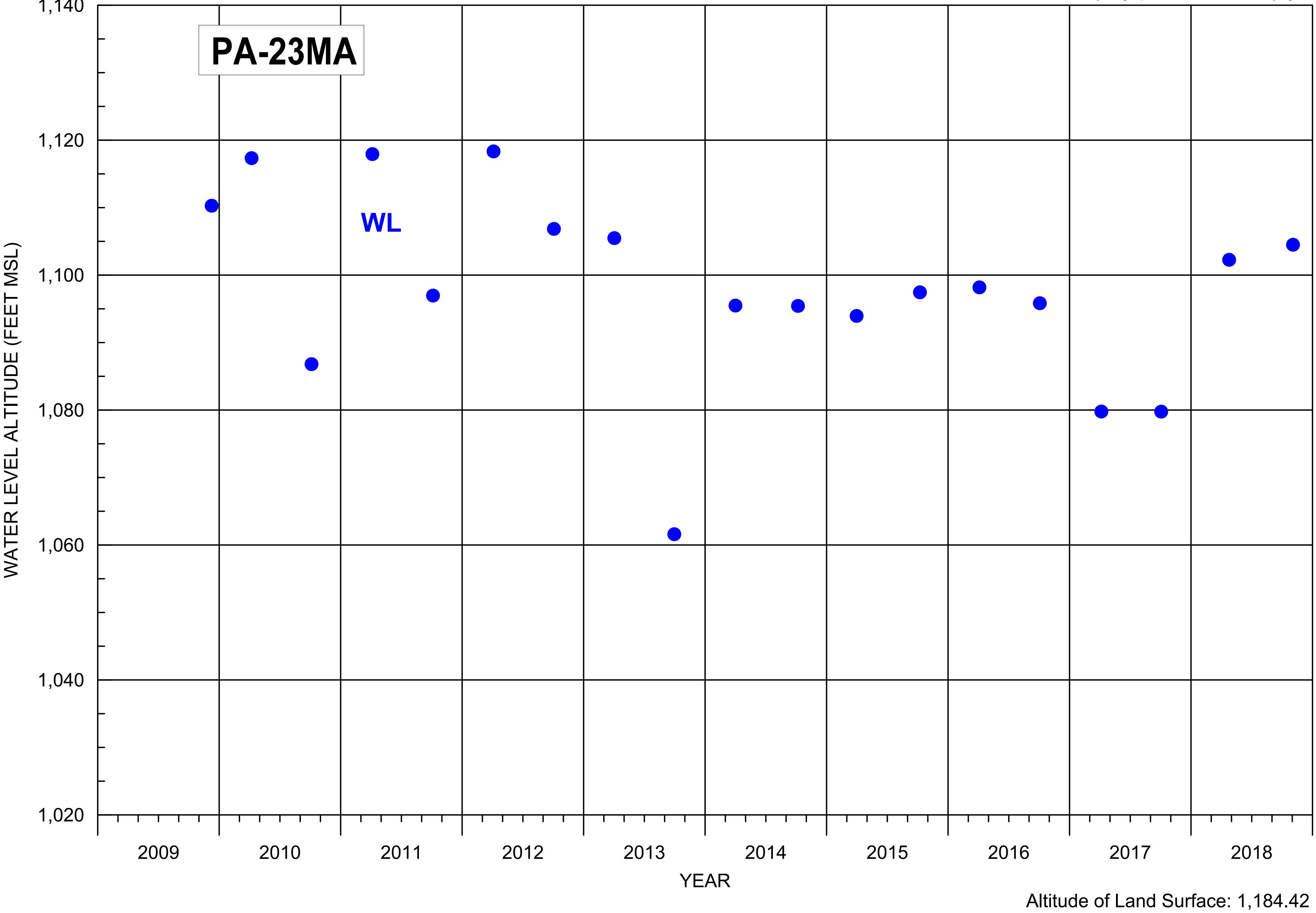


FIGURE C-77. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-23MA

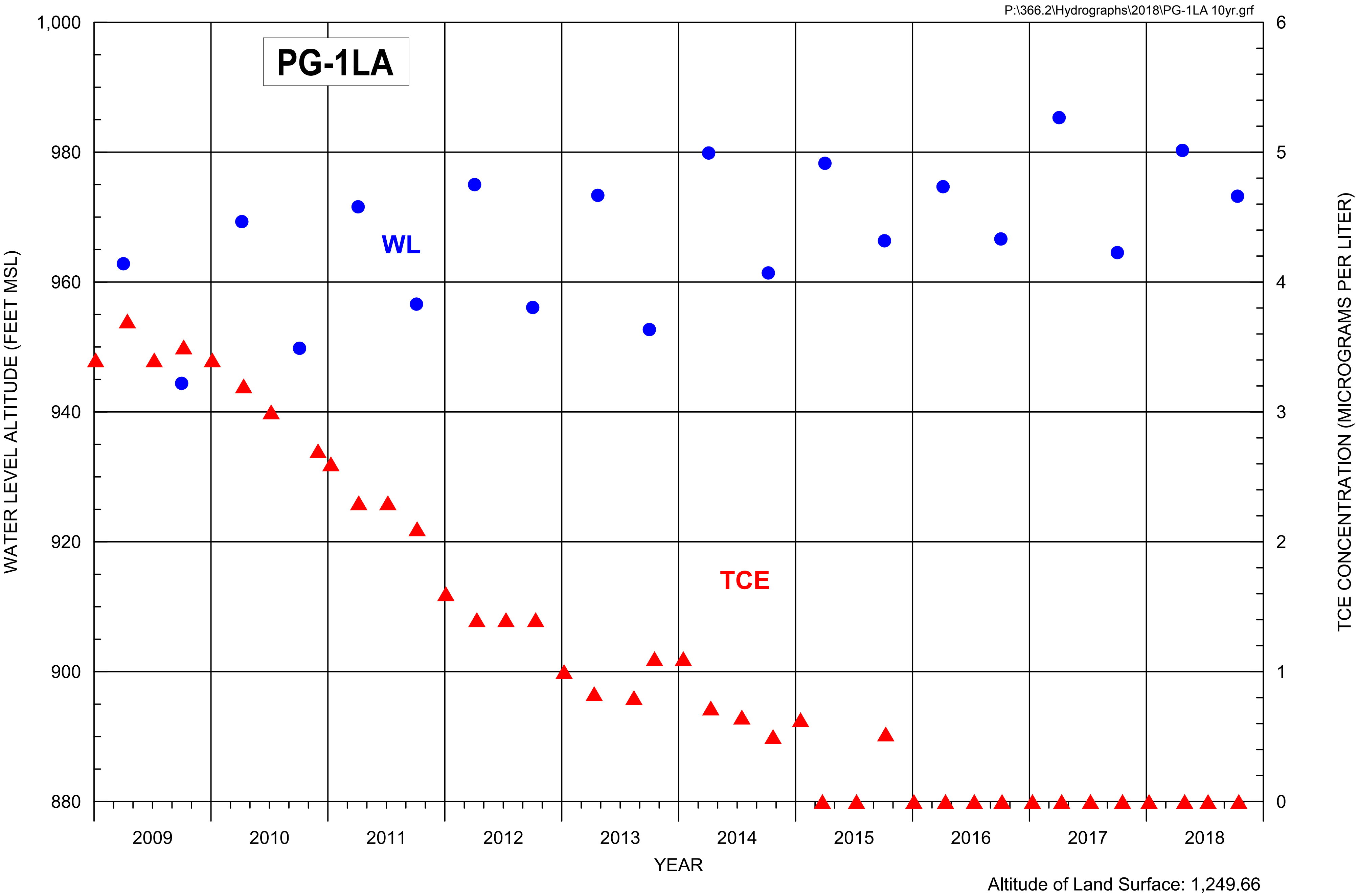


FIGURE C-78. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-1LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

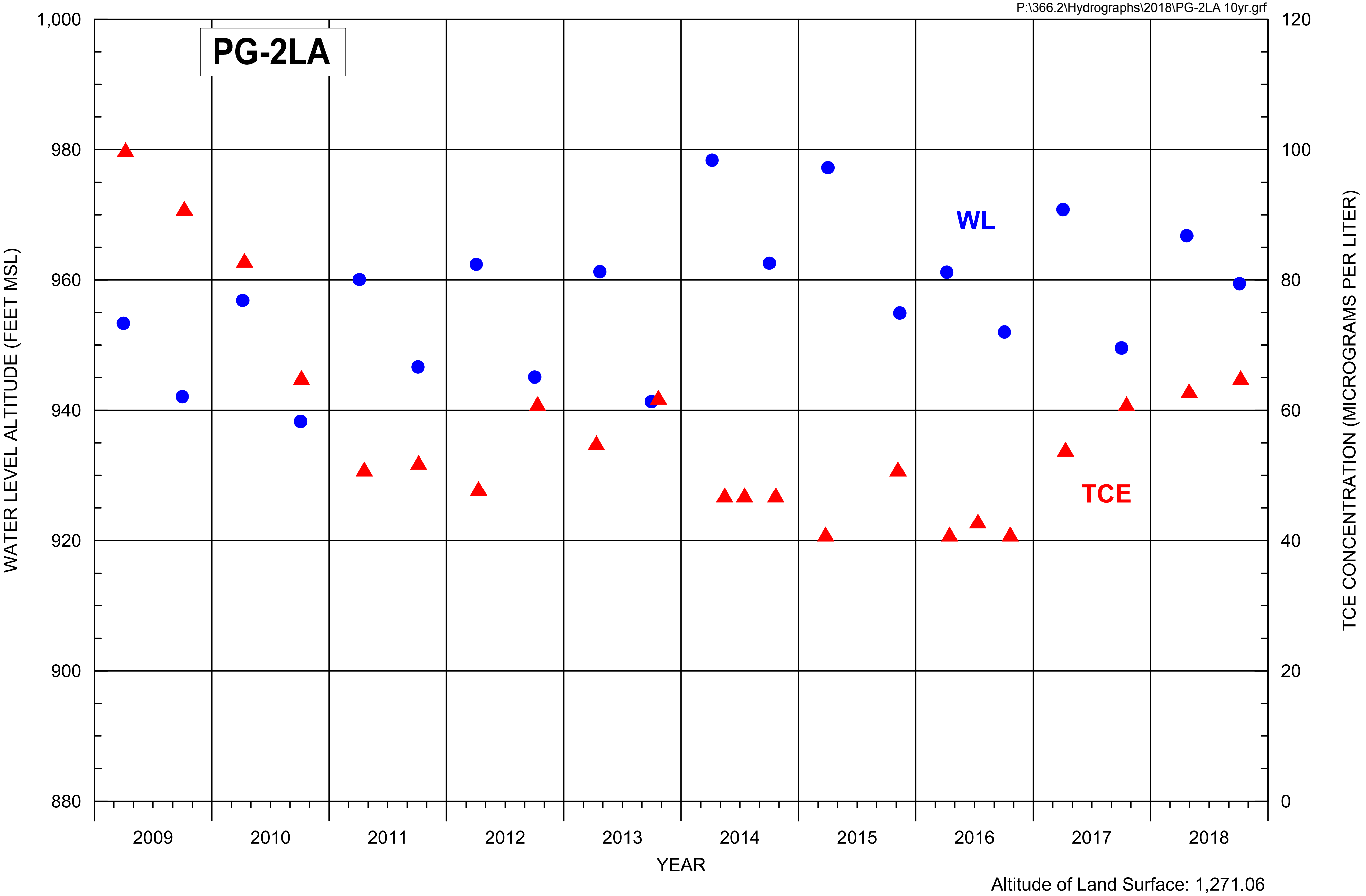


FIGURE C-79. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-2LA

North Indian Bend Wash Superfund Site

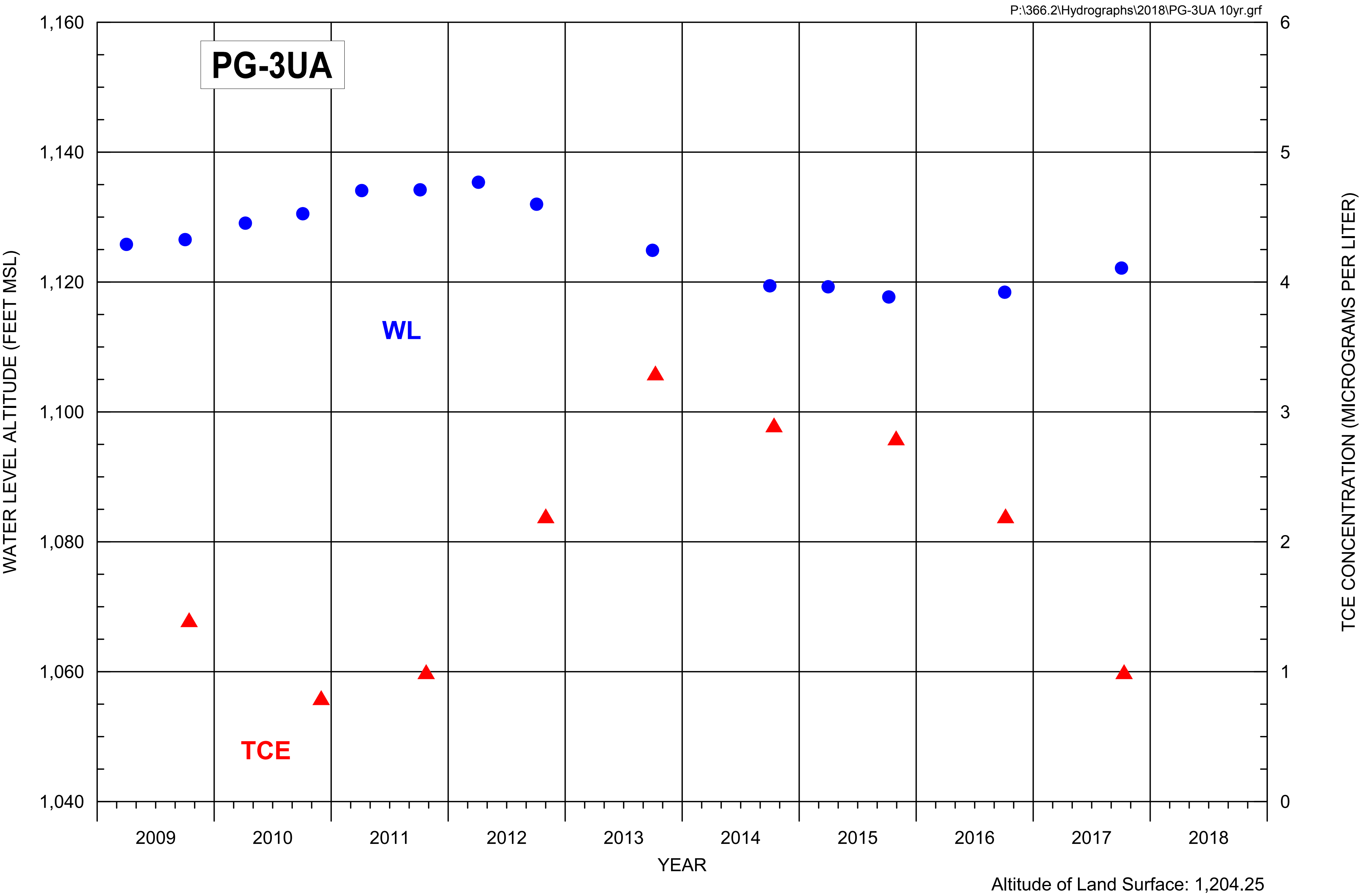


FIGURE C-80. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-3UA

Note: Well was abandoned 3/12/2018.

North Indian Bend Wash Superfund Site

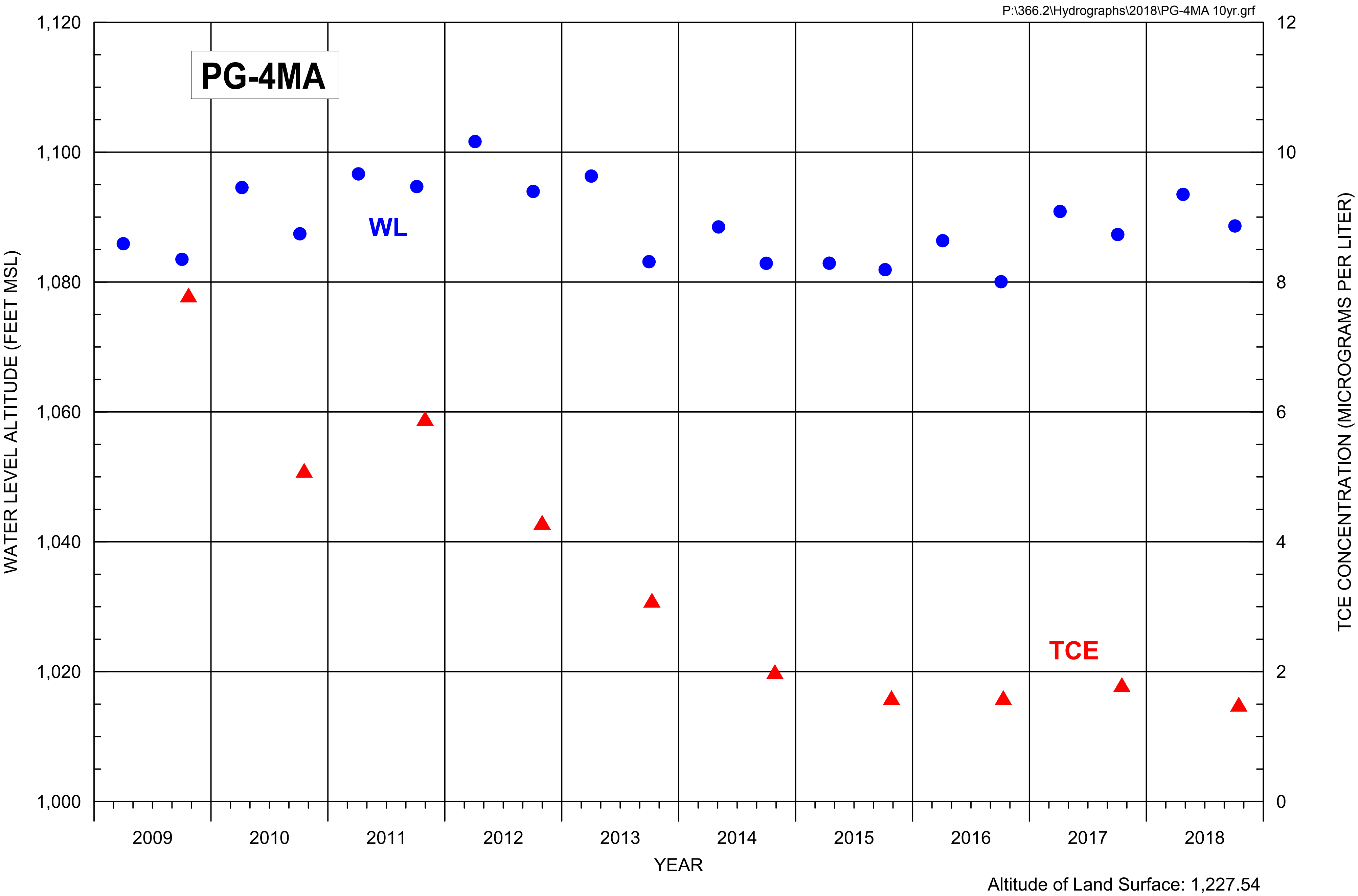
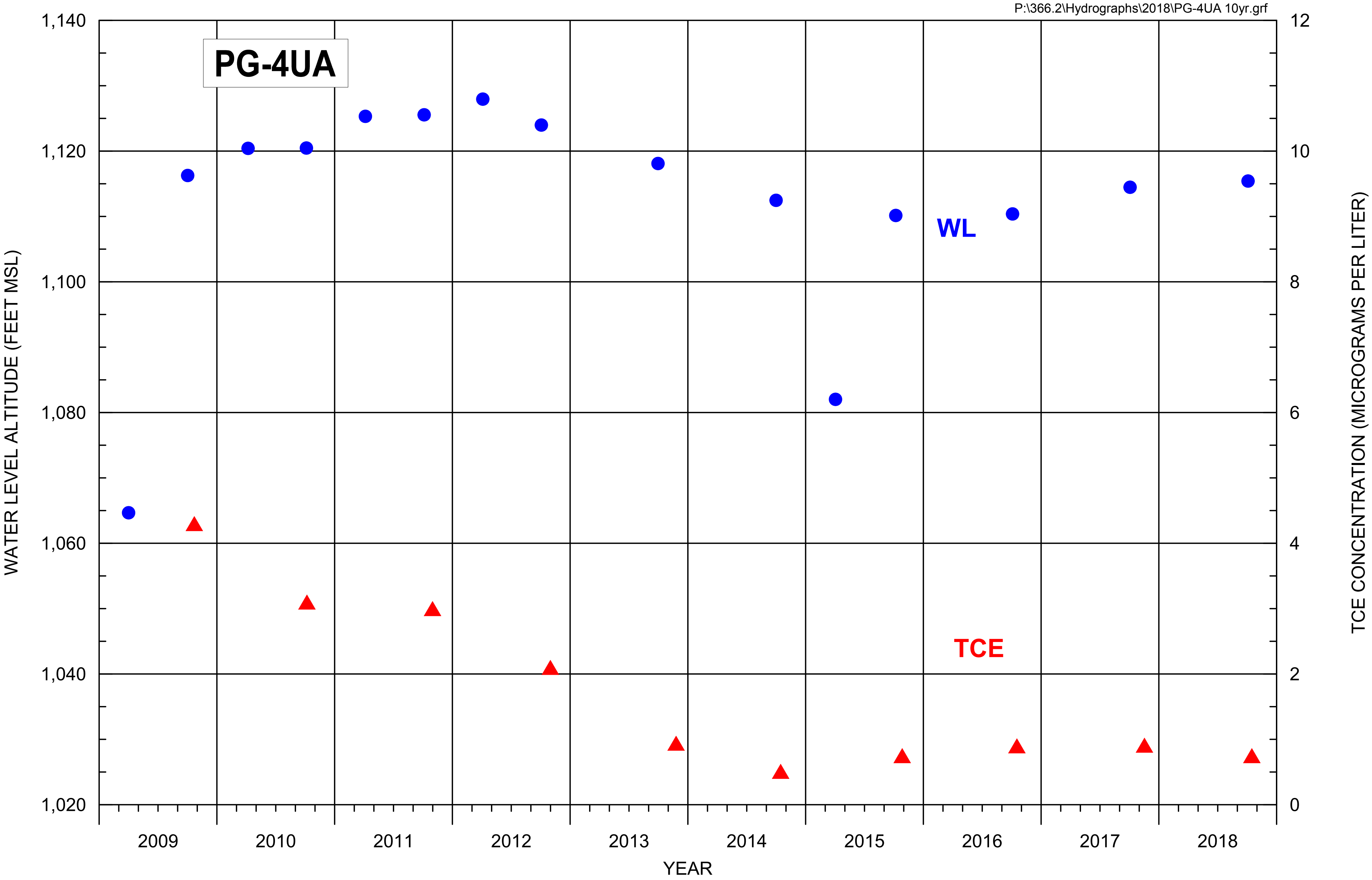


FIGURE C-81. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-4MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,227.83

FIGURE C-82. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-4UA

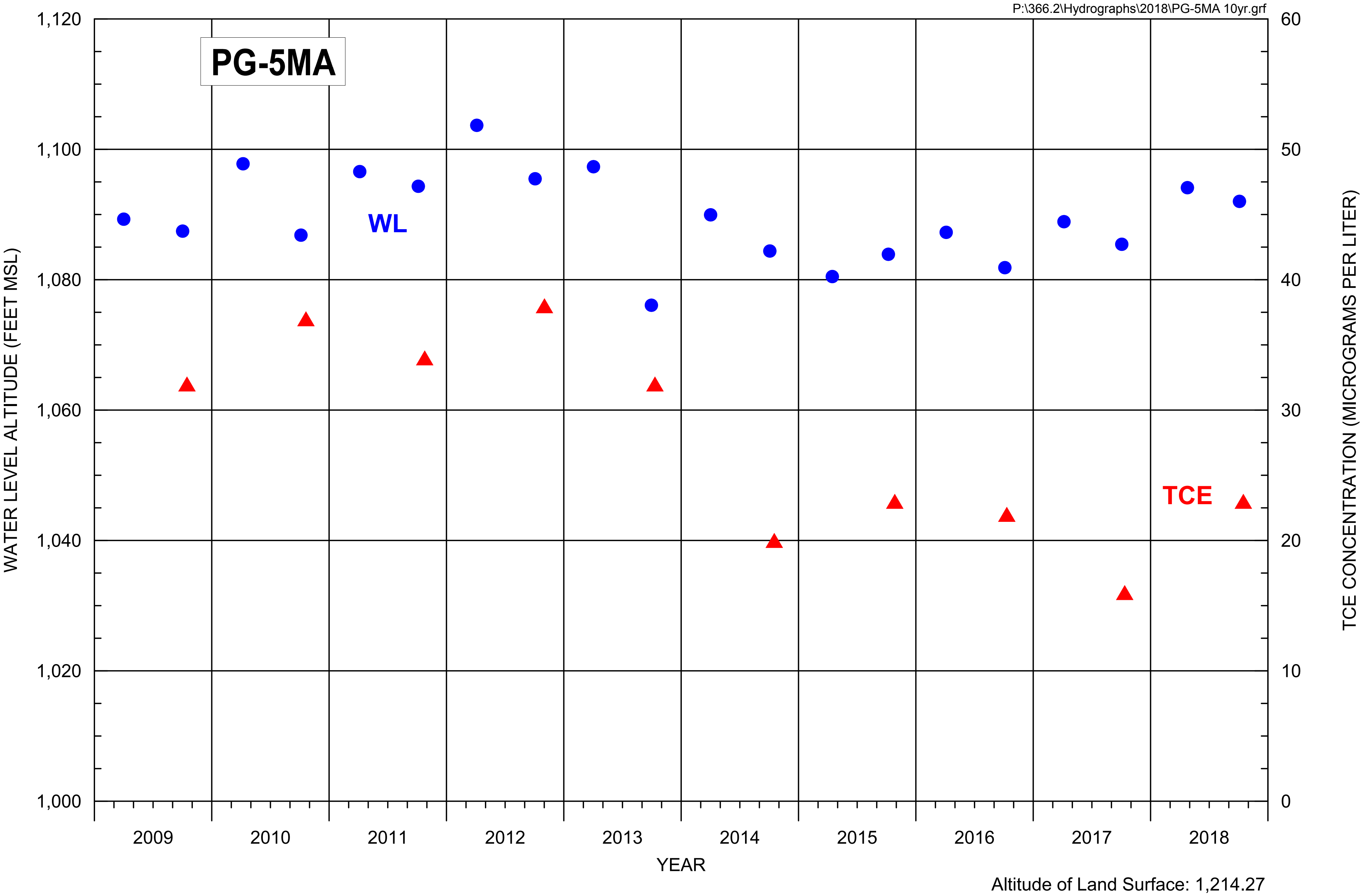


FIGURE C-83. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-5MA

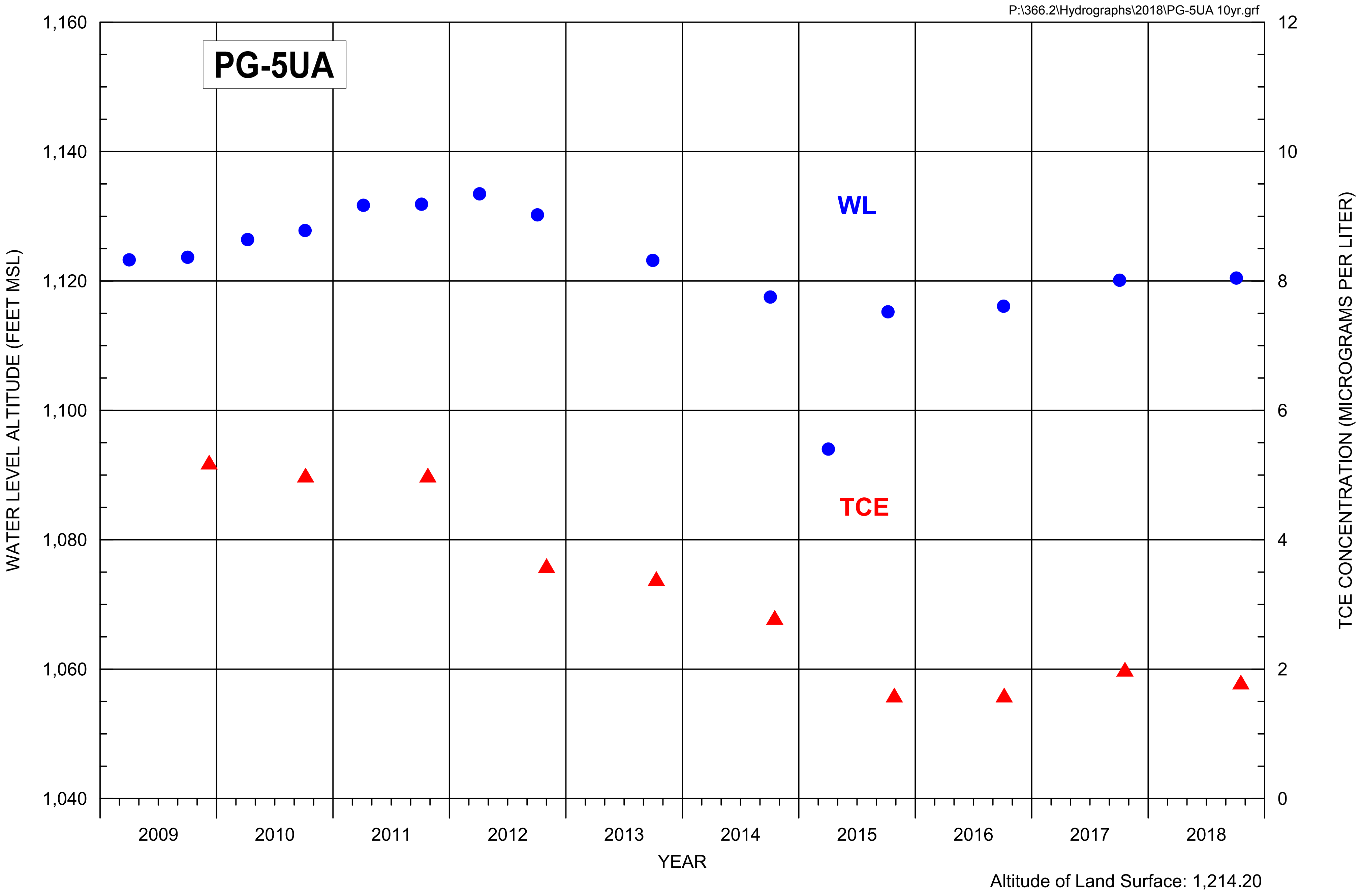
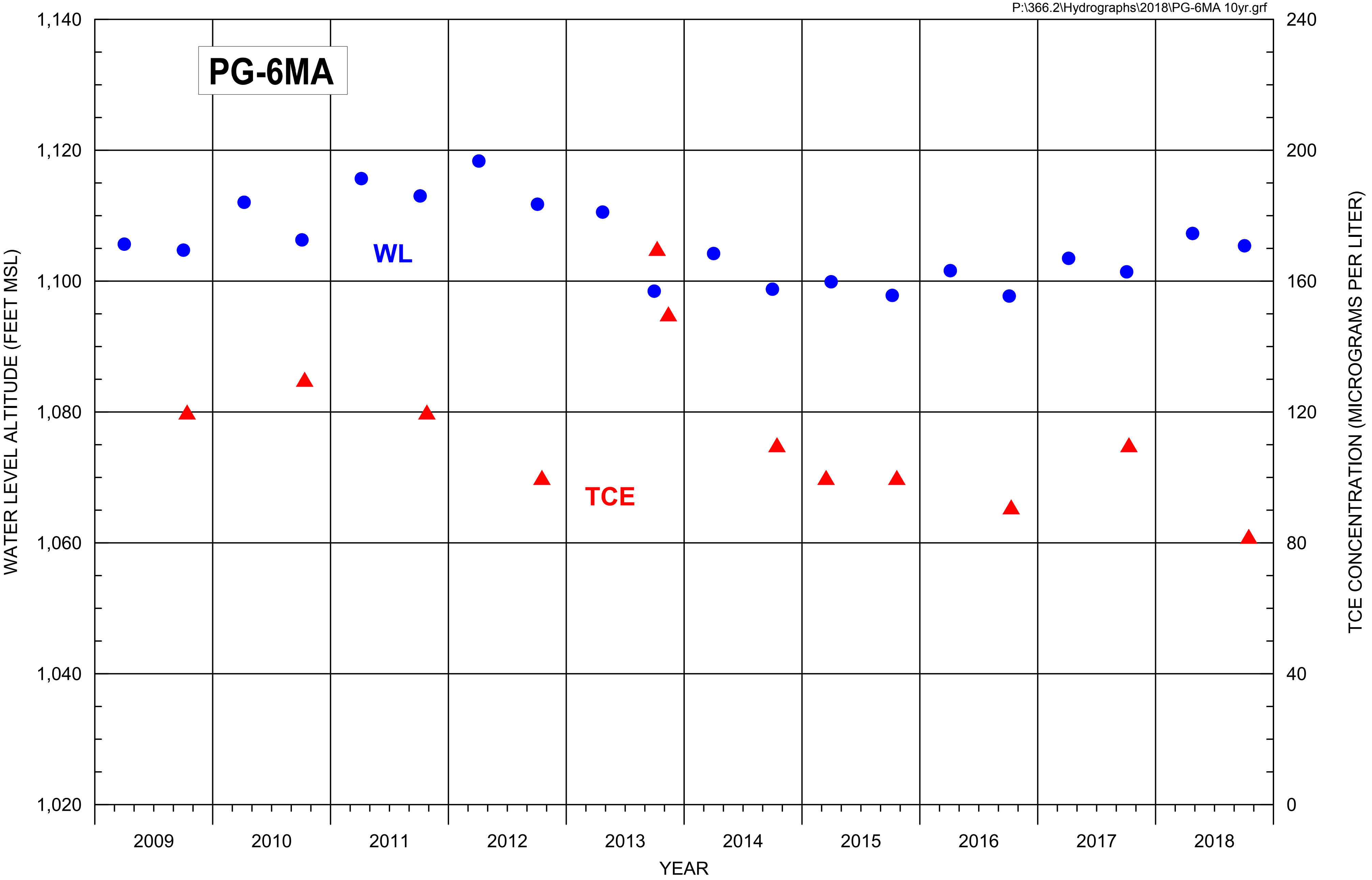


FIGURE C-84. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-5UA

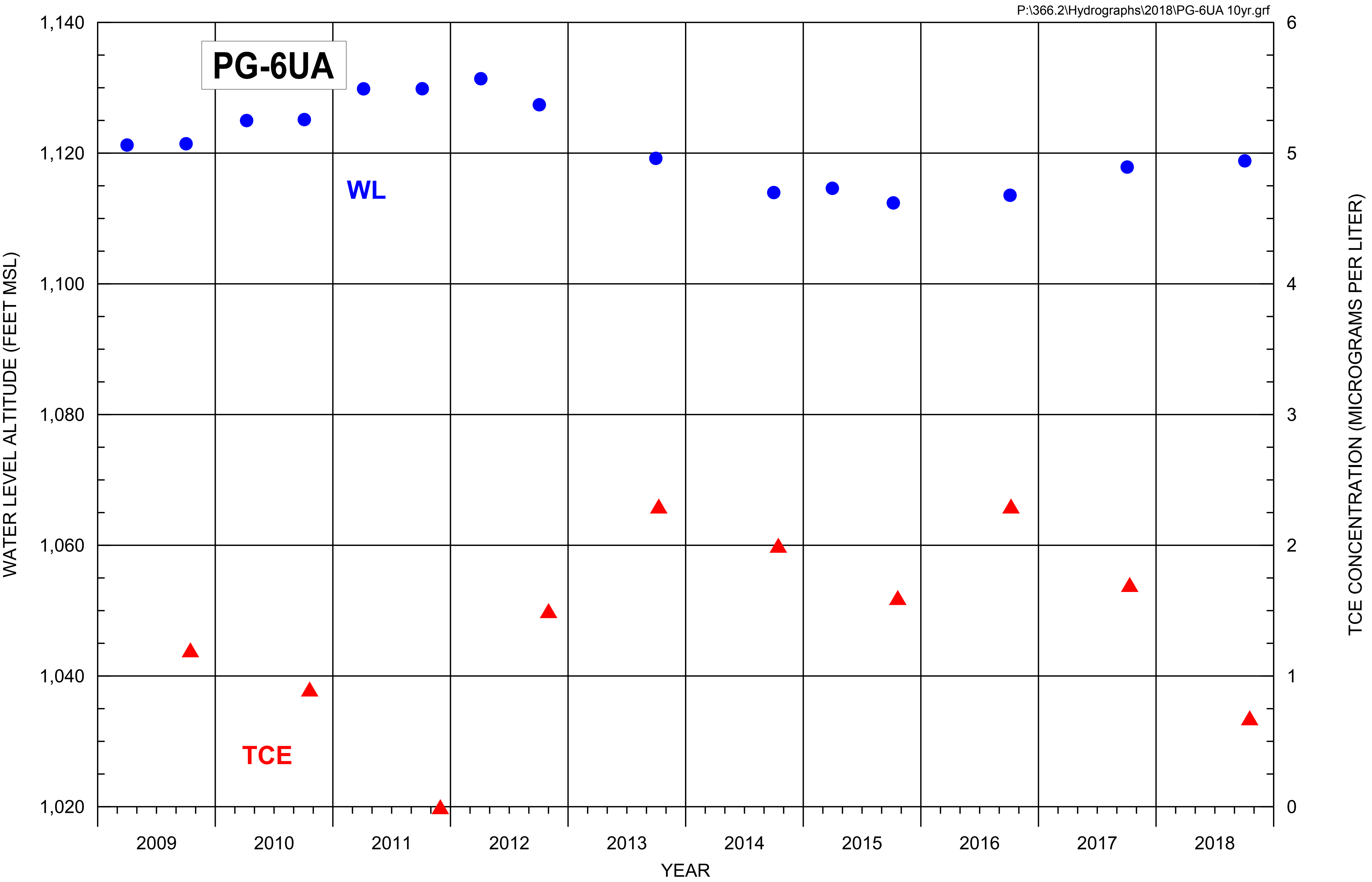
North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,212.70

FIGURE C-85. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-6MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,213.09

FIGURE C-86. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-6UA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

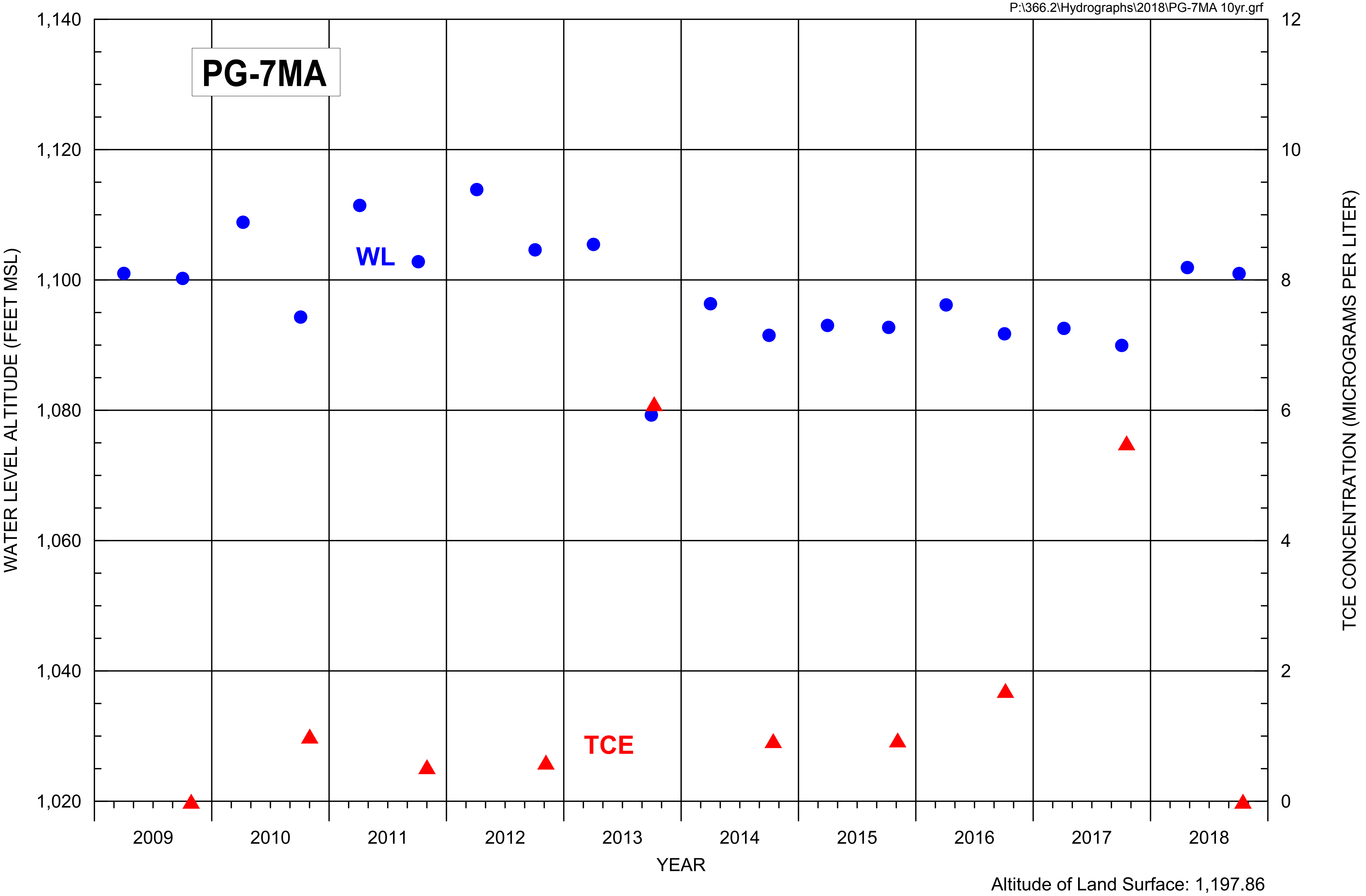


FIGURE C-87. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-7MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

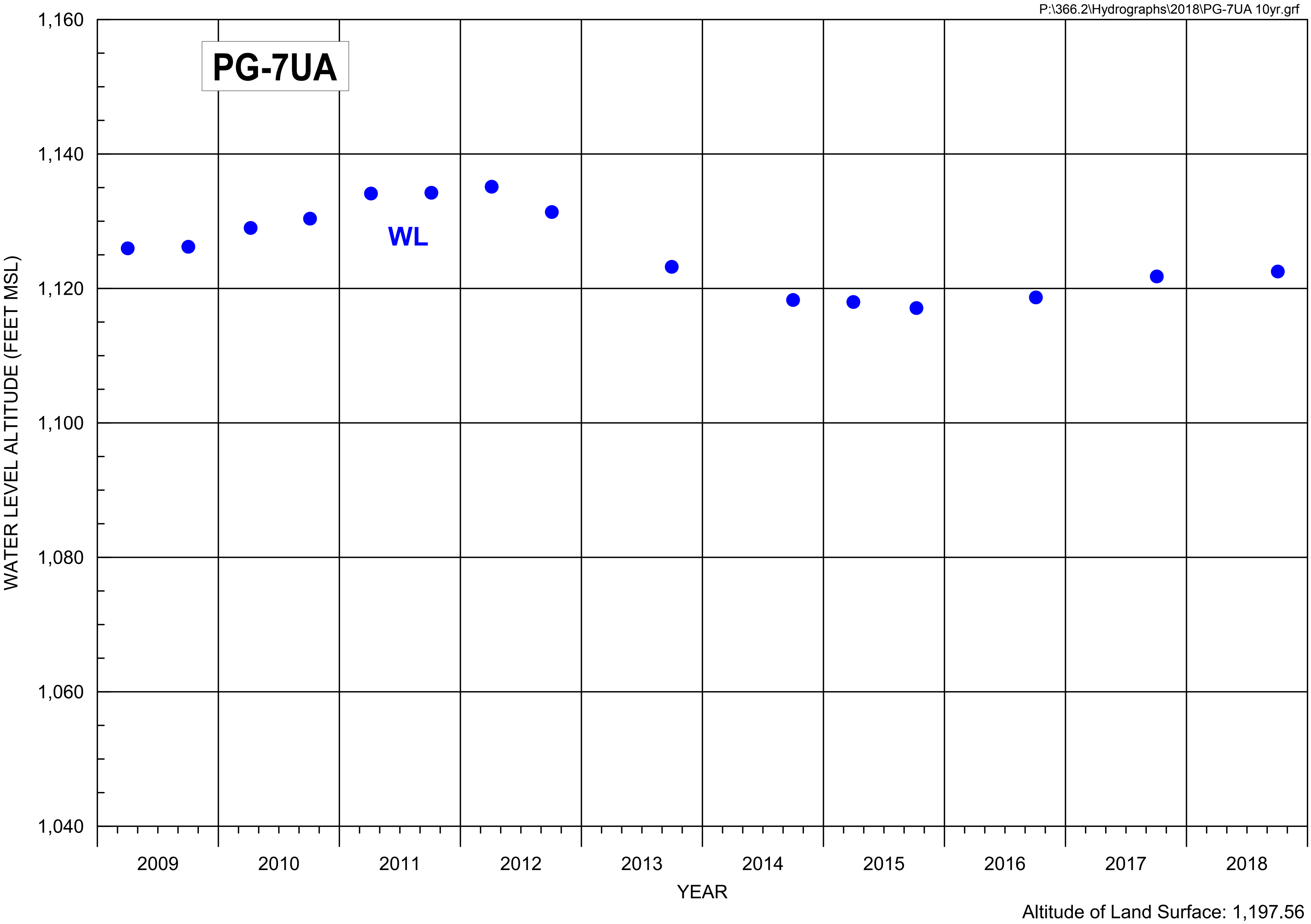
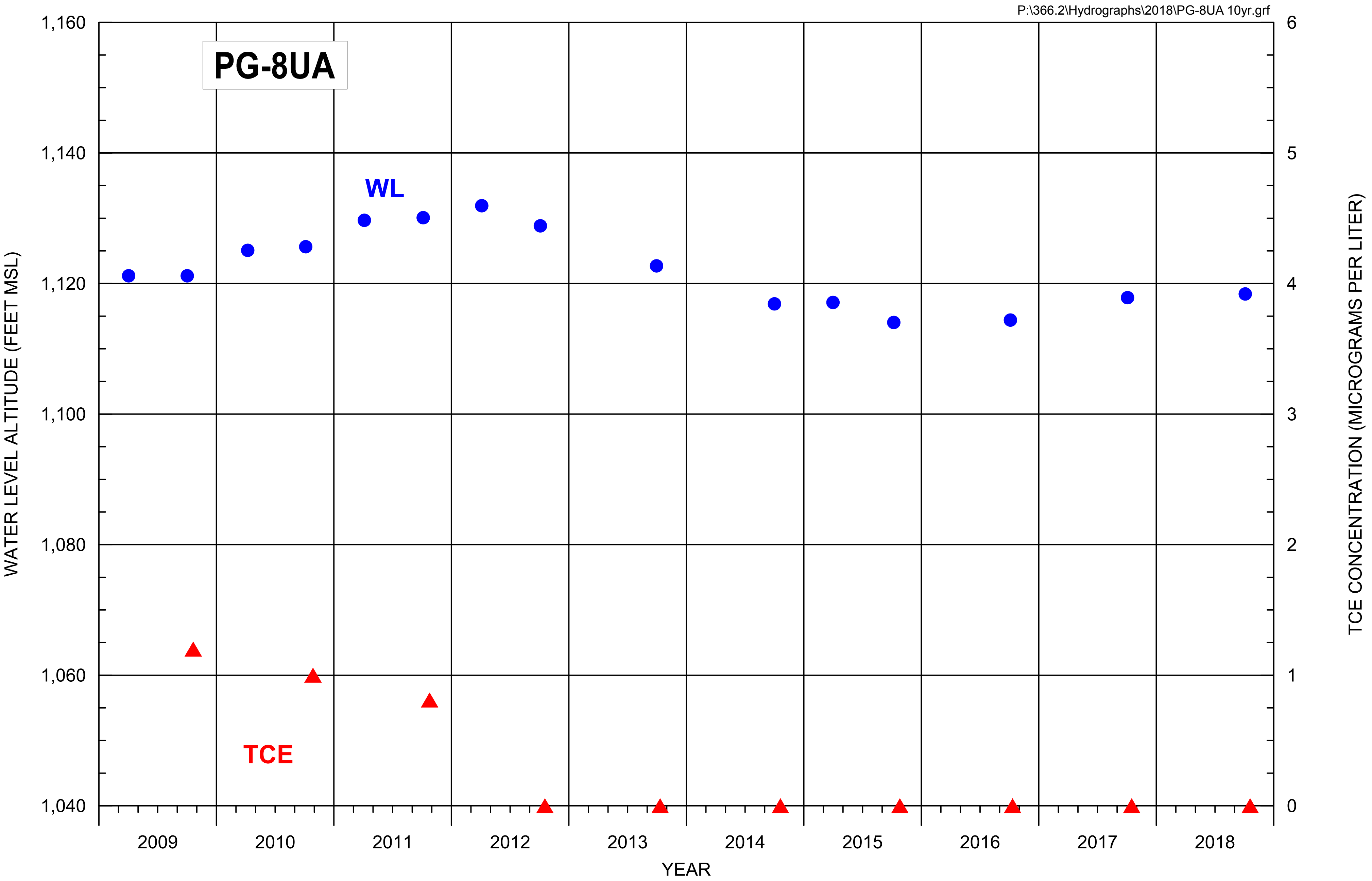


FIGURE C-88. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-7UA

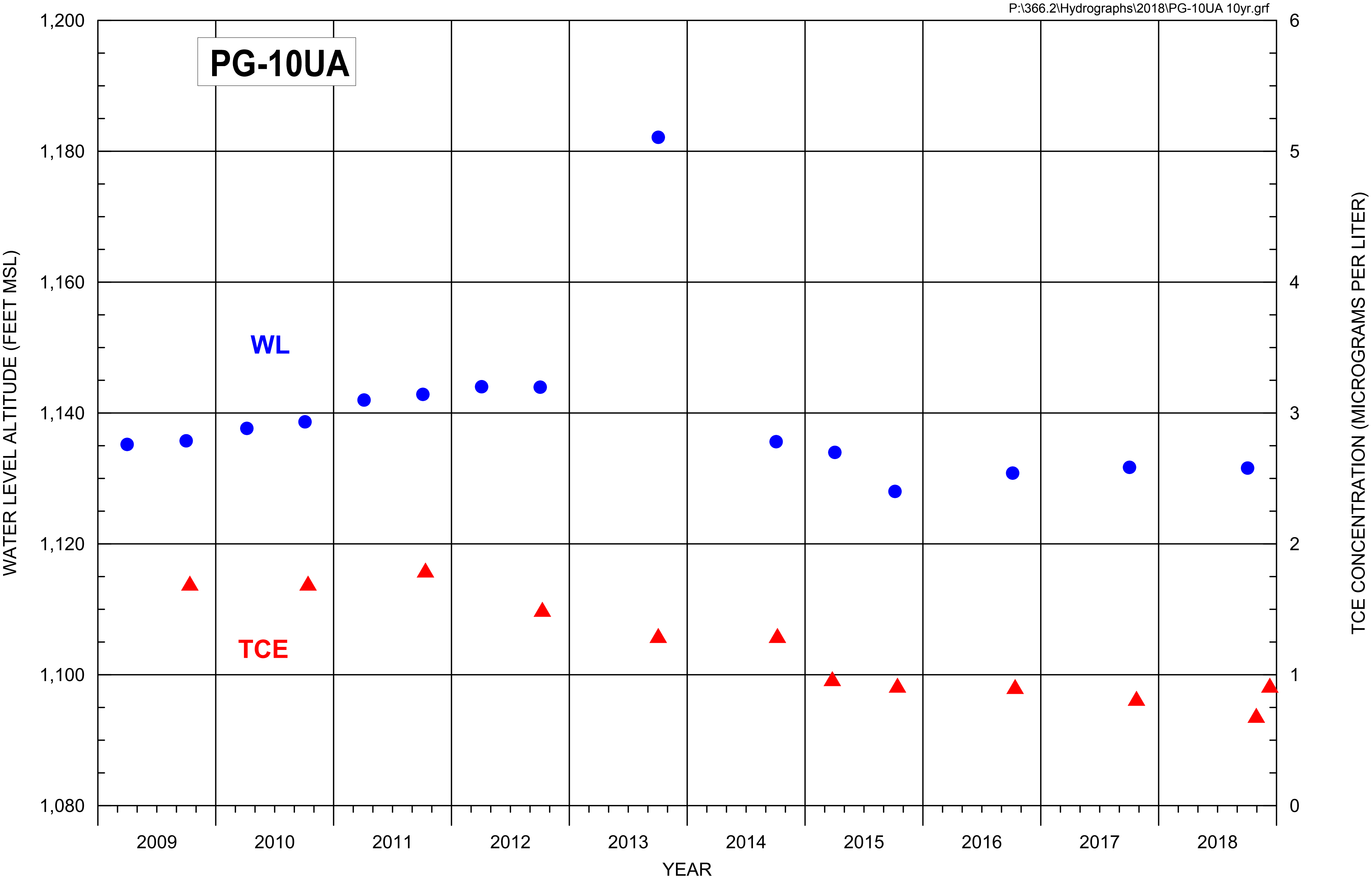


Altitude of Land Surface: 1,222.01

FIGURE C-89. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-8UA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,240.84

FIGURE C-90. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-10UA

North Indian Bend Wash Superfund Site

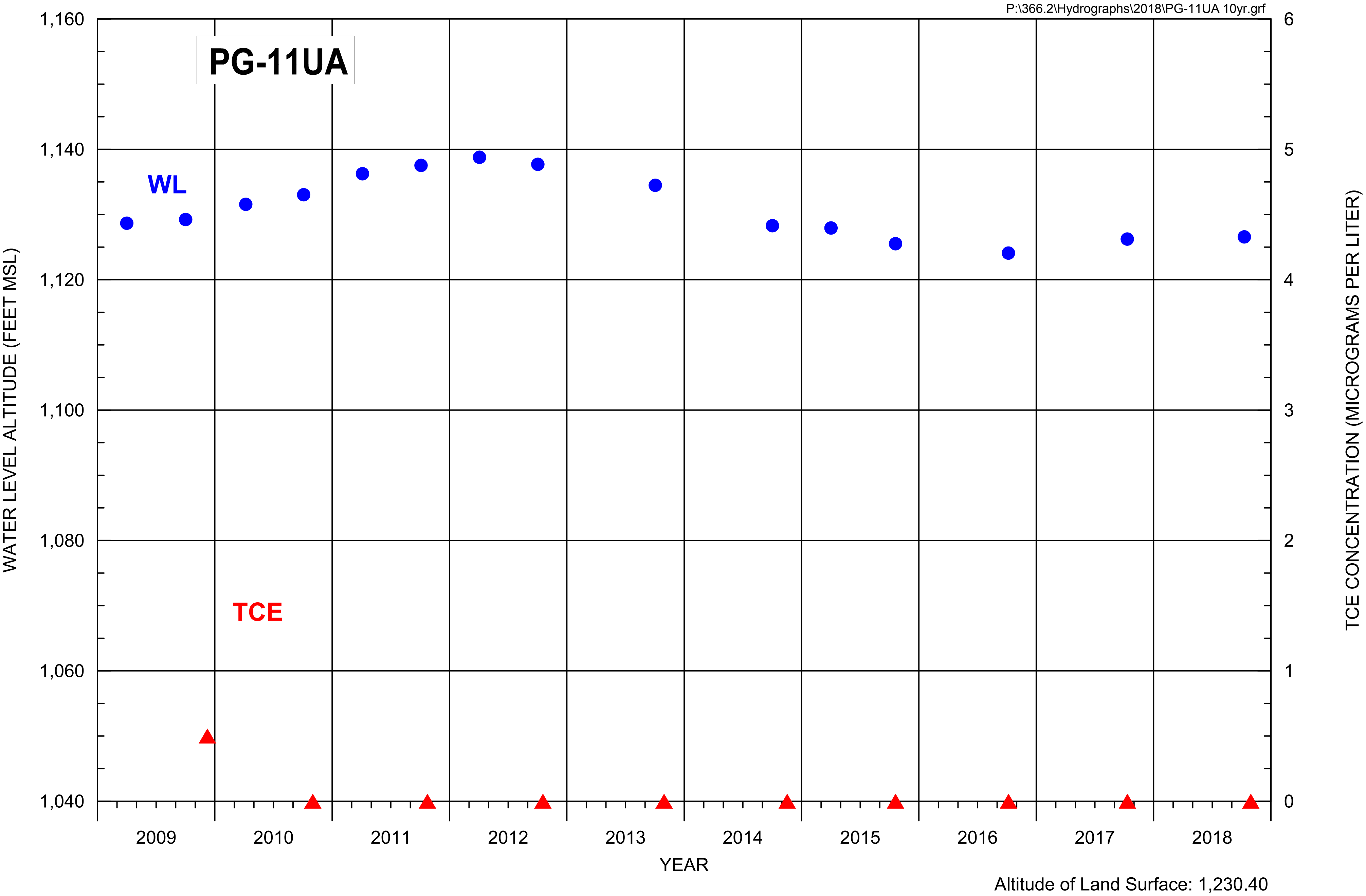
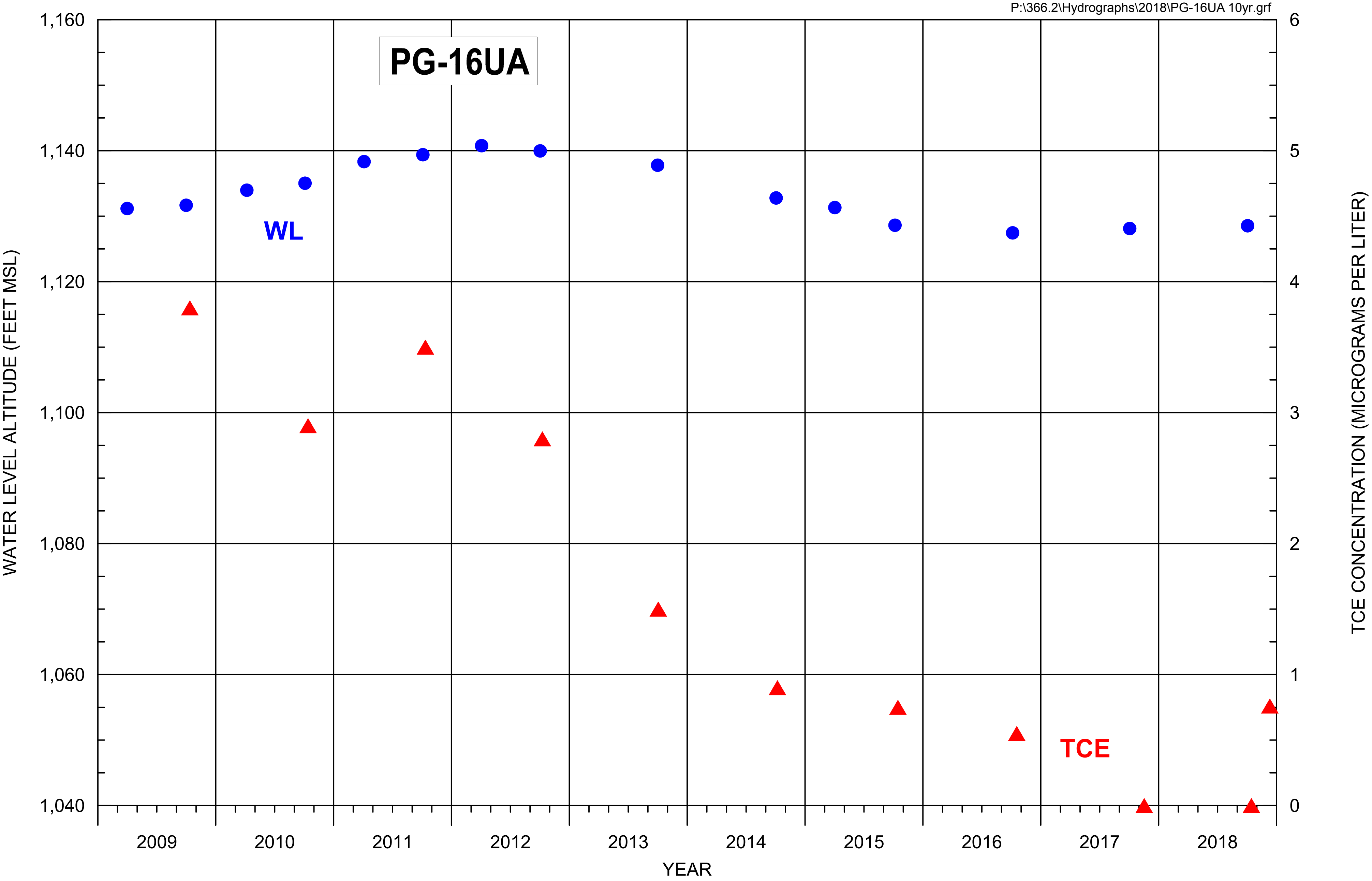


FIGURE C-91. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-11UA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,241.89

FIGURE C-92. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-16UA

North Indian Bend Wash Superfund Site

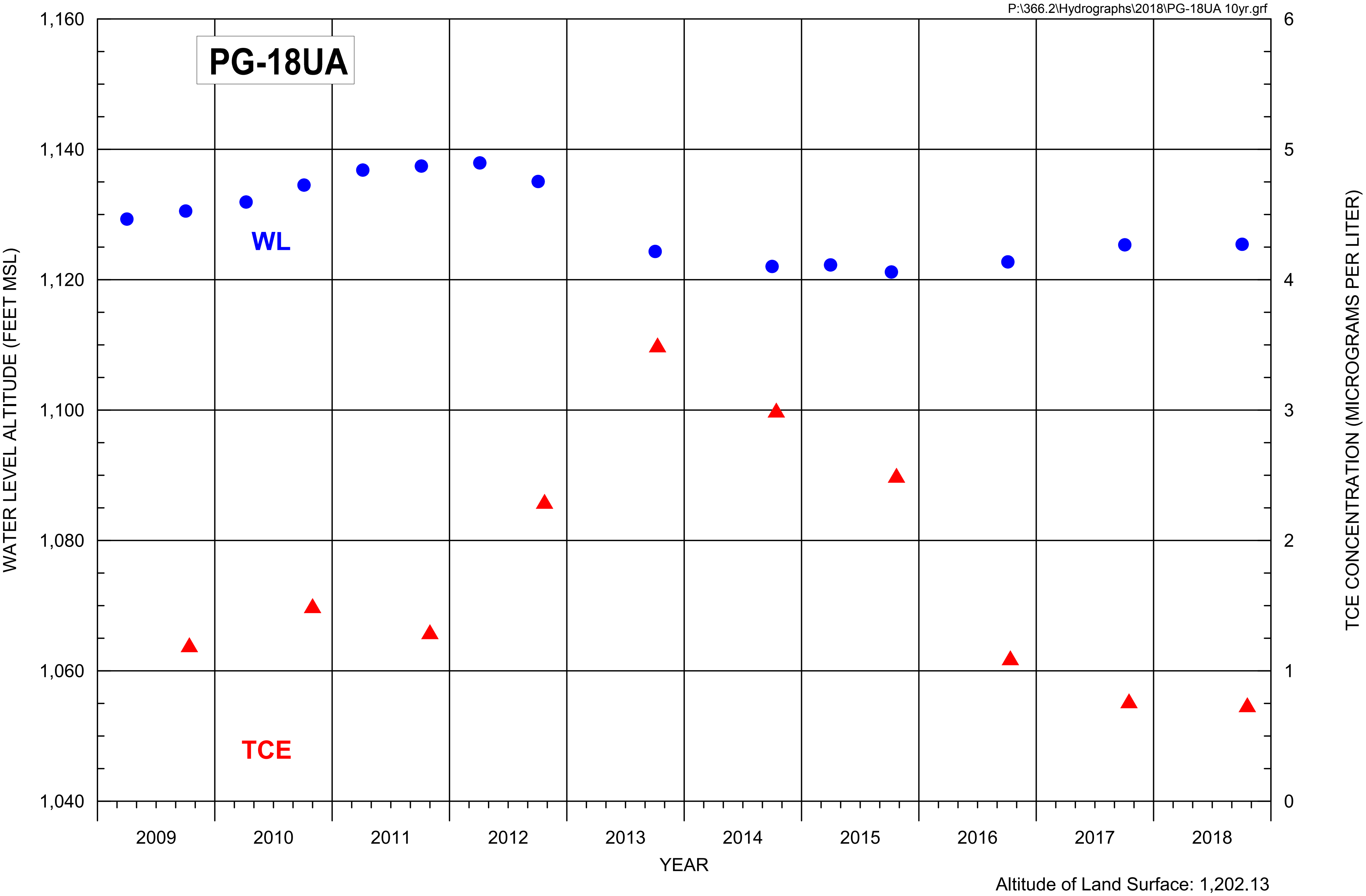


FIGURE C-93. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-18UA

North Indian Bend Wash Superfund Site

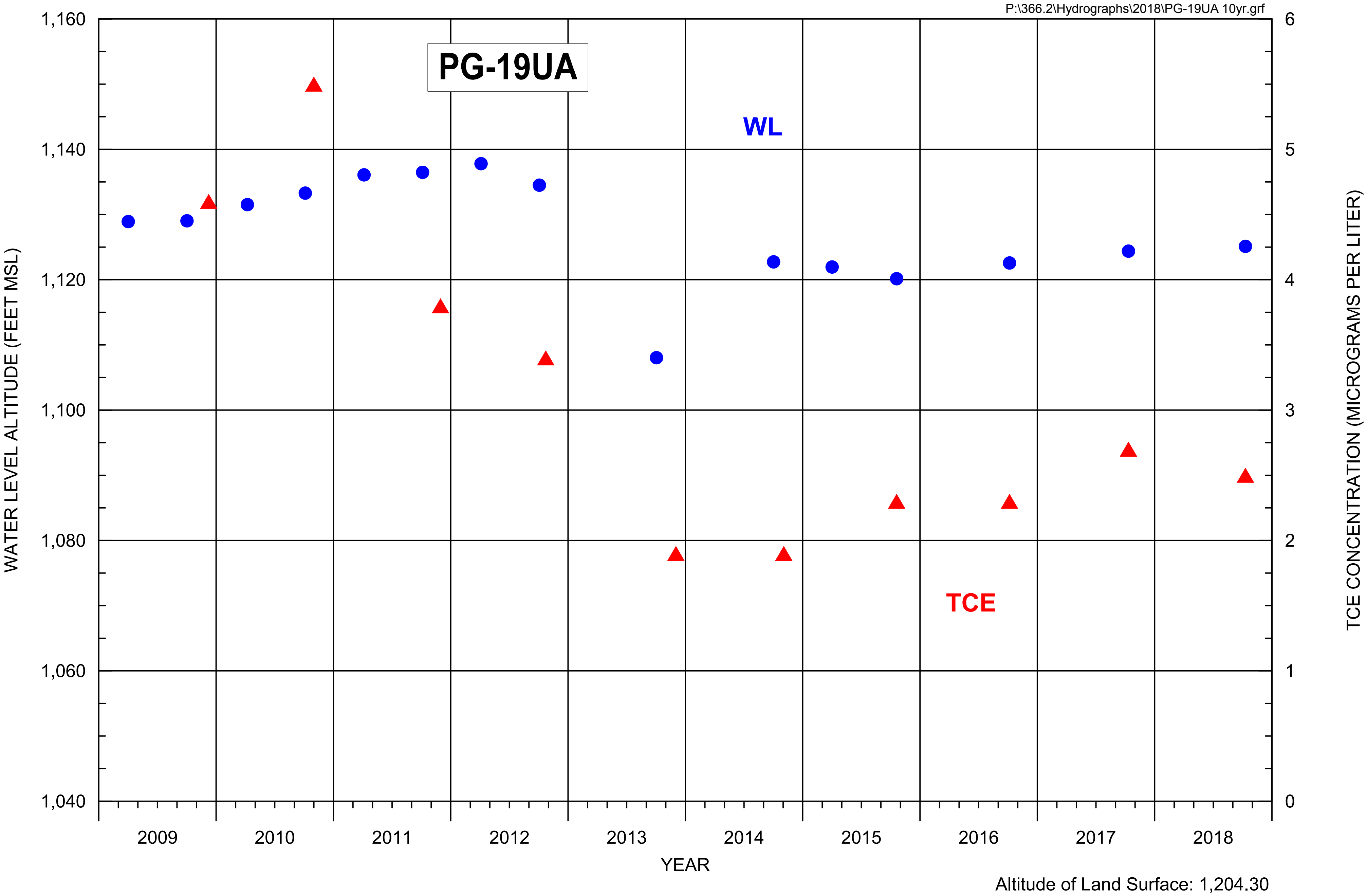


FIGURE C-94. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-19UA

North Indian Bend Wash Superfund Site

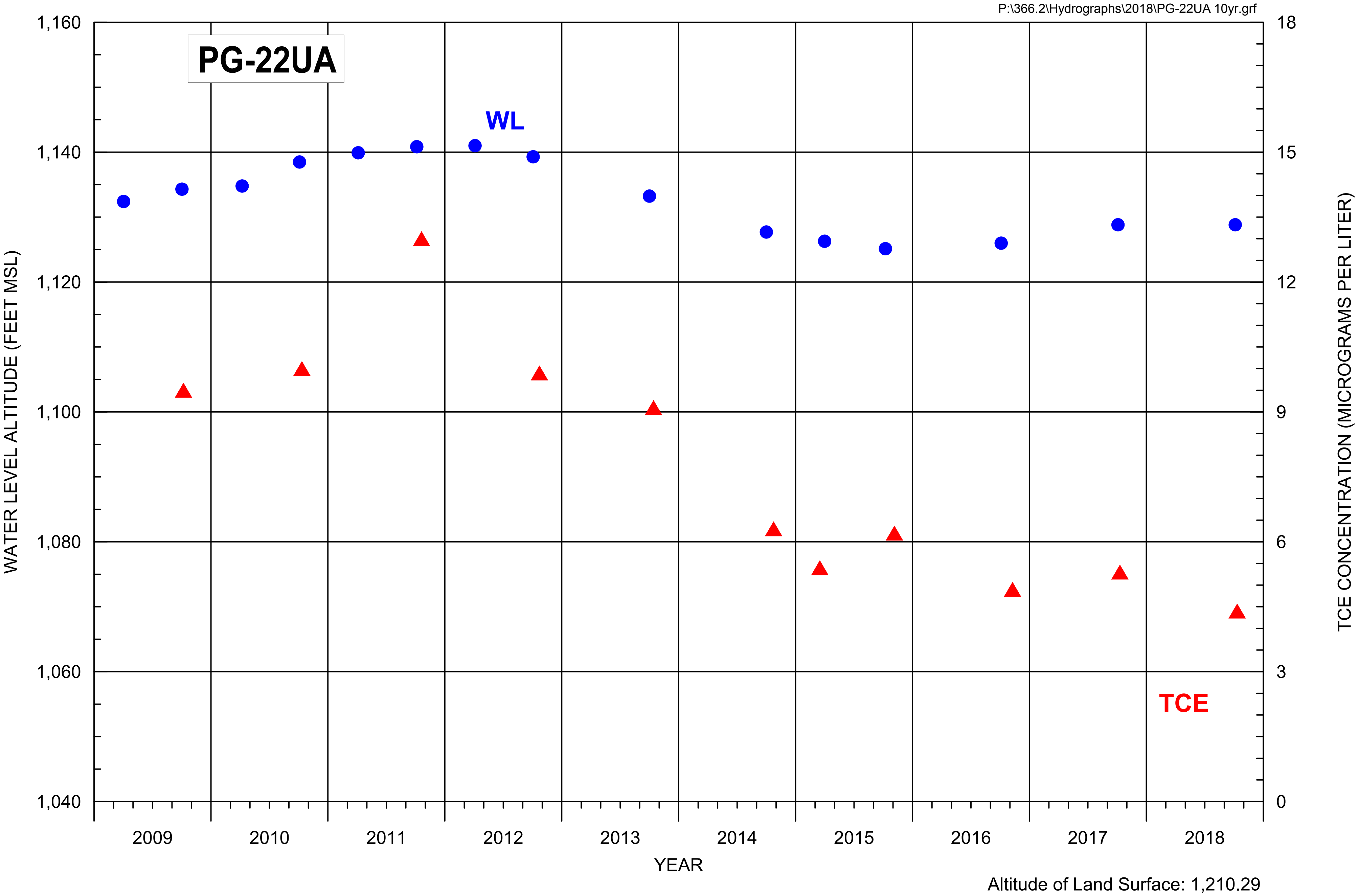
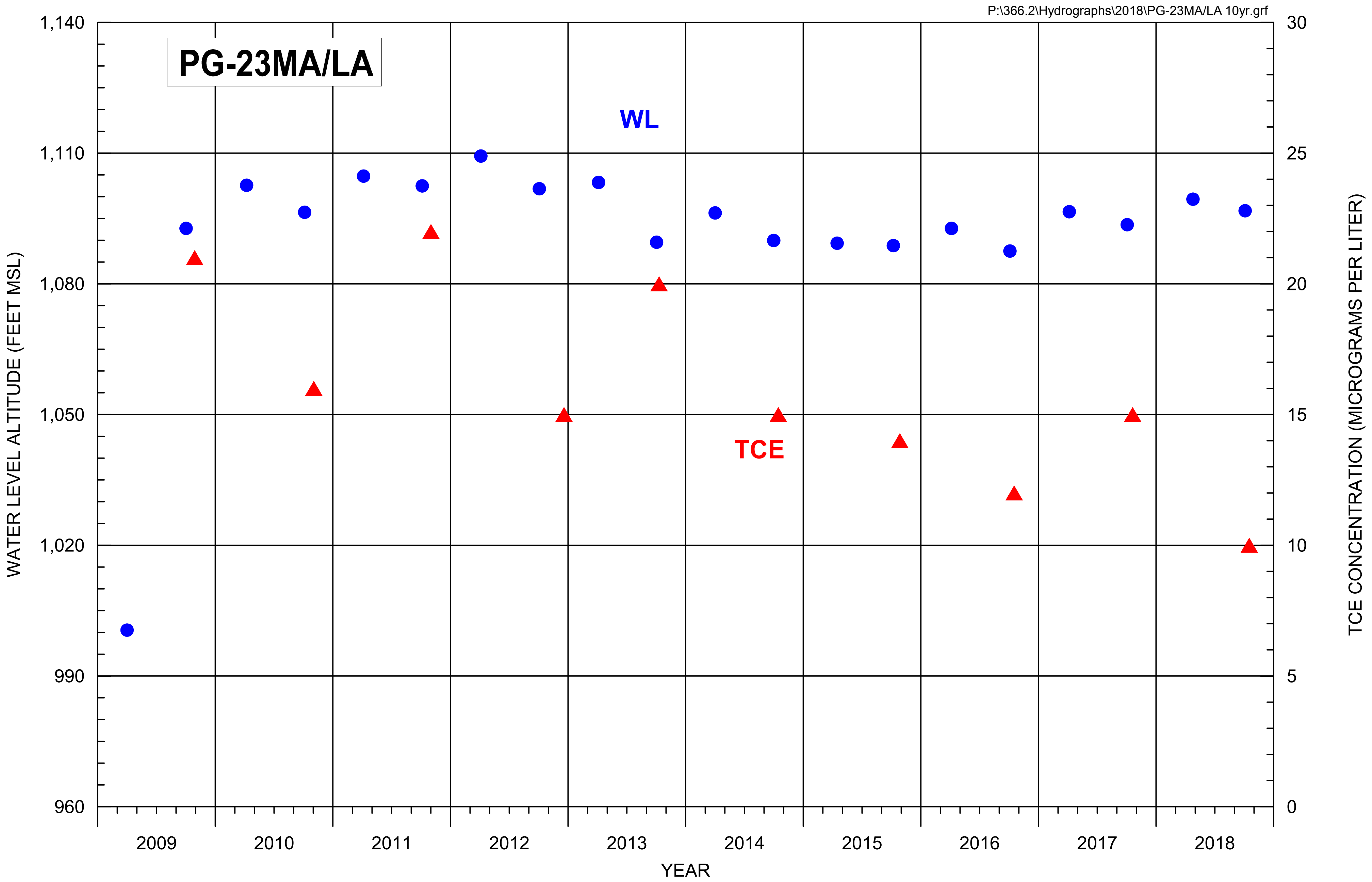


FIGURE C-95. WATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-22UA

North Indian Bend Wash Superfund Site

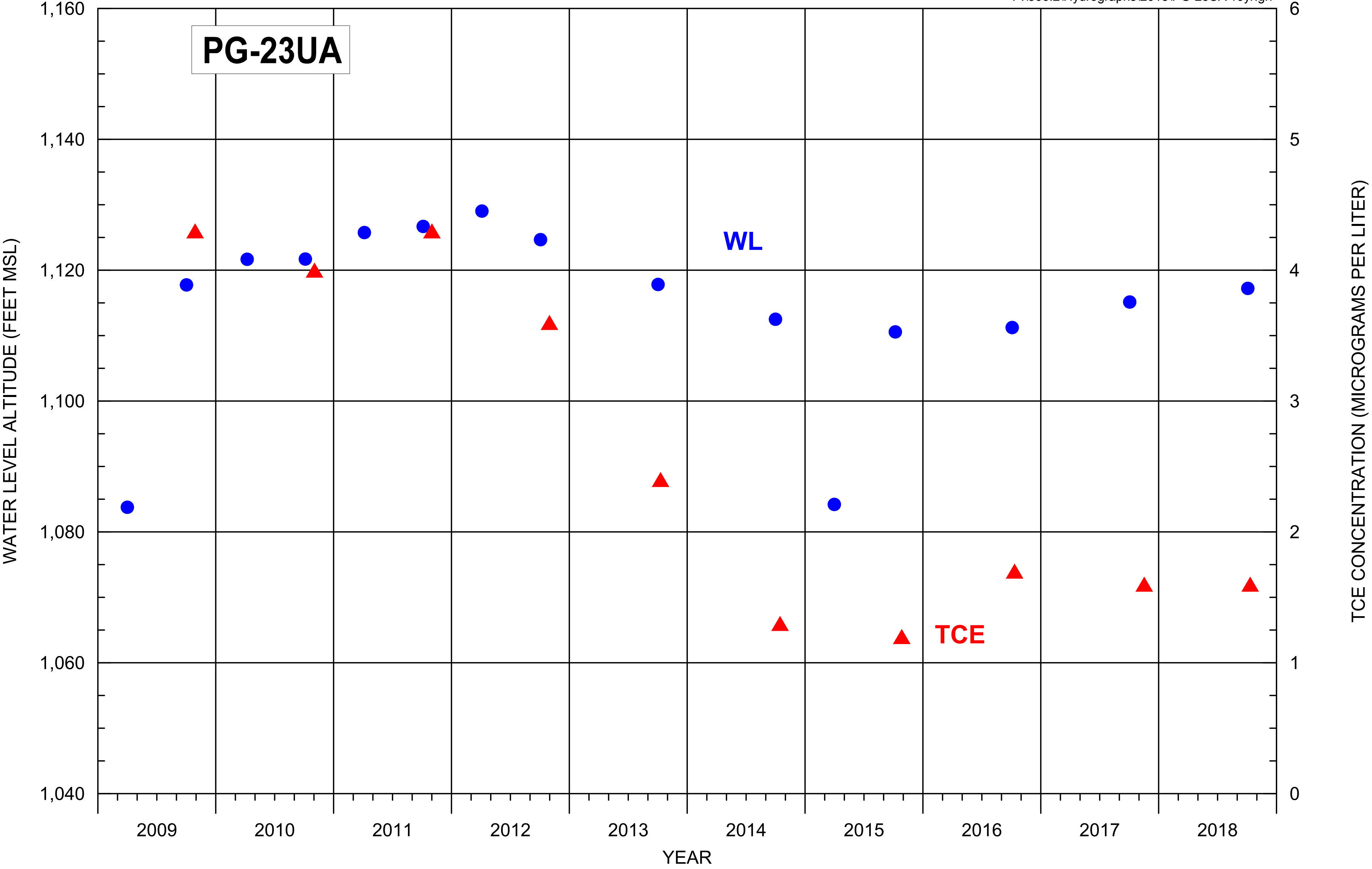


Altitude of Land Surface: 1,222.53

FIGURE C-96. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-23MA/LA

North Indian Bend Wash Superfund Site

P:\366.2\Hydrographs\2018\PG-23UA 10yr.grf



Altitude of Land Surface: 1,222.96

FIGURE C-97. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-23UA

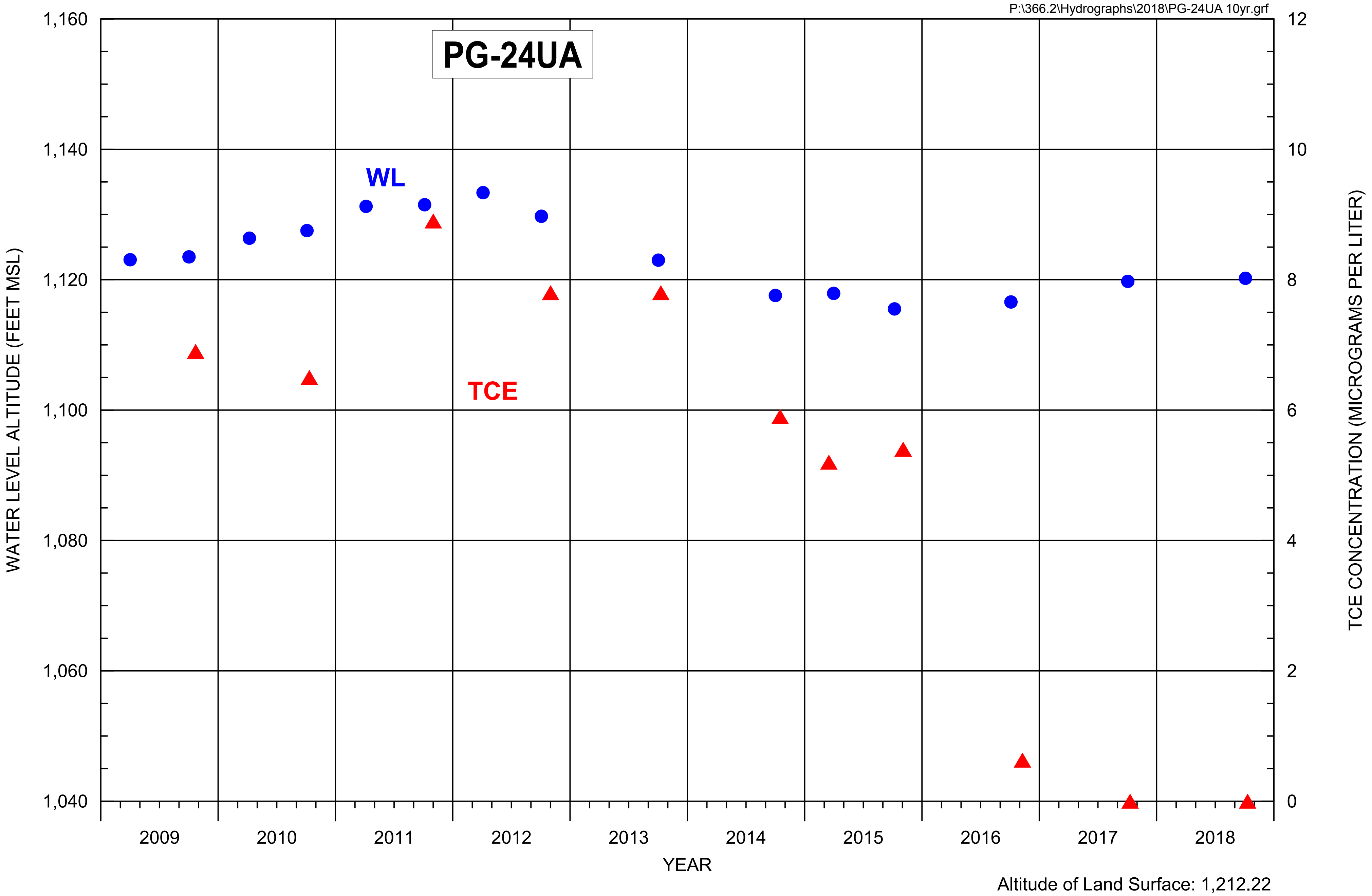


FIGURE C-98. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-24UA

North Indian Bend Wash Superfund Site

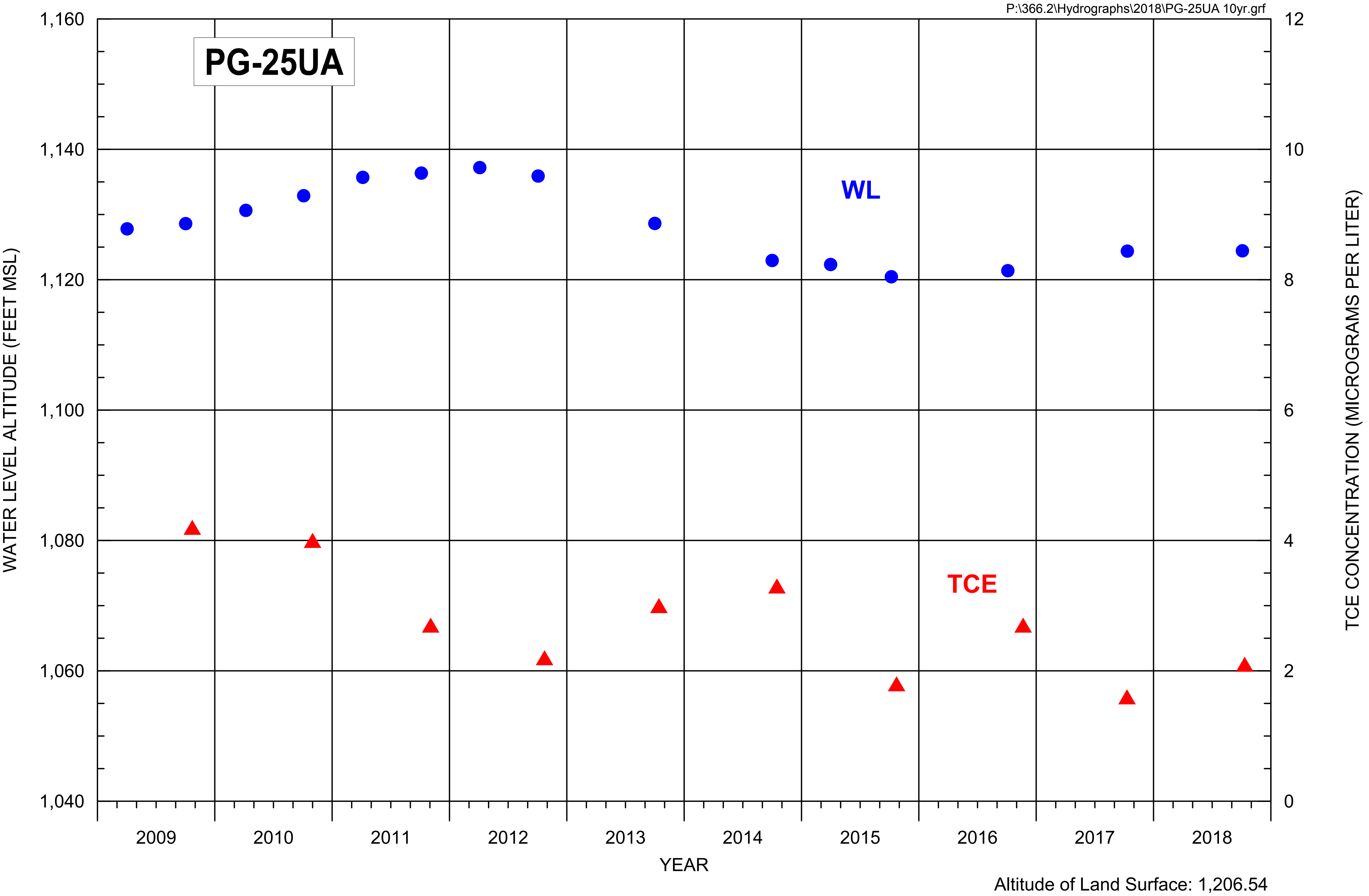


FIGURE C-99. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-25UA

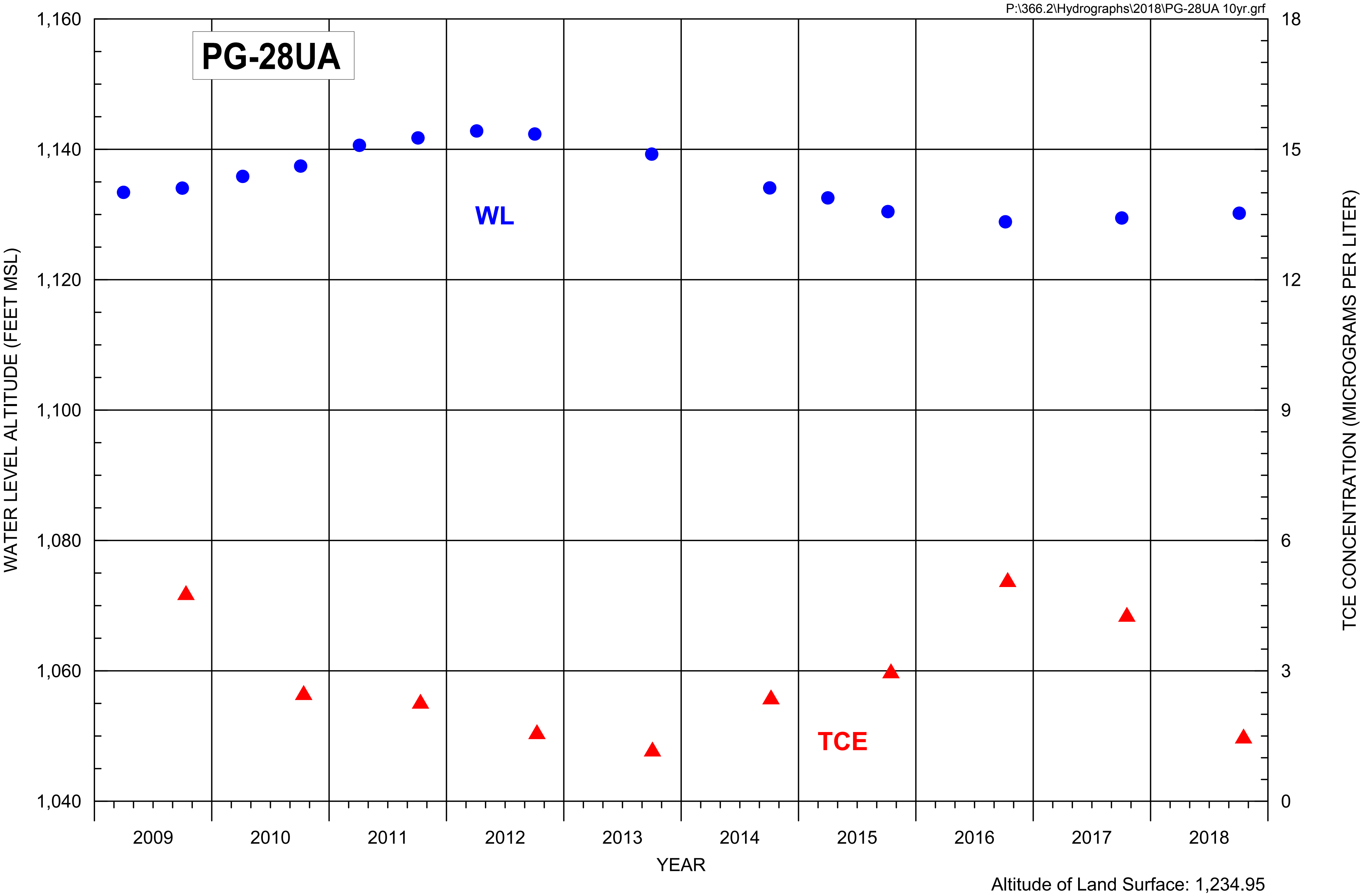
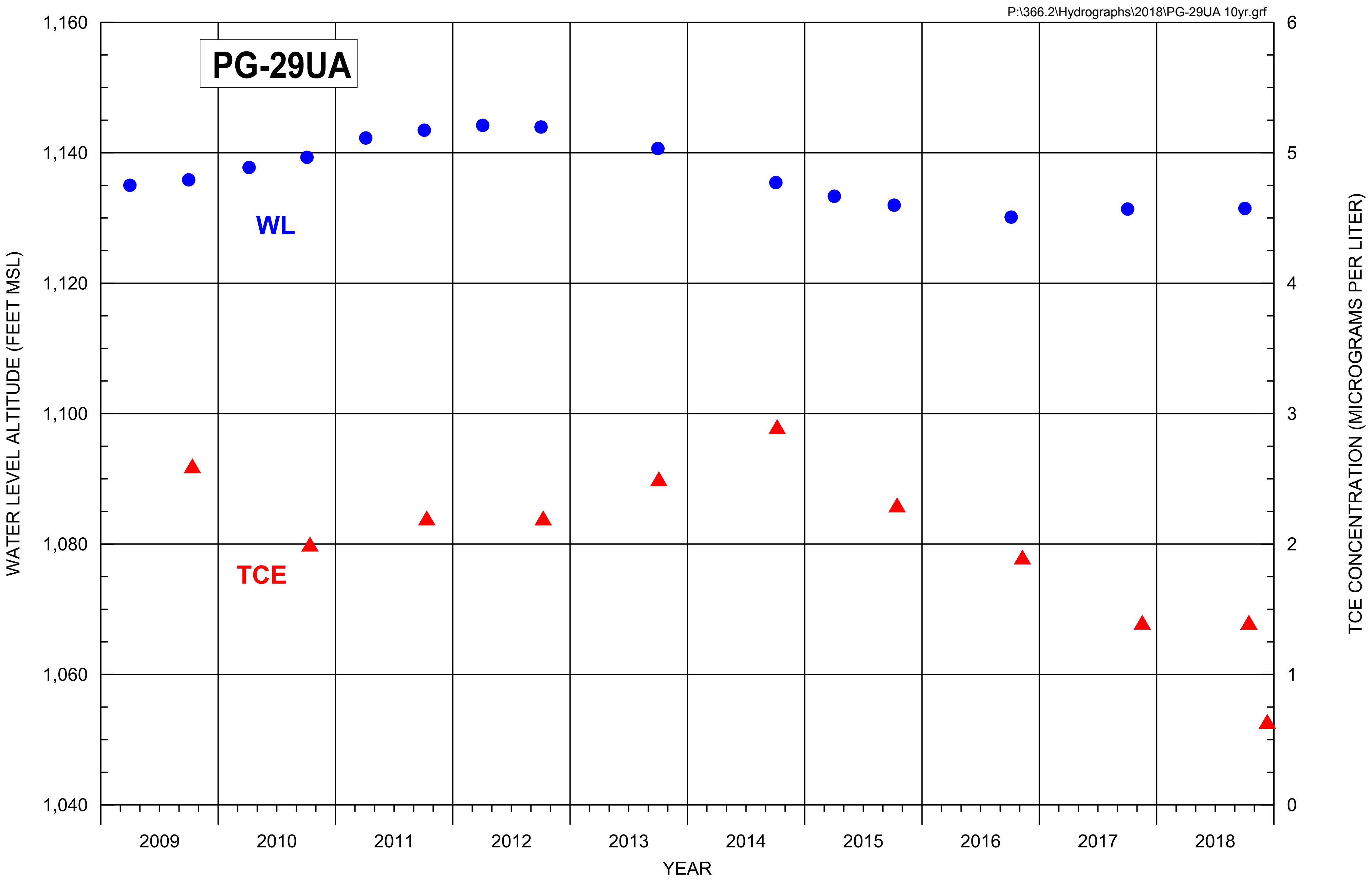


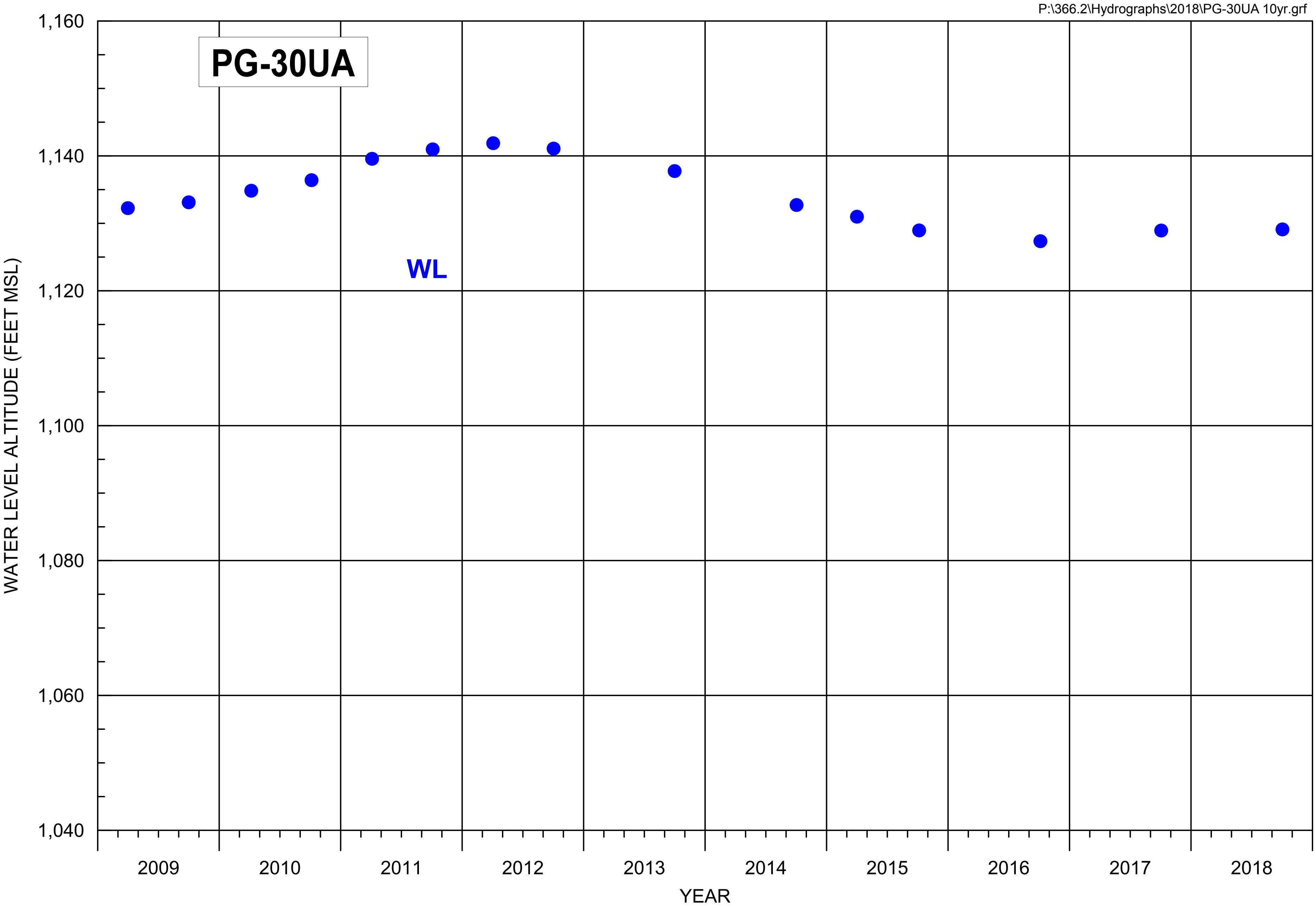
FIGURE C-100. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-28UA



Altitude of Land Surface: 1,233.03

FIGURE C-101. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-29UA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,226.36

FIGURE C-102. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-30UA

North Indian Bend Wash Superfund Site

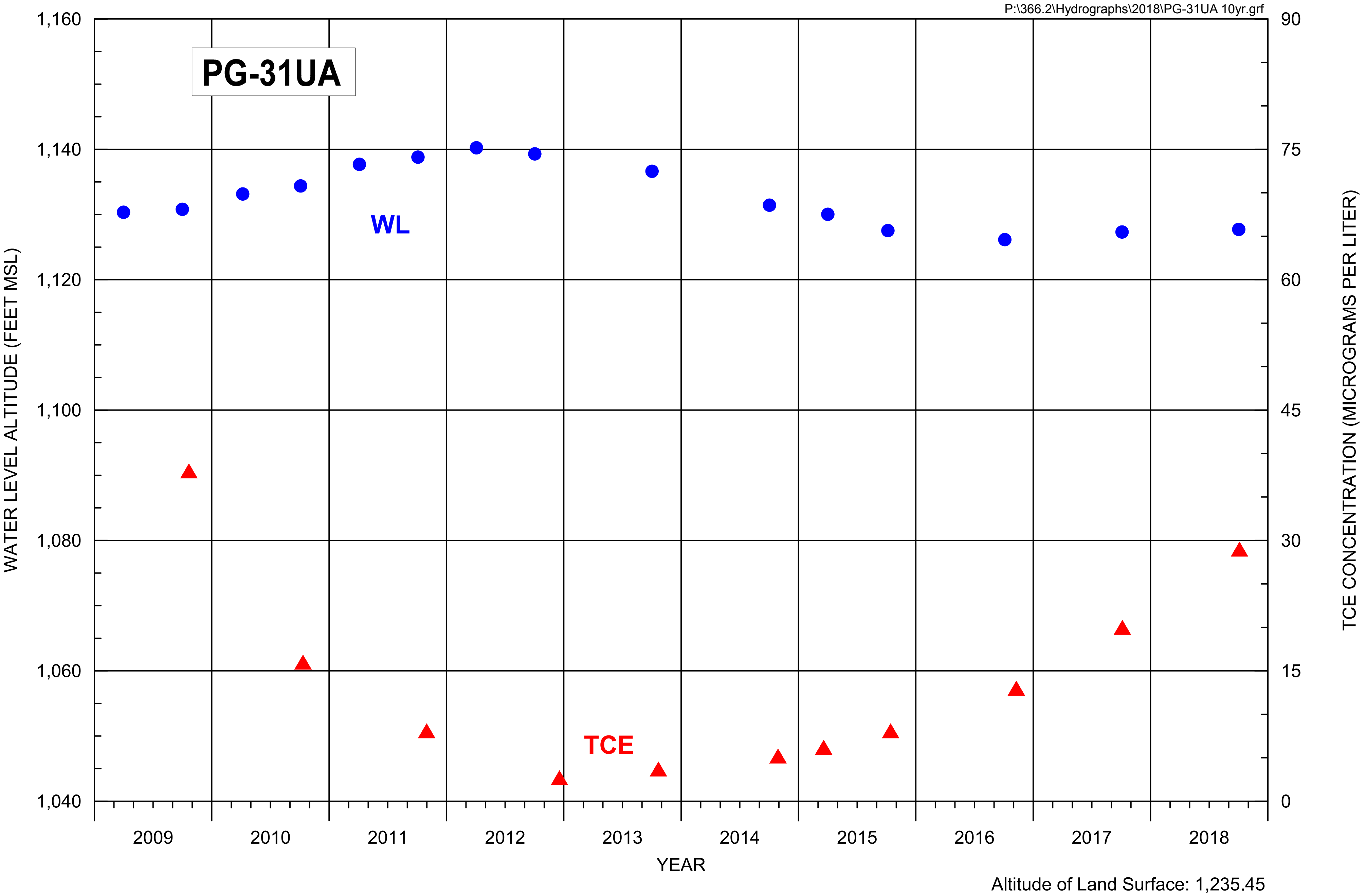


FIGURE C-103. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-31UA

North Indian Bend Wash Superfund Site

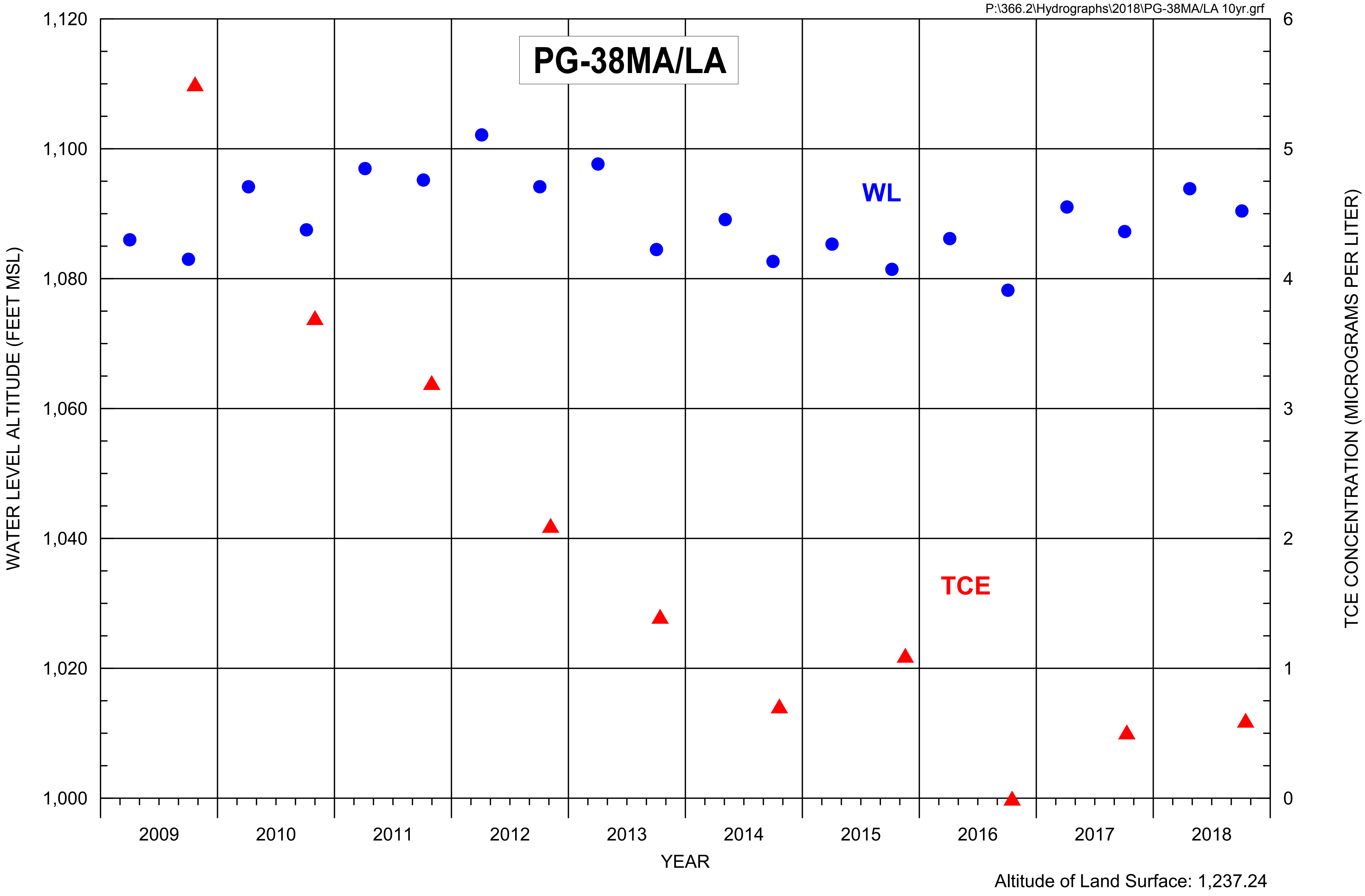


FIGURE C-104. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-38MA/LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

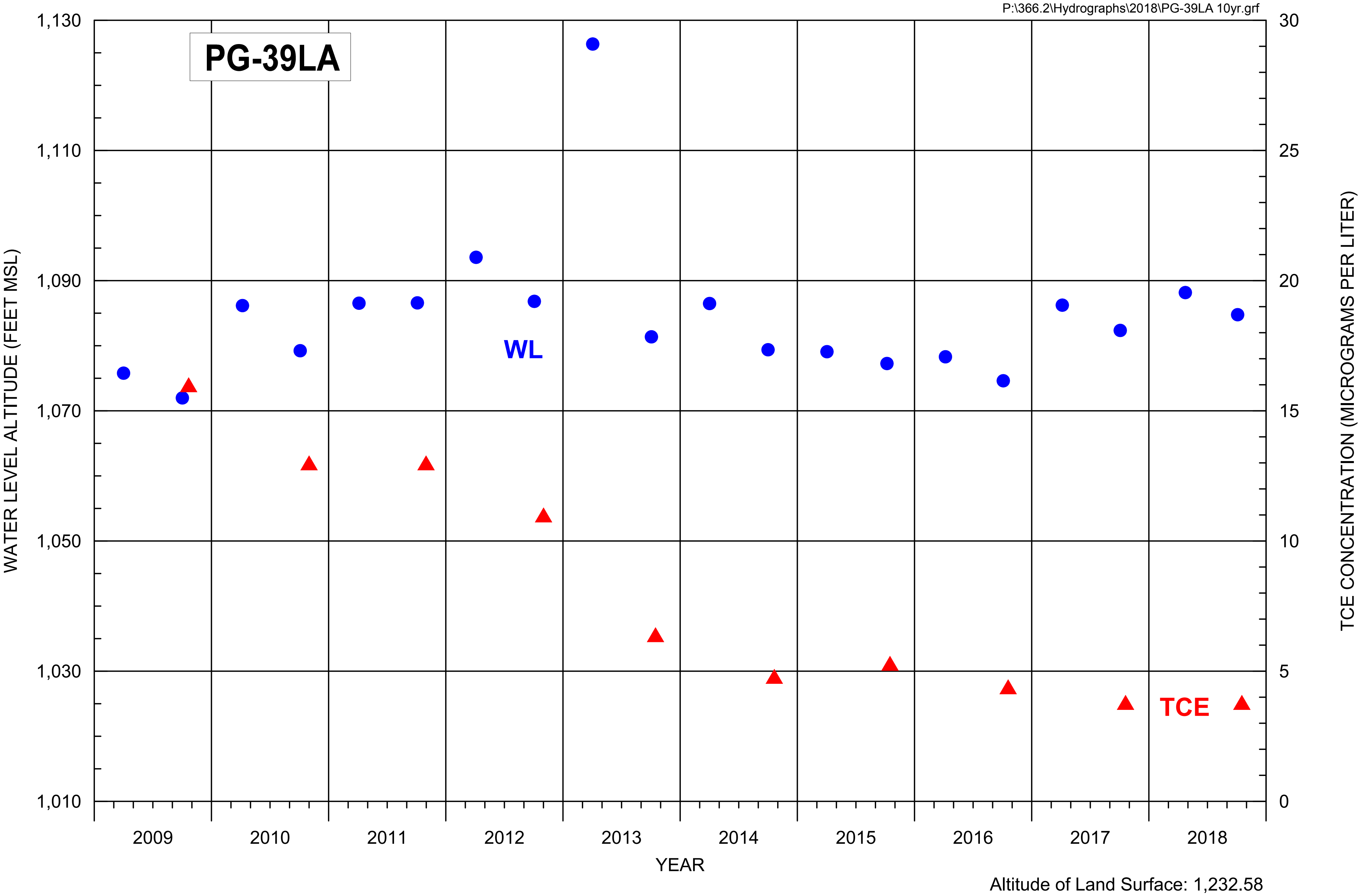


FIGURE C-105. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-39LA

North Indian Bend Wash Superfund Site

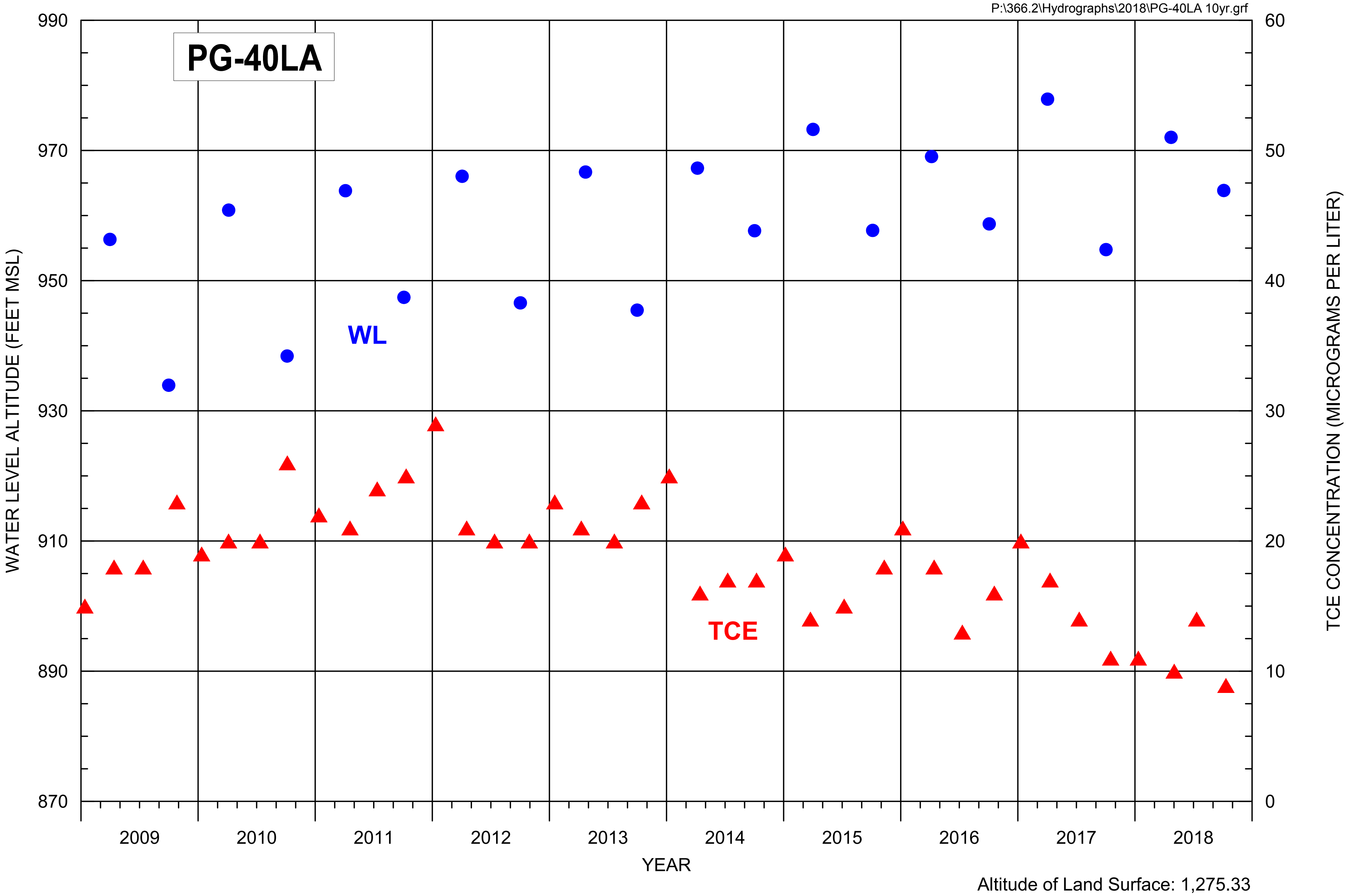
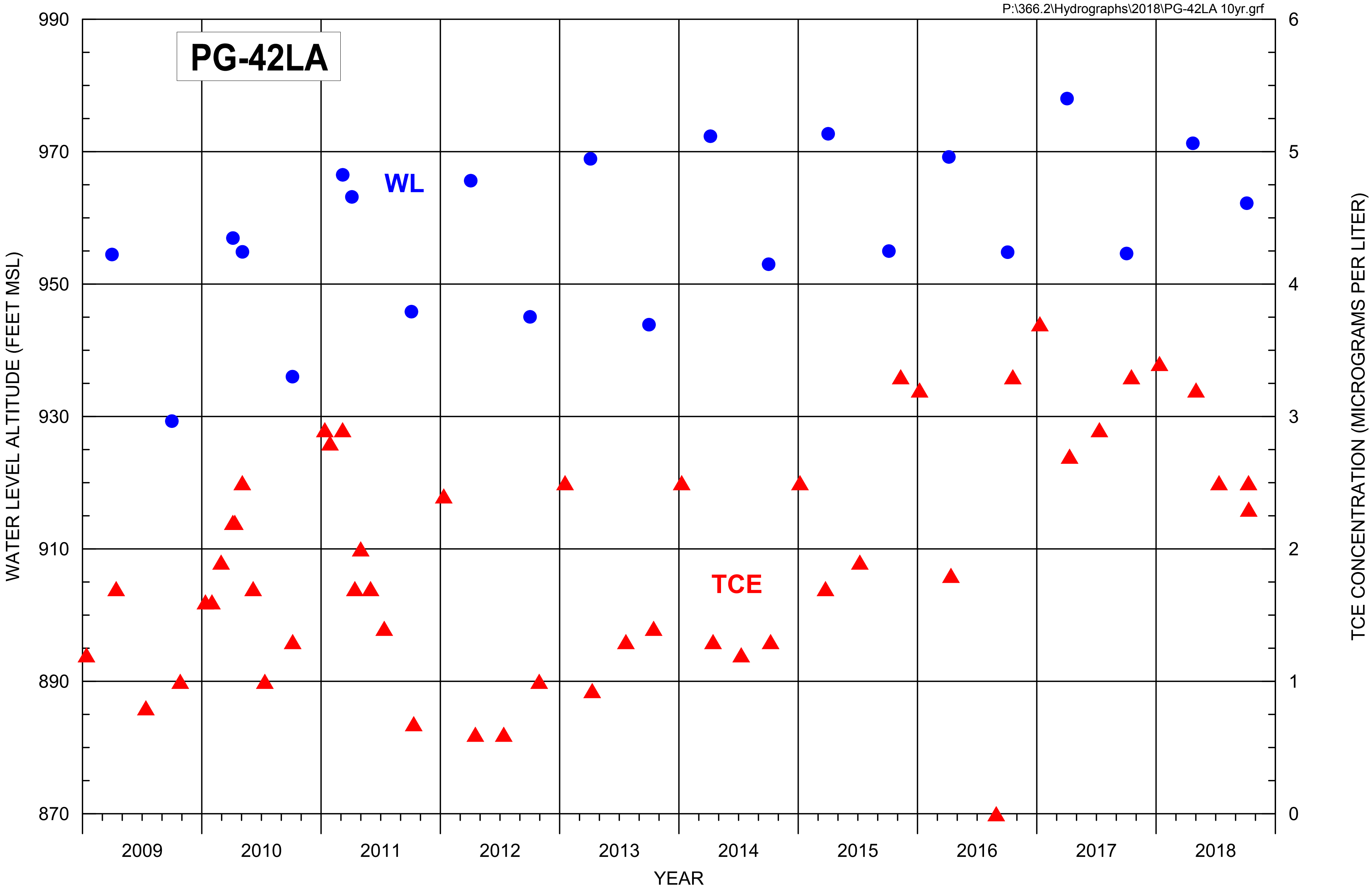


FIGURE C-106. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-40LA

North Indian Bend Wash Superfund Site

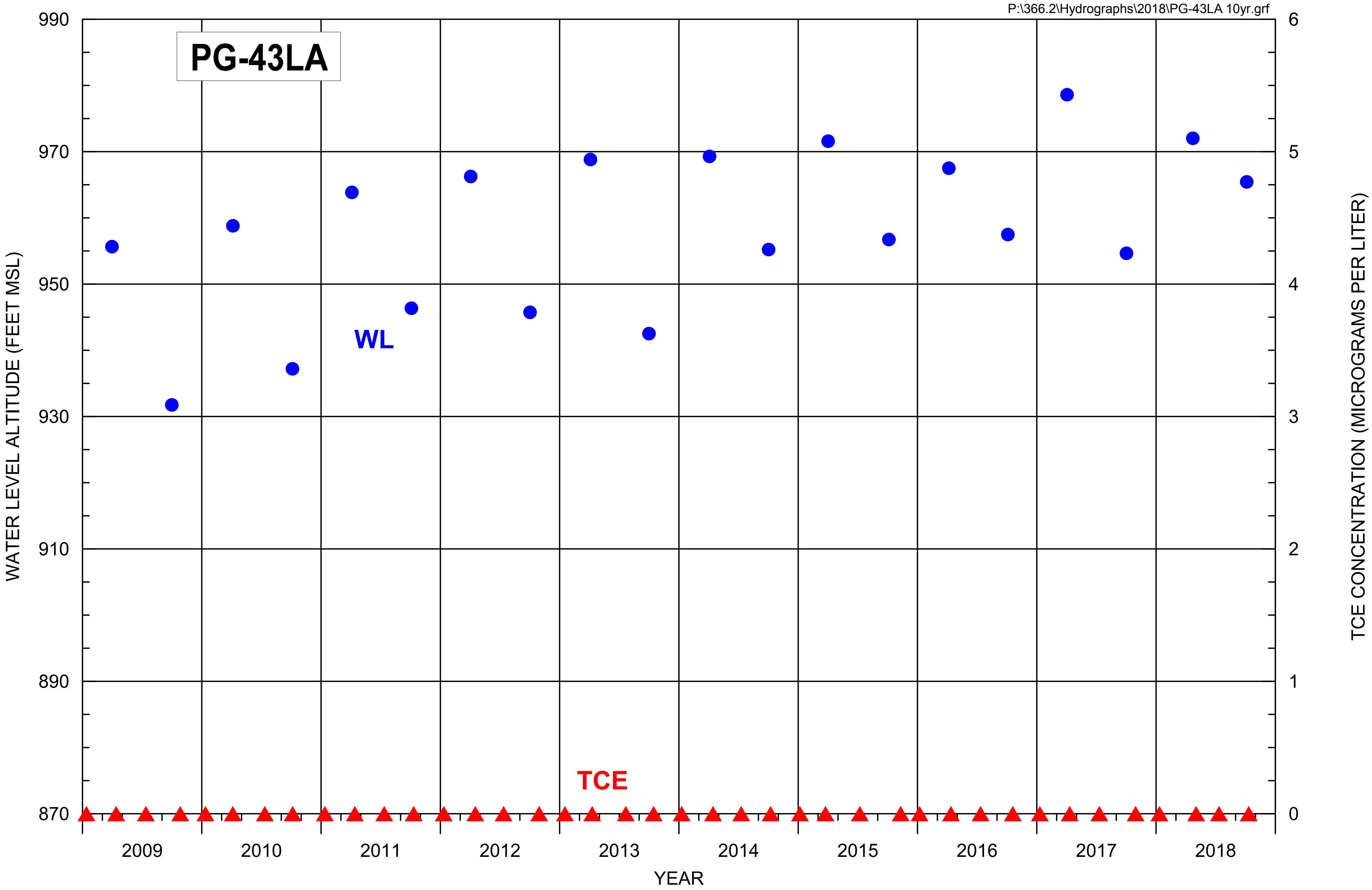


Altitude of Land Surface: 1,292.31

FIGURE C-107. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-42LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,265.01

FIGURE C-108. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-43LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

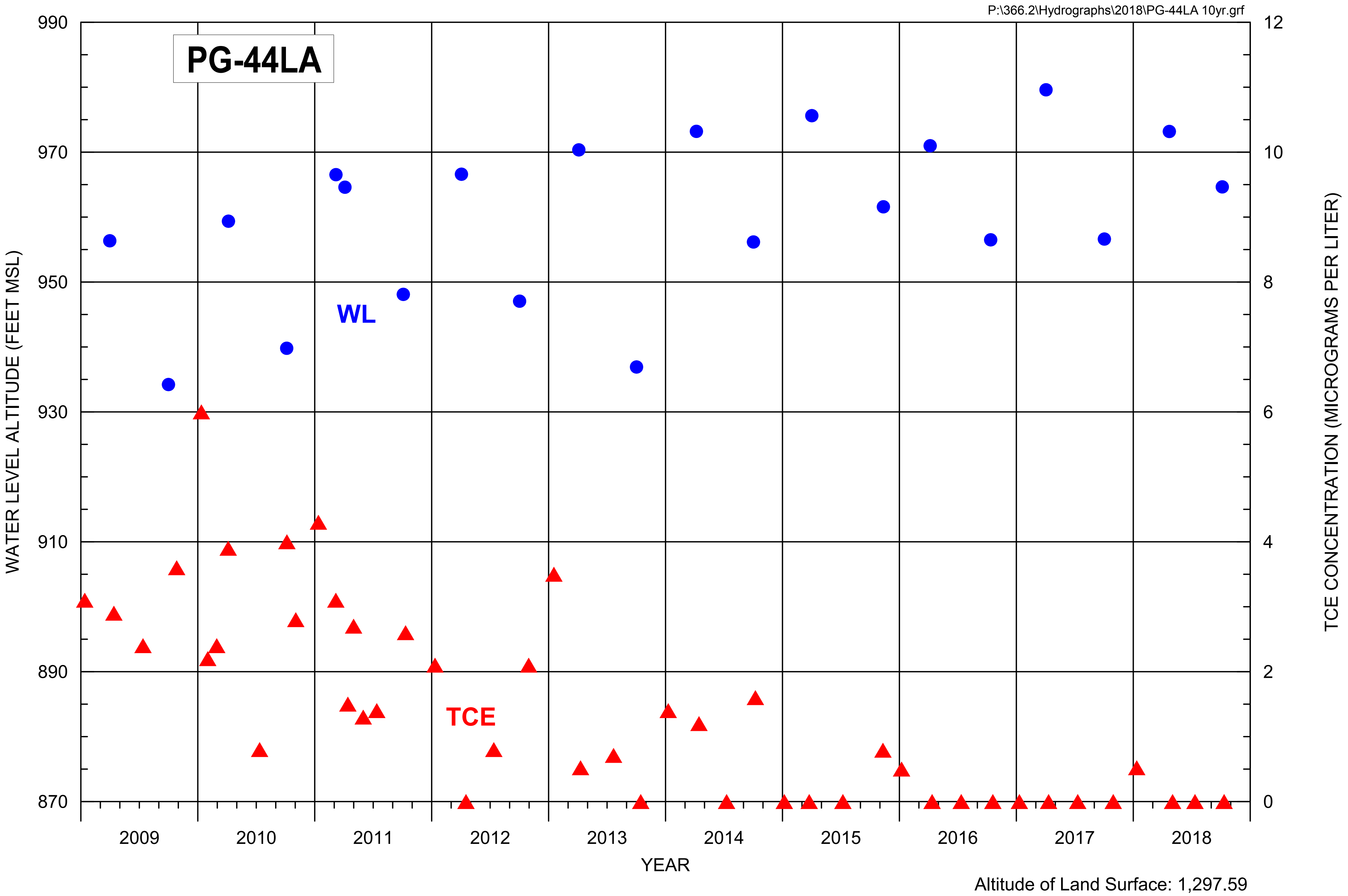


FIGURE C-109. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-44LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

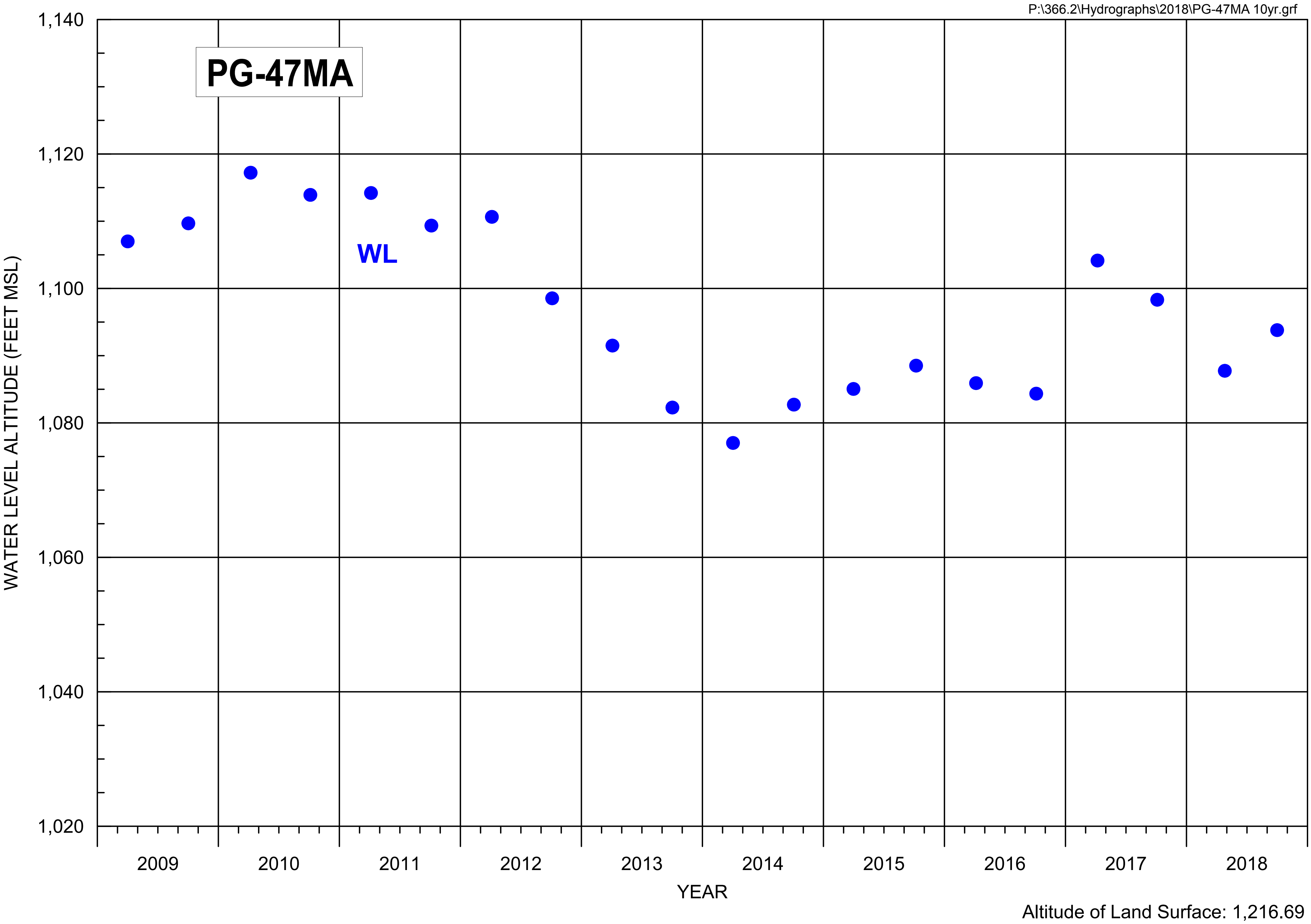


FIGURE C-110. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-47MA

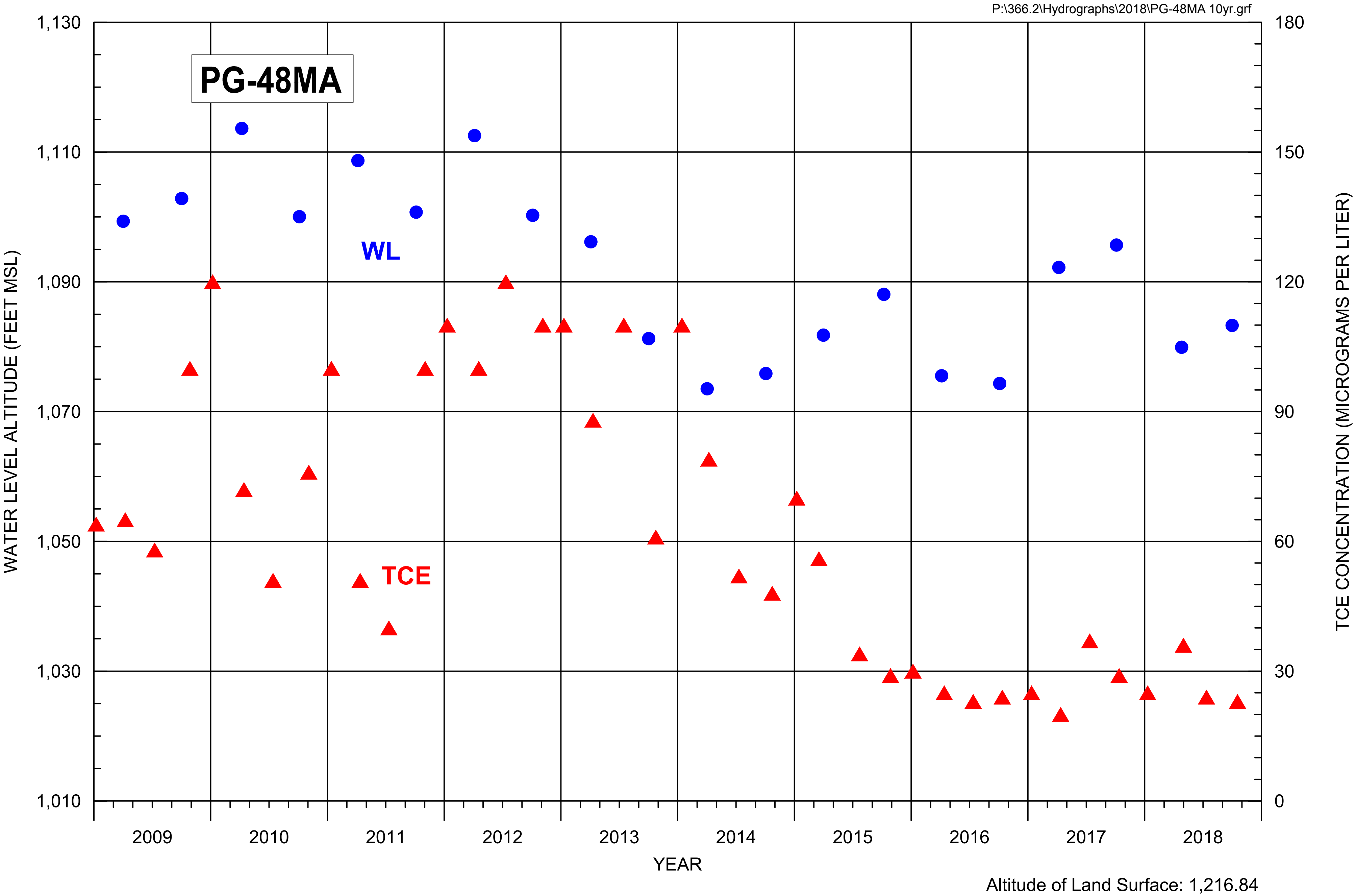
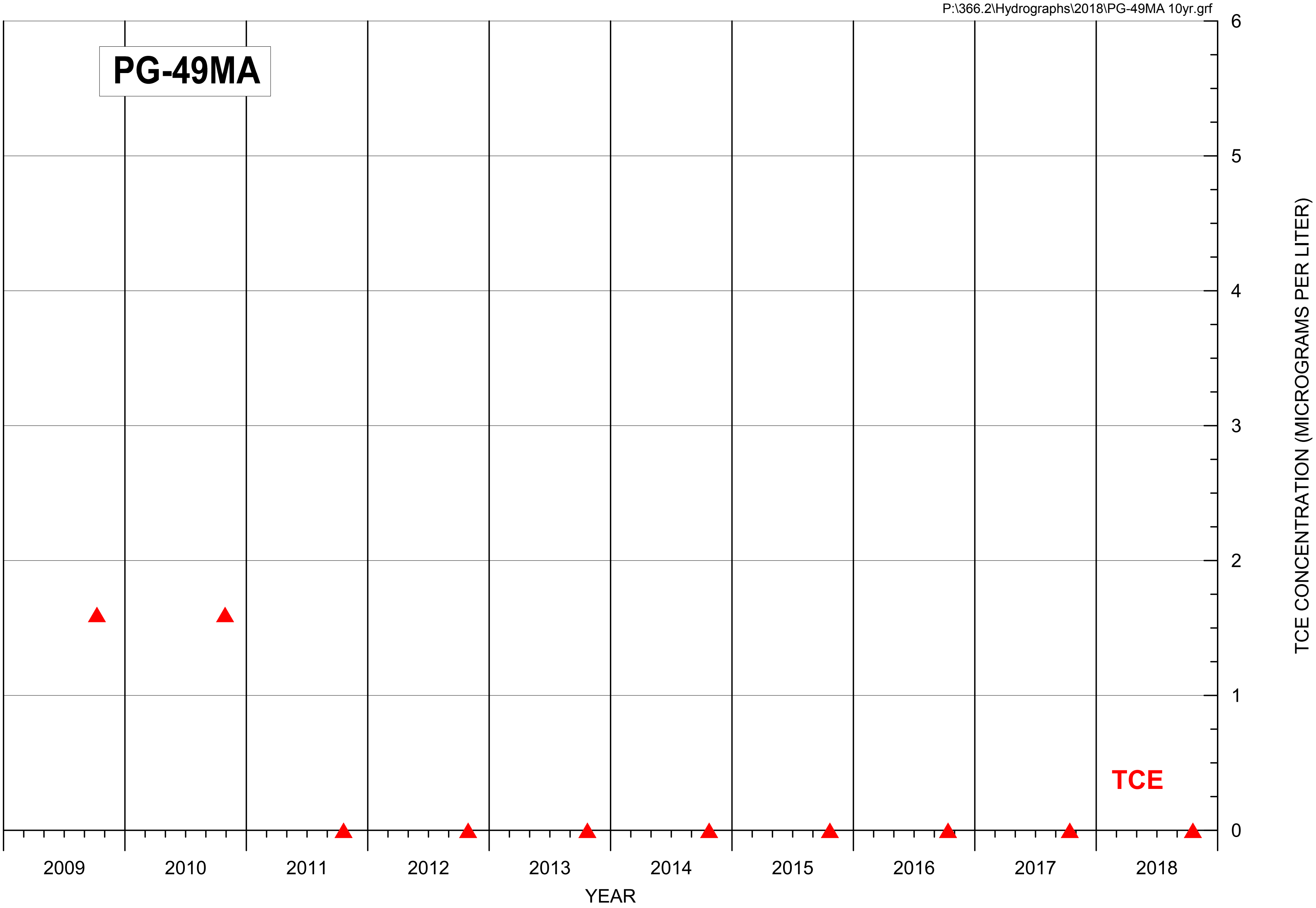


FIGURE C-111. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-48MA

North Indian Bend Wash Superfund Site



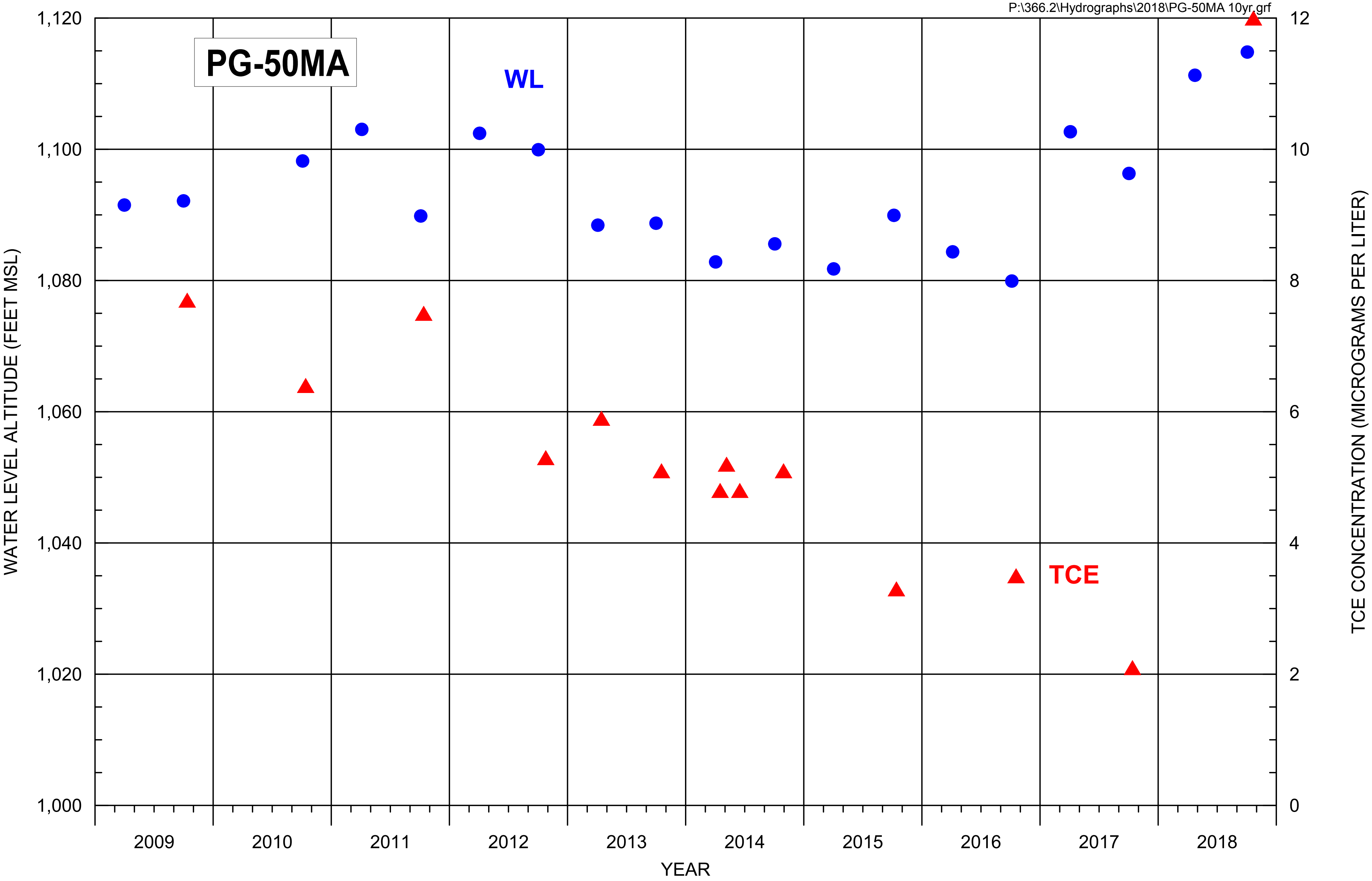
Altitude of Land Surface: 1,210.48

FIGURE C-112. TCE CONCENTRATIONS FOR MONITOR WELL PG-49MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

P:\366.2\Hydrographs\2018\PG-50MA 10yr.grf



Altitude of Land Surface: 1,240.96

FIGURE C-113. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-50MA

North Indian Bend Wash Superfund Site

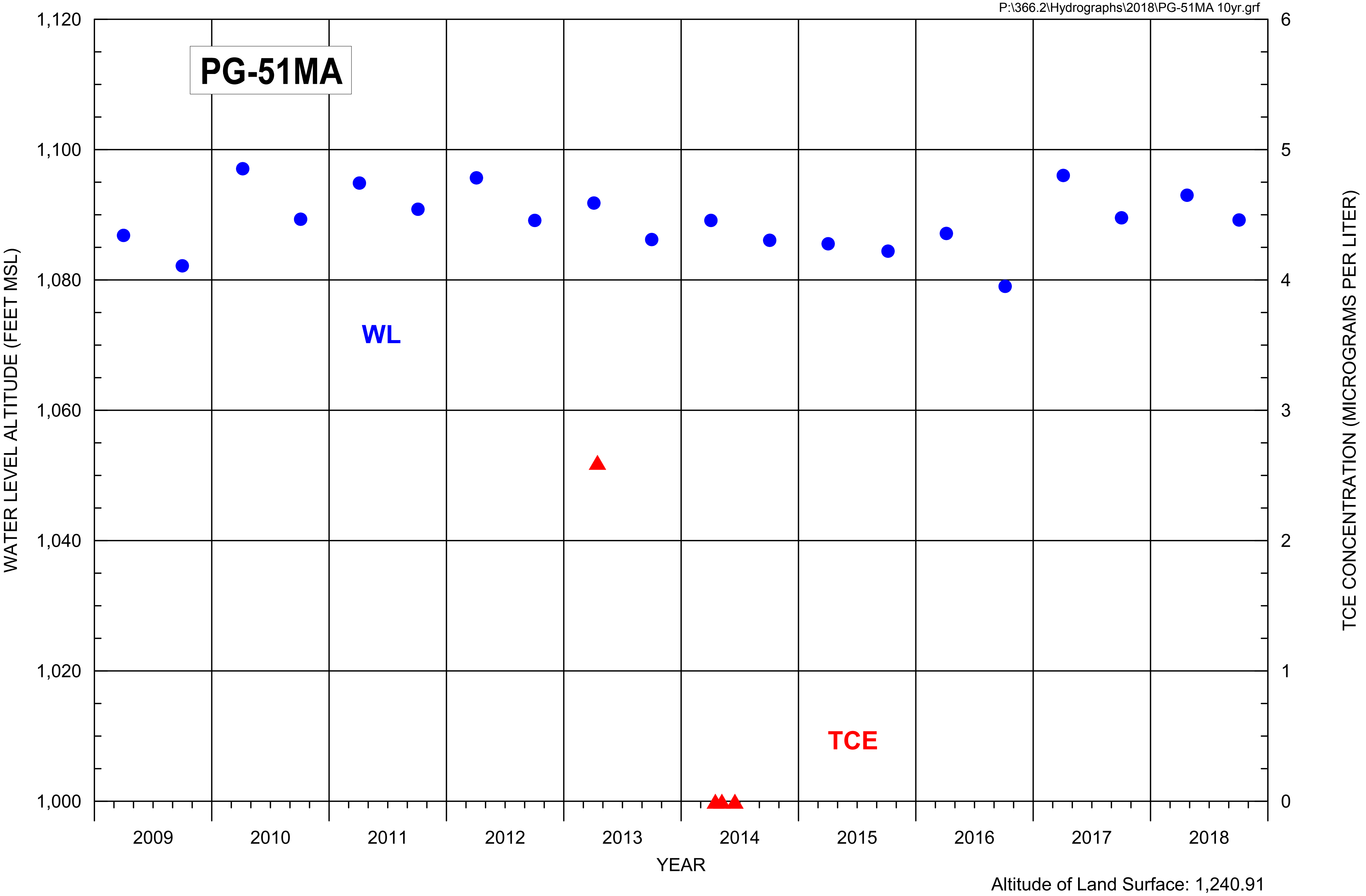


FIGURE C-114. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-51MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

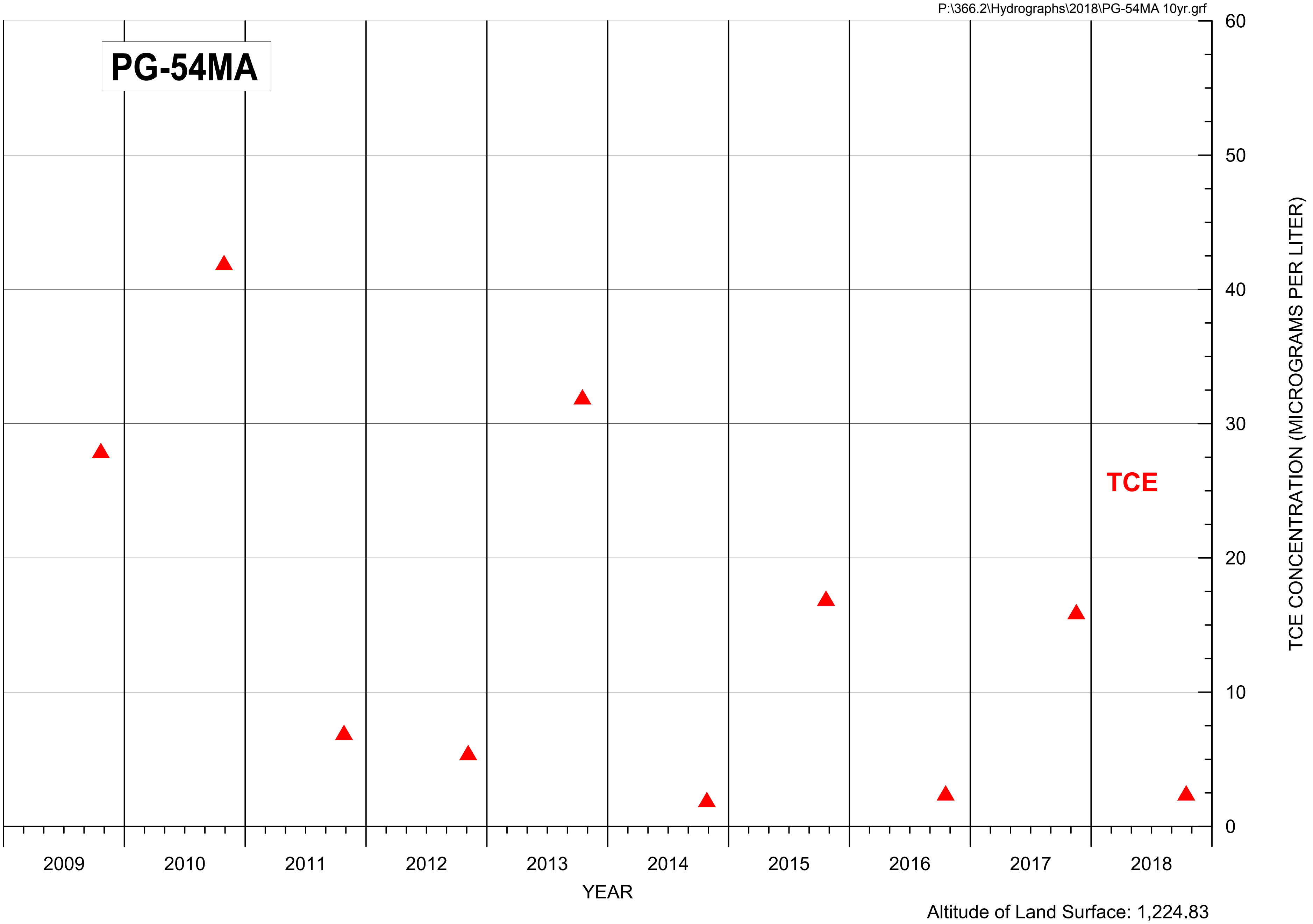
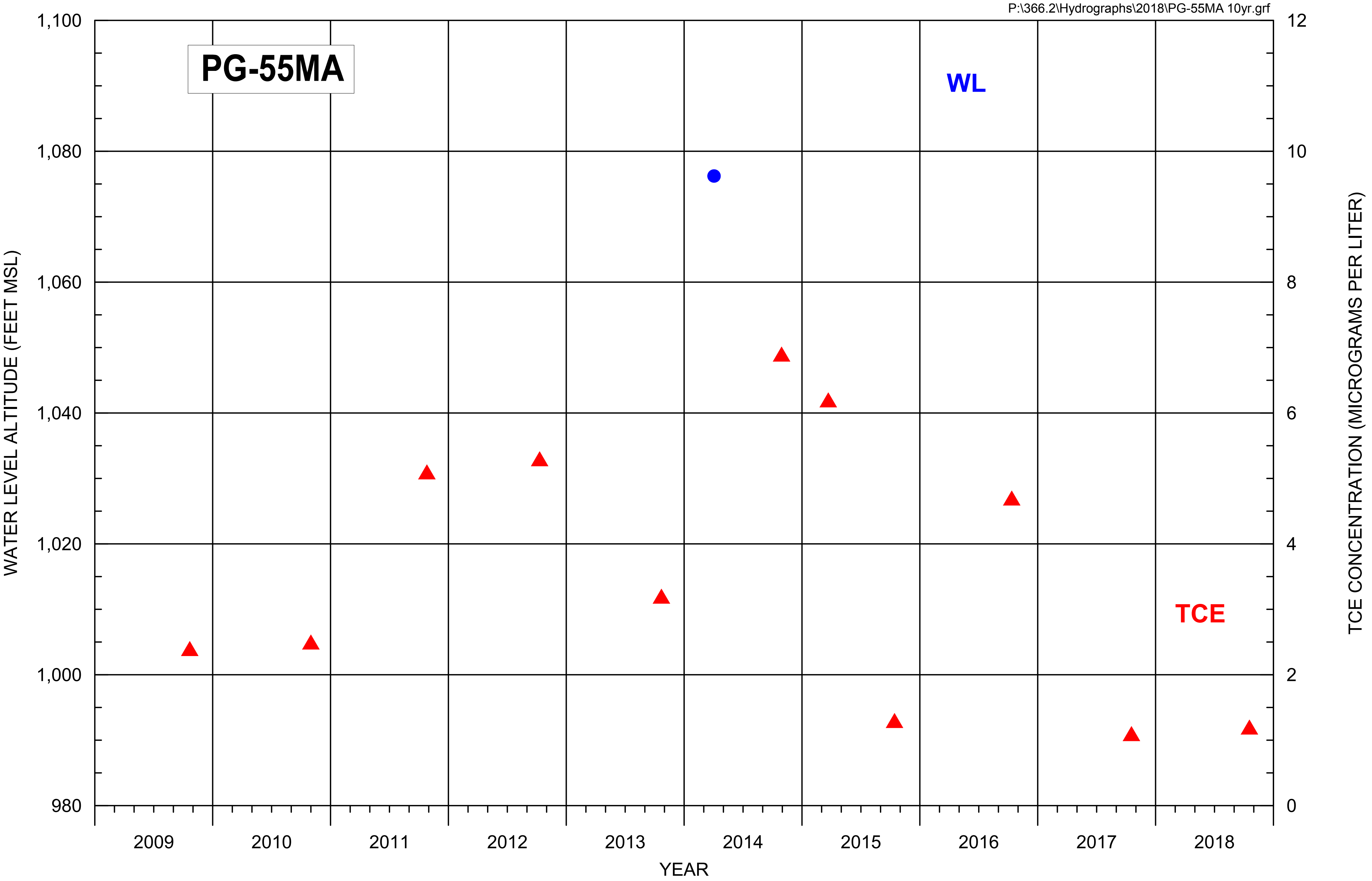


FIGURE C-115. TCE CONCENTRATIONS FOR MONITOR WELL PG-54MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,225.77

FIGURE C-116. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-55MA

North Indian Bend Wash Superfund Site

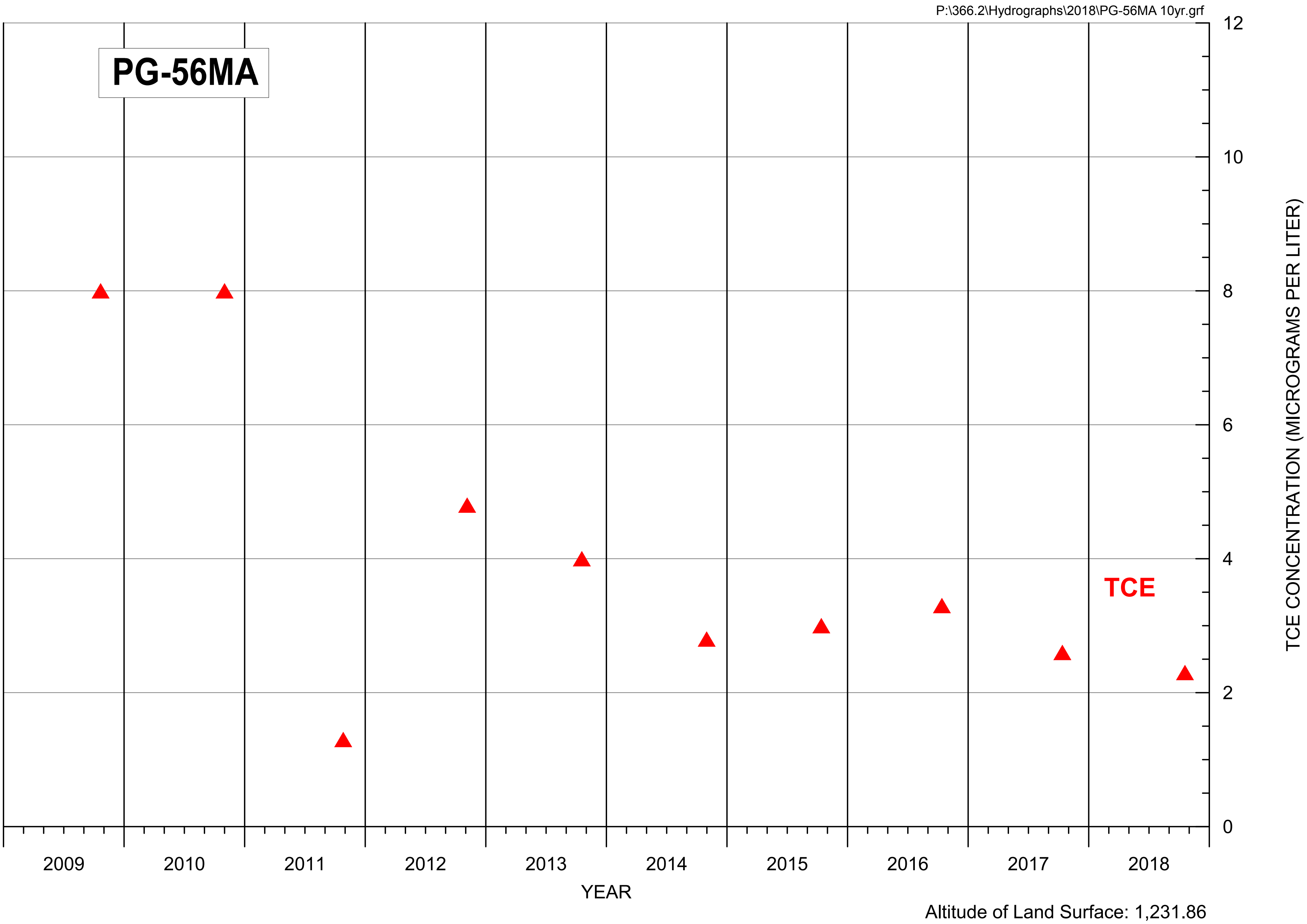


FIGURE C-117. TCE CONCENTRATIONS FOR MONITOR WELL PG-56MA

North Indian Bend Wash Superfund Site

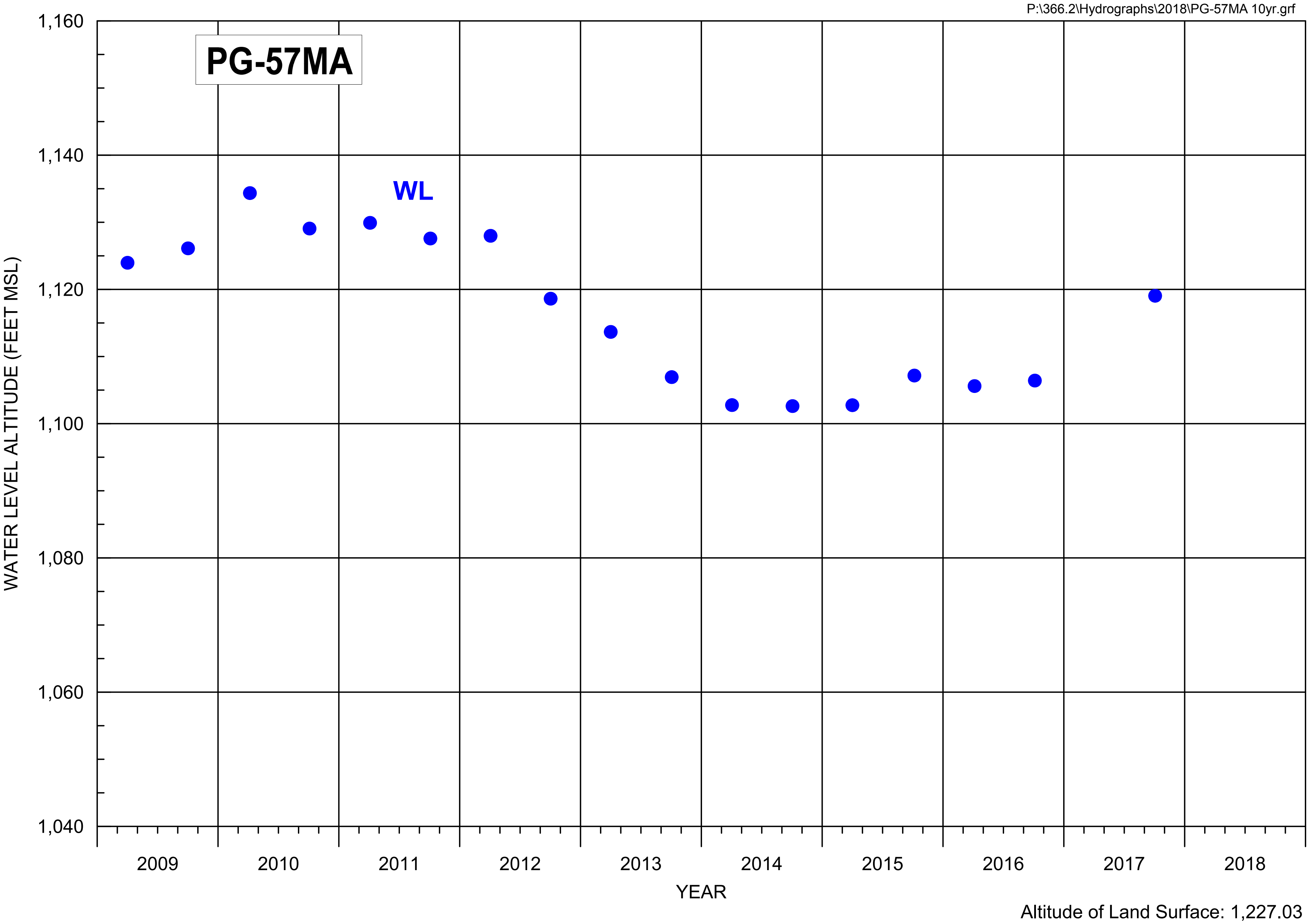
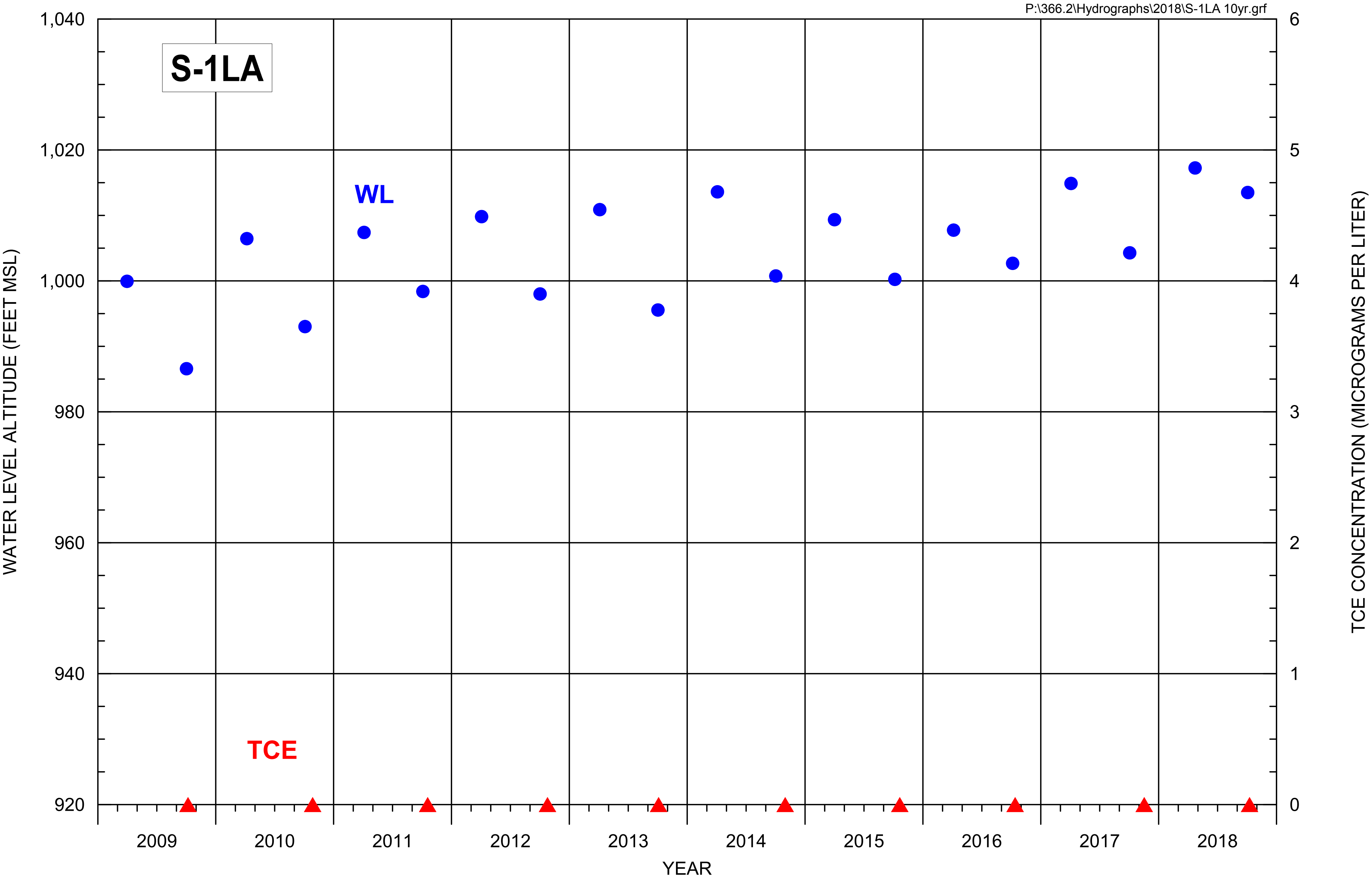


FIGURE C-118. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-57MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,260.45

FIGURE C-119. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL S-1LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

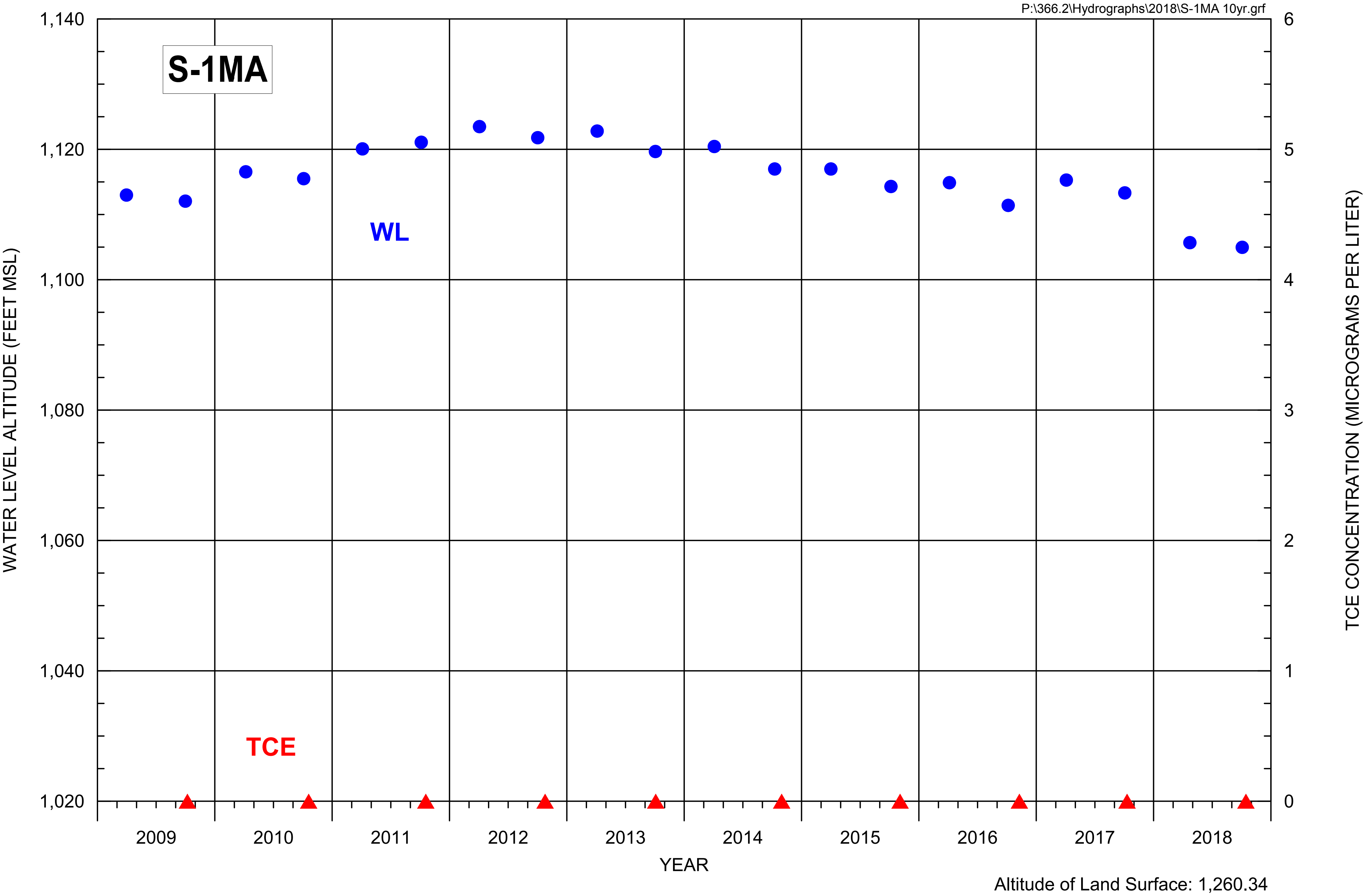


FIGURE C-120. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL S-1MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

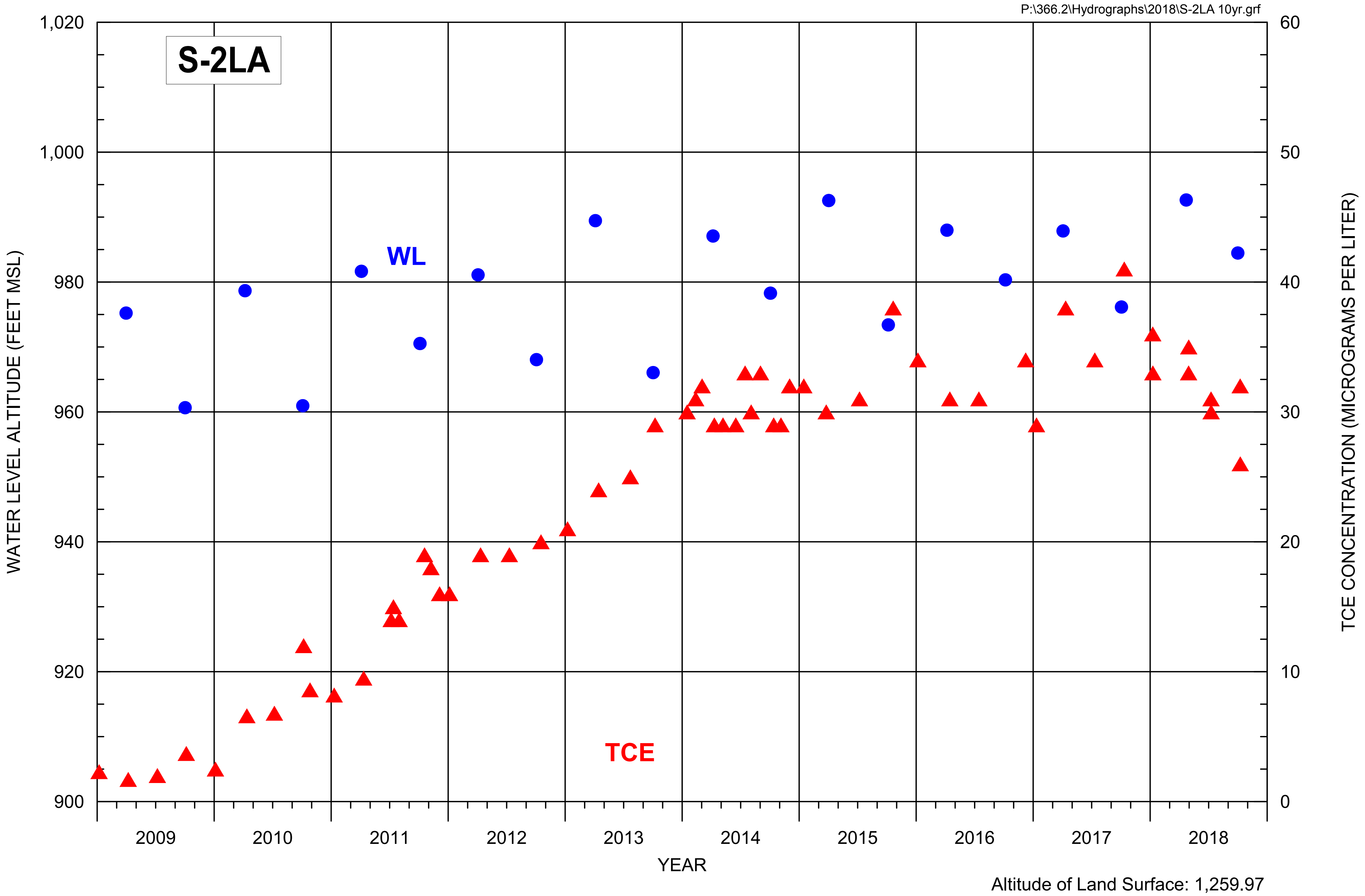


FIGURE C-121. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL S-2LA

North Indian Bend Wash Superfund Site

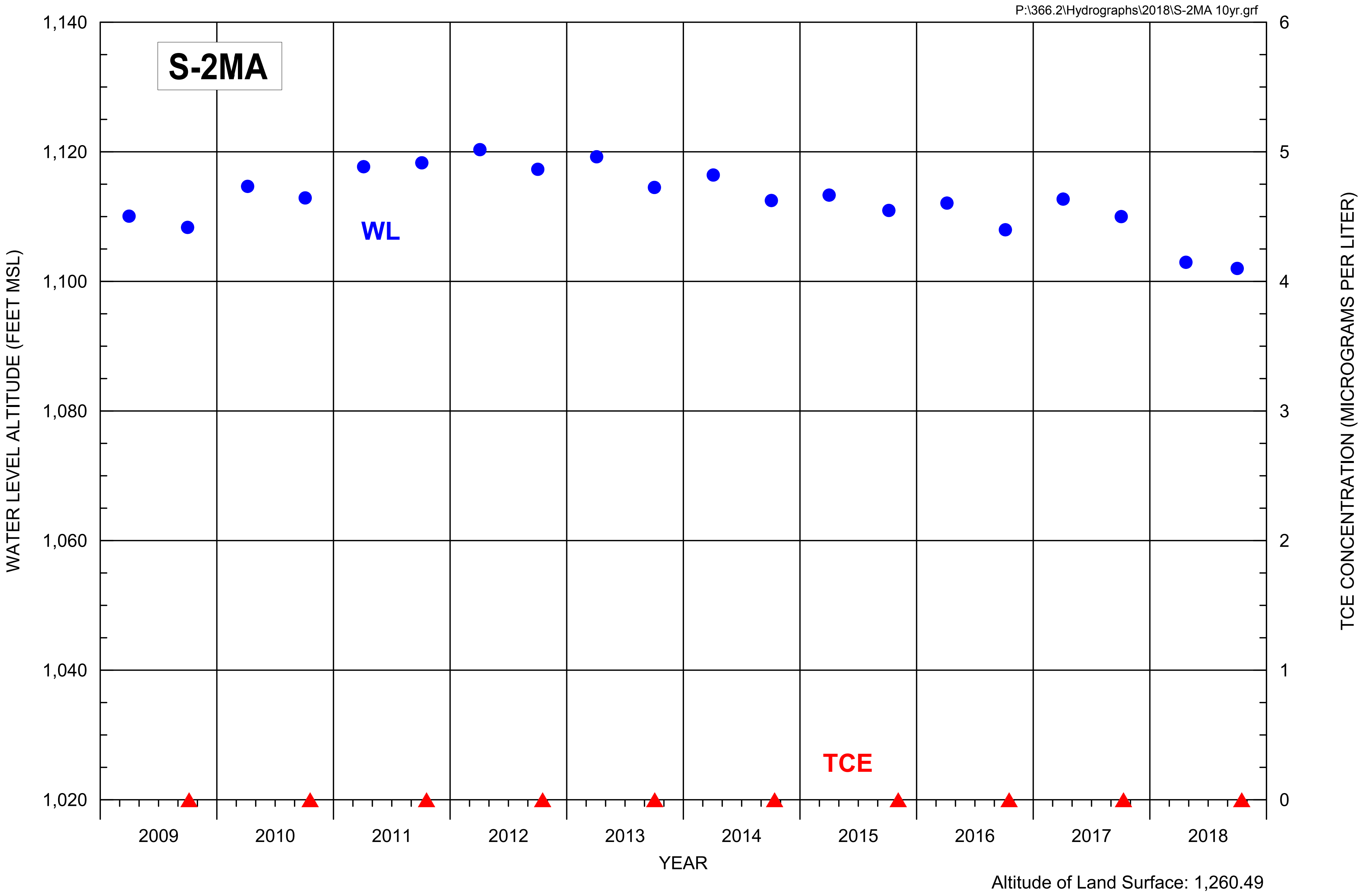
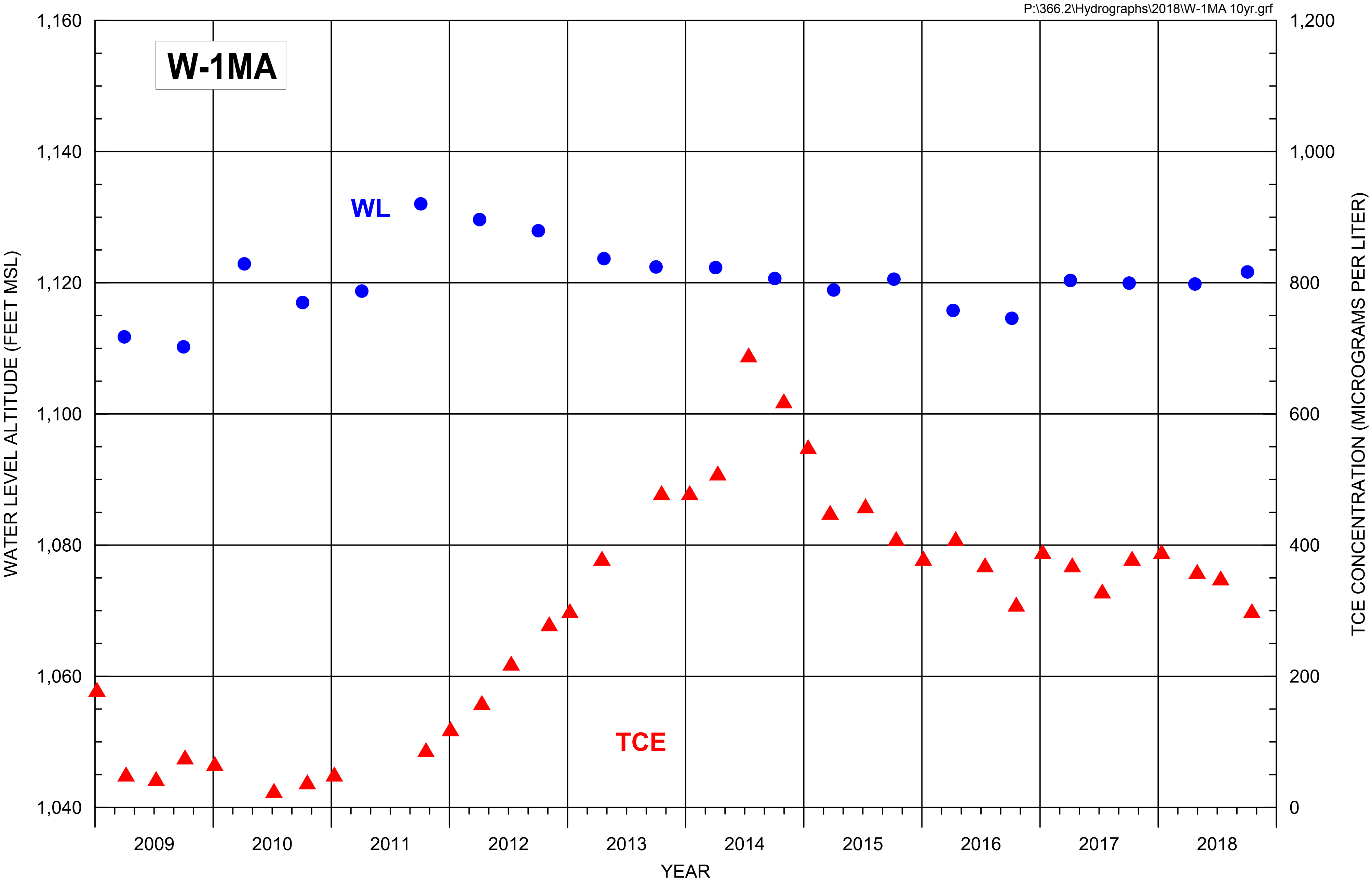


FIGURE C-122. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL S-2MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

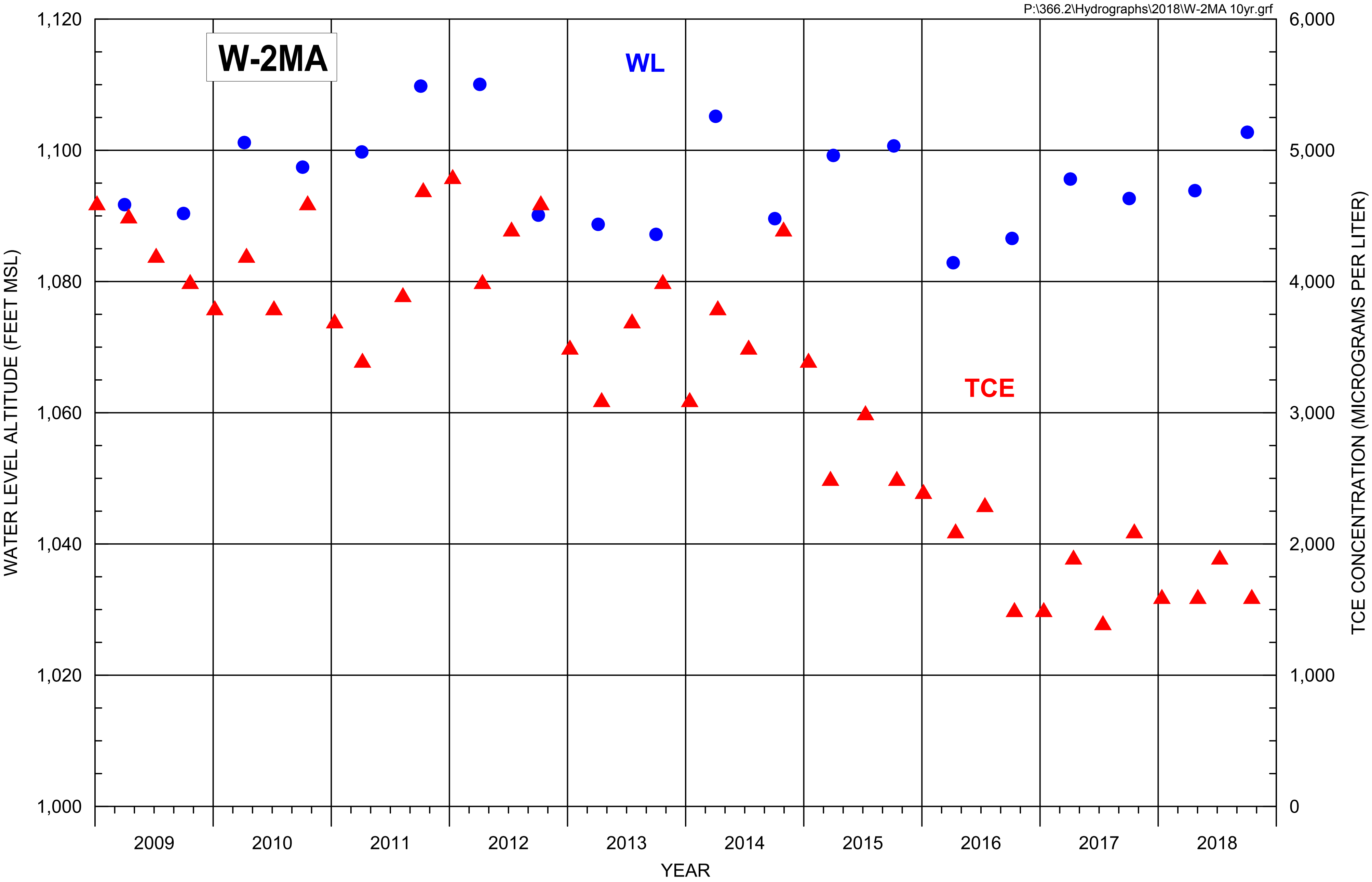
North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,230.38

FIGURE C-123. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL W-1MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,235.08

FIGURE C-124. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL W-2MA

North Indian Bend Wash Superfund Site

APPENDIX D

2018 SITE INSPECTION REPORT
GROUNDWATER TREATMENT FACILITIES

2018 INSPECTION REPORT
GROUNDWATER TREATMENT FACILITIES

North
Indian Bend Wash
Superfund Site

Prepared for:
U.S. Environmental Protection Agency
Region IX

Prepared by:
NIBW Participating Companies

February 28, 2019

North Indian Bend Wash Superfund Site

2018 ANNUAL INSPECTION REPORT
Groundwater Treatment Facilities
North Indian Bend Wash Superfund Site
Scottsdale, Arizona

1.0 INTRODUCTION

This report documents the activities and findings for the North Indian Bend Wash (NIBW) groundwater treatment plant inspections conducted in accordance with Section VI.B.4.d of the NIBW Statement of Work (SOW). The purpose of the inspections, as described in the SOW, is to identify malfunctions, deterioration, operator practices or errors, and discharges that may be causing or could result in a release of untreated groundwater. The inspections were coordinated and conducted by the NIBW Participating Companies (PCs) and attended by representatives of the U.S. Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ).

2.0 OVERVIEW

The groundwater remedy for the NIBW Superfund Site addresses aquifer restoration by monitoring, extracting, and treating groundwater affected by volatile organic compounds (VOCs), including the following five NIBW contaminants of concern (COCs): trichloroethene (TCE), tetrachloroethene (PCE), 1,1-dichloroethene (DCE), 1,1,1-trichloroethane (TCA), and chloroform. The NIBW COCs are treated to levels set forth in the Amended Consent Decree (ACD). Five separate groundwater extraction and treatment systems are used to extract and treat NIBW COC-affected groundwater at the Site. These systems are referred to as the Central Groundwater Treatment Facility (CGTF), Miller Road Treatment Facility (MRTF), North Indian Bend Wash GAC Treatment Facility (NGTF), Area 7 Groundwater Extraction and Treatment System (GWETS), and Area 12 GWETS.

Complete descriptions of the CGTF, MRTF, Area 7 GWETS and Area 12 GWETS and associated operation and maintenance (O&M) activities are presented in the "*Feasibility Study Addendum, North Indian Bend Wash Superfund Site*", dated November 15, 2000 (FSA), "*Record of Decision Amendment – Final Operable Unit, Indian Bend Wash Area*", dated September 27, 2002 (AROD), and the "*Sitewide Operation and Maintenance Plan*", dated June 5, 2006 (Sitewide O&M Plan), with individual treatment plant O&M plan updates that were prepared in 2012 and further revisions and Response to Comments in 2014 based on EPA comments received in 2013.

Detailed design and operational information for NGTF is included in "*Design Report, PCX-1 Granular Activated Carbon Treatment Facility*", dated August 2012, and "*Operation and Maintenance Plan, North Indian Bend Wash GAC Treatment Facility*", dated March 31, 2016.

All five groundwater treatment systems were designed to reduce NIBW COCs to below concentrations specified in Table 3 of the AROD (Treatment Standards).

3.0 INSPECTION PROCEDURES

3.1 Routine Inspections

The operators routinely inspect the treatment facilities, either daily or weekly. General operating parameters, such as totalized flow, local pressures and equipment state is logged manually during periodic site visits. Logging of more critical parameters, such as air and water flow rates, is performed by the computer control system at each facility on an hourly basis, at a minimum. The operators review the data for trends and anomalies to evaluate the overall operation of the treatment systems.

Due to the size of the treatment plants and the drinking water end-use, the NIBW PCs coordinate and conduct regular operational review meetings on an approximate monthly basis with the operators for the CGTF and NGTF. The NIBW PCs also visit all of the treatment facilities frequently to conduct walk-throughs and to meet with the operators. These meetings include discussions of current operations issues, routine maintenance, planning for upcoming non-routine maintenance such as column cleaning, and equipment and/or systems upgrades.

Weekly, monthly, and/or quarterly data and operating reports are submitted by the facility operators. These reports are reviewed by the NIBW PCs to document O&M issues and confirm treatment effectiveness of each plant. Updates are provided during monthly meetings of the NIBW Technical Committee.

3.2 Annual Inspections

Inspections are conducted annually in accordance with the SOW and ACD. A general question and answer session was held on December 18, 2018. The field inspections for CGTF, NGTF, and Area 7 GWETS were conducted on December 19, 2018, and the field inspections for MRTF and Area 12 GWETS were conducted on December 20, 2018.

The schedule of site inspections was coordinated in advance with EPA and ADEQ to provide an opportunity for regulatory agency participation. Representatives of EPA's contractor, Gilbane, Inc., were present during the 2018 inspections. The inspections included a facility walk-through, an interview with the primary operator, visual inspections of the treatment equipment and groundwater containment systems, and review of operating and maintenance data. Detailed operating data and maintenance logs for routine operation and non-routine projects are maintained and available for review at each treatment facility in accordance with the SOW. Additionally, documents such as the facility O&M Plans, O&M Manuals, Contingency and Emergency Response Plans, and Health and Safety Plan are maintained at each respective facility. A description of each facility inspection and associated results are provided in the following section.

4.0 FACILITY INSPECTIONS

4.1 Area 7 Groundwater Extraction and Treatment System

NIBW Area 7 is located at the southeast corner of 75th Street and 2nd Street in Scottsdale. The groundwater treatment system is located in the southeast corner of Area 7 in an area approximately 56 feet by 75 feet. The facility includes the treatment system and control equipment. Groundwater extraction is performed using two remote MAU groundwater extraction wells (7EX-3aMA and 7EX-6MA). In its current configuration, the groundwater treatment system is capable of treating up to approximately 450 gallons per minute (gpm) of NIBW COC-affected groundwater. Treated water is delivered to one of two remote groundwater injection wells (7IN-1UA and 7IN-2UA) for recharge to the Upper Alluvium Unit (UAU).

In 2012, well 7EX-5MA became unusable during a rehabilitation project to increase production at that location. Well 7EX-5MA was abandoned in early 2016. At the same time, production from well 7EX-4MA was declining due to well conditions. In 2015, well 7EX-6MA was installed to replace both wells 7EX-4MA and 7EX-5MA while still capturing the highest concentrations of NIBW COCs in the vicinity of Area 7.

In October 2016, the water level in well 7EX-4MA had decreased to a point that the pump began to stall. The pump already had been lowered to near the bottom of the well prior to that time. A previous well rehabilitation was performed in 2012 with limited results. Another rehabilitation of that well likely would result in minimal production increase. Well 7EX-4MA is currently offline with no future plans to pump groundwater at this location.

In 2018, the typical water flow rate to the Area 7 GWETS was approximately 400-430 gpm. The typical air flow rate through the shallow-tray air stripper at Area 7 was approximately 2,700 cubic feet per minute (cfm).

The major components of the Area 7 GWETS include submersible water pumps, wellhead equipment, piping from the wellheads to the treatment plant, an equalization tank, an ultraviolet oxidation (UV/Ox) reactor, a low-profile air stripper, and a vapor-phase granular activated carbon (GAC) treatment system.

During normal operation, treated groundwater is injected into the UAU via wells 7IN-1UA and 7IN-2UA. The GWETS is equipped to discharge treated groundwater either to the UAU aquifer upgradient of Area 7 through the injection wells or, under limited circumstances, to the City of Scottsdale sanitary sewer during maintenance on the system.

The groundwater treatment plant includes a building, which houses the major treatment equipment such as the UV/Ox and air stripper systems. A control room is integral with the building and is equipped with the motor control center (MCC) and human machine interface (HMI), main control center, including programmable logic controller (PLC), and motor drives.

The equalization tank and GAC adsorbers are located outside the building on the north side of the treatment plant area. A double-contained hydrogen peroxide tank is located on the south side of the treatment plant area in a contained concrete foundation with a six-inch berm. The entire treatment plant area is paved with concrete and surrounded by a two-inch berm for containment.

The treatment plant is surrounded by a block wall for security. Access to the plant is provided through three steel gates, two located on the west wall and one on the south wall.

4.1.1 Area 7 Maintenance and Condition

The Area 7 GWETS is operated and maintained by Arcadis, Inc. (Arcadis), an engineering consultant working on behalf of the NIBW PCs. Arcadis makes daily remote checks on the system via computer link and makes weekly site inspections of the equipment and grounds at Area 7. The operator also maintains operations logs and data spreadsheets at Area 7. The logs and spreadsheets were presented for review by the inspection team during the site inspection. Equipment maintenance records, including task and date, are kept on a separate log. Other site and operational information kept in a log book includes daily inspection observations and any other data collected by the operator. Treatment system data is also automatically logged by the control system and accessed through the HMI.

The Area 7 GWETS was available for operation almost 80 percent of the time during 2018. Downtime is attributed to repair work on the UV/Ox PLC, routine equipment maintenance, and multiple periodic power outages, primarily related to local weather.

In general, the facility appeared clean with no apparent leaks or significant deterioration during the inspection. The equipment was clean, labeled, and well maintained.

During the inspection, the process pumps in the plant appeared to be operating smoothly and without abnormal noises or vibrations. The process pumps are inspected weekly and serviced monthly. No significant maintenance or replacement was required on the process pumps at Area 7 in 2018. The hydrogen peroxide pump was rebuilt in 2018.

The UV/Ox system appeared to be operating normally during the inspection. The lamp in UV/Ox reactor #2 was replaced in October 2018.

The blower appeared to be running smoothly during the inspection. The blower is direct drive and operated via a variable frequency drive which maintains fan speed. The operator indicated that the blower has performed well, and no service has been required. All dampers are checked monthly for operability.

The internal air stripper trays were inspected in December 2018. The internal air stripper trays were last cleaned in January 2015. With the use of the scale inhibitor, only minor accumulation of calcium carbonate scale was present during the inspection; however, this does not affect the air stripper performance. Descaling may be performed every few years, as needed.

The exterior of the building and outdoor equipment such as the equalization tank and GAC system appeared in order without significant deterioration.

Treated water from Area 7 is injected into the underlying UAU aquifer using wells 7IN-1UA and 7IN-2UA. The injection wells are equipped with monitoring devices that will shut down discharge to the injection wells in the event water in the wells rises to pre-determined levels. At the time of the inspection, no operational issues were apparent with either injection well 7IN-1UA or 7IN-2UA.

Arcadis indicated that all instruments, alarms, and interlocks for the main control system were tested and validated in August 2018.

4.1.2 Results

Based on operating and monitoring data, the Area 7 GWETS has consistently met treatment performance criteria set forth in the ACD.

Based on the 2018 inspection of the Area 7 GWETS, no treatment performance issues, hazards, significant deterioration, or equipment malfunctions were apparent.

4.2 Area 12 Groundwater Extraction and Treatment System

The Area 12 GWETS is located at the General Dynamics facility at 8201 East McDowell Road in Scottsdale, Arizona. At this site, the air stripping tower is located just west of the Chemical Operations Building. The Area 12 GWETS is designed to treat up to 1,850 gpm of groundwater. Groundwater is extracted from two wells: MEX-1MA (MEX-1) and SRP well 23.6E-6.0N, also known as the Granite Reef well. MEX-1 is owned by Motorola Solutions and the Granite Reef well is owned by SRP. Both wells are operated by SRP. The treated groundwater from both wells is delivered to SRP's irrigation distribution system through a connection to an SRP lateral pipeline, located along Granite Reef Road.

Typical flow rates from MEX-1 and Granite Reef wells in 2018 were approximately 600 to 675 gpm and 800 to 850 gpm, respectively. During about half of 2018, both the Granite Reef well and MEX-1 were operated concurrently. Otherwise, one or the other of the wells was operated. The 2018 average flow rate from well MEX-1 has decreased from historical production rates. SRP and the NIBW PCs began pump replacement and well rehabilitation activities during the annual maintenance period beginning in December 2018.

The Area 12 system is typically shutdown for the annual SRP dry-up in December and restarted in February, once the discharge is allowed by SRP. Much of the 2018 scheduled maintenance including column cleaning and blower service was performed during that time. The system remained offline until April 2018 while upgrades were made to the post-air stripper air ducting and GAC system.

The Area 12 GWETS consists of an air stripping system and an off-gas treatment system. Groundwater is pumped from the extraction wells in individual pipes to a common manifold near the air stripper. The air stripper is a counter-current forced-draft, packed column through which the NIBW COCs are removed from the groundwater. In 2018, the typical air flow rate through the air stripper was approximately 5,400 cfm.

The off-gas treatment is a vapor-phase GAC polishing system. The treated groundwater is discharged to SRP's irrigation distribution system under an agreement between SRP and Motorola Solutions, Inc.

The main control panel containing the system PLC is located at the Area 12 treatment plant. Each well pump system is connected to the PLC using an Ethernet connection with signals traveling via a fiber optic pathway. Each well site also contains a PLC to control the individual remote well operation. The remote well pump PLCs also interface with SRP systems to monitor and control well operation.

A small control room located at the treatment plant houses the HMI and various plant-specific records. The HMI consists of a computer that supports a graphical user interface, logs operating data, and allows remote operation and data transfer using a telephone modem.

4.2.1 Area 12 Maintenance and Condition

The Area 12 GWETS is operated and maintained by EnSolutions, an engineering consultant working on behalf of the NIBW PCs. When in operation, EnSolutions makes daily remote checks on the system via computer and approximately twice weekly visits to the GWETS. During the visits, the operator conducts inspections of the equipment and grounds at Area 12. A safety coordinator for the General Dynamics facility makes daily walk-throughs at the Area 12 GWETS. The operator also maintains operations logs and data spreadsheets at the facility. The logs and spreadsheets were presented for review by the inspection team during the site inspection.

Except for the scheduled maintenance shut down in January into April and again in mid-December 2018 for the annual SRP dry-up and air system upgrades, the Area 12 GWETS was available for operation more than 99% of the remaining time in 2018. In general, the facility appeared clean, with no apparent leaks or significant deterioration during the inspection. The equipment was clean, labeled, and well maintained.

The blowers appeared to run smoothly. The air stripper blower belts were changed in January 2018 during the SRP dry-up. The main blower was also balanced and aligned during January 2018 maintenance. The operator indicated that the blowers have performed well since that time, and no other non-routine service has been required.

Scale removal was last performed on the air stripper column in January 2018 during the extended maintenance period. Scale removal is typically performed annually when maintenance is performed during the SRP dry-up period.

The process control system is monitored continuously by computer. The system must be in auto-mode for start-up and operation. The system cannot start with an active shutdown alarm. The primary control system alarms are tested annually during the SRP dry-up maintenance period. The control system primary alarms were tested and validated in January 2018. The results of the testing were presented for review during the inspection. The testing data indicated that all systems were operable. The operator indicated that the alarms are routinely tested when the system is shut down. All equipment, control device elements, transmitters, alarms, and interlocks are tested at least once per year.

4.2.2 Results

Based on operating and monitoring data, the Area 12 GWETS has consistently met performance criteria set forth in the ACD.

Based on the 2018 inspection of the Area 12 GWETS, no treatment performance problems, hazards, significant deterioration, or equipment malfunctions were apparent.

4.3 Miller Road Treatment Facility

MRTF is located at 5975 Cattletrack Road, south of the intersection of Cattletrack Road and McDonald Drive in Scottsdale, Arizona. The facility is owned and operated by, and the responsibility of, EPCOR Water USA (EPCOR). MRTF is used to treat water from EPCOR production wells PV-14 and PV-15.

MRTF consists of three individual air stripping treatment trains. Each treatment train includes a counter-current, forced-draft air stripper with appurtenant equipment, such as an air blower. The off-gas from each air stripper passes through a mist eliminator, then through ducting to one of three GAC adsorbers before discharge to the atmosphere. Each air stripper column treats groundwater at flow rates up to approximately 2,100 gpm, with an air flow rate of approximately 5,650 cfm.

Water produced from wells PV-14 and PV-15 is treated by EPCOR and delivered to the clearwell at MRTF, where it is then pumped to EPCOR's Paradise Valley Arsenic Removal Facility. If not required for use in EPCOR's system, treated water may be delivered to SRP via the Arizona Canal outfall. The treatment system is configured such that water from one well is treated through a specific column. The treatment piping allows water from well PV-14 to be treated through Towers 2 or 3 and water from well PV-15 to be treated through Tower 1 or 2. EPCOR switches treatment of water from the wells between the towers periodically.

At the time of the inspection, treatment of water from both wells PV-14 and PV-15 was occurring at MRTF.

All of the MRTF treatment equipment, except the GAC adsorbers and acid feed system, is located inside the treatment building. The treatment building consists of several rooms including the air stripper room, which houses the air stripper columns, blowers, and distribution pumps; the electrical room, which supports the MCCs, starters, Remote Terminal Units (RTUs), Remote Input/Output (RIO) cabinets, transformers, and other electrical equipment; and the control room, where the HMI, laboratory, and records are located.

For security and aesthetics, the facility is surrounded by a masonry wall with locking access gates.

4.3.1 MRTF Maintenance and Condition

EPCOR made relevant operating, monitoring, and safety documents, as well as operating data and maintenance logs for MRTF, available during the inspection. Additionally, the operator was interviewed and a walk-through of the facility was conducted.

EPCOR has an operator onsite at MRTF for several hours a day, five days a week. The operator makes daily inspections of the equipment and grounds at MRTF. The operator also maintains operations logs and data spreadsheets at the facility.

MRTF was available for treatment of groundwater from wells PV-14 and PV-15 the entire year. During 2018, each well produced approximately 2,100 gpm. Wells PV-14 and PV-15 are operated based on demand from EPCOR's system. Well PV-15 is the highest priority for pumping, so it remained operational greater than 98 percent of the time in 2018. Well PV-14 was shut down from time to time during the winter months due to low demand, but operated over 90 percent of the time in 2018. The MRTF was available for treatment of extracted groundwater nearly 100 percent of the time in 2018. The facility was idle only during system maintenance and replacement of the main discharge valve in the MRTF yard.

Column cleaning to remove calcium carbonate scale at MRTF was performed in March and April of 2018. Column cleaning consists of circulating a low pH solution through the packing to remove the accumulated scale. Spent cleaning solution is discharged to the Scottsdale sanitary sewer under requirements of a temporary discharge permit issued by Scottsdale.

The blowers and treatment area are inspected daily by the operator. Maintenance, such as balancing and belt alignment on the blowers, is performed by EPCOR technicians on an as needed basis in accordance with the O&M

instructions provided by the manufacturer. EPCOR uses a system-wide preventative maintenance program that automatically schedules the appropriate maintenance on each piece of equipment in accordance with manufacturers' instructions. Blowers 1 and 3 were operating at the time of the inspection and appeared to run smoothly without excessive vibration and unusual noises.

The equipment and work areas at MRTF appeared clean and well maintained during the inspection. The piping, valves, and instruments were labeled and appeared in good condition.

EPCOR indicated that the automated valves are tested and calibrated once per year. The manual valves are exercised approximately three to four times a year. Process instruments are checked and calibrated and/or tested once per year by EPCOR.

The air handling system appeared tight and in good condition during the inspection. EPCOR indicated that the dampers are exercised periodically.

4.3.2 Results

Based on operating data, MRTF has consistently met performance criteria set forth in the ACD.

Based on the 2018 inspection of MRTF, no treatment performance issues, hazards, significant deterioration, or equipment malfunctions were apparent.

4.4 Central Groundwater Treatment Facility

The CGTF is located at 8650 E. Thomas Road in Scottsdale, Arizona at the northeast corner of Pima Park, a municipal park. Other related facilities include the CGTF extraction wells and Reservoir 80, into which treated water from the CGTF is discharged for beneficial use as a supply to City of Scottsdale's potable water system.

Background and details of the CGTF are provided in the O&M Plan developed for this facility. EPA approved the CGTF O&M Plan, dated March 2006, including several updates; the most recent in June 2018. The O&M Plan describes the facility, major pieces of equipment, control strategies, and performance monitoring of the treatment plant. Design parameters and performance of CGTF have been validated and documented in the O&M Plan, quarterly Compliance Monitoring Reports, and annual data reports for the NIBW Site.

Additionally, an extensive engineering evaluation of the plant, equipment, and control system was conducted between August and October 2008. The results and findings associated with those activities are included in the final report, *Engineering Evaluation, Central Groundwater Treatment Facility*, dated January 2009, by Environ.

The CGTF uses air stripping to remove NIBW COCs, primarily TCE, from groundwater. The CGTF is comprised of three separate, parallel treatment trains. Each treatment train consists of a packed column, a process air fan, and an off-gas vapor treatment system that removes NIBW COCs prior to discharge to the atmosphere. Each column has a design capacity of 3,150 gpm. The overall capacity of the CGTF is approximately 9,450 gpm. The separate treatment trains allow for one or more columns to be removed from service while the other column(s) continue to operate.

Groundwater can be pumped from City of Scottsdale wells 75A, 71A, 72, and 31 through transmission pipelines to the CGTF. Currently, only well 75A is routinely pumped to and treated at CGTF. Water from well 31 may be used as back-up if water from other sources is not available. Well 72 is operated infrequently. Due to inorganic water quality, City of Scottsdale has removed well 71A from service. The typical flow rate from well 75A is approximately 2,250 gpm; the typical flow rate from well 31 is approximately 2,650 gpm; and the typical flow rate from well 72 is approximately 2,300 gpm.

Influent water combines in a common raw water header and is evenly distributed into the available columns, where it flows top to bottom through the column packing while airflow is pulled through the tower in a counter-current direction.

Since water from the wells is delivered to CGTF in a common header, the flow rate through each column can vary depending on the number of wells and columns in service at any given time. Typically, the flow rate through the columns ranges between approximately 1,500 and 3,000 gpm depending on the number of wells operating at the time.

The treated water gravity flows to Scottsdale's potable water system or is pumped to the SRP irrigation system. The capacity of the connection to the SRP irrigation system varies based on several factors, with a current maximum of approximately 4,000 gpm. Blending of CGTF treated water with other water supplies occurs in the potable water storage facility, Reservoir 80, just south of the site.

A process air fan is used to pull air through an intake filter then upward through the packed column, counter-current to the water flow. The off-gas is directed through a mist eliminator, a natural gas-fired duct heater, and then to a GAC contactor prior to discharge to the atmosphere. The duct heater heats the air which reduces relative humidity prior to VOC adsorption in the GAC contactors.

The majority of the treatment equipment, except the duct heaters, GAC contactors, and disinfection equipment, is located inside the CGTF treatment building. The treatment building consists of several rooms, including: the air stripper room, which houses the packed columns and process air fans; the electrical equipment room, which supports the MCCs, starters, RTUs, RIO cabinets, transformers, and other electrical equipment; and the laboratory. Disinfection equipment is located in a separate building at the Reservoir 80 booster station and is part of the drinking water system operated by City of Scottsdale.

For security and aesthetics, the facility is surrounded by a masonry wall with locking access gates.

4.4.1 CGTF Maintenance and Condition

CGTF is operated and maintained by a City of Scottsdale water treatment operator. City of Scottsdale operations personnel also monitor the status of CGTF remotely. Operators make minimum daily inspections of the equipment and grounds at CGTF. The operator maintains operations logs and data spreadsheets at the facility. The logs and spreadsheets were presented for review by the inspection team during the site inspection. Technical staff from City of Scottsdale Water Operations such as mechanics, electricians, and instrumentation technicians also provide maintenance support, as needed.

The City of Scottsdale Water Resources Department uses a city-wide preventative maintenance program for all equipment operated by the water operations staff. This program maintains a service record database for each piece of equipment and prompts the technicians to perform routine preventative maintenance in accordance with manufacturers' instructions or as necessary.

The CGTF was available for operation nearly 100% of the time between January and October. The CGTF was shut down for annual column cleaning and maintenance in November 2018. The system was restarted in early December following completion of the column cleaning activities and was operational until the end of the year.

In general, the facility appeared clean with no apparent leaks or significant deterioration. The equipment is clean, labeled, and well maintained. All piping appeared in good condition without leaks or corrosion during the inspection. All valves in the plant are turned at least once per year to verify proper working order.

All blowers appeared to run smoothly. Service is performed on the blowers as needed but, at least during each GAC service event on the associated treatment train. Service activities may include alignment, bearing repacking, and inspection and tightening the drive belts. The air handling and treatment system appeared tight and in good condition during the inspection.

Visual inspection through the viewports on the air stripper column during the inspection indicated minimal scaling of packing material.

The trays at the top of each column are visually inspected by the operator on a monthly basis for even water distribution and for accumulation of debris produced from the wells.

The process control system is monitored continuously. City of Scottsdale has implemented a program to test all switches and alarms on a routine basis when a treatment train is offline for GAC service. Results of the control tests are maintained in a notebook at CGTF. Additionally, instruments are checked and calibrated during the GAC service events by City of Scottsdale instrument technicians.

4.4.2 Results

Based on operating data, CGTF has consistently met performance criteria set forth in the ACD.

Based on the 2018 inspection at CGTF, no treatment performance problems, hazards, significant deterioration, or significant equipment malfunctions were apparent.

4.5 NIBW GAC Treatment Facility

The NGTF is located at 5985 North Cattletrack Road in Scottsdale, Arizona at the southwest corner of Cattletrack Road and McDonald Drive. NGTF is owned by Motorola Solutions, Inc. and is operated under contract by City of Scottsdale Water Resources. Treated water from NGTF is delivered to City of Scottsdale's Chaparral Water Treatment Plant (CWTP) located approximately one-half mile east of NGTF or to SRP's Arizona Canal through a dedicated outfall immediately east of the facility.

NGTF treats water from extraction well PCX-1. The typical production rate from well PCX-1 is approximately 2,650 gpm. Treatment of water from well PCX-1 at NGTF is accomplished using liquid-phase GAC. A pre-filter located upstream of the GAC system removes entrained solids to prevent accumulation of sediment in the media bed. The GAC system is comprised of four separate, parallel treatment trains. Each treatment train consists of two contactors, each containing approximately 20,000 pounds of GAC with interconnecting piping and valves. Each treatment train has a design capacity of approximately 1,050 gpm. All treatment trains are used for treatment of groundwater from well PCX-1. The flow of water from well PCX-1 is typically split across three treatment trains, while the remaining treatment train is in standby mode. Service rotates among the four treatment trains. This arrangement allows the system to remain operating while GAC media is serviced.

Groundwater enters the treatment train through the LEAD contactor, which provides the required NIBW COC treatment. Treated groundwater then flows through the LAG contactor. The configuration of the treatment train allows for each of the two GAC contactors in the treatment train to operate in either LEAD or LAG position and also supports reverse flow through the contactors for backwashing the media.

Following GAC treatment, water is disinfected by City of Scottsdale and delivered to the CWTP finished water reservoir through a dedicated 16-inch pipeline between the facilities. Chlorination is required by City of Scottsdale to meet drinking water standards associated with the CWTP. The disinfection system at NGTF is not considered part of the treatment system for NIBW COCs in groundwater.

After GAC replacement or during normal operation, the media may require backwashing to remove fines and sediment build-up in the bed. Backwash water is collected in the backwash storage tank, and discharged to the sanitary sewer.

The control building at NGTF supports the control console with HMI, appurtenant mechanical equipment, electrical equipment, and the RTU containing the main PLC. The system is linked with City of Scottsdale’s city-wide SCADA system. The program logic associated with the SCADA system is secure and only accessible by authorized personnel. Changes to the program can only be made after review and acceptance by City of Scottsdale and the NIBW PCs.

The City of Scottsdale Water Resources Department uses a city-wide preventative maintenance program for all equipment operated by the water operations staff. This program maintains a service record database for each piece of equipment and alerts the technicians when routine preventative maintenance is necessary. Service records for all the primary equipment at NGTF were available for review at the time of the inspection.

The treatment facility site comprises approximately one and a half acres surrounded by a masonry block wall, with a main vehicle entry gate and two walk-through gates. NGTF has a maximum hydraulic capacity of approximately 4,400 gpm.

4.5.1 NGTF Maintenance and Condition

The NGTF is maintained by a City of Scottsdale water treatment operator. City of Scottsdale operations personnel also monitor the status of NGTF remotely. Operators make minimum daily inspections of the equipment and grounds at NGTF. The operator maintains operations logs and data spreadsheets at the facility. The logs and spreadsheets were presented for review by the inspection team during the site inspection.

Well PCX-1 and NGTF were available for service nearly the entire year (greater than 98 percent). GAC service is accomplished on the standby treatment train while the other three trains remain in service treating the groundwater. Currently, the service life of the carbon in the LEAD contactors is approximately six weeks.

The facility appeared clean and well maintained with no apparent leaks or deterioration during the inspection. The equipment was clean and in good condition. The piping, valves, and instrumentation labeling appeared complete and intact. All piping appeared in good condition without leaks or corrosion.

The process control system is monitored continuously. Instruments are checked and calibrated in accordance with the manufacturers' instructions by City of Scottsdale instrument technicians. Maintenance is scheduled and performed through City of Scottsdale's city-wide preventive maintenance system.

4.5.2 Results

Based on operating data, NGTF has consistently met performance criteria set forth in the ACD.

Based on the 2018 inspection at NGTF, no treatment performance problems, hazards, significant deterioration, or significant equipment malfunctions were apparent.

5.0 RECOMMENDATIONS

In the 2017 Inspection Report, a recommendation to add the description of the fourth treatment train was made. The NGTF O&M Plan is currently under review and an updated version will be prepared and published in 2019. Except for the description of the fourth Treatment Train, all other elements of the O&M Plan are the same whether for three train or four train configuration.

APPENDIX E

ANNUAL GROUNDWATER PRODUCTION AND TCE TIME-SERIES DATA FOR NIBW EXTRACTION WELLS

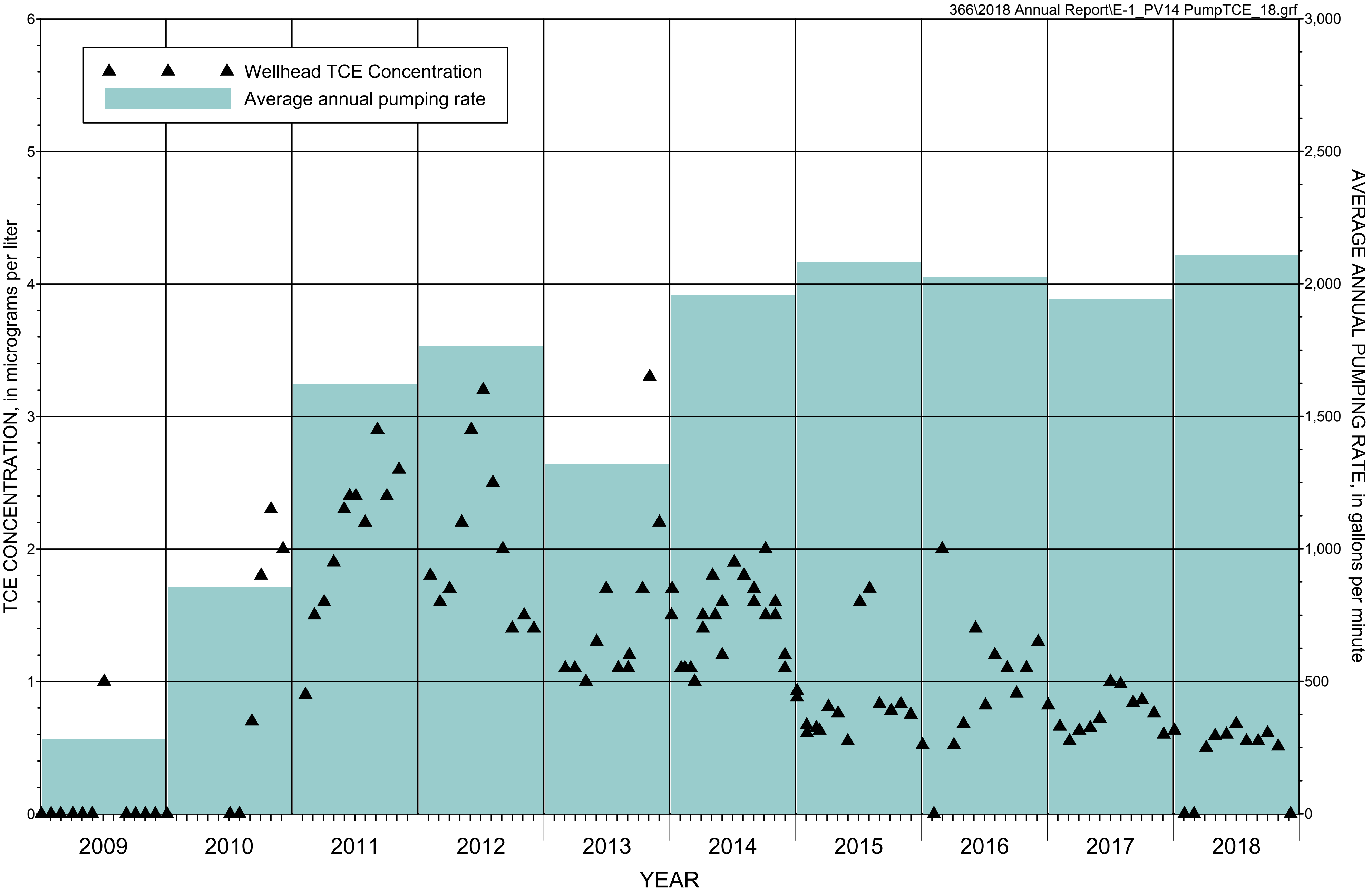


FIGURE E-1. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PV-14 2009 THROUGH 2018

North Indian Bend Wash Superfund Site

Note: All values of 0.5 indicate lab results of 0.5 micrograms per liter or less.

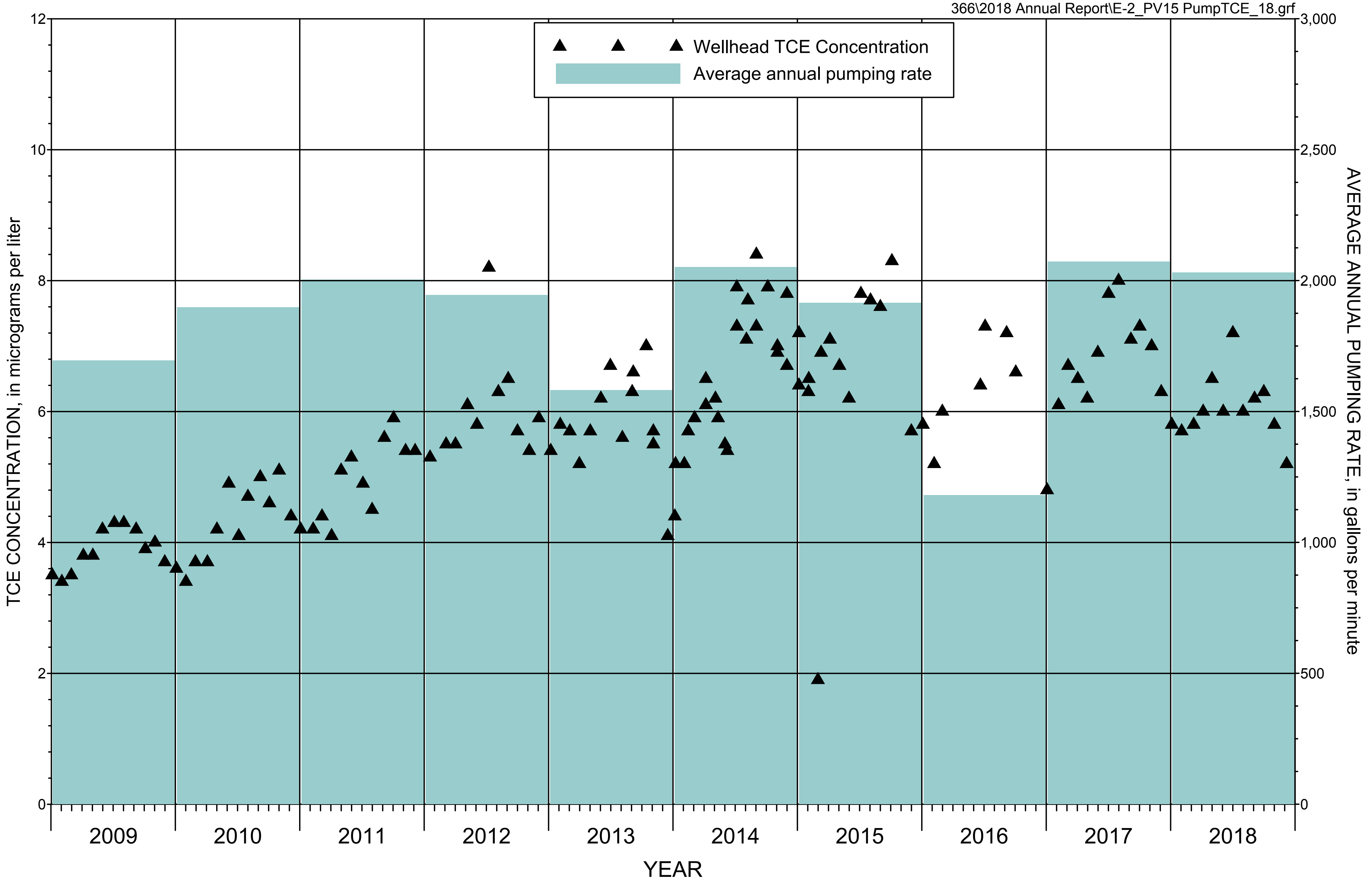


FIGURE E-2. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PV-15 2009 THROUGH 2018

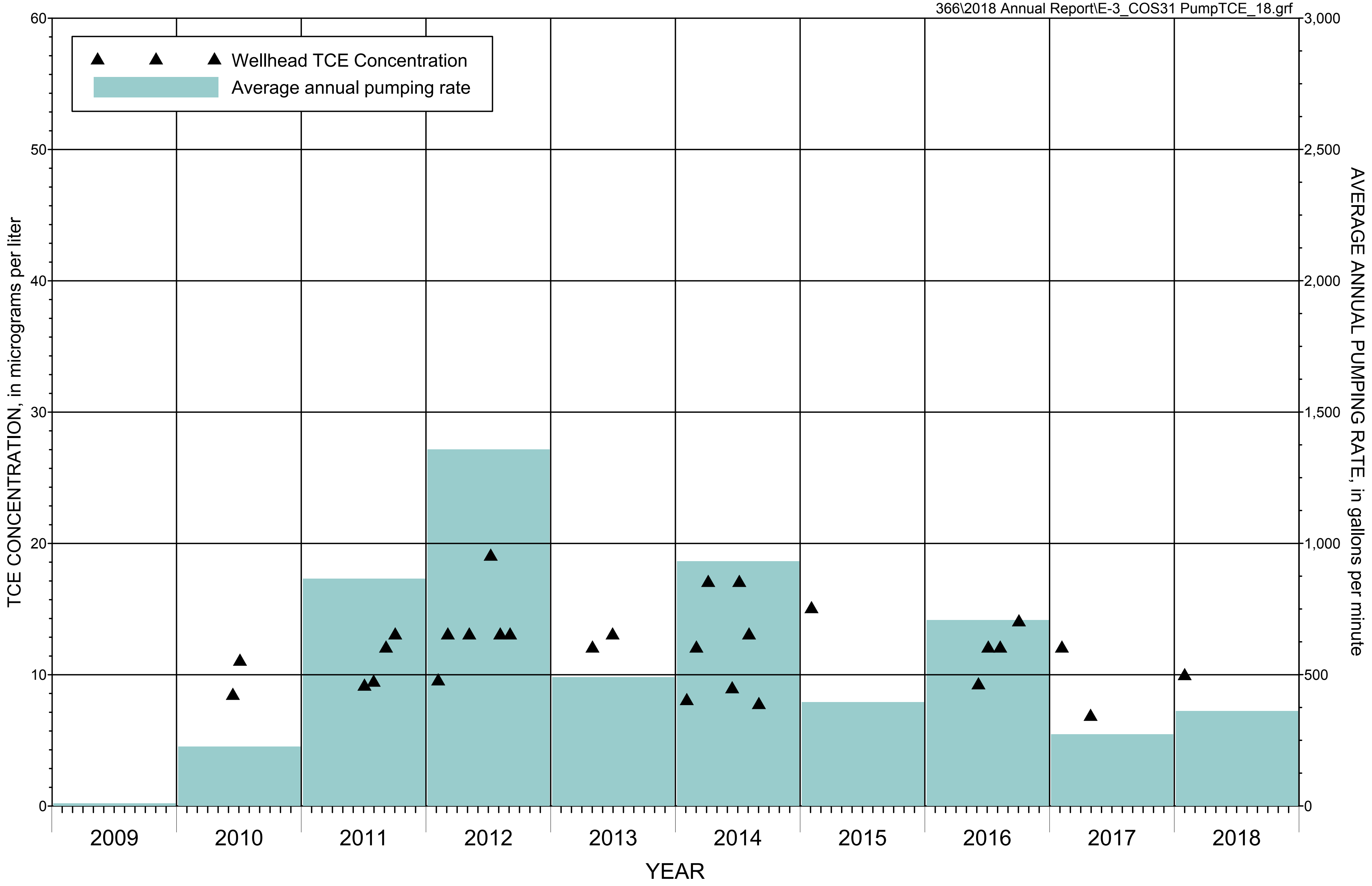


FIGURE E-3. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-31 2009 THROUGH 2018

Note: Well not sampled in 2009 due to intermittent operation. Assume average TCE concentrations from 2008. COS did collect samples in September and December (8.51 and 6.14 micrograms per liter, respectively), however, due to the intermittent well operation, those samples may not be representative.

North Indian Bend Wash Superfund Site

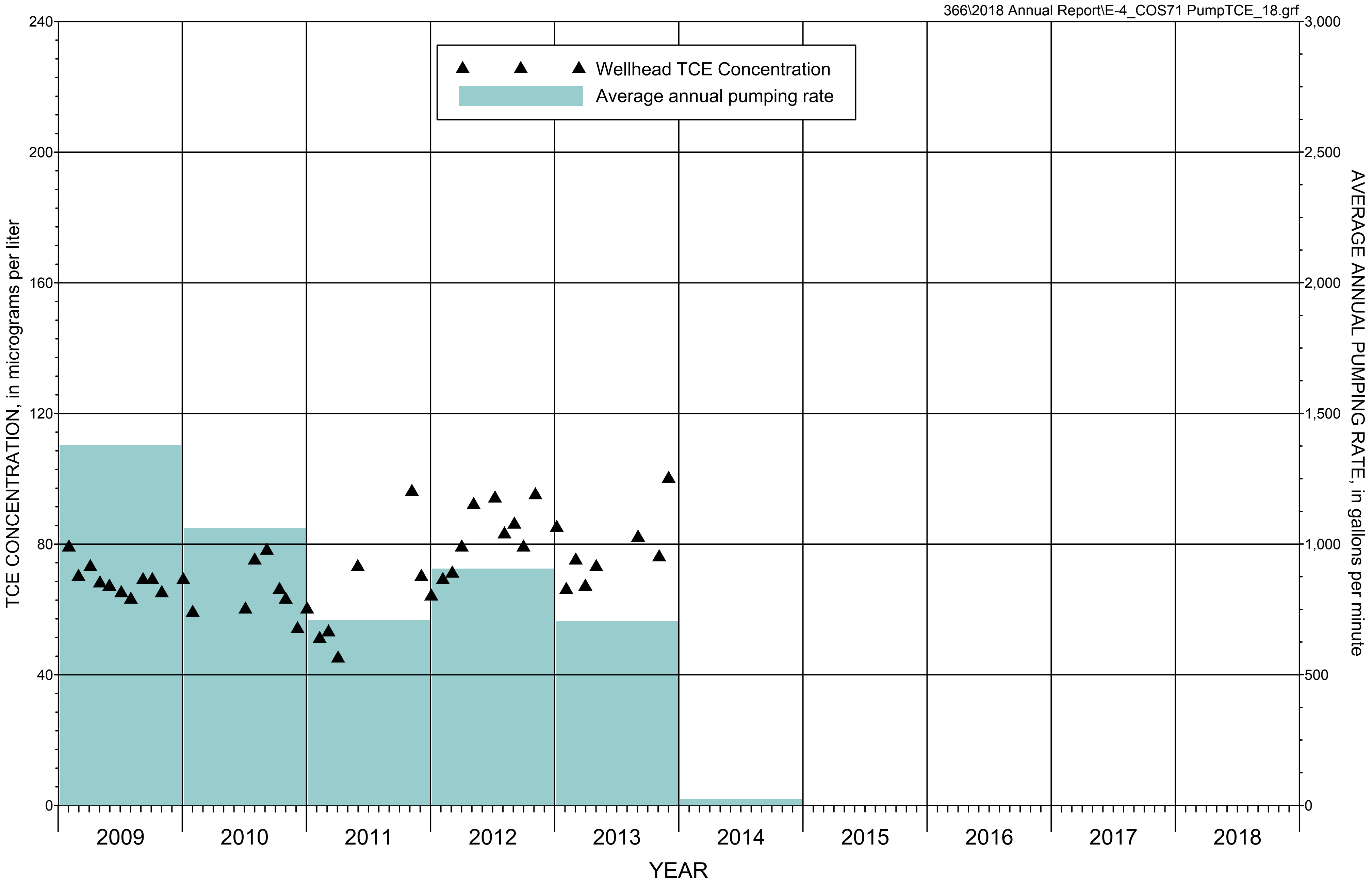


FIGURE E-4. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-71 2009 THROUGH 2018

Note: Well COS-71A replaced Well COS-71 April 2014.

North Indian Bend Wash Superfund Site

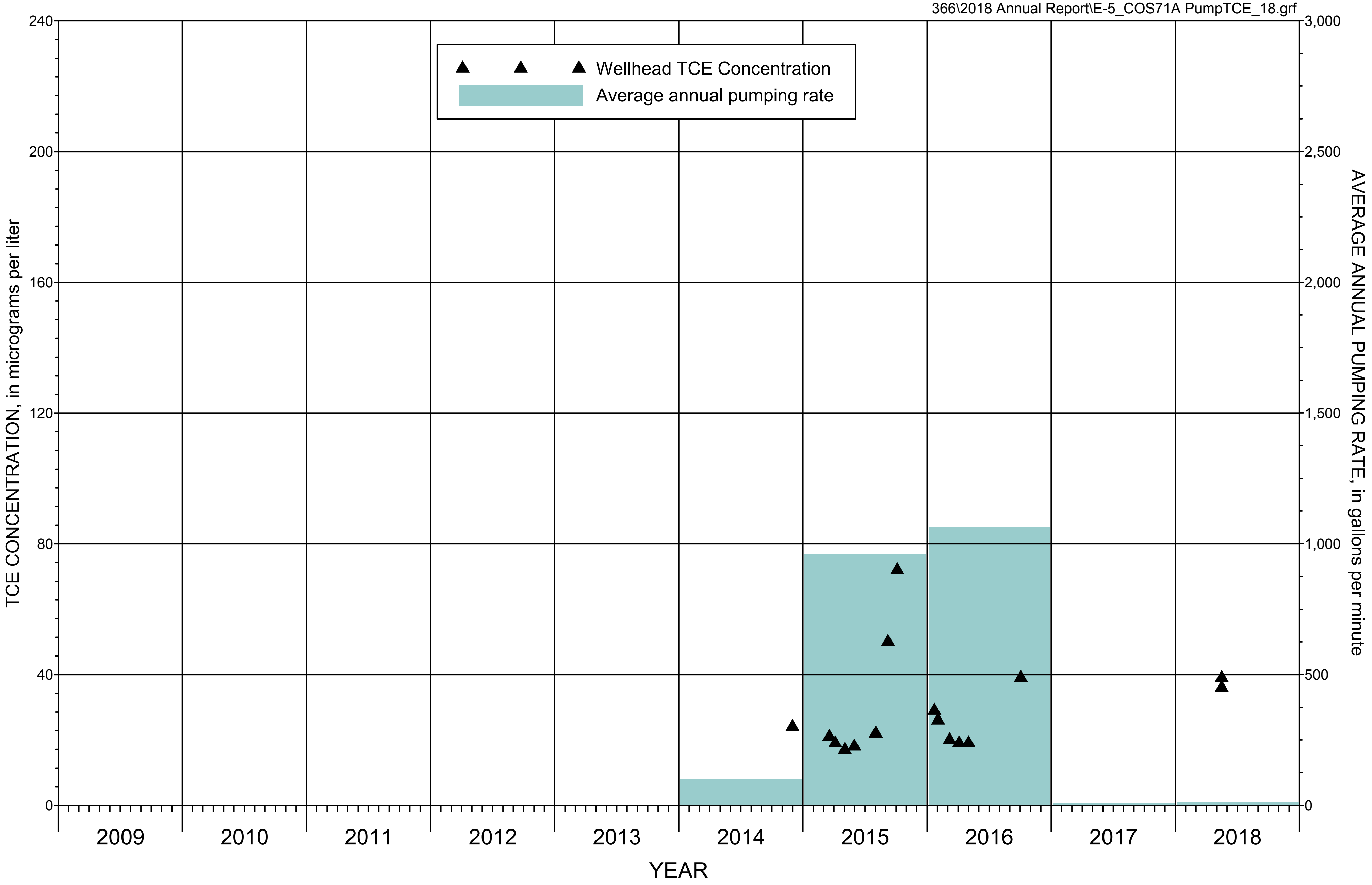


FIGURE E-5. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-71A
2009 THROUGH 2018

Note: Well COS-71A replaced Well COS-71 April 2014.

North Indian Bend Wash Superfund Site

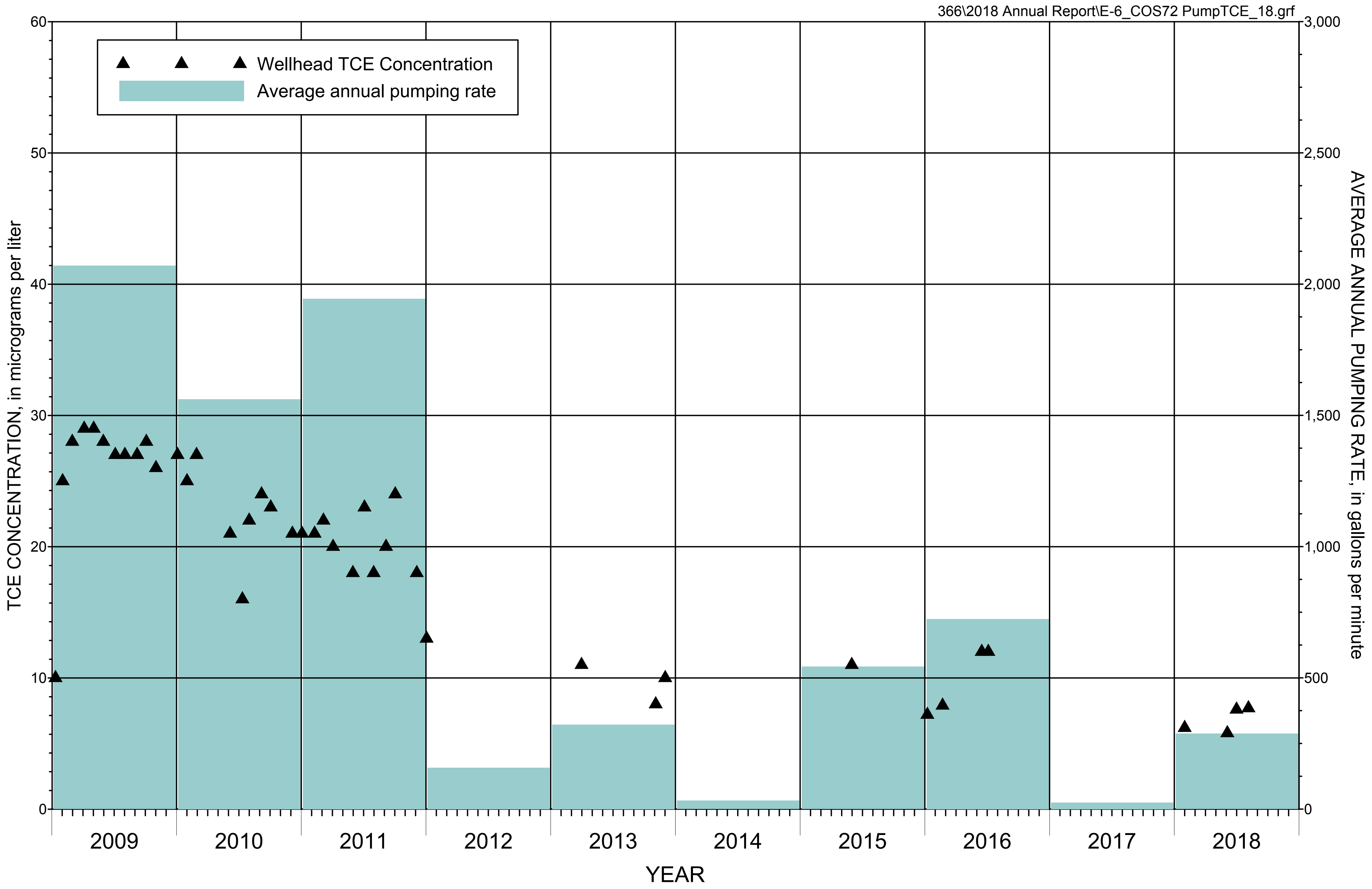


FIGURE E-6. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-72 2009 THROUGH 2018

North Indian Bend Wash Superfund Site

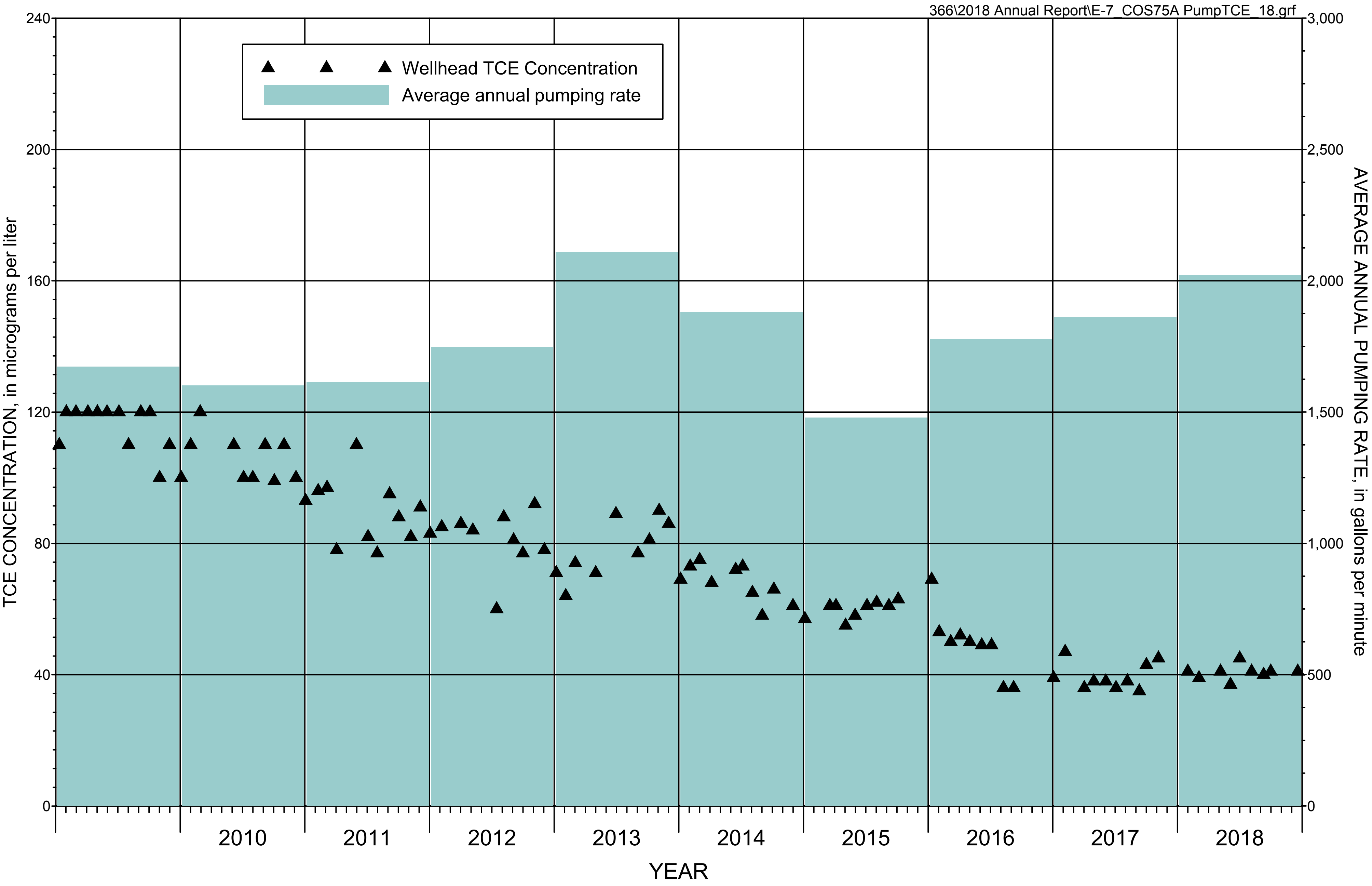


FIGURE E-7. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-75A 2009 THROUGH 2018

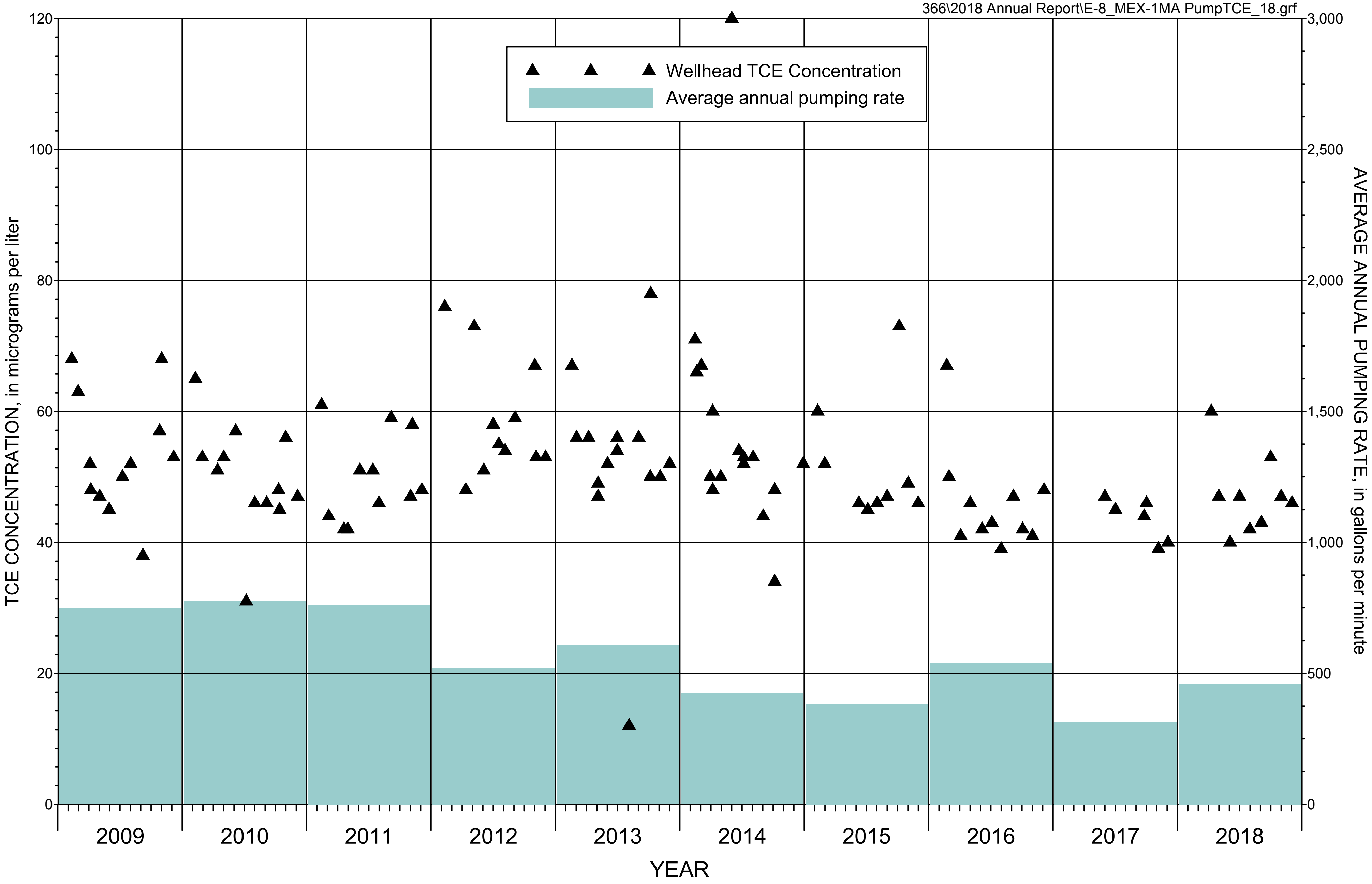


FIGURE E-8. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL MEX-1MA 2009 THROUGH 2018

North Indian Bend Wash Superfund Site

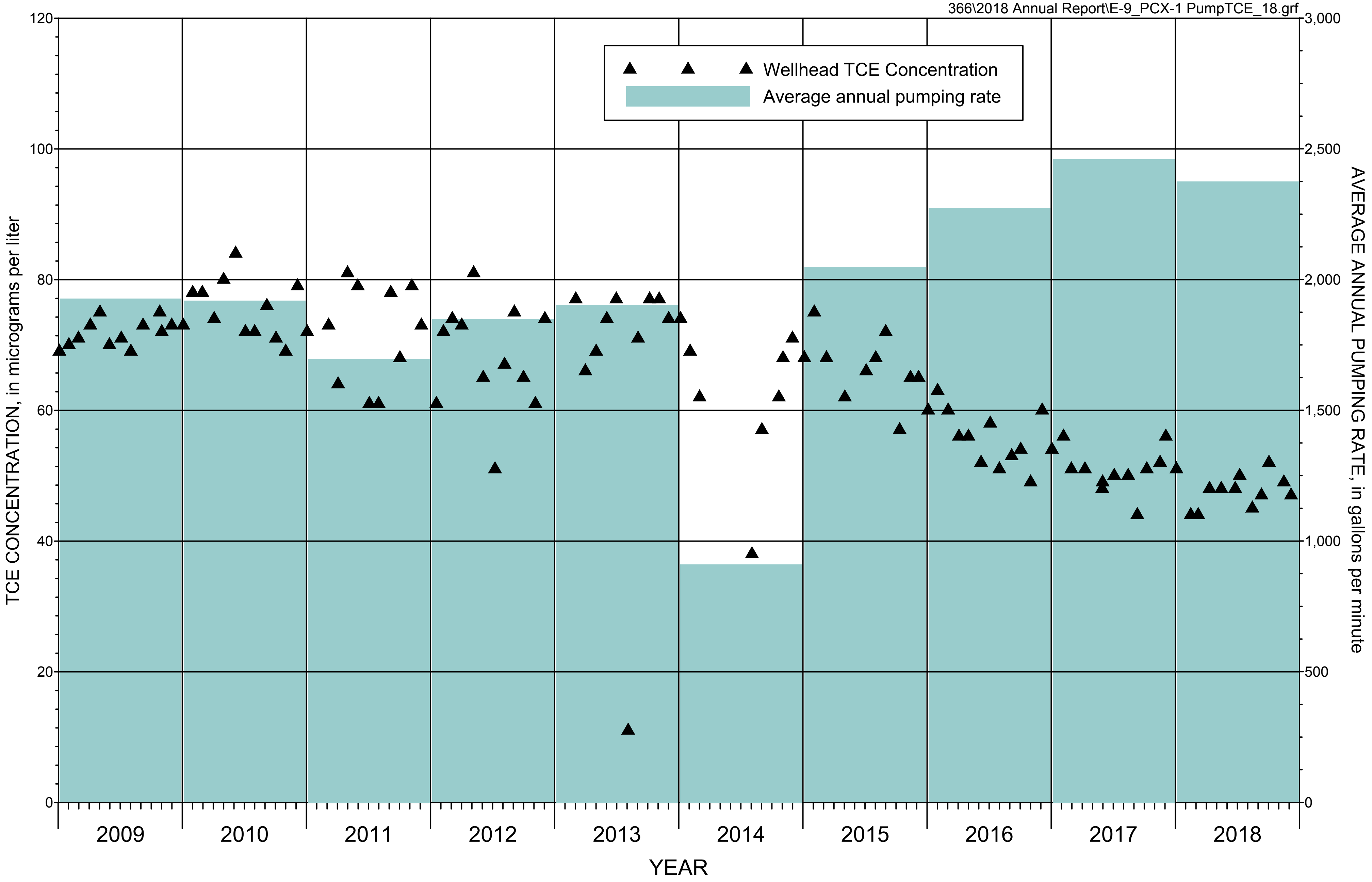


FIGURE E-9. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PCX-1 2009 THROUGH 2018

North Indian Bend Wash Superfund Site

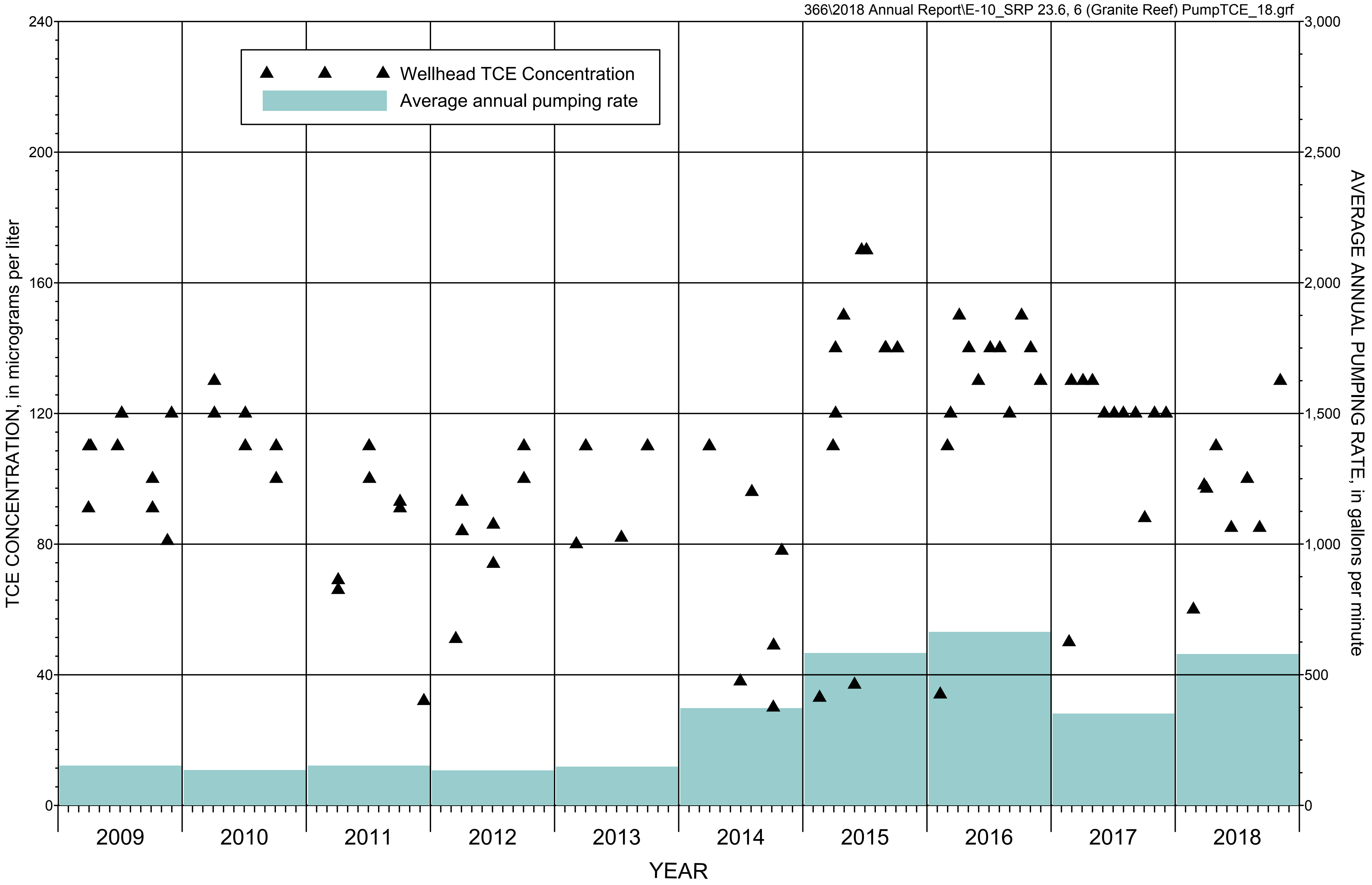


FIGURE E-10. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL SRP 23.6E, 6N (GRANITE REEF), 2009 THROUGH 2018

North Indian Bend Wash Superfund Site

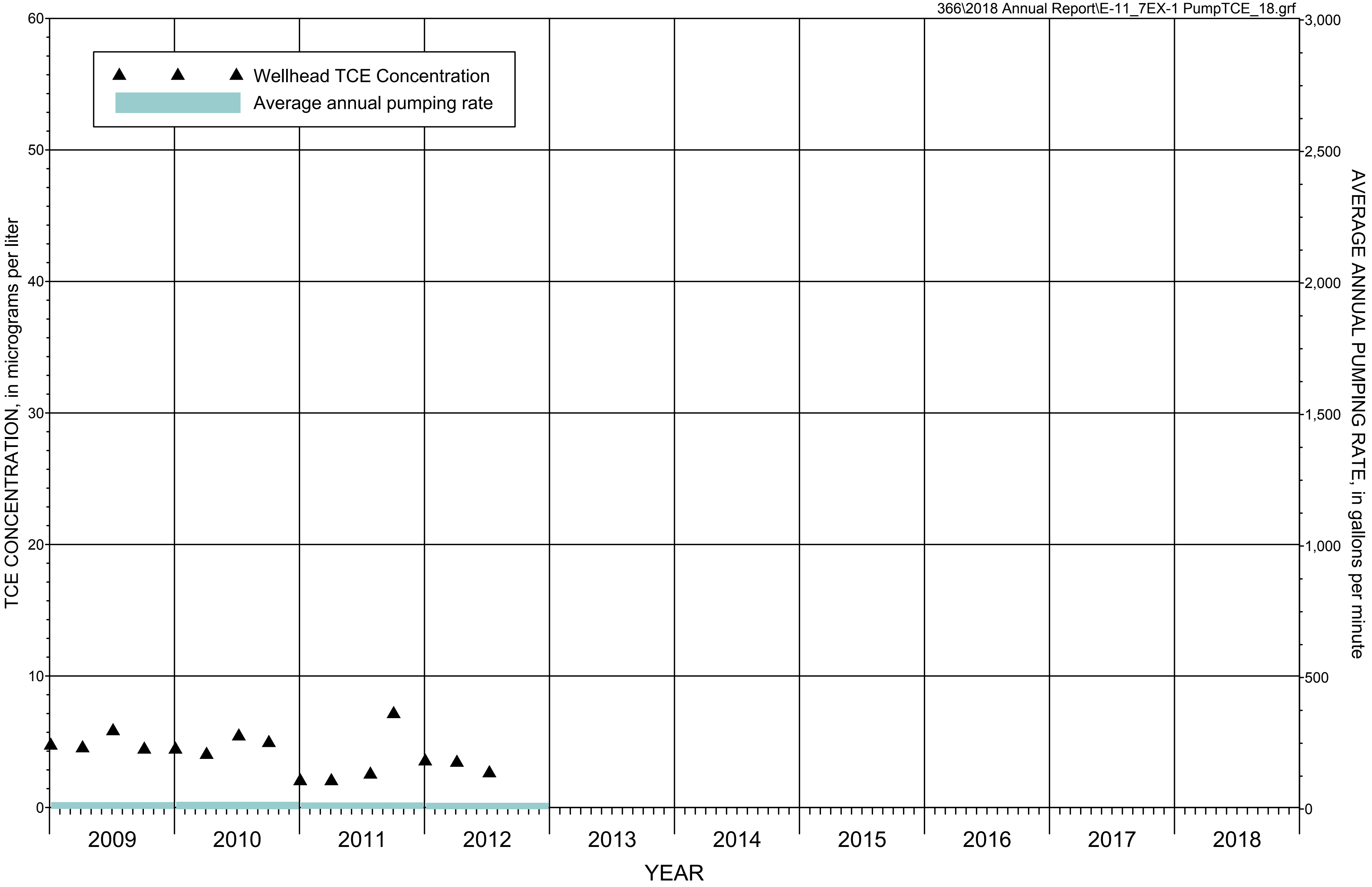


FIGURE E-11. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-1UA 2009 THROUGH 2018

North Indian Bend Wash Superfund Site

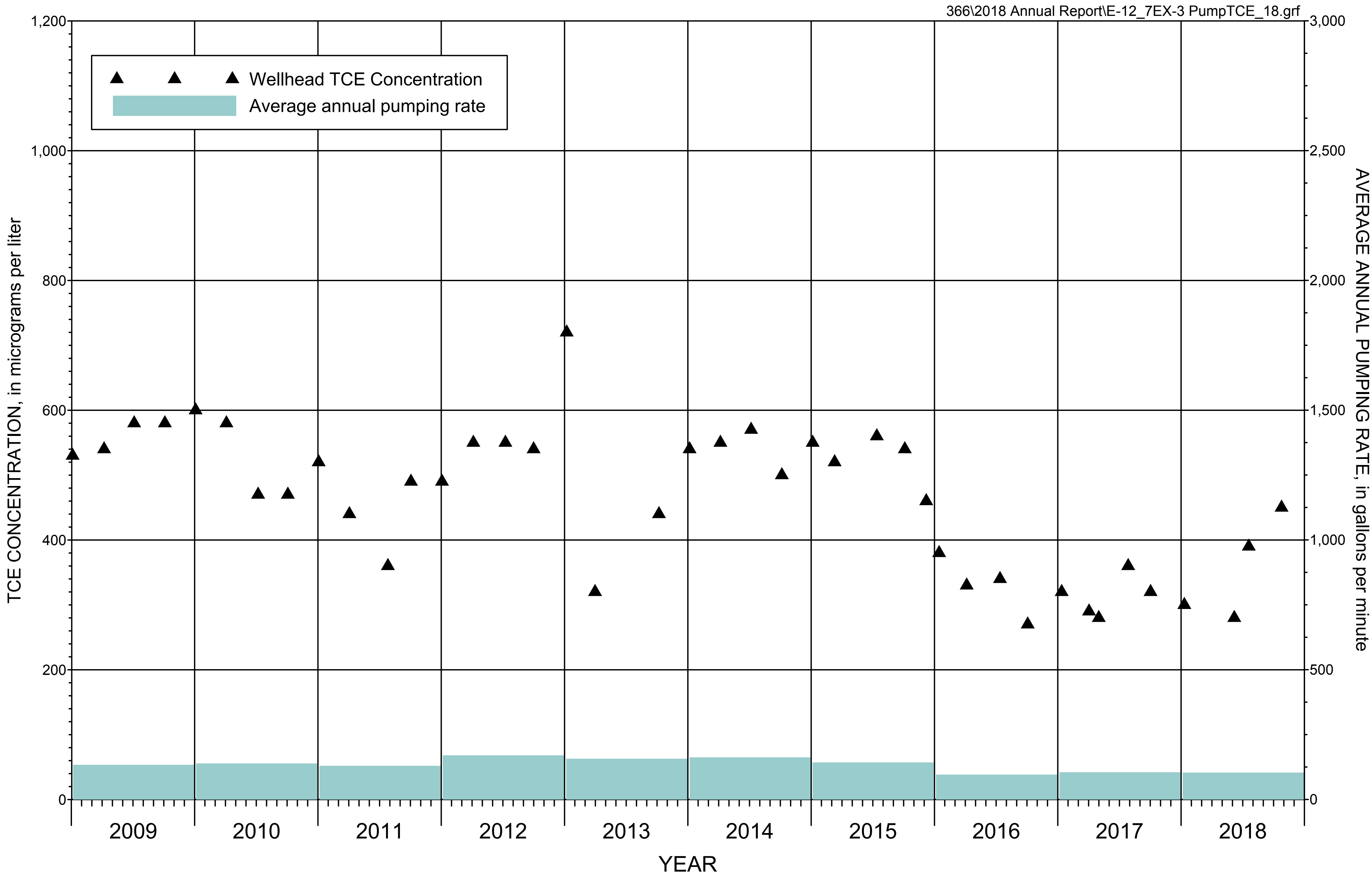


FIGURE E-12. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-3aMA 2009 THROUGH 2018

North Indian Bend Wash Superfund Site

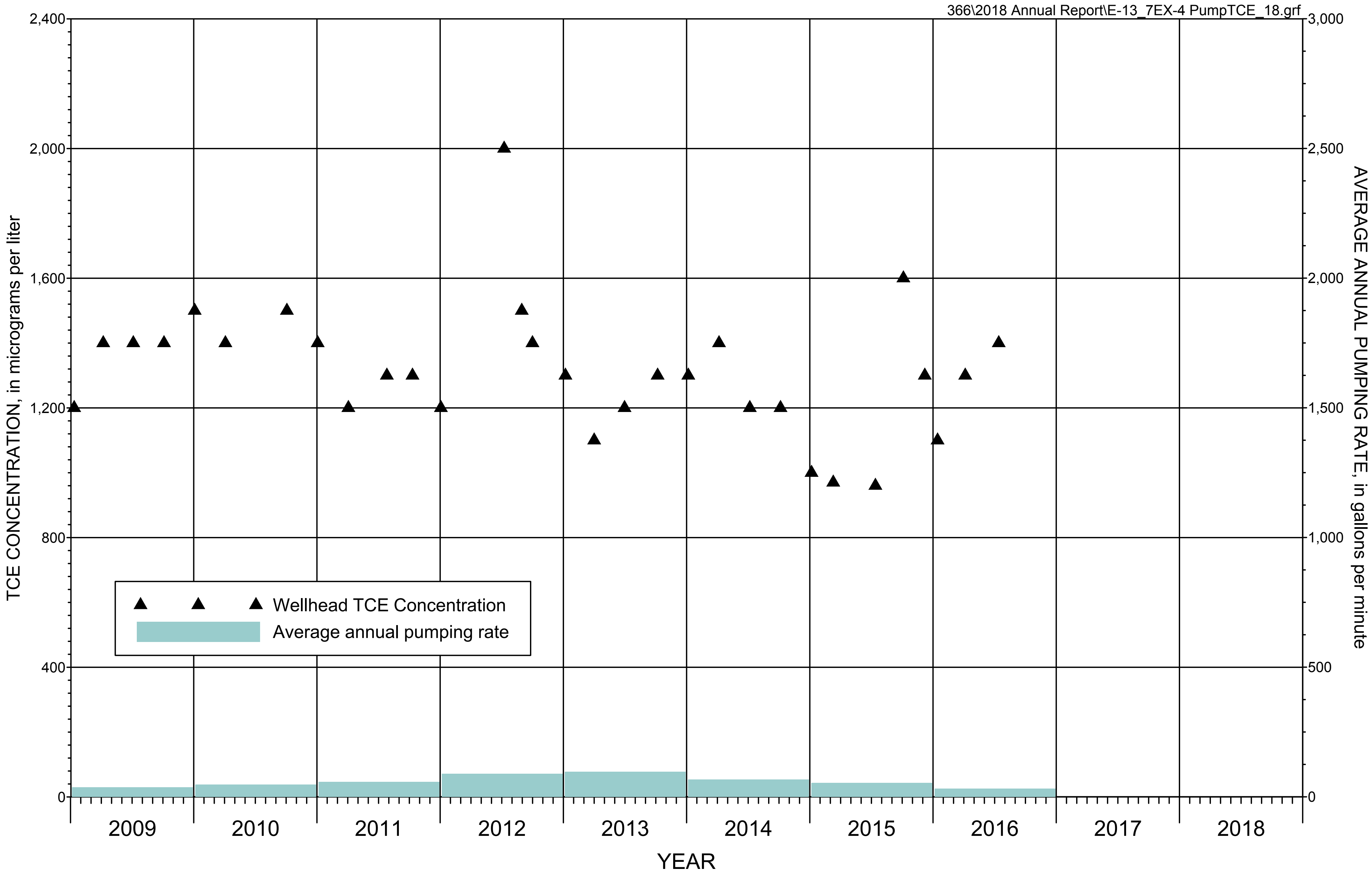


FIGURE E-13. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-4MA
2009 THROUGH 2018

North Indian Bend Wash Superfund Site

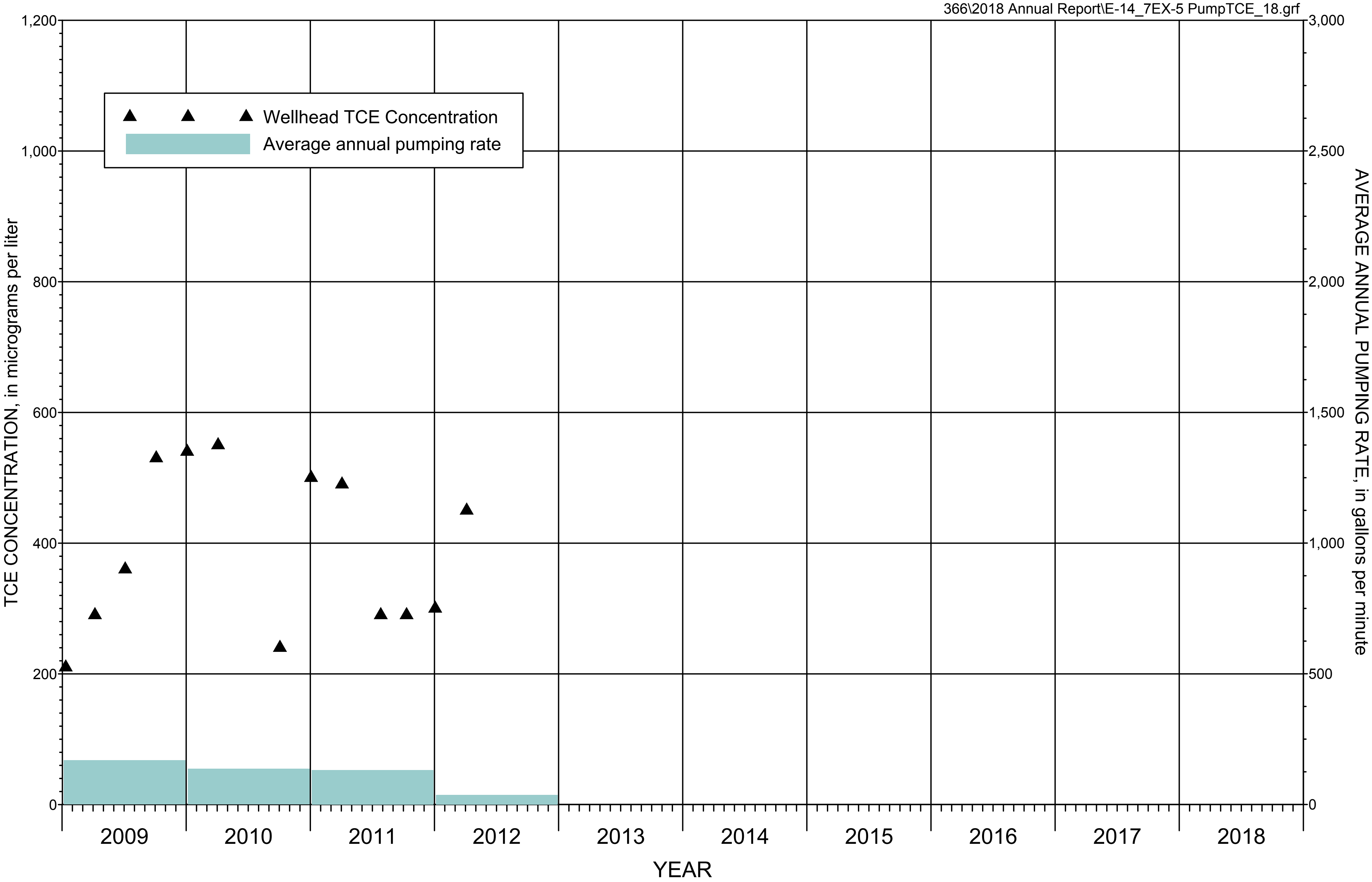


FIGURE E-14. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-5MA 2009 THROUGH 2018

Note: Well 7EX-6MA replaced Well 7EX-5MA August 2015.

North Indian Bend Wash Superfund Site

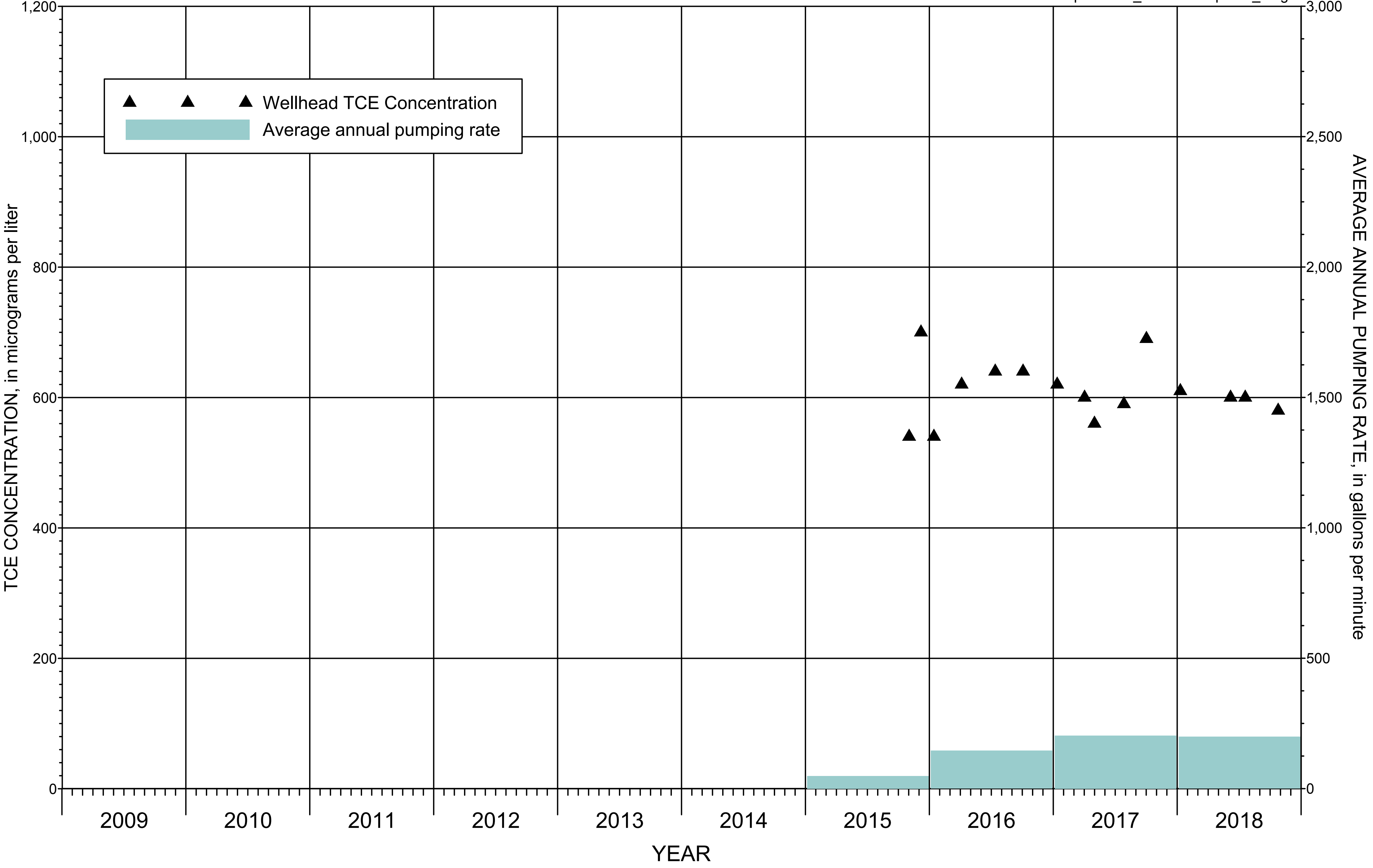


FIGURE E-15. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-6MA 2009 THROUGH 2018

Note: Well 7EX-6MA replaced Well 7EX-5MA August 2015.

APPENDIX F

FOURTH QUARTER REPORT

QUARTERLY REPORT
October through December 2018

North Indian Bend Wash Superfund Site

Prepared for:
U.S. Environmental Protection Agency
Region IX

Prepared by:
NIBW Participating Companies

February 28, 2019

North Indian Bend Wash Superfund Site

QUARTERLY REPORT
October – December 2018

North Indian Bend Wash Superfund Site
Scottsdale, Arizona

This Quarterly Report (Report) summarizes the remedial activities performed and data collected at the North Indian Bend Wash (NIBW) Superfund Site (Site) during October through December 2018 (the reporting period) by the NIBW Participating Companies (PCs) pursuant to the Amended Consent Decree, CV-91-1835-PHX-FJM (ACD), entered by the U.S. District Court on June 5, 2003. A detailed summary of the components and work requirements of the remedial action program can be found in the Record of Decision Amendment (AROD) – Final Operable Unit, Indian Bend Wash Area, dated September 27, 2001, and the Statement of Work (SOW), Appendix A to the ACD. Remedial activities are conducted to address contaminants of concern (COCs) in groundwater at the Site.

GROUNDWATER MONITORING AND EVALUATION PROGRAM

During the reporting period, the NIBW PCs conducted sampling and analysis of monitoring and extraction wells according to requirements specified in the Groundwater Monitoring and Evaluation Plan (GMEP), dated October 8, 2002. The U.S. Environmental Protection Agency (EPA) approved the GMEP on the same date. The GMEP and associated Phase I Sampling and Analysis Plan supersede all previous groundwater monitoring requirements in the Operable Unit-1 (OU-1) and OU-2 Consent Decrees. The NIBW PCs are currently working with EPA and other Technical Committee members to prepare an updated GMEP to ensure that monitoring, analysis, and reporting requirements are protective and relevant.

During the reporting period, NIBW PCs' contractors collected groundwater samples from monitoring wells and remedial extraction wells, as shown in the following table. Wells that were sampled during the reporting period are shown on **Figure 1**. The NIBW COCs are: trichloroethene (TCE), tetrachloroethene (PCE), 1,1,1-trichloroethane (TCA), 1,1-dichloroethene (DCE), and chloroform. Results for all COCs are included in the attached tables. TCE is the principal COC for NIBW; results for TCE are given in in-text tables.

Groundwater Monitoring Summary

Number of Wells Sampled	Well Type	Hydrologic Unit	Treatment System	Contractor
22	Monitoring Well	UAU	---	Verdad
35	Monitoring Well	MAU	---	Verdad
24	Monitoring Well	LAU	---	Verdad
3	Monitoring Well	MAU/LAU	---	Verdad
2	Extraction Well	---	Area 7 GWETS	ARCADIS
2	Extraction Well	---	Area 12 GWETS	EnSolutions
2	Extraction Well	---	MRTF	EnSolutions
1	Extraction Well	---	NGTF	EnSolutions
1	Extraction Well	---	CGTF	Verdad
92	All Wells			

Notes:
CGTF = Central Groundwater Treatment Facility
GWETS = Groundwater Extraction and Treatment System
LAU = Lower Alluvium Unit
MAU = Middle Alluvium Unit
MRTF = Miller Road Treatment Facility
NGTF = NIBW Granular Activated Carbon (GAC) Treatment Facility
UAU = Upper Alluvium Unit

Sampling details for the reporting period are summarized in **Table 1**. **Table 1** lists all wells scheduled for sampling during the reporting period as part of the NIBW monitoring program, and indicates which aquifer unit(s) the wells are designed to monitor, the sampling frequency for each well, and comments regarding why any specific wells were not sampled as planned. A summary of results for groundwater samples collected from monitor wells, pursuant to the GMEP, during the reporting period is provided in **Table 2**. A summary of results for groundwater samples collected from extraction wells, pursuant to the GMEP, during the reporting period is provided in **Table 3**.

GROUNDWATER REMEDIATION PROGRAM

The NIBW remedy provides for containment of the Middle Alluvium Unit (MAU) / Lower Alluvium Unit (LAU) plumes through a groundwater extraction and treatment program. Treatment occurs at the MRTF, NGTF, CGTF, and Area 7 and Area 12 GWETSs. Locations of the groundwater treatment facilities and their corresponding extraction wells are shown on **Figure 1**. The NIBW PCs are responsible for compliance monitoring and reporting for the MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS. This Report provides a summary of operations and data collected for these four facilities during the reporting period. The City of Scottsdale owns and operates the CGTF and reports the results of compliance testing and plant operations for this facility directly to EPA and Arizona Department of Environmental Quality (ADEQ). EPCOR Water USA (EPCOR) owns and operates the MRTF. A summary of the treatment system monitoring data for the MRTF, NGTF, Area 7, and Area 12 facilities for October through December 2018 is provided in **Table 4**.

Groundwater Remediation at MRTF

The MRTF achieved performance standards specified in the SOW during the reporting period by consistently treating groundwater to concentrations safely below Treatment Standards for NIBW COCs. During the reporting period, groundwater from wells PV-14 and PV-15 was treated at the MRTF by EPCOR and primarily delivered to the Paradise Valley Arsenic Removal Facility (PVARF) for subsequent distribution by EPCOR for drinking water use. If operating on the scheduled monitoring dates, monthly samples of groundwater from wells PV-14 and PV-15 were collected by the NIBW PCs and analyzed by TestAmerica. A summary of analytical results for extraction wells PV-14 and PV-15, in micrograms per liter (μg/L), is included in the following table.

MRTF Groundwater & Treatment System Monitoring

(TCE in μg/L)

Sample Date	PV-14	PV-15	Tower 1 Effluent	Tower 2 Effluent	Tower 3 Effluent
10/1/2018	**0.61**	**6.3**	<0.50	<0.50	---
11/1/2018	**0.51**	**5.8**	<0.50	<0.50	---
12/3/2018	REJ*	REJ*	<0.50	<0.50	---
12/7/2018	<0.50	**5.2**	---	---	---

Note:
All samples collected by EnSolutions

*REJ = Data rejected because contractor reported that samples were switched during collection. Location was re-sampled 12/07/2018.

In addition to the routine monitoring of extraction wells conducted pursuant to the GMEP, the NIBW PCs conducted supplemental sampling at wells PV-11 and PV-12B (if operating on the scheduled monthly sampling date). During the quarter, results of laboratory analyses indicated no detectable concentrations of COCs in the samples obtained from wells PV-11 on October 1, November 6, and December 3, 2018. During the quarter, no samples were obtained at well PV-12B, because the well was offline when the NIBW PCs visited the well to obtain samples.

The total volume of groundwater extracted and treated at MRTF during the reporting period was approximately 554 million gallons (MG). Of this total, approximately 273 MG was produced from well PV-14 and approximately 281 MG was produced from well PV-15. None of the treated water was discharged to the Salt River Project (SRP) Arizona Canal during the reporting period. An estimated 15 pounds of TCE were removed from groundwater treated at the MRTF during the reporting period.

Groundwater Remediation at NGTF

The NGTF achieved performance standards specified in the NGTF Operation and Maintenance (O&M) Plan (March 31, 2016) during the reporting period by consistently treating groundwater to concentrations below Treatment Standards for NIBW COCs. Treated water from the treatment system can be discharged to the City of Scottsdale (COS) Chaparral Water Treatment Plant (CWTP) and/or the Arizona Canal under the NGTF Arizona Pollutant Discharge Elimination System (AZPDES) permit; for the reporting period, about 237 MG of treated water was discharged to the CWTP and 80 MG of treated water was discharged to the Arizona Canal. For treated water discharged to the Arizona Canal, samples were collected at the Arizona Canal outfall for analyses required by the AZPDES permit. The results of sample analyses were summarized in monthly Discharge Monitoring Reports (DMRs) and submitted directly to the EPA and ADEQ under separate cover.

During the reporting period, samples were collected monthly from NGTF extraction well PCX-1 by EnSolutions and analyzed for NIBW COCs by TestAmerica.

Compliance monitoring was performed in accordance with the EPA-approved NGTF O&M Plan to verify removal of volatile organic compounds (VOCs) from the extracted groundwater and assure Treatment Standards were achieved. Treatment system samples were collected by the Operator and submitted to TestAmerica for analysis of NIBW COCs.

Results of TCE analyses for groundwater monitoring and treatment system samples collected during the reporting period are included in the following tables.

NGTF Groundwater Monitoring
(TCE in μg/L)

Date	**PCX-1**
10/3/18	**52**
11/16/18	**49**
12/7/18	**47**

NGTF Treatment System Monitoring
(TCE in µg/L)

Week of:	Influent	Effluent
	NGTF-INF(1)	AZCO(2) or CHAP-CP(3)
Oct 1-5	---	<0.50
Oct 8-12	---	<0.50
Oct 15-19	---	<0.50
Oct 22-26	---	<0.50
Oct 29 – Nov 2	---	<0.50
Nov 5-9	---	<0.50
Nov 12-16	---	<0.50
Nov 19-23	---	<0.50
Nov 26-30	---	<0.50
Dec 3-7	---	<0.50
Dec 10-14	---	<0.50
Dec 17-21	---	<0.50
Dec 24-28	---	<0.50
Dec 31-Jan 4 2019	---	<0.50

Notes:

(1) Extraction well PCX-1 is not accessible for wellhead sampling. Samples for the well are obtained at the NGTF pipeline, just a few feet away from the sample port for the NGTF influent. These samples meet the compliance requirements for monitoring influent to the treatment plant; therefore, beginning in July 2018, the redundant NGTF influent samples are no longer obtained.
(2) AZCO = Discharge to Arizona Canal
(3) CHAP-CP = Discharge to City of Scottsdale Chaparral Water Treatment Plant

The total volume of groundwater extracted from well PCX-1 and treated at NGTF during the reporting period was approximately 318 MG, and an estimated 131 pounds of TCE were removed.

Groundwater Remediation at the Area 7 GWETS

The NIBW Area 7 GWETS achieved performance standards specified in the SOW during the reporting period by consistently treating groundwater to concentrations safely below Treatment Standards for NIBW COCs prior to injection into the Upper Alluvium Unit near the GWETS. Compliance monitoring is performed according to the EPA-approved Area 7 O&M Plan to verify removal of VOCs from the extracted groundwater and assure groundwater treatment standards are achieved.

During the reporting period, samples were collected from Area 7 extraction wells 7EX-3aMA and 7EX-6MA by ARCADIS and analyzed for NIBW COCs by TestAmerica. Also during the reporting period, treatment system samples were collected each month and submitted to TestAmerica for analysis of NIBW COCs. Samples were collected from the combined influent to the GWETS at sample port SP-102, from the ultraviolet/oxidation (UV/Ox) reactor effluent at sample port SP-103, and from the air stripper (A/S) effluent at sample port SP-105. Results of TCE analyses for groundwater monitoring and treatment system samples collected during the reporting period are included in the following tables.

Area 7 Groundwater Monitoring

(TCE in µg/L)

Date	7EX-3aMA	7EX-4MA	7EX-6MA
10/25/18	**450**	---	**580**

Note:
Well 7EX-4MA was not sampled during third quarter because the well was offline on the scheduled sampling date; Area 7 GWETS is presently operating without well 7EX-4MA due to low production from the well.

Area 7 Treatment System Monitoring

(TCE in µg/L)

Date	GWETS Influent	UV/Ox Effluent	A/S Effluent
	@ SP-102	@ SP-103	@ SP-105
10/25/18	**540**	**64**	<0.50
11/20/18	**630**	**120**	<0.50
12/19/18	**570**	**260**	**0.62**

Notes:
UV/Ox = Ultraviolet/Oxidation Reactor
A/S = Air Stripper

The Area 7 GWETS operated most of the reporting period, except during routine maintenance, short-term weather-related power outages, and minor equipment repair events. The total volume of groundwater extracted, treated, and injected during the reporting period was approximately 38 MG. Performance data provided by the Area 7 GWETS Operator indicates an estimated 170 pounds of TCE were removed from the extracted groundwater.

Groundwater Remediation at the Area 12 GWETS

The NIBW Area 12 GWETS achieved performance standards specified in the SOW during the reporting period by consistently treating groundwater to concentrations below Treatment Standards for NIBW COCs prior to discharge to an SRP irrigation lateral. Compliance monitoring was performed according to the EPA-approved Area 12 O&M Plan to verify removal of VOCs from the extracted groundwater and assure groundwater treatment standards are achieved.

During the reporting period, treatment system samples were collected each month and submitted to TestAmerica for analysis of NIBW COCs. Treatment system samples included combined influent to the GWETS at sample port WSP-1 and effluent from the GWETS at sample port WSP-2. Area 12 extraction well samples were collected by the Operator, EnSolutions, on a monthly basis when the wells were operational, and submitted to TestAmerica for analysis. The results of TCE analyses of samples obtained by the NIBW PCs for groundwater and process water monitoring are included in the following table.

Area 12 Groundwater and Treatment System Monitoring

(TCE in μg/L)

Date	MEX-1MA (SRP 23.1E6N)	Granite Reef Well (SRP 23.6E6N)	GWETS Influent	GWETS Effluent
			WSP-1	WSP-2
10/1/2018	**53**	**61**	**54**	<0.50
11/1/2018	**47**	**120**	**93**	<0.50
12/3/2018	**46**	**130**	**90**	<0.50

Treated groundwater from Area 12 discharges to the SRP distribution system for irrigation use and is regulated by an AZPDES permit. Samples were collected at the outfall to the irrigation lateral for analyses required by the permit. The results of the sample analyses were summarized in monthly DMRs, and submitted directly to the EPA and ADEQ under separate cover.

The Area 12 GWETS operated for most of the reporting period, except during routine maintenance or short-term weather-related power outages. GWETS operations were suspended on December 29, 2018, for annual maintenance and canal dry-up. The total volume of groundwater extracted and treated at the Area 12 GWETS during the reporting period was approximately 162 MG. Performance data provided by the Area 12 GWETS Operator indicated an estimated 107 pounds of TCE were removed from the treated groundwater.

Groundwater Remediation Summary

The following table presents the volume of groundwater treated at each facility, as well as the estimated pounds of TCE removed from groundwater via treatment, both for the reporting period and cumulatively for the year (i.e., year-to-date).

Treatment System	Volume of Groundwater Treated (MG)	Estimated Pounds of TCE Removed (4Q18)	Cumulative Pounds of TCE Removed (YTD 2018)
MRTF	554	15	59
NGTF	318	131	498
Area 7 GWETS	38	170	685
Area 12 GWETS	162	107	388

Notes:
MG = million gallons
4Q18 = fourth quarter (October through December) 2018
YTD = year to date

MEETINGS AND OTHER EVENTS

Representatives of the NIBW Technical Committee held meetings by teleconference on October 15, November 5, and December 18 to coordinate on-going NIBW remedial action efforts.

DOCUMENTS SUBMITTED BY NIBW PCS DURING THE REPORTING PERIOD

During the reporting period, from October through December 2018, the NIBW PCs provided EPA with the following documents.

NIBW Technical Committee Meeting Minutes – September 24, 2018, electronic mail submitted by NIBW PCs on October 1, 2018.

Groundwater Monitoring and Evaluation Plan Update Discussion Presentation, electronic mail submitted by NIBW PCs on October 16, 2018.

NIBW Area 7 Indoor Air Sampling Results – 3719 N. 75th Street, electronic mail submittal of map and summary table by NIBW PCs on October 19, 2018.

NIBW Technical Committee Meeting Minutes – October 15, 2018, electronic mail submitted by NIBW PCs on November 7, 2018.

Quarterly Report, July through September 2018, North Indian Bend Wash Superfund Site, report submitted by NIBW PCs on November 21, 2018.

Response to September 18, 2018 Letter from EPA relative to Request for Determination on Air Emissions Controls at the North Indian Bend Wash (NIBW) Central Groundwater Treatment Facility (CGTF), electronic mail submittal of letter and attachments by NIBW PCs on November 29, 2018.

NIBW Technical Committee Meeting Minutes – November 5, 2018, electronic mail submitted by NIBW PCs on December 5, 2018.

TABLES

TABLE 1. SAMPLING MATRIX - FOURTH QUARTER 2018
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

WELL IDENTIFICATION	AQUIFER UNIT	SAMPLING FREQUENCY	COMMENTS
COS-31	MAU/LAU	Monthly	Not sampled during Quarter because the well was offline on the scheduled sampling dates
COS-71A	MAU/LAU	Monthly	Not sampled during Quarter because the well was offline on the scheduled sampling dates; COS has removed this well from the remedial pumping priority list due to inorganic water quality
COS-72	MAU/LAU	Monthly	Not sampled during Quarter because the well was offline on the scheduled sampling dates
COS-75A	LAU	Monthly	Not sampled during November 2018 because the well was offline on the scheduled sampling date.
PCX-1	LAU	Monthly	---
PV-14	LAU	Monthly	---
PV-15	MAU/LAU	Monthly	---
MEX-1MA	MAU	Quarterly	---
Granite Reef	MAU	Quarterly	---
7EX-3aMA	MAU	Quarterly	---
7EX-4MA	MAU	Quarterly	Not sampled during Quarter because the well was offline on the scheduled sampling dates; Area 7 GWETS presently operating without well 4MA
7EX-6MA	MAU	Quarterly	---
B-J	UAU	Annually	---
D-2MA	MAU	Quarterly	---
E-1MA	MAU	Quarterly	---
E-5MA	MAU	Quarterly	---
E-5UA	UAU	Annually	---
E-7LA	LAU	Annually	---
E-7UA	UAU	Annually	---
E-8MA	MAU	Annually	---
E-10MA	MAU	Quarterly	---
E-12UA	UAU	Annually	Unable to obtain sample during Quarter; Compliance sample for 2018 was collected on January 8, 2019
E-13UA	UAU	Annually	---
M-2MA	MAU	Annually	---
M-2UA	UAU	Annually	---
M-4MA	MAU	Quarterly	---
M-5LA	LAU	Annually	---
M-5MA	MAU	Quarterly	---
M-6MA	MAU	Quarterly	---
M-7MA	MAU	Annually	---
M-9MA	MAU	Annually	---
M-10LA2	LAU	Annually	---
M-10MA2	MAU	Quarterly	---
M-11MA	MAU	Annually	---
M-12MA2	MAU	Annually	---
M-14LA	LAU	Annually	---
M-15MA	MAU	Quarterly	---

TABLE 1. SAMPLING MATRIX - FOURTH QUARTER 2018
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

WELL IDENTIFICATION	AQUIFER UNIT	SAMPLING FREQUENCY	COMMENTS
M-16LA	LAU	Annually	---
M-16MA	MAU	Annually	---
M-17MA/LA	MAU/LAU	Quarterly	---
PA-2LA	LAU	Annually	---
PA-5LA	LAU	Quarterly	---
PA-6LA	LAU	Quarterly	---
PA-8LA2	LAU	Annually	---
PA-9LA	LAU	Annually	---
PA-10MA	MAU	Quarterly	---
PA-11LA	LAU	Annually	---
PA-12MA	MAU	Quarterly	---
PA-13LA	LAU	Quarterly	---
PA-15LA	LAU	Annually	---
PA-16MA	MAU	Annually	---
PA-18LA	LAU	Annually	---
PA-19LA	LAU	Annually	---
PA-20MA	MAU	Annually	---
PA-21MA	MAU	Annually	---
PG-1LA	LAU	Quarterly	---
PG-2LA	LAU	Semi-Annually	---
PG-3UA	UAU	Annually	Well was abandoned in 2018; Not sampled
PG-4MA	MAU	Annually	---
PG-4UA	UAU	Annually	---
PG-5MA	MAU	Annually	---
PG-5UA	UAU	Annually	---
PG-6MA	MAU	Annually	---
PG-6UA	UAU	Annually	---
PG-7MA	MAU	Annually	---
PG-8UA	UAU	Annually	---
PG-10UA	UAU	Annually	---
PG-11UA	UAU	Annually	---
PG-16UA	UAU	Annually	---
PG-18UA	UAU	Annually	---
PG-19UA	UAU	Annually	---
PG-22UA	UAU	Annually	---
PG-23MA/LA	MAU/LAU	Annually	---
PG-23UA	UAU	Annually	---
PG-24UA	UAU	Annually	---
PG-25UA	UAU	Annually	---
PG-28UA	UAU	Annually	---

TABLE 1. SAMPLING MATRIX - FOURTH QUARTER 2018
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

WELL IDENTIFICATION	AQUIFER UNIT	SAMPLING FREQUENCY	COMMENTS
PG-29UA	UAU	Annually	---
PG-31UA	UAU	Annually	---
PG-38MA/LA	MAU/LAU	Annually	---
PG-39LA	LAU	Annually	---
PG-40LA	LAU	Quarterly	---
PG-42LA	LAU	Quarterly	---
PG-43LA	LAU	Quarterly	---
PG-44LA	LAU	Quarterly	---
PG-48MA	MAU - Lower	Quarterly	---
PG-49MA	MAU - Lower	Annually	---
PG-50MA	MAU - Lower	Annually	---
PG-54MA	MAU - Lower	Annually	---
PG-55MA	MAU - Lower	Annually	---
PG-56MA	MAU - Lower	Annually	---
S-1LA	LAU	Annually	---
S-1MA	MAU	Annually	---
S-2LA	LAU	Quarterly	---
S-2MA	MAU	Annually	---
W-1MA	MAU	Quarterly	---
W-2MA	MAU	Quarterly	---

EXPLANATION:

UAU = Upper Alluvium Unit
MAU = Middle Alluvium Unit
LAU = Lower Alluvium Unit

TABLE 2. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
Monitoring	B-J	B-J	10/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.66	550-112060
Monitoring	D-2MA	D-2MA	10/17/2018	Original	TA	<0.50	<0.50	1.1	<0.50	**37**	550-111869
Monitoring	E-1MA	E-1MA	10/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.0	550-112060
Monitoring	E-1MA	AM	10/19/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.5	550-112060
Monitoring	E-5MA	E-5MA	10/10/2018	Original	TA	<0.50	<0.50	1.1	0.75	**25**	550-111406
Monitoring	E-5UA	E-5UAHS	10/11/2018	Original	TA	<0.50	<0.50	0.50	<0.50	4.5	550-111537
Monitoring	E-7LA	E-7LA	10/16/2018	Original	TA	<0.50	<0.50	1.0	1.6	**14**	550-111762
Monitoring	E-7UA	E-7UAHS	10/30/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.3	550-112554
Monitoring	E-8MA	E-8MA	10/10/2018	Original	TA	<0.50	<0.50	0.82	<0.50	**18**	550-111406
Monitoring	E-10MA	E-10MAHS	10/15/2018	Original	TA	<0.50	<0.50	0.63	3.3	3.9	550-111677
Monitoring	E-12UA (A)	E-12UAHS	1/8/2019	Original	TA	<0.50	<0.50	0.52	<0.50	1.6	550-115938
Monitoring	E-13UA	E-13UA	10/19/2018	Original	TA	<0.50	<0.50	0.55	<0.50	0.93	550-112060
Monitoring	M-2MA	M-2MAHS	10/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.6	550-110946
Monitoring	M-2MA	AC	10/4/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	1.6	550-110946
Monitoring	M-2UA	M-2UA	10/19/2018	Original	TA	<0.50	<0.50	0.61	<0.50	0.58	550-112060
Monitoring	M-4MA	M-4MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.5**	550-111677
Monitoring	M-5LA	M-5LA	10/18/2018	Original	TA	<0.50	<0.50	1.5	<0.50	1.2	550-112013
Monitoring	M-5MA	M-5MA	10/18/2018	Original	TA	<0.50	<0.50	0.53	<0.50	**12**	550-112013
Monitoring	M-6MA	M-6MA	10/18/2018	Original	TA	<0.50	<0.50	0.53	<0.50	**9.4**	550-112013
Monitoring	M-6MA	AL	10/18/2018	Duplicate	TA	<0.50	<0.50	0.58	<0.50	**9.5**	550-112013
Monitoring	M-7MA	M-7MA	10/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112060
Monitoring	M-9MA	M-9MA	10/19/2018	Original	TA	REJ	REJ	REJ	REJ	REJ	550-112060
Monitoring	M-9MA	M-9MA	12/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.4	550-114691
Monitoring	M-10LA2	M-10LA2HS	10/4/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**7.2**	550-110946
Monitoring	M-10MA2	M-10MA2	10/16/2018	Original	TA	<0.50	0.76	1.1	0.59	**44**	550-111762
Monitoring	M-11MA	M-11MA	10/30/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112554
Monitoring	M-12MA2	M-12MA2	10/10/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**12**	550-111406
Monitoring	M-14LA	M-14LA	10/11/2018	Original	TA	<0.50	<0.50	1.2	3.4	**17**	550-111537
Monitoring	M-15MA	M-15MA	10/18/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	3.5	550-112013
Monitoring	M-16LA	M-16LA	10/15/2018	Original	TA	<0.50	<0.50	1.3	3.7	**14**	550-111677
Monitoring	M-16MA	M-16MA	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.9**	550-111677
Monitoring	M-17MA/LA	M-17 MA/LAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111677
Monitoring	PA-2LA	PA-2LA	10/17/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111919
Monitoring	PA-5LA	PA-5LA	10/16/2018	Original	TA	<0.50	0.64	3.2	2.4	**58**	550-111759
Monitoring	PA-5LA	AJ	10/16/2018	Duplicate	TA	<0.50	<0.50	3.0	2.0	**49**	550-111759
Monitoring	PA-6LA	PA-6LA	10/8/2018	Original	TA	<0.50	4.5	4.0	**22**	**140**	550-111205
Monitoring	PA-8LA2	PA-8LA2	10/9/2018	Original	TA	<0.50	<0.50	0.57	<0.50	3.8	550-111287
Monitoring	PA-9LA	PA-9LAHS	10/16/2018	Original	TA	<0.50	<0.50	1.8	<0.50	**21**	550-111762
Monitoring	PA-10MA	PA-10MAHS	10/16/2018	Original	TA	<0.50	<0.50	<0.50	1.1	**56**	550-111762
Monitoring	PA-11LA	PA-11LA	10/17/2018	Original	TA	<0.50	<0.50	1.1	<0.50	<0.50	550-111869
Monitoring	PA-12MA	PA-12MA	10/11/2018	Original	TA	<0.50	<0.50	0.65	3.3	**290**	550-111537
Monitoring	PA-13LA	PA-13LA	10/9/2018	Original	TA	<0.50	<0.50	1.3	0.77	**80**	550-111285
Monitoring	PA-15LA	PA-15LA	10/18/2018	Original	TA	<0.50	<0.50	1.9	0.65	<0.50	550-112013
Monitoring	PA-16MA	PA-16MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.9	550-111677
Monitoring	PA-16MA	AI	10/15/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	1.8	550-111677
Monitoring	PA-18LA	PA-18LA	10/19/2018	Original	TA	<0.50	<0.50	1.9	<0.50	0.88	550-112060
Monitoring	PA-19LA	PA-19LA	10/17/2018	Original	TA	<0.50	1.8	2.1	4.0	**76**	550-111869
Monitoring	PA-20MA	PA-20MA	10/17/2018	Original	TA	<0.50	0.53	1.2	2.3	**46**	550-111869
Monitoring	PA-21MA	PA-21MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111677
Monitoring	PG-1LA	PG-1LA	10/16/2018	Original	TA	<0.50	<0.50	0.77	<0.50	<0.50	550-111759
Monitoring	PG-2LA	PG-2LA	10/8/2018	Original	TA	<0.50	<0.50	1.0	1.8	**65**	550-111205
Monitoring	PG-2LA	AD	10/8/2018	Duplicate	TA	<0.50	0.50	1.2	1.9	**66**	550-111205

TABLE 2. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
Monitoring	PG-4MA	PG-4MA	10/16/2018	Original	TA	<0.50	<0.50	0.57	<0.50	1.5	550-111762
Monitoring	PG-4UA	PG-4UAHS	10/16/2018	Original	TA	<0.50	<0.50	0.75	**15**	0.75	550-111762
Monitoring	PG-5MA	PG-5MA	10/16/2018	Original	TA	<0.50	<0.50	1.1	0.60	**23**	550-111762
Monitoring	PG-5UA	PG-5UA	10/18/2018	Original	TA	<0.50	<0.50	0.55	<0.50	1.8	550-112013
Monitoring	PG-6MA	PG-6MA	10/16/2018	Original	TA	<0.50	0.88	2.6	2.4	**82**	550-111762
Monitoring	PG-6UA	PG-6UA	10/18/2018	Original	TA	<0.50	<0.50	0.64	<0.50	0.68	550-112013
Monitoring	PG-7MA	PG-7MA	10/15/2018	Original	TA	<0.50	<0.50	0.64	<0.50	<0.50	550-111677
Monitoring	PG-8UA	PG-8UA	10/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112060
Monitoring	PG-10UA	PG-10UAHS	10/30/2018	Original	TA	<0.50	<0.50	0.67	<0.50	0.69	550-112554
Monitoring	PG-10UA (B)	PG-10UA	12/11/2018	Original	TA	<0.50	<0.50	1.3	<0.50	0.92	550-114691
Monitoring	PG-11UA	PG-11UAHS	10/30/2018	Original	TA	<0.50	<0.50	0.79	<0.50	<0.50	550-112554
Monitoring	PG-11UA	AO	10/30/2018	Duplicate	TA	<0.50	<0.50	0.81	<0.50	<0.50	550-112554
Monitoring	PG-16UA	PG-16UAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111677
Monitoring	PG-16UA (B)	PG-16UA	12/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.76	550-114691
Monitoring	PG-18UA	PG-18UA	10/19/2018	Original	TA	<0.50	<0.50	0.69	<0.50	0.74	550-112060
Monitoring	PG-19UA	PG-19UA	10/10/2018	Original	TA	<0.50	<0.50	0.62	<0.50	2.5	550-111406
Monitoring	PG-19UA	AF	10/10/2018	Duplicate	TA	<0.50	<0.50	0.59	<0.50	2.4	550-111406
Monitoring	PG-22UA	PG-22UAHS	10/11/2018	Original	TA	<0.50	<0.50	0.58	1.1	4.4	550-111537
Monitoring	PG-23MA/LA	PG-23MA/LA	10/17/2018	Original	TA	<0.50	<0.50	1.0	0.71	**10**	550-111869
Monitoring	PG-23UA	PG-23UAHS	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.6	550-111537
Monitoring	PG-24UA	PG-24UAHS	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111537
Monitoring	PG-25UA	PG-25UAHS	10/11/2018	Original	TA	<0.50	<0.50	0.74	<0.50	2.1	550-111537
Monitoring	PG-28UA	PG-28UA	10/17/2018	Original	TA	<0.50	<0.50	1.3	<0.50	1.5	550-111869
Monitoring	PG-28UA	AK	10/17/2018	Duplicate	TA	<0.50	<0.50	1.3	<0.50	1.5	550-111869
Monitoring	PG-29UA	PG-29UAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.4	550-111677
Monitoring	PG-29UA (B)	PG-29UA	12/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.64	550-114691
Monitoring	PG-29UA (B)	AR	12/11/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	0.58	550-114691
Monitoring	PG-31UA	PG-31UAHS	10/4/2018	Original	TA	<0.50	<0.50	2.8	<0.50	**29**	550-110946
Monitoring	PG-38MA/LA	PG-38MA/LAHS	10/16/2018	Original	TA	<0.50	<0.50	<0.50	3.7	0.60	550-111762
Monitoring	PG-39LA	PG-39LA	10/17/2018	Original	TA	<0.50	<0.50	0.94	2.1	3.8	550-111869
Monitoring	PG-40LA	PG-40LA	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**8.9**	550-111536
Monitoring	PG-42LA	PG-42LA	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.3	550-111536
Monitoring	PG-42LA	AG	10/11/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.5	550-111536
Monitoring	PG-43LA	PG-43LA	10/11/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111536
Monitoring	PG-44LA	PG-44LA	10/11/2018	Original	TA	<0.50	<0.50	3.1	<0.50	<0.50	550-111536
Monitoring	PG-48MA	PG-48MA	10/18/2018	Original	TA	<0.50	<0.50	1.2	0.56	**23**	550-112013
Monitoring	PG-49MA	PG-49MA	10/18/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112013
Monitoring	PG-50MA	PG-50MA	10/22/2018	Original	TA	<0.50	<0.50 (1)	2.7	<0.50	**12**	550-112140
Monitoring	PG-50MA	AN	10/22/2018	Duplicate	TA	<0.50	<0.50 (1)	2.7	<0.50	**11**	550-112140
Monitoring	PG-54MA	PG-54MA	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	2.5	550-111677
Monitoring	PG-54MA	AH	10/15/2018	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.4	550-111677
Monitoring	PG-55MA	PG-55MA	10/18/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	1.2	550-112013
Monitoring	PG-56MA	PG-56MA	10/19/2018	Original	TA	<0.50	<0.50	0.56	<0.50	2.3	550-112060
Monitoring	S-1LA	S-1LA	10/9/2018	Original	TA	<0.50	<0.50	1.3	**38**	<0.50	550-111287
Monitoring	S-1MA	S-1MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	4.6	<0.50	550-111677
Monitoring	S-2LA	S-2LA	10/9/2018	Original	TA	<0.50	<0.50	0.52	<0.50	**26**	550-111285
Monitoring	S-2LA	AE	10/9/2018	Duplicate	TA	<0.50	<0.50	0.59	<0.50	**32**	550-111285
Monitoring	S-2MA	S-2MAHS	10/15/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111679
Monitoring	W-1MA	W-1MA	10/17/2018	Original	TA	<0.50	<0.50	0.81	1.2	**300**	550-111869
Monitoring	W-2MA	W-2MA	10/17/2018	Original	TA	<0.50	<0.50	0.71	**5.1**	**1,600**	550-111869

TABLE 2. 2018 LABORATORY RESULTS FOR GROUNDWATER MONITORING WELLS NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
--	QC	FRB (Trip)	10/4/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110946
--	QC	FRB (Trip)	10/8/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111205
--	QC	FRB (Trip)	10/9/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111285
--	QC	FRB (Trip)	10/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111406
--	QC	FRB(Trip)	10/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111537
--	QC	FRB(Trip)	10/15/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111677
--	QC	FRB (Trip)	10/16/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111762
--	QC	FRB (Trip)	10/17/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111869
--	QC	FRB (Trip)	10/18/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112013
--	QC	FRB (Trip)	10/19/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112060
--	QC	FRB (Trip)	10/22/2018	TB	TA	<0.50	<0.50 (1)	<0.50	<0.50	<0.50	550-112140
--	QC	FRB (Trip)	10/30/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112554
--	QC	FRB (Trip)	12/11/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114691
--	QC	FRB (Trip)	1/8/2019	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115938

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene

ID = Identifier
TA = TestAmerica, Inc.
<0.50 = Analytical result is less than laboratory detection limit
QC = Quality Control
TB = Trip Blank
FRB = Field Reagent Blank
REJ = Data rejected because contractor reported that samples were switched during collection. Re-sampled.

NOTES:

<0.50 =	Non-Detect
5	Cleanup Standards for Treated Water (µg/L)
5.1	Sample result exceeds Cleanup Standards for Treated Water

(A) Samplers were unable to collect E-12UA sample in Q4 of 2018. Sample was collected on 1/8/2019.

(B) Additional monitoring results are available because VOC analyses were mistakenly conducted on samples obtained for inorganic purposes only.

(1) R6 Flag: Laboratory Fortified Blank / Laboratory Fortified Blank Duplicate (LFB / LFBD) relative percent difference (RPD) exceeded method control limit. Recovery met acceptance criteria.

TABLE 3. 2018 LABORATORY RESULTS FOR GROUNDWATER EXTRACTION WELLS
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA
(results presented in micrograms per liter, µg/L)

WELL TYPE	SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
						200	*6*	*6*	*5*	*5*	
AREA 7 GWETS											
Extraction	7EX-3aMA	7EX-3MA	10/25/2018	Original	TA	<0.50	<0.50	0.93	3.4	**450**	550-112439
Extraction	7EX-6MA	7EX-6MA	10/25/2018	Original	TA	<0.50	<0.50	0.78	3.0	**580**	550-112439
CGTF											
Extraction	COS-75A	COS - 75A	10/1/2018	Original	TA	<0.50	0.90	2.0	**5.8**	**41**	550-110644
Extraction	COS-75A	AB	10/1/2018	Duplicate	TA	<0.50	1.0	2.1	**6.1**	**44**	550-110644
Extraction	COS-75A	COS-75A	12/19/2018	Original	TA	<0.50	0.62	1.7	**5.4**	**41**	550-115171
Extraction	COS-75A	AS	12/19/2018	Duplicate	TA	<0.50	0.58	1.8	**5.7**	**42**	550-115171
AREA 12 GWETS											
Extraction	MEX-1MA	MEX-1-1A-10012018	10/1/2018	Original	TA	<0.50	2.0	1.8	3.3	**53**	550-110666
Extraction	MEX-1MA	MEX-1-1A-11012018	11/1/2018	Original	TA	<0.50	1.7	1.5	2.8	**47**	550-112667
Extraction	MEX-1MA	MEX-1-1A-12032018	12/3/2018	Original	TA	<0.50	1.1	1.5	2.9	**46**	550-114183
Extraction	Granite Reef	GR-1-1A-10012018	10/1/2018	Original	TA	<0.50	1.5	2.3	2.9	**61**	550-110666
Extraction	Granite Reef	GR-1-1A-11012018	11/1/2018	Original	TA	<0.50	2.0	5.1	3.0	**120**	550-112667
Extraction	Granite Reef	GR-1-1A-12032018	12/3/2018	Original	TA	<0.50	1.5	4.5	2.9	**130**	550-114183
NGTF											
Extraction	PCX-1	PCX-1	10/3/2018	Original	TA	<0.50	0.92	2.0	4.2	**52**	550-110818
Extraction	PCX-1	PCX-1	11/16/2018	Original	TA	<0.50	0.81	1.8	3.9	**49**	550-113514
Extraction	PCX-1	PCX-1	12/7/2018	Original	TA	<0.50	0.64	1.6	3.9	**47**	550-114583
MRTF											
Extraction	PV-14	PV14	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.61	550-110668
Extraction	PV-14	PV14	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.51	550-112668
Extraction	PV-14	PV14	12/3/2018	Original	TA	REJ	REJ	REJ	REJ	REJ	550-114182
Extraction	PV-14	PV 14	12/7/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114582
Extraction	PV-15	PV15	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**6.3**	550-110668
Extraction	PV-15	PV15	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.8**	550-112668
Extraction	PV-15	PV15	12/3/2018	Original	TA	REJ	REJ	REJ	REJ	REJ	550-114182
Extraction	PV-15	PV 15	12/7/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	**5.2**	550-114582
Trip/Field Blanks											
--	QC - CGTF	FRB (Trip)	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110644
--	QC - CGTF	FRB (Trip)	12/19/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115171
--	QC - NGTF	TB	10/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110818
--	QC - NGTF	TB	11/16/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113514
--	QC - NGTF	TB	12/7/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114583
--	QC - MRTF	TB	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110668
--	QC - MRTF	TB	11/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112668
--	QC - MRTF	TB	12/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114182
--	QC - MRTF	TB	12/7/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114582

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene

ID = Identifier
TA = TestAmerica, Inc.
<0.50 = Analytical result is less than laboratory detection limit
QC = Quality Control
TB = Trip Blank
FRB = Field Reagent Blank
REJ = Data rejected because contractor reported that samples were switched

NOTES:

<0.50 =	Non-Detect
5	Cleanup Standards for Treated Water (µg/L)
5.1	Sample result exceeds Cleanup Standards for Treated Water

TABLE 4. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	*6*	*6*	*5*	*5*	
AREA 7 GWETS										
SP-102 (influent)	SP-102	10/25/2018	Original	TA	<0.50	<0.50	0.79	2.9	**540**	550-112440
SP-102 (influent)	SP-102	11/20/2018	Original	TA	<0.50	<0.50	0.90	3.4	**630**	550-113731
SP-102 (influent)	SP-102	12/19/2018	Original	TA	<0.50	<0.50	0.84	3.3	**570**	550-115244
SP-103 (UV/Ox effluent)	SP-103	10/25/2018	Original	TA	<0.50	<0.50	0.78	0.87	**64**	550-112440
SP-103 (UV/Ox effluent)	SP-103	11/20/2018	Original	TA	<0.50	<0.50	0.84	1.5	**120**	550-113731
SP-103 (UV/Ox effluent)	SP-103	12/19/2018	Original	TA	<0.50	<0.50	0.88	2.2	**260**	550-115244
SP-105 (Air Stripper Effluent)	SP-105	10/25/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112440
SP-105 (Air Stripper Effluent)	SP-105	11/20/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113731
SP-105 (Air Stripper Effluent)	SP-105	12/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	0.62	550-115244
AREA 12 GWETS										
WSP-1 (Influent)	WSP-1-1A-10012018	10/1/2018	Original	TA	<0.50	1.5	1.8	3.4	**54**	550-110666
WSP-1 (Influent)	WSP-1-1A-11012018	11/1/2018	Original	TA	<0.50	1.8	3.5	2.9	**93**	550-112667
WSP-1 (Influent)	WSP-1-1A-12032018	12/3/2018	Original	TA	<0.50	1.6	3.5	3.0	**90**	550-114183
WSP-2 (Air Stripper Effluent)	WSP-2-1A-10012018	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110660
WSP-2 (Air Stripper Effluent)	WSP-2-1A-11012018	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112666
WSP-2 (Air Stripper Effluent)	WSP-2-1A-12032018	12/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114150
MRTF										
Tower 1 Effluent	Tower 1	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110668
Tower 1 Effluent	Tower 1	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112668
Tower 1 Effluent	Tower 1	12/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114182
Tower 2 Effluent	Tower 2	10/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110668
Tower 2 Effluent	Tower 2	11/1/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112668
Tower 2 Effluent	Tower 2	12/3/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114182
NGTF										
Outfall 001 (Effluent)	NGTF-CP	10/1/2018	Original	TA	<0.50	<0.50	0.64	<0.50	<0.50	550-110642
Outfall 001 (Effluent)	NGTF-CP	10/8/2018	Original	TA	<0.50	<0.50	0.50	<0.50	<0.50	550-111178
Outfall 001 (Effluent)	NGTF-CP	10/15/2018	Original	TA	<0.50	<0.50	0.70	<0.50	<0.50	550-111669
Outfall 001 (Effluent)	NGTF-CP	10/22/2018	Original	TA	<0.50	<0.50	0.52	<0.50	<0.50	550-112138
Outfall 001 (Effluent)	NGTF-CP	10/29/2018	Original	TA	<0.50	<0.50	0.63	<0.50	<0.50	550-112490
Outfall 001 (Effluent)	NGTF-CP	11/5/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112838
Outfall 001 (Effluent)	NGTF-CP	11/13/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113326
Outfall 001 (Effluent)	NGTF-CP	11/19/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113670
Outfall 001 (Effluent)	NGTF-CP	11/27/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113906
Outfall 001 (Effluent)	NGTF-CP	12/3/2018	Original	TA	<0.50	<0.50	0.56	<0.50	<0.50	550-114184
Outfall 001 (Effluent)	AZCO	12/10/2018	Original	TA	<0.50	<0.50	0.82	<0.50	<0.50	550-114631
Outfall 001 (Effluent)	AZCO	12/17/2018	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115043
Outfall 001 (Effluent)	NGTF-CP	12/24/2018	Original	TA	<0.50	<0.50	0.65	<0.50	<0.50	550-115438
Outfall 001 (Effluent)	AZCO	12/31/2018	Original	TA	<0.50	<0.50	0.64	<0.50	<0.50	550-115604

TABLE 4. 2018 LABORATORY RESULTS FOR TREATMENT SYSTEM SAMPLES
NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

(results presented in micrograms per liter, µg/L)

SAMPLE LOCATION	FIELD SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	LAB	TCA	DCE	TCM	PCE	TCE	REPORT
					200	*6*	*6*	*5*	*5*	
Trip/Field Blanks										
QC - Area 7	Field Blank	10/25/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112440
QC - Area 7	Trip Blank	10/25/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112440
QC - Area 7	Field Blank	11/20/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113731
QC - Area 7	Trip Blank	11/20/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113731
QC - Area 7	FIELD BLANK	12/19/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115244
QC - Area 7	TRIP BLANK	12/19/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115244
QC - Area 12	FB-1-1A-10012018	10/1/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110660
QC - Area 12	TB	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110660
QC - Area 12	FB-1-1A-11012018	11/1/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112666
QC - Area 12	TB	11/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112666
QC - Area 12	FB-1-1A- 12032018	12/3/2018	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114150
QC - Area 12	TB	12/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114150
QC -MRTF	TB	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110668
QC -MRTF	TB	11/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112668
QC -MRTF	TB	12/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114182
QC - NGTF	TB	10/1/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-110642
QC - NGTF	TB	10/8/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111178
QC - NGTF	TB	10/15/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-111669
QC - NGTF	TB	10/22/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112138
QC - NGTF	TB	10/29/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112490
QC - NGTF	TB	11/5/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-112838
QC - NGTF	TB	11/13/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113326
QC - NGTF	TB	11/19/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113670
QC - NGTF	TB	11/27/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-113906
QC - NGTF	TB	12/3/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114184
QC - NGTF	TB	12/10/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-114631
QC - NGTF	TB	12/17/2018	TB	TA	<0.50 $^{(1,2,3)}$	<0.50 $^{(1,2,3)}$	<0.50 $^{(1,2,3)}$	<0.50 $^{(1,2,3)}$	<0.50 $^{(1,2,3)}$	550-115043
QC - NGTF	TB	12/24/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115438
QC - NGTF	TB	12/31/2018	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-115604

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene
AZCO = Arizona Canal Outfall

ID = Identifier
TA = TestAmerica, Inc.
<0.50 = Analytical result is less than laboratory detection limit
QC = Quality Control
TB = Trip Blank
FB = Field Blank
REJ = Data rejected because contractor reported that samples were switched during collection. Re-sampled.

NOTES:

<0.50 =	Non-Detect
5	Cleanup Standards for Treated Water (µg/L)
5.1	Sample result exceeds Cleanup Standards for Treated Water

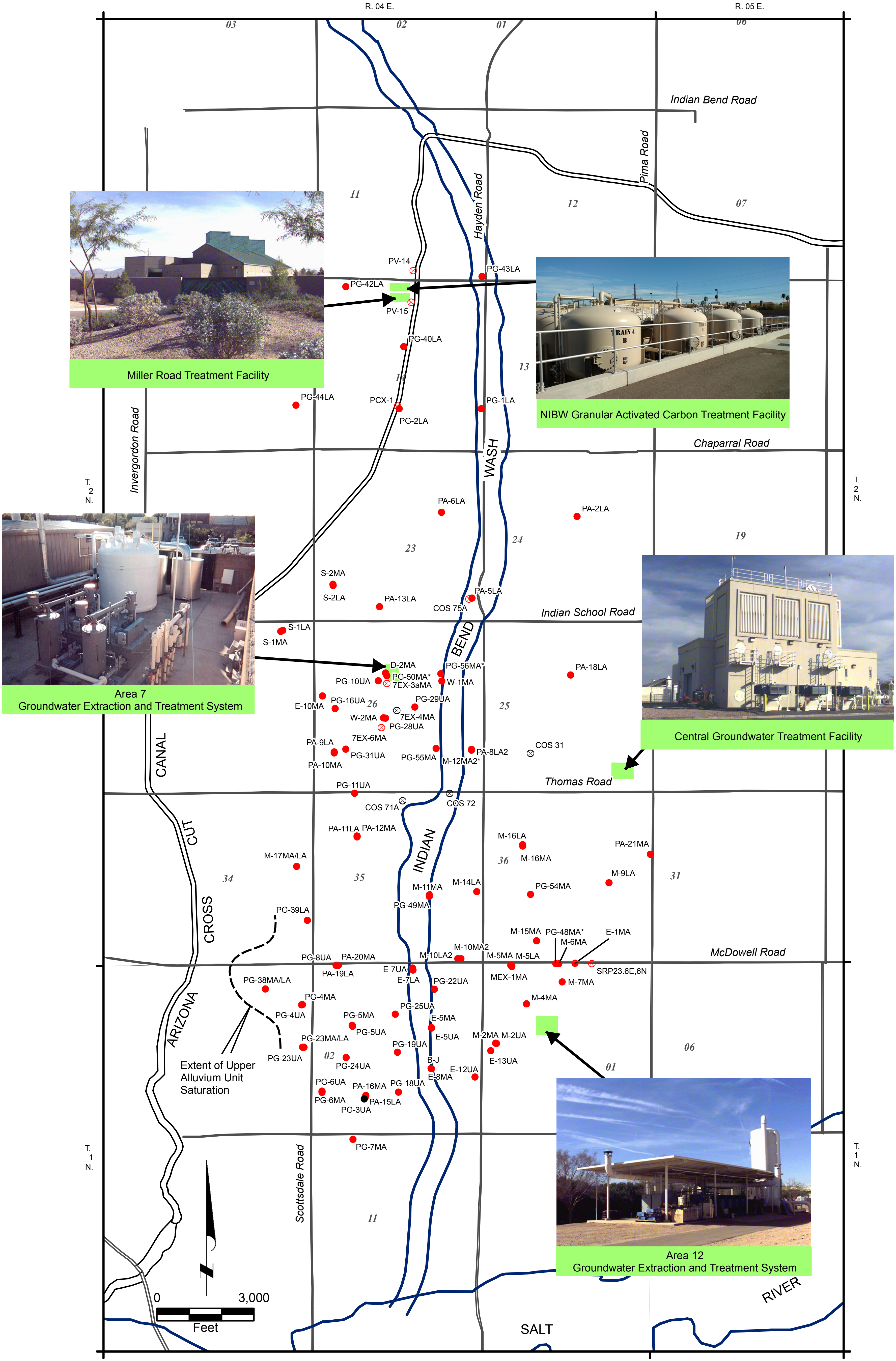
* Influent sampling results at the NGTF are not compliance data; however, they are reported here for completeness.

(1) V9 Flag: Continuing calibration verification (CCV) recovery was below method acceptance limits

(2) R1 Flag: Relative Percent Difference/Relative Standard Deviation (RPD/RSD) exceeded the method acceptance limit.

(3) L4 Flag: The associated blank spike recovery was below method acceptance limits.

FIGURE



EXPLANATION

M-15MA	●	Location and Identifier for Monitor Well Sampled
PCX-1	⊗	Location and Identifier for Extraction Water Well Sampled
COS-71A	⊗	Location and Identifier for Extraction Water Well Not Sampled

NORTH INDIAN BEND WASH AREA
MARICOPA COUNTY, ARIZONA

LOCATIONS OF SAMPLE PROGRAM WELLS AND TREATMENT FACILITIES FOURTH QUARTER 2018

North Indian Bend Wash Superfund Site

FIGURE 1

P\GISDATA\366.14\SampleWells_2018locmap_4Q.mxd\28Feb2019