

**RECORD OF DECISION
7TH AVENUE AND BETHANY HOME ROAD
WQARF REGISTRY SITE
PHOENIX, ARIZONA**



June 2016

Arizona Department of Environmental Quality
Remedial Projects Unit
1110 West Washington
Phoenix, Arizona 85007



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LIST OF ACRONYMS	
A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
A.R.S.	Arizona Revised Statute
AWQS	Aquifer Water Quality Standards
bgs	below ground surface
CAB	Community Advisory Board
CIP	Community Involvement Plan
COC	Contaminant of Concern
COP	City of Phoenix
DCE	dichloroethene
ERA	Early Response Action
ERD	Enhanced Reductive Dechlorination
FS	Feasibility Study
GPL	Groundwater Protection Level
PCE	tetrachloroethene
MNA	Monitored Natural Attenuation
NFA	No Further Action
PRAP	Proposed Remedial Action Plan
RI	Remedial Investigation
RO	Remedial Objectives
ROD	Record of Decision
SRL	Soil Remediation Level
SRP	Salt River Project
SVE	soil vapor extraction
TCE	trichloroethene
URS	URS Corporation
VOC	volatile organic compound
WQARF	Water Quality Assurance Revolving Fund
mg/Kg	milligrams per kilogram
mg/m ³	milligrams per cubic meter
µg/L	micrograms per liter



1.0 DECLARATION

1.1 SITE NAME AND LOCATION

This Record of Decision (ROD) is for the 7th Avenue and Bethany Home Road Water Quality Assurance Revolving Fund (WQARF) Registry Site (Site), located in Maricopa County, Phoenix, Arizona. The Site was placed on the Arizona Department of Environmental Quality (ADEQ) WQARF Site Registry in 2004 (ADEQ, 2004). The Site is approximately bounded to the north by W. Rose Lane, to the south by Bethany Home Road, to the east by N. 5th Avenue, and to the west by N. 8th Avenue (Figure 1).

Site contaminants of concern (COCs) consist of tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride.

1.2 BASIS AND PURPOSE

This ROD presents the selected remedy for the Site, chosen in accordance with applicable requirements with Title 18, Chapter 16 of the Arizona Administrative Code (A.A.C.). The process for selecting the remedy also complied with Arizona Revised Statute (A.R.S.) Title 49, Chapter 2, Article 5. ADEQ, as the lead agency, has reviewed the remedy and determined that site completion criteria used to evaluate the selected remedial action for PCE, TCE, and vinyl chloride in groundwater at the Site and remedial objectives (ROs) have been satisfied. This ROD describes the basis for the selected remedy and addresses all elements of A.A.C. R18-16-410 under the WQARF Program. The decision in this ROD is based upon previous activities and investigations conducted and performed for this site documented and placed in ADEQ's Administrative Record file.

1.3 DESCRIPTION OF SELECTED REMEDY

The selected remedy at the Site, as specified in the *Proposed Remedial Action Plan for the 7th Avenue and Bethany Home Road WQARF Site – Phoenix, Arizona* (URS Corporation [URS], 2015), is to conduct In-Situ Enhanced Reductive Dechlorination (ERD) with Monitored Natural Attenuation (MNA) for remediation of COCs in groundwater at the Site. In addition, the selected remedy includes the following contingencies:

- Use of sodium lactate with the injected carbon substrate, if necessary to maintain pH levels in the optimum range for reductive dechlorination
- Introduction of dehalococoides should vinyl chloride accumulation become evident



- In the event PCE concentrations in groundwater samples collected from the SRP well exceed risk-based water use levels established by SRP or 5.0 µg/L if the use designation changes to drinking water during the remedial period, a wellhead treatment program will be implemented. Groundwater monitoring will continue while wellhead treatment is implemented at the SRP well using a series of granular activated carbon (GAC) vessels to treat SRP well effluent.

Detailed information on the selected remedy is provided in Section 3.0 of this ROD. Upon completion of remedial actions, all remedial equipment and wells associated with the Site will be abandoned in accordance with the Preliminary Remedial Action Plan (PRAP) and applicable Arizona Department of Water Resources (ADWR) requirements as promulgated in A.A.C. R12-15-816. After completion of the above actions, ADEQ will delist the Site as stated in A.R.S. 49-287.01 (K).

1.4 STATUTORY DETERMINATIONS

In April 2011, ADEQ completed the Remedial Investigation (RI) report (ADEQ, 2011) and in November 2012 the Feasibility Study (FS) report (Arcadis, 2012) was completed pursuant to Arizona Revised Statutes (A.R.S.) §49-287.03. The RI report:

- Established the nature and extent of the contamination and the sources thereof;
- Identified current and potential impacts to public health, welfare and the environment;
- Identified current and reasonable foreseeable uses of land and waters of the state;
- Obtained and evaluated information necessary for identification and comparison of alternative remedial actions.

Based on this information, the FS evaluated three different remedial options and identified the remedy for use at the Site. The FS:

- Provided for the development of a reference remedy and at least two alternative remedies which were capable of achieving all of the remedial objectives;
- Insured that the reference remedy was based upon best engineering, geological, or hydrogeological judgment;
- Provided one alternative remedy that was more aggressive than the reference remedy; and
- Provided one alternative remedy that was less aggressive than the reference remedy.



In accordance with A.R.S. §49-287.04, the Proposed Remedial Action Plan (PRAP) discussed the reference remedy recommended by the FS and provided costs to implement the reference remedy (URS, 2015). Public comments on the selected remedy were solicited but none were received. The PRAP:

- Identified the boundaries of the Site;
- Identified results of the RI and FS;
- Proposed the selected remedy and its cost; and
- Described how the remedial goals and selection factors were evaluated.

Pursuant to A.R.S. §49-287.04(H), this ROD is the final administrative decision as defined under A.R.S. §41-1092. The selected remedy for the contaminated groundwater at the Site is considered:

- Protective of public health and the environment;
- Compliant with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action;
- Reasonable;
- Necessary;
- Cost-effective; and
- Technically feasible.



2.0 SITE BACKGROUND

2.1 7TH AVENUE AND BETHANY HOME ROAD WQARF SITE

The Site was placed on the ADEQ WQARF Site Registry in 2004 (ADEQ, 2004). The approximate boundaries of the Site are W. Rose Lane to the north, Bethany Home Road to the south, N. 5th Avenue to the east, and N. 8th Avenue to the west (Figure 1). A contaminated groundwater plume with PCE, TCE, and vinyl chloride exists at the Site resulting from historic dry cleaning operations at two properties located at the intersection of 7th Avenue and Bethany Home Road (the Bayless property located on the northeast corner, and the SCI property located on the northwest corner).

2.2 SOURCE AREA DEFINITION

The two properties identified as likely sources of the groundwater contamination associated with the Site include the Bayless property located at 540 West Bethany Home Road (Figure 2) and the SCI property located at 710 West Bethany Home Road (Figure 3). At the Bayless property, on-Site septic tanks were identified as a potential PCE source, impacting two Salt River Project irrigation wells located within ½ mile of the Site. During a soil gas investigation conducted in 1999 by a consultant working for the Bayless property owner, excavation activities uncovered two separate septic tanks, three cesspools, and several runs of piping. A dried sludge sample collected from one of the septic tanks was analyzed for volatile organic compounds (VOCs) with a PCE concentration of 54 milligrams per kilogram (mg/kg). Subsequent samples collected from the cesspools revealed PCE concentrations ranging from non-detect to 2.1 mg/kg.

At the SCI property, investigations conducted in 1990 and 1991, a dry well, septic tank, and seepage pit were identified as a potential PCE sources. PCE and other VOCs were detected in soil vapor, soil, sludge, and dry well sediment.

The Site investigations conducted at the Bayless property confirmed the presence of PCE and other VOCs in the soil and groundwater underlying the property. In addition, site investigations conducted at the SCI property indicated that chlorinated VOCs were present in both the underlying soils and groundwater. A detailed discussion pertaining to the distribution of contaminants associated with both properties is available in the Remedial Investigation Report (ADEQ, 2011) and summarized in the following sections.



2.3 CHRONOLOGY OF SITE ACTIVITIES

The detailed history of site investigations and Early Response Actions (ERAs) completed at the Site was presented in the Remedial Investigation (ADEQ, 2011) and the Feasibility Study (Arcadis, 2012) reports, and in subsequent groundwater monitoring and pilot testing reports. The following provides summaries of the main events and investigative/ERA milestones for the 7th Avenue and Bethany Home Road Site:

- **1990-1991:** Investigations are conducted at the SCI property consisting of soil borings and soil sampling, soil vapor sampling, excavations of contaminated soils and sludge, removal of contaminated sediment from a dry well, and abandonment of a septic tank and seepage pit. PCE and other VOCs were detected in soil vapor, soil, sludge, and dry well sediment.
- **1995:** A prospective buyer of the Bayless property conducted a Phase I and a Phase II Environmental Site Assessment. Five soil borings were drilled to 30 feet below ground surface (bgs) with soil samples collected and analyzed for VOCs. Monitoring wells MW-1, MW-2, and MW-3 were installed (Figure 2). PCE was detected during a 1995 sampling effort in groundwater underlying the site at concentrations above the Arizona Aquifer Water Quality Standard (AWQS) of 5.0 µg/L.
- **1999:** During a soil gas investigation conducted by a consultant working for the Bayless property owner, excavation activities uncovered two separate septic tanks, three cesspools, and several runs of piping. A dried sludge sample collected from one of the septic tanks was analyzed for VOCs with a PCE concentration of 54 mg/kg.
- **March 2000:** Soil samples were collected from the cesspools at the Bayless property and analyzed for VOCs. PCE was detected ranging from non-detect to 2.1 mg/Kg.
- **May 2000:** The septic tanks and piping at the Bayless property were excavated along with 1 foot of soil beneath the tanks. Soil samples were collected from beneath the excavation, and no VOCs were detected above reporting limits.
- **August 2004:** The Site was placed on the WQARF Registry by ADEQ with a score of 29 out of 120. Detections of PCE in nearby Salt River Project (SRP) wells contributed to the rationale for placement on the WQARF Registry.
- **2004-2007:** ADEQ initiated an ERA consisting of soil vapor extraction (SVE) to address soil and groundwater contamination associated with the Bayless property as described in the *Final Work Plan, ERA Investigation, 7th Avenue and Bethany Home Road WQARF Site* (Malcolm Pirnie, 2005a). PCE was detected in soil gas up to of 6,100 milligrams per cubic meter (mg/m³), and in groundwater ranging from 56 micrograms per liter (µg/L) to 10,000 µg/L, exceeding the AWQS of 5 µg/L.
- **June 2005:** An SVE system was installed at the Bayless property in the second quarter of 2005 and was operational by the end of June 2005. The SVE system consisted of five



extraction wells, with screened intervals from 40 to 75 feet bgs, located within the septic system source area. VOCs were removed from extracted air using two 5,000 pound granular activated carbon vessels that were operated in series. Air emissions from the SVE system were regulated under an air permit issued by the Maricopa County Environmental Services Department.

- **January 2006:** Field data and analytical soil gas samples indicated that relatively low mass removal rates were occurring and that the majority of the extractable VOC mass in the vadose zone had been removed by the SVE system at the Bayless property.
- **April 11, 2006:** An SVE rebound test was conducted at the Bayless property to determine whether a substantial amount of removable VOCs remained in the unsaturated soils of the vadose zone previously treated by the SVE system. Results of the rebound test indicated that PCE soil gas concentrations detected in the borings were up to three orders of magnitude less than the levels detected previously at comparable depths in borings drilled during the ERA Investigation. Converting the soil gas concentrations to soil solid concentrations indicated the remaining total concentrations in the soil ranged from approximately 0.0005 to 0.06 mg/kg, which were below the prescribed Groundwater Protection Level (GPL) for PCE of 0.8 mg/kg and the Residential Soil Remediation Level (SRL) of 5.1 mg/kg.
- **March-April 2008:** Six exploratory soil borings were drilled and two groundwater monitoring wells (MW-11 and MW-12) were installed as part of an ERA investigation conducted at the SCI property (Figure 3). Soil gas sampling during drilling four of the soil borings was performed. The soil boring locations were selected based on the known locations of a former dry cleaner building; potential source areas including a dry well, a former septic system, and a seepage pit; and the known groundwater flow direction. Analytical results indicated that the highest PCE concentrations in soil gas ranged from 100 mg/m³ and 120 mg/m³ at a depth of 65 feet. No concentrations were detected above regulatory standards and no further remediation of the vadose zone at the SCI property was conducted.
- **December 2008:** As a result of the SVE operations and subsequent soil verification sampling, the ADEQ granted the Bayless property owner a No Further Action (NFA) determination for soil at the property.
- **2004-2008:** ADEQ conducted periodic groundwater monitoring and sampling activities at the Site.
- **April 2011:** ADEQ issued the *Remedial Investigation Report* (ADEQ, 2011) including a Land and Water Use Evaluation and the Final Remedial Objectives Report.
- **November 19, 2012:** The *Feasibility Study Report* (Arcadis, 2012) was issued for the Site.
- **February 2013:** A *Pilot Test Work Plan* (Arcadis, 2013) in support of an ERD remedy selection was approved by ADEQ on February 25, 2013.



- **March 2013:** Injection wells IW-1S, IW-1D and monitoring wells MW-3R, and MW-14 through MW-19 were installed (Figure 2).
- **March 2013 - August 2014:** ERD Pilot Test implementation was conducted at the Site including two injection events, associated performance monitoring, and pilot test evaluation.
- **2010-2014:** Site-wide groundwater monitoring and sampling events were conducted in 2010, 2012, 2013, and 2014.
- **May 2014:** Arcadis issued the *Enhanced Reductive Dechlorination Pilot Test Summary Report* (Arcadis, 2014a).
- **August 2014:** Arcadis issued a Pilot Study Performance Monitoring Update (Arcadis, 2014b).
- **April 2015.** URS issued the *Proposed Remedial Action Plan (PRAP), 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* (URS, 2015).

2.3.1 Summary of Soil Contamination

As part of an ERA Investigation conducted in 2005, data were collected to characterize the source area of PCE contamination underlying the Bayless property. As a result of the ERA, the extent of the PCE contamination in the vadose zone was defined. Subsequently, a SVE system was installed at the site in the second quarter of 2005 and operated from June 2005 to April 2006 at which time a rebound test was conducted. The results of the rebound test indicated that the SVE system had adequately addressed the PCE contamination in the vadose zone as confirmed by the drilling and sampling of two verification borings which indicated that neither the regulatory limits for the GP L nor the SRL were exceeded in any of the borehole samples. As a result of the SVE operations and soil verification sampling, the ADEQ granted the property owner a NFA Further Action determination for soil at the Bayless property in December 2008.

In 2008, six exploratory soil borings were drilled and two groundwater monitoring wells were installed as part of the ERA investigation at the SCI property. The exploratory boring locations were selected based on the known location of the former dry cleaner building, potential source areas including a dry well and former septic system and seepage pit, and known groundwater flow direction. Analytical results obtained during the investigation indicated that no constituent concentrations were detected in soil above regulatory standards and no further remediation of the vadose zone at the SCI property was deemed necessary.



2.3.2 Summary of Groundwater Contamination

COCs associated with the Site groundwater plume are PCE, TCE, and vinyl chloride. The extent of the plume as depicted on the ADEQ's website is identified on Figure 1 (ADEQ, 2015a). The plume is approximately bounded to the north by W. Rose Lane, to the south by Bethany Home Road, to the east by N. 5th Avenue, and to the west by N. 8th Avenue. The present plume footprint dimensions are approximately 1,200 feet long from north to south, and up to 900 feet wide from east to west.

Historically, COCs identified in groundwater underlying the Site included the following:

- Chloroform
- *cis*-1,2-Dichloroethene (DCE)
- *trans*-1,2-DCE
- Dichlorodifluoromethane
- TCE
- PCE
- Methyl-*tert*-butyl ether
- Vinyl chloride

Based on concentrations exceeding the AWQSSs, ADEQ has retained PCE, TCE, and vinyl chloride as the COCs in groundwater at the Site requiring active remediation. The impacted groundwater interval extends from a depth of approximately 80 feet bgs to 110 feet bgs. The water table occurs at the upper portion of a fine-grained layer at a depth between 76 to 88 feet bgs.

For the Bayless property, the horizontal extent of PCE-impacted groundwater has been characterized by existing groundwater monitoring wells MW-3, MW-4, MW-5, and MW-10. This has been supplemented by the two new wells (MW-3R and MW-14), in addition to the two injection wells (IW-1S and IW-1D) that were installed in support of a pilot test. Well MW-4 exhibits the highest PCE concentrations (i.e., up to 2,300 micrograms per liter [$\mu\text{g/L}$]) in the monitoring well network. The most current PCE concentration for Well MW-4 (from the March 2014 groundwater monitoring event) was 1,000 $\mu\text{g/L}$. Well MW-7 which is located farthest north of the Site (approximately 950 feet north of the Bayless property) has detectable concentrations of PCE, albeit at levels below regulatory concern, with the March 2014 result being 1.2 $\mu\text{g/L}$. The downgradient extent of the shallow PCE plume that exceeds the 5 $\mu\text{g/L}$ standard is estimated to be between monitoring wells MW-10 and MW-7 (Figure 4). The deeper portion of the PCE plume extends through MW-21, a deep well downgradient of the release areas, to the SRP irrigation well.



In February 2016, the groundwater sample collected from well MW-21 contained a PCE concentration of 147 µg/L, which exceeds the AWQS of 5 µg/L for PCE.

Well SRP13.1E-10.5N shown in Figure 1 has been sampled intermittently for VOCs since 1986. The PCE concentration has ranged from less than the detection limit to 5 µg/L, with an increasing trend observed from 2001 to 2012. The PCE result for the most recent groundwater sample collected on March 28, 2013 was 12 µg/L exceeding the 5 µg/L standard. The SRP well is located north of wells MW-7 and MW-21. Analytical data collected at well MW-21 indicate that the SRP irrigation well is drawing the PCE plume down into the deeper aquifer and impacting the SRP well. Current groundwater use for the groundwater extracted from the SRP irrigation well is used for irrigation, however, SRP has indicated that in the foreseeable future the groundwater use could be changed to drinking water.

Groundwater samples collected in March 2014 from monitoring wells on the SCI property and immediately downgradient from the SCI property indicate PCE concentrations ranging from 9.2 µg/L to 170 µg/L (Arcadis, 2014c), the location with the highest PCE concentration of 170 µg/L is MW-18, an off-site, downgradient well (Figure 4). The sample collected from offsite well MW-19, located north of MW-18, contained a PCE concentration of 56 µg/L. Located approximately 1,350 feet north of the property, monitoring well MW-8 PCE concentration was below the laboratory reporting limit of 1.0 µg/L.

In March 2014, the groundwater sample collected from well MW-12 on the SCI property also contained a TCE concentration of 13 µg/L, which exceeds the AWQS of 5 µg/L for TCE. Vinyl chloride was also detected in this well at a concentration of up to 1.5 µg/L, below the AWQS of 2 µg/L and *cis*-1,2-DCE at a concentration of 18 µg/L, which is less than the AWQS of 70 µg/L. Other wells associated with the SCI property did not exhibit the PCE degradation products as were observed in MW-12.

2.4 SELECTED REMEDY

The *Final Feasibility Study, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* (Arcadis, 2012) provided the evaluation of three Alternative Remedies. Section 3.1 describes the Selected Remedy.

The Selected Remedy is Alternative 1 as described in the Feasibility Study (FS) (Arcadis, 2012) and the PRAP (URS, 2015). More specifically, the Selected Remedy includes the following:



- In-Situ ERD with MNA for remediation of COCs in groundwater at the Site. The COCs associated with the Site are PCE, TCE, and vinyl chloride. Remediation by ERD will be established and maintained by injecting a carbon substrate solution (i.e., molasses or emulsified vegetable oil) into groundwater, which may be augmented by sodium lactate for pH optimization if necessary. MNA will be implemented to monitor and evaluate the decline of VOCs in groundwater over time as a result of the ERD process and processes of dilution, sorption, and advection, until Arizona AWQS are attained. Injections will occur on a quarterly basis using a molasses based substrate or every other year if using an emulsified vegetable oil substrate for a period of 7 years, with an initial periodic review of progress at 3 years.
- Installation of two new injection well transects, each consisting of eight nested well pairs aligned east-to-west with a 30-foot spacing to accommodate a 15-foot radius of influence, to conduct the carbon substrate solution injections to groundwater. Each nested well pair will contain a shallow well screened from 80 to 95 feet bgs, and a deeper well screened from 95 to 110 feet bgs to treat a 15 foot aquifer thickness per well screen. The transects will be installed across a portion of the approximate center axis of the groundwater plume along the north (downgradient) property line of the Bayless property, and approximately 375 feet downgradient of this property (Figure 4).
- Installation of a new injection well, constructed as above, north (downgradient) of the SCI property in the near vicinity and to the west of monitoring well MW-18. The injection well will serve to deliver the carbon substrate solution for ERD remediation of this high-concentration area located downgradient of source contamination at the SCI Property. (Figure 4).
- Performance monitoring and field monitoring of various parameters in groundwater to ensure that optimal aquifer conditions are maintained to support ERD. This will be accomplished by sampling monitoring wells located at select locations near and downgradient of ERD injection wells.
- A contingency to add wellhead treatment at the SRP well using a series of granular activated carbon (GAC) vessels to treat SRP well effluent in the event PCE concentrations in water samples collected from the SRP wells exceed risk-based water use levels established by SRP or 5.0 µg/L if the use designation changes to drinking water.
- Groundwater monitoring at MW-7 to determine if PCE concentrations continue to increase, and if so, performing groundwater modeling to evaluate whether MNA will adequately address the portion of the plume north of W. Berridge Lane. Using modeling results, a



decision may be made to potentially expand ERD remediation further downgradient with the installation of an additional transect of injection wells.

- A contingency to amend carbon substrate solution injections with *dehalococcoides*¹ that would address remediation of vinyl chloride if its accumulation in groundwater becomes greater than the AWQS of 2 µg/L.

2.5 BASIS OF SELECTED REMEDY

The *Proposed Remedial Action Plan (PRAP)*, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona (URS, 2015) provided the basis for the Selected Remedy.

2.6 ACHIEVEMENT OF REMEDIAL ACTION CRITERIA

In accordance with A.A.C. R18-16-406(I), the ADEQ prepared the *Final Remedial Objectives Report, 7th Avenue and Bethany Home Road WQARF Registry Site, Phoenix, Arizona*, which is provided in Appendix F of the *Remedial Investigation Report, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* (ADEQ, 2011). Remedial objectives are established for current and reasonably foreseeable uses of land and waters of the State of Arizona that have been or are threatened to be affected by a release of a hazardous substance(s). Per A.A.C. R18-16-407, the remedial objectives were evaluated in the *Final Feasibility Study, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* (Arcadis, 2012) and in accordance with A.A.C. R18-16-408 and A.R.S. 49-287.04(A)(B) & (C), considered in development of the remedial action alternatives presented in *The Proposed Remedial Action Plan (PRAP), 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* (URS, 2015).

2.6.1 Land Use and Zoning

As discussed in the RO Report provided in Appendix F of the *Remedial Investigation Report, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* (ADEQ, 2011), there is little acreage available to be developed in the future. The area near the site is not expected to experience significant increases in either employment or residential growth. The zoning pattern in the Site area has long been established, and there are no foreseeable changes in the future. The Proposed Remedy is considered to be consistent with Current and Future Land Use and provides for adequate protection of public health and welfare and the environment

¹ *Dehalococcoides* is a genus of bacteria noted for its use in bioremediation of PCE, TCE, 1,2-DCE, and vinyl chloride in groundwater, in a mode of anaerobic respiration called dehalorespiration.



2.6.2 Groundwater Use

The contaminants TCE, PCE, and vinyl chloride are the only COCs currently present at the Site with concentrations above their respective AWQS. The groundwater uses identified in the vicinity of the Site include municipal use, agricultural use, and private use (including domestic and irrigation).

Addressing groundwater contamination associated with the 7th Avenue and Bethany Home Road WQARF Site is necessary to ensure the municipal, agricultural, private use of the groundwater. Regarding the City of Phoenix's (COP's) access to groundwater required for the benefit of the municipality, the disconnection and/or abandonment of the COP's production wells due to water quality concerns and aging equipment has left the COP capable of only meeting 10 to 15 percent of its peak demand with groundwater. The COP has identified a need to substantially rebuild its well capacity for drought redundancy, operating flexibility, and system emergencies. In correspondence and discussions with the ADEQ and the EPA, the COP has emphasized that the Central Phoenix Aquifer is an important future water supply that the COP will need to be able to access (COP, 2011).

2.6.3 Surface Water Use

SRP provides its members with water for agricultural and residential irrigation. SRP owns and operates a piped lateral that conveys irrigation water from north to south along 7th Avenue. Local residential properties in and near the Site are irrigated with water provided by SRP. Because the remedial goal for groundwater at the Site is to meet AWQS, the remedial goal for surface water will also be met.

The Selected Remedies described above achieve the remedial objectives for the Site and are designed to achieve the remedial action criteria pursuant to A.R.S. § 49-282.06A including the following:

- Assures the protection of public health, welfare and the environment.
- Provides for the beneficial use of the groundwater resource.
- Is reasonable, necessary, cost-effective, and technically feasible.

2.7 COMPLIANCE WITH ARIZONA ADMINISTRATIVE CODE

In August 2004, the Site was placed on the WQARF Registry by ADEQ with a score of 29 out of a possible 120.



In June 2010, the ADEQ issued the *Remedial Investigation Report, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* (ADEQ, 2011) for public comment to meet the requirements under A.R.S. § 49-287.03 and A.A.C. R18-16-406. The report documented the results of field investigation activities that were conducted between 1990 and 2008. Solicitation for ROs to be included in the RO report was conducted during the Community Advisory Board (CAB) meeting per A.A.C. R18-16-406(I). Based on the solicitation, Land and Water Use report, and water management plans of providers, the draft RO report was prepared and put out for public comment prior to finalization.

The *Feasibility Study Work Plan 7th Avenue and Bethany Home Road WQARF Site Phoenix, Arizona* (Malcolm Pirnie, Inc. May, 2011) was written describing the overall scope of work required for completing the feasibility study for the Site. A public notice was issued in accordance with the requirements outlined in A.A.C. 404(C)(1)(d). The *Final Feasibility Study Report, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* (Arcadis, 2012) was prepared documenting the development and evaluation of alternatives for remediation of the site and providing a recommendation of a final remedy capable of achieving the remedial objectives developed for the project.

As a result of the work executed under the FS work plan and contained in the FS report, the *Proposed Remedial Action Plan (PRAP), 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona* was prepared. The PRAP documented the results of the FS and evaluated the alternative remedies. The PRAP evaluated each remedial alternative including:

- The ability of the remedial alternative to achieve the remedial objectives with regard to both land use and groundwater use
- Each alternative's consistency with water management plans of affected water providers and the general land use plans of the local government(s)
- Evaluation of alternatives with regard to practicability, cost, risk, and benefit.

The Selected Remedy and other alternative remedies are described in Section 3.0 of this ROD. A public notice regarding the PRAP was issued by the ADEQ and a public comment period held in accordance with A.R.S. § 49-287.04.

2.8 COMMUNITY INVOLVEMENT AND PUBLIC COMMENT REQUIREMENTS

A CAB was formed that has previously met on a regular basis to discuss issues and status of investigation and cleanup activities conducted at the Site. These meetings are open to the public



and the last meeting was held on June 17, 2015. Details of the CAB meeting agendas and minutes can be viewed on the ADEQ Web site at <http://www.azdeq.gov/viron/waste/sps/reg.html>. A Community Involvement Plan (CIP) (last updated in March 2015 [ADEQ, 2015b]) was also developed for the Site.

The following provides specific public participation activities that have been completed for the Site:

Table 1. Chronology of Major Events		
Community Involvement Activities	Regulatory Citation/Rule	Date
Establish Community Involvement Area (CIA)	A.R.S. § 49-289.02(A)	September 2009
Notice of the site listing on the Registry	A.R.S. § 49-287.01 A.R.S. § 49-289.03(A)	August 2004
Hazardous substance contamination notice and fact sheet	A.R.S. § 49-289.02(B) A.R.S. § 49-287.03(B) A.A.C. R18-16-404(C)(1)(i)	2004
Establish CAB selection committee	A.R.S. § 49-289.03(D)	March 2010
Establish CAB	A.R.S. § 49-289.03(C) A.R.S. § 49-289.03(F)(1)	May 25, 2010
Notice of RI scope of work, fact sheet, and outline of CIP	A.R.S. § 49-287.03(B) A.R.S. § 49-287.03(C) A.A.C. R18-16-403(F) A.A.C. R18-16-403(G)	January 2009
Establish information repository	A.R.S. § 49-289.03(B)	September 2009
Prepare and update CIP	A.R.S. § 49-287.03(D) A.R.S. § 49-289.03(C) A.A.C. R18-16-403(E) A.A.C. R18-16-404(C)	September 2009, March 2015
Questionnaires mailed for draft Land and Water Use Study	A.A.C. R18-16-404	April 2009



Table 1. Chronology of Major Events		
Community Involvement Activities	Regulatory Citation/Rule	Date
Notice of opportunity to comment on draft RI report	A.A.C. R18-16-404(C)(1)(b) A.A.C. R18-16-406(F)	June 16, 2010
Public meeting to establish ROs	A.A.C. R18-16-404(C)(1)(b) A.A.C. R18-16-406(I)	September 2010
Notice of opportunity to comment on proposed RO report and availability of final RO report	A.A.C. R18-16-404(C)(1)(c) A.A.C. R18-16-406(I)	February 11, 2011
Public meeting(s) to discuss proposed/revised RO report if needed	A.A.C. R18-16-406(I)(5)	N/A
Notice of availability of final RI and RO reports	A.A.C. R18-16-406	May 2011
Notice of availability of the FS work plan	A.A.C. R18-16-404(C)(1)(d)	May 2011
Issue notice of availability and opportunity to comment on the PRAP	A.R.S. § 49-287.04(B) A.A.C. R18-16-404(C)(1)(e)	April 23, 2015
Notice of ROD & Responsiveness Summary Availability	A.R.S. § 49-287.04 (G) A.A.C. R18-16-404(C)(1)(f)	TBD

The following summarizes public participation activities that have been completed for the Site:

- June 2010:** The RI Report was issued for public comment on June 16, 2010 for a period of 45 days to meet the requirements under A.R.S. § 49-287.03 and A.A.C. R18-16-406. A total of eight comments were received from the CAB and/or CAB members of which three resulted in changes being made to the Draft RI Report. The detailed comments along with ADEQ’s responses to the comments are provided in the April 2011 Responsiveness Summary prepared by the ADEQ Remedial Projects Unit, and included in Appendix G to the Final RI Report (ADEQ, 2011).
- September 1, 2010:** A CAB meeting was conducted, pursuant to A.A.C. R18-16-404, to discuss review of the Arizona Department of Water Resources (ADWR) well survey report; provide an update on the draft RI Report; provide an overview and obtain input on the Site ROs. A presentation of this information was given by the ADEQ. In addition, a discussion of the draft Community Involvement Plan (CIP) was made with a request for



the CAB members to review and provide comments to the CIP. Comments on proposed ROs were provided to ADEQ subsequent to the CAB meeting.

- **February, 2011:** The comment period for the Draft Proposed ROs was opened on February 11, 2011 for 45 days. No comments were received by ADEQ, and the ROs were included in the Final Remedial Objectives Report completed in April 2011.
- ADEQ provided notice to interested parties announcing the availability of the final RI report and the availability of the Feasibility Study Work Plan on May 26, 2011 to meet the requirements under A.A.C. R18-16-407.
- **February 19, 2013:** A CAB meeting was conducted, pursuant to requirements of A.A.C. R18-16-404. A presentation by the ADEQ was given to provide information on the January 2012 groundwater sampling results, recommendations in the final FS Report and the planned FS Study Pilot Test activities. The merging of the Site CAB with the Central and Camelback WQARF Site CAB, and an update to the CIP were also discussed.
- **January 8, 2014:** A CAB meeting was conducted, pursuant to requirements of A.A.C. R18-16-404. The meeting included an update on the status of the on-going FS Pilot Test implemented to evaluate ERD in groundwater at the Site.
- **July 23, 2014:** A CAB meeting was conducted, pursuant to requirements of A.A.C. R18-16-404, which included providing an update on the status of the FS Pilot Test in progress using ERD at the Site. A presentation associated with the pilot test was given by ADEQ.
- **April 23, 2015.** The ADEQ issued the PRAP for 30-day public comment period to meet the requirements established under A.A.C. R18-16-408(C)(1). Comments were received during the 30-day comment period. Notices on the availability of the PRAP were published in the Arizona Business Gazette on April 23 and April 30, 2015. The notice requested that public comments on the PRAP be provided in writing to the ADEQ Remedial Project Manager on or before May 22, 2015. Comments received by ADEQ on the PRAP are presented in the Responsiveness Summary, Section 4.0 of this ROD.

2.9 SCHEDULE

The selected remedy will be implemented over an estimated maximum life cycle of 15 years after the system is fully installed.



3.0 RESPONSIVENESS SUMMARY

As per A.A.C. R18-16-410(B)(2) and A.R.S. 49-287.04(F), a comprehensive responsiveness summary shall be prepared by the director regarding all comments received on the PRAP after the conclusion of all public comment periods. A 30-day comment period for the PRAP was held starting on April 23, 2015. Two sets of written comments were received during the comment period. Copies of written comments are contained in Appendix A. Comments received and ADEQ responses to the comments are as follows:

1	<p>Written Comment: Paul Thomas Cox, CAB Member, comment provided 04-24-2015</p> <p>Sections 5.1, 5.2 & 5.3 adequately cover technical remedial objectives for land, groundwater and surface water use. However, each should also contain a statement as follows:</p> <ul style="list-style-type: none">• Protect through continuous adherence to EPA standards and compliance with ARARs so that future contamination does not reoccur at this site. <p>NOTE: Since the objective of this PRAP is to present remedial requirements over time to an interested public body, thus a reminder that institutional standards must be maintained at a high level. This is particularly relevant in AZ where any federal action is often seen as infringing on state's rights. Having been involved in many river basin and watershed studies, state and international boundaries are not relevant to movement of underground and surface water as well as contaminants.</p>
	<p>ADEQ Response: The remedial objectives are ADEQ's remediation or cleanup goals for the site. ADEQ does not require the remedial objectives also need indicate best management practices for waste handling to insure sites are not contaminated again. ADEQ believes these best management practices are well described and regulated in federal and state regulations such as The Resource Conservation and Recovery Act (RCRA) enacted in 1976. RCRA is the principal federal law, implemented by the state pursuant to delegation from the U.S. EPA, governing the disposal of solid and hazardous waste. No change to the ROD needed.</p>



2	<p>Written Comment: Paul Thomas Cox, CAB Member, comment provided 04-24-2015</p> <p>NOTE: A comment on English composition of ADEQ and AZ government reports in general. There are several hundred unnecessary ‘the’ in these reports. This may seem trivial but a historical and cost perspective may prove otherwise as follows:</p> <ul style="list-style-type: none">• Historical: In the 17th & 18th centuries there were many ‘the’ & ‘thou’ in old English. By the end of the 18th fortunately mostly ‘thou’ had been eliminated. Also, the British Empire brought foreign translators paid by the word so excess ‘the’ became the norm as profitable. USAID unfortunately continue this as few multi lingual Americans.• Cost: Currently professionals and contractors charging or calculating cost per page continue excess ‘the’ as profitable. However, now that everything is electronically stored with accompanying charges, it saves government and taxpayers to create efficiencies through elimination of useless ‘the’. Storage costs continue to add up forever!• The basic new or business English is to eliminate all ‘the’ before action words, that is adjectives and adverbs or strings thereof.• Please note writing on this page contains no excess ‘the’, then note all the useless ‘the’ in reviewed report using this new criteria.
	<p>ADEQ Response: Comment noted. No change to the ROD needed.</p>
3	<p>Written Comment: Ms. Karen S. Gaylord on behalf of Bayless Investment and Trading Company, comment provided 5-27-2015</p> <p>I am writing to you today on behalf of Bayless Investment and Trading Company (BIT) to comment on ADEQ’s proposed Remedial Action Plan for the 7th Avenue and Bethany Home Road WQARF site. We are pleased to note that the Department has carefully considered three distinct remedial alternatives and has explained its reasons for selecting the Proposed Remedy. BIT has followed all of ADEQ’s efforts closely and supports continued aggressive action at the site. We understand that the agency faces WQARF funding shortfalls for the next fiscal year, but we hope that you will be able to fund as much of the proposed work for this Site as possible.</p> <p>BIT has been generous in its provision of access to the BIT property for ADEQ’s remediation efforts. But we hope that ADEQ’s remediation can be concluded expeditiously so that BIT’s unrestricted access can be restored. As in the past we would like to meet with you before ADEQ’s installation of any new equipment on the BIT property to understand the impact the installation might have on future use and development of the property, and to help analyze any alternative configurations that would have the least impact.</p> <p>Thank you for confirming that the department considered all of the PRP information that BIT provided to you between 2000 and 2005. BIT has no further information about liable parties that it can provide at this time.</p> <p>Please continue to keep us informed about activities at the Site. We will continue to attend any Community Advisory Board meetings. And we thank you once again for all your efforts to address this Site.</p>
	<p>ADEQ Response: Comment noted. No change to the ROD needed.</p>



4.0 COST

As required in A.A.C. R18-16-410(C), the following is a breakdown of costs during the site characterization and ERAs excluding non-recoverable costs incurred by ADEQ and projected future remedial action costs.

4.1 HISTORIC COSTS

As previously discussed, soil and groundwater contamination were initially discovered as part of environmental site investigations conducted from 1990 through 1995 at the Bayless and SCI properties (see Section 2.3). Investigation of the Site by ADEQ began in 2004 and will continue as the proposed remedy is implemented. An SVE remediation system ERA was conducted at the Site from 2004 through 2007 and was instrumental in reducing contaminant concentrations and risk of exposure. Significant costs have been incurred by ADEQ during characterization of the site, oversight of the ERA, and implementation of the ERD pilot study. The ADEQ's total costs, excluding non-recoverable costs, are \$2,053,546.99.

4.2 FUTURE COSTS

The estimated costs for implementing the remedy for the Site are presented in Table 1 and summarized below.

4.2.1 ERD Capital Costs

The capital investment for ERD costs includes the following:

- Administrative/Regulatory Interface for ERD - \$155,000
- Mobilization/Demobilization - \$90,000
- Injection Well Installation - \$340,000
- Injection Treatment System - \$207,500
- Personnel Oversight Costs - \$72,900
- Project Management and Administrative - \$86,540

Based on the collective costs noted above, the estimated total capital investment cost for implementation of the Selected Remedy is \$951,940.



4.2.2 ERD Operation and Maintenance Costs

The operation and maintenance costs for ERD included the following:

- Quarterly Monitoring for Years 1 through 7 - \$46,600 per year; \$326,200 total
- Semi-Annual Monitoring for Years 8 through 12 - \$29,300 per year; \$146,500 total
- Annual Monitoring for Years 13 through 15 - \$20,700 per year; \$62,100 total
- Annual O&M (limited to Years 1 through 7) - \$90,000 per year; \$630,000 total
- Project Management and Administrative Costs for Years 1 through 7 - \$13,700 per year; \$95,900 total
- Project Management and Administrative Costs for Years 8 through 12 - \$2,900 per year; \$14,500 total
- Project Management and Administrative Costs for Years 13 through 15 - \$2,100 per year; \$6,300 total

Based on the collective costs noted above, the estimated total operation and maintenance costs for ERD remediation over a projected period of 15 years is \$1,281,500.

4.2.3 ERD Remedy Effectiveness Reporting Costs

A technical evaluation of the ERD remediation performance data and overall effectiveness of groundwater clean-up will be conducted initially at three years after the first injection and periodically after that as necessary. There will be approximately three effectiveness reports prepared for the projected 15 year groundwater remediation program. The estimated total effectiveness reporting cost is \$25,500.

4.2.4 SRP Wellhead Treatment Contingency Costs

Also, as previously mentioned, if contaminant concentrations increase or current groundwater use changes, then a contingency for SRP wellhead treatment has been scoped and costed for a five year remedy period. These contingency costs are as follows:

- Wellhead Treatment System Installation - \$650,200
- Monitoring, Profiling, and Oversight - \$261,800
- GAC Replacement - \$167,500
- Additional Total Cost – \$1,079,500



4.2.5 ERD System Decommissioning and Well Abandonment Costs

The injection wells, monitoring wells, and remediation system compound and associated equipment will need to be decommissioned (closed) once groundwater remediation is complete. The total estimated decommissioning cost is \$142,560.

4.2.6 ERD Total Costs

The total cost of the remedy with site close-out activities and the SRP Wellhead Treatment Contingency is \$3,481,000.

The estimated cost for the Selected Remedy as presented in this ROD incorporates the recommended ERD design presented in Figure 4. The monitoring well network is presented in Figure 1.



5.0 CONCLUSIONS

The Selected Remedy chosen for the Site consists of ERD with MNA. Based on the schedule presented in the PRAP, the Selected Remedy will be implemented for an estimated time period of 15 years until the concentrations of COCs in groundwater are below Arizona AWQSS. At this time, operations will cease and all equipment, monitoring wells, injection wells, and treatment infrastructure associated with the Site investigation and remediation will be abandoned in accordance with the PRAP and ADWR requirements promulgated in A.A.C. R12-15-816. Furthermore, at this time there will be no need to protect human health and the environment and the Site will be delisted as stated in A.R.S. 49-287.01 (K). At any time prior to completion of the ROD, a portion of the Site may be issued an NFA based on criteria contained in A.R.S. 49-287.01 (F) & (G).



6.0 REFERENCES

- ADEQ, 2004. “Site Registry Report (Final) Water Quality Assurance Revolving Fund (WQARF) Site, 7th Avenue and Bethany Home Road, Phoenix, Maricopa County, Arizona.” August.
- ADEQ, 2011. *Remedial Investigation Report, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona.* April.
- ADEQ, 2015a. http://www.azdeq.gov/enviro/waste/sps/7th_Bethany_Home_Road.html, reviewed on April 20, 2015.
- ADEQ, 2015b. *Community Involvement Plan, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona.* March.
- Arcadis, 2012. *Final Feasibility Study, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona.* November.
- Arcadis, 2013. *Enhanced Reductive Dechlorination Pilot Test Work Plan, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona.* February.
- Arcadis, 2014a. *Enhanced Reductive Dechlorination Pilot Test Summary Report, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona.* May.
- Arcadis, 2014b. “7th Avenue and Bethany Home Road WQARF Site Pilot Study Performance Monitoring Update.” Transmittal letter dated August 29, 2014.
- Arcadis, 2014c. “7th Avenue and Bethany Home Road WQARF Site 2014 Groundwater Monitoring.” Transmittal letter dated June 27, 2014.
- COP, 2011. 2011 Water Resource Plan. City of Phoenix Water Services Department.
- COP, 2012. “City of Phoenix – Schedule F-1 Amendment to 2011 & 2012 Annual Water Withdrawal and Use Reports (56-002030).” Transmittal letter dated April 23, 2013.
- Malcolm Pirnie, 2005a. *Final Work Plan, ERA Investigation. 7th Avenue and Bethany Home Road WQARF Site.* June.
- Malcolm Pirnie 2005b. *Early Response Action Evaluation Report. 7th Avenue and Bethany Home Road WQARF Site.* June.
- URS, 2015. *Proposed Remedial Action Plan, 7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona.* April.

TABLES

Table 2
Cost Estimate for Final Remedy
7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona

Capital Investment for Enhanced Reductive Dechlorination				
Task Description	Unit	Unit Cost	Quantity	Total
Administrative/Regulatory Interface for ERD				\$155,000
RDI/RD work plans, design, specifications, and documents	LS	\$155,000	1	\$155,000
Mobilization/Demobilization				\$90,000
Site survey/Utility Mark Out	LS	\$10,000	2	\$20,000
Equipment & Manpower Mobilization/Demobilization	LS	\$10,000	2	\$20,000
Subcontractor/Equipment/Materials Procurement	LS	\$25,000	2	\$50,000
Injection and Monitoring Well Installation				\$340,000
Injection Well Installation: 34 stainless steel wells (17 nested well pairs), screened 15 feet. Drilling, materials, per diem, decontamination, permits, IDW management, drums included.				
	LS	\$9,000	34	\$306,000
Drilling oversight (one staff professional)	Day	\$1,000	34	\$34,000
Injection Treatment System				\$207,500
Trenching, piping, backfill, resurfacing	LF	\$55	1000	\$55,000
Instrumentation and Piping Conveyance	LS	\$25,000	1	\$25,000
Equalization Tank	LS	\$7,500	1	\$7,500
Reagent Feed System/Tanks/Pumps/Filters	LS	\$20,000	1	\$20,000
Static Mixers	LS	\$5,000	2	\$10,000
Control Panel/Telemetry	LS	\$50,000	1	\$50,000
Building, piping, valves, fittings, other misc. equipment	LS	\$10,000	1	\$10,000
Electrical Install and Start Up	LS	\$30,000	1	\$30,000
Personnel Oversight Costs				\$72,900
On-site resident construction engineer	Day	\$1,000	54	\$54,000
Truck, Health & Safety Monitoring Equipment, Expendables	Day	\$350	54	\$18,900
Project Management and Administrative				\$86,540
Project Management and Administrative (10% of capital cost)	LS	\$86,540	1	\$86,540
Project Management Subtotal				\$86,540
Total Capital Investment for In Situ Groundwater Treatment				\$951,940
Operation and Maintenance Costs for ERD				
Task Description	Unit	Unit Cost	Quantity	Total
Annual Performance Monitoring Program Costs				
Quarterly Monitoring for 7 Years (costs below include 4 full rounds of sampling of 22 wells including two duplicates and one field blank per round).				
Labor & Materials (\$1,600 for two persons)	Day	\$1,600	3	\$4,800
Laboratory Sampling Costs	sample	\$130	25	\$3,250
Groundwater Sampling Kit, Truck, Expendables	Day	\$200	3	\$600
Monitoring Cost Per Event				\$8,650
Annual Report/Regulatory Interfacing	LS	\$12,000	1	\$12,000
Annual Monitoring/Reporting Subtotal - Years 1 through 7				\$46,600
7-Year Total				\$326,200
SemiAnnual Monitoring for 5 Years (costs below include 2 full rounds of sampling of 22 wells including two duplicates and one field blank per year).				
Labor & Materials (\$1,600 for two persons)	Day	\$1,600	3	\$4,800
Laboratory Sampling Costs	sample	\$130	25	\$3,250
Groundwater Sampling Kit, Truck, Expendables	Day	\$200	3	\$600
Monitoring Cost Per Event				\$8,650
Annual Report/Regulatory Interfacing	LS	\$12,000	1	\$12,000
Annual Monitoring/Reporting Subtotal - Years 8 through 12				\$29,300
5-Year Total				\$146,500
Annual Monitoring for 3 Years (costs below include 1 full round of sampling of 22 wells including two duplicates and one field blank per year).				
Labor & Materials (\$1,600 for two persons)	Day	\$1,600	3	\$4,800
Laboratory Sampling Costs	sample	\$130	25	\$3,250
Groundwater Sampling Kit, Truck, Expendables	Day	\$200	3	\$600
Monitoring Cost Per Event				\$8,650
Annual Report/Regulatory Interfacing	LS	\$12,000	1	\$12,000
Annual Monitoring/Reporting Subtotal - Years 13 through 15				\$20,700
3-Year Total				\$62,100

Table 2
Cost Estimate for Final Remedy
7th Avenue and Bethany Home Road WQARF Site, Phoenix, Arizona

Annual Operation and Maintenance				
Carbon Substrate (includes shipping)	LS	\$40,000	1	\$40,000
Injection Labor, Miscellaneous O&M Expenses:	LS	\$50,000	1	\$50,000
Subtotal Annual O&M				\$90,000
7-Year Total				\$630,000
Project Management and Administrative (PMA)				
Project Management and Administrative (PMA) - Years 1 through 7	LS	\$13,700	7	\$95,900
Project Management and Administrative (PMA) - Years 8 through 12	LS	\$2,900	5	\$14,500
Project Management and Administrative (PMA) - Years 13 through 15	LS	\$2,100	3	\$6,300
Total Project Management and Administrative (PMA)				\$116,700
Total Operation and Maintenance Costs for ERD				\$1,281,500
Remedy Effectiveness Reporting - Every 5 Years				
Remedy Effectiveness Report - Year 5	LS	\$8,500	1	\$8,500
Remedy Effectiveness Report - Year 10	LS	\$8,500	1	\$8,500
Remedy Effectiveness Report - Year 15	LS	\$8,500	1	\$8,500
Total Effectiveness Reporting				\$25,500
SRP Wellhead Treatment Contingency				
Task Description	Unit	Unit Cost	Quantity	Total
Capital Investment for Treatment System				
Administrative/Regulatory/Purchase/Installation/Construction				
System work plans, design, specifications, permitting, and documents	LS	\$30,200	1	\$30,200
2 GAC Canisters (20,000 lbs.)	LS	\$50,000	2	\$100,000
Piping/Controls/Ancillary Supplies	LS	\$225,000	1	\$225,000
Concrete Slab Consturction	LS	\$10,000	1	\$10,000
Installation/startup	LS	\$285,000	1	\$285,000
Purchase/Installation Subtotal				\$650,200
Monitoring/Profiling/Oversight				
Labor & Materials	Day	\$1,600	20	\$32,000
Laboratory Sampling Costs	sample	\$130	60	\$7,800
Groundwater Sampling Kit, Truck, Expendables	Day	\$100	20	\$2,000
Annual Report/Regulatory Interfacing	LS	\$12,000	10	\$120,000
Data Management/Administration	LS	\$10,000	10	\$100,000
Semiannual Sampling/Reporting Subtotal - Years 5 through 15				\$261,800
Carbon Change-out				
Carbon Replacement	LS	\$30,000	5	\$150,000
Labor	LS	\$3,500	5	\$17,500
Subtotal Annual O&M				\$167,500
Site Closure Cost				
Task Description	Unit	Unit Cost	Quantity	Total
Well Abandonment inc. Permitting, Surface Restoration	LS	\$89,100	1	\$89,100
Remediation System Demolition, Site Restoration	LS	\$20,000	1	\$20,000
Personnel Oversight Costs	Day	\$1,000	12	\$12,000
Site Closeout Documents	LS	\$8,500	1	\$8,500
Project Management and Administrative (10% of closure cost)	LS	\$12,960	1	\$12,960
Total Closure Cost				\$142,560
Total Cost of Remedy				\$2,401,500
Total Cost of SRP Wellhead Treatment Contingency				\$1,079,500
Total Cost of Remedy WithSRP Wellhead Treatment Contingency				\$3,481,000
Notes:				
LS = lump sum				

FIGURES



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- Legend**
-  Shallow Monitoring Well
 -  Deep Monitoring Well
 -  SRP Well
 -  Private Well
 -  City of Phoenix Well 58 (55-626549)
 -  Estimated PCE Plume Boundary
 -  Dashed Where Inferred

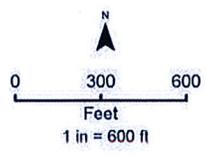


Figure 1
Site Map with Existing Wells,
and Estimated Plume Boundary
7th Ave & Bethany Home Rd
WQARF Site

Source:
 Project Features: ARCADIS 2014
 Imagery: Source: Esri, DigitalGlobe, GeoEye, Earthstar

P:\Projects\ADFO\448822 - Tucson - Batemary-Home\Fig. 0 - Technical\3 - Maps - Photos\GIS\mxd\Bayless-WellNetwork.mxd



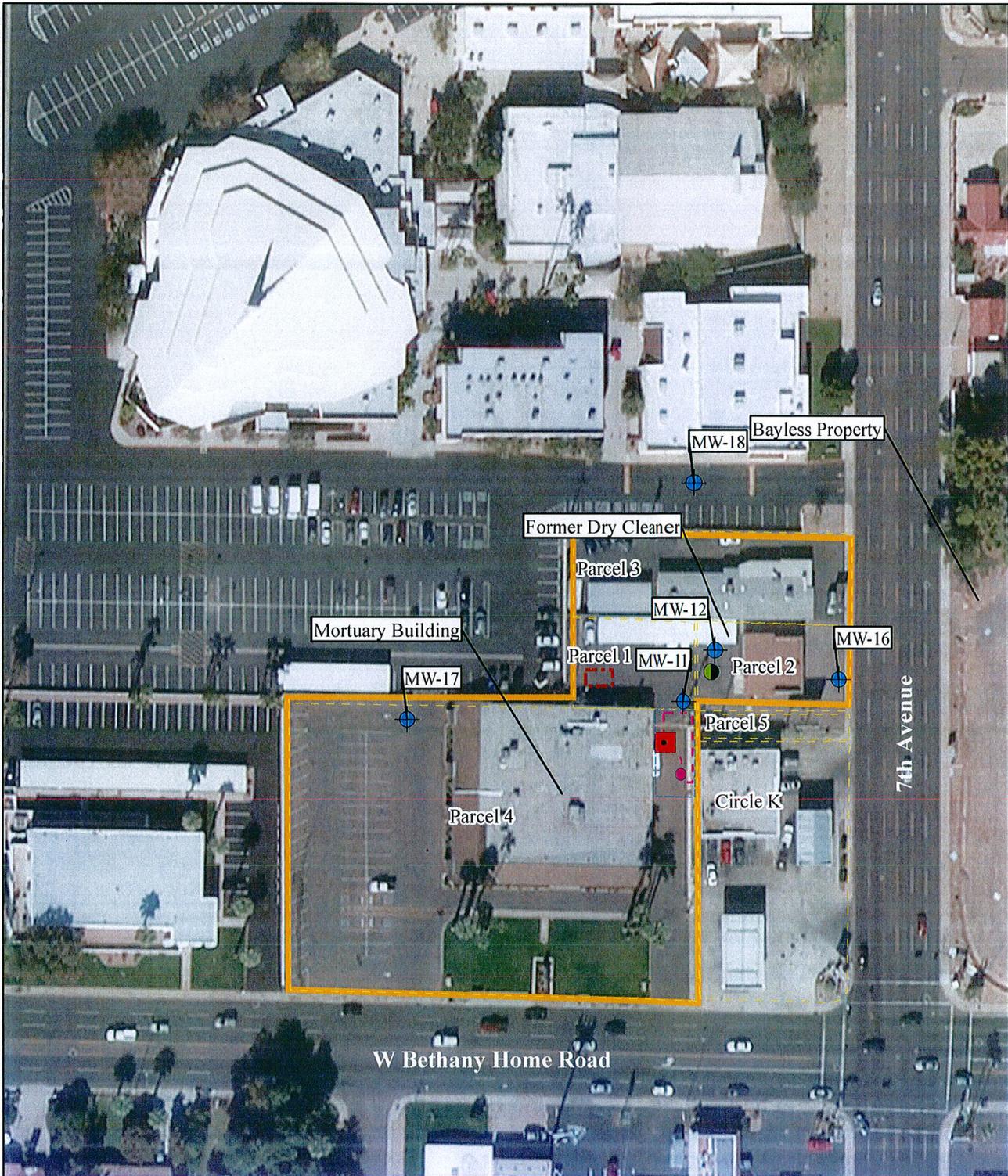
Legend

- Groundwater Monitoring Well
- ▲ Groundwater Injection Well
- Former Buildings
- General Groundwater Direction
- Septic Piping

0 30 60
 Feet
 1 in = 60 ft

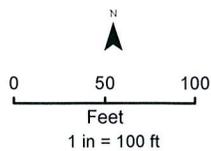
Figure 2
Site Map with Monitoring Well Network (Bayless Property)
 7th Ave & Bethany Home Rd
 WQARF Site

Source:
 Project Features: ARCADIS 2014
 Imagery: Source: Esri, DigitalGlobe,



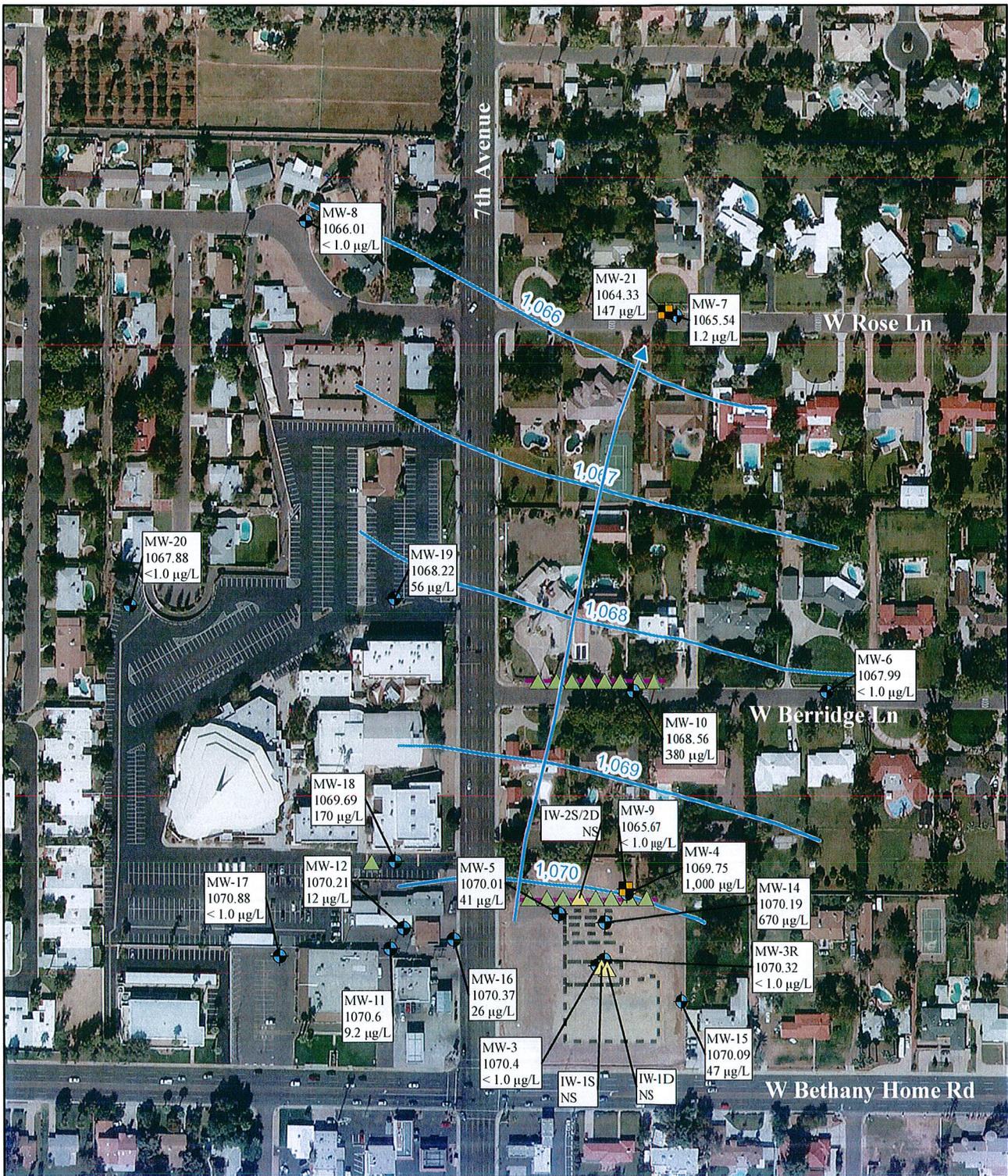
Legend

- Property Boundary
- Former Septic System Area
- + Monitoring Well
- Limits of Excavation
- Former Seepage Pit
- Former Tank Pit
- Former Septic Tank
- Dry Well



Source:
 Project Features: ARCADIS 2014
 Imagery: Source: Esri, DigitalGlobe, GeoEye,
 Earthstar Geographics, CNES/Airbus DS,

Figure 3
Site Map with Monitoring Well
Network (SCI Property)
 7th Ave & Bethany Home Rd
 WQARF Site



Legend

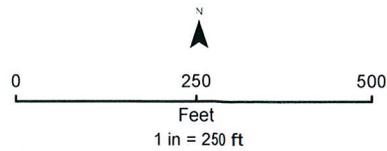
- Shallow Monitoring Well
- Deep Monitoring Well
- Existing Injection Well
- Proposed Nested Injection Well
- Proposed Injection Transect
- March 2014 Groundwater Elevation Contours (ft amsl)
- Former Buildings
- General Groundwater Direction

Monitor Well Name	March 2014 Groundwater Elevation (ft amsl)	PCE Concentration (µg/L)
MW-3	1075.20	250 µg/L

Data for MW-20 and MW-21 are based on the February 2016 sampling event.
 NS = Not Sampled

Figure 4

**Recommended Design for Alternative 1:
 In Situ Enhanced Reductive Dechlorination
 with Monitored Natural Attenuation
 7th Ave & Bethany Home Rd
 WQARF Site**



Source:
 Project Features: ARCADIS 2014
 Imagery: Source: Esri, DigitalGlobe,
 GeoEye, Earthstar Geographics,
 CNES/Airbus DS, USDA, USGS, AEX,

APPENDIX A

WRITTEN COMMENTS TO PROPOSED REMEDIAL ACTION PLAN

**COMMENTS
BY
PAUL THOMAS COX, CAB MEMBER
ON**

**7TH AVENUE AND BETHANY HOME ROAD WATER QUALITY
ASSURANCE REVOLVING FUND (WQARF) SITE PROPOSED
REMEDIAL ACTION PLAN (PRAP)**

Sections 5.1, 5.2 & 5.3 adequately cover technical remedial objectives for land, groundwater and surface water use. However, each should also contain a statement as follows:

- Protect through continuous adherence to EPA standards and compliance with ARARs so that future contamination does not reoccur at this site.

NOTE: Since the objective of this PRAP is to present remedial requirements over time to an interested public body, thus a reminder that institutional standards must be maintained at a high level. This is particularly relevant in AZ where any federal action is often seen as infringing on state's rights. Having been involved in many river basin and watershed studies, state and international boundaries are not relevant to movement of underground and surface water as well as contaminants.

NOTE: A comment on English composition of ADEQ and AZ government reports in general. There are several hundred unnecessary 'the' in these reports. This may seem trivial but a historical and cost perspective may prove otherwise as follows:

- Historical: In the 17th & 18th centuries there were many 'the' & 'thou' in old English. By the end of the 18th fortunately mostly 'thou' had been eliminated. Also, the British Empire brought foreign translators paid by the word so excess 'the' became the norm as profitable. USAID unfortunately continue this as few multi lingual Americans.
- Cost: Currently professionals and contractors charging or calculating cost per page continue excess 'the' as profitable. However, now that everything is electronically stored with accompanying charges, it saves government and taxpayers to create efficiencies through elimination of useless 'the'. Storage costs continue to add up forever!
- The basic new or business English is to eliminate all 'the' before action words, that is adjectives and adverbs or strings thereof.
- Please note writing on this page contains no excess 'the', then note all the useless 'the' in reviewed report using this new criteria.

04-24-2015



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May 27, 2015

VIA E-MAIL: lanson.nimeesha@azdeq.gov, anthony.young@azag.gov,
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Re: *Comments from Bayless Investment & Trading Company*

Dear Nimeesha, Anthony, and Scott:

I am writing to you today on behalf of Bayless Investment & Trading Company (BIT) to comment on ADEQ's proposed Remedial Action Plan for the 7th Avenue and Bethany Home Road WQARF Site. We are pleased to note that the Department has carefully considered three distinct remedial alternatives and has explained its reasons for selecting the Proposed Remedy. BIT has followed all of ADEQ's efforts closely and supports continued aggressive action at the Site. We understand that the agency faces WQARF funding shortfalls for the next fiscal year, but we hope that you will be able to fund as much of the proposed work for this Site as is possible.

BIT has been generous in its provision of access to the BIT property for ADEQ's remediation efforts. But we hope that ADEQ's remediation can be concluded

JENNINGS, HAUG
& CUNNINGHAM, L.L.P.

Ms. Nimeesha B. Lanson
Mr. Anthony E. Young
Mr. Scott Goodwin
May 27, 2015
Page 2

expeditiously so that BIT's unrestricted access can be restored. As in the past, we would like to meet with you before ADEQ's installation of any new equipment on the BIT property to understand the impact the installation might have on future use and development of the property, and to help analyze any alternative configurations that would have the least impact.

Thank you for confirming that the Department considered all of the PRP information that BIT provided to you between 2000 and 2005. BIT has no further information about liable parties that it can provide at this time.

Please continue to keep us informed about activities at the Site. We will continue to attend any Community Advisory Board meetings. And we thank you once again for all of your efforts to address this Site.

Very truly yours,



Karen S. Gaylord

KSG

cc: Arthur E. Romley, Arthur E. Romley Attorney at Law
Linda K. Bayless, Bayless Investment & Trading Company