



**MONTGOMERY
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Water Resource Consultants

Implementation Plan

September 25, 2009

Prepared for:

Gallagher & Kennedy, P.A.

Roosevelt Irrigation District Groundwater Response Action

West Van Buren Water Quality Assurance
Revolving Fund Site

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September 25, 2009
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**ROOSEVELT IRRIGATION DISTRICT
GROUNDWATER RESPONSE ACTION IMPLEMENTATION PLAN
WEST VAN BUREN WATER QUALITY ASSURANCE REVOLVING FUND SITE**

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**ROOSEVELT IRRIGATION DISTRICT
GROUNDWATER RESPONSE ACTION IMPLEMENTATION PLAN
WEST VAN BUREN WATER QUALITY ASSURANCE REVOLVING FUND SITE**

EXECUTIVE SUMMARY

This document presents a preliminary evaluation of and conceptual implementation plan for a groundwater response action to address extensive groundwater contamination in the West Van Buren Area (WVBA) Water Quality Assurance Revolving Fund (WQARF) Site (the WVBA Site) that currently impacts or threatens to impact Roosevelt Irrigation District (RID) wells, its operations, and the unrestricted use of its water supply (**Figure ES-1**). In accordance with Arizona statute and rule¹, a reasonable, economical, and technically feasible groundwater response action is required to prevent further groundwater contamination; protect public health, welfare and the environment; eliminate public exposure pathways to contaminated groundwater; and restore groundwater quality to acceptable levels that meet all reasonably foreseeable beneficial uses for all water users and providers.

RID, the largest water provider in the WVBA Site, currently operates 31 large capacity groundwater production wells and a water conveyance system within the WVBA Site (**Figure ES-1**). Approximately 75,000 acre-feet per year of groundwater are pumped from these wells and conveyed to RID's service area west of the Agua Fria River (**Figure ES-2**). Approximately half of this groundwater production comes from over 20 RID

¹ See A.R.S. 49-282.06.A.2, 49-282.06(B)(4)(b) and A.A.C. R18-16-407.G

production wells that are currently impacted by hazardous substances in the contaminated groundwater. Pursuant to federal and state authority, RID is pursuing this groundwater response action to mitigate the adverse impacts to its wells, operations, and water uses. The capital and operating costs of this groundwater response action are the legal liability of those parties that released or threaten to release hazardous substances that are the subject of the groundwater response action. This groundwater response action implementation plan has been prepared by Montgomery & Associates under the direction of RID's legal counsel Gallagher & Kennedy, P.A.

The specific objectives of this document are to:

- Summarize an abbreviated conceptual site model for the WVBA Site that demonstrates the need for a groundwater response action to mitigate the adverse impacts caused by the contamination and adverse impacts to RID wells, its operation, and its water uses.
- Demonstrate that a groundwater response action that uses RID's wells, conveyances, and easements (designated as the "RID Groundwater Response Action (GRA)") is the most logical, efficient, and economical approach, or "**reference remedy**" for the WVBA Site based on a preliminary analysis conducted in accordance and consistent with Arizona Administrative Code (A.A.C.) R18-16-407 and the federal National Contingency Plan (NCP) (40 CFR, Chapter 1, §300.430) for feasibility studies.
- Demonstrate that the RID GRA fully complies with the remedial objectives specified in Arizona Revised Statute (A.R.S.) 49-282.06 and is consistent with the NCP as specified in 40 CFR, Chapter 1, §300.430 and, therefore, meets all of the requirements for selection as the **preferred final remedy** for the WVBA Site.
- Establish a plan to expedite implementation of the RID GRA for the WVBA Site that includes an **Early Response Action (ERA)** conducted in accordance with A.A.C. R18-16-405. The proposed ERA would be implemented immediately and

in parallel with completion of the feasibility study, proposed remedial action plan, and record of decision (collectively designated as the “administrative requirements”) associated with the selection of the final groundwater remedy as defined in Article 4 (Remedy Selection) of A.A.C. R18-16. Given the apparent preferred status of the RID GRA, this plan proposes a **streamlined approach** to meet the administrative requirements for final remedy selection. This streamlined approach will focus the required analysis, reduce the level of agency effort on review and approvals, effectively incorporate input from the community, and facilitate earlier implementation of the final groundwater remedy.

- Provide the **written rationale** for the ERA in accordance with provision C of A.A.C. R18-16-405 and be consistent with the goals of the Superfund Accelerated Cleanup Model (EPA, 1992).
- Present an overview of the **Work Plan** for the ERA, which has been prepared under separate cover in accordance with provision D of A.A.C. R18-16-405 and will be submitted to the Arizona Department of Environmental Quality (ADEQ) in September 2009.
- Present an accelerated implementation schedule for the RID GRA.

REGIONAL GROUNDWATER CONTAMINATION

Extensive regional groundwater contamination exists in the City of Phoenix from approximately 52nd Street to 75th Avenue between Lower Buckeye Road and Campbell Avenue (**Figure ES-2**). Contaminated groundwater west of 7th Avenue and south of McDowell Road is associated with the WVBA Site and is managed by ADEQ. Contaminated groundwater north of McDowell Road between 27th Avenue and 51st Avenue is associated with the West Central Phoenix WQARF Site (WCP Site) and is also managed by ADEQ. Contaminated groundwater east of 7th Avenue is associated with the Motorola

52nd Street Superfund Site (52nd Street Site) and is managed by the U.S. Environmental Protection Agency (EPA).

Numerous potentially responsible parties (PRPs) have been identified in the WVBA Site, the 52nd Street Site, and the WCP Site where subsurface contamination is documented and where historical, current and threatened releases are suspected to represent past and ongoing sources to the regional groundwater contamination (ADEQ, 2008a, b, and c). The 52nd Street Site is subdivided into three operable units (OUs) (**Figure ES-2**). Groundwater pump and treat systems are currently operating in OU1 and OU2 to address the groundwater contamination². A groundwater response action has not been implemented in OU3. The WCP Site is subdivided into 5 operable units that correspond to distinct groundwater contamination plumes that have been delineated. To date, groundwater response actions to address the site-wide contamination have not been implemented in the WCP Site (ADEQ, 2008c). The available water quality data for the WVBA Site and assertions by ADEQ in the draft RI report indicate that contaminated groundwater continues to migrate from the 52nd Street Site and the WCP Site to the WVBA Site (Terranext, 2008a)³.

In October 2008, ADEQ published the draft remedial investigation (RI) report for the WVBA Site (Terranext, 2008a). The RI characterized the hydrogeologic conditions, delineated the nature and extent of groundwater contamination, and identified the potential sources of the groundwater contamination based on an extensive regional investigation conducted by ADEQ and numerous facility-specific investigations conducted by the PRPs over the past 20 years. This Implementation Plan summarizes the RI results that are relevant to the proposed groundwater response action. The public comment period on the draft RI report is over and the next step in the remedy selection process for the WVBA Site is to develop the remedial objectives. Recent shortfalls in State revenue have limited the resources available to ADEQ which, in turn, is expected to adversely impact progress on the remedy selection process for the WVBA Site.

² Groundwater contamination may have migrated from OU1 and OU2 to the WVBA Site before groundwater response actions were initiated.

³ The results of the draft RI for the WVBA Site indicated that trichloroethene, 1,1-dichloroethene, and other volatile organic compounds appear to be migrating from the 52nd Street Site and WCP Sites to the WVBA Site (Terranext, 2008a).

The primary contaminants of concern (COC) in groundwater in the WVBA Site are volatile organic compounds (VOCs). The primary VOCs detected in groundwater in the WVBA Site are tetrachloroethene, trichloroethene, and 1,1-dichloroethene⁴. To a lesser extent, chromium is also considered a COC. Methyl tertiary butyl ether (MTBE) is also detected in groundwater in the vicinity of the Phoenix Fuel Terminal (Terranext, 2008a). Groundwater pumped from over 20 RID wells has detectable levels of these COCs, including two wells with MTBE. Most of these wells are impacted by COCs at levels that exceed Arizona Aquifer Water Quality Standards.

REMEDIAL OBJECTIVES

A sufficient understanding of site conditions, current and future water uses, and community expectations exists for the WVBA Site to develop preliminary remedial objectives (ROs). Accordingly, RID proposes the following ROs for the WVBA Site, which are consistent with the requirements of A.A.C., Title 18⁵.

1. Protect human health and the environment by reducing and eventually eliminating potential exposure to COCs in the groundwater;
2. Restore groundwater to meet all beneficial uses including potable supply;
3. Prevent further degradation of groundwater quality by COCs;
4. Minimize the relocation, transfer, and/or volatilization of COCs from groundwater to the environment;
5. Prevent impacts to RID wells that are currently not impacted;
6. Maintain plume containment by continuing to operate the RID wells;
7. Provide all water users, with particular emphasis on RID, a water source that meets the maximum anticipated beneficial use as drinking water;

⁴ Other hazardous substances detected in groundwater in the WVBA Site, WCP Site, and Motorola 52nd Street Site include benzene, toluene, ethylbenzene, xylenes, nitrate, vinyl chloride, 1,1,1-trichloroethane, cis-1,2-dichloroethene, 1,1-dichloroethane, and chloroform

⁵ See A.A.C. R-18-16-406(C)(I)

8. Maximize the beneficial use of the treated groundwater to support the goals and objectives of the Arizona Groundwater Management Act; and,
9. Provide long-term management of contaminated groundwater to improve the regional aquifer's suitability for potable use.

These preliminary ROs will be refined based on input from the community and other stakeholders during completion of the final RI report and before the feasibility study is prepared.

PROPOSED REFERENCE REMEDY

A proposed reference remedy, designated as the RID GRA, is presented in this Implementation Plan for the WVBA Site in accordance with the A.A.C.⁶. The proposed RID GRA was developed to achieve all proposed preliminary ROs and the remedial goals specified in Arizona statute⁷. **Figure ES-3** summarizes the remedial strategies, measures, and technologies considered during the development of the RID GRA. The RID GRA employs a “pump and treat” remedial approach that uses existing RID impacted wells, conveyances, and easements to the greatest extent possible. The highly favorably layout of the existing RID wells and conveyances with respect to the groundwater contamination provides unique opportunities to develop an efficient and economical regional groundwater remedy in the WVBA Site.

Table ES-1 summarizes a preliminary analysis of the RID GRA in accordance with the A.A.C.⁸ As summarized in **Table ES-1** and discussed in greater detail in the complete Implementation Plan, the RID GRA is the preferred alternative because it is a comprehensive, economical, and technically feasible response action that achieves the ROs,

⁶ See A.A.C. R18-16-407(E)

⁷ See A.R.S. 49-282.06

⁸ See A.A.C. R18-16-407(H)

balances all aspects of the evaluation criteria, and fully complies with the remedial goals specified in Arizona statute.

Figure ES-4 depicts the proposed RID GRA layout. At full build out, the RID GRA would include: 1) a nominal 20,000 gallon per minute regional groundwater pump and treat system comprised of a new central liquid-phase granular activated carbon treatment facility and required appurtenances, 10 existing impacted RID wells, approximately 8 miles of existing RID conveyances, approximately 4 miles of new below-grade pipelines, and 2) supplemental treatment of impacted groundwater from four additional RID wells using air stripping and/or blending combined with active wellfield management to reduce VOC concentrations in water conveyed to and within the RID Main Canal to acceptable levels. The treated water from the new central groundwater treatment facility would be discharged to the RID Main Canal for irrigation use and/or conveyed to the west valley for potable use via a new pipeline constructed in existing RID easements along the RID Main Canal. During Phase 1, RID would coordinate with the Arizona Department of Water Resources to obtain and potentially operate the remediation system under a Poor Quality Groundwater Withdrawal Permit. The estimated 30-year net present value of capital and operation and maintenance costs for the RID GRA ranges from approximately \$123,000,000 to \$172,000,000.

The RID GRA would be implemented in 2 phases. **Table ES-2** identifies the RID wells proposed for each phase and summarizes the estimated rates of groundwater extraction, current total VOC concentrations, and the estimated VOC mass removal for each phase. Phase 1 of the RID GRA, which comprises a nominal 20,000 gallon per minute pump and treat operation, is estimated to remove over 5,700 pounds of VOCs during the early years of operation. The estimated 30-year net present value of capital and operation and maintenance costs for Phase 1 of the RID GRA ranges from approximately \$111,000,000 to \$130,000,000. The need for and scope of Phase 2 of the proposed RID GRA will be determined based on the degree to which Phase 1 achieves the ROs.

EARLY RESPONSE ACTION

Phase 1 of the RID GRA will be completed as an **ERA** in accordance with the A.A.C. (**Figure ES-5**)⁹. The rationale for the ERA and an overview of the ERA Work Plan are provided in the Implementation Plan. The ERA Work Plan has been prepared under separate cover and will be submitted to ADEQ in September 2009. Initiation of the ERA, which can begin immediately after approval from ADEQ and before the formal remedy selection process is completed, is needed to prevent further degradation of groundwater, protect RID wells not currently impacted, begin the regional groundwater restoration and, most importantly, begin to mitigate the adverse impact of the groundwater contamination on RID's operation. To this end, it is envisioned that approval of the ERA from ADEQ will be obtained in 2009 and implementation will occur over the ensuing 12 to 18 months.

IMPLEMENTATION PLAN

Implementation of the RID GRA will include immediate initiation of the ERA after approval of the Work Plan by ADEQ and once sufficient response action costs are available from the PRPs. In parallel with the ERA, efforts will commence on the administrative requirements (i.e., the feasibility study followed by the proposed remedial action plan) for selection of the final groundwater remedy for the WVBA Site. These administrative requirements will be conducted under a cooperative agreement with ADEQ in accordance with the A.A.C. and in a manner consistent with the federal NCP, relevant federal Superfund guidance and federal statute. It is envisioned that the effort required to complete these administrative requirements can be streamlined in light of the unique synergy that exists between the primary harmed party, RID, and the favorable disposition of its wells, conveyances, and easements as the foundation of an efficient and economical regional groundwater response action. RID will work closely with ADEQ and other stakeholders to

⁹ See A.A.C. R-18-16-405

develop this streamlined approach, which will focus the necessary analyses, effectively involve the community and other stakeholders, and ultimately lead to a regional groundwater response action that addresses one of the largest groundwater contamination plumes in the United States and provides a secure source of remediated water that can be used for all beneficial uses including potable supply.

TABLE ES-1
PRELIMINARY ANALYSIS OF ROOSEVELT IRRIGATION DISTRICT GROUNDWATER RESPONSE ACTION

ROOSEVELT IRRIGATION DISTRICT
GROUNDWATER RESPONSE ACTION IMPLEMENTATION PLAN
WEST VAN BUREN WATER QUALITY ASSURANCE REVOLVING FUND SITE

REMEDIAL ALTERNATIVE	REMEDIAL STRATEGIES	REMEDIAL MEASURES	REMEDY COMPONENTS	REMEDIAL OBJECTIVE ACHIEVEMENT	CONSISTENCY WITH LAND AND WATER USE PLANS	COMPARISON CRITERIA			
						Practicability	Risk	Benefit	Estimated Cost
<p>Reference Remedy: Roosevelt Irrigation District (RID) Groundwater Response Action</p> <p>Phase 1 - Early Response Action - nominal 20,000 gallon per minute (gpm) extraction and treatment system</p> <p>Phase 2 - Supplemental Response Actions - manage operation of remaining impacted RID wells to maintain contaminants of concern (COC) concentrations below AWQSSs or other appropriate standards through treatment, blending, and/or priority pumping</p>	<p>Plume Remediation, Plume Containment, Source Control, and Monitoring</p> <p><i>note: assumes source control in the West Van Buren Area (WVBA) Site is conducted by potentially responsible parties (PRPs) and sources upgradient of the WVBA Site are addressed under Federal Superfund Program by the Environmental Protection Agency (EPA).</i></p>	<p>Groundwater extraction; impacted water conveyance; central, local, and/or wellhead treatment; treated water discharge for all beneficial uses; sampling, lab analysis, and reporting</p>	<p>Treat impacted groundwater from up to 16 existing RID production wells; wellhead improvements; use approximately 8 miles of existing RID pipelines/canals; install approximately 4 miles of new below-grade pipelines; construct and operate a new nominal 20,000 gpm central groundwater treatment facility using granular activated carbon; construct and operate local and/or wellhead treatment systems using air stripping with sufficient capacity to meet discharge goals in a coordinated program of treatment, blending, and/or priority pumping; obtain operating permit; monitor system performance and report results</p>	<p>Expected to achieve all preliminary ROs by removing COCs through extraction and treatment; protects human health and environment; prevents public exposure to COCs in groundwater; restores groundwater quality; prevents further groundwater contamination and protects unimpacted RID wells via source control and hydraulic plume containment; limits volatilization of VOCs from groundwater to air; results in a secure source of remediated water that is acceptable for all beneficial uses through permitted treatment, monitoring, and discharge</p>	<p>Minimal impact on land use in WVBA Site because remedy uses largely existing RID infrastructure; new pipelines will be installed in existing RID easements or new easements on public or private property; treatment facilities will likely require permits, property purchases or long-term access agreements; remedy consistent with all water use plans by restoring groundwater quality to meet all beneficial uses; significant declines in regional water levels not expected based on historical data</p>	<p>High degree of practicability; remedy uses existing infrastructure to the greatest extent possible; uses effective technologies that are proven and reliable; permits and access for new infrastructure can likely be obtained; professional services to design, construct, and operate remedy are available</p>	<p>Risks to public are effectively managed; remedy protects human health and environment over long-term through containment of impacted groundwater, extraction, and treatment; residual risk during remedy implementation and after remedy completion manageable; monitoring will ensure compliance with applicable State and Federal water quality standards</p>	<p>High degree of benefit; remedy restores groundwater quality; reduces risk to public and environment through treatment; mitigates impact on RID's operation and water supply and protects unimpacted wells; high degree of public acceptance expected; treated water available as a secure source of high quality water</p>	<p>PHASE 1 Capital Cost: \$34 MM Annual O&M Cost: \$4 - \$5 MM 30-Year NPV O&M Cost: \$77 - \$96 MM Total Cost: \$111 - \$130 MM</p> <p>PHASE 2 Capital Cost: \$5 - \$13 MM Annual O&M Cost: \$0.4 - \$1.5 MM 30-Year NPV O&M Cost: \$8 - \$29 MM Total Cost: \$13 - \$42 MM</p> <p>TOTAL Capital Cost: \$39 - \$47 MM Annual O&M Cost: \$4.4 - \$5.5 MM 30-Year NPV O&M Cost: \$85 - \$125 MM Total Cost: \$124 - \$172 MM</p>

Footnotes:
MM - Millions of dollars
O&M - Operation and maintenance
NPV = Net present value

**TABLE ES-2
SUMMARY OF PROPOSED ROOSEVELT IRRIGATION DISTRICT GROUNDWATER RESPONSE ACTION**

**ROOSEVELT IRRIGATION DISTRICT
GROUNDWATER RESPONSE ACTION IMPLEMENTATION PLAN
WEST VAN BUREN AREA WATER QUALITY ASSURANCE REVOLVING FUND SITE**

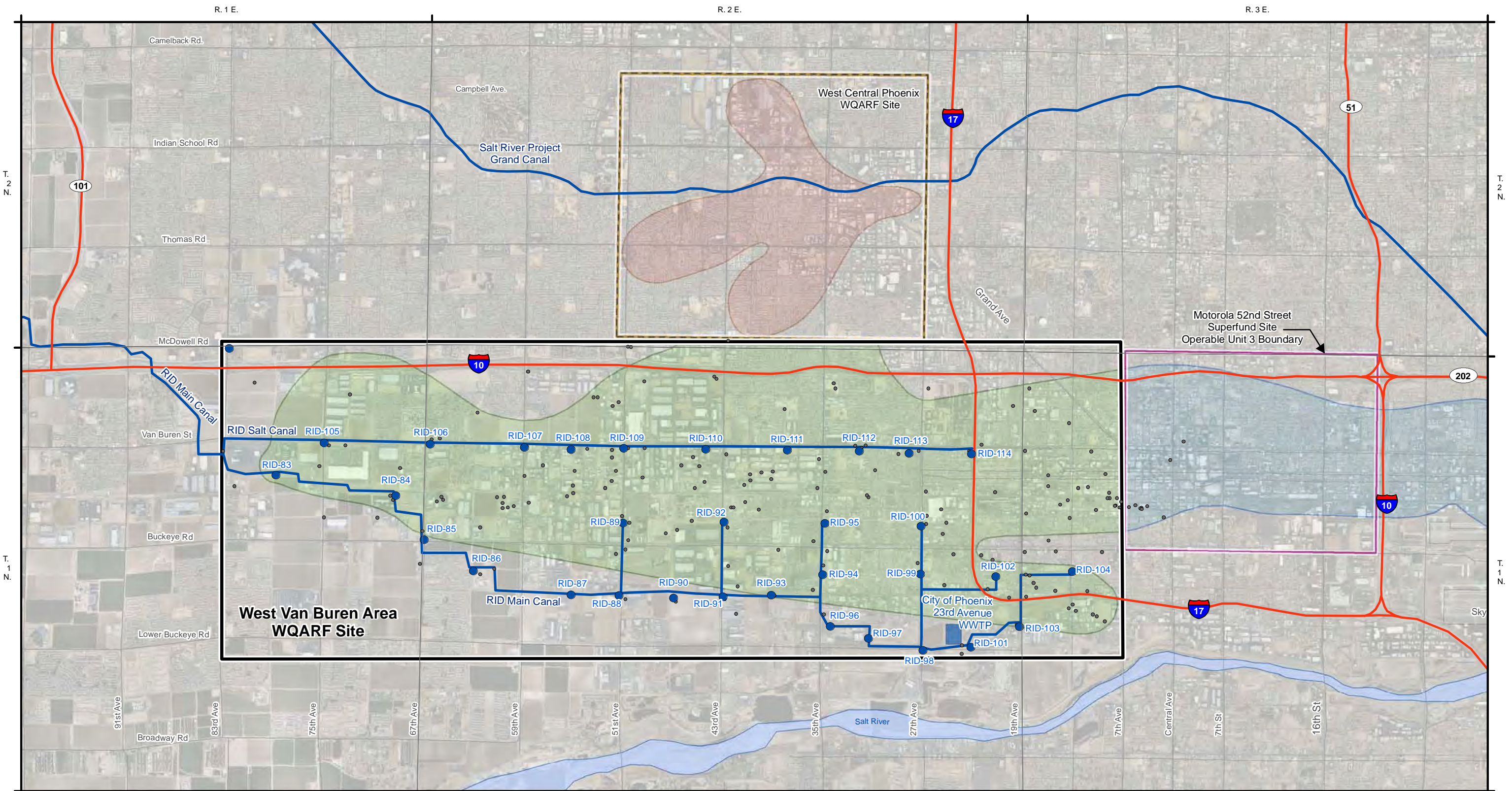
PHASE		WELL NAME	ESTIMATED PUMPING RATE (gallons per minute) ¹	TOTAL VOC CONCENTRATION (micrograms per liter) ²	ESTIMATED MASS OF TOTAL VOCs REMOVED (pounds per year) ³	
PHASE 1 EARLY RESPONSE ACTION	1A Pump and treat impacted groundwater from RID wells located along Van Buren Street	RID-105	1,900	5	44	
		RID-106	1,500	61	397	
		RID-107	2,100	51	464	
		RID-108	1,900	63	526	
		RID-109	2,400	22	234	
		RID-110	2,900	14	180	
		RID-112	1,700	31	231	
		RID-113	2,300	44	443	
		RID-114	2,500	110	1,202	
	SUBTOTAL		19,200	AVG ⁴	44	3,722
	1B Pump and treat impacted groundwater from RID wells with highest VOC concentrations	RID-89 ⁵	2,900	51	652	
		RID-92	1,200	119	624	
		RID-95 ⁵	1,700	80	593	
		RID-100	2,100	65	599	
		RID-106	1,500	61	397	
		RID-107	2,100	51	464	
		RID-108	1,900	63	526	
		RID-112	1,700	31	231	
		RID-113	2,300	44	443	
	RID-114	2,500	110	1,202		
SUBTOTAL		19,900	AVG ⁴	66	5,732	
PHASE 2 SUPPLEMENTAL RESPONSE ACTIONS Enhanced wellfield management to reduce VOC concentrations in impacted groundwater discharged to RID Main Canal to acceptable levels by treatment, blending, and/or priority pumping		RID-84	2,400	The degree of treatment required to meet the Phase 2 objectives is unknown at this time. For planning and cost estimating purposes, it was assumed that four low-profile air strippers would be constructed to treat impacted groundwater from RID wells 84, 99, 102, and 104. In this case, an estimated total of approximately 600 pounds of total VOCs would be treated annually from Phase 2 operations.		
		RID-99	2,400			
		RID-102	3,900			
		RID-104	3,600			
		RID-109 ⁶	2,400			
		RID-110 ⁶	2,900			
		RID-111	see note 7			
SUBTOTAL		17,600				
TOTAL (PHASES 1B AND 2)			37,500	AVG ⁴	35	5,732

Footnotes:

- 1 - Pumping rates based on data provided by RID for 2008 and 2009.
- 2 - Sum of all detected VOCs; concentrations based on most recent analytical data available for each well.
- 3 - Total VOC removal in early years of remedy assuming all impacted wells from Phase 1A and 1B are pumped continuously and all water is treated; actual mass removal may vary depending on demand for treated water.
- 4 - Pumping rate weighted average concentration in micrograms per liter assuming no loss due to volatilization or degradation.
- 5 - Pumping rates shown are 75% of reported rates; well testing and modification may be conducted to seal off lower portion of wells to optimize pumping of impacted groundwater.
- 6 - Wellhead and/or discharge infrastructure modifications may be required to blend impacted water from these wells with clean water from RID-88 and RID-91 before discharge to RID Main Canal.
- 7 - RID-111 is currently inoperable. A new replacement well may be drilled outside the plume to restore the lost water supply from RID-111 to RID.

Abbreviations:

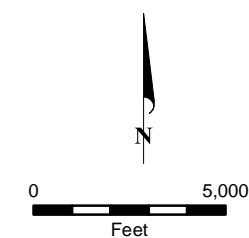
RID - Roosevelt Irrigation District
VOC - Volatile organic compounds



EXPLANATION

- Roosevelt Irrigation District Well
- Monitor Well
- Existing Canal or Pipeline
- Interstates
- Local Streets
- Estimated Extent of Impacted Groundwater in WVBA WQARF Site Based on 1st Quarter 2008 Data (Terranext, 2008a)
- Estimated Extent of Impacted Groundwater in West Central Phoenix WQARF Site
- Estimated Extent of Impacted Groundwater in Motorola 52nd Street Superfund Site

Abbreviations
 WVBA - West Van Buren Area
 WQARF - Water Quality Assurance Revolving Fund
 WWTP - Waste Water Treatment Plant
 RID - Roosevelt Irrigation District



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Roosevelt Irrigation District
 Groundwater Response Action
 Implementation Plan
 West Van Buren Area WQARF Site

Study Area


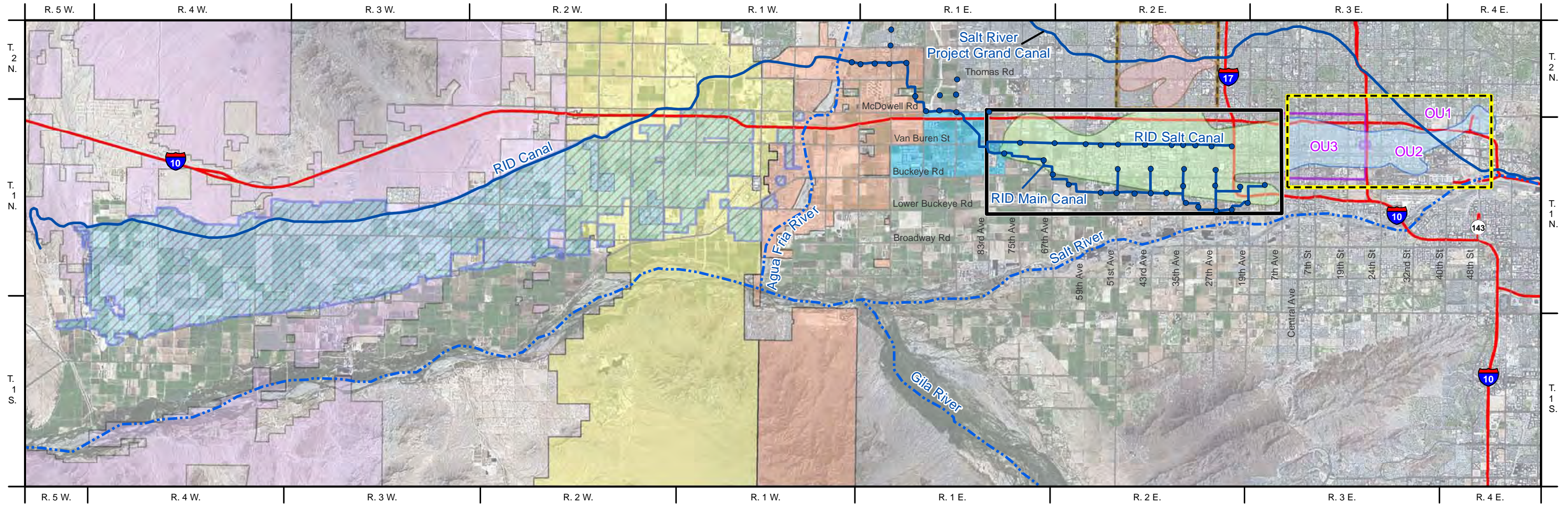















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FIGURE ES-1

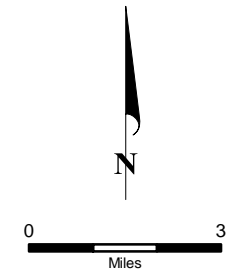


EXPLANATION

-  Roosevelt Irrigation District
-  City of Goodyear Boundary
-  City of Avondale Boundary
-  Town of Buckeye Boundary
-  City of Tolleson Boundary
-  Interstates
-  Local Streets
-  Roosevelt Irrigation District Well
-  West Van Buren WQARF Site
-  Motorola 52nd Street Superfund Site
-  West Central Phoenix WQARF Site
-  Estimated Extent of Impacted Groundwater in WVBA WQARF Site Based on 1st Quarter 2008 Data (Terranext, 2008a)
-  Estimated Extent of Impacted Groundwater in West Central Phoenix WQARF Site
-  Estimated Extent of Impacted Groundwater in Motorola 52nd Street Superfund Site

Abbreviations


- WQARF - Water Quality Assurance Revolving Fund
- OU - Operable Unit
- RID - Roosevelt Irrigation District



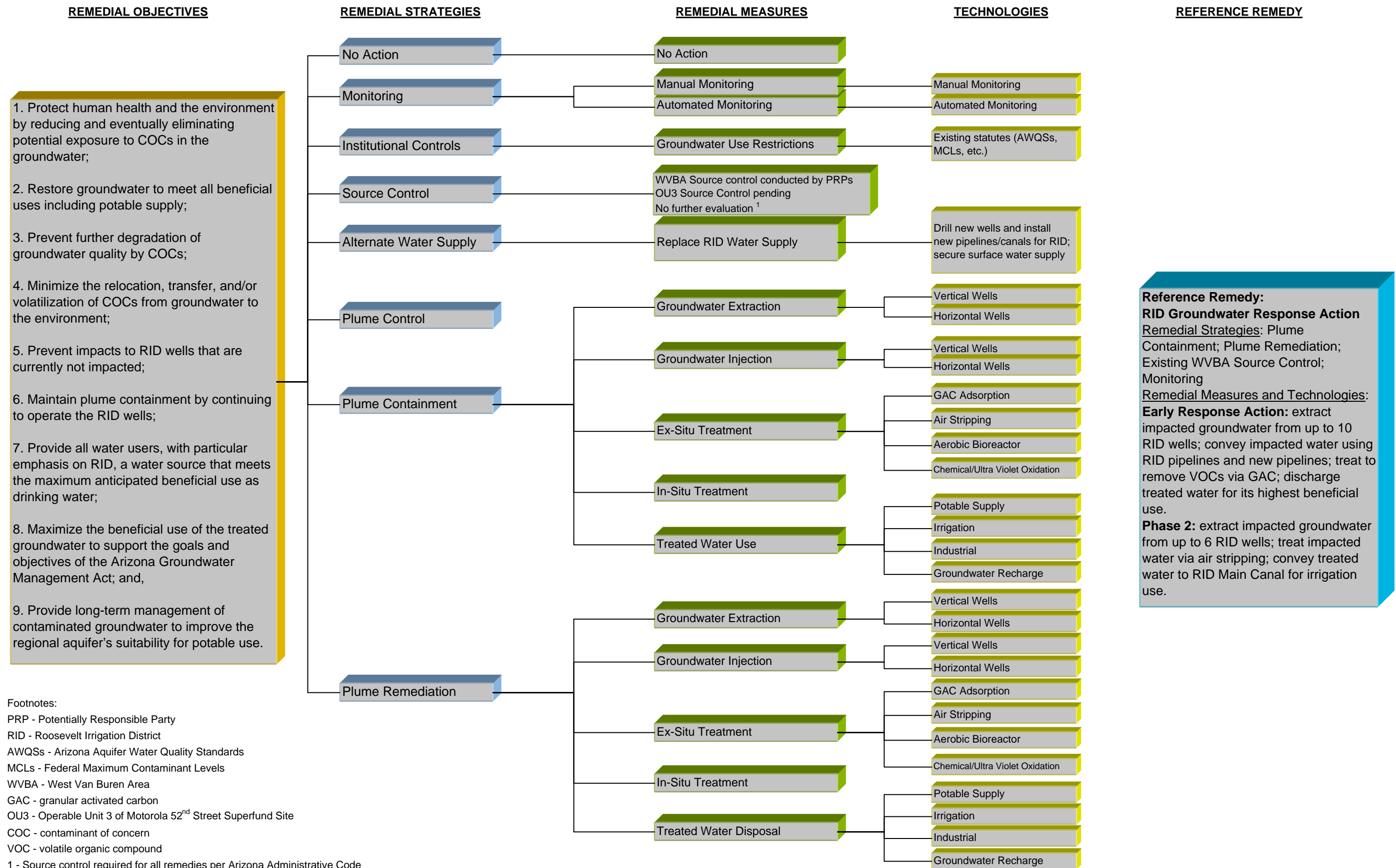
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Roosevelt Irrigation District
Groundwater Response Action
Implementation Plan
West Van Buren Area WQARF Site

Regional Conditions

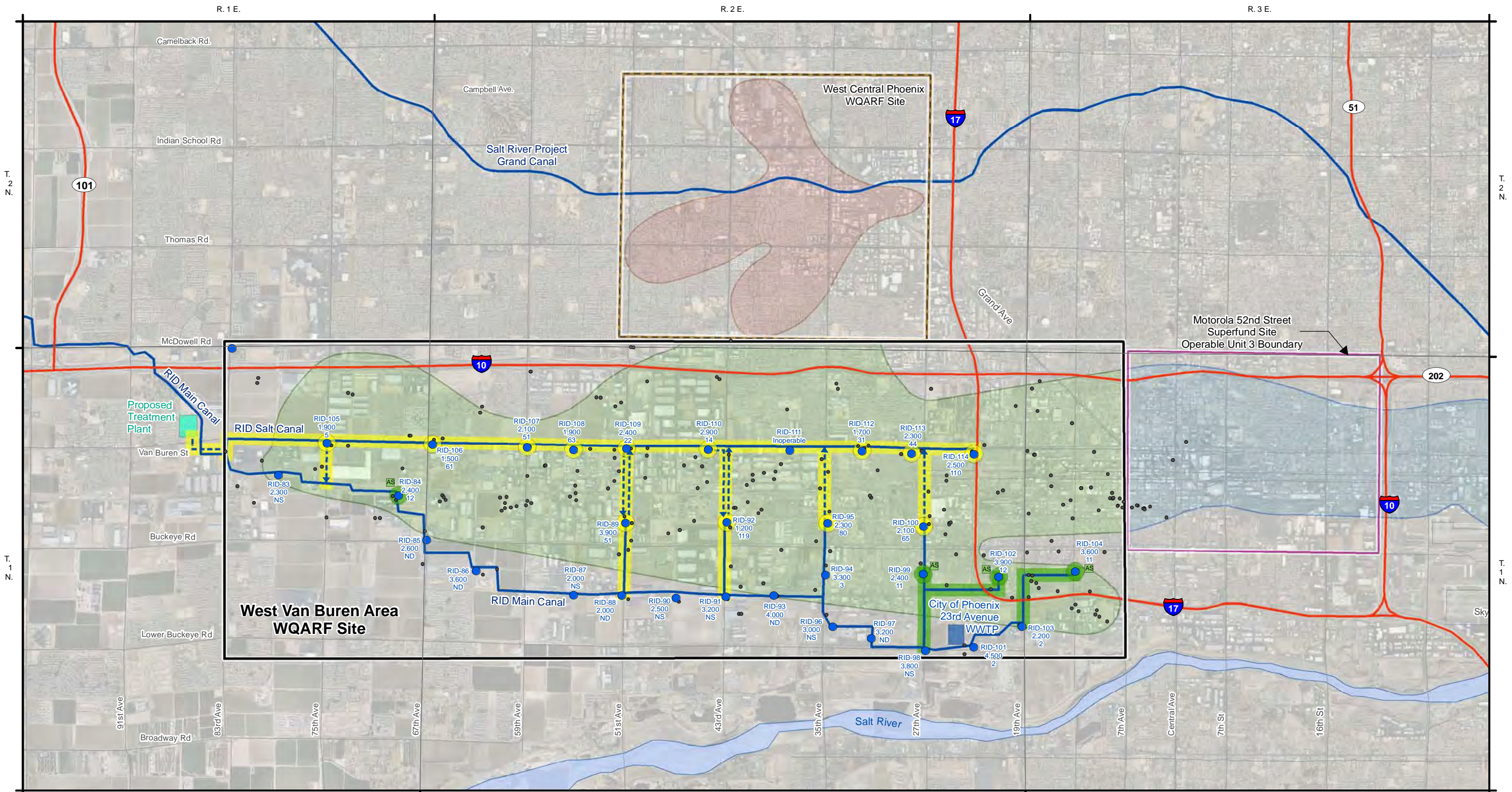
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Water Resource Consultants

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FIGURE ES-2



Footnotes:
 PRP - Potentially Responsible Party
 RID - Roosevelt Irrigation District
 AWQSS - Arizona Aquifer Water Quality Standards
 MCLs - Federal Maximum Contaminant Levels
 WVBA - West Van Buren Area
 GAC - granular activated carbon
 OU3 - Operable Unit 3 of Motorola 52nd Street Superfund Site
 COC - contaminant of concern
 VOC - volatile organic compound
 1 - Source control required for all remedies per Arizona Administrative Code

FIGURE ES-3. DEVELOPMENT OF REFERENCE REMEDY
 ROOSEVELT IRRIGATION DISTRICT GROUNDWATER RESPONSE ACTION IMPLEMENTATION PLAN
 WEST VAN BUREN AREA WATER QUALITY REVOLVING FUND SITE

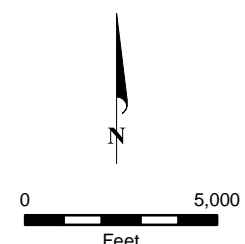


EXPLANATION

- Roosevelt Irrigation District Well
- RID-89 - Well ID
- 3,900 - Estimated Pumping Rate (gpm)
- 51 - Total 2008 VOC Concentration (ug/L)
(ND = Not Detected, NS = Not Sampled)
- Existing Canal or Pipeline
- - - Proposed New Below-Grade Pipeline
- Interstates
- Local Streets

- Estimated Extent of Impacted Groundwater in WVBA WQARF Site Based on 1st Quarter 2008 Data (Terranext, 2008a)
- Estimated Extent of Impacted Groundwater in West Central Phoenix WQARF Site
- Estimated Extent of Impacted Groundwater in Motorola 52nd Street Superfund Site
- Monitor Well

- Abbreviations**
- WVBA - West Van Buren Area
 - WQARF - Water Quality Assurance Revolving Fund
 - WWTP - Waste Water Treatment Plant
 - RID - Roosevelt Irrigation District
 - gpm - Gallons Per Minute
 - ug/L - Micrograms Per Liter
 - OU3 - Operable Unit 3
- Phase 1 (Early Response Action)
 - Phase 2 (Supplemental Response Actions)
 - AS Wellhead Air Stripper



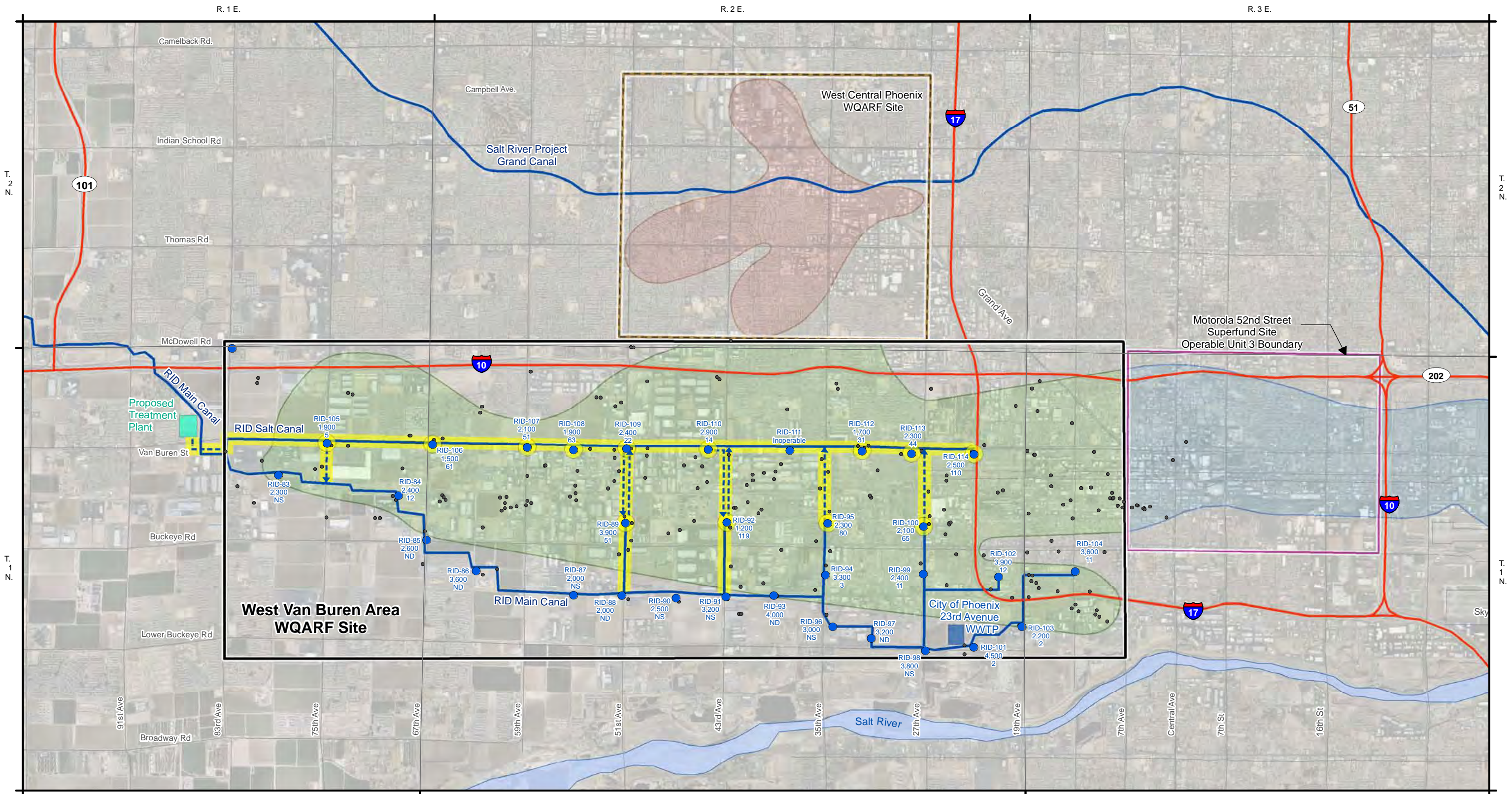
DRAFT

Roosevelt Irrigation District
Groundwater Response Action
Implementation Plan
West Van Buren Area WQARF Site

**Proposed
Roosevelt Irrigation District
Groundwater Response Action**

MONTGOMERY & ASSOCIATES
Water Resource Consultants

2009
FIGURE ES-4



EXPLANATION

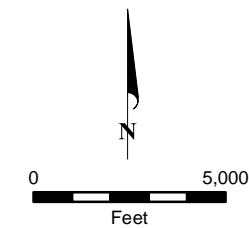
- Roosevelt Irrigation District Well
- RID-89 - Well ID
- 3,900 - Estimated Pumping Rate (gpm)
- 51.4 - Total 2008 VOC Concentration (ug/L)
- (ND = Not Detected, NS = Not Sampled)
- Existing Canal or Pipeline
- - - Proposed New Below-Grade Pipeline
- Interstates
- Local Streets

- Estimated Extent of Impacted Groundwater in WVBA WQARF Site Based on 1st Quarter 2008 Data (Terranext, 2008a)
- Estimated Extent of Impacted Groundwater in West Central Phoenix WQARF Site
- Estimated Extent of Impacted Groundwater in Motorola 52nd Street Superfund Site
- Monitor Well

Abbreviations

- WVBA - West Van Buren Area
- WQARF - Water Quality Assurance Revolving Fund
- WWTP - Waste Water Treatment Plant
- RID - Roosevelt Irrigation District
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- ug/L - Micrograms Per Liter
- OU3 - Operable Unit 3

● Early Response Action
(see Table 2 for a summary of phased implementation)



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Roosevelt Irrigation District
Groundwater Response Action
Implementation Plan
West Van Buren Area WQARF Site

Early Response Action



2009

FIGURE ES-5