FEASIBILITY STUDY WORK PLAN
SHANNON ROAD – EL CAMINO DEL CERRO
WQARF REGISTRY SITE
TUCSON, ARIZONA

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LIST OF ABBREVIATIONS & ACRONYMS

AAC	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ARS	Arizona Revised Statutes
AWQS	Aquifer Water Quality Standard
COCs	Contaminants of Concern
ERA	Early Response Action
ECDC	El Camino del Cerro
FS	Feasibility Study
ft bgs	Feet Below Ground Surface
µg/L	Micrograms per Liter
PCE	Tetrachloroethene
RO	Remedial Objectives
RI	Remedial Investigation
TCE	Trichloroethene
VOCs	Volatile Organic Compounds
WP	Work Plan
WQARF	Water Quality Assurance Revolving Fund

1.0 INTRODUCTION

1.1 Purpose

This Work Plan (WP) presents the methodology that will be followed for completion of the Feasibility Study (FS) for the Shannon Road – El Camino del Cerro Water Quality Assurance Revolving Fund (WQARF) Site (the Site) in Tucson, Arizona. This WP is required as part of the FS process, pursuant to Arizona Administrative Code (AAC) R18-16-407(B).

The purpose of the FS is to develop and evaluate a reference remedy and alternative remedies that are capable of achieving the Remedial Objectives (ROs) for the Site. A FS Report will be developed based on data from the Remedial Investigation (RI) as well as data collected during the FS. The FS will evaluate the reference remedy and at least two alternative remedies to ensure that each remedy meets the following criteria in accordance with AAC R18-16-407(H):

- achieves the ROs,
- is consistent with water management plans and general land use plans, and
- is evaluated with comparison criteria including practicability, risk, cost, and benefit.

One of the alternative remedies will be less aggressive than the reference remedy and one will be more aggressive as required by AAC R18-16-407(E).

In accordance with AAC R18-16-407(I), based on the evaluation of the reference remedy and the alternative remedies, the proposed remedy will be developed and described in the FS Report. The FS Report shall describe the reasons for selecting the remedy including

- how the proposed remedy will achieve the ROs,
- how the comparison criteria were considered, and
- how the proposed remedy meets the requirements of Arizona Revised Statutes (ARS) §49-282.06.

1.2 Site Description

The Site was originally identified as two separate WQARF sites, the El Camino del Cerro (ECDC) WQARF Site (placed on WQARF Registry in 1998) and the Shannon Road - Rillito Creek WQARF Site (placed on WQARF Registry in 1999). Evaluation of data gathered during environmental investigations of the two sites indicated that both sites where composed of a single plume. Therefore, the sites were administratively combined into the Shannon Road - El Camino del Cerro WQARF Site in 2004.

The Site is generally bound by West Rudasill Road to the north, North Moonbrook Road to the east, West El Camino del Cerro/West Ruthrauff Road to the south, and North Camino de la Tierra

to the west in Tucson, Arizona (Figure 1). The Site includes the closed ECDC Landfill, located at the southwest corner of the Site, and the area that encompasses the current groundwater plume.

The purpose of the RI was to determine the nature and extent of contamination at the Site. The RI also identified present and reasonably foreseeable uses of land and waters of the state that have been or are threatened to be impacted by the contamination. A summary of the findings from the RI is presented in the following paragraphs.

The RI Report identified several potential source areas in the Site vicinity through historical research and environmental investigations. These areas included the ECDC Landfill, the former E.C. Winter facility, I-10 corridor properties, the former AMRI Oil facility, Curtis Landfill and the south bank of Rillito Creek. Site-specific investigations conducted at these facilities yielded no indication of impacts to groundwater from these properties with the exception of the ECDC Landfill and former E.C. Winter facility. The ECDC Landfill includes approximately 19 acres along the east bank of the Santa Cruz River just north of El Camino del Cerro Road and was operated as a landfill from 1973 to 1977. The RI Report concludes that the landfill area is the primary source and point of origin for contaminants of concern (COCs) in the groundwater plume.

The property formerly occupied by the E.C. Winter facility is located at 3100 West Curtis Road and was operated as a waste oil recycling facility from 1950s to 1974. The RI concluded that the facility may have impacted groundwater, but is not likely an ongoing source and that the ECDC Landfill is the primary source of COCs in groundwater.

Soil underlying the Site generally consists of sandy gravels to silty gravels with some areas of sand, gravel, and clays. Groundwater flow is generally north, but historically variable and influenced by flood events and regional groundwater pumping. For evaluating groundwater impacts at the Site, the regional aquifer is divided into shallow (100 to 200 feet below ground surface [ft bgs]), middle (200 to 280 ft bgs), and deep (280 to 400 ft bgs) zones.

The COCs are tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene, cis-1,2-dichloroethene, and vinyl chloride. COCs PCE and TCE are present at concentrations above their respective aquifer water quality standard (AWQS) of 5 micrograms per liter (µg/L) in shallow and middle groundwater zones at the Site.

Groundwater at the Site is currently used as a drinking water supply. Six supply wells owned by Metropolitan Domestic Water Improvement District are present in the vicinity of the Site. One of the six supply wells, the South Shannon well, is impacted by concentrations of PCE and TCE exceeding AWQS.

Numerous Early Response Actions (ERAs) have been implemented at the Site. Completed ERAs include soil excavation, landfill gas collection, soil vapor extraction, source area groundwater extraction and treatment, replacement of private supply wells with municipal water connections and underground storage tank removal. Ongoing ERAs at the site include maintenance of a native soil cover at the ECDC Landfill and granular activated carbon wellhead treatment at the South Shannon supply well.

Land uses in the Site area consist of residential, commercial and light industrial areas. The Site lies across the boundaries of both the City of Tucson and Pima County. Based on information

provided by the City of Tucson and Pima County, land uses for the foreseeable future in the Site area are expected to remain similar to the current land uses.

2.0 FEASIBILITY STUDY TASKS

This section discusses the tasks associated with the development of the FS Report. The FS tasks will be performed in order to meet the requirements of AAC R18-16-407. The FS process considers the data gathered during the RI, further work that may be conducted during the FS and

- considers the ROs,
- includes the identification of potential treatment and containment technologies that satisfy the ROs,
- includes remedial technology screening,
- includes the development and analysis of remediation alternatives and technologies, and
- includes a comparison of the remedies and proposes a remedy.

2.1 Remedial Objectives

The ROs were developed as part of the finalization of the RI Report. Pursuant to AAC R18-16-406(I), ROs were to be based upon field investigation results, the land and water use surveys, Arizona Department of Environmental Quality (ADEQ) input and input from the community during the draft RO Report public comment period. The ROs will be used during the development of remedial alternatives to identify appropriate remedial technologies.

2.2 Development and Screening of Remedial Measures

Remedial measures are remediation technologies or methodologies typically used in remediation activities. These measures are screened based on their anticipated removal efficiency, ability to reduce contamination and their overall ability to achieve the ROs. The FS will evaluate future risk under reasonably foreseeable uses of the suspected source facilities, surrounding properties and the groundwater. Appropriate remediation technologies or methodologies will be screened using the following criteria:

- compatibility with current and reasonably foreseeable land use,
- COC treatment effectiveness,
- regulatory requirements,
- constructability,
- operation and maintenance requirements,
- health and safety considerations,
- generation and management of waste products,

- flexibility/expandability, and
- cost.

Selected remedial measures will be further described and included in remedial strategies that will be used to develop the reference remedy and alternative remedies. The remedial strategies to be developed, per AAC R18-16-407(F), are

- plume remediation,
- physical containment,
- controlled migration,
- source control,
- monitoring, and
- no action alternative.

Source control shall be considered as an element of the reference remedy and all alternative remedies, if applicable, except for the monitoring and no action strategies. A strategy may incorporate more than one remediation technology or methodology.

2.3 Development of Reference Remedy and Alternative Remedies

Based upon the selected remedial measures and strategies, a reference remedy and two alternative remedies will be developed as described in AAC R18-16-407(E). The reference remedy and alternative remedies shall be capable of achieving all of the ROs. The reference remedy and any alternative remedy also may include contingent remedial strategies or remedial measures to address reasonable uncertainties regarding the achievement of ROs or uncertain timeframes in which ROs will be achieved. The reference remedy and alternative remedies will be described in the FS Report in sufficient detail to allow evaluation using the comparison criteria. Where appropriate, the reference remedy and alternative remedies may incorporate different strategies for different aquifers or portions of the aquifer. This will also be applied to soils for different portions of the soil at the Site, if necessary.

The reference remedy shall be developed based upon best engineering, geological or hydrogeological judgment following engineering, geological or hydrogeological standards of practice considering

- the information in the RI,
- the best available scientific information concerning available remedial technologies, and
- preliminary analysis of the comparison criteria and the ability of the reference remedy to comply with ARS §49-282.06.

At a minimum, at least two alternative remedies shall be developed for comparison with the reference remedy. At least one of the alternative remedies must employ a remedial strategy or combination of strategies that is more aggressive than the reference remedy, and at least one of the alternative remedies must employ a remedial strategy or combination of strategies that is less aggressive than the reference remedy. A more aggressive strategy is a strategy that requires fewer remedial measures to achieve the ROs, a strategy that achieves the ROs in a shorter period of time or a strategy that is more certain in the long term and requires fewer contingencies. A less aggressive strategy is a strategy that includes remedial measures that will achieve the ROs over a longer period of time.

In accordance AAC R18-16-407(G), the needs of the well owners and the water providers and their customers will be considered, including quantity and quality of water, water rights and other legal constraints on water supplies, reliability of water suppliers and any operational implications. Such remedial measures may include, but will not be limited to, well replacement, well modification, water treatment, provision of replacement water supplies and engineering controls. Where remedial measures are relied upon to achieve ROs, such remedial measures will remain in effect as long as required to ensure the continued achievement of those objectives.

A comparative evaluation of the reference remedy and the alternative remedies will be conducted. In accordance with AAC 18-16-407(H), each remedial alternative will be evaluated using

- a demonstration that the remedial alternative will achieve the ROs,
- an evaluation of consistency with the water management plans of the affected water providers and the general land use plans of the local governments with land use jurisdiction, and
- an evaluation of the comparison criteria, including
    a. practicability of the alternative,
    b. an evaluation of risk, including the overall protectiveness of public health and aquatic and terrestrial biota,
    c. cost of the alternative,
    d. benefit or value the alternative, and
    e. a discussion of the comparison criteria as evaluated in relation to each other.

Based upon the evaluation and comparison of the reference remedy and the other alternative remedies developed, a proposed remedy will be selected. Pursuant to AAC R18-16-407(I), the FS Report shall describe the reasons for selection of the proposed remedy including

- how the proposed remedy will achieve the ROs,
- how the comparison criteria were considered, and

- how the proposed remedy meets the requirements of ARS §49-282.06.

3.0 COMMUNITY INVOLVEMENT

ADEQ will issue a Notice to the Public announcing availability of the Work Plan to implement the Feasibility Study on ADEQ's website at www.azdeq.gov. The notice may also be mailed to those on the Public Mailing List for the Site, local water providers, the Community Advisory Board and any other interested parties.

4.0 FEASIBILITY STUDY REPORT FORMAT

An FS Report will be prepared documenting the FS process. The FS Report will include the following sections:

- **Section 1.0 INTRODUCTION**

  This section will summarize the purpose of the FS Report.

- **Section 2.0 SITE BACKGROUND**

  This section will present a summary of the Site description, physiographic setting, nature and extent of contamination and a risk evaluation.

- **Section 3.0 FEASIBILITY STUDY SCOPING**

  This section will present the regulatory requirements presented in statue and rule, delineate the remediation areas and present the ROs identified in the RI.

- **Section 4.0 IDENTIFICATION AND SCREENING OF REMEDIAL MEASURES AND REMEDIAL STRATEGIES**

  This section will present the evaluation and screening of various remedial measures and strategies related to contamination in soil and groundwater and lists the technologies that have been retained for evaluation as part of the reference and alternative remedies pursuant to AAC R18-16-407 (E) and (F).

- **Section 5.0 DEVELOPMENT OF REFERENCE REMEDY AND ALTERNATIVE REMEDIES**

  This section will present the selected reference remedy and, at a minimum, a more aggressive remedy and a less aggressive remedy. Each remedy will include a discussion of the associated remedial measures and remedial strategies pursuant to AAC R18-16-407(E).

- **Section 6.0 DETAILED COMPARISON OF THE REFERENCE REMEDY AND THE ALTERNATIVE REMEDIES**

  The remedies will be compared to each other based on the comparison criteria of practicability, cost, risk and benefit. Uncertainties, if identified, associated with each remedy or comparison criteria will be discussed pursuant to AAC R18-16-407(H).

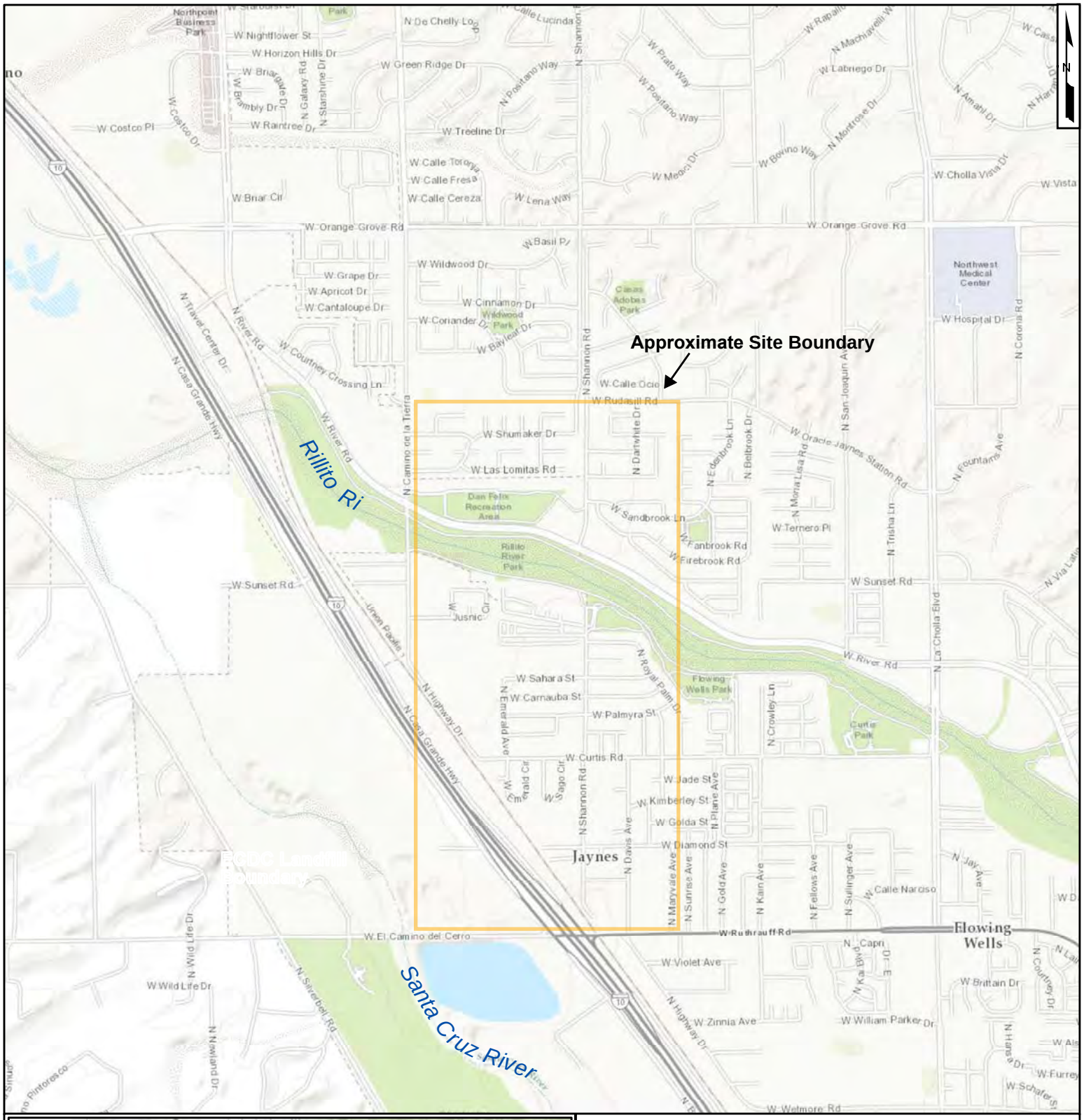
- **Section 7.0 PROPOSED REMEDY**

  This section will present the proposed remedy as required in AAC R18-16-407(I), and discusses how it will achieve the ROs, how the comparison criteria were considered and how the proposed remedy will meet the requirements of ARS §49-282.06.

- **Section 8.0 COMMUNITY INVOLVEMENT**

  This section will document the community involvement activities conducted in association with the FS.

FIGURES



Site Location

SR/ECDC WQARF Site
Tuscon, Arizona

ADEQ Arizona Department of Environmental Quality

Figure 1

Tucson, AZ | February 2021