



Klondyke Tailings Project
Water Quality Assurance Revolving Fund (WQARF) Site
Community Involvement Plan



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Disclaimer: All telephone numbers, email addresses, and contact names are subject to change after the date of this publication.

Introduction

CIP Purpose

The Arizona Department of Environmental Quality (ADEQ) is committed to involving communities in the Water Quality Assurance Revolving Fund (WQARF) site investigation and cleanup process. The Klondyke Tailings Project WQARF Site Community Involvement Plan (CIP) describes how ADEQ will fulfill this commitment. ADEQ will regularly update this plan based on site-specific developments, public comments, and community concerns. ADEQ welcomes community input on this CIP.

WQARF Process

The goal of the WQARF process is to clean up sites with groundwater and/or soil contamination to protect human health and the environment. Created under the Environmental Quality Act of 1986, WQARF receives funding from legislative appropriations, cost recovery from responsible parties, and special fees.

The WQARF program identifies contaminated sites in significant need of remediation. WQARF Registry sites are assigned an Eligibility and Evaluation (E&E) score based on several factors, such as the nature and extent of contamination and the number of people who may be exposed to the contaminants. The E&E score does not necessarily mean that the site poses a direct risk to human health and/or the environment.

The WQARF process uses a step-by-step approach to thoroughly investigate contaminated sites. ADEQ uses data from the investigation to develop a site-specific cleanup strategy, also called the remedy of the site.

The flowchart in Appendix A depicts each phase in the WQARF process. The definitions of each WQARF phase can be found in the glossary.

ADEQ Spokesperson Contact Information

The ADEQ designated spokesperson, the Community Involvement Coordinator, will act as liaison between ADEQ and the community near the Klondyke Tailings Project WQARF Site. The spokesperson will provide notice of public meetings, plan Community Advisory Board meetings, and ensure that CIP requirements are followed. Contact information for the designated spokesperson is below:

Community Involvement Coordinator ADEQ

1110 West Washington Street, 6th Floor, Phoenix AZ 85007

602-316-4270

Or

1-800-234-5677

Fax: 602-771-4272

Email: Marks.Tereza@azdeq.gov

View Community Involvement Contacts Online: azdeq.gov/WQARF

Site Information Repository

The information repository for Klondyke Tailings Project WQARF Site contains technical reports, public notices, and this CIP. ADEQ will add site-related documents to the repository as they are completed. The site information repository is available online and in person:

Online:

<https://azdeq.gov/klondyke-tailings-project>

In Person:

ADEQ Records Center 1110
West Washington Street
Phoenix, AZ 85007

602-771-4380

Or

1-800-234-5677

(Please call to make an appointment)

To make alternative arrangements to review documents, contact the ADEQ Community Involvement Coordinator.

Site Overview

The Klondyke Tailings Project WQARF Site is located in Graham County, Arizona. This Site is located on the north bank of Aravaipa Creek, approximately 4.5 miles upstream of the Aravaipa Canyon Wilderness Area and 2 miles north of the town of Klondyke with irregular boundaries defined by the extent of soil contamination above the residential soil remediation level (SRL) for lead of 400 milligrams per kilogram (mg/kg). The Site is comprised of three piles of mine tailings, referred to as the upper, lower, and hillside tailings piles, and the soil between and adjacent to the tailings and several surrounding properties. The Site was placed on the WQARF Registry in September 1998, with an eligibility and evaluation (E&E) score of 69 out of a possible 120. The major factor leading to the score was the presence of metals in the tailings left at the former mine site.

The Site contaminants of concern are lead, antimony, arsenic, cadmium, copper, manganese, mercury, vanadium, and zinc. Physical evidence and testing of the soil and surface water in Aravaipa Creek indicated that runoff from the tailings piles could be reaching Aravaipa Creek and that flooding of the creek could erode contaminated materials into the creek bed.

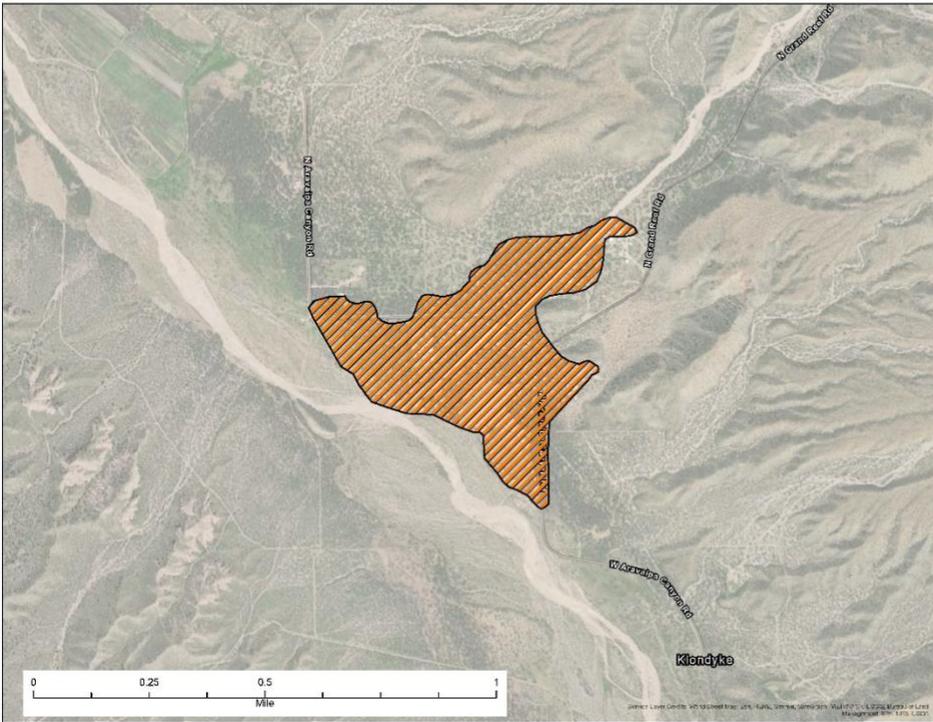
Early response actions completed at the Site include the capping of the upper tailings pile source area (2008), remediation of impacted soils near residences (2010 – 2016), and the remediation of a road constructed of mine tailings (2016). The remedy selected by the Record of Decision (ROD), capping of the lower tailings pile (parcel 110-47-003g) and small hillside tailings pile (parcel 110-47-006) source areas, was completed in 2018.

ADEQ has completed the remedy prescribed by the Site's ROD and currently maintains the remedy through annual inspections and maintenance.

The following map shows most recent boundaries of the site. This area may change as ADEQ collects more information.

A full history of site activities is located in Appendix B.

KLONDYKE TAILINGS PROJECT



WQARF Estimated Plume Boundary
 Counties

Plume data update: 1/1/2013
 Publication Number: M 23-23

Plume boundaries depicted on the site map represent ADEQ's interpretation of data available at the time the map was constructed. The map is intended to provide the public with basic information as to the estimated geographic extent of stream contamination as of the date of map production. The actual extent of contamination may be different. Therefore, the plume for this site may change in the future as new information becomes available.

ADEQ
 Arizona Department
 of Environmental Quality
 Date Saved: 1/30/2023

©:gisdev\dc7\WQARF\WQARF_MapSeries.aprx

Community Profile

Community Involvement Area (CIA)

The CIA of the Klondyke Tailings Project WQARF Site designates a geographic area in which ADEQ will send mass mailings and focus its outreach efforts. CIA boundaries are determined based on site-specific characteristics such as the affected media (i.e., soil, surface water, or groundwater), groundwater flow direction, exposure routes, and proximity to residential areas and public facilities. The CIA may change as ADEQ collects more information.

Because of the low density of population, there is no CIA for the Klondyke Tailings Project WQARF Site.

Community Demographics

Demographics help ADEQ plan and implement tailored community involvement activities. The following page displays key demographic information for the CIA of the Klondyke Tailings Project WQARF Site.

The Klondyke Tailings Project WQARF Site is located in Graham County. The current estimated population of Graham County is 38,145 people¹.

The CIA is highly rural within one zip code (85643). It is estimated that only about a dozen individuals live in Klondyke, AZ. ²

Refer to Appendix C for a list of neighborhood associations, community schools, and vulnerable population centers. Appendix D contains a list of elected officials.

¹ Source: Arizona Demographics Interactive Map Viewer: <https://geo.azmag.gov/maps/azdemographics/>

² Source: Klondyke Ghost Town <http://www.ghosttowns.com/states/az/klondyke.html>

Community Issues and Concerns

To better understand the community and its concerns, ADEQ conducted interviews prior to 2016 with community and former Citizens Advisory Board (CAB) members who live or work near the Klondyke Tailings Project WQARF Site. The following sections summarize common concerns related to the Site along with suggestions for ADEQ outreach activities. ADEQ will use this community feedback to ensure that future outreach addresses community concerns and to determine effective communication methods.

Community Interview Summary

All of the interviewees were familiar with the Klondyke Tailings Project WQARF Site.

Environmental and health concerns

Specific environmental and health concerns expressed by the interviewees included the following:

- How safe is drinking water from wells in the area? One interviewee, noting that his well had tested positive for lead, asked when his water would be safe to use.
- What are the long-term plans for the Site? How long will it take achieve the end goal for the site?
- Is dust from the public road at the Site dangerous?
- Will the devaluation of property be addressed at all?
- One interviewee stated that the perception in the community was that too much money had been spent on investigating and remediating the Site. Another interviewee stated that the channels where water flows should be remediated, in addition to the tailings piles.
- One interviewee stated that ADEQ had done a good job at cleaning up the Site with the budget available.

Outreach Recommendations

Interviewees suggested the following community outreach and involvement strategies to ADEQ:

Sharing site information:

- All interviewees stated that their experiences with ADEQ about the Site had been positive and thought that they had been adequately informed about activities at the Site.
- All but one of the interviewees stated that they preferred receiving updates about Site activities by postal mail rather than by email.

- Almost all of the interviewees had attended at least one CAB meeting, but they offered no suggestions on how to improve attendance at CAB meetings. One interviewee was aware of the CAB meetings, but had not attended because his primary residence was in the Phoenix metropolitan area.
- Only two interviewees were aware of the information repository for the Site.
- Almost all interviews thought that the community as a whole was well informed about the Site. Two interviewees indicated that it was common to learn information about the Site through word of mouth.
- Regarding translation services, two interviewees mentioned a Spanish-speaking resident, but stated that he understood English and that remediation work had already been conducted on his property.

Community Involvement Action Plan

The Community Involvement Action Summary table for the Klondyke Tailings Project WQARF Site describes the required community involvement activities for each WQARF phase and notes the date of completed activities. This summary is followed by a description of ADEQ communication techniques to share Site information and implement required activities.

Community Involvement Action Summary - Required Activities

The following table describes the required community involvement actions for the Klondyke Tailings Project WQARF Site and notes which actions have been completed to date.

Community Involvement Action Summary

WQARF Phase	ADEQ Community Involvement Activity	Statute (A.R.S.) and Rule (A.A.C) References	Activity to Date	Complete
Preliminary Investigation	Provide owners and operators a copy of the Draft WQARF Site Registry Report for a 15-day comment period prior to publishing a notice in a newspaper announcing the availability of the Draft WQARF Site Registry Report for a 30-day public comment period.	A.R.S. § 49-287.01(C) A.R.S. § 49-289.03(A)(1)	July 1998- Mailing to owners and operators August 5 and 12, 1998- Public notice in Eastern Arizona Courier	✓
WQARF Registry Listing	Following the listing of a site on the WQARF Registry, ADEQ will: <ul style="list-style-type: none"> • Establish a preliminary community involvement area (see Chapter 2, Section A) within 90 days of site listing on the WQARF Registry. • Provide written notice to the community on hazardous substance contamination in the area, the actual and potential risks and routes of exposure, possible health effects, and the opportunity to join the site mailing list. • Identify ADEQ personnel to contact for further information. 	A.R.S. § 49-289.02	July 1, 1999 and April 2000- Notice to community and development of CIA	✓
	Develop a Community Involvement Plan that establishes a Community Advisory Board, designates a spokesperson, provides for newsletters with current information about the status of remedial actions at the site, establishes a public document repository location, and provides for schedules of Community Advisory Board meetings and public meetings. Update the Community Involvement Plan at least every 2 years.	A.R.S. § 49-287.03(D) A.R.S. § 49-289.03(B) A.R.S. § 49-289.03(C) A.A.C. R18-16-404(C)(1)(i) A.A.C. R18-16-404(C)(1)(j) A.A.C. R18-16-404(C)(1)(k) A.A.C. R18-16-404(C)(1)(o)	March 1999- CIP developed December 2000, October 2007, March 2016 and January 2023- Updated CIP	✓

Community Involvement Action Summary

WQARF Phase	ADEQ Community Involvement Activity	Statute (A.R.S.) and Rule (A.A.C) References	Activity to Date	Complete
Early Response Action	<p>A work plan shall be prepared for each Early Response Action that will include a description of work to be done, known site conditions, a plan for conducting the work; a description of community involvement activities for the Early Response Action under R18- 16-404; and a schedule.</p> <p>Community involvement activities may include development of a community involvement plan under A.A.C. R18-16-404(C) or community involvement activities appropriate to the scope and schedule of the work performed such as a general public notice to those who may be impacted by field work as indicated in A.A.C. R18-16-404(D)(2).</p> <p>If immediate action is necessary to address a current risk to public health or the environment, to protect a source of water, or to provide a supply of water, the work plan and written rationale may be prepared and the community involvement activities may be conducted after commencement of the Early Response Action.</p>	<p>A.A.C. R18-16-404 A.A.C. R18-16-405(D)(2) A.A.C. R-18-16-405(E) A.A.C. R18-16-405(G)</p>	<p>2002, 2006, 2008, and 2016- Early Response Actions</p>	
Remedial Investigation	<p>Provide notice to interested parties announcing the availability of the Remedial Investigation Scope of Work or Work Plan, Fact Sheet, and Community Involvement Plan outline for review and a 30-day public comment period. Provide notice indicating that any person by written agreement with ADEQ may develop and implement a work plan for the Remedial Investigation and Feasibility Study and solicit information regarding the current and future land and water uses at the site. These notices shall also provide an opportunity to request a public meeting.</p>	<p>A.R.S. § 49-287.03(B) A.R.S. § 49-287.03(C) A.A.C. R18-16-301(C) A.A.C. R18-16-403(F) A.A.C. R18-16-403(G) A.A.C. R18-16-404(C)(1)(a) A.A.C. R18-16-406(B) A.A.C. R18-16-406(D)</p>	<p>August 5 and 12, 1998- Combined notice</p>	

Note: A potentially responsible party search is conducted concurrently with the Remedial Investigation and Feasibility Study, but does not have mandated community involvement activities.

Community Involvement Action Summary

WQARF Phase	ADEQ Community Involvement Activity	Statute (A.R.S.) and Rule (A.A.C) References	Activity to Date	Complete
Remedial Investigation (continued)	<p>Establish a selection committee to choose Community Advisory Board members for the site. The selection committee shall consist of the following number of people from each organization:</p> <ul style="list-style-type: none"> ● ADEQ: 1 ● Potentially Responsible Party: 1 ● Local Official: 1 ● Local Community: 2 	A.R.S. § 49-289.03(D)	June 2000- Selection committee established	✓
	<p>Establish a Community Advisory Board of between 5 to 20 members that represent a diversified cross section of the community. Within 90 days of appointment by the Community Advisory Board selection committee, the Community Advisory Board shall elect co-chairpersons and develop a charter defining operating procedures, membership terms and obligations, goals for developing issues, concerns and opportunities related to quick cleanup of the site, and any other anticipated activities for identifying and improving the public's access and understanding of information regarding the remediation process at the site.</p>	<p>A.R.S. § 49-289.03(C) A.R.S. § 49-289.03 (E) A.R.S. § 49-289.03(F)</p>	June 2000- CAB established	✓
	<p>Publish a combined public notice announcing the availability of the Draft Remedial Investigation Report for review and a minimum 30-day public comment period and the date of a public meeting to solicit Remedial Objectives for the site. The public meeting shall be held not less than 45 calendar days and not more than 90 calendar days after release of the Draft Remedial Investigation report, unless ADEQ sets a different date for good cause.</p> <p>The Draft Remedial Investigation Report should be provided to the Community Advisory Board, interested local government agencies, affected water providers and the Department of Water Resources.</p>	<p>A.A.C. R18-16-301(C) A.A.C. R18-16-404(C)(1)(b) A.A.C. R18-16-406(F) A.A.C. R18-16-406(I)(1) A.A.C. R18-16-406(I)(2)</p>	<p>December 7, 2013- Public notice/comment period for Draft Remedial Investigation Report</p> <p>January 22, 2014- Remedial Objectives public meeting</p>	✓

Community Involvement Action Summary

WQARF Phase	ADEQ Community Involvement Activity	Statute (A.R.S.) and Rule (A.A.C) References	Activity to Date	Complete
Remedial Investigation (continued)	<p>Publish a public notice announcing the availability of the Proposed Remedial Objectives Report for a 30-day public comment period.</p> <p>Publish a public notice of the availability of the Final Remedial Investigation Report, which shall contain the results of site characterization and the final Remedial Objectives Report. The final Remedial Investigation report shall be accompanied by responsiveness summaries regarding comments, issues and concerns raised in the community involvement process and, if the report is prepared by a person other than ADEQ, copies of the comments received.</p>	<p>A.A.C. R18-16-301(C) A.A.C. R18-16-404(C)(1)(c) A.A.C. R18-16-406(I)(5) A.A.C. R18-16-406(J)</p>	<p>May 31, 2014- Proposed Remedial Objectives Report public notice/comment period</p> <p>October 1, 2014- Final Remedial Investigation Report public notice</p>	
Feasibility Study	<p>Provide notice to interested parties announcing the availability of the Feasibility Study Work Plan</p> <p>Although not mandated, ADEQ will also provide public notice upon completion of the Feasibility Study.</p>	<p>A.A.C. R18-16-404(C)(1)(d) A.A.C. R18-16-407(B)</p>	<p>February 14, 2015- Feasibility Study Work Plan public notice</p>	
Proposed Remedial Action Plan	<p>Publish a public notice announcing the availability of the Proposed Remedial Action Plan for a 90-day public comment period. (If not combined, separate public notices will be provided for the Draft Remedial Investigation/comment period and the Remedial Objectives solicitation and public meeting.) Mail the same notice(s) to interested parties. The notice(s) will describe the proposed remedy and its estimated cost, and identify where the Proposed Remedial Action Plan, Remedial Investigation, and Feasibility Study Reports may be inspected.</p>	<p>A.R.S. § 49-287.04(B) A.R.S. § 49-289.03(A)(2) A.A.C. R18-16-301(C) A.A.C. R18-16-404(C)(1)(e) A.A.C. R18-16-408(A)</p>	<p>June 2017- Proposed Remedial Action Plan</p>	
Record of Decision	<p>Publish a public notice announcing the availability of the Record of Decision and Responsiveness Summary for review.</p>	<p>A.R.S. § 49-287.04(G) A.A.C. R18-16-404(C)(1)(f) A.A.C. R18-16-410</p>	<p>May 26, 2018- Record of Decision public notice</p>	

Community Involvement Action Summary

WQARF Phase	ADEQ Community Involvement Activity	Statute (A.R.S.) and Rule (A.A.C) References	Activity to Date	Complete
Implementation of Remedy (Remedial Actions)	Publish a public notice announcing a request for ADEQ to approve remedial actions at the site. The notice will provide the opportunity for a 30-day public comment period.	A.A.C. R18-16-301(C) A.A.C. R18-16-404(C)(1)(h) A.A.C. R18-16-413		
	Provide notice to the public and interested parties of a request for ADEQ to waive a regulatory requirement (permit) to complete remedial actions.	A.R.S. § 49-290 A.A.C. R18-16-404(C)(1)(l)		
	Provide notice to the public that fieldwork conducted to remove contaminants of concern may result in noise, light, odor, dust, or other adverse impacts.	A.A.C. R18-16-404(C)(1)(m)	Done as needed	
	Provide notice to the public of a request for ADEQ to determine whether each of the Remedial Objectives for a site have been satisfied and will continue to be satisfied. The notice will provide the opportunity for a 30-day public comment period on the request.	A.A.C. R18-16-301(C) A.A.C. R18-16-404(C)(1)(n) A.A.C. R18-16-4-16(B)		
Operation & Maintenance	Publish a public notice announcing the availability of the Operation & Maintenance Plan for review and a 30-day public comment period. Mail the same notice to interested parties.	A.A.C. R18-16-301(C) A.A.C. R18-16-404(C)(1)(g) A.A.C. R18-16-411(E)		
Removal from WQARF Registry	Although not mandated by Arizona Statute or administrative code, ADEQ may publish a public notice upon the removal of the site from the WQARF Registry.	Not Applicable		
Any Phase	Publish a public notice announcing a request to ADEQ for a prospective purchaser agreement. The notice will provide the opportunity for a 30-day public comment period.	A.R.S. § 49-289.03(A)(3) A.A.C. R18-16-301(C)		
	Publish a public notice announcing the intention of ADEQ to enter into a settlement agreement with a responsible party.	A.R.S. § 49-289.03(A)(4) A.A.C. R18-16-301(C)		

	The notice will provide the opportunity for a 30-day public comment period.			
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Community Involvement Techniques

This section describes the specific activities and resources that ADEQ uses to communicate and engage with stakeholders and community members near the Klondyke Tailings Project WQARF Site.

ADEQ uses the following community involvement techniques:

1. CAB: The CAB, with assistance from ADEQ, had been conducting public meetings about the Klondyke Tailings Project WQARF Site from 2000 until the ROD was signed in 2018. The CAB advised ADEQ on sharing Site information and provided input on content. CAB members served as an information resource for their community. Per Arizona Revised Statutes § 49-289.03, CAB meetings were open to the public and held at easily accessible locations. CAB meetings were held to receive site briefings, progress reports and other pertinent information in response to site activities or a request from a community advisory board member or a city, town or county in which the site is located.
2. Local Print Media: ADEQ will publish all WQARF milestone public notices in the *Eastern Arizona Courier*. The Arizona Newspaper Association maintains a database of all public notices published in major Arizona newspapers (arizonapublicnotices.com). For a list of other media outlets, see Appendix F.
3. U.S. Mail and Email Lists: ADEQ created U.S. Mail and email address lists to share updates on the Klondyke Tailings Project WQARF Site. Anyone can join the site mailing list by contacting the ADEQ Community Involvement Coordinator or registering on GovDelivery (public.govdelivery.com/accounts/AZDEQ/subscriber/new).
4. ADEQ Website: ADEQ's website provides visitors with three areas of information related to the Site and is updated regularly:
 - Notices Page: contains WQARF site public notices and announces comment periods (azdeq.gov/notices).
 - Events Page: includes information on WQARF site public meetings, including CAB meetings (azdeq.gov/events).
 - Site Information Page: provides detailed site information and links to the site information repository (azdeq.gov/klondyke-tailings-project).
5. ADEQ Notice Board: Notices are displayed on boards located in ADEQ's Phoenix and Tucson offices.

6. Public Meetings: In addition to CAB meetings, ADEQ may schedule public meetings or open houses as needed or requested. Examples include meetings with neighborhood/homeowner's associations, schools, or other community groups.
7. Site Tours: The public may request site tours through the ADEQ Community Involvement Coordinator. Tours will be arranged in conjunction with the property owners and in compliance with current regulations.

ADEQ takes reasonable measures to provide access to community involvement activities to individuals with limited English proficiency and/or to those with disabilities. The community can request language interpretation, American Sign Language (ASL) interpretation, Communication Access Realtime Translation (CART) captioning services, or disability accommodations through the ADEQ Title VI Nondiscrimination Coordinator (602-771-2288 or Drago.Leonard@azdeq.gov).

The following table of Communication Techniques illustrates how these techniques have and will be used throughout the WQARF process for the Klondyke Tailings Project WQARF Site.

Communication Techniques

Communication Deliverable			Communication Recipients/Methods				
Type	Why	When	CAB Members	Interested Parties List	ADEQ Website	Local Print Media	ADEQ Notice Board
Notice	Provide notice of availability of milestone documents, request comments, and solicit input.	Per mandate (See Community Involvement Action table).	✓	✓	✓ <i>(site and calendar pages)</i>	✓ <i>(Eastern Arizona Courier)</i>	✓
CAB or Public Meeting Notice/Agenda	Provide two-way communication about the status of site activities. The notice announces the meeting and provides the agenda.	Variable schedule based on level of site activity as scheduled by CAB and ADEQ, with the exception of the required public meeting for the solicitation of remedial objectives (see Community Involvement Action table).	✓	✓	✓ <i>(site, calendar, and CAB history pages)</i>	Not Applicable	✓
Technical Presentation	Provide current information about site activity or related topics.	At CAB meetings or at specially requested public meetings.	✓	Not Applicable	✓ <i>(site page)</i>	Not Applicable	Not Applicable
Technical Milestone Document	Provide current technical information about site investigation/remediation activities (e.g., Remedial Investigation, Feasibility Study, etc.)	According to the WQARF Process as documents are developed and become available.	✓	Not Applicable	✓ <i>(information repository)</i>	Not Applicable	Not Applicable
Site Fact Sheet	Provide current information about the site activity.	Published at the start of the Remedial Investigation and at specific milestones or other times as deemed appropriate by ADEQ and the CAB.	✓	✓	✓ <i>(information repository)</i>	Not Applicable	Not Applicable

Communication Techniques

Communications Deliverable			Communications Recipients/Methods				
Type	Why	When	CAB Members	Interested Parties List	ADEQ Website	Local Print Media	ADEQ Notice Board
Public Meeting to solicit Remedial Objectives	Provide forum to solicit Remedial Objectives. (Note that this meeting may be conducted in conjunction with a CAB meeting.)	After release of Draft Remedial Investigation Report.	✓	✓	✓ <i>(site and calendar pages)</i>	✓ <i>(Eastern Arizona Courier)</i>	✓
Public notice announcing a prospective purchaser agreement	Provide notice of availability and request comments.	Per mandate (see Community Involvement Action table).	✓	✓	✓ <i>(online information repository)</i>	✓ (Newspaper of general circulation in Graham County)	Not Applicable
Public notice announcing settlement agreement with a responsible party.	Provide notice of availability and request comments.	Per mandate (see Community Involvement Action table).	✓	✓	✓ <i>(online information repository)</i>	✓ (Newspaper of general circulation in Graham County)	Not Applicable
Site Tour	Provide walking or driving tour of the site to observe current site conditions and the surrounding community and environment.	If requested, and with cooperation of current property owners.	Contact ADEQ Community Involvement Coordinator.				

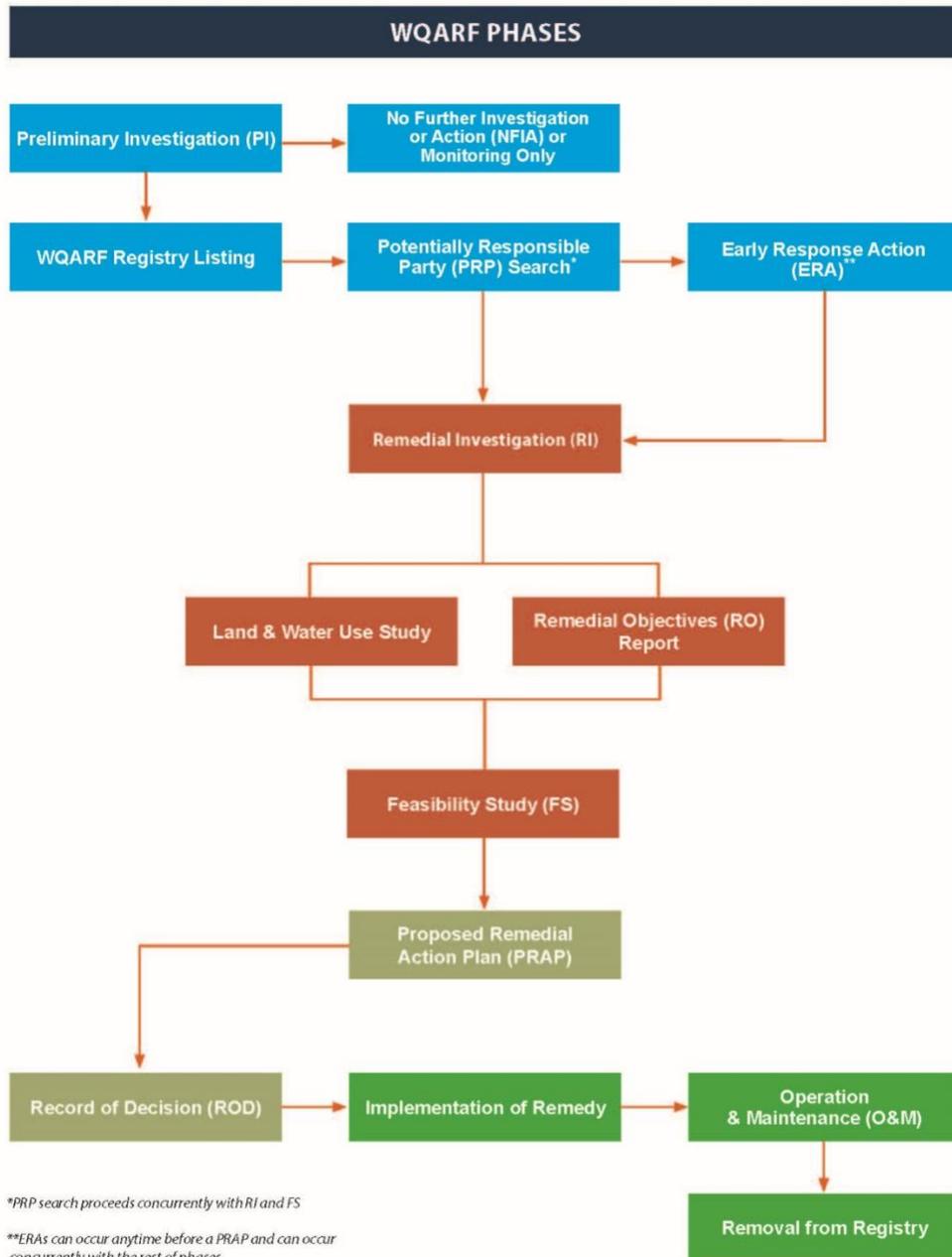
APPENDICES

The following appendices provide additional resources to support community involvement for the Klondyke Tailings Project WQARF Site:

- Appendix A: WQARF process flowchart
- Appendix B: History of major activities at the Klondyke Tailings Project WQARF Site.
- Appendix C: Targeted communities in the CIA of the Klondyke Tailings Project WQARF Site.
- Appendix D: Elected officials representing communities within the CIA.
- Appendix E: Current CAB members of the Klondyke Tailings Project WQARF Site.
- Appendix F: Local media outlets in the area.
- Appendix G: Related state and local agencies.
- Appendix H: Prospective purchaser agreements for property in and around the Klondyke Tailings Project WQARF Site.
- Appendix I: Consent orders and settlements related to the Klondyke Tailings Project WQARF Site.

Appendix A

WQARF Process Chart



Appendix B

Site History

- 1870 – 1958 From the 1870s through the 1950s, lead, zinc, copper, silver, and gold mining was conducted in the Klondyke area of the Aravaipa Mining District. In 1948, the Athletic Mining Company constructed a flotation mill next to Aravaipa Creek that operated until about 1958 and generated, in part, the tailings at the site.
- 1993 In March, a complaint concerning erosion and runoff from the tailings pile was filed with ADEQ, and an investigation began. The results of that investigation revealed high levels of lead and arsenic in the tailings piles and surrounding soils and acidic runoff emanating from the site.
- 1997 In October, ADEQ received an Arizona Water Protection Fund Grant to conduct a preliminary investigation, compile existing data, and evaluate possible remedial alternatives at the site. The U.S. Fish and Wildlife Service conducted fish tissue sampling and analysis of fish in Aravaipa Creek at two sites within Nature Conservancy property. The results of that investigation revealed elevated levels of arsenic, cadmium and lead in fish tissue, though not at levels that threatened native fish species.
- 1998 In September, the site was placed on WQARF Registry with an E&E score of 69 out of a possible 120.
- 1999 ADEQ contracted with United Research Services Corporation (URS) to conduct the remedial investigation (RI) for the site.
- 2001 In July, fifteen private wells in the Klondyke area were sampled. No drinking water standards were exceeded in any of the wells tested. Results indicated very good water quality. In December, samples of tailings were collected and analyzed to assess the long-term potential for generating and releasing acidity and metals from the tailings as a result of storm water runoff. The results of the Phase I investigation indicate high levels of stored acidity in the two tailings piles.
- 2001 – 2002 Magnetic and electromagnetic geophysical surveys were conducted to identify the possible presence of buried drums, tanks, and piping that may contain contaminants.
- 2002 – 2003 Aerial photography and topographic mapping were conducted to provide the technical background necessary to conduct a geomorphic and floodplain analysis of the site. The 100-year and the 500-year flood plains were delineated. Soil sampling was conducted for bioavailability testing. The results of that testing indicate a wide range of bioavailability for lead-contaminated soils and tailings and a low level of bioavailability

for arsenic in soils and tailings. Biological, archeological and cultural resource surveys were also completed.

2005 – 2006 ADEQ completed one early response action (ERA) at the site. During the ERA, ADEQ excavated 11 geophysical targets previously identified during the geophysical survey. No buried tanks, drums or pipelines requiring removal were found. During the ERA, a small amount of laboratory reagents still present at the site were also removed. Also, during the ERA, ADEQ conducted minor earth moving repairs such as repairing berms around the tailings piles and correcting drainage problems to contain storm water runoff on the tailings piles.

ADEQ continued with the RI activities including soil sampling of the entire site to determine the extent of soil contamination. Sampling results indicated that adjacent properties also needed to be evaluated. Over 1,700 soil samples were collected and analyzed using X-ray fluorescence. Samples were collected from the surface, a depth of six inches, a depth of one foot and a depth of two feet. The RI also included sediment sampling in Aravaipa and Laurel Creeks both upstream and downstream of the site. In addition, four groundwater monitor wells were installed at the site and quarterly monitoring and analyses of groundwater samples from these wells indicates no impacts to the groundwater beneath the site from metals above Aquifer Water Quality Standards (AWQS).

A significant flood event occurred in Aravaipa and Laurel Creeks during late July and early August. ADEQ continued to evaluate ERA activities at the site. Two ERA alternatives were proposed in a 2004 report to begin to consolidate the tailings at the site.

2007 For the RI, ADEQ continued collecting soil samples from properties adjacent to the tailings piles to determine the extent of contamination in the area. Approximately 500 additional soil samples were collected.

Groundwater sampling continued at the site and analyses of groundwater samples from on-site wells indicate no impacts to the groundwater beneath the site above AWQS. Private wells in the area continue to be sampled at the property owners' requests.

ADEQ continued evaluating the proposed ERA alternatives. The August 2006 flooding altered the channels of Aravaipa and Laurel Creeks. Based on the flooding, ADEQ was concerned that consolidating the tailings or constructing berms in the floodplain may have adversely impacted adjoining properties. The proposed ERA remedies were re-evaluated considering the new conditions. The floodplain analysis was updated and also evaluated the impacts of the most recent flood assuming the proposed ERA remedy and possible alternative options were in place at the time of the flood. After reviewing the

updated floodplain analysis, it was determined that moving the tailings out of the 100-year floodplain was not possible. It was also determined that threats exist to the upper tailings pile from flooding and lateral migration of Aravaipa Creek. ADEQ moved forward with a plan to protect upper tailings piles in their current locations. ADEQ also decided to move a small portion of the lower tailings pile, closest to Aravaipa Creek, to be consolidated with the upper tailings pile.

In August, URS provided ADEQ with an Erosion Protection Alternatives Analysis. The Erosion Protection Alternatives Analysis evaluated estimated construction costs and operation and maintenance costs for several methods of erosion protection of the upper pile. In October, ADEQ authorized URS to begin designing the erosion protection for the upper tailings pile using gabion mattresses. In December, URS and ADEQ met with the U.S. Army Corps of Engineers and determined no permit from the U.S. Corps of Engineers would be required.

2008 Results of soil samples collected in late 2007 and provided to ADEQ in 2008 indicated, with the exception of the contribution of contamination from the Laurel Creek watershed, that the extent of soil contamination above the residential SRL of 400 mg/kg for lead had been defined on all properties that allowed ADEQ access to collect samples.

In June, ADEQ and their contractors completed the consolidation, capping with a two-foot clean soil cover, and installation of erosion protection on the upstream pile. ADEQ received a draft of the RI report from the contractor.

2010 The EPA, with the assistance of ADEQ, evaluated soil removal options on the residential properties near the site. The EPA provided the results of additional soil samples collected from five properties near the site in August. Average concentration of lead detected on each property ranged from 190 to 3,500 mg/kg. The residential SRL for lead is 400 mg/kg. Arsenic concentrations above the residential SRL of 10 mg/kg were also detected with the average arsenic concentrations on the properties ranging from 5 to 76 mg/kg. Elevated lead and arsenic concentrations were detected from the same sample locations.

2011 – 2012 The U.S. Environmental Protection Agency (EPA), with the assistance of ADEQ, is currently evaluating soil removal options on four residential properties near the site. Once the scope of a removal is determined, soil removed from these properties will be consolidated in both the upstream and downstream tailings piles, and the downstream pile will receive the same erosion protection and clean soil cap installation as the upstream pile.

ADEQ and their contractor continued working to finalize the draft RI report.

- 2013 The EPA, with the assistance of ADEQ, is finalizing the soil removal actions on three properties near the site. As determined previously, soil removed from these properties will be consolidated in the downstream tailings piles, and in the future, the downstream pile will receive the same erosion protection and clean soil-cap installation as the upstream pile.
- ADEQ and their contractor solicited comments on the draft RI, as well as input on the proposed remedial objectives (ROs) for the site.
- 2014 The EPA, with the assistance of ADEQ, completed soil removal actions near the residences. As planned, soil removed from these properties was consolidated in the downstream tailings piles.
- ADEQ and their contractor finalized the RI report and the report was mailed to interested parties in September 2014.
- 2015 In March, mining tailings were removed from areas around the lower tailings pile. In December, soil samples from Klondyke Road were collected to evaluate contamination in the materials used to construct the road.
- 2016 In March, April, and November, impacted soils around five residences and the lower tailings pile were remediated. In October and November, impacted media in Klondyke Road was remediated and replaced with clean material.
- 2017 ADEQ issued the Feasibility Study (FS) Report and Proposed Remedial Action Plan (PRAP) for the site.
- 2018 The ROD for the site was issued in April 2018. The ROD documented the description of the final remedy, engineered tailings caps, for the site. The ROD prescribed remedy was constructed.
- 2019 ADEQ conducted annual inspections of the caps per the ROD and made drainage repairs on and around the cap on parcel 110-47-006.
- 2020 – Present ADEQ conducted annual inspections of the caps, per the ROD.

Appendix C

Targeted Communities

A. Neighborhood Associations

No neighborhood associations were found within the Klondyke Tailings Project Water Quality Assurance Revolving Fund (WQARF) site community involvement area.

B. Community Schools

No schools were located within the Klondyke Tailings Project WQARF site community involvement area.

C. Vulnerable Population Centers

No vulnerable population centers were located within the Klondyke Tailings Project WQARF site community involvement area.

Appendix D

Elected Officials

As of the publication of this community involvement plan, the community involvement area for the Klondyke Tailings Project WQARF Site falls under one County District (2), and Arizona Legislature District 19.

Graham County Board of Supervisors	Arizona State Representatives	Arizona State Legislature
921 Thatcher Blvd. Safford, AZ 85546 https://www.graham.az.gov/19/Board-of-Supervisors	1700 W. Washington St Phoenix, AZ 85007 azleg.gov/memberroster	1700 W. Washington St Phoenix, AZ 85007 azleg.gov/memberroster
District 2 Supervisor John Howard 928-428-3250 https://www.graham.az.gov/for/mcenter/Board-of-Supervisors-24/Contact-Us-John-Howard-86	District 19 Representative Lupe Diaz Room 302 602-926-3138 ldiaz@azleg.gov	District 19 Senator David Gowan Room 300 602-926-5154 dgowan@azleg.gov
	District 19 Representative Gail Griffin Room 225 602-926-5895 ggriffin@azleg.gov	

Appendix E

Community Advisory Board

The Klondyke Tailings Project WQARF Site Community Advisory Board was established in June 2000 and was disbanded in 2018 when the ROD was signed.

Appendix F

Media Outlets

The community may use any media outlets to share information on the Klondyke Tailing Project WQARF Site. ADEQ will publish all site-related public notices in the *Eastern Arizona Courier*. All future public notices for the Klondyke Tailing Project WQARF Site can be found by searching arizonapublicnotices.com.

Newspapers and Magazine

Eastern Arizona Courier 301 E Highway 70, Suite A, Safford, AZ 85546 www.eacourier.com	928-428-2560
Arizona Daily Star PO Box 26887, Tucson, AZ 85726 tucson.com	520-573-4292
The Daily Territorial 100 North Stone Avenue, Suite 300, Tucson, AZ 85701 about.dailyterritorial.com	520-299-1200
The Arizona Business Gazette and The Arizona Republic 200 East Van Buren Street, Phoenix, AZ 85004 www.azcentral.com/business	602-444-8000

Radio

Arizona Public Media (KUAT, KUAZ) PO Box 2100067, Tucson AZ 85721 www.azpm.org	520-621-1480
Cumulus Media (KCUB, KHYT, KSZR, KTUC) 575 West Roger Road, Tucson, AZ 85705 www.cumulusmedia.com	520-887-1000
KXCI Community Radio (KXCI)	520-209-1965

220 South 4th Avenue, Tucson, AZ 85701

kxci.org

Cochise Broadcasting (KNXN)

520-209-1965

7604 North LaCholla Boulevard, Tucson, AZ 85741

Family Life Radio (KQTH)

800-776-1070

PO Box 35300, Tucson, AZ 85740

www.myflr.org

Lotus Communications Corp (KTKT, KLPX, KFMA, KCMT, KMXZ, KFFN, KPLX)

520-407-4500

3871 North Commerce Drive, Tucson AZ 85705

www.lotuscorp.com

iHeartMedia Inc. (KIIM, KMIY, KNST, KOHT, KRQQ, KTZR, KYMD, KXEW)

520-326-1200

3202 North Oracle Road, Tucson, AZ 85705

www.iheart.com

Bustos Media (KVOI)

520-790-2440

3222 South Richey Avenue, Tucson, AZ 85713

bustosmedia.com

Willcox Radio (KHIL, KWCX, KWQR)

520-384-4626

900 W Patte Rd, Willcox, AZ 85643

www.willcoxradio.com

Double R Media (KATO, KXKQ)

928-428-1230

PO Drawer L, Safford, AZ 8554

gilavalleycentral.net

KJIK

928-428-4100

1850 W. Thatcher Blvd, Safford, AZ 85546

kjik.fm

Stafford Radio (KFMM)

928-428-0916

C/O Frank Newell, P.O. Box 567, Green Valley, AZ 85622

www.saffordradio.com

Television

KFTU-CA Channel 25 (Univision) 2301 North Forbes Boulevard, Suite 103, Tucson, AZ 85745 www.univision.com/temas/tucson	520-204-1270
KGUN Channel 9 (ABC) AND KWBA (The CW) 7280 East Rosewood Street, Tucson, AZ 85710 www.kgun9.com	520-722-5486
KHRR Channel 40 (Telemundo) 283 North Stone Avenue, Suite 101, Tucson, AZ 85701 www.telemundoarizona.com	520-396-2618
KMSB Channel 11 (Fox) 7831 North Business Park Drive, Tucson, AZ 85743	520-770-1123
KOLD Channel 13 (CBS) 7831 North Business Park Drive, Tucson, AZ 85743 www.kold.com	520-744-1313
KVOA Channel 4 (NBC) PO Box 5188, Tucson, AZ 85703 www.kvoa.com	520-792-2270
KUDF-LP Channel 14 (Azteca America Tucson) 2919 East Broadway Boulevard, Tucson, AZ 85716 aztecaamericatucson.com	520-881-0334
KTTU Channel 18 7831 North Business Park Drive, Tucson, AZ 85743	520-770-5434
KUAT/KUAS (PBS) University of Arizona, PO Box 210067, Tucson, AZ 85721 tv.azpm.org	520-621-5828

Appendix G

Local and State Agencies

The following list presents additional agencies that may be used by the public to address concerns related to the Klondyke Tailings Project WQARF Site.

State of Arizona

Department of Health Services: Environmental Health 602-542-1025
150 N 18th Ave Phoenix, AZ 85007 azdhs.gov/environmentalhealth

Department of Water Resources: Permitting and Wells 602-771-8527
1110 W Washington St, Ste 310, Phoenix, AZ 85007 new.azwater.gov/permitting-wells

Other

Agency for Toxic Substances and Disease Registry – Region 9 800-232-4636
75 Hawthorne St, Ste 9410 M/S:HHS-1, San Francisco, CA 94105 atsdr.cdc.gov

Arizona Association of Realtors: Real Estate Seller Disclosures 602-248-7787
255 E Osborn Rd #200, Phoenix, AZ 85012
aaronline.com/wp-content/uploads/2017/10/Residential-Sellers-Property-Disclosure-Statement-SPDS_REV_01Oct2017.pdf

Graham County Department of Public Health 928-428-0110
825 W Main Street, Safford, AZ 85546
<https://www.graham.az.gov/263/Public-Health>

Appendix H

Prospective Purchaser Agreements

No parties have requested or received prospective purchaser agreements from the Arizona Department of Environmental Quality for properties in or around the Klondyke Tailings Project WQARF Site.

Appendix I

Consent Orders and Settlements

As of the date of this CIP, there are no parties that have entered into consent decree settlements with the ADEQ for properties in or around the Klondyke Tailings Project WQARF Site.

Acronyms and Glossary of Terms

Aquifer: An underground rock formation composed of such materials as sand, soil, or gravel, that can store groundwater and supply it to wells and springs. In aquifers, groundwater occurs in sufficient quantities to be used for drinking water, irrigation, and other purposes.

Aquifer Water Quality Standards (AWQS): State of Arizona maximum levels for contaminants which apply to groundwater in aquifers designated for drinking water use. For example, the AWQS for tetrachloroethene is 5 micrograms per liter ($\mu\text{g/L}$).

Arizona Administrative Code (A.A.C.): The publication in which the official rules of the state of Arizona are published. The *Code* is the official compilation of rules that govern state agencies, boards, and commissions.

Arizona Department of Environmental Quality (ADEQ): ADEQ is the executive agency of the Arizona State Government mandated to enforce and administer the State's environmental laws and regulations.

Arizona Revised Statutes (A.R.S.): State laws adopted by the Arizona State Legislature.

Bioavailability: The amount of an element or compound that is accessible to an organism for uptake or adsorption across its cellular membrane.

Cleanup: Actions taken that deal with a release or threat of a release of hazardous substances that could adversely affect public health and/or the environment. The word "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, response action, remedy, remediation, or corrective action.

Community Advisory Board (CAB): A diverse group of community members interested in or affected by the presence of a WQARF site. By statute, ADEQ is required to form a CAB for each WQARF Registry site where ADEQ is initiating a Remedial Investigation. ADEQ seeks the CAB's input in the decision-making process and works with them from the onset of the RI/FS process until the requirements of the record of decision have been fulfilled.

Community Involvement Area: The mailing area of residences and businesses used in the notification for public meetings and other written notices regarding a site.

Community Involvement Coordinator: The ADEQ employee responsible for ensuring that all statutes and rules related to the involvement of the public and public outreach at WQARF sites are upheld and complied with by ADEQ. Community Involvement Coordinators manage and coordinate the work of CABs for WQARF sites.

Community Involvement Plan (CIP): A document that identifies techniques used by ADEQ and EPA to communicate effectively with the public during the Superfund cleanup process at a specific site. This plan describes the site history, nature and history of community involvement, and concerns expressed during community interviews. In addition, the plan outlines methodologies and timing for continued interaction between the Agencies and the public at the site.

Contamination: Any hazardous or regulated substance released into the environment.

Contaminant: Any physical, chemical, biological or radiological substance or matter present in any media at concentrations that may result in adverse effects on air, water or soil. A harmful or hazardous matter introduced into the environment that is not normally found there, or not naturally occurring.

Early Response Action (ERA): Refers to a remedial action performed prior to the final remedy, and often prior to the Remedial Investigation. An ERA addresses current risks to public health, welfare, and the environment; protects or provides a supply of water; addresses sources of contamination; or controls or contains contamination where such actions are expected to reduce the scope or cost of the remedy needed at the site. Also referred to as an interim remedial action.

Eligibility and Evaluation score (E&E): ADEQ's method to prioritize sites for investigation and cleanup. The score is based on multiple criteria and does not always mean there is a current threat to health.

Feasibility Study (FS): A process to identify a reference remedy and alternative remedies that appear to be capable of achieving the Remedial Objectives for the site. It is often done as part of a two-phase investigation in conjunction with a Remedial Investigation (RI/FS).

Floodplain Analysis: The process that determines a floodplain's boundaries regarding its present condition and the proposed condition in which potential new construction could disrupt the current floodplain boundaries.

Gabion Mattress: A double twisted hexagonal woven galvanized steel wire mesh compartmented basket with a rectangular mattress shape commonly used for slope stabilization on steep hillsides, channel linings, bridge protection, soil retention, riverbank.

Geomorphic Analysis: The study of landforms and the processes that shape them.

Geophysical Survey: The collection of information associated with subsurface features.

Groundwater: Water located beneath the ground surface in soil pore spaces and in the fractures of geologic formations. A formation of rock or soil is called an aquifer when it can yield a usable quantity of water.

Hazardous Substance: Any material that, because of its quantity, concentration, physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment.

Information Repository: A collection of documents about a specific project. Information on certain WQARF and Superfund sites may be available at ADEQ offices and libraries throughout the state.

Monitoring Well (Monitor Well): A well installed for the purpose of collecting samples such as groundwater and soil gas. Analytical results from samples are used to characterize the extent of contamination, the direction of groundwater flow, and the types and quantities of contaminants present in the groundwater.

Potentially Responsible Party (PRP): A party (individual or corporation) identified by state or federal authorities as potentially liable for cleanup costs at a contaminated site.

Preliminary Investigation (PI): The process of collecting and reviewing available information about a known or suspected hazardous waste site or release.

Proposed Remedial Action Plan (PRAP): A document that reviews the cleanup alternatives presented in the site Feasibility Study and identifies ADEQ's preferred alternative. Selection of a preferred alternative is not a closed-end commitment to use that alternative; rather, it is a way for the agency to indicate, based on experience and expertise, which alternative is the most likely course of action. ADEQ must actively solicit public review of and comment on all the alternatives under consideration.

Public Comment Period: A period during which the public can formally review and comment on various documents and ADEQ actions.

Record of Decision (ROD): A legal document that announces and explains the cleanup methods ADEQ will use at a Superfund/WQARF site. The Record of Decision is based on information and technical analysis generated during the Remedial Investigation and Feasibility Study, and on consideration of comments received during the public comment record for the Proposed Remedial Action Plan.

Remedial Action (RA): Any action taken to investigate, monitor, assess and evaluate the release or threat of release of hazardous substances or contaminants to the environment. It may also refer to the actual "cleanup" of the environment by various removal, treatment, monitored remediation, or corrective actions. The term cleanup is sometimes used interchangeably with the terms remedial action, removal action, response action, remedy, remediation, or corrective action.

Remedial Investigation (RI): Establishes the nature and extent of the contamination and the sources; identifies current and potential impacts to public health, welfare, and the environment; identifies current and reasonable foreseeable uses of land and waters of the state; and obtains and evaluates any information necessary for identification and comparison of alternative remedial actions.

Remedial Objective (RO): Established remedial goals for the current and reasonably foreseeable uses of lands and waters of the state that have been or are threatened to be affected by a release of hazardous substance.

Remediation: Cleanup or other methods used to remove or contain a toxic spill or hazardous materials.

Remedy: Cleanup method chosen for a site.

Responsible Party: An individual or company (*e.g.*, an owner, operator, transporter, or generator of hazardous waste) that is responsible for the contamination problems at a Superfund/WQARF site. Whenever possible, responsible parties are required to clean up hazardous waste sites they have contaminated.

Responsiveness Summary: A summary of oral and written comments (and ADEQ responses to those comments) received during the public comment period.

Soil Remediation Level (SRL): A pre-determined risk-based standard protective for residential or non-residential use based upon the total contaminant concentration in soil. In addition to meeting the SRLs, it must also be shown that soil contaminant levels do not: 1) Cause or threaten to cause a violation of Water Quality Standards that are protective of aquifer water quality and surface water quality; 2) Exhibit a hazardous waste characteristic of ignitability, corrosivity, or reactivity; and 3) Cause or threaten to cause an adverse impact to ecological receptors. SRLs have replaced what were known as Health-Based Guidance Levels or HBGLs.

Soil Vapor Extraction (SVE): Soil vapor extraction removes contaminant vapors from below ground for treatment above ground. Soil vapor extraction removes vapors from the soil above the water table by applying a vacuum to pull the vapors out. The method is used for chemicals that evaporate easily, such as those found in solvents and gasoline.

Superfund: The federal program operated under the legislative authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA) that funds and carries out U.S. Environmental Protection Agency solid waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising cleanup and other remedial actions. It provides for the cleanup of hazardous substances released into the environment, regardless of fault. The term Superfund also is used to refer to cleanup programs designed and conducted under CERCLA and its subsequent amendments.

Tailings: The materials left over after the process of separating the valuable fraction from the uneconomic fraction of an ore.

Tetrachloroethene or Tetrachloroethylene or Perchloroethene (PCE): A clear, colorless, liquid with a chloroform or sweet odor and a low boiling point; a solvent used for dry-cleaning; degreasing and drying

metals and other solids; dissolving waxes, greases, oils, fats, and gums, and in other industrial applications. PCE is a potential occupational carcinogen. Evaporation of PCE increases as temperature increases.

Total Petroleum Hydrocarbons (TPH): Total petroleum hydrocarbons refer to a measure of concentration or total mass of petroleum hydrocarbon constituents present in a given amount of air, soil or water.

Trichloroethene or Trichloroethylene (TCE): A colorless liquid used as a solvent, metal degreasing agent, and in other industrial applications.

Volatile Organic Compounds (VOC): A large group of carbon-containing compounds that are easily dissolved into water, soil, or the atmosphere and evaporate readily at room temperature. Examples of VOCs include PCE, TCE, benzene, toluene, ethylbenzene, and xylene. These contaminants are typically generated from metal degreasing, printed circuit board cleaning, gasoline, and wood preserving processes.'

Water Quality Assurance Revolving Fund (WQARF): Also known as the State Superfund, WQARF is the program and funding used to address hazardous substance releases within the state that are not covered by other specific programs.

X-Ray Fluorescence: A non-destructive analytical technique used to determine the elemental composition of materials.