

Mindy Mill

Work Plan

April 21st, 2026

Prepared For:

Eric Zielske

Bureau of Land Management Arizona Site Office

One North Central Ave. Ste. 800

Phoenix, Arizona 85004-4427

Prepared By:

Revive & Restore Remediation

Annika Elizabeth Dillemath • Gloria Millanez • Rashel Deleon • Jazmin Montes De Oca

aed369@nau.edu • em2673@nau.edu • rdd88@nau.edu • jgm294@nau.edu

Northern Arizona University

Flagstaff, AZ, 86001

Draft: 4

Table of Contents

1.0 Project Description.....	1
1.1 Project Objectives	1
1.2 Project Scope.....	1
1.3 Project Schedule.....	1
2.0 Site Background.....	1
2.1 Site Location	1
2.2 Site Description.....	4
2.3 Site History.....	5
3.0 Project Management	6
3.1 Site Investigation Objective & Project Management Approach	6
3.2 Quality Management.....	6
4.0 Field Methods & Procedures	6
5.0 Deviations from Work Plan	6
6.0 References.....	7

List of Appendices

Appendix A: Sampling & Analysis Plan (SAP)	0
1.0 Introduction	1
1.1 Responsible Agency.....	1
1.2 Project Organization	1
1.3 Sampling Overview	1
2.0 Project Data Quality Objectives & QA/QC Methods	2
2.1 Project Objectives	2
2.2 Data Quality Objectives (DQO).....	2
2.3 Quality Assurance and Control.....	2
3.0 Field Sampling Methods	5
3.1 Soil Sampling.....	5
3.2 Equipment and Calibration	9
3.3 Sample Containers and Labeling	9
3.4 Sample Storage and Shipping.....	10
3.5 Equipment Decontamination	10
3.6 Documentation.....	10
4.0 Laboratory Analyses	14
4.1 Sample Drying	14
4.2 Sample Sieving.....	14
4.3 XRF.....	15
4.4 Acid Digestion and ICP Confirmation.....	16
5.0 Disposal of Residual Materials	16
5.1 Field Disposal	16
5.2 Laboratory Waste Disposal.....	16
Appendix B: Health and Safety Plan (HASP)	0

1.0 Job Name & Location	1
2.0 Safety & Health Administration.....	1
3.0 Hazard Assessment	2
3.1 Field Hazards and Personal Protective Equipment.....	2
3.2 Lab Hazards and Personal Protective Equipment.....	3
4.0 Training Requirements.....	4
4.1 NAU Lab Safety	4
4.2 XRF.....	4
5.0 Site Control & Operating Procedures.....	4
6.0 Decontamination Procedures.....	4
6.1 Field	5
6.2 Lab	5
6.3 Field Waste Disposal	6
7.0 Emergency Response Procedures.....	7
7.1 Medical Facilities.....	7
7.2 Emergency Contacts	9

List of Figures

Figure 2. 1: Location Map [2]	2
Figure 2. 2: Vicinity Map [2]	3
Figure 2. 3: Project Map [3]	4
Figure 2. 4: Site Summary [3]	5
Appendix A: Sampling & Analysis Plan (SAP)	0
Figure A.3. 1: Site Map with Labeled Decision Units	6
Figure A.3. 2: Soil Sample Locations	8
Figure A.3. 1: Chain of Custody Record.....	12
Figure A.3. 2: Chain of Custody Seal	13
Appendix B: Health and Safety Plan (HASP)	0

List of Tables

Appendix A: Sampling & Analysis Plan (SAP)	0
Table A.1. 1: Personnel Titles and Emails	1
Table A.3. 1: Sample Summary	7
Table A.4. 1: CoC Detection Limits	15
Appendix B: Health and Safety Plan (HASP)	0
Table B.3. 1: Field Hazard Assessment	2
Table B.3. 2: Lab Hazards and Mitigation	3
Table B.3. 3: Emergency Contacts.....	9

List of Equations

Equation 2-1: Relative Percent Difference Equation	4
--	---

1.0 Project Description

1.1 Project Objectives

The objectives include the completion of a Preliminary Assessment and Site Investigation (PA/SI) report for the Bureau of Land Management abandoned Mindy Mill site. This site was for primarily processing silver and lead ores, with gold and tungsten ores as secondary minerals. The ores were milled using jaw and cone crushers as well as ball mill. With the testing completed, a contamination analysis will be run to determine the risks to environmental and human health to then determine if remediation is needed. Additionally, the materials will be analyzed for potential resource recovery.

1.2 Project Scope

The project scope will include the collection of 66 total surface soil samples from the Mindy Mill site. These samples will be tested and analyzed to determine contaminants of concern, mapping out the migration pathways, and potentially determining a remediation and recovery plan.

1.3 Project Schedule

The project will begin on October 23, 2025, and end May 4, 2025. Site Investigation is planned for January 23rd, 2026, and January 24th, 2026. The team will be staying at a motel nearby in Kingman, Arizona on the 23rd and will return after completing the site investigation on the 24th.

2.0 Site Background

2.1 Site Location

Mindy Mill is located near the town of Yucca, Arizona south of Kingman following the westbound I-40. In respect to Yucca, Mindy Mill is located 10 minutes southeast from the town in Township 17 N Range 17 W Section 30 Quarter SW with the following coordinates [1]:

Latitude : 34°49'15" N

Longitude : 114°7'6" W

Figure 2.1 below is a generalized location map for the Mindy Mill Site

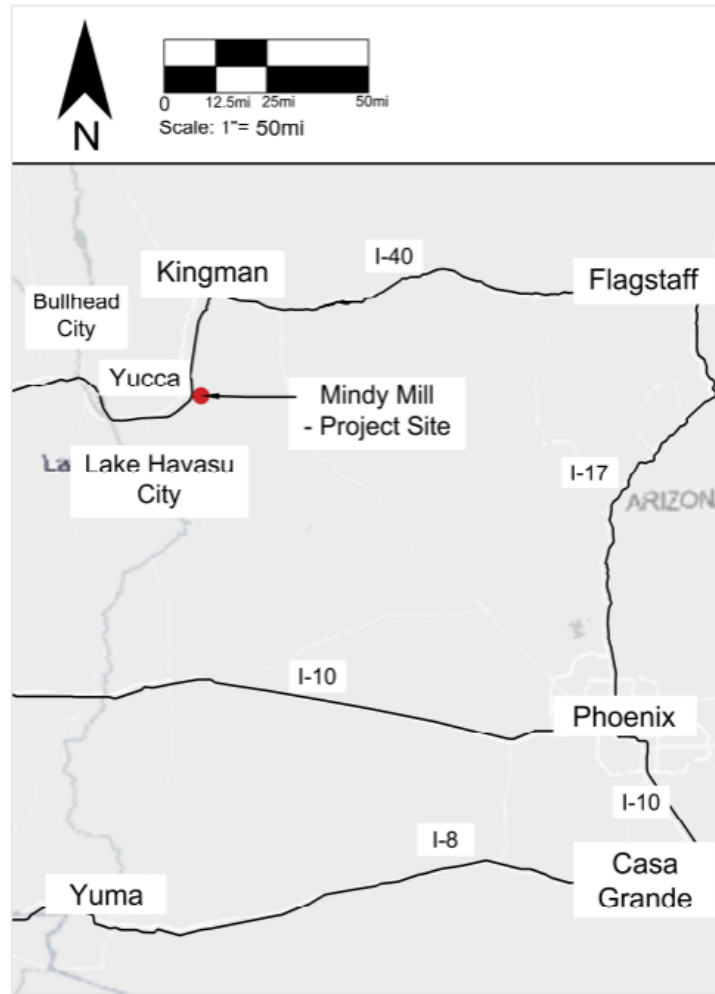


Figure 2. 1: Location Map [2]

Figure 2.2 below displays the Mindy Mill site location with respect to the town of Yucca, AZ, as well as the Flag and McCracken Mines.

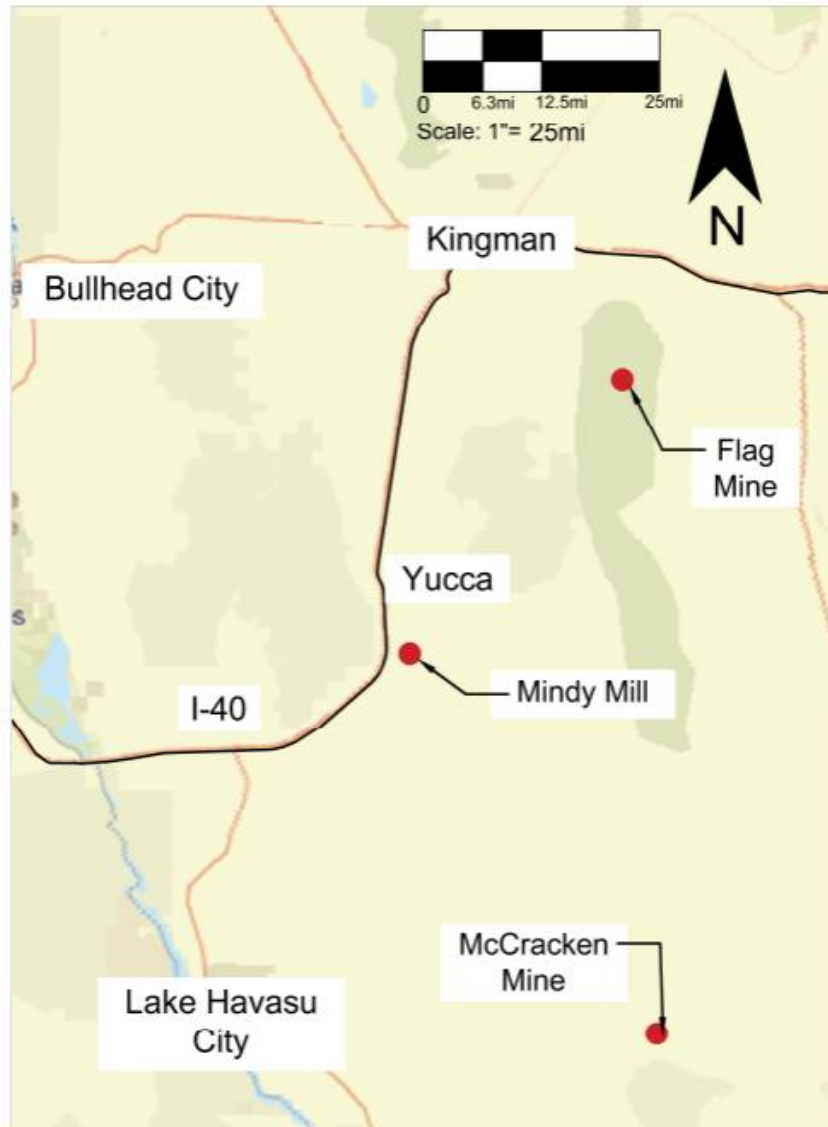


Figure 2. 2: Vicinity Map [2]

Figure 2.3 below shows the Mindy Mill site, including site boundaries and the nearby wash. The Bar I-L Wash and the unnamed wash south of the site are downgradient from Mindy Mill and flow east to west.

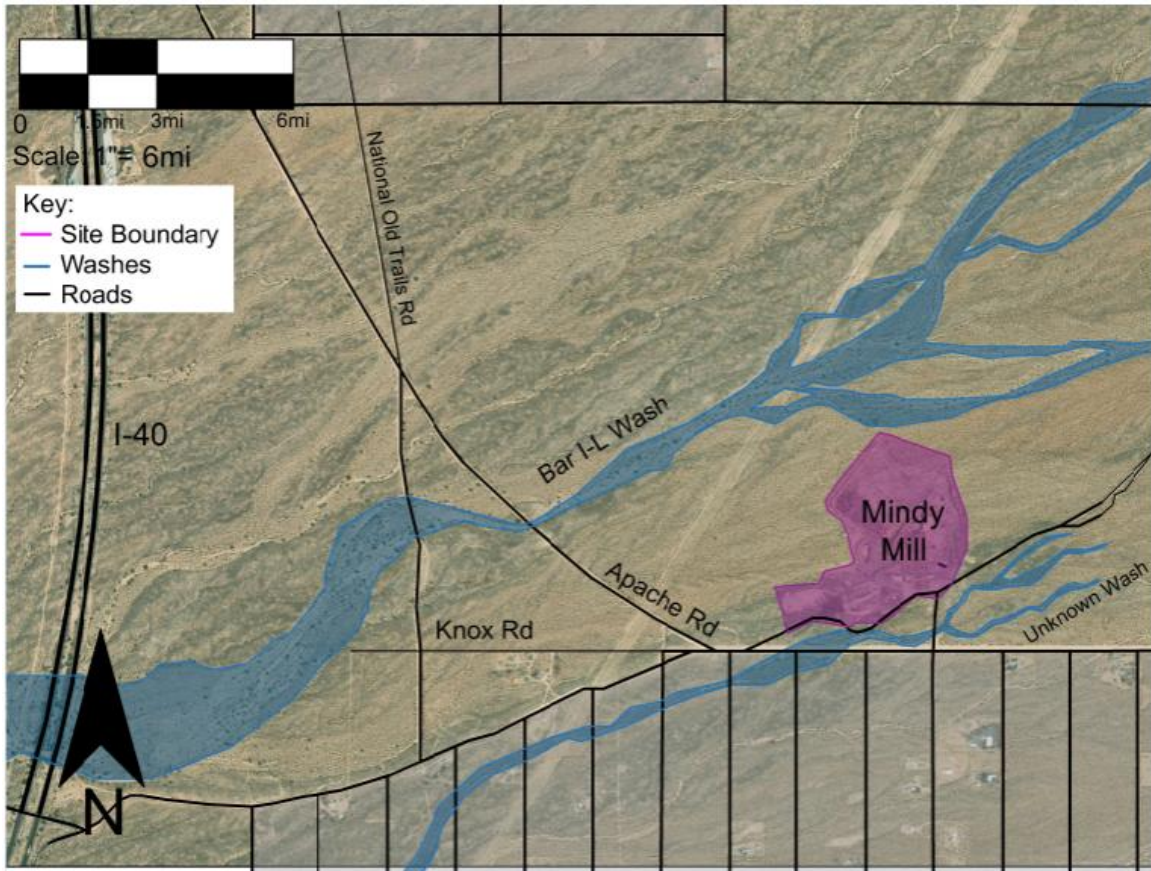


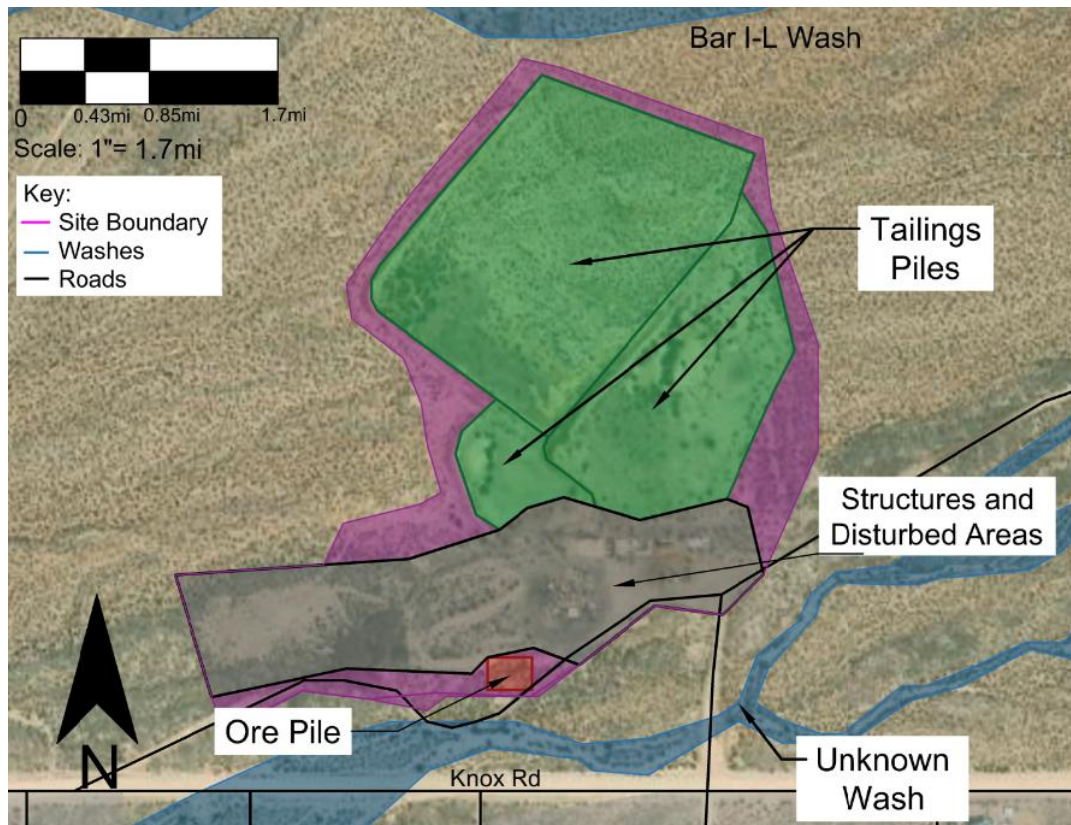
Figure 2. 3: Project Map [3]

2.2 Site Description

The site is located just south of the Bar I-L Wash noted through the BLM database. This wash flows towards the Mackenzie Wash located west of Yucca, flowing along the course of I-40. The Bar I-L Wash was determined to be too far away from the Mindy Mill site and therefore unaffected by site activities, so it was not sampled. However, with many homes and communities being located along the unnamed wash south of the mill, part of the site's investigation taking place will include the soil in the wash to test potential contaminants of concern (CoCs). On the site there is one abandoned ore pile and 3 tailing piles. Waste rock piles were also identified and sampled.

Since the 1980s, the site buildings have been mostly torn down; however, there are still remnants of the old mill buildings scattered between the tailings as well as the ore piles. These areas were sampled to check for CoCs.

Figure 2.4 below displays the structures map of the Mindy Mill site. The site contains three tailing piles, varying mill structures for processing as well as ore pile southwest of the tailings.



2.3 Site History

Mindy Mill reopened and began its final operations on October 1, 1984, and ceased operations on August 16th, 1985. There is evidence of the mill being opened before 1981, but the operations before this are unknown. It is an abandoned milling site that uses jaw and cone crushers, followed by a ball mill grinder to grind the ore down to about 100 mesh. The ground ore was then processed in flotation tanks to concentrate silver and lead minerals. A cyanide leaching circuit was considered for further silver recovery, but it was not documented if it was implemented.

The mill operated at about 425 tons per day processing ore from mines in the surrounding area, notably McCracken and Flag mines, with ore that averaged about 12oz of silver per ton with 1.5% lead [1]. A legal document found on site also indicated that tungsten ore from Boreana Mine was processed on site for an unknown amount of time. The client also indicated that the Arizona Department of Transportation drilled a well on site and may have used the site for training haul truck drivers.

3.0 Project Management

3.1 Site Investigation Objective & Project Management Approach

The goal of the site investigation is to find the CoC concentration levels at the site for further analysis and risk assessment.

Project management will ensure that the project schedule will be closely followed and that all health and safety (HS), quality assurance (QA) and quality control (QC) guidelines will also be followed. Eric Zielske from BLM, Dr. Briget Bero, and Dr. Wilbert Odem will be the primary leads in the field and will make any decisions regarding protocols.

Gloria Millanez is the primary contact for the client. Rashel Deleon is the QA/QC officer. The QA/QC officer's responsibility is to ensure that the team is in compliance with all protocols during the site investigation and lab analysis for data quality assurance. Jazmin Montes De Oca is the HS officer. The HS officer's responsibility is to ensure that the team follows the health and safety protocol while in the field and in the lab.

3.2 Quality Management

The quality management for both the field and the lab will be the responsibility of the QA/QC officer. They will be overseeing and implementing QA/QC procedures for the sample and data collection to ensure that the data will meet the quality objectives for the project. The data quality objectives are detailed in Appendix A, Section 2.

4.0 Field Methods & Procedures

The field methods and procedures will follow the procedures defined in the Sampling and Analysis Plan (SAP) in Appendix A and the Health and Safety Plan (HASP) in Appendix B.

5.0 Deviations from Work Plan

Any and all changes from the current Work Plan will be approved by the technical advisors Dr. Bridget Bero and Dr. Wilbert Odem or by Eric Zielske. The QA/QC officer will document the changes made to the Work Plan.

6.0 References

- Bureau of Land Management,
- 1] "YuccaFlotationMillsiteMohaveT17NR17WSec30%20.pdf".

 - Google Maps, 2025. [Online]. Available:
2] https://www.google.com/maps/@34.3335375,-111.4739698,8z?entry=tu&g_ep=EgoyMDI1MTIwOS4wIKXMDSOASAFQAw%3D%3D. [Accessed 8 December 2025].

 - Google Earth, 2025. [Online]. Available:
3] <https://earth.google.com/web/@27.25729507,0,286.50814505a,14509367.83791178d,30y,0h,0t,0r/data=CgRCAggBMikKJwolCiExSm1pdHIQaU9kV0pTRkxWd0NUMUhkZTNwN1JCbUJWtWsgAToDCgEwQgIIAEoICL7GkdsDEAE>. [Accessed 31 December 2025].

 - EPA, "Method 6200," 2007. [Online]. Available:
4] <https://www.epa.gov/sites/default/files/2015-12/documents/6200.pdf>. [Accessed 17 November 2025].

 - K. Simmons, "Field X-Ray Fluorescence Measurement," 22 April 2023. [Online].
5] Available: https://www.epa.gov/sites/default/files/2016-01/documents/field_xrf_measurement107_af.r3.pdf. [Accessed 17 November 2025].

 - EPA, "Sampling and Analysis Plan Guidance and Template," May 2014. [Online].
6] Available: <https://www.epa.gov/sites/default/files/2015-06/documents/sap-general.pdf>. [Accessed 17 November 2025].

 - EPA, "National Functional Guidelines for Inorganic Superfund Methods Data Review," November 2020. [Online]. Available:
7] https://www.epa.gov/sites/default/files/2021-03/documents/nfg_for_inorganic_superfund_methods_data_review_november_2020.pdf. [Accessed 17 November 2025].

 - EPA, "Guidance on Systematic Planning Using the Data Quality Objectives Process," Washington, DC, 2006.
8]

Appendix A: Sampling & Analysis Plan (SAP)

1.0 Introduction

1.1 Responsible Agency

The agency responsible for the Mindy Mill PA/SI project is the Bureau of Land Management, represented by Eric Zielske.

1.2 Project Organization

Table A.1.1 below shows the roles and responsibilities of each personnel on the project.

Table A.1. 1: Personnel Titles and Emails

Personnel Title	Name	Email
Client	Eric Zielske	ezielske@blm.gov
Professional Engineer, Technical Advisor	Bridget Bero	bridget.bero@nau.edu
Engineer	Annika Dillemath	aed369@nau.edu
Engineer, QA/QC Officer	Rashel Deleon	rdd88@nau.edu
Engineer	Gloria Millanez	em2673@nau.edu
Engineer, HS Officer	Jazmin Montes De Oca	jgm294@nau.edu

1.3 Sampling Overview

Approximately 66 samples will be collected, 62 unique with 4 duplicates. Each area of interest was separated into numbered decision units (DU) to best allocate samples. 12 samples will be taken at the largest tailings pile (DU1) and 13 will be taken at the other two tailings piles (DU2). The two smallest piles were combined into one DU because they were found to be homogeneous. 12 hot spot samples will be taken around the buildings and disturbed areas on site (DU4). 3 random samples will be taken at the ore pile identified on site (DU6). Finally, 9 transect samples will be collected at the unnamed wash that is south of the site (DU9). DU 3 was combined with DU 2 and DUs 5, 7, and 8 were removed from the sampling plan following the site visit. There were 10 additional hot spots, and 3 background samples set aside to decide on site. Duplicates were also taken during the sample collection process. One duplicate sample will be collected from each DU for a total of 4 duplicate samples. There was no duplicate sample taken at DU 6.

2.0 Project Data Quality Objectives & QA/QC Methods

2.1 Project Objectives

A site investigation is being conducted at the Mindy Mill site to identify any CoCs. The distribution of any CoCs and their migration pathways will be identified through soil sampling. The sampling data collected from the site investigation will be utilized to assess risks to human and ecological health. Qualitative observations will also be made to further identify any risks.

2.2 Data Quality Objectives (DQO)

As per the most recent Guidance on Systematic Planning Using the Data Quality Objectives Process by the Environmental Protection Agency (EPA), there is a list of recommendations in the planning process when alternatives are being selected, or contamination is being estimated [4]. The data obtained will be sufficient for screening level decision making.

2.3 Quality Assurance and Control

To ensure quality and accurate data, quality assurance (QA) and quality control (QC) will be needed within this project to apply to the procedures completed in the lab and on site. Quality assurance entails items such as proper documentation of sampling and lab analysis procedures. The quality control portion entails procedures to ensure that the data is both precise and accurate. These procedures are outlined in sections 2.3.1 and 2.3.2 below.

2.3.1 Field QC Procedures

While on site for sampling, the team will collect 4 duplicate samples, for a total of approximately 66 samples. The duplicate samples will be taken from the same location and under the same conditions as the original sample. Sample duplicates are taken to assess variability in concentration or sampling techniques.

Sample locations will be confirmed by GPS location to mark the initial sampling location, then marked with a flag. The rest of the sample locations will be measured with measuring tape and a compass, and then their GPS locations will be logged.

The QA/QC officer will be provided with a sample checklist to ensure that all sample locations are collected and documented.

Sample bag labeling will be checked and confirmed with the QA/QC officer according to the sampling name scheme outlined in Section 3.3.

The methods for storing, securing, and tracking of the samples will be followed as outlined in Section 3.4.

2.3.2 XRF QC Procedures

The XRF Niton XL3t GOLDD will be used to determine the CoC and their concentrations in the samples. The XRF will be used at the site for in-situ analyses and in the lab after proper sample preparation, drying, and sieving. To maintain the quality of the data the team will follow the procedures in the XRF manufacture's manual, the EPA method 6200,

and the Science and Ecosystem Support Division (SESD) Operating Procedure for Equipment Inventory and Management for the XRF (SESDPROC-108-R5) [4].

2.3.2.1 Calibration check

Each time the XFR is turned on, the team will perform the internal system check on the device. The XRF has an internal calibration check that is accessed from the main menu; the device will indicate if it passes the calibration or not. If not, Thermo Scientific Services will be contacted.

2.3.2.2 Operational Use

To ensure QA, the XRF must be used in the proper operation mode; in this case, the “soils” mode will be used. The temperature of the surrounding area will be recorded and measured every 30 minutes while the XRF is in use. According to the SESDPROC-108-R5, if the temperature changes more than 10°F while the XRF is in use, then the device will need to be recalibrated [5].

2.3.2.3 XRF Analysis

Each sample will be sub-sampled 9 times within lab analysis, and 9 XRF readings will be taken in ex-situ procedures. For each metal, the highest and lowest readings will be discarded, and the other 7 readings will be averaged to give the concentration of each metal.

The standard deviation value is also given by the XRF; any readings with a value outside of the standard deviation will be flagged by the team. Samples that are flagged due to being outside the standard deviation indicate that these samples have abnormal readings that do not fall under the standard for the element being tested for, therefore needing to be reverified as they are considered low-quality.

Any metal that has “none detected” returned will be given a value half of the lower detection limit for that metal.

2.3.3 Data Analysis

Data quality indicators (DQIs) are the means to evaluate the quality of the results based on the following terms: precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) [6]. The PARCCS are described below.

2.3.3.1 Precision

Precision is the degree of mutual agreement between independent measurements of similar properties using a standard deviation (SD) or a relative percent difference (RPD) [6]. This project will use the RDP as measurement of precision of the data. The equation is listed below in Equation 2-1.

Equation 2-1: Relative Percent Difference Equation

$$RPD = \frac{|X_1 - X_2|}{\left(\frac{X_1 + X_2}{2}\right)} * 100$$

Where:

RPD = Relative Percent Difference for Compound

X₁ = Value of compound in original sample

X₂ = Value of compound in duplicate sample

2.3.3.2 Accuracy

Accuracy is the degree of agreement of a measurement with a known true value [6]. To ensure accuracy, the team will send 10 samples to Northern Arizona University's Chemistry Department for ICP results that will be used to verify XRF data. Each individual sample will be analyzed for the following element contents: Arsenic, Antimony, Cadmium, Chromium III, Copper, Cobalt, Lead, Mercury, Nickle, Silver, Zinc.

2.3.3.3 Representativeness

Representativeness is the degree of which the data accurately and precisely represents the environment conditions or population [6]. While on site, the QA/QC officer will ensure the samples collected are a representation of the site and its conditions. If any changes are necessary, the sampling plan will be confirmed by the Technical Advisors Dr. Bridget Bero and Dr. Wilbert Odem.

2.3.3.4 Completeness

Completeness is the percentage of usable data obtained compared to the amount of data expected [6]. Non usable data may be a result of not collecting every sample, loss of sample, equipment errors or mistakes made by the team. The goal range is 75-90% and for this project the goal will be 90%.

2.3.3.5 Comparability

Comparability is the confidence of one data set to another data set [6]. This does not apply to the project as there is no other data set available.

2.3.3.6 Sensitivity

Sensitivity is the method detection limits (MDL). The MDLs for each element will be identified for the XRF and ICP methods. As mentioned in Section 2.3.2.3, any values returned as "none detect" will be assigned a value of half of the MDL.

2.3.3.6 Cross Contamination in the Field

To minimize cross contamination in the field, the team will follow the procedures listed below.

- Wear a new pair of nitrile gloves when collecting each sample
- Discard the pair of gloves after the equipment has been decontaminated
- The inside of the sampling bag will not be touched
- All sampling equipment will be decontaminated before each use
- Each sample will be sealed, labeled, and documented correctly. Any sample bags that have holes or tears will be double bagged.
- All notes will be recorded in the logbook.

2.3.3.7 Cross Contamination in the Lab

To minimize cross contamination in the laboratory, all sieves, drying containers, and XRF sample cups will be decontaminated after each use. All equipment and surfaces in the lab will be thoroughly cleaned between each sample analysis. All XRF sample containers will be sealed. Gloves will be used for the duration of the analysis.

2.3.4 Data Review and Validation

The data review and validation will be an assessment of the laboratory performance and sample specific criteria. The QA/QC officer will review the data to determine if the DQOs were met. All usable data will adhere to the EPA's "National Functional Guidelines for Inorganic Superfund Methods Data Review" [7]. The results of the quality review will be reported in the project report, and any unacceptable values will be noted.

2.3.5 Data Management

All data files will be uploaded to Microsoft Teams for ease of access for each team member. To ensure data security, data files will also be uploaded to a team member to drive between each draft submittal. All data will be reviewed by the QA/QC officer and one other team member. All raw XRF Analysis Data will be provided to the client prior to extra ICP verification Data.

3.0 Field Sampling Methods

3.1 Soil Sampling

66 surface soil samples will be collected during the site investigation. These samples are broken into decision units of Tailings, Structures, Ore Pile, and Wash. Figure A.3.1 below displays the overall site and the general sampling map showing the final 5 decision units.

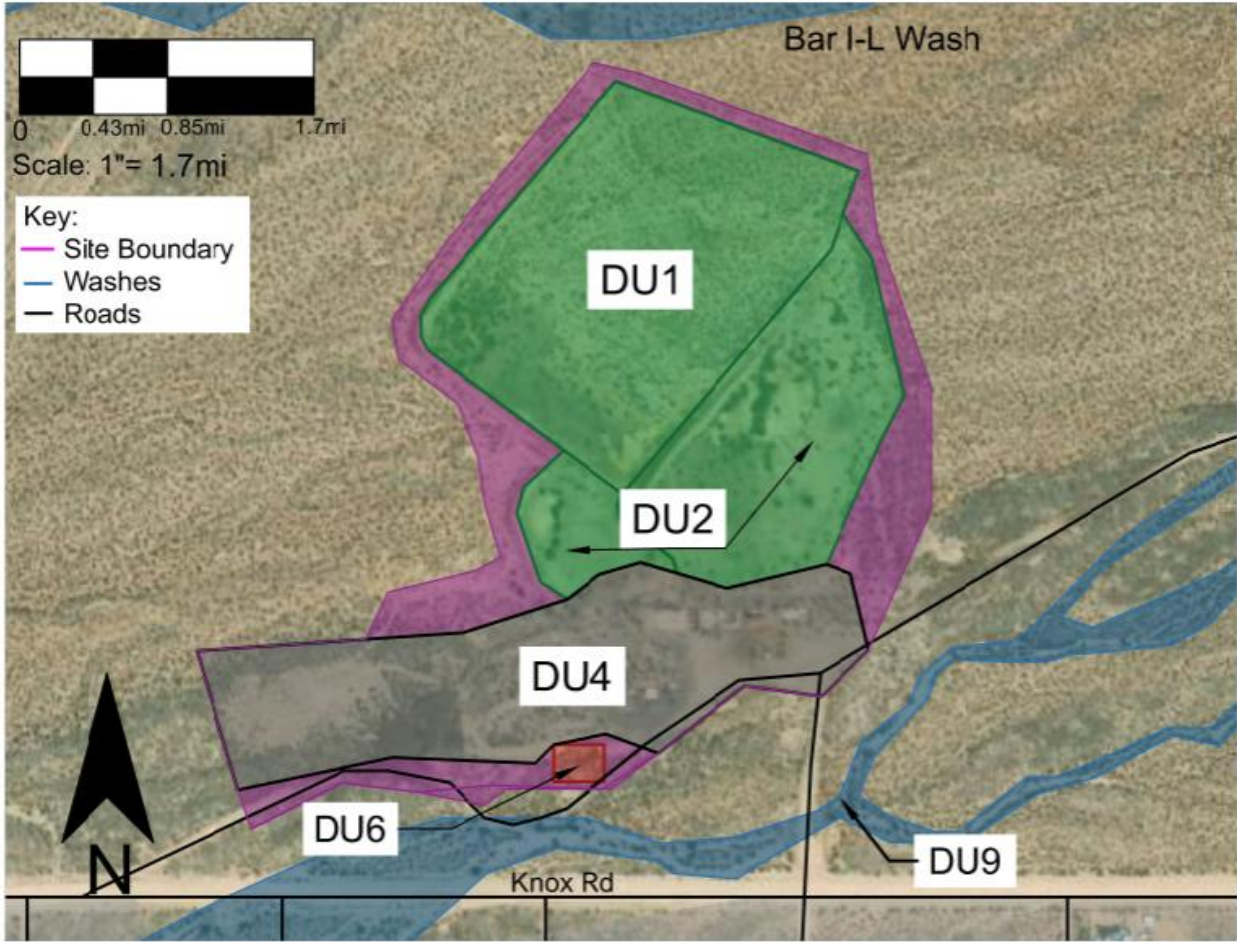


Figure A.3. 1: Site Map with Labeled Decision Units

The sample breakdown is as follows in Table A.3.1 below. For the column of # of samples, the first number is the number of samples that will be collected for the respective decision unit, and the (#) is representative of the number of duplicate samples taken for each decision unit.

Table A.3. 1: Sample Summary

Sampling Summary			
DU #	Area	Sampling Type	# of Samples
1	Tailings	Grid	12(1)
2	Tailings	Grid	13(1)
4	Buildings and disturbed areas	Grid	12(1)
6	Ore pile	Grid	3
9	Wash	Transect	9(1)
		Background	3
		Hot Spots	10
		Total Unique	62
		Total with Duplicates	66

9 surface samples will be taken in a transect along the south wash from the site. Transects will be taken further downstream so to ensure that if any contaminants have flowed off site they will be recorded.

Figure A.3.2 below is a display of the soil samples to be taken during the site visit.

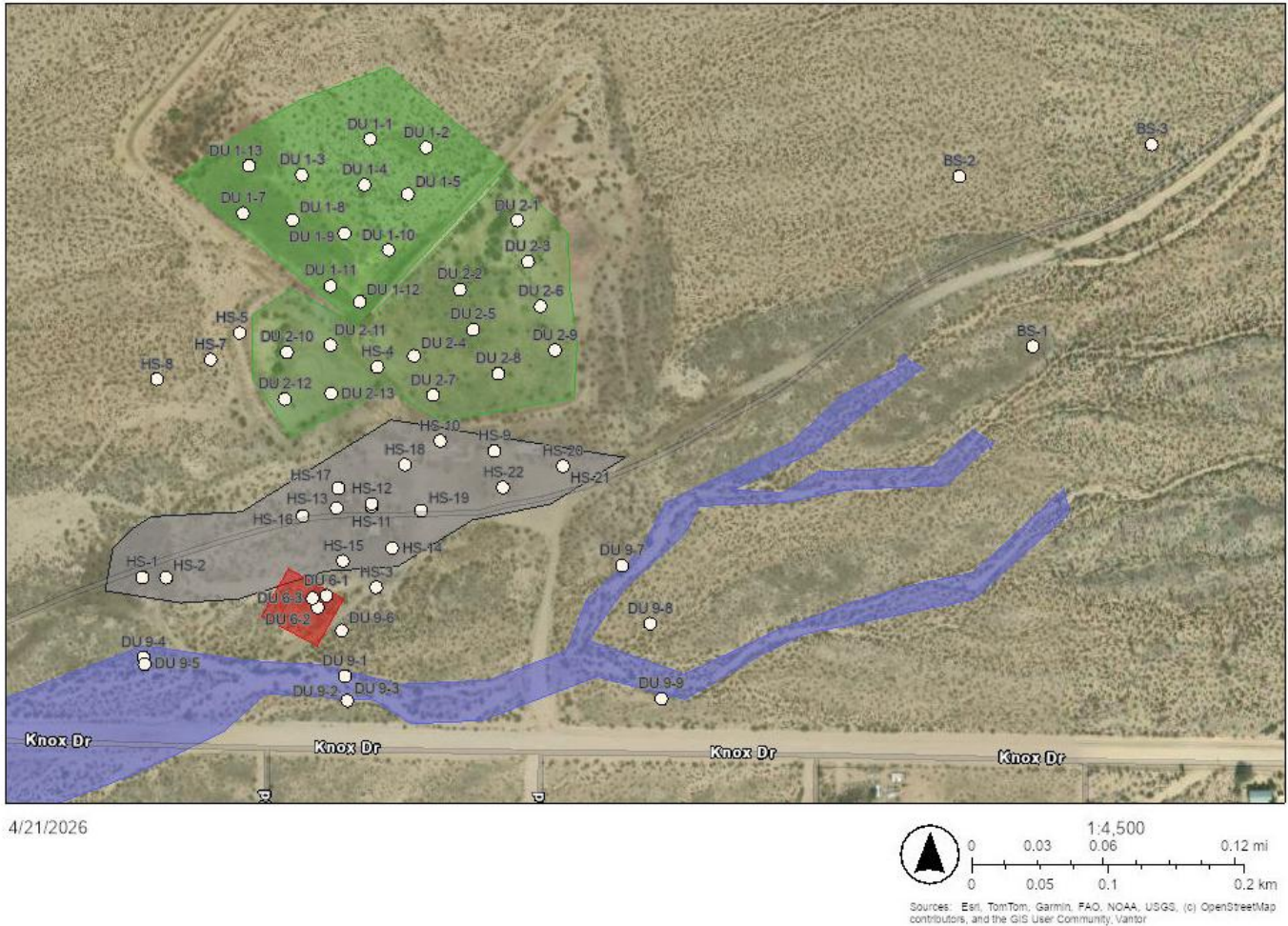


Figure A.3. 2: Soil Sample Locations

3.1.1 Soil Collection

Each surface sample will be collected through utilizing a trowel to take off the first inch of surface soil so to remove any debris. From here, an in-situ XRF reading will be taken. After the XRF reading, the trowel will be used to place a ½ of a gallon into a gallon-sized freezer bag. This bag will be labeled in accordance with Section 3.3 of this report.

3.1.2 Background Samples

A total of 4 background samples will be collected following the same methods in the previous section of this report. These samples' locations will be selected when the site investigation occurs.

3.1.3 Hot Spot Samples

Up to 5 samples have been allocated for Hot Spot samples. These sample locations will be determined when the site investigation occurs and selected based on areas of suspected contamination. Samples taken in DU4 will be selected in the style of Hot Spot sampling due to the nature of the soils surrounding the building structures.

3.2 Equipment and Calibration

The equipment that will be used in the collection of samples is as follows; Ziploc gallon freezer bags, trowels, dish soap, marking flags, 5-gallon buckets with lids, large bins, paper towels, sharpie pens, gloves, scrub brushes, field logbooks, long measuring tape, X-Ray Fluorescence (XRF) machine, GPS units, cellphones for photos, and tape for sealing bins. The bags and trowels will be utilized in the sample collection. The field logbooks, flags, and sharpies will be used in the documentation of all work completed. Scrub brushes, soap, water, and buckets will be used in the decontamination of supplies between each sample collection. Long measuring tape will be used for establishing a sampling location relative to a fixed reference and GPS units for producing coordinates for each sample's exact location.

The calibration of the XRF equipment is to occur prior to the site investigation. After this, when conducting the site investigation, the XRF device will go through a system check and have an internal calibration completed for when the device is started up.

3.3 Sample Containers and Labeling

Each individual sample will be placed into different gallon heavy duty bags to ensure each sample is separate, and cross contamination cannot occur. From here, all the bags will be labelled and placed in a bin for ease of storage and transport.

The labelling of the samples will include the decision unit (DU) of the sample location, and the number of the sample. Following this notation, samples for tailings will be labelled as DU1-# and DU2-#. Samples for ore piles will be labelled DU6-#, RS to indicate that they were random samples. Samples for the washes will be labelled DU9-# for the south wash. Background samples for the site will be labelled as BS-#. All hot spot samples for the site will be labelled as HS-#, including the ones taken at the buildings and disturbed sites in DU 4. If a duplicate is taken for a

sample, it will be labelled with the same DU as the original sample, with the sample number adding an “A” to notate that it is a duplicate. The individual locations will be recorded using GPS equipment and then shared within an online application amongst the team following the return from the site visit.

3.4 Sample Storage and Shipping

For storage of samples, each sample will be placed into separate gallon bags and placed into bins. Bins will be sealed once filled with a custody seal. They will be documented on the Chain of Custody Form, sealed, and transported back to the CECMEE laboratory on the NAU campus. No method of preservation will be needed for these samples.

After NAU laboratory procedures are completed, the 10 samples that are selected for sub-contracted ICP verification will be dried, sieved, and put into new gallon sized bags. These bags are to be labeled in accordance with the naming convention in Section 3.3 then shared with NAU’s Chemistry Department with the Chain of Custody document enclosed.

3.5 Equipment Decontamination

In between each use, to ensure contamination does not occur between samples, equipment such as the trowels will be disinfected and cleaned utilizing the 5-gallon buckets, dish soap, and water.

3.6 Documentation

3.6.1 Field Notes and Lab Binder

All team members are to have a separate field logbook each outlining the project name and location. These logbooks will include maps, changes from the Work Plan, field observations, proper numbering of the pages, and a log of the samples each member has collected with the label of each sample along with the coordinates set within the GPS application.

As a part of the CECMEE lab binder, NAU Laboratory Project Activity sheets will be completed for each task done by the team within the laboratory. These sheets will contain who has completed the task, the date, what the task is, and the project name. Additionally, these sheets will have laboratory analysis recorded onto them. This will include equipment used, calibrations, materials used, results, and disposal.

3.6.2 Photographs

Each team member is to use their cellular devices to collect photographs of the site. This will be for the documentation of site conditions upon arrival, as well as photos of the sample locations and shared within the team Microsoft drive along with a thumb drive for backup storage.

3.6.3 Chain of Custody Form

All collected samples will be monitored throughout the entire process, including collection, handling, transportation, analysis, and final disposal. A Chain of Custody Form

will be used to document the movement of each sample. This form records who has the sample, its current location, condition of the sample, and every transfer of custody. Refer to Figure A.6.1 below for the specific form that will be used.

3.6.4 Custody Seals

A Chain of Custody seal will be used to secure all containers holding samples. Anytime a container is opened in the laboratory, the date of access will be documented, and the removed seal will be kept with the project logbook. When samples are placed back into storage, a new seal will be applied, and the Chain of Custody record will be updated as necessary. All updates to custody documentation will include the date and initials of the person making the change. The Chain of Custody seal is shown in Figure A.6.2 below.

Chain of Custody Seal	
<i>Revive & Restore Remediation</i>	
Sample ID: _____	
Storage Conditions: _____	Site Name: _____
Bucket #: _____	Sample Type: _____
Sample Range: _____	Date Sealed: _____
Sealed By: _____	Time Sealed: _____
The seal must be intact upon receipt; a broken seal invalidates custody.	

Figure A.3. 2: Chain of Custody Seal

4.0 Laboratory Analyses

4.1 Sample Drying

All samples must be dried to remove moisture and homogenize the soil. The samples will be dried according to the ASTM D2216-98 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass. The soil will then be prepared for the following sieving process. Any clusters will be ground in a pestle for proper sieving. The whole sample will be placed into its own new Ziploc bag with its original sample identification being written on the bag following this drying process and the sieving process detailed below.

4.2 Sample Sieving

To improve the accuracy of the results of the XRF machine, each sample will undergo a sieving process. This assists in the concentration of the potential CoCs within the samples since they will be sorb to the finer particulates. Therefore, the samples will be sieved to achieve a finer and homogeneous soil before the use of the XRF machine. The collection of sieves will be used, with the smallest being a #60 sieve that has a pore size of less than 75 micrometers. The full stack of sieves that will be used from top to bottom will be #4, #10, #20, #40-50, and #60. A #40-50 sieve indicates a size of sieve in the range based on equipment availability. Once a sample has been sieved, the sieves will be cleaned outdoors with compressed air to reduce any contamination of the lab space. The material that passes through the #60 sieve will be placed in its respective Ziploc bag. The soil that is oversized will be disposed of as solid waste. Table A.4.1 below shows the summarization of detection limits and screening levels for the potential CoCs.

Table A.4. 1: CoC Detection Limits

Contaminant of Concern	Detection Limit (mg/kg)	AZSRS - Residential (mg/kg)		AZSRS - Non-Residential (mg/kg)
		Non-Carcinogenic	Carcinogenic (10-5)	
Arsenic (As)	11	10	10	10
Antimony (Sb)	-	-	31	410
Cadmium (Cd)	-	-	39	510
Chromium III (Cr)	-	-	120,000	1,000,000
Copper (Cu)	-	-	3,100	41,000
Cobalt (Co)	-	9,000	1,400	41,000
Lead (Pb)	13	-	400	800
Mercury (Hg)	-	-	23	310
Nickel (Ni)	-	-	1,600	20,000
Silver (Ag)	-	-	390	5,100
Zinc (Zn)	-	-	23,000	310,000

4.3 XRF

X-Ray Fluorescence (XRF) analysis will be conducted in accordance with EPA Method 6200, SW-846 Test Method 6200: Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment. Each sample will be divided into nine polyethylene XRF sample cups, and each subsample will sustain a 90-second XRF scan. The XRF device that will be utilized is the model NITON XL3t Gold Model in NAU’s Civil and Environmental Engineering Soils Laboratory. All raw measurements will be downloaded into a spreadsheet, where all the minimum and maximum values for each element will be removed. The remaining seven values will be averaged to create a representative concentration of a CoC for that sample. If there are any non-detects, they will be assigned a value that is equal to half of the instrument’s detection value.

4.4 Acid Digestion and ICP Confirmation

NAU's Chemistry Department will be enlisted to confirm the concentration of CoCs measured from the XRF device through soil acid digestion and Inductively Coupled Plasma (ICP). This is done primarily because it is known that there is arsenic and lead present at the site, and lead is known to bias arsenic in XRF results. They will perform acid digestion accordingly with EPA Method 3050B Acid Digestion of Sediments, Sludges, and Soils and then conduct ICP following EPA Method 6010B Inductively Coupled Plasma-Atomic Emission Spectrometry.

5.0 Disposal of Residual Materials

5.1 Field Disposal

Wash and rinse water used for equipment cleaning will be poured directly onto the site's soil. This water is diluted; therefore, it is not expected to pose a risk to human health or the environment. All disposable materials such as gloves, wipes, paper towels, and flags will be collected in a trash bag and disposed of as solid waste at NAU.

5.2 Laboratory Waste Disposal

All generated waste in the laboratory will be handled in accordance with Environmental Health and Safety (EHS) procedures. Liquid and solid water will be managed separately. Soil waste that is considered nonhazardous, such as the "overs" from the sieving process, will be disposed of as solid waste. Any liquid waste from the decontamination processes that is determined to be hazardous will be placed in a labeled hazardous waste container of EHS collection.

Appendix B: Health and Safety Plan (HASP)

1.0 Job Name & Location

A Preliminary Assessment and Site Investigation will be conducted at the Mindy Mill site, located just southeast of Yucca Arizona.

2.0 Safety & Health Administration

The project's Health and Safety Officer, Jazmin Montes De Oca, is responsible for ensuring that all field and laboratory work is conducted safely and in compliance with NAU EH&S Standards and established safety protocols.

3.0 Hazard Assessment

3.1 Field Hazards and Personal Protective Equipment

Table B.3.1 below displays all the potential field hazards that may be encountered, and the teams plan for mitigation for each hazard.

Table B.3. 1: Field Hazard Assessment

Field Hazards	Mitigation Approach
Physical	
Prolonged Sun Exposure	Use sunscreen and appropriate clothing, drink water, take breaks, and find shade if needed.
Temperature Exposure	Pack extra clothing for temperature variability.
Inclement Weather	Monitor weather forecasts; bring extra clothing to accommodate weather changes.
Falls and Slips	Be mindful of where you tread, particularly on inclines, and wear sturdy boots.
Chemical	
CoCs Exposure: Inhalation	Wear a face mask over your lower face if it's windy.
CoCs Exposure: Dermal	Wear gloves, tie or cover long hair, wear protective clothing, and remove clothing into secure bag after use.
CoCs Exposure: Ingestion	Wear mask if windy and wash hands after field work.
Biological	
Contact with dangerous flora and fauna	Be aware of your surroundings and potential hazards. Avoid contact with unknown flora and fauna.
Radiological	
Exposure: X-Ray	Use XRF leaning forward to keep the device away from torso and at arm's length.

3.2 Lab Hazards and Personal Protective Equipment

Table B.3.2 below displays all the potential laboratory hazards that may be encountered and the teams plan for mitigation for each hazard.

Table B.3. 2: Lab Hazards and Mitigation

Lab Hazards	Mitigation Approach
Physical	
Burns	Use thermal gloves when using drying ovens.
Cuts	Be cautious when handling glassware and disposing of broken glass properly.
Fire	Call 911 and use a fire extinguisher or fire blanket.
Falls and Slips	Be aware of surroundings and possible tripping hazards in the lab.
Chemical	
CoCs Exposure: Inhalation	Work under a fume hood when testing or handling dust or working outdoors.
CoCs Exposure: Dermal	Wear proper lab PPE, particularly gloves, when handling soil and washing hands.
CoCs Exposure: Ingestion	Wear proper lab PPE, such as gloves, lab coats, closed-toed shoes, pants, and long sleeves.
Biological	
N/A	N/A
Radiological	
Exposure: X-Ray	Operate only using proper apparatus.

4.0 Training Requirements

4.1 NAU Lab Safety

All Revive and Restore personnel participating in laboratory activities are required to complete NAU's Chemical Hygiene and Lab Safety Training as well as NAU's X-Ray Safety Training before conducting any sample analysis. The copies of each member's training completion proof will be kept in the lab binder.

4.2 XRF

All Revive and Restore will be trained to use the XRF device by a qualified XRF operator that will provide hands-on guidance. The team will also be required to review the XRF training and operating manual to ensure proficiency and compliance with safety protocols during sample analysis.

5.0 Site Control & Operating Procedures

Site control and operating procedures for Mindy Mill site will follow the Occupational Safety and Health Administration (OSHA), 1910 General Industry Subpart H: Guidelines for Hazardous Waste Operations. These guidelines require the inclusion of a site map, designation of work zones, buddy system, site communications, and emergency response procedures to ensure safe work practices.

All field and laboratory activities will be performed in compliance with these standards. Working alone in the lab is strictly prohibited and to reiterate there must be a minimum of two personnel during all field and laboratory work.

6.0 Decontamination Procedures

Decontamination for field and laboratory work will follow OSHA standards for hazardous waste decontamination. Procedures will address the layout and number of decontamination stations, the equipment required, methods for minimizing work contamination during the removal of PPE, and appropriate disposal methods of contaminated materials.

6.1 Field

Potential contamination in the field will be minimized by avoiding direct contact with hazardous materials and by using proper PPE and disposable outer clothing when possible.

The following preventative measures will be implemented:

- Avoid walking through or touching potentially hazardous areas.
- Protect sampling instruments with bags and leave openings for any sensors and ports.
- Use disposable equipment and protective coverings when practical.
 - Protective coverings include eyewear, dust masks, and gloves.
- Remove and combine contaminated outer garments and equipment coverings into plastic bags before entering transport vehicles.
- Contaminated clothing will be placed in sealed bags until it can be cleaned properly by the user.
- Handwashing is required prior to eating or leaving the site.
- Wash liquid will be disposed of onsite following the proper safety protocols.

6.2 Lab

All laboratory activities will follow the Chemical Hygiene Plan of NAU. Working with potentially hazardous materials will only occur in designated lab areas.

The following decontamination practices will be followed:

- Store breakable containers in trays to prevent spills or breakage.
- Remove and store PPE in consistently labeled containers before leaving the designated area.
- Wash hands and forearms thoroughly after removing any PPE.
- Decontaminate all equipment before it leaves the designated area.
- Clean surfaces with a wet mop or equivalent method.
- Any accidents or chemical exposures that occur must be reported to NAU's "Standard Operating Procedures for Chemical Processes" under their "Responding to Accidents and Emergencies".

6.3 Field Waste Disposal

NAU's Environmental Health and Safety department will oversee the disposal of all hazardous materials in the laboratory. Containers holding hazardous materials must be triple rinsed and made unusable. It must have a completed "EMPTY" label if the container cannot be made unusable. Any non-hazardous field materials, like paper towels or empty bottles, will be placed into trash bags and held until proper disposal is made available.

7.0 Emergency Response Procedures

7.1 Medical Facilities

The closest medical facility to the site is the Kingman Regional Medical Center, located at 3269 Stockton Hill Rd, Kingman, AZ. The medical center's phone number is 928-757-2101. The medical center is located 37 minutes away from the site; the route can be seen in Figure B.7.1 below.

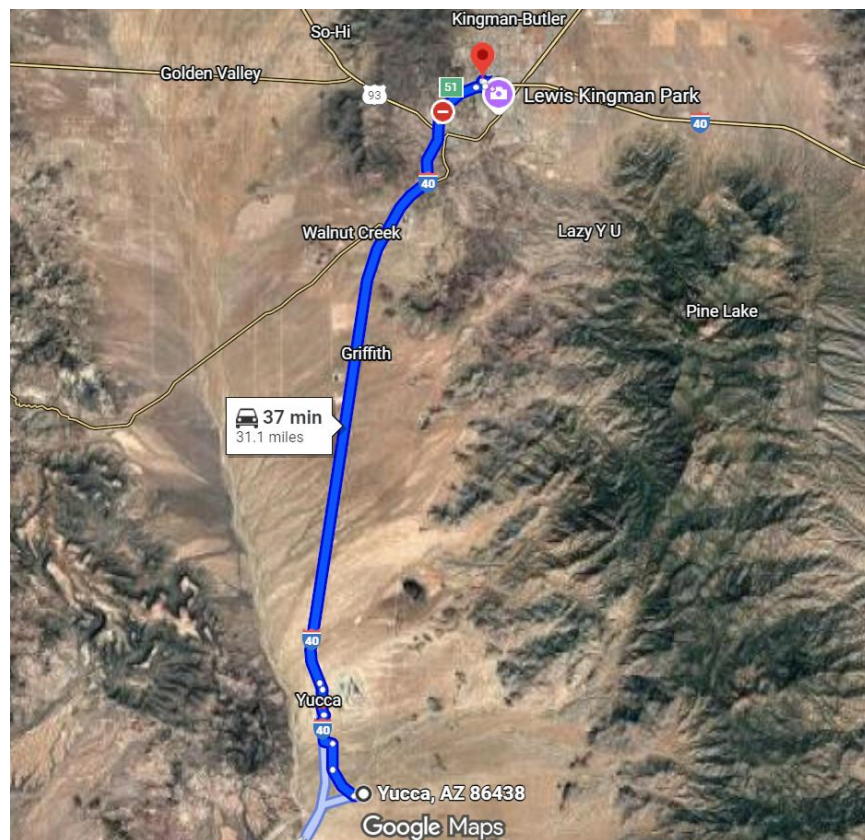


Figure B.7. 1: Medical Center

In case of any accident in the NAU Soils Lab, the NAU Clinic is located at 824 S San Francisco St, Flagstaff, AZ. The clinic's phone number is 928-523-2131. The clinic is 6 minutes away from the Engineering Building; the route can be seen in Figure B.7.2 below.

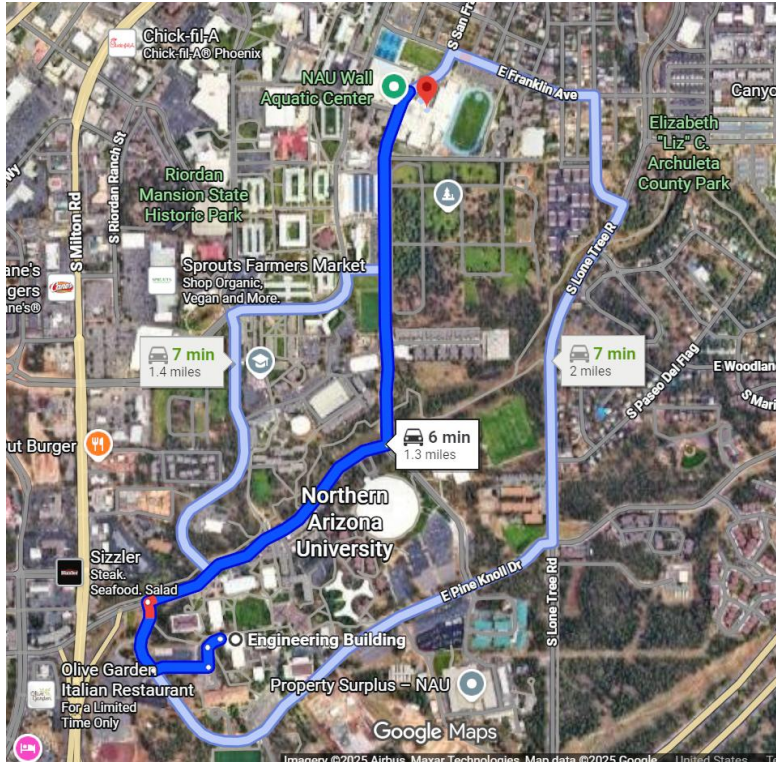


Figure B.7. 2: Northern Arizona Clinic

7.2 Emergency Contacts

Table B.3.3 below outlines an emergency contact list relevant to this project.

Table B.3. 3: Emergency Contacts

Name	Phone Number	Emergency Contact	Relationship	Contact Phone Number
Dr. Bridget Bero	(928) 607-2516	Charles Beadles	Spouse	(928) 607-8688
Dr. Wilbert Odem	(928) 863-8114	John Odem	Son	(928) 863 4340
Gloria Millanez	(480) 205-4476	David Millanez	Father	(602) 524-8905
Rashel Deleon	(928) 965-3738	Elena Deleon	Mother	(928) 965-2217
Annika Dillemath	(520) 904-2805	Amy Dillemath	Mother	(520) 904 -8801
Jazmin Montes De Oca	(602) 503-5828	Carter Park	Friend	(480) 600-2015