Mindy Mill Preliminary Assessment/Site Investigation Project Proposal
CENE 476

Prepared For:

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List of Abbreviations

ALM	Adult Lead Model
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	Conceptual Site Model
COC	Contaminant of Concern
EPA	U.S Environmental Protection Agency
FAA	Flame Atomic Absorption
HH&E	Human Health and the Environment
ICP	Inductively Coupled Plasma
IEUBK	Integrated Exposure Uptake Biokinetic Model
IRIS	Integrated Risk Information System
OSHA	Occupational Safety and Health Act
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action or Risk Assessment
RAP	Remedial Action Plan
RFD	Reference Dosages
RI	Remedial Investigation
XRF	X-Ray Fluorescence

1.0 Project Understanding

1.1 Project Purpose

The project includes a complete Preliminary Assessment and a Site Investigation for the Mindy Mill site near Yucca, Arizona (AZ), managed by the Bureau of Land Management (BLM). The project report is prepared for the purpose of surveying the Contaminants of Concern (CoCs) of the area, evaluating the associated risks to human and ecological health, to ensure that compliance is maintained in accordance to the Environmental Protection Agency (EPA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and will recommend remedial action if needed for the site. An assessment of the waste on site will also be conducted to decide if recovery of any constituents on site, e.g., silver, would be economically viable.

1.2 Project Background

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 1.1 below is a generalized location map for the Mindy Mill site.

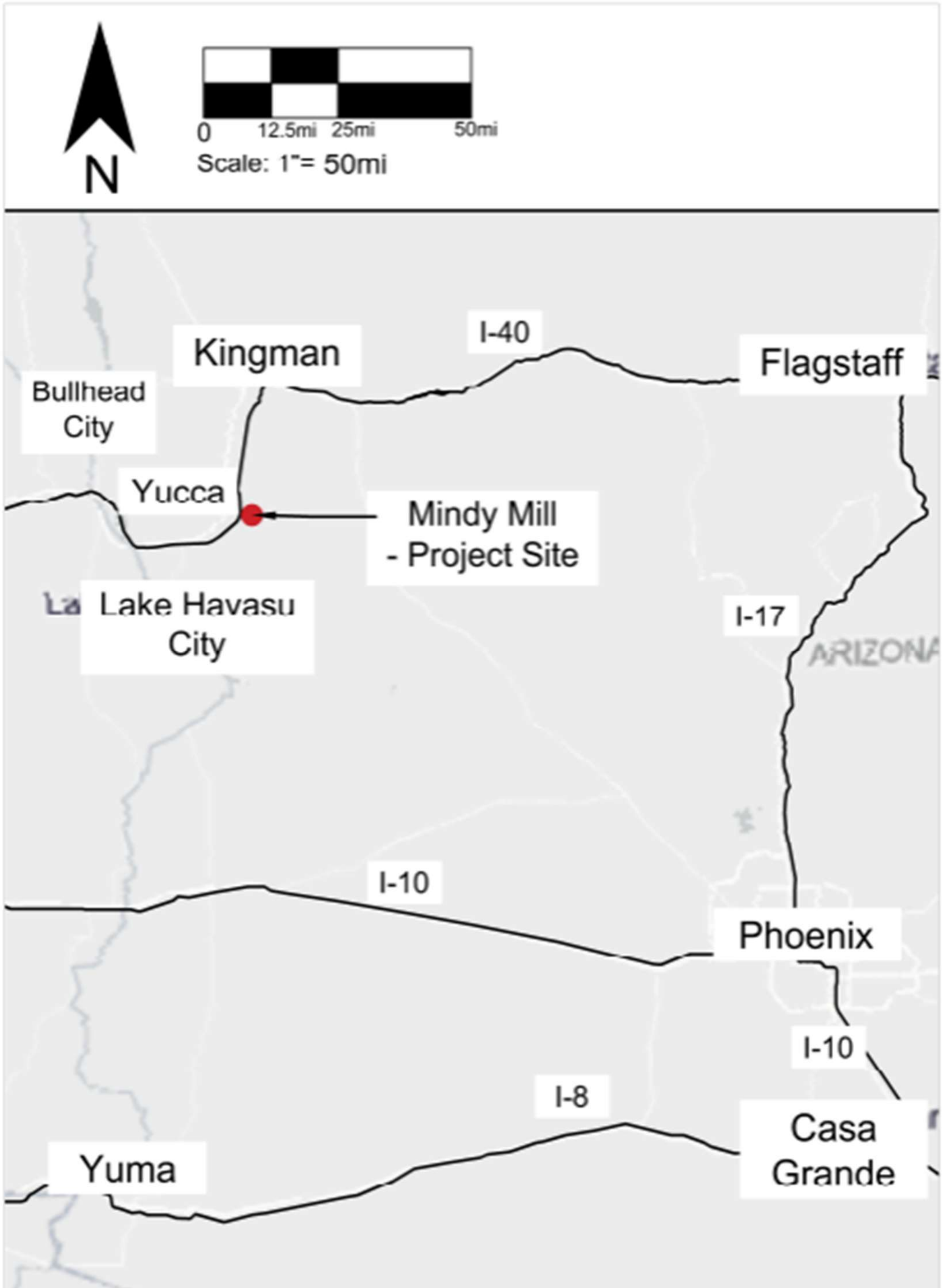

Figure 1. 1: Location Map

Figure 1.2 below displays the Mindy Mill site location with respect to the town of Yucca, AZ, as well as the Flag and McCracken Mines.

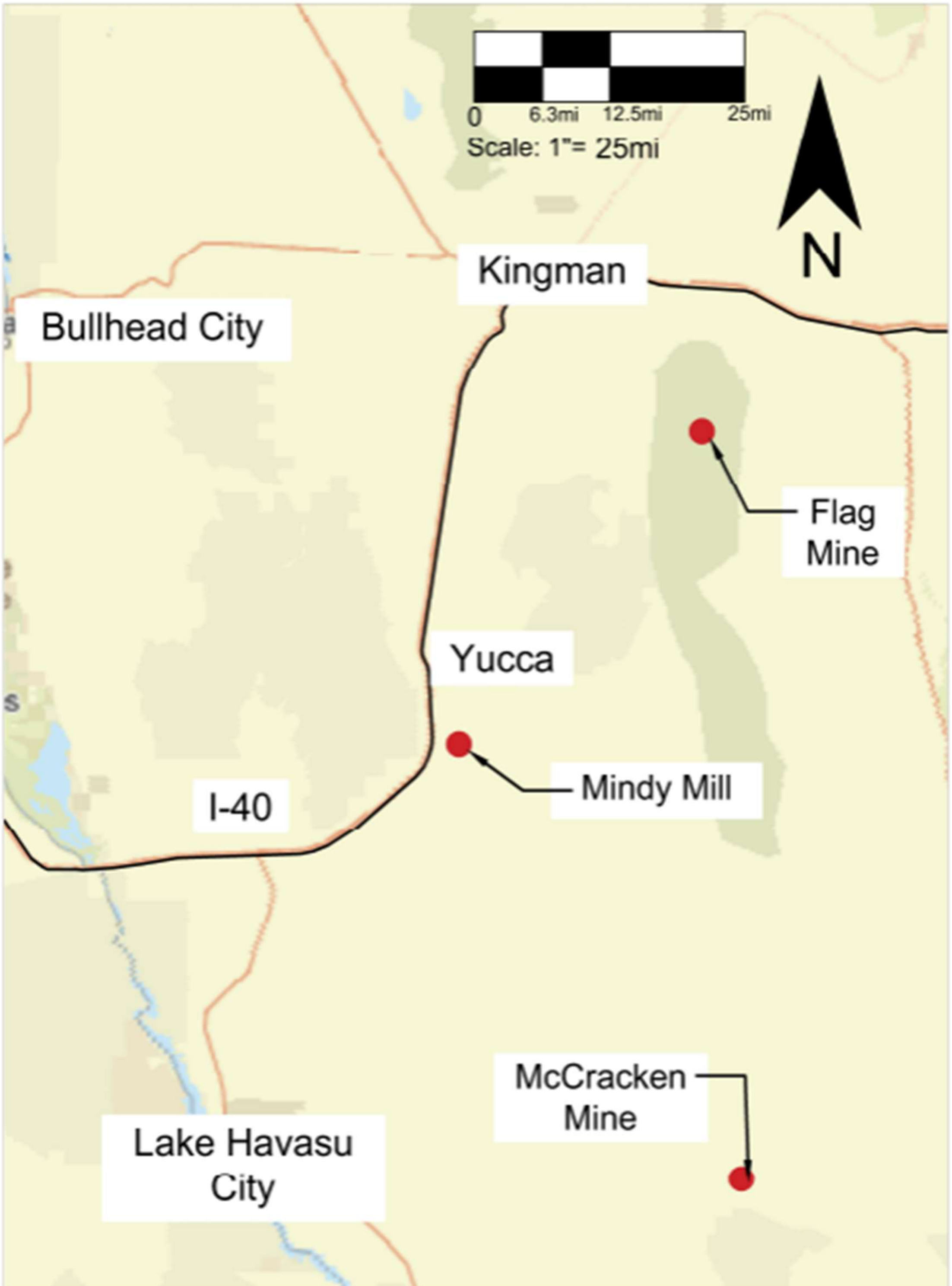

Figure 1. 2: Vicinity Map

Figure 1.3 below shows the Mindy Mill site, including site boundaries and the nearby wash. The Bar I-L Wash is downgradient from Mindy Mill and flows east to west.

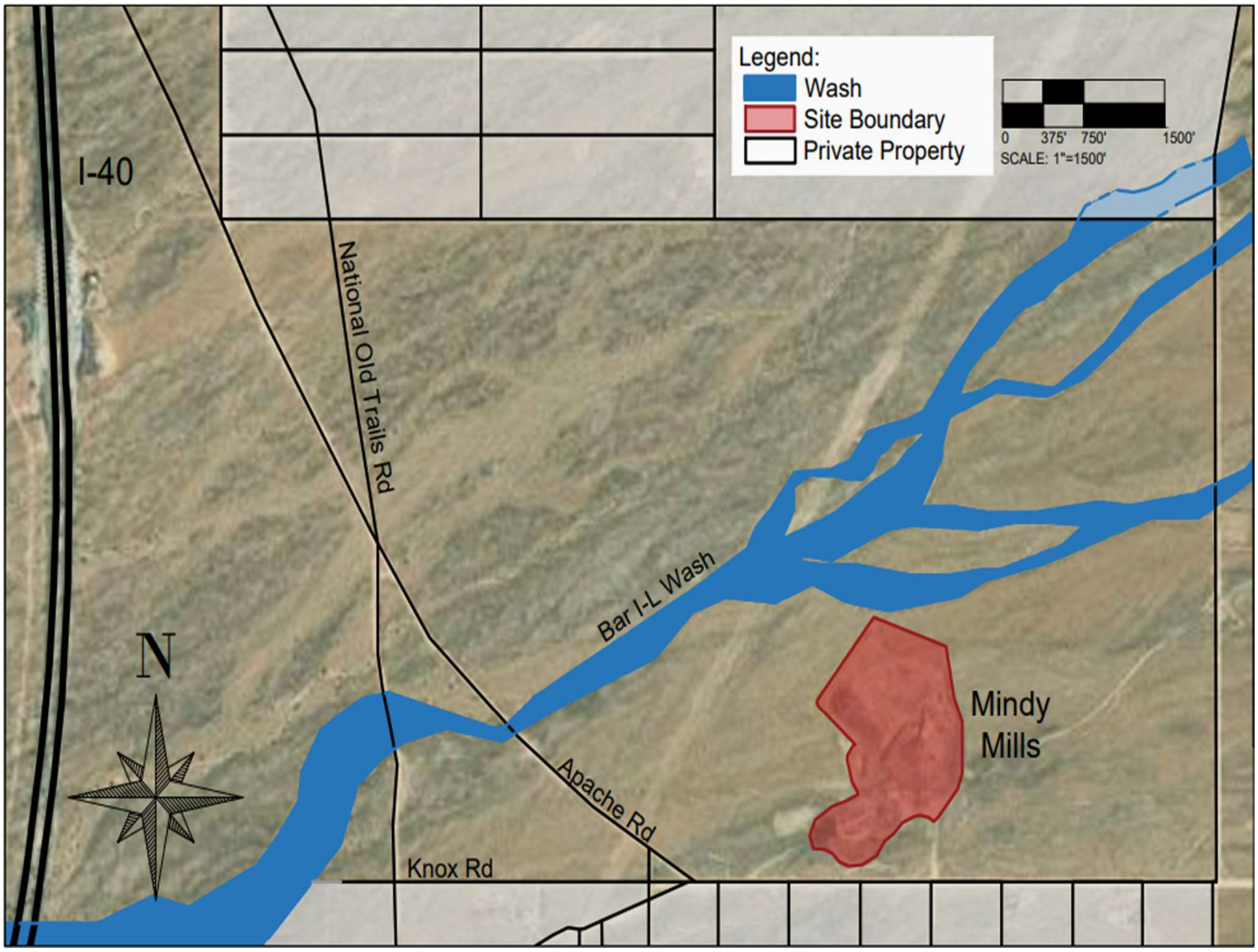

Figure 1. 3: Project Map

Figure 1.4 below displays the structures map of the Mindy Mill site. The site contains three tailings piles, varying mill structures for processing as well as ore piles southwest of the tailings.

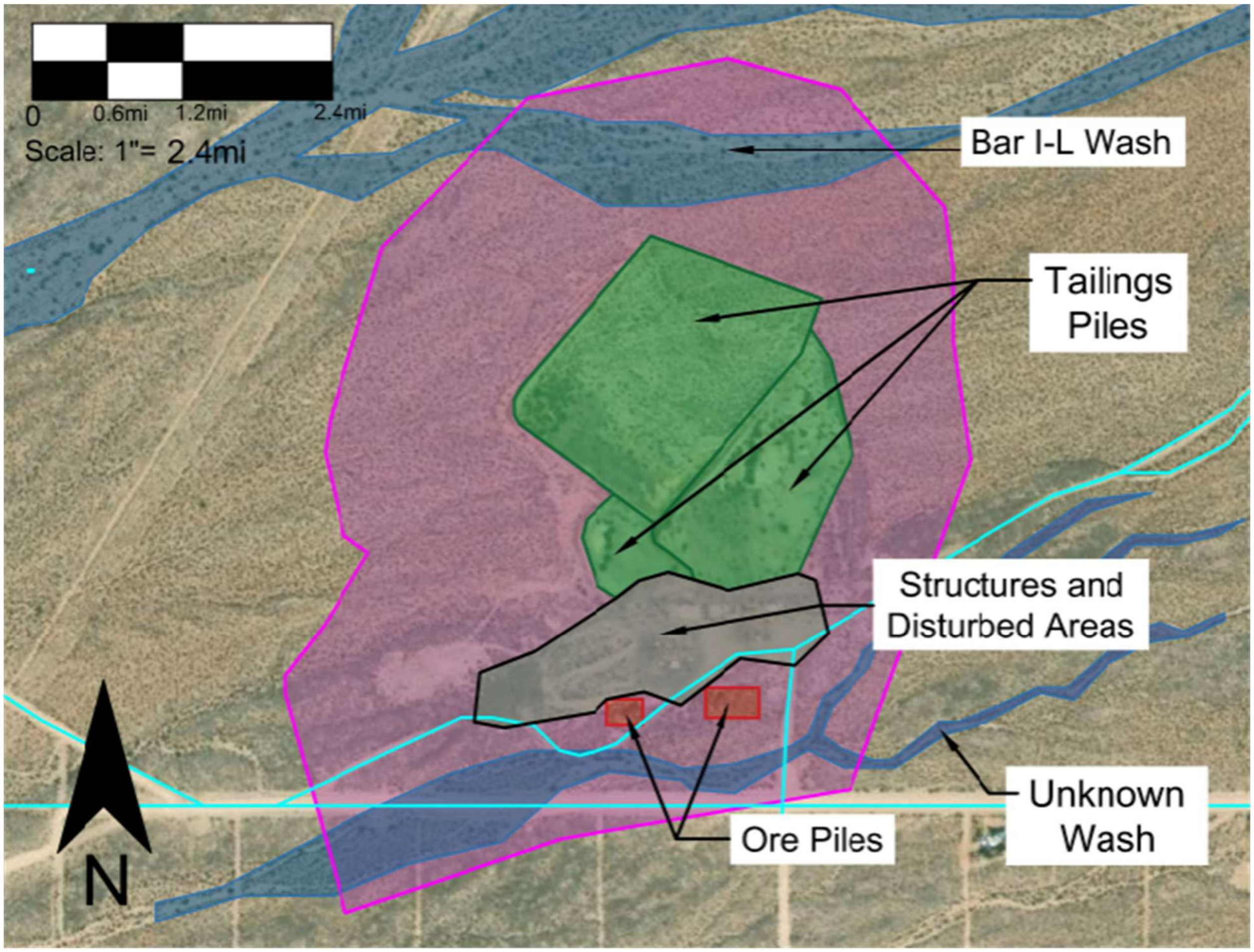

Figure 1. 4: Mill Structures

Mindy Mill began operations on October 1, 1984, and ceased operations on August 16, 1985. 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].

The nearby wash is of potential concern to runoff contamination from the Mindy Mill site tailings. The specific items and structures on the site location are unlabeled as there is minimal information on the buildings from the client.

1.3 Technical Considerations

The technical work for this project includes a site visit to walk around the site and document the condition of the site. This will be done through photos, and the purpose is to document the flora and fauna existing on the site. The photos will also serve to document the current conditions and existing structures at the site. The site visit will also include the analysis of CoC's by conducting a site sampling plan. The sampling plan will be developed before the sampling is done. For samples using X-Ray Fluorescence (XRF), the samples will undergo a sieve and moisture content analysis prior to using the XRF. This is to minimize inaccuracies when reading the concentrations of contaminants, which are mainly heavy metals. After collecting the results from the XRF the data will be verified using Inductively Coupled Plasma (ICP) as a secondary form of analysis to obtain more exact readings of Arsenic (As) and Lead (Pb) in the samples to compare to background data collected near the project site. Samples will also be taken from the site and prepared for further analysis at the NAU lab.

After completing XRF and confirmatory analysis, results are then compared to the safety standards to assess risks to Human Health and the Environment (HH&E). Along with the safety standards and risk assessment equations will be used to determine the level of risk each containment poses to the population. The Integrated Exposure Uptake Biokinetic Model (IEUBM) and Adult Lead Model (ALM) will also be used when assessing the risk of lead. For remedial action, if needed, deemed from the assessed risk, design options will be created and using a decision matrix. Then the design that scores the highest will be implemented. An engineer's opinion of the cost for implementing each of the designs will be calculated and broken down for each material and service used and will be used in determining what design will be used. Impact analysis of each design will also be considered, both positive and negative impacts, on the environment, social and economy.

1.4 Potential Challenges

One challenge of this project is funding the analysis needed for data confirmation at a commercial lab or a lab on the NAU campus. Also, inclement weather may require a change in sampling date, so a backup date must be established, considering the project's timelines.

1.5 Stakeholders

This project has the stakeholders of the Bureau of Land Management, the project of client Eric Zielske, and the surrounding public. The Bureau of Land Management is a stakeholder as the goal of their organization is to oversee and protect land for the use of future generations. The end goal of this project is remediation so that the area can be reused. Recreational users of the site may be exposed to any hazardous materials potentially present and therefore can be considered not only stakeholders but also potentially impacted users.

Additionally, these recreational users run the risk of tracking and transporting contaminants back to residential zones, placing nearby residents at risk. If there is work completed on the site, this can impact the nearby residents from any potential runoff from site; they are added to the list of stakeholders. Finally, NAU can be considered a stakeholder due to the project team being associated with the university.

2.0 Scopes of Services

2.1 Task 1.0: Project Work Plan

Prepare a plan that outlines goals, quality assurance/quality control (QA/QC) procedures, the project schedule, pertinent regulatory guidelines, and detailed laboratory and field procedures. The work plan establishes that all laboratory and field activities are conducted consistently and meet necessary standards.

2.1.1 Task 1.1: Sampling and Analysis Plan (SAP)

Develop an SAP that includes sampling decisions, field methods, lab procedures, QA/QC documentation, and other analytical processes. SAP will specify how duplicates, blanks, and spiked samples will be used to evaluate data accuracy and precision.

2.1.2 Task 1.2: Health and Safety Plan (HASP)

Develop HSAP identifying site hazards, the required PPE, and emergency procedures. The HASP will include site information, roles and responsibilities, and methods to ensure compliance with Occupational Safety and Health Administration regulations during laboratory and field work.

2.1.3 Task 1.3: Lab Binder

Prepare a lab binder that details laboratory procedures and protocols for safety, sample preparation, disposal, and cleanup. This binder must be approved by the CENE Lab Manager prior to lab work being conducted

2.2 Task 2.0: Site Activities

Conduct scheduled Site Investigation (SI) to document existing conditions, survey local flora and fauna by recording those viewed around the site and collecting soil samples following the Work Plan. Soil samples will be collected using the method of hand trowels to collect from the designated locations. Methods such as core sampling will not be utilized. The SI will confirm and update information on the contaminants of concern (CoCs) located on site to provide accurate data for later analysis. Data will be collected in-situ during the site visit using X-Ray Fluorescence (XRF) equipment. The GPS devices will be utilized to record where each sample is collected. Backup dates will be included for any weather-related delays.

2.3 Task 3.0: Laboratory Analysis

Prepare and analyze samples to determine contaminants of concern and their concentrations. These analyses will identify the extent of contamination and type to support following risk assessment and remedial planning.

2.3.1 Task 3.1: Moisture Content and Sieving

Dry and sieve soils to achieve homogeneity and prepare sieved samples for analysis. ASTM D2216-98 and ASTM D6913-04 will be used to dry and sieve the samples, ensuring consistency and improving the accuracy of the following analyses.

2.3.2 Task 3.2: X-Ray Fluorescence (XRF) Screening

Perform heavy metal and other contaminant screening (Ag, As, Au, Cu, Pb, Pt, etc.) utilizing the NITON XL3t GOLDD Model XRF from Thermo Fisher Scientific. All samples will be analyzed following the drying of the samples using ASTM D8064-16.

2.3.2.1 Task 3.2.1: Sample Preparation for XRF

Prepare dried and sieved samples to be logged, labeled, and arranged for consistent handling. Duplicates and blanks will also be prepared for QA/QC checks. This ensures that all samples are uniform and properly documented prior to analysis.

2.3.2.2 Task 3.2.2: Sample Analysis by XRF

Analyze prepared samples using XRF to determine concentrations of metals. Instrument calibration and QA/QC checks using reference materials will be performed to confirm accuracy. This provides rapid, preliminary contaminant data that guides confirmatory testing.

2.3.3 Task 3.3: Inductively Conductive Plasma Verification

Representative samples will be sent to Western Technologies, Inc. for confirmatory testing. The confirmatory testing will be subcontracted; Chain of Custody documents will be organized and prepared appropriately. A $2,500 budget is available for testing. Ten samples will be set aside for additional testing, and they will be selected based on any concerns or contaminants of interest identified by the client.

2.3.3.1 Task 3.3.1: Sample Preparation and Shipment

Ten samples will be selected and appropriately prepared to send to Western Technologies, Inc. for the confirmatory testing. Each sample will have it's chain of custody form and location label prior to shipping these samples out. From here, the samples will be shipped to the subcontractor for testing.

2.3.3.3 Task 3.3.2: XRF Adjustments

Once the samples have been received from the subcontractors, the team will then cross reference these results with that of the XRF and adjusted accordingly.

2.4 Task 4.0: Data Analysis

Process and interpret analytical data to determine which contaminants present potential risks. CoCs will be identified based on whether their measured concentrations exceed pertinent regulatory limits and background concentrations. This allows for potential CoCs to be recognized early and accurately before proceeding with a full risk evaluation.

2.4.1 Task 4.1: Identification of Human Health CoCs

Identify the CoCs that may pose a risk to Human Health and Safety (HH&S) by comparing analytical results to Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) and background soil concentration collected near the site. This provides a method to identify which contaminants should be evaluated further in the Human Health Risk Assessment.

2.4.2 Task 4.2: Identification of Ecological (ECO) CoCs

Identify the CoCs that may pose a risk to Ecological Health and Safey (EH&S) by comparing measured values to ecological screening benchmarks and background concentrations. This proves a method to identify contaminants that are relevant to the Ecological Risk Assessment.

2.4.3 Task 4.3: QA/QC

Perform QA/QC analysis according to the Work Plan using field duplicates, blanks, and spiked samples to verify the accuracy, precision, and reliability of laboratory results. This confirms that the analytical data meets the quality objectives before the risk assessment.

2.4.4 Task 4.4: CoC Mapping

Develop maps that show the spatial distribution and concentration of each contaminant across the site. These maps will help to visualize contaminant trends and highlight areas of concern for risk and remediation planning.

2.5 Task 5.0: Contaminant Migration Pathways

Develop maps showing contaminant levels and distributions, migration routes in air and water. Create a Site Conceptual Model (CSM) showing the sources, transport mechanisms, and receptors. This will define how contaminants move through the environment and identify potential exposure pathways.

2.6 Task 6.0: Risk Assessment - Human Health

Determine carcinogenic and non-carcinogenic risks associated with site contaminants.

2.6.1 Task 6.1: HH COC Exposure Point Concentration (EPCs)

Quantify risk for each contaminant of concern and exposure scenario. Finding the contaminant data distributions within the 50% and 95% EPCs. Calculate 50% and 95% EPCs for each CoC and exposure scenario. EPCs provide indicative exposure levels used in risk modeling.

2.6.2 Task 6.2: Toxicology Assessment

Use EPA's Integrated Risk Information System (IRIS) to obtain non-carcinogenic Reference Dosages (RfDs) and carcinogenic slope factors. The Integrated Exposure Uptake Biokinetic (IEUBK) and Adult Lead Models (ALM) will also be applied for lead screening. This provides the values of toxicity needed to assess human health risk.

2.6.3 Task 6.3: Exposure Assessment

Develop exposure scenarios for human use at the site to develop intake doses of the CoCs. This estimates the amount of each contaminant an individual could contract under realistic conditions.

2.6.4 Task 6.4: Risk Characterization

Compute carcinogenic and noncarcinogenic risk for each exposure scenario from exposure assessment. This identifies which contaminants exceed acceptable risk limits.

2.7 Task 7.0: Risk Assessment - Ecological

Identify species and habitats that are at risk with descriptions and qualitatively assess ecological impacts and uncertainties.

2.7.1 Task 7.1: Species and Habitat Evaluation

Determine species on-site, researching sensitive or threatened species, and their potential exposure pathways. This defines which species could be affected by contamination and severity.

2.7.2 Task 7.2: ECO Risk Levels

Estimate the ecological risk levels for the identified species using the EPA guidelines for performing an ecological risk assessment. This evaluates the likelihood of adverse ecological effects.

2.7.3 Task 7.3: Qualitative Assessment of ECO Risk

Assess the ecological risk by comparing the ECO risk level to the known COC levels on-site. This summarizes the ecological risk effects in qualitative terms for inclusion in the overall risk decision.

2.8 Task 8.0: Remedial Action Development

Develop and evaluate potential remediation options for contaminants of concern identified through data analysis and risk assessments.

2.8.1 Task 8.1: Development of RAOs

Identify Remedial Action Outlines (RAOs) that install specific cleanup or management goals based on the results of the human health and ecological risk assessment.

2.8.2 Task 8.2: Remedial Alternatives

Identify and combine feasible technology into remedial alternatives that address each Remedial Actions Objective (RAO). The team will identify evaluation criteria and weighting based on the client’s priorities before final design selection. This creates a structured approach to compare cleanup options using criteria that express the client's objectives.

2.8.3 Task 8.3: Selection of Preferred Alternative

Evaluate the remedial alternative using a decision matrix developed from the client's selected criteria and weightings. The alternative that ranks the highest will be selected as the preferred option. An estimate of the cost to implement the selected alternative will also be prepared to support feasibility assessment. This step identifies the most practical and cost-effective remediation option for the site.

2.9 Task 9.0: Economic and Resource Recovery Assessment

Estimate the volume and potential economic value of recoverable metals in areas with elevated concentrations to assess whether resource recovery could offset remediation costs or justify the effort and time required for recovery.

2.10 Task 10.0: Project Impacts

Assess the positive and negative regulatory, environmental, social, and economic impacts of project findings and potential remedial options. This identifies how project outcomes may affect stakeholders and surrounding communities.

2.11 Task 11.0: Project Deliverables

2.11.1 Task 11.1: 30% Project Deliverable

Submit the Project Understanding report and presentation for review, with tasks 1-3 done. Tasks 1-3 are related to site investigation with preparation of samples for XRF analysis and ICP verification. This early submission allows for feedback before major analyses begin.

2.11.2 Task 11.2: 60% Project Deliverable

Incorporate comments from the 30% project deliverable and continue report and presentation progress with the inclusion of tasks 4-7, with the exclusion of tasks 6.3 and 6.4. These tasks are related to the interpretation and mapping of contaminants from the site. This verifies the mid-project progress and incorporation of revisions.

2.11.3 Task 11.3: 90% Project Deliverable

Submit the 90% report, poster, draft final presentation, and the website to the client for review, with the completion of tasks 7-10. Tasks 6.3 and 6.4 will also be completed for this deliverable. Tasks for this deliverable continue data analysis and completion, developing alternatives with a selected choice, waste resource recovery, and the impacts of the project. This provides a near-final draft for an encompassing evaluation.

2.11.4 Task 11.4: Final Report

The final report, final presentation, and final website will be submitted to the client. This focuses on completion of project deliverables and documentation of project management.

2.12 Task 12.0: Project Management

2.12.1 Task 12.1: Meetings and Communication

Schedule and document team, client, and grading instructor meetings. Documentation of meetings will be utilized to update the Gantt chart and track completion of project requirements. This maintains clear communication and documentation throughout the project.

2.12.2 Task 12.2: Schedule Management

Maintain and update the Gantt chart with estimated and actual duration for all tasks. This ensures that the project remains on schedule and identifies any delays early.

2.12.3 Task 12.3: Resource Management

Track budget and staffing hours. There is a budget of $2,500 allotted to the team for housing, gas, and sampling verification. This monitors resource us and keeps project expenses within limits.

2.13 Exclusions

Air and water sampling will not be conducted. No full-scale remediation design or construction will be implemented. These exclusions clarify the limits of the project's scope.

3.0 Schedule

3.1 Duration and Content

The project duration is a total of 137 days, with the exclusion of weekends. The project preparation begins October 24th, 2025, and all project activity ends on May 4th, 2026. The Gantt chart that displays the project task schedule is seen in Appendix A, excluding weekends.

The time estimated for the major tasks are as seen below:

- Task 1.0: Project Work Plan (25 days)
- Task 2.0: Site Activities (4 days)
- Task 3.0: Laboratory Analysis (23 days)
- Task 4.0: Data Analysis (19 days)
- Task 5.0: Contaminant Migration Pathways (8 days)
- Task 6.0: Risk Assessment – Human Health (20 days)
- Task 7.0: Risk Assessment – Ecological (5 days)
- Task 8.0: Remedial Action Development (10 days)
- Task 9.0: Economic and Resource Recovery Assessment (6 days)
- Task 10.0: Project Impacts (7 days)
- Task 11.0: Project Deliverables (69 days)
- Task 12.0: Project Management (137 days)

The following table details the project deliverables and their due dates:

Table 1: Project Deliverables and Deadlines

Project Deliverable	**Tasks to be Completed**	**Due Date**
30% Report	1-3	February 10th, 2026
60% Report	4-7, excluding 6.3 and 6.4	March 17th, 2026
90% Report	6.3, 6.4, 8-10	April 23rd, 2026
Final Presentation	All tasks and responses to feedback	May 1st, 2026
Final Report	Any additional responses to feedback	May 5th, 2026

3.2 Critical Path

The preparation for the site investigation begins within the first semester of the 2025-2026 school year. The tasks to begin preparation include the project work plan which consists of SAP, HASP, and Lab Binder. While these deliverables are not due as a part of the CENE 476 course work, they are included in the critical path because they are essential for completing following site and laboratory activities. Their completion ensures that all field and laboratory work can proceed according to established regulatory and safety requirements. To maintain the timing and duration of the items on the critical path, the team will section the work off and assign other deadlines within the set due date for each item so that the team may help each other keep checks for each deliverable. Additionally, weekends and spring breaks provide available float time that can be used to recover from schedule delays or complete any outstanding work if necessary.

The critical path is the longest order of activities in a project that must be completed on time for the entire project to be finished on schedule. The critical path, highlighted in red on the Gantt chart, includes:

- Task 1.1, 1.2, 1.3 (Work Plan)
- Task 2.0 (Site Investigation)
- Task 3.1, 3.2, and 3.3 (Laboratory Analysis)
- Task 4.4 (CoC Mapping)
- Task 5.0 (Contaminant Migration Pathways)
- Task 6.1, 6.2, 6.3, 6.4 (Risk Assessment – HH)
- Task 8.1, 8.2, 8.3 (Remedial Action Development)
- Task 10.0 (Project Impacts)
- Task 11.1, 11.2, 11.3, 11.4 (Project Deliverables)

4.0 Staffing Plan

4.1 Qualifications and Positions

The project team consists of a team of four personnel, a senior engineer, an engineer, lab technician, and engineering intern. The responsibilities and qualifications are as described below.

4.1.1 Senior Engineer (SENG)

The senior engineer will be the project manager; they will oversee the project's timeline and ensure the completion of each deliverable. They must have at least a master's degree in environmental engineering and must be a registered Professional engineer. They must also have at least ten years of experience to be knowledgeable about the roles and aspects of the project.

4.1.2 Engineer (ENG)

The engineer will be performing the majority of the work and have the senior engineer verify their work. They must have at least a bachelor's degree in environmental engineering and have passed the Environmental Engineering Fundamentals of Engineering exam. They must also have experience in the field related to the project such as human risk, soil sampling, and analysis.

4.1.3 Lab Technician (TECH)

The lab technician will assist in soil sampling and analysis. They will have all the proper certifications, required training in lab safety, and lab equipment procedures.

4.1.4 Engineering Intern (INT)

The engineering intern will assist whenever possible and appropriate. They will be a current environmental engineering student enrolled in an ABET accredited university. They must have a minimum GPA of 3.0 and have completed their sophomore year so to ensure they have the course experience necessary to complete these tasks. All tasks done by the intern will be supervised and verified by other professionals on the team.

4.2 Project Staffing

The project will take an estimated 658 hours to complete. The hours worked by each position are as follows: the senior engineer will work 95 hours, the engineer will work 247 hours, the lab technician will work 124 hours, and the engineering intern will work 192 hours. Table 4.1 shows the breakdown of each role and their hours for each task.

Table 4. 1 Staffing Hours

Task	SENG	ENG	TECH	INT	Task Total
Task 1.0: Project Work Plan					**64**
Task 1.1: Sampling and Analysis Plan (SAP)	5	15	0	2	22
Task 1.2: Health and Safety Plan (HASP)	5	15	0	2	22
Task 1.3: Lab Binder	0	5	9	6	20
Task 2.0: Site Activities	20	20	20	20	**80**
Task 3.0: Laboratory Analysis					**164**
Task 3.1: Moisture Content and Sieving	0	2	48	48	98
Task 3.2: X-Ray Fluorescence Screening					
Task 3.2.1: Sample Preparation for XRF	0	3	3	1	7
Task 3.2.2: Sample Analysis by XRF	0	2	32	16	50
Task 3.3: Inductively Conductive Plasma Verification (sub-contracted)					
Task 3.3.1: Sample Prep and Shipment	1	1	2	1	5
Task 3.3.2: XRF Adjustment	1	2	0	1	4
Task 4.0: Data Analysis					**53**
Task 4.1: Identification of HH CoCs	2	8	0	4	14
Task 4.2: Identification of ECO CoCs	2	8	0	4	14
Task 4.3: QA/QC	2	1	5	1	9
Task 4.4: CoC Mapping	4	8	0	4	16
Task 5.0: Contaminant Migration Pathways	0	20	0	10	**30**
Task 6.0: Risk Assessment - Human Health					**63**
Task 6.1: HH CoC EPCs	2	10	0	5	17
Task 6.2: Toxicology Assessment	1	2	0	2	5
Task 6.3: Exposure Assessment	2	15	0	7	24
Task 6.4: Risk Characterization	2	10	0	5	17
Task 7.0: Risk Assessment - Ecological					**59**
Task 7.1: Species and Habitat Evaluation	2	20	0	10	32
Task 7.2: ECO Risk Levels	1	6	0	3	10
Task 7.3: Qualitative Assessment of ECO Risk	2	10	0	5	17
Task 8.0: Remedial Action Development					**12**

Table 4. 2 Continued

Task	SENG	ENG	TECH	INT	Task Total
Task 8.1: Development of RAOs	1	2	0	1	4
Task 8.2: Remedial Alternatives	1	8	0	4	13
Task 8.3: Selection of Preferred Alternatives	4	5	0	3	12
Task 9.0: Economic and Resource Recovery Assessment	2	5	0	3	**10**
Task 10.0: Project Impacts	1	3	0	1	**5**
Task 11.0: Project Deliverables					**66**
Task 11.1: 30% Project Deliverable	4	8	0	4	16
Task 11.2: 60% Project Deliverable	4	8	0	4	16
Task 11.3: 90% Project Deliverable	4	8	0	4	16
Task 11.4: Final Project Report	6	8	0	4	18
Task 12.0: Project Management					**35**
Task 12.1: Meetings and Communication	5	5	5	5	20
Task 12.2: Schedule Management	5	2	0	1	8
Task 12.3: Resource Management	4	2	0	1	7
Subtotal Hours	95	247	124	192	
Total Hours	658				

5.0 Cost of Engineering Services

The estimated total cost of the project is $98,033. The breakdown of the estimated total is shown in Table 5.1. The personnel billing rate costs were calculated with the inclusion of salary, benefits, overhead, and profit margins. The cost of travel includes the van, lodging, and meals for 6 people during the two-day site visit. The cost of the supplies includes all the equipment and tools needed for the site visit. The cost of analysis includes the rental of the NAU Soils Lab and the subcontract with Western Technologies Inc.

Table 5. 1: Cost of Engineering Services Summary

Summary Cost of Engineering Services					
Subsection	Classification	Hours	Rate	Unit	Cost ($)
Personnel	Senior Engineer	95	325	$/hr	30,875
	Engineer	247	182	$/hr	44,954
	Lab Technician	124	65	$/hr	8,060
	Intern	192	33	$/hr	6,336
	Total Personnel				90,225
Travel	Classification	Quantity	Rate	Unit	Cost ($)
	NAU Mileage Rate (1 round trip)	391	0.67	$/mile	262
	Rental: NAU Large 4WD SUV	2	56	$/day	112
	Hotel 1 Night; 4 rooms	4	100	$/night	400
	PerDiem; 5 Persons, 2 days	10	30	$/day-person	300
	Total Travel				1,074
Supplies	Classification	Quantity	Rate	Unit	Cost ($)
	Ziploc Gallon Freezer Bags, 200ct	1	17	$/pack	17
	Trowel	12	5	$/trowel	60
	Dish Soap	1	5	$/Dish Soap	5
	Marking Flags, 50ct	2	8	$/pack	16
	5-gallon Buckets with Lids	4	8	$/bucket	32
	Large Bins	4	12	$/bin	48
	Water, Gallon	10	2	$/gallon	20
	Paper Towels, 2 pack	1	5	$/pack	5
	Sharpie Pens, 5 pack	2	5	$/pack	10
	Field Logbooks	4	8	$/notebook	32
	Gloves, 1000ct	1	45	$/pack	45
	Trash Bags, 30 Gallon, 50ct	1	11	$/pack	11
	Clip Board, 2ct	2	8	$/pack	16
	Scrub Brushes, 4ct	1	17	$/pack	17
	Total Supplies				334

Table 5. 2: Continued

Summary Cost of Project					
	Classification	Quantity	Rate	Unit	Cost ($)
Analysis	Rental: NAU XRF Device	10	300	$/day	3,000
	Rental: NAU Soils Lab	20	100	$/day	2,000
	Rental: NAU Survey GPS	2	100	$/day	200
	Total Analysis				5,000
Subcontract	Western Technologies Inc.	10	140	$/sample	1,400
Total Cost					98,033

6.0 References

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

7.0 Appendices

Appendix A – Schedule Gantt Chart