

Part III Annex I

## Cultural Heritage Management Plan

Version 2.0

January 2015

### Yara Dallol Potash Project, Danakil Depression, Ethiopia

Document Ref.	Prepared By	Reviewed By	Date Submitted to Yara Dallol BV for Review
0224244_V1.0_CHMP	Douglas Park and Emlen Myers	Dieter Rodewald and Mike Everett	14 October 2014
0224244_V2.0_CHMP			January 2015

This report has been prepared by Environmental Resources Management (ERM) the trading name of Environmental Resources Management Southern Africa (Pty) Limited, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.



## CONTENTS

	<i>LIST OF ACRONYMS</i>	2
	<i>DEFINITIONS</i>	1-1
1	<i>INTRODUCTION</i>	1-1
1.1	<i>POLICY STATEMENT AND OBJECTIVES</i>	1-1
1.2	<i>PURPOSE AND SCOPE</i>	1-2
1.3	<i>LINKAGE TO OTHER ENVIRONMENTAL AND SOCIAL PLANS</i>	1-2
2	<i>SUMMARY OF LEGAL AND OTHER REQUIREMENTS</i>	2-1
2.1	<i>NATIONAL LEGISLATION AND POLICY</i>	2-1
2.2	<i>NATIONAL GUIDELINES AND STANDARDS</i>	2-3
2.3	<i>IFC PERFORMANCE STANDARDS</i>	2-3
3	<i>OVERALL ACCOUNTABILITY AND RESPONSIBILITY FOR THIS PLAN</i>	3-1
4	<i>CULTURAL HERITAGE IMPACT MANAGEMENT</i>	4-1
4.1	<i>SUMMARY OF IMPACT MANAGEMENT</i>	4-1
4.2	<i>MANAGEMENT PLAN (CONSTRUCTION AND OPERATION)</i>	4-1
5	<i>VERIFICATION AND MONITORING</i>	5-2
5.1	<i>OVERVIEW</i>	5-2
5.2	<i>VIBRATION IMPACT MONITORING AT CULTURAL HERITAGE SITES</i>	5-2
5.3	<i>COMMUNITY COMPLAINTS</i>	5-2
6	<i>REPORTING AND DOCUMENTATION</i>	6-3
6.1	<i>GOVERNMENT/AUTHORITY, LENDER AND INTERNAL REPORTING</i>	6-3
6.2	<i>COMMUNITY REPORTING</i>	6-3
7	<i>CULTURAL HERITAGE MANAGEMENT PLAN SUMMARY</i>	7-1
8	<i>REFERENCES CITED</i>	8-1

## *LIST OF ACRONYMS*

<b>Abbreviation</b>	<b>Full Definition</b>
ACH	Archaeological Cultural Heritage
CHMP	Cultural Heritage Management Plan
ARCCH	Authority for Research and Conservation of Cultural Heritage
CH	Cultural Heritage
ESIA	Environmental and Social Impact Assessment
LCH	Living Cultural heritage

## DEFINIITIONS

The following definitions are of relevance within this Cultural Heritage Management Plan (CHMP):

- **Cultural Heritage** - Research and Conservation of Ethiopian Cultural Heritage are regulated by Proclamation No.209/2000. The proclamation defines 'Cultural Heritage' as anything tangible or intangible which is the product of creativity and labour of man, in either pre-historic or historic times, that describes and witnesses to the evolution of nature and which has a major value in its scientific, historical, cultural, artistic and handicraft contents. According to Proclamation 209/2000, Cultural Heritage is divided into tangible and intangible heritage.

**'Tangible Cultural Heritage'** is defined as:

*"Cultural heritage that can be seen and felt and includes immovable or moveable historical and manmade cultural heritage".*

**'Immovable Cultural Heritage'** means

*"Cultural heritage attached to the ground with a foundation and which can be moved only by dismantling and shall include: sites where cultural heritage have been discovered, paleontological historic and pre-historic archaeological places; buildings, memorial places, monuments and palaces; remains of ancient towns, burial places, cave paintings, and inscriptions as well as church, monastery, mosque or any other places of worship".*

**'Movable Cultural Heritage'** is defined as:

*"Cultural heritage not attached to the foundation and that can be moved from place to place easily and which are handed down from the past generation and shall include: parchment manuscripts, stone paintings and implements, sculptures and statues made of gold, silver, bronze, iron, copper or of any other mineral or wood, stone, inscriptions of skin, ivory, horn, archaeological and bone or earth or of any other material, and also paleontological remains; written and graphic documents or cinematographic and photographic documents or sound and video recordings; coins made of gold, silver, bronze, copper or of any other materials; and ethnographic implement, ornament or any other cultural object of nations, nationalities and peoples".*

**'Intangible Cultural Heritage'** - is defined as *"any Cultural Heritage that cannot be felt by hands or ears, and includes different kinds of performances and show, folklore, religious, belief, wedding and mourning ceremonies, music, drama, literature and similar other cultural values, traditions and customs of nations, nationalities and peoples".*

- **Replicable Cultural Heritage** – defined as:

*“Tangible forms of cultural heritage that can be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures. Archaeological or historical sites may be considered replicable where the particular eras and cultural values they represent are well represented by other sites and/or structures”.*

- **Nonreplicable Cultural Heritage** – Is more important than replicable cultural heritage and may relate to the social, economic, cultural, environmental, and climatic conditions of past peoples, their evolving ecologies, survival strategies, and early forms of environmental management and adaptation, where the:

- Cultural heritage is unique or highly unusual for the period it represents; or
- Cultural heritage is unique or highly unusual in linking several periods in the same site.

- **A Chance Find** – defined as:

*“Any cultural heritage site or associated material encountered during the course of construction works, as opposed to a find made in the course of intentional archaeological investigation. Chance Finds include, but are not limited to artefacts, archaeological deposits, ruins, monuments, and human remains”.*

- **A Cairn** – defined as:

*“a manmade cultural feature of piled or stacked stones. Cairns are a common cultural heritage feature of prehistoric societies and they are known to serve multiple functions, including: burial markers, territorial or location markers, or centres of ritual or ceremonial activity”.*

Yara International is a leading global fertilizer company with sales of fertilizer to about 150 countries globally. As part of Yara International's overall upstream strategy, the company is exploring for suitable raw sources that can be developed and used as a source to Yara International's global fertilizer production and directly as finished product in its product portfolio. To complement these upstream processes, Yara International has recently started a subsidiary company, Yara Dallol BV, which is involved in the exploration and mining development of potash concessions in Ethiopia. These concessions are located in the Danakil Depression, Afar National Regional State (ANRS), Ethiopia. Yara International, through its subsidiary, proposes to develop a potash mine - the Yara Dallol Potash Project (hereafter referred to as the proposed Project) within these concession areas.

As part of the environmental approval process for the Project a suite of environmental and social management plans is needed to address the issues identified in the Environmental and Social Impact Assessment (ESIA). Several management plans have been developed to address impacts identified in the ESIA and are implemented as part of an environmental management system for the Yara Dallol Potash Project.

Several activities associated with the Project will impact cultural resources at a moderate scale. This Cultural Heritage Management Plan (CHMP) has been compiled to address the specific impacts that are anticipated to occur as a result of planned mining developments as identified in the ESIA and associated impact assessment. This plan sets out a formal system by which Yara Dallol BV can manage mitigation measures that will reduce the impacts to Cultural Heritage

Specifically, this CHMP seeks to provide detail regarding the implementation of avoidance, mitigation and management measures for impacts related to the Yara Dallol Potash Project and items of archaeological or cultural heritage significance.

## **1.1**

### **OBJECTIVES**

The objectives of this CHMP are as follows:

- Identify the framework for compliance with Ethiopian National Law and IFC Performance Standards.
- Establish the potential for sub-surface remains through pre-construction archaeological test excavations.
- Describe several mitigation measures to be implemented during construction, operational and decommissioning phases of the Project.

- Outline a Chance Finds Program to manage the discovery of Chance Finds during the construction phase.
- Establish an appropriate Cultural Heritage Training Program for Project management and staff.
- Define the roles and responsibilities for implementing the above management and mitigation measures.

## 1.2 *PURPOSE AND SCOPE*

The purpose of this CHMP is to provide specific and updated management and mitigation measures, including a clear set of actions and responsibilities for the control of impacts affecting cultural heritage resources within the Project's area of influence. Cultural heritage is a scientific and historical resource as well as a key mechanism that supports local cultural identity. Cultural heritage can also serve to support community development and can be the basis for establishing a beneficial relationship between the Project and local communities.

The impacts from the Project are described in detail in the ESIA, which reflects the significance of impact and suggested management measures to address them. This CHMP sets out initial steps within a high level framework, but requires implementation in a detailed policy and set of management procedures.

The scope of this CHMP covers pre-construction, construction, operational and decommissioning/closure phases of the Project. Specifically, this CHMP primarily address's Archaeological Cultural Heritage (ACH). Living Cultural Heritage (LCH) and sites actively used by living traditional communities is largely covered by the socio-economic study.

This plan should be considered to be a "living" document that is amended in light of the learning experienced during its implementation.

## 1.3 *LINKAGE TO OTHER ENVIRONMENTAL AND SOCIAL PLANS*

This CHMP should be read in the context of the ES-MS (discussed in *Chapter 13 of Part I the ESIA*), which has been structured to provide a vehicle for the integrated management of the suite of management plans described in *Part III*, which have been designed to address a broad range of social and environmental risks.

It is recognised that the ES-MS and associated plans are living tools that will be constantly updated to accommodate changing circumstances.

The CHMP links with the Community Health, Safety and Security Management Plan (CHSSMP). Details of this link are described in *Table 1.1* below.

**Table 1.1** *Details of Linkages between the CHMP and Other Management Plans associated with the Yara Dallol Potash Project*

Management Plan	Overlap of the CHMP with Content of Other Plans
<b>CULTURAL HERITAGE MANAGEMENT PLAN</b>	
Community Health, Safety and Security Management Plan (CHSSMP)	Living Cultural Heritage (LCH) such as communal areas and other tangible aspects that are to be found within the boundaries of a modern village were more thoroughly addressed by the socio-economic study.
Community Health, Safety and Security Management Plan (CHSSMP)	Intangible Cultural Heritage, such as local folklore and belief systems were also more thoroughly addressed by the socio-economic study.

A summary of the legal requirements and standards relevant to the CHMP are presented below.

## 2.1 NATIONAL LEGISLATION AND POLICY

The following Ethiopian regulation informed the development of this CHMP:

### 2.1.1 *Constitution of the Federal Democratic Republic of Ethiopia*

Article 51(3) of the Constitution of the Ethiopia (1995) states that the Federal Government –

*“Shall establish and implement national standards and basic policy criteria for public health, education, science, and technology as well as for the protection and preservation of cultural and historical heritage.”*

The concept of sustainable development and environmental rights are also established in article 43, 44 and 92 of the Constitution.

### 2.1.2 *Cultural Policy of Ethiopia (1997)*

Based on the Constitution, the Council of Ministers of Ethiopia endorsed the Cultural Policy of Ethiopia in October 1997 and one of its main objectives is to enable the languages, heritage, history, handicraft, fine arts, oral literature, traditional lore, beliefs and other cultural features of the various nations, nationalities and peoples of Ethiopia to receive equal recognition. In addition the Cultural Policy states their objective is to respect, preserve and conserve these and pass them over to future generations.

### 2.1.3 *Research and Conservation of Cultural Heritage Proclamation (209/2000)*

Research and conservation of Ethiopian cultural heritage are regulated by Proclamation No.209/2000. The proclamation defines ‘Cultural Heritage’ as anything tangible or intangible which is the product of creativity and labour of man, in either pre-historic or historic times, that describes and witnesses to the evolution of nature and which has a major value in its scientific, historical, cultural, artistic and handicraft contents. According to Proclamation 209/2000, Cultural Heritage is divided into tangible, immovable and movable cultural heritage.

- **Tangible Cultural Heritage** – is defined as: *“cultural heritage that can be seen and felt and includes immovable or moveable historical and manmade cultural heritage”*.

- **Immovable Cultural Heritage** – is defined as: “cultural heritage attached to the ground with a foundation and which can be moved only by dismantling and shall include: sites where cultural heritage have been discovered, paleontological historic and pre-historic archaeological places; buildings, memorial places, monuments and palaces; remains of ancient towns, burial places, cave paintings, and inscriptions as well as church, monastery, mosque or any other places of worship”.
- **Movable Cultural Heritage** is defined as: “cultural heritage not attached to the foundation and that can be moved from place to place easily and which are handed down from the past generation and shall include: parchment manuscripts, stone paintings and implements, sculptures and statues made of gold, silver, bronze, iron, copper or of any other mineral or wood, stone, inscriptions of skin, ivory, horn, archaeological and bone or earth or of any other material, and also paleontological remains; written and graphic documents or cinematographic and photographic documents or sound and video recordings; coins made of gold, silver, bronze, copper or of any other materials; and ethnographic implement, ornament or any other cultural object of nations, nationalities and peoples”.

Protection and conservation of cultural heritage from manmade and natural hazards is one of the duties and responsibilities of the Authority for Research and Conservation of Cultural Heritage (ARCCH). Article 42 of the same proclamation states:

- 1) *The Council of Ministers may, upon the recommendation of the Minister, declare any area as a reserved area and publish same in the Negarit Gazeta, where an assemblage of immovable Cultural Heritage is situated or where such an area is deemed to be an archaeological site.*
- 2) *Unless otherwise specifically decided by the Council of Ministers, no person may, without a permit issued by the Authority, carry out building or road construction, excavations of any type or any operation that may cause ground disturbance in an area declared reserved pursuant to Sub-Article (1) of this Article.*
- 3) *Any person who holds permit to conduct construction works in a reserved area and who discovers Cultural Heritage in the course of construction activities shall stop construction and shall forthwith report same in writing to the Authority.*

These indicate that the Authority (ARCCH) has the power of issuing building permission for any work to be carried out in an area declared reserved by the Council of Ministers. It is also stated that the removal of any cultural heritage is to be carried out under strict supervision of the responsible authority, the ARCCH.

#### 2.1.4

#### ***Environmental Impact Assessment Proclamation (299/2002)***

The Environmental Impact Assessment (EIA) Proclamation (No. 299/2002) has made EIA a mandatory legal prerequisite for the implementation of major development projects, programs and plans. This proclamation is a proactive tool seeking to integrate environmental, economic, cultural, and social considerations into a decision making process in a manner that promotes

sustainable development. This Proclamation outlines the procedures for the management of environmental protection in case of public works. It states that impact means any changes to the environment or its components that may affect human health or safety, flora, fauna, soil, air, climate, natural and cultural heritage.

## 2.2 NATIONAL GUIDELINES AND STANDARDS

There are no known Ethiopian guidelines for cultural heritage management, save for those set out in the national legislation and policy, which are outlined above.

## 2.3 IFC PERFORMANCE STANDARDS

The following IFC Performance Standards are applicable to this CHMP:

Consistent with the convention concerning the Protection of the World Cultural and Natural Heritage, **IFC Performance Standard 8: Cultural Heritage** aims to ensure that projects protect cultural heritage in the course of their activities, support its preservation and promote the equitable sharing of benefits from the use of cultural heritage.

IFC Performance Standard 8 requires that projects:

- Protect cultural heritage by ensuring that internationally recognised practices for the protection, field-based study, and documentation of cultural heritage are implemented. Where relevant this includes the retention of a competent professional to assist in the identification and protection of cultural heritage.
- Develop provisions for managing chance finds, requiring any chance find to be undisturbed until an assessment by competent professional is complete and management actions are identified.
- Consult with affected communities to identify cultural heritage of importance and to incorporate their views into the decision making process. This should involve national and local regulatory agencies.
- Allow continued access to cultural heritage sites by affected communities within living memory for long-standing cultural purposes.
- Avoid impacts to or where not feasible minimise (negative impacts) or restore *in situ* the functionality of replicable cultural heritage.
- Do not remove any non-replicable cultural heritage unless the following criteria are met namely, that – there are no technically or financially feasible alternatives; the overall benefit of the project outweigh the anticipated cultural heritage loss from removal; and the removal of cultural heritage is conducted using the best available techniques.

- Should not remove, significantly alter, or damage critical cultural heritage. In exceptional circumstances where impacts are unavoidable, the Project will use a process of Informed Consultation and Participation (ICP).

With respect to this Plan, Yara Dallol BV has the responsibility to provide cultural heritage management and to structure and coordinate cultural heritage management procedures for the proposed Yara Dallol Potash Project.

Furthermore, Yara Dallol BV has the responsibility for ensuring that specific cultural heritage responsibilities allocated to them are organised and implemented. Yara Dallol BV has the responsibility to ensure that their employees and contracted third parties are trained and aware of all required cultural heritage procedures.

The roles and responsibilities within Yara Dallol BV for the implementation of the CHMP are presented in *Table 3.1*.

**Table 3.1** *Responsible Parties and Roles and Responsibilities*

<b>Responsible Parties</b>	<b>Roles and Responsibilities</b>
<b>Dallol General Manager</b>	Responsible for assuring that the Environmental and Social Manager has the resources, information and authority to implement the management measures described in this CHMP.
<b>Environmental and Social Manager</b>	Responsible for stakeholder engagement and enforcing the management measures described in this CHMP. The Environmental and Social Manager is also responsible for the provision of cultural heritage training to Yara BV staff and sub-contractors.
<b>Health and Safety Manager</b>	Responsible for the health and safety training of CH contractors.
<b>Project Manager</b>	Together with the Environmental and Social Manager is responsible for staffing, planning and day-to-day execution of the management measures described under the construction phase of this CHMP.  As needed, this individual will develop and propose staff plans and contractual terms to ensure that these measures are implemented by Yara Dallol BV staff and contractors throughout the construction phase of the Project.
<b>Operations Manager</b>	Together with the Environmental and Social Manager, is responsible for staffing, planning and day-to-day execution of the management measures described under the operational phase of this CHMP.  As needed, this individual will develop and propose staff plans and contractual terms to ensure that these measures are implemented by Yara Dallol BV staff and contractors during Project operation.
<b>Contractors</b>	Responsible for following the procedures and requirements indicated in the Chance Finds Program, including the identification of Chance Finds in the field and the cessation of work activities in the vicinity of a Chance Find until the required treatment measures are complete. Also responsible, with oversight from the Project Manager, for implementing mitigation measures (as outlined in this CHMP) against impacts to existing CH sites within the Project area.

Responsible Parties	Roles and Responsibilities
<p><b>On-Call Archaeological Sub-Contractors</b></p>	<p>Should meet internationally recognized professional standards and should perform technical tasks required by this CHMP with the assistance of technicians and laborers.</p> <p>Tasks will include preparation of written reports, analyses and recommendations; test and rescue excavations; and monitoring of ground disturbing construction activities.</p> <p>There should be one international and one local specialist from the ARCCH on-call. The specific roles of the international and local specialists are detailed in the Chance Find Program section below. The international and local ARCCH specialist will confer with each other to decide the sensitivity rating of a newly discovered resource.</p>

**4.1 SUMMARY OF IMPACT MANAGEMENT**

As with any project of this scale and nature, there are certain impacts that cannot be entirely eliminated, i.e. residual impacts after implementing mitigation measures. With respect to impact mitigation, the Project subscribes to the philosophy of impact avoidance (by reasonable changes to Project planning and/or design) and impact reduction (to reduce impacts to acceptable levels as reasonably possible). What follows, is a description of the potential residual impacts and the mitigation measures that will be implemented to reduce them to acceptable levels. These mitigation measures essentially comprise the “management plan” to address cultural heritage related impacts.

The following sections will:

- Identify potential impacts associated with each phase of the Project;
- Identify the objectives and targets related to the impacts;
- Describe the management measure(s) to minimise the impact; and
- Assign responsibilities for the management measures.

**4.2 MANAGEMENT PLAN (CONSTRUCTION AND OPERATION)****4.2.1 Potential Impacts**

There are no cultural heritage sites located within the footprints of any Project components, so there are no expected direct impacts to known resources from ground disturbing activities. However, it is possible that, given the long period of human settlement in the general Project Area, there may be unknown sub-surface archaeological resources that could fall within the footprints of proposed ground disturbing activities. Moreover, both known aboveground and unknown sub-surface cultural resources currently located outside the Project component footprints might be impacted by future Project activities that have not yet been planned or designed. The latter may include access roads; borrow pits; utilities; and other ancillary Project infrastructure. Such impacts would be direct and could cause irreparable damage to cultural sites of significance.

Vibration impacts from construction activity and increased road traffic is also of concern, as is the possibility of non-local Project staff who might alter or remove artefacts from archaeological sites in the Project Area and surrounds.

The latter two impacts could occur during both the construction and operational phases and closure.

Accordingly, based on a review of the Project description, three principal impact sources have been identified:

- Ground works associated with Project construction;
- Vibrations from construction and increased vehicle traffic; and
- Influx of non-local Project staff.

#### 4.2.2 *Objectives and Targets*

The objectives for the construction phase of the Project are as follows:

- To mitigate impact through specified management actions;
- To provide a Chance Finds Program to be followed in case unexpected archaeological resources are encountered;
- To establish the roles and responsibilities of Project staff and contractors in relation to chance finds; and
- To reduce the risk of major Project delay.

There are five resource targets that need to be considered for the construction phase of the Project (and for all subsequent phases as well):

- **Early Hominid Remains:** While no early hominid remains have been documented within the Project Area, there are known locations nearby that have produced stone tools and hominid fossils from the Pleistocene period <sup>(1)</sup>. Although the probability is very low, there is a chance that this resource category exists within the Project Area.
- **Isolated Conical Cairns:** The term *cairn* refers to a man-made pile or stack of stones. A cairn may serve as a grave, religious structure, storage area, or landscape marker. The most common type of isolated cairn found in the Project Area is the conical cairn. The function of the conical cairns is not fully understood, but the most likely scenario is that they are grave markers, and some may date back as early as 3,000 BC.
- **Cairn Clusters:** Cairn clusters or complexes can be characterised as a grouping of multiple cairns. Cairn clusters are quite common in the

---

<sup>1</sup> During an earlier ERM cultural heritage survey in 2012 a Middle Stone Age tool dating to ca. 20,000 years ago was found approximately 30 kilometers to the south of the Yara concession area. In addition a one-million-year-old hominid cranium was recently discovered at Buia approximately 35 km north of Mount Dallol. (Abate et al. 1998). The presence of Early and Middle Stone Age tools dating between 2.6 million years ago and 10,000 BC are also documented along the adjacent mountain slopes and alluvial fans to the east and west of the Project Area (Roubet, 1970)..

western half of the Project Area, and are sometimes comprised of several different cairn types. Most cairn clusters are likely quite old and perhaps date back to the very end of the Late Stone Age (ca. 3,000 – 1,000 BC). However, modern cairn clusters also exist and function as cemeteries.

- **Abandoned Settlements:** The most common type of site recorded in the Project Area was *abandoned settlements*. These sites often come in the form of expansive clusters of dense stone circles, and tend to be located in the western half of the Project Area. The *abandoned settlement* sites appear to range in date from the very recent past up to 3,500 years old.
- **Historic Structures:** Within the Project Area, there are only a few historic structures, and most are related to the old Parsons' mining operations from the 1960's.

In addition to the above listed resources, there are two other types of cultural resources that are not considered targets of this CHMP. The first type is military shooting blinds, which are all date to the late 20<sup>th</sup> century and of such low importance and sensitivity that they do not need to be mitigated against Project impacts. The second type of resource is potential early hominid rock shelters, which could be of very high importance but are only found in the valleys and gorges far to the west of the Project Area. Currently, no Project activity will likely impact these locations. However, should the Project expand into the foothills to the west, then new mitigation measures should be developed.

#### 4.2.3 *Management Actions*

The most effective way to manage potential impacts to cultural heritage sites is by well-planned avoidance through Project redesign. Where avoidance is not possible, impacts will be managed through:

- Post-assessment archaeological test excavations (Pre-Construction Phase);
- A stakeholder engagement program (Pre-Construction/Construction Phases);
- Implementation of a Chance Finds Program (Construction Phase);
- Provision of Cultural Heritage Training to Project Staff (All Project Phases);
- Marking of Vulnerable Cultural Heritage Sites (Pre-Construction Phase); and
- Reduced Vehicle Speed Limit Near Sites Prone to Vibration or Accidental Impact (All Project Phases).

### *Post-Assessment Archaeological Excavations (Pre-Construction)*

Archaeological test excavations will be conducted within the footprint of any ground disturbing Project component that falls outside the salt flats. Selective test excavations will also be undertaken prior to ground disturbing activities.

Based on current Project design, the only area in need of archaeological test excavations is the processing plant. However, if additional significant Project components are to be constructed in other locations outside the salt flats then test excavations will be conducted there as well.

Archaeological test excavations will consist of:

- One test excavation undertaken for every 10 hectares of area that will be disturbed. Accordingly, seven selectively placed test units will be dug for the proposed site of the processing plant for potash, which has a footprint of approximately 70 hectares.
- Each test unit will take one day to complete, thus all testing will be finished within seven days given the current Project design.
- Each test excavation unit will measure 1 meter cubed (1 meter long, 1 meter wide, 1 meter deep). The goal of the test units is to identify areas with Pleistocene soil deposition and therefore with the potential for sub-surface archaeological resources. The interest in Pleistocene soil relates to the observation that if early hominid remains exists within the project area, they would most likely be found within a Pleistocene soil matrix. Thus, areas within the processing plant that do have a layer of Pleistocene soil will be more closely monitored during project construction.
- Test excavations should be conducted by an archaeologist that meets recognized international standards and a local ARCCH specialist as well.
- The results of the test excavations will be presented in a brief report that will include a map identifying areas where test units were excavated and specifying the nature of negative and positive finds, including soil descriptions and noting inferences supported by the finds as to the general extent of Pleistocene soils. In addition, soil profile drawings detailing the stratigraphy of each test unit will be included in the report.

### *Stakeholder Engagement Program (Pre-construction/Construction)*

The cultural heritage baseline survey identified a number of both prehistoric and modern cultural sites within the Project Area. A stakeholder engagement program will be implemented that will seek the input of local communities regarding the sensitivities of cairns, graves and other sites. This program will:

- Identify which cultural heritage sites are currently utilised or viewed as significant by local communities in order to implement measures for avoidance of these sites during the construction and operation phases of the mine; and

- Where avoidance is deemed to be unfeasible, establish compensation measures including, but not limited to, site relocation or archaeological excavations to mitigate impacts to significant cultural heritage sites.

This focused stakeholder engagement program will be implemented during the pre-construction phase of the Project. The program will continue throughout the construction and operation phases to address stakeholder concerns as they arise.

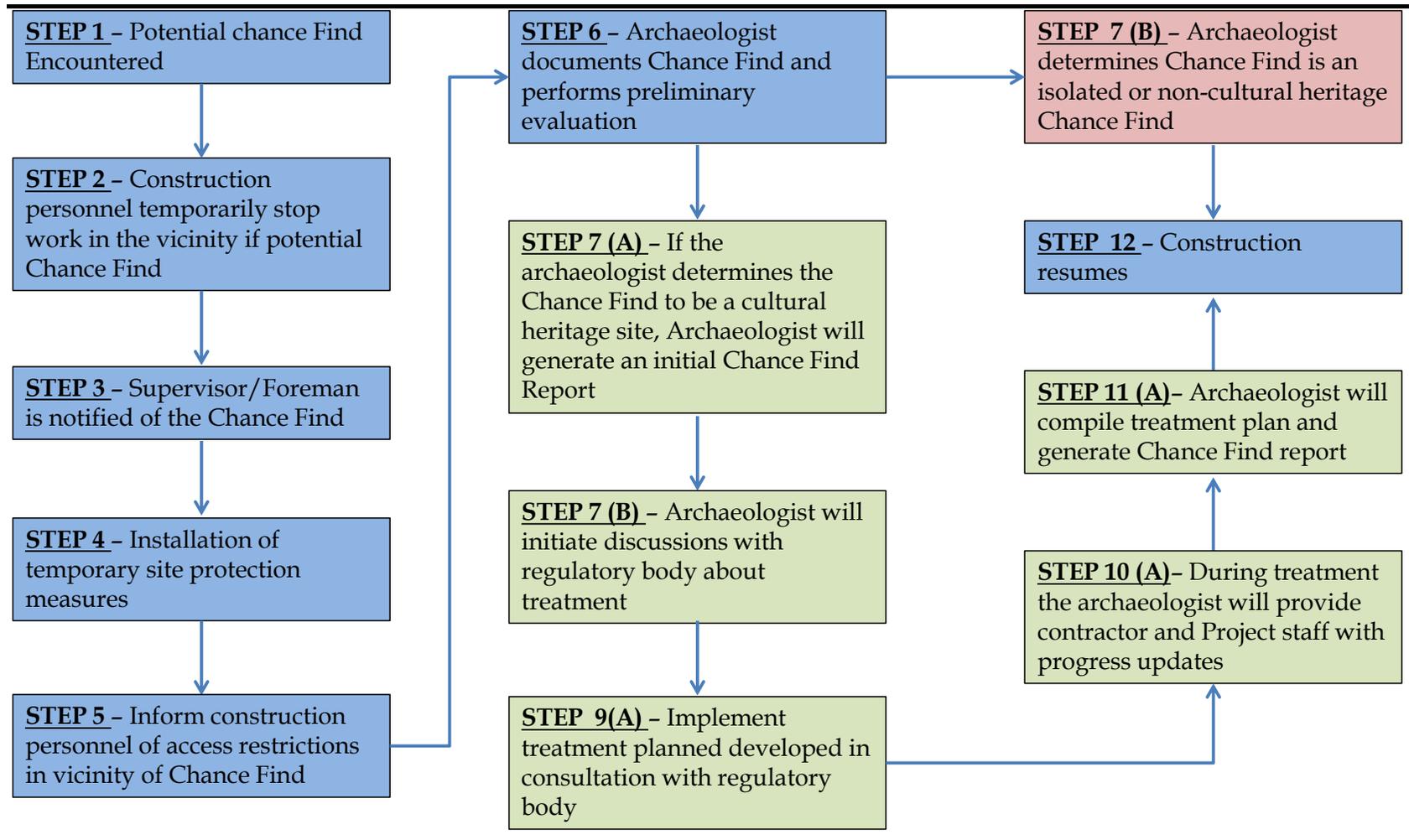
#### *Implementation of a Chance Finds Program (Construction)*

The Chance Finds Program is intended to manage impacts to known, probable and unknown cultural heritage sites during the Project construction phase (refer to *Figure 4.1*). It also defines the protocols and procedures for assessing any unanticipated cultural heritage sites or materials encountered during the Project construction phase. These protocols include:

- Localized *stop work* authority and procedures for protecting cultural heritage materials encountered during construction;
- Procedures for the documentation and assessment of *Chance Finds* to determine if additional investigations are required;
- Protocols for consultation with Project management, cultural heritage specialists, and national regulatory bodies to design and implement additional investigations; and
- Roles and responsibilities of all stakeholders.

The Chance Finds protocol will be implemented through a combination of Project staff training and the use of an archaeological monitor(s). A generalized Chance Finds Program is outlined below (also refer to *Figure 4.1*), which describes the approach.

Figure 4.1 Diagram of Chance Finds Procedure



A Chance Finds Program includes the following provisions:

- An internationally qualified cultural heritage specialist <sup>(1)</sup> and local ARCCCH specialist should remain on-call and will provide oversight of the Chance Finds Program. The on-call specialists should be used on an as-needed-basis and will monitor the Chance Finds Program from his/her desktop. The on-call specialists should only conduct field monitoring in the case of unusual or highly sensitive and importance chance finds.
- An archaeologist will also remain on-call on an as-needed-basis and will only conduct field monitoring if the Project either encroaches on areas of known archaeological sensitivity, or encounters chance finds of low to moderate importance.
- An archaeologist must be present during all ground disturbing works conducted within specific areas of concern. Based on current Project design, the only area of concern in need of in-field monitoring is the site associated with the processing plant. The reason for this is because this is the only planned Project component requiring earth works that falls outside the western salt flats, which have negligible archaeological potential.
- Ground works in other areas will be monitored by at least one member of the Project staff that has received cultural heritage training.
- A chance find can be reported by any member of the Project. Accordingly, it is necessary to provide cultural heritage training to all Project staff and sub-contractors. A separate section detailing cultural heritage training is provided in the next section.
- If a *chance find* is encountered the **first course of action is to stop work in the vicinity of the find**. Then the following steps will be undertaken:
  - Inform site supervisor/foreman.
  - Install temporary site protection measures (warning tape and stakes, avoidance signs).
  - Inform all personnel of the Chance Find if access to any part of the work area is restricted.
  - Establish a localized no-go area needed to protect the Chance Find.

---

<sup>1</sup> The specialist should meet relevant internationally recognized professional standards.

- The internationally qualified and ARCCH specialists will confer and perform a preliminary evaluation to determine whether the Chance Find is cultural heritage and if so, whether it is an isolate or part of a larger site or feature.
  - Artefacts will be left in place when possible; if materials are collected they will be placed in bags and labelled by an archaeologist and transported to the ARCCH in Addis Ababa; no Project personnel are permitted to take or keep artefacts as personal possessions.
  - Document find through photography, notes, GPS coordinates, and maps (collect spatial data) as appropriate.
  - If the Chance Find proves to be an isolated find or not cultural heritage, the ARCCH specialist, in consultation with the internationally qualified specialist, will authorize the removal of site protection measures and activity in the vicinity of the site can resume.
  - If the archaeological specialists confirm the Chance Find is a cultural heritage site they will inform the ARCCH and initiate discussions with the latter about treatment.
  - Prepare and retain archaeological monitoring records including all initial reports whether they are later confirmed or not. The record will include coordinates of all observations to be retained within the project's GIS system (*viz.* ArcGIS).
  - Develop and implement treatment plans for confirmed finds using the services of qualified cultural heritage experts.
  - If a Chance Find is a verified cultural heritage site, prepare a final Chance Finds report once treatment has been completed.
  - While investigation is ongoing, co-ordinate with on-site personnel keeping them informed as to status and schedule of investigations, and informing them when the construction may resume.
- If mitigation is required, then expedient rescue excavations will be undertaken by the archaeological specialists, except in the case that the chance find is of international importance, such as early hominid remains. If early hominid remains are encountered special care will be taken and archaeologists with the appropriate expertise in addressing the find will be appointed.

### *Provision of Cultural Heritage Training (All Project Phases)*

Yara Dallol BV will establish a Cultural Heritage Training Programme for Project management and for the construction contractor's management and field staff. The objective of the Cultural Heritage Training programme is to manage potential impacts to known and unknown cultural heritage sites by facilitating the identification and reporting of potential Chance Finds encountered during construction works. The program will consist of lecture(s) and classroom training; *Chance Finds* tool box talks/training for field staff; and the development of reference materials such as fliers, signage, and educational posters to be posted in the construction camp(s) and facilities. Initial high level training should be designed and delivered by an experienced international cultural heritage specialist. The Environmental and Social Manager will then be responsible for providing training for all future staff that join the Project. Training includes:

- Defining *Chance Finds*;
- Identifying *Chance Finds* in the field;
- Local sensitivity to damage to cultural heritage resources;
- Sensitivity of cultural heritage sites to looting and legal penalties for looting or the destruction of cultural heritage sites;
- *Chance Finds* reporting procedures; and
- The consultation process with local and national stakeholders and regulatory agencies.

The presence of construction personnel with training in the identification and reporting of *Chance Finds* will limit the need for direct archaeological involvement to the most sensitive situations such as monitoring in the vicinity of known or suspected cultural heritage sites.

### *Marking of Vulnerable Cultural Heritage Sites (Pre-Construction)*

The Project will mark vulnerable cultural heritage for avoidance using warning signage and high visibility temporary flagging. A site will be considered vulnerable, if it is within 200 meters ground distance of any existing or planned Project component, including roads. Any resource that falls within the 200m buffer will be marked with high visibility flagging tape or a spray-painted rock along the site's boundaries every 25 meters. GPS coordinates will be taken at each marker spot. All sites that will receive visibility marking are indicated in *Figure 4.2* and listed in *Table 4.1*.

Figure 4.2 Map of Resource Requiring Marking

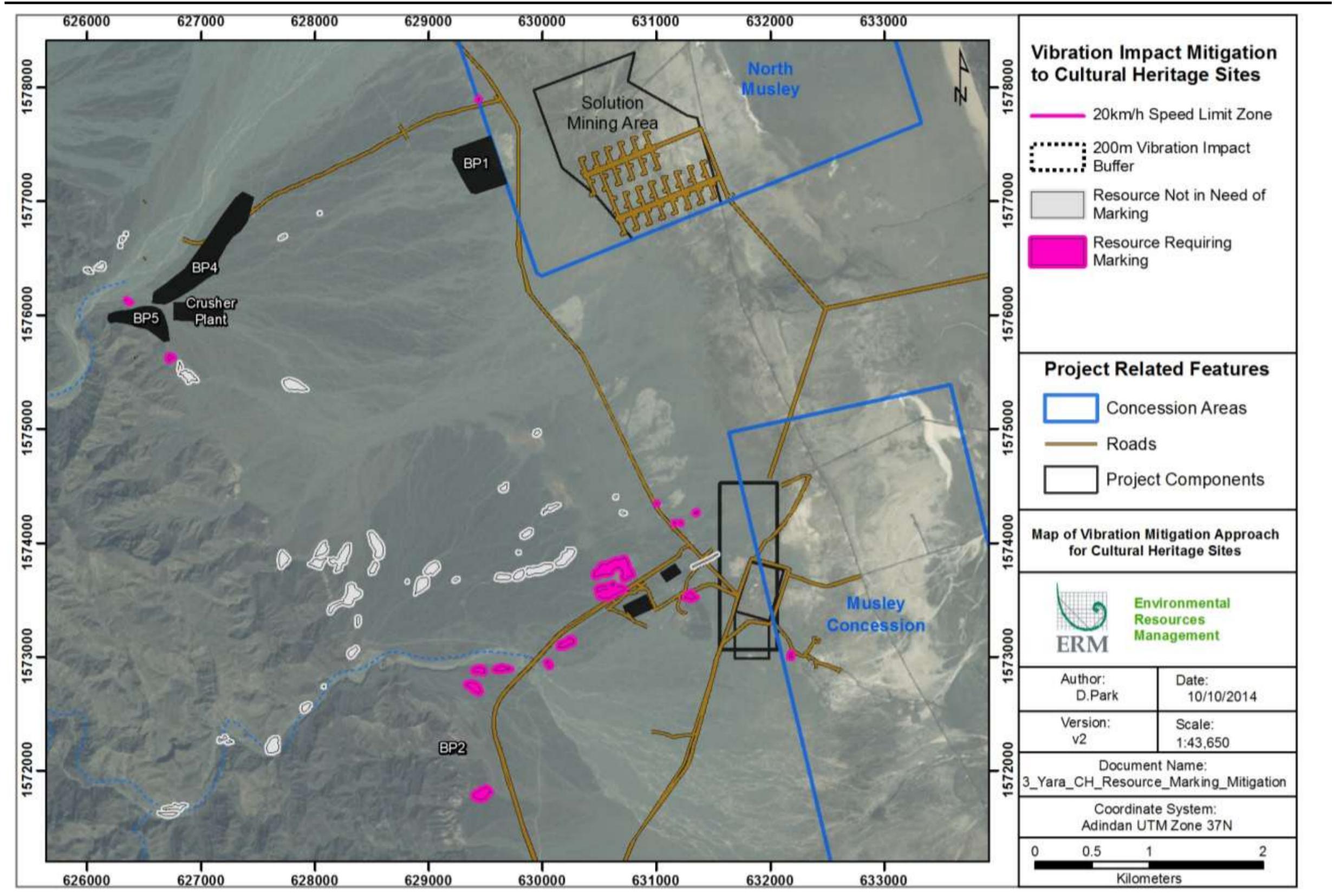


Table 4.1: List of Known Cultural Sites requiring Vibration Monitoring and High Visibility Boundary Marking

CH Site Number	Site Type	Artifact Density	Structure Density	Site Size	Site Sensitivity	Site Description	Longitude	Latitude	Site Size (m2)
#11	Cairn Cluster	None Found	Low	Small	High	Two very old stacked circular cairns	626381	1576106	105
#12	Historic Architecture	None Found	Low	Small	High	A mosque structure (semi-circle of stones with marker pointed towards Mecca.)	626341	1675131	50
#33	Isolated Cairn	None Found	Isolated	Small	Low	Isolated conical cairn	631004.13	1574345	110
#34	Isolated Cairn	None Found	Isolated	Small	Low	Isolated conical cairn	631162.31	1574173	200
#35	Cairn Cluster	None Found	Low	Medium	Low	2 conical cairns	631207.51	1574178	155
#37	Settlement	None Found	Low	Large	Medium	Looks like a storage cairn area with numerous tent circles suggesting a multi-use area/settlement. Damaged by bulldozer.	630584.49	1573588	12868
#38	Settlement	None Found	Isolated	Small	Low	Another settlement with a storage cairn	630575.06	1573611	3503
#39	Settlement	None Found	Low	Medium	Low	Tent circle and associated storage cairns	630609.1	1573630	482
#40	Settlement	Low	High	Large	Medium	Location of feasting, lots if settlement and cairns. An important location for local populations. Found broken water pots. Site slightly damaged by old Nova Camp	630696.59	1573815	29246
#41	Settlement	None Found	Medium	Large	Low	A medium sized cluster of settlement structures	630192.76	1573103	5812
#42	Cairn Cluster	None Found	Medium	Large	High	Medium sized stacked circular cairn structure. Several graves have been damaged from government road building activity	630062.51	1572913	1044
#43	Settlement	None Found	High	Large	Low	Recent seasonal settlement for livestock and access to temporary water, but not used for a while	629658.05	1572896	3424
#45	Settlement	None Found	Medium	Large	Low	Recent seasonal camp, not used in a while	629367.05	1572754	6026
#46	Settlement	Low	Medium	Large	High	Older seasonal settlement next to fossil shells with obsidian ceramics and glass artifacts	629507.38	1571795	9309
#47	Isolated Cairn	None Found	Isolated	Medium	Medium	Conical cairn and oval cairn	629436.35	1577899	150
#77	Cairn Cluster	None Found	High	Large	High	Modern military graves	631288.4	1573525	3218
#78	Historic Architecture	None Found	Isolated	Medium	High	Old U.S. mining building	632188.01	1573029	850

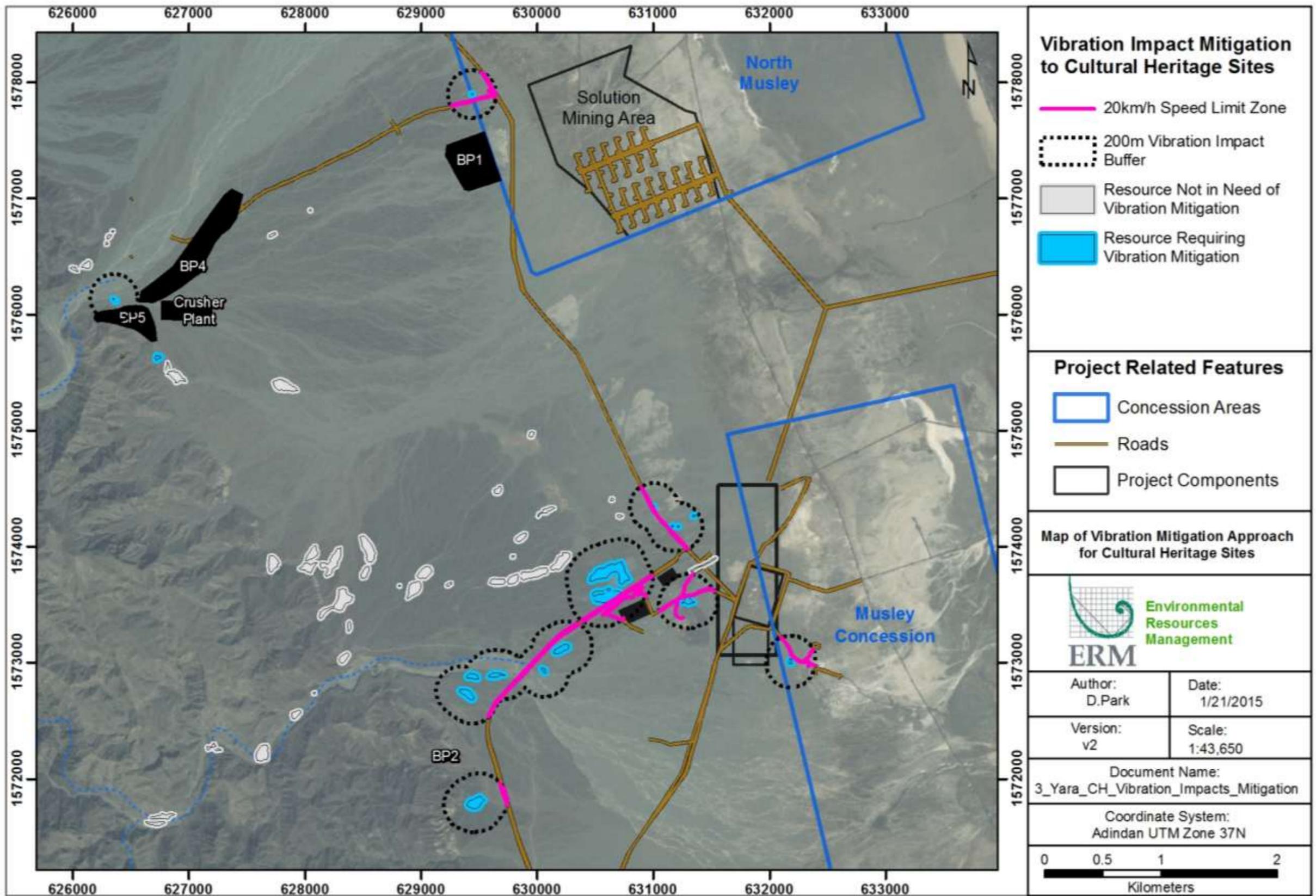
Marking will assist in reducing unintended impact to cultural heritage sites by ancillary construction activities and vehicle traffic. Staff and contractor briefings on cultural heritage will include information on the presence and significance of the protective boundary markings at cultural heritage sites.

*Reduced Vehicle Speed Limit near Sites Prone to Vibration or Accidental Impact (All Project Phases)*

In the case of vibration due to vehicle traffic, trucks will travel at reduced speed when traveling in areas within 200 meters of vulnerable sites in order to reduce the magnitude of their vibrations. The speed limit is 20km/h, which given the loose and unconsolidated nature of the soil, is considered slow enough to reduce the vibration impact zone considerably. A speed limit of 30km/h is suggested for asphalted roads.

Accordingly, *Figure 4.3* maps the stretches of road that fall within the reduced speed zones where speed limits are 20km/h for unpaved roads and 30km/h for asphalted (paved) roads. Speed limits should be posted 100m before and after the boundaries of the reduced speed zones to allow enough distance for vehicles to slow down.

Figure 4.3 Map of Vibration Mitigation Approach for Cultural Heritage Sites



#### 4.2.4

#### **Responsibility**

##### *Post-Assessment Archaeological Excavations (Pre-Construction)*

Post assessment archaeological test excavations shall be undertaken by both an internationally qualified archaeologist and an ARCCH archaeologist. In coordination with the Dallol General Manager, the archaeological specialists will employ local community practitioners who have sub-surface clearance training to assist with the test excavations to assure that excavations do not accidentally encounter buried utilities or other buried hazards. The archaeological specialists will, on completion of their investigations prepare a report of their findings.

##### *Stakeholder Engagement Program (Pre-construction/Construction)*

The Yara Dallol BV Environmental and Social Manager (and Community Liaison Officer) is responsible for conducting and managing all stakeholder engagements. The archaeological specialists will provide a list of questions and topics for the community coordinator to cover during the engagement meetings.

##### *Implementation of a Chance Finds Programme (Construction)*

This will be a coordinated effort between the Yara Dallol BV site staff and the archaeological specialists.

##### *Provision of Cultural Heritage Training (All Project Phases)*

After receiving training from the archaeological specialists, the Yara Dallol BV Community Liaison Officer shall be responsible for training all new Yara staff and contractors in identifying chance finds in the field and chance finds reporting procedures along with informing them about local sensitivities around damage to cultural heritage sites.

##### *Marking of Vulnerable Cultural Heritage Sites (Pre-Construction)*

Using the map illustrated in *Figure 4.2* and the list of sites in *Table 4.1*, and under the direction of the Environmental and Social Manager, a qualified Yara Dallol BV staff member with map reading skills will be sent out to the site locations to mark the site boundaries. When the site boundary marking effort is finished, the GPS coordinates for each marker spot will be compared against the mapped site boundaries to ensure that the appropriate area is covered.

##### *Reduced Vehicle Speed Limit near Sites Prone to Vibration or Accidental Impact (All Project Phases)*

The Yara Dallol BV Project Manager and Operations Manager will implement the reduced speed zones as indicated on the map in *Figure 4.3*.

## 5 VERIFICATION AND MONITORING

### 5.1 OVERVIEW

Two kinds of monitoring will be implemented throughout the lifespan of the Project, namely - 1) Monitoring of Vibration Impacts; and 2) Monitoring Community Complaints.

### 5.2 VIBRATION IMPACT MONITORING AT CULTURAL HERITAGE SITES

Even with a reduced speed limit, vibrations from vehicle traffic and/or construction activity could still impact cultural resources. Accordingly, at quarterly intervals for the lifespan of the Project a monitoring exercise will be undertaken to assess any signs of damage to vulnerable cultural resources within the 200m vibration impact zone. These resources are indicated in *Figure 4.3* and are listed in *Table 4.1*.

The quarterly vibration monitoring report will include the following information:

- A photograph of each of the cultural resources within each site;
- GPS coordinates for each of the built cultural resources within each site; and
- A brief description of any visible changes to the cultural resources in comparison with previous quarterly monitoring reports.

Vibration impact monitoring will be undertaken by a member of the Project site staff, so long as he/she has undergone training in cultural heritage and is able to use a GPS unit. The quarterly report should also be sent to the Project's senior on-call international specialist to review the results and determine if any changes to the structural integrity of sites is occurring. If there are sites being affected by residual vibrations, then the Project will work in consultation with appropriate specialists to stabilize the sites in jeopardy and to recommend possible changes in protection protocols, such as different speed limits or changes in vehicle routing.

### 5.3 COMMUNITY COMPLAINTS

Stakeholder meetings will be held quarterly with the local community to discuss any potential complaints related to the management of cultural resources. The engagement will be conducted by the Project's Community Liaison Officer and the results should be sent back to the on-call international specialist for review. If there are substantial complaints then corrective actions will be developed in consultation with appropriate specialists.

**6.1 GOVERNMENT/AUTHORITY, LENDER AND INTERNAL REPORTING**

Quarterly reports during the Project lifespan (during the construction, operation and decommissioning phases) will be prepared on the vibration monitoring and community outreach program and will be limited in scope to the mining Project Area. During construction, reports concerning *chance finds* will be completed on a weekly basis during the Project construction phase, reporting construction activities performed and whether chance finds occurred or not. Any *chance finds* made and the measures to assess and management the find will be reported.

The reports will summarise the data collected through the monitoring programme, identifying any occasions when the action levels were triggered and the corresponding management action that was taken. The reports will also summarise any complaints received from the local communities, setting out the complaint, the efforts made to substantiate the basis of the complaint, and any actions taken to address the complaint and correct Project performance.

All reports will be provided to ARCCH in Addis Ababa and to the Yara Dallol BV board of directors.

**6.2 COMMUNITY REPORTING**

A summary report suitable for a non-technical audience will be developed and disclosed on a quarterly basis along with the quarterly community complaint monitoring engagements. This report will focus upon graphical representation of information, and in particular outcomes of any community complaints and those actions taken to manage any significant impacts.

Table 711: Pre-Construction Phase

Impact	Objective	Mitigation/Management Measures	Monitoring Plan	Responsibility
Impacts from Ground Disturbing Project Activities	To identify areas within the proposed processing plant where sub-surface resources are likely to be found	<ul style="list-style-type: none"> <li>• Post-Assessment Archaeological Test Excavations</li> <li>• Provision of Cultural Heritage Training</li> <li>• Stakeholder Engagement Program</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly Basis – Community Complaint Report concerning issues related to post-assessment archaeological test excavations</li> </ul>	<ul style="list-style-type: none"> <li>• Dallol General Manager</li> <li>• International and Local ARCCH Archaeological Specialists</li> </ul>
Vibration Impact	To clearly identify the boundaries of vulnerable sites through high visibility markings and to reduce the Speed Limit of Vehicles	<ul style="list-style-type: none"> <li>• Marking of Vulnerable Cultural Heritage Sites</li> <li>• Reduced Vehicle Speed Limit near Sites Prone to Vibration or Accidental Impact</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly Basis – Vibration Monitoring Report</li> </ul>	<ul style="list-style-type: none"> <li>• Dallol General Manager</li> </ul>
Disturbance by Non-Local and/or Local Staff	To ensure that non-local staff have sufficient knowledge to respect the cultural resources of the local population	<ul style="list-style-type: none"> <li>• Provision of Cultural Heritage Training</li> <li>• Marking of Vulnerable Cultural Heritage Sites</li> <li>• Stakeholder Engagement Program</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly Basis – Community Complaint Report concerning issues related to non-local interactions with cultural sites</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental and Social Manager</li> <li>• In consultation with International and ARCCH Archaeological Specialists</li> </ul>

**Table 7.2 Construction Phase**

Impact	Objective	Mitigation/Management Measures	Monitoring Plan	Responsibility
Impacts from Ground Disturbing Project Activities	To limit Project delay from chance finds (and to limit impact to chance finds themselves)	<ul style="list-style-type: none"> <li>Implementation of Chance Finds Program</li> <li>Stakeholder Engagement Program</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Basis – Chance Finds Program</li> <li>Quarterly Basis – Community Complaint Report concerning issues related to impacts from ground disturbance</li> </ul>	<ul style="list-style-type: none"> <li>Yara Dallol BV Site Staff</li> <li>International and Local ARCCH Archaeological Specialists</li> </ul>
Vibration Impact	To monitor any residual impacts to cultural sites from vibration	<ul style="list-style-type: none"> <li>Vibration Impact Monitoring at Cultural Heritage Sites</li> <li>Reduced Vehicle Speed Limit near Sites Prone to Vibration or Accidental Impact</li> <li>Move the northern border of Borrow Pit #5 100 meters to the south to avoid vibrations impacts to high sensitivity Site #11</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly – Vibration Monitoring Report</li> </ul>	<ul style="list-style-type: none"> <li>Project Manager</li> </ul>
Disturbance by Non-Local Staff	To ensure that non-local staff respect the cultural resources of the local population	<ul style="list-style-type: none"> <li>Provision of Cultural Heritage Training</li> <li>Stakeholder Engagement Program</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly Basis – Community Complaint Report concerning issues related to non-local interactions with cultural sites</li> </ul>	<ul style="list-style-type: none"> <li>Environmental and Social Manager</li> <li>In consultation with International and Local ARCCH archaeological specialists</li> </ul>

**Table 7-3 Operational Phase**

Impact	Objective	Mitigation/Management Measures	Monitoring Plan	Responsibility
Vibration Impact	To monitor any residual impacts to cultural sites from vibration	<ul style="list-style-type: none"> <li>Vibration Impact Monitoring at Cultural Heritage Sites</li> <li>Reduced Vehicle Speed Limit near Sites Prone to Vibration or Accidental Impact</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly – Vibration Monitoring Report</li> </ul>	<ul style="list-style-type: none"> <li>Dallol General Manager</li> </ul>

Impact	Objective	Mitigation/Management Measures	Monitoring Plan	Responsibility
Disturbance by Non-Local Staff	To ensure that non-local staff respect the cultural resources of the local population	<ul style="list-style-type: none"> <li>Provision of Cultural Heritage Training</li> <li>Stakeholder Engagement Program</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly Basis - Community Complaint Report concerning issues related to non-local interactions with cultural sites</li> </ul>	<ul style="list-style-type: none"> <li>Environmental and Social Manager</li> <li>In consultation with International and Local ARCCH archaeological specialists</li> </ul>

**Table 7-4 Decommissioning Phase**

Impact	Objective	Mitigation/Management Measures	Monitoring Plan	Responsibility
Vibration Impact	To monitor any residual impacts to cultural sites from vibration	<ul style="list-style-type: none"> <li>Vibration Impact Monitoring at Cultural Heritage Sites</li> <li>Reduced Vehicle Speed Limit near Sites Prone to Vibration or Accidental Impact</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly - Vibration Monitoring Report</li> </ul>	<ul style="list-style-type: none"> <li>Dallol General Manager</li> </ul>
Disturbance by Non-Local Staff	To ensure that non-local staff respect the cultural resources of the local population	<ul style="list-style-type: none"> <li>Provision of Cultural Heritage Training</li> <li>Stakeholder Engagement Program</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly Basis - Community Complaint Report concerning issues related to non-local interactions with cultural sites</li> </ul>	<ul style="list-style-type: none"> <li>Environmental and Social Manager</li> <li>In consultation with International and Local ARCCH archaeological specialists</li> </ul>

Abbate E. et al. (1998) A one-million-year-old Homo cranium from the Danakil (Afar) Depression of Eritrea, *Nature*, 393, pp. 458-460.

Roubet, C. (1970) 'Prospection et decouvertes de documents prehistoriques in Danakile (Ethiopic septrionale), *Annales d'Ethiopie* vol 8:8 pp 13-20