

HERITAGE IMPACT ASSESSMENT KLEINZEE MINING AREA

HERITAGE MANAGEMENT PLAN FOR THE MINING STRUCTURES WITHIN
THE KLEINZEE MINING RIGHTS AREA, KLEINZEE,
NORTHERN CAPE PROVINCE.

PREPARED BY:



PREPARED FOR:

DE BEERS
GROUP OF COMPANIES

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***Disclaimer;** This report is a first phase heritage investigation into the heritage sensitivity of the area demarcated for the project. The report is meant to be a guide for further fieldwork and is not meant to be totally encompassing. Information is derived solely from published works.*

Statement of Independence

As the duly appointed representative of G&A Heritage, I Stephan Gaigher, hereby confirm my independence as a specialist and declare that neither I nor G&A Heritage have any interests, be it business or otherwise, in any proposed activity, application or appeal in respect of which the Environmental Consultant was appointed as Environmental Assessment Practitioner, other than fair remuneration for work performed on this project.

SIGNED OFF BY: STEPHAN GAIGHER



EXECUTIVE SUMMARY

Site name and location: Kleinzee Mining Structure Heritage Management Plan at Kleinzee in the Northern Cape Province

Proponent: De Beers Group of Companies

Consultant: G&A Heritage, PO Box 522, Louis Trichardt, 0920, South Africa.
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Date of Report: 07 March 2018

The purpose of the management summary is to distil the information contained in the report into a format that can be used to give specific results quickly and facilitate management decisions. It is not the purpose of the management summary to repeat in shortened format all the information contained in the report, but rather to give a statement of results for decision making purposes.

This study encompasses the heritage impact investigation. A preliminary layout has been supplied to lead this phase of this study.

This study focuses on the management of mining structures earmarked for demolition within the Kleinzee Mining Rights area in the Northern Cape Province.

Scope of Work

The Heritage Management Plan (HMP) aims at providing the client with the full scope of heritage related information as it pertains to the mining structures on site. This information will then be used to guide the management of these structures whether that be preservation or demolition;

- A desk-top investigation of the area;
- Review of the available archaeological and historical literature covering the area, as well as previous cultural resource management studies in the area.
- Consultations with the SAHRIS database of heritage sites.
- A site visit to the proposed development site;
- Identify the heritage significance of each of the structures;
- Evaluate the potential impacts of construction and operation of the proposed development on these structures; and
- Recommend mitigation measures to be followed pre-demolition.

The purpose of this study is to determine the heritage significance of the mining structures under review and make recommendations based on this significance regarding their demolition. The study is based on archival and document combined with fieldwork investigations.

Findings

Although none of the sites were found to be older than 60 years it was found that they contribute significantly to the cultural history and landscape of the area and as such warrant documentation before being demolished. The demolition will contribute positively to the landscape as a whole.

Fatal Flaws

No fatal flaws were identified.

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HERITAGE IMPACT ASSESSMENT

HERITAGE IMPACT ASSESSMENT FOR THE DE BEERS MINING STRUCTURES AT KLEINZEE

INTRODUCTION

LEGISLATION AND HISTORY OF ARCHAEOLOGICAL RESEARCH

In South Africa cultural heritage is protected under the *National Heritage Resources Act (NHRA) no 25 of 1999*.

Section 38(1) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study is undertaken for:

- (a) Construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (b) Construction of a bridge or similar structure exceeding 50 m in length; and
- (c) Any development, or other activity which will change the character of an area of land, or water –
 - (1) Exceeding 10 000 m² in extent;
 - (2) Involving three or more existing erven or subdivisions thereof; or
 - (3) Involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or
 - (d) The costs of which will exceed a sum set in terms of regulations; or
 - (e) Any other category of development provided for in regulations.

While the above describes the parameters of developments that fall under this Act., Section 38 (8) of the NHRA is applicable to this development. This section states that;

- (8) *The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.*

In regards to a development such as this that falls under Section 38 (8) of the NHRA, the requirements of Section 38 (3) applies to the subsequent reporting, stating that;

- (3) *The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2) (a): Provided that the following must be included:*
 - (a) *The identification and mapping of all heritage resources in the area affected;*
 - (b) *An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7;*
 - (c) *An assessment of the impact of the development on such heritage resources;*
 - (d) *An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*

- (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.*
 - (1) Ancestral graves,
 - (2) Royal graves and graves of traditional leaders,
 - (3) Graves of victims of conflict (iv) graves of important individuals,
 - (4) Historical graves and cemeteries older than 60 years, and
 - (5) Other human remains which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);
- (h) Movable objects, including ;*
 - (1) Objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
 - (2) Ethnographic art and objects;
 - (3) Military objects;
 - (4) Objects of decorative art;
 - (5) Objects of fine art;
 - (6) Objects of scientific or technological interest;
 - (7) Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
 - (8) Any other prescribed categories, but excluding any object made by a living person;
- (i) Battlefields;*
- (j) Traditional building techniques.*

A **'place'** is defined as:

- (a) A site, area or region;
- (b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
- (c) A group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'Structures' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

'Archaeological' means:

- (a) Material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- (b) Rock art, being a form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation; and
- (c) Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;
- (d) Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this heritage impact assessment are as follows;

- Field investigations were performed on foot and by vehicle where access was readily available.
- Sites were evaluated by means of description of the cultural landscape, direct observations and analysis of written sources and available databases.
- It was assumed that the site layout as provided by Aurecon is accurate.
- We assumed that the public participation process performed as part of the EIA process was sufficiently encompassing not to be repeated in the Heritage Assessment Phase.

Table 1. Impacts on the NHRA Sections

Act	Section	Description	Possible Impact	Action
National Heritage Resources Act (NHRA)	34	Preservation of buildings older than 60 years	Yes	Mitigation
	35	Archaeological, paleontological and meteor sites	No impact	None
	36	Graves and burial sites	No impact	None
	37	Protection of public monuments	No impact	None
	38	Does activity trigger a HIA?	Yes	HIA

Table 2. NHRA Triggers

Action Trigger	Yes/No	Description
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	No	N/A
Construction of a bridge or similar structure exceeding 50m in length.	No	N/A
Development exceeding 5000 m ²	No	N/A
Development involving more than 3 erven or sub divisions	No	N/A
Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years	No	N/A
Re-zoning of site exceeding 10 000 m ²	No	N/A
Any other development category, public open space, squares, parks or recreational grounds	No	N/A

BACKGROUND INFORMATION

PROPOSED DEMOLITION OF KLEINZEE MINING STRUCTURES PROJECT DESCRIPTION

As part of the decommissioning of the mining activities at the De Beers, Kleinzee mining area, certain structures were identified for demolition. Since these structures are representative of a major industry in this areas it is recommended that their heritage significance be determined before they are demolished.

De Beers has been mining alluvial diamonds in this area for the last 80 years. Currently they are in the process of transferring the mining rights to West Coast Resources, If this process does not succeed the mine will be mothballed for possible future use. As part of this process some of the mining structures are being transferred to the new owners and some are earmarked for demolition. It is the purpose of this study to determine the heritage significance of these structures.



Figure 1. Location of structures within the study

HERITAGE INDICATORS WITHIN THE RECEIVING ENVIRONMENT

REGIONAL CULTURAL CONTEXT

MINING HISTORY

Since this study is only concerned with the mining structures and their heritage significance the report will not need to evaluate any other heritage components.

In August 1925 Jack Carstens found a diamond at the Buffels River mouth at Oubeep. The year 1926 saw a number of discoveries along the Namaqualand coast and in particular near the mouth of the Buffels River, the site of the present Kleinzee Diamond Mine. Carstens recovered thousands of carats of diamonds near the mouth of the Buffels River and De Beers subsequently obtained all the claims Carstens and his partner owned on the West Coast.



Figure 2. Historic Mining Artefacts at the Kleinzee Museum

Large and highly profitable mines were established along the coast all the way from the mouth of the Orange River in the north to south of the mouth of the Olifants River. Large scale diamond mining along this entire area started soon after the initial discovery but was limited to the beach and neighbouring raised marine terrace deposits.



Figure 3. Mining at Kleinzee in 1930



Figure 4. Mining at Kleinzee 1930's

Onland mining takes place along the entire Namaqualand coastal plain. De Beers reports a total of 768 480 carats recovered from their Namaqualand mines by 2010 and a remaining reserve of 10 million carats

in their inventory. Alexkor recovered 9.2 million carats at a grade of 10cph since 1928. The Trans Hex Group (THG) operated mines at Hondeklip Bay and Buffelsbank and is still active on the Lower Orange River valley. Since 1965 THG recovered some 3.7 million carats from its projects on the West Coast.

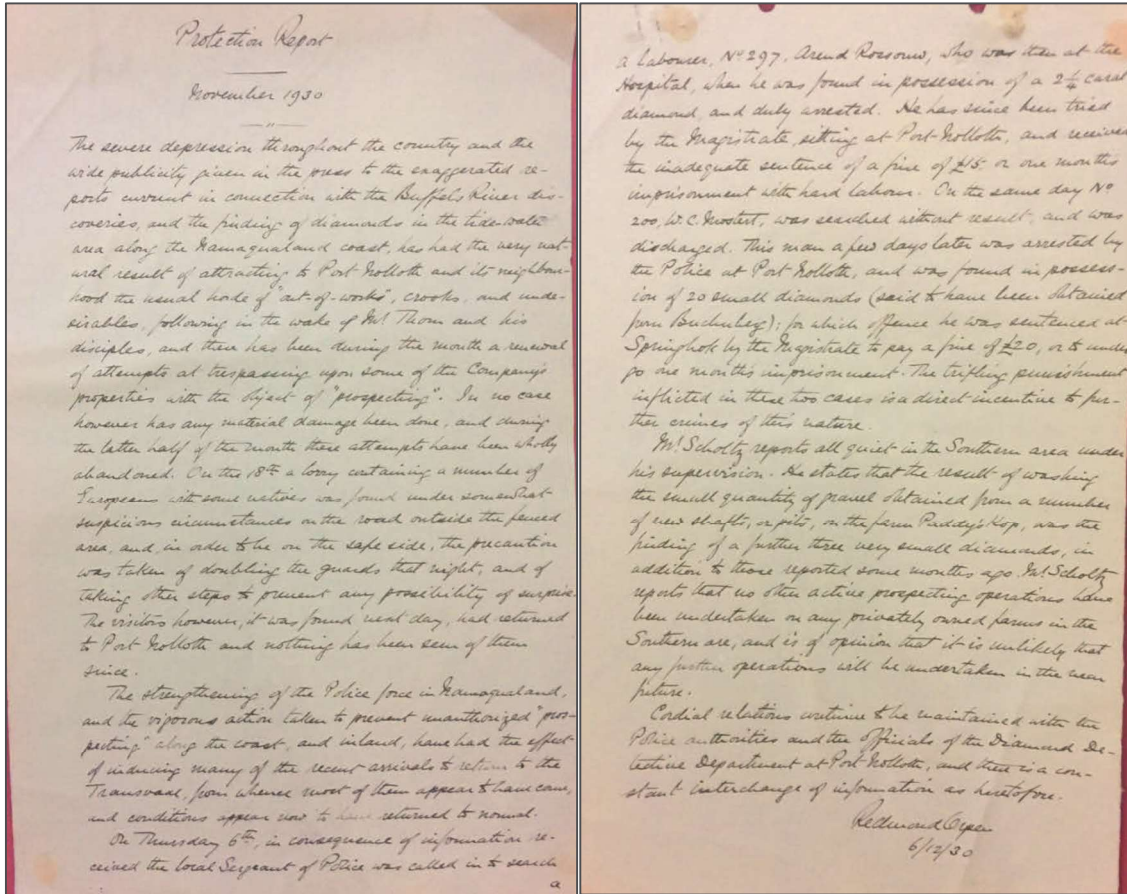


Figure 5. Protection Report for Kleinsee 1930



Figure 6. Western Mining Cut



Figure 7. 1972 Single Quarters



Figure 8. Kleinzee in the 1960's

CULTURAL LANDSCAPE

The cultural landscape in the study area is associated mainly with diamond mining. The area has been closed for any other activities for nearly a hundred years and as such no other activities apart from those associated with the residential developments are found here.

Historic Landscape Type	Description	Occurrence possible?
1 Paleontological	Mostly fossil remains. Remains include microbial fossils such as found in Barberton Greenstones	No
3 Historic Built Environment	<ul style="list-style-type: none"> - Historical townscapes/streetscapes - Historical structures; i.e. older than 60 years - Formal public spaces - Formally declared urban conservation areas - Places associated with social identity/displacement 	Yes
4 Historic Farmland	<p>These possess distinctive patterns of settlement and historical features such as:</p> <ul style="list-style-type: none"> - Historical farm yards - Historical farm workers villages/settlements - Irrigation furrows - Tree alignments and groupings - Historical routes and pathways - Distinctive types of planting - Distinctive architecture of cultivation e.g. planting blocks, trellising, terracing, ornamental planting. 	No
5 Historic rural town	<ul style="list-style-type: none"> - Historic mission settlements - Historic townscapes 	No
6 Pristine natural landscape	<ul style="list-style-type: none"> - Historical patterns of access to a natural amenity - Formally proclaimed nature reserves - Evidence of pre-colonial occupation - Scenic resources, e.g. view corridors, viewing sites, visual edges, visual linkages - Historical structures/settlements older than 60 years - Pre-colonial or historical burial sites - Geological sites of cultural significance. 	No
7 Relic Landscape	<ul style="list-style-type: none"> - Past farming settlements - Past industrial sites - Places of isolation related to attitudes to medical treatment - Battle sites - Sites of displacement, 	Yes
8 Burial grounds and grave sites	<ul style="list-style-type: none"> - Pre-colonial burials (marked or unmarked, known or unknown) - Historical graves (marked or unmarked, known or unknown) - Graves of victims of conflict - Human remains (older than 100 years) - Associated burial goods (older than 100 years) - Burial architecture (older than 60 years) 	No
9 Associated Landscapes	<ul style="list-style-type: none"> - Sites associated with living heritage e.g. initiation sites, harvesting of natural resources for traditional medicinal purposes - Sites associated with displacement & contestation - Sites of political conflict/struggle - Sites associated with an historic event/person - Sites associated with public memory 	No
10 Historical Farmyard	<ul style="list-style-type: none"> - Setting of the yard and its context - Composition of structures - Historical/architectural value of individual structures - Tree alignments - Views to and from - Axial relationships 	No

	<ul style="list-style-type: none"> - System of enclosure, e.g. defining walls - Systems of water reticulation and irrigation, e.g. furrows - Sites associated with slavery and farm labour - Colonial period archaeology 	
11 Historic institutions	<ul style="list-style-type: none"> - Historical prisons - Hospital sites - Historical school/reformatory sites - Military bases 	No
12 Scenic visual	<ul style="list-style-type: none"> - Scenic routes 	No
13 Amenity landscape	<ul style="list-style-type: none"> - View sheds - View points - Views to and from - Gateway conditions - Distinctive representative landscape conditions - Scenic corridors 	No

SITES

TWEEPAD SEAWATER INTAKE POINT

GPS 29° 27' 58,5"S
16° 58' 45,2"E



Figure 9. Tweepad Seawater Intake Point

This is the location of the seawater pump station supplying the Tweepad Processing Plant with seawater from the Atlantic. The site consists of two sections with a canal blasted through the coastal rock. This canal supplies the first-floor reservoirs of the pump stations with seawater which is then pumped up to the processing plant.

The structures consist of concrete, steel and wood. Electric pumps provided water transfer. An aerial photograph of 1964 does not show this structure and according to mining personnel the site dates from either the late 1960's or early 1970's.



Figure 10. First phase pump station



Figure 11. First phase pump station with gantry



Figure 12. Feeder canal blasted through coastal rock



Figure 13. Inside of first phase pump house



Figure 14. Second phase pump house

TWEEPAD PROCESSING PLANT

GPS 29° 27' 30,5"S
17° 01' 26,2"E



Figure 15. Tweepad Processing Plant

This is the processing plant for the Tweepad mining area. It utilised seawater supplied by the Tweepad Seawater Intake point. The site was developed after the seawater intake and is therefore also younger than 60 years. Significant alterations have been done to the site since it stopped operating. The main structure is the dumping site on the northern side of the site. There are still several large steel sheds with hoisting fittings.

To the south are the remains of the offices and ablution blocks. There is a dragline storage area to the east of the site.

To the north is the remains of three large reservoirs.



Figure 16. Steel and Asbestos shed and offices



Figure 17. Inside of Shed



Figure 18. Dump site with retaining wall



Figure 19. Reservoirs on site



Figure 20. Processing plant



Figure 21. Maintenance Panel Store

DRAGLINE WORKSHOP AND OLD DREYERSPAN OFFICE

GPS 29° 33' 29,5"S
17° 02' 36,2"E



Figure 22. Dragline Workshop and Old Dreyerspan Office



Figure 23. Dreyerspan Office



Figure 24. Old Dreyerspan mining area and berm



Figure 25. Ablution block Dreyerspan



Figure 26. Dragline Workshop



Figure 27. Cables on at Dragline Yard

BULK SAMPLE PLANT

GPS 29° 35' 16,5"S
17° 02' 33,2"E



Figure 28. Bulk Sample Processing Plant

This plant was built in the 1980's and was used for the processing of bulk prospecting samples at this and other source sites. There is a possibility that West Coast Resources will use this plant for processing of diamonds once they take over the mining area. If it is not transferred this site will be demolished.

The site is a large industrial plant with extensive conveyor systems, crushers, off-loading ramps and tailings dams. It has not been used for at least 10 years and is currently in a state of disrepair.



Figure 29. Bulk Sampling Plant with Conveyor System



Figure 30. Off-loading Bays



Figure 31. Conveyor Belt System

DREYERSPAN WATER RESERVOIR

GPS 29° 38' 26,5"S
17° 04' 09,8"E



Figure 32. Dreyerspan Reservoir (the study refers to the smaller of the two reservoirs)

The original reservoir was built in the 1980's and is the smaller of the two located here. As water needs increased in the town of Kleinsee the larger reservoir was built, and this took over the duties of the smaller reservoir. As a result, the small reservoir is not needed anymore and is earmarked for demolition.



Figure 33. Older of the two Reservoirs at Kleinzee

BMR WORKSHOPS AND MINE OFFICES

GPS 29° 39' 42,5"S
17° 04' 14,8"E

This is the where the main administrative offices and mine maintenance workshops are located. These structures date from the early 1980's and have in places been built on the remains of earlier mining structures. Nothing remains of these earlier structures. The site is earmarked for demolition.



Figure 34. BMR Workshops and Mine Offices



Figure 35. Offices and Workshops

The site consists of several one-story brick buildings as well as both asbestos and corrugated iron stores and workshops. Due to corrosion at the coast most of these are of asbestos and pose a significant health threat.



Figure 36. Asbestos Stores



Figure 37. Asbestos Stores



Figure 38. Mine Offices



Figure 39. Maintenance Workshops

E44 WORKSHOPS (LDV WORKSHOPS)

GPS 29° 38' 26,5"S
17° 04' 09,8"E



Figure 40. E44 LDV Workshop

This workshop for LDV's consists of two outbuildings and a large steel and asbestos store. The workshop structures were built in the later 1980's and is of generic design.



Figure 41. Workshop at E44

CHECKPOINT, WASH BAY AND GARAGES

GPS 29° 40' 09,5"S
17° 04' 05,8"E

Structures built in the late 1980's to early 1990's consisting of steel and asbestos stores and brick garages as well as a wash bay for vehicles.



Figure 42. Checkpoint, Wash Bay and Garages



Figure 43. Garages

OLD RECOVERY PLANT AND ASBESTOS LINE

GPS 29° 39' 19,5"S
17° 02' 27,8"E



Figure 44. Old Recovery Plant and Asbestos Line

This is an older part of the mine. It is prominent on the 1964 aerial photographs and most likely date to around 1959. It has not been used for at least 30 years and is in a dangerous state of disrepair. The asbestos line also poses a health risk.



Figure 45. Old Recovery Plant



Figure 46. Recovery Plant Dam and Pump Station



Figure 47. Pump Station and Reservoir

FIELD SERVICE WORKSHOP

GPS 29° 39' 14,7"S
17° 02' 29,8"E



Figure 48. Field Services Workshop

Field Services Workshop consisting of steel and asbestos stores. These were used up to 1970 and dates from 1961.



Figure 49. Field Services Workshop and Stores

AK3 OFFICE BLOCK AND SUB STATION

GPS 29° 39' 07,5"S
17° 02' 34,8"E

A modern brick and cement building dating from the 1980's as well as a power sub-station.



Figure 50. AK3 Office Block and Sub Station



Figure 51. AK3 Office Block and Sub Station

Chapter 3

IMPACT ASSESSMENT

METHODOLOGY

This study defines the heritage component of the EIA process being undertaken for the decommissioning phase of the Kleinzee Mining Area structures. It is described as a first phase Heritage Impact Assessment (HIA). This report attempts to evaluate the heritage significance of the structures earmarked for demolition.

INVENTORY

Inventory studies involve the in-field survey and recording of archaeological resources within a proposed development area. The nature and scope of this type of study is defined primarily by the results of the overview study. In the case of site-specific developments, direct implementation of an inventory study may preclude the need for an overview.

There are a number of different methodological approaches to conducting inventory studies. Therefore, the proponent, in collaboration with the archaeological consultant, must develop an inventory plan for review and approval by the SAHRA prior to implementation (*Dincause, Dena F., H. Martin Wobst, Robert J. Hasenstab and David M. Lacy 1984*).

EVALUATING HERITAGE IMPACTS

After plotting of the site on a GPS the areas were accessed using suitable combinations of vehicle access and access by foot.

Sites were documented by digital photography and geo-located with GPS readings using the WGS 84 datum.

Further techniques (where possible) included interviews with local inhabitants, visiting local museums and information centers and discussions with local experts. All this information was combined with information from an extensive literature study as well as the result of archival studies based on the SAHRA (South African Heritage Resource Agency) provincial databases.

This Heritage Impact Assessment relies on the analysis of written documents, maps, aerial photographs and other archival sources combined with the results of site investigations and interviews with effected people. Site investigations are not exhaustive and often focus on areas such as river confluence areas, elevated sites or occupational ruins.

The following documents were consulted in this study;

- South African National Archive Documents
- SAHRIS (South African Heritage Resources Information System) Database of Heritage Studies
- Internet Search
- Historic Maps
- 1972 and 2003 Surveyor General Topographic Map series
- 1952 1:10 000 aerial photo surveys
- Google Earth 2016 imagery
- Published articles and books
- JSTOR Article Archive

FIELDWORK

Fieldwork for this study was performed on the 19th and 20th of February 2018. The structures were shown to the investigators by personnel of De Beers.

Where sites were identified it was documented photographically and plotted using GPS with the WGS 84 datum point as reference.

MEASURING IMPACTS

In 2003 the SAHRA (South African Heritage Resources Agency) compiled the following guidelines to evaluate the cultural significance of individual heritage resources.

TYPE OF RESOURCE

- Place
- Archaeological Site
- Structure
- Grave
- Paleontological Feature
- Geological Feature

TYPE OF SIGNIFICANCE

HISTORIC VALUE

It is important in the community, or pattern of history

- o Important in the evolution of cultural landscapes and settlement patterns
- o Important in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, province, region or locality.
- o Important for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, province, region or community.
- o Important as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period.

It has strong or special association with the life or work of a person, group or organisation of importance in history

- o Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.

It has significance relating to the history of slavery

- o Importance for a direct link to the history of slavery in South Africa.

AESTHETIC VALUE

It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

- o Important to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
- o Importance for its creative, design or artistic excellence, innovation or achievement.
- o Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
- o In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

SCIENTIFIC VALUE

It has potential to yield information that will contribute to an understanding of natural or cultural heritage

- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
 - Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
 - Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
 - Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
 - It is important in demonstrating a high degree of creative or technical achievement at a particular period
 - Importance for its technical innovation or achievement.
- (a) Does the site contain evidence, which may substantively enhance understanding of culture history, culture process, and other aspects of local and regional prehistory?
- internal stratification and depth
 - chronologically sensitive cultural items
 - materials for absolute dating
 - association with ancient landforms
 - quantity and variety of tool type
 - distinct intra-site activity areas
 - tool types indicative of specific socio-economic or religious activity
 - cultural features such as burials, dwellings, hearths, etc.
 - diagnostic faunal and floral remains
 - exotic cultural items and materials
 - uniqueness or representativeness of the site
 - integrity of the site
- (b) Does the site contain evidence which may be used for experimentation aimed at improving archaeological methods and techniques?
- monitoring impacts from artificial or natural agents
 - site preservation or conservation experiments
 - data recovery experiments
 - sampling experiments
 - intra-site spatial analysis
- (c) Does the site contain evidence which can make important contributions to paleo-environmental studies?
- topographical, geomorphological context
 - depositional character
 - diagnostic faunal, floral data
- (d) Does the site contain evidence which can contribute to other scientific disciplines such as hydrology, geomorphology, pedology, meteorology, zoology, botany, forensic medicine, and environmental hazards research, or to industry including forestry and commercial fisheries?

SOCIAL VALUE / PUBLIC SIGNIFICANCE

- It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
- Importance in contributing to a community's sense of place.

(a) Does the site have potential for public use in an interpretive, educational or recreational capacity?

- integrity of the site
- technical and economic feasibility of restoration and development for public use
- visibility of cultural features and their ability to be easily interpreted
- accessibility to the public

- opportunities for protection against vandalism
- representativeness and uniqueness of the site
- aesthetics of the local setting
- proximity to established recreation areas
- present and potential land use
- land ownership and administration
- legal and jurisdictional status
- local community attitude toward development

(b) Does the site receive visitation or use by tourists, local residents or school groups?

ETHNIC SIGNIFICANCE

(a) Does the site presently have traditional, social or religious importance to a particular group or community?

- ethnographic or ethno-historic reference
- documented local community recognition or, and concern for, the site

ECONOMIC SIGNIFICANCE

(a) What value of user-benefits may be placed on the site?

- visitors' willingness-to-pay
- visitors' travel costs

SCIENTIFIC SIGNIFICANCE

(a) Does the site contain evidence, which may substantively enhance understanding of historic patterns of settlement and land use in a particular locality, regional or larger area?

(b) Does the site contain evidence, which can make important contributions to other scientific disciplines or industry?

HISTORIC SIGNIFICANCE

(a) Is the site associated with the early exploration, settlement, land use, or other aspect of southern Africa's cultural development?

(b) Is the site associated with the life or activities of a particular historic figure, group, organization, or institution that has made a significant contribution to, or impact on, the community, province or nation?

(c) Is the site associated with a particular historic event whether cultural, economic, military, religious, social or political that has made a significant contribution to, or impact on, the community, province or nation?

(d) Is the site associated with a traditional recurring event in the history of the community, province, or nation, such as an annual celebration?

PUBLIC SIGNIFICANCE

(a) Does the site have potential for public use in an interpretive, educational or recreational capacity?

- visibility and accessibility to the public

- ability of the site to be easily interpreted
- opportunities for protection against vandalism
- economic and engineering feasibility of reconstruction, restoration and maintenance
- representativeness and uniqueness of the site
- proximity to established recreation areas
- compatibility with surrounding zoning regulations or land use
- land ownership and administration
- local community attitude toward site preservation, development or destruction
- present use of site

(b) Does the site receive visitation or use by tourists, local residents or school groups?

OTHER

(a) Is the site a commonly acknowledged landmark?

(b) Does, or could, the site contribute to a sense of continuity or identity either alone or in conjunction with similar sites in the vicinity?

(c) Is the site a good typical example of an early structure or device commonly used for a specific purpose throughout an area or period of time?

(d) Is the site representative of a particular architectural style or pattern?

DEGREES OF SIGNIFICANCE

SIGNIFICANCE CRITERIA

There are several kinds of significance, including scientific, public, ethnic, historic and economic, that need to be taken into account when evaluating heritage resources. For any site, explicit criteria are used to measure these values. These checklists are not intended to be exhaustive or inflexible. Innovative approaches to site evaluation which emphasize quantitative analysis and objectivity are encouraged. The process used to derive a measure of relative site significance must be rigorously documented, particularly the system for ranking or weighting various evaluated criteria.

Site integrity, or the degree to which a heritage site has been impaired or disturbed as a result of past land alteration, is an important consideration in evaluating site significance. In this regard, it is important to recognize that although an archaeological site has been disturbed, it may still contain important scientific information.

Heritage resources may be of scientific value in two respects. The potential to yield information, which, if properly recovered, will enhance understanding of Southern African human history, is one appropriate measure of scientific significance. In this respect, archaeological sites should be evaluated in terms of their potential to resolve current archaeological research problems. Scientific significance also refers to the potential for relevant contributions to other academic disciplines or to industry.

Public significance refers to the potential a site has for enhancing the public's understanding and appreciation of the past. The interpretive, educational and recreational potential of a site are valid indications of public value. Public significance criteria such as ease of access, land ownership, or scenic setting are often external to the site itself. The relevance of heritage resource data to private industry may also be interpreted as a particular kind of public significance.

Ethnic significance applies to heritage sites which have value to an ethnically distinct community or group of people. Determining the ethnic significance of an archaeological site may require consultation with persons having special knowledge of a particular site. It is essential that ethnic significance be assessed by someone properly trained in obtaining and evaluating such data.

Historic archaeological sites may relate to individuals or events that made an important, lasting contribution to the development of a particular locality or the province. Historically important sites also reflect or commemorate the historic socioeconomic character of an area. Sites having high historical value will also usually have high public value.

The economic or monetary value of a heritage site, where calculable, is also an important indication of significance. In some cases, it may be possible to project monetary benefits derived from the public's use of a heritage site as an educational or recreational facility. This may be accomplished by employing established economic evaluation methods; most of which have been developed for valuating outdoor recreation. The objective is to determine the willingness of users, including local residents and tourists, to pay for the experiences or services the site provides even though no payment is presently being made. Calculation of user benefits will normally require some study of the visitor population (*Smith, L.D. 1977*).

RARITY

It possesses uncommon, rare or endangered aspects of natural or cultural heritage.

- Importance for rare, endangered or uncommon structures, landscapes or phenomena.

REPRESENTIVITY

- It is important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects.
- Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class.
- Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.

The table below illustrates how a site's heritage significance is determined

Spheres of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific Community			

ASSESSMENT OF HERITAGE POTENTIAL

INDICATORS OF IMPACT SEVERITY

Magnitude

The amount of physical alteration or destruction, which can be expected. The resultant loss of heritage value is measured either in amount or degree of disturbance.

Severity

The irreversibility of an impact. Adverse impacts, which result in a totally irreversible and irretrievable loss of heritage value, are of the highest severity.

Duration

The length of time an adverse impact persists. Impacts may have short-term or temporary effects, or conversely, more persistent, long-term effects on heritage sites.

Range

The spatial distribution, whether widespread or site-specific, of an adverse impact.

Frequency

The number of times an impact can be expected. For example, an adverse impact of variable magnitude and severity may occur only once. An impact such as that resulting from cultivation may be of recurring or on-going nature.

Diversity

The number of different kinds of project-related actions expected to affect a heritage site.

Cumulative Effect

A progressive alteration or destruction of a site owing to the repetitive nature of one or more impacts.

Rate of Change

The rate at which an impact will effectively alter the integrity or physical condition of a heritage site. Although an important level-of-effect indicator, it is often difficult to estimate. Rate of change is normally assessed during or following project construction.

The level-of-effect assessment should be conducted and reported in a quantitative and objective fashion. The methodological approach, particularly the system of ranking level-of-effect indicators, must be rigorously documented and recommendations should be made with respect to managing uncertainties in the assessment. (*Zubrow, Ezra B.A., 1984*).

HISTORIC SIGNIFICANCE

No	Criteria
1	Are any of the identified sites or buildings associated with a historical person or group? Yes The mining structures are associated with the De Beers Mining Group
2	Are any of the buildings or identified sites associated with a historical event? No
3	Are any of the identified sites or buildings associated with a religious, economic, social or political or educational activity? Yes Diamond mining on the West Coast
4	Are any of the identified sites or buildings of archaeological significance? No
5	Are any of the identified buildings or structures older than 60 years? No

ARCHITECTURAL SIGNIFICANCE

No	Criteria
1	Are any of the buildings or structures an important example of a building type? Yes The Seawater Intake, Processing Plant and Bulk Sampling Plant
2	Are any of the buildings outstanding examples of a particular style or period? No
3	Do any of the buildings contain fine architectural details and reflect exceptional craftsmanship? No
4	Are any of the buildings an example of an industrial, engineering or technological development? Yes Diamond Mining on the West Coast
5	What is the state of the architectural and structural integrity of the building? Deteriorating
6	Is the building's current and future use in sympathy with its original use (for which the building was designed)? N/A
7	Were the alterations done in sympathy with the original design? N/A
8	Were the additions and extensions done in sympathy with the original design?

	N/A
9	<i>Are any of the buildings or structures the work of a major architect, engineer or builder?</i> No.

SPATIAL SIGNIFICANCE

Even though each building needs to be evaluated as a single artefact the site still needs to be evaluated in terms of its significance in its geographic area, city, town, village, neighbourhood or precinct. This set of criteria determines the spatial significance.

No	Criteria
1	<i>Can any of the identified buildings or structures be considered a landmark in the town or city?</i> Yes The mining structures defines the cultural identity of the area
2	<i>Do any of the buildings contribute to the character of the neighborhood?</i> Yes The mining structures
3	<i>Do any of the buildings contribute to the character of the square or streetscape?</i> No
4	<i>Do any of the buildings form part of an important group of buildings?</i> Yes The De Beers mining structures

IMPACT EVALUATION

This HIA Methodology assists in evaluating the overall effect of a proposed activity on the heritage environment. The determination of the effect of a heritage impact on a heritage parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the heritage practitioner through the process of heritage impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

DETERMINATION OF SIGNIFICANCE OF IMPACTS

Significance is determined through a synthesis of impact characteristics, which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity if the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

IMPACT RATING SYSTEM

Impact assessment must take account of the nature, scale and duration of effects on the heritage environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact will be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

RATING SYSTEM USED TO CLASSIFY IMPACTS

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

NATURE		
Including a brief description of the impact of the heritage parameter being assessed in the context of the project. This criterion includes a brief written statement of the heritage aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on a heritage parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which heritage resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.

2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impacts on the heritage parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the heritage parameter. A cumulative effect/impact is an effect, which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects.
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects.
3	Medium Cumulative impact	The impact would result in minor cumulative effects.
4	High Cumulative Impact	The impact would result in significant cumulative effects.
INTENSITY / MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).

3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE		
<p>Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the heritage parameter. The calculation of the significance of an impact uses the following formula:</p> <p>(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.</p> <p>The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.</p>		
Points	Impact Significance Rating	Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

ANTICIPATED IMPACT OF THE PROPOSED DEMOLITIONS

IMPACT TABLE FORMAT		
Heritage component	<i>Mining Structures at Kleinzee</i>	
Issue/Impact/Heritage Impact/Nature	<i>Proposed demolition and rehabilitation</i>	
<i>Extent</i>	<i>Local (2)</i>	
<i>Probability</i>	<i>Possible (2)</i>	
<i>Reversibility</i>	<i>Barely Reversible (3)</i>	
<i>Irreplaceable loss of resources</i>	<i>Significant loss of resources (3)</i>	
<i>Duration</i>	<i>Medium term (2)</i>	
<i>Cumulative effect</i>	<i>Low cumulative effect (2)</i>	
<i>Intensity/magnitude</i>	<i>High (3)</i>	
<i>Significance Rating of Potential Impact</i>	<i>42 points. The impact will have a medium negative impact rating.</i>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	2	1
Reversibility	3	2
Irreplaceable loss	3	1
Duration	2	2
Cumulative effect	2	1
Intensity/magnitude	3	1
Significance rating	42 (medium negative)	8 (low negative)
Mitigation measure	<i>Architectural documentation of identified sites.</i>	

RESOURCE MANAGEMENT RECOMMENDATIONS

Several structures associated with the mining of diamonds in the Kleinzee area of the West Coast were investigated for their heritage significance. These structures are earmarked for demolition as part of the rehabilitation phase of the mine.

It was found that none of the structures were older than 60 years and therefore is not directly protected by the NHRA. Although mining has taken place here since 1927 most of the mining structures has undergone extensive upgrading as mining technology has advanced and as a result none of the areas investigated contained structures older than 60 years.

The NHRA does however not preclude structures immediately if they do not comply to the 60-year requirement. Structures can also have intrinsic heritage value if they are seen as important components of the heritage landscape. A major cultural component of the culture of this part of the West Coast is the mining for diamonds. For many years most of the population of South Africa only knew of this one aspect of this area and since few people were allowed to access the area this perception prevailed. As a result of the area being opened to the public, there is a general interest in the mining history of the area and for this reason these structures have heritage significance.

The mine proposed the demolition of the structures as part of the rehabilitation of the mining areas to their natural condition or as close as possible. It is accepted that the best result for the mining area will be to have it rehabilitated to its natural condition. The demolition of the structures will therefore add positively to the landscape. It is however recommended that these structures be recorded professionally before they

are demolished. Since mining has had such a large part to play in the history of the area it would be beneficial to have an architectural and historic record of these structures for future reference.

Not all the structures are unique enough to warrant documentation. The following is recommended;

Site Description	Historic Significance (1-5)	Proposed Mitigation
Tweepad Seawater Intake Point	3	Architectural sketches and drawings. Photographic documentation
Tweepad Processing Plant	3	Architectural sketches and drawings. Photographic documentation
Dragline Workshop	2	Photographic documentation and site plan
Old Dreyerspan Office and sub-station	3	Architectural sketches and drawings. Photographic documentation
Bulk Sample Plant	2	Photographic documentation and site plan
Dreyerspan Water Reservoir	1	Photographic Documentation
BMR Offices and Workshops	2	Photographic documentation and site plan
E44 Workshop and LDV Workshop	2	Photographic documentation and site plan
Checkpoint and parking	1	Photographic documentation and site plan
Old recovery plan	3	Architectural sketches and drawings. Photographic documentation
Field services workshop	2	Photographic documentation and site plan

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