



*Fig 23; In winter, bus drivers create small seats for themselves and make fires to keep warm (see middle foreground) because there are no shelter facilities for them. Uncontrolled fires can easily start on site in this way*



*Fig 24: The traffic throughflow, service vehicle routes and turning facilities for buses have not been well thought through. Buses waiting for tours to finish often pile up one behind the other causing traffic congestion*

### **3.3.4 Built environment**

This part of the Status Quo report has been divided onto Part 1: the public area of the site and Part 2, the fossil site enclosure:

Status quo:

#### **PART 1 PUBLIC AREA**

##### ***Tourist-related, including signage***

- There is a long single-storey building which houses a site museum dedicated to the interpretation of the site and the broader concepts which are needed to interpret the Cradle of Humankind as a whole, a restaurant, a curio-cum-tuck shop, conference rooms, store rooms and toilets (Fig 6)
- There is interpretative material on sale in the tuck shop which includes booklets concerning the site. Price is a deterrent for many visitors (school children and their teachers)
- This part of the site is accessible to the disabled
- There is a brass plaque (erected by SAHRA) identifying the site as a National Heritage Site
- The World Heritage Emblem is displayed on the signifier at the front gate
- There is directional signage on site, but the museum is labeled 'Waiting Area' and many visitors miss it (Fig 25)
- There are behavioural modifiers (e.g. no eating in the caves, no littering)
- There are some safety warnings e. g. do not throw objects down sinkholes
- There is an introductory series of engraved granite blocks showing stages in the history of life on earth. Some types of rock surface are weathering faster than others.
- There are interpretive illustrated boards along the boardwalk (Fig. 12)
- There is an interpretative video in the cave part of the tour

##### ***Ablutions and toilets***

- There are male and female restrooms with flush toilets and a septic tank sewage system which is not ideal (Fig.16).

##### ***Pathways, walkways and viewing platforms***

- The tourist route is paved with pavers along pathways. Where there is open rough or steep ground, Loose concrete blocks placed on flat foundations have been used in the form of steps and pathways.
- There is a raised boardwalk which is unfortunately not accessible to the disabled, but it could easily be made so.
- The boardwalk includes viewing platforms but these can unfortunately not look into the excavation site itself

##### ***Sheds and storage***

- There is a new store room and laboratory for the use of the permitted scientists busy on site, with storage room, work room and offices (Fig 26). Unfortunately the design of this building has many flaws and it does not suit the activities it was originally planned for. Details have been included in the Site Inspection Report for Sterkfontein, October 2006.
- There are toilets, ablution facilities and a wash basin
- The laboratory is air-conditioned but not dust-proof.

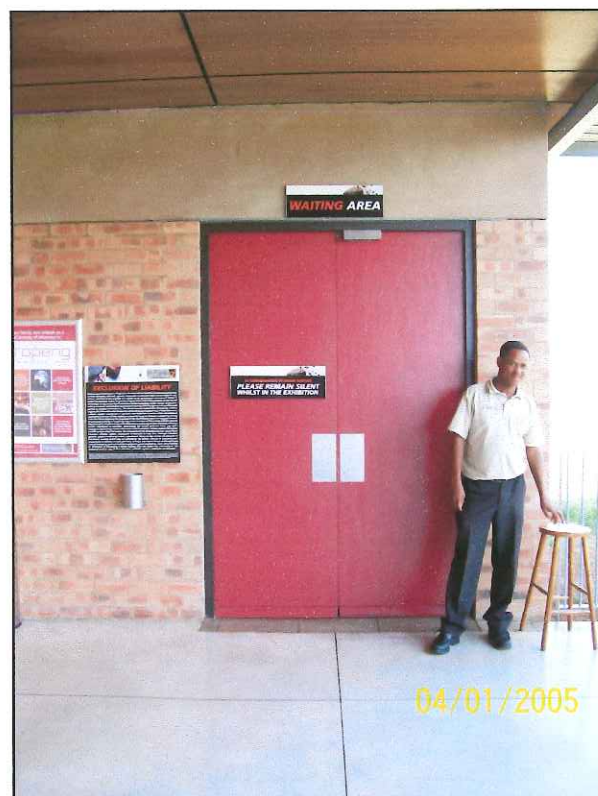
##### ***Accommodation***

- The 'Compound' provides on-site accommodation for the fossil site excavators and preparators. This is an aging facility and requires renovation urgently. Attention to limiting the inmates to authorized persons and to safety aspects are recommended
- The 'Compound' as it now is, or will be after renovation, should be screened from view and appropriate building material selected.

This management area is the responsibility of the University of the Witwatersrand. It is unfortunate that this Status Quo report is still mentioning items which were issues at the time that the original management plan was developed.

Risks and threats:

- These are not relevant to the fossil site management plan



*Fig 25: Inappropriate label over Museum door reads 'Waiting Area' – many visitors have departed unaware that there was a museum. Waiting area is being interpreted as an organizing venue for large groups of schoolchildren*





*Fig 26. The laboratory and fossil store built for the scientists has many inherent flaws in its design. It is utilized by the swartkrans excavation team from across the valley and by the Sterkfontein technicians for casting. Future planning should address ways in which amendments to inappropriate design could be rectified to make the structure fulfill the purposes for which it was built, or fit it for alternative purposes if this is not possible*

## **PART 2: FOSSIL SITE ENCLOSURE**

Status quo:

### ***Tourist-related, including signage***

- There is no infrastructure dedicated to tourism because this is exclusively a work environment.
- There are some explanatory boards and texts inside the store for use when students, academics and high –profile visitors come to the site

### ***Ablutions and toilets***

- There are toilet and ablution facilities on site for the use of site users

### ***Pathways, walkways and viewing platforms***

- There are traditional pathways around the site, some of them passing dangerously high and unprotected drops
- There is an extensive metal walkway crossing the site with a handrail. This has no mesh between the handrail and the footplate and is not safe for small or very short persons. The drops to the excavation floor are dangerous (Fig. 7).

### ***Sheds and storage***

- There is a metal shed which was erected in the early 1970s, using the surface of a flattened dump as a foundation. It is used to store excavation equipment, prepared fossils awaiting transportation to the University, and the casts and demonstration material needed for site interpretation for professional and international academic visitors (Fig 27)





*Fig 27: The metal shed within the fossil site enclosure is used as a store and as a delightful informal site interpretation facility for students and scientific visitors. It is not open to the public, but serves an important function. Preparators can work indoors in inclement weather, increasing productivity (Note: date not correct)*

#### **Accommodation**

- There is no accommodation within the fossil site enclosure

#### Risks and threats:

- Despite a full-time caretaker presence, break-ins and theft continue to be a threat

### **3.3.5 Waste Management (Concessionaire management issue)**

#### Status quo:

#### **Sewage**

- There are flush toilets at the Visitor centre which discharge into a septic tank system. This situation is far from ideal in a dolomitic area with a known void beneath the site because of risk of water contamination- the authorities are aware of this.
- The system needs to be re-engineered to accommodate unexpectedly high volumes of through-put.
- The overflow flows through a series of reed beds which assist in filtering process (Fig 16)
- The final effluent is discharged under the Sterkfontein tar road and seeps down into the Blaauwbank drainage system, an already heavily polluted conduit (Fig 28).
- The toilets in the scientists' laboratory also drains into the septic tank
- The toilet facilities in the excavation enclosure have their own septic tank
- The ideal situation would be a closed sewage system with a holding tank which could be emptied periodically

#### **Litter**

- Litter bins are provided in the main tourist areas
- Restaurant waste is also catered for

- There is a 'waste away' metal hopper parked opposite the bus park (Fig 11) but this does not have a confining net to prevent litter from blowing about
- The excavation area is kept litter free by the excavation team and researchers
- Litter is always to be found but is not a serious problem. No eating is allowed in the caves

Threats and risks:

- Not relevant to fossil site management plan

### **3.3.6 Energy (Concessionaire management issue)**

Status quo:

- The site is on ESKOM power.
- There are several redundant power lines and poles which need to be removed in order to improve visual aesthetics (Fig 20)
- The present power should ideally be buried in order that there is better integration of the site with its surrounding landscape

Threats and risks:

- Redundant infrastructure is an eyesore



*Fig 28: Effluent from the multiple septic tank system at Sterkfontein caves spills over into the Blaauwbank River, an already heavily polluted drainage system. The throughput at Sterkfontein exceeds design specifications and an upgrade is planned. The overflow seen here is on its way to the Blaauwbank at the valley bottom seen in the distance*

### **3.3.7 Water (Concessionaire management issue)**

Status quo:

Please elaborate how the site is currently supplied – Compound, visitor centre and excavation site

Threats and risks:

- None, at the fossil site



### **3.3.8 Telecommunications**

**Status quo:**

- The site has good telecommunications and a good cellular phone signal
- There are redundant telephone lines and poles which need to be removed in order to improve visual aesthetics (Fig 29)

**Threats and risks:**

- Redundant telecommunications infrastructure is an impediment to visual integrity and sense of place



*Fig 29: redundant infrastructure such as telephone lines that once served the former Cave Inn Restaurant and the pipeline water supply need to be removed to reduce visual impact.*

### **3.4 Research Environment**

**Status quo:**

In-house expertise such as the skills and advice of Prof Tim Partridge, a geological engineer, and John Cruise, a mining engineer and explosives practitioner, allow for professional monitoring of most aspects of the work. The researchers, particularly Prof Ron Clarke, have many years of excavation experience. The management of all activities taking place within the excavation area is under his personal supervision.

#### **3.4.1 Previous and ongoing research and excavations**

**Status quo:**

The bone-bearing breccias at Sterkfontein were noted soon after 1895 when prospecting and exploitation of the cave travertine was initiated by G. Martinaglia, a gold and lime prospector. Some fossils were described and reported in the scientific press e.g. Draper 1895 and Frames, 1897, but nothing further was done for almost three decades, during which time many thousands of fossils were probably consigned to the lime-burning kilns and "forever destroyed" (Broom, 1950).



Fossil bones from the Sterkfontein caves were brought to the attention of Raymond Dart by two of his students in 1935, who in turn alerted Robert Broom, then at the Transvaal Museum. Broom discovered the first hominin material from the site in 1936. He initially classified the remains as *Australopithecus transvaalensis*, later creating a new genus to accommodate the material, which he re-named *Plesianthropus transvaalensis*, and hence, "Mrs. Ples". Since the mid-1950s, this hominin has been considered synonymous with *Australopithecus africanus*.

Broom worked the site more or less continuously (together with Kromdraai and Swartkrans) from this time until about 1958, by which time his protégé, John Robinson, had taken over the excavations.

New excavations were begun by the Wits Anatomy Department in 1966 and the site has been continuously excavated since then, by researchers such as Emeritus Professor P.V. Tobias, the late Alun Hughes, Ron Clarke, Tim Partridge and Kathy Kuman. This makes it the world's longest-running archaeological and palaeontological excavation. Current research falls under the aegis of the Sterkfontein Research Unit of the University of the Witwatersrand School of Anatomical Sciences.

The ongoing and proposed excavation targets have been discussed in section 3.1.4 above.

### **3.4.2 Excavation edges**

Status quo:

- The excavation edges are stable where the underlying breccia is calcified or partly so. Paths do not run too close to the edge and a metal walkway makes access across the site easy without putting edges at risk (Fig.7).
- Large boulders and fallen blocks of dolomite which are embedded in friable material need watching to see that they are not de-stabilised by excavation proceeding underneath

Risks and threats:

- None at present

### **3.4.3 Excavation walls**

Status quo:

- Excavation walls have reached dangerously impressive heights at Sterkfontein. The excavations have not been benched but have mostly proceeded straight down (Fig 30). This has created dangerous overhangs and vertical faces, particularly where patches of decalcified breccias underlie solid deposit. Some of the overhanging material has had to be blasted down before excavation could continue.
- Another consequence is the problem of access to the base of the excavation when it is 5 or 6 metres down.
- The creation of a huge sump in which rainwater can collect, or drain off into the underground cave, taking sediment with it, is a further problem. Water in the underground cave causes its own problems. At the time of the discovery of Little Foot, the walls of the Silberberg Grotto were wet and muddy with water draining into the cavern from above.
- The situation is one which should be watched closely. Each case needs to be assessed on its own merits, but as yet there are no agreed guidelines as to how deep, (apart from the safety factor), excavations should go without benching out, and without preserving sections of deposit which demonstrate contacts and field relationships between different sedimentary strata. Such situations need to be discussed in the proposed scientific advisory committee (see generic issues document)

Risks and threats:

- Collapse of friable wall material
- Loose boulders may collapse, together with wall material
- Safety aspects of steep drops
- Ponding of water destabilizes footwall and washes sediment into underlying caves



*Fig 30: Excavations into the breccias at Sterkfontein have reached a considerable and dangerous depth. The report of a professional site safety officer is awaited. Cracks, overhangs and unstable breccia make the site unsafe for excavators and other site users (Image from May to July folder)*

#### **3.4.4 Access to excavations: steps, ladders, lifts etc.**

Status quo:

- The deeper parts of the surface excavations can be accessed by means of a ladder or by climbing down residual portions of the deposit. Ladders and scaffolding can be unstable and unsafe because of the uneven substrate.
- Access by whatever means needs to be checked by a site safety officer and an inspection will take place shortly
- The Silberberg Grotto, where there is a deep excavation taking place underground, is accessed by means of the tourist stairs. There is a gate which can be locked.
- The old gate has almost rusted away but provides an additional security barrier. If removed, it should be replaced. There is a newer, second inner gate already in place.



Risks and threats:

- The report of the professional site safety officer is awaited

### **3.4.5 Erosion**

Status quo:

- Erosion within the fenced off area is not a problem. Fortunately, being near the crest of the hill, most drainage is away from the excavation.
- Erosion beyond the confines of the excavation area is the concern of the landowner and Concessionaire. The bus park and car park need attention.

Risks and threats:

- Not a problem within the fossil site

### **3.4.6 Compliance with conditions of excavation permit**

Status quo:

Inspection by a SAHRA permitting committee member takes place twice a year to check compliance with the terms of the permit

Risks and threats:

- Excavation is inevitably a destructive process. Inappropriate excavation techniques, recording techniques, recovery techniques, preparation techniques, inadequate subsequent publication and indifferent conservation of artefacts recovered is perhaps the greatest threat to the fossil sites. This is an issue generic to all the sites in the COH WHS, hence the SAHRA twice-yearly inspections. Non-compliance is not an issue at this site.

### **3.4.7 Witness sections**

Status quo:

- A witness section demonstrating members 4,5 and 6 plus post-6 has been identified in squares U,T,S and R, and R66. This area of the deposit demonstrates contacts between these members (Fig 31)
- Witness section at the 'Historic face' at the original 'Mrs Ples' discovery site (Fig 32)
- Witness section in south wall at M4 near STW 53 find site and contact between Member 4 and Member 5

Risks and threats:

- Stratigraphic conclusions reached should be independently verifiable. If no witness sections are preserved, this would not be possible
- Dating results need to be independently verifiable. If witness sample sections are not preserved, this will not be possible
- New techniques and analytical procedures are perpetually coming to light. These need to be applied to sites from which earlier conclusions were obtained, in order to verify and expand understanding. If there are no witness sections, this cannot be accomplished.





*Fig 31: Witness section along south-western extremity of the de-roofed Sterkfontein deposit showing interdigitation of Member 4 (chocolate brown) and Member xx (beige, and with considerable more embedded clasts). Last remaining roof blocks of dolomite can be seen just below the walkway, with breccia fill underneath*

### **3.4.8 Dumps**

Status quo:

- The Sterkfontein excavation site has very confined space and large dumps cannot be accommodated. The resident excavators and preparators normally process dumps resulting from excavation as they are created so that on site storage is not problematic.
- Waste material has been dumped and leveled and the spaces so created built on. The entire shed is built on an old leveled dump of sterile waste material
- The dumps are properly made with foundations and toes and correct angles of repose because they have not been piled up too high
- There are still a few unworked dumps dating from the time of the lime workers but the scientists plan to sort these to recover fossils

- A plan on which all dumps are marked and annotated is still required

Threats and risks:

- Dumps well documented at this site and mostly processed for their fossil content. Nothing at risk at present.

### **3.4.9 Repository**

Status quo:

- The University of the Witwatersrand is the designated repository of the fossil material and artefacts recovered. This institution has been accredited by SAHRA as it has all the necessary controls in place and it conforms to the minimum standards laid down by SAHRA

Risks and threats:

- Loss of, or deterioration of artefacts
  - Loss of information concerning artefacts
  - Lack of publicized information about artefacts
- These threats are not an issue at present.

## **3.5 Site safety and security**

There has not been a site safety inspection by a professional site safety officer for some years but an inspection is due to take place shortly. The site also needs a public health and safety inspection unless these aspects are also covered by the site safety inspector.

### **3.5.1 Physical safety**

Status quo:

- The site has until recently been situated within a relatively remote rural area where most people used to know each other, and at that time personal security was not a problem. However, there has of recent years been a tremendous influx of people from all over South Africa, and informal settlements have grown up, bringing in many strangers. Personal safety can no longer be taken for granted. There has been an increase in theft, some break-ins made in broad daylight. The excavator across the valley at Swartkrans was assaulted and crime has become a management factor when it was previously not an issue

Risks and threats:

- Theft and crimes of violence have increased dramatically over the last two years and are an ongoing risk

### **3.5.2 Safety of surface and built environment**

Status quo:

This section looks only at the safety situation of the fossil site excavation area, and not the whole property, which is the management domain of the Concessionaire or University, as the landowner:

- Fuel tanks; see below
- Walkway; see below



- The remaining elements of the built environment (shed, shelter, garage, outbuildings and toilet block appear to be safe and the report of the site safety officer should be awaited

Threats and risks:

- A site safety inspection is due, and the report of the professional site safety inspector is awaited

### **3.5.3 Safety of excavation area**

Status quo:

- The excavation has now reached an irregular depth of about 5 to 6 metres and further excavation is still continuing
- This has resulted in some very steep drops
- Loose boulders and dolomite blocks embedded in friable walls may become unstable and collapse into the excavation, putting those at work below at risk
- There is a fracture in the north wall of Member 4, monitor for widening
- Excavation in Member 5 has produced a dangerous overhang
- At ground level, the edges of the excavation are unprotected
- The surface of the excavation area is breccia in some areas and extremely irregular making for a dangerous walking surface (tripping, sprained ankles, falling etc)
- There are several old abandoned excavation pits in the type site area which are very deep and which have unprotected edges
- The walkway has a handrail but the space between the handrail and footplate is not meshed and small and short people might be at risk
- There is loose gravel lying on pathways
- Where chipping with hammers and chisels is carried out and airscribes are used there is a risk of eye damage from flying chips of material and safety goggles are a legal requirement (Public Health and Safety Act). The same is true wherever rock drills are used in the excavation process
- Where dust is created, breathing masks are required
- Where loud noise is created (such as from jackhammers) earmuffs are necessary
- The use of dangerous chemicals requires special gloves
- The storage of chemicals must conform to safety and fire hazard requirements
- The use of flammable chemicals for preparation and protection of fossils requires other special safety interventions, also for the disposal of waste chemicals
- Hard hats are required on excavation sites such as this one, where there is loose and friable material above head height
- The fuel storage tank is a potential fire hazard, particularly from uncontrolled fires started elsewhere
- Fuel build-up in the form of long dry grass which encroaches on the excavation area is a threat but is usually well controlled

Risks and threats:

- There are a number of potential safety risks. The report of the professional site safety inspector is awaited
- There is a beehive in the dolomite between the Type Site and the viewing platform, and this should be removed as it is a potential danger to visitors.

### **3.5.4 Subterranean safety**

The Status Quo report does not deal with safety issues in the underground cave. This awaits the report of a professional site safety officer. The inspection will shortly take place



Status quo:

- The Little Foot excavation is being carried out in the subterranean Silberberg Grotto which is the remains of a cavity mined out by lime workers in the past. Its location is shown in the site plans, Fig 4 a, b, and c.
- The extremely irregular mined out floor surface is dangerous especially to those who are unfamiliar with the site
- The stairway is potentially dangerous, not from a structural safety point of view but from the possibility of falls. Wood rot in the damp atmosphere is a risk
- There is low headroom in places, especially at the top of the ladderway
- The approach tunnel also has low headroom
- There are unexpected changes in level both of the roof and floor and several unprotected pits and long drops
- The report of a site safety officer is awaited before this section can be completed

Risks and threats:

- There are a number of potential safety risks. The report of the professional site safety inspector is awaited

### **3.6 Presentation of site value**

Many values at Sterkfontein go without presentation. These include:

- Natural values such as rare plants, edible plants, medicinal, magical, toxic and economically significant species e.g. they were traditionally used to make bows and arrows, etc.)
- Cave ecology and cave taphonomy (there is a little)
- Mining relics on site
- Geological and geomorphological heritage values
- How fossils are prepared, interpreted and reconstructed
- The most significant values of the other sites, especially Swartkrans, Drimolen Gladysvale, Coopers, Kromdraai, Bolt's Farm and Plover's Lake
- There is little in the way of reasonably priced pamphlets which are within the financial reach of school pupils and their teachers, although there are several good books on the fossil sites

#### **3.6.1 Site interpretation**

Status quo:

- The fossil site values are adequately presented in the museum attached to the Visitor Centre
- The display addresses general concepts of the origin and evolution of life on this planet, creation stories, cave formation, cave taphonomy, fossil hominids and associated animals, lime mining and stone tools.
- The display includes both actual specimens (as casts, not originals) and flesh reconstructions
- The site values of the other 12 sites in the COH WHS receive scant treatment.
- It was noted that several school groups by-passed the museum but site interpretation is incomplete without a visit.
- The lack of appropriate bold signage has meant that people have visited the site without knowing that there is a museum, visiting only the restaurant and curio shop, and going on the tour.

Threats and risks:

- Lack of full site interpretation (visual, signage, oral, experiential) diminishes tourist experience

- Lack of presentation of site values (there are 15 separate fossil sites) to a wider audience prevents information concerning site significance from reaching public psyche
- Potential funders might not know about site significance, particularly of the non-Sterkfontein sites. Sterkfontein is the only site open to the public.
- Public not educated about full range of COH WHS values

### **3.6.2 Visitor numbers**

Status quo:

- There is no regular mechanism for recording and reporting visitor numbers as yet, particularly visitors to the fossil site, who are mainly academic.

## **4 MANAGEMENT OBJECTIVES, DESIRED OUTCOMES**

### **4.1 Physical environment, surface**

Desired outcomes for the physical environment include:

*Rangeland:*

- To ensure that contextual veld conditions and rangeland in the Isaac Edwin Stegmann Reserve are maintained in as good a condition as possible.

*Erosion:*

- To ensure that the fossil site and its environs are free of active erosional problems and that existing areas of erosion are identified, analysed, remedied, rehabilitated and monitored for follow-up action if necessary

*Fire management:*

- Fire management of the greater reserve area is a Concessionaire issue
- To ensure that fossil site users are aware of fire hazards and can control on-site fires.
- To ensure that the fossil site does not harbor or create fire hazards
- To ensure that the necessary fire-fighting equipment is on hand in the event of a domestic fire (fire extinguishers and beaters)
- To ensure that the basic data necessary to assess the long-term impact of frequent fires is available, which information is necessary to feed back into appropriate fire management. This is a generic issue pertinent to all the fossil sites as well as the remainder of the COH WHS.

*Biodiversity, rare plants and animals:*

- To ensure that a database of plant and animal species present on site becomes available, because biological values are as yet poorly understood
- To assess which of these are target species for use as food, medicines, economic reasons, etc., and to what extent they are being collected
- To identify, record and map special species in order to ensure their protection

*Alien vegetation and weeds:*

- Desired outcome is a fossil site which is free from alien invasive species, and, as far as possible, from weeds. This will necessitate a 'generic' programme which includes the whole of the COH WHS plus upstream areas from which new infestations are introduced,

particularly into the wetland below Sterkfontein. The proper rehabilitation of the old restaurant site would help in weed control.

- A further desired outcome is the generation of a list of invasive alien species and weeds present on the site in order that optimum control measures can be implemented

Visual aesthetics:

- Desired outcome is protection of viewshed and contextual environment in order that the site does not become an island in a sea of inappropriate development or land use.
- A further desired outcome is the removal of all redundant infrastructure from the site, and the rehabilitation of foundations, if any

#### **4.2 Physical environment, subterranean**

- Desired outcome is a subterranean environment in which the cave atmosphere, substrate, biota and appearance is kept in as undisturbed and natural a condition as possible
- A further desired outcome is a subterranean environment which, if it is being visited or excavated, is safe for all site users.
- Desired outcomes for the tourist route are:
  - Ultimate replacement of galvanized metal with stainless steel,
  - Proper lighting (floor level, with cables concealed under boardwalk and special features only spotlighted),
  - Concealment or camouflage of lighting cables, transformer boxes, lamps, etc.
  - Raised boardwalk
  - Rehabilitated cave floor
  - Properly monitored cave atmosphere (humidity, temperature, carbon-dioxide levels, dust)
  - Properly monitored groundwater
  - Properly monitored biota and substrate
  - No graffiti
  - No algal or plant growth
  - Improved quality of tourist guide input

#### **4.3 Infrastructure, built environment**

TOURIST AREA

The problems connected with the built environment have been discussed in the October 2006 Site Inspection Report for Sterkfontein. They fall under the management plans developed by the Concessionaire

- Disabled access is problematic, given Government policy in this regard.

FOSSIL SITE EXCAVATION AREA

There are no special management outcomes that are needed or desired states requiring attention with regard to the built environment in the excavation area at present.

#### **4.4 Research environment**

- Isolation from communication with specialist scientists and peers can lead to becoming cut off from peer feedback and review and a desired outcome is a forum where matters of mutual concern can be reviewed – see generic Issues document.



- To ensure that the activities of scientists on site are perceived as 'adding value' rather than as 'site users' and that authorities take cognizance of this, particularly with regard to funding items which are not directly research or science-orientated, such as the purchase of materials for storage containers, which items have little hope of being funded by the NRF or other funding bodies
- To ensure that lack of funding does not inhibit research opportunities and prevent site potential from being realised
- To ensure that the Management Authority has in-house heritage expertise which allows for the follow-up of fossil site inspection observations and recommendations
- To ensure that all structures, excavations and site features are committed to a site plan which includes the gazetted proclamation boundary
- To ensure that all dumps, old and new, are committed to plan, with appropriate annotations
- To ensure that new dumps are appropriately sited and properly constructed
- To ensure that excavations are safely executed and compliant with permit terms and conditions
- To ensure that appropriate witness sections are left and stabilized
- To ensure that sample sites are properly recorded and that results are independently verifiable
- To ensure safe excavation edges, walls and bases, and that these are stabilized when work ceases
- To ensure that fossils are carefully and properly prepared, catalogued, curated and housed in a safe repository
- To ensure that regular site safety inspections take place

#### **4.5 Site safety and security**

- Desired outcomes include the provision of safety interventions recommended by the professional site safety officer after inspection of the surface and subterranean environments as well as all infrastructure has taken place
- Desired outcome is an underground disaster plan (e.g. major roof collapse) in place and guides trained to implement it
- Desired outcome is a first aid and evacuation policy in the event of an accident or medical crisis
- Desired outcome is the removal of the beehive between the Type Site and the viewing platform because it is a danger to visitors

#### **4.6 Presentation of site values**

- To ensure that the many heritage and natural values of the site are interpreted and made available to as wide a public as possible
- To ensure that appropriate attention is drawn to the Sterkfontein Museum with an obvious sign, as many people miss it.
- A desired outcome is the inclusion of mining values into the tourist route
- A greater variety of affordable information pamphlets is required, especially as palaeontology is now a grade 11 and 12 topic in Life Science syllabus
- A desired outcome is a new balance in the present disproportionate emphasis on Sterkfontein – it is the flagship site, but other sites are in danger of being marginalized

Deleted:

## **5 MANAGEMENT AND MONITORING TASKS**

The following are operational management tasks and issues that need to be addressed now or in the future as part of on-going management actions in order to achieve the above-mentioned desired outcomes. Their funding is still problematic.

The development of research at the fossil sites has been limited by the unfortunate perceptions that the State may not fund development on privately owned property and that the scientists are 'site-users'. This needs to change as it must be seen as the responsibility of the authorities to foster research and necessary associated development on these sites. It is recommended that in future, scientists be viewed rather as 'value adders' and thus eligible for some easement for the funding of heritage site management interventions which they are currently expected to fund, for example, fencing. In effect, the state has been expecting others to finance the protection of the COH WHS fossil sites.

Sites which have no active scientist are generally neglected – this is an indication of the positive influence which scientists have on fossil sites.  
which scientists have on fossil sites.

The following tables have been drawn up with the specific aim of clarifying who should do what, and when, on the heritage site. The Tables also provide some indication of priority ratings. They have been constructed in such a way as to incorporate all the key management issues, strategies and monitoring criteria so that they may be used independently of the text.

The relative priority of the management measures has been identified based on ICCROM definitions as follows:

- Immediate - to be attended to urgently as it constitutes a danger to the public or a resource;
- Urgent - to be attended to urgently to protect the resource;
- Necessary - to be attended to, to protect the resource;
- Desirable - to be attended to from a development perspective;
- Keep watch – to be monitored to see if the problem is serious.

TABLE 1 FOLLOWS: MANAGEMENT AND MONITORING; STERKFORTEIN



TABLE 1 MANAGEMENT AND MONITORING: STERKFONTAIN FOSSIL SITE

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
<b>1 Surface environment</b>						
Rangeland condition	<ul style="list-style-type: none"> <li>Deterioration of rangeland due to too frequent fires</li> </ul>	<p><b>Rangeland free from impacts of over frequent burning and other deleterious activities (*).</b></p> <ul style="list-style-type: none"> <li>GDACE can advise</li> <li>Plan for acquiring baseline data against which impacts can be assessed</li> <li>Plant species list required</li> <li>see fire management below</li> </ul>	Desirable	Landowner	<ul style="list-style-type: none"> <li>Until baseline data are in place, monitoring criteria cannot be formulated</li> </ul>	
Retention of topsoil, surface drainage, surface erosion	<ul style="list-style-type: none"> <li>Loss and dispersal of topsoil makes re-vegetation difficult</li> </ul>	<p><b>Site free from erosional problems (*).</b></p> <ul style="list-style-type: none"> <li>Check all tracks, overflow car park and bus park</li> <li>Check for surface drainage and distribution of runoff over surface</li> <li>Check for signs of surface erosion</li> </ul>	Necessary	Landowner, Concessionaire	<ul style="list-style-type: none"> <li>Check for worn patches of grass where vehicles habitually park</li> <li>Check for erosion</li> <li>Check for patches of exposed soil, as in bus park</li> <li>Check for gulleys</li> </ul>	Ongoing

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Fire Management	<ul style="list-style-type: none"> <li>• Too frequent fires have a negative effect on vegetation</li> <li>• Fire is a threat to buildings and moveable property</li> <li>• Fire repeatedly burns off reed bed filter for septic tank effluent</li> <li>• Fire destroys landscaping plants</li> <li>• Fire smoke and dust drawn into cave, dirties speleothems</li> </ul>	<p><b>Fossil site and wetland protected from uncontrolled fire (*).</b></p> <ul style="list-style-type: none"> <li>• Implement a fire management policy</li> <li>• Record fire frequency and intensity</li> <li>• Take precautionary measures to contain domestic fires started on site</li> <li>• Brief residents on what to do in such a situation</li> <li>• Provide fire extinguishers, training in their use and annual checks of equipment</li> <li>• Provide suitable beaters for research staff and excavating team</li> </ul>	urgent	Landowner, Concessionaire, GDACE	<ul style="list-style-type: none"> <li>• Set up rangeland study for base data against which fire impact can be assessed</li> <li>• Set up a fire frequency recording programme</li> <li>• Check location and functionality of fire extinguishers</li> <li>• Ensure that annual check of equipment takes place</li> <li>• Ensure that residents, students and scientists know how to use equipment</li> <li>• Ensure that beaters are always on hand</li> </ul>	
Red data species, rare and economically significant plants	<ul style="list-style-type: none"> <li>• Loss of edible and medicinal plants</li> <li>• Many important plant species are not on RED DATA list.</li> <li>• Lack of interpretation means loss of knowledge</li> </ul>	<p><b>Preservation of rare and ethno-botanically significant species (*).</b></p> <ul style="list-style-type: none"> <li>• Surveillance of indigenous plant use</li> <li>• Draw up a species list of medicinal, poisonous, edible and economically significant species</li> <li>• Map occurrence and preferred microhabitats</li> <li>• Monitor collection and utilization</li> <li>• Incorporate in site interpretation</li> </ul>	Necessary	Landowner, Concessionaire	<ul style="list-style-type: none"> <li>• Record vegetation of nature reserve</li> <li>• Check for signs of digging geophytes out by the roots</li> <li>• Check local roadside vendors for plants on sale</li> </ul>	Ongoing



Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Invasive alien plant species.	<ul style="list-style-type: none"> <li>• Invasion of avens and other habitats by alien species</li> <li>• Loss of biodiversity</li> <li>• Unattractive landscape</li> <li>• Uncleared infestations threaten nearby properties wit re-infestation</li> </ul>	<p><b>Fossil site free of alien invasives (*).</b></p> <ul style="list-style-type: none"> <li>• Make a list of all invasive plant species</li> <li>• Map and prioritise infestations</li> <li>• Determine best eradication or control programme. GDACE available for assistance. See generic plan, operational Guidelines</li> <li>• Assess costs and find budget</li> <li>• Begin control according to guideline provided in generic management plan</li> <li>• Enlist expertise of GDACE</li> <li>• Implement control and clearance programme</li> <li>• Monitor and follow up as required</li> </ul>	necessary	Landowner, research scientists (in work environment)	<ul style="list-style-type: none"> <li>• Visual checks for infestations and incidence density</li> <li>• Monitor with fixed point photography</li> </ul>	Ongoing
Weeds in public spaces	<ul style="list-style-type: none"> <li>• Weeds give a negative visual impression and project an air of dereliction</li> <li>• Weeds in disturbed area at old restaurant site are problematic</li> </ul>	<p><b>Weed-free fossil site (*).</b></p> <ul style="list-style-type: none"> <li>• Pull weeds out by hand – do not 'skoffel' as this eradicates non-weed pioneer indigenous vegetation</li> </ul>	Necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Visual checks for weed infestations on reported areas</li> </ul>	ongoing
Weeds & shrub growth in excavation site	<ul style="list-style-type: none"> <li>• Roots destabilize breccias in time</li> <li>• Plants reduce visibility of noteworthy sections</li> <li>• Weeds give a negative visual experience and project an air of dereliction</li> </ul>	<p><b>Weed-free fossil site (*).</b></p> <ul style="list-style-type: none"> <li>• Pull weeds by hand, or 'skoffel' on areas that need to be completely cleared</li> <li>• Destroy in a manner that does not spread seed further</li> </ul>	Necessary	Research scientists (in excavation environment), University	<ul style="list-style-type: none"> <li>• Visual checks for weed infestations</li> <li>• Fixed point photography for controls</li> </ul>	Ongoing

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Development in 'viewshed'	<ul style="list-style-type: none"> <li>Negative visual impact</li> <li>Destruction of rural ambience</li> </ul>	<p><b>Retention of sense of place, visual aesthetics (*)</b></p> <ul style="list-style-type: none"> <li>COH WHS to monitor all new development plans</li> </ul>	Necessary	COH WHS MA	<ul style="list-style-type: none"> <li>Check development plans submitted for visual impact on viewshed of site</li> <li>Set up fixed point monitoring at view sites</li> </ul>	Ongoing
Habitat protection: Removal of stromatolites.	<ul style="list-style-type: none"> <li>Loss of Heritage material and site significance.</li> <li>Loss of micro-habitats (mosaic of sunny and shady areas).</li> </ul>	<p><b>Stromatolites and 'Pelindaba Stone' retained and protected (*)</b></p> <ul style="list-style-type: none"> <li>Landowner, Research scientists and field staff to maintain surveillance</li> <li>Heritage Monitors to be alerted</li> </ul>	Necessary	Landowner, permitted scientists, field staff, Heritage Inspectors, GDACE	<ul style="list-style-type: none"> <li>Check for signs of disturbed soil, exposed patches of soil, overturned and disturbed rock</li> <li>Check for area depleted of all portable sizes of rock</li> </ul>	Ongoing
<b>2 SUBTERRANEAN ENVIRONMENT</b>						
Interpretation of subterranean environment	<ul style="list-style-type: none"> <li>Lack of information regarding the significance of caves to science of palaeontology</li> <li>Lack of appreciation of the significance and sensitivities of the subterranean environment</li> <li>If not interpreted, loss of information and opportunity to learn and appreciate</li> </ul>	<p><b>Subterranean environment properly interpreted (*)</b></p> <ul style="list-style-type: none"> <li>Incorporate caves and ecology of subterranean environment into site interpretation</li> <li>Develop a temporary display around cave ecology theme</li> </ul>	necessary	Concessionaire, persons who train tourist guides	<ul style="list-style-type: none"> <li>Check that subterranean environments are suitably interpreted, both in museum and on tourist route</li> </ul>	Ongoing



Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERKFONTAIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Metal structures underground, galvanized metal handrails	<ul style="list-style-type: none"> <li>• Metal infrastructure rusts in high humidity environments</li> <li>• Not best practice, as required in original management plan terms of reference</li> </ul>	<p><b>Metal structures replaced (*).</b></p> <ul style="list-style-type: none"> <li>• Plan for systematic removal and replacement with chemically neutral and inert plastic timber</li> <li>• Galvanized handrails and security fence at underground lake both need attention</li> </ul>	Necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check for rusting, corrosion and safety of galvanized structures</li> </ul>	ongoing
lighting	<ul style="list-style-type: none"> <li>• Destruction of sense of place</li> </ul>	<p><b>Appropriate attractive lighting which does not adversely impact on the cave environment (*).</b></p> <ul style="list-style-type: none"> <li>• Consult with 'show cave' experts to redesign lighting</li> <li>• Place lighting at foot level</li> <li>• Conceal cables under raised boardwalk</li> <li>• Highlight special features with spotlights (specially designed for caves)</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Subjective. Consult specialist</li> </ul>	When lighting proposed When lighting installed
lighting	<ul style="list-style-type: none"> <li>• Algal bloom on stalactites under lights</li> <li>• Moss growing under lights and in damp places</li> <li>• Bacterial blooms and slime molds also growing</li> <li>• Tree growth under 'spots' on floor</li> <li>• Discolouration of speleothems</li> </ul>	<p><b>Appropriate attractive lighting which does not adversely impact on the cave environment (*).</b></p> <ul style="list-style-type: none"> <li>• Install cold lights</li> <li>• Consult 'show cave' lighting specialist about type of lamps to use</li> <li>• Use serial switching to turn off sections of the cave and leave in darkness</li> <li>• Switch off lights after last tour group leaves</li> <li>• Consider rehabilitation of badly affected speleothems</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check for algal growth on stalactites – this shows as a faint greenish bloom</li> <li>• Check for vegetation growing within ambient light</li> </ul>	Ongoing

Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERKFONTAIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
lighting	<ul style="list-style-type: none"> <li>Exposed transformer boxes and switch boards detract from sense of place</li> <li>Exposed transformer boxes are visually intrusive</li> </ul>	<p><b>Lighting infrastructure concealed or camouflaged (*).</b></p> <ul style="list-style-type: none"> <li>Conceal transformer boxes in side passages</li> <li>Camouflage by painting out (eg black)</li> <li>Conceal behind panels of fake but convincing dolomite</li> </ul>	necessary	concessionaire	<ul style="list-style-type: none"> <li>Check for concealment of all transformer boxes</li> </ul>	Ongoing, until done
lighting	<ul style="list-style-type: none"> <li>Coils of cable, badly laid cable, untidy, careless</li> <li>Tripping</li> <li>Exposed cable visually intrusive</li> <li>Destruction of sense of place</li> </ul>	<p><b>Lighting infrastructure concealed or camouflaged (*).</b></p> <ul style="list-style-type: none"> <li>Conceal cable under raised boardwalk, when this is installed</li> <li>Interim, conceal at join between floor and wall of cave passage – can be packed with strategically varied rock sizes</li> <li>Do not unnecessarily disturb substrate because of dust</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>Check that electrical cables are concealed</li> </ul>	Ongoing until done
lighting	<ul style="list-style-type: none"> <li>Conceal lamps rather than have the full glare of light visible</li> <li>'In your face' lights are not best practice</li> </ul>	<p><b>Concealed lamps with no blinding face-on glare (*).</b></p> <ul style="list-style-type: none"> <li>Angle lamps to highlight special features rather than throwing general broadcast light</li> <li>Conceal lamps behind features if possible</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>Monitor concealment of spotlights and other lights</li> </ul>	Ongoing until done



Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
boardwalks	<ul style="list-style-type: none"> <li>• Lack of boardwalks compacts cave floor surface</li> <li>• Lack of boardwalk causes dust</li> <li>• Lack of boardwalk allows free-ranging of tourists and leads to loss of control of tour group</li> <li>• Lack of boardwalk does not allow for easy concealment of electric cables and other cave infrastructure such as tapes, switches, etc which otherwise tend to go on the walls</li> <li>• Compaction leads to loss of cave microfauna</li> <li>• Honeycomb rubber matting causes fungal growth</li> </ul>	<p><b>Replacement of rubber matting with raised boardwalk of inert substance (*)</b></p> <ul style="list-style-type: none"> <li>• Install raised boardwalk of inert plastic timber</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check for installation of boardwalk</li> </ul>	
Floor compaction	<ul style="list-style-type: none"> <li>• Loss of cave microfauna</li> </ul>	<p><b>Restored substrate (*)</b></p> <ul style="list-style-type: none"> <li>• Seek professional advice from managers of tourist caves elsewhere</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check for floor compaction – a badly compacted floor has a dimpled knobby surface</li> </ul>	Ongoing until done

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Dust on water surface	<ul style="list-style-type: none"> <li>• Almost impossible to clear</li> <li>• Creates a visual impression of pollution or 'sick water'</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Protection of underground lake from pollutants (*).</b></li> <li>• Never open cement bags or other powdery material inside the cave</li> <li>• Never open cement bags or other powdery material outside the cave where it can be drawn in by natural draughts</li> <li>• Keep outside of cave as dust free as possible so that dust is not drawn into caves – this settles on water surface as well as on speleothems</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check for dust on water surface</li> <li>• Determine source (sample and analyses dust particles)</li> <li>• Remove source if possible</li> </ul>	ongoing
Air and atmospheric quality	<ul style="list-style-type: none"> <li>• Raised CO<sub>2</sub> levels,</li> <li>• Relative humidity</li> <li>• Temperature</li> <li>• Dust, all of above affect speleothem growth and/or decay</li> </ul>	<p><b>Maintenance of acceptable levels of CO<sub>2</sub> for cave health (*).</b></p> <ul style="list-style-type: none"> <li>• Monitor according to standards set internationally for 'show caves'</li> <li>• Reduce numbers of visitors if indicator levels exceeded – CO<sub>2</sub> levels, temperature, dust is all affected by large and regular numbers of humans moving through cave system</li> </ul>	necessary	GDACE, Concessionaire	<ul style="list-style-type: none"> <li>• Sample, measure and check atmospheric conditions according to international standards</li> </ul>	ongoing
Histo-plasmosis	<ul style="list-style-type: none"> <li>• Spores of histoplasma capsulatum cause lung disease.</li> <li>• Immune-compromised individuals at risk (HIV)</li> </ul>	<p><b>Ensure that appropriate warnings are in place if necessary (*).</b></p> <ul style="list-style-type: none"> <li>• Check for presence and post warning notices if found</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check that such tests have been done, and if necessary, check that warning notice is prominently displayed</li> </ul>	

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
<p>Tour group sizes, graffiti</p>	<ul style="list-style-type: none"> <li>Very large groups cannot be properly managed</li> <li>Large groups can have laggards who write graffiti</li> <li>School classes are often well over 40 pupils and reluctant to be 'split'</li> <li>Tour guides appear to like to do larger and fewer groups</li> </ul>	<p><b>Tourist numbers or group sizes must not compromise cave values or create environmental impacts (*).</b></p> <ul style="list-style-type: none"> <li>Monitor group sizes</li> <li>Ideal size 25 and under. Do not exceed 35</li> <li>Ensure that there is a front and end person supervising large school groups (the teachers like to sit in the restaurant and leave the tour to the guide)</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>Do spot checks on group sizes</li> <li>Report over-sized groups to Concessionaire</li> </ul>	ongoing
<p>Tourist guides</p>	<ul style="list-style-type: none"> <li>Lack of proper training and regular refresher courses leads to inferior site presentation</li> <li>All tourist guides must comply with the terms of the Heritage Agreement</li> </ul>	<p><b>Tourist Guides must be able to interpret all site features fully and coherently (*).</b></p> <ul style="list-style-type: none"> <li>Ensure that tourist guides are trained to the highest standards</li> <li>All tourist guides need to be registered with the Department of Environment and Tourism (legal requirement)</li> <li>Tour guides need to have a first aid training (legal requirement)</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>Check that guides are properly trained</li> <li>Check that guides are updated on new discoveries on site</li> <li>Check that guides are registered</li> </ul>	ongoing
<p>Presence of bats – there are still one or two</p>	<ul style="list-style-type: none"> <li>Loss of colony – sensitive to human interference. Colony departed many years ago</li> <li>Species involved (Mimopterus natalensis) is declining in numbers</li> </ul>	<p><b>Ensure conservation of small bat numbers within cave (*).</b></p> <ul style="list-style-type: none"> <li>Ensure that bats have free access into and out of cave</li> <li>GDACE can offer advice</li> </ul>	Keep watch	GDACE to monitor	<ul style="list-style-type: none"> <li>GDACE to establish monitoring criteria for bats</li> <li>Check for presence and numbers of bats</li> </ul>	Ongoing, breeding season
<b>3 INFRASTRUCTURE</b>						



Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERKFORTEIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Access road	<ul style="list-style-type: none"> <li>• Potholes, loss of condition</li> </ul>	<p><b>Erosion and pothole free access road (*)</b></p> <ul style="list-style-type: none"> <li>• Check that road condition is maintained</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check that mitre drains remain open at all times</li> <li>• Check verges for erosion of tar and crumbling</li> <li>• Report defects to Concessionaire</li> </ul>	ongoing
Car park – erosion of surface	<ul style="list-style-type: none"> <li>• Frequent parking can cause erosion of grassed surface</li> </ul>	<p><b>Erosion-free car park (*)</b></p> <ul style="list-style-type: none"> <li>• Monitor and spread crushed stone gravel when necessary</li> </ul>	Keep watch	Concessionaire	<ul style="list-style-type: none"> <li>• Check surface and surrounds of car park for signs of erosion</li> </ul>	Ongoing
Bus park	<ul style="list-style-type: none"> <li>• Bus park is in a 'first impression' area situated opposite service entrance and rubbish tip</li> <li>• View on de-bussing will give negative impression</li> </ul>	<p><b>Appropriately located, paved bus park with driver shelter (*)</b></p> <ul style="list-style-type: none"> <li>• Relocate bus park and integrate with traffic flow</li> <li>• Separate service vehicle entrance/exit area (rubbish trucks) from buses</li> <li>• Screen service areas</li> <li>• Screen tip and provide with a net or cover to prevent rubbish blowing about</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check first impression area</li> <li>• Check for screening</li> </ul>	
Visual impact of Compound	<ul style="list-style-type: none"> <li>• Visual impact on sense of place</li> <li>• Obtrusive elements in an otherwise pleasant landscape</li> </ul>	<p><b>Visual impact of Compound ameliorated by screening or upgrading (*)</b></p> <ul style="list-style-type: none"> <li>• Consider alternative placement</li> <li>• Consider renovation or redesign</li> <li>• Consider screening or camouflaging – 'toning down' of impact</li> <li>• Consider more appropriate structures and building materials</li> <li>• Repair or remove ineffectual fence</li> </ul>	Desirable	Landowner,	<ul style="list-style-type: none"> <li>• Check for visual impact and obtrusiveness</li> </ul>	Ongoing

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Visual impact of redundant infrastructure	<ul style="list-style-type: none"> <li>Visual impact on sense of place, unsightly</li> <li>Obtrusive elements in an otherwise pleasant landscape</li> </ul>	<p><b>Visual integrity and sense of place maintained (*)</b>.</p> <ul style="list-style-type: none"> <li>Remove all redundant infrastructure and rehabilitate the site</li> <li>Unightly elements include redundant fences, power lines, telephone lines, water pipes and taps, cement patches, builders' rubble, etc</li> </ul>	necessary	Landowner, Concessionaire	<ul style="list-style-type: none"> <li>Check for remaining redundant infrastructure</li> <li>Check that builders; rubble has been removed</li> </ul>	Ongoing until done
Infrastructure : Energy	<ul style="list-style-type: none"> <li>Lack of energy reduces excavation speed and efficiency</li> <li>Nearest supply is at borehole 800 m away</li> </ul>	<p><b>Visual integrity and sense of place maintained (*)</b>.</p> <ul style="list-style-type: none"> <li>If brought to site, bury cable underground</li> </ul>	Necessary	Landowner, researchers	<ul style="list-style-type: none"> <li>None</li> </ul>	
Toilets, sewage	<ul style="list-style-type: none"> <li>Inadequate or improper sewage disposal could pollute groundwater</li> <li>Effluent could pollute stream down slope of site</li> </ul>	<p><b>Environmentally acceptable sewage system installed (*)</b>.</p> <ul style="list-style-type: none"> <li>Improved system to be installed in time</li> </ul>	Necessary	Concessionaire	<ul style="list-style-type: none"> <li>Check efficacy, odours, flies</li> <li>Implement fly control because of nearby restaurant</li> </ul>	Ongoing
Waste management and disposal	<ul style="list-style-type: none"> <li>Litter</li> <li>Wind blows plastic bags, paper and other rubbish</li> <li>Untidy and unkempt</li> </ul>	<p><b>Litter-free site (*)</b>.</p> <ul style="list-style-type: none"> <li>Provide net to prevent rubbish blowing from tip bin</li> <li>Collect and remove all litter regularly, especially from sinkholes around tourist route</li> <li>Best practice would require sorting and recycling litter</li> </ul>	necessary	All site users	<ul style="list-style-type: none"> <li>Check for left litter</li> <li>Check that litter bins have been installed</li> <li>Check removal schedule</li> <li>Check that litter stored on site cannot be wind distributed</li> <li>Encourage recycling</li> </ul>	Ongoing
<b>4 RESEARCH ENVIRONMENT</b>						

Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERKFORTEIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Inner fence	<ul style="list-style-type: none"> <li>Fence is necessary to separate tourists from excavation area which is sensitive</li> <li>Without a fence, the excavation area would be exposed to the depredations of tourists</li> <li>Without a fence, tourists would be exposed to danger present within fossil site</li> </ul>	<p><b>Fence intact and secure (*).</b></p> <ul style="list-style-type: none"> <li>Danger to excavations identified by scientists</li> <li>Danger to tourists identified by scientists</li> <li>Ensure that the fence around excavation area is intact</li> </ul>	necessary	Researcher, landowner	<ul style="list-style-type: none"> <li>Check that fence is intact</li> </ul>	Ongoing
Pathways in excavation site used by workers and site visitors	<ul style="list-style-type: none"> <li>Pathways too close to excavations can cause excavation edges to collapse</li> <li>Visitors can fall into excavations or miners' excavations if edges are crumbly and unprotected</li> <li>Pathways can cause erosion</li> </ul>	<p><b>Safe pathways that at not too close to excavation edges (*).</b></p> <ul style="list-style-type: none"> <li>Capping with thin layer of cement – can be removed if necessary</li> <li>Psychological barriers to keep people from edge (row of stones, tape, etc)</li> <li>Use safe retaining area for visitors</li> <li>Provide anti-erosion measures at sensitive areas</li> </ul>	Keep watch	Researchers	<ul style="list-style-type: none"> <li>Check visitor pathways, boardwalks, viewing platforms for safety - of visitors and of site fabric</li> <li>Check pathways for wear and tear and channeling/erosion</li> </ul>	Ongoing
Alteration of surface topography, drainage	<ul style="list-style-type: none"> <li>Excavation has created a sump, into which water is directed</li> </ul>	<p><b>Excavation area free from damming of water and erosional problems (*).</b></p> <ul style="list-style-type: none"> <li>Create appropriate drainage in area peripheral to excavation area which directs runoff away from sump</li> <li>Situation appears to be in hand at the site</li> </ul>	Keep watch	Researcher	<ul style="list-style-type: none"> <li>Monitor sump for floodwater and ponding (usually drains underground)</li> </ul>	Ongoing



Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERK FONTEIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Excavation edges	<ul style="list-style-type: none"> <li>Decalcifying breccia results in the excavation walls having friable edges</li> <li>Unstable edges collapse</li> <li>This poses a risk of physical danger as well as of information loss</li> </ul>	<p><b>Excavation edges that are safe and stable (*)</b></p> <ul style="list-style-type: none"> <li>provide physical barrier or psychological barrier to prevent site users from getting too close</li> <li>do not site pathways too close to excavation edges</li> <li>cap unstable edges with lime cement</li> </ul>	Keep watch	Researcher	<ul style="list-style-type: none"> <li>Researchers to monitor every time they are digging</li> <li>Monitor for fallen and slumped wall deposit.</li> <li>Check footwall for fallen debris.</li> <li>Annual professional assessment as part of site safety inspection</li> </ul>	Ongoing

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
<p>Excavation walls</p> <ul style="list-style-type: none"> <li>• Unstable walls, particularly if decalcified tend to slump and collapse</li> <li>• Member 4 shows a large crack (N, S-E side)</li> <li>• Member 5: excavation has produced a dangerous overhang</li> <li>• Collapse poses a threat to site users below unstable areas</li> <li>• Collapse poses a threat to site significance because of mixing of sedimentary units in large uncontrolled collapse</li> <li>• Very high walls are difficult to stabilize when excavation is terminated or completed</li> <li>• Very high walls are susceptible to problems noted above</li> </ul>	<p><b>Excavation walls of safe height and degree of stability (*).</b></p> <ul style="list-style-type: none"> <li>• Excavation walls at Sterkfontein are higher than at most other excavations at present</li> <li>• Deep excavations should be "benched", quarry-style, if possible</li> <li>• Unstable walls should be stabilised – or unstable portions removed in a controlled manner (geotextile or sandbagging with 10% cement not possible at Sterkfontein because of scale of hole</li> <li>• Brow edges to be beveled off</li> <li>• Ensure that site safety officer checks the situation</li> </ul>	<p>Necessary</p>	<p>SAHRA, researchers</p>	<ul style="list-style-type: none"> <li>• Check degree of calcification of breccia – hard breccia can take higher walls than decalcified material</li> <li>• Check unsupported wall height and recommend benching out if it appears unstable</li> <li>• Check wall for loose rocks and boulders and bar down if necessary</li> <li>• Bevel off friable excavation edges</li> <li>• Remove overhangs or unsafe walls in a controlled manner</li> <li>• Check if site safety inspection report makes special recommendations</li> </ul>	<p>Ongoing</p>	

Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERKFONTEIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Access to bottom of excavation	<ul style="list-style-type: none"> <li>Steps, ladders, etc. must be safe and stable</li> </ul>	<p><b>Safe and convenient access to excavation base (*).</b></p> <ul style="list-style-type: none"> <li>Make benching shallow enough to use as steps wherever possible</li> <li>Create and cap 'made' steps with protective layer if decalcified</li> <li>Ensure ladders are safe</li> <li>Ensure that foot of ladder is resting on a secure base</li> </ul>	Necessary	Researchers	<ul style="list-style-type: none"> <li>Check access routes to excavation base for safety and stability</li> </ul>	Ongoing
Compliance with terms and conditions of permit	<ul style="list-style-type: none"> <li>Loss of information and site significance</li> </ul>	<p><b>Excavation that is compliant with terms and conditions of SAHRA permit (*).</b></p> <ul style="list-style-type: none"> <li>Check all terms and conditions written into the permit ROD</li> </ul>	Necessary	SAHRA, researchers	Check all terms and conditions written into the permit such as:	At each site inspection
Samples	<ul style="list-style-type: none"> <li>Loss of information</li> </ul>	<p><b>Sampling protocols that are correctly followed and sample sites that are properly recorded and preserved (*).</b></p> <ul style="list-style-type: none"> <li>Permit required for sampling and/or export</li> <li>Sample residues or portions to be retained for independent verification</li> <li>Sample test outcomes to be forwarded to SAHRA</li> <li>Repository of sample the same as for fossils and artefacts</li> </ul>	Necessary	SAHRA, Permit holders	<ul style="list-style-type: none"> <li>Check sampling procedure is in place</li> </ul>	Ongoing



Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERKFONTAIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
<ul style="list-style-type: none"> <li>Witness sections</li> </ul>	<ul style="list-style-type: none"> <li>Loss of information and site significance (witness sections have been identified demonstrating members 4/5/6 and post 6, plus the 'historic face' at the Type Site discovery place, and along the South Wall at the discovery site of STW 53 and the M4/5 contact)</li> </ul>	<p><b>Appropriately selected and well-stabilised witness sections and sample sites (*).</b></p> <ul style="list-style-type: none"> <li>Ensure that selection of appropriate witness sections are a requirement in terms of the permit</li> <li>Ensure that the researcher provides adequate criteria for the election of witness sections</li> <li>Ensure that all significant features are covered by or included in witness sections proposed</li> <li>Ensure that witness sections are not prone to collapse and that they are stabilized on closure of excavation</li> <li>Ensure that witness section is committed to plan</li> </ul>	Necessary	Researcher	<ul style="list-style-type: none"> <li>Check that witness sections are in place</li> <li>Check that witness sections have been properly stabilized for long-term preservation</li> </ul>	

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Breccia Dumps	<ul style="list-style-type: none"> <li>• Loss of information concerning source and content of dumped material (NB)</li> <li>• Footprint site of dumps not checked for significant plants or possible underlying cave deposit</li> <li>• Position obscures significant part of deposit</li> <li>• Dump built over cave infill</li> <li>• No proper toe to dump or careless containment</li> <li>• Dump is cascading due to incorrect angle of repose</li> <li>• Dump origin not recorded</li> <li>• Dump contents not recorded</li> <li>• Duration of dump on site not recorded</li> <li>• Dump built over or too close to drainage line</li> </ul>	<p><b>All dumps recorded, committed to site plan and annotated (*).</b></p> <ul style="list-style-type: none"> <li>• SAHRA to request that the scientist explain how dumped material – whether sterile or fossiliferous and 'in transit' – is to be managed. Dumped material management plan to become part of permitting requirement</li> </ul>	In hand at this site, keep watch	SAHRA, researchers	<ul style="list-style-type: none"> <li>• Check placement of dump on landscape</li> <li>• Check planned position and ultimate size for possible problems with visibility of significant site features</li> <li>• Check to ensure dump is not planned to be situated over cave fill</li> <li>• Check that dump has containment toe</li> <li>• Check footprint area in relation to planned height – cascading must not happen</li> <li>• Check that source of material is recorded</li> <li>• Check that contents of dump are recorded</li> <li>• Check that dump does not slump or erode into drainage line</li> <li>• Check that all dumps are recorded and annotated on a plan of the site</li> <li>• Monitor all the products of excavation, their recording (3D) and storage</li> </ul>	Ongoing

Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERKFORTEIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Sieved residues, sterile	<ul style="list-style-type: none"> <li>• Could be placed where they will inconvenience work at a later stage of development</li> <li>• Placed where they will constitute a visual impediment</li> <li>• Built in such a way that they will erode or become unstable</li> <li>• See points recorded for dumps above</li> </ul>	<p><b>Appropriate disposal or storage of sieved residues (*).</b></p> <ul style="list-style-type: none"> <li>• Could be used for road and erosion repair if really sterile and in places suited to nature of sieved waste residues (e.g. rock gardens, foundation for shelters, etc)</li> <li>• Sieved material EIA to become part of permit application – see recommendation regarding dumps above</li> </ul>	In hand at this site, keep watch	SAHRA, researchers	<ul style="list-style-type: none"> <li>• Check location of sieved waste material</li> <li>• Check for stability and erosion</li> <li>• Apply same monitoring criteria as noted for dumped breccia above</li> </ul>	Ongoing
Repository	<ul style="list-style-type: none"> <li>• Poor repository policies can result in information loss</li> <li>• Poor repository policy can result in problems of locating fossils</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Long-term safety and conservation of fossils and artefacts recovered (*).</b></li> <li>• Monitor repositories according to 'Minimum Standards for Repositories' guideline as prepared by SAHRA</li> </ul>	Necessary	SAHRA	<ul style="list-style-type: none"> <li>• Monitor repositories</li> </ul>	Ongoing
<b>Site safety, security and stability</b>						



Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Domestic cooking fires, gas and faulty stoves	<ul style="list-style-type: none"> <li>Gas cylinders can explode</li> <li>Domestic cooking fires are a potential source of uncontrolled fire</li> <li>Electrical faults are a fire hazard</li> </ul>	<p><b>Site compliant with fire safety regulations, equipment and training(*)</b>.</p> <ul style="list-style-type: none"> <li>Ensure correct storage of gas cylinders</li> <li>Ensure that there are no electrical faults or misused power sockets</li> <li>Provide fire extinguishers, one for each residential unit</li> <li>Train residents in their use - suppliers often provide free training</li> <li>Ensure extinguishers checked annually</li> <li>Brief residents on what to do in the event of fire</li> <li>Provide appropriate beaters in the event of a grass fire</li> <li>Burn suitable firebreaks around fossil site and infrastructure</li> <li>Ensure that fire hazard is built in to site safety report</li> <li>Ensure that public health and safety officer inspects Compound area and Visitor centre regularly</li> </ul>	Necessary	Landowner, Concessionaire (for Visitor Centre)	<ul style="list-style-type: none"> <li>Check gas cylinders stored correctly</li> <li>Check that stoves, power sockets, electrical wiring is safe</li> <li>Check that extinguishers are installed and appropriately mounted</li> <li>Check that residents understand their use</li> <li>Ensure that equipment is inspected annually</li> <li>Check that there are sufficient beaters on site</li> <li>Check that fire hazard is a part of site safety and public health and safety reporting</li> </ul>	At each fossil site inspection
Signage, site safety and warnings	<ul style="list-style-type: none"> <li>Lack of appropriate signage can expose visitors to unexpected hazards, e.g. that there is a bees' nest, low head room, etc</li> </ul>	<p><b>Appropriate signage in place (*)</b>.</p> <ul style="list-style-type: none"> <li>Install appropriate behavior modifiers and site safety signage as and when this becomes necessary</li> <li>Appropriate safety signage is a requirement of Public (Occupational) Health and Safety Act</li> <li>Maropeng even warns against possible presence of snakes</li> </ul>	Necessary	Researchers, landowner, Concessionaire	<ul style="list-style-type: none"> <li>Check for installation and appropriate wording</li> <li>Check for appropriate location of signs, design and durability</li> </ul>	Ongoing

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Bees, "Kransbye", Wasps	<ul style="list-style-type: none"> <li>The numerous cavities and hollows are home to bee hives and wasps' nests. Many people are allergic to bee stings in particular.</li> <li>The hive between the Type Site and viewing platform is a danger to visitors</li> </ul>	<p><b>Hazardous bee-hives removed, or site visitors warned to avoid (*).</b></p> <ul style="list-style-type: none"> <li>Ensure that the necessary antihistamines are on hand.</li> <li>Destroy or have hives removed if these are where people frequently walk or work, such as the one close to the Type Site, dolomite and viewing platform</li> <li>Post warning signage</li> <li>Provide first aid post</li> </ul>	Necessary	Researcher, Tour Operators, concessionaire	<ul style="list-style-type: none"> <li>Monitoring should include checking the route for insect problems.</li> <li>Monitor speed at which an emergency case could reach appropriate medical help</li> <li>Monitor that beehive has been removed.</li> </ul>	Ongoing
Theft, crime	<ul style="list-style-type: none"> <li>The rural and relatively isolated situation after hours) makes the site particularly prone to petty theft</li> <li>Personal safety of inhabitants</li> <li>Hijacking of cars arriving early or leaving late</li> </ul>	<p><b>Reduction in incidence of crime, improved surveillance (*).</b></p> <ul style="list-style-type: none"> <li>Ensure that lock-up facilities on-site for researchers equipment are secure at all times</li> <li>Control on all persons entering the area</li> <li>Patrolling site (security) might be considered.</li> </ul>	Keep watch and respond if necessary	Researchers, landowner, Concessionaire	<ul style="list-style-type: none"> <li>Security checks</li> </ul>	Ongoing
Site safety inspection, public health and safety inspection	<ul style="list-style-type: none"> <li>Site may have safety problems if not regularly checked</li> </ul>	<p><b>Safe surface, subterranean area, and infrastructure (*).</b></p> <ul style="list-style-type: none"> <li>Undertake an inspection on an annual basis. University has its own in-house inspector who should be able to include Compound ad excavation area</li> </ul>	necessary	Landowner, Concessionaire	<ul style="list-style-type: none"> <li>Check that all public health and safety details are in place such as ;</li> <li>Protective clothing such as goggles, gloves, boots, hard hats, chemical-proof protection, etc</li> <li>Safety training and procedures</li> <li>Safety warnings</li> <li>Safety and first aid equipment is in place</li> </ul>	

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
<ul style="list-style-type: none"> <li>• Vehicular access to cave exit or entrance</li> </ul>	<ul style="list-style-type: none"> <li>• Evacuation of heavy persons or several people not easy without a vehicle</li> </ul>	<p><b>Ensure that it is possible for an emergency evacuation vehicle to reach the cave entrance or exit (*).</b></p> <ul style="list-style-type: none"> <li>• Create an emergency plan whereby a vehicle, if necessary could be brought around to the entrance or exit area</li> </ul>	Keep watch	concessionaire	<ul style="list-style-type: none"> <li>• Ensure that evacuation of people from caves is planned for</li> </ul>	Ongoing until attended
<ul style="list-style-type: none"> <li>• Disaster Management plan</li> </ul>	<ul style="list-style-type: none"> <li>• Chaos in the case of an emergency (major fire, rock fall underground, civil unrest, etc)</li> </ul>	<p><b>Disaster management plan in place (*).</b></p> <ul style="list-style-type: none"> <li>• Plan disaster management</li> </ul>	necessary	COH WHS MA	<ul style="list-style-type: none"> <li>• Ensure that disaster management is part of the planning process</li> </ul>	Ongoing until attended
<b>6 PRESENTATION OF SITE VALUES</b>						
<ul style="list-style-type: none"> <li>• Signage: adequacy</li> </ul>	<ul style="list-style-type: none"> <li>• Redundant signage is untidy and clutters site</li> <li>• Variety of styles, type-faces and board designs confusing</li> </ul>	<p><b>Appropriate signage in place (*).</b></p> <ul style="list-style-type: none"> <li>• Install directional signs</li> <li>• Install warning signs</li> <li>• Install behavioural modifiers (no eating, e.g.)</li> <li>• Install interpretive signage</li> <li>• Ensure that signage has been passed by SAHRA</li> <li>• Ensure consistency with agreed design, appearance, colour, type face etc</li> </ul>	Largely attended	Landowner, Researchers, Concessionaire	<ul style="list-style-type: none"> <li>• Check quality of signage</li> <li>• Check quality of site interpretation</li> </ul>	Ongoing
<ul style="list-style-type: none"> <li>• Sign for Museum</li> </ul>	<ul style="list-style-type: none"> <li>• Museum overlooked</li> </ul>	<p><b>Sign above museum door replaced (*).</b></p> <ul style="list-style-type: none"> <li>• Post a more prominent notice indicating the museum</li> </ul>	necessary	Concessionaire	<ul style="list-style-type: none"> <li>• Check that Museum prominently indicated</li> </ul>	Ongoing until done



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Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Disabled access	<ul style="list-style-type: none"> <li>Ensure that the site museum and at least part of the route is accessible to disabled persons</li> </ul>	<p><b>Concession to disabled visitors is at least partial accessibility (*).</b></p> <ul style="list-style-type: none"> <li>Install a ramp at the wooden boardwalk</li> <li>Install wooden slat or cement ramp to create a circular route incorporating at least the above-ground part of the cave</li> </ul>	necessary	Concessionaire, COH WHS MA	<ul style="list-style-type: none"> <li>Check that the disabled and part of future planning</li> </ul>	
Interpretation of biological heritage values	<ul style="list-style-type: none"> <li>Impoverished tourism experience if all site values not interpreted</li> </ul>	<p><b>Full site values interpreted (*).</b></p> <ul style="list-style-type: none"> <li>Train guides to incorporate natural heritage assets into site interpretation</li> </ul>	Necessary	Concessionaire, COH WHS MA (tourist guide accreditation)	<ul style="list-style-type: none"> <li>Ensure that natural site values receive mention in site interpretation</li> </ul>	Ongoing
Interpretation of subterranean environment (see also section 2 of table above)	<ul style="list-style-type: none"> <li>Lack of information regarding the significance of caves to palaeontology</li> <li>Lack of appreciation of the significance and sensitivities of the subterranean environment</li> <li>If not interpreted, loss of information and opportunity to learn and appreciate</li> </ul>	<p><b>Subterranean environment interpreted by tourist guides (*).</b></p> <ul style="list-style-type: none"> <li>incorporate caves and ecology of subterranean environment into site interpretation</li> <li>Develop a temporary display around cave ecology theme</li> </ul>	necessary	Concessionaire, persons who train tourist guides	<ul style="list-style-type: none"> <li>Check that subterranean environments are suitably interpreted, both in museum and on tourist route</li> </ul>	Ongoing

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
<p>Interpretation of historical and mining values</p> <ul style="list-style-type: none"> <li>• Impoverished tourist experience</li> <li>• Lack of opportunity to learn and appreciate</li> <li>• Important link between discovery of fossils and mining not interpreted</li> </ul>	<ul style="list-style-type: none"> <li>• Mining history incorporated into tourist route and oral interpretation (*)</li> <li>• Incorporate mining history into site interpretation as well as tourist route</li> <li>• Clean area around old kilns and re-route pathways to enable visitors to look into kilns</li> <li>• Keep kilns weed and vegetation free</li> </ul>	necessary	<p>Concessionaire</p> <p>Note: permit from SAHRA required to disturb, damage clean etc., kilns.</p>	<ul style="list-style-type: none"> <li>• Check old lime-kiln precinct for weeds and maintenance</li> <li>• Check that mining history is incorporated into site interpretation</li> </ul>	Ongoing until done	
<p>Interpretation of the values of the other 12 sites in the COH WHS</p> <ul style="list-style-type: none"> <li>• Lack of knowledge about major importance of other sites</li> <li>• Other sites marginalized</li> <li>• Because public money cannot be spent on private land, only chance of site interpretation of other sites (interpretation is a requirement of UNESCO) is via Sterkfontein, unless private funding creates site museums at other sites)</li> </ul>	<p><b>Exposure of other sites in COH WHS. (*)</b></p> <ul style="list-style-type: none"> <li>• Ensure that other sites receive mention and acknowledgement</li> </ul>	necessary	<p>Concessionaire in consultation with scientists and SAHRA</p>	<ul style="list-style-type: none"> <li>• Check that remaining sites are not marginalised</li> </ul>		
<p>Exposure of sister world heritage sites</p> <ul style="list-style-type: none"> <li>• Marginalization of Taung and Makapan valley as sister sites</li> </ul>	<p><b>Exposure of other sites in serial cluster (*)</b></p> <ul style="list-style-type: none"> <li>• Ensure that sister serial sites receive sufficient mention and acknowledgement. Most people are totally unaware of the sister sites</li> </ul>	necessary	<p>Concessionaire in consultation with SAHRA and respective scientists</p>	<ul style="list-style-type: none"> <li>• Ensure that information concerning sister sites and their whereabouts and key values are interpreted somewhere</li> </ul>		

Cradle of Humankind World Heritage Site Cultural Heritage Resources Management: STERKFONTAIN SITE PLAN

Issues	Threats or Risks	Desired outcomes (*) and Management Measures	Priority	Responsibility	Monitoring Criteria	Monitoring frequency
Development of educational programmes for schools and resident communities	<ul style="list-style-type: none"> <li>Failure to comply with Article 27 and Article 5 of the World Heritage Convention</li> </ul>	<p><b>Affordable brochures available for teachers and school children (*).</b></p> <ul style="list-style-type: none"> <li>Design educational material which supports and extends school syllabuses, which have recently incorporated heritage into the school curriculum</li> </ul>	necessary	COH WHS MA to co-ordinate	<ul style="list-style-type: none"> <li>Check that steps have been taken to plan and implement the development of educational programs and material</li> </ul>	
Development of educational material – pamphlets and booklets	<ul style="list-style-type: none"> <li>Failure to comply with Articles 5 and 27 of the World heritage Convention</li> <li>Expensive books are beyond the reach of many. Educational goals not reached</li> </ul>	<p><b>Affordable brochures available for teachers and school children (*).</b></p> <ul style="list-style-type: none"> <li>Design educational material which supports and extends school syllabuses, which have recently incorporated heritage into the school curriculum</li> </ul>	necessary	COH WHS MA	<ul style="list-style-type: none"> <li>As above</li> </ul>	
Visitor impacts	<ul style="list-style-type: none"> <li>Littering</li> <li>Disturbance of plants, fauna</li> <li>Graffiti</li> <li>Vandalism</li> <li>Noise</li> <li>Altering cave atmosphere</li> </ul>	<p><b>Amelioration or elimination of visitor impacts (*).</b></p> <ul style="list-style-type: none"> <li>These potential impacts all noted and adequately attended at Sterkfontein unless noted elsewhere (graffiti in cave, alteration of cave atmosphere, etc.)</li> </ul>	Attended	Concessionaire	<ul style="list-style-type: none"> <li>Check for littering</li> <li>Check for pollution of site</li> <li>Check all walkways for wear and tear</li> <li>Check for graffiti, vandalism</li> <li>Check cave atmosphere as noted above</li> </ul>	
<b>7 GENERIC ISSUES RELATING TO FOSSIL SITE EXCAVATIONS: general issues pertinent to all sites: see Generic Issues document</b>						



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