

CHAPTER 5

Heritage Resources

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Executive Summary

This review considers the nature and distribution of various heritage resources within the Namakwa Region SEA study area. It determines the cumulative impacts of the proposed regional Green Hydrogen economy on the heritage of the area in view of a dynamic baseline scenario.

Baseline Scenario (Sc0)

Palaeontology

Most of the study area is of zero or low palaeontological sensitivity. However, some areas of moderate sensitivity occur in the east and areas of high sensitivity occur in the mountains northwest of Springbok and in the southeastern part of the study area. The surficial sands of the coastal plain are rated as low sensitivity but are underlain by marine formations of high sensitivity below about 100 m above sea level (Figure S-1a).

Terrestrial Archaeology

- Early Stone Age (ESA) finds occur on the coastal plain, generally beneath the surface aeolian sands, and also among the gravels of Bushmanland.
- Middle Stone Age (MSA) finds are more commonly identified along the current coastline and particularly in the Bushmanland gravels.
- Later Stone Age (LSA) sites are abundant. The coastline is most sensitive because of the high density of sites there (Figure S-1a), but inland they occur far more sporadically in deflation hollows in dunefields, and around rocky hills and pans in Bushmanland. Rock shelters with stratified deposits are extremely rare.
- Rock paintings are generally rare but occur in a few locations. Geometric rock engravings are found along the Orange River. Engravings are not known from the remainder of the study area but may be found in the southeast where dolerite occurs.
- Historical archaeological remains are frequently found around old farmhouses and other places of permanent or temporary settlement. Historical remains are also found in the copper mining areas and at prospecting locations. Historical remains relating to the Anglo-Boer War are also known.

Graves

- Pre-colonial graves could be found throughout the study area, but particularly in coastal dunes. Most are not marked at the surface and cannot be identified until disturbed. Occasionally graves with stone-packed mounds are found. These are likely to be very late/historical graves. In addition to archaeological graves, all villages and towns, as well as farms, have local cemeteries which are usually marked and can be avoided during development. It is not feasible to try and map these.

Maritime Heritage

- Shipwrecks are recorded along the Namaqualand coastline, but location data are often poor. Only a few small areas that feature more prominently in shipwreck databases are of potential concern (Figure S-1a).

Living Heritage

- The **Richtersveld Cultural and Botanical Landscape World Heritage Site (RCBL WHS)** reflects the long-standing and persistent traditions of the indigenous Nama community including the transhumance lifestyle of the pastoralists. The Richtersveld, Leliefontein, Steinkopf, Komaggas, Concordia and Pella communal areas (Figures S-1a & S-1b) remain in use for seasonal grazing with herders still staying in stockposts.

Cultural Landscape

- The area has four distinct components, namely the coastline, coastal plain, the granite mountains of the Kamiesberg and the inland plain of Bushmanland which includes many smaller mountains. The landscape is arid and desolate and has great aesthetic value.
- The **RCBL WHS** and buffer zone (see Living Heritage above), and the Richtersveld and Namaqualand National Parks protect iconic sections of South Africa's semi-arid landscapes (Figures S-1a & S-1b).
- "The Namaqualand Copper Mining Landscape" is a part of the regional cultural landscape.
- Gamsberg has been identified as a place of "genocide of the San people".
- The N7, N14 and R382 are identified as scenic routes while Wildeperdehoek Pass (on the Messelpad Road) is Provincial Heritage Site (Grade II) (Figure S-1a).

Baseline Scenario - Key threats*Palaeontology:*

- Desertification and increased mining.

Terrestrial Archaeology (pre-colonial and colonial):

- Increasing agricultural development along the Orange River.
- Renewed copper mining around Okiep, and continuation of mining elsewhere, especially along the coast.
- Continued renewable energy development and transmission lines.
- Development of new roads and the industrial corridor along the N14.

Maritime:

- Offshore mining and gas and oil exploration.

Graves:

- Increased mining, especially along the coast.

Built Environment:

- New mining and infrastructure development.

Living Heritage:

- New mining and infrastructure development and climate change.

Cultural Landscape:

- New mining and infrastructure development and climate change.
- Population growth and associated development.

Baseline Scenario - Positive Impacts

- Benefits to science the discovery and recording of fossils and archaeological sites.
- Growth in tourism may reinforce the need to protect heritage resources which attract tourists.

Scenario 1 (by 2035) - Negative impacts*Palaeontology:*

- Impacts are likely to be largely insignificant because most development will affect surficial sediments which are generally of low palaeontological sensitivity.

Terrestrial Archaeology (pre-colonial and colonial):

- Impacts to surface resources across the area are possible, but generally not likely to be of high significance. The exception is for increased development along the coastline where archaeological sites of higher significance are more concentrated. However, the overall impact area close to the coast is likely to still be small compared to the existing and ongoing impacts from mining, and the same applies with regards to agriculture inland along the Orange River.

Maritime heritage:

- Impacts are unlikely to significantly increase due to the generally low probability of wrecks being found. However, there is always a chance of impacts.

Graves

- Impacts to graves are unpredictable and it is equally possible that several or no graves could be affected.

Historical resources and built environment

- Given the relatively small footprint of Scenario 1, significant impacts to historical and built environment resources are unlikely. The main potential threat could be the insensitive 'restoration' of historical structures or even potentially their demolition in towns where new residential areas are required. Steinkopf, Okiep and Springbok may be most at risk here.

Living Heritage:

- The relatively small footprint is unlikely to impact on communal areas in which living heritage traditions are still practiced because they could be easily avoided. Nonetheless, the Communal Areas of Steinkopf, Concordia and the Richtersveld are perhaps most at risk as these areas are located near potential centres of development.

Cultural Landscape:

- The relatively small overall footprint should not have significant impacts on the cultural landscape unless specific developments are situated in close proximity to prominent and aesthetically pleasing landscape features such as the RCBL, National Parks and reserves, the Kamiesberg and the coastline.

Scenario 2 (by 2050) – Negative Impacts

Impacts from Scenario 2 will be very similar to Scenario 1 but with higher intensity. This is because the larger overall footprint will mean more pressure on available land and a reduced likelihood of being able to avoid impacts. This will be worst along the coastline. Inland developments, either on the coastal plain (more than 2 km from the coast) or in Bushmanland are likely to be able to avoid the majority of significant sites. Due to the far larger land requirement, there is a greater chance of impacts to the communal areas.

Positive Impacts associated with the proposed development**Scenario 1 (by 2035)**

- Positive impacts will largely relate to the increase in scientific knowledge in terms of the discovery, recording and sampling of fossils and archaeological sites. These would be of benefit to science. It must be noted, however, that impacts to highly significant sites would still be seen as negative such as the RCBL.
- Another potential benefit comes with the responsible restoration and reuse of historical structures which might otherwise become degraded over time through neglect and disuse. This reuse may relate directly to the development or indirectly through the need for increased accommodation in the area.
- Growth in tourism may increase the need to protect heritage resources which are tourist attractions.

Scenario 2 (by 2050)

- As for the small development scenario, but with a greater increase in scientific knowledge.
- Due to the far larger land requirement, there is an increased likelihood that the communal area will be used for at least some development. Although loss of communal land is an impact, financial benefit could accrue to the affected communities with the proper agreements in place.

Risk/Opportunity Assessment

The destructive nature of impacts to heritage resources means that most negative impacts to the various types of heritage are in the moderate to high range. Mitigation measures will generally reduce the ratings to acceptable levels. Benefits/opportunities are generally rated very low to moderate and they tend to relate to the increase in scientific knowledge. Built heritage could experience significant benefits related to tourism.

Recommended Strategic Management Actions

A Heritage Impact Assessment (HIA) under Section 38(8) of the NHRA will be required for every Environmental Impact Assessment. Notwithstanding the heritage resources on site, HIAs will be needed in order to satisfy the requirements of the National Heritage Resources Act (No. 25 of 1999). A separate Visual Impact Study must be included in every EIA process where visual impacts to the landscape are a potential concern.

Palaeontology

- There are no areas of highly sensitive fossiliferous strata in the study area that may require protection as NO-GO areas.
- Every EIA conducted within the WP2 study area MUST be evaluated by a palaeontologist to determine the need for a palaeontological specialist study despite the surface sensitivity grading because, depending on depth of excavation, significant impacts could still arise, especially on the coastal plain.

Terrestrial Archaeology

- Archaeological specialist studies will be required in all EIAs which trigger Section 38(8) of the NHRA, and detailed surveys of each project footprint must take place.
- Due to the density and distribution of archaeological sites along the coastline, it will not be feasible to mitigate all impacts there. The appointed archaeologists will need to determine the sites to sample in order to best characterize the archaeology in each development footprint.
- Away from the coast mitigation measures will effectively mitigate impacts.
- It is likely that monitoring of development may be required in the coastal areas where middens can be buried within sand dunes.

Maritime Heritage

- A Maritime Heritage specialist study will need to be included in any developments that might require, for example, undersea pipelines.

Graves

- Graves would be considered along with archaeology in any EIA. Because many graves are unmarked and cannot be spatially identified in advance, the SEA adopts a precautionary approach, particularly in coastal dune systems and historically occupied landscapes where the probability of encountering burials is elevated. Graves and Burial grounds are protected under Section 36 of the NHRA.
- Given the size of the study area, it is possible that many graves could be present. Discussions with SAHRA and the Northern Cape Heritage Resources Authority and representatives of local communities must be initiated in advance of development to determine whether reburial of human remains should be considered and which locations should be chosen for this.

Living heritage

- The local herder communities in each of the communal areas must be consulted to determine their response to the loss of their grazing lands. Among other things, consultation should aim to understand:
 - Why these areas were chosen for grazing.
 - The value of the pasturage in terms of seasonal grazing requirements and mobility routes.
 - Any alternative options; and
 - How nature and culture are intertwined within their world view.

Cultural landscape / sense of place

- The N7, N14 and the R382 and surrounding area are significant for a number of reasons, largely tourism-related. SANParks, UNESCO, SAHRA and local tourism operators should all be engaged in the consultation process because the arid to semi-arid landscapes of the area are key elements of the aesthetic beauty and attract tourists. Any proposed development in or close to the buffer zone of the RCBL Heritage Site could cause significant impacts. Discussions will need to be initiated with the South

African Government and the UNESCO commission regarding potential impacts on the World Heritage status of the RCBL in such instances.

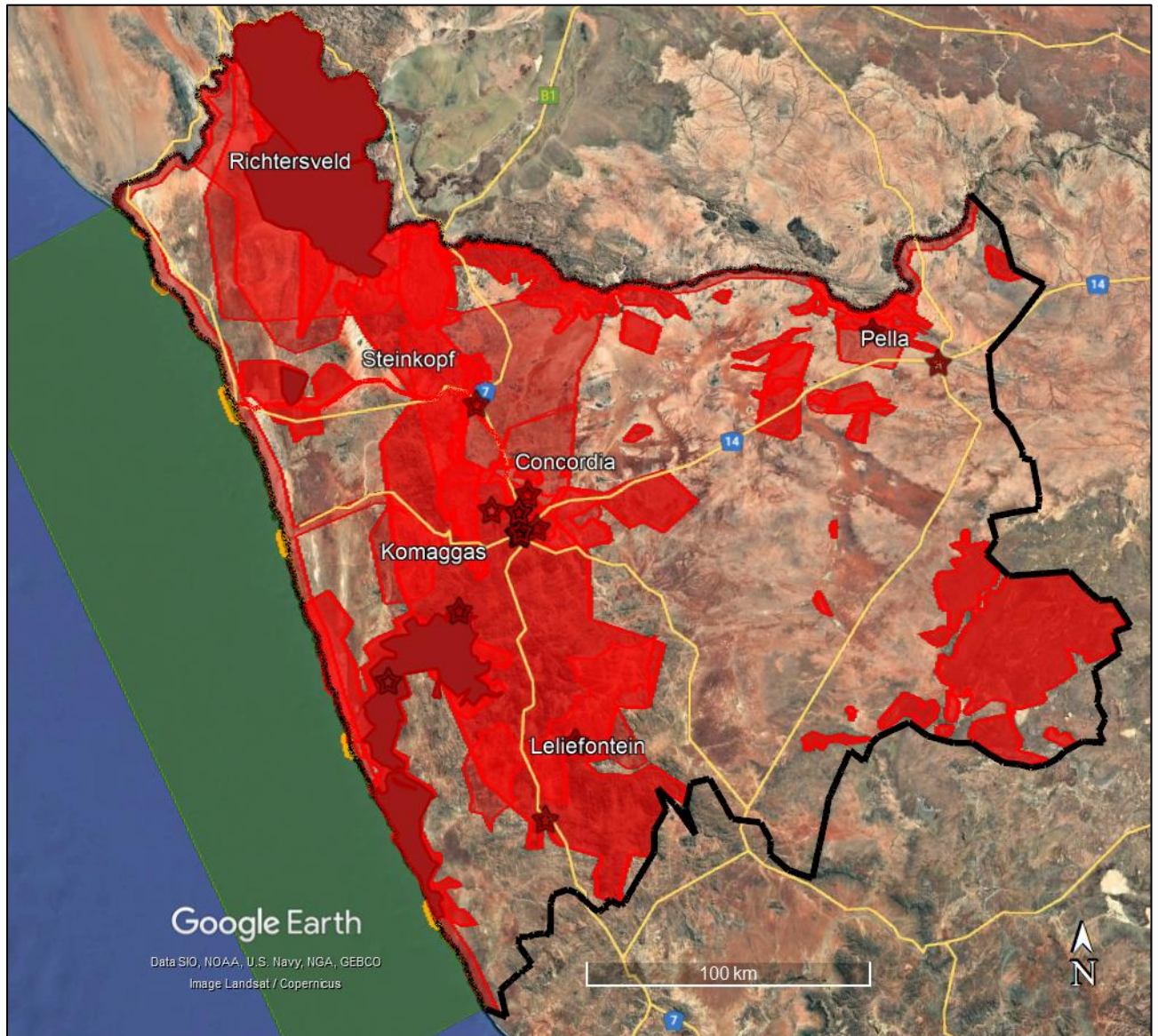


Figure S-1a: Sensitivity map of the study area. Terrestrial areas known to be of high (red) and very high sensitivity (dark red) are indicated as are marine areas of low (green) and moderate sensitivity (orange). The stars indicate the position of the Provincial Heritage Sites in the study area (very high sensitivity). For clarity, lower sensitivity ratings are not mapped here. Note that the primary concentrations of patches of high and very high visual sensitivity have been incorporated into larger polygons for the sake of clearer mapping, but the roads have been omitted here; see **Figure 5-36** for detail.

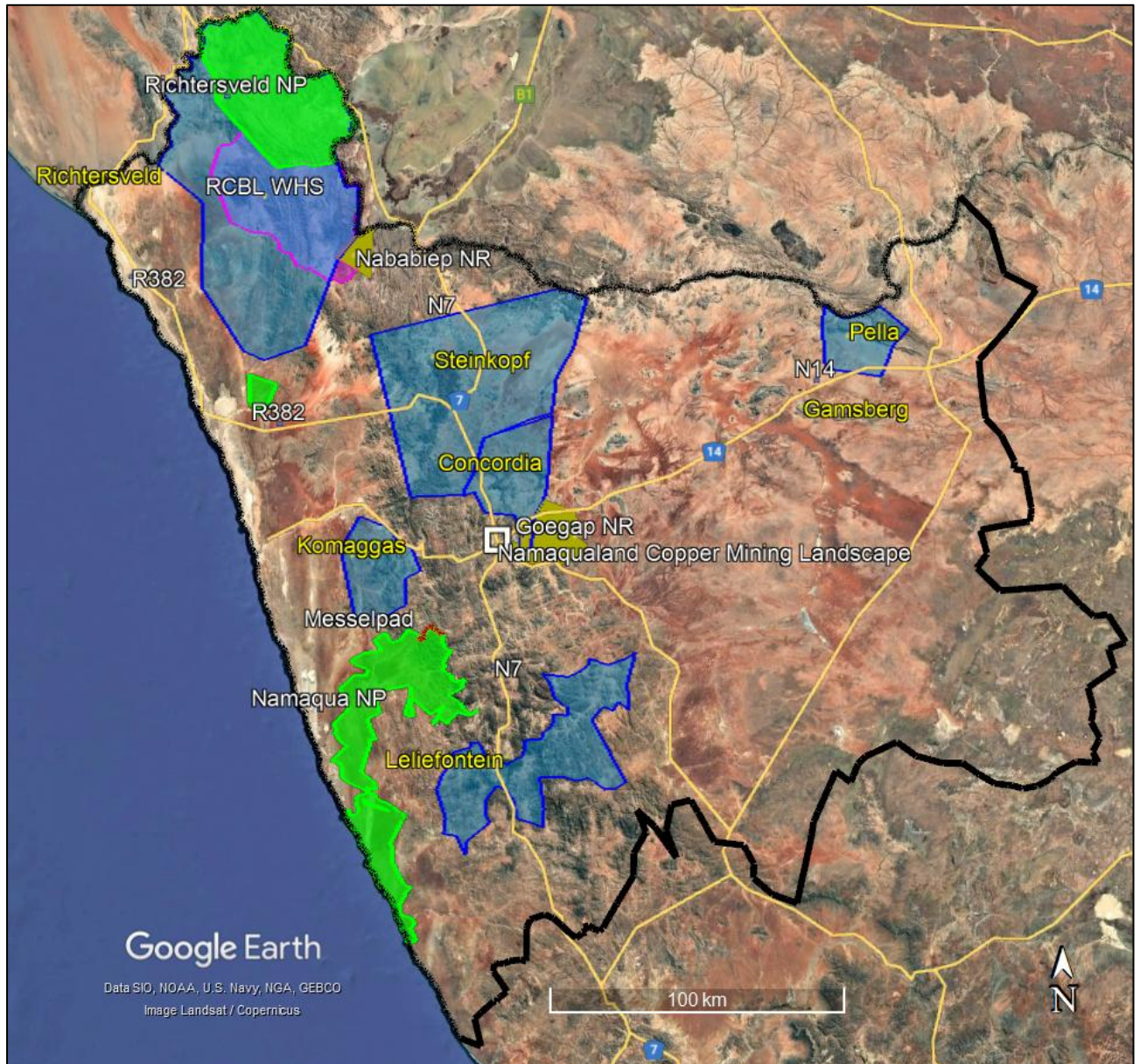


Figure S-1b: Map of the study area showing places mentioned in the Executive Summary. National Parks in bright green, Nature Reserves in olive green, Communal Reserves in blue with yellow labels, WHS in pink, roads as labelled, and Copper Mining Landscape marked by a central point.

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CHAPTER 5. HERITAGE RESOURCES

5.1 BRIEF LEGISLATIVE CONTEXT

The National Heritage Resources Act No. 25 of 1999 (NHRA) protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years.
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites.
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

While living heritage is not specifically protected by the NHRA, places and objects associated with living heritage are protected by virtue of being listed in Section 3(2)(b) and 3(2)(i)(ii) as part of the National Estate. Similarly, landscapes with cultural significance do not have a dedicated Section in the NHRA, but Section 3(2)(d) includes “landscapes and natural features of cultural significance” as part of the National Estate. A Living Heritage landscape may also be graded and declared as a formally protected site i.e. under Section 27, 28 or 30 of the NHRA.

Any development in the region will require an impact assessment under S38 of the NHRA with the following being the primary triggers:

- Section 38(1)(a): Any development that involves a linear feature more than 300 m long
- Section 38(1)(c)(i): Any development that involves changes to the character of a site exceeding 5000 m².

5.2 THE WORK PACKAGE 2 STUDY AREA

The study area extends from the semi-arid West Coast in northern Namaqualand, through the Richtersveld, the Kamiesberg, and into north-western Bushmanland. This is an area which spans over 5 million hectares and includes four Local Municipalities, namely the Richtersveld Municipality, the Kamiesberg Municipality, the Nama Khoi Municipality and the Khâi-Ma Municipality.

The extensive coastal plain is characterised by sandy flats (**Figure 5-1**) and occasional dunefields and rises gently towards the east. Rock exposure is rare until one reaches the foothills of the Kamiesberg. The mountains themselves are mostly of granite and gneiss with many exposed granite domes visible (**Figure 5-2**). Over the mountains to the east are the extensive gravel and sand plains of Bushmanland with occasional inselbergs (**Figure 5-3**) and a scattering of pans (known locally as ‘vleis’), often with bedrock exposed in their bases.



Figure 5-1: Looking west of the coastal dunes near Koingnaas. A mine dump is visible in the background and the Atlantic Ocean beyond it.



Figure 5-2: Typical view in a valley between the granite hills of the northern Kamiesberg.



Figure 5-3: Sandy substrate in the eastern part of the study area near Aggeneys with the large inselberg of Gamsberg visible. This photograph was taken prior to the removal of part of the northern face of the mountain for mining.

5.3 METHODOLOGY

- All assessments in this report are desktop studies. They are based on published scientific literature, grey literature, and the authors' extensive field experience.
- Although extensive locational data are available in grey literature, no attempt has been made to map specific archaeological sites. Away from the coastline the culturally significant sites tend to be associated with landscape features such as pans, water courses and the bases of hills which are generally less likely to be impacted.
- The inherent unreliability of shipwreck location data is noted.
- Visual sensitivity mapping was commissioned to inform the landscape study. It was undertaken by visual specialists and based on available databases (Oberholzer & Lawson 2024). The lack of a visual chapter in the SEA is a significant limitation.

5.4 DESCRIPTION OF THE RECEIVING ENVIRONMENT/SCENARIO 0

5.4.1 Palaeontology

Rocks of the **Namaqua Metamorphic Province** underlie the study area. They consist of very ancient, much altered, metamorphosed and deformed sediments. In the area northwest of Springbok they are overlain by **Nama Group** sediments which are only mildly deformed and are recognizable by their thick shale units and interbedded quartzites. They are famous for their body and trace fossils spanning the Precambrian/Cambrian boundary. Overlying the metamorphic rocks in the east are the **Karoo Supergroup** sediments which include the **Dwyka Group** glacial tillites and the **Ecca Group** shales. These were eroded after deposition and are now only preserved in the east of the WP2 area. They contain trace fossils, plant fossils (including wood) and a variety of marine fossils. At the end of the Cretaceous Period, several hundred small kimberlite-like volcanoes erupted forming the **Gamoep Volcanic Pipe Swarm**, many of them infilled with fossils, including the remains of a dinosaur from the Kangnas pipe.

A broad fossil valley, the **Koa Valley**, traverses the region and its course is marked by a series of pans, the most prominent being Bosluispan. Here the fossils include extinct proboscideans, bovids, giraffids, rhinocerotid, tortoises, rodents, crocodile and fish. The extensive surficial aeolian deposits, overlie older aeolianites, alluvial river deposits, pan infills, alluvial fans and colluvium. In Bushmanland, a major calcreted surface caps the older generation of these deposits. The teeth of an extinct three-toed horse (Hipparion) have been found at Areb, near Springbok. Elsewhere, the teeth of *Equus* (zebra) have been found in basal river deposits. The alluvial deposits and pans (many of these are filled volcanic craters) along the ephemeral water courses are of moderate sensitivity.

On the coastal plain, the surficial sands are of low sensitivity but are underlain by marine formations of high sensitivity that contain scattered bones and extinct shell species. These sensitive formations generally occur below 100 m above sea level.

The palaeontological baseline environment is not expected to change much by 2050, although further mining may impact on fossils on the coastal plain.

5.4.2 Terrestrial archaeology

Early Stone Age

Early Stone Age (ESA) occurrences (**Figure 5-4**) have been identified throughout the coastal zone but are usually low density. Material of this age generally occurs beneath the surface aeolian sands and on top of the harder dorbank layer and is exposed through natural or anthropogenic disturbance. Inland of the Kamiesberg, ESA artefacts are also found in areas where cover sands are absent, either in association with dorbank or in places where gravel beds are exposed. ESA materials are sometimes found in close proximity to pans and have also been recorded at silcrete outcrops which were quarried for rock to manufacture the artefacts.

Middle Stone Age

Middle Stone Age (MSA) sites are more commonly identified and include both quarry sites and living sites. Most are located along the current coastline, including a site near Koingnaas (Halkett & Orton 2005), but inland rock shelters with MSA occupation have been identified at *Spitzkloof* in the Richtersveld (Dewar & Stewart 2012, 2017; **Figure 5-5**) and in the basal layers of Wolfkraal Cave and Keurbos Cave in the Kamiesberg (Webley 1984; Webley 1992). A significant MSA deposit was recorded on the top of the Gamsberg (Orton 2014) but the site has subsequently been destroyed by mining.

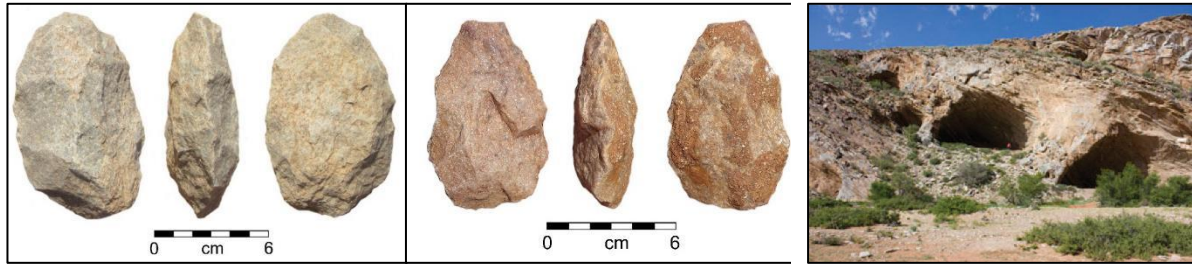


Figure 5-4: ESA handaxes from the coastal plain near Boegoeberg (left) and the plains of western Bushmanland (right).

Figure 5-5: The Spitzkloof rockshelters in the Richtersveld. Source: Dewar & Stewart (2017: fig. 2).

Later Stone Age

Later Stone Age sites are by far the most commonly encountered sites throughout the Namakwa Region study area. They vary substantially in their appearance and size. The main types of precolonial sites are listed below with some notable examples highlighted.

- Shell middens of varying size have been recorded throughout the coastal section of the study area (Dewar & Orton 2013). Especially large middens are known from Port Nolloth, Kleinsee and Boegoebaai. They contain marine shells, ostrich eggshell fragments, stone artefacts and sometimes pottery and ostrich eggshell beads. Shell middens are more numerous close to the shoreline with most being within about 300 m of the beach. Most date to the late Holocene.
- Artefact scatters of varying density are often associated with deflation hollows near the coast, and the foot of rocky hills and the margins of pans in Bushmanland. They contain typical LSA materials and sometimes also historical items (**Figure 5-6**). Grinding grooves or hollows, and ground areas, are often found in exposed bedrock surfaces in or adjacent to pans (**Figure 5-7**). These are likely to have been used as lower grindstones for the processing of plant foods and always occur at places where water could be obtained.



Figure 5-6: LSA and historical items from KK2015/012 near Pofadder (quartz backed bladelet, pot lug, glass truncated backed point and glass bead). Source: Orton (2016a).



Figure 5-7: Large pan with exposed bedrock bearing grinding grooves and surrounded by many artefact scatters. Source: Orton (2016b). Inset: grinding groove at KK2015/012. (Source: Orton 2016b).

- Ostrich eggshell flask caches with varying numbers of flasks. They are generally plain, but some shells decorated with engravings are known.
- Within the study area, rock shelters with stratified deposits currently known to science are extremely rare, numbering less than ten. Namaqualand is critical to the understanding of the spread of pastoralism in southern Africa and Spoeg River Cave (**Figure 5-8**), currently the only known shelter on the coastal plain, yielded the earliest dated sheep bone in South Africa (2105 ± 65 BP [OxA-3862]; Webley 2001; Sealy & Yates 1994). GI2 in the Gamsberg Inselberg has a 30 cm deep late Holocene deposit (undated). The excavation was never completed (Orton 2014) and the site is now extremely vulnerable to total loss through continued mining. Wolfkraal in the Kamiesberg (Webley 1992) and Leeu Klip Cave in Bushmanland (Beaumont *et al.* 1995) are two excavated rock shelters containing rock paintings.
- Rock paintings are generally rare in the Namakwa Region study area (Orton 2013; Rudner & Rudner 1968) but occur in either the fine-line tradition or the geometric tradition. The latter style dominates strongly (e.g. **Figure 5-9**). The rarity of painted sites serves to increase their significance.
- Geometric rock engravings have been found along the Orange River and are likely all the work of Khoekhoe herders (Halkett 1999; Orton 2025). Engravings are not known from the remainder of the study area, but, in the southeast where dolerite occurs, they may still be found. Cupules ground into the rock surface have been located in the vicinity of Kangnas in western Bushmanland (Orton & Webley 2014).
- Isolated special finds, such as complete pastoralist ceramic pots, are made from time to time, such as a pot eroded out of a sand bank on a farm in the extreme east of the study area (Webley & Orton 2012), northeast of Pofadder (**Figure 5-10**).



Figure 5-8: View of Spoeg River Cave near the mouth of the Spoeg River. (Source: L. Webley).



Figure 5-9: Geometric rock painting from Wolfkraal in the Kamiesberg. Scale in 5 cm intervals. (Source: J. Orton).



Figure 5-10: A whole pot found by a farmer near the north-eastern boundary of the study area (Orton & Webley 2014).

Some LSA sites also have historical materials on them indicating their age to be very late, falling into what is commonly referred to as the 'contact period'. These items were likely traded from Europeans, but possibly also from other indigenous groups. Examples have been shown above but further evidence for contact in the form of glass beads and iron fragments has been obtained from Spitzkloof D in the Richtersveld (Hopper & Dewar 2023).

Historical period

Historical archaeological sites are the most tangible sites (making them vulnerable to damage) and are most common in the mountains. Ruins of stone and/or brick (**Figure 5-11-Figure 5-13**) are sometimes accompanied by scatters of domestic refuse (**Figure 5-14 &Figure 5-15**).



Figure 5-11: Example of a stone-walled structure from the Goegap Nature Reserve, northern Kamiesberg. (Source: Orton 2025).



Figure 5-12: Stone ruin, possibly of a house, from the area east of Concordia. Source: (Orton 2019).



Figure 5-13: Stone ruin and threshing floor from the area east of Concordia. (Source: Orton 2019).



Figure 5-14: Collage of historical materials from the coastal plain section of the study area. (Source: Orton)



Figure 5-15: Historical materials from a site in the Kamiesberg north of Concordia. (Source: Orton 2019).

Copper mining in Namaqualand dates back to the 1684 expedition of the Governor, Simon van der Stel. After reaching the “Koperberg” they sank a number of shafts. One of the first shafts, on the Carolusberg, has been declared a PHS (**Figure 5-16**).

Commercial copper mining commenced in 1854, and within a short time mines were sunk at Okiep, Tweefontein (Concordia), Spektakel and sometime later at Nababeep (Smallberger 1975). Initially, ore and later concentrate from the smelters were transported by ox-wagon to Hondeklip Bay from where they were shipped. The Wildeperdehoek Pass along the Messelpad Road was built by convicts over the Wildeperdehoek Mountains and is a PHS. However, in the 1860's a narrow-gauge railway line was built from Okiep to Port Nolloth, which was developed as a port. Copper mining ceased in 1928 but then the Okiep Copper Company (OCC) was formed in 1937 to re-open the mines. The railway line between Port Nolloth and Okiep was finally closed in 1940 although sections were still used for mine purposes. Eventually the railway line was dismantled with only the culverts and water towers remaining (**Figure 5-17** & **Figure 5-18**).

A number of these copper mining sites are declared Provincial Heritage Sites (PHSs):

- Clara is one of the last remaining steam locomotives used for conveying copper ore on the historic rail section from Okiep to Port Nolloth and is parked at Nababeep.

- The old smokestack, dating to 1880, was erected at Okiep by the Cape Copper Company to provide energy to the pumping engine, and to pump water from the copper mine shafts (**Figure 5-19**).
- The Cornish pump building has an historic pump engine dating to 1882 and in use until 1929. It was used to pump water from the historic mine (**Figure 5-19**).
- The copper smelting chimney at Springbok is associated with the history of copper exploitation in South Africa.

In 2009, the Dept of Sport, Arts & Culture in the Northern Cape Provincial Administration, South Africa submitted an application to UNESCO to have “The Namaqualand Copper Mining Landscape” listed on the Tentative Listing for a World Heritage Site as a serial nomination consisting of several sites. While it was removed from the list in 2015, the nomination indicates the significant heritage value of the copper mining landscape.



Figure 5-16: Van der Stel's mine near Carolusberg, a declared PHS. Source: (Orton 2021).

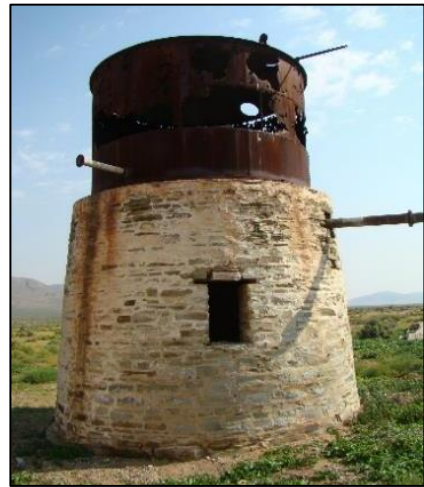


Figure 5-17: A water tower near Okiep. (Source: L. Webley).



Figure 5-18: View of a culvert under the 19th century copper railway. (Source: Orton 2019).



Figure 5-19: The Cornish Beam Pump (inset) and smokestack in O'okiep (both declared PHSs). (Source: J. Orton).

Diamonds were first recognized some 9 km south of Port Nolloth in 1925. These discoveries were followed by finds at Kleinzee and further north toward Alexander Bay, precipitating a “diamond rush” (Carstens 1962; Coetzer 1997 and de la Harpe 2024). In 1927, the government passed a proclamation prohibiting further prospecting and mining for diamonds on State land along the coast. They subsequently passed the Precious Stones Act No 44 of 1927. By 1928, the State Alluvial Diggings were established. In 1929, the Minister of Mines & Industries served notice that trekboers and herders on Crown lands within a 15-mile radius had to vacate their land (de la Harpe 2024). The diamond diggings comprised shallow trenches excavated by hand with picks and shovels to recover the diamonds. The diamond-bearing ore was later transported by cocopans on rails. The ore was moved to an area where it was subjected to rollers and sieving. Miners tended to live in Alexander Bay or Kleinzee, but in the early days, many were accommodated in small, corrugated iron buildings and tents, for example near the Boegoeberg (**Figure 5-20**).

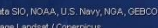


Figure 5-20: Diamond miners in the 1920s near Boegoeberg. Note the corrugated iron buildings in the background (Rudd & Watson n.d., in Coetzer 1997:5).

Hand labour was replaced by large bulldozers. Increased security led to the use of x-rays to tackle the illicit traffic in diamonds. The area was surrounded by barbed-wire fencing, and had police patrols, flood lights, etc. Several pickets were maintained by the police along the road between Port Nolloth and Alexander Bay. The archaeology of early 20th century mining would include the study of the mining sites, associated infrastructure, worker compounds and the cultural landscapes they have created. It is possible that the historical middens found on the southern slopes of Boegoeberg 1, relate to early 20th century mining. There is an argument for characterising mine wastes as archaeological landscapes (Lawrence et al. 2023). No one can dispute the significant alteration to the coastal landscape. Although currently not legally archaeology, this section is included based on certain aspects of diamond mining becoming archaeological in the coming years.

5.4.3 Maritime Heritage

The north-western coastline of South Africa has long featured in maritime texts and maps. However, the accuracy of the records is often questionable. The nature of the environment in which foundered vessels can drift a long way before settling, poor historical reporting, and the length of time since the wrecks occurred means that maritime cultural heritage sites are hard to accurately locate. **Figure 5-21** maps known wrecks off the relevant section of the West Coast of South Africa. Given the limitations, 54 wrecks pre-dating 1965 and a further six post-dating 1965 are known to occur off the Namakwa region coastline. Another approximately 60 more may, with a lower level of certainty, be located somewhere off the coast of the study area.



Namakwa Region study area coastline is between the yellow dots.

Pre-colonial graves can be found anywhere. They are often found in coastal dune contexts where the sand is easy to excavate by hand and population densities were generally higher than inland. They are only rarely reported from Namaqualand and Bushmanland with most of those on record being from the Kleinsee to Hondeklipbaai area (Dewar 2008; Dewar & Orton 2013) and along the Orange River (Morris 1992). Most precolonial graves are not marked at the surface and are not identified until disturbed. Rare stone-packed graves are likely to be very late/historical graves. **Figure 5-22** shows an example from Boegoeberg, while **Figure 5-23** shows a small cluster of stones that, by its location on a sandy plain, may very well mark a grave. However, stone piles can also arise from prospecting/drilling and may be confused with graves. Unmarked colonial era graves, dating to the Anglo-Boer War or from historical farms may also occur in isolated areas, but historical graves generally have head and/or footstones enabling easy identification during ground surveys.



Figure 5-22: A stone cairn, which may represent a burial, at the foot of Boegoeberg South. It is situated inside the Conservancy area. (Source: Webley 2024)



Figure 5-23: Cluster of rocks likely to represent a grave near Aggeneys. (Source Orton 2016a).

5.4.5 History and built environment

Important themes which are briefly described and illustrated below, include the settlement by the first colonial farmers, missionary activity and the establishment of the communal reserves, the history of copper mining, and the impact of the Anglo-Boer War. The discovery of diamonds in 1925, falls just inside the 100-year minimum age for archaeological remains in terms of the NHRA (see Section 1 above) and is briefly discussed in Section 4.2, but associated structures greater than 60 years old feature in this section.

Various expeditions were sent up to the north-western Cape (Namaqualand) during the latter part of the 17th century, culminating in Commander van der Stel's visit in 1685 (1685). They encountered the Namaqua Khoekhoen, at that time consisting of eight or nine kraals (Penn 2005: 159). By 1740, the Dutch were in control of the southern part of Namaqualand and by 1750 a number of loan farms had been granted, including the farm Leliefontein (on the top of the Kamiesberg) which subsequently became the core of the Leliefontein Communal Area or sometimes called "reserve". By the middle of the 19th century the only land available to the descendants of the Namaqua Khoekhoen was located around the mission stations. There are no historic farmhouses in the study area which have been declared heritage sites or graded as significant, although there are many 19th century farm buildings across the study area (**Figure 5-24 & Figure 5-25**). However, on the farm *Riethuis* (*Roodeklip Heuwel*) at the end of the Messelpad, and just before Honde Klip Bay, an outbuilding contains an historic horse mill. The mill, building and 5 m of surrounding land have been declared a PHS (**Figure 5-24**).

Missionary work in Namaqualand led to the establishment of a number of mission stations or communal areas. These in chronological order are:

- **Pella:** A new mission was established in Bushmanland in 1811, called "Pella". It was abandoned in 1872, because of drought. The first Catholics started their mission in Springbok in 1869 and in 1878 they arrived at Pella. They built a cathedral which was consecrated in 1895 and is now a PHS (**Figure 5-26**).



Figure 5-24: This structure on Riethuis 619 houses an historic horse mill. It is a PHS. Source: Webley (2004).



Figure 5-25: Rondekop in the Namaqua National Park has a distinctive stone, flat roofed house with decorative window and door treatment. Source: Webley (2004)



Figure 5-26: The church at Pella is a Provincial Heritage Site. Source: L. Webley.

- Leliefontein: The Rev Barnabas Shaw, of the London Missionary Society (LMS), set up a mission at Leliefontein on the top of the Kamiesberg in 1816. In order to persuade them to give up their transhumant lifestyle, he introduced the planting of wheat which is still practised today. The property on which the 1855 Church and Manse at Leliefontein stand is a PHS.
- Steinkopf (Kookfontein): In 1818, the Rev. Schmelen of the LMS established a mission at Kookfontein (also known as Kokfontein or Besondermeid). It was later renamed Steinkopf. He also founded the mission at Komaggas. The Church is a PHS.
- Komaggas: Komaggas became the mission station of the London Missionary Society in 1829. The Rev. Schmelen took over as the minister until his death in 1848.
- Concordia: In 1852, the Rhenish Missionary Society established the Concordia Mission, close to Springbok. Construction of a large church commenced in 1874 and it was inaugurated in 1876 (Strassberger 1969).
- Richtersveld: The catechist, Frederick Hein, started preaching among the Namas along the Orange River in 1842. In 1851 he started work at Kuboes which became a 'sub-station' of the Steinkopf

Mission, and they started building a church in 1888. The reserve is called after Dr E Richter of the Rhenish Mission Society.

Tickets of occupation to the land were issued by the Cape colonial government shortly after the territory to the north of the Buffalo River was annexed in 1847. It gave the inhabitants long term security to their lands. The Mission Stations and Communal Reserves Act of 1909 was aimed at removing the control of secular matters from the missionaries at the mission stations (SPP 1995). The nature of the settlement in the reserves is discussed further in Section 4.6.

Copper Mining is an important aspect of the region's history and is discussed at greater length under the section on archaeology. This includes listing of associated structures declared as PHSs.

Namaqualand was impacted by the *Anglo-Boer War* of 1899-1902. A Major Shelton of the British forces was appointed to Namaqualand in 1901 in order to protect the valuable copper deposits around Springbok and Okiep as well as the railway line to Port Nolloth (Burke 1995). The British forces garrisoned themselves in the town of Okiep and a number of blockhouses were constructed around the town. Garies and Springbok eventually fell to the Boers and Okiep was besieged. British reinforcements eventually arrived to relieve the town but at the same time General Smuts had to leave to attend the peace negotiations in Pretoria. The siege of the town, which had lasted a month, was eventually lifted.

Remnants of the war are found throughout the study area and include:

- Letterklip – near Garies. It is a PHS. This rock formation was fortified and occupied from 1901 to 1902 by British forces. It contains names and badges engraved on the rockface.
- The massacre of 35 inhabitants of Leliefontein Communal Area by General Maritz is commemorated by a bronze plaque in the church.
- Darter's Grave (at Darters Poort south of Kamieskroon on the N7) is the grave of Lt James Darter, a member of the Namaqualand Border Scouts who was killed and buried here in 1902.
- There are blockhouses in and around Okiep relating to the siege of the town.
- Remnants of stone-walled features related to the Anglo-Boer War have been found between Springbok and Aggeneys (Orton & Webley 2012).

The discovery of first diamond on the Namaqualand coast, just south of Port Nolloth by Jack Carstens in 1925, has had a significant impact on the coastal landscape and therefore the Cultural Landscape. It is further discussed under the section on archaeology but it is noted here that the earlier buildings connected to 20th century mining are heritage resources.

5.4.6 Living heritage

The National Heritage Resources Act, No. 25 of 1999 (NHRA) defines living heritage as: "cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems; and the holistic approach to nature, society and social relationships" (Section 2(xxi)). Although living heritage is not specifically protected by the NHRA, places associated with living heritage are. Living Heritage landscapes may be graded and declared as formally protected sites, i.e. under Sections 27, 28 or 30 of the NHRA. There is also a National Policy document on Living Heritage (DAC 2009) that aims to protect and promote living heritage.

The arrival of the first trekboers and Baster groups put increasing pressure on rights to the lands of the Namaqua Khoekhoen pastoralists and hunter-gatherer groups as well as their natural resources. Prior to the arrival of the trekboers, the indigenous people had no formal title to the land. From the 19th century, the colonial government encouraged the establishment of mission stations, seeing them as a way of stabilising indigenous peoples within a fixed geographic area where they could serve as a source of labour. Historically, the government was reluctant to commit to reserve boundaries.

In place of their traditional transhumant lifestyle, the pastoralist descendants were severely restricted. They were encouraged by the missionaries to settle in villages and to practice an agrarian lifestyle. The Mission Stations and Communal Reserves Act of 1909 was intended to administer the “coloured rural communities”.

There are six communal areas within the study area.

- Richtersveld
- Steinkopf
- Concordia
- Kommagas
- Pella
- Leliefontein

In the 1980s, the Apartheid government initiated a scheme to divide the communal lands up into “economic units” since it was believed that privatisation of land would increase agricultural output and efficiency. Many of the reserves rejected this proposal, but the proposal was implemented in parts of the Richtersveld, Steinkopf and Leliefontein where there are now dozens of small farms. Those residents who were unable to obtain a farming unit, were forced to graze their livestock on the village commonages, resulting in significant overgrazing. The privatisation scheme was eventually overthrown by the courts in 1988 (SPP 1995).

Each communal area has its own particular history, in terms of early missionary settlement and the impacts of copper and diamond mining. The 19th century Namaqua Khoekhoen camp or kraal consisted of a patrilineal clan under the nominal authority of the chief or ‘kaptein’. They were predominantly herders, with cattle, sheep and goats. The transhumance cycles of the Nama herders have been documented in the Richtersveld (Boonzaaier 1980, Mussgunug 1995, Hendricks *et al.* 2004), Steinkopf (Webley 1987), Leliefontein (Webley 1987) and Pella (Klinghardt 1982). Due to the extremely dry climate and differing climatic zones, seasonal mobility was, and continues to be, essential for these small stock herders. In the far western part of the study area they moved historically between the Orange River, the mountains and the coast. In areas such as Steinkopf and Leliefontein, which cross ecological zones, pastoralists move to the mountainous zones in the summer months and to the lower sandveld region in winter. Historical transhumance patterns have been traced through oral history and historic aerial photography.

Most farmers live in permanent dwellings, while their herds move in a seasonal orbit under the care of a shepherd. It is important to emphasise that very few of the inhabitants are full-time herders. Many families may own livestock, but they are often combined into a single herd and cared for by an employed shepherd. The temporary settlements are called “veeposte” (stockposts). They consist of a temporary dwelling and, in the case of winter stockposts, also a kraal or two. The stockpost has been described by Webley (1982 and 2009b), Mussgunug (1995) and Mills (1995). There has been considerable variability in the design and layout of stockposts with accelerated change over the last 50 years.

The traditional “matjieshuise” (mat house or !haru-oms) comprised a lathe framework of about 40 to 60 poles which was covered by up to 16 reed mats (**Figure 5-27**). The decline in the use of such huts relates to a lack of suitable rush. It is also time-consuming to make the mats, and most women no longer know how to make them. The herders therefore use hessian, plastic sheeting, cardboard and other bits of material to cover the frame. Nearby was the “kookskerm” (cooking shelter) which traditionally comprised a semi-circle of bushes enclosing a central hearth (**Figure 5-28 & Figure 5-29**).



Figure 5-27: A traditional matjieshouse in a village in the Leliefontein Reserve c. 1986 (source: L. Webley). It illustrates the correct placement of the reed mats.

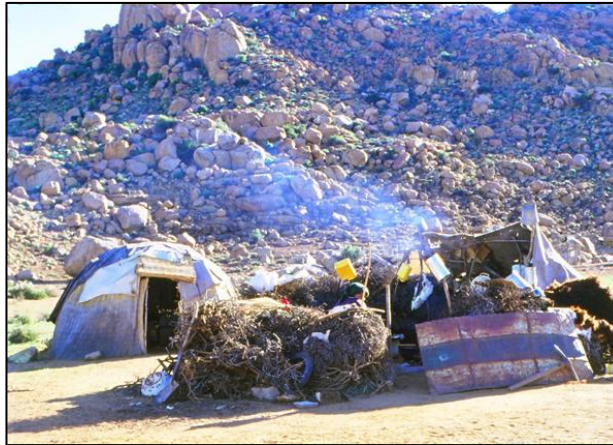


Figure 5-28: A stockpost in the Leliefontein Reserve, showing the matjies house, the circular kookskerm and the forked n//a pole at the entrance c. 1986 (Source: L. Webley).



Figure 5-29: A contemporary stockpost hut in the Boegoebaai study area with barrels of water standing outside. The 'kookskerm' is between the door and barrels c. 2024 (Source: J. Orton).



Figure 5-30: Contemporary lamb kraal in the corner of the main kraal (Source: J. Orton).



Figure 5-31: Lamb kraal in the foreground c. 1986 (Source: L. Webley).

Kraals are typically constructed in the winter months to provide protection from the cold and predators. Kraals (made of wire, poles, bushes or stone) often included lamb kraals or enclosures (**Figure 5-30** & **Figure 5-31**). Any development which within the communal areas may impact on traditional transhumance patterns and therefore the way of life (living heritage) of the local inhabitants. This review acknowledges that the Living Heritage component is presently based primarily on desktop review of existing literature. Detailed field-based engagement with affected communities will be required during subsequent project-level assessments (Heritage Impact Assessments).

5.4.7 Cultural landscape / sense of place

The area has four distinct physiographic components. The coastline, coastal plain, granite mountains of Namaqualand, and the inland plain of Bushmanland. The latter includes many smaller mountains, often present as inselbergs. The landscape is arid and desolate, but mining traces occur widely. Diamonds are mined along the coast and Orange River, and as a result these areas are largely inaccessible to tourism. Copper mines are located in the granite mountains around Springbok and Okiep. Other minerals are mined further inland around the Gamsberg at Aggeneys. The Kamiesberg range has the highest mountains in the area. Important topographic features are the Boegoeberg Twins near Alexander Bay, the granite mountains around Springbok, Okiep and Concordia, Sneeuwkop overlooking Kamieskroon and Gamsberg near Aggeneys. All have historical significance. The Orange, Buffels and Spoeg Rivers are the main rivers through the study area, and all have aesthetically significant aspects. Granite mining too, is prevalent in the northeast, near Pofadder and these activities can alter the landscape, and disturb archaeological and historical remains.

The most significant aspect of the cultural landscape is the Richtersveld Cultural and Botanical Landscape (RCBL) World Heritage Site which lies within the north-western part of the Namakwa Region study area (Figure S-1b). The description of the RCBL is as follows (UNESCO 2024):

The 160,000 ha Richtersveld Cultural and Botanical Landscape sustains the semi-nomadic pastoral livelihood of the Nama people, reflecting seasonal patterns that may have persisted for as much as two millennia in southern Africa. It is the only area where the Nama still construct portable rush-mat houses (*haru om*) and includes seasonal migrations and grazing grounds, together with stock posts. The pastoralists collect medicinal and other plants and have a strong oral tradition associated with different places and attributes of the landscape.

A buffer zone has been created around the RCBL in order to further control impacts on it. It must be noted that the transhumant lifestyle practiced by the Nama also incorporates land both within and beyond the buffer zone. Adjacent, and within the buffer zone, are the Richtersveld National Park and Nababiep Nature Reserve. Immediately east of Springbok is the Goegap Nature Reserve and further south again is the Namaqua National Park (Figure S-1b). All protect iconic sections of South Africa's semi-arid landscapes as well as aspects of the region's cultural heritage (i.e. ruined buildings, kraals, cemeteries, etc).

"The Namaqualand Copper Mining Landscape" was included on South Africa's Tentative World Heritage List in 2009 but was subsequently withdrawn in 2015. This underscores their historical significance. The Gamsberg Mountain, although now partially destroyed by mining, has been identified as having high significance as a place of "genocide of the San people" (Morris 2013). It was considered part of the proposed /Xam Khomani Heartland Heritage Site, on South Africa's Tentative World Heritage List, but has since been removed.

The N7, N14 and R382 are identified as scenic routes because they provide access to the RCBL World Heritage Site, the Richtersveld National Park, the Orange River and Namibia (Figure S-1b). These include a number of historic mountain passes, while the Wildeperdehoek Pass (on the Messelpad Road) is a Provincial Heritage Site (Grade II).

The coastline, scenic route corridors, topographic features and pans are the main highly sensitive areas, while during spring many of the smaller roads in the western half of the study area are frequented by local and foreign tourists alike to enjoy the floral landscapes (**Figure 5-32**).



Figure 5-32: Wildflowers inland of Hondeklipbaai. Photograph: J. Orton.

5.5 SPATIAL CLASSIFICATION OF RECEIVING ENVIRONMENTS

5.5.1 Palaeontology

The theoretical palaeontological sensitivity of the study area is taken from the Palaeosensitivity Map at the South African Heritage Resources Information System (SAHRIS n.d.) but has been altered to align with the desktop study (**Figure 5-33**). In general, the surficial sediments of the coastal plain are of low sensitivity with more highly significant deposits present at depth close to the coast and below elevations of about 100 m above sea level. The band of igneous mountains flanking the escarpment is generally of zero sensitivity but the remnants of depositionally higher rocks to the west and northwest of Springbok are of high sensitivity.

The Bushmanland area is generally of low sensitivity but patches of zero and moderate sensitivity occur, and an area of high sensitivity lies in the southeast.

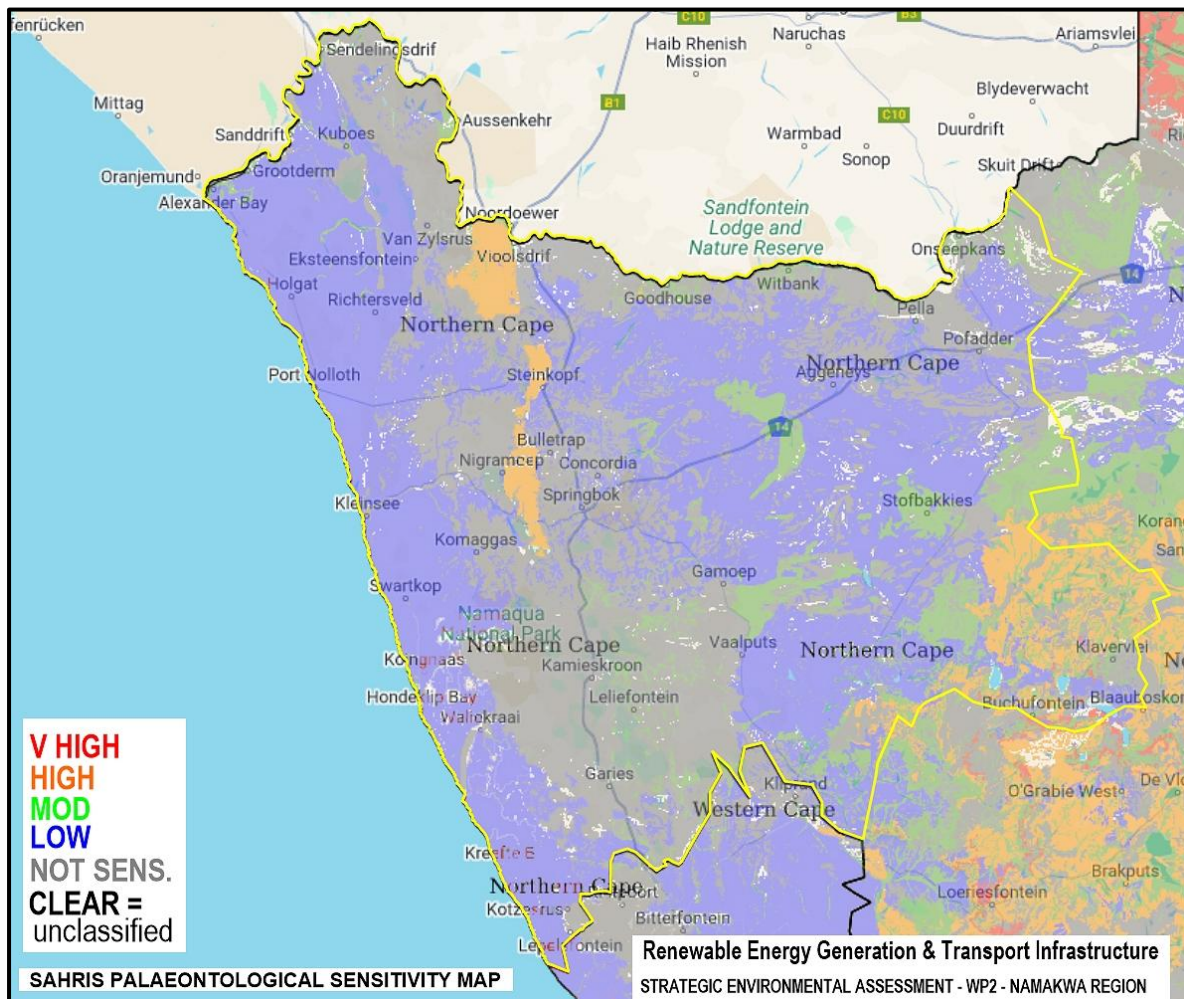


Figure 5-33: The SAHRIS palaeontological sensitivity classification (SAHRA n.d.) but edited to align with the results of the desktop research. The boundaries of the SEA WP2 are shown in yellow. Grey = zero, blue = low, green = moderate, orange = high, red = very high. Note that the surface sediments close to the coast are of low sensitivity but are underlain by very high sensitivity sediments.

5.5.2 Terrestrial Archaeology

Archaeological knowledge is largely derived from Cultural Resource Management work and therefore any map of the distribution of sites would reflect the locations of surveys. Work has focused along the coastline south of Port Nolloth and within the Springbok REDZ. Large parts of the WP2 study area remain poorly explored. These include much of its southern half as well as western Bushmanland and parts of the Richtersveld.

The identification of definitive sensitivity zones is entirely dependent on detailed field surveys. Sites may vary in cultural significance from very low (and not worthy of sampling) to very high (potential provincial significance). Archaeologists therefore rely on their knowledge of which landscape features were conducive to prehistoric settlement. Pans, the margins of rivers, ridges, inselbergs and deflation hollows between dunes are all potentially sensitive in this regard.

For the purposes of this study, the areas where archaeology is likely to be most dense are allocated high sensitivity, as are the remains of the 19th century Copper Railway network (**Figure 5-34**). It must be noted that many thousands of small points scattered across the entire study area where archaeological sites occur will be of variably low to high sensitivity, but these cannot be meaningfully mapped at this scale. Detailed mapping of archaeological sites (using desktop research and field surveys) must be undertaken at the EIA phase.



Figure 5-34: Map showing terrestrial archaeological sensitivity. Red = high, with the remainder of the area best seen as low sensitivity.

5.5.3 Maritime Heritage

Because of the low likelihood of actually encountering shipwrecks in general, the area of ocean adjacent to the WP2 study area is almost all considered as of low sensitivity. The exceptions, however, are Cape Voltas, Wreck Point, Soco Reefs, Port Nolloth, Kleinsee, Hondeklipbaai, Groenriviermond and Skulpfontein Point which were all mentioned in the shipwreck database as foundering localities which means that these places have a slightly higher likelihood of hosting wrecks. These latter areas are indicated in **Figure 5-35** as medium sensitivity and are within 2 km of the coastline.

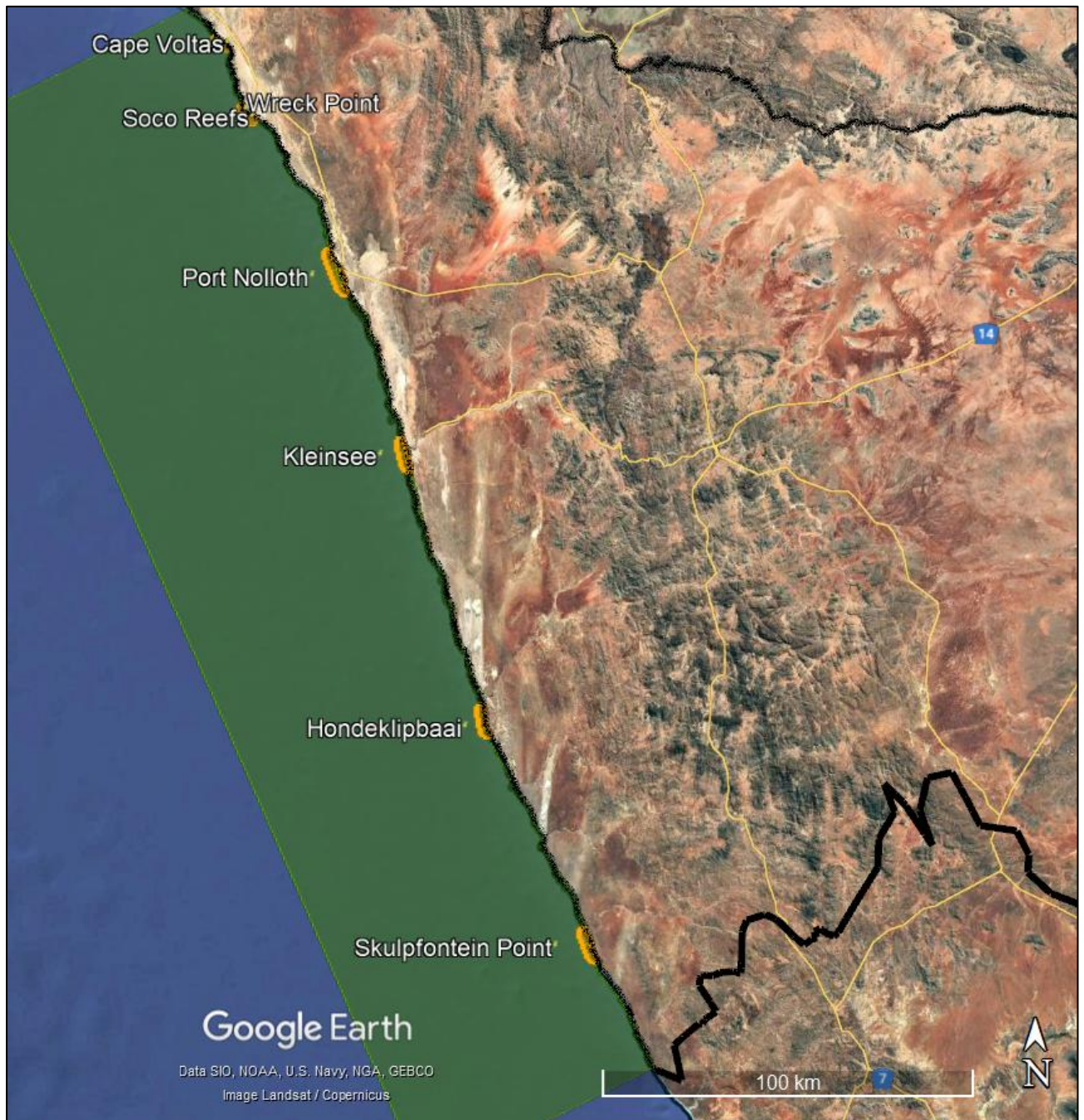


Figure 5-35: Sensitivity mapping for maritime heritage. Orange = medium, green = low.

5.5.4 Graves

It is likely that pre-colonial graves will occur in some archaeological shell middens along the coast. Graves have **high local cultural significance (Grade IIIA)** and are automatically of very high sensitivity. Sensitivity mapping for graves is not feasible, and the entire area is best considered as of low sensitivity because of the low probability of encountering graves. Although graves are particularly concentrated along the coastal margins, their likelihood of occurrence is still low enough to not warrant a medium sensitivity strip there.

5.5.5 History and Built Environment

No spatial mapping of sensitivity zones is possible for historical and built environment resources since they are small sites that will be present widely on farms and in towns throughout the region. However, Figure S-1a does include the locations of declared provincial heritage sites which can be regarded as of very high sensitivity. The many other historical structures across the province will need to be evaluated for significance through fieldwork.

5.5.6 Living Heritage

The RCBL as a cultural landscape, reflects long-standing traditions of the Nama, the indigenous community.

However, transhumant herders from all six communal areas shown in **Figure 5-36** have utilized the land within the study area historically and have a centuries old tradition with respect to the landscape and settlement patterns. As representative examples, the areas within the boundaries of the communal reserves are thus regarded as of high sensitivity.

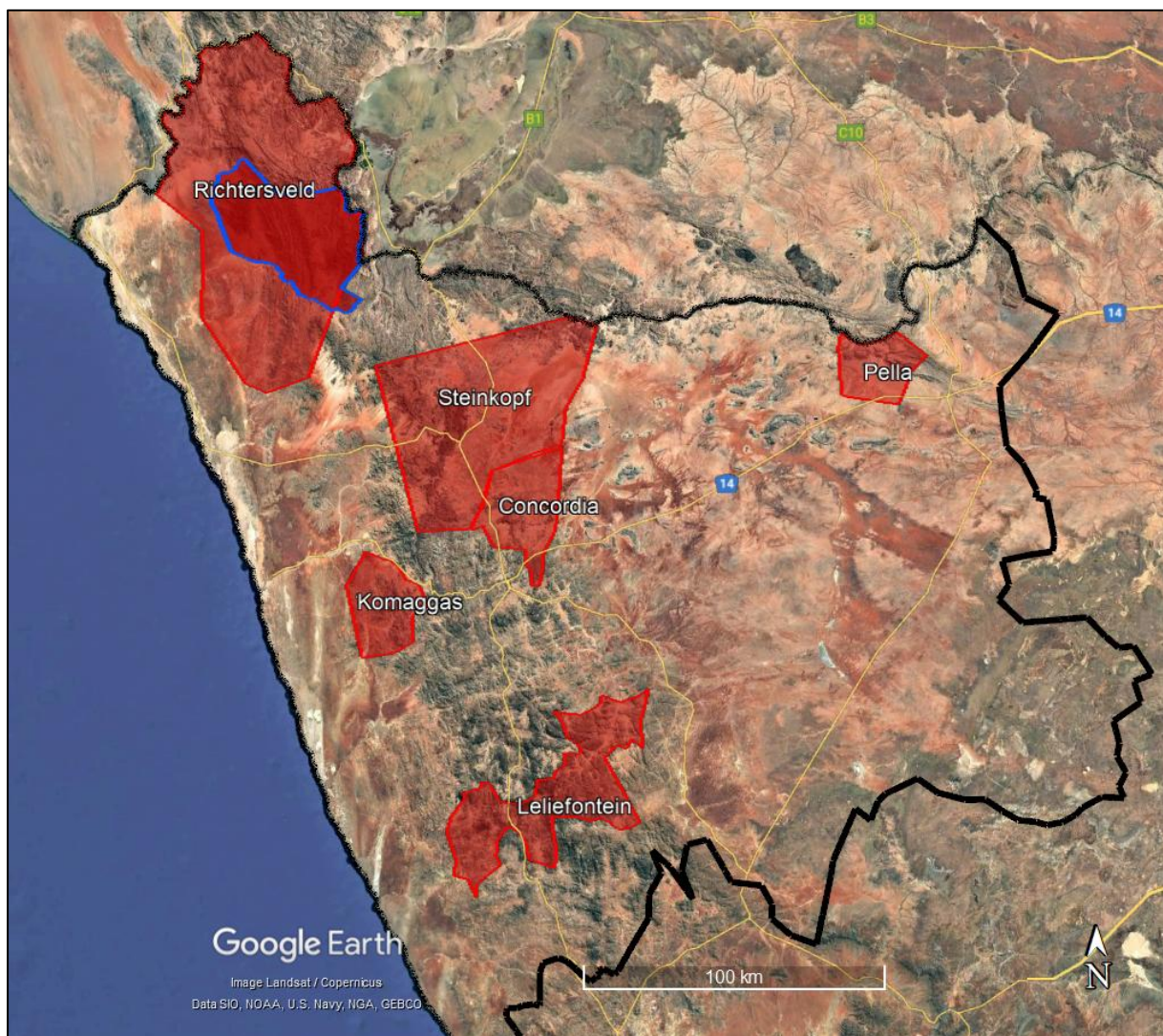


Figure 5-36: Sensitivity mapping for living heritage. Red = high. The 6 communal reserves are shown as red polygons (high sensitivity) and the RCBL WHS is the dark red polygon with blue outline (very high sensitivity). Differing forms of transhumance are followed by the herders in each of the areas.

5.5.7 Cultural Landscape / sense of place

From a purely visual point of view, the following features are identified as highly sensitive for their aesthetic value: the WHS and its buffer zone, the various National Parks and other reserves, the coastline, the Kamiesberg, and the various main roads through the area (**Figure 5-37**). From a more cultural point of view, the RCBL (and buffer) and National Parks would also be seen as very high sensitivity (these areas are captured within the visual sensitivity mapping). Further detailed mapping is not possible without ground truthing, but the remainder of the study area is likely to be of at least medium sensitivity for aesthetic reasons. It should be noted, however, that, in terms of impact assessment, sensitivity also varies depending on the type of development, since some developments will be far more visually intrusive than others.

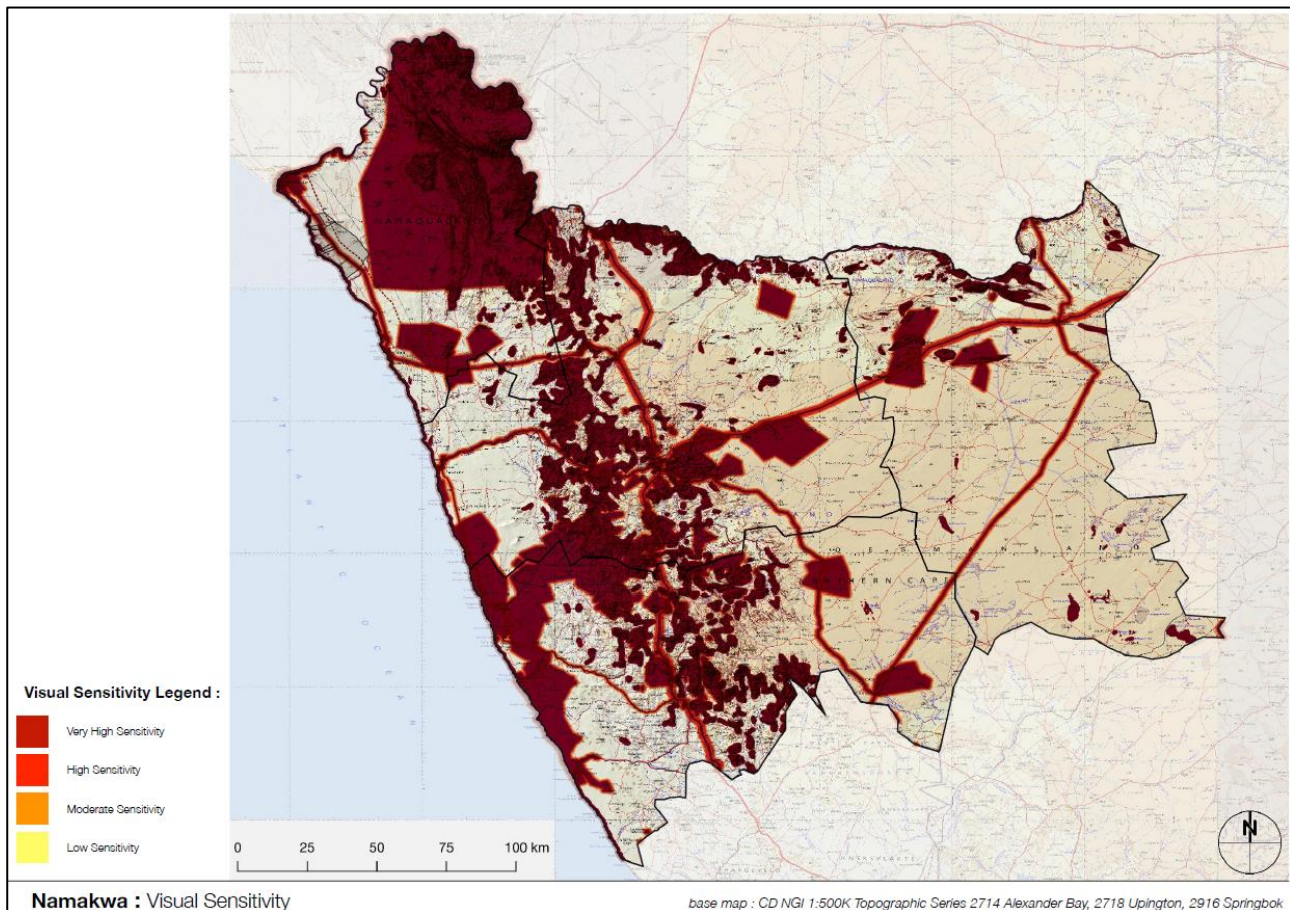


Figure 5-37: Visual sensitivity map for the Namakwa study area.

5.6 POTENTIAL IMPACTS (POSITIVE AND NEGATIVE)

5.6.1 Baseline Scenario (up to 2050)

Here we consider the negative and positive effects of the various development scenarios. These include a Baseline Scenario, in which the GH2 economy does not take place. In this scenario, the current social, ecological, climatic and developmental trends continue.

Negative Impacts:

Palaeontology:

- Desertification and increased mining may expose new fossil sites and risk fossil loss.

Terrestrial Archaeology (pre-colonial and colonial):

- Increasing agricultural development along the Orange River and the continuation of diamond mining along the coast continue to threaten significant archaeological sites on the banks of the river and along the coastline. These activities appear to be poorly regulated and pose the greatest threat to archaeology.
- Renewed copper mining centred in Okiep may impact the historic Copper Mining Landscape, damaging historic infrastructure which has not been adequately recorded. Potential artisanal mining licences and an increase in oil and gas exploration along the coast may impact archaeological and historical sites. Prospecting and increase in mining for manganese and iron, as well as granite in the northern part of the study area (centred around Aggeneys and Pofadder, may impact on heritage resources in this area. Despite the implementation of the environmental process, archaeological resources are being lost on an incremental basis.
- Continued development of renewable energy facilities in the REDZ (wind and solar farms) as well as new transmission lines may impact heritage resources, but impacts are generally mitigated during the Environmental Impact Assessment process as prescribed in NEMA (Act 107 of 1998) and the NHRA (Act 25 of 1999).
- The development of new roads and the industrial corridor from Springbok to Upington along the N14 may potentially impact on archaeological resources but impacts can be mitigated during the environmental process.

Maritime heritage:

- Potential offshore mining and gas exploration may impact on unknown wrecks and may result in their destruction.

Graves

- Graves will continue to be impacted very occasionally. Given that they are generally completely unmarked, impacts are unpredictable.

History and Built Environment

- Incremental increases in mining and infrastructure development, may impact on historic places, structures and buildings older than 60 years which may be destroyed, damaged or vandalised.

Living Heritage:

- Small stock farmers in the communal areas are likely to continue with traditional grazing practices despite poor environmental conditions and overgrazing. This may threaten certain aspects of living heritage. Infrastructure and mining development may also occur in communal grazing lands and further threaten traditional landuse patterns.

Cultural Landscape:

- Population growth and associated development will gradually alter the historical and cultural landscapes. This is already happening in the Springbok/Okiep and Aggeneys areas. This is in contrast with the seasonal tourism initiatives which rely on the natural aesthetic and heritage preservation of the region.

Positive Impacts:

- Positive impact can result from the discovery and recording of fossils and archaeological sites. These would be of benefit to science. It must be noted, however, that impacts to highly significant sites would still be seen as negative. Growth in tourism may reinforce the need to protect heritage resources which are tourist attractions.

Potential Negative Impacts associated with proposed development

5.6.2 Scenario 1 (by 2035)

Negative Impacts:

Palaeontology:

- Impacts are likely to be largely insignificant over the bulk of the study area because most development will affect surficial sediments which are generally of low palaeontological sensitivity. However, excavation depths might vary. The main exception is at the coast where buried sediments of high sensitivity are more likely to be encountered.

Terrestrial Archaeology (pre-colonial and colonial):

- Impacts to surface resources across the area are possible, but generally not likely to be of high significance. The exception is for increased development along the coastline where archaeological sites of higher significance are more concentrated. However, the overall impact area close to the coast is likely to still be small compared to the existing and ongoing impacts from mining. Inland sites will be more dispersed and there is the opportunity to avoid them during development.

Maritime heritage:

- Impacts are unlikely to significantly increase due to the generally low probability of wrecks being found. However, there is always a chance of impacts.

Graves

- Impacts to graves are unpredictable and it is equally possible that several or no graves could be affected.

Historical resources and built environment

- Given the relatively small footprint of Scenario 1, significant impacts to historical and built environment resources are unlikely. The main potential threat could be the insensitive 'restoration' of historical structures or even potentially their demolition in towns where new residential areas are required. Steinkopf, Okiep and Springbok may be most at risk here.

Living Heritage:

- The relatively small footprint is unlikely to impact on communal use areas in which living heritage traditions are still practiced because they could be easily avoided. Nonetheless, the Communal Areas of Steinkopf, Concordia and the Richtersveld are perhaps most at risk as these areas are located near potential centres of development.

Cultural Landscape:

- The relatively small overall footprint should not have significant impacts on the cultural landscape unless specific developments are situated in close proximity to prominent and aesthetically pleasing landscape features.

Positive Impacts:

- Positive impacts will largely relate to the increase in scientific knowledge in terms of the discovery, recording and sampling of fossils and archaeological sites. These would be of benefit to science. It must be noted, however, that impacts to highly significant sites would still be seen as negative.
- Another potential benefit comes with the responsible restoration and reuse of historical structures which might otherwise become degraded over time through neglect and disuse. This reuse may relate directly to the development or indirectly through the need for increased accommodation in the area.
- Growth in tourism may increase the need to protect heritage resources which are tourist attractions.

5.6.3 Scenario 2 (by 2050)**Negative Impacts:**

Impacts with a large development scenario will be very similar to the small development scenario but just with higher intensity. This is because the larger overall footprint will mean more pressure on available land and a reduced likelihood of being able to avoid impacts. This is likely to be exacerbated along the coastline where space between significant archaeological sites is far more limited. Inland developments, either on the coastal plain (more than 2 km from the coast) or in Bushmanland are likely to be able to avoid the majority of significant sites since they tend to be located adjacent to water courses, pans or rocky hills. Due to the far larger land requirement, there is a far greater chance of impacts to the communal areas.

Positive Impacts:

- As for the small development scenario, but with a greater increase in scientific knowledge.
- Due to the far larger land requirement, there is an increased likelihood that the communal area will be used for at least some development. Although loss of communal land is an impact, financial benefit could accrue to the affected communities with the proper agreements in place.

5.7 RISK/OPPORTUNITY ASSESSMENT OF IMPACTS

Below, we consider a systematic risk/opportunity assessment of the impacts relating to the GH2.

Risk and opportunity are determined by estimating the likelihood of events or trends occurring, in relation to their negative or positive consequences i.e. likelihood x consequence.

The consequence/benefit categories are described in Table 5-1.

Table 5-2 indicates the predefined risk/opportunity categories.

Table 5-3 to Table 5-16 shows the Risk/Opportunity assessments associated with the negative/positive impacts, respectively.

TABLE 5-1: Defined Consequence/Benefit Categories. Note that “Significance” refers to “Cultural Significance” in terms of the NHRA.

Theme/ Receptor	Negative consequences (-)				
	Slight	Moderate	Significant	Drastic	Extreme
Palaeontological Resources	Isolated fossils of low significance damaged or destroyed	Fossils of medium significance damaged or destroyed in a small area	Fossils of high significance damaged or destroyed in a small area	Fossils of high significance damaged or destroyed in a large area	Fossils of high significance damaged or destroyed in multiple large areas
Archaeological Resources	Isolated artefacts or sites of low significance damaged or destroyed	Occasional small sites of low to medium significance damaged or destroyed	Occasional large sites of medium to high significance, or many small sites of low to medium significance damaged or destroyed	Several large sites of medium to high significance, or many small sites of medium significance damaged or destroyed	Widespread destruction of sites of high significance
Maritime	Shipwrecks of low significance minimally damaged	Shipwrecks of low to medium significance minimally damaged	Shipwrecks of medium significance damaged or wrecks of low significance destroyed	Shipwrecks of high significance damaged, or wrecks of medium significance destroyed	Shipwrecks of high significance damaged or destroyed
Graves	Graves uncovered, reported and rescued with minimal damage	Few graves uncovered, reported and rescued after being damaged or disturbed	Many graves uncovered and only reported and rescued after being disturbed or removed	Occasional graves destroyed, or many graves uncovered and only reported and rescued after being disturbed or removed	Many graves destroyed without any record
Built heritage	New buildings near heritage structures affect their context, or low to medium significance heritage structures altered in sensitive ways	New buildings overwhelm heritage structures, or medium significance heritage structures are altered insensitively	Partial demolition of medium significance heritage structures	Partial demolition of high significance heritage structures	Total demolition of high significance heritage structures
Living Heritage	Development in the vicinity of living heritage sites	Occasional living heritage sites damaged, or transhumant settlement patterns constrained	Occasional living heritage sites damaged or destroyed, or transhumant settlement patterns disrupted	Several living heritage sites damaged or destroyed, or transhumant settlement patterns severely disrupted	Widespread destruction of living heritage sites or complete cessation of transhumant settlement patterns

Cultural Landscape	Occasional nodes of development occur in low to medium visual sensitivity areas	Frequent nodes of development occur in low to medium visual sensitivity areas, sense of place disrupted	Frequent nodes of development occur in medium to high visual sensitivity areas, sense of place severely disrupted	Frequent nodes of development occur in high visual sensitivity areas or widespread development in medium sensitivity areas, sense of place severely disrupted	Widespread development in high visual sensitivity areas, sense of place destroyed
Theme/ Receptor	Positive consequences (+)				
	Slight	Moderate	Significant	Drastic	Extreme
Palaeontological Resources	Occasional fossils of low significance uncovered and rescued	Occasional fossils of medium significance uncovered and rescued	Occasional fossils of high significance uncovered and rescued	Many fossils of high significance uncovered and rescued	Many fossils of high significance uncovered and rescued over large areas
Archaeological Resources	Occasional sites of low to medium significance are rescued with minimal loss	Many sites of low to medium significance are rescued with minimal loss	Many sites of medium to high significance are rescued with minimal loss	Many sites of high significance are rescued with minimal loss	Many sites of high significance are rescued with minimal loss, and some are formally protected (e.g. heritage declaration or in protected areas)
Maritime	Shipwrecks of low significance discovered and protected with minimal damage	Shipwrecks of low significance discovered, recorded and protected with minimal damage	Shipwrecks of medium to high significance discovered, recorded and protected with minimal damage	Shipwrecks of high significance discovered, recorded and protected with minimal damage	Shipwrecks of high significance discovered and extensively studied/excavated
Graves	Occasional marked graves discovered and protected	Occasional marked graves in several areas discovered and protected	Occasional marked graves in widespread areas discovered and protected	Many marked graves in several areas discovered and protected	Many marked graves in widespread areas discovered and protected
Built heritage	Occasional heritage structures are recognised and protected from harm	Many heritage structures are recognised and protected from harm	Many heritage structures are recognised and protected from harm with some receiving formal protection (e.g. heritage declaration)	Many heritage structures receive formal protection (e.g. heritage declaration)	Many heritage structures receive formal protection (e.g. heritage declaration) and celebration

Living Heritage	Occasional living heritage sites are recognised and protected from harm	Many living heritage sites are recognised and protected from harm	Many living heritage sites are recognised and protected from harm with some receiving formal protection (e.g. heritage declaration or in protected areas)	Many living heritage sites receive formal protection (e.g. heritage declaration or in protected areas)	Many living heritage sites receive formal protection (e.g. heritage declaration or in protected areas) and celebration
Cultural Landscape	Some rehabilitation of existing mining impacts in low visual sensitivity areas	Some rehabilitation of existing mining impacts in high visual sensitivity areas	Extensive rehabilitation of existing mining impacts in high visual sensitivity areas	Extensive rehabilitation of existing mining impacts in high visual sensitivity areas and/or some expansion of formally protected areas	Extensive rehabilitation of existing mining impacts in high visual sensitivity areas and/or extensive expansion of formally protected areas

Limitation to above table:

Clearly, the grading of impacts is more complicated than Table 8 suggests above. So, for example, the total number of fossils uncovered, and their significance, cannot be converted to a linear expression. A single hominid fossil fragment, for example, is scientifically more significant than hundreds of fossil tortoise fragments. A similar comment can be made with respect to archaeological sites as well as historic buildings and shipwrecks. The significance of archaeological and fossil heritage sites has been addressed by SAHRA in their grading system. In this scenario, impacts to a single small, but high-graded, heritage resource/site may be much greater than impacts to a large number of low-graded heritage sites. The consequence will be higher without mitigation and the likelihood will be greater.

TABLE 5-2: Predefined risk/opportunity categories

RISK (-)		OPPORTUNITY (+)	
VERY LOW	Almost indiscernible negative impact.	Almost indiscernible positive impact.	VERY LOW
LOW	Slight negative impact, limited extent, and short duration, well within tolerance.	Slight positive impact, very localised, well below expectations.	LOW
MODERATE	Substantial impact, but less than major; within tolerance and below limits of acceptable change.	Substantial positive impact, but mostly short term, and spatially limited.	MODERATE
HIGH	Major consequence, approaching tolerance and limits of acceptable change.	Highly desirable impact, major medium to long term positive impacts across a broad range of stakeholders at local or regional scales.	HIGH
VERY HIGH	Extremely negative impact, persistent/long lasting, beyond tolerance and limits of acceptable change.	Highly desired, grandiose long term positive impacts across a broad range of stakeholders at local, regional, national, and/or international scales.	VERY HIGH

TABLE 5-3: Risk associated with a negative impact on Palaeontological resources

Negative Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (-)	Likelihood	Risk	Consequence (-)	Likelihood	Risk
	S0: Baseline	Very high Sensitivity	Significant	Likely	Moderate	Moderate	Likely	Moderate
	S1: Small GH2		Significant	Likely	Moderate	Moderate	Likely	Moderate
	S2: Big GH2		Drastic	Likely	High	Significant	Likely	Moderate
	S0: Baseline	High Sensitivity	Moderate	Likely	Moderate	Slight	Likely	Moderate
	S1: Small GH2		Moderate	Likely	Moderate	Slight	Likely	Moderate
	S2: Big GH2		Significant	Likely	Moderate	Moderate	Likely	Moderate
	S0: Baseline	Medium Sensitivity	Slight	Likely	Moderate	Slight	Likely	Moderate
	S1: Small GH2		Slight	Likely	Moderate	Slight	Likely	Moderate
	S2: Big GH2		Moderate	Likely	Moderate	Slight	Likely	Moderate
	S0: Baseline	Low Sensitivity	Slight	Likely	Moderate	Slight	Likely	Moderate
	S1: Small GH2		Slight	Likely	Moderate	Slight	Likely	Moderate
	S2: Big GH2		Slight	Likely	Moderate	Slight	Likely	Moderate

TABLE 5-4: Opportunity Associated with positive impact on Palaeontological resources

Positive Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (+)	Likelihood	Opportunity	Consequence (+)	Likelihood	Opportunity
	S0: Baseline	Very High Sensitivity	Slight	Very unlikely	Very low	Moderate	Unlikely	Low
	S1: Small GH2		Slight	Very unlikely	Very low	Moderate	Unlikely	Low
	S2: Big GH2		Slight	Very unlikely	Very low	Significant	Likely	Moderate
	S0: Baseline	High Sensitivity	Slight	Very unlikely	Very low	Slight	Unlikely	Low
	S1: Small GH2		Slight	Very unlikely	Very low	Slight	Unlikely	Low
	S2: Big GH2		Slight	Very unlikely	Very low	Moderate	Likely	Moderate
	S0: Baseline	Medium Sensitivity	Slight	Very unlikely	Very low	Slight	Unlikely	Low
	S1: Small GH2		Slight	Very unlikely	Very low	Slight	Unlikely	Low
	S2: Big GH2		Slight	Very unlikely	Very low	Slight	Unlikely	Low
	S0: Baseline	Low Sensitivity	Slight	Very unlikely	Very low	Slight	Unlikely	Low
	S1: Small GH2		Slight	Very unlikely	Very low	Slight	Unlikely	Low
	S2: Big GH2		Slight	Very unlikely	Very low	Slight	Unlikely	Low

TABLE 5-5: Risk Associated with a negative impact on **Archaeological resources**. Note that although only high and low sensitivity have been mapped at the regional scale, other categories could be mapped with fieldwork but would likely be very small areas. For this reason, all sensitivity levels are assessed.

Negative Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (-)	Likelihood	Risk	Consequence (-)	Likelihood	Risk
	S0: Baseline	Very High Sensitivity	Drastic	Definite	Very High	Moderate	More Likely	High
	S1: Small GH2		Drastic	Definite	Very High	Moderate	More Likely	High
	S2: Big GH2		Extreme	Definite	Very High	Significant	More Likely	High
	S0: Baseline	High Sensitivity	Moderate	Definite	Very High	Moderate	Likely	Moderate
	S1: Small GH2		Moderate	Definite	Very High	Moderate	Likely	Moderate
	S2: Big GH2		Significant	Definite	Very High	Significant	Likely	Moderate
	S0: Baseline	Medium Sensitivity	Slight	More Likely	High	Slight	Likely	Moderate
	S1: Small GH2		Slight	More Likely	High	Slight	Likely	Moderate
	S2: Big GH2		Moderate	More Likely	High	Moderate	Likely	Moderate
	S0: Baseline	Low Sensitivity	Slight	Likely	Moderate	Slight	Unlikely	Low
	S1: Small GH2		Slight	Likely	Moderate	Slight	Unlikely	Low
	S2: Big GH2		Slight	Likely	Moderate	Slight	Unlikely	Low

TABLE 5-6: Opportunity Associated with positive impact on **Archaeological resources**

Positive Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (+)	Likelihood	Opportunity	Consequence (+)	Likelihood	Opportunity
	S0: Baseline	Very High Sensitivity	Slight	Very Unlikely	Very Low	Slight	Unlikely	Low
	S1: Small GH2		Moderate	Very Unlikely	Very Low	Slight	Unlikely	Low
	S2: Big GH2		Moderate	Very Unlikely	Very Low	Moderate	Unlikely	Low
	S0: Baseline	High Sensitivity	Slight	Very Unlikely	Very Low	Slight	Unlikely	Low
	S1: Small GH2		Moderate	Very Unlikely	Very Low	Slight	Unlikely	Low
	S2: Big GH2		Moderate	Very Unlikely	Very Low	Moderate	Unlikely	Low
	S0: Baseline	Medium Sensitivity	Slight	Very Unlikely	Very Low	Slight	Unlikely	Low
	S1: Small GH2		Slight	Very Unlikely	Very Low	Slight	Unlikely	Low
	S2: Big GH2		Moderate	Very Unlikely	Very Low	Slight	Unlikely	Low
	S0: Baseline	Low Sensitivity	Sight	Very Unlikely	Very Low	Slight	Unlikely	Low
	S1: Small GH2		Slight	Very Unlikely	Very Low	Slight	Unlikely	Low
	S2: Big GH2		Slight	Very Unlikely	Very Low	Slight	Unlikely	Low

TABLE 5-7: Risk Associated with a negative impact on **Maritime resources**

Negative Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (-)	Likelihood	Risk	Consequence (-)	Likelihood	Risk
	S0: Baseline	Very high Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	High Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	Medium Sensitivity	Slight	Unlikely	Low	Slight	Very unlikely	Very Low
	S1: Small GH2		Slight	Unlikely	Low	Slight	Very unlikely	Very Low
	S2: Big GH2		Slight	Unlikely	Low	Slight	Very unlikely	Very Low
	S0: Baseline	Low Sensitivity	Slight	Very unlikely	Very Low	Slight	Very unlikely	Very Low
	S1: Small GH2		Slight	Very unlikely	Very Low	Slight	Very unlikely	Very Low
	S2: Big GH2		Slight	Very unlikely	Very Low	Slight	Very unlikely	Very Low

TABLE 5-8: Opportunity associated with positive impact on **Maritime resources**

Positive Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (+)	Likelihood	Opportunity	Consequence (+)	Likelihood	Opportunity
	S0: Baseline	Very High Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	High Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	Medium Sensitivity	Slight	Unlikely	Low	Slight	Very unlikely	Very Low
	S1: Small GH2		Slight	Unlikely	Low	Slight	Very unlikely	Very Low
	S2: Big GH2		Slight	Unlikely	Low	Slight	Very unlikely	Very Low
	S0: Baseline	Low Sensitivity	Slight	Very unlikely	Very Low	Slight	Very unlikely	Very Low
	S1: Small GH2		Slight	Very unlikely	Very Low	Slight	Very unlikely	Very Low
	S2: Big GH2		Slight	Very unlikely	Very Low	Slight	Very unlikely	Very Low

TABLE 5-9: Risk associated with a negative impact on Graves

Negative Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (-)	Likelihood	Risk	Consequence (-)	Likelihood	Risk
	S0: Baseline	Very high Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	High Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	Medium Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	Low Sensitivity	Drastic	More likely	High	Significant	Likely	Moderate
	S1: Small GH2		Drastic	More likely	High	Significant	Likely	Moderate
	S2: Big GH2		Extreme	More likely	Very High	Drastic	Likely	High

TABLE 5-10: Opportunity Associated with positive impact on Graves

Positive Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence	Likelihood	Opportunity	Consequence	Likelihood	Opportunity
	S0: Baseline	Very High Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	High Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	Medium Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	Low Sensitivity	Slight	Very unlikely	Very low	Moderate	Likely	Moderate
	S1: Small GH2		Slight	Very unlikely	Very Low	Moderate	Likely	Moderate
	S2: Big GH2		Moderate	Very unlikely	Very Low	Significant	More likely	High

TABLE 5-11: Risk Associated with a negative impact on Built Environment

Negative Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (-)	Likelihood	Risk	Consequence (-)	Likelihood	Risk
	S0: Baseline	Very high Sensitivity	Moderate	Likely	Moderate	Slight	Unlikely	Low
	S1: Small GH2		Moderate	Likely	Moderate	Slight	Unlikely	Low
	S2: Big GH2		Significant	More likely	High	Moderate	Likely	Moderate
	S0: Baseline	High Sensitivity	Moderate	Likely	Moderate	Slight	Unlikely	Low
	S1: Small GH2		Moderate	Likely	Moderate	Slight	Unlikely	Low
	S2: Big GH2		Significant	More likely	High	Moderate	Likely	Moderate
	S0: Baseline	Medium Sensitivity	Slight	Unlikely	Low	Slight	Very Unlikely	Very Low
	S1: Small GH2		Slight	Unlikely	Low	Slight	Very Unlikely	Very Low
	S2: Big GH2		Moderate	Likely	Moderate	Slight	Unlikely	Low
	S0: Baseline	Low Sensitivity	Slight	Unlikely	Low	Slight	Very Unlikely	Very Low
	S1: Small GH2		Slight	Unlikely	Low	Slight	Very Unlikely	Very Low
	S2: Big GH2		Slight	Likely	Moderate	Slight	Unlikely	Low

TABLE 5-12: Opportunity Associated with positive impact on Built Environment

Positive Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (+)	Likelihood	Opportunity	Consequence	Likelihood	Opportunity
	S0: Baseline	Very High Sensitivity	Slight	Unlikely	Low	Moderate	More likely	High
	S1: Small GH2		Slight	Unlikely	Low	Moderate	More likely	High
	S2: Big GH2		Slight	Likely	Moderate	Significant	Definite	Very High
	S0: Baseline	High Sensitivity	Slight	Unlikely	Low	Moderate	More likely	High
	S1: Small GH2		Slight	Unlikely	Low	Moderate	More likely	High
	S2: Big GH2		Slight	Likely	Moderate	Significant	Definite	Very High
	S0: Baseline	Medium Sensitivity	Slight	Very Unlikely	Very Low	Slight	Likely	Moderate
	S1: Small GH2		Slight	Very Unlikely	Very Low	Slight	Likely	Moderate
	S2: Big GH2		Slight	Unlikely	Low	Moderate	More likely	High
	S0: Baseline	Low Sensitivity	Slight	Very Unlikely	Very Low	Slight	Likely	Moderate
	S1: Small GH2		Slight	Very Unlikely	Very Low	Slight	Likely	Moderate
	S2: Big GH2		Slight	Unlikely	Low	Slight	Likely	Moderate

TABLE 5-13: Risk Associated with a negative impact on **Living Heritage**. Communal areas where living heritage is practised are rated high with no other sensitivity rating recognised.

Negative Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (-)	Likelihood	Risk	Consequence (-)	Likelihood	Opportunity
	S0: Baseline	Very high Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	High Sensitivity	Significant	Likely	Moderate	Moderate	Unlikely	Low
	S1: Small GH2		Significant	Likely	Moderate	Moderate	Unlikely	Low
	S2: Big GH2		Drastic	More Likely	High	Significant	Likely	Moderate
	S0: Baseline	Medium Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	Low Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a

TABLE 5-14: Opportunity Associated with positive impact on **Living Heritage**

Positive Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (+)	Likelihood	Opportunity	Consequence (+)	Likelihood	Opportunity
	S0: Baseline	Very High Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	High Sensitivity	Slight	Very unlikely	Very Low	Moderate	Likely	Moderate
	S1: Small GH2		Slight	Very unlikely	Very Low	Moderate	Likely	Moderate
	S2: Big GH2		Slight	Unlikely	Low	Significant	More Likely	High
	S0: Baseline	Medium Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S0: Baseline	Low Sensitivity	n/a	n/a	n/a	n/a	n/a	n/a
	S1: Small GH2		n/a	n/a	n/a	n/a	n/a	n/a
	S2: Big GH2		n/a	n/a	n/a	n/a	n/a	n/a

TABLE 5-15: Risk Associated with a negative impact on Cultural Landscape

Negative Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence (-)	Likelihood	Risk	Consequence (-)	Likelihood	Risk
	S0: Baseline	Very high Sensitivity	Moderate	Likely	Moderate	Slight	Unlikely	Low
	S1: Small GH2		Moderate	Likely	Moderate	Slight	Unlikely	Low
	S2: Big GH2		Significant	More Likely	High	Moderate	Likely	Moderate
	S0: Baseline	High Sensitivity	Drastic	Likely	High	Moderate	Likely	Moderate
	S1: Small GH2		Drastic	Likely	High	Moderate	Likely	Moderate
	S2: Big GH2		Extreme	More Likely	Very High	Significant	More Likely	High
	S0: Baseline	Medium Sensitivity	Moderate	Unlikely	Low	Slight	Likely	Moderate
	S1: Small GH2		Moderate	Unlikely	Low	Slight	Likely	Moderate
	S2: Big GH2		Significant	Likely	Moderate	Moderate	More Likely	High
	S0: Baseline	Low Sensitivity	Slight	Unlikely	Low	Slight	Very unlikely	Very Low
	S1: Small GH2		Slight	Unlikely	Low	Slight	Very unlikely	Very Low
	S2: Big GH2		Slight	Unlikely	Low	Slight	Unlikely	Low

TABLE 5-16: Opportunity Associated with positive impact on Cultural Landscape

Positive Impact	Scenario	Spatial Receiving Environment	Without Management			With Management		
			Consequence	Likelihood	Opportunity	Consequence	Likelihood	Opportunity
	S0: Baseline	Very High Sensitivity	Slight	Very unlikely	Very Low	Significant	Likely	Moderate
	S1: Small GH2		Slight	Very unlikely	Very Low	Significant	Likely	Moderate
	S2: Big GH2		Slight	Very unlikely	Very Low	Drastic	More likely	High
	S0: Baseline	High Sensitivity	Slight	Very unlikely	Very Low	Significant	Likely	Moderate
	S1: Small GH2		Slight	Very unlikely	Very Low	Significant	Likely	Moderate
	S2: Big GH2		Slight	Very unlikely	Very Low	Drastic	More likely	High
	S0: Baseline	Medium Sensitivity	Slight	Very unlikely	Very Low	Moderate	Likely	Moderate
	S1: Small GH2		Slight	Very unlikely	Very Low	Moderate	Likely	Moderate
	S2: Big GH2		Slight	Very unlikely	Very Low	Significant	More likely	High
	S0: Baseline	Low Sensitivity	Slight	Very unlikely	Very Low	Moderate	Likely	Moderate
	S1: Small GH2		Slight	Very unlikely	Very Low	Moderate	Likely	Moderate
	S2: Big GH2		Slight	Very unlikely	Very Low	Significant	More likely	High

5.8 RECOMMENDED STRATEGIC MANAGEMENT ACTIONS

A Heritage Impact Assessment (HIA), compliant with Section 38(3) of the NHRA and relevant heritage authority minimum standards, will be required for every Environmental Impact Assessment that triggers Section 38(8) of the NHRA. .

A separate Visual Impact Study must be included in every EIA process where visual impacts to the landscape are a concern.

- *An assessment of the impact to heritage resources must be undertaken for each specific development as part of the NEMA authorisation process.*
- *These HIAs may include specialist assessments such as Archaeological Impact Assessments, Palaeontological Impact Assessments, Built Environment Assessments, Cultural Landscape Assessments and other relevant specialist studies.*
- *The HIA must comply with Section 38(3) of the NHRA and published Minimum Standards or reporting requirements issued by the relevant heritage authorities.*
- *All HIAs must be submitted through the relevant heritage authority application system, in this case SAHRIS, together with supporting documentation including EIAs, BARs, SSVRs and applicable processing fees.*
- *All NEMA authorisation applications submitted to DFFE or the provincial competent authorities must include comments from the relevant heritage authorities. Applications lacking heritage authority comment may be considered incomplete and subject to rejection.*
- *The final SEA must be submitted to SAHRA for record purposes.*
- *The decision regarding the Gazette process must be uploaded to the relevant SAHRIS case for record purposes.*

Management actions will vary depending on the type of resource being impacted, the nature of the impact, and the nature of the proposed development. The list below thus serves as a general guide for further assessment and best practice.

5.8.1 Palaeontology

- There are no areas of highly sensitive fossiliferous strata in the study area that may require protection as No-Go areas.
- Every project MUST be evaluated by a palaeontologist to determine the need for a palaeontological specialist study despite the surface sensitivity grading because, depending on depth of excavation, significant impacts could still arise, especially along the coast.

5.8.2 Terrestrial Archaeology

- Archaeological specialist studies will be required in all EIAs and detailed surveys of each project footprint must take place.
- Due to the density and distribution of archaeological sites along the coastline, it will not be feasible to mitigate all impacts there. The appointed archaeologists will likely need to determine the sites to sample in order to best characterize the archaeology in each development footprint.
- Desktop study and fieldwork suggest that No-Go areas are unlikely to be identified in the region. However, the possibility of preserving certain coastal areas found to contain a high density of

archaeological resources might be considered during EIAs, especially if there are other reasons to protect these same areas.

- Away from the coast mitigation will be easier to implement and all significant sites could be sampled.
- It is likely that monitoring of construction excavations and grubbing may be required in coastal areas where middens can be buried within sand dunes.

5.8.3 Maritime Heritage

- A Maritime Heritage specialist study will need to be included in any developments that might require, for example, undersea pipelines.
- The need for fieldwork within EIAs must be determined based on the development proposal, but it is likely that most underwater fieldwork can be conducted during the pre-construction/micrositing phase of any development.

5.8.4 Graves

- Graves would be considered along with archaeology in any EIA.
- Given the size of the study area, it is possible that many graves could be present. Discussions with the Northern Cape Heritage Resources Authority and representatives of local communities should be initiated in advance of development to determine whether reburial of human remains should be considered and which locations should be chosen for this. Exhumations should only occur where no other options for mitigation are possible.
- When retained close to developments, graves should be fenced in order to enhance their long term protection.

5.8.5 History and built environment

- Historical and built environment sites would need to be evaluated against a development proposal during any EIA because reuse and buffer size would vary based on the proposal and what the potential impacts would be. Restoration work may also be recommended in order to enhance the future protection and cultural significance of such sites.
- In general, it will be best practice to avoid farmsteads with a buffer large enough so as to not render the structures 'uninhabitable' due to the close proximity of undesirable development. Uninhabited structures tend to fall into disrepair.

5.8.6 Living heritage

- The local herder communities in each of the communal areas should be consulted to determine their response to the loss of their grazing lands. Among other things, consultation should aim to understand:
 - The Grazing Management Plan should be informed by social research in order to account for the potential impacts on the living heritage practices of local communities, including seasonal grazing patterns, mobility routes, stockpost use, and associated intangible heritage traditions.
 - Why these areas were chosen for grazing.
 - The value of the pasturage in terms of seasonal grazing requirements.
 - Any alternative options; and
 - How the local environment (nature) and culture are intertwined within their world view.

5.8.7 Cultural landscape / sense of place

- The N7, N14 and the R382 and surrounding area are significant for a number of reasons, largely tourism-related. SANParks, UNESCO, SAHRA and local tourism operators should all be engaged in the consultation process because the arid to semi-arid landscapes of the area are key elements of the aesthetic beauty and attract tourists.
- Any proposed development in or close to the buffer zone of the RCBL Heritage Site could cause significant impacts. Discussions will need to be initiated with the South African Government and the UNESCO commission regarding potential impacts on the World Heritage status of the RCBL in such instances. It is here suggested that the entire RCBL, and preferably also its buffer zone, be considered a No-Go area.

Any development that will reuse heritage sites or preserve them within close proximity to the development may require the compilation of a management plan that guides reuse, restoration and or preservation of the resources. This would be compiled under the conditions of authorisation.

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