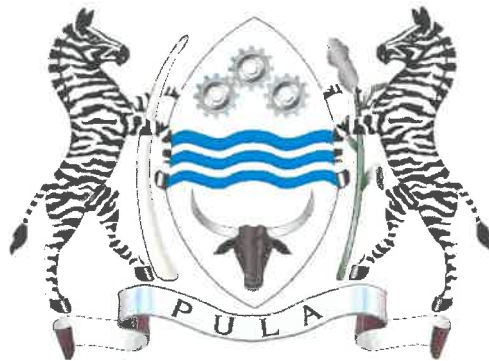


STATE OF CONSERVATION REPORT

OKAVANGO DELTA WORLD HERITAGE SITE

BOTSWANA

(N1432)



REPUBLIC OF BOTSWANA

SUBMITTED
BY THE
GOVERNMENT OF THE REPUBLIC OF BOTSWANA

February 2022

1. EXECUTIVE SUMMARY

This report on the state of conservation of the Okavango Delta World Heritage Property is in response to the decisions adopted during the Extended 44th Session of the World Heritage Committee, **44 COM 7B.80** held in Fuzhou, China on 16 – 31 July 2021. The State Party was further required to submit an update on reports pertaining to Recon Africa oil and gas exploration within the Cubango-Okavango River Basin for examination at the next meeting of the 45th Session by the World Heritage Committee.

The State Party through the Permanent Okavango River Basin Water Commission (OKACOM), has undertaken to ensure that detailed Environmental Impact Assessments are conducted prior to any major developments. Furthermore, the State Party is cognisant that any development in the Cubango-Okavango River Basin (CORB) leading to unsustainable water abstraction or pollution could impact on the Outstanding Universal Value (OUV) of the Okavango Delta World Heritage Property.

The revised Okavango Delta Management Plan was submitted in July 2021. This presents an important opportunity to ensure that the protection of the OUV of the Property. The ODMP also provides for management strategies in order to maintain the ecological integrity of the Property, including wildlife management, control of invasive alien species, monitoring of mining activities and climate change as well as integration of traditional resources use for livelihoods, user access and cultural rights as requested by the Committee.

The State Party is fully supportive of the effective transboundary cooperation between Angola, Botswana and Namibia on the management of the shared waters of the Cubango-Okavango River Basin. In June 2019, the State Party of Botswana with the support of the UNESCO World Heritage Centre hosted a technical meeting to advance this discussion. The tripartite meeting led to the adoption of an Action Plan to take forward the transboundary initiative and recommended the establishment of a Steering Committee to facilitate its implementation.

The Okavango Delta Transboundary Committee includes representatives from the three State Parties of Angola, Botswana and Namibia, and observers from UNESCO World Heritage Centre, African World Heritage Fund (AWHF), Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA), Permanent Okavango River basin Water Commission (OKACOM) as well as International Union for Conservation of Nature (IUCN).

2. INTRODUCTION

The Okavango Delta, located in the north-west of Botswana was inscribed as the 1000th World Heritage Site in Doha, Qatar in June 2014 under the natural criteria; (vii), (ix) & (x). The Okavango Delta World Heritage Property, guided by the Okavango Delta Management Plan (ODMP) is one of the very few vast, natural, scenic inland deltas in the world.

Since the last state of conservation report submitted in November 2020, consultations have been held with key stakeholders among them; Department of Environmental Affairs (DEA), Department of National Museum & Monuments (DNMM), Department of Mines (DoM), Department of Wildlife and National Parks, Permanent Okavango River Basin Water Commission (OKACOM), Kavango–Zambezi Trans-frontier Conservation Area (KAZA), Okavango Research Institute (ORI), the North-West District to address issues and recommendations raised by the WHC Decision 42 COM 7B.89.

The State Party acknowledged the conclusion of the World Heritage Centre and Advisory Bodies (IUCN), which stated that although the ODMP of 2008 provided a management framework for the area, it pre-dated the property's inscription in the World Heritage List. The Okavango Research Institute (ORI) was consequently engaged to review the Okavango Delta Management Plan (ODMP) in 2019. Funding towards the review of the plan had been provided through UNESCO International Assistance to the amount of USD 27, 080 (270,000 Botswana Pula). The State Party also availed funds amounting to USD 54,000 (Botswana Pula 540,000) towards the review. The revised management plan has since been completed (2021-2027).

The State Party acknowledges that many of the ODMP prescriptions have not been implemented, and the institutional arrangements for its implementation have proved to be ineffective, hence the revised plan. The issues and recommendations raised by the WHC Decision 42 COM 7B.89 among them; integration of wildlife monitoring protocols in the systematic wildlife monitoring programme, management effectiveness, control of

invasive alien species, mining activities, climate change, access, governance as well as cultural rights and benefits have been addressed in detail by the revised Okavango Delta Management Plan of 2021-2027.

Through the OKACOM structures, the three riparian states of Angola, Botswana and Namibia are working closely to ensure that any proposed major developments within the Okavango watershed which may adversely impact the OUV of the property are subject to detailed Environmental Impact Assessments in conformity with IUCNs World Heritage Advice. One of the important milestone in addressing this issue is the completion of the development of guidelines for 'Assistance to implement the SADC Protocol on shared watercourses by the Permanent Okavango River Basin Water Commission's Member States' Focus: Notification and Prior Consultation of Planned Measures According to Article 4(1) of the SADC Revised Protocol.

Significant progress has also been made in addressing the World Heritage Committee recommendation to conduct a Strategic Environmental Assessment (SEA) for the Cubango-Okavango River Basin. The State Party has put in place measures geared towards the control and management of invasive alien species to ensure that they do not compromise the integrity and Outstanding Universal Values of the Okavango Delta World Heritage Property. The State Party further acknowledges the impact that the newly developed Okavango River Bridge may have on the integrity and potential impact on the OUV of the Okavango Delta World Heritage Property.

In addressing the issues raised by the World Heritage Committee on the prospecting within the buffer zones of the Okavango Delta World Heritage Property, the State Party continues to monitor mining activities to ensure that they do not impact on the OUV of the Property. Currently there are no prospecting licenses in the core zone and negotiations with companies holding prospecting licenses within the buffer zone have been concluded. In this regard, it has been agreed that the company, Gcwihaba Resources (Pty) Ltd will relinquish all the prospecting licenses within the buffer zone.

3. RESPONSE TO THE WORLD HERITAGE COMMITTEE DECISION 44 COM 7B.80

This report serves to address the issues and recommendations raised by the **WHC Decision 44 COM 7B.80** that requested Botswana to submit an updated report on the State of Conservation Report of the Okavango Delta World Heritage Property. The response to the various comments, observations and concerns are thus addressed under this section of the report:

The World Heritage Committee,

3.1 Having examined Document WHC/21/44.COM/7B;

Document WHC/21/44.COM/7B is hereby acknowledged by the State Party of Botswana.

3.2 Recalling Decisions 38 COM 8B.5 and 42 COM 7B.89, adopted at its 38th (Doha, 2014) and 42nd (Manama, 2018) sessions respectively;

The State Party of Botswana is fully aware of previous World Heritage Committee Decisions concerning the management and ideal conservation of the Okavango Delta World Heritage Property in its pristine nature, as well as to ensure the continued Outstanding Universal Values of the Property.

3.3 Warmly welcomes the increased cooperation between the States Parties of Botswana, Angola and Namibia through the Permanent Okavango River Basin Water Commission (OKACOM), in particular the initiation of the process to conduct a comprehensive Strategic Environmental Assessment (SEA) in order to assess impacts of developments in the Cubango-Okavango River Basin (CORB) at the strategic level and at the landscape scale, as was requested by the Committee, and the development of a basin-wide Environmental Monitoring Framework;

The three State Parties of Angola, Botswana and Namibia have noted the importance of undertaking the Strategic Environmental Assessment (SEA) for the Cubango-Okavango River Basin (CORB) as

noted by the World Heritage Committee **Decision 44 COM 7B.80**. This as it is observed will not only address the requirements of the World Heritage Convention but address the responsibility that OKACOM has in delivering its mandate related to the sustainable utilization of the resources of the CORB. Therefore, OKACOM has initiated a process to develop the CORB- Strategic Environmental Assessment (SEA).

Noting the fact that, the CORB is undoubtedly receiving developments, and these come in different forms and carry varying externalities with a potential to affect the sustainability of the basin, OKACOM commissioned a Strategic Environmental Assessment (SEA) for the Okavango-Cubango River Basin (CORB). The SEA will therefore, guide the placement of infrastructural developments given the sensitivity of the receiving environment.

3.4 Encourages the State Parties of Angola, Botswana and Namibia on their initiative to review the feasibility of a Transboundary or nation-wide extension of the property to include key areas of the CORB, which would contribute to a better protection of the Outstanding Universal Value (OUV) and in particular the integrity of the property;

The draft CORB-SEA and related reports (Water demand forecasting methodology and 10-year water demand forecasting for the CORB; Socio-economic Monitoring Framework for the Cubango-Okavango River Basin (CORB; and Transboundary EIA Guidelines) is on its final stages of review by the Technical Reference Group (TRG). It is anticipated that the TRG will meet on the 7 March 2022 to deliberate on the revised SEA documents. Once the reports have been cleared and approved by the TRG, a consensus and awareness building regional workshop will be organized for stakeholders to dialogue and appreciate its content and subsequent implementation. As such, it is anticipated that the final CORB-SEA will be complete by the end of May 2022.

3.5 Reiterates the importance of an adequate protection of the CORB to ensure the long-term survival of the property and considers that any development in the watershed, which would lead to significant water abstraction or pollution, has a high potential to impact the OUV of the property;

The Permanent Okavango River Basin Water Commission Agreement (OKACOM) of 1994 has been ratified by the three riparian member states of Angola, Botswana and Namibia. The Commission was established to guide three Member States on matters relating to the conservation, development and utilization of water resources of common interest to the Member States. Specifically, the Commission determines the long-term safe yield of the water available from all potential water resources in the Basin; the reasonable demand for water from consumers in the Basin; and develop criteria for the conservation, equitable allocation and sustainable utilization of water resources in the Okavango River Basin.

The Okavango River and the Okavango Delta, are part of the larger Cubango-Okavango River Basin and hence promotion of regional dialogue, understanding of member states of the need to conserve water, and coordinated interventions for sustainability of the Delta are very important. The OKACOM subscribes to the principles of Integrated Water Resources Management (IWRM) in the Okavango River Basin (ORB). OKACOM is currently facilitating the development of an Integrated Water Resources Management Plan for the Cubango-Okavango River Basin. The plan will go a long way ensuring IWRM principles are enhanced within the ORB.

3.6 Expresses concern about the granting of oil exploration licenses in environmentally sensitive areas within the Okavango river basin in northwestern Botswana and northeastern Namibia that could result in potential negative impact on the property in case of spills or pollution;

The Government of Botswana, hereby acknowledges, the concerns raised by the World Heritage Committee over the granting of oil exploration licence issued to Reconnaissance Energy Botswana (Pty) Ltd within the Okavango River basin and the likely potential negative impact on the Okavango Delta World Heritage Property in case of spills and pollution.

The State Party, would like to express that the current exploration licence is outside of the buffer and core zones of the Okavango Delta World Heritage Property and that of the Tsodilo Hills World Heritage Site which are within the prescribed Okavango River Basin. Notwithstanding, the ORB is regarded an environmentally sensitive area. Therefore, rigorous and critical Environmental Impact Assessment is a prerequisite to any intrusive development in the area. Furthermore, the State Party commits to ensuring and monitoring of any future prospecting and mining activities within the ORB and will continue the engagement of Angola and Namibia on the management of the shared waters of the Cubango-Okavango River Basin.

Table 1: maps showing the locations of the Reconnaissance Energy Botswana (Pty) Ltd and the Gcwihaba (Pty) Ltd exploration permits around the Okavango Delta World Heritage Property (Department of Mines).

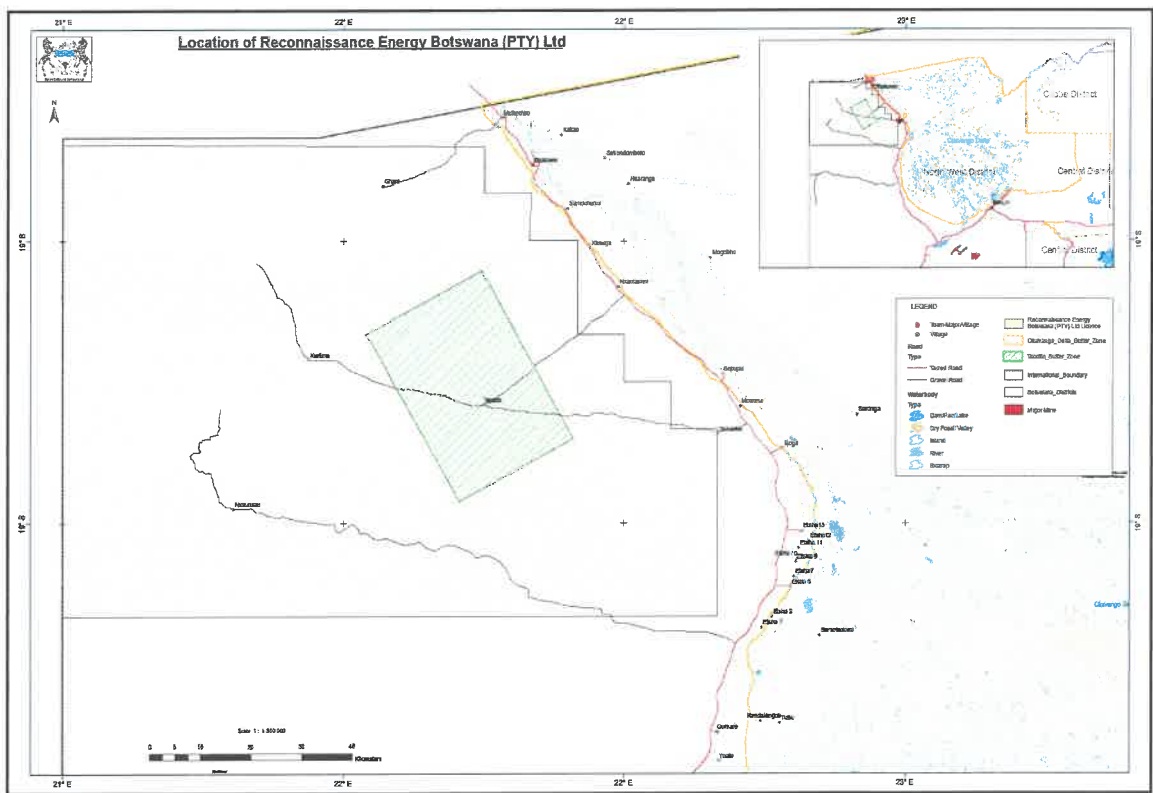
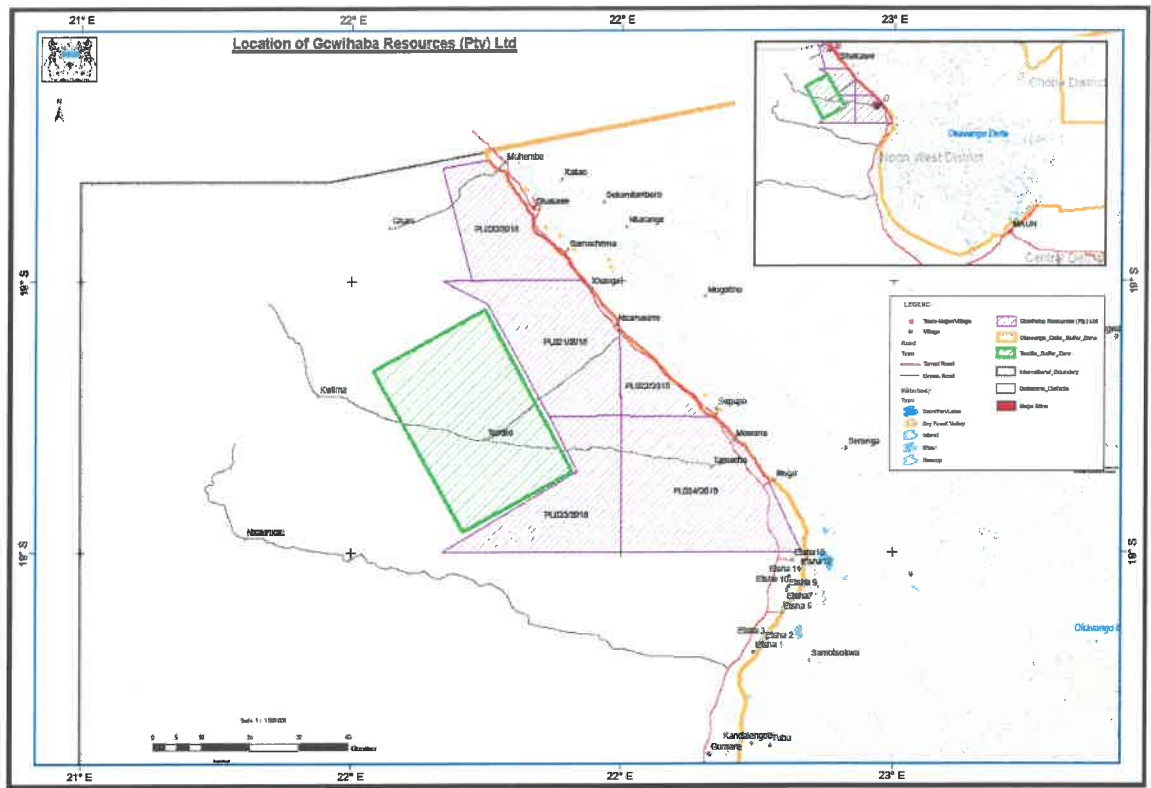


Table: 1

3.7 Urges the States Parties of Botswana and Namibia to ensure that potential further steps to develop the oil project, which include the use of new exploration techniques, are subject to rigorous and critical prior review, including Environmental Impact Assessment (EIA) that corresponds to international standards, including an assessment of social impacts and a review of potential impacts on the World Heritage property, in line with the IUCN World Heritage Advice Note on Environmental Assessment, and requests that all such assessments are submitted to the World Heritage Centre, for review by IUCN;

The State Party of Botswana acknowledges the World Heritage Committee's concerns to ensure that potential steps needs to be undertaken prior to the development of the oil project, including the use of new exploration techniques are subjected to a rigorous and critical prior review, that includes the conduct of a rigorous EIA, that complies to the best international standards. Such an EIA will also include a rigorous Social Impact Assessment of communities living within the confines of the Okavango Delta World Heritage Property. The State Party hereby commit to avail such studies for review by IUCN before approval.

The State Party will continue working with key stakeholders among them; Department of Environmental Affairs (DEA), Department of National Museum & Monuments (DNMM), Okavango Research Institute (ORI) to address issues and recommendations raised according to best international practices. This will be done in line with best resources governance principles of accountability, responsibility and transparency including consultation with the interested and affected communities in the area in question.

3.8 Appreciates the efforts to revise the Okavango Delta Management Plan (ODMP) and its submission to the World Heritage Centre, and also requests the State Party to finalise the plan following IUCN's review;

The Okavango Delta Management Plan (ODMP) was initially developed following the Okavango Delta being declared a Ramsar Site in 2008. Key developments that took place post 2008 include the listing of the Okavango Delta as a World Heritage Site (WHS) in July 2014. The inscription necessitated the revision of ODMP to align with the requirements of the World Heritage Convention.

The World Heritage Site listing, together with other post 2008 emerging issues and new threats (such as mining, upstream and downstream developments and increasing land-use and human-wildlife conflicts) that may impact the socio-ecological integrity of the ODRS, now a Multi-Internationally Designated Area (MIDA), motivated for the review of the 2008 ODMP. Furthermore, the ODMP mid-term review (MTR), completed in 2014, also highlighted and recommended key issues that were overlooked in the 2008 management plan development and implementation. Some of these issues include climate change, gender, and emerging stakeholder voices such as the youth in the management process of the ODRS.

The revised Okavango Delta Management Plan (ODMP) will guide management and use of the Okavango Delta MIDA landscape for the next seven years, effective 2021. The State Party is happy to announce that the ODMP has since been completed. The review exercise conducted by the Okavango Research Institute (ORI) of the University of Botswana followed a four-staged process being, i) inception, ii) scoping, iii) draft revised plan and iv) the final plan.

3.9 Also appreciates the on-going efforts to control invasive alien species that threaten the ecological integrity of the property, and further requests the State Party to include control strategies and a comprehensive monitoring plan in the revised ODMP;

The State Party acknowledges the observation by the World Heritage Committee for the continued ecological control measures set in place

for the alien invasive species within the Okavango Delta World Heritage Property. The State Party reaffirms its position to have control measures of the alien invasive species in the newly revised Okavango Delta Management Plan of 2021-2027.

The most common alien invasive species in the ODRS is the free-floating water fern *Salvinia molesta* (Mochimbama). It occurs mainly in the eastern parts of the Delta and is kept under control by the introduced weevil *Cyrtobagous salviniae*. The control is effective but lags plant growth in the cool winters when mats can form. *Salvinia* control has been in place in the form of the host-specific biological weevil, *Cyrtobagous salviniae* Calder and Sands. *Cyrtobagous salviniae* feed on *Salvinia molesta* leaves senescence leading to sediment litter formation, leaching/release of tissue nutrients and changes in physical-chemical properties of water during the course of *Salvinia* bio control are observed.

An array of activities to control *Salvinia* are undertaken including monthly new infestation surveys and biological control weevil establishment through sampling and assessment. There are 56 *Salvinia* monitoring sites in the lower Okavango Delta. *Salvinia* control has been thoroughly established in all infested sites to ecologically acceptable levels. The aim of the biological control program is not to eradicate the weed, but to reduce abundance to the level where it no longer causes a problem. Small residual mats of *Salvinia* will continue to harbor the weevils so that if regrowth of *Salvinia* occurs as a result of favorable conditions with sufficient nutrients, control agents can build up rapidly to restore control. The weed may cover most of the channel sides and vegetation make it difficult when applying biological agent.

Current Status:

New *Salvinia* infestation along the Boro channel was observed in June 2020 that originated from Nxaraga lagoon, the technical aspects of

weed control has been ongoing until to date, the thick mats coverage has been reduced significantly as the result of the introduced biological control, monitoring of the new infestations revealed that the biocontrol weevil has established all the way to Boro Buffalo Fence and control has been achieved.

Salvinia infestation in the Abaqao/Mborogha River system has increased between Camp Okavango and Txaba. Unfortunately, monitoring is hindered by aquatic blockage and vegetation encroachment. Control strategies are implemented to augment the weevils in these river systems. There has been significant decline in mat coverage in Maunachira River System, which indicates Salvinia control effectiveness.

All the other sites monitored in the core zone have abundant number of weevils as determined by scientific methods. Therefore, it indicates that biological control progress in the Salvinia infestations has been under constant progress and maintained in most of the core and buffer zones of the Okavango Delta World Heritage Site.

Salvinia Control

For stakeholders' engagement on aquatic weeds control, joint Salvinia monitoring programme has been proposed for in-house breeding of Salvinia weevils at some of safari operators and trusts after finalizing and signing of Memorandum of Understanding (MoU). Training of Safari Camps staff and Trusts on Salvinia biological control on breeding forms part of MoU. The involvement of stakeholders besides control of Salvinia will benefit some lodges as they use it as part of sightseeing, environmental education.

The ecotourism businesses and riparian communities have benefitted and secured enormously from the control of Salvinia weed in the Okavango Delta. Complaints of difficulty in navigating the streams due to thick blockage of Salvinia mats, for tourism recreation and other activities continue to be received. Notwithstanding the above stated

situation, sustainable monitoring of Salvinia has improved considerably and several pools and lagoons are accessible to wildlife for water use.

3.10 Also recalling that veterinary cordon fences create a major impediment to wildlife migrations, expresses its concern that an EIA has not yet been undertaken in this regard, and reiterates its request to the State Party to continue efforts to rationalize veterinary cordon fencing, removing them when possible;

The State Party acknowledges the concerns raised by the World Heritage Committee in regard for the need to rationalize the issue of cordon fences around the Okavango Delta World Heritage Property as they tend to inhibit the free movement of wild animals across zones. The State Party further acknowledges the concerns of the World Heritage Committee that to date an EIA has not yet been undertaken to inform the rationalization exercise.

The State Party is happy to inform the World Heritage Committee that an EIA was conducted for Veterinary Fences in Ngamiland in 2000. The EIA recommended the rationalization of some fences in the District, that included the taking down of some fences, others to be maintained while others were to be built. The Department of Veterinary Services has as such taken down 35 km of the fence from the Okavango Delta core area. Furthermore, another EIA for the Protection Zone between Hainaveld and Communal Grazing Area is ongoing and it is at Draft Final Stage.

It is very important to note that the issue of cordon fences is by no small measure a simple matter. It is true that cordon fences on the one hand tend to inhibit the free movement of wild animals as they tend to cut some of the natural animal corridors. On the other hand, cordon fences are used in Botswana to separate wild animals from both human settlements and domestic animals. Cordon fences around the Okavango Delta are used as an example to separate buffalos from domestic animals. Buffalos are known to be carriers of the much dreaded foot and mouth disease that can ravage the entire cattle stock.

It is also widely publicised that the issue of human-wildlife conflict is very prevalent in the Greater Okavango Region. Elephants are known

to kill people in relatively unacceptable levels in the District, while predators such as lions, hyenas and cheetahs constantly kill domestic animals as they come in close contact with human settlements. The community around the area constantly puts government under pressure to establish new fences, or at least maintain the existing ones. It is upon this background that Government is under tremendous to do a balancing act to accommodate the varying interests.

The State Party is pleased to announce that the Department of Agriculture has since taken a decision to rationalize some cordon fences in the District. As an example, the Northern Buffalo fence will be removed all the way to Xhoroma area, with the option to cattle vaccinate three times per year to control the Foot and Mouth disease. In addition, fence from Xhoroma to Kilo 70 along the Botswana-Namibia will be removed to aid free movement of animals in the area. However, from Kilo 70 to Mohembo East the fence will be maintained to prevent stray animals into the Namibian side as there is a high cattle concentration in the area. Further, the Samochima fence all the way to the Namibian border will be taken down to ease free movement of animals. The Border fence between the current corner Samuchima-Namibia to corner Ikoga/Namibian Border will be maintained to separate domestic animals from wild animals.

The above scenario demonstrate State Party's commitment to rationalize the issue of cordon fences where possible, and to maintain these where it is impractical not to do so.

3.11 Also reiterates its requests to the State Party to:

- a) **Complement the EIA for the Mohembo bridge project with a specific assessment of the potential impacts of the construction and use of the bridge and the road on the property's OUV, and submit it to the World Heritage Centre for review by IUCN,**

The state party acknowledges the concerns of the World Heritage in regard to the development of the Okavango River Bridge, commonly referred to as the Mohembo Bridge, and its potential impact on the

Outstanding Universal Values of the Okavango Delta World Heritage Property.

However, the State Party hereby reports that the Okavango River Bridge construction project is at a final stage of completion. The State Party further indicates that the initial Environmental Impact Assessment for the project was conducted in 2009. This was well before the Okavango Delta was inscribed as a World Heritage Property, therefore outdated, lacking sufficient and adequate relevant assessment of potential impacts of the project on the Outstanding Universal Value of the property.

Botswana understands the importance of the property not only for the ecological maintenance but also to the sustenance of local communities' livelihoods. The State Party is happy to report that the proponent of the project, Ministry of Transport and Communication, through the Department of Roads has developed and implemented complementary assessment of impacts to the initial EIA through the following instruments;

- Monitoring of Environmental Compliance and Implementation of Mitigation Measures during the Construction of the Okavango River Crossing Bridge in Mohembo Village.
- Specialist Baseline studies report intended to be used to monitor the impact of the bridge to the bio-physical environment including;
- Air Quality Sampling Requirement, Methodology and Baseline Study.
- Baseline Noise Monitoring Report.
- Surface Water Baseline Report.
- Ground Water Baseline Report

Furthermore, the state party informs the World Heritage Committee of the Environmental Audit undertaken by the Department of Environmental Affairs in collaboration with relevant institutions in August 2021. This was a follow up on the 2019 Audit Report that was

appended to the 2020 Okavango Delta State of Conservation Report that was submitted to the World Heritage Committee.

b) Submit the results of the 2019 aerial wildlife surveys to the World Heritage Centre and set up a regular monitoring programme of wildlife populations using the 2019 data as a baseline,

The State Party acknowledges the comment by the World Heritage Committee in relation to the submission of the latest Aerial Wildlife survey to be used as a baseline data. The State Party wishes to make correction that the Aerial Wildlife Survey that was referred to in 2020 Okavango Delta State of Conservation Report was that of 2018 and not 2019.

Background to this process is that the Department of Wildlife and National Parks (DWNP) has been conducting aerial surveys since the early 1980s. In 2010, 2014 and 2018, a Botswana-based Non-Governmental Organization, Elephants Without Borders (EWB), conducted aerial surveys, most recently in conjunction with the DWNP. The most recent population estimates are thus from the 2018 survey, which covered northern Botswana, not just the Okavango Delta. Estimates for large, gregarious animals are likely to be more accurate than those for smaller-bodied and solitary species.

The population survey was done during dry season, July to October 2018 on elephant and other wildlife species in the northern Botswana. A total area of 103662 km² was covered that consist of the following: Moremi Game Reserve, Chobe National Parks, their surrounding Wildlife Management Areas (WMAs), Makgadikgadi and Nxai Pan Parks, Pastoral areas in Ngamiland and Chobe and Central District. It is important to note that the 2018 aerial survey was the expansion of the 2010 and 2014 of Michael Chase aerial survey, where the new strata was added south of the Okavango Delta near Maun and west of Makgadikgadi National Park including the southeast Ngwasha/Sepako near Zimbabwe border.

The survey was done to estimate population for elephant and other wildlife species. Secondly the survey in addition to numbers, mapped the spatial distribution of the said species including the baobabs trees, large birds and livestock going to the extends of showing trends in wildlife population. During this census the area was divided in 69 strata that included the WMAs and protected areas. The table below shows the summary of the population estimation for elephant and other wildlife species.

Species	Estimate	Std error	Density
Elephant	126114	5054	1.22
Breeding herd	105469	4837	1-02
Bull	20645	1097	0.2
Other Herbivores			
Buffalo	28 534	0	0.28
Duiker	303	66	0.003
Eland	2098	544	0.02
Gemsbok	3302	720	0.03
Giraffe	8343	587	0.08
Hippo	13232	1015	0.13
Impala	77694	3884	0.07
Kudu	7473	521	0.85
Lechwee	88584	4845	0.03
Reedbuck	2620	227	0.01
Roan	833	138	0.03
Sable	2872	799	0.03
Sitatunga	875	85	0.01
Springbok	120	52	0.001
Steenbok	1561	217	0.02
Tsessebe	3650	384	0.04
Warthog	5723	403	0.06
Waterbuck	993	182	0.01

Wildebeest	99317017	3788	0.16
Zebra	60170	9247	0.58
Predators			
Hyena	91	36	0.001
Birds			
Bateleur	1079	117	0.01
Fish eagle	2242	131	0.02
Ground hornbill	438	86	0.004
Ostrich	3429	427	0.03
Pelicans	6423	2731	0.06
Saddle billed stork	552	62	0.01
Vulture	6474	954	0.06
Wattled crane	1373	211	0.06
Livestock			
Cow	128936	8292	1.24
Goat	51035	6132	0.49

The elephant population was found to be increasing as compared to 2014 survey with elephant movement observed occurring across the strata. The elephant carcasses were observed during survey. There was clear indication of fresh carcasses indicating freshly suspected poached elephants. Going further to confirm carcasses on the ground, 79 carcasses were confirmed where 80% were suspected poached. The following places were listed as hotspots NG 11/12/13, NG 15/18/19, area around Maun and NG42.

Other species counted like Lechwee has recorded highest number ever in Northern Botswana. The hippopotamus population was found increasing significantly including Reedbuck, Sitatunga, Fish eagles and Wattle cranes comparing to 2014 survey. Notable Sable and Saddle billed stork were found decreasing as from 2014. On trees 569 baobab trees were counted during the survey and were classified in different categories e.g. age and effect of damages.

- c) Take measures to ensure that all wastewater generating facilities in the property comply with national wastewater pollution standards and avoid any effluent disposal methods that could impact the OUV of the property, ensuring regular monitoring of water quality.**

The State Party of Botswana take note the observation by the World Heritage Committee that it is imperative to put measures in place to ensure that all wastewater generating facilities within the Okavango Delta World Heritage Site comply with national wastewater pollution standards.

Improper disposal and management of solid and liquid waste were identified as one of the concerning practices by the 2008 Okavango Delta Management Plan. Several interventions to address this problem were recommended being:

- Engaging the private sector licensed by Department of Waste Management and Pollution Control (DWMPC) to collect and dispose of both liquid and solid waste.
- Ensuring that tour operators comply with provisions of waste management as contained in their lease agreement;
- To construct a landfill in Gumare:

The lease agreements of tour operators did not make it mandatory on them to comply with the Waste Management Act and North West District Council (NWDC) waste management guidelines. However, this failure to adopt the recommendation should not be a cause for concern as the provisions of the Waste Management Act are legally binding. Department of Waste Management and Pollution Control is legally empowered to act against any operator, individual or entity violating the law. Further, NWDC acting under the Trade Act has the authority to inspect, ensuring compliance with environmental and public health laws. The revocation of a trade license, issuing of a fine, or both are some of the measures available.

Water Conservation

Water conservation and demand management initiatives continue to be implemented within the core zone of the delta. These include the use of water efficient fixtures and reclamation of wastewater by tourism establishments. Reclaimed water is used for landscape irrigation and indirect recharge of aquifers.

Pollution Control

Surveillance of tourism establishments generating wastewater within the Okavango Delta is undertaken throughout to safeguard water resources from threats of pollution. A total of seven (7) facilities within the core zone were inspected and the effluent quality for all but one were not in compliance to Botswana standard for environmental discharge (BOS 93:2012- Wastewater-Physical, Microbiological and Chemical Requirements- Specification) and best wastewater management practices. Nonetheless, continual efforts are being made through surveillance exercise, environmental audits and education/awareness to encourage a shift to safer methods of effluent disposal.

Water Quality Monitoring

A total of 24 monitoring sites (figure 1) in the Okavango Delta with 9 sites located in the core are monitored on quarterly basis following the Okavango Delta Systematic Monitoring program by the Department of Water Affairs. The systematic water quality monitoring tracks changes in freshwater quality by providing reliable scientific data and enable apt decision making on the water resources consummate with ecological conditions, water resources protection and restoration. The water quality of the core zone as such remains in a pristine state with all the water bodies depicting good ambient water quality. However, this is despite threats from anthropological activities within the Okavango delta and especially those emanating from the tourism sector.

4. OTHER CURRENT CONSERVATION ISSUES AFFECTING THE OKAVANGO DELTA WORLD HERITAGE SITE:

Notwithstanding the above discussed conservation issues as raised by the World Heritage Committee, the State Party do recognize other conservation issues that affects the Okavango Delta World Heritage property. It is the State Party's considered opinion that if not well managed or mitigated, some of these issues have the potential to affect the Property's Outstanding Universal Values, as well as to affect its integrity and authenticity. Some of these factors are discussed below to elucidate the above observation:

a. Climate Change: Studies have revealed some changes in the physical environment and ecosystem effects of the delta including variation and reduction in hydrological flow; changes in sediment dynamics; water quality, abundance, and distribution of biota; channel distribution. The changes are driven by a combination of factors including climate change, population dynamics, land use change and poverty. The 2008 ODMP noted that "The combined water resources developments with climate change have the most severe impact on the Delta". The report further noted that scenario testing involving water extraction plans and climate change predictions revealed that these factors, particularly climate change, will reduce the value of the ODRS. Some of these changes may affect animal distribution. For example, large mammals such as the lechwe are sensitive to the degree of flooding in the delta. Similarly, these observed changes in the delta are a threat to riparian communities' livelihoods, rendering them more susceptible to the effects of climate change.

Changes in the physical environment observed by participants in the Kgotla consultation meetings during the recent Review exercise of the Okavango Delta Management Plan of 2021, include decline in the availability of veld products, over population or declined population of some animal species, land degradation, dry tributaries, and vegetation destruction. The communities raised concern that wild fruits such as

Mokapana (African horned cucumber or *Cucumis metuliferus*), Moretlwa (wild berry, *Grewia flava*) Motsentsela (bird plum, *Berchemia discolor*) are no longer available due to competition from elephants and baboons who feed on them. Some grass species such as Bojang jwa Dipitse (Adrenaline grass, *Vetiveria nigriflora*) are also reported to be extinct in some areas such as Kauxwi. Residents also observed that while elephant's population has bloated over time, wildcat populations have declined, and those of lions, hippos, crocodiles, and buffalos have increased. For instance, the residents of Ditshipi settlement on the edge of the Okavango Delta claimed that hippos and crocodiles that were relocated to their area following the drying up of the Thamalakane river in Maun have now become a menace as witnessed in the destruction of mekoro (dugout canoes) by hippos.

Residents in the consulted villages during the Review of the Okavango Delta Management Plan, also raised concern that overpopulation of elephants affects the ecosystem balance such that some small game have disappeared due to vegetation destruction; some protected species such as the baobab plant species have been destroyed; and other economic sectors such as hand-crafts have been affected due to the destruction of reeds by the elephants. Loss of natural appeal in protected areas is also exacerbated by developments comprising accommodation facilities, use of generators for power supply and lighting.

Most of the tributaries of the Okavango River were also reported to have run dry. Examples include the Sankuyo river which is said to have dried up due to the blockage of the Mogogelo tributary, whose flow was last recorded in 1978/9). The community, however, ruled out climate change as the main cause and believe that the river flow was interfered with when authorities were attempting to arrest the spread of *Salvinia molesta* at Mogogelo. Another tributary which is said to have dried up is one known as 'mogobe wa Makoba' along Savuti-Gobatshaa. According to the residents, the drying up of the river and its tributaries has led to birds'

migration. High prevalence of invasive species was also raised as a concern.

b. Covid-19 and Tourism Vulnerabilities: Another factor that has the potential to negatively affect conservation and ultimately the Outstanding Universal Value of the Okavango Delta World Heritage Property is the recent outbreak of the Covid 19. The outbreak of the Novel Coronavirus (SARS-CoV-2) commonly known as 'COVID-19' has negatively impacted on most sectors of the economy with the tourism and hospitality industry being one of the hardest hits. The imposition of travel restrictions to curb the spread of the virus has resulted in low tourism demand and a downward spiral of international arrivals. Due to restrictions imposed, the tourism sector has suffered great losses as borders remained closed for a good part of the year 2020. Consequently, the local tourism sector has been trying different strategic interventions as a way of adapting to the rapid changes. One of the notable adaptation attempts is the promotion of domestic tourism through reduced pricing of up to 70% for citizens. By late-October 2020, Botswana was one of the 93 destinations (43% of all global destinations) that still had their borders completely closed to international tourists (UNWTO, 2020a).

Travel restrictions due to COVID-19 resulted in the collapse of the sector with some hotels in the country operating at 10% capacity. COVID-19 has resulted in the loss of jobs due to the collapse of some businesses. As a result of the loss of business, many tourism facilities have laid-off workers. In the context of Botswana, some tour operators and related establishments had put their workers on paid and unpaid leave and others' wages have been reduced. A preliminary study by the HATAB showed that the sector experienced huge financial losses, with some hotels operating at less than 10% of their capacity by mid-March 2020. By April 2020, of the 26 000 workers employed in the tourism sector, only 300 were at work mainly working in facilities offering quarantine services for COVID-19 and related patients. Only those facilities contracted by the

government to provide accommodation for essential services personnel and mandatory quarantine were able to remain afloat, make reasonable earnings and retain some of their employees.

The surge in advertisements offering “affordable rates” aimed at attracting citizens and residents to patronise the normally out of bounds luxury tented camps in the Okavango Delta has shown the importance of expanding the domestic tourism base. It is critical to observe that price reductions come at a cost because that will require a change in policy from high value-low volume to low cost-high volume which may have negative impacts on conservation of the Okavango Delta World Heritage Site if left unchecked. Therefore, the changes adopted by various operators to remain operational during COVID-19 and beyond should be done within the parameters of sustainable tourism development in a manner that does not jeopardise the integrity of the natural environment and temper with the pristine aspect of the Okavango. Studies are hopefully still to be done to establish the impact of this change on conservation strategy.

Low tourism activities during the height of the Covid 19 Pandemic is also suspected to have significantly facilitated increased poaching activities, which in turn could affect the Outstanding Universal Value of the Okavango Delta. Reduced numbers of people within the Okavango Delta core area, either as tourists or employees of the various tourism establishments could have enabled poachers to have a field day. Furthermore, less revenue from tourism activities may lead to communities having less interest to conserve the Okavango Delta ferociously as they did before because of less economic benefits.

COVID-19 has also highlighted the need to diversify Community Based Organizations revenue away from both consumptive and non-consumptive tourism. This is critical to ensure that they are insulated from the volatility of the sector. The hunting ban has previously shown that the dependence of communities on tourism and related activities is

not sustainable. COVID-19 is merely highlighting a reality that the communities have been living with for the past 5 years.

c. Poaching: Poaching continues to be one of the major threats to the integrity and OUV of the Okavango Delta World Heritage Site. The most targeted animal species are the elephants. Botswana is home to approximately a third of the global population of African elephants, which are under huge poaching pressure throughout most of their range. The population in Botswana is therefore vital to the survival of the species, but there is a growing opinion that the pressure exerted by such a large population of elephants could be having detrimental effects, particularly on large tree species. Elephants de-bark and knock over adult trees, while browsing on younger individuals, thereby reducing recruitment rates and preventing replacement of adults. This could have severe consequences for other species that rely on large trees, and for the functioning of the Okavango Delta overall, which requires large trees to filter nutrients and concentrate salinity into islands, thereby maintaining low salinity in the waters of the Okavango. Ideally, the large elephant population in Botswana could be spread out over the Kavango-Zambezi landscape through restored connectivity between protected areas in neighbouring countries, but these movement routes are currently disrupted by human activities, including developments and poaching pressure.

Another animal species that is under eminent threat is the rhino. Rhino population numbers are never presented, since they are sensitive data. Two organisations have been working with Department of Wildlife and National Parks (DWNP) and Botswana Defence Force (BDF) to monitor and protect rhinos. Rhinos without Borders, supported by Great Plains and Beyond safari operators, imported approximately 70 white rhinos into Botswana when poaching was lower in the Okavango Delta than elsewhere in the rhino range.

Rhino Conservation Botswana has been assisting the government with collaring and monitoring rhinos, including having multiple monitoring patrols on the ground that work with BDF and DWNP. In the last five years, rhino poaching has escalated, with most of the black rhino population being poached for their horns and the remainder evacuated out of the Okavango Delta to private reserves with higher security. White rhinos are also being poached at a high rate, such that rhinos will be locally extinct in the Okavango Delta MIDA landscape within a few years if poaching continues at its current rate.

In recent years, Botswana has taken a decision to dehorn all rhinos to reduce their appeal, but this has not had the desired effect, since the small amount of horn left by the dehorning procedure is still worth a large amount of money. The 2019 drought opened access to poachers since there was less water in the delta to hinder them, and the Covid-19 pandemic greatly reduced tourism activities in 2020, so fewer people were moving around in the concessions and poachers have been less deterred and detected. BDF, DWNP, RWB and RCB have maintained their presence, including using aerial and ground patrols to monitor rhinos and respond to any carcasses located.

5. DEVELOPMENT PROJECTS PLANNED WITHIN THE OKAVANGO DELTA WORLD HERITAGE SITES AND ITS ENVIRONS

The State Party is happy to announce that there are no major ongoing projects at the core area, nor the buffer zone of the Okavango Delta World Heritage Property. This is partly owing to the fact the core area of the delta is relatively inaccessible and not suitable for any major infrastructure developments. For the most part of the year, the core area is flooded with swampy water and marsh. The various tourism facilities dotted around the delta are mostly accessed using small air crafts, tour safari vehicles and carved dug out wooden boats known as *mekoro* in local languages. It has been Government position that no permanent infrastructure developments are allowed within the core area of the Okavango Delta World Heritage Property.

The dotted tourism facilities found at the core and buffer zones of the Okavango Delta World Heritage Property are encouraged to construct their tourism facilities using semi-permanent structures such as the use of wooden materials, the use of canvas tent materials, and the use of natural building materials such as wooden logs and grass thatch.

The above being the case, one notable major project taking place around the Okavango Delta World Heritage Property, but outside the buffer zone is the Maun Water and Sanitation Networks Project. The project is implemented by the Ministry of Land Management, Water and Sanitation Services through the Programme Management Office (PMO). The project entails the upgrading of Maun Water and Sanitation Networks to meet the village's water and sanitation requirements. The project comprises of water supply source development, transmission, treatment, storage and distribution, as well as upgrading of the rudimentary and dilapidated sewerage infrastructure in Maun to meet the village demand up to the year 2030.

It is important to note that the project is currently underway. The project was preceded by a detailed EIA, and EIA consultants are on the ground to ensure the smooth implementation of the project.

Report prepared and submitted by

A handwritten signature in black ink, appearing to read 'Stephen Mogotsi', is positioned above a horizontal blue line.

Stephen Mogotsi

Director – Department of National Museum and Monuments

**Annexure 1: Audit Report for Construction of Bridge Over
Okavango River at Mohembo**

Republic of Botswana



Construction of Bridge Over Okavango River at Mohembo

Report on Audit of 18 – 19 August 2021

As per Section 19 of the Environmental Assessment Act (No 10 of 2010) (CAP 65:07)

Department of Environmental Affairs

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Acronyms

- AIDS – Acquired Immunodeficiency Syndrome
- BEAPA – Botswana Environmental Assessment Practitioners Association
- BEAPB – Botswana Environmental Assessment Practitioners Board
- BOBS – Botswana Bureau of Standard
- BOS – Botswana Standard
- DEA – Department of Environmental Affairs
- DWNPC – Department of Waste Management and Pollution Control
- EAPB – Botswana Environmental Assessment Practitioners Board
- EIA – Environmental Impact Assessment
- EMP – Environmental Management Plan
- HIV – Human Immune Virus
- I&APs – Interested and Affected Parties
- SHE – Safety, Health and Environment
- WTP – Wastewater Treatment Plant

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Executive Summary

Background

The Mohembo Bridge is developed to link the area East of the Okavango River in Botswana's North West District. The project commenced on 2018 and is set to complete in late 2021. As of August 2021, the project was 96% complete. Key components of the projects are the Bridge and approach roads, Contractor's Camp, and four Burrow Pits.

Given the complexity (magnitude) of the project, as well as the area's environmental sensitivity, it is key that all development be guided by environmental sustainability principles. Key to this is the Environmental Assessment Act, which mainstreams various socioeconomic and biophysical aspects.

Audit Approach

To assess the compliance level and identify opportunities for improvement, an audit activity was undertaken by a multisectoral team on the 18th and 19th of August 2021. The audit involved documentation review, site inspections, as well as interviews with relevant parties. All components deemed to be essential were assessed, the period 2018 to present.

Findings

The key findings were that the environmental performance of the project was largely compliant, with records being maintained for various aspects. The staffing was present, though proven to be inadequate. Although there was no evidence of ecological degradation and the management thereof appeared satisfactory, the absence of monitoring thereof was a concern. Similarly of concern was the absence of an archaeologist.

An absence of an authorisation and license for the Waste Treatment Plant were similarly raised as findings as they constituted noncompliance by the project.

Conclusion

The project is generally compliant to the provision of environmental related instruments save for comprehensive monitoring of environmental aspects.

Recommendations

- Within 21 days, demonstrate plan towards establishing changes that may have been brought by the project by monitoring changes in the economic status, crime rate, health before close of the project.
- Demonstrate a plan towards progressive realisation of systematic collection of ecological data within 21 days.
- Initiate application process for Environmental Authorisation and Licensing of Wastewater Treatment Plan within 21 days.
- Demonstrate conscious effort towards deliberate consideration of archaeological finds monitoring of Burrow Pits within 21 days.
- Within 21 days, demonstrate plan towards progressive realisation of Land Reclamation for Shakawe, Samochima and Shakawe Burrow pits -taking into consideration neighbouring land uses.
- Develop a comprehensive, budgeted decommissioning and rehabilitation program with timelines, with specific revegetation plan of relevant components sites such as burrow pits.

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1 Project Background

Following a desire to connect the area on the East of the Okavango River in the North West District of Botswana, a permanent, all-weather, safe and 24-hr crossing structure was proposed. Such a structure would enable the steady supply of goods and services to communities on the Eastern side of the river, and ultimately be an economy enabler in the Eastern Panhandle.

The components of the ensuing structure would be a cable-stayed bridge, including an approach road, the contractors' camp, asphalt plant, waste treatment plant, and cement batching plant. The bridge is envisaged to measure 1.161km with a complementary approach road of 3.0km.

The location of the site is 18°16'22.1"S 21°47'43.9"E, 200m downstream of the Mohembo East Ferry landing site. Additional components are the burrow pits at 18°27'19.7"S 21°53'59.9"E, 18°21'53.5"S 21°49'44.9"E, 18°20'01.9"S 21°40'03.3"E, and 18°19'15.4"S 21°54'30.6"E. Villages within the impact area of the project are Samochima, Shakawe, Mohembo West, Shaikarawe, Mohembo East, Kauxhwi, and Xakao.

The Project is being implemented by the Ministry of Works and Transport, under the Department of Roads (TB NO. 9/5/152/2001-2002). The contract amount is P 1,045,510,751.77, while the contractor is ITINERA/Cimolai JVP. The engineer is CPP Botswana (Pty) Ltd. The project commenced on 8 November 2016. It was initially set to end on 7 July 2019, while the revised completion date is late 2021. In mid-August 2021, the project was reportedly 96% complete.

2 Audit methodology

With an understanding of the environmental impact that a project of this complexity and magnitude would have, an audit was undertaken on 18 – 19 August 2021 with the aim of establishing the project's environmental compliance level. This was additionally motivated by the setting of the project location, which has key ecological sensitivity, as well as a sensitive socioeconomic aspect. A previous audit had been conducted from 14 to 16 August 2018 although only the preliminary findings were communicated (dated 23 August 2018).

2.1 Scope

The temporal extent was primarily on the period since 2018, although several issues extended further back due to the absence of a previous final audit report.

The spatial extent covered all the core components, and included the sensitive receptors, primarily being the neighbouring homesteads, main river channel and associated floodplains. The project components covered during the audit were;

1. Bridge and approach roads
2. Contractor's Camp
3. Asphalt Plant
4. Cement Batching Plant
5. Waste Treatment Plant
6. Burrow Pits
 - a. Samochima
 - b. Shakawe
 - c. Shaikarawe
 - d. Xakao

A pre-audit was done on the 3rd and 4th of **August 2021**. Full-audit was done on the 18th and 19th of **August 2021**.

2.2 Proceedings

The pre-audit meeting was preceded by a rapid test for the Corona-virus Disease of 2019 (COVID-19) on all team members. All members tested negative.

A pre-audit meeting was held at the contractor's seminar room and attended by the client, as well as engineer's environmentalists, the contractor's environmentalist as well as the audit team. Details of the audit team are in an earlier section of the current report. A safety briefing was done at the contractor's Safety Health and Environment (SHE) officer.

The audit commenced with a review of documentation as availed by the environmentalists following earlier communication from the audit team. Interviews with the auditee team were conducted to seek clarification where deemed necessary.

The second stage was that of Site Inspections and Observations for verification of records and independent assessment thereof. Interviews with neighbouring homesteads was done in addition to seek independent perceptions on some of the identified issues.

To streamline the audit, the following key components were identified for audit

1. EMP Implementation
2. Ecological aspect monitoring
3. Archaeological findings management
4. Social Impact monitoring
5. Occupational Health monitoring
6. Burrow Pit management
7. Access Roads management
8. Contractor's Camp management
9. Workshop and Maintenance areas
10. Liquid Waste Management
11. Solid Waste Management
12. Water Monitoring
13. Solid Monitoring
14. General air-quality Monitoring
15. Dust Monitoring
16. Noise Management

Definitions: in reporting the results from an audit, the following terms are key; compliance, noncompliance, and observation. A compliance reflects that the requirement in a documented condition has been met. A noncompliance refers to a failure to meet any of the specific requirements of the condition. Observation reflects a failure to meet nonspecific requirements of a condition.

The closure meeting was attended by the same attendants as the pre-audit meeting. In spite of a desire to involve decisionmakers at this stage, this did not come to be. The purpose of this meeting was to provide preliminary findings. Though a desired component, an assessment on the improvement since feedback from the previous audit.

Although systematic, an audit is a sampling exercise and purports by no means to apply to areas that were not actively audited. The conclusions drawn, therefore, pertain strictly to the sampled aspects. Furthermore, the results are only valid at the time of the audit.

Key noncompliances raised during the 2018 audit were;

1. No EMP and authorisation for (1) Contractor's Camp and (2) Shakawe Burrow Pit,
2. Absence of aquatic life specialist and archaeologist,
3. No environmental Policy Statement,
4. No documentation on implementation of some EMP components,
5. Malfunctioning of Waste Treatment Plant,
6. Surface of chemical storage facility was not bunded,
7. Lack of signage for designated areas and labelling of items,
8. Engagement of unlicensed waste collection carriers for used cooking oil, scrap metal and clinical waste,
9. Inadequate monitoring of ecological aspects,
10. Lack of staff induction or awareness raising on archaeological matters,
11. Improper placement of pollution sampling points,
12. Lack of monitoring of hydrocarbons and microbiology during water monitoring,
13. Inconsistency in the timing of sampling for water-quality,
14. Lack of mitigation despite evidence of noncompliant water quality,
15. Invalid measurement of water levels,
16. Absence of sediment-deposit monitoring,
17. Lack of mitigation for soil erosion from storm water trenches,
18. Lack of mitigation for sedimentation from storm water trenches,
19. Lack of mitigation for contamination from storm water trenches,
20. BTEX monitoring station impeded by soil stockpile, and
21. Unavailability of dust suppression plan.

3 Key legislation

3.1 Laws of Environmental Relevance

Table 1. List of laws of relevance, indicating salient provisions

Act	Sector	Key Sections
Environmental Assessment Act (No 6 of 2005) (Cap. 65:07)	Environmental Management	Section 14
Environmental Assessment Act (No 10 of 2010) (CAP 65:07)	Environmental Management	Section 6(3) -Authorisation Section 12(1)(a) - Authorisation Section 19 -Audit
Monuments and Relics Act (CAP 59:03)	Historical Artefacts	Section 12 –Notification of discoveries Section 9 –Pre-development Archaeological Assessment
Air Pollution (Prevention) Act (CAP 65:03)	Air Quality	Air quality management
Waste Management Act (1998) (CAP 65:06)	Waste Resources Management	Part 5, Section 13 –Waste Carrier License Part 6, Section 16 –Waste Facility License
Fish Protection Act (No 42 of 1975) (CAP 38:04)		
Water Act (CAP 34:01)	Water Resources Management	Sections 27 and 35 abstraction
Aquatic Weeds (Control) Act (1971) (CAP 34:04)	Water Resources Management	Regulation 5 - Boat registration
Wildlife Conservation and National Parks Act (CAP 38:01)	Management of Faunal Species	Fauna management
Tribal Land Act (CAP 32:02) ()		Surface Rights Way leave
Forest Act (CAP 38:03) (1968)	Management of Floral Species	Management of protected flora species
Herbage Preservation Act (CAP 38:02) (1977)	Management of Floral Species	Veldt-fire management
Public Health Act (CAP 63:01) (1971)	Human Health	General health
Road Traffic Act (CAP 46:05)	Road	

Mineral Rights in Tribal Territories (CAP 66:02)	Extraction	
Mines and Minerals (CAP 66:01)	Extraction	Prospecting License Section 52 –Minerals Permit Closure Certificate
Labour and Employment Act	Labour	Employment

3.2 Conventions that apply to the area/project

The two Conventions apply to the area; 1. Ramsar Convention on Wetlands of International Importance (1971), and 2. Convention Concerning the Protection of World Cultural and Natural Heritage – World Heritage Convention. Both these Conventions are given effect to by the Okavango Delta Management Plan (2021). Other Conventions are the Convention on Biological Diversity and the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage.

3.3 Compulsory Standards

BOS 498:2012 Ambient air quality–Limits for common pollutants

BOS 93:2012 2nd ed. Wastewater – Physical, microbiological and chemical requirements-Specification

BOS 575:2013 ed. 1 Maximum permissible limits for environmental noise

3.4 Agreements that apply to the area/project

The Permanent Okavango River Basin Water Commission (OKACOM)

3.5 Plans that apply to the area/project

National Development Plan 11 (2017-2023)

North West District Plan 8 (2017-2023)

Okavango Delta Ramsar Site (ODRS) Strategic Environmental Management Plan (2012)

Okavango Delta Management Plan (2008).

Ngamiland District Integrated Land Use Plan (2009)

Okavango River Panhandle Management Plan

4 Findings

4.1 EMP Implementation

This aspect deals with the Environmental Management Plan (EMP) implementation and compliances to the provision of Environmental Assessment Act and associated regulations, licenses, permits and regulations. It is important to note that the Environmental Impact Statement for the bridge is dated and some activities being implemented by the auditee are additional to the initial EMP.

This aspect assessed whether all the components that required authorisations as per section 9 of the EA Act. Additionally, the authorisations were assessed to determine whether the authorisations were still within their validity period. The components that had been identified to require environmental authorisations were;

1. Bridge
2. Contractor's camp
3. Samochima Burrow Pit
4. Shaikarawe Burrow Pit
5. Shakawe Burrow Pit
6. Xakao Burrow Pit
7. Waste Treatment Plant
8. Cement Batching Plant

Licenses were required for

1. Burrow Pit operations
2. Burrow Pit Way leave
3. Pontoon registration
4. Waterway rights
5. Waste carrier licenses
6. Mining permits
7. Water abstraction

Components such as burrow pits, contractor's camp, batching plant, waste water treatment plant etc. were expected to be assessed ahead of the implementation. The auditee availed Environmental Authorization and mining permits for; Xakao Burrow Pit, Samochima Burrow Pit, Shakawe Burrow Pit and Shadikekete Burrow Pit. Furthermore, there is an Authorization for the Construction of the bridge and the Asphalt Plant. There was, however, no evidence of an environmental authorization for the contractor's camp and batching plant.

As for the acquisition of licences, all burrow pits are licensed by the Department of Mines while the Wastewater Treatment Plant is operated without a licence.

Out of 9 main components, only six (6) has Authorizations/EIA clearance or licenses. Letters for Burrow Pits and the Bridge availed. Components which were deemed to be operating without environmental authorisations were thus determined to be; Wastewater Treatment Plant (WTP) and Contractor's Camp, which had neither Environmental Management Plans nor authorisations.

Notably, this issue of licensing the WTP has been raised during the previous audit, and continued to prevail regardless.

Summary Finding	Rating
Few components remain unauthorised	Partially compliant

4.1.1 Budget for EMP

There is no evidence of a specific budget intended to implement the EMP. However, a budget for the implementation of individual components of the EMP including Environmental Protection, Health and

Safety, HIV/AIDS Awareness and Prevention have been provided for at the beginning of the project. Yearly breakdown of the required funds, assessment adequacy including expenditure was not availed.

Summary Finding	Rating
Budget available for various component, but yearly breakdown not available	Partially compliant

4.1.2 Contractor awareness of EMP content

There is no evidence that employees are made aware of the contents of the EMP, save for the Code of Conduct of 2015. Note that this Code of Conduct excludes EMPs done post 2015.

Summary Finding	Rating
Employee sensitization of EMP content not done	noncompliant

4.1.3 Contractor awareness of authorization conditions

There is no evidence of inclusion of the EMP implementation between the auditee and the subcontract. The only evidence produced is the Code of Conduct that dates 2015, thereby not adequate as it leaves out EMPs authorized post 2015. There is no evidence of documents that verifies that the Contractor and subcontracts service agreements bears implementation of the EMP as part of such contracts.

Summary Finding	Rating
Sub-contractor sensitization of post-2015 EMP content not done	Partially compliant

4.1.4 Responsibility for implementation of all EMPs

The project has two (2) Environmental Officers, one for the consulting company, otherwise known as the Engineer, responsible for the supervision of the project while the other is with the construction company, responsible for the implementation of Environmental issues and EMPs.

There auditee failed to produce specific Job description for the implementing Environmental Officer save for those that are stated within Code of Conduct, but the Environmental Control Officer presented the contract with clear Job descriptions.

Summary Finding	Rating
Specific Job-description for the implementing Environmental Officer not available	Partially compliant

4.1.5 Availability of Community Relations Officer

There is no specific community liaison officer, rather Human Resources Officer and environmental officers are said to be sharing responsibility of the community liaison officer.

Summary Finding	Rating
Role of dedicated Community Relation Officer delegated to other representatives	Partially compliant

4.1.6 Code of Conduct

There was Code of Conduct between the developer and the Contractor. However, there was no evidence of an evaluation of implementation.

Summary Finding	Rating
Though Code of Conduct available, evaluation of implementation thereof not done.	Partially compliant

4.1.7 Timely and regular submission of monitoring reports

There was a satisfactory compliance with the approval conditions pertaining to the submission of monitoring reports. Independent checks with the competent authority reflected a regular submission of monthly reports from the contractor and quarterly reports from the engineer.

Summary Finding	Rating
Monthly reports submitted regularly as per approval conditions	Compliant

4.2 Contractor's Camp

The components audited in the Contractor's camp were the Fuel Bay, Washing Bay, and Storage Facility. The camp was generally well-kept, with a few littering instances along walk ways and the chemical storage. Furthermore, dust suppression within the camp was observed. There was presence of well-serviced fire extinguishers though the expiry date was not visible on others, as the date was said to be affected by exposure to direct sunlight.

There are two (2) fuel storage bays, each with a capacity of 14000 m³. Each bay holds 28 000 m³ of fuel. There was no sign of seepage around the wall, except for the used oil. Discoloration of top soil was observed at the used oil storage facility. Oil/water separators were identified at the Wash Bay, Fuel Bay and the Workshop Area.

4.2.1 Workshop and Maintenance Areas

Discoloration of soil due to oil spillage was observed at the used oil storage facility around the workshop. Generally, the upkeep was found to be clean, save for walk ways and the storeroom where litter and unwanted material were spotted. There is adequate provision for containment and storage of solid waste awaiting collection. Management of used oil is generally acceptable, however there are few areas that need improvement particularly collection time and prevention of spillages.

The area was well secured and maintained adequately. Oil separators provided and in operational state. Fire management plan was in place. Adequate Fire extinguishers were strategically placed within the camp have been provided, maintained and well displayed. Fire drills are conducted on routine basis.

There are records for servicing of fire extinguishers and the stickers for expiring dates are displayed. Signage was provided and adequate for in around the workshop and maintenance area, these include Labels, no smoking signs, warning alerting signs. However, there were instances where fire extinguishers were found without visible identification signs.

There was not much spillage around the workshops except where used oil was being stored. Emergency response plan was place as evidenced by document number HSE-013 even though there were no evaluation reports.

Summary Finding	Rating
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Satisfactory upkeep of Workshop and Maintenance Areas

Compliant

4.3 Socioeconomic Aspects

There was no evidence of monitoring of the project impact to the health systems, improvement of livelihoods and economic activities even though there are activities directly contributing to the three aspects.

4.3.1 Employment

Employment statistics records presented categorised citizens and non-citizens. It also provided a breakdown by age, gender, and skill category as verified by Job Creation Monitoring tool. According to the records, out of 491 employees 458 (93.3%) are citizens while 33 are non-citizens; 431 (87.8%) are males and only 60 account for females.

It was reported that unskilled employees are recruited locally through village structures, particularly Kgotla, however there was no evidence of how many employees recruited actually reside from the project catchment areas.

Summary Finding	Rating
Recordkeeping and evaluation of employment creating actively done, slight improvement required.	Partially compliant

4.4 Corporate Social Responsibility

The auditee failed to account for the amount of money used for corporate social responsibilities, these records were being kept with the Headquarters offsite. However, there were a number of recorded activities that the project contributed to the local communities including;

1. Donation of 200 chairs to Samochima Primary School,
2. Donation of Stationery to Mohembo Primary School, 3.
- Development of young professionals on scaffold assembly.

Summary Finding	Rating
Evidence of Corporate Social Responsibility	Not rated

4.4.1 Health impact

There was no monitoring of impact of the project to the local health system, increase or decrease in communicable diseases such as HIV/AIDS in relation to the baseline.

Summary Finding	Rating
Health impact not being actively monitored.	noncompliant

4.4.2 Employer/Employee dispute resolution

There was no evidence of employer/employee dispute resolution procedure. There is record of disputes as authenticated by Complaints log from 2017-2021 amounting to 55 complaints.

Summary Finding	Rating

No evidence of employer/employee dispute resolution procedure	noncompliant
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4.4.3 Displacement of people and Compensation

The list is within the land expropriation Report and the number of displaced people stands at 18 people and were compensated with money amounting to P1,492,655.50

Summary Finding	Rating
Recordkeeping actively done on Displacement and Compensation of people	compliant

4.4.4 Public complaints

The complaints register was presented to the audit team; however, it was not discernible how most of complaints were resolved.

Summary Finding	Rating
Public complaints register maintained, but complaint resolution not clear therefrom.	Partially compliant

4.5 Occupational Health

The project employs SHE officers and Job Descriptions were clearly documented. It was observed that all employees have been provided the Personal Protective Equipment (PPE). There is a PPE issue register that indicates 2 piece overall.

Signage has been adequately provided around the site informing, alerting and warning about the danger in the area. Incidents/accident records were available as evidenced by Incident capture tool/register Document number HSE-6765-090 recorded from 17/08/2017 to 30/07/2019.

Fire Management Strategy in place and evidence presented to the audit team. There also exists a Fire Management Strategy.

As mentioned under section 4.4.1 of this report, records on HIV/AIDS prevalence are not clear; the Auditee presented HIV/AIDS report that do not bear clear dates and systematic reporting. The report contained statistics for 2016/2017, while recent years were missing.

Risks were identified and documented as evidenced by Document number HSE-6765-018.

Health facilities were available on site, and these included an on-site clinic and ambulance.

There was evidence of undertaking of occupational and safety awareness-raising as authenticated by toolbox meetings minutes/report and attendance register.

Emergency response plans and procedures is well documented and verified through

1. Document number HSE-013 INCIDENT/ACCIDENT.
2. Reporting and investigation procedure document number HSE-PRO-6765-093.
3. Working near or overwater procedure Document number HSE-PRO-6765-002.
4. Fall rescue plan Document number HSE-6765-130.
5. Fall protection plan Document number HSE-6765-103.

6. Working in confined space procedure Document number HSE-PRO-6765-013.

7. Lifting Operation procedure Document HSE-PRO-6765-011.

Summary Finding	Rating
Recordkeeping on various Occupational Health and Safety actively and systematically done	compliant

4.6 Burrow Pits

4.6.1 Access control (personnel)

During the site inspection, no personnel were available on site. It was communicated that the presence of security personnel was guided by extracting/hauling activities as the main responsibility was recordkeeping. Given the risk of unauthorised access which would lead to other noncompliances, this was an undesirable state of affairs. The challenge that was raised about providing round the clock security was the safety from wildlife.

Finding	Rating
no personnel were available on site	noncompliant

4.6.2 Access route

Access routes were clearly demarcated.

Finding	Rating
Access routes were clearly demarcated.	Compliant

4.6.3 Fence integrity

The Shakawe and Samochima burrow pits were fenced using a 1.5m grid fence. This was considered a commendable standard as it was largely animal proof. Given that these burrow pits were in the centres of livestock/wildlife area, the provided fences were deemed to be reasonably useful. The integrity of the fence needs attention/maintenance. Access, livestock which would lead to conflict with neighbouring land users. No fence was observed around the Shadikekete Burrow Pit.



Figure 1. Gully encroaching into fence at Samochima Burrow Pit

Summary Finding	Rating
Where available, fencing was of commendable standard, although maintenance required.	Partially compliant

4.6.4 Signage

Signage was reportedly confined to times when there were activities as signs were reportedly frequently stolen. During the audit, signage was available along the tarred road closest to Shakawe Burrow Pit (see Figs 5).



Figure 2 Signage near Shakawe Burrow Pit

4.6.5 Slopes

The rehabilitation programme varied largely amongst the burrow pits;

- At Samochima, the banks were steep and unrehabilitated. Given the excavated depths, the servitudes were likely inadequate for rehabilitation.

- At Shakawe, there was evidence of backfilling which would presumably address the rehabilitation issue.
- At Shaikarawe, the rehabilitation was reportedly complete and the auditee was awaiting a closure certificate from the Mining Department. Although this might be deemed adequate by mining standards, it was concluded to be inadequate as will be detailed later in this report.
- At Xakao, the South Western banks had been thoroughly rehabilitated, while the North Eastern areas remained steep, unrehabilitated and close to project boundaries. Notably, the excavation resulting in steep slopes went right up to the graveyard fence -risking undesirable occurrences in the event of a bank collapse.

Finding	Rating
Evidence of rehabilitation effort available, but requires conscious attempts to make rehabilitation adequate	Partially compliant

4.6.6 Containment of solid waste

General upkeep in terms of solid-waste containment was above average.

Finding	Rating
General upkeep satisfactory save for isolated incidents	Partially compliant

4.6.7 Containment of liquid waste

Mobile toilets were on available on site. There was no evidence of improper management.

Finding	Rating
Mobile toilets were on available on site.	compliant

4.6.8 Decommissioning plan

In spite of decommissioning underway for some of the burrow pits, there was no specific decommissioning plan availed for any. Of key concern is the Shakawe Burrow Pit, which is less than 25m from the nearest household. Given the movement of haulage trucks and backfilling exercise, there is need to specifically and deliberately plan of the environmental impact of the decommissioning exercise.

Finding	Rating
no specific decommissioning plan availed for any burrow pits	noncompliant

4.6.9 Pre-decommissioning structural assessment

An assessment of structures neighbouring the burrow pit and along the access road was availed. However, this seemed to be dated as it was from 2017. There was thus need to establish a specific decommissioning plan.

Finding	Rating
Comprehensive structural assessment available, albeit dated	Partially compliant

4.6.10 Neighbouring homesteads complaints register

Complaint report available. However, some reports were seemingly not registered.

Finding	Rating
Complaint report available. However, some reports were seemingly not registered.	Partially compliant



Figure 3 Aerial view of Burrow Pits at Samochima



Figure 4 Aerial view of Xakao Burrow Pit showing adjacent floodplain and ploughing fields

4.7 Waste management

4.7.1 Liquid waste

Sewage from the contractor's camp was treated using an onsite WTP. Details of the design were not known to the environmentalists. The facility is not licensed in spite of requirements of the Waste Management Act and recommendations of the previous environmental audit.

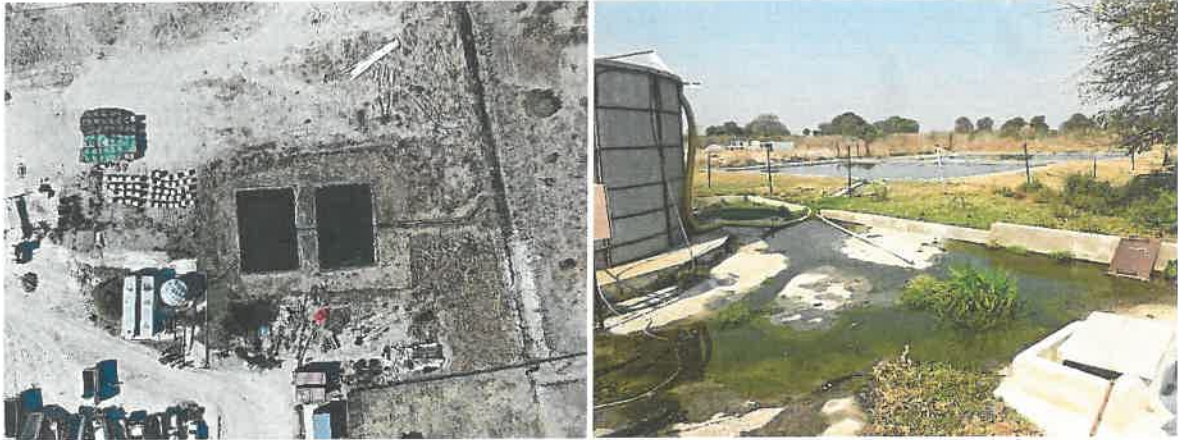


Figure 5 Aerial view of the Wastewater Treatment Plant



Figure 6 Wastewater Treatment Plant



Figure 7. Liquid waste management at Cement-batching Plant

Finding	Rating
The facility is not licensed	Partially compliant

4.7.2 Signage

No signage at chemical storage facility, no demarcation, no access control. Poor signage (



Figure 8. Signage at WTP

Finding	Rating
No signage at some points	Partially compliant

4.7.3 Monitoring of effluent quality

Effluent quality monitoring is commendable

Finding	Rating
Monitoring of effluent is commendable	compliant

4.7.4 Comparison effluent quality BOS 93:2012

Effluent quality monitoring is commendable

Finding	Rating
Effluent quality monitoring is commendable	Compliant

4.7.5 Sampling points

Sampling points

Finding	Rating
Sampling points	compliant



Figure 9 Aerial view of Cement Batching Plant

4.7.6 Sludge management

Sludge management needs attention – Monitoring and implementation of sludge management plan.

Finding	Rating
Sludge management needs attention	non-compliant

4.7.7 Destination of treated effluent/ sludge

Effluent discharges into flood plains and eventually into the river therefore noncompliance (Effluent shall not be discharged into the water sources).

Finding	Rating
Effluent shall not be discharged into the water sources	non-compliant

Figure 10 Samochima Burrow Pit, a gully encroaching into the fence due to soil erosion Recommendation – re use of effluent.

Finding	Rating
Recommendation – re use of effluent.	Not rated

4.7.8 Solid

Waste management is commendable and complying to EMP.



Finding	Rating
Waste management is commendable and complying to EMP.	compliant

4.7.9 Demarcation of Waste Disposal

Sites identified

Finding	Rating
Sites identified	compliant

4.7.10 Waste streams identified

Management of different waste streams is satisfactory.

Finding	Rating
Management of different waste streams is satisfactory.	compliant

4.7.11 Used oil management

Used oil management is satisfactory.

Finding	Rating
Used oil management is satisfactory.	compliant

4.7.12 Waste recycling/reuse initiatives

Scrap metal reuse

Finding	Rating
Scrap metal reuse	Partially compliant

4.7.13 Waste transportation

Licensed carriers used. Recordkeeping at destination.

Finding	Rating
Licensed carriers used. Recordkeeping at destination.	compliant

4.7.14 Chemical storage

Scrap metal reuse

Finding	Rating
Scrap metal reused	Not rated

4.7.15 Sanitary storage

Compliant

Finding	Rating
Sanitary storage compliant	compliant

4.7.16 Adequacy of Sanitary facilities

Compliant

Finding	Rating
Compliance to adequacy of sanitary facilities	compliant

4.8 Noise

4.8.1 Existence of noise monitoring programme

Regular sampling of noise levels as reflected in monitoring reports

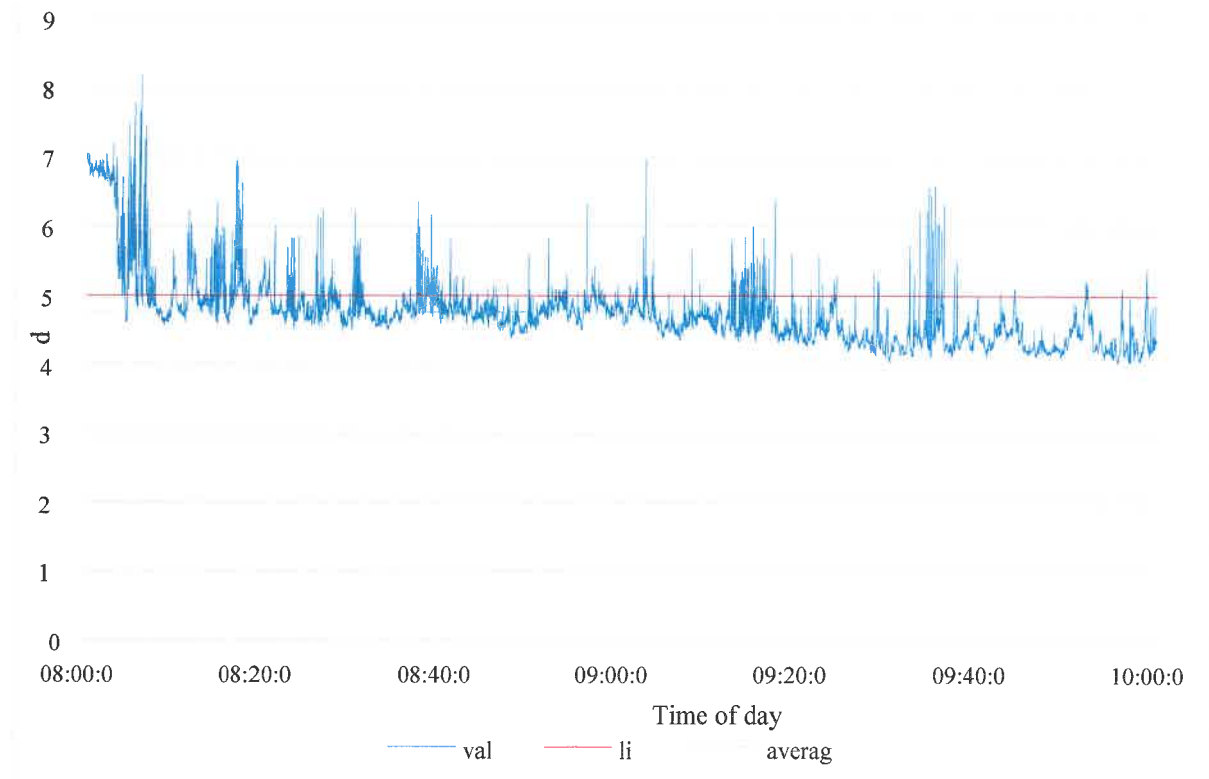
Finding	Rating
Regular sampling of noise levels	compliant

4.8.2 Compliance to standard

Satisfactory compliance to BOBS standards (below 50 dBA). Recommendation for use of monitoring protocols as prescribed in BOS 575:2013 standards.

Independent noise sampling was done on the morning of the 19th August 2021. Monitoring was done from 18°17'14.4"S 21°47'17.4"E, which is a residential area lying 200m from the contractor's camp at a bearing of 280°. Monitoring was done for a period of 2 hours, being 0800-1000hrs. Measurement was done on a MT975 noise meter, erected at a height of 1.5m. Deployment was inside a reed shelter with the only opening being a door, which was left wide open. The weather for the morning was calm, with a low breeze in the south westerly direction. No precipitation was noted.

The observation was that the readings for the morning ranged from 38 to 53 dB, with an average of 48 dBA. Although this was below the legal threshold, the proximity was only within 2dB of the threshold - suggesting that exceedances were likely as can be observed in Fig 11.



Figur 1 Noise monitoring results

Finding	Rating
	compliant

4.8.3 Noise mitigation measures

From the interviews, this amounted to adherence unnecessary operation of machinery.

to operating times, servicing of equipment,

Finding	Rating
Evidence of noise mitigation measures	compliant

4.8.4 Evaluation Noise mitigation measures

There were perceptions of noise pollution – this was observed through community interviews.

Finding	Rating
Evaluation Noise mitigation measures done	Partially compliant

4.9 Air quality

4.9.1 Dust

4.9.1.1 Dust monitoring

Most of burrow pits do not have dust monitoring devices except Xakao burrow pit.

Finding	Rating

Most of burrow pits do not have dust monitoring devices except Xakao burrow pit	
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Samochima

No evidence of monitoring

Finding	Rating
No monitoring at Samochima	non-compliant

Xakao

No evidence of monitoring in neighbouring homesteads

Finding	Rating
Xakao	non-compliant

Shakawe

Evidence of monitoring in neighbouring homesteads

Finding	Rating
Shakawe	compliant

Cement batching plant

Finding	Rating
Dust monitoring at Cement batching plant	compliant

Bridge and contractor's camp

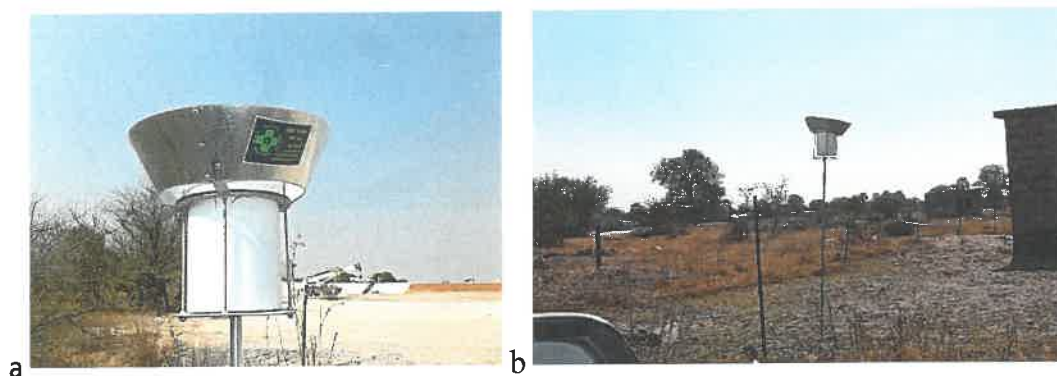


Figure 12. some of the dust buckets observed

Finding	Rating
Dust monitoring at Bridge and contractor's camp	compliant

4.9.1.2 Dust suppression plan Plan available.

Finding	Rating
Dust suppression plan available	Partially compliant

4.9.1.3 Performance of Dust suppression measures

Dust remedial measures are implemented satisfactorily e.g. dust suppression with water

Finding	Rating
Dust remedial measures implemented satisfactorily	compliant

4.9.1.4 Perception of dust

Community complained of dust

4.9.2 Ambient air

4.9.2.1 Emission monitoring programme

There was an active programme for monitoring the quality of ambient air, as proven by the monitoring records as well as the monitoring stations at the cement batching plant.

Parameters included BTEX, PM₁₀



Figure 13 Air quality monitoring station at the cement batching plant

Finding	Rating
Evidence of air quality monitoring station at cement batching plant	compliant

4.9.2.2 Validity of monitoring protocol

Best practise suggests that monitoring should be done from sensitive receptors. However, given that the devices were kept at areas of controlled access, it is a reasonable choice.

Finding	Rating
Monitoring protocol valid under the circumstances	compliant

4.9.2.3 Compliance to standard

Finding	Rating

Occasional exceedance of thresholds	Partially compliant
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There is no monitoring of indoor air quality. In spite of commendable monitoring of ambient air quality in the bounds of the cement batching plant, a similar effort was non evident in respect of occupational health.

Finding	Rating
indoor air quality not being monitored	Partially compliant

4.9.2.4 Perceptions on air pollution

Finding	Rating
No evidence of effort to manage perceptions and concerns	Partially compliant

4.9.2.5 Availability of mitigation measures

Finding	Rating
mitigation measures available	Partially compliant

or's camp. Raingauge available at Samochima

4.10 Weather monitoring

Weather monitoring station available on contract Burrow Pit (see fig)



Figure 14. Rain gauge at Samochima Burrow Pit

Finding	Rating
Rainfall being monitored at burrow pits	compliant

4.11 Archaeological findings records monitoring

There is no Archaeologist employed to monitor project activities however there is evidence of employment of one hired twice for specific activity. There is need to have a resident archaeologist on site. Although the project environmentalists indicated that an archaeologist-on-call during the excavation activities who could be contacted in the event of findings, this would suffice if it was not for the fact that there were no records of induction/training to operators regarding archaeological artefacts, hence making it difficult for them to establish what findings would be worthy of contacting the archaeologist.

The management of graveyards reflects the deliberate effort to manage heritage aspects. However, this was presumably driven by community consultations as opposed to relations with relevant specialists.

Finding	Rating
deliberate effort to manage heritage aspects	compliant

There was no record form for archaeological findings available. Standard operating procedures were not available in the event of chance findings.

Finding	Rating
no record form for archaeological findings available	non-compliant

Similar reports were not available for monitoring the impact on intangible heritage. •
Effort made for graveyard consideration

Finding	Rating
reports were not available for monitoring the impact on intangible heritage	Partially compliant

4.12 Ecological management

An important observation was that ecological management and monitoring was completely missing from the content of the approved EMP. This was in spite of the ecological sensitivity of the area. The audit therefore relied on best practise.

Notwithstanding the above observation, it was noted that ecological monitoring was deprioritized. The inclusion of ecological monitoring in reports was inconsistent, with more recent reports reflecting a more consistent inclusion. The engineer's monthly monitoring reports have no ecological monitoring, while the contractor's quarterly reports do. Furthermore, where the baseline was offered, it was not site-specific, but appeared to rely on zoogeographic data from literature with related more the Delta region.

EIA was not site specific regarding ecological indicators: species composition (inventory), conservation status, likely invasives, location of protected trees, sighting frequency, land cover, -making it impossible to attribute impact to the project.

Where monitoring had been done, it was unclear what protocol had been used to generate the records. To illustrate, maps were available clearly demarcating the locations of biophysical monitoring points, however, the same was not available for ecological monitoring.

There was no evidence of ecological monitoring in regard to the WTP. Among the burrow pits, only records from the Samochima burrow pit were reflected in the report.

As noted earlier, a budget for environmental protection has been allocated amounting to P1,700,00 as of 2016. However, since this was not costed in the plan, it is difficult to ascertain the adequacy thereof.

special consideration has been given to access to natural resources by humans or animals

Important Faunal species that are known to occur in the area are;

Important Floral species that are known to occur in the area include; *Adansonia digitata* (Baobab), *Baikiaea plurijuga* (Mukusi),

4.12.1 Vegetation clearing

Confined to project area

Finding	Rating
Vegetation clearing confined to project area	compliant

Access to natural resources by community

Finding	Rating
No unnecessary obstruction of resource access	compliant

4.13 Ecological monitoring

4.13.1 General

During the previous audit, a concern was raised on the lack of monitoring reports regarding ecological components. It was noted, however,

No provision for ecological monitoring in monitoring plans of EIAs. Hence, reliance on environmentalists' competence

Finding	Rating
No provision for ecological monitoring in monitoring plans of EIAs	Not rated

Ecological monitoring is not prioritized in monitoring reports. Recent monitoring reports attempted to address this aspect

Finding	Rating
Deprioritization of ecological monitoring	Partially compliant



Figure 15. Outlet stream from Wastewater Treatment Plant

Given the extensive documentation and recordkeeping that had to be carried out regarding specific aspects of environmental monitoring, it was established that there was a staffing constraint. The contractor’s environmentalist would not be able to undertake the extensive work that was required.

Finding	Rating
Staff shortage evident	Partially compliant

A general observation on the area including various off-site component showed no evidence of loss of ecological integrity. There was a general presence of faunal species on the main river channel and in the floodplains.

Avian species noted during the audit included slaty egret, lesser egret, Egyptian goose, African white-backed vulture (CE), swift,

Finding	Rating
Evidence of ecological integrity	compliant

4.13.2 Bridge, approach roads

- Accessibility of wildlife well managed; no unnecessary movement route obstruction, e.g. Fence built, although not maintained.
- There was good management of waste –hence avoidance of scavenger attraction

4.13.3 Burrow Pits

- Samochima, Shakawe, Shadikekete, Xakao
- Good standard fence was used
- Bank collapse evident, leading to a gully encroaching into fence -thus compromising integrity (see Fig. 1)
- Poor fence maintenance might be a legacy issue -this might, however, lead to land use conflict, as well as waste dumping
- Protected-species management evident, but has flaws as some trees has exposed roots, or were on sand islands.
- Shadikekete rehabilitation attempted, but standards seemingly aimed to comply with Mines standards, without considering HWC implications for area.
- Ongoing extraction undermines rehabilitation effort, hence requires regular monitoring and corrective action.

4.13.4 Waste Treatment Plant

- Documentation of impact pertaining to ecology not evident
- Monitoring focused within fence confines
- Sampling issue/protocol unclear
- Low flow might mean low impact, however, given the projected lifespan of the facility, it is key to pay deliberate consideration.
- Biological treatment option might be explored, e.g. use of reed-bed for filtration. Alternatively, charcoal to augment filtration.

4.13.5 Invasive species

There was no evidence of a deliberate invasive species monitoring programme for faunal species.

Fauna

- No deliberate monitoring thereof
- No evidence of identification of species of concern

Flora

- No deliberate monitoring thereof

Finding	Rating
deliberate monitoring of invasive species	non-compliant

- No evidence of identification of species of concern

Finding	Rating
No evidence of identification of invasive species of concern	non-compliant

4.13.6 Awareness

It was discerned from the interviews that ecological monitoring at burrow pits was reliant on operators. This assumed that the operators could accurately identify all possible species in the area. In relation to this, there were no records of training/induction/awareness available to ensure the validity of this assumption. This thus undermines the validity of the ecological monitoring at these points. Ecological-monitoring representatives.

Finding	Rating
no records of training/induction/awareness in respect to ecology	non-compliant

At the Xakao burrow pit, there appeared to be a deliberate effort to avoid the destruction of protected floral species. Several trees were left standing. The concern, however, was that the management was not well guided as the trees were left on sand island, with some having their roots partially exposed.

Finding	Rating
deliberate effort to avoid the destruction of protected floral species at some burrow pits	Partially compliant

- Soil erosion monitoring and management

Finding	Rating
Soil erosion management being doesn't, but no evidence of monitoring	Partially compliant

Clearing of vegetation

Aerial photography, and ground assessments indicated that clearing of vegetation was confined to the work areas. However, as baseline landcover maps had not been developed, it was difficult to ascertain this observation. In spite of the missing documentation, there appeared to be no areas of unnecessary land clearing.

4.14 Water quality monitoring

- Map availed

Finding	Rating
Locations of water sampling points clearly indicated on map	compliant

Hydrogeology and hydrology both done



Finding	Rating
both Hydrogeology and hydrology done	compliant

Comparison to BOS 93, instead of BOS 32

Finding	Rating
Comparison to BOS 93, instead of BOS 32	Partially compliant

Reports availed

Finding	Rating
Water quality reports availed	compliant

Water Quality results availed

Finding	Rating
Water Quality results availed	compliant

Performance does not meet standard –treated water released without meeting standard

Finding	Rating
treated water released without meeting standard	Partially compliant

Pontoon spill management plan available

Finding	Rating
Pontoon spill management plan availed	compliant

Consistent exceedance of threshold (Calcium Carbonate, Ammonia, Phosphate)

Finding	Rating
Consistent exceedance of threshold (Calcium Carbonate, Ammonia, Phosphate)	noncompliant

Sampling at confluence with river/stream whenever possible

Finding	Rating
Sampling at confluence with river/stream whenever possible	Not rated

Trend monitoring

Finding	Rating
Trend monitoring not done	Not rated

Monitoring protocol for reproducibility

Finding	Rating
Monitoring protocol not availed	Partially compliant

Include monitoring points/transects in map

Finding	Rating
monitoring points/transects not included on map	Not rated

Summary of incident register (currently it is itemised)

Finding	Rating
Summary of incident register (currently itemised)	Not rated

5 Conclusion

The project generally complied with most of legal instruments in terms of acquisition of permits, authorizations, licences and approvals.

There was however, no systematic documentation and monitoring of project impact to the livelihoods, health system, intangible heritage, economic activities of the local community is neglected and not.

- The project failed to systematically monitor the possibility of archaeological discoveries by not having the resident archaeologist or an archaeologist on call.
- Occupational Health activities are well executed and documented.
- The contractor's camp level of upkeep is impressive

5.1 Summary per component

Table 2. Summary of compliance rate per component 1-5, with 0 being non-compliance and 5 being highest level of compliance.

Component	Compliance level	Comments
Bridge and Approach Roads	4	Generally compliant
Contractor's camp	4	Generally compliant
Wastewater Treatment Plant	2	No authorisation, not license
Asphalt Plant	4	Avail waste management plan
Cement Batching Plant	4	Liquid waste management requires attention
Samochima Burrow Pit	4	Attend to fence maintenance
Shadikekete Burrow Pit	3	Consider additional backfilling
Shakawe Burrow Pit	4	Update pre-decommissioning structural assessment
Xakao Burrow Pit	3	Improve protected species management. Avail evidence of archaeologist engagement.
Water Abstraction	4	Generally compliant
Waste Collection	5	Commendable

5.2 Summary per authorisation

Table 3. Summary of compliance rate per authorisation, permits, licenses.

Component	Compliances noted	Noncompliances noted
Bridge and Approach Roads	1	0
Contractor's camp	1	0
Wastewater Treatment Plant	3	2
Asphalt Plant	1	0
Cement Batching Plant	2	1
Samochima Burrow Pit	3	1

6 Recommendations

Table 4. Recommendations

Aspect	Recommendation
Socio-economic monitoring	Establish the changes that may have been brought by the project by monitoring changes in the economic status, crime rate, health before close of the project.
Ecological monitoring	Demonstrate a plan towards progressive realisation of systematic data collection within 21 days.
Burrow pits/Archaeological monitoring	Demonstrate conscious effort towards deliberate consideration of archaeological finds monitoring within 21 days.
Wastewater Treatment Plant	Apply for Environmental Authorisation and Licensing process within 21 days.
Burrow pits	Land Reclamation should be done for Shakawe, Samochima and Shakawe Burrow pits taking into consideration neighbouring land uses.
Decommissioning	Develop a comprehensive, budgeted decommissioning and rehabilitation program with timelines, with specific revegetation plan of relevant components sites such as burrow pits