

**IMPLEMENTATION OF AND COMPLIANCE WITH THE ENVIRONMENTAL
MANAGEMENT PLAN FOR THE MINING OF SAND AND QUARRYING FOR
CONSTRUCTION MATERIALS BY NAMIBIA CONSTRUCTION (PTY) LTD ON
THE REMAINDER OF PORTION 9 OF FARM KRUMHUK NO. 30, KHOMAS
REGION, NAMIBIA**



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TABLE OF CONTENTS

1	Introduction.....	5
1.1	Background	5
1.2	Activities	6
1.3	Terms of Reference	8
1.4	Environmental Assessment Practitioner	9
2	Environmental Management Plan: Implementation and Compliance	10
2.1	Introduction.....	10
2.2	Compliance: Environmental Management Plan.....	10
2.3	Compliance: Monitoring and Reporting.....	28
2.4	Compliance: Conditions attached to the ECC for Sand Mining	29
3	Conclusions and Recommendations	31
4	References	32
5	Annexure A	33

LIST OF TABLES

Table 1: Compliance by Namibia Construction (Pty) Ltd's with the Environmental Management Plan for the activities (sand mining, exploration and quarrying for construction materials) on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia.	11
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LIST OF FIGURES

Figure 1: Map showing the location of the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia (Source: <i>Linear Design and Mapping, September 2016</i>).....	5
Figure 2: Map showing the location of Namibia Construction's sand mining, exploration and possible quarrying activities on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia (Source: <i>Linear Design and Mapping, September 2016</i>).....	6
Figure 3: Pictures showing some of the material stockpiled at the laydown area (Source: <i>L. Maartens, 25 February 2020</i>).	7
Figure 4: "Updated" map showing the location of Namibia Construction's proposed "new" borrow pit, on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia (Source: <i>Miss Maïke Prickett, GIS-Specialist, February 2020</i>).	8
Figure 5: Pictures showing the proposed "new" borrow pit-area: a) in the foreground and looking east; and b) with the Aris Mountains in the background (Source: <i>L. Maartens, 25 February 2020</i>).	8
Figure 6: Pictures showing the eroded banks due to the recent flowing of the Usip River (the area had around 200 millimetres of rain since December 2019) (Source: <i>L. Maartens, 25 February 2020</i>).	16

ACRONYMS AND GLOSSARY

The following is a list of the abbreviations, acronyms, technical terms, and definitions used in this Report:

ADT	Articulated Dump Truck
AIDS	Acquired Immunodeficiency Syndrome
CIF	Construction Industries Federation of Namibia
CoW	City of Windhoek
DID	(Malaysian) Department of Irrigation and Drainage
EAP	Environmental Assessment Practitioner

EAPAN	Environmental Assessment Professionals of Namibia
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
GN	Government Notice
GRN	Government of the Republic of Namibia
HIV	Human Immunodeficiency Virus
I&APs	Interested and Affected Parties
IEMA	Institute of Environmental Management and Assessment
IFC	International Finance Corporation
MANWU	Metal Allied and Namibia Workers Union
MAWF	Ministry of Agriculture, Water and Forestry
MET	Ministry of Environment and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MSDS	Material Safety Data Sheet
NC	Namibia Construction (Pty) Ltd
NCE	Namibia Chamber of Environment
PDAC	Prospectors and Developers Association of Canada
PM	Particulate Matter
PPE	Personal Protective Equipment
SA	South Africa
SHE	Safety, Health, Environment
STIs	Sexually Transmitted Infections
UK	United Kingdom
UNAM	University of Namibia
VOC	Volatile Organic Compound

cm	centimetre
kg	kilogramme
km	kilometre
km/h	kilometre per hour
l	litre
m	metre
mm	millimetre
m ³	cubic metre
m ³ /day	cubic metres per day

1 Introduction

1.1 Background

Namibia Construction (Pty) Ltd (hereinafter referred to as Namibia Construction or NC) is a wholly-owned Namibian Company that was founded in 1949. At the time, the Company was called HH Schulz. In 1977, the name was changed (from HH Schulz) to Namibia Construction (Pty) Ltd.

Namibia Construction provides services in civil engineering, building construction, crushing, and the supply of ready mix concrete. The Company is qualified and experienced to perform the following activities: earth works; layer works; surfacing works; concrete works; building of bridges; drainage and culverts; and road signage and markings (see <http://www.namibia-construction.com/>).

In 2016, Namibia Construction proposed to mine sand from the Usip Riverbed and to quarry for construction materials (stone/gravel) on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia (see Figures 1 and 2).

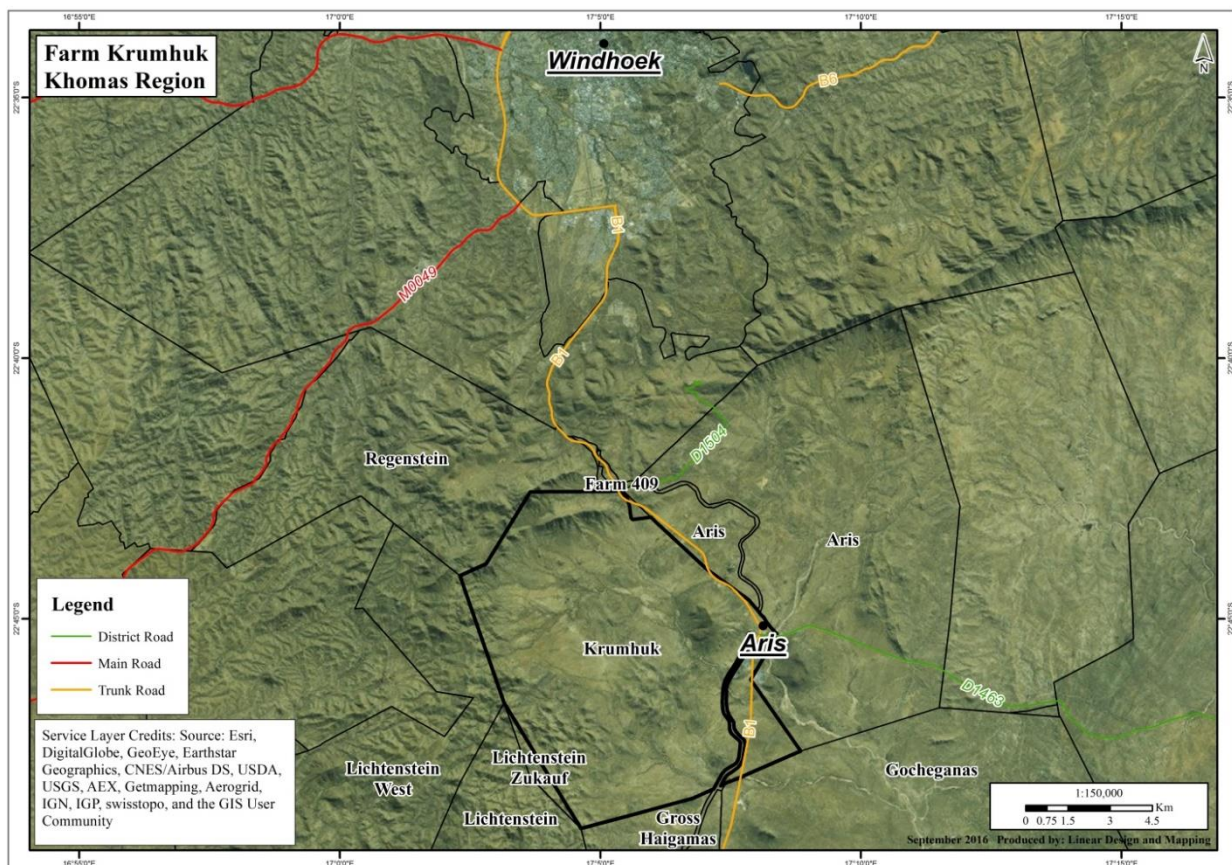


Figure 1: Map showing the location of the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia (Source: Linear Design and Mapping, September 2016).

In line with the Commencement of the Environmental Management Act (EMA), 2007 (Act No. 7 of 2007) (06 February 2012; Government Notice (GN) No. 28), the Listed Activities that may not be undertaken without an Environmental Clearance Certificate (ECC) (GN No. 29), and the Environmental Impact Assessment (EIA) Regulations (GN No. 30) (Government of the Republic of Namibia (GRN), 2012), Namibia Construction applied to the Environmental Commissioner for an ECC on 04 October 2016.

An Environmental Scoping and Management Plan Report for the Mining of Sand and Quarrying for Construction Materials by Namibia Construction (Pty) Ltd on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia (Maartens, 2017) was submitted to the Office of the Environmental

Commissioner on 31 January 2017. An ECC, with conditions attached to it, was received from the Office of the Environmental Commissioner on 06 June 2017 (see Annexure A).

1.2 Activities

At the time, Namibia Construction prepared a laydown area (see Figure 2) where sand, gravel, etc. were to be stockpiled; the area, 80 by 100 metres (m) in size, was fenced (to keep cattle and game out) and surrounded by a strip of open space that served as a firebreak.

A gravel (haul) road (~1.3 kilometre (km) in length) was constructed between the laydown area and the Usip Riverbed (where sand mining was taking place). Drainage pipes were installed in the tributaries next to the road so that the road does not wash away during the rainy season. The material to construct the road (~4,500 cubic metres (m³)) was obtained from the Wearing Course Borrow Pit (see Figure 2).

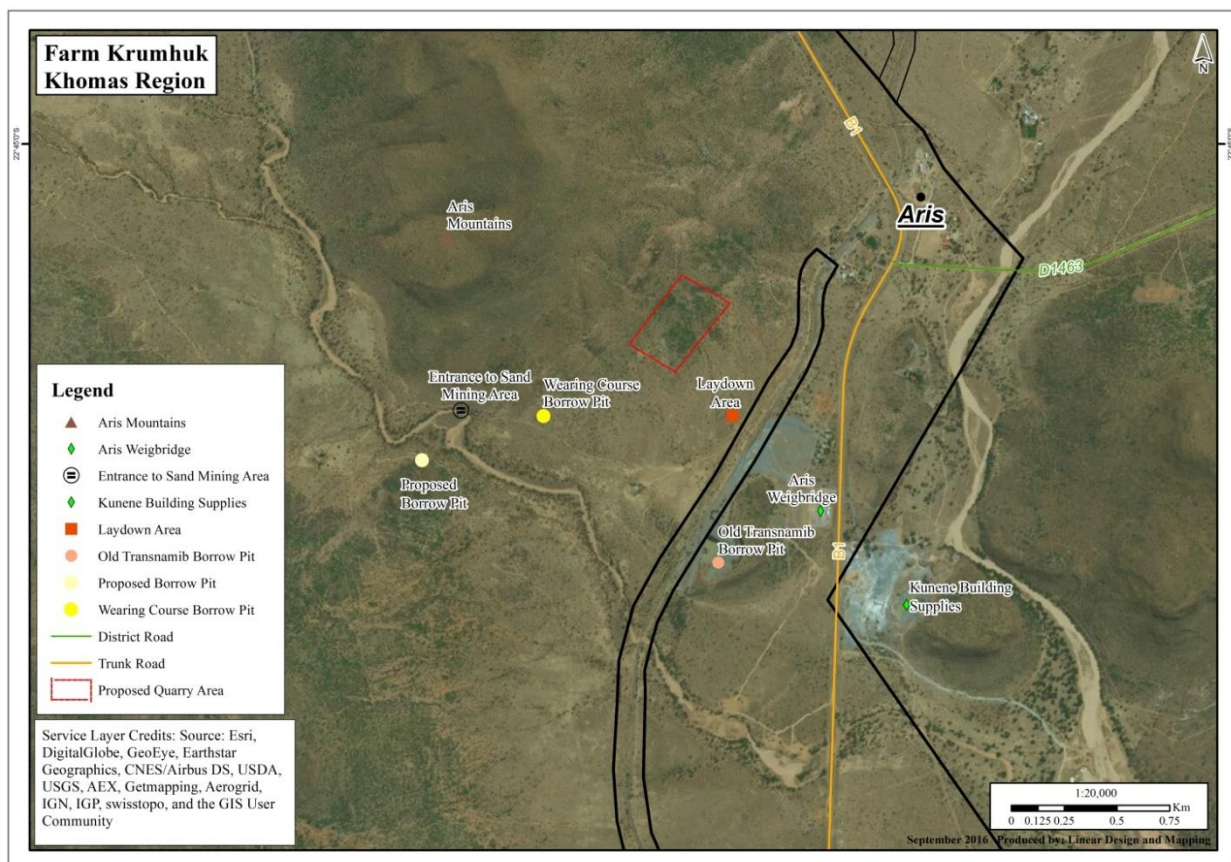


Figure 2: Map showing the location of Namibia Construction’s sand mining, exploration and possible quarrying activities on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia (Source: Linear Design and Mapping, September 2016).

Between 10,000 and 12,000 m³ of sand was mined from the Usip Riverbed by means of a 324 Excavator. Two Articulated Dump Trucks (ADTs) hauled the sand from the riverbed to the laydown area and at the laydown area, the sand was stockpiled and then transported by means of horse, trailer, and 10 m³ tipper trucks to NC’s Concrete Batch Plant in Newcastle Street, Northern Industrial Area, Windhoek. It was anticipated that ~60,000 m³ of sand will be mined from a 1.6 km strip (~1.5 m deep). However, the clay content of the sand was found to be too high, and the sand mining was put on hold.

NC also proposed to do exploration (i.e. diamond drilling: three boreholes up to 15 m depth) to determine the feasibility of opening up another borrow pit (see Figure 2: Proposed Quarry Area).

In 2017, it was unlikely that any material (i.e. gravel for road construction) will be sourced from the Proposed Borrow Pit (see Figure 2); a small amount of gravel (~1,000 m³), however, was taken from this borrow pit.

Water was obtained from a borehole ~4 km to the south of the “laydown area” (this borehole also supplies the Primary School at Aris). Around 2 m³ of water per week was needed (mainly for use by the security guard that stayed at the laydown area); water for human consumption was stored in a closed, 5,000 litre (l) tank. There is a water meter and Mr Ulf-Dieter Voigts (representing and managing *21 Krumhuk for Agricultural and Social Development*) was compensated by NC for the water used.

Water for dust suppression (~30 cubic metres per day (m³/day)) was obtained from Kunene Building Supplies; a water bowser transported and delivered the water to NC’s site on an *ad hoc* basis.

Namibia Construction proposed the use of chemical toilets at the Remainder of Portion 9 of Farm Krumhuk No. 30; Mr Ulf-Dieter Voigts (representing and managing *21 Krumhuk for Agricultural and Social Development*), however, preferred that NC’s staff make use of a pit latrine(s) (longdrop). The pit latrine was treated with a chemical toilet cleaner (Taurus-range) on a two-weekly basis.

All solid waste was removed from the site and disposed of at NC’s Concrete Batch Plant in Newcastle Street, Northern Industrial Area, Windhoek (for ultimate disposal at the Windhoek landfill).

As very little sand was mined from the Usip Riverbed, no exploration activities took place, and only a small amount of material was sourced from the Proposed Borrow Pit, all infrastructure (including the fence) at the laydown area has since been removed. Some material is still stockpiled in the area (see Figure 3).



Figure 3: Pictures showing some of the material stockpiled at the laydown area (Source: L. Maartens, 25 February 2020).

Namibia Construction will resume their activities in the area, and is also looking at opening up another borrow pit to source gravel for road construction. The proposed area is located north north-east of the laydown area, and to the west of the farm road (track) and TransNamib Holdings Ltd’s servitude (see Figures 4 and 5). The area is not considered ecologically sensitive (see Figure 5).

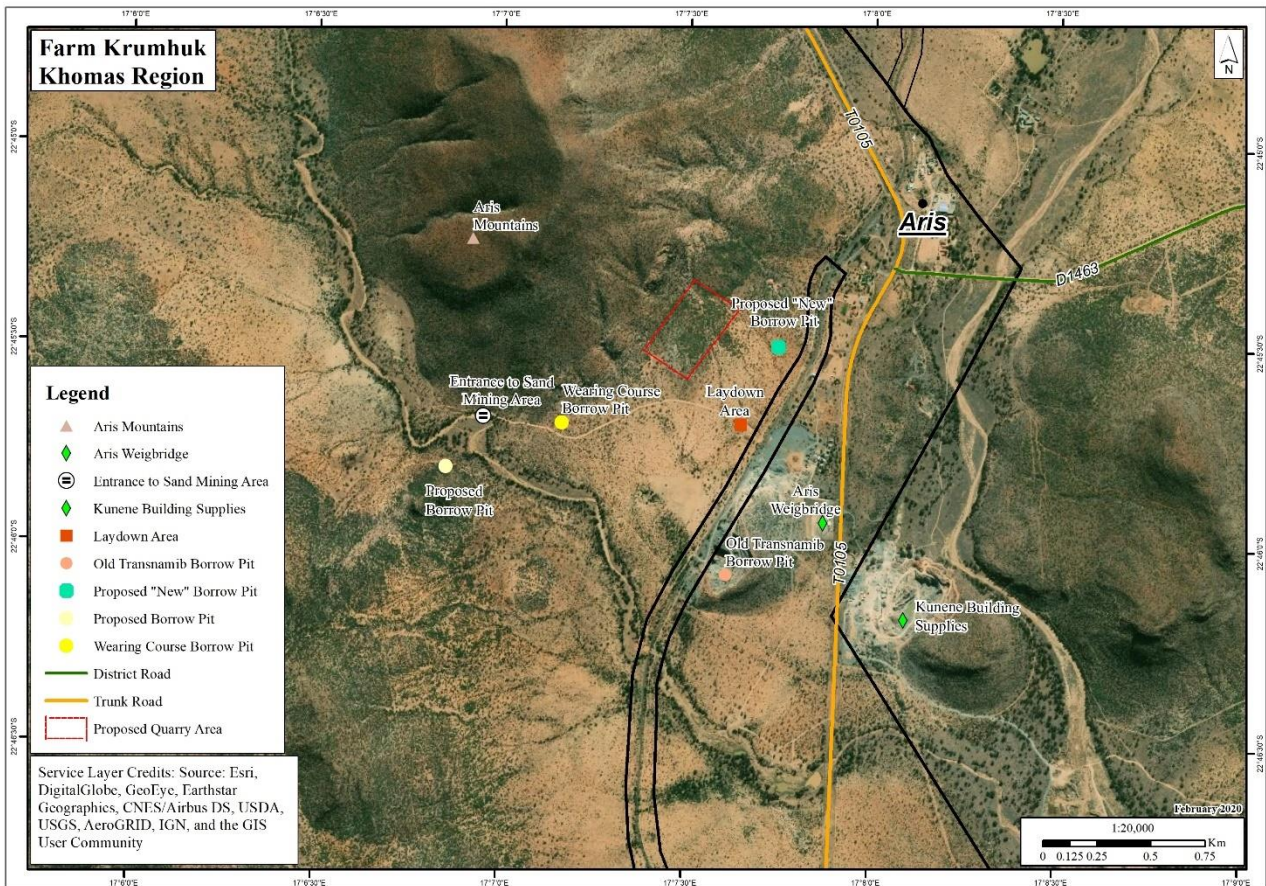


Figure 4: “Updated” map showing the location of Namibia Construction’s proposed “new” borrow pit, on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia (Source: Miss Maïke Prickett, GIS-Specialist, February 2020).



Figure 5: Pictures showing the proposed “new” borrow pit-area: a) in the foreground and looking east; and b) with the Aris Mountains in the background (Source: L. Maartens, 25 February 2020).

1.3 Terms of Reference

LM Environmental Consulting was appointed by Namibia Construction (Pty) Ltd in February 2020 to prepare a report, illustrating the implementation of and compliance with the Environmental Management Plan (EMP), in aid of the application for the renewal of the ECC for the mining of sand and quarrying for construction materials on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia.

1.4 Environmental Assessment Practitioner

The author of this Report is Dr Lima Maartens who has more than 27 years' experience in natural resource management (she gained her doctorate (Ph.D.) in Fisheries Science from Rhodes University, South Africa (SA) while working for the Namibian Ministry of Fisheries and Marine Resources (MFMR) in 2000, lecturing (University of Namibia (UNAM)), environmental science and management (De Beers Marine Namibia and the Canadian Forsys Metals Corp), and consulting). Dr Maartens is registered as a Lead Practitioner and Reviewer with the Environmental Assessment Professionals of Namibia (EAPAN) (she served on the Executive Committee during 2016/17), an Associate Member and Environmental Auditor with the Institute of Environmental Management and Assessment (IEMA) in the United Kingdom (UK), an Associate Member of the Namibia Chamber of Environment (NCE), and a Member of the Namibia Scientific Society. LM Environmental Consulting was established by Dr Maartens in October 2009.

2 Environmental Management Plan: Implementation and Compliance

2.1 Introduction

As part of the EMP performance review, the following actions were carried out:

- A meeting was held with Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd on 19 February 2020; and
- A site visit was subsequently undertaken, together with Mr Luther du Plessis, Civil Division, Namibia Construction (Pty) Ltd and Mr Ulf-Dieter Voigts (representing and managing *21 Krumhuk for Agricultural and Social Development*), to the area on 25 February 2020.

2.2 Compliance: Environmental Management Plan

In order to illustrate compliance with the EMP (see Table 1), the following colour codes were applied:

	Compliance/Completed
	In Progress/Ongoing
	Non-compliance
	Not (Currently) Applicable
	Changes made to existing EMP

Note that all activities in the area have been put on hold (after small amounts of sand and fill was mined and sourced from the Usip Riverbed and Proposed Borrow Pit, respectively). Compliance with the EMP will thus mostly be, either “ongoing” (taking into account the ongoing activities / operation of Namibia Construction), or “Not Applicable (N/A) (Currently)”.

The EMP (see Maartens, 2017; also see International Finance Corporation (IFC), 2007a, b; (Malaysian) Department of Irrigation and Drainage (DID), 2009; Prospectors and Developers Association of Canada (PDAC), 2009) is not a static document and the document should be updated as Namibia Construction’s activities progresses.

Table 1: Compliance by Namibia Construction (Pty) Ltd's with the Environmental Management Plan for the activities (sand mining, exploration and quarrying for construction materials) on the Remainder of Portion 9 of Farm Krumhuk No. 30, Khomas Region, Namibia.

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
Social and Environmental Performance			
Management and Monitoring	Social and Environmental Performance	Adhere to all Namibian Legislation, including Best Practice Guidelines.	Ongoing (Company)
		Ensure that all aspects related to the Environmental Management Plan (EMP) are implemented.	Ongoing; Namibia Construction (Pty) Ltd (NC) also has a <i>Baseline Environmental Management Plan</i> in place.
		Ensure that the Rehabilitation Plan is implemented (see Maartens, 2017: Annexure G – Kolberg, 2016b).	N/A (Currently)
Consultation and Disclosure	Social and Environmental Performance	Maintain open and direct lines of communication with the Authorities and Interested and Affected Parties (I&APs) (e.g. Mr Ulf-Dieter Voigts (representing and managing 21 Krumhuk for Agricultural and Social Development), the Ministry of Environment and Tourism (MET), the Ministry of Agriculture, Water and Forestry (MAWF), and the City of Windhoek (CoW) with regards to environmental matters.	Ongoing
		Consult with I&APs throughout the project process and adequately incorporate I&APs' concerns.	
Grievance Mechanism	Social and Environmental Performance	Implement a grievance mechanism for receiving and resolving any concerns and grievances related to the project's social and environmental performance throughout the project life cycle.	Ongoing / N/A (Currently)
		Inform all I&APs about the mechanism.	
		Address concerns promptly and transparently and in a culturally appropriate manner.	
		Keep a register of all concerns/issues received from I&APs, as well as the measures taken to address these.	
Training, including awareness and inductions	Social and Environmental Performance	Train employees and contractors in matters related to the project's social and environmental performance and Namibia's regulatory requirements.	Ongoing (as part of e.g. the toolbox talks) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Ensure adequate environmental awareness training for all senior site personnel.	
		Give environmental induction presentations	

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
Employment and procurement opportunities	Social and Environmental Performance	to all site personnel.	
		Source contracting companies/service providers/experts/workers based on merit and expertise giving preference to local contractors/service providers/experts/workers on condition that the local contractors/service providers/experts/workers have the required experience and expertise.	N/A
		Consider utilising local labour for unskilled work and to then provide training to workers in order to perform semi-skilled work; this should be done under the supervision of managers/specialists to ensure maximum local beneficiation.	N/A
		Ensure that contractors/service providers/experts adhere to the Namibian Labour, Social Security, Health and Safety, and Affirmative Action laws.	N/A
		Contracts to stipulate that all contractors/service providers have an HIV/AIDS Policy and Programme in place.	N/A
		Source maximally from local resources to ensure maximum economic beneficiation of local businesses in terms of new business sales.	Ongoing (Company)
Labour and Working Conditions	Social and Environmental Performance	Establish, maintain and improve the worker-management relationship. Base the employment relationship on equal opportunity and fair treatment and no discrimination to be allowed.	<p>NC is a member of the Construction Industries Federation of Namibia (CIF) and the Metal Allied and Namibia Workers Union (MANWU).</p> <p>Labour disputes are handled (externally) by Labour Dynamics cc.</p> <p>The following Company Policies are in place: Health and Safety; Environmental; HIV/AIDS; General Health and Safety; Alcohol and Drug Zero Tolerance; Fire Arm; Sexual Harassment; Smoking; Information Technology; Cell Phone; Life Threatening Disease; Personal Protective Equipment; and Quality.</p>
		Comply with Namibia's labour and employment laws.	
		Promote safe and healthy working conditions and the protection and promotion of worker health.	
		Document and communicate the Working Conditions and Terms of Employment.	
		Respect Collective Agreements and the right of workers to organize and bargain collectively.	
		Implement a Grievance Mechanism.	
Occupational and Community Health, Safety and Security	Social and Environmental Performance	Adhere to all Namibia's Health and Safety Regulations (Labour Act, 1992: Regulations	NC is a member of the CIF and the MANWU.

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		Relating to the Health and Safety of Employees at Work).	
		Ensure that an HIV/AIDS Policy and Programme and Health and Safety Plan are in place.	Health and Safety, HIV/AIDS, and General Health and Safety Policies are in place.
		A SHE (Safety, Health, Environment) Representative to be appointed once the staff complement reaches 20.	OSH Representatives (Shop Stewards) only; environmental matters are addressed as part of e.g. the toolbox talks (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Occupational Health and Safety Training to be provided to all employees.	The following training are provided to NC staff: OSH Representative (Health and Safety) and First Aid Level A (at OSH-Med International); and Advance Rigging "Refresh" and 7 Ton Tower Crane Refresh (at H.J.L. Trading CC). NC also has a <i>Health, Safety, & Environment Safe Operating Procedure Fire Prevention</i> in place.
		Ensure that qualified first aid can be provided at all times.	Sick or injured staff is transported to the Roman Catholic Hospital in Windhoek (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Comply with all safety regulations re. electricity supply (if applicable).	Ongoing (Company)
		Ensure that employees are trained in the use of appropriate fire fighting equipment and ensure that such equipment is on hand at all times.	NC has a <i>Health, Safety, & Environment Safe Operating Procedure Fire Prevention</i> in place.
		Provide and ensure the active use of Personal Protective Equipment (PPE) (e.g. protective glasses and dust masks in dusty working conditions, overalls, gloves, safety shoes and hard hats).	Ongoing (Company) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Supply potable water for human consumption and other domestic uses; conduct chemical testing of water samples; drinking-water quality to be in accordance with the MAWF's Water Quality Guidelines and Standards for Potable Water (2008)*.	N/A (currently); at the time, around 2 cubic metres (m ³) of water per week was needed (mainly for use by the security guard that stayed at the laydown area).
		Make suitable arrangements, as far as practicable, for the maintenance of health, the prevention and overcoming of outbreaks of disease and of adequate first aid services.	Ongoing (Company)
		Prevent communicable disease (e.g.	Ongoing (Company)

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		Sexually Transmitted Infections (STIs) such as HIV transmission): provide surveillance and active screening and treatment of employees; prevent illness among employees (through health awareness and education initiatives); ensure ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers; and promote immunization.	
		Ensure that security arrangements are in place.	At the time, NC appointed a security guard that stayed in an old caravan at the laydown area (Maartens, 2017).
		Notice or information boards relating public and occupational health and safety hazards and emergency contact details should be put up at the laydown area.	N/A (Currently)
		Transport safety: all vehicles/trucks moving on the (internal) roads should not exceed 30 kilometres per hour (km/h); vehicles/trucks moving on the B1 to adhere to the speed limits of Namibia (and NC's Company Policy if applicable).	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Enforce a strict ban on the recruitment of workers at the entrances to the laydown area and on visitors gaining entry to the workers on site.	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Restrict construction/mining/quarrying activities to demarcated areas; all other areas will be regarded as "no go" zones in order to minimise the impact on the surrounding land/properties.	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
Sand Mining, Exploration and Possible Quarrying for Construction Materials on the Remainder of Portion 9 of Farm Krumhuk No. 30: General			
Exploration Activities (Diamond Drilling), Construction of Laydown Area, Borrow Pits and Roads, Sand Mining and Quarrying	Clearing of vegetation / negative impact on floral species	Avoid the sensitive areas immediately adjacent to the development areas (areas with white quartz pebbles and the granite cliffs); keep a buffer zone of at least 10 metres (m) at the base of the cliffs, do not expand the Wearing Course Borrow Pit, and do not store any material in the area (to the north of the Wearing Course Borrow Pit).	N/A (Currently)
		Restrict construction/mining/quarrying activities to demarcated areas; all other	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt,

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		areas will be regarded as "no go" zones in order to minimise the impact on the flora.	Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Create awareness among staff and contractors about the importance of the vegetation in this area.	N/A (Currently)
		Avoid the removal of and/or damage to any protected flora species as far as feasible. A permit is required prior to the picking, cutting/chopping/picking off, taking, gathering, uprooting, damaging or destroying, or transporting any protected tree and/or plant.	N/A (Currently)
		Avoid off-road driving in the area.	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Monitor dust or Particulate Matter (PM) pollution and implement dust control/suppression methods (should it be required).	N/A (Currently); Compliant (when NC was operational in the area). Water for dust suppression (~30 cubic metres per day (m ³ /day)) was obtained from Kunene Building Supplies; a water bowser transported and delivered the water to NC's site on an <i>ad hoc</i> basis (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Implement the Rehabilitation Plan (see Maartens, 2017: Annexure G – Kolberg, 2016b).	N/A (Currently)
		Avoid removing vegetation adjacent to the Usip River. Leave a buffer zone of undisturbed vegetation at least 10 m wide on either side of the River (i.e. the excavation of sand should be at least 10 m away from the Usip River bank). Vertical slopes resulting from excavations shall not be higher than one (1) m; ideally, the zone must be sloped from the mined area to the trees and not be a vertical, 90 degree drop (in order to reduce erosion of soil away from the roots of the trees on the Usip River bank).	N/A (Currently); Compliant (when NC was operational in the area; also see Figure 6) (Mr Luther du Plessis, Civil Division, Namibia Construction (Pty) Ltd and Mr Ulf-Dieter Voigts (representing and managing 21 Krumhuk for Agricultural and Social Development), pers. comm.).
		Create weirs to slow flow of water on slopes (and to avoid erosion).	N/A (Currently)
		Implement strip mining in river bed (to increase sedimentation and decrease	N/A (Currently)

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		erosion along the river bank). Avoid blocking water flow patterns by infrastructure (e.g. use pipes under roads so that water can flow across) and avoid putting permanent structures in watercourses.	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).



Figure 6: Pictures showing the eroded banks due to the recent flowing of the Usip River (the area had around 200 millimetres of rain since December 2019) (Source: L. Maartens, 25 February 2020).

Exploration Activities (Diamond Drilling), Construction of Laydown Area, Borrow Pits and Roads, Sand Mining and Quarrying	Possible loss of the seed bank in the topsoil	Any decaying vegetation, overlying the soil layer, should be removed first and stockpiled.	N/A (Currently)
		The upper layer of soil (10 - 20 centimetres (cm)), where alluvial, to be stripped and stockpiled separately (1 – 2 m high piles to allow for proper aeration). Install drainage to protect the topsoil pile from (water) erosion and cover it to protect it from (wind) erosion.	
		Any excavated subsoil and rock also to be stockpiled for backfilling.	
Exploration Activities (Diamond Drilling), Construction of Laydown Area, Borrow Pits and Roads, Sand Mining and Quarrying	Disturbance of fauna and flora and habitat alteration	Avoid the removal of any protected flora species as far as feasible. A permit is required prior to the picking, cutting/chopping/picking off, taking, gathering, uprooting, damaging or destroying, or transporting any protected	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		tree and/or plant.	
		No open fires are allowed to be made on Farm Krumhuk and no wood or any other items are allowed to be collected and removed from Farm Krumhuk (as per Memorandum of Agreement (MoA)).	
		No animals may be kept in the area (as per MoA).	
		Ensure the availability of firefighting equipment (e.g. fire beaters, spades, extinguishers, etc.).	
		Do not introduce non-indigenous/invasive alien plant species.	
		No wild animal may be injured, fed, trapped or harmed in any way.	
		Implement a policy of "no kill" with regards to fauna (e.g. poaching for meat (snares); the collection of veld foods (e.g. tortoises); the capture/killing of birds; the killing of snakes, etc.).	
		Implement a suitable and appropriate refuse removal policy (littering could result in certain animals becoming accustomed to humans and the associated activity and result in typical problem animal scenarios).	N/A (Currently); Compliant (when NC was operational in the area). Solid waste was removed from the site and disposed of at NC's Concrete Batch Plant in Newcastle Street, Northern Industrial Area, Windhoek (for ultimate disposal at the Windhoek landfill) (Maartens, 2017).
		Avoid off-road and unnecessary nocturnal driving in the area (as it could result in the destruction of slow moving fauna, i.e. various reptiles and other nocturnal species).	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Implement and maintain (internal) track discipline with maximum speed limits (e.g. 30 km/h) (this would result in fewer faunal road mortalities and associated dust pollution problems).	
		Teach drivers to use three point turns (vs full circle turns), or restrict turning to designated areas.	
		Restrict construction/mining/quarrying activities to demarcated areas; all other areas will be regarded as "no go" zones in order to minimise the impact on the	

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		surrounding land.	
		No trespassing on adjoining properties is allowed and no game/vegetation is to be interfered with.	
Exploration Activities (Diamond Drilling), Construction of Borrow Pits and Roads, Sand Mining and Quarrying	Loss of or damage to archaeological material	All staff to be made aware of the provisions of the National Heritage Act 27 of 2004 with regard to the protection of all archaeological sites and the need to report any new finds.	N/A (Currently)
		Carefully examine the area before any site preparation/excavation is undertaken.	
		Implement the Chance Finds Procedure (see Maartens, 2017: Annexure D): should a possible or suspected site be discovered (e.g. a grave), immediately stop work, cordon the area off and photograph the area/site; immediately inform the project manager/supervisor, and contact Dr Kinahan, the National Heritage Council of Namibia, and the Police in Windhoek.	
		Under no circumstances are archaeological and/or cultural heritage sites to be disturbed or any relics to be removed from such a site.	
Exploration Activities (Diamond Drilling), Construction of Borrow Pits and Roads, Sand Mining and Quarrying	Pollution of biophysical environment (air, soil and water)	No open fires are allowed to be made on Farm Krumhuk (as per MoA). Cooking appliances (e.g. gas stoves) are to be properly maintained and ventilated.	N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Pit latrines to be provided by NC and used by the staff.	N/A (Currently). At the time of operation, there was one pit latrine; 20 kilogrammes (kg) of builder's lime was added to the pit latrine at the start and the pit latrine was treated with a chemical toilet cleaner (Taurus-range) on a two-weekly basis afterwards (Maartens, 2017).
		Sanitary wastewater to be released into a French drain system. Use bio-degradable detergents on site.	N/A (Currently)
		Vehicle maintenance/servicing/washing not to be allowed anywhere on site.	N/A (Currently)
		Fuel tanks (portable), gas cylinders and chemicals (if relevant) are to be properly stored and transported.	N/A (Currently). At the time of operation, a service truck delivered fuel to the area on a daily basis (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		All diesel generators on site (if relevant) to	N/A

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		be placed on concrete slabs/a tarpaulin sail.	
		Oil and grease traps or sumps to be installed and maintained.	N/A (Currently)
		Immediately report and clean up any accidental hydrocarbon spill: Sunisorb, Drizit, Peatsorb can be used to clean up small spills; in case of larger spills, the spill together with the polluted soil should be removed and disposed of at e.g. a biological remediation site; ensure the availability of absorbent pads and/or spill kits and ensure that personnel are trained in their use.	N/A (Currently)
		Enforce proper waste (hazardous and non-hazardous) management practices (as per Waste Management Plan) – waste and litter to be disposed of in scavenger and weatherproof bins and the refuse to be collected and disposed of at least once a week.	N/A (Currently); Compliant (when NC was operational in the area). Solid waste was removed from the site and disposed of at NC's Concrete Batch Plant in Newcastle Street, Northern Industrial Area, Windhoek (for ultimate disposal at the Windhoek landfill) (Maartens, 2017).
		Return overburden to mined-out quarry (to prevent the accumulation of exposed, stagnant water) and rehabilitate (the mined-out quarry).	N/A (Currently)
Exploration Activities (Diamond Drilling, including Rigs, Vehicles, Generators)	Pollution of biophysical environment (soil and groundwater)	Use biodegradable and non-toxic drill fluids/additives.	N/A (Currently)
		All diesel generators on site to be placed on a tarpaulin sail.	
		Oil traps to be installed in appropriate places to collect potential toxic materials.	
		Immediately report and clean up any accidental hydrocarbon spill: Sunisorb, Drizit, Peatsorb can be used to clean up small spills; in case of larger spills, the spill together with the polluted soil should be removed and disposed of at e.g. a biological remediation site.	
		Ensure the availability of absorbent pads and/or spill kits and ensure that personnel are trained in their use.	
		(Backfill or) seal all drill holes with a steel or uPVC casing equipped with a secure cap (to prevent groundwater contamination from taking place through the drill holes).	

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		<p>Drill cuttings not to be used for backfilling; use clean sand or clay where possible.</p> <p>Drill holes not to be used as pit latrines and/or for the disposal of waste.</p>	
<p>Exploration Activities (Diamond Drilling), Construction of Laydown Area, Borrow Pits and Roads, Sand Mining and Quarrying</p>	<p>Soil erosion</p>	<p>Sediment mobilization and transport: reduce or prevent soil erosion (schedule activities to avoid heavy rainfall periods; contour and minimise length and steepness of slopes; mulching to stabilize exposed areas; re-vegetate areas promptly (if feasible); and design channels and ditches for post-construction flow). Note that the area(s) towards and adjacent to the drainage line(s) are easily eroded and further development may exacerbate this problem.</p> <p>Road design: limit access road gradients to reduce run-off induced erosion; provide adequate road drainage based on road width, surface material, compaction and maintenance.</p> <p>Structural (slope) stability: provide effective short-term measures for slope stabilization, sediment and subsidence control until long-term measures (during operations) can be implemented; provide adequate drainage systems to minimise and control infiltration.</p>	<p>N/A (Currently)</p>
<p>Traffic, presence and movement of machinery</p>	<p>Air quality (dust or Particulate Matter (PM) pollution)</p>	<p>Minimise dust generation from vehicles on the roads; all vehicles/trucks moving on the gravel roads should not exceed 60 km/h; all vehicles, trucks moving within Farm Krumhuk should not exceed 30 km/h.</p> <p>Minimise the area in which the movement of vehicles will take place to reduce the effects of dust pollution.</p> <p>Avoid the excavation, handling and transport of erodible materials under high wind conditions or when a visible dust plume is present.</p> <p>Maintain the road surface to preserve surface characteristics (e.g. texture and roughness).</p>	<p>N/A (Currently); Compliant (when NC was operational in the area) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).</p>

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		Use dust control/suppression methods (if needed), such as applying water or non-toxic chemicals to minimise dust (oil and oil by-products is not a recommended measure to control road dust).	N/A (Currently); Compliant (when NC was operational in the area). Water for dust suppression (~30 m ³ /day) was obtained from Kunene Building Supplies; a water bowser transported and delivered the water to NC's site on an <i>ad hoc</i> basis (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
Traffic, presence and movement of machinery (exhaust from diesel engines)	Air quality & Occupational and Community Health and Safety	Implement manufacturer recommended engine maintenance programmes (to control vehicle emissions: carbon monoxide (CO), nitrogen oxides (NO _x), sulphur dioxide (SO ₂), Particulate Matter (PM) and Volatile Organic Compounds (VOCs)).	Ongoing (Company) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
Traffic, movement of machinery	Occupational and Community Safety	<p>Adopt best transport safety practices by implementing the following measures: emphasize safety aspects among drivers; improve driving skills and require licensing of drivers; adopt limits for trip duration; avoid dangerous routes and times of day; and use speed control devices.</p> <p>Regularly maintain vehicles and use manufacturer approved parts.</p> <p>Use locally sourced materials (where possible) to minimise transport distances.</p> <p>Employ safe traffic control measures, including the use of traffic and safety warning signs and flag persons to warn of dangerous conditions.</p>	<p>Ongoing (Company)</p> <p>All trucks are fitted with vehicle tracking devices (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).</p>
Sand Mining in the Usip Riverbed			
Sand Mining	Changes to river morphology, habitat alteration, erosion	<p>The excavation of sand to be at least 200 m from any developed areas/plots in the flood plains and on the river banks.</p> <p>Do not pollute, block or deflect the normal underground flow of water in the Usip River, as well as the periodic visible run-off and floods.</p> <p>Base the (sand) mining volume on the measured annual replenishment (of sand).</p> <p>Establish an absolute elevation below which no extraction may occur (the "redline"). The MAWF requires that excavation shall under no circumstances expose the ground water table and shall have slopes not higher than</p>	N/A (Currently)

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		<p>4 m. Vertical slopes resulting from excavations shall not be higher than 1 m.</p> <p>Limit in-stream mining methods to bar skimming.</p> <p>Extract sand from the downstream portion of the bar.</p> <p>Concentrate in-stream mining activities to minimise the area of disturbance.</p> <p>Review, on an annual basis, the cumulative effects of sand extraction.</p> <p>Maintain river channel flood discharge capacity (flood capacity in the river to be maintained in areas where there are significant flood hazards to existing structures or infrastructure).</p> <p>Establish a long-term monitoring programme (to monitor changes in bed elevation and channel morphology, and riparian habitat upstream and downstream of the in-stream mining site).</p> <p>Minimise activities that release fine sediment to the river (i.e. no washing, crushing, screening, stockpiling, or plant operations to occur at or below the stream's "average high water elevation").</p> <p>Retain the riparian buffer at the edge of the water and against the river bank (where feasible; the riparian zone is necessary to the integrity of the ecosystem providing habitat for invertebrates, birds and other wildlife).</p> <p>Limit in-stream mining to take place during the dry season only.</p> <p>Follow the following setbacks and mining envelope levels (for in-stream mining): the excavation must be setback for a minimum distance of 10 m from the main channel bank toward the flow channel; stockpiles (if applicable and where feasible) to be located 30 m to the right or left of the main channel bank; the minimum depth of the excavation or redline to be at one (1) m deposition above natural thalweg elevation; a maximum allowable mining depth of 1.5 m.</p>	

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
Sand Mining, Exploration and Possible Quarrying for Construction Materials on the Remainder of Portion 9 of Farm Krumhuk No. 30: Resource Use			
Energy Management	Resource use (e.g. coal) / depletion of natural resources	Promote the sustainable use of energy (that will result in the reduction of use and cost reductions) (e.g. energy efficient light sources).	N/A (Currently)
		Raise awareness amongst the staff and contractors/service providers (to save energy).	N/A
Water Management	Resource use / depletion of natural resources	Ensure prudent use of water in all activities.	Ongoing (Company) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Implement a water conservation program, promoting the continuous reduction in water consumption; treatment and disposal costs commensurate with the magnitude and cost of water use.	
		Water storage tanks to be insect and animal-proof and to be covered to reduce evaporation.	N/A (Currently); Compliant (when NC was operational in the area). The 5,000 litre (l) water tank was covered (Maartens, 2017).
		Record monthly water meter readings (to demonstrate low water consumption); should consumption exceed 20 cubic meters per month (m ³ /month) then the reason(s) therefore should be recorded.	N/A (Currently)
Sand Mining, Exploration and Possible Quarrying for Construction Materials on the Remainder of Portion 9 of Farm Krumhuk No. 30: Hazardous Materials Management			
Hazardous materials management	Social and Environmental Performance	Establish hazardous materials management priorities (based on hazard analysis of risky operations).	N/A (Currently)
		Avoid, or minimise the use of hazardous materials.	
		Prevent uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that may result in fire or explosion.	
		Implement management controls (procedures, inspections and training, communication and drills) to address residual risks.	
Hazardous materials management	Pollution of biophysical environment (soil and water)	Implement prevention and control measures for the use, handling and storage of hazardous materials: <u>Materials transfer (if relevant)</u> : regularly inspect, maintain and repair fittings/pipes/hoses; make use of drip trays/other drip containment measures at	Ongoing (Company) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		<p>connection/possible overflow points; <u>Overfill protection if relevant</u>): use trained filling operators; install gauges on tanks to measure the volume inside; make use of dripless hose connections (vehicle tanks) and fixed connections (storage tanks); use a catch basin/drip tray around the fill pipe to collect spills;</p> <p><u>Reaction, fire, and explosion prevention</u>: hazardous materials to be stored in marked containers and separate (from non-hazardous materials); incompatible hazardous materials (acids, bases, flammables, oxidizers, reactive chemicals) to be stored in separate areas and with containment facilities separating material storage; smoking or working with open flames not to be permitted in the presence of these substances; limit access to hazardous waste storage areas and clearly label and demarcate the area; conduct regular inspections of the areas and document the findings; prepare and implement spill response and emergency plans; train employees in the use of appropriate fire fighting equipment and ensure that such equipment is on hand at all times.</p> <p>Train workers on the correct transfer and handling of fuels and chemicals (if relevant) and the response to spills.</p> <p>Immediately report and clean up any accidental hydrocarbon spill: Sunisorb, Drizit, Peatsorb can be used to clean up small spills; in case of larger spills, the spill together with the polluted soil should be removed and disposed of at e.g. a biological remediation site.</p>	
Hazardous materials management	Occupational Health and Safety	<p>Implement hazard communication and training programmes (including information on Material Safety Data Sheets (MSDS)) to make employees aware of workplace chemical hazards and how to respond to these.</p> <p>Provide and ensure the active use of PPE.</p>	<p>Ongoing (Company). The only hazardous materials used, is fuel (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).</p> <p>Ongoing (Company) (Mr Wilfried Schmidt,</p>

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
			Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
Sand Mining, Exploration and Possible Quarrying for Construction Materials on the Remainder of Portion 9 of Farm Krumhuk No. 30: Waste Management			
Waste management: non-hazardous and hazardous	Pollution of biophysical environment	Ensure that a Waste Management Plan is in place. The generation of waste should be avoided as far as practicable; where it cannot be avoided, waste should be reduced, re-used and recovered (including recycling and composting) (e.g. set up collection points for the recycling of solid waste); where waste cannot be reduced, re-used and/or recovered, it should be disposed of in an environmentally sound manner.	Ongoing (Company). The City of Windhoek, as well as Rent-A-Drum, collect (wheely bins and skips, respectively) and remove waste from the Concrete Batch Plant in Newcastle Street, Northern Industrial Area, Windhoek (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
		Institute and maintain good housekeeping and operating practices; littering is not allowed.	N/A (Currently); Compliant (when NC was operational in the area). Solid waste was removed from the site and disposed of at NC's Concrete Batch Plant in Newcastle Street, Northern Industrial Area, Windhoek (for ultimate disposal at the Windhoek landfill) (Maartens, 2017).
		Waste generated during construction should not be disposed/stored near any surface water source in the area.	N/A (Currently); Compliant (when NC was operational in the area).
		Generators to be placed on concrete slabs/tarpaulin sails (if applicable).	N/A (Currently)
		Runoff from areas where surface water might have become contaminated should be captured and treated in accordance with the MAWF's Water Quality Standards for Effluent (2008); uncontaminated runoff should be diverted around areas where such water might become contaminated. Contaminated water should not be allowed to enter the Usip River or its tributaries.	
		Non-hazardous and hazardous waste to be collected and stored separately.	
		Non-hazardous waste: refuse (that will not be recycled) to be stored in covered refuse bins, collected on a regular basis and disposed of at the Windhoek Landfill.	
Hazardous waste: recycle petroleum (fuels and lubricants) waste products and collect and recycle batteries and print cartridges (if			

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		relevant). The remainder to be transported to the hazardous waste disposal site in Windhoek.	
Waste management: sanitary	Pollution of biophysical environment	Pit latrines to be provided by NC and used by the staff.	N/A (Currently). At the time of operation, there was one pit latrine; 20 kg of builder's lime was added to the pit latrine at the start and the pit latrine was treated with a chemical toilet cleaner (Taurus-range) on a two-weekly basis afterwards (Maartens, 2017).
		Sanitary wastewater to be released into a French drain system.	N/A (Currently)
		Ensure that the discharge of sanitary wastewater to land conform to the regulatory requirements (MAWF's Water Quality Standards for Effluent, 2008).	
Wastewater management - wastewater treatment	Pollution of biophysical environment	Ensure that the discharge of process wastewater and/or sanitary wastewater and/or wastewater from utility operations and/or stormwater to land conform to the regulatory requirements (MwAF, 2008).	N/A (Currently)
		Runoff from areas where surface water might have become contaminated should be captured and treated in accordance with the MAWF's Water Quality Standards for Effluent (2008); uncontaminated runoff should be diverted around areas where such water might become contaminated.	
Wastewater management - stormwater management	Soil erosion	Regular inspection and maintenance of permanent erosion and runoff control features.	N/A (Currently)
Sand Mining, Exploration and Possible Quarrying for Construction Materials on the Remainder of Portion 9 of Farm Krumhuk No. 30: Rehabilitation & Decommissioning			
Rehabilitation	Social and Environmental Performance	Ensure that the Rehabilitation Plan is implemented (see Maartens, 2017: Annexure G – Kolberg, 2016b). Rehabilitation to take place on a continuous basis.	N/A (Currently)
		Drill dust to be raked into already disturbed areas (e.g. tracks), or the dust to be removed to a dump site.	
		If water is struck while drilling, a sump must be built to capture the mud; the water must be left to evaporate; salt crusts must then be covered with gravel and topsoil /	

Aspect	Impact	Mitigation & Management Measures	Compliance & Comments
		<p>removed.</p> <p>Return overburden to mined-out quarry (to prevent the accumulation of exposed, stagnant water) and rehabilitate (the mined-out quarry).</p> <p>Disturbed areas to be backfilled with rocks and subsoil, and then the topsoil/vegetation layers.</p> <p>Manually rip (using picks or rakes) disturbed areas where compaction has taken place; avoid creating parallel furrows (this will promote erosion).</p> <p>Reshape all disturbed areas to their original contours / manually rip disturbed areas, where compaction has taken place.</p> <p>Manually remove all weedy / invasive alien species that are present at the site.</p> <p>Adequately drain pipelines and tanks prior to decommissioning (to avoid pollution of the biophysical environment (soil and groundwater)).</p>	
Decommissioning	Social and Environmental Performance	<p>Clean out the oil traps, seal all petrol, diesel, oil and grease containers and remove these from the site(s) to the hazardous waste facility in Windhoek.</p> <p>Remove all equipment, waste, temporary structures, etc. from the site(s).</p> <p>Inform the Ministry of Environment and Tourism to assess the rehabilitation effort for approval and signoff.</p>	N/A (Currently)

*The Department of Water Affairs (DWA), Ministry of Agriculture, Water and Rural Development (MAWRD) prepared Water Quality Guidelines and these were adopted in 1998 (MAWRD, 1998). In 2008, draft (Water Quality Guidelines and Standards for Potable Water, as well as) Water Quality Standards for Effluent were prepared (Ministry of Agriculture, Water and Forestry (MAWF)) to become Regulations under the Water Resources Management Act 24 of 2004.

2.3 Compliance: Monitoring and Reporting

In order to illustrate Namibia Construction’s compliance with the proposed “monitoring and reporting” (see Maartens, 2017), the following colour codes were applied:

	Compliance/Completed
	In Progress/Ongoing
	Non-compliance
	Not Applicable
	Changes made to existing EMP

Type	Parameter	Frequency	Compliance
River morphology	Volume of sand removed	Monthly (before the 7 th of each month; as per conditions to the authorization granted by the Ministry of Agriculture Water and Forestry for the removal of sand from the Usip River	N/A (10,000-12,000 cubic metres (m ³) only were removed by Namibia Construction (Pty) Ltd (NC))
River morphology	Volumes of sand replenished and mined, including cumulative impacts	Annual	N/A
Changes in bed elevation and channel morphology, and riparian habitat upstream and downstream of the in-stream mining site	See Department of Irrigation and Drainage (DID), Ministry of Natural Resources and Environment Malaysia (2009)	Annual and Long-Term Monitoring Programme (if the agreement (for the removal of sand) between Mr Ulf-Dieter Voigts and Namibia Construction (Pty) Ltd is extended)	N/A
Water consumption	Volume of water consumed	Monthly (and if consumption exceeds 20 cubic centimetres (cm ³) per month, record the reason)	N/A (around 2 m ³ of water per week only was needed (mainly for use by NC’s security guard that stayed at the laydown area))
Stormwater and soil erosion	Soil erosion rates	<i>Ad hoc</i> (rainy season)	N/A (NC’s activities in the area were short-lived)
Environmental Management Plan	Environmental performance / corrective measures to be taken as or when required	Internal audits (monthly)	N/A (NC’s activities in the area were short-lived)
		External audits (annual)	N/A (NC’s activities in the area were short-lived)

Once Namibia Construction resumes their activities in the area (i.e. sourcing material from the Proposed Borrow Pit and Proposed “New” Borrow Pit, and possibly Exploration and Quarrying for Construction Materials), it is advised that Namibia Construction implements the recommendations related to “monitoring and reporting”.

2.4 Compliance: Conditions attached to the ECC for Sand Mining

In order to illustrate Namibia Construction's compliance with the "Conditions attached to the ECC" (see Annexure A), the following colour codes were applied:

	Compliance/Completed
	In Progress/Ongoing
	Non-compliance
	Not Applicable
	Changes made to existing EMP

Condition	Compliance
In the case of private land not owned by the lease holder an affidavit should be obtained regarding consent of the concerned land owner (s) for carrying out the mining operation.	See Maartens (2017 - ...an agreement for the removal of sand during the period 01 September 2015 until 31 August 2017 is in place between Mr Ulf-Dieter Voigts (representing and managing 21 Krumhuk for Agricultural and Social Development) and Namibia Construction (Pty) Ltd (NC)). Compensation is paid to Mr Voigts monthly; NC is in the process of negotiating a new contract / agreement with Mr Voigts (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
Valid permit from the Relevant Competent Authority to be obtained for riverbed sand mining, vegetation clearing of protected plant species and boreholes drilling prior to commencement of the project.	An application for a Sand Mining Permit was submitted by Namibia Construction (Pty) Ltd (NC) to the Permanent Secretary, Ministry of Agriculture Water and Forestry (MAWF) on 20 October 2016, again on 21 November 2016, and again on 01 August 2017. A representative from NC followed up with Mr Franciskus Witbooi, Deputy Director Law Administration, MAWF in person on 19 February 2020 and was informed that the MAWF has not been issuing separate Permits for Sand Mining for the last few years (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.). No vegetation has been cleared / protected plant species removed. No boreholes have been drilled.
All conditions provided by the Relevant Competent Authority with regards to riverbed sanding mining must be complied with.	Ongoing
The Holder shall erect a signboard not smaller than 70 cm in height and 100 cm in width, at the major entrance/s to each of its Sand Mining Site /Area, specifying the duration of the ECC validity and the name of the ECC holder, and a contact name and number for enquiries.	
Mining shall be done in layers of 1 m depth to avoid ponding effect and after first layer is excavated, the process will be repeated for the next layers; All possible precaution as identified in the Environmental Management Plan shall be complied with to prevent and mitigate potential impacts.	N/A
No exposure of groundwater should take place in respect of sand mining activities undertaken within a riverbed.	N/A; also see Maartens (2017: Annexure E - Botha and Van der Merwe (2016) - <i>Depth to groundwater level in the area has an average depth of 40 mbs with some shallower water levels along the banks of the Usip River. Boreholes have an average yield of 4 m³/h and are drilled to an average depth of 75 m.</i>
Depending upon the location, thickness of sand, deposition, agricultural land/river bed, the method of mining may be manual, semi-mechanized or mechanized; however, manual method of mining shall be preferred over any other method.	The method of mining was mechanized.

The ECC holder shall keep a correct account of quantity of sand mined out, dispatched from the site, mode of transport, registration number of vehicle, person in-charge of vehicle and site plan. This should be produced before inspectors at any time.	Logs of the loads of material transported to NC's Concrete Batch Plant in Newcastle Street, Northern Industrial Area, Windhoek were kept. Note that there is still some material stockpiled at the laydown area (that will be removed at a later stage; see Figure 3) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
Restricted working hours: sand mining operation has to be carried out between 7 am to 5 pm.	
Pollution due to dust, exhaust emission or fumes during mining and processing phase should be controlled and kept in permissible limits specified under environmental laws.	
Restoration of flora affected by mining should be done immediately. Twice the number of trees destroyed by mining be planted preferably of indigenous species.	N/A
No overhangs shall be allowed to be formed due to mining and mining shall not be allowed in areas where subsidence of rocks is likely to occur due to steep angle of slope.	N/A
No extraction of stone / boulder / sand in landslide prone areas.	N/A
Dumping of waste shall be done in earmarked places as approved in the plan.	All solid waste was removed from the site and disposed of at NC's Concrete Batch Plant in Newcastle Street, Northern Industrial Area, Windhoek (for ultimate disposal at the Windhoek landfill). Note that there is still some material stockpiled at the laydown area (that will be removed at a later stage; see Figure 3) (Mr Wilfried Schmidt, Contract Manager, Civil Division, Namibia Construction (Pty) Ltd, pers. comm.).
Sand mining sites should not be located within 100 meters from the edge of National Highway and railway line, 60 meters from water reservoir, 25 meter from the edge of other roads except on special exemption from relevant authority.	N/A
Junction at take-off point approach road with main road be properly developed with proper width and geometry required for safe movement of traffic by lease holder at his own cost.	See Maartens (2017: Annexure C - Letter from the Chief Executive Officer, Roads Authority, 21 August 2016). Permission was also given to NC by TransNamib Holdings Ltd for a temporary level crossing at km 243.07 for 5 years (letter from the Executive: Engineering and Technical Services, 09 February 2017).

Once Namibia Construction resumes their activities in the area (i.e. sourcing material from the Proposed Borrow Pit and Proposed "New" Borrow Pit, and possibly Exploration and Quarrying for Construction Materials), it is advised that Namibia Construction adheres to the conditions attached to the (renewed) ECC for sand mining.

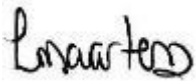
3 Conclusions and Recommendations

Namibia Construction's activities in the area have been very limited since 2017. Once the Company resumes their activities (i.e. sourcing material from the Proposed Borrow Pit and Proposed "New" Borrow Pit, and possibly Exploration and Quarrying for Construction Materials), the following is advised:

Namibia Construction (Pty) Ltd and their employees should implement and observe the Environmental Management Plan, including the recommendations related to "monitoring and reporting", and especially the Rehabilitation Plan (see Kolberg 2016a, b), on an ongoing basis.

All conditions attached to the (renewed) ECC should also be implemented and observed.

Environmental performance should be regularly monitored (so that the lessons learnt can be incorporated into the improvement of the Environmental Management Plan over time) and corrective measures taken as or when required.



Dr Lima Maartens
LM Environmental Consulting

4 References

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5 Annexure A



REPUBLIC OF NAMIBIA

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05 June 2017

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

Mr W. J. Schmidt
The Director
Namibia Construction (Pty) Ltd
P. O. Box 5092
Windhoek, 9000

Dear Mr Schmidt

SUBJECT: ENVIRONMENTAL CLEARANCE CERTIFICATE FOR MINING OF SAND AND QUARRYING FOR CONSTRUCTION MATERIALS BY NAMIBIA CONSTRUCTION PTY LTD ON THE REMAINDER OF PORTION 9 OF FARM KRUMHUK NO. 30, KHOMAS REGION

The Environmental Scoping Report and Environmental Management Plan submitted are sufficient as it made provisions of the environmental management concerning the project's activities. From this perspective regular environmental monitoring and evaluations on environmental performance should be conducted. Targets for improvements should be established and monitored throughout this process.

This Ministry reserves the right to attach further legislative and regulatory conditions during the operational phase of the project. The Environmental Clearance Certificate is issued with the conditions in Appendix A printed overleaf.

On the basis of the above, this letter serves as an environmental clearance for mining of sand and quarrying for construction materials on the Remainder of Portion 9 of farm Krumhuk No. 30. However, this clearance letter does not in any way hold the Ministry of Environment and Tourism accountable for misleading information, nor any adverse effects that may arise from these activities. Instead, full accountability rests with Namibia Construction (Pty) Ltd and its consultants.

This environmental clearance is valid for a period of 3 (three) years, effective from the date of issue unless withdrawn by this office.

Yours sincerely,

Teofilus Nghitila
ENVIRONMENTAL COMMISSIONER



"Stop the poaching of our rhinos"

**APPENDIX A - CONDITIONS ATTACHED TO ENVIRONMENTAL CLEARANCE
CERTIFICATE FOR SAND MINING**

1.	In the case of private land not owned by the lease holder an affidavit should be obtained regarding consent of the concerned land owner (s) for carrying out the mining operation.
2.	Valid permit from the Relevant Competent Authority to be obtained for riverbed sand mining, vegetation clearing of protected pla species and boreholes drilling prior to commencement of the project.
3.	All conditions provided by the Relevant Competent Authority with regards to riverbed sanding mining must be complied with.
4.	The Holder shall erect a signboard not smaller than 70 cm in height and 100cm in width, at the major entrance/s to each of its Sand Mining Site /Area, specifying the duration of the EC validity and the name of the EC holder, and a contact name and number for enquiries.
5.	Mining shall be done in layers of 1 m depth to avoid ponding effect and after first layer is excavated, the process will be repeated for the next layers; All possible precaution as identified in the Environmental Management Plan shall be complied with to prevent and mitigate potential impacts.
6.	No exposure of groundwater should take place in respect of Sand mining activities undertaken within a riverbed.
7.	Depending upon the location, thickness of sand, deposition, agricultural land/river bed, the method of mining may be manual, semi-mechanized or mechanized; however, manual method of mining shall be preferred over any other method.
8.	The EC holder shall keep a correct account of quantity of sand mined out, dispatched from the site, mode of transport, registration number of vehicle, person in-charge of vehicle and site plan. This should be produced before inspectors at any time.
9.	Restricted working hours: Sand mining operation has to be carried out between 7 am to 5 pm.
10.	Pollution due to dust, exhaust emission or fumes during mining and processing phase should be controlled and kept in permissible limits specified under environmental laws.
11.	Restoration of flora affected by mining should be done immediately. Twice the number of trees destroyed by mining be planted preferably of indigenous species;
12.	No overhangs shall be allowed to be formed due to mining and mining shall not be allowed in areas where subsidence of rocks is likely to occur due to steep angle of slope.
13.	No extraction of stone / boulder / sand in landslide prone areas.
14.	Dumping of waste shall be done in earmarked places as approved in the plan;
15.	Sand mining sites should not be located within 100 meters from the edge of National Highway and railway line, 60 meters from water reservoir, 25 meter from the edge of other roads except on special exemption from relevant authority.
16.	Junction at take-off point approach road with main road be properly developed with proper width and geometry required for safe movement of traffic by lease holder at his own cost.