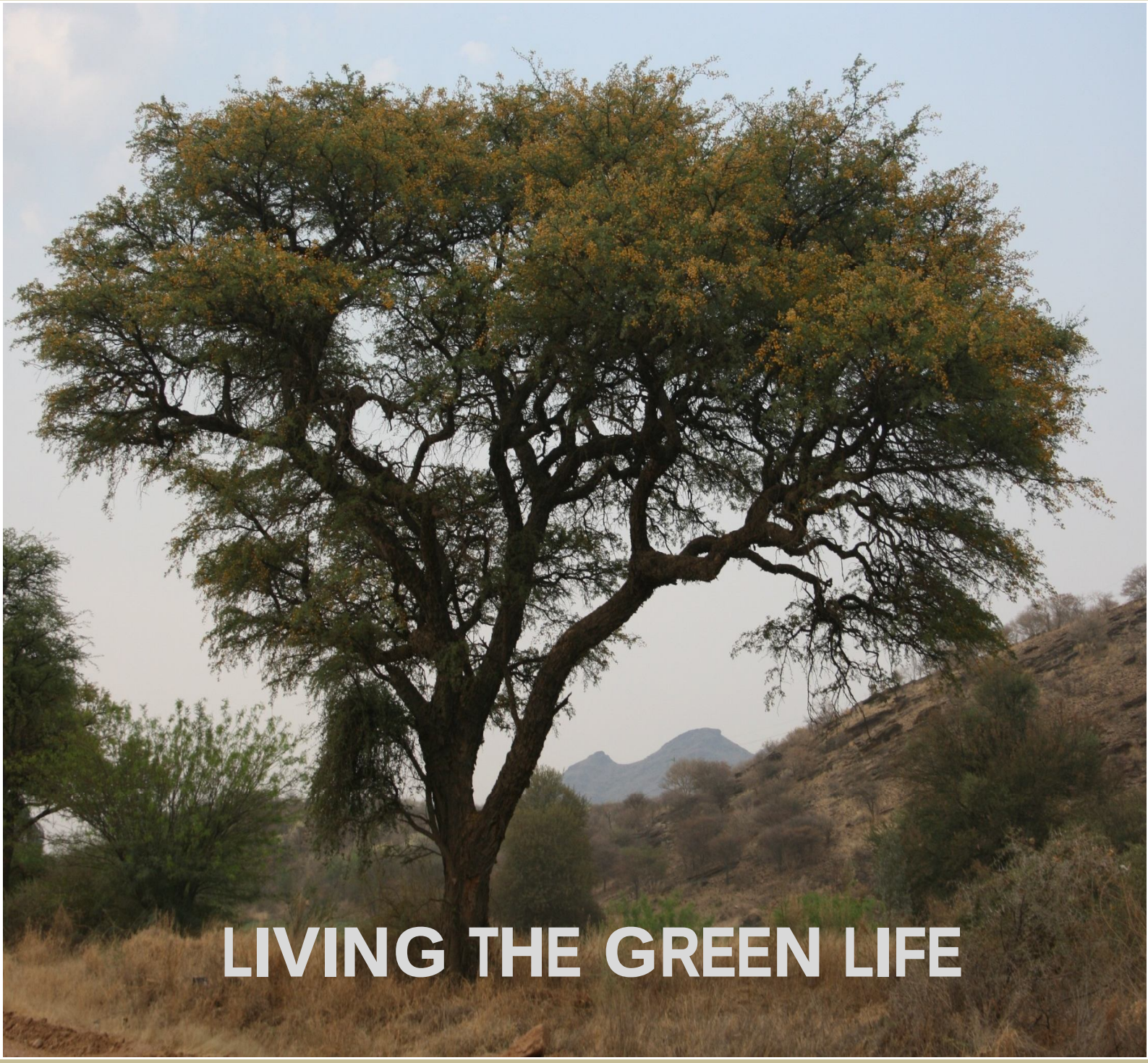
ENVIRONMENTAL MANAGEMENT PLAN

ELISENHEIM LIFESTYLE VILLAGE ESTATE

PHASE 1



FEBRUARY 2012

TABLE OF CONTENTS

Shall we not learn from life its laws, dynamics, balances?

Learn to base our needs not on death, destruction, waste but on renewal ……Learn at last to shape a civilization in harmony with the earth."

Ansel Adams, 1960

ABBREVIATIONS

ASE	Aqua Services and Engineering
CoW	City of Windhoek
ECO	Environmental Control Officer
EPDC	Elisenheim Property Development Company
ESM	Environmental Site Manager
ESMP	Environmental and Social Management Plan
MAWF	Ministry of Agriculture, Water and Forestry
POS	Public Open Spaces
PTN	Portion
RE	Resident Engineer
WWTP	Waste Water Treatment Plant

APPENDICES

1. PROJECT OUTLINE

1.1. INTRODUCTION

This document represents the Environmental and Social Management Plan (ESMP) for the construction and operational phases of the proposed Phase 1 Development of the Elisenheim Lifestyle Village Estate and follows on an Environmental Scoping Assessment (Urban Green, 2005) that was done for the larger Elisenheim Development (Portion 5 of the Farm Elisenheim No. 68). It also takes cognisance of an assessment of construction impacts on the hydrology and geohydrology (Van Vuuren, 2011) and on the bio-physical environment (Cunningham, 2011) at the Elisenheim Lifestyle Village Estate. The generic Construction Environmental Management Plan that was prepared by Urban Green (2010) was also incorporated into this ESMP.

What is an Environmental and Social Management Plan (ESMP)?

An ESMP is simply a list of management actions needed to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced. It assigns responsibilities and will be used as a checklist to monitor compliance at the site.

This Environmental and Social Management Plan (ESMP) follows on the Environmental Assessment Process and addresses the Construction and Operational Phases of the development.

Scope of the ESMP

In order to ensure a holistic approach to the management of environmental impacts during the construction and operational phases of the proposed Phase 1 this ESMP provides the methods by which proper environmental controls are to be implemented by the Contractor (s) and all other parties involved and monitored by the Environmental Site Manager (ESM), Environmental Control Officer (ECO) and Resident Engineer (RE).

The ESMP intends to guide and manage the construction and operational activities as it relates to the natural environment. It describes mitigation measures and is prescriptive, identifying specific people or organisations to undertake specific tasks.

This document however will require regular review and updating via the correct channels in order for it to effectively guide the environmental management of this project. Once the construction works are complete the operation and maintenance of the Elisenheim Lifestyle Village Estate will become the responsibility of the Developer, Elisenheim Property Development Company (EPDC) until such time that it is transferred to the City of Windhoek and the Home owners association, individual home owners and business managers.

Amendments to the ESMP

Any party involved with the Project can suggest changes to the ESMP via the ESM and RE. Such suggestions will be presented to the Environmental Forum before approval and implementation. Approved changes will be minuted and drafted into this existing ESMP in the form of an appendix or amendments.

The ESMP, once approved, becomes a legally binding document and each role-player identified in the ESMP is required to abide to the conditions stipulated in it.

1.2. PROJECT DESCRIPTION

The proposed Elisenheim Lifestyle Village Estate development forms part of the larger Elisenheim Township development situated on Portion 5 of the Farm Elisenheim No. 68, located 15 km north of the Windhoek CBD (Figure 1). The Township is a private township development within the jurisdictional boundaries of the City of Windhoek (CoW). Phase 1 of the proposed development is intended as a mix-use development (421 erven) comprising business, low and high density residential, institutional and public open space erven. A landscape framework plan (Figure 2) outlines the conceptual and physical design of the urban framework and intended mix-use development. Phase 1 encompasses two stages i.e.

- Stage 1: Provision of Bulk Services
- Stage 2: Construction of houses and businesses and operation of the Elisenheim Lifestyle Village Estate.

1.3. ENVIRONMENTAL SENSITIVE AREAS

During the Environmental Assessment, environmental sensitive areas have been identified; disturbance to these areas should be avoided as far as possible. These areas include the prominent ridges and steep slopes as well as the main drainage

lines with associated riparian vegetation. These areas will be demarcated as NO GO AREAS.

Figure 1: Locality plan of Phase 1

Figure 2 : Landscape framework Plan

2. STAGE 1: BULK SERVICES

2.1. DESCRIPTION

Stage 1 involved site formation works and construction of municipal services inclusive of building substructures.

The services which were constructed are surfaced roads, storm water structures, water and sewerage reticulation networks, a waste water treatment plant, a four mega liter reservoir and the Nubuamis load centre and electricity reticulation network as well as ancillary works.

It is important to note that **Section 2.2** indicates the rehabilitation activities to be performed in terms of construction of bulk service activities already undertaken.

2.2. REHABILITATION OF PREVIOUS ACTIVITIES

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
MANAGEMENT AND MONITORING	Ensure that the rehabilitation management plans are implemented.	• Rehabilitation plans need to be implemented by the different contractors.	EPDC need to assign specific contractors to specific areas to be rehabilitated according to plan	Elisenheim Property Development Company (EPDC) Urban and landscape design team ESM	Rehabilitation Plans to be provided by the Urban and Landscape Design Team
ROADS AND ACCESS	Prevention of erosion	• Run off from roads need to be accommodated within the Storm Water Plan. • Steep areas and road shoulders at risk of erosion need to be re vegetated or accommodated by means of gabions. • Main entrance as well as newly built bridge area (western side) needs to be levelled and topsoil added, all dead trees removed and *Prosopis* trees eradicated. • Where necessary the soil need to be stabilised by re vegetating the area with indigenous trees and	Layout Plan to incorporate mitigation measures	CoW Planning, Urbanisation & Environment division RE ESM Site Manager In-house Nursery	Lay out Plan

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		shrubs • Develop and implement an eradication plan for all *Prosopis* trees as well as all other alien invasives that have established on site.			Eradication Plan
RESERVOIR AND ACCESS ROAD	Rehabilitation of reservoir site.	**Aesthetic mitigation measures** • Trees are planted in a zig zag manner at six meters (minimum) from the reservoir wall on the perimeter of the reservoir. Trees and shrubs are also planted on the slopes of the koppie and compost socks filled with grass seeds indigenous to the area are placed at intervals along the slopes which have the advantage of establishment of grass as well as stabilizing the soil. • The following species are recommended as they do not have aggressive root systems that could interfere with the drainage system of the reservoir are frost and drought resistant and grow	Implement the Rehabilitation Plan for the Reservoir area as well as the access road. Use only the recommended species for screening and rehabilitation. Trees and shrubs to be sourced at the In House nursery.	Urban and Landscape design Team RE ESM ECO	Rehabilitation and lay out Plan

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		relatively fast: *Combretum apiculatum* ; *Combretum imberbe*; *Dombeya rotundifolia* ; *Grewia flavescens*; *Peltophorum africanum*; *Searsia lancea*; *Steganotaenia araliacea*; *Tarchonanthes camphorates; Ziziphus mucronata*. • In order for the reservoir to blend in with the natural surroundings it should be painted and shadings of a natural colour (e.g. grey tones) should receive preference. **Erosion Mitigation Measures** • Construction of a storm water pipe that runs from the reservoir to the bottom of the access road, parallel to the water supply pipe and discharge storm water in the Klein Windhoek river at the bottom. • Pipe protected by the gabion constructed to the side of the current water supply pipe. Cover			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		these pipes with a layer of a sand, compost and grass seed mix and stabilised with shade net and rocks. • Construction of four, wire mesh gabion baskets filled with rocks on the western slope of the reservoir site in the four major erosion rills to stabilise the slope and minimise run off. • Use compost filter socks along the perimeter of the site and at intervals along the north western and western slopes, to capture and treat storm water that runs off as sheet flow is recommended. • Filter socks are flexible and can be filled in place or filled and moved into position, making them especially useful on steep or rocky slopes where installation of other erosion control tools is not feasible. • Compost filter socks can be vegetated or unvegetated.			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		Vegetated filter socks can be left in place to provide long-term filtration of stormwater as a post-construction best management practice (BMP). The vegetation grows into the slope, further anchoring the filter sock. • Unvegetated filter socks can be cut open when the project is completed, and the compost spread around the site as soil amendment or mulch. Dispose of the mesh sock unless it is biodegradable. • The compost retains a large volume of water, which helps prevent or reduce rill erosion and aids in establishing vegetation on the filter sock.			
PUBLIC OPEN SPACES (POS)	Rehabilitation	• Areas disturbed on POS areas for construction of services to be identified. • Areas to be levelled and topsoil added.	Discussion and cooperation between In House Nursery manager and Urban and Landscape Design Team	Urban and Landscape design Team Engineer ESM	Lay out Plans

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• Plant indigenous trees and shrubs sourced from nursery. • Re-seed with perennial grasses occurring at Elisenheim e.g. *Antephora pubescens, Cenchrus ciliaris, Eragrostis trichophora, Fingerhuthia africana, Heteropogon contortus, Stipagrostis uniplumis* and *Triraphis ramosissima.* • Also plant shrubs and trees that occur naturally in the area. • Irrigate areas that are re seeded if not planted during rainy season.		In House nursery	
VISUAL IMPACT	To minimise a decrease in scenic quality or "sense of place".	• Architectural design should be environmental friendly and visually integrated with natural environment. • Colours, textures, and materials used should blend in with the natural environment. • No additions or alterations allowed to houses that are not on original architect plans without consultation with Home owners	Discussions and cooperation between architect, developers, engineers and Planning, Urbanisation and Environment Department of CoW Architectural guidelines should address the policy regarding building and additions to houses.	Architect Developers ESM ECO	Lay out design

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		association.			
BORROW PIT MANAGEMENT	Borrow pit area to be demarcated	• Borrow pit area clearly demarcated and decision taken on who will be responsible for removing materials from borrow pits. • Borrow pits only allowed in these designated area. • All large and protected trees to be clearly marked with red and white tape before any removal of materials is to take place. • ESM to be informed in advance if borrow pit area needs to be expanded in order to demarcate the area and to mark trees.	Regular inspection	ESM ECO Engineer	
	Rehabilitation of borrow pit area	• All borrow-pits must be rehabilitated. • Topsoil (the top layer of organic material, even if the topsoil is non-existent, the top 300mm layer of organic material) at borrow pits			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		shall be stockpiled separately and the stockpile maintained for use at the end of the contract to rehabilitate the borrow pits. • The borrow pits shall be rehabilitated by trimming the sides to a slope not steeper than 30° and evenly spreading the top soil over the entire area to allow for the growth of new vegetation. • All spoil material at the borrow pits shall be neatly shaped and no loose material will be left inside the borrow pits. • The borrow pit floor should be leveled as part of rehabilitation. • Soil left intact around all large trees need to be neatly shaped around the stem to cover all roots that have been exposed. • Branches of trees that have been damaged need to be neatly trimmed with correct equipment.			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• Final payment will not be issued unless the environmental consultant is satisfied with the obligations listed under this section (borrow pit management").			
RENEWABLE RESOURCES	To minimise or prevent impacts on resources	• Use renewable energy sources as far as possible	Development should make use of renewable resources.	Architect ESM ECO Engineers	Design and Lay out Plans
STORMWATER AND RUN OFF	Minimise run-off and erosion.	• Erosion rills and gullies evident along gravel roads need to be rehabilitated. • Disturbed areas need to be stabilised by making use of gabions and vegetation cover.	Inspection	EPDC RE ESM	
		• Sewerage lines to be placed on the banks of drainage lines outside of floodline areas. • Storm water drains and channelling need to follow natural drainage lines and should be lined with natural rocks to ensure infiltration and minimise run off. • Storm water channels	Establish protection zones before any construction starts.	CoW Planning, Urbanisation & Environment division ESM Contractor Developer	Storm water management Plan

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		accommodated next to roads. • Minimise paved or impermeable areas, rather make use of natural rocks. • Storm water Management Plan to be developed and submitted to CoW			
		• Serious consideration need to be given to Storm water management especially in terms of increased run-off from large impermeable areas i.e. streets and paved areas. • Culverts need to be constructed to replace natural drainage channels that have been cut off by streets. • Developers to follow guidelines in Drainage regulations of the CoW for internal reticulation.	Collaboration between CoW Stormwater Division and EPDC	Urban Design Team, EPDC, CoW Stormwater Division ESM RE	Storm water management Plan
		• Natural drainage lines passing through erven need to be identified and taken into consideration when placing houses on these erven.	Inspection	EPDC Site Manager	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• All collected storm water is discharged into the Klein Windhoek River at the end of Elim street with very high flow velocities with subsequent high risk of erosion of river sediments, the riverbanks need to be protected against erosion by leaving vegetation intact. • Construct gabion at bottom and sides of river to reduce the flow rate of discharged stormwater. • Run off from tar roads should not be discharged directly into the natural drainage channels where it has potential to severely erode unconsolidated river sediments. • Link stormwater discharge to the sewerage system in order to remove pollutants. • Stormwater can therefore be re used as grey water for gardens. • Sufficient capacity and structures to allow surface water to flow or drain to the Klein Windhoek River		EPDC RE Site Manager ESM Urban Design Team CoW Planning, Urbanisation & Environment division	Stormwater Management Plan

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		during flood events must be constructed to minimise a damming effect • Major Contributary to Klein Windhoek River has been replaced by Elim Street, runoff need to be accommodated along this road			
SEWAGE	Ensure correct operation of WWTP	• EPDC need to sign a contract with Aqua Services & Engineering (ASE) to manage the WWTP for next 5 years (2017). • MoU signed with CoW to have ASE manage the WWTP for the next 5 years (2017)	Compliance with contract signed. Request copy of WWTP permit from CoW.	EPDC ASE CoW	Contract MoU Permit from DWAF
	Rehabilitate areas disturbed due to construction of sewage lines.	• Gabions to be constructed at bottom and side of Klein Windhoek River to reduce flow of discharged storm water to protect the sewer lines against flood damage		EPDC RE Site manager ESM	
		• No raw sewage to be discharged into the Klein Windhoek River or onto surface.	Establish monitoring points along the line and inspect on a weekly basis.	Site manager RE ESM ASE	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• Contact Water quality division of MAWF with regards to monitoring and frequency therof with regards to water quality of final effluent.	CoW to check that final effluent comply with Special Standards for re use as determined by MAWF	EPDC ESM RE CoW	Special standard requirements as set by MAWF
WWTP	Waste water treatment plant	• Rehabilitation plan developed for this area • Screening of the area by means of vegetation screens. • Use only indigenous plants (See ***Appendix B***)	Rehabilitation Plan to be developed	Urban and Landscape designers ESM RE	Rehabilitation Plan

3. MANAGEMENT REQUIREMENTS AND ACTIONS FOR CONSTRUCTION AND OPERATION

3.1. EMP OBJECTIVES & STRATEGIES

This EMP is intended to minimise the impact of the construction and operation of Phase 1 of the Elisenheim development as identified in the *Environmental Assessment Report (Urban Green, 2005)* on the immediate and surrounding areas.

The objectives of this plan are to:

- ensure the implementation of sustainability principles through sound urban design and "green" development;
- ensure all environmental safeguards are carried out correctly;
- minimise adverse impacts on the environment;
- conserve the biodiversity of the site;
- minimise disruption to existing adjacent neighbours;
- ensure the wellbeing and upliftment of the workforce and local community;
- meet the requirements of all relevant legislation; and
- monitor the project for environmental impact.

The strategies to achieve the objectives are:

- Control soil and sediment runoff on the site.
- Control waste generated by the construction team and during the operation of the development.
- Minimise disturbance to surrounding trees, vegetation, fauna, and environmental sensitive areas.
- Control and monitor water usage and monitor water quality.
- Monitor and review environmental procedures and audit compliance to ensure standards are being maintained whilst highlighting potential areas for improvement.
- Encourage sub-contractors, designers, and suppliers to adopt environmental policies and management systems that are satisfactory to the project manager.

- Reduce the environmental impacts and their effects by adopting reasonable controls for preventing air, ground, water, or noise pollution and keeping sites clean and tidy.
- Make use of opportunities to minimise waste and to reuse or recycle materials.
- Train employees and promoting environmental awareness and commitment.
- Keep abreast of and comply with legislation, regulations, and codes of practice on environmental matters relevant to the operational activities of the proposed development.
- Advise the developer on a wellness policy with focus on components such as training, awareness raising and skills development.

3.2. RISK STATEMENT

It is important to avoid or if unavoidable, minimise impacts on the environment. Environmental and social risks exist in terms of:

- Rapid soil loss in exposed areas by erosion during rain;
- Different forms of pollution by a number of construction and operational activities;
- Loss and disturbance to biodiversity and habitats;
- Planting species that will become invasive or spread as weeds;
- Use of herbicides and pesticides;
- Increased water demand;
- Pollution of groundwater and surface water;
- Sustainability of groundwater;
- Nuisances in the form of dust, noise to neighbouring residents; and
- Minimal benefits to local communities.

The primary control measures for these risks include:

- Minimise vegetation removal;
- Building and architectural guidelines regarding building on steep slopes
- Construct erosion and sedimentation barriers;

- Cover all bare soil as soon as possible with mulch or organic matting;
- Use environmentally friendly methods for stabilising bare slope areas;
- Appoint a landscape designer;
- Monitor and minimise all possible pollution;
- Minimise roads and access as far as possible;
- Restrict topsoil stripping and reuse topsoil;
- Environmental sensitive planning of different types of land use;
- Design should incorporate large indigenous trees;
- Collection of wood on site should be forbidden;
- No fires will be allowed within construction area;
- Remove all alien vegetation that have established in disturbed areas;
- Bio control and organic treatment of pests will be recommended;
- Maximise the use of site soil;
- Maximise the use of locally indigenous vegetation;
- Water usages should be minimised and waste water recycled;
- Treat entire area as groundwater sensitive;
- Protection measures in place to avoid any surface contaminant reaching the drainage lines;
- Control dust and noise;
- On site accommodation of labourers should be prohibited; and

  introduce the 'Locals' First' policy.

4. LEGAL REQUIREMENTS

REGULATORY INSTRUMENT	PROVISIONS	REGULATORY AUTHORITY	PROJECT IMPLICATION	CONTACT PERSON
Environmental Management Act (No 7 of 2007) and Namibia's Environmental Assessment Policy (1995)	Schedule 1: Screening list of policies/plans/programme/project subject to full Environmental Assessment. "*The rezoning of land from use for nature conservation or zoned open space to any other land use*."	Ministry of Environment and Tourism (MET), Directorate of Environmental Affairs (DEA)	The design and implementation of an EMP before any construction may be undertaken on the site.	Dr. Freddy Sikabongo Tel: 061 284 2715 freddy@met.na Environmental Management Division Olavi Makuti Tel: 061 290 3518 olm@windhoekcc.org.na
Windhoek Town Planning Scheme (2005)	Allowed activities under "Residential Building" and "Residential Unit".	Minister of Regional and Local Government, Municipal Council of Windhoek	The design and implementation of an EMP before any construction may be undertaken on the site.	Mr. Erastus Negonga Tel: 061 297 2911
Windhoek Environmental Structure Plan (2004)	Indicates all sensitive and environmentally fragile zones that should be conserved and protected. The document is mainly helping in applying sound environment planning and management (Section 3.4.1, page 60).	City of Windhoek. Department of Planning, Urbanization and Environment.	Development in these areas must be subjected to visual impact assessment and the formulation of effective mitigation measures. Demarcate koppies and rocky ridges as "NO GO" areas.	Environmental Management Division Olavi Makuti Tel: 061 290 3518 olm@windhoekcc.org.na

REGULATORY INSTRUMENT	PROVISIONS	REGULATORY AUTHORITY	PROJECT IMPLICATION	CONTACT PERSON
Townships and Division of Land Amendment Act, 1992 (Act 28 of 1992)	"(I) *Whenever any area of land constitutes, by reason of its situation, a portion of an approved township, or adjoins an approved township, the Executive Committee may, by proclamation notice in the Gazette and after consultation with the Board, extend the boundaries of that township to include such area*."	Minister of Regional and Local Government	A new township needs to be created for approval by the Namibian Planning Advisory Board and the Townships Board.	Mr. Erastus Negonga Tel: 061 297 2911
Forest Act, 2001 (Act No. 12 of 2001),	Provision for the protection of various plant species.	Ministry of Agriculture, Water and Forestry (MAWF), Directorate of Forestry	A Harvesting Permit needs to be acquired from the Directorate of Forestry for the removal of certain protected tree species from the site, including *Acacia erioloba; Albizia anthelmintica; Aloe littoralis; Boscia albitrunca; Cyphostemma currorii; Erythrina decora; Euphorbia avasmontana; Ficus cordata ; Maerua schinzii; Moringa ovalifolia; Ozoroa crassinervia; Searsia lancea; Ziziphus mucronata* (See **Appendix A** for photos of these species)	Mr. Andries Uugwanga Tel: 062 501 925
Water Resources Management Act, 2004 (Act No. 24 of 2004)	Control of disposal of sewerage, the purification of effluent, the prevention of surface and groundwater pollution, and the sustainable use of water resources.	Department of Water Affairs (DEA)	Permit required for construction of a wastewater and effluent disposal treatment system Sewerage Treatment Plant Developers need to develop a satisfactory plan for sewage disposal and MoU signed with Aqua Services and CoW with regards to management of WWTP.	Elizabeth Amagola Tel: 061 208 7719 amagolaE@mawf.gov.na

REGULATORY INSTRUMENT	PROVISIONS	REGULATORY AUTHORITY	PROJECT IMPLICATION	CONTACT PERSON
Sewerage and Drainage Regulations (amendments) Local authorities act, section 23, 1992	Affords the prevention of pollution and environmental damage caused by the improper construction of sewerage and water pipelines in drainage lines.	Council of the Municipality of Windhoek.	Mitigation measures in terms of construction of sewerage and water pipelines provided in EMP.	Mr. Erastus Negonga Tel: 061 297 2911
Policy For The Distribution & Future Usage Of Public Open Spaces In Windhoek, 2000	Affords the provision of land for the explicit development of open spaces which by definition refers to areas specifically left free of any intensive development.	City of Windhoek. Department of Planning, Urbanization and Environment.	Mitigation measures for the establishment of open spaces and green corridors along drainage lines and sensitive environmental areas.	Environmental Management Division Olavi Makuti Tel: 061 290 3518 olm@windhoekcc.org.na
Soil Conservation Act 76 of 1969	Prevention and combating of soil erosion; conservation, improvement and manner of use of soil and vegetation, and protection of water sources.	Ministry of Environment and Tourism (MET)	Mitigation measures in terms of removal of vegetation cover.	Dr. Freddy Sikabongo Tel: 061 284 2715 freddy@met.na
Nature Conservation Ordinance (Ordinance 4 of 1975)	Conservation of indigenous species.	Ministry of Environment and Tourism	*Aloe littoralis* is protected under this legislation. Permit required from MET. Inform National Botanical Institute and/or In-house nursery if any *Aloes* or other indigenous plants need to be removed	Ministry of Environment and Tourism Ministry of Agriculture, Water and Forestry National Botanical Institute

REGULATORY INSTRUMENT	PROVISIONS	REGULATORY AUTHORITY	PROJECT IMPLICATION	CONTACT PERSON
National Heritage Act 27 of 2004	Heritage resources to be conserved in development.	National Heritage Council of Namibia	Immediately inform the National Heritage Council of Namibia should any archaeological material, e.g. graves be found during the construction phase. The site should be cleared for archaeological potential before construction may commence.	Rev. Salomon April Tel: 061 244 375 salomon@nhc-nam.org
Labour Act (No 11 of 2007)	135 (f): "*the steps to be taken by the owners of premises used or intended for use as factories or places where machinery is used, or by occupiers of such premises or by users of machinery in connection with the structure of such buildings or otherwise in order to prevent or extinguish fires, and to ensure the safety, in the event of fire, of persons in such buildings*;"	Ministry of Labour and Social Welfare	Specify the measures to be taken to secure the safety and the preservation of the health and welfare of employees at work in the EMP.	Mr. Bro-Matthew Shinguadja Tel: 061 214 4880 Bro.matthew@mol.gov.na
Convention on Biological Biodiversity (1992)	The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components.	Ministry of Environment and Tourism	Preservation of biodiversity addressed in EMP	Ministry of Environment and Tourism

REGULATORY INSTRUMENT	PROVISIONS	REGULATORY AUTHORITY	PROJECT IMPLICATION	CONTACT PERSON
Roads Ordinance, Ordinance 17 of 1972.	Roads Authority needs to be consulted in terms of all construction and alteration to roads	Roads Authority	Detail design drawings of access and intersection submitted and approved. Developer responsible for the construction and alteration of the accesses and lanes as well as the required road signs. The construction to the intersections must be completed prior to any other construction development.	Roads Authority

5. GENERAL REQUIREMENTS FOR THE ESMP

5.1. ESMP ADMINISTRATION

Copies of this ESMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarize themselves with the contents of this document.

5.2. ROLES AND RESPONSIBILITIES

The implementation of this ESMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during each phase of the project.

5.2.1. Environmental Forum

Elisenheim Property Development Company (Pty) Ltd. will be responsible for the establishment of an Environmental Forum. This forum should ideally comprise of a representative from the Developer, Engineers, Landscape and Urban Design Team and the Environmental Site Manager (ESM) or any nominee in the event of one of the members not being able to attend.

The core responsibilities of this Forum will be to:

- Provide feedback to stakeholders regarding the Project and implementation of the ESMP.
- Address stakeholder concerns and
- Handle any disputes or disagreements between role players on Site with regard to environmental management.

Monthly meetings will be held by the Environmental Forum, the purpose of these meetings shall be:

- To establish the suitability of the Contractor's methods and machinery in an effort to lower the risk of impacts on the environment.
- To discuss possible non conformance to ESMP guidelines or environmental legislation.

- To discuss the general state of the environment on site and environmental problems that might have materialised.

5.2.2. Developer (EPDC)

- Responsible to attain all necessary approvals and permits.
- Liase with the ESM and ECO regarding environmental management and provide the ESM and ECO with all relevant documentation and plans.
- Support and comply with the ESMP specifications.

5.2.3. Contractor

- Responsible for the overall implementation of the ESMP in accordance with the requirements of the Developer (EPDC) and this ESMP.
- The Contractor shall appoint a person from the construction team to take responsibility for the implementation for all provisions of this ESMP.
- The Contractor shall at every site meeting report on the status of the implementation of all provisions of the ESMP.
- The contractor should implement the environmental awareness training as stipulated in this report.
- The contractor must list the stakeholders of the project and their contact details with whom communication would be required throughout the contract. This list, together with an indication of how stakeholder communication will be done throughout construction must be agreed upon and given to the ESM before construction commences.
- The contractor is also responsible for compliance to this ESMP by all sub-contractors. Make sure that all sub-contractors have a copy of this ESMP and that they understand its contents. Include the ESMP in the sub-contracts/agreements with sub-contractors.
- The Contractor shall liaise with the ESM regarding all issues related to community consultation and negotiation before construction commences.
- The Contractor must adhere to the regulations pertaining to Health and Safety, including the provision of protective clothing and shoes, failing which the contract may be ended immediately.

5.2.4. Environmental Site Manager (ESM)

Elisenheim Property Development Company need to appoint an Environmental Site Manager (ESM) that could act as the Employer's on-site implementing agent and will be responsible to ensure that the Employer's responsibilities are executed in compliance with relevant legislation and the ESMP. In addition to general project management, the ESM in collaboration with the developer has the responsibility to appoint the Environmental Control Officer (ECO) (see below).

Any on-site decisions regarding environmental management are ultimately the responsibility of the ESM. The on-site ESM shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this ESMP:

- Ensuring that the necessary environmental authorizations and permits have been obtained.
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary.
- Ordering the removal of person(s) and/or equipment not complying with the ESMP specifications.
- Issuing fines for transgressions of site rules and penalties for contravention of the ESMP.
- Providing input into the ECO's ongoing internal review of the ESMP, this review report is submitted to the Employer (Elisenheim Property Development Company).

5.2.5. Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) will be a competent person appointed by the ESM to act as the Employer's representative to monitor and review the on-site environmental management and implementation of this ESMP by the Contractor.

The ECO shall be on site daily for the first six months of the construction contract and thereafter on a needs basis, but at least once a week. The ECO's duties will include the following:

- Assisting the ESM in ensuring that the necessary environmental authorizations and permits have been obtained.
- Maintaining open and direct lines of communication between the ESM, Employer, Contractor and I&APs with regard to environmental matters.
- Organise meetings with Stakeholders.

- Regular site inspections of all construction areas with regard to compliance with the ESMP.
- Monitoring and verifying adherence to the ESMP, monitoring and verifying that environmental impacts are kept to a minimum.
- Taking appropriate action if the specifications are not followed.
- Assisting the ESM in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.
- Advising on the removal of person(s) and/or equipment not complying with the specifications (via the ESM).
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the ESMP (via the ESM).
- Auditing the implementation of the ESMP and compliance with authorization on a monthly basis.
- Undertaking a continual review of the ESMP and recommending additions and/or changes to the document.

5.3. ENVIRONMENTAL AWARENESS TRAINING

The Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the ESMP. The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

- Explanation of the importance of complying with the ESMP.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this ESMP and its specification (no-go areas, etc.).

- Explanation of the management structure of individuals responsible for matters pertaining to the ESMP.
- The contractor shall keep records of all environmental training sessions, including names, dates and the information presented.

5.4. PUBLIC PARTICIPATION

An ongoing process of public participation shall be maintained to ensure the continued involvement of the stakeholders in a meaningful way. Meetings to discuss progress and any construction issues that may arise shall be held at least every two months and more regularly if deemed necessary by the ESM. These meetings shall be arranged by the ECO but shall be facilitated by the ESM. The Contractor shall present a progress report at each public meeting. All Interested and Affected parties that participated in or were informed during the EIA shall be invited to each of the public meetings.

5.5. PROCEDURES CORRECTING NON-COMPLIANCE

The Contractor shall comply with the environmental specifications and requirements as described in the ESMP on an ongoing basis and any failure on his part to do so will entitle the ESM to impose a penalty.

In the event of non-compliance the following recommended process shall be followed:

- The ESM shall issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.
- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor shall provide the ESM with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.
- In the case of the Contractor failing to remedy the situation within the predetermined timeframe, the ESM shall impose a monetary penalty based on the conditions of contract.

- In the case of the Contractor being unable to remedy the situation due to permanent environmental damage already incurred, the ESM shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the RE shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion etc, between any parties in regard to or arising out of interpretation of the conditions of the ESMP, disagreement regarding the implementation or method of implementation of conditions of the ESMP etc., any party shall be entitled to require that the issue be referred to independent specialists for determination.
- The ESM shall at all times have the right to stop work and/or certain activities on site in the case of ESMP non-compliance or failure to implement remediation measures.

5.6. FINES AND PENALTIES

The following fines and penalties are in place for transgressions listed below. It will be issued after the procedure in **Section 5.5** has been duly followed and only in severe cases and after repeated non-compliance. The ESM shall be the judge as to what constitutes a transgression in terms of this document.

5.6.1. FINES

Fines may be issued per incident at the discretion of the ESM. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the ESMP. The ESM will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract.

Fines for the activities detailed below, will be imposed by the ESM on the Contractor and/or his Subcontractors.

ACTIVITIES	FINES
Any persons, vehicles, equipment, etc. related to the Contractors operations within the designated boundaries of a “no-go” area.	N$2000
Any vehicle guilty of reckless driving on and in the vicinity of the	N$1,000

site, including excessive speeds.	
Any vehicle being driven and items or materials being parked or stored outside the demarcated boundaries of the site.	N$2,000
Persons repeatedly walking outside the demarcated walking area on the site.	N$1,000
Persistent and un-repaired spilling of hazardous materials and materials causing pollution.	N$3,000
Persistent littering on site.	N$500
Individuals repeatedly not making use of the designated toilet facilities.	N$200
Disposal of waste in a manner other than what was agreed upon on site or the prescribed method in the waste management plan section.	N$5,000
Deliberate lighting of illegal fires on site	N$2,000
Felling of trees or collection of live wood	N$ 2,000

For each subsequent similar offence the fine may, at the discretion of the ESM, be doubled in value to a maximum value of N$10,000.

5.6.2. PENALTIES

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he/she shall be liable to pay a penalty fine over and above any other contractual consequence.

The Contractor is deemed NOT to have complied with this Specification if:

- within the boundaries of the site, site extensions and haul/ access roads there is evidence of contravention of the Specification;
- environmental damage due to negligence;
- Safety of contractor personnel and public being compromised due to negligence;
- the Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time;

- the Contractor fails to respond adequately to complaints from the public; and
- Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The ESM will be responsible for a Report on the non-repairable damage and / or non-compliance with visual and other evidence as well as issuing the penalty to the contractor with the report attached. A copy must be handed to the ECO.

The following penalties are suggested for transgressions:

Oil spills:	A penalty equivalent in value to the cost of clean-up operation plus N$1,000.
Damage to sensitive environment:	A penalty equivalent in value to the cost of restoration operation plus 20%.
Impact on birds and wildlife:	A penalty to a maximum of N$2,000 for damages to any natural occurring birds and/or wildlife.
Damage to indigenous trees:	A penalty to a maximum of N$2, 000 for unnecessary damage to any indigenous trees.
Felling of indigenous trees:	A penalty to a maximum of N$5, 000 for felling of any indigenous trees with a diameter of 100 mm or more
Accident due to safety negligence:	A penalty to a maximum of N$50,000 for injuries to personnel or public.

6. MANAGEMENT ACTIONS

6.1 CONSTRUCTION PHASE

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
MANAGEMENT AND MONITORING	Ensure that the provisions of the ESMP are implemented during construction.	• Prior to commencement of construction a suitably qualified and experienced Environmental Site Manager (ESM) need to be appointed. • The ESMP should be included in the tender documents so that tenderers can make provision for implementation of the EMP.	Ensure that mitigation measures and recommendations are implemented and ensure compliance with ESMP Include ESMP in tender documents and file signed documents.	EPDC ESM	Tender documents to be prepared
	Non compliance with aspects of ESMP.	• The ESM and ECO shall ensure that all aspects of the ESMP are implemented during construction. • The ECO shall attend regular site inspections and meetings and minutes shall make provision for reporting on every	To ensure that the provisions of the ESMP are implemented during construction. The ECO will report performance to the ESM, who, in turn will report this and any issues and concerns to the DEA on a	Developer ESM Contractors and Sub contractors	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		aspect of the ESMP. • The contractor is also responsible for compliance to this EMP by all sub-contractors. Make sure that all sub-contractors have a copy of this EMP and that they understand its contents. Include the EMP in the sub-contracts/agreements with sub-contractors. • The EMP must be available at all site offices. • Management and supervisors must lead by example.	monthly basis.		
COMMUNICATION AND STAKEHOLDER COMMUNICATION	Continued involvement of stakeholders	• The ESM in collaboration with the developer must appoint an ECO to liaise between the contractor, stakeholders, client, and consultants. • The Contractor shall appoint a person from the construction team to take responsibility for the implementation for all provisions of this ESMP.	Ensure that all stakeholders are adequately informed throughout construction and that there is effective communication and feedback. Public meeting every 2 months.	EPDC ESM ECO Environmental Forum Contractor	Minutes of meetings

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• The developer need to establish an Environmental Forum with representatives from the Developer, Engineers, Landscape and Urban Design Team, ESM and ECO. • The Contractor shall at every site meeting report on the status of the implementation of all provisions of the ESMP. • The contractor should implement the environmental awareness training as stipulated in this report. • A stakeholders list with contact details needs to be compiled by the Environmental Forum and the Contractor. This list, together with an indication of how stakeholder communication will be done throughout construction must be agreed upon and given to the ESM before construction			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		commences. • All communication with the stakeholders must take place through the ECO. • A copy of the ESMP must be available at the site office for perusal to all stakeholders, who must be invited to raise any concerns and issues on the project progress. • The communication plan, as included in the tender document, shall be binding. • A register will be kept where all complaints received from the public should be recorded. • The register should be under the authority of the ESM. • A sign off procedure will be in place to address any concerns raised. • Management measures to address the complaint should be indicated in the register.			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• The register will be submitted to the ESM prior to site meetings. • All people on the stakeholders' list should be informed about the availability of the complaints register in writing by the ESM prior to the commencement of construction activities.			
CONTRACTOR'S CAMP	Minimise impact on environment	• ESM, RE and Developer to advise Contractor on area to be used for site establishment. • Construction Camp to be placed within an existing disturbed area as far as possible. • Contractor's camp not within 50m of Klein Windhoek River. • Contractors Camp to be fenced off to limit unauthorised access. • With decommissioning of the structures all compacted platforms and foundations must be ripped up and removed.	ESM to approve extent and location of Contractor's camp	RE ESM Contractor	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
	Prevent pollution due to spillage of fuel and oil	• If required fuel may be stored inside the Contractor's camp. • The fuel area must not be located <100m from any water resource. • Contractor to ensure that all liquid fuels are stored in tanks with lids that are kept firmly shut. • Tank placed on a smooth impermeable surface (250 µm plastic or concrete) base with an earth bund (plastic must have a 5 cm layer of sand on top). • The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 110% x total capacity of all storage tanks. • Floor shall be bunded and sloped towards a sump to contain any spillages. • No smoking allowed in vicinity of fuel tanks. • Fuel tanks kept locked.	Bunded area to be inspected and to the satisfaction of the ESM and Engineer prior to any refuelling activities. Bund to be inspected and emptied daily. Bund to be closely monitored during rain events to ensure that it does not overflow.	Contractor ESM Engineer Site Manager	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• Symbolic safety signs depicting "No Smoking" and "Danger" are to be provided. • Areas for storage of fuels and other flammable materials shall comply with standard fire safety regulations. • Soil contaminated by oil, fuel or chemicals shall be removed and disposed of at a registered Hazardous waste Disposal site (Kuperberg)			
WORKSHOP, MAINTENANCE AND STORAGE		• All plant and equipment shall be kept in good working order and serviced regularly. • All maintenance of plant and equipment on Site shall be performed at the workshop.		Contractor ECO	
TRAFFIC AND ACCESS	Raising awareness amongst workforce	• All vehicles to be allocated a dedicated parking area at the Contractor's Camp. • No storage of vehicles outside the designated area.	Awareness of different actions on environment.	Contractor ESM RE ECO	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY/ PARTNERSHIP	RESOURCES REQUIRED
		• Notices to be placed on visible locations in the vicinity of the construction site to warn the public of construction activities and indicating that heavy vehicles may be using the road. • On site the contractor shall control movement of all vehicles and plant machinery so that they remain on demarcated routes. • No temporary access roads will be permitted. • Organise an induction course for all personnel. Contractors should sign agreement.			
TRAINING OF THE WORKFORCE.	Information dissemination to workforce	• Training session with regards to code of conduct, general housekeeping requirements, NO GO areas, etc.	Attendance list to be signed by all participants.	Contractor EPDC Environmental Forum ESM	Attendance list Housekeeping requirements
AWARENESS RAISING	Minimise the risk of spread of HIV/AIDS that may result from the project	• Organise a workshop in order to explain the various health and safety issues during construction.	The tender document should outline the content of the workshop and when conducted.	Contractor. ESM	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY/ PARTNERSHIP	RESOURCES REQUIRED
	implementation. Optimise benefits to local communities.				
	Ensure Health and Safety of workers	• Particular provisions to be worked into the tender documents for the contractor to approach the Ministry of Health and Social Services to co-opt a health officer to facilitate HIV/AIDS education programmes periodically on site.	Prior to construction. ER should monitor.	National and Regional HIV task forces and NGO's working in the field Contractor Site Manager ESM	
POVERTY ALLEVIATION AND GENDER EQUALITY	Provide economic opportunities	• To ensure that the project renders the maximum level of poverty alleviation possible, and to promote gender equality in economic opportunities. • Optimise local service and contractor procurement. • Optimise expenditure to local companies.	During drafting of Tender documents, the consultant shall include provisions designed to maximise the use of local labour. All unskilled labour shall be sourced from local communities. Specific recruitment procedures shall be spelled out. At least 25% of recruits must be women. Ensure that local firms enjoy preference during tender	Elisenheim Property Development Company (EPDC) Site Manager Contractor ESM	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY/ PARTNERSHIP	RESOURCES REQUIRED
			adjudication.		
'NO GO' AREAS	To prevent fragmentation of habitats.	• All areas outside the demarcated working area and Contractor's Camp as well as the areas identified as sensitive by the ESM and/or landscape architect are 'NO GO" areas. • A 10 m green corridor to either side of the Klein Windhoek River should be established and indicated as a NO GO AREA. • All koppies and ridges as well as POS areas should be demarcated as NO GO AREAS. • "NO GO" areas shall be demarcated with wooden or metal posts and 1 plain wire strand 900 mm from ground level covered with danger tape. • The contractor shall ensure that in so far as he has the authority, no unauthorised entry, stockpiling, dumping or storage of equipment	These areas should be demarcated as NO GO Areas before any construction starts. Regular inspections The ESM and ECO need to maintain the fence and ensure that the danger tape is not dislodged.	EPDC ESM	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
	Ensure minimum disturbance to natural environment.	• Larger indigenous trees should be surveyed and marked with red Paint or danger Tape • The placement of the house plan on the erf should incorporate large indigenous trees as far as possible. If not possible permits would be required to remove protected trees (***Appendix A***). Each tree that is removed need to be replaced after construction (see list of recommended trees, ***Appendix B***). • Consider to accommodate as many of the trees as possible on POS and street verges in order to retain the natural "sense of place" on POS's and street verges. If not possible permits would be required to remove protected trees (***Appendix A***). Each tree that is removed need to be replaced after construction (see list of recommended trees,	Survey of trees on all erven. The following protected trees are likely to occur: • *Acacia erioloba* • *Albizia anthelmintica* • *Aloe littoralis* • *Boscia albitrunca* • *Cyphostemma currorii* • *Erythrina decora* • *Euphorbia avasmontana* • *Ficus cordata* • *Maerua schinzii* • *Moringa ovalifolia* • *Ozoroa crassinervia* • *Searsia lancea* • *Ziziphus mucronata* Apply for permits. Inform National Botanical Institute and/or In-house nursery if any indigenous plants need to be removed Keep record of the following: • the number of trees that are removed	EPDC Site manager ESM	List of trees and erven Permits

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED

		Appendix B).
		• Disposal of vegetation by burning or burial is prohibited.
		• Cleared vegetative material shall be:
		  • *Removed from site and disposed of at an approved disposal site closest to Elisenheim*
		  • *Chipped and mulched where suitable*
		• Vegetation to be cleared mechanically. Minimise disturbance to topsoil
		• All green areas need to be connected in some way to facilitate wildlife movement
			• the number of the erf where trees are removed
			• the specific tree species that is removed.
			• On site control at each site as construction commences to monitor compliance throughout the development phase.		

NATURAL ENVIRONMENT	Minimise run-off and erosion.	• Run off from roads need to be accommodated within the Storm Water Plan. • Developers to follow guidelines in Drainage regulations of the CoW for internal reticulation. • Maintain the “pebble mulch”	Layout Plan to incorporate mitigation measures	EPDC CoW Planning, Urbanisation & Environment division ESM RE	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		cover, as this will enhance water infiltration. • Plan road network to accommodate envisaged increased traffic.			
	Protection of drainage lines against contamination.	• Sewerage lines to be placed on the banks of drainage lines outside of the green corridor and flood line area.	Establish protection zones before any construction starts.	ESM Contractor RE	
	Conserve biodiversity Minimise clearance and disturbance of habitats	• No development should be allowed within the areas marked as sensitive areas in terms of biodiversity, i.e. major drainage lines as well as the koppies and steep slopes.	Layout and Landscape design need to comply with areas marked as sensitive.	Architect Engineers ESM ECO	
	To minimise a decrease in scenic quality or “sense of place”.	• Place infrastructure lines along contour lines.			
	Minimise clearance and disturbance of habitats	• Indigenous trees of all species should be left intact, wherever possible, to reduce erosion by stabilising soil and reducing			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		runoff. • Added effect is that gardens already have shade and biodiversity is therefore preserved.			
	Prevent damage to natural features	• The contractor shall not deface, paint, damage or mark any natural features situated in or around the site			
ARCHAEOLOGICAL MATERIAL	Conservation of archaeological material	• Immediately inform the National Heritage Council of Namibia should any archaeological material, e.g. graves be found during the construction phase. • The site should be cleared for archaeological potential before construction may commence.		Contractor ESM	
VISUAL IMPACT	Prevention of pollution	• A complete water and sewer reticulation for the site needs to be done and submitted to the Strategic Executive: Infrastructure at the CoW for approval as well as CoW Planning, Urbanisation &	Layout and design. Need approval from SE.	Architect ESM ECO RE CoW Planning, Urbanisation & Environment division	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		Environment division.			
	Borrow Pits	• Borrow pit area clearly demarcated and decision taken on who will be responsible for removing materials form borrow pits. • Borrow pits only allowed in these designated area. • All borrow pits to be rehabilitated according to rehabilitation plan after construction.	Regular inspection	ESM ECO Engineer	
POLLUTION	Prevention of soil pollution	• Spillages of any potentially toxic materials, whether by accident or through negligence, must be scooped up immediately into waste bags and disposed of at a site designated for such purpose.	Inspection and regular clean up. Formal agreement signed with contractors.	Contractors ESM ECO	
WASTE MANAGEMENT	Reduce amount of waste generated.	• Have drums readily available on site. • No burying or dumping of any waste materials, rubble or	Regular inspection. Reducing waste generated. Formal agreement signed with contractor.	Contractor ESM ECO Rent a Drum	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		refuse shall occur on site. • Cement bags must be gathered and disposed of in drums. • Waste may be temporarily stored in a facility that is weather and scavenger proof and which has been approved by the ESM and Site Manager. • Waste must be disposed of at the Kupferberg landfill site. • Where ever possible materials used or generated by construction shall be recycled.	Contact Rent a Drum to provide Recycling drums and to remove on a regular basis.		
	Prevent pollution due to hazardous waste	• All cement need to be mixed on appropriate containers provided. • No paints and solvents to be disposed of on the open ground. • In the event of cement, paint and oil spillages, whether by accident or through negligence, must be scooped	Inspection and regular clean up. Formal agreement signed with contractor.	Contractor ESM ECO	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		up immediately into waste bags and disposed of at a site designated for such purpose.			
	Prevent pollution due to hazardous waste	• Any materials left after construction should be removed from the site • Redundant construction materials to be removed once a week	Inspection. Formal agreement signed with contractor.	Contractor ESM ECO	
	Prevent pollution due to affluent.	• Washing, whether of the person or of personal effects and acts of excretion and urination are strictly prohibited other than at the designated facilities provided. • Chemical toilets and washing facilities should be provided during construction. • These facilities shall be maintained in a hygienic state and serviced regularly. • These toilets should be within walking distance (<50m) for	Exact location of facilities to be approved by ESM and Site manager Inspection daily. Formal agreement signed with contractor.	Contractors ESM ECO	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY/ PARTNERSHIP	RESOURCES REQUIRED
		construction workers and 1 toilet per 30 workers provided. • Spillage or leakage to be cleaned-up and discharge of waste from toilets in the environment is prohibited. • No toilets allowed within 10m from the drainage lines			
SOIL EROSION	Minimise habitat destruction and dust generation	• An area that is not sensitive in terms of erosion need to be identified and marked out as the area for storing equipment and materials and parking of construction vehicles. • The area of soil that is disturbed should be kept as small as possible to reduce potential impact of erosion. • Special care need to be taken in sensitive areas e.g. erodible soils, steeper slope, ridge lines. • Trees and undergrowth should be left intact as far as possible as they have a soil-holding		Contractor ESM RE Engineers ECO	Permits

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		capacity, incorporate into landscaping of erven. • Take care not to remove ground cover and pebble mulch layer as this provide effective protection from rain splash erosion • Creation of scars due to groundwork during construction should be prevented and if scars do occur be rehabilitated			
	Conservation of ridges and steep slopes	• NO construction activities allowed in steep slope areas and on koppies. • Areas need to be demarcated as NO GO AREAS.	Monitoring of unsolicited entrance beyond building restriction line.	ESM ECO ER Surveyor Urban designer	
TRACKS AND ROADS	Avoid unnecessary clearance	• The servitude for the road should be carefully considered, and then the surveyor must mark out the exact servitude, where trees are in the road reserve, the alignment needs to be changed to accommodate	An authoritative person must accompany the contractor while doing the bush clearing so as to avoid unnecessary damage.	Surveyor Contractor ESM ECO RE	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		the road. • Minimum access roads will be allowed.			
ELECTRICAL FENCE	Minimise negative effect on vertebrate fauna	• Avoid electrifying the lowest strands (25 -30 cm) to prevent tortoises from being electrocuted. • Ensure that gap between strands is wider than the reach of most adult chameleons (20cm)	Inspect fence for any mortalities. Remove reptiles.	ESM ECO	
WATER POLLUTION AND SUPPLY	Prevent and/or minimise pollution of ground and surface water resources.	• Cement, paint, oil spillages must be scooped up into waste bags and disposed of at appropriate disposal site. • Activities that can lead to pollution should be avoided in the areas adjacent to drainage lines.	The area should be treated as a groundwater sensitive area due to fractures. Regular inspection. Check regularly for any leakages. Formal agreement signed with contractor.	Contractor ESM ECO	
VEGETATION	Conservation of indigenous trees and shrubs.	• Indigenous trees are legally protected. No tree felling, wood gathering, burning, harvesting, or damaging to any	Regular inspection. Formal agreement signed with contractor. The following trees that occur on	Contractor EPDC ESM ECO	Permit requirements Appendix B: Photographs of

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		plant species. • Trees with a trunk diameter exceeding 100 mm (1 meter above ground) shall be left intact. • At the outset of construction (or during construction as may be applicable), the ECO and the contractor shall visit all proposed access roads and other areas to be disturbed. • Areas to be disturbed shall be clearly demarcated, and no land outside these areas shall be disturbed or used for construction activities. • Detailed instructions and final arrangements for protection of sensitive areas, keeping of topsoil and rehabilitation of disturbed areas shall be made, in line with the guidelines in this document. • The ECO shall be consulted	the site are protected: • *Acacia erioloba* • *Albizia anthelmintica* • *Aloe littoralis* • *Boscia albitrunca* • *Cyphostemma currorii* • *Erythrina decora* • *Euphorbia avasmontana* • *Ficus cordata* • *Maerua schinzii* • *Moringa ovalifolia* • *Ozoroa crassinervia* • *Searsia lancea* • *Ziziphus mucronata*		protected species

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		before any new areas are disturbed which have not yet been visited. • No off-road driving shall be allowed. • A prescribed penalty will be deducted from the Contractors payment certificate for every mature tree removed without approval. • No trees may be felled or live wood in the project area removed by any member of the construction team, including sub-contractors. Contravention of this arrangement is liable for a prescribed penalty. • A prescribed penalty will be deducted from the contractor's payment certificate if it is shown that trees and/or branches have been broken down unnecessarily, or that any plants			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		have been collected illegally, by any of the staff or sub-contractors. • Trees should be trimmed with the correct equipment, i.e. a chain saw. No axes may be used. Branches shall be neatly trimmed as close to the main branch as possible. • No wood may be collected from the construction area. The contractor must provide either meals or cooking gas for the workforce to cook their own meals (during lunch hours). • Informal vendors that sell food will also not be allowed to collect wood from the construction area and surrounds.			
CONSERVATION OF BIODIVERSITY	To minimise damage to soil and biodiversity during the	• At outset of construction the ESM & ECO and the contractor shall visit all proposed borrow pit	Discussions with architect and engineers. Inspections daily.	Architect Engineers ESM ECO	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
	construction phase	areas, access roads, and other areas to be disturbed. Areas to be disturbed shall be clearly demarcated, and no land outside these areas shall be disturbed or used for construction activities. • The ESM & ECO shall be consulted before any new areas are disturbed which have not yet been visited to survey, mark the areas requiring protection in the road reserve, access roads, campsite as well as areas identified and pointed out to the contractor by the engineer, ECO or Environmental Consultant. • Koppies and major drainage lines should be demarcated as NO GO areas. • No construction personnel to enter these areas.		Developer Contractor	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY/ PARTNERSHIP	RESOURCES REQUIRED
		• Construction vehicles only allowed within the areas demarcated. • Poaching, collecting of wild animals or setting of traps is prohibited without a permit. Any staff members caught in such an activity must be handed over to the authorities and should be dismissed from the contract. • Avoid small mammal/reptile nesting/breeding sites where possible. • A prescribed penalty will be deducted from the contractor's payment certificate if it is shown that any of his staff or sub-contractors is involved in trapping, hunting or any kind of collecting of wild animals in the vicinity of the work sites. Offenders will be handed to the			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		authorities for prosecution.			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• Where topsoil (i.e. the top 300mm of soil organic material) is available, this must be stockpiled separately in 1 m high piles. The stored topsoil must be moved with trucks, dropped and spread across all areas that have been damaged. • Where compaction has taken place in disturbed areas, these areas must be ripped manually and covered with topsoil separately kept for this purpose. • The removal of material at borrow-pit sites shall be focused where the least significant vegetation exists. If material is only available around significant mature trees, a radius of soil of at least 3m shall be kept around the base of the trunk, and it shall be endeavored not to expose the roots of such trees removed. • No wood may be collected from the construction area. The contractor must provide either meals or cooking gas for the workforce to cook their own meals (during lunch			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• Where a cluster of trees exist, a 3m radius shall be left undisturbed around the entire cluster of trees. The ESM and ECO shall visit all proposed borrow-pit areas and indicate where and how material may be before works commences. • All cleared areas need to be stabilized as soon as possible. • All indigenous vegetation rescued from the site need to be transported to the In house nursery and re planted for rehabilitation process later. • Planting of indigenous trees and shrubs as well as rehabilitation of disturbed areas need to be supervised by In House Nursery.			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
	Conservation of drainage lines	• Excavation of alluvial material from drainage lines not allowed.	Regular inspections	Contractor ECO	
VISUAL IMPACTS	Minimise visual impacts	• All disturbed areas shall be reshaped to their original contours; as close as possible to the natural conditions before construction commenced, including the road reserve, detours and temporary access routes. • All trees removed should be replaced. See list of indigenous vegetation (***Appendix B***). • Alien vegetation particularly the Downy thorn apple (*Datura innoxia*), Wild tobacco (*Nicotiana glauca*) and Cacti (*Opuntia* spp.) that has appeared in the project corridor during construction must be eradicated under supervision of the In House Nursery	Rehabilitation and design.	Landscape designer Contractor ER ECO In House Nursery	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
.	Minimise amount of dust created	• Regular spraying with suitable dust suppressing agent for dust control during the construction phase	Regular spraying.	Contractor ER ECO	Schedule for spraying
NOISE	Minimise and or mitigate increased noise levels	• No Construction should take place after 18h00. • Fit large construction vehicles with silencers • A speed limit of 40 km/hour should be maintained. • No construction workers allowed staying on the premises. All workers except for security members and employees of Elisenheim Property Development Company to leave the site area at 18h00.	Regular inspection. Contractor to sign agreement.	Developer Contractor	
HEALTH AND SAFETY	To ensure health and safety of workers and the public at all times during construction.	• The Contractor shall submit a strategy to ensure the least possible disruption to traffic and potential safety hazards during construction.		Contractor Developer CoW Traffic division	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• The strategy should include a schedule of work indicating when and how road crossings (construction at existing intersections) will be made. The schedule should be updated and distributed to all stakeholders. • The Contractor shall also liaise with the traffic authorities for their approval in this regard. • Proper traffic and safety warning signs must be placed at the construction site to the satisfaction of the Engineer and the Roads Authority. • The Contractor must adhere to the regulations pertaining to Health and Safety, including the provision of protective clothing and shoes, failing which the contract may be ended immediately. • Dust protection masks shall be provided to task workers if they complain about dust.			

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• Potable water must be available to workers to avoid dehydration. At least 5 litres of drinking water per person per day (working hours) should be made available during construction. • The contractor must enforce relevant health and safety regulations for these specific activities. • The contractor should also comply with relevant labour laws as stipulated by the labour Act.			

6.2 OPERATIONAL PHASE

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
MANAGEMENT AND MONITORING	All home owners to belong to the Home Owners Association	• Establish a Home owners association and develop an Estate management plan	All home owners to subscribe to Home owners Association	Home owners Association ESM	Estate Management Plan
POLLUTION	Prevention of pollution	• Spillages of any potentially toxic materials, whether by accident or through negligence, must be scooped up immediately into waste bags and disposed of at an appropriate disposal site.	Inspection and regular clean up.	Home owners association ESM	
	Prevention of groundwater pollution	• Sewerage lines need to be maintained • Monitoring of quality of final effluent from WWTP	Regular inspections of sewerage lines and quarterly reports to MAWF on water quality.	Home owners association in conjunction with Aqua Services and Engineering (ASE) ESM CoW	Quarterly reports
	Information dissemination to workers	• Awareness campaigns. • Literature available.	Information sessions. Availability of literature.	ESM Home owners Association	Awareness materials

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
				ECO	
WASTE	Effective waste management	• Integrated Waste Management Plan to be developed for Lifestyle Estate (Phase 1) that addresses recycling, re-use and reduction of waste. • Organic waste should be used for composting	Regular inspection. Integrated waste management plan as part of Homeowners Guidelines and rules. Formal agreement on amount of waste to be disposed of.	Home owners association CoW In-house Nursery	Waste Management Plan
		• Any hazardous waste should be disposed of immediately at the Kupferberg site.	Inspection and regular clean up.	Home owners association ECO	
WWTP	Effective management of WWTP	• A full service and maintenance team to be available in Windhoek 24 hour/day. • ASE to develop a routine maintenance program for the WWTP. • All sewage to be collected at the sewerage plant. • All sewerage lines to be inspected for leakage to be cleaned-up.	Maintenance team to deal with emergency situations. Routine service and maintenance to be carried out by ASE for first 5 years. Inspection daily.	Home owners association ASE ECO	
	Plant should comply with Special Standard	• Post treatment processes should include the following: • *Sand filtration to remove fine suspended solids*	Monitoring of treatment procedures. Monitoring of effluent water	EPDC Aqua Services & Engineering (Pty). Ltd.	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
	Treatment Conditions	• *UV disinfection to disrupt cell material.* • *GAC (granular activated carbon) filtration for organics removal.* • *Final disinfection by chlorination to ensure residual disinfection capacity in all distribution pipelines.*	for helminth eggs. Quarterly report to MAWF.	ECO	
EROSION	Prevention of erosion	• Special care need to be taken in areas with steep slopes. • Minimise large impermeable areas. • Reno mattresses or gabions should be used to stabilise soil in steep areas. • Adequate, Innovative site drainage. • Indigenous vegetation of all species should be left intact as far as possible. • Pebble mulch layer left intact	Regular inspection for signs of erosion. Precautionary measures to be taken. Permits required removing any trees.	ER ECO Home owners association	
TRACKS AND ROADS	Disturbance to habitats	• Do not drive off existing tracks care must be taken to avoid damage to existing vegetation especially shrubs and trees. • No new access roads will be allowed. • Speed limit of 40 km/hour to be enforced. • Introduce “speed calming” devices e.g. speed bumps into the road network to ensure slower speeds. • Introduce traffic signs warning drivers of	Inspection daily.	Home owners association	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		vertebrate fauna crossing roads			
WATER SUPPLY AND DEMAND	Promote wise use of water resources	• Monitoring of groundwater resource - water level, water quality, and abstraction rates. • Promote wise use of water resources. • Use of water-saving devices in toilets and low-flow showerheads or similar devices.	Quarterly reports submitted to MAWF on monitoring. Record rainfall data.	Home owners association MAWF and all land owners Namwater CoW	
		• Water wise gardening. • Plant only indigenous vegetation (See recommended list **Appendix B**) • Use recycled grey water to decrease demand	Waterwise gardening design. Monitor quality of grey water. Reports to MAWF every 3 months.	Landscape designer Nursery Manager Home owners association	
ENERGY CONSUMPTION	Energy efficient	• Use renewable energy sources. • Awareness campaigns on energy efficiency.	Develop Energy Management plan as part of Homeowners guidelines and rules that addresses the reduction of energy use.	Home owners association ECO Engineers	
WASTE WATER TREATMENT PLANT	Ensure correct operation	• Management system • Make provision for plant to continue operating during power failure • No raw sewage to be discharged in Klein Windhoek River or onto soil surface.	Ensure correct, skilled operation Routine repairs Emergency repairs to mechanical and electrical	EPDC to enter into MOU with ACE	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
		• Final effluent to conform to standards as set out by CoW and MAWF.	equipment Provide standby equipment		
VEGETATION	Preservation of indigenous vegetation	• No tree felling, wood gathering, burning, harvesting, or damaging to any plant species.	Regular inspection. Remove any alien vegetation immediately.	Home owners association ECO	
	Conservation of biodiversity	• Conserve all indigenous species as far as possible. • Only specific plant and grass species will be allowed to be planted. (See recommended list **Appendix B**)	Integrated Conservation Management plan as part of Homeowners Guidelines and Rules.	Home owners association ECO In House Nursery	Plant list of recommended species
	Removal of alien invasive species	• Continuous active control of alien invasive species. • Avoid the use of herbicides to eradicate aliens.	Implement continuous monitoring and eradication of aliens.	Home owners Association In House nursery	Nasty Nine list

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
BIODIVERSITY	Preservation of biodiversity	• No hunting, trapping, setting of snares or any other disturbance of any fauna species. • Bird species should be conserved by identifying nesting areas and important habitats – development to be restricted there. Limit recreation activities at important bird areas. • Restriction on numbers of pets – very important for biodiversity. • Fence should allow for movement of smaller mammals.	Inspections daily. Incorporated into management plan. Provision of literature to increase awareness to staff and guests. Regular inspections. Provision of literature to increase awareness. Develop a policy regarding the keeping of pets.	Home owners association ECO	
VISUAL IMPACTS	Minimise degradation of landscape qualities	• Building and Design guidelines and rules – name examples of what it should contain e.g. washing lines, colours of buildings, type of building materials etc.	Home owners' guidelines and rules.	Home owners association Architect	
SOCIO ECONOMIC ISSUES	Minimise visual impact	• Green architecture and design. • Preserve skyline. • Avoid high bulk residential development. • Avoid monotonous designs and rather follow the contours of the surrounding landscape, thus creating a visual flow. • Avoid the use of highly reflective glass.	Developer to have a set of design and building guidelines and individual erf owners to stick to the guidelines	Home Owners Association	

COMPONENT	OBJECTIVE	MANAGEMENT MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY / PARTNERSHIP	RESOURCES REQUIRED
	Create recreational areas	• Reserve open space and green corridors • Maintain hiking and cycling paths along green corridors	Home owners association to adopt open spaces and green corridors Maintenance and Management Plan for POS	CoW Planning, Urbanisation & Environment division Home owners Association	

7. ENVIRONMENTAL MONITORING (OPERATIONAL PHASE)

ISSUE TO BE MONITORED	WHAT NEEDS TO BE MONITORED	MONITORING FREQUENCY	BY WHO?
Water quality.	Quality of water provided to Elisenheim Phase 1	Once every three months.	Home Owners Association in collaboration with EPDC and Ministry of Water Affairs or Namwater
Water sustainability.	Water demand	Once in three months	CoW Planning, Urbanisation & Environment division Namwater
Sewerage system.	Sewerage lines and Sewerage plant for leakages.	Once a month.	CoW Planning, Urbanisation & Environment division Home Owners Association
Erosion/Siltation.	Monitor soil erosion rates Slope stability in steeper areas. Siltation of drainage lines.	Once in three months.	Home Owners Association
Indigenous trees.	Any damage to trees.	Regularly.	Home Owners Association
Alien invasives.	Recording of different species. Removal of unwanted species.	Once every three months.	Home Owners Association
Implementation of mitigation plan.	Ensure compliance with the mitigation plan. Apply corrective measures	Once every three months.	Home Owners Association

ISSUE TO BE MONITORED	WHAT NEEDS TO BE MONITORED	MONITORING FREQUENCY	BY WHO?
	immediately where required.		

7.1 SITE ENVIRONMENTAL MONITORING REPORT

Elisenheim Lifestyle Village

Zone/Erf: ..... Contractor: .....

Report No: ..... Date: .....

Issue	Observation	Remedial Action	Compliance
1. Construction			
All plant, personnel, etc. restricted to works area?			
Contractor's camp located in area of low environmental sensitivity as indicated by Engineer?			
Where needed, sensitive areas adequately fenced off?			
Fencing well maintained			
No unauthorised entry, stockpiling, etc. outside work areas?			
All vehicles and plant remain on designated routes?			

Information posters put up and maintained where needed?			
No smoking in hazardous areas?			
Basic fire fighting equipment available on Site?			
No burning of wastes as a means of disposal?			
Staff aware of procedures in event of spills/leaks?			
Materials for dealing with spills/leaks available?			
Emergency contact numbers displayed at Contractor's office?			
Complaints Register up to date?			
Archaeological material found on Site mitigated?			
No animals trapped or harmed?			
No flora removed or damaged outside work areas?			
Adequate drainage and retaining works in place to control erosion/siltation?			
Restricted traffic over stabilised areas?			
No concrete mixing on bare ground?			
Concrete batching restricted to area of low environmental sensitivity?			

All wastewater from concrete mixing area disposed of via wastewater management system?			
Concrete mixing area kept neat and clean?			
Suitable screening and containment of cement silos?			
All visible remains of excess concrete removed on completion of concrete works?			
No pollution from drilling operations?			
Location and rescue of plants on erven			
Rescued plants moved to nursery			
After vegetation clearance, all unstable areas are properly stabilised?			
Cleared vegetation properly disposed of?			
All wastes removed from cleared area and disposed of?			
No unauthorised traffic on revegetated areas?			
MATERIALS			
Construction materials adequately secured to ensure safe deliveries?			
All materials being stored inside Contractor's camp			

All imported materials free of weeds, litter, etc.?			
Stockpile areas approved?			
Topsoil stripped and stockpiled at a suitable site prior to earthworks?			
No spoil stockpiled outside agreed areas?			
Spoil stockpiles correctly shaped and protected?			
All plants used for landscaping/rehabilitation listed in the approved plant list?			
Plants adequately protected during transit and at storage facilities?			
Plants healthy and free from diseases and pests?			
PLANT			
Fuel/oil storage facilities adequately secured and protected against leakage?			
Safety signage provided at fuel storage areas?			
All electrical/petrol pumps suitably equipped and placed not cause any danger of ignition?			
Fuel storage areas comply with fire safety regulations?			
Necessary authorisations obtained for temporary above ground fuel tanks?			

Capacity of fuel tank does not exceed 9000 ℓ?			
Fuel tanks erected at least 3.5m away from buildings, boundaries or other flammable materials?			
Adequate toilet facilities provided for staff? (Min 1 toilet/30 workers)			
Toilets adequately maintained?			
All workers use toilets?			
Scavenger proof bins provided at eating areas?			
Waste temporarily stored inside Contractor's camp in weather- and scavenger- proof bins?			
No burying or dumping of wastes on site?			
Waste management system in place?			
Refuse disposed of at licensed landfill?			
Adequate waste-water management system in place?			
Approval for discharge of contaminated water into municipal sewer system?			
Runoff from workshops, fuel depots, etc. directed into conservancy tanks for disposal at approved site?			
Wash areas placed and built in such a way that does not cause any pollution?			

All maintenance of plant and equipment takes place in workshop?			
All plant is well maintained (no leaking)?			
Workshop has a bunded, impermeable floor sloping towards oil trap?			
Contractor's Camp tidy?			
All plant and machinery have drip trays, which are checked and emptied daily?			
All repairs on machinery using fuels or lubricants done over a drip tray?			
Static plant within a bunded area?			
Measures in place to minimise dust generation?			
No Handling/transport of erodible materials under high wind conditions?			

EMP Transgressions	**Contractor/Subcontractor**	**Date**	**Fine issued**

Complaints	**Date received**	**Action taken**

Other Issues	

REFERENCES

Curtis, B. & Mannheimer, C., 2005. *Tree Atlas of Namibia.* National Botanical Research Institute, Windhoek, Namibia.

Cunningham, P.L., 2011. *Biophysical Assessment (Fauna and Flora) – Elisenheim Phase 1. Unpublished Report*

Lochner, P. 2005. *Guideline for Environmental Management Plans*. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town

Urban Green, 2005. *Environmental Scoping Report – Proposed Township Establishment on a Portion of Portion 4 of the farm Elisenheim No. 68.* Unpublished Report

Urban Green, 2010. *Elisenheim Lifestyle Village Estate. Generic Construction Environmental Management Plan - Phase 1B.* Unpublished Report

Van Vuuren, O. 2011. *Post Phase 1 Assessment of construction impact on the hydrology and geohydrology at the Elisenheim Lifestyle Village.* Unpublished Report

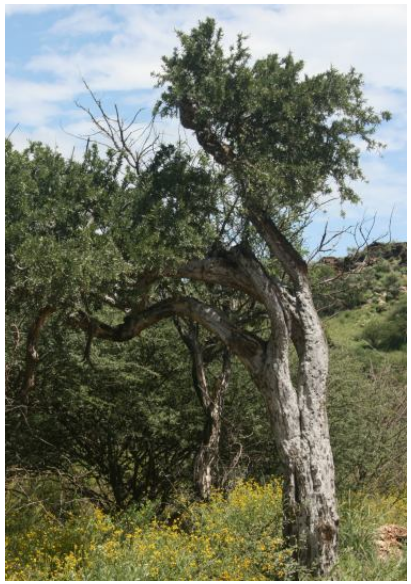
Model EMP for Landscaping works:
http://www.environment.nsw.gov.au/resources/sustainbus/emp.pdf

APPENDICES

APPENDIX A:

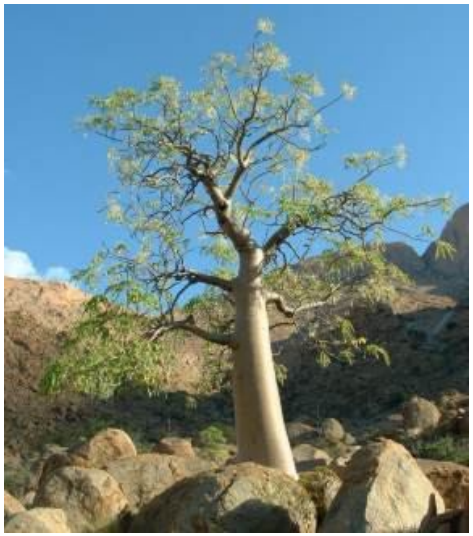
PROTECTED PLANT SPECIES

SCIENTIFIC NAME	PROTECTED IN NAMIBIA UNDER	PHOTOGRAPH
Acacia erioloba (Camelthorn/Kameeldoring/ Omumbonde)	The preservation of Trees and Forests Ordinance of 1952	  
Albizia anthelmintica (Worm cure albizia/Aru)	The preservation of Trees and Forests Ordinance of 1952	  

Aloe littoralis (Windhoek/Mountain aloe/ Otjombonde)	Nature Conservation Ordinance 4 of 1975 and 247 of 1977 CITES II	  
Boscia albitrunca (Shepherd's tree/Witgat/ Omutendereti)	The preservation of Trees and Forests Ordinance of 1952	  

Cyphostemma currorii (Kobas/Omutindi)	Nature Conservation Ordinance 4 of 1975 and 247 of 1977	  
Erythrina decora (Namib coral tree/ Koraalboom/ omuninga)	The preservation of Trees and Forests Ordinance of 1952	  
Euphorbia avasmontana	CITES II	

(slender candelabra euphorbia)		  
Ficus cordata (Namaqua rock fig)	The preservation of Trees and Forests Ordinance of 1952	  

Maerua schinzii (Ringwood tree/ LammerdrolOmutengu)	The preservation of Trees and Forests Ordinance of 1952	   
Moringa ovalifolia (Phantom tree/ Sprokiesboom/Omutindi)	The preservation of Trees and Forests Ordinance of 1952	  

Ozoroa crassinervia (Namibian Resin tree/ Harpuis boom)	The preservation of Trees and Forests Ordinance of 1952	 
Searsia lancea (Karee)	The preservation of Trees and Forests Ordinance of 1952	  

Ziziphus mucronata (Buffalo thorn/ Blinkblaar-wag-n-bietjie/Omuketete)	The preservation of Trees and Forests Ordinance of 1952	   

APPENDIX B:

RECOMMENDED PLANT LIST

TREES	
SCIENTIFIC NAME	**COMMON NAME**
Acacia erioloba	Camel Thorn/Kameeldoring
Acacia erubescens	Yellow-bark Acacia/Withaak
Acacia hereroensis	Mountain Thorn/Berg doring
Acacia karroo	Sweet thorn/Soetdoring
Acacia reficiens	Red umbrella thorn/ Rooihaak
Acacia sieberiana	Paper bark Acacia
Acacia tortillis	Umbrella thorn/Krulpeul
Albizia anthelmintica	Worm cure albizia/Aru
Boscia albitrunca	Shepherd's tree/Witgat
Combretum apiculatum	Kudu bush
Combretum erythrophyllum	Bush willow/Rivier vaderlands wilg
Combretum imberbe	Leadwood/Hardekool
Commiphora africana	Hairy corkwood
Commiphora angolensis	Sandy corkwood
Commiphora glandulosa	Tall Common corkwood
Commiphora glaucescens	Blue-leaved corkwood
Dombeya rotundifolia	Wild pear/Wilde peer

Elephantorrhiza suffriticosa	Skew leaved elephant root//Looiwortel
Erythrina decora	Namib coral tree
Euclea pseudebenus	Wild ebony/Ebbehout
Euclea undulata	Common quarrie/Ghwarrie
Faidherbia albida	Ana tree
Ficus cordata	Namaqua rock fig/Rotsvy
Ficus ingens	Red-leaved rock fig
Kirkia acuminata	White seringa/Wit sering
Maerua schinzii	Ringwood tree/Lammerdrol
Moringa ovalifolia	Phantom tree/Sprokies boom
Mundulea sericea	Cork Bush/Kurkbos
Olea europeae subsp. europeae	Wild Olive/Olien
Ozoroa crassinervia	Namibian Resin tree/ harpuisboom
Ozoroa paniculosa	Common Resin bush/ Harpuisboom
Pappea capensis	Jacket plum/Doppruim
Peltophorum africanum	Weeping wattle/Huilboom
Sclerocarya birrea	Marula
Salvadora persica	Mustard bush/Kerriebos
Searsia lancea	Karee
Searsia marlothii	Bitter Karee
Steganotaenia araliacea	Carrot tree/Wortelboom
Vangueria infausta	Medlar/Wilde mispel
Ziziphus mucronata	Buffalo Thorn/Blinkblaarwag-n-bietjie

SHRUBS	
SCIENTIFIC NAME	**COMMON NAME**
Barleria spp.	Bush violet/Bosviooltjie
Bauhinia galpinii	Pride of the Cape
Carissa macrocarpa	Big Num Num
Croton gratissimus	Lavender Feverberry
Cyphostemma currori	Kobas
Cyphostemma juttae	Blue Kobas
Dichrostachys cinerea	Kalahari Christmas Tree
Ehretia alba	Puzzle bush/Deurmekaar bos
Gardenia volkensii	Savanna gardenia /bosveld katjiepiering
Grewia flava	Velvet raisin bush
Grewia flavescens	Rough leaved raisin bush
Leonotis leonurus	Wild dagga
Polygala virgata	Purple broom bush
Sutherlandia frutescens	Cancer bush
Tarchonanthes camphoratus	Camphor bush
Rhigozum obovatum	Yellow pomegranate
HERBACEOUS PERENNIALS	
All indigenous Aloe species	
Bulbine capitata	Scented grass bulbine

APPENDIX C

NASTY NINE ALIEN INVASIVEPLANT SPECIES