PROPOSED FLOOD MITIGATION MEASURES FOR THE OSHAKATI/ONGWEDIVA AREA

Environmental Impact Assessment (EIA)

DRAFT SCOPING REPORT

May 2012

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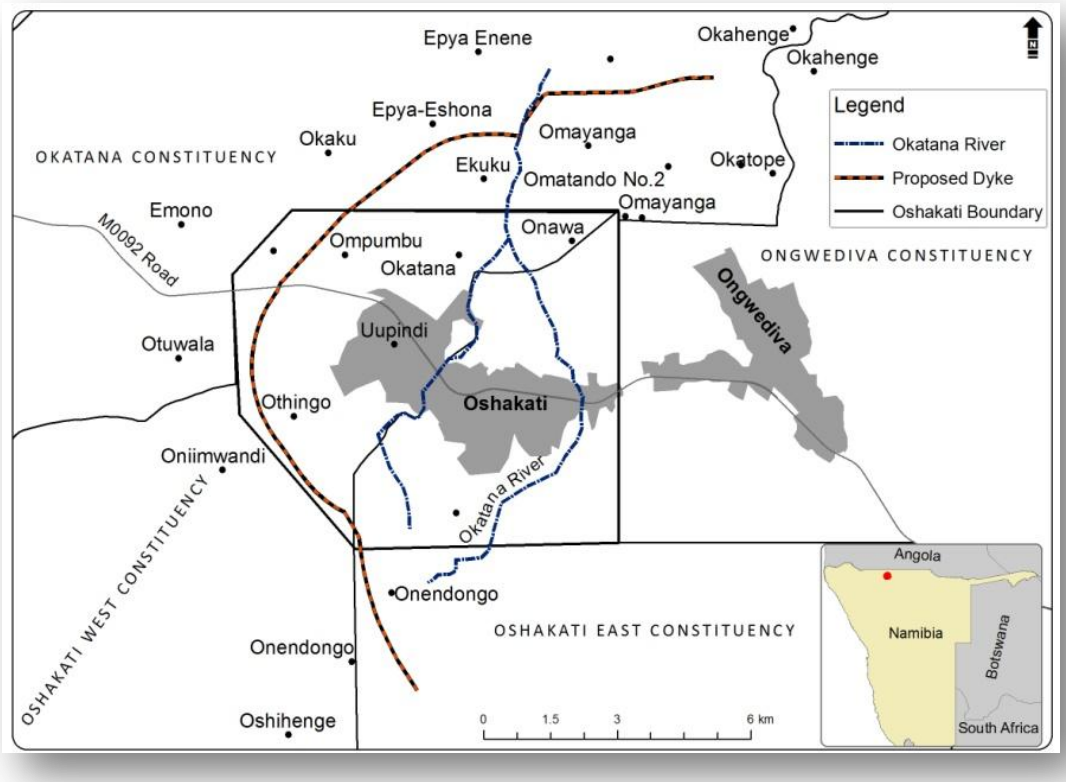
PROJECT NAME	Draft Scoping Report: Environmental Impact Assessment for the Proposed Mitigation Measures to be implemented for the Oshakati/Ongwediva area
STAGE OF REPORT	Draft to Public
CLIENT	Ministry of Regional and Government, Housing and Rural Development Oshakati Town Council
LEAD CONSULTANT	**Enviro Dynamics cc.** Enquiries: Stephanie van Zyl Tel: (061) 223336 E-mail: Stephanie@envirod.com
DATE OF RELEASE	May 2012
CONTRIBUTORS TO THE REPORT	Stephanie van Zyl, Eloise Carstens, Carla Saayman, Sheldon Husselman, Chris Muir, Ernst Simon

EXECUTIVE SUMMARY

Introduction

In March 2008, February 2009, and April 2011, heavy floods occurred in the Oshakati-Ongwediva area in northern Namibia (see map below)). The Oshakati-Ongwediva-Ondangwa area is regarded as one of the most important commercial, industrial and administrative nodes in Namibia. The urban area of Oshakati which is densely populated was heavily affected.



In order to find a permanent solution to the flooding problem in Oshakati, the Ministry of Regional and Local Government, Housing and Rural Development (MRLGHRD), in 2008, appointed the Buro of Architecture (BAR), a Belgium based consultant to compile a long term concept master plan for the town.

Besides various other proposals, the Concept Master Plan had two key components aimed at preventing future flooding of the town, namely:

- A dyke (a structure similar to a dam wall) around the northern and western sections of Oshakati, diverting water to the south.

- Deepening of the Okatana River in Oshakati and lining of its banks with concrete.

Since these activities may not be undertaken without an Environmental Clearance Certificate (Government Notice No 29 of 2012), so as to ensure that on this project we do

> "*promote the sustainable management of the environment and the use of natural resources by establishing principles for decision making on matters affecting the environment (Environmental Management Act, 2007);*

and that its activities are assessed and appropriately controlled , since they may have significant effects on the environment.

The Ministry of Regional and Local Government and Housing and Rural Development therefore commissioned Enviro Dynamics cc. to undertake the process of obtaining environmental clearance on their behalf.

The Legal Environment

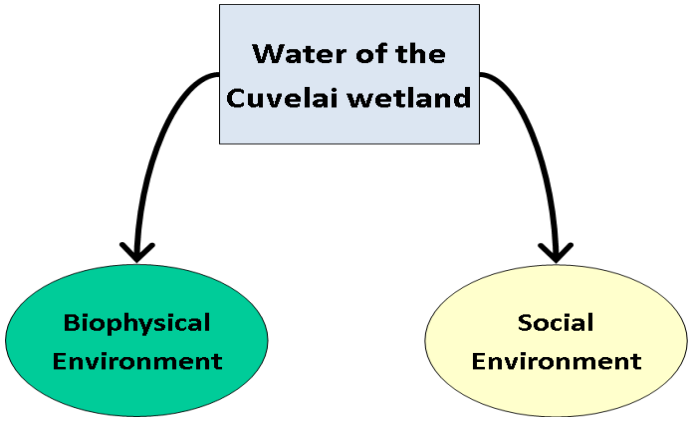
The legal and regulatory environmental which has a bearing on the decision-making process and implementation of this project is described in **Section 3** of this document. The main instruments of importance are the Environmental Management Act (2007) and its Regulations (January 2012) which gave effect to the Act, the Water Resources Management Act (2004), and the Ramsar Convention according to which the Cuvelai is an important feeder of water to the Etosha Pans, one of Namibia's Ramsar sites. These instruments require Government to think strategically about the best option for mitigating the flood problem in Oshakati and surrounds and to implement the most sustainable alternative.

Other instruments which require attention during the operations of the project are also listed in **Section 3**. They need to be incorporated into the Environmental Management Plan for the project.

The Receiving Environment

Since independence in 1991, Oshakati grew from a relative small and poorly developed town into a large urban settlement with modern buildings and services. The town is situated within the Cuvelai Delta which is characterised by shallow drainage channels called Oshanas with pockets or islands of higher lying land in between. The continued growth of the town meant that the pressure for suitable land in the town increased to a point where many people settled in lower lying areas on the edges of the higher lying land portions and sometimes even within the Oshanas. Since 2008, the Cuvelai delta experienced heavy rain and flooding which originates in the highlands of Angola and flows through the Cuvelai to the Etosha Pan. This led to substantial flooding of houses, homesteads and fields in Oshakati and its surrounds as well as throughout the Cuvelai delta.

Notwithstanding this pressure for available land, the Cuvelai wetland system provides a variety of renewable natural resources and vitally important ecological services. The collection and use of "free" wetland natural resources forms a vital part of the livelihood of many people. In essence, both the social and biophysical environments of the north-central parts of Namibia are sustained by the water of the Cuvelai wetland system (Figure below).



Importance of the water of the Cuvelai wetland in sustaining the biophysical and social environments.

The sensitivities of the elements of the Cuvelai ecological, physical and social environments are outlined in **Section 4** of this Scoping Report. The resilience of these elements to the changes proposed need to be understood during the specialist studies that will follow in the full investigation phase of the EIA.

Public Consultation

Consultation has been conducted in accordance with the Regulations of the Environmental Management Act (2007). Consultation meetings were held in Windhoek (mainly with authorities and key stakeholders) and in Oshakati (authorities, key stakeholders and potentially affected community leadership).

The outcome of this process is contained in the minutes which have been appended, and in the summary of issues presented in **Section 5**.

Potential positive and negative impacts, as well as issues related to the EIA process have been identified under the following themes:

- Land use planning
- Water quality and ecology
- Hydrology
- EIA Process
- Socio-economic
- Economic/financial/costing
- Flood infrastructure, maintenance and rehabilitation
- Environmental consultants
- Cooperative Governance

Some of the issues raised are beyond the scope of this EIA, namely broader planning issues for Oshakati and the Northern Regions. These are for the Government to take up separately. For most of the matters raised that are relevant to this EIA, too little information is currently available to confidently assess the potential impacts. It is therefore recommended that further specialist studies be conducted in the areas of ecology, water and socio-economic impacts in order to better understand the potential impacts of the project.

Furthermore, in order to fulfil the requirements of the Environmental Management Act, alternatives to the proposed flood mitigation measures need to be considered and assessed. This will enable the Government to ascertain whether the most sustainable flood mitigation options are being implemented, particularly for the larger Cuvelai. This aspects is beyond of the scope of this EIA.

All the issues raised in Section 8 of this document, which are of relevance to the scope of this EIA Study, will be assessed during the full investigation phase.

The way forward

- This Draft Scoping Report will be circulated to the authorities and public for comment. These comments will be a) incorporated into the report or b) carried forward for consideration in the remaining phases of the EIA process.

- The Draft Scoping Report will be submitted to the DEA. According to the Regulations of the Environmental Management Act, the DEA has to consider the contents of this report and provide feedback as to content of the process ahead.

- The specialist studies will be commissioned, based on the outcome of the issues identified. These specialist studies will form the basis for the Draft Environmental Impact Report.

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ABBREVIATIONS AND ACRONYMS

BAR	Buro of Architecture
BID	Background Information Document
CBD	Central Business District
CV	Curriculum Vitae
DEA	Directorate of Environmental Affairs
EAP	Environmental Assessment Practitioner
EMP	Environmental Management Plan
EIA	Environmental Impact Assessment
GN	Government Notice
I&AP	Interested and Affected Party
MAWF	Ministry of Agriculture, Water and Forestry
MET	Ministry of Environment and Tourism
MHSS	Ministry of Health and Social Services
MOE	Ministry of Education
MRLGHRD	Ministry of Regional and Local Government and Housing and Rural Development
MWTC	Ministry of Works Transport and Communication
NCCI	Namibia Chamber of Commerce and Industry
NGO	Non Governmental Organisation
NORED	Northern Electricity Distribution

NPC	National Planning Commission
OC	Oshana Connections
PCDP	Public Consultation and Disclosure Plan
PPP	Public Participation Process
SR	Scoping Report
SME	Small and Medium Enterprise
TOR	Terms Of Reference
UNAM	University of Namibia
VAT	Value Added Tax
WCE	Windhoek Consulting Engineers

1 INTRODUCTION

1.1 BACKGROUND

In March 2008, February 2009, and April 2011, heavy floods occurred in the Oshakati-Ongwediva area in northern Namibia (**Figure 1**). The Oshakati-Ongwediva-Ondangwa area is regarded as one of the most important commercial, industrial and administrative nodes in Namibia. The urban area of Oshakati which is densely populated was heavily affected.

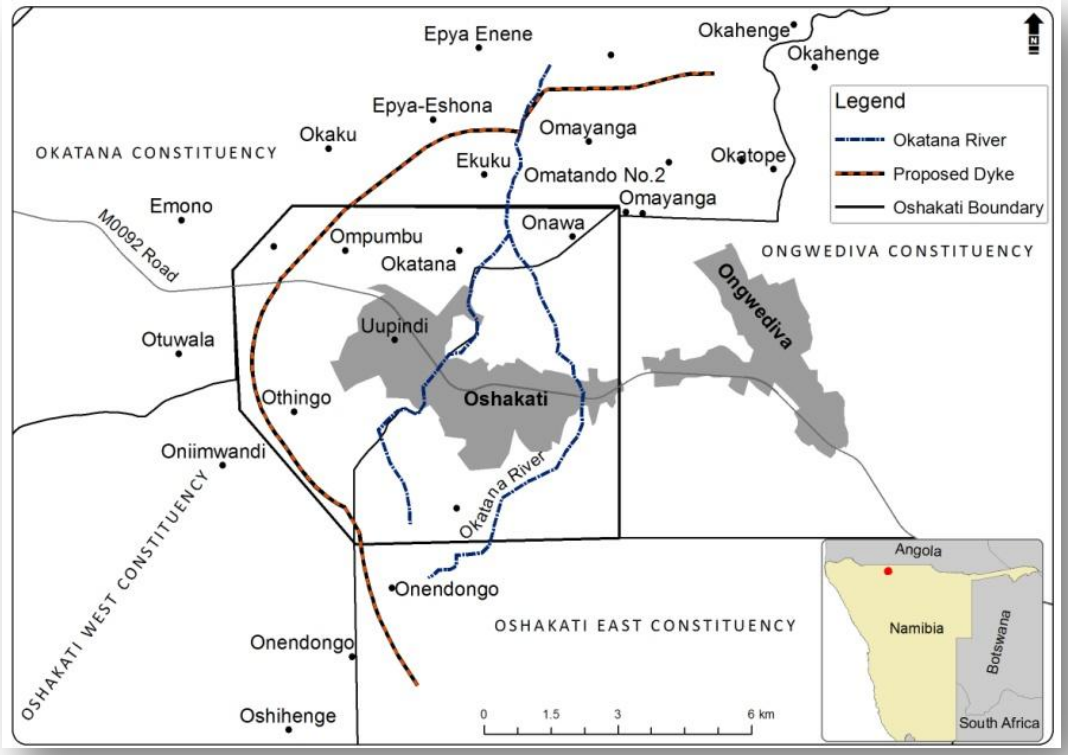

Figure 1: Locality map of proposed Oshakati Flood Mitigation Project.

In order to find a permanent solution to the flooding problem in Oshakati, the Ministry of Regional and Local Government, Housing and Rural Development (MRLGHRD), in 2008, appointed the Buro of Architecture (BAR), a Belgium based consultant to compile a long term concept master plan for the town.

Besides various other proposals, the Concept Master Plan had two key components aimed at preventing future flooding of the town, namely:

- A dyke (a structure similar to a dam wall) around the northern and western sections of Oshakati, diverting water to the south (see Figure 1).

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The Ministry of Regional and Local Government and Housing and Rural Development therefore commissioned Enviro Dynamics cc. to undertake the process of obtaining environmental clearance on their behalf.

1.2 THE EIA TEAM

The designated Environmental Assessment Practitioner (EAP) for this EIA process is Ms Stephanie van Zyl, in terms of Regulation 3 of the Environmental Management Act (2007), and her declaration for committing to the requirements of the Act for EAPs hereby follows.

DECLARATION

I hereby declare that I do:

(a) have knowledge of and experience in conducting assessments, including knowledge of the Act, these regulations and guidelines that have relevance to the proposed activity;

(b) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

(c) comply with the Act, these regulations, guidelines and other applicable laws.

I also declare that there is, to my knowledge, no information in my possession that reasonably has or may have the potential of influencing –

(i) any decision to be taken with respect to the application in terms of the Act and the regulations; or

(ii) the objectivity of this report, plan or document prepared in terms of the Act and these regulations.

The CV for Ms van Zyl is attached as ***APPENDIX A***.

The specialists who have been employed on this project to this end are as follows. More specialists may be needed as the project issues unfold.

COMPANY	LEAD SPECIALIST	RESPONSIBILITY
Enviro Dynamics	Stephanie van Zyl	EAP
Enviro Dynamics	Carla Saayman	Public Participation
WCE	Chris Muir	Hydrological impacts
Urban Dynamics	Ernst Simon	Socio-economic impacts
	Shirley Bethune	Ecological impacts

2 TERMS OF REFERENCE

2.1 TERMS OF REFERENCE PROVIDED

The Terms of Reference issued for this assignment is attached as ***APPENDIX B.*** The document describes the original project description, which has changed since inception, as described in **Section 3** of this report.

As far as the Scope of Work is concerned, the following is provided in the TOR:

1. *A socio-economic study must be conducted to address the implications of the temporary and permanent relocation of residents within the Townlands as necessitated by the new Concept Master Plan.*
2. *An Environmental Impact Assessment must be conducted for the mediation measures indicated above.*
3. *Both the study and the EIA must be conducted in strict accordance with all relevant current and anticipated legislation.*

2.2 LIMITATIONS TO THE TERMS OF REFERENCE

Following the TOR presented, a few adjustments were proposed in order to get the process in line with the requirements of the Environmental Management Act and its regulations. The proposal submitted reads as follows:

> *Our team regards this (i.e. the scope of works provided by the Client, quoted in 2) as a fragmented approach because the mediation measures may have substantial social impacts beyond the boundary of the Townlands while the concept master plan may also have substantial ecological impacts. In addition, the law requires that the concept master plan also be subject to environmental assessment. Omitting this would be unacceptable to the Ministry of Environment and Tourism.*
>
> *It is therefore proposed that, in the interest of the quality of the assessment and complying with the Environmental Management Act, (as required in the TOR) these components be combined into an Environmental and Social Impact Assessment (ESIA) and handled as*

one integrated assessment which will satisfy all requirements of the TOR.

However, the Ministry has made it clear that the Concept Master Plan has already been approved by Cabinet and is therefore excluded from the Scope of Works of this EIA. It is only expected of the Consultant team to consider the impacts of the proposed Dyke and Okatana River Channelling, and to propose mitigation measures to address the impacts.

Therefore, the following are missing steps to make the process complete in terms of the Environmental Management Act:

- The associated Concept Master Plan components have not yet been subjected to an environmental assessment.
- The client will provide the alternatives considered, including the no-go alternative.

2.3 METHODOLOGY AND WORK PLAN

The aims of the study are to:

- Implement a robust Public Consultation and Disclosure Plan (PCDP) for the period of the environmental assessment, by ensuring that all stakeholders understand the implications of the project and are capacitated to make informed contributions.
- Develop a thorough current and future "Without Project" baseline so that ecological and social factors are fully integrated into the design of the Project.
- Work closely with the Client, the engineering and planning teams, contributing to the appraisal of alternatives and decisions on design and mitigation measures, so that measures can be integrated into the Project proposals of the earliest stage.
- Provide strategic solutions that are sustainable, relevant locally and that are feasible and affordable for ecological and social management and monitoring during the different phases of project development, including guidance on management plans for environmental protection, resettlement and land acquisition, and capacity building in the local authority.

An overview of the work plan is provided in **Figure 2** below.

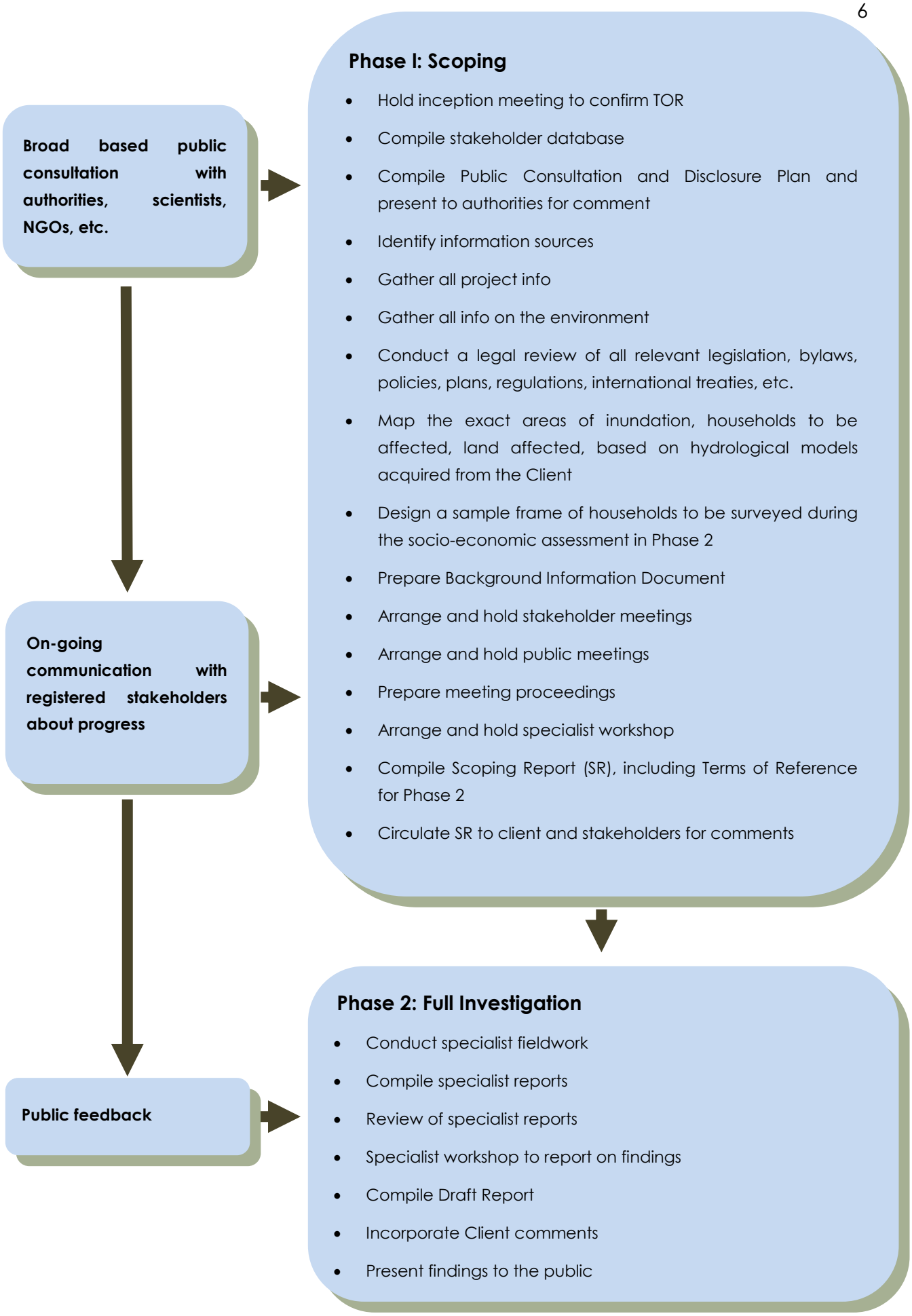

Figure 2: Work plan for the Environmental Assessment

3 PROJECT DESCRIPTION

3.1 RATIONALE

The Oshakati-Ongwediva-Ondangwa area is regarded as one of the most important commercial, industrial and administrative nodes in Namibia. The recent floods affected the lives of thousands of people residing in low lying areas. The urban area of Oshakati where a high density of people reside, was heavily influenced with access to schools, clinics and businesses affected and many households flooded to a point where the Government of Namibia and the Oshakati Town Council had to provide relief to the flood victims. Reportedly, about 3414 people (984 hh) were displaced in 2008, 2221 in 2009 (708 hh), 1402 in 2010 (377 hh), 2522 in 2011 (813 hh) and 506 so far in 2012 (155 hh). **Figure 3** provides an indication of the extent of the floods in the area.

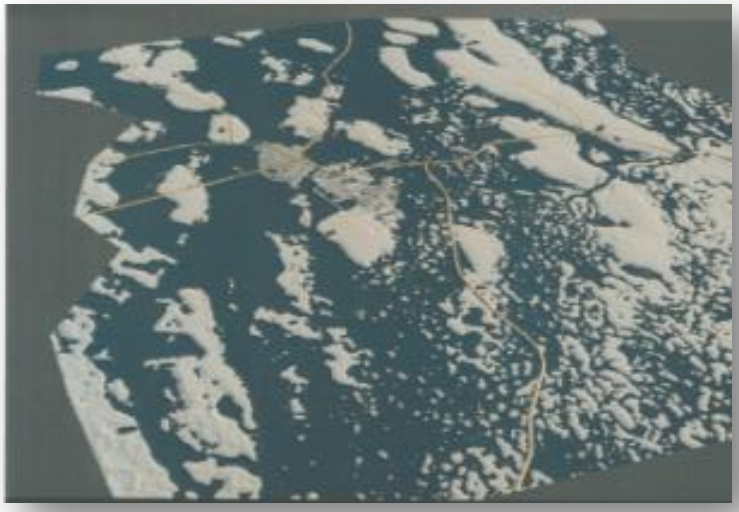

Figure 3: Current flood regime

Besides the direct effect the flooding has on residential areas, it also has a very negative influence on business at the town. Many businesses have to close during the flood period resulting in loss of income for both business owners and their employees. The floods also cause great damage to municipal infrastructure such as water supply, sanitation systems, roads and bridges.

In order to find a permanent solution to the flooding problem in Oshakati, the Ministry of Regional and Local Government, Housing and Rural Development (MRLGHRD), in 2008, appointed the Buro of Architecture (BAR), a Belgium based consultant to compile a long term concept master plan for the town (**Figure 4**).

Besides various other proposals, the Concept Master Plan had two key components aimed at preventing future flooding of the town. Firstly, it is proposed that a dyke be constructed from the Ongwediva high ground in a westward direction north of the current Town of Oshakati, turning south on the western side of the town (**Figure 5**).

Figure 4: The Proposed Oshakati Concept Master Plan.

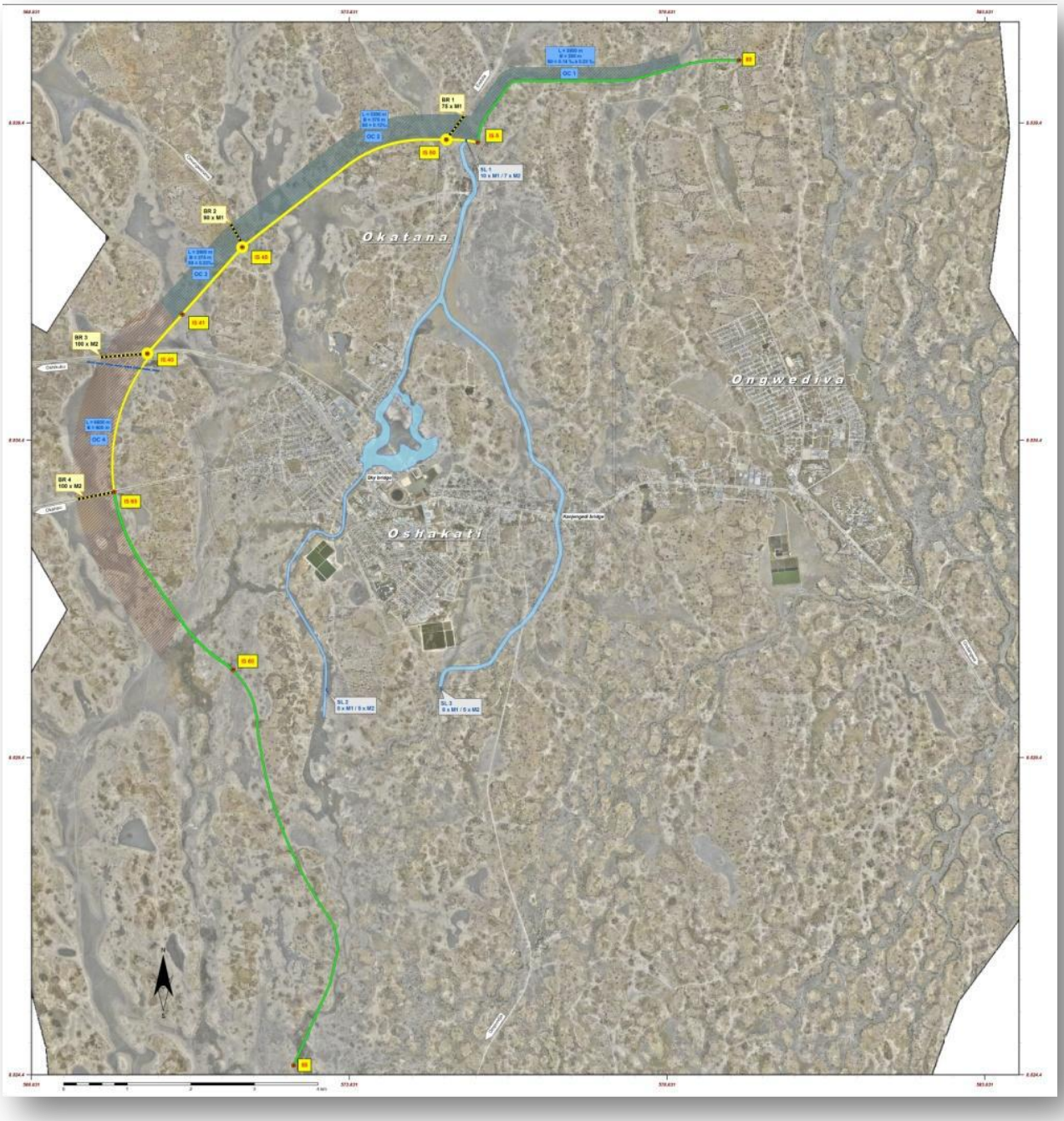

Figure 5: Overview of the proposed Oshakati flood protection measures.

Figure 6: Expected flood patterns after the dyke

This dyke will be fitted with sluice gates to let some water into Oshakati but enable water flow to be closed as soon as the water levels inside the town reach a certain level (**Figure 6**). The second component consists of the deepening and lining of the Okatana Channel.

A third component has since been added to this, namely the development of an internal stormwater system. It was realised that due to the flat topography, even if the Cuvelai flow is kept out of town, local rainfall and runoff will still cause substantial flooding unless a stormwater system is installed.

3.2 THE PROPOSED DYKE

In essence, a dyke is an earth wall, much like a dam wall which is designed to keep water in or out of a specific area. The proposed dyke for Oshakati will be approximately 26km long and 44m wide (**Figure 5**). The crown height of the dyke will be between 2.2-2.5 m, relative to the existing oshana bed level. This level corresponds to the maximum water level of the design flood (return period of 100 year). The 100 year flood level has been determined using a hydrological and hydraulic model which has been developed with the support of the Department of Water Affairs and the EIA Team[1].

A free board of 0.5m has been allowed for, considering the effect of wind waves and as extra safety. At three locations the dyke height will correspond to the maximum water level of the design flood, thus not taking into account this free board. At these locations the dyke will be protected to prevent erosion even when dyke overtopping occurs.

The initial dyke height will be higher to take into account future settlement of construction material. The southern extension of the dyke is necessary to avoid backwater flowing into the town from the south.

[1] ***A separate document is available with further details of the hydraulic and hydrological models.***

The dykes will have a slope protection such as grouted stone pitching at the water side to avoid erosion, the details of which will be designed according to the soil characteristics. At the land side a cemented gravel slope protection is foreseen. A drainage system is planned that will discharge ground water from the dyke when the water level at the outside drops faster than the ground water level within the dyke. The dyke slopes will be flat enough so that animals can cross them and to avoid people not to fall in the water by accident.

All natural vegetation including large trees will be cleared from the footprint area of the dyke to ensure a good foundation.

On top of the dyke a dual carriage way (60m road reserve) will be constructed between the road to Endola (D3610) and the road to Okahao (C41) (yellow line in **Figure 5**) in order to divert traffic around the town. On the other parts of the dyke a service road in gravel is foreseen (green line in **Figure 5**).

The ring road will have a limited access only at the intersections with the trunk roads entering Oshakati. These intersections will be designed as roundabouts with a large radius to avoid the need for and maintenance of robot controlled intersections. The ring road is being considered in conjunction with the Roads Authority.

Provisions will have to be taken to prevent pedestrians and cyclists to use and cross the ring road. Therefore an acceptable alternative routing for these road users is essential.

Due to the construction of the dyke around Oshakati, a part of the flow from the northern oshanas has to be diverted around the town. This diverted flow will be directed west. Some obstacles prevent water of flowing fluently downstream. For this, three so-called 'Oshana Connections' (OCs) have to be excavated through the ridges currently separating the oshanas.

Figure 7: Typical dyke section with dual carriageway

It is proposed that a road would eventually be built on top of the dyke and in some places; it could even accommodate a railway line (**Figure 7**).

In addition to the dyke, it is also proposed that a 300m wide channel be made to the north and west of the dyke. This channel will be deepened to allow water to flow in a westward direction.

To be able to control the flow of water into the town, sluice gates will be installed (**Figure 8**). These will be used to regulate the flow of water into the town. In times of high floods, these sluices will be closed (manually operated) to prevent too much water from entering the Okatana River system where it goes through town. An operating manual with alarm levels will be provided to the Town Council at the end of the works to serve as a guideline when to open and close the sluices.

Figure 8: Sluice gates

Since the widening of the Oshana Connections intersect with existing roads, new and wider bridges will be constructed. Both sluices and bridges are designed using the same type of precast concrete culvert modules, M1 and M2. M1 is 3 m wide and 1.2 m high, while M2 is 3 m wide and 1.8 m high.

3.3 PROPOSED CHANGES TO THE OKATANA RIVER

The Okatana River will be retained, but modified to act as a focal point and water feature during wet times of the year (**Figure 9**). Low flows will be allowed to enter the river, but high flows will be diverted through the use of the sluice gates. The system is ephemeral, thus it will not flow all the time. During the rainy season, fresh water would normally enter the system and then dry up again through the course of the dry season, only to be filled again during the rainy season. The discharge and the water level in the inner channels are controlled by manually operable sluices.

Their current design has a width of 60 m for the upper channel, and 40 m for the two lower channels.

The initial idea was to have a wide water feature that runs through Oshakati which will enable water sport activities and other landscaping features such as a waterfront. However, this idea has been abandoned due to costs and other anticipated problems such as pollution, standing water creating mosquito breeding grounds and keeping the system full of water year round.

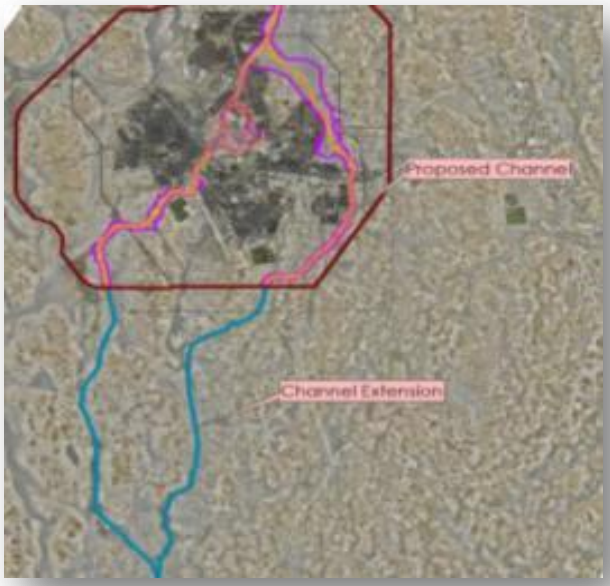

Figure 9: Proposed channels and channel extensions

The current plan is to deepen and line the edges of the Okatana River as it winds through Oshakati. The edges will be lined with concrete (**Figure 10**) and the river system will act as the main stormwater collector for rainwater inside the dyke area. The deepening will need to be to a level where it can act as the main stormwater collector for the internal stormwater drainage system. In order to ensure adequate flow, the deepening will have to continue for a distance of about 10km to the south of Oshakati.

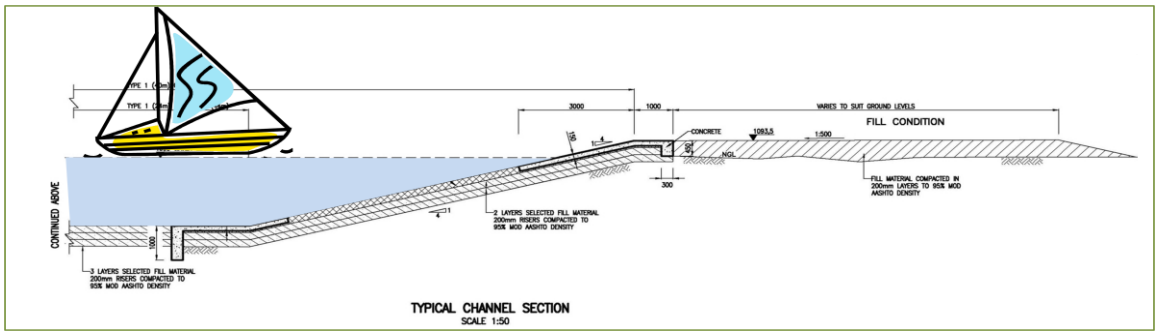

Figure 10: Typical Right Bank of the proposed channel.

Deepening of the Okatana River System will also require the removal and re-installation of municipal utility services that cross the river such as main water lines, main sewer lines, roads and bridges and electricity transmission and distribution lines. For the NamWater Canal, a siphon will need to be built underneath the river to ensure continued water supply.

3.4 INTERNAL STORMWATER

In order to address stormwater generated through rainfall inside the town, a conceptual Stormwater design has been completed. The Conceptual design will take both the current developed area of Oshakati as well as the area covered by the Concept Master Plan into account. Three drainage levels will be used namely rivers (which is the Okatana River system discussed above), major stormwater channels which will take stormwater from the minor drains into the river system and minor drains which collect stormwater from within the residential areas and streets and feed it into the major drainage channels.

In order to ensure adequate fall from the residential and business areas on the edges of town, the depth of the Okatana River system design will also be informed by the needs of the internal stormwater system.

3.5 PROJECT SCHEDULING

The study commenced during February 2012 and is expected to be completed by mid June 2012. The study will involve extensive public participation and it is envisaged that the public meetings will take place during March 2012, followed by further community meetings with those likely to be affected.

3.6 PROJECT COSTS

A detailed bill of quantities and cost estimate has been prepared based on the design drawings.

In order to have the main purpose of the works (i.e. flood protection) realised as soon as possible and to spread the budget needs, the works are planned in phases.

The total amount of tasks is largely dependent on the method of construction and on the concept of certain parts of the works. The current cost estimate amounts to N$ 760 Million (exclusive VAT), for all the various components combined.

4 LEGAL AND REGULATORY REQUIREMENTS

The legal environment of this project can be divided into two central themes. The first is the statutes that have **strategic planning implications** for the project. This theme includes local and international statutes that has bearing on this project and therefore needs to be considered in the strategic planning phases of the project. The second theme relates to the statutes that have **project management implications** and consequently need to be considered in the implementation of the EMP. The statutes that fall under each of the two themes are listed below:

4.1 STRATEGIC PLANNING STATUTES

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	NAMIBIAN LAWS	
The Constitution of the Republic of Namibia	Chapter 10 Article 91: The Ombudsman - Functions The functions of the Ombudsman shall be defined and prescribed by an Act of Parliament and shall include the following: The duty to investigate complaints concerning the over-utilization of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia; Chapter 11 Article 95: Promotion of the Welfare of the People. The State shall actively promote and maintain the welfare of the people by adopting policies that are aimed at maintaining ecosystems, essential ecological processes and the biological diversity of Namibia. It further promotes the sustainable utilization of living natural resources basis for the benefit of all Namibians, both present and future.	Aim towards achieving sustainable development by maintaining the ecological integrity of the ecosystems.
Environmental	Schedule of listed activities requiring an	Follow the requirements of the Act

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
Management Act (2007)	Environmental Clearance Certificate – the following are applicable: • The establishment of land resettlement schemes. • Construction of canals and channels including the diversion of the normal flow of water in a • Riverbed and water transfer schemes between water catchments and impoundments. • Construction of dams, reservoirs, levees and weirs. • Alteration of natural wetland systems. • Construction and other activities in water courses within flood lines. • Public roads; • Railways and harbours; Prescribes the procedures to the followed for public participation. Prescribes the procedures to be followed for authorisation of the project (i.e. Environmental clearance certificate) Prescribes the contents of the Scoping Report and the Environmental Report.	to ensure sustainability of the project. Borrow pits should be constructed in such a way that it does not expose groundwater or pollute, block or deflect any surface water and its flow.
Water Act 54 of 1956 **Water Resources Management Act 24 of 2004**	The Water Resources Management Act is presently without regulations; therefore the Water Act is still in force. A permit application in terms of Sections 21(1) and 21(2) of the Water Act is required for the disposal of industrial or domestic waste water and effluent. Section 23 (1): Prohibits the pollution of underground and surface water bodies. Section 23 (2): Liability of clean up costs after closure/ abandonment of an activity. Protection against surface and	Obligation not to pollute surface water bodies. The following permits are required in terms of the Water Act: • water abstraction permits; • domestic effluent discharge permits (site offices, construction camp); • industrial effluent discharge permits; • water use for dust suppression; and

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	underground water pollution. XIV Section 78 (1); Section 84 (1c)	• water reticulation permits (pipelines). • No person may engage in any construction activity that may impound, block or otherwise impede the flow of water in a watercourse particular when it contributes to a flooding risk. Although this Act has not commenced yet, the implications of the act remains applicable and should be abided by.
Public Health Act 36 of 1919	Provides for the prevention of pollution of public water supplies.	Potential pollution of the Cuvelai to be considered. A general obligation for the Contractor not to pollute the water bodies in the area.
RoN Revised Compensation Policy and Guidelines	Spells out that people should be compensated and resettled according to these guidelines so that they are not worse off post-project. Compensation rates and methodologies for negotiations are provided in this policy.	People to be compensated and resettled because of this project need to be treated in accordance with this policy.
INTERNATIONAL TREATIES		
Convention on Biological Diversity (CBD)	Namibia is obliged under international law to conserve its biodiversity.	Projects should refrain from causing any damage to the country's biodiversity.
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, 1994	Namibia is bound to prevent excessive land degradation that may threaten livelihoods.	This is a general requirement to be considered in all projects.
Ramsar Convention on	Namibia is a signatory to this intergovernmental treaty that provides	Needs to be considered during the

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
Wetlands, 1971	the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Cuvelai system is one of the four Ramsar Sites in Namibia. The site and surrounding area play an important role in local hydrology.	implementation of the project.

4.2 PROJECT MANAGEMENT STATUTES

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
Atmospheric Pollution Prevention Ordinance 45 of 1965	• Part II - control of noxious or offensive gases, • Part III - atmospheric pollution by smoke, • Part IV - dust control, and • Part V - air pollution by fumes emitted by vehicles.	• Application for an Air Emissions permit.
Forest Act 12 of 2001	Provision for the protection of various plant species. No regulations promulgated yet. Section 22(1): It is unlawful for any person to "*cut, destroy or remove:* • any vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilizing the sand or gully; or • any living tree, bush or shrub growing within 100 metres from a river, stream or watercourse on land that is not part of a surveyed erf or a local authority area without a licence.	• Vegetation in water courses to be protected from damage. Intended removal of such vegetation would require a permit.
Hazardous Substances Ordinance 14 of 1974	Control of substances which may cause injury or ill-health or death of human	• The handling and storage of hazardous substances on the

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	beings because of their toxic, corrosive, irritant, strongly sensitising or flammable nature, and for the control of certain electronic products and radioactive material. Does not regulate the transport or dumping of hazardous substances. Regulations only relate to the declaration of certain substances as hazardous substances.	Project Site should be carefully controlled. • Disposal of hazardous substances needs to be carefully controlled.
Minerals (Prospecting and Mining) Act 33 of 1992	Provides for the reconnaissance, prospecting, mining, disposal and control of minerals in Namibia. Section 91 (f): EIA to accompany the mining licence application "indicating the extent of any pollution of the environment before any prospecting or mining operations are carried out and an estimate of the pollution likely to be caused by the proposed activities. In case pollution is likely to be caused, an EMP is to be submitted to the Mining Commissioner indicating the proposed steps to minimise or prevent the pollution.	Clearly record previous damage to the area. Prevent pollution and report on and clean up accidental spillages and pollution. Keep record of waste management practices. Reclamation and rehabilitation of disturbed land to be addressed.
National Heritage Act 27 of 2004	Part V Section 46; Section 48; Section 51 (3) Part VI; Section 55 Paragraphs 3 and 4.	Prohibits the removal, damage, alteration or excavation of heritage sites or remains. The Act also sets out the requirements for impact assessment and requires that **any person who discovers an archaeological site should notify the National Heritage Council.**
Nature Conservation Ordinance 4 of 1975	Prohibits *inter alia* the hunting of and protection of wild animals, and the protection of indigenous plants. Prohibits disturbance or destruction of the eggs of huntable game birds or protected birds without a permit. Requires a permit for picking (the	Protected plants have been identified in the Botanical Assessment. Damage to protected plants need to be prohibited. In case there is an intention to remove protected species, then permits will be required.

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	definition of "picking" includes damage or destroy) protected plants without a permit.	
Preservation of Trees and Forests Ordinance	Protection to tree species.	The Contractor will require a permit to remove any protected trees.
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. The Minister may direct owners or land occupiers in respect of *inter alia* water courses. No Regulations exist to this effect.	Removal of vegetation cover to be avoided and minimized at all costs. The mining area to be rehabilitated concurrently with operations where practical.
Petroleum (Exploration and Production) Act 2 of 1991	• Prevention of pollution of aquifers, rivers, streams, borehole, etc. • Inspections of proper health and safety requirements may be carried out. Requires precautions for proper rehabilitation.	• The Contractor to act diligently to avoid pollution of the riverbeds, and to ensure diligence in terms of health and safety of the workforce. • Proper rehabilitation to be carried out. Ensure proper handling of petroleum products and reporting of spills to MME.
Petroleum Products and Energy Act 13 of 1990 **Regulations relating to the purchase, sale, supply, acquisition, usage, possession, disposal, storage, transportation, recovery and refinement of used mineral oil GN 112 of 1991** **Petroleum Product Regulations GN 155 of 2000**	1991 Regulations control the disposal, destruction, transport of oil. Petroleum Products Regulations 2000. Licence required for a petroleum products consumer installation and the Minister to take into consideration *inter alia* the protection of the environment and the suitability of the site. Licence required for storing >1000ℓ of petroleum. General duty to prevent social or environmental harm in storing, keeping, handling, conveying, using or disposing of any petroleum product. Provides conditions regarding petroleum	A permit is required for the storage of more than 1000ℓ of petroleum on the Project site. Obligations regarding petroleum products to be included in Contract Specifications. Reporting of any spills is required. Annual inspection of tanks is required.

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	spills and site abandonment. Annual reports required for storage tanks with a capacity of >2200 ℓ (above ground) and > 4560 ℓ (below ground). Inform the Ministry of "*major petroleum product spills*", i.e. > 200ℓ per spill and take all steps necessary in accordance with good industry to clean up the spill.	

5 THE RECEIVING ENVIRONMENT

5.1 CUVELAI-ETOSHA BASIN

The Cuvelai-Etosha basin is located in the central northern part of Namibia and is comprised of the southern Angola delta in the north and the Etosha Pan in the south. Due to the geography, population distribution, and water infrastructure the Cuvelai-Etosha basin is divided into by four sub-basins: Iishana, Niipele, Olushandja, and Tsumeb.

The Iishana of the seasonal Cuvelai wetland system are made up of a network of shallow pans, or iishana and seasonally flowing interconnected channels or rivers, locally known as "omuramba". This wetland extends from southern Angola into north-central Namibia before terminating in the Etosha Pan.

Omuramba = Local name for ephemeral river (pl.: omiramba)

Oshana = Local name for the system of interconnected drainage channels that flow through the central Owambo basin (pl.: Iishana)

The Etosha Pans complex has been listed as one of the Ramsar sites of Namibia. The site, comprising an area of approximately 600 000 ha, consists of Etosha Pan and its associated smaller pans, the ephemeral rivers feeding the pans, Lake Oponono and the inland seasonal Cuvelai delta. Although not currently included in the definition of the site, the option has been reserved to, in future, extend the Ramsar site to cover the entire Cuvelai-Etosha wetland system.

The **Ramsar Convention** defines wetlands as: "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including marine water the depth of which at low tide does not exceed six meters."

Although it is characterized as a semi-arid region, the Cuvelai-Etosha basin is considered one of the wettest parts of Namibia. It receives between 350 mm and 450 mm of rain annually, which contributes, along with high floods, to the surface flow of the basin. As is the case with most of the entire Namibian landscape, the eastern portion of the Cuvelai-Etosha has much more consistent rainfalls, than the western section (Mendelsohn, et al 2009). Historically, communities develop where the water was most plentiful, and relied on shallow wells to retrieve water during dry periods. Currently there are two major methods to retrieve non-surface water; an extensive network of NamWater and DRWS pipelines from the Kunene River and Angolan reservoirs, and boreholes that use solar, wind, and petrol energy to retrieve water from the aquifers deep underground (Amakali 2003).

Almost half of the Namibian population resides in the rural part of this basin, which is currently experiencing a relative rapid population growth of about 2% per annum. This increase in population is the "biggest threat to achieving sustainable development in the area" (Amakali 2003). This population density provides a serious drain on the available water resources in the region. It has been remarked that "there is substantial evidence that the land is unable to support the current numbers of people" (Marsh & Seely, 1992).

5.2 WHY IS THE CUVELAI WETLAND IMPORTANT?

According to Kolberg, Griffen, & Simmons (1997) the significance of the Cuvelai drainage system lies in the fact that it forms a natural wetland that covers most of the north-central parts of Namibia. This system not only plays an important role in local hydrology, but also sustains one of the most biologically diverse areas in the country. Coupled with this, the area supports 45% of the population of Namibia, making it one of the most important areas in the country.

The Cuvelai wetland system provides a variety of renewable natural resources and vitally important ecological services. The collection and use of "free" wetland natural resources forms a vital part of the livelihood of many people in Namibia and their culture. In essence, both the social and biophysical environments of the north-central parts of Namibia are sustained by the water of the Cuvelai wetland system (**Figure 11**).

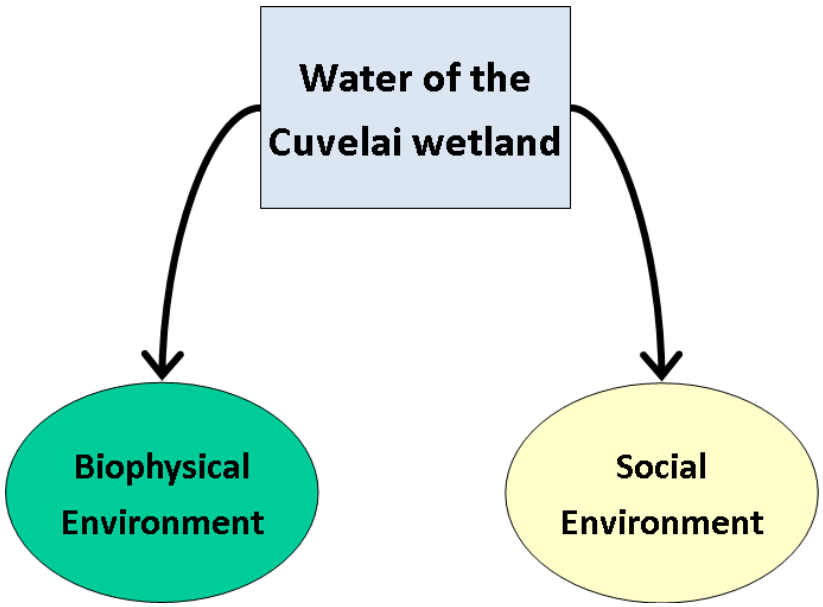

Figure 11: Importance of the water of the Cuvelai wetland in sustaining the biophysical and social environments.

5.3 WATER OF THE CUVELAI WETLAND

5.3.1 Hydrology

Although the Namibia MET office has rainfall records at a few stations in the Cuvelai, some of which stretch back to 1913, very little data is available on surface water flows in the catchment. There are 13 stations located south of the border which measure water levels, but no flow data are available.

No data is available for the major part of the catchment which lies north of the Namibia/Angola border.

The lack of data has made the hydrological and hydraulic modelling of the water levels and flows around Oshakati a challenging task. BAR Namibia has done substantial work and applied innovative techniques to develop a methodology for these models. The level of confidence in the results of the model is difficult to assess in terms of:

- The flow and flood frequency data generated from the hydrological model
- The method employed to calibrate the model

The flows generated by BAR and flows transposed from the Kunene and Okavango rivers based on the measured flow data at Ruacana and Rundu respectively could not be compared. The flow quantities generated do, however, appear to be conservative which implies that there is an inherent factor of safety in the values used to design the Oshakati dyke.

Table 1: Sensitivities and potential impacts related to hydrology

ENVIRONMENTAL FEATURE	SENSITIVITY	POTENTIAL IMPACT/ENHANCEMENT
Flood model	Lack of local flood data. Model is based on the Probability Distributed Moisture (PDM) model developed by the UK Centre for Ecology and Hydrology. Models developed in Europe and the UK are often not applicable to conditions in southern Africa	Accuracy of the model is a concern but the model is considered to be conservative.
Change in the effects of flow conditions	Change in flow conditions may result in increased flooding of the	Changes in flood conditions downstream, and upstream of the

ENVIRONMENTAL FEATURE	SENSITIVITY	POTENTIAL IMPACT/ENHANCEMENT
upstream, in and downstream of the project area	new terrain in the area immediately upstream of the project. The new flow condition in the diverted stream may result in effects such as scarring; sediment deposits and changes in expected flood conditions over time. Changes in flow conditions in the transition area and immediately downstream may result in sediment deposition and changes in expected flood conditions over time.	project area.
Transportation of sediments	Sediment transport along the bed of the channel is unknown. Material may be either deposited or eroded causing unknown changes to the flood levels in certain areas	Sedimentation and changes in turbidity downstream
Water quality	Changes in the flow conditions upstream of the project area may lead to localized change in levels of contaminants and physical pollution deposition. Changes in the flow conditions in the transition area may lead to localised change in levels of contaminants and physical pollution deposition. The upgrade of the Oshakati stormwater drainage may change in levels the accumulation of pollutants in the system as well as downstream of Oshakati in the transition area.	Changes to water quality downstream of the project area.
Stormwater drainage in Oshakati	During times of flood the water level on the outside of the dyke may be higher than many low lying areas in Oshakati. Under these conditions it may be impossible to drain local	Flash floods could cause internal flooding in Oshakati due to cumulative flood conditions.

ENVIRONMENTAL FEATURE	SENSITIVITY	POTENTIAL IMPACT/ENHANCEMENT
	run-off into the downstream oshanas. Many houses in Oshakati are constructed at ground level which makes them very susceptible to flooding from local run-off.	

5.4 THE BIOPHYSICAL ENVIRONMENT

5.4.1 Physical Components

Water

Water may be considered a major wetland resource, but in ecological terms it is a major constituent of the wetland itself. It is inextricably intertwined with all levels of the ecosystems it sustains and influences the surrounding area's environmental and socio-economic stability.

The determination of ecological water needs involves looking at the water needs of the environment so that sufficient water is retained in the wetland to maintain all the physical and ecological processes and wetland productivity. In order to achieve this, it is important to recognise the interconnected nature of a wetland system and its terrestrial surroundings.

Flood pulse is another important aspect of water that plays a role in sustaining biotic life, and maintaining interactions and productivity within the river-floodplain system (Junk *et al.*, 1989). Flood pulses are influenced by geomorphological and hydrological conditions, which determine the nature of the flood pulse.

Soils and Gradients

Due to the flat topography of the north-central regions of Namibia, the floodwaters flowing from Angola to Namibia, spreads over a large area to recharge the groundwater, and as the water recedes, fertile soils are left behind that provides pastures for livestock in the dry season. Some of shallow depressions then form dry pans with a clayey and often saline base due to the accumulation of salts left behind each time the water evaporates.

5.4.2 Biological Components

The natural resources the system freely provides to sustain the livelihoods of the people are (**Figure 12**):

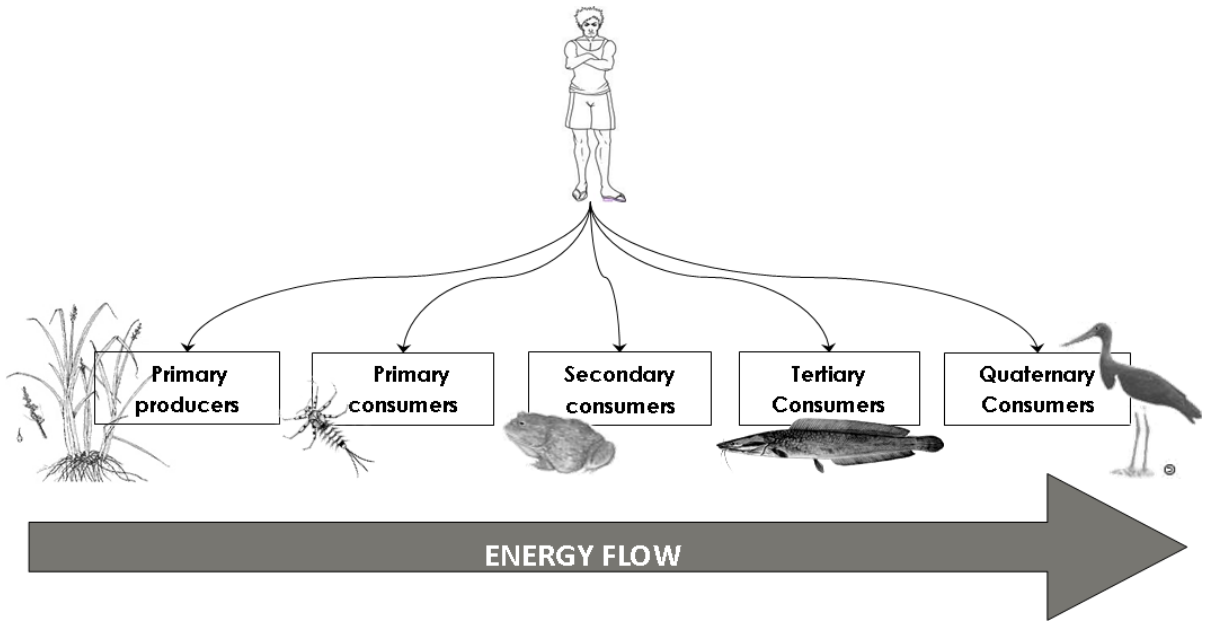

Figure 12: The natural resources of the Cuvelai sustain the livelihoods of the people.

Vegetation

The vegetation which grows in the Cuvelai supports the livelihoods of the local people. Reeds and sedges are used as building materials for household items such as baskets and fish traps. Grasses provide grazing for livestock and wildlife, while trees provide, shade and wood for fuel, tools, building materials and canoes. A large number of fruit trees are also associated with river systems and wetlands. Some plants are harvested for food and used as medicine for humans and livestock.

Animals

Animals such as freshwater fish, frogs, reptiles, birds and many aquatic invertebrates are found in wetlands, while other wildlife and livestock congregate around wetland area **Table 2**. Oshanas provide fish, frogs and other food resources when in flood and also recharge groundwater.

The Cuvelai Basin is an important freshwater fish habitat in this eco-region. When rain in Angola floods its tributaries, the basin fills with water and fish are swept up to 200 km from the permanently watered Angolan areas. During these floods, the basin supports up to 43 crustaceans and 19 fish species. The fish are an important natural resource and are extensively utilized by the local people.

Table 2: Significance for the biological components of the Cuvelai system.

BIOLOGICAL COMPONENT OF THE CUVELAI SYSTEM	NUMBER OF RECORDED SPECIES	SIGNIFICANCE
Plant species	Unknown	Wood is the main construction material in the north-central regions of Namibia. Deeper pools are often surrounded by larger trees bearing edible fruit, including birdplums, marulas and jackalberries.
Macro-invertebrate species*		Important source of food for fish and frogs.
Molluscs	11 species	
Crustaceans	60 species, 16 endemic	
Invertebrates	72 species, 4 endemic	
Fish species*	49 species	Fish are heavily utilized by the local people with estimates of up to 4,000kg of fish caught in a 30km section in one day. The total harvest is unknown (Kolberg, Griffin, & Simmons, 1997). Total exploitation of fish stocks can be done every year without any harm to the system – replenished with every flood.
Frog species*	16 species	Sixteen out of the 52 amphibian species known or expected to occur in Namibia, are found in the Cuvelai-Etosha system. They include such species as the Large Bullfrog *Pyxicephalus adspersus* and the colourful Banded Rubber Frog *Phrynomantis bifasciatus*.
Bird species	250 – 270 species of which more than 90 species are wetland species 42% of these are included in the	Breeding area Dependent on fish and frog species

BIOLOGICAL COMPONENT OF THE CUVELAI SYSTEM	NUMBER OF RECORDED SPECIES	SIGNIFICANCE
	Namibian Red Data Book 25 wetland species are known to breed in the Etosha	
Wildlife species		Mostly restricted to Etosha
*(Curtis, Roberts, Griffin, Bethune, Clinton, & Kolberg, 1998)		

5.4.3 Ecological Services

Biodiversity Support

Primary production in wetland systems enables the survival of diverse animal species. Linear riverine wetlands are ecological corridors enabling the movement of plant and animal species through harsh arid environments.

Water Quality Improvement

Oshanas sustains life in the Cuvelai by replenishing aquifers and providing seasonal water sources. These seasonal water resources are however not reliable as most of it dries up to the end of the dry season. When this happen water quality deteriorates to become unfit for livestock and even the most hardy fish species. Aquatic plants recycle nutrients and hence keep their concentrations at levels conducive for healthy functioning. Water is filtered as it passes through the wetlands to underground aquifers.

Flood Abatement

The duration and amount of water in pans and oshanas are unpredictable, with marked fluctuations in the diversity of biota associated with the system. During exceptional floods, water from the Oponono complex floods the Ekuma River and may reach the Etosha Pan. Water can also reach the Etosha Pan from the east via omirambas draining the north-eastern dunes and northern aspect of the Otavi highlands.

The ecological sensitivities associated with the Cuvelai system, are presented in **Table 3** below:

Table 3: Environmental sensitivity and the potential impact

ENVIRONMENTAL FEATURE	SENSITIVITY	POTENTIAL IMPACT
Fauna and flora of the Cuvelai	The seasonal movement of fish and frog species and macro invertebrates (molluscs, crustaceans and aquatic insects) southwards is vital to maintaining the healthy functioning of the Cuvelai ecosystem and replenishment of fish stocks and frog populations.	• Infrastructure constructed in a predominantly east-west orientation interrupts the flow of water which flows from north to south. • Damage to the sensitive ecosystem during construction e.g. loss of vegetation
	Naturally occurring resources (e.g. fish, frogs, plants) important for sustaining livelihoods of the people.	Occurrence/abundance of resources may change in certain areas due to the altered flow. This could result in the unsustainable harvesting of frogs and fish in areas with low flow.
	Change in the flow dynamics of the Cuvelai during floods	• Impact on the biodiversity of fauna and flora lower down in the system due to the change in flow velocity, duration and time • Breeding grounds for disease bearing vectors such as mosquitos (vector for malaria) and *Bulinus globosus* (vector for bilharzia). • Impact of erosion • Distribution of pollution and litter from Oshakati to other areas not previously affected by the floods • Hydrological, nutrient and energy cycles of the oshana system may be altered.
	Opening up of large borrow pits to find suitable road construction material	Spoiling large volumes of material which is unsuitable for dyke construction is not

ENVIRONMENTAL FEATURE	SENSITIVITY	POTENTIAL IMPACT
		acceptable and must be re-used.
	Deepening of the Okatana channel	Damage to the existing ecology of the channel
Etosha pan	Dependent on water from the northern parts of the Cuvelai One of only two mass breeding grounds for flamingos in Southern Africa	• Because Etosha is a Ramsar site, any project that could alter the system has international implications. • Impact on the sensitive habitats of the Etosha pans • Impact on breeding grounds of wetland birds

5.5 THE SOCIO-ECONOMIC ENVIRONMENT

Oshakati can be regarded as the commercial centre of the north. Functioning as the seat of the Oshana Regional Council, the town accommodated about 28 255 people in 2001, up from a population of 21 603 according to the 1991 and 2001 Population and Housing Census. (RoN 1994) (RoN 2003). According to the Oshakati Town Council, the current population is about 45 000 with an estimated growth rate of 5.5% per annum.

Since independence in 1991, Oshakati grew from a relative small and poorly developed town into a large urban settlement with modern buildings and services. The town is situated within the Cuvelai Delta which is characterised by shallow drainage channels called oshanas with pockets or islands of higher lying land in between. The continued growth of the town meant that the pressure for suitable land in the town increased to a point where many people settled in lower lying areas on the edges of the higher lying land portions and sometimes even within the oshanas. Since 2008, the Cuvelai delta experienced heavy rain and flooding which originates in the highlands of Angola and flows through the Cuvelai to the Etosha Pan. This led to substantial flooding of houses, homesteads and fields in Oshakati and its surrounds as well as throughout the Cuvelai delta.

Following a process of public consultation in Windhoek and Oshakati as well as a literature review, the following sensitivities and potential impacts were identified during the scoping phase (**Table 4**).

Table 4: Sensitivities and potential impacts related to human settlement and livelihoods.

SETTLEMENT FEATURE	SENSITIVITY	POTENTIAL IMPACT/ENHANCEMENT
Reduced flooding within the area protected by the dyke.	Households currently flooded seasonally inside the town.	Approximately 1000 households will now be flood free and will no longer be displaced annually as a result of the floods.
Reduced flooding within the area protected by the dyke system.	Urban expansion, logical land use and long term development.	More land close to the centre of Oshakati available for development with resultant cost savings.
Internal stormwater system	Virtually all residential and business areas within Oshakati.	Relieve localised flooding and has the potential to ensure that residential and business areas in the town will be free of standing stormwater with the resultant economic benefits of continued business activities, irrespective of the rainy season.
Employment creation	Unemployed people and SMEs in Oshakati	Much needed employment will be created through the construction project. The eventual significance of this impact will depend on the construction model eventually selected.
Land take required by the dyke and associated works	Homesteads and fields under the footprint of the dyke and the channel to the north and west of the dyke.	People will lose their homesteads and fields.
More flooding at Ompundja at the point of discharge of the water channelled around the dyke.	Homesteads and fields in close proximity to the discharge point of the dyke close to Ompundja	Increase in flooding in the area where the main discharge will again be accommodated in the normal unaltered oshana system.
Backwater effect of the dyke during flood periods	Households and fields that would not normally be flooded.	These households will be flooded as a result of the backwater effect and a mitigation regime will need to be put in place for them.

SETTLEMENT FEATURE	SENSITIVITY	POTENTIAL IMPACT/ENHANCEMENT
Land take and backwater effect of dyke and associated infrastructure	Households dependent on subsistence agriculture for their livelihood.	Loss of livelihood sources.
Deepening of the Okatana river system	People and animals needing to cross the Okatana river.	Drowning of people and livestock may increase when the river is deeper.

6 PUBLIC CONSULTATION AND DISCLOSURE

6.1 INTRODUCTION

Public consultation forms an important component of an Environmental Impact Assessment (EIA). It has been defined by the Namibian Ministry of Environment and Tourism (MET) Environmental Assessment Regulations of the Environmental Management Act (2007), as a '*process in which potential interested and affected parties (I&APs) are given an opportunity to comment on, or raise issues relevant to, specific matters'*.

In the case of the Oshakati Flood Mitigation Project, there are a number of authorities who need to work together to deal with the flood problem in Oshakati. For this reason the Consultants not only focussed on soliciting the comments from the potentially affected **communities** in the project area, but also from the potentially affected and involved line, regional and local **authorities.** Government expects various authorities and institutions involved in the planning and implementation of programmes and projects to make decisions in unity, while integrating their plans and actions to ensure harmony in development.

6.2 HIGH LEVEL STRATEGIC SESSION

Keeping in mind the complexity of this project and the magnitude of its potential effects on communities and the ecology, it was decided to precede the formal EIA process with a strategic session involving all key authorities, NGOs, and other stakeholders that are involved with the flood problem of the northern areas in some way. The outcome of this process delivered a number of key principles. The full report of the strategic session is attached as ***APPENDIX C***, while the key outcomes are as follows.

- The Oshakati Flood Mitigation Project is recognized as a project of critical importance, for the protection of lives and to secure a future for the Town of Oshakati. However, a sustainable solution must allow for proper investigations as suggested in the Scoping Report.

- The project will protect the identified area from future flooding and more space will be created in the medium term for the development of Oshakati. A strategic long-term planning approach is crucial for the sustainable development of the area and surrounds and to holistically solve the flooding vs. settlement dilemma in a responsible way.

- The hydrological model needs to be refined before the EIA process can go ahead (this has meanwhile been completed to the satisfaction of the EIA Team and Water Affairs).

- Some elements of the project, including a stormwater master plan, cleaning of the channels through Oshakati, and the set up of gauging stations in the Cuvelai are urgent and do not hold significant risks. They should be implemented with immediate effect (significant progress has since been made with all these components).

- Potential ecological effects may be very significant since they play a crucial role in the livelihoods of the Cuvelai inhabitants, which are maintained by natural ecological processes. These include potential change of groundwater and surface water resources, removal of the self-cleaning properties of the Cuvelai by lining and channelling it, impacts on fish communities, turning a seasonal system into a perennial one, which will change the entire bio-system, and the effects of these changes to the Etosha Pans, which is a declared Ramsar site.

- The establishment of a permanent water body in Oshakati was questioned. It potentially has significant impacts, including, siltation, mosquito and other insect problems, spreading of waterborne diseases, algae growths and water contamination. With the Oshakati Flood Mitigation project it is aimed to protect the people from future flood risks. Potential negative social impacts include relocation of homesteads and other impacts on settlements due to the inundation by the backwater, and other potential issues raised at the meeting. The EIA Team is to ensure that the social impacts far outweigh the negative ones.

The proposed systems should be manageable from an operations and maintenance point of view keeping in mind current institutional constraints. The system needs to be appropriate for local social, institutional, ecological and physical conditions.

6.3 PUBLIC AND AUTHORITY CONSULTATION

Following the strategic consultation phase outlined above and the putting in place of a proper hydrological model to be used in predicting the flooding effects of the new structures, meetings were held with the relevant authorities at a higher level in Windhoek in order to solicit their inputs and identify their issues and concerns. It was not deemed necessary to conduct a separate meeting for the Windhoek public since few might be directly affected by the proposed project. However, the public was also invited to the authorities meeting since it was envisaged that a number of businessmen from Windhoek also have interests in Oshakati.

An important component of the public consultation was to consult with both the authorities and public in Oshakati. Separate meetings were held for these two interest groups whereby the project information could be presented to them and potential issues and concerns are identified. The traditional authorities and leadership were invited to the public meeting as representatives of their communities, since consultation with village members will be undertaken at a later stage by the Socio-Economic Specialist. Key businessmen from Oshakati and its surrounds were also invited to the public meeting.

A summary of all issues and concerns that have been raised during public consultation is provided in the Issues and Responses Trail (see ***APPENDIX D***). The latter also assisted in developing the parameters of the study in terms of issues to be explored in the full EIA phase.

The purpose of this section of the report is to specify the identified stakeholders, the meetings that have been conducted as well as common themes resulting from these meetings. This will be contextualized in terms of relevant legislation.

6.4 POLICY AND LEGAL FRAMEWORK

The Public Participation Process (PPP) prescribes to certain national and international legislation. **Table 5** below outlines the legislation and policies applicable to the PPP for this project.

Table 5: Summary of Relevant Namibian Legislation

LEGISLATION/ GUIDELINE/ POLICY	APPLICABLE CLAUSE/ POLICY	COMMENTS
Environmental Management Act (2007)	Environmental Impact Assessment Regulations (January 2012) Schedule 21: Public Consultation Process	"The person conducting a public consultation process must give notice to all potential interested and affected parties of the application which is subjected to public consultation by - a) Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is or is to be undertaken; b) giving written notice to – • the owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site; • the local authority council, regional council and traditional authority, as the case may be, in which the site or alternative site is situated; • any other organ of state having jurisdiction in respect of any aspect of the activity; and c) advertising the application once a week for two consecutive weeks in at least two newspapers circulated widely in Namibia."
Environmental Management Act (2007)	Environmental Impact Assessment Regulations (January 2012) Schedule 21: Public Consultation Process	"When complying with this regulation, the person conducting the public consultation process must ensure that – • information containing all relevant facts in respect of the application is made available to potential interested and affected parties; and • consultation by potential interested and affected parties is facilitated in such a manner that all potential interested and affected parties are provided with a reasonable opportunity to comment on the application."
Environmental Management Act (2007)	Environmental Impact Assessment Regulations (January 2012) Schedule 22: Register	"An applicant responsible for an application must open and maintain a register which contains the names and addresses of – • all persons who, as a consequence of the public consultation process conducted in respect of that

LEGISLATION/ GUIDELINE/ POLICY	APPLICABLE CLAUSE/ POLICY	COMMENTS
	of interested and affected parties	application, have submitted written comments or attended meetings with the applicant; • all persons who, after completion of the public consultation process referred to in paragraph (a), have requested the applicant responsible for the application, in writing, for their names to be placed on the register; and • all organs of state which have jurisdiction in respect of the activity to which the application relates. (2) An applicant responsible for an application must give access to the register to any person who submits a request for access to the register in writing."
Environmental Management Act (2007)	Environmental Impact Assessment Regulations (January 2012) Schedule 21: Public Consultation Process	"Before the EAP responsible for the application, submits a report compiled in terms of these regulations to the competent authority, the EAP must give registered interested and affected parties access to, and an opportunity to comment in writing on the report."

6.5 THE STAKEHOLDERS

An interested and affected party can be defined as '(a) any person, group of persons or organization interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity' (MET, 2010).

The interested and affected parties for this project were identified using the Enviro Dynamics existing stakeholder database as well as public invitation through newspaper adverts. Notices were placed in various newspapers inviting the public to register as interested and affected parties. Organizations were invited to participate if they considered to be interested in or affected by this particular project which were added to the stakeholders list.

Key stakeholders have been identified at national, regional and local level. As for this project, local refers to the Oshakati community. A summary of these stakeholder groups are presented in. The complete stakeholders list can be viewed in ***APPENDIX E***.

Members of the Public received the opportunity to register as stakeholders and are added to the stakeholder list as they come on board.

Table 6: Summary of Stakeholders

ITEM	LEVEL	DESCRIPTION
STAKEHOLDER DATABASE	NATIONAL	Ministry of Regional and Local Government and Housing and Rural Development (MRLGHRD) Ministry of Environment and Tourism (MET) Ministry of Agriculture, Water and Forestry (MAWF) Ministry of Health and Social Services (MHSS) Ministry of Works Transport and Communication (MWTC) Ministry of Education (MOE)
		Emergency Response Unit (Office of the Prime Minister) National Planning Commission NamWater NamPower NGOs Specialists
		Other Consultancies Media
	REGIONAL	Ministry of Regional and Local Government and Housing and Rural Development Ministry of Environment and Tourism Ministry of Works Transport and Communication Ministry of Agriculture, Water and Forestry Ministry of Education
		Oshana Regional Council
		NORED NamPower Media

ITEM	LEVEL	DESCRIPTION
	LOCAL	Oshakati Town Council Ongwediva Town Council
		Chamber of Commerce and Industry Premier Electric Telecom
		NGOs Specialists Other Consultancies Media

6.6 METHODOLOGY

The public was informed about this project in various ways. Notices were placed in the press in two different newspapers covering the central and national areas over a period of two consecutive weeks. It briefly explained the project and its locality while also inviting people to register as I&APs (see **Table 7** below). These newspaper notices are attached as ***APPENDIX F***.

The Town Council assisted the EIA team with informing the public of the public meeting by announcing it over the local radio. In addition, the Regional Councillors provided their assistance by inviting the traditional authorities and leadership from the potentially affected villages as well as those living inside Oshakati. These councillors were also tasked to invite key business leaders from the community. The Chamber of Commerce and Industry invited all their members, amounting to more than 200, by forwarding the invitations and all communications regarding the proposed project to them via e-mail.

The I&APs, as discussed under **section 6.5**, were notified about the proposed project and the consultation meetings via faxes and e-mails. Prior to the consultation meetings, a Background Information Document (BID) on the proposed project was circulated to them (***APPENDIX G***).

As for a notice board, it was deemed impractical to put up such a notice due to the sheer size of the proposed project locality. It is also not a fenced-off area, but rather stretches over a distance of approximately 26 km.

An article was also published in a national newspaper on the proposed project (see ***APPENDIX H***). Even though this article was not formally released by the project team, it assisted in further raising awareness and it is noted that the press do have a role to play in the public consultation phases of a project. Hence, they were also invited to the public meetings.

The meetings were conducted in both Windhoek and Oshakati with high level stakeholders, authorities and the public respectively. Venues known and accessible to the I&APs were identified for both Windhoek and Oshakati, namely the NamPower Convention Centre and the Oshandira Lodge in Oshakati.

Table 7: Notifications Placed in Press

DATES	NATIONAL NEWSPAPER	CIRCULATION
22-02-2012 29-02-2012	Republikein	Afrikaans Newspaper, National
22-02-2012 29-02-2012	The Namibian	English Newspaper, National

6.6.1 The Meetings to Date

All the meetings were facilitated by Norman van Zyl from Enviro Dynamics whom also explained the EIA process. Jan Wynants and Martha Amapolo from BAR Namibia presented an overview of the proposed project, while Gunter Leicher from Knight Piesold presented some information on the deepening and lining of the Okatana River System. In addition, Ronny van Looveren (BAR Namibia) explained the hydrological model employed for this project.

A short film on the proposed project was shown. Excluding Windhoek, it was shown in both English and

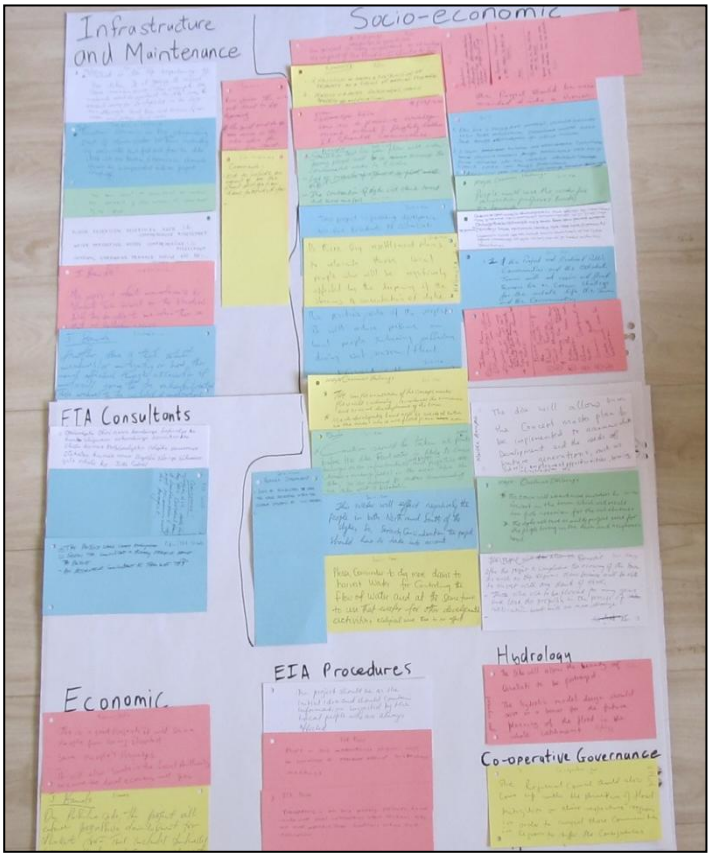

Figure 13: Cards grouped according to themes

Oshiwambo. The meetings in Oshakati were also conducted in both these two languages in order to ensure that no one present was excluded from the discussions.

Attendees were given the opportunity to ask questions for clarification purposes as well as later raise concerns and issues, both positive and negative. Cards were also handed out to them on which to record any point they wanted to make. An example of this is shown in **Figure 13**. These were then afterwards grouped according to certain themes and added to the summary of issues identified for this project.

The minutes of all the meetings can be viewed in ***APPENDIX I***.

A summary of the objectives and methodology employed for each meeting, as well as the main issues raised are presented in **Table 8** overleaf.

Table 8: Summary of the Objectives and Methodology for Each Meeting, as well as main issues raised

OBJECTIVES	THE MEETINGS	MAIN ISSUES RAISED	METHODOLOGY
AUTHORITIES CONSULTATION			
In order to consult with the organs of state which have jurisdiction over the areas where the proposed project will be implemented, meetings were conducted with the relevant authorities in Oshakati and Windhoek. In addition, it was hoped that possible solutions to challenges faced with regards to the proposed project could also be provided.	• *Windhoek:* The authorities meeting in Windhoek was held on 07 March 2012 and was attended by more than 40 people (**Figure 14**). They represented the MAWF, MET, MRLGHRD, DWAF, NPC, private consultants, City of Windhoek, Road Authority, and local businessmen. • *Oshakati:* This meeting took place on 08 March 2012 and had 52 attendees (**Figure 14**). They represented the Oshakati Town Council, Oshana Regional Council, Traditional Authorities, MET, MWAF, MRLGHRD, hydrologist, private consultants and NamPol.	The key concerns raised by the attendees can be summarized as potential increased velocity of the water along the dyke, impacts on villages downstream from the dyke near Ompundja, crossing the dyke and its water channel, harvesting of water, still standing water and associated health risks, locality of the dyke, safety and linking up of the dyke with existing roads. Concerns regarding the crossing of the Okatana River inside the town and pollution were also raised.	• *Windhoek*: The authorities were invited to the meeting via fax and e-mail, while a notice was placed in the newspapers to inform the Windhoek public about the meeting. • *Oshakati:* The attendees were invited to the meeting via fax and e-mail. Also, the Oshana Regional Council assisted with invitations to the traditional authorities.
PUBLIC CONSULTATION			
The main objective of consulting with the public was to create a platform whereby the concerns of individuals,	• *Oshakati*: Members from the public attended this public meeting on 09 March 2012 at the	The main issues raised can be summarized as relating to the managing of the sluice gates,	An invitation to the public meetings was circulated via e-mail and fax to the I&APs. In addition, the meetings

OBJECTIVES	THE MEETINGS	MAIN ISSUES RAISED	METHODOLOGY
groups or local communities could be conveyed and the parameters for the study in terms of issues to explore can be developed. In addition, these meetings facilitate transparency with the public which aids in building good rapport, while identifying potential challenges brought about by the proposed project, along with possible solutions.	Oshandira Lodge in Oshakati. They represented the Namibia Chamber of Commerce and Industry (NCCI) and business community, Oshakati Town Council, Hydrology, Traditional Authorities and students from the Engineering Faculty of UNAM. Parts of this meeting were filmed by members of the BAR Namibia.	changes in velocity of the water as it reaches Ompundja, spreading out of water at the end of the dyke, deepening and levelling of the Okatana river and the linking of existing roads and villages to the dyke, not restricting access to Oshakati.	were announced in the various newspapers as shown in **Table 7** in order to inform the public about the meeting. It was also announced over the radio with the help of the Oshakati Town Council, while the Oshana Regional Council invited the traditional authorities and leadership as well as key business people. The NCCI also assisted by inviting their members to the meeting.

Figure 14: Photos of the Meetings Conducted

6.6.2 Public Feedback

Continuous public input and feedback is important as it also assists in transparency and building good relations. A two-week commentary period will allow I&APs the opportunity to submit any questions or comments on the BID as well as information presented at the meetings.

The Draft Environmental Scoping Report which also includes a summary of the public participation process, the minutes and an Issues and Responses Trail, will be made available on the Enviro Dynamics website for the perusal of all registered I&APs. Again, the link will be e-mailed and faxed to them with an invitation to provide comments on this document. Hard copies of this document will also be placed at the Windhoek and Oshakati libraries.

All comments received during this round of consultation will be collated into a Comments and Responses Trail which will include statements of how the comments were considered and incorporated into the Final Environmental Scoping Report, before submitting it to the DEA for approval.

6.6.3 Issues Identified

The issues that were raised during the above consultation forums, as well as in writing, have all been collated in the Issues and Responses Trail (see ***APPENDIX D***). These issues will further be considered in the full impact assessment phase which will be a separate document. The key concerns and issues raised by the I&APs are summarized in **Table 9** below.

Table 9: Summary of Key Issues Identified

SUMMARY OF ISSUES	
Land use planning	• Dyke will obstruct the westward expansion of Oshakati • Need for the designation and enforcement of restricted areas which are prone to flooding where no development should take place • Need for a SEA for the entire Cuvelai system • Concept Master Plan could formalise informal settlements • Need for region and nation-wide planning to deal with the flooding problem –other areas such as Caprivi are also subject to flooding • Restrict the development of Oshakati and use the money for the development of other towns? This would be in keeping with Vision 2030,

SUMMARY OF ISSUES	
	which seeks to develop towns other than those that are more established..
Water quality and Ecology	• Exposure of the hard salt/mud layer under the oshanas could cause a change in water quality downstream during subsequent floods. • Hydrological, nutrient and energy cycles of the oshana system may be altered. • Distribution of pollution and litter from Oshakati to other areas not previously affected by the floods • Searching for material to use in the construction of the dyke and the spoiling of large volumes of material which is unsuitable for dyke construction could present ecological problem • Impact of increased velocities and volumes of water on sensitive ecosystems further south like Etosha (breeding grounds of wetland birds, unsustainable harvesting of frogs and fish in areas with low flow.). • Restriction of the normal flow of the watercourses could cause flooding in other areas. • Impact on flora and fauna (construction of the dyke, deepening of Okatana channel), (e.g. deforestation, change in biodiversity due to change in flow velocity, duration and time - Loss of livelihood sources.) • Impact of siltation/turbidity downstream in a system where the water is already very turbid (erosion). • Impact of changes in water quality on fish production.
Hydrology	• Infrastructure constructed in a predominantly east-west orientation interrupts the flow of water which flows from north to south. • Consider early flood warning system with the use of satellite technology • Impact of the construction process during flooding • Increased seepage in Oshakati from the dyke • Impact of the dyke on the Calueque-Oshakati water scheme • Impact of the dyke on the flow velocities of diverted/downstream water • Impacts of flood gate operations on Cuvelai system (duration and time of flow) • Removal of the salt/mud layer lining the oshanas could have an impact on aquifer recharge, flows, etc. downstream. • Impact on the internal storm water drainage of Oshakati. • Integration of swamp/lake/canal/dyke/stormwater systems • Risks associated with flash floods after heavy rainfall.

SUMMARY OF ISSUES	
	• Consider the uncertainties and the associated risks of the hydrological model
EIA Process	• Consider alternatives to the construction of a dyke/consider a simpler solution for flooding in the north-central regions that could be applied to other affected areas as well. • Consider the input from the local people • Consider the lessons learnt from similar projects (canalisation of rivers through towns) in other countries. • Government should not take decisions without consulting the public – (referring to the Oshakati Concept Master Plan, which has already been approved by Cabinet). • The need for a feedback meeting. • Comments raised at meetings need to be translated into Oshiwambo for all to understand.
Socio-economic	• Impact of the project on residents to the north, west and further downstream (Ompundja) of the dyke (relocation and compensation of locals - People will lose their homesteads and fields) • Employment of local people during the construction phase of this project (Reduction in unemployment and hence poverty) • Safety risks for people and animals associated with the deepening of the Okatana channel (i.e. people and animals falling into and drowning in the channel). • Increase in flooding in the area where the main discharge will again be accommodated in the normal unaltered oshana system. These households will be flooded as a result of the backwater effect and a mitigation regime will need to be put in place for them. • Impact of creating a precedent that settlements experiencing flooding can expect intervention from Government. • Improved protection of people's property and lives from flooding (Approximately 1000 households will now be flood free and will no longer be displaced annually as a result of the floods). • More space available for residential development (More land close to the centre of Oshakati available for development with resultant cost savings). • Increased, business, recreation and tourism opportunities • Access across the large body of water and a dyke (traditional pathways, movement of livestock, children walking to school). • Capacity of headmen (residing outside Oshakati) in dealing with

SUMMARY OF ISSUES	
	complaints and issues. • Consider damming the water for consumption by local residents (Lower water prices in the area, Water harvesting) • Effect of deforestation on locals especially the removal of fruit bearing trees. • Consider the potential of fish farming if water is dammed.
Economic/Financial/ Costing	• Frequency of flood events vs. justification of this project • Benefits of project for the Oshakati economy (development of multipurpose infrastructure, investments and improved capacity of local government) • Consider the cost associated with the relocation of people vs. the costs of the project.
Flood Infrastructure, Maintenance and Rehabilitation	• Institutional capacity to maintain and operate the flood mitigation structures • Consider siltation in the Maintenance Plan for the flood gates • Elevation of areas within Oshakati to avoid flooding caused by rainwater accumulated in the town • Excavation of material from the river to the north of Oshakati to construct the dyke. • EMP required for the rehabilitation of areas that will be excavated during construction. • Impact of the flood mitigation project on the time schedules of planned projects (e.g. road planned between Ongwediva and Oshakati, telecommunication projects) and projects currently in progress (e.g. the construction of the DR 3671 road) • Consider maintenance issues on the dike slopes. With domestic stock and foot borne human activity. • Costs and maintenance requirements of erosion control.
Health and Safety	• Health impacts associated with the spreading of diseases and malaria associated with the slow flow speed of water. • Pollution of standing and canalised water. • Improved sanitation due to the movement of previously standing (contaminated) water away from Oshakati
Environmental Consultants	• Issues and concerned raised must be objectively presented.

SUMMARY OF ISSUES	
Co-operative governance	• Need for co-ordination between the various Regional Authorities in the affected regions so as to share solutions regarding flooding concerns • All relevant government institutions (like Roads Authority) need to be consulted and informed regarding the project.

7 IDENTIFICATION OF KEY IMPACTS

7.1 SCREENING OF ISSUES

In order to arrive at the final scope of the further investigations, all the baseline sensitivities, legal requirements as well as community concerns raised were collated. This list of issues was further screened to identify those for which further investigation is required, using a decision-making process explained in **Figure 15**.

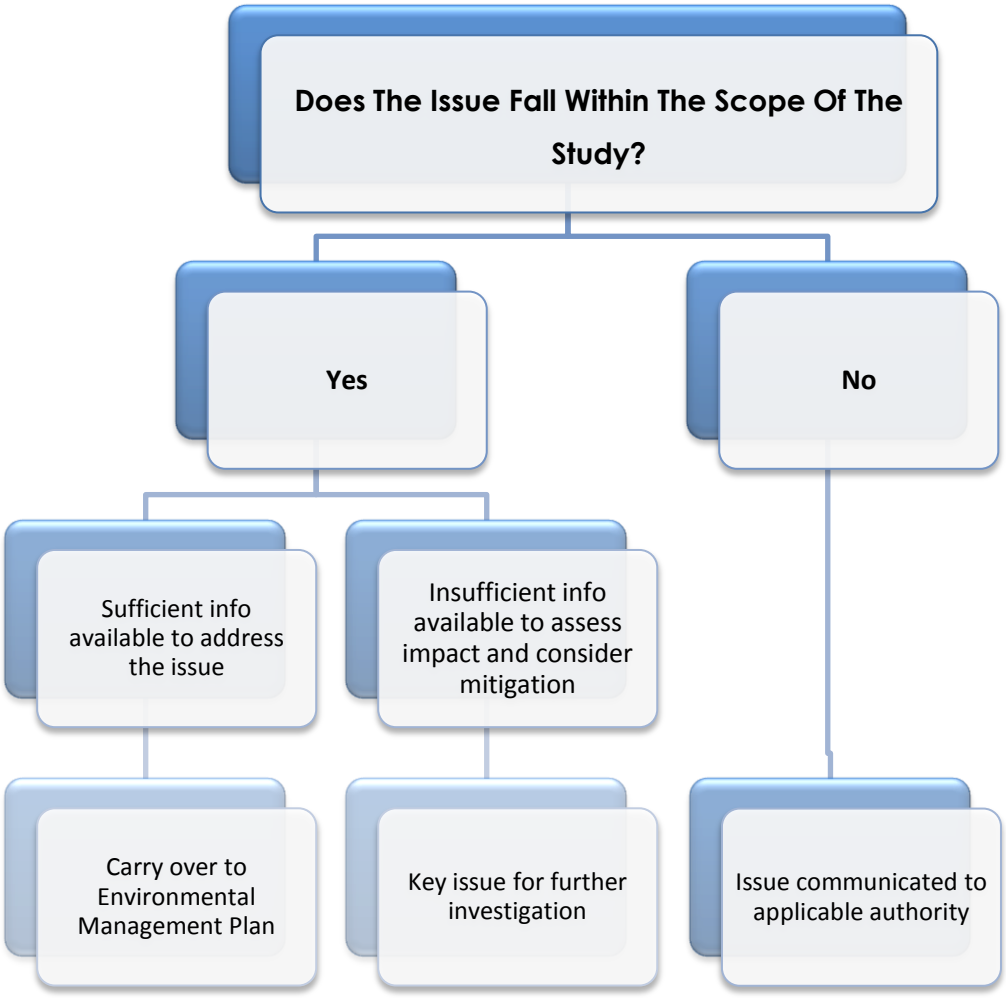

Figure 15: Screening process to determine key issues

All the potential impacts identified for this project are presented in **Table 10** with the above process applied. The highlighted rows represent potential significant impacts which require further investigation while the management of the remaining impacts will be addressed in the Environmental Management Plan.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
LAND USE PLANNING				
Dyke will obstruct the westward expansion of Oshakati	No but part of MRLGHRD responsibility	Yes.	Not applicable.	Part of wider planning efforts for Oshakati.
Need for the designation and enforcement of restricted areas which are prone to flooding where no development should take place	No but part of MRLGHRD responsibility	Yes.	Not applicable.	Part of wider planning efforts for Oshakati.
Need for a SEA for the entire Cuvelai system	No but part of MRLGHRD responsibility	Yes.	Not applicable.	Part of wider planning efforts for the applicable regions.
Concept Master Plan could formalise informal settlements	No but part of MRLGHRD responsibility	Yes.	Yes.	Further guidelines to be established for the Master Plan.
Need for region and nation-wide planning to deal with the flooding problem –other areas such as Caprivi are also subject to flooding	No but part of MRLGHRD responsibility	Yes.	Not applicable.	Part of wider planning efforts for the applicable regions.
Restrict the development of Oshakati and use the money for the development of other towns? This would be in keeping with Vision 2030, which seeks to develop towns other than those that are more established.	No, for MRLGHRD to consider as part of wider planning.	Yes.	Not applicable.	Part of wider planning efforts.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
WATER QUALITY AND ECOLOGY				
Exposure of the hard salt/mud layer under the oshanas could cause a change in water quality downstream during subsequent floods.	Yes.	No.	Uncertain.	Water study.
Hydrological, nutrient and energy cycles of the oshana system may be altered.	Yes.	No.	Uncertain.	Water and ecological studies.
Distribution of pollution and litter from Oshakati to other areas not previously affected by the floods.	Yes.	No.	Uncertain.	Water and ecology studies.
Impact of removing material to be used for the construction of the dyke.	Yes.	No.	Uncertain.	Info from technical team to feed into EIA. Further work for EMP.
Impact of changed flow, and increased velocities and volumes of water on sensitive ecosystems further south like Etosha (breeding grounds of wetland birds, unsustainable harvesting of frogs and fish in areas with low flow.).	Yes.	No.	Uncertain.	Water and ecology studies.
Restriction of the normal flow of the	Yes.	No.	Uncertain.	Water study.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
watercourses could cause flooding in other areas.				
Impact on flora and fauna (construction of the dyke, deepening of Okatana channel), (e.g. deforestation, change in biodiversity due to change in flow velocity, duration and time - Loss of livelihood sources.)	Yes.	No.	Uncertain.	Ecology study.
Impact of siltation/turbidity downstream in a system where the water is already very turbid (erosion).	Yes.	No.	Uncertain.	Water study.
Impact of changes in water quality on fish production.	Yes.	No.	Uncertain.	Ecology study.
HYDROLOGY				
Roads constructed in a predominantly east-west orientation interrupts the flow of water which flows from north to south.	Yes.	Yes.	Yes.	Communicate to engineers. Include in EMP that infrastructure must be wide enough not to obstruct flow.
Consider early flood warning system with the use of satelite technology	No.	No.	Not applicable.	Monitoring by Water Affairs.
Impact of the construction process during flooding	Yes.	Yes.	Yes.	Carry over to EMP.
Increased seepage in Oshakati from the dyke .	Yes.	No.	Uncertain.	Water study.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
Impact of the dyke on the Calueque-Oshakati water scheme	Yes.	Yes.	Yes.	EMP – design crossing infrastructure to accommodate this.
Impact of the dyke on the flow velocities of diverted/downstream water	Yes.	No.	Uncertain.	Water study.
Impacts of flood gate operations on Cuvelai system (duration and time of flow)	Yes.	No.	Uncertain.	Water study and Ecology study.
Impact on the internal storm water drainage of Oshakati. Risks associated with flash floods after heavy rainfall.	Yes.	No.	Yes.	Assumption – designs will accommodate internal stormwater drainage. Comments in water study.
Integration of swamp/lake/canal/dyke/stormwater systems	Yes.	Yes.	Yes.	Engineering team to integrate designs.
Consider the uncertainties and the associated risks of the hydrological model .	Yes.	No.	Uncertain.	Water study.
EIA PROCESS				
Consider alternatives to the construction of a dyke/consider a simpler solution for flooding in the north-central regions that could be	No. Recommendations to be made to consider alternatives only.	No.	Not applicable.	Recommendations of the EIA.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
applied to other affected areas as well.				
Consider the input from the local people	Yes.	Not applicable.	Not applicable.	On-going consultation as part of the EIA.
Government should not take decisions without consulting the public – (referring to the Oshakati Concept Master Plan, which has already been approved by Cabinet).	No.	Not applicable.	Not applicable.	On-going consultation as part of the EIA. General note for government.
The need for a feedback meeting.	Yes.	Not applicable.	Not applicable.	Feedback meeting following the draft EIA.
Comments raised at meetings need to be translated into Oshiwambo for all to understand.	Yes.	Not applicable.	Not applicable.	Translation of issues summary.
SOCIO-ECONOMIC				
Impact of the project on residents to the north, west and further downstream (Ompundja) of the dyke (relocation and compensation of locals - People will lose their homesteads and fields)	Yes.	No.	Uncertain.	Socio-economic study.
Employment of local people during the construction phase of this	Yes.	No.	Yes.	Socio-economic study.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
project (Reduction in unemployment and hence poverty)				
Safety risks for people and animals associated with the deepening of the Okatana channel (i.e. people and animals falling into and drowning in the channel).	Yes.	Yes	Yes	Socio-economic study. Oshakati regulations must be strictly applied
Increase in flooding in the area where the main discharge will again be accommodated in the normal unaltered oshana system. These households will be flooded as a result of the backwater effect and a mitigation regime will need to be put in place for them.	Yes.	No.	Uncertain.	Yes. Socio-economic and water studies.
Impact of creating a precedent that settlements experiencing flooding can expect intervention from Government.	No.	No.	Uncertain.	Government to consider.
Improved protection of people's property and lives from flooding (Approximately 1000 households will now be flood free and will no longer be displaced annually as a result of the floods).	Yes.	No.	Uncertain.	Socio-economic study.
More space available for residential	Yes.	No.	Uncertain.	Socio-economic study.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
development (More land close to the centre of Oshakati available for development with resultant cost savings).				
Increased, business, recreation and tourism opportunities	Yes.	No.	Uncertain.	Socio-economic study.
Access across the large body of water and a dyke (traditional pathways, movement of livestock, children walking to school).	Yes.	No.	Uncertain.	Socio-economic study.
Headman complaint that Oshakati town council does not consult with them concerning matters within Oshakati.	No.	No.	Not applicable.	None, for headman to take up directly.
Consider damming the water for consumption by local residents (Lower water prices in the area, Water harvesting)	No.	Uncertain.	Not applicable.	Engineering team to consider.
Effect of deforestation on locals especially the removal of fruit bearing trees.	Yes.	No.	Uncertain.	Socio-economic study.
Consider the potential of fish farming if water is dammed.	No.	Not applicable.	Not applicable.	Government to consider. Ecology study to comment.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
ECONOMIC/FINANCIAL/COSTING				
Frequency of flood events vs. justification of this project	Yes.	Not applicable.	Not applicable.	Client to provide motivation for the project.
Benefits of project for the Oshakati economy (development of multipurpose infrastructure, investments and improved capacity of local government)	Yes.	No.	Uncertain.	Socio-economic study.
Consider the cost associated with the relocation of people vs. the costs of the project.	No.	No.	Info unavailable.	Recommendations of the EIA.
FLOOD INFRASTRUCTURE, MAINTENANCE AND REHABILITATION				
Institutional capacity to maintain and operate the flood mitigation structures	Yes.	No.	Uncertain.	Consider institutional capacity and management recommendations in EMP.
Consider siltation in the Maintenance Plan for the flood gates	Yes.	Uncertain.	Yes.	Carry over to EMP. Maintenance plan to be provided by engineers.
Elevation of areas within Oshakati to avoid flooding caused by rainwater accumulated in the town	Yes.	Yes.	Uncertain	Consider as mitigation option.
Excavation of material from the river to the north of Oshakati to construct the dyke.	Yes.	No.	Uncertain.	Ecological study. Engineering materials study.
EMP required for the rehabilitation of	Yes.	Yes.	Yes.	Obtain info from Engineers,

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
areas that will be excavated during construction.				include in EMP.
Impact of the flood mitigation project on the time schedules of planned projects (e.g. road planned between Ongwediva and Oshakati, telecommunication projects) and projects currently in progress (e.g. the construction of the DR 3671 road)	Yes.	No.	Yes.	Contact all relevant authorities for construction schedules. Include in EMP.
Consider maintenance issues. With domestic stock and foot borne human activity.	Yes,	No.	Uncertain.	Maintenance Plan in EMP.
Costs and maintenance requirements of erosion control.	Yes.	No.	Uncertain.	Consider in the EMP. Costs from Engineers.
HEALTH AND SAFETY				
Health impacts associated with the spreading of diseases, including balharzia and malaria associated with the slow flow speed of water.	Yes.	No.	Uncertain.	Water, Socio-economic. Ecological.
Pollution of standing and canalised water.	Yes.	No.	Uncertain.	Water study.
Improved sanitation due to the movement of previously standing	Yes.	No.	Uncertain.	Water study. Socio-economic.

Table 10: Potential impacts associated with this project.

IMPACT/ISSUE	DOES IT FALL UNDER THIS EIA? YES/NO	SUFFICIENT INFO YES/NO	MITIGATION AVAILABLE YES/NO	FURTHER WORK TO BE CONDUCTED
(contaminated) water away from Oshakati				
ENVIRONMENTAL CONSULTANTS				
Issues and concerns raised must be objectively presented.	Yes.	Yes.	n/a	Objective evaluation of positive and negative issues.
CO-OPERATIVE GOVERNANCE				
Need for co-ordination between the various Regional Authorities in the affected regions so as to share solutions regarding flooding concerns	Yes.	N/a	n/a	Note to Government
All relevant government institutions (like Roads Authority) need to be consulted and informed regarding the project.	Yes.	n/a	n/a	Consult authorities throughout the EIA. Government and engineers to do the same.

8 IMPACT ASSESSMENT

8.1 METHODOLOGY FOR IMPACT ASSESSMENT

The following methods will be used by all specialists to determine the significance rating of impacts identified:

8.1.1 Description of impact

- Reviews the type of effect that a proposed activity will have on the environment;
- What will be affected; and
- How will it be affected.

Points 1 to 3 above are to be considered / evaluated in the context of the following impact criteria:

- Extent;
- Duration;
- Probability; and
- Intensity / magnitude
-

Table 11: Impact criteria for determination of significance

	DESCRIPTION				
EXTENT	Site specific At the facility constructed/ operated.	Local Limited to within a 15km radius	Regional (100km radius)	National Namibia	International Extending beyond Namibia's borders
DURATION	Very Short Term 3 days	Short term 3 days – 1 year	Medium term 1 - 5 years	Long term 5 – 20 years	Permanent > 20 years (life of mine)

	DESCRIPTION				
INTENSITY/ MAGNITUDE	No lasting effect No environmental functions and process are affected	Minor effects The environment functions, but in a modified manner	Moderate effects Environmental functions and processes are altered to such extent that they temporarily cease	Serious effects Environmental functions and processes are altered to such extent that they permanently cease	

- **Status of the impact:** A description as to whether the impact is positive (a benefit), negative (a cost), or neutral.

- **Degree of confidence in predictions:** The degree of confidence in the predictions, based on the availability of information and specialist knowledge. This is assessed as high, medium or low.

Based on the above considerations, the specialist provides an overall evaluation of the significance of the potential impact, which is described as follows:

Table 12: Significance descriptions

	NONE	LOW	MEDIUM	HIGH
IMPACT SIGNIFICANCE	A concern or potential impact that, upon evaluation, is found to have no significant impact at all.	Any magnitude, impacts will be localised and temporary Accordingly the impact is not expected to require amendment to the project design.	Impacts of moderate magnitude locally to regionally in the short term. Accordingly the impact is expected to require modification of the project design or alternative mitigation.	Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable.

Furthermore,

- Impacts are described both **before and after the proposed mitigation** and management measures have been implemented;

- Where possible the impact evaluation takes into consideration the **cumulative effects** associated with this project. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts;

- **Mitigation / management actions**: Where negative impacts were identified, the specialists specifies practical mitigation measures (i.e. ways of avoiding or reducing negative impacts); and

Monitoring (forms part of mitigation): Specialists recommend monitoring requirements to assess the effectiveness of mitigation actions, indicating what actions are required, the timing and frequency thereof.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUDING REMARKS

Following consultation with authorities, potentially affected community leadership and other stakeholders of the Oshakati Flood Mitigation project, the legal implications, issues and concerns and sensitivities have been identified and are detailed in this Draft Scoping Report.

Section 8 of this document provides a list of potential impacts and issues to be addressed in the Environmental Impact Assessment. Potential positive and negative impacts, as well as issues related to the EIA process have been identified under the following themes:

- Land use planning
- Water quality and ecology
- Hydrology
- EIA Process
- Socio-economic
- Economic/financial/costing
- Flood infrastructure, maintenance and rehabilitation
- Environmental consultants
- Cooperative Governance

Some of the issues raised are beyond the scope of this EIA, namely broader planning issues for Oshakati and the Northern Regions. These are for the Government to take up separately. For most of the matters raised that are relevant to this EIA, too little information is currently available to confidently assess the potential impacts. It is therefore recommended that further specialist studies be conducted in the areas of ecology, water and socio-economic impacts in order to better understand the potential impacts of the project.

Furthermore, in order to fulfil the requirements of the Environmental Management Act, the alternatives to the proposed flood mitigation measures will be described in more detail by the client. This will enable the Government to ascertain whether the most sustainable flood mitigation options have been identified. This is currently not included in the scope of this EIA.

All the issues raised in **Section 8** of this document, which are of relevance to the scope of this EIA Study will be assessed during the full investigation phase.

9.2 THE WAY FORWARD

- This Draft Scoping Report will be circulated to the authorities and public for comment. These comments will be a) incorporated into the report or b) carried forward for consideration in the remaining phases of the EIA process.

- The Draft Scoping Report will be submitted to the DEA. According to the Regulations of the Environmental Management Act, the DEA has to consider the contents of this report and provide feedback as to content of the process ahead.

- The specialist studies will be commissioned, based on the outcome of the issues identified. These specialist studies will form the basis for the Draft Environmental Impact Report.

10 REFERENCES

BAR Namibia. (2012). *Design and Supervision of the Construction of the Dike around Oshakati: Report on the Hydrological and Hydraulic Model*

Curtis, B., Roberts, K. S., Griffin, M., Bethune, S., Clinton, J. H., & Kolberg, H. (1998). Species richness and conservation of Namibian freshwater macroinvertebrates, fish and amphibians. *Biodiversity and Conservation*, 447-466.

Department of Water Affairs – Hydrology Division: *Hydrological Perspective on 2008 Floods in northern Namibia, with special reference to Cuvelai Area*

Enviro Dynamics. (2010). *Environmental Impact Assessment and Environmental Management Plan of Orange River Life of Mines Extension Project, Sendelingsdrift.* Oranjemund: NAMDEB.

Enviro Dynamics. (2011). *Environmental Impact Assessment and Environmental Management Plan for Orange River Life of Mines Extension Project, Sendelingsdrift: Socio-Economic Assessment.* Namdeb.

Hattingh Anderson Associates (2012): *Hydrology for the Omafo to Outapi Road* (DR3608)

Junk, W.J., Bayley, P.B. & Sparks, R.E., 1989. The Flood Pulse Concept in River-Floodplain Systems. Canadian Special Publication of Fisheries and Aquatic Sciences, 106(1), pp.110-27.

Kolberg, H., Griffin, M., & Simmons, R. (1997). Case Study 1: The Ephemeral Wetlands of Central Northern Namibia. In A. J. Hails, *Wetlands, Biodiversity and the Ramsar Convention.* Gland, Switzerland: Ramsar Convention Bureau.

KPE Joint Venture. *Study Report on Flooding of Proclaimed Roads in North Central Namibia*

Mendelsohn, J., Jarvis, A., Roberts, C., & Robertson, T. (2009). *Atlas of Namibia: A portrait of the land and its people.* Cape Town, South Africa: Sunbird Publishers (PTY) LTD.

Roads Authority: Report No RA/CS-NP/04-2008

RoN. (1994). *1991 Population and Housing Census: Basic Analysis with Highlights.* Windhoek: Central Statistics Office: National Planning Commission.

RoN. (2003). *2001 Population and Housing Census: Basic Analysis with Highlights.* Windhoek: Central Bureau of Statistics: National Planning Commission.

Shilunga, M. O. (2012, February 10). People displaced during the 2008 - 2012 floods. (E. Simon, Interviewer)