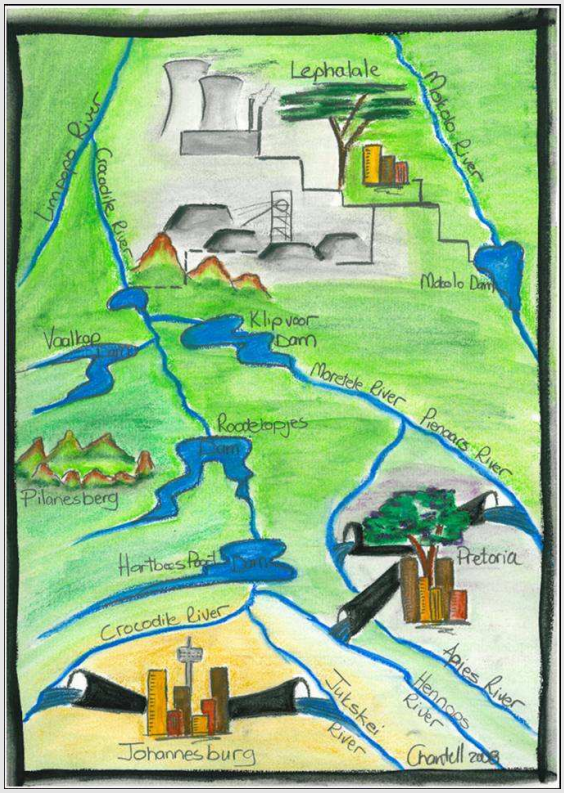
water affairs
Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

MOKOLO AND CROCODILE RIVER (WEST) WATER AUGMENTATION PROJECT (MCWAP)

Phase 1: Augment Supply from Mokolo Dam



FINAL SCOPING REPORT

December 2009

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TITLE AND APPROVAL PAGE

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UITVOERENDE OPSOMMING

PROJEK AGTERGROND EN MOTIVERING

Groot ontwikkelings word beplan vir die Waterberg Steenkool velde in die Lephalale area. As 'n direkte gevolg van die voorgenoemde ontwikkelings sal die water aanvraag in die Lephalale area noemenswaardig toeneem oor die volgende 20 jaar.

Weens die beperkte beskikbaarheid van water in die Lephalale area het die Departement van Waterwese (DWA) die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek (MKWAP) Uitvoerbaarheid Studie van stapel gestuur om opsies vir die voorsiening in die water behoeftes te ondersoek. Die fases vir die voorgestelde infrastruktuur vir die oordrag van water vanaf die Mokolodam en Krokodilrivier (Wes) word hieronder getabuleer.

Oorsig van MKWAP komponente

Komponent	Kort samevatting
Fase 1	Parallelle pyplyn ter aanvulling vanaf Mokolodam om aan die groeiende water behoeftes te voldoen vir die interim periode totdat die oordragpyplyne vanaf die Krokodilrivier (Wes) geïmplementeer kan word. Fase 1 bestaan uit die volgende: • Styglyn vanaf Mokolodam na Wolvenfontein balanseerdamme; • Gravitasielyn vanaf Wolvenfontein balanseerdamme na Matimba kragstasie; en • 'n Nuwe gravitasielyn vanaf Matimba kragstasie na Steenbokpan.
Fase 2	Oordrag skema vanaf Krokodilrivier (Wes) by Vlieëpoort naby Thabazimbi, na Lephalale area via 'n sisteem bestaande uit: • 'n Stuwal en onttrekkingswerke, insluitende 'n balanseerdam, ontslikkingswerke, en 'n hoëdruk pompstasie by Vlieëpoort (naby Thabazimbi); • Oordragskema (ongeveer 100 km); • Drukbreekreservoir; • Operasionele Storingsdam; en • 'n Leweringstelsel wat bestaan uit 'n gravitasiepyplyn (ongeveer 30km) vanaf die Operasionele Storingsdam na die Steenbokpan area.
Verwydering van Bottelnek	Die bottelnek op die bestaande pyplyn wat aan Exxaro behoort en wat strek vanaf die Mokolodam tot by Lephalale moet verwyder word. Dit sluit in die konstruksie van die eerste 9km van die nuwe gravitasie pyplyn (vir MKWAP Fase 1) vanaf Wolvenfontein balanseerdamme, met inlaste tot die bestaande pyplyn. Die doelwit van die verwydering van die bottelnek is om die hidroliese gradiënt by Rietspruitnek te verbeter, waar die bestaande pyplyn bo-oor 'n hoogte punt gaan.

OMVANGSBEPALING EN OIB PROSES

MKWAP bestaan uit sekere aktiwiteite wat goedkeuring vereis in terme van die Nasionale Wet op Omgewingsbestuur (Wet No. 107 van 1998) (NEMA). Die proses wat gevolg word om goedkeuring te verkry word geneem ingevolge die Omgewings Impak Bepaling (OIB) Regulasies (Staatskennisgewing No. R385, R386 en R387 van 21 April 2006), geproklameer interme van Hoofstuk 5 van NEMA. Die OIB besluitnemende owerheid is die Nasionale Departement van Omgewingsake (DEA), aangesien die projek aansoeker (DWA) 'n Nasionale Departement is. Nemai Consulting is aangestel deur DWA as die onafhanklike Omgewingsimpakbepalings Praktisyn (OIP) om die Omgewingsimpakondersoek uit te voer vir MKWAP.

Tydens konsultasie met DEA, voor die aanvang van die projek, is daar besluit om 'n Klas Aansoek in te dien vir die drie MKWAP sub-projekte, waar afsonderlike omgewings bepalings uitgevoer word vir elke komponent.

MKWAP Omgewings Ondersoeke

MKWAP Komponente	Omgewingsbepalings Proses	DEA Verwysings Nr.
Fase 1	Omvangsbepaling en OIB	12/12/20/1465
Fase 2	Omvangsbepaling en OIB	12/12/20/1466
Verwydering van Bottelnek	Basiese Bepaling	12/12/20/1467

PROJEK LIGGING

Die voorkeur opsie vir die voorgestelde pyplyn roete begin by Mokolodam, in die suid-oostelike punt van die projek area, waarna dit hoofsaaklik die roete volg van die bestaande Exxaro pyplyn, in 'n noord-westelike rigting tot by die Zeeland Watersuiweringswerke (WSW) en die Matimba aftappunt. Hierna draai die pyplynroete in 'n westelike rigting tot by Steenbokpan.

ALTERNATIEWE

Die volgende alternatiewe vir die pyplynroete is oorweeg:

a) **Styglyn (vanaf Mokolodam na Wolwenfontein balanseerdamme)** -
Die eerste 5.7km (±) van die roete vanaf Mokolodam verskil van die roete van die bestaande Exxaro pyplyn, waar dit die roete van die toegangspad volg. 'n Alternatiewe roete is ook voorgestel deur Mnr. G. Viljoen, grondeienaar van plase Wolvenfontein 645LQ en Witbank 647LQ, en sal noukeurig oorweeg word tydens die OIB fase.

b) **Gravitasielyn (vanaf Wolvenfontein balanseerdamme na die Matimba aftap)** -
'n Alternatiewe roete is oorweeg deur die R510 pad te volg tot by Lephalale. Hierdie opsie is oorweeg om die hoë punt by Rietspruitnek te probeer vermy. Hierdie opsie word nie geag as 'n voorkeur nie as gevolg van die steil hange aan die noord-oostelike kant van die pad en die spruit aan die suid-oostelike kant, wat geen spasie laat vir die gravitasie pyplyn nie.

c) **Gravitasielyn (tussen die plase Hanglip 508LQ tot by Kringgatspruit 318LQ)** -
Oor die algemeen is die roete van die pyplyn na Steenbokpan geselekteer om suid van die steenkoolveld te wees en dus nie die steenkool te steriliseer nie. Die twee alternatiewe roetes vir die gravitasie lyn na Steenbokpan is: (a) **Opsie 1 (voorkeur)** –volg die roete van die nuwe Steenbokpan teerpad noord van Medupi Kragstasie, maar suid van die Steenkoolvelde. Hierdie opsie sal verdere impakte op die omgewing en ander dienste minimaliseer; en (b) **Opsie 2** – volg die treinspoor aan die suide van Medupi Kragstasie, en plaasgrense om die impak op die omgewing te minimaliseer. Hierdie is die minder gewenste roete aangesien hoër hoeveelhede van harde rots uitgrawing vereis sal word. Dit is ook verder weg van die Steenkoolveld waar water benodig word in mynbou operasies m.a.w. langer afstand na leweringspunt vanaf die pyplyn en het hoër kostes.

OMVANGSVLAK IMPAK BEPALING

Om impakte te minimaliseer, is probeer om die voorgestelde Fase 1 pyplyn roete langs bestaande ontwikkelings grense (bv. Plaasgrense) en liniêre-tipe infrastruktuur te hou. Die omgewing word hier as minder sensitief geag, soos byvoorbeeld:

- Pyplyne (met verwysing na die bestaande Exxaro pyplyn vanaf die Wolvenfontein balanseerdamme na Zeeland WSW),
- Paaie,

- Treinspore,
- Transmissie lyne, en
- Industriële korridors.

'n 200m Korridor (m.a.w. 100m weerskant van die middellyn) is aangeneem as die studie area aanvaar, wat vir enige moontlike afwykings van die voorgestelde roete binne hierdie korridor voorsiening maak.

Die Omvangsbepalings Verslag gee 'n algemene beskrywing van die stand van die omgewing in die projek area, wat vir die inagneming van sensitiewe omgewingskenmerke en moontlike geaffekteerde partye van die voorgestelde projek voorsiening maak. Die moontlike implikasies van MKWAP Fase 1 op die volgende kenmerke word bespreek op 'n kwalitatiewe vlak:

- Klimaat
- Topografie
- Oppervlak water
- Geologie en grond
- Geohidrologie
- Flora
- Fauna
- Sosio-Ekonomiese Aspekte
- Beplanning
- Landbou Potensiaal
- Lug Kwaliteit/ Gehalte
- Geraas
- Argeologiese en Kulturele kenmerke
- Infrastruktuur en dienste
- Vervoer
- Visueel
- Toerisme

Pertinente omgewings kwessies wat spesifieke aandag sal geniet gedurende die OIB fase, word in die tabel hieronder aangedui.

Pertinente Kwessies (Konstruksie Fase) vir prioritisering gedurende die OIB

Potensiële kwessie/ Impak
• Erosie by steil hellings – toegangspad by Mokolodam en Rietspruitnek
• Impak op rivier struktuur en waterloop kruisings (konstruksie fase)
• Impakte op hierdie sensitiewe sisteme sou hulle kruis word deur die pyplyn
• Erosie op steil hellings
• Skepping en rehabilitasie van leengroewe
• Wegdoening van groot hoeveelhede oortollige materiaal
• Versteuring van die akwifer, veroorsaak deur skietwerke
• Skade aan oewer plantegroei by rivier kruisings
• Impakte op beskermde spesies
• Impakte op diere op wildsplase
• Impakte op beskermde spesies
• Verlies aan inkomste van jagaktiwiteite, wildbesigtiging en gewas produksie
• Skade aan eiendom
• Verlies aan landbougrond binne serwituut
• Skade aan erfenis hulpbronne
• Toename in verkeer as gevolg van konstruksie voertuie
• Verlaging van Mokolodam se watervlak

Pertinente Kwessies (Operasionele Fase) vir prioritisering gedurende die OIB

Potensiële kwessie/ Impak
• Water beskikbaarheid aan verbruikers stroom af van Mokolodam
• Verlaging van akwatiese fauna biodiversiteit stroomaf van Mokolodam, indien water inkortings van toepassing is.
• Impak op diere stroomaf van Mokolodam weens die beskikbaarheid van water, sou water inkortings van toepassing wees.
• Potensiële inkortings van water verbruik stroomaf van Mokolodam
• Verlies aan grond met registrasie van permanente serwituut/ uitbreiding van bestaande Exxaro pyplyn serwituut
• Verlaging in eiendomswaarde
• Verlies van landbougrond binne serwituut
• Agro-ekonomiese impak
• Voedsel sekuriteit

OPENBARE DEELNAME

Die Omvangsbepalingsverslag voorsien ’n volledige verslag van die openbare deelname proses wat gevolg is vir die Omvangsbepalings fase vir MKWAP Fase 1.

Die doel van openbare deelname vir MKWAP sluit in:

1. Om Belanghebbende en Geaffekteerde Partye (B&GP'e) die geleentheid te bied om inligting rakende MKWAP te verkry;
2. Om B&GP'e die geleentheid te bied om hulle menings, kwessies en bekommernisse te opper;
3. Om B&GP'e die geleentheid te bied om maatreëls voor te stel om ongunstige impakte te vermy of te minimaliseer, sowel as om positiewe impakte geassosieer met MKWAP te vergroot; en
4. Om DWA en die projekspan die geleentheid te gee om die behoeftes, bekommernisse en aanbevelings van B&GP'e te inkorporeer in die projek.

Bo-en-behalwe openbare deelname geassosieer met die OIB protokol, word 'n breër Openbare Deelname Proses (ODP) ook uitgevoer vir MKWAP om te verseker dat omvattende en kragtige konsultasie prosedures gevolg word. Die mees prominente belange groep, inagnemend die kwessies rondom die water beskikbaarheid en die grondgebruik tipe, wat in die projek area voorkom is die Landbou Sektor.

Die kwessies geopper deur B&GP'e gedurende die Omvangsbepaling, bepaal en lei die ondersoeke tydens die OIB fase tot 'n groot mate. Die Kommentaar en Terugvoerings Verslag, wat die uitstaande kwessies geopper deur die B&GP'e (tydens vergaderings en in korrespondensie ontvang) opsom en die projekspan se terugvoering daarop, is ingesluit in die Omvangsbepalingsverslag.

Neem kennis dat slegs die kommentaar ontvang tot en met die afsnydatum vir die inhandiging van die Terugvoerings Vorms (aangedui in die AID as 19 Junie 2009), in die Omvangsbepalingsverslag ingesluit is. Die kommentaar en kwessies wat daarna ontvang is vanaf B&GP'e sal gedurende die openbare deelname van die OIB fase aangespreek word en sal ingesluit word in die voorlopige OIB Verslag, wat beskikbaar gestel sal word vir die publiek.

STUDIE PLAN VIR OIB

Die Omvangsbepalingsverslag word afgesluit met die Studie Plan vir die OIB, wat die benadering wat gevolg moet word vir die uitvoering van die OIB vir MKWAP Fase 1 verduidelik, en sluit die volgende in:

- Spesialis studies wat uitgevoer moet word -
  - Ekologiese Studie – Terrestrieel;
  - Ekologiese Studie – Akwaties;
  - Verkeersimpakstudie;
  - Erfenis Impak Studie;
  - Sosio-Ekonomiese Studie;
  - Sosiale Impak Studie;
- Die Openbare Deelname proses wat gevolg moet word -
  - Opdatering van B&GP Databasis;
  - Kennisgewing – Goedkeuring van Omvangsbepalings Verslag;
  - Openbare Vergadering;
  - Hersien van Voorlopige OIB Verslag;
  - Kennisgewing van die DEA Besluit;
  - Breër Openbare Deelname Proses;
- Inhoud van die OIB Verslag; en
- Konsultasie met DEA en die OIB tydsraamwerk.

EXECUTIVE SUMMARY

PROJECT BACKGROUND AND MOTIVATION

Major developments are planned for the Waterberg coalfields that are located in the Lephalale area. As a direct result of the aforementioned developments, the demand for water in the Lephalale area will significantly increase over the next 20 years.

Due to the limited availability of water in the Lephalale area, the Department of Water Affairs (DWA) commissioned a feasibility study of the Mokolo Crocodile (West) Water Augmentation Project (MCWAP) to establish how the future water demands could be met. The phases for the proposed infrastructure for transferring water from the Mokolo Dam and Crocodile River (West) are tabulated below.

Overview of MCWAP Components

Component	Brief Overview
Phase 1	A pipeline parallel to the existing Exxaro pipeline, to augment the supply from Mokolo Dam. This is to supply in the growing water requirement and also to supply more water for the interim period until a transfer pipeline from the Crocodile River (West) can be implemented. The system will utilise the available yield from Mokolo Dam. Phase 1 consists of the following: • Rising main from Mokolo Dam to Wolvenfontein balancing dams; • Gravity line from Wolvenfontein to Matimba Power Station; and • Gravity line from Matimba Power Station to Steenbokpan.
Phase 2	Transfer scheme from the Crocodile River (West) at Vlieëpoort near Thabazimbi to the Lephalale area via a system consisting of: • A weir and abstraction infrastructure, including a balancing reservoir, desilting woks, and a high lift pumpstation at Vlieëpoort (near Thabazimbi); • Transfer system (approximately 100 km): consisting of three potential pipeline routes for the rising main pipeline, with the preferred route running primarily parallel to the railway line; • A Break Pressure Reservoir; • An Operational Reservoir; and a • Delivery system, consisting of a gravity pipeline (approximately 30km) running from the Operational Reservoir to the Steenbokpan area, connecting to the Phase 1 works.
De-bottlenecking	De-bottlenecking of the existing pipeline that stretches from Mokolo Dam to Lephalale, which belongs to Exxaro. This entails the construction of the first 9km of the proposed gravity pipeline (for Phase 1) from Wolvenfontein balancing dams, with interconnections to the existing pipeline. The intention of the de-bottlenecking is to improve the hydraulic gradient at Rietspruitnek, where the existing pipeline passes over a high point.

SCOPING AND EIA PROCESS

MCWAP entails certain activities that require authorisation in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA). The process for seeking authorisation is undertaken in accordance with the Environmental Impact Assessment (EIA) Regulations (Government Notice No. R385, R386 and R387 of 21 April 2006), promulgated in terms of Chapter 5 of NEMA. The EIA decision-making authority is the National Department of Environmental Affairs (DEA), as the project proponent (i.e. DWA) is a national department. Nemai Consulting was appointed by DWA as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for MCWAP.

Following pre-consultation with DEA it was decided to submit a Class Application for the three MCWAP sub-projects, where separate environmental assessments are being undertaken for each component.

MCWAP Environmental Assessments

MCWAP Component	Environmental Assessment Process	DEA Reference No.
Phase 1	Scoping and EIA	12/12/20/1465
Phase 2	Scoping and EIA	12/12/20/1466
De-bottlenecking	Basic Assessment	12/12/20/1467

PROJECT LOCATION

The preferred option for the proposed pipeline route commences from Mokolo Dam, in the south-eastern point of the project area. From there it predominantly follows the route of the existing Exxaro pipeline, and travels in a north-westerly direction until the Zeeland Water Treatment Works (WTW) and the Matimba off take. The alignment then turns westerly and continues until Steenbokpan.

ALTERNATIVES

The following alternatives to the pipeline alignment were considered:

a) **Rising main (from Mokolo Dam to Wolwenfontein balancing dams)** -
The first 5.7km (±) of the route from Mokolo Dam deviates from the alignment of the existing Exxaro pipeline, where it follows the access road. An alternative alignment has also been suggested by Mr. G. Viljoen, who is the landowner of the Farms Wolvenfontein 645LQ and Witbank 647LQ, which will be duly considered during the EIA phase.

b) **Gravity Main (from Wolvenfontein balancing dams to Matimba take-off)** -
An alternative alignment was considered to follow Road R510 to Lephalale. This was investigated to eliminate passing through the high point at Rietspruitnek. This option is not regarded as preferable due to the steep rocky slopes on the north-eastern side of the road and the spruit on the south-eastern side which leaves no space for the gravity pipeline.

c) **Gravity Main (between the Farms Hanglip 508LQ to Kringgatspruit 318LQ)** -
In general, the alignment of the pipeline to Steenbokpan was selected to be south of the coalfield, thus not sterilizing the coal. The two alignment alternatives for the gravity main to Steenbokpan include (1) **Option 1 (preferred) - c**hosen to follow alignment of new Steenbokpan tar road that runs north of Medupi Power Station, but south of coalfield. This will minimize further impact on the environment and other services; and (2) **Option 2 - f**ollows the railway line to the south of Medupi Power Station and farm boundaries to minimize impact on environment. Less favorable route as higher quantities of hard rock excavation will be required. Is also further away from coalfield where water will be used in mining operations i.e. distance to supply point from pipeline and associated cost.

SCOPING-LEVEL IMPACT ASSESSMENT

To minimise impacts, the proposed Phase 1 pipeline route attempts to remain alongside existing development footprints (e.g. farm boundaries) and linear-type infrastructure where the environment is regarded as less sensitive, such as:

- Pipelines (i.e. existing pipeline from the Wolvenfontein balancing dams to Zeeland WTW),
- Roads,
- Railway lines,
- Transmission lines; and
- Industrial corridors.

A 200m corridor (i.e. 100m on either side of the centre line) was adopted as the study area, which allows for any possible deviations from the proposed alignment within this corridor.

The Scoping Report provides a general description of the status quo of the receiving environment in the project area, which allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed project. The possible implications of MCWAP Phase 1 to the following features is discussed on a qualitative level:

- Climate
- Topography
- Surface Water
- Geology and Soil
- Geohydrology
- Flora
- Fauna
- Socio-Economic Aspects
- Planning
- Agricultural Potential
- Air Quality
- Noise
- Archaeological and Cultural Features
- Infrastructure and Services
- Transportation
- Visual
- Tourism

Pertinent environmental issues, which will receive specific attention during the EIA phase through specialist studies and suitable mitigation measures, are tabulated below (overleaf).

Pertinent Issues (Construction Phase) for prioritisation during the EIA

Potential Issues / Impacts
• Erosion at steep areas - access road from Mokolo Dam and Rietspruitnek
• Impacts on river structure at watercourse crossings (construction phase)
• Impacts to these sensitive systems if they are traversed by the pipeline
• Erosion on steep slopes
• Creation and rehabilitation of borrow pits
• Disposal of large quantity of spoil material
• Disturbance of the aquifer from blasting
• Damage to riparian vegetation at river crossings.
• Impacts to protected species
• Impacts to animals on game farms
• Impacts to protected species
• Loss of income from hunting, game viewing, and crop production • Damage to property
• Loss of agricultural land within servitude
• Damage to heritage resources
• Increase in traffic from construction vehicles
• Lowering of Mokolo Dam level

Pertinent Issues (Operational Phase) for prioritisation during the EIA

Potential Issues / Impacts
• Water availability for users downstream of Mokolo Dam
• Reduction of biodiversity of aquatic fauna downstream of Mokolo Dam, should curtailments apply.
• Impact to terrestrial animals downstream of Mokolo Dam due to availability of water, should curtailments apply.
• Potential curtailment of water use downstream of the Mokolo Dam
• Loss of land with registration of permanent servitude / extension of existing Exxaro pipeline servitude
• Reduction in property value
• Loss of agricultural land within servitude • Agro-economical impact • Food security

PUBLIC PARTICIPATION

The Scoping Report provides a full account of the public participation process that was followed for the Scoping phase for MCWAP Phase 1.

The purpose of public participation for MCWAP includes:

1. Providing Interested and Affected Parties (I&APs) with an opportunity to obtain information about MCWAP;
2. Allowing I&APs to present their views, issues and concerns regarding MCWAP;
3. Granting I&APs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with MCWAP; and
4. Enabling DWA and the project team to incorporate the needs, concerns and recommendations of I&APs into the project.

Over-and-above public participation associated with the EIA protocol, a broader Public Involvement Process (PIP) is also being conducted for MCWAP to ensure that comprehensive, inclusive and robust consultative procedures are followed. The Agricultural Sector is the most prominent interest group, considering the issues surrounding water availability and the land use type encountered in the project area.

The issues raised by I&APs during Scoping, to a large extent, determine and guide the investigations during the EIA phase. The Comments and Response Report, which summarises the salient issues raised by I&APs (during meetings and in correspondence received) and the project team's response to these matters, is contained in the Scoping Report.

Note that only those comments received up until the cut-off date for the submission of completed Reply Forms (stipulated in the BID as 19 June 2009), are included in the Scoping Report. The comments and issues raised by I&APs thereafter will be addressed during the public participation of the EIA phase and will be incorporated into the draft EIA Report, which will be lodged in the public domain.

PLAN OF STUDY FOR EIA

The Scoping Report is concluded with the Plan of Study for EIA, which explains the approach to be adopted to conduct the EIA for MCWAP Phase 1, which includes the following:

- Specialist studies to be undertaken -
  - Ecological Study – Terrestrial;
  - Ecological Study – Aquatic;
  - Traffic Impact Assessment;
  - Heritage Impact Assessment;
  - Socio-Economic Study;
  - Social Impact Assessment;
- The Public Participation process to be followed -
  - Updating of I&AP Database;
  - Notification – Approval of Scoping Report;
  - Public Meeting;
  - Review of Draft EIA Report;
  - Notification of DEA Decision;
  - Broader Public Involvement Process;
- Contents of the EIA Report; and
- Consultation with DEA and the EIA timeframes.

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LIST OF ACRONYMS

AGIS	Agricultural Geo-Referenced Information System
BID	Background Information Document
℃	Degrees Celsius
CW RMA	Crocodile (West) River Management Authority
CTL	Coal to Liquid Fuel
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DEDET	Department of Economic Development Environment and Tourism
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EI&S	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EWR	Ecological Water Requirements
GDACEL	Gauteng Department of Agriculture, Conservation, Environment and Land Affairs
GIS	Geographical Information System
GN	Government Notice
ha	Hectare
HFY	Historic Firm Yield
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IPP	Independent Power Producer
km	Kilometre
kV	Kilovolt
l	Litres
l/s	Litres per second
m	Metre
m^3	Cubic metre
MAR	Mean Annual Runoff
mm	Millimetre
Mm^3	Million cubic metres
Mm^3/a	Million cubic metres per annum
MCWAP	Mokolo Crocodile (West) Water Augmentation Project

MVA	Mega Voltage Amperes
NAFU	National African Farmers' Union
NEMA	National Environmental Management Act (No. 107 of 1998)
NWRS	National Water Resources Strategy
OHS	Occupational Health and Safety
OS	Operational Reservoir
PIP	Public Involvement Process
PLC	Programmable Logic Controller
PMF	Probable Maximum Flood
PSC	Project Steering Committee
RI	Recurrence Intervals
RDM	Resource Directed Measures
RHP	River Health Programme
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANDF	South African National Defence Force
SANS	South African National Standards
SASAqS	South African Society for Aquatic Scientists
SCADA	Systems Control and Data Acquisition
SDF	Spatial Development Framework
SID	Strategically Important Development
SMA	Scheme Management Authority
TAU	Transvaal Agricultural Union
TCTA	Trans-Caledon Tunnel Authority
TDS	Total Dissolved Solids
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
VSD	Variable Speed Drive
WMA	Water Management Area
WRC	Water Research Commission
WTW	Water Treatment Works

1 PROJECT BACKGROUND AND MOTIVATION

1.1 Increased Need for Water in the Lephalale Area

The Lephalale municipal area falls in the Limpopo catchment area. The Mokolo (previously known as the Mogol) and the Lephalala (also referred to as the Phalala) rivers run through the municipal area to the north, with the Matlabas River running along the south eastern boundary and the Mogalakwena River along the eastern boundary. All four rivers feed into the Limpopo River which forms the north western border of South Africa with Botswana.

The Mokolo Dam (formerly known as the Hans Strijdom Dam) was constructed in the late 1970s and completed in July 1980, to supply water to Matimba Power Station, Grootegeluk Mine, Lephalale (Ellisras) Municipality and for irrigation downstream of the dam. Based on the water infrastructure, the current water availability and water use allows only limited spare yield existing for future allocations for the anticipated surge in economic development in the area.

Large parts of the Mokolo River catchment area are located on the Waterberg coalfields (refer to **Figure 1**) where, according to preliminary estimates, almost half of South Africa's in-situ coal reserves are situated. As such, the Waterberg has long been considered the country's major coal resource for the future, especially once the current mining areas in the Witbank-Highveld coalfields of the Mpumalanga province have been depleted (DWAF, 2008d). As a result, major developments are planned for the Lephalale area. As a direct result of the above developments, the demand for water in the Lephalale area will significantly increase over the next 20 years.

Box 1:	**Why is water needed in Lephalale?**

Water demand will increase in the in the Lephalale area due to the following planned and anticipated consequential developments due to the Waterberg coalfields:

- Construction of Eskom's Medupi Power Station (presently underway);
- Development of further Eskom power stations;
- Possible development of power stations by Independent Power Producers (IPPs);
- Extension of the Exxaro mining operations and further mines;
- Possible petrochemical industries to be developed around the coal field further west of Lephalale;
- Possible exploitation of gas; and
- Accelerated growth in the population in the area.

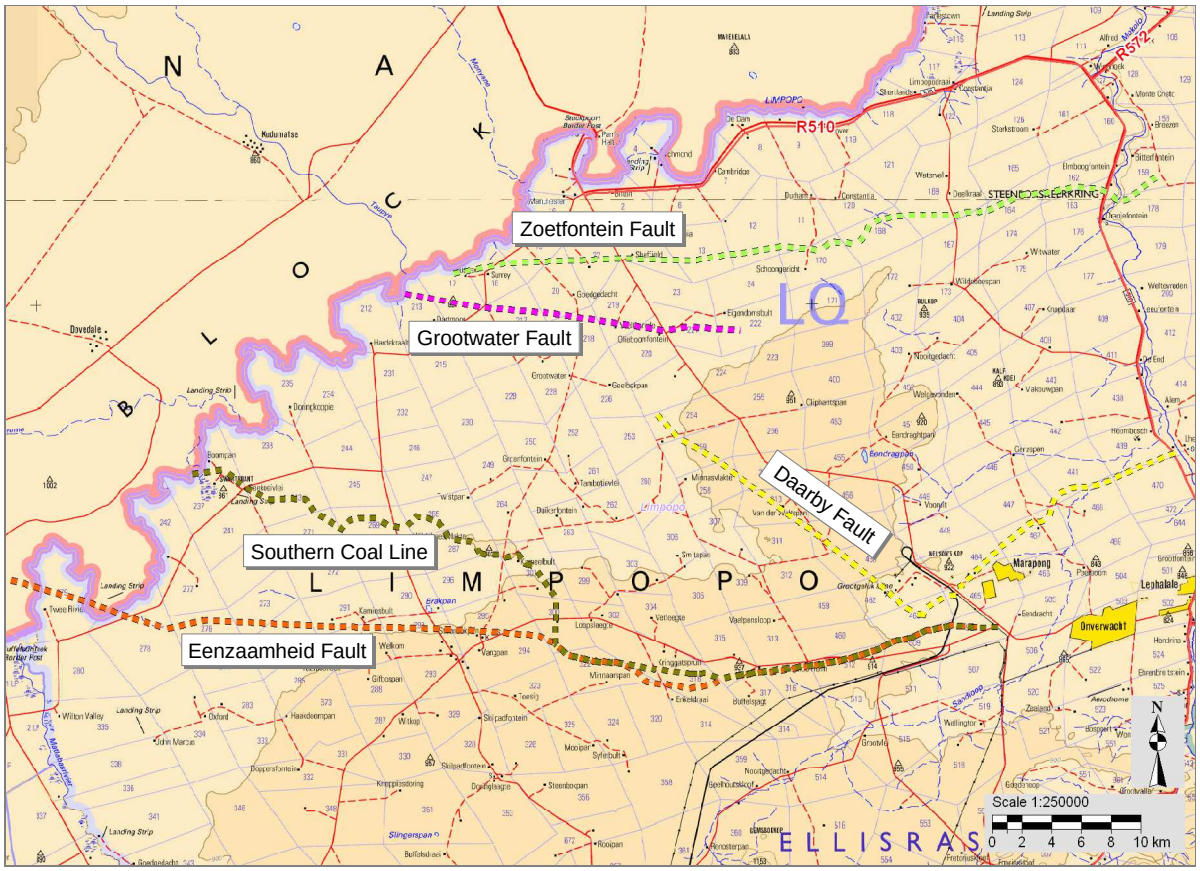


Figure 1: Fault lines of the Waterberg Coalfield

1.2 Water Requirements

Water requirements scenarios were developed using water use projections provided by the large users (i.e. Eskom, Exxaro and Sasol). The projected water requirements for the local municipality were derived using the existing number of households in Lephalale and adding the projected growth in households as a result of the establishment of new mines, power stations and coal-to-liquid fuel facilities. A 25 year planning horison was considered.

The water requirement forecast for the interim period (i.e. period during which water will be delivered from Mokolo Dam only – MCWAP Phase 1) was adjusted to match the quantity that can be safely abstracted up to the end of 2014.

Projects that were considered during the preparation of scenario 9 curve are tabulated below. Due to the dynamic nature of MCWAP's planning process, the exact scenario and concomitant details may change depending on the requirements of the end users. The implications are that the sizing of the MCWAP infrastructure may vary, however the proposed siting and alignment of the fixed and linear infrastructure should remain the same if the planning scenario is updated. Changes to the aforementioned could however result from significant issues identified during the environmental assessment.

Table 1: Development scenario projects used to determine water requirements

No.	Proponent	Details
1	Eskom	Matimba, Medupi + 4 coal power stations
2	Independent Power Producers (IPPs)	Equivalent of 1 Eskom power station
3	Exxaro	Matimba coal supply + further projects
4	Coal mining	Allowance for 4 additional coal mines each supplying a power station
5	Sasol	Mafutha 1 Coal to Liquid Fuel (CTL) plant and associated coal mine
6	Municipality	Estimate based on projected growth in households for construction and permanent workforce

The annual water requirements for the abovementioned projects are shown in **Table 2** and the resultant annual demand is presented in **Figure 2**.

Table 2: Total annual water requirements (Million m^3 per annum) for projects, domestic use and irrigation in the Lephalale and Steenbokpan Area – based on planning scenario 9 (18 May 2009)

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2030
Eskom	4.3	4.3	4.9	6.8	9.3	10.9	14.3	21.8	32.1	39.1	44.2	50.9	56.4	64.2	70.6	75.7	77.6	77.6
IPP's		0.4	0.9	0.9	1.5	4.4	13.2	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
Coal Mining (Power)			1.1	2.7	4.4	5.3	6.8	9.5	11.8	14.0	14.0	15.1	14.5	15.1	16.8	19.0	20.0	20
Exxaro Projects	3.0	3.2	3.7	4.8	6.6	9.2	10.8	13.3	14.8	15.7	15.9	15.9	15.9	15.9	15.9	16.1	16.2	18.6
Sasol (Mafutha 1)			0.4	6.1	6.6	9.9	25.2	39.1	43.9	43.6	43.5	43.5	43.5	43.5	43.5	43.5	43.5	44
Municipality	5.6	5.9	7.7	10.4	12.0	13.6	14.5	16.7	17.3	19.8	20.4	20.4	20.7	20.9	21.3	20.7	21.2	21.4
Total	12.9	13.8	18.7	31.7	40.4	53.4	84.8	115.9	135.5	147.9	153.5	161.4	166.5	175.2	183.7	190.5	194.1	197.2
Irrigation	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Total + Irrigation	23.3	24.2	29.1	42.1	50.8	63.8	95.2	126.3	145.9	158.3	163.9	171.8	176.9	185.6	194.1	200.9	204.5	207.6

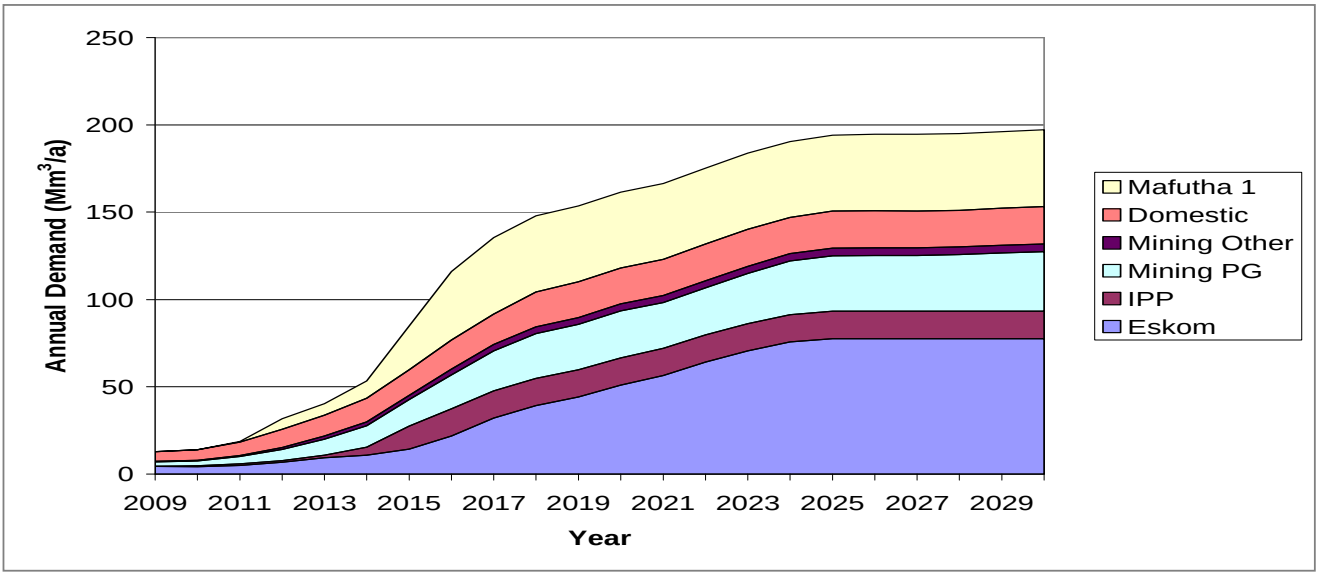


Figure 2: Demand Projection per User for planning scenario 9 (18 May 2009)

1.3 Meeting the Increased Water Demands

Due to the limited availability of water in the Lephalale area, the Department of Water Affairs (DWA) commissioned a feasibility study of the Mokolo Crocodile (West) Water Augmentation Project (MCWAP) to establish how the future water demands could be met. The phases for the proposed infrastructure for transferring water from the Mokolo Dam and Crocodile River (West) are tabulated below (refer to **Figure 3**).

Table 3: MCWAP Components

Component	Brief Overview
Phase 1	A pipeline parallel to the existing pipeline, to augment the supply from Mokolo Dam. This is to supply in the growing water requirement and also to supply more water for the interim period until a transfer pipeline from the Crocodile River (West) can be implemented. The system will utilise the available yield from Mokolo Dam. Phase 1 consists of the following: • Rising main from Mokolo Dam to Wolvenfontein balancing dams; • Gravity line from Wolvenfontein to Matimba Power Station; and • Gravity line from Matimba Power Station to Steenbokpan.
Phase 2	Transfer scheme from the Crocodile River (West) at Vlieëpoort near Thabazimbi to the Lephalale area via a system consisting of: • A weir and abstraction infrastructure, including a balancing reservoir, desilting woks, and a high lift pumpstation at Vlieëpoort (near Thabazimbi); • Transfer system (approximately 100 km): consisting of three potential pipeline routes for the rising main pipeline, with the preferred route running primarily parallel to the railway line; • A Break Pressure Reservoir; • An Operational Reservoir; and a • Delivery system, consisting of a gravity pipeline (approximately 30km) running from the

	Operational Reservoir to the Steenbokpan area, connecting to the Phase 1 works.
De-bottlenecking	De-bottlenecking of the existing pipeline that stretches from Mokolo Dam to Lephalale, which belongs to Exxaro. This entails the construction of the first 9km of the proposed gravity pipeline (for Phase 1) from Wolvenfontein balancing dams, with interconnections to the existing pipeline. The intention of the de-bottlenecking is to improve the hydraulic gradient at Rietspruitnek, where the existing pipeline passes over a high point.

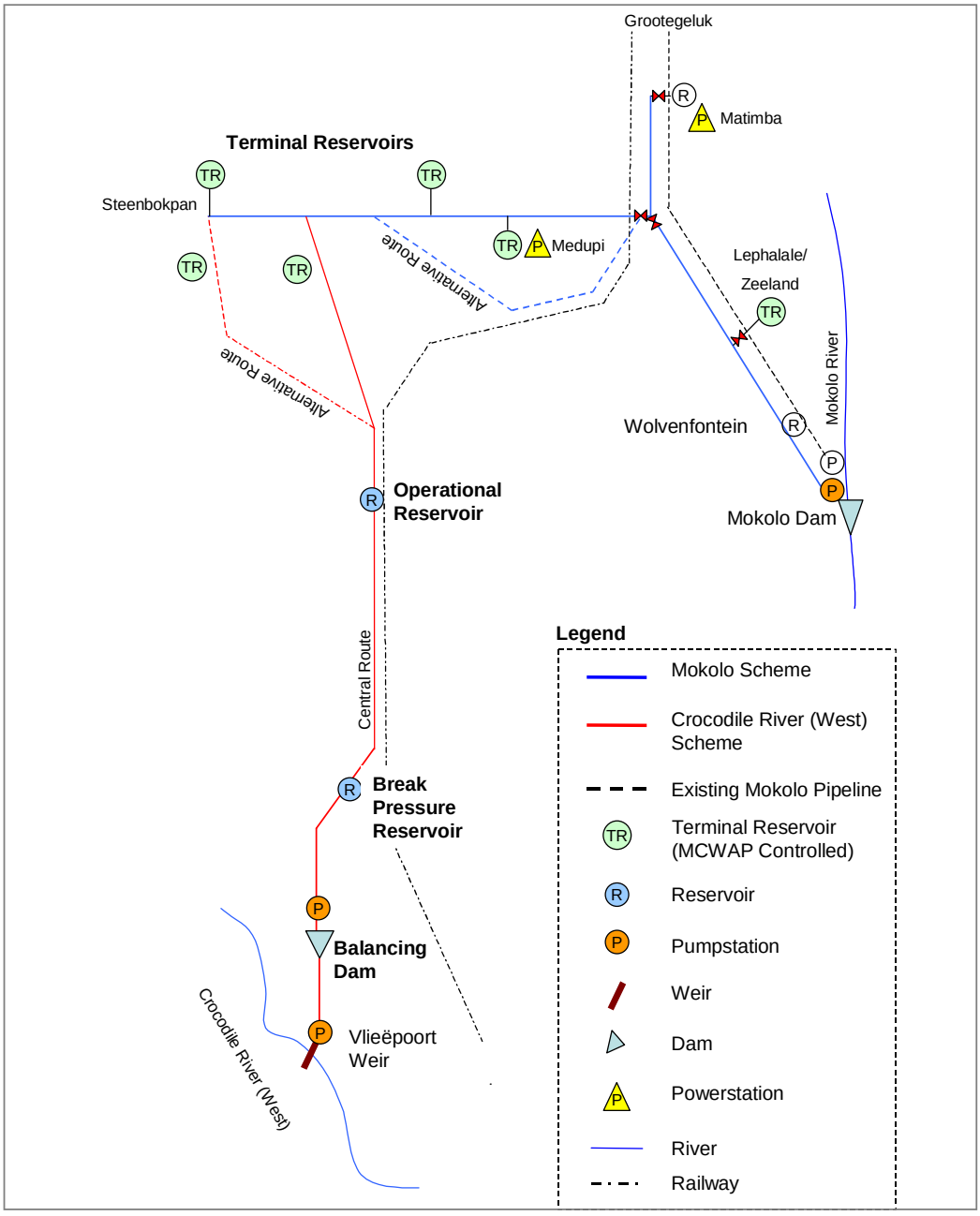


Figure 3: MCWAP schematic layout

Based on the final water requirement figures, which will be provided by the end users, the design criteria for MCWAP Phases 1 and 2 are as follows:

- **Phase 1:**
  - Designed to supply the interim water requirements up to late 2014 after which date the Phase 2 infrastructure should be operational;
  - Capacity of existing Exxaro pipeline = 14.7 Mm^3/a (annual average);
  - The design allows for 2% system losses and a 20% peak factor;
  - De-bottlenecking section to be implemented first; and
  - Rising main and gravity sections will be economically optimised.
- **Phase 2:**
  - Designed to supply the long-term waster requirements, as indicated by the end users;
  - The design allows for 2% system losses and a 20% peak factor;
  - Rising main and gravity sections will be economically optimised; and
  - Return flows from sewage treatment works will be returned to the system and used for industrial processes.

The resultant increase in capacity of MCWAP is illustrated in **Figures 4** and **5**.

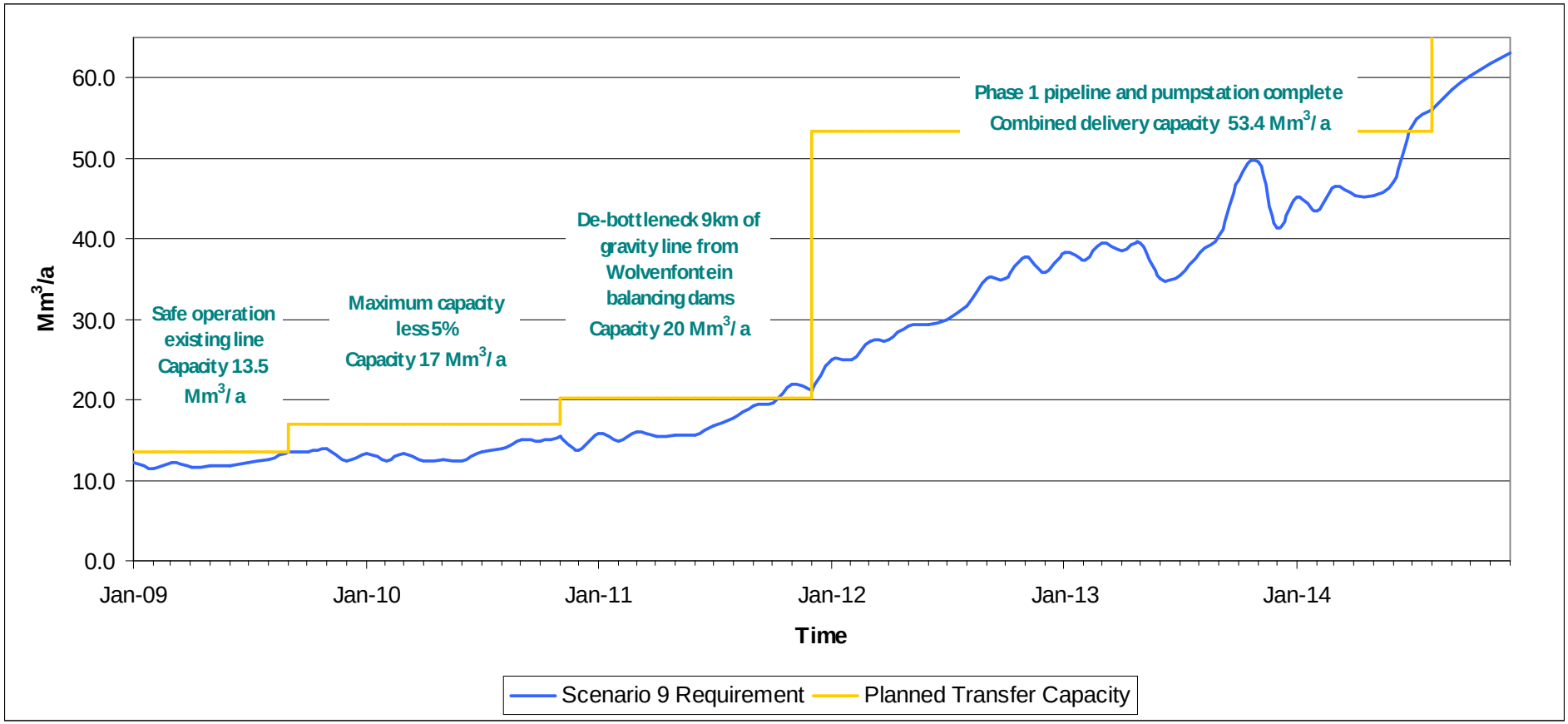


Figure 4: Projected Monthly Water requirement for Interim Period (Scenario 9)

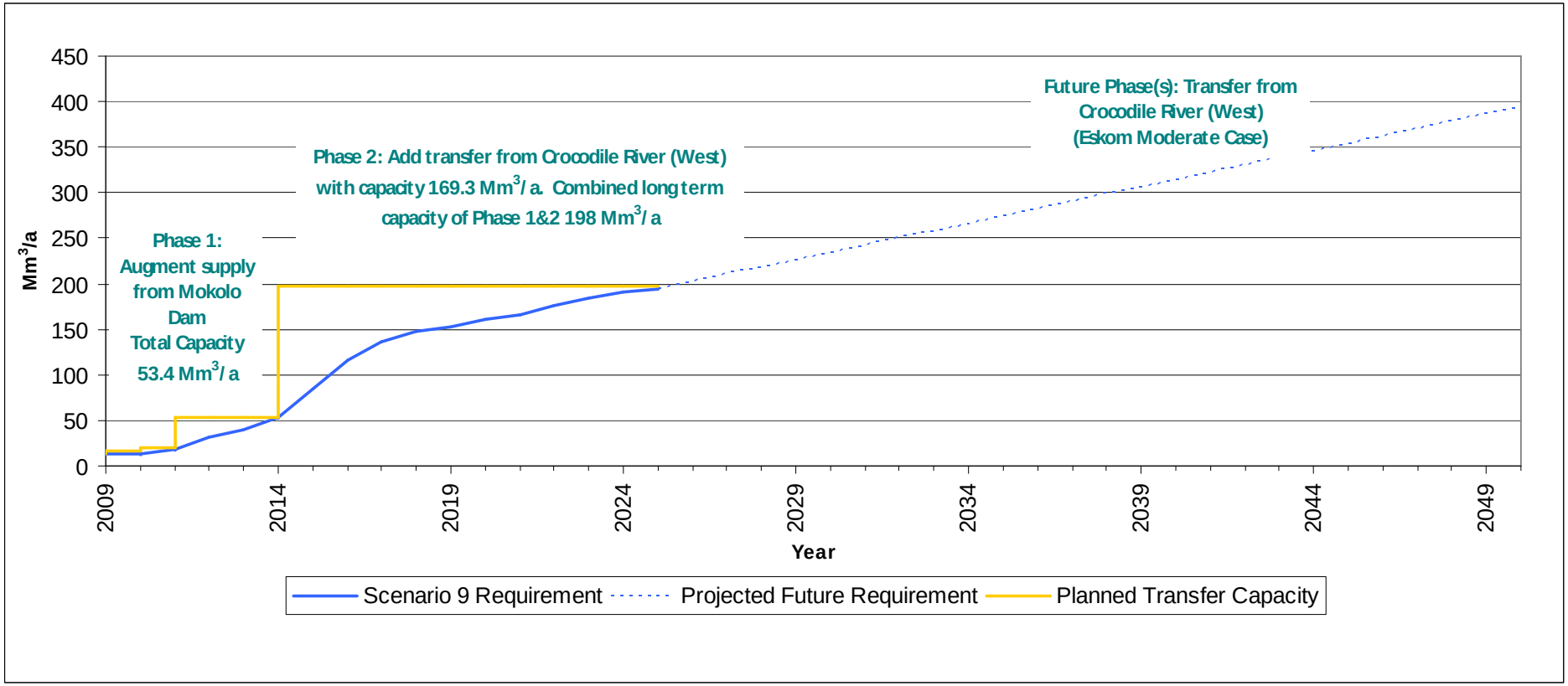


Figure 5: Projected Annual Water Requirement and Planned Transfer Capacity (Scenario 9)

2 SCOPING AND EIA PROCESS

MCWAP entails certain activities that require authorisation in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA). Refer to **Section 7** for further discussion on the project's legal framework.

Box 2:	What is "Scoping"?

Scoping is the first phase in the overall EIA process. Scoping defines the Terms of Reference for the subsequent EIA phase of the assessment by identifying key issues that need further consideration and prioritisation. According to DEAT (2002), the characteristics of a scoping exercise are as follows:

- It is an open process that involves the authorities, proponent and stakeholders;
- Feasible alternatives are identified and selected for further assessment;
- Important characteristics of the affected environment are identified; and
- Significant issues to be examined in the assessment procedure are identified.

The process for seeking authorisation is undertaken in accordance with the Environmental Impact Assessment (EIA) Regulations (Government Notice No. R385, R386 and R387 of 21 April 2006), promulgated in terms of Chapter 5 of NEMA.

The EIA decision-making authority is the National Department of Environmental Affairs (DEA), as the project proponent (i.e. DWA) is a national department. However, the Limpopo Department of Economic Development, Environment and Tourism (DEDET) is regarded as a key authority during the execution of the EIA, and all documentation will thus be forwarded to this Department.

As explained, MCWAP is divided into three main components, namely de-bottlenecking of the existing Exxaro pipeline, Phase 1 and Phase 2 (see **Table 3**). Following pre-consultation with DEA it was decided to submit a Class Application for the three aforementioned sub-projects, where separate environmental assessments are being undertaken for each MCWAP component, as shown in **Table 4** below.

Table 4: MCWAP Environmental Assessments

Focus of this document

MCWAP Component	Environmental Assessment Process	DEA Reference No.
Phase 1	Scoping and EIA	12/12/20/1465
Phase 2	Scoping and EIA	12/12/20/1466
De-bottlenecking	Basic Assessment	12/12/20/1467

The environmental assessment for MCWAP Phase 1, which is the focus of this report, is thus a Scoping and EIA process. An outline of the process is provided in **Figure 6**.

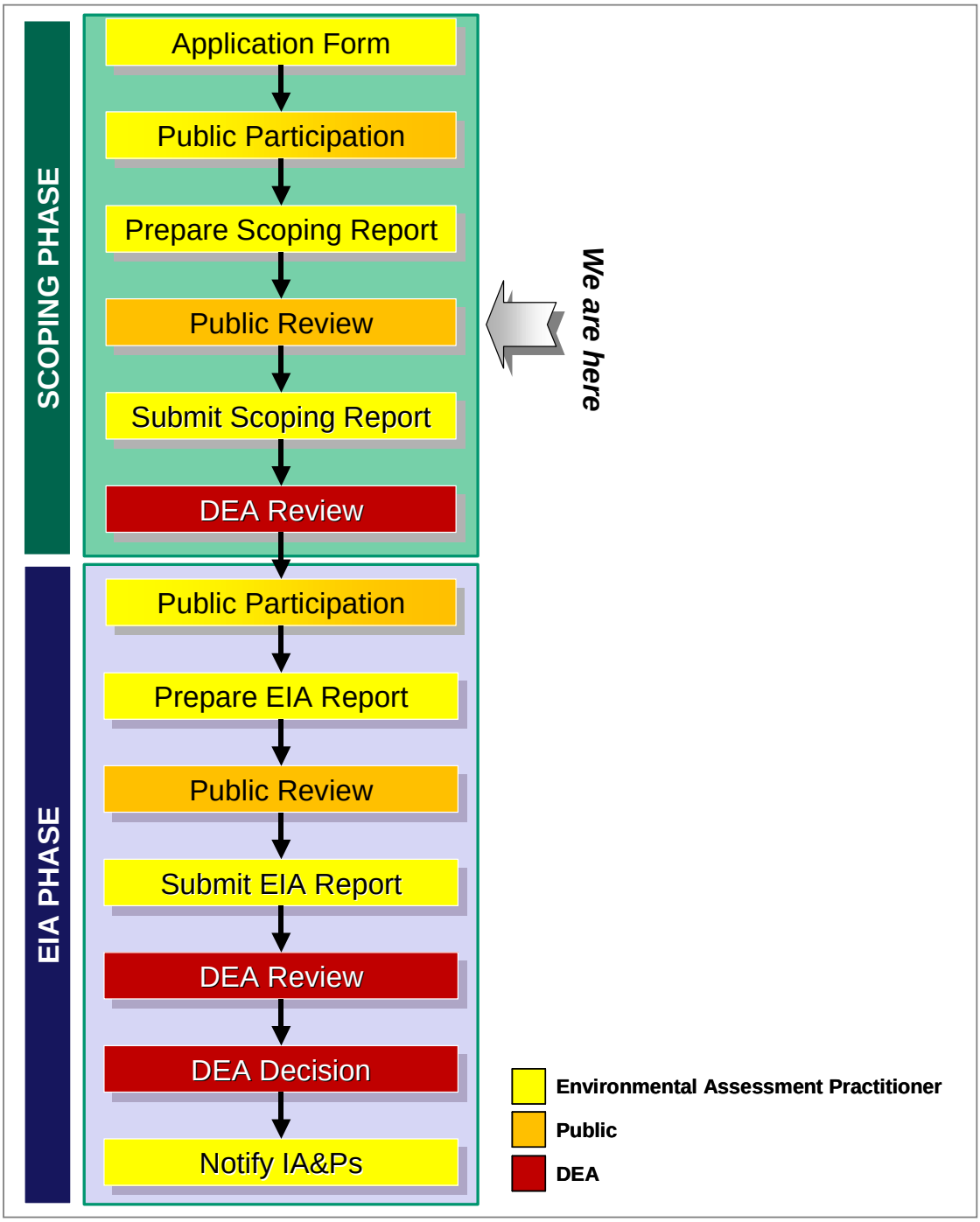


Figure 6: Overview of Scoping and EIA process

3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nemai Consulting was appointed by DWA as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for MCWAP.

In accordance with Regulation 29(2) of Government Notice No. R. 385 of 21 April 2006, this section provides an overview of Nemai Consulting and the company's experience with EIAs, as well as the details and experience of the EAPs that form part of the Scoping and EIA team.

Nemai Consulting is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng), Rustenburg (North West Province), and Durban (KwaZulu Natal).

Previous examples of related environmental assessments completed by Nemai Consulting are as follows:

1. Installation of the P1 water pipeline from Randfontein to Rustenburg, for Rand Water;
2. Raising of Hazelmere Dam, for DWAF;
3. Edenville Bulk Water Supply, for Ngwathe Local Municipality;
4. Mhlabatshane Dam, for Ugu District Municipality;
5. Mooi-Mngeni Transfer Scheme Fish-barrier EIA for DWAF; and
6. Blanket environmental consultant to Johannesburg Water on all water (including pipelines and reservoirs) and sanitation projects for the 2003/2004 and 2004/2005 financial years, which included in excess of 50 EIAs.

The members of Nemai Consulting that are involved with the MCWAP Phase 1 Scoping and EIA process are captured in **Table 5** below, and their respective Curricula Vitae are contained in to ***Appendix A***.

Table 5: Scoping and EIA Team Members

Name	Duties
Ms D. Naidoo	Project Director
Mr D. Henning	• Project Manager • Compiling Scoping and EIA Reports
Mr S. Pienaar	Public Participation Coordinator
Mr C. Chidley	Quality Reviewer

4 PROJECT LOCATION

The study area is situated in the Limpopo Province, and falls under the Waterberg District Municipality and Lephalale Local Municipality. The geographical area of the municipality is 19 605 km^2.

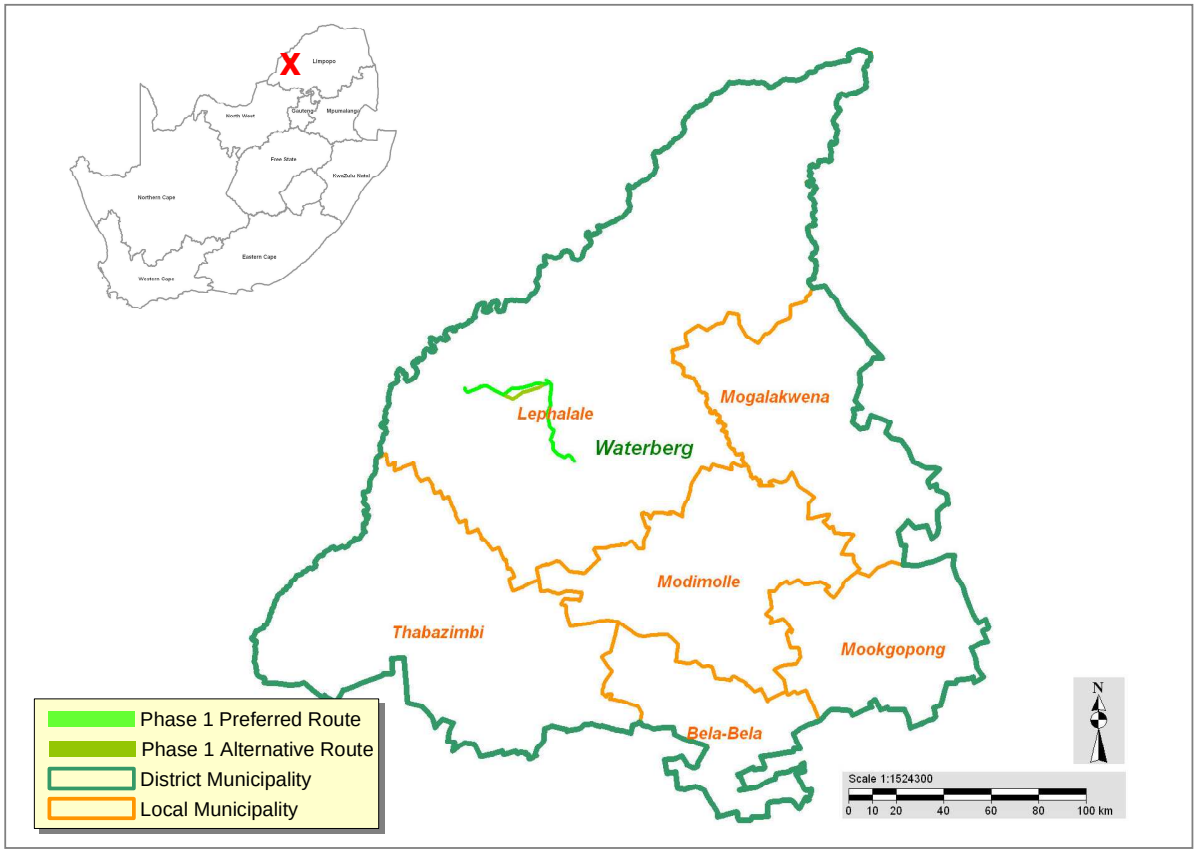


Figure 7: Municipal Map

Refer to the locality map contained in **Figure 8** for the discussion to follow. The preferred option for the proposed pipeline route commences from Mokolo Dam, in the south-eastern point of the project area. From there it predominantly follows the route of the existing Exxaro pipeline, and travels in a north-westerly direction until the Zeeland Water Treatment Works (WTW) and the Matimba off take. The alignment then turns westerly and continues until Steenbokpan. A more detailed route description is provided in **Section 5.2**.

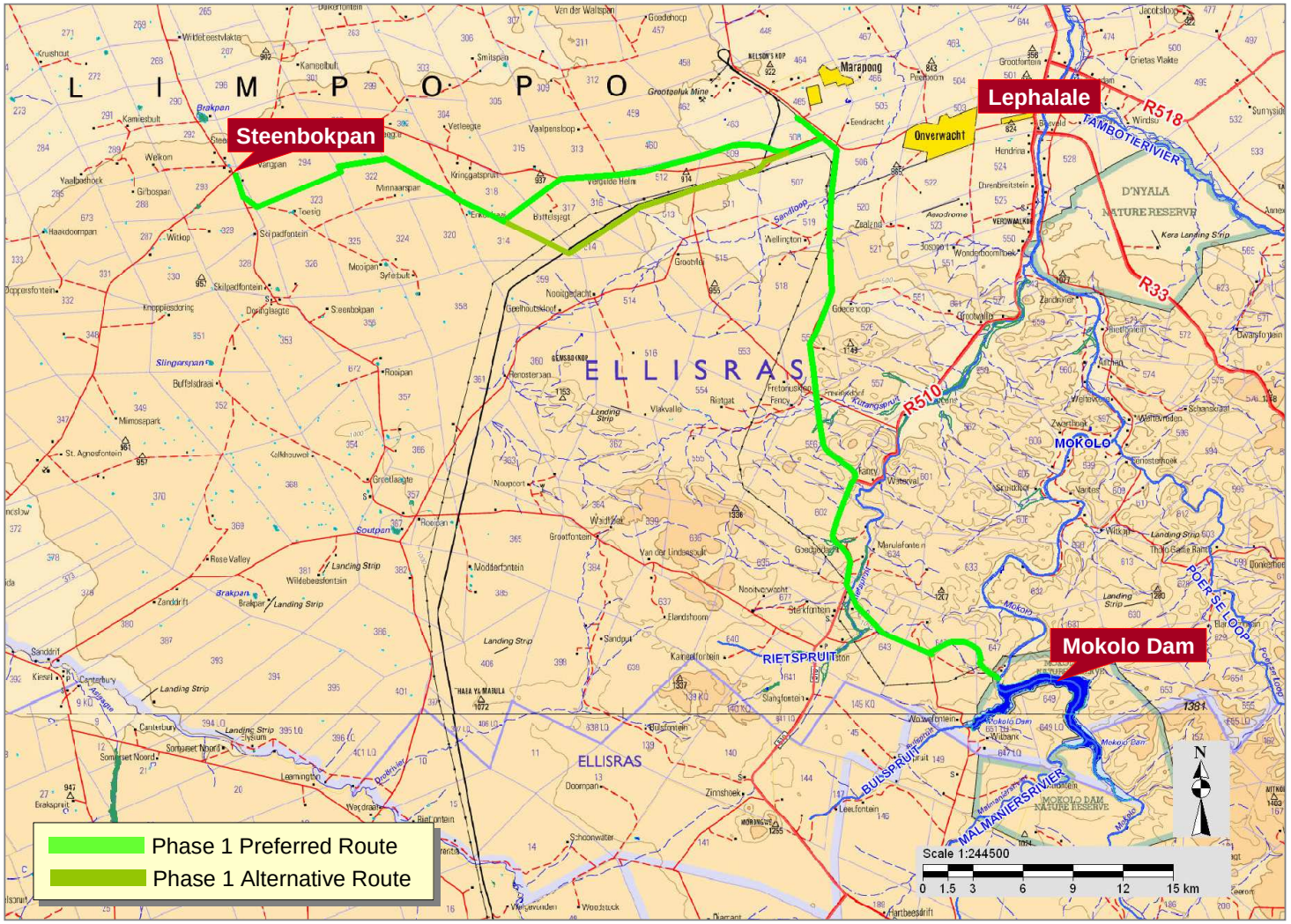


Figure 8: Locality Map

5 PROJECT DESCRIPTION

Even though it is regarded as one single project, three separate environmental assessments are being undertaken for the three sub-components of MCWAP (i.e. Phase 1, Phase 2 and De-bottlenecking), as discussed in **Section 2**. The focus of this Scoping Report is MCWAP Phase 1.

5.1 MCWAP Phase 1 Project Components

The information contained in **Section 5.1** was extracted from the MCWAP Phase 1 Feasibility Report (DWAF, 2008a).

5.1.1 Summary of Major Scheme Components

The major scheme components for MCWAP Phase 1 include the following:

- High lift pump station as Mokolo Dam;
- Rising main – 900mm diameter of approximately 5 700m length; and
- Gravity main – combination of pipe sizes up to 1 900mm diameter of approximately 7 800m total length.

5.1.2 Abstraction Pump Station at Mokolo Dam

Refer to plans contained in ***Appendix B***.

A new pump station will be constructed at the Mokolo Dam directly downstream of the existing pump station but at a higher level to ensure that the pump station is not flooded under the Probable Maximum Flood (PMF) event. The new station will take water directly from Mokolo Dam via one of the two existing outlet pipes from the dam. It will have

Figure 9: Entrance to existing pump station.

combined low lift – high lift pumps.

The new pump station together with the existing pump station will have to provide the total requirements until the completion of the Crocodile River Transfer Scheme (currently October 2015). The existing pump station is likely to be decommissioned over time due to the inherent flood risk and ageing works.

The pump station will by its design be capable of delivering the widest range of flows at a high efficiency by means of variable speed drives (VSD's).

As the dam will in effect act as a large settling tank, no de-silting structures will be required.

All pump sets will be controlled via a Programmable Logic Controller (PLC) either locally or from a remote control centre.

5.1.3 Power Supply

A new bulk power supply line as well as a new substation will be required to feed the new pump station. Refer to **Figure 10** for the discussion to follow. The environmental authorisation for the aforementioned activities fall outside of the ambit of the MCWAP application and the requisite approvals will be sought by Eskom.

The existing 33kV line feeding from Waterberg substation will be upgraded to a 132kV line, but utilized as a 33kV line (existing 3.3kV pump station) until the new voltage level is required (new pump station). The substation will be

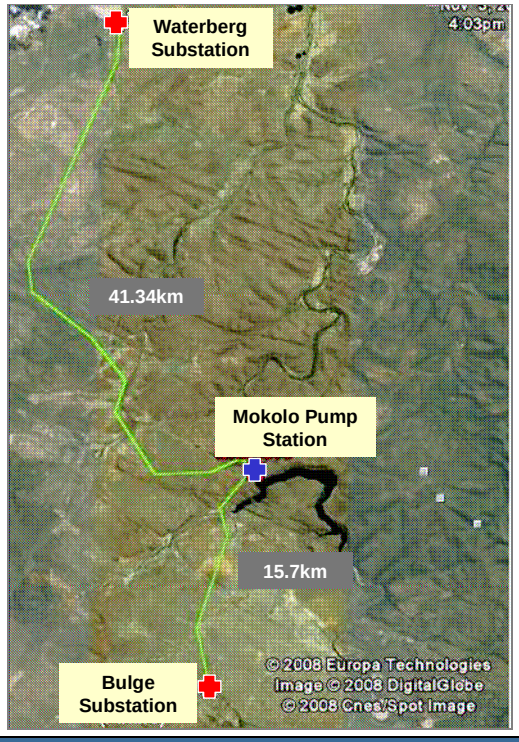


Figure 10: Power Supply to Mokolo Dam

converted to either a 132/33/3.3kV or a 132/3.3kV substation. This is applicable to both the upgrading of the new substation, and/or to building a new substation. The capacity of this line after the upgrade will be more than 100MVA, and will form part of Eskom's network strengthening.

A new 132kV line is planned from Bulge River substation to Mokolo dam. Both the substation and line is in Eskom's Concept Release Approval stage. The line route is not finalised as yet.

The planned upgrade of the existing Waterberg line and the planned new Bulge River line will ensure a reliable redundant supply to Mokolo Dam with adequate capacity.

The present switch yard is unsuitable for extension for the following reasons:

- The switch yard will be fully submerged by the tailwater level at PMF (depth of submergence ± 1,0m).
- New transformers will be installed for the new pump station. The existing transformers are at 3,3 KV which is unlikely to be chosen for the new motors.

Therefore an extension to the yard will be required which during operation is not advisable. It is therefore proposed that an entirely new switch yard be constructed. Furthermore, because of the history of unreliability of the existing power line due to lightning strikes and bush fires (as well as the lines being supported on wooden poles), an additional new power supply is strongly recommended. The final decision on the location of the switch yard lies with Eskom.

5.1.4 Rising mains from Mokolo Dam (new and existing)

There will be two rising mains from Mokolo Dam to Wolvenfontein balancing reservoirs, namely:

- The existing rising main will be retained. It currently has an accepted annual average capacity of 14.7 million m^3/annum (570 l/s). For permanent retention the internal lining will need refurbishment once the Crocodile River Transfer Scheme becomes operational; and

- A new pipeline with a design capacity to supply the interim to long-term water requirement for Phase 1.

Since the economics of the retention of the existing rising main for the long term has not yet been investigated, it is recommended that it be investigated after the Crocodile River Transfer System becomes operational. Should refurbishment of the existing rising main be warranted, the two pipelines will be interconnected so that both can be used to reduce the overall energy consumption and either used as and when necessary.

The philosophy employed in selecting the route of the new rising main was to remain alongside existing linear infrastructure where the environment has already been disturbed, thus minimising the potential environmental impacts.

The following facilities and structures normally associated with pipelines will be installed en-route:

- Air valves;
- Scour valves;
- Pipe access points;
- Road crossings;
- River crossings;
- Cathodic protection system;
- AC-mitigating system;
- Protective measures required to curb surge in a pipeline such as, reflux valves, surge tank(s);
- Any bulk off-takes that may be agreed on by DWA; and
- Farmers off takes.

5.1.5 Wolvenfontein Balancing Reservoir (existing)

This reservoir, has two compartments for purposes of normal operation and maintenance, and:

- Has top entry and bottom outlets, and
- Has level indication linked to the high lift pump station as well as the interim and final control rooms for normal operational purposes.

Figure 11: Aerial view of Wolvenfontein balancing dams.

The inlet and outlet structures are likely to be upgraded to cater to the increased throughput.

Should coupled pipes be used downstream of this reservoir, it is recommended that the installation of a flow control valve be considered to protect the pipe lining from being damaged.

5.1.6 Gravity pipelines (new and existing)

The gravity pipeline system delivers water into the terminal reservoirs serving the consumers supplied from the Mokolo Dam Scheme (i.e. Lephalale/Zeeland Waste WTW, Matimba Power Station, Medupi Power Station as well as the Steenbokpan, Eskom and Sasol consumers).

The following facilities and structures normally associated with pipelines will be installed en-route:

- Air valves;
- Scour valves;
- Pipe access points;
- Road crossings;

- River crossings;
- Cathodic protection system;
- AC-mitigating system;
- Protective measures required to curb surge in a pipeline such as, reflux valves, surge tank(s);
- Any bulk off-takes that may be agreed on by DWA; and
- Farmers off takes.

5.2 Pipeline Route Description

For detailed maps on the pipeline route, please refer to ***Appendix C***.

The following aspects were considered in defining the MCWAP Phase 1 pipeline route:

- Environmental impacts;
- Social impact of pipeline location;
- Existing servitudes;
- Abstraction and water supply locations;
- Existing roads, as well as boundaries between landowners along the routes;
- Historical and planned future mining activities in the area, both sub-surface and open cast;
- Site constraints, potential watercourse crossings, road and railway crossings; and
- Geotechnical overview.

A coarse overview of the pipeline route alternatives follows below. The route description is for the alignment alternatives considered during the Scoping phase, as discussed in **Section 5.8.3**. Alternatives suggested by Interested and Affected Parties (I&APs) (see **Section 5.8.7**) will be investigated in greater detail during the EIA phase. All distances provided should be regarded as approximates, as they are based on a desktop estimate from a Geographical Information System (GIS). Where the pipeline follows linear infrastructure (e.g. roads) and between farm boundaries, the exact route still needs to be finalised in terms of which side of the aforementioned features it will run alongside to.

5.2.1 Rising Main - Mokolo Dam to Wolvenfontein Balancing Dams

The initial section of the MCWAP Phase 1 transfer line from Mokolo Dam follows the existing access road (see **Figure 12**) on the Farm Witbank 647LQ for ± 2.5km, in a north-westerly direction. This route is a deviation from the alignment of the existing Exxaro pipeline, where at this stage it is deemed more practical with potentially less impacts.

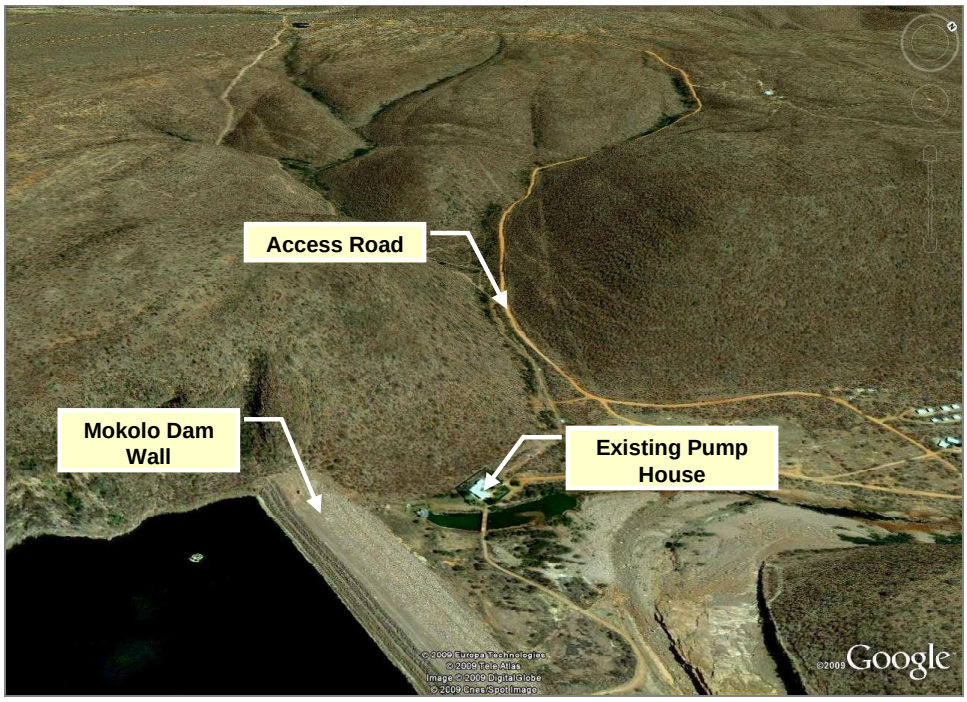


Figure 12: North-westerly view of route from Mokolo Dam

Figure 13: North-westerly view of one of the Wolwenfontein balancing dams.

The pipeline continues alongside the access road for ± 3km on the Farm Wolvenfontein 645LQ, where it feeds into the Wolvenfontein balancing dams.

5.2.2 Gravity Line - Wolvenfontein Balancing Dams to Matimba Power Station

From the Wolvenfontein balancing dams, the route follows a secondary road over the Farm Wolvenfontein 645LQ for a further ± 1.8km. It continues along the secondary road over the Farm Toulon 643LQ for ± 1.8km, and turns away more sharply to the north as it crosses a tributary of the Rietspruit.

The route crosses over the Farm Wolvenfontein 645LQ for ± 4.7km. It follows the existing access road over the Farm Toulon 643LQ for ± 1.8km, where it turns away more sharply to the north as it crosses a tributary of the Rietspruit.

The route runs for ± 3.2km on the Farm Sterkfontein 642LQ, where it crosses the main stem of the Rietspruit. At the boundary of the Farm Nooitverwacht 635LQ, the route turns northwards and travels alongside the R510 (see **Figure 14**), on the boundaries of the Farms Goedgedacht 602LQ and Fancy 556LQ. After ± 7km the route turns westwards along the access road of the existing Exxaro pipeline. The route passes over the Rietspruitnek ridge on the Farm Fancy 556LQ.

The following 7km remains beside the Exxaro access road, and traverses the Farms Fourieskloof 557LQ (Portion 1) and Goedehoop 552LQ. At the boundary of the Farm Grootgenoeg 529LQ, the route turns north-easterly and traverses this property for ± 2.5km. It then crosses over ± 650m of the Farm Zeeland 526LQ.

Figure 14: North-westerly view of route along R510 (existing Exxaro pipeline runs to the left).

Hereafter the route changes to a northerly direction, and travels along the boundaries of the following Farms:

- Zeeland 526LQ and Fancy 518LQ for ± 2.7km;
- Wellington 519LQ and Worchester 520LQ for ± 3km; and
- Zwartwater 507LQ and Altoostyd 506LQ for ± 2.8km.

The route then turns north-westerly along a secondary road and splits on Portion 3 of the Farm Hanglip 508LQ, where a short section (± 1.6km) continues to the Matimba Power Station termination point, situated on the Farm Grootestryd 465LQ.

5.2.3 Gravity Line - Matimba Power Station to Steenbokpan

This section of the MCWAP Phase 1 pipeline is a new line (i.e. no existing parallel pipeline as is the case with the Exxaro pipeline for the transfer line), and an alignment alternative was selected for the route where the two options split on the boundary of Portion 3 and the Remainder of the Farm Hanglip 508LQ and again join on the boundary of the Farms Kringgatspruit 318LQ and Enkeldraai 314LQ.

Option 1 (preferred alignment)

From the split on the Farm Hanglip 508LQ, Option 1 of the delivery line continues for a further ± 1.3km on this farm before crossing over the following farms:

- Naauw Ontkomen 509LQ for ± 4km;
- Eenzaamheid 512LQ for ± 5km;
- Hieromtrent 460LQ for ± 414m;
- Boundary of Vaalpensloop 313LQ and Vergulde Helm 316LQ for ± 3.4km;
- Boundary of Hooikraal 315LQ and Buffelsjagt 317LQ for ± 2.4km; and
- Kringgatspruit 318LQ for ± 1.8km.

Option 2

From the split on the Farm Hanglip 508LQ, Option 2 of the delivery line continues south-westerly along a secondary road for ± 3.7km until it reaches the Farm Naauw Ontkomen 509LQ where it turns further south-west to follow alongside the railway line. From here it traverses the following farms:

- Naauw Ontkomen 509LQ for ± 4.3km;
- Eenzaamheid 512LQ for ± 940m;
- Kaffirsdraai 513LQ for ± 3.1km;

- Vergulde Helm 316LQ for ± 1.9km;
- Buffelsjagt 317LQ for ± 1.3km;
- Buffelsjagt 317LQ and Enkeldraai 314LQ (on the boundaries) for ± 1.1km;
- Kringgatspruit 318LQ for ± 265m; and
- Buffelsjagt 317LQ and Enkeldraai 314LQ (on the boundaries) for ± 1.1km.

Option 2 then turns away from the railway line to travel on the boundary of the Farms Kringgatspruit 318LQ and Enkeldraai 314LQ for ± 4.4km.

From the point where Option 1 and Option 2 meet, the route continues north-westerly along the boundaries of the following Farms:

- Kringgatspruit 318LQ and Enkeldraai 314LQ for ± 2.8km;
- Loopleegte 302LQ and Taaiboschpan 320LQ for ± 570m; and
- Loopleegte 302LQ and Minnaarspan 322LQ for ± 4.5km.

The line then turns south-westerly to follow the boundaries of the Farms Zandbult 300LQ and Minnaarspan 322LQ for ± 2.9km, and thereafter Vangpan 294LQ and Toezicht 323LQ for ± 5.4km.

The route finally turns north-westwards, and crosses over the Farm Theunispan 293LQ for ± 2.4km before it reaches Steenbokpan.

5.3 Pipeline Termination Points

According to DWAF (2008a), the proposed Phase 1 pipeline was designed to supply water to the following termination points.

5.3.1 Zeeland WTW

An interconnection will be provided to supply water to Zeeland WTW, situated on the Farm Zeeland 526LQ.

This interconnection will also be utilised when refurbishment of the existing pipeline takes place. It is envisaged that the refurbishment will take place shortly after commissioning of the Crocodile River (West) Transfer Scheme. There will thus be sufficient capacity through the new pipeline to completely dry the existing pipeline for refurbishment.

An 18-day storage dam will have to be provided at Zeeland WTW to ensure redundancy to the downstream users. The storage dam will be funded and implemented by the user.

5.3.2 Matimba Power Station and Grootegeluk Mine

The gravity pipeline will terminate at the existing manifold west of Matimba Power Station, on the Farm Grootestryd 465LQ.

5.3.3 Medupi Power Station

It was assumed that the interim demand of 2015 be supplied at the Matimba termination point. Eskom is currently in the process of designing and constructing a 600mm pipe that will transfer water from the existing Matimba manifold to a proposed new raw water dam to be constructed just south of Medupi power station. The storage dam will be funded and implemented by the user.

The Steenbokpan link will thus only provide for the excess long-term requirement which cannot be bet by the Mokolo System and will need to be provided from the Crocodile River (West) system via the Steenbokpan Link.

5.3.4 Steenbokpan Area

Due to the fact that the exact locations of the future infrastructure of the end users have not yet been finalized, only a termination point was allowed for at Steenbokpan for the

feasibility planning. When final locations are confirmed for the detail design, take-off points will be provided on the main pipeline.

The users will be responsible for the construction of the respective pipelines and storage dams from the central termination point or en-route at take-off points.

5.4 Pipeline Specifications

Pipe diameter	:	Up to 2400 mm
Pipe material	:	Steel pipes with welded joints.
Installation	:	• Underground, with a minimum cover above the pipe of 1.0m. • Access/valve chambers will be located at approximately 500 m intervals along the route. It will be concrete structures protruding slightly above natural ground level.
Servitude Width	:	Typically up to 40 m to allow for future expansion.
Servitude Conditions	:	• Permanent access to the pipeline servitude will be required after construction. • Pipeline markers (concrete posts) will be installed at changes in direction and at regular intervals along the route • Farming activities (stock and crop farming) can continue within the servitude area after construction, taking cognisance of the need for permanent access to the pipeline servitude.

5.5 Construction Phase

5.5.1 Methodology – Normal

The methodology for the installation of the pipeline is as follows:

- Remove topsoil in the area where construction will take place and stockpile separately for later re-instatement.
- Excavate pipe trench; refer to the construction servitude diagram contained in ***Appendix D*** for an illustration of the typical trench geometry.

- Install and compact pipe bedding.
- Install pipe sections by means of side booms (special cranes) and weld joints.

Figure 15: Typical trench excavation and pipe installation activities

- Repair field joints and backfill and compact pipe trench in layers.
- Construct valve and access chambers.

Figure 16: Typical examples of chambers (left - during construction; right – completed)

- Re-shape the impacted area to its original topography and replace stripped topsoil.

Figure 17: Typical views of reinstated (left) and rehabilitated (right) pipeline routes

- Install final Cathodic Protection measures.
- Install pipeline markers.

5.5.2 Methodology – Watercourse Crossings

Watercourse crossings will generally consist of pipe sections encased in concrete in accordance with the relevant DWA criteria, as illustrated in ***Appendix E***. The typical construction methodology for a river crossing is as follows:

- An earthen berm (coffer dam) and temporary bypass canal is constructed to divert the water around the construction site.
- The trench is excavated across the dry river channel
- A concrete bedding is constructed first, followed by the installation and restraining of the pipe to prevent flotation. Encasement is completed by the construction of further concrete lifts.
- Once the concrete has set, the temporary coffer dam is removed and the bypass canal backfilled to re-instate the flow.
- The impacted area is re-shaped to its original topography.
- The disturbed area is rehabilitated.
- If erosion of the disturbed river banks is a concern, gabion cut-off walls will be installed on either side.

Figure 18: Typical river crossing showing concrete encasement pipe section

5.5.3 First Order Cathodic Protection and AC Mitigation

Cathodic protection and AC mitigation will be necessary where the proposed pipeline route runs parallel to and crosses (a) existing and proposed future high voltage powerline routes, and (b) electrified railway lines.

Mutual interference effects between the pipeline and a high voltage powerline could result in danger to safety of personnel under normal operation and fault conditions, risk to the pipeline integrity under fault conditions, risk of AC-enhanced corrosion under normal operation and risk of damage to the coating from electrical stress under fault conditions. Hence, AC mitigation is necessary.

5.5.4 Construction Programme

At an average construction rate of 50 m per day for rocky areas and restricted work space in close proximity of the existing pipeline and 150 m per day for all other sections and allowing for start-up time and the annual break, the total construction period for the pipelines will be approximately 24 months.

Indicative implementation dates for the construction phase are as follows:

- Commencement of construction : First Quarter 2011
- Commissioning : Final Quarter 2012

5.5.5 Construction Camp

The location of the construction camp has not yet been identified. Establishing a camp at the Zeeland WTW is deemed a favourable option, as it would minimise the impact to the environment. The EIA report will comment further on this matter.

A satellite camp will be required at the pump station.

5.6 Operational Phase

The information contained in this section was extracted from the Operation and Maintenance Philosophy DWAF (2009b).

5.6.1 Operation of Mokolo Dam

The Mokolo Dam will remain a DWA asset and will be operated by DWA (or DWA may opt to appoint an agent to operate the dam.) Abstraction from the dam will be done based on operating rules which the Department will develop; typically this will include an allocation to each user based on the dam level at April of each year and the level of assurance at which water is allocated to different users. The process is to assess the risk of non-supply based on the dam level and historic trends for the dam. Curtailments may then be implemented should it be necessary to ensure supply to critical industries. Compensation must be paid to affected parties should the cause of curtailment not be natural (i.e. during dry periods of reduced runoff).

5.6.2 Operational Control Centre

The information contained in this section was extracted from the Operation and Maintenance Philosophy (DWAF, 2009b).

Since it is envisaged that both transfer systems (i.e. Crocodile River and Mokolo Dam) will be managed by the same MCWAP Scheme Management Authority (SMA), it is proposed that both the transfer schemes are controlled and managed from one operational control centre.

This control centre will comprise the administration offices, a central control room, stores and workshops, and will be conveniently located more or less at the centroid of operational activities (i.e. such as Lephalale).

A communications network will link the operations control room to all the main components of both transfer systems, including security. The communications network is

proposed to be a fibre-optic cable from the control centre to each site, with a backup system such as a GSM network.

The control and operation of all sites will be monitored and managed by means of a SCADA (Systems Control And Data Acquisition) system from the control room. The following facilities will also be provided:

- Full operational control of all sites
- Monitoring of river releases and flows as provided by the Crocodile (West) River Management Authority (CW RMA)
- The control of the abstraction of surplus river flows into off-channel storage to optimize water usage.

It is envisaged that the operational control centre from which all the sites, together with the functions that will be monitored and controlled/operated at each site, will be manned on a 24 hr day basis.

The following functions will be performed:

1. Abstraction Pump Station at Mokolo Dam -
    - Monitor the water level in Mokolo Dam;
    - Start and stop the high lift and booster pumps;
    - Change the flow by means of the variable speed drives (VSD's) on the high lift pumps;
    - Monitor the "general health" of all the mechanical & electrical equipment;
    - Monitor all security and control access;
    - Monitor the flow from the high lift pump station;
2. Rising mains from Mokolo Dam (new and existing) -
    - Monitor the cathodic protection system (i.e. transformer rectifier installations if installed);
    - Open and close relevant inter-connecting valves as may be required;
3. Wolvenfontein Balancing Reservoir (existing) -
    - Flow into the reservoir;
    - Flow out of the reservoir;

- The water level in both the reservoir compartments. The operational one(s) will be used to manage the pumping rate from the high lift pump station;
- Security installations and control access;

4. Gravity pipelines (New and Existing) -
   - Read all revenue water meters;
   - Monitor the cathodic protection system (i.e. transformer rectifier installations if installed).

5.6.3 Maintenance

Maintenance is generally divided into the three major engineering disciplines namely: mechanical; electrical and civil. For each of these disciplines maintenance will be categorised as follows:

- Routine planned maintenance;
- Major Breakdown repairs; and
- Minor breakdown repairs.

These are expanded on below.

Table 6: MCWAP Phase 1 Maintenance Aspects

Mechanical	
Routine planned maintenance	A schedule of routine maintenance will be compiled to cover all mechanical components such as: • Exchange of pump and motor unit(s); • Bearing replacements; • Water and oil seal adjustment and replacement; • Servicing (lubrication, oil changing and or refilling); • Inspection and repair of leaks • Painting of components such as valves, pipes and gates • Inspection and repair of valves and gate seals in the pump stations, weirs and the de-gritting and de-silting channels at the abstraction works • Inspection and repair of any hydraulic piping • All gates, sluices, and valves. In certain instances maintenance functions will be based on efficiency monitoring of pump sets and other mechanical components. Routine maintenance will generally be done by any one or a combination of the following: • Staff exchanging strategic spares units and taking old units in for refurbishment or replacement • Contractors doing maintenance repairs • Contractors doing SCADA maintenance on call out • Pump contractors servicing/maintaining units on a regular basis.

Major breakdown repairs	These repairs will include the rectification of faults shown by SCADA, such as: • Bearing faults • Power supply breakdowns • Rectifying loss of efficiency on pump sets. These breakdown repairs can be done by any of the methods listed for routine planned maintenance (see above).
Minor breakdown repairs	These repairs will cover mechanical components such as: • Exchange of pump and motor unit(s); • Bearing replacements; • Water and oil seal adjustment and replacement; • Repair of leaks • Repair of all gates, sluices, and valves • Inspection and repair of any hydraulic piping. Breakdowns of this nature can be done by staff or large/small contractors (i.e. mechanics, etc.)
Electrical	
Routine planned maintenance	A schedule of routine maintenance will be compiled to cover all electrical components such as: • Checking/servicing transformer oils, • Switchgear components, • Routine calibration of instruments and • Routine cleansing of equipment depending on design. In certain instances maintenance functions could be based on efficiency monitoring of electrical motors and components. These maintenance inspections and resulting actions can be done by any of the methods listed for mechanical routine planned maintenance (see above)
Major breakdown repairs	These repairs will cover the rectification of faults shown by SCADA, such as: • Power supply breakdowns • Motor faults. These maintenance repairs can be done by any of the repair units listed for mechanical routine planned maintenance (see above)
Minor breakdown repairs	Breakdowns of the following nature can be done by staff or large/small contractors (i.e. electricians, etc.) • Replacement of lights and bulbs, • Repair of light and other switches, • Faulty control units, • Replacement of transducers and switches and • Repair of wiring faults.
Civil	
Routine planned maintenance	A schedule of routine maintenance will be compiled to cover all components such as: • Five yearly dam safety inspections of river abstraction works and other qualifying reservoirs, subject to being delegated to MCWAP SMA; • Regular inspection and repair of pipelines and chambers including fencing, gates, access roads, road crossings, etc.; • Regular painting of valves and pipes in chambers; • Inspection and repair of pipe linings at intervals (say 5 years); • Inspection and repair of all reservoir embankments, structural and other concrete elements of all the principal components mentioned above. This will include checking for leaks and leakage rates from all reservoirs; • Inspect and repair erosion and flood damage caused at any of the principal components; • Keeping the pipeline servitudes free of shrubs and trees; • Painting of buildings, and • Maintenance of building services. These maintenance inspections and resulting actions can be done by any of the methods listed for

	mechanical routine planned maintenance (see above)
Major breakdown repairs	These repairs will include aspects such as: • Repair of leaks in reservoir linings • Structural repairs to the abstraction works structures • Fighting of veld fires • Repair major erosion damage. These maintenance repairs can be done by any of the repair units listed for mechanical routine planned maintenance (see above)
Minor breakdown repairs	These repairs will include aspects such as: • Repairs to buildings and structures (i.e. safety handrails, doors, roofs, windows, etc). These maintenance repairs can be done by any of the repair units listed for mechanical routine planned maintenance (see above)

5.7 Decommissioning Phase

It is envisaged that the pipeline will be used indefinitely, under suitable maintenance. Decommissioning is thus not considered applicable to the scheme. However, should decommissioning be required the activity will need to comply with the appropriate environmental legislation and best practices.

5.8 Alternatives

5.8.1 Eskom switch yard

Two alternative positions for the Eskom switch yard, options 1 and 2 (as shown in ***Appendix B***), include the following (DWAF, 2008a):

- *Option 1* is on higher ground close to the existing yard, and
- *Option 2* is just behind the proposed new pump station.

Option 1 is preferred because it is the most suitable for supply to the pump station switch rooms because of its proximity. It will however be more expensive in the sense that the yard terrace will have to be benched into the hillside behind the pump station.

Option 2, although the terrain is fairly level, has the following disadvantages:

- It is approximately 200m away, and

- The cables need to cross a stream between the switch yard to the pump station, which may be inundated by up to 6m by the tailwater downstream of the dam when a flood occurs.

Option 2 poses a greater risk because of the route thereof and the longer length of cabling required. The final decision on the location of the switch yard lies with Eskom.

5.8.2 Alternative Water Resources

Alternative water resources to those described in this report were considered and found to be inadequate or not feasible. These water resources include:

- **Ground water resources in the Lephalale area.**

  Current studies are being done by DWA as well as the Water Research Commission (WRC) on the potential of the groundwater in the Lephalale area. Although the results of these studies are not yet available, preliminary indications are that water can be abstracted by recharge of a deep aquifer. The sustainable yield is expected to be between 2 and 3 million m^3/a, which will be insufficient to be utilised as an additional resource in the long-term water requirement of the area (DWAF, 2008a). Although this resource was found to be inadequate for the volumes required, some of it can possibly be used as a local resource;

- **Raising of the Mokolo Dam on Mokolo River.**

  The dam raising options that were assessed are (DWAF, 2008c):

  (1) Raising of FSL without raising the dam embankment. On the basis of preliminary analyses it appears as if the present total freeboard of 10.0m is considerably more than what is required. Therefore it is possible to raise the existing FSL to some extent without having to raise the crest of the rockfill embankment. This will avoid the likely problem of not finding sufficient quantities of suitable soil for the clay core within economical haul distances.

  (2) Raise the embankment crest by 12.0m to reduced level (RL) 934.00 corresponding to the deck level of the intake tower.

Figure 19: Crump weir and rock spillway at Mokolo Dam

For the two raising options two spillway options were assessed:

(i) A straight uncontrolled concrete ogee type spillway, and

(ii) A reinforced concrete labyrinth spillway. Because of the better discharge characteristics of a labyrinth spillway an approximately 3m increase in FSL can be achieved.

The raising of Mokolo Dam was discarded as a solution because the system yield analysis undertaken as part of the MCWAP pre-feasibility study (DWAF, 2008d) showed that any increase in yield resulting from raising of the Dam would be discounted by increased Ecological Water Requirements (EWR) releases.

- **Increasing storage through construction of further dams or raising of existing Dams in the Crocodile River catchment (Klipvoor Dam, Vlieëpoort, Boschkop etc).**

  This was found to be problematic as it does not provide adequate volumes of water and comes at high cost. It also requires a long lead time in terms of the protocols that need to be followed with the neighboring countries. As such it was

not considered as a feasible option at this stage for the current fast track developments, but may be considered at a later development phase; and

- Water transfer from rivers beyond the borders of South Africa. It was found that the cost and the time frames required for such development renders it not feasible.

5.8.3 Transfer Scheme

The following two most viable options of transferring water from the Mokolo Dam to the end users were identified and investigated during the MCWAP pre-feasibility study (DWAF, 2008b):

1. **Option 1:** Construct a pump station and new pipeline from Mokolo Dam to Zeeland, Matimba and Medupi power stations as well as Steenbokpan. This pipeline will be constructed parallel (or close) to the existing pipeline for most of the route. A total length of 83 700m (including the rising main from the Mokolo Dam and the gravity main to the end consumers) will be required including the extension to Steenbokpan.
2. **Option 2:** Construct a weir, abstraction works and a high lift pump station downstream of Mokolo Dam as well as a pipeline to deliver water to Zeeland, Matimba and Medupi power stations as well as Steenbokpan. This option includes a mass gravity concrete weir in the Mokolo River approximately 41 km downstream of Mokolo Dam between the farms Sandier 559LQ and Rivers Bend 591LQ and immediately downstream of the confluence of the Rietspruit. This site was selected on the basis that it is located at the end of the deep and narrow valley section with only a small amount of developed irrigation along the river, and a short rising main to Zeeland. The objective was to minimise river losses and to limit the degree of water resource management that would be required. The low-lift pump station to abstract the sediment laden water from the river, located on the left flank of the weir, will be provided with 2 pumping bays to each accommodate a 750 ℓ/s submersible pump. Degritting and desilting facilities to remove coarse sediment and a balancing dam with 4 hours storage capacity will be provided between the low and high-lift pump stations. Water will be pumped

from the high-lift pump station to the Zeeland WTW, Matimba raw water dam and Steenbokpan area. The total length of pipeline will be approximately 63.23 km.

From an engineering and environmental perspective, Option 1 (i.e. Mokolo Dam pipeline option) was considered as preferable due to the following reasons:

a) The Option 1 pipeline route will mostly follow the existing Exxaro pipeline alignment, which is already disturbed. Option 2 will create more environmental disturbance by clearing a new area for the pipeline.
b) For Option 2, the weir will impact on the flow of the river and therefore the migration of fish species. The change in the flow speed will also lead to the alteration of the riverine habitat. The possibility also exists that some terrestrial ecosystems next to the river may be inundated. The weir will also result in the increase in the 1:100 year flood line, which will make some of the adjacent land unavailable for use for landowners. It is therefore foreseen that some of the land along the river will have to be acquired by the client.
c) The capital cost of Option 2 is estimated to be marginally less than that of Option 1.
d) Higher risk attached to the cost and construction of the weir in the river due to the very limited geotechnical information available and uncertainties concerning river losses.
e) Option 2 will require a larger transfer from Crocodile River (West) (i.e. MCWAP Phase 2) with the associated operational and maintenance costs.
f) Option 2 has a higher overall operational cost due to the cost of the water lost in the river.
g) Due to the high water losses expected along the river between the Mokolo Dam and the proposed weir site, Option 2 may not have sufficient water to provide in the interim water requirement until the Phase 2 infrastructure can be implemented.

Option 1 was thus regarded as the more feasible alternative.

5.8.4 Pipeline Routing

The following alternatives to the pipeline alignment were considered (DWAF, 2008a):

d) **Rising main (from Mokolo Dam to Wolwenfontein balancing dams)** -
The first 5.7km (±) of the route from Mokolo Dam deviates from the alignment of the existing Exxaro pipeline, where it follows the access road. The reasons for adopting this slightly longer route are as follows:

- The existing route:
  - Traverses very rugged terrain;
  - Has very steep crossfalls;
  - Has rock outcrop over about 90% of its length;
  - Is often on a bench blasted into the side slope;
  - Has no soft material for bedding/backfill; and
  - Limits the number of working fronts to two (i.e. from either end).
- To follow the existing route would:
  - Require extensive blasting right next to the existing pipe;
  - Result in a very low production rate, due to having to limit blast loadings;
  - Impose a very real risk of damage to the existing pipe;
  - Result in risk of erosion and damage if it were placed on the downslope side of existing pipe and this leaked; and
  - All pipes and backfill material would have to be hauled in along the pipe route. The cover to the existing pipe is insufficient for heavy equipment and there is insufficient space to trench for the new pipe and haul along the route.

In particular, the production rate along the alternative route (along the access road) is estimated to be about three times that achievable along the existing pipe route. Conditions along the access road are similar, with extensive outcrop present, but crossfalls are generally less steep and access is possible along the whole route (allowing work on multiple fronts). A “normal” production rate should be possible along this route.

An alternative alignment has also been suggested by Mr. G. Viljoen, who is the landowner of the Farms Wolvenfontein 645LQ and Witbank 647LQ, which will be duly considered during the EIA phase.

e) **Gravity Main (from Wolvenfontein balancing dams to Matimba take-off)** -
An alternative alignment was considered to follow Road R510 to Lephalale. This was investigated to eliminate passing through the high point at Rietspruitnek. This option is not regarded as preferable due to the steep rocky slopes on the north-eastern side of the road and the spruit on the south-eastern side which leaves no space for the gravity pipeline.

f) **Gravity Main (between the Farms Hanglip 508LQ to Kringgatspruit 318LQ)** -
In general, the alignment of the pipeline to Steenbokpan was selected to be south of the coalfield, thus not sterilizing the coal. The two alignment alternatives for the gravity main to Steenbokpan include (see **Figure 20**):

1. **Option 1 (preferred):** Chosen to follow alignment of new Steenbokpan tar road that runs north of Medupi Power Station, but south of coalfield. This will minimize further impact on the environment and other services.
2. **Option 2:** Follows railway line to the south of Medupi Power Station and farm boundaries to minimize impact on environment. Less favorable route as higher quantities of hard rock excavation will be required. Is also further away from coalfield where water will be used in mining operations i.e. distance to supply point from pipeline and associated cost.

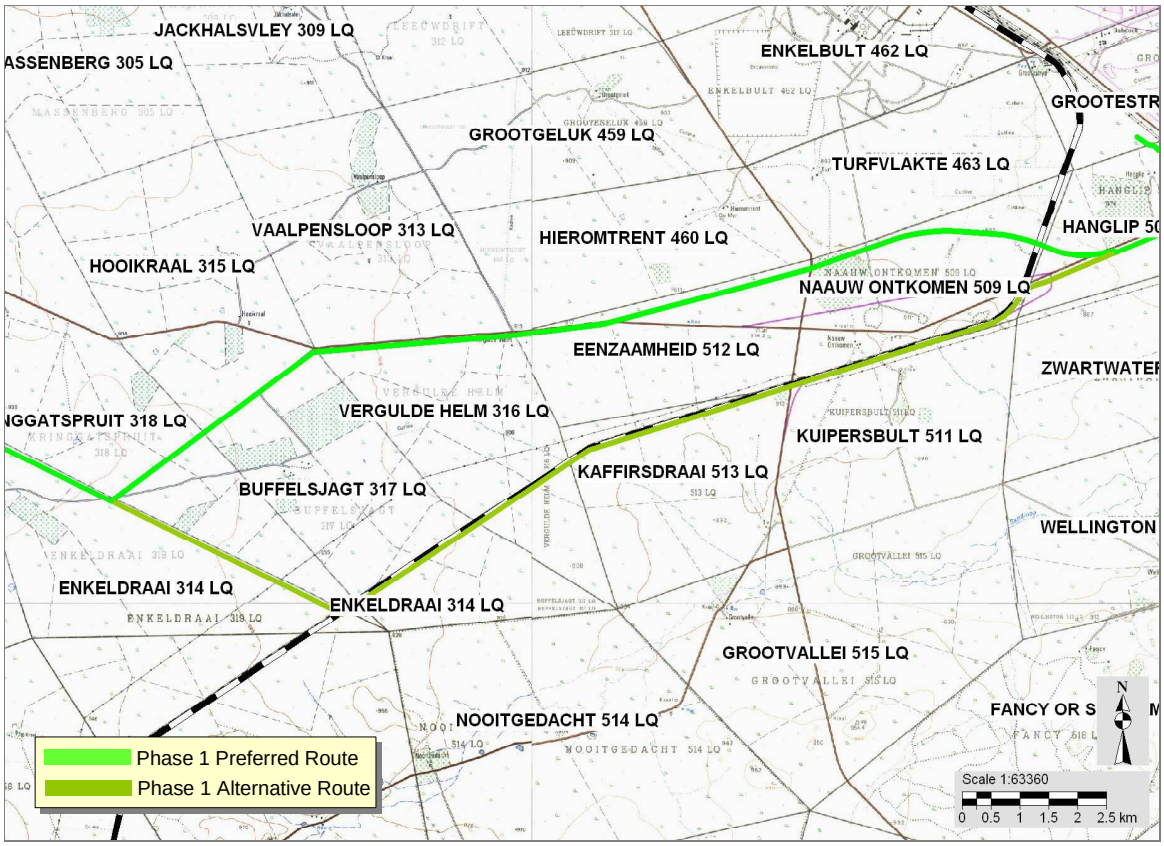


Figure 20: Alternative alignment for Gravity Main (from Hanglip 508LQ to Kringgatspruit 318LQ)

5.8.5 No Go Option

The Mokolo Dam is considered to be the only viable source of water that can satisfy the water requirements of the interim period until the Crocodile River (West) Transfer System (i.e. MCWAP Phase 2) has been constructed.

The no go option will have the following implications:

- The development of new power stations is of high strategic importance with tight timeframes. Commissioning of the first generation unit is planned for end 2010 and additional water needs to be available by mid 2011 according to the expected water requirements. Without the implementation of MCWAP Phase 1, this will not be able to take place until Phase 2 is executed (planned completion date is early 2015). Provision of additional electricity by Eskom would thus be delayed by about 4 years.

- The absence of water will suppress development, with associated socio-economic implications on a national scale.

5.8.6 Alternatives Suggested by Interested and Affected Parties

The following concerns were raised by an Interested and Affected Party (I&AP), during the Scoping phase of the project, regarding the proposed MCWAP Phase 1 route:

- Mr. G. Viljoen has indicated that the Sable Hills Eco Park is to be developed on the Farms Wolvenfontein 645LQ and Witbank 647LQ. In consultation with a blasting expert, concerns have been raised by Mr. G. Viljoen regarding the impact of the route along the Mokolo Dam access road, which include *inter alia* aspects related to visual impacts (along construction footprint and in ravine), rehabilitation, ecology as well as access and future usage of the road.

Deviations from the proposed alignment due to issues raised by I&APs, which include the abovementioned concerns as well as future suggestions or issues that may arise, will be considered in detail from a technical and environmental perspective during the EIA phase.

5.9 De-bottlenecking

An option to phase the construction of the MCWAP Phase 1 pipeline by first increasing the capacity of the existing gravity section from Wolvenfontein balancing dams with interconnections to the new pipeline for the first 9 kilometres (i.e. MCWAP De-bottlenecking – see **Figure 21**) is being considered to overcome the interim capacity constraints whilst the full Phase 1 is being constructed.

The intention of the de-bottlenecking of the existing Exxaro pipeline is to improve the hydraulic gradient at Rietspruitnek, where the existing pipeline passes over a ridge (approximately 16.5km from the Wolvenfontein Balancing Dams). By utilising the existing pump station at Mokolo Dam water could then be delivered at a rate higher than the capacity of the existing pipeline.

A separate environmental assessment, in the form of a Basic Assessment, is underway for the abovementioned de-bottlenecking project.

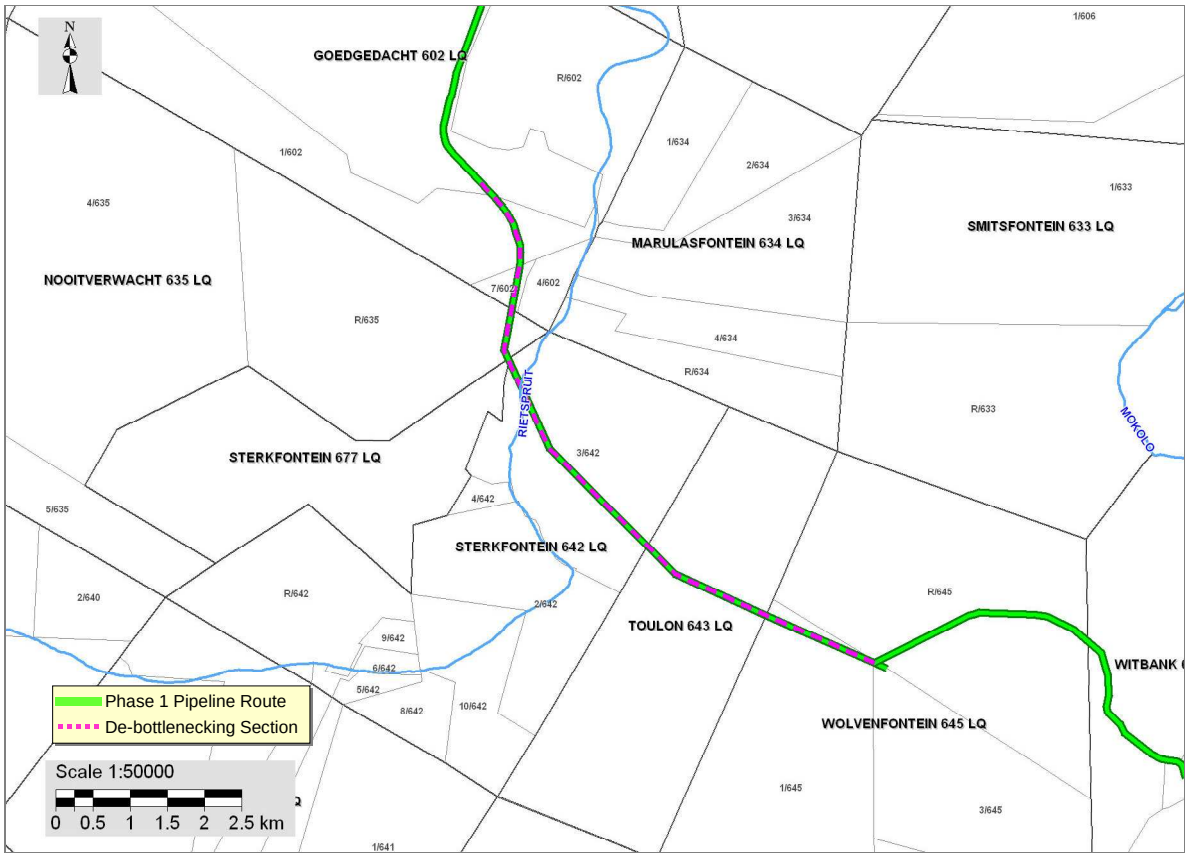


Figure 21: De-bottlenecking section

5.10 Institutional Arrangements

The information contained in this section was extracted from Institutional Arrangements and River Management (DWAF, 2009a), which forms part of the MCWAP feasibility study.

Presently the main parties to the MCWAP are the owner, DWA, and the Trans-Caledon Tunnel Authority (TCTA) as their Implementing Agent, and the main users, being Eskom, Exxaro, Sasol and the Municipality of Lephalale. Other interested and affected parties

are the existing users supplied from the Mokolo Dam and the existing users supplied from the Crocodile River (West) downstream of the Vaalkop, Roodekopjes and Klipvoor dams. These users rely on releases from these dams and accruals from the catchments downstream of the dams.

The MCWAP will be managed and operated by a suitable and representative authority, with the duty to implement the policies, functions and responsibilities associated with this scheme.

Three distinctly different functions must be performed by the MCWAP Authority. These are:

- Management of the river flows in the Crocodile River (West);
- Management of releases from the Mokolo Dam and flows in the Mokolo River;
- Abstracting water from the Mokolo Dam and the Crocodile River (West) at Vlieëpoort and managing its supply and distribution to the users supplied by the MCWAP; and
- Operating and maintaining the MCWAP.

6 PROFILE OF THE RECEIVING ENVIRONMENT

Aerial perspectives of the proposed MCWAP Phase 1 pipeline route are shown below.

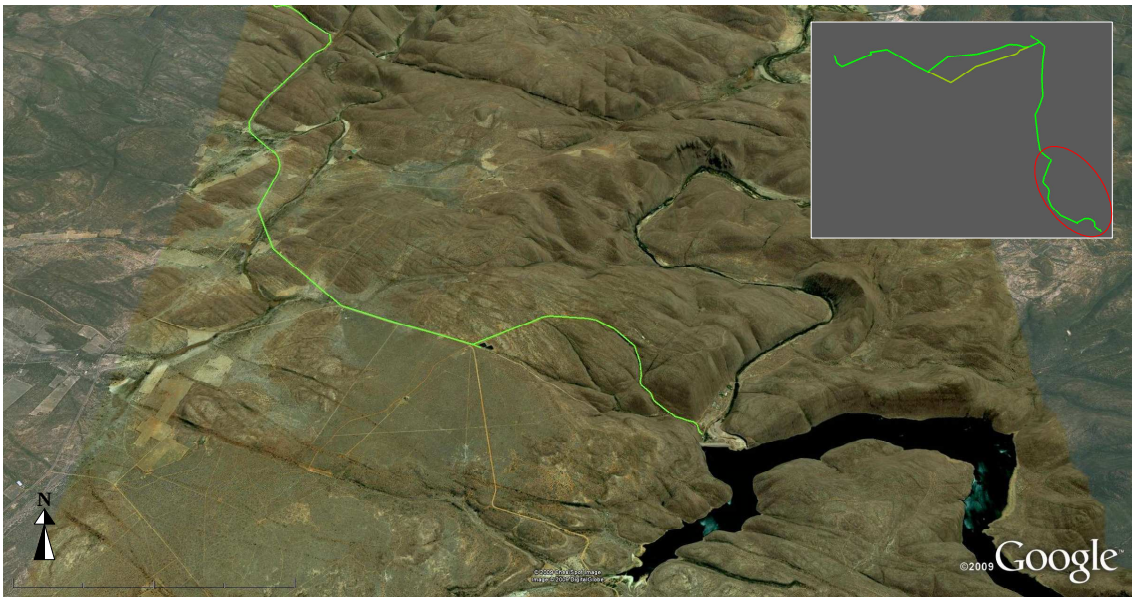


Figure 22: Aerial view of the first section of the pipeline route, from Mokolo Dam

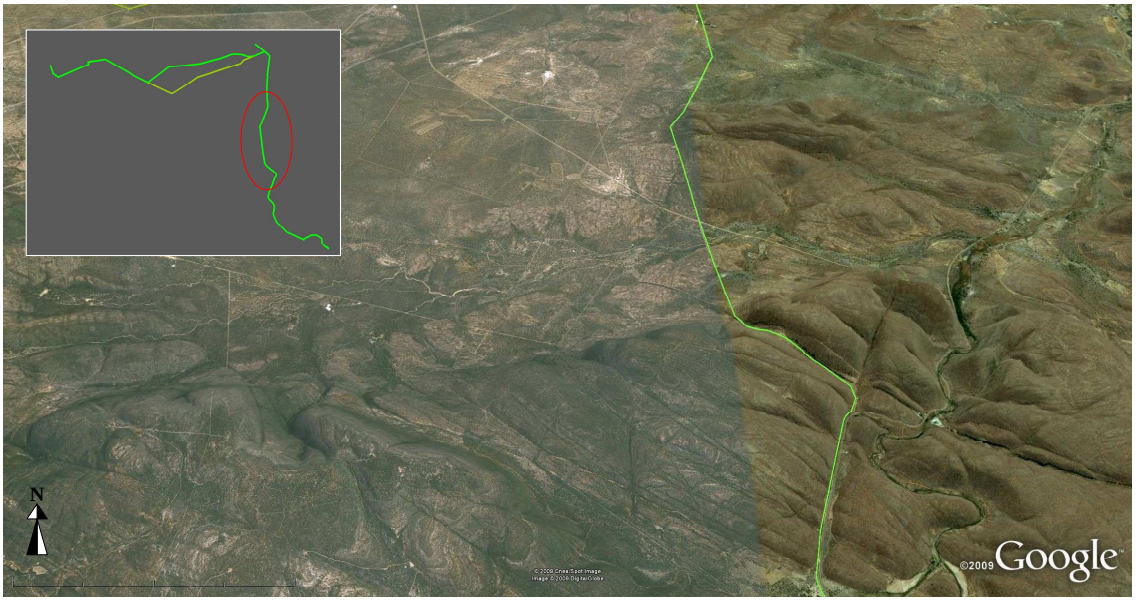


Figure 23: Aerial view of the second section of the pipeline route

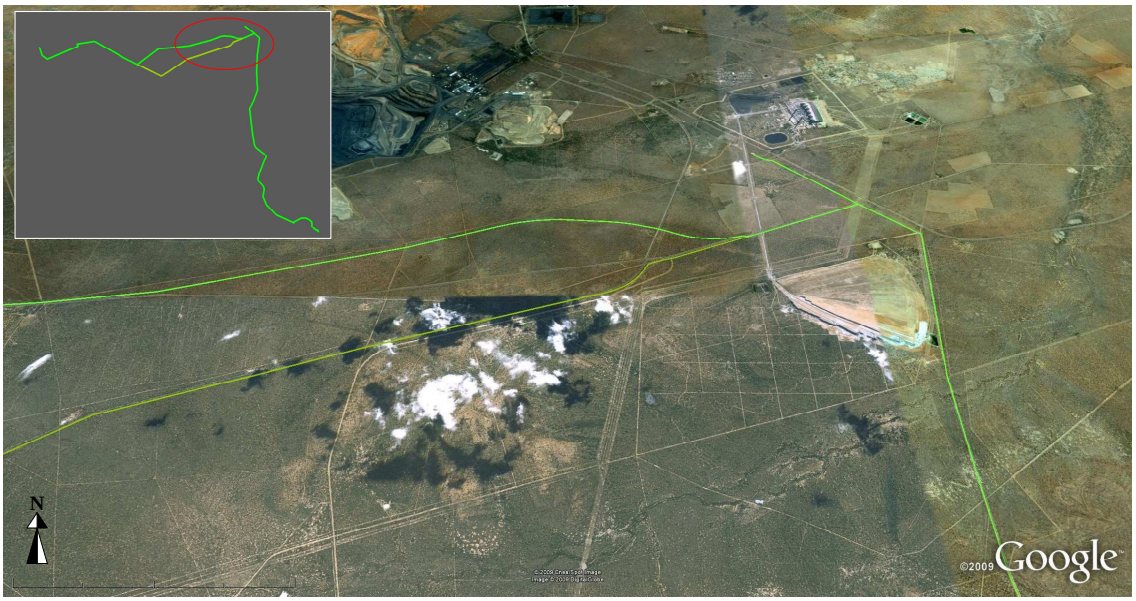


Figure 24: Aerial view of the third section of the pipeline route

Figure 25: Aerial view of the fourth section of the pipeline route

Figure 26: Aerial view of the fifth section of the pipeline route

To minimise impacts, the proposed route attempts to remain alongside existing development footprints (e.g. farm boundaries) and linear-type infrastructure where the environment is regarded as less sensitive, such as:

- Pipelines (i.e. existing Exxaro Pipeline from the Wolvenfontein balancing dams to Zeeland WTW),
- Roads,
- Railway lines,
- Transmission lines; and
- Industrial corridors.

A 200m corridor (i.e. 100m on either side of the centre line) was adopted as the study area, which allows for any possible deviations from the proposed alignment within this corridor.

The sub-sections below provide a general description of the status quo of the receiving environment in the project area. This allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed project. A

brief overview of the possible implications of MCWAP to the environmental features is also included, which has bearing on the further investigations and assessments during the subsequent EIA phase. Key environmental issues are discussed further in **Section 9**.

6.1 Climate

Status Quo

The information below was obtained from the South African Weather Service for the weather station in Lephalale.

6.1.1 Temperature

Average daily maximum and minimum temperatures for Lephalale for the last ten years are tabulated below. The region is characterised by moderate fluctuations in seasonal temperature, with a high of 36.6℃ and a low of 2.7 ℃.

Table 7: Average Daily Maximum Temperature (℃) for station [0674341 8] - Lephalale

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1999	31.7	33.0	31.5	30.1	26.8	24.7	23.7	27.1	28.0	30.4	31.7	*
2000	29.9	32.4	28.1	26.0	24.3	22.7	22.9	26.6	29.7	31.5	31.5	33.4
2001	34.8	30.9	29.8	28.2	26.4	24.5	23.2	28.2	30.0	30.3	27.7	31.3
2002	34.7	34.0	33.9	31.0	27.7	23.1	25.1	27.7	29.3	32.5	34.7	35.1
2003	36.6	36.4	35.0	32.2	27.7	22.9	24.5	26.5	30.8	32.7	33.5	35.3
2004	32.6	30.5	28.1	27.7	25.9	23.1	23.7	28.1	29.5	32.2	35.0	31.3
2005	33.6	34.7	32.1	28.7	28.0	26.3	24.9	28.4	32.4	33.4	32.8	30.5
2006	31.1	30.9	27.2	27.6	24.5	23.9	25.3	25.2	29.4	33.0	31.9	34.1
2007	32.6	35.3	33.2	28.5	26.1	24.0	23.2	27.3	31.9	28.8	30.3	28.8
2008	29.7	33.4	30.6	29.2	27.4	25.3	24.1	28.4	31.5	33.9	31.5	32.4
2009	31.6	30.8	28.9	29.4	26.5	*	*	*	*	*	*	*

** No date available at time of request*

Table 8: Average Daily Minimum Temperature (℃) for station [0674341 8] - Lephalale

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1999	20.0	19.5	18.9	15.0	11.3	6.3	7.3	9.0	12.6	15.2	19.6	*
2000	19.4	21.0	19.1	14.6	8.1	8.8	4.7	7.8	13.3	16.9	17.9	19.5
2001	20.0	20.0	18.3	15.3	9.5	6.5	6.0	10.4	13.5	16.1	17.5	20.1
2002	21.2	20.6	19.1	15.5	10.0	7.1	4.2	11.6	12.9	17.9	19.2	22.2
2003	22.4	23.3	19.9	16.6	10.4	9.4	5.6	8.4	13.5	17.9	20.7	21.3
2004	21.2	20.0	19.3	15.6	10.1	6.4	3.7	9.1	11.8	16.7	20.2	19.8
2005	21.1	20.4	18.3	15.9	10.7	7.6	5.4	11.5	14.4	17.4	19.4	18.3
2006	20.3	20.0	17.2	13.1	6.9	5.4	5.7	7.1	11.5	17.1	18.1	19.8
2007	18.6	19.0	17.6	13.4	6.1	4.4	2.7	6.4	13.6	15.2	15.8	17.3
2008	19.2	18.7	17.9	11.8	10.4	6.4	5.8	8.9	12.0	17.6	19.3	19.9
2009	20.5	19.3	17.0	12.3	9.8	*	*	*	*	*	*	*

** No date available at time of request*

6.1.2 Precipitation

The monthly daily rainfall for Lephalale for the last ten years is tabulated below. The area classified as semi-arid and precipitation occurs mainly in the summer, with the maximum rainfall experienced during November - March. The mean annual precipitation ranges between 350 and 400mm.

Table 9: Monthly Daily Rain (mm) for station [0674341 8] - Lephalale

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
1999	24.4	57	32	12	20	0	0.6	0	1.6	21.2	90.6	*	**259.4**
2000	86	64.4	104.8	102.4	9.4	9	0.2	0	0.2	0	25.8	62.6	**464.8**
2001	21.4	74.4	16.8	11.2	7.2	21.4	0	0.2	0.2	18.2	142	104.6	**417.6**
2002	26	9	8.6	107.2	43	5.6	0.8	0.6	3	47	0.4	57.2	**308.4**
2003	83.6	31	9.2	0.4	0	22.8	0	0	1.6	21	20.2	48	**237.8**
2004	98.4	94.8	121.4	41	9	0	0	0	0	9	14.4	107.4	**495.4**
2005	9.8	17.4	3.2	35.2	0	0	0	0	0	0	73.4	42.4	**181.4**
2006	143.6	68.8	52.2	12.4	11	0	0	2	1.6	3.2	42	81.4	**418.2**
2007	11.8	24.2	47.4	36.6	0	0.2	1.4	0	30.2	90.2	113.4	74.6	**430**
2008	142.4	0	60.8	1.2	11	0	1	0	0	15.2	166.2	80.8	**478.6**
2009	116.8	62	69.8	0.6	4.8	*	*	*	*	*	*	*	**
Average	**69.5**	**45.7**	**47.8**	**32.7**	**10.5**	**5.9**	**0.4**	**0.3**	**3.8**	**22.5**	**68.8**	**73.2**	**369.2**

** No date available at time of request*

6.1.3 Wind

Refer to **Figure 27** for the wind rose at the Lephalale weather station. The prevailing wind direction over a 10-year period (19998 – 2009) is east-northeast.

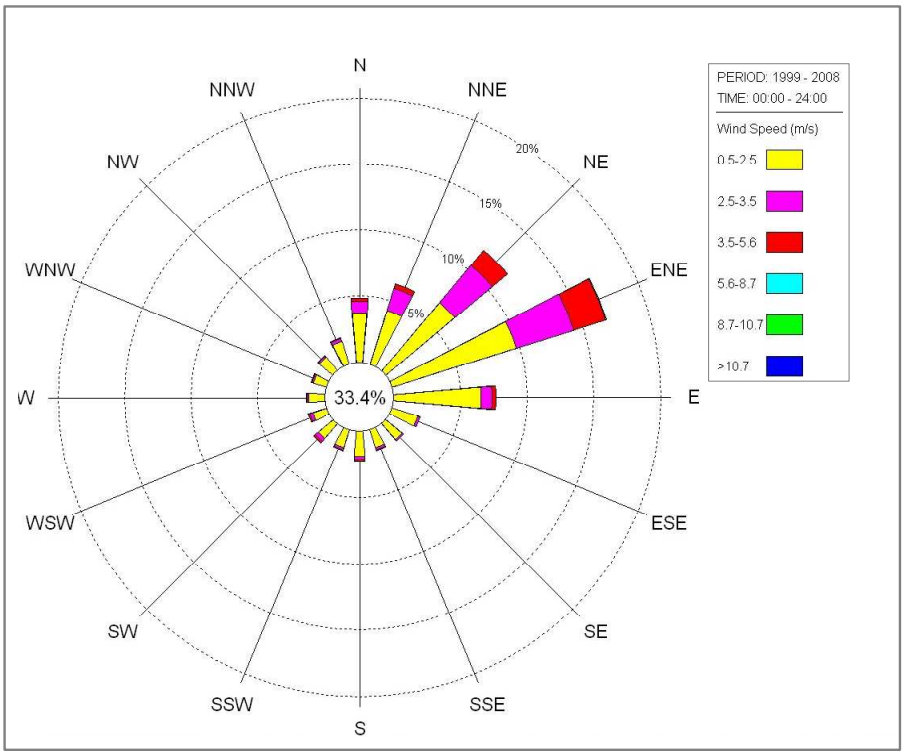


Figure 27: Wind rose for the Lephalale weather station

Potential Implications of MCWAP Phase 1

As is common accepted practice, the potential impact of climate change to river flows has been considered in the hydrological modeling, where a margin for error in the future predictions has been considered. This is based on historical data of wet and dry periods for the area, as well as all known water use that affects river runoff.

The potential impact of drastic changes in the regional climate has not been recorded and can only be estimated.

6.2 Topography

Status Quo

The terrain morphology consists mainly of table lands along the first section of the pipeline route from Mokolo Dam, in the south-eastern part of the MCWAP Phase 1 project area. From there, the terrain transforms to plains for the last section of the transfer line and for the entire route along the delivery line. This area comprises flat and undulating topography.

The most noteworthy topographical feature includes the ridge where the pipeline route traverses Rietspruitnek, at the point where the pipeline exits the Mokolo River valley (see **Figures 28**).

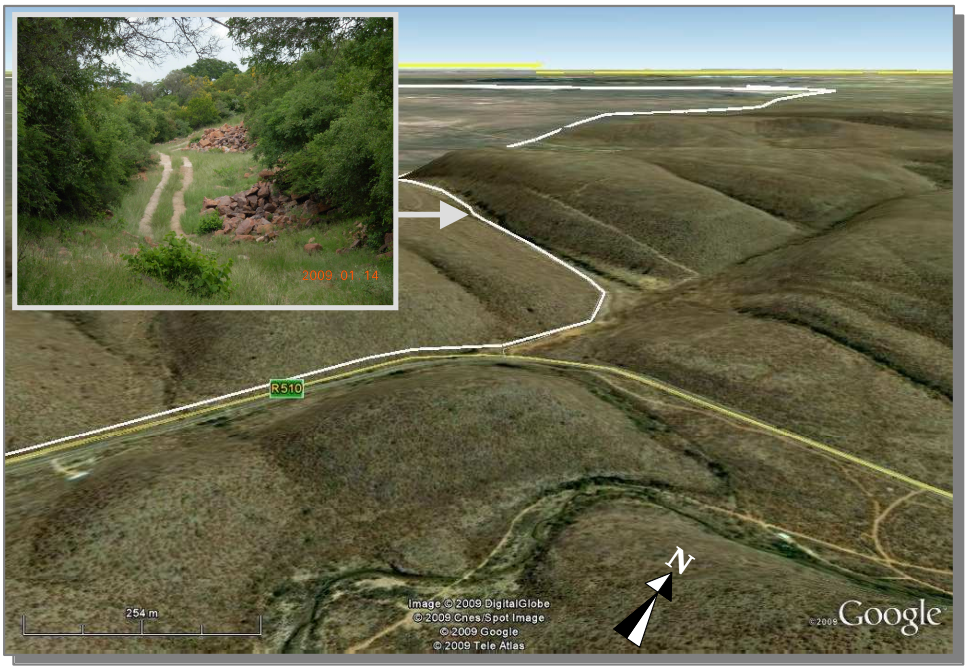


Figure 28: North-westerly view of Rietspruitnek

Potential Implications of MCWAP Phase 1

Topographical features like ridges are not preferred for the pipeline route or associated structures due to the influence to the hydraulic gradient and the prevention of impacts to environmental features such as aesthetics, soil (erosion), and biodiversity (usually high

on ridges). However, two steep areas are traversed by the route, namely along the initial section from Mokolo Dam and at Rietspruitnek (see **Figure 29**).

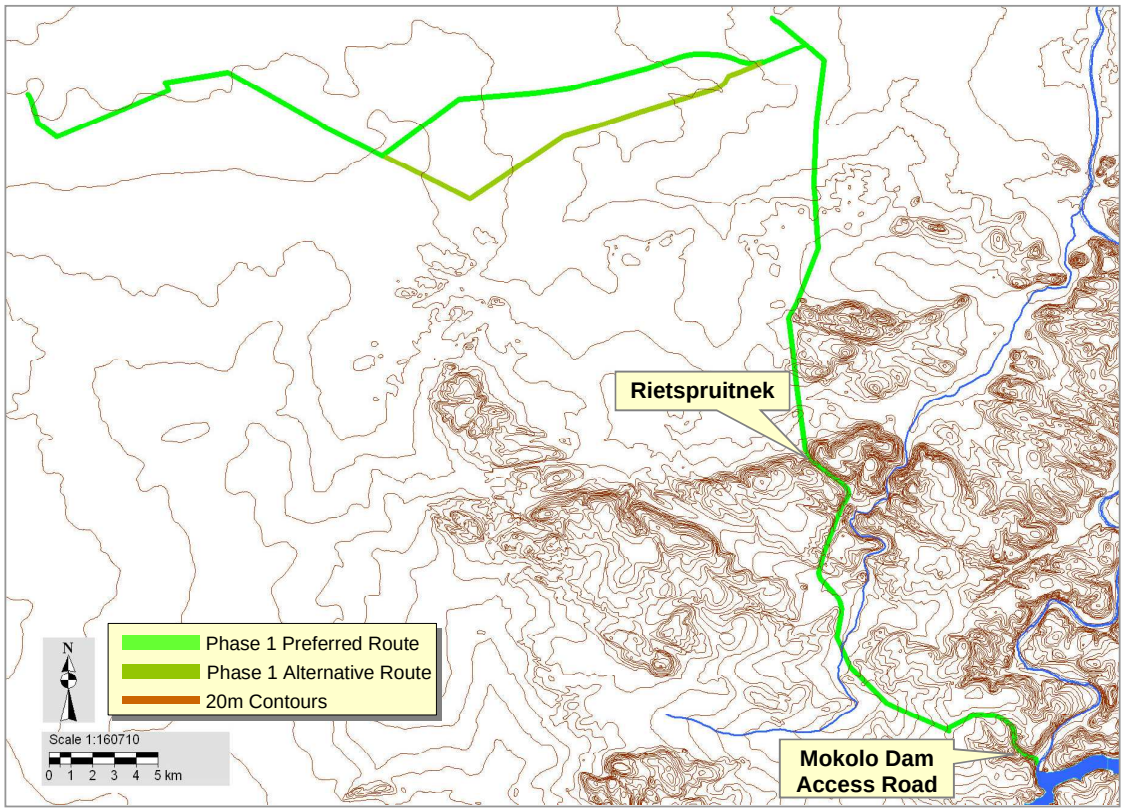


Figure 29: Steep terrain along route

Impacts associated with construction along the access road to Mokolo Dam include adverse effects to the visual and ecological quality of the area, disruption of the use of the road, blasting-related impacts (e.g. dislodging of rocks and material that could damage environmental features in the ravine). Taking cognisance of concerns raised by the landowner (i.e. Mr. G. Viljoen), additional route alternative(s) will need to be investigated during the EIA stage, as well as measures to mitigate the aforementioned impacts.

Impacts to aesthetics and the existing Exxaro pipeline at the crossing of Rietspruitnek, which are associated with the construction phase of MCWAP Phase 1 and the related increase in servitude width, will require attention during the EIA phase.

Ridges are commonly characterized by a high biodiversity due to variation in aspect (north, south, east, west and variations thereof), soil drainage and elevation/altitude (GDACEL, 2001). This will need to be considered during the execution of the specialist Ecological Study in the EIA phase.

6.3 Surface Water

Status Quo

6.3.1 Watercourses

Figure 30 illustrates the main watercourses in the project area.

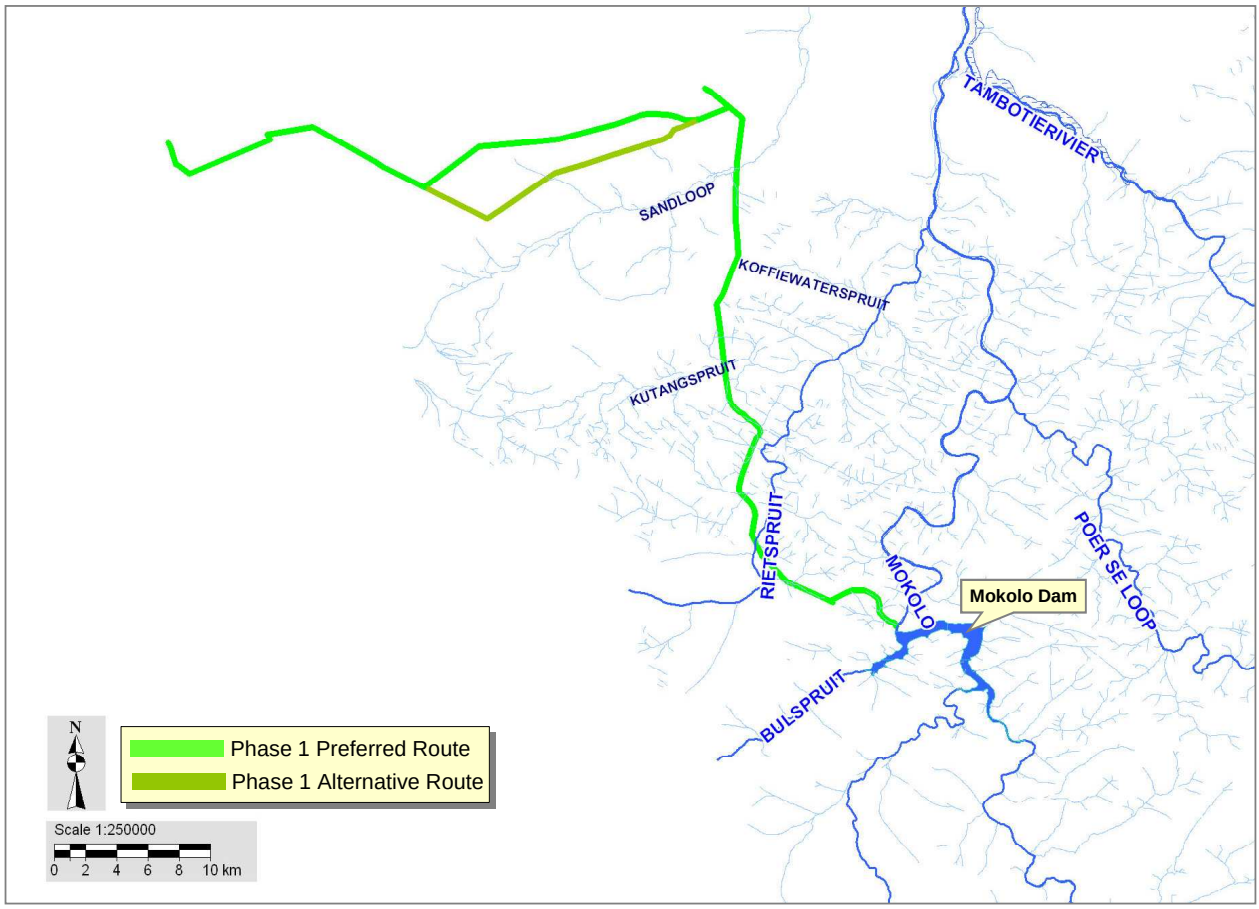


Figure 30: Main surface water resources in the project area

MCWAP Phase 1 falls within the Limpopo Water Management Area (WMA), which represents part of the South African portion of the Limpopo Basin which is also shared by Botswana, Zimbabwe and Mozambique.

The pipeline route is situated in the Mokolo catchment, and traverses the following quaternary catchments: A42G, A42H and A42J. The Mokolo River (also known as the Mogol or Mogolo River) rise in the western part of the Waterberg (between 1200 and 1600 metres above mean sea level). It originates in a flattish, open area with numerous koppies and flows through a steep gorge emerging above the town of Vaalwater. Here the river flows through a relatively flat area until it enters the Mokolo Dam. From there, it flows through another gorge before entering the Limpopo Plain, near the junction with the Rietspruit. From this point, the Mokolo River flows through flat sandy areas until it reaches the Limpopo River (River Health Programme, 2006).

Figure 31: Northern view of Mokolo River downstream of the Mokolo Dam.

The Mokolo River is a major tributary of the Limpopo River and commands a total catchment area of over 8 000 km^2 with a total natural mean annual runoff (MAR) of almost 300 Mm^3/a. The towns of Lephalale and Vaalwater are situated in the Mokolo Catchment. Agriculture (irrigation) is the major water user in the catchment.

A number of river crossings will take place along the proposed pipeline route, including the following (amongst others):

- **Rising Main - Mokolo Dam to Wolvenfontein Balancing Dams** -
  - Tributary of the Mokolo River, on the Farm Witbank 647LQ.
- **Gravity Line - Wolvenfontein Balancing Dams to Matimba Power Station** -
  - Tributaries of the Rietspruit, on the Farms Toulon 643LQ, Goedgedacht 602LQ and Fancy 556LQ;
  - Main stem of the Rietspruit, on the Farm Sterkfontein 642;

- Tributary of the Kutangspruit, on the Farms Fancy 556LQ and Goedehoop 552LQ;
- Main stem of the Kutangspruit, on the Farm Fourieskloof 557LQ;
- Tributary of the Sandloop, on the Farm Wellington 519LQ; and
- Main stem of the Sandloop, on the Farm Wellington 519LQ.

- **Gravity Line - Matimba Power Station to Steenbokpan**
  - Tributary of the Sandloop, on the Farm Vergulde Helm 316LQ (alternative alignment only).

Potential Implications of MCWAP Phase 1

The pipeline crossings could lead to the alteration of the structure (i.e. bed and banks) and damage to the riparian habitat of the various affected watercourses. Any changes to the structure of these watercourses will require adequate rehabilitation and stabilisation measures, which will be addressed through specific mitigation measures during the EIA phase. Alternative crossings, such as pipeline bridges (as opposed to open trenches) will also be considered.

6.3.2 Impoundments

Status Quo

The Mokolo Dam (formerly known as the Hans Strijdom Dam) is the largest dam in the catchment. The dam, with a total live capacity of 145 Mm^3 (68 % of its natural MAR) was commissioned in 1980 for the purpose of supplying water to the nearby Grootegeluk coal mine, Matimba dry-cooled power station, the towns of Lephalale and Onverwacht, Marapong township and an irrigation scheme located downstream of the dam. Currently, the combined water allocation from the dam is approximately 26.2 Mm^3/a (DWAF, 2008d). Water is conveyed from Mokolo Dam via an existing Exxaro pipeline to the Zeeland

Figure 32: South-eastern view of the Mokolo Dam.

WTW. The treatment plant is operated and maintained by Exxaro's Grootegeluk Mine and provides potable water to the Grootegeluk Mine and the Lephalale Municipality. Treated water is transported via the existing Exxaro pipeline to the Lephalale Municipality, Onverwacht and the Grootegeluk mine (Digby Wells & Associates, 2009) and the Matimba Power Station. As discussed in **Section 5.2**, the proposed MCWAP Phase 1 pipeline follows the same alignment of the Exxaro pipeline from the Wolwenfontein balancing dams to the Zeeland WTW.

Potential Implications of MCWAP Phase 1

The Mokolo Dam is considered to be the only viable source of water that can supply in the water requirements of the interim period until the Crocodile River (West) Transfer System (i.e. MCWAP Phase 2) has been constructed. The Mokolo Dam has a long-term firm yield of 39.1 million m^3/annum of which 10.4 million m^3/annum is allocated for irrigation. The remaining 28.7 million m^3/annum is available to augment the water requirements of the Lephalale and Steenbokpan areas.

Abstraction from the dam will be undertaken based on operating rules which DWA will develop, which will typically include an allocation to each user based on the dam level at April of each year and the level of assurance at which water is allocated to different users. The process is to assess the risk of non-supply based on the dam level and historic trends for the dam. Curtailments may then be implemented should it be necessary to ensure supply to critical industries. Compensation must be paid to affected parties should the cause of curtailment not be natural i.e. dry period of reduced runoff.

6.3.3 Pans and Wetlands

Status Quo

Figure 33 indicates the location of wetlands and non-perennial pans along the pipeline route, as identified on a desktop level through an appraisal of the topographical map and the National Wetlands Map II of the South African National Biodiversity Institute (SANBI), which was extracted from the National Land Cover 2000 dataset.

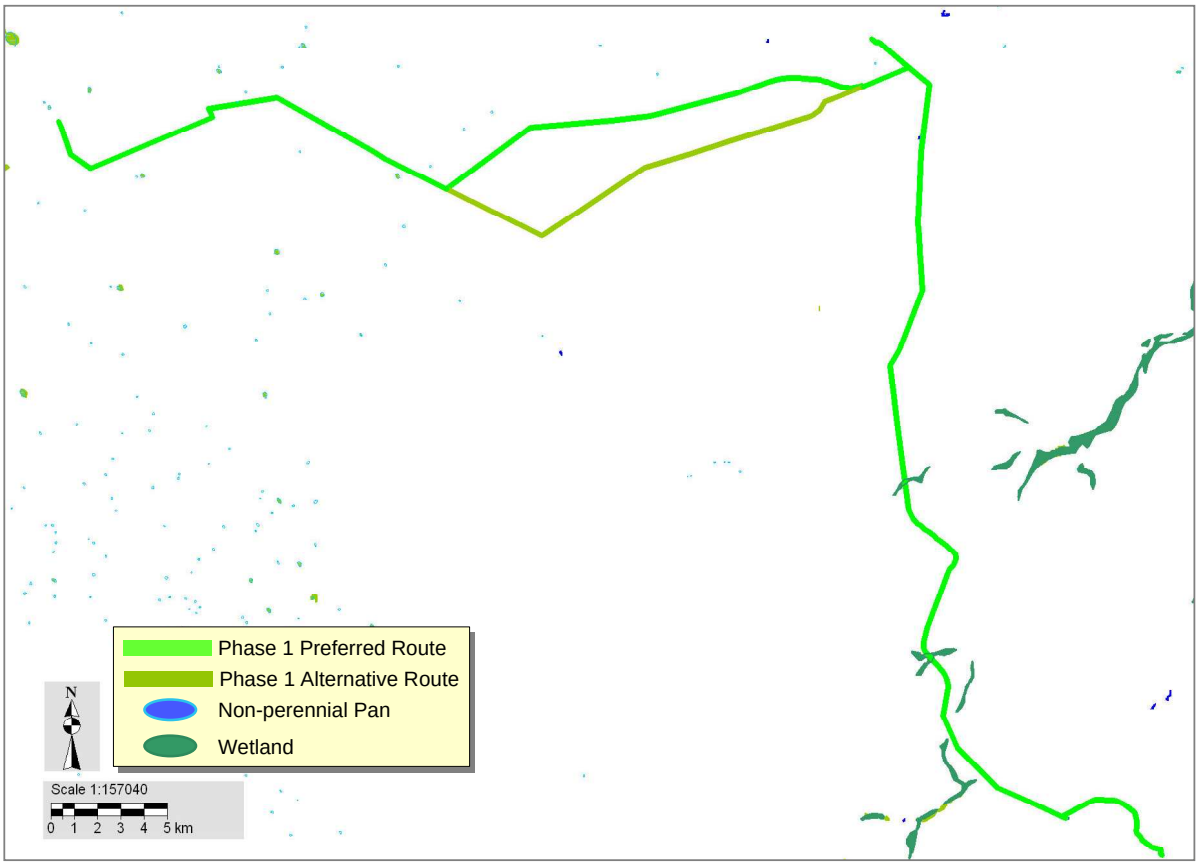


Figure 33: Locations of wetlands and non-perennial pans along pipeline route

Potential Implications of MCWAP Phase 1

The status of wetlands and pans in the project area and the potential impact of the project and concomitant management measures will be considered during a specialist Aquatic Ecological Study, earmarked for the EIA phase.

6.3.4 Water Users

Status Quo

The content of this section was extracted from the Water Resources Report (DWAF, 2008d), prepared as part of the MCWAP pre-feasibility study.

In order to obtain estimates of the current and future water resources capability of the Mokolo River system, DWA Directorate: National Water Resource Planning commissioned the Updating the Hydrology and Yield Analysis in the Mokolo River Catchment. The study included the following two components:

- Updating the Hydrology and Yield Analysis in the Mokolo River Catchment: Yield Analysis study; and
- Updating the Hydrology and Yield Analysis in the Mokolo River Catchment: Planning Analysis study. This component included a planning analysis with the main objective of developing a detailed Water Resources Planning Model configuration of the entire Mokolo River system.

The main objective of the Yield Analysis study was to accurately determine the current water resources capability of the Mokolo River system for a variety of situations. The Mokolo Dam yield analysis results for the scenario with most the accurate representation of the current-day situation are summarised in **Table 10** below. The Historic Firm Yield (HFY) and the Long-term stochastic yields at the various Recurrence Intervals (RI) are illustrated.

Table 10: Mokolo Dam Yield Analysis Results

HFY		Yield (Mm^3/a), at indicated RI			
(Mm^3/a)	***RI (years)***	***1:200***	***1:100***	***1:50***	***1:20***
38.7	*1:224*	*39.1*	*44.6*	*50.7*	*66.8*

The HFY of the Mokolo Dam is 38.7 million m^3/a and occurs at a high recurrence interval of 1:224 years. The 1:200 yield available from the Mokolo Dam under current day conditions is 39.1 million m^3/annum and was accepted for further planning purposes. This is considerably higher than the total allocation from Mokolo Dam of 28.6 Mm^3/a.

Based on the water infrastructure of Mokolo Dam, the current water availability and water use allows only limited spare yield for future allocations for the anticipated surge in

economic development in the area (DWAF, 2008d). Alternative resources must therefore be developed.

Potential Implications of MCWAP Phase 1

Curtailment of water use downstream of Mokolo Dam will impact existing entitled water users, which is regarded as a key environmental issue associated with the project, and has been raised by many I&APs (including the Mokolo Irrigation Board) during public participation. This matter will be addressed in detail in the EIA report.

6.3.5 Ecological Status

Status Quo

The Intermediate Reserve Determination study for the Mokolo River Catchment (DWAF, 2007) is currently being conducted. The primary objective of the study is to implement a Resource Directed Measures (RDM) assessment yielding results at an intermediate level of confidence for the Mokolo sub-catchment, taking into account water resource management aspects.

Box 2:	What is the "Reserve"?

The **Reserve** is central to water resource management and enjoys priority of use according to the National Water Act (No. 36 of 1998). The Reserve relates to the quantity and quality of water required to satisfy the following two elements:

- The **Basic Human Needs Reserve**, which provides for essential needs of individuals; and
- The **Ecological Reserve**, which relates to the water required to protect the functional integrity of aquatic ecosystems.

According to the River Health Programme (2006), the status of the major rivers in the project area, in terms of their Ecostatus and Ecological Importance and Sensitivity (EIS), are as follows:

- Mokolo (downstream of Mokolo Dam) – Ecostatus = fair; EIS = moderate; and
- Rietspruit – Ecostatus = fair; EIS = moderate.

Potential Implications of MCWAP Phase 1

During construction, the instream works (i.e. at watercourse crossings) will increase the turbidity in the affected watercourses, which could lead to the clogging of gills of aquatic

fauna from increased silt loads. A number of the watercourses that are earmarked for pipeline crossings are non-perennial, and construction-related impacts to these systems will be minimised if the work is undertaken in the dry season (if possible).

Suitable mitigation measures will be included in the Environmental Management Plan (EMP), which will form part of the EIA Report, to ensure the safeguarding and reinstatement of the affected environment.

A specialist Aquatic Ecological Study will be undertaken during the EIA phase.

6.3.6 Water Quality

Water quality in the Mokolo River is considered to be good (River Health Programme, 2006). Contributing factors include the mountainous nature of the upper reaches and the prevalence of game reserves.

Table 11 below provides water quality data, as obtained near the spillway at the Mokolo Dam, for the period 1972 – 2009.

Table 11: Water Quality Data (90th percentile) at Mokolo Dam (23°59'07"S, 27°43'25"E) , for 1972 – 2009 *(source: www.dwaf.gov.za/iwqs/wms/data/a42/a42_90335)*

Variable	Value (90th Percentile)
Conductivity	10.82 mS/m
TDS	74.6 mg/l
pH	7.71
Calcium	8.98 mg/l
Magnesium	3.26 mg/l
Potassium	2.63 mg/l
Sodium	7.89 mg/l
TAlkalinity	34.58 mg/l
Chloride	9.15 mg/l
Fluoride	0.25 mg/l
Silica	4.43 mg/l
Sulphate	10.43 mg/l
NH4(N)	0.09 mg/l
NO3(N)	0.21 mg/l
PO4(P)	0.03 mg/l

According to DWAF (2004), the rapid and uncontrolled growth of informal settlements is a source of concern with regard to the surface and groundwater quality in the Mokolo Catchment.

Potential Implications of MCWAP Phase 1

During the construction phase, potential contamination of surface water could occur through sedimentation from instream works, silt-laden runoff from disturbed areas, and improper practices (e.g. poor management of waste water and disposal of solid waste).

6.4 Geology and Soil

Status Quo

A general description of the geological conditions in the project areas is provided below. Refer to the maps contained in **Figures 34** for the discussion to follow.

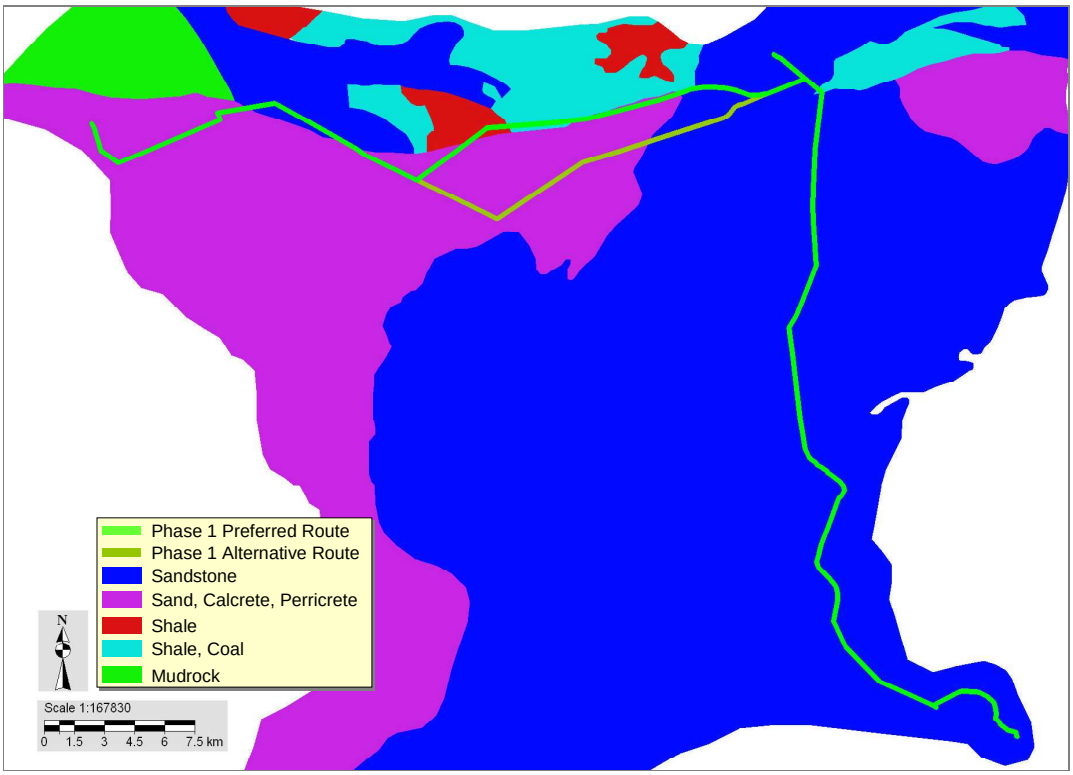


Figure 34: General geology of the project area

The majority of the pipeline route is underlain by the Waterberg Group, where the geology consists of quartzite and sandstone. The Karoo Super Group is found in the region of the Zeeland WTW, which consists of sandstone and shale. A small portion of the route is underlain by the Cleremont Formation of the Kransberg Sub-group south-west of the Wolwenfontein balancing dams, consisting of quartzite.

Large coal deposits are found in the area (see **Figure 1**), in the form of the Waterberg coalfield. The coal seams mined at the Grootegeluk Mine form part of the Upper (Volksrust formation) and Middle Ecca (Vryheid formation) with an average coal thickness of 115 meters.

The locations of the proposed borrow pits for MCWAP Phase 1, as shown in **Figure 35**, are provided below. Note that these locations may change following further geotechnical investigations.

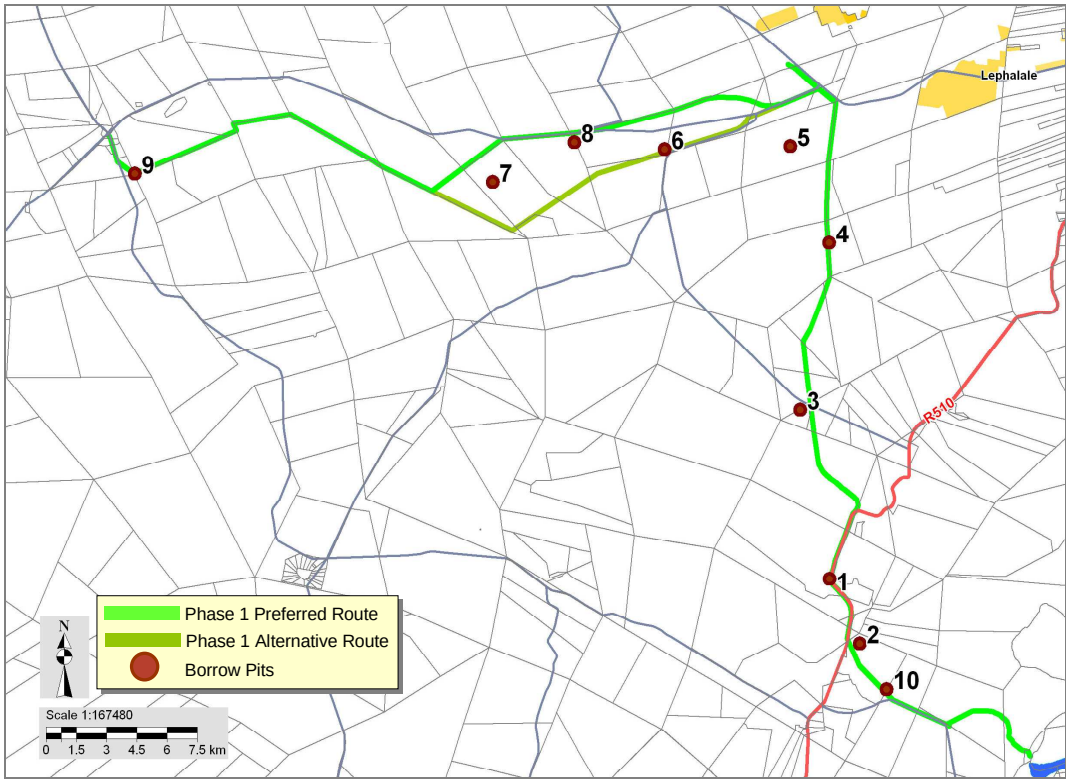


Figure 35: Proposed sites for MCWAP Phase 1 Borrow Pits

Table 12: Locations of proposed Borrow Pits for MCWAP Phase 1

Borrow Pit No.	Farm	Coordinates	
		Latitude	Longitude
1	Goedgedacht	23°54'15.66" S	27°37'19.25" E
2	Sterkfontein	23°55'55.18" S	27°38'13.24" E
3	Fourieskloof	23°49'46.54" S	27°36'25.97" E
4	Zeeland	23°45'26.38" S	27°37'19.58" E
5	Zwartwater	23°42'53.89" S	27°36'10.70" E
6	Eensaamheid	23°43'12.45" S	27°32'32.68" E
7	Buffelsjacht	23°43'47.65" S	27°27'31.86" E
8	Vergulde Helm	23°42'46.21" S	27°29'54.44" E
9	Vangpan	23°43'36.13" S	27°17'09.39" E
10	Toulon	23°57'01.14" S	27°38'57.48" E

Potential Implications of MCWAP Phase 1

A geotechnical investigation is currently underway for the project area, and the results will be included in the EIA Report.

A permit is required for the proposed borrow pits, in terms of the Minerals and Petroleum Resources Development Act (No. 28 of 2002).

Important considerations from a geological and soil perspective for the EIA phase include *inter alia* blasting and the large quantity of spoil material that will need to be disposed of during the installation of the pipeline through filling of borrow pits or other suitable environmental practices.

The EMP will contain measures to mitigate against impacts to geology and soil, for example the management of topsoil, preventing soil contamination during construction, etc.

6.5 Geohydrology

According to the Water Resources Report (DWAF, 2008d), a primary aquifer occurs in the Lephalala River alluvium. The basin of the Lephalala River consists of coarse-grained alluvial sand with inter-bedded lenses of finer clay/shale material. This aquifer is primarily used for irrigation and is recharged during the rainy season. The quality of the water in this aquifer is regarded as good with TDS < 500 mg/ℓ. Groundwater in the area, however, occurs mainly in the fractured secondary aquifers located in the rocks of the Waterberg Group and the Karoo Supergroup.

Groundwater is the main source of water supply to rural communities and is also used widely for irrigation purposes in the Limpopo WMA. The groundwater use in the Mokolo catchment is 11 million m^3/a (DWAF, 2004).

Current studies are being done by DWA as well as the Water Research Commission (WRC) on the potential of the groundwater in the project area. Although the results of these studies are not yet available, preliminary indications are that water can be abstracted by recharge of a deep aquifer. The yield is expected to be between 2 and 3 million m^3/a, which will be insufficient to be utilised as an additional resource in the long-term water requirement of the area (DWAF, 2008d). The findings of the aforementioned studies will be included in the EIA Report.

As mentioned, the Intermediate Reserve Determination study for the Mokolo River Catchment (DWAF, 2007) is currently being undertaken. The results of this study will be necessary to evaluate the impact of groundwater resource development on the available groundwater resource in the catchment.

Potential Implications of MCWAP Phase 1

The EIA phase will need to investigate potential disturbance of the aquifer from blasting, and mitigation measures to manage the potential contamination of groundwater during the construction stage.

6.6 Flora

Status Quo

6.6.1 Terrestrial

The project area is situated within the Savanna Biome and Central Bushveld Bioregion. According to Low & Rebelo (1996), a "biome" is a broad ecological unit representing major life zones of large natural areas, and in South Africa these are defined mainly by vegetation structure and climate. The Savanna Biome is characterised by a grassy ground layer and a distinct upper layer of woody plants.

As shown in **Figure 36**, the delivery line and northern section of the transfer line extends over the Limpopo Sweet Bushveld. A small section of the delivery line crosses Western Sandy Bushveld. The southern portion of the transfer line is located in Waterberg Mountain Bushveld and Central Sandy Bushveld.

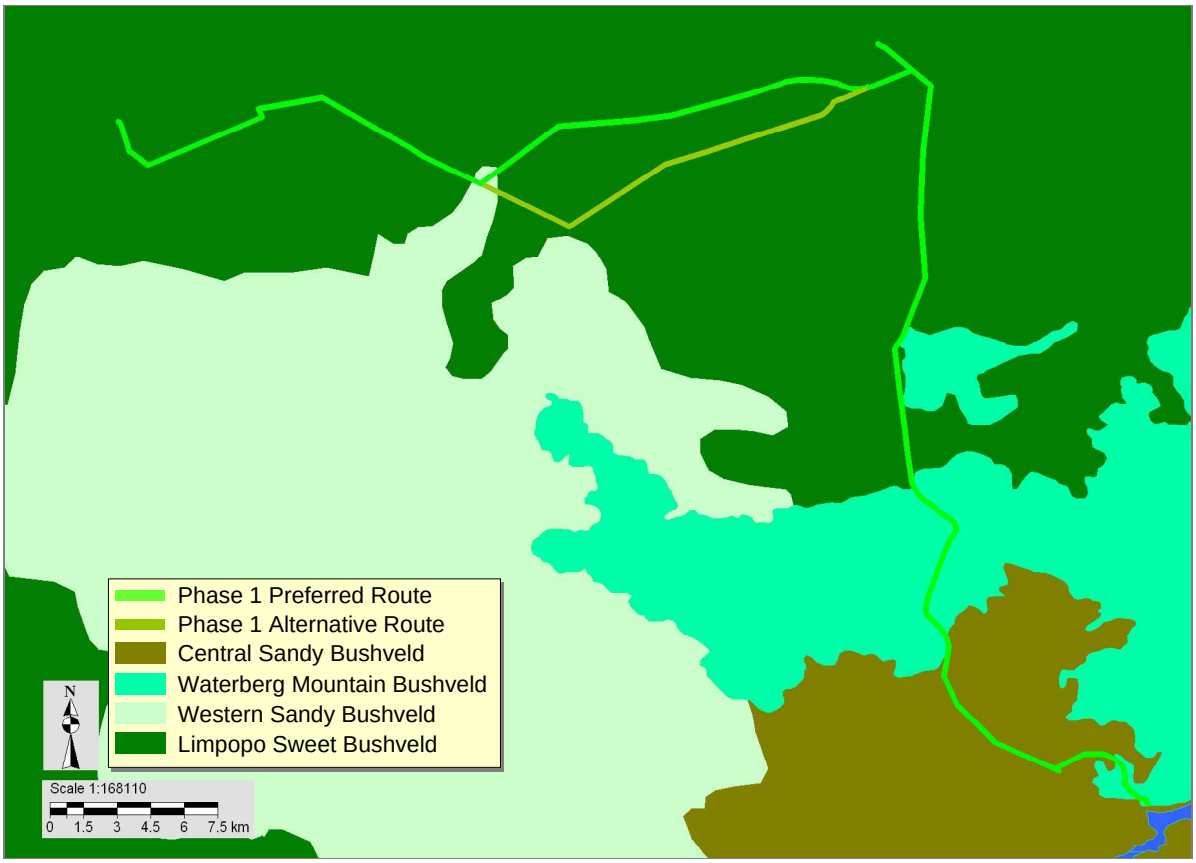


Figure 36: Vegetation types along pipeline route

Mucina & Rutherford (2006) explain the abovementioned vegetation types as follows:

- The **Limpopo Sweet Bushveld** (see **Figure 37**) occurs mainly on plains and sometimes undulating or irregular topographical area. The veld type is characterised by short open woodland with previously disturbed areas dominated by thickets of *Acacia erubescens*, *Acacia Mellifera* and *Dichrostachys cinerea* that are almost impenetrable. The veld type has no endemic taxa and is considered least threatened. Although only about 1% is statutorily conserved the abundance of games farms in the area adds to the low transformation figure of about 5%.

Figure 37: Typical vegetation associated with Limpopo Sweet Bushveld alongside route

- The **Waterberg Mountain Bushveld** (see **Figure 38**) generally occurs on rugged mountains with vegetation ranging from *Faurea seligna – Protea Caffra* bushveld on the higher slopes through broad leaved deciduous bushveld on rocky mid- and footslopes to *Burkea Africana – Terminalia sericea* savannah in the lower lying valleys as well as on deeper sands on the plateau. The grass layer is moderately developed or well developed. Endemic taxa to this veld type include tall shrub *Grewia rogersii, Pachystigma triflorum* and herb *Oxygonum dregeanum*. This veld type is regarded as least threatened with about 9% statutorily conserved. Only about 3% of the veld type is transformed.

Figure 38: Typical vegetation associated with Waterberg Mountain Bushveld alongside route

- The **Central Sandy Bushveld** (see **Figure 39**) exist in low undulating areas, sometimes between mountains, and sandy plains and catenas supporting tall, deciduous *Terminalia sericea* and *Burkea africana* woodland on deep sandy soil and low, broadleaved Combretum woodland on shallow, rocky or gravely soil. The most important taxa, endemic to this region are *Mosdenia leptostachys* and *Oxygonum dregeanum*. The veld type in general is classified a vulnerable and poorly protected with only approximately 4.5 % conserved. Approximately 24% of the veld type is transformed, including 19% agriculture and 5% urban and built up areas.

Figure 39: Typical vegetation associated Central Sandy Bushveld alongside route

- The **Western Sandy Bushveld** vegetation type varies from tall open woodland to low woodland with broad-leaved as well as microphylous tree species being dominant. Dominant species include *Acacia erubences* on the flatter areas, *Combretum apiculatum* on shallow gravely soils and *Terminalia sericea* on deep sandy areas. This vegetation type does not have any endemic species and is about 4% transformed.

6.6.2 Riparian

According to the River Health Programme (2006), the status of the riparian vegetation for the Mokolo River (downstream of Mokolo Dam) is fair and for the Rietspruit it is good.

Dominant riparian species along the Mokolo River include the river bushwillow (*Combretum erythrophylum*), water berries (*Syzygium spp*.) and the sweet thorn (*Acacia karroo)*. Alien species encountered in the riparian area include the rattlebox (*Sesbania punicea)* and the syringa (*Melia azedarach)*.

The River Health Programme (2006) identified small populations of the highly invasive alien weed parrots feather (*Myriophyllum aquaticum*) in pools below Mokolo Dam, as well as within the dam itself.

Potential Implications of MCWAP Phase 1

Mitigation measures will be established during the EIA phase to manage the potential impacts to vegetation during the construction period, such as the damage to riparian vegetation at river crossings, damage to / removal of protected trees and medicinal plants, encroachment by exotic species, and overall reinstatement and rehabilitation of the affected area. The EIA will also consider the possible impacts of increased reed encroachment downstream of the Mokolo Dam and the potential loss of marginal and aquatic vegetation downstream of instream works due to alteration of flow.

Permit(s) will be obtained under the National Forests Act (No. 84 of 1998) if protected trees are to be cut, disturbed, damaged, destroyed or removed. However, the final alignment will attempt to avoid protected trees where possible.

A specialist Ecological Study will be included in the EIA Report.

6.7 Fauna

Status Quo

The greater area was historically commonly used for cattle grazing. Game farms are now more common, with an associated high faunal biodiversity. Various mammal species (e.g. buffalo) have been introduced through this practice. Proper conservation measures on

game farms also afford protection to other species that naturally occur in the area, which include leopard, warthog, baboon and aardvark.

The riverine areas (see **Figure 40**) and ridges in the area are regarded as significant in terms of the habitat that they provide to fauna. Riparian zones also serves as important corridors to allow for animal migration.

Figure 40: Dense riparian zone.

According to the River Health Programme (2006), the status of the aquatic fauna (i.e. fish and macro-invertebrates) for the Mokolo River (downstream of Mokolo Dam) and Rietspruit is fair. The Mokolo Dam has a large population of two alien fish species, namely the largemouth bass (*Micropterus salmoides*) and the common carp (*Cyprinus carpio*).

Table 13 contains a list of all the fish species historically recorded in the Mokolo catchments.

Table 13: All fish species historically recorded in the Mokolo catchment (RHP, 2008)

Species	English Common Name
Amphilius uranoscopus	Common mountain catfish
Anguilla bengalensis labiata	African mottled eel
Anguilla mossambica	Longfin eel
Aplocheilichthys johnstoni	Johnston's topminnow
Barbus afrohamiltoni	Hamilton's barb
Barbus annectens	Broadstriped barb
Barbus bifrenatus	Hyphen barb
Barbus brevipinnis	Shortfin barb
Barbus eutaenia	Orangefin barb
Barbus lineomaculatus	Line-spotted barb
Barbus marequensis	Largescale yellowfish
Barbus paludinosus	Straightfin barb

Species	English Common Name
Barbus radiatus	Beira barb
Barbus trimaculatus	Threespot barb
Barbus unitaeniatus	Longbeard barb
Barbus viviparus	Bowstripe barb
Chetia flaviventris	Canary Kurper
Chiloglanis paratus	Sawfin rock catlet
Chiloglanis pretoriae	Shortspine suckermouth
Clarias gariepinus	Sharptooth catfish
Labeo cylindricus	Redeye labeo
Labeo molybdinus	Leaden labeo
Labeo rosae	Rednose labeo
Labeo ruddi	Silver labeo
Marcusenius macrolepidotus	Bulldog
Mesobola brevianalis	River sardine
Micralestes acutidens	Silver robber
Oreochromis mossambicus	Mozambique tilapia
Petrocephalus wesselsi	Churchill
Pseudocrenilabrus philander	Southern mouthbrooder
Schilbe intermedius	Silver catfish
Synodontis zambezensis	Brown squeaker
Tilapia rendalli	Redbreast tilapia
Tilapia sparrmanii	Banded tilapia

Potential Implications of MCWAP Phase 1

The potential impacts to fauna, with particular emphasis on the animals on game farms (e.g. poaching, obstruction of movement, access to watering points, harm from construction activities) will need to be addressed during the EIA phase. Numerous concerns were also expressed by landowners regarding this matter during public participation.

A specialist Ecological Study (aquatic and terrestrial) will be included in the EIA Report.

6.8 Socio-Economic Aspects

Status Quo

The Lephalale municipal area comprises two urban nodes, namely Lephalale/Onverwacht and Marapong, as well as the surrounding Witpoortjie/Thabo Mbeki rural area. Other towns in the study area include Baltimore, Maasstroom, Marnitz, Tom Burke, Zwartwater, and Steenbokpan

According to the Spatial Development Framework (SDF) (Lephalale Local Municipality. 2006), Lephalale is the economic hub of the municipal area and also serves as regional service centre to the surrounding farming communities.

As mentioned, there are a number of planned and anticipated consequential developments in the Lephalale Municipality associated with the rich coal reserves in the Waterberg coal field. These developments include (amongst others) the development of additional power stations by Eskom, the potential development of coal to liquid facilities by Sasol and the associated growth in mining activities and residential development.

There are 10 pre-primary schools, 95 primary schools and 35 secondary schools within the Lephalale Municipality. Medical facilities include the Ellisras Provincial Hospital, Marapong Private Hospital, Witpoort Provincial Hospital, 6 clinics, and 3 mobile clinics.

The Lephalale population totals 105 000 of which 19 500 reside in urban areas. Based on the 2001 census data the dominant language in the area is Sepedi, followed by Setswana and Afrikaans. Of the economically active people in the area, 28 675 are employed and 5 274 unemployed. The majority of employed people are concentrated in elementary occupations (48%), with the second major occupation category being skilled agricultural workers (13%).

The farming, industrial (i.e. mining and electricity), social and personal service sectors are the strongest economic sectors and major job providers in the municipality. Matimba Power Station and Grootegeluk Mine in particular offer a large number of employment opportunities. According to the Integrated Development Plan (IDP) for the 2007/2008 financial year (Lephalale Local Municipality, 2007), the municipal economy is dominated by the electricity and water sector and specifically by power generation (see **Figure 41**), which is represented by the Matimba Power Station.

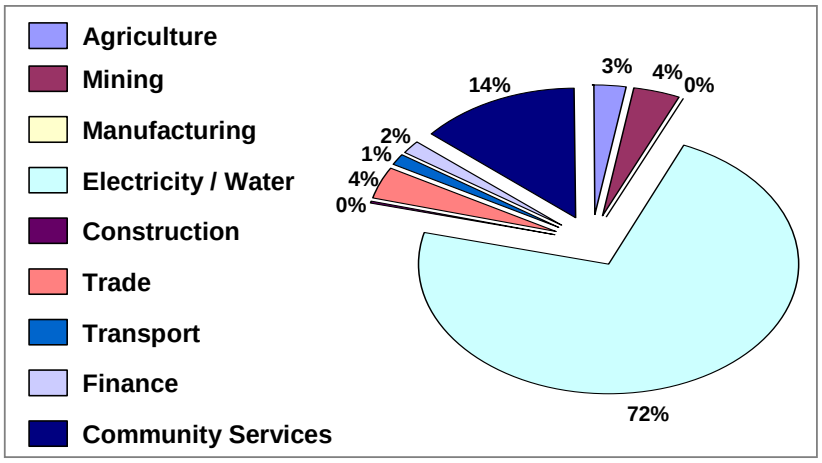


Figure 41: Structure of Lephalale's Local Economy (Lephalale Local Municipality, 2007)

The estimated future population of Lephalale Municipality will increase with approximately 17 000 people over the next 6 years (Lephalale Local Municipality, 2007). Additional social facilities and municipal Infrastructure will be needed to accommodate the expected increase in population.

Potential Implications of MCWAP Phase 1

The possible adverse impacts of MCWAP Phase 1 to the socio-economic environment could include (amongst others):

- Damage to property (e.g. gates, fences, structures) during construction;
- Temporary loss of income generated from hunting, game viewing and crop production during construction phase;

- Loss of property through permanent servitude, associated infrastructure and inundation.
- Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes, health-related impacts, safety and security);
- Reduction in property value; and
- Loss of income from crop production during the operational phase, should curtailment of water use be implemented.

A Socio-economic Study and Social Impact Assessment will be undertaken as part of the EIA phase, and mitigation measures will need to be identified to manage the abovementioned and other socio-economic impacts related to the project.

6.9 Planning

Status Quo

The population of Lephalale can be grouped according to the geographic area, with the majority residing in villages within the Lephalala River catchment, the urban population found in the Lephalale/Onverwacht/Marapong town between the Mokolo River and the coal mine, and the farming community living dispersed over the municipal area.

Land use in the Limpopo WMA is dominated by stock farming (mostly cattle) while there is an increasing tendency to replace this with game farming. Most of the pipeline route passes privately owned land, which is predominantly used for agricultural purposes comprising a mixture of cultivated lands, livestock farms and game farms. The following land use is encountered in the Mokolo Catchment (DWAF, 2004):

- Irrigation – 100km^2;
- Dryland crops – 733km^2;
- Nature reserves – 131km^2; and
- Urban – 7 431km^2.

According to the SDF (Lephalale Local Municipality. 2006), the prevalent spatial pattern in the Lephalale Municipality can be attributed to historic policies and development initiatives, economic potential of land, land ownership and management, culture and topography. The following **spatial challenges** and constraints should be addressed to promote the creation of liveable and integrated town and rural areas (Lephalale Municipality, 2006):

- ***Topography**: A large percentage of land area within the municipal area cannot be considered for urban development due to both the mountainous nature of the terrain and the riverine areas, although this situation has other advantages in respect of water catchment areas, tourism value, climate, etc.*
- ***Urban Sprawl** / Spatial separations and disparities between towns and townships have caused inefficient provision of basic services, and transport costs are enormous. It further hinders the creation of a core urban complex that is essential for a healthy spatial pattern.*
- ***Potential Agricultural Land** – most of the municipal area (99%) consists of grazing land and can be regarded as low potential agricultural land, while areas with sustainable water and irrigable soil properties can be regarded as high potential agricultural land.*
- ***The existing mine, power station** and mineral rights directly to the west of Lephalale limit eastwards extension of the township.*
- ***Inaccessibility of land** caused by land ownership and other related factors is regarded as a serious constraint to the harmonious development of the area.*
- ***Environmental Sensitive areas** - The mountainous area and hydrological pattern to the east and south east of the municipal area can be considered as development constraints and can also influence the design of a future spatial pattern, in that their position is fixed. The areas along major rivers can however encourage a greenbelt effect.*
- ***Huge backlogs in service infrastructure** and networks in the underdeveloped areas require municipal expenditure far in excess of the revenue currently available within the local government system.*
- ***The constant increase of informal settlement** areas and skewed settlement patterns, are functionally inefficient and costly. It further bears the threat of*

neutralizing development alternatives by the reduction of land availability, and the problems associated with relocation of communities once they have established.

- ***Restricted access to land by the Municipality*** *due to inhibitive land cost (privately owned land) and statutory deterrents (state – owned land under tribal custodianship) would exacerbate attempts by the Council to orchestrate and encourage the development of a beneficial spatial pattern within the municipal area.*
- ***The proposed Matimba B Power Station –*** *the future planning for services and other related infrastructure should be incorporated in the next revision of the IDP in order to cater for potential growth of such a nature.*

The proposed development in Lephalale is shown in the map contained in ***Appendix F***, which forms part of the latest SDF that is still in draft format.

Potential Implications of MCWAP Phase 1

The project could possibly lead to changes in demographics in the region due to the influx of employment seekers, which will need to be considered further during the EIA through a Social Impact Assessment.

6.10 Agricultural Potential

Status Quo

In general the Lephalale area is regarded as arid. Irrigation is hence limited to the Mokolo river area. A large portion of the project area consists of sandy soils, which drain rapidly due to poor water retention capability, and are thus associated with low agricultural potential.

According to the Agricultural Geo-Referenced Information System (AGIS), accessed from www.agis.agric.za, the area has a low agricultural potential.

The majority of the project area is characterised by game farms, with grazing land encountered along the gravity line (mostly in the Steenbokpan region).

Potential Implications of MCWAP Phase 1

Loss of agricultural land in the development footprint (i.e. extent of servitude) and the associated loss of income will be considered in the Socio-economic Study. However, this is not considered to be a significant impact at this stage, as the route remains alongside existing linear infrastructure.

The Socio-economic Study will include an assessment of the agro-economical impact from reduced crop and food production, due to the potential curtailment of water use downstream of Mokolo Dam. The impact of MCWAP Phase 1 on food security, which is of national concern, will also need attention during thee EIA phase.

A strategy for water conservation and demand management is needed during the operational phase, which will include the consideration of efficient water use and loss management.

6.11 Air quality

Status Quo

The air quality in the project area can be regarded as good, based on the non-obtrusive land use types (i.e. game farms) encountered within the vicinity of the pipeline route. Obvious sources of air quality pollution in the region include the following:

- Emissions from Matimba power station (stacks) and its associated ash dump (see **Figure 42**);
- Grootegeluk coal mining operations;
- Urban-related emissions from the town of Lephalale;
- Dust from agricultural lands, bare areas and use of dirt roads;
- Tailpipe emissions from vehicles travelling along the road network;

- Burning of wood for household purposes in areas without electricity; and
- Veld fires.

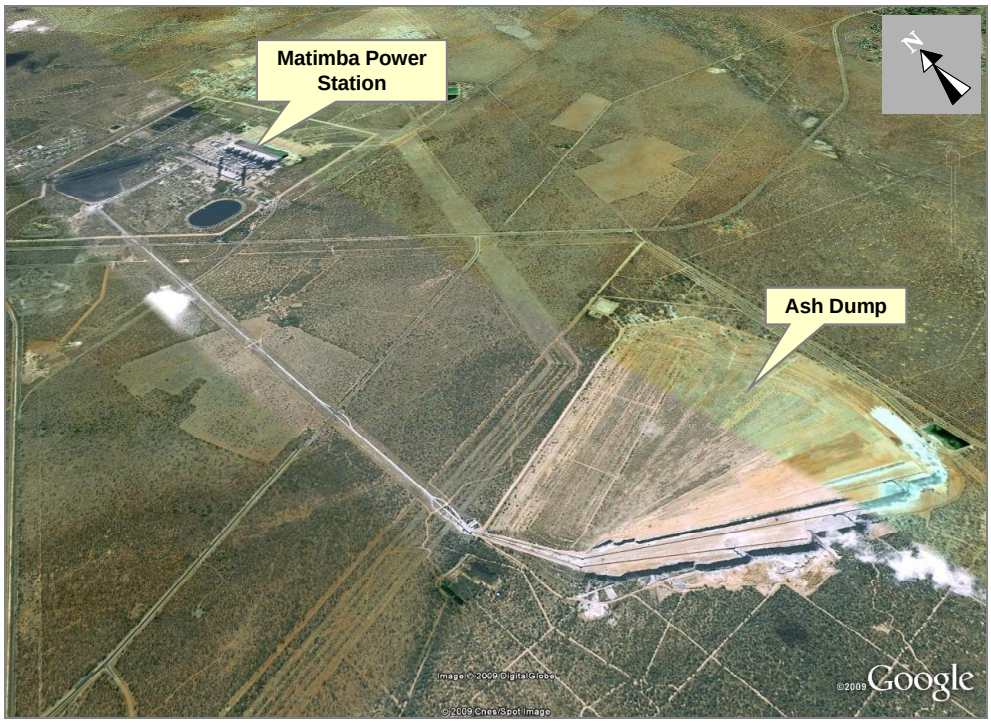


Figure 42: North-eastern view of Matimba Power Station and ash dump

Potential Implications of MCWAP Phase 1

No specialist air quality study will be undertaken for MCWAP Phase 1, as it is not deemed necessary for the type of activities associated with this project. Mitigation measures will be developed in the EMP to ensure that the air quality impacts during the construction phase (e.g. dust from use of dirt roads) are suitably managed.

6.12 Noise

Status Quo

Noise in the region emanates primarily from the following sources:

- Mining operations at the Grootegeluk Mine;
- Operations at the Matimba power station and ash dump;

- Farming operations (e.g. use of farming equipment);
- Vehicles on the road network; and
- Trains utilising the coal haul railway line.

The ridges in the south-eastern part of the route serve as noise attenuation features, although the ambient noise levels are insignificant on the surrounding area.

Potential Implications of MCWAP Phase 1

Noise that emanates from construction activities will be addressed through targeted best practices for noise management in the EMP. The EIA will further pay special attention to the management of noise from the pump station at Mokolo Dam, by investigating measures to attenuate noise to remain within regulated standards.

6.13 Archaeological and Cultural Features

Status Quo

The Waterberg is rich in cultural heritage, boasting a World Heritage Site. Bushmen entered Waterberg around two thousand years ago, and they produced rock paintings at Lapalala within the Waterberg. Early Iron Age settlers in Waterberg were Bantu, who had brought cattle to the region. Later people left the first Stone Age artifacts recovered in northern South Africa. Starting about the year 1300 AD, Nguni settlers arrived with new technologies, emanating from the Iron Age.

Potential Implications of MCWAP Phase 1

In order to reduce the impact to the environment, the pipeline route was selected to follow existing linear infrastructure. The potential for heritage resources along the existing Exxaro pipeline and other linear infrastructure is anticipated to be minimal due to the previous disturbances that would have been caused during the construction of this infrastructure.

A Phase 1 Heritage Impact Assessment, in accordance with the South African Heritage Resources Act (No. 25 of 1999), will be conducted during the EIA phase. The South African Heritage Resources Agency (SAHRA) is regarded as a key authority, and will be kept informed as the EIA unfolds.

6.14 Infrastructure and Services

6.14.1 Water

Status Quo

Lephalale Local Municipality

The Lephalale Municipal area is provided with water from the Mokolo Dam. In the municipality 19.9% of households have piped water inside their dwellings, 39.2% have piped water inside their yard, 19% have piped water to a community stand less than 200m from dwelling, and 17.3% have piped water to a community stand more than 200m from dwelling (Census 2001 - Statistics South Africa, 2008).

Potential Implications of MCWAP Phase 1

MCWAP Phase 1 proposes infrastructure for the bulk conveyance of water to the intended end users in the greater Lephalale area. These users will need to provide their own storage facilities and delivery systems for the supplied water.

6.14.2 Sanitation

Status Quo

According to Census 2001 (Statistics South Africa, 2008), in Lephalale Local Municipality 49.9% of households use pit latrines, 0.8% use bucket toilets and 16.7% have no toilets. The remainder of the population is supplied with water borne sewage.

Potential Implications of MCWAP Phase 1

Sanitation facilities during the construction phase for construction workers will primarily be in the form of chemical toilets, which will be located to minimise the environmental impacts and serviced regularly.

6.15 Transportation

Status Quo

The major transportation network in the region is shown in **Figure 43**.

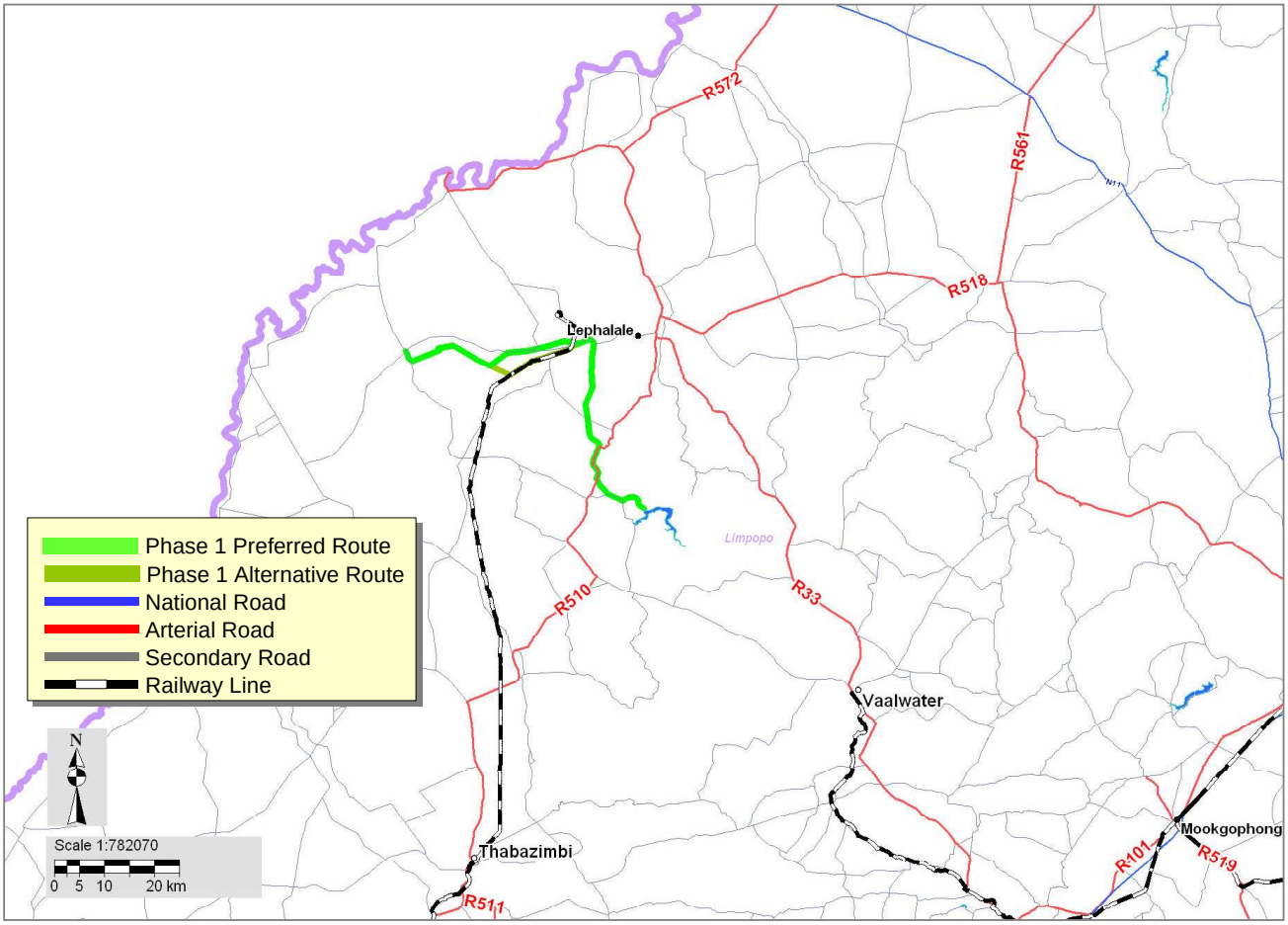


Figure 43: Major Transportation Network in Region

The N1 and N11 national roads run well to the east of the project area. Provincial roads in Lephalale, which serve as links between Thabazimbi, Vaalwater, Ellisras and Mokopane include (Lephalale Local Municipality, 2007):

- P84/1 (Vaalwater/Ellisras/Botswana);
- P19/2 (Ellisras/Marken) that links with (Mokopane); and
- P198/1 (Vaalwater/Ellisras).

The majority of the movement in the municipality occurs between the Mokerong-area and Lephalale where most of the business facilities are located, and along the road networks to Thabazimbi, Mokopane and Gauteng.

A number of District Roads link with the Main roads, and there are also a number of internal roads, which grant access to farms and settlements.

Lephalale is also serviced with a north/south railway line, which transports coal from Grootgeluk Mine. An airport is situated in Lephalale and is maintained by the South African National Defence Force (SANDF) (Lephalale Local Municipality, 2007).

Potential Implications of MCWAP Phase 1

The proposed gravity main from Wolvenfontein balancing dams to Matimba take-off travels alongside the R510 (see **Figure 44**) for a distance of 6.8km (±). From Matimba, the preferred alignment for the pipeline is parallel to the new Steenbokpan tar road that runs north of Medupi Power Station (south of coalfield). The pipeline also follows lower order roads for a large portion of the route. The alignment adjacent to existing linear infrastructure was a decisive factor during the route selection process, as these sections were deemed to be environmentally less sensitive.

Figure 44: North-westerly view of route along R510.

Roads could be directly impacted on by the proposed MCWAP Phase 1 infrastructure during the construction period, for example where the pipeline runs parallel to roads and

in instances where roads need to be traversed. In addition, transportation will be impacted on by the use of existing roads by construction vehicles, trucks hauling fill and spoil material to and from the construction site (respectively), and delivery vehicles. Any disruptions to transportation must be mitigated, and will be discussed in the EIA Report. A Traffic Impact Assessment will also be conducted during the EIA phase.

The impact of the proposed route along the access road to Mokolo Dam will also need to be considered during the EIA phase.

6.15.1 Electricity

Status Quo

Electricity is largely generated and distributed by ESKOM. Sources of electricity and energy include:

- Grid electricity from Matimba power station, in Lephalale;
- Non-grid electricity (petrol and diesel generators); and
- Alternative sources of energy (e.g. batteries, paraffin, coal, wood, candles, gas)

In the municipality, the percentage of households using electricity for lighting = 68.2%, cooking = 35.1% and heating = 40.6 (Census 2001 - Statistics South Africa, 2008).

Potential Implications of MCWAP Phase 1

A new bulk power supply line as well as a new substation will be required to feed the new pump station at Mokolo Dam. The environmental authorisation for the aforementioned infrastructure will be undertaken by Eskom.

6.16 Visual

Game farms are prevalent in the project area, which afford a high-level of aesthetic appeal to the region. The visual quality of the area is further enhanced by watercourses, undisturbed vegetation and the ridges along the south-eastern part of the pipeline route.

Figure 45: Waterbody beside hill, on the Farm Fancy 556LQ.

The aesthetic quality of the immediate area flanking the proposed route is partly degraded due to the existence of infrastructure such as roads, railway lines and the Exxaro pipeline.

Potential Implications of MCWAP Phase 1

A Visual Impact Assessment has not been considered for the EIA phase, as the pipeline will be underground, it follows existing linear infrastructure and rehabilitation measures for the affected area will be considered as part of the EIA phase. Further mitigation measures to manage impacts to the aesthetic quality of the project area will be included in the EMP.

6.17 Tourism

Tourism is a key economic sector within Lephalale as well as the Limpopo Province. An abundance of tourism activities are available in Lephalale, including hunting, bird watching, fishing, horse riding, hiking, etc.

The main tourism attractions in Lephapale include the following (Lephalale Local Municipality, 2007):

- A sporting centre (Lephalale town);

- An events venue (Lephalale town);
- Game watching -
  - D'Nyala Nature Reserve;
  - Ferroland Private Game Reserve;
  - Mokolo Dam Nature Reserve and adjoining areas;
  - Lapalala Wilderness and adjoining areas;
  - Marakele National Park, Welgevonden Game Reserve and adjoining areas; and
  - Wonderkop Reserve and adjoining areas.

There has been a large-scale shift from cattle farming to ecotourism-based land use and hunting in the Lephalale area, with numerous lodges, chalets and other forms of bush-accommodation also available.

The Mokolo Dam was proclaimed as a provincial nature reserve in 1993, and covers an area of 4 600Ha (including the dam surface area). The dam is characterised by dense wooded mountains and surrounding cliffs. The mountains mainly comprise of sandstone. The reserve plays an important role in providing outdoor recreation, including both land and water orientated activities.

The Mokolo Dam lies within the core area within the Waterberg Biosphere Reserve (see **Figure 46**). According to UNESCO (2009), Biosphere reserves are areas of terrestrial and coastal marine ecosystems which are internationally recognized under UNESCO's Man and the Biosphere Programme. Biosphere Reserves are protected areas and they promote and demonstrate a balanced relationship between people and nature. The Waterberg Biosphere Reserve stretches from Marakele National Park in the south west to Wonderkop nature reserve in the north east and is entered through the small town of Vaalwater.

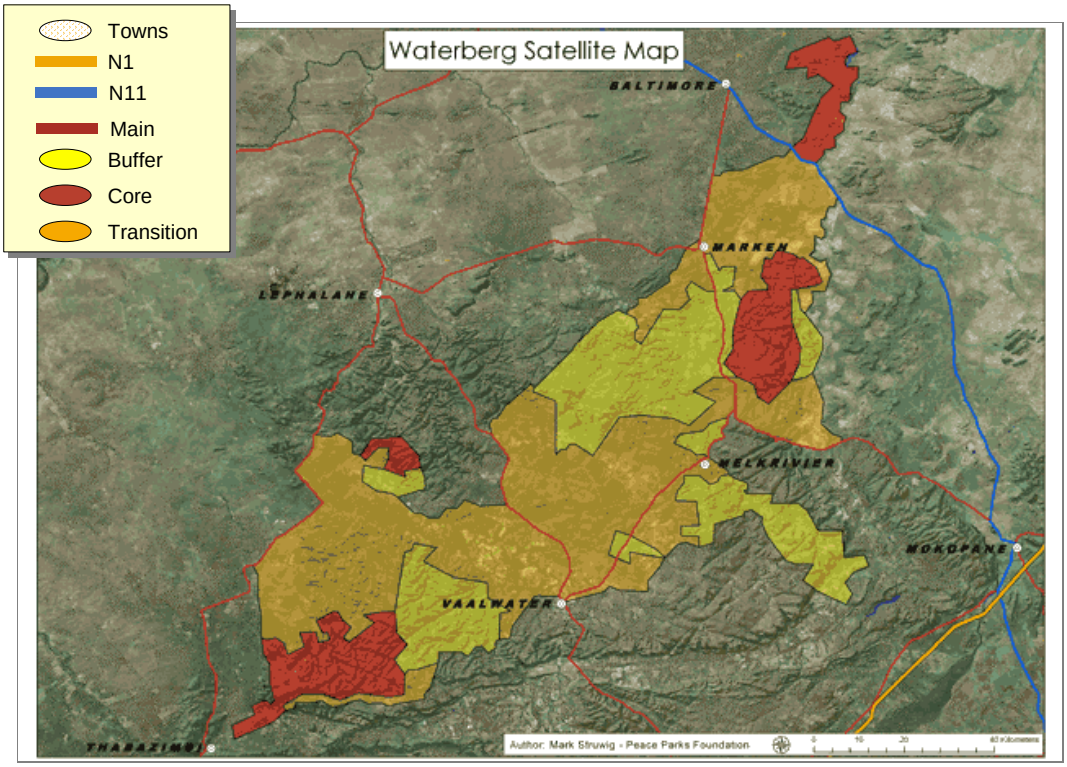


Figure 46: Waterberg Biosphere Reserve (*source: www.waterbergbiosphere.org*)

Potential Implications of MCWAP Phase 1

No national game parks are directly affected by the project infrastructure. Indirect impacts to game reserves from MCWAP Phase 1 include the following:

- Visual impacts from construction along roads (e.g. R510);
- Use of surrounding road network by construction and delivery vehicles, which are also used by visitors to the reserves.

Where private game reserves are traversed, the impacts would be the same as discussed under the sections for geology, flora, fauna, aesthetics, noise, and socio-economic

A Socio-economic Study earmarked for the EIA phase will need to consider the impact of the MCWAP Phase 1 on local tourism, and specifically on adverse effects to game farms. Adequate compensation will also be required for the affected parties.

The impact on recreational activities should the level of the Mokolo Dam be lowered will need to be considered during the EIA Phase.

With the Mokolo Dam situated in the core zone of the Waterberg Biosphere, provision will need to be made in the EMP for any specific requirements and conditions from the Waterberg Biosphere Reserve Management Committee and UNESCO.

7 LEGISLATION AND GUIDELINES CONSIDERED

7.1 Legislation

The legislation that has possible bearing on MCWAP Phase 1 is captured in **Table 14** below. **Note:** this list does not attempt to provide an exhaustive explanation, but rather an identification of the most appropriate sections from pertinent legislation.

Table 14: Environmental Statutory Framework for MCWAP Phase 1

Legislation	Relevance
Constitution of the Republic of South Africa, (No. 108 of 1996)	• Chapter 2 – Bill of Rights. • Section 24 – environmental rights.
National Environmental Management Act (No. 107 of 1998)	• Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). • Section 28 – Duty of care and remediation of environmental damage. • Environmental management principles. • Authorities – DEA and DEDET.
Government Notice No. R. 385 of 21 April 2006	• Process for undertaking Scoping and the EIA.
Government Notice No. R. 386 of 21 April 2006	1 The construction of facilities or infrastructure, including associated structures or infrastructure, for: (k) the bulk transportation of sewage and water, including storm water, in pipelines with -(a) an internal diameter of 0,36 metres or more; or(b) a peak throughput of 120 litres per second or more; (l) the transmission and distribution of electricity above ground with a capacity of more than 33 kilovolts and less than 120 kilovolts; (m) any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including - canals; channels; bridges; dams; and weirs; (n) the off-stream storage of water, including dams and reservoirs, with a capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of the activity listed in item 6 of Government Notice No. R. 387 of 2006. 4 The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic meters from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland. 7 The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site. 12 The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or

Legislation	Relevance
	removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). 15 The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long. 16 The transformation of undeveloped, vacant or derelict land to – establish infill development covering an area of 5 hectares or more, but less than 20 hectares; or residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare. 20 The transformation of an area zoned for use as public open space or for a conservation purpose to another use.
Government Notice No. R. 387 of 21 April 2006	1 The construction of facilities or infrastructure, including associated structures or infrastructure, for: (c) the above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of 1 000 cubic metres or more at any one location or site including the storage of one or more dangerous goods, in a tank farm; (f) the recycling, re-use, handling, temporary storage or treatment of general waste with a throughput capacity of 50 tons or more daily average measured over a period of 30 days; (n) the transfer of 20 000 cubic metres or more water between water catchments or impoundments per day; (o) the final disposal of general waste covering an area of 100 square metres or more or 200 cubic metres or more of airspace. 2 Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more. 6 The construction of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more. 7 Reconnaissance, exploration, production and mining as provided for in the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), as amended in respect of such permits and rights. 10 Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
National Water Act (No. 36 of 1998)	• Chapter 3 – Protection of water resources. • Section 6 to 18 – The Reserve. • Section 19 – Prevention and remedying effects of pollution. • Section 20 – Control of emergency incidents. • Chapter 4 – Water use. • Watercourse crossings. • Authority – DWA.
Environment Conservation Act (No. 73 of 1989):	• Environmental protection and conservation. • Section 25 – Noise regulation.

Legislation	Relevance
	• Section 20 – Waste management. • Authority – DEA
National Environmental Management Air Quality Act (No. 39 of 2004)	• Air quality management • Section 32 – dust control. • Section 34 – noise control. • Authority – DEA.
National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004)	• Management and conservation of the country's biodiversity. • Protection of species and ecosystems. • Authority – DEA.
National Environmental Management: Protected Areas Act (No. 57 of 2003)	• Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes.
National Forests Act (No. 84 of 1998)	• Section 15 – authorisation required for impacts to protected trees. • Authority – DWA.
Minerals and Petroleum Resources Development Act (No. 28 of 2002)	• Permit required for borrow pits. • Authority – Department of Mineral Resources (DMR).
Occupational Health & Safety Act (No. 85 of 1993)	• Provisions for Occupational Health & Safety • Authority – Department of Labour.
National Heritage Resources Act (No. 25 of 1999)	• Section 34 – protection of structure older than 60 years. • Section 35 – protection of heritage resources. • Section 36 – protection of graves and burial grounds. • Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m^2 in extent. • Authority – South African Heritage Resources Agency (SAHRA).
Conservation of Agricultural Resources Act (No. 43 of 1983)	• Control measures for erosion. • Control measures for alien and invasive plant species. • Authority – Department of Agriculture.
World Heritage Convention Act (No. 49 of 1999)	• Protection of World Heritage Sites.
National Road Traffic Act (No. 93 of 1996)	• Authority – Department of Transport
Tourism Act of 1993	• Authority – South African Tourism Board
Limpopo Environmental Management Act (No. 7 of 2003)	• Management and protection of the environment in the Limpopo Province.

7.2 Guidelines

The following guidelines were considered during the preparation of the Scoping Report:

- Guideline in Alternatives: NEMA Environmental Impact Assessment Regulations (prepared by the Western Cape Department of Environmental Affairs and Development Planning, 2006).
- Guideline 3: General Guide to the Environmental Impact Assessment Regulations, 2005. Integrated Environmental Management Guideline Series (DEAT, 2005a).

- Guideline 4: Public Participation, in support of the EIA Regulations. Integrated Environmental Management Guideline Series (DEAT, 2005b).

7.3 Environmental Authorisations Required

From the relevant legislation listed in **Section 7.1**, the following environmental authorisations will be required for MCWAP Phase 1:

1. Approval required from DEA for listed activities associated with the project. Scoping and EIA conducted under NEMA, in accordance with the EIA Regulations (Government Notice No. R385, R386 and R387 of 21 April 2006).
2. Permit to be obtained under National Forests Act (No. 84 of 1998) if protected trees are to be cut, disturbed, damaged, destroyed or removed.
3. Permit to be obtained from SAHRA under the National Heritage Resources Act (No. 25 of 1999) if heritage resources are to be impacted on.
4. Environmental Management Programme to be submitted for approval to DMR for burrow pits, under the Minerals and Petroleum Resources Development Act (No. 28 of 2002).

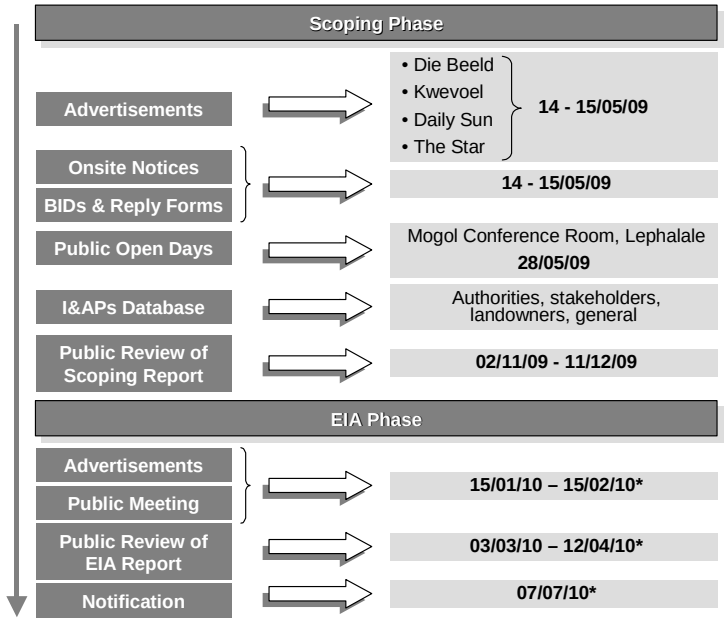
Note that authorisation of water use, in terms of Section 21 of the National Water Act (No. 36 of 1998), is not required for MCWAP as DWA cannot simultaneously fulfil the roles of project proponent and authorising agent. Nonetheless, the principles of this Act need to be adhered to.

8 PUBLIC PARTICIPATION

The purpose of public participation for MCWAP includes:

5. Providing I&APs with an opportunity to obtain information about MCWAP;
6. Allowing I&APs to present their views, issues and concerns regarding MCWAP;
7. Granting I&APs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with MCWAP; and
8. Enabling DWA and the project team to incorporate the needs, concerns and recommendations of I&APs into the project.

The public participation process that was followed for MCWAP Phase 1 is governed by NEMA and Government Notice No. R. 385. The figure below (**Figure 47**) outlines the public participation process for the Scoping phase (current) as well as the Environmental Impact Assessment (pending).



Note: ***** - *dates may change during course of EIA*

Figure 47: Public Participation Process for MCWAP Phase 1

8.1 Notification

Box 3:	What is an "I&AP"?
According to Government Notice GN No. R. 385 (2006), "*Interested and Affected Party*" (I&AP) means an party contemplated in section 24(4)(d) of the NEMA, and which in terms of that section includes – (a) any person, group of persons or organisation interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity.	

8.1.1 Database of I&APs

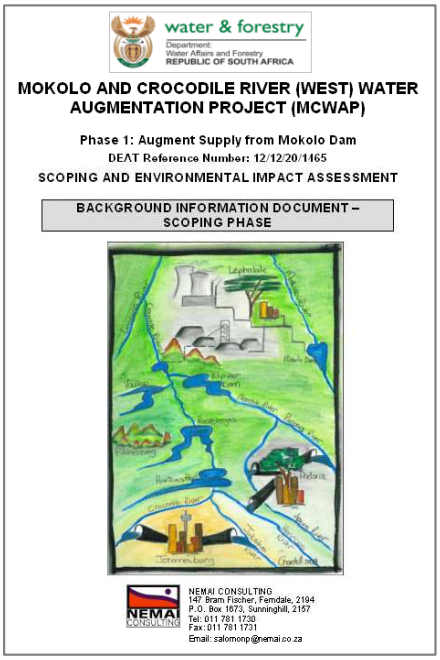
A database of I&APs, which contained authorities, stakeholders, landowners and members of the general public, was prepared for the project and is contained in ***Appendix G***. Directly affected landowners were identified using the information provided by Exxaro for their existing pipeline from Mokolo Dam, through a deed search on all the affected properties within a 200m corridor for the pipeline route, and through discussions held with the Agricultural Sector, Councillors and known landowners. For the water users downstream of the Mokolo Dam, extensive consultation has been undertaken with the Mokolo Irrigation Board (see **Section 8.3**); however, the registered water users will be directly consulted during the EIA phase.

8.1.2 Background Information Document

Background Information Documents (BIDs) (refer to ***Appendix H***) and Reply Forms (refer to completed forms in ***Appendix I***) were distributed as follows:

- Registered mail to Councillors and landowners (and occupiers) adjacent to and within 100 metres of the centerline of the pipeline route; and
- Fax and email to remaining parties of database.

The BIDs (English, Afrikaans and Sepedi)


water & forestry
Department: Water Affairs and Forestry
REPUBLIC OF SOUTH AFRICA

MOKOLO AND CROCODILE RIVER (WEST) WATER AUGMENTATION PROJECT (MCWAP)

Phase 1: Augment Supply from Mokolo Dam
DEAT Reference Number: 12/12/20/1465
SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT

BACKGROUND INFORMATION DOCUMENT – SCOPING PHASE

NEMAI CONSULTING
147 Bram Fischer, Femdale, 2194
P.O. Box 1673, Sunninghill, 2157
Tel: 011 781 1730
Fax: 011 781 1731
Email: salomonp@nemai.co.za

Figure 48: Cover page of BID (English version)

provided a brief background and description of the project, as well as the EIA process, and listed the details of the public open days for MCWAP (Phase 1, Phase 2 and De-bottlenecking).

The BID included a Reply Form, which granted the public an opportunity to register as an I&AP, and to raise queries or concerns regarding the project. The time period stipulated in the BID for submitting completed Reply Forms and registering as an I&AP was from **14 May 2009 – 19 June 2009**.

8.1.3 Onsite notices

Onsite notices were also placed at strategic points (refer to **Figure 49** and ***Appendix J***), which included the following:

- Beginning and end point of the route;
- Places where main roads crossed the pipeline route; and
- Public places (e.g. municipal offices, libraries).

Figure 49: Examples of Onsite Notices erected for MCWAP Phase 1

8.1.4 Newspaper Advertisements

In addition, advertisements were placed in the following newspapers (refer to copies of the newspaper advertisements contained in ***Appendix K***):

- Regional newspapers –
  - Die Beeld (Afrikaans) on 15 May 2009;
  - The Star (English) on 14 May 2009;
  - Daily Sun (English) on 15 May 2009;

- Local newspaper –
  - Kwevoel (Afrikaans) on 15 May 2009.

8.2 Open Days

An open day was held on 28 May 2009 at the Mogol Conference Room in Lephalale for MCWAP Phase 1. The format of the Open Day, as shown in **Figure 50**, included a presentation on the project background and motivation, technical information (i.e. project description), and EIA process, followed by an aerial photographic fly-over of the pipeline route. A copy of the presentation is included in ***Appendix L***. Thereafter the attendees were granted an opportunity to pose questions to the project team (see **Figure 51**).

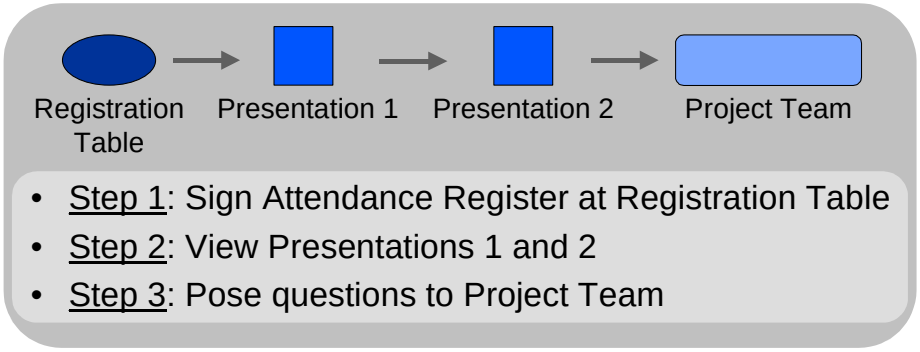


Figure 50: Format of Open Day Proceedings for MCWAP Phase 1

Figure 51: Discussions between I&APs and the Project Team for MCWAP Phase 1

Matters that also pertain to MCWAP Phase 1 were discussed at the open day for the De-bottlenecking component, held on 28 May 2009. These issues were included in this Scoping Report.

8.3 Broader Public Involvement Process

Over-and-above public participation associated with the EIA protocol, a broader Public Involvement Process (PIP) is also being conducted for MCWAP to ensure that comprehensive, inclusive and robust consultative procedures are followed. The process aims to also adhere to the DWAF Generic Public Participation Guidelines (2001).

The Agricultural Sector is the most prominent interest group, considering the issues surrounding water availability and the land use type encountered in the project area. From the overall MCWAP perspective, key members from this sector include (*inter alia*):

- Lephalale District Agricultural Union;
- Transvaal Agricultural Union (TAU);
- Agri SA;
- National African Farmers' Union (NAFU);
- Mokolo Irrigation Board;
- Crocodile West Irrigation Board;
- Hartebeespoort Dam Irrigation Board;
- Makoppa farmers; and
- Steenbokpan Farmers Association.

In recognition of the abovementioned, the project team engaged with this sector prior to the initiation of the EIA process. On 27 January 2009 a meeting was convened with representatives from the Agricultural Sector, in order to establish an Agricultural Forum. This forum, which has been active since March 2009, grants the Agricultural Sector an opportunity to collectively engage with DWA and the project team regarding planning aspects and the impacts of MCWAP on this interest group. Working groups have also been held with the irrigation boards, which allowed for more technically-orientated discussions.

Focus group meetings were convened on 24 April 209 in Thabazimbi and Lephalale for MCWAP. The purpose of the focus group meetings were primarily to assist with understanding the potential concerns before the formal EIA public participation process commenced.

A Project Steering Committee (PSC) chaired by DWA was established for MCWAP, and the first meeting was held on 03 February 2009. The purpose of the meetings was to allow for the sharing of information, to ensure improved coordination, and to provide a platform for high-level discussions between the intended water users, affected parties and various relevant government departments and stakeholders.

Separate meetings have been held with landowners that are directly affected by the project infrastructure. On 05 March 2009 a meeting was convened with the landowners of MCWAP Phase 1 (including the De-bottlenecking section). Such meetings will be on-going, and serve to identify concerns of I&APs, and to guide the technical and environmental investigations.

A summary of the meetings held under the overall MCWAP PIP and Scoping phase public participation is tabulated below.

Table 15: Meetings held for MCWAP PIP and Scoping public participation

No.	Date	Meeting Type
1	27 January 2009	Agricultural Sector
2	03 February 2009	MCWAP PSC
3	05 March 2009	Phase 1 Landowners
4	06 March 2009	Agricultural Sector – Water Forum
5	06 March 2009	Agricultural Sector – Environmental Forum
6	09 April 2009	Vlieëpoort Landowners
7	26 May 2009	Agricultural Forum
8	27 May 2009	MCWAP Phase 2 EIA Open Days (x2)
9	28 May 2009	MCWAP Phase 1 EIA Open Day
10	28 May 2009	MCWAP De-bottlenecking Basic Assessment Open Day
11	08 June 2009	Phase 2 - Farms Inmalkaar and Rooibokkraal
12	18 June 2009	Phase 2 - Farm Welgevonden
13	19 June 2009	Phase 2 - Farm Mabulskop

Note: *Working groups and meetings after 16 June 2009 have been excluded – will be contained in EIA Report.*

8.4 Consultation with Authorities

A pre-consultation meeting was held with DEA on 09 January 2009, and the aims of this meeting were as follows:

- To provide additional project information to DEA regarding MCWAP;
- To discuss the timeframes of the EIA process, and the alignment with the Strategically Important Development (SID) timeframes;
- To decide on the type of applications (Basic Assessment / Scoping and EIA) for the MCWAP components;
- To provide opportunity to seek clarification; and
- To determine specific requirements of DEA.

In addition, another meeting was held with DEA on 03 March 2009 to discuss the approach to the Basic Assessment for the proposed De-bottlenecking of the existing Exxaro pipeline, as a sub-project to MCWAP.

An authorities meeting was held on 14 July 2009 with DEA, DEDET, DMR, DWA and the Waterberg District Municipality, and apologies were tendered by local authorities. Additional meetings will be convened with the authorities to present the Scoping and EIA Reports. BIDs were also forwarded to the authorities and they were invited to the PSC meeting and Open Days.

8.5 Landowner Consent

In terms of regulation 16(1) of Government Notice No. R. 385 of 21 April 2006, landowner consent is required if the applicant (i.e. DWA) is not the owner of the land on which the proposed activity is to be undertaken. According to regulation 16(3), this stipulation does not apply to a linear activity provided the applicant “has given notice of the proposed activity to the owners of the land on which the activity is to be undertaken as soon as the proposed route or route alternatives have been identified”. The lastmentioned provision

was attended to during public participation. Landowner consent will thus not be sought for the linear components of MCWAP Phase 1.

8.6 Issues raised by I&APs

The issues raised by I&APs during Scoping, to a large extent, determine and guide the investigations during the EIA phase. The correspondence received from I&APs is included in ***Appendix K***. The Comments and Response Report, which summarises the salient issues raised by I&APs (during meetings and in correspondence received) and the project team's response to these matters, is contained in ***Appendix M***.

Note that only those comments received up until the cut-off date for the submission of completed Reply Forms (stipulated in the BID as 19 June 2009), are included in this Scoping Report. The comments and issues raised by I&APs thereafter will be addressed during the public participation of the EIA phase and will be incorporated into the draft EIA report, which will be lodged in the public domain.

As mentioned, the Scoping phase serves to identify and prioritise issues for further assessment during the EIA phase. Accordingly, the comments received from I&APs during public participation as part of Scoping will be afforded due consideration and further investigation during the pending EIA stage.

8.7 Review of Draft Scoping Report

8.7.1 Notification

I&APs were notified as follows of the opportunity to review the draft Scoping Report:

1. A notification letter and a summary of the draft Scoping Report were forwarded to I&APs; and
2. The following newspaper advertisements were placed as notification:
   - Regional newspapers –
     - Die Beeld (Afrikaans) on 21 October 2009;
     - The Star (English) on 21 October 2009;
     - Daily Sun (English) on 21 October 2009;
   - Local newspaper –
     - Kwevoel (Afrikaans) on 23 October 2009;
     - Mogol Pos (Afrikaans) on 22 October 2009.

8.7.2 Lodging of Draft Scoping Report

The draft Scoping Report was placed at the locations provided in **Table 16** to allow the I&APs to review the document. A forty-day review period (from 02 November 2009 until 11 December 2009) was granted.

Table 16: Locations for review of Draft Scoping Report

Copy No.	Location	Address	Tel No.
1	Lephalale Local Municipal office	Lephalale Civic Centre, corner of Joe Slovo and Dou Water St, Lephalale	014 763 2193
2	Lephalale Public Library		014 762 1453
3	Lephalale Dept of Agriculture	Cnr Chris Hani Street and Groote Geluk St	014 763 2137
4	Agri Lephalale Office	6A Jacobus St	014 763 1888
5	Lephalale District Agricultural Union	NTK Landmerk Gebou, Louis Botha Ave	014 763 3263
6	Mokolo Irrigation Board	Ellisras Hardeware Gebou, Office No. 4, Stroh St	014 763 3095
7	Steenbokpan Winkel	Steenbokpan	014 766 0167
8	Transvaal Agricultural Union (TAU)	Obaro, Warmbadweg, Thabazimbi	072 549 8579
9	Crocodile River West Irrigation Board	Koedoeskop	014 785 0610
10	Makoppa Irrigation Board	G. Fritz, Farm Fairfield, Makoppa	083 469 3777
11	Pretoria Central Library	Cnr Van der Walt and Vermeulen St	012 358 8954

The draft Scoping Report could also be downloaded from the DWA website (http://www.dwaf.gov.za/projects.asp).

8.7.3 Commenting on the Draft Scoping Report

For remarks on the Draft Scoping Report the reviewer was requested to complete a Comment Sheet, which accompanied the summary of the report forwarded to I&APs and which was also included as an appendix in the document. I&APs were notified (see **Section 8.7.1.**) that the completed Comment Sheets needed to be forwarded to Nemai Consulting on or before 11 December 2009.

In accordance with regulation 59 of Government Notice No. R. 385 of 21 April 2006, the comments received from I&APs (including correspondence and completed Comment Sheets) from the review of the Draft Scoping Report are included in ***Appendix O***.

8.7.4 Public Meeting

A public meeting was held to present the MCWAP Phase 1 Draft Scoping Report on 12 November 2009 at the Mogol Conference Room in Lephalale. All I&APs were notified via email, fax or post regarding the details of the meeting. The minutes of the meeting are contained in ***Appendix N***.

8.7.5 Authorities Reivew

Copies of the draft Scoping Report were provided to the following authorities:

- DEA;
- DEDET;
- DMR;
- DWA Regional Office;
- Department of Agriculture;
- Waterberg District Municipality; and
- Lephalale Local Municipality.

9 ENVIRONMENTAL ISSUES

This section focuses on the pertinent environmental impacts that could potentially be caused by MCWAP Phase 1, with **Sections 9.1** – **9.2** focussing on the key direct and indirect impacts during the construction and operation phases of the project, with a compilation of the impacts provided in **Section 9.3**. Cumulative impacts are briefly discussed in **Section 9.4**. Impacts were identified through an appraisal of the project description and the receiving environment, and through comments received during public participation.

The preliminary effects and the proposed management thereof are only concisely discussed on a qualitative level, as part of the Scoping phase. During the EIA stage a detailed assessment will be conducted to identify all potential impacts (paying particular attention to the key impacts listed in this section), which will be evaluated via input from the project team and requisite specialist studies and through the application of the impact assessment methodology contained in **Section 10**.

Suitable mitigation measures will also be identified during the EIA phase, which will be included in an Environmental Management Plan (EMP). According to DEAT (2006), the objectives of mitigation are to:

- Find more environmentally sound ways of doing things;
- Enhance the environmental benefits of a proposed activity;
- Avoid, minimise or remedy negative impacts; and
- Ensure that residual negative impacts are within acceptable levels.

Mitigation should strive to abide by the following hierarchy – (1) prevent; (2) reduce; (3) rehabilitate; and/or (4) compensate for the environmental impacts.

Figure 83: Mitigation Hierarchy

9.1 Construction Phase

9.1.1 Surface Water

Impact Overview

The Rietspruit system (main stem and tributaries) will be traversed by the proposed pipeline route. This will cause impacts to the characteristics of the affected watercourse, which include the habitat (i.e. riparian zone), morphology (i.e. river structure), water quality (through sedimentation), flow regime (temporary diversions) and aquatic biota.

Mitigation Overview

The crossings of the Rietspruit and its tributaries should remain as close as possible to the existing crossing points of the Exxaro pipeline.

Specific EIA considerations:

- Mitigation measures will be prescribed in the EMP to manage impacts to surface water resources. Examples include the building of temporary diversions to maintain a dry works area, safeguarding of tie-in points at riverbanks to prevent erosion and suitable reinstatement and rehabilitation of the affected area.
- Specialist Aquatic Ecological Study to be undertaken to identify sensitive systems (e.g. wetlands) and prescribe suitable mitigation measures.

9.1.2 Aesthetics

Impact Overview	Construction activities will be visually obtrusive against the bushveld backdrop. A temporary construction servitude will be established along the pipeline route, wherein vegetation will be cleared to allow for trenching and the installation of the pipeline and building of chambers. The areas earmarked for the construction camp will also need to be cleared of vegetation. Burrow pits will be required to source suitable fill material, which will also be unsightly whilst they remain un-rehabilitated.
Mitigation Overview	Where possible, development corridors (i.e. where there is existing linear infrastructure such as roads and the existing pipeline) and farm boundaries were selected as alignment criteria for the pipeline. This approach was adopted to *inter alia* minimise the visual impact of the pipeline. Specific EIA considerations: • Mitigation measures will be prescribed in the EMP to manage impacts to the aesthetics. Examples include the erection of a suitable fence and screen during construction and the reinstatement and rehabilitation of the development footprint.

9.1.3 Flora

Impact Overview

A temporary construction servitude will be established along the pipeline route, wherein vegetation will be cleared to allow for trenching and the installation of the pipeline and building of chambers. The areas earmarked for the construction camp will also need to be cleared of vegetation. This may include the removal or damaging of protected trees and other sensitive flora species.

Riparian vegetation will be cleared during the crossing of the Rietspruit and its tributaries.

Mitigation Overview

As mentioned, the pipeline route was selected to follow existing linear infrastructure (e.g. roads, existing pipeline) and farm boundaries, where the motivation was that these corridors were regarded as less sensitive than previously undisturbed areas.

Specific EIA considerations:

- I&APs noted the presence of protected species on their properties (e.g. on the Farm Wolvenfontein 645LQ and Witbank 647LQ). Where possible, these specimens will be preserved.
- Protected trees within the construction footprint will be marked and safeguarded, where possible.
- Mitigation measures will be prescribed in the EMP to manage impacts to the flora. Examples include the restriction of movement to the demarcated construction servitude, a Plant Relocation Programme, and the rehabilitation of the affected area with indigenous vegetation.
- An Ecological Study will be undertaken to identify red data species, assess the project's impacts to the flora and recommend mitigation measures.

9.1.4 Game Farms

Impact Overview

Where the project encroaches on game farms the following impacts could potentially occur during the construction period:

- Interference with hunting, game viewing and other eco-tourism activities, with associated loss of income;
- Disturbance and risk of harm to game animals;
- Disturbance to breeding patterns of animals;
- Temporary movement of game fences;
- Risk of poaching;
- Loss of animals due to improper access control; and
- Loss of habitat.

Mitigation Overview

The pipeline is predominantly aligned alongside existing linear infrastructure (e.g. roads, existing pipeline) and farm boundaries. This approach attempts to limit the disturbance to game farms, where the game fence is moved and erected on the boundary of the construction servitude.

Specific EIA considerations:

- Mitigation measures will be prescribed in the EMP to manage impacts to game farms. Examples include the restriction of construction activities to the demarcated construction servitude.
- Specialist studies that will aid in identifying the impacts and concomitant mitigation measures for game farms will include the following:
  - Ecological Study; and
  - Socio-economic Study.
- The area within the temporary construction servitude will be reinstated. Any damage to private property outside of this area will be dealt with on a proven claim basis.

9.1.5 Registration of Temporary Construction Servitude & Acquisition of Land

Impact Overview

A temporary construction servitude (up to 40m wide) will need to be registered to allow for adequate space for the installation of the pipeline. The loss a land will especially adversely affect smaller game reserves and those farms where agricultural land will be encroached upon.

Mitigation Overview

TCTA's land rights acquisition strategy will adhere to all statutory requirements, as per the Promotion of Administrative Justice Act (No. 99 of 2000), the Expropriation Act (No. 63 of 1975) and the National Water Act (No. 36 of 1998). Determination of compensation will be done in terms of Section 12 of the Expropriation Act (No. 63 of 1975), which in case of the servitude right will include an amount to make good actual financial losses caused by the expropriation of the right. In case of servitude rights, in principle, compensation is payable for both temporary (during construction and rehabilitation) and permanent servitude rights, as may be required. In the case of existing permanent servitudes (where applicable), the available rights will need to be investigated.

The negotiations with the landowners for the registration of the temporary servitude will be undertaken by TCTA.

Specific EIA considerations:

- Socio-economic Study.

9.2 Operation Phase

9.2.1 Water Availability

Impact Overview

I&APs (especially the Mokolo Irrigation Board) have expressed significant concern about the availability of water in the Mokolo Dam to cater for the MCWAP Phase 1 requirements, whilst still ensuring that the needs of the downstream agricultural water users can be met.

Abstraction from Mokolo Dam will be undertaken based on operating rules which DWA will develop, which will typically include an allocation to each user based on the dam level at April of each year and the level of assurance at which water is allocated to different users. The process is to assess the risk of non-supply based on the dam level and historic trends for the dam. Curtailments may then be implemented should it be necessary to ensure supply to critical industries.

Mitigation Overview

Specific EIA considerations:

- Water conservation and demand management strategy.
- The possible reduction in the average level of the Mokolo Dam during the operational phase.
- Socio-economic Study

9.2.2 Registration of Permanent Servitude

Impact Overview	A permanent servitude will need to be registered and land will need to be acquired for the associated infrastructure. The width of the aforementioned servitude still needs to be confirmed. The associated loss of land will especially adversely affect smaller farms.
Mitigation Overview	TCTA's land and land rights acquisition strategy will adhere to all requisite statutory requirements. The negotiations with the landowners for the registration of the permanent servitude will be undertaken by TCTA. Although the Right of Use to the land will belong to the infrastructure custodian, the landowner will still be permitted access and certain use of the servitude area (depending on the limitations specified in the servitude agreement). Specific EIA considerations: • Socio-economic Study.

9.3 Compilation

Pertinent environmental issues, which will receive specific attention during the EIA phase, are tabulated below.

Table 17: Pertinent Issues (Construction Phase) for prioritisation during the EIA

Environmental Factor	Potential Issues / Impacts	Proposed Resolution
Topography	• Erosion at steep areas - access road from Mokolo Dam and Rietspruitnek	• Geotechnical investigation • Ecological Specialist Study • EMP
Surface Water	• Impacts on river structure at watercourse crossings (construction phase)	• Ecological Specialist Study • EMP
Pans & Wetlands	• Impacts to these sensitive systems if they are traversed by the pipeline	• Ecological Specialist Study • EMP
Geology and Soil	• Erosion on steep slopes	• EMP
	• Creation and rehabilitation of borrow pits	• Geotechnical investigation • Environmental Management Programme • EMP
	• Disposal of large quantity of spoil material	• EMP
Geohydrology	• Disturbance of the aquifer from blasting	• Geotechnical investigation • EMP
Flora	• Damage to riparian vegetation at river crossings.	• Ecological Specialist Study • EMP
	• Impacts to protected species	
Fauna	• Impacts to animals on game farms	• Ecological Specialist Study • EMP
	• Impacts to protected species	
Socio-economic	• Loss of income from hunting, game viewing, and crop production • Damage to property	• Socio-economic Study • Compensation • EMP
Agricultural Potential	• Loss of agricultural land within servitude	• Socio-economic Study • Compensation
Archaeological and Cultural Features	• Damage to heritage resources	• Heritage Impact Assessment • EMP
Transportation	• Increase in traffic from construction vehicles	• Traffic Impact Study • EMP
Tourism	• Lowering of Mokolo Dam level	• Technical evaluation

Table 18: Pertinent Issues (Operational Phase) for prioritisation during the EIA

Environmental Factor	Potential Issues / Impacts	Proposed Resolution
Water Quantity	• Water availability for users downstream of Mokolo Dam	• Water conservation and demand management strategy • Socio-economic Study • Compensation
Fauna	• Reduction of biodiversity of aquatic fauna downstream of Mokolo Dam, should curtailments apply.	• Ecological Specialist Study • EMP
	• Impact to terrestrial animals downstream of Mokolo Dam due to availability of water, should curtailments apply.	
Socio-economic	• Potential curtailment of water use downstream of the Mokolo Dam	• Socio-economic Study • Compensation
	• Loss of land with registration of permanent servitude / extension of existing Exxaro pipeline servitude	
	• Reduction in property value	
Agricultural Potential	• Loss of agricultural land within servitude • Agro-economical impact • Food security	• Socio-economic Study • Compensation

9.4 Cumulative Impacts

Box 4:	What is a "Cumulative Impact"?
According to Government Notice No. R. 385 (2006), ***"cumulative impact"***, in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.	

During the EIA phase attention will be given to the following potential cumulative impacts (amongst others):

- Changes in demographics in the region due to the influx of employment seekers, particularly in the light of the existing and future development in Lephalale;
- Increasing the footprints of existing linear developments (e.g. pipeline, roads, power lines); and
- Usage of the regional and local road network.

10 METHODOLOGY TO ASSESS THE IDENTIFIED IMPACTS

All impacts will be analysed with regard to their nature, extent, magnitude, duration, probability and significance. The following definitions apply:

Nature (/Status)

The project could have a positive, negative or neutral impact on the environment.

Extent

- Local - extend to the site and its immediate surroundings.
- Regional - impact on the region but within the province.
- National - impact on an interprovincial scale.
- International - impact outside of South Africa.

Magnitude

Degree to which impact may cause irreplaceable loss of resources.

- Low - natural and social functions and processes are not affected or minimally affected.
- Medium - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way.
- High - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

Duration

- Short term - 0-5 years.
- Medium term - 5-11 years.
- Long term - impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.
- Permanent - mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Probability

- Almost certain - the event is expected to occur in most circumstances.
- Likely - the event will probably occur in most circumstances.
- Moderate - the event should occur at some time.
- Unlikely - the event could occur at some time.

- Rare/Remote - the event may occur only in exceptional circumstances.

Significance

Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-

0 – Impact will not affect the environment. No mitigation necessary.

1 – No impact after mitigation.

2 – Residual impact after mitigation.

3 – Impact cannot be mitigated.

11 PLAN OF STUDY FOR EIA

This section explains the approach to be adopted to conduct the EIA for the MCWAP Phase 1.

11.1 Specialist Studies

The specialist studies identified for the EIA phase, as well as the terms of reference and nominated specialists for these studies, follow below.

11.1.1 Ecological Study - Terrestrial

Terms of Reference

General:

1. Determine ecological status of the receiving terrestrial environment, including the identification of endangered or protected species. Both fauna- (including mammal, amphibian, reptile, bird, fish and invertebrates) and flora-related features need to be considered.
2. Assess the impacts to the ecological (aquatic and terrestrial) environment and suggest suitable mitigation measures to be included in the Environmental Management Plan (EMP) during the construction, operation and decommissioning phases of the project.
3. Make recommendations on preferred options from an ecological perspective.
4. Prepare a sensitivity map, based on the findings of the study.
5. The appointed specialists must take into account all legislation relevant to their particular study.
6. Compile a report that reflects the above and includes appropriate mapping. Ensure that the report complies with section 33 (“specialist reports and reports on specialist processes”) of Government Notice No. R385 (2006), as part of the EIA Report.

Specific Considerations:

7. The Waterberg Biosphere Reserve and associated sensitivities and mitigation measures.
8. Watercourse (including wetland) crossings.
9. Influence to game.

Specialist				
Organisation:	Galago Environmental			
Name:	Vanessa Marais	Dr. J.V. Van Greuning	Dr. I.L. Rautenbach	Mr. W.D. Haacke
Discipline:	• Coordinator • Environmental Impacts	Flora	• Mammalogy • zoological review	Herpetology
Qualifications:	BL Landscape Architecture	Pri. Sci. Nat: D.Sc	Pri.Sci. Nat Ph.D, T.H.E.D.	Pri. Sci. Nat: M.Sc
No. of years experience:	16	40	45	50

11.1.2 Ecological Study - Aquatic

Terms of Reference

General:

1. Determine ecological status of the receiving aquatic environment, including the identification of endangered or protected species.
2. Assess the impacts to the ecological (aquatic) environment and suggest suitable mitigation measures to be included in the Environmental Management Plan (EMP) during the construction, operation and decommissioning phases of the project.
3. Make recommendations on preferred options from an ecological perspective.
4. Prepare a sensitivity map, based on the findings of the study.
5. The appointed specialists must take into account all legislation relevant to their particular study.
6. Compile a report that reflects the above and includes appropriate mapping. Ensure that the report complies with section 33 (“specialist reports and reports on specialist processes”) of Government Notice No. R385 (2006), as part of the EIA Report.

Specific Considerations:

7. The Waterberg Biosphere Reserve and associated sensitivities and mitigation measures.
8. Watercourse (including wetland) crossings.
9. Reduction in water availability downstream of Mokolo Dam during operation stage.

Specialist	
Organisation:	Enviross Environmental Impact Studies CC
Name:	Mathew James Ross
Qualifications:	MSc – Aquatic Health Presently completing a PhD – Aquatic Health
No. of years experience:	6
Affiliation (if applicable):	• South African Society for Aquatic Scientists (SASAqS) • Aquatox Forum (Environmentek, CSIR)

11.1.3 Traffic Impact Assessment

Terms of Reference

General:

1. Describe the baseline conditions for the state of the road infrastructure, the current traffic patterns and volumes.
2. Obtain and review existing information on the road networks in the project area.
3. Liaise with relevant MCWAP Technical Module team members regarding proposed road usage during construction.
4. Identify and assess the significance of potential traffic impacts associated with MCWAP during construction.
5. Evaluate road safety.
6. Propose suitable mitigation measures to prevent or reduce identified traffic impacts.
7. Compile a report that reflects the above and includes appropriate mapping. Ensure that the report complies with section 33 (“specialist reports and reports on specialist processes”) of Government Notice No. R385 (2006), as part of the EIA Report.

Specific Considerations:

8. Transportation of fill material from borrow pits.
9. Transportation of spoil material to dumping site.
10. Condition of access road to Mokolo Dam.
11. Use of local dirt roads.

Specialist	
Organisation:	Details to be confirmed
Name:	
Qualifications:	
No. of years experience:	
Affiliation (if applicable):	

11.1.4 Heritage Impact Assessment

Terms of Reference

General:

1. Undertake a Phase 1 Heritage Impact Assessment in accordance with the South African Heritage Resources Act (No. 25 of 1999).
2. Identify and assess significance of all heritage resources to be affected by the project.
3. Assess the impacts to the heritage resources and suggest suitable mitigation measures to be included in the Environmental Management Plan (EMP).
4. Make recommendations on preferred options from a heritage perspective.
5. Take cognisance of historical information for the area.
6. Prepare a heritage sensitivity map, based on the findings of the study.
7. Compile a report that reflects the above and includes appropriate mapping. Ensure that the report complies with section 33 (“specialist reports and reports on specialist processes”) of Government Notice No. R385 (2006), as part of the EIA Report.

Specific Considerations:

8. None.

Specialist	
Name:	Leonie Marais-Botes
Qualifications:	• BA Hons (Cultural History) • Post Grad Dip in Museum Science • Post Grad Dip in Heritage
No. of years experience:	15
Affiliation (if applicable):	N/A

11.1.5 Socio-Economic Study

Terms of Reference

General:

1. Determine the socio-economic implications (local and regional) of the MCWAP Phase 1 scheme.
2. Assess socio-economic impacts (positive and negative) of the project, and quantify the economic impacts.
3. Suggest suitable mitigation measures to address the identified impacts.
4. Make recommendations on preferred options from a socio-economic perspective.
5. Compile a report that reflects the above and includes appropriate mapping. Ensure that the report complies with section 33 ("specialist reports and reports on specialist processes") of Government Notice No. R385 (2006), as part of the EIA Report.

Specific Considerations:

6. Loss of income from hunting, game viewing, and crop production during construction.
7. Potential curtailment of water use downstream of the Mokolo Dam.
8. Loss of land with registration of permanent servitude / extension of existing Exxaro pipeline servitude.
9. Reduction in property value.

Specialist	
Organisation:	Details to be confirmed
Name:	
Qualifications:	
No. of years experience:	
Affiliation (if applicable):	

11.1.6 Social Impact Assessment

Terms of Reference

General:

1. Determine the social implications of the MCWAP Phase 1 scheme.
2. Suggest suitable mitigation measures to address the identified impacts.
3. Make recommendations on preferred options from a social perspective.
4. Compile a report that reflects the above and includes appropriate mapping. Ensure that the report complies with section 33 ("specialist reports and reports on specialist processes") of Government Notice No. R385 (2006), as part of the EIA Report.

Specific Considerations:

5. Impacts related to the influx of workers.

Specialist	
Name:	Michele Vrdoljak
Qualifications:	• Masters of the Art (Psychology) • PhD
No. of years experience:	7
Affiliation (if applicable):	N/A

11.2 Public Participation – EIA Phase

11.2.1 Updating of I&AP Database

The I&APs database will be updated as and when necessary (e.g. alteration of route) during the execution of the EIA.

11.2.2 Notification – Approval of Scoping Report

Advertisements will be placed in the following newspapers as notification that the Scoping Report has been approved by DEA:

- Regional newspapers –
  - Die Beeld (Afrikaans);
  - The Star (English);
  - Daily Sun (English);
- Local newspaper –
  - Kwevoel (Afrikaans); and
  - Mogol Pos (Afrikaans).

In addition, all I&APs will be notified of the approval of the Scoping Report and commencement of the EIA phase via fax, email or registered mail.

11.2.3 Appraisal of Alternatives Suggested by I&APs

Deviations from the proposed pipeline alignment and location of associated infrastructure due to recommendations and issues raised by I&APs, will be considered in detail from a technical and environmental perspective during the EIA phase.

At the time when the draft Scoping Report was prepared, the only alternatives suggested by I&APs was the deviation from the pipeline route recommended by Mr. G. Viljoen (Farm Wolvenfontein 645 LQ).

11.2.4 Public Meeting

A public meeting will be held during the EIA phase. All parties on the I&APs database will be invited (via email, fax or post) to attend and advertisements will be placed in local and regional newspapers (same as listed in **Section 11.2.2**) as notification of the public meetings. The aims of the meetings will be as follows:

- To present the project details (i.e. scheme components);
- To present the findings of the specialist studies;
- To address key issues raised during the Scoping Phase;
- To elaborate on the potential environmental impacts (qualitative and quantitative), and the proposed mitigation of these impacts;
- To explain the EIA process; and
- To allow for queries and concerns to be raised, and for the project team to respond.

Opportunity will be provided after the public meeting for I&APs to view the project information (including maps, posters, aerial photographic fly-over, presentation) and to interact more closely with the project team and specialists.

A comments and response report will be compiled and included in the EIA Report, which will record the date that issues were raised, a summary of each issue, and the response of the team to address the issue.

11.2.5 Review of Draft EIA Report

The draft EIA Report will be lodged for public review at the following venues:

Table 19: Locations for review of draft EIA Report

Copy No.	Location	Telephone Number
1	Lephalale Local Municipal office	014 763 2193
2	Lephalale Public Library	014 762 1453
3	Lephalale Dept of Agriculture	014 763 2137
4	Agri Lephalale Office	014 763 1888

Copy No.	Location	Telephone Number
5	Lephalale District Agricultural Union	014 763 3263
6	Mokolo Irrigation Board	014 763 3095
7	Steenbokpan Winkel	014 766 0167
8	Transvaal Agricultural Union (TAU)	072 549 8579
9	Crocodile River West Irrigation Board	014 785 0610
10	Makoppa Irrigation Board	083 469 3777
11	Pretoria Central Library	012 358 8954

The draft EIA Report will also be placed on the DWA website (http://www.dwaf.gov.za/projects.asp).

40 days will be granted for review, and the anticipated review period will be from 03 March – 23 April 2010 (*tentative dates*).

All parties on the I&APs database will be notified via email, fax or post of the opportunity to review the draft EIA Report at the abovementioned locations, the review period and the process for submitting comments on the report. The public will also be notified of the aforementioned via advertisements in local and regional newspapers.

All comments received from I&APs and the responses thereto will be included in the final EIA Report for submission to DEA.

11.2.6 Notification of DEA Decision

All I&APs will be notified via email, fax or post within 10 days after having received written notice from DEA on the final decision for MCWAP Phase 1. Advertisements will also be placed in local and regional newspapers regarding the Department's decision. These notifications will include the appeal procedure to the decision.

11.2.7 Broader Public Involvement Process

As part of the broader Public Involvement Process, the following will still be undertaken during the EIA phase:

- Technical working groups with Irrigation Boards;
- Agricultural Forum meetings;

- PSC meetings;
- One-on-one meetings with directly affected landowners; and
- Distribution of a newsletter.

11.3 EIA Report

The EIA Report will be compiled to satisfy the minimum requirements stipulated in section 32 of Government Notice No. R. 385 of 21 April 2006. The following critical components of the EIA Report are highlighted:

- A detailed description of the activities related to the execution of MCWAP Phase 1.
- A detailed description of the extant environmental conditions and the manner in which the relevant environmental features will be affected by the proposed project.
- An account of public participation undertaken as part of the EIA phase.
- A detailed comparative assessment of the alternatives, including their advantages and disadvantages to the receiving environment.
- A summary of significant findings of the specialist studies. Full versions of the specialist studies will be contained as appendices in the EIA Report.
- A detailed assessment of each pertinent environmental impact, where the analysis will consider the nature, extent, magnitude, duration, probability and significance of the impacts (refer to methodology contained in **Section 10** of the Scoping Report), as well as cumulative effects. Suitable mitigation measures will also be identified and generated to address these impacts.
- An Environmental Management Plan (EMP), which contains *inter alia* the following:
  - Suitable mitigation measures to address environmental impacts during the planning, pre-construction, construction, operation and decommissioning phases of MCWAP Phase 1;
  - Roles and responsibilities, as well as timeframes (where applicable), for the implementation of the mitigation measures; and
  - Systems for monitoring and reporting compliance to the EMP.
- An environmental impact statement, summarising the conclusions from the EIA.

11.4 Authority Consultation

The EIA will only commence once DEA has accepted the Scoping Report and the Plan of Study for the EIA. If relevant, the necessary revisions will be made to the aforementioned documents if requested by this Department.

An authorities meeting will be scheduled with the following parties to present the draft EIA Report:

- DEA;
- DEDET;
- DMR;
- DWA;
- Department of Agriculture;
- Waterberg District Municipality; and
- Lephalale Local Municipality.

The final EIA Report will be submitted to DEA. Any requested amendments will be discussed with the Department to ensure that their queries are adequately and timeously attended to.

For the remainder of the Scoping process and EIA the interaction with DEA will be as follows:

- Submission of final Scoping Report;
- Meeting with designated Environmental Officer to explain project and arranging a site visit;
- Addressing comments and facilitating approval of Scoping Report;
- Arranging an authorities meeting during EIA stage;
- Submission of EIA Report;
- Addressing comments and facilitating approval of EIA Report; and
- Obtaining a decision.

All authorities will also remain involved through their participation on the MCWAP PSC.

11.5 EIA Timeframes

The table below presents to proposed timeframes for the EIA process, which takes cognisance of DEA's proposed SID timeframes. *Note that these dates are subject to change*.

Table 20: EIA Timeframes

EIA Milestone	Proposed Timeframe
Public Review of draft Scoping Report	02/11/09 – 11/12/09
Public Meeting to present draft Scoping Report	11 – 12/11/09
Submission of final Scoping Report to DEA	17/12/09
Review of Scoping Report by DEA	18/12/09 – 14/01/10
Notification of Scoping Report decision and commencement of EIA	18/01/10
EIA Public Participation	18/01/10 – 23/04/10
Public Review of draft EIA Report	03/03/10 – 23/04/10
Submit final EIA Report to DEA	10/05/10
DEA Review & Decision	11/05/10 – 27/07/10
Notify I&APs of Decision	28/07/10

Note: *Dates may change during the course of the EIA process*

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