DEPARTMENT OF WATER AND SANITATION

NO. 856 **22 JULY 2016**

INVITATION TO SUBMIT WRITTEN COMMENTS IN TERMS OF SECTION 110 OF THE NATIONAL WATER ACT 1998 (ACT 36 OF 1998) ON THE PROPOSED MZIMVUBU WATER PROJECT AND THE ENVIRONMENTAL IMPACT ASSESSMENT RELATING THERETO

The Minister of Water and Sanitation intends constructing a government waterworks as contained in the Schedule hereto.

In terms of Section 110(1)(b)(iii) of the National Water Act, 1998 (Act 36 of 1998), interested parties are invited to submit written comments on the proposed waterworks and the environmental impact assessment by 29 September 2016. Comments must be submitted to the Director-General, Department of Water and Sanitation, Private Bag X313, Pretoria; Fax: 012 336 7399 and marked for the attention of Mr Menard Mugumo, Chief Engineer: Options Analysis.

SCHEDULE TO THE PROPOSED MZIMVUBU WATER PROJECT AS A GOVERNMENT WATERWORKS AND A SUMMARY OF THE ENVIROMENTAL IMPACT ASSESSEMENT

A. PROPOSED MZIMVUBU WATER PROJECT

PURPOSE

The Mzimvubu River catchment in the eastern part of the Eastern Cape Province, one of the poorest and least developed regions of South Africa, is endowed with untapped economic potential in the form of its abundant water resources. Development of the water resources of the Mzimvubu River catchment with the express purpose of accelerating socio-economic upliftment of communities in the region has been identified as a priority initiative of government.

The Department of Water and Sanitation has undertaken detailed planning investigations into the Mzimvubu Water Project located across the district municipalities of OR Tambo, Alfred Nzo and Joe Gqabi with the primary objective the stimulation of socio-economic development in the region. The Mzimvubu Water Project is a Strategic Integrated Project (SIP 3) and appears in the National Development Plan. A locality map of the scheme is appended to this notice.

NTABELANGA – LALINI CONJUNCTIVE SCHEME

The project entails a multi-purpose conjunctive scheme comprising a large dam at Ntabelanga on the Tsitsa River, a tributary of the Mzimvubu River, and a smaller dam at Lalini further downstream on the same Tsitsa River. In addition to supplying domestic and irrigated agriculture requirements, the upstream Ntabelanga Dam will regulate streamflow in the Tsitsa River for generating hydroelectric power at Lalini Dam. The two dams are designed to operate as one integrated scheme sustainable over its useful life.

1) NTABELANGA DAM

It has been concluded that the sizing and modus operandi of the Ntabelanga Dam and its associated works would take into account its multi-purpose role, namely:

i. To supply potable water to an estimated current population of 502 822 people, growing to some 726 616 people in 2050, and other potable water consumers in the region;
ii. To supply raw water for irrigation of some 2 868 hectares of high potential agricultural land;
iii. To generate hydropower locally at the dam wall to reduce the cost of energy consumption when pumping water;
iv. To provide sufficient flow of water downstream of the Ntabelanga Dam to meet environmental water requirements for an ecological Category C; and
v. To provide additional balancing storage volume and constant downstream flow releases to enable a second dam at Lalini, about 3.5 km above the Tsitsa Falls, to generate significant hydropower for supply into the national grid.

A review of the location of the Ntabelanga Dam wall, first identified in previous studies, was undertaken both using topographical mapping as well as field reconnaissance. The proposed Ntabelanga Dam is located approximately 55 km north of Mthatha on the Tsitsa River, at co-ordinates 31° 7' 1.40"S, 28° 40' 20.45"E. It was concluded that there were no better upstream dam wall locations available with regard to river valley shape (which affects dam wall length), founding conditions, close proximity to construction materials, and the depth versus volume characteristics of the impoundment.

Taking the various decision-making factors into consideration, it was concluded that the preferred dam type was the roller compacted concrete (RCC) solution. This provides for a simplified layout, better aesthetics and less environmental impact than the other dam types investigated, and offers the better opportunity for implementation in a shorter time period.

The proposed Ntabelanga Dam has the following characteristics:

DESCRIPTION	UNIT	NTABELANGA DAM
DETAILS OF STRUCTURE		
Non-overspill crest level	m.a.s.l	953.9
Full supply level	m.a.s.l	947.3
River bed level at dam	m.a.s.l	886.7
Minimum operating level	m.a.s.l	918.0
Maximum height to non-overspill crest	m	66.1
Crest length including spillway	m	407
Spillway crest length	m	150
1 in 200 year design flood	m^3/s	2 500
Safety evaluation flood	m^3/s	5 530
STORAGE		
Gross storage at full supply level	million m^3	490
Storage below minimum operating level	million m^3	37
Surface area of lake behind dam	km^2	31.5
STREAM FLOW		
Mean annual runoff at dam	million m^3	415

* The above details are subject to final design which may require minor changes.

In addition to the dam and its outlet and conveyance works, the design also includes the layouts and requirements for the following associated infrastructure:

i. Water treatment works location;
ii. Raw water pumping station to the irrigation systems;
iii. Operational staff housing;
iv. Local road upgrades and realignments;
v. Access roads dam crest and to national roads;
vi. Bridge across the river downstream of the dam;
vii. Wastewater treatment plant;
viii. Temporary water supply;
ix. EWR release facility;
x. Mini hydropower plant;
xi. Flow gauging stations;
xii. Power supplies for construction and operation; and
xiii. Visitor's centre.

2) LALINI DAM AND HYDROPOWER SCHEME

The proposed Ntabelanga Dam will be operated to provide additional balancing storage volume and consistent downstream flow releases to enable a second, smaller dam at Lalini to generate significant hydropower for supply into the national grid. The purpose of the Lalini Dam and hydropower scheme would thus be to generate significant revenue by selling energy into the Eskom grid, thus generating a net positive income stream which would be used to cross-subsidise the significant energy and operating costs required for pumping water for the irrigation and domestic water supply scheme proposed to be supplied from the Ntabelanga Dam. The cross-subsidisation of pumping costs provides self-sustainability.

It has been concluded that the sizing and modus operandi of the Lalini Dam and its associated works would take into account its main role, namely:

i. To generate hydropower both locally at the dam wall and in the Tsitsa River gorge downstream of the Tsitsa Falls; and
ii. To provide sufficient flow of water downstream of the Lalini Dam and these hydroelectric plants to meet the environmental water requirements for an ecological Category B/C.

The preferred dam site is at a narrowing neck of the Tsitsa River approximately 3.5 km upstream of the Tsitsa Falls, co-ordinates: 31° 15' 44.76"S, 28° 55' 15.85"E. It was concluded that there were no better upstream dam wall locations available with regard to river valley shape (which affects dam wall length), founding conditions, close proximity to construction materials, and the depth versus volume characteristics of the impoundment.

Taking the various decision-making factors into consideration, it was concluded that the preferred dam type was the roller compacted concrete (RCC) solution. This provides for a simplified layout, better aesthetics and less environmental impact than the other dam types investigated, and offers the better opportunity for implementation in a shorter time period.

The proposed Lalini Dam has the following characteristics:

DESCRIPTION	UNIT	NTABELANGA DAM
DETAILS OF STRUCTURE		
Non-overspill crest level	m.a.s.l.	770.41
Full supply level	m.a.s.l.	765.58
River bed level at dam	m.a.s.l.	717.00
Minimum operating level	m.a.s.l.	740.14
Maximum height to non-overspill crest	m	53.41
Crest length including spillway	m	371
Spillway crest length	m	320
1 in 200 year design flood	m^3/s	3 500
Safety evaluation flood	m^3/s	7 100
Hydropower transfer conduit length	km	7.85
HEP location elevation	m.a.s.l.	445
STORAGE		
Gross storage at full supply level	million m^3	232
Storage below minimum operating level	million m^3	31.2
Surface area of lake behind dam	km^2	14.5
STREAM FLOW		
Mean annual runoff at dam	million m^3	828

* The above details are subject to final design which may require minor changes.

The Lalini Dam will provide enough water and effective head required to generate an average of 19.77 MW and a peak output of 37.5 MW hydropower as well as providing regulated flow releases in the river below the dam to meet the environmental water requirements. In addition to the main hydropower plant, a mini hydropower plant with installed generating capacity of 5 MW has been provided to generate an average 1.83 MW locally at the dam wall.

Other associated infrastructure to be developed would be:

i. Temporary and permanent access roads and servitudes for the construction and operation of the scheme;
ii. New, replacement or realigned roads, power lines, services, buildings, and other infrastructure impacted by the dam and its impoundment;
iii. Operational staff housing;
iv. Administrations and operations buildings;
v. Water supply, power supply and telecommunications to the dam, tunnel, and HEP sites for the construction period and operational stage;
vi. Wastewater treatment works;
vii. Solid waste disposal facilities;
viii. Flow gauging stations; and
ix. Visitor's centre.

3) DOMESTIC BULK WATER DISTRIBUTION

Bulk water supply infrastructure has been designed for both domestic potable water and irrigation raw water requirements based on population and household demographics and cropping patterns on irrigated agriculture.

Population figures have been developed from national census databases together with the other information provided by the district municipalities in the project area. The population figures show the population in the project area to be supplied to be 502 822, which increases to 726 616 by the year 2050.

The projected average daily water demands from the scheme for domestic purposes increase from an average of 62 764 m^3/day in 2020 to 84 596 m^3/day in the year 2050. The peak demands range from 75 316 m^3/day in 2020 to 101 515 m^3/day in the year 2050. A water treatment works with capacity to supply this water requirement will be constructed close to the Ntabelanga Dam, and will be supplied with raw water by a gravity pipeline fed from multiple draw-offs at the dam outlet works.

The distribution of the population to be served per district municipality is as follows.

DISTRICT	POPULATION		HOUSEHOLDS	
	Year 2020	Year 2050	Year 2020	Year 2050
OR Tambo	325 472	438 687	66 492	89 621
Alfred Nzo	177 691	239 500	36 301	48 928
Joe Gqabi	35 931	48 429	7 340	9 894
TOTAL	**539 094**	**726 616**	**110 133**	**148 443**

The treatment processes envisaged are conventional and will include:

- Flocculation;
- Coagulation;
- Settlement in Clarifiers;
- Filtration in Rapid Gravity Filters; and
- Disinfection using Chlorine gas.

Treated water is transferred from clear water pumping stations at the water treatment works to four primary command reservoirs. The treated water is then delivered to the projected 726 616 consumers predominantly by gravity via the secondary bulk conveyance pipelines and command reservoirs, which feed the tertiary lines to villages and urban centres such as Tsolo and Mount Frere.

The bulk water supply infrastructure is split into primary, secondary and tertiary infrastructure to meet design and operational requirements. The primary infrastructure consists of the water treatment works (supplied with raw water from the Ntabelanga Dam), potable water pumping stations from the treatment works to transfer water to primary command reservoirs, and the bulk water pipelines delivering from this primary storage to the downstream bulk water infrastructure.

Secondary infrastructure links these primary command reservoirs to the secondary command storage reservoirs, which then, via the tertiary lines, feed the village reservoirs located at the settlements. The design approach is to assume the need to construct a new village reservoir at each settlement, but some of the secondary command reservoirs are existing, albeit that some of these storage facilities will need to be expanded to meet minimum storage requirements.

The Technical Guidelines for the Development of Water and Sanitation Infrastructure require 48 hours of total system annual average daily demand (AADD) to be available in bulk storage; and this has been allowed for as follows.

Village bulk storage	24 hours x AADD
Secondary command reservoirs	8 hours x AADD
Primary command reservoirs	16 hours x AADD

The proposed reservoirs range in capacity from 10 m^3 to 750 m^3 in the respective secondary and tertiary systems with the command reservoirs in the primary system being in the order of 2 500 m^3 to 33 000 m^3. The proposed reservoir construction materials range from pressed steel tanks for capacities less than 500 m^3, modular pre-fabricated systems for the medium sized reservoirs, and conventional reinforced concrete reservoirs for capacities greater than 2 500 m^3.

4) Raw Water for Irrigation Development

Some 2 868 hectares of high potential irrigable land has been identified, and recommendations have been made to develop commercially run farming units of average size 60 hectares. Some 417 hectares of this total are located adjacent to the north shore of the area that would be inundated by the dam, and on each bank of the Tsitsa River downstream of the dam. Irrigation to these areas could be via simple portable abstraction pumps, and quick-coupling systems, and permanent bulk raw water transfer systems would not be needed.

Based on an economic average size of farming unit of 60 hectares, the 2 868 hectares of high potential irrigable land can thus be reasonably grouped into 45 farming units. Any deviation from this recommended farm size will need to be properly motivated to ensure the farming units remain commercially viable.

Most of the proposed farming units are located in and around the town of Tsolo, at a distance of some 17 km away from the Tsitsa River and at an elevation of between 130 and 220 m above the river level. This means raw water supply to these areas would need to be conveyed via pipeline and pumped from the source.

For these Tsolo irrigation areas totalling 2 451 hectares, and allowing up to 20 hours pumping to achieve the required daily water application for the suggested cropping patterns, this requires the following water transfer pumping rates:

- Peak daily pumping rate 1.06 m^3/s
- Average pumping rate 0.81 m^3/s

The above pumping rate is based on net application rates ranging between 619 mm to 1 141 mm per annum, plus allowance for losses, with a typical application of 880 mm per annum used for economic analysis.

Limiting pumping to 20 hours per day avoids peak hour tariffs and significantly reduces energy costs.

Raw water abstraction takes place at the Ntabelanga Dam raw water outlet works. Water is pumped from here to an intermediate storage tank at an elevation that can then supply just over 60% of the farming units by gravity, with the remainder at higher elevations fed by booster pumped pipelines from that gravity system. This resulted in a raw water pumping station at Ntabelanga Dam outlet works with 2.7 MW peak power consumption, a 16.4 km x 1 000 mm diameter rising main to intermediate storage, then gravity pipelines and local tanks located at strategic points close to the edge of fields of the proposed farming units. In order to reach those farming units located at the highest elevations two smaller booster pumping stations of installed capacity 269 kW and 481 kW respectively would be installed.

The O&M cost for supply of raw water to edge of field excluding power cost has been estimated to be R0.27/m^3 excluding power cost, and R1.14/m^3 including power cost. Clearly some subsidization of this unit cost of raw water as well as capital cost must be made if the potential irrigation schemes are to be viable and sustainable. The Department of Rural Development and Agrarian Reform suggests that a figure of R0.25/m^3 would be a reasonable target to ensure that gross margins are attractive to encourage investment into commercial irrigated agriculture. This emphasizes the need to cross-subsidize the Ntabelanga water supply scheme with revenue gained from energy sales generated by the Lalini Dam and Hydropower Scheme.

5) Power Requirements

The power requirements for the complete scheme are estimated as 13 MW, with the majority of this centralized at the Ntabelanga Dam and the water treatment works. Eskom has 132 kV high voltage lines running parallel to the N2 road from Mount Frere to Mthatha and running through the project supply area from the above alignment to Maclear, passing between the Ntabelanga Dam and Tsolo. Eskom are also implementing a programme of expansion of both high and medium voltage power supplies in the area, and information received from them indicates that this will eventually result also in complete coverage of power services to all settlements in the area.

The Ntabelanga-Lalini Conjunctive Scheme is expected to produce up to 37.5 MW of base load. The conjunctive scheme would not only be self-sufficient in its energy usage for potable and irrigation water supply needs, but can also supply surplus energy into the Eskom grid, thus generating surplus revenue which can be used for capital redemption or further phases of development of the Mzimvubu River catchment.

The regional grid access department of Eskom have been consulted and have confirmed that they can provide a connection to the conjunctive scheme to provide both construction and operational power requirements. It was also confirmed that energy generated by the conjunctive scheme could be fed back into the Eskom grid through the same interconnector via a switching arrangement, and credits given.

B. SUMMARY OF THE ENVIRONMENTAL IMPACT ASSESMENT

(Visit http://www.dws.gov.za/Projects_&_Programmes/Mzimvubu Water Project for EIA reports)

The Department of Water and Sanitation recently completed an Environmental Impact Assessment (EIA) in terms of Section 110 of the National Water Act, 1998 (Act No. 36 of 1998) and in terms of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998). Authorisation was granted by the Department of Environmental Affairs on 10 February 2016 after following an appeal process as stipulated by the NEMA Act.

Nine specialist studies were conducted during the EIA phase and are summarised as follows.

1) Plants and Animals

Four habitat units have been identified within the study area, namely the Mountain/ Rocky Outcrops habitat unit, Grassland/Acacia Thornveld habitat unit, Riparian/ Wetland habitat unit and the Transformed (Grassland) habitat unit. Vegetation surrounding the proposed Ntabelanga Dam consists of rocky ridge vegetation, mostly indigenous to the area. Little transformation has occurred within this area.

Large sections of the proposed Lalini Dam basin have undergone vegetation transformation due to small scale agricultural activities, as well as overgrazing and trampling of veld by livestock. More sensitive habitat (Euphorbia forest) located closer to the dam will be affected by the construction of the dam and access roads.

Rescue and relocation measures for flora can be implemented in more sensitive areas such as the mountain/rocky ridge habitat before construction commences.

With the decreased available faunal habitat, the remaining faunal species will be pushed into the small pockets of remaining habitat, where inter and intraspecific competition amongst the various faunal species for space and resources will cause a decline in the overall faunal abundance and diversity. Upstream towards the tail end of the Ntabelanga Dam, there will be a section of land that, once the water levels have risen, will be transformed into an island. Any faunal species unable to fly or readily swim will be trapped on this island, with limited resources available to survive. It is therefore recommended that any small mammals that become trapped on the island be captured and relocated to the mainland by a qualified and suitable specialist.

2) Aquatic Ecology And Wetlands

Overall, the various riparian and wetland resources can be considered to be in a moderately modified condition, indicating that loss of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged. Fish diversity is very low.

The impact due to inundation of habitat upstream of the dam walls and disruption of natural flow downstream are considered high. However, adhering to the recommended Environmental Water Requirements will ensure that the river downstream of the dams is maintained in an acceptable ecological state.

3) Heritage Impact

An archaeological site was identified in the proposed Ntabelanga Dam basin and another in the proposed Lalini Dam basin. These sites will be destroyed by inundation. The significance of these sites after mitigation was assessed as low.

A detailed survey of potential Early Iron Age sites should be undertaken once crops have been harvested and vegetation clearance has occurred.

All graves, buildings and heritage structures within the full supply level will be destroyed by inundation, while those within the footprints of the bulk distribution infrastructure could either be damaged or destroyed. All heritage structures have low significance while all human remains have high heritage significance. The significance of these impacts on graves and structures was assessed as low after mitigation.

Impacts on heritage resources are confined entirely to the construction phase.

4) Visual Impact

The significance of visual impact of the Ntabelanga and Lalini Dams is considered medium-low.

The significance of the visual impact of the power line is regarded as low for the recommended alignment.

The significance of the visual impact of the new and upgraded roads is considered medium-low.

5) Socio-economic Impact

The Mzimvubu Water Project holds great potential for significant development and growth in this economically depressed region of the country.

With regard to the dams and associated infrastructure, most negative impacts will occur during the construction phase as a result of the need for resettlement, the loss of land and the influx of the construction workforce. The size and extent of the project will result in these impacts being significant and widespread, however, they will largely be of a temporary nature and many can be mitigated. Notwithstanding this, however, the impact of resettlement on both the displaced and host communities must not be underestimated.

In Ntabelanga Dam basin, 62 structures and 19.9 km^2 of cultivated land will be lost while in the Lalini Dam basin 12 structures and 7.6 km^2 of cultivated land will be lost. In addition, it has been estimated that 160 structures and 0.7 km^2 of cultivated land could be lost as a result of the bulk water distribution infrastructure and access roads. Apart from the structures and cultivated land directly impacted, 124 structures have also been identified as being within 5 metres of the servitudes of the various infrastructure components and therefore are at risk. The facilities at risk are largely associated with the linear components of the project which include access roads, pipelines, the power line and it is possible to re-align the routes to avoid the majority, if not all of these structures, as a relatively wide servitude was used for planning purposes.

As the construction of the dams and associated infrastructure will require a large workforce, it is important to reduce the impact of the influx of construction workers by utilising local labour as far as possible.

The negative operational impacts, although they extend over a long period, are likely to be less significant than the more significant positive impacts, such as economic development and the provision of domestic and agricultural water being of high significance for the area. The provision of water, for both domestic and agricultural use, is likely to have an effect on the division of labour. On the domestic front this is likely to be positive in nature releasing women from the arduous and time consuming task of collecting water. With regard to agriculture, however, this may result in an increased work burden being placed on women due to double or triple cropping with women undertaking such tasks as weeding.

A unique aspect of the generation and distribution of electricity concerns exposure to electromagnetic fields. There has been wide international concern regarding the effect that electromagnetic fields may have on public health and a possible link to various cancers. On the other hand, the hydro-electricity scheme has the potential to positively contribute to the economy which would have positive social benefits.

A unique aspect of the roads infrastructure concerns easier access to the area which will carry with it both positive and negative consequences. On the positive side communities living in the area will have easier access into and out of the area as will tourists wanting to visit the area. On the negative side, easier access could hasten the effects of globalisation and changes to local norms and culture. Vulnerable groups may also face greater psychological and social impacts due to rapid change as a result of greater access and exposure to outsiders.

One of the haul roads between the borrow pits and the Lalini Dam construction site passes through the village of Lalini. Due to increased traffic hazards, dust and noise, this would increase the level of health and safety risks. An alternative route should be considered during implementation.

6) Sourcing of Construction Materials

A range of construction materials such as sand, gravel and rock are required for the construction of the two dams and site access roads. Existing licenced quarries and borrow pits in the area may not be adequate or suitable to provide all the required construction materials and new quarries and borrow pits have been identified. As far as possible construction materials are sourced from the dam basins that are inundated once impoundment has commenced.

7) Public Participation

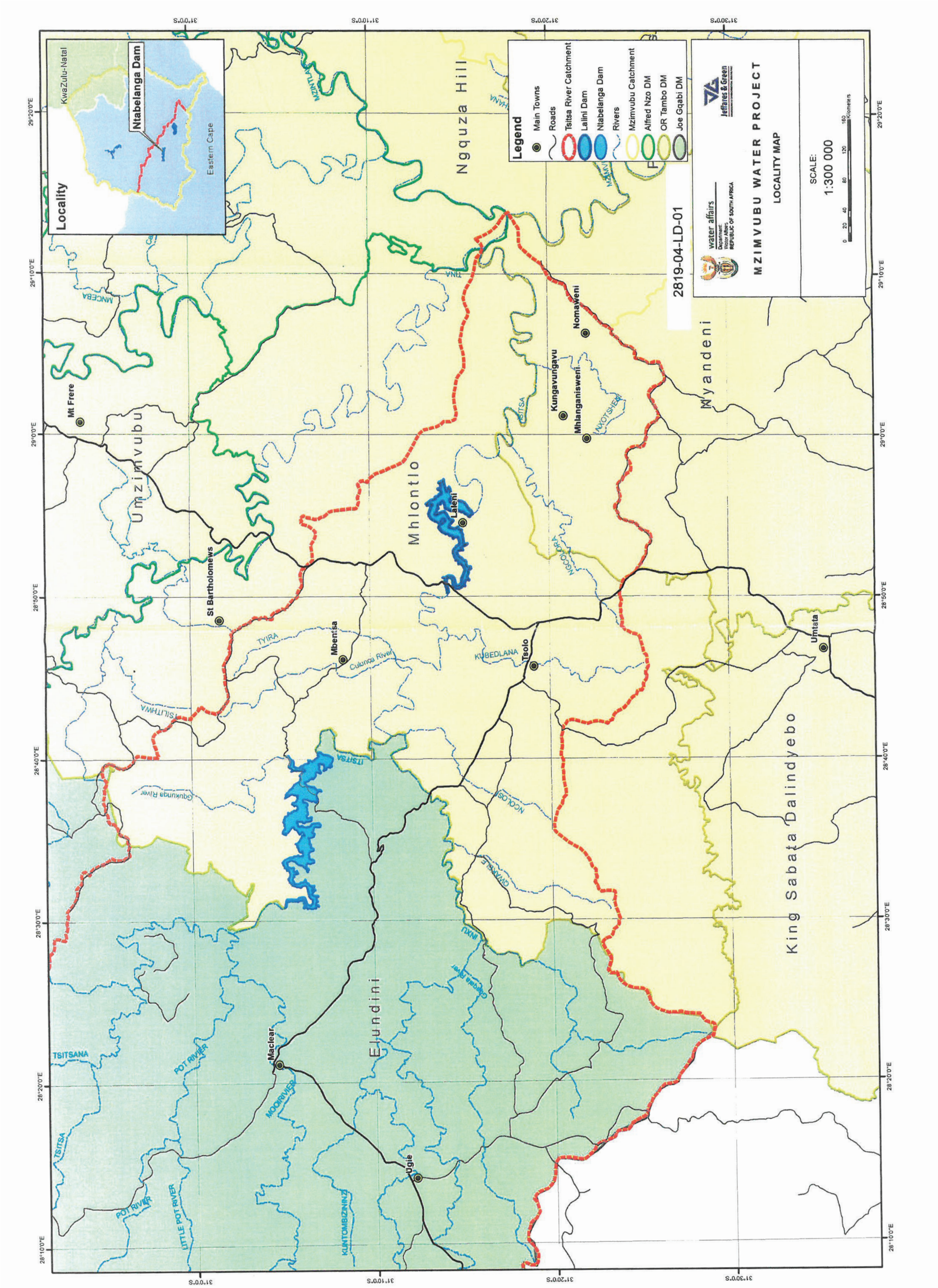
Extensive public participation was undertaken both during the Feasibility Study and during the Environmental Impact Assessment. Interested and Affected Parties were extensively involved to inform them about the project and obtain their comments. A Relocation Policy Framework was presented to the Interested and Affected Parties that explains the relocation and compensation procedure to be followed for affected properties. An Issues and Responses Report was compiled and submitted to the Department of Environmental Affairs to inform the authorisation decision.

8) Environmental Management Programme

An Environmental Management Programme (EMPr) has been drafted and submitted together with the Environmental Impact Report for authorisation. The EMPr shall be finalised for approval by the Department of Environmental Affairs before implementation to guide the various activities associated with the construction and operational phases.

MRS NP MOKONYANE
MINISTER OF WATER AND SANITATION

DATE: 28.05.16


Locality
Ntabelanga Dam
KwaZulu-Natal
Eastern Cape
Legend
Main Towns
Roads
Tsitsa River Catchment
Lalini Dam
Ntabelanga Dam
Rivers
Mzimvubu Catchment
Alfred Nzo DM
OR Tambo DM
Joe Gqabi DM
2819-04-LD-01
water affairs
Jeffares & Green
MZIMVUBU WATER PROJECT
LOCALITY MAP
SCALE:
1:300 000
Kilometers
Ngquza Hill
Nyandeni
Mhlontlo
Umzimvubu
King Sabata Dalindyebo
Elundini
Mt Frere
St Bartholomews
Mbenisa
Tsolo
Lalini
Umtata
Nomaweni
Kungavungavu
Mhlanganisweni
Maclear
Ugie
TSITSANA
POT RIVER
LITTLE POT RIVER
MOOIRIVER
TSITSA
KUNTOMBIZININI
INXU
KUBEDLANA
TYIRA
Culunca River
SILITHWA
Qaukunqa River
NGCOLOSI
NGCOLORA
INXOTSHE
MNCEBA
MZINTLAVA
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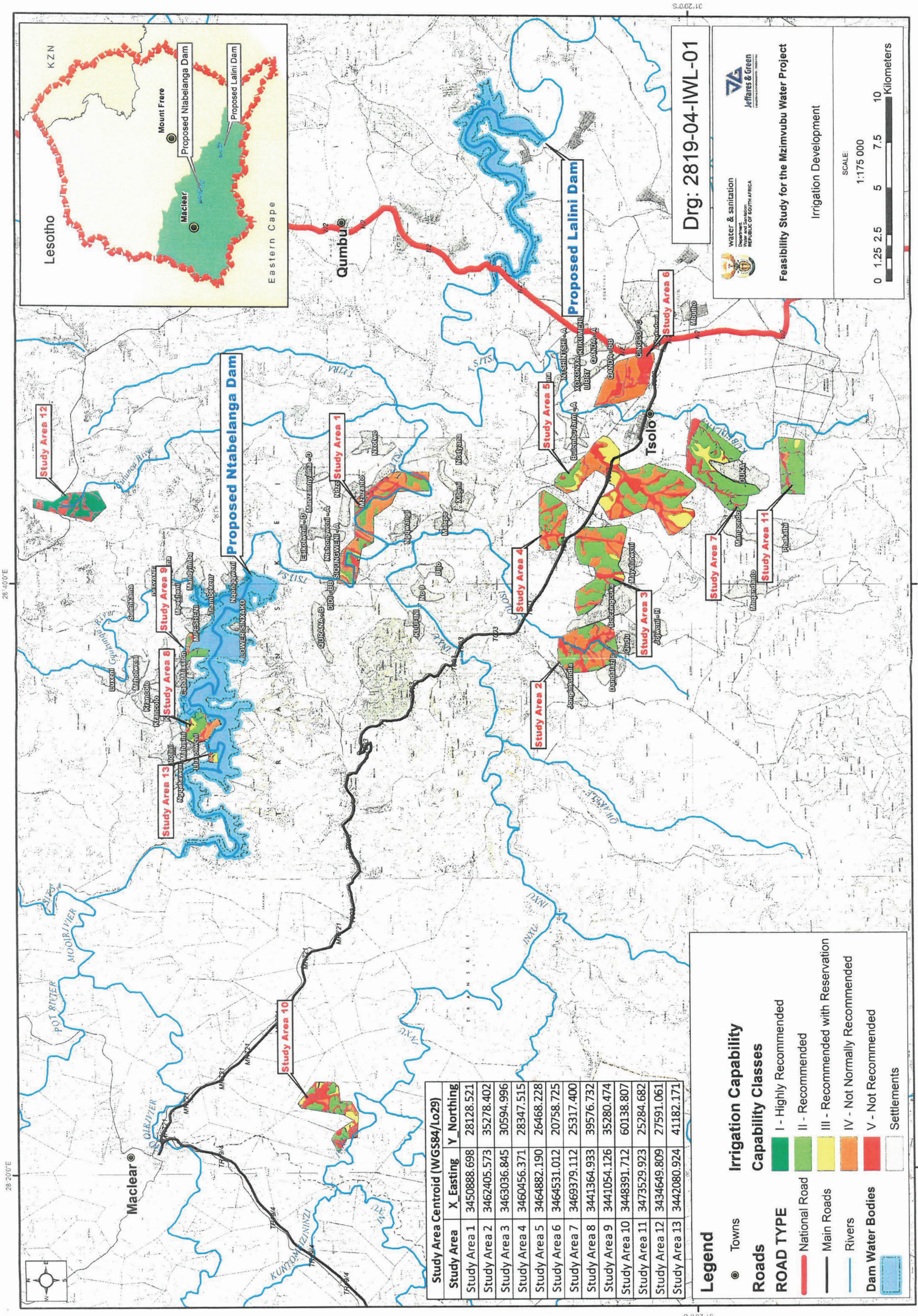
29°20'0"E



Study Area Centroid (WGS84/Lo29)		
Study Area	X_Easting	Y_Northing
Study Area 1	3450888.698	28128.521
Study Area 2	3462405.573	35278.402
Study Area 3	3463036.845	30594.996
Study Area 4	3460456.371	28347.515
Study Area 5	3464882.190	26468.228
Study Area 6	3464531.012	20758.725
Study Area 7	3469379.112	25317.400
Study Area 8	3441364.933	39576.732
Study Area 9	3441054.126	35280.474
Study Area 10	3448391.712	60138.807
Study Area 11	3473529.923	25284.682
Study Area 12	3434649.809	27591.061
Study Area 13	3442080.924	41182.171