Regulation of wastewater treatment plants in the Ba-Phalaborwa Municipality

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ABSTRACT

South Africa is a water-scarce country and over the years, the quality of water resources has deteriorated due to poor effluent discharge, agricultural, industrial, mining and human activities. The major contributing factors of poorly-treated or inadequately treated wastewater may be attributed to: (a) the poor design and construction of wastewater treatment plants; (b) lack of qualified process controllers; (c) non-compliance with applicable legislation; (d) lack of proper monitoring; and (e) management issues with regard to wastewater treatment plants. Water quality is important as many communities depend on water resources for their daily activities and livelihood. There is a need therefore to build and manage wastewater treatment plants effectively as they have an impact on water quality.

Wastewater treatment plants in South Africa are regulated by the *Constitution of the Republic of South Africa,* 1996, the *National Environmental Management Act* 107 of 1998, the *National Water Act* 36 of 1998, the *Water Services Act* 108 of 1997, Provincial legislation, Municipal by-laws and other Government policies applicable to Local Government. Chapter 7 of the Constitution *inter alia,* provides that Local Government has the duty to provide a safe and healthy environment to its community in a sustainable manner. Schedule 4B of the Constitution imposes the function of delivering water, sanitation and wastewater treatment services on Municipalities. This responsibility rests on District Municipalities but may be performed by a Local Municipality if the district municipality lacks the capacity to do so. Although Local Government has the right to govern on its own initiative the affairs of its communities, it needs support and monitoring from other spheres of Government (National and Provincial) to ensure the delivery of wastewater treatment services in a sustainable manner.

In this study, Ba-Phalaborwa Local Municipality is used as an example of a Municipality in the Limpopo Province faced with challenges related to the operation and management of its wastewater treatment plant. This study aims to determine who should be responsible for the regulation of wastewater treatment plants in Ba-Phalaborwa Local Municipality area in order to ensure service delivery to communities in a sustainable manner.

In order to deal with the challenges experienced by Local Government in dealing with wastewater treatment plants, the study considers Best Practice Guidelines and external service delivery mechanisms, specifically in the form of Public-Private Partnerships.

The study concludes with recommendations based on Best Practice Guidelines which Municipalities can use to avoid wastewater pollution and proposes management mechanisms in managing a Public-Private Partnership effectively in order to ensure that they provide service delivery in a sustainable manner.

Key words: Wastewater, Wastewater Treatment Plants, Effluent, Local Government, Service delivery, Green Drop Assessment, Best Practice Guidelines, Public-Private Partnership.

OPSOMMING

Suid-Afrika is 'n waterskaarsland en deur die jare het die kwaliteit van water weens swak rioolafvoer sowel as boerdery-, industriële-, myn- en menslike aktiwiteite agteruitgegaan. Die belangrikste bydraende faktore tot swak of onvoldoende behandelde afvalwater, kan toegeskryf word aan: (a) die swak ontwerp en konstruksie van afvalwatersuiweringswerke; (b) die afwesigheid van gekwalifiseerde proses-kontroleerders; (c) die nie-toepassing van betrokke wetgewing; (d) ‘n gebrek aan behoorlike monitering; en (e) bestuurskwessies met betrekking tot afvalwatersuiweringswerke. Die kwaliteit van water is belangrik omrede baie gemeenskappe van waterbronne vir hul daaglikse aktiwiteite afhanklik is. Om dié rede is daar 'n behoefte om afvalwatersuiweringswerke effektief te ontwikkel en te bestuur omdat dit 'n invloed op die kwaliteit van water het.

Afvalwatersuiweringswerke word in Suid-Afrika deur die *Grondwet van die Republiek van Suid Afrika*, 1996, die *Wet op Nasionale Omgewingsbestuurs* 107 van 1998, die *Wet op Waterdienste* 108 van 1997, provinsiale wetgewing, munisipale verordeninge en ander regeringsbeleide van toepassing op plaaslike regering gereguleer. Hoofstuk 7 van die Grondwet bepaal, onder meer, dat plaaslike regering die plig het om 'n veilige en gesonde omgewing aan sy gemeenskap op 'n volhoubare wyse te verskaf. Skedule 4B van die Grondwet plaas die funksie van water- en sanitasiedienste, beperk tot stelsels vir die voorsiening van drinkbare water en die wegdoen van huishoudelike afvalwater en rioolvuil, op die skouers van die munisipaliteite. Dié verantwoordelikheid berus op distrik munisipaliteite maar kan deur plaaslike munisipaliteite uitgeoefen word, indien die distrik munisipaliteit dit nie kan doen nie. Alhoewel plaaslike regering die bevoegdheid het om op eie inisiatief die sake van hul gemeenskappe te bestuur, het hulle tog die ondersteuning en monitering van die ander regeringsfere (nasionale en provinsiale regering) nodig om die verskaffing van dienste op ‘n volhoubare wyse te verseker.

In hierdie studie word daar na die Ba-Phalaborwa plaaslike munisipaliteit verwys as 'n voorbeeld van 'n munisipaliteit in die Limpopo provinsie wat die uitdagings in verband met die operasie en bestuur van afvalwatersuiweringswerke aanvaar het. Hierdie studie beoog om te bepaal wie verantwoordelik moet wees vir die regulering

van afvalwatersuiwering in die Ba-Phalaborwa plaaslike regeringsgebied ten einde die verskaffing van dienste aan die plaaslike gemeenskappe op ‘n volhoubare wyse te verseker.

Ten einde die uitdagings wat deur plaaslike regerings met afvalwatersuiwerings-werke ondervind word aan te spreek, oorweeg hierdie studie beste praktyk voorskrifte en diensleweringsmeganismes, meer spesifiek in die vorm van Publiek-Private Vennootskappe.

Die studie sluit af met aanbevelings gebaseer op beste praktyk voorskrifte wat munisipaliteite kan gebruik om afvalwaterbesoedeling te verhoed en stel bestuursmeganisme voor om die bestuur van Publiek-Private Vennootskappe effektief te verseker sodat dienslewering op ‘n volhoubare wyse voorsien kan word.

Sleutelwoorde: Afvalwater, afvalwatersuiweringswerke, riool, plaaslike regering, dienslewering, *Green Drop Assessment*, beste praktyk voorskrifte, Publiek-Private Vennootskappe

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LIST OF ABBREVIATIONS AND ACRONYMS

BEE	Black Economic Empowerment
BPG	Best Practice Guidelines
BOOT	Build, Own, Operate and Transfer
CRR	Cumulative Risk Ratio
CSIR	Council for Scientific and Industrial Research
DBO	Design, Build and Operate
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DG	Director General
DPLG	Department: Provincial and Local Government
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
EWISA	Electronic Water Institute of Southern Africa
GG	Government Gazette
GN	Government Notice
IDP	Integrated Development Plan
IGRFA	*Intergovernmental Relations Framework Act* 13 of 2005
ISO	International Organisation for Standardisation
LED	Local Economic Development
LEG	Local Environmental Governance
LM	Local Municipality
LWI	Limpopo Water Initiative
MEC	Member of Executive Council
MFMA	*Local Government: Municipal Finance Management Act* 56 of

	2003
MPPP	Regulations Municipal Public Private Partnerships
MSA	*Local Government: Municipal Systems Act* 32 of 2000
NEMA	*National Environmental Management Act* 107 of 1998
NEMWA	*National Environmental Management: Waste Act* 59 of 2008
NWA	*National Water Act* 36 of 1998
NWRS	National Water Resource Strategy
PAIA	*Promotion of Access to Information Act* 2 of 2000
PER	Potchefstroomse Elektroniese Regsblad
PG	Provincial Gazette
PPIAF	Public-Private Infrastructure Advisory Facility
PPPs	Public-Private Partnerships
QMS	Quality Management Systems
RDP	Reconstruction Development Programme
RECIEL	Review of European Community and International Environmental Law
SALGA	South African Local Government Association
SAJHR	South African Journal of Human Rights
SOeR	State of the Environment Report
Stell LR	Stellenbosch Law Review
Structures Act	*Local Government: Municipal Structures Act* 117 of 1998
WA	*Water Act* 54 of 1956
WBI	World Band Institute
WHO	World Health Organisation
WQM	Water Quality Management
WRC	Water Research Commission
W_2RAP	Water Risk Abatement Plan

WSA	*Water Services Act* 108 of 1997
WSDP	Water Services Development Plan
WSSA	Water Services South Africa
WWPS	Wastewater Treatment Plants

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1 Introduction

South Africa is a water-scarce country and relies primarily on surface water resources[1] for most of its urban, industrial and irrigation requirements.[2] While it is generally accepted that water is a precarious natural resource for essential growth and development, environment, health and well-being, the resource is not receiving the priority it deserves. This is evident in the manner in which water is polluted and degraded.[3] According to the 2012 *National Water Resources Strategy* (hereafter the NWRS-2), 37% of South Africa's water is lost, polluted, degraded, inadequately financed and inappropriately strategically positioned.[4] There are different sources of water pollution varying from agricultural, industrial, mining and human activities.[5]

According to the Department of Water Affairs (hereafter the DWA):[6]

> major sources of pollution of surface waters are agricultural drainage and wash-off (irrigation return flow, fertilisers, pesticides and runoff from feedlots), urban wash-off and effluent return flows (bacteriological) contaminations, salt and nutrients (chemical substances), mining (acids and salt) and areas with insufficient sanitation services (microbial contamination). Pollution of groundwater results from mining activities, leachate from landfills, human settlements and intrusion of sea water.

Poor effluent[7] treatment, operation and maintenance of wastewater treatment plants (hereafter WWTPs) are a cause for concern in South Africa.[8] Water pollution[9] is a

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1 Water resources refer to water reserves, such as groundwater, surface water or borehole water that can be used for daily activities or to sustain life. South Africa is a water-scarce country and over the years, water resources have deteriorated due to increased effluent discharge and lack of proper water resource management with regard to wastewater treatment plants (WWTPs).

2 Kidd *Environmental Law* 68.

3 DWA *Draft National Resource Strategy 2* (2012) also refers to the DEA *State of the Environment Report: Water Availability* available at http://soer.deat.gov.za/472.html.

4 DWA NWRS-2 ii.

5 CSIR *A CSIR Perspective on Water in South Africa*5.

6 DWA NWRS-2 24.

7 The term "effluent" is described in GN R509 in GG 22355 of 8 June 2001 as "human excreta, domestic sludge, domestic wastewater, grey water resulting from commercial use and are discharged after treatment processes."

8 Mema 2010 ewisa.co.za/literature/files/335_269 Mema.pdf.

9 "Pollution" in terms of s1 of the *National Environmental Management Act* 107 of 1998 is defined as "any change in the environment caused by:(i) substances;(ii) radioactive or other waves; or (iii) noise, odour, dust or heat, emitted from any activity, including the storage or treatment or waste or substances, construction and the provision of services, whether engaged in by any person or an

concern as it affects water quality which is essential for human use and the environment. The treatment of contaminated water before it is discharged back into water resources is critical. The shocking state of South Africa's WWTPs which treat billions of litres of wastewater each day was revealed in the *2010 Green Drop Assessment*.[10] According to the *2010 Green Drop Assessment*,[11] most Municipalities in Limpopo Province received a low score for the management of their WWTPs.[12] The findings of the Report implied that hundreds of million litres of untreated or inadequately treated effluent is illegally discharged into rivers and streams each day. The *2011 Green Drop Assessment*[13] results were not very different, with the Province averaging a Municipal Green Drop score of 24%. The *2012 Green Drop Assessment*[14] results have shown an improvement in respect of WWTPs in Limpopo Province since 2010, with the Cumulative Risk Ratio (CRR)[15] of 77.6% compared to 84.9% reported in 2011.[16] Though the results show an improvement, the assessment shows that most WWTPs still remain in a high and critical position.

Treatment of water is regarded vital in the management of water resources as it limits the amount of pollutants that are present when the discharged effluents end up in rivers and streams.[17] Therefore, there is a great need to build and manage WWTPs

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organ of state, where that change has an adverse effect on human or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on material useful to people, or will have such an effect in the future."

10 The Green Drop Certification Programme for Wastewater Quality Management Regulation is an incentive-based regulation introduced in September 2008 by the then Minister of Water Affairs. The process measures and compares the results of performance of Water Service Authorities and subsequently, award or penalise the Municipality upon evidence of their excellence or failure according to the minimum standards or requirement that have been defined. See DWAF 2008 www.DWAF.gov.za/Documents/GD/GDPP.

11 DWAF *2010 Green Drop Assessment* 211.

12 Following the release of the *2011 Green Drop Assessment*, Limpopo Province obtained second last position of the national Performance Barometer. This is an indication that most WWTPs in Limpopo Province are still in a high and critical position. See in this regard, EWISA 2011 http://www.ewisa.co.za/misc/BLUE_GREENDROPREPORT/GreenDrop2012/009_Chapter9%20Limpopo(FINAL).pdf.

13 DWAF*2011* Green Drop Assessment 210.

14 DWA *2012 Green Drop Assessment*269.

15 CRR Risk Ratio refers to the wastewater risk rating.

16 DWA *2012 Green Drop Assessment*270.

17 Morrison *et al* 2001 *Water SA* 475. See also, Anon 2011 http://wrc.umn.edu/prod/groups/cfans/@pub/@cfans/@wrc/documents/asset/cfans_asset_292046.pdf.

effectively.[18] Proper establishment and operation of WWTPs are important as they impact on water quality. Water resources are important to many people in their daily activities. For instance, many people in rural areas depend on surrounding rivers for irrigation and drinking water. The assessment, planning and management of water resources are vital to ensure sustainable resources and to reduce damaging impacts on these natural systems.[19] Poor treatment of effluents may be a source of pathogens, nitrogen, phosphate and metals, and can lower the quality of water resources and cause ecological and health hazards to people.[20]

The *Constitution of the Republic of South Africa*, 1996[21] (hereafter the Constitution) provides that everyone has a right to an environment that is not harmful to their health or well-being.[22] It further provides that the environment should be protected for future generations through the implementation of reasonable legislative and other measures that prevent pollution and ecological degradation.[23] In order to achieve this goal and to give effect to the constitutional environmental right, other legislation also provide for measures to control pollution. The *National Environmental Management Act* [24] (hereafter the NEMA) is the core of South Africa's environmental framework legislation. In addition to the NEMA, there are other sector environmental laws pertaining to water and waste, namely, the *National Water Act*[25] (hereafter the NWA) which provides guidelines to the use and protection of water and the *Water Services Act*[26] (hereafter the WSA) which deals with norms and standards pertaining to water, access to water supply and basic sanitation.[27]

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18 SALGA Date Unknown www.salga.org.za/…/Guidelines%20for%20Municipalities/Hints_and_Tips.pdfHints & Tips 1. See also in this regard Burger 2013 http://www.ru.ac.za/perspective/perspectivearticles/name,81704,en.html.z.

19 DWAF 2008 www.dwarf.gov.za/Documents/GD/GDPP.

20 Kidd *Environmental Law* 68.

21 *Constitution of the Republic of South Africa*, 1996.

22 S 24(a) of the Constitution.

23 S 24(b)(i).

24 107 of 1998.

25 36 of 1998.

26 108 of 1997.

27 Preamble to the WSA.

To ensure environmental compliance and enforcement, the Constitution has placed an obligation on the different spheres of Government depending on the sector concerned. The management and conservation of the nation's water resources seem to be an exclusive National Government competence.[28] The DWA is the responsible Water Service Authority tasked by the NWA to protect the environment with regard to water regulation and protection. In terms of the NWA, the Minister of Water and Environmental Affairs (hereafter the Minister) is empowered to ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner.[29] The NWA should be seen against the legislative framework of the WSA. The connection between the NWA and the WSA is further expressed as a fundamental principle in the 2004 *National Water Resource Strategy*.[30] While the NWA deals with the management and conservation of water resources, the WSA outlines the regulatory framework within which water-related services should be provided by Local Municipalities. In order to effectively administer Local Government affairs, the Constitution has awarded Municipalities certain executive[31] and legislative[32]powers. Municipalities have a duty to promote a safe and healthy environment[33] in their areas of jurisdiction and are authorised to care for the environment through their various activities which include the provision of water and basic sanitation.[34]

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28 Bosman, Kotzé and Du Plessis 2004 *SAPR/PL* 412-421 state that despite applicable environmental legislation in South Africa, the administration of environmental matters is still a problem. One of the reasons, amongst others is the fact that some responsibilities of the three spheres of Government overlap, or have direct or indirect influence on each other. The overlapping of these functions may result in many inconsistencies, particularly in environmental governance and decision-making. National Government departments are tasked with the management of resources held in public trust. For example, water resources are held in public trust by the DWA and include watercourses, surface water, estuary, or aquifers (as defined by the NWA). However, the definition of the NEMA of "environment" also makes specific mention of water. Confusion will inevitably occur where matters relating to one activity are governed by more than one line function.

29 S 3 of the NWA.

30 Principle 27 of the NWRS 2004 states that "while the provision of water services is an activity distinct from the development and management of water resources, water services shall be provided in manner consistent with the goals of water resource management."

31 S 151(1) and s 156(1)(a) Part B of Sch 4 and Part B of Sch 5 of the Constitution. Executive powers include *inter alia,* municipal planning, specified water and sanitation services, refuse removal and solid waste disposal.

32 Legislative powers allow Municipalities to administer by-laws (which are not in conflict with national or Provincial legislation) for the effective administration of only those matters which they have the right to administer in terms of Sch 4 and 5 Part B of the Constitution.

33 S 152(1)(d) of the Constitution.

34 S 3(1) of the WSA.

The NEMA requires all organs of state (including Municipalities) to incorporate measures in their plans to cater for best practicable environmental options through Local Government legislation in order to provide for environmental protection.[35] The Local Government legislation are the *Local Government: Municipal Structure Act* (hereafter the Structures Act),[36] the *Municipal Systems Act*[37] (hereafter the MSA) and other municipal by-laws[38] which enable Local Government to fulfil their constitutional obligations.

In the administration of their duties, District and Local Municipalities often experience challenges which hamper service delivery to their communities, as reflected by the Green Drop Assessment of Municipalities in Limpopo Province.[39] For the purpose of this study, Ba-Phalaborwa Local Municipality, one of the five Local Municipalities in the Mopani District Municipality in Limpopo Province, was identified as an example to illustrate the challenges of service delivery in relation to the regulation and management of WWTPs.[40]

The primary aim of this study is to determine who should be responsible for the regulation of WWTPs in the Ba-Phalaborwa local municipal area in order to ensure service delivery to communities in a sustainable manner.[41]

A literature study of important primary and secondary sources, including legislation, case law, books, scientific contributions in academic journals, reports and other official

35 Ch 1, s 2(4)(b) of the principles of the NEMA. One of the challenges is the fact that there are different competent authorities dealing with environmental governance and decision-making in relation to the provision of water.

36 117 of 1998.

37 32 of 2000.

38 S 156(2) of the Constitution. Bekink *Principles of South African Local Government Law* 219 states that Municipalities are allowed to make and administer by-laws for the effective administration of matters which they have the right to administer.

39 As previously mentioned, see in this regard, DWAF *2010 Green Drop Assessment*; DWAF *2011 Green Drop Assessment*; and DWA *2012 Green Drop Assessment*.

40 Ba-Phalaborwa Local Municipality was chosen as it illustrates how challenges experienced between District and Local Municipalities in relation to their powers and functions can hamper service delivery.

41 S 152(1)(c) of the Constitution provides that one of the objectives of Local Government is to ensure the provision of services to communities in a sustainable manner.

documents and electronic sources constitute sources of information for the study. The research on the WWTPs in the Ba-Phalaborwa Local Municipality area is based on documents (including reports and a service level agreement) received from the Limpopo Water Initiative (Pty) Ltd (LWI), a private consultancy company from the Limpopo Province.[42] Ba-Phalaborwa Local Municipality was chosen as it illustrates how challenges experienced between District and Local Municipalities in relation to the regulation of WWTPs can hamper service delivery.

A discussion on wastewater, the effects of water pollution and possible management or control are provided as background to the study.[43] In sections 3 and 4, environmental governance and environmental tools available to Local Government relating to WWTPs are discussed, followed by a consideration in section 5 regarding the challenges and possible solutions in relation to the management and operation of WWTP, focusing on Ba-Phalaborwa Local Municipality. The study concludes with recommendations based on the theoretical background in section 1 through section 5 in determining alternative measures available for the management and operation of WWTPs in the Ba-Phalaborwa Local Municipality area.

2 Background on wastewater treatment

In this section, a brief discussion of wastewater and its effects are provided. The section also explores the challenges and possible management and control of WWTPs in South Africa.

2.1 Defining wastewater

There is no universal definition of wastewater. It is, for example, defined as:

[42] Permission was granted by the Technical Director of the Company to use and refer to these documents in the current study.

[43] See section 2.

> any liquid waste, whether or not containing matter in solution or suspension and includes domestic liquid waste and industrial effluent but excludes stormwater.[44]

Wastewater is also regarded as any water that has been adversely affected in quality by anthropogenic influence such as liquid waste discharged by domestic residences, commercial properties, industry, and/or agriculture and can encompass a range of potential contaminants and concentrations.[45] The NWA does not define wastewater *per se*, but includes a definition of waste which is of paramount importance in an attempt to define wastewater. "Waste" is defined in the NWA to include:[46]

> any solid material or material that is suspended, dissolved or transported in water (including sediment) and which is spilled or deposited on land or into a water resource in such volume, composition or manner as to cause, or to be reasonably likely to cause, the water resource to be polluted.

The *National Environmental Management: Waste Act (*hereafter the NEM:WA*)*[47] defines "waste" as:[48]

> any substance, whether or not that substance can be reduced, re-used, recycled and recovered that is (a) surplus, unwanted, rejected, discarded, abandoned or disposed of (b) which the generator has no further use of for the purpose of production (c) that must be treated or disposed of (d) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by mines, medical or other sector.

Ineffective wastewater treatment may, for example, result in raw sewage being discharged into water resources. Raw sewage/untreated effluent consists mainly of water but also includes substances such as solid matter, faeces, liquid matter, urine, fats, carbohydrates, pathogens and many different bacteria.[49] An example of how raw sewage is composed is illustrated in Table 1 below.

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44 PG 6373 of 1 August 2006.
45 Riswan Date Unknown http://www.slideshare.net/Atharsaeedi/treatment-of-waste-water.
46 S (1)(xxiii) of the NWA.
47 59 of 2008.
48 S (1) of the NEM:WA.
49 Scholzel and Bower 1999 http://www.pacificwater.org/userfiles/file/TR0288.pdf.

Table1: Typical composition of raw sewage[50]

Suspended Solids	250-400mg/l
Ammonia	25-50mg/l
Total Phosphorous	15-25mg/l
Chloride	60-100mg/l
Fats	100-200mg/l
Chromium	0.1-0.5
Copper	0.2-0.5
Lead	0.08-0.4
Zinc	0.4-07
Faecal Coliforms	2-30x10^6/100ml

The *2012 Green Drop Progress Report*[51] indicated that there are still ineffective WWTPs throughout South Africa. In terms of the Report, a total of 831 WWTPs were assessed. Of the 831 WWTPs, 440 showed progress since 2009, 323 digressed, 68 maintained the *status quo* of 2011, 241 (the majority) are at moderate risk, 212 are at high risk and 153 are at critical risk space.[52] The Ba-Phalaborwa Local Municipality falls under the Mopani District Municipality, Limpopo Province.[53]These statistics are an indication that inadequately treated effluent is discharged into South Africa's water resources. Untreated or inadequately treated effluent contains a wide array of pathogens, chemicals and nutrients, many of which pose a serious threat to human health.

From the above definitions, it may be inferred that, waste (in a solid or liquid form) includes any unwanted substance caused by human activity whether industrial, commercial, agricultural or domestic, which is discarded. This waste has the potential to

50 Water Research Centre *Design Guide for Marine Treatment Schemes* as referred to in EWISA Date Unknown www.ewisa.co.za/misc/DomWWater/default.htm.
51 DWA *2012 Green Drop Assessment* 14.
52 DWA *2012 Green Drop Assessment* 11.
53 See also the discussion under section 5.2.

pollute natural resources and pose a threat to human health if not treated before it is disposed. For the purpose of this study, "wastewater" will be defined as any water which has been adversely affected in quality by human activities and may include domestic,[54] industrial and mine effluent. The emphasis of this study will of course be on wastewater to be treated by Local Municipalities.

2.2 The effects of non-treatment of wastewater

Treatment of wastewater before it is discharged back into the water resource is critical. Inadequately treated wastewater also has cost implications for re-use.[55] When WWTPs do not operate optimally, untreated effluent is discharged back into water resources.[56] The untreated effluent that is discharged back into water resources does not only directly impact on the water quality for human consumption, but also impacts on the health, ecology and economy of a country indirectly. These impacts will be discussed below.

2.2.1 Health and social impacts

The social implications relating to untreated effluent water relates primarily to increased risk to human health.[57] Most people in rural and informal settlements obtain their drinking water directly from the river or water streams. Inadequately treated effluent water contains bacteriological and other pathogens which cause health problems to both humans and animals.[58] Polluted water has potential health risks as a result of

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54 Domestic wastewater consists mainly of water that arises from domestic and commercial activities and premises and may contain sewage. It also includes the composition of household waste from washing, bathing and toilets.

55 Kanyoka and Eshtawi 2012 *Analysing the trade-off of wastewater re-use in Agriculture: An Analytical Framework* 3.

56 Fuggle and Rabie's *Environmental Management in South Africa* 639.

57 Graham 2005 www.mg.co.za./2005-09-03-human-waste-caused-delmas-typhoid-outbreak reported that, there is an outbreak of typhoid in Delmas, Mpumalanga caused by human waste.

58 According to Dungeni, Van der Merwe and Momba 2010 *Water SA* 608 pathogens such as s*higela, salmonella* and *vibrio cholerae* (cholera) is caused when a toxin-producing bacterium, v*ibrio cholerae*, infects the gut. It is carried in water containing human faeces. In its most severe form, and without treatment of antibiotics and rehydration, it causes acute diarrhoea and dehydration, and can

contaminants such as nitrates[59] found in drinking water. Occasional spillages of raw sewage into aquatic ecosystems are more harmful than inadequately treated effluent.[60] WWTPs that are operationally defective or non-functional cause spillages which are of great risk to human health. Polluted water resources also have negative social impacts such as closure of recreational areas as a result of high levels of faecal discharge to beaches/dams.[61]

2.2.2 Ecological impacts

Most of the drinking water for communities in South Africa is obtained from surface water sources (rivers and reservoirs), though groundwater supplies are important in more arid areas. Cyanobacteria[62] blooms have been recorded in many if not most of the rivers and reservoir systems because of prevailing high levels of eutrophication caused by inadequate treatment of domestic and industrial effluents discharged in the country's catchments.[63] Cyanobacteria produce a variety of neuro,[64] hepato[65] and lipopolysaccaride[66] toxins which have been associated with a number of livestock and game deaths in South Africa.[67]

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kill within hours of symptoms showing. The DWAF *Cholera Outbreak in Limpopo and Mpumalanga Provinces* 4 also reported that the outbreak of c*holera* resulted in 3 and 132 fatalities respectively.

59 Water containing nitrate is linked to a condition known as *Methemoglobinema* in infants and pregnant women. See Zeman 2005 *Environmental Health Perspectives* 1371.

60 Ukhahlamba District Municipality 2008 ecdoh.gov.za/press_release/398/Status_of_baby_deaths_in_Ukhahlamba reported that 94 patients were treated in the Eastern Cape for diarrhoea symptoms while 18 babies died. The Ukhahlamba District Municipality attributed these cases to microbiological water quality resulting from sewage spills from catchment based land activities.

61 Elmanama, Afifi and Bahr 2006 *Environmental Research* 25-33.

62 Du Preez, Van Baalen and Swanepoel Date Unknown http://www.ewisa.co.za/literature/files/284%20du%20Preez.pdf attribute water problems such as coagulation, sedimentation, clogging of sand flitters of WWTPs, increased organic overload and the release of odour compounds as well as toxic compounds to cyanobacteria (also referred to as blue-green alga).

63 Du Preez and Van Baalen *Generic Incident Management Framework for Toxic Blue-Green Alga Blooms for Application by Potable Water Suppliers* 65.

64 Neurotoxins disrupt nerve and brain function in both humans and animals. See Center for Earth and Environmental Science Date Unknown www.cees.iupui.edu/education/workshops/…/Presentations/Klaunig.pdf.

65 Hepato toxins affects the liver. See Center for Earth and Environmental Science Date Unknown www.cees.iupui.edu/education/workshops/…/Presentations/Klaunig.pdf.

66 Lipopolysaccaride toxins can illicit irritant and allergic responses in human and animal tissues. See Center for Earth and Environmental Science Date Unknown www2.ib.uj.edu.pl/abc/pdf/45_2/01_manki.pdf.

67 DWAF 1996 *South Africa's Water Quality Guidelines: Domestic Water-Use* 17.

Discharging untreated effluent into water resources not only poses health risks to humans but also have a negative effect on the ecosystem. The following are the effect of untreated sewage into fresh water: (a) sewage affect the dissolved oxygen (DO) levels in the water body causing increased nutrient loads which are dangerous for fish and other aquatic life,[68] (b) sewage increases the turbidity and the amount of sediments in the water which affect the light needed by plants and stunting their growth, (c) these sediments can also smother in-stream habitats, damage fish gills and respiratory structures of other aquatic species[69] as contained in the *2011 State of the Environment Report* (SOeR).[70] This Report shows that the primary result of water pollution is extensive habitat loss, a decrease in biodiversity and an increase in invasive and pest species. In extreme cases, these results may lead to total ecological collapse in the functioning of the natural system of the water resources.

2.2.3 Economic impacts

There are also cost implications associated with untreated effluent water discharged back into water resources. There are high costs incurred from the increased conservation of water resources. The cost of monitoring water quality, management of people and the impacts of odours that affect property market value are all associated with inadequate treatment of effluent water.[71]

Litigation by communities against the state due to sewage in water resources, sewage spillages[72] due to damaged stormwater drainage systems and canals may also result in expensive court cases[73] which are settled with taxes collected from the very same complainants.

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68 Iginosa and Okoh 2009 *International Journal of Environmental Science and Technology* 175-182.

69 Sparks *Effect of Sediments on Aquatic Life* 9.

70 DEA 2011http://www.ngo.grida.no/soesa/nsoer/issues/water/impact.htm.

71 CSIR *A CSIR Perspective on WaterQuality in South Africa* 5.

72 According to DWAF *TheGreen Drop Handbook: Towards Improved Municipal Management*10, "sewerspillage" is defined as an overflow or discharge of wastewater from the sanitary sewer system (sewer mains and wastewater treatment works) that reaches a water resource.

73 For the past few years, service delivery protests have been rife in Municipalities across South Africa, with angry communities demonstrating against poor service performance by Municipalities.Clark

2.3 Defining wastewater treatment

Wastewater treatment refers to the process of removing contaminants from wastewater and household sewage, both runoff (effluent) and domestic. [74] During treatment, toxic or dangerous substances (such as heavy metals or phosphorous which are likely to distort sustainable biological cycles, even after stabilisation[75] of the organic matter), are removed.[76] A wastewater treatment process entails various stages which include preliminary treatment,[77] primary treatment,[78] secondary and tertiary treatment.[79]

2.4 Problems and challenges in relation to WWTPs

2011 http://72.27.231.67/south-africa/impact-service-delivery-south-africa%E2%80%99s-local-Government-elections-0reports on different Municipalities being investigated for fraud, corruption and poor service delivery. Carnie 2008 http://www.iol.co.za/news/south-africa/sewage-overflow-into-rivers-worsening-1.390840, also reported that members of the community were concerned as raw sewage was still passing through the wastewater treatment plant and discharged into rivers causing water-borne diseases such as cholera and dysentery.

74 Riswan Date Unknown http://www.slideshare.net/Atharsaeedi/treatment-of-waste-water.

75 Stabilisation means the degradation of organic matter until the point at which chemical or biological reactions stop.

76 Ulrich, Reuter and Gutterer (eds) *Decentralised Wastewater Treatment Systems (DEWATS) and Sanitation in Developing Countries* 44.

77 Preliminary treatment is the initial stage in treatment which entails the removal of large solid materials such as plastics, cans and paper which might clog the pipes or affect the downstream processes. Thereafter, it goes through a settlement tank/clarifier wherein, soil and small stones are removed, and then it goes to the sedimentation tank and the primary treatment process starts. See New Zealand Institute of Chemistry Date Unknown http://www.nzic.org.nz/ChemProcessess/water/13C.pdf.

78 Primary treatment involves the removal of organic solids through settlement/sedimentation (heavy particles settle below due to gravity) as well as the removal of fats/oil. See New Zealand Institute of Chemistry Date Unknown http://www.nzic.org.nz/ChemProcessess/water/13C.pdf.

79 During the secondary treatment stage, up to 90% of the organic matter is removed by using biological treatment (anaerobic and aerobic) processes. During the anaerobic process, bacteria break the organic matter (no oxygen) and produce carbon dioxide (CO_2) and methane. During the aerobic process (which requires oxygen to feed), the organic matter is broken down and CO_2 and sludge are produced. The tertiary treatment process improves the effluent quality before it is discharged in water resources. The process entails nitrification (oxygen present), denitrification (oxygen absent), filtration and disinfection. Nitrification and denitrification are responsible for the removal of nutrients such as nitrates, ammonia and phosphate. What is left of the liquid/water goes through a filtration process to remove any remaining small suspended particles in the effluent. Any viruses or bacteria that are suspended in the liquid are removed through disinfection (using chlorine or ultra-violet light). See World Bank Date Unknown http://water.worldbank.org/shw-resource-guide/infrastructure/menu-technical-options/wastewater-treatment.

The main causes of inadequate treatment of sewage effluent in WWTPs are, amongst others, poor design and construction, lack of maintenance and skilled operators, non-compliance with applicable legal requirements, lack of proper monitoring, technical and management issues.[80] These challenges are discussed in the study.[81]

In order to ensure that all WWTPs conform to the process requirements the following aspects must be observed:[82] legislative requirements, environmental aspects, critical design and planning criteria, reliability and power consumption, best practice and operations, health and safety and maintenance.[83] For example, in a study conducted at Amahlathi Local Municipality,[84] the discharge of raw sewage from Keiskammahoek WWTP was found to be the cause of increased oxygen demand and nutrient overload of water resources.[85] The problem was traced to a combination of three factors: inadequate treatment works, a malfunctioning pump station and poor planning for expansion. During the planning phase, the Municipality built a small WWTP which did not provide sufficient capacity to treat the existing effluent volumes. The design of the WWTP did not take into consideration population growth in the near future. The constructions of houses in terms of the Reconstruction and Development Programme (RDP) within the area worsened the problem in that more housing units were connected to the same WWTP without considering the low capacity of the plant. No enlargement of the reticulation system or improvements on the capacity of the treatment plant was made, resulting in high inflow load into the Keiskammahoek WWTP. The high inflows led to poor levels of sewage purification, frequent and severe spills into Keiskamma River.[86]

Another factor that contributed to the pollution of Keiskamma River included the malfunctioning of the pump station in which raw sewage would bypass the pumps to be

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80 Swartz *et al, Guidelines for the Sustainable Operation and Maintenance of Small Water Treatment Plants* 40-46.

81 See section 2.5 of this study

82 DPW *Small Wastewater Treatment Design Manual* 1.

83 DPW *Small Wastewater Treatment Design Manual* 1.

84 Momba, Osode and Sibewu 2006 *Water SA* 687-692

85 Morrison *et al* 2001 *Water SA* 475-480.

86 Mema 2010 http://www.ewisa.co.za/literature/files/335_269%20Mema.pdf.

discharged directly into Gxulu River, a tributary of Keiskamma River. The polluted water of Keiskamma River exposed the Keiskammahoek community to serious health hazards as these communities depended on this water source for a variety of activities including drinking and recreation purposes.

The lack of maintenance and skilled operators could also cause problems. In the Eastern Cape Province, 55 WWTPs were surveyed and only 18% complied with the South African Bureau of Standards' (hereafter the SABS) recommended limits in terms of microbiological quality.[87] The major factors that contributed to high bacterial numbers were high turbidity and inefficient chemical (coagulant and chlorine) dosing, which led to low chlorine residuals.[88] It was noted that the lack of required technical knowledge of plant operators, with regard to factors such as flow rating and chemical dosing was one of the reasons why the WWTPs are failing in their provision of safe drinking water to rural communities. In terms of regulations issued in terms of the NWA[89] and the *Water Act* (WA),[90] all Waste Services Institutes (hereafter WSI) are required to classify and register all water services works and process controllers on site.

The required knowledge and skills of process controllers are not only important for the daily operation of a WWTP but also in observing the national standards applicable to water quality. The process controllers have to be aware of the applicable effluent water quality standards as prescribed by the NWA[91] in order to ensure that before the effluent is discharged into any water resource, it is clean and safe for both humans and the environment.

It is against this background that it is necessary to determine what Best Practices regarding WWTPs management exist.

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87 SABS and DWAF *South African Water Quality Guidelines* 1996.

88 Momba *et al* 2006 *Water SA* 715-720. Five District Municipalities (Cacadu, Amatole, Chris Hani, Ukhahlamba and OR Tambo) were surveyed. It was also noted that, although some plants had low bacterial numbers at the point of treatment, bacterial re-growth occurred in the distribution system, thereby compromising the quality of water at the point of use.

89 GN R181 in GG 28557 of 24 February 2006.

90 54 of 1956 (repealed). See also section 3.3 of this study.

91 GN R991 in GG 9225 of 18 May1984.

2.5 Best Practice Guidelines in relation to WWTPs

The DWA, in an effort to combat spills and overflow of wastewater from WWTPs that reach a water resource, developed the *Wastewater Quality Risk Management* (W_2RAP) concept. The DWA identified, *inter alia,* the following challenges by making use of the W_2RAP:[92]

(a) extraneous flows to WWTPs increased as a result of preventative maintenance and the use of sub-standard material;

(b) substantial groundwater infiltration produced a steady base flow which affected the plants' operation and resulted in increased treatment costs;

(c) the inflow of stormwater and surface water was the cause of dramatic peak flows (more than 3 times the normal 15% of the average dry weather flow); and

(d) that South Africa experiences 3.3 blockages/km sewer pipe/annum compared to the international benchmark of 1.2.

The DWA proposed in terms of the W_2RAP, amongst others, the following recommendations to water services authorities to resolve the above-mentioned challenges: (a) to make provision for emergency capacity in sewerage systems and WWTPs; (b) to lay sewerage pipes to a higher specification to minimise infiltration spilling; (c) to refurbish existing deteriorated WWTPs and seal manholes; (d) to manage stormwater inflows, (e) to ensure that building inspectors enforce compliance of regulations and by-laws; and (f) to install billing systems that will report any unusual water consumption in order to respond promptly. In addition to this WWTPs could further be improved by the design and operation that minimises the potential for harm resulting from spills and bypasses and by taking into account, current and future inflows based on population estimation.[93] The plant operators must be certified with the DWA

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92 DWA 2001 *The Green Drop Handbook Towards Improved Municipal Management*8.

93 S 26(e) and (f) Schedule I and II of the NWA further regulates the design, construction, installation, operation and maintenance of WWTPs and control process to be followed in the operation, maintenance administration of the WWTP. Schedule III classify persons according to educational qualifications and experience to be employed for the operation of water works and stipulates the

and fully trained to operate the WWTP and all WWTPs should have adequate level of competent staff.[94] The effective maintenance and operations of water works (including WWTPs) depend on the management practices and operators' responsibilities.[95] Technical guidelines for plant operators and maintenance operators for the sustainable management of the plant have to be compiled in a user-friendly manual suitable for that particular plant.[96] The guidelines should contain management responsibilities, the responsibilities of the operators and propose practices/actions for effective operation and maintenance of the plant.[97]Various audit methods (such as the International Organisation for Standardisation (ISO) and Environmental Management Systems

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minimum number of persons to be employed for the operation of the water care works. See also, GN 718 in GG 32368 of 3 July 2009 of the NEM:WA which provides that, any person who wishes to construct wastewater treatment facilities/sewage works for activities listed in Category B of the Schedule, must conduct an environmental Impact Assessment (EIA) process as stipulated in the EIA Regulations made under s 24(5) of the NEMA as part of a waste management licence application. DEA is currently in the process of amending the NEMA Listing Noticesto include listed activities for the construction and expansion of facilities for waste water treatment works (WWTW) in Listing Notices 1 and 2 (GNR 544-545 in GG 33306 of 18 June 2010) of the EIA Regulations. Meaning the listed activities (GN 718 in GG 32368 of 3 July 2009) under NEM:WA will be repealed upon the insertion of the new listed activities into the EIA Regulations Listing Notices. The new listed activities inGN778 in GG 35716 and GN 779 in GG 35718 of 28 September 2012 are as follows: Listing Notice 1 (GNR 544 in GG 33306 of 18 June 2010) "55A.The construction of facilities for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres;" and "55B.The expansion of facilities for the treatment of effluent, wastewater or sewage on undeveloped land where the capacity will be increased by 15 000 cubic metres or more per day." Listing Notice 2 (GNR 546 in GG 33306 of 18 June 2010) "27. The construction of facilities for the treatment of effluent, wastewater or sewage with a daily throughput capacity of 15000 cubic metres or more." According to Implex 2013 http://www.implex.co.za/_blog/Legal_Update_Bulletin/post/newsflash-16 the main implications of the proposed amendments is that the DEA will no longer be the licencing authority dealing with waste management licencing but Provincial departments responsible for environmental affairs will be the competent authority, unless the WWTP facility falls within one of the areas in section 24C of the NEMA where the Minister is the competent authority. Furthermore, according to Implex 2013 http://www.implex.co.za/_blog/Legal_Update_Bulletin/post/newsflash-16 "[t]he thresholds of the activities have been changed from being measured in terms of annual throughput capacity to being measured in terms of daily throughput capacity. This in effect means an increase in the thresholds." In terms of the new listed activities, only expansion of facilities on undeveloped land will require an environmental authorisation."

94 See in this regard, Brady, Ebage and Lunn *Environmental Management in Organisations* 261-274; 311-334; 357-375.

95 Swartz *et al Guidelines for the Sustainable Operation and Maintenance of Small Water Treatment Plants* 2.

96 Swartz *et al Guidelines for the Sustainable Operation and Maintenance of Small Water Treatment Plants*40-46.

97 Swartz *et alGuidelines for the Sustainable Operation and Maintenance of Small Water Treatment Plants* 9-14.

(EMS)) could be incorporated for continuous improvement in the management and operations of WWTPs.[98]

Between 2002 and 2006 Local Municipalities in Grand River, Ontario Canada developed Best Practice Guidelines (hereafter BPG) to encourage sustainable management of WWTPs.[99] These guidelines prescribe, *inter alia*, that pollutants must be prevented from being discharged into the neighbouring aquatic environment and that WWTPs should remain compliant to applicable legislative requirements. WWTPs should consequently avoid or reduce the frequency and severity of sewage spills into water resources.

The management and operation of WWTPs should be the responsibility of both District and Local Municipalities.[100] Municipalities should prepare action plans and present an implementation programme for maintenance and continuous improvement of the WWTPs. The Ontario guidelines further acknowledge that no two WWTPs are the same and that a Municipality may follow different approaches to reduce the occurrence of high-risk bypasses or spills. The following summarises the best responses in various types of spills and bypasses as set out in the Ontario Guidelines:[101]

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98 Paterson and Kotzé (eds) *Environmental Compliance and Enforcement in South Africa: Legal Perspective* 281. See also Nel and Wessels 2010 *PER* 48-78.

99 This is deduced from the Grand River Municipal Water Managers Working Group *Best Practices: Municipal WastewaterTreatment Plant Bypass and Spill Prevention & Reporting in the Grand River Watershed* available at Grand River Municipal Water Managers Working Group 2009 http://www.grandriver.ca/governance/spillreport2009.pdf.Between 2002 and 2006 local communities within the Grand River, Ontario Canada vicinity started complaining of bypasses or spills of sewage into the Grand River. A working group comprising of senior managers of municipal water and wastewater services met and came up with a report containing the best practices with the aim to reduce the frequency and severity of spills and bypass into the Grand River. The report contained a summary of general causes of spills and bypasses which included: power-failure, equipment failure, maintenance/repairs, damage/blocked sewers and weather related (infiltration/inflow) causes. Other BPG include that (a) operators of WWTPs should have and ensure good communication with other Government stakeholders (other WWTPs operators, DWA, other Government departments and Municipalities), (b) improved understanding of the implications of sewage spills and bypasses; (c) ensure information management and data collection; (d) a need for implementing best practices for improved management of sewage in watershed.

100 Grand River Municipal Water Managers Working Group 2009 http://www.grandriver.ca/governance/ spillreport2009.pdf.

101 Grand River Municipal Water Managers Working Group 2009 http://www.grandriver.ca/governance/ spillreport2009.pdf.

(a) Power outages: All plants should have power backup facilities to mitigate against spills and bypasses in the case of a power outage. Alarm systems may also be installed at strategic points in the treatment process and within the collection system to sense and alert in case of spills and bypasses. A documented action plan for the above must be available at the plant, explaining which actions should be implemented in emergency situations.[102]

(b) Equipment failure-related events: There should be a routine maintenance programme of assets to ensure that the equipment is operational at all times. As in the case of power outages, alarm systems may be installed to alert the standby operators of equipment failure.[103]

(c) Damage to blocked pipes: Action and implementation plans are to be generated to keep record of aging infrastructure and identify areas which have a potential to cause blockages. It is advisable to keep spares of key parts like valves in stock on site.[104]

(d) Weather-related causes (infiltration/inflows): It is advisable that there should be continued monitoring of wastewater inflows in various weather conditions to regulate the levels of infiltration and inflows. It is further recommended that a documented action plan dealing with infiltration and infrastructure replacement must be in place.[105] The document should also include capital and operational budgets and the time frames for implementation and enforcement of applicable municipal by-laws.

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[102] Grand River Municipal Water Managers Working Group 2009 http://www.grandriver.ca/governance/spillreport2009.pdf.

[103] Grand River Municipal Water Managers Working Group 2009 http://www.grandriver.ca/governance/spillreport2009.pdf.

[104] Grand River Municipal Water Managers Working Group 2009 http://www.grandriver.ca/governance/spillreport2009.pdf

[105] Grand River Municipal Water Managers Working Group 2009 http://www.grandriver.ca/governance/spillreport2009.pdf.

In a study conducted by Swatz,[106] it was discovered that Municipalities experienced problems in operating and maintaining their WWTPs on a sustainable basis. The owner of the WWTP is ultimately responsible for effluent treatment and meeting regulatory requirements.[107] It is important that both the Municipality and process controller of the WWTP ensure that there is effective effluent treatment and that the quality meets all applicable requirements. The ultimate goal of the guidelines is to provide and ensure that raw sewage or inadequately treated effluent is not discharged into water resources.[108] The ultimate responsibility and accountability for service delivery rests with the Municipal Manager.[109]

In South Africa, there is a comprehensive legislative framework that regulates WWTPs and it aims to control and reduce the adverse impacts associated with WWTPs on the people and the environment. In the following section, the legislative framework for Local Government (which includes the Constitution, the Structures Act and the MSA) and legislation such as the WSA and the NWA and their relevance to WWTPs will be considered.

3 Legal framework regulating WWTPs

WWTPs in South Africa are regulated, *inter alia,* by the Constitution, the NEMA, the NWA, the WSA, the Structures Act, the MSA and other Government policies applicable to Local Government. These instruments, together with the authorities responsible, form the framework within which South Africa's environmental legislation operates in respect of WWTPs. This section discusses the applicable legislative framework, policies and authorities responsible in varying detail depending on the extent of their relevance to the aim and scope of the study. The constitutional mandate, Local Government and applicable policies and legislation are discussed below.

106 WRC *Guidelines for Upgrading of Small Water Treatment Plants* 4.20.
107 WRC *Guidelines for Upgrading of Small Water Treatment Plants* 4.14.
108 WRC *Guidelines for Upgrading of Small Water Treatment Plants* 4.14.
109 S 55(1)(d) of the MSA.

3.1 Constitution

As stated earlier,[110] the Constitution provides that every person has the right to an environment that is not harmful to their health or well-being.[111] Section 24(b) of the Constitution mandates that the environment should be protected, for the benefit of the present and future generations through reasonable legislation and other measures that prevent pollution and ecological degradation.[112]

Chapter 7 of the Constitution also states that Local Government has the environmental responsibility to provide a safe and healthy environment to its communities.[113] Local Government is regarded as the sphere of Government that function closest to the community and has an obligation in the rendering of essential services.[114] The obligation therefore includes the duty on the part of Local Government to protect water resources from pollution resulting from untreated effluents.[115] This obligation by Local

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110 See section 1 of this study.

111 S 24(a) of the Constitution. See also, Feris 2008 *SAJHR 7*; Kidd *Environmental Law* 22-26; Glazewski *Environmental Law in South Africa* (2000) 86;Du Plessis A *PER* 2006 8-9.The Constitution acknowledges that environmental degradation may threaten not only the health, livelihood and lives of humans, but continued existence of the human race. Constitutional rights are basic condition for human existence. In the unreported case of *Fuel Retailers Association of Southern Africa v Director General Environmental Management* CCT 67/06 par 102, the court emphasised that an environmental right has to be protected for the benefit of the present and future generation. See in this regard, Kotzé 2003 *PER* 81.

112 Ss 24 and 27 of the Constitution require the state through reasonable measures to achieve their constitutional mandate. In the case of *Mazibuko and Others v City of Johannesburg and Others* 20104 SA 1 (CC) par 19 which deals with the right to water, though the Court specifically referred to s 27 of the Constitution which requires the state to take reasonable legislation and other measures progressively to achieve the right of access to sufficient water, s 24(b) if read together with s 7 of the Constitution the positive legal obligation on the state to take reasonable legislation and other measures is similar to those required under s 27. Feris 2008 *SAPR/PL* 198 states that s 24(b) is more of a directive principle having a character of a socio-economic right which imposes the constitutional obligation on the state to *inter alia,* prevent pollution and environmental degradation for the benefit of present and future generations. Du Plessis 2011 *RECIEL* 317 state that "the right of access to water is a socio-economic, but nonetheless enforceable right." See also, Glazewski *Environmental Law in South Africa (*2005) 78.

113 S 152(1)(d).See also, Kotzé 2003 *PER* 81, s 24(b) of the Constitution contains directive principles and therefore resembling the character of a socio-economic right that imposes duties on the State to protect the environment (which includes pollution prevention by WWTPs) for present and future generations through reasonable legislation and other measures.

114 Bekink *Local Government Law* 16.

115 Sch 4B of the Constitution.

Government is further echoed in the principles of NEMA. The first principle in NEMA[116] which is of relevance to Local Municipality provides that:

> environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.

Further, NEMA[117] provides that for the benefit of the present and future generations all spheres of Government must *inter alia*, avoid pollution and degradation of the environment.

In the paragraphs that follow, a brief discussion of the role, functions and powers of Local Government as enshrined in the Constitution and other related legislation in respect of WWTPs are presented.

3.2 Structures Act

The objective of the Structure's Act is *inter alia*, to provide for the establishment of Municipalities, to establish the criteria for determining the categories and types of Municipalities and to provide for appropriate division of Municipalities.[118] Local Government is divided into three categories of Municipalities, namely; Category A, Category B and Category C Municipalities.[119]Category A is a Metropolitan Municipality that has exclusive municipal executive and legislative authority in its area.[120] A Metropolitan Municipality is an area of high population density, with intense movement of people and goods and extensive development with multiple business and industrial areas.[121] It is a Municipality with a strong interdependent social and economic linkage between its constituent units and a centre of economic activities.[122] Category A

116 S 2(2) of NEMA.
117 S 2(4)(a)(ii) of NEMA.
118 See long title of the Act.
119 S 155(1) of the Constitution and ch1 of the *Local Government Municipal Structures Act* 117 of 1998 (hereafter the Structures Act).
120 S 155(1)(a) of the Constitution.
121 S 2(a) of the Structures Act .
122 S 2(b)-(d) of the Structures Act.

Municipalities will not be discussed as they are not relevant for this study. A Category B Municipality is a Local Municipality which shares its municipal executive and legislative authority in its area with a Category C Municipality (District Municipality) within whose area it falls.[123] A Category C Municipality is defined as:

> a municipality that has municipal executive and legislative authority in an area that includes more than one municipality.[124]

A District Municipality is thus composed of a number of Local Municipalities. Limpopo Province has only Categories B and C Municipalities.

A District Municipality has more than one Local Municipality within its area of jurisdiction.[125] The powers and functions of a District Municipality are defined in section 84(1)(a)-(p) of the Structures Act.[126]A Local Municipality's powers and functions are defined in section 84(2) of the Structures Act.[127] The District Municipality's functions *inter alia,* include water services, sanitation and sewage purification. With the amendments to the Structures Act,[128] the functions of District Municipalities shifted from being coordinators to direct service providers.[129] This means functional areas traditionally performed by Local Municipalities were now the responsibility of District Municipalities. The powers and functions of the District Municipality are defined in section 84 (1)-(3) of the Act[130] and the Local Municipality's powers and functions are

123 S 155(1)(b) of the Constitution.
124 S 155 (1)(c) of the Constitution.
125 S 155(1)(c) of the Constitution.
126 The functions of District Municipalities as provided by s 84(1) of the Structures Act include: development of an integrated development plan (IDP); infrastructural development agents (such as bulk supply of water, sewage purification works which affect a significant proportion of the District); capacity-building of category B Municipalities; and to provide and maintain administrative capacity where inadequate.
127 S 85(2) provides that the function and powers of a Local Municipality are those defined in s 156 and s 229 of the Constitution, excluding those mentioned in subsection 1.
128 *Municipal Structures Amendment Act* 33 of 2000 (hereafter the MSAA)
129 Steytler 2003 *Law, Democracy and Development* 228.
130 The functions of district municipalities are define as: a wide range of planning and development (IDP); infrastructural development agents (such as bulk supply of water, sewage purification works which affect a significant proportion of the district); capacity-building of category B municipalities; and to provide and maintain administrative capacity where inadequate.

defined in section 84 (2) of the Act.[131] The amendment of the Structures Act altered the policy originally envisioned by the *White Paper*.[132] These amendments not only caused confusion amongst District and Local Municipalities as to their powers and functions, but also hampered service delivery (including the management and operation of WWTPs).[133]The amendment to the Structures Act does not, however, preclude Local Municipalities from performing District municipal functions except those defined in section 84(1)(a), (o) or (p).[134] The Minister or Member of the Executive Council (MEC) of a Local Government may, subject to other legislative provisions, adjust powers and functions between a District and Local Municipality[135] if the responsible Municipality in which the function of power is vested, lacks the capacity to perform that function or to exercise that power.[136]

If the provision of basic services by a District or Local Municipality collapses due to lack of capacity or other reasons, the MEC in the Province may, after written notice to the District or Local Municipality and with immediate effect, allocate any functions and powers necessary to restore or maintain those basic services, to a Local Municipality which falls within the area of jurisdiction of that District Municipality or to the District Municipality in whose area that Local Municipality falls, as the case may be.[137] In the event of a dispute between a District and a Local Municipality concerning the

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131 S 85 (2) provides that local municipality's function and powers are those defined in section 156 and section 229 of the Constitution, excluding those mentioned in subsection 1.

132 *White Paper on Local Government* 1998 69-72.

133 See Ministerial Advisory Committee on Local Government Transformation *Interim Report on the Challenges Facing Local Government* 44 available at http://www.docstoc.com/docs/24047764/Ministerial-Advisory-Committee-on-Local-Government-Transformationwherein it is stated that after an assessment of authorisation made in 2001, the Ministerial Advisory committee found that the authorisation resulted in uncertainty between District and Local Municipality due to the fact that the Municipalities were anticipating and insisting that the division of power and function be adjusted in compliance with s 84 of the Structures Act.

134 These functions are the development of an Integrated Development Plan, receipt, allocation and distribution of grants made to District Municipality and the collection of taxes and levies. See also in this regard, section 4.4 of this study.

135 S 85(1) of the Structures Act.

136 S 85(2)(a) of the Structures Act subject to the recommendation of the Municipal Demarcation Board. The shifting of executive powers has financial implications as well. Local Government's revenue base is mostly comprised of user charges. In terms of s 229 of the Constitution, Municipalities derive their revenue-generation from imposing rates and surcharges on service provided such as water supply and sewage disposal at WWTPs. Meaning, shifting the functions or powers influence the revenue derived from delivery of the service.

137 S 87(1) of the Structures Act.

performance of a duty or the exercise of power that falls under both Municipalities, the MEC for Local Government in the Province, may by notice in the *Provincial Gazette,* resolve the dispute by defining their respective roles in the performance of that function or in the exercise of that power.[138]

It is evident that the provision to adjust the powers and functions inter-changeably between District and Local Municipalities would require cooperation between the different Municipalities.[139] Cooperative Government is not only important between Local Government and other spheres of Government, but also between Municipalities *inter se*.[140] In order to enhance such cooperation, Municipalities as service providers in relation to WWTPs, should not exercise their sovereignty independently, but must exercise their powers and duties under the supervision of both Provincial and national Government.[141] Cooperation may include financial, technical and administrative support services by both Provincial and National Government, if capacity allows.[142]

Section 156 of the Constitution provides that Municipalities have executive and legislative powers to administer all the affairs listed in Schedule 4B and 5B of the Constitution.[143] In accordance with Schedule 4B, the following functions fall within the powers of Local Government: air pollution, building regulations, municipal planning, local tourism, municipal public transport, municipal health services and municipal public works. Other services include *inter alia,* stormwater management systems in build-up areas and water and sanitation services limited to potable water supply systems, and

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138 S 86 of the Structures Act.

139 S 41(1)(h) of the Constitution. See also Kotzé 2006 *PER* 99 where it is stated that co-operative governance is a mechanism, or strategy, that may be used to facilitate acceptable and sustainable inter-Governmental relations. In *Uthekele District Municipality and Others v President of the Republic and Others* 2003 1 SA 678 (CC) par 13, the Constitutional Court was of the view that organs of state must exercise their powers of fulfil their obligations in co-operation with other state organs. See Du Plessis 2006 *PER* 5 and Du Plessis 2010 *StellLR* 277.

140 S 88(1)-(3) of the MSA provides that the District Municipality and the local Municipality must co-operate and support one another. S 41 of the Constitution requires spheres of Government to cooperate in mutual trust and in good faith in order to promote effective interGovernmental relations and to resolve their disputes internally as opposed to litigating against each other. See also, Malan 2005 *Politeia* 227-228.

141 Malzbender *et alReview of Regulatory Aspects of the Water Service Sector* 38.

142 Bekink *Principles of South African Local Government Law* 227.

143 See section 1 of this study on municipal executive and legislative powers.

domestic wastewater and sewage disposal systems. The municipal functional areas in Schedule 5B *inter alia* includes refuse removal, refuse dumps and solid waste disposal, noise pollution, municipal parks and recreation. However, none of the functions in Schedule 4B are allocated to Local Government exclusively.[144] The significance of these powers is that, they are 'core' functions of Local Government and can only be removed or amended by the Constitution.[145]

The Constitution describes the role that Local Government should play and provides a framework within which to attain its constitutional mandate. In terms of the Constitution, the objective of Local Government *inter alia,* is to ensure services to their communities in a sustainable manner[146] promote a safe and healthy environment[147] and encourage community involvement in matters of Local Government.[148] These objectives are focused on providing a safe and healthy environment (which includes the provision of basic sanitation) in a sustainable matter. These objectives also require Local Government to develop policies and pass by-laws to attain these objectives.[149]In order to address water pollution, Municipalities should promote compliance with legal requirements regulating environmental pollution and also draft and administer by-laws for the effective administration of matters which they have the right to administer.[150]. In the absence of by-laws, any Municipality may request the Director General for assistance in preparing the by-laws affecting a particular aspect of the environment such as effluent treatment and disposal.[151]Though it is not mandatory for Municipalities

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144 The Constitution states that Sch 4B are functional areas of concurrent national and Provincial legislative competence to the extent set out in s 155(6)(a) and (7).

145 De Visser *Developmental Local Government: A Case Study of South Africa* 79.

146 S 152(1)(b) of the Constitution.

147 S 152(1)(d) of the Constitution.

148 S 152(1)(e) of the Constitution. According to Bekink *Principles of South African Local Government Law*16 Local Government is considered the cornerstone of ensuring an overall democratic Government brings decision-making process closer to the local people thus ensuring public involvement.

149 S 11(3)(m) of the MSA; s 156(2) of the Constitution.

150 S 156(2) of the Constitution. See also s 21(1) of the WSA and Department of Environmental Affairs and Development Planning 2007 *Decision-making for Sustainable Development: Guidelines for Municipalities* 20-21 on the authority of Municipalities to draft by-laws.

151 S 46(2) of the NEMA which provides for Model Environmental By-laws (MEBs). See also s 21(4) of the WSA. See also DWAF 2004 http://intertest.dwaf.gov.za/dir_ws/waterpolicy/vdFileLoad/file.asp?ID=422. In response to s 21(4) of the WSA, the DWA developed Model By-laws to guide water services authorities to develop and implement their by-laws such as Water Services By-Laws

to draft by-laws, section 21(1)(a)(b) of the WSA provides that every Water Service Authority must draft by-laws which provides for, *inter alia,* the standard of the services and quality of the standards relating to water services and basic sanitation.

3.3 MSA

The main aim of the MSA is to regulate Municipalities. The objective of the MSA is to provide core principles, mechanisms and processes that are necessary to enable Municipalities achieve the vision of developmental Local Government.[152] While the Structures Act deals with structures and powers of Local Government, the MSA is focused more specifically, amongst other things, on environmental protection and management. The MSA specifically states that it is the duty of the Municipal Council to promote a safe and healthy environment in the community.[153] The Act also recognises that physical infrastructure is needed to provide a particular service. WWTPs need to be built or upgraded, maintained and properly operated in order to treat effluent before it is discharged into water resources.[154] Failures to design, build, maintain and upgrade (when required) infrastructure associated with WWTPs has the potential to affect water quality which is essential for human use and the environment.[155] The sustainable service of wastewater treatment and disposal is only possible if supplemented by proper maintenance and management plans.[156]

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within their respective Municipalities. See also, s 14(2) of the MSA which provides that the MEC for Local Government may design and adopt standard draft by-laws for example by-laws dealing with matters affecting the environment in Sch 4B of the Constitution.

152 According to Bekink *Local Government Law* 70 developmental government refers to Local Governments that are committed to working with the people within their respective communities in an effort to find sustainable ways to meet their different social, economic and material needs and improve their overall quality of life.

153 S 4(2)(i) of the MSA.

154 S 73(2) of the MSA.

155 Nel, Du Plessis and Retief *The Local Government Sustainability Interface: Key Elements for Environmental Action* 53-54 (unpublished paper).

156 According to Du Plessis 2011 *RECIEL* 316-377 an effective environmental infrastructure, such as a WWTP to treat wastewater before it is disposed into a water resource, has a direct impact on the ability of people to live a dignified life.

3.4 NWA

The NWA is the primary legislation regulating the management of water resources in South Africa, including effluent quality. The NWA provides that water is a scarce national resource and that it should be protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons and in accordance with the constitutional mandate.[157] In order to meet these objectives, the Minister of Water and Environmental Affairs is empowered to regulate and prescribe waste standards which specify the quantity, quality and temperature of waste which may be discharged or deposited into water resources.[158] This would include *inter alia,* reducing and preventing pollution and degradation of water resources.[159] WWTPs are but one of many sources which may cause water resources to be polluted through the discharge of untreated or inadequately treated sewage into water resources.[160]

The National Government's overall responsibility to manage water resources includes the equitable allocation and beneficial use of water in the public interest.[161] Further to that, section 21(f)-(h) emphasises the responsibilities and conditions for discharge of wastewater into water resources by WWTPs. The Act provides that a person wishing to use water must have a license to do so, unless exempted from doing so in terms of the Act.[162]In the event that a person is unable to meet the requirements of the general

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157 S 3(1) of the NWA.

158 S 26(1)(h) and (i) of the NWA. GN R1191 in GG 20526 of 8 October 1999 (repealed by GN R991 in GG 9225 of 18 May 1984) the standards are divided into special and general standards. The special standard regulates the quality of effluent arising in catchment areas/tribunals in Sch 1 of the NWA from on point source to non-point source. The general standards regulate all other areas not mentioned in Sch 1 of the NWA.

159 S19 of the NWA.

160 See section 1 of this study.

161 S 21 of the NWA.

162 S 22(1) of the NWA provides that a person is exempted from the licensing requirement if: (i) the water use is permissible under Schedule 1; (ii) the water use is permissible as a continuation of an existing lawful use; or (iii) the water use is permissible in terms of a general authorisation issued under section 39 (discharging of waste containing waste generated through any industrial activity or by a waterworks, discharge of waste or water containing waste into a water resource which may be a detrimental effect to a water resource such as a WWTP would require a general authorisation).

authorisation[163] either in terms of volume or quality, they must apply to the DWA for a licence to discharge.[164] In terms of the NEM:WA, any person wishing to conduct certain waste management activities that may have a detrimental effect on the environment and human heath, is required to have a licence[165] before commencing or undertaking a waste management activity.[166]

The NWA requires an owner of land (including Municipalities) or any person in control of the land where any activity which caused or may cause pollution of a water resource, to take all reasonable measures to prevent such pollution from occurring or continue to occur or recurring.[167] This sentiment is also expressed in section 28 of the NEMA which deals with the duty of care and remediation of environmental damage. In the event of pollution, the owner or the person in control of the land should take measures to remedy the effect of such pollution.[168] Failure to comply with these directives[169] may lead to the imposition of a penalty.[170] Section 151 of the NWA also grants the courts powers to impose a fine or imprisonment if any provision of the Act is contravened.[171]

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163 S 39 of the NWA provides that general authorisations may be restricted to a particular water resource, a particular category of persons, a defined geographical area or a period of time, and requires conformity with other laws. The use of water under the general authorisation does not require a license until the general authorisation is revoked, in which case licensing will be necessary.

164 S 22 of the NWA.

165 Chapter 4 of the NWA provides that a person can only be entitled to use water if the use is permissible under the Act. Water use *inter alia,* includes wastewater discharge. Water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence

166 GN 718 in GG 32368 of 3 July 2009 provides that treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more falls under listed activities in Category B(7) of the NEM:WA and requires a licence as stipulated in the EIA regulations made under s 24(5) of the NEMA.

167 S 19(1)(b) of the NWA.

168 S 19(2)(e) and s 20(4)(c) of the NWA.

169 S 53(1) of the NWA. See also Paterson and Kotzé *Environmental Compliance and Enforcement in South Africa: Legal Perspective* 226.

170 S 19(4) and (5) of the NWA. See also s 48(4) of the NEMA, Paterson and Kotzé *Environmental Compliance and Enforcement in South Africa: Legal Perspective* 226.

171 S 151 of the NWA provides that any person who contravenes any provision of the Act is guilty of an offence and liable on the first conviction to a fine or imprisonment for a period of five years, or to both a fine and such imprisonment and in the case of a second or subsequent conviction, to a fine or imprisonment for a period not exceeding ten years or to both a fine and such imprisonment.

The Act further states that a responsible authority may give a directive to a person who contrived to take remedial action to rectify the pollution within a stipulated time.[172] Failure to act within the stipulated time may result in criminal sanctions as in the matter wherein the NPA and DWA instituted criminal action against the Municipal Manager of Matjhabeng Municipality.[173] This happened after the Odendaalsrus WWTP was decommissioned and as a result, the sewer flow was diverted to neighbouring ponds. From the ponds, the water overflowed into a neighbouring wetland and finally into the Losdoring Spruit. The wetland acted as a temporary filter, diminishing the effect of pollution and aiding in the decomposition process. However, the wetland became saturated and could not provide further reprieve. The NPA, together with the DWA, instituted criminal actions against the Municipal Manager (and others) of Matjhabeng Municipality for failing to comply with the directive to show remedial actions for the pollution caused.[174] It should be noted that, if the Municipality fails to implement the directive and continues to discharge sewer into water resources, the Provincial Executive may assume the responsibility to remedy the situation.[175]

3.5 WSA

The WSA is a regulatory framework which provides the parameters within South Africa which water services should be provided. The WSA, as in accordance with the Constitution, supports the constitutional right to have access to basic water supply and basic sanitation[176] and an environment that is not harmful to people's health and well-being.[177] Such provision is subject to certain national standards and norms which would

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172 S 53 of the NWA.

173 DWAF *Update of the Matjhabeng Directive* 2.

174 See in this regard, Pejan and Emmerson 2012 http://www.award.org.za/File_uploads/File/Municipal%20manager%20case%20study.pdf. The citation of the case is unknown, however, it is referred to as the Odendaalsrus-case. At the time of writing, the defendants have yet to plead and the criminal action has still not gone to trial due to several adjournments requested by the lawyers involved and due to other unforeseen circumstances. See also, De Wet 2013 http://www.beeld.com/nuus/2013-10-02-rioolvuil-het-nie-ras-of-status.

175 S 139(1)(b)(i) of the Constitution and s 105(1) of the MSA.

176 S 3 of the WSA. In *Bejav Premier of the Western Cape* 2011 (10) BCLR 1077 par 142-143, it was recognised that people's dignity is affected by lack of provision of basic services which include sewage disposal systems in terms of Sch 4 Part B of the Constitution.

177 S 24(a) of the Constitution. Also see Thomson 2006 *Water Law* 204-207.

regulate the quality of water to ensure that it is safe for humans and the environment.[178] The Water Services Authorities[179] have the ultimate responsibility, in addition to water supply services, to also ensure that communities in their area of jurisdiction have access to sanitation services.[180] Sanitation services is more than the provision of toilets, it is a process of sustained environment and health improvement.[181] This responsibility extends further to how the sewer is transported, disposed and treated at a WWTP.[182] WWTPs that do not function optimally are already a major cause of pollution and, therefore, concern. The Water Service Authority responsible for the collection, treatment and discharge of wastewater is required to ensure that WWTPs comply with compulsory national standards relating to the construction and functioning of WWTPs.[183]The problem is further worsened by the construction of poorly dimensioned WWTPs and a lack of experienced or qualified personnel.[184] In terms of the regulations process, controllers are required to be registered according to the relevant legislation[185] and must be licenced according to the class of the WWTP.[186] The WWTP must have a site-specific operator's manual to guide the process controllers.[187]

The Minister may prescribe compulsory national standards relating to the quality of water taken from or discharged into any water services or water resource system[188]in

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178 S 2 of the WSA.

179 Water Service Authorities refers to all Metropolitan Municipalities, many District Municipalities and authorized Local Municipalities who have the constitutional responsibility for the provision of water services within their areas of jurisdiction. They may undertake these activities themselves and/or contract an external water services provider to undertake these activities on their behalf.

180 S (1)(xx) of the WSA.

181 DWAF 2001 *White Paper on Basic Household Sanitation* 11-12.

182 The World Health Organisation, Date Unknown http://www.who.int/topics/sanitation states that: "Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces. Inadequate sanitation is a major cause of disease world-wide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities. The word ‘sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal."

183 GN R813 in GG 36958 of 23 October 2013 Sch I and II (repealed by GN R2834 in GG 10048 of 27 December 1985). S 9(1)(f) of the WSA.

184 See section 3.5 of this study.

185 GN R813 in GG 36958 of 23 October 2013.

186 GN R813 in GG 36958 of 23 October 2013 deals with the erection, enlargement, operation and registration of water care works which ensures that operators with relevant qualifications were running the different classes of water works.

187 GN R813 in GG 36958 of 23 October 2013.

188 S 9(1)(b) of the WSA.

terms of the NWA[189]and the construction and functioning of water services works.[190] The Constitution and WSA are clear when it comes to the duty of Government to provide an environment that is not harmful to people's health and well-being.[191]In *Federation for Sustainability Development v Minister of Water Affairs,* [192]the community of Silobela in Mpumalanga instituted a claim against the Municipality for failure to provide safe drinking water. Though the case focused on the provision of water, the court ruled that the right to sufficient water in terms of section 27(1)(b) extends to the right to health and well-being. The court was of the view that an obligation is placed on all spheres of Government to ensure a healthy environment to the communities.[193] Municipalities should construct, operate and maintain WWTPs in accordance with applicable legislation in order to avoid sewer spillages and discharging inadequately treated effluent into water resources.[194]

The DWA developed the Green Drop certificate programme to progressively improve the status of WWTPs and to encourage municipal compliance with wastewater legislation.

3.6 Green Drop Assessment Programme

The Green Drop process is an incentive-based regulatory system developed by the Minister for WWTPs.[195] The process measures and compares the results of the performance of water services authorities and award or penalise them on evidence of their excellence or failure according to compliance with the minimum standards or regulations provided. The objective of the Green Drop Certificate Programme is to ensure progressive improvement in the operation of WWTP in order to avoid untreated

189 GG R1191 in GG 20526 of 8 October 1999 (repealed by GN R991 in GG 9225 of 18 May 1984).
190 S 9(1)(f) of the WSA. Water services works include sewage treatment plants/WWTPs to dispose effluents.
191 See also s 2.5 of this study. Inadequate infrastructure can cause sewer spillage and overflow leading to diseases.
192 *Federation for Sustainability Development & Others v Minister of Water Affairs & Others* 35672 (2012) ZAGPPHC 128 (SCA) (hereafter the Federation for Sustainable Development-case).
193 *Federation for Sustainable Development*-case par 13.
194 See section 2.3 of this study.
195 DWA 2011 http://www.dwaf.gov.za/Documents/GD/GDIntro.pdf.

effluents from being discharged into water resources. The whole aim of the programme is to award water services authorities which complied with the standards and other best practice requirements set by DWA with a Green Drop Status.

The risk-based programme[196] allows the Municipality to identify and prioritise the critical risk areas within its wastewater treatment process and take corrective measures.[197] The risk analysis guides the Regulator to identify, quantify and manage the corresponding risks according to their potential impact on the water resource and to ensure a prioritised and targeted regulation of high risk Municipalities.[198] The Green Drop requirements assess the entire function of the Municipality with regards to service delivery as a whole, while the risk analysis focuses mainly on the treatment process of the WWTPs. The programme consolidates the results of each Province in the country and compares them in terms of higher-to lowest Provincial performers. It provides Municipalities with a comparative guideline where they rank in comparison to their sister Municipalities and with regard to their own performance.

3.7 W2RAP

The W_2RAP, developed by the DWA and the Water Research Commission,[199] is an operational and management guideline for Municipalities to identify, quantify and manage risk according to the potential and probable impact of untreated effluents on the

196 The risk-based programme is used by the regulator to have an insight into the treatment component of the Municipality which is one of the high risk components within the production chain (production of sewage, transport and treatment and discharge or re-use of final effluent or sludge). The risk analysis focuses on the wastewater treatment function of a WWTP, specifically compared with the Green Drop assessment that concentrates on the entire business of the Municipality. See DWA 2011 http://www.dwaf.gov.za/Documents/GD/GDIntro.pdf.

197 DWAF *2011 Green Drop Assessment* 1. See also DWA 2011 http://www.dwaf.gov.za/Documents/GD/GDIntro.pdf.

198 DWAF *2011 Green Drop Assessment* 2. See also DWA 2011 http://www.dwaf.gov.za/Documents/GD/GDIntro.pdf.

199 DWA and WRC 2010 *A Guideline to Plan and Manage Towards Safe and Compliant Wastewater Collection and Treatment in South Africa* 1.

receiving water resources.[200] The process enables water management professionals to be able to define control points and risk management procedures for the operation and maintenance of WWTPs. The plan further encourages Municipalities to be more proactive and practical in order to improve their wastewater services management.[201]

The W_2RAP is supported by legislative provisions[202] and municipal business requirements such as the IDP and Quality Management Systems (QMS).[203] The W_2RAP has to comply with certain QMS such as ISO 9001.[204] The QMS also includes standard operating procedures such as data capturing, equipment malfunctioning, reporting and preventative and mitigation factors.[205]

The W_2RAP is therefore a direct instrument that Municipalities may use to improve the management of their WWTPs.

4 *Governance of WWTPs within Local Government*

In order to achieve proper management of WWTPs at the local level, it is necessary to discuss local environmental governance, environmental tools and alternative service delivery in Local Government.

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200 Van der Merwe-Botha and Manus *A W_2 RAP Guideline: To Plan and Manage Towards Safe and Complying Municipal Wastewater Collection and Treatment in South Africa* 10.

201 DWA *2011 Green Drop Assessment 2*.

202 Such as the incentive-based regulations and the risk-based regulations discussed in section 3.4 of this study. See also DWA and WRC 2010 *A Guideline to Plan and Manage Towards Safe and Compliant Wastewater Collection and Treatment in South Africa* 9.

203 Van der Merwe-Botha and Manus *A W_2 RAP Guideline: To Plan and Manage Towards Safe and Complying Municipal Wastewater Collection and Treatment in South Africa iii.*

204 QMS in terms of (ISO) 9001:2000– the standard provides examples of the service and associated processes that Local Government should strive to improve the quality and consistency of service delivery. See ISO Date Unknown http://www.iso.org/iso/home/news_archive/news.htm?refid.

205 Van der Merwe-Botha and Manus *A W_2 RAP Guideline: To Plan and Manage Towards Safe and Complying Municipal Wastewater Collection and Treatment in South Africa* 13.

4.1 Local environmental governance

Local Government may be described as the sphere of Government that is closest to its constituents and responsible for rendering a wide range of services that materially affect the daily lives of the inhabitants residing within its area of jurisdiction.[206] In the context of their everyday lives, it is the only level of Government that has constant impact on the physical and human social environment within which humans live.[207] Its closeness to the people involves the rendering of services such as *inter alia,* the provision of potable water and domestic wastewater and sewage disposal services.[208]

In line with the Constitution[209] and the mandates of Local Government,[210] Municipalities play an important role in environmental conservation and sustainable development pursuant to local environmental governance (LEG).[211]

LEG can be defined as:[212]

> The management process executed by Local Government and communities to holistically regulate human activities and the effects of these activities in their own and the total environment (including all environmental media, and biological, chemical, aesthetic, cultural and socio-economic processes and conditions) at local levels; by means of formal and informal institutions, processes and mechanisms embedded in and mandated by law, so as to promote the present and future interest human beings hold in the environment. This management process necessitates a collection of legislative, executive and administrative functions, instruments and ancillary processes that could be used by Local Government, the private sector and citizens to pursue sustainable behaviour within the community as far as products, services, processes, tools and livelihoods are concerned, both in a substantive and procedural sense.

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206 Venter *Government and Politics in the New South Africa: An Introductory Reader to its Institutions, Processes and Policies Development Southern Africa* 371-373.

207 Box *Citizen Governance: Leading American Communities into the 21st Century* 41.

208 S 84(1)(b) and (d) of the Structures Act.

209 See section 3.1 of this study.

210 See section 3.1 of this study.

211 The WCED Date Unknown http://www.un-documents.net/ocf-02.htm defines sustainable development as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs."

212 Du Plessis 2010 *Stellenbosch LR* 265-297.

It may be concluded from the above definition that Local Government promotes the interests of present and future generations, which conforms to the principle of sustainable development. The definition encapsulates all the elements that affect WWTPs in that it covers the following: (i) section 24 of the Constitution which is an enforceable environmental right which in respect of Local Government, must be exercised at a local level; (ii) the process or instruments referred to in the LEG include Local Government programmes aimed at reducing water pollution such as the use of its Water Quality Management (WQM)[213] under environmental management;[214] (iii) activities (referring to the formation of partnerships such as Public Private Partnerships (hereafter PPPs) where the Municipality is unable to provide a service such as sewage treatment and disposal);[215] and (iv) services and tools (referring to municipal services such as wastewater treatment and disposal, management and operation of WWTPs). The definition of LEG also addresses issues such as the rights and duties of not only Local Government but also of the private sector and citizens who have the responsibility of protecting the environment. Water Services Authorities should ensure that WWTPs comply with applicable national standards relating to the construction and functioning of WWTPs.[216] Communities also have the responsibility to pay for services to enable Municipalities to provide a sustainable service and in turn the Municipalities need to also educate the people about their role and functions.[217]

Local Government therefore has a constitutional obligation to govern people and provide services in a sustainable manner. Sustainability in this context means that, there should be adequate resources (human and financial) to operate, maintain, rehabilitate and expand wastewater services.[218] This extends to equipment, technical and management skills to install, operate, maintain and use the necessary infrastructure

213 Water quality management deals with the quality of water and whether it is suitable for its intended use such for drinking, mining, industrial or agricultural purposes. See in this regard, DWAF Date Unknown http://www.dwaf.gov.za/Dir_WQM/wqmFrame.htm.
214 Du Plessis 2010 *Stellenbosch LR*265-297.
215 See section 4.4.1 of this study.
216 GNR 813 in GG 36958 of 23 October 2013. See also s 9(1)(f) of the WSA.
217 DWAF *1994 Water Supply and Sanitation Policy* 9.
218 DWA *2002 Draft White Paper on Water Services* 8.

to provide the service.[219] Experienced and qualified process controllers are central in the operation, maintenance and management of WWTPs in order to treat and purify wastewater in terms of legally prescribed standards.[220] The inability to provide proper wastewater treatment services in a sustainable manner may negatively affect the relationship between the Municipality and the community to whom it must provide the service to. This may result in civil actions against the Municipality and the non-payment of levies by consumers, which may increase the inability of the Municipality to provide service to the people on a continuous basis.[221]

Although Local Government has the right to govern affairs of its communities on its own initiative, it is subject to Provincial and National legislation.[222] Therefore Municipalities as service providers may not exercise their autonomy independently but perform their functions and powers under the supervision of Provincial and National Government.[223] In order to achieve this objective, there should be cooperation and consultation between all spheres of Government on issues of mutual interest, such as regulation, maintenance and operations of WWTPs.[224] This cooperation is discussed below.[225]

4.2 Intergovernmental tools

The *Intergovernmental Relation Framework Act*[226] (IGRFA) was enacted pursuant to co-operative governance. One of the objectives of the IGFRA is to facilitate efficient, effective and transparent intergovernmental relations in order to secure the well-being of

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219 Thompson *Water Law* 693.

220 DWAF *2005 Water Services Infrastructure Asset Management Strategy Study* 11 wherein it is stated that the delivery of services does not end with commissioning of the infrastructure. Once it has been commissioned, the activities necessary to ensure that it continues to perform its function must be carried out. Delivery needs to be universally understood as embracing, not just the placing in service of infrastructure and facilities, but the management of that infrastructure or facility for its designed life.

221 Braun 2010 http://newswatch.nationalgeographic.com/2010/11/05/water_crisis_looms_in_south_africa.

222 S151(3) of the Constitution.

223 S155(7) of the Constitution. See also Malzbender *et al Review of Regulatory Aspects of the Water Services Sector* 38.

224 See the discussion of co-operative Government in section 3.1 of this study.

225 See section 4.2 of this study.

226 13 of 2005.

the people and the progressive realisation of their constitutional rights.[227] The Act provides a framework within which all spheres of Government work together and integrate, as far as possible, their actions to provide services (such as wastewater treatment service for the purpose of this study) to their communities in a sustainable manner.[228]

In order for Provincial Government to enforce specific legislation or assist Local Government in providing sustainable wastewater treatment services, there are various intergovernmental tools available which include, supervision (regulation, monitoring and reporting, and support) and intervention. These tools are discussed below.

4.2.1 Supervision

Municipalities do not exercise their autonomy independently but perform their duties and exercise their powers under the supervision of Provincial and National Government.[229] Supervision may be defined as:[230]

> The regulation, intervention and redistribution of municipal powers, with monitoring being linked to intervention, as an integral component of the power to intervene in terms of section 139 of the Constitution and as a tool to evaluate Local Government's performance.

Supervision includes four different but interrelated activities which include regulation, monitoring, support and intervention. These activities are discussed below.

4.2.1.1 Regulation

Regulation provides a framework within which Provincial and National Government ensure that Local Government *inter alia,* deliver wastewater treatment and disposal in

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227 Preamble of the Act.

228 S 23(2)(a) of the NEMA provides that the purpose of an intergovernmental regulated framework is to promote the integration of environmental management principles in all decisions which may have a significant impact on the environment. See Nel and Kotzé "Environmental Management: An Introduction" 18.

229 DPLG *A Guideline Document on Provincial-Local Intergovernmental Relations* 9.

230 De Visser *Developmental Local Government: A Case Study of South Africa* 171-208.

accordance with the prescribed norms and national standards.[231] In terms of section 155(7) of the Constitution, Provincial and National Government have the power to regulate, through legislation and executive measures, how Municipalities exercise their executive powers. However, regulation should not extend to the core of Schedule 4B and 5B matters,[232] but rather provide a framework within which Local Government is to legislate on them.[233] Regulation has the characteristics of a command-and-control-based instrument and may also include incentive-based instruments. Command-and-control instruments involve prescribing legal requirements and obligations (the command) and compelling compliance through the use of different enforcement measures where non-compliance is detected (control).[234] Examples of command-and-control instruments include compliance notices,[235] directives[236] and abatement notices.[237] Incentive-based instruments seek to encourage compliance through motivation and rewards as opposed to sanctioning non-compliance (as in a case with command-and-control instruments).[238] An example of an incentive-based instrument is the Green Drop Certification Programme developed by the DWA.[239]

4.2.1.2 Monitoring and reporting

The purpose of monitoring and reporting is to identify whether there is lack of competency in the Municipality that may warrant assistance from Provincial Government.[240] The WSA requires Municipalities to have a Water Services Development Plan (hereafter the WSDP) in their IDPs.[241] The WSDP will contain *inter*

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231 Malzbender *et al Review of Regulatory Aspects of the Water Services Sector* iv. See also section 3.3 of this study.
232 See section 3.2 of this study.
233 DPLG *A Guideline Document on Provincial-Local Intergovernmental Relations* 9.
234 Craigie, Snijman and Fourie *Dissecting Environmental Compliance and Enforcement* 51.
235 Feris 2006 *PER* 53-54.
236 Directive notices are issued in terms of s 31A of the *Environment Conservation Act* 73 of 1989, s 19 of the NWA and s 28 of the NEMA. These provisions establish a duty of care and empower competent authorities to direct transgressors to take a number of steps to remedy harm to environment such as in the *Odendaalsrus*-case (see section 3.3 of this study).
237 Local Government provide for abatement notices.
238 Craigie, Snijman and Fourie *Dissecting Environmental Compliance and Enforcement* 58.
239 See section 3.5 of this study.
240 Ntliziywana *Professionalisation of Local Government* 31.
241 S 12(1)(i) of the WSA.

alia, information about the size and distribution of the population[242] the existing industrial water use within its area of jurisdiction,[243] the existing industrial effluent disposed of within its area,[244] the operation, maintenance, repair and replacement of existing and future infrastructure, and the number and location of people not provided with water and basic sanitation services.[245] This reporting function will inform Provincial Government whether the Municipality is capable of providing a sustainable service to its community. The report will allow Provincial Government to determine whether there are existing possibilities that the Municipality may fail to provide, for instance, wastewater treatment services. For example, it will contain information as to the size of the population and whether there are sufficient WWTPs in its relevant area of jurisdiction and whether the existing WWTPs are capable of treating the effluent volumes.

4.2.1.3 Support

The Constitution requires National and Provincial Government by legislative and other measures, have the duty to support and strengthen the capacity of Municipalities to manage their own affairs, exercise their powers and perform their functions.[246] Support, in this context, may be referred to as a system of mutual dependency of each level of Government to ensure that each sphere of Government is able to perform adequately.[247] The duty to support between spheres of Government is significant as emphasised in the case of *First Certification of the Constitution of the Republic of South Africa*,[248] wherein the Constitutional Court held that:

> The term "support" derives much of its significance from section 154(1) of the Constitution, which compels national and Provincial Governments to "support and strengthen the capacity of Municipalities to manage their own affairs, to exercise their powers and to perform their functions." The meaning of the word "support" in section 155(2)(b) of the Constitution, although it appears without the word

242 S 13(b) of the WSA.
243 S 13(e) of the WSA. See also s 21(f)(g) and (h) of the NWA.
244 S 13(f) of the WSA
245 S 13(g) of the WSA.
246 S 154(1) of the Constitution. See also 155(6) of the Constitution and s 31 and s 105 of the MSA. See also Bekink 2008 *Principles of South African Local Government Law* 343
247 DPLG 2007-2008 *Practitioner's Guide to the Intergovernmental Relations System in South Africa* 36.
248 *Certification of the Constitution of the Republic of South Africa, 1996* 1996 4 SA 744 (CC).

> "strengthen", is clearly no less extensive. Its general meaning is entirely consistent with the use of the word "supporting" in its reciprocal sense in section 41(1)(h)(ii). The legislative and executive powers to support Local Government are, again, not insubstantial. Such powers can be employed by Provincial Governments to strengthen existing Local Government structures, powers and functions and to prevent a decline or degeneration of such structures, powers and functions….

National and Provincial Government should therefore offer financial or capacity building support to Municipalities,[249] particularly with regard to wastewater-related activities such as the operation and maintenance of WWTPs which is considered highly technical as well as expensive to build, replace and maintain.

4.2.1.4 Intervention

Intervention, for the purpose of this study, refers to the necessary interference of one sphere of Government into the affairs of another sphere where shortcomings or inadequacies are evident in service provision. Intervention may be necessary if the monitoring mechanisms reveal serious shortcomings and support mechanism have been unable to remedy these shortcomings.[250] In terms of section 139 of the Constitution, intervention can be applied by Provincial Government when a Municipality fails to fulfil its executive functions in terms of the Constitution or legislation, such as failure to supply water and basic sanitation services to the community in terms of the WSA.[251] Before a Province commences with a section 139 intervention, a Provincial Executive must notify the Municipality of its intentions and the Municipality must be given an opportunity to respond and make representations.[252] After considering the representation by the Municipality, the Provincial Executive may issue a directive[253] to

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249 DPLG 2007-2008 *Practitioner's Guide to the Intergovernmental Relations System in South Africa* 36-37.

250 DPLG 2007-2008 *Practitioner's Guide to the Intergovernmental Relations System in South Africa* 41-49. See also Mettler 2003 *Law, Democracy and Development* 220.

251 See section 3.3 of this study for a discussion of the WSA.

252 S 139(2) of the Constitution.

253 See section 4.2.1.1 of this study. See also s 16(2)(b) of the NEMA which provides for instruments such as notices to rectify the non-compliance with environmental implementation plans. If the non-compliance continues, the Director-General (DG) of the DEA may request the relevant MEC to intervene in terms of s 139 of the Constitution. S 63 of WSA states that the Minister of Water Affairs may request an intervention in terms of s 139 of the Constitution if the water services authority has failed to perform any function imposed on it in terms of the WSA.

the Municipality if it concludes that intervention is still necessary. A directive will outline the area where the Municipality is failing and detail what steps the Municipality should take in order to remedy the situation.[254] Only if the Municipality fails to implement the directive and continues to fail with its executive functions may the Provincial Executive assume the responsibility for the relevant obligation in that Municipality.[255]

Continued failure to meet the required norms and standards and poor level of service delivery, such as poor wastewater treatment or disposal, may lead to Provincial Government taking action either to deliver support or to intervene.[256] Persistent failure to provide a service as a result of a financial crisis on the part of the Municipality may require urgent assistance from Provincial Government.[257]

4.3 Community involvement and monitoring

The Constitution requires Local Government to be democratic and accountable to local communities, and it also encourages the involvement of communities in matters of Local Government.[258] Community involvement or participation refers to the organised and active involvement of the people in a community, or the potential users of services, in defining their problems and making decisions concerning the implementation of development projects.[259] These sentiments are echoed in the Structures Act which requires Municipalities to establish ward committees in order to enhance public participation[260] and the MSA which requires Municipalities to develop mechanisms, processes and procedures to enable the local community to participate in the affairs of

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254 DPLG 2007-2008 *Practitioner's Guide to the Intergovernmental Relations System in South Africa* 43.

255 S 139(1)(b) of the Constitution.

256 S 105 of the MSA. See also section 3.1 of this study.

257 S 136(4) of the *Municipal Financial Management Act* 56 of 2003 (MFMA) provides that if a Municipality is in persistent material breach of its obligation in relation to service delivery as a result of financial crisis, the Provincial Executive must intervene in the Municipality in terms of s 139(5) of the Constitution.

258 S152(1)(a) and (e) of the Constitution. See also Du Plessis 2008 *PER* 170-200 on public participation and its relation to Local Government's fulfilment of its constitutional duty to protect people's environmental right.

259 Swartz *et al, Guidelines for the Sustainable Operation and Maintenance of Small Water Treatment Plants*37.

260 S 72(3) of the Structures Act.

the Municipality.[261] In terms of section 74(b) of the Structures Act, Municipalities may delegate their duties and powers to ward committees. These duties of community-based monitoring committees are to extend the law enforcement process to civil society, particularly on those activities that may have a detrimental impact on human health and the environment.[262] The duties may, amongst others, include: verification of compliance to authorisation conditions, review and verification of actual monitoring results and tracking the performance of process controllers in a WWTP, reviewing of audit reports[263] and lodging of complaints[264] regarding sewage spills and degradation of water resources by WWTPs. The principles of environmental management as contained in NEMA[265] also recognise that community well-being and empowerment must be promoted through environmental education,[266] the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.[267]

Community participation in Local Government processes plays an important role in developing strategies and monitoring local service in a wide range of areas.[268] Community involvement and monitoring are essential in improving Local Government service delivery as they assist Local Government to know the basic needs and aspirations of their communities.[269] An IDP may also serve as a tool to communicate the needs of communities to the Municipalities through representative Government and Public Participation Processes (PPP), thus making it possible for Local Government to

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261 S 16 (1) of the MSA. See also Nyalunga 2006 *International NGO Journal* par 3, who states that public participation is an important ingredient for good governance and quality service delivery at Local Government level.

262 Du Plessis and Nel 2011 "Driving Compliance" 272.

263 Du Plessis and Nel 2011 "Driving Compliance"272, states that DWAF has lately directed some organisation to their legal compliance audits to be conducted by accredited DWAF auditors.

264 Jankielsohn 2012 *Journal for Contemporary History* 123 states that the inability of Local Government in South Africa to react to the water needs of the community has become a major cause of service delivery protests.

265 S 2 of NEMA.

266 Du Plessis 2010 *Stell LR*265-297 emphasises that education programmes should not only be seen as belonging in formal educational facilities such as schools, colleges or universities.

267 S 2(4)(h) of the NEMA which provides that communities should be empowered through environmental education, the raising of awareness and sharing of knowledge.

268 Madzhivhandila and Asha 2012 *Journal of Public Administration* 369-378.

269 De Visser *Developmental Local Government: A Case Study of South Africa* 107 states that the function of ward committees is to be a formal communication channel between the community and the council. It is a channel through which communities can lodge their complaints.

consider environmental sustainability in its decisions, basic service delivery services and by-laws.[270]

Communities also have the right to environmental information as afforded by the *Promotion of Access to Information Act* (PAIA).[271]Water Service Authorities in conjunction with the DWA have the responsibility to make water-related information available to its communities, especially in respect of existing or potential and emergency situations.[272] Communities also have the right to be informed of the impact of waste on their health, well-being and the environment.[273]

The interaction between the community and the Municipality may enable the Municipality to be aware of the effects of sewage bypasses and spills in their communities, the need to improve their wastewater infrastructure and other related wastewater treatment challenges. The community on the other hand, may have a realistic expectation as they may begin to know and understand the functions and responsibilities of Local Government.[274] The community will have a platform to raise their concerns instead of opting for violent protests. Community participation ensures an improved sense of ownership in development efforts and may break down the so-called

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270 Du Plessis and Du Plessis "Striking the Sustainability Balance in South Africa" 451. In terms of chapter 5 of the MSA, Municipalities must draft an integrated development plan (IDP) which contains municipal strategic planning for a specific number of years (5 years). An IDP guides and informs all planning, management and developmental decisions of a Municipality. The needs of the community such as basic water and sanitation, construction/refurbishment of WWTPs should be considered in the IDP. An IDP, because of its short-term existence, has its short fall in addressing policies/programmes of a long-term consequence. Valet and Walton 2008 *Journal of Public Administration* 379 state that the impact of policy on the community, infrastructure and natural environment are often underestimated in an IDP. Mema 2010 ewisa.co.za/literature/files/ 335_269Mema par 13 gives an example from Buffalo City Municipality illustrating the potential pitfall wherein, only immediate observable impacts were considered in the construction of the WWTP. A few years when the WWTP was well beyond its lifespan, there were no funds to refurbish and upgrade the WWTP within the next coming five years. See also Haigh, Fox and Davies-Coleman 2010 *Water SA* 476.

271 2 of 2000. See also s 32(I)(a) of the Constitution and s 31 of the NEMA.

272 S 15 of PAIA makes it possible for 'public bodies' to automatically make categories of records available to the public without having to request access in terms of the Act. These records would include information as to the status of effluent in WWTPs in the *Green Drop Assessments*. See also Du Plessis *Access to Information* 199.

273 S 2(b) of NEM:WA.

274 Modisha and Mtapuri 2013 *South Africa Journal of Public Administration* 267-280.

"dependence mentality."[275] The community as "owners" may begin to understand what goes into infrastructure building and maintenance costs, which in turn ensures users' commitment to long-term operation and maintenance.[276] Community consultation, involvement and awareness have an impact on public confidence in the Municipality that it will provide service such as water and wastewater services.[277] The DWA may include, as a condition in their licences, the obligation that the holder of a water authorisation should report to a community monitoring committee. These committees are usually established during the PPP.[278]

Community participation should, however, not be allowed to interfere with the affairs and the rights of the Municipality to govern[279]and therefore the whole process of participation must be properly monitored and managed. The Municipality's right to govern also empowers them to seek alternative service delivery options in order to meet the needs of their communities.

4.4 Alternative service delivery

Local Government has a constitutional obligation to develop local communities and to give priority to the basic needs of the people within its area of jurisdiction.[280] This task is not always easy considering that Local Government in South Africa has been undergoing radical changes under the new constitutional dispensation since 1994.[281] The restructuring processes, in particular the amalgamation of the previously divided Local Government jurisdiction meant a massive increase in population figures for which

275 Madzhivhandila and Asha 2012 *Journal of Public Administration* 369-378.
276 Mark and Davis 2012 *World Development* 1569-1576.
277 Mbomba, Thompson and Obi *Guidelines for the Improved Dissatisfaction of Small Water Treatment* 52.
278 See in this regard, Du Plessis and Nel "Driving Compliance" 272.
279 Craythorne *Municipal Administration* 264.
280 S 153(a) of the Constitution.
281 Bekink *Principles of South African Local Government Law* 15-16 states that: "[w]ith the introduction of the new Constitution in South Africa in 1994, the former Government had to undergo fundamental changes at all levels of Government. All three spheres of Government, national, Provincial and Local Government have to transform in compliance with the new Constitution. In contrast to the old regime, where municipal services were based on racial segregation, the new Local Government structure objective was to rebuild local communities and environments, and further to establish a new foundation for democratic, prosperous and non-racial society."

municipal authorities are responsible.[282] A sudden increase in the number of local residents and responsibilities resulted in infrastructure deterioration, financial crises and serious service delivery problems. Considering these challenges, Municipalities, in order to achieve optimal service delivery to their communities, may decide to use internal or external service delivery mechanisms.[283] Internal mechanisms would entail establishing another administrative unit within the Municipality or a business unit that operates within the Municipality determined by the Municipal Council. An external mechanism entails entering into a service delivery agreement with either, another Municipality, other organ of state (National Government, Provincial Government or traditional authorities), a non-governmental organisation (NGO) or other private entities.[284] Before a Municipality decides to explore providing services through an external mechanism, it must notify the local community of its intentions, taking into account, *inter alia,* the following:[285] (a) the direct and indirect costs and benefits associated with the project; (b) the views of the local community; (c) potential development and creation of employment; (d) skills and expertise transfer by the prospective service providers to the municipal employees; and (e) resources necessary for the provision of the service.[286] If a Municipality appoints an external service provider, it must ensure that the service provider delivers a service that is accessible, of good quality, sustainable and that they are responsible and accountable for the service.[287]

Before a Municipality enters into an agreement to procure services of an external mechanism, the Accounting Officer (Municipal Manager or appointed representative) must notify the National Treasury and relevant Provincial Treasury in writing of its intention, together with the information of any experienced person internally who will be responsible to advise on the preparation and procurement of the agreement.[288] If not,

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282 Bekink *Principles of South African Local Government Law* 42.
283 S 78(2) of the MSA.
284 S 76 (b)(i)-(v) of the MSA.
285 S 78(3)(i)-(v) of the MSA.
286 S 168(1)(d) of the MFMA states that the minister of Finance in concurrence with the Minister for Provincial and Local Government (DPLG), may issue regulations and guidelines regulating the financial commitments of Municipalities in terms of procuring external mechanisms.
287 Bekink *Principles of South African Local Government Law* 282.
288 Reg 2(1)(a) of the Municipal PPP Regulations.

the Municipality may request assistance from the Treasury to appoint such person.[289] An Accounting Officer is the only responsible person to enter into a service agreement on behalf of the Municipality and only after complying with the provisions of the Local Government: Municipal Finance Management Act[290] (MFMA).[291] The Accounting Officer must also ensure that the agreement is properly implemented, managed, enforced, monitored and reported on, including that the Municipality has contract management and monitoring capacity.[292]

In most instances, external service delivery is necessary where the Municipality has limited expertise and resources to procure that particular service on its own. Considering the challenges that Municipalities experience in the management and operation of WWTPs in respect of expertise and resources, services of external parties are often utilised.[293]

The *White Paper on Municipal Service Partnerships* [294] introduced the idea of service delivery agreements between Municipalities and the private sector as it acknowledged the inability of Municipalities to effectively provide services to their communities.[295] However, the financial resources to provide services in a swift, effective, simplified and seamless manner[296] is often hampered due to Government's budget constraints.[297] The effect of financial constraints on the responsibility of Government to provide a particular service was also highlighted in *Mazibuko and Others v City of Johannesburg &*

289 Reg 2(1)(b) of the Municipal PPP Regulations.
290 56 of 2003.
291 S 33 of the MFMA.
292 GN R27431 in RG 8200 of 1 April 2005 and s 116(2) of the MFMA. The Ministry for Provincial Affairs and Constitutional Development *White Paper on Local Government* (1998) encourages the establishment of PPPs and public joint ventures to ensure effective service delivery and less financial expenditures for local authority 117.
293 The City of Cape Town engaged in external service delivery agreements to improve wastewater treatment services of the Zandvliet WWTP and the Cape Flats WWTP. See City of Cape Town 2010 www.capetown.gov.za/…CoCT_Wastewater_S78_3_final_report_draft_17. See also section 3.4.1 of this study.
294 DPLG 2004 *White Paper on Municipal Service Partnerships.*
295 Phago and Malan 2004 *Journal of Public Administration* 482.
296 Fourie 2008 *Journal of Public Administration* 559.
297 Pauw, Woods and Van der Linde *Managing Public Money: A System from the South* 54.

Others.[298] The court stated that the institutions of Government are best placed to investigate social conditions in the light of available budgets and to determine what targets are achievable in relation to social and economic rights.

In terms of the MSA, before deciding on alternative service delivery, the Municipality must consider the cost implications, potential future capacity to provide the skills, expertise and resources, and how using an external mechanism will impact on its administration.[299]

According to the provisions of the MSA, a Municipality is empowered to engage external mechanisms in order to significantly upgrade, extend or improve its services.[300] In deciding which mechanism to utilise, the Municipality should consider which of the options is likely to provide feasible and sustainable institutional service delivery in respect of WWTPs. One option of such external mechanism is PPPs. The PPP concept is not new to Government. Organs of state (including Municipalities) have in the past engaged in PPPs to eliminate challenges of inefficient service delivery. Although there are different interpretations of PPPs, the context is more or less similar. For instance, the *Municipal Public-Private Partnership Regulations* (MPPP Regulations)[301] define PPP as:

> a commercial transaction between a Municipality and a private party in terms of which the private party: (a) performs a municipal function for or on behalf of a Municipality, or acquires the management or use of municipal property for its own commercial purpose; or both performs a municipal function for or on behalf of a Municipality and acquires the management or use of municipal property for its own commercial purposes (b) assumes substantial financial, technical and operational risks in connection with the performance of the municipal function, the management or use of the municipal property; or both (c) receives a benefit from performing the

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298 *Mazibukoand Others v City of Johannesburg and Others* 2010 4 SA 1 (CC). See also the Ministry for Provincial Affairs and Constitutional Development *White Paper on Local Government* (1998) par 38 wherein the Constitution commits Government to take reasonable measures, within its available resources to ensure that all South Africans have access to adequate housing, health care, water, education and social security.

299 S78(1) of the MSA.

300 S77(c) of the MSA.

301 MPPP Regulations of the MFMA.

> municipal function, or from using the municipal property or both, by: (i) consideration to be paid or given by the Municipality or a municipal entity under the sole or shared control of the Municipality, (ii) charges or fees to be collected by the private party from users or customers of a service provided to them, (iii) a combination of the benefits referred to in subparagraphs (i) and (ii).

The above definition specify the framework in which the agreement is negotiated, the private entity assumes the financial risk in exchange for fees while the Government remains the regulator and monitor of the project.[302] PPPs are perceived by some as nothing but privatisation. This is not the case as under PPP, the Municipality retains ownership of the assets and controls the procurement process, dictates specifications and market regulation and constant evaluation and monitoring. In privatisation, the state-owned asset is transferred to the private entity. PPPs are regulated by the *Public Finance Management Act* (PFMA)[303] which provides the legislative framework upon which PPPs are formed and developed and the *National Treasury Regulations*[304] which prescribe that all PPPs should first obtain approval from the National Treasury before commencement. There are generally six critical components involving varying degrees to a successful PPP: political leadership; public sector involvement; a well-thought-out plan; a dedicated income stream; communication with stakeholders; and selecting a right partner.[305]

PPPs may be organised in different forms depending on requirements of the parties concerned. Not exhausting all possible options, PPPs may be structured as follows:[306]

(a) Joint ventures – the public and private sector jointly finance, own and operate the asset.
(b) Build, Own, Operate and Transfer (BOOT) - the private sector takes the responsibility of designing, building and operating the facility until it is

302 See Metcalfe 2003 *Report Civil Engineering* 58.
303 *Public Finance Management Act* 1 of 1999.
304 Reg 16 of the National Treasury Regulations 2002.
305 Nzimakwe 2009 *Africanus* 53.
306 Grimsey and Lewis 2005 *Accounting Forum* 356.

transferred to the public sector at the end of the service delivery agreement.[307]

(c) Design Build Operate (DBP) – the public sector purchases the infrastructure and retains ownership and the private sector is only responsible for the operation of the asset.

(d) Co-operative Arrangements – an informal arrangement between the public and the private sector for equity partnership deals and concession type franchise arrangements.

(e) Management contract - the private sector only manages the asset without the risk of ownership; usually for a stipulated period in order to gain expertise from the private sector.[308]

The concept of PPPs is not without challenges as an alternative method of service delivery. There are a number of advantages and disadvantages to PPPs. The advantages of PPPs include, *inter alia,* increased organisational effectiveness and efficiency.[309] Depending on the service required, private entities utilise new technologies and highly skilled personnel. For example, in a case of effluent treatment, ultra-violet process as opposed to chlorine will be used to purify wastewater. There is pooling of specialised resources into the project which may be challenging for a Municipality on its own.[310] Private entities are able to secure financial resources on their own or through different kinds of investment in order to sustain their operations, while Municipalities provide long-term project feasibility once the project has been approved in their IDP. In PPPs, risk is transferred to the private entity who receives economic benefit from the project. Private entities, in most cases, procure third party risk insurance in order to safe guard the project against risk.[311] The cost of a service delivered under a PPP is usually lower than that achieved under traditional public

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307 See Gildenhuys and Knipe *The Organisation of Government: An Introduction* 82. See also Botha 2008 *Official Journal of the Institute of Municipal Finance Officers* 11.

308 Nzimakwe 2009 *Africanus* 59.

309 Osborne *Public Private Partnerships: Theory and Practice in International Perspective* 20.

310 Osborne *Public Private Partnerships: Theory and Practice in International Perspective* 19.

311 Osborne *Public Private Partnerships: Theory and Practice in International Perspective* 21.

procurement processes, making it value for money.[312] Savings are also procured from efficient project planning and execution. PPP projects are usually completed quicker without waiting for lengthy Government processes and funding approvals.[313]

Through the sharing of expertise and technology, the private sector usually has skills, capacity and resources that the public sector does not have. Some private entities may have new and experimental technologies to pilot and PPP provide them the opportunity to introduce and showcase these technologies.[314] In South Africa, PPPs are viewed as being beneficial for Black Economic Empowerment (BEE). Private companies form partnerships with BEE companies providing the space and opportunity for BEE companies to acquire skills, create employment within their communities and gain experience from private companies, as well as to establish networks and collaboration with Government Departments.[315]

A major shortcoming of PPPs in South Africa is that there is no effective monitoring and evaluation by the public sector to assess the benefits of their sustainability.[316] Other challenges would include, *inter alia:*[317]

(a) the potential that the partnership was introduced through corruptive political and administrative influences, meaning the aim would be to benefit a few at the expense of service delivery.
(b) generally, in most cases, the main aim of the private entity would be to make a profit as opposed to service delivery. It is therefore important that, clear roles are established from the inception of the partnership. For example, it should be stipulated that, the private sector is responsible for the management and

312 World Bank Institute (WBI) and Public-Private Infrastructure Advisory Facility (PPIAF) 2012 *PPP: Reference Guide* 138.
313 Bruxel *Public Private Partnerships Convenience and Peculiarities of Brazilian PPPs* 9.
314 Bruxel *Public Private Partnerships Convenience and Peculiarities of Brazilian PPPs* 8.
315 Mitchell 2008 *Partnerships between Government and Business in South Africa: A Practical Guideline* 7.
316 Fourie 2008 *Journal of Public Administration* 567.
317 Fourie 2008 *Journal of Public Administration* 567

operation of the WWTP and the Municipality will be responsible for ensuring that these services are provided;

(c) in some cases, the private sector wants to retain control of the assets as they control the resources, which may lead to tension.[318] It is therefore, especially in the BOOT model, that the public entity retains control of the asset as they are transferred back to the public sector at the end of the partnership though it is developed and managed by the private sector.

(d) most of the time, the public sector does not have the capacity to monitor the projects resulting in the private sector not complying with the agreed standards.[319]

There are mechanisms that can be utilised to protect the public interest and improve the management of PPPs. According to Kroukamp,[320] the following management system tools need to be included to improve PPP management, namely: reporting,[321] accounting mechanisms,[322] transparency[323] and measures to protect the public interest.[324]

The advantages of PPPs far outweigh the challenges. The challenges can be overcome through effective and efficient administration enabling the management of the contract, monitoring systems, acquiring of relevant skills and the application of technology.[325] There are some examples of successful PPP ventures such as the Zandvleit WWTP,

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318 Osborne *Public Private Partnerships: Theory and Practice in International Perspective*23.

319 Katz *Financing Major Infrastructure Projects in Public Private Partnership* 7. See also Metcalfe 2013 *Civil Engineering* 33 stating that the public entity depends on the private entity for necessary information about the project, in some instances, the private entity may restrict the information, especially if the performance is poor. This challenge can be overcome through effecting structures such as Assurance Strategy in the Service Level Agreement.

320 See Kroukamp 2004 *Management Today* 38.

321 The reports would include clear public objectives and performance expectations.

322 The accounting mechanisms would address amongst other things, performance expectations that are balanced with capabilities, well defined management structures and appropriate audit regime.

323 To promote transparency, the private entity would need to make information related to the project accessible to the public.

324 To protect public interest mechanisms such as citizen complaint and redress, public consultation/feedback and policies to promote relevant public sector value would restore public trust in the community.

325 Fourie 2008 *Journal of Public Administration* 567.

the Cape Flats Thermal Sludge Drying and Pelletisation Plant and the New Fisantekrall WWTP in Cape Town.[326] In the case of the Zandvliet WWTP the City of Cape Town was required in terms of the MSA, to explore other appropriate mechanisms at the Zandvliet WWTP before its decision to continue procuring external services. Since its construction in 1988, the Zandvliet WWTP has been managed and operated by a private contractor. After investigation of all possible internal service delivery mechanisms and comparing them to external options, the City of Cape Town opted to extend the provision of services to private entities.[327] The City observed that since the utilisation of a private entity, there has been a turnover of highly skilled and experienced technical staff in the Municipality and the cost implications of managing and operating a WWTP are far less than it would have been if provided internally.[328]

Queenstown Municipality entered into a PPP agreement with Water Services South Africa (WSSA) in 1992.[329] The agreement was for the operations, maintenance and management of water, sanitation and wastewater treatment services over a period of 25 years. The partnership facilitated a 17% cost saving for the Local Municipality and by absorbing municipal staff, has assisted in improving employment conditions for those previously employed by the Local Government. Furthermore, new job opportunities have been created within local communities as the private partner has undertaken the extension of infrastructure into previously subserviced areas.[330]

In the section that follows, Ba-Phalaborwa Local Municipality is discussed in order in order to highlight the challenges the Municipality experiences in the operation and management of its WWTP.

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326 Roman 2010 http://www.capetown.gov.za/en/Water/Documents/CoCT_Wastewater_S78_3_final_report_draft_17thSept_2010.pdf.

327 Roman 2010 http://www.capetown.gov.za/en/Water/Documents/CoCT_Wastewater_S78_3_final_report_draft_17thSept_2010.pdf.

328 Roman 2010 http://www.capetown.gov.za/en/Water/Documents/CoCT_Wastewater_S78_3_final_report_draft_17thSept_2010.pdf.

329 Palmer Development Group 2005 http://wedc.lboro.ac.uk/resources/books/PPP_and_the_Poor_-_CS_-_Queenstown.pdf.

330 Palmer Development Group 2005 http://wedc.lboro.ac.uk/resources/books/PPP_and_the_Poor_-_CS_-_Queenstown.pdf.

5 Ba-Phalaborwa Local Municipality

This section provides a brief background of Ba-Phalaborwa LM and focuses on the status of its WWTP with specific reference to the Green Drop Assessment results. A brief reference is made to the Ba-Phalaborwa LM powers and functions and the impacts on the ability or inability of a Local Government to fulfil its constitutional mandate of providing a service to communities in a sustainable manner.[331]

The Municipality's ability to manage and operate the WWTP is analysed against problems and challenges Municipalities face in relation to WWTPs discussed in section 2 of this study and alternative service delivery options discussed in section 4.5 of this study. This Local Municipality was selected because of its decision to explore a PPP model in resolving its WWTP challenges.

5.1 Factual context and background

Ba-Phalaborwa LM is situated in the North-Eastern part of South Africa in the Limpopo Province. It is one of the five Local Municipalities in the Mopani District Municipality.[332] The Municipality has a population of 150 637[333] and a geographical area of 7461.6 km^2 that constitutes more than 27% of Mopani District Municipality.[334] Ba-Phalaborwa LM is a Category B Municipality established in terms of section 155(1)(b) of the Constitution.[335] Ba-Phalaborwa LM is not a Water Service Authority as it falls under the Mopani District Municipality.[336]

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331 Section 5 is mainly based on reports and a Service Level Agreement between LWI and Mopani District Municipality which were provided by LWI's Technical Director to the author. The documents are in the author's possession. See also section 1 of this study.

332 Limpopo Tourism Agency Date Unknown http://www.golimpopo.com/mopani/ba-phalaborwa.

333 The Local Government Handbook 2012 http://www.localGovernment.co.za/locals/view/127/ba-phalaborwa-local-Municipality.

334 DWAF *Ba-Phalaborwa Draft IDP Document* 2012-2017.

335 See section 3.2 of this study.

336 DWAF 2012 http://www.dwaf.gov.za/Documents/BD2012/Limpopo.pdf.

Between the five Local Municipalities in the Mopani District, Ba-Phalaborwa LM has the most concentrated economy due to its large mining sector.[337] Linked to mining, the manufacturing sector also grew by 10.8% since 2010 leading to population growth and an increase in informal settlements which resulted in an increased water demand.[338] According to the information contained in the IDP, the foremost cause of water pollution within the area of jurisdiction of the Municipality are sewage spillage, industrial effluent into streams and solid waste dumping into water resources.[339]

Cases of water pollution have been reported in the Mopani District resulting in the death of fish and crocodiles in the Kruger National Park.[340] Within the Ba-Phalaborwa LM, there have been reported incidents of sewage spillage from malfunctioning WWTPs which resulted in raw sewage being discharged into neighbouring water resources.[341]

5.2 Status of the Ba-Phalaborwa WWTP

According to the records provided by a private company, LWI[342] which formed a PPP with the Ba-Phalaborwa LM in 2009, the Municipality has one large and two smaller WWTPs.[343] The large plant was not operating optimally, discharging raw sewage into the water resource. It needed to be refurbished or upgraded in order for the Municipality to meet regulatory standards and its legal obligations.[344] The treatment capacity at the time was 4000 m^3/day, and needed to be increased to 15000 m^3/day.[345] Solid removal prior to the treatment was done manually. A bar screen was used to capture solid parts and directed them to a corner of the tank and thereafter, buckets were used to remove

337 The South African LED Network Date Unknown http://led.co.za/Municipality/ba-phalaborwa-local-Municipality.

338 Mopani District Municipality *Review Integrated Development* 2006-2011 36 available at http://www.kruger2canyons.org/Mopani%20IDP1%20Review%202008%20to%202011%20MEC%20June%202008.pdf.

339 Mopani District Municipality *Review Integrated Development* 2006-2011 42.

340 Anon Date Unknown www.krugerpark.co.za/krugerpark-times-5-9-crocodile-deaths-lead-healthier-rivers-24978.html.

341 Parliamentary Monitoring Group 2011 www.pmg.org.za/node/26581.

342 LWI constructed the Ba-Phalaborwa LM phase two WWTP as part of a PPP pilot project. See also section 1 of this study.

343 LWI *Water Quality Report* 4.

344 LWI *Water Quality Report* 4.

345 LWI *Water Quality Report* 5.

the solids.[346] The large WWTP also lacked experienced and qualified plant operators to operate the plant. This resulted in inadequate treatment of effluent and raw sewage being discharged into water resources.[347]

The Municipality procured the services of an external service provider through tender processes to design and construct a clarifier.[348] However, the project failed as the Municipality lacked the financial resources to complete the project.[349]

5.3 Ba-Phalaborwa LM Green Drop Assessments

In the 2009 Green Drop Assessment, Ba-Phalaborwa LM recorded a 0% score which equals a situation of non-compliance to the legal requirements, posing serious environmental and health risks.[350] According to a risk-based assessment conducted in 2009 in the Limpopo Province, Ba-Phalaborwa LM was one of the Municipalities which did not hold a licence as required in terms of section 21 of the NWA.[351] The Assessment also showed that the WWTP information with regard to Schedule III and IV of the NWA and GN R2834 of the WA was not readily available implying that there is a general non-compliance trend with regard to qualification or experience of process controllers and maintenance staff in accordance with the works classification.[352]

In 2011, the Local Municipality received a score of 23.5% indicating that although a significant improvement, wastewater services were not managed consistently and

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346 LWI *Water Quality Report* 5.

347 LWI *Water Quality Report* 2009 which contains a District wide audit of all the drinking water treatment plants and all WWTPs within the Mopani District.

348 A clarifier is used to remove sediment, turbidity and floating material from raw wastewater http://www.pollutioncontrolsystem.com/Page.aspx/76/Circular-Mechanical-Clarifiers.html.

349 LWI *Water Quality Report* 2009 3.

350 DWA *2009 Limpopo Green Drop Assessment* 233.

351 DWA *2009 Executive Summary Municipal Wastewater Treatment Base information for Targeted Risk-Based Regulation Limpopo Province* 12 available at https://sites.google.com/a/peopleofbelabela.co.za/people-of-bela-bela/municipal-matters/bela-bela/environment-1/sewage/green-drop.

352 DWA 2009 *Executive Summary Municipal Wastewater Treatment Base information for Targeted Risk-Based Regulation Limpopo Province* 13.

according to recommended regulatory standards.[353] Four WWTPs within Mopani District Municipality, including Ba-Phalaborwa LM, were inspected in order to verify the Green Drop Assessment. During the assessment of the Ba-Phalaborwa WWTP, it was confirmed that:[354]

(a) the monitoring equipment could not be operated as the pH reagents were damaged;
(b) no chlorine was used on the day of the site inspection and the process controller indicated that chlorine had not been delivered over an extended period; and
(c) there was evidence that maintenance problems with the clarifier had resulted in sludge carry-over into the final effluent which decreases the final effluent quality.

The poor Green Drop Assessment of Ba-Phalaborwa WWTP in 2009 and 2010 indicated that the plant held a high or critical risk position within Mopani District Municipality. The WWTP was classified as a critical risk and was not on par with national benchmarks.[355] The PPP project was established to build a new WWTP using new technology with a cost saving of over 60% of a conventional plant. This project was successful. According to the 2012 Green Drop Assessment, it appeared that Ba-Phalaborwa WWTP improved and moved from a high risk to a medium risk category WWTP.[356]

Ba-Phalaborwa LM does not have any by-laws dealing with treatment and disposal of wastewater. By-laws are important as they regulate Local Government affairs and peoples' conduct within the environment. The only By-laws which make reference to wastewater discharge are the *Water Services Restriction By-laws*.[357] Chapter 5 of the By-laws provides that the Municipality when determining the charges for sanitation services compares the quality of effluent to the quantity of water supplied. The chapter also deals with the quality of industrial effluent before it is discharged into the municipal

353 DWA *2011 Limpopo Green Drop Assessment* 233.
354 DWA *2011 Limpopo Green Drop Assessment* 234.
355 DWA *2011 Limpopo Green Drop Assessment* 233.
356 DWA *2012 Limpopo Green Drop Assessment* 285. See also sections 4.4.1 and 5.6 of this study.
357 LAN 277 in LPG 1654 of 5 August 2009 (hereafter referred to as By-laws).

sanitation system. The by-laws do not make any reference to the disposal of effluent or WWTPs. It was confirmed with the Municipal Manager of Mopani District Municipality and the Technical Director that there are no gazetted by-laws dealing with wastewater and treatment works.[358] By-laws are important as they give effect to municipal policies.[359]In the absence of their own wastewater by-laws, a Municipality may adopt the standard draft by-laws[360] of the Province or request the Director-General (DG) of the DEA to assist with the preparation of environmental by-laws to which he or she may not unreasonably refuse.[361]

5.4 Ba-Phalaborwa LM's ability to manage and operate the WWTP

As in accordance with section 84(1)(d) of the Structures Act,[362] the powers and functions of providing bulk wastewater treatment services and WWTPs rests with District Municipalities.[363] In terms of section 84(2) of the Structures Act a Local Municipality may also perform the function allocated to District Municipalities.[364] This function must, however, be executed in a constitutionally designed system of co-operative governance. In Mopani area, the District Municipality is the Water Service Authority and is responsible for the wastewater treatment services and sewage disposal, while Ba-Phalaborwa LM is responsible for maintenance and operation of the WWTP and the imposing and collection of levies.[365]

It is the responsibility of Municipalities to provide services to its communities, which includes *inter alia*, wastewater treatment and a healthy environment in a sustainable manner.[366] Despite the Constitutional obligation to provide sufficient water[367] and an

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358 Meeting held on 7 April 2013.
359 DWAF 2005 *Model Credit Control and Debt Collection Water Services By-Laws* 5.
360 S 14(2)(a)(i) of the MSA.
361 S 46(2) of the NEMA.
362 See section 3.2 of this study.
363 S 84(1) (d) of the Structures Act. See also section 3.2 of this study.
364 See section 3.2 of this study.
365 S 84(1)(a)-(p) of the Structures Act. See also section 3.1 of this study.
366 See section 4.2 of this section.
367 S 27(1)(b) of the Constitution. See also section 3.1 of this study.

environment that is not harmful to human health or well-being,[368] contamination of water resources as a result of poorly treated effluent still remains a challenge. The *White Paper on Municipal Service Partnerships*[369] also recognises the challenges many Municipalities face in the provision of effective service delivery to their communities.[370]

The Ba-Phalaborwa LM Green Drop Assessment of 2009-2011 discussed above has shown that standards such as legislative authorisation, maintenance and operation, adequate qualifications/experience of process controllers and monitoring of effluent quality are still grossly neglected.[371]

In 2011, Ba-Phalaborwa LM entered into an alternative service delivery agreement in a form of PPP with LWI.[372] In terms of the PPP, LWI will design, fund, build, operate and maintain the WWTP for a period of three years at which point it will be transferred to the Ba-Phalaborwa LM. The operation and maintenance period will be managed through a Service Level Agreement (SLA).[373] LWI would also carry the financial and operational risk of the project and the Ba-Phalaborwa LM will pay LWI a monthly operational and maintenance fee.[374] Amongst some of the provisions of the SLA, LWI and the Ba-Phalaborwa LM (hereafter the 'parties') agreed that:

(a) each party would appoint a Contract Manager to ensure that the responsibilities of either party are carried out in terms of the agreement;
(b) the Contract Managers would be responsible for monitoring the provision of the service and provide monthly reports as to the general management of the agreement;

368 See section 3.1 of this study.
369 DPLG *White Paper on Municipal Services Partnerships 2004* 1. See also section 4.4 of this study.
370 Phago and Malan 2004 *Journal of Public Administration* 482. See also section 4.5 of this study.
371 See section 5.5 of this study.
372 See section 1.1 of this study.
373 SLA signed on the 18 November 2011.
374 Clause 2 of the SLA.

(c) LWI will provide accredited training and technical support to all operators under the Municipality to make them compliant with the required legislation as part of capacity building and skills transfer;

(d) the parties would establish a Steering Committee consisting of the Technical Director of Ba-Phalaborwa LM, the Technical Director of Mopani District Municipality , the Technical Director of LWI and a Contract Manager from each entity who will be responsible for the evaluation of performance of the parties' obligations in terms of the agreement; and

(e) the Steering Committee would meet on a quarterly basis to discuss the provision of the service and any issues of concern to either party.

Before the parties proceeded with the procurement of the PPP, the Municipality received written approval from Treasury.[375] The approval[376] was granted on the basis that the project was competitive,[377] equitable,[378] transparent[379] and cost-effective.[380] Since the commencement of the SLA in 2011, LWI has been responsible for the operation and maintenance of Ba-Phalaborwa WWTP. There has been a steady improvement since the inception of the PPP in 2011 in respect of the risk ratio of the Municipality as shown by the 2011-2012 Green Drop Assessment.[381] The control personnel are now well equipped to operate as a result of the training received, the monitoring system installed has assisted in troubleshooting and in diagnosing non-compliances timeously. It has been established that the bioreactor of the new plant only

375 Reg 16.4.2 of the National Treasury Regulations 2002.

376 Reg 16.5 of the National Treasury Regulations 2002. See also section 4.4.1 of this study.

377 According to Annexure A of the SLA, the project was cost-effective because it cost 50% less than a conventional sewer plant because it replaces concrete reservoirs with prefab steel tanks with a life span of over 70 years.

378 According to Annexure A of the SLA, the plant is equitable because it presents value for money investment where the Municipality carries no financial and operational risk. The process controllers of the Municipality receive skills transfer through training and are certified to operate and maintain the plant. See also section 4.4.1 of this study.

379 According to the LWI *EIA Report* 85, the Treasury requirements for a PPP process were followed and public participation process was carried out to notify the local community of the project and to get their imputes. See s 78(3)(i)-(v) of the MSA and section 4.4 of this study.

380 According to Annexure A of the SLA, the plant's operational and management costs are low compared to a conventional sewer plant as it uses UV treatment instead of chlorine which is expensive and not environmentally friendly. The plant has low energy consumption compared to a conventional sewer plant. See also Reg 16.6.1(a) of the Treasury Regulations.

381 See section 5.4 of this study.

uses 20% of the energy used by the old plant. Furthermore, UV disinfection resulted in cost savings by dramatically reducing the use of chlorine. Finally, there is a huge improvement in the final effluent that is discharged into water resources.

There have been a few challenges and shortcomings insofar as the implementation of the SLA is concerned, however, with regard to the management of the SLA. The Steering Committee members, particularly from both the Ba-Phalaborwa LM and Mopani District Municipality, rarely attend quarterly meetings. Therefore, reporting and monitoring on the project are not done as agreed in terms of the provisions of the SLA. The Ba-Phalaborwa LM is also not honouring its monthly payments as agreed leading to the accumulation of interest which, in turn has a negative impact on the project concept in that it undermines the cost-effectiveness of the project. It also leads to LWI not responding to emergencies in time due to financial constraints. The reason for the challenges is attributed mainly to the fact that in the Mopani District, there is a contention of powers and responsibilities between the District and the Local Municipalities.[382] While the SLA addresses issues such as the duties of Contract Managers to oversee the proper execution of the obligations and responsibilities of the parties, dispute resolution and non-performance by any of the parties, it does not address accountability of the parties.

The success of a PPP depends on all partners fulfilling their respective responsibilities including the responsibility to hold others to account and take corrective actions where necessary.[383] Due to the power contention and conflict of interests between the Ba-Phalaborwa LM (the beneficiary of the project) and the Mopani District Municipality (the Water Service Authority) none of the Technical Directors and Contract Managers of both Municipalities accepted responsibility for the SLA. As a result decisions could not be taken timeously seriously hampering the project timelines and thus, service delivery.

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[382] Department of Co-operative Governance & Traditional Affairs Date Unknown www.nda.agric.za/…/PROFILES%202011%20MOPANI%20AUG.docx.The Greater Tzaneen and Ba-Phalaborwa Municipality applied for the Water Service Authority functions, and are of the view that the District is prolonging timeframes for service delivery. The District is of the view that the powers allocated to them did not allow for interventions in Local Municipalities.

[383] See Kroukamp 2004 *Management Today* 39.

Clearly, there is a need to have a supportive institution that will evaluate and review the management and implementation of PPPs.[384]Furthermore, the SLA does not address public consultation or feedback mechanisms[385] to inform the community on the progress of the project and also to enable them to raise complaints and concerns they may have. This defeats the whole purpose of community participation and involvement in Local Government affairs.[386]

Mopani District Municipality is empowered as Water Service Authority to deal with the delivery of bulk water services and wastewater treatment services.[387] The actual operation and maintenance of WWTPs in Ba-Phalaborwa is performed by the Local Municipality.[388] To avoid power contention and conflict between the District and Local Municipality, Ba-Phalaborwa LM as the Municipality in charge of the operation and maintenance of the WWTPs should be responsible for the regulation and delivery of wastewater treatment services.

6. Conclusion and recommendations

6.1 Conclusion

In South Africa, water is a scarce and valued resource that needs protection and conservation. Over the years, the quality of water in South Africa has deteriorated due to pollution by poor effluent discharge, agriculture, industrial, mining and human activities.[389] Adequately treated effluent water is essential as many communities depend on surface water for their daily activities. It is therefore critical that effluent water is sufficiently treated before it is discharged into water resources. In terms of the *2010 Green Drop Assessment*, Limpopo Province was one of the Provinces in South Africa

384 The World Bank Institute Date Unknown http://wbi.worldbank.org/wbi/news/2013/09/25/delivering-ppps-frameworks-monitor-and-manage-contracts.
385 See section 4.4.1 of this study.
386 See section 4.3 of this study.
387 See section 5.4 of this study.
388 See section 5.4 of this study.
389 See section 1 of this study.

that received a low score in the management of their WWTPs.[390] The findings of the Report implied that untreated or inadequately treated effluent was being discharged into water resources. Treatment of effluent is important as it limits the amount of pathogens in water resources which causes ecological, economical and health hazards to people. There is therefore, a need to build and manage WWTPs effectively as they impact on water quality. The aim of this study was to determine who should be responsible for the regulation of WWTPs in the Ba-Phalaborwa LM area in order to ensure service delivery to communities in a sustainable manner.[391]

In section 2 of this study, "wastewater" and its effects were discussed. For the purpose of this study, "wastewater" was defined as any water which has been adversely affected in quality by human activities and may include domestic, industrial and mine wastewater. Poor treatment of wastewater before its discharge into water resources has, *inter alia*, health and social impacts, ecological impacts and economic impacts.[392]

Poorly treated or inadequately treated wastewater may be attributed to poor design and construction, lack of qualified process controllers, non-compliance with applicable legislation, lack of proper monitoring and management accountability with regard to WWTPs.[393] Proper design and construction of WWTPs during the planning phase of a development of a WWTP is important as it considers factors such as future growth and high inflows which cause poor sewage purification and sewage spills. The required knowledge of experienced process controllers is not only important for the daily operation and maintenance of WWTP but also to observe and comply with applicable national standards with regard to WWTPs.[394]

390 See section 1 of this study.
391 See section 4.1 of this study.
392 See section 2.2 of this study.
393 See section 2.4 of this study.
394 See section 2.4 of this study.

In an effort to combat the challenges experienced by WWTPs, the following BPG (to which the WWTPs should at least comply with) were distilled from the literature, namely:[395]

(a) during the design, construction and operational phase of the WWTP, aspects such as legislative requirements and environmental aspects must be considered. Current and future inflows based on population estimation should also be considered to minimise the potential of spills and effluent bypasses.
(b) the Municipality must ensure that plant operators are certified with the DWA and fully trained to operate the WWTP and all WWTPs should have adequate levels of competent staff;
(c) the Municipality must ensure that environmental and building inspectors enforce compliance of regulations and by-laws;
(d) the Municipality must compile a user-friendly manual which contains management responsibilities and technical guidelines for plant operators and maintenance operators for the sustainable management of the plant. Management responsibilities would entail capital and operational budgets and action plans to replace or build failing infrastructures. Technical guidelines can address issues such as: (i) allowing emergency capacity in sewer and WWTPs according to the Ontario Guidelines;[396] (ii) laying sewer pipes to a higher specification to minimise infiltration spilling; (iii) monitor and manage wastewater inflows; (iv) effective effluent treatment and quality control, and (v) installing billing systems that report any unusual water consumption in order to respond promptly; and
(e) incorporate different QMS such as ISO 9001 and EMS for continuous improvement in the management and operations of WWTPs.

Table 2 below compares the legal framework to the BPG tools which Municipalities can use to avoid wastewater pollution and minimise effluent spills and bypasses.

[395] See section 2.5 of this study.
[396] See section 2.5 of this study.

Table 2: BPG tools and legal framework

Best Practice Guidelines	Legislation framework
Certification of plant operators	• S 26(f) of the NWA • GN R813 in GG 36958 of 23 October 2013 (Schedule III)
Proper planning during the design, construction and operation of WWTPs to minimise wastewater pollution and spills	• S 26(e) of the NWA • GN R813 in GG 36958 of 23 October 2013 (Schedules I & II)
Ensuring national standards compliance by environmental inspectors and enacting by-laws which regulate wastewater and WWTPs	• S 9(1)(b) of the WSA • S26(1)(h) and (i) of the NWA • S 156(2) of the Constitution • S 11(3)(m) of the MSA • S 21(1) of the WSA • S 46(2) of the NEMA
Developing user-friendly manuals containing technical and management guidelines	• GN R813 in GG 36958 of 23 October 2013 (Schedules I & II)
Auditing and monitoring systems to improve the management of WWTPs	• DWA incentive–based regulation, the "Green Drop Assessment Programme" • W_2RAP developed by the DWA
Command and control instruments	• S 31A of the ECA • S 19 of NWA • S 28 of the NEMA
Incentive-based instruments	• DWA incentive–based regulation the "Green Drop Assessment Programme"

In terms of Table 2 above, all the BPG tools are provided for in legislation and other National Government policies.

As mentioned, section 24(a) of the Constitution provides that everyone has a right to an environment that is not harmful to their health or well-being.[397] In terms of section 152(1)(b) of the Constitution, it is the responsibility of Local Government to ensure that the delivery of service is provided to their communities in a sustainable manner. Section 3 of the WSA and section 4(2)(i) of the MSA provides that it is the duty of Local Government to provide a safe and healthy environment to its communities, which include the right to basic water, sanitation and sewage purification. This duty includes enacting by-laws that protects water resources. Municipalities, in performing their duties to provide water and basic sanitation, have to comply with prescribed national standards in terms of the NWA.[398] In terms of section 84(1)(d) of the Structures Act a District Municipality is responsible for the WWTPs within its District. Local Municipalities in terms of section 85(2)(a) of the Structures Act may also perform some of the functions of District Municipalities if the District Municipality lacks the capacity to perform or exercise its powers. The ability to inter-change powers and functions between District and Local Municipalities requires cooperation between the different Municipalities.[399] Cooperation may include financial, technical and administrative support services. In order to enhance such cooperation, Municipalities do not exercise their autonomy independently but perform their duties and exercise their powers under the supervision of both Provincial and National Government.[400] In terms of section 139 of the Constitution, Provincial Government may intervene in the affairs of the Municipality when a Municipality fails to exercise its executive functions such as failure to supply water, basic sanitation and sewage purification. Municipalities have an obligation not only to provide a basic service and promote a safe and healthy environment but to encourage community involvement in matters of Local Government. However, meeting this obligation is not easy, especially where the Municipality has limited expertise and resources. In terms of section 78(2) of the MSA, in order to achieve optimal service

397 See section 3.1 of this study.
398 See section 3.4 of this study.
399 See section 3.2 of this study.
400 See section 4.2 of this study.

delivery to their communities, Municipalities may engage external mechanisms in the form of PPPs.[401]

PPPs, for the purposes of this study, refers to a contract between Government and a private entity, wherein, the private entity performs a function on behalf of the Municipality and assumes all the financial, technical and operational risk in exchange for payment of a fee.[402] PPPs may be organised in different forms depending on the requirements of the parties. PPPs may be structured in the form of a joint venture, BOOT, DBP, co-operative agreements or management contract.[403] There are strengths and weaknesses to PPPs, but it is worth emphasising that if PPPs are effectively and efficiently managed, they can encourage development and improve service delivery.[404]

Table 3 below compare PPP management tools to the SLA entered into between Ba-Phalaborwa LM and LWI and tests whether the PPP agreement addresses the recommended PPPs management mechanisms.

Table 3: PPPs management tools

PPP Management Tools	PPP Agreement between Ba-Phalaborwa and LWI
Cost effective	✓
Equitability	✓
Transparency	X
Competitive	✓
Value for money	✓
Reporting mechanisms	X
Accounting mechanisms	X
Measures to protect the public interest	X

401 See section 4.4 of this study.
402 See section 4.4.4 of this study.
403 See section 4.4.1 of this study.
404 See section 4.4.1 of this study.

Community involvement	X

From Table 3, it is clear that the SLA addresses most mechanisms recommended in managing a PPP efficiently and effectively. The deficiency of the SLA is that it does not include provisions dealing with transparency and the protection of public interest.[405] Transparency in relation to information that is relevant to the delivery of service is important. For example, transparency will allow the community to understand total project and maintenance costs.[406] Protection of public interest entails involving the community in Local Government affairs and having mechanisms in place to enable the community to raise their concerns.[407] Transparency and public protection are important as they encourage communities to have trust in the public sector.

While the SLA provides for most of the tools recommended in the effective management of a PPP, the conflict between Ba-Phalaborwa LM and Mopani District Municipality is affecting the management of the contract. The contention of power and lack of cooperation between the two Municipalities does not only defeat the Treasury Regulations concept of accountability and value for money but affects the sustainable delivery of service to the community. Therefore, Ba-Phalaborwa LM as the Municipality in charge of the operation and maintenance of the WWTPs should be responsible for the regulation and delivery of wastewater treatment services to communities in a sustainable manner.

6.2 Recommendations

Based on the discussions and finding in this study, the following recommendations are made:

- In instances where there are no existing by-laws in dealing with a particular aspect of the environment, such as effluent treatment and disposal, the

405 See section 5.6 of this study.
406 See section 4.3 of this study.
407 See section 4.3 of this study.

Municipality should request the Provincial Government to assist in drafting the by-laws affecting that particular aspect.

- District Municipalities should consider transferring the functions of water services, basic sanitation and sewage treatment and disposal to Local Municipalities, particularly Local Municipalities which have the capacity to render such services.
- National or Provincial Government should attend to intergovernmental disputes timeously taking into account the long-term relationship of the parties involved.
- National or Provincial Government should improve their monitoring and supervisory role, particularly in PPPs arrangements. Being proactive will allow National or Provincial Government to intervene and offer support timeously to Municipalities experiencing challenges in the provision of services to their communities.
- PPP arrangements should have an effective and supportive institutional framework to monitor and review the management and implementation of the PPP. The institution should also have power to enforce PPP agreements and hold parties to the PPP agreement accountable.
- National or Provincial Government may assist Local Government if "concept/draft agreements or contracts" between Municipalities and private entities are made available to Municipalities in order to enable them to ensure that their agreements include best practice guidelines and the necessary management tools to ensure effective implementation and monitoring of the partnership.
- Provision should be made for community participation during the design, construction, operational and closure phases of WWTPs as an additional monitoring tool.

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NOORDWES-UNIVERSITEIT

DEPARTMENT OF ENGLISH

05 DECEMBER 2013

TO WHOM IT MAY CONCERN

RE: EDITING OF THE MINI-DISSERTATION OF QUEEN NOTHANDO GOPO

STUDENT NUMBER: 22534245

TITLE: REGULATION OF WASTEWATER TREATMENT PLANTS IN THE BA-PHALABORWA MUNICIPALITY

This serves to confirm and certify that the language and grammatical errors in the above-mentioned research study have been corrected. The candidate has been advised on the correctness and usage of English and the necessary amendments have been effected to the best of my knowledge.

Yours sincerely,

P. N. NKAMTA, BA Honours; MA (DEPARTMENT OF ENGLISH)