

---

# NTUZUMA B-KWAMANCINZA SEWER PIPELINES PROJECT STORMWATER MANAGEMENT PLAN KWAZULU NATAL

---

August 2020  
Version 01

Prepared By:



Lwandisa Holdings (Pty) Ltd

Unit 2, 21 Clough Street

Mandini Park, Pietermaritzburg

3201

Prepared For:



eThekweni Metropolitan Municipality  
Water and Sanitation

3 Prior Road, Durban,

4001

---


**PROJECT TITLE:**

**NTUZUMA B-KWAMANCINZA SEWER PIPELINES PROJECT  
 KWAZULU NATAL  
 STORMWATER MANAGEMENT PLAN**

<b>Date</b>	<b>18 August 2019</b>
<b>Report Version</b>	<b>Final</b>

**SPECIALIST DECLARATION:**

Lwandisa Holdings (Pty) Ltd have undertaken this assessment in an objective manner, even if this results in views and findings that are not favourable to the client. Zonhla has the expertise required to undertake the specialist stormwater management plan study and the following report presents the results in an objective manner. The main author of the report, Mr. Nhlakanipho Zondi is a senior hydrologist, has a BSc Honours in Hydrology with nine years of experience in various hydrological studies and is professionally registered with the South African Council of Natural Scientific Professions (SACNASP).

<b>Verification</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Author	Nhlakanipho Zondi <i>Pr. Sci. Nat</i>		August 2020

---

# NTUZUMA B-KWAMANCINZA SEWER PIPELINES PROJECT KWAZULU-NATAL STORMWATER MANAGEMENT PLAN

## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b> .....	<b>1</b>
<b>2</b>	<b>SITE DISCRIPTION</b> .....	<b>1</b>
<b>3</b>	<b>STORMWATER IMPACT ASSESSMENT AND MANAGEMENT PLAN</b> .....	<b>4</b>
	3.1 Stormwater Management During the Construction .....	4
	<u>3.1.1</u> SWMP Related to Water Quality Issues During Construction.....	4
	<u>3.1.2</u> SWMP for Alteration of a Watercourse Flow During Construction.....	6
	3.2 Post-Construction SWMP.....	6
<b>4</b>	<b>CONCLUSION</b> .....	<b>7</b>

## FIGURES

Figure 2-1:	Locality Map of the Ntuzuma B Sewer Pipelines Project .....	2
Figure 2-2	Site Plan of the Ntuzuma B Sewer Pipelines Project.....	3

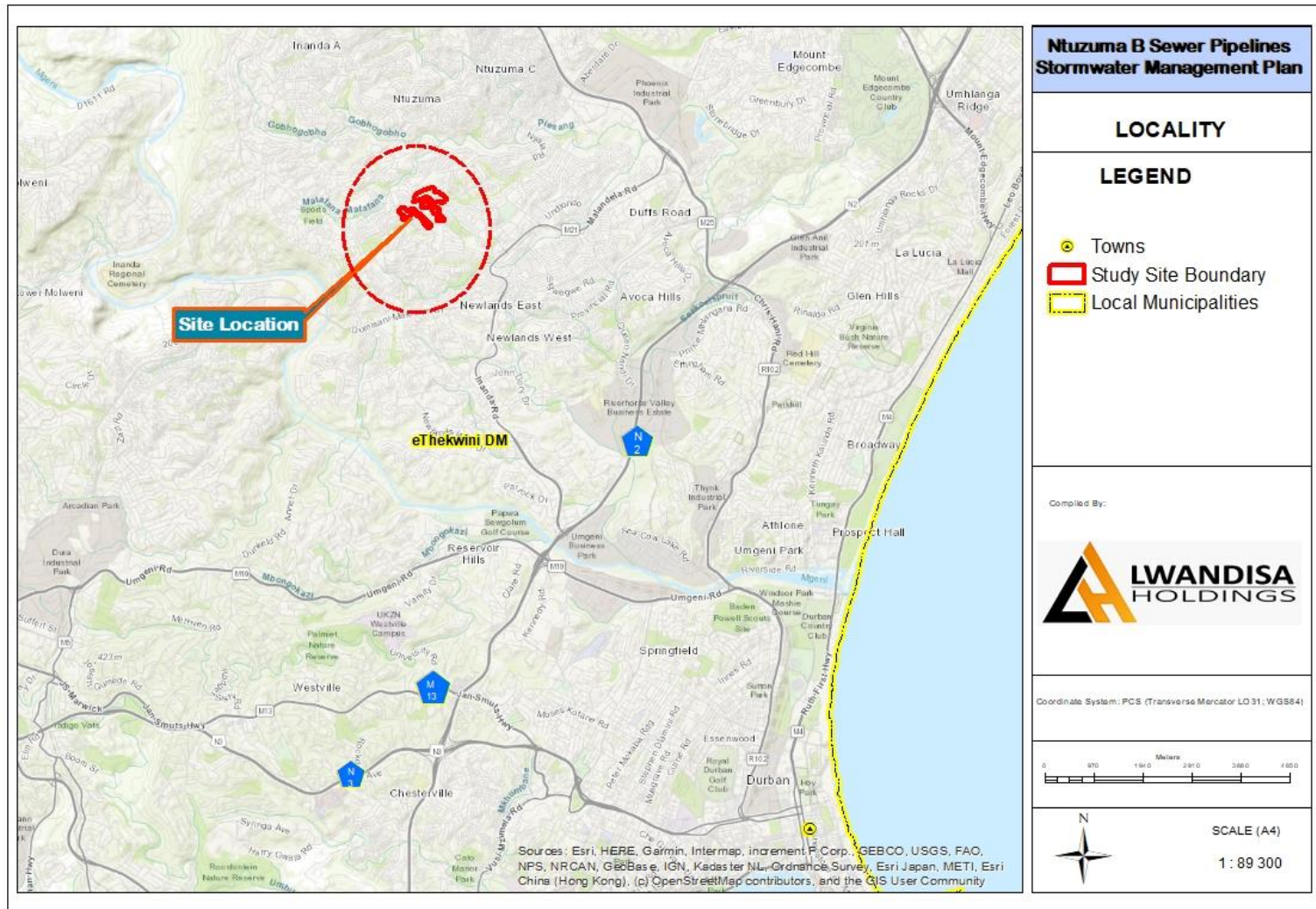
## 1 INTRODUCTION

Lwandisa Holdings (Pty) Ltd were appointed by the eThekweni Metropolitan Municipality Water and Sanitation, to undertake the Stormwater Management Plan (SWMP) study for the proposed Ntuzuma B – KwaMancinza Sewer Reticulation Pipelines Project, near the town of Durban in KwaZulu-Natal. The SWMP is required as part of the Water Use Licence Application (WULA) process, in terms of the Section 21 of the National Water Act (NWA) No. 36 of 1998, and environmental authorisation as per National Environmental Management Act (NEMA) No.107 of 1998 and Environmental Impact Assessment [EIA] Regulations of 2014, as amended on the 07 April 2017.

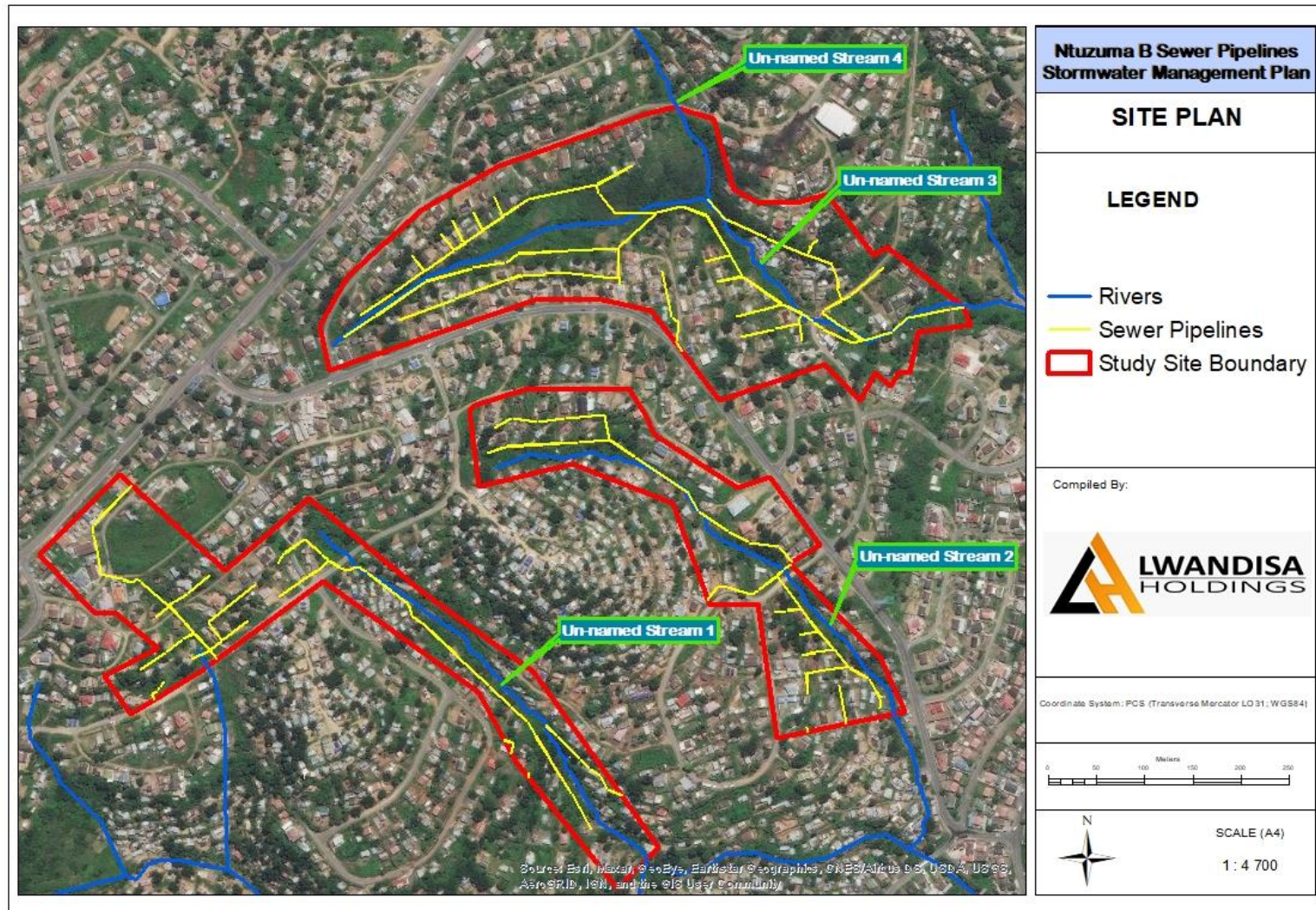
This SWMP is developed as a guideline to include in the requirements during the construction phase of the project.

## 2 SITE DISCRIPTION

The location of the project site is presented in **Figure 2-1**. As depicted in this map, the proposed Ntuzuma B sewer pipelines are located approximately 15 km north west of the town of Durban, in the eThekweni Metropolitan Municipality of the KwaZulu-Natal Province. A site plan, presenting the proposed Ntuzuma B sewer pipelines is provided in **Figure 2-2**. As presented in **Figure 2-2**, the drainage lines in the vicinity of the proposed construction sites includes Un-named Streams 1 to 4. The study area is located in the Quaternary Catchment U20M within the Pongola to Mtamvuma Water Management Area (WMA 4).



**Figure 2-1: Locality Map of the Ntuzuma B Sewer Pipelines Project**



**Figure 2-2 Site Plan of the Ntuzuma B Sewer Pipelines Project**

---

### 3 STORMWATER IMPACT ASSESSMENT AND MANAGEMENT PLAN

The SWMP is structured such that it relates directly to proposed mitigation measures of identified potential stormwater related impacts of the project. The impact assessment and therefore the SWMP has been developed for both the construction and post-construction phases of the project. The main objectives of the SWMP include:

- Maintaining the downstream water quantity and quality requirements;
- Protection of water resources from pollution;
- Prevention of land and watercourse erosion (especially during storm events); and
- Preservation of the natural environment (water courses and their ecosystems).

#### 3.1 Stormwater Management During the Construction

##### 3.1.1 SWMP Related to Water Quality Issues During Construction

Impact source identification include:

- Erosion from construction sites and sedimentation of streams downstream of the proposed sewer pipelines.
- Hydrocarbon spills from machinery used in the excavation of trenches associated with the sewer pipelines.

As per the SWMP objectives presented in **Section 3**, maintaining the downstream water quality. In order to achieve this objective, the following management practices are proposed:

- If possible, construction activities in the vicinity of river crossings, as presented in **Figure 2-1**, should be limited to the dry season (May to October).
- Cut off drains and berms should be constructed in order to divert/capture stormwater run-off.
- Upstream and downstream berms should be constructed during the construction phases of the project in the areas of drainage lines. Upstream diversions will ensure limited surface flows through construction areas. Downstream berms will ensure that sediments eroded from within the construction sites will be caught, therefore reducing the impact to the downstream receiving environment. It is recommended that the berms are constructed out of a non-erodible material, such as sand bags with plastic liners.
- Sandbag berms must be placed at regular intervals on all steep slopes in the trench lines before and after backfilling to minimize erosion and contaminate stormwater runoff into the streams.

- 
- When the trench line runs across sloping ground, the topsoil excavated from the trench must be stored on the downslope side of the trench and subsoil on the upslope side, for the following reasons:
    - The large volume soils is stored upslope of the trench, so that the soils fines and silt will be washed off the into the trench during the rainfall event and
    - Separation of the soils (topsoil and subsoil), is important during the backfilling of the trench.
  - Materials excavated from trenches should be deposited in areas outside of drainage lines. Materials excavated along road servitudes should be deposited in areas protected by road curbs or stormwater channels. This will ensure minimal contact between concentrated stormwater runoff and the project sites.
  - If possible, trenches and excavated materials must be limited to areas outside of the delineated 1in100 year floodlines.
  - Minimise the disturbed areas by phasing or sequencing construction and preserving the existing vegetation where possible.
  - Any river diversions required as part of the sewer pipeline laying should be correctly constructed. This includes ensuring that no water will flow through the construction site even during a storm event. The required heights of the diversion berms are dependent on the location of the required diversion berm relative to the river channel and size of the contributing catchment area.
  - Machinery used during the construction process should be regularly (at least daily) checked for oil leaks. During periods where the machinery is not in use, drip trays should be placed under the machinery to contain any spillages.
  - Contamination of surface water and stormwater must be controlled as follows:
    - Fuels and hydrocarbon stores used during the construction phase of the project must be bunded such that spills from the store areas will not enter the receiving environment, and
    - Concrete must be mixed on wooded boards in a plastic lined and bunded area to reduce spill of hazardous substances
  - Water downstream of watercourse crossing sites should be monitored.
  - Inspect the site regularly and properly maintain it, especially after rain storms.



---

### 3.1.2 SWMP for Alteration of a Watercourse Flow During Construction

Impact identification:

- Diversion of watercourses during the construction of river crossings may result in temporal reductions in flow downstream of the diversion works.
- Destruction of the bed and banks of the streams may occur during construction.

As per the SWMP objectives presented in **Section 3**, maintaining the downstream water quantity. In order to achieve this objective, the following management practices are proposed:

- All water diverted should be returned to the natural river or stream downstream of the diversion.
- The integrity of the beds and banks of the drainage lines should be maintained as far as possible. The area of impact should be minimised as far as possible. Where impacts are unavoidable, the natural conditions of the river beds and banks should be restored.

### 3.2 Post-Construction SWMP

The main potential impact identified is the potential for erosion from open ground areas along the construction footprint. In order to reduce the likelihood of erosion, especially during the period immediately after the rising main pipeline has been constructed, the following mitigation measures are recommended:

- All construction materials and debris should be removed.
- Open ground areas (where trenches have been covered by excavated materials) along the length of the pipeline should be rehabilitated using indigenous vegetation.
- Where required (depending on slope and soil types), silt fences may be placed along the contour so that the likelihood of erosion during the vegetation establishment phase is reduced.
- In areas in which vegetation establishment is not successful and erosion continues to be a problem, it may be necessary to construct more significant erosion preventative measures. These may include riprap, gabion baskets or similar.
- It is recommended that quarterly monitoring is undertaken for the first year post-construction. Thereafter, it is recommended that annual inspections are undertaken. The aim of the inspections is to identify areas of erosion and to ensure that areas

rehabilitated are maintained with indigenous vegetation (at least 80% of the coverage should be with indigenous plants).

An inspection format is preferred where the Environmental Control Officer or Employer's Representative is appointed to conduct pre-construction inspections, regular inspections during construction and inspections post-construction to record observations. Records of activities and watercourse condition must be made.

To account for a potential accidental release or spill of pollutants during construction, a chemical specific monitoring programme should be put in place to monitor and manage the impacts associated thereto.

#### **4 CONCLUSION**

The main objective of the stormwater management plan was to provide a set of guidelines such that, if implemented correctly, potentially detrimental impacts related to poor stormwater management will be reduced. In line with this, recommendations were provided, largely aimed at preventing a reduction in water quality downstream of the construction site. The recommendations provided were generic. It is, therefore, recommended that the design engineer and contractor on site takes cognisance of this and is responsible for the implementation of the mitigation measures recommended.