INTEGRATED WASTE WATER MANAGEMENT PLAN

FOR THE

PROPOSED HELMSLEY COUNTRY ESTATE LOCATED IN COMPENSATION, KWAZULU-NATAL

Prepared for	Prepared by
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February 2019

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ABBREVIATIONS

DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Programme
EMPr	Environmental Management Plan Report
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
IEM	Integrated Environmental Management
KZN	KwaZulu-Natal
PES	Present Ecological State
MAR	Mean Annual Runoff
ME	Mitigation Efficiency
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Protected Areas
NWA	National Water Act, 1998 (Act No. 36 of 1998)
REC	Recommended Ecological Category

ROD	Record of Decision
WMA	Water Management Area
WUL	Water Use License
WULA	Water Use License Application

SECTION 1: INTRODUCTION

1.1 Background

An application has been submitted to the Department of Water and Sanitation (DWS) on behalf of the Helmsley Development Company (Pty) Ltd (The Applicant), for a Full Water Use License Application (WULA) in terms of the National Water Act, 1998 (Act No 36 of 1998) (NWA) for Section 21 Water Uses A, C, G, F and I associated with the development of the proposed Helmsley Country Estate in Compensation, KwaZulu-Natal.

The proposed Helmsley Country Estate will comprise of a 21,0801ha residential housing estate along the Dolphin Coast and will consist of 32 special single residential units, 93 intermediate density housing residential units. The associated infrastructure required to support the residential development includes: roads, electricity, a sewage treatment facility, the supply and treatment of borehole sourced water, storm water management and solid waste management.

Following the Freshwater Specialist recommendations and a pre-application meeting with the DWS on the 12th of June 2017, it was determined that a Full WULA was required due to the nature of activities and subsequent risk posed by the development on the surrounding 10 watercourses. The first WULA submission was submitted to the Department at the end of 2017 which was withdrawn by DWS on the 25th of January 2018. The Consultant (IDM Environmental) has since addressed all issues raised in the withdrawal letter and thus submits this Final WULA for review and approval. The issues that have been addressed by the Helmsley Project Team in this second submission include:

- The Engineering team have included detailed information on the process of extraction and treatment of borehole sourced water for supply to the proposed Helmsley Country Estate (**Appendix 15**). Detailed Civil designs (**Appendix 19**) and volumes have been included;
- The inclusion of C and I forms (**Appendix 5**) and designs (**Appendix 19**) for the road upgrade from the entrance of the property off D176 to the residential units. The access road (which is currenty in existence and has been used as a farm access road for decades) crosses three watercourses, and the existing road infrastructure will require upgrading in order to accommodate increased traffic flow as well as the installation of measures to prevent contamination, pollution and uncontrolled stormwater flow from the access road;
- The inclusion of a detailed Wetland Rehabilitation Plan (**Appendix 12**) dealing with post development rehabilitation of the surrounding wetlands. The surrounding wetlands are noted by the Freshwater Specialist as being significantly degraded due to anthropogenic activities. Thus with the implementation of this Rehabilitation Plan it is the opinion of the Freshwater Specialist that the quality of surrounding wetlands will improve in quality in terms of Present Ecological State (PES).
- The Freshwater Specialist has undertaken a Risk Matrix Assessment (**Appendix 12**) for all watercourses impacted by the proposed Helmsley Country Estate;

- Detailed information has been included in the submission on the sewerage disposal process (**Appendix 15**). This includes information on the package plant treatment process, its location, waste volumes generated and disposed including detailed civil designs (**Appendix 19**);
- Detailed mitigation measures for the operation of the Helmsley Country Estate have been included in the IWWMP and Environmental Management Plan (**Appendix 11**);
- An updated Master Layout Plan (**Appendix 7**) including information on all sensitive areas, all watercourses and riparian areas, the 1:100 year floodline, the flow direction of watercourses, buffer areas; the development in relation to all watercourses, the provision of all services, contours and the location of any other water uses that may occur;
- Property zoning documents (**Appendix 2**);
- All Service Level Agreements (approved by Council) for the proposed Helmsley Country Estate development (**Appendix 16**);
- The updating of various specialist reports including the Engineering Report (**Appendix 15**), the Stormwater Management Plan (**Appendix 18**), the Geotechnical Study (**Appendix 13**) and the Geohydrological Study(**Appendix 14**); and
- A detailed second round of Public Participation Process will be undertaken for a further 60 days.

1.2 Locality

The Helmsley Country Estate is located on Portion 177 of 161 of the Farm Compensation No. 868, (Erf 1 Driefontein upon registration), 10km North West from Ballito, off district road D176 in Compensation. The proposed Estate is located approximately 45km north-east of the Durban City Centre (CBD) and within ward 4 of the KwaDukuza Local Municipality. **Table 1.1**, below contains a summary of all the property details of the proposed Helmsley Country Estate. **Figure 1.1 and 1.2** contain regional and locality maps of the proposed Helmsley Country Estate.

Table 1.1: Summary of the proposed Helmsley Estate location

Farm Name	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein upon registration
Title Deed Number	T38714/2013
Property Owner	Helmsley Development Company (Pty) Ltd – Mr. Sean Hulett (Signing power)
Property ownership from	28/11/2013 to Current
Application Area (Ha)	Application area of the Estate - 19,327ha Total Property size – 21,0801HA
Magisterial District	KwaDukuza Local and the iLembe District Municipalities
Distance and Direction to nearest town	Ballito is situated approximately south east
SG 21 Code	N0FU00000000086800161

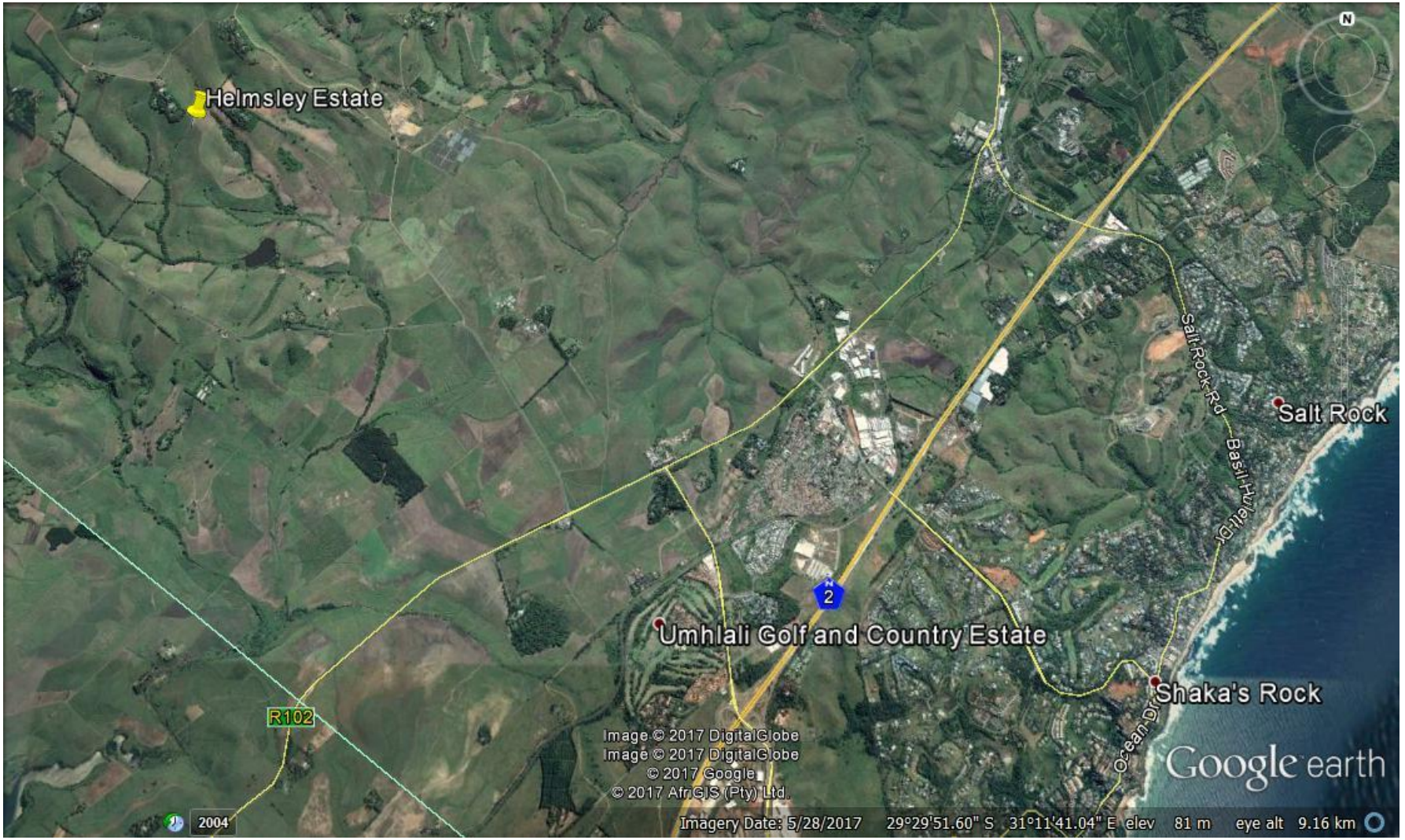


Figure 1.1: Locality map of the proposed Helmsley Country Estate

Figure 1.2: Enhanced view of the location of the proposed Helmsley Country Estate

1.3 Applicable legislation to project

The proposed Helmsley Country Estate requires authorization in terms of several legislative frameworks. Each individual legislative authorization plays an integral part in the WULA and must not be viewed in isolation. It must be stressed to the Applicant/Developer that the Environmental Impact Assessment (EIA), Environmental Management Plan (EMP) and the following IWWMP Report are legal documents and must be strictly enforced and adhered to.

1.3.1 National Water Act (Act 36 of 1998)

The provision of water in South Africa is divided into public water and private water, and its use is regulated by the NWA (under the directorship of DWS). The NWA, 1998 (Act No. 36 of 1998) was created in order to ensure the protection and sustainable use of watercourses in South Africa. The NWA recognises that the ultimate aim of water resource management is to achieve the sustainable use of water for the benefit of all users. Bearing these principles in mind, there are a number of stipulations within the NWA that are relevant to the potential impacts on rivers, streams and wetlands that may be associated with the proposed development.

It must be noted that, in terms of the NWA, it is an offence to pollute public and/or private water to render it unfit for the propagation of fish and aquatic life, including rainwater, seawater, and subterranean water. All water in South Africa is under the trusteeship of the national government (Bailie, 2006). Furthermore, development within a watercourse requires a WUL application, before a developer can proceed to construction.

The purpose of this report is to provide technical information in support of the WUL for the Helmsley Country Estate. This application will include all information on the water uses that are triggered in terms of the NWA. The following Section 21 water uses (**Table 1.2**) apply to the Helmsley Country Estate:

Table 1.2: Section 21 Water Uses applied for the proposed Helmsley Country Estate

Section 21	Water Use	Reason
A	Taking water from a water resource	To supply water to the proposed Helmsley Country Estate from two boreholes situated north of the property and the treatment of this water before consumption at a package plant.
C	Impeding or diverting the flow of water in a watercourse	1) The proposed Helmsley Country Estate is located within 500m of 10 watercourses. 2) The upgrading of the access road to the proposed Helmsley Country Estate.
F	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit	Disposal of treated water from the Sewage Package Plant into watercourse 1 (based on the preliminary design).

G	Disposing of waste in a manner which may detrimentally impact on a water resource	Due to the lack of a sewerage network in the area, a sewage treatment plant dealing with the treatment of sewage from the proposed Helmsley Country Estate will be developed in the South East corner of the property.
I	Altering the bed, banks, course or characteristics of a watercourse	1) The proposed Helmsley Country Estate is located within 500m of 10 watercourses. 2) The upgrading of the access road to the proposed Helmsley Country Estate.

Further information on the different water uses can be found in **Table 5.1** in **Section 5** of this Report.

1.3.2 Other Applicable Legislation

Table 1.3: Additional Legislation applicable to the Helmsley Country Estate

Legislation	Relevance to the development
The Constitution of the Republic of South Africa, Section 24 (Environmental Right)	The Constitution stipulates that everyone has the right to an environment that is not harmful to their health or well-being; and the right to have the environment protected, for the benefit of the present and future generations, through reasonable legislative and other measures. The Constitution paved the way for environmental/water use legislation in South Africa.
National Environmental Management Act, 1998 (Act No. 107 of 1998)	An **Environmental Authorisation (EIA/6421) has been granted for the proposed development activities in 2008 and was amended 2017**.
National Environmental Management: Biodiversity Act (No. 10 of 2004)	There is a possibility that flora and fauna found on site may be impacted upon. If Protected species are found on site, the Developer will be required to apply for a permit. Alien species will also be required to be removed from the site and wetlands as recommended in the specialist report and EMP.
National Environmental Management: Waste Act, 2008 (Act no. 59 of 2008)	All waste generated on site will need to be dealt with according the EMP and Engineering Report.
National Environmental Management: Air Quality Act, 2004 (Act no.39 of 2004)	Mitigation measures to control air pollution and dust must be implemented to ensure compliance with this Act.
Occupational Health and Safety Act (No. 85 of 1993)	The employer needs to manage his/her staff and crew in strict accordance with the Occupational Health and Safety Act in order to prevent injuries to their staff.
National Heritage Resources Act (Act 25 of 1999)	This Act has been put into place to protect and conserve heritage resources. If anything of heritage importance is found

	on the proposed site, the construction process will be halted and a suitably qualified specialist will be contacted.
KwaZulu-Natal Heritage Act (No. 4 of 1998)	This Act has been put into place to conserve, protect and conserve provincial heritage resources.

1.4 Structure of the Technical Report

This IWWMP has been compiled to provide all the necessary information as required by DWS for decision making, in order to authorise the required water uses. The IWWMP is a legal document based on site specific actions that will be implemented over time. This Report has been structured using the guideline on Licensing format and Requirements as obtained from DWS during the pre-application meeting. The report is divided into the following sections:

- Section 1: Introduction;
- Section 2: Description Of The Proposed Project;
- Section 3: Environmental Settings and Background To The proposed Helmsley Country Estate;
- Section 4: Description Of Watercourses impacted by the proposed Helmsley Country Estate;
- Section 5: Description Of The Water Uses associated with the proposed Helmsley Country Estate;
- Section 6: Impact Assessment and Mitigation measures;
- Section 7: Public Participation;
- Section 8: WUL Motivation;
- Section 9: Recommendation and Conclusion; and
- Section 10: Supporting Documentation to the Full Water Use License Application.

SECTION 2: DESCRIPTION OF THE PROPOSED PROJECT

2.1 Proposed development

The proposed Helmsley Country Estate is located in close proximity to the N2 (Level 1) multi-sectoral activity corridor and the Ballito (level 3) development node, which has experienced prolific growth during recent years and thus there exists a high demand for affordable, gap, luxury and leisure residential property. The proposed Helmsley Country Estate thus aims to meet this growing demand in the region for residential property, as formally endorsed and approved by the Kwadukuza Municipality under the Spatial Planning Land Use Management Act (SPLUMA).

The proposed 21,0801ha Helmsley Country Estate development will comprise of 32 full title individual special residential type I stands and 93 sectional title units on 5 medium density residential type II and III stands. The associated infrastructure required to support the residential development includes: the upgrading of existing farming tracks on the property to tar roads, the provision of electricity, the construction of a sewage treatment facility, the supply and treatment of borehole sourced water, storm water management, solid waste management and the installation of Telekom telephone lines. Please see **Figure 2.1** below containing the design of the proposed Helmsley Country Estate.

Section 2.2 of this IWWMP Report describes the activities associated with the different project phases, while **Section 2.3** explores the service provision to the proposed Helmsley Country Estate.

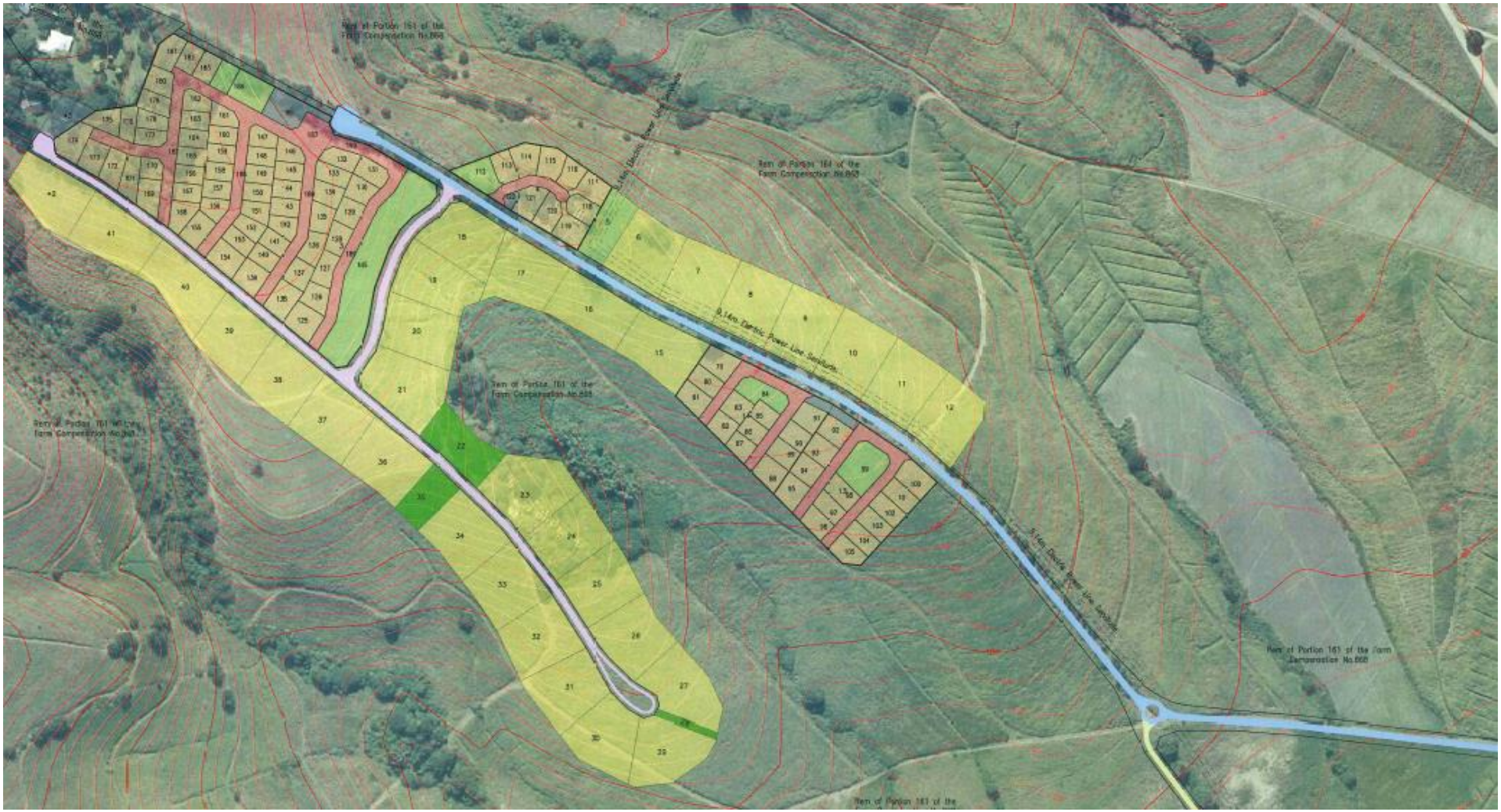


Figure 2.1: The proposed Helmsley Country Estate Layout

2.2 Activity Description

2.2.1 Site Planning

Before site establishment, construction and operation can commence, careful planning must take place which will lay the foundations for the abovementioned phases. This will ensure that impacts can be identified at the earliest possible stage and appropriate mitigation measures employed. This in order to prevent/minimise impacts to acceptable levels. The EIA, WUL and associated Appendices, forms an integral part of this planning process. Careful planning will thus help to limit the impacts on the surrounding wetlands and ensure that an improvement in terms of quality of these wetlands will occur through the rehabilitation process. Before site establishment, construction and operation can occur, it is of the upmost importance that the Applicant and Construction Manager must ensure plans are in place to implement mitigation measures in this IWWMP and EMP and that rehabilitation is an on-going process, which is not solely confined to one phase.

2.2.2 Site preparation

Before construction commences site planning and preparation must occur. This includes:

- Environmental awareness and training for all workers and subcontractors;
- Demarcating the boundary of the construction area;
- Demarcating strict no go areas around sensitive environments including, wetlands, streams, riparian areas and any pockets of indigenous forests. As according to the Freshwater specialist, a 20m buffer must be implemented between construction related activities and these watercourses/forests;
- Determining the location of the construction offices, screening and other structures;
- Determining and preparing site access (including entry and exit points) and access to different areas of the project area, taking into consideration the sensitive areas and existing farm tracks;
- Determining all material and equipment storage areas (including storage areas for hazardous substances such as fuel and chemicals);
- Determining the need and location for temporary services such as electricity and water;
- Determining the location of the concrete batching plant (including the location of cement stores and sand and aggregate stockpiles);
- Implementing of security and safety measures (including temporary and permanent fencing, signage, lighting and the location of first aid kits, spill kits etc);
- Location of vehicle parking;
- Preparing equipment for operation;
- Solid waste collection facilities for litter, kitchen refuse, and for all nonhazardous solid waste including office and workshop waste,
- The placement of portable toilets; and
- Implementing erosion and stormwater control measures on site and at the construction camp.

2.2.3 Construction

Once site preparation has occurred and all necessary approvals have been received, construction can commence. It is of the upmost importance that the Applicant, Construction Manager and ECO ensure that the relevant environmental reports (EIA, IWWMP and EMP) recommendations and mitigation measures are implemented and guide the construction process to ensure impacts are mitigated to acceptable levels and the surrounding environment including watercourses are not degraded or polluted during the development phase. The Engineering Report (**Appendix 15**) and designs (**Appendix 19**) have taken into consideration best practises in dealing with surrounding watercourses and other sensitive environments to ensure the development embraces the principles of sustainable development.

The Geotechnical Report (**Appendix 12**) undertook a detailed investigation of the excavatebility of the soils on the property. It was determined that in the colluvial topsoil and residual Sandstone / Tillite / Diamictite subsoils (typically encountered within Gotechnical Zones 2 and 3) excavation should not pose any issues. In other words, these materials classify as soft in terms of SABS 1200 DA criteria. Notwithstanding this, materials classifying as intermediate could be encountered where re-cementation of the residual soils is well formed or where the consistency of the clayey subsoils has increased due to drying out during months of drier conditions. Completely weathered Sandstone / Tillite / Diamictite bedrock is expected to range from soft to intermediate in terms of SABS 1200 DA criteria, while medium to highly weathered Sandstone / Tillite / Diamictite bedrock could classify as hard, depending on bedding and joint spacing as well as the nature of the bedrock present. Where relatively hard Sandstone / Tillite / Diamictite occurs within less than 1m of the surface (within Geotechnical Zone 1) there is a potential for heavy ripping.

2.2.4 Operation

Once in operation, the development will operate as a residential housing estate to meet the local and regional housing demands of the region. The proposed estate will comprise of 32 special single residential units and 93 intermediate density housing residential units, which will all form part of country estate. Water provision will occur through two boreholes and the water will require treatment before consumption. Furthermore, sewerage disposal will occur on site through a sewerage treatment plant located south east of the proposed site. During operation a corporate body will be tasked with running the management of the Helmsley Country Estate. This body will be required to ensure that the mitigation measures specified in the EIA, EMP and this IWWMP are implemented. Furthermore, regular testing of water quality is required as elaborated on in the Monitoring Programme (**Appendix 20**)

2.2.5 Rehabilitation

Rehabilitation must be seen as an on-going process and not solely confined to one phase in the life cycle of the development. A key part of the rehabilitation process is the implementation of the Wetland Rehabilitation Plan (**Appendix 12**) that aims to rehabilitate surrounding degraded wetlands and improve the quality of these systems. Further information can be found in **Section 6** of this Report.

2.2.6 Access to site

The site is located directly adjacent to road D176 which traverses the north eastern section of the site and then runs in a north westerly direction at a distance that varies between 50m to 200m from the north eastern boundary of the farm. The Helmsley farm is located approximately 6,2km North West of the N2 Freeway which forms the main development corridor between Durban and Richards Bay running approximately 2km west of Ballito. The proposed development is placed approximately 3km west of the R102 between Tongaat and Shakaskraal.

Figure 2.2 contains a map of the existing road network leading to the access of the Helmsley Farm. The black path leads to the R102 between Shakaskraal in the North and Tongaat in the South. The red path leads to the N2/Ballito.

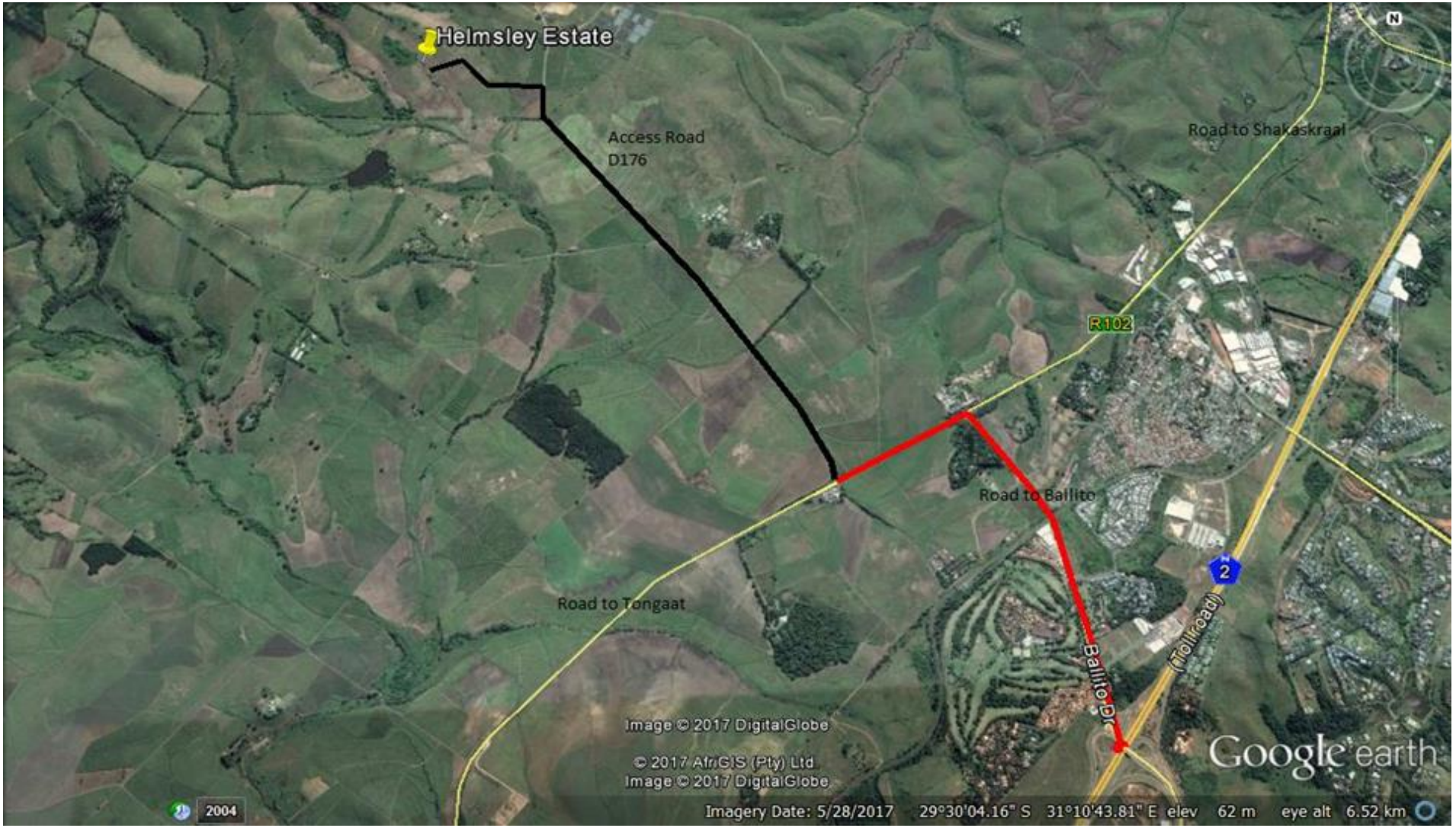


Figure 2.2: Locality map of proposed access road to the Helmsley Country Estate

2.3 Service provision

After an investigation by Bigen Africa Engineers, an Engineering Services Report was formulated in 2007 and updated in 2018 **Appendix 15.** This Report sets out how services will be supplied to the proposed Helmsley Country Estate. Due to the location of the Helmsley Country Estate and after detailed discussions with the Local and District Municipalities some services are not available to the Estate. Therefore services like water provision and sewerage treatment will take place on site.

2.3.1 Design

The applicant is considering both a low level cluster development, as well as free standing individual sites, which will blend with the prevailing agricultural / rural ambience of the property. All structures will follow a set architectural regimen that will be set by the developer following advice and input from qualified architect(s) and in line with the ambience and target market of the development. This architectural regime will be integrated with an urban design framework, the ecological framework and the town planning layout. The residential houses will consist of both single storey and double storey dwellings.

2.3.2 Electricity

The KwaDukuza Local Municipality (LM) is the services authority that is responsible for the planning, supply and network distribution of electricity in the proposed Helmsley development area. As with the discussions with the LM there are two options for electricity provision.

Option 1

The first option involves the installation of two 120mm² PILCDSTA A1 11kV cables which are to be laid in the road reserves of the P2-2 (R102), P387 and D176 district roads in order to form a ring feed circuit from the Municipality new switch room within the Manor Mews development to the proposed new switch room located on Helmsley Residential Estate boundary (**Figure 2.3**).

Encroachment consent from the Department of Transport has been obtained by the Developer of Helmsley Estate for the placement of the 11kV link cables in question. These cables shall terminate at an 11kV switch panel to be housed in a brick built switch room which is to be constructed to the specifications of Kwadukuza Municipality at the boundary of the Helmsley development.

Option 2

Option 2 involves the construction of a 33kV overhead electrical power line to the estate and the installation of a 33/11kV 5MVa step down substation. The land for this substation and overhead line option would have to be secured and made available for same.

The supply authority responsibility shall cease at this 11kV bulk supply metered point of control. Responsibility for the maintenance and upkeep of estate internal 11kV reticulation cables, associated mini substations/transformers, low voltage cables/distribution kiosks and street lighting infrastructure shall remain vested with the Developer/Body Corporate/Homeowners Association.

Figure 2.3: Option 1 Electricity provision option. Manor Gardens to Helmsley Country Estate

2.3.1 Water provision

The iLembe District Municipality does not have any existing bulk water supply pipelines or other related water treatment infrastructure available in close proximity to the development to be able to supply the Estate with bulk water supply. iLembe DM is however planning a bulk water off-take (Off-take No. 13) from the newly constructed 900Ø mm bulk gravity water main from Mandini to Mvoti, that was completed in 2015 as part of the Lower Thukela Bulk Water Supply Scheme implemented by Umgeni Water. However, in the short to medium term, the Helmsley Country Estate will be required to provide its own bulk water supplies. This will take place through two existing boreholes situated on the proposed Helmsley Property and the treatment of this water before consumption via a water treatment package plant.

2.3.1.1 Water Demand

The average household demand for bulk water is the following:

- Special Residential – 1500ℓ/day (annual average daily water demand)
- Sectional title – 1200ℓ/day (annual average daily water demand)
- Conservation Reserve – 15kℓ/ha (annual average daily water demand)

2.3.1.2 Water supply options

In the short to medium term water provision will be provided by two boreholes situated on the north-eastern boundary (**Figure 2.4**) of the property and the treatment of this water in a package plant before it is distributed to the various residential units.

An updated geohydological assessment (**Appendix 13**) was undertaken in 2019 by GSC. Two production boreholes, BH KZN070181 and BH KZN070182 are located within the site boundaries. These boreholes were drilled and aquifer tested by Geomeasure Group during 2007 (the first geohydrological assessment). Based on the evaluation of the existing data, GCS agrees with the findings of the aquifer tests performed. The sustainable yield for BH KZN070181 was 5 l/s and the recommended daily pump cycle is for 8 hours. BH KZN070182 has a sustainable yield of 6.94 l/s and the recommended daily pump cycle is for 12 hours. The total volume that can be abstracted is 443.81m3/day.

Groundwater samples were collected from BH KZN070181 and BH KZN070182 and submitted for inorganic and bacteriological analysis by GSC. Groundwater results were compared to the South African National Standard (SANS) 241-1:2015 drinking water quality standards (SABS, 2015). Based on the laboratory results the water is generally of a very good quality with a neutral pH, compliant Total Dissolved Solids (TDS) and Electrical Conductivity (EC) values. A marginal non-compliant manganese concentration was detected in BH KZN07018. Feacal coliforms exceeding the SANS standard was detected in BH KZN070182. Faecal Coliform concentrations between 0 and 10 colonies per 100ml can cause negligible effects with occasional or short- exposure, however slight risk of microbial infection with continuous term exposure. Total Coliforms exceeding the SANS standards were detected in both boreholes. Total coliform concentrations between 5 and 100 counts per 100ml have the risk of infectious disease transmission with continuous exposure and a slight risk with occasional exposure.

Based on the GSC findings it must be noted that groundwater can be abstracted as a viable source of water supply from the two boreholes provided mitigation and monitoring measures are installed.

The impacts of abstraction were determined. The groundwater impact thereof includes the following:

- Over exploitation of the groundwater resource; and
- Contamination of the groundwater resource, either by human waste or agricultural fertilizers and chemicals, due to the absence of a buffer zone between the surface and the shallow water table.

Detailed mitigation measures as specified by the Geohydrologist Specialist are contained in **Section 6** of this Report.

The Engineering Team (**Appendix 15**) have opted to use a conventional standard type of package plant in order to treat the water (**Figure 2.5**). Based on the treatment guide from DWS for domestic water supply, the construction of a new water treatment package plant could be considered and is generally modular in nature. The main advantages of a package plant is that it can be erected in a relatively short period of time and is a compact self-contained unit capable of producing water from a variety of raw water supply sources. The capital costs are generally much lower than that of a conventional permanent type of treatment plant.

It is foreseen that a conventional water treatment process will be required. The main treatment process/aspects are:

- A pre-oxidation step will be required in order to oxidize the iron and manganese to the acceptable target levels.
- With the raw water turbidity of less than 10 NTU it is foreseen that direct filtration will be sufficient for phase separation.
- Conventional stabilization and disinfection strategies are expected to be sufficient to ensure a good quality of treated water.

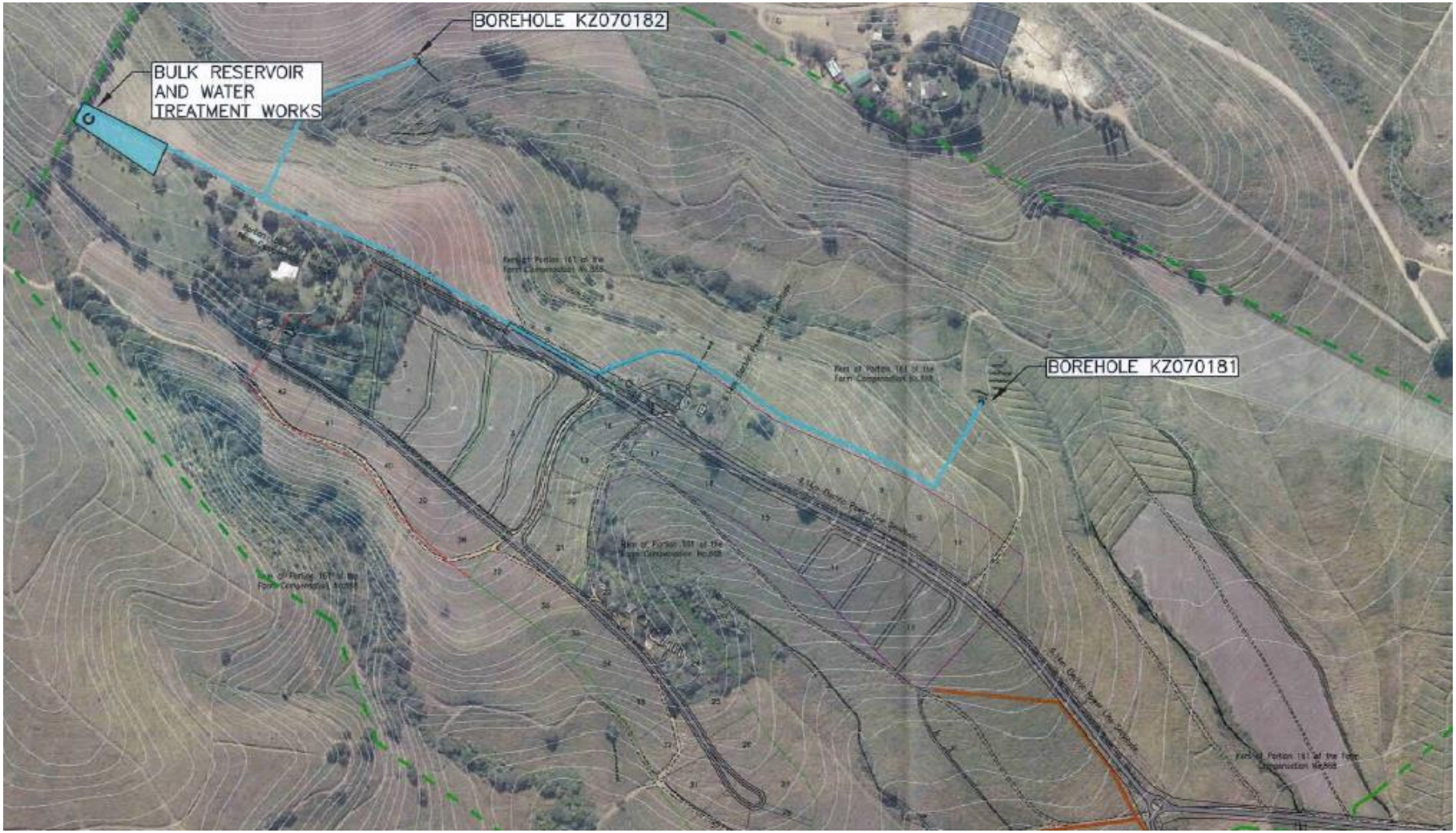


Figure 2.4: Location of boreholes and package plant in relation to the development

Figure 2.5: Treatment of water at the package plant

2.3.2 Sewage

NB: This section should be read with the Engineering Report (Appendix 15), Geotechnical (Appendix 12) and Geohydrological (Appendix 13)

Sewage disposal in the Compensation area is the responsibility of the Ilembe District Municipality, but at present there is no existing Sewage Treatment Works in the vicinity of the proposed development. The proposed development will thus have to plan, establish and provide its own onsite sewage treatment and disposal facilities by way of a package plant that will be constructed in the south east corner of the Helmsley property at the lowest point on the Development.

The expected effluent discharge from the proposed new residential estate development as indicated on the final/approved layout plan is 153kℓ/day

Given the fact that there is still no bulk sewage treatment/disposal and/or outfall sewer infrastructure available in the area at this stage of the development process, the only other remaining technically feasible sanitation disposal alternative will be for the development to be provided with an on-site sewage treatment/disposal facility (i.e. package plant). In terms of which, the proposed project area will have to be developed by making use of an internal water borne sanitation system draining toward the south eastern corner of the site where the proposed sewage treatment/ disposal plant will have to be constructed. The treated effluent from the proposed package plant (at general stream standards) can then be discharged into the existing non-perennial streams traversing through the proposed development (a tributary of the Wewe River);

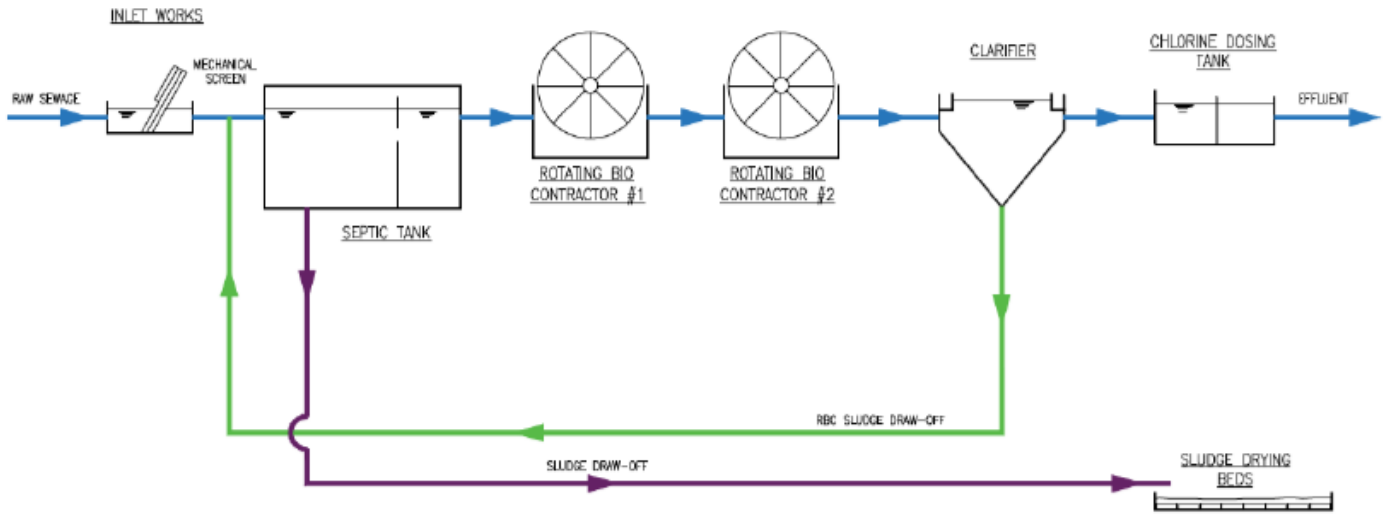
Two (2) 160mm uPVC Ø collection sewers with manholes at direction changes and <90m spacing will collect the sewage under gravity, joining up into a single 160Ø outfall sewer line, running parallel along the western side of the access road to the Waste Water Treatment Works (WWTW) site as reflected on WWTW site layout plan and bulk gravity sewer layout plan (**Appendix 7**)

The estimated Average Dry Weather Flow (ADWF) that will require treatment in respect of the development, is 128m³/day with Peak Dry Weather Flow (PWDF) and Peak Wet Weather Flow (PWWF) factors of 1,2 and 2,5 respectively. The treatment process structures shall be designed in order to accommodate the ADWF for them to operate as intended while the pipework will be sized to handle PWWF flows. In selecting a process for this small wastewater treatment works, the following considerations must be taken into account:

- Type of effluent to be treated;
- Typical characteristics of the effluent;
- Final treated effluent standards required;
- Location of the proposed treatment works;
- Type of population served;
- Level of plant operation and maintenance requirements.

Based on the abovementioned factors, the waste water treatment process selected must be capable of producing the required standard of treated effluent, which must also be appropriate for small flow conditions, be robust in nature, as well as be simple and inexpensive to operate.

Although there are various different types of effluent treatment systems on the market that are being offered by the industry, the quantum and quality of the effluent expected at the Helmsley Country Estate was taken into consideration. The most appropriate system that has been selected by ourselves for implementation on this project is based on the SA general standards for a plant greater than 100kℓ/day as contained in the guidelines for small domestic waste water treatment plants from the Department of Public Works. In terms of which, the flow diagram for the recommended package plant is detailed below for discussion and reference purposes



Primary Treatment:

a) Septic Tank

A septic tank within the treatment process serves to remove, retain and partially stabilise floatable and settable solids from the raw sewage and the recycled clarifier sludge. The septic tank is sized considering the following parameters:

- Frequency of desludging;
- Population served; and
- Allowable retention time.

A minimum retention time of 24 hours at ADWF is typically allowed for when a septic tank is included upstream of a Rotating Biological Contactor (RBC). However, due to the remote location of the treatment facility, the Engineers have allowed for an additional 12 hours of retention time, i.e. to 36 hours of storage in order to reduce the frequency of having to clean out the septic tank.

The volume of the tank must also account for the volume of sludge accumulated over time. The total Volume of the Septic Tank = 239,5 m^3

It is also recommended that some form of screening be allowed for to capture/ screen out any rags and/or plastics in order to protect the tank and any subsequent pumping processes against possible clogging.

Secondary Treatment:

b) Rotating Biological Contactors (RBC)

A Rotating Biological Contactor (RBC) is an aerobic biological attached growth system which consists of rotating discs that act as an oxygen mass transfer device. The discs are uniformly spaced along the length of the shaft and 40% of the disc's surface area is submerged in the liquid. Biomass attaches to the surface of the discs forming a biofilm. The rotation of the discs exposes the biofilm to air resulting in the aeration of the layer and the sewage. Shear forces applied on the discs during rotation cause excess biomass to be stripped intermittently from the discs. The biomass is removed from the process as sludge in the clarifier downstream of the RBC.

Based on the hydraulic and organic loading, two RBCs with a diameter of 2m and a motor size of 1,1kW each be installed. The installation will require a civil structure as details in DWG-05W001 attached in Annexure H9 of this report. Each RBC will be covered by a half cylindrical GRP cover in order to protect the process from UV rays and minimise odours.

c) Sedimentation

Sedimentation of the biologically treated effluent involves the separation of suspended material from the liquid by gravitational forces. This in practise involves the reduction of the incoming effluent's velocity in order to allow the suspended particles to separate and settle down to the bottom of the structure. The tank mustbe designed to ensure that the effluent is retained in the structure for a sufficient period of time in order to bring about sedimentation but short enough to prevent decomposition of organic matter.

Sedimentation is typically achieved in the Clarifier, which consists of a cylindrical concrete structure where the sludge is collected in a conical sump. The design of a clarifier must ensure sufficient surface area is provided in order to produce an upflow velocity of 1m/h at ADWF or 1,5m/h at PDWF. Enough hydraulic head must be allowed for to remove sludge from the bottom of the conical sump.

d) Disinfection

Disinfection of the effluent prior to discharge is included in order to remove inactive pathogenic micro-organisms that include bacteria and viruses. A chlorine contact tank is sized to allow for a minimum retention time period of 30 minutes. The chlorine dosing rate shall be determined based on the characteristics of the incoming sewage. The dosage rate will vary but is likely to remain within the rangeof between 4 to 8mg/l. It is likely that a HTH based process will be used for a plant of this size and not a gas chlorination system.

e) Sludge Disposal

Sludge removal from the septic tank must be done every six months. The sludge will have to be withdrawn by vacuum tankers and either discharged off site at a registered disposal site or onto sludge drying beds.

The sludge should not be completely withdrawn, a layer of approximately 100mm should remain in the tank as an inoculum.
Approximate Sludge Volume withdrawn = 22m^3 every 6 months

f) Pumping Equipment

Where gravity is not an option between process units, pumps will need to be utilised. It is estimated that the following pumps will be required at this stage of the design process:

- RBC Feed Pumps – effluent is abstracted from the equalisation compartment of the septic tank and pumped into the first RBC. Two submersible type pumps will be installation in a Duty/Standby configuration.
- Recycle Sludge Pumps – a single centrifugal pump will be required to abstract sludge from the bottom of the clarifier and pump to the first compartment of the septic tank.

It is assumed, based on the provisional location and layout of the treatment works, that the final treated effluent will discharge under gravity into the nearby stream to the south east of the planned site.

h) Electrical, Control and Instrumentation
MCC's and Control Panels will need to be weather proof and mounted inside the pump house, and will include timers, low and high level transmitters with flow switches, to stop and start the various pumps.
A HMI/SCADA control system will provide flow and pump details to the operating room that will be situated inside the Gate house to the estate. Pressure and/or float switches will be installed in the reservoir in order to stop the pumps when the reservoirs are full. This will also include lightning and electrical surge protection to protect the pump and control panel. Water meters have also been specified in order to allow for checking of the pump performance.

Figure 2.6: Treatment of sewerage at treatment plant process

2.3.3 Stormwater management

A comprehensive Stormwater Management Report (**Appendix 18**) has been formulated in order to provide a practical plan of management in dealing with stormwater runoff generated by rainfall so as to ensure the protection of the environment from flood hazards, as well as the safe routing and discharge of stormwater from within the proposed development area.

Even though stormwater management and control systems have a budgetary impact on developments, it is nevertheless very important to dispose of stormwater as effectively and efficiently as possible, because uncontrolled runoff can cause damage to property and may erode and destabilize cut and fill banks. The objectives of the stormwater management system are as follows:

- To adequately dispose of runoff from developed areas without causing soil saturation or erosion. This is particularly important on any sites underlain by erodible soils and on steep slopes;
- To provide overland flow routes through the development in order to cater for major storms and thereby minimizing any risk of damage to property and other immovable assets; and
- Stormwater systems should be designed to function adequately with low maintenance in the long term, and should cater for silting, etc.

Extensive attenuation facilities will be required in order to control the construction and operation development run off into the surrounding watercourses. All stormwater emanating from the roads as well as run off from properties, where applicable, would be collected by the proposed piped stormwater reticulation system and conveyed in a controlled manner to the natural drainage courses. All attenuation ponds will be located above the 1:100 year flood line in order to fulfil their intended function.

There are existing stormwater culverts on the Helmsley farm where the main entrance road crosses three watercourses on route to the D176 road. Access routes to the site must follow the existing access roads or cane haulage roads, already established on the site. Prior to moving onto site, the Engineer and Contractor shall inspect the existing stormwater drainage measures along these access routes and repair or construct new drainage measures to limit point source run-off, prevent erosion and allow for the natural flow of water. Major culverts will be required in low laying areas and appropriately located in areas where roads cross natural drainage courses/valley lines. A rehabilitation plan (**Appendix 12**) has been formulated to deal with the development within a watercourses.

Sites adjacent to steeper slopes in excess of 1:3, should be subjected to bunding and erosion control measures. Furthermore, developers shall ensure that no materials, fluids or substances are allowed to enter the stormwater system that could have a detrimental effect on the flora, fauna and aquatic life in the surrounding watercourses.

It is important to note, according to the Determination of the 1:100 year Floodlines at the proposed Sanitation Plant for Helmsley Housing Development Report, the development as intended, will have a

very limited effect on the post development run-off flood volumes of each of the different catchments in the project area.

Figure 2.7: Stormwater management for the proposed Helmsley Country Estate

2.3.4 Solid waste disposal

The KwaDukuza Local Municipality is the services authority responsible for the planning and operationalisation of a functional solid waste removal and disposal system/service within the proposed development area. Depending on circumstances at the time when the services will be required, the Local Authority may consider sub-contracting the collection and removal of solid waste out to a private Contractor. The total volume of solid waste that will be generated once the project area is fully developed is estimated to be approximately 923m^3 per annum. As far as the available land fill sites are concerned, this is an element that is continually being reviewed and managed by the Local Municipality together with their appointed Services Provider in order to ensure that this service can be provided on a sustainable basis. The Municipality has entered into a long term agreement with the Dolphin Coast Waste Disposal land fill site in order to secure the disposal of solid waste rights. There is currently sufficient capacity available at the Dolphin Coast Land Fill site to receive all collected solid waste from the Municipality for the foreseeable future. A service level agreement is provided in Appendix of this submission.

2.3.5 Road network

The internal road network will developed on the existing road network located on the proposed Helmsley site. There is an existing road leading from D176 to the proposed Helmsley Country Estate and numerous cane roads on the site itself. This road will require upgrading to meet the demands of increased traffic flow and the LM standards. All roads will consist of hardened surfaces and kerbing on both sides. The road surfacing material to be used on the various internal roads within the proposed development will be a Client/Architect/Urban designer specific requirement. Major culverts will be required in low laying areas and appropriately located in areas where roads cross natural drainage courses/valley lines. Please see **Figure 2.8** for the proposed internal road network and **Figure 2.9** for the location of where the existing road to be upgraded (including the installation of stormwater measures) crosses the three watercourses.

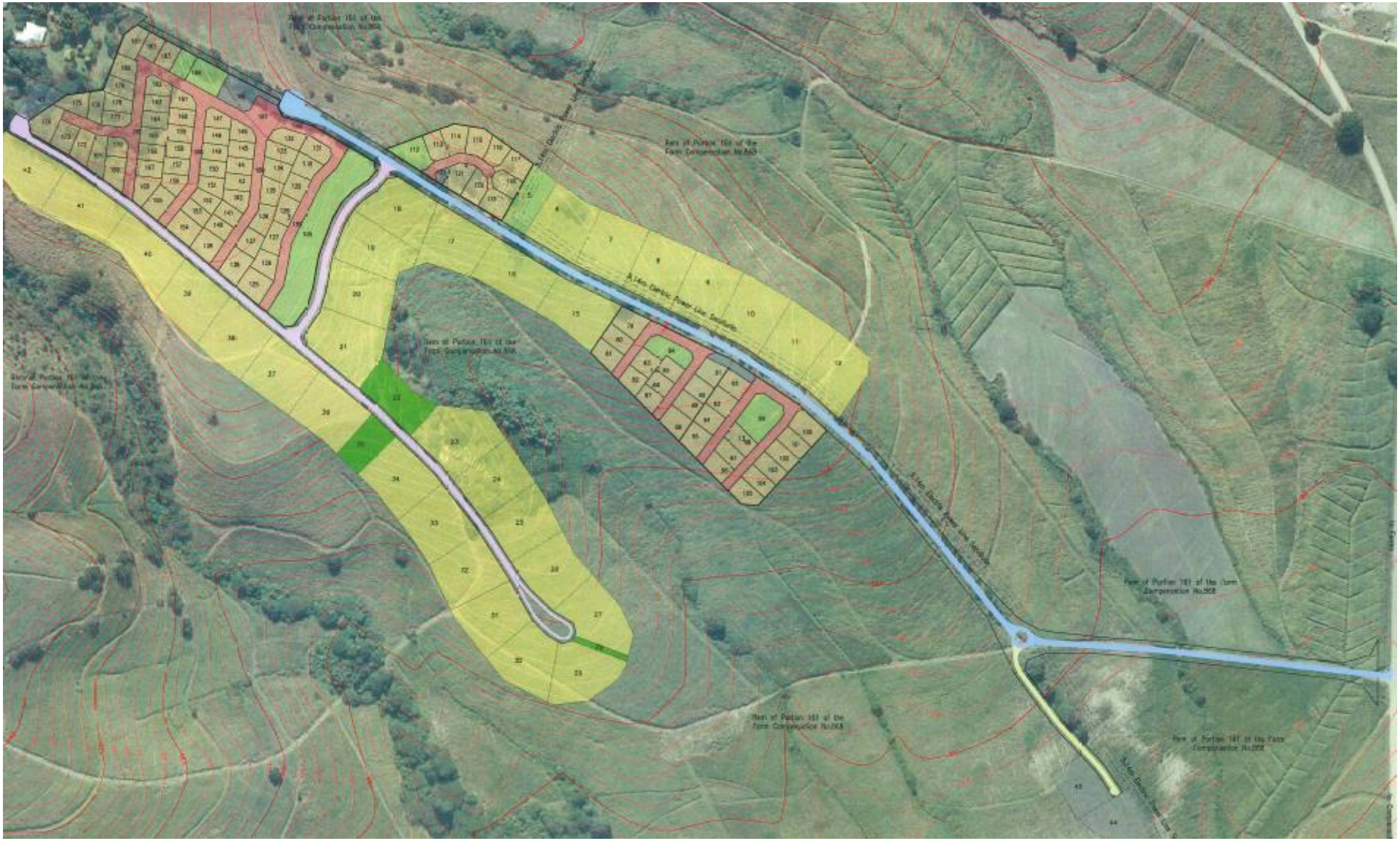


Figure 2.8: The Helmsley Country Estate internal road network

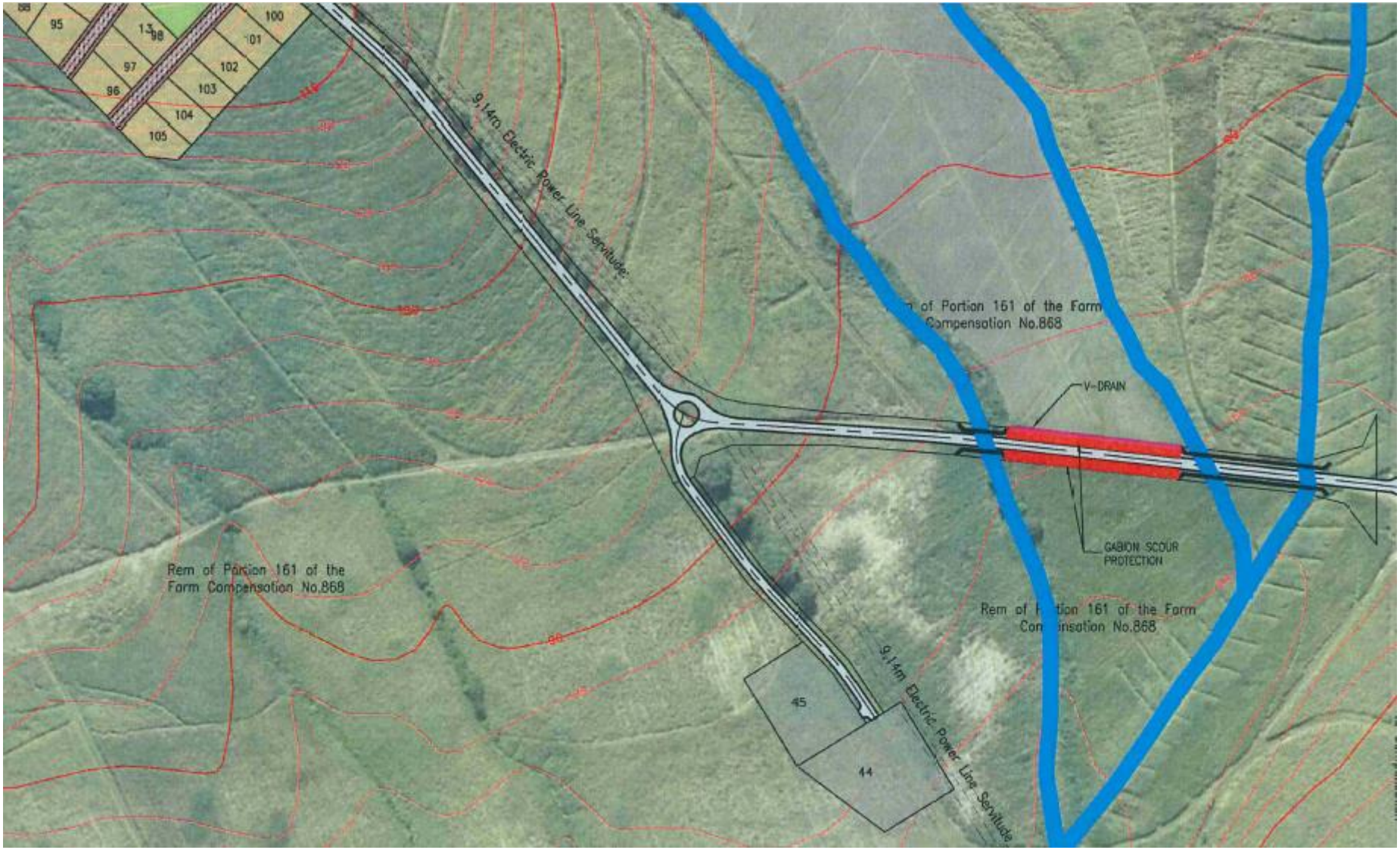


Figure 2.9: Internal road network crossing three watercourses

SECTION 3: ENVIRONMENTAL SETTINGS AND BACKGROUND TO THE PROPOSED HELMSLEY COUNTRY ESTATE

3.1 Climate

The KwaDukuza District Municipality climate can be characterised as warm and sub-tropical, with hot and humid summers and relatively mild and dry winters. The region receives an annual rainfall of approximately 1000mm falling mainly in the summer months between October to March. Mean monthly temperatures range from 16.60C in July to 23.70 C in February, while average daily maximum temperatures fluctuate between 22.30C (July) and 27.40C (February).

3.2 Landscape Characteristics and existing features on site

The Helmsley farm is situated within a predominantly sugarcane farming area, traditionally characteristic of the KwaZulu-Natal North Coast. The farm itself was previously farmed with sugar cane that has since been cleared. The site consists of degraded watercourses, grasslands, with few patches of indigenous woodland. The site generally slopes from the north-west towards the south-east of the farm. Slopes vary across the site from gently sloping ridge lines to moderately to steeply sloping hillside slopes and valley head areas. Abandoned labour homesteads exist within the proposed development area as well as farm roads and existing culverts. The balance of the farm is currently under sugar cane cultivation at various stages of harvesting, with plans to grow macadamia nuts over the long term.

3.3 Geology

The Natal Group Sandstone sequence and its related subsoils mainly underlie the site of the proposed new development, with Dwyka Group Tillites confined to the south and south western portions of the site. The Natal Group Sandstone sequence is approximately 250 to 490 million years old and therefore, over time, has been exposed to a multitude of different environmental and geological conditions. The geology of the site is characterised by colluvial topsoil overlying residual clayey subsoils that have undergone a protracted period of weathering to form a lateritic profile, which in turn overlie weathered Sandstone bedrock at depth.

3.4 Geohydrological characteristics of the site

According to the 1:500 000 Hydrogeological map series 2928 Durban (King et al., 1998) the site is underlain by a fractured aquifer with the average borehole yields ranging between 0.5 and 2L/s. Fractured aquifers describe aquifers associated with fractures, fissures and joints in hard rocks. Sandstone of the Natal Group portray this mode of groundwater. Hydraulic conductivities ranging between 0.4 and 7.7 m2/day and storativity of between 0.0005 and 0.005 can be expected. The aquifer vulnerability and classification maps of South Africa classify the underlying aquifer as a minor aquifer which is the least vulnerable aquifer system. However the water quality in the Natal Group Sandstone is generally good, but elevated concentrations of iron and manganese do occur.

3.5 Flora

According to Mucina and Rutherford (2006), the study area is located within the Indian Ocean Coastal Belt Biome and Bioregion, and, according to the vegetation type map for KZN, the project footprint is located within the KZN Coastal Belt Grassland vegetation type which is indicated as Critically Endangered within the region (Shaw and Escott, 2011). The KZN Coastal Belt Grasslands are characterised by highly dissected undulating coastal plains which presumably used to be covered to a great extent with various types of subtropical coastal forest. Some primary grassland dominated by Themeda triandra still occurs in hilly, high-rainfall areas where pressure from natural fire and grazing regimes prevail. At present the KZN Coastal Belt is impacted by an intricate mosaic of very extensive sugarcane fields, timber plantations and coastal holiday resorts, with interspersed secondary Aristida grasslands, thickets and patches of coastal thornveld present (Shaw and Escott, 2011) (**Figure 3.1**).

According to the National Biodiversity Assessment (NBA, 2011) the study area is not located within a formally or informally protected area, and according to the National Protected Areas Expansion Strategy (NPAES, 2010), the study area is not located within a focus area for expansion.

The study area was not indicated as a Critical Biodiversity Area (CBA) or as an Ecological Support Area (ESA) by the either the KZN Terrestrial Systematic Conservation Plan (TSCP) (Ezemvelo KZN Wildlife, 2010) or the more recent KZN Biodiversity Spatial Planning (Ezemvelo KZN Wildlife, 2016). The majority of the study area is indicated as 100% transformed by the KZN TSCP (**Figure 3.2**). Areas located within the western and eastern portions of the study area are indicated as Biodiversity Areas by the TSCP, however, these areas are located approximately 40m and 520m outside of the project footprint boundary, respectively.

Five vegetation communities are associated with the study area. These include the transformed vegetation community, the degraded grassland vegetation community, the degraded woodland vegetation community, the wetland vegetation community and the riparian vegetation community. The majority of the vegetation associated with the study area has been transformed as a result of sugarcane and Macadamia cultivation. Cultivation has resulted in the complete loss of indigenous species.

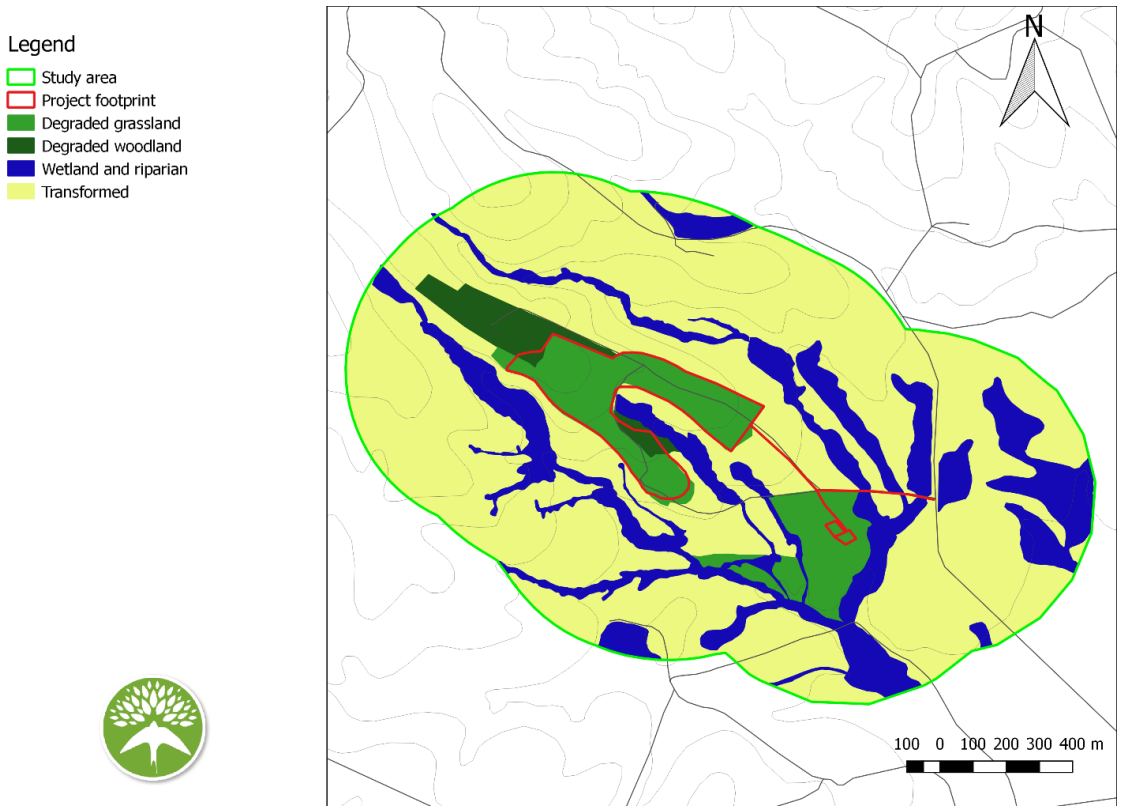


Figure 3.1: Habitat units associated with the study area

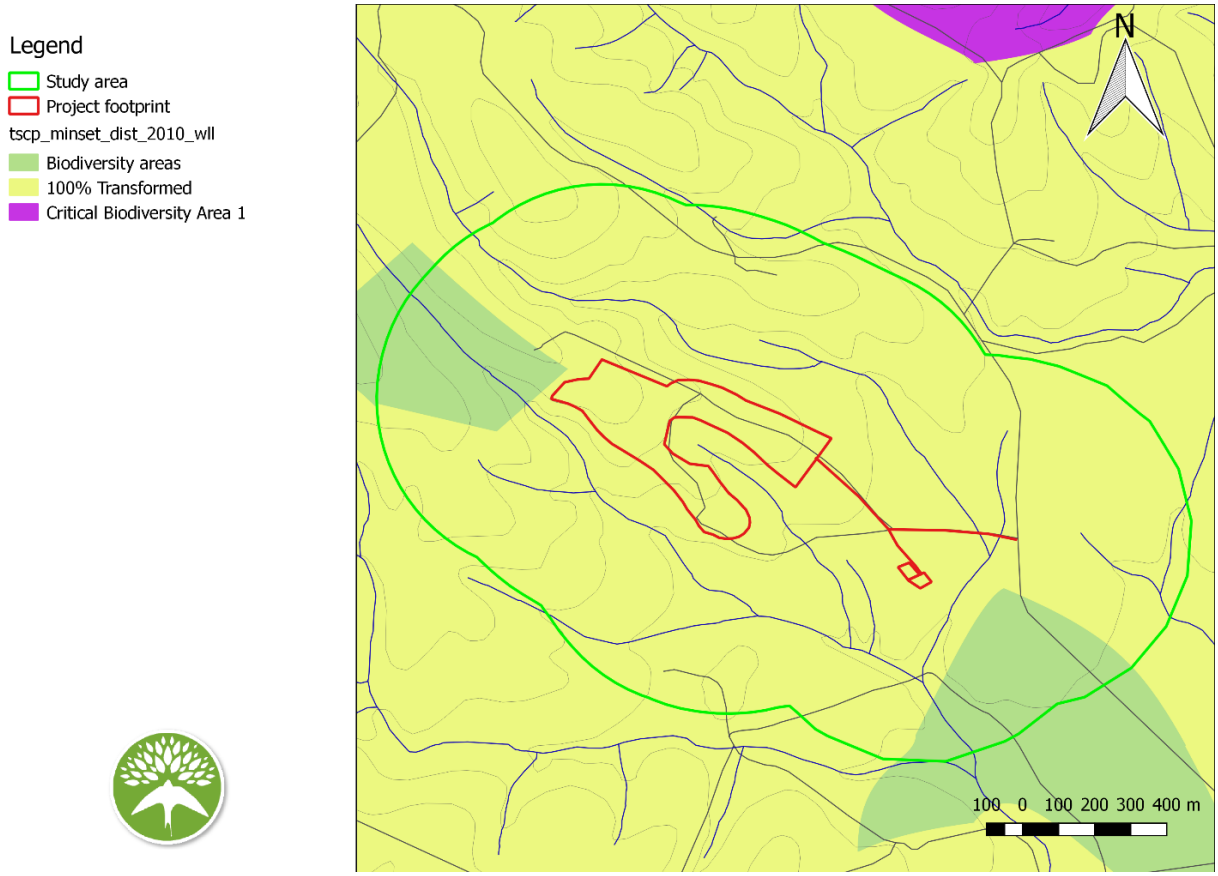


Figure 3.2: Biodiversity areas as indicated by the KZN TSCP

3.5.1 Protected species

No floral Species of Conservation Concern (SCC) as listed by the South African National Biodiversity Institute (SANBI) Red List of South African Plants were encountered within the study area during the brief field survey. However, the riparian habitat associated with Watercourse 1 and watercourse 7a, and the pockets of degraded woodland could potential offer suitable habitat for SCC listed for the Quarter Degree Grid Square (Plants of Southern Africa) such as the Vulnerable Mystacidium aliaceae orchid.

Ficus trichopoda (Swamp Fig) is listed as a protected tree by the National Forests Act (Act 84 of 1998) and was encountered scattered within watercourse 1. However, should development related activities remain outside of the stipulated buffer area of watercourse 1, this species will not be affected.

3.6 Socio-economic status of the Kwadukuza Region

The KwaDukuza LM stretches from the Zinkwazi River in the north to the Tongaat River in the south and is one of four local municipalities that makes up the iLembe DM. The main economic nodes of the LM consist of KwaDukuza/Stanger Town and the growing development around the Ballito area (whereby Helmsley Country Estate occurs). While the LM has made significant strides in addressing socio-economic challenges and service provision in the area, it still faces significant challenges. These include service delivery protests, infrastructure dilapidation, safety and security, unemployment, public transport, electricity provision and low levels of skills development and literacy.

The Helmsley Country Estate is situated adjacent to the coastal town of Ballito which has seen rapid economic growth and development since the 1990s. Key to Ballito's growth has been the tourism sector, centred on its local beaches. To cater for rapid growth, the development of new schools, road infrastructure, new malls and revamping of the town centre has occurred. The Helmsley Country Estate is part of the growth of Ballito in the provision of luxury residential housing for a rapidly expanding market.

SECTION 4: DESCRIPTION OF WATERCOURSES IMPACTED BY THE PROPOSED HELMSLEY COUNTRY ESTATE

The study area falls within the North Eastern Coastal Belt Ecoregion, within the Mvoti to Umzimkulu Water Management Area (WMA) and within the Mvoti sub-Water Management Area (sub-WMA) as defined by NFEPA (2011). The quaternary catchment indicated for the project footprint is U30D

Numerous watercourses were encountered within 500m of the proposed Helmsley Country Estate project footprint, however according to the Freshwater Specialist Report (**Appendix 12**) only ten watercourses (hereafter referred to as watercourses 1 – 9) are likely to be impacted upon as a result of the proposed Helmsley Country Estate development and related activities. This as either the watercourses are located directly adjacent to or are downslope of the proposed development. Watercourse 7 is broken down to Watercourse 7a which is classified as a seasonal stream and further downslope it becomes more characteristic of a channelled bottom wetland (Watercourse 7b).

4.1 Description of impacted watercourses.

Watercourse 1: Perennial stream

Watercourse 1 is a lower foothill river located 70m to the south of the project footprint. It is characterized by a mixed-bed alluvial channel with sand and gravel dominating the bed and by a well-defined riparian area which is dominated by indigenous tree species typical of riparian areas in the region. However, disturbance of the watercourse as a result of surrounding agricultural related activities has resulted in the proliferation of alien and invasive species.

Figure 4.1a: Riparian vegetation of watercourse 1

Figure 4.1b: Instream habitat of watercourse 1

Watercourse 2: Intermittent stream

Watercourse 2 is located 10m to the south of the project footprint. Surrounding cultivation activities and associated disturbance has resulted in the loss of vegetation from both the banks and channel of the majority of the watercourse.

Figure 4.2: Transformed habitat of watercourse 2

Watercourse 3: Seasonal stream

Watercourse 3 is located to the east of the project footprint. The watercourse has been significantly disturbed as a result of surrounding cultivation activities. This disturbance has resulted in the loss of natural riparian vegetation communities from both the banks and the channel of the majority of the watercourse, and in the proliferation of alien and invasive species. No development activities are proposed within this watercourse, however the development footprint is within the proposed buffer area.

Figure 4.3: Degraded riparian habitat of watercourse 3

Watercourse 4 and 5: Seep wetlands

Watercourse 4 and 5 are located to the east of the project footprint and are 90m and 40m away from the proposed development. The wetland habitat associated with these features has been transformed as a result of the cultivation of sugarcane and the associated compaction and ripping of the wetland soils within the features. As result, the wetland vegetation communities along these features have been lost.

Figure 4.4a: Transformed habitat of watercourse 4 Figure 4.4b: Transformed habitat of watercourse 5

Watercourse 6: Seep wetland

The majority of watercourse 6 is located 50m to the east of the project footprint. The majority of the wetland habitat associated with this feature has been transformed as a result of the cultivation of sugarcane.

Figure 4.5: Transformed habitat of watercourse 6

Watercourse 7: Seasonal stream and channelled valley bottom wetland

Watercourse 7 is located 90m to the north of the project footprint. This feature could be divided into two HGM Units. The upstream portion of the watercourse is characteristic of a seasonal stream (hereafter referred to as watercourse 7a and is characterized by a well-defined riparian area which is dominated by indigenous tree species commonly associated with riparian areas. Disturbance as a result of surrounding cultivation has however resulted in the encroachment of alien and invasive species

The downstream portion of the watercourse which is characteristic of a channelled valley bottom wetland (hereafter referred to as watercourse 7b). This portion of the watercourse has been significantly degraded as a result of the past and present cultivation of sugarcane within the feature and as a result of the excavation of drains within the feature which have been developed in an attempt to dry the wetland area out. This disturbance has resulted in the loss of natural wetland vegetation and in the proliferation of alien and invasive species

Figure 4.6a: Stream section of watercourse 7 Figure 4.6b: Wetland section of watercourse 7

Watercourse 8: Channelled valley bottom wetland

This feature has been significantly disturbed as a result of the past cultivation of sugarcane within the feature and within its catchment. Desiccation channels have been created throughout the feature in an attempt to drain excess water from the soil. Historically disturbed areas within the feature are currently dominated by alien and invasive species.

Figure 4.7: Degraded habitat of watercourse 8

Watercourse 9: Channelled valley bottom wetland

Watercourse 9 will be traversed by the access road into the proposed development. The wetland habitat associated with this feature has been transformed as a result of the cultivation of sugarcane and as a result of the excavation of an extensive drainage network within the feature. The main channel of the feature is dominated by the common indigenous obligate wetland species Phragmites australis and by the alien and invasive species Coix lacryma-jobi.

Figure 4.8: Transformed vegetation of watercourse 9

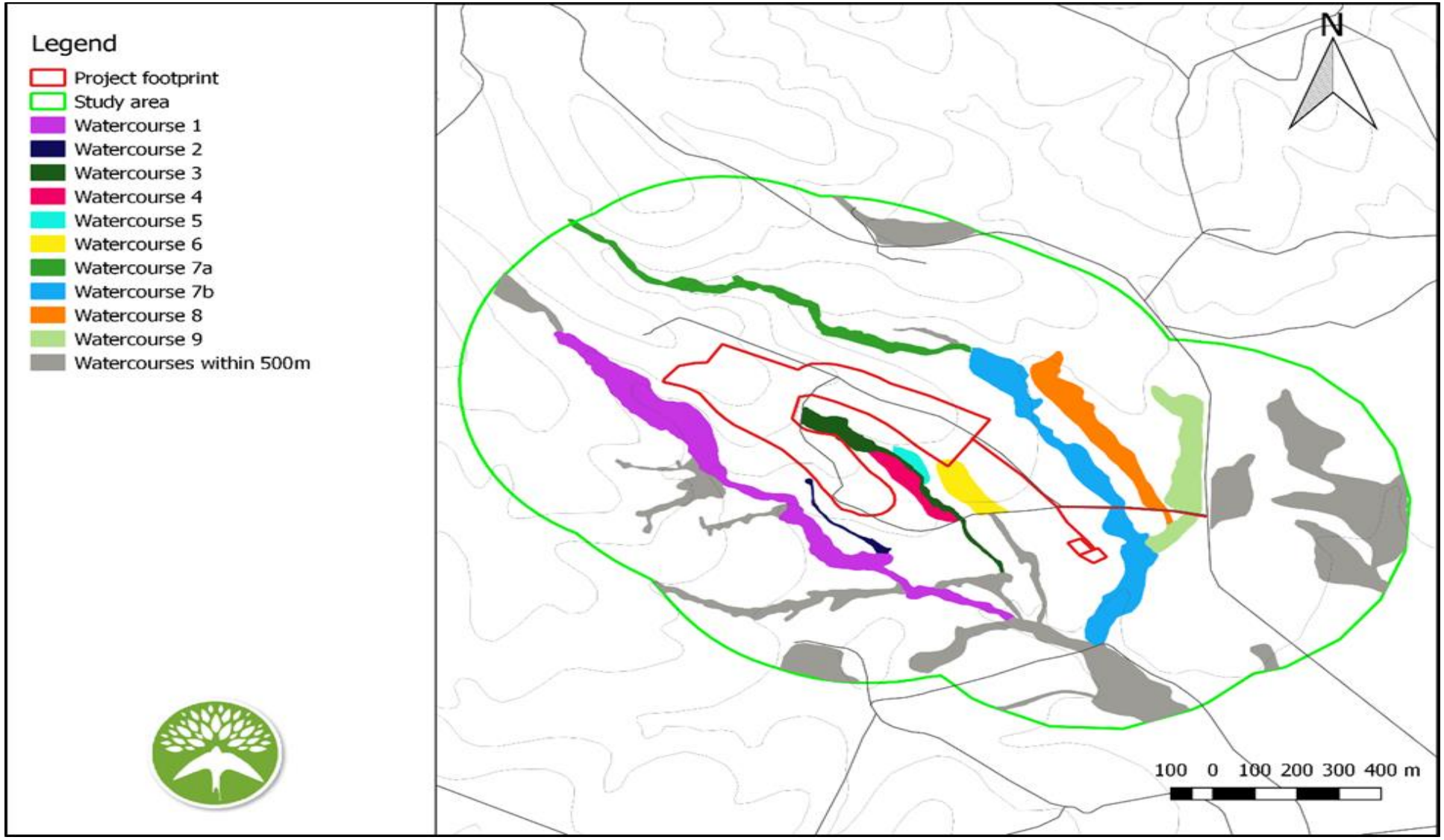


Figure 4.9: Watercourses associated with the project footprint of the Helmsley Country Estate

4.2 PES and EIS Assessment findings of the Helmsley Country Estate affected watercourses

4.2.1 PES and EIS of watercourses 1, 2, 3 and 7a (Streams)

In order to determine the PES of watercourses 1, 2, 3 and 7a, the river IHIA was applied. The IHIA is founded on the assessment of two separate modules of a watercourse namely riparian habitat and instream habitat.

The following existing impacts and aspects influenced the scoring:

- **Flow modification:**
    - An increase of flow into the watercourses is expected as a result of the disturbance within the catchment of the features and an increase in bare soil surfaces.
- **Bed modification and channel modification:**
    - An increase in runoff from surrounding cultivated areas, and disturbance as a result of agricultural activities has resulted in the erosion of the banks of the watercourses and in the modification of the beds of the watercourses.
- **Water quality modification:**
    - No onsite water quality testing was undertaken as part of the assessment, however runoff from disturbed and cultivated areas within the catchment of the watercourses is likely to result in an increase in the sediment load and turbidity of water within the systems.
- **Indigenous vegetation removal and exotic vegetation encroachment:**
    - Cultivation has resulted in the removal of indigenous vegetation from the riparian areas of all watercourses with special mention of watercourses 2 and 3. Disturbance has also resulted in the proliferation of alien and invasive species within all watercourses.

The instream and riparian scores calculated for watercourse 1 and watercourse 7a fall within IHIA Category C (moderately modified - A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged), and the instream and riparian scores calculated for watercourse 2 and watercourse 3 fall within IHIA Category D (largely modified - A large loss of natural habitat, biota and basic ecosystem functions has occurred). The scoring for the watercourses can be found in the Freshwater Assessment in **Appendix**.

The EIS method of assessment for rivers is based on the approach adopted by the DWA as detailed in the document “Resource Directed Measures for Protection of Water Resources” (1999).

Watercourse 1 is considered the most important in terms of biodiversity support. Although encroached by alien and invasive species, the riparian vegetation is still largely intact and floral species diversity is considered to be high. There is also a high probability that watercourse will provide the habitat to support rare and endangered species or populations of unique species. Furthermore, the watercourse is perennial in nature and is likely to provide important breeding and foraging habitat for aquatic species.

The riparian habitat associated with watercourse 2 and 3 has been significantly transformed as a result of cultivation on the banks of the features which resulted in the removal of riparian vegetation and in theproliferation of alien and invasive species within the features. This has significantly reduced the habitat available to support rare and endangered species or populations of unique species. Species richness associated with watercourse 2 is considered to be low and species richness associated with watercourse 3 is considered to be moderate.

Riparian habitat associated with watercourse 7a is considered to be more intact than that associated with watercourse 2 and 3. There is therefore a greater possibility that the feature will support rare and endangered species or populations of unique species. The watercourse is also likely to provide foraging and breeding habitat to aquatic species.

Watercourse 1 and 7a were determined to be of a high EIS (Watercourses that are considered to be ecologically important and sensitive. The biodiversity of these watercourses may be sensitive to flow and habitat modifications), watercourse 3 was determined to be of a moderate EIS (Watercourses that are considered to be ecologically important and sensitive on a provincial or local scale.

The PES and EIS of the watercourses is provided in **Table 4.1** below:

Watercourses	**Present Ecological State (PES)**	**Ecological Importance and Sensitivity (EIS)**	**Recommended Ecological Category (REC)**
Watercourse 1 - Perennial stream	C Category - (moderately modified)	High	C Category - (moderately modified)
Watercourse 2 – Intermitted stream	D Category – (largely modified)	Low	C Category - (moderately modified)
Watercourse 3 – Seasonal Stream	D Category – (largely modified)	Moderate	C Category - (moderately modified)
Watercourse 7a – Seasonal Stream	C Category - (moderately modified)	High	C Category - (moderately modified)

Table 4.1: PES and EIS of watercourses 1, 2, 3 and 7a

4.2.2 PES and EIS of watercourses 4, 5, 6, 7b, 8 and 9 (Wetlands)

The PES of the wetlands associated with the study area (watercourses 4, 5, 6, 7b, 8 and 9) was determined with the use of the WET-Health Tool (Macfarlane *et. al.* 2007). WET-Health is defined as a measure of the similarity of a wetland to a natural or reference condition. This technique attempts to assess hydrological, geomorphological and vegetation health in three separate modules. The probable trajectory of change was also considered should development activities proceed as well as if the project does not prove feasible.

The key findings of the assessment for **watercourses 4, 5 and 6** are summarised below:

Hydrology

- Increased abstraction of water by sugarcane within the catchments of the features has likely reduced inflow into the watercourses.
- An increase in bare, disturbed soils within the catchment has likely increased floodpeaks into the watercourses.
- Recent harvesting of sugarcane from within the watercourses has resulted in a reduction in the surface roughness of all the features and has therefore reduced the retention of water within the watercourses.

Geomorphology

- An increase in sediment laden runoff from surrounding areas disturbed as a result of agricultural activities has resulted in deposition within the watercourses.

Vegetation

- Natural vegetation associated with watercourse 4 and 5 has been completely removed and replaced with sugarcane.
- The majority of watercourse 6 is currently under sugarcane. Only the small northern portion of the feature is dominated by secondary grassland.

The key findings of the assessment for **watercourses 7b, 8 and 9** are summarised below:

Hydrology

- Increased abstraction of water by Macadamia plantations in the catchment of watercourse 7b and sugarcane within the catchment of all features has likely reduced flows into the features.
- An increase in bare, disturbed soils within the catchment of all features as a result of agricultural activities has resulted in small increase in floodpeaks.
- Drainage channels within the wetlands have resulted in an impact to the distribution and retention of water within the wetlands.
- Alien vegetation within watercourses 7b and 8, and sugarcane within watercourse 9 has resulted in an increase in water abstraction when compared to the natural condition.

Geomorphology

- Infilling associated with the historical development of a gravel road through the watercourses has affected flow patterns through the watercourses, resulting in the erosion of upstream areas and the sedimentation of downstream areas.
- An increase in runoff from surrounding disturbed areas has increased the erosional potential of flows running into the watercourses.
- The disturbance of soils as a result of cultivation activities has likely increased the deposition of sediment within the watercourses.

Vegetation

- Watercourses 7b and 8 were historically cultivated with sugarcane. At present the wetlands are characterized by secondary vegetation and are dominated by ruderal and alien and invasive species.
- Watercourse 9 is currently cultivated with sugarcane.

The overall wetland health scores calculated for all of the watercourses within their present states fall within Category E (seriously modified - The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable).

The EIS method applied to wetlands is based on the assessment tool developed by Rountree et. al (2014). To obtain an accurate indication of EIS, the wetland areas identified were assessed according to the degree of transformation. Watercourse 7b was determined to be of an overall Moderate EIS (Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers). Watercourses 4, 5, 6, 8 and 9 were determined to be of an overall Low EIS (Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers).

Watercourses	**Present Ecological State (PES)**	**Ecological Importance and Sensitivity (EIS)**	**Recommended Ecological Category (REC)**
Watercourse 4 – Seep Wetland	Category E (seriously modified)	Low	Category C or D (moderately or largely modified)
Watercourse 5 – Seep Wetland	Category E (seriously modified)	Low	Category C or D (moderately or largely modified)
Watercourse 6 – Seep Wetland	Category E (seriously modified)	Low	Category C or D (moderately or largely modified)
Watercourse 7b – Channelled Valley Bottom Wetland	Category E (seriously modified)	Moderate	Category C or D (moderately or largely modified)
Watercourse 8 – Channelled Valley Bottom Wetland	Category E (seriously modified)	Low	Category C or D (moderately or largely modified)
Watercourse 9 – Channelled Valley Bottom Wetland	Category E (seriously modified)	Low	Category C or D (moderately or largely modified)

Table 4.2: PES and EIS of watercourses 4, 5, 6 and 7a, 8 and 9

4.3 Implementation of Buffers

Buffer zones protect aquatic resources from the effects of adjacent development and/or land use changes. The Buffer Zone Guidelines for Rivers, Wetlands and Estuaries (Macfarlane and Bredin, 2016) was utilized in order to determine an appropriate buffer area for the watercourses assessed. Factors such as the proposed activity as well as the PES and EIS were considered during the calculation of the appropriate buffer area. It should however be noted that the ROD for the project (2008, amended in 2017) stipulates

that a 20m buffer should be applied to all wetland features. It is therefore recommended that this specified buffer area is applied to all of the watercourses assessed. A 20m buffer area will cover the buffer areas calculated by the buffer tool and will provide a measure of additional protection to the watercourses.

Watercourse buffer areas should be treated as ‘no-go’ areas. However, an existing access road running through watercourses 7b, 8 and 9 will need to be upgraded as part of the development, it will therefore not be practical to designate ‘no-go’ buffer zones around these features. Impacts resulting from the proposed development would therefore need to be effectively mitigated and monitored during the construction phase. Furthermore, it must be ensured that non-essential development related activities are strictly prohibited within the watercourses and their associated 20m buffer areas, in order to avoid any unnecessary impact.

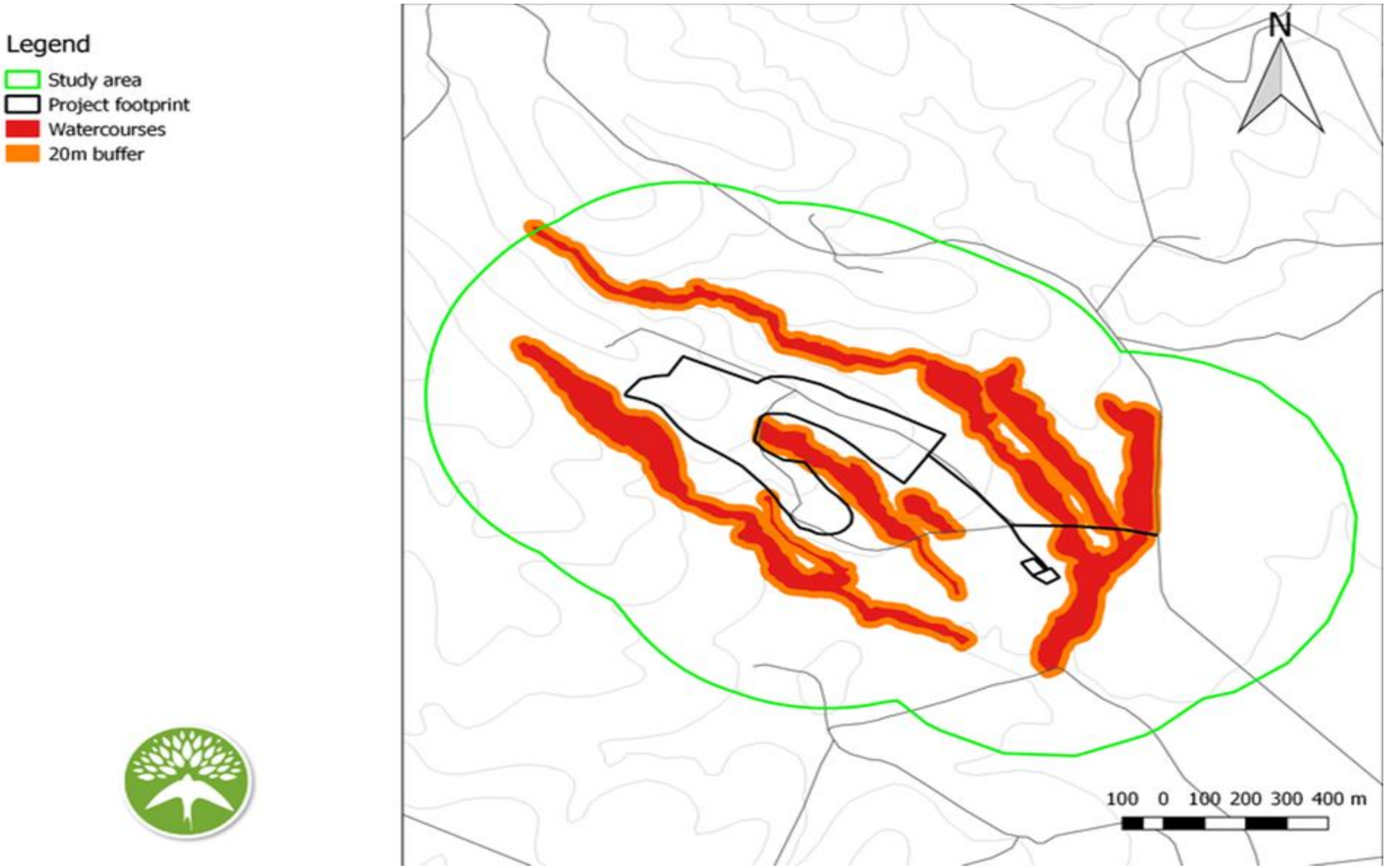


Figure 4.10: Buffers proposed around surrounding watercourse

SECTION 5: DESCRIPTION OF THE WATER USES ASSOCIATED WITH THE HELMSLEY COUNTRY ESTATE

The proposed water uses which will occur at the Helmsley Country Estate in terms of Section 21 of the NWA are as follows:

- (a): Taking water from a water resource;
- (c): Impeding or diverting the flow of water in a watercourse;
- (f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- (g): Disposing of waste in a manner which may detrimentally impact on a water resource; and
- (i): Altering the beds, banks, course or characteristics of a water course;

These water uses were confirmed in a pre-application meeting with Ms. Moonsamy of KZN DWS on the 12th of June 2017. It was further determined that a Full WUL process will be required. A further explanation of why the water uses are required is provided below.

Section 21 (a): In the short to medium term water provision for the Helmsley Country Estate will be provided through two boreholes situated on the property. Both boreholes have been pumped and tested. DW760 abstraction form and DW784 supplementary form (Pump technical information) have been completed and included in the WUL application.

Section 21 (c) and (i): The Freshwater Study identified 10 watercourses that are likely to be impacted by the proposed Helmsley Country Estate. After accessing the watercourses, the Freshwater specialist indicated that the wetlands were highly degraded due to extensive farming practices. With the development of a rehabilitation plan the quality of the watercourses is likely on improve and thus the development can be considered as favorable. After a quantum risk assessment was undertaken, a **Medium Risk** was obtained for activities accessed. Forms DW763 (Impeding or diverting the flow of water in a watercourse) and DW768 (Altering the beds, banks, course or characteristics of a water course) have been submitted. Furthermore, Supplementary form DW781/DW775 has also be included in this submission.

Section 21 (f): The disposal of waste water (from the sewerage packaging plant) into the surrounding watercourse 1 (based on preliminary designs). DW766 dealing with the discharge of waste or water containing waste into a watercourse has been submitted.

Section 21 (g): Due to the lack of a sewerage network in the region a sewage package plant dealing with the treatment of sewage from the Helmsley Country Estate will be developed. Forms DW767 (disposing of waste in a manner which may be detrimental to a watercourse) and Supplementary form DW905 (Treatment facility information) have been completed. Information provided is on preliminary designs provided in the Engineering Report (**Appendix 15**).

Table 5.1 contains a summary of the different water uses.

Water Use Name	Water Use Section	Quaternary Catchment	Purpose	Property Description	Co-ordinates	Volumes/Dimensions
Borehole 1	Section A	U30D	To supply water to the Helmsley Country Estate.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 41.4 S 31 09 43.6 E	144 m^3 (Daily)
Borehole 2	Section A	U30D	To supply water to the Helmsley Country Estate.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 29.5 S 31 09 19.8 E	300 m^3 (Daily)
Watercourse 1: Perennial stream	Section C and I	U30D	Watercourse 1 is in close proximity to the Helmsley Country Estate. No development will occur in the watercourse and a buffer will be implemented between the development and the watercourse.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 58.9 S 31 09 29.0 E	N/a
Watercourse 2: Intermittent stream	Section C and I	U30D	Watercourse 2 is in close proximity to the Helmsley Country Estate. No development will occur in the watercourse and a buffer will be implemented between the development and the watercourse.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 58.6 S 31 09 32.3 E	N/a
Watercourse 3: Seasonal stream	Section C and I	U30D	The internal sewer line/pipe transporting sewage from the residential properties to the Sewage Package Plant for treatment crosses Watercourse 3.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 57.2 S 31 09 41.9 E	Minimum diameter of the sewer reticulation pipe is 150mm Ø. Total length of internal sewer line 3900m.
Watercourse 4: Seep wetlands	Section C and I	U30D	Watercourse 4 occurs within 500m of the Helmsley Country Estate. No development will occur in the watercourse and a buffer will be implemented between the development and the watercourse.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 54.2 S 31 09 37.6 E	N/a

Watercourse 5: Seep wetlands	Section C and I	U30D	Watercourse 5 occurs within 500m of the Helmsley Country Estate. No development will occur in the watercourse and a buffer will be implemented between the development and the watercourse.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 51.0 S 31 09 37.7 E	N/a
Watercourse 6: Seep wetland	Section C and I	U30D	The internal sewer line/pipe transporting sewage from the residential properties to the Package Plant for treatment crosses Watercourse 6.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 56.5 S 31 09 44.4 E	Minimum diameter of the sewer reticulation pipe is 150mm Ø. Total length of internal sewer line 3900m.
Watercourse 7a: Seasonal stream	Section C and I	U30D	The water pipe and electric cables (providing power to the borehole) crosses watercourse 7a on route from Borehole 2 to the Reservoir.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 32.4 S 31 09 19.5 E	2M wide servitude for the water pipe.
Watercourse 7b: channelled valley bottom wetland	Section C and I	U30D	The existing access road from the residential units to the gatehouse/D176 road crosses watercourse 7b. Prior to moving onto site, the Engineer and Contractor shall inspect the existing stormwater drainage measures along these access route and repair or construct new drainage measures to limit point source run-off, prevent erosion and allow for the natural flow of water. This includes inspecting culverts.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 55.8 S 31 09 55.9 E	Class 5 road Road reserve 16m Road width 5,5m
Watercourse 8: Channelled valley bottom wetland	Section C and I	U30D	The existing access road from the residential units to the gatehouse/D176 road crosses watercourse 8. Prior to moving onto site, the Engineer and Contractor shall inspect the existing stormwater drainage measures along these access route and repair or construct new drainage measures to limit point	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 56.2 S 31 09 59.8 E	Class 5 road Road reserve 16m Road width 5,5m

			source run-off, prevent erosion and allow for the natural flow of water. This includes inspecting culverts.			
Watercourse 9: Channelled valley bottom wetland	Section C and I	U30D	The existing access road from the residential units to the gatehouse/D176 road crosses watercourse 9. Prior to moving onto site, the Engineer and Contractor shall inspect the existing stormwater drainage measures along these access route and repair or construct new drainage measures to limit point source run-off, prevent erosion and allow for the natural flow of water. This includes inspecting culverts.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 28 56.5 S 31 10 10.8 E	Class 5 road Road reserve 16m Road width 5,5m
N/A	Section F	U30D	Disposal of treated effluent from the Helmsley Package Plant into the surrounding watercourses.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	Final disposal of the treated waste water from the Package Plant into the watercourse to be determined upon final design of the Package Plant.	151.8m³/d (ADWF)
N/A	Section G	U30D	Due to the lack of a sewerage network in the area a sewage package plant dealing with the treatment of sewage from the Helmsley Country Estate will be developed.	Portion 177 of 161 of the Farm Compensation No. 868; Erf 1 Driefontein on registration	29 29 01.3 S 31 09 54.3 E	2500 m² size of facility 151.8m³/d (ADWF) daily treatment Capacity of the WWTW is 200kl.

Table 5.1: Identified water uses for the proposed Helmsley Country Estate

SECTION 6: IMPACT ASSESSMENT AND MITIGATION MEASURES

The impact assessment was conducted by the Freshwater Specialist Ms. Louise Zdnaow and the full report is contained in **Appendix 12**. In the impact assessment it has been assumed that the specific conditions as set by the ROD (2008, amended 2017) will be strictly adhered to, and that all management measures as stipulated within the EMP (compiled by IDM Environmental, 2012 and updated in 2019) and the stormwater management plan (2019) will be implemented. Should the above conditions be strictly adhered to and should the management measures be implemented, the majority of the freshwater impacts associated with the proposed development related activities will be prevented. However, the following impacts are still likely to occur regardless of the adherence to the conditions and management measures. These include:

Construction Phase:

- Loss of degraded wetland habitat from watercourses 7b, 8, and 9.
- Disturbance of degraded wetland habitat associated with watercourses 7b, 8 and 9 and disturbance of degraded riparian habitat associated with watercourse 7a.
- Water quality impairment.
- Alteration of flow patterns.
- Disturbance of watercourses during the removal of crops and alien and invasive vegetation.

Operational Phase:

- Increased runoff from hardened surfaces resulting in erosion and sedimentation of surrounding watercourses.
- Water quality impairment.
- Alteration of flow patterns through watercourses 7a, 7b, 8 and 9.

6.1 Impacts assessed in the Freshwater study

Table 6.1: Summary of the impacts assessed and the ratings received

	Intensity	Extent	Duration	Probability of impact occurring	Significance
Construction Phase					
Loss of degraded wetland habitat from watercourses 7b, 8, and 9.					
Without Mitigation	Medium	Local	Permanent	Definite	**Medium (-ve)**
With mitigation	N/A	N/A	N/A	N/A	N/A
Disturbance of degraded wetland habitat associated with watercourses 7b, 8 and 9 and disturbance of degraded Riparian habitat associated with watercourse 7a					
Without Mitigation	Medium	Local	Long term	High	**Medium (-ve)**
With mitigation	Low	Local	Short term	High	**Very Low (-ve)**
Water quality impairment					
Without Mitigation	High	Local	Long term	High	**High (-ve)**

With mitigation	Low	Local	Short term	Medium	**Very Low (-ve)**
Alteration of flow patterns					
Without Mitigation	High	Local	Long Term	High	**High (-ve)**
With mitigation	Low	Local	Long term	Low	**Low (-ve)**
Disturbance of watercourses during the removal of crops and alien and invasive vegetation					
Watercourses 2, 4,5, 6, 8 and 9					
Without Mitigation	Low	Local	Long term	High	**Medium (-ve)**
With mitigation	Medium	Local	Long term	Medium	**Medium (+ve)**
Watercourses 1, 3, 7a and 7b					
Without Mitigation	Medium	Local	Long term	High	**Medium (-ve)**
With mitigation	Medium	Local	Long term	Medium	**Medium (+ve)**
Operational Phase					
Increased runoff from hardened surfaces resulting in erosion and sedimentation of surrounding watercourses					
Without Mitigation	Low	Local	Short term	Definite	**Very Low (-ve)**
With mitigation	N/A				
Water quality impairment					
Without Mitigation	Medium	Local	Long term	High	**Medium (-ve)**
With mitigation	Low	Local	Long term	High	**Low (-ve)**
Alteration of flow patterns through watercourses 7b, 8 and 9					
Without Mitigation	Medium	Local	Long Term	High	**Medium (-ve)**
With mitigation	Low	Local	Short Term	Low	**Very Low (-ve)**

6.1.1 Construction related impacts

6.1.1.1 Impact 1 – Loss of degraded wetland habitat from watercourses 7b, 8 and 9

An existing access road traversing watercourses 7b, 8 and 9 will be upgraded. The upgrade of the existing access road will include the ripping up of the existing gravel road (approximately 4m wide) and the construction of a new tarred road which will be approximately 10m wide. The upgrade and limited widening of an existing gravel access road into the project footprint will result in the loss of approximately 235m2 wetland habitat from watercourse 7b, approximately 188m2 wetland habitat from watercourse 8 and approximately 206m2 wetland habitat from watercourse 9. However, wetland habitat directly adjacent to the existing road has already been degraded as a result of the development of the gravel access road through the features, and as a result of the historical and current cultivation of sugarcane. This has reduced the PES of all three features to a Category E (Seriously modified).

The impact associated with the loss of a limited area of already degraded wetland habitat is considered to be of a medium intensity25, will occur regardless of the implementation of mitigation measures and will remain permanently. The overall impact significance was therefore rated as medium (negative).

Impact	Without Mitigation	With Mitigation
Loss of degraded wetland habitat from watercourses 7b, 8 and 9	Medium (-ve)	N/A

6.1.1.2 Impact 2: Disturbance of degraded wetland habitat associated with watercourses 7b, 8 and 9

The proposed upgrading of an existing access road and associated stormwater culverts through watercourses 7b, 8 and 9 will likely result in the disturbance of wetland areas directly adjacent to the upgrade activities. Areas outside of the direct construction footprint will likely be cleared of vegetation to make way for the movement of construction vehicles and personnel, and the associated disturbance of soils may result in the sedimentation of downstream areas of the watercourses. The movement of construction vehicles and personal through the wetland areas may also result in the disturbance and compaction of soils and the spread of alien and invasive vegetation. However, as mentioned above, these watercourses have been significantly transformed as a result of the historical and current cultivation of sugarcane, and the wetland areas are therefore currently dominated by alien and invasive species and sugarcane. This has decreased the PES of the features which were determined to fall within PES Category E (Seriously modified).

The proposed development of an underground 75mm diameter uPVC Class 12 water pipeline through watercourse 7a will result in the disturbance of riparian habitat associated with this feature. Riparian vegetation will be removed in order to excavate a trench for the pipeline, and the disturbance of soils during excavation activities may result in the sedimentation of downstream riparian habitat. However, vegetation will be able to re-establish above the pipeline and the loss of vegetation will therefore not be permanent.

Impact	Without Mitigation	With Mitigation
Disturbance of degraded wetland habitat associated with watercourses 7b, 8 and 9	Medium (-ve)	Very Low (-ve)

Mitigation measures include:

- The following general recommendations are made regarding the access road upgrade and the development of the water pipeline crossing:

→ Restrict access road upgrade activities and water pipeline development to the dry winter months;

→ Restrict disturbance of wetland and riparian soils to a narrow construction footprint area. The construction footprint area must be as narrow as practically possible and must be clearly demarcated. Areas outside of the demarcated area must be designated as no-go areas;

→ Allow only essential construction related activities within the demarcated areas;

→ Immediately rehabilitate any accidental disturbance to portions of watercourses falling outside of the demarcated construction footprint area;

→ Prohibit the dumping of spoil material within watercourses. Spoil material must be appropriately disposed of at a registered waste disposal facility;

→ Store topsoil and vegetation removed from the construction footprint at designated stockpile areas for use in rehabilitation activities. Designated stockpile areas must be located outside of the buffer areas of the watercourses, preferably within already disturbed areas;

→ Stockpile topsoil and subsoil removed during construction separately for future rehabilitation;

→ Install silt fences/traps downstream of the road crossing area and downstream of the pipeline crossing during construction activities to trap any sediment produced during construction activities. The Environmental Control Officer (ECO) must be consulted on the location of silt fences, and silt fences must not result in any unnecessary disturbance to the watercourses;

→ Remove sediment from silt fences/traps on a regular basis;

→ An ECO (or similar) must inspect the construction footprint on a weekly basis and must take measures to address unforeseen disturbances to watercourses;

→ Once construction has been completed all construction waste, rubble, and equipment must be removed from the construction footprint; and

→ Rehabilitate disturbed wetland and riparian habitat. This can be achieved through the ripping of compacted soils to a depth of 300m and through the reprofiling of areas to pre-disturbance conditions. Indigenous wetland and riparian vegetation must also be re-established within disturbed areas.

- The following recommendations are made regarding the water pipeline crossing:

→ The pipeline crossing area must be developed at a 90 degree angle to the watercourse in order to limit the area of disturbance;

→ Limit the number of trees and shrubs removed from the riparian habitat as far as practically possible;

→ The trench excavated for the pipeline must be dug by hand in order to avoid any unnecessary disturbance and compaction of soils;

→ Topsoil and subsoil removed during excavation of the trench must be stockpiled separately at designated stockpile areas (see above) for future rehabilitation activities;

→ Replace soil in the correct order e.g. subsoil below and topsoil above, as soon as possible after the pipeline has been placed;

→ Compact subsoil and spread the topsoil as evenly as possible over the subsoil. The creation of permanent depressions or mounds above the pipeline must be avoided; and

→ Revegetate disturbed areas above the pipeline with vegetation assemblages reflecting the general species composition of the area as soon as possible after the application of topsoil. A botanical specialist should advise on appropriate species to be utilized during revegetation.

6.1.1.3 Impact 3 – Water quality impairment

A large majority of activities that could potentially result in impairment of water quality can be prevented with the implementation of management measures as stipulated within the EMP. However, the localities of topsoil stockpiles, construction material and equipment storage areas, fuel storage areas, concrete

batching areas as well as vehicle parking and equipment cleaning areas have not been specified. Runoff of sediment and pollutants from these areas may result in the contamination of nearby watercourses and in the impairment of water quality.

Furthermore, construction vehicles will need to traverse watercourses 7b, 8 and 9 on the existing gravel access road in order to gain access to the project footprint, and the upgrading of this gravel access road will require the use of construction equipment within the watercourses. This increases the potential of the contamination of surface water within the watercourses as a result of leaks or spillages from construction vehicles and equipment.

An additional threat is considered to be the pollution of surface water with cement and other construction related materials during the upgrading of the existing gravel access road through watercourses 7b, 8 and 9 as well as during the development of the water pipeline through watercourse 7a. Extreme caution will need to be taken with these materials in the vicinity of the watercourses in order to prevent accidental spillage. Spillage should be cleaned up immediately and disposed of at an appropriately licensed facility. The impact is considered to be of a high intensity and may have long term impacts without the implementation of appropriate mitigation measures. The overall impact is therefore considered to be of a high (negative) significance prior to the implementation of mitigation measures. However, with the implementation of the additional mitigation measures as listed below the intensity and duration of the impact may be reduced and the overall impact may be reduced to a very low (negative) significance.

Impact	**Without Mitigation**	**With Mitigation**
Water quality impairment	High (-ve)	Very Low (-ve)

Mitigation measures include:

- Restrict access road upgrade activities to the dry winter months when flow within the watercourses is at its lowest. This will reduce the possibility of contaminants entering into surrounding surface water areas with stormwater runoff.
- Locate topsoil stockpiles, construction material and equipment storage areas, concrete batching areas as well as vehicle parking and equipment cleaning areas at least 20m away from the edge of all delineated watercourses.
- Fuel, chemicals and other hazardous substances should preferably be stored offsite, or at least 20m away from the edge of all delineated watercourses in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding or storm damage.
- Use bunded surfaces within designated areas at least 20m away from the edge of all delineated watercourses for servicing and re-fuelling vehicles.
- Inspect all storage facilities and vehicles daily for the early detection of deterioration or leaks.
- Construct temporary bunds around areas where cement is to be cast in-situ.
- Prohibit the use of infill material or construction material with pollution / leaching potential.

- Clean up any spillages (e.g. concrete, oil, fuel), immediately. Remove contaminated soil and dispose of it appropriately.

6.1.1.4 Impact 4: Alteration of flow patterns

The upgrade of the access road and culverts below the access road may result in an impact on the flow patterns through watercourses 7b, 8 and 9 due to the diversion or obstruction of flow during construction activities. Poorly designed culverts may also result in the permanent obstruction/concentration of flow through watercourses which may result in the scouring/incision of the watercourse channels. Furthermore, the excavation of a trench through watercourse 7a for the water pipeline may result in the interception and diversion of flows through the feature.

There is also the potential that the base level of the watercourses may be lowered or raised at the point where excavations and infilling for road and water pipeline development takes place. The lowering of the base level of the watercourses may result in the scouring of the watercourse beds downstream of the crossings and in headward erosion during the operational phase. Alternatively, the raising of the watercourse beds may result in upstream ponding and downstream erosion during the operational phase. The impact is considered to be of a high intensity and may have long term impacts without the implementation of appropriate mitigation measures. The overall impact is therefore considered to be of a high (negative) significance prior to the implementation of mitigation measures. However, with the implementation of the additional mitigation measures as listed below the intensity and duration of the impact may be reduced and the overall impact may be reduced to a low (negative) significance.

Impact	**Without Mitigation**	**With Mitigation**
Water quality impairment	High (-ve)	Low (-ve)

- Design related mitigation measures:

→ During the design of the road upgrade and water pipeline crossings, allowance should be made for the movement of subsurface and surface flow; and

→ The road culvert designs must allow for sufficient dispersion of water through watercourses 7b, 8 and 9 in order to prevent the concentration of flow and the resultant scouring and incision of the channels of the features.

- Restrict access road upgrade activities and the development of the water pipeline to the dry winter months when flow within the watercourses is at its lowest;
- Ensure that hydrological connectivity between areas upstream and downstream of the access road and proposed pipeline crossing is maintained throughout the construction phase. The impoundment of flow through watercourses must be strictly prohibited;
- Any existing flows through the watercourses should be temporarily diverted away from the construction footprint by a small diversion dam and piped to portions of the watercourses downstream of the construction footprint. Care must be taken to ensure that erosion of watercourses is avoided at the downstream discharge points; and
- The bed and the banks of the watercourses must be rehabilitated to as close to their original condition as possible after the completion of construction related activities. Ensure that the beds

of the features are restored to the natural base level in order to prevent erosion or upstream ponding (i.e. the base of culverts below the access road must tie in with the natural base level of the watercourses).

6.1.1.5 Impact 5: Disturbance of watercourses during the removal of crops and alien and invasive vegetation.

Specific conditions set within the RoD require that agricultural crops and alien and invasive species are removed from watercourses. The removal of crops and alien and invasive species from watercourses will result in the further disturbance of the features, sedimentation and erosion of the features, and in the loss of existing natural vegetation.

The intensity of the impact will differ for different watercourses due to the varying sensitivities of the watercourses to disturbance. The removal of sugarcane and alien vegetation from watercourses falling within a low EIS category would result in a low intensity impact as theses feature are already significantly transformed. However, the removal of sugarcane and alien and invasive species from watercourses falling within moderate and high EIS categories would result in a medium intensity impact. The overall impact prior to the implementation of mitigation measures is therefore considered to be of a low (negative) significance for watercourses 2, 4, 5, 6, 7a, 8 and 9; and of a medium (negative) significance for watercourses 1, 3 and 7b.

However, should environmentally sensitive rehabilitation measures be implemented after the removal of sugarcane from watercourses26, and should alien vegetation removal take place in an environmentally sensitive manor, the specified conditions will result in an increase in the biodiversity of watercourses, in an improvement of the PES of watercourses, and will result in an overall positive impact on wetland and riparian habitat.

Impact	**Without Mitigation**	**With Mitigation**
Disturbance of watercourses during the removal of crops and alien and invasive vegetation.		
for watercourses 2, 4, 5, 6, 8 and 9	Medium (-ve)	Medium (-ve)
watercourses 1, 3, 7a and 7b	Medium (-ve)	Medium (-ve)

- The indiscriminate movement of vehicles through watercourses during the removal of sugarcane and alien and invasive species must be strictly prohibited;
- Where possible, alien and invasive species must be removed by hand;
- Footprint areas should be kept as small as possible when removing alien vegetation and care must be taken during alien vegetation eradication so as to avoid the disturbance of indigenous vegetation currently occurring within the area;
- The use of herbicides should be avoided. However, if necessary, only herbicides which have been certified safe for use in wetlands/aquatic environments by an independent testing authority

may be considered. Aerial spraying of herbicides should be strictly prohibited. The DWS/ECO must be consulted in this regard;

- All plant material should be covered with a sail that is tied down during transportation by road to prevent any blow-off from the vehicle;
- All removed alien plant species must be disposed of at a registered garden refuse site;
- A watercourse rehabilitation plan must be developed by a landscape architect with input from a freshwater specialist. Rehabilitation measures must be undertaken concurrently with the removal of sugarcane and alien vegetation. Rehabilitation measures should include but will not be limited to:

→ The plugging of existing desiccation channels/drains in order to reinstate the natural hydrology of the watercourses;

→ The reshaping and reprofiling of disturbed areas to pre-disturbance conditions;

→ The ripping of compacted areas to a depth of 300mm;

→ The revegetation of wetland and riparian areas with locally indigenous wetland and riparian vegetation; and

→ The implementation of strategic erosion control measures in order to prevent the erosion of bare soils while wetland and riaprian vegetation is establishing. Erosion control and soil stabilisation measures may include brush matresses, brush fences, fibre mats, fibre rolls and/or vegetative bundles, or similar "bio-engineering" approaches. These measures must be implemented immediately after the clearing, ripping and profiling of soils.

6.1.2 Operational Phase

6.1.2.1 Impact 1 – Increased runoff from hardened surfaces resulting in erosion and sedimentation.

The majority of activities that could potentially result in an increase in runoff from hardened surfaces and the erosion and sedimentation of surrounding watercourses can be prevented with the implementation of management measures as stipulated within the Stormwater Management Plan for the development. The impact is therefore considered to be very low and no mitigation measures are required to lower the impact further.

Impact	Without Mitigation	With Mitigation
Increased runoff from hardened surfaces resulting in erosion and sedimentation.	Very Low (-ve)	N/A

However, the following additional swale development guidelines are recommended for swales which will be constructed as part of the development, in order to achieve the most environmentally sensitive design:

- Swales should preferably be unlined and vegetated. Vegetated swales will allow for infiltration, therefore reducing the water volumes ultimately reaching watercourses as well as enhancing water quality due to the assimilation of nutrients;
- Incorporate small earth-lined detention ponds into which stormwater can be released, to allow filtration of water into the ground;
- General swale development guidelines:

→ The slope of the sides of the swales should not exceed 3:1 (horizontal to vertical slope).

→ Compacting the soil should be prevented as far as practically possible during construction of the swales – soil needs to be free-draining;

→ Swales should not be lined, to increase infiltration capacity;

→ Revegetate swales with indigenous vegetation, use should be made of robust, hardy indigenous species with high solute assimilation capability that will also aid with soil binding such as:

- Cyperus dives (Giant Sedge);
- Cyperus solidus;
- Cyperus latifolius (Njekenjeke);
- Cyperus denudatus;
- Cladium mariscus (Swamp sawgrass);
- Phragmites australis (Common Reed);
- Juncus lomatophyllus (Leafy Juncus);

→ Rip-rap, grass blocks or reno mattresses may be used within sections where the slope increases;

→ Flow controls should be installed if slope of swale length is more than 5% gradient;

→ Construct energy dissipaters (such as lining with stones, concrete, grass or gabions) where stormwater enters and exits swales and where the stormwater exits into detention ponds; and

→ Ensure that all swale crossings are designed in a way that enables surface water to flow freely underneath crossings. Crossings should also cater for the movement of smaller faunal species and amphibians.

6.2.1.2 Impact 2 – Water quality impairment.

The use of treated waste water from the sewage package plant to supplement crop irrigation has been proposed. It has not been specified where this irrigation will take place, however, the runoff of treated waste water into surrounding watercourses could have an impact on the water quality of the features.

The impact is considered to be of a medium intensity and of a medium (negative) overall significance prior to the implementation of mitigation measures. However, with the implementation of the mitigation measures as listed below, the overall impact may be reduced to a low (negative) significance.

Impact	Without Mitigation	With Mitigation
Water quality impairment	Medium (-ve)	Low (-ve)

Mitigation Measures:

- Strictly prohibit irrigation with waste water within the watercourses and their associated 20m buffer areas.

- Irrigation sites should be restricted to areas higher up in the landscape in order to minimize contamination risk and to allow for the effective operation of buffer filter zones.
- Waste water quality requirements as set by DWS must be met. •
- Strictly prohibit irrigation with waste water within the watercourses and their associated 20m buffer areas.
- Irrigation sites should be restricted to areas higher up in the landscape in order to minimize contamination risk and to allow for the effective operation of buffer filter zones.
- Waste water quality requirements as set by DWS must be met.

6.2.1.3 Impact 3 – Alteration of flow patterns through watercourses 7a, 7b, 8 and 9

The existing gravel access road has already had an impact on the hydrology of watercourses 7b, 8 and 9, and additional impact as a result of the access road upgrade is likely to be minimal should the mitigation measures as listed for the construction phase be strictly adhered to. However, the accumulation of debris within culverts below the road may result in the restriction of flows through the features during the operational phase should the debris not be removed, which would result in upstream ponding.

The development of a water pipeline through watercourse 7a may also result in the obstruction of flows through the feature during the operational phase, however, should the design related mitigation measures as listed for the construction phase be implemented, i.e. allowance for surface and subsurface flow and the rehabilitation of the bed and banks of the watercourse to as close to their original conditions as possible, the impact is likely to be minimal.

There is also a possibility that flow patterns through watercourse 7a may be altered/increased as a result of leakage of water from the pipeline traversing the feature. However, any water losses through the pipeline will seriously impact on the water supply and demand balance requirements of the proposed development. Therefore, the pipeline will be strictly monitored and maintained into perpetuity28 and the impact can be largely avoided.

The significance of the impact prior to the implementation of mitigation measures is considered to be medium (negative) and, after the implementation of mitigation measures, is considered to be very low (negative).

Impact	Without Mitigation	With Mitigation
Alteration of flow patterns through watercourses 7a, 7b, 8 and 9	Medium (-ve)	Very Low (-ve)

- Implement design related mitigation measures as listed for the construction phase of the development;

- Inspect the culverts on a regular basis (quarterly and after heavy rainfall) for the build-up of sediment and debris. Any sediment or debris noted must be removed immediately and disposed of at a registered waste disposal facility; and
- Monitor watercourses on a regular basis (quarterly and after heavy rainfall) for erosion. Any erosion noted must be immediately addressed. Rehabilitation measures may include the filling of erosion gullies and rills and the stabilization of gullies with silt fences, rip rap etc.

6.1.3 Cumulative impacts

Cumulative impacts are impacts that result from the incremental impact of the proposed activity on freshwater systems within a greater catchment, ecoregion and wetland vegetation group when added to the impacts of other past, present or reasonably foreseeable future activities. Freshwater habitat within the region has already been significantly impacted as a result of extensive sugarcane cultivation and as a result of urban and rural development. The proposed development will result in the loss of a marginal area of already significantly degraded wetland habitat during the upgrade of an existing access road through watercourses. However, the loss of this habitat is not considered to add significantly to the cumulative loss of freshwater habitat from the region. Furthermore, the proposed development includes the rehabilitation of watercourses 1-9. This will result in the significant improvement of the biodiversity and health of the features and will add to watercourse conservation within the region.

6.2 Mitigation measures stipulated in EIA ROD

The following conditions were set out in the EIA ROD and are related to the protection of surrounding watercourses and the environment. These are legally binding conditions. Specific conditions set within the ROD make reference to:

6.2.1 Wetland management:

- All agricultural crops must be removed from wetland areas and planted outside the 20m buffer from the edge of the temporary wetland areas.
- No development, including infrastructure may occur within 20m from the edge of the delineated temporary wetlands.
- Delineated wetland areas must be managed for conservation as part of the residential estates open space system.

6.2.2 Sewage and solid waste disposal including recommendations relating to:

- The management of the package plant,
- The disposal of sludge and waste material,
- Backup generator for the package plant;
- The use of wastewater for irrigation purposes and;
- Water quality monitoring.

6.2.3 Dust control

6.2.4 Stormwater management and soil erosion including recommendations relating to:

- The stormwater management plan for the development;
- Alien vegetation control;
- Drainage control; and
- Soil erosion prevention.

6.3 Measures stipulated in the Geohydrological Report

Recommendations from the Final Geohydrological Report on the Drilling Pump Testing Water Quality Analysis and Preliminary Reserve Determination for the Proposed Helmsley Housing Development

- Storage of water in such a way that the evaporation thereof is minimal;
- Monitoring groundwater quality by sampling and submitting to a SANAS accredited laboratory;
- Ensure that measures are in place for the protection of the down hole equipment to prevent tampering, electrical surges and protect the pump from lightning;
- The area around the borehole should be graded to allow surface water run-off and to prevent surface water from ponding;
- Groundwater level monitoring of the abstraction boreholes to determine seasonal variations and long-term impact on water table due to abstraction.
- The controls for equipped boreholes should include the following:
  - 24 hour timers to ensure that the pump/s do not run for more than the time recommended on the attached borehole management sheets.
  - Pressure switch float switch in the reservoir to stop the pumps when the reservoirs are full.
  - High quality lightening and electrical surge protection to protect the pump and control panel.
  - Water meter to allow checking of the pump performance and water abstraction.
  - The area around the boreholes should be graded so as to allow surface water runoff to drain away freely to prevent ponding which can lead to contamination of the boreholes.
  - The boreholes should be covered I protected by concrete manholes to prevent tampering with the pumps and possible contamination of the boreholes.

6.3.1 Rehabilitation Plan

Due to the road and sewerage pipeline crossing surrounding watercourses, a detailed rehabilitation plan (**Appendix 12**) has been formulated to mitigate the impacts of these activities. It must be stressed that the numerous watercourses surrounding the proposed development (including all wetlands) are degraded and likely to continue to degrade if action does not take place to rehabilitate them. Therefore if the development does not take place there will be no beneficial effects associated with the rehabilitation phase. It is noted that minor wetland loss will occur due to the road crossings, however the greater extent of the wetland habitats around the development health will improve.

The main objectives of the Wetland Rehabilitation Plan are to:

- Prevent unnecessary disturbance of wetland habitat;

- Remove alien vegetation and sugarcane from wetland areas;
- Deactivate desiccation channels and drains;
- Improve hydrology of wetland areas;
- Restore wetland vegetation;
- Improve the PES of wetland habitat; and
- Improve the function of wetland habitat.

Both detailed mitigation and monitoring measures have been proposed in the wetland rehabilitation report. If these measures are implemented is likely to result in an overall improvement in the hydrological, geomorphological and vegetation health of the wetlands and will ultimately result in an overall gain in wetland hectare equivalents.

A WET-Health assessment was undertaken for watercourse 7b, 8 and 9 prior to development (EnviroSwift KZN, 2017). The results of this assessment were then compared to a WET-Health assessment undertaken for each of the wetlands presuming that the rehabilitation measures as listed above were successful (Tables 4, 5 and 6).

The proposed upgrade of the access road will result in the loss of approximately 235m^2 degraded wetland habitat from watercourse 7b, approximately 188m2 degraded wetland habitat from watercourse 8 and approximately 206m2 degraded wetland habitat from watercourse 9. However, the upgrade of culverts below the existing road will improve flow through the features and will therefore improve the hydrological integrity of the features. Furthermore, the backfilling of drains and channels, the removal of sugarcane and alien vegetation, and the revegetation of the features with indigenous wetland vegetation will improve the overall hydrological, geomorphological and vegetation integrity of the features as well as the overall function and service provision of the features.

Based on the current PES score for watercourse 7b, the approximately 6.08ha of wetland habitat is currently equivalent to 2.21ha intact wetland habitat. However, for the post-development/post-rehabilitation scenario the wetland habitat will be considered to be equivalent to 4.46ha intact wetland habitat. There is therefore a gain of approximately 2.24 hectare equivalents.

Based on the current PES score for watercourse 8, the approximately 3.13ha of wetland habitat is currently equivalent to 0.79ha intact wetland habitat. However, for the post-development/post-rehabilitation scenario the wetland habitat will be considered to be equivalent to 2.25ha intact wetland habitat. There is therefore a gain of approximately 1.46 hectare equivalents.

Based on the current PES score for watercourse 9, the approximately 3.23ha of wetland habitat is currently equivalent to 0.67ha intact wetland habitat. However, for the post-development/post-rehabilitation scenario the wetland habitat will be considered to be equivalent to 2.33ha intact wetland habitat. There is therefore a gain of approximately 1.66 hectare equivalents.

While the Wetland Rehabilitation Plan focused on three wetlands, the overall mitigation measures can be applied to the other 7 watercourses. Measures such as the clearing of alien vegetation, the clearance of litter, the planting of indigenous vegetation associated with riparian/wetland areas and the implementation of various other measures specified in the various Reports, should result in positive impacts on all watercourses.

6.3.2 Monitoring Plan

A monitoring plan has been formulated and included in **Appendix 20**. The following monitoring measures must be undertaken for the development:

- Monthly Monitoring of the conditions of the EIA, WULA and measures stipulated in the EMP during the site establishment and construction phases by an independent ECO. The ECO must forward findings to the Competent Authority.
- Daily monitoring by the Project Manager of the conditions of the EIA, WULA and measures stipulated in the EMP during the site establishment and construction phase.
- Once in operation regular monitoring must take place. This to ensure compliance with the WULA and EMP. The Applicant must appoint a suitable appointed individual to undertake this task. This person must Report regularly to the Management of the Estate.
- Regular monitoring of the sewerage pipeline must take place. This to check for any leaks.
- Baseline sampling of both the upstream and downstream of the watercourses has been undertaken. Water samples must be taken upstream and downstream of the Package Plant on a weekly basis by an accredited laboratory once the Package Plant is in operation.
- It is recommended that the water levels in BH KZN070181 and BH KZN070182 are manually monitored on a quarterly basis, while quality is monitored on an annual basis to ensure water is suitable for human consumption;
- Regular monitoring of the Rehabilitation Plan must be undertaken during the rehabilitation of the wetlands.

SECTION 7: PUBLIC PARTICIPATION

The first public participation process was conducted from the 18th of August 2017 to the 18th of October 2017. The public participation followed for the Helmsley Country Estate included:

- Planning Phase: The identification of landowners (including adjacent) or lawful occupiers, government departments/ state enterprises and any other potential I&APs
- The Informing of the Stakeholders and IAPs of the Helmsley Country Estate WUL process through:
  - Advertising in a one local newspaper in English;
  - Placement of site notices on site boundary, access gate and outside municipal offices; and
  - The email and mail of Notification and BID Documents.
- Providing of any further information and capturing all comments from IAPs onto a Comment and Response Table; and
- Formulation of a Public Participation Report (with Proof).

A second round of public participation will be conducted for 60 days commencing in February 2019. The requirement of the second round of PPP is due to:

- The upgrading of the IWWMP;
- The revisions made to the Freshwater Assessment;
- The updating of various specialist Reports including the Stormwater, Geotechnical and Geohydrological Reports;
- The availability of additional civil designs; and
- The availability of the Wetland Rehabilitation Plan.

The Second Round of PPP will occur in the same manner as that undertaken in the first Round. The following steps will occur:

- The updating of the stakeholders list;
- The advertisement of the availability of the IWWMP for comment in one local newspaper;
- The forwarding of notification emails to the various stakeholders;
- The placement of site notices on the proposed site and at local municipal offices;
- The placement of a hardcopy of the IWWMP and all appendices at the local library;
- The placement of the IWWMP and selected appendices on the IDM website;
- The updating of the Comments and Response Table; and
- Formulating a PP Report for review by DWS.

The second round of PP will take place over a 60 day period as per the NWA requirements. Additional days will be added to the process to accommodate the public holidays during this period.

SECTION 8: WUL MOTIVATION

S27 (a) EXISTING LAWFUL WATER USES

The John Albert Trust (IT6410/1986) managed by Mr. S Hullett (also manages the Helmsley Development Company which is the Applicant) has an existing **Schedule 1 Water Use** for the abstraction of water from a water resource on the proposed Helmsley Country Estate property. The registration is for the taking of 2500m³ of water per year from the 1st of July 2004. Please see attached Registration Certificate.

Provided that migration measures specified in the Water Use License Report and recommendations provided by the Freshwater Specialist are adhered to, impacts on downstream water users can be regarded as minimal (if any). Downstream users of water are made up of other farmers.

S27 (b) THE NEED TO REDRESS THE RESULTS OF PAST RACIAL AND GENDER DISCRIMINATION

The Applicant is BEE compliant and will employ local labour from the region. Both the construction phase and operational phase will create employment opportunities and the training of workers. Gender equality will be ensured and implemented.

S27 (c) EFFICIENT AND BENEFICIAL USE OF WATER IN THE PUBLIC INTEREST

The Helmsley Country Estate will provide residential housing to the Ballito market which has seen rapid prolific growth during recent years and thus a high demand for affordable residential property exists. The Ballito economy is continuing to expand and there are numerous upgrades and proposed business development being proposed and built around the locality. As more development and employment opportunities are created, the need for housing will increase as well. Thus the authorising of the various water uses being applied for the Helmsley Country Estate will have a beneficial impact on the surrounding economy and people through the provision of employment opportunities and housing accommodation. Provided the mitigation measures are implemented there is likely to minimal impact on surrounding water users.

S27 (d) THE SOCIO-ECONOMIC IMPACT OF -

(i) THE WATER USE(S) IF AUTHORISED; OR,

The water uses for the proposed Helmsley Country Estate if approved is likely to have positive socio-economic impacts. Employment opportunities will be created in both the construction and operational phases of the development. Training will be provided and workers as far as possible will be sourced locally. The Kwadukuza Local Municipality has high levels of poverty and unemployment and thus the Helmsley Country Estate will help to address these challenges (albeit a small contribution). As discussed above, the Estate will further provide residential housing for a market in high demand. It is important to note the new development and business opportunities being created in Balitto will not be a success unless housing is available to the market. Thus the Helmsley Country Estate fulfils a need to meet the rapid growth of Ballito.

(ii) OR OF THE FAILURE TO AUTHORISE THE WATER USE(S)

The failure to authorise the water uses will mean the Helmsley Country Estate will not be able to proceed with development and no additional and eco-friendly residential housing will be provided to the market. No employment or training opportunities will be created. The wetlands on site will not be rehabilitated and thus will continue to degrade which is not in the public interest.

S27 (e) CATCHMENT MANAGEMENT STRATEGY APPLICABLE TO THE RELEVANT WATER RESOURCE

N/A

S27 (f) THE LIKELY EFFECT OF THE WATER USE TO BE AUTHORISED ON THE WATER RESOURCE AND ON OTHER WATER USERS

The Freshwater Specialist assessed the surrounding wetlands as being highly degraded and will likely to continue to degrade if no remedial action is taken. It is therefore the opinion of the Freshwater Specialist and the Environmental Assessment Practitioner that the proposed development related activities be considered favourably provided that mitigation measures (as set out in this report) are strictly implemented and that Wetland Rehabilitation takes place. The rehabilitation will help to improve the health of the wetlands and result in them being in a better state than previously. The buffer around the wetlands will help to prevent any future environmental degradation of the wetlands.

The balance of the property is in the process of being partly transformed into a macadamia farm.

Due to the disposal of stormwater and treated waste water through a Packaging Plant into a surrounding stream, this will impact on the stream itself. Regularly monitoring will take place to ensure downstream users will not be negatively impacted on.

S27 (g) THE CLASS AND THE RESOURCE QUALITY OBJECTIVES OF THE WATER RESOURCE

The PES and EIS of the watercourses varied. The wetlands were assessed as highly degraded, while the streams health status varied.

S27 (h) INVESTMENTS ALREADY MADE AND TO BE MADE BY THE WATER USER IN RESPECT OF THE WATER USE IN QUESTION;

The Applicant has contributed considerable amounts of time and money into the proposed Helmsley Country Estate already. Various environmental reports and specialist studies have been commissioned to ensure the impacts on the surrounding environments are reduced to an acceptable standard. All legal requirements have been approved and construction can commence once DWS approval has been granted.

S27 (i) THE STRATEGIC IMPORTANCE OF THE WATER USE TO BE AUTHORISED;

The Kwadukuza Local Municipality's IDP notes that rapid economic growth has taken place in the Ballito area. There is thus a need for the continuation of employment opportunities and the provision of housing to meet the growing market demand.

S27 (j) THE QUALITY OF WATER IN THE WATER RESOURCE WHICH MAY BE REQUIRED FOR THE RESERVE AND FOR MEETING INTERNATIONAL OBLIGATIONS;

N/A – Downstream water users are predominantly farmers.

S27 (k) THE PROBABLE DURATION OF ANY UNDERTAKING FOR WHICH A WATER USE IS TO BE AUTHORISED

The Helmsley Country Estate is unlikely to be decommissioned. If such, a Closure and Rehabilitation Plan will need to implemented to ensure no further impacts will occur on the surrounding watercourses. There are long term plans by the Local and District Municipality to provide portable water to the area. Thus borehole water will be replaced by Municipal pipelines.

SECTION 9: CONCLUSION AND RECOMENDATIONS

The EIA ROD was granted on the 22nd of August 2008 by the KZN Department of Agriculture and Environmental Affairs and amended by EDTEA in 2017. The EA ROD included specific conditions for the Helmsley Country Estate, which must be implemented by the Applicant and monitored by the appointed and compulsory ECO. Further recommendations and requirements will be provided in the IWWMP Report and must also be adhered to during the lifetime of the project.

The water uses as set out in this document require approval in order to ensure all applicable legislation is adhered to. This document is compiled in alignment with all other statutory and regulatory requirements, e.g. NEMA, and should therefore be implemented in conjunction with the other reports, specialist studies, licenses and approvals relating to this project.

A guideline document (entitled License format and requirements) received from the DWS was used in the formulating of this WUL Report and supporting documentation. In consultation with DWS, it was determined that water uses A, C, G, F and I of Section 21 of the NWA apply to the proposed Helmsley Country Estate.

The Helmsley Country Estate will further provide much needed residential housing to the rapidly expanding Ballito market. Furthermore, upon implementation of the Rehabilitation plan, the PES of the wetlands will increase.

Taking all circumstances and submissions into consideration, the proposed Helmsley Country Estate is recommended for approva,l provided the recommendation measures in this Report (and all supporting specialist reports and studies) are implemented and strictly monitored.

Please see **Section 10** below containing information on supporting documentation provided.

SECTION 10: SUPPORTING DOCUMENTATION TO THE FULL WATER USE LICENSE APPLICATION

The following documentation is submitted to the DWS as appendices to the initial application as indicated within the Report. Kindly note, some of the below appendices are not provided to the Public in the following hardcopy due to the lack of relevance (title deeds, BEE certificates, land clearance letters etc). However, all specialist reports and engineering drawing are provided. If any I&AP wish to request an appendix that is not provided in this document, please kindly contact Mr. Justin Ellero at IDM Environmental on 031 566 2856 (work), Justinel@idmconsultants.co.za (email), or PO Box 918, Umhlanga Rocks, 4320 (mail). Please see below appendix list, with documents included in this copy for review.

- **Helmsley Country Estate IWWMP_ Draft 2**
- Appendix 1: Certified copy of ID of Applicant and Company Registration Certificate (Not provided)
- Appendix 2: Property Title Deeds and zoning documents (Not provided)
- Appendix 3: Land Clearance Letter (Not provided)
- Appendix 4: BEE Certificate (Not provided)
- Appendix 5: Water Use Registration Forms (Not provided)
- **Appendix 6: 1:50000 and Locality Map**
- **Appendix 7: Master Layout Plan**
- **Appendix 8: Alternative Report**
- **Appendix 9: EIA**
- **Appendix 10: Record of Decision**
- **Appendix 11: Environmental Management Plan**
- **Appendix 12: Freshwater study and Risk Assessment and Rehabilitation Plan**
- **Appendix 13: Geotechnical Studies**
- **Appendix 14: Geohydrological Studies**
- **Appendix 15: Engineering Study**
- Appendix 16: Municipal Services Agreement (Not provided)
- **Appendix 17: Method Plan**
- **Appendix 18: Stormwater Management Plans**
- **Appendix 19: Civil Design**
- **Appendix 20: Monitoring Plan**
- **Appendix 21: Contingency Plan**
- Appendix 22: Public Participation Report (Will be provided in Final submission to DWS)
- Appendix 23: Financial Provision (Not provided)