

**ASTRON ENERGY (PTY) LTD:
MILLY'S STAR STOP
WATER USE LICENSE
APPLICATION**

February 2026



M²ENCO



Title:

Water Use License Application Report for Astron Energy: Milly's Star Stop near eNtokozweni, Emakhazeni Local Municipality, Nkangala District Municipality, Mpumalanga Province

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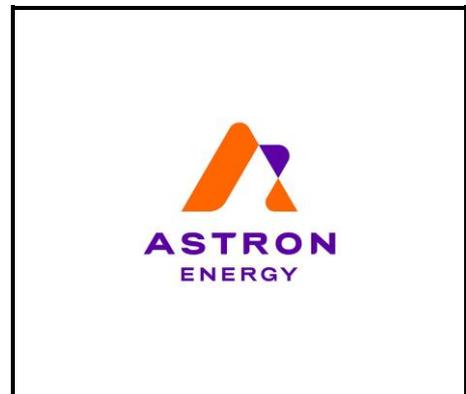
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LIST OF ABBREVIATIONS

AEV	Acute Effect Value
CEV	Chronic Effect Value
CMA	Catchment Management Agency
COD	Chemical Oxygen Demand
DS	Downstream
DWS	Department of Water and Sanitation
DWA	Department of Water Affairs (previous)
DWAF	Department of Water Affairs and Forestry (previous)
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EISC	Ecological Importance and Sensitivity Category
GA	General Authorisation
GN	Government Notice
GVA	Gross Value Added
I&AP	Interested & Affected Party
ICMA	Inkomati Catchment Management Agency
IMAGE	Intervention with Microfinance for AIDS & Gender Equity
IWWMP	Integrated Water and Waste Management Plan
MAP	Mean Annual Precipitation
MAR	Mean Annual Rainfall
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NGA	National Groundwater Archive
NWA	National Water Act, 1998 (Act 36 of 1998)
NWRS	National Water Resource Strategy
PES	Present Ecological State
PESC	Present Ecological State Category
RAMSAR	International Treaty for the conservation and sustainable utilisation of wetlands
RBC	Rotating Biological Contactor
REC	Recommended Ecological Category
RQO	Resource Quality Objectives
RWQO	Receiving Water Quality Objectives
SANAS	South African National Accreditation System
SANBI	South African National Biodiversity Institute
STP	Sewage Treatment Plant
SWM	Significance With Mitigation
SWOM	Significance Without Mitigation
TWQR	Target Water Quality Range
ULP	Unleaded Petrol
US	Upstream
WMA	Water Management Area
WUL	Water Use License
WULA	Water Use License Application
WULAR	Water Use License Application Report
WWTW	Waste Water Treatment Works



1 BACKGROUND INFORMATION

Astron Energy SA (Pty) Ltd is a leading supplier of petroleum products in South Africa, with a vast network of Caltex-branded service stations that make them one of the country's top two petroleum brands. In 2018, Astron Energy entered the South African market through a majority acquisition of the former Chevron South Africa (Pty) Ltd.

More than 800 Caltex outlets exist throughout the country of which Milly's Star Stop near eNtokozweni, Mpumalanga Province, forms part of. The property encompasses several buildings including the Caltex Star Stop Fuel Station, Milly's Restaurant, Milly's Farm Shop, accommodation and conference centre as well as a trout processing plant.

Situated approximately 4km southwest of eNtokozweni (Machadodorp) next to the N4 Highway, Milly's Star Stop falls within the jurisdiction of the Emakhazeni Local Municipality (MP314) and the Nkangala District Municipality (DC31). Water use at Milly's Star Stop currently takes place on the Remainder of Portion 11 and 13 of the Farm De Kroon 363 JT on which all infrastructure is located.

M² Environmental Connections (Pty) Ltd (Menco) was appointed in their capacity as Environmental Consultants to apply for a new water use license for Milly's Star Stop on behalf of Astron Energy (Pty) Ltd in order to ensure environmental compliance. Astron Energy (Pty) Ltd: Milly's Star Stop was issued a water use license on the 17th of May 2018 with license number: **05/X21F/CFCICCIIGAI/7130**. The licensee applied for a name change on the WUL from Chevron South Africa (Pty) Ltd to Astron Energy (Pty) Ltd in 2019. The amendment was approved on 23 July 2019.

The current application stems from an omission that was made on the previous application whereby the volume of abstracted water required for the operation of the on-site Trout Factory was not accounted for. The applicant is therefore re-applying for all existing water uses covered in WUL **05/X21F/CFCICCIIGAI/7130** while applying for an increased abstraction volume as set out in this WULAr.

Additionally, the proposed Milly's South Development inclusive of a filling station and truck overnight parking facilities triggers additional water uses that are applied for under this current application.

Water use at Milly's Star Stop currently takes place on the Remaining Extent of Portion 11, on Portion 13 and on Portion 14 of the Farm De Kroon 363 JT on which all



infrastructures is located. The property details for the relevant farm portions are depicted in **Table 1-1** below.

Table 1-1: Property Details

Register Description	Land Owner	Title Deed Number	Surveyor-General Cadastral Code
Remaining Extent of Portion 11 of the Farm De Kroon 363 JT	Leroma Investments (Pty) Ltd	T3250/2023	TOJT00000000036300011
Portion 13 of the Farm De Kroon 363 JT	Leroma Investments (Pty) Ltd	T3251/2023	TOJT00000000036300013
Portion 14 of the Farm De Kroon 363 JT	Leroma Investments (Pty) Ltd	T3254/2023	TOJT00000000036300014
Erf 3 Milly's South Township	Leroma Investments (Pty) Ltd	T10959/2022	TOJT00750000000300000

1.1 CATCHMENT INFORMATION

1.1.1 WATER MANAGEMENT AREA

The study area falls within the boundaries of the Crocodile Sub-Catchment, which together with the Sabie-Sand, Upper Komati, Lower Komati, and Usuthu Sub-Catchments form the Inkomati-Usuthu Water Management Area (WMA). This WMA is situated in the north-eastern part of South Africa, primarily in Mpumalanga Province with a small portion in Limpopo Province, and borders Mozambique in the east and Eswatini in the south-east, with which it shares river systems. The WMA is managed by the Inkomati-Usuthu Catchment Management Agency (IUCMA), established in terms of Section 78 of the National Water Act (Act 36 of 1998).

The Crocodile River forms the southern boundary of the world-renowned Kruger National Park, while the ecologically significant Sabie River flows through the park and is considered one of the most important rivers in the country. The Komati River flows from the Upper Komati Sub-Catchment into Eswatini and re-enters South Africa at the Lower



Komati Sub-Catchment before flowing into Mozambique where it joins with the Crocodile River to form the Inkomati River.

According to the National Water Resource Strategy Third Edition (NWRS-3, 2023), the Inkomati-Usuthu WMA faces significant water resource challenges. The WMA has a total water availability of approximately 1,029 million m³/annum but experiences a deficit of approximately 163 million m³/annum. Water resources in the Crocodile River catchment remain over-allocated, and water requirements regularly exceed available supplies. Approximately 98% of the predicted total surface water resources are already being utilized. The Ecological Reserve continues to face challenges in meeting its requirements, which affects South Africa's international obligations for the release of water to Mozambique and Eswatini.

Water requirements within South Africa have grown to the extent that the total available yield from these rivers is being absorbed by local demands. Transfers of water into the Inkomati-Usuthu WMA from elsewhere in South Africa are not feasible given the distance from other water sources, meaning that water resource deficits must be addressed from within the WMA through alternative sources including groundwater utilization, water conservation and demand management measures, water reuse, and desalination. Opportunities for new surface water storage dams remain very limited, with some possible storage to meet growing domestic needs. Climate change considerations have added further complexity to water resource management in the WMA.

Figure 1-3 gives an indication of the WMA boundaries.

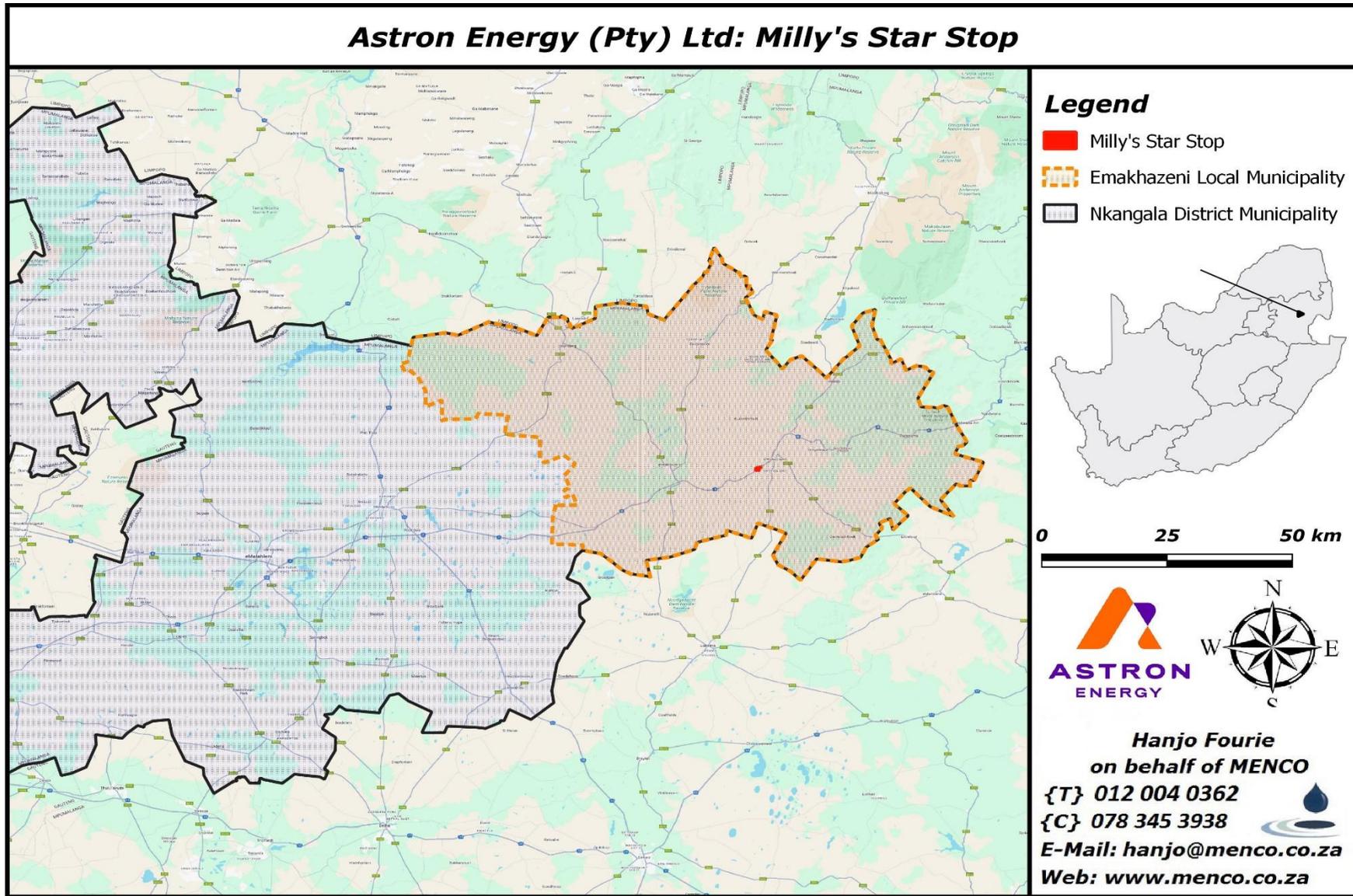


Figure 1-1: Regional Locality of Milly's Operations



1.1.2 SURFACE WATER HYDROLOGY

As indicated in **Figure 1-4** the study area on which operations at Milly's Star Stop currently takes place is located within Quaternary Drainage Region X21F. The identified surface water resources in close proximity to the project include the Elands River which flows north of the study area in a north easterly direction and ultimately feeds into the Crocodile River as well as the De Kroon Spruit to the west of the study area which flows into the Elands River from the south. The dam at Milly's Star Stop is located in the De Kroon Spruit. Please refer to **Figure 1-4** and **Figure 1-8** for an indication of surface water features in close proximity to the study area.

1.1.3 SURFACE WATER QUALITY

1.1.3.1 HISTORICAL SURFACE WATER QUALITY

Historical surface water quality data as obtained from the Directorate Resource Quality Services database for a monitoring point located downstream of the project site are presented in **Table 1-3**. The details for this monitoring point are indicated in **Table 1-2** below.

Table 1-2: Locality and description of DWA surface water monitoring point

Station	Place	Latitude	Longitude
X21_102956	At Geluk on Elands River	25°38'45.00"S	30°16'40.00"E

The DWS database information for this monitoring point extends back to 1977 with the latest quality information captured on the system in March 2009.

**Table 1-3: Historical Surface Water Quality data for the Elands River**

Date	EC (m/Sm)	pH	Cl (mg/l)	K (mg/l)	Na (mg/l)	NH ₄ (mg/l)	SO ₄ (mg/l)	NO ₃ (mg/l)	F (mg/l)
13/03/2000	12.83	7.89	5.0	2.128	4.611	0.094	5.46	0.17	0.103
12/03/2001	29.1	8.192	29.347	0.956	16.114	0.06	23.694	0.042	0.128
12/03/2002	26.8	8.05	26.885	0.608	13.422	0.02	20.604	0.207	0.127
24/02/2003	29.0	8.054	25.139	0.556	13.507	0.02	22.554	0.177	0.176
24/02/2004	20.6	7.644	16.041	1.178	9.958	0.034	20.831	0.312	0.1
07/03/2005	33.2	7.866	31.198	1.091	17.944	0.02	31.948	0.325	0.142
13/03/2006	9.56	7.346	5.154	0.535	6.32	0.02	5.021	0.088	0.125
12/03/2007	54.0	7.953	58.355	0.672	37.612	0.114	58.654	0.1	0.05
10/03/2008	20.2	7.928	11.871	1.019	10.215	0.303	17.277	0.404	0.11
02/03/2009	17.1	7.522	12.514	1.919	7.33	0.025	16.487	0.162	---



1.1.3.2 CURRENT SURFACE WATER QUALITY

As a requirement of the notice of intent to direct issued to Milly's Star Stop by the Inkomati CMA, the analyses of surface water from the Elands River were initiated by Menco during February 2014. Sample points were established by Menco 100 m upstream of the WWTW and 100 m downstream of the WWTW as indicated in **Figure 1-10**.

Table 1-4 indicates the latest water quality results upstream and downstream from the Milly's WWTW as analysed by *Waterlab (Pty) Ltd*. *Waterlab (Pty) Ltd* (SANAS accredited laboratory according to ISO/IEC 17025:2005 standards). The components were analysed in accordance with parameters as set out in the notice of intent to direct and finally captured in the current WUL for the project.

Monthly monitoring has been conducted by Menco on behalf of Astron Energy in order to be compliant with the requirements as set out in the WUL issued to Astron Energy.

The average water quality data for 2017 –2024 are indicated below. The old WWTW did not have the capacity to treat the effluent to an acceptable standard. Although the 2019 results are above the set limits it is noticed that the new plant is improving the overall water quality. The Maturation Pond has also been decommissioned as a sampling point due to the current WUL conditions. In addition, the trout factory outlet has been added to the monitoring programme in February 2019 due to the discharge taken place into the small maturation pond.

The 2020 water quality results indicate that there has been a significant improvement in water quality parameters for the SW effluent with EC, NO₃, COD, E.coli and NH₃ showing significant improvements during the extent of 2020. E.coli levels have slightly increased for the upstream and downstream Elands River sites which are mostly related to external impact sources. Fluctuations in E.coli levels have been related to external impact sources and cannot be attributed to activities at Milly's Star Stop.

Table 1-4: Average Water Quality Comparisons for the Hydrological Years

2017 Average				
Variable	Milly's US	Milly's DS	SW Effluent	Maturation Pond
pH	7.7	7.6	7.4	7.3
EC	14.6	14.7	121.5	66.1
TDS	101.6	97.4	606.7	392.1



SS	3	3.2	20.1	97.9
Cl	4.5	5.2	184.6	120.4
NO3	0.1	0.2	21.3	2.5
NO2	<0.05	<0.05	4.5	0.4
COD	<10	<10	85.1	140.3
<i>E. coli</i>	52.8	48.6	261.8	2095.4
NH3	0.2	0.1	36.7	2.5
2018 Average				
Variables	Milly's US	Milly's DS	SW Effluent	Maturation Pond
pH	8.2	7.9	7.7	7.3
EC	39.7	13.4	147.8	84.6
TDS	161.8	108.8	692.5	491.4
SS	5.5	4.9	27.8	93
Cl	5.8	6.3	232.5	162.8
NO3	0.2	0.2	12.8	4.9
NO2	0.1	0.1	5.9	0.7
COD	21.3	11.5	93.2	156.5
<i>E. coli</i>	43.9	38.6	798.3	1108.4
NH3	0.2	0.2	53.9	8.3
2019 Average				
Variables	Milly's US	Milly's DS	SW Effluent	Trout Factory
pH	7.8	7.8	6.7	7
EC	13.8	14.3	79.0	159.5
TDS	101.7	105.5	476.9	951.5
SS	7.4	7.4	4.2	384.2
Cl	4.5	4.8	105.6	334.9
NO3	0.1	0.2	22.9	0.1
NO2	<0.05	0.1	5.7	0.8
COD	14.4	14.7	39.8	1120.1
<i>E. coli</i>	65.7	165	567.5	2941.9
NH3	0.2	0.3	18.7	15
2020 Average				
Variables	Milly's US	Milly's DS	SW Effluent	Trout Factory
pH	7.8	7.8	7.3	No water Quality date Available
EC	15.0	12.8	71.6	
SS	5.6	7.7	3.7	
Cl	5.3	5.5	93.7	
F	0.2	0.2	0.2	
P	0.1	0.1	7	
NO3	0.2	0.2	15.0	
NO2	<0.05	<0.05	1.8	
COD	13.4	14.5	27.8	
<i>E. coli</i>	162.5	82.3	108.7	
NH3	0.1	0.1	0.5	
2021 Average				
Variables	Milly's US	Milly's DS	SW Effluent	Trout Factory



pH	7.9	7.9	7.6	7
EC	13.4	13.8	92.3	130.5
SS	15.8	11.4	6.9	81.8
Cl	4.9	4.8	104	351
F	0.3	0.3	0.3	0.2
P	0.1	0.1	3.5	2.28
NO3	0.5	0.5	8.7	0.3
NO2	<0.05	<0.05	0.54	<0.05
COD	15.7	14.6	39.8	57
<i>E. coli</i>	423.3	277.6	259	43548
NH3	0.2	0.3	31.8	1
2022 Average				
Variables	Milly's US	Milly's DS	SW Effluent	Trout Factory
pH	7.9	7.8	7.5	7.9
EC	12	13.8	103.8	295.8
SS	10.16	11.2	16.8	91.5
Cl	5.6	6.25	113	643
F	0.3	0.3	0.2	0.2
P	0.1	0.1	5.14	2.18
NO3	0.5	0.5	8.7	0.3
NO2	<0.05	<0.05	1.95	<0.05
COD	13.75	15.83	62.17	143
<i>E. coli</i>	68	99	1278	88888
NH3	0.2	0.2	33	1.83
2023 Average				
Variables	Milly's US	Milly's DS	SW Effluent	Trout Factory
pH	7.87	7.86	7.67	7.82
EC	15.61	14.36	84.41	856.4
SS	10.11	10.63	57.54	187.4
Cl	13.2	13.1	97	1415
F	0.2	0.2	0.2	0.2
P	0.1	0.1	3.27	1.64
NO3	0.18	0.18	0.18	0.1
NO2	0.05	0.05	0.22	0.05
COD	11.5	11.67	93	455.2
<i>E. coli</i>	111	109	9092	100000
NH3	0.12	0.13	35.9	6.36
2024 Average				
Variables	Milly's US	Milly's DS	SW Effluent	Trout Factory
pH	7.94	7.93	7.64	Pre: 8.07 Mid: 8.19 Post: 8.12
EC	14.8	8.3	133	Pre: 528 Mid: 202 Post: 182
SS	5.22	5	78	Pre: 240 Mid: 462



				Post: 107
Cl	4.5	5	162	Pre: 1446 Mid: 349 Post: 345
F	<0.2	<0.2	<0.2	Pre: <0.2 Mid: <0.2 Post: <0.2
P	0.13	0.13	7.53	Pre: 5.99 Mid: 4.54 Post: 4.19
NO3	0.29	0.44	3.7	Pre: 0.31 Mid: 0.26 Post: 0.2
NO2	<0.05	0.05	2.34	Pre: 0.06 Mid: <0.5 Post: <0.5
COD	14.18	17.50	180	Pre: 866 Mid: 813 Post: 330
<i>E. coli</i>	155	149	80001	Pre: 1694 Mid: 196 Post: 76
NH3	0.24	0.25	49	Pre: 10.61 Mid: 3.21 Post: 2.81

Taking the 2021 monitoring data (averages) into account it is clear that there are several alterations in chemical levels compared to 2020. A significant increase in E.coli levels have been observed within the 2021 hydrogeological year. It should be noted that considerable E.coli spikes have been observed during December which has significantly increased the average E.coli levels obtained during the yearly period. Apart from December all of the obtained E.coli levels were similar to the average levels obtained during the 2020 hydrological year. Apart from E.coli no significant changes in water quality data was observed for the Elands River during the 2021 year. The similarity in water quality data for the upstream and downstream site also indicates that there are currently no direct impacts from Milly's which has an impact on the chemical parameters of the Elands River. Several alterations in chemical parameters have been observed at the SW effluent. Compared to the 2020 monitoring results **P**, **NO3** as well as **E.coli** levels have progressively improved throughout the monitoring year.

Taking the 2022 monitoring period into account similar water quality parameters were observed for the upstream and downstream Elands River sites with minimal fluctuations in chemical parameters. The **E.coli** levels have however decreased notably at both the Elands River upstream and downstream sites. Overall the water quality data indicates that the



operations currently taking place at Milly's has no impact on the overall water quality of the Elands River despite 2 spill events taking place during the 2022 monitoring period.

The average EC, P as well as E.coli levels of the SW Effluent have however increased during 2022 indicative that there are still several mitigation measures and management actions needed to be taken to ensure sustainable compliance of water quality variables. Despite increases in E.coli levels it should be noted that there were only 2 instances where the E.coli levels exceeded 1mg/l which is related to the spills taking place at the WWTW plant.

The 2023 monitoring period produced slight increases in COD and SS levels while improved EC, P and NO₃ levels have been observed in terms of the SW effluent site. A significant average increase in E.coli levels have been observed for the SW effluent. It should be noted that up until December 2023 no traces of E.coli has been observed within the SW effluent with the increased average amount being completely related to the once off spike in parameter levels. The water quality within the Elands River has remained fairly similar apart from an increase in upstream and downstream E.coli levels. This increase is however related to upstream discharge sources and not activities related to Milly's.

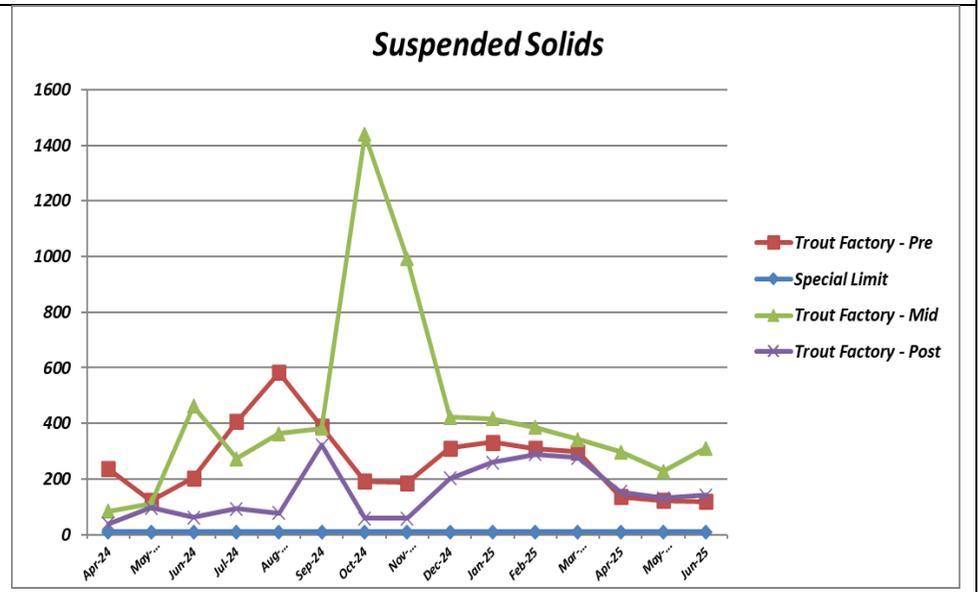
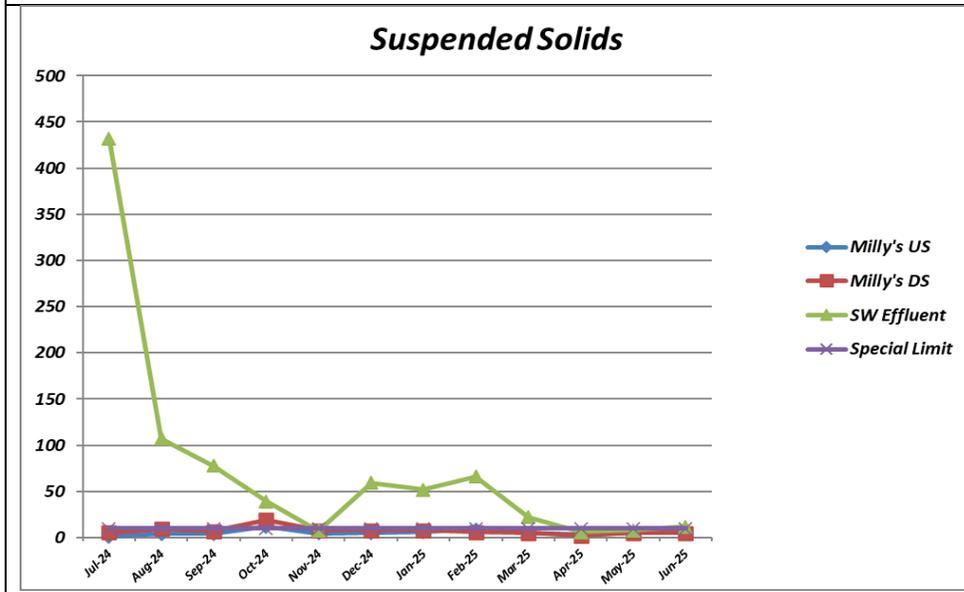
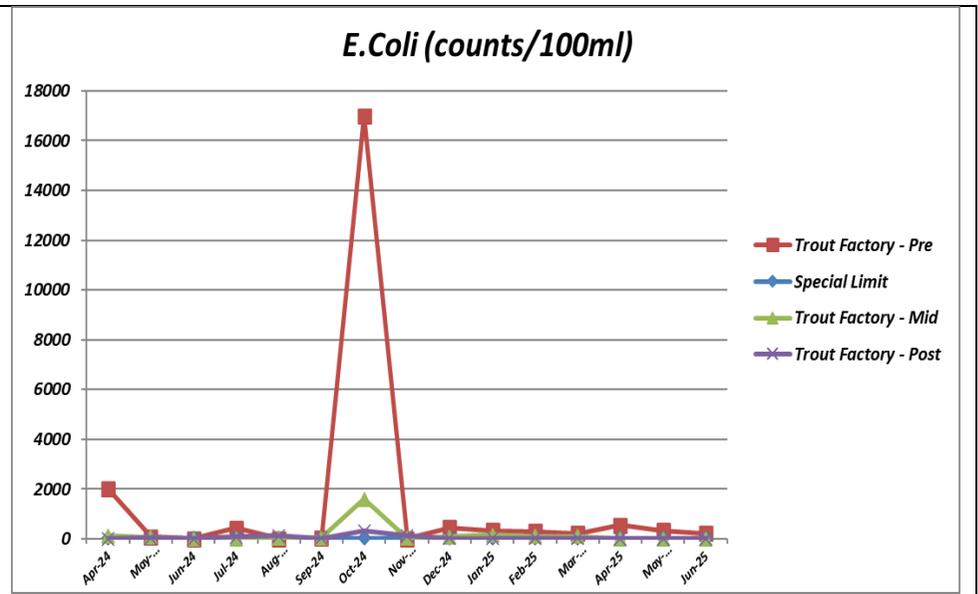
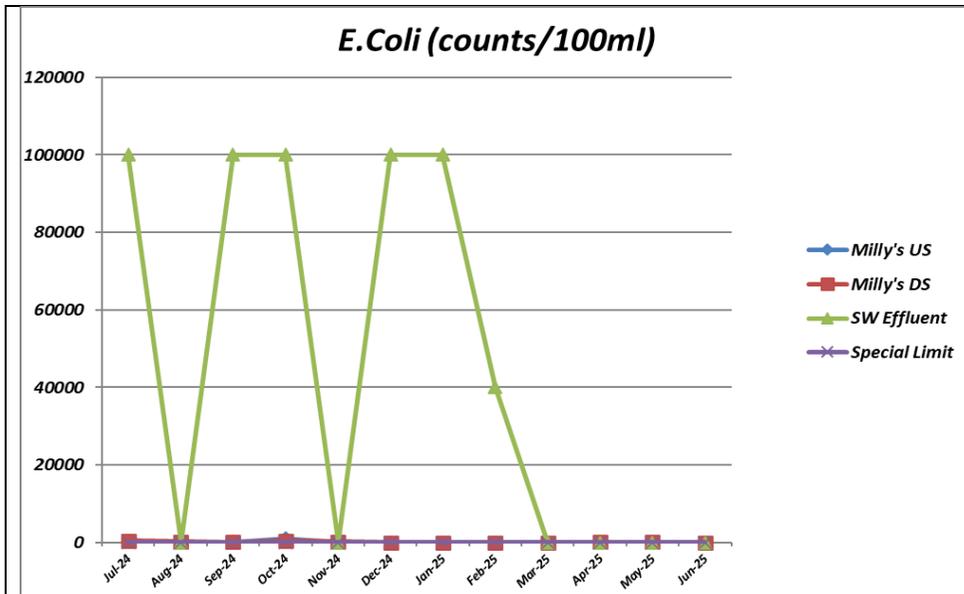
In addition to the 2024 monitoring data the Trout Pre, Trout post as well as the Trout mid sampling points have been added for comparative purposes. More comparative annual data will only be available at the end of 2025 to indicate the advanced effectiveness of the Trout factory treatment options. In terms of the 2024 data, it is clearly observed that the water quality parameters have gradually improved from the Trout pre to Trout post sampling points. Chloride levels, E.coli as well as COD levels in particular have markable improved compared to the Trout Pre site. Comparing the average SW effluent results to that of 2023 clear increases in EC, SS, Cl, P, COD, NH₃ as well as E.coli have occurred. E.coli levels in particular has increased by more than 9 times the 2023 amount. As mentioned during the 2024 monitoring period the WWTW is currently being rebuilt and upgraded which has resulted in the improper functioning of the WWTW.

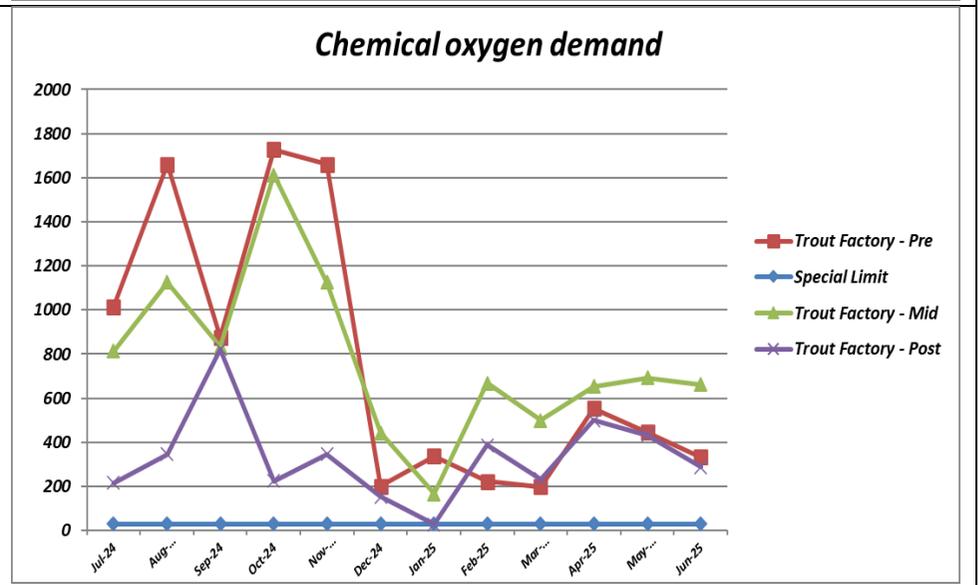
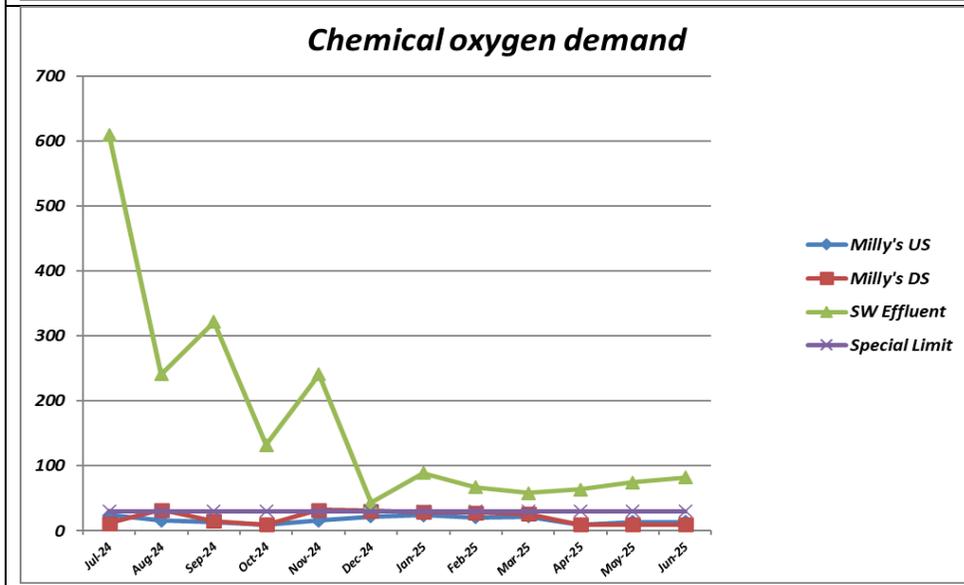
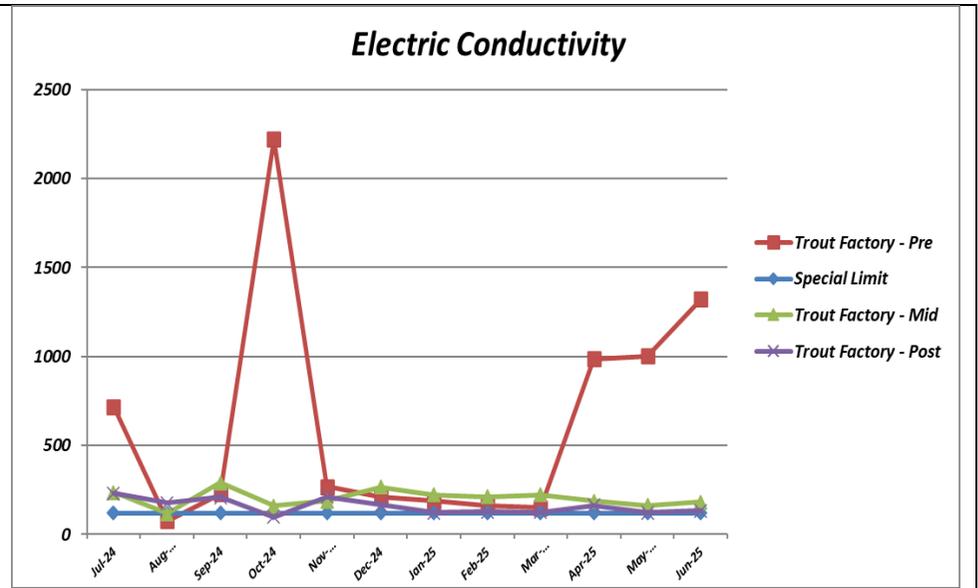
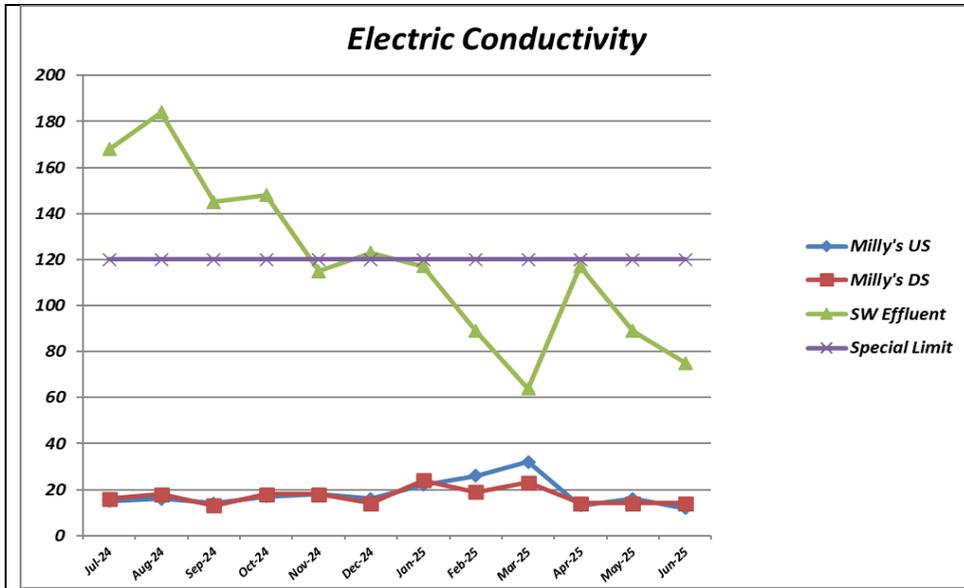
The WWTW also need additional time in order to readjust since additional waste load has been added to the overall monthly load. The E.coli levels discharged at the SW effluent is also expected to exceed 10000 mg/l on a continual basis during the 2024 period till the necessary improvements and reparations on the WWTW has been completed, which is scheduled for the end of 2024. Once the WWTW has been upgraded it is expected that the

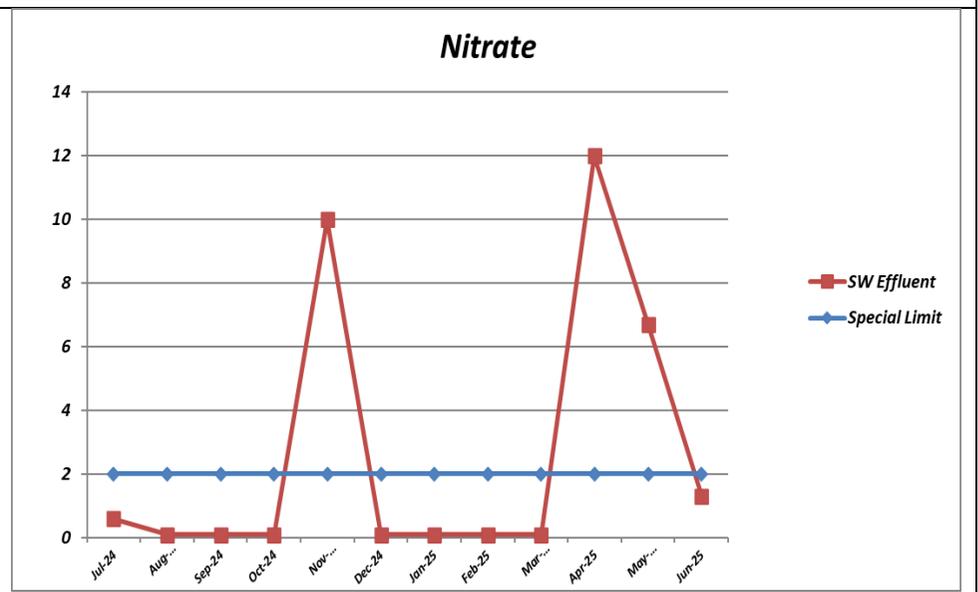
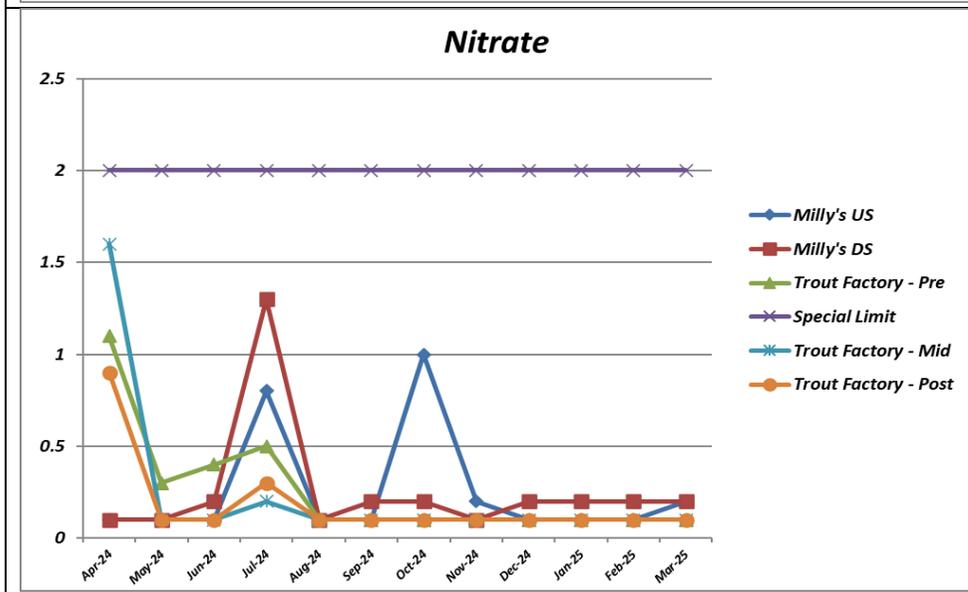
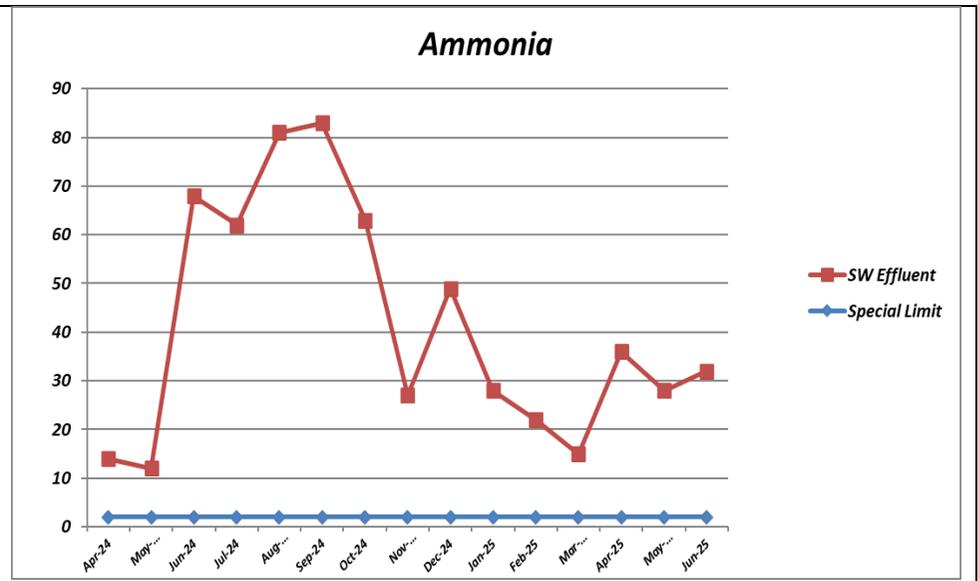
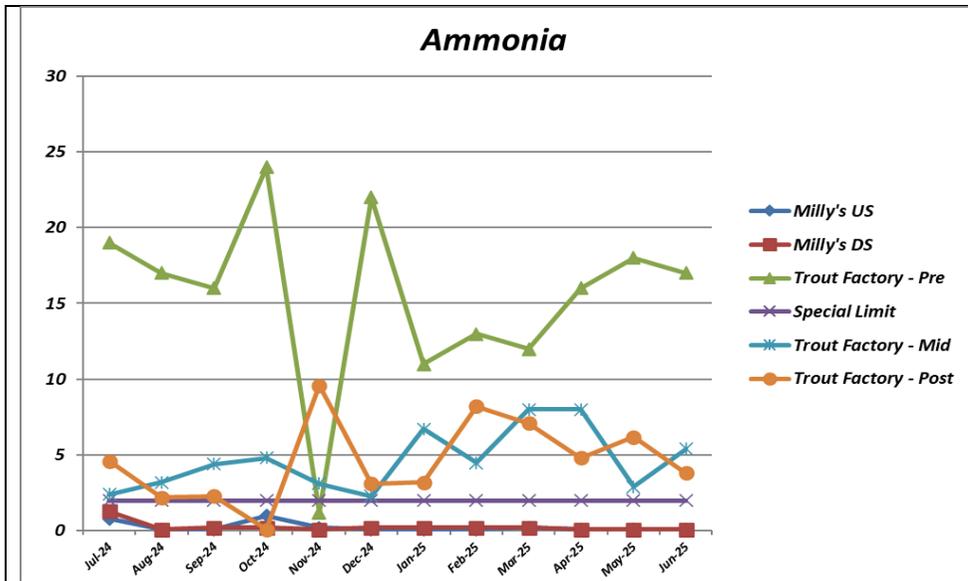


water quality results of the SW effluent will be in a similar or improved state compared to the 2023 monitoring results.

E. coli levels have also increased within the Elands River, although the downstream water quality remained in a similar state when being compared to the upstream water quality. It is however evident that there have been additional external upstream impacts on the main Elands River. The 2025 monitoring data will be included within **Table 1-4** at the end of the 2025 monitoring period.







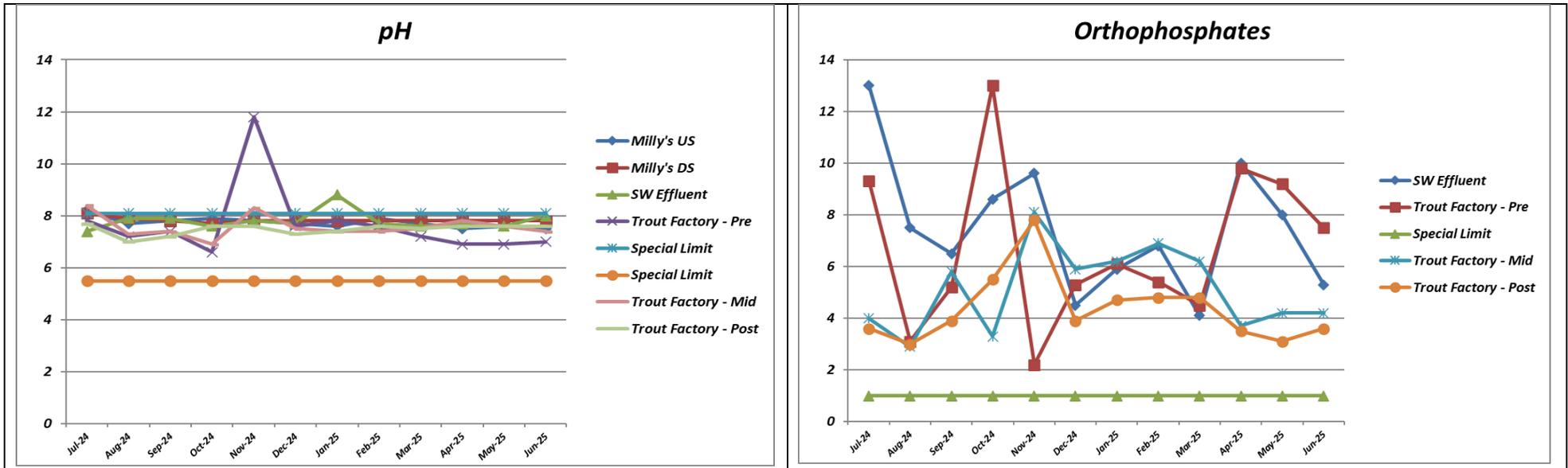


Figure 1-2: Water Quality Comparisons of 2024/2025



The graphs above are comparisons from July 2024 until June 2025. The current data trend indicates that overall, the water quality parameters at the SW effluent have gradually improved over the last three months with E.coli levels also returning to compliant levels during the last 2 quarters. The E.coli results have also significantly improved at the SW effluent with no traces being observed during the current quarter.

The current water quality results indicate that the Elands River sites remain largely compliant to the special limits apart from non-compliant E coli levels which have been observed on a monthly basis. The Trout-pre, Trout-mid and Trout-post sampling sites revealed that despite some high parameter levels obtained at the Trout pre sampling site these levels have significantly improved at the Trout-mid and Trout-post sampling sites.

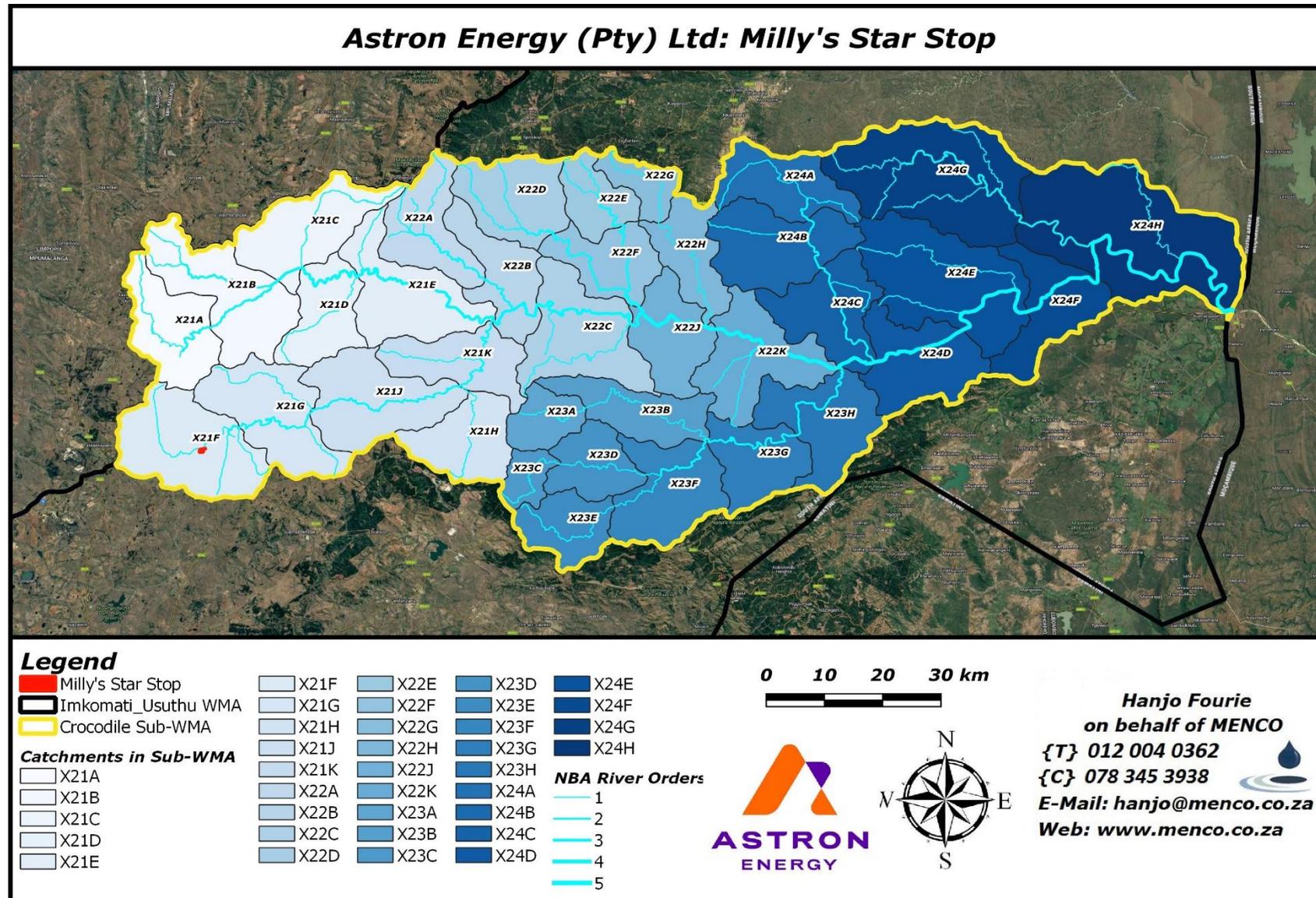


Figure 1-3: WMA Boundaries applicable to the study area

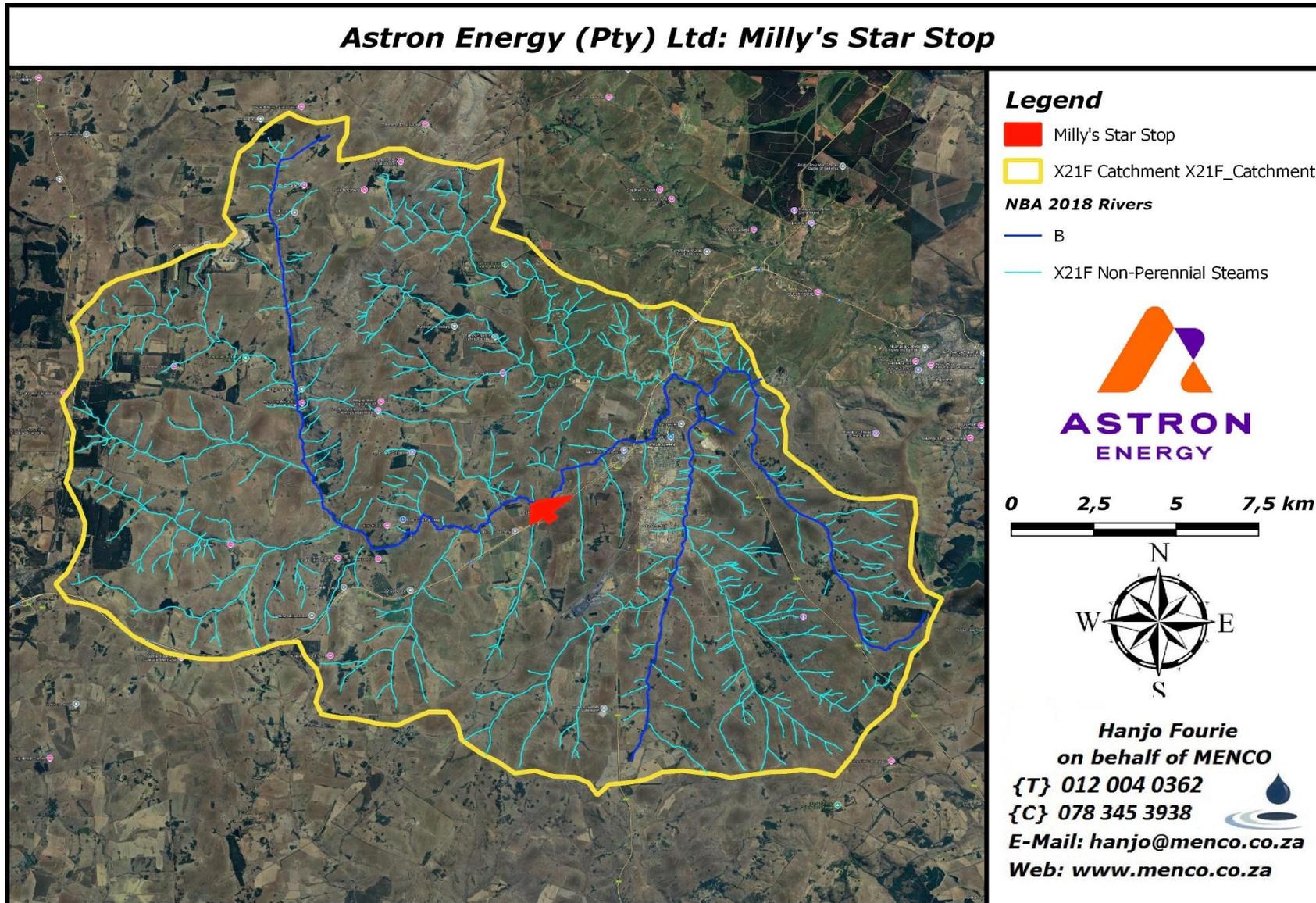


Figure 1-4: Surface Water Drainage Lines within the Relevant Quaternary Catchment

1.1.4 GROUNDWATER

1.1.4.1 AQUIFER CHARACTERISATION

The aquifer system underlying the proposed development is hosted within sedimentary rocks of the Silverton Formation of the Pretoria Group, Transvaal Supergroup. The geology is dominated by shale with subordinate mudstone, which generally exhibits low primary porosity. As a result, groundwater occurrence within the study area is controlled predominantly by secondary features such as weathering, fracturing, and lithological contacts.

Based on drilling records and borehole logs, two main hydrogeological units were identified. The upper unit comprises a shallow weathered zone extending to depths of approximately 15 to 20 m below ground level. This zone consists of fine-grained, weathered shale material and is laterally discontinuous. Minor groundwater strikes were encountered within this unit; however, the yields were low and not considered sufficient to support sustainable abstraction. The weathered zone therefore does not constitute a reliable aquifer and is expected to contribute limited groundwater storage.

The primary aquifer unit is associated with fractured bedrock and contact zones between shale and intrusive diabase. Significant groundwater strikes were encountered at depths of approximately 30 m and 49 m below ground level, particularly at the shale–diabase contact. Groundwater is stored and transmitted through fracture networks within the otherwise low-permeability bedrock. The aquifer is therefore classified as an intergranular and fractured aquifer with low to moderate yields.

Aquifer test results indicate moderate transmissivity and low storativity, which is characteristic of fractured rock aquifers. Groundwater abstraction sustainability is dependent on maintaining sufficient saturated thickness within the fractured zones. Excessive abstraction may result in fracture dewatering and a corresponding reduction in borehole yield. For this reason, abstraction from the aquifer requires careful management and ongoing monitoring to prevent long-term impacts.

Table 1-5: Ratings – Aquifer System Management and Second Variable Classifications

Aquifer System Management Classification		
Class	Points	Study Area
Sole Source Aquifer System:	6	
Major Aquifer System:	4	

Minor Aquifer System:	2	2
Non-Aquifer System:	0	
Special Aquifer System:	0 - 6	
Second Variable Classification (Weathering/Fracturing)		
Class	Points	Study Area
High:	3	
Medium:	2	2
Low:	1	

Table 1-6: Ratings - Groundwater Quality Management (GQM) Classification System

Aquifer System Management Classification		
Class	Points	Study Area
Sole Source Aquifer System:	6	
Major Aquifer System:	4	
Minor Aquifer System:	2	2
Non-Aquifer System:	0	
Special Aquifer System:	0 - 6	
Second Variable Classification (Weathering/Fracturing)		
Class	Points	Study Area
High:	3	
Medium:	2	2
Low:	1	

As part of the aquifer classification, a Groundwater Quality Management (GQM) Index is used to define the level of groundwater protection required. The GQM Index is obtained by multiplying the rating of the aquifer system management and the aquifer vulnerability. The GQM index for the study area is presented in Table 1-7.

The level of groundwater protection based on the Groundwater Quality Management Classification:

$$\begin{aligned} \text{GQM Index} &= \text{Aquifer System Management} \times \text{Aquifer Vulnerability} \\ &= 2 \times 2 = 4 \end{aligned}$$

Table 1-7: GQM Index for the Study Area

GQM Index	Level of Protection	Study Area
<1	Limited	
1 - 3	Low Level	

3 - 6	Medium Level	4
6 - 10	High Level	
>10	Strictly non-degradation	

Minor aquifers may not yield large volumes of sustainable flow but is potentially important for local supply and baseflow contribution to rivers. For this reason, this aquifer should be protected against over-abstraction and contamination.

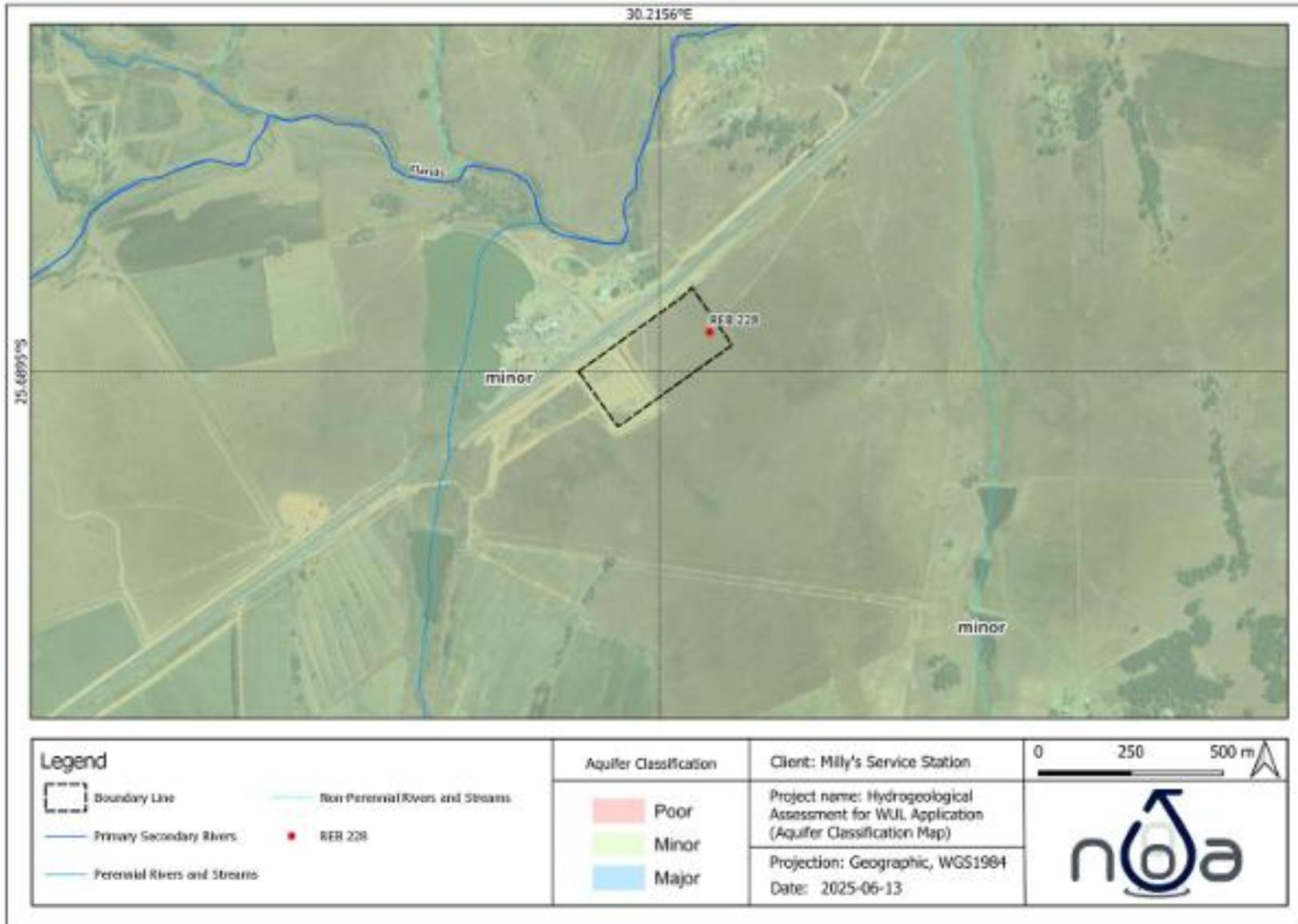


Figure 1-5: Aquifer Classification Map of South Africa

1.1.4.2 AQUIFER SENSITIVITY

Aquifer sensitivity within the study area was assessed using the national Aquifer Vulnerability Map of South Africa, based on the Borehole Prospects mapping by Vegter. According to this classification, the aquifer underlying the proposed development falls within a moderately vulnerable category.

This classification indicates that the aquifer is susceptible to contamination under conditions of continuous or prolonged pollutant loading, rather than from isolated or short-term incidents. The moderate vulnerability reflects the fractured nature of the aquifer, combined with relatively shallow groundwater levels in parts of the area. While the presence of weathered material in the upper profile provides some degree of natural protection, it is not sufficient to fully prevent the downward migration of contaminants over time.

The aquifer vulnerability rating was used together with the aquifer system classification to determine the Groundwater Quality Management (GQM) Index. The aquifer was classified as a minor aquifer system with a medium vulnerability rating, resulting in a GQM Index of 4. This corresponds to a medium level of groundwater protection, indicating that groundwater resources should be protected against contamination and that appropriate management and monitoring measures are required.

Given the moderate vulnerability of the aquifer, activities with pollution potential should be carefully controlled, and preventative measures should be implemented to minimise the risk of groundwater contamination (refer to **Error! Reference source not found.**).

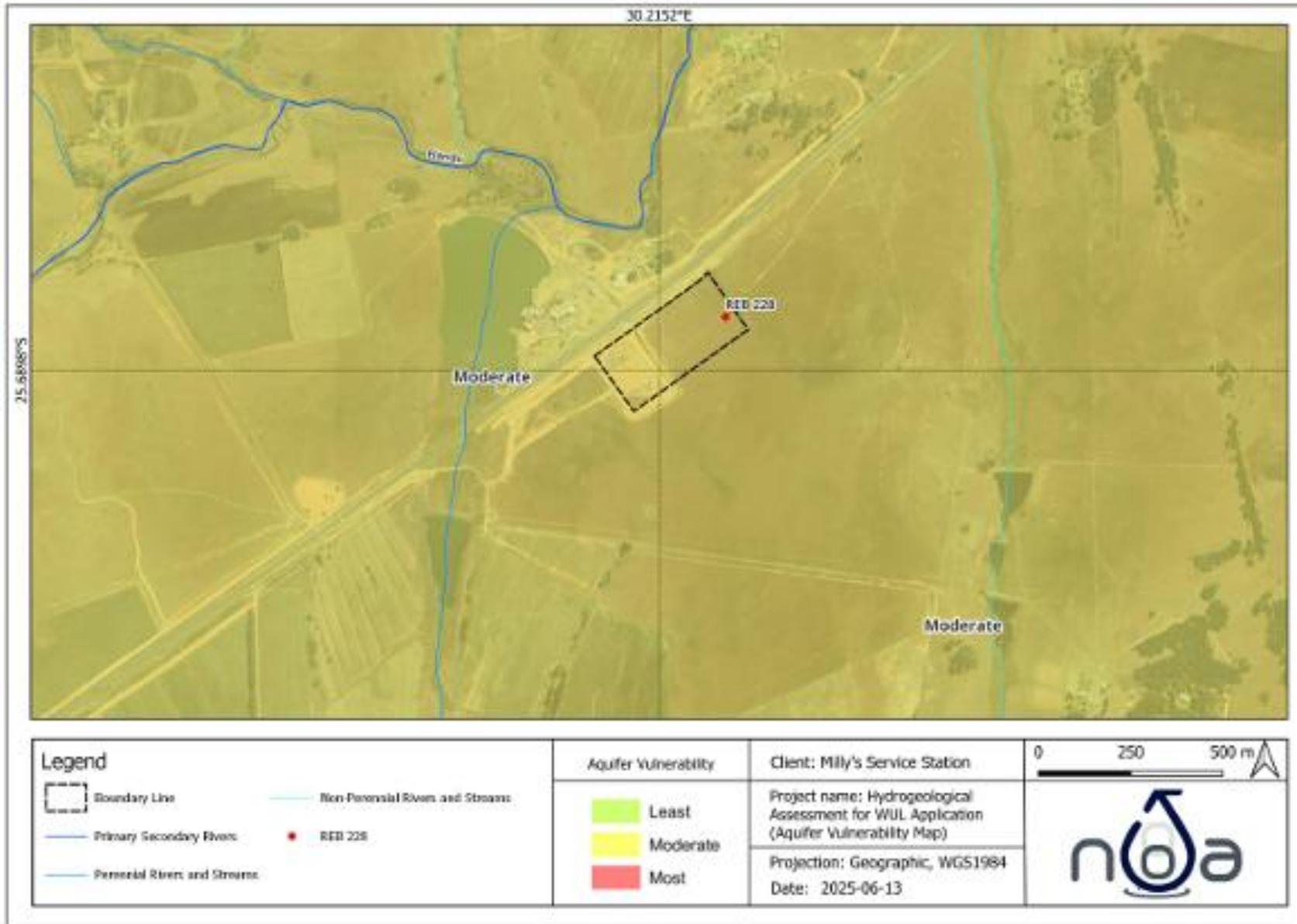


Figure 1-6: Aquifer Vulnerability Map of South Africa

1.1.4.3 GROUNDWATER QUALITY

Groundwater quality within the study area is generally good and suitable for domestic and agricultural use, subject to appropriate treatment. Analytical results indicate circum-neutral pH values and low electrical conductivity, reflecting low salinity conditions. Major ions occur at low concentrations and comply with applicable drinking water, irrigation, and livestock watering guidelines.

All determinands complied with SANS 241 drinking water standards, with the exception of microbiological indicators, which exceeded guideline limits in at least one sample. This suggests potential surface influence or borehole sanitation issues and indicates that treatment is required prior to human consumption.

No petroleum-related contaminants were detected at the time of sampling. These results provide a baseline against which future groundwater quality monitoring can be assessed. Given the proposed land use, ongoing monitoring for hydrocarbons and volatile organic compounds is recommended to ensure early detection of any potential contamination.

**Table 1-8: Groundwater Quality data for M20A quaternary catchment (DWA 2009)**

Sample ID / Parameter	Unit	SANS 241	DWS Irrigation 1996	DWS Livestock	MBH01 (04/06/2025)	REG 228 (11/06/2025)
pH	pH	<5 & >9.7	<6.5 & >8.4	NG	7.8	7.24
EC	mS/m	170	40	NG	22.6	9.70
TDS	mg/ℓ	1200	NG	<1000	141	72
Total Alkalinity	CaCO ₃	NG	NG	NG	90	40
Chloride	mg/ℓ Cl	300	100	<1500	4.6	2.28
Sulphate	mg/ℓ SO ₄	500	NG	<1000	<2	<2
Fluoride	mg/ℓ F	<1.5	NG	NG	0.28	0.09
Nitrate as N	mg/ℓ N	11	5	100	<0.5	<0.5
Free Ammonia as N	mg/ℓ N	1.5	NG	NG	<0.02	0.28
Phosphate	mg/ℓ PO ₄	NG	NG	NG	<0.20	<0.2
Calcium	mg/ℓ Ca	NG	NG	<1000	17.31	5.10
Magnesium	mg/ℓ Mg	NG	NG	<500	10.45	6.14
Sodium	mg/ℓ Na	<200	70	<2000	9.87	5.37
Potassium	mg/ℓ K	NG	NG	NG	0.56	0.51
Iron	mg/ℓ Fe	2	5	<10	<0.05	0.06
Manganese	mg/ℓ Mn	0.4	0.02	<10	<0.05	<0.05
Zinc	mg/ℓ Zn	5	NG	NG	<0.05	0.09
E. coli	colonies/100ml	0	1	NG	30	0
Total Coliform	colonies/100ml	<10	NG	NG	190	9
Total Plate Count	colonies/ml	NG	NG	NG	17	17

1.1.4.4 HYDRO-CENSUS

A hydro-census was undertaken within a one-kilometre radius of the proposed abstraction borehole to identify existing groundwater users, groundwater-dependent receptors, and surface water features that could be influenced by abstraction. The survey confirmed that groundwater use in the surrounding area is limited, with only one operational borehole identified within the assessment radius. This borehole is used for domestic and irrigation purposes and represents a potential receptor to abstraction-related drawdown.

The surrounding land use is predominantly agricultural, consisting of grazing land and cultivated fields. Groundwater abstraction in the area is therefore primarily associated with household supply and small-scale irrigation. No evidence of intensive groundwater exploitation was observed, and database searches confirmed the absence of registered high-volume groundwater users in the immediate vicinity.

Several surface water features, including farm dams and tributaries linked to the Elands River system, were identified. These features may receive baseflow contributions from groundwater, particularly during dry periods. In addition, a hillslope seep wetland located within approximately 100 m of the abstraction borehole was identified as a sensitive groundwater-dependent ecosystem. This feature represents a key ecological receptor that could be affected by excessive drawdown.

The hydro-census findings indicate that while regional groundwater use is limited, localised impacts on nearby users and groundwater-dependent features could occur if abstraction is not carefully managed.



Table 1-9: Hydrocensus Details

BH ID	Coordinates		Z mamsl	Water Level (mbgl)	Water Level Elevatio n	Depth (m)	Pump Type	Casing Type	Water Use	Comments	Sample d
	Latitude	Longitud e		Static	(mamsl)			Steel/uPV C			
MBH01	- 25.68170	30.21790 9	1560.00	NM	NM	40	Submersibl e	Steel	Domesti c Irrigatio n	Borehole sealed	Yes
REB 228	- 25.68855	30.21699 0	1588.00	4.14	1583.86	56	Not equipped	Steel	Not in use	Borehole sealed with cap. Not equipped	Yes

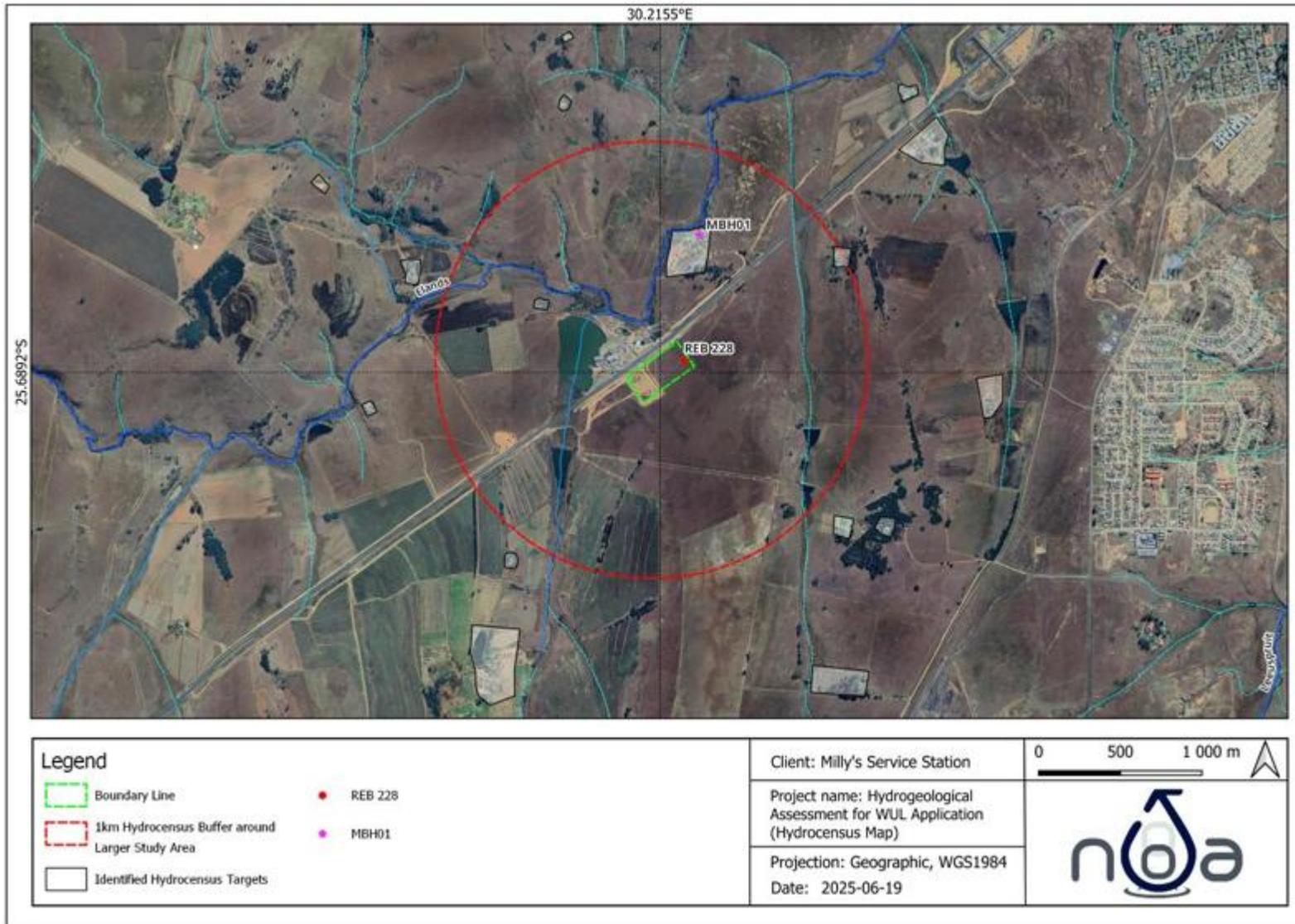


Figure 1-7: Hydrocensus Borehole Map



1.1.4.5 POTENTIAL POLLUTION SOURCE IDENTIFICATION

Potential sources of groundwater contamination within the study area were identified based on existing land use and the nature of the proposed development. The primary potential pollution risk is associated with fuel storage, handling, and dispensing activities linked to the proposed service station. Accidental fuel spills or leaks represent a potential source of hydrocarbon contamination if not adequately managed.

Secondary potential sources include general operational activities associated with the service station, as well as surrounding agricultural land uses. Agricultural activities may contribute diffuse inputs such as nutrients or microbiological contaminants, although no evidence of groundwater degradation was identified at the time of assessment.

The fractured nature of the underlying aquifer increases the importance of preventative management, as once contaminants enter the subsurface they may be difficult to remediate. For this reason, the identification and control of potential pollution sources is considered an important component of groundwater protection, supported by routine groundwater quality monitoring.

1.1.5 MEAN ANNUAL RUNOFF (MAR)

The proposed results (GN 1248 of November 2017) for the Reserve determination and ecological categorisation for the Inkomati Catchment, where the Reserve is expressed as a percentage of the NMAR for the respective catchments (cumulative) in terms of section (16) (1) are tabulated below.

Table 1-10: Quantity component for the Rivers which includes the results of the EWR Sites and the biophysical nodes

Quaternary catchment	Water Resource	Ecological Reserve (%NMAR)	BHN Reserve (%NMAR)	Total Reserve (%NMAR)	NMAR (MCM)
X21F	Elands	35.50	0.17	35.67	50.80

1.1.6 RESOURCE CLASS AND RIVER HEALTH

The ecological status of a river refers to its overall condition of health, i.e. the totality of the features and characteristics of the river and its riparian areas, which manifests in its ability to support a natural array of species. This ability relates directly to the capacity of the system to provide a variety of goods and services. The information reported here refers to the area applicable to the license application and has been derived from the



2016 Ecstatus Report for the Elands River Catchment in the Inkomati-Usuthu Water Management Area.

The in-stream and riparian health for the Elands River near Machadodorp is moderately to largely modified (Category C to C/D). The greatest threat to river health in this region is sewage pollution from poorly maintained wastewater treatment works at Machadodorp and Waterval Boven. These facilities have critical compliance failures, resulting in high nutrient loads and excessive algal growth. Additional threats include invasive alien vegetation (particularly black wattle, eucalyptus, and weeping willow) in the riparian zone, commercial forestry activities, and over-abstraction during drought periods.

The Elands River in Quaternary Catchment X21F has been classified by the Department of Water and Sanitation as having a Present Ecological State (PES) of Class C, indicating a moderately modified river system. To ensure sustainability of this critically important river system and protect endemic fish species, urgent intervention is required to upgrade wastewater treatment infrastructure and manage invasive vegetation.

Table 1-11: RWQO for the relevant Quaternary Catchment

Catchment	River	PESC	EISC	REC
X21F	Elands River	Class C	High	Class C

1.1.7 RECEIVING WATER QUALITY OBJECTIVES AND THE RESERVE

In terms of Milly's Resource Quality Objectives as contemplated in Government Notice 1248 of 10 November 2017 the X21F quaternary drainage area falls under the Ecological Water Requirement (ERW1) as determined at monitoring site X2H074Q01 in the Crocodile East catchment. The Eco-Specs relevant to the catchment is presented in **Table 1-12** together with the IUCMA set Limits.

The X21F catchment is further classified as Water Quality Class III with a PES of Class C and an EIS of high. With reference to the IUCMA set limit for pH, it is clear that the pH should not be rated as a variable of concern as the effluent range is given as 6.5 to 8.0. The table below is used to compare the monthly water quality data to detect any potential increases that might exceed the required limits. It also assists to identify potential impact sources stemming from certain monitoring points.

Table 1-12: Required limits set for the X21F Catchment

Variable (s)	IUCMA Limits	GN 1248 (ERW1) RQO's
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<i>pH</i>	5.5 – 7.5	6.5 – 8.0
<i>Electrical Conductivity</i>	50 mS/m	<30 mS/m
<i>Ammonia as (N)</i>	1	1.5
<i>Nitrate as (N)</i>	1.5	<6
<i>Nitrite as (N)</i>	1.5	<6
<i>Chemical Oxygen Demand as (COD)</i>	30	-
<i>Orthophosphate as (P)</i>	2	<0.125
<i>Fluoride</i>	-	1.5
<i>Suspended Solids (SS)</i>	10	-
<i>E-Coli (Counts/100ml)</i>	0	0

In order to identify exceeding variables on the water quality database, a Management Target Range has been implemented to which the set limits by the IUCMA are compared to. This will assist in comparing the monthly data to each other and make for easy identification of impacts sources. **Table 1-13** provides the Management Target Range implemented for Milly's Star Stop.

Table 1-13: Management Target Range

Parameter	Special Limit	Tolerable Target	Unacceptable
<i>pH</i>	5.5 – 7.5	7.6 – 8.0	< 5.4 ; >8.1
<i>Electrical Conductivity</i>	50	50 - 80	80 – 120
<i>Suspended Solids</i>	10	10 - 30	30 – 50
<i>Chloride</i>	120	120 - 150	150 – 180
<i>Nitrate</i>	1.5	1.6 – 5.9	<6
<i>Nitrite</i>	1.5	1.6 – 5.9	<6
<i>Fluoride</i>	0.5	0.6 – 1.5	1.6 – 3.0
<i>Orthophosphate</i>	1.0	1.1 – 2.0	2.1 - 10
<i>Chemical Oxygen Demand</i>	30	30 - 40	40 -55
<i>E. coli</i>	0	0 - 20	20 – 40
<i>Ammonia</i>	2	2 - 4	4 - 8

1.1.8 SURFACE WATER USER SURVEY

Water requirements for the Inkomati-Usuthu WMA, as reported in 2016, show a total water availability of 1,029 million m³/annum against a deficit of 163 million m³/annum. The largest water user in the WMA is the irrigation sector, which represents 31% of total requirements (approximately 319 million m³/a). The ecological reserve accounts for 23%



(237 million m³/a), while afforestation consumes 21% (216 million m³/a). Strategic water use represents 8% (82 million m³/a), cross-border obligations 6% (62 million m³/a), and domestic use 5% (51 million m³/a). The remainder is allocated to alien vegetation impacts at 3% (31 million m³/a), water transfers at 2% (21 million m³/a), and industrial use at 1% (10 million m³/a). This distribution reflects the WMA's critical role in supporting South Africa's agriculture, forestry, and energy sectors, particularly the coal-fired power stations in Mpumalanga Province.

1.1.9 SENSITIVE AREAS SURVEY

According to current assessments, the Greater Lakenvlei Protected Environment near eMakhazeni (Belfast) was expanded in September 2023, now covering 21,753 hectares across 98 properties. De Berg Nature Reserve, approximately 20 kilometres north of Dullstroom, was designated as South Africa's 30th Ramsar site in February 2024, representing the highest altitude wetlands in Mpumalanga. No RAMSAR sites are located immediately at the project site; however, numerous local wetland areas surround the site and are ecologically significant.

The area is zoned for tourism industry development according to the Environmental Management Framework for the Emakhazeni Local Municipality. The Greater Lakenvlei Protected Environment protects endangered grassland habitats and two main water catchments – the Crocodile and the Olifants.

The Elands River remains an important and biologically diverse aquatic habitat. However, the conservation status of key fish species has changed significantly. The Incomati rock catlet (*Chiloglanis bifurcus*) is now classified as Critically Endangered by the IUCN and was recently rediscovered after being thought extinct for the past 20 years. A 2013 survey by Mpumalanga Tourism and Parks Authority showed drastic population decline, with the species sampled from only three of 56 biomonitoring sites. The Bushveld smallscale yellowfish (*Labeobarbus polylepis*) population continues to recover but has not reached historical levels. Continued conservation efforts are critical to protect these threatened species and maintain the ecological integrity of the Elands River system.

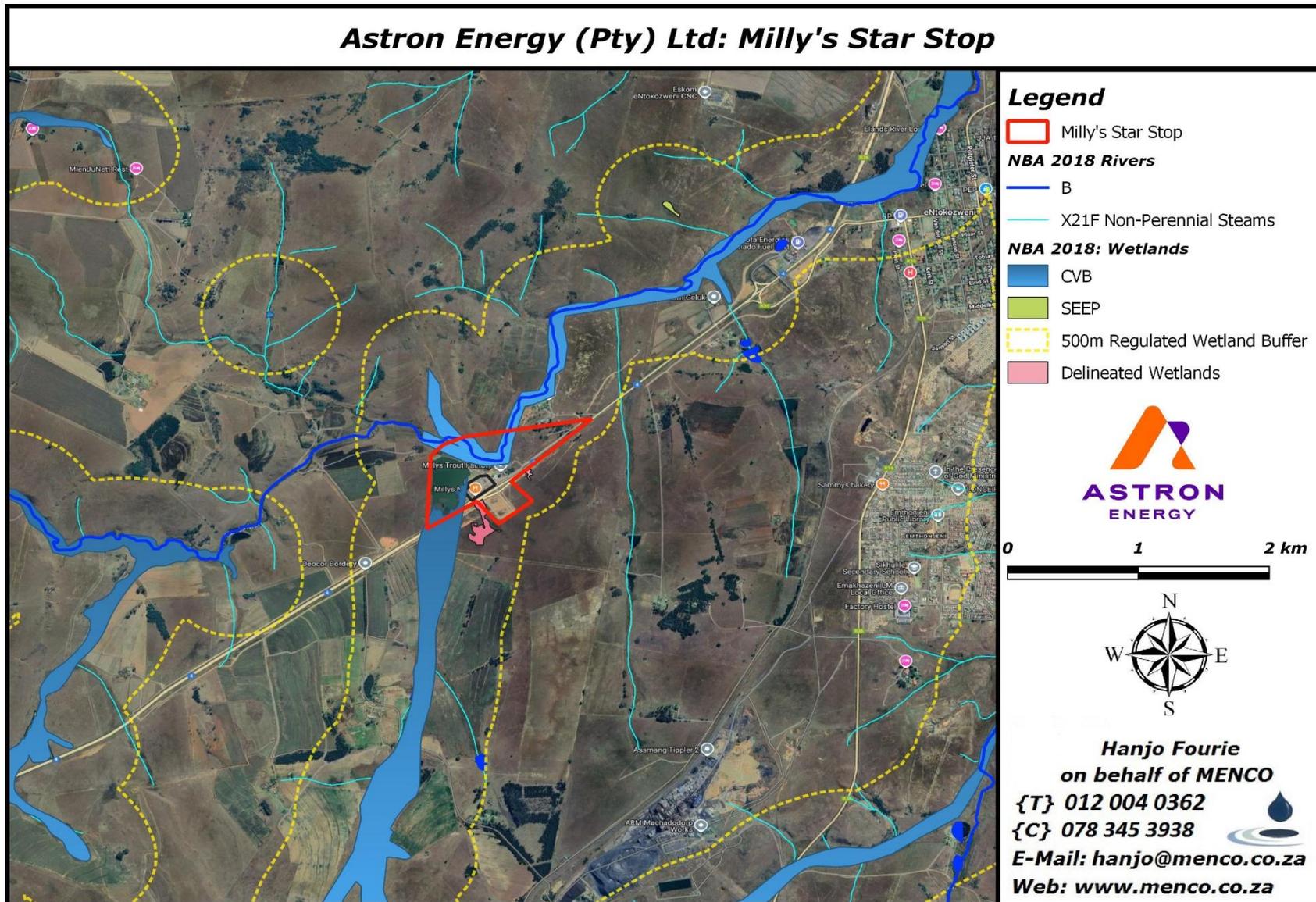


Figure 1-8: Surface Water Features in close proximity to the project site

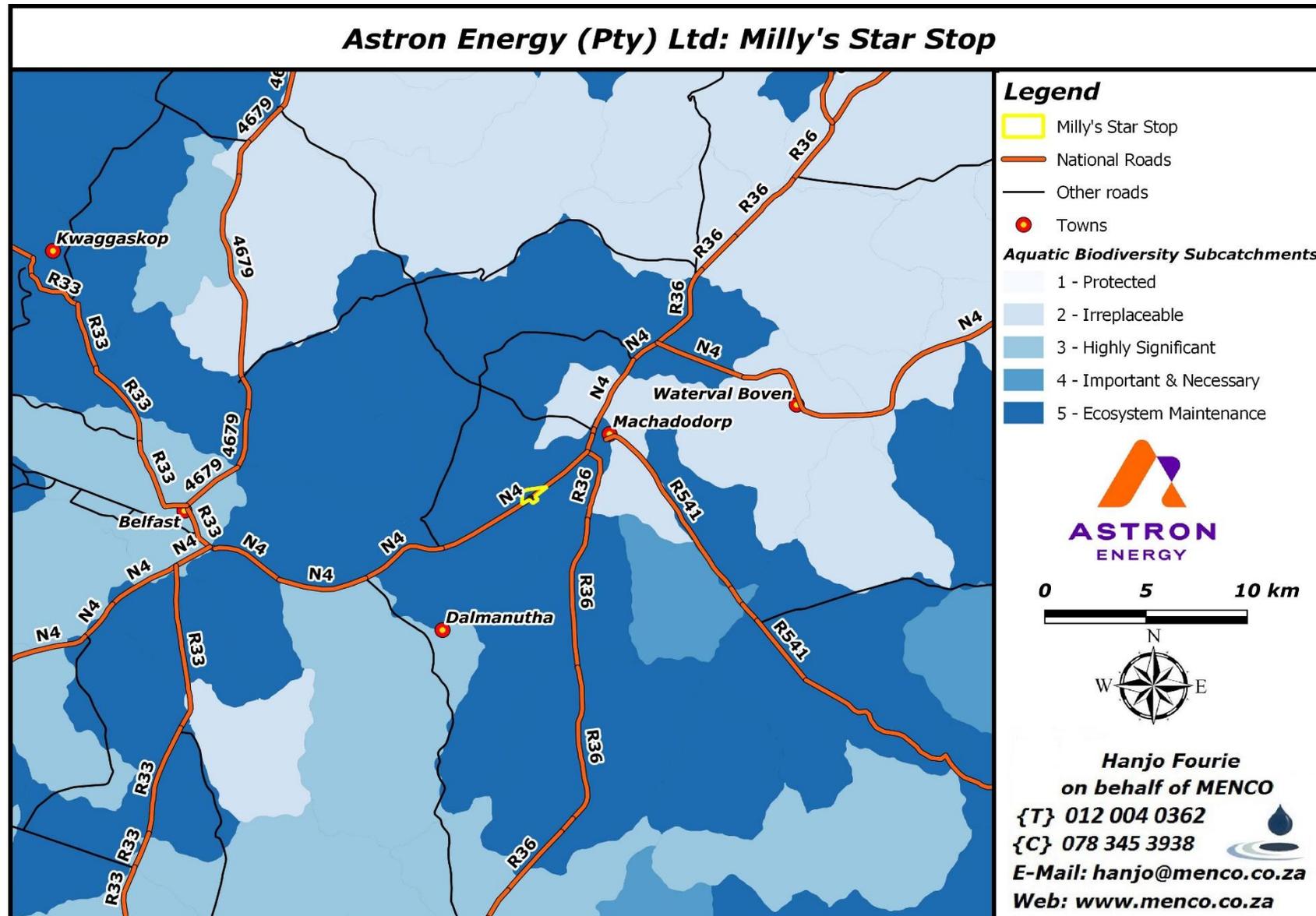


Figure 1-9: Aquatic Ecosystem Classification

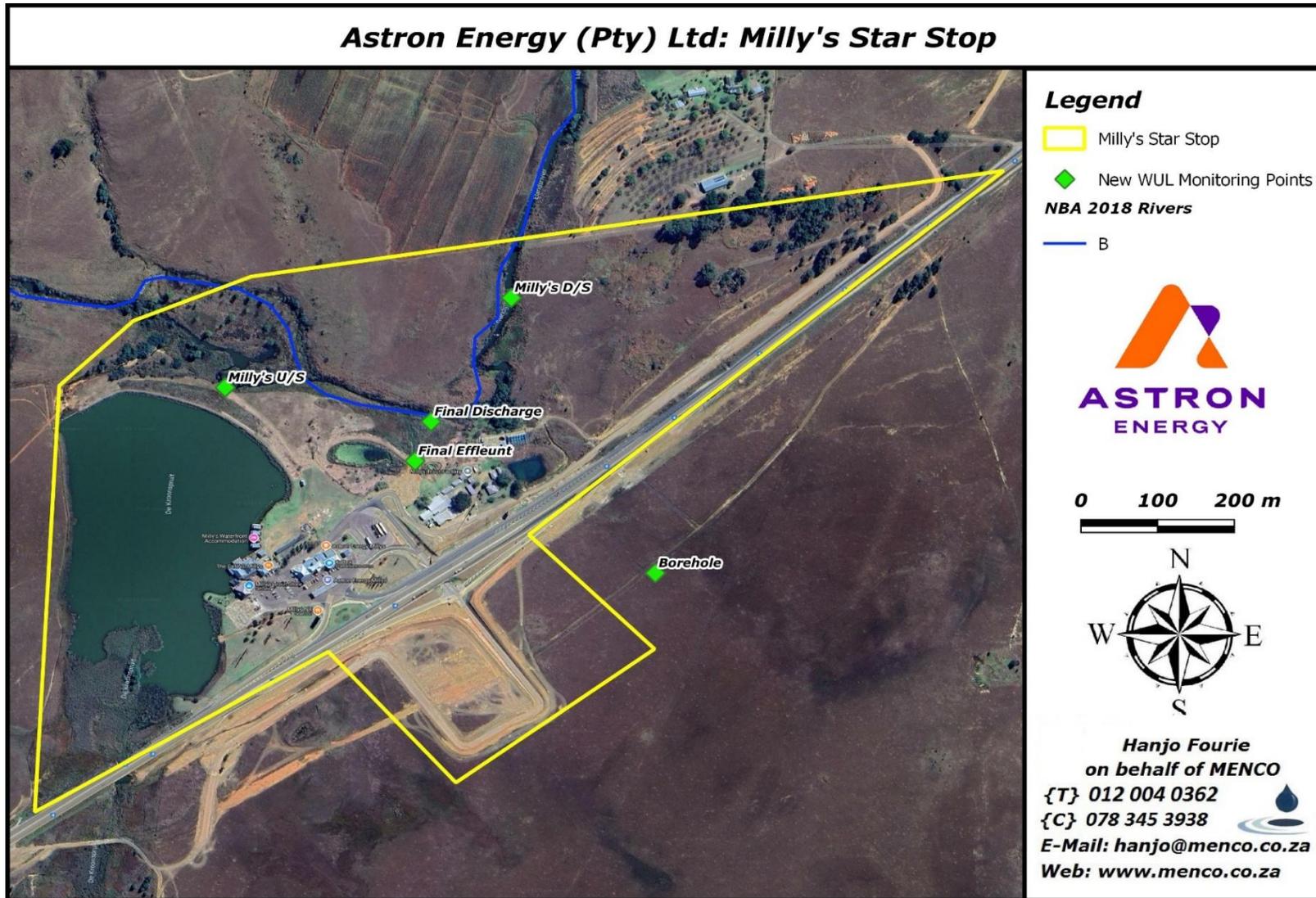


Figure 1-10: Surface Water Monitoring sites applicable to the study area



1.2 MUNICIPALITY

The Emakhazeni Local Municipality is situated in Mpumalanga Province in the east of the Nkangala District Municipality covering an area of approximately 4,736 km² (473,600 hectares). This Local Municipality is strategically located between the Pretoria/Johannesburg complex in Gauteng and Mbombela (Nelspruit) in Mpumalanga and is connected to both these centres via the N4 Freeway.

1.2.1 POPULATION AND HOUSEHOLD NUMBERS

According to Statistics South Africa, the population of the Emakhazeni Local Municipality stood at 50,165 persons in 2022, representing growth from 47,216 in 2011. This amounts to approximately 3.5% of the total population in the Nkangala District Municipality. The municipality consists of approximately 19,613 households with an average household size of 2.6 persons.

1.2.2 SPACIAL ANALYSES

The Emakhazeni area is a vast rural area with an undulating landscape and high environmental and aesthetic value. Settlements in the area are sparsely distributed with residential densities increasing towards towns in the area as well as rural settlements.

The area is situated on the highest part of the Steenkampsberg Plateau at approximately 2 072 m above sea level, with the Dullstroom station being the highest point in Mpumalanga. The Suikerboschkop koppies area situated in the west of the area with the landscape declining from the plateau towards the escarpment and the Lowveld to the Mozambique Coast in the east.

Farming is the dominant economic activity in the Emakhazeni area occupying the largest part of the physical area. Small towns have developed throughout the area, which serve as service centres to the agricultural sector. These towns include:

- Belfast and Siyathuthuka
- Dullstroom and Sakhelwe
- Machadodorp and Emthonjeni
- Waterval-Boven and Emgwenya

The road network and railway lines are defining elements in the spatial structure and the location of towns in the area. Major elements in the transport network include the following:

- P81-1 (R540) which connects Belfast and Dullstroom with Lydenburg north of the Emakhazeni area;



- R216 which connects Dullstroom and Machadodorp;
- R36 linking Machadodorp with Carolina to the southwest;
- R541 linking Machadodorp with Badplaas to the southeast;
- R36 linking Machadodorp and Waterval-Boven with Lydenburg;
- R33 linking Belfast with Ermelo;
- The railway line from Gauteng to Belfast. The main line continues to the east, through Nelspruit to the Maputo harbour. From this main line there are two lines going south (one from Belfast and one from Machadodorp), through Ermelo to the Richards Bay harbour. There is also a railway line going north from the Belfast station, running parallel to Road P81-1 through Dullstroom towards Lydenburg.

The Emakhazeni Local Municipality is therefore linked to many of the major economic centres within the region and the continent.

1.2.3 EDUCATION AND EMPLOYMENT

The education profile for people aged 20+ in the Emakhazeni Local Municipality shows improvement, with only 13.2% having no schooling (down from 15.0% in 2011). Approximately 32.7% have completed Grade 12 or matric (up from 28.6% in 2011), and 6.2% have higher education qualifications.

The official unemployment rate stood at 25.9% in 2011, with youth unemployment (ages 15-34) at 34.2%. Emakhazeni Local Municipality continues to be challenged by high unemployment, requiring ongoing local economic development strategies.

1.3 CLIMATIC INFORMATION

Climatic information in these investigations was obtained from the Integrated Development Plan (2006 – 2011) for the Emakhazeni Local Municipality as well as www.saexplorer.co.za. Rainfall and evaporation figures were obtained from DWA Directorate Resource Quality Services database.

1.3.1 REGIONAL CLIMATE

The eNtokozweni (Machadodorp) region is situated on the Steenkampsberg Plateau within the Emakhazeni Local Municipality. eNtokozweni forms part of the eastern boundary of the Highveld region of Mpumalanga. The slope of the municipal area displays a gradual decline from south to north and from west to east with the highest point in the south being 1645 m above sea level and the lowest point at 1585 m above



sea level. Average midday temperatures for eNtokozweni range from 15.7°C in June to 23.3°C in January. The region is coldest during June when minimum temperatures can reach -1°C.

1.3.2 RAINFALL

Mean annual precipitation (MAP) for the study area falls within the 600 to 700 mm range and is characterised by summer rainfall. It receives the lowest rainfall in June and the highest in January. Historic rainfall data as obtained from the Directorate Resource Quality Services database for a weather station located approximately 3 km east of eNtokozweni (Machadodorp) is indicated in **Table 1-15**. However, it should be noted that this weather station has not been active since 1961. The nearest active weather station is located at the Kwena Dam approximately 40 km to the north of Milly's. Rainfall data for this station is indicated in **Table 1-16**. The description and locality of these weather stations are illustrated in **Table 1-14** below.

Table 1-14: Locality and description of weather stations

Station	Place	Latitude	Longitude
X2E002	Machadodorp	25°40'02"S	30°16'59"E
X2E013	Elandspruit@Kwena Dam	25°21'17"S	30°22'44"E

Table 1-15: Yearly rainfall figures for weather station X2E002

Year	Rainfall (mm) for the month of February	Rainfall (mm) for the month of May	Rainfall (mm) for the month of July	Rainfall (mm) for the month of October
1955	---	---	0.0	89.0
1956	174.0	89.0	12.7	63.9
1957	178.6	6.2	21.7	58.3
1958	130.5	0.0	0.0	45.3
1959	185.4	38.1	0.0	38.1
1960	0.0	2.5	0.0	54.6
1961	105.6	6.9	---	---

Table 1-16: Yearly rainfall figures for weather station X2E013

Year	Rainfall (mm) for the month of February	Rainfall (mm) for the month of May	Rainfall (mm) for the month of July	Rainfall (mm) for the month of October
------	---	--	---	--



2005	0.0	0.0	0.0	25.4
2006	119.3	4.6	0.0	23.8
2007	58.8	0.0	5.6	82.5
2008	69.2	35.8	0.0	104.2
2009	150.1	12.2	0.0	121.8
2010	33.8	9.4	11.2	45.6
2011	53.6	4.0	11.4	82.2
2012	33.8	0.0	0.0	110.2
2013	86.5	13.6	0.0	117.8
2014	21.2	0.0	---	---

1.3.3 EVAPORATION

Mean annual evaporation for the study area falls within the 1300 – 1400 mm range. Evaporation data as obtained from the Directorate Resource Quality Services database for weather stations mentioned in is indicated in **Table 1-17** below and in **Table 1-18**.

Table 1-17: Yearly evaporation figures for weather station X2E002

Year	Evaporation (mm) for the month of February	Evaporation (mm) for the month of May	Evaporation (mm) for the month of July	Evaporation (mm) for the month of October
1955	---	---	78.1	136.1
1956	134.0	82.8	84.9	142.0
1957	155.7	103.9	69.4	119.4
1958	201.0	83.7	40.9	93.3
1959	192.1	107.0	69.8	80.6
1960	51.6	42.2	68.5	92.1
1961	112.6	86.7	---	---

Table 1-18: Yearly evaporation figures for weather station X2E013

Year	Evaporation (mm) for the month of February	Evaporation (mm) for the month of May	Evaporation (mm) for the month of July	Evaporation (mm) for the month of October
2005	---	119.5	117.0	226.9
2006	147.2	107.6	---	203.3



2007	225.3	129.0	118.6	160.0
2008	204.2	105.8	102.5	206.2
2009	154.6	109.7	96.5	198.3
2010	185.3	110.9	93.2	198.6
2011	203.1	114.0	94.4	180.2
2012	225.8	123.0	101.5	182.0
2013	192.6	107.3	99.5	187.3
2014	184.2	113.5	---	---



2 DESCRIPTION OF THE ACTIVITY

2.1 PROPOSED MILLY'S SOUTH TOWNSHIP DEVELOPMENT

2.2 EXISTING WASTE WATER TREATMENT WORKS

The Elands River (recipient of treated effluent) is a listed water resource in terms of the General Authorisations (GA's) which means that waste water needs to meet special standards in terms of GN 399 of 26 March 2004 and GN 665 of 6 September 2013, before it is discharged into the environment. These special standards have been set by the Department of Water and Sanitation to protect sensitive water resources.

The Milly's wastewater treatment plant was constructed in 2018 and the plant was commissioned in December of 2018. From the outset the plant did not comply to special standards and in certain cases, not general standards. The plant has been redesigned, refurbished, and is currently operational.

Figure 2-1 indicates the plant process flow diagram as designed, constructed, and commissioned back in 2018. In essence the designers of the as built system sought to emulate the process conditions that one would find in a three in series large tank system viz an Anoxic section, an Aerobic (Aerator) section and a clarification section by coupling 24 small JOJO type tanks in series.

Following the non-performance of the plant i.e. not meeting the licensing conditions and the Water Act specified special standards nor the less onerous conventional standards a specialist consultant was approached. The proposal was to construct six small mini process flow plants each comprising 4 tanks in series. The proposals were only partly implemented. Many of these proposals were also implemented incorrectly to the extent that not even conventional standards could be met. The concept was abandoned for the wrong reasons. See **Figure 2-2** indicating the as built process flow diagram of the six mini plants.

The current plan of action is to complete the proposals from the specialist consultant in full. See **Figure 2-3** indicating the process flow diagram.



Figure 2-1: Currently approved WWTW layout

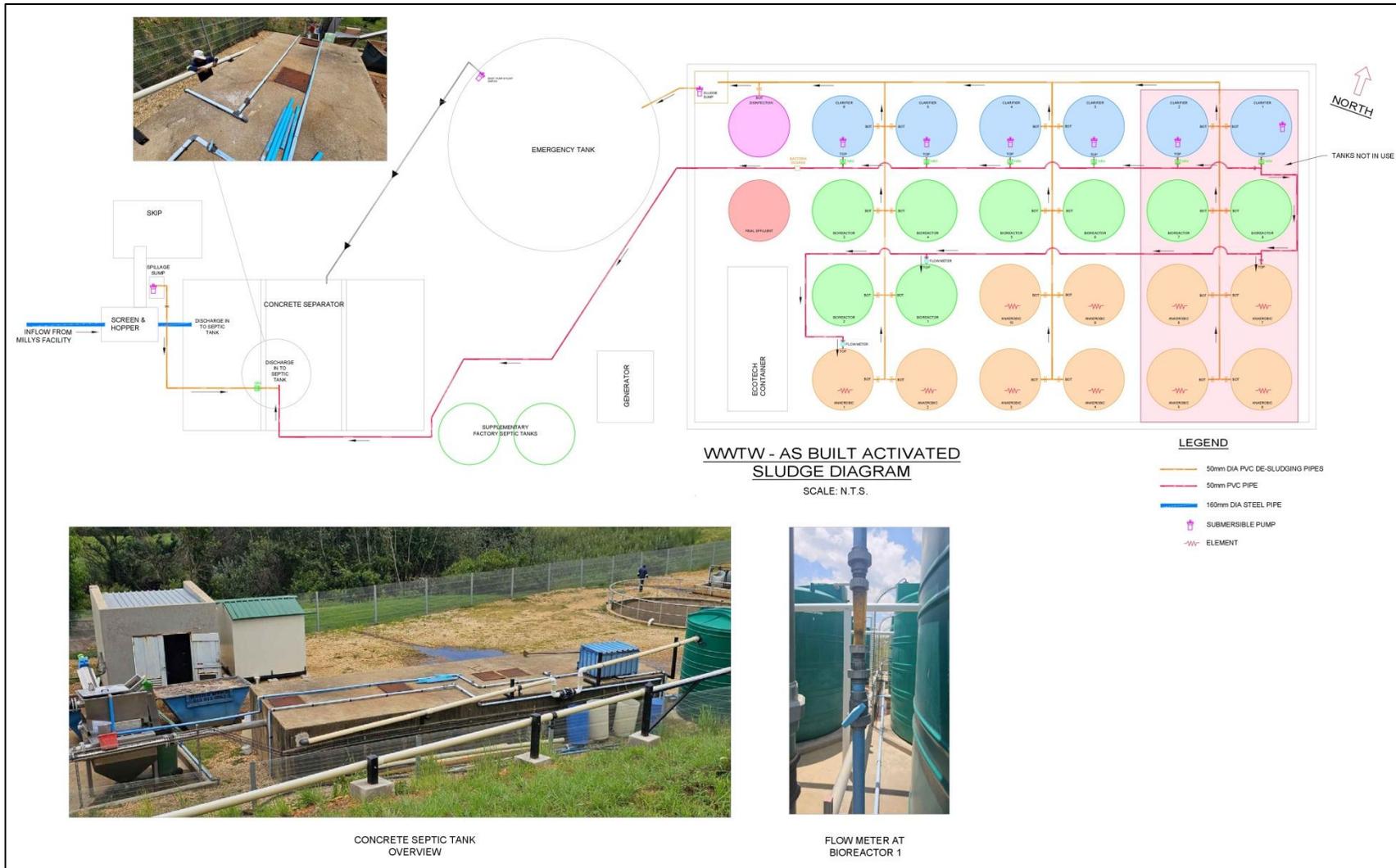


Figure 2-2: Previous approved WWTW sludge flow diagram

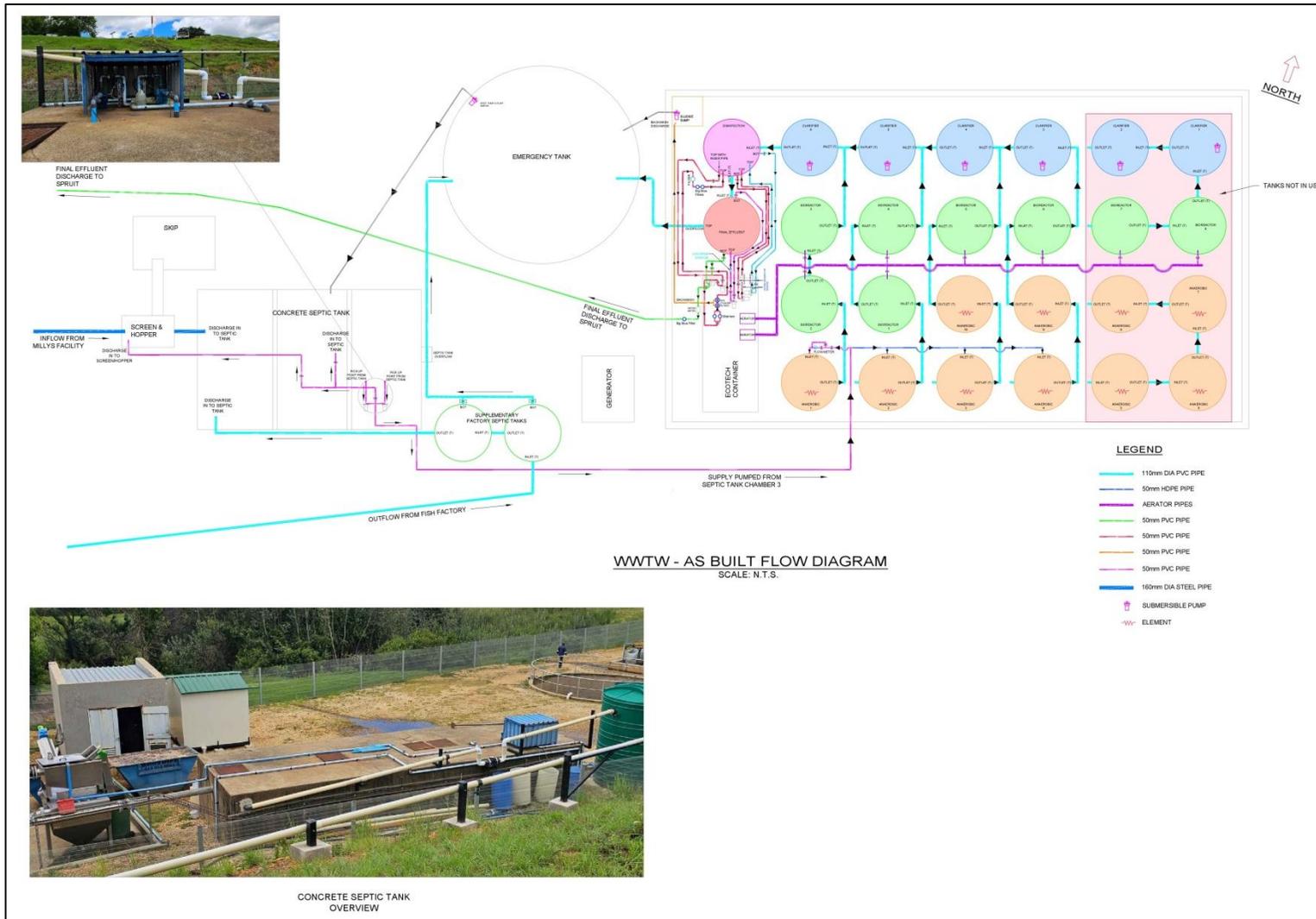


Figure 2-3: Previous approved WWTW piping flow diagram



2.3 IMPLEMENTED WWTW IMPROVEMENTS

Phase 1 and 2 is to affect the necessary changes so that the plant consistently meets general standards. Some of the construction necessary to affect these changes are currently underway or already completed.

Phase 3 is to affect the necessary changes to get the plant to meet special standards and this would require further investigation and or design work which can only be fully scoped once phase 1 and 2 is completed, commissioned and optimised.

The main reasons for the plant not meeting general standards:

1. Inconsistent flow into the plant.
2. Flow was not distributed evenly over the six off mini plants.
3. Incorrect pipe work that meant that raw sewerage was by passing the tanks.
4. Aeration did not take place and the aeration was not distributed evenly over all six mini plants.
5. Sludge return is not taking place.
6. No filtration taking place.
7. Miss management of the operational activities at the plant.
8. No maintenance taking place.

The following is a brief work scope description of phase 1 and 2:

Construct and commission 6 off small mini plants (refer **Figure 2-4** and **Figure 2-5**)

1. Install a manifold system, with flow meters to ensure equal distribution of flow through each of the six mini plants.
2. Install a new piping and a pumping system to ensure constant flow of effluent from the septic tank into the six mini plants.
3. Correct the piping of the plant i.e. correct the bypass of effluent at mini plant no. 1 and the piping after the final clarifiers.
4. Repair the aeration system by, a) repairing broken/disconnected pipes, b) install flow meters to each bioreactor tank, c) converting anoxic tanks to bioreactor tanks, d) repairing and or installing diffusers etc.
5. Installing packing for the growth of bacteria in the bioreactor tanks and the anoxic tanks.
6. Correct the activated sludge return lines.
7. Correct the filtration system.

**Operational requirements needed:**

As mentioned above miss management has contributed to the lack of performance of the plant. The appointed a company by the name of Regen Waters has the necessary skills and expertise to perform the work.

Daily Maintenance:

- Screen waste containers to be checked and removed if full.
- Check that all mechanical Equipment is operational.
- Check bacteria level in bacteria holding tank and mix bacteria.
- Check chlorine level in holding tank and replace if needed.

The above can be performed by the current plant operator (Robert), with the necessary supervision and input from a company like Regen Waters.

Weekly Maintenance:

- Check that all mechanical Equipment is operational.
- Check the timers to ensure that the timing has not changed due to electrical failure.
- Screen waste containers to be checked and removed if full.
- Ensure that flow meters are set to prescribed flow rate.
- Sampling for analysis
- Mechanical/Automated screen – Clean, check and service as required.
- Ensure all mechanical equipment is operational.
- Aerators – Verify that aerators are clear of obstruction and are functioning.
- Ozone Equipment - Measure & record Ozone Generation is to design specifications.
- Dosing Equipment - Measure & record dosing ratio & check bacteria level in bacteria holding tank and mix bacteria.
- Chlorine Dosing Equipment - Measure & record dosing ratio and adjust as required.
- Report back to Astron Energy, Specialist Consultant (Brett Keyser) and Sitanani Energy (Marketer) re operations on site, sampling results, breakages, and any incidents.
- Sludge ratio's - Measure & record sludge levels (both top & bottom Blanket) in each tank.



- Electrical - Check timers are set to correct intervals for the clarifier pumps and test & ensure time is accurate.
- Post maintenance procedures - House Keeping of immediate plant area and control room & dispose of hazardous waste materials.

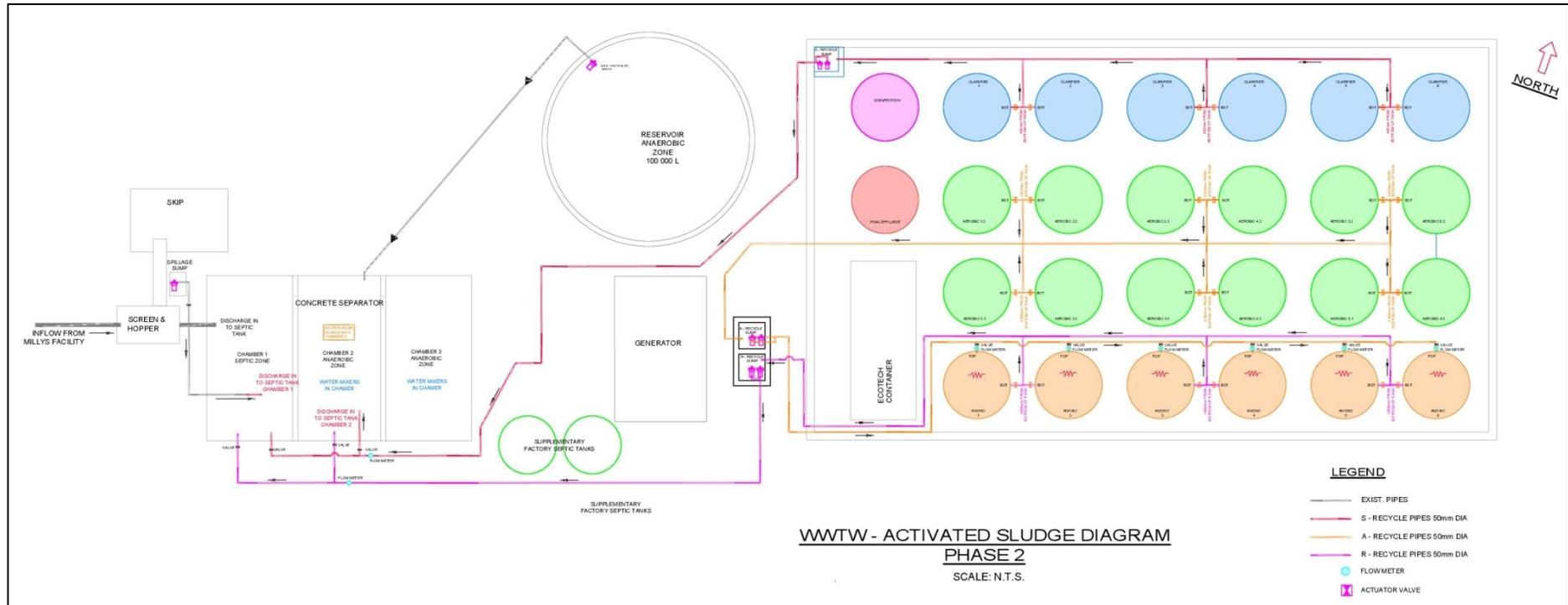


Figure 2-4: New activated sludge flow diagram (phase 2)

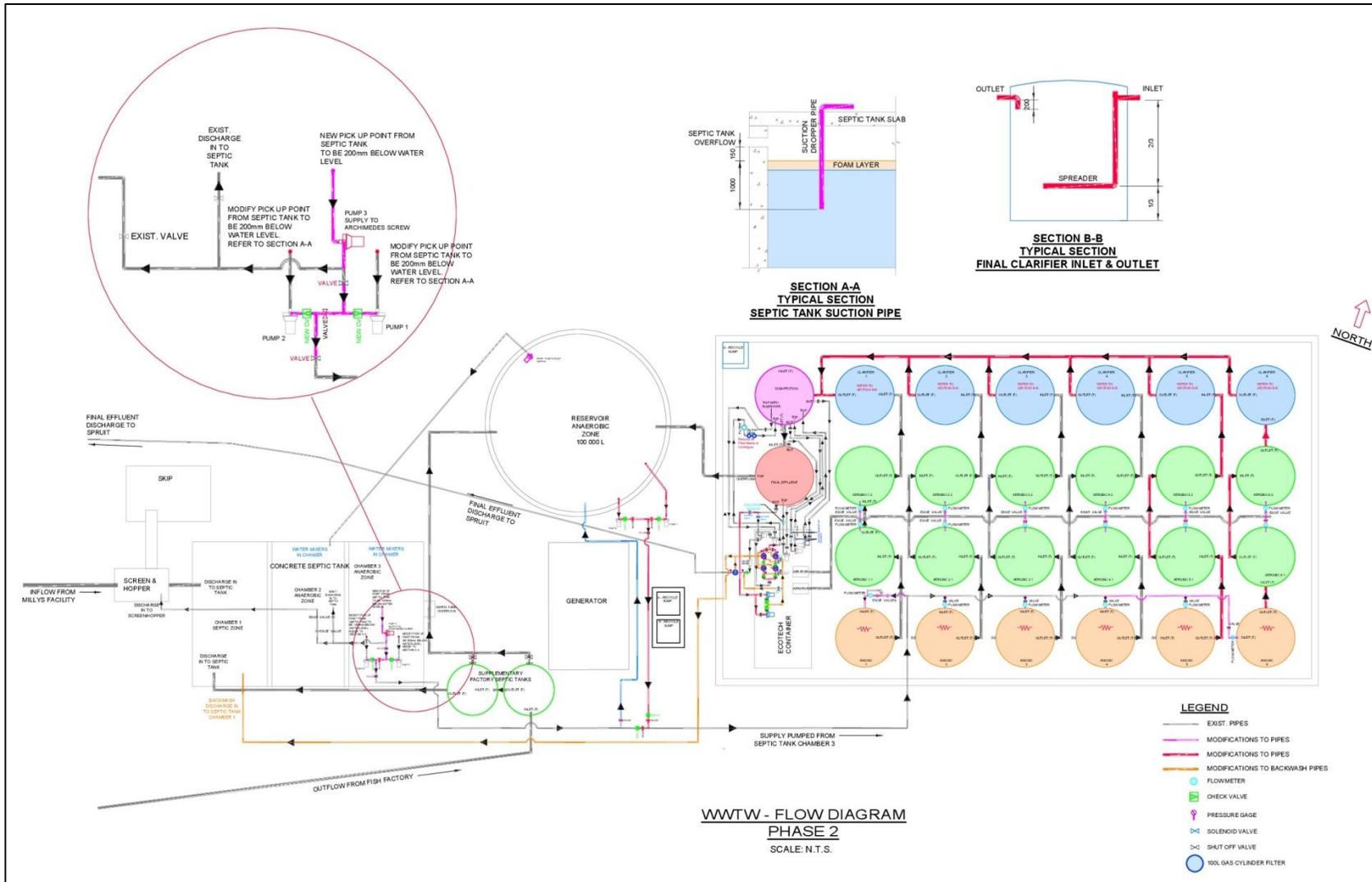


Figure 2-5: New piping flow diagram (phase 2)



2.4 EFFLUENT DISCHARGE

Treated effluent is discharged through a constructed wetland (reed bed system) into the Elands River.

2.5 KEY ACTIVITY RELATED PROCESSES AND PRODUCTS

Sewage waste is created at numerous buildings on the properties in question which is then conveyed to the WWTW for treatment. These buildings include the Astron Energy Star Stop fuel station inclusive of restaurants and convenience stores, Milly's Restaurant and Farm Shop, eight accommodation rooms, a 40-seater conference centre facility, Milly's offices and also a trout processing plant.

The newly proposed infrastructure to be located on Erf 3 Milly's South Township will also be connected to the WWTW.

2.6 ACTIVITY LIFE DESCRIPTION

The life of activities at Milly's Star Stop is mainly determined by product market and socio-economic aspects. If the market and socio-economic aspects allow it, the life of Milly's can be unlimited depending on whether the owner decides to discontinue activities in future.

2.7 WATER AND WASTE MANAGEMENT

2.7.1 PROCESS WATER

Process water for the entire Milly's site is sourced from the DeKroon Dam on site. The total storage volume of the dam is 392 519 m³ (covered under Existing Lawful Use – Ref 363JT/11.) with an average proposed abstraction rate of 69 350 m³ per annum.

2.7.2 POTABLE WATER SUPPLY

Potable water supply is sourced from the De Kroon Dam on site as mentioned above. The use of water will be maximised and recycling should take place as far as possible.

In addition to the surface water abstraction from the De Kroon Dam, a single borehole (RED 228) will be used to supply additional potable water to a volume of 25 638 m³ per annum.



2.7.3 STORM WATER

Effective storm water management exist around the fuel station area to ensure the separation of clean water from dirty water. The wetlands surrounding the property act as a sponge which decreases the flow of water resulting in pollutants contained in water settling out which can then be absorbed by wetland plants. This is evident in the results of Bio-monitoring conducted upstream and downstream of the WWTW. The Bio-monitoring results showed no significant difference between the two monitoring points which indicates that no/minimal pollutants reach the Elands River.

The proposed Milly's South Development inclusive of a filling station and truck overnight parking facilities will implement best practises in terms of stormwater management and will be isolated from "clean" adjacent areas through the development of the SANRAL/TRAC public road for farm access as well as the N4 national road off-ramp infrastructure.

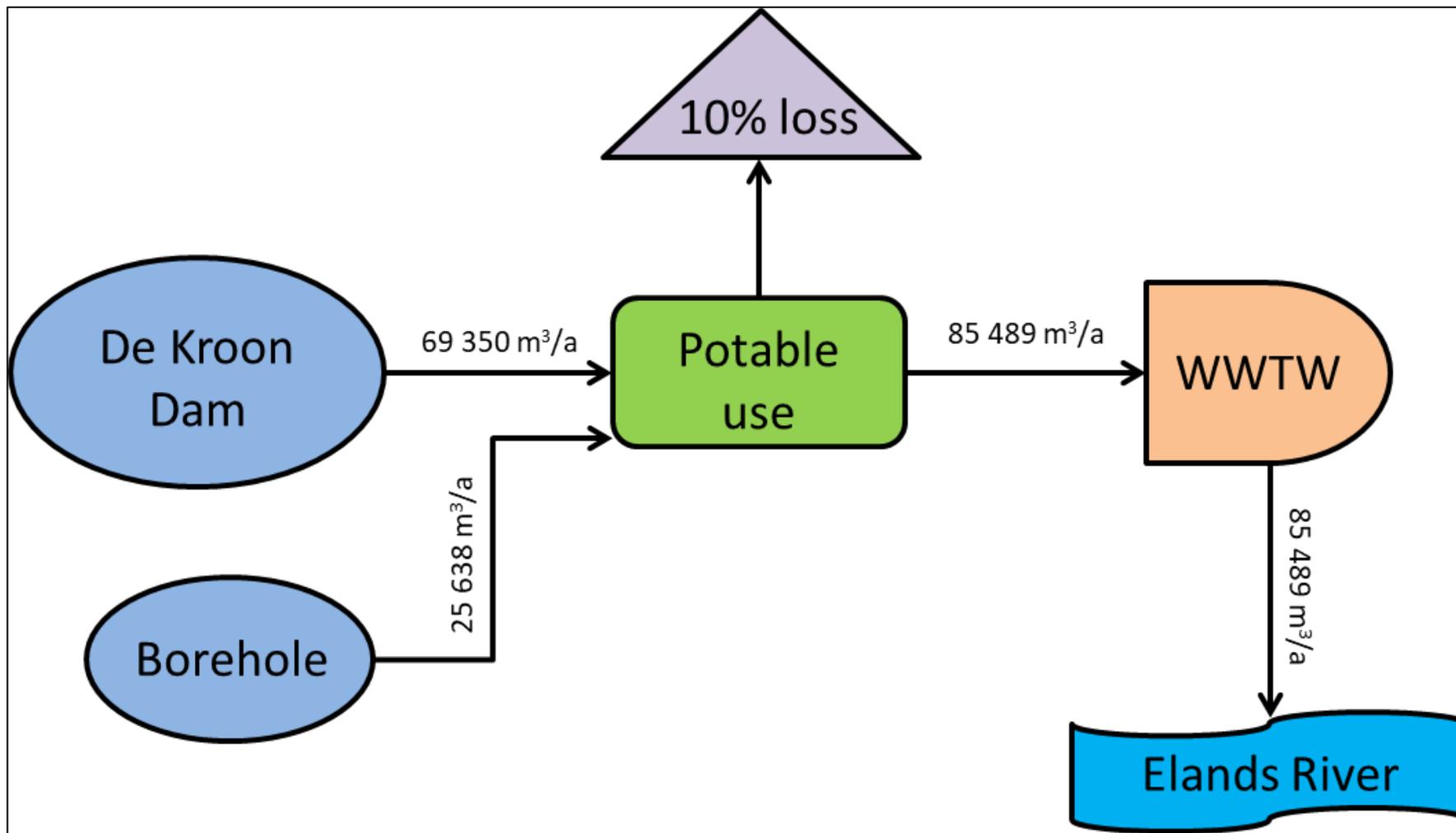


Figure 2-6: Current Conceptual Water Balance (m³/annually)



3 WATER USES

3.1 SECTION 21(A)

The taking of raw surface water from the De Kroon Dam at Milly's has previously been registered under Water Use License 05/X21F/CFCICCIIGAI/7130. However, as result of the site's increasing popularity amongst travellers and subsequent increase in water abstraction the applicant is applying to abstract an increased volume of water equating to 69 350 m³/a (currently authorised volume is 36 500 m³/a).

Table 3-1 indicates the Target Water Quality Range (TWQR) for domestic use as indicated by DWAF (1996a).

Table 3-1: TWQR for Domestic Use (DWAF, 1996a)

Parameter	Target Water Quality Range
pH	6.0 – 9.0
Electrical Conductivity mS/m	0 – 70
Sodium as Na in mg/l	0 – 100
Magnesium as Mg in mg/l	0 – 30
Sulphate as SO ₄ in mg/l	0 – 200
Chloride as Cl in mg/l	0 – 100
Nitrate/Nitrite as N in mg/l	0 – 6
Fluoride as F in mg/l	0 – 1
Feacal coliforms counts/ 100ml	0
E-coli counts/100ml	0 – 1.0
Ammonia as N in mg/l	0 – 1.0

The current and active Water Use License does not include the authorisation of groundwater. As part of the new development, Milly's Star Stop is also applying for the abstraction of groundwater to a maximum volume of 25 638 m³/a from a single borehole (RED 228). To this end, NOA8 Pty Ltd (NOA8) was commissioned by M2 Environmental Connections on behalf of Astron Energy to conduct a hydrogeological assessment. The assessment was completed in June 2025 had the following recommendations to ensure sustainable water management practices:

- The recommended yield is 70 m³ in a 16-hr pumping cycle, which equates to 25 638 m³/a. The borehole should be allowed to recover for at least 8 hours after a 16-hour pumping schedule.



- To protect borehole failure and dewatering, water level should not reach a maximum allowable drawdown of 30 metres.
- If the maximum allowable drawdown is reached, the pumps should be switched off and allowed to recover to 90 % of the static ground water level.
- Daily monitoring of abstraction volumes (preferably with automated flow meters)
- Monthly capturing of groundwater levels in an electronic database, for long-term trend analysis)
- It is recommended to do a comprehensive bi-annual analysis at an accredited laboratory for parameters pH, Electrical Conductivity, total dissolved solids, major anions and cations (Ca, Mg, Na, NO₃, Cl, SO₄,) as well as Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene and Xylene.

3.2 SECTION 21(B)

The storage of water in the De Kroon Dam at Milly's has been active since 1983 and has been verified and validated by the IUCMA under Ref: 363JT/11 with the issuance of a Lawful Water Use Certificate. The current maximum capacity of the De Kroon Dam is listed as 392 519 m³.

3.3 SECTION 21(C) AND (I)

The current and active Water Use License (05/X21F/CFCICCIIGAI/7130) covers several section 21 (c&i) water uses including:

- The existing WWTW located 40m from the Elands River; and
- The De Kroon Dam wall itself;

However, the Existing Service Station Facilities within a surface water regulated area was not included in the previous application and is therefore applied for under the current application.

Additionally, the newly proposed development to be located on Erven 3 Milly's South Township has been found to impede on the 500m regulated area surrounding a wetland and therefore also triggers Section 21 (c&i) water uses.

3.4 SECTION 21(F)

The WWTW at Milly's Star Stop currently discharges treated waste water into the Elands River through a reed bed system under Water Use License 05/X21F/CFCICCIIGAI/7130 Section 21 (f). The current active license allows for discharge up to a maximum volume of 36 500 m³/a. As with the Section 21 (a) abstraction aspect discussed earlier in this



report, and additional 25 915 m³/a is applied for (thus total discharge volume applied for is 62 415 m³/a).

3.5 SECTION 21(G)

The current active license allows for disposal up to a maximum volume of 43 800 m³/a of treated effluent into a reed system adjacent of the Elands River. As with the Section 21 (a) abstraction aspect discussed earlier in this report, and additional 18 615 m³/a is applied for (thus total discharge volume applied for is 62 415 m³/a).

In addition the previously authorised disposal of sludge into the Emergency Holding Tank with a 150 m³ capacity is re-applied for in this current application.

3.6 EXISTING LAWFUL WATER USES

An Existing Lawful Water Use as defined by Section 32 of the National Water Act, 1998 (Act 36 of 1998) as a water use that has taken place at any time during a period of two years immediately before the date of commencement of the Act and was authorised by a law before the date of commencement.

Existing lawful water uses at Milly's Star Stop include the following:

- The storing of water in the De Kroon Dam (Section 21(b) water use).

3.7 RELEVANT EXEMPTIONS

As with the current active license, the following treated effluent discharge limits are applied for again.

Variable (s)	Treated effluent discharge limits
pH	5.5-7.5
Electrical Conductivity	50 mS/m above background receiving water
Nitrates (as N)	1.5 mg/l
Ammonia (as N)	2 mg/l
Chemical Oxygen Demand (COD)	30 mg/l
E-coli (counts/100mf)	0
Orthophosphate (as P)	1.0 mg/l
Suspended solids	10mg/l

**Table 3-2: Summary of water uses and locations**

Water Use Number	Section 21 Water Use	Description	Volume / Length	Location	Property	Notes
Lawful Use – Ref 363JT/11.						
n/a	(b)	Storage of water in De Kroon Dam	392 519 m ³ Capacity	25°41'15.90"S 30°12'37.70"E	Remaining Extent of Portion 11 of the Farm De Kroon 363 JT	Covered under Existing Lawful Use – Ref 363JT/11.
New and additional water uses						
1	(a)	Abstraction from the De Kroon Dam	69 350 m ³ /a	25°41'14.46"S 30°12'44.00"E	Abstraction point on Remaining Extent of Portion 11 of the Farm De Kroon 363 JT Water used on Portion 14 of the Farm De Kroon 363 JT and will also be used on Erf 3 Milly's South Township	Current water use license (05/X21F/CFCICCIIGAI/7130) allows for 36 500 m ³ /a. Additional 32 850 m ³ /a applied for.
2	(a)	Groundwater abstraction for borehole (REB 228)	25 638 m ³ /a	25°41'18.78"S 30°13'1.16"E	Erf 3 Milly's South Township	New application
3	(c) & (i)	Existing Waste Water Treatment Works	40 meters	25°41'12.41"S 30°12'54.92"E	Portion 13 of the Farm De Kroon 363 JT	Covered under current water use license (05/X21F/CFCICCIIGAI/7130) and re-applied for.
4	(c) & (i)	De Kroon Dam, Storage	300 meters	25°41'15.90"S	Remaining Extent of Portion	Covered under current water



Water Use Number	Section 21 Water Use	Description	Volume / Length	Location	Property	Notes
		within 500m of wetland area		30°12'37.70"E	11 of the Farm De Kroon 363 JT	use license (05/X21F/CFCICCIIGAI/7130) and re-applied for.
5	(c) & (i)	Existing Service Station Facilities within surface water regulated area	100 meters	25°41'18.68"S 30°12'44.13"E	Remaining Extent of Portion 14 of the Farm De Kroon 363 JT	New application as ELU cannot be confirmed
6	(c) & (i)	Newly proposed Service Station Facilities within wetland regulated area	300 meters	Start: 25°41'24.71"S 30°12'49.88"E End: 25°41'18.99"S 30°12'57.33"E Center: 25°41'21.71"S 30°12'53.19"E	Erven 3 Milly's South Township	Entire site within regulated area
7	(f)	Discharging treated Waste Water into the Elands River through a reedbed system	85 489.2 m ³ /a	25°41'14.16"S 30°12'50.78"E	Remaining Extent of Portion 11 of the Farm De Kroon 363 JT	Current water use license (05/X21F/CFCICCIIGAI/7130) allows for 36 500 m ³ /a. Additional 48 989.2 m ³ /a applied for.
8	(g)	Disposal of sludge into Emergency Holding Tank	150 m ³ capacity	25°41'12.2"S 30°12'53.9"E	Remaining Extent of Portion 11 and 13 of the Farm De Kroon 363 JT	Covered under current water use license (05/X21F/CFCICCIIGAI/7130)



Water Use Number	Section 21 Water Use	Description	Volume / Length	Location	Property	Notes
						and re-applied for.
9	(g)	Disposal of treated waste water into a reed bed system	0.49 Ha; 85 489.2 m ³ /a	25°41'13.1"S 30°12'49.9"E	Remaining Extent of Portion 11 and 13 of the Farm De Kroon 363 JT	Current water use license (05/X21F/CFICCIIGAI/7130) allows for 43 800 m ³ /a. Additional 41 689.2 m ³ /a applied for.

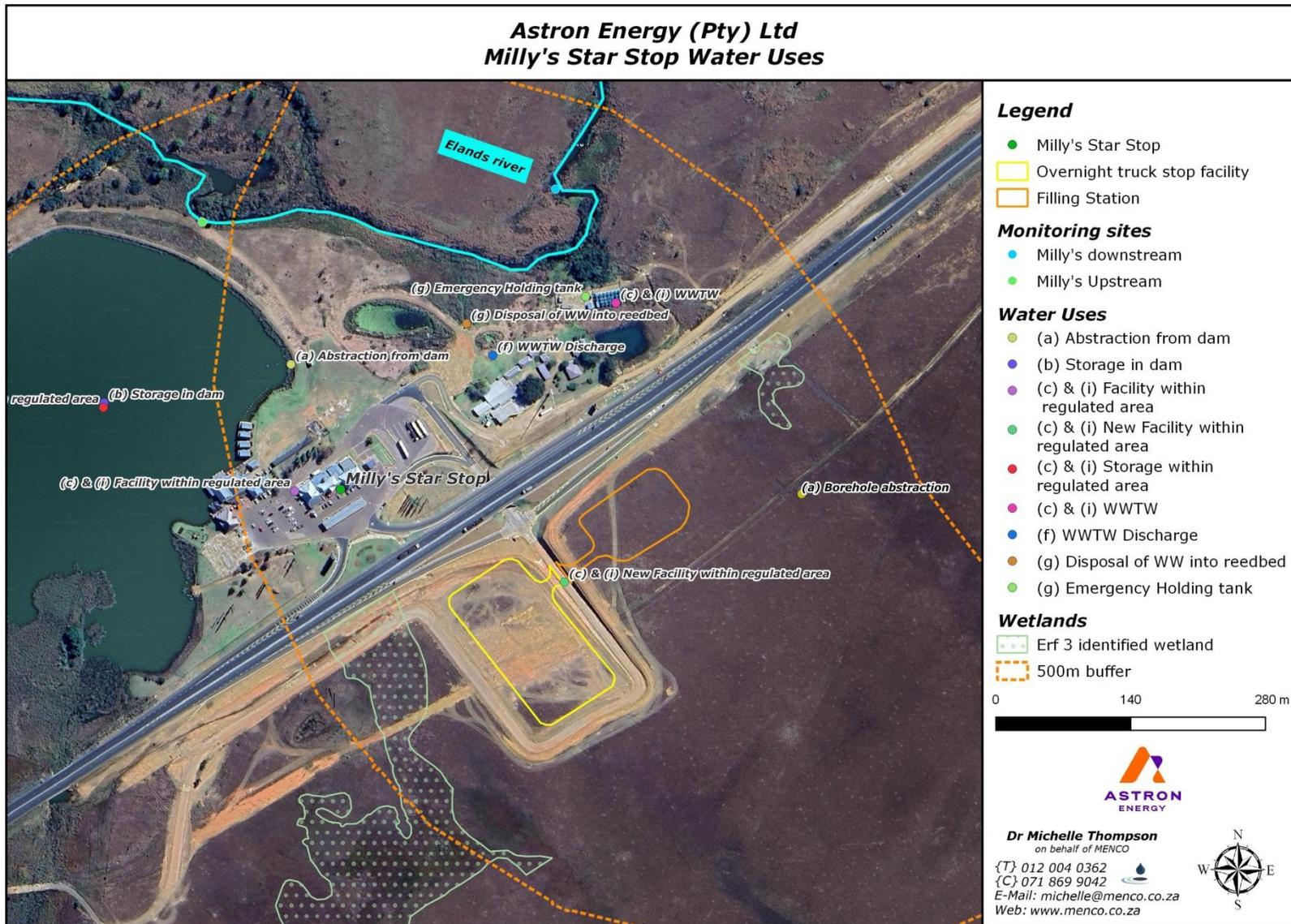


Figure 3-1: Identified Water Uses at Milly's Star Stop



4 RISK ASSESSMENT

This section of the report describes and evaluates the potential impact of the activity on the receiving water environment.

4.1 IMPACT ASSESSMENT CRITERIA

The criteria for the description and assessment of environmental impacts on water resources were provided by the DWS during the recent consultation process followed for proposed amendments to the regulations. This risk assessment key was referenced from the DWS risk based water use authorisation approach and delegated guidelines. The criteria were drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (DEAT, 1998) in terms of the NEMA.

The level of detail as depicted in the DWS Risk-Based Water Use Authorisation Approach and Delegation Guidelines was fine-tuned by assigning specific values to each impact. In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes each aspect was assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. An explanation of the impact assessment criteria is defined in the table below.



Table 4-1: Explanation of the EIA Criteria

Spatial Scale/Extent			
Classification of the physical and spatial scale of the impact			
How big is the area that the aspect is impacting on?			
DWS	NEMA	Description	Class
Area specific	Footprint (F)	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.	1
Whole site	Site (S)	The impact could affect the whole, or a significant portion of the site.	2
Regional / neighbourhood areas	Regional (R)	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.	3
National	National (N)	The impact could have an effect that expands throughout the country (South Africa).	4
Global	International (I)	Where the impact has international ramifications that extend beyond the boundaries of South Africa.	5
Duration			
The lifetime of the impact that is measured in relation to the lifetime of the proposed development.			
How long does the aspect impact on the environment and resource quality?			
DWS	NEMA	Description	Class
1 day – 1 month, PES, EIS and/REC not impacted	Short (ST)	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.	1
1 month – 1 year, PES, EIS and/REC impacted but no change in status	Short to Medium (S-M)	The impact will be relevant through to the end of a construction phase (1.5 years)	2
1 year – 10 years, PES, EIS and/REC	Medium (M)	The impact will last up to the end of the development phases, where	3



impacted to a lower status but it can be improved over this period through mitigation		after it will be entirely negated.	
Life of the activity, PES, EIS and/REC permanently lowered	Long (LT)	The impact will continue or last for the entire operational lifetime i.e. exceed 30 years of the development, but will be mitigated by direct human action or by natural processes thereafter.	4
More than the life of the organisation/facility, PES and EIS scores a E or F	Permanent (P)	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.	5

Probability / Frequency

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.

Activity frequency: How often do you do the specific activity?

Frequency of impact: How often does the activity impact on the environment?

DWS		NEMA		Class
Activity frequency	Impact frequency			
Annually or less	Almost never / almost impossible / >20%	Probable (Pr)	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0 %).	1
6 monthly	Very seldom / highly unlikely / >40%	Possible (Po)	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact	2



			occurring is defined as 25 %.	
Monthly	Infrequent / unlikely / seldom / >60%	Likely (L)	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50 %.	3
Weekly	Often / regularly / likely / possible / >80%	Highly Likely (HL)	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.	4
Daily	Daily / highly likely / definitely / >100%	Definite (D)	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.	5

Magnitude/Intensity/Severity

The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself.

How severe does the aspect impact on the environment and resource quality characteristics (flow regime, Water quality, geomorphology, biota, habitat)?

DWS		NEMA		Class
Insignificant / non-harmful	1	Insignificant (I)		2
Small / potentially harmful	2	Low (L)	The impact alters the affected environment in such a way that the natural processes or functions are not affected.	4
Significant / slightly	3	Moderate	The affected environment is altered,	6



harmful		(M)	but functions and processes continue, albeit in a modified way.	
Great / harmful	4	High (H)	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.	8
Disastrous / extremely harmful and/or wetland(s) involved ¹	5	Very high / Don't know		10
Legal Issues				
How is the activity governed by legislation?				
DWS				
No Legislation				1
Fully covered by legislation (wetlands are legally covered) ²				5
Detection				
How quickly can the impacts/risks of the activity be observed on the environment (water resource quality, characteristics) people and property?				
Immediately				1
Without much effort				2
Need some effort				3
Remote and difficult to observe				4
Covered				5

In order to assess each of these factors for each impact, the following ranking scales will be used.

¹ Where "or wetland(s) are involved" it means the activity is located within the boundary (the temporary, seasonal / permanent zone of the wetland)

² Within the outer edge of the 1 in 100 year flood line or delineated riparian area as measured from the middle of the watercourse measured on both banks, or within a 500 m radius from the boundary of any wetland (The boundary of a wetland is the outer edge of the seasonal or temporary zone as delineated for the wetland)



Table 4-2: Assessment Criteria: Ranking Scales

PROBABILITY		SEVERITY / MAGNITUDE	
Description / Meaning	Score	Description / Meaning	Score
Definite/don't know	5	Very high/don't know	10
Highly likely	4	High	8
Likely	3	Moderate	6
Possible	2	Low	4
Improbable	1	Insignificant	2
DURATION		SPATIAL SCALE / EXTENT	
Description / Meaning	Score	Description / Meaning	Score
Permanent	5	International	5
Long Term	4	National	4
Medium Term	3	Regional	3
Short term	2	Local	2
Temporary	1	Footprint	1/0

Details of the significance of the various impacts identified are presented in **Table 4-5** and **Table 4-6**.

4.2 DETERMINATION OF SIGNIFICANCE

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. The Significance Rating (SR) is determined as follows:

Equation 1:

<p>Consequence = Severity + Spatial Scale + Duration</p> <p>Likelihood = Frequency of activity + Frequency of Incident + Legal Issues + Detection</p> <p>Significance / Risk Rating (SRR) = Consequence x Likelihood</p>

4.3 IDENTIFYING THE POTENTIAL IMPACTS

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned probabilities, resulting in a value for each impact (prior to the implementation of mitigation measures).



In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact.

Table 4-3: Significance Rating Scales without mitigation

Rating	Class	Management Description
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	(M) Moderate Risk	Risk and impact on watercourses are notable and require mitigation measures on a higher level, which costs more and require specialist input. Wetlands are excluded.
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

Table 4-4: Significance Rating scale With Mitigation

SR < 30	Low (L)	The impact is mitigated to the point where it is of limited importance.
30 < SR < 60	Medium (M)	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
SR > 60	High (H)	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

4.4 AREAS OF INFLUENCE

In order to assess the impact of the proposed activities and associated infrastructure on the water resources, various areas of potential impacts have been assessed. The first area is referred to as the "area of direct influence" (ADI), which is the area directly



impacted upon by the WWTW activities. The second area is referred to as the "area of indirect influence" (AII) which includes the broader catchments perspective.

4.4.1 AREA OF DIRECT INFLUENCE

The ADI for water resources is determined by:

- Interception of regulated areas due to the development of the WWTW
- Reduction of base flow feeding the watercourses caused by a surface water abstraction
- Potential for spillage from WWTW and Garage

In terms of the EIA methodology, the spatial extent of the ADI is referred to as "Local" and "Site Specific".

4.4.2 AREA OF INDIRECT INFLUENCE (AII)

The Area of Indirect Influence (AII) is determined by the boundaries of the quaternary drainage area, X21F, with the main emphasis on catchment. In terms of the EIA methodology, the spatial extent of the AII is referred to as "Regional".

4.5 RESULTS OF IMPACT ASSESSMENT

The identified impacts on surface water and groundwater are described and outlined in **Table 4-5** and **Table 4-6**, below.

**Table 4-5: Calculation of severity rating based on the identified impacts**

Nr.	Phases	Activity	Aspect	Impact	Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorphology & Vegetation)	Biota	Severity
1	O	The effect of Milly's Star Stop operations on the surface water quality of the Elands River, De Kroon Spruit and its surrounding wetland areas	Surface Water quality	Pollution of surface water features as result of contaminated storm water runoff from Milly's infrastructure and the WWTW Pollution of surface water features as result of inadequately treated waste water discharged	2	3	3	3	2.75
2	O	The effect of Milly's Star Stop operations on the surface water quantity of water resources in close proximity	Surface Water quantity	Impact on catchment yield as result of Milly's operations	1	2	1	2	1.75



Nr.	Phases	Activity	Aspect	Impact	Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorphology & Vegetation)	Biota	Severity
3	O	The effect of Milly's Star Stop operations on the groundwater quality	Groundwater quality	Pollution of groundwater resources as result of contamination, either by hydrocarbon spills or untreated effluent	1	1	2	1	1.25
4	O	Over abstraction	Groundwater quantity	Fracture dewatering	2	1	1	1	1.25
5	O	Over abstraction	Groundwater quantity	Drawdown of receptor boreholes	2	1	1	1	1.25
6	O	Impact on identified receptor	Interflow	Intercept interflow that sustains hillslope seep wetland	2	1	2	2	7
7	O; C	Erf 3 Milly's South vegetation clearance	Wetland habitat loss	Loss of wetland vegetation and associated functions in hillslope seep wetlands (S2, S3) and valley bottom wetland (S1)	3	3	4	3	3.25

Table 4-6: Calculated Risk Rating based on Consequences and likelihood



Nr.	Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating
1	2.75	3	2	7.75	2	2	5	2	11	85.25	M
2	1.75	3	2	6.75	2	2	5	3	12	81	M
3	1.25	3	2	6.25	2	2	5	3	12	75	M
4	1.25	2	2	5.25	1	2	5	3	11	57.75	M
5	1.25	2	1	4.25	1	2	5	2	10	42.5	L
6	7	1	2	10	1	1	5	1	8	80	M
7	3.25	2	4	9.25	2	3	5	2	12	111	M

Table 4-7: Mitigation and Management Plan

Nr.	Objective	Mitigation	Significance after Mitigation
1	Pollution of surface water features as result of contaminated storm water runoff from Milly's infrastructure and the WWTW Pollution of surface water features as result of inadequately treated waste water discharged into the environment	<ul style="list-style-type: none"> Design water containing structures according to applicable standards Storm water management to divert clean water around Milly's infrastructure must be maintained in order to prevent runoff from becoming contaminated and to maximise the return of clean runoff to the Elands River When possible, monitor the quality of storm water before it is discharged into the environment Enforce appropriate maintenance and management practices to ensure correct functioning of the WWTW and treatment of effluent to acceptable standard 	Low



Nr.	Objective	Mitigation	Significance after Mitigation
		<ul style="list-style-type: none"> • Spills from equipment and other infrastructure must be cleaned immediately • Ensure operation of the WWTW by skilled operators • Emergency standby pumps and contingency measures to retain untreated sewerage will minimise impacts on the environment • Final effluent must be monitored to determine if effluent standards are met • Clearly demarcate construction areas during construction processes and also no-go areas • Enforce appropriate maintenance and management practices to ensure correct functioning of the WWTW and treatment of effluent to acceptable standards 	
2	Impact on catchment yield as result of Milly's operations	<ul style="list-style-type: none"> • Implement effective storm water management to divert clean water around the site to ensure that the dirty footprint is kept to a minimum • Contain all contaminated water in a dedicated design facility to adhere to legislation and to contain a 1:50 year storm event and have a 0.8 m freeboard. • Ensure that all hazardous substances (Oils etc.) are stored in suitable facilities (bund walls / roofs). 	Low
3	Pollution of groundwater resources as result of contamination, either by hydrocarbon spills or untreated effluent	<ul style="list-style-type: none"> • Ensure that pipes are sufficiently protected or of a hard enough material to withstand damage. • Groundwater must be monitored regularly for early detection of possible 	Low



Nr.	Objective	Mitigation	Significance after Mitigation
		<p>pollution occurrence.</p> <ul style="list-style-type: none"> • Ensure that waste water facilities are suitably lined (concrete/cement) and that the lining is maintained during the operational phase • Inspect waste water facilities regularly for early detection of spills/leaks • When effluent is spilled, it must be contained immediately to ensure that it does not spread into the surrounding environment • Hydrocarbon spills emanating from the fuel station area (vehicles/storage/products) should immediately be cleaned up and responsibly disposed of. • Fuel/chemical storage areas should be bounded effectively and applicable safety standards must be adhered to. • All liquid material (Fuel and mechanical oil etc.) must be stored on solid concrete surfaces and must be surrounded by bunds. • Storage containers must be inspected regularly • Sewage effluent emanating from the ablution blocks must be conveyed to the WWTW and treated to acceptable levels before discharge into the environment. 	
4 & 5	Fracture dewatering	<ul style="list-style-type: none"> • The recommended yield is 70 m³ in a 16-hr pumping cycle, which equates to 25 638 m³/a. The borehole should be allowed to recover for at least 8 hours after a 16-hour pumping schedule. • To protect borehole failure and dewatering, water level should not reach a maximum allowable drawdown of 30 metres 	Low



Nr.	Objective	Mitigation	Significance after Mitigation
		<ul style="list-style-type: none"> • If the maximum allowable drawdown is reached, the pumps should be switched off and allowed to recover to 90 % of the static ground water level. • Daily monitoring of abstraction volumes (preferably with automated flow meters) • Monthly capturing of groundwater levels in an electronic database, for long-term trend analysis) • It is recommended to do a comprehensive bi-annual analysis at an accredited laboratory for parameters pH, Electrical Conductivity, total dissolved solids, major anions and cations (Ca, Mg, Na, NO₃, Cl, SO₄,) as well as Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene and Xylene 	
6	Ensure wetland sustainability	<ul style="list-style-type: none"> • Borehole is situated outside of a 30-metre width buffer zone and aligns with Mpumalanga Tourism and Parks Agency (2006) 	Low
7	Loss of wetland vegetation and associated functions in hillslope seep wetlands (S2, S3) and valley bottom wetland (S1) through vegetation clearance at Erf 3 Milly's South	<ul style="list-style-type: none"> • Clearly demarcate all wetland boundaries (S1, S2, S3) as identified in the wetland delineation as strict no-go areas during construction • Maintain a minimum 30m buffer zone from all delineated wetland boundaries as recommended by MTPA (2006) • Minimize development footprint and avoid encroachment into wetland areas and buffer zones • Implement erosion and sediment control measures (silt fences, sediment traps) during vegetation clearance to prevent sedimentation of wetlands 	Low



Nr.	Objective	Mitigation	Significance after Mitigation
		<ul style="list-style-type: none"> • Maintain existing vegetation within buffer zones and wetland areas • Rehabilitate any areas within buffer zones that are inadvertently disturbed with indigenous wetland species • Implement alien invasive plant species management and control program (<i>Acacia dealbata</i>, <i>Pennisetum clandestinum</i>, etc.) • Ensure no dumping of construction materials or waste within wetland areas or buffer zones • Install environmental signage to demarcate wetland no-go areas • Appoint an Environmental Control Officer (ECO) to monitor compliance during construction • Implement storm water management to prevent altered runoff patterns affecting wetland hydrology 	



5 MONITORING AND CONTROL

Inadequately treated waste water discharged into the environment can adversely affect water quality and poses a potential significant risk to the area's water resources. The area on which Milly's Star Stop is located has already been impacted on and it is not foreseen that the upgrade of the WWTW will have any additional negative impacts on the hydrological characteristics of the area. On the contrary, it is expected that water quality in the area will improve as effluent will be more adequately treated. However, sound management practices to prevent and minimise water pollution are fundamental for Milly's operations to be sustainable. Monitoring at Milly's Star Stop is therefore critical in order to take the correct management decisions. The following monitoring system is proposed to provide sound information on the effectiveness of protection measures.

5.1 SURFACE WATER MONITORING

In accordance with the notice of intent to direct issued to Milly's Star Stop by the Inkomati CMA, monitoring points were established 100 m upstream of the WWTW and 100 m downstream of the WWTW within the Elands River. These two points were included a required monitoring points in the current active WUL.

Monitoring of the surface water quality should be conducted and recorded on a monthly basis and should include the variables as specified in **Table 5-1**. Please refer to **Section 1.1.3** for existing surface water quality results at Milly's Star Stop. As stated in the Bio-monitoring and Surface Water Monitoring reports compiled by Menco for the section of the Elands River in close proximity to Milly's Star Stop, the overall water results were of an acceptable quality and able to sustain a diverse biological community.

Table 5-1: Surface Water Quality Monitoring Parameters

Variable	Unit
Chemical Oxygen Demand	mg/L
pH	
Ammonia (ionised and un-ionised) as Nitrogen	mg/L
Nitrate/Nitrite as Nitrogen	mg/L
Electrical Conductivity	mS/m
Ortho-Phosphate as phosphorous	mg/L
E-Coli (per 100ml)	mg/L
Suspended Solids	mg/L



Variable	Unit
Chlorine as Free Chlorine	mg/L
Soap, oil or grease	mg/L

Should any contamination be detected at the compliance monitoring points, Milly's Star Stop must immediately notify the IUCMA after which the source of contamination will be identified and measures for the prevention of the contamination (in the short term and the long term) will be implemented.

5.2 GROUNDWATER MONITORING

As part of the current WULA, a single abstraction borehole is being applied for on Erf 3 Milly's South Township. This borehole will be utilised as a potable water source providing water for the new development. The following monitoring requirements have been recommended in the Geohydrological Assessment (NOA8, 2025):

- Monitor flow in the hillslope valley seep in response to abstraction of borehole REG 228.
- Groundwater level should not reach critical groundwater level of 30 metres below ground level.
- Implementation of a level logger to record when the groundwater level reaches the critical groundwater level and automatically switches off the pump.
- Should the groundwater level reach the critical groundwater level, the borehole shall be allowed to recover to static groundwater level.
- Daily monitoring of abstraction volumes.
- Monthly manual measuring of groundwater levels.

5.3 BIO-MONITORING

Based on the sensitivity of the Elands River, it is suggested that bio-monitoring be conducted on a quarterly basis upstream and downstream of the WWTW. It is recommended that the same monitoring points be used as was used during the initial field survey and as included in the current WUL. These monitoring points are the same points used as the surface water monitoring points and are indicated in **Figure 1-10**.



5.4 WETLAND ASSESSMENT

A wetland assessment was conducted by Menco which covered Portions 11, 13 and 14 of the farm De Kroon 363 JT. The Department has specifically requested that a PES and REC assessment be undertaken for the wetland.

Therefore, this wetland study was conducted in order to:

- Determine the nature and importance of water resources potentially impacted by the service station and related WWTW activities;
- Delineation of areas classified as wetlands;
- Identification of wetland vegetation;
- Functionality and current status of the delineated wetland; and
- Identify practicable mitigation measures to reduce negative impacts on the wetland and indicate how these can be implemented.

As part of the proposed new development located on Erf 3 of Milly's South Township, Wet-Earth compiled a stand-alone Wetland Assessment (2022) during which the following activities were conducted:

- Area description;
- Identification of wetlands;
- Delineation of wetland zones;
- Classification of wetlands;
- An assessment of the Present Ecological State (PES) or integrity of the wetlands;
- An assessment of Ecological Importance and Sensitivity (EIS) of wetlands; and
- Buffer determination.

5.4.1 WETLAND DELINEATION RESULTS - PORTIONS 11, 13 AND 14 OF THE FARM DE KROON 363 JT

The wetland obtained a Class B category in the Present Ecological State (PES) assessment, which indicates that the habitat is largely natural. The Ecological Importance and Sensitivity of the wetland is considered to be high; the wetland was considered ecologically important on a provincial and local scale. The biodiversity of this valley bottom and hillslope wetland system is not sensitive to flow and habitat modifications. The Hydrological Functional and Importance of this wetland is considered to be moderate; the wetland plays a small role in moderating the quantity and quality of water in major rivers. Direct Human Benefits obtained from this wetland is considered to



be a Class D and consisted of uses such as grazing and livestock watering. This wetland contributes little towards the larger community.

Table 5-2: Summarised result for the wetland at Milly's Service station

Quaternary	Coordinates	Wetland	PES	EIS	Confidence	REC
X21F	25°41'27.10"S 30°12'34.85"E	Channelled Valley Bottom	C	Very High	High	B
	25°41'12.04"S 30°12'48.66"E	Hillslope	C	High		

Based on the hydro-geomorphic setting, a channelled valley bottom type wetland was identified in the project area. The hydrological benefits from this wetland are indicated in **Table 5-2**. The channelled valley bottom system is surrounded by farm land and is maintained by rain water precipitation draining the catchment that feeds into the wetland system. Flow within this wetland is therefore predominantly surface flow, generated as a result of rainfall events. The wetland has several functions still intact of which nutrient removal, flow regulation and sediment trapping appears to be most important.

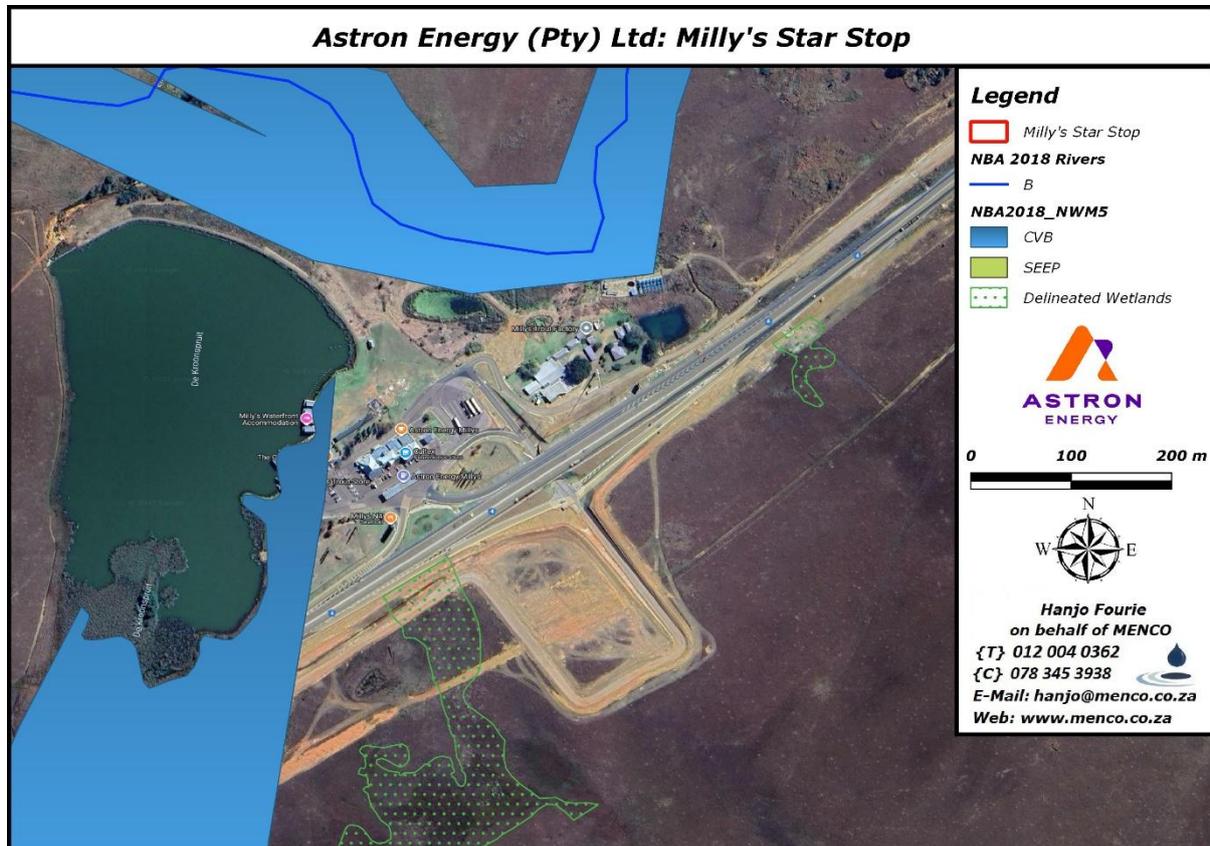


Figure 5-1: Locality of delineated bottom valley wetland with buffer zone



5.4.2 WETLAND DELINEATION RESULTS - ERF 3 OF MILLY'S SOUTH TOWNSHIP

The wetland's catchment is still reasonably intact, with signs of historic agriculture, grazing and trampling, a suspect burning regime and some exotic vegetation. The wetland itself has impacts such as road-crossings, grazing, exotic vegetation, etc. which has resulted in changes to the three components of wetland health assessed. The wetland can, therefore be currently described as having a "C" Category (**Table 5-3**).

It is anticipated that management conditions will stay the same in the near future for all the components assessed, therefore it is expected that conditions will remain stable.

Table 5-3: Summary of present wetland health based on the Wet-Health assessment

Wetland	Ha	Hydrology		Geomorphology		Vegetation	
		Impact Score	Change Score	Impact Score	Change Score	Impact Score	Change Score
Hillslope Seep connected to a stream	0.2	5.0	0	2.2	0	2.9	0
PES Categories		D	→	C	→	C	→
Wetland Impact Score		3.60					
Wetland PES		C					

Ecological Importance and Sensitivity (EIS)

The Ecological Importance and Sensitivity of this wetland is considered to be Moderate (1.2) i.e. important on a local scale. Its biodiversity is not sensitive to flow or habitat modifications. In addition, the presence of good vegetation cover and a variety of species contributes towards its moderate biodiversity.

The Hydro-functional Importance of this wetland is considered to be Moderate (1.4) as it plays a small role in moderating the quantity and quality of water in rivers and wetlands downstream. Unfortunately, the Milly's development downstream limits this potential. Good vegetation cover contributes towards a moderate score in this regard.

The Direct Human Benefits derived are considered to be non-existent Low (0.2). Local people do not depend on many direct benefits from this wetland, although some grazing does take place.

A combined EIS score of 0.9 indicate Marginal (D) conditions.



Buffer Zone recommendations

Buffer zones are strips of undeveloped, typically vegetated land (composed in many cases of riparian habitat or terrestrial plant communities) which separate development or adjacent land uses from aquatic ecosystems (rivers and wetlands). The primary purpose for establishing buffers in this case would be to reduce the potential impact of adjacent land-uses on wetland habitat and for providing this habitat the opportunity to recover and to improve its integrity.

To assess and apply the width of any buffer, it is important to understand the role that buffer zones play in protecting aquatic resources, with associated biota and in mitigating impacts from anthropogenic impacts. Thus, the proposed buffer serves to provide a wide range of buffer functions and values including (MacFarlane, Dickens, & Von Hase, 2009):

- Sediment removal;
- Nutrient removal;
- Toxic removal;
- Control of microclimate and water temperature;
- Provision of habitat for wildlife;
- Screening of adjacent disturbances;
- Habitat connectivity;
- Channel stability and flood attenuation;
- Groundwater recharge; and
- Aesthetic appeal.

Indications are that this wetland is mainly dependent on groundwater which can thus be described as the key driver for the wetland's existence. However, it is also important to take into account the surface water contribution in determining wetland buffer zones. Anthropogenic impacts (agriculture, roads (include management roads and N4 highway), dams, filling station, powerline crossings, etc.) in and around this wetland, emphasises the already increased impacts from the wetland's catchment. To support the wetland's integrity, in an already disturbed environment and with the proposed development still to come, a wetland buffer will be a necessity. However, it should be noted that a wetland surface buffer of 20-30 m is highly unlikely to provide catchment-related hydrology support such as groundwater recharge. Therefore, the identification of mitigation and management measures of the proposed development in the catchment should compensate for the possible loss of catchment support.

It is important to place emphasis on the fact that wetland and or aquatic buffer zones are typically defined from the edge of the identified wetland and/or aquatic resource,



extending outwards, ending at the interface with another land use. Buffers would, therefore, typically be applied from the delineated edge of the wetland.

Several approaches exist in determining buffer widths and the one proposed in this case is the Fixed Width methodology. The fixed-width approach applies a standard buffer width (e.g. 30m) to a resource and typically prohibits any land use within this zone. In this case a generic width is applied regardless of any characteristic of the water resource and/or any biotic requirements. However, no single-size buffer can protect all functions, unless it is extremely large.

A buffer width of 30 m is recommended by the Mpumalanga Tourism and Parks Agency (2006) and is also supported in this case, it will cater for various buffer functions as mentioned above (Macfarlane, et al., 2009).

5.5 WASTE MONITORING

5.5.1 SOLID WASTE

In accordance with the Astron Waste Management Procedure the volume of waste produced at the terminal shall be recorded on a monthly basis or as waste is generated. Terminal waste tracking logs shall be kept for this purpose.

All disposal sites should be inspected twice yearly to ensure the correct disposal and adherence to all legal requirements. Furthermore all contractors and disposal agents, premises and sites should be inspected twice yearly to ensure that all environmental and legal requirements are adhered to. This procedure should be reviewed annually, for efficiency and compliance and updated if required.

The Millys Wastewater Treatment Plant sewage sludge classification report, completed in April 2025 by AqSciScience, presents laboratory analyses conducted in accordance with South African Department of Water and Sanitation guidelines and Water Research Commission standards. The sludge has been classified as A2a, indicating it meets high quality standards suitable for beneficial reuse. The microbiological classification of Class A demonstrates very low pathogen content, with no helminth ova detected and faecal coliform levels of 8,600 CFU per gram dry weight, well within the maximum allowable limit of 10,000 for unrestricted use in agriculture and public contact applications. All heavy metal concentrations including arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc tested significantly below the thresholds for Class 'a' pollutant



status, allowing unrestricted land application without concerns about metal accumulation in soils or crops.

The stability classification of Class 2 indicates moderate biological stability, meaning the organic matter has been partially stabilized though some residual odor and potential for further decomposition may remain. This classification is contingent upon implementing appropriate vector attraction reduction measures on at least a 75th percentile basis, with the report noting that stability issues can be addressed through subsequent management practices. The report highlights that this sludge is appropriate for agricultural use at agronomic rates, land rehabilitation, forestry, composting, and soil conditioning. However, the laboratory analysis identified a chloride concentration of 2.69 percent, which, while not affecting the core classification, warrants consideration in site-specific applications near salt-sensitive crops or in areas where soil salinization is a concern. Overall, the A2a classification confirms this is a high-quality biosolid suitable for beneficial reuse rather than disposal, representing an opportunity for resource recovery from the wastewater treatment process.

5.5.2 WASTE WATER

It is proposed that waste water be monitored on a monthly basis or in accordance with the WUL for the parameters listed below. Samples should be taken of the final waste water at the point of discharge into the environment.

Table 5-4: Waste Water Quality Monitoring Parameters

Variable	Unit
Chemical Oxygen Demand	mg/L
pH	
Ammonia (ionised and un-ionised) as Nitrogen	mg/L
Nitrate/Nitrite as Nitrogen	mg/L
Electrical Conductivity	mS/m
Ortho-Phosphate as phosphorous	mg/L
E-Coli (per 100ml)	mg/L
Suspended Solids	mg/L
Chlorine as Free Chlorine	mg/L
Soap, oil or grease	mg/L



5.6 AUDITING AND REPORTING

Internal and external audits on compliance with the Water Use License will be conducted on an annual basis. Results of both the internal and external audits will be forwarded to the IUCMA.

Internal and external audits will be conducted on compliance to the objectives, measures and goals as outlined in this document.

The most recent External WUL Audit was conducted by Prescali Environmental Consultants (Pty) Ltd (June 2025). Refer to the below information for a summary of the findings:

Non-compliance	Compliance	N/a
13	74	11
98		

1. The operator responsible for maintaining the WWTW is not registered with the Department of Water and Sanitation in terms of Regulation 3630 of 30 June 2023. A recommendation has been made by the auditor to the licensee to initiate the registration process through the Water Institute of Southern Africa (WISA).
2. Proof of calibration of the flow meters at the effluent plant and trout effluent was not available for this audit and the previous audit conducted in 2023. This is a recurring non-compliance.
3. The quality of the water discharged have exceeded the following parameters during the first quarter (2025): EC, Nitrate, Ortho-Phosphate, Ammonia, Suspended solids and Chemical Oxygen Demand.
4. The quantity of water abstracted to date remains unknown. Abstraction records were not made available to the Auditor.
5. During the audit, it was indicated by the licensee's representative that discharge volumes had been noted and captured in a spreadsheet; however, proof of this was not provided to the auditor (X2).
6. During the audit, it was indicated by the licensee's representative that the quantity of water containing waste discharge volumes had been noted and captured in a spreadsheet; however, proof of this was not provided to the auditor.
7. During the audit, it was indicated by the licensee's representative that the Quantity of water discharged to the Elands River had been noted and captured in a spreadsheet; however, proof of this was not provided to the auditor.



8. During the audit, it was indicated by the licensee's representative that quantity of waste authorised to be disposed had been noted and captured in a spreadsheet; however, proof of this was not provided to the auditor.
9. The recorded abstraction volumes were not made available to the auditor, and required reporting to the CEO could not be confirmed (X2).
10. During the audit, it was indicated by the licensee's representative that discharge volumes had been noted and captured in a spreadsheet; however, proof of this was not provided to the auditor.
11. The most recent annual external audit was conducted November 2023. The annual audit should have been conducted in November 2024 but has been postponed numerous times, thus the annual external audit did not take place within the required time frame.



6 PUBLIC CONSULTATION

Current document under Public Review.



7 SECTION 27 MOTIVATION

A Section 27 motivation needs to form part of the water use license application submitted to the DWS. All criteria as specified in the NWA have been considered as contemplated in **Table 7-1**. The Section 27 motivation is included in the Water Use License Application Report (WULAR) and is hereby submitted as stand-alone upon request.

Table 7-1: Section 27 Motivation Criteria

Section	Aspect
5 – 7	The National Water Resource Strategy
27 (1)(e)	The Catchment Management Strategy applicable to the relevant water resource
27 (1)(j)(i)	The quality and quantity of water in the water resource which may be required for the reserve
27 (1)(j)(ii)	The quantity and quality of water in the water resource which may be required for meeting international obligations
27 (1)(g)	The class and the resource quality objectives of the water resource
27 (1)(i)	The strategic importance of the water use to be authorised
27 (1)(a)	Existing Lawful Water Uses (ELU)
27 (1)(f)	The likely effect of the water use to be authorised on the water resource and on other water users
41(3)	Compliance with the requirements contained in regulations made under section 26 of the Environment Conservation Act, 1989 (Act no. 73 of 1989)
41(4)	Comments/objections from stakeholders and interested and affected parties
27 (1)(b)	The need to redress the results of past racial and gender discrimination
27 (1)(c)	Efficient and beneficial use of water in the public interest
27 (1)(d)(i)	The socio-economic impact of the water use or uses if authorised
27 (1)(d)(ii)	The socio-economic impacts of the failure to authorise the water use or uses
27 (1)(h)	The investments already made and to be made by the water user in respect of the water use in question
27 (1)(k)	The probable duration of the undertaking for which a water use is to be authorised



7.1 SECTION 27(A) EXISTING LAWFUL USE

An Existing Lawful Water Use as defined by Section 32 of the National Water Act, 1998 (Act 36 of 1998) as a water use that has taken place at any time during a period of two years immediately before the date of commencement of the Act and was authorised by a law before the date of commencement.

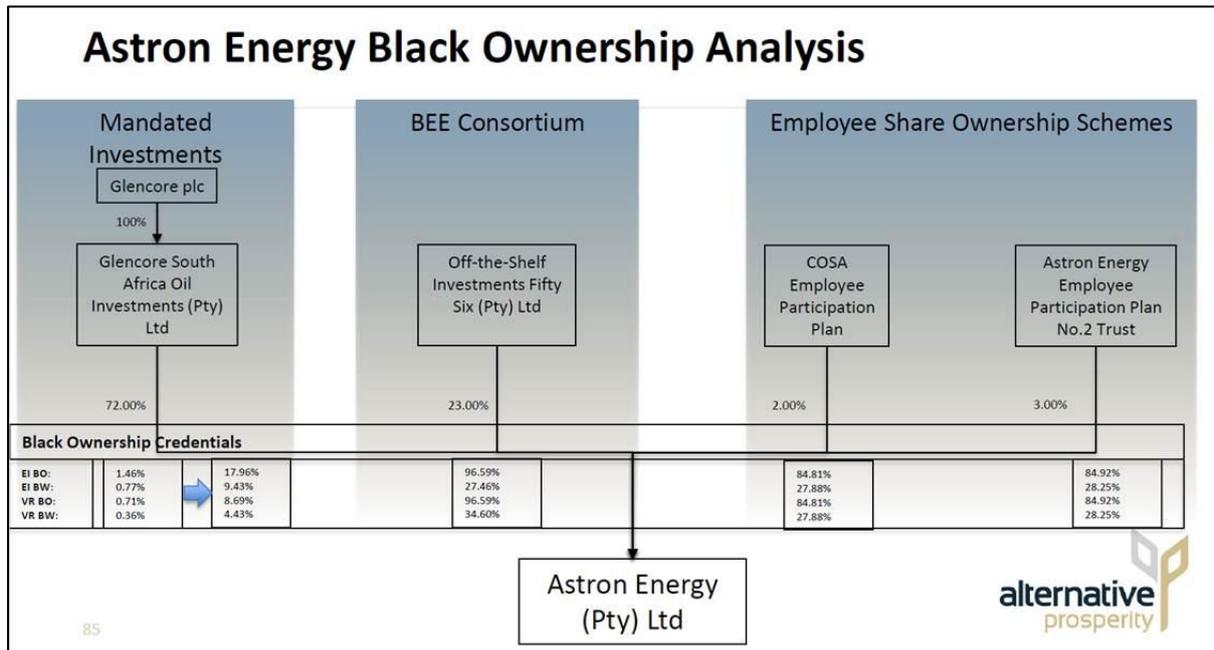
Existing lawful water uses at Milly’s Star Stop include the following:

- The storing of water in the De Kroon Dam (Section 21(b) water use).

7.2 SECTION 27(B) THE NEED TO REDRESS THE RESULTS OF DISCRIMINATION

Astron Energy (Pty) Ltd retains an approved Social Investment Programme which aims to promote sustained economic growth by investing in people, partnerships and performance by focusing on education, health and economic development. The current B-BEE status is as follows:

- Direct Black Shareholding is 28% with 12,55% of that held by Black women.
- Level 1 B-BBEE contributor
- The company employs a large group of individuals of which more than 80% are previously disadvantaged individuals.



7.3 SECTION 27(C) EFFICIENT AND BENEFICIAL USE OF WATER IN THE PUBLIC INTEREST

All of the water uses that are being applied for as discussed in the WULAR will be beneficial in the public interest.

- Section 21 (a): abstracting water from resource: Water abstraction from the De Kroon Dam and the borehole will take place and be used as potable water in the



facilities. Monitoring of the volumes abstracted will be recorded to ensure that the volumes stipulated in the WUL are not exceeded. This abstraction is already authorised under the current license however and additional volume increase is being applied for.

- Section 21(c) & (i): Impeding or diverting the flow of water in a watercourse and Altering the bed, banks, course or characteristics of a watercourse
 - Existing and already licensed WWTW situated within the 100 m buffer zone of the Elands River;
 - Trout Farm situated within the 500 m buffer zone of a wetland;
 - De Kroon Dam is also situated within 500 m of the wetland area,

Regular monitoring (surface water and biomonitoring) will take place, as stipulated in the WUL, to ensure that the activities do not negatively impact the affected water resources. All water uses will be of beneficial use to the public due to monitoring schemes that will be incorporated and set in place to help determine if the associated activities has an impact on the water system. During various site visits it was noted through monitoring that the water quality of the Elands River has been improving.

- Section 21(f) Disposal of treated waste water from the WWTW into the Elands River through a reedbed system.
- Section 21(g) water use: Disposing of waste in a manner which may detrimentally impact on a water resource. The following section 21(g) water uses are relevant:
 - Maturation Pond
 - Existing Waste Water Treatment Works

The current upgrades of the WWTW will be beneficial due to it being able to handle higher volumes of waste water with an improved effluent quality.

7.4 SECTION 27(D)(I) SOCIO-ECONOMIC IMPACT OF THE WATER USES IF APPROVED

The main positive impacts associated with the operations at Milly's Star Stop are summarised below:

- Provision of employment to a number of people during the expansion and operational phase of the WWTW.
- Provision of long-term employment during the operational phase.
- Money paid out locally in the form of the company payroll.
- Money paid to the government in the form of local, regional and national taxes.



- Trout production and thus food contribution (together with an onsite bakery, restaurant, trout stall and Star Stop Shop).
- The outsourcing of service provision to local and regional service providers.
- Milly's is an important stop for tourists, attracting many travellers.

7.5 SECTION 27(D)(II) THE SOCIO-ECONOMIC IMPACT OF THE FAILURE TO AUTHORISE THE WATER USE

All water uses, apart from the increased abstraction volume, are already licensed under the current WUL. The increased abstraction volume being applied for stems from an omission in the previous application whereby water used by the trout factory was not accounted for and thus not applied for.

As the trout factory is operational and currently using water, the currently licensed abstraction volume is being exceeded. If the new application is declined and the increased abstraction volume not authorised, Astron Energy Milly's will be in contravention of the existing WUL and will be unlawful.

7.6 SECTION 27(E) CATCHMENT MANAGEMENT STRATEGY APPLICABLE

According to DWAF (2004b) (also as specified in the National Water Act, Act 36 of 1998) the delegation of water resource management from central government to catchment level will be achieved by establishing Catchment Management Agencies (CMAs) at WMA level. Each CMA has the responsibility to develop a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA.

The CMA relevant to this Water Use License Application is the Inkomati-Usuthu Catchment Management Agency (IUCMA), the first of a total of nineteen CMAs to be formed by the South African Government. As per their website, the Agency was formed to protect, conserve, develop and manage water resources at the Water Management Area level. The central objective of the IUCMA is to ensure that water is used to support equitable and sustainable social and economic transformation and development. The currently implemented CMS is for the period 2023-2028.

7.7 SECTION 27(F) THE LIKELY EFFECT OF THE WATER USE TO BE AUTHORIZED ON THE CATCHMENT

The taking of raw surface water from the De Kroon Dam at Milly's has previously been registered under Water Use License 05/X21F/CFCICCIIGAI/7130. However, as result of the site's increasing popularity amongst travellers and subsequent increase in water



abstraction the applicant is applying to abstract an increased volume of water equating to 69 350 m³/a (currently authorised volume is 36 500 m³/a).

7.8 SECTION 27(G) CLASS AND RESOURCE QUALITY OBJECTIVES OF THE WATER RESOURCE

The ecological status of a river refers to its overall condition of health, i.e. the totality of the features and characteristics of the river and its riparian areas, which manifests in its ability to support a natural array of species. This ability relates directly to the capacity of the system to provide a variety of goods and services. The information reported here refers to the area applicable to the license application and has been derived from the 2016 Ecostatus Report for the Elands River Catchment in the Inkomati-Usuthu Water Management Area.

The in-stream and riparian health for the Elands River near Machadodorp is moderately to largely modified (Category C to C/D). The greatest threat to river health in this region is sewage pollution from poorly maintained wastewater treatment works at Machadodorp and Waterval Boven. These facilities have critical compliance failures, resulting in high nutrient loads and excessive algal growth. Additional threats include invasive alien vegetation (particularly black wattle, eucalyptus, and weeping willow) in the riparian zone, commercial forestry activities, and over-abstraction during drought periods.

The Elands River in Quaternary Catchment X21F has been classified by the Department of Water and Sanitation as having a Present Ecological State (PES) of Class C, indicating a moderately modified river system. To ensure sustainability of this critically important river system and protect endemic fish species, urgent intervention is required to upgrade wastewater treatment infrastructure and manage invasive vegetation.

Table 7-2: RWQO for the relevant Quaternary Catchment

Catchment	River	PESC	EISC	REC
X21F	Elands River	Class C	High	Class C

Table 7-3: Treated Effluent Discharge Limits

Variable (s)	Limit (s)
pH	5.5 – 7.5
Electrical Conductivity	50 mS/m above background receiving water
Nitrates as (N)	1.5 mg/l
Ammonia as (N)	2 mg/l
Chemical Oxygen Demand as (COD)	30 mg/l



<i>E-Coli (Counts/100ml)</i>	0
<i>Orthophosphate as (P)</i>	1.0 mg/l
<i>Suspended Solids (SS)</i>	10 mg/l

The water quality parameters relevant for sampling are presented in **Table 7-4** and provide the required set limits as specified by the IUCMA. These limits must be adhered to in order to be compliant to the X21F catchment reserve. In terms of Milly's Resource Quality Objectives as contemplated in Government Notice 1248 of 10 November 2017 the X21F quaternary drainage area falls under the Ecological Water Requirement (ERW1) as determined at monitoring site X2H074Q01 in the Crocodile East catchment. The Eco-Specs relevant to the catchment is presented in **Table 7-4** together with the IUCMA set Limits.

The X21F catchment is further classified as Water Quality Class III with a PES of Class C and an EIS of high. With reference to the IUCMA set limit for pH, it is clear that the pH should not be rated as a variable of concern as the effluent range is given as 6.5 to 8.0. The table below is used to compare the monthly water quality data to detect any potential increases that might exceed the required limits. It also assists to identify potential impact sources stemming from certain monitoring points.

Table 7-4: Required limits set for the X21F Catchment

Variable (s)	IUCMA Limits	GN 1248 (ERW1) RQO's
<i>pH</i>	5.5 – 7.5	6.5 – 8.0
<i>Electrical Conductivity</i>	50 mS/m	<30 mS/m
<i>Ammonia as (N)</i>	1	1.5
<i>Nitrate as (N)</i>	1.5	<6
<i>Nitrite as (N)</i>	1.5	<6
<i>Chemical Oxygen Demand as (COD)</i>	30	-
<i>Orthophosphate as (P)</i>	2	<0.125
<i>Fluoride</i>	-	1.5
<i>Suspended Solids (SS)</i>	10	-
<i>E-Coli (Counts/100ml)</i>	0	0

In order to identify exceeding variables on the water quality database, a Management Target Range has been implemented to which the set limits by the IUCMA are compared to. This will assist in comparing the monthly data to each other and make for easy identification of impacts sources. **Table 7-5** provides the Management Target Range implemented for Milly's Star Stop.



Table 7-5: Management Target Range

Parameter	Special Limit	Tolerable Target	Unacceptable
pH	5.5 – 7.5	7.6 – 8.0	< 5.4 ; >8.1
Electrical Conductivity	50	50 - 80	80 – 120
Suspended Solids	10	10 - 30	30 – 50
Chloride	120	120 - 150	150 – 180
Nitrate	1.5	1.6 – 5.9	<6
Nitrite	1.5	1.6 – 5.9	<6
Fluoride	0.5	0.6 – 1.5	1.6 – 3.0
Orthophosphate	1.0	1.1 – 2.0	2.1 - 10
Chemical Oxygen Demand	30	30 - 40	40 -55
E. coli	0	0 - 20	20 – 40
Ammonia	2	2 - 4	4 - 8

7.9 SECTION 27(H) INVESTMENTS ALREADY MADE AND TO BE MADE BY THE APPLICANT

Various investments have been made by the applicant in term of appointment of specialists to conduct environmental investigations in support of the Water Use License Application. WULAR, IWWMP together with Bio-monitoring and surface water assessment has been conducted. Water samples have been taken to determine a reference condition which must be maintained during operation of the WWTW. Monthly Surface Water monitoring is taking place as well.

The applicant has also invested in the construction of a new WWTW to ensure better waste water management. This includes complete WWTW Supplies (all tanks, mechanical equipment, construction material), and complete installation of upgraded WWTW by a professional Civil Engineering Company.

7.10 SECTION 27(I) STRATEGIC IMPORTANCE OF THE ACTIVITY

The project entails the management of the WWTW at Milly's to ensure the discharge of adequately treated waste water into the Elands River system. The Elands River is a listed water resource in terms of the General Authorisations (GA's) which means that waste water needs to meet special standards in terms of GN 399 of 26 March 2004 and GN 665 of 6 September 2013 before it is discharged into the environment. These special standards have been set by the Department of Water and Sanitation (DWS) to protect sensitive water resources.



Astron Energy Milly's is currently not complying with the existing WUL by abstracting more water from the De Kroon dam. This increased volume, which is applied for in the new application, is used at the Trout Factory for cleaning and processing.

7.11 SECTION 27(J) QUANTITY OF WATER THAT IS REQUIRED FOR THE RESERVE

The operations taking place at Milly's Star Stop will not have any impact on the reserve as they do not abstract from the Elands River and only use water from the De Kroon Dam which is mainly rain water.

A summary of the quality component for the Rivers at the EWR sites for the Inkomati Catchment is set out in Tables 5.1.1 - 5.3.6 of GN998 of 2019.

A summary of the groundwater contribution to the Reserve for Water Quantity for the Inkomati Catchment is set out in Table 6.1 of GN998 of 2019.

A summary of the groundwater contribution to the Reserve for Water Quality for the Inkomati Catchment is set out in Tables 7.1, 7.2 and 7.3 of GN998 of 2019.

A summary of the Water Quantity & Quality Reserve for selected Wetlands for the Inkomati Catchment is set out in Tables 8.1 and 8.2 GN998 of 2019.

Gazetted into law under GN998 of 2019, the reserve quantity for the area of interest is summarised below:

Node	Water Resource	PES	EIS	TEC	Ecological Reserve (%NMAR)	NMAR (MCM)	BHN Reserve (%NMAR)
X21F-01046	Elands	C	Moderate	C	35.2	35.1	0.17
X21F-01081	Elands	C	High	C	35.5	50.8	

7.12 SECTION 27(K) THE PROBABLE DURATION OF ANY UNDERTAKING FOR WHICH WATER USE IS TO BE AUTHORISED

The life of activities at Milly's Star Stop is mainly determined by product market and socio-economic aspects. If the market and socio-economic aspects allow it, the life of



Milly's can be unlimited depending on whether the owner decides to discontinue activities in future.

Taking this into consideration a license is requested for the maximum period with a review period of every three (3) years.