PROPOSED CLASSES OF WATER RESOURCE AND ASSOCIATED RESOURCE QUALITY OBJECTIVES IN THE THUKELA CATCHMENT

Comments and Responses Register

60 Days Public Commenting Period
(11 March 2022 – 10 May 2022)

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Abbreviations / Acronyms:

DWS	Department of Water and Sanitation
EFZ	Estuarine Functional Zone
GA	General Authorisation
IUA	Integrated Unit of Analysis
MAR	Mean Annual Run-off
MPA	Marine Protected Area
nMAR	Natural Mean Annual Run-off
NTU	Nephelometric Turbidity Unit
PAMSA	Paper Manufacturers Association of South Africa
PMC	Project Management Committee
PSC	Project Steering Committee
QC	Quaternary Catchment
RQOs	Resource Quality Objectives
RU	Resource Unit
WMA	Water Management Area
WQA	Water Quality Analysis
WQC	Water Quality Concentration
WUL	Water Use Licence
WWTWs	Wastewater Treatment Works

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
No	**COMMENTS**	**RESPONSE**
Commentator: Paper Manufacturers Association of South Africa (PAMSA)		
A. General Comments:		
1	The proposed Classes and RQOs for the Thukela catchment do not make provision for a review period, and as it is informed by scientific concepts relating to aquatic and riparian health, the sciences of which are fast-growing and constantly evolving, it is strongly recommended that the Classes and RQOs be established for a limited timeframe, e.g., ten (10) years, following which it can be reviewed and updated with newly gained scientific knowledge. We are aware of the current amendment of the NWA to make provision for such review periods, and therefore it is considered prudent for the proposed RQOs to pre-emptively include review periods so as to not become obsolete once the NWA has been amended.	This was dealt with at the public meetings heal on the 16th and 17th of November 2021, and the Chief Director: Water Ecosystem Management responded that this shortcoming would be dealt with as part of the NWA amendment process. The NWA amendment will include timelines for all classes and RQOs that have already been set, and it is deemed unnecessary, and would in fact not be legislatively correct should this be gazetted prior to the NWA amendment.
2	Overall, the document containing the proposed Classes and RQOs for the Thukela catchment is not well structured, and the numbering of the Tables in the document is inconsistent, duplicated, and confusing. For example, there are more than one Table numbered “Table 1” (see page 4 and page 7), and Table 4 (page 9) is listed before Table 3 (page 18).	This has been corrected.
3	In Table 3 (on pages 18 – 21) it is indicated that for IUA 15.1, where the Sappi Tugela Mill is located, the proposed RQOs for rivers and dams are contained in “Table 20”, while the proposed RQOs for groundwater are contained in “Table 36”. However, Table 20 (on page 123 of the document) refers to the proposed RQOs for groundwater in IUA 8, and not to the proposed RQOs for Rivers and dams in IUA 15.1. There is no Table numbered “Table 36” found anywhere in the document.	This has been corrected.
4	The RQOs for rivers and dams for IUA 15 appear to be contained in Table 11 (page 96 of the document) while the proposed RQOs for groundwater in IUA 15.1 appear to be contained in Table 27 (page 134 of the document).	This has been corrected.
B: Comments on the Proposed Classes for the Thukela Catchment		
5	(1) We note that the proposed Resource Classes are listed in the first table numbered “Table 1” (on page 4).	Agreed

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
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	(2) This Table specifies that the proposed Class for most of the IUs upstream from IUA 4, IUA 13, and IUA 15 are “III”, indicating a water resource that is “significantly altered” from its predevelopment condition.	Agreed
	(3) This Table furthermore specifies that the proposed Resource Classes for IUA 4, IUA 13, and IUA 15, are “II”, indicating a water resource that is only “moderately altered” from its predevelopment condition.	Agreed
	(4) We are of the opinion that it is not possible to designate a downstream location as being of a “better than” or “improved” resource class from the upstream river stretches.	While the water resource class is a designation of the state of an IUA, it is also set to achieve the delicate balance between protection and development, which may in certain instances be that improvements are needed. Setting of the class includes an iterative process of evaluating catchment configuration options (scenarios) where economic, social and ecological trade-offs are made, in collaboration with stakeholders and specialists, as was undertaken for this project. In a large catchment such as the Thukela catchment, there may be areas where development has not occurred for various reasons, and these may be amidst or downstream of Class III resources. It does not mean that these areas should automatically be a Class III, rather the associated RQOs are set to achieve an improvement over time that will maintain the downstream Class II. Several of the IUAs include protected areas, such as the Marine Protected Area (MPA) designation of the Thukela Estuary, and these areas which may have been designated protected areas subsequent to development having taken place, now need a higher level of protection and may need stricter RQOs to achieve this, and are therefore, based on specialist inputs, designated as Class II resources.

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
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	(5) We therefore propose that the Resource Classes for IUA 4, IUA 13, and IUA 15 be aligned with the upstream classes, and be designated as Class III, alternatively that the upstream classes be changed to Class II, and the downstream classes for IUA 4, IUA 13, and IUA 15 be set as Class III.	While the water resource class is a designation of the state of an IUA, it is also set to achieve the delicate balance between protection and development, which may in certain instances be that improvements are needed. Setting of the class includes an iterative process of evaluating catchment configuration options (scenarios) where economic, social and ecological trade-offs are made, in collaboration with stakeholders and specialists, as was undertaken for this project. In a large catchment such as the Thukela catchment, there may be areas where development has not occurred for various reasons, and these may be amidst or downstream of Class III resources. It does not mean that these areas should automatically be a Class III, rather the associated RQOs are set to achieve an improvement over time that will maintain the downstream Class II. Several of the IUAs include protected areas, such as the Marine Protected Area (MPA) designation of the Thukela Estuary, and these areas which may have been designated protected areas subsequent to development having taken place, now need a higher level of protection and may need stricter RQOs to achieve this, and are therefore, based on specialist inputs, designated as Class II resources.
C. Comments on the Proposed RQOs for the Quality of Rivers and Dams for IUA 15		

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
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6	(1) Unfortunately, the proposed RQO and limit values for the Quality of Rivers and Dams for the Upper Thukela estuary (IUA 15.1) as contained in Table 11 (page 96 of the document) did not take cognisance of the following scientific veracities: (a) A middle or upper estuarine environment is regularly influenced by tidal influences from the ocean, resulting in much higher salt and nutrient content than the fresher water higher upstream. (b) Rivers, before they are diluted by the enormous body of ocean water, have generally high concentrations of many chemical elements needed by plants and animals to build their tissues. Organic particulates draining from the land tend to be sedimented out in the estuary. Their breakdown on the muddy bottoms recycles these elements and nutrients to the estuarine communities of organisms. (c) The mixing of seawater and fresh water in estuaries provide high levels of salts and nutrients, both in the water column and in sediment, making estuaries among the most productive natural terrestrial and aquatic habitats in the world. (d) Truly estuarine species are those that complete their whole life cycle within the transitional waters where saline and fresh water become mixed. Species permanently dwelling there are mostly hardy, stress-tolerant species able to handle salinity fluctuations and high suspended solid levels, as well as additional stresses during temporary emersion at low tide, such as exposure to air, dehydration and temperature variations. Not many species can perform well under such conditions.	It is noted that (IUA 15.1) referred to should be RU 15.1. This is the upper resource unit of Integrated Unit of Analysis (IUA) 15: Thukela Estuary and lower Thukela Reach. It is noted that the aspects described in point (1) (a – f) in the adjacent column are descriptions of the possible estuarine conditions that would occur in RU 15.2, the estuarine component of the Thukela River. Resource Unit (RU) 15.1 lower boundary is approximately 12.7km upstream of the Estuary Mouth, approximately 4 km upstream of the upper boundary of the Estuarine Functional Zone (EFZ) described in the National Biodiversity Assessment of 2018 (van Niekerk et al. 2019[1]) which recognises the upper boundary as being 8.7km from the estuary mouth. This is the same boundary used in the uThukela MPA in terms of Section 22A of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) at GPS point 29°11'59.1" S, 31°25'27.1" E (which corresponds with -29.199736, 31.424198 as defined in the Government Gazette No. 42478, 2019). The river in RU15.1 is therefore seen as river (fresh) water, and it is not estuarine water. There is no mixing that takes place in this RU.

[1] Van Niekerk, L., Adams, J.B., Lamberth, S.J., MacKay, C.F., Taljaard, S., Turpie, J.K., Weerts S.P. & Raimondo, D.C., 2019 (eds). *South African National Biodiversity Assessment 2018: Technical Report. Volume 3: Estuarine Realm*. CSIR report number CSIR/SPLA/EM/EXP/2019/0062/A. South African National Biodiversity Institute, Pretoria. Report No. SANBI/NAT/NBA2018/2019/Vol3/A.http://hdl.handle.net/20.500.12143/6373.

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
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	(e) Estuarine ecosystems are thus characterised by relatively low species diversity compared to freshwater or full salinity conditions. Along the estuary, from head to mouth, freshwater species become rarer as salinity increases, and are gradually replaced by marine organisms in the lower estuarine reaches, with some truly estuarine species found only at intermediate salinities. This pattern is reflected by the overall species richness, where the least diverse fauna is found in the middle estuary zone. (f) Aquatic species often migrate between the fresh water and saline reaches of an estuary, and for some species, these reaches are critical for their life cycles. For example, fish species such as the dusky sleeper (*Eleotris fusca*) and the near-threatened golden sleeper (*Hypseleotris cyprinoides*) are only found in lowland rivers such as the Tugela and need a higher salt content for their juvenile stages. They are therefore considered as an important indicator species for monitoring natural biodiversity within the ecosystem. The estuary head waters are of particular importance as nursery areas for young estuary and marine-spawned fishes in temperate climates, such as in the Tugela Estuary.	
7	(2) The following are of particular note with regard to the proposed RQO and limit values for the Quality of Rivers and Dams for the Upper Thukela estuary (IUA 15.1) as contained in Table 11 (page 96 of the document):	It is noted that (IUA 15.1) referred to should be RU 15.1. This is the upper resource unit of Integrated Unit of Analysis (IUA) 15: Thukela Estuary and lower Thukela Reach.

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
No	**COMMENTS**	**RESPONSE**
7.1	(a) The limit values proposed as RQO for Total Dissolved Solids (“TDS”) for IUA 15.1 of 500 mg/ℓ is not appropriate for an upper estuarine environment which is regularly influenced by tides, and where the higher salinity is necessary for the spawning of estuarine species. Moreover, the comparable TDS value in the General Authorisations (“GAs”) for fresh surface water (derived from an approximation of the Electrical Conductivity (“EC”) of 150 mS/m specified in the GA or the discharge of effluent into a surface water resource), is 1,050 mg/ℓ. The proposed RQO limit value will therefore cause both a legal conundrum and will lead to harmful effects on estuarine species.	As described in the response to comment 6, RU 15.1 is not estuarine. RU15.1 boundary is upstream of the Estuary upper boundary, so is seen as a freshwater system. The data collected at the John Ross Bridge (coordinates: -29.1733; 31.43847) for the period December 2014 to May 2018 indicate a 95% electrical conductivity of 28.6 mS/m equating to a total dissolved solids concentration of 186 mg/L, using a factor of 6.5.
7.2	(b) The low limit values proposed as RQOs for chloride and sodium are therefore also not appropriate for an upper estuarine environment which is regularly influenced by tides, and where the higher salinity is necessary for the spawning of estuarine species, as both these salts are present in high concentrations in such environments. For example, the current average background concentration of sodium in the Upper Thukela Estuary is 260 mg/ℓ, and the limit value of 115 mg/ℓ specified for the Mandini River will therefore have a detrimental impact on the aquatic environment of the Upper Thukela Estuary. It is simply non-sensical to specify limit values for sodium and chloride for an estuary influenced by the natural influence of seawater with extremely high levels of these two variables.	As described in the response to comment 6, RU 15.1 is not estuarine. RU15.1 boundary is upstream of the Estuary upper boundary, so is seen as a freshwater system.
7.3	(c) As discussed under paragraph C above, established science shows that healthy estuarine environments require higher levels of nutrients for proper functioning. It is therefore quite peculiar that the RQOs and numerical limit values specified for the nutrient levels, orthophosphate and total inorganic nitrogen, are much lower than the limit values for the same nutrients listed under the GAs, which will cause a legal conundrum and contradiction, should these proposed RQOs be implemented.	RQOs are not necessarily aligned to the General Authorisation (GA) limits. GA limits, as well as any Water Use Licence limits may need to be reviewed in light of the RQOs that have been set. Such a review would be undertaken should the contaminant load at the monitoring site at the downstream point of the RU be greater than the load that could be expected if the RQO was being met, and if this is the case then the contributing water users may need to implement stricter measures to improve effluent discharge quality.
7.4	(d) Due to the higher nutrient loads and the inflow- and outflow processes taking place in estuaries, the turbidity of estuaries is quite high, and a high turbidity (high levels of suspended solids) is necessary for the proper ecological functioning of the estuary. The low limit values proposed as RQOs for turbidity are therefore also not	RQOs are not necessarily aligned to the General Authorisation (GA) limits. GA limits, as well as any Water Use Licence limits may need to be reviewed in light of the RQOs that have been set. Such a review would be undertaken should the contaminant load at the monitoring site at the downstream point of the RU be

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
No	**COMMENTS**	**RESPONSE**
	defendable from a scientific perspective. Furthermore, it is scientifically more accurate to measure suspended solids rather than to use an estimate for turbidity, and the limit value for turbidity should therefore be replaced with a lower and upper limit value range for suspended solids that will reflect healthy estuarine aquatic conditions. Such a limit value range for suspended solids could be set at between 100 – 500 mg/ℓ.	greater than the load that could be expected if the RQO was being met, and if this is the case then the contributing water users may need to implement stricter measures to improve effluent discharge quality. Originally the RQOs indicated that turbidity and TSS should not exceed 20 NTU and 20 mg/L, respectively, and Secchi (or clarity tube) depth should exceed 20 cm. However, an analysis of DWAF (2004) and Sappi reports for the period 2010 to 2016 show that turbidity ranges from 3.0 to 281 NTU, only a small fraction of measurements were lower than 20 NTU, and there was no clear link to high and low flows. There were no clear links between turbidity and salinity during samplings sessions in May 1996, August 2001 and February 2002 (DWAF 2004). Strong winds are also likely to suspend fine sediments in water that is less than 2 m deep. Considering the uMzimvubu RQOs it is necessary to provide a rather generic description as the river and estuary are naturally turbid, so it is necessary to maintain the turbidity within a range that is suitable for the TEC. In this respect, amendments have been made as follows: no RQOs are set for TSS, and the turbidity has been amended to read: Must not deviate more than 10% from background levels.
7.5	(e) None of the limit values proposed as RQOs for the so-called “toxicants” (ammonia (0.1 mg/ℓ) and the heavy metals aluminium (0.105 mg/ℓ), manganese (0.15 mg/ℓ), iron (0.1 mg/ℓ), lead (0.0095 mg/ℓ), copper (0.0073 mg/ℓ), nickel (0.07 mg/ℓ), cobalt (0.05 mg/ℓ), and zinc (0.002 mg/ℓ)) correlate with the values for the same variables listed in the GAs. The proposed values seem to be calculated arbitrarily.	RQOs are not necessarily aligned to the General Authorisation (GA) limits. GA limits, as well as any Water Use Licence limits may need to be reviewed in light of the RQOs that have been set. Such a review would be undertaken should the contaminant load at the monitoring site at the downstream point of the RU be greater than the load that could be expected if the RQO was being met, and if this is the case then the contributing water users may need to implement stricter measures to improve effluent discharge quality. The values were calculated in conjunction with the fish and macroinvertebrate specialists and considering historic and recent data for the site.
7.6	(f) With regard to temperature, it appears that the drafters of the proposed RQOs did not take cognisance of the fact that the Thukela Estuary is located in a hot	Considering the temperature range proposed for the RU15.2 (the estuary component in the MPA), the following is relevant:

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
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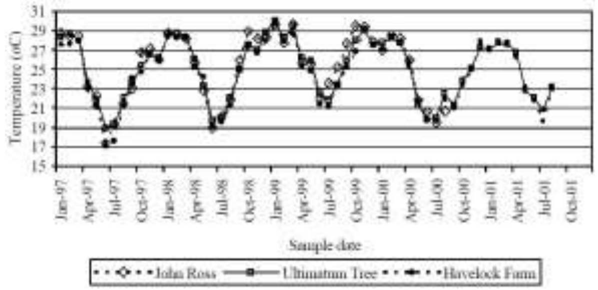
	and humid climate, with background water temperatures averaging 38°C (long term Sappi data, can be made available if necessary). This high water temperature is required and necessary for the reproduction of a number of estuarine fish and macro-invertebrates. The proposed limit value range of 17 – 30°C is therefore not indicative of the natural conditions in a sub-tropical estuary.	Water temperature, based on the January 1997 to October 2001 dataset (DWAF 2004) and subsequent Sappi reports, shows a very strong seasonal pattern with temperatures reaching a maximum of 30ºC during summer and 17ºC in winter.  Fig 6.1 Source - DWAF (2004) However, there have been a number of anomalies: 1) temperatures exceeding 30ºC: such as 33ºC measured at Ultimatum Tree in 2012 (high flow), 36.5ºC at John Ross Bridge in 2010 (high flow) and 36.2ºC just upstream of the N2 Bridge (low flow) 2) temperatures <17ºC: such as 15.5ºC at Mandini Weir in 2006 (low flow) and 16.6ºC at John Ross Bridge in 2006 (low flow). RQOs: Given this range, the temperatures for the estuary and river up to Mandini should fall within the 17ºC to 30ºC range with <5% of measurements outside of this range within a given year.
7.7	(g) It is unclear as to why *Escherichia coli* ("*E. coli*") is used as the indicator for pathogens in rivers and dams, instead of Total coliforms, which is used as indicator for pathogens in groundwater in Table 27 (see paragraph D below). This is a significant inconsistency.	The inclusion of Total coliforms for groundwater was a mistake and has been rectified.
7.8	Furthermore, *E coli* is typically used as indicator for the suitability of water treated for human consumption and serves as a specific indicator of human faecal contamination with associated human health risk, and not as an indicator of the	The use of *Escherichia coli* as an indicator is based on the fact that communities do use river water for domestic use, and due to the concern around poorly

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
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	health of a natural water body. As the measurement of Total (faecal) coliforms will also provide information on algal growth (indicating resource health) as well as treatment efficiency, which the measurement of *E. coli* alone does not provide, Total (faecal) coliforms should be the variable specified as an RQO for rivers and dams, not *E. coli*. The limit value for Total (faecal) coliforms should furthermore be the same as that specified in the GAs, namely 1,000 counts/100 mℓ water, instead of the arbitrary value of 130 counts/100 mℓ water for *E. coli* as currently contained in the Notice.	performing domestic wastewater treatment works, it is important to identify faecal contamination, where faecal coliforms are not all of faecal origin. The limit of 130 counts per 100mL is related to domestic use and the impacts for full-contact recreational use and downstream domestic use proposed in the South African Water Quality Guidelines for domestic use and recreational use[2]. The term CFU has been replaced by 'counts'
D. Comments on the Proposed RQOs for groundwater quality for IUA 15		
8	(1) The proposed descriptive RQOs for groundwater quality as contained in Table 27 (page 134 of the document) is specified as "*groundwater quality must not deteriorate further, to safeguard human health*". This descriptive RQO is based on a scientifically flawed assumption that the quality of groundwater is "suitable" to be consumed by humans in the first place. It is a basic principle of hydrogeology that the quality of groundwater is invariably influenced by the host rock through which it moves and is often naturally brackish or could contain naturally high levels of substances that could be potentially harmful to people.	Agreed, however the assessment is done per Quaternary Catchment (QC) that includes more than one primary host rock types. The water quality differentiation/ classification was based on the assessment done for the 2009 Reserve Study by DWAF. The contribution of these aquifers to the total water budget as per Borehole Yield Classification (BYC) is low to inTOTALsignificant. Amendments have been made to the RQO to read only: Groundwater quality must not deteriorate further.
9	(2) Natural hydrogeochemical processes that take place as water moves through the host rock from recharge to discharge areas will influence groundwater quality. Large parts of the Thukela Estuary basin are underlain by the Dwyka and Ecca Groups of the Karoo Supergroup. The Dwyka diamictites were deposited under marine conditions, while the Ecca Group deposits occurred in marine influenced deltaic environments. The Karoo formations have been extensively intruded by dolerites. The hydrogeochemical characteristics of these formations include the following:	We expect that due to high rainfall flushing of these Karoo aquifers are possible over millennia. There are cases where groundwater in the Dwyka Group falls in Good (Class 1) and Marginal (Class 2) water classification. Regarding points (a) to (c), these are regarded as point sources and were identified in the groundwater Reserve study (DWAF, 2009) as "hotspots" throughout the Thukela Catchment, however, the water quality concentration (WQC) and RQO limitations are based for Quaternary Catchment level and these sites are regarded as "site specific" cases. QCs where these "hotspots" were

[2] Department of Water Affairs and Forestry, 1996. South African Water Quality Guidelines (second edition), Volumes 1 and 2, Domestic and Recreational Use respectively

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
No	**COMMENTS**	**RESPONSE**
	(a) Formations deposited under marine conditions will have naturally high chloride and sodium concentrations. The background Electrical Conductivity ("EC") in aquifers associated with the diamictites of the Dwyka Group can easily reach levels of up to 1,000 mS/m (which converts to a TDS of up to 7,000 mg/ℓ), while aquifers associated with the Ecca Group can have an EC of 500 mS/m (which converts to a TDS of up to 3,500 mg/ℓ). (b) The weathering of dolerite results in the release of calcium, magnesium, sodium, and fluoride into the groundwater. (c) In certain areas of the Karoo, NO3 and NO2 levels of between 21–50 mg/ ℓ (as N) have been measured by the DWS, as well as high background sulphate concentrations,12 while in some of the Karoo deposits, elevated levels of arsenic and uranium have been observed.	mapped previously are indicated in the tables in the RQO Report (RDM/WMA04/00/CON/CLA/0221). We agree with the comment/advice re water quality of dolorite-type aquifers, however, according to the hydrogeological information available, these aquifer systems are rather isolated and not regional to conclude that a whole QC will have "dolerite water quality characteristics".
10	(3) The numerical limits specified in the proposed RQOs for groundwater include values for pH (5.5 – 9.5), Total Alkalinity (250 mg/ℓ), Total Dissolved Solids (450 mg/ℓ), Sodium (100 mg/ℓ), Chloride (100 mg/ℓ), Sulphate (200 mg/ℓ), Nitrate (6 mg/ℓ), Fluoride (0.7 mg/ℓ), Arsenic (0.05 mg/ℓ), Dissolved Iron (0.2 mg/ℓ), Dissolved Manganese (0.4 mg/ℓ), and Total coliforms (10 counts/100 mℓ). It appears that these limit values were derived from the SANS 241 Drinking Water Standard,15,16 established by Standards South Africa. This standard specifies the criteria for potable water, at the point of delivery (typically after treatment). Considering the abovementioned scientific veracities relating to aquifers associated with the Karoo deposits, it does not make any scientific sense to set a limit value based on the expectation that groundwater occurring in marine-based aquifers should meet drinking water standards. As for surface water, the proposed RQOs are much stricter that the limit values specified in the correlating GA, specifically for the irrigation of wastewater onto land.	TDS concentration has been altered based on the request for IUA 15. These limits were compiled from "Quality of Domestic Water Supplies – Assessment Guide" by DWAF (Water Research Commission et al, 1998). Only the basal diamictites (Dwyka Group) were deposited under marine conditions and should have an elevated primary salinity. However, where these rocks have high yields (viz., >5 L/s), the primary salinity is lower. The Ecca Group mudrock (argillaceous) and sandstones (arenaceous) [in the north-eastern part of the Karoo Basin] were (i) a fluvial-deltaic (post-glacial transgression), (ii) fluvial-deltaic – fluvial – fluvial-deltaic cycles (pebbly sandstone + coal seams), and (iii) argillaceous mudrocks (transgressive open shelf mudstone sequence in a lacustrine (lake-like)-lagoon-shallow coastal sedimentation – the presence of fluvial sandstones with less salinity should, therefore, be acknowledged (fresh water deposits during a marine regression). The following references were consulted:

DRAFT GAZETTE (No.1873) COMMENTS (11 MARCH 2022 to 10 MAY 2022)		
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	(4) The proposed RQOs for groundwater do not identify sensitive aquifers, for example by making use of the aquifer vulnerability maps published by the DWS as part of the 2005 Groundwater Resource Assessment Phase II (GRAII) project,18 or the aquifer susceptibility indices. The failure to identify such sensitive aquifers, and the failure to assign a different class to such aquifers, implies that they are not being appropriately protected by the proposed RQOs.	i. 'n Geochemiese Opname van die Grondwatervoorrade van die Unie van Suid-Afrika (Bond, G.W., 1947) Geological Survey Memoir № 47 ii. An Explanation of the 1:500 000 General Hydrogeological Map – Durban 2928 King, G.M., 2002) (Brochure Durban 2928) iii. An Explanation of the 1:500 000 General Hydrogeological Map – Kroonstad 2725. Baran and Dziembowski, Z.M., 2003 iv. An Explanation of the 1:500 000 General Hydrogeological Map – Vryheid 2730 and v. Groundwater Reserve Determination Study in the Thukela Catchment: High Level assessment. DWAF, 2009. Authors: Dennis, I. and Dennis, R. DWAF Project № WP9437/3 (2008-189).
11	(5) The proposed RQOs for groundwater therefore fails the requirements of the *Promotion of Administrative Justice Act 3 of 2000* ("PAJA"), specifically section 6(e)(iii), in that it do not take relevant considerations into account. As suggested in our previous comments, it is strongly recommended that the scientifically appropriate mechanisms that have been followed in the proposed Classes and RQOs for the Crocodile Marico catchment to establish Protection Zones and to derive RQOs from changes in natural background, also be used for the setting of RQOs for groundwater in the Thukela catchment.	Noted. Please note that the available hydrochemical dataset used for the Thukela was pre-2009 (DWAF, 2009). The 2009 dataset also included a water quality factor (2.5x) to obtain a realistic water quality baseline composition considering the higher "than normal" salinity composition of the lower Karoo Supergroup sediments. Notification of "hotspots" indicating marginal-poor water quality were made where the 2009 dataset included them. One, however, can't use these isolated "hotspots" to declare the water quality of a whole QC as marginal or poor – or even unacceptable.