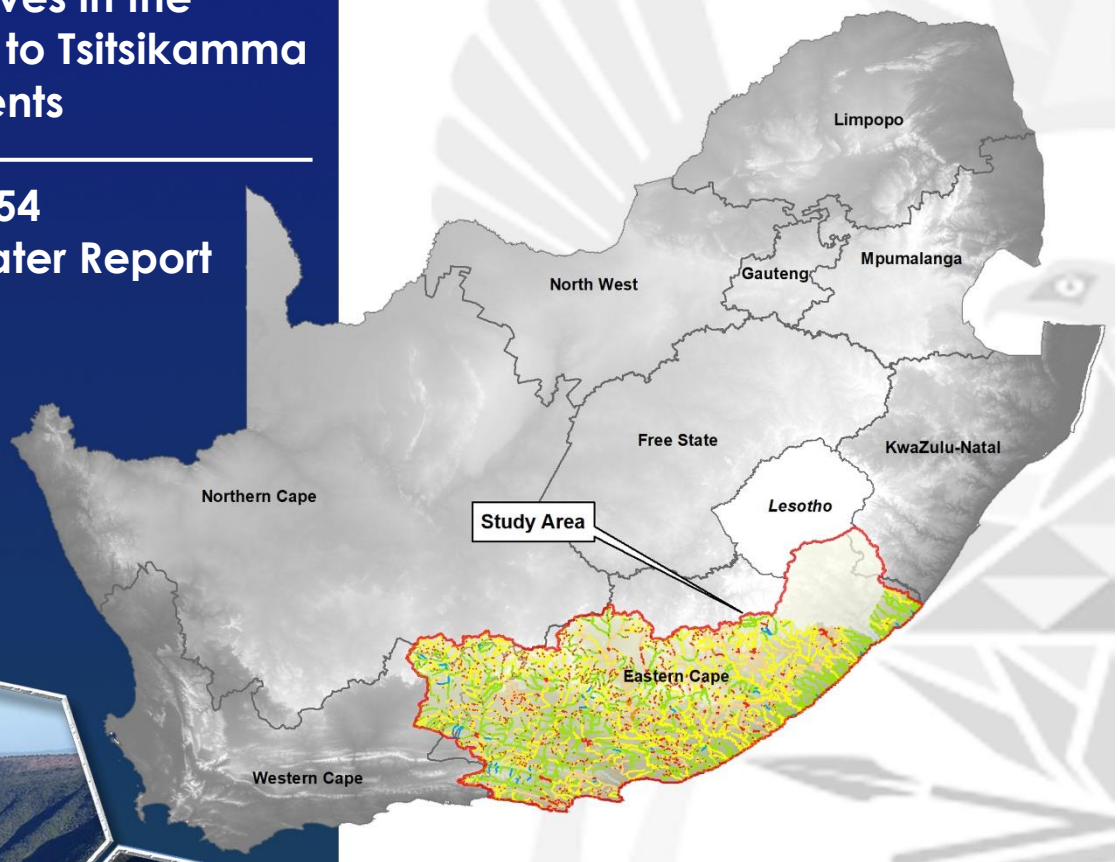
DEPARTMENT OF WATER AND SANITATION

Determination of Water Resource Classes, Reserve and the Resource Quality Objectives in the Keiskamma and Fish to Tsitsikamma Catchments

WP11354
Final Groundwater Report



REPORT NO.:
WEM/WMA7/00/CON/RDM/1223

July 2023

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Published by

Department of Water and Sanitation
Private Bag X313
Pretoria, 0001
Republic of South Africa

Tel: (012) 336 7500/ +27 12 336 7500
Fax: (012) 336 6731/ +27 12 336 6731

Copyright reserved

This report is to be cited as:

Department of Water and Sanitation, South Africa. July 2023. Determination of Water Resource Classes, Reserve and RQOs in the Keiskamma and Fish to Tsitsikamma catchment: Final Groundwater Report. Report No: WEM/WMA7/00/CON/RDM/1223.

Prepared by:

GroundTruth: Water, Wetlands and Environmental Engineering

Title:	*Final Groundwater Report*
Authors:	*R. Rose*
Project Name:	*Determination of Water Resource Classes, Reserve and RQOs in the Keiskamma and Fish to Tsitsikamma catchment: WP11354*
DWS Report No.:	WEM/WMA7/00/CON/RDM/1223
Status of Report	*Final*
First Issue:	*April 2023*
Final Issue:	*7 July 2023*

Approved for GroundTruth: Water, Wetlands and Environmental Engineering

…… …….

Dr Mark Graham *Date*

Director, GroundTruth

Supported by:

…… ……

Project Manager *Scientific Manager*

Approved for the Department of Water and Sanitation by:

……..

Director: Reserve Determination

DOCUMENT INDEX

Reports as part of this project:

Bold type indicates this report

INDEX	REPORT NUMBER	REPORT TITLE
1.0	WEM/WMA7/00/CON/RDM/0121	Inception Report
2.0	WEM/WMA7/00/CON/RDM/0222	Water Resources Information, Gap Analysis and Models Report
3.0	WEM/WMA7/00/CON/RDM/0322	Status quo and delineation of Integrated Units of Analysis Report
4.0	WEM/WMA7/00/CON/RDM/0422	Resource Units Prioritisation Report
5.0	WEM/WMA7/00/CON/RDM/0522	Wetland Survey Report
6.0	WEM/WMA7/00/CON/RDM/0622	Groundwater Survey Report
7.0	WEM/WMA7/00/CON/RDM/0722	River Field Survey Report 1
8.0	WEM/WMA7/00/CON/RDM/0822	Linking the Socio-Economic and Ecological Value and Condition of the Water Resource/s
9.0	WEM/WMA7/00/CON/RDM/0922	Basic Human Needs Report
10.0	WEM/WMA7/00/CON/RDM/1022	Estuary Survey Report 1
11.0	WEM/WMA7/00/CON/RDM/1122	Groundwater PES and Quantification of the Reserve Report
12.0	**WEM/WMA7/00/CON/RDM/1223**	**Groundwater Final Report**

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

BHN	Basic Human Needs
CMB	Chloride Mass Balance
CRD	Cumulative Rainfall Departure
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
EWR	Ecological Water Requirements
GDE	Groundwater Dependent Ecosystem
GRDM	Groundwater Resource Directed Measures
IUA	Integrated Unit of Analysis
NWA	National Water Act
RDM	Resource Directed Measures
RQO	Resource Quality Objectives
SVF	Saturated Volume Fluctuation
TDS	Total Dissolved Solids
TMG	Table Mountain Group
WARMS	Water use Authorization and Registration Management System
WMA	Water Management Area
WR2012	Water Resources 2012
WRC	Water Research Commission
WRCS	Water Resource Classification System

1. INTRODUCTION

The National Water Act, 1998 (No. 36 of 1998) (NWA) is founded on the principle that National Government has overall responsibility for and authority over water resource management for the benefit of the public without affecting the functioning of water resource systems. To achieve this objective, Chapter 3 of the NWA provides for the protection of water resources through the implementation of Resource Directed Measures (RDM). These measures are protection-based and include Water Resource Classification, determination of the Reserve and setting the associated Resource Quality Objectives (RQOs). These measures collectively aim to ensure that a balance is reached between the need to protect and sustain water resources, while allowing economic development.

The provision of water required for the maintenance of the natural functionality of the ecosystem and provision of Basic Human Needs (BHN) is the only right to water in the National Water Act (No. 36 of 1998) (NWA). The other water users from a strategic use who are second in line to other water users are subject to formal gazetted General Authorization and water use authorization as per Section 21 of the NWA.

The Chief Directorate: Water Ecosystems Management (CD: WEM) has initiated a study for the determination of Water Resource Classes, Reserve and associated Resource Quality Objectives for the identified significant water resources in the Keiskamma, Fish to Tsitsikamma catchments. The water resource components included for this study are rivers, wetlands, groundwater and estuaries. The Reserve determination include both the water quantity and quality of Ecological Water Requirements (EWR) and Basic Human Needs (BHN). This will ensure the availability of water required to protect aquatic systems and that the human basics are directly dependent on these water resources.

1.1 Study motivation

The Keiskamma and Fish to Tsitsikamma catchments within the Mzimvubu to Tsitsikamma Water Management Area (WMA7) are amongst many water stressed catchments in South Africa. This study area is important for conservation and have recognisable protected areas, natural heritage, cultural and historical sites that require protection. As a number of rivers and estuaries are within these catchments with no major impacts, it is vital that their ecological integrity is retained.

However, water use from surface as well as groundwater for agricultural and other land use activities are high, especially in the more arid catchments, impacting on the availability of water resources for the protection of the aquatic ecosystems. Industrial practices and domestic water use are on the rise in some of these catchments, especially around the major towns and cities. Water transfers into the study area from adjacent Water Management Areas (WMA) and within the study area and numerous storage dams changes the flow patterns, impacting on the aquatic biota. Furthermore, various water use license applications and increasing land use impacts in the catchments (forestry, farming, eradication of alien vegetation, wastewater treatment works) are increasing.

Therefore, measures including the Classification of water resources, quantification of the Reserve and setting of Resource Quality Objectives (RQOs) for all identified significant water resources is required to ensure ecological sustainability within these catchments. This will ultimately assist the DWS in managing and protecting of the water resources in the study area in an integrated manner, as well as making informed decisions regarding the authorisation of future water use and the magnitude of the impacts of proposed developments.

Overall, the ultimate goal of this study is to provide information that is legally defensible and that the Management Class identified, set RQOs and the determined Reserve, will be gazetted and thus the outputs will be legally binding.

1.2 Study objective

The main objectives of the study are to determine (i) Water Resource Classes, (ii) the Reserve and (iii) associated Resource Quality Objectives (RQOs) and gazetting of all of these for the significant identified water resources in the Keiskamma and Fish to Tsitsikamma catchment area that would facilitate sustainable use of the water resources while maintaining the required ecological integrity. All the water resource components, including rivers, wetlands, estuaries and groundwater will be considered during this study and where applicable, integration between these components will be undertaken.

Furthermore, the determination of the Water Resource Classes, the Reserve and setting RQOs will depend on the integration of a number of disciplines in respect of water resources protection (i.e. instream and riparian health and Source Directed Control) that includes the needs of the water users present in the catchment area. This will be done through a consultative process with continual communication and liaison by involving the various stakeholders in the study area. Skills development and transfer through a number of workshops, training days, in-field surveys and day-to-day management of the study will be undertaken as part of the capacity building requirements of the DWS.

The key aims of this study are thus to (i) co-ordinate the implementation of the Water Resource Classification System (WRCS) through the published Regulation 810 (DWA, September 2010) and (ii) following the various methodologies for the determination of the Reserve and setting the RQOs as prescribed by the DWS. The integrated procedure as developed to Operationalise Resource Directed Measures (DWS, 2017) will be used to guide the overall process for this study. The study team understands that this study is linked to previous Reserve determination studies and other water resource management initiatives within the study area. Linking and integration with current parallel studies, including the development of a reconciliation strategy for the management of the water resources in the study area will be undertaken as part of this study.

The Water Resource Classes and associated RQOs will assist as input information when assessing potential authorisation of future water uses, provide guidance on the operation and management of the system and the evaluation of the impacts of the present and proposed developments, in the form of operational scenario evaluation. Furthermore, taking the economic, social and ecological goals to

be attained, and considering and specifying the risks of non-compliance, with meeting of the Recommended Ecological Category (REC) and the potential loss of social and economic water use.

1.3 Purpose of this report

The purpose of this Final Groundwater report is to provide detailed descriptions of the Present Status of the groundwater based on the assessment of the data from monitoring undertaken in the study area (see report DWS 2023, WEM/WMA7/00/CON/RDM/1122), and to quantify the stress index for based on degree of impact to provide input into the Water Resource Classes .

2. STUDY AREA

The study area forms part of the Mzimvubu to Tsitsikamma WMA (WMA7) as indicated in Table 1. The water resources of the Mzimvubu catchment (T31 – T36) are not included as part of the study area for the purposes of this study. Secondary catchments T40 (Mtamvuna) and T50 (Mzimkhulu) form part of WMA4.

Table 1: Main catchments and rivers in the study area

Catchment	Major Rivers
K80	Tsitsikamma and small coastal rivers
K90	Krom and small coastal rivers
L10 - L90	Gamtoos with main tributaries Groot, Baviaanskloof and Kouga
M10 - M30	Koega, Swartkops and small coastal rivers
N10 - N40	Sundays
P10 - P40	Kowie, Kariega, Boesmans and small coastal rivers
Q10 - Q90	Fish River with main tributaries of Little Fish, Koonap and Kat
R10 - R50	Keiskamma and small coastal rivers
S10 - S70	Great Kei River with main tributaries of Klipplaats, Indwe, White Kei, Black Kei
T10	Mbashe
T20	Mthatha
T60	Small coastal rivers (Mtentu, Msikaba, Mzintlava)
T70	Small coastal rivers (Mtakatye, Mngazi)
T80 & T90	Small coastal rivers

2.1 Regional Geology

Basement rocks in the catchment is represented by the Precambrian aged Gamtoos Group consisting mainly of quartzite, limestone and phyllite. The Gamtoos Group is unconformably overlain by the Cape Supergroup, comprising of the Table Mountain, Bokkeveld and Witteberg Groups of alternating quartzitic sandstone and shale. The Cape Supergroup is overlain by the Karoo Supergroup, comprising of the Ecca, Beaufort, Stormberg and Drakensberg Groups.

The Karoo Supergroup consists of a sequence of units, mostly of non-marine origin, deposited between the Late Carboniferous and Early Jurassic age. Late Jurassic aged dolerite sills and dykes intruded into the main Karoo basin.

The Uitenhage Group unconformably overlies older deposits of the Cape Supergroup in small rift basins, i.e. Algoa and Gamtoos Basins and comprise of poorly sorted conglomerate and subordinate sandstone, siltstone and mudstone. These rift basins formed mainly due to normal faulting during the break-up of Gondwana. Unconsolidated to semi-consolidated, palaeo-coastal calcareous sand and conglomerate deposits of the Algoa Group occur within the eastern portion of the Algoa Basin and the Bushman's River coastal plain. Significant alluvium deposits are associated with the major river systems like the Sundays River valley south of Kirkwood. Recent and reworked coastal sands occur within a narrow dune zone between Cannonvale and Port Alfred.

The regional geology is presented in Table 2 and shown in Figure 1**.**

Table 2: Regional Geological Succession of Keiskamma and Fish to Tsitsikamma Catchment

Symbol on Map	Geological Time Scale (Period)	Lithological Unit		Description
		Sedimentary & Volcanic Rocks	Intrusive Rocks	
Qz	Quaternary	Aeolian sand	-	Aeolian sand
Q		Alluvium		Unconsolidated sediments
T-Qa	Nanaga	Nanaga Formation		Calcareous sandstone, sandy limestone
Kmb	Cretaceous	Mbotyi Formation		Dark greyish conglomerate sandstone
J-Ku	Jurassic	Uitenhage Group: Kirkwood Formation		Reddish greenish mudstone and sandstone
Jdr / Jd		Drakensberg Formation	Dolerite	Dolerite dyke and Sills-
				Basaltic lava, tuff, and agglomerate
Trc	Triassic	Clarens Formation	-	Yellowish-grey, pale-orange, or pink, very fine-grained sandstone

Symbol on Map	Geological Time Scale (Period)	Lithological Unit		Description
		Sedimentary & Volcanic Rocks	Intrusive Rocks	
Tre		Elliot Formation		Brownish-red and grey mudstone, sandstone
Trm		Molteno Formation		Gritty sandstone, grey mudstone, shale, and occasional coal seams
P-Trb		Beaufort Group: Katberg Formation		fine-grained sandstone and red and green-grey mudstone
	Permian	Beaufort Group: Adelaide Formation		Red, purple, grey, and blue green mudstone subordinate sandstone
Pe		Ecca Group		Alternating succession of Sandstone, siltstone and mudstone
C-Pd	Carboniferous	Dwyka Formation		Tillite
Dw	Carboniferous/ Devonian	Witteberg Group: Weltevrede Formation		Shale, quartzite
Dms	Devonian	Witteberg Group:		Sandstone, feldspathic sandstone, arkose
Db	Devonian	Bokkeveld Group		Claystone, mudstone, Shale)
O-St	Silurian/Ordovician	Table Mountain Group		Quartzite
Ng	Namibian	Mpambanyoni Formation	Mapumulo Metamorphic Suite	Quartz feldspar gneiss
Nmp				Biotite garnet cordierites sillimanite gneiss and migmatite subordinate hornblende gneiss
Nk		Gamtoos Group: Klein River Formation	-	Quartzite, limestone and phyllite

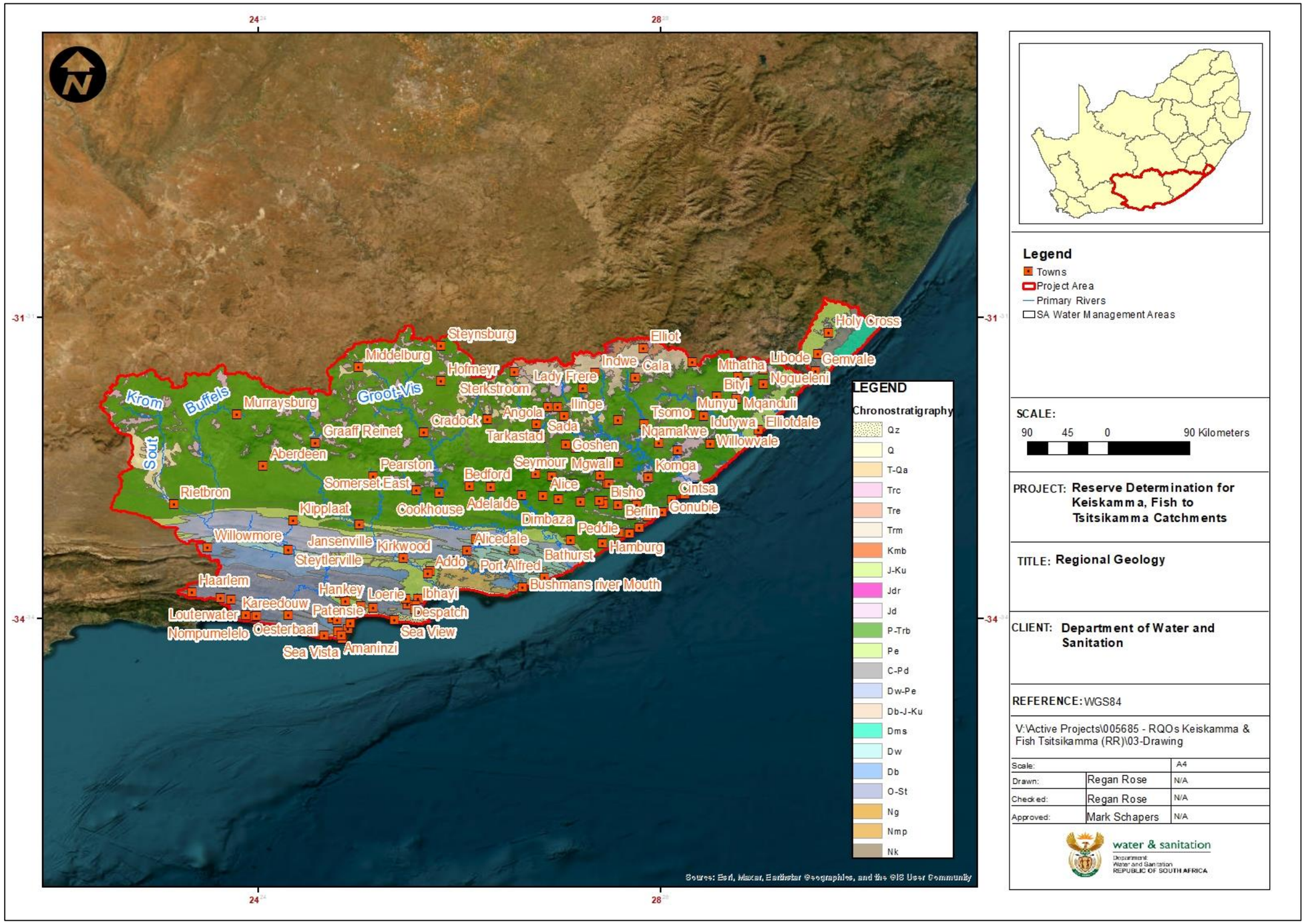


Figure 1: Regional Geology

2.2 Regional Geohydrology

The regional geohydrology of the catchment is characterised by three types of aquifers, fractured, intergranular and intergranular and fractured. The north eastern portion and to a lesser extent the north western extremity of the catchment is characterised by intergranular and fractured aquifer types. Isolated portions of the catchment, to the north, are underlain by a two layered intergranular and fractured aquifer type. Characteristically associated with the arenaceous rocks of the Beaufort Group the principal groundwater occurrence in the area is inferred to be “d2” and “d3”. According to the DWS geohydrological map series of Port Elizabeth (3324) median borehole yields are expected to be in the range of 0.1 to 0.5l/s and 0.5 to 2.0l/s. The portions of the catchment underlain by the two layered inter granular and fractured aquifer type are anticipated to have borehole yields exceeding 5.0l/s.

The south eastern extremity of the catchment, specifically along the coast is underlain by an intergranular aquifer type. This type of aquifer is typically associated with Quaternary aged porous sands of the coastal belt, alluvium and the semi consolidated calcareous sands and conglomerates of the Algoa Group. In accordance with the DWS geohydrological map series of Port Elizabeth the principal groundwater occurrence in the area is inferred to be “a2” and “a3”. Median borehole yields are anticipated to be in the range of 0.1 to 0.5l/s and 0.5 to 2.0l/s.

Fractured aquifer types predominantly underlie the central and western areas of the catchment and are generally associated with the quartz arenites of the Table Mountain and Witteberg Groups, as well as the Karoo dolerites. Typically, “b2”, “b3” and “b4” types occur. The occurrence of “b5” type aquifers is not uncommon in isolated patches, specifically towards the western margin of the catchment. Median borehole yields are anticipated to be in the range of 0.5 to 2.0l/s, 2.0 to 5.0l/s and 2.0 to 5.0l/s with higher borehole yields exceeding 5.0l/s, expected in “b5” aquifers. Elevated borehole yields can occur especially adjacent to defined valleys and near to river channels within the area due to favourable recharge conditions. The regional geohydrology of the catchment is presented in Figure 2.

Groundwater quality, as contoured in the DWS geohydrological map series, indicates Electrical Conductivity (EC) to be in the range of 0-70mS/m towards the north eastern region of the catchment and isolated portions along the northern, north western and south western parts. The south eastern and central parts of the catchment are predominated by electrical conductivities in the rage of 70-300mS/m and 300-1000mS/m. These is an isolated occurrence in the western extremity of the catchment which is inferred to have ECs that exceed 1000mS/m. The regional groundwater quality of the catchment is presented in Figure 3. The improved groundwater quality along the north eastern and south western coast parts reflect higher rainfall and elevated groundwater recharge conditions.

Groundwater resources within the study area are mainly linked with the Cape Supergroup and Karoo Supergroup aquifers. The Mzimvubu to Keiskamma sub-catchment area is mainly covered with Karoo Supergroup sediments whilst the Fish to Tsitsikamma sub-catchment area is covered with Cape Supergroup, Karoo Supergroup, as well as Uitenhage Group. Quaternary sand deposits also occur in the Coega region close to Gqeberha, whilst significant alluvial deposits also occur in parts of the Great Karoo.

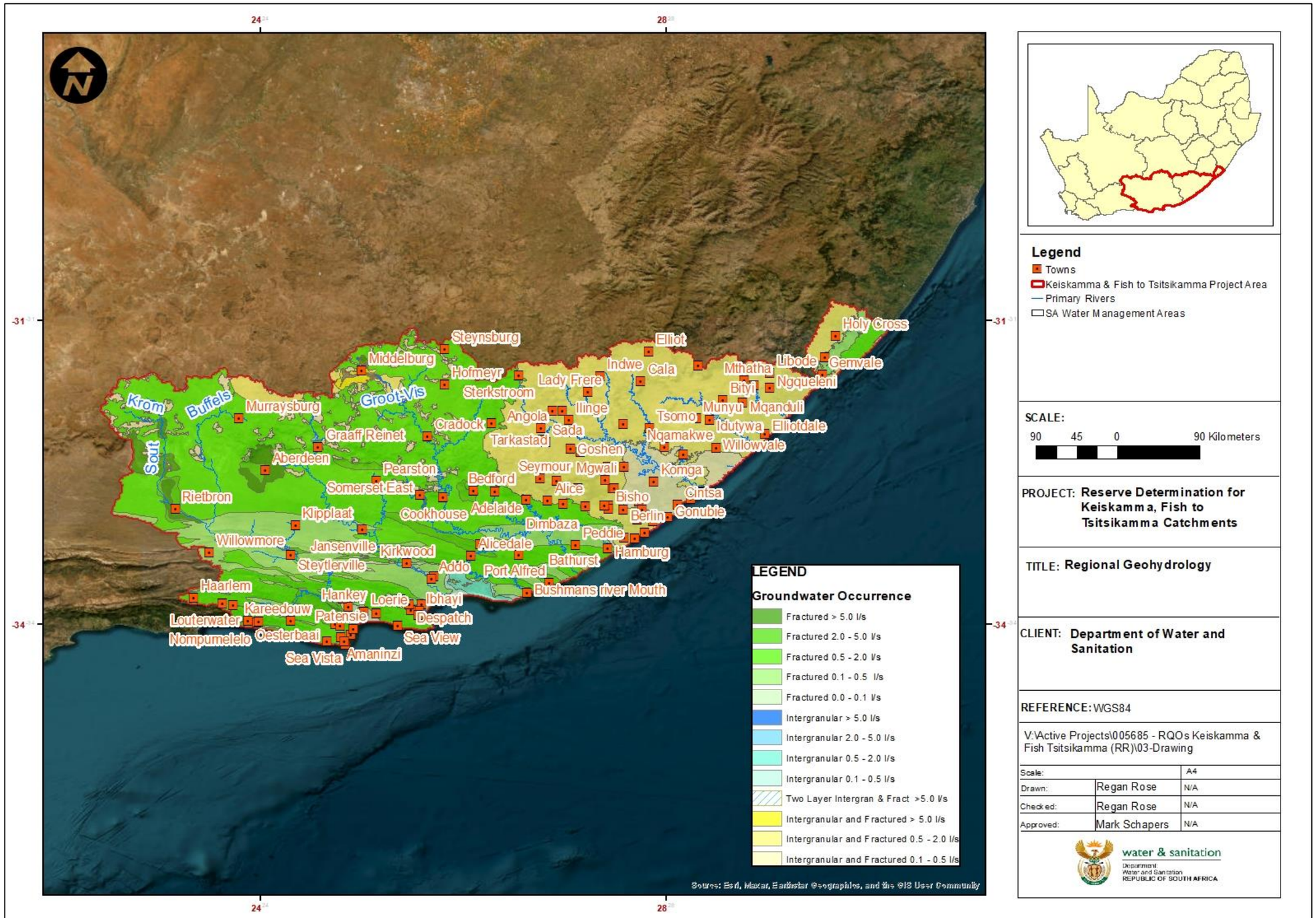


Figure 2: Regional Geohydrology

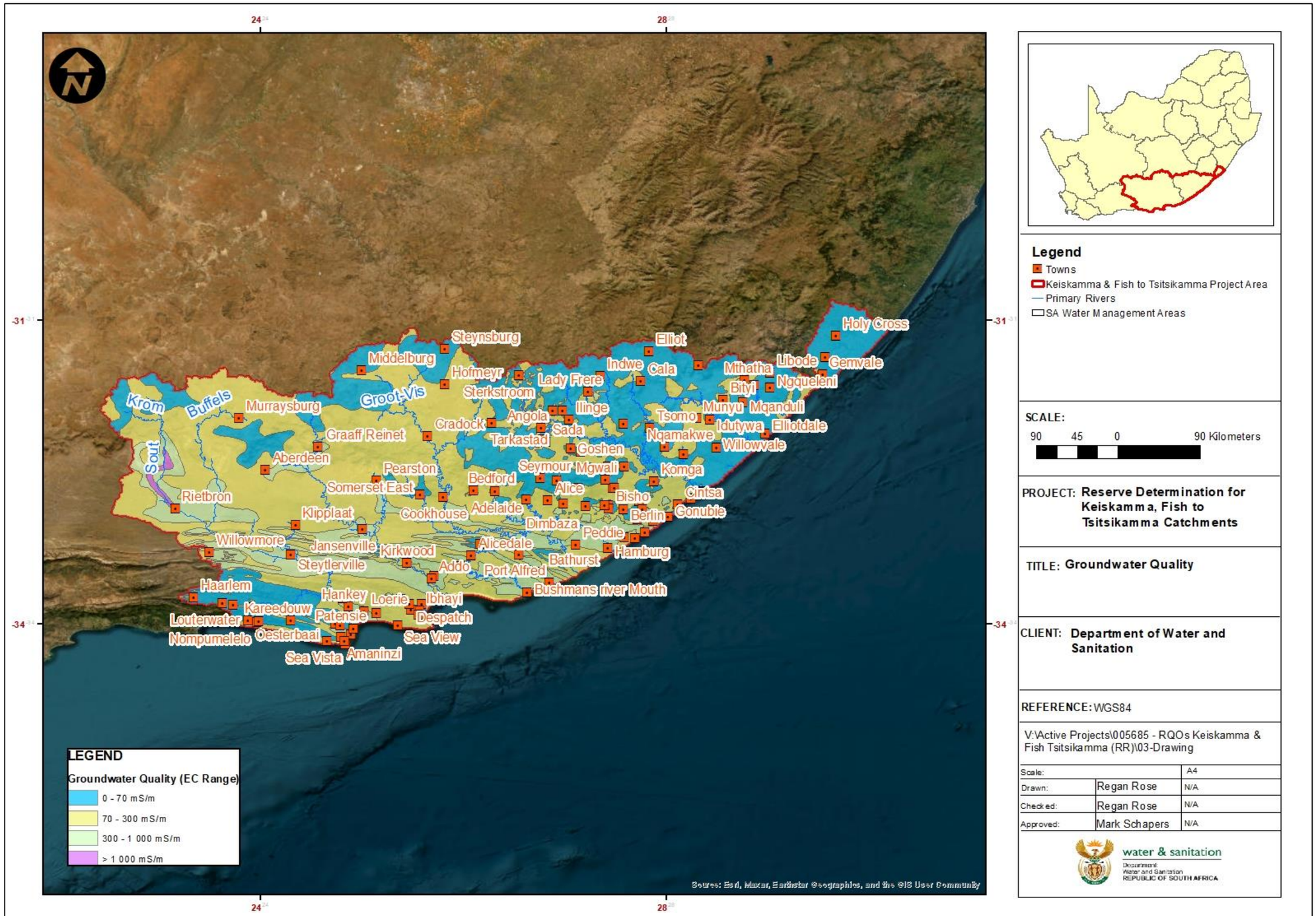


Figure 3: Regional Groundwater Quality

(i) Mzimvubu to Keiskamma

Groundwater is mainly used for rural domestic purposes and stock watering as well as for supplies to towns and rural settlements. Substantial irrigation from groundwater is practised in the vicinity of Queenstown, where some over-exploitation of groundwater is also experienced. The quality of groundwater is generally of a high standard. However, water of high salinity is found along parts of the coast and at some inland locations where the rainfall is low and the geology is not favourable.

(ii) Fish to Tsitsikamma

Groundwater is used for municipal, rural settlements, rural domestic and stock watering purposes. Towns in the Karoo region generally have a greater dependence on groundwater with some town's almost entirely dependent on groundwater for their existence. Recent exploration of groundwater in the Nelson Mandela Bay Municipality in particular, is to supplement the diminishing surface water supplies in the region caused by a decline in rainfall. In this region, the Table Mountain Group (TMG) of the Cape Supergroup generally provides the best option for groundwater development in terms of borehole yield and quality. Groundwater quality is generally good with minor treatment required at municipal level.

3. OBJECTIVES OF THE GROUNDWATER REPORT

This Groundwater Assessment has the following objectives in mind:

- Describe the present status of groundwater in the catchment
    - This relates to both quantity and quality of groundwater
- Define the degree of impact of the groundwater resource in terms of level of stress or Stress Index (SI)
- Define the Groundwater Classes in the catchment
- Seek the protection of groundwater resources with consideration to equitable and sustainable use thereof
- Presentation of the results in a manner that is supportive of the managerial and administrative procedures that inform implementation of the groundwater Reserve.

4. DETAILED SCOPE OF WORK / METHODOLOGY

The study envisaged to meet the requirements of a high level GRDM determination. This is informed by factors such as the significant degree of groundwater use, the measure of negative impact on and threat to groundwater quality, and the uncertainty regarding the importance and sensitivity of GDEs in the study area.

Step 1: Defining the present status of groundwater

The present status must be assessed for each IUA in terms of groundwater levels and groundwater quality. The present status, in turn, must inform the derivation of a groundwater resource category for each IUA.

Step 2: Define the degree of impact of the groundwater resource

This activity will seek to reconcile the water balance in the catchment through estimations of the groundwater reserve and current groundwater use to establish a Stress Index. This is a necessary prerequisite to determining the quantity of groundwater potentially available for allocation to users and potential users.

Step 3: Define the Groundwater Classes

Based on the degree of impact, define Classes for the catchment. This will be required to identify the appropriate level of protection for the catchment to ensure equitable and sustainable use of groundwater.

5. PRESENT STATUS OF GROUNDWATER

The available data for the Hydstra and WMS monitoring sites was used to assess the present status of groundwater in the catchment. The Hydstra monitoring sites are mainly time series water levels, whilst the WMS sites are time series water quality. Time series data of water levels and water quality (using EC as overall indicator) is presented in Appendix A (Figure 11 to Figure 43). It is important to note that not all monitoring sites have long-term data as some sites have become closed sites but have historical data.

5.1 IUA_K01: Tsitsikamma and headwaters of Kromme to Kromme Dam

IUA Description	Tsitsikamma and headwaters of Kromme to Kromme Dam
	The aquifer is of a fractured type, mainly associated with the fractured Table Mountain Group Aquifer. The IUA is moderately to highly stressed.
GW RU	G_RU01
Quaternary Catchments	K80A-F, K90A-B

The monitoring sites in IUA 1 (K1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 6 and **Figure 44.** A total of five (5) monitoring sites exists for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 11 and Figure 12, respectively in Appendix A.

From Figure 11, groundwater levels vary between 7 - 28mbgl. The observed groundwater levels have a cyclical trend and indicate strong seasonality. Recent water levels show a significant decline in groundwater levels from end-2015 to 2018/2019, followed by a significant recovery to 2015 groundwater levels and beyond. This is possibly due to severe drought conditions from 2015 to 2019.

From Figure 12, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is very good. The most recent ECs at the monitoring site are below 50mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.2 IUA_KL01: Kromme from Kromriver Dam to Estuary and Gamtoos

IUA Description	Kromme from Kromriver Dam to Estuary and Gamtoos
	The aquifer is of a fractured type, mainly associated with the fractured Table Mountain Group Aquifer. The IUA is moderately stressed in certain areas.
GW RU	GW_RU02
Quaternary Catchments	K90C-G, L90A-C

The monitoring sites in IUA 2 (KL1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, **Table 7** and Figure 45**.** A total of twenty-seven (27) monitoring sites exists for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 13 and Figure 14, respectively in Appendix A.

From Figure 13, groundwater levels vary significantly in the IUA. Groundwater levels have a cyclical trend and indicate strong seasonality. Recent water levels show a significant decline in groundwater levels from end 2015 to 2022. This is possibly due to severe drought conditions and increased groundwater abstraction in this IUA during this period.

From Figure 14, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is good. ECs at the monitoring sites are below 170mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water. ECs are generally stable, however an increasing recent trend in EC at ZQMSFB1 is noted.

5.3 IUA_L01: Kouga to Kouga Dam, Baviaanskloof

IUA Description	Kouga to Kouga Dam, Baviaanskloof
	The aquifer is of a fractured type, mainly associated with the fractured Table Mountain Group Aquifer. The IUA is mildly stressed in certain areas.
GW RU	GW_RU03
Quaternary Catchments	L81A-D, L82A-J

The monitoring sites in IUA 3 (L1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 8 and **Figure 46**. A total of twenty-three (23) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 15 and Figure 16, respectively in Appendix A.

From Figure 15, groundwater level monitoring only recently commenced in the IUA. The available groundwater levels are mainly stable with seasonal variations.

From Figure 16, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is excellent (with the exception of a few outliers, which may be erroneous field or laboratory measurements). ECs at the monitoring site are around 20mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.4 IUA_LN01: Groot to Kouga confluence, Upper Sundays to Darlington Dam

IUA Description	Groot to Kouga confluence, Upper Sundays to Darlington Dam
	The aquifer is of a fractured type, mainly associated with the fractured Upper Cape Supergroup (Bokkeveld and Witteberg Groups) and Lower Karoo Supergroup. The IUA is mildly to moderately stressed in certain areas.
GW RU	GW_RU07
	GW_RU08
	GW_RU09
	GW_RU10
Quaternary Catchments	L11A-G, L12A-D , L21A-F, L22A-D, L23A-D, L30A-D, L40A-B, L50A-B, L60A-B, L70A-G N11A-B, N12A-C, N13A-C, N14A-D, N21A-D, N22A-E, N23A-B, N24A-D, N30A-C

The monitoring sites in IUA 4 (LN1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 9 and **Figure 47**. A total of four hundred and sixty-one (461) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 17 and Figure 18, respectively in Appendix A.

From Figure 17, groundwater levels vary significantly in the IUA. Groundwater levels have a cyclical trend and indicate strong seasonality. Recent water levels show a significant decline in groundwater levels from end 2016 to 2021 followed by a slight recovery in 2022. This is possibly due to severe drought conditions and increased groundwater abstraction in this IUA from 2016 to 2021.

From Figure 18, time series trend analysis graph for EC indicates that the groundwater quality within the IUA varies significantly from good to poor. ECs vary from 50 - 650mS/m. Elevated ECs are possibly due to lithological control, limited recharge and rainfall. Alternatively, it can also be the result of external impacts, possibly from agricultural practices in the IUA.

5.5 IUA_M01: M primary catchment

IUA Description	M primary catchment
	The aquifer is of a fractured type, mainly associated with the fractured Table Mountain Group and Uitenhage Group. A small part of the IUA is also of an intergranular type, associated with Quaternary sands. The IUA is mildly stressed in certain areas.
GW RU	GW_RU04
	GW_RU05
	GW_RU06
Quaternary Catchments	M10A-D, M20A-B, M30A-B

The monitoring sites in IUA 5 (M1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 10 and **Figure 48**. A total of sixty-four (64) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 19 and Figure 20, respectively in Appendix A.

From Figure 19, groundwater levels vary significantly in the IUA. Groundwater levels have a cyclical trend and indicate strong seasonality. Recent water levels show a significant decline in groundwater levels from end 2016 to 2022, although some monitoring sites have shown some recovery. This is possibly due to severe drought conditions and increased groundwater abstraction in this IUA from 2016 to 2022.

From Figure 20, time series trend analysis graph for EC indicates that the groundwater quality within the IUA varies significantly from good to poor. ECs vary from 50 - 1000mS/m. Elevated ECs are possibly due to lithological control, limited recharge and rainfall. Alternatively, it can also be the result of external impacts, possibly from agricultural and industrial practices in the IUA.

5.6 IUA_NQ1: Sundays downstream Darlington Dam

IUA Description	Sundays downstream Darlington Dam
	The aquifer is mainly of a fractured type associated with the fractured Lower Karoo Supergroup and Uitenhage Group. A smaller part of the area is also of an intergranular type associated with Quaternary sand and alluvium. There are no stressed areas in the IUA.
GW RU	GW_RU11
	GW_RU12
	GW_RU13
	GW_RU14
	GW_RU15
	GW_RU16
	GW_RU17
Quaternary Catchments	N40A-F

The monitoring sites in IUA 6 (NQ1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 11 and **Figure 49**. A total of seventeen (17) monitoring sites exist for this IUA. Time series data of groundwater quality (using EC as overall indicator) is presented in Figure 21 in Appendix A.

From Figure 21, time series trend analysis graph for EC indicates that the groundwater quality within the IUA varies significantly from good to poor. ECs vary from 50 - 850mS/m. Elevated ECs are possibly due to lithological control, limited recharge and rainfall. Alternatively, it can also be the result of external impacts, possibly from agricultural practices in the IUA.

5.7 IUA_P01: P1 primary catchment

IUA Description	P1 primary catchment
	The aquifer is mainly of a fractured type associated with the upper Cape Supergroup (Bokkeveld and Witteberg Groups) and Lower Karoo Supergroup. A smaller part of the area is also of an intergranular type associated with Quaternary sand and alluvium. There are no stressed areas in the IUA.
GW RU	No priority 1 or 2 groundwater areas
Quaternary Catchments	P10A-G, P20A-B, P30A-C, P40A-D

The monitoring sites in IUA 7 (P1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B Table 12 and **Figure 50**. A total of sixteen (16) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 22 and Figure 23, respectively in Appendix A.

From Figure 22, groundwater levels vary significantly in the IUA. Groundwater levels have a cyclical trend and indicate strong seasonality. Recent groundwater data show a significant decline in groundwater levels from end-2015 to 2022, although some monitoring sites have shown some recovery. This is possibly due to severe drought conditions and increased groundwater abstraction in this IUA from 2015 to 2022.

From Figure 23, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good (with the exception of a few outliers, which may be erroneous field or laboratory measurements). The available ECs at the monitoring site are <170mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.8 IUA_Q1: Fish

IUA Description	Fish
	The aquifer is mainly of a fractured type associated with the Karoo Supergroup. Intergranular and fractured aquifers, owing to the presence of dolerite sills and dykes also exist, as well as localised intergranular aquifers associated with alluvial deposits. The IUA is mildly to highly stressed in certain areas.
GW RU	GW_RU18
	GW_RU19
	GW_RU20
	GW_RU21
	GW_RU22
Quaternary Catchments	Q11A-D, Q14A-E, Q21A-B, Q22A-B, Q30A-B and Q80A-C

The monitoring sites in IUA 8 (Q1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 13 and **Figure 51**. A total of forty (40) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 24 and Figure 25, respectively in Appendix A.

From Figure 24, groundwater levels vary significantly in the IUA. Groundwater levels are erratic at some monitoring sites and relatively stable at others. A cyclical trend is visible at some monitoring sites with strong seasonality. Recent groundwater data show a significant decline in groundwater levels from 2017/2018 to 2022, although some monitoring sites have remained stable. This is possibly due to drought conditions and increased groundwater abstraction in this IUA from 2017 to 2022.

From Figure 25, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good (with the exception of an outlier, which may be erroneous field or laboratory measurements). The available ECs at the monitoring site are <170mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.9 IUA_Q02: Great Fish

IUA Description	Great Fish
	The aquifer is mainly of a fractured type associated with the Karoo Supergroup. Intergranular and fractured aquifers, owing to the presence of dolerite sills and dykes also exist. The IUA is mildly to highly stressed in certain areas.
GW RU	GW_RU23
	GW_RU24
	GW_RU25
	GW_RU26
	GW_RU27
Quaternary Catchments	Q12A-C, Q13A-C, Q30C-E, Q41A-D, Q42A-B, Q43A-B, Q44A-C, Q50A-C, Q60A-C, Q70A-C, Q80D-G, Q91A-C, Q93A-D

The monitoring sites in IUA 9 (Q2) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 14 and **Figure 52**. A total of thirty two (32) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 26 and Figure 27, respectively in Appendix A.

From Figure 26, groundwater levels vary in the IUA. Groundwater levels are relatively stable throughout the monitoring period at most monitoring sites with seasonal variations. Recent groundwater data show a significant decline in groundwater levels from 2017 to 2022, although some monitoring sites have indicated a recovery in 2022. This is possibly due to drought conditions and increased groundwater abstraction in this IUA from 2017 to 2022.

From Figure 27, time series trend analysis graph for EC indicates that the groundwater quality within the IUA varies from good to poor. The available ECs vary between 20 - 1350mS/m, however, in terms of the DWAF Water Classification System the groundwater at most of the monitoring sites within this IUA can be classified as a “Class 1” (Good Water Quality) or a “Class 2” (Marginal Quality) type water.

5.10 IUA_Q03: Koonap and Kat

IUA Description	Koonap and Kat
	The aquifer is mainly of a fractured type associated with the Karoo Supergroup. Intergranular and fractured aquifers, owing to the presence of dolerite sills and dykes also exist. There are no stressed areas in the IUA.
GW RU	GW_RU28
	GW_RU29
Quaternary Catchments	Q92A-G, Q94A-F

The monitoring sites in IUA 10 (Q3) include only WMS sites. These monitoring sites are summarised in Appendix B, Table 15 and **Figure 53.** A total of seven (7) monitoring sites exist for this IUA. Time series data of groundwater quality (using EC as overall indicator) is presented in Figure 28 in Appendix A.

From Figure 28, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good (with the exception of a few outliers, which may be erroneous field or laboratory measurements). The available ECs at the monitoring site are generally <170mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.11 IUA_R1: Keiskamma

IUA Description	Keiskamma
	The aquifer is mainly of a fractured type associated with the Karoo Supergroup. Intergranular and fractured aquifers, owing to the presence of dolerite sills and dykes also exist. There are no stressed areas in the IUA.
GW RU	GW_RU30
	GW_RU31
Quaternary Catchments	R10A-M, R40A-C, R50A-B

There are currently no monitoring sites in IUA 11 (R1). The IUA layout is provided in Appendix B (**Figure 54**).

5.12 IUA_R02: Buffalo/ Nahoon

IUA Description	Buffalo/ Nahoon
	The aquifer is mainly of a fractured type associated with the Karoo Supergroup. Intergranular and fractured aquifers, owing to the presence of dolerite sills and dykes also exist. The IUA is mildly stressed in certain areas.
GW RU	GW_RU32
	GW_RU33
Quaternary Catchments	R20A-G , R30A-F

The monitoring sites in IUA 12 (R2) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 16 and **Figure 55**. A total of seventy one (71) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 29 and Figure 30, respectively in Appendix A.

From Figure 29, groundwater levels indicate relatively stability at both monitoring sites, albeit a slight downward trend at R3N0503. A short but significant recovery period is evident at both monitoring sites at the start of 2022, followed by a subsequent decline in groundwater levels.

From Figure 30, time series trend analysis graph for EC indicates that the groundwater quality within the IUA varies from good to poor. ECs vary between 50 - 750mS/m, however, the available ECs date back to 2003. In terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” (Good Water Quality) to a “Class 4” (Poor Quality) type water.

5.13 IUA_S01: Upper Great Kei

IUA Description	Upper Great Kei
	The aquifer is of an intergranular and fractured type associated with the Karoo Supergroup, as well as the presence of dolerite sills and dykes. There are no stressed areas in the IUA.
GW RU	GW_RU34
	GW_RU35
	GW_RU36
Quaternary Catchments	S10A-J, S20A-D, S40A-F, S50A-J

The monitoring sites in IUA 13 (S1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 17 and **Figure 56**. A total of sixty four (64) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 31 and Figure 32, respectively in Appendix A.

From Figure 31, groundwater levels vary between significantly in the IUA. Groundwater levels are relatively stable throughout the monitoring period at some monitoring sites with seasonal variations (S1N0001 & S2N0001). The groundwater levels at the remaining monitoring sites appear more erratic and show two major cycles, i.e.

i) Significant decline since end-2015, followed by significant recovery in mid-2018.
ii) Significant decline in 2019, followed by significant recovery from end-2020 to 2022.

It must be noted that the recovery during both the above cycles was still significantly below the pre-2015 levels. These cycles are related to drought conditions and increased groundwater abstraction in this IUA from end-2015 to 2022.

From Figure 32, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is good. ECs vary between 10 - 110mS/m, however, the available ECs date back to 2003. In terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.14 IUA_S02: Black Kei

IUA Description	Black Kei
	The aquifer is of an intergranular and fractured type associated with the Karoo Supergroup, as well as the presence of dolerite sills and dykes. The IUA is mildly to moderately stressed in certain areas.
GW RU	GW_RU37
Quaternary Catchments	S31A-G, S32A-M

The monitoring sites in IUA 14 (S2) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 18 and **Figure 57**. A total of two hundred and twelve (212) monitoring sites exists for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 33 and Figure 34, respectively in Appendix A.

From Figure 33, groundwater levels vary between 2.0 – 21.5mbgl in the IUA. Cyclical trends are visible at all monitoring sites with seasonal effects. The groundwater levels show two major cycles, i.e.

i) Significant decline from mid-2007, followed by a recovery from 2011 to 2015.
ii) Significant decline from end-2015, followed by a recovery from end-2020 to 2022.

It must be noted that the recovery during both the above cycles was still significantly below the pre-2007 levels. These cycles are related to drought conditions and increased groundwater abstraction in this IUA from 2007 to 2011 and 2015 to 2020, respectively.

From Figure 34, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good and stable. The available ECs are between 30 - 130mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.15 IUA_S03: Lower Great Kei

IUA Description	Lower Great Kei
	The aquifer is of an intergranular and fractured type associated with the Karoo Supergroup, as well as the presence of dolerite sills and dykes. The IUA is moderately stressed in certain areas.
GW RU	GW_RU38
	GW_RU39
Quaternary Catchments	S60A-E, S70A-F

The monitoring sites in IUA 15 (S3) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 19 and **Figure 58**. A total of twenty three (23) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 35 and Figure 36, respectively in Appendix A.

From Figure 35, groundwater levels vary between 3 – 35mbgl in the IUA. Cyclical trends are visible at S7N0002 with seasonal effects. The groundwater levels show two major cycles, i.e.

i) Significant decline from mid-2007, followed by a recovery from 2011 to 2013.
ii) Significant decline from end-2013, followed by a minor recovery from end-2021 to 2022.

It must be noted that the latest recovery from end-2021 to 2022 is still significantly below the pre-2007 levels. These cycles are related to drought conditions and increased groundwater abstraction in this IUA from 2007 to 2011 and 2013 to 2021, respectively.

From Figure 36, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good and stable (with the exception of a few outliers which are possibly due to incorrect field or laboratory measurement). The available ECs are generally <150mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.16 IUA_T01: Upper Mbashe, Upper Mthatha

IUA Description	Upper Mbashe, Upper Mthatha
	The aquifer is of an intergranular and fractured type associated with the Karoo Supergroup, as well as the presence of dolerite sills and dykes. The IUA is mildly to highly stressed in certain areas.
GW RU	GW_RU40
	GW_RU41
	GW_RU42
Quaternary Catchments	T11A-H, T12A-G, T20A

The monitoring sites in IUA 16 (T1) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 20 and **Figure 59**. A total of forty three (43) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 37 and Figure 38, respectively in Appendix A.

From Figure 37, groundwater levels vary between 1 – 45mbgl in the IUA and appear very stable with seasonal variations at some monitoring sites. A recovery of groundwater levels is evident in 2022.

From Figure 38, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good and stable. The available ECs are between 30 - 82mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.17 IUA_T02: Lower Mbashe

IUA Description	Lower Mbashe
	The aquifer is of an intergranular and fractured type associated with the Karoo Supergroup, as well as the presence of dolerite sills and dykes. The IUA is mildly stressed in certain areas.
GW RU	GW_RU43
Quaternary Catchments	T13A-E

The monitoring sites in IUA 17 (T2) include only WMS sites. These monitoring sites are summarised in Appendix B, (Table 21 and **Figure 60**. A total of ten (10) monitoring sites exist for this IUA. Time series data of groundwater quality (using EC as overall indicator) is presented in Figure 39 in Appendix A.

From Figure 39, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good. The available ECs are between 43 - 106mS/m, however, EC measurements are sparse and date back to 2008. In terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.18 T3 IUA_T03: Lower Mthatha

IUA Description	Lower Mthatha
	The aquifer is of an intergranular and fractured type associated with the Karoo Supergroup, as well as the presence of dolerite sills and dykes. The IUA is moderately stressed in certain areas.
GW RU	GW_RU44
Quaternary Catchments	T20B-G

The monitoring sites in IUA 18 (T3) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 22 and **Figure 61**. A total of sixteen (16) monitoring sites exist for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 40 and Figure 41, respectively in Appendix A.

From Figure 40, groundwater levels vary between 5 – 45mbgl in the IUA. A cyclical trend is evident at T2N0001 with seasonal variations. The groundwater levels at the remaining monitoring sites appear more stable. A recovery of groundwater levels is evident in 2022 at all monitoring sites.

From Figure 41, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good. The available ECs are between 69 - 140mS/m, however, EC measurements are sparse and date back to 1999. In terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

5.19 IUA_T04: Pondoland Coastal

IUA Description	Pondoland Coastal
	The aquifer is of an intergranular and fractured type associated with the Karoo Supergroup, as well as the presence of dolerite sills and dykes. There are no stressed areas in the IUA
GW RU	GW_RU45
	GW_RU46
	GW_RU47
	GW_RU48
Quaternary Catchments	T60A-K, T70A-G, T80A-D, T90A-G

The monitoring sites in IUA 19 (T4) include Hydstra and WMS sites. These monitoring sites are summarised in Appendix B, Table 23 and **Figure 62**. A total of thirty two (32) monitoring sites exists for this IUA. Time series data of groundwater levels and groundwater quality (using EC as overall indicator) is presented in Figure 42 and Figure 43, respectively in Appendix A.

From Figure 42, groundwater levels vary from 1 – 39mbgl and appear to be more stable at some monitoring sites and more erratic at others. A decline in groundwater levels is noted from 2015 to 2018, followed by a short recovery period towards end 2018. From 2018 there appears to be a slow but steady decline of groundwater levels at some monitoring sites (T9N0004 & T9N0005) and a recovery at other monitoring sites (T6N0004, T7N0001, T7N0002 & T9N0003).

From Figure 43, time series trend analysis graph for EC indicates that the groundwater quality within the IUA is generally good (with the exception of a few outliers). The available ECs at the monitoring site are generally <100mS/m, and, in terms of the DWAF Water Classification System the groundwater within this IUA can be classified as a “Class 1” or “Good Water Quality” type water.

6. DEGREE OF IMPACT

A Groundwater Balance approach was used to determine the degree of impact of the groundwater resource on a catchment scale. Previous estimations of Groundwater Recharge, Basic Human Needs (BHN) and Groundwater contribution to Baseflow were used as the basis for this assessment (DWS, 2023, WEM/WMA7/00/CON/RDM/1122). In addition to this groundwater use data, acquired from the DWS WARMS database and certain municipal databases[1], was added to the water balance equation to provide an estimation of the volume of groundwater in surplus or deficit in the catchment. This volume is then translated in a Stress Index to express the degree of impact.

6.1 Groundwater Use

The DWS WARMS data for boreholes and springs was acquired to provide a spatial distribution of groundwater use in the catchment. In total there are 4266 registered groundwater resources in the catchment, of which 3727 are boreholes and 539 are springs. The total groundwater use registered in the catchment is 154.52Mm^3/annum. Currently, the irrigation sector accounts for the largest component with 38%, followed by Schedule 1 with 26% and water supply service (i.e. mainly municipalities) with 21% (Figure 4). The remaining sectors (i.e. Aquaculture, Livestock, Industry, Mining, Power Generation and Recreation) contribute to about 15% of the total groundwater use in the catchment.

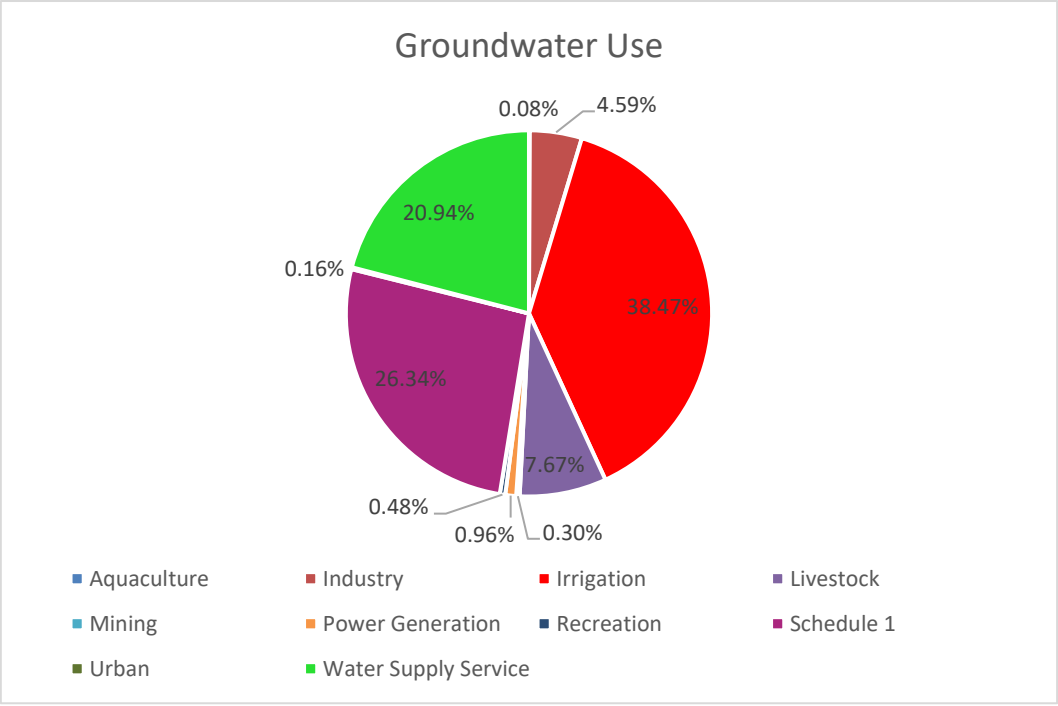


Figure 4: Groundwater Use per Sector

[1] Municipal groundwater use data was acquired from Nelson Mandela Bay, Kouga and Koukamma Municipalities

The spatial distribution of the groundwater resources (i.e. boreholes and springs) is displayed in Figure 5. Based on annual registered groundwater volume, the groundwater resources have also been categorised in terms of water use (Figure 6). Most groundwater resources fall in the 'low use' category of 0 – 46 391m^3/annum, however it must be noted that the groundwater resources occur in clusters, which implies that the cumulative use of individual groundwater resources is much greater. The groundwater use per quaternary catchment is provided in Appendix C, Table 24.

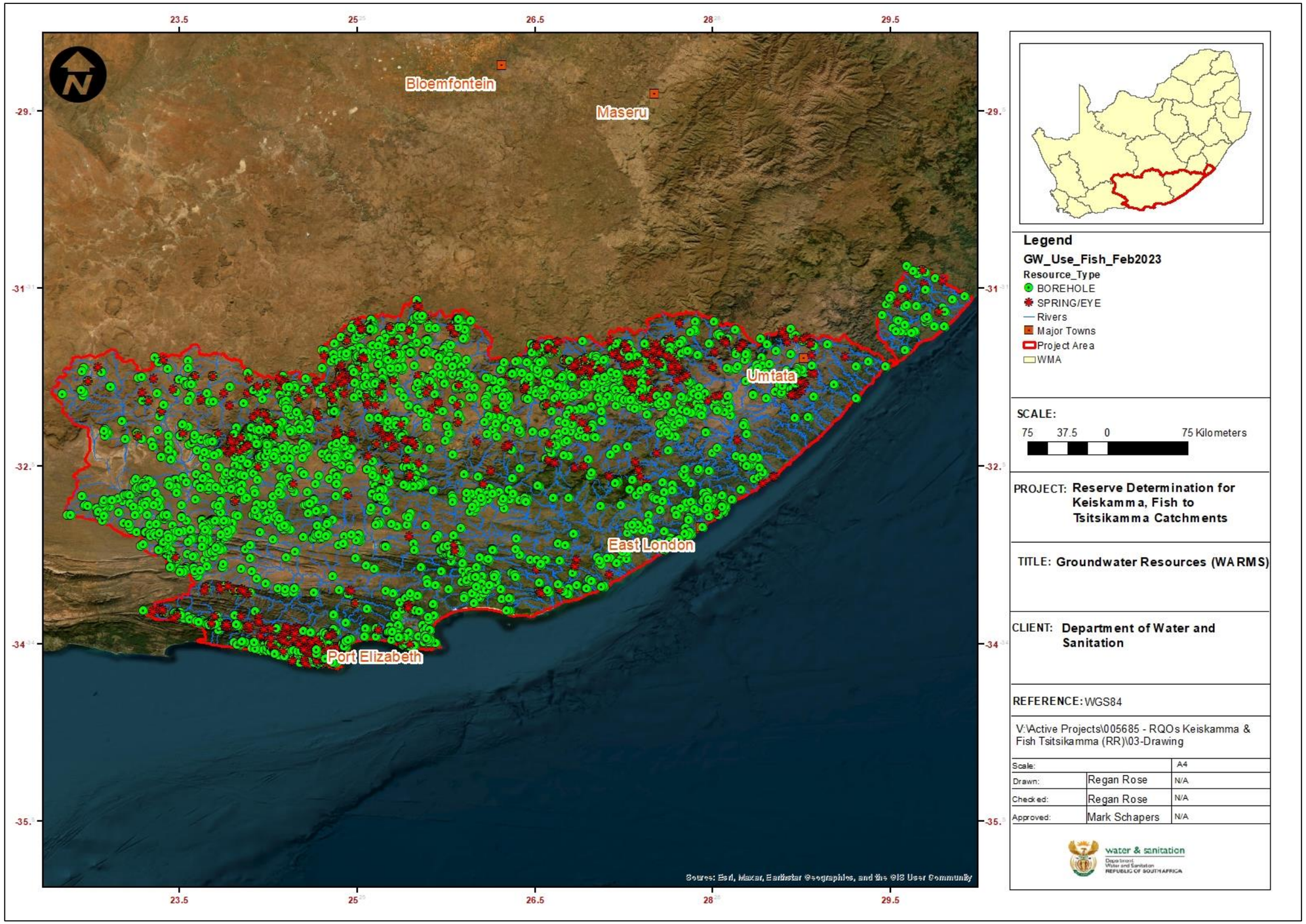


Figure 5: Registered Groundwater Resources in WARMS

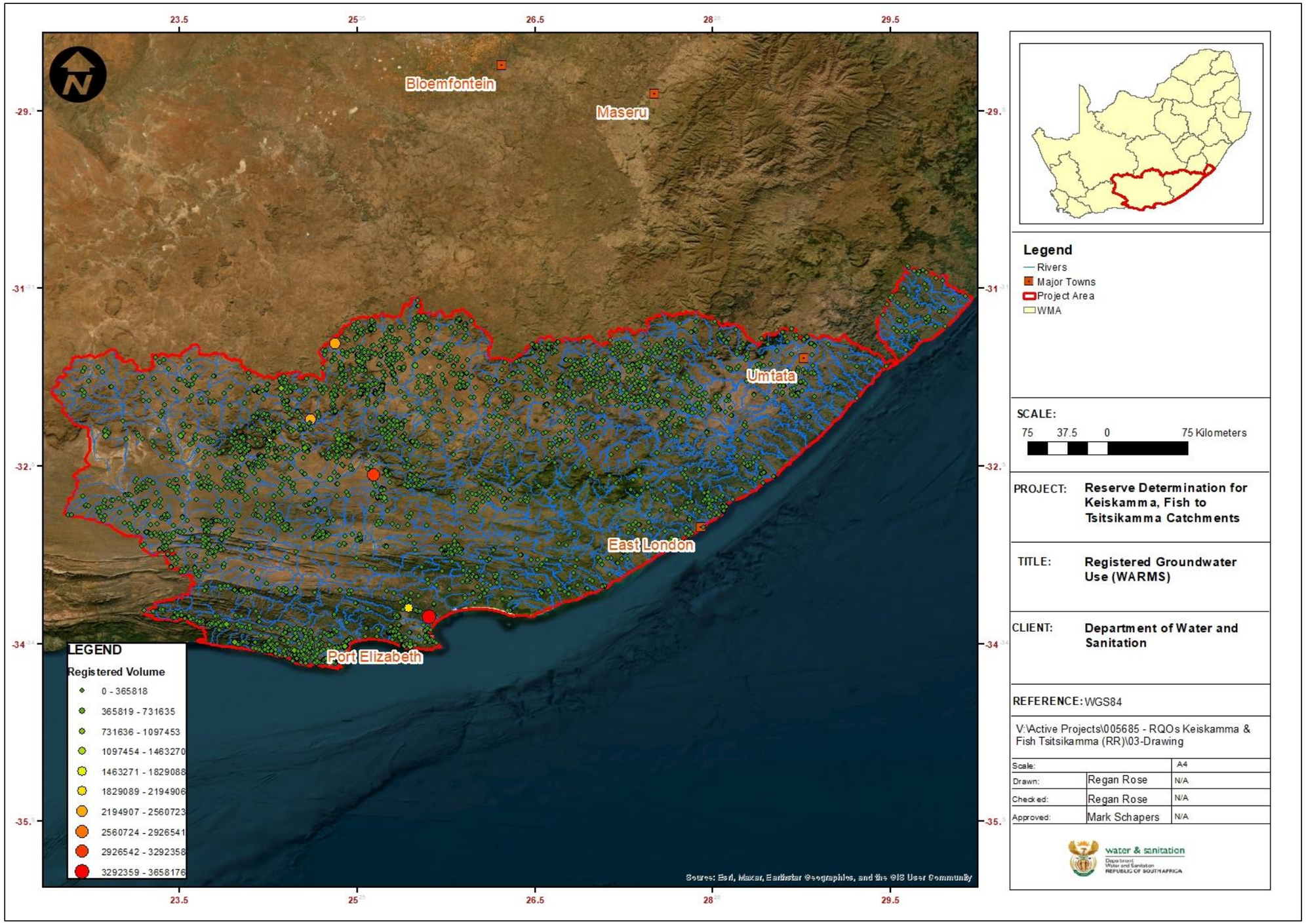


Figure 6: Registered Groundwater Resources and categorised volumes

6.2 Groundwater Quality

Section 2.2 describes the overall groundwater quality in the catchment in terms of aquifer type and EC. The overall groundwater quality is generally good over most parts, however areas in the central and western parts of the catchment reflect marginal to poor groundwater quality. The spatial distribution of EC generally reflects lithological control, favourable recharge and rainfall conditions. Groundwater associated with the Cape Supergroup (i.e. in particular the Table Mountain Group) and Karoo Supergroup (i.e. in particular the Beaufort Group) generally have very good quality; whereas groundwater associated with the Bokkeveld Group, Uitenhage Group and alluvium (particularly over the more arid western parts of the catchment), owing to greater interaction with rock and sediments, have poorer quality. Therefore, though certain parts of the catchment have poor quality groundwater, it is not always impacted by external sources and occur naturally in aquifers.

Where external sources are impacting negatively on groundwater quality, increases in typical pollution indicators such as nitrate, ammonia, sulphate will generally be evident. The DWS WMS database was interrogated to analyse groundwater quality data in the catchment. The distribution of nitrate and nitrite, ammonia and sulphate in the catchment is displayed in Figure 7, Figure 8 and Figure 9, respectively. In each case the SANS 241 (2015) aesthetic limits were used to distinguish between acceptable and elevated concentrations, respectively. The results show that elevated nitrate and nitrite concentrations occur widespread in the catchment. This is likely due to the impact of farming practices in the catchment. Ammonia concentrations are generally within the SANS 241 (2015) aesthetic limits in the catchment. Elevated sulphate concentrations occur mainly in the western half of the catchment. These elevated sulphates may potentially be owing to an external sources namely agricultural practices or other surrounding land use activities. A summary of the aesthetic and health effects of these compounds is provided in Table 3. Treatment of the groundwater is required to render it suitable for domestic purposes.

Table 3: Aesthetic and Health Effects

Compound	Aesthetic Effects	Human Health Effects
Ammonia	- taste and odour complaints - converts to nitrite which can be toxic to aquatic life and humans - retards chlorination treatment	- indirectly toxic through nitrite, especially infants
Nitrate/Nitrite	- none	- causes methaemoglobinaemia by combining with oxygen in the blood, particularly in young infants - may cause carcinogenic nitrosamines
Sulphate	- bitter salty taste - increase erosion of metal fittings	- diarrhoea

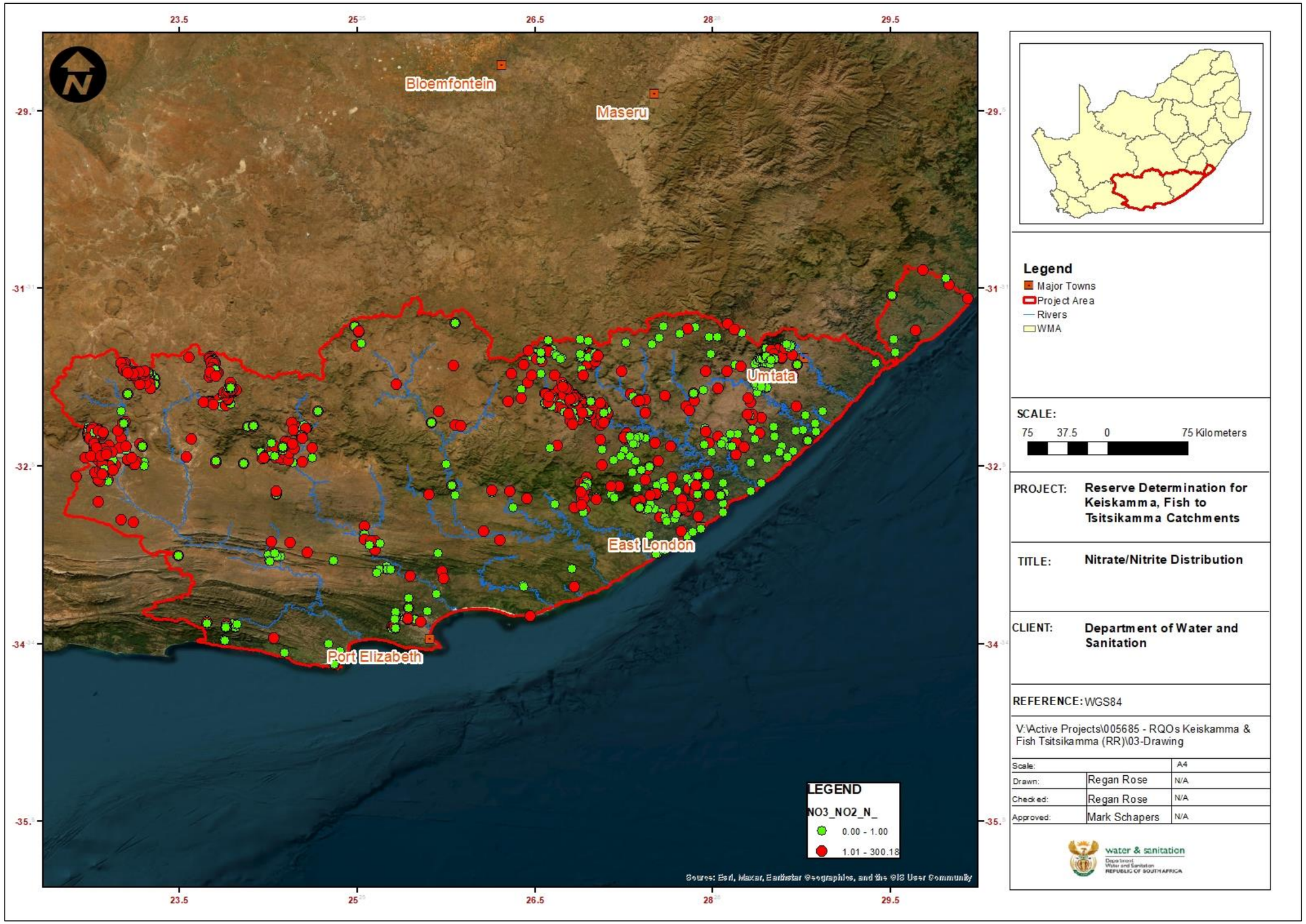


Figure 7: Spatial distribution of nitrate and nitrite in the catchment

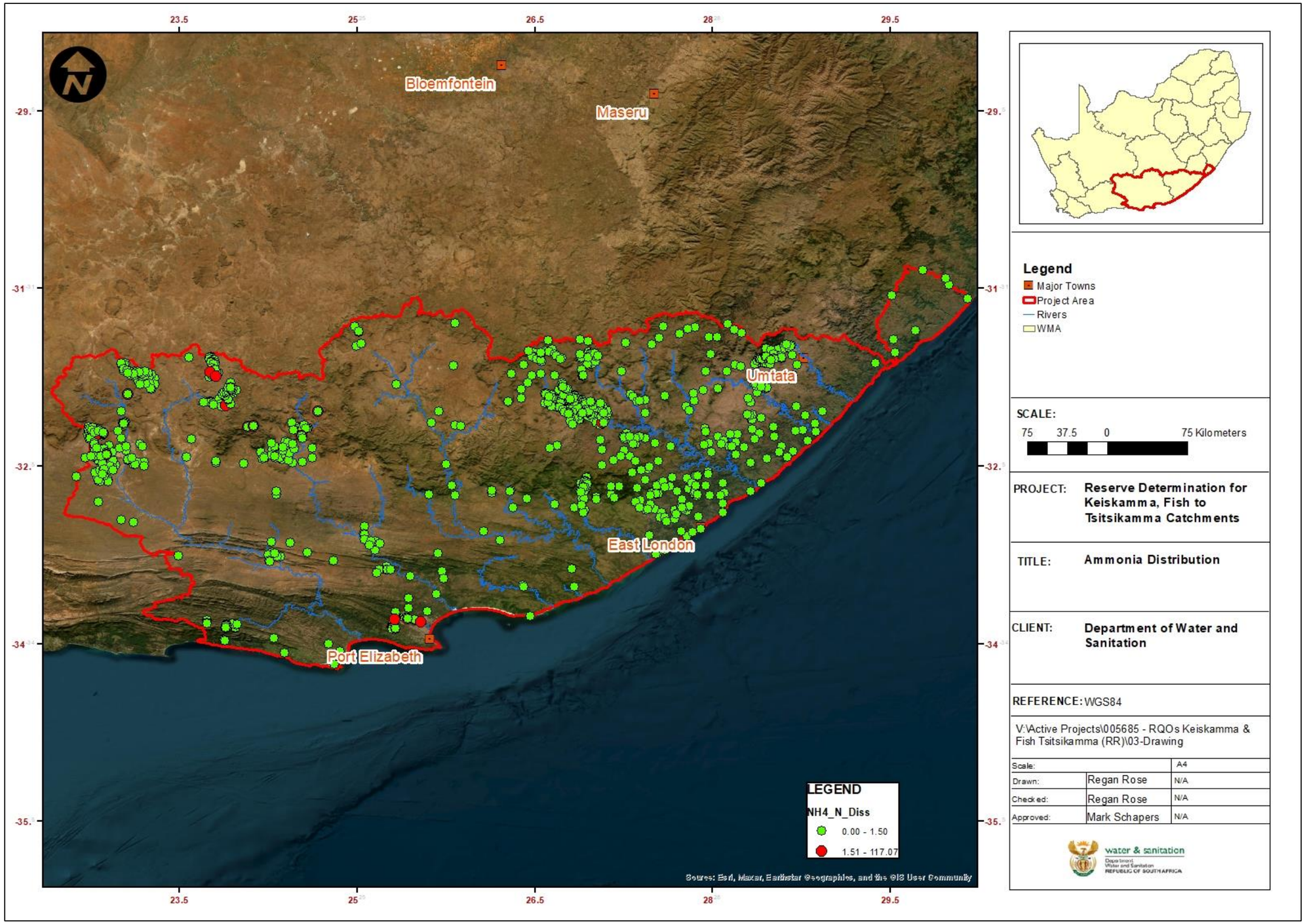


Figure 8: Spatial distribution of ammonia in the catchment

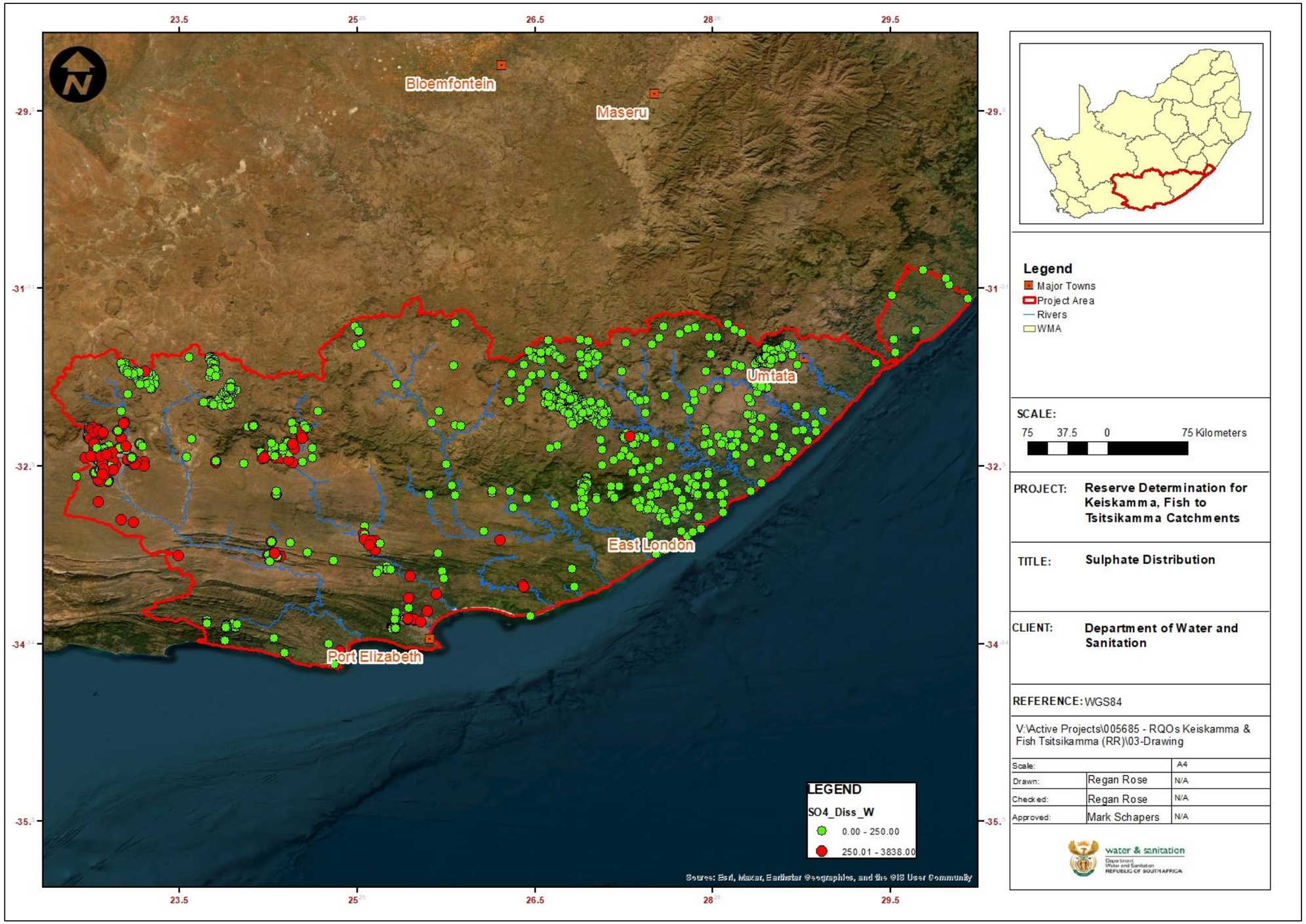


Figure 9: Spatial distribution of sulphate in the catchment

6.3 Groundwater Quality Reserve

The DWS WMS database was further interrogated to assess groundwater quality (chemical) parameters in more detail in the catchment. The available chemical parameters are EC, calcium, magnesium, sodium, potassium, total alkalinity, chloride, sulphate, nitrate/nitrite and fluoride. The objective is to assign limits for the Groundwater Quality Reserve through observations of chemical groundwater trends. Median concentrations of each chemical parameter were determined to characterise the dominant groundwater quality in each quaternary catchment, where available. In consultation with DWS, the Groundwater Quality Reserve was set at median concentrations plus 10% for each chemical parameter. The results are provided in Appendix D.

It must be noted that only one hundred and eight (108 No.) of the three hundred and forty five (345 No.) quaternary catchments have groundwater quality data, therefore Groundwater Quality Reserves are only available for these quaternary catchments. For this reason, Groundwater Quality Reserves were aggregated to IUA scale to represent quaternary catchments with no groundwater quality data (Table 4). These results are provided in Appendix E. With the exceptions of IUAs LN1 and NQ1, the Groundwater Quality Reserves for all IUAs are within the limits of a Class 1 water quality in terms of DWS Water Quality Guidelines (DWS, 1998).

Table 4: List of quaternary catchments with no groundwater quality data

IUA	No groundwater quality data
K1	K80A, K80C, K80D, K80E, K80F, K90A
KL1	K90C, K90D, L90B, L90C
L1	L81A, L81B, L81C, L81D, L82A, L82B, L82E, L82F, L82G, L82H, L82J
M1	M10A, M10B, M20A, M20B, M30A
LN1	L11A, L11B, L11D, L11E, L11G, L12A, L12B, L12C, L12D, L21A, L21B, L21C, L21D, L21E, L21F, L22A, L22B, L22C, L22D, L23A, L23B, L23C, L23D, L30A, L30B, L30C, L30D, L40A, L40B, L50A, L50B, L60A, L70A, L70C, L70D, L70E, L70F, L70G, N11A, N12A, N12B, N12C, N13B, N14B, N14C, N14D, N21A, N21B, N21C, N21D, N22A, N22B, N22C, N22D, N22E, N23A, N23B, N24A, N24B, N24C, N24D, N30A, N30B, N30C
NQ1	N40A, N40E, N40F
P1	P10A, P10B, P10D, P10E, P10G, P20B, P30A, P30B, P30C, P40A, P40B, P40D
Q1	Q11A, Q11B, Q11C, Q11D, Q14A, Q14C, Q14D, Q21A, Q21B, Q22A, Q30A, Q30B, Q80A, Q80B, Q80C
Q2	Q12A, Q12C, Q13B, Q13C, Q30C, Q30D, Q30E, Q41A, Q41B, Q41D, Q42A, Q42B, Q43A, Q43B, Q44A, Q44C, Q50A, Q50B, Q60A, Q60B, Q60C, Q70B, Q70C, Q80E, Q80F, Q80G, Q91C
Q3	Q92A, Q92B, Q92D, Q92E, Q93A, Q93B, Q93C, Q93D, Q94A, Q94B, Q94C, Q94D, Q94E
R1	R10A, R10B, R10C, R10D, R10E, R10F, R10G, R10H, R10J, R10K, R10L, R10M, R40A, R40B, R40C, R50A, R50B
R2	R20A, R20B, R20C, R20D, R20E, R20F, R20G, R30A, R30B, R30D
S1	S10E, S10F, S10J, S20B, S20C, S40D, S40F, S50A, S50B, S50D, S50E, S50H, S50J
S2	S32A, S32D, S32E, S32G
S3	S60E, S70B, S70C
T1	T11B, T11G, T12A, T12C, T12E, T12G, T20A
T2	T13A, T13B, T13E

IUA	No groundwater quality data
T3	T20D, T20E, T20F, T20G
T4	T60C, T60D, T60E, T60F, T60G, T70A, T70B, T70C, T70E, T70F, T70G, T80A, T80B, T80C, T90B, T90D

6.4 Groundwater Stress Index and the determination of Categories

The available groundwater use data was lumped with Groundwater Reserve estimations to quantify the surplus or deficit in the catchment. This was done on a quaternary catchment level. For the purpose of this assessment the Stress Index has been defined as follows:

Stress Index (SI) = $Re - (GW_{use} + EWR_{gw} + BHN_{gw})$

Where:

Re = Recharge

GW_{use} = Groundwater Use

BHN_{gw} = Basic human needs derived from groundwater

EWR_{gw} = Groundwater contribution to EWR

Using a GIS approach, the volume of surplus or deficit groundwater was divided into eleven (11 No.) geometric interval categories as shown in Table 5 . The stress categories vary from “A” (Natural) to “F” (Critically Modified).

Table 5: Stress Index (SI) categories

Category	SI Volume (Mm^3/a, lower limit)	SI Volume (Mm^3/a, upper limit)	Description
A	14.67	22.04	Natural
A/B	10.39	14.67	Natural to good
B	7.89	10.39	Good
B/C	6.43	7.89	Good to Fair
C	5.58	6.43	Fair
C/D	4.12	5.58	Fair to Poor
D	1.62	4.12	Poor
D/E	-2.67	1.62	Poor to Seriously Modified
E	-10.03	-2.67	Seriously Modified
E/F	-22.65	-10.03	Seriously Modified to Critically Modified
F	-44.31	-22.65	Critically modified

The spatial distribution of the Stress Index categories is shown in Figure 10. The Stress Index per quaternary catchment is provided in Appendix F, Table 151. The majority of the quaternary catchments falls in the “D” (Fair) category (18.26%), followed by the “B” (Good) category (14.20%) and “B/C” (Good to Fair) category (13.91%).

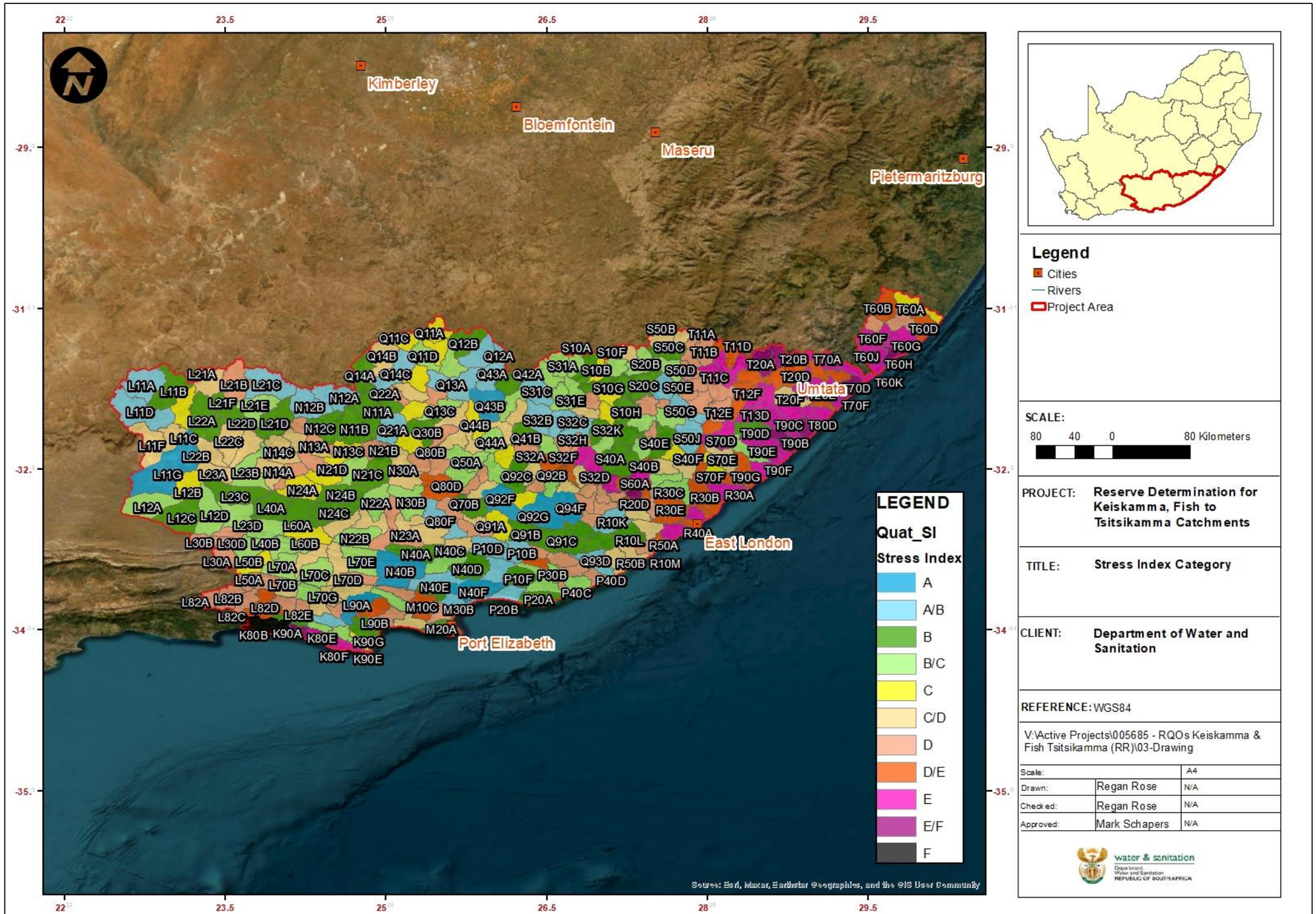


Figure 10: Stress Index categories

7. CONCLUSION

This report details the findings of the groundwater present ecological status in the catchment. The available monitoring data, which comprises of groundwater levels and groundwater quality, were assessed to describe the present status. A water balance approach was them employed to determine the surplus of deficit in the catchment. This was done by lumping the Groundwater Reserve calculations with the groundwater use data acquired from DWS's WARMS database.

The available data for the Hydstra and WMS monitoring sites was used to assess the present status of groundwater in the catchment. General the catchment has a good spatial distribution of monitoring sites, which is being maintained by the DWS regional offices. Groundwater levels are monitored continuously with loggers and manual measurements, whilst groundwater quality is monitored bi-annually at selected monitoring sites. The results can be summarised as follows:

- Groundwater levels vary significantly over the catchment
- Long term continuous groundwater level data generally indicate cyclical trends with seasonal variations
    - A decline in groundwater levels is evident at most monitoring sites from 2015 – 2021. At some monitoring sites a decline in groundwater levels is also observed from 2007 – 2011. These cycles are related to drought conditions in the catchment.
    - Although recovery is indicated at some monitoring sites in 2022, the groundwater levels are below the pre-drought conditions
- Groundwater quality (using EC as indicator) is generally good in the entire catchment
    - The exceptions are in the central and western parts of the catchment where lithology, as well as limited recharge and rainfall, have a bearing on groundwater quality.

Groundwater use data for boreholes and springs was acquired to provide a spatial distribution of groundwater use in the catchment. The total groundwater use registered in the catchment is 154.52Mm^3/annum. Currently, the irrigation sector accounts for the largest component with 38%, followed by Schedule 1 with 26% and water supply service with 21%. The remaining sectors (i.e. Aquaculture, Livestock, Industry, Mining, Power Generation and Recreation) account for about 15% of the total groundwater use in the catchment. The largest groundwater use is in quaternary catchment M20A with 9.73Mm^3/annum. This quaternary catchment includes the Gqeberha metropolitan area that experienced severe drought from about 2017, which resulted in extensive groundwater exploration (municipal and private) occurring in the catchment.

The spatial distribution of EC generally reflects lithological control, favourable recharge and rainfall conditions. Though certain parts of the catchment have poor quality groundwater, it is not always impacted by external sources and occur naturally in aquifers. Where external sources are impacting negatively on groundwater quality, increases in typical pollution indicators such as nitrate, ammonia, sulphate are generally evident. The distribution of nitrate and nitrite, ammonia and sulphate was assessed to determine potential anthropogenic impacts. The results show that elevated nitrate and nitrite concentrations occur widespread in the catchment. This is likely due to the impact of farming practices in the catchment. Ammonia concentrations are generally within the SANS 241 (2015)

aesthetic limits in the catchment. Elevated sulphate concentrations occur mainly in the western half of the catchment. Based on the groundwater quality assessment, the main parameters of concern are EC (salinity), nitrate and nitrite and sulphate. These areas will require treatment prior to use.

Groundwater quality data was further interrogated to assess the Groundwater Quality Reserve. The Groundwater Quality Reserve was set at median concentrations plus 10% for each chemical parameter. Only one hundred and eight (108 No.) of the three hundred and forty five (345 No.) quaternary catchments have groundwater quality data, therefore Groundwater Quality Reserves are only available for these quaternary catchments. For this reason, Groundwater Quality Reserves were aggregated to IUA scale to represent quaternary catchments with no groundwater quality data. With the exceptions of IUAs LN1 and NQ1, the Groundwater Quality Reserves for all IUAs are within the limits of a Class 1 water quality in terms of DWS Water Quality Guidelines.

Using a GIS approach, the volume of surplus or deficit groundwater was divided into geometric interval categories. The majority of the quaternary catchments falls in the “D” (Fair) category (18.26%), followed by the “B” (Good) category (14.20%) and “B/C” (Good to Fair) category (13.91%). The main quaternary catchments of concern are K80A, K80B and K80C, which all have “F’s”. This is mainly due to the high Ecological Water Requirements (i.e. Groundwater contribution to Baseflow) demand in these catchments as the groundwater use is very low.

8. RECOMMENDATIONS

Based on the results of the current assessment, the following are recommended:

- Establish and implement an improved regional groundwater monitoring plan. Utilise the outcomes of the current and future assessments to implement and improve the existing regional groundwater monitoring plan; and
- Conduct a follow up on compliance of groundwater use licenses.

A more detailed monitoring programme and implementation plan will be developed as part of the larger study and will include specific recommendations for all the water resource components (wetlands, rivers, groundwater and estuaries).

APPENDIX A – GRAPHS

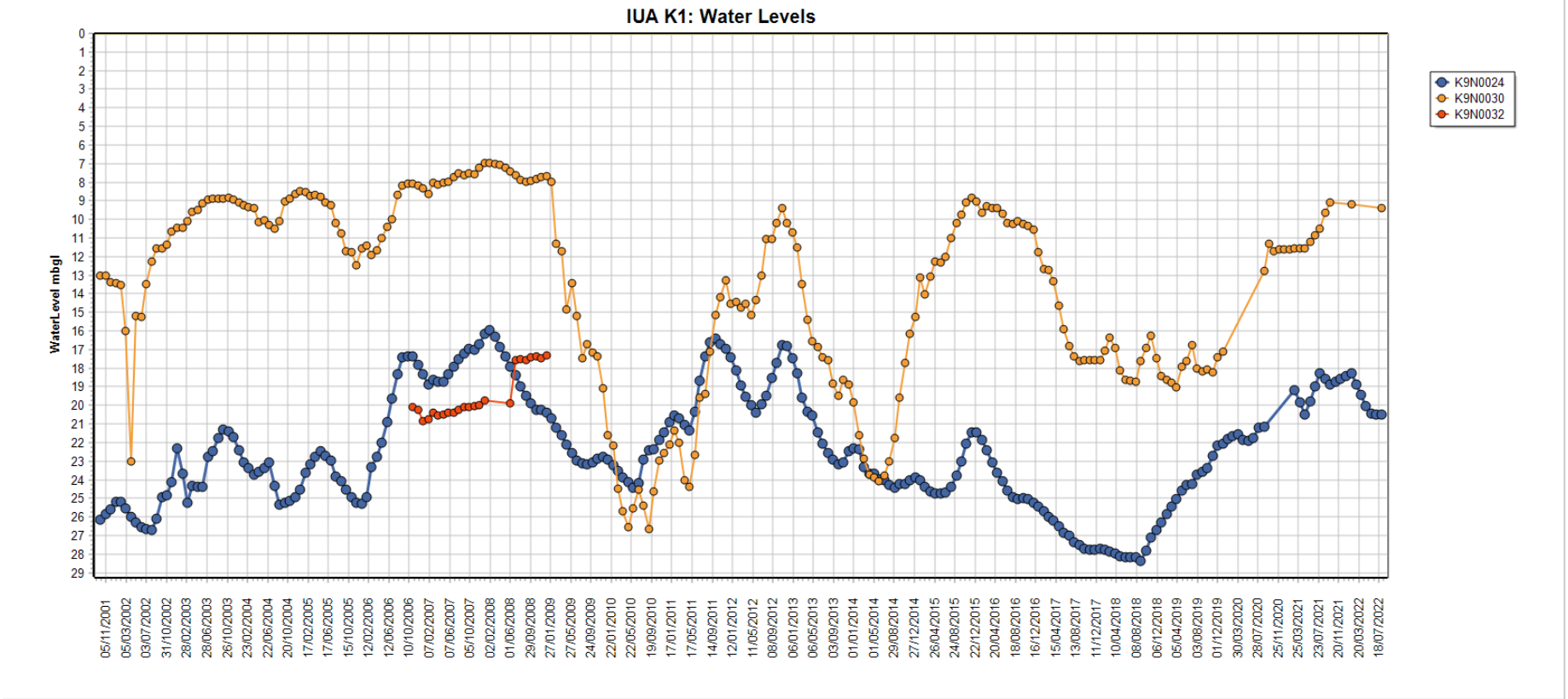


Figure 11: IUA K1 Water Levels

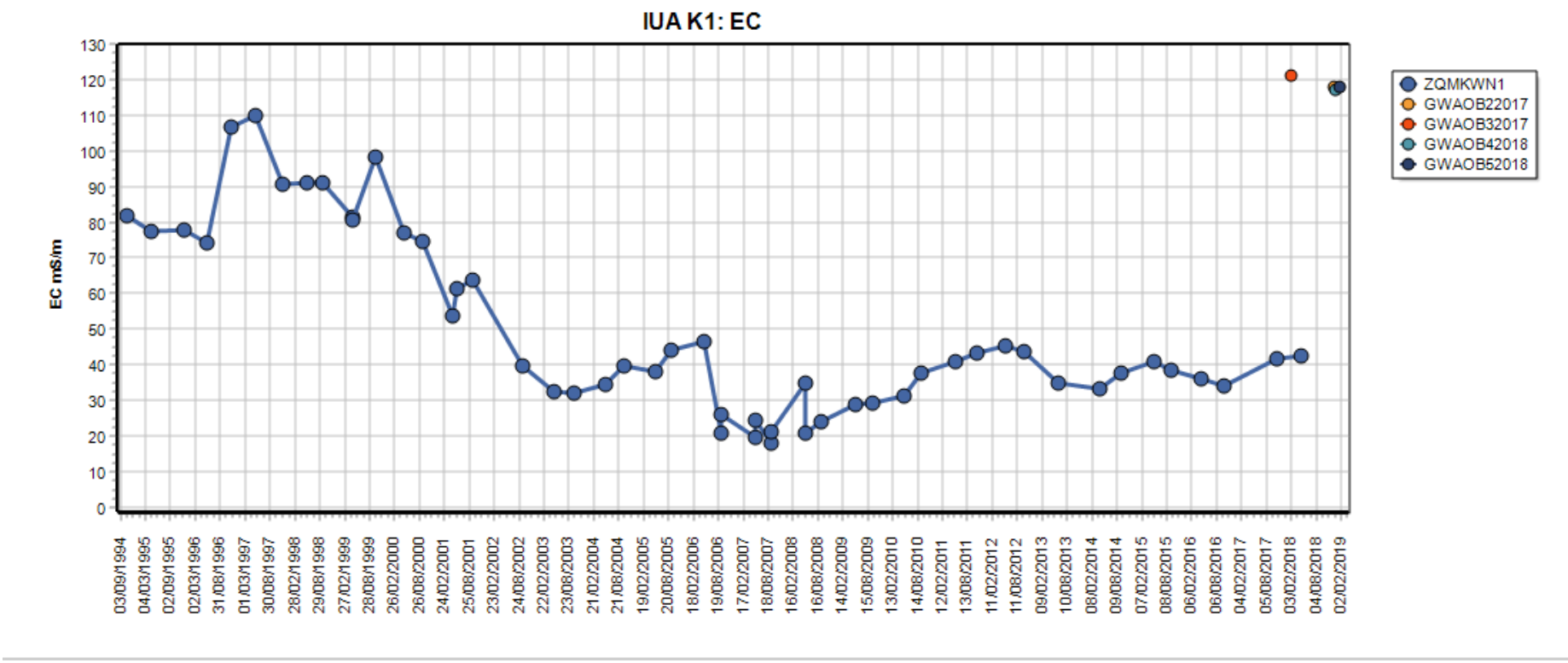


Figure 12: IUA K1 EC

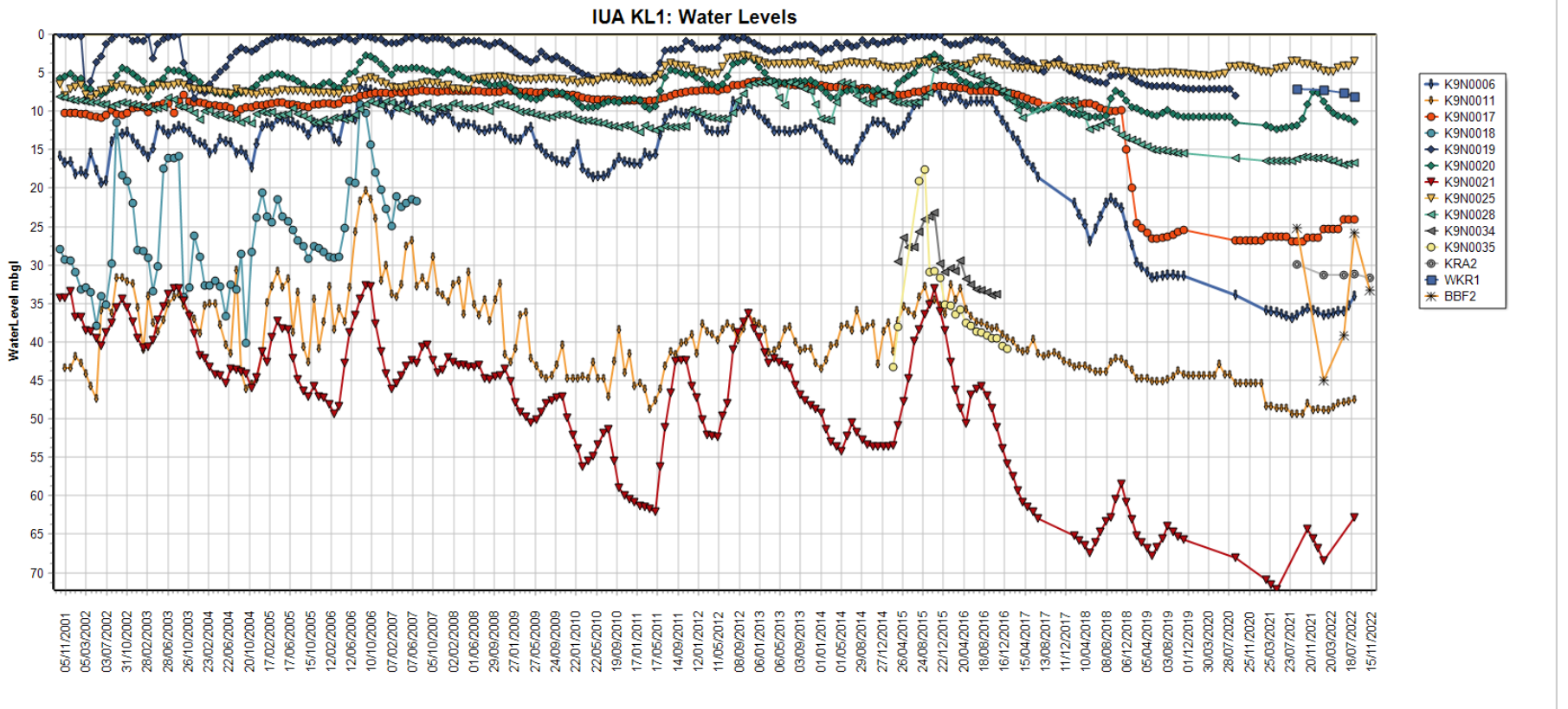


Figure 13: IUA KL1 Water Levels

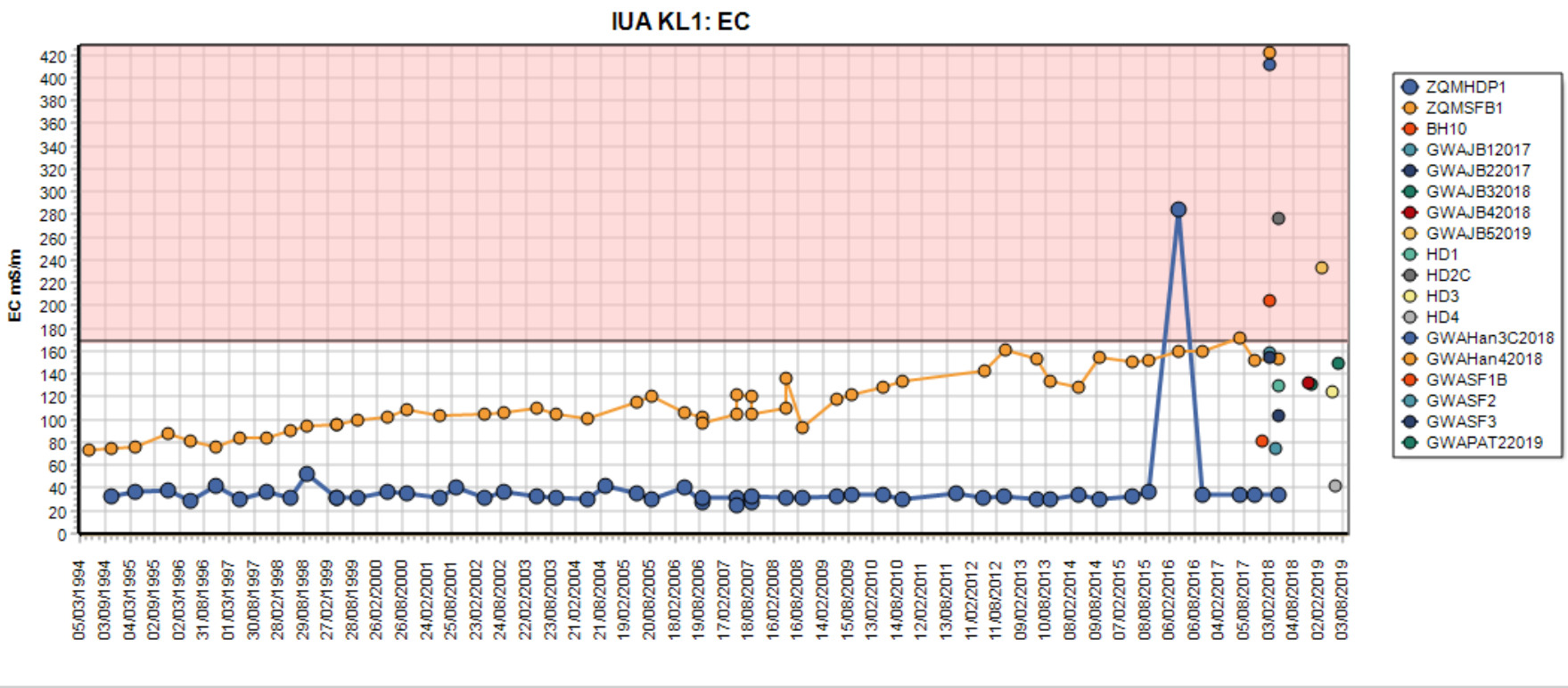


Figure 14: IUA KL1 EC

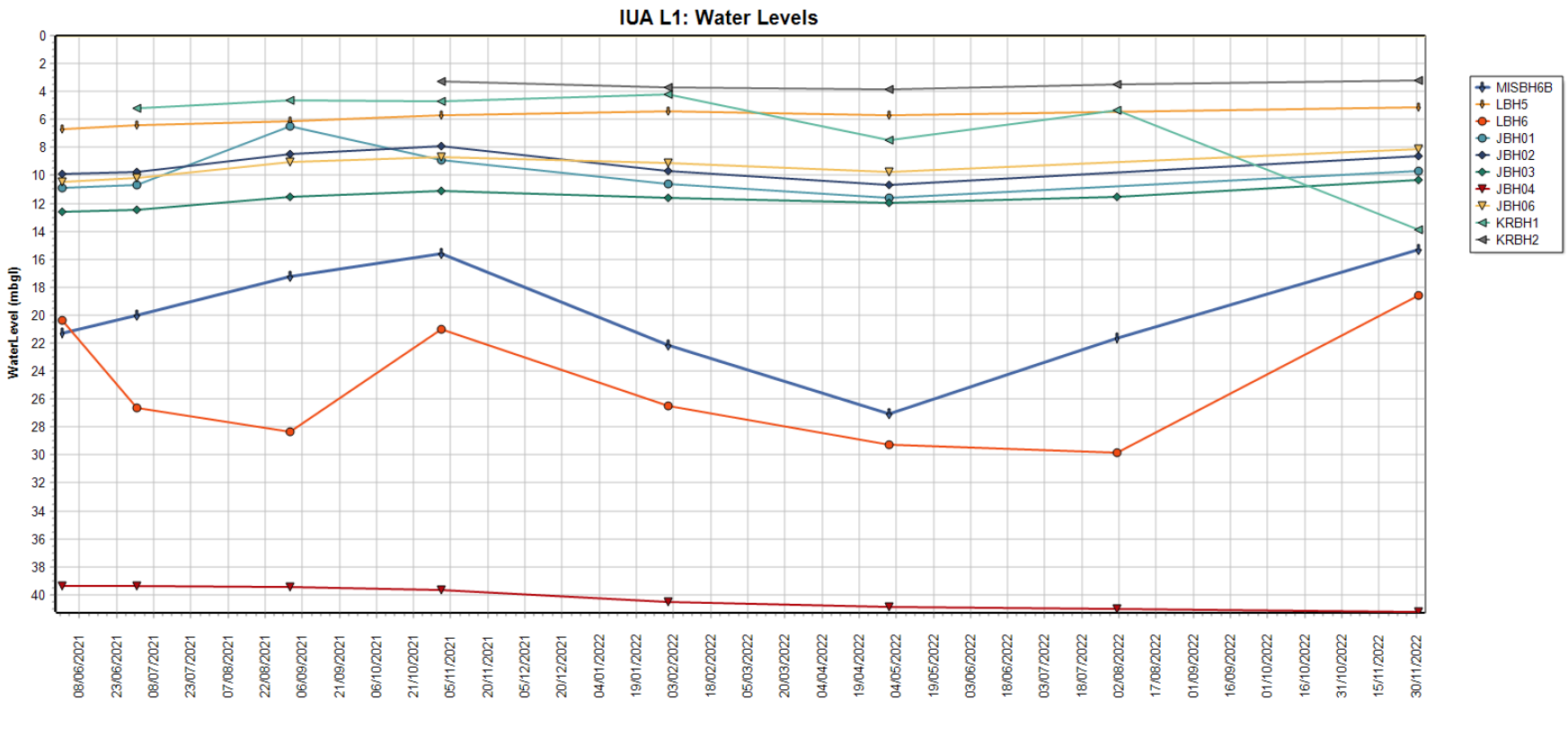


Figure 15: IUA L1 Water Levels

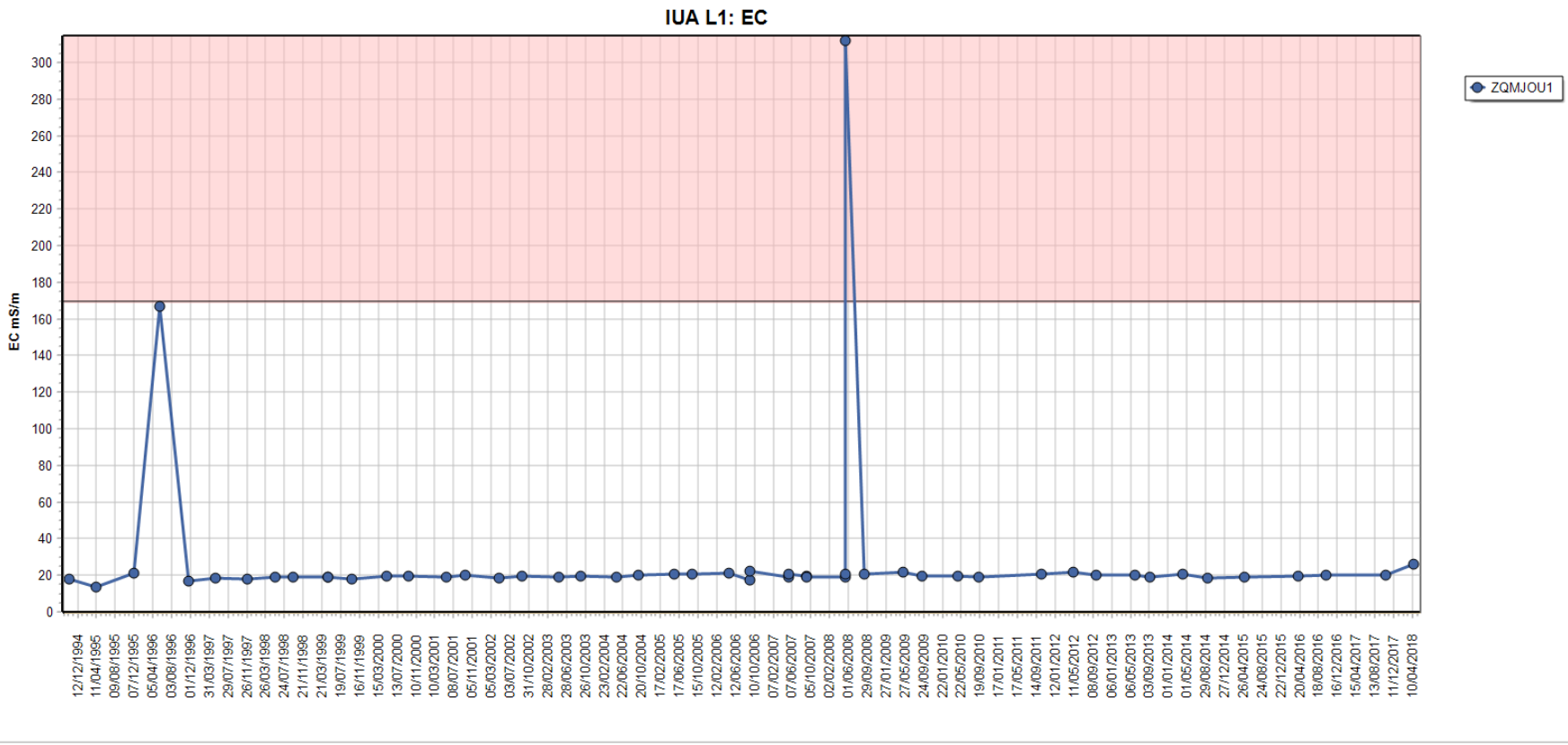


Figure 16: IUA L1 EC

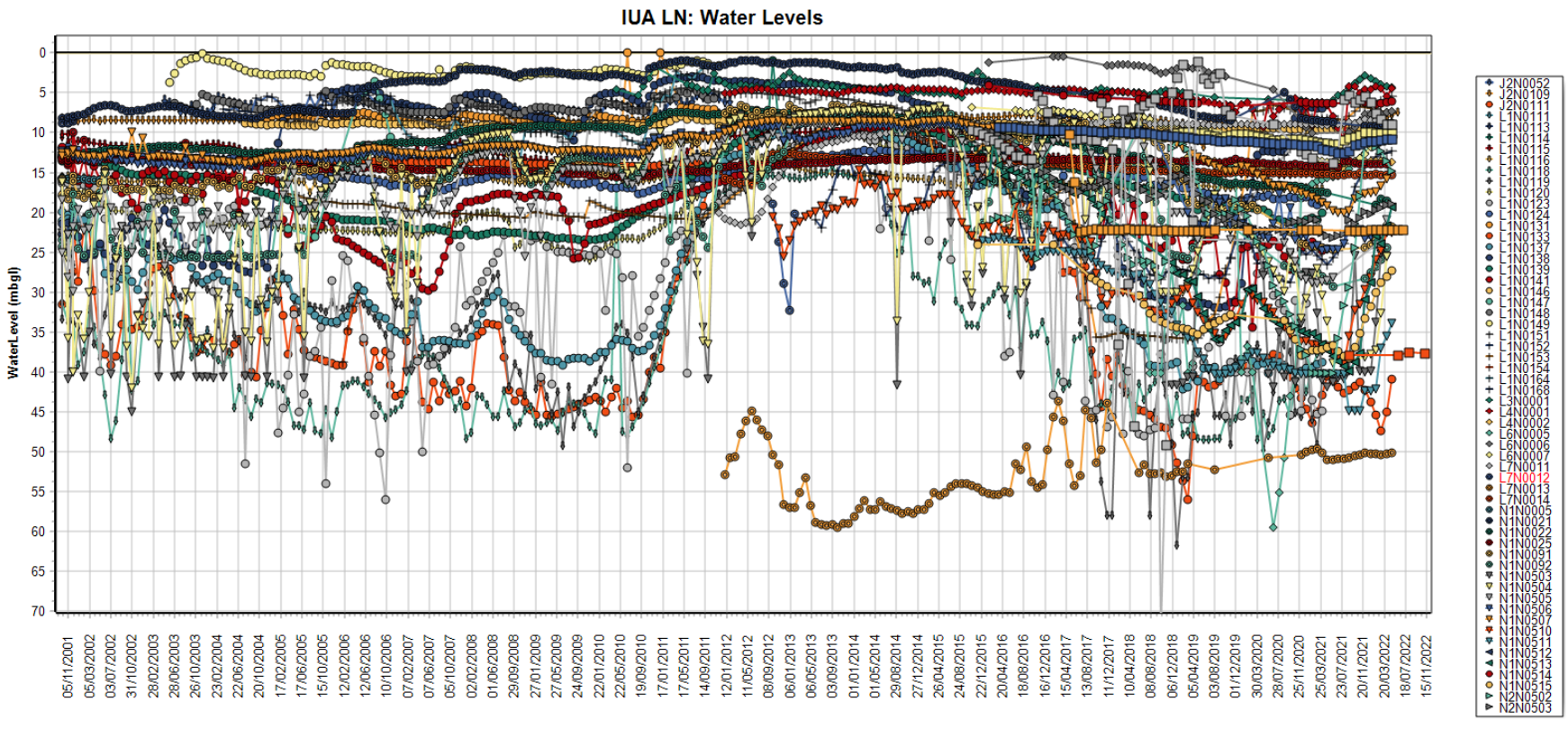


Figure 17: IUA LN1 Water Levels

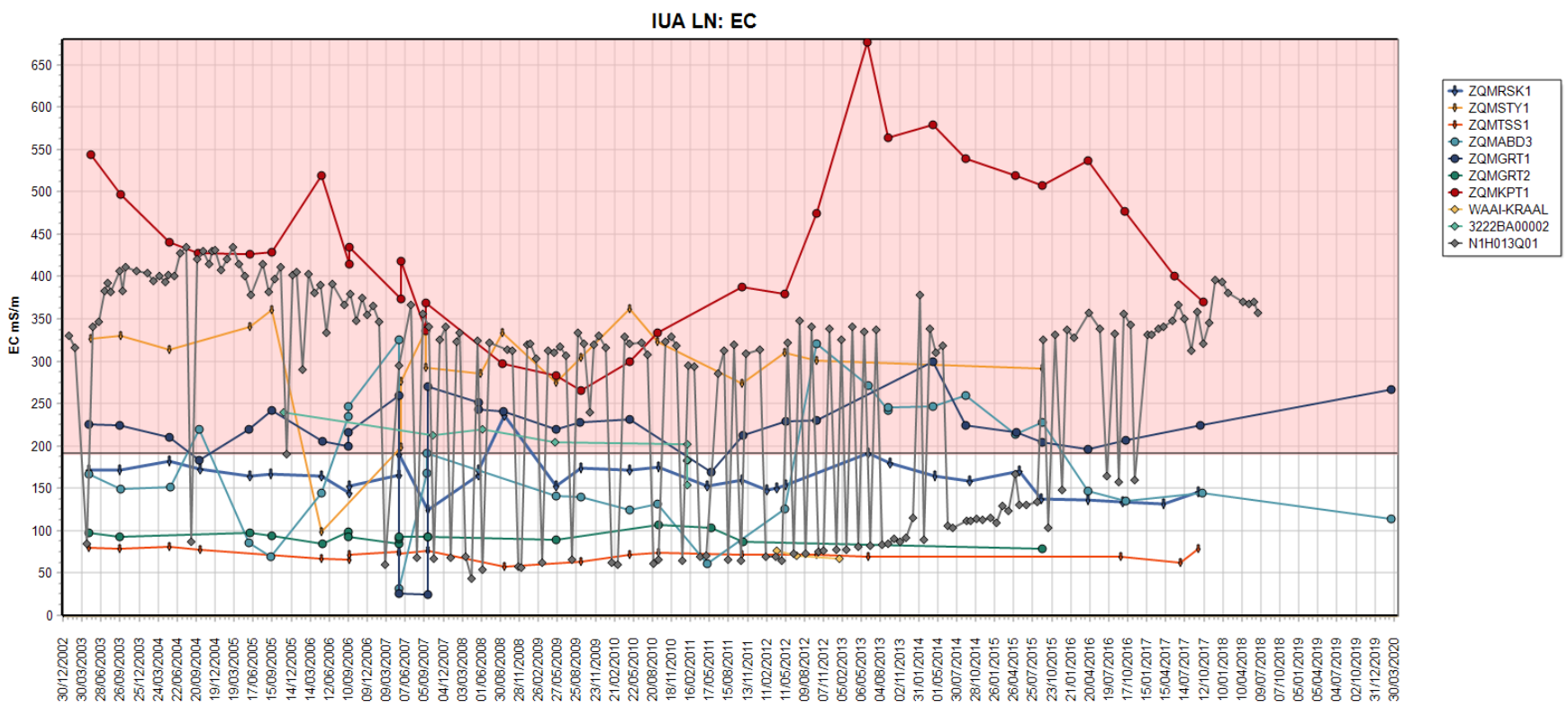


Figure 18: IUA LN1 EC

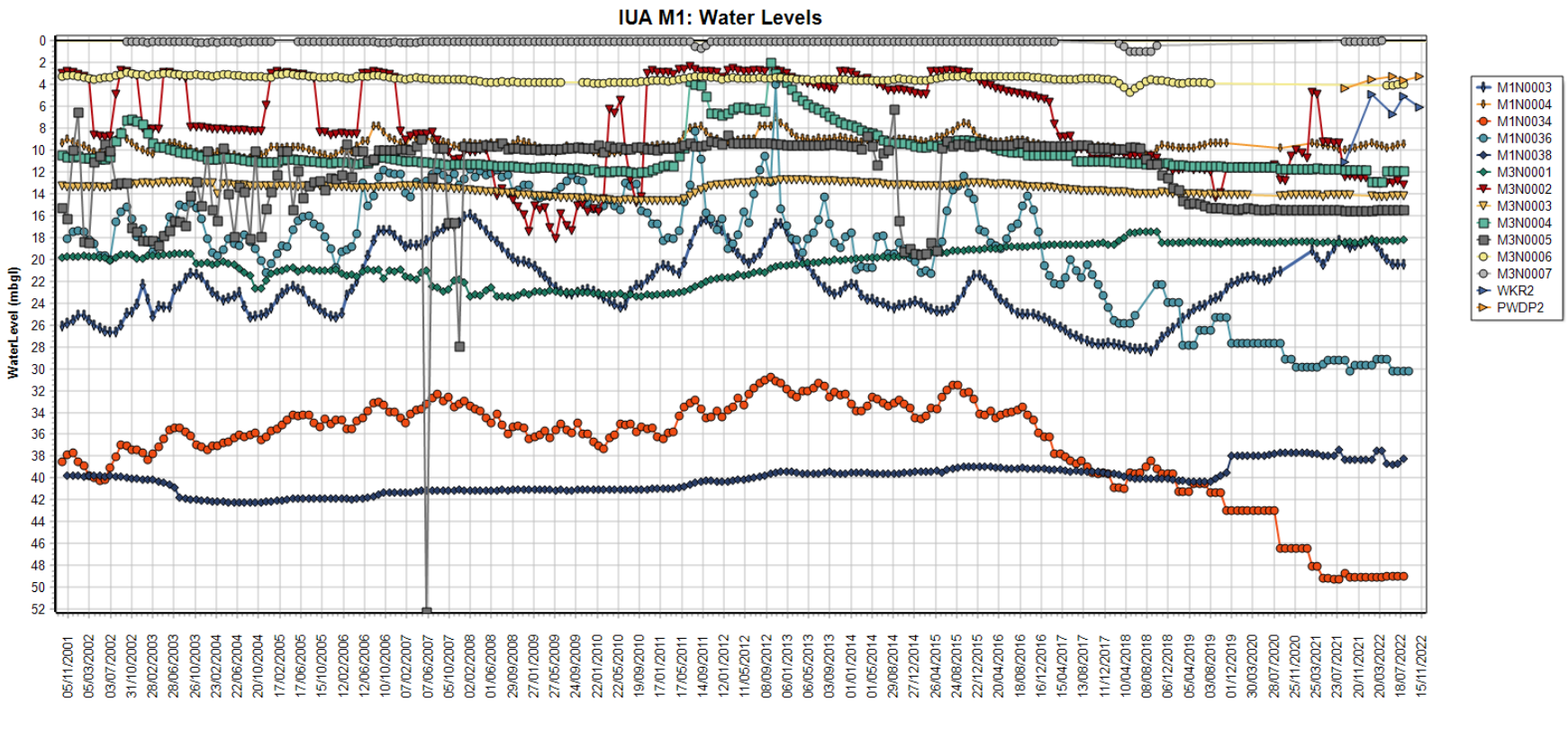


Figure 19: IUA M1 Water Levels

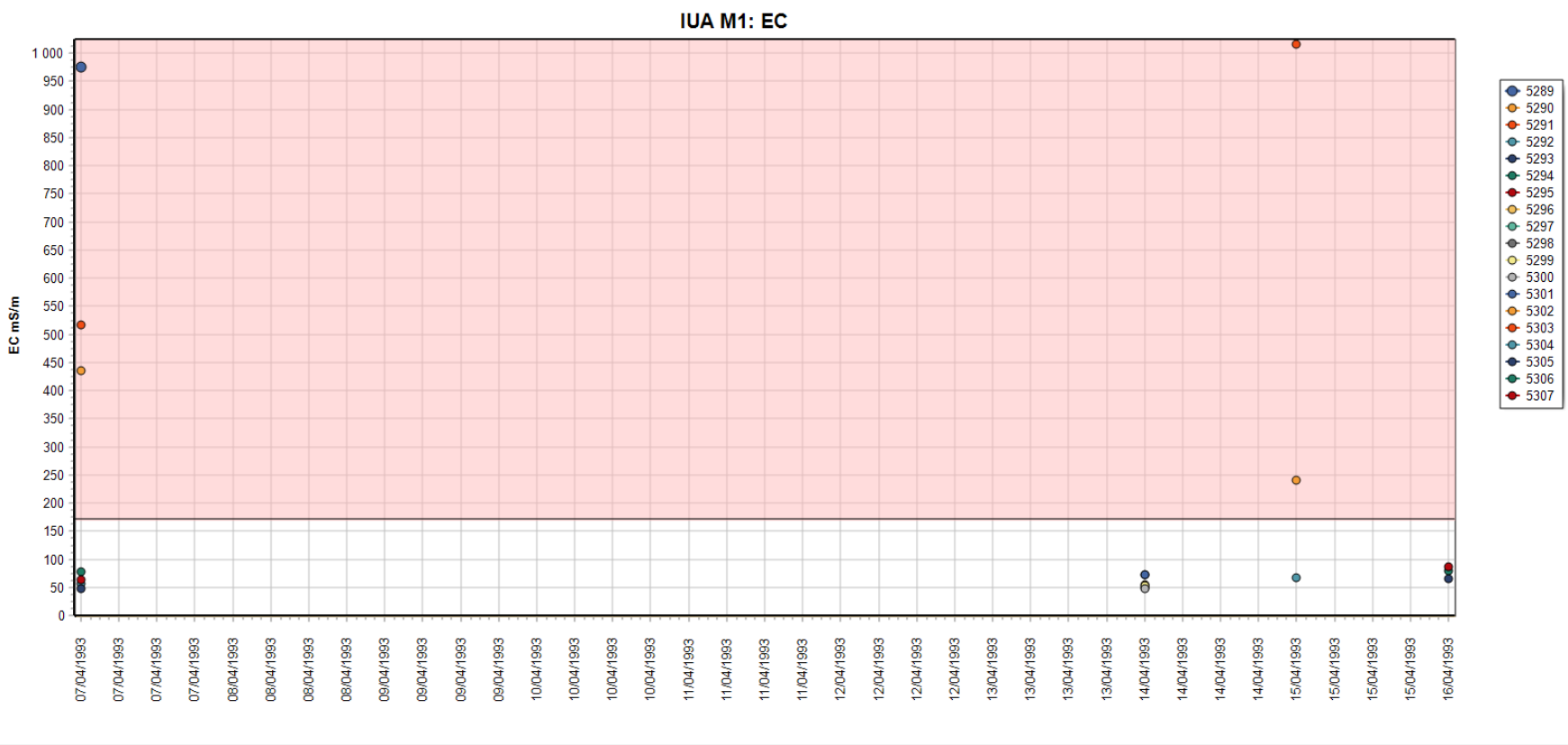


Figure 20: IUA M1 EC

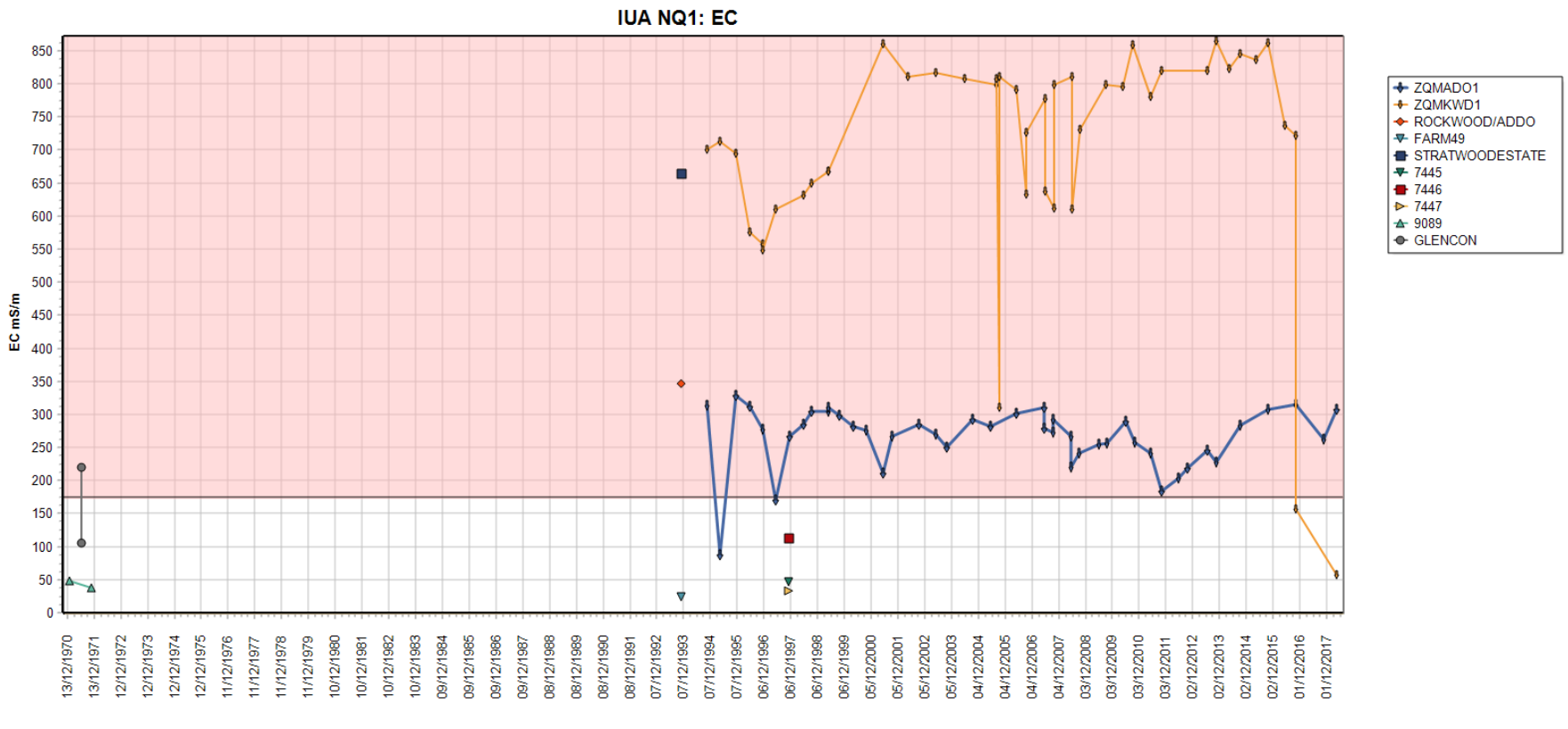


Figure 21: IUA NQ1 EC

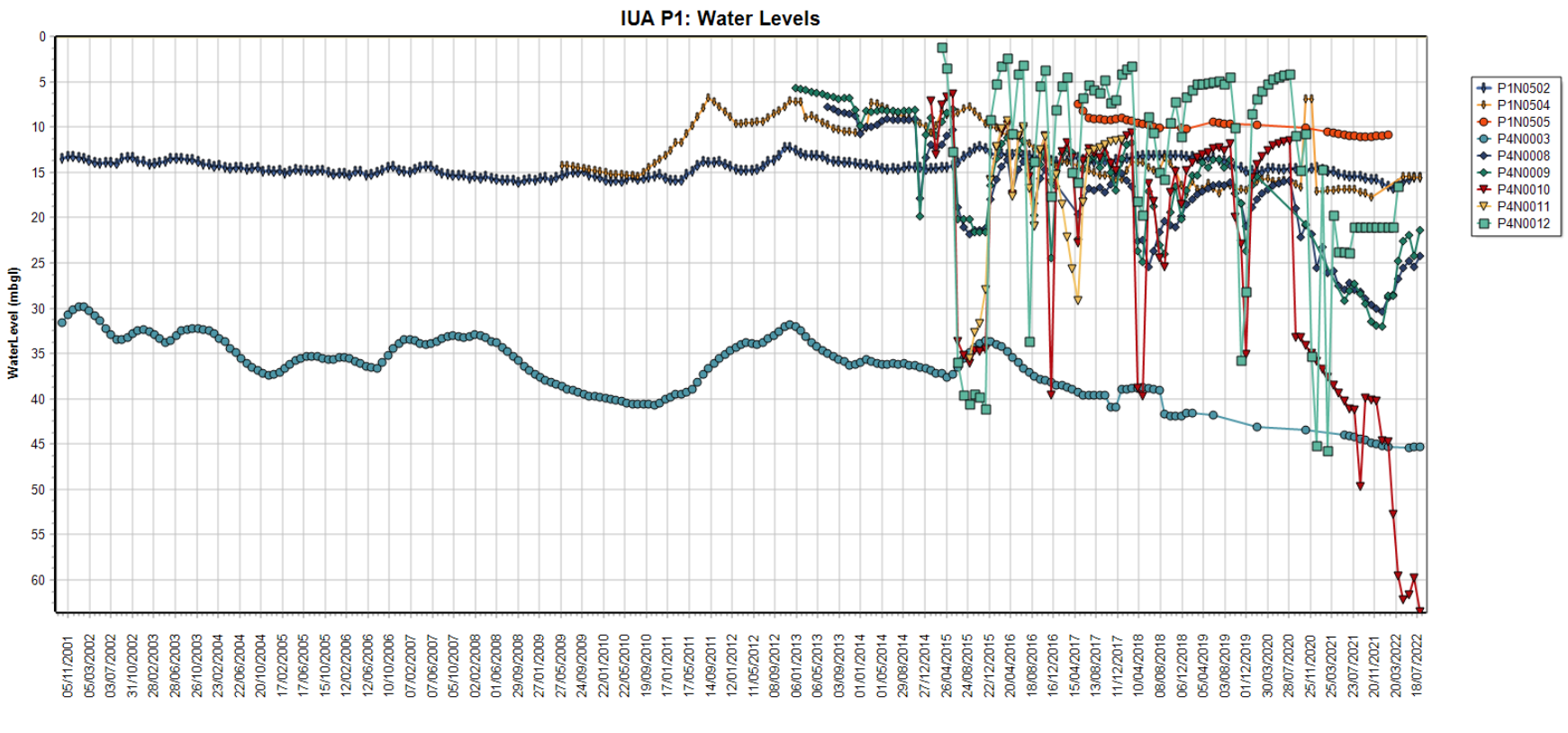


Figure 22: IUA P1 Water Levels

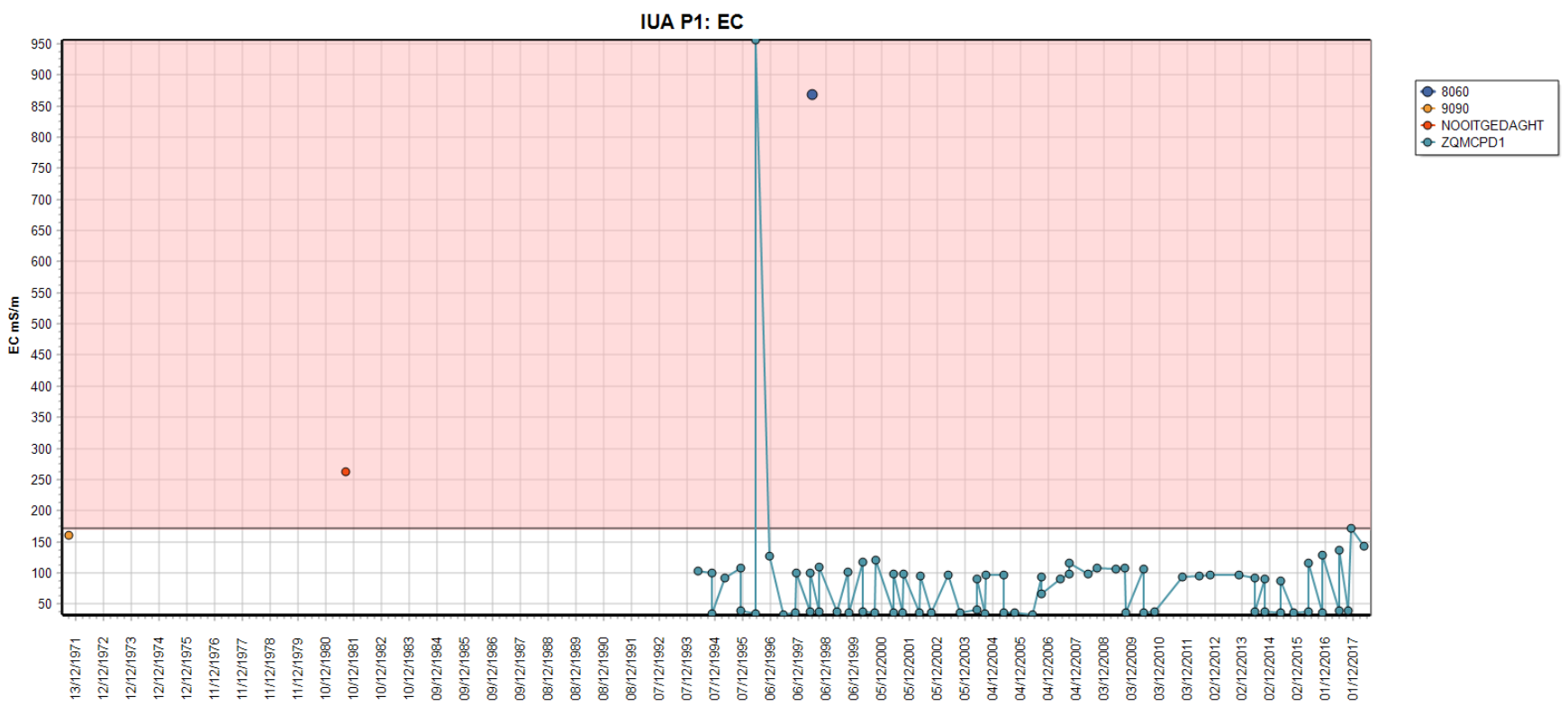


Figure 23: IUA P1 EC

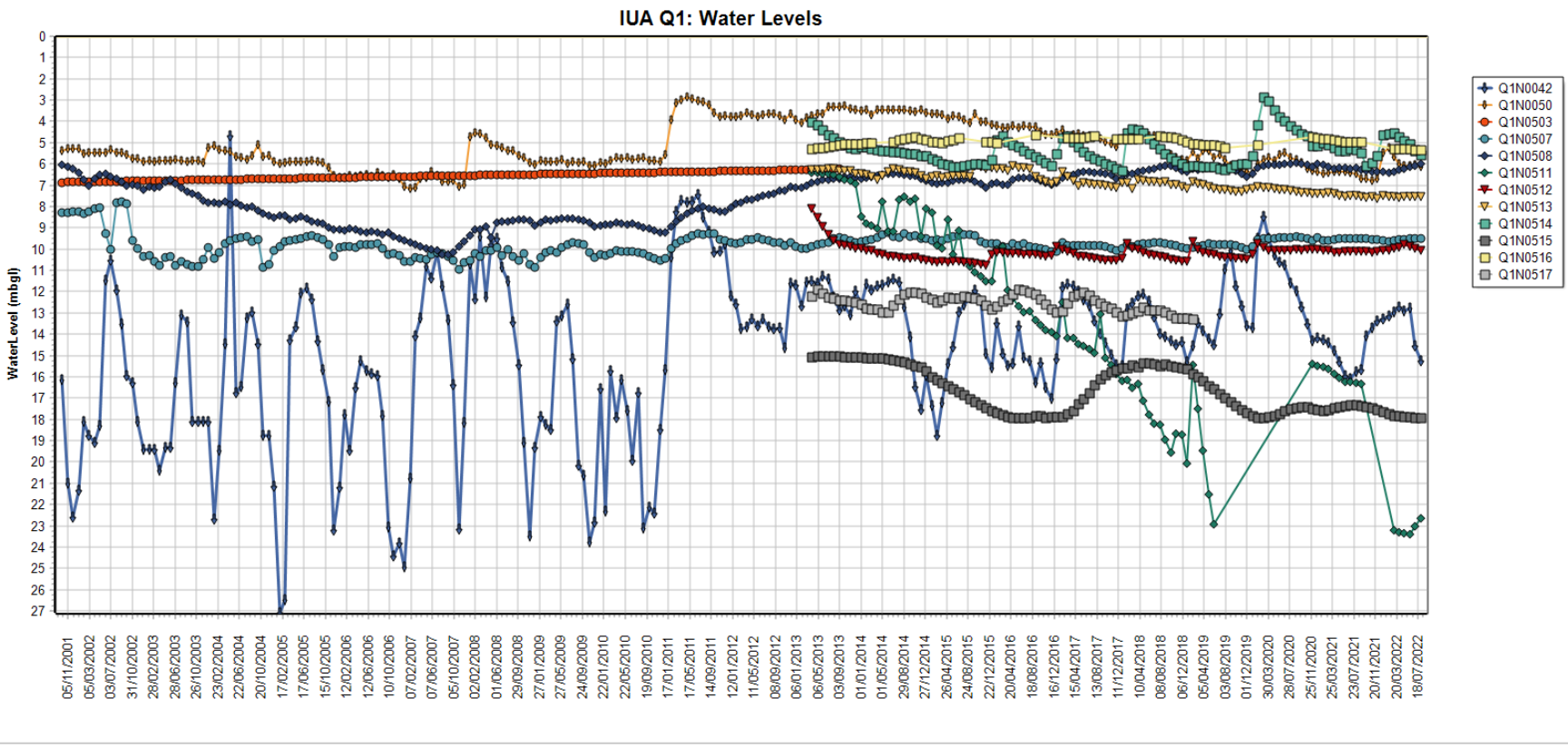


Figure 24: IUA Q1 Water Levels

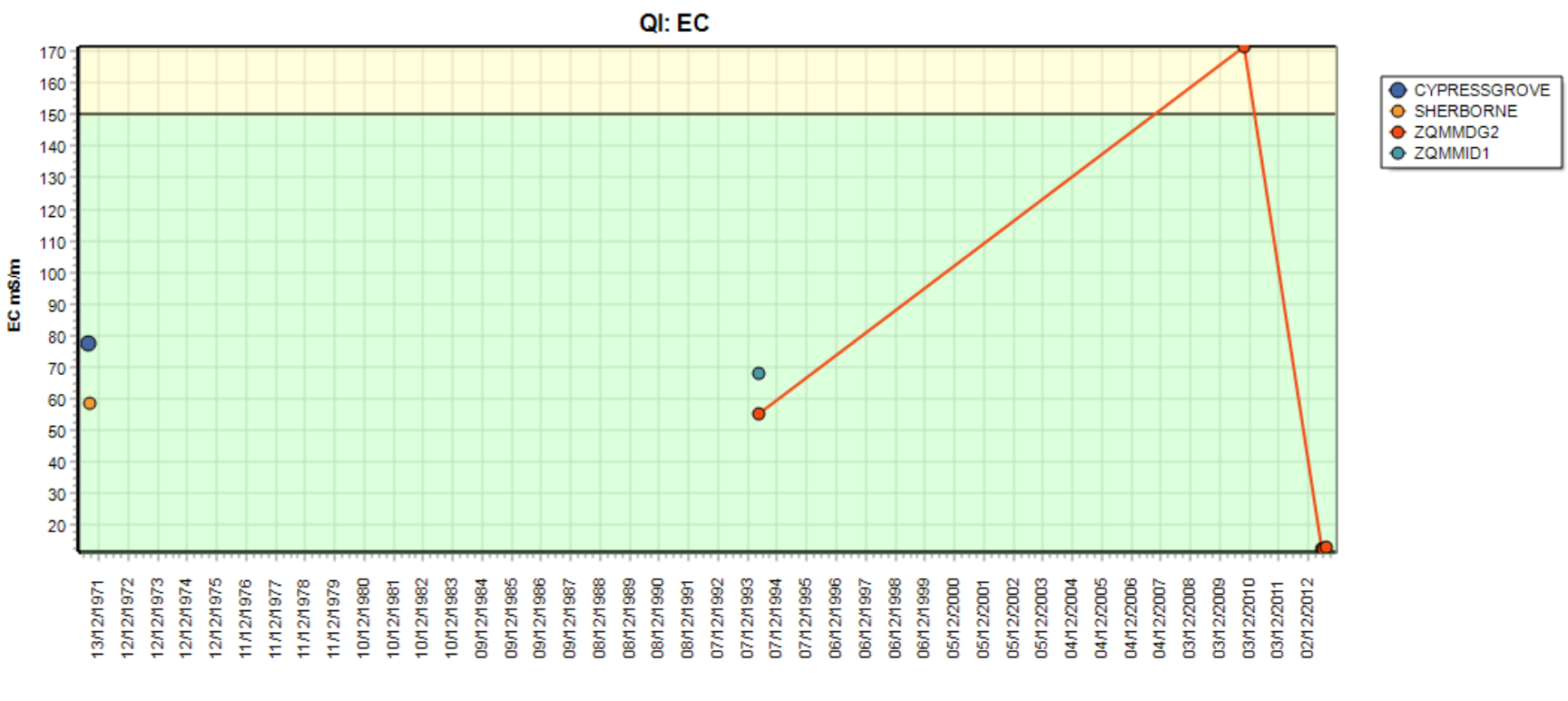


Figure 25: IUA Q1 EC

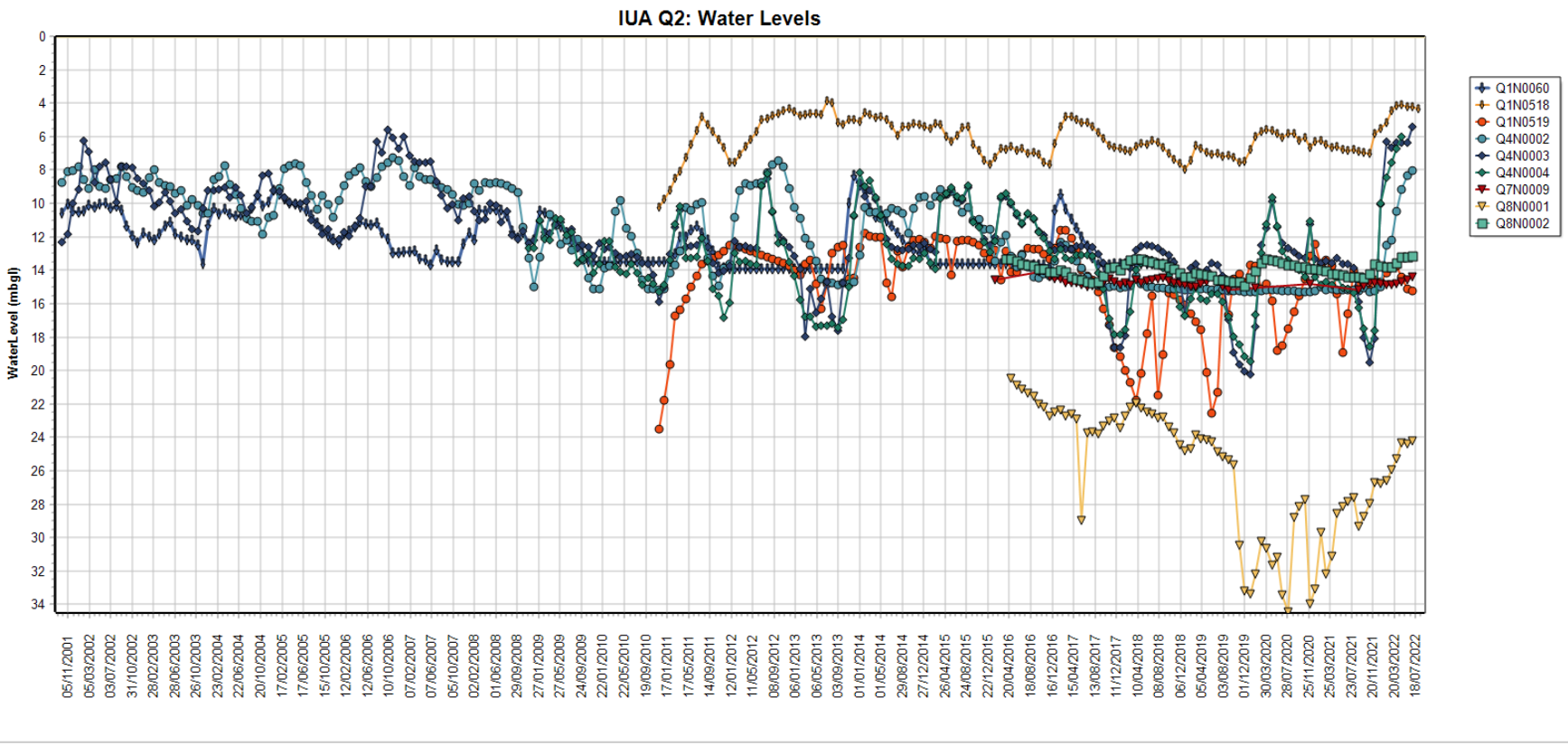


Figure 26: IUA Q2 Water Levels

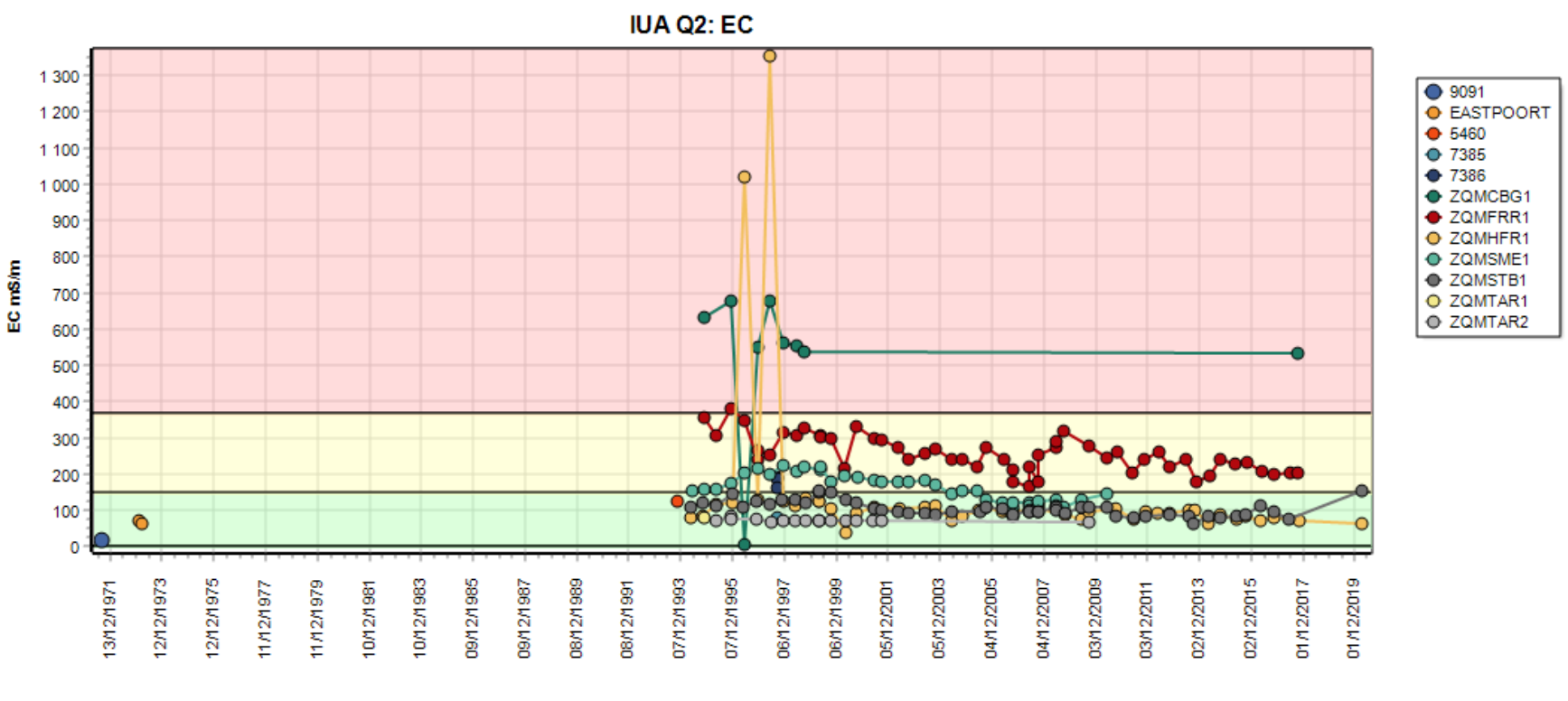


Figure 27: IUA Q2 EC

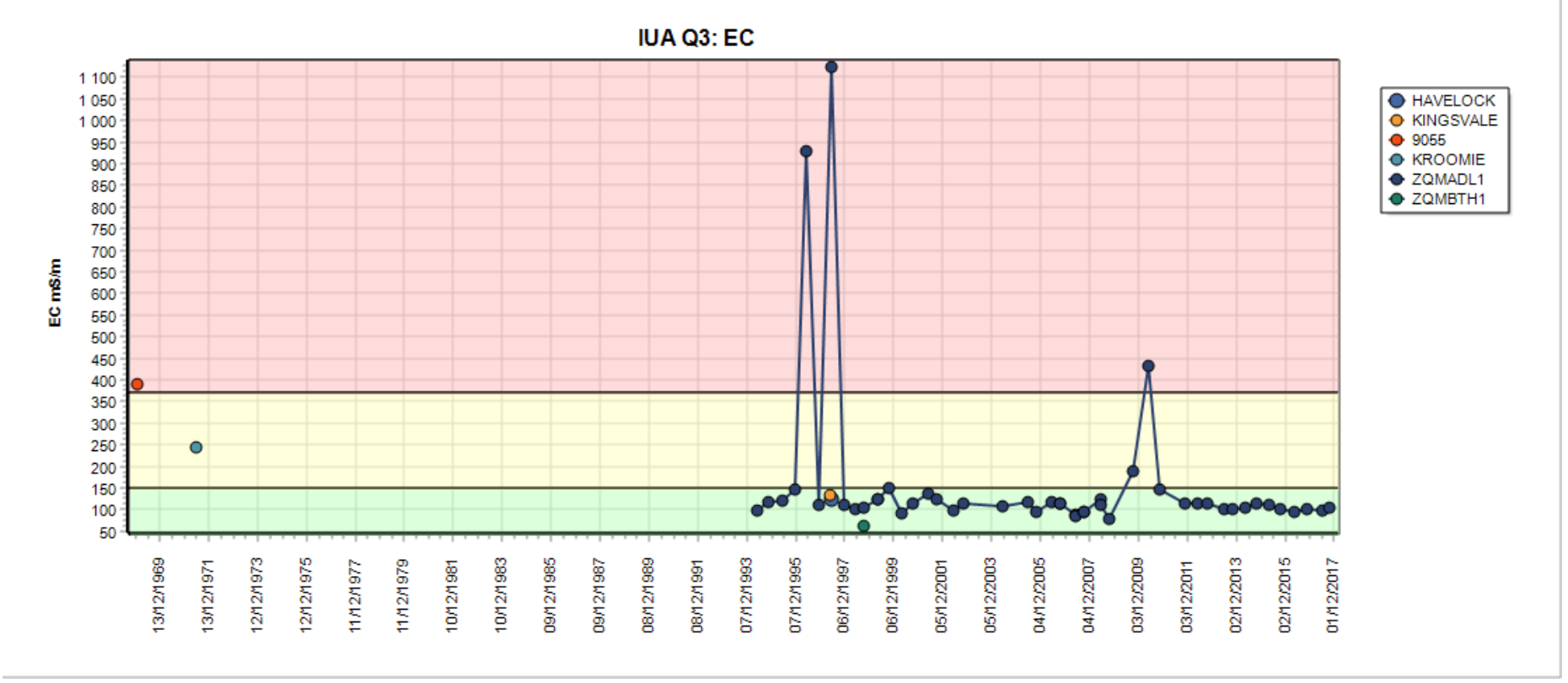


Figure 28: IUA Q3 EC

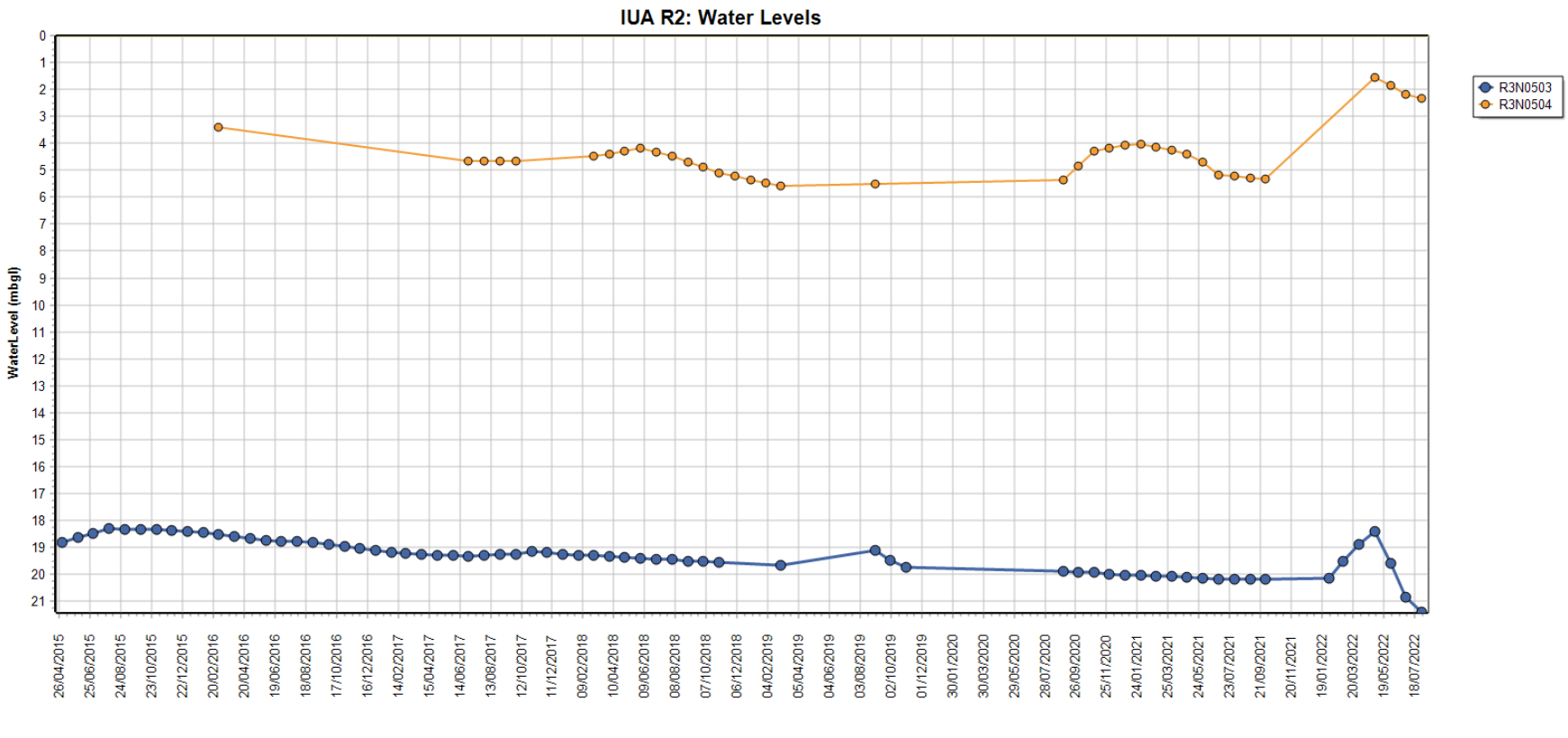


Figure 29: IUA R2 Water Levels

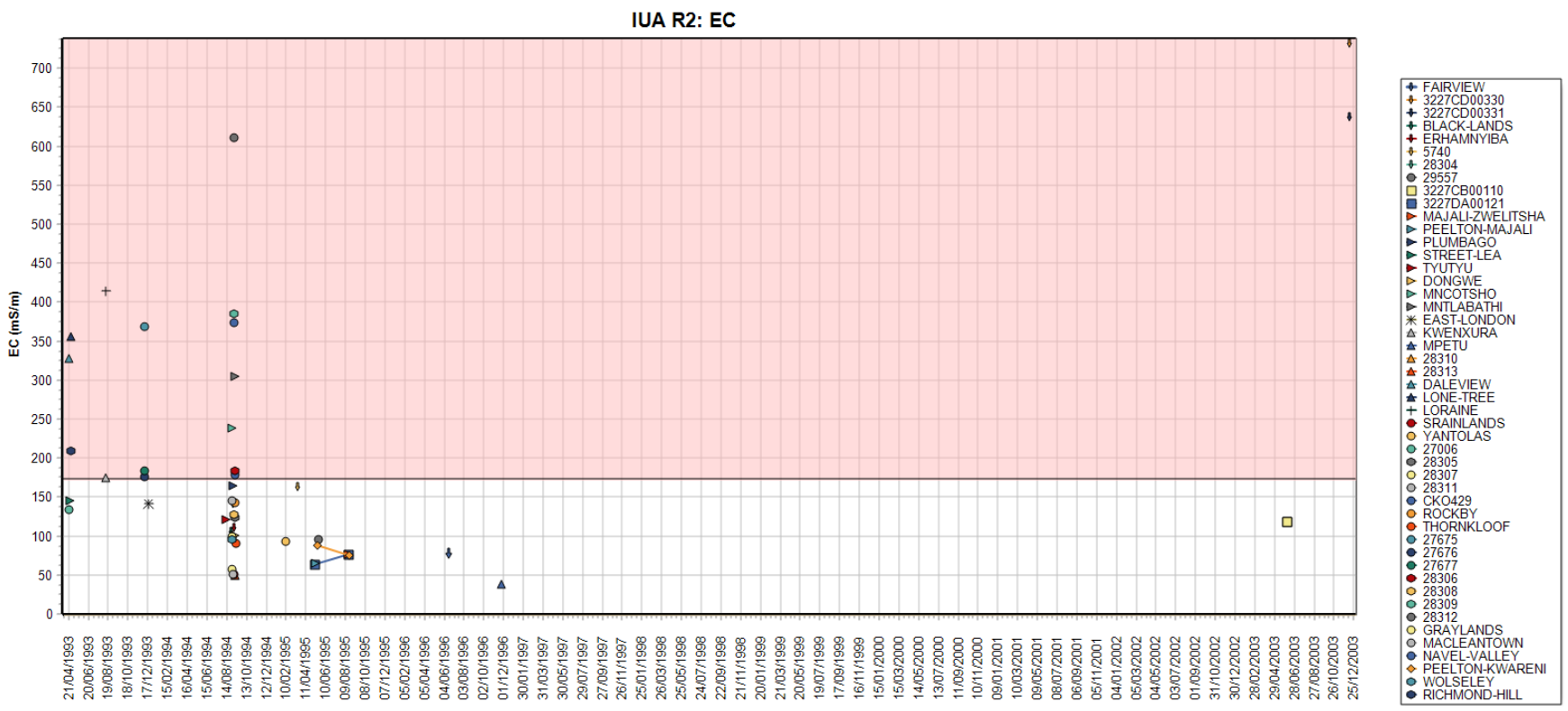


Figure 30: IUA R2 EC

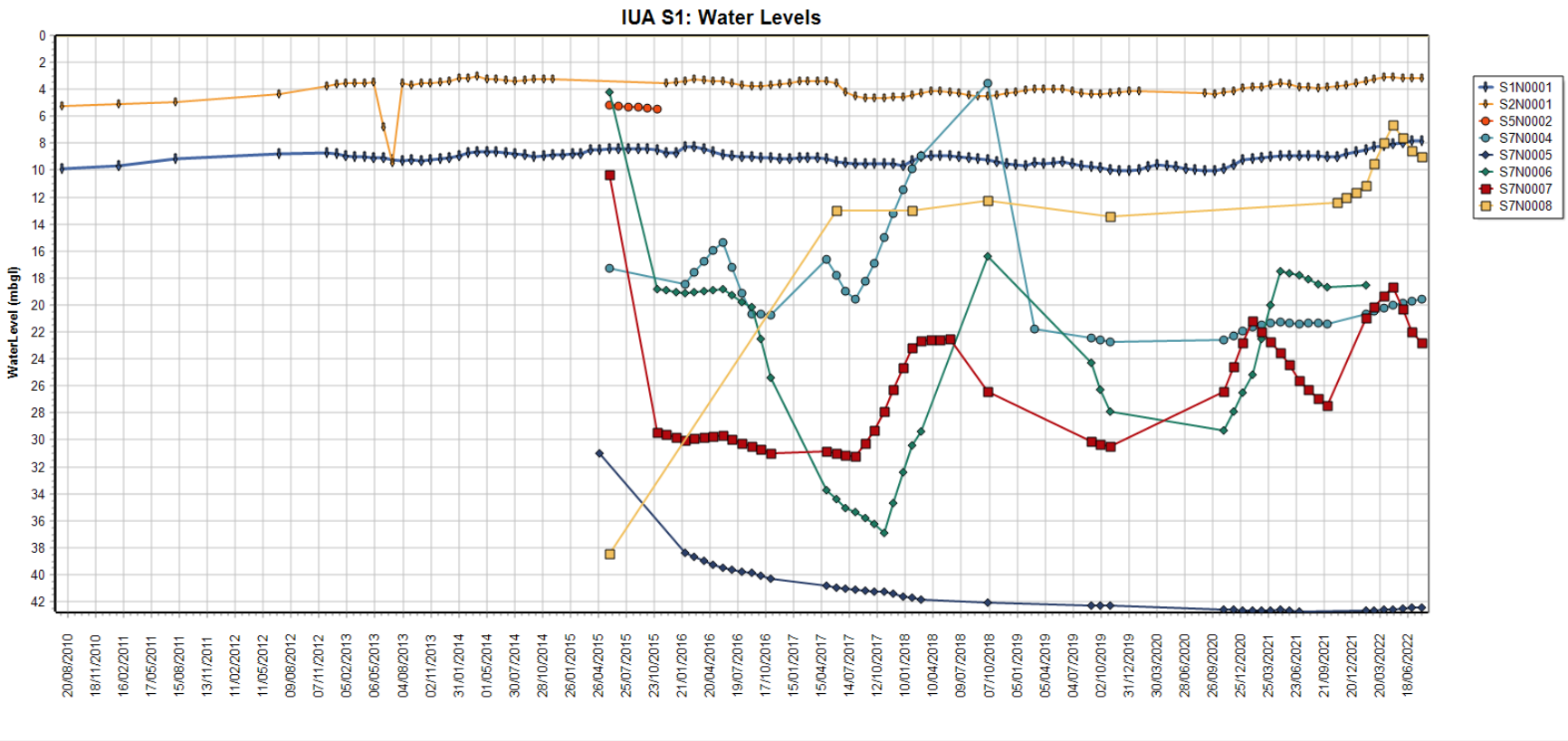


Figure 31: IUA S1 Water Levels

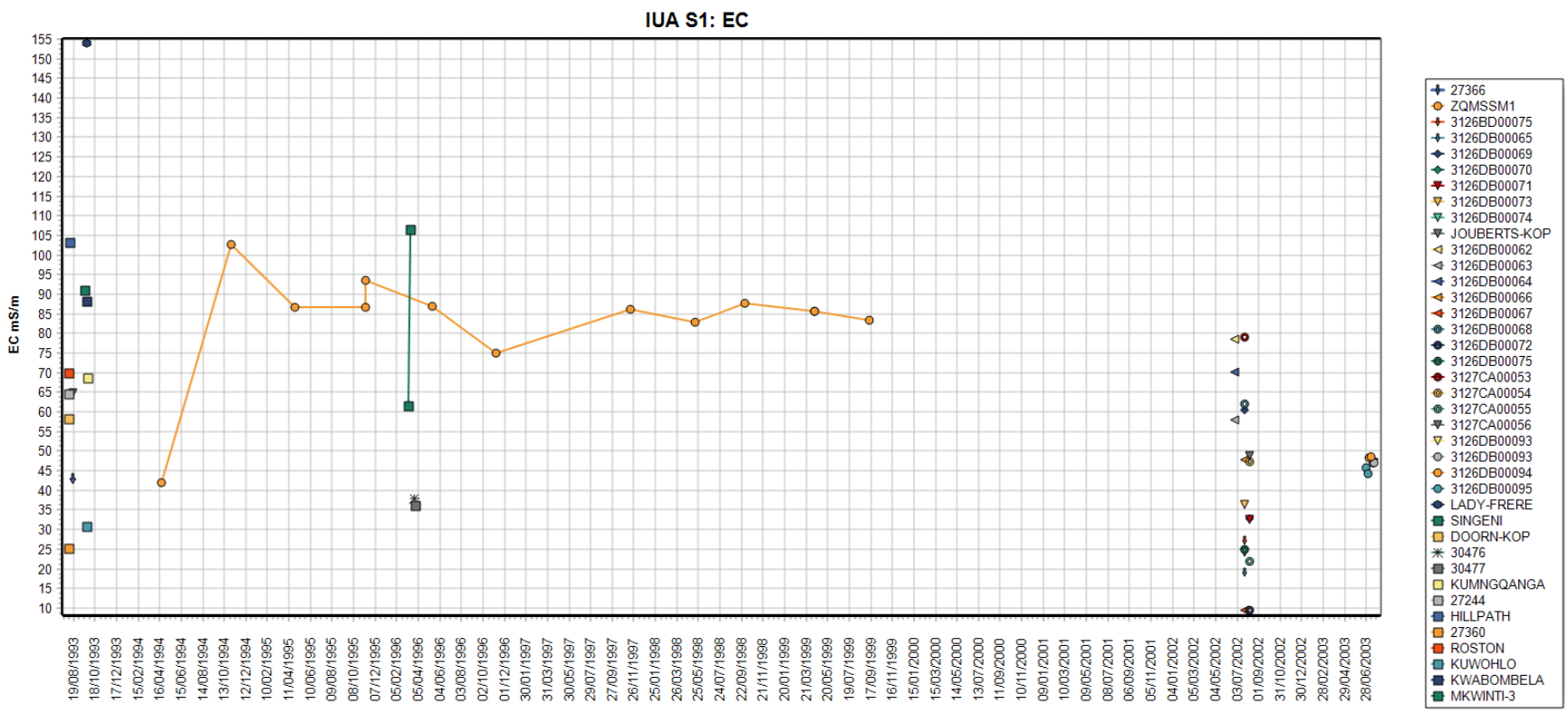


Figure 32: IUA S1 EC

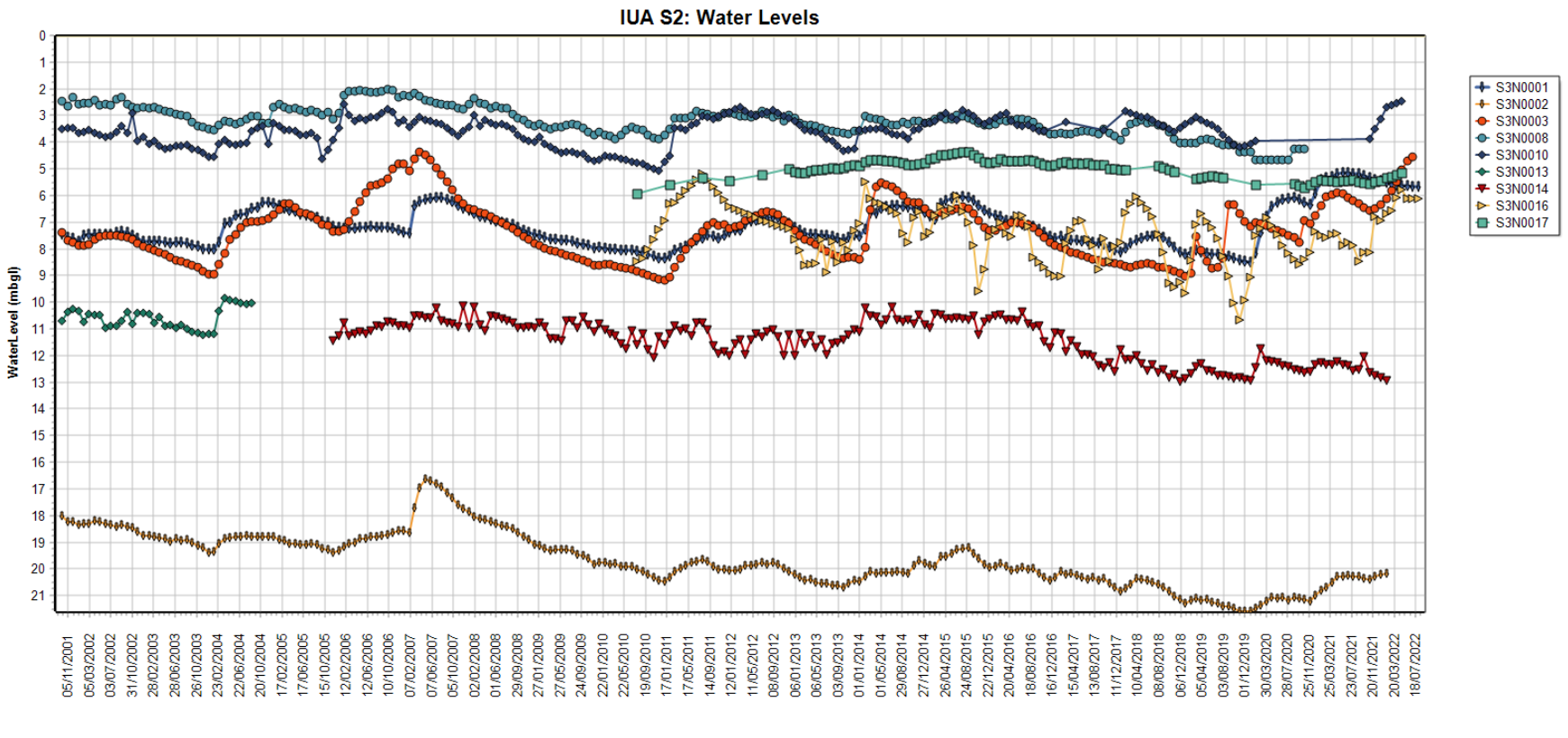


Figure 33: IUA S2 Water Levels

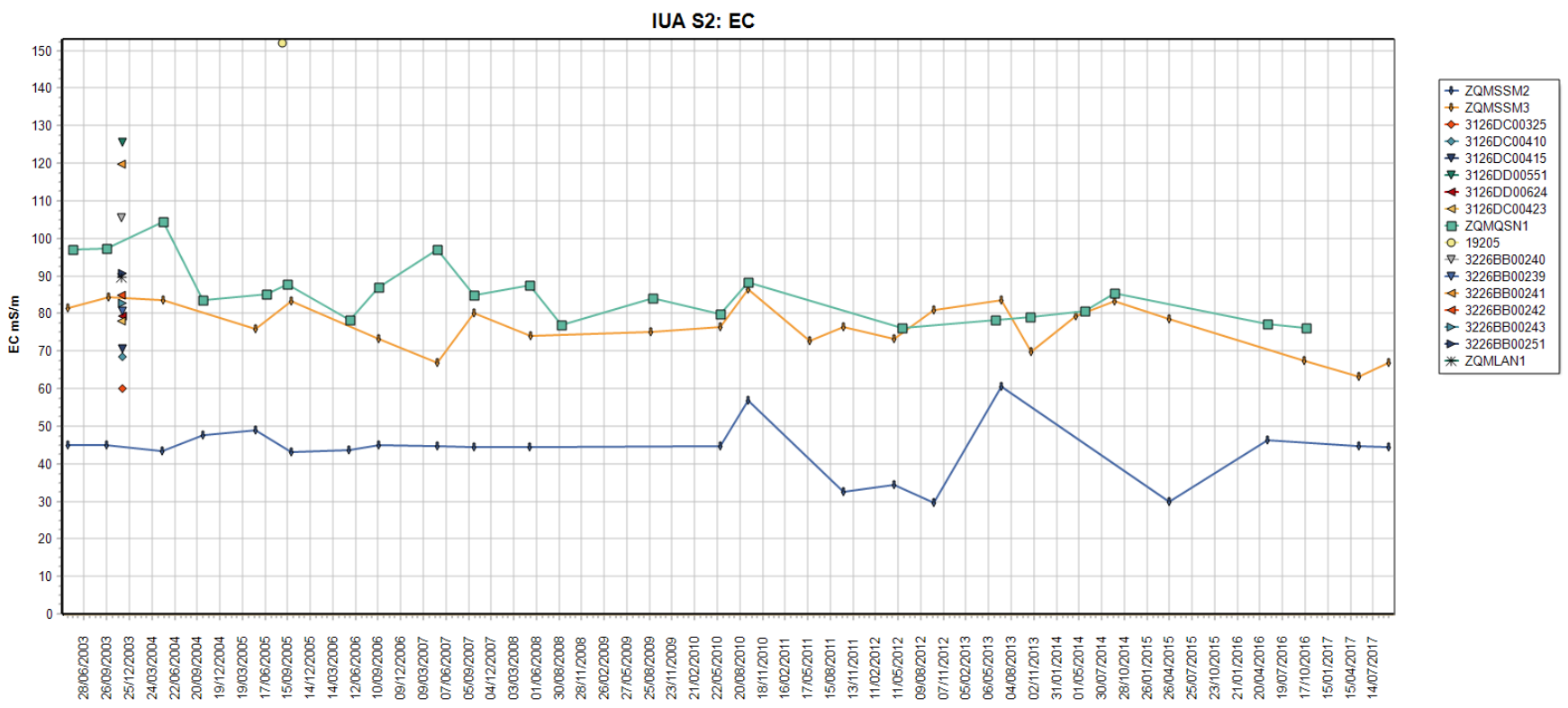


Figure 34: IUA S2 EC

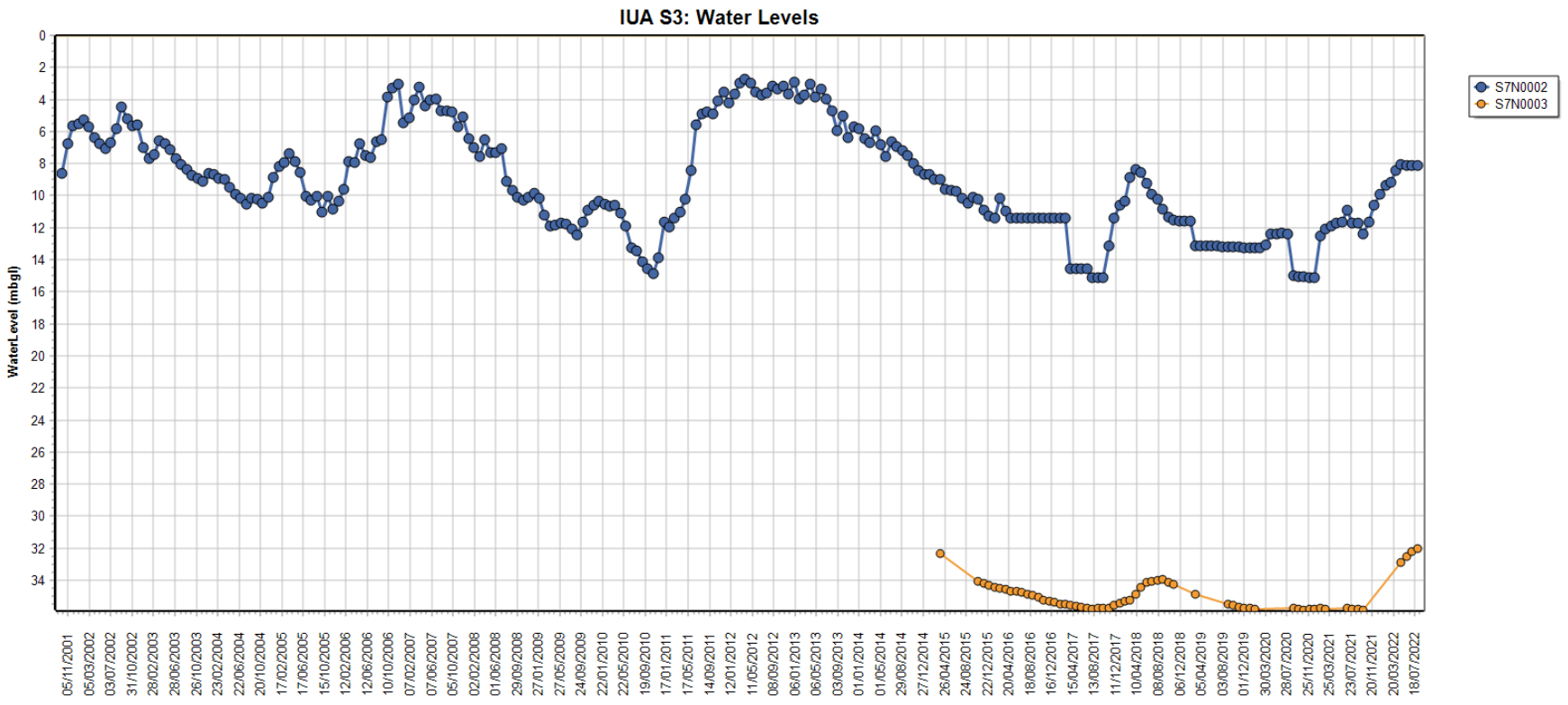


Figure 35: IUA S3 Water Levels

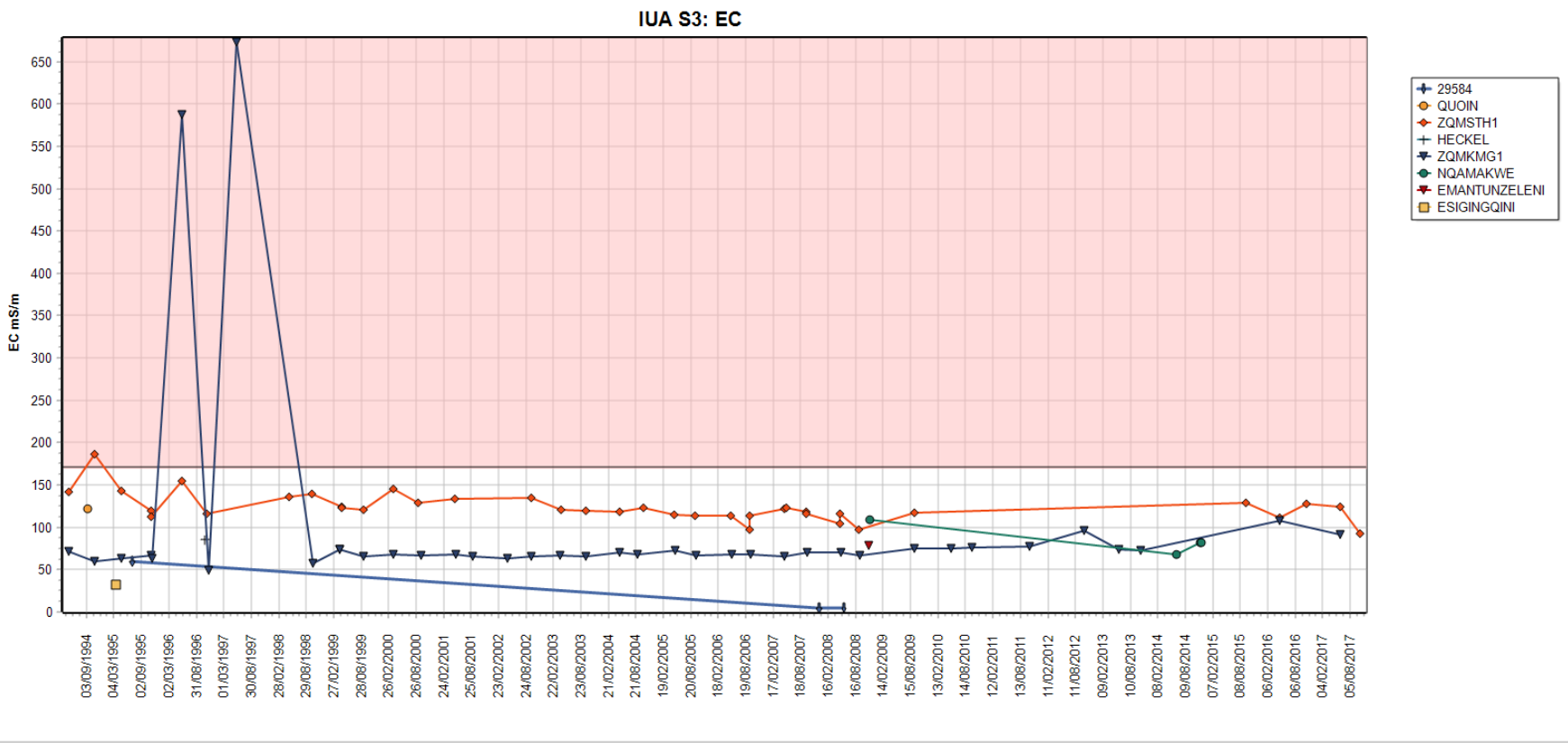


Figure 36: IUA S3 EC

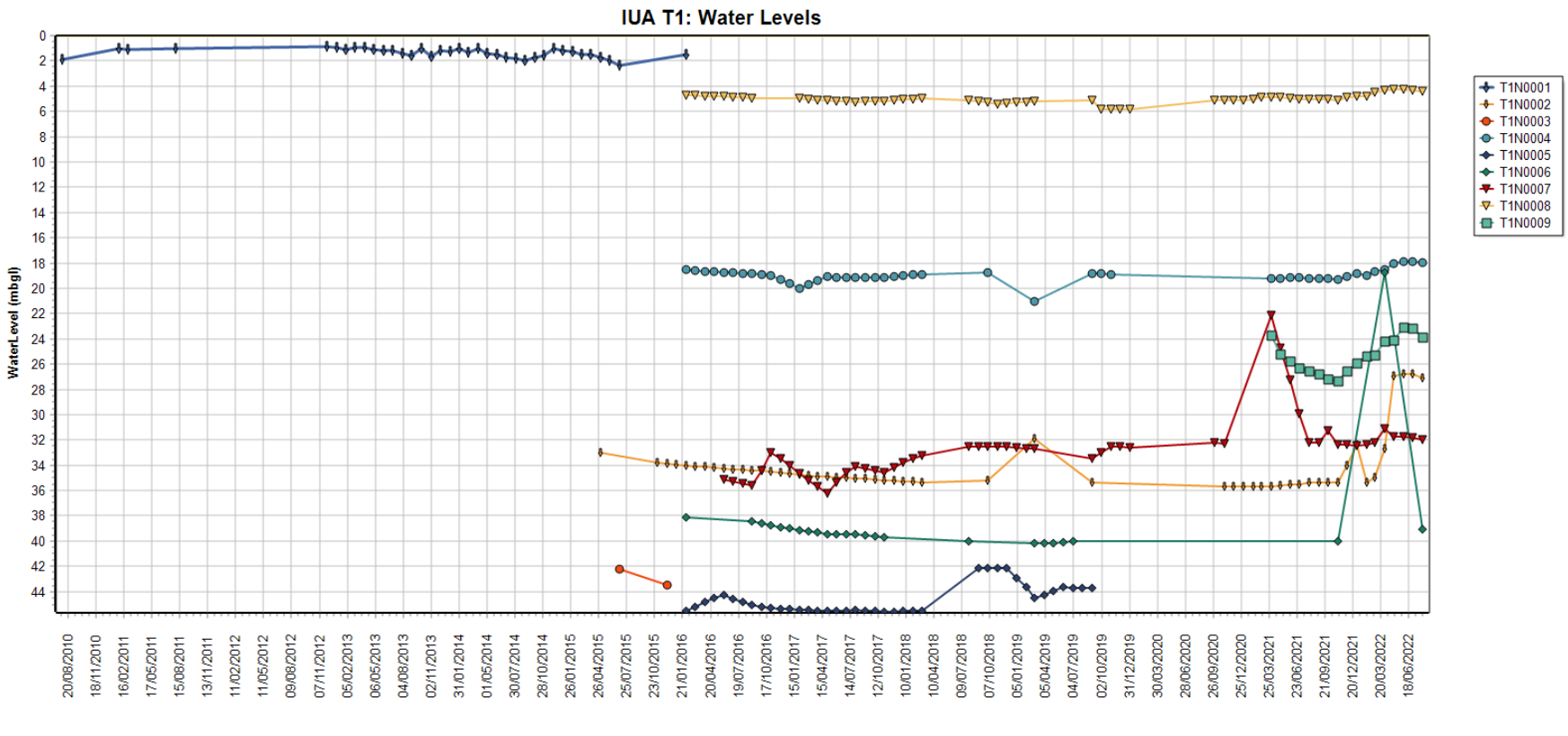


Figure 37: IUA T1 Water Levels

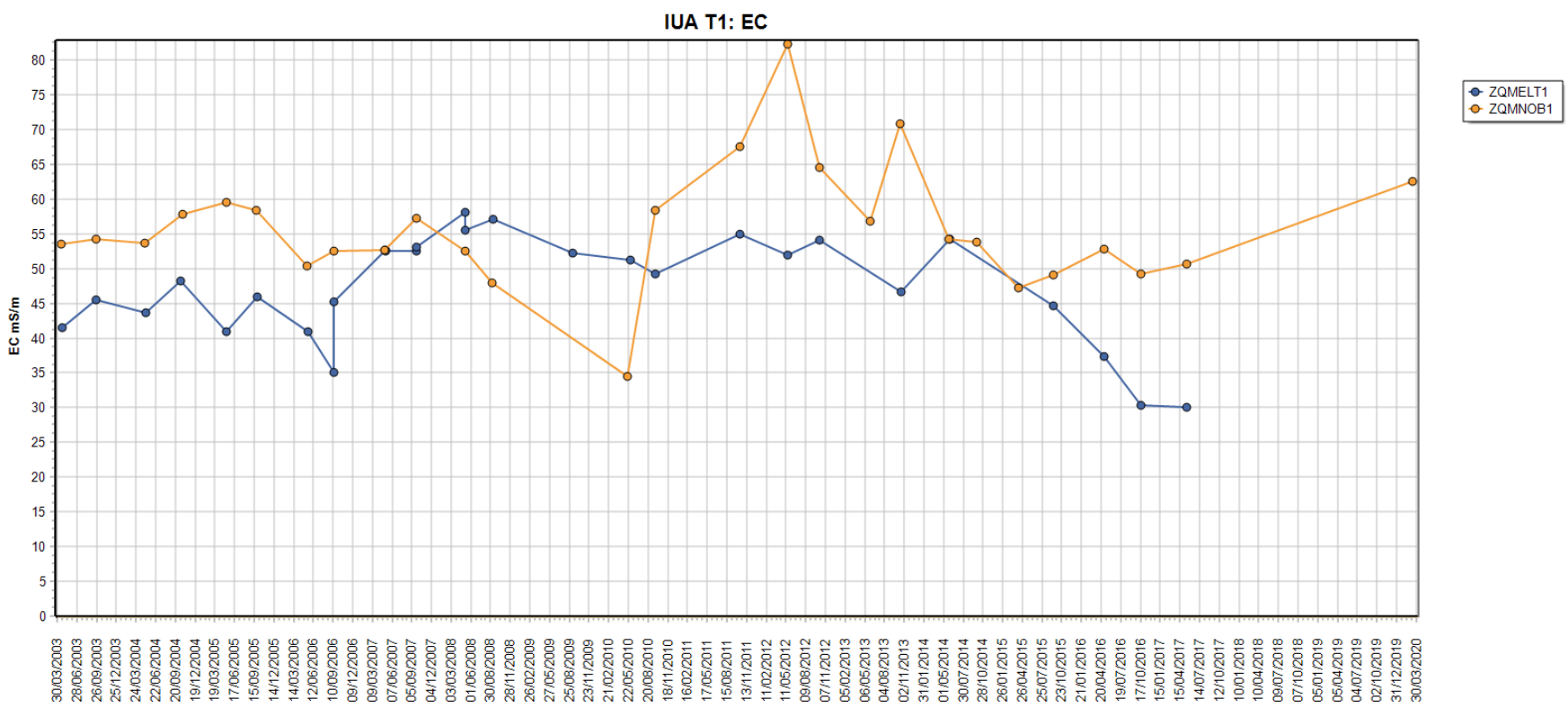


Figure 38: IUA T1 EC

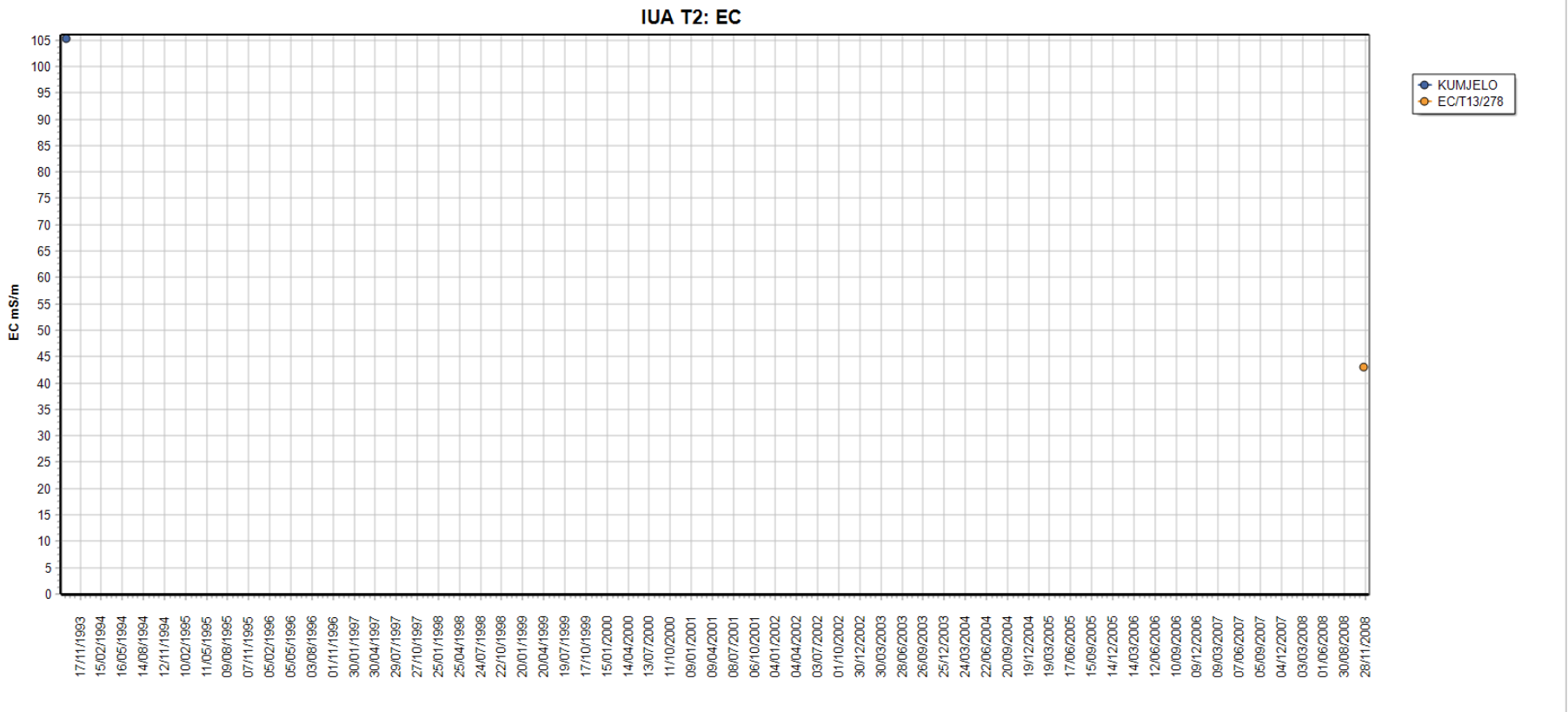


Figure 39: IUA T2 EC

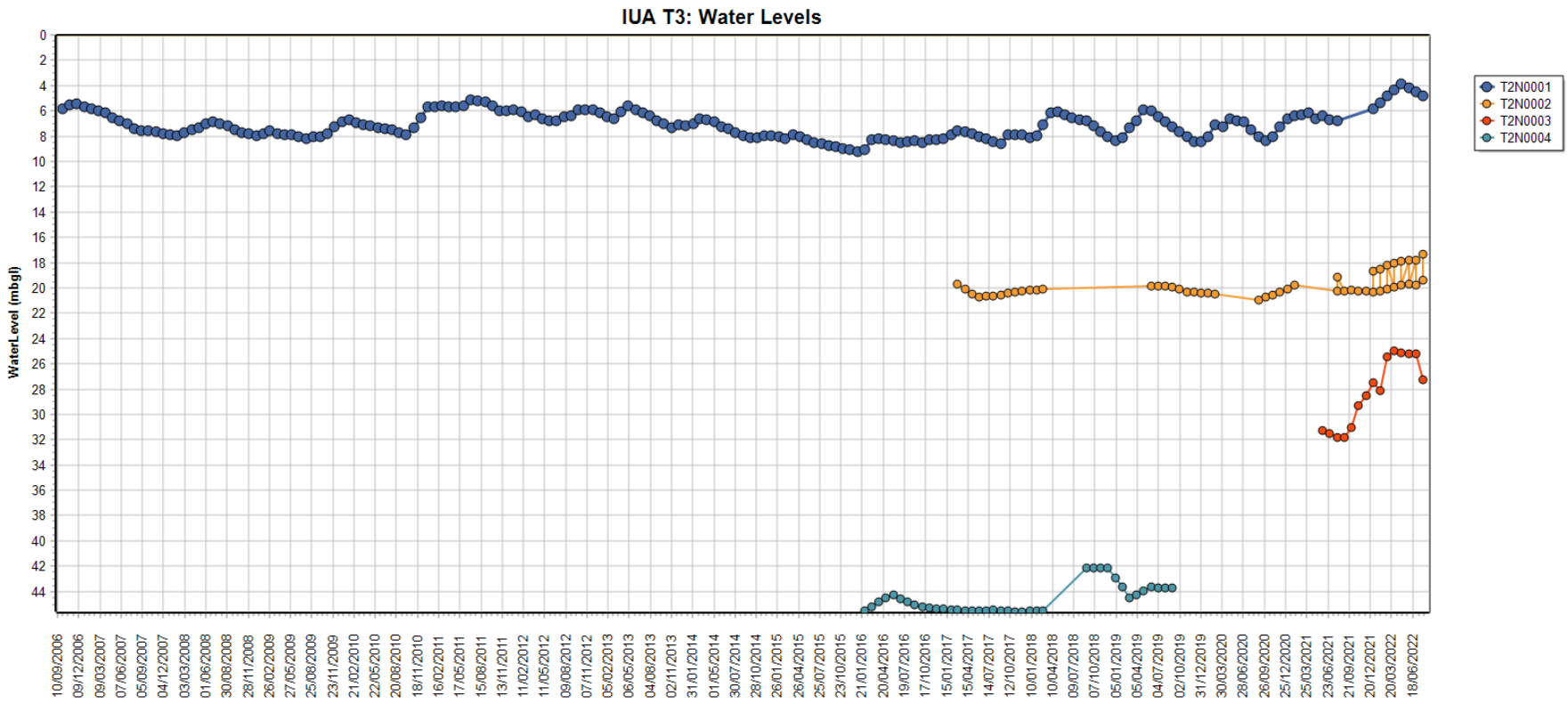


Figure 40: IUA T3 Water Levels

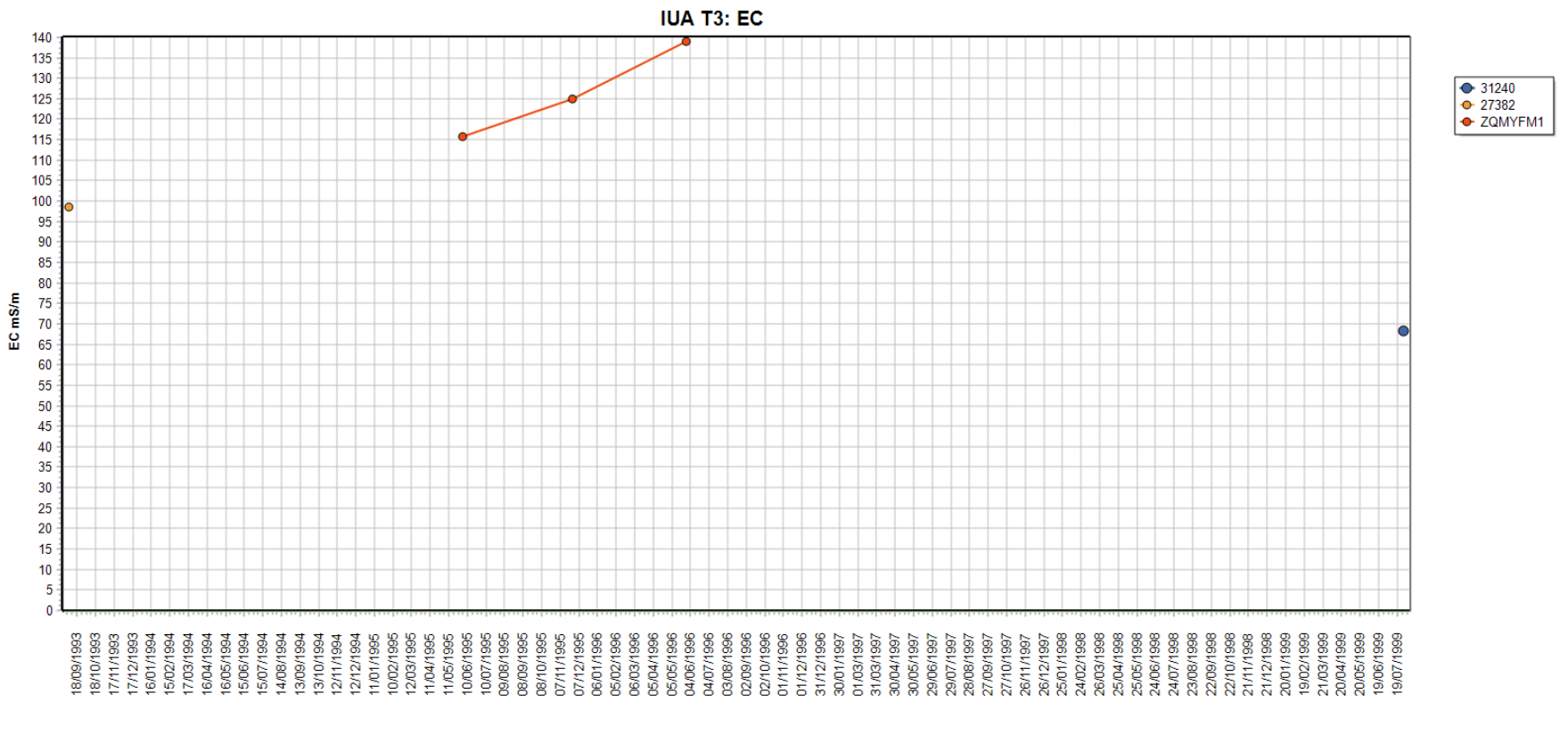


Figure 41: IUA T3 EC

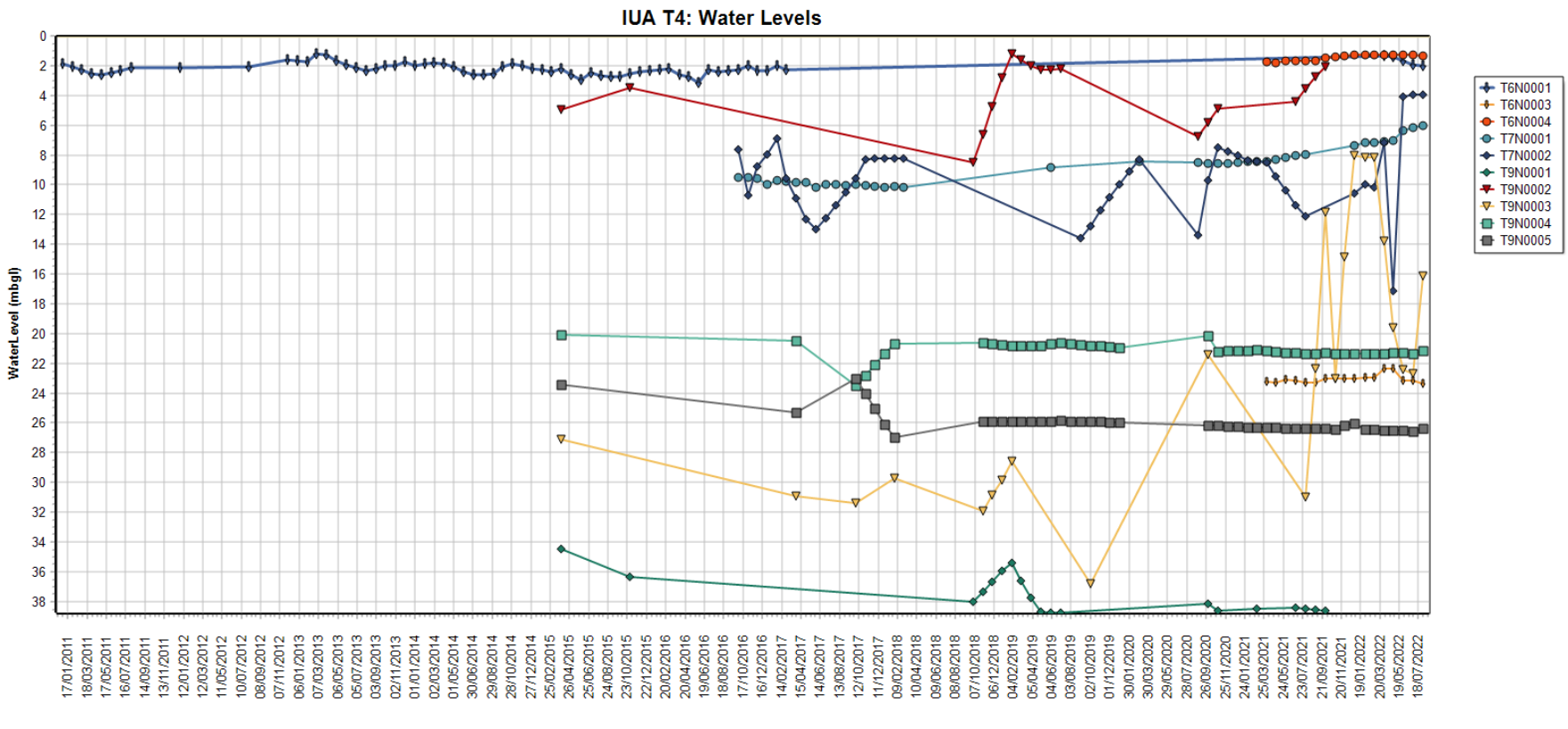


Figure 42: IUA T4 Water Levels

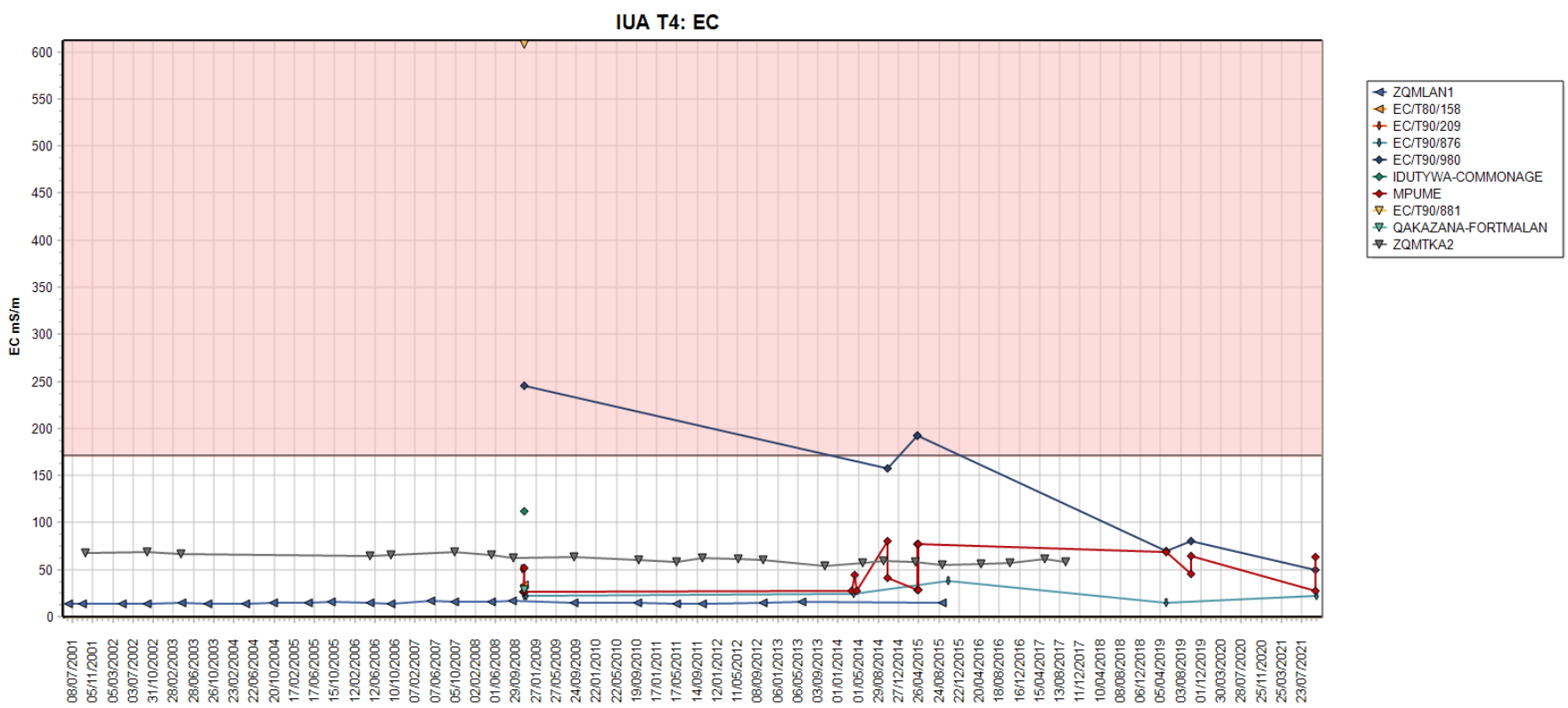


Figure 43: IUA T4 EC

APPENDIX B – MONITORING SITES AND MAPS

IUA 1 (K1)

Table 6: Monitoring sites in IUA 1 (K1)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
K9N0024	-34.03161	24.45145	Borehole, water level	K90F
K9N0029	-33.95778	24.30192	Borehole, water level	K90B
K9N0030	-33.95808	24.30175	Borehole, water level	K90B
K9N0032	-33.95808	24.30275	Borehole, water level	K90B
ZQMKWN1	-33.95583	24.29556	Borehole, water quality	K90B
GWA_OB2_2017	-34.16227	24.66768	Borehole, water quality	K80F
GWA_OB3_2017	-34.17289	24.66130	Borehole, water quality	K80F
GWA_OB4_2018	-34.17106	24.65586	Borehole, water quality	K80F
GWA_OB5_2018	-34.16984	24.65600	Borehole, water quality	K80F

Figure 44: Monitoring sites in IUA 1 (K1)

Table 7: Monitoring sites in IUA 2 (KL1)

Site Name	NGA ID/Other ID	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
BBF2	-	-33.77115	24.81543	Borehole, water level	L90A
K9N0002	3424BB00002	-34.03278	24.92500	Borehole, water level	K90G
K9N0004	3424BB00004	-34.03472	24.92500	Borehole, water level	K90G
K9N0005	3424BB00068	-34.01944	24.90778	Borehole, water level	K90G
K9N0006	3424BB00005	-34.01650	24.90911	Borehole, water level	K90G
K9N0009	3424BB00008	-34.02306	24.92389	Borehole, water level	K90G
K9N0010	3324DD00001	-33.97500	24.92083	Borehole, water level	K90G
K9N0011	3424BB00069	-34.01914	24.54186	Borehole, water level	K90D
K9N0016	3324DD00009	-33.97500	24.92083	Borehole, water level	K90G
K9N0017	33997	-34.02569	24.90122	Borehole, water level	K90G
K9N0018	33996	-34.03094	24.89567	Borehole, water level	K90G
K9N0019	39913	-34.02675	24.86858	Borehole, water level	K90F
K9N0020	39914	-34.01556	24.85925	Borehole, water level	K90F
K9N0021	39915	-34.02519	24.84208	Borehole, water level	K90F
K9N0025	3424BB00009	-34.17731	24.81547	Borehole, water level	K80F
K9N0026	3324DC00001	-33.99167	24.73167	Borehole, water level	K90F
K9N0027	3324DC00002	-33.99000	24.73083	Borehole, water level	K90F
K9N0028	3324DC00003	-33.99156	24.73450	Borehole, water level	K90F
K9N0034	EC/K90/0276	-34.01741	24.90918	Borehole, water level	K90G
K9N0035	EC/K90/0279	-34.01783	24.90808	Borehole, water level	K90G
KRA2	-	-33.80381	24.83702	Borehole, water level	L90B
PWDP2	-	-33.74706	24.76489	Borehole, water level	L90A
WKR1	-	-33.81663	24.89681	Borehole, water level	L90B
WKR2	-	-33.72229	24.82513	Borehole, water level	L90A
ZQMHDP1	3424BB00086	-34.00111	24.75917	Spring, water quality	K90F
ZQMSFB1	3424BB00085	-34.17278	24.80833	Borehole, water quality	K90E
GWA_JB1_2017	JB1	-34.02714	24.90064	Borehole, water quality	K90G
GWA_JB2_2017	JB2	-34.02580	24.89863	Borehole, water quality	K90G
GWA_JB3_2018	JB3	-34.02143	24.90222	Borehole, water quality	K90G
GWA_JB4_2018	JB4	-34.02489	24.89906	Borehole, water quality	K90G
GWA_JB5_2019	JB5	-34.02396	24.89991	Borehole, water quality	K90G
HD_1	GWA/HD1/2018	-33.99732	24.78425	Borehole, water quality	K90F
HD2C	GWA/HD2C/2018	-33.99265	24.78774	Borehole, water quality	K90F
HD_3	GWA/HD3/2018	-33.99528	24.78553	Borehole, water quality	K90F
HD_4	GWA/HD4/2018	-33.99960	24.78198	Borehole, water quality	K90F
GWA_Han_3C_2018	Han3c	-33.87531	24.80737	Borehole, water quality	K90G
GWA_Han_4_2018	Han4	-33.87528	24.80680	Borehole, water quality	K90G
GWA_SF1B	SF1B	-34.16170	24.81360	Borehole, water quality	K90E
GWA_SF2	SF2	-34.17186	24.80682	Borehole, water quality	K90E
GWA_SF3	SF3	-34.16792	24.81001	Borehole, water quality	K90E

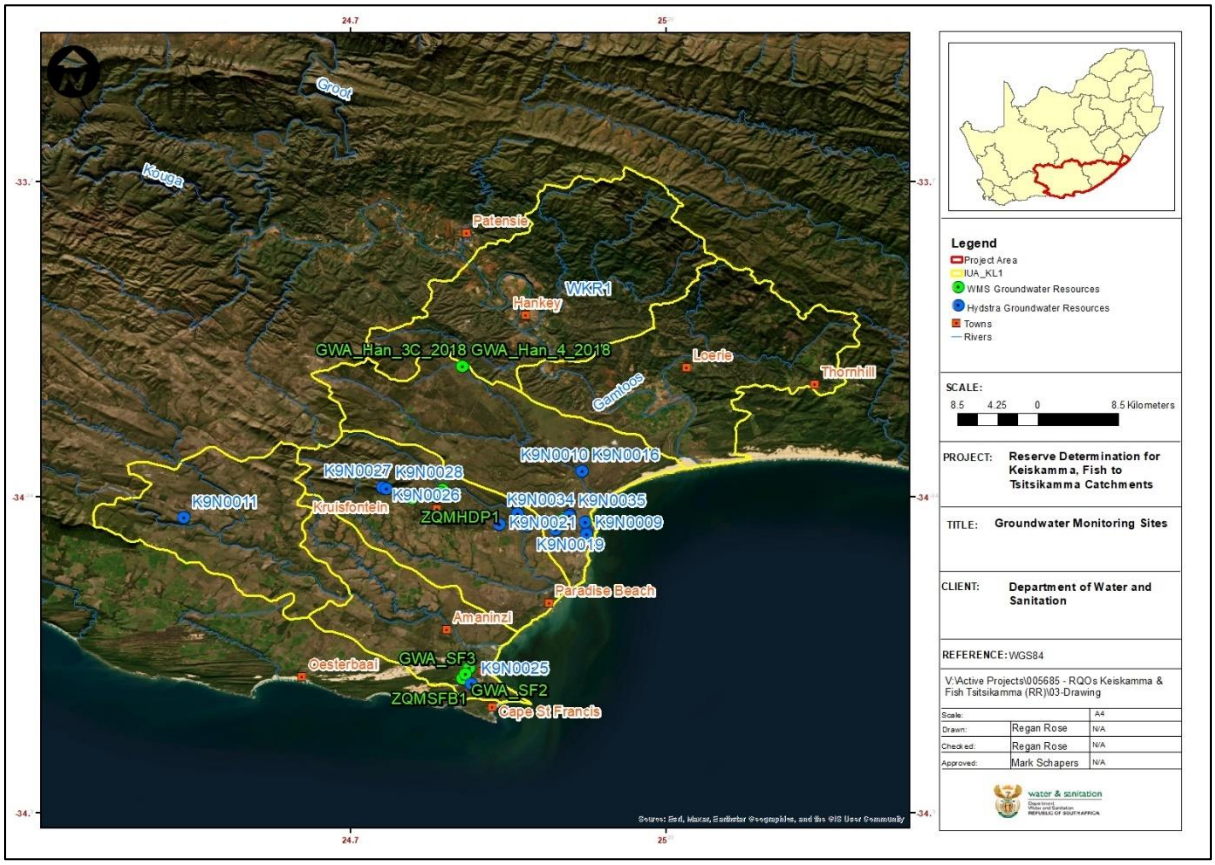


Figure 45: Monitoring sites in IUA 2 (KL1)

Table 8: Monitoring sites in IUA 3 (L1)

Site Name	NGA ID	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
JBH01	-	-33.83009	23.86567	Borehole, water level	L82D
JBH02	-	-33.83020	23.86621	Borehole, water level	L82D
JBH03	-	-33.83121	23.86574	Borehole, water level	L82D
JBH04	-	-33.83087	23.86515	Borehole, water level	L82D
JBH06	-	-33.82645	23.87166	Borehole, water level	L82D
KRBH1	-	-33.83059	23.73577	Borehole, water level	L82D
KRBH2	-	-33.81208	23.72060	Borehole, water level	L82D
LBH5	-	-33.79167	23.63667	Borehole, water level	L82C
LBH6	-	-33.79306	23.62917	Borehole, water level	L82C
MISBH6B	-	-33.76056	23.50583	Borehole, water level	L82B
ZQMJOU1	3323DD00015	-33.84194	23.98083	Borehole, water quality	L82D
3323DC00006	3323DC00006	-33.80250	23.73194	Borehole, water quality	L82D
3323DC00007	3323DC00007	-33.82194	23.73611	Borehole, water quality	L82D
3323DC00009	3323DC00009	-33.83111	23.73417	Borehole, water quality	L82D
3323DD000005	3323DD000005	-33.85250	23.89028	Borehole, water quality	L82D
3323DD00004	3323DD00004	-33.86583	23.88611	Borehole, water quality	L82D
3323DD00007	3323DD00007	-33.86556	23.89167	Borehole, water quality	L82D
3323DD00009	3323DD00009	-33.84222	23.98167	Borehole, water quality	L82D
3323DD00010	3323DD00010	-33.82917	23.94528	Borehole, water quality	L82D
3323DD00011	3323DD00011	-33.83333	23.98667	Borehole, water quality	L82D
3323DD00012	3323DD00012	-33.84889	23.90361	Borehole, water quality	L82D
3323DD00013	3323DD00013	-33.83778	23.89722	Borehole, water quality	L82D
3323DD00014	3323DD00014	-33.84111	23.89639	Borehole, water quality	L82D
GWA_J1B	-	-33.84824	23.84400	Borehole, water quality	L82D
GWA_J3A	-	-33.84761	23.84433	Borehole, water quality	L82D
GWA_J4	-	-33.84801	23.84216	Borehole, water quality	L82D
GWA_J2	-	-33.79158	23.63663	Borehole, water quality	L82D
GWA_J5	-	-33.79083	23.63569	Borehole, water quality	L82D
GWA_L1	-	-33.78984	23.63262	Borehole, water quality	L82C
GWA_L2	-	-33.84960	23.84903	Borehole, water quality	L82C
GWA_L3	-	-33.86560	23.84317	Borehole, water quality	L82C

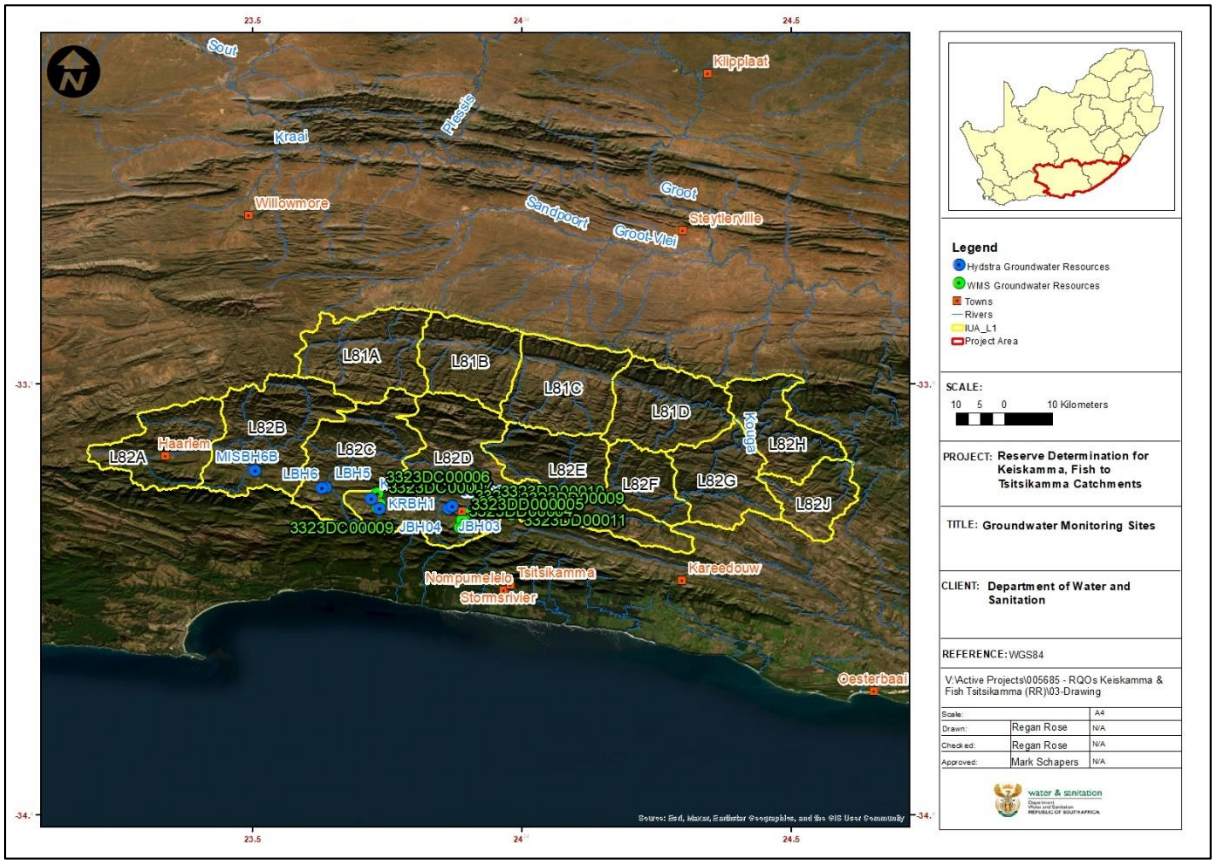


Figure 46: Monitoring sites in IUA 3 (L1)

Table 9: Monitoring sites in IUA 4 (LN1)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
971	-32.38667	22.84500	Borehole, water quality	L11F
972	-32.21028	22.75750	Borehole, water quality	L11F
2446	-32.17750	24.54056	Borehole, water quality	N12C
2626	-32.19500	24.46722	Borehole, water quality	N12C
2635	-32.18917	24.54250	Borehole, water quality	N11B
2636	-32.18000	24.57833	Borehole, water quality	N11B
2637	-32.17167	24.56472	Borehole, water quality	N11B
2717	-32.43333	24.31389	Borehole, water quality	N14D
2718	-32.42750	24.21944	Borehole, water quality	N14D
2720	-33.25000	24.25000	Borehole, water quality	L50B
2727	-32.18500	24.56472	Borehole, water quality	N11B
3112	-32.47167	24.45889	Borehole, water quality	N14D
3113	-32.43611	24.20167	Borehole, water quality	N14B
3114	-32.44306	24.36472	Borehole, water quality	N14D
3115	-32.40667	24.39694	Borehole, water quality	N14D
3116	-32.45333	24.42556	Borehole, water quality	N14D
3117	-32.39917	24.28472	Borehole, water quality	N14D
3125	-32.43222	24.62306	Borehole, water quality	N21D
3175	-32.41667	24.22083	Borehole, water quality	N14D
3238	-32.32306	24.45167	Borehole, water quality	N13A
3239	-32.34500	24.29333	Borehole, water quality	N13B
3240	-32.31278	24.44000	Borehole, water quality	N13A
3241	-32.37667	24.41361	Borehole, water quality	N13B
3242	-32.39167	24.43056	Borehole, water quality	N13C
3243	-32.36333	24.28417	Borehole, water quality	N14D
3244	-32.41250	24.27611	Borehole, water quality	N14D
3245	-32.33222	24.30472	Borehole, water quality	N13B
3312	-32.41667	24.30694	Borehole, water quality	N14D
3313	-32.36556	24.37528	Borehole, water quality	N13B
3314	-32.30194	24.41639	Borehole, water quality	N13A
3638	-32.30944	24.27917	Borehole, water quality	N13B
3639	-32.34167	24.37722	Borehole, water quality	N13B
3640	-32.41389	24.30611	Borehole, water quality	N14D
3641	-32.42861	24.21528	Borehole, water quality	N14D
4158	-33.30000	24.25833	Borehole, water quality	L70B
4159	-33.30500	24.26500	Borehole, water quality	L70B
5495	-32.21444	22.81889	Borehole, water quality	L11F
8558	-31.76389	23.28917	Borehole, water quality	L21A
8559	-31.81194	23.29278	Borehole, water quality	L22A
8560	-31.72528	23.26389	Borehole, water quality	L21A

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
8562	-31.71222	23.23500	Borehole, water quality	L21A
8802	-31.85333	23.26639	Borehole, water quality	L22A
8803	-31.84778	23.26028	Borehole, water quality	L22A
8804	-31.80194	23.21361	Borehole, water quality	L11C
8905	-31.78222	23.15194	Borehole, water quality	L11C
8906	-31.75000	23.19083	Borehole, water quality	L11C
8907	-31.80778	23.16583	Borehole, water quality	L11C
9050	-32.50000	22.93333	Borehole, water quality	L11G
9052	-32.23333	22.80000	Borehole, water quality	L11F
9064	-32.48667	23.12833	Borehole, water quality	L11G
9065	-32.40500	22.88000	Borehole, water quality	L11F
9473	-32.36667	22.80000	Borehole, water quality	L11F
9474	-32.45000	22.83333	Borehole, water quality	L11F
9475	-32.63333	22.90000	Borehole, water quality	L11G
9476	-32.50000	23.20000	Borehole, water quality	L11G
9477	-32.45000	22.94167	Borehole, water quality	L11G
9478	-33.30000	24.80000	Borehole, water quality	L70E
9575	-32.34583	22.99583	Borehole, water quality	L11G
9577	-32.58333	22.80000	Borehole, water quality	L11G
9578	-32.62500	22.81667	Borehole, water quality	L11G
9579	-32.45833	22.82500	Borehole, water quality	L11G
9580	-32.62917	22.83333	Borehole, water quality	L11G
9581	-32.61667	22.81667	Borehole, water quality	L11G
9593	-32.55417	22.78750	Borehole, water quality	L11G
9594	-32.53333	22.83333	Borehole, water quality	L11G
9596	-32.50000	22.91667	Borehole, water quality	L11G
9597	-32.42917	22.85000	Borehole, water quality	L11F
9599	-32.48667	23.11667	Borehole, water quality	L11G
9606	-32.45944	22.82500	Borehole, water quality	L11G
9607	-32.33611	23.05000	Borehole, water quality	L11G
9608	-32.53000	22.85667	Borehole, water quality	L11G
9632	-32.45000	23.06667	Borehole, water quality	L11G
9633	-32.53333	22.94167	Borehole, water quality	L11G
9634	-32.48806	23.12833	Borehole, water quality	L11G
9635	-32.46667	22.85000	Borehole, water quality	L11G
9636	-32.44167	23.06667	Borehole, water quality	L11G
9639	-32.45000	22.81667	Borehole, water quality	L11F
9643	-32.47806	22.85000	Borehole, water quality	L11G
9645	-32.53000	22.86222	Borehole, water quality	L11G
9646	-32.43333	23.10000	Borehole, water quality	L11G
9647	-32.42500	23.55833	Borehole, water quality	L22C

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
9661	-33.21250	25.15000	Borehole, water quality	N40A
9663	-32.27083	23.60000	Borehole, water quality	L22C
9664	-32.57000	22.85417	Borehole, water quality	L11G
9680	-33.14111	25.15000	Borehole, water quality	N23B
9941	-33.13333	25.15417	Borehole, water quality	N23B
9942	-33.07500	25.05417	Borehole, water quality	N22E
9944	-33.15417	25.19583	Borehole, water quality	N23B
9945	-33.13611	25.12083	Borehole, water quality	N23B
10008	-32.41333	22.83167	Borehole, water quality	L11F
10009	-32.41167	22.86500	Borehole, water quality	L11F
10010	-32.40500	22.87833	Borehole, water quality	L11F
10011	-32.39833	22.89500	Borehole, water quality	L11F
10012	-32.38833	22.92167	Borehole, water quality	L11G
10013	-32.35333	22.86333	Borehole, water quality	L11F
10014	-32.38167	22.93333	Borehole, water quality	L11G
10015	-32.32667	22.78000	Borehole, water quality	L11F
10018	-32.33333	22.78500	Borehole, water quality	L11F
10019	-32.34500	22.78167	Borehole, water quality	L11F
10020	-32.35500	22.78167	Borehole, water quality	L11F
10021	-32.34833	22.79667	Borehole, water quality	L11F
10027	-32.21333	22.83000	Borehole, water quality	L11F
10028	-32.21111	22.81667	Borehole, water quality	L11F
10029	-32.20000	22.80000	Borehole, water quality	L11F
10103	-32.21167	22.80333	Borehole, water quality	L11F
10104	-32.24000	22.83667	Borehole, water quality	L11F
10105	-32.23833	22.84333	Borehole, water quality	L11F
10106	-32.24000	22.84333	Borehole, water quality	L11F
10107	-32.24167	22.84500	Borehole, water quality	L11F
10108	-32.24333	22.84167	Borehole, water quality	L11F
10109	-32.22167	22.86000	Borehole, water quality	L11F
10110	-32.23000	22.85333	Borehole, water quality	L11F
10184	-32.22000	22.85667	Borehole, water quality	L11F
10185	-32.21111	22.80278	Borehole, water quality	L11F
10186	-32.20000	22.73472	Borehole, water quality	L11F
10187	-32.18472	22.74861	Borehole, water quality	L11F
10188	-32.22222	22.78472	Borehole, water quality	L11F
10189	-32.21583	22.82500	Borehole, water quality	L11F
10356	-32.22833	22.82778	Borehole, water quality	L11F
10357	-32.22778	22.80833	Borehole, water quality	L11F
10358	-32.26972	22.74111	Borehole, water quality	L11F
10359	-32.25278	22.78750	Borehole, water quality	L11F

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
11435	-31.58167	23.75167	Borehole, water quality	L21C
11436	-31.75167	23.75167	Borehole, water quality	L21C
11437	-31.58667	23.58333	Borehole, water quality	L21B
11438	-31.59833	23.75333	Borehole, water quality	L21C
11439	-31.61167	23.77833	Borehole, water quality	L21C
11440	-31.60500	23.79333	Borehole, water quality	L21C
11441	-31.62333	23.80333	Borehole, water quality	L21C
11442	-31.63833	23.80500	Borehole, water quality	L21C
11443	-31.61667	23.76667	Borehole, water quality	L21C
11444	-31.62167	23.77333	Borehole, water quality	L21C
11445	-31.62333	23.77000	Borehole, water quality	L21C
11446	-31.64000	23.78667	Borehole, water quality	L21C
11447	-31.71167	23.82833	Borehole, water quality	L21C
11448	-31.71167	23.81833	Borehole, water quality	L21C
11449	-31.67333	23.77500	Borehole, water quality	L21C
11450	-31.68667	23.79667	Borehole, water quality	L21C
11451	-31.69000	23.80000	Borehole, water quality	L21C
11452	-31.73667	23.77500	Borehole, water quality	L21C
11453	-31.70833	23.76333	Borehole, water quality	L21C
11454	-31.74167	23.80833	Borehole, water quality	L21C
11455	-31.72833	23.15500	Borehole, water quality	L11B
11456	-31.73167	23.20667	Borehole, water quality	L11C
11457	-31.71333	23.20167	Borehole, water quality	L11C
11477	-31.69833	23.20667	Borehole, water quality	L21A
11480	-31.70333	23.07167	Borehole, water quality	L11B
11481	-31.69833	23.08500	Borehole, water quality	L11B
11482	-31.73167	23.09500	Borehole, water quality	L11B
11483	-31.72333	23.14833	Borehole, water quality	L11B
11484	-31.73333	23.12333	Borehole, water quality	L11B
11485	-31.71333	23.12000	Borehole, water quality	L11B
11486	-31.70833	23.10000	Borehole, water quality	L11B
11487	-31.70333	23.12167	Borehole, water quality	L11B
11488	-31.70500	23.13167	Borehole, water quality	L11B
11489	-31.70167	23.14833	Borehole, water quality	L11B
11490	-31.70833	23.16333	Borehole, water quality	L11B
11491	-31.62833	23.04667	Borehole, water quality	L11B
11492	-31.64833	23.04000	Borehole, water quality	L11B
11493	-31.63667	23.01167	Borehole, water quality	L11B
11494	-31.62833	23.01333	Borehole, water quality	L11B
11501	-31.68833	23.04333	Borehole, water quality	L11B
11502	-31.69167	23.03000	Borehole, water quality	L11B

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
11503	-31.68000	23.03333	Borehole, water quality	L11B
11504	-31.69167	23.05833	Borehole, water quality	L11B
11505	-31.72167	23.11167	Borehole, water quality	L11B
11506	-31.71667	23.06500	Borehole, water quality	L11B
11520	-31.97333	23.78500	Borehole, water quality	L21E
11521	-31.95833	23.76333	Borehole, water quality	L21E
11522	-31.96000	23.76333	Borehole, water quality	L21E
11523	-31.95833	23.76167	Borehole, water quality	L21E
11524	-31.95833	23.75833	Borehole, water quality	L21E
11525	-31.95833	23.75667	Borehole, water quality	L21E
11526	-31.95667	23.75667	Borehole, water quality	L21E
11527	-31.95833	23.76500	Borehole, water quality	L21E
11528	-31.96333	23.76500	Borehole, water quality	L21E
11529	-31.96167	23.77000	Borehole, water quality	L21E
11530	-31.96278	23.70333	Borehole, water quality	L21E
11531	-31.97167	23.78667	Borehole, water quality	L21E
11532	-31.96500	23.84833	Borehole, water quality	L21E
11533	-31.95833	23.83667	Borehole, water quality	L21E
11534	-31.93667	23.83667	Borehole, water quality	L21E
11535	-31.97667	23.85000	Borehole, water quality	L21E
11536	-31.99333	23.86000	Borehole, water quality	L21D
11537	-31.98833	23.89167	Borehole, water quality	L21D
11538	-31.97500	23.93333	Borehole, water quality	L21D
11539	-31.98167	23.78667	Borehole, water quality	L21E
11540	-31.88833	23.95667	Borehole, water quality	L21E
11541	-31.89667	23.93167	Borehole, water quality	L21E
11542	-31.93833	23.91333	Borehole, water quality	L21E
11543	-31.93667	23.91500	Borehole, water quality	L21E
11544	-31.90500	23.88833	Borehole, water quality	L21E
11545	-31.89167	23.86667	Borehole, water quality	L21E
11546	-31.87833	23.88000	Borehole, water quality	L21E
11547	-31.88167	23.91833	Borehole, water quality	L21E
11548	-31.87500	23.94000	Borehole, water quality	L21E
11549	-31.86500	23.96333	Borehole, water quality	L21E
11550	-31.86500	23.96333	Borehole, water quality	L21E
11552	-31.85500	23.95333	Borehole, water quality	L21E
11553	-31.86333	23.91000	Borehole, water quality	L21E
11554	-31.86000	23.94000	Borehole, water quality	L21E
11555	-31.85000	23.93667	Borehole, water quality	L21E
11556	-31.84000	23.91333	Borehole, water quality	L21E
11557	-31.80667	23.93167	Borehole, water quality	L21E

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
11558	-31.79667	23.93667	Borehole, water quality	L21C
11559	-31.83000	23.93500	Borehole, water quality	L21E
3222BA00001	-32.23194	22.73056	Borehole, water quality	L11F
3222BA00002	-32.24972	22.73306	Borehole, water quality	L11F
3222BA00093	-32.18889	22.73750	Borehole, water quality	L11F
3222BA00098	-32.17500	22.76667	Borehole, water quality	L11F
3222BA00226	-32.16750	22.73528	Borehole, water quality	L11F
3222BB00001	-32.22333	22.80611	Borehole, water quality	L11F
3222BB00022	-32.19667	22.76500	Borehole, water quality	L11F
3222BB00032	-32.19083	22.77917	Borehole, water quality	L11F
3222BB00033	-32.18889	22.81333	Borehole, water quality	L11F
3222BB00094	-32.19667	22.82194	Borehole, water quality	L11F
3222BB00099	-32.23056	22.78944	Borehole, water quality	L11F
3222BB00100	-32.23278	22.79722	Borehole, water quality	L11F
3222BD00008	-32.35833	22.88750	Borehole, water quality	L11F
3222BD00030	-32.49444	22.96444	Borehole, water quality	L11G
3222BD00037	-32.40889	22.85833	Borehole, water quality	L11F
3222BD00038	-32.40500	22.87167	Borehole, water quality	L11F
3222BD00053	-32.35222	22.84417	Borehole, water quality	L11F
3222BD00054	-32.36667	22.85889	Borehole, water quality	L11F
3222BD00055	-32.36639	22.83250	Borehole, water quality	L11F
3222BD00063	-32.41083	22.85167	Borehole, water quality	L11F
3224AD00010	-32.31278	24.45361	Borehole, water quality	N13A
3224AD00300	-32.35806	24.47222	Borehole, water quality	L11F
3324AB00048	-33.23556	24.30361	Borehole, water quality	L60B
3324AD00091	-33.26194	24.32806	Borehole, water quality	L70B
ABERDEENWEG	-32.71667	24.31667	Borehole, water quality	N24A
ALLEMANS KRAAL	-33.23333	24.28333	Borehole, water quality	L60B
ALLEMANS KRAAL	-33.24611	24.29500	Borehole, water quality	L60B
BAROE	-33.23333	24.58333	Borehole, water quality	L70E
BEYERSVLEI	-32.46667	23.20000	Borehole, water quality	L11G
BIETJESFONTEIN	-33.00833	25.06250	Borehole, water quality	N22D
BLOEDSKRAAL	-32.16750	24.55556	Borehole, water quality	N12C
BLOEMKRAAL	-32.16806	24.55250	Borehole, water quality	N12C
BLOUBOSKRAAL	-32.43333	22.70833	Borehole, water quality	L11F
BOSKRAAL	-32.15861	24.55000	Borehole, water quality	N12C
BRAKFONTEIN	-32.13528	24.44944	Borehole, water quality	N12C
BRANDWAGTWEELING	-32.24333	22.75167	Borehole, water quality	L11F
BRITSHOEK	-32.80000	22.81667	Borehole, water quality	L12A
DAGLUIMER	-32.43000	24.34889	Borehole, water quality	N14D
GRAAFF REINET ALL	-32.18444	24.54556	Borehole, water quality	N11B

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
GRAAFF REINET ALL	-32.18417	24.54528	Borehole, water quality	N11B
GRAAFF-REINET ALLOT	-32.17222	24.49028	Borehole, water quality	N12C
GRAAFF-REINET-ALLOT	-32.18944	24.51139	Borehole, water quality	N12C
GRASRAMD	-32.31361	24.44917	Borehole, water quality	N13A
GROOTKRAANVOESKUIL	-32.53333	22.91667	Borehole, water quality	L11G
IRENE	-32.29278	24.39694	Borehole, water quality	N13A
J2N0050	-32.10028	22.74194	Borehole, water level	L11F
J2N0051	-32.16250	22.74389	Borehole, water level	L11F
J2N0052	-32.16413	22.78470	Borehole, water level	L11F
J2N0054	-32.21389	22.79583	Borehole, water level	L11F
J2N0060	-32.24139	22.80056	Borehole, water level	L11F
J2N0061	-32.22833	22.75917	Borehole, water level	L11F
J2N0065	-32.25556	22.78583	Borehole, water level	L11F
J2N0073	-32.20389	22.78306	Borehole, water level	L11F
J2N0075	-32.39639	22.74306	Borehole, water level	L11F
J2N0076	-32.41556	22.75583	Borehole, water level	L11F
J2N0077	-32.41417	22.83278	Borehole, water level	L11F
J2N0081	-32.37778	22.78389	Borehole, water level	L11F
J2N0082	-32.25278	22.78306	Borehole, water level	L11F
J2N0109	-32.25615	22.78489	Borehole, water level	L11F
J2N0111	-32.21571	22.81690	Borehole, water level	L11F
J2N0529	-32.21389	22.79389	Borehole, water level	L11F
KAMFERKRAAL	-32.20000	22.98333	Borehole, water quality	L11E
KAMFERSKRAAL	-32.26833	23.01333	Borehole, water quality	L11E
KLEIN AAR	-32.31667	23.16667	Borehole, water quality	L11G
KRA1	-33.47160	24.50150	Borehole, water level	L70D
L1N0005	-32.41667	22.83306	Borehole, water level	L11F
L1N0027	-32.13306	23.03306	Borehole, water level	L11E
L1N0028	-32.15556	23.03583	Borehole, water level	L11E
L1N0029	-32.16667	23.04139	Borehole, water level	L11E
L1N0030	-32.14278	22.99500	Borehole, water level	L11E
L1N0031	-32.11583	23.00167	Borehole, water level	L11E
L1N0032	-32.11556	23.00194	Borehole, water level	L11E
L1N0033	-32.09500	23.02333	Borehole, water level	L11E
L1N0034	-32.07833	23.01167	Borehole, water level	L11E
L1N0035	-32.09000	23.01083	Borehole, water level	L11E
L1N0036	-32.05000	23.02222	Borehole, water level	L11C
L1N0037	-32.04694	22.99917	Borehole, water level	L11C
L1N0038	-32.01083	23.01944	Borehole, water level	L11C
L1N0039	-31.97500	23.00806	Borehole, water level	L11C
L1N0040	-31.96944	23.01667	Borehole, water level	L11C

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
L1N0041	-32.00278	23.00000	Borehole, water level	L11C
L1N0042	-32.36250	22.98917	Borehole, water level	L11F
L1N0043	-32.39833	22.97472	Borehole, water level	L11F
L1N0044	-32.39889	22.97417	Borehole, water level	L11F
L1N0045	-32.43389	22.79500	Borehole, water level	L11F
L1N0047	-32.38500	23.10194	Borehole, water level	L11G
L1N0048	-32.34667	23.04528	Borehole, water level	L11G
L1N0049	-32.33639	23.06250	Borehole, water level	L11G
L1N0050	-32.32139	23.07444	Borehole, water level	L11G
L1N0051	-32.33667	23.12556	Borehole, water level	L11G
L1N0052	-32.25139	23.06694	Borehole, water level	L11G
L1N0054	-32.28056	22.99611	Borehole, water level	L11E
L1N0055	-32.22917	23.06278	Borehole, water level	L11E
L1N0056	-32.20750	23.05944	Borehole, water level	L11E
L1N0062	-32.26083	22.99889	Borehole, water level	L11E
L1N0063	-32.28056	23.04889	Borehole, water level	L11G
L1N0064	-32.36389	22.99139	Borehole, water level	L11F
L1N0065	-32.43583	23.03194	Borehole, water level	L11G
L1N0066	-32.44417	23.15306	Borehole, water level	L11G
L1N0067	-32.17500	23.04833	Borehole, water level	L11E
L1N0068	-32.22500	23.06528	Borehole, water level	L11E
L1N0069	-32.24083	23.07556	Borehole, water level	L11G
L1N0070	-32.50778	22.93556	Borehole, water level	L11G
L1N0071	-32.17417	23.04889	Borehole, water level	L11E
L1N0072	-32.70694	22.79417	Borehole, water level	L11G
L1N0073	-32.77583	22.81278	Borehole, water level	L12A
L1N0076	-32.77611	22.81278	Borehole, water level	L12A
L1N0080	-32.24167	23.07528	Borehole, water level	L11G
L1N0111	-32.24917	22.75056	Borehole, water level	L11F
L1N0113	-32.19827	22.76485	Borehole, water level	L11F
L1N0114	-32.19056	22.77889	Borehole, water level	L11F
L1N0115	-32.18583	22.78750	Borehole, water level	L11F
L1N0116	-32.18861	22.81306	Borehole, water level	L11F
L1N0117	-32.19639	22.82167	Borehole, water level	L11F
L1N0118	-32.21167	22.84000	Borehole, water level	L11F
L1N0119	-32.21417	22.81389	Borehole, water level	L11F
L1N0120	-32.20417	22.80417	Borehole, water level	L11F
L1N0121	-32.19833	22.80167	Borehole, water level	L11F
L1N0122	-32.22306	22.80583	Borehole, water level	L11F
L1N0123	-32.21389	22.79139	Borehole, water level	L11F
L1N0124	-32.22222	22.76694	Borehole, water level	L11F

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
L1N0125	-32.23056	22.78917	Borehole, water level	L11F
L1N0126	-32.23278	22.79694	Borehole, water level	L11F
L1N0127	-32.23528	22.83944	Borehole, water level	L11F
L1N0128	-32.24583	22.81306	Borehole, water level	L11F
L1N0129	-32.24500	22.81056	Borehole, water level	L11F
L1N0130	-32.26250	22.80056	Borehole, water level	L11F
L1N0131	-32.25455	22.77488	Borehole, water level	L11F
L1N0132	-32.26306	22.74667	Borehole, water level	L11F
L1N0133	-32.27840	22.78029	Borehole, water level	L11F
L1N0134	-32.28306	22.78139	Borehole, water level	L11F
L1N0136	-32.21028	22.75750	Borehole, water level	L11F
L1N0137	-32.21056	22.82222	Borehole, water level	L11F
L1N0138	-32.21917	22.85667	Borehole, water level	L11F
L1N0139	-32.22778	22.82694	Borehole, water level	L11F
L1N0140	-32.23167	22.81556	Borehole, water level	L11F
L1N0141	-32.22583	22.79139	Borehole, water level	L11F
L1N0143	-32.35889	22.85889	Borehole, water level	L11F
L1N0144	-32.23056	22.80639	Borehole, water level	L11F
L1N0145	-32.42556	22.78889	Borehole, water level	L11F
L1N0146	-32.10957	22.75417	Borehole, water level	L11F
L1N0147	-32.10500	22.74806	Borehole, water level	L11F
L1N0148	-32.16295	22.78386	Borehole, water level	L11F
L1N0149	-32.16414	22.78246	Borehole, water level	L11F
L1N0151	-32.21895	22.86250	Borehole, water level	L11F
L1N0152	-32.09707	22.63811	Borehole, water level	L11F
L1N0153	-32.67464	22.87174	Borehole, water level	L11G
L1N0154	-32.21583	22.81806	Borehole, water level	L11F
L1N0164	-32.10889	22.74667	Borehole, water level	L11F
L1N0168	-32.90517	23.14768	Borehole, water level	L12C
L1N0169	-32.18889	23.08639	Borehole, water level	L11E
L3N0001	-33.07726	23.49294	Borehole, water level	L30C
L4N0001	-33.08492	23.92842	Borehole, water level	L40B
L4N0002	-33.17712	23.83105	Borehole, water level	L30D
L6N0002	-33.23278	24.25806	Borehole, water level	L60B
L6N0003	-33.23278	24.26056	Borehole, water level	L60B
L6N0004	-33.23278	24.25889	Borehole, water level	L60B
L6N0005	-33.01324	24.34521	Borehole, water level	L60A
L6N0006	-32.96140	24.33153	Borehole, water level	N24C
L6N0007	-33.02139	24.34249	Borehole, water level	L60A
L7N0001	-33.25194	24.33889	Borehole, water level	L70B
L7N0002	-33.25278	24.33833	Borehole, water level	L70B

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
L7N0003	-33.25278	24.33861	Borehole, water level	L70B
L7N0004	-33.25250	24.33750	Borehole, water level	L70B
L7N0005	-33.24861	24.38333	Borehole, water level	L70B
L7N0006	-33.25444	24.26556	Borehole, water level	L50B
L7N0010	-33.26556	24.32444	Borehole, water level	L70B
L7N0011	-33.26146	24.32780	Borehole, water level	L70B
L7N0012	-33.53292	24.48438	Borehole, water level	L70D
L7N0013	-33.53255	24.47427	Borehole, water level	L70D
L7N0014	-33.26105	24.35296	Borehole, water level	L70B
MOUNT STEWART	-33.15000	24.43333	Borehole, water quality	L60B
MUNICIPALITY	-32.20111	24.54917	Borehole, water quality	N11B
N1H011Q01	-32.16889	24.07639	Borehole, water quality	N13B
N1H012Q01	-32.16083	24.12639	Borehole, water quality	N13B
N1H013Q01	-32.24139	24.53222	Borehole, water quality	N13C
N1H014Q01	-32.03556	24.67306	Borehole, water quality	N11B
N1N0001	-32.18333	24.55000	Borehole, water level	N12C
N1N0005	-32.19833	24.54694	Borehole, water level	N12C
N1N0021	-32.20239	24.54083	Borehole, water level	N12C
N1N0022	-32.18528	24.54478	Borehole, water level	N12C
N1N0023	-32.31278	24.45333	Borehole, water level	N13A
N1N0024	-32.31028	24.40417	Borehole, water level	N13A
N1N0025	-32.29164	24.42561	Borehole, water level	N13A
N1N0026	-32.28861	24.35028	Borehole, water level	N13A
N1N0028	-32.23194	24.34583	Borehole, water level	N13A
N1N0029	-32.20389	24.33889	Borehole, water level	N13A
N1N0030	-32.35556	24.47306	Borehole, water level	N13A
N1N0031	-32.39167	24.41778	Borehole, water level	N13C
N1N0032	-32.37111	24.41306	Borehole, water level	N13C
N1N0033	-32.35000	24.38222	Borehole, water level	N13B
N1N0034	-32.33806	24.37556	Borehole, water level	N13B
N1N0036	-32.30972	24.27917	Borehole, water level	N13B
N1N0037	-32.30583	24.28028	Borehole, water level	N13B
N1N0041	-32.42750	24.20000	Borehole, water level	N14C
N1N0042	-32.43167	24.21694	Borehole, water level	N14D
N1N0046	-32.41667	24.29944	Borehole, water level	N14D
N1N0047	-32.42806	24.35556	Borehole, water level	N14D
N1N0058	-32.31056	24.27833	Borehole, water level	N13B
N1N0071	-32.35806	24.35222	Borehole, water level	N13B
N1N0091	-32.30450	24.40094	Borehole, water level	N13A
N1N0092	-32.30825	24.41214	Borehole, water level	N13A
N1N0503	-32.30875	24.41244	Borehole, water level	N13A

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
N1N0504	-32.18307	24.24433	Borehole, water level	N13B
N1N0505	-32.30619	24.40474	Borehole, water level	N13A
N1N0506	-32.31083	24.41944	Borehole, water level	N13A
N1N0507	-32.31344	24.41286	Borehole, water level	N13A
N1N0510	-32.47461	24.06006	Borehole, water level	N14B
N1N0511	-32.48908	24.07112	Borehole, water level	N14B
N1N0512	-32.49445	24.04990	Borehole, water level	N14A
N1N0513	-32.48322	24.06225	Borehole, water level	N14B
N1N0514	-31.86565	24.55983	Borehole, water level	N12A
N1N0515	-32.47160	24.05846	Borehole, water level	N14B
N2N0500	-32.94167	24.66111	Borehole, water level	N24C
N2N0501	-33.19500	24.90056	Borehole, water level	N22E
N2N0502	-32.93407	24.70008	Borehole, water level	N24D
N2N0503	-32.91490	24.65493	Borehole, water level	N24C
N2N0504	-33.07542	25.00177	Borehole, water level	N22C
N2N0505	-32.90220	24.65670	Borehole, water level	N24C
N3N0001	-32.57324	25.13486	Borehole, water level	N30A
N3N0002	-32.56670	25.13931	Borehole, water level	N30A
ONDER PLAATDOORNS	-32.38333	22.78500	Borehole, water quality	L11F
OORLOGS POORT	-33.26167	24.32806	Borehole, water quality	L70B
POLISIE AKADEMIE GRAAF REINET	-32.26417	24.53778	Borehole, water quality	N13C
RUST VREDE	-32.61667	22.90000	Borehole, water quality	L11G
SPOELMANS KUIL	-32.26667	22.74917	Borehole, water quality	L11F
SUNNYSIDESPRUIT	-32.35833	22.87500	Borehole, water quality	L11F
THORNLANDS	-32.19361	24.46139	Borehole, water quality	N12C
THORNLANDS	-32.19722	24.46944	Borehole, water quality	N12C
THORNLANDS	-32.19861	24.46139	Borehole, water quality	N12C
TOORNITZ	-32.58333	22.86667	Borehole, water quality	L11G
TRULERSKUIL	-32.33333	23.19167	Borehole, water quality	L11G
TRUTERSKUIL	-32.36667	23.05000	Borehole, water quality	L11G
VAALE DRAAI	-33.12083	25.06667	Borehole, water quality	N22E
VAALNEK	-33.16667	25.10417	Borehole, water quality	N23B
VAN DER WALTSKLOOF	-32.38500	24.18861	Borehole, water quality	N14D
VK348	-32.43389	22.79500	Borehole, water quality	L11F
VK353	-32.47944	22.86111	Borehole, water quality	L11G
ZEVENFONTYNEN	-32.46528	24.53667	Borehole, water quality	N13C
ZQMABD1	-32.47722	24.04667	Borehole, water quality	N14A
ZQMABD2	-32.47389	23.80944	Borehole, water quality	N14A
ZQMABD3	-32.45750	23.81111	Borehole, water quality	N14A
ZQMABR1	-32.73972	24.31694	Borehole, water quality	N24A
ZQMARBI	-32.73833	24.31750	Borehole, water quality	N24A

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
ZQMGRT1	-32.20111	24.54917	Borehole, water quality	N11B
ZQMGRT2	-32.30889	24.41306	Borehole, water quality	N13A
ZQMKPT1	-33.13806	24.28083	Borehole, water quality	L60B
ZQMNLS1	-32.03917	23.00750	Borehole, water quality	L11D
ZQMRSK1	-32.21444	22.81889	Borehole, water quality	L11F
ZQMRTB1	-32.95361	23.00806	Borehole, water quality	L12C
ZQMRTB2	-32.97472	23.11583	Borehole, water quality	L12C
ZQMSTY1	-33.26167	24.35083	Borehole, water quality	L70B
ZQMTSS1	-31.89333	23.06722	Borehole, water quality	L11C
ZQMURG1	-31.96444	23.76500	Borehole, water quality	L21E
ZQMWHW1	-33.25556	23.48972	Borehole, water quality	L30A

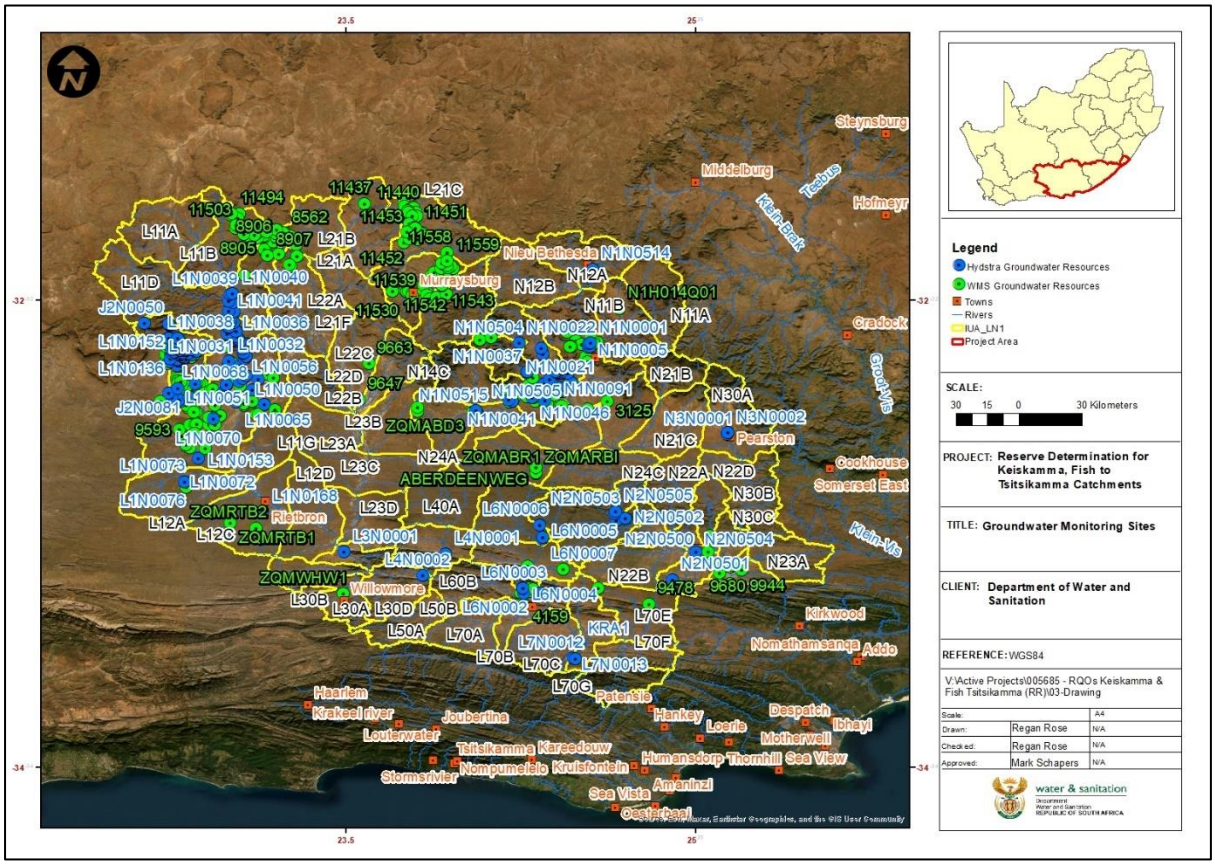


Figure 47: Monitoring sites in IUA 4 (LN1)

Table 10: Monitoring sites in IUA 5 (M1)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
5289	-33.84861	25.29889	Borehole, water quality	M10C
5290	-33.84472	25.29833	Borehole, water quality	M10C
5291	-33.85222	25.30222	Borehole, water quality	M10C
5292	-33.85889	25.29139	Borehole, water quality	M10C
5293	-33.85944	25.28917	Borehole, water quality	M10C
5294	-33.85806	25.29528	Borehole, water quality	M10C
5295	-33.86028	25.29472	Borehole, water quality	M10C
5296	-33.86306	25.29528	Borehole, water quality	M10C
5297	-33.87472	25.29417	Borehole, water quality	M10C
5298	-33.86306	25.30222	Borehole, water quality	M10C
5299	-33.86389	25.30639	Borehole, water quality	M10C
5300	-33.86222	25.30389	Borehole, water quality	M10C
5301	-33.87194	25.31639	Borehole, water quality	M10C
5302	-33.86306	25.32083	Borehole, water quality	M10C
5303	-33.85583	25.31694	Borehole, water quality	M10C
5304	-33.87694	25.30000	Borehole, water quality	M10C
5305	-33.86500	25.31500	Borehole, water quality	M10C
5306	-33.87444	25.32583	Borehole, water quality	M10C
5307	-33.87389	25.32556	Borehole, water quality	M10C
9054	-33.61667	25.43333	Borehole, water quality	M30A
3325CB00089	-33.77083	25.33722	Borehole, water quality	M10C
3325CB00125	-33.73389	25.32278	Borehole, water quality	M10C
3325CB00127	-33.74028	25.32389	Borehole, water quality	M10C
3325CD00072	-33.80083	25.48861	Borehole, water quality	M10D
3325CD00073	-33.79306	25.43056	Borehole, water quality	M10D
3325CD00074	-33.78611	25.42500	Borehole, water quality	M10D
3325CD00075	-33.78389	25.42389	Borehole, water quality	M10D
3325CD00078	-33.79250	25.48111	Borehole, water quality	M10D
3325CD00082	-33.78722	25.42667	Borehole, water quality	M10D
3325CD00085	-33.77278	25.35417	Borehole, water quality	M10C
3325CD00090	-33.76972	25.33417	Borehole, water quality	M10C
3325CD00091	-33.77139	25.33000	Borehole, water quality	M10C
3325CD00092	-33.77833	25.32306	Borehole, water quality	M10C
3325CD00093	-33.77972	25.33056	Borehole, water quality	M10C
3325CD00095	-33.77972	25.33417	Borehole, water quality	M10C
3325DC00041	-33.81528	25.53889	Borehole, water quality	M10D
ECHODALE (UITENHAGE DISTRIK)	-33.79750	25.31611	Borehole, water quality	M10C

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
M1H003Q01	-33.70000	25.43806	Borehole, water quality	M10C
M1N0001	-33.72083	25.51194	Borehole, water level	M30A
M1N0002	-33.73750	25.48000	Borehole, water level	M30B
M1N0003	-33.78961	25.33086	Borehole, water level	M10B
M1N0004	-33.80114	25.32944	Borehole, water level	M10B
M1N0007	-33.76583	25.32500	Borehole, water level	M10C
M1N0010	-33.84667	25.40778	Borehole, water level	M10C
M1N0012	-33.77083	25.62083	Borehole, water level	M30B
M1N0016	-33.72833	25.52778	Borehole, water level	M30B
M1N0021	-33.58806	25.31944	Borehole, water level	M30A
M1N0024	-33.69528	25.39667	Borehole, water level	M10C
M1N0029	-33.78889	25.30139	Borehole, water level	M10B
M1N0030	-33.79833	25.32556	Borehole, water level	M10B
M1N0032	-33.76139	25.33889	Borehole, water level	M10C
M1N0034	-33.74361	25.30125	Borehole, water level	M10C
M1N0036	-33.77761	25.33136	Borehole, water level	M10C
M1N0037	-33.78056	25.33000	Borehole, water level	M10C
M1N0038	-33.80228	25.34147	Borehole, water level	M10B
M3N0001	-33.64422	25.27303	Borehole, water level	M10C
M3N0002	-33.64717	25.45364	Borehole, water level	M30A
M3N0003	-33.64306	25.45094	Borehole, water level	M30A
M3N0004	-33.59675	25.38683	Borehole, water level	M30A
M3N0005	-33.72381	25.50897	Borehole, water level	M30A
M3N0006	-33.73556	25.55814	Borehole, water level	M30B
M3N0007	-33.73786	25.58000	Borehole, water level	M30B
ZQMMRA1	-33.72389	25.59722	Borehole, water quality	M30B
ZQMUTH1	-33.70000	25.43806	Borehole, water quality	M10C

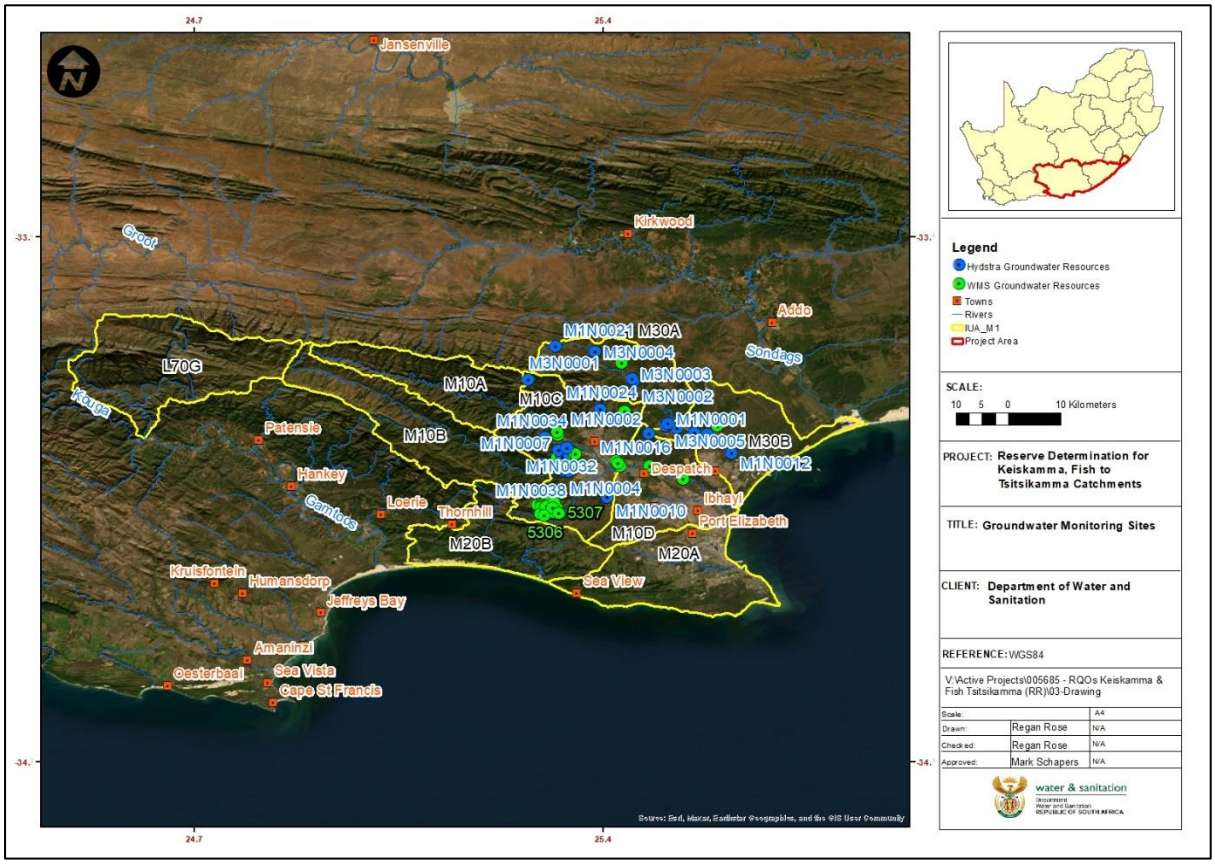


Figure 48: Monitoring sites in IUA 5 (M1)

Table 11: Monitoring sites in IUA 6 (NQ1)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
7445	-33.37167	25.24278	Borehole, water quality	N40B
7446	-33.37750	25.18750	Borehole, water quality	N40B
7447	-33.37361	25.25389	Borehole, water quality	N40B
9089	-33.45000	25.73333	Borehole, water quality	N40D
9661	-33.21250	25.15000	Borehole, water quality	N40A
ADDO DRIFT EAST	-33.58278	25.67056	Borehole, water quality	N40F
FARM 49 UIT Q 4C 79/WINTERHOEKSBERGE	-33.34667	25.25250	Borehole, water quality	N40B
GLENCONNER	-33.40000	25.16667	Borehole, water quality	N40B
M1N0008	-33.43306	25.07111	Borehole, water level	N40B
N4N0505	-33.39639	25.44306	Borehole, water level	N40C
N4N0507	-33.39639	25.44306	Borehole, water level	N40C
N4N0508	-33.39667	25.44278	Borehole, water level	N40C
N4N0511	-33.39639	25.44306	Borehole, water level	N40C
ROCKWOOD/ADDO	-33.39111	25.71944	Borehole, water quality	N40D
STRATHSOMERS ESTATE KIRKWOOD	-33.43000	25.44583	Borehole, water quality	N40C
ZQMADO1	-33.38944	25.72056	Borehole, water quality	N40D
ZQMKWD1	-33.43000	25.44583	Borehole, water quality	N40C

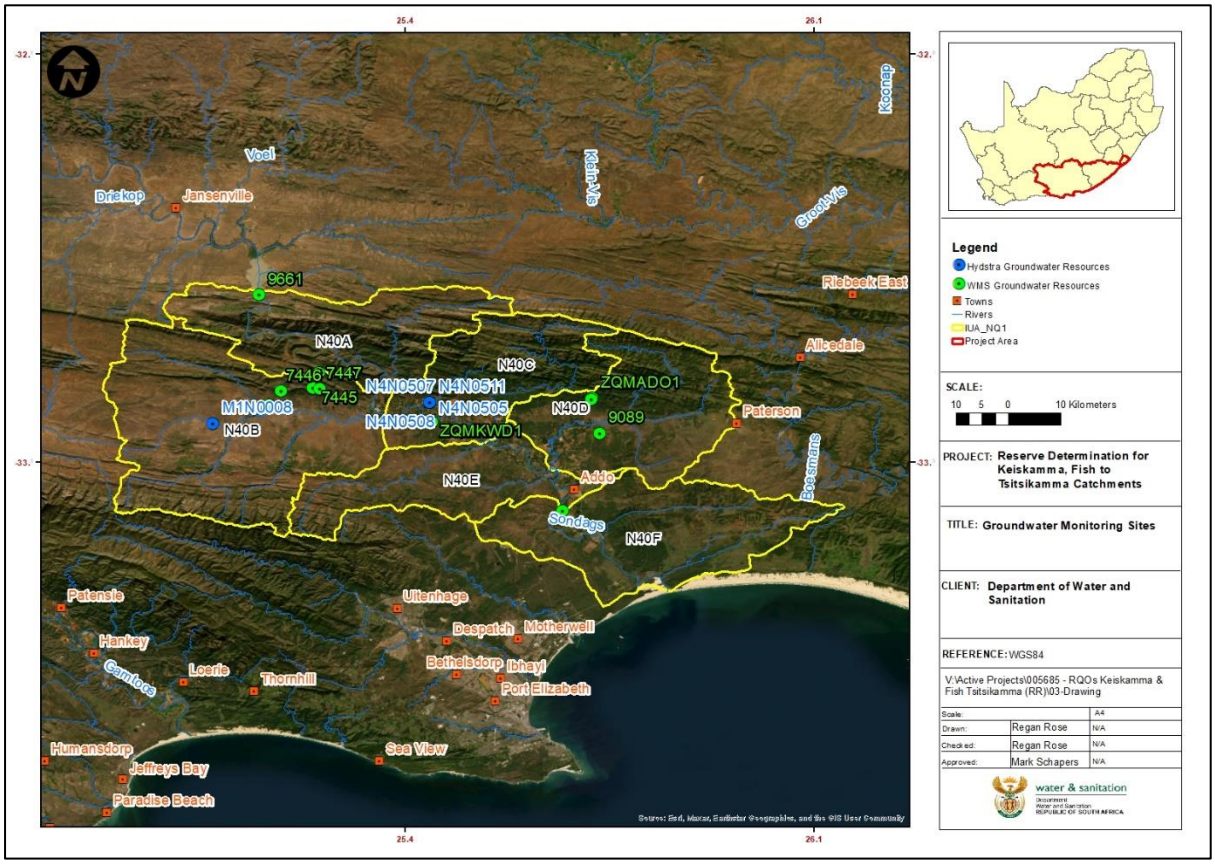


Figure 49: Monitoring sites in IUA 6 (NQ1)

Table 12: Monitoring sites in IUA 7 (P1)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
8060	-33.50694	26.40167	Borehole, water quality	P10F
8061	-33.52028	26.40639	Borehole, water quality	P10F
9090	-33.51667	26.83333	Borehole, water quality	P40C
NOOITGEDAGHT	-33.23472	25.68333	Borehole, water quality	P10C
P1N0502	-33.50981	26.36575	Borehole, water level	P10F
P1N0504	-33.20691	25.79665	Borehole, water level	P10C
P1N0505	-33.53033	27.04664	Borehole, water level	P40D
P4N0003	-33.53097	26.89333	Borehole, water level	P40C
P4N0004	-33.56389	26.84750	Borehole, water level	P40C
P4N0008	-33.52800	26.93288	Borehole, water level	P40D
P4N0009	-33.53229	26.94093	Borehole, water level	P40D
P4N0010	-33.53042	26.94026	Borehole, water level	P40D
P4N0011	-33.53106	26.94248	Borehole, water level	P40D
P4N0012	-33.53213	26.94601	Borehole, water level	P40D
ZQMCPD1	-33.77083	26.46250	Spring, water quality	P20A
ZQMMND1	-33.37028	26.81667	Borehole, water quality	P40B

Figure 50: Monitoring sites in IUA 7 (P1)

Table 13: Monitoring sites in IUA 8 (Q1)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
2706	-31.46667	25.03361	Borehole, water quality	Q14B
CYPRESSGROVE	-31.81250	25.33333	Borehole, water quality	Q14E
Q1N0042	-31.53372	25.00017	Borehole, water level	Q14B
Q1N0043	-31.60611	24.79139	Borehole, water level	Q14A
Q1N0050	-31.46236	25.02317	Borehole, water level	Q14B
Q1N0054	-31.56889	25.08306	Borehole, water level	Q14C
Q1N0061	-31.55000	25.00000	Borehole, water level	Q14B
Q1N0062	-31.57750	24.92083	Borehole, water level	Q14B
Q1N0063	-31.55167	25.11306	Borehole, water level	Q14C
Q1N0064	-31.57500	25.05806	Borehole, water level	Q14C
Q1N0065	-31.49056	24.97639	Borehole, water level	Q14B
Q1N0066	-31.45000	25.03250	Borehole, water level	Q14B
Q1N0067	-31.45000	25.03250	Borehole, water level	Q14B
Q1N0068	-31.53750	24.94417	Borehole, water level	Q14B
Q1N0069	-31.54917	24.82250	Borehole, water level	Q14A
Q1N0070	-31.50833	24.80806	Borehole, water level	Q14A
Q1N0071	-31.51778	24.79639	Borehole, water level	Q14A
Q1N0072	-31.52028	25.07444	Borehole, water level	Q14C
Q1N0073	-31.60000	24.79139	Borehole, water level	Q14A
Q1N0074	-31.29361	25.01639	Borehole, water level	Q14B
Q1N0075	-31.52472	24.91944	Borehole, water level	Q14B
Q1N0502	-31.47722	25.02583	Borehole, water level	Q14B
Q1N0503	-31.47722	25.02611	Borehole, water level	Q14B
Q1N0504	-31.47722	25.02583	Borehole, water level	Q14B
Q1N0505	-31.45000	25.00000	Borehole, water level	Q14B
Q1N0506	-31.47722	25.02611	Borehole, water level	Q14B
Q1N0507	-31.50611	24.98947	Borehole, water level	Q14B
Q1N0508	-31.51403	24.97233	Borehole, water level	Q14B
Q1N0509	-31.54333	24.90778	Borehole, water level	Q14B
Q1N0510	-31.66667	24.96778	Borehole, water level	Q14C
Q1N0511	-31.43121	24.98600	Borehole, water level	Q14B
Q1N0512	-31.48742	25.10950	Borehole, water level	Q14C
Q1N0513	-31.44015	25.29320	Borehole, water level	Q11D
Q1N0514	-31.54246	25.01686	Borehole, water level	Q14B
Q1N0515	-31.48293	24.98436	Borehole, water level	Q14B
Q1N0516	-31.53711	24.94391	Borehole, water level	Q14B
Q1N0517	-31.50411	25.04747	Borehole, water level	Q14B
SHERBORNE	-31.36667	25.01667	Borehole, water quality	Q14B
ZQMMDG2	-31.31833	24.98278	Spring, water quality	Q14B

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
ZQMMID1	-31.48472	24.99250	Borehole, water quality	Q14B

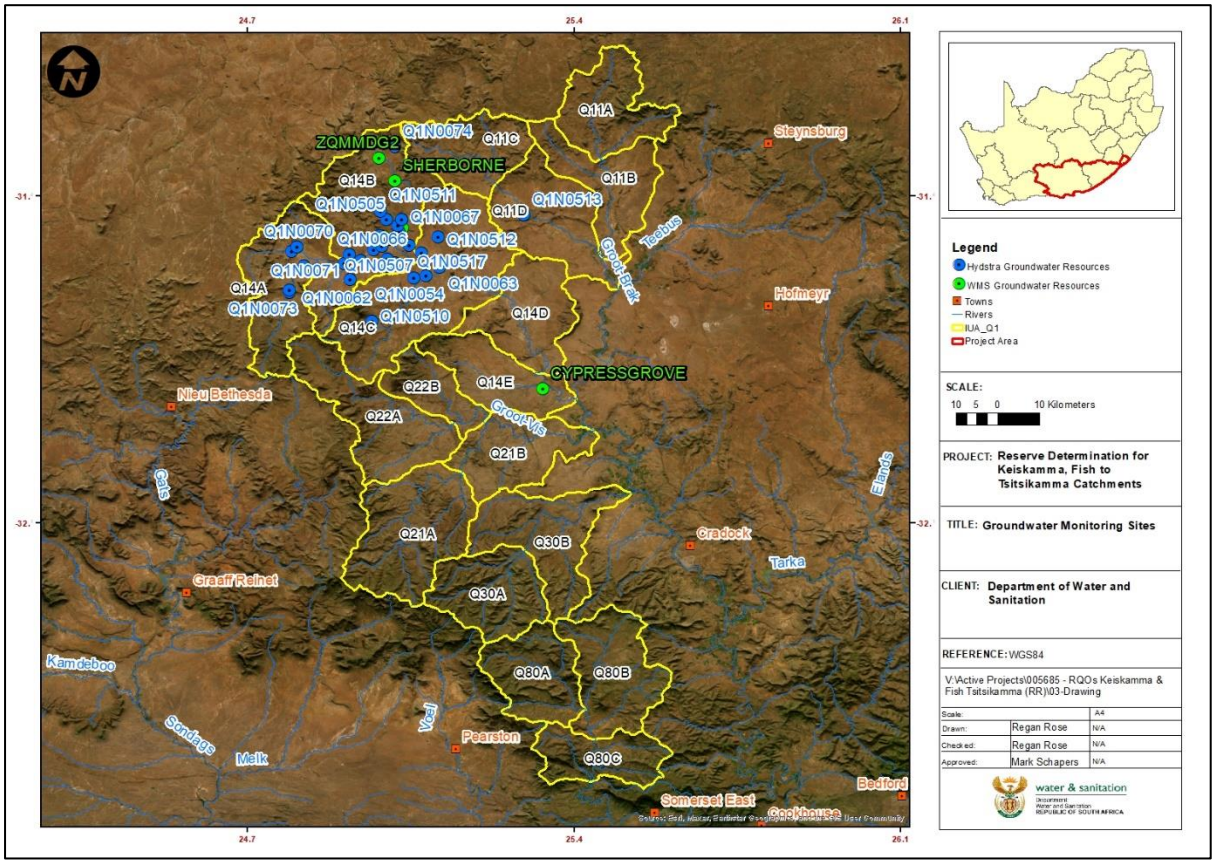


Figure 51: Monitoring sites in IUA 8 (Q1)

Table 14: Monitoring sites in IUA 9 (Q2)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
5460	-31.65278	25.81528	Borehole, water quality	Q13A
7385	-32.15806	25.82917	Borehole, water quality	Q44B
7386	-32.15972	25.87500	Borehole, water quality	Q44B
9091	-32.75000	25.82500	Borehole, water quality	Q70A
3225BA00107	-32.13500	25.62583	Spring, water quality	Q30D
EASTPOORT	-32.66667	25.80000	Borehole, water quality	Q50C
NELLAND	-32.48333	25.75000	Borehole, water quality	Q50A
Q1N0046	-31.65000	25.80000	Borehole, water level	Q13A
Q1N0055	-32.01306	26.25417	Borehole, water level	Q41C
Q1N0059	-31.65528	25.81528	Borehole, water level	Q13A
Q1N0060	-31.65511	25.81758	Borehole, water level	Q13A
Q1N0518	-31.29054	25.82594	Borehole, water level	Q12B
Q1N0519	-31.29329	25.81578	Borehole, water level	Q12B
Q4N0002	-32.00867	26.27428	Borehole, water level	Q41C
Q4N0003	-31.95756	26.27733	Borehole, water level	Q41C
Q4N0004	-31.95883	26.27550	Borehole, water level	Q41C
Q7N0004	-32.97333	25.83056	Borehole, water level	Q70C
Q7N0005	-32.97556	25.82917	Borehole, water level	Q70C
Q7N0008	-32.95000	25.81667	Borehole, water level	Q70B
Q7N0009	-32.75019	25.80260	Borehole, water level	Q70A
Q8N0001	-32.72274	25.57475	Borehole, water level	Q80D
Q8N0002	-32.70695	25.55711	Borehole, water level	Q80D
ZQMCBG1	-33.12556	26.20944	Borehole, water quality	Q91B
ZQMCRA1	-32.03472	25.68750	Spring, water quality	Q30C
ZQMCRA2	-32.13500	25.62583	Spring, water quality	Q30D
ZQMFRR1	-33.05278	26.07111	Borehole, water quality	Q91A
ZQMHFR1	-31.65278	25.81528	Borehole, water quality	Q13A
ZQMMND1	-33.37028	26.81667	Borehole, water quality	P40B
ZQMSME1	-32.73861	25.60500	Borehole, water quality	Q80D
ZQMSTB1	-31.29611	25.83028	Borehole, water quality	Q12B
ZQMTAR1	-31.95611	26.27583	Borehole, water quality	Q41C
ZQMTAR2	-31.95611	26.27583	Borehole, water quality	Q41C

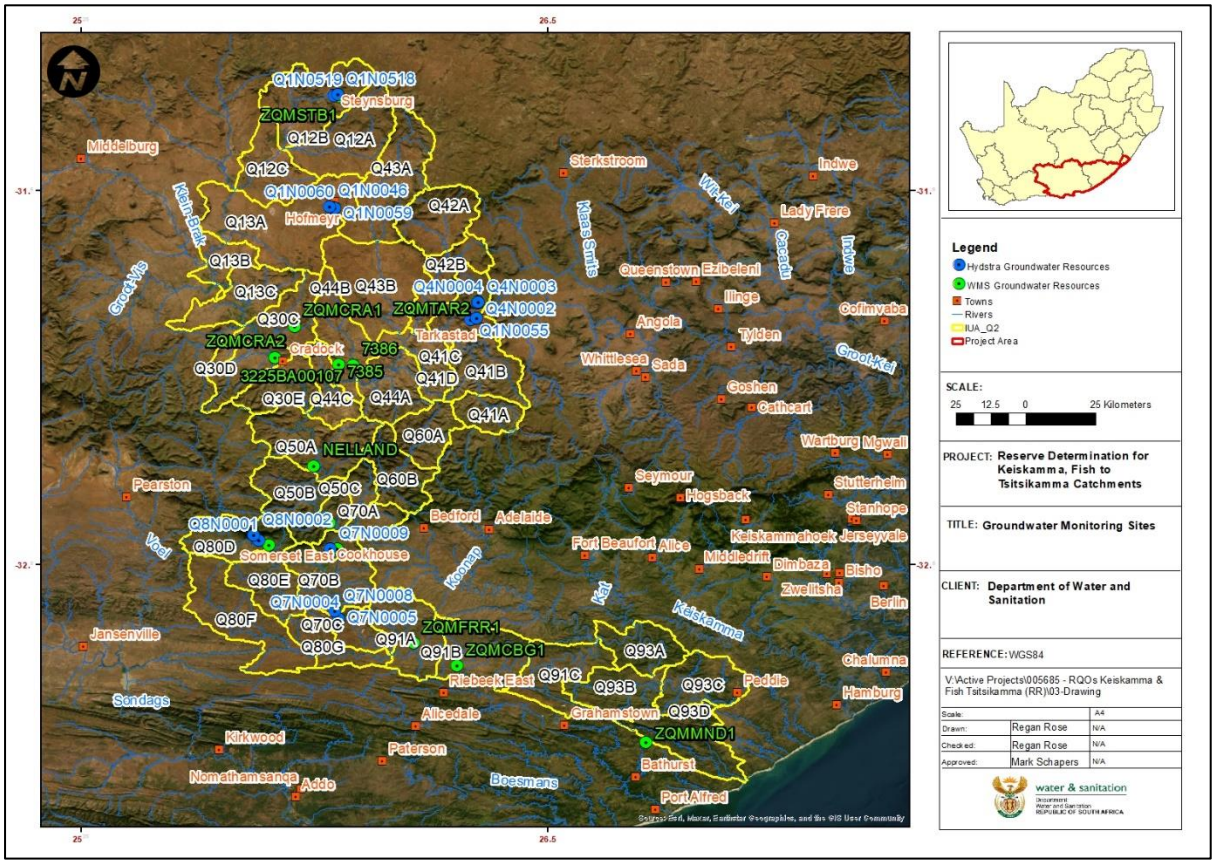


Figure 52: Monitoring sites in IUA 9 (Q2)

Table 15: Monitoring sites in IUA 10 (Q3)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
9055	-32.85000	26.31667	Borehole, water quality	Q92G
HAVELOCK HOLME BEDFORD DIST	-32.70972	26.13944	Borehole, water quality	Q92F
KINGSVALE BEDFORD DIST	-32.73000	26.13556	Borehole, water quality	Q92F
KROOMIE	-32.77500	26.43333	Borehole, water quality	Q92G
ZQMADK1	-32.70750	26.29444	Borehole, water quality	Q92C
ZQMADL1	-32.71194	26.29028	Borehole, water quality	Q92C
ZQMBTH1	-32.82556	26.67056	Borehole, water quality	Q94F

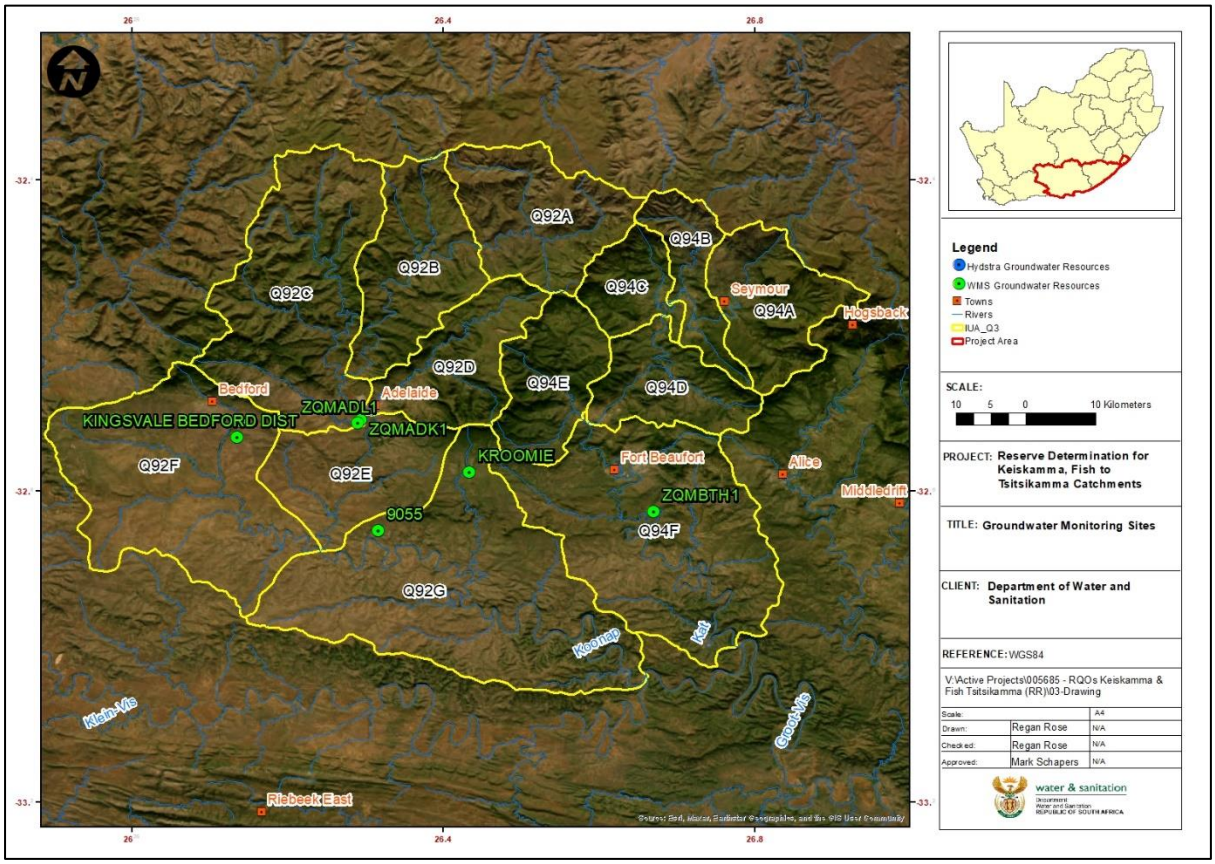


Figure 53: Monitoring sites in IUA 10 (Q3)

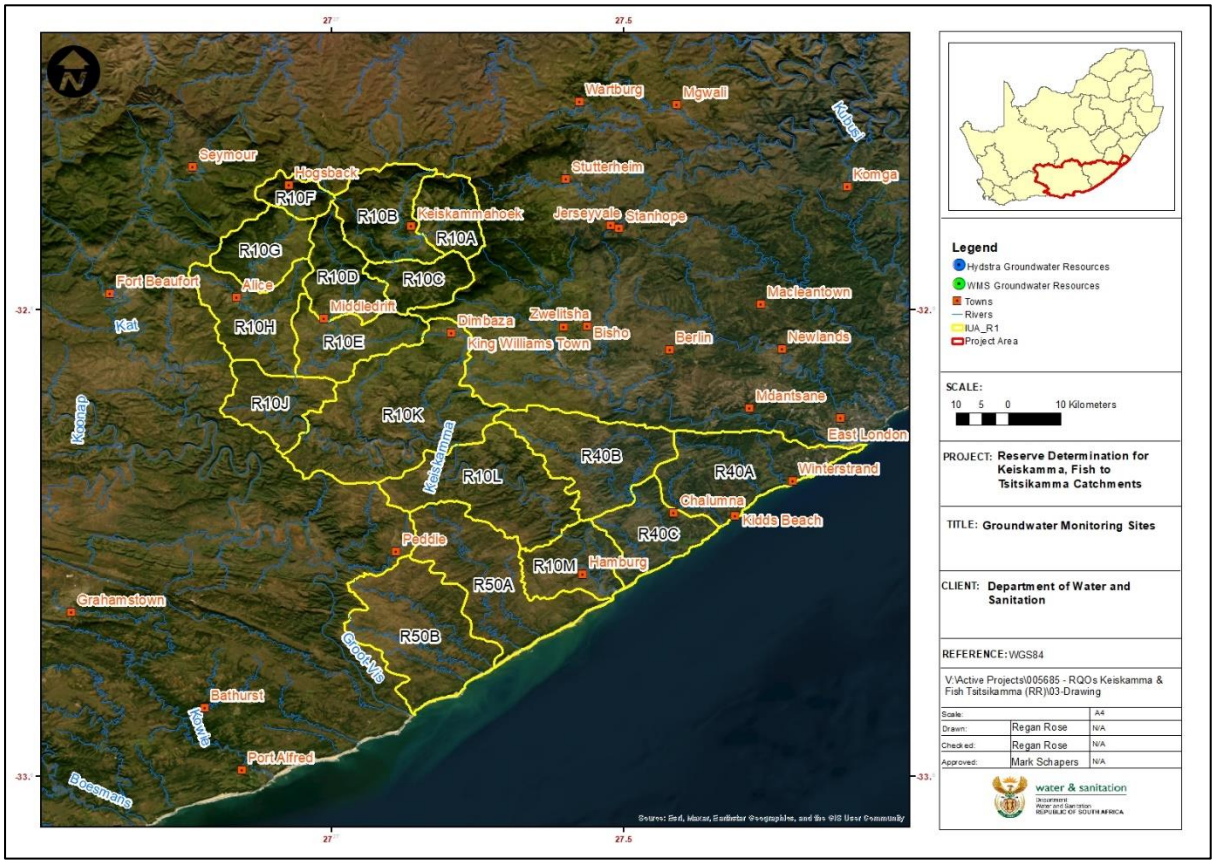


Figure 54: Map of IUA 11 (R1)

Table 16: Monitoring sites in IUA 12 (R2)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
R3N0500	-32.93306	27.95833	Borehole, water level	R30D
R3N0501	-32.93306	27.95806	Borehole, water level	R30D
R3N0502	-32.93333	27.95806	Borehole, water level	R30D
R3N0503	-32.75040	28.06816	Borehole, water level	R30A
R3N0504	-32.90440	28.02220	Borehole, water level	R30B
EAST-LONDON	-33.03111	27.90194	Borehole, water quality	R20G
MNTLABATHI	-32.96861	27.61222	Borehole, water quality	R20F
FORT-JACKSON	-32.95000	27.68333	Borehole, water quality	R20F
DONGWE	-32.93472	27.55833	Borehole, water quality	R20F
MNCOTSHO	-32.93361	27.59639	Borehole, water quality	R20F
RICHMOND-HILL	-32.92556	27.88444	Borehole, water quality	R30F
GRAYLANDS	-32.90583	27.69667	Borehole, water quality	R30E
WOLSELEY	-32.89750	27.69917	Borehole, water quality	R30E
GLENGARIFF	-32.89389	28.09111	Borehole, water quality	R30B
STREET-LEA	-32.89167	27.57278	Borehole, water quality	R20E
27675	-32.87611	27.78472	Borehole, water quality	R30E
PLUMBAGO	-32.87389	27.43861	Borehole, water quality	R20E
28306	-32.87083	27.68333	Borehole, water quality	R30E
28308	-32.87083	27.72944	Borehole, water quality	R30E
BLANEY	-32.86667	27.51667	Borehole, water quality	R20E
TYUTYU	-32.86306	27.45083	Borehole, water quality	R20E
NAVEL-VALLEY	-32.86278	27.75083	Borehole, water quality	R30E
3227CD00331	-32.85278	27.38778	Borehole, water quality	R20B
3227CD00331	-32.85278	27.38778	Borehole, water quality	R20B
3227CD00330	-32.85250	27.38861	Borehole, water quality	R20B
3227CD00330	-32.85250	27.38861	Borehole, water quality	R20B
28312	-32.85139	27.74222	Borehole, water quality	R30E
27676	-32.84194	27.80194	Borehole, water quality	R30E
27677	-32.83694	27.80861	Borehole, water quality	R30E
28309	-32.83667	27.73917	Borehole, water quality	R30E
28304	-32.82528	27.47694	Borehole, water quality	R20E
LONE-TREE	-32.81833	28.08667	Borehole, water quality	R30B
ERHAMNYIBA	-32.79944	27.35306	Borehole, water quality	R20B
BLACK-LANDS	-32.79111	27.39500	Borehole, water quality	R20B
MACLEANTOWN	-32.78528	27.74528	Borehole, water quality	R30E
28305	-32.75250	27.87083	Borehole, water quality	R30C
3227CB00110	-32.74992	27.47728	Borehole, water quality	R20E
3227CB00110	-32.74992	27.47728	Borehole, water quality	R20E
LORAINE	-32.74583	27.98056	Borehole, water quality	R30B
CKO429	-32.73944	27.87528	Borehole, water quality	R30C

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
3227DA00121	-32.73750	27.52333	Borehole, water quality	R20E
3227DA00121	-32.73750	27.52333	Borehole, water quality	R20E
MAJALI-ZWELITSHA	-32.73722	27.52306	Borehole, water quality	R20E
PEELTON-MAJALI	-32.73722	27.52306	Borehole, water quality	R20E
28307	-32.73694	27.84361	Borehole, water quality	R30C
PEELTON-KWARENI	-32.73389	27.54167	Borehole, water quality	R30E
PEELTON-KWARENI	-32.73389	27.54167	Borehole, water quality	R30E
5740	-32.73056	27.50778	Borehole, water quality	R20E
29557	-32.72944	27.49139	Borehole, water quality	R20E
KWENXURA	-32.72694	28.10500	Borehole, water quality	R30A
28311	-32.72278	27.85361	Borehole, water quality	R30C
27006	-32.71472	27.70472	Borehole, water quality	R30C
DALEVIEW	-32.69639	27.85167	Borehole, water quality	R30B
22027	-32.69306	27.80000	Borehole, water quality	R30C
FAIRVIEW	-32.68861	27.36611	Borehole, water quality	R20A
THORNKLOOF	-32.67556	27.60111	Borehole, water quality	R30C
28310	-32.67028	27.86222	Borehole, water quality	R30B
ROCKBY	-32.67000	27.63778	Borehole, water quality	R30C
23083	-32.66667	27.53333	Borehole, water quality	R30C
28313	-32.66444	27.85806	Borehole, water quality	R30B
YANTOLAS	-32.66417	27.94250	Borehole, water quality	R30B
23064	-32.65000	27.55000	Borehole, water quality	R30C
MPETU	-32.64472	28.08861	Borehole, water quality	R30A
SRAINLANDS	-32.64222	27.82778	Borehole, water quality	R30B
24769	-32.63333	27.58500	Borehole, water quality	R30C
24769	-32.63333	27.58500	Borehole, water quality	R30C
24769	-32.63333	27.58500	Borehole, water quality	R30C
24769	-32.63333	27.58500	Borehole, water quality	R30C
22389	-32.61722	27.80000	Borehole, water quality	R30C
22390	-32.60056	27.78417	Borehole, water quality	R30C
LONEOAK	-32.60000	27.82500	Borehole, water quality	R30B

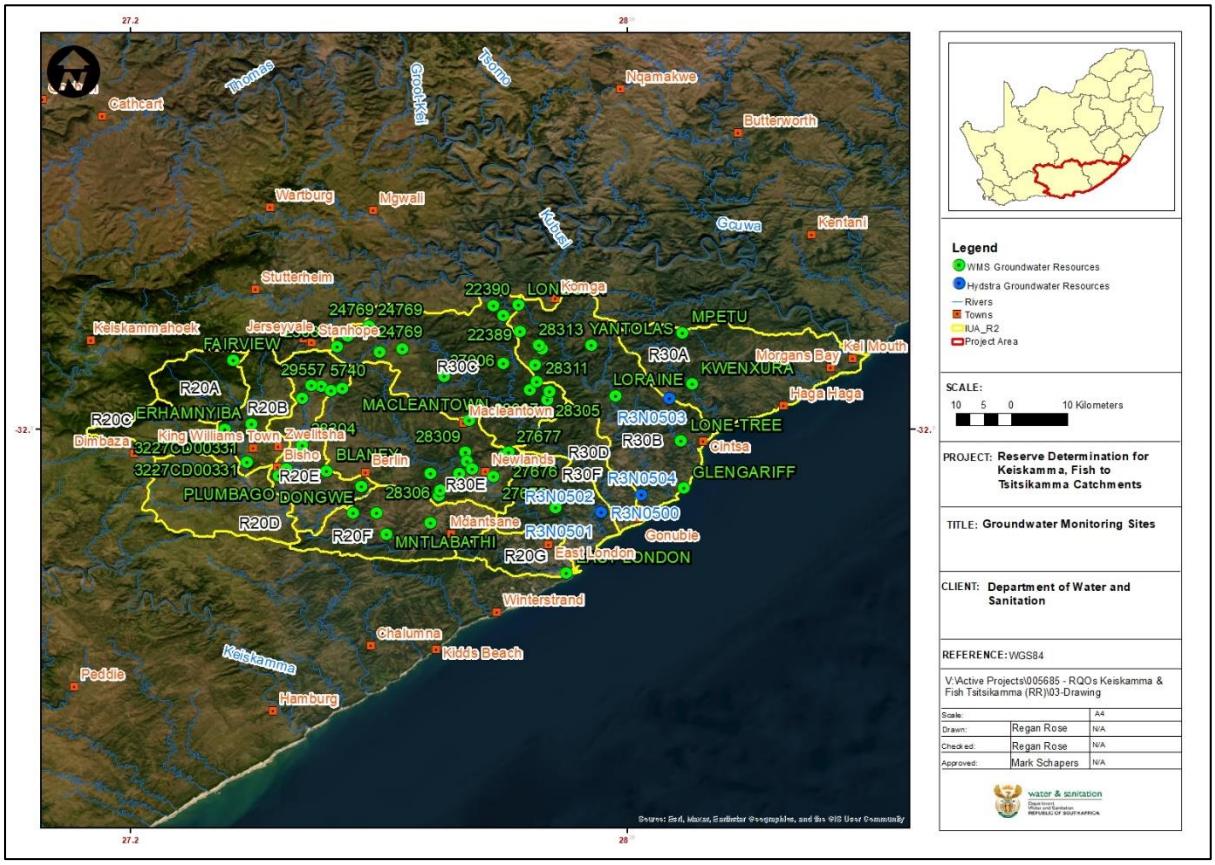


Figure 55: Monitoring sites in IUA 12 (R2)

Table 17: Monitoring sites in IUA 13 (S1)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
S1N0001	-31.70448	27.23228	Borehole, water level	S10G
S2N0001	-31.47037	27.33360	Borehole, water level	S20A
S5N0002	-31.74230	27.59937	Borehole, water level	S50E
S7N0004	-31.81290	27.73293	Borehole, water level	T12C
S7N0005	-31.88040	27.77054	Borehole, water level	S50G
S7N0006	-31.92640	27.75019	Borehole, water level	S50G
S7N0007	-31.98530	27.66327	Borehole, water level	S50H
S7N0008	-32.05500	27.83516	Borehole, water level	S50J
HAPPYVALLEY	-32.49167	27.07083	Borehole, water quality	S40A
GIDDYS-FARM	-32.45083	27.16667	Borehole, water quality	S40B
ITALY	-32.41667	27.22500	Borehole, water quality	S40B
THOMAS-RIVER	-32.41667	27.30000	Borehole, water quality	S40B
SURBITON	-32.36667	27.25417	Borehole, water quality	S40B
22380	-32.36528	27.07083	Borehole, water quality	S40A
22426	-32.31667	27.35083	Borehole, water quality	S40C
2242	-32.31667	27.35139	Borehole, water quality	S40C
27244	-32.31278	27.33111	Borehole, water quality	S40C
HILLPATH	-32.30500	27.51389	Borehole, water quality	S40E
HENDERSON-MISSION	-32.28389	27.31667	Borehole, water quality	S40C
BROKEN-SLAPES	-32.26667	27.35083	Borehole, water quality	S40C
BROKEN-SLOPEST	-32.26667	27.35417	Borehole, water quality	S40C
LANGFIELD	-32.26667	27.43333	Borehole, water quality	S40C
THE-GEORGE	-32.25000	27.38750	Borehole, water quality	S40C
MKWINTI-3	-31.99556	27.77944	Borehole, water quality	S50G
30476	-31.95444	27.36306	Borehole, water quality	S20D
30477	-31.94778	27.38417	Borehole, water quality	S20D
KWABOMBELA	-31.94667	27.84944	Borehole, water quality	S50G
KUMNGQANGA	-31.93972	27.43444	Borehole, water quality	S20D
SINGENI	-31.91333	27.32806	Borehole, water quality	S10H
KUWOHLO	-31.90972	27.59917	Borehole, water quality	S50F
SINGENI	-31.89500	27.30861	Borehole, water quality	S10H
3126DB00093	-31.74125	26.90356	Borehole, water quality	S10D
3126DB00093	-31.74125	26.90356	Borehole, water quality	S10D
3126DB00094	-31.73706	26.90485	Borehole, water quality	S10D
3126DB00094	-31.73706	26.90485	Borehole, water quality	S10D
3126DB00095	-31.73458	26.90797	Borehole, water quality	S10D
3126DB00095	-31.73458	26.90797	Borehole, water quality	S10D
LADY-FRERE	-31.70222	27.23667	Borehole, water quality	S10G
3126DB00072	-31.68467	26.89656	Borehole, water quality	S10C
3126DB00063	-31.64578	26.95133	Borehole, water quality	S10C
3126DB00064	-31.63853	26.94208	Borehole, water quality	S10C

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
3126DB00062	-31.63778	26.98297	Borehole, water quality	S10C
3127CA00053	-31.61617	27.01525	Borehole, water quality	S10C
27366	-31.59833	26.71500	Borehole, water quality	S10A
3126DB00073	-31.59131	26.88722	Borehole, water quality	S10B
ZQMSSM1	-31.58750	26.72944	Borehole, water quality	S10A
3126DB00065	-31.58472	26.89528	Borehole, water quality	S10B
3126DB00069	-31.57986	26.94956	Borehole, water quality	S10B
3127CA00054	-31.57750	27.02322	Borehole, water quality	S10C
3126DB00068	-31.57717	26.95994	Borehole, water quality	S10C
3127CA00056	-31.56670	27.03081	Borehole, water quality	S10C
3126DB00067	-31.55622	26.97361	Borehole, water quality	S10C
3126DB00070	-31.55572	26.88311	Borehole, water quality	S10B
3126DB00071	-31.55569	26.88364	Borehole, water quality	S10B
3126DB00066	-31.54878	26.96919	Borehole, water quality	S10C
3127CA00055	-31.54553	27.00364	Borehole, water quality	S10C
3126DB00074	-31.54067	26.94964	Borehole, water quality	S10B
3126DB00075	-31.53736	26.95786	Borehole, water quality	S10C
27360	-31.46972	27.48611	Borehole, water quality	S50C
DOORN-KOP	-31.45889	27.26611	Borehole, water quality	S20A
JOUBERTS-KOP	-31.44472	26.94972	Borehole, water quality	S10B
3126BD00075	-31.43222	26.88100	Borehole, water quality	S10B
IDA-POLST	-31.41667	27.55000	Borehole, water quality	S50C
ROSTON	-31.38389	27.72083	Borehole, water quality	S50C

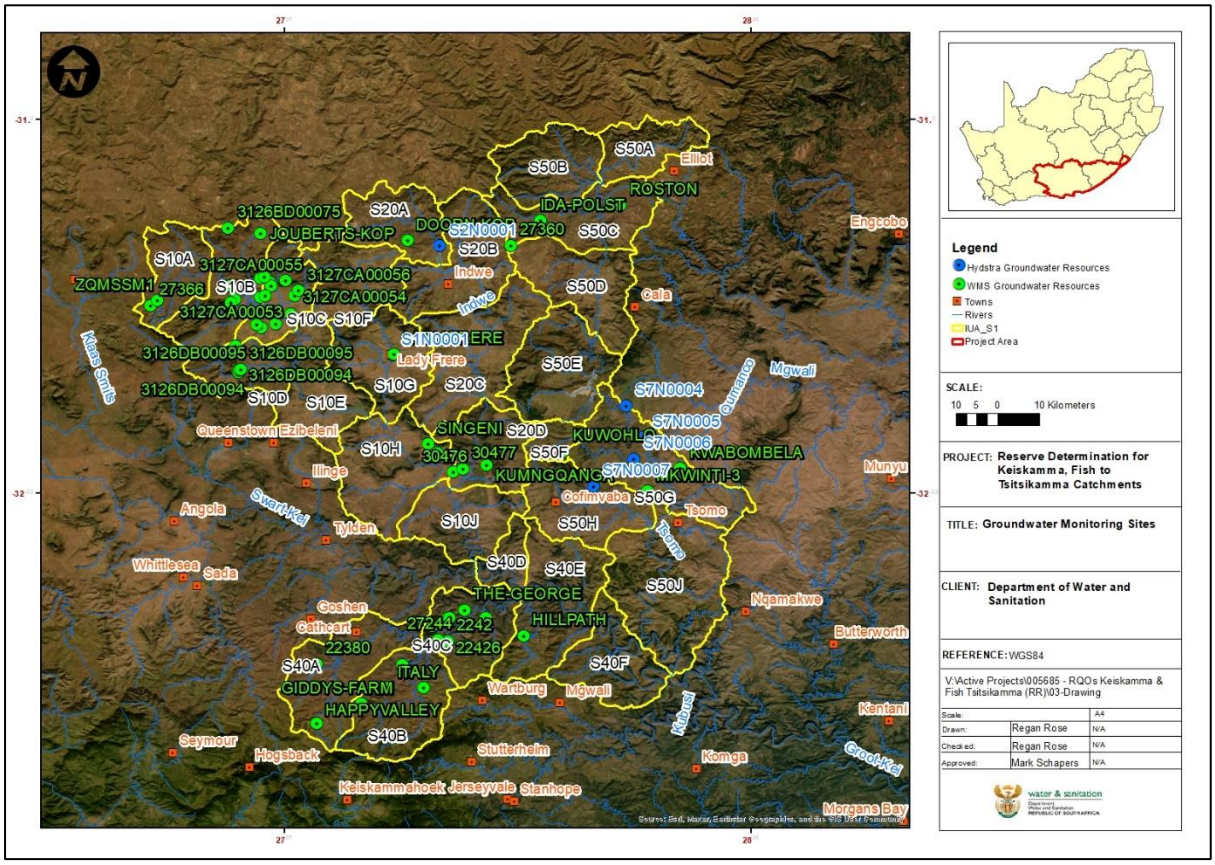


Figure 56: Monitoring sites in IUA 13 (S1)

Table 18: Monitoring sites in IUA 14 (S2)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
S3N0001	-31.89117	26.59400	Borehole, water level	S31E
S3N0002	-31.90311	26.64231	Borehole, water level	S31E
S3N0003	-31.92367	26.65039	Borehole, water level	S31E
S3N0004	-31.54568	26.46486	Borehole, water level	S31B
S3N0005	-32.10167	26.84472	Borehole, water level	S32H
S3N0006	-31.95667	26.83056	Borehole, water level	S31G
S3N0007	-31.83056	26.90667	Borehole, water level	S31F
S3N0008	-31.92839	26.82814	Borehole, water level	S31G
S3N0010	-31.90228	26.84647	Borehole, water level	S31G
S3N0013	-31.59038	26.36415	Borehole, water level	S31B
S3N0014	-31.98422	26.61258	Borehole, water level	S32C
S3N0016	-31.90076	26.89054	Borehole, water level	S31G
S3N0017	-32.17493	26.82692	Borehole, water level	S32G
MUSWA	-32.34750	26.62667	Borehole, water quality	S32F
BUSHBYPARK-ZWELEDINGA	-32.32444	26.69167	Borehole, water quality	S32F
GOSHEN-MISSION	-32.28028	27.05694	Borehole, water quality	S32L
22378	-32.27083	27.26250	Borehole, water quality	S32M
22393	-32.25833	27.25111	Borehole, water quality	S32M
29644	-32.25194	27.30333	Borehole, water quality	S32M
HALLOWDALE	-32.25000	27.25000	Borehole, water quality	S32M
22259	-32.25000	27.28333	Borehole, water quality	S32M
22258	-32.22500	27.27500	Borehole, water quality	S32M
UPPER-THORN-PARK	-32.15472	27.05417	Borehole, water quality	S32K
3226BB00243	-32.14917	26.82333	Borehole, water quality	S32H
3226BB00251	-32.14583	26.82250	Borehole, water quality	S32H
19106	-32.13583	27.02028	Borehole, water quality	S32K
19192	-32.13111	27.06750	Borehole, water quality	S32K
3226BB00239	-32.12083	26.79806	Borehole, water quality	S32H
TRADERS-DRIFT	-32.11833	27.08583	Borehole, water quality	S32K
19191	-32.11667	27.07028	Borehole, water quality	S32K
19105	-32.11194	27.02972	Borehole, water quality	S32K
19116	-32.10750	26.87278	Borehole, water quality	S32H
ZQMLAN1	-32.10556	26.80722	Borehole, water quality	S32H
19115	-32.10472	26.88528	Borehole, water quality	S32H
19104	-32.10306	27.05722	Borehole, water quality	S32K
WELDON	-32.10000	26.83333	Borehole, water quality	S32H
19093	-32.09028	26.98167	Borehole, water quality	S32K
19092	-32.08694	26.98194	Borehole, water quality	S32K
19119	-32.08389	26.81833	Borehole, water quality	S32H
19117	-32.08056	26.86806	Borehole, water quality	S32H

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
1XWORTH	-32.07917	27.06139	Borehole, water quality	S32K
19108	-32.07806	26.94361	Borehole, water quality	S32K
19120	-32.07583	26.81972	Borehole, water quality	S32H
GLEN-THORN	-32.07472	27.10778	Borehole, water quality	S32J
19123	-32.06750	26.80528	Borehole, water quality	S32H
1701	-32.06667	26.83333	Borehole, water quality	S32H
19112	-32.06583	26.97139	Borehole, water quality	S32K
19110	-32.06111	26.99083	Borehole, water quality	S32K
3226BB00242	-32.06000	26.78611	Borehole, water quality	S32H
19109	-32.05917	26.99167	Borehole, water quality	S32K
19107	-32.05889	26.97083	Borehole, water quality	S32K
19124	-32.05750	26.81417	Borehole, water quality	S32H
22984	-32.05417	26.90000	Borehole, water quality	S32H
3226BB00241	-32.05278	26.79139	Borehole, water quality	S32H
19121	-32.05194	26.84389	Borehole, water quality	S32H
19118	-32.05194	26.84611	Borehole, water quality	S32H
19193	-32.05167	27.11417	Borehole, water quality	S32J
19122	-32.05111	26.84000	Borehole, water quality	S32H
MAPASSA-KRAAL	-32.05083	26.94944	Borehole, water quality	S32K
CATHCARDS-GIFT	-32.05056	26.81306	Borehole, water quality	S32H
BLOEMHOF(P1)	-32.05000	27.08333	Borehole, water quality	S32J
19412	-32.04583	26.81972	Borehole, water quality	S32H
19412	-32.04583	26.81972	Borehole, water quality	S32H
19113	-32.04528	26.95361	Borehole, water quality	S32K
19111	-32.04528	26.97972	Borehole, water quality	S32K
3226BB00240	-32.04167	26.75389	Borehole, water quality	S32C
19114	-32.03861	26.96000	Borehole, water quality	S32K
SHERWOOD-FOREST	-32.03806	26.76694	Borehole, water quality	S32C
19200	-32.03778	26.82611	Borehole, water quality	S32H
LAUSANNE	-32.03750	27.06917	Borehole, water quality	S32J
19194	-32.03500	27.07111	Borehole, water quality	S32J
19195	-32.03139	27.10861	Borehole, water quality	S32J
19211	-32.02500	26.73833	Borehole, water quality	S32C
CATHCARD	-32.02472	26.92083	Borehole, water quality	S31G
MOUNTAIN-GLEN	-32.02306	26.95000	Borehole, water quality	S31G
19097	-32.02056	26.90639	Borehole, water quality	S31G
POPLAR-GRAVE	-32.02028	26.82278	Borehole, water quality	S32H
19125	-32.01778	26.87556	Borehole, water quality	S31G
19198	-32.01028	27.02417	Borehole, water quality	S32J
19098	-32.00722	26.90333	Borehole, water quality	S31G
19201	-32.00667	26.85861	Borehole, water quality	S31G

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
POTGIETERS-KRAAL	-32.00306	26.68611	Borehole, water quality	S32C
18945	-32.00250	26.82222	Borehole, water quality	S32H
19099	-32.00194	26.89278	Borehole, water quality	S31G
19210	-32.00167	26.71083	Borehole, water quality	S32C
19096	-32.00139	26.88278	Borehole, water quality	S31G
18948	-32.00056	26.80833	Borehole, water quality	S32H
19100	-31.99917	26.89361	Borehole, water quality	S31G
19196	-31.99917	27.07528	Borehole, water quality	S32J
19408	-31.99806	26.64056	Borehole, water quality	S32C
19101	-31.99639	26.95139	Borehole, water quality	S31G
19209	-31.99417	26.69528	Borehole, water quality	S32C
19197	-31.99222	27.05389	Borehole, water quality	S32J
ESSEX	-31.99083	26.99056	Borehole, water quality	S31G
18947	-31.98639	26.84139	Borehole, water quality	S31G
19102	-31.98556	26.94194	Borehole, water quality	S31G
19199	-31.98500	26.99889	Borehole, water quality	S32J
18946	-31.98250	26.82778	Borehole, water quality	S31G
DICKENSTONE	-31.97528	26.79722	Borehole, water quality	S31G
19103	-31.97444	26.93333	Borehole, water quality	S31G
ILINGE	-31.97167	27.05278	Borehole, water quality	S32J
30458	-31.96833	26.58972	Borehole, water quality	S32C
19207	-31.96833	26.70389	Borehole, water quality	S32C
30459	-31.96806	26.58889	Borehole, water quality	S32C
19091	-31.96778	26.84444	Borehole, water quality	S31G
18951	-31.96750	26.81500	Borehole, water quality	S31G
18950	-31.96722	26.79139	Borehole, water quality	S31G
FORDYCEFONTEIN	-31.96611	26.71694	Borehole, water quality	S32C
THORNHILL	-31.96500	26.61250	Borehole, water quality	S32C
18942	-31.96361	26.81917	Borehole, water quality	S31G
19095	-31.96194	26.92444	Borehole, water quality	S31G
19094	-31.95917	26.90917	Borehole, water quality	S31G
19202	-31.95889	26.97806	Borehole, water quality	S31G
18940	-31.95694	26.78139	Borehole, water quality	S31G
19205	-31.95694	26.83111	Borehole, water quality	S31G
19205	-31.95694	26.83111	Borehole, water quality	S31G
19203	-31.95583	26.97056	Borehole, water quality	S31G
19208	-31.95333	26.69222	Borehole, water quality	S32C
19085	-31.95333	26.80444	Borehole, water quality	S31G
19087	-31.95139	26.82361	Borehole, water quality	S31G
19084	-31.95083	26.78083	Borehole, water quality	S31G
19204	-31.95056	26.79083	Borehole, water quality	S31G

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
ROODE-KRANTZ	-31.95000	26.78333	Borehole, water quality	S31G
19082	-31.94639	26.79611	Borehole, water quality	S31G
18949	-31.94528	26.79972	Borehole, water quality	S31G
18937	-31.94444	26.87056	Borehole, water quality	S31G
18939	-31.94389	26.84306	Borehole, water quality	S31G
19086	-31.94361	26.81250	Borehole, water quality	S31G
18952	-31.94194	26.75250	Borehole, water quality	S31G
18935	-31.94167	26.89944	Borehole, water quality	S31G
19083	-31.94056	26.79778	Borehole, water quality	S31G
18941	-31.94000	26.76611	Borehole, water quality	S31G
18957	-31.93917	26.74111	Borehole, water quality	S31G
19404	-31.93861	26.80111	Borehole, water quality	S31G
18936	-31.93389	26.86583	Borehole, water quality	S31G
19586	-31.93333	26.80000	Borehole, water quality	S31G
18928	-31.93278	26.80556	Borehole, water quality	S31G
3126CD00103	-31.92989	26.38517	Borehole, water quality	S32B
19206	-31.92944	26.82778	Borehole, water quality	S31G
18938	-31.92861	26.84889	Borehole, water quality	S31G
18930	-31.92500	26.81639	Borehole, water quality	S31G
19406	-31.92250	26.65194	Borehole, water quality	S31E
18943	-31.92000	26.77889	Borehole, water quality	S31E
18931	-31.92000	26.82278	Borehole, water quality	S31G
19409	-31.91750	26.64000	Borehole, water quality	S31E
1699	-31.91667	26.65000	Borehole, water quality	S31E
19405	-31.91667	26.66167	Borehole, water quality	S31E
18944	-31.91639	26.79139	Borehole, water quality	S31G
19088	-31.91556	26.76389	Borehole, water quality	S31E
19090	-31.91556	26.77500	Borehole, water quality	S31E
18932	-31.91528	26.82750	Borehole, water quality	S31G
19403	-31.91500	26.78389	Borehole, water quality	S31E
3126DC00423	-31.91472	26.61861	Borehole, water quality	S31E
ZOLA	-31.91472	26.62083	Borehole, water quality	S31E
ZOLA	-31.91472	26.62083	Borehole, water quality	S31E
18933	-31.91333	26.81583	Borehole, water quality	S31G
WAAYPOORT	-31.91222	26.73611	Borehole, water quality	S31E
18927	-31.91167	26.83889	Borehole, water quality	S31G
19089	-31.91111	26.78750	Borehole, water quality	S31E
18953	-31.91056	26.77083	Borehole, water quality	S31E
WELTEVREEDEN	-31.90861	26.80417	Borehole, water quality	S31G
DOORN-HOEK	-31.90639	26.78139	Borehole, water quality	S31E
18934	-31.90583	26.83278	Borehole, water quality	S31F

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
18929	-31.90361	26.83694	Borehole, water quality	S31F
19407	-31.90222	26.64000	Borehole, water quality	S31E
1700	-31.90000	26.63333	Borehole, water quality	S31E
BOWKERSPARK	-31.89750	26.74556	Borehole, water quality	S31E
18955	-31.89583	26.74750	Borehole, water quality	S31E
TURVEU`S-POST	-31.89306	26.59167	Borehole, water quality	S31E
ZQMQSN1	-31.89306	26.59167	Borehole, water quality	S31E
19410	-31.89278	26.59472	Borehole, water quality	S31E
PLAATTAFELBERG	-31.89278	26.59694	Borehole, water quality	S31E
18954	-31.89167	26.70417	Borehole, water quality	S31E
19411	-31.88500	26.59806	Borehole, water quality	S31E
1698	-31.88333	26.58333	Borehole, water quality	S31E
18956	-31.87222	26.71722	Borehole, water quality	S31E
BECKERSFONTEIN	-31.85889	26.70444	Borehole, water quality	S31E
3126DD00623	-31.85306	26.76833	Borehole, water quality	S31D
3126DD00551	-31.85167	26.77583	Borehole, water quality	S31D
OCHTER-MITHIL	-31.84944	26.38444	Borehole, water quality	S31C
3126DD00624	-31.84639	26.76250	Borehole, water quality	S31D
3126DC00415	-31.83111	26.73639	Borehole, water quality	S31D
3126DC00410	-31.83028	26.73306	Borehole, water quality	S31D
3126DC00325	-31.81000	26.73528	Borehole, water quality	S31D
BAILEY	-31.80000	26.73333	Borehole, water quality	S31D
HUNTERS-HILL	-31.79556	26.44250	Borehole, water quality	S31C
27379	-31.73417	26.47639	Borehole, water quality	S31C
BOMBANI	-31.73333	26.66667	Borehole, water quality	S31E
27367	-31.72111	26.55278	Borehole, water quality	S31B
HARTFONTEIN	-31.71944	26.30528	Borehole, water quality	S31C
27368	-31.64583	26.40917	Borehole, water quality	S31C
LE-GRANGE-EST	-31.61917	26.56083	Borehole, water quality	S31A
24415	-31.60250	26.54944	Borehole, water quality	S31B
24414	-31.59694	26.52056	Borehole, water quality	S31B
24408	-31.58611	26.51500	Borehole, water quality	S31B
24412	-31.57556	26.47250	Borehole, water quality	S31B
24411	-31.57333	26.49556	Borehole, water quality	S31B
STRATHFIELD	-31.56833	26.68000	Borehole, water quality	S31A
PRIMGRADIA	-31.55806	26.66667	Borehole, water quality	S31A
24406	-31.54861	26.49639	Borehole, water quality	S31B
3126DA00282	-31.54861	26.55056	Borehole, water quality	S31A
3126DA00246	-31.54528	26.55222	Borehole, water quality	S31A
27374	-31.54250	26.55333	Borehole, water quality	S31A
ZQMSSM2	-31.54250	26.55333	Borehole, water quality	S31A

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
24407	-31.54111	26.49139	Borehole, water quality	S31B
ZQMSSM3	-31.54028	26.55289	Borehole, water quality	S31A
PIET-KUIL	-31.53694	26.62250	Borehole, water quality	S31A
24413	-31.52972	26.59333	Borehole, water quality	S31A
24409	-31.52861	26.63639	Borehole, water quality	S31A
27371	-31.52472	26.44611	Borehole, water quality	S31B
24410	-31.51472	26.64528	Borehole, water quality	S31A
27369	-31.44056	26.61389	Borehole, water quality	S31A

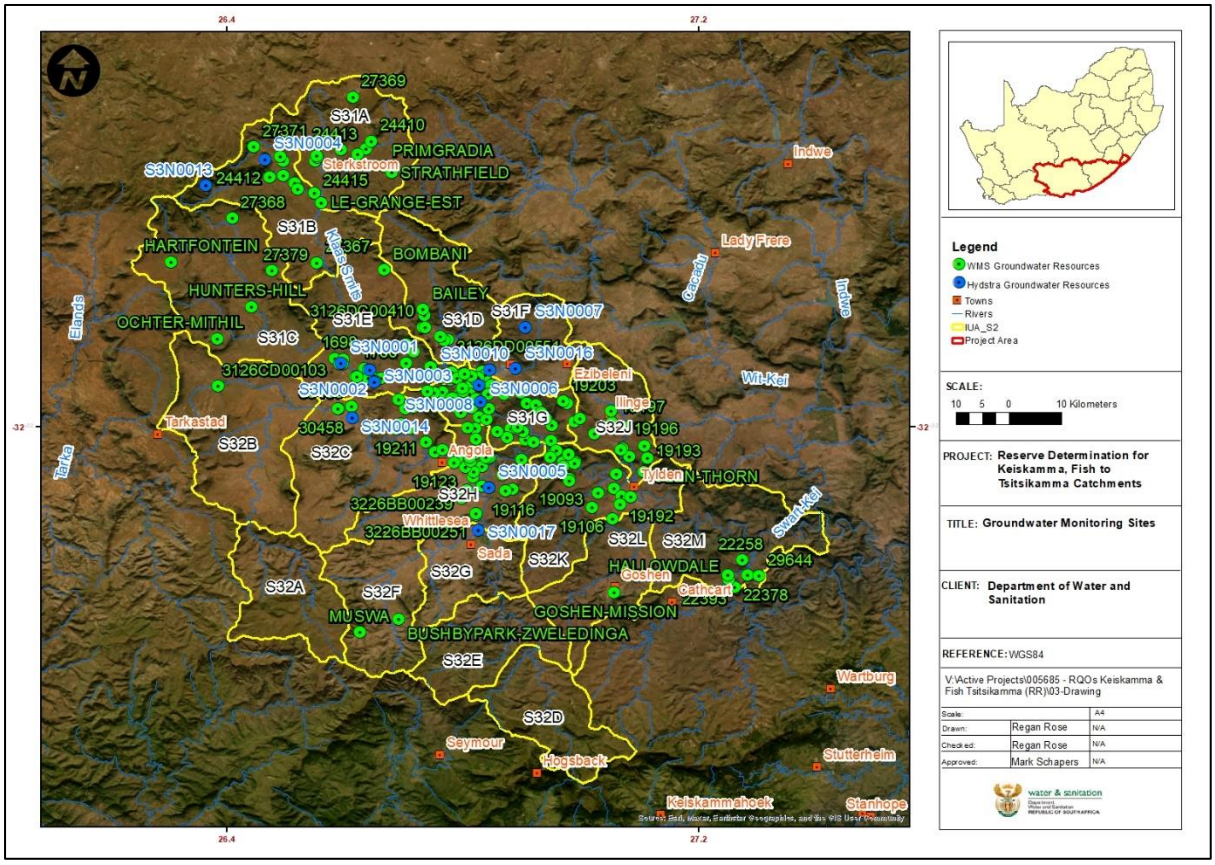


Figure 57: Monitoring sites in IUA 14 (S2)

Table 19: Monitoring sites in IUA 15 (S3)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
S7N0001	-32.57722	27.88444	Borehole, water level	S70A
S7N0002	-32.57758	27.88506	Borehole, water level	S70A
S7N0003	-32.31150	28.07159	Borehole, water level	S70E
MIRITE-FARM	-32.61667	27.43333	Borehole, water quality	S60A
QUOIN	-32.59694	27.65889	Borehole, water quality	S60B
27372	-32.58528	27.87389	Borehole, water quality	S70A
22292	-32.58333	27.86250	Borehole, water quality	S70A
5459	-32.58056	27.88278	Borehole, water quality	S70A
ZQMKMG1	-32.58056	27.88278	Borehole, water quality	S70A
22291	-32.57500	27.88306	Borehole, water quality	S70A
22391	-32.56667	27.96667	Borehole, water quality	S70F
29584	-32.55667	27.32639	Borehole, water quality	S60A
22388	-32.55000	27.96667	Borehole, water quality	S70A
27007	-32.52694	27.45750	Borehole, water quality	S60C
27373	-32.51000	27.46722	Borehole, water quality	S60C
ZQMSTH1	-32.51000	27.46722	Borehole, water quality	S60C
HOVE	-32.46139	27.35417	Borehole, water quality	S60C
HECKEL	-32.45806	27.54444	Borehole, water quality	S60D
ESIGINGQINI	-32.40472	28.19972	Borehole, water quality	S70E
15684	-32.30528	27.97000	Borehole, water quality	S70A
THEMBENI-EBIKA	-32.29806	28.19750	Borehole, water quality	S70D
EMANTUNZELENI	-32.24871	28.04810	Borehole, water quality	S70E
NQAMAKWE	-32.20729	27.94589	Borehole, water quality	S70D

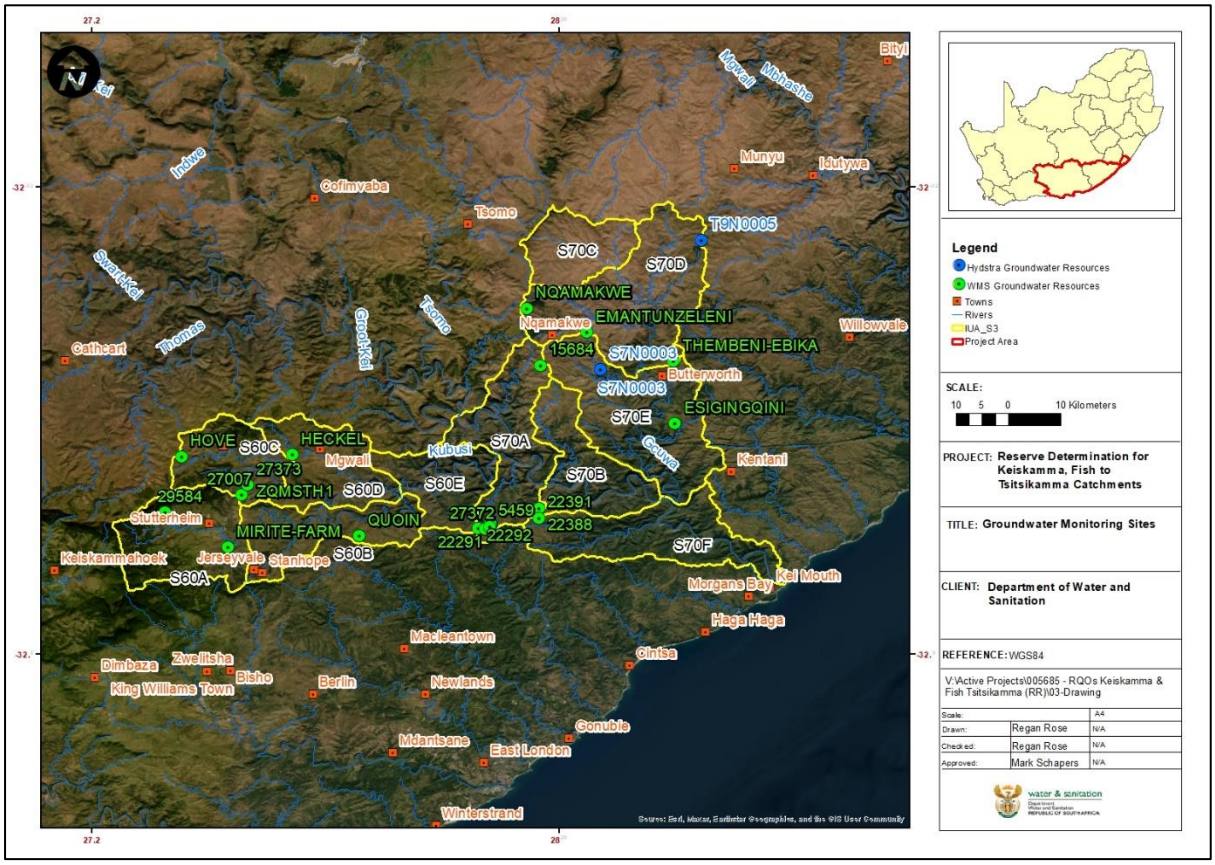


Figure 58: Monitoring sites in IUA 15 (S3)

Table 20: Monitoring sites in IUA 16 (T1)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
T1N0001	-31.33261	27.85320	Borehole, water level	T11A
T1N0002	-31.86120	27.84752	Borehole, water level	T12D
T1N0003	-31.74740	27.77098	Borehole, water level	T12C
T1N0004	-31.77890	27.90253	Borehole, water level	T12C
T1N0005	-31.71747	27.95005	Borehole, water level	T12B
T1N0006	-31.73430	28.14605	Borehole, water level	T12F
T1N0007	-31.63560	28.11393	Borehole, water level	T11C
T1N0008	-31.61890	28.16621	Borehole, water level	T11F
T1N0009	-31.58170	27.83217	Borehole, water level	T12A
ZQMNOB1	-31.88861	27.83917	Borehole, water quality	T12D
LOWER-MAKWABABA	-31.85556	27.92056	Borehole, water quality	T12D
EHUKWINI	-31.84667	28.04722	Borehole, water quality	T12D
BASHEE-HILL-A	-31.80139	28.37556	Borehole, water quality	T11H
3128CD00069	-31.80111	28.36333	Borehole, water quality	T11H
3128CD00064	-31.79583	28.35194	Borehole, water quality	T11H
LUHEWINI	-31.70139	28.12222	Borehole, water quality	T12F
SIKOBENI	-31.69722	27.94222	Borehole, water quality	T12B
NKONDLO	-31.66083	28.23667	Borehole, water quality	T11C
ENGXOGI	-31.64333	28.19389	Borehole, water quality	T11F
3128CB00040	-31.64167	28.48972	Borehole, water quality	T11G
3128CB00021	-31.63861	28.35694	Borehole, water quality	T11G
3128CB00031	-31.63250	28.45583	Borehole, water quality	T11G
3128CB00024	-31.63167	28.39277	Borehole, water quality	T11G
3128CB00023	-31.62723	28.39139	Borehole, water quality	T11G
3128CB00025	-31.62389	28.43139	Borehole, water quality	T11G
3128CB00039	-31.61778	28.48417	Borehole, water quality	T11G
3128CB00034	-31.61388	28.47055	Borehole, water quality	T11G
3128CB00020	-31.61306	28.38056	Borehole, water quality	T11G
3128CB00033	-31.59750	28.40194	Borehole, water quality	T11G
3128CB00035	-31.59611	28.41888	Borehole, water quality	T11G
3128CB00030	-31.59444	28.39666	Borehole, water quality	T11G
3128CB00028	-31.59277	28.40750	Borehole, water quality	T11G
3128CB00029	-31.59027	28.39138	Borehole, water quality	T11G
3128CB00027	-31.59027	28.42194	Borehole, water quality	T11G
3128CB00037	-31.58199	28.45805	Borehole, water quality	T11G
3127DB00028	-31.55439	27.98817	Borehole, water quality	T11C
27359	-31.41389	28.04139	Borehole, water quality	T11E
DUIRA	-31.41306	27.97361	Borehole, water quality	T11B
RONDAVEL-HOEK	-31.37333	28.24778	Borehole, water quality	T11D
HOME-ELLIOT-SMALL-GRAN	-31.34778	28.18472	Borehole, water quality	T11D

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
CLOETA	-31.34278	27.79139	Borehole, water quality	T11A
ZQMELT1	-31.32944	27.85583	Borehole, water quality	T11A
10969	-31.30000	28.12667	Borehole, water quality	T11D

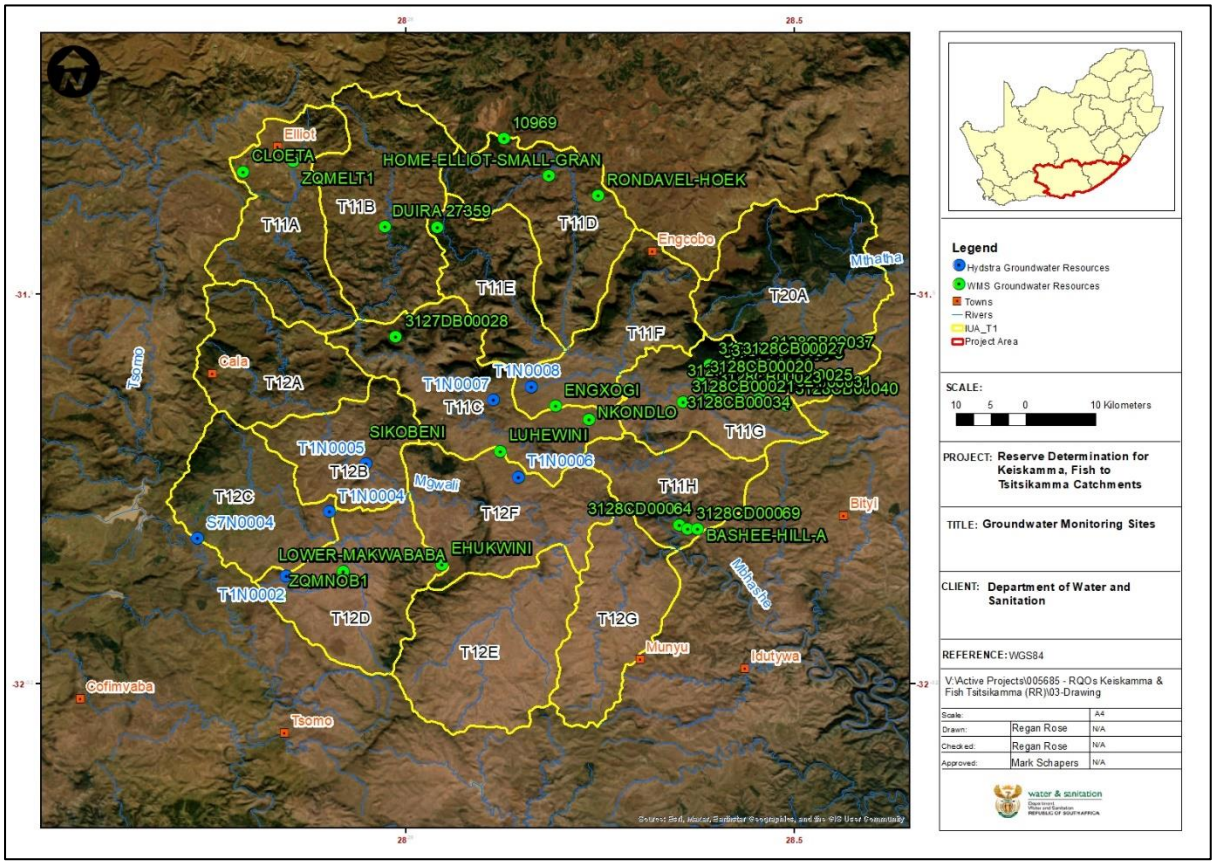


Figure 59: Monitoring sites in IUA 16 (T1)

Table 21: Monitoring sites in IUA 17 (T2)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
EC/T13/278	-31.99686	28.70633	Borehole, water quality	T13D
KUMJELO	-31.96000	28.32111	Borehole, water quality	T13C
3128CD00061	-31.84666	28.44972	Borehole, water quality	T13A
3128CD00066	-31.84416	28.45055	Borehole, water quality	T13A
3128CD00068	-31.83833	28.45694	Borehole, water quality	T13A
3128CD00070	-31.83222	28.41111	Borehole, water quality	T13A
3128CD00065	-31.82388	28.37388	Borehole, water quality	T13A
3128CD00062	-31.81860	28.44638	Borehole, water quality	T13A
3128CD00067	-31.81555	28.43666	Borehole, water quality	T13A
3128CD00063	-31.80500	28.43611	Borehole, water quality	T13A

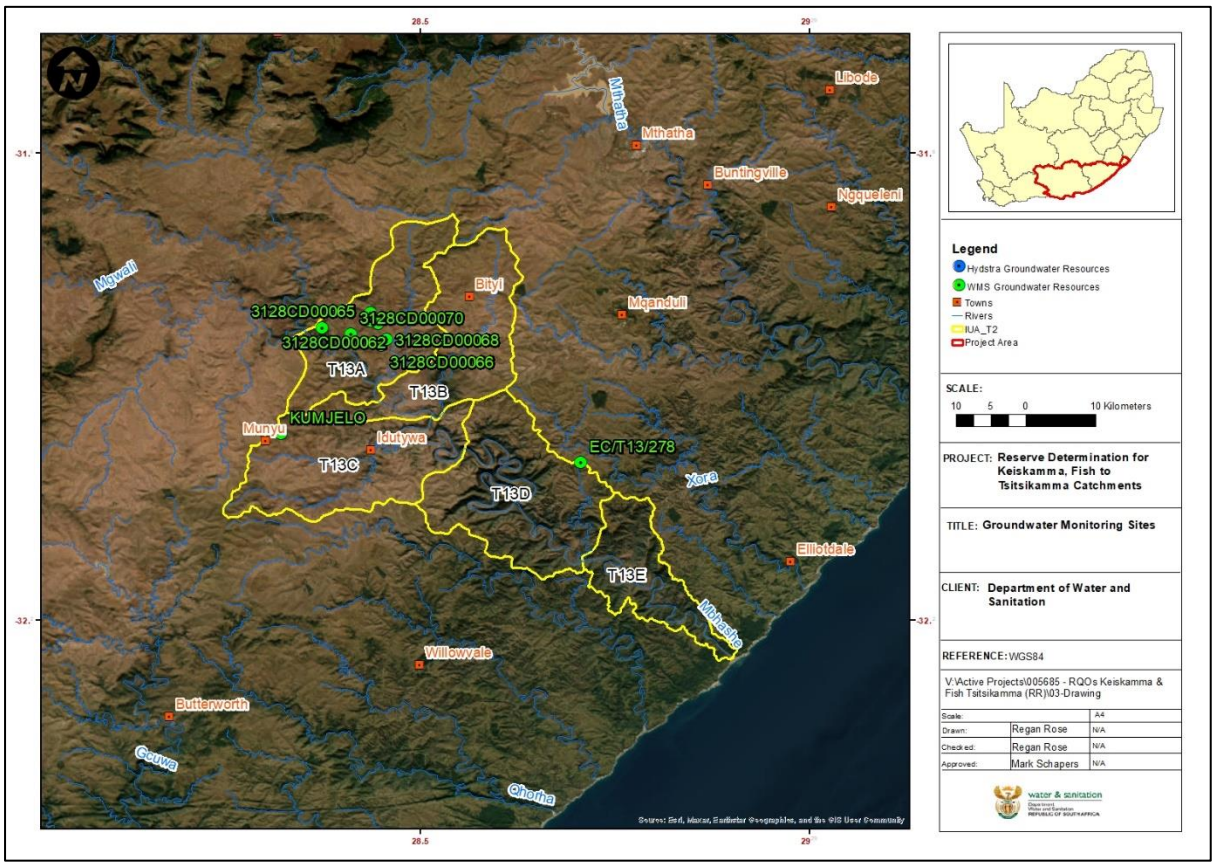


Figure 60: Monitoring sites in IUA 17 (T2)

Table 22: Monitoring sites in IUA 18 (T3)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
T2N0001	-31.64392	28.71503	Borehole, water level	T20C
T2N0002	-31.73361	28.69083	Borehole, water level	T20F
T2N0003	-31.66702	28.93310	Borehole, water level	T20E
T2N0004	-31.86190	28.76823	Borehole, water level	T20F
VIEDGESVILLE	-31.73300	28.68300	Borehole, water quality	T20C
ZQMYFM1	-31.64400	28.71500	Borehole, water quality	T20C
27382	-31.56200	28.67100	Borehole, water quality	T20C
31240	-31.50800	28.61500	Borehole, water quality	T20B
3128BC00017	-31.50000	28.64600	Borehole, water quality	T20B
3128BC00015	-31.50000	28.64900	Borehole, water quality	T20B
3128BC00016	-31.49000	28.65900	Borehole, water quality	T20B
3128BC00014	-31.48900	28.64900	Borehole, water quality	T20B
3128BC00018	-31.48900	28.66100	Borehole, water quality	T20B
3128BC00012	-31.48100	28.64100	Borehole, water quality	T20B
3128BC00013	-31.48000	28.66600	Borehole, water quality	T20B
3128BC00019	-31.47500	28.62800	Borehole, water quality	T20B

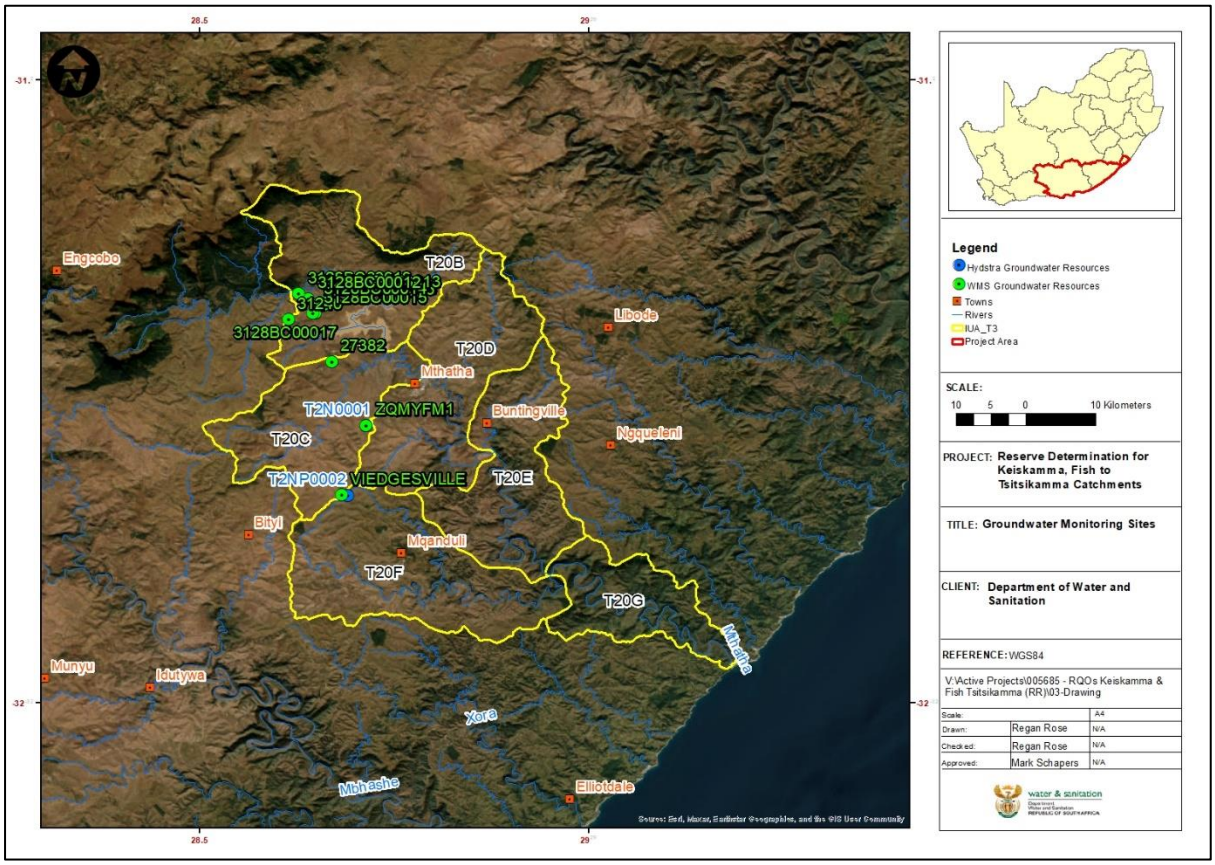


Figure 61: Monitoring sites in IUA 18 (T3)

Table 23: Monitoring sites in IUA 19 (T4)

Site Name	Latitude	Longitude	Monitoring Site Type	Quaternary Catchment
T6N0001	-31.36484	29.56955	Borehole, water level	T60F
T6N0003	-31.19725	29.74789	Borehole, water level	T60C
T6N0004	-31.19928	29.80521	Borehole, water level	T60G
T7N0001	-31.45881	28.96275	Borehole, water level	T70A
T7N0002	-31.52139	29.08308	Borehole, water level	T70B
T9N0001	-32.47020	28.31941	Borehole, water level	T90G
T9N0002	-32.43630	28.45978	Borehole, water level	T90F
T9N0003	-32.28650	28.80700	Borehole, water level	T90B
T9N0004	-32.06880	28.29755	Borehole, water level	T90A
T9N0005	-32.09040	28.24459	Borehole, water level	T90A
EC/T90/876	-32.43626	28.45978	Borehole, water quality	T90F
EC/T90/881	-32.37882	28.68222	Borehole, water quality	T90C
ZQMTKA2	-32.34444	28.26972	Borehole, water quality	T90G
BOJENI	-32.33250	28.58583	Borehole, water quality	T90E
MPUME	-32.28645	28.80700	Borehole, water quality	T90B
NQADU	-32.22306	28.39528	Borehole, water quality	T90E
GQUPU	-32.18833	28.33528	Borehole, water quality	T90A
QAKAZANA-FORTMALAN	-32.16665	28.51736	Borehole, water quality	T90C
EC/T80/158	-32.14133	28.86996	Borehole, water quality	T80D
IDUTYWA-COMMONAGE	-32.10693	28.33414	Borehole, water quality	T90A
21799	-32.09000	28.41444	Borehole, water quality	T90A
COLOSA	-32.07056	28.33000	Borehole, water quality	T90A
EC/T90/980	-32.06879	28.29755	Borehole, water quality	T90A
EC/T90/209	-32.06870	28.33956	Borehole, water quality	T90A
TOMBO	-31.63111	29.37500	Borehole, water quality	T70D
LOWER-NTAFUFU	-31.54278	29.53972	Borehole, water quality	T60K
MZINTLAVA	-31.43444	29.52889	Borehole, water quality	T60J
TRACOR-LUSIKISIKI	-31.35889	29.71444	Borehole, water quality	T60H
27672	-31.08389	30.15222	Borehole, water quality	T60A
ZQMLAN1	-31.05944	29.51389	Borehole, water quality	T60B
IMIZIZI	-30.97250	29.99528	Borehole, water quality	T60A
EKSIKUMBENI	-30.84306	29.77417	Borehole, water quality	T60A

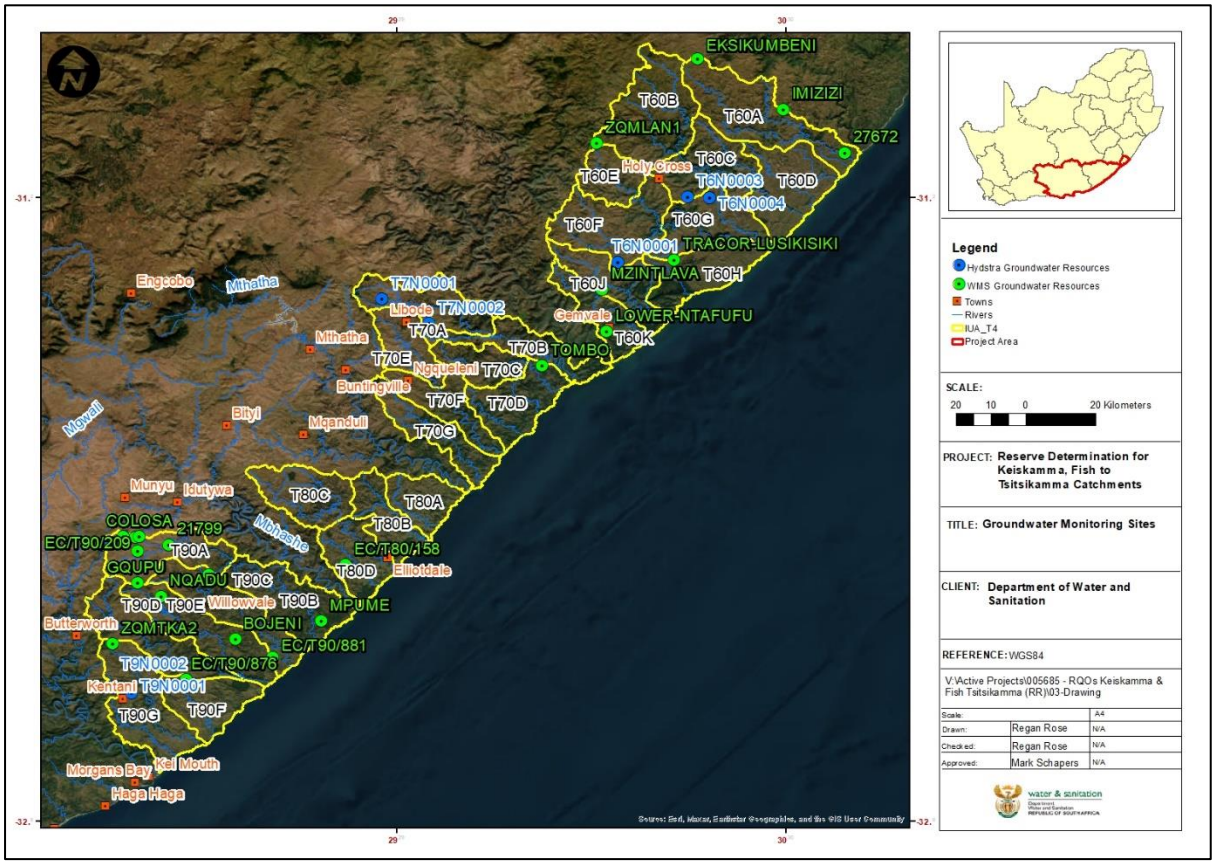


Figure 62: Monitoring sites in IUA 19 (T4)

APPENDIX C – GROUNDWATER USE

Table 24: Groundwater Use

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
K80A	0	0.000
K80B	0	0.000
K80C	604363	0.604
K80D	3143604.5	3.144
K80E	3563999.2	3.564
K80F	2994926	2.995
K90A	528583	0.529
K90B	331151	0.331
K90C	413806.15	0.414
K90D	377969	0.378
K90E	1502412	1.502
K90F	3600449.6	3.600
K90G	8460377.48	8.460
L11A	451600	0.452
L11B	33007	0.033
L11C	16000	0.016
L11D	22464	0.022
L11E	488696	0.489
L11F	2112616	2.113
L11G	26624	0.027
L12A	1121799.5	1.122
L12B	637436	0.637
L12C	835047	0.835
L12D	611652	0.612
L21A	433320	0.433
L21B	1610694	1.611
L21C	116239	0.116
L21D	27294	0.027
L21E	483625	0.484
L21F	338470	0.338
L22A	180267	0.180
L22B	123913	0.124
L22C	803719	0.804
L22D	403845	0.404
L23A	60000	0.060
L23B	936561	0.937

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
L23C	333653	0.334
L23D	42870	0.043
L30A	1245452	1.245
L30B	26164	0.026
L30C	343227	0.343
L30D	301018	0.301
L40A	199922.67	0.200
L40B	180401	0.180
L50A	135996	0.136
L50B	73197	0.073
L60A	142338	0.142
L60B	68500	0.069
L70A	5600	0.006
L70B	21543	0.022
L70C	126934	0.127
L70D	367119	0.367
L70E	2920	0.003
L70F	25221	0.025
L70G	34070	0.034
L81A	166200	0.166
L81B	584049	0.584
L81C	208041	0.208
L81D	31200	0.031
L82A	257503	0.258
L82B	1012821	1.013
L82C	420892.8	0.421
L82D	2617203.7	2.617
L82E	57100	0.057
L82F	0	0.000
L82G	0	0.000
L82H	0	0.000
L82J	44960	0.045
L90A	492100	0.492
L90B	61416.8	0.061
L90C	367080	0.367
M10A	75926	0.076
M10B	2490	0.002
M10C	872937	0.873
M10D	138227.54	0.138
M20A	9726629.2	9.727

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
M20B	4843023	4.843
M30A	3672019.5	3.672
M30B	3684426	3.684
N11A	1554521	1.555
N11B	5326132	5.326
N12A	2046932.5	2.047
N12B	315348	0.315
N12C	1119508.8	1.120
N13A	3018574	3.019
N13B	1909079.5	1.909
N13C	696284.28	0.696
N14A	659819.2	0.660
N14B	927060	0.927
N14C	2712824.5	2.713
N14D	163753	0.164
N21A	153650	0.154
N21B	686173.5	0.686
N21C	947068.5	0.947
N21D	113537.5	0.114
N22A	92987	0.093
N22B	74319	0.074
N22C	300	0.000
N22D	4560	0.005
N22E	33068.5	0.033
N23A	99660	0.100
N23B	77580	0.078
N24A	233665.5	0.234
N24B	220269.67	0.220
N24C	158338	0.158
N24D	25593	0.026
N30A	3933735	3.934
N30B	1285992	1.286
N30C	72045	0.072
N40A	12045	0.012
N40B	83468	0.083
N40C	5000	0.005
N40D	233218	0.233
N40E	10605	0.011
N40F	313575	0.314
P10A	9914	0.010

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
P10B	139711.8	0.140
P10C	63988	0.064
P10D	236343	0.236
P10E	1141178.05	1.141
P10F	2040	0.002
P10G	14277	0.014
P20A	834552	0.835
P20B	2765	0.003
P30A	900	0.001
P30B	44263	0.044
P30C	5760	0.006
P40A	14275	0.014
P40B	240	0.000
P40C	476369	0.476
P40D	439117	0.439
Q11A	282475	0.282
Q11B	733412	0.733
Q11C	472790	0.473
Q11D	1094338	1.094
Q12A	787426	0.787
Q12B	804940	0.805
Q12C	1209760.35	1.210
Q13A	1292857	1.293
Q13B	121946	0.122
Q13C	65224	0.065
Q14A	1085701.5	1.086
Q14B	6069894.9	6.070
Q14C	3686023.1	3.686
Q14D	798330.5	0.798
Q14E	184408	0.184
Q21A	57200	0.057
Q21B	363211	0.363
Q22A	317380	0.317
Q22B	401530	0.402
Q30A	686120.5	0.686
Q30B	227259.5	0.227
Q30C	339773	0.340
Q30D	80240	0.080
Q30E	0	0.000
Q41A	459921	0.460

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
Q41B	836524	0.837
Q41C	589279	0.589
Q41D	99920	0.100
Q42A	107477	0.107
Q42B	308392	0.308
Q43A	743625	0.744
Q43B	404041	0.404
Q44A	12000	0.012
Q44B	266298	0.266
Q44C	115224	0.115
Q50A	88379	0.088
Q50B	0	0.000
Q50C	0	0.000
Q60A	0	0.000
Q60B	33200	0.033
Q60C	5500	0.006
Q70A	5110	0.005
Q70B	14887	0.015
Q70C	18427	0.018
Q80A	164735	0.165
Q80B	650142	0.650
Q80C	719707	0.720
Q80D	288148.5	0.288
Q80E	0	0.000
Q80F	245426.7	0.245
Q80G	62500	0.063
Q91A	3000	0.003
Q91B	4586	0.005
Q91C	0	0.000
Q92A	335915	0.336
Q92B	22780	0.023
Q92C	139413	0.139
Q92D	0	0.000
Q92E	351634	0.352
Q92F	1141505	1.142
Q92G	14545	0.015
Q93A	2738	0.003
Q93B	44343	0.044
Q93C	0	0.000
Q93D	38029	0.038

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
Q94A	10444	0.010
Q94B	39340	0.039
Q94C	0	0.000
Q94D	0	0.000
Q94E	56645	0.057
Q94F	15000	0.015
R10A	324120	0.324
R10B	118360	0.118
R10C	0	0.000
R10D	6	0.000
R10E	1200	0.001
R10F	14600	0.015
R10G	2160	0.002
R10H	0	0.000
R10J	0	0.000
R10K	0	0.000
R10L	0	0.000
R10M	0	0.000
R20A	383647	0.384
R20B	1200	0.001
R20C	10	0.000
R20D	0	0.000
R20E	171101	0.171
R20F	0	0.000
R20G	0	0.000
R30A	3220	0.003
R30B	973242.05	0.973
R30C	89272.5	0.089
R30D	3005	0.003
R30E	269326	0.269
R30F	226107.18	0.226
R40A	603120	0.603
R40B	587.48	0.001
R40C	172543.75	0.173
R50A	268679	0.269
R50B	465010	0.465
S10A	5256	0.005
S10B	24481.77	0.024
S10C	16859	0.017
S10D	80074	0.080

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
S10E	163640	0.164
S10F	25714	0.026
S10G	38364	0.038
S10H	1438380.5	1.438
S10J	81775	0.082
S20A	6950	0.007
S20B	256145	0.256
S20C	555334.6	0.555
S20D	1580473.48	1.580
S31A	204762.03	0.205
S31B	170735.5	0.171
S31C	445789.5	0.446
S31D	64284	0.064
S31E	788917	0.789
S31F	504508	0.505
S31G	354763	0.355
S32A	0	0.000
S32B	166885	0.167
S32C	204779	0.205
S32D	5556.4	0.006
S32E	10	0.000
S32F	116	0.000
S32G	38	0.000
S32H	40827	0.041
S32J	118498	0.118
S32K	216552	0.217
S32L	72712	0.073
S32M	0	0.000
S40A	102912	0.103
S40B	0	0.000
S40C	0	0.000
S40D	0	0.000
S40E	205326.5	0.205
S40F	5475	0.005
S50A	15600	0.016
S50B	0	0.000
S50C	115000	0.115
S50D	651011	0.651
S50E	100000	0.100
S50F	430992	0.431

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
S50G	113469	0.113
S50H	80049.95	0.080
S50J	95084	0.095
S60A	31717	0.032
S60B	3368	0.003
S60C	29900	0.030
S60D	84240	0.084
S60E	0	0.000
S70A	15745.9	0.016
S70B	10000	0.010
S70C	0	0.000
S70D	44150	0.044
S70E	204208.6	0.204
S70F	1200	0.001
T11A	71214	0.071
T11B	87986.5	0.088
T11C	380417.8	0.380
T11D	72071	0.072
T11E	129744	0.130
T11F	158769	0.159
T11G	161909	0.162
T11H	47304	0.047
T12A	34410	0.034
T12B	0	0.000
T12C	51548	0.052
T12D	104812	0.105
T12E	194125	0.194
T12F	0	0.000
T12G	83585	0.084
T13A	25550	0.026
T13B	514017	0.514
T13C	0	0.000
T13D	6307	0.006
T13E	0	0.000
T20A	8695	0.009
T20B	160376	0.160
T20C	113072	0.113
T20D	474445.8	0.474
T20E	5000	0.005
T20F	166750	0.167

Quaternary	GW Use (m3/annum)	GW Use (Mm3/annum)
T20G	0	0.000
T60A	200828	0.201
T60B	47384	0.047
T60C	0	0.000
T60D	194638.8	0.195
T60E	104921	0.105
T60F	196220	0.196
T60G	11221.5	0.011
T60H	26700	0.027
T60J	0	0.000
T60K	0	0.000
T70A	15000	0.015
T70B	150642	0.151
T70C	500	0.001
T70D	0	0.000
T70E	0	0.000
T70F	0	0.000
T70G	95555	0.096
T80A	0	0.000
T80B	0	0.000
T80C	40000	0.040
T80D	55552	0.056
T90A	68334	0.068
T90B	0	0.000
T90C	0	0.000
T90D	600	0.001
T90E	0	0.000
T90F	4560	0.005
T90G	810085.7	0.810

APPENDIX D – GROUNDWATER QUALITY RESERVE (QUATERNARY CATCHMENTS)

Table 25: Groundwater Quality Reserve K80B

Chemical Parameter	Unit	Quaternary K80B			
		No. of Samples	Ambient GW quality or median[1)]	BHN Reserve[2)]	Groundwater Quality Reserve[3]
pH	–	4	7.05	5.0 – 9.5	7.76
Electrical Conductivity	mS/m	4	118.00	<150	129.80
Calcium as Ca	mg/l	4	66.50	<150	73.15
Magnesium as Mg	mg/l	4	16.20	<100	17.82
Sodium as Na	mg/l	4	135.00	<200	148.50
Potassium as K	mg/l	4	11.50	<50	12.65
Total Alkalinity as $CaCO_3$	mg/l	4	210.50	<330	231.55
Chloride as Cl	mg/l	4	192.00	<200	211.20
Sulphate as SO_4	mg/l	4	35.95	<400	39.55
Nitrate and Nitrite as N	mg/l	4	0.18	<1.0	0.20
Fluoride as F	mg/l	4	0.32	<1.0	0.35
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 26: Groundwater Quality Reserve K90B

Chemical Parameter	Unit	Quaternary K90B			
		No. of Samples	Ambient GW quality or median [1)]	BHN Reserve[2)]	Groundwater Quality Reserve[3]
pH	–	50	6.70	5.0 – 9.5	7.37
Electrical Conductivity	mS/m	50	40.30	<150	44.33
Calcium as Ca	mg/l	50	3.58	<150	3.94
Magnesium as Mg	mg/l	50	6.64	<100	7.30
Sodium as Na	mg/l	50	60.37	<200	66.41
Potassium as K	mg/l	50	0.46	<50	0.51
Total Alkalinity as $CaCO_3$	mg/l	50	10.78	<330	11.86
Chloride as Cl	mg/l	50	98.05	<200	107.86
Sulphate as SO_4	mg/l	50	13.97	<400	15.37
Nitrate and Nitrite as N	mg/l	50	1.20	<1.0	1.32
Fluoride as F	mg/l	50	0.11	<1.0	0.12
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 27: Groundwater Quality Reserve K90E

Chemical Parameter	Unit	Quaternary K90E			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	54	7.99	5.0 – 9.5	8.79
Electrical Conductivity	mS/m	54	109.70	<150	120.67
Calcium as Ca	mg/l	54	128.66	<150	141.53
Magnesium as Mg	mg/l	54	13.06	<100	14.37
Sodium as Na	mg/l	54	0.05	<200	0.06
Potassium as K	mg/l	54	1.56	<50	1.72
Total Alkalinity as $CaCO_3$	mg/l	54	237.20	<330	260.92
Chloride as Cl	mg/l	54	210.75	<200	231.83
Sulphate as SO_4	mg/l	54	51.58	<400	56.74
Nitrate and Nitrite as N	mg/l	54	0.05	<1.0	0.06
Fluoride as F	mg/l	54	0.33	<1.0	0.36
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 28: Groundwater Quality Reserve K90F

Chemical Parameter	Unit	Quaternary K90F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	58	6.97	5.0 – 9.5	7.67
Electrical Conductivity	mS/m	58	33.30	<150	36.63
Calcium as Ca	mg/l	58	4.58	<150	5.04
Magnesium as Mg	mg/l	58	5.46	<100	6.01
Sodium as Na	mg/l	58	46.17	<200	50.79
Potassium as K	mg/l	58	0.45	<50	0.50
Total Alkalinity as $CaCO_3$	mg/l	58	9.92	<330	10.91
Chloride as Cl	mg/l	58	86.03	<200	94.63
Sulphate as SO_4	mg/l	58	10.66	<400	11.73
Nitrate and Nitrite as N	mg/l	58	0.04	<1.0	0.04
Fluoride as F	mg/l	58	0.12	<1.0	0.13
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 29: Groundwater Quality Reserve K90G

Chemical Parameter	Unit	Quaternary K90G			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	10	6.60	5.0 – 9.5	7.26
Electrical Conductivity	mS/m	10	141.00	<150	155.10
Calcium as Ca	mg/l	10	29.50	<150	32.45
Magnesium as Mg	mg/l	10	29.50	<100	32.45
Sodium as Na	mg/l	10	252.00	<200	277.20
Potassium as K	mg/l	10	4.94	<50	5.43
Total Alkalinity as $CaCO_3$	mg/l	10	57.50	<330	63.25
Chloride as Cl	mg/l	10	302.00	<200	332.20
Sulphate as SO_4	mg/l	10	54.90	<400	60.39
Nitrate and Nitrite as N	mg/l	10	0.15	<1.0	0.17
Fluoride as F	mg/l	10	0.24	<1.0	0.26
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 30: Groundwater Quality Reserve L11C

Chemical Parameter	Unit	Quaternary L11C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	22	8.25	5.0 – 9.5	9.08
Electrical Conductivity	mS/m	22	72.20	<150	79.42
Calcium as Ca	mg/l	22	63.23	<150	69.55
Magnesium as Mg	mg/l	22	35.70	<100	39.27
Sodium as Na	mg/l	22	39.42	<200	43.36
Potassium as K	mg/l	22	1.20	<50	1.32
Total Alkalinity as $CaCO_3$	mg/l	22	250.30	<330	275.33
Chloride as Cl	mg/l	22	47.73	<200	52.50
Sulphate as SO_4	mg/l	22	54.90	<400	60.39
Nitrate and Nitrite as N	mg/l	22	2.02	<1.0	2.22
Fluoride as F	mg/l	22	0.59	<1.0	0.65
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 31: Groundwater Quality Reserve L11F

Chemical Parameter	Unit	Quaternary L11F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	66	7.96	5.0 – 9.5	8.76
Electrical Conductivity	mS/m	66	164.00	<150	180.40
Calcium as Ca	mg/l	66	146.06	<150	160.66
Magnesium as Mg	mg/l	66	38.56	<100	42.42
Sodium as Na	mg/l	66	149.77	<200	164.75
Potassium as K	mg/l	66	3.17	<50	3.49
Total Alkalinity as $CaCO_3$	mg/l	66	243.85	<330	268.24
Chloride as Cl	mg/l	66	215.93	<200	237.52
Sulphate as SO_4	mg/l	66	254.84	<400	280.33
Nitrate and Nitrite as N	mg/l	66	2.13	<1.0	2.34
Fluoride as F	mg/l	66	0.70	<1.0	0.77
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 32: Groundwater Quality Reserve L60B

Chemical Parameter	Unit	Quaternary L60B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	33	8.06	5.0 – 9.5	8.87
Electrical Conductivity	mS/m	33	427.00	<150	469.70
Calcium as Ca	mg/l	33	157.35	<150	173.09
Magnesium as Mg	mg/l	33	160.27	<100	176.30
Sodium as Na	mg/l	33	530.64	<200	583.70
Potassium as K	mg/l	33	5.31	<50	5.84
Total Alkalinity as $CaCO_3$	mg/l	33	373.00	<330	410.30
Chloride as Cl	mg/l	33	1115.84	<200	1227.42
Sulphate as SO_4	mg/l	33	326.84	<400	359.52
Nitrate and Nitrite as N	mg/l	33	1.10	<1.0	1.21
Fluoride as F	mg/l	33	1.04	<1.0	1.14
				Water quality class	Class 4

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 33: Groundwater Quality Reserve L70B

Chemical Parameter	Unit	Quaternary L70B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	20	7.86	5.0 – 9.5	8.65
Electrical Conductivity	mS/m	20	307.20	<150	337.92
Calcium as Ca	mg/l	20	111.58	<150	122.74
Magnesium as Mg	mg/l	20	126.74	<100	139.42
Sodium as Na	mg/l	20	351.61	<200	386.77
Potassium as K	mg/l	20	4.82	<50	5.30
Total Alkalinity as $CaCO_3$	mg/l	20	421.13	<330	463.24
Chloride as Cl	mg/l	20	634.34	<200	697.77
Sulphate as SO_4	mg/l	20	249.43	<400	274.37
Nitrate and Nitrite as N	mg/l	20	0.04	<1.0	0.04
Fluoride as F	mg/l	20	0.60	<1.0	0.66
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 34: Groundwater Quality Reserve L82C

Chemical Parameter	Unit	Quaternary L82C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	3	6.20	5.0 – 9.5	6.82
Electrical Conductivity	mS/m	3	17.70	<150	19.47
Calcium as Ca	mg/l	3	1.75	<150	1.93
Magnesium as Mg	mg/l	3	2.38	<100	2.62
Sodium as Na	mg/l	3	24.00	<200	26.40
Potassium as K	mg/l	3	0.00	<50	0.00
Total Alkalinity as $CaCO_3$	mg/l	3	0.35	<330	0.39
Chloride as Cl	mg/l	3	36.00	<200	39.60
Sulphate as SO_4	mg/l	3	2.56	<400	2.82
Nitrate and Nitrite as N	mg/l	3	0.12	<1.0	0.13
Fluoride as F	mg/l	3	0.06	<1.0	0.07
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 35: Groundwater Quality Reserve L82D

Chemical Parameter	Unit	Quaternary L82D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	70	6.40	5.0 – 9.5	7.04
Electrical Conductivity	mS/m	70	19.60	<150	21.56
Calcium as Ca	mg/l	70	3.65	<150	4.02
Magnesium as Mg	mg/l	70	2.38	<100	2.62
Sodium as Na	mg/l	70	24.00	<200	26.40
Potassium as K	mg/l	70	0.64	<50	0.70
Total Alkalinity as $CaCO_3$	mg/l	70	7.83	<330	8.61
Chloride as Cl	mg/l	70	45.97	<200	50.57
Sulphate as SO_4	mg/l	70	4.20	<400	4.62
Nitrate and Nitrite as N	mg/l	70	0.35	<1.0	0.39
Fluoride as F	mg/l	70	0.11	<1.0	0.12
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 36: Groundwater Quality Reserve L90A

Chemical Parameter	Unit	Quaternary L90A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	6.85	5.0 – 9.5	7.54
Electrical Conductivity	mS/m	2	155.00	<150	170.50
Calcium as Ca	mg/l	2	39.00	<150	42.90
Magnesium as Mg	mg/l	2	33.00	<100	36.30
Sodium as Na	mg/l	2	258.50	<200	284.35
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l	2	105.50	<330	116.05
Chloride as Cl	mg/l	2	282.00	<200	310.20
Sulphate as SO_4	mg/l	2	68.60	<400	75.46
Nitrate and Nitrite as N	mg/l	2	0.28	<1.0	0.31
Fluoride as F	mg/l	2	0.34	<1.0	0.37
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 37: Groundwater Quality Reserve M10C

Chemical Parameter	Unit	Quaternary M10C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	153	6.40	5.0 – 9.5	7.04
Electrical Conductivity	mS/m	153	16.40	<150	18.04
Calcium as Ca	mg/l	153	5.20	<150	5.72
Magnesium as Mg	mg/l	153	2.60	<100	2.86
Sodium as Na	mg/l	153	18.30	<200	20.13
Potassium as K	mg/l	153	0.51	<50	0.56
Total Alkalinity as $CaCO_3$	mg/l	153	11.50	<330	12.65
Chloride as Cl	mg/l	153	34.54	<200	37.99
Sulphate as SO_4	mg/l	153	6.29	<400	6.92
Nitrate and Nitrite as N	mg/l	153	0.06	<1.0	0.07
Fluoride as F	mg/l	153	0.12	<1.0	0.13
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 38: Groundwater Quality Reserve M10D

Chemical Parameter	Unit	Quaternary M10D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	8	7.98	5.0 – 9.5	8.78
Electrical Conductivity	mS/m	8	586.00	<150	644.60
Calcium as Ca	mg/l	8	112.26	<150	123.49
Magnesium as Mg	mg/l	8	133.80	<100	147.18
Sodium as Na	mg/l	8	1056.60	<200	1162.26
Potassium as K	mg/l	8	25.54	<50	28.09
Total Alkalinity as $CaCO_3$	mg/l	8	375.20	<330	412.72
Chloride as Cl	mg/l	8	1624.25	<200	1786.68
Sulphate as SO_4	mg/l	8	417.20	<400	458.92
Nitrate and Nitrite as N	mg/l	8	1.17	<1.0	1.29
Fluoride as F	mg/l	8	0.62	<1.0	0.68
				Water quality class	Class 3

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 39: Groundwater Quality Reserve M30B

Chemical Parameter	Unit	Quaternary M30B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	51	8.01	5.0 – 9.5	8.81
Electrical Conductivity	mS/m	51	1340.00	<150	1474.00
Calcium as Ca	mg/l	51	211.17	<150	232.29
Magnesium as Mg	mg/l	51	146.49	<100	161.14
Sodium as Na	mg/l	51	2677.80	<200	2945.58
Potassium as K	mg/l	51	10.81	<50	11.89
Total Alkalinity as $CaCO_3$	mg/l	51	219.59	<330	241.55
Chloride as Cl	mg/l	51	4230.50	<200	4653.55
Sulphate as SO_4	mg/l	51	763.97	<400	840.37
Nitrate and Nitrite as N	mg/l	51	0.05	<1.0	0.06
Fluoride as F	mg/l	51	0.65	<1.0	0.72
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 40: Groundwater Quality Reserve N11B

Chemical Parameter	Unit	Quaternary N11B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	32	8.12	5.0 – 9.5	8.93
Electrical Conductivity	mS/m	32	223.80	<150	246.18
Calcium as Ca	mg/l	32	82.38	<150	90.62
Magnesium as Mg	mg/l	32	88.50	<100	97.35
Sodium as Na	mg/l	32	271.86	<200	299.05
Potassium as K	mg/l	32	3.20	<50	3.52
Total Alkalinity as $CaCO_3$	mg/l	32	412.00	<330	453.20
Chloride as Cl	mg/l	32	299.18	<200	329.10
Sulphate as SO_4	mg/l	32	265.01	<400	291.51
Nitrate and Nitrite as N	mg/l	32	1.98	<1.0	2.18
Fluoride as F	mg/l	32	0.52	<1.0	0.57
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 41: Groundwater Quality Reserve N13A

Chemical Parameter	Unit	Quaternary N13A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	17	8.01	5.0 – 9.5	8.81
Electrical Conductivity	mS/m	17	93.20	<150	102.52
Calcium as Ca	mg/l	17	59.50	<150	65.45
Magnesium as Mg	mg/l	17	14.40	<100	15.84
Sodium as Na	mg/l	17	127.08	<200	139.79
Potassium as K	mg/l	17	0.90	<50	0.99
Total Alkalinity as $CaCO_3$	mg/l	17	258.44	<330	284.28
Chloride as Cl	mg/l	17	129.80	<200	142.78
Sulphate as SO_4	mg/l	17	31.10	<400	34.21
Nitrate and Nitrite as N	mg/l	17	0.04	<1.0	0.04
Fluoride as F	mg/l	17	3.12	<1.0	3.43
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 42: Groundwater Quality Reserve N13C

Chemical Parameter	Unit	Quaternary N13C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	191	8.29	5.0 – 9.5	9.12
Electrical Conductivity	mS/m	191	322.00	<150	354.20
Calcium as Ca	mg/l	191	63.00	<150	69.30
Magnesium as Mg	mg/l	191	107.52	<100	118.27
Sodium as Na	mg/l	191	489.25	<200	538.18
Potassium as K	mg/l	191	4.01	<50	4.41
Total Alkalinity as $CaCO_3$	mg/l	191	479.00	<330	526.90
Chloride as Cl	mg/l	191	545.92	<200	600.51
Sulphate as SO_4	mg/l	191	362.53	<400	398.78
Nitrate and Nitrite as N	mg/l	191	0.06	<1.0	0.07
Fluoride as F	mg/l	191	0.70	<1.0	0.77
				Water quality class	Class 3

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 43: Groundwater Quality Reserve N14A

Chemical Parameter	Unit	Quaternary N14A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	65	8.25	5.0 – 9.5	9.08
Electrical Conductivity	mS/m	65	72.50	<150	79.75
Calcium as Ca	mg/l	65	63.23	<150	69.55
Magnesium as Mg	mg/l	65	35.70	<100	39.27
Sodium as Na	mg/l	65	39.42	<200	43.36
Potassium as K	mg/l	65	1.20	<50	1.32
Total Alkalinity as $CaCO_3$	mg/l	65	250.30	<330	275.33
Chloride as Cl	mg/l	65	47.73	<200	52.50
Sulphate as SO_4	mg/l	65	54.90	<400	60.39
Nitrate and Nitrite as N	mg/l	65	2.02	<1.0	2.22
Fluoride as F	mg/l	65	0.59	<1.0	0.65
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 44: Groundwater Quality Reserve N40B

Chemical Parameter	Unit	Quaternary N40B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	7	6.90	5.0 – 9.5	7.59
Electrical Conductivity	mS/m	7	75.90	<150	83.49
Calcium as Ca	mg/l	7	7.85	<150	8.64
Magnesium as Mg	mg/l	7	5.50	<100	6.05
Sodium as Na	mg/l	7	49.65	<200	54.62
Potassium as K	mg/l	7	6.93	<50	7.62
Total Alkalinity as $CaCO_3$	mg/l	7	38.80	<330	42.68
Chloride as Cl	mg/l	7	85.45	<200	94.00
Sulphate as SO_4	mg/l	7	21.55	<400	23.71
Nitrate and Nitrite as N	mg/l	7	0.02	<1.0	0.02
Fluoride as F	mg/l	7	0.25	<1.0	0.28
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 45: Groundwater Quality Reserve N40C

Chemical Parameter	Unit	Quaternary N40C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	45	8.12	5.0 – 9.5	8.93
Electrical Conductivity	mS/m	45	777.00	<150	854.70
Calcium as Ca	mg/l	45	125.46	<150	138.01
Magnesium as Mg	mg/l	45	183.70	<100	202.07
Sodium as Na	mg/l	45	1363.77	<200	1500.15
Potassium as K	mg/l	45	18.40	<50	20.24
Total Alkalinity as $CaCO_3$	mg/l	45	462.70	<330	508.97
Chloride as Cl	mg/l	45	1734.19	<200	1907.61
Sulphate as SO_4	mg/l	45	966.90	<400	1063.59
Nitrate and Nitrite as N	mg/l	45	0.05	<1.0	0.06
Fluoride as F	mg/l	45	1.14	<1.0	1.25
				Water quality class	Class 4

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 46: Groundwater Quality Reserve N40D

Chemical Parameter	Unit	Quaternary N40D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	53	7.94	5.0 – 9.5	8.73
Electrical Conductivity	mS/m	53	277.00	<150	304.70
Calcium as Ca	mg/l	53	129.66	<150	142.63
Magnesium as Mg	mg/l	53	106.58	<100	117.24
Sodium as Na	mg/l	53	294.26	<200	323.69
Potassium as K	mg/l	53	1.88	<50	2.07
Total Alkalinity as $CaCO_3$	mg/l	53	477.00	<330	524.70
Chloride as Cl	mg/l	53	562.93	<200	619.22
Sulphate as SO_4	mg/l	53	110.64	<400	121.70
Nitrate and Nitrite as N	mg/l	53	2.13	<1.0	2.34
Fluoride as F	mg/l	53	0.52	<1.0	0.57
				Water quality class	Class 3

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 47: Groundwater Quality Reserve P10C

Chemical Parameter	Unit	Quaternary P10C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–			5.0 – 9.5	5.0 – 9.5
Electrical Conductivity	mS/m	1	262.40	<150	288.64
Calcium as Ca	mg/l			<150	150.00
Magnesium as Mg	mg/l			<100	100.00
Sodium as Na	mg/l			<200	200.00
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l			<330	330.00
Chloride as Cl	mg/l			<200	200.00
Sulphate as SO_4	mg/l			<400	400.00
Nitrate and Nitrite as N	mg/l			<1.0	1.00
Fluoride as F	mg/l			<1.0	1.00
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 48: Groundwater Quality Reserve P10F

Chemical Parameter	Unit	Quaternary P10F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.49	5.0 – 9.5	8.24
Electrical Conductivity	mS/m	1	869.00	<150	955.90
Calcium as Ca	mg/l	1	399.50	<150	439.45
Magnesium as Mg	mg/l	1	237.20	<100	260.92
Sodium as Na	mg/l	1	1766.40	<200	1943.04
Potassium as K	mg/l	1	35.79	<50	39.37
Total Alkalinity as $CaCO_3$	mg/l	1	370.30	<330	407.33
Chloride as Cl	mg/l	1	3651.80	<200	4016.98
Sulphate as SO_4	mg/l	1	401.40	<400	441.54
Nitrate and Nitrite as N	mg/l	1	0.02	<1.0	0.02
Fluoride as F	mg/l	1	0.20	<1.0	0.22
				Water quality class	Class 4

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 49: Groundwater Quality Reserve P20A

Chemical Parameter	Unit	Quaternary P20A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	52	8.10	5.0 – 9.5	8.91
Electrical Conductivity	mS/m	52	99.40	<150	109.34
Calcium as Ca	mg/l	46	69.09	<150	76.00
Magnesium as Mg	mg/l	46	13.08	<100	14.39
Sodium as Na	mg/l	45	116.29	<200	127.92
Potassium as K	mg/l	45	3.20	<50	3.52
Total Alkalinity as $CaCO_3$	mg/l	46	170.29	<330	187.32
Chloride as Cl	mg/l	46	189.46	<200	208.41
Sulphate as SO_4	mg/l	46	35.49	<400	39.04
Nitrate and Nitrite as N	mg/l	44	1.42	<1.0	1.56
Fluoride as F	mg/l	43	0.41	<1.0	0.45
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 50: Groundwater Quality Reserve P40C

Chemical Parameter	Unit	Quaternary P40C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.30	5.0 – 9.5	8.03
Electrical Conductivity	mS/m	1	160.00	<150	176.00
Calcium as Ca	mg/l	1	67.20	<150	73.92
Magnesium as Mg	mg/l	1	4.90	<100	5.39
Sodium as Na	mg/l			<200	200.00
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l	1	556.10	<330	611.71
Chloride as Cl	mg/l	1	124.00	<200	136.40
Sulphate as SO_4	mg/l			<400	400.00
Nitrate and Nitrite as N	mg/l	1	7.23	<1.0	7.95
Fluoride as F	mg/l	1	0.30	<1.0	0.33
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 51: Groundwater Quality Reserve Q12B

Chemical Parameter	Unit	Quaternary Q12B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	50	8.20	5.0 – 9.5	9.02
Electrical Conductivity	mS/m	51	99.60	<150	109.56
Calcium as Ca	mg/l	44	83.18	<150	91.50
Magnesium as Mg	mg/l	44	21.22	<100	23.34
Sodium as Na	mg/l	42	116.65	<200	128.32
Potassium as K	mg/l	42	0.95	<50	1.05
Total Alkalinity as $CaCO_3$	mg/l	44	295.00	<330	324.50
Chloride as Cl	mg/l	44	80.99	<200	89.09
Sulphate as SO_4	mg/l	44	136.37	<400	150.01
Nitrate and Nitrite as N	mg/l	42	1.00	<1.0	1.10
Fluoride as F	mg/l	42	0.48	<1.0	0.53
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 52: Groundwater Quality Reserve Q13A

Chemical Parameter	Unit	Quaternary Q13A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	48	8.12	5.0 – 9.5	8.93
Electrical Conductivity	mS/m	49	99.50	<150	109.45
Calcium as Ca	mg/l	43	73.50	<150	80.85
Magnesium as Mg	mg/l	43	43.61	<100	47.97
Sodium as Na	mg/l	42	71.39	<200	78.53
Potassium as K	mg/l	42	3.97	<50	4.37
Total Alkalinity as $CaCO_3$	mg/l	43	272.89	<330	300.18
Chloride as Cl	mg/l	43	117.69	<200	129.46
Sulphate as SO_4	mg/l	43	75.89	<400	83.48
Nitrate and Nitrite as N	mg/l	41	3.62	<1.0	3.98
Fluoride as F	mg/l	42	0.60	<1.0	0.66
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 53: Groundwater Quality Reserve Q14B

Chemical Parameter	Unit	Quaternary Q14B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	7	7.96	5.0 – 9.5	8.76
Electrical Conductivity	mS/m	7	12.87	<150	14.16
Calcium as Ca	mg/l	7	7.63	<150	8.39
Magnesium as Mg	mg/l	7	4.61	<100	5.07
Sodium as Na	mg/l	7	8.68	<200	9.55
Potassium as K	mg/l	7	2.41	<50	2.65
Total Alkalinity as $CaCO_3$	mg/l	7	40.08	<330	44.09
Chloride as Cl	mg/l	7	7.77	<200	8.55
Sulphate as SO_4	mg/l	7	1.5	<400	1.65
Nitrate and Nitrite as N	mg/l	7	0.24	<1.0	0.26
Fluoride as F	mg/l	7	0.23	<1.0	0.25
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 54: Groundwater Quality Reserve Q14E

Chemical Parameter	Unit	Quaternary Q14E			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.2	5.0 – 9.5	7.92
Electrical Conductivity	mS/m	1	77.8	<150	85.58
Calcium as Ca	mg/l	1	60.8	<150	66.88
Magnesium as Mg	mg/l	1	26.2	<100	28.82
Sodium as Na	mg/l			<200	0.00
Potassium as K	mg/l			<50	0.00
Total Alkalinity as $CaCO_3$	mg/l	1	296	<330	325.60
Chloride as Cl	mg/l	1	28	<200	30.80
Sulphate as SO_4	mg/l			<400	0.00
Nitrate and Nitrite as N	mg/l	1	7	<1.0	7.70
Fluoride as F	mg/l	1	0.43	<1.0	0.47
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 55: Groundwater Quality Reserve Q22B

Chemical Parameter	Unit	Quaternary Q22B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.5	5.0 – 9.5	8.25
Electrical Conductivity	mS/m	1	58.6	<150	64.46
Calcium as Ca	mg/l	1	40	<150	44.00
Magnesium as Mg	mg/l	1	33	<100	36.30
Sodium as Na	mg/l			<200	0.00
Potassium as K	mg/l			<50	0.00
Total Alkalinity as $CaCO_3$	mg/l	1	248	<330	272.80
Chloride as Cl	mg/l	1	26	<200	28.60
Sulphate as SO_4	mg/l			<400	0.00
Nitrate and Nitrite as N	mg/l	1	4.07	<1.0	4.48
Fluoride as F	mg/l	1	0.8	<1.0	0.88
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 56: Groundwater Quality Reserve Q41C

Chemical Parameter	Unit	Quaternary Q41C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	15	8.00	5.0 – 9.5	8.80
Electrical Conductivity	mS/m	17	71.00	<150	78.10
Calcium as Ca	mg/l	14	58.48	<150	64.33
Magnesium as Mg	mg/l	14	31.40	<100	34.54
Sodium as Na	mg/l	14	48.70	<200	53.57
Potassium as K	mg/l	14	1.52	<50	1.67
Total Alkalinity as $CaCO_3$	mg/l	14	288.50	<330	317.35
Chloride as Cl	mg/l	14	47.55	<200	52.31
Sulphate as SO_4	mg/l	14	16.20	<400	17.82
Nitrate and Nitrite as N	mg/l	14	1.99	<1.0	2.19
Fluoride as F	mg/l	13	0.36	<1.0	0.40
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 57: Groundwater Quality Reserve Q44B

Chemical Parameter	Unit	Quaternary Q44B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	4	8.23	5.0 – 9.5	9.05
Electrical Conductivity	mS/m	4	175.00	<150	192.50
Calcium as Ca	mg/l	4	75.05	<150	82.56
Magnesium as Mg	mg/l	4	79.50	<100	87.45
Sodium as Na	mg/l	4	197.69	<200	217.46
Potassium as K	mg/l	4	4.16	<50	4.58
Total Alkalinity as $CaCO_3$	mg/l	4	448.35	<330	493.19
Chloride as Cl	mg/l	4	196.95	<200	216.65
Sulphate as SO_4	mg/l	4	204.70	<400	225.17
Nitrate and Nitrite as N	mg/l	4	3.26	<1.0	3.59
Fluoride as F	mg/l	4	0.85	<1.0	0.94
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 58: Groundwater Quality Reserve Q50C

Chemical Parameter	Unit	Quaternary Q50C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	7.65	5.0 – 9.5	8.42
Electrical Conductivity	mS/m	2	69.05	<150	75.96
Calcium as Ca	mg/l			<150	150.00
Magnesium as Mg	mg/l			<100	100.00
Sodium as Na	mg/l			<200	200.00
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l	2	60.00	<330	66.00
Chloride as Cl	mg/l	2	140.00	<200	154.00
Sulphate as SO_4	mg/l			<400	400.00
Nitrate and Nitrite as N	mg/l	2	0.62	<1.0	0.68
Fluoride as F	mg/l	2	2.00	<1.0	2.20
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 59: Groundwater Quality Reserve Q70A

Chemical Parameter	Unit	Quaternary Q70A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.00	5.0 – 9.5	8.80
Electrical Conductivity	mS/m	1	16.70	<150	18.37
Calcium as Ca	mg/l	1	16.00	<150	17.60
Magnesium as Mg	mg/l	1	2.90	<100	3.19
Sodium as Na	mg/l			<200	200.00
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l	1	34.00	<330	37.40
Chloride as Cl	mg/l	1	12.00	<200	13.20
Sulphate as SO_4	mg/l			<400	400.00
Nitrate and Nitrite as N	mg/l	1	0.02	<1.0	0.02
Fluoride as F	mg/l	1	0.10	<1.0	0.11
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 60: Groundwater Quality Reserve Q80D

Chemical Parameter	Unit	Quaternary Q80D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	36	7.91	5.0 – 9.5	8.70
Electrical Conductivity	mS/m	37	160.00	<150	176.00
Calcium as Ca	mg/l	29	89.20	<150	98.12
Magnesium as Mg	mg/l	30	63.30	<100	69.63
Sodium as Na	mg/l	30	190.59	<200	209.65
Potassium as K	mg/l	30	2.99	<50	3.29
Total Alkalinity as $CaCO_3$	mg/l	30	419.75	<330	461.73
Chloride as Cl	mg/l	30	251.20	<200	276.32
Sulphate as SO_4	mg/l	30	108.50	<400	119.35
Nitrate and Nitrite as N	mg/l	29	3.65	<1.0	4.02
Fluoride as F	mg/l	30	0.71	<1.0	0.78
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 61: Groundwater Quality Reserve Q91A

Chemical Parameter	Unit	Quaternary Q91A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	52	8.07	5.0 – 9.5	8.88
Electrical Conductivity	mS/m	52	248.00	<150	272.80
Calcium as Ca	mg/l	45	95.30	<150	104.83
Magnesium as Mg	mg/l	46	64.89	<100	71.38
Sodium as Na	mg/l	43	361.70	<200	397.87
Potassium as K	mg/l	44	13.29	<50	14.62
Total Alkalinity as $CaCO_3$	mg/l	46	480.70	<330	528.77
Chloride as Cl	mg/l	44	492.81	<200	542.09
Sulphate as SO_4	mg/l	45	131.90	<400	145.09
Nitrate and Nitrite as N	mg/l	44	3.59	<1.0	3.95
Fluoride as F	mg/l	42	1.59	<1.0	1.75
				Water quality class	Class 3

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 62: Groundwater Quality Reserve Q91B

Chemical Parameter	Unit	Quaternary Q91B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	9	7.83	5.0 – 9.5	8.61
Electrical Conductivity	mS/m	9	555.00	<150	610.50
Calcium as Ca	mg/l	8	324.45	<150	356.90
Magnesium as Mg	mg/l	8	185.95	<100	204.55
Sodium as Na	mg/l	9	668.30	<200	735.13
Potassium as K	mg/l	9	21.39	<50	23.53
Total Alkalinity as $CaCO_3$	mg/l	9	547.50	<330	602.25
Chloride as Cl	mg/l	9	1497.10	<200	1646.81
Sulphate as SO_4	mg/l	9	359.60	<400	395.56
Nitrate and Nitrite as N	mg/l	9	19.02	<1.0	20.92
Fluoride as F	mg/l	9	1.83	<1.0	2.01
				Water quality class	Class 3

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 63: Groundwater Quality Reserve Q92C

Chemical Parameter	Unit	Quaternary Q92C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	49	8.07	5.0 – 9.5	8.88
Electrical Conductivity	mS/m	49	111.40	<150	122.54
Calcium as Ca	mg/l	49	118.68	<150	130.55
Magnesium as Mg	mg/l	49	33.23	<100	36.55
Sodium as Na	mg/l	49	133.21	<200	146.53
Potassium as K	mg/l	49	2.59	<50	2.85
Total Alkalinity as $CaCO_3$	mg/l	49	363.70	<330	400.07
Chloride as Cl	mg/l	49	118.68	<200	130.55
Sulphate as SO_4	mg/l	49	36.35	<400	39.99
Nitrate and Nitrite as N	mg/l	49	0.37	<1.0	0.41
Fluoride as F	mg/l	49	0.79	<1.0	0.87
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 64: Groundwater Quality Reserve Q92F

Chemical Parameter	Unit	Quaternary Q92F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	8.04	5.0 – 9.5	8.84
Electrical Conductivity	mS/m	2	128.20	<150	141.02
Calcium as Ca	mg/l	2	53.55	<150	58.91
Magnesium as Mg	mg/l	2	27.75	<100	30.53
Sodium as Na	mg/l	2	179.26	<200	197.19
Potassium as K	mg/l	2	14.59	<50	16.05
Total Alkalinity as $CaCO_3$	mg/l	2	351.65	<330	386.82
Chloride as Cl	mg/l	2	193.65	<200	213.02
Sulphate as SO_4	mg/l	2	34.70	<400	38.17
Nitrate and Nitrite as N	mg/l	2	1.42	<1.0	1.56
Fluoride as F	mg/l	2	1.12	<1.0	1.23
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 65: Groundwater Quality Reserve Q92G

Chemical Parameter	Unit	Quaternary Q92G			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	7.05	5.0 – 9.5	7.76
Electrical Conductivity	mS/m	2	316.10	<150	347.71
Calcium as Ca	mg/l	2	103.40	<150	113.74
Magnesium as Mg	mg/l	2	94.70	<100	104.17
Sodium as Na	mg/l	2	1126.00	<200	1238.60
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l	2	459.30	<330	505.23
Chloride as Cl	mg/l	2	683.50	<200	751.85
Sulphate as SO_4	mg/l	2	230.00	<400	253.00
Nitrate and Nitrite as N	mg/l	2	3.29	<1.0	3.62
Fluoride as F	mg/l	2	1.05	<1.0	1.16
				Water quality class	Class 4

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 66: Groundwater Quality Reserve Q94F

Chemical Parameter	Unit	Quaternary Q94F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	10.10	5.0 – 9.5	11.11
Electrical Conductivity	mS/m	1	62.00	<150	68.20
Calcium as Ca	mg/l	1	2.60	<150	2.86
Magnesium as Mg	mg/l	1	0.50	<100	0.55
Sodium as Na	mg/l	1	118.50	<200	130.35
Potassium as K	mg/l	1	0.84	<50	0.92
Total Alkalinity as $CaCO_3$	mg/l	1	62.00	<330	68.20
Chloride as Cl	mg/l	1	120.10	<200	132.11
Sulphate as SO_4	mg/l	1	22.80	<400	25.08
Nitrate and Nitrite as N	mg/l	1	0.02	<1.0	0.02
Fluoride as F	mg/l	1	0.02	<1.0	0.02
				Water quality class	Class 4

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 67: Groundwater Quality Reserve R30C

Chemical Parameter	Unit	Quaternary R30C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	16	8.01	5.0 – 9.5	8.81
Electrical Conductivity	mS/m	16	71.85	<150	79.04
Calcium as Ca	mg/l	16	30.2	<150	33.22
Magnesium as Mg	mg/l	16	20.55	<100	22.61
Sodium as Na	mg/l	16	82.25	<200	90.48
Potassium as K	mg/l	16	1.62	<50	1.78
Total Alkalinity as $CaCO_3$	mg/l	16	178.9	<330	196.79
Chloride as Cl	mg/l	16	93	<200	102.30
Sulphate as SO_4	mg/l	16	13.4	<400	14.74
Nitrate and Nitrite as N	mg/l	16	0.65	<1.0	0.72
Fluoride as F	mg/l	16	0.29	<1.0	0.32
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 68: Groundwater Quality Reserve R30E

Chemical Parameter	Unit	Quaternary R30E			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	13	8.24	5.0 – 9.5	9.06
Electrical Conductivity	mS/m	13	176	<150	193.60
Calcium as Ca	mg/l	13	60.8	<150	66.88
Magnesium as Mg	mg/l	13	45	<100	49.50
Sodium as Na	mg/l	13	198.7	<200	218.57
Potassium as K	mg/l	13	2.83	<50	3.11
Total Alkalinity as $CaCO_3$	mg/l	13	297.2	<330	326.92
Chloride as Cl	mg/l	13	313.6	<200	344.96
Sulphate as SO_4	mg/l	13	53.6	<400	58.96
Nitrate and Nitrite as N	mg/l	13	2.98	<1.0	3.28
Fluoride as F	mg/l	13	0.64	<1.0	0.70
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 69: Groundwater Quality Reserve R30F

Chemical Parameter	Unit	Quaternary R30F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.38	5.0 – 9.5	9.22
Electrical Conductivity	mS/m	1	209	<150	229.90
Calcium as Ca	mg/l	1	96.8	<150	106.48
Magnesium as Mg	mg/l	1	63	<100	69.30
Sodium as Na	mg/l	1	318.6	<200	350.46
Potassium as K	mg/l	1	2.6	<50	2.86
Total Alkalinity as $CaCO_3$	mg/l	1	386.4	<330	425.04
Chloride as Cl	mg/l	1	492.6	<200	541.86
Sulphate as SO_4	mg/l	1	76.9	<400	84.59
Nitrate and Nitrite as N	mg/l	1	2.89	<1.0	3.18
Fluoride as F	mg/l	1	1.03	<1.0	1.13
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 70: Groundwater Quality Reserve S10A

Chemical Parameter	Unit	Quaternary S10A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	8.05	5.0 – 9.5	8.86
Electrical Conductivity	mS/m	2	85.60	<150	94.16
Calcium as Ca	mg/l	2	27.70	<150	30.47
Magnesium as Mg	mg/l	2	13.60	<100	14.96
Sodium as Na	mg/l	2	152.90	<200	168.19
Potassium as K	mg/l	2	1.63	<50	1.79
Total Alkalinity as $CaCO_3$	mg/l	2	393.70	<330	433.07
Chloride as Cl	mg/l	2	38.80	<200	42.68
Sulphate as SO_4	mg/l	2	13.10	<400	14.41
Nitrate and Nitrite as N	mg/l	2	0.05	<1.0	0.06
Fluoride as F	mg/l	2	0.70	<1.0	0.77
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 71: Groundwater Quality Reserve S10B

Chemical Parameter	Unit	Quaternary S10B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	8	8.22	5.0 – 9.5	9.04
Electrical Conductivity	mS/m	8	32.70	<150	35.97
Calcium as Ca	mg/l	8	27.16	<150	29.88
Magnesium as Mg	mg/l	8	12.93	<100	14.22
Sodium as Na	mg/l	8	11.17	<200	12.29
Potassium as K	mg/l	8	0.79	<50	0.87
Total Alkalinity as $CaCO_3$	mg/l	8	141.58	<330	155.74
Chloride as Cl	mg/l	8	5.00	<200	5.50
Sulphate as SO_4	mg/l	8	6.45	<400	7.10
Nitrate and Nitrite as N	mg/l	8	0.63	<1.0	0.69
Fluoride as F	mg/l	8	0.20	<1.0	0.22
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 72: Groundwater Quality Reserve S10C

Chemical Parameter	Unit	Quaternary S10C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	12	8.32	5.0 – 9.5	9.15
Electrical Conductivity	mS/m	12	48.35	<150	53.19
Calcium as Ca	mg/l	12	26.15	<150	28.77
Magnesium as Mg	mg/l	12	12.24	<100	13.46
Sodium as Na	mg/l	12	37.45	<200	41.20
Potassium as K	mg/l	12	1.25	<50	1.38
Total Alkalinity as $CaCO_3$	mg/l	12	193.93	<330	213.32
Chloride as Cl	mg/l	12	21.02	<200	23.12
Sulphate as SO_4	mg/l	12	12.49	<400	13.74
Nitrate and Nitrite as N	mg/l	12	1.57	<1.0	1.73
Fluoride as F	mg/l	12	0.33	<1.0	0.36
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 73: Groundwater Quality Reserve S10D

Chemical Parameter	Unit	Quaternary S10D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	6	7.91	5.0 – 9.5	8.70
Electrical Conductivity	mS/m	6	47.00	<150	51.70
Calcium as Ca	mg/l	6	32.57	<150	35.83
Magnesium as Mg	mg/l	6	25.05	<100	27.56
Sodium as Na	mg/l	6	32.54	<200	35.79
Potassium as K	mg/l	6	0.42	<50	0.46
Total Alkalinity as $CaCO_3$	mg/l	6	231.26	<330	254.39
Chloride as Cl	mg/l	6	12.12	<200	13.33
Sulphate as SO_4	mg/l	6	6.25	<400	6.88
Nitrate and Nitrite as N	mg/l	6	0.83	<1.0	0.91
Fluoride as F	mg/l	6	0.35	<1.0	0.39
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 74: Groundwater Quality Reserve S10G

Chemical Parameter	Unit	Quaternary S10G			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.00	5.0 – 9.5	8.80
Electrical Conductivity	mS/m	1	154.00	<150	169.40
Calcium as Ca	mg/l	1	142.50	<150	156.75
Magnesium as Mg	mg/l	1	45.70	<100	50.27
Sodium as Na	mg/l	1	132.00	<200	145.20
Potassium as K	mg/l	1	1.12	<50	1.23
Total Alkalinity as $CaCO_3$	mg/l	1	495.00	<330	544.50
Chloride as Cl	mg/l	1	145.60	<200	160.16
Sulphate as SO_4	mg/l	1	61.00	<400	67.10
Nitrate and Nitrite as N	mg/l	1	21.37	<1.0	23.51
Fluoride as F	mg/l	1	0.57	<1.0	0.63
				Water quality class	Class 4

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 75: Groundwater Quality Reserve S10H

Chemical Parameter	Unit	Quaternary S10H			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	8.61	5.0 – 9.5	9.47
Electrical Conductivity	mS/m	2	84.00	<150	92.40
Calcium as Ca	mg/l	2	59.10	<150	65.01
Magnesium as Mg	mg/l	2	32.30	<100	35.53
Sodium as Na	mg/l	2	100.20	<200	110.22
Potassium as K	mg/l	2	2.48	<50	2.73
Total Alkalinity as $CaCO_3$	mg/l	2	308.90	<330	339.79
Chloride as Cl	mg/l	2	122.80	<200	135.08
Sulphate as SO_4	mg/l	2	3.35	<400	3.69
Nitrate and Nitrite as N	mg/l	2	0.95	<1.0	1.05
Fluoride as F	mg/l	2	0.76	<1.0	0.84
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 76: Groundwater Quality Reserve S20A

Chemical Parameter	Unit	Quaternary S20A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.77	5.0 – 9.5	8.55
Electrical Conductivity	mS/m	1	58.20	<150	64.02
Calcium as Ca	mg/l	1	42.70	<150	46.97
Magnesium as Mg	mg/l	1	20.90	<100	22.99
Sodium as Na	mg/l	1	48.60	<200	53.46
Potassium as K	mg/l	1	0.52	<50	0.57
Total Alkalinity as $CaCO_3$	mg/l	1	264.30	<330	290.73
Chloride as Cl	mg/l	1	11.00	<200	12.10
Sulphate as SO_4	mg/l	1	6.60	<400	7.26
Nitrate and Nitrite as N	mg/l	1	0.62	<1.0	0.68
Fluoride as F	mg/l	1	0.38	<1.0	0.42
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 77: Groundwater Quality Reserve S20D

Chemical Parameter	Unit	Quaternary S20D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	3	8.19	5.0 – 9.5	9.01
Electrical Conductivity	mS/m	3	37.05	<150	40.76
Calcium as Ca	mg/l	3	35.20	<150	38.72
Magnesium as Mg	mg/l	3	20.30	<100	22.33
Sodium as Na	mg/l	3	21.95	<200	24.15
Potassium as K	mg/l	3	1.06	<50	1.17
Total Alkalinity as $CaCO_3$	mg/l	3	178.25	<330	196.08
Chloride as Cl	mg/l	3	6.35	<200	6.99
Sulphate as SO_4	mg/l	3	7.30	<400	8.03
Nitrate and Nitrite as N	mg/l	3	3.68	<1.0	4.05
Fluoride as F	mg/l	3	0.28	<1.0	0.31
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 78: Groundwater Quality Reserve S31A

Chemical Parameter	Unit	Quaternary S31A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	78	8.24	5.0 – 9.5	9.06
Electrical Conductivity	mS/m	78	58.90	<150	64.79
Calcium as Ca	mg/l	78	48.80	<150	53.68
Magnesium as Mg	mg/l	78	27.35	<100	30.09
Sodium as Na	mg/l	78	20.22	<200	22.24
Potassium as K	mg/l	78	1.37	<50	1.51
Total Alkalinity as $CaCO_3$	mg/l	78	257.96	<330	283.76
Chloride as Cl	mg/l	78	15.35	<200	16.89
Sulphate as SO_4	mg/l	78	15.74	<400	17.31
Nitrate and Nitrite as N	mg/l	78	0.14	<1.0	0.15
Fluoride as F	mg/l	78	0.36	<1.0	0.40
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 79: Groundwater Quality Reserve S31B

Chemical Parameter	Unit	Quaternary S31B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	9	7.41	5.0 – 9.5	8.15
Electrical Conductivity	mS/m	9	88.00	<150	96.80
Calcium as Ca	mg/l	9	26.20	<150	28.82
Magnesium as Mg	mg/l	9	36.70	<100	40.37
Sodium as Na	mg/l	9	126.30	<200	138.93
Potassium as K	mg/l	9	1.70	<50	1.87
Total Alkalinity as $CaCO_3$	mg/l	9	352.40	<330	387.64
Chloride as Cl	mg/l	9	69.10	<200	76.01
Sulphate as SO_4	mg/l	9	31.80	<400	34.98
Nitrate and Nitrite as N	mg/l	9	0.55	<1.0	0.61
Fluoride as F	mg/l	9	0.64	<1.0	0.70
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 80: Groundwater Quality Reserve S31C

Chemical Parameter	Unit	Quaternary S31C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	5	8.10	5.0 – 9.5	8.91
Electrical Conductivity	mS/m	5	74.00	<150	81.40
Calcium as Ca	mg/l	5	56.20	<150	61.82
Magnesium as Mg	mg/l	5	28.60	<100	31.46
Sodium as Na	mg/l	5	56.00	<200	61.60
Potassium as K	mg/l	5	1.24	<50	1.36
Total Alkalinity as $CaCO_3$	mg/l	5	303.20	<330	333.52
Chloride as Cl	mg/l	5	16.70	<200	18.37
Sulphate as SO_4	mg/l	5	22.50	<400	24.75
Nitrate and Nitrite as N	mg/l	5	1.41	<1.0	1.55
Fluoride as F	mg/l	5	0.57	<1.0	0.63
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 81: Groundwater Quality Reserve S31D

Chemical Parameter	Unit	Quaternary S31D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	11	8.25	5.0 – 9.5	9.08
Electrical Conductivity	mS/m	11	70.50	<150	77.55
Calcium as Ca	mg/l	11	67.20	<150	73.92
Magnesium as Mg	mg/l	11	26.23	<100	28.85
Sodium as Na	mg/l	11	49.50	<200	54.45
Potassium as K	mg/l	11	0.79	<50	0.87
Total Alkalinity as $CaCO_3$	mg/l	11	320.50	<330	352.55
Chloride as Cl	mg/l	11	30.58	<200	33.64
Sulphate as SO_4	mg/l	11	27.39	<400	30.13
Nitrate and Nitrite as N	mg/l	11	1.05	<1.0	1.16
Fluoride as F	mg/l	11	0.43	<1.0	0.47
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 82: Groundwater Quality Reserve S31E

Chemical Parameter	Unit	Quaternary S31E			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	74	8.02	5.0 – 9.5	8.82
Electrical Conductivity	mS/m	74	84.80	<150	93.28
Calcium as Ca	mg/l	74	58.00	<150	63.80
Magnesium as Mg	mg/l	74	27.86	<100	30.65
Sodium as Na	mg/l	74	89.25	<200	98.18
Potassium as K	mg/l	74	7.68	<50	8.45
Total Alkalinity as $CaCO_3$	mg/l	74	332.71	<330	365.98
Chloride as Cl	mg/l	74	53.00	<200	58.30
Sulphate as SO_4	mg/l	74	24.61	<400	27.07
Nitrate and Nitrite as N	mg/l	74	3.58	<1.0	3.94
Fluoride as F	mg/l	74	0.89	<1.0	0.98
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 83: Groundwater Quality Reserve S31F

Chemical Parameter	Unit	Quaternary S31F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.49	5.0 – 9.5	9.34
Electrical Conductivity	mS/m	1	92.00	<150	101.20
Calcium as Ca	mg/l	1	33.00	<150	36.30
Magnesium as Mg	mg/l	1	45.80	<100	50.38
Sodium as Na	mg/l	1	82.80	<200	91.08
Potassium as K	mg/l	1	2.40	<50	2.64
Total Alkalinity as $CaCO_3$	mg/l	1	217.20	<330	238.92
Chloride as Cl	mg/l	1	110.70	<200	121.77
Sulphate as SO_4	mg/l	1	64.80	<400	71.28
Nitrate and Nitrite as N	mg/l	1	2.95	<1.0	3.25
Fluoride as F	mg/l	1	0.47	<1.0	0.52
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 84: Groundwater Quality Reserve S31G

Chemical Parameter	Unit	Quaternary S31G			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	58	7.80	5.0 – 9.5	8.58
Electrical Conductivity	mS/m	58	88.90	<150	97.79
Calcium as Ca	mg/l	58	62.30	<150	68.53
Magnesium as Mg	mg/l	58	35.65	<100	39.22
Sodium as Na	mg/l	58	66.15	<200	72.77
Potassium as K	mg/l	58	2.17	<50	2.39
Total Alkalinity as $CaCO_3$	mg/l	58	283.00	<330	311.30
Chloride as Cl	mg/l	58	79.75	<200	87.73
Sulphate as SO_4	mg/l	58	17.40	<400	19.14
Nitrate and Nitrite as N	mg/l	58	2.33	<1.0	2.56
Fluoride as F	mg/l	58	0.57	<1.0	0.63
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 85: Groundwater Quality Reserve S32B

Chemical Parameter	Unit	Quaternary S32B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.75	5.0 – 9.5	8.53
Electrical Conductivity	mS/m	1	88.70	<150	97.57
Calcium as Ca	mg/l	1	81.58	<150	89.74
Magnesium as Mg	mg/l	1	31.77	<100	34.95
Sodium as Na	mg/l	1	67.10	<200	73.81
Potassium as K	mg/l	1	1.83	<50	2.01
Total Alkalinity as $CaCO_3$	mg/l	1	356.07	<330	391.68
Chloride as Cl	mg/l	1	54.37	<200	59.81
Sulphate as SO_4	mg/l	1	26.37	<400	29.01
Nitrate and Nitrite as N	mg/l	1	5.78	<1.0	6.36
Fluoride as F	mg/l	1	0.60	<1.0	0.66
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 86: Groundwater Quality Reserve S32C

Chemical Parameter	Unit	Quaternary S32C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.13	5.0 – 9.5	8.94
Electrical Conductivity	mS/m	1	52.80	<150	58.08
Calcium as Ca	mg/l	1	45.30	<150	49.83
Magnesium as Mg	mg/l	1	27.90	<100	30.69
Sodium as Na	mg/l	1	19.00	<200	20.90
Potassium as K	mg/l	1	2.34	<50	2.57
Total Alkalinity as $CaCO_3$	mg/l	1	226.00	<330	248.60
Chloride as Cl	mg/l	1	11.30	<200	12.43
Sulphate as SO_4	mg/l	1	14.70	<400	16.17
Nitrate and Nitrite as N	mg/l	1	3.01	<1.0	3.31
Fluoride as F	mg/l	1	0.31	<1.0	0.34
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 87: Groundwater Quality Reserve S32F

Chemical Parameter	Unit	Quaternary S32F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	8.47	5.0 – 9.5	9.32
Electrical Conductivity	mS/m	2	57.30	<150	63.03
Calcium as Ca	mg/l	2	50.70	<150	55.77
Magnesium as Mg	mg/l	2	15.75	<100	17.33
Sodium as Na	mg/l	2	62.95	<200	69.25
Potassium as K	mg/l	2	3.02	<50	3.32
Total Alkalinity as $CaCO_3$	mg/l	2	203.80	<330	224.18
Chloride as Cl	mg/l	2	61.75	<200	67.93
Sulphate as SO_4	mg/l	2	10.85	<400	11.94
Nitrate and Nitrite as N	mg/l	2	6.64	<1.0	7.30
Fluoride as F	mg/l	2	0.67	<1.0	0.74
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 88: Groundwater Quality Reserve S32H

Chemical Parameter	Unit	Quaternary S32H			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	32	7.96	5.0 – 9.5	8.76
Electrical Conductivity	mS/m	32	88.70	<150	97.57
Calcium as Ca	mg/l	32	63.51	<150	69.86
Magnesium as Mg	mg/l	32	32.80	<100	36.08
Sodium as Na	mg/l	32	73.15	<200	80.47
Potassium as K	mg/l	32	3.77	<50	4.15
Total Alkalinity as $CaCO_3$	mg/l	32	312.77	<330	344.05
Chloride as Cl	mg/l	32	67.53	<200	74.28
Sulphate as SO_4	mg/l	32	20.17	<400	22.19
Nitrate and Nitrite as N	mg/l	32	2.72	<1.0	2.99
Fluoride as F	mg/l	32	0.76	<1.0	0.84
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 89: Groundwater Quality Reserve S32J

Chemical Parameter	Unit	Quaternary S32J			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	11	7.96	5.0 – 9.5	8.76
Electrical Conductivity	mS/m	11	99.70	<150	109.67
Calcium as Ca	mg/l	11	55.20	<150	60.72
Magnesium as Mg	mg/l	11	41.90	<100	46.09
Sodium as Na	mg/l	11	77.90	<200	85.69
Potassium as K	mg/l	11	1.67	<50	1.84
Total Alkalinity as $CaCO_3$	mg/l	11	283.40	<330	311.74
Chloride as Cl	mg/l	11	120.70	<200	132.77
Sulphate as SO_4	mg/l	11	13.10	<400	14.41
Nitrate and Nitrite as N	mg/l	11	3.59	<1.0	3.95
Fluoride as F	mg/l	11	0.68	<1.0	0.75
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 90: Groundwater Quality Reserve S32K

Chemical Parameter	Unit	Quaternary S32K			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	13	8.05	5.0 – 9.5	8.86
Electrical Conductivity	mS/m	13	82.30	<150	90.53
Calcium as Ca	mg/l	13	62.80	<150	69.08
Magnesium as Mg	mg/l	13	45.00	<100	49.50
Sodium as Na	mg/l	13	64.10	<200	70.51
Potassium as K	mg/l	13	2.46	<50	2.71
Total Alkalinity as $CaCO_3$	mg/l	13	324.10	<330	356.51
Chloride as Cl	mg/l	13	59.00	<200	64.90
Sulphate as SO_4	mg/l	13	20.20	<400	22.22
Nitrate and Nitrite as N	mg/l	13	3.28	<1.0	3.61
Fluoride as F	mg/l	13	0.51	<1.0	0.56
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 91: Groundwater Quality Reserve S32L

Chemical Parameter	Unit	Quaternary S32L			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.70	5.0 – 9.5	8.47
Electrical Conductivity	mS/m	1	49.70	<150	54.67
Calcium as Ca	mg/l	1	40.80	<150	44.88
Magnesium as Mg	mg/l	1	23.10	<100	25.41
Sodium as Na	mg/l	1	39.50	<200	43.45
Potassium as K	mg/l	1	0.42	<50	0.46
Total Alkalinity as $CaCO_3$	mg/l	1	238.90	<330	262.79
Chloride as Cl	mg/l	1	12.40	<200	13.64
Sulphate as SO_4	mg/l	1	6.90	<400	7.59
Nitrate and Nitrite as N	mg/l	1	1.25	<1.0	1.38
Fluoride as F	mg/l	1	0.56	<1.0	0.62
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 92: Groundwater Quality Reserve S32M

Chemical Parameter	Unit	Quaternary S32M			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	7	7.86	5.0 – 9.5	8.65
Electrical Conductivity	mS/m	7	63.70	<150	70.07
Calcium as Ca	mg/l	7	32.00	<150	35.20
Magnesium as Mg	mg/l	7	19.30	<100	21.23
Sodium as Na	mg/l	7	72.50	<200	79.75
Potassium as K	mg/l	7	15.66	<50	17.23
Total Alkalinity as $CaCO_3$	mg/l	7	217.60	<330	239.36
Chloride as Cl	mg/l	7	67.40	<200	74.14
Sulphate as SO_4	mg/l	7	16.50	<400	18.15
Nitrate and Nitrite as N	mg/l	7	0.75	<1.0	0.83
Fluoride as F	mg/l	7	0.40	<1.0	0.44
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 93: Groundwater Quality Reserve S40A

Chemical Parameter	Unit	Quaternary S40A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	7.85	5.0 – 9.5	8.64
Electrical Conductivity	mS/m	2	90.25	<150	99.28
Calcium as Ca	mg/l	2	42.60	<150	46.86
Magnesium as Mg	mg/l	2	13.75	<100	15.13
Sodium as Na	mg/l	2	122.60	<200	134.86
Potassium as K	mg/l	2	2.46	<50	2.71
Total Alkalinity as $CaCO_3$	mg/l	2	155.30	<330	170.83
Chloride as Cl	mg/l	2	177.50	<200	195.25
Sulphate as SO_4	mg/l	2	14.95	<400	16.45
Nitrate and Nitrite as N	mg/l	2	1.51	<1.0	1.66
Fluoride as F	mg/l	2	0.39	<1.0	0.43
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 94: Groundwater Quality Reserve S40B

Chemical Parameter	Unit	Quaternary S40B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	4	7.60	5.0 – 9.5	8.36
Electrical Conductivity	mS/m	4	87.40	<150	96.14
Calcium as Ca	mg/l	4	47.35	<150	52.09
Magnesium as Mg	mg/l	4	12.75	<100	14.03
Sodium as Na	mg/l	4	93.85	<200	103.24
Potassium as K	mg/l	4	6.69	<50	7.36
Total Alkalinity as $CaCO_3$	mg/l	4	218.05	<330	239.86
Chloride as Cl	mg/l	4	137.45	<200	151.20
Sulphate as SO_4	mg/l	4	25.65	<400	28.22
Nitrate and Nitrite as N	mg/l	4	0.29	<1.0	0.32
Fluoride as F	mg/l	4	0.75	<1.0	0.83
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 95: Groundwater Quality Reserve S40C

Chemical Parameter	Unit	Quaternary S40C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	8	8.00	5.0 – 9.5	8.80
Electrical Conductivity	mS/m	8	61.05	<150	67.16
Calcium as Ca	mg/l	8	36.40	<150	40.04
Magnesium as Mg	mg/l	8	15.65	<100	17.22
Sodium as Na	mg/l	8	84.95	<200	93.45
Potassium as K	mg/l	8	3.64	<50	4.00
Total Alkalinity as $CaCO_3$	mg/l	8	209.50	<330	230.45
Chloride as Cl	mg/l	8	57.75	<200	63.53
Sulphate as SO_4	mg/l	8	9.95	<400	10.95
Nitrate and Nitrite as N	mg/l	8	0.08	<1.0	0.09
Fluoride as F	mg/l	8	0.45	<1.0	0.50
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 96: Groundwater Quality Reserve S40E

Chemical Parameter	Unit	Quaternary S40E			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.07	5.0 – 9.5	8.88
Electrical Conductivity	mS/m	1	103.10	<150	113.41
Calcium as Ca	mg/l	1	72.30	<150	79.53
Magnesium as Mg	mg/l	1	33.80	<100	37.18
Sodium as Na	mg/l	1	100.70	<200	110.77
Potassium as K	mg/l	1	1.21	<50	1.33
Total Alkalinity as $CaCO_3$	mg/l	1	370.40	<330	407.44
Chloride as Cl	mg/l	1	91.80	<200	100.98
Sulphate as SO_4	mg/l	1	28.40	<400	31.24
Nitrate and Nitrite as N	mg/l	1	4.21	<1.0	4.63
Fluoride as F	mg/l	1	0.48	<1.0	0.53
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 97: Groundwater Quality Reserve S50C

Chemical Parameter	Unit	Quaternary S50C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	3	7.79	5.0 – 9.5	8.57
Electrical Conductivity	mS/m	3	55.60	<150	61.16
Calcium as Ca	mg/l	3	23.20	<150	25.52
Magnesium as Mg	mg/l	3	7.00	<100	7.70
Sodium as Na	mg/l	3	92.00	<200	101.20
Potassium as K	mg/l	3	0.67	<50	0.74
Total Alkalinity as $CaCO_3$	mg/l	3	250.20	<330	275.22
Chloride as Cl	mg/l	3	17.30	<200	19.03
Sulphate as SO_4	mg/l	3	5.40	<400	5.94
Nitrate and Nitrite as N	mg/l	3	0.21	<1.0	0.23
Fluoride as F	mg/l	3	0.83	<1.0	0.91
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 98: Groundwater Quality Reserve S50F

Chemical Parameter	Unit	Quaternary S50F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.23	5.0 – 9.5	7.95
Electrical Conductivity	mS/m	1	30.70	<150	33.77
Calcium as Ca	mg/l	1	23.10	<150	25.41
Magnesium as Mg	mg/l	1	12.30	<100	13.53
Sodium as Na	mg/l	1	15.70	<200	17.27
Potassium as K	mg/l	1	1.04	<50	1.14
Total Alkalinity as $CaCO_3$	mg/l	1	67.80	<330	74.58
Chloride as Cl	mg/l	1	26.90	<200	29.59
Sulphate as SO_4	mg/l	1	2.00	<400	2.20
Nitrate and Nitrite as N	mg/l	1	7.64	<1.0	8.40
Fluoride as F	mg/l	1	0.17	<1.0	0.19
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 99: Groundwater Quality Reserve S50G

Chemical Parameter	Unit	Quaternary S50G			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	7.90	5.0 – 9.5	8.69
Electrical Conductivity	mS/m	2	89.65	<150	98.62
Calcium as Ca	mg/l	2	57.40	<150	63.14
Magnesium as Mg	mg/l	2	27.65	<100	30.42
Sodium as Na	mg/l	2	85.65	<200	94.22
Potassium as K	mg/l	2	1.51	<50	1.66
Total Alkalinity as $CaCO_3$	mg/l	2	227.45	<330	250.20
Chloride as Cl	mg/l	2	136.15	<200	149.77
Sulphate as SO_4	mg/l	2	10.80	<400	11.88
Nitrate and Nitrite as N	mg/l	2	2.90	<1.0	3.19
Fluoride as F	mg/l	2	0.42	<1.0	0.46
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 100: Groundwater Quality Reserve S60A

CA1:F17hemical Parameter	Unit	Quaternary S60A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	4	7.48	5.0 – 9.5	8.23
Electrical Conductivity	mS/m	4	32.47	<150	35.72
Calcium as Ca	mg/l	4	15.41	<150	16.95
Magnesium as Mg	mg/l	4	4.78	<100	5.26
Sodium as Na	mg/l	4	44.66	<200	49.13
Potassium as K	mg/l	4	3.82	<50	4.20
Total Alkalinity as $CaCO_3$	mg/l	4	45.26	<330	49.79
Chloride as Cl	mg/l	4	59.18	<200	65.10
Sulphate as SO_4	mg/l	4	6.35	<400	6.99
Nitrate and Nitrite as N	mg/l	4	0.11	<1.0	0.12
Fluoride as F	mg/l	4	0.50	<1.0	0.55
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 101: Groundwater Quality Reserve S60B

Chemical Parameter	Unit	Quaternary S60B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.20	5.0 – 9.5	9.02
Electrical Conductivity	mS/m	1	121.40	<150	133.54
Calcium as Ca	mg/l	1	37.20	<150	40.92
Magnesium as Mg	mg/l	1	26.10	<100	28.71
Sodium as Na	mg/l	1	173.40	<200	190.74
Potassium as K	mg/l	1	1.51	<50	1.66
Total Alkalinity as $CaCO_3$	mg/l	1	252.50	<330	277.75
Chloride as Cl	mg/l	1	228.40	<200	251.24
Sulphate as SO_4	mg/l	1	10.10	<400	11.11
Nitrate and Nitrite as N	mg/l	1	1.81	<1.0	1.99
Fluoride as F	mg/l	1	0.58	<1.0	0.64
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 102: Groundwater Quality Reserve S60C

Chemical Parameter	Unit	Quaternary S60C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	98	7.86	5.0 – 9.5	8.65
Electrical Conductivity	mS/m	98	120.60	<150	132.66
Calcium as Ca	mg/l	98	83.01	<150	91.31
Magnesium as Mg	mg/l	98	24.79	<100	27.27
Sodium as Na	mg/l	98	144.75	<200	159.23
Potassium as K	mg/l	98	1.12	<50	1.23
Total Alkalinity as $CaCO_3$	mg/l	98	308.11	<330	338.92
Chloride as Cl	mg/l	98	204.40	<200	224.84
Sulphate as SO_4	mg/l	98	23.10	<400	25.41
Nitrate and Nitrite as N	mg/l	98	0.31	<1.0	0.34
Fluoride as F	mg/l	98	0.43	<1.0	0.47
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 103: Groundwater Quality Reserve S60D

Chemical Parameter	Unit	Quaternary S60D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.10	5.0 – 9.5	8.91
Electrical Conductivity	mS/m	1	86.00	<150	94.60
Calcium as Ca	mg/l	1	38.80	<150	42.68
Magnesium as Mg	mg/l	1	19.50	<100	21.45
Sodium as Na	mg/l	1	103.40	<200	113.74
Potassium as K	mg/l	1	1.48	<50	1.63
Total Alkalinity as $CaCO_3$	mg/l	1	199.40	<330	219.34
Chloride as Cl	mg/l	1	125.90	<200	138.49
Sulphate as SO_4	mg/l	1	21.60	<400	23.76
Nitrate and Nitrite as N	mg/l	1	2.95	<1.0	3.25
Fluoride as F	mg/l	1	0.23	<1.0	0.25
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 104: Groundwater Quality Reserve S70A

Chemical Parameter	Unit	Quaternary S70A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	50	7.84	5.0 – 9.5	8.62
Electrical Conductivity	mS/m	50	70.00	<150	77.00
Calcium as Ca	mg/l	50	35.53	<150	39.08
Magnesium as Mg	mg/l	50	20.98	<100	23.08
Sodium as Na	mg/l	50	69.58	<200	76.54
Potassium as K	mg/l	50	1.28	<50	1.41
Total Alkalinity as $CaCO_3$	mg/l	50	155.00	<330	170.50
Chloride as Cl	mg/l	50	103.83	<200	114.21
Sulphate as SO_4	mg/l	50	10.35	<400	11.39
Nitrate and Nitrite as N	mg/l	50	4.45	<1.0	4.90
Fluoride as F	mg/l	50	0.21	<1.0	0.23
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 105: Groundwater Quality Reserve S70D

Chemical Parameter	Unit	Quaternary S70D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	8.00	5.0 – 9.5	8.80
Electrical Conductivity	mS/m	2	102.35	<150	112.59
Calcium as Ca	mg/l	2	88.60	<150	97.46
Magnesium as Mg	mg/l	2	45.50	<100	50.05
Sodium as Na	mg/l	2	142.60	<200	156.86
Potassium as K	mg/l	2	1.70	<50	1.87
Total Alkalinity as $CaCO_3$	mg/l	2	378.60	<330	416.46
Chloride as Cl	mg/l	2	218.20	<200	240.02
Sulphate as SO_4	mg/l	2	16.50	<400	18.15
Nitrate and Nitrite as N	mg/l	2	3.36	<1.0	3.70
Fluoride as F	mg/l	2	0.67	<1.0	0.74
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 106: Groundwater Quality Reserve S70E

Chemical Parameter	Unit	Quaternary S70E			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.04	5.0 – 9.5	8.84
Electrical Conductivity	mS/m	1	33.20	<150	36.52
Calcium as Ca	mg/l	1	17.10	<150	18.81
Magnesium as Mg	mg/l	1	10.00	<100	11.00
Sodium as Na	mg/l	1	28.20	<200	31.02
Potassium as K	mg/l	1	6.72	<50	7.39
Total Alkalinity as $CaCO_3$	mg/l	1	109.40	<330	120.34
Chloride as Cl	mg/l	1	24.80	<200	27.28
Sulphate as SO_4	mg/l	1	2.00	<400	2.20
Nitrate and Nitrite as N	mg/l	1	3.73	<1.0	4.10
Fluoride as F	mg/l	1	0.32	<1.0	0.35
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 107: Groundwater Quality Reserve S70F

Chemical Parameter	Unit	Quaternary S70F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.90	5.0 – 9.5	8.69
Electrical Conductivity	mS/m	1	68.50	<150	75.35
Calcium as Ca	mg/l	1	37.60	<150	41.36
Magnesium as Mg	mg/l	1	19.30	<100	21.23
Sodium as Na	mg/l	1	79.40	<200	87.34
Potassium as K	mg/l	1	5.21	<50	5.73
Total Alkalinity as $CaCO_3$	mg/l	1	192.60	<330	211.86
Chloride as Cl	mg/l	1	86.10	<200	94.71
Sulphate as SO_4	mg/l	1	12.00	<400	13.20
Nitrate and Nitrite as N	mg/l	1	1.68	<1.0	1.85
Fluoride as F	mg/l	1	0.05	<1.0	0.06
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 108: Groundwater Quality Reserve T11A

Chemical Parameter	Unit	Quaternary T11A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	46	8.49	5.0 – 9.5	9.34
Electrical Conductivity	mS/m	47	42.30	<150	46.53
Calcium as Ca	mg/l	40	7.70	<150	8.47
Magnesium as Mg	mg/l	40	1.24	<100	1.36
Sodium as Na	mg/l	38	82.97	<200	91.27
Potassium as K	mg/l	39	0.56	<50	0.62
Total Alkalinity as $CaCO_3$	mg/l	40	140.35	<330	154.39
Chloride as Cl	mg/l	40	36.16	<200	39.78
Sulphate as SO_4	mg/l	40	11.40	<400	12.54
Nitrate and Nitrite as N	mg/l	39	0.04	<1.0	0.04
Fluoride as F	mg/l	37	3.58	<1.0	3.94
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 109: Groundwater Quality Reserve T11C

Chemical Parameter	Unit	Quaternary T11C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	8.00	5.0 – 9.5	8.80
Electrical Conductivity	mS/m	2	53.20	<150	58.52
Calcium as Ca	mg/l	2	37.29	<150	41.02
Magnesium as Mg	mg/l	2	16.03	<100	17.63
Sodium as Na	mg/l	2	46.31	<200	50.94
Potassium as K	mg/l	2	1.32	<50	1.45
Total Alkalinity as $CaCO_3$	mg/l	2	176.57	<330	194.23
Chloride as Cl	mg/l	2	48.40	<200	53.24
Sulphate as SO_4	mg/l	2	5.95	<400	6.55
Nitrate and Nitrite as N	mg/l	2	3.82	<1.0	4.20
Fluoride as F	mg/l	2	0.36	<1.0	0.40
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 110: Groundwater Quality Reserve T11D

Chemical Parameter	Unit	Quaternary T11D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	3	8.21	5.0 – 9.5	9.03
Electrical Conductivity	mS/m	3	34.80	<150	38.28
Calcium as Ca	mg/l	3	32.50	<150	35.75
Magnesium as Mg	mg/l	3	9.60	<100	10.56
Sodium as Na	mg/l	3	29.00	<200	31.90
Potassium as K	mg/l	3	1.11	<50	1.22
Total Alkalinity as $CaCO_3$	mg/l	3	139.80	<330	153.78
Chloride as Cl	mg/l	3	4.70	<200	5.17
Sulphate as SO_4	mg/l	3	9.20	<400	10.12
Nitrate and Nitrite as N	mg/l	3	1.50	<1.0	1.65
Fluoride as F	mg/l	3	0.61	<1.0	0.67
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 111: Groundwater Quality Reserve T11E

Chemical Parameter	Unit	Quaternary T11E			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.35	5.0 – 9.5	8.09
Electrical Conductivity	mS/m	1	25.00	<150	27.50
Calcium as Ca	mg/l	1	22.30	<150	24.53
Magnesium as Mg	mg/l	1	2.80	<100	3.08
Sodium as Na	mg/l	1	31.70	<200	34.87
Potassium as K	mg/l	1	0.41	<50	0.45
Total Alkalinity as $CaCO_3$	mg/l	1	118.60	<330	130.46
Chloride as Cl	mg/l	1	3.70	<200	4.07
Sulphate as SO_4	mg/l	1	5.70	<400	6.27
Nitrate and Nitrite as N	mg/l	1	0.02	<1.0	0.02
Fluoride as F	mg/l	1	0.78	<1.0	0.86
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 112: Groundwater Quality Reserve T11F

Chemical Parameter	Unit	Quaternary T11F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.25	5.0 – 9.5	9.08
Electrical Conductivity	mS/m	1	57.10	<150	62.81
Calcium as Ca	mg/l	1	3.30	<150	3.63
Magnesium as Mg	mg/l	1	1.30	<100	1.43
Sodium as Na	mg/l	1	128.80	<200	141.68
Potassium as K	mg/l	1	0.32	<50	0.35
Total Alkalinity as $CaCO_3$	mg/l	1	181.80	<330	199.98
Chloride as Cl	mg/l	1	71.40	<200	78.54
Sulphate as SO_4	mg/l	1	2.00	<400	2.20
Nitrate and Nitrite as N	mg/l	1	0.02	<1.0	0.02
Fluoride as F	mg/l	1	2.87	<1.0	3.16
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 113: Groundwater Quality Reserve T11H

Chemical Parameter	Unit	Quaternary T11H			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.08	5.0 – 9.5	8.89
Electrical Conductivity	mS/m	1	58.30	<150	64.13
Calcium as Ca	mg/l	1	37.60	<150	41.36
Magnesium as Mg	mg/l	1	18.30	<100	20.13
Sodium as Na	mg/l	1	52.00	<200	57.20
Potassium as K	mg/l	1	0.54	<50	0.59
Total Alkalinity as $CaCO_3$	mg/l	1	148.20	<330	163.02
Chloride as Cl	mg/l	1	75.60	<200	83.16
Sulphate as SO_4	mg/l	1	9.50	<400	10.45
Nitrate and Nitrite as N	mg/l	1	6.60	<1.0	7.26
Fluoride as F	mg/l	1	0.20	<1.0	0.22
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 114: Groundwater Quality Reserve T12B

Chemical Parameter	Unit	Quaternary T12B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.62	5.0 – 9.5	8.38
Electrical Conductivity	mS/m	1	20.70	<150	22.77
Calcium as Ca	mg/l	1	16.40	<150	18.04
Magnesium as Mg	mg/l	1	8.50	<100	9.35
Sodium as Na	mg/l	1	10.00	<200	11.00
Potassium as K	mg/l	1	0.55	<50	0.61
Total Alkalinity as $CaCO_3$	mg/l	1	78.20	<330	86.02
Chloride as Cl	mg/l	1	6.10	<200	6.71
Sulphate as SO_4	mg/l	1	8.80	<400	9.68
Nitrate and Nitrite as N	mg/l	1	2.99	<1.0	3.29
Fluoride as F	mg/l	1	0.18	<1.0	0.20
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 115: Groundwater Quality Reserve T12D

Chemical Parameter	Unit	Quaternary T12D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	33	8.36	5.0 – 9.5	9.20
Electrical Conductivity	mS/m	33	53.90	<150	59.29
Calcium as Ca	mg/l	33	45.09	<150	49.60
Magnesium as Mg	mg/l	34	24.95	<100	27.45
Sodium as Na	mg/l	32	37.24	<200	40.96
Potassium as K	mg/l	32	1.00	<50	1.10
Total Alkalinity as $CaCO_3$	mg/l	34	264.47	<330	290.92
Chloride as Cl	mg/l	34	18.17	<200	19.99
Sulphate as SO_4	mg/l	34	6.25	<400	6.88
Nitrate and Nitrite as N	mg/l	33	0.30	<1.0	0.33
Fluoride as F	mg/l	32	0.34	<1.0	0.37
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 116: Groundwater Quality Reserve T12F

Chemical Parameter	Unit	Quaternary T12F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.99	5.0 – 9.5	8.79
Electrical Conductivity	mS/m	1	149.00	<150	163.90
Calcium as Ca	mg/l	1	67.70	<150	74.47
Magnesium as Mg	mg/l	1	32.90	<100	36.19
Sodium as Na	mg/l	1	182.60	<200	200.86
Potassium as K	mg/l	1	1.23	<50	1.35
Total Alkalinity as $CaCO_3$	mg/l	1	225.10	<330	247.61
Chloride as Cl	mg/l	1	337.10	<200	370.81
Sulphate as SO_4	mg/l	1	4.10	<400	4.51
Nitrate and Nitrite as N	mg/l	1	1.69	<1.0	1.86
Fluoride as F	mg/l	1	0.66	<1.0	0.73
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 117: Groundwater Quality Reserve T13C

Chemical Parameter	Unit	Quaternary T13C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.08	5.0 – 9.5	8.89
Electrical Conductivity	mS/m	1	105.30	<150	115.83
Calcium as Ca	mg/l	1	47.00	<150	51.70
Magnesium as Mg	mg/l	1	28.30	<100	31.13
Sodium as Na	mg/l	1	138.00	<200	151.80
Potassium as K	mg/l	1	1.46	<50	1.61
Total Alkalinity as $CaCO_3$	mg/l	1	283.10	<330	311.41
Chloride as Cl	mg/l	1	153.90	<200	169.29
Sulphate as SO_4	mg/l	1	12.40	<400	13.64
Nitrate and Nitrite as N	mg/l	1	7.77	<1.0	8.55
Fluoride as F	mg/l	1	0.43	<1.0	0.47
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 118: Groundwater Quality Reserve T13D

Chemical Parameter	Unit	Quaternary T13D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.30	5.0 – 9.5	8.03
Electrical Conductivity	mS/m	1	43.00	<150	47.30
Calcium as Ca	mg/l			<150	150.00
Magnesium as Mg	mg/l			<100	100.00
Sodium as Na	mg/l			<200	200.00
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l			<330	330.00
Chloride as Cl	mg/l			<200	200.00
Sulphate as SO_4	mg/l	1	41.80	<400	45.98
Nitrate and Nitrite as N	mg/l	1	2.07	<1.0	2.28
Fluoride as F	mg/l	1	0.46	<1.0	0.51
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 119: Groundwater Quality Reserve T20B

Chemical Parameter	Unit	Quaternary T20B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.20	5.0 – 9.5	7.92
Electrical Conductivity	mS/m	1	68.40	<150	75.24
Calcium as Ca	mg/l	1	52.30	<150	57.53
Magnesium as Mg	mg/l	1	29.60	<100	32.56
Sodium as Na	mg/l	1	29.40	<200	32.34
Potassium as K	mg/l	1	1.06	<50	1.17
Total Alkalinity as $CaCO_3$	mg/l	1	107.10	<330	117.81
Chloride as Cl	mg/l	1	77.70	<200	85.47
Sulphate as SO_4	mg/l	1	9.60	<400	10.56
Nitrate and Nitrite as N	mg/l	1	20.87	<1.0	22.96
Fluoride as F	mg/l	1	0.16	<1.0	0.18
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 120: Groundwater Quality Reserve T20C

Chemical Parameter	Unit	Quaternary T20C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	6	7.70	5.0 – 9.5	8.47
Electrical Conductivity	mS/m	6	120.00	<150	132.00
Calcium as Ca	mg/l	6	74.85	<150	82.34
Magnesium as Mg	mg/l	6	34.55	<100	38.01
Sodium as Na	mg/l	5	145.30	<200	159.83
Potassium as K	mg/l	5	2.52	<50	2.77
Total Alkalinity as $CaCO_3$	mg/l	6	343.15	<330	377.47
Chloride as Cl	mg/l	6	167.90	<200	184.69
Sulphate as SO_4	mg/l	5	16.60	<400	18.26
Nitrate and Nitrite as N	mg/l	6	1.06	<1.0	1.17
Fluoride as F	mg/l	6	0.28	<1.0	0.31
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 121: Groundwater Quality Reserve T60A

Chemical Parameter	Unit	Quaternary T60A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	4	7.43	5.0 – 9.5	8.17
Electrical Conductivity	mS/m	4	20.00	<150	22.00
Calcium as Ca	mg/l	4	4.70	<150	5.17
Magnesium as Mg	mg/l	4	5.70	<100	6.27
Sodium as Na	mg/l	4	15.20	<200	16.72
Potassium as K	mg/l	4	1.93	<50	2.12
Total Alkalinity as $CaCO_3$	mg/l	4	50.05	<330	55.06
Chloride as Cl	mg/l	4	20.50	<200	22.55
Sulphate as SO_4	mg/l	4	2.00	<400	2.20
Nitrate and Nitrite as N	mg/l	4	1.73	<1.0	1.90
Fluoride as F	mg/l	4	0.20	<1.0	0.22
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 122: Groundwater Quality Reserve T60B

Chemical Parameter	Unit	Quaternary T60B			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	23	7.58	5.0 – 9.5	8.34
Electrical Conductivity	mS/m	23	14.90	<150	16.39
Calcium as Ca	mg/l	23	5.49	<150	6.04
Magnesium as Mg	mg/l	23	5.09	<100	5.60
Sodium as Na	mg/l	23	11.65	<200	12.82
Potassium as K	mg/l	23	0.91	<50	1.00
Total Alkalinity as $CaCO_3$	mg/l	23	42.78	<330	47.06
Chloride as Cl	mg/l	23	9.85	<200	10.84
Sulphate as SO_4	mg/l	23	2.00	<400	2.20
Nitrate and Nitrite as N	mg/l	23	2.49	<1.0	2.74
Fluoride as F	mg/l	23	0.13	<1.0	0.14
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 123: Groundwater Quality Reserve T60H

Chemical Parameter	Unit	Quaternary T60H			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.73	5.0 – 9.5	8.50
Electrical Conductivity	mS/m	1	17.80	<150	19.58
Calcium as Ca	mg/l	1	4.80	<150	5.28
Magnesium as Mg	mg/l	1	5.00	<100	5.50
Sodium as Na	mg/l	1	16.30	<200	17.93
Potassium as K	mg/l	1	3.37	<50	3.71
Total Alkalinity as $CaCO_3$	mg/l	1	31.60	<330	34.76
Chloride as Cl	mg/l	1	21.90	<200	24.09
Sulphate as SO_4	mg/l	1	2.00	<400	2.20
Nitrate and Nitrite as N	mg/l	1	2.55	<1.0	2.81
Fluoride as F	mg/l	1	0.26	<1.0	0.29
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 124: Groundwater Quality Reserve T60J

Chemical Parameter	Unit	Quaternary T60J			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.37	5.0 – 9.5	9.21
Electrical Conductivity	mS/m	1	31.30	<150	34.43
Calcium as Ca	mg/l	1	15.30	<150	16.83
Magnesium as Mg	mg/l	1	8.50	<100	9.35
Sodium as Na	mg/l	1	34.80	<200	38.28
Potassium as K	mg/l	1	1.07	<50	1.18
Total Alkalinity as $CaCO_3$	mg/l	1	90.60	<330	99.66
Chloride as Cl	mg/l	1	33.70	<200	37.07
Sulphate as SO_4	mg/l	1	5.70	<400	6.27
Nitrate and Nitrite as N	mg/l	1	0.02	<1.0	0.02
Fluoride as F	mg/l	1	0.49	<1.0	0.54
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 125: Groundwater Quality Reserve T60K

Chemical Parameter	Unit	Quaternary T60K			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.29	5.0 – 9.5	9.12
Electrical Conductivity	mS/m	1	27.60	<150	30.36
Calcium as Ca	mg/l	1	5.10	<150	5.61
Magnesium as Mg	mg/l	1	5.50	<100	6.05
Sodium as Na	mg/l	1	45.50	<200	50.05
Potassium as K	mg/l	1	0.48	<50	0.53
Total Alkalinity as $CaCO_3$	mg/l	1	78.70	<330	86.57
Chloride as Cl	mg/l	1	31.20	<200	34.32
Sulphate as SO_4	mg/l	1	23.20	<400	25.52
Nitrate and Nitrite as N	mg/l	1	0.14	<1.0	0.15
Fluoride as F	mg/l	1	0.53	<1.0	0.58
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 126: Groundwater Quality Reserve T70D

Chemical Parameter	Unit	Quaternary T70D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	7.95	5.0 – 9.5	8.75
Electrical Conductivity	mS/m	1	303.00	<150	333.30
Calcium as Ca	mg/l	1	87.50	<150	96.25
Magnesium as Mg	mg/l	1	103.70	<100	114.07
Sodium as Na	mg/l	1	452.70	<200	497.97
Potassium as K	mg/l	1	3.10	<50	3.41
Total Alkalinity as $CaCO_3$	mg/l	1	378.10	<330	415.91
Chloride as Cl	mg/l	1	797.80	<200	877.58
Sulphate as SO_4	mg/l	1	96.50	<400	106.15
Nitrate and Nitrite as N	mg/l	1	0.38	<1.0	0.42
Fluoride as F	mg/l	1	0.56	<1.0	0.62
				Water quality class	Class 3

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 127: Groundwater Quality Reserve T80D

Chemical Parameter	Unit	Quaternary T80D			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	1	8.10	5.0 – 9.5	8.91
Electrical Conductivity	mS/m	1	34.00	<150	37.40
Calcium as Ca	mg/l			<150	150.00
Magnesium as Mg	mg/l			<100	100.00
Sodium as Na	mg/l			<200	200.00
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l			<330	330.00
Chloride as Cl	mg/l			<200	200.00
Sulphate as SO_4	mg/l	1	46.20	<400	50.82
Nitrate and Nitrite as N	mg/l	1	0.55	<1.0	0.61
Fluoride as F	mg/l	1	0.15	<1.0	0.17
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 128: Groundwater Quality Reserve T90A

Chemical Parameter	Unit	Quaternary T90A			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	13	7.70	5.0 – 9.5	8.47
Electrical Conductivity	mS/m	13	112.00	<150	123.20
Calcium as Ca	mg/l	13	87.80	<150	96.58
Magnesium as Mg	mg/l	13	41.80	<100	45.98
Sodium as Na	mg/l	13	238.80	<200	262.68
Potassium as K	mg/l	13	4.94	<50	5.43
Total Alkalinity as $CaCO_3$	mg/l	13	298.80	<330	328.68
Chloride as Cl	mg/l	13	339.80	<200	373.78
Sulphate as SO_4	mg/l	13	14.85	<400	16.34
Nitrate and Nitrite as N	mg/l	13	1.11	<1.0	1.22
Fluoride as F	mg/l	13	0.44	<1.0	0.48
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 129: Groundwater Quality Reserve T90C

Chemical Parameter	Unit	Quaternary T90C			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	7.85	5.0 – 9.5	8.64
Electrical Conductivity	mS/m	2	318.50	<150	350.35
Calcium as Ca	mg/l	2		<150	150.00
Magnesium as Mg	mg/l	2		<100	100.00
Sodium as Na	mg/l	2		<200	200.00
Potassium as K	mg/l	2		<50	50.00
Total Alkalinity as $CaCO_3$	mg/l	2		<330	330.00
Chloride as Cl	mg/l	2		<200	200.00
Sulphate as SO_4	mg/l	2	18.30	<400	20.13
Nitrate and Nitrite as N	mg/l	2	0.40	<1.0	0.44
Fluoride as F	mg/l	2	0.27	<1.0	0.30
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 130: Groundwater Quality Reserve T90E

Chemical Parameter	Unit	Quaternary T90E			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	2	7.29	5.0 – 9.5	8.02
Electrical Conductivity	mS/m	2	19.90	<150	21.89
Calcium as Ca	mg/l	2	7.05	<150	7.76
Magnesium as Mg	mg/l	2	4.75	<100	5.23
Sodium as Na	mg/l	2	21.55	<200	23.71
Potassium as K	mg/l	2	1.07	<50	1.18
Total Alkalinity as $CaCO_3$	mg/l	2	20.25	<330	22.28
Chloride as Cl	mg/l	2	27.65	<200	30.42
Sulphate as SO_4	mg/l	2	9.90	<400	10.89
Nitrate and Nitrite as N	mg/l	2	3.85	<1.0	4.24
Fluoride as F	mg/l	2	0.22	<1.0	0.24
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 131: Groundwater Quality Reserve T90F

Chemical Parameter	Unit	Quaternary T90F			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	23	7.50	5.0 – 9.5	8.25
Electrical Conductivity	mS/m	23	29.00	<150	31.90
Calcium as Ca	mg/l			<150	150.00
Magnesium as Mg	mg/l			<100	100.00
Sodium as Na	mg/l			<200	200.00
Potassium as K	mg/l			<50	50.00
Total Alkalinity as $CaCO_3$	mg/l			<330	330.00
Chloride as Cl	mg/l			<200	200.00
Sulphate as SO_4	mg/l	23	7.14	<400	7.85
Nitrate and Nitrite as N	mg/l	23	0.37	<1.0	0.41
Fluoride as F	mg/l	23	0.07	<1.0	0.08
				Water quality class	Class 0

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 132: Groundwater Quality Reserve T90G

Chemical Parameter	Unit	Quaternary T90G			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	23	8.17	5.0 – 9.5	8.99
Electrical Conductivity	mS/m	23	61.30	<150	67.43
Calcium as Ca	mg/l	23	37.48	<150	41.23
Magnesium as Mg	mg/l	23	25.24	<100	27.76
Sodium as Na	mg/l	23	45.05	<200	49.56
Potassium as K	mg/l	23	0.62	<50	0.68
Total Alkalinity as $CaCO_3$	mg/l	23	115.60	<330	127.16
Chloride as Cl	mg/l	23	71.54	<200	78.69
Sulphate as SO_4	mg/l	23	8.85	<400	9.74
Nitrate and Nitrite as N	mg/l	23	15.10	<1.0	16.61
Fluoride as F	mg/l	23	0.18	<1.0	0.20
				Water quality class	Class 3

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

APPENDIX E – GROUNDWATER QUALITY RESERVE (IUAs)

Table 133: Groundwater Quality Reserve IUA K1

Chemical Parameter	Unit	IUA K1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	51	6.7	5.0 – 9.5	7.37
Electrical Conductivity	mS/m	51	41.7	<150	45.87
Calcium as Ca	mg/l	51	3.64	<150	4.00
Magnesium as Mg	mg/l	51	6.74	<100	7.41
Sodium as Na	mg/l	51	62.04	<200	68.24
Potassium as K	mg/l	51	0.48	<50	0.53
Total Alkalinity as $CaCO_3$	mg/l	51	10.9	<330	11.99
Chloride as Cl	mg/l	51	106.11	<200	116.72
Sulphate as SO_4	mg/l	51	14.28	<400	15.71
Nitrate and Nitrite as N	mg/l	51	1.18	<1.0	1.30
Fluoride as F	mg/l	51	0.11	<1.0	0.12
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 134: Groundwater Quality Reserve IUA KL1

Chemical Parameter	Unit	IUA KL1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	124	7.29	5.0 – 9.5	8.02
Electrical Conductivity	mS/m	124	84.40	<150	85.13
Calcium as Ca	mg/l	124	22.00	<150	22.73
Magnesium as Mg	mg/l	124	9.55	<100	10.28
Sodium as Na	mg/l	124	43.05	<200	43.78
Potassium as K	mg/l	124	1.18	<50	1.90
Total Alkalinity as $CaCO_3$	mg/l	124	64.00	<330	64.73
Chloride as Cl	mg/l	124	131.10	<200	131.83
Sulphate as SO_4	mg/l	124	27.40	<400	28.13
Nitrate and Nitrite as N	mg/l	124	0.05	<1.0	0.78
Fluoride as F	mg/l	124	0.28	<1.0	1.01
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 135: Groundwater Quality Reserve IUA LN1

Chemical Parameter	Unit	IUA LN1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	446	8.14	5.0 – 9.5	8.95
Electrical Conductivity	mS/m	446	216.2	<150	237.82
Calcium as Ca	mg/l	446	82.91	<150	91.20
Magnesium as Mg	mg/l	446	82.48	<100	90.73
Sodium as Na	mg/l	446	220.83	<200	242.91
Potassium as K	mg/l	446	3.72	<50	4.09
Total Alkalinity as $CaCO_3$	mg/l	446	345.88	<330	380.47
Chloride as Cl	mg/l	446	325.88	<200	358.47
Sulphate as SO_4	mg/l	446	253.35	<400	278.69
Nitrate and Nitrite as N	mg/l	446	0.8	<1.0	0.88
Fluoride as F	mg/l	446	0.71	<1.0	0.78
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 136: Groundwater Quality Reserve IUA L1

Chemical Parameter	Unit	IUA L1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	73	6.41	5.0 – 9.5	7.05
Electrical Conductivity	mS/m	73	19.6	<150	21.56
Calcium as Ca	mg/l	73	3.64	<150	4.00
Magnesium as Mg	mg/l	73	2.91	<100	3.20
Sodium as Na	mg/l	73	24	<200	26.40
Potassium as K	mg/l	73	0.64	<50	0.70
Total Alkalinity as $CaCO_3$	mg/l	73	7.6	<330	8.36
Chloride as Cl	mg/l	73	45.97	<200	50.57
Sulphate as SO_4	mg/l	73	4.2	<400	4.62
Nitrate and Nitrite as N	mg/l	73	0.36	<1.0	0.40
Fluoride as F	mg/l	73	0.1	<1.0	0.11
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 137: Groundwater Quality Reserve IUA M1

Chemical Parameter	Unit	IUA M1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	212	6.81	5.0 – 9.5	7.49
Electrical Conductivity	mS/m	212	18.5	<150	20.35
Calcium as Ca	mg/l	212	8.9	<150	9.79
Magnesium as Mg	mg/l	212	3	<100	3.30
Sodium as Na	mg/l	212	19.43	<200	21.37
Potassium as K	mg/l	212	0.62	<50	0.68
Total Alkalinity as $CaCO_3$	mg/l	212	19.6	<330	21.56
Chloride as Cl	mg/l	212	37	<200	40.70
Sulphate as SO_4	mg/l	212	9.3	<400	10.23
Nitrate and Nitrite as N	mg/l	212	0.05	<1.0	0.06
Fluoride as F	mg/l	212	0.12	<1.0	0.13
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 138: Groundwater Quality Reserve IUA NQ1

Chemical Parameter	Unit	IUA NQ1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	99	7.98	5.0 – 9.5	8.778
Electrical Conductivity	mS/m	99	310	<150	341
Calcium as Ca	mg/l	99	122.38	<150	134.618
Magnesium as Mg	mg/l	99	116.9	<100	128.59
Sodium as Na	mg/l	99	315.5	<200	347.05
Potassium as K	mg/l	99	3.91	<50	4.301
Total Alkalinity as $CaCO_3$	mg/l	99	459.5	<330	505.45
Chloride as Cl	mg/l	99	622.94	<200	685.234
Sulphate as SO_4	mg/l	99	132.92	<400	146.212
Nitrate and Nitrite as N	mg/l	99	1.24	<1.0	1.364
Fluoride as F	mg/l	99	0.6	<1.0	0.66
				Water quality class	Class 2

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 139: Groundwater Quality Reserve IUA P1

Chemical Parameter	Unit	IUA P1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	56	8.1	5.0 – 9.5	8.91
Electrical Conductivity	mS/m	56	100.7	<150	110.77
Calcium as Ca	mg/l	56	69.09	<150	76.00
Magnesium as Mg	mg/l	56	13.08	<100	14.39
Sodium as Na	mg/l	56	116.3	<200	127.93
Potassium as K	mg/l	56	3.3	<50	3.63
Total Alkalinity as $CaCO_3$	mg/l	56	170.3	<330	187.33
Chloride as Cl	mg/l	56	189.46	<200	208.41
Sulphate as SO_4	mg/l	56	35.91	<400	39.50
Nitrate and Nitrite as N	mg/l	56	1.42	<1.0	1.56
Fluoride as F	mg/l	56	0.39	<1.0	0.43
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 140: Groundwater Quality Reserve IUA Q1

Chemical Parameter	Unit	IUA Q1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	9	7.96	5.0 – 9.5	8.76
Electrical Conductivity	mS/m	9	55.4	<150	60.94
Calcium as Ca	mg/l	9	38.64	<150	42.50
Magnesium as Mg	mg/l	9	12.8	<100	14.08
Sodium as Na	mg/l	9	8.68	<200	9.55
Potassium as K	mg/l	9	2.41	<50	2.65
Total Alkalinity as $CaCO_3$	mg/l	9	240.3	<330	264.33
Chloride as Cl	mg/l	9	13.9	<200	15.29
Sulphate as SO_4	mg/l	9	1.5	<400	1.65
Nitrate and Nitrite as N	mg/l	9	0.31	<1.0	0.34
Fluoride as F	mg/l	9	0.4	<1.0	0.44
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 141: Groundwater Quality Reserve IUA Q2

Chemical Parameter	Unit	IUA Q2			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	222	8.05	5.0 – 9.5	8.86
Electrical Conductivity	mS/m	222	122.6	<150	134.86
Calcium as Ca	mg/l	222	82.45	<150	90.70
Magnesium as Mg	mg/l	222	47.17	<100	51.89
Sodium as Na	mg/l	222	131.65	<200	144.82
Potassium as K	mg/l	222	3.66	<50	4.03
Total Alkalinity as $CaCO_3$	mg/l	222	329.8	<330	362.78
Chloride as Cl	mg/l	222	139.64	<200	153.60
Sulphate as SO_4	mg/l	222	106.42	<400	117.06
Nitrate and Nitrite as N	mg/l	222	3.09	<1.0	3.40
Fluoride as F	mg/l	222	0.67	<1.0	0.74
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 142: Groundwater Quality Reserve IUA Q3

Chemical Parameter	Unit	IUA Q3			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	53	8.06	5.0 – 9.5	8.87
Electrical Conductivity	mS/m	53	113.3	<150	124.63
Calcium as Ca	mg/l	53	65.09	<150	71.60
Magnesium as Mg	mg/l	53	33.3	<100	36.63
Sodium as Na	mg/l	53	134	<200	147.40
Potassium as K	mg/l	53	2.61	<50	2.87
Total Alkalinity as $CaCO_3$	mg/l	53	358.5	<330	394.35
Chloride as Cl	mg/l	53	132.53	<200	145.78
Sulphate as SO_4	mg/l	53	36.34	<400	39.97
Nitrate and Nitrite as N	mg/l	53	0.34	<1.0	0.37
Fluoride as F	mg/l	53	0.8	<1.0	0.88
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 143: Groundwater Quality Reserve IUA R1

Chemical Parameter	Unit	IUA R1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	208	6.8	5.0 – 9.5	7.48
Electrical Conductivity	mS/m	208	18.15	<150	19.97
Calcium as Ca	mg/l	208	8.9	<150	9.79
Magnesium as Mg	mg/l	208	3	<100	3.30
Sodium as Na	mg/l	208	19.35	<200	21.29
Potassium as K	mg/l	208	0.62	<50	0.68
Total Alkalinity as $CaCO_3$	mg/l	208	19.6	<330	21.56
Chloride as Cl	mg/l	208	37	<200	40.70
Sulphate as SO_4	mg/l	208	8.9	<400	9.79
Nitrate and Nitrite as N	mg/l	208	0.06	<1.0	0.07
Fluoride as F	mg/l	208	0.14	<1.0	0.15
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 144: Groundwater Quality Reserve IUA R2

Chemical Parameter	Unit	IUA R2			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	64	8.14	5.0 – 9.5	8.95
Electrical Conductivity	mS/m	64	111.3	<150	122.43
Calcium as Ca	mg/l	64	268.3	<150	295.13
Magnesium as Mg	mg/l	64	29.7	<100	32.67
Sodium as Na	mg/l	64	147.3	<200	162.03
Potassium as K	mg/l	64	2.42	<50	2.66
Total Alkalinity as $CaCO_3$	mg/l	64	268.3	<330	295.13
Chloride as Cl	mg/l	64	177.9	<200	195.69
Sulphate as SO_4	mg/l	64	28.9	<400	31.79
Nitrate and Nitrite as N	mg/l	64	0.95	<1.0	1.05
Fluoride as F	mg/l	64	0.51	<1.0	0.56
Water quality class					Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 145: Groundwater Quality Reserve IUA S2

Chemical Parameter	Unit	IUA S2			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	325	7.95	5.0 – 9.5	8.75
Electrical Conductivity	mS/m	325	81.3	<150	89.43
Calcium as Ca	mg/l	325	56	<150	61.60
Magnesium as Mg	mg/l	325	29.9	<100	32.89
Sodium as Na	mg/l	325	67.35	<200	74.09
Potassium as K	mg/l	325	2.35	<50	2.59
Total Alkalinity as $CaCO_3$	mg/l	325	303.2	<330	333.52
Chloride as Cl	mg/l	325	49.79	<200	54.77
Sulphate as SO_4	mg/l	325	21.37	<400	23.51
Nitrate and Nitrite as N	mg/l	325	1.43	<1.0	1.57
Fluoride as F	mg/l	325	0.62	<1.0	0.68
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 146: Groundwater Quality Reserve IUA S3

Chemical Parameter	Unit	IUA S3			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	103	7.86	5.0 – 9.5	8.65
Electrical Conductivity	mS/m	103	93.45	<150	102.80
Calcium as Ca	mg/l	103	41.51	<150	45.66
Magnesium as Mg	mg/l	103	22.72	<100	24.99
Sodium as Na	mg/l	103	96.1	<200	105.71
Potassium as K	mg/l	103	1.24	<50	1.36
Total Alkalinity as $CaCO_3$	mg/l	103	176.99	<330	194.69
Chloride as Cl	mg/l	103	147.9	<200	162.69
Sulphate as SO_4	mg/l	103	14.6	<400	16.06
Nitrate and Nitrite as N	mg/l	103	1.9	<1.0	2.09
Fluoride as F	mg/l	103	0.38	<1.0	0.42
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 147: Groundwater Quality Reserve IUA T1

Chemical Parameter	Unit	IUA T1			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	92	8.39	5.0 – 9.5	9.23
Electrical Conductivity	mS/m	92	50.4	<150	55.44
Calcium as Ca	mg/l	92	16.65	<150	18.32
Magnesium as Mg	mg/l	92	6	<100	6.60
Sodium as Na	mg/l	92	70.3	<200	77.33
Potassium as K	mg/l	92	0.71	<50	0.78
Total Alkalinity as $CaCO_3$	mg/l	92	168.39	<330	185.23
Chloride as Cl	mg/l	92	28.1	<200	30.91
Sulphate as SO_4	mg/l	92	8.6	<400	9.46
Nitrate and Nitrite as N	mg/l	92	0.07	<1.0	0.08
Fluoride as F	mg/l	92	0.8	<1.0	0.88
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 148: Groundwater Quality Reserve IUA T2

Chemical Parameter	Unit	IUA T2			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	3	7.69	5.0 – 9.5	8.46
Electrical Conductivity	mS/m	3	74.15	<150	81.57
Calcium as Ca	mg/l	3	47	<150	51.70
Magnesium as Mg	mg/l	3	28.3	<100	31.13
Sodium as Na	mg/l	3	138	<200	151.80
Potassium as K	mg/l	3	1.46	<50	1.61
Total Alkalinity as $CaCO_3$	mg/l	3	283.1	<330	311.41
Chloride as Cl	mg/l	3	153.9	<200	169.29
Sulphate as SO_4	mg/l	3	27.1	<400	29.81
Nitrate and Nitrite as N	mg/l	3	4.92	<1.0	5.41
Fluoride as F	mg/l	3	0.45	<1.0	0.50
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 149: Groundwater Quality Reserve IUA T3

Chemical Parameter	Unit	IUA T3			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	8	7.78	5.0 – 9.5	8.56
Electrical Conductivity	mS/m	8	124.9	<150	137.39
Calcium as Ca	mg/l	8	76.2	<150	83.82
Magnesium as Mg	mg/l	8	34.1	<100	37.51
Sodium as Na	mg/l	8	146.4	<200	161.04
Potassium as K	mg/l	8	2.57	<50	2.83
Total Alkalinity as $CaCO_3$	mg/l	8	339.1	<330	373.01
Chloride as Cl	mg/l	8	175.8	<200	193.38
Sulphate as SO_4	mg/l	8	18.35	<400	20.19
Nitrate and Nitrite as N	mg/l	8	1.03	<1.0	1.13
Fluoride as F	mg/l	8	0.29	<1.0	0.32
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

Table 150: Groundwater Quality Reserve IUA T4

Chemical Parameter	Unit	IUA T4			
		No. of Samples	Ambient GW quality or median[1]	BHN Reserve[2]	Groundwater Quality Reserve[3]
pH	–	95	7.72	5.0 – 9.5	8.49
Electrical Conductivity	mS/m	95	41	<150	45.10
Calcium as Ca	mg/l	95	9.97	<150	10.97
Magnesium as Mg	mg/l	95	7.15	<100	7.87
Sodium as Na	mg/l	95	16.9	<200	18.59
Potassium as K	mg/l	95	0.92	<50	1.01
Total Alkalinity as $CaCO_3$	mg/l	95	72.2	<330	79.42
Chloride as Cl	mg/l	95	32.45	<200	35.70
Sulphate as SO_4	mg/l	95	7.05	<400	7.76
Nitrate and Nitrite as N	mg/l	95	2.48	<1.0	2.73
Fluoride as F	mg/l	95	0.17	<1.0	0.19
				Water quality class	Class 1

[1] Median value (calculated from population of samples in QC).

[2] Upper limit of Class I water quality (DWAF et al 1998).

[3] The median plus 10% for the Groundwater Quality Reserve.

APPENDIX F – STRESS INDEX

Table 151: Stress Index results

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
K80A	16.538	0.0000	46.56	46.56	281.54	0.000	-30.023	F
K80B	21.966	0.0054	66.27	66.27	301.70	0.000	-44.306	F
K80C	24.582	0.0054	63.51	63.51	258.37	0.604	-39.535	F
K80D	21.524	0.0115	35.38	35.39	164.43	3.144	-17.011	E/F
K80E	26.807	0.0115	31.25	31.26	116.63	3.564	-8.022	E
K80F	18.883	0.0106	23.95	23.96	126.91	2.995	-8.076	E
K90A	19.902	0.0011	9.93	9.93	49.92	0.529	9.439	B
K90B	16.050	0.0011	8.68	8.68	54.09	0.331	7.038	B/C
K90C	17.382	0.0011	6.47	6.47	37.25	0.414	10.493	A/B
K90D	14.935	0.0000	8.03	8.03	53.79	0.378	6.524	B/C
K90E	12.456	0.0025	4.94	4.94	39.68	1.502	6.011	C
K90F	20.349	0.0006	7.71	7.71	37.91	3.600	9.035	B
K90G	24.926	0.0051	7.12	7.13	28.59	8.460	9.340	B
L11A	13.207	0.0000	0.82	0.82	6.21	0.452	11.936	A/B
L11B	10.413	0.0000	0.99	0.99	9.48	0.033	9.393	B
L11C	6.875	0.0264	0.69	0.71	10.37	0.016	6.146	C
L11D	14.922	0.0000	1.18	1.18	7.91	0.022	13.720	A/B
L11E	5.514	0.0132	0.62	0.63	11.48	0.489	4.392	C/D
L11F	9.164	0.0000	1.82	1.82	19.86	2.113	5.231	C/D
L11G	23.888	0.0000	4.05	4.05	16.94	0.027	19.815	A
L12A	10.052	0.0000	1.26	1.26	12.53	1.122	7.670	B/C
L12B	7.366	0.0000	1.07	1.07	14.48	0.637	5.661	C
L12C	11.210	0.0001	1.50	1.50	13.38	0.835	8.875	B
L12D	9.743	0.0000	1.59	1.59	16.35	0.612	7.538	B/C
L21A	6.641	0.0000	1.86	1.86	28.01	0.433	4.348	C/D
L21B	8.546	0.0132	4.91	4.92	57.57	1.611	2.016	D
L21C	12.919	0.0400	2.15	2.19	16.93	0.116	10.616	A/B
L21D	13.136	0.0000	3.14	3.14	23.90	0.027	9.968	B
L21E	9.331	0.0132	1.63	1.65	17.65	0.484	7.201	B/C
L21F	11.041	0.0000	1.79	1.79	16.18	0.338	8.916	B
L22A	11.582	0.0000	3.27	3.27	28.20	0.180	8.135	B
L22B	6.075	0.0000	1.19	1.19	19.53	0.124	4.764	C/D
L22C	8.280	0.0000	2.45	2.45	29.63	0.804	5.023	C/D
L22D	8.009	0.0000	2.27	2.27	28.38	0.404	5.332	C/D
L23A	6.192	0.0000	0.95	0.95	15.29	0.060	5.185	C/D
L23B	11.044	0.0000	2.56	2.56	23.18	0.937	7.548	B/C

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
L23C	10.776	0.0000	1.71	1.71	15.90	0.334	8.729	B
L23D	8.108	0.0000	1.15	1.15	14.22	0.043	6.912	B/C
L30A	3.716	0.0081	0.42	0.43	11.52	1.245	2.043	D
L30B	4.347	0.0000	0.31	0.31	7.21	0.026	4.008	D
L30C	2.870	0.0000	0.19	0.19	6.74	0.343	2.334	D
L30D	7.444	0.0000	0.47	0.47	6.27	0.301	6.676	B/C
L40A	9.914	0.0000	0.59	0.59	5.92	0.200	9.127	B
L40B	8.076	0.0000	0.46	0.46	5.70	0.180	7.435	B/C
L50A	6.996	0.0000	0.57	0.57	8.10	0.136	6.293	C
L50B	7.964	0.0000	0.60	0.60	7.53	0.073	7.290	B/C
L60A	10.158	0.0000	0.46	0.46	4.53	0.142	9.556	B
L60B	6.576	0.0000	0.33	0.33	4.97	0.069	6.181	C
L70A	7.618	0.0000	0.43	0.43	5.69	0.006	7.179	B/C
L70B	4.494	0.0000	0.30	0.30	6.68	0.022	4.173	C/D
L70C	7.214	0.0000	0.48	0.48	6.65	0.127	6.607	B/C
L70D	5.894	0.0000	0.55	0.55	9.39	0.367	4.973	C/D
L70E	8.491	0.0000	1.05	1.05	12.33	0.003	7.441	B/C
L70F	4.565	0.0000	0.61	0.61	13.43	0.025	3.927	D
L70G	10.662	0.0000	6.25	6.25	58.65	0.034	4.375	C/D
L81A	14.646	0.0006	10.74	10.74	73.34	0.166	3.739	D
L81B	8.251	0.0006	5.14	5.14	62.30	0.584	2.526	D
L81C	11.790	0.0000	7.06	7.06	59.88	0.208	4.522	C/D
L81D	11.723	0.0000	5.22	5.22	44.53	0.031	6.472	B/C
L82A	10.283	0.0062	6.28	6.29	61.13	0.258	3.740	D
L82B	16.471	0.0123	11.83	11.85	71.92	1.013	3.613	D
L82C	15.534	0.0123	11.97	11.98	77.11	0.421	3.134	D
L82D	21.151	0.0026	17.73	17.73	83.82	2.617	0.804	D/E
L82E	14.564	0.0000	10.63	10.63	73.01	0.057	3.873	D
L82F	6.371	0.0000	4.13	4.13	64.77	0.000	2.245	D
L82G	9.683	0.0000	5.40	5.40	55.77	0.000	4.283	C/D
L82H	8.257	0.0000	3.89	3.89	47.07	0.000	4.370	C/D
L82J	6.412	0.0000	2.52	2.52	39.30	0.045	3.847	D
L90A	27.394	0.0009	10.27	10.27	37.48	0.492	16.635	A
L90B	21.363	0.0025	23.55	23.56	110.27	0.061	-2.255	D/E
L90C	23.532	0.0030	21.05	21.05	89.45	0.367	2.115	D
M10A	14.140	0.0000	10.89	10.89	77.04	0.076	3.171	D
M10B	25.381	0.0019	18.33	18.33	72.21	0.002	7.050	B/C
M10C	20.205	0.0232	21.12	21.14	104.64	0.873	-1.811	D/E
M10D	13.425	0.0199	11.43	11.45	85.26	0.138	1.840	D
M20A	25.769	0.0188	6.87	6.89	26.75	9.727	9.150	B

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
M20B	24.477	0.0243	15.21	15.24	62.25	4.843	4.396	C/D
M30A	14.282	0.0074	1.40	1.41	9.85	3.672	9.203	B
M30B	17.384	0.0013	1.39	1.39	8.02	3.684	12.305	A/B
N11A	12.878	0.0025	1.15	1.15	8.92	1.555	10.175	B
N11B	14.243	0.0000	0.93	0.93	6.51	5.326	7.991	B
N12A	13.572	0.0089	0.85	0.86	6.35	2.047	10.663	A/B
N12B	14.395	0.0089	0.73	0.74	5.16	0.315	13.337	A/B
N12C	11.356	0.0000	0.69	0.69	6.05	1.120	9.550	B
N13A	9.027	0.0000	2.22	2.22	24.59	3.019	3.788	D
N13B	8.822	0.0089	1.76	1.77	20.05	1.909	5.144	C/D
N13C	8.254	0.0089	1.23	1.24	15.05	0.696	6.315	C
N14A	6.263	0.0000	0.98	0.98	15.65	0.660	4.623	C/D
N14B	4.898	0.0000	0.83	0.83	17.02	0.927	3.137	D
N14C	12.056	0.0000	4.36	4.36	36.17	2.713	4.983	C/D
N14D	4.800	0.0000	1.33	1.33	27.64	0.164	3.309	D
N21A	7.181	0.0000	0.97	0.97	13.55	0.154	6.054	C
N21B	7.560	0.0000	2.87	2.87	37.92	0.686	4.007	D
N21C	12.769	0.0000	2.59	2.59	20.26	0.947	9.235	B
N21D	9.011	0.0000	1.48	1.48	16.42	0.114	7.418	B/C
N22A	9.586	0.0000	2.53	2.53	26.36	0.093	6.966	B/C
N22B	9.252	0.0000	1.30	1.30	14.05	0.074	7.878	B/C
N22C	6.100	0.0000	1.30	1.30	21.31	0.000	4.800	C/D
N22D	5.676	0.0000	1.89	1.89	33.24	0.005	3.785	D
N22E	4.039	0.0000	0.93	0.93	22.94	0.033	3.079	D
N23A	9.023	0.0000	4.24	4.24	46.99	0.100	4.684	C/D
N23B	3.091	0.0000	1.34	1.34	43.35	0.078	1.673	D
N24A	7.923	0.0000	1.41	1.41	17.84	0.234	6.276	C
N24B	10.052	0.0000	1.41	1.41	14.06	0.220	8.418	B
N24C	12.121	0.0000	1.81	1.81	14.96	0.158	10.149	B
N24D	5.490	0.0000	0.71	0.71	12.87	0.026	4.758	C/D
N30A	15.705	0.0000	7.25	7.25	46.19	3.934	4.518	C/D
N30B	12.375	0.0000	3.28	3.28	26.51	1.286	7.809	B/C
N30C	5.818	0.0000	1.51	1.51	26.01	0.072	4.232	C/D
N40A	14.289	0.0038	4.13	4.13	28.91	0.012	10.146	B
N40B	21.894	0.0038	4.49	4.49	20.51	0.083	17.320	A
N40C	14.730	0.0005	6.86	6.86	46.58	0.005	7.864	B/C
N40D	16.918	0.0005	6.50	6.50	38.42	0.233	10.184	B
N40E	12.191	0.0005	1.67	1.67	13.67	0.011	10.514	A/B
N40F	30.516	0.0070	8.16	8.17	26.76	0.314	22.036	A
P10A	3.439	0.0004	0.83	0.83	24.05	0.010	2.602	D

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
P10B	13.572	0.0004	2.01	2.01	14.79	0.140	11.425	A/B
P10C	4.660	0.0077	0.30	0.31	6.60	0.064	4.288	C/D
P10D	11.786	0.0077	0.97	0.97	8.27	0.236	10.575	A/B
P10E	16.927	0.0111	3.13	3.14	18.58	1.141	12.641	A/B
P10F	13.604	0.0084	5.02	5.03	36.96	0.002	8.573	B
P10G	10.767	0.0082	3.56	3.57	33.14	0.014	7.185	B/C
P20A	21.606	0.0082	11.24	11.25	52.06	0.835	9.523	B
P20B	20.040	0.0035	5.49	5.49	27.40	0.003	14.547	A/B
P30A	5.116	0.0056	3.63	3.64	71.13	0.001	1.476	D/E
P30B	12.121	0.0000	5.39	5.39	44.49	0.044	6.684	B/C
P30C	2.632	0.0001	0.97	0.97	36.73	0.006	1.659	D
P40A	8.631	0.0000	5.78	5.78	66.97	0.014	2.837	D
P40B	7.612	0.0150	3.85	3.86	50.73	0.000	3.750	D
P40C	14.812	0.0196	6.76	6.78	45.77	0.476	7.556	B/C
P40D	10.596	0.0075	6.33	6.34	59.84	0.439	3.816	D
Q11A	7.453	0.0106	0.99	1.00	13.38	0.282	6.173	C
Q11B	7.504	0.0106	0.72	0.73	9.74	0.733	6.040	C
Q11C	7.196	0.0106	0.67	0.68	9.50	0.473	6.039	C
Q11D	9.095	0.0106	0.67	0.68	7.52	1.094	7.316	B/C
Q12A	12.852	0.0000	1.25	1.25	9.70	0.787	10.817	A/B
Q12B	11.149	0.0007	1.62	1.62	14.54	0.805	8.724	B
Q12C	8.262	0.0069	0.54	0.55	6.62	1.210	6.506	B/C
Q13A	15.877	0.0064	1.41	1.41	8.90	1.293	13.171	A/B
Q13B	4.248	0.0010	0.31	0.31	7.40	0.122	3.812	D
Q13C	8.268	0.0000	0.75	0.75	9.03	0.065	7.456	B/C
Q14A	10.595	0.0257	1.21	1.23	11.63	1.086	8.277	B
Q14B	12.258	0.0000	1.46	1.46	11.91	6.070	4.728	C/D
Q14C	17.030	0.0106	1.33	1.34	7.85	3.686	12.007	A/B
Q14D	7.799	0.0106	0.59	0.60	7.66	0.798	6.403	C
Q14E	5.382	0.0000	0.59	0.59	10.90	0.184	4.611	C/D
Q21A	12.064	0.0086	1.19	1.20	9.96	0.057	10.805	A/B
Q21B	7.037	0.0086	0.59	0.60	8.46	0.363	6.079	C
Q22A	10.308	0.0086	1.22	1.23	11.92	0.317	8.762	B
Q22B	4.240	0.0086	0.42	0.43	10.11	0.402	3.410	D
Q30A	8.370	0.0086	1.43	1.44	17.15	0.686	6.248	C
Q30B	9.445	0.0132	1.14	1.15	12.21	0.227	8.065	B
Q30C	6.516	0.0010	2.01	2.01	30.81	0.340	4.169	C/D
Q30D	5.752	0.0010	1.63	1.63	28.42	0.080	4.037	D
Q30E	7.102	0.0000	1.80	1.80	25.34	0.000	5.302	C/D
Q41A	5.763	0.0064	2.04	2.05	35.51	0.460	3.257	D

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
Q41B	10.804	0.0039	1.81	1.82	16.82	0.837	8.150	B
Q41C	7.195	0.0039	1.23	1.23	17.10	0.589	5.375	C/D
Q41D	5.845	0.0003	0.72	0.72	12.32	0.100	5.025	C/D
Q42A	11.984	0.0043	2.15	2.15	17.95	0.107	9.726	B
Q42B	9.277	0.0011	1.33	1.33	14.38	0.308	7.634	B/C
Q43A	15.803	0.0000	1.84	1.84	11.64	0.744	13.220	A/B
Q43B	18.540	0.0000	1.42	1.42	7.66	0.404	16.716	A
Q44A	8.338	0.0000	1.15	1.15	13.83	0.012	7.173	B/C
Q44B	6.689	0.0064	0.78	0.79	11.76	0.266	5.636	C
Q44C	4.906	0.0039	0.54	0.54	11.09	0.115	4.247	C/D
Q50A	10.362	0.0039	3.01	3.02	29.12	0.088	7.256	B/C
Q50B	8.582	0.0000	1.89	1.89	22.06	0.000	6.688	B/C
Q50C	3.424	0.0000	0.87	0.87	25.51	0.000	2.550	D
Q60A	7.521	0.0000	1.66	1.66	22.07	0.000	5.861	C
Q60B	9.826	0.0000	2.40	2.40	24.42	0.033	7.393	B/C
Q60C	3.274	0.0000	0.42	0.42	12.83	0.006	2.849	D
Q70A	5.652	0.0000	0.93	0.93	16.40	0.005	4.720	C/D
Q70B	9.291	0.0000	1.27	1.27	13.70	0.015	8.003	B
Q70C	4.965	0.0000	0.59	0.59	11.82	0.018	4.360	C/D
Q80A	7.914	0.0030	5.51	5.52	69.70	0.165	2.233	D
Q80B	10.251	0.0030	6.52	6.52	63.63	0.650	3.078	D
Q80C	6.468	0.0030	4.21	4.21	65.09	0.720	1.538	D/E
Q80D	8.022	0.0019	9.15	9.16	114.13	0.288	-1.422	D/E
Q80E	7.397	0.0000	5.43	5.43	73.45	0.000	1.964	D
Q80F	13.808	0.0000	2.57	2.57	18.64	0.245	10.989	A/B
Q80G	4.847	0.0000	1.03	1.03	21.32	0.063	3.751	D
Q91A	7.354	0.0000	1.49	1.49	20.31	0.003	5.857	C
Q91B	10.755	0.0000	2.43	2.43	22.62	0.005	8.317	B
Q91C	12.368	0.0000	1.99	1.99	16.06	0.000	10.381	B
Q92A	11.016	0.0012	12.43	12.43	112.88	0.336	-1.754	D/E
Q92B	10.121	0.0025	4.71	4.72	46.59	0.023	5.383	C/D
Q92C	15.435	0.0025	6.33	6.33	41.00	0.139	8.967	B
Q92D	7.809	0.0025	5.23	5.24	67.05	0.000	2.573	D
Q92E	7.950	0.0014	1.35	1.35	17.04	0.352	6.244	C
Q92F	20.358	0.0000	1.18	1.18	5.80	1.142	18.037	A
Q92G	20.872	0.0014	2.29	2.29	10.96	0.015	18.569	A
Q93A	9.324	0.0000	1.10	1.10	11.80	0.003	8.221	B
Q93B	11.139	0.0000	1.77	1.77	15.86	0.044	9.327	B
Q93C	11.826	0.0000	1.95	1.95	16.46	0.000	9.879	B
Q93D	17.129	0.0000	4.22	4.22	24.64	0.038	12.871	A/B

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
Q94A	10.719	0.0000	5.99	5.99	55.85	0.010	4.721	C/D
Q94B	5.690	0.0000	5.41	5.41	95.14	0.039	0.237	D/E
Q94C	5.462	0.0000	4.93	4.93	90.32	0.000	0.529	D/E
Q94D	7.590	0.0000	3.27	3.27	43.04	0.000	4.323	C/D
Q94E	8.379	0.0000	1.36	1.36	16.23	0.057	6.963	B/C
Q94F	19.821	0.0000	2.17	2.17	10.93	0.015	17.639	A
R10A	6.229	0.0001	4.59	4.59	73.64	0.324	1.318	D/E
R10B	9.888	0.0000	18.18	18.18	183.86	0.118	-8.410	E
R10C	5.823	0.0005	3.71	3.71	63.78	0.000	2.109	D
R10D	7.368	0.0010	4.82	4.82	65.43	0.000	2.547	D
R10E	6.204	0.0004	3.23	3.23	52.13	0.001	2.969	D
R10F	3.231	0.0003	11.47	11.47	355.11	0.015	-8.257	E
R10G	5.658	0.0010	3.68	3.68	65.06	0.002	1.975	D
R10H	5.985	0.0000	3.20	3.20	53.47	0.000	2.785	D
R10J	5.203	0.0049	3.10	3.10	59.67	0.000	2.098	D
R10K	18.503	0.0006	7.09	7.09	38.30	0.000	11.416	A/B
R10L	13.262	0.0004	4.75	4.75	35.85	0.000	8.508	B
R10M	6.368	0.0018	3.98	3.98	62.52	0.000	2.387	D
R20A	6.747	0.0008	21.47	21.47	318.28	0.384	-15.111	E/F
R20B	5.801	0.0002	5.90	5.90	101.71	0.001	-0.100	D/E
R20C	4.816	0.0002	5.11	5.11	106.18	0.000	-0.298	D/E
R20D	8.343	0.0003	3.78	3.78	45.31	0.000	4.563	C/D
R20E	9.178	0.0006	5.15	5.15	56.08	0.171	3.860	D
R20F	9.705	0.0000	11.09	11.09	114.23	0.000	-1.381	D/E
R20G	4.314	0.0002	6.87	6.87	159.19	0.000	-2.553	D/E
R30A	19.743	0.0172	23.13	23.14	117.22	0.003	-3.404	E
R30B	22.872	0.0119	22.58	22.59	98.78	0.973	-0.693	D/E
R30C	19.777	0.0012	13.16	13.16	66.55	0.089	6.526	B/C
R30D	6.250	0.0064	7.21	7.21	115.41	0.003	-0.966	D/E
R30E	18.251	0.0033	17.65	17.66	96.74	0.269	0.325	D/E
R30F	8.699	0.0067	11.63	11.64	133.81	0.226	-3.168	E
R40A	12.826	0.0139	15.25	15.27	119.04	0.603	-3.045	E
R40B	12.261	0.0021	7.34	7.34	59.88	0.001	4.919	C/D
R40C	6.703	0.0104	5.96	5.97	89.07	0.173	0.560	D/E
R50A	13.626	0.0029	8.56	8.56	62.84	0.269	4.794	C/D
R50B	14.321	0.0022	9.03	9.03	63.05	0.465	4.827	C/D
S10A	8.581	0.0000	1.79	1.79	20.82	0.005	6.789	B/C
S10B	13.715	0.0059	3.43	3.44	25.08	0.024	10.252	B
S10C	7.967	0.0112	1.80	1.81	22.73	0.017	6.139	C
S10D	10.993	0.0089	2.62	2.63	23.91	0.080	8.284	B

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
S10E	8.318	0.0078	2.26	2.27	27.26	0.164	5.886	C
S10F	10.385	0.0078	3.84	3.85	37.05	0.026	6.511	B/C
S10G	14.149	0.0234	3.74	3.76	26.60	0.038	10.347	B
S10H	16.271	0.0280	6.65	6.68	41.06	1.438	8.151	B
S10J	11.797	0.0000	4.75	4.75	40.29	0.082	6.962	B/C
S20A	10.702	0.0066	5.79	5.80	54.20	0.007	4.895	C/D
S20B	15.995	0.0101	8.75	8.76	54.75	0.256	6.982	B/C
S20C	19.931	0.0000	11.11	11.11	55.76	0.555	8.262	B
S20D	11.486	0.0120	7.03	7.05	61.34	1.580	2.860	D
S31A	13.780	0.0040	6.03	6.04	43.81	0.205	7.538	B/C
S31B	13.400	0.0044	5.79	5.80	43.27	0.171	7.432	B/C
S31C	19.934	0.0055	6.39	6.39	32.07	0.446	13.096	A/B
S31D	11.386	0.0098	3.81	3.82	33.52	0.064	7.506	B/C
S31E	11.717	0.0068	4.14	4.15	35.39	0.789	6.782	B/C
S31F	7.809	0.0108	3.26	3.27	41.88	0.505	4.034	D
S31G	7.341	0.0041	2.60	2.60	35.47	0.355	4.382	C/D
S32A	11.091	0.0004	3.81	3.81	34.39	0.000	7.277	B/C
S32B	18.368	0.0026	3.90	3.90	21.25	0.167	14.299	A/B
S32C	15.833	0.0306	4.44	4.47	28.24	0.205	11.157	A/B
S32D	12.311	0.0041	18.07	18.08	146.84	0.006	-5.772	E
S32E	10.355	0.0000	14.17	14.17	136.82	0.000	-3.812	E
S32F	10.791	0.0038	7.55	7.55	69.97	0.000	3.240	D
S32G	7.446	0.0043	3.67	3.68	49.39	0.000	3.769	D
S32H	13.766	0.0089	1.43	1.44	10.43	0.041	12.289	A/B
S32J	8.198	0.0074	1.99	2.00	24.41	0.118	6.078	C
S32K	12.648	0.0018	2.93	2.94	23.21	0.217	9.497	B
S32L	9.155	0.0000	2.21	2.21	24.18	0.073	6.869	B/C
S32M	13.553	0.0018	4.13	4.14	30.51	0.000	9.418	B
S40A	15.308	0.0123	6.59	6.60	43.11	0.103	8.606	B
S40B	15.041	0.0062	6.75	6.76	44.94	0.000	8.281	B
S40C	11.540	0.0000	4.07	4.07	35.30	0.000	7.466	B/C
S40D	4.445	0.0000	1.89	1.89	42.44	0.000	2.559	D
S40E	17.480	0.0021	8.27	8.28	47.34	0.205	8.999	B
S40F	11.709	0.0010	6.02	6.02	51.42	0.005	5.683	C
S50A	8.624	0.0034	4.47	4.48	51.91	0.016	4.132	C/D
S50B	13.811	0.0063	8.98	8.99	65.07	0.000	4.825	C/D
S50C	14.186	0.0068	5.89	5.90	41.59	0.115	8.171	B
S50D	14.950	0.0180	7.41	7.42	49.66	0.651	6.874	B/C
S50E	17.692	0.0000	6.68	6.68	37.76	0.100	10.912	A/B
S50F	3.272	0.0031	1.16	1.16	35.54	0.431	1.678	D

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
S50G	18.595	0.0189	6.37	6.39	34.34	0.113	12.096	A/B
S50H	13.568	0.0089	5.74	5.75	42.37	0.080	7.739	B/C
S50J	25.280	0.0151	12.48	12.50	49.43	0.095	12.690	A/B
S60A	15.589	0.0015	22.26	22.26	142.80	0.032	-6.704	E
S60B	11.062	0.0025	3.82	3.82	34.56	0.003	7.236	B/C
S60C	7.596	0.0012	6.51	6.51	85.76	0.030	1.052	D/E
S60D	11.010	0.0011	6.30	6.30	57.23	0.084	4.625	C/D
S60E	10.155	0.0000	5.31	5.31	52.32	0.000	4.842	C/D
S70A	15.802	0.0009	17.02	17.02	107.71	0.016	-1.235	D/E
S70B	14.969	0.0017	9.23	9.23	61.65	0.010	5.730	C
S70C	9.421	0.0039	9.58	9.58	101.73	0.000	-0.163	D/E
S70D	21.366	0.0122	26.93	26.95	126.12	0.044	-5.624	E
S70E	21.824	0.0021	17.04	17.04	78.09	0.204	4.577	C/D
S70F	17.079	0.0000	19.61	19.61	114.84	0.001	-2.536	D/E
T11A	15.741	0.0007	13.17	13.17	83.65	0.071	2.502	D
T11B	20.045	0.0007	17.53	17.53	87.44	0.088	2.429	D
T11C	19.416	0.0025	22.70	22.70	116.93	0.380	-3.667	E
T11D	19.345	0.0013	21.81	21.81	112.73	0.072	-2.535	D/E
T11E	13.071	0.0043	17.49	17.49	133.81	0.130	-4.549	E
T11F	16.253	0.0331	20.17	20.21	124.33	0.159	-4.113	E
T11G	15.598	0.0008	15.75	15.75	101.00	0.162	-0.318	D/E
T11H	11.297	0.0194	11.03	11.05	97.78	0.047	0.203	D/E
T12A	14.117	0.0119	11.18	11.19	79.28	0.034	2.891	D
T12B	10.879	0.0072	8.51	8.52	78.32	0.000	2.358	D
T12C	13.433	0.0218	9.70	9.72	72.37	0.052	3.660	D
T12D	15.312	0.0170	11.33	11.35	74.13	0.105	3.857	D
T12E	20.229	0.0043	17.13	17.13	84.68	0.194	2.904	D
T12F	17.577	0.0182	14.09	14.10	80.25	0.000	3.472	D
T12G	13.165	0.0142	11.59	11.60	88.12	0.084	1.481	D/E
T13A	15.437	0.0036	24.06	24.06	155.88	0.026	-8.652	E
T13B	15.501	0.0122	19.56	19.57	126.26	0.514	-4.585	E
T13C	19.334	0.0014	23.01	23.01	119.00	0.000	-3.674	E
T13D	24.416	0.0042	29.68	29.68	121.58	0.006	-5.275	E
T13E	12.953	0.0054	16.75	16.75	129.33	0.000	-3.799	E
T20A	26.647	0.0062	46.11	46.11	173.05	0.009	-19.474	E/F
T20B	21.721	0.0099	35.52	35.53	163.57	0.160	-13.969	E/F
T20C	18.848	0.0088	20.21	20.22	107.29	0.113	-1.487	D/E
T20D	20.836	0.0186	22.01	22.03	105.71	0.474	-1.664	D/E
T20E	18.970	0.0186	23.89	23.91	126.05	0.005	-4.947	E
T20F	30.478	0.0107	25.16	25.17	82.59	0.167	5.141	C/D

Quaternary	Recharge (Mm3/a)	BHN (Mm3/a)	GW Baseflow (Mm3/a)	GW Reserve (Mm3/a)	GW Reserve (% of Recharge)	GW Use (Mm3/ annum)	Surplus/ Deficit GW (Mm3/a)	Stress Index
T20G	17.509	0.0000	19.83	19.83	113.24	0.000	-2.318	D/E
T60A	42.479	0.0076	36.48	36.49	85.90	0.201	5.790	C
T60B	36.258	0.0053	37.13	37.13	102.41	0.047	-0.922	D/E
T60C	32.162	0.0065	28.45	28.45	88.47	0.000	3.709	D
T60D	40.945	0.0026	41.43	41.44	101.20	0.195	-0.686	D/E
T60E	18.493	0.0152	15.19	15.20	82.20	0.105	3.186	D
T60F	39.904	0.0162	45.71	45.73	114.60	0.196	-6.022	E
T60G	37.980	0.0023	43.31	43.31	114.03	0.011	-5.340	E
T60H	34.293	0.0013	51.79	51.79	151.04	0.027	-17.528	E/F
T60J	27.077	0.0087	35.28	35.29	130.33	0.000	-8.211	E
T60K	21.102	0.0000	27.69	27.69	131.23	0.000	-6.591	E
T70A	20.567	0.0037	24.12	24.12	117.29	0.015	-3.572	E
T70B	23.290	0.0004	31.54	31.54	135.42	0.151	-8.401	E
T70C	16.810	0.0040	18.88	18.88	112.34	0.001	-2.074	D/E
T70D	27.204	0.0000	40.17	40.17	147.65	0.000	-12.963	E/F
T70E	13.543	0.0025	15.70	15.70	115.94	0.000	-2.159	D/E
T70F	18.603	0.0012	25.05	25.05	134.68	0.000	-6.452	E
T70G	19.242	0.0003	26.51	26.51	137.79	0.096	-7.367	E
T80A	17.999	0.0003	27.13	27.13	150.72	0.000	-9.128	E
T80B	18.743	0.0019	25.33	25.34	135.17	0.000	-6.592	E
T80C	19.341	0.0000	22.55	22.55	116.57	0.040	-3.246	E
T80D	22.960	0.0011	33.04	33.04	143.91	0.056	-10.137	E/F
T90A	20.661	0.0025	10.24	10.24	49.57	0.068	10.350	B
T90B	32.562	0.0010	45.91	45.91	141.01	0.000	-13.352	E/F
T90C	26.660	0.0007	31.85	31.85	119.48	0.000	-5.194	E
T90D	27.038	0.0071	19.93	19.94	73.75	0.001	7.096	B/C
T90E	33.166	0.0161	36.23	36.25	109.30	0.000	-3.083	E
T90F	23.998	0.0033	31.28	31.28	130.36	0.005	-7.290	E
T90G	30.149	0.0079	31.91	31.92	105.88	0.810	-2.582	D/E