PART A REQUEST FOR INFORMATION (RFI) - E1676CXRTD			
Description of the works/goods/services	Request to obtain information about the Forward Osmosis technology for the treatment of Wastewater for re-use.		
Deadline for submission	22 September 2025	**At (South African Standard Time)**	10:00
Tender Office address	Tenders are uploaded via Eskom Tender bulletin site on the Eskom E- tendering page.		
Enquiries - Representative	Letsibogo Mahlatji MahlatLN@eskom.co.za		
EOI's/RFI are to be submitted electronically via Eskom E- tendering site by the stipulated closing date and time. ***Please note it is the responsibility of the supplier to ensure that EOI/RFI submission is submitted before the closing date and time***	Tenders are uploaded via Eskom Tender bulletin site on the Eskom E- tendering page.		
Electronic Submission of RFI	The tenderer must upload the tender via Eskom Tender bulletin site on the Eskom E- tendering page. All documents need to be submitted in a PDF and Excel format (The upload size per document is 500 megabytes and total submission is restricted to 4 gigabyte). No Zip/condense files can be uploaded No hard copy will be accepted If for some reason you resubmit your EOI, then the latest version of the EOI submitted will only be accepted and all previous submission/s will be null and void. Please ensure that the submission status is indicated as complete. Supplier Help Manual guide and video can be found on Eskom E-Tendering page		
E-tendering Help Manual for supplier	E-tendering Help Manual attached		

Eskom Holdings SOC Ltd ("Eskom") invites you to submit an:

- **Request for information (RFI)** to submit information for the works/goods/services as stated in the table. This RFI is a stand-alone information-gathering and market-testing exercise, intended only to inform and assist Eskom's further deliberation and development of a strategy for the Forward Osmosis technology for the treatment of Wastewater for re-use. Eskom may request indicative prices if so, stated in this RFI.

Eskom has delegated the responsibility for this **RFI** to the Representative.

We look forward to receipt of your response.

Yours faithfully

Procurement Manager

Shamani Padayachee

Date: 01 August 2025

DEFINITIONS

In this Document, except as otherwise defined herein, the following terms shall have the following meanings:

B-BBEE	-	means Broad-Based Black Economic Empowerment.
Document	-	this document which outlines the requirements of the Request for information of solar photovoltaics (PV) technologies and associated components, services, and capabilities.
ERIC	-	Eskom Research and Innovation Centre that is located at Lower Germiston Road, Rosherville, Gauteng.
Procurement Process	-	Means the procurement process being conducted in terms of this RFI in respect of the Project or requested information.
RT&D	-	Research, Testing and Development, a business unit in Eskom.
Respondent	-	any entity or consortium that submits a Response to this Document.
State Owned Company or SOC	-	a legal entity that is or has previously been created by the Government in order to partake in commercial activities on the Government's behalf, where in the context of the Project, such entity may include any entity with a mandate to engage in the energy or financing sector.

BACKGROUND

Eskom has prescribed to the Zero Liquid Effluent (ZLED) Discharge philosophy which necessitates the treatment and/or reuse of wastewater generated on site. Furthermore, environmental legislation promulgated, prohibits the disposal of effluent with a total dissolved solids (TDS) concentration that is greater than 5% and a leachable concentration for TDS of 100 000mg/L or more, to landfill.

Some of the wastewater generated at Eskom can be treated using established technologies, such as conventional reverse osmosis (RO). However, wastewater with very high dissolved and suspended solids cannot be treated with conventional RO; due to its high scaling and fouling potential. To overcome this limitation, it is envisaged that these wastewaters can be treated with forward osmosis (FO) to recover water for reuse.

FO is a commercial technology based on the natural flow of water; that is the osmotic pressure difference, to drive water permeation across a semi-permeable membrane. The technology is not widely used throughout industry hence there is a need to assess its robustness and ease of application to treat wastewater generated at Eskom.

FO is a membrane technology based on the natural osmotic flow of water; from a solution with low solute concentration to a solution with high solute concentration across a semi-permeable membrane to equilibrate the osmotic pressure difference between the two solutions. As such; the process does not require the application of high hydraulic pressure (Korenak, 2017).

This immediate benefit of FO hence provides opportunities for energy savings; thereby making it a promising technology as a potential alternative or supplement to RO for wastewater reclamation and desalination (Korenak, 2017).

Information on the use of Forward Osmosis (FO)Technology for the treatment of wastewater such as:

- Water in ash water return dams
- Contaminated station drains water
- Concentrated cooling water
- Flue gas desulphurisation (FGD) blowdown water
- Ion exchange regeneration wastewater
- Tied colliery mine water
- Reverse Osmosis plant reject

MOTIVATION

Due to the ZLED philosophy and environmental legislations that govern disposal of effluent to the environment, it is necessary to treat water for reuse.
Some of the wastewater generated at Eskom can be treated using established technologies, such as conventional reverse osmosis (RO). However, wastewater with very high dissolved and suspended solids cannot be treated with conventional RO; due to its high scaling and fouling potential. To overcome this limitation, it is envisaged that these wastewaters can be treated with forward osmosis (FO) to recover water for reuse. The technology is not widely used throughout industry hence there is a need to assess its robustness and ease of application to treat wastewater generated at Eskom.

BENEFITS TO ESKOM

- Better understanding of the technology pre-requisites to aid in technology adoption decision making process within Eskom.
- Development of a strategy for adoption of the FO technology within Eskom
- FO offers the following potential advantages :
  - ➢ Recovery rates up to 80% with continuous operation
  - ➢ High rejection of a wide range of contaminants
  - ➢ Reduction in energy consumption
  - ➢ Stable water flux
  - ➢ Lower volumes of reject/brine produced

ADDITIONAL INFORMATION

Submit information on the use FO Osmosis (FO) technology for the treatment of various wastewaters.

The submission **MUST** include:

- The background literature and justification for the use of the FO technology for wastewater treatment to substantiate its use.
- Installation requirements of the technology (mechanical, electrical, C&I, civil, etc) for the pilot plant.
- Utility requirements (air, electricity, water, etc.).
- Information on the maintenance requirements of the system.
- The impact of the technology on downstream water quality (increased conductivity, turbidity or blowdown requirements).
- Waste produced from the technology
- The footprint required and maximum load of the technology proposed for civil requirements.
- The typical capital, operating and maintenance costs (itemised) of the pilot testing equipment.
- Indicate any exclusions, deviations and limitations (based on physical and chemical properties) from the Contractor's supply.
- A process flow diagram, P&ID and General Arrangement drawings must be included with the submission, clearly defining battery limits.
- Provide a budget capital cost for full scale installation (mechanical, civil, and electrical work must be included).
- The typical capital cost of the equipment.
- The typical operating cost of the system.
- Highlight any process constraints / limits that impact the operation of the system.
- Provide case studies and information on reference plant where the technology has been employed with process information showing plant performance

- Provide information on the expected maintenance requirements regarding lifespan of consumable items, etc. where applicable.
- Indicate the estimated lead time for the delivery of the equipment.

The water qualities for the various effluent streams to be treated are as follows:

a. <u>Wastewater which contains high levels of ash and oil</u>

The dirty water dams receive the wastewater from the station. This includes all drains from the water and steam circuit, drains from the CW pipework in the units, floor-washing effluent, etc. These drains are contaminated with ash when the stations are forced to implement emergency floor ashing to clear the boiler throat prior to shutting down the unit to repair the defect. The ash is washed into the station drains and ends up in these dirty water dams. In addition to this, the water is contaminated with oil from leaks which exist on the plant. This is also washed into the station drains. The design of the system is such that this water must be treated by an oil and grit system. However, this system is only designed for certain levels of oil and grit and is usually overloaded, and hence it is not effective. As part of the ZLED philosophy, the water from this system must be returned to the cooling water system for further treatment. This excess ash then impacts the cooling water treatment system and causes frequent failures on the clarifiers bridges and stirrers.

A solution is required for this dirty water dam water which will remove all the ash and oil from the water and produce water which is of a raw water quality or better. Table 1 shows the raw analysis of the dissolved species. The intention is to understand the capability of the technology with regards to the removal of ash and oil.

The typical analysis of raw water quality is as per Table 1 and Figures 1-15 below:

Table 1: Raw Vaal water supplied to Tutuka Power Station

Parameter	Unit	Minimum	Maximum	Average	95^{th} percentile
Conductivity	µS/cm	110.0	433.0	237.6	327.0
pH		4.3	9.9	7.5	8.9
m-alkalinity as $CaCO_3$	mg/kg	15.0	129.5	71.8	108.0
p-alkalinity as $CaCO_3$	mg/kg	0.0	19.1	0.4	0

Ca Hardness as $CaCO_3$	mg/kg	6.0	104.0	38.8	62.9
Mg Hardness as $CaCO_3$	mg/kg	3.8	91.6	38.4	66.4
Chloride	mg/kg	0.4	29.7	11.8	20.1
Potassium	mg/kg	1.7	4.5	3.2	4.0
Phosphate	mg/kg	0.0	2.0	1.0	2.0
Silicate	mg/kg	2.4	51.7	23.1	42
Sulphate	mg/kg	7.4	46.0	26.7	42.3
Sodium	mg/kg	6.0	32.2	15.5	26.7
Total organic carbon as C	mg/kg	4.2	10.4	7.6	9.6
Total hardness as $CaCO_3$	mg/kg	28.9	170.0	69.4	124.5
Turbidity	NTU	0	88.3	29.3	58.0

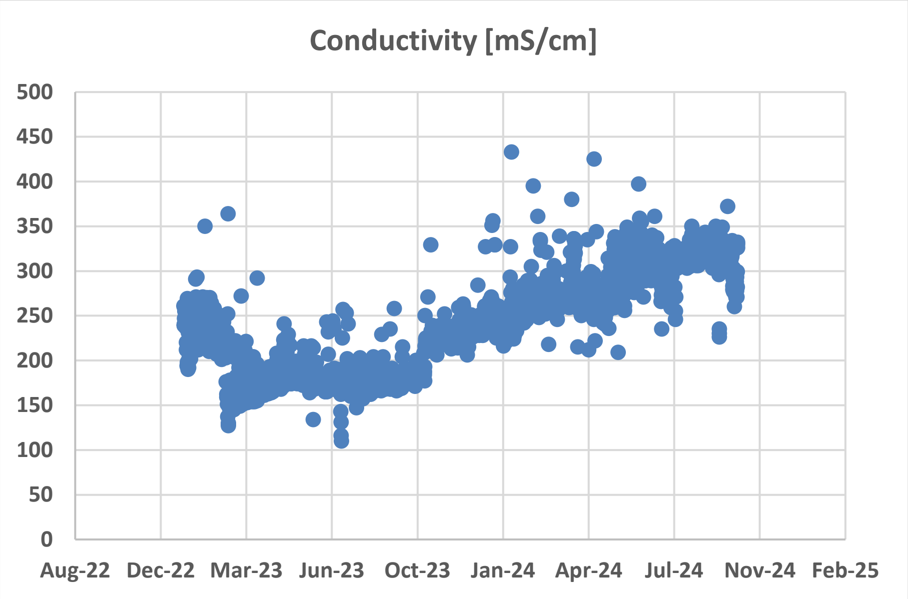


Figure 1: Raw water conductivity at Tutuka Power Station

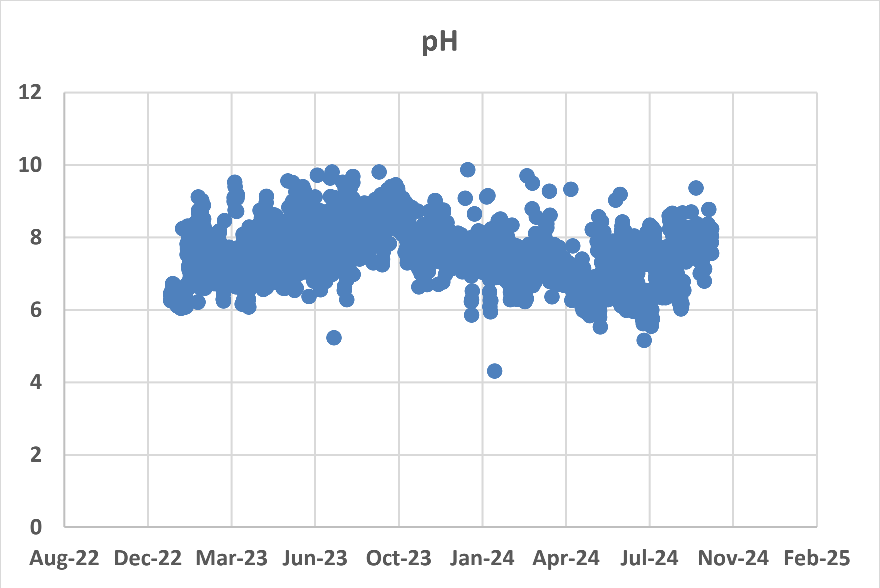


Figure 2: Raw water pH at Tutuka Power Station

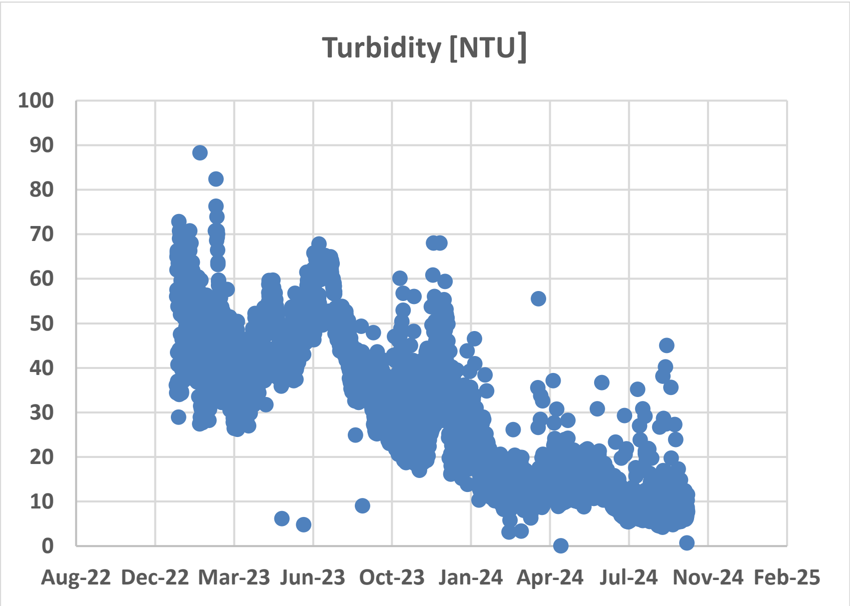


Figure 3: Raw water turbidity at Tutuka Power Station

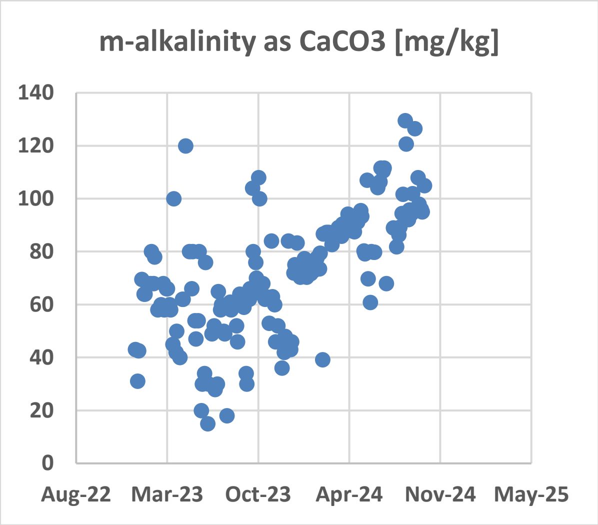


Figure 4: Raw water m-alkalinity

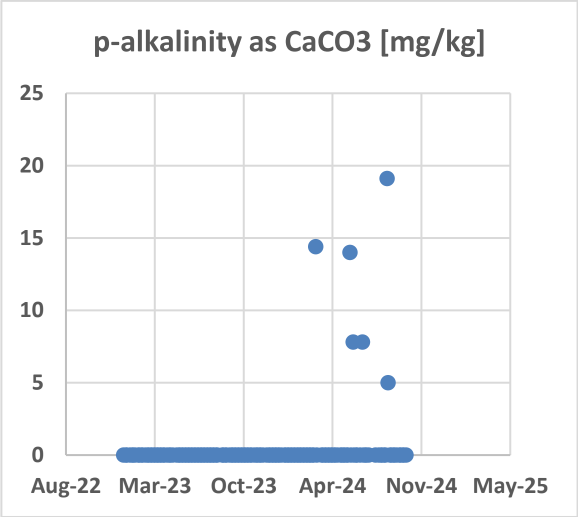


Figure 5: Raw water P-alkalinity

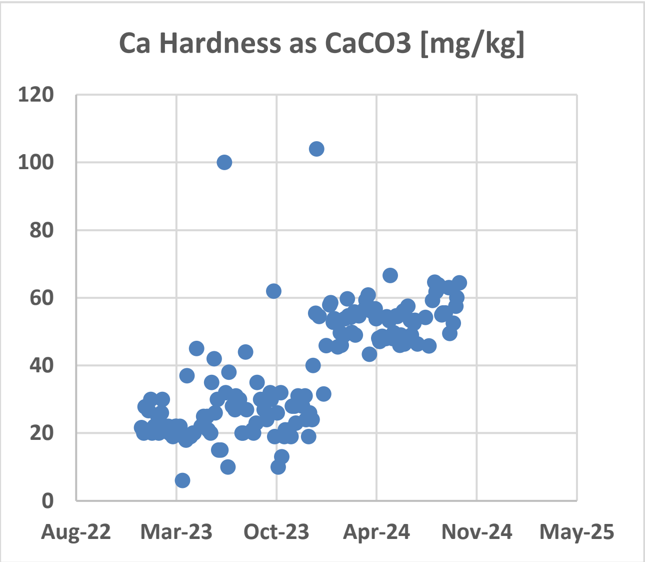


Figure 6: Raw water Ca hardness

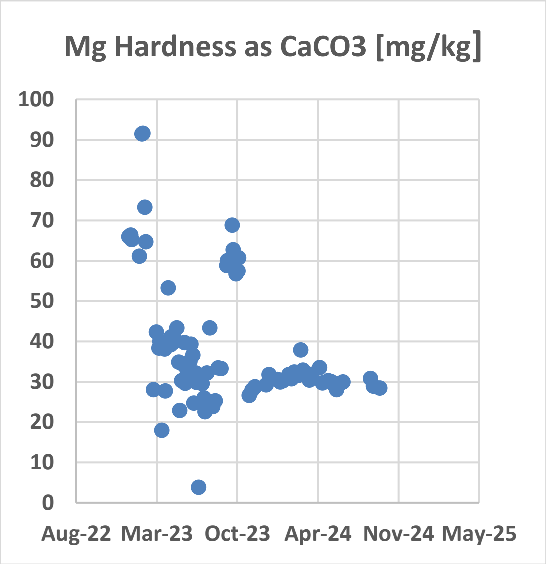


Figure 7: Raw water Mg hardness

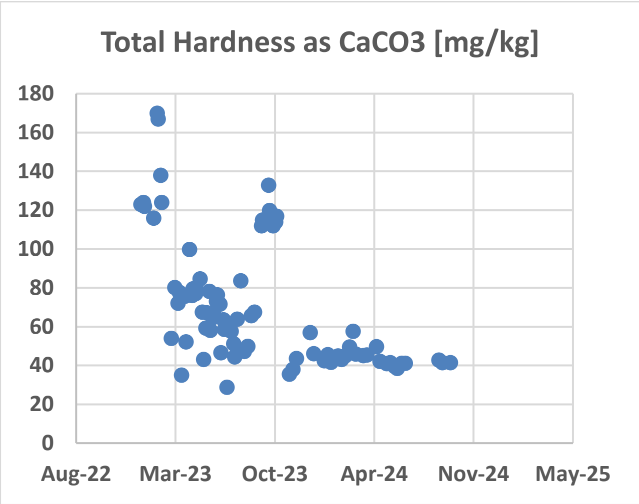


Figure 8: Raw water total hardness

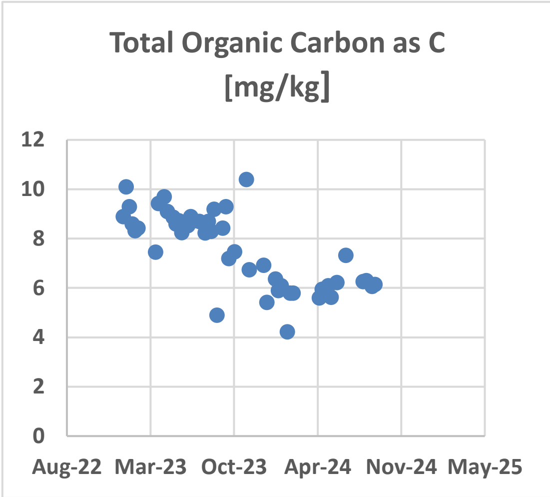


Figure 9: Raw water Total organic carbon

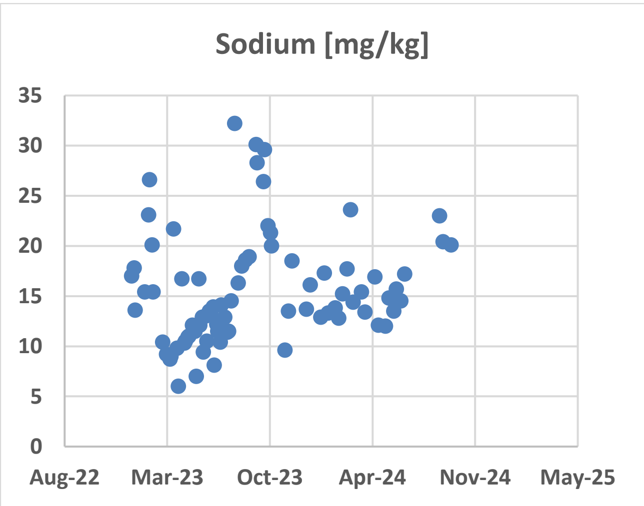


Figure 10: Raw water sodium

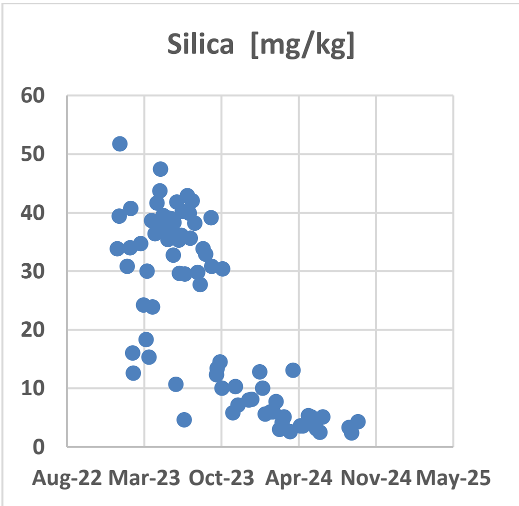


Figure 11: Raw water silica

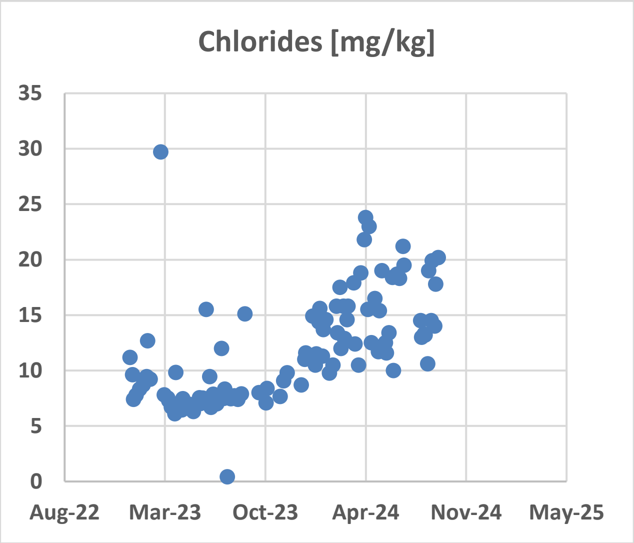


Figure 12: Raw water Chlorides

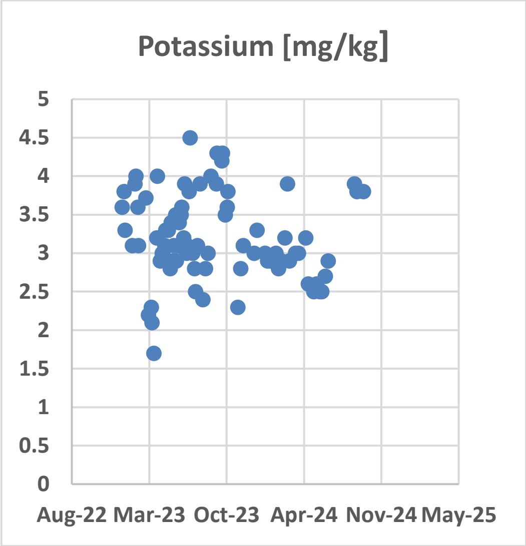


Figure 13: Raw water Potassium

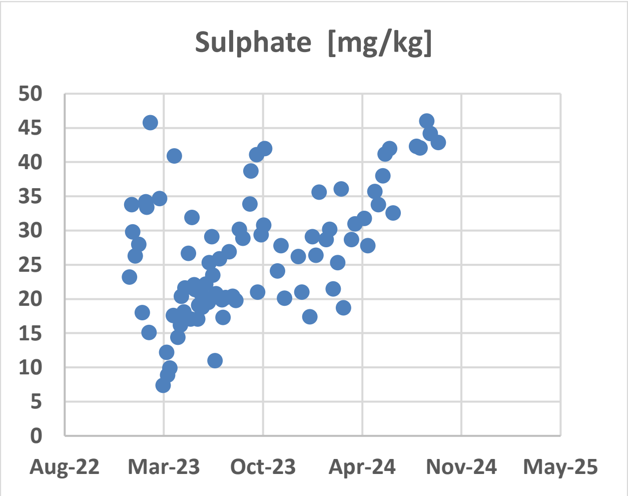


Figure 14: Raw water sulphate

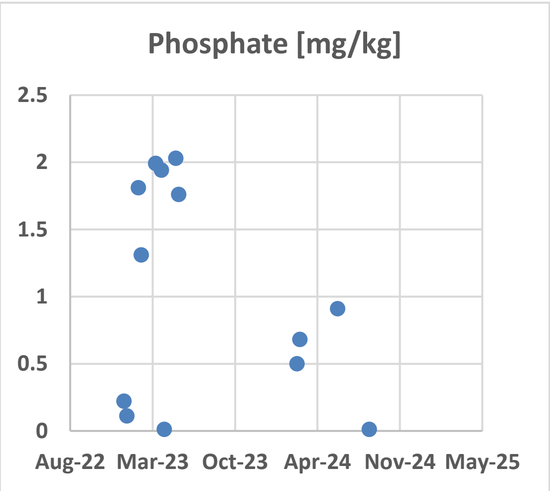


Figure 15: Raw water phosphate

The typical range of water quality in the dirty water dams is as indicated in the Table 2 and Figures 16 to 25 below:

Table 2: Wastewater which contains high levels of ash and oil (Dirty Water Dam recovery -Tutuka Power Station)

Parameter	Unit	Range	Average	95th percentile
pH	-	6.91 - 10.9	9.1	9.7
Conductivity	µS/cm	809 – 33564	10036.7	25654.8
Turbidity	NTU	1.2 – 343.0	20.5	47.1
Calcium Hardness as $CaCO_3$	mg/kg	17.9 – 1431.0	113.7	251.5
Magnesium Hardness as $CaCO_3$	mg/kg	42.1 – 1191	342.7	926
Total Hardness as $CaCO_3$	mg/kg	65.8 – 1309.0	430.1	1065.4
m-alkalinity	mg/kg	22.8 – 946.8	361.7	680
p-alkalinity	mg/kg	0 - 222	58.0	176.8
Sodium	mg/kg	58.8 - 10180	2034.6	5537
Potassium	mg/kg	8 - 214	56.8	167.2
Chloride	mg/kg	56.7 - 7726	1778.6	6140.5
Silica as SiO_2	mg/kg	0.8 - 339	17.0	29.7
Sulphate	mg/kg	214 - 27000	3970.2	10424.5
FOG	mg/kg	100-5000	4682	4754

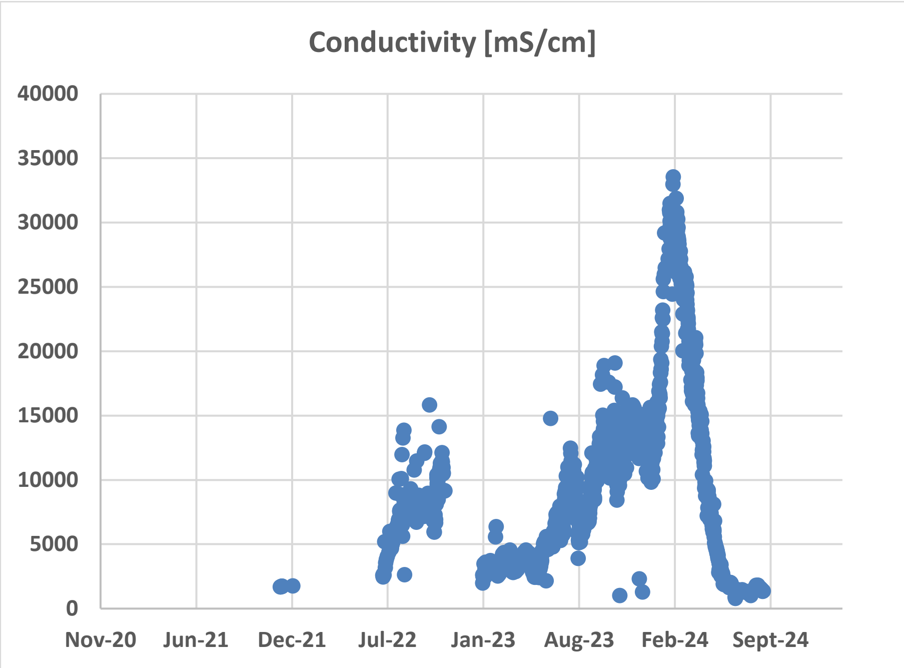


Figure 16: Dirty water dam recovery conductivity at Tutuka Power Station

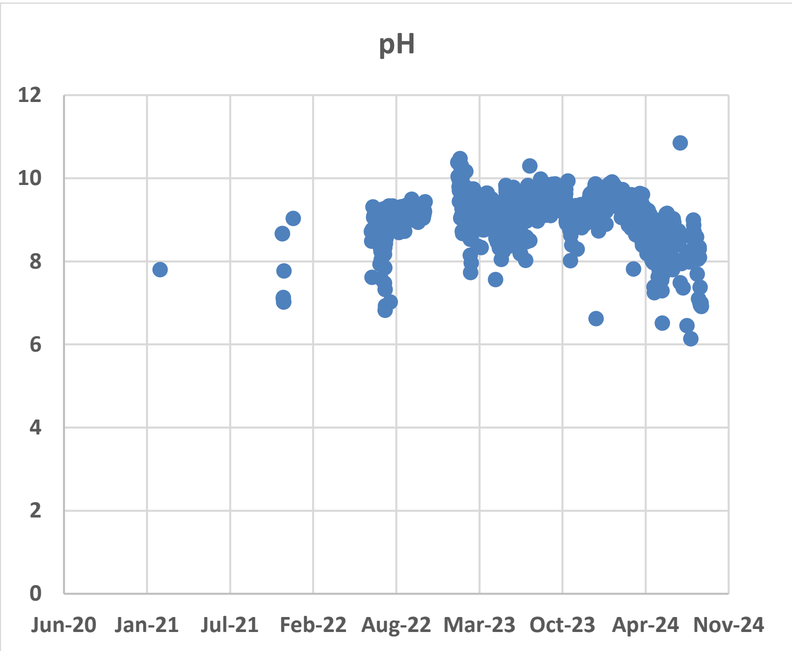


Figure 17: Dirty water dam recovery pH at Tutuka Power Station

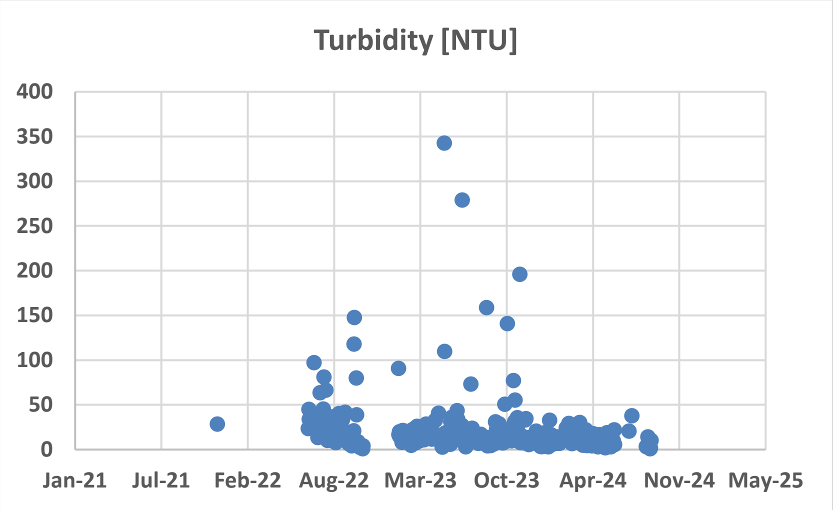


Figure 18: Dirty water dam recovery turbidity at Tutuka Power Station

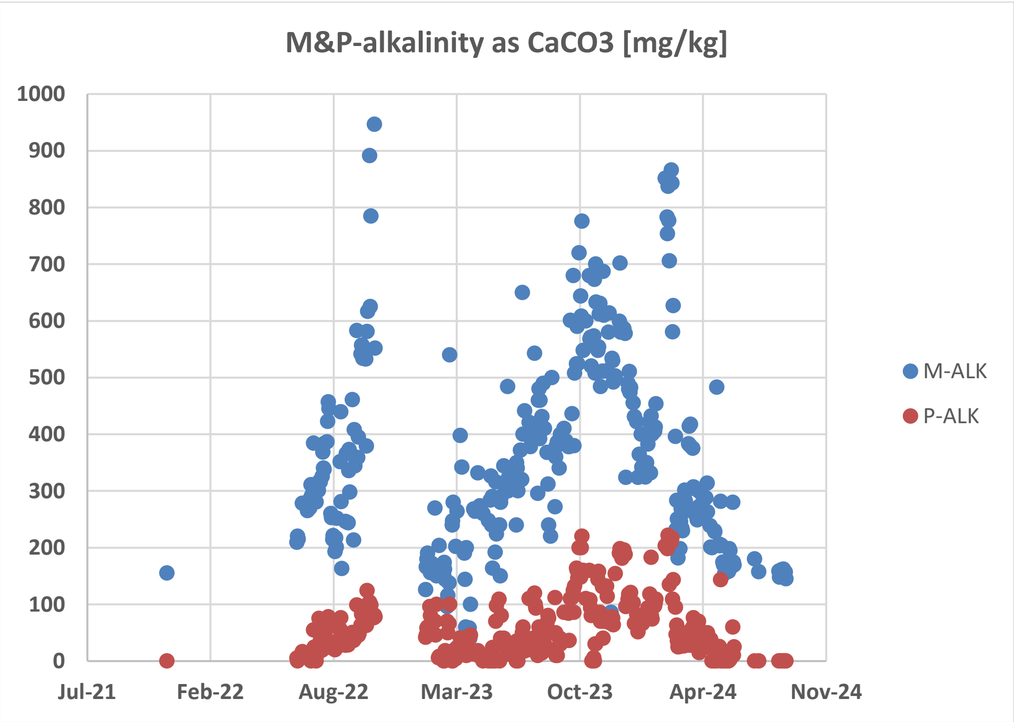


Figure 19: Dirty water dam recovery M&P alkalinity at Tutuka Power Station

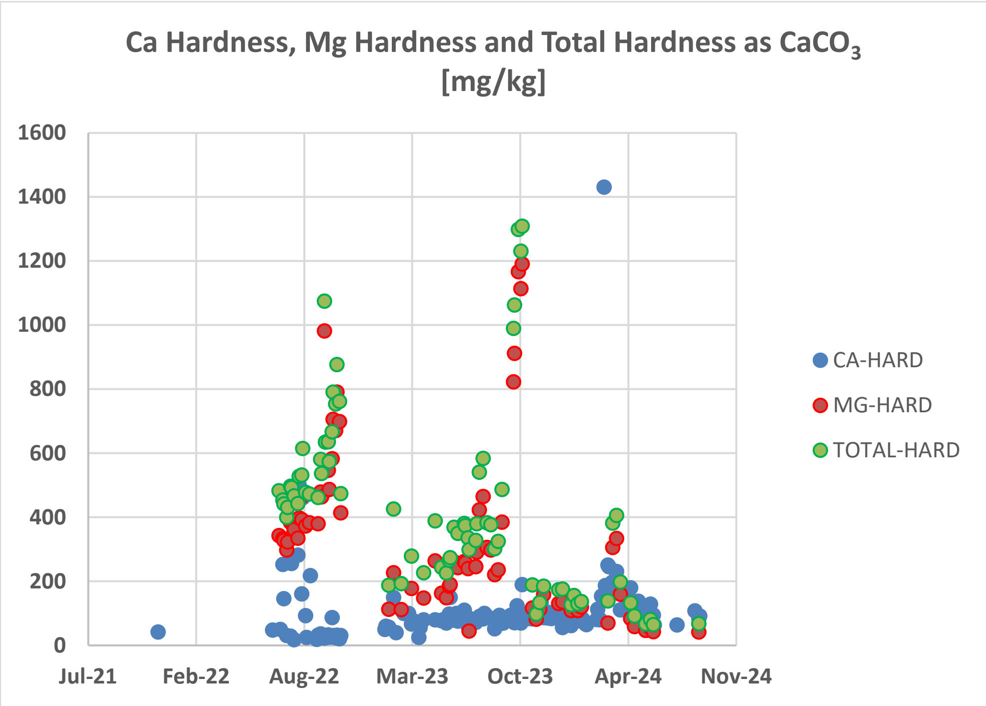
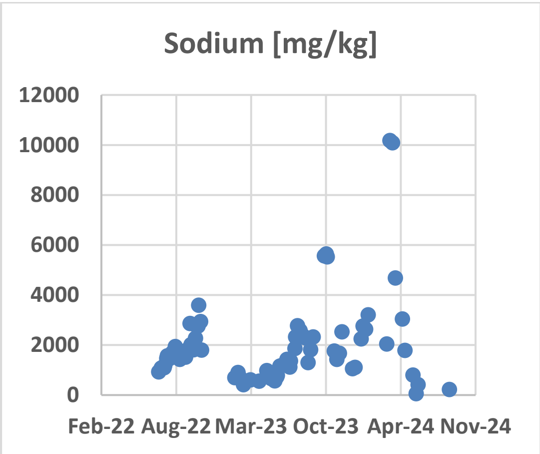


Figure 20: Dirty water dam recovery Calcium, magnesium and total hardness at Tutuka Power Station



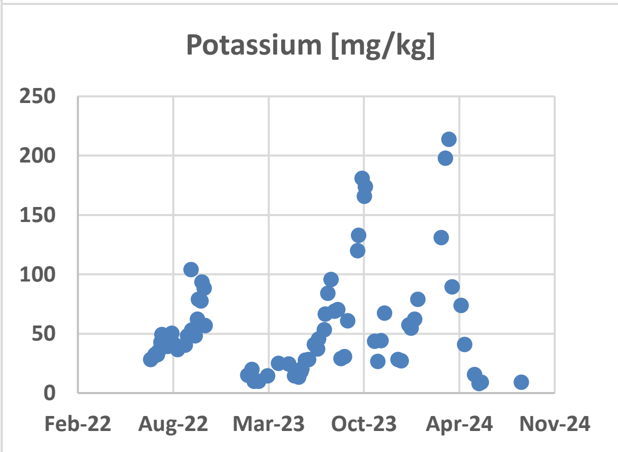
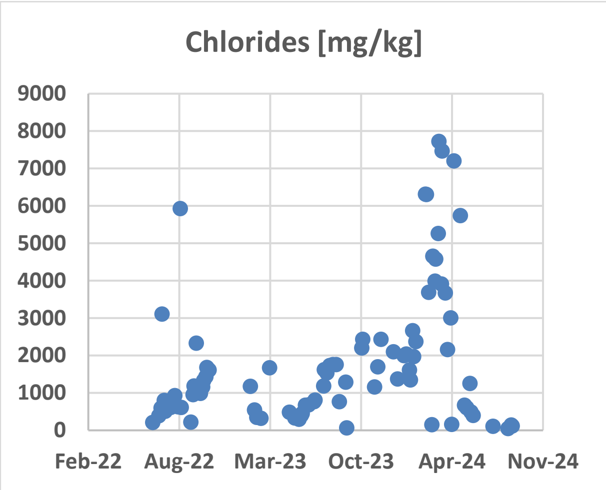


Figure 21: Dirty water recovery Sodium

Figure 22: Dirty water recovery Potassium



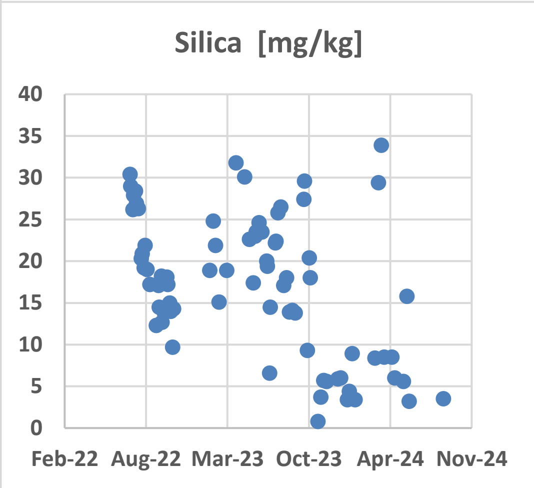


Figure 23: Dirty water recovery chlorides

Figure 24: Dirty water recovery silica

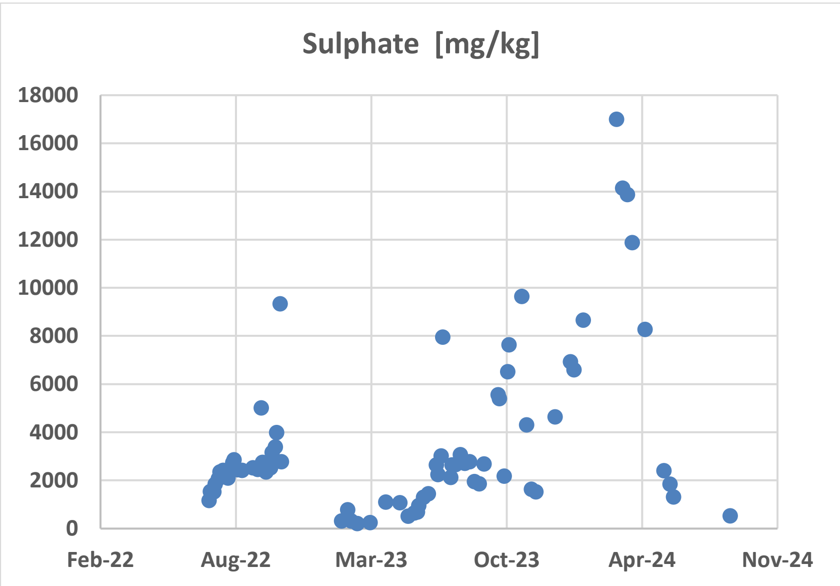


Figure 25: Dirty water recovery Sulphate

The water that is recovered must be of a quality similar to raw water quality in Table 1 or better. The flow requirement differs for each of the sites from 100 l/s to about 400l/s. The water to be treated (i.e. the DWD recovery stream) is predominantly a mixture of clay, sand and coal in water. The indicative dry base ash of a DWD sample is 63%. The typical particle size of the solids in the water is between 0.25 µm – 794.33 µm.

a. Ash Water – High pH

Many of the stations have problems with very high levels of water in the ash system. Reverse osmosis plants have been built at some of the stations to treat this water. These reverse osmosis plants are problematic as a result frequent scaling. A solution is required for the treatment of this high salinity, high pH water.

The typical water quality for treatment from the ash dams at Duvha is as indicated in the Figures 26-32 and Table 3 below:

Table 3: Ash water return (Duvha Power Station)

Parameter	Unit	Range	Average	95th percentile
pH	-	7.99 – 12.48	11.14	12.06
Conductivity	µS/cm	152 - 4707	1897.01	3524.9
Turbidity	NTU	0.22-14.4	2.34	6.21
Calcium Hardness as $CaCO_3$	mg/kg	300-1784	77.35	1394.7
Magnesium Hardness as $CaCO_3$	mg/kg	86 – 327	163.98	224.9
Total Hardness as $CaCO_3$	mg/kg	330 – 1970	921.87	1540.7
m-alkalinity	mg/kg	20.7 – 700.8	179.48	532.8
p-alkalinity	mg/kg	9.2 – 687.7	164.68	520.68
Sodium	mg/kg	8.38 – 277	134.54	174.3
Ammonium	mg/kg	0 – 1.1	0.1	0.335
Nitrate	mg/kg	0 – 18.7	4.16	12.1
Phosphate	mg/kg	0.1 – 27.6	0.91	6.6
Potassium	mg/kg	16.6 – 315	39.89	56.84
Chloride	mg/kg	4.37 – 252	91.18	126.8

Parameter	Unit	Range	Average	95th percentile
Fluoride	mg/kg	0 – 12.5	0.86	4.67
Sulphate	mg/kg	37.4 – 1403	649.09	969.35
TOC as C	mg/kg	0.762 – 6	2.38	3.94

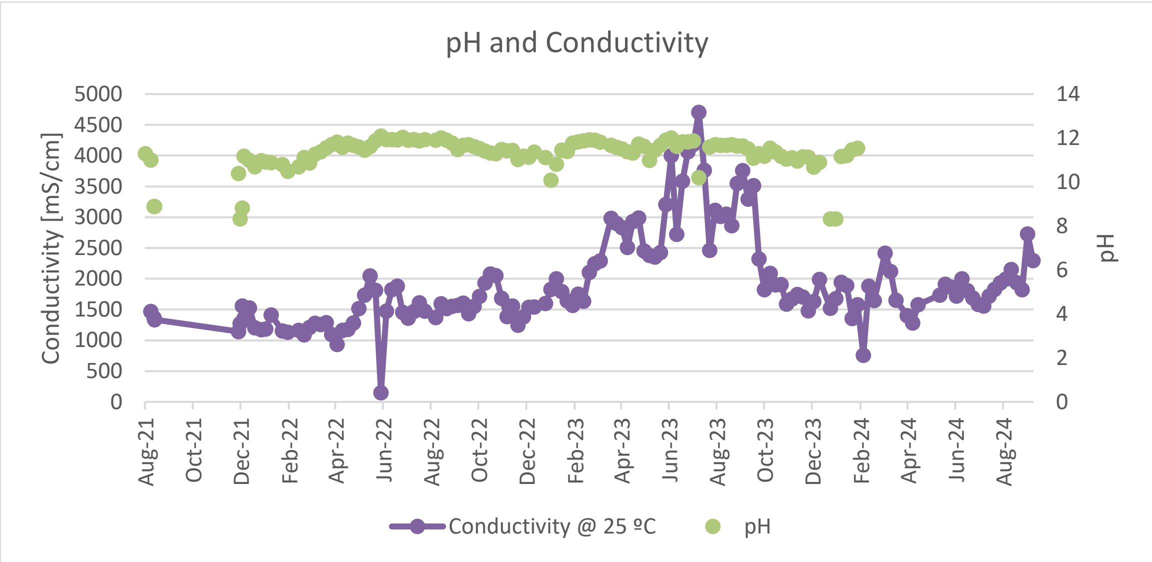


Figure 26: Duvha Ash Water pH and Conductivity

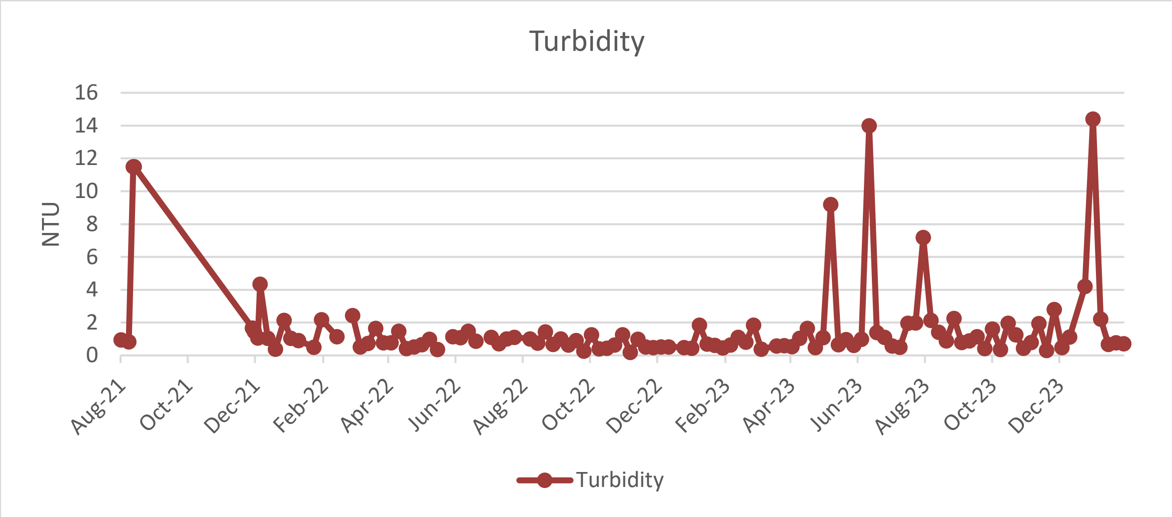


Figure 27: Duvha Ash Water Turbidity

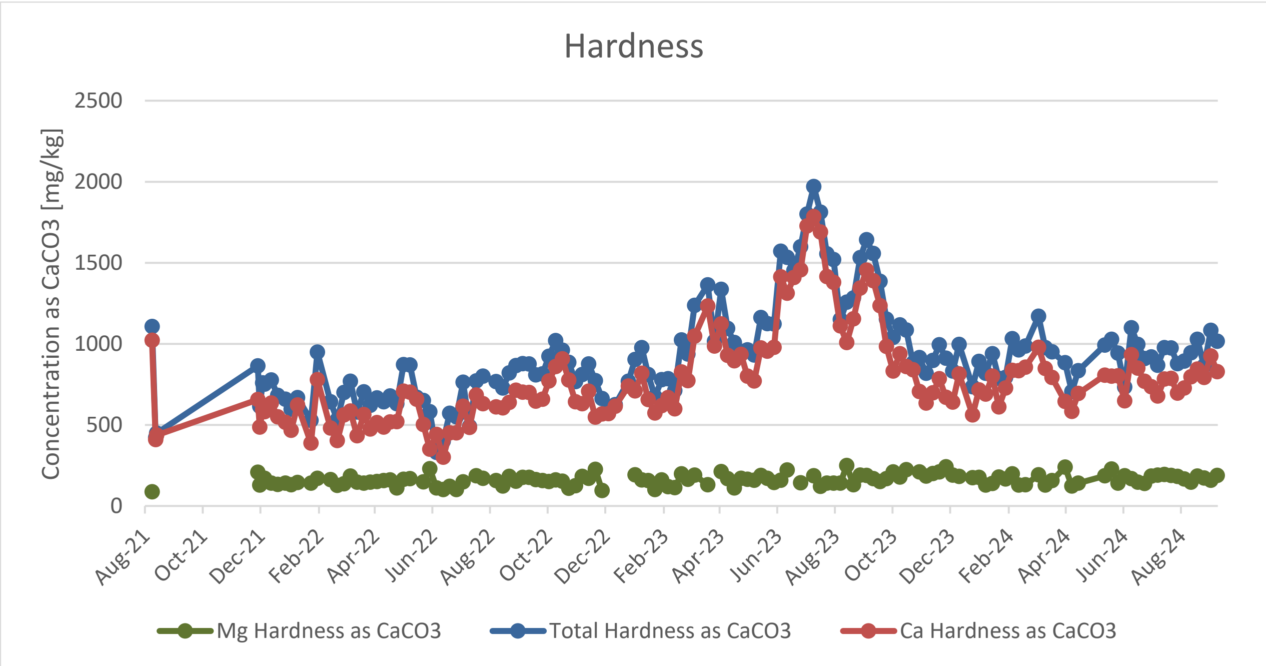


Figure 28: Duvha Ash Water Hardness

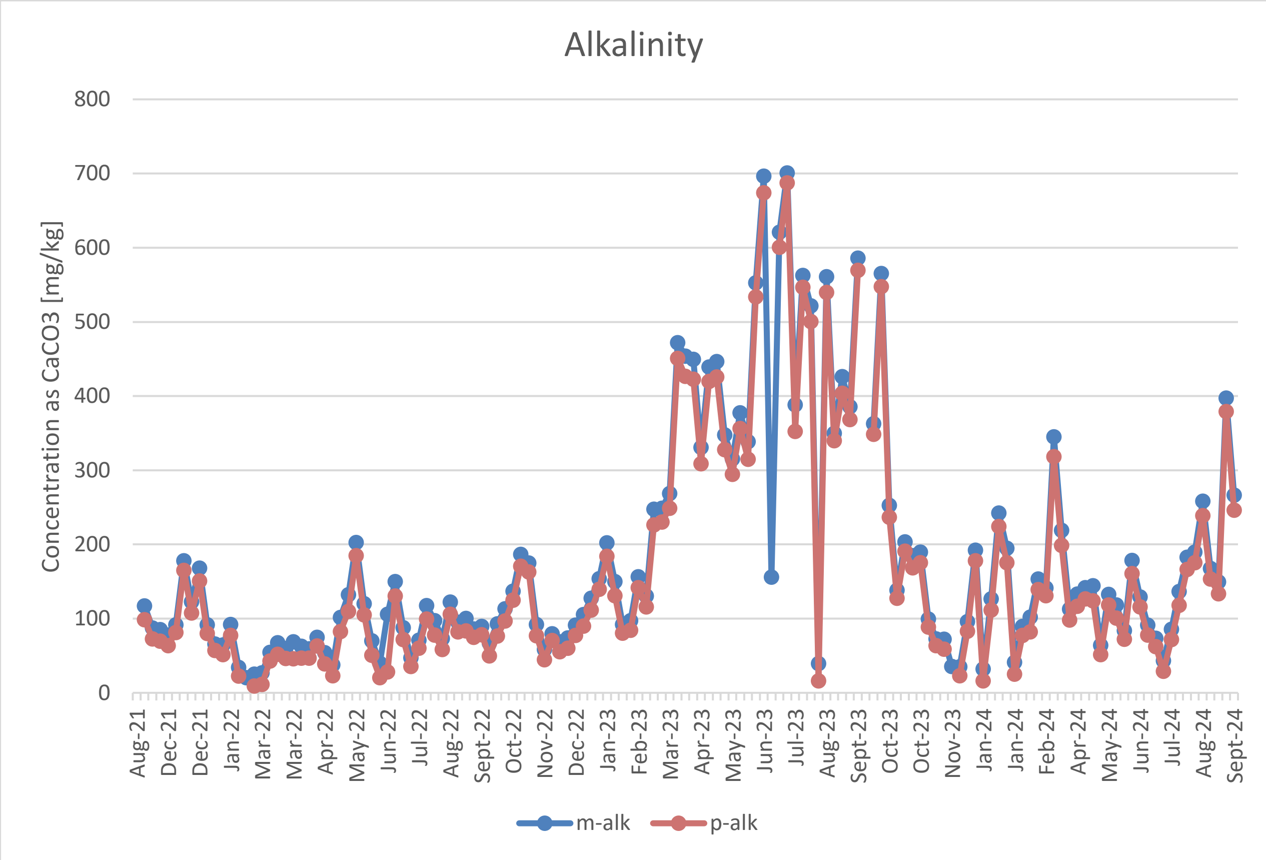


Figure 29: Duvha Ash Water Alkalinity

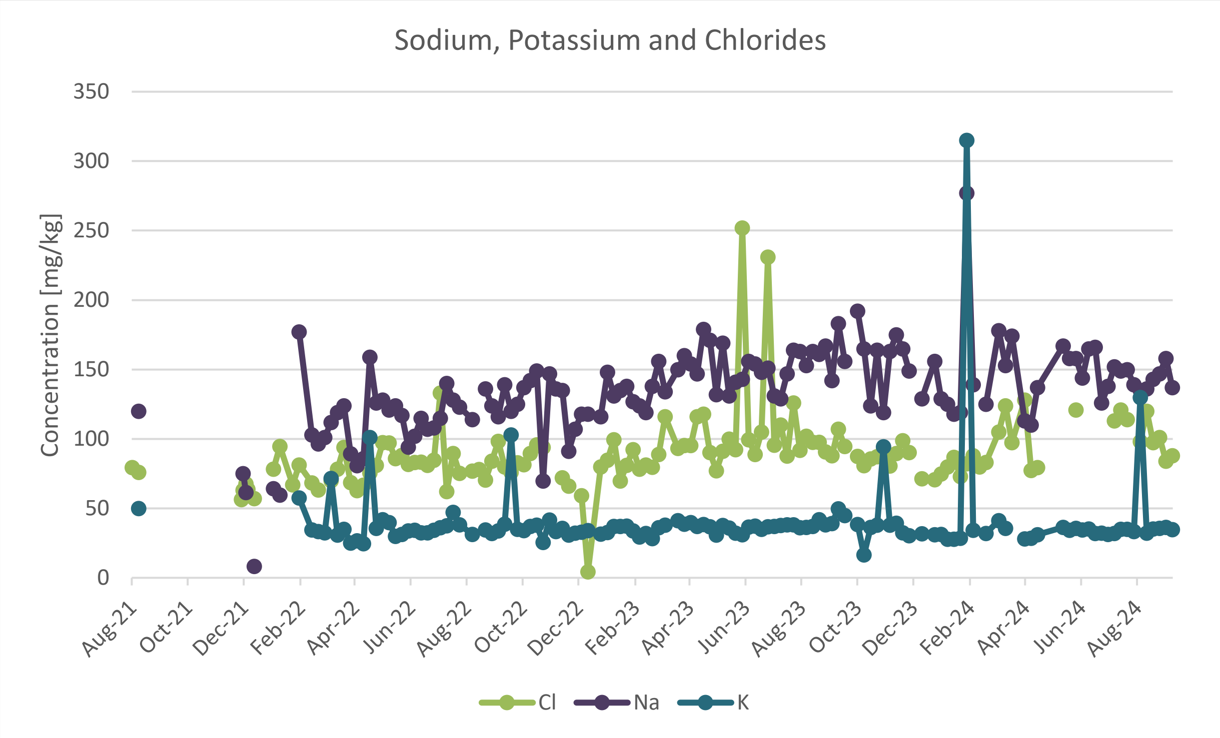


Figure 30: Duvha Ash Water Sodium, Chlorides and Potassium

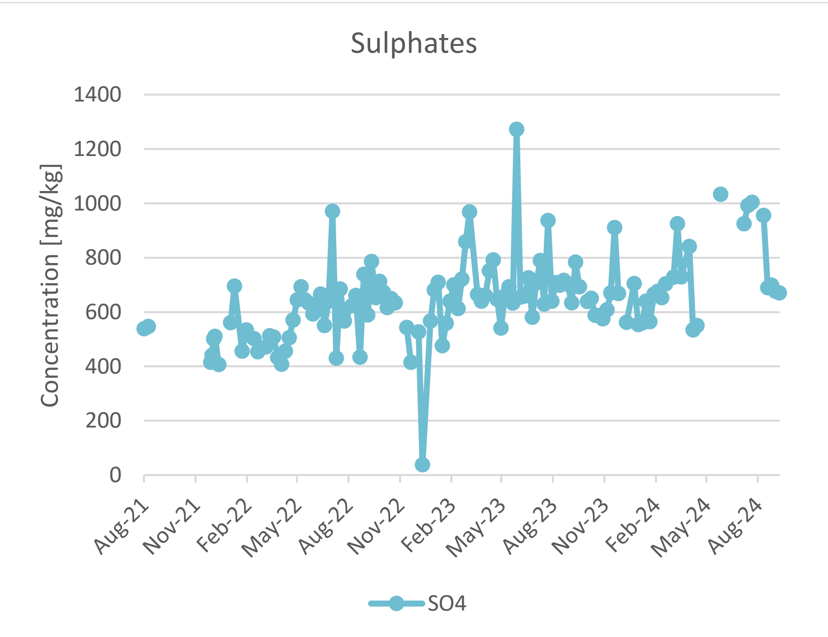


Figure 31: Duvha Ash Water Sulphates

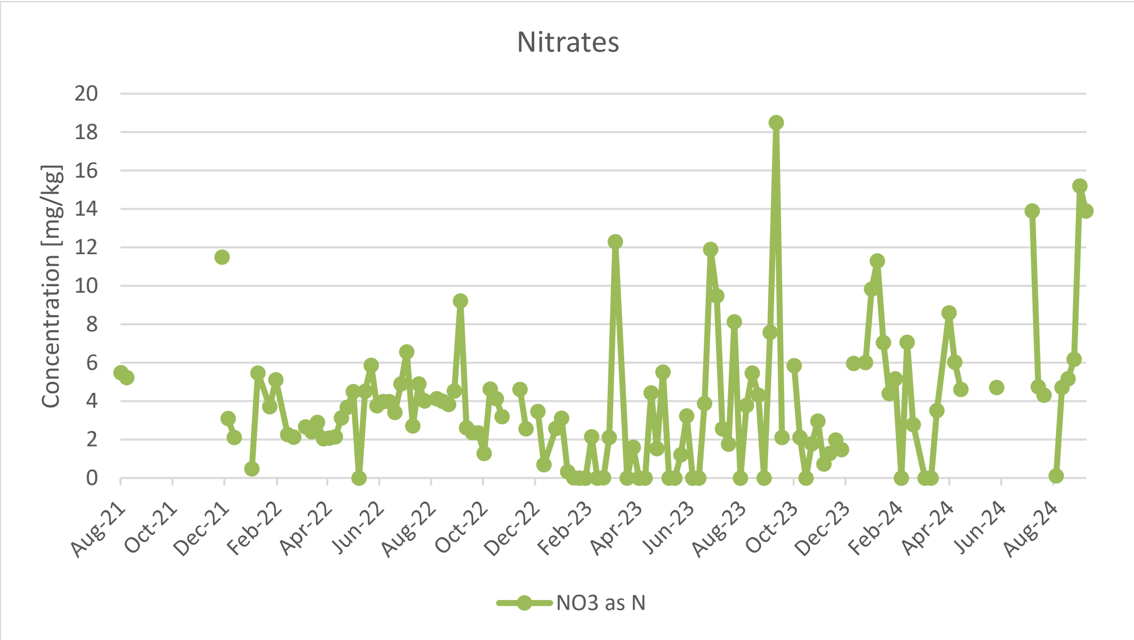


Figure 32: Duvha Ash Water Nitrates

The typical water quality for treatment from the ash dams at Kriel is as indicated in the Figures 33-39 and Table 4 below:

Table 4: Ash water return (Kriel Power Station)

Parameter	Unit	Range	Average	95th percentile
pH	-	7.4 – 12.23	10.713	11.94
Conductivity	µS/cm	229 - 4640	2628.21	4435
Turbidity	NTU	0.61 – 3.35	1.75	3.19
Calcium Hardness as $CaCO_3$	mg/kg	21.3-890	386.58	836
Magnesium Hardness as $CaCO_3$	mg/kg	2.47 - 563	58.47	379.8
Total Hardness as $CaCO_3$	mg/kg	42.7 – 1348	523.82	1269.7

m-alkalinity	mg/kg	15.5 – 662.6	189.48	545.58
p-alkalinity	mg/kg	0 – 623.1	133.92	335.5
Sodium	mg/kg	193 – 380	327.54	378.3
Nitrate	mg/kg	0.02 – 2.51	0.76	2.44
Potassium	mg/kg	42.7 – 97.5	82.13	96.81
Chloride	mg/kg	78 – 307	111.56	165.6
Fluoride	mg/kg	0.01 – 1.67	0.49	1.47
Sulphate	mg/kg	425 – 1671	923.19	1169.25

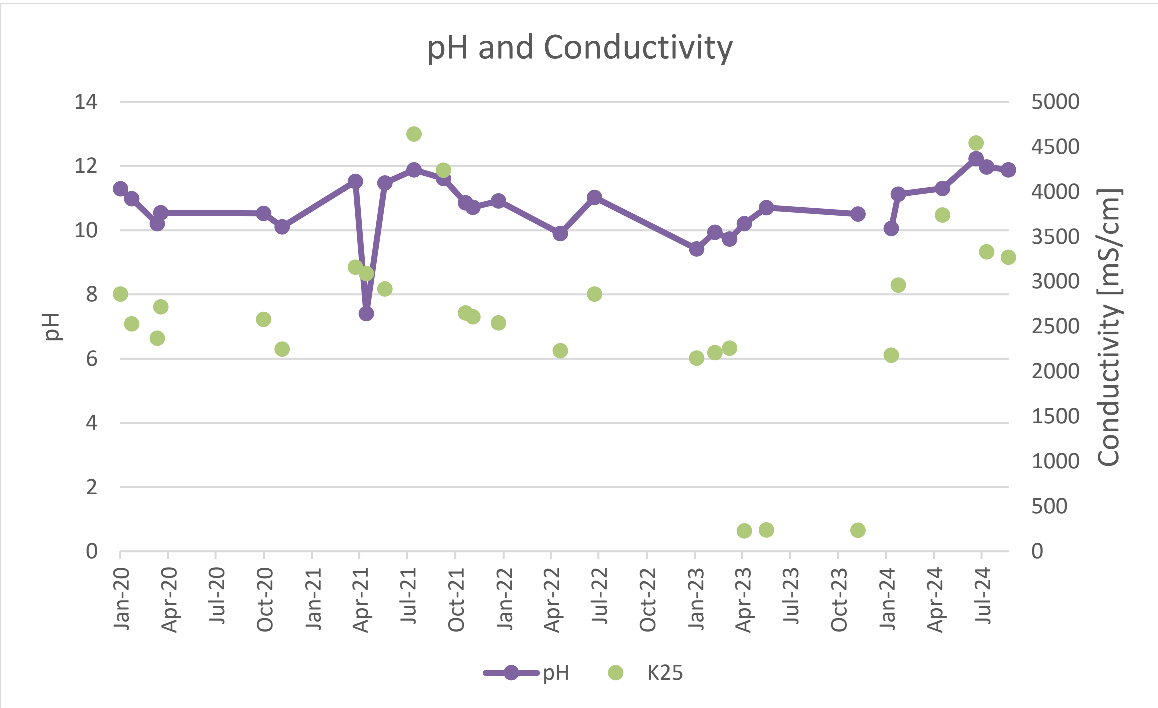


Figure 33: Kriel Ash Water pH and Conductivity

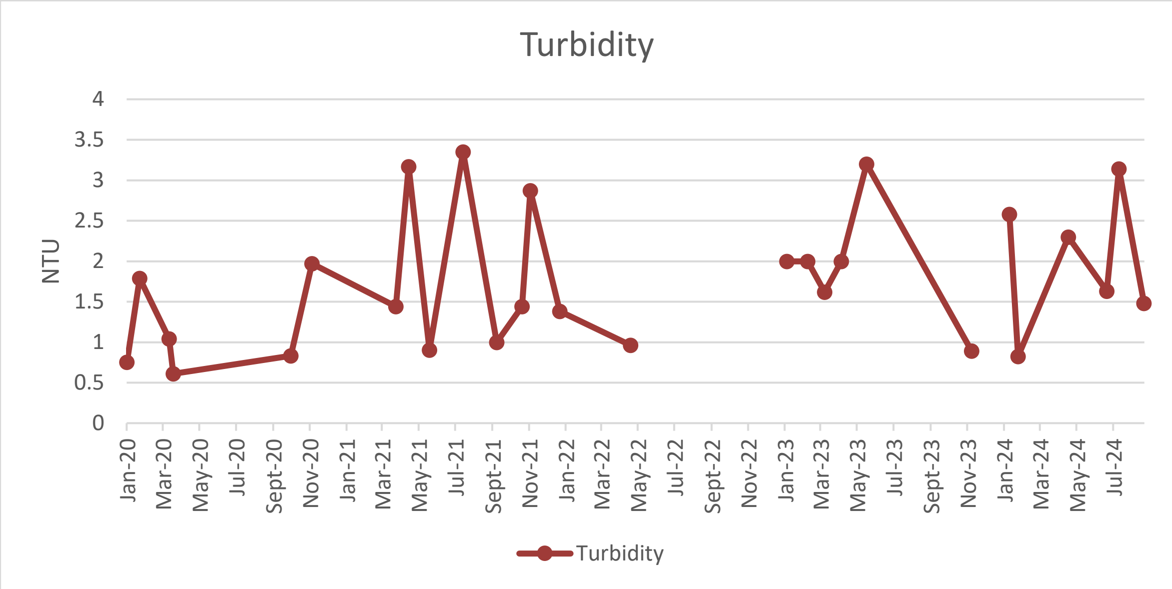


Figure 34: Kriel Ash Water Turbidity

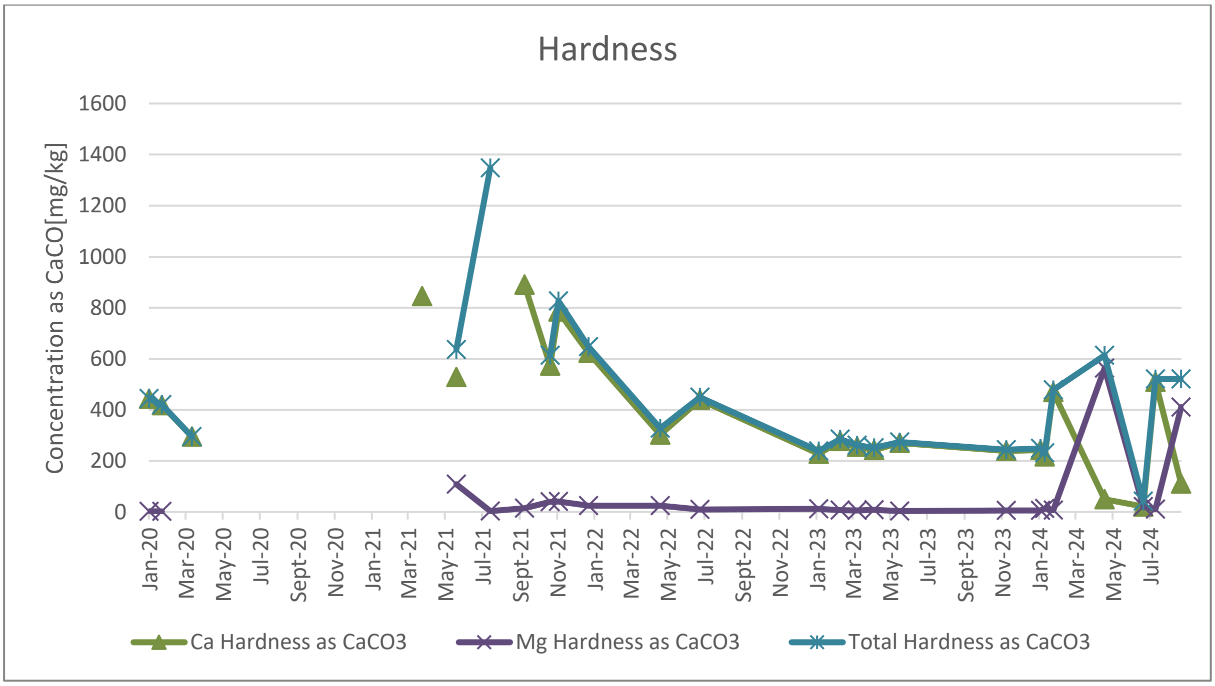


Figure 35: Kriel Ash water Hardness

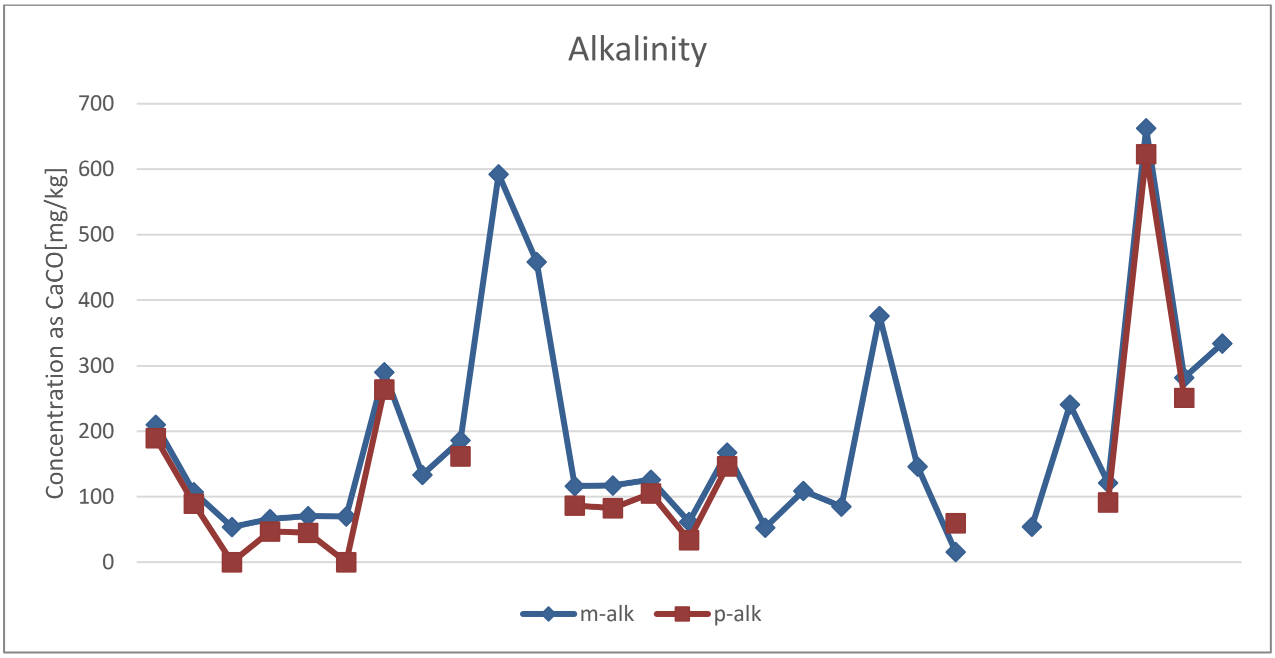


Figure 36: Kriel Ash water Alkalinity

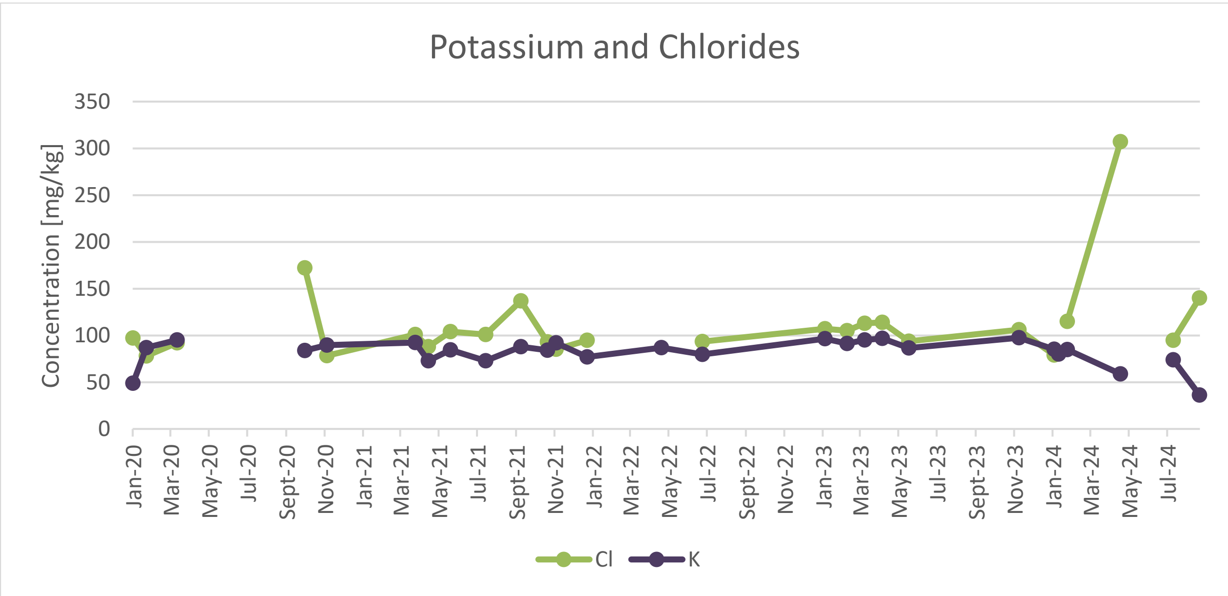


Figure 37: Kriel Ash water Potassium and Chloride concentration

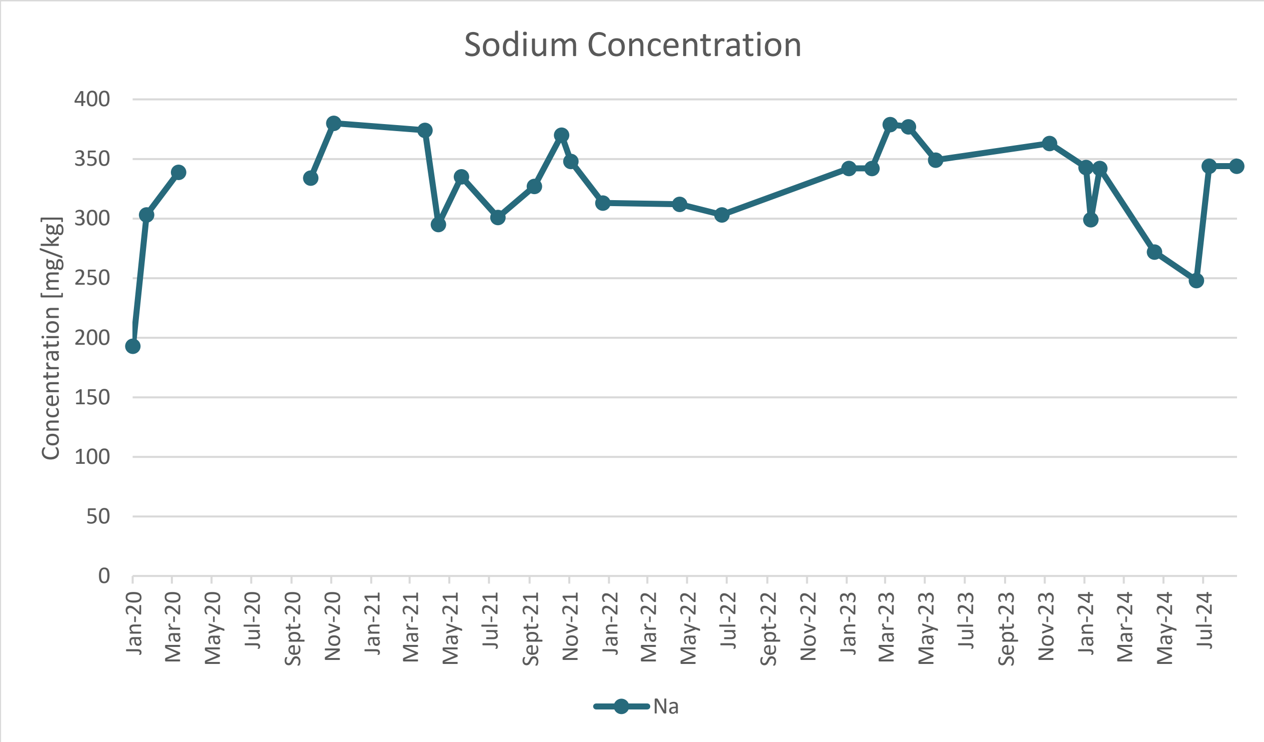


Figure 38: Kriel Ash water sodium concentration

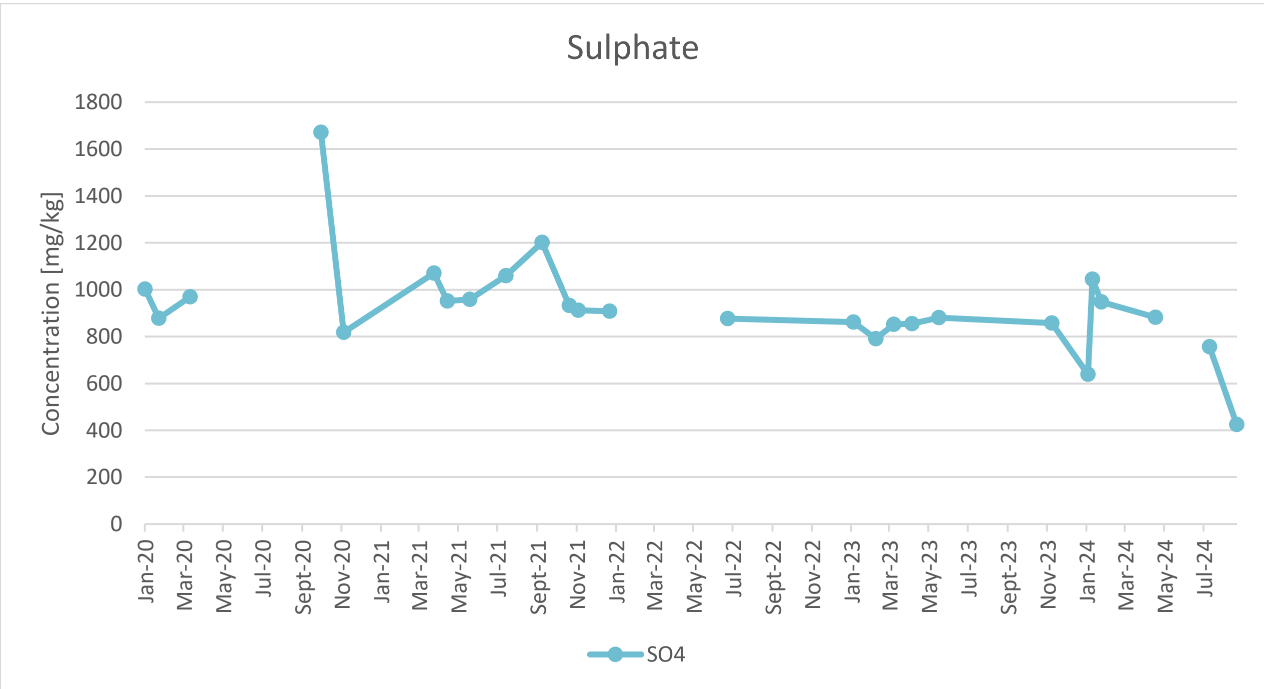


Figure 39: Kriel Ash water sulphate concentration

The flow requirement differs for each of the sites from 3 to 6Ml/day.

b. FGD bleedstream

In a drive to reduce the particulate emissions at the newly built power stations, flue gas desulphurisation plants have been built at Kusile and the intention is for another to be built at Medupi. However, the bleedstream from this water has to be treated further. Thermal crystallisation is one of the techniques being utilised to treat this water. This plant has been installed at Kusile. However, it is a very cost intensive plant with extremely high capital and operating costs. An alternative solution must be investigated which could treat this water.

The typical range of water quality for treatment is not known as yet since the analysis of these streams are still in progress. However, the chemical analysis as per the design is in the table below. The flow requirement differs for this plant and has a design of 50 m^3/hr and a normal operating flowrate of 25m^3/hr. The table below refers to the design parameters for the plant.

Table 5: Designed chemical parameters for the Bleedstream from the FGD plant (Kusile Power Station)

PARAMETER	CONCENTRATION [mg/L ion] BEFORE PRE-TREATMENT
Chloride	30,000
Sulfate	1,500 - 8,000
Sulfite	<20
Nitrate	100 – 1,500
Fluoride	30 – 200
Calcium	4,000 – 20,000
Magnesium	200 – 5,600
Sodium	75 – 1,200
Iron	30 – 400
Aluminum	50 – 800
Arsenic	0.05 – 3.0
Boron	20 – 40

PARAMETER	CONCENTRATION [mg/L ion] BEFORE PRE-TREATMENT
Boron (as HBO_3)	
Cadmium	0.04 – 0.5
Cobalt	0.05 – 0.4
Chromium Total	0.3 – 5.0
Copper	0.1 – 0.85
Mercury	0.05 – 0.8
Nickel	0.2 – 6.0
Lead	0.1 – 3.0
Selenium	0.2 – 1.0
Vanadium	0 – 2.4
Zinc	5 – 10
Ammonium	<10 – 100
Ammonia	
COD	100 – 150
pH	4 – 7
TSS	300 – 10,000
Bicarbonate	
Silica	
TOC	

However, the samples from the plant have been tested and certain parameters are less than the designed parameters. Refer to the table below for the last set of samples. Since the intention is to test the water to the design parameters of the plant, the contractor must make allowance for recycle of the concentrate stream in order to cycle up the ions.

Table 6: Chemical operational parameters for the Bleedstream from the FGD plant (Kusile Power Station)

PARAMETER	UNITS	CONCENTRATION [mg/L ion] BEFORE PRE-TREATMENT
Total Alkalinity (pH>4.5)	mg CaCO3/L	60.2
Bicarbonate Alkalinity	mg CaCO3/L	60.2
Carbonate Alkalinity	mg $CaCO_3$/L	0.00
M Alkalinity (8.3>pH>4.5)	mg $CaCO_3$/L	60.2

PARAMETER	UNITS	CONCENTRATION [mg/L ion] BEFORE PRE-TREATMENT
P Alkalinity (pH>8.3)	mg $CaCO_3$/L	0.00
Conductivity (Laboratory)	mS/cm	2560
pH (Laboratory)		6.69
Total Hardness	mg $CaCO_3$/L	13215
Calcium Hardness	mg $CaCO_3$/L	2068
Magnesium Hardness	mg $CaCO_3$/L	11147
Total Dissolved Solids (TDS)	mg/L	17779
Suspended Solids (TSS)	mg/L	5528
Temperature	°C	21.0
Chemical Oxygen Demand (COD)	mg O_2/L	4000
Ammonia and Ammonium	mg N/L	
Calcium	mg Ca/L	828
Chloride	mg Cl/L	1004
Magnesium	mg Mg/L	2707
Nitrate and Nitrite (TON)	mg N/L	4.14
Potassium	mg K/L	136
Sodium	mg Na/L	1369
Silicon	mg Si/L	34.5
Sulphate	mg SO_4/L	9008
Aluminium	mg Al/L	1.33
Antimony	mg Sb/L	
Arsenic	mg As/L	0.06
Barium	mg Ba/L	0.10
Beryllium	mg Be/L	0.01
Boron	mg B/L	68.8
Bromide	mg Br/L	
Cadmium	mg Cd/L	0.002
Chromium	mg Cr/L	0.01
Cobalt	mg Co/L	0.10
Copper	mg Cu/L	0.01
Fluoride	mg F/L	71.7
Iron	mg Fe/L	0.09

PARAMETER	UNITS	CONCENTRATION [mg/L ion] BEFORE PRE-TREATMENT
Lead	mg Pb/L	0.23
Lithium	mg Li/L	6.86
Total Manganese	mg Mn/L	
Manganese	mg Mn/L	2317
Mercury	mg Hg/L	0.003
Molybdenum	mg Mo/L	0.08
Nickel	mg Ni/L	0.84
Selenium	mg Se/L	1.21
Strontium	mg Sr/L	1.29
Tin	mg Sn/L	0.04
Vanadium	mg V/L	0.96
Zinc	mg Zn/L	0.41
Total Organic Carbon (TOC)	mg C/L	
Total Sulphur	mg S/L	

c. Effluent from the Spiral Reverse Osmosis plant

The resin regeneration and reverse osmosis effluent is sent to the neutralisation sump. From this sump it is further sent for co-disposal with the ash. Legislation passed in 2013, states that brine with a high salt content (TDS>5%), cannot be co-disposed with the ash from 2021 onwards. Hence, a solution is required to treat this water instead of the co-disposal with ash. The typical range of water quality for treatment of the SRO brine is as per table and Figures 40-52 below when the plant was last in service.

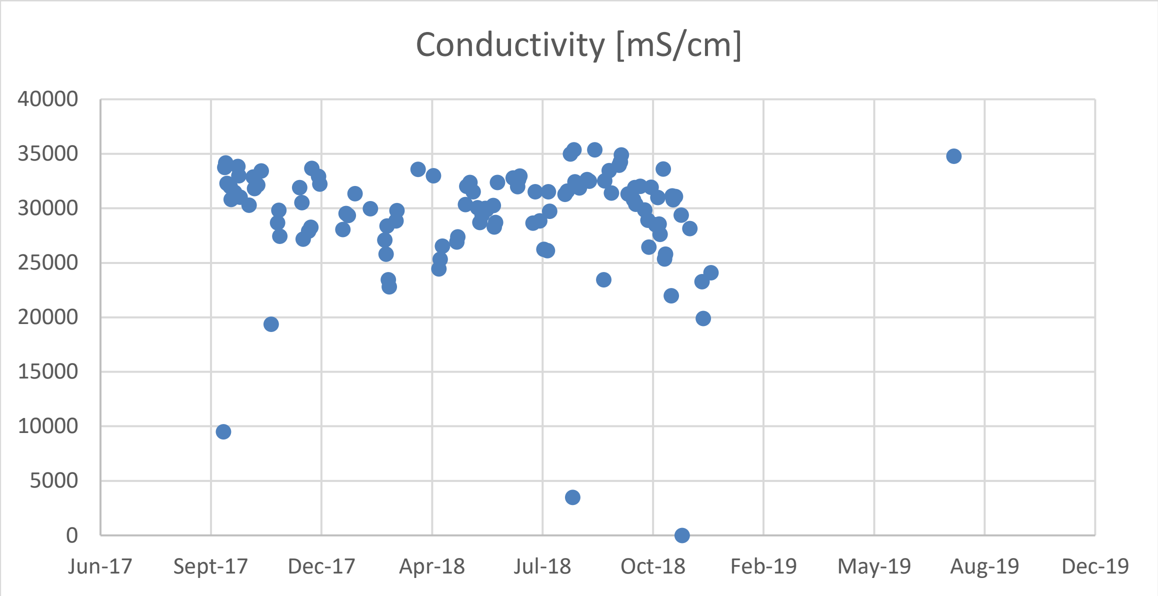


Figure 40: Tutuka SRO brine conductivity

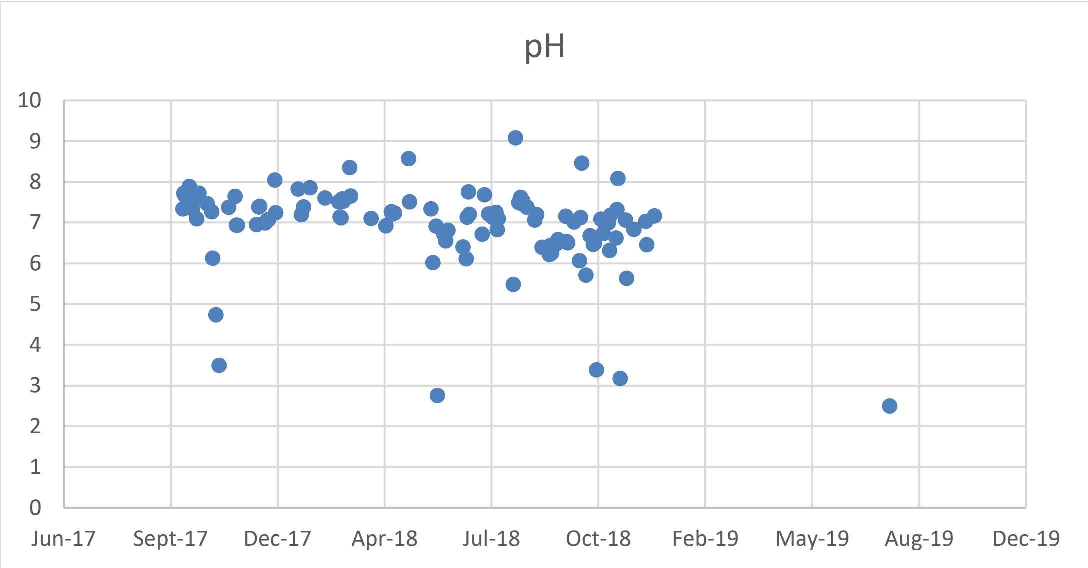


Figure 41: Tutuka SRO brine pH

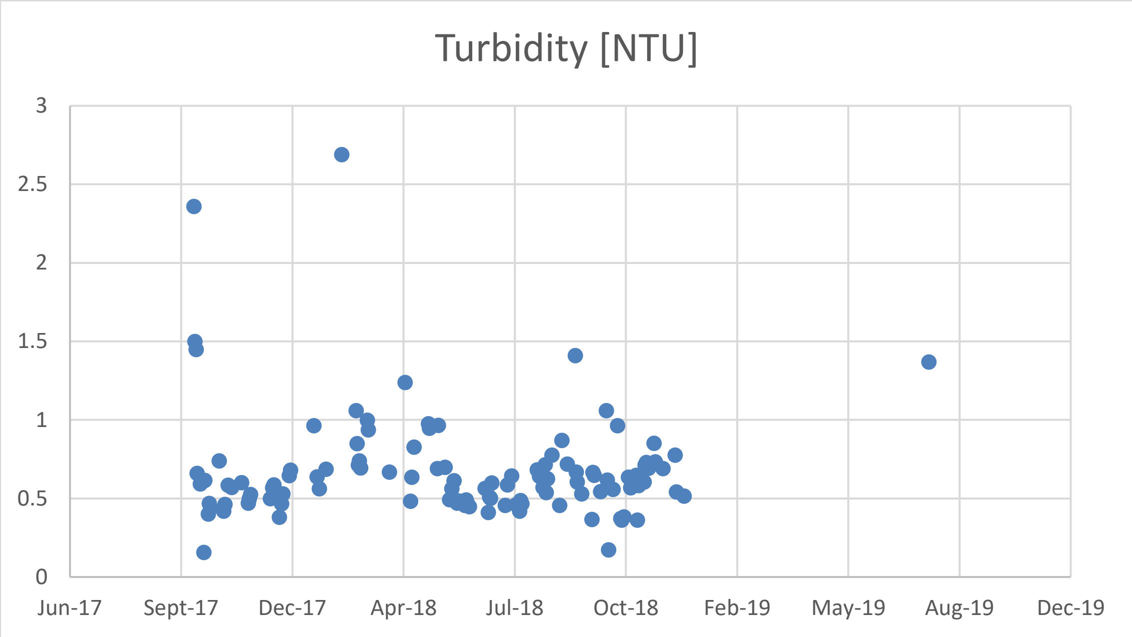


Figure 42: Tutuka SRO brine turbidity

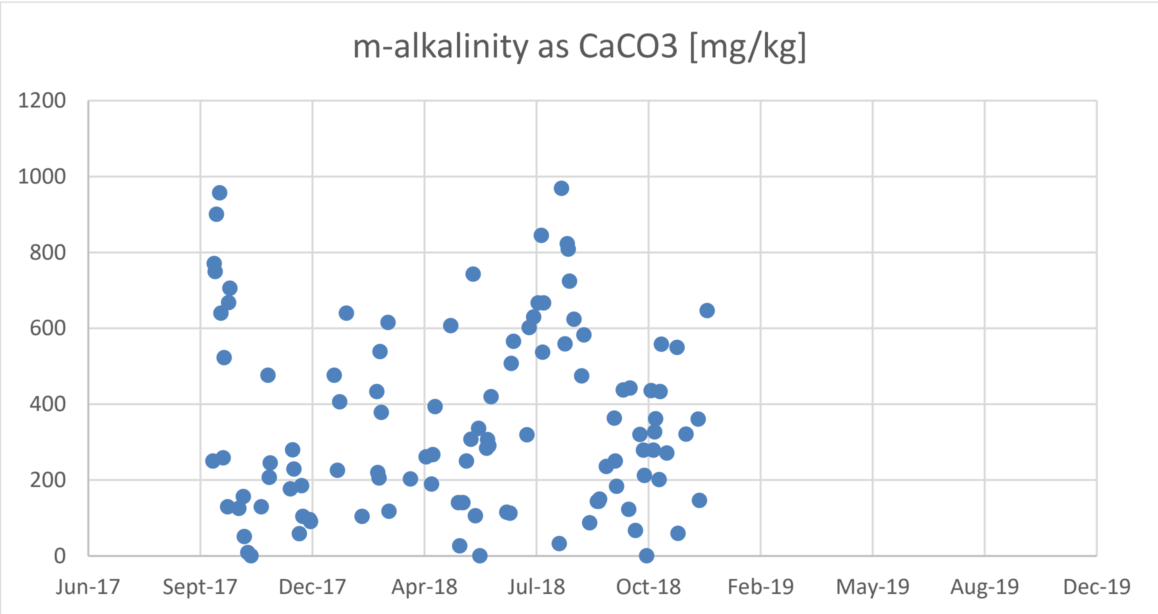


Figure 43: Tutuka SRO brine m-alkalinity

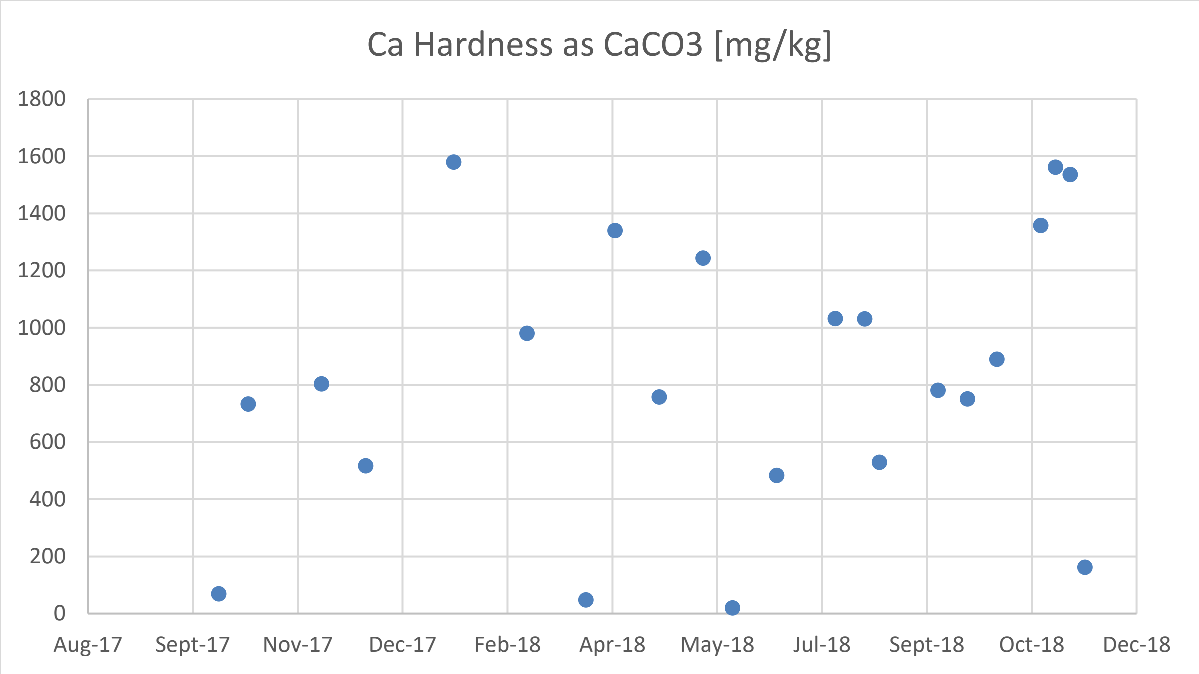


Figure 44: Tutuka SRO Calcium hardness

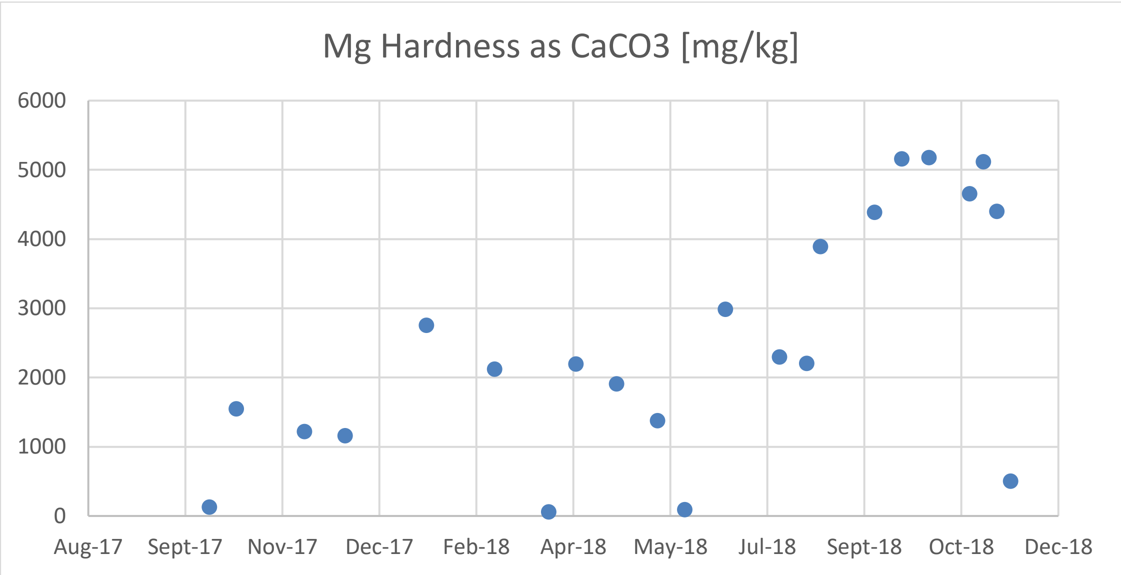


Figure 45: Tutuka SRO brine magnesium hardness

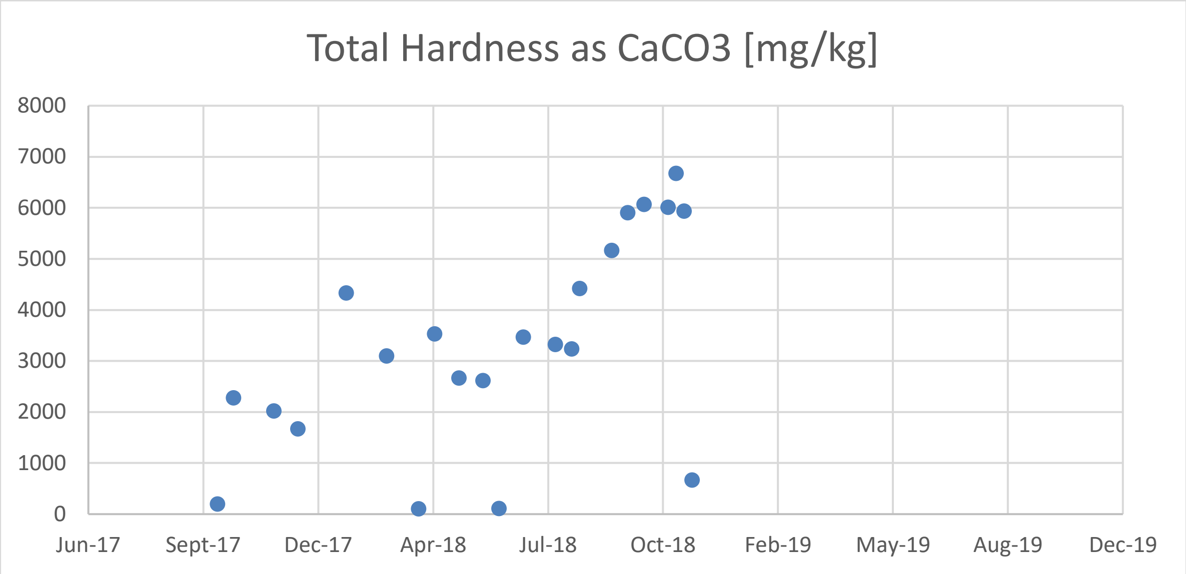


Figure 46: Tutuka SRO total hardness

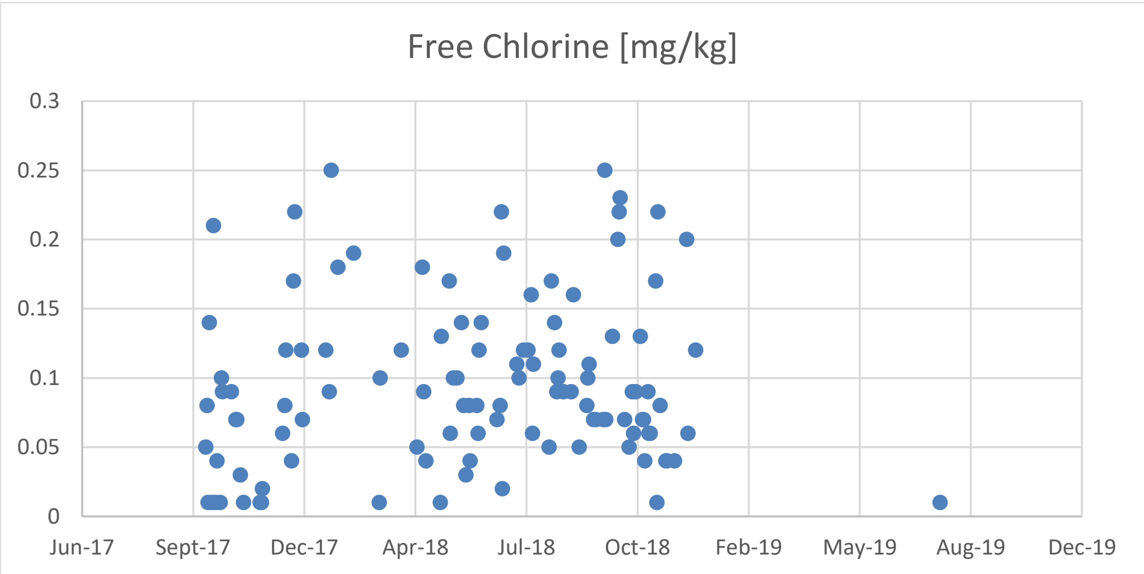


Figure 47: Tutuka SRO brine Free chlorine

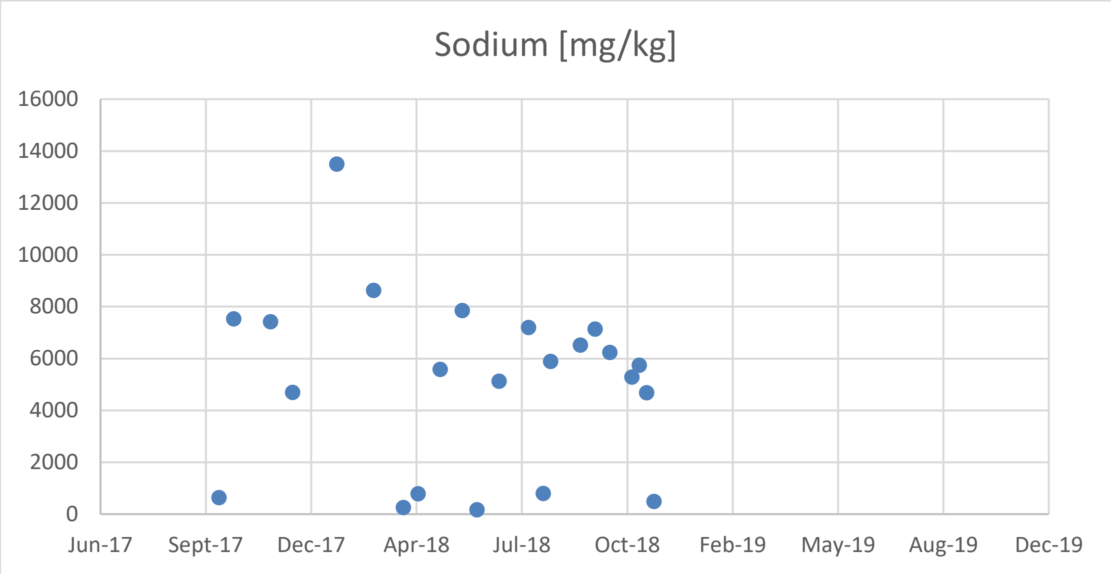


Figure 48: Tutuka SRO sodium concentration

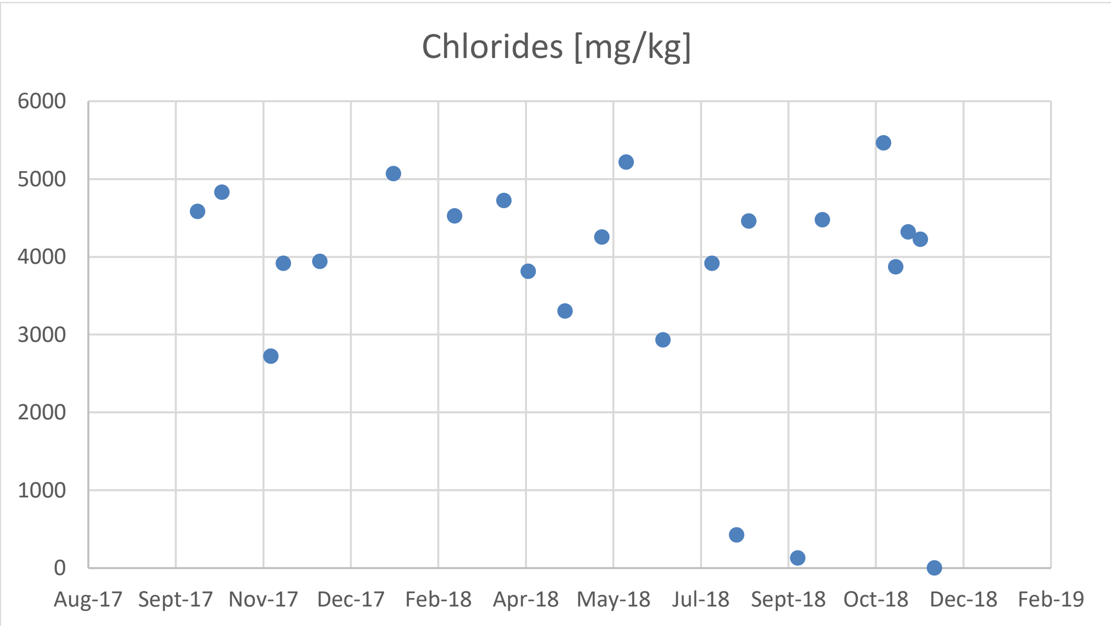


Figure 49: Tutuka SRO chlorides concentration

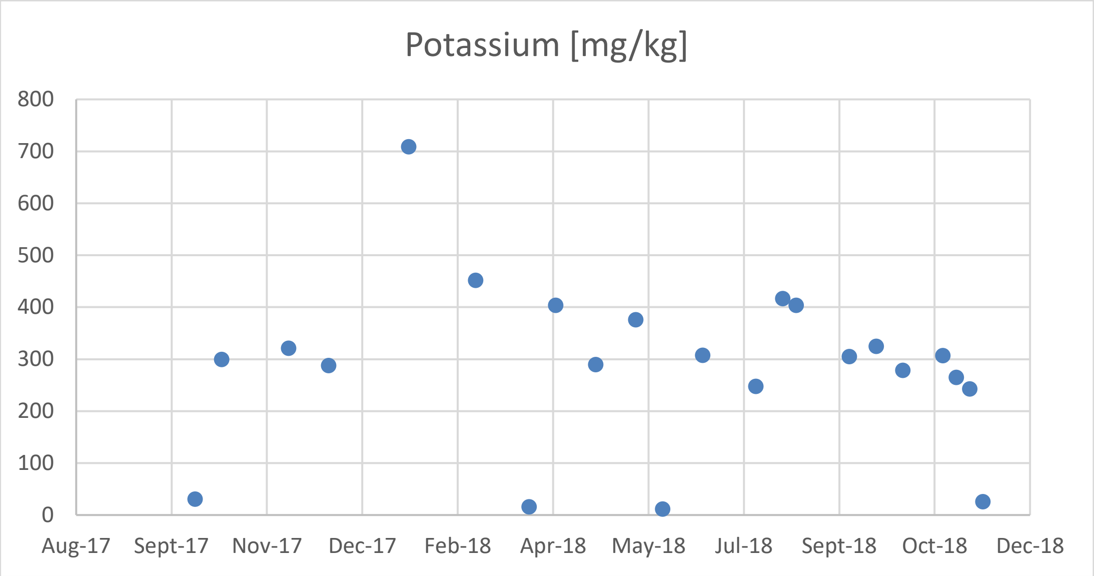


Figure 50: Tutuka SRO potassium concentration

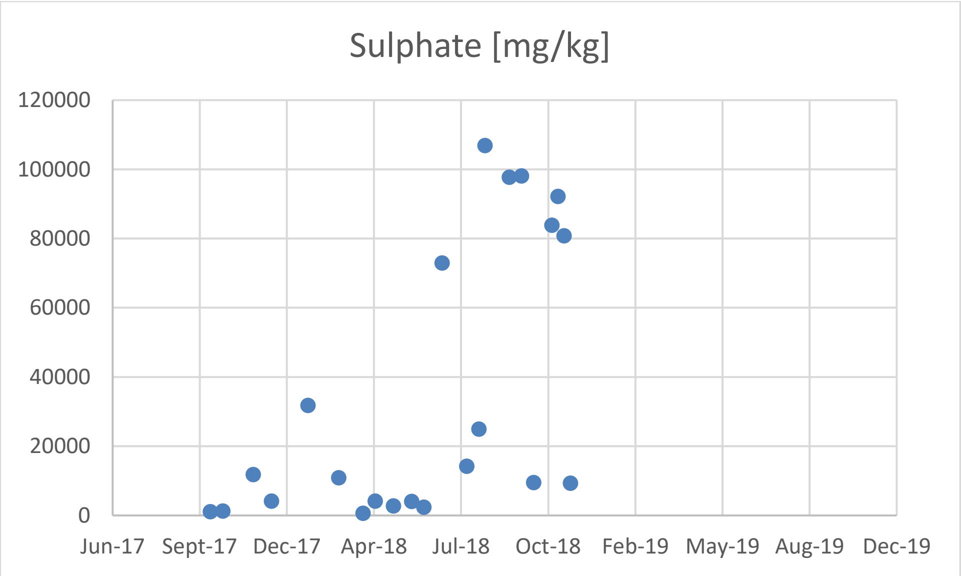


Figure 51: Tutuka SRO sulphate concentration

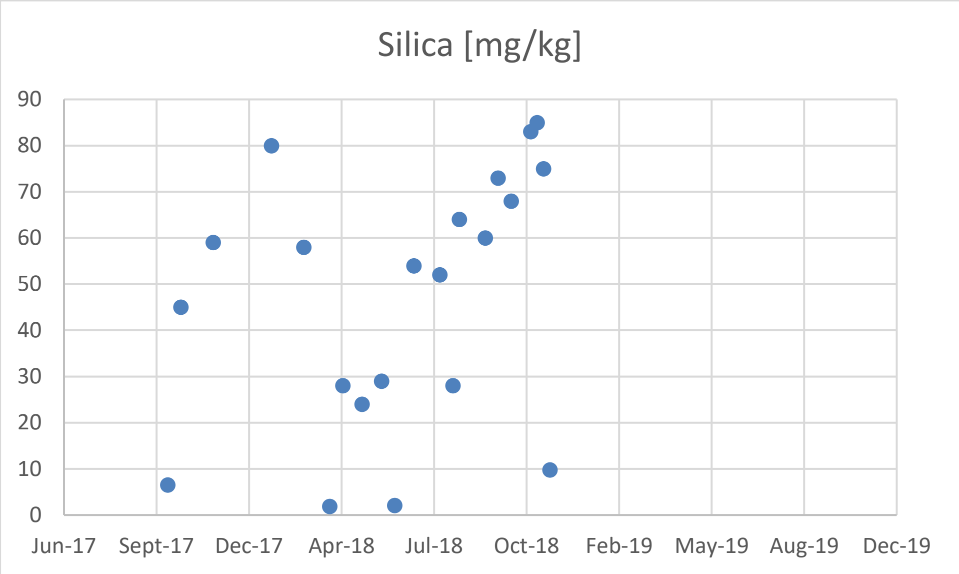


Figure 52: Tutuka SRO silica concentration

d. CW sidestream/blowdown

Water from the concentrated cooling water system is blown down when the water quality is out of specification with respect to the limits in the Eskom Cooling Water Chemistry standard. There are times when the water cannot be blown down because of high water levels in the ash system. The water then concentrates out of specification which exacerbates the scaling potential of the water and results in scaling of the cooling water system. Currently, lime softening treatment has been employed at many stations to treat the concentrated cooling water on a side stream. These plants have however been found to be problematic and are often out of service. Since this water is not as saline as the other waters being tested, this stream will be tested for sensitivity analysis purposes.

The typical range of water quality for treatment from the CCW at Kriel is as indicated below:

Table 7: Concentrated Cooling water (Kriel Power Station)

		Kriel CW South			Kriel CW north		
Parameter	**Unit**	**Range**	**Average**	**95th percentile**	**Range**	**Average**	**95th percentile**

		Kriel CW South			Kriel CW north		
pH	-	6.9 - 9.0	8.4	8.6	7.6 - 8.9	8.6	8.8
Conductivity	µS/cm	1.5 - 32680	2393	3440	0.3 – 24560	2448.6	3620
Turbidity	NTU	4.4 - 323	21.1	36.4	2.4 – 253	17.7	32.4
TSS	mg/kg	14.5 - 37.8	25	36.1	10.4 - 31.1	19.6	30.9
CCPP as $CaCO_3$	mg/kg	4.2 - 61.8	26.8	45.3	6.5 - 103.8	34.1	62.5
Calcium Hardness as $CaCO_3$	mg/kg	123 - 635	319.4	483	77.5 – 3565	287.3	426.1
Magnesium Hardness as $CaCO_3$	mg/kg	4.7 - 575	285.1	479.6	78.1 – 1192	346	597.6
Total Hardness as $CaCO_3$	mg/kg	255 - 1120	604.6	911.6			
m-alkalinity	mg/kg	0 - 1236	118.5	168.4	9.8 – 2060	133.6	195.9
p-alkalinity	mg/kg	0 - 50.8	3.3	8.0	0 - 33.4	6.8	12.7
Sodium	mg/kg	101 - 517	274.4	414.6	10.1 – 1131	296.1	454.5
Potassium	mg/kg	25 - 136	72.7	110.2	5.1 – 252	81.1	131.0

		Kriel CW South			Kriel CW north		
Chloride	mg/kg	12.1 – 310	161.4	252.4	16 – 419	180.2	288.0
Sulphate	mg/kg	240 - 1483	762.8	1175.3	23.7 – 1882	759.1	1229.8
Nitrates	mg/kg	1 - 17.6	4.4	7.7	0.2 – 107	5	8
Phosphates	mg/kg	520	520	520			
Silicate at SiO_2	mg/kg	2 - 20	10.6	15.0	4 – 29	13.1	17
COD	mg/kg	34 - 182	101.8	157.5	27 – 160	111.2	158.5
TOC as C	mg/kg						

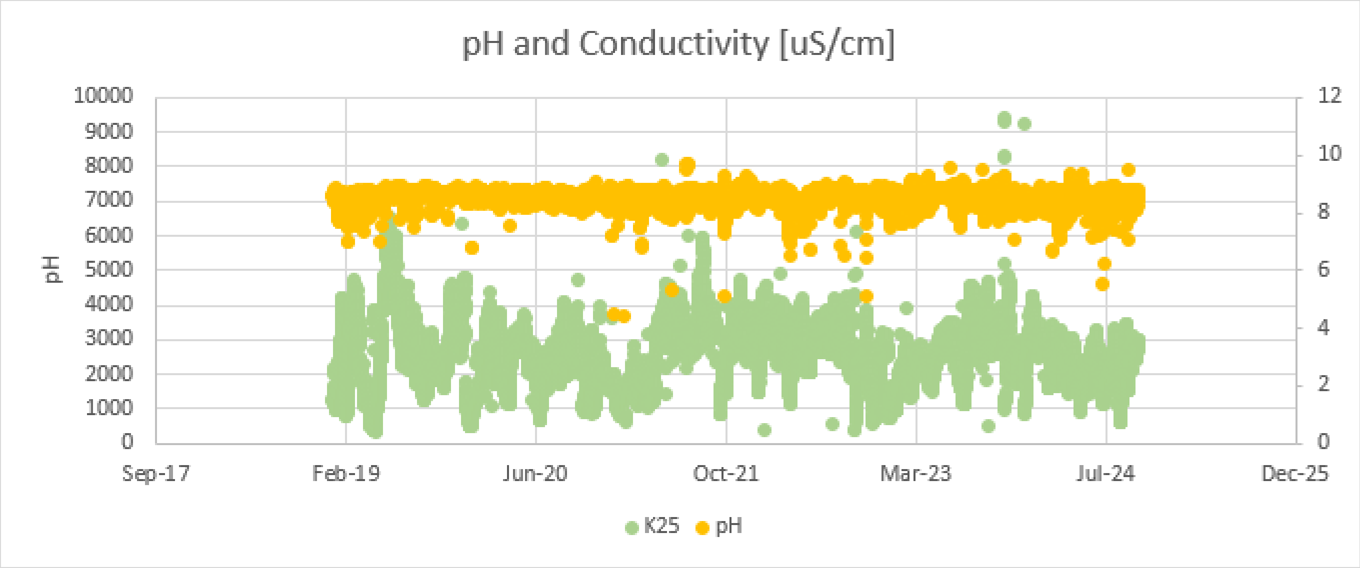


Figure 53: Kriel Cooling water South pH and conductivity

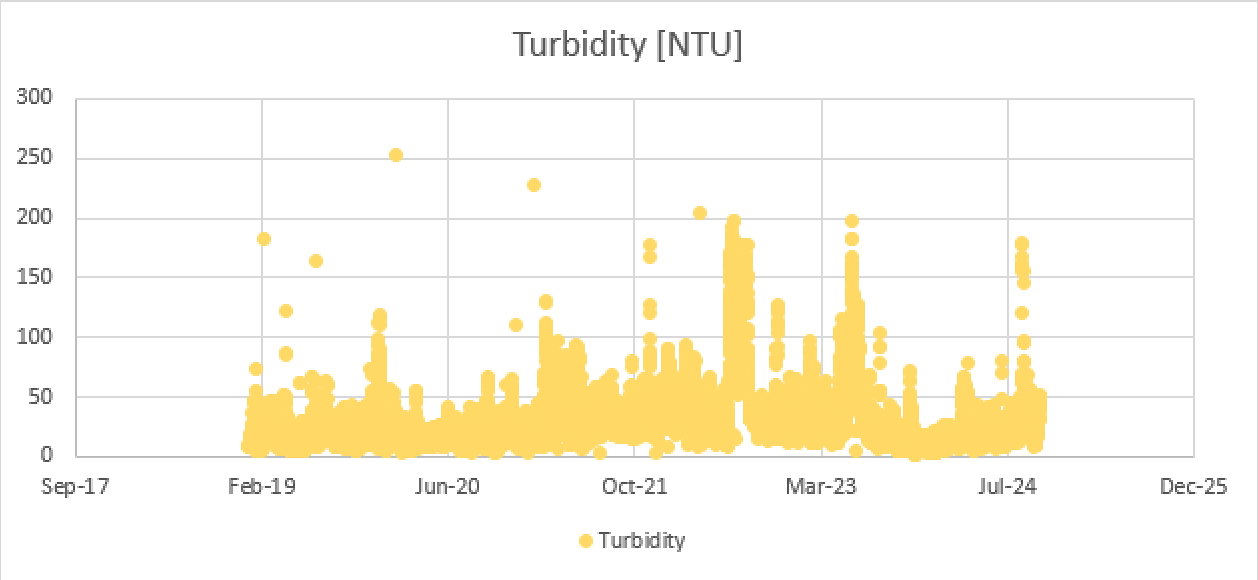


Figure 54: Kriel Cooling water South Turbidity

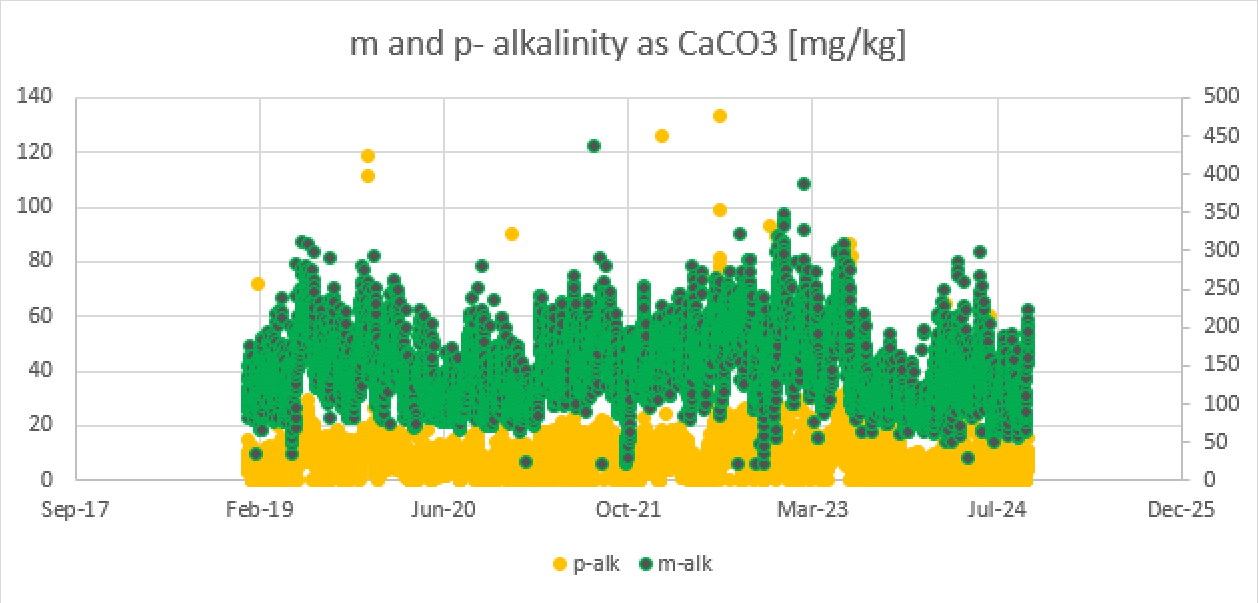


Figure 55: Kriel Cooling water South p-alkalinity and m-alkalinity

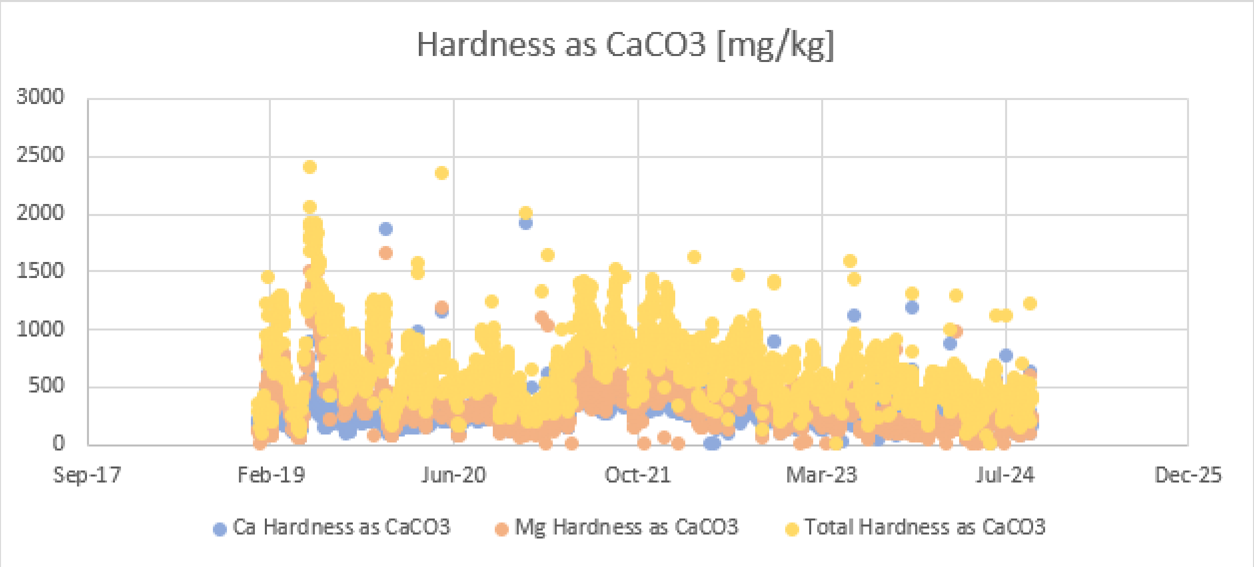


Figure 56: Kriel Cooling water South Hardness

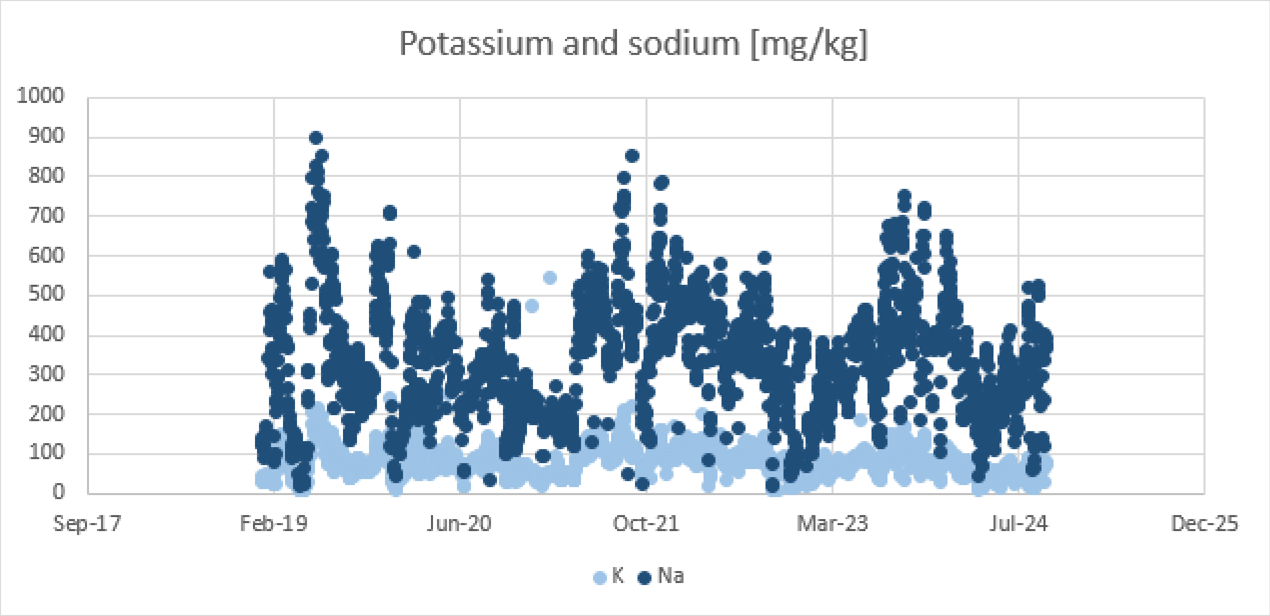


Figure 57: Kriel Cooling water South Potassium and sodium

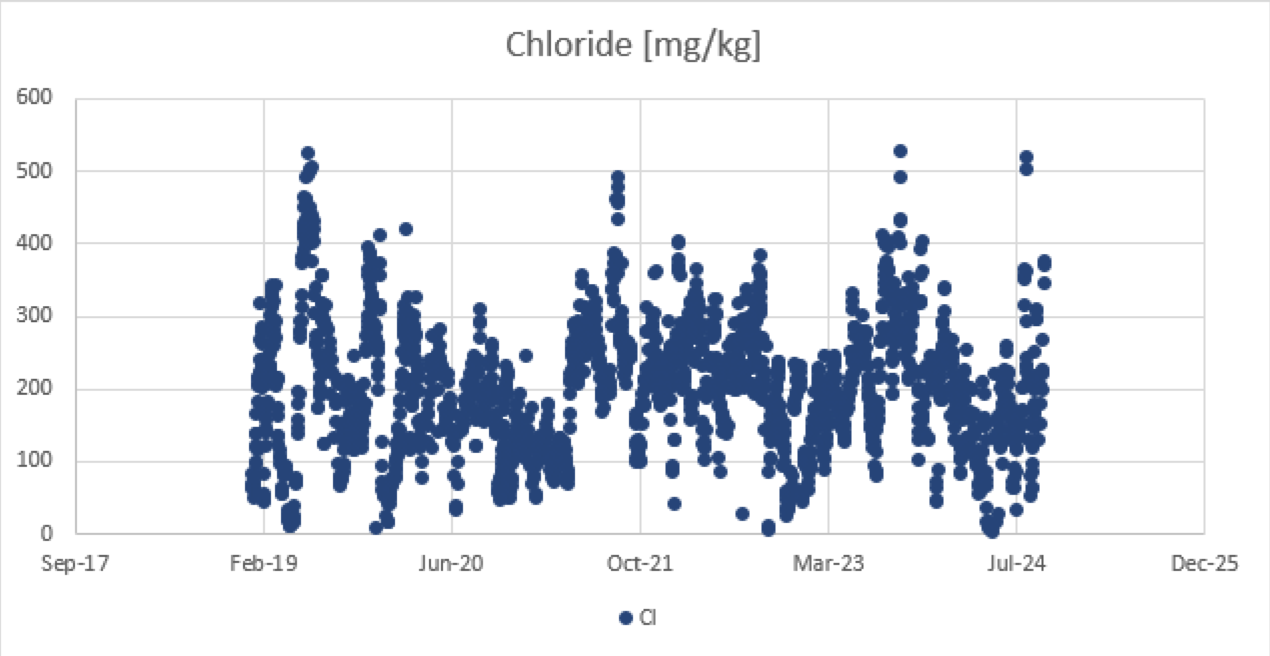


Figure 58: Kriel Cooling water South Chloride

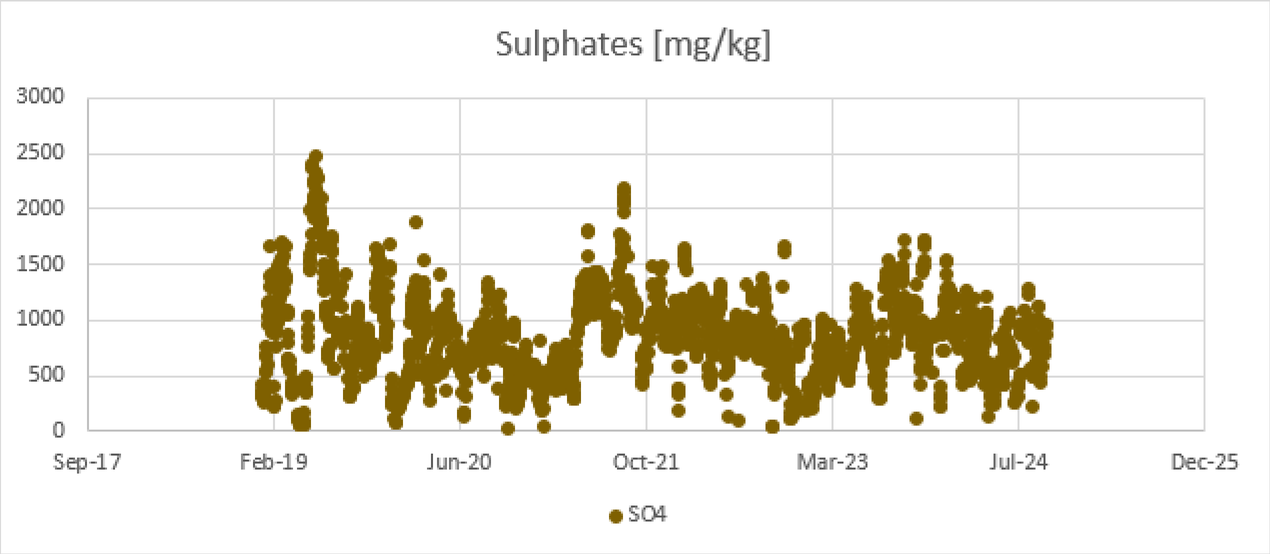


Figure 59: Kriel Cooling water South pH and sulphate

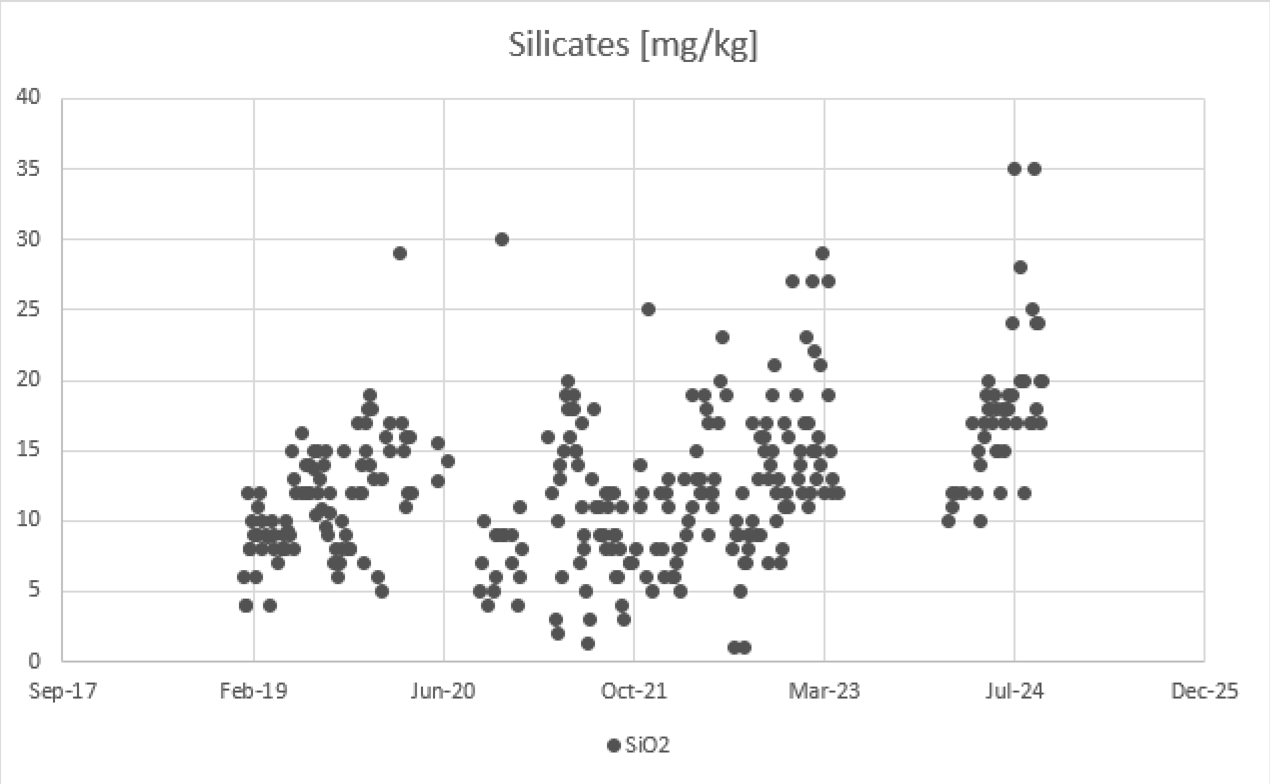


Figure 60: Kriel Cooling water South silicate

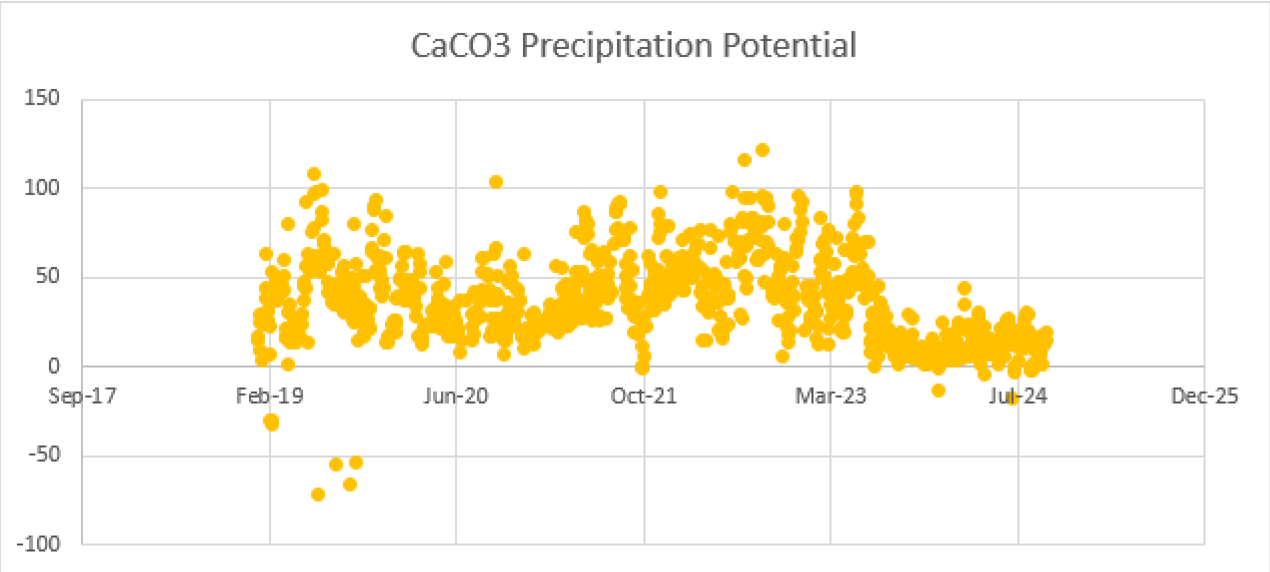


Figure 61: Kriel Cooling water South Calcium Carbonate Precipitation Potential

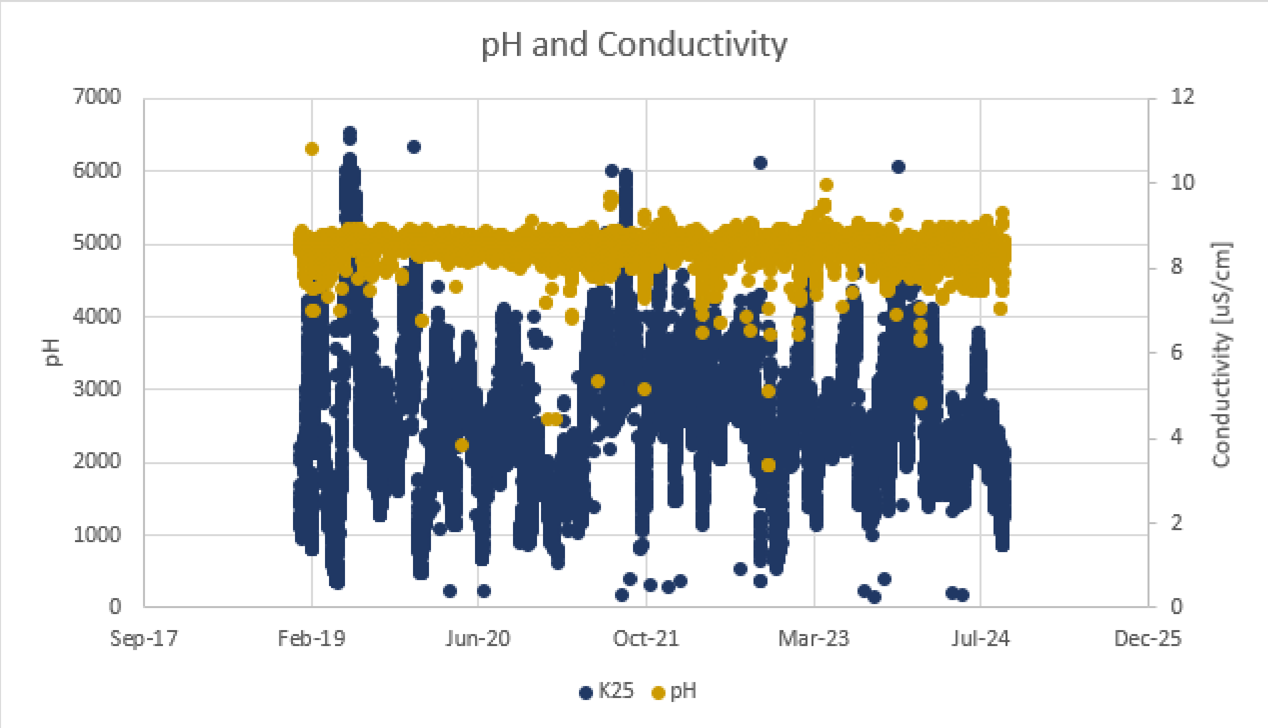


Figure 62: Kriel Cooling water North pH and conductivity

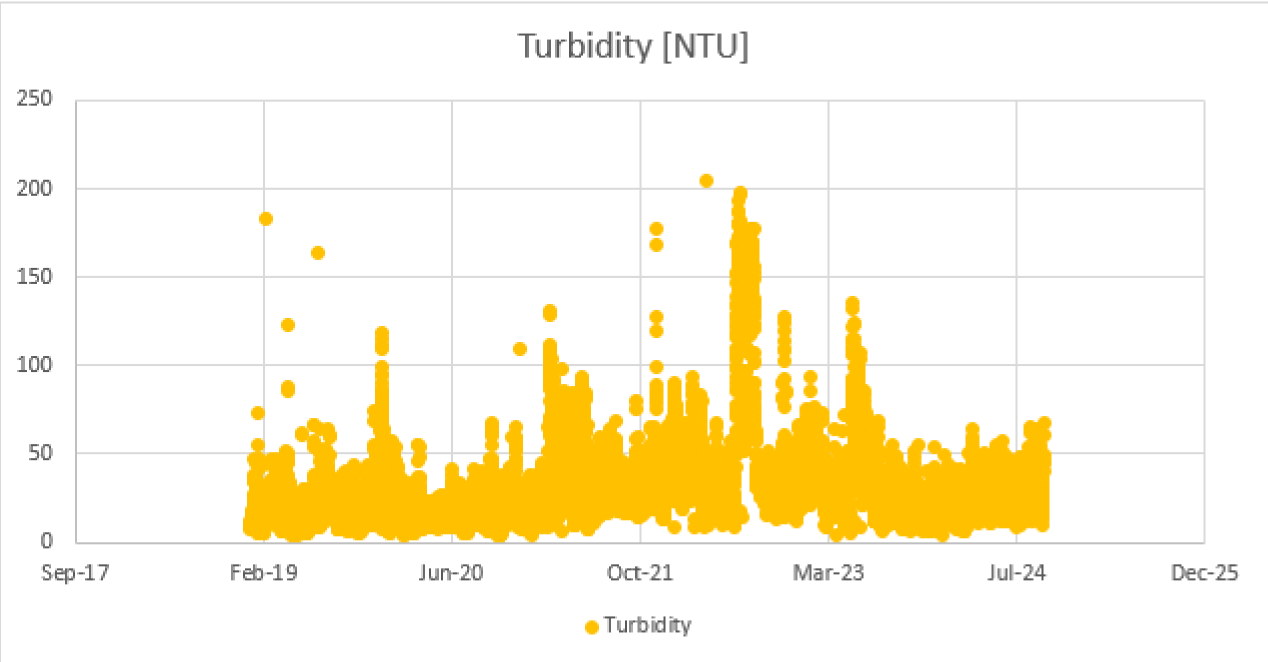


Figure 63: Kriel Cooling water North turbidity

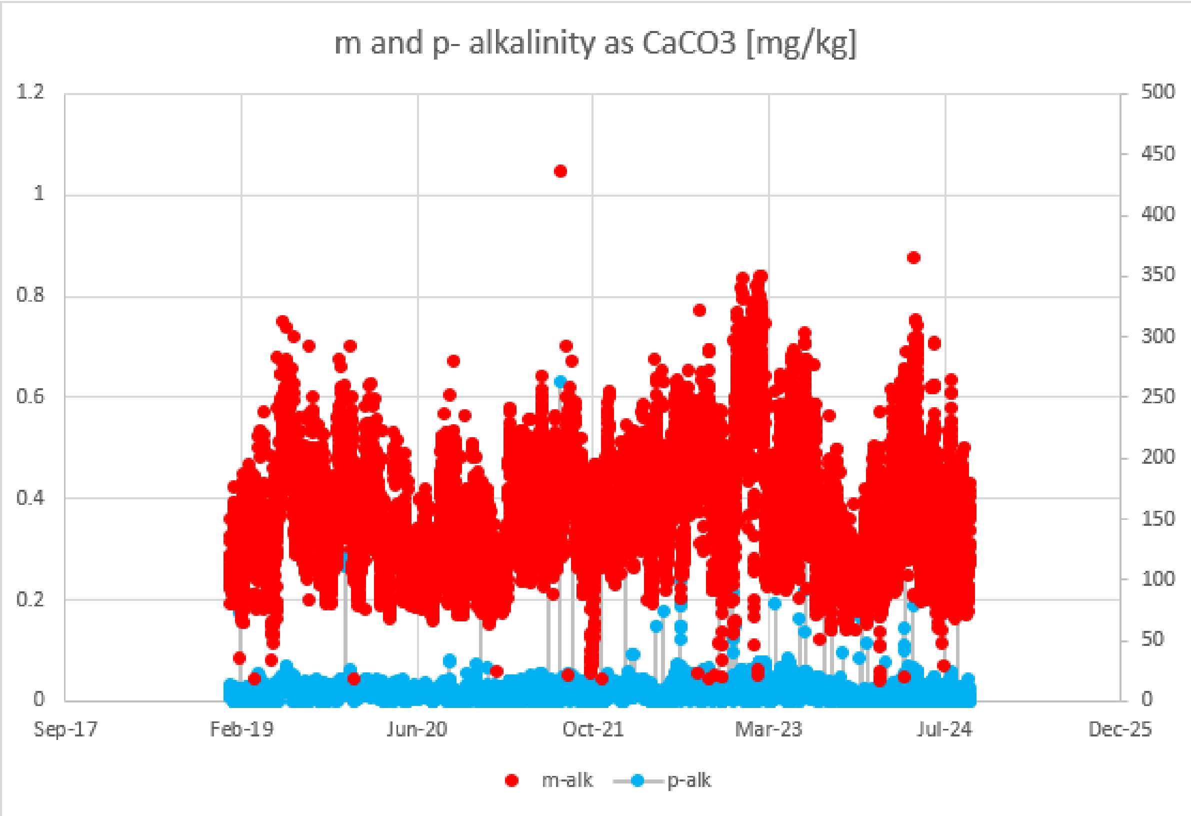


Figure 64: Kriel Cooling water North m-alkalinity and p-alkalinity

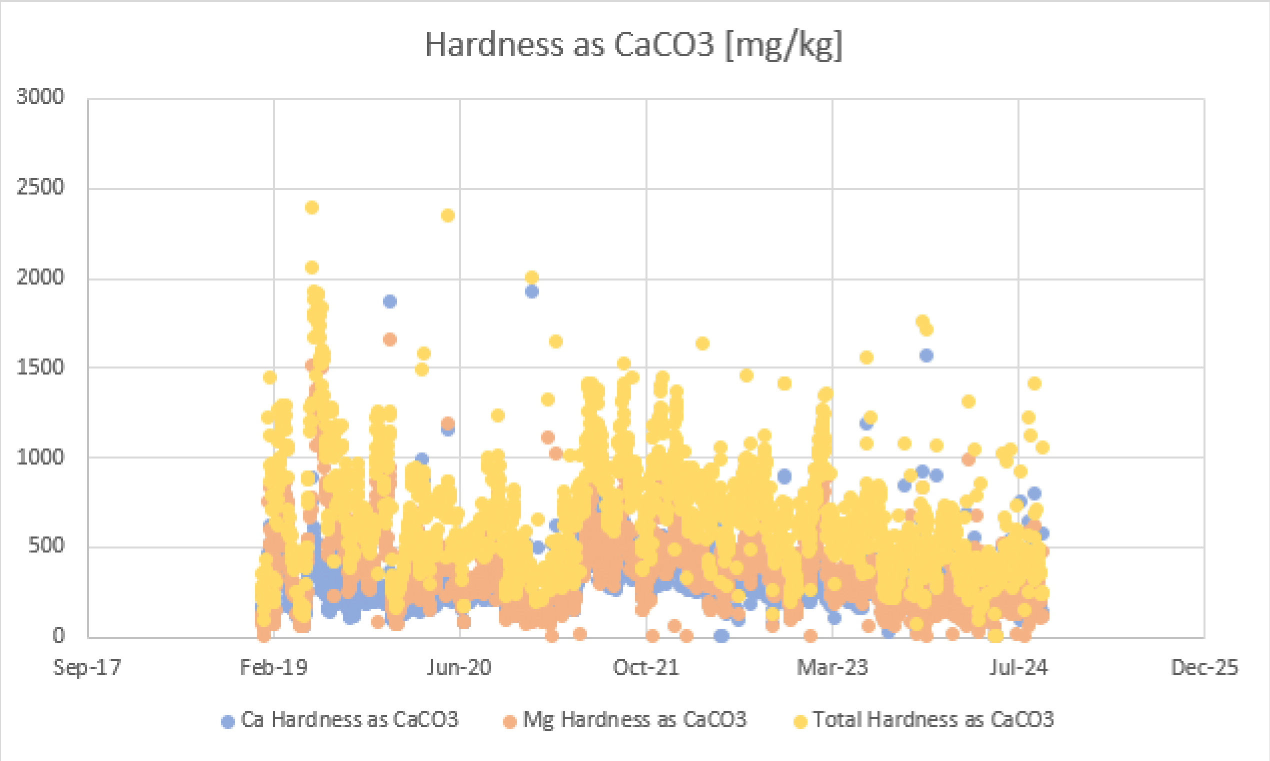


Figure 65: Kriel Cooling water North hardness

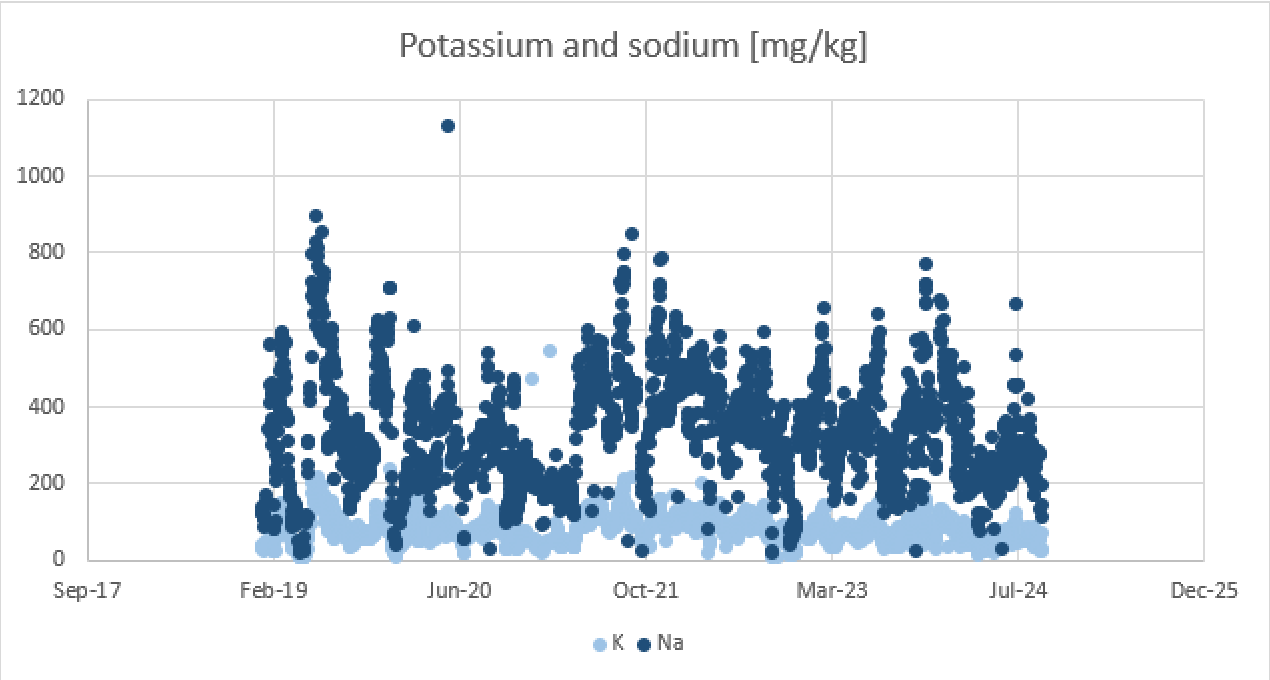


Figure 66: Kriel Cooling water North Potassium and Sodium

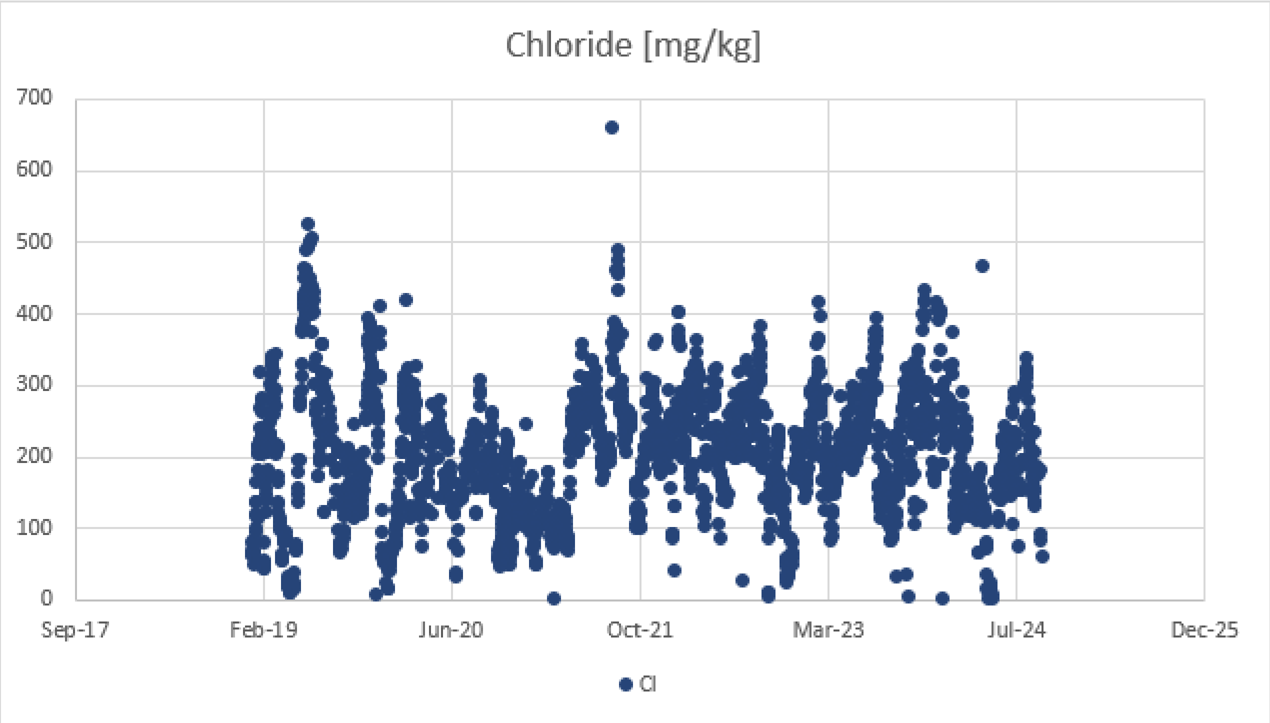


Figure 67: Kriel Cooling water North Chlorides

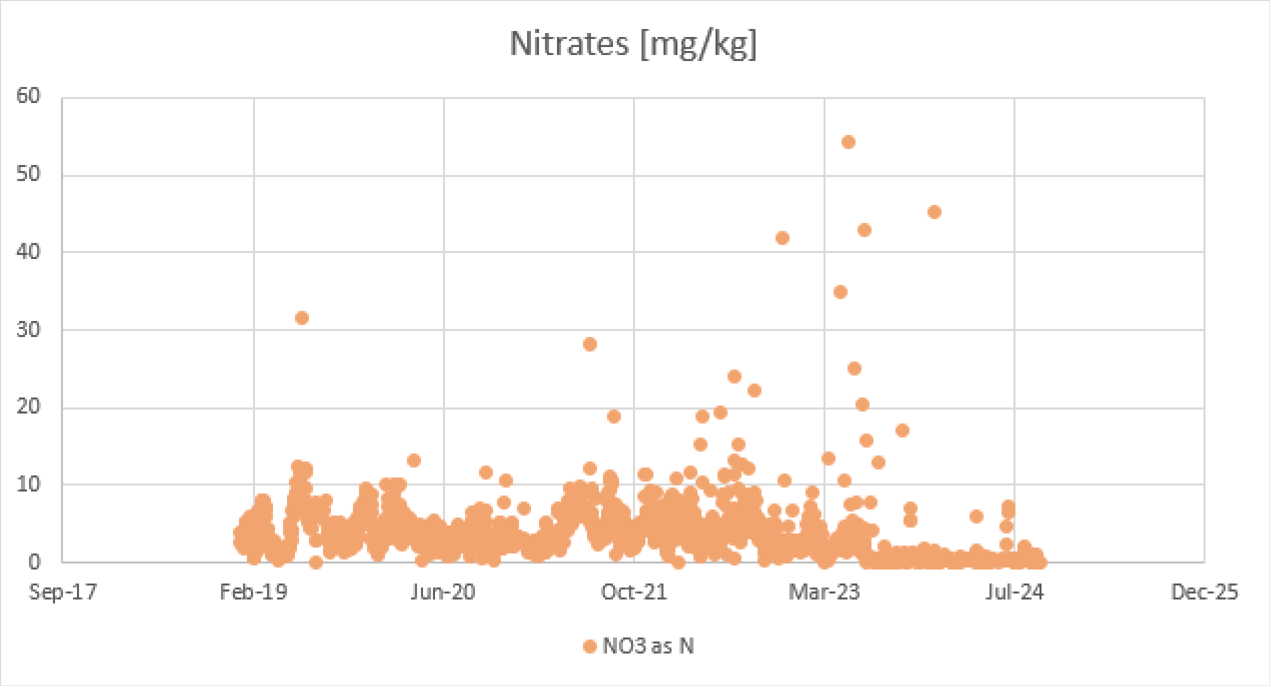


Figure 68: Kriel Cooling water North Nitrates

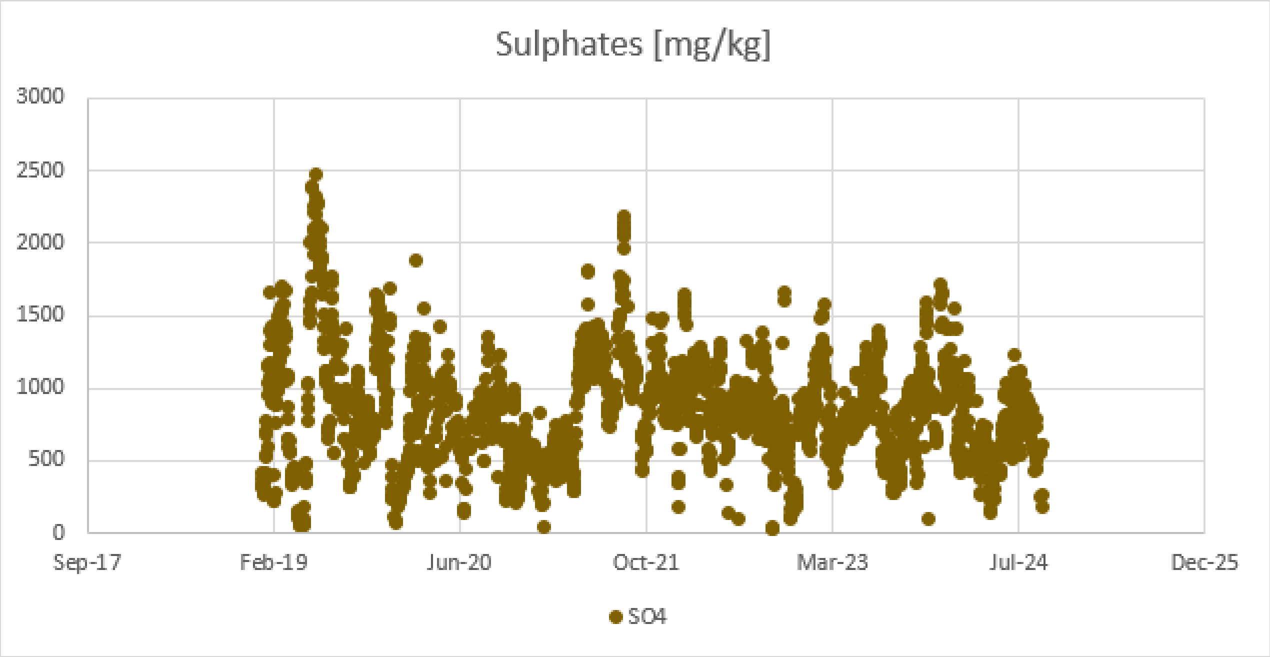


Figure 69: Kriel Cooling water North Sulphates

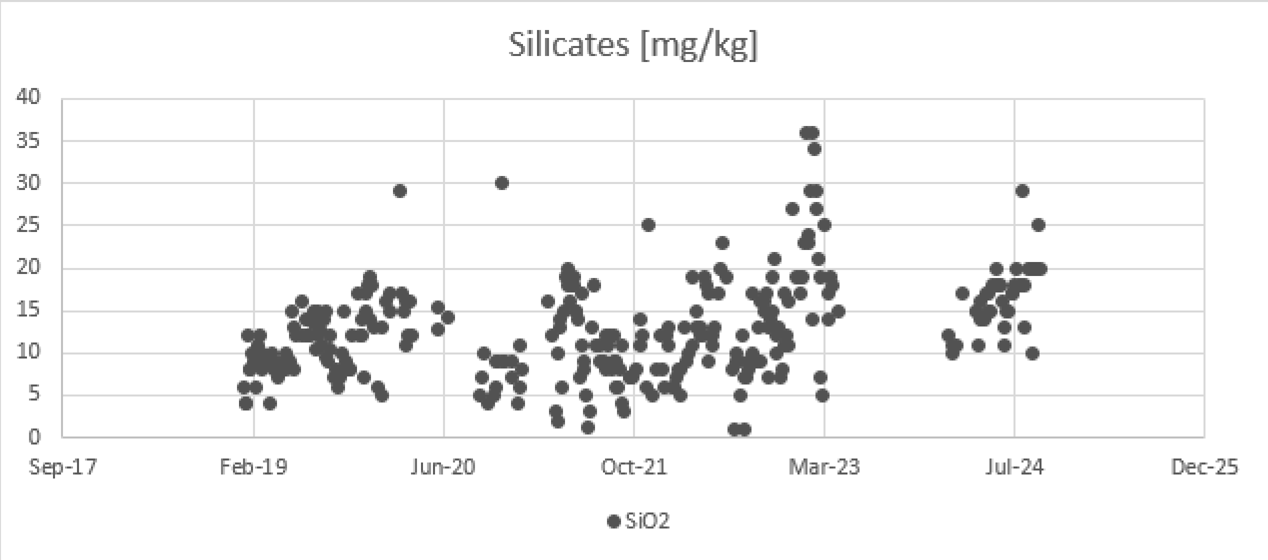


Figure 70: Kriel Cooling water North Silicates

Table 8: Concentrated Cooling water (Tutuka Power Station)

		Tutuka CW East			Tutuka CW west		
Parameter	**Unit**	**Range**	**Average**	**95th percentile**	**Range**	**Average**	**95th percentile**
pH	-	6.2 – 12.31	8.84	9.54	6.05 – 12	8.91	9.59
Conductivity	µS/cm	292 - 52700	52700	9332	178 – 48209	8512	25734
Turbidity	NTU	1.69 - 359	71.08	191.85	0.872 – 279	33.1	82.5
CCPP as $CaCO_3$							
Calcium Hardness as $CaCO_3$	mg/kg	119.2	139.9	558	-1.4 – 174.6	52.02	
Magnesium Hardness as $CaCO_3$	mg/kg	0 – 3449	413.53	1634.75	0 – 2060	301.69	981.2
Total Hardness as $CaCO_3$	mg/kg	37.7 - 4960	1063.27	3386	10.4 - 3119	656.28	2319.3
m-alkalinity	mg/kg	0 – 4720	276.89	720	0 – 1528	301.2	604.03
p-alkalinity	mg/kg	0 – 3519	37.64	171.85	0 – 939	36.67	145.12
Sodium	mg/kg	0.01 - 11040	1967.8	6522	0.01 – 5972	1456.25	4719.7

		Tutuka CW East			Tutuka CW west		
Potassium	mg/kg	0.3 - 1183	109.77	313.6	0.01 – 834	74.2	252.75
Chloride	mg/kg	14.6 – 5080	736.87	3213.5	0 – 8900	753.15	2336.7
Sulphate	mg/kg	0.06 - 34290	3612.68	17164	0 – 16845	2728.02	10136
Nitrates	mg/kg	0.01 – 101	17.35	64.15	0 – 78.9	10.69	46.1
Phosphates	mg/kg	0.01 - 1810	33.59	139.83	0.01 - 1015	11.13	11.26
Silicate at SiO_2	mg/kg	0.01 - 130	36.65	90	1.3 – 126	20.83	49.98
TOC	mg/kg	0.44 - 135	30.66	76.46	0 – 73	18.78	43.09

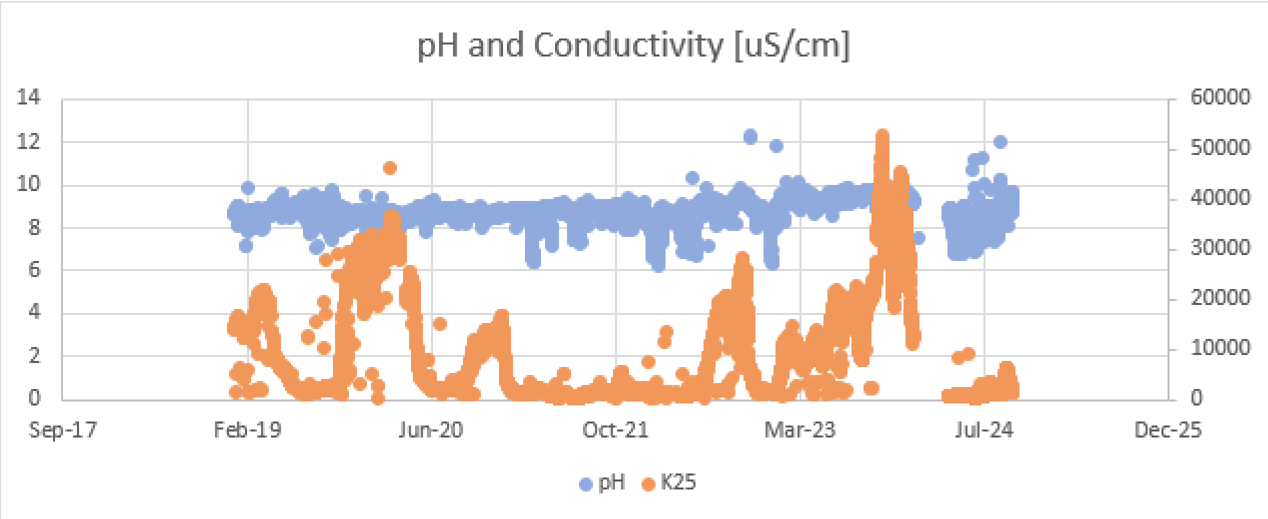


Figure 71: Tutuka Cooling water East pH and Conductivity

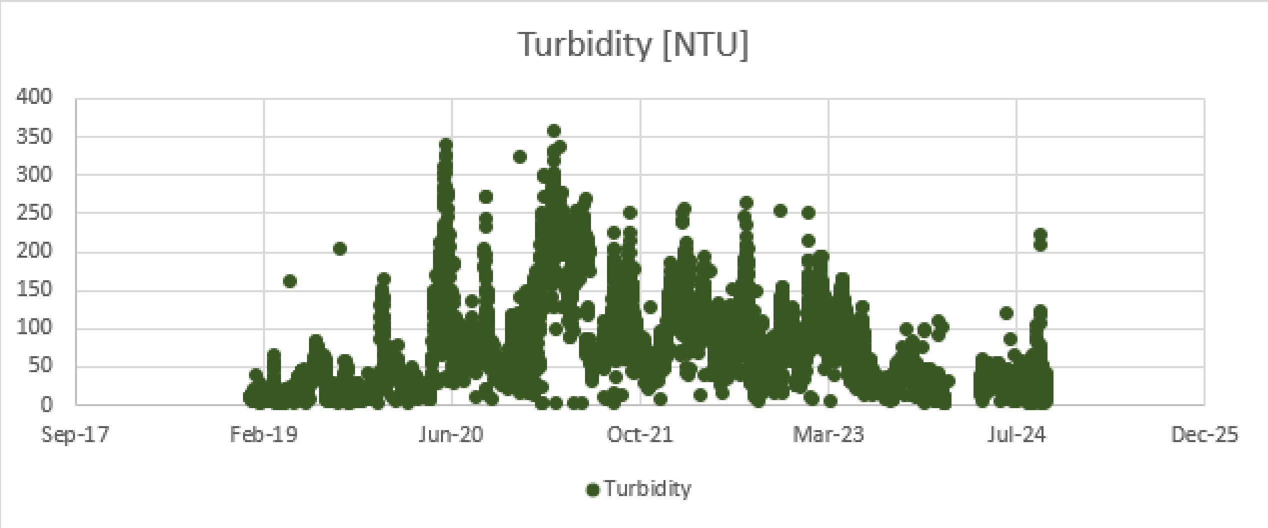


Figure 72: Tutuka Cooling water East Turbidity

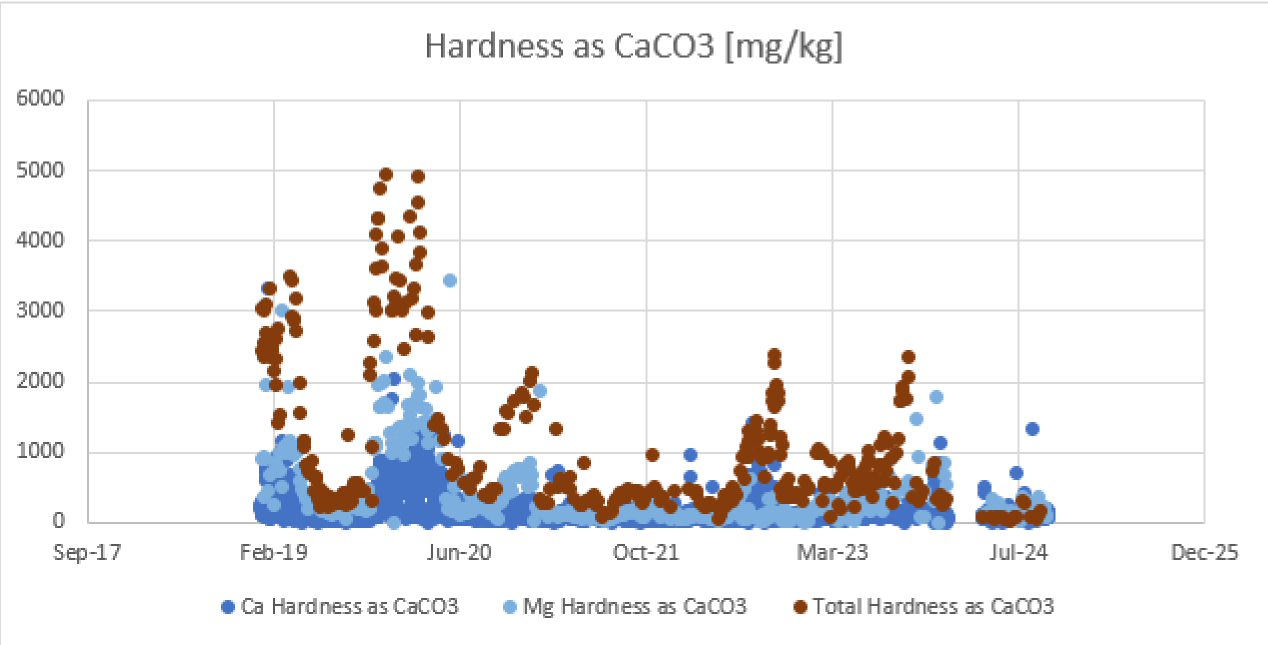


Figure 73: Tutuka Cooling water East Hardness

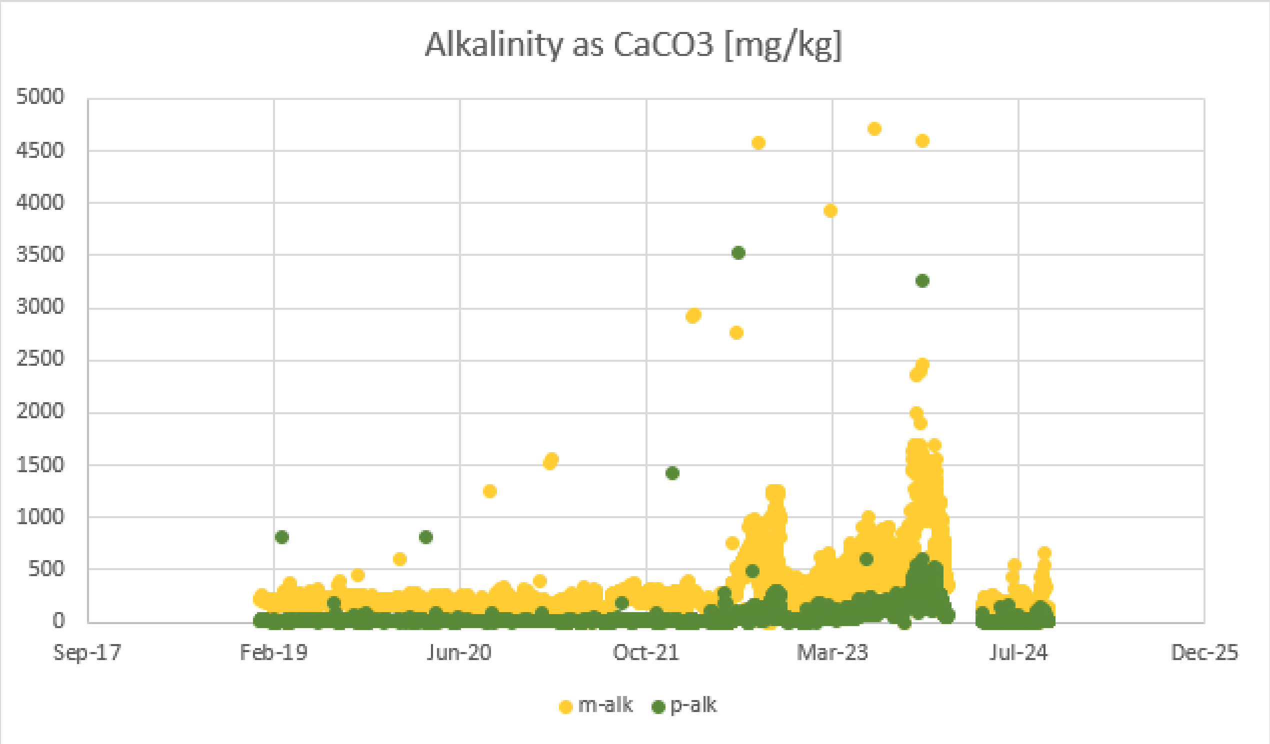


Figure 74: Tutuka Cooling water East Alkalinity

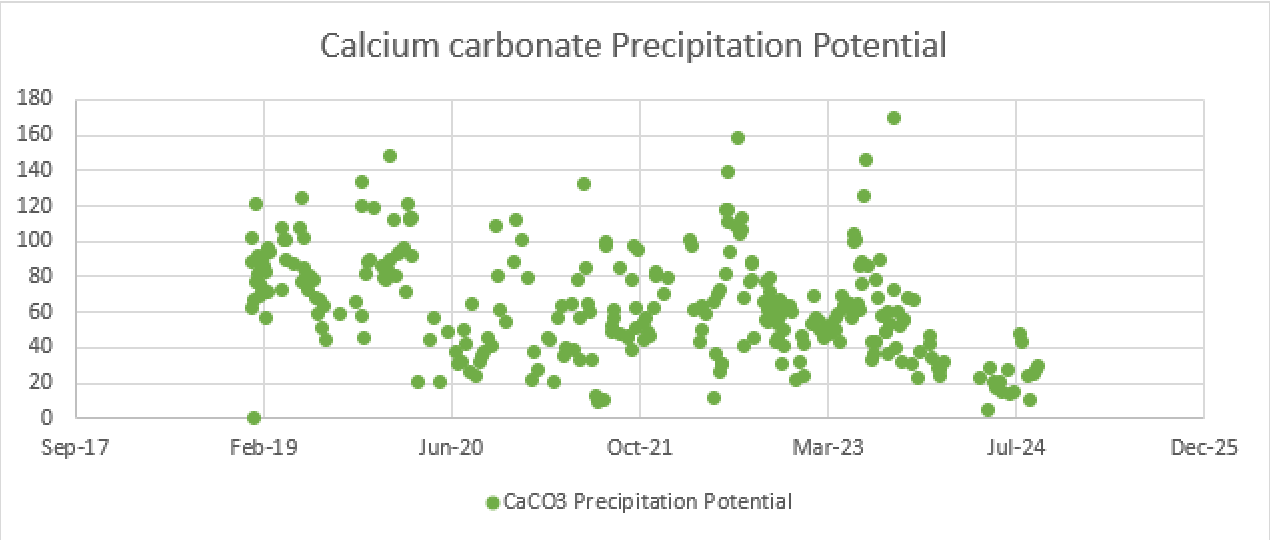


Figure 75: Tutuka Cooling water East Calcium carbonate precipitation potential

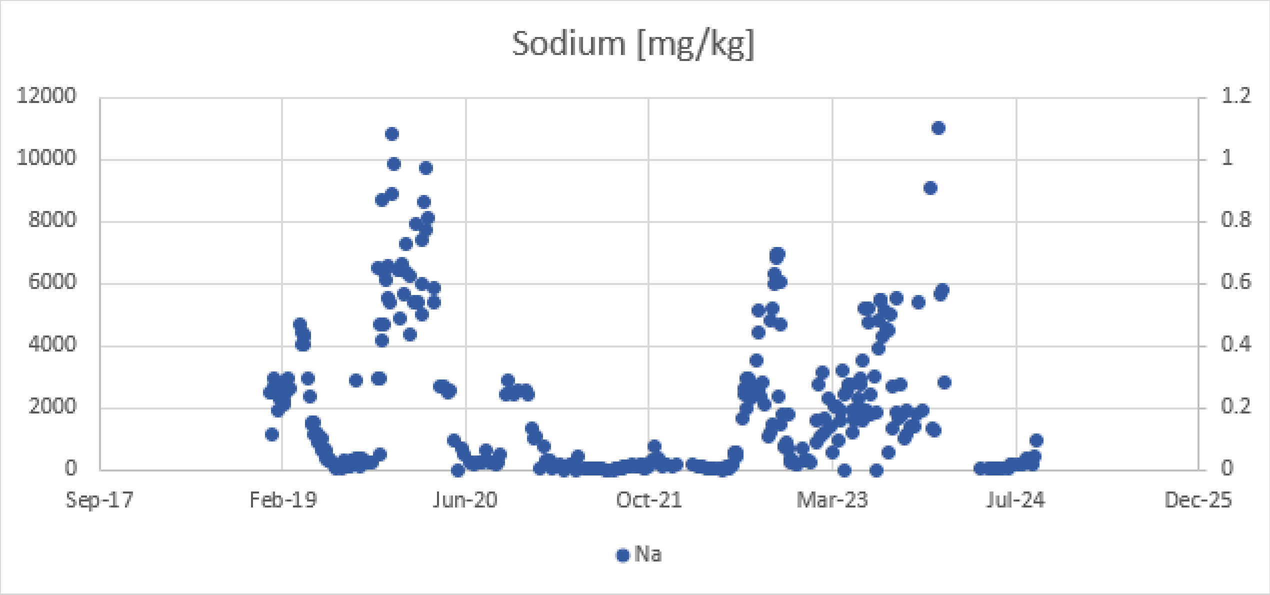


Figure 76: Tutuka Cooling water East Sodium

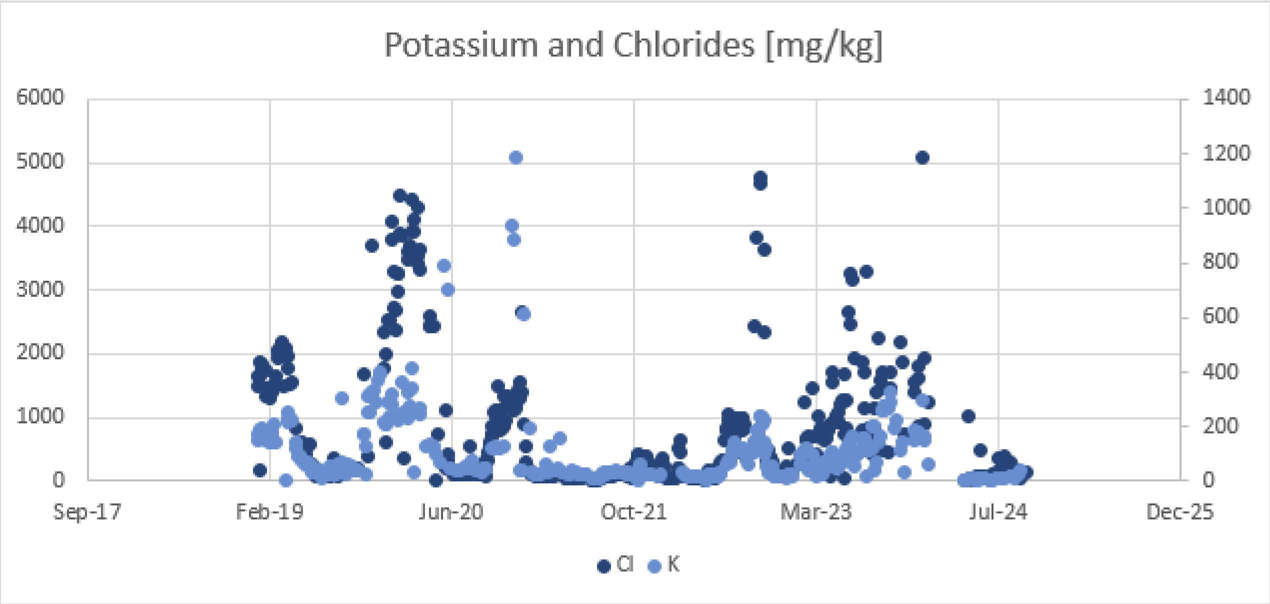


Figure 77: Tutuka Cooling water East Chlorides and Potassium

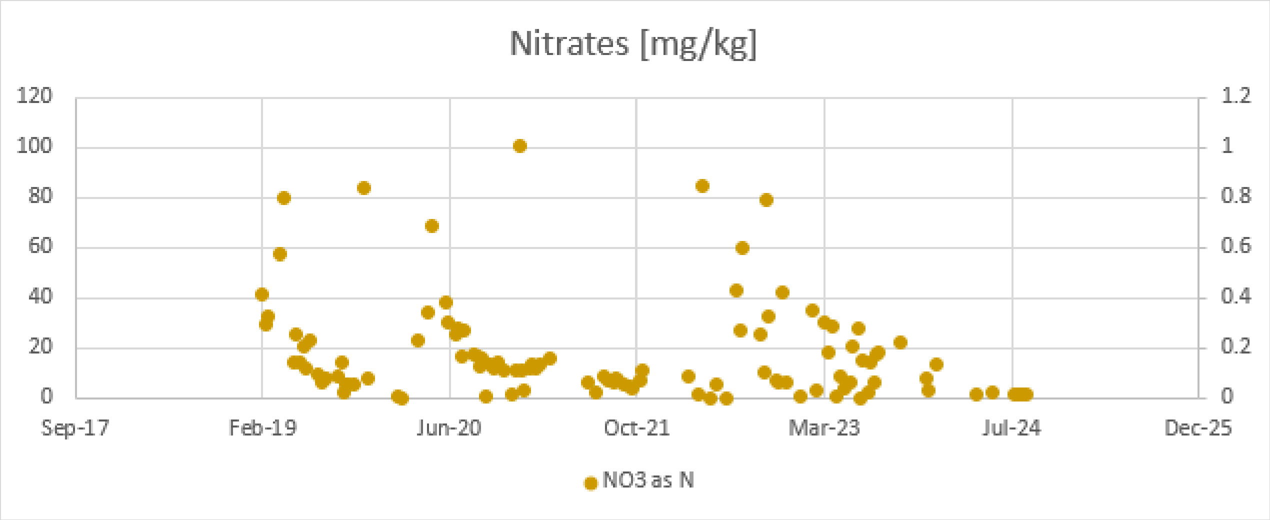


Figure 78: Tutuka Cooling water East Nitrates

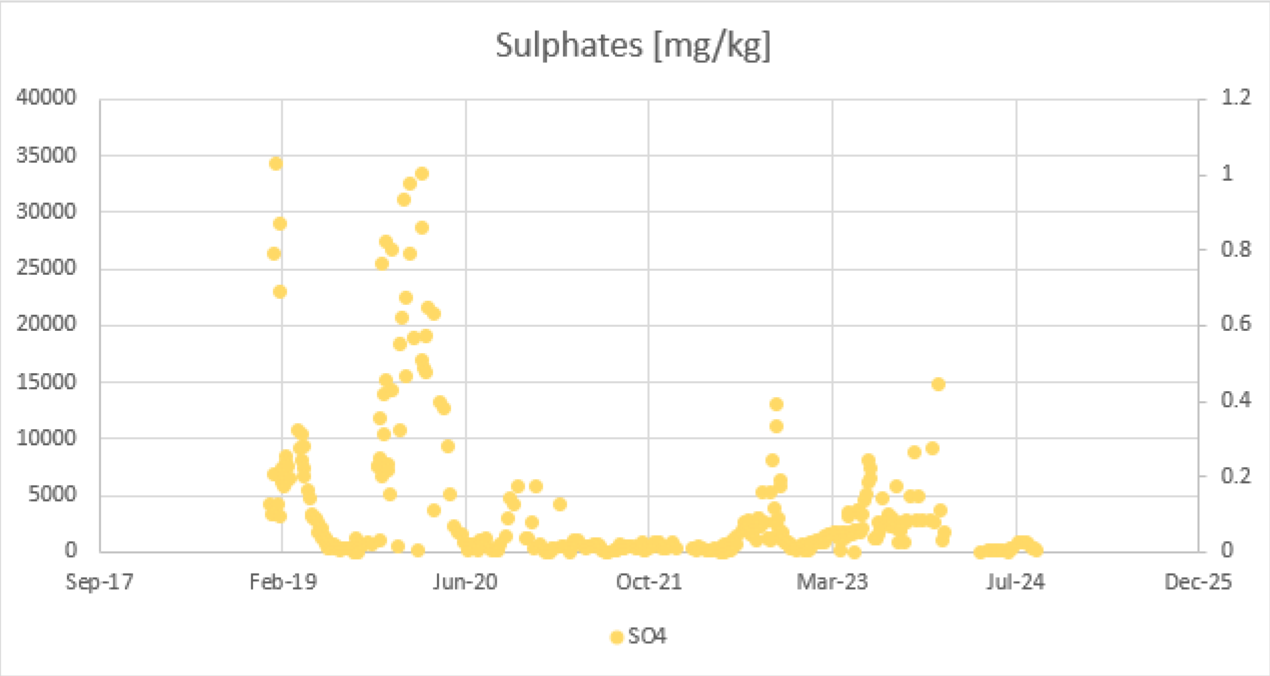


Figure 79: Tutuka Cooling water East Sulphates

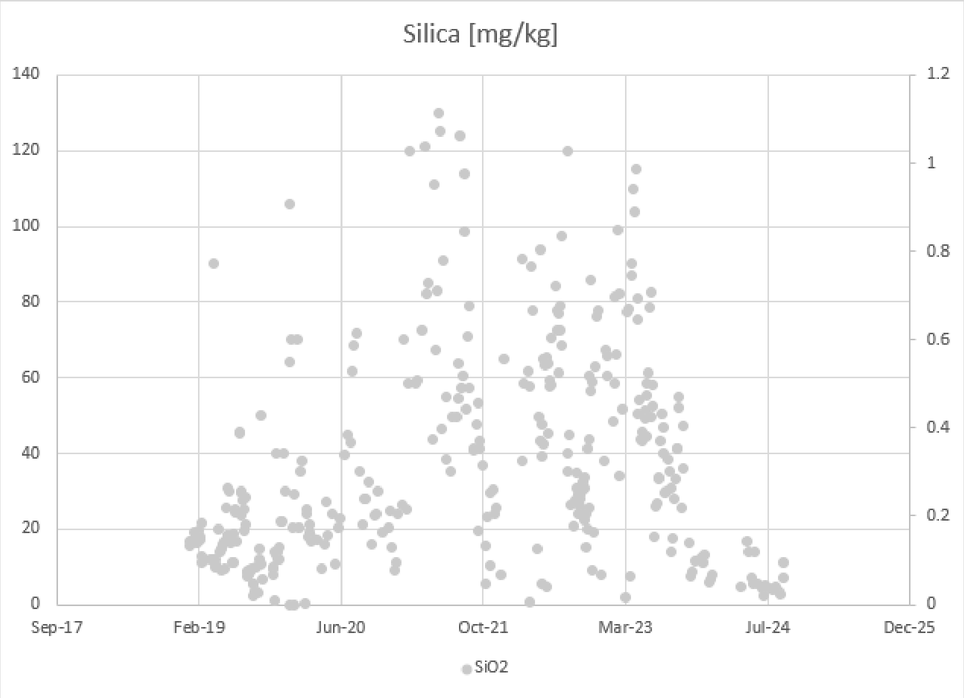


Figure 80: Tutuka Cooling water East Silicates

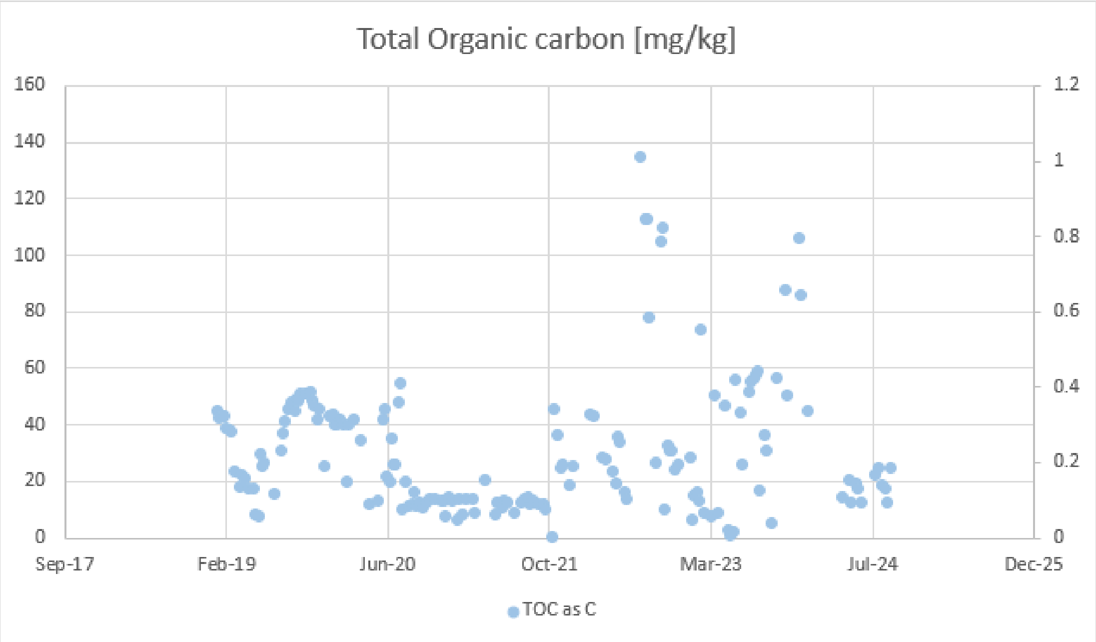


Figure 81: Tutuka Cooling water East Total organic carbon

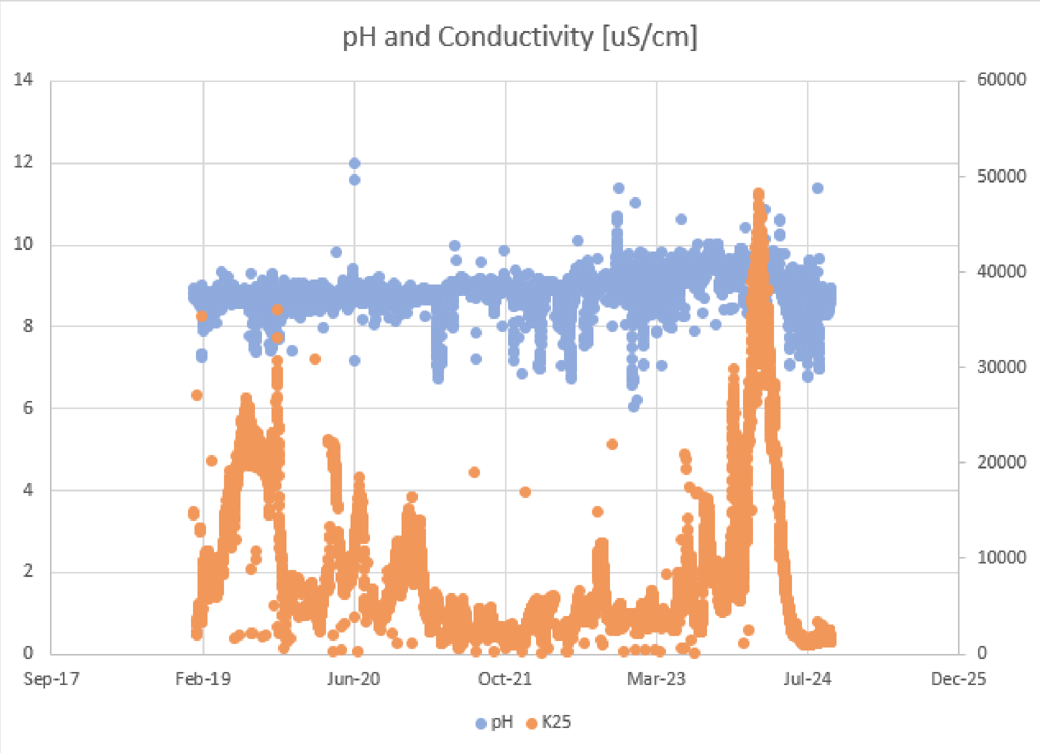


Figure 82: Tutuka Cooling water West pH and conductivity

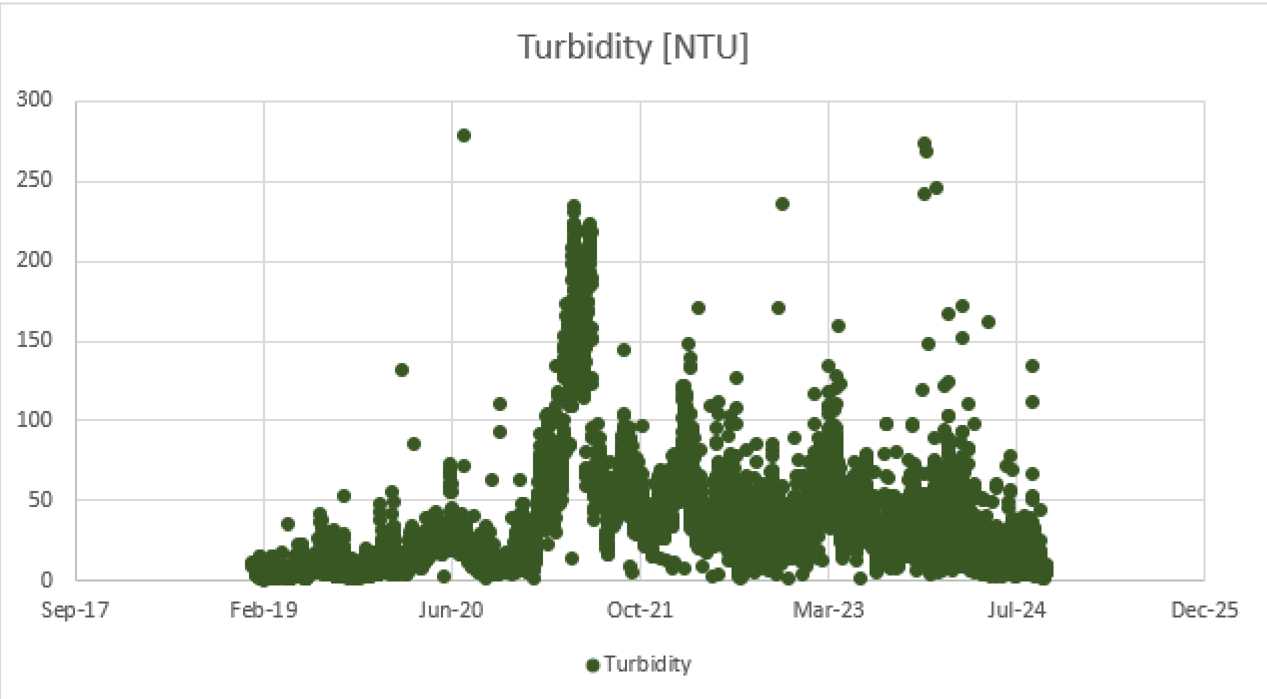


Figure 83: Tutuka Cooling water West turbidity

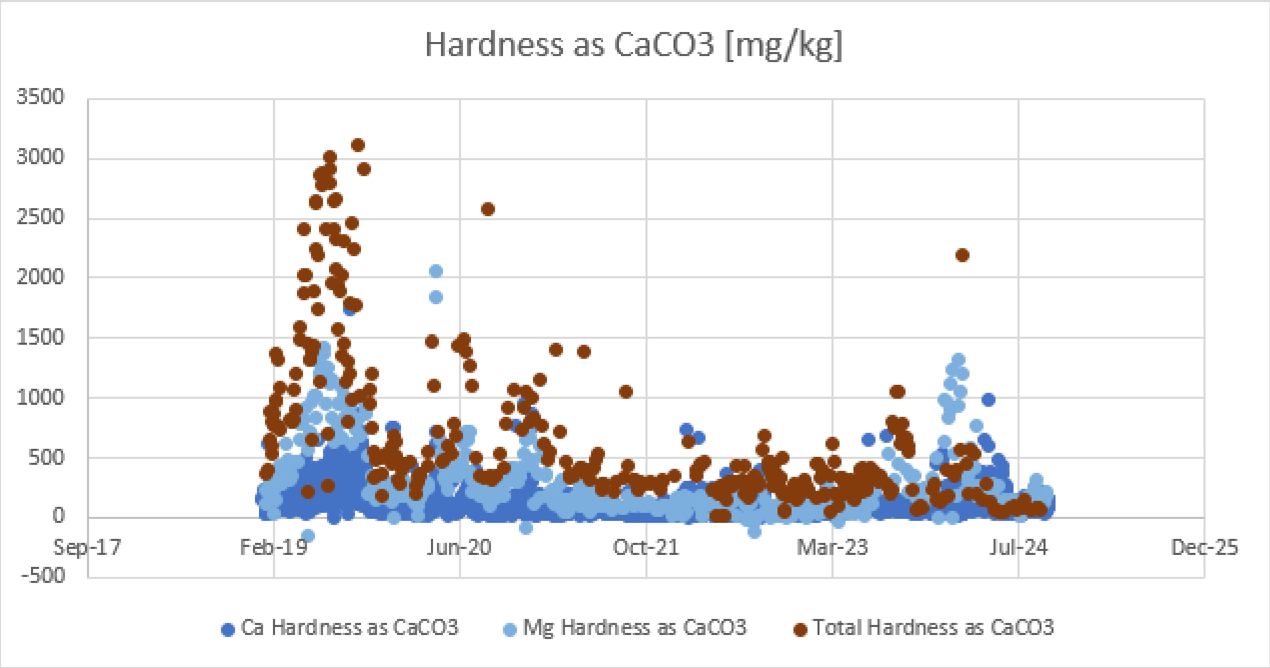


Figure 84: Tutuka Cooling water West Hardness

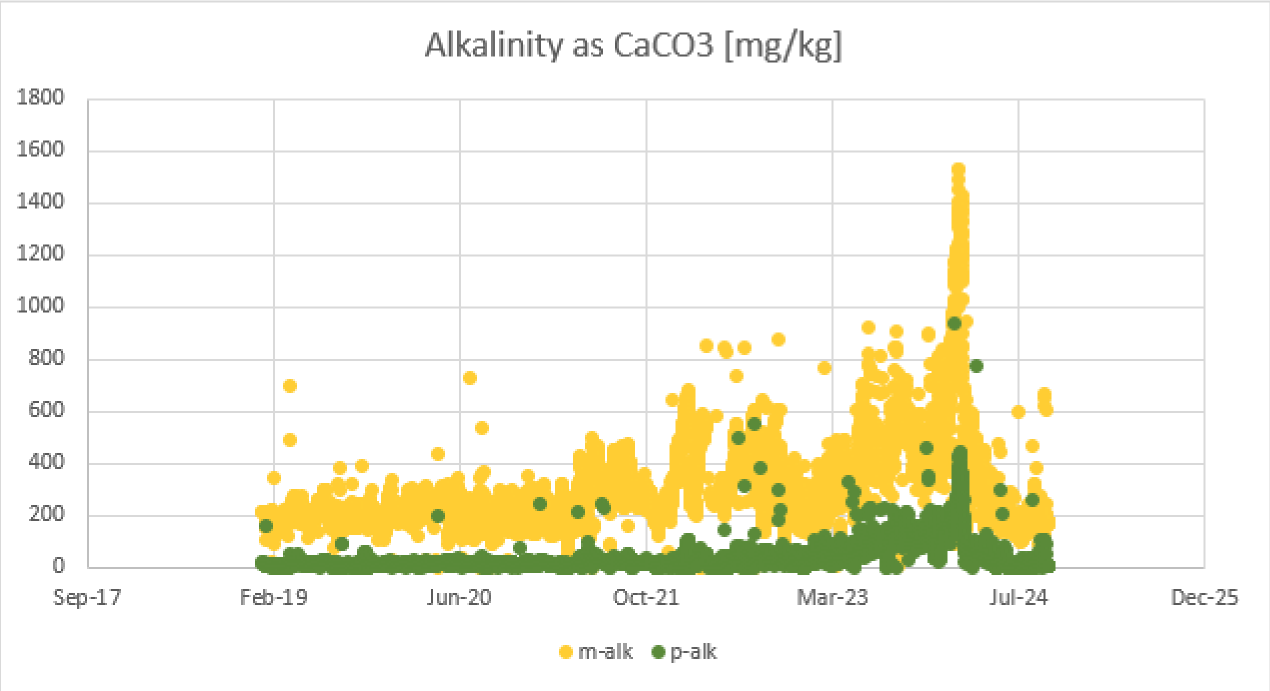


Figure 85: Tutuka Cooling water West alkalinity

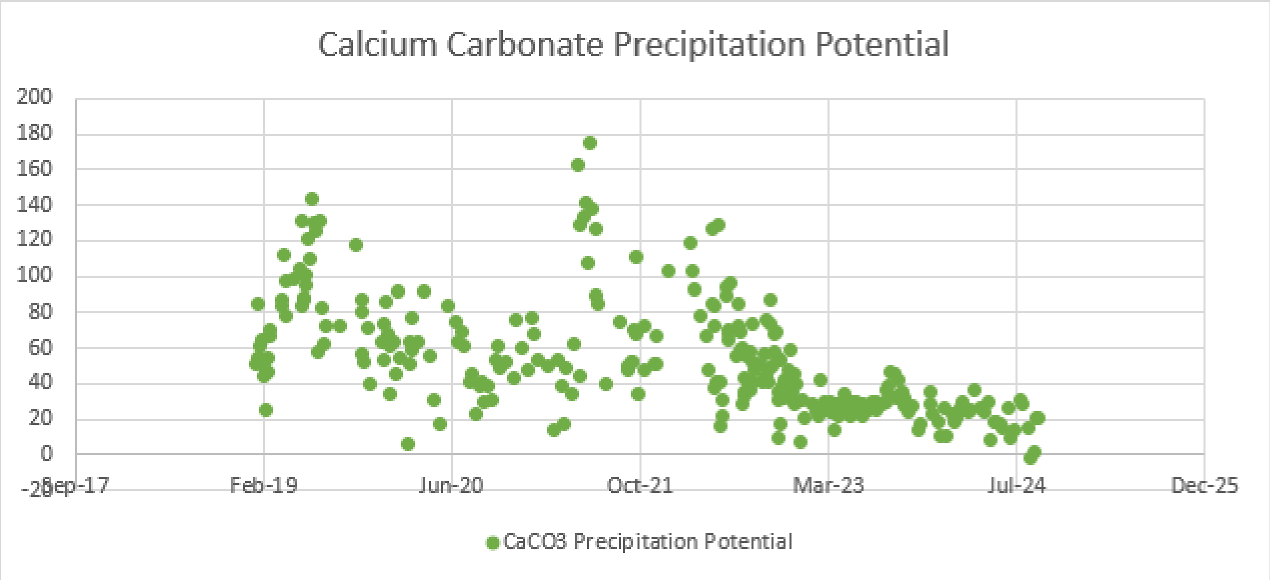


Figure 86: Tutuka Cooling water West Calcium carbonate precipitation potential

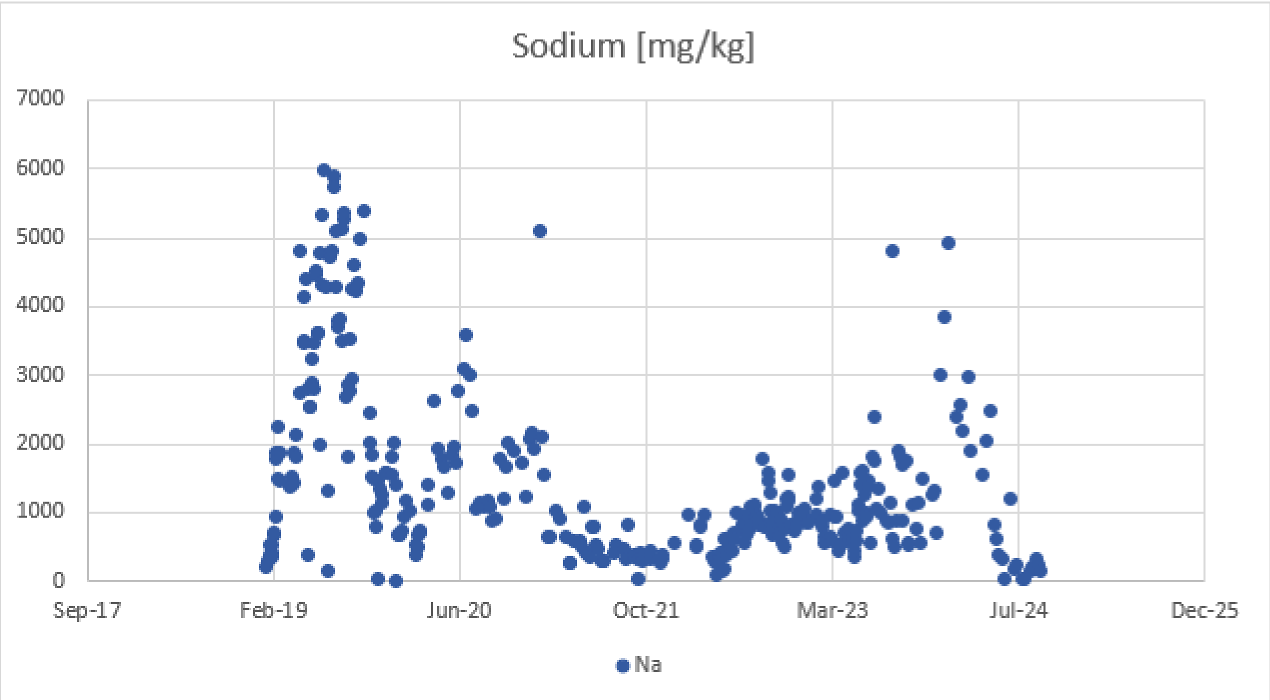


Figure 87: Tutuka Cooling water West sodium

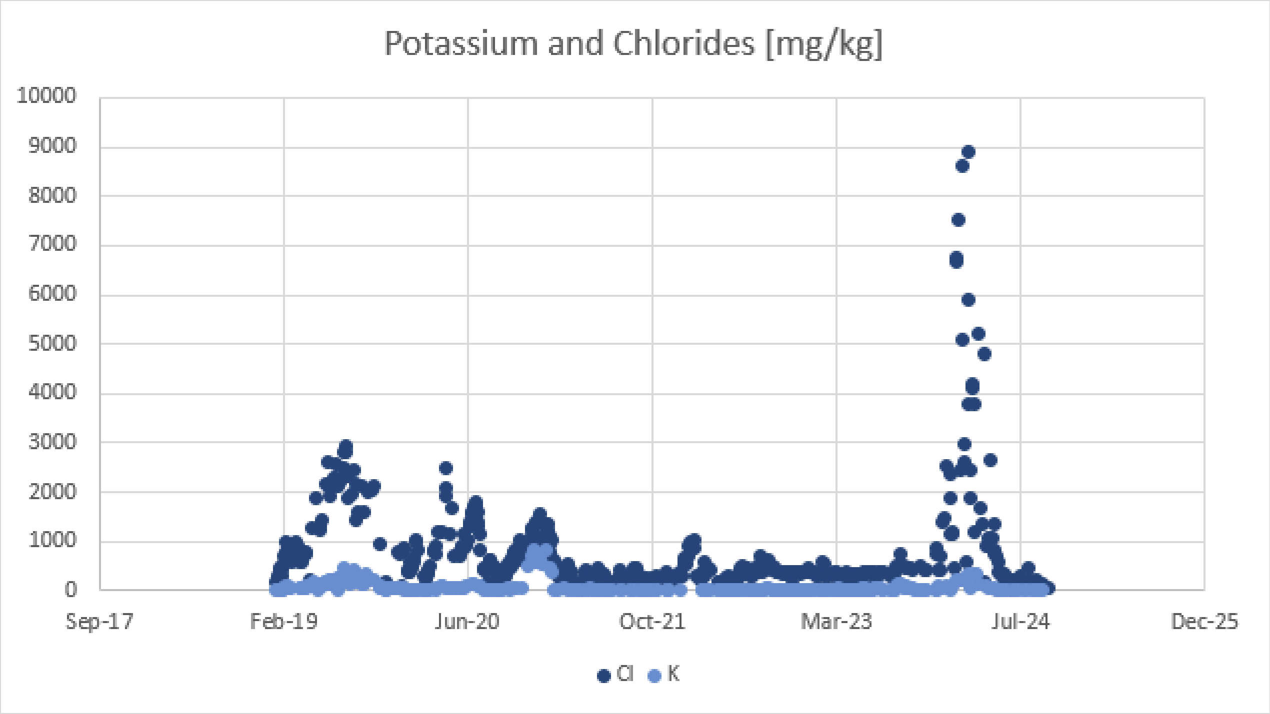


Figure 88: Tutuka Cooling water West Potassium and chlorides

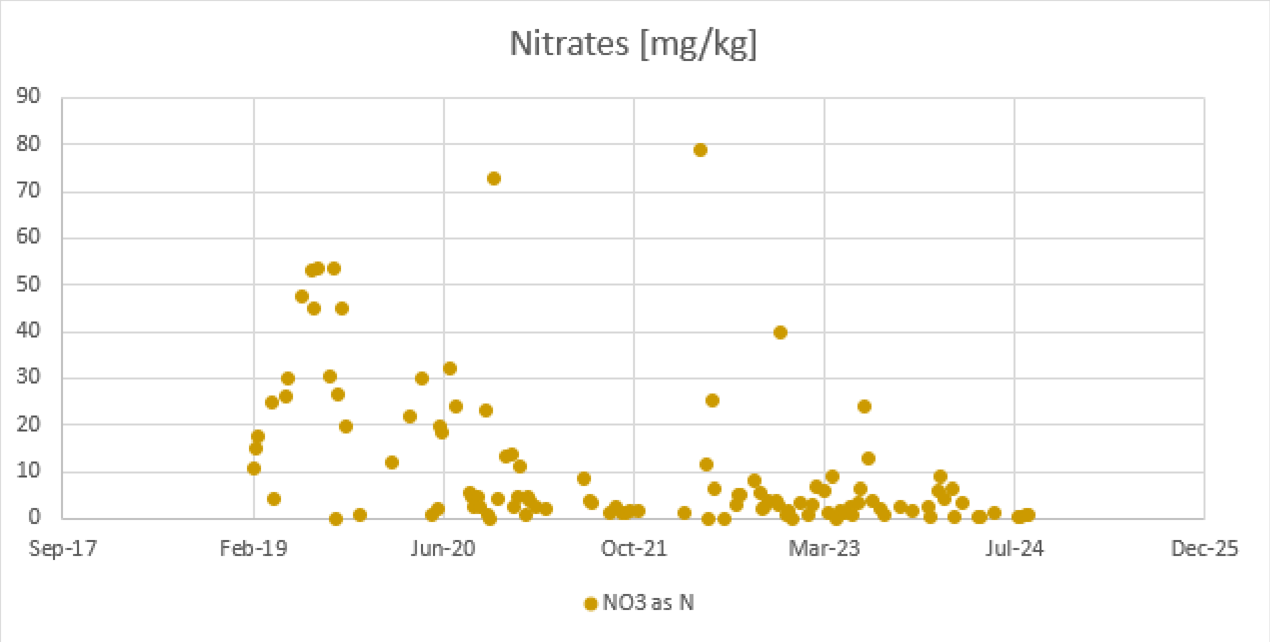


Figure 89: Tutuka Cooling water West Nitrates

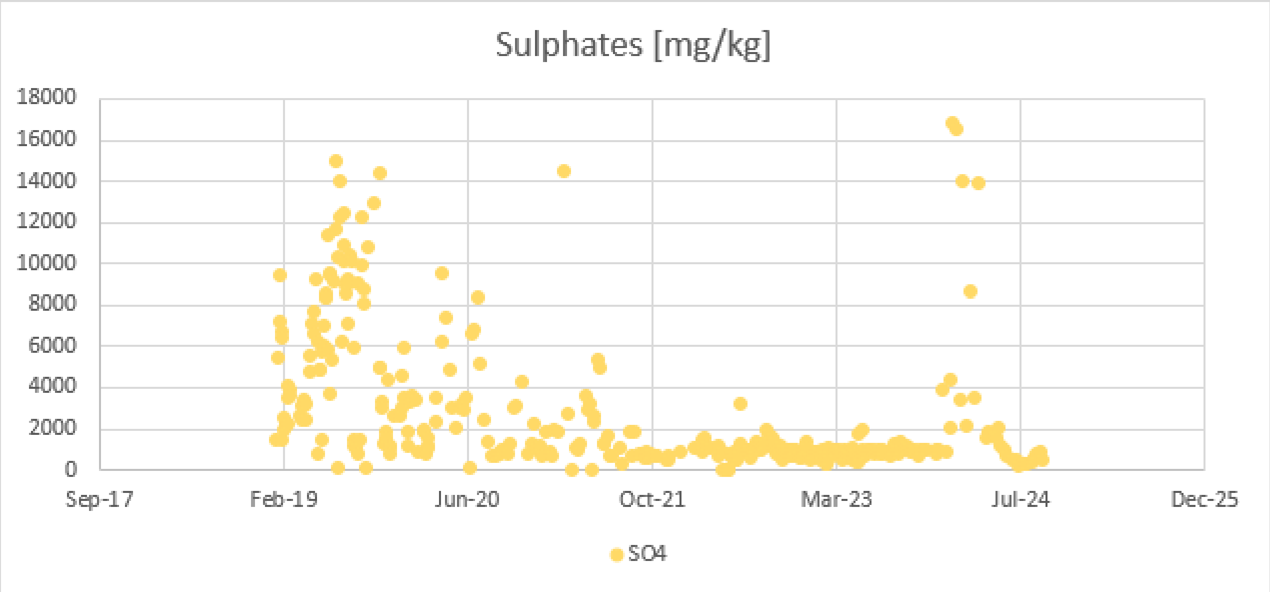


Figure 90: Tutuka Cooling water West sulfates

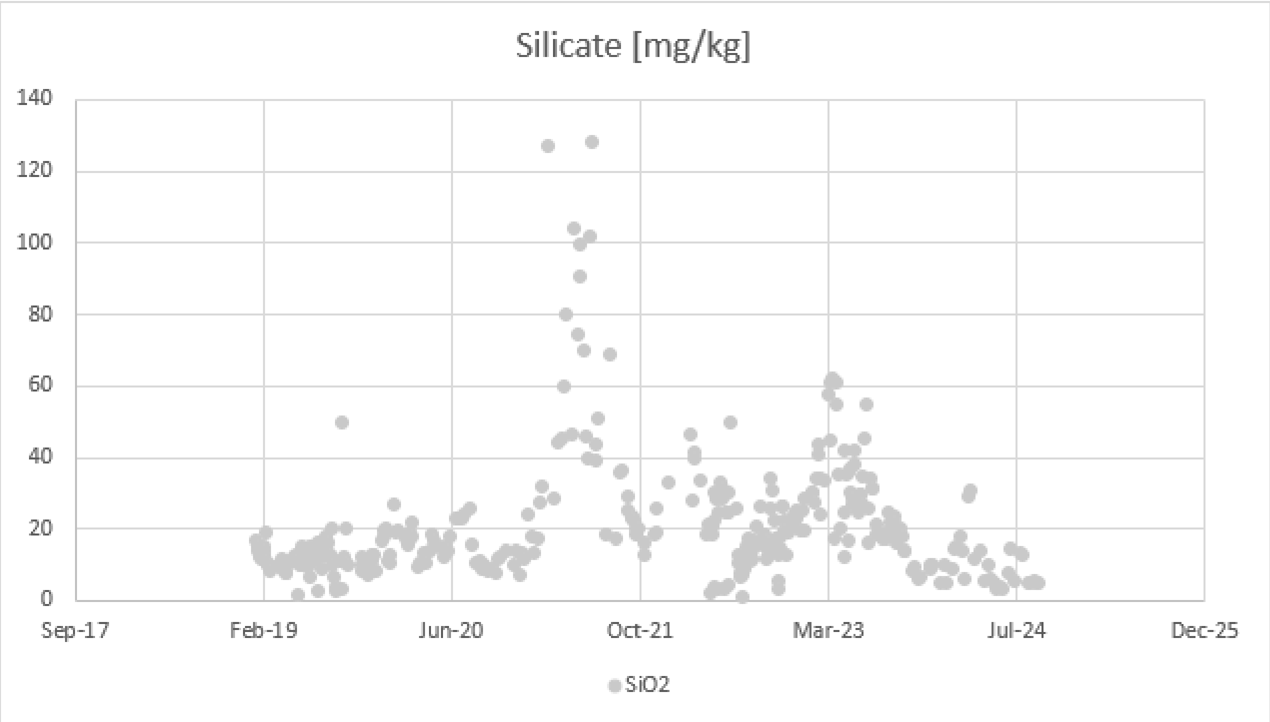


Figure 91: Tutuka Cooling water West silicates

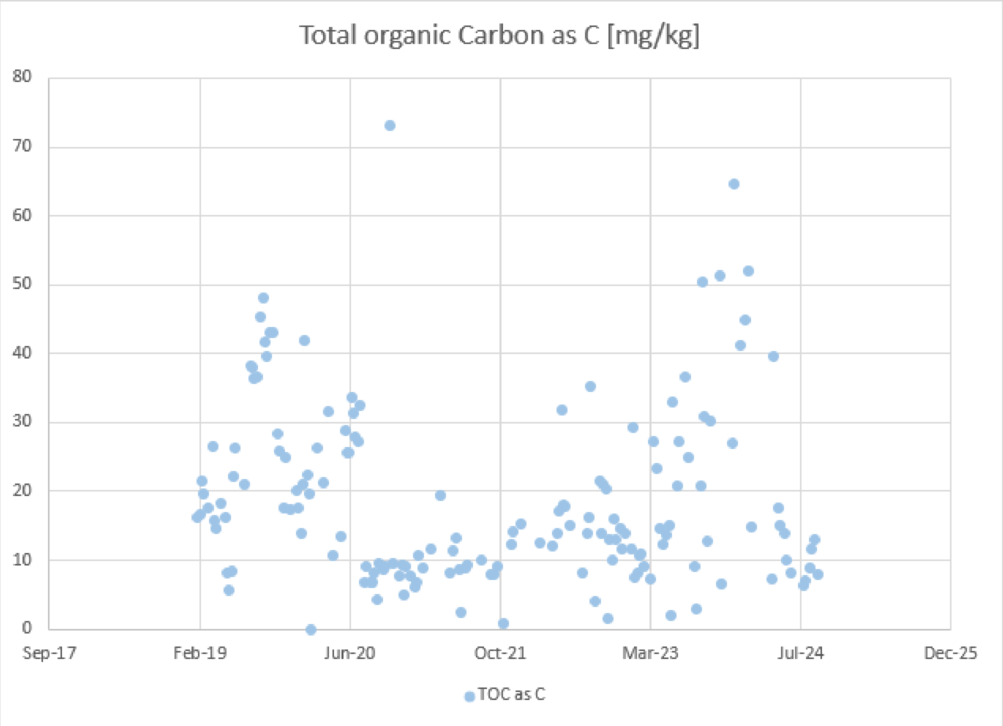


Figure 92: Tutuka Cooling water West total organic carbon

PART B RESPONSE SHEET IN TERMS OF A REQUEST FOR INFORMATION To be completed by the supplier			
To	Eskom Holdings SOC Ltd	**Date**	04 August 2025
Attention	Letsibogo Mahlatji		
Tel no		**Fax no and /or e-mail address**	
From		**Address**	
Address			
Sender			
Description of the works/goods/services	Request to obtain information about the Forward Osmosis technology for the treatment of Wastewater for re-use.		

Please find below our response to Eskom's questions:

No.	Question	Please indicate your response in this column
1.	Name of the Respondent	
2.	The name and contact details of the person appointed by the Respondent as its representative in the event that Eskom needs to contact the company for clarification or further details.	
3.	Company profile and description of key service offerings and capacities.	
4.	Is the respondent/company an existing registered Eskom vendor? (Please provide vendor registration details)	
5.	Provide details on respondent/Company empowerment, localisation credentials (Black Youth & Women Owned Enterprise, BBBEE Enterprise etc)	
6.	Is the company locally based or have a local office in South Africa? If no, indicate if the company is familiar with the requirements of South African State-Owned Companies tendering processes.	

Yours faithfully

Name	Designation	Signature	Date
Telephone number		**Fax and/or e-mail address**	