TWEED SHIRE COUNCIL

Eviron Road Quarry Landfill
Annual Environmental Management Review 2018
Stage 1 (Application No.08_0068)

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Executive Summary

In December 2012, Council sought an approval from the NSW Department of Planning and Environment (DoPE) (formerly known as the Department of Planning and infrastructure (DoPI)) to develop new waste infrastructure at Eviron Road, Eviron. Approval was granted (Project Approval 08_0068) following an environmental assessment prepared by GHD Pty Ltd (GHD) in accordance with the requirements of Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). This approval includes:

- A landfill within the void space created by Quirks Quarry
- Development of two further quarries to be used as landfills after exhaustion of quarry resources and
- Operational infrastructure such as haul roads, an acid sulphate soil treatment area and other service buildings/storage facilities as required.

Construction works under this approval have commenced for Stage 1 of the project which includes:

- Construction of a Haul Road from the existing Stott's Creek Resource Recovery Centre to the new landfill at Quirks Quarry; and
- Construction of a new landfill in the void of the existing Quirks Quarry; and
- Construction of a new quarry at the site known as the West Valley.

The purpose of this report is to satisfy the requirements of Schedule 6, Condition 6 of Project Approval 08_0068, namely that an Annual Review be produced detailing the works carried out in the previous twelve months, being the reporting period from 1 January 2018 to 31 December 2018. The works carried out during this period are summarised as follows:

Management Plans

In the 2018 reporting period, no new management plans were prepared or submitted for approval and no approvals of outstanding management plans previously submitted to the NSW DoPE were received.

General Activities

During the 2018 reporting period, the following general works activities were carried out at the site:

- The final material stockpiles located within Quirks Quarry were removed from the site by the previous operations contractor.
- Ongoing environmental baseline monitoring of groundwater and surface water was undertaken as per the Environmental Assessment recommendations.
- Environmental and cultural heritage site inductions have continued for site personnel.
- Monitoring, maintenance and rectification of vegetation protection measures installed at the site was undertaken as required.
- Monitoring, maintenance and rectification of environmental controls installed at the site was undertaken as required.

Meteorological Station

The meteorological station that had originally been installed at the site was lost during the unprecedented March 2017 flood which was the largest flood event on record in the Tweed. A new weather station was subsequently re-installed and commenced recording data from the 24th January 2018.

Haul Road

Activities undertaken at the site during the 2018 reporting period were minimal and comprised of preliminary works for the commencement of construction of the haul road. Specifically, these works included:

- Management and maintenance of a fob activated boom gate at the entry to the site off Eviron Road to manage, control and monitor all material coming into the site during construction.
- Monitoring and maintenance of permanent and temporary erosion and sediment controls in current active areas of disturbance.
- Importation, placement and compaction of approximately 3,300m^3 of imported fill material between approximately CH800 and CH1000.

Biodiversity Offsets

During the 2018 reporting period ongoing maintenance and weed control within the planting areas was undertaken in accordance with the maintenance program for the site

Nest Box

The first annual follow-up and maintenance inspection was undertaken in March 2018 which recorded 17 sugar gliders (Petaurus breviceps) occurring within a range of nest box types. Five nest boxes had nesting material (eucalypt and/or eucalypt leaves and camphor leaves combined) present within boxes. Based on the type of nest construction observed, a further three species may be using boxes and includes Antechinus spp., the Feather-tail Glider and Possum (most likely Mountain Brushtail Possum based on previous site records). Three boxes were colonised by arboreal ants.

Complaints

During the 2018 reporting period, no complaints were received relating to the project.

1. Project Overview

Residents within the Tweed Shire Council (the Council) Local Government Area (LGA) currently generate approximately 100,000 tonnes of waste annually which is largely recycled or reused. A component of this waste, however, cannot be reused and therefore must be safely managed in landfill.

Waste within the Tweed is currently landfilled at Council's Stott's Creek Resource Recovery Centre, however, this facility is nearing its design capacity. In planning for the shires future landfill requirements, Council sought an approval from the NSW Department of Planning and Environment (DoPE) (formerly known as the Department of Planning and infrastructure (DoPI)) in December 2012 to develop new waste infrastructure at Eviron Road, Eviron (Project Approval 08_0068). Approval was granted following an environmental assessment prepared by GHD Pty Ltd (GHD) in accordance with the requirements of Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). This approval includes:

- A landfill within the void space created by Quirks Quarry,
- Development of two further quarries to be used as landfills after exhaustion of quarry resources, and
- Operational infrastructure such as haul roads, an acid sulphate soil treatment area and other service buildings/storage facilities as required.

Construction works under this approval have commenced for Stage 1 of the project which includes:

- Construction of a Haul Road from the existing Stott's Creek Resource Recovery Centre to the new landfill at Quirks Quarry; and
- Construction of a new landfill in the void of the existing Quirks Quarry; and
- Construction of a new quarry at the site known as the West Valley.

Works carried out at the site to date have been minimal and comprise only of preliminary works for the construction of the haul road. Works are yet to commence on the landfilling or quarrying components of Stage 1 of the project. A number of management plans have also been prepared for the project along with necessary site investigations and monitoring works. Environmental controls have also been installed in preparation for the commencement of construction for the haul road.

2. Location

The subject site is located at Eviron Road, Eviron, within the Tweed LGA. The site is approximately 16km north east of Murwillumbah and adjoins the existing Stott's Creek Resource Recovery Centre which is located to the north west of the site.

The Council owned site has an area of 136 hectares (excluding Stott's Creek Resource Recovery Centre) which previously comprised Lot 1 of DP 34555, Lot 26 of DP 615931, and Lot 602 DP 1001049. Following a series of property acquisitions and boundary adjustments, the subject site now comprises Lot 1 DP 1159352, Lot 2 DP 1170442, Lot 1 DP 1170442, Lot 30 DP 820048, Lot 1 DP 34555, Lot 1 DP 783802 and Lot 25 DP 615931 (refer Appendix A).

3. Scope of This Report

The purpose of this report is to satisfy the requirements of Schedule 6, Condition 6 of Project Approval 08_0068, namely that an Annual Review be produced detailing the works carried out in the previous twelve months.

This Review covers the reporting period from 1 January 2018 to 31 December 2018.

The requirements of Condition 6 are provided in Table 1 below, with specific section references for each relevant section addressed in this document.

Table 1: Annual Review requirements (Condition 6 of Schedule 6 of Project Approval 08_0068)

	Annual Review Requirement	Specific Section
(a)	Describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year	Section 4 and Section 5
(b)	Include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against: • The relevant statutory requirements, limits or performance measures/criteria; • The monitoring results of previous years; and • The relevant predictions in the EA;	Section 6
(c)	Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance	Section 7
(d)	Identify any trends in the monitoring data over the life of the project	Section 6 and Appendix B & C
(e)	Identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies	Section 8
(f)	Describe what measures will be implemented over the current calendar year to improve the environmental performance of the project	Section 9

4. Summary of Works Undertaken in 2018

4.1 Management Plans

A number of management plans which are required under the project approval have been previously prepared and submitted to the Director General for necessary approval. A summary of these plans and their progress is presented in Table 2 below.

In the 2018 reporting period, no new management plans were prepared or submitted for approval and no approvals of outstanding management plans previously submitted to the NSW DoPE were received.

Table 2: Status summary of management plans submitted under Project Approval 08_0068.

Management Plan	Summary	Status
Environmental Management Strategy	Schedule 6, Condition 3 of Project Approval 08_0068, requires that an Environmental Management Strategy be prepared and implemented for the project to the satisfaction of the Director-General. The Environmental Management Strategy outlines all plans required under the approval, who is responsible for preparation of each plan, who is responsible for implementing each plan and who audits each plan within recommended timeframes.	✓ Completed - 27 May 2014 ✓ Approved - 4 June 2014

Management Plan	Summary	Status
	The Environmental Management Strategy was prepared and submitted to the Director General on 27 May 2014 and was granted approval by NSW DoPE on 4 June 2014.	
Heritage Management Plan	A Heritage Management Plan is required as per Schedule 4, Condition 28 of Project Approval 08_0068. This plan was prepared in consultation with the Tweed Byron Local Aboriginal Land Council and included a Heritage Awareness Induction for all those involved. To date any personnel attending the site have been inducted prior to commencement of any activities. The Heritage Management Plan was submitted to the Director General on 8 January 2014 and approved by the NSW DoPE on 4 June 2014.	✓ Completed - 8 January 2014 ✓ Approved - 4 June 2014
Biodiversity Offset Plan	The Biodiversity Offset Plan is a requirement of Schedule 4, Condition 29 of Project Approval 08_0068. This plan was submitted to the Director General on 18 December 2013 and the reply from NSW DoPE dated 4 June 2014 stated they would review its adequacy in consultation with relevant agencies. A number of key commitments within the submitted plan have been undertaken which include: (i) Delineation of Vegetation Protection Areas on the site with bunting and signage that restricts access from site operations (refer Figure 1). (ii) Vegetation planting in the Northern Riparian Corridor and Southern Ridgeline Corridor in accordance with the Biodiversity Offset Restoration Plan.	✓ Completed - 18 December 2013 X Awaiting Approval
White Laceflower Translocation Plan	This plan is required as per Schedule 4, Condition 30 of Project Approval 08_0068. This plan was submitted 28 August 2013 and approved by NSW DoPE 4 June 2014.Work to date has been carried out in accordance with the plan. Despite ongoing monitoring of white lace flower seeds on the site, no white lace flower seeds have propagated on the site since the approval of this plan. Ongoing monitoring of white lace flowers continues locally with the aim of utilising white lace flower seedlings from the site as soon as they become available. Failing this, alternative White Lace seedlings may have to be sourced from an alternative source.	✓ Completed - 28 August 2013 ✓ Approved - 4 June 2014
Landscape Management Plan	A Landscape Management Plan (LMP) is a requirement of Schedule 4, Condition 31 of Project Approval 08_0068. This plan was submitted to NSW DoPE 4 April 2014. NSW DoPE advised that further discussions would be required with the Office of Environment and Heritage. Under the provision of Condition 32, Schedule 4, a conservation and rehabilitation bond is to be lodged within six (6) months of the approval of the Landscape Management Plan. Once	✓ Completed - 4 April 2014 X Awaiting Approval

Management Plan	Summary	Status
	approval has been received, necessary arrangements will be made for lodgement of this bond.	

4.2 General

During the 2018 reporting period, the following general works activities were carried out at the site:

- The final material stockpiles located within Quirks Quarry were removed from the site by the previous operations contractor.
- Ongoing environmental baseline monitoring of groundwater and surface water was undertaken as per the Environmental Assessment recommendations.
- Environmental and cultural heritage site inductions have continued for site personnel.
- Monitoring, maintenance and rectification of vegetation protection measures installed at the site was undertaken as required.
- Monitoring, maintenance and rectification of environmental controls installed at the site was undertaken as required.

Figure 1 – Vegetation protection area and erosion and sediment controls.

4.3 Meteorological Station

Condition 9 of Schedule 3 of Project Approval 08_0068 requires that a meteorological station be situated on the site to continuously monitor air temperature, wind direction, wind speed, rainfall and relative humidity (refer Figure 2). Meteorological data captured for the 2018 reporting period is summarised in Appendix D.

Figure 2 –Meteorological station located at the site.

4.4 Haul Road

Pre-construction and design works for the proposed haul road were completed in 2016 with the proposed road alignment surveyed and pegged out.

Activities undertaken at the site during the 2018 reporting period were minimal and comprised of preliminary works for the commencement of construction of the haul road. Specifically, these works included:

- Management and maintenance of a fob activated boom gate at the entry to the site off Eviron Road to manage, control and monitor all material coming into the site during construction.
- Monitoring and maintenance of permanent and temporary erosion and sediment controls in current active areas of disturbance.
- Importation, placement and compaction of approximately 3,300m^3 of imported fill material between approximately CH800 and CH1000.

Figure 3 – Fob activated boom gate constructed at entrance to haul road site.

Figure 4 – Photo of vegetated stockpiles and stormwater infrastructure on site ready for installation.

Figure 5 – Material placed within haul road alignment between approximately CH800 and CH1000.

4.5 Biodiversity Offsets

A total of 13,700 tube stock were planted at the site in 2017 in accordance with the submitted Biodiversity Offset Plan. These works were aimed at improving the quality of corridor vegetation composition and connectivity through enhancement plantings, bush regeneration and weed control in two defined corridor alignments; being the Northern Riparian Corridor (NRC) and Southern Ridgeline Corridor (SRC) (refer Figure 6). During the 2018 reporting period ongoing maintenance and weed control within the planting areas was undertaken in accordance with the maintenance program for the site (refer Appendix E for annual report).

Figure 6 – Vegetation growth within SRC.

In addition to the above, 12 nest boxes have also been installed at the site in accordance with the Eviron Road Quarry and Landfill Nest Box Plan (refer Figure 7). Nest boxes were installed on the 29th July 2016 as per Table 3 below. During the 2018 reporting period Council engaged an independent ecologist (Lewis Ecological Consultants) to undertake the first annual follow-up and maintenance inspection on the16th March 2018 (refer Appendix F). In accordance with the nest box management plan, the engaged ecologist inspected each box looking for evidence of fauna occupation or pest activity. The inspection recorded 17 sugar gliders (Petaurus breviceps) occurring within a range of nest box types. Five nest boxes had nesting material (eucalypt and/or eucalypt leaves and camphor leaves combined) present within boxes. Based on the type of nest construction observed, a further three species may be using boxes and includes Antechinus spp., the Feather-tail Glider and Possum (most likely Mountain Brushtail Possum based on previous site records). Three boxes were colonised by arboreal ants.

In regards to the condition and functionality of nest boxes, all boxes were in good condition and functioning as designed. Consequently, no maintenance is required on boxes at this stage.

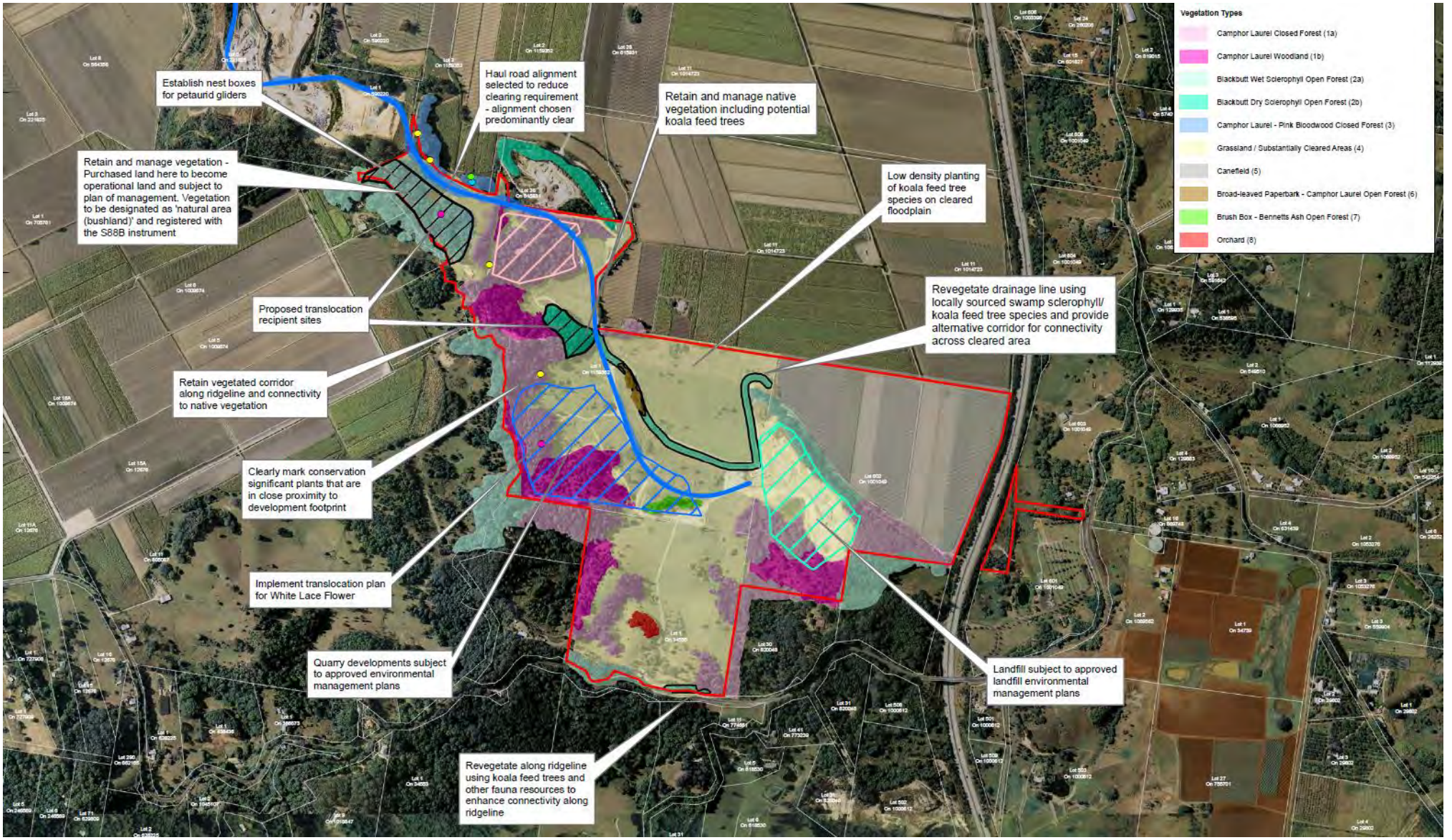


Figure 7 – Biodiversity offset plan.

Table 3: Location and details of nest boxes installed at the site

Location	Id.	Box type	Height above Gnd. (m)	Aspect	Tree species	GPS coordinate
Conservation Area 5 (Southern end of north valley)	Tree 1	Small Glider (silver top)	6.0	SSE	Blackbutt	23.30066, 153.50279
as above	Tree 1	Bat Box wedge	7.0	E	Blackbutt	23.30066, 153.50279
as above	Tree 2	Small Glider (silver top)	8.0	SSE	Blackbutt	28.30062, 153.50279
as above	Tree 2	Bat Box Wedge	7.0	W	Blackbutt	28.30062, 153.50279
as above	Tree 3	Bat Box Wedge	7.0	SSW	Blackbutt	28.30096, 153.50299
as above	Tree 3	Small Glider (silver top)	5.0	ESE	Blackbutt	28.30096, 153.50299
Conservation Area 1 (boxes along ridgeline road to Hawkins house)	Tree 4	Bat Box (HLH)	5.5	N	Brushbox	28.29826, 153.49902
as above	Tree 4	Parrot (HLH)	7.0	ESE	Brushbox	28.29826, 153.49902
as above	Tree 5	Small Glider Wedge	5.0	NW	Bloodwood	28.29798, 153.49881
as above	Tree 5	Parrot (HLH)	6.5	SE	Bloodwood	28.29798, 153.49881
as above	Tree 6	Large Parrot	7.0	W	Blackbutt	28.29774, 153.49855
as above	Tree 6	Small Glider wedge	8.0	S	Blackbutt	28.29774, 153.49855

Figure 8: Nest box installed at the site.

4.6 Environmental Audit

During August 2018 Council engaged GeoLINK Pty Ltd to carry out an environmental audit of the site in accordance with Condition 10 of Schedule 6 of the project approval. This condition required Council to "*engage a suitably qualified and experience environmental consultant to undertake an independent environmental audit of the project which must:*

- *Be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director General*
- *Include consultation with relevant agencies*
- *Assess the environmental performance of the project and whether it is complying with the relevant requirements in the approval and any relevant EPL and/or Water Licence (including any assessment, plan or program required under these approvals)*
- *Review the adequacy of any approved strategy, plan or program required under the approvals*
- *Recommend measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under these approvals"*

The environmental audit was completed on the 29th October 2018 and was provided to the NSW DoPE on the 2nd November 2018 for comment (awaiting response). As a summary, the outcome of the audit found that:

> *The commitment of Eviron Road Quarry and Landfill and its staff to the quarry's environmental management was apparent, and site operations, work practices and documentary records were found to be generally in compliance with the Conditions of Approval, Statement of Commitments and relevant legislation, and consistent with good Environmental practices.*
>
> *In total there were eight Administrative Non-compliances and five Observations made that may improve environmental management on this site.*
>
> *The level of awareness among staff of good environmental practice was generally satisfactory. Several examples of good environmental practices were observed during the site inspection. The findings obtained during this Audit shows that Eviron Road Quarry and Landfill is generally compliant with the Conditions of Approval, Statement of Commitments, and with relevant environmental legislation.*

A copy of the full Environmental Audit Report is provided in Appendix G.

5. Forward Works Planned for 2019

5.1 Haul Road Construction

Pre-loading of the haul road is to continue in 2019 with works to be undertaken by Council. The pre-loading works will utilise Virgin Excavated Natural Material (VENM) or certified Excavated Natural Material (ENM), but also Excavated Public Road Material (EPRM) left over from Council road construction projects in accordance with the Tweed Shire Council Excavated Road Material Order and Exemption 2016 which is valid until May 2020.

Once the pre-load material has compacted and settlement has been completed as per the design requirements, construction of Stage 1 of the haul road will commence.

Installation of stormwater and drainage infrastructure for the haul road will also be undertaken during 2019, however, specific timelines are yet to be finalised and are dependent on necessary compaction of pre-load areas as described above.

5.2 Environmental

Environmental monitoring and recording will continue at the site in accordance with the approved Environmental Management Plans submitted to date.

Continual reviews of the timelines for activities will be carried out to ensure they align with the Environmental Management Strategy.

Ongoing maintenance of the biodiversity offset plantings is proposed throughout 2019 which will include follow-up weed control of the NRC and SRC plantings, stem injection of remaining Camphor Laurels in SRC, planting of propagated Swamp Hibiscus, replacement of dead plants and ongoing monitoring.

The second annual follow-up and maintenance review of the nest boxes installed at the site will be undertaken in Spring 2019. Any required maintenance or repairs will be undertaken at the time of inspection.

6. Monitoring Results Review

6.1 Surface Water Quality

In 2008 Council implemented a baseline surface water monitoring program which occurs in the main drainage channel on the northern boundary of the site, adjacent to Quirks Quarry. This monitoring program comprises three (3) monitoring sites (SW1, SW2 and SW4) (refer Figure 9) which are sampled on a quarterly basis. A suite of parameters are tested during each monitoring event which are outlined in Table 9-7 of the Environmental Assessment. This suite of parameters is generally consistent with the requirements of the Environmental Guidelines: Solid Waste Landfills (EPA 1996).

For the suite of parameters that are monitored, there are currently no specific trigger values, however, the ANZECC/ARMCANZ freshwater guidelines continue to be used as a point of reference. Upon commencement of significant construction works, a range of operational trigger values will be developed for each site based on the collected baseline data. These trigger values will be applicable during quarrying and landfill activities and will feed into the Quarry Plan of Management and Landfill Environmental Plan. It is anticipated that once operations commence, the surface water monitoring program will be a specific requirement in the Environmental Protection Licences for the site.

The results of surface water monitoring and their graphs are provided in Appendix B and C. Surface water monitoring data continues to be considered baseline at this stage as no significant project works have been undertaken at the site. Nonetheless, a summary analysis of data trends to date for each monitoring site has been undertaken which is provided below. A more detailed analysis of data will be undertaken once substantial construction works are undertaken at the site.

SW1

SW1 is a surface water monitoring site with baseline data indicating that surface water in this location is fresh. The pH of surface water at this site varies between moderately acidic and neutral ranging between 5.6 and 6.7. Nutrient values at the site are typically low, however, a spike in BOD, total nitrogen and total phosphorus has been previously recorded in the past which extended over three monitoring periods between 09/08/2011 and 06/02/2012. This period coincides with a similar spike in suspended solids which is likely the result of significant rainfall during this period. The concentration of metals at the site are generally low, however, similar to that described above, a spike in total arsenic, total cadmium, total copper, total manganese and total nickel were all recorded the same rain event period. It is also noted that a spike in total phosphorus was recorded on the 9th August 2017, however, this value had returned to background by the following monitoring event.

SW2

SW2 is a surface water monitoring site with baseline data indicating that surface water in this location is fresh. The pH of surface water at this site varies between strongly acidic and neutral ranging between 5.4 and 7.1. Nutrient values at the site are generally low with total nitrogen ranging between 0.3 and 2.7mg/L throughout the monitoring period. The concentration of metals at the site are also generally low and consistent with baseline monitoring data in the other surface water monitoring sites.

SW4

SW4 is a surface water monitoring site with baseline data indicating that surface water in this location is fresh. The pH of surface water at this site varies between moderately acidic and neutral ranging between 6.0 and 7.0. Nutrient values at the site are generally low with total nitrogen ranging between 0.2 and 2.8mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the other surface water monitoring sites. It is noted, however, that concentrations of manganese and calcium are slightly elevated at this site.

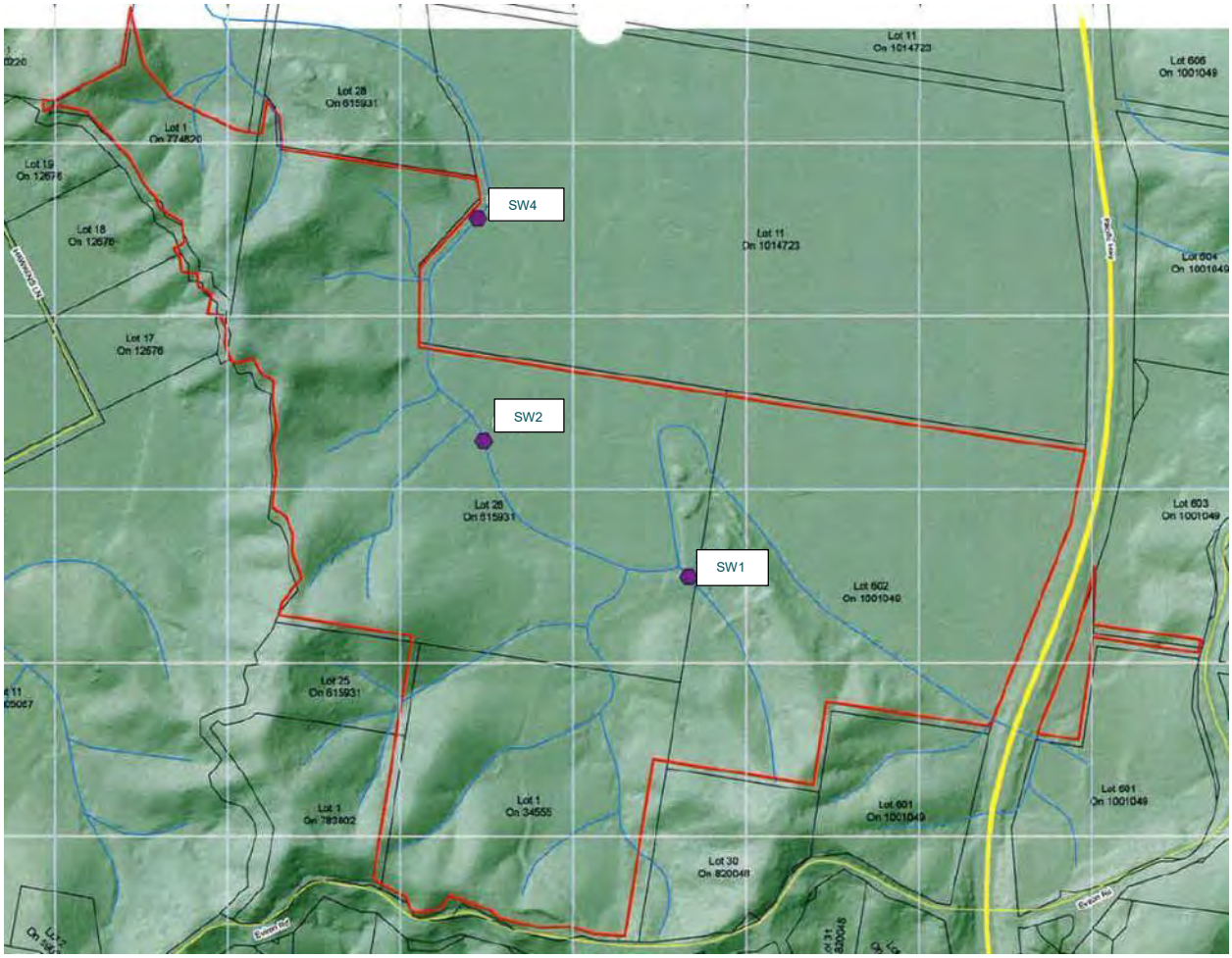


Figure 9 – Eviron surface water monitoring bores.

6.2 Groundwater Water Quality

There are currently nineteen (19) groundwater monitoring bores (refer Figure 10) located on the site which are monitored on a quarterly basis, measuring both groundwater levels and groundwater quality.

Similar to the surface water monitoring program, there are currently no specific trigger values for groundwater at the site, however, the ANZECC/ARMCANZ freshwater guidelines continue to be used as a point of reference. Upon commencement of significant construction works, a range of operational trigger values will be developed for each site based on the collected baseline data. These trigger values will be applicable during quarrying and landfill activities and will feed into the Quarry Plan of Management and Landfill Environmental Plan. It is anticipated that once operations commence, the groundwater monitoring program will be a specific requirement in the Environmental Protection Licences for the site.

The results of groundwater monitoring and their graphs are provided in Appendix B and C. Groundwater monitoring data continues to be considered baseline at this stage as no significant project works have been undertaken at the site. Nonetheless, a summary analysis of data trends to date for each monitoring site has been undertaken which is provided below. A more detailed analysis of data will be undertaken once substantial construction works are undertaken at the site.

Figure 10 – Eviron Groundwater Monitoring Bore locations.

GW1

GW1 is a bedrock monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity and alkalinity values which are recorded at the site. The pH of groundwater varies from very strongly acidic to slightly acidic ranging between 4.9 and 6.4. Nutrient values at the site are typically low with total nitrogen concentrations ranging between 0.1 and 1.8mg/L. The concentration of metals at this site are also considered to be generally low and stable. Notwithstanding, one monitoring event on the 14/11/2012 recorded a significant spike in total chromium, total copper, total iron, total lead, total aluminium, total calcium, total manganese, total nickel and total zinc. It is noted that the total aluminium, total copper and

total iron, total lead, total nickel concentrations were very high during this event reaching 485mg/L, 1.08mg/L and 612mg/L respectively.

GW2

GW2 is an alluvial monitoring site with baseline monitoring data indicating that groundwater in this location is brackish. This is reflected in the relatively high concentration of conductivity, alkalinity, bicarbonate, total sodium, total chloride, and total calcium recorded at the site. Given the brackish nature of the groundwater, pH values at this site are generally neutral and stable, ranging between 6.7 and 7.1 throughout the monitoring period. Nutrient values at the site are generally low and stable, however, one moderate spike in concentration was recorded on the 09/02/2015 which is reflected in the results for ammonia, BOD, TKN and total nitrogen. The concentrations of metals at the site are generally characteristic of soils in this location and are consistent with the surrounding baseline monitoring data.

GW4

GW4 is an alluvial monitoring site with baseline monitoring data indicating that groundwater in this location is brackish. This is reflected in the relatively high concentration of conductivity, alkalinity, bicarbonate, total sodium, total chloride, and total calcium recorded at the site. Given the brackish nature of the groundwater, pH values at this site are generally neutral to slightly alkaline, ranging between 6.9 and 7.5 throughout the monitoring period. Nutrient values at the site are generally low and stable, however, one significant spike in concentration was recorded on the 09/02/2015 which is shown in the results for ammonia, BOD, TKN, total nitrogen and total phosphorus. An additional moderate spike in nutrient values was also recorded at this site during the 2016 monitoring period. The concentrations of metals at the site are generally characteristic of soils in this location and are consistent with the surrounding baseline monitoring data.

GW5

GW5 is a bedrock monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity, alkalinity and bicarbonate values which are recorded at the site. The pH of groundwater is strongly to extremely acidic ranging between 3.8 and 5.4. Nutrient values at the site are typically low with Total Nitrogen concentrations ranging between 0.3 and 4.1mg/L. With the exception of manganese which is considered to be high in this location, the concentration of metals at the site are generally characteristic of soils in this location and are consistent with the surrounding baseline monitoring data.

GW6

GW6 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity, alkalinity and bicarbonate values which are recorded at the site. The pH of groundwater varies between strongly acidic to slightly acidic ranging between 5.1 and 6.3. Nutrient values at the site are generally low and stable, however, one moderate spike in concentration was recorded on the 09/02/2015 which is reflected in the results for ammonia, BOD, TOC, TKN and total nitrogen. With the exception of nickel and zinc which appear to occur in high concentrations at the site relative to background levels, the concentrations of metals at the site are generally characteristic of soils in this location and are consistent with the surrounding baseline monitoring data.

GW7

GW7 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity, alkalinity and bicarbonate values which are recorded at the site. The pH of groundwater varies from extremely acidic to strongly acidic ranging between 4.2 and 5.5. Nutrient values at the site are generally low and stable, however, one moderate spike in concentration was recorded on the 13/02/2013 which is reflected in the results for BOD, nitrate, oxidised nitrogen, TOC, TKN and total nitrogen. The concentrations of metals at the site are generally characteristic of soils in this location and are consistent with the surrounding baseline monitoring data.

GW8

GW8 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity, alkalinity and bicarbonate values which are recorded at the site. The pH of groundwater varies between moderately acidic and neutral ranging between 5.7 and 6.6. Nutrient values at the site are generally low and stable, with total nitrogen ranging between 0.6 and 3.1mg/L throughout the monitoring period. The concentrations of metals at the site are generally characteristic of soils in this location and are consistent with the surrounding baseline monitoring data. Notwithstanding, a significant spike in the concentration of nickel was recorded on the 13/11/2012 at this location which was high relative to background levels.

GW9

GW9 is an alluvial monitoring site with baseline data indicating that groundwater at this site ranges between fresh and brackish. This is reflected in the elevated conductivity, sodium and chloride levels, however, it is noted that the alkalinity and bicarbonate values are generally low. The pH of groundwater varies between very strongly acidic and slightly acidic ranging between 4.8 and 6.2. Nutrient values at the site are generally low and stable, with total nitrogen ranging between 0.2 and 1.1mg/L throughout the monitoring period. The concentration of metals at the site are generally consistent with baseline monitoring data in the surrounding area, however, it is noted that total lead concentrations were slightly elevated at this site.

GW10

GW10 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity levels recorded during the monitoring period. The pH of groundwater varies between very strongly acidic and slightly acidic ranging between 4.8 and 6.3. Nutrient values at the site are generally low although slightly elevated against other surrounding baseline monitoring sites with total nitrogen ranging between 0.2 and 4.4mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the surrounding area, however, a spike was recorded at the site which occurred on the 12/11/2013 and saw temporary elevated levels of chromium, aluminium, arsenic, copper, iron, lead, nickel and zinc. In addition, it is also noted that a significant spike in conductivity occurred on the 11/08/2015 which also coincided with spikes in chloride, sulfate, calcium, magnesium, manganese, nickel and sodium, and a drop in pH.

GW11

GW11 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity and alkalinity levels recorded during the monitoring period. The pH of groundwater varies between extremely acidic and moderately acidic ranging between 4.1 and 5.7. Nutrient values at the site are generally low although slightly elevated against other surrounding baseline monitoring sites with total nitrogen ranging between 0.4 and 3.06mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the surrounding area, however, a low level spike was recorded at the site on the 14/05/2014 which saw a short-term spike in the level of total aluminium, total chromium, total copper, total iron, total lead, total manganese, total nickel and zinc.

GW14

GW14 is a bedrock monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity and alkalinity levels recorded during the monitoring period. The pH of groundwater at this site is the lowest of all monitoring sites varying between extremely acidic and very strongly acidic ranging between 3.7 and 4.9. Nutrient values at the site are generally low with total nitrogen ranging between 0.5 and 3.5mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the surrounding area, however, slightly elevated levels of total aluminium, total chromium, total lead, total iron and total copper were recorded at the site during a low level spike that occurred on the 14/11/2012.

GW15

GW15 is a bedrock monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity and alkalinity levels recorded during the monitoring period. The pH of groundwater at this site varies between moderately acidic and neutral ranging between 5.6 and 6.9. Nutrient values at the site are generally low although two slightly elevated spikes were recorded on the 14/05/2014 and 11/11/2015. Total nitrogen concentrations at the site ranged between 0.2 and 6.4mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the surrounding area.

GW16

GW16 is a bedrock monitoring site with baseline data indicating that groundwater at this site is fresh. This is reflected in the low conductivity and alkalinity levels recorded during the monitoring period. The pH of groundwater at this site varies between very strongly acidic and neutral ranging between 4.6 and 6.8. Nutrient values at the site are generally low although slightly elevated against other surrounding baseline monitoring sites with total nitrogen ranging between 0.2 and 5.5mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the surrounding area. It is noted that the concentration of calcium is generally very low, although a very high spike in concentration was recorded on the 08/11/2011.

GW17

GW17 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh. The pH of groundwater at this site varies between strongly acidic and slightly acidic ranging between 5.3 and 6.2. Nutrient values at the site are generally low with total nitrogen ranging between 1.1 and 2.4mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the surrounding area, however, it is noted that total arsenic, total chromium and calcium concentrations are slightly elevated.

GW19

GW19 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh. The pH of groundwater at this site varies between moderately acidic and slightly alkaline ranging between 5.9 and 7.5. Nutrient values at the site are generally very low with total nitrogen ranging between 0.4 and 0.7mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the surrounding area.

GW20

GW20 is a bedrock monitoring site with baseline data indicating that groundwater at this site is fresh, although close to approaching brackish. This is reflected in the slightly elevated conductivity, alkalinity and bicarbonate levels recorded at the site. The pH of groundwater at this site varies between neutral and slightly alkaline ranging between 6.8 and 7.6. Nutrient values at the site are generally very low with total nitrogen ranging between 0.07 and 0.9mg/L throughout the monitoring period. The concentration of metals at the site are generally low and consistent with baseline monitoring data in the surrounding area. It is noted that the concentration of calcium and fluoride are slightly high in this location relative to surrounding monitoring sites.

GW21

GW21 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh which is reflected in the low conductivity levels recorded at the site. The pH of groundwater at this site varies between strongly acidic and neutral ranging between 5.3 and 6.6. Nutrient values at the site are very low with total nitrogen ranging between 0.05 and 0.3mg/L throughout the monitoring period. The concentration of metals at the site are also generally low and consistent with baseline monitoring data in the surrounding area.

GW22

GW22 is a bedrock monitoring site with baseline data indicating that groundwater at this site is slightly brackish as reflected in the elevated conductivity, alkalinity and bicarbonate levels recorded at the site. The pH of groundwater at this site is neutral, ranging between 6.5 and 7.0. Nutrient values at the site are generally very low with total nitrogen ranging between 0.2 and 1.05mg/L throughout the monitoring period. The concentration of metals at the site are also generally low and consistent with baseline monitoring data in the surrounding area. It is noted that elevated concentrations of anions and cations are present at site including calcium, fluoride, sodium and sulfate.

GW23

GW23 is an alluvial monitoring site with baseline data indicating that groundwater at this site is fresh. The pH of groundwater at this site varies between moderately acidic and neutral ranging between 6.0 and 6.8. Nutrient values at the site are very low with total nitrogen ranging between 0.05 and 0.8mg/L throughout the monitoring period. The concentration of metals at the site are also generally low and consistent with baseline monitoring data in the surrounding area. It is noted that the concentration of some anions and cations at the site are slightly elevated above other baseline sites, including calcium, chloride, fluoride and sodium.

6.3 Meteorological Station

Condition 9 of Schedule 3 of Project Approval 08_0068 requires that a meteorological station be situated on the site to continuously monitor air temperature, wind direction, wind speed, rainfall and relative humidity (refer Figure 2 and Appendix A). The data captured from the station is used to identify any impacts that weather has on other parameters being monitored for the project and is also useful for assisting in reviewing ways to minimise potential impacts.

Meteorological data captured for the 2018 reporting period is summarised in Appendix D.

6.4 Complaints

To date there have been no complaints related to the project.

7. Identification of Non-Compliance and Actions

The environmental audit undertaken by GeoLINK Pty Ltd identified a total of eight administrative non-compliances and five observational issues which require addressing. The identified items are summarised below as follows:

The eight Administrative Non-compliances related to:

- *Finalising DPE approval of strategies*
- *Changes in offsetting techniques which require changes to management plans*
- *Website information*
- *Nest box monitoring*
- *Periodic site inspections.*

The five Observations were noted regarding:

- *Flicker tape*
- *Erosion and sediment controls*
- *Consultation*
- *Weed inspections*
- *Traffic Management Plan.*

The results of the environmental audit were provided to the NSW DoPE on the 2nd November 2018 and Council is awaiting a formal response. In the interim, Council is in the process of addressing each of the non-compliances and observational issues identified above. A copy of the environmental audit with full details on each of the non-compliance matters is provided in Appendix G.

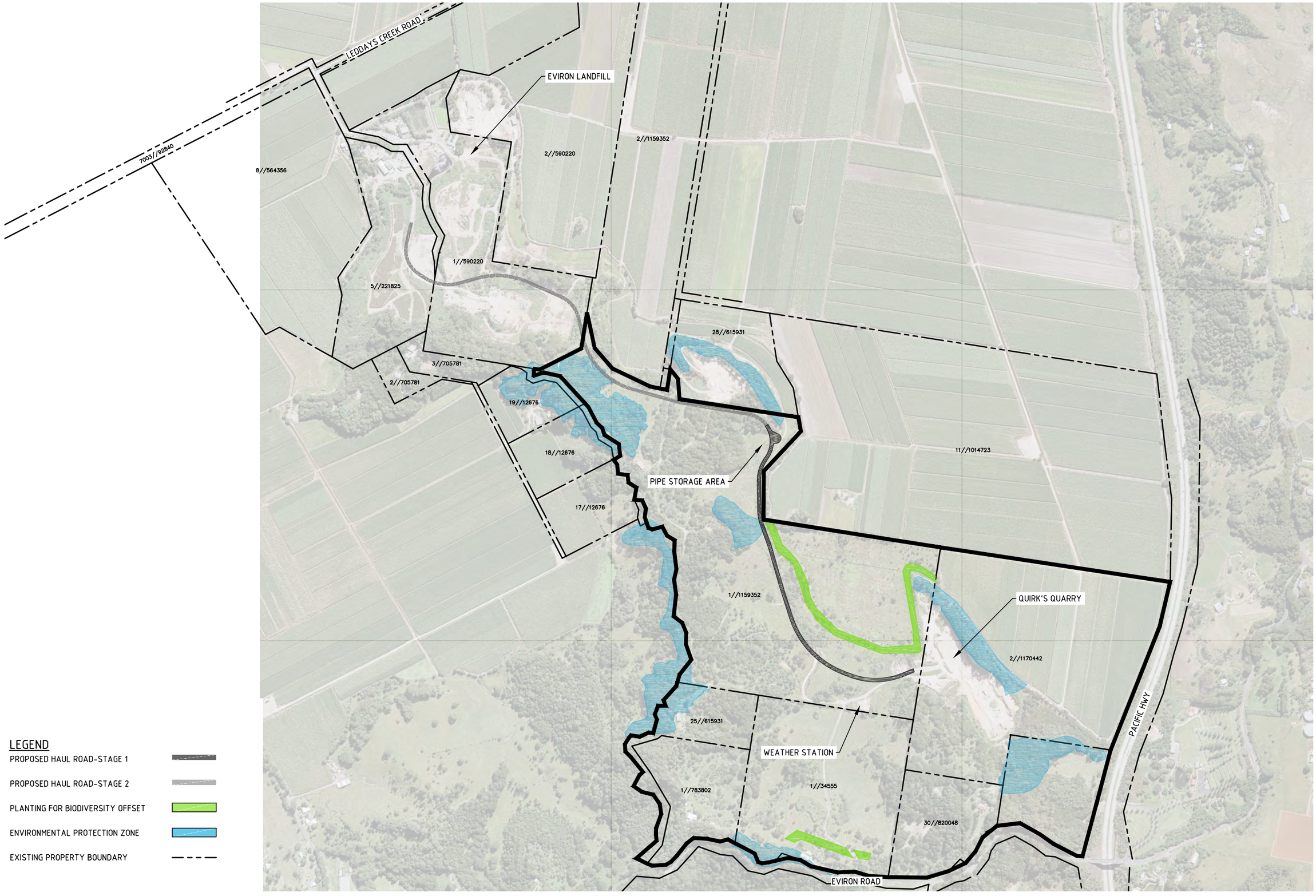
8. Impact Assessment

As works undertaken to date have been minimal, no discrepancies have been identified against the relevant predictions in the Environmental Assessment.

9. Improvement Program

As the project moves into the construction and operation phases, a detailed analysis of operational data will be undertaken against baseline data for assessment against predictions of the Environmental Assessment.

Appendix A – Site Plan



LEGEND

- PROPOSED HAUL ROAD-STAGE 1
- PROPOSED HAUL ROAD-STAGE 2
- PLANTING FOR BIODIVERSITY OFFSET
- ENVIRONMENTAL PROTECTION ZONE
- EXISTING PROPERTY BOUNDARY

PRELIMINARY
NOT FOR CONSTRUCTION

ISSUE	AMENDMENT DETAILS	DRAWN	CHECK	DATE
A	ORIGINAL ISSUE	A.D.	W.K.	22.03.17

SCALE: A1 SHEET 1:5000, A3 SHEET 1:10000
0 50 100 200 300 400 500m

USE FIGURED DIMENSIONS ONLY. DO NOT SCALE.

DESIGN UNIT
COUNCIL OFFICES
TUMBULGUM ROAD,
MURWILLUMBAH NSW 2484.
PHONE 02 66702400
FAX 02 66727513
WEBSITE www.tweed.nsw.gov.au
TWEED SHIRE COUNCIL

DESIGN ENGINEER ..... DATE .....

DESIGNED				
DRAWN	A.D.	22.03.17	COORDS ADOPTED	PM 124179
CHECKED	W.K.	22.03.17	EASTING	548869.775
HORIZONTAL DATUM		MGA	NORTHING	6869228.643
VERTICAL DATUM		AHD	R.L.	1.252

PROJECT: EVIRON ROAD, EVIRON QUIRKS QUARRY TO STOTTS LANDFILL HAUL ROAD

PLAN TITLE: SITE PLAN

PROJECT NUMBER: INF7

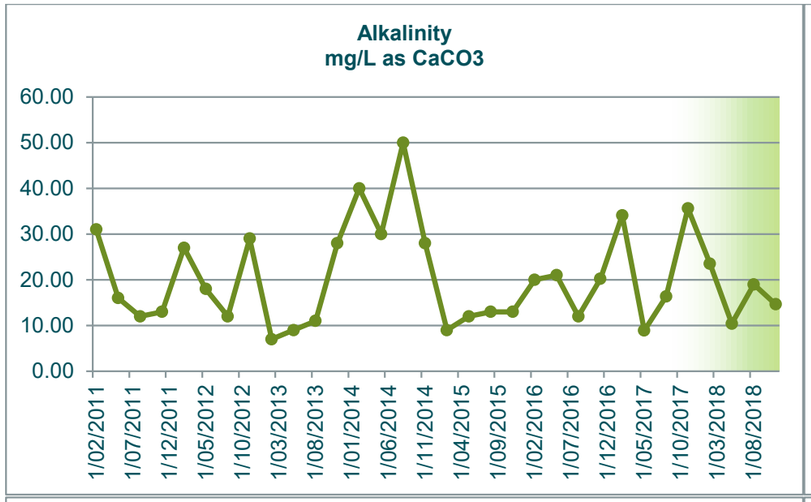
DRAWING NUMBER: INF7-SK-10

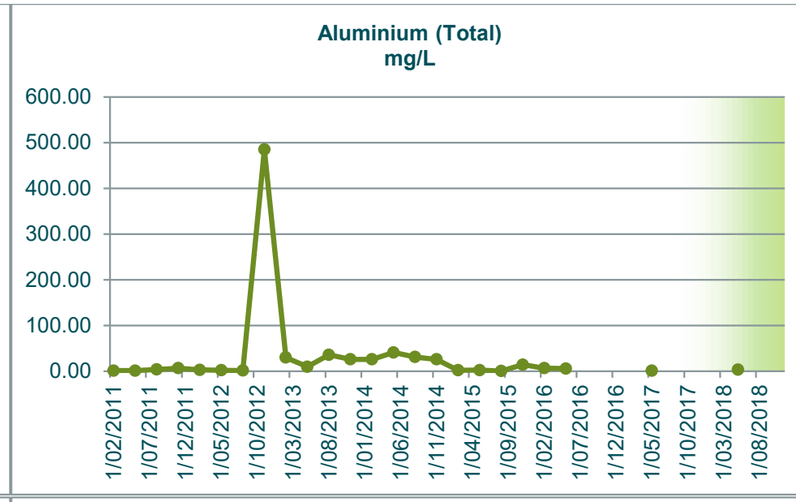
ISSUE: A

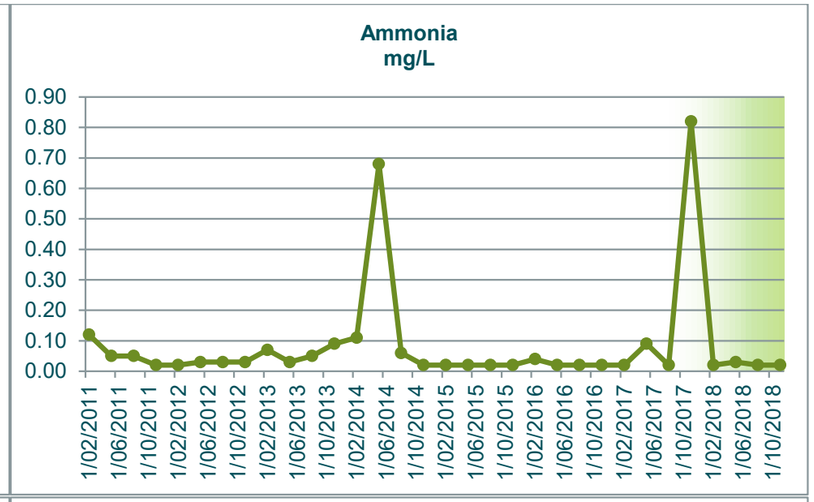
ACAD FILE No: G:_AAA DESIGN PROJECTS\INF\INF7_STOTTS TO QUIRKS HAUL ROAD\Drawings_Misc Dwgs\INF7-Overall Site Details.dwg

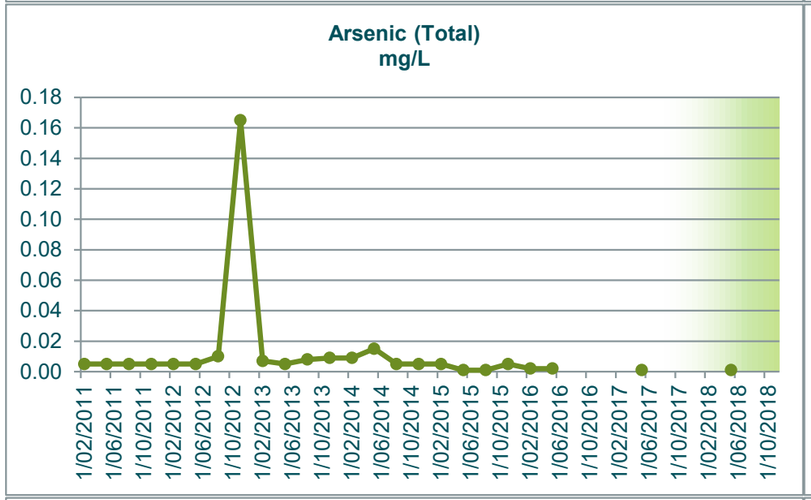
Appendix B – Monitoring Data

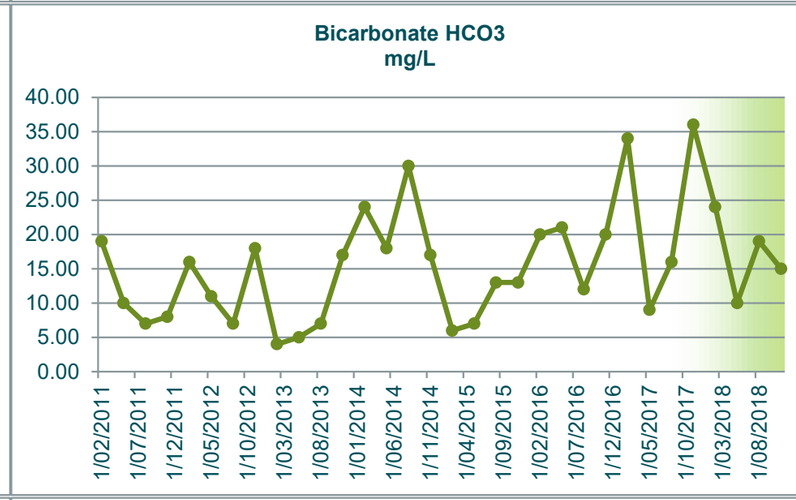
GW1	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
1/02/2011	31.00	1.12	0.12	0.01	19.00	1.00	0.00	4.80	34.00	0.01	0.01	0.01	184.00	0.01	1.60	0.06	1.03	0.01	2.50	0.19	0.01	0.05	0.05	0.05	0.33	6.20	0.10	5.00	381.00	16.00	4.10	21.60	0.33	2.10	39.00	0.09
11/05/2011	16.00	1.12	0.05	0.01	10.00	1.60	0.00	2.70	35.00	0.01	0.01	0.01	181.00	0.04	3.10	0.05	0.78	0.01	2.60	0.08	0.01	0.05	0.05	0.05	0.22	4.90	0.05	5.00	271.00	15.00	5.20	20.10	0.22	1.30	48.00	0.03
10/08/2011	12.00	3.90	0.05	0.01	7.00	1.80	0.00	2.70	34.00	0.01	0.01	0.01	179.00	0.01	2.90	0.04	2.53	0.01	3.40	0.17	0.01	0.06	0.05	0.06	0.17	5.30	0.06	5.00	307.00	21.00	5.40	20.00	0.11	1.50	45.00	0.01
9/11/2011	13.00	6.60	0.02	0.01	8.00	6.30	0.00	3.60	36.00	0.01	0.01	0.01	154.00	0.01	2.50	0.10	4.97	0.01	4.20	0.15	0.01	0.06	0.02	0.06	0.19	5.40	0.10	5.00	310.00	13.00	8.10	20.20	0.13	0.70	50.00	0.04
7/02/2012	27.00	3.00	0.02	0.01	16.00	2.40	0.00	6.10	39.00	0.01	0.01	0.01	211.00	0.01	1.40	0.05	2.55	0.01	4.20	0.16	0.01	0.05	0.02	0.05	0.18	5.70	0.60	5.00	197.00	30.00	9.00	20.50	0.13	0.30	58.00	0.01
9/05/2012	18.00	2.06	0.03	0.01	11.00	2.10	0.00	3.80	34.00	0.01	0.01	0.01	171.00	0.02	4.50	0.04	1.48	0.01	3.30	0.12	0.01	0.15	0.02	0.15	0.28	5.60	0.11	5.00	273.00	19.00	6.10	20.50	0.13	4.50	42.00	0.08
7/08/2012	12.00	1.67	0.03	0.01	7.00	1.50	0.00	2.80	31.00	0.01	0.01	0.01	160.00	0.01	1.00	0.03	0.99	0.01	3.20	0.14	0.01	0.04	0.02	0.04	0.10	5.20	0.05	5.00	239.00	14.00	5.40	18.90	0.06	0.70	28.00	0.03
14/11/2012	29.00	485.00	0.03	0.17	18.00	1.80	0.00	5.50	56.00	0.21	0.21	0.01	266.00	1.16	1.40	0.13	581.00	0.88	4.90	9.42	0.25	0.06	0.02	0.06	0.53	5.20	0.82	5.00	138.00	25.00	7.60	20.50	0.47	0.80	101.00	1.94
14/02/2013	7.00	30.00	0.07	0.01	4.00	1.00	0.00	2.10	27.00	0.01	0.01	0.01	130.00	0.04	3.10	0.04	31.00	0.04	2.20	0.50	0.01	0.15	0.02	0.15	0.63	5.30	0.20	5.00	207.00	16.00	5.20	20.80	0.48	1.30	37.00	0.14
15/05/2013	9.00	9.72	0.03	0.01	5.00	1.50	0.00	2.50	32.00	0.01	0.01	0.01	136.00	0.01	4.20	0.03	7.10	0.01	2.20	0.09	0.01	0.12	0.02	0.12	0.38	5.40	0.20	5.00	156.00	17.00	4.80	20.60	0.26	1.30	63.00	0.16
7/08/2013	11.00	36.00	0.05	0.01	7.00	1.00	0.00	3.50	40.00	0.01	0.01	0.01	150.00	0.04	2.10	0.05	28.00	0.03	2.50	0.52	0.01	0.05	0.02	0.05	0.56	5.50	0.50	5.00	60.00	21.00	4.50	19.80	0.51	1.00	77.00	0.17
13/11/2013	28.00	26.00	0.09	0.01	17.00	1.00	0.00	8.70	59.00	0.01	0.01	0.01	289.00	0.03	1.60	0.06	23.00	0.03	6.30	0.77	0.01	0.14	0.02	0.14	0.60	5.70	0.19	5.00	148.00	37.00	10.00	20.50	0.46	0.60	71.00	0.14
12/02/2014	40.00	26.00	0.11	0.01	24.00	1.00	0.00	9.80	70.00	0.01	0.01	0.01	328.00	0.04	1.20	0.06	26.00	0.04	6.50	1.04	0.01	0.11	0.02	0.11	0.74	5.90	0.16	5.00	77.00	43.00	13.00	21.00	0.63	0.70	187.00	0.25
14/05/2014	30.00	41.00	0.68	0.02	18.00	8.10	0.00	5.60	54.00	0.01	0.01	0.01	282.00	0.06	1.90	0.05	50.00	0.06	4.50	1.06	0.01	0.17	0.02	0.17	1.82	5.70	0.37	5.00	19.00	34.00	11.00	20.10	1.65	1.60	68.00	0.23
13/08/2014	50.00	31.00	0.06	0.01	30.00	1.00	0.00	13.00	77.00	0.01	0.01	0.01	375.00	0.03	1.30	0.11	20.00	0.02	7.80	0.63	0.01	0.08	0.02	0.08	0.55	6.30	0.28	5.00	149.00	53.00	13.00	20.40	0.47	0.50	159.00	0.11
11/11/2014	28.00	26.00	0.02	0.01	17.00	2.10	0.00	6.70	60.00	0.01	0.01	0.01	262.00	0.02	3.10	0.04	18.00	0.03	5.50	0.36	0.01	0.07	0.02	0.07	0.82	6.10	0.20	5.00	78.00	37.00	10.00	21.30	0.75	1.00	67.00	0.07
10/02/2015	9.00	2.16	0.02	0.01	6.00	1.00	0.00	2.10	28.00	0.01	0.01	0.01	122.00	0.01	2.60	0.04	0.82	0.01	1.80	0.03	0.01	0.16	0.02	0.16	0.47	6.40	0.07	5.00	88.00	16.00	6.40	21.40	0.31	2.50	36.00	0.02
12/05/2015	12.00	2.37	0.02	0.00	7.00	2.70	0.00	2.40	27.00	0.00	0.01	0.01	130.00	0.00	5.70	0.02	1.22	0.00	2.40	0.07	0.00	0.15	0.02	0.15	0.36	5.60	0.09	5.00	165.00	18.00	4.90	21.40	0.21	1.60	30.00	0.05
12/08/2015	13.00	0.53	0.02	0.00	13.00	2.10	0.00	3.60	32.00	0.00	0.01	0.01	149.00	0.00	2.30	0.02	0.32	0.00	3.10	0.11	0.00	0.02	0.02	0.02	0.15	5.60	0.03	5.00	116.00	19.00	4.50	18.00	0.13	0.80	67.00	0.01
11/11/2015	13.00	14.28	0.02	0.01	13.00	1.50	0.00	4.20	40.00	0.01	0.01	0.01	177.00	0.02	3.20	0.02	10.63	0.01	4.00	0.19	0.00	0.15	0.02	0.15	0.78	5.40	0.15	5.00	123.00	23.00	5.00	20.50	0.63	0.80	74.00	0.07
9/02/2016	20.00	6.55	0.04	0.00	20.00	1.00	0.00	5.13	53.00	0.00	0.01	0.01	238.00	0.01	1.00	0.02	3.82	0.00	4.91	0.14	0.00	0.09	0.02	0.09	0.49	5.50	0.25	5.00	192.00	29.47	7.33	21.10	0.40	0.61	97.00	0.04
10/05/2016	21.00	5.69	0.02	0.00	21.00	1.00	0.00	3.51	40.00	0.00	0.01	0.01	180.00	0.01	1.50	0.02	3.05	0.00	3.41	0.09	0.00	0.10	0.02	0.10	0.34	5.40	0.16	5.00	184.00	22.54	5.80	21.50	0.24	1.46	71.00	0.06
10/08/2016	12.00		0.02		12.00	1.00		3.05	36.00				165.60		5.30	0.08			3.52			0.03	0.02	0.03	0.15	5.20	0.04	5.00	292.00	21.22	6.05	19.80	0.12	1.10	80.60	
8/11/2016	20.20		0.02		20.00	1.80		5.89	46.00				201.90		2.50	0.03			4.67			0.02	0.02	0.02	0.11	5.50	0.06	5.00	356.20	25.37	7.18	22.40	0.11	2.62	89.20	
8/02/2017	34.10		0.02		34.00	1.50		8.26	58.00				287.50		1.60	0.06			5.86			0.02	0.02	0.02	0.35	5.60	0.11	5.00	356.50	33.70	9.58	22.20	0.35	1.60	113.30	
9/05/2017	8.90	0.90	0.09	0.00	9.00	1.20	0.00	1.80	23.00	0.00	0.01	0.01	110.20	0.00	3.00	0.05	0.69	0.00	1.81	0.05	0.00	0.19	0.02	0.19	0.53	5.40	0.11	5.00	406.30	15.10	6.14	21.00	0.34	1.83	40.50	0.12
9/08/2017	16.35		0.02		16.00	1.00		2.52	35.00				135.10		5.80	0.03			2.61			0.11	0.02	0.11	0.22	5.40	0.04	5.00	407.30	17.41	4.78	20.30	0.11	1.81	28.70	
8/11/2017	35.62		0.82		36.00	5.10		7.65	58.00				289.10		1.00	0.06			5.69			0.02	0.02	0.02	1.31	5.70	0.31	5.00	104.70	34.62	8.14	20.00	1.31	2.71	63.90	
14/02/2018	23.54		0.02		24.00	2.40		5.25	43.00				216.20		3.10	0.04			4.18			0.04	0.02	0.04	0.45	5.60	0.12	5.00	189.90	28.03	6.94	20.90	0.41	1.78	66.20	
9/05/2018	10.40	3.23	0.03	0.00	10.00	2.10	0.00	2.31	28.50	0.00	0.01	0.01	137.50	0.00	1.80	0.03	1.42	0.00	2.47	0.04	0.00	0.44	0.02	0.44	0.77	5.30	0.16	0.55	266.90	18.15	6.04	21.20	0.33	1.40	59.80	0.05
15/08/2018	18.98		0.02		19.00	1.80		4.55	40.00				194.10		5.00	0.04			4.18			0.31	0.02	0.31	0.49	5.60	0.13	0.52	375.00	27.02	7.10	20.40	0.18	3.80	53.90	
14/11/2018	14.64		0.02		15.00	2.40		3.72	30.00				153.00		3.55	0.03			3.02			0.10	0.02	0.10	0.25	5.66	0.06	0.50	203.00	21.15	6.50	21.50	0.15	1.88	46.80	
2018 Min	**10.40**	**3.23**	**0.02**	**0.00**	**10.00**	**1.80**	**0.00**	**2.31**	**28.50**	**0.00**	**0.01**	**0.01**	**137.50**	**0.00**	**1.80**	**0.03**	**1.42**	**0.00**	**2.47**	**0.04**	**0.00**	**0.04**	**0.02**	**0.04**	**0.25**	**5.30**	**0.06**	**0.50**	**189.90**	**18.15**	**6.04**	**20.40**	**0.15**	**1.40**	**46.80**	**0.05**
2018 Max	**23.54**	**3.23**	**0.03**	**0.00**	**24.00**	**2.40**	**0.00**	**5.25**	**43.00**	**0.00**	**0.01**	**0.01**	**216.20**	**0.00**	**5.00**	**0.04**	**1.42**	**0.00**	**4.18**	**0.04**	**0.00**	**0.44**	**0.02**	**0.44**	**0.77**	**5.66**	**0.16**	**5.00**	**375.00**	**28.03**	**7.10**	**21.50**	**0.41**	**3.80**	**66.20**	**0.05**
2018 Mean	**16.89**	**3.23**	**0.02**	**0.00**	**17.00**	**2.18**	**0.00**	**3.96**	**35.38**	**0.00**	**0.01**	**0.01**	**175.20**	**0.00**	**3.36**	**0.03**	**1.42**	**0.00**	**3.46**	**0.04**	**0.00**	**0.22**	**0.02**	**0.22**	**0.49**	**5.54**	**0.12**	**1.64**	**258.70**	**23.59**	**6.64**	**21.00**	**0.27**	**2.21**	**56.68**	**0.05**
Long-term average	**20.12**	**32.45**	**0.08**	**0.01**	**15.41**	**2.03**	**0.00**	**4.68**	**41.73**	**0.02**	**0.02**	**0.01**	**198.26**	**0.06**	**2.68**	**0.05**	**35.47**	**0.05**	**3.86**	**0.67**	**0.02**	**0.11**	**0.02**	**0.11**	**0.48**	**5.57**	**0.18**	**4.58**	**213.62**	**24.40**	**7.02**	**20.64**	**0.38**	**1.51**	**67.43**	**0.16**

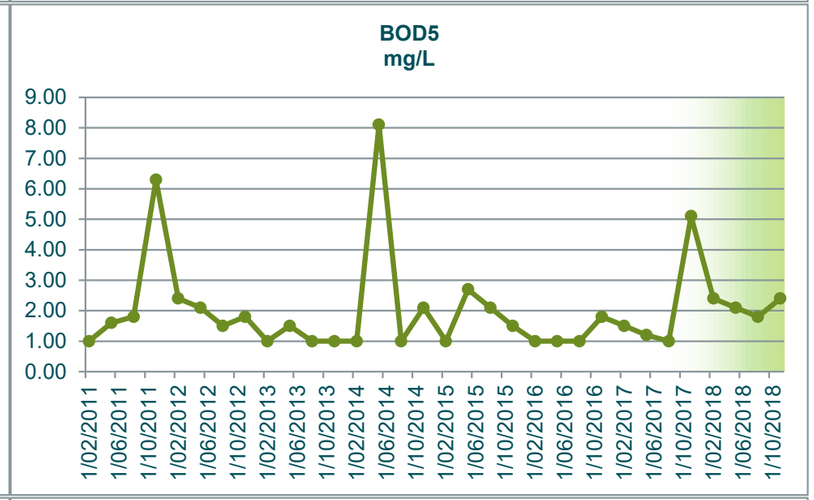

Alkalinity
mg/L as CaCO3
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

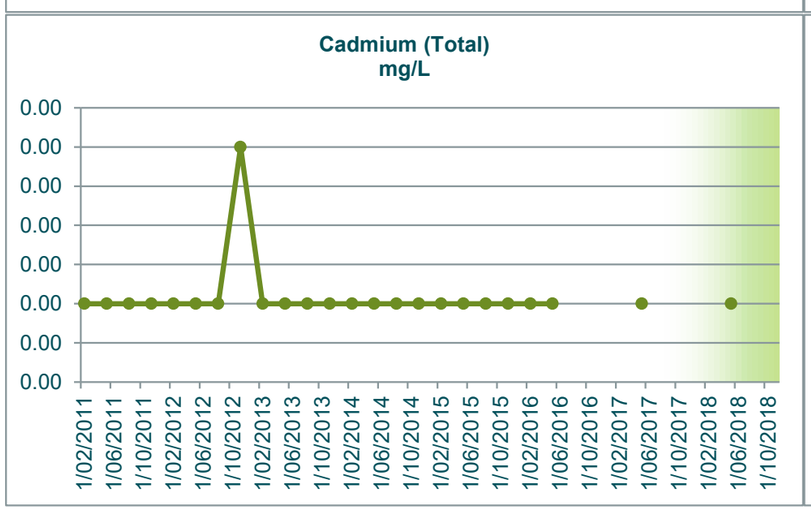

Aluminium (Total)
mg/L
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

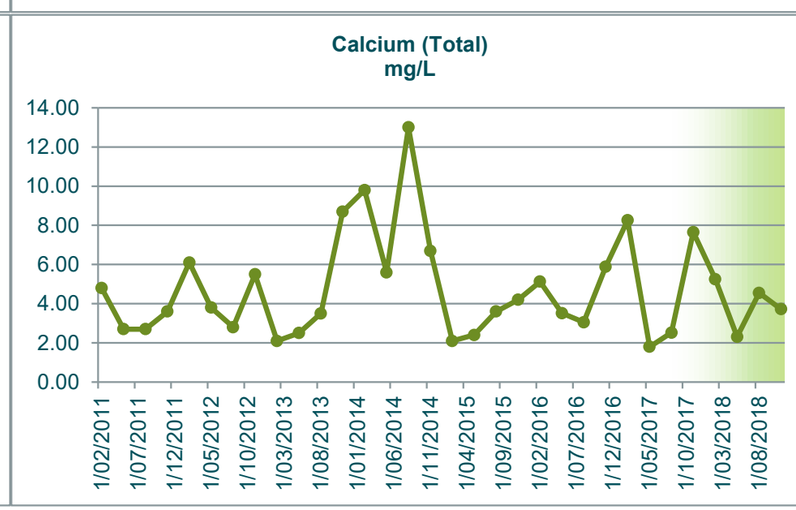

Ammonia
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

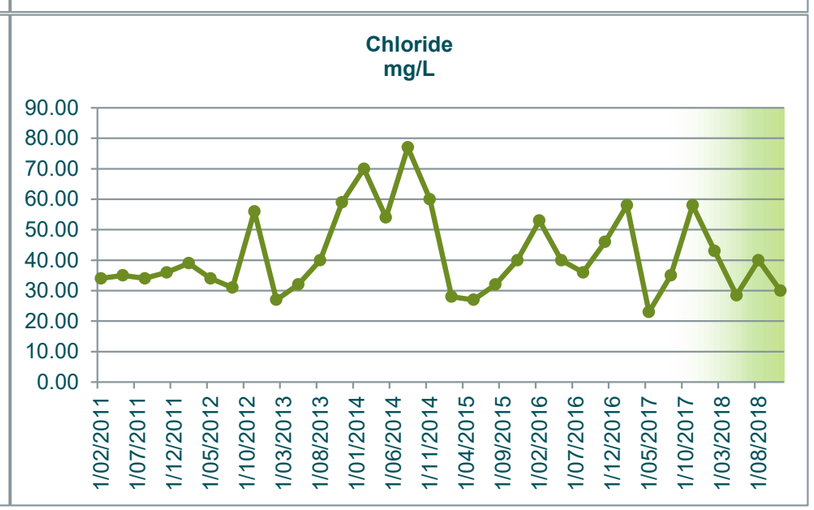

Arsenic (Total)
mg/L
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

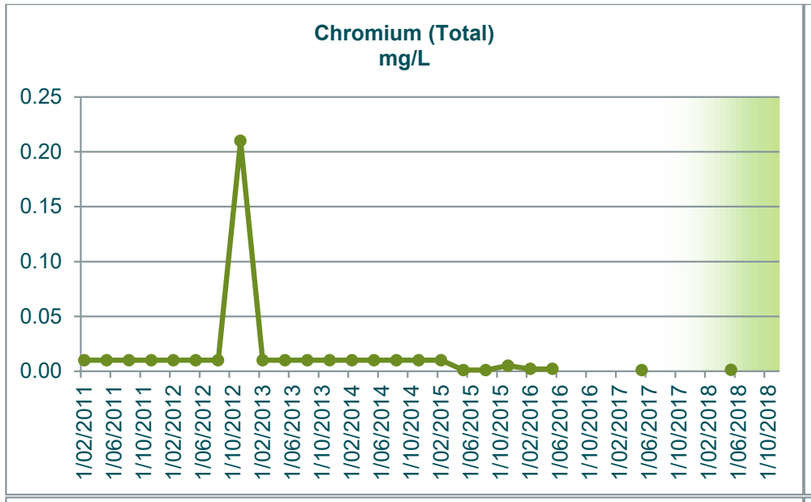

Bicarbonate HCO3
mg/L
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

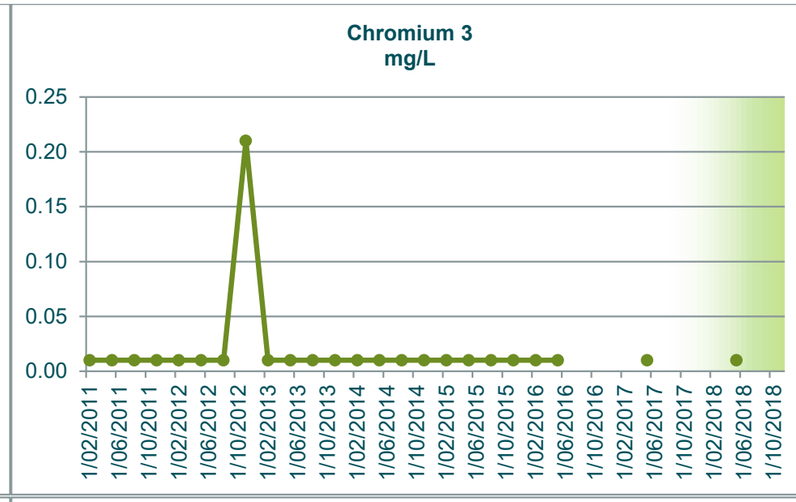

BOD5
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

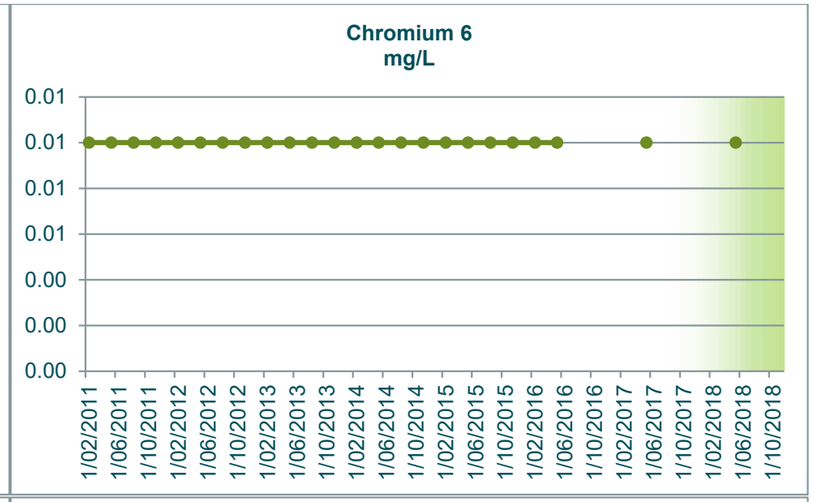

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

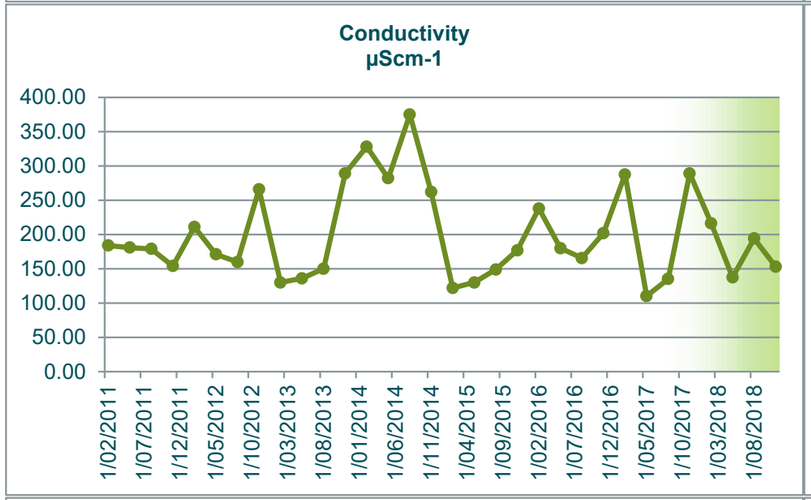

Calcium (Total)
mg/L
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

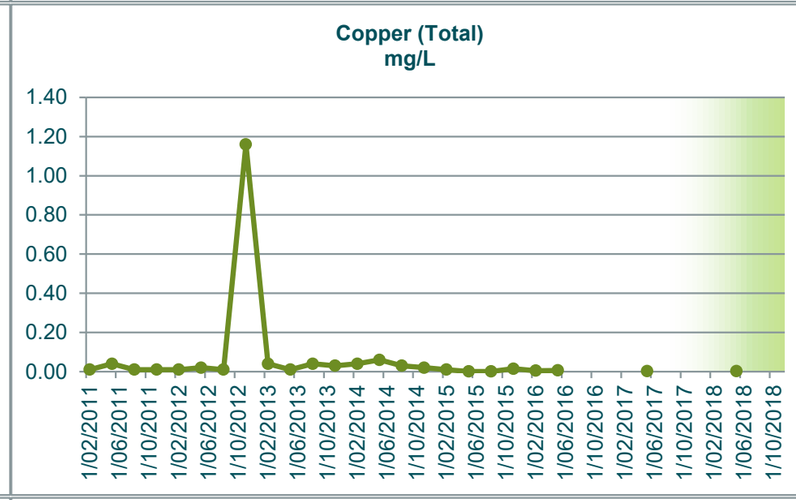

Chloride
mg/L
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

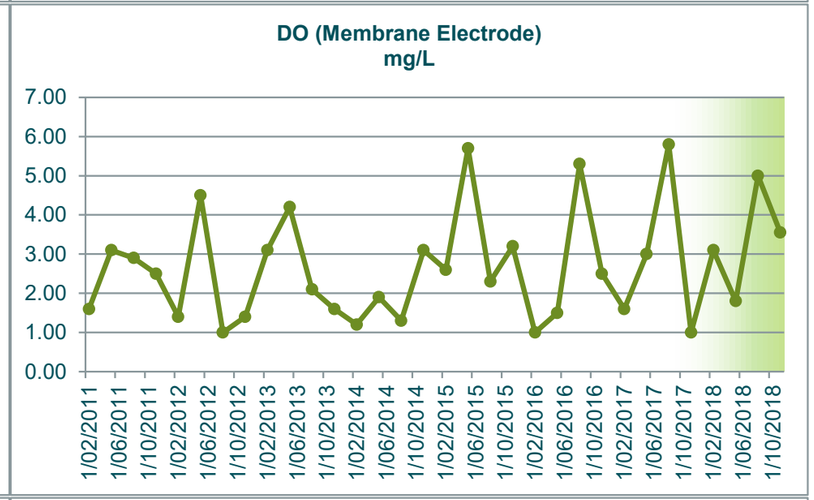

Chromium (Total)
mg/L
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

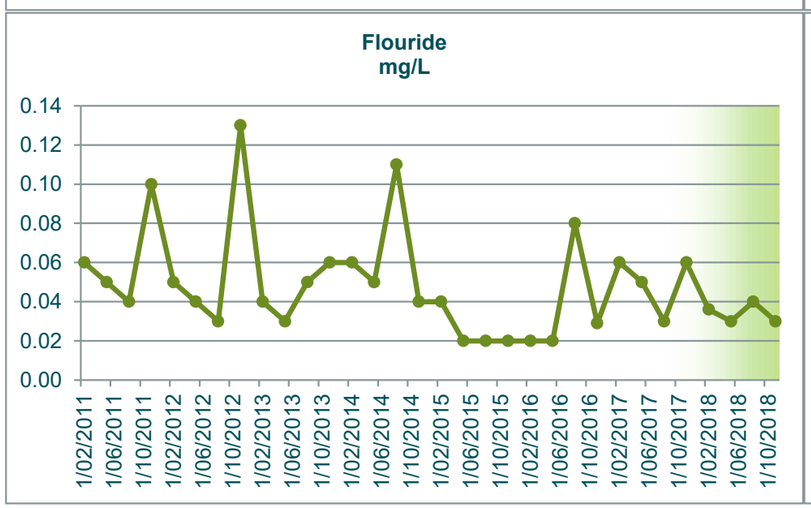

Chromium 3
mg/L
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

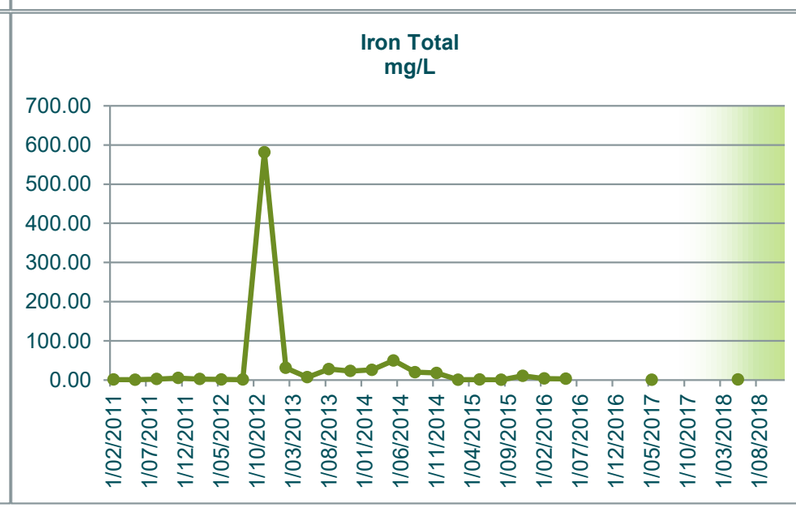

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

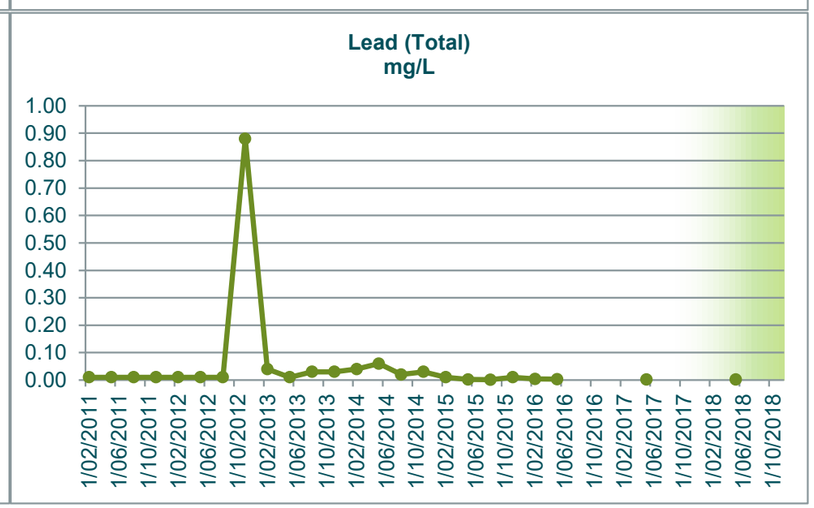

Conductivity
µScm-1
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

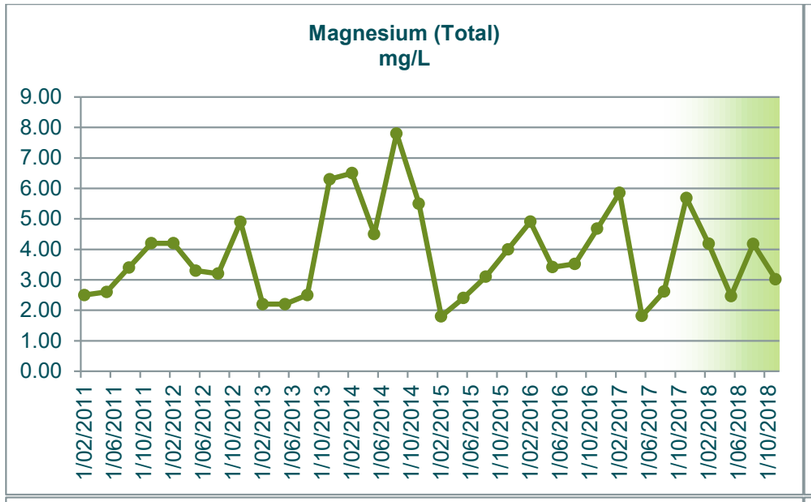

Copper (Total)
mg/L
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

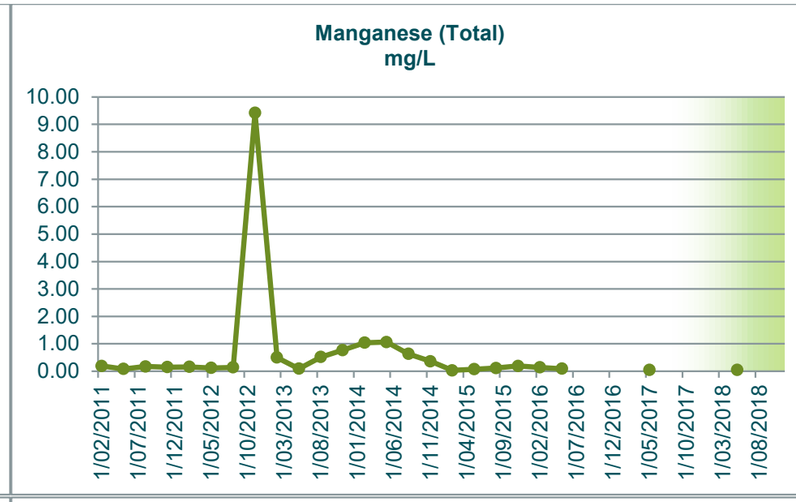

DO (Membrane Electrode)
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

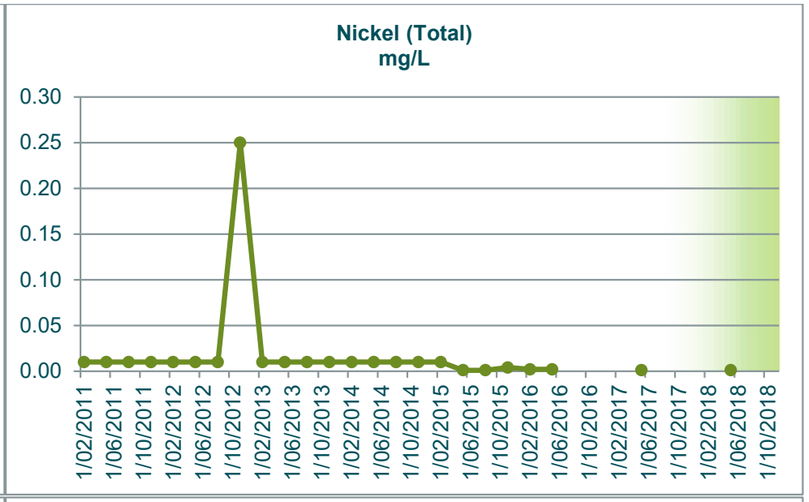

Flouride
mg/L
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

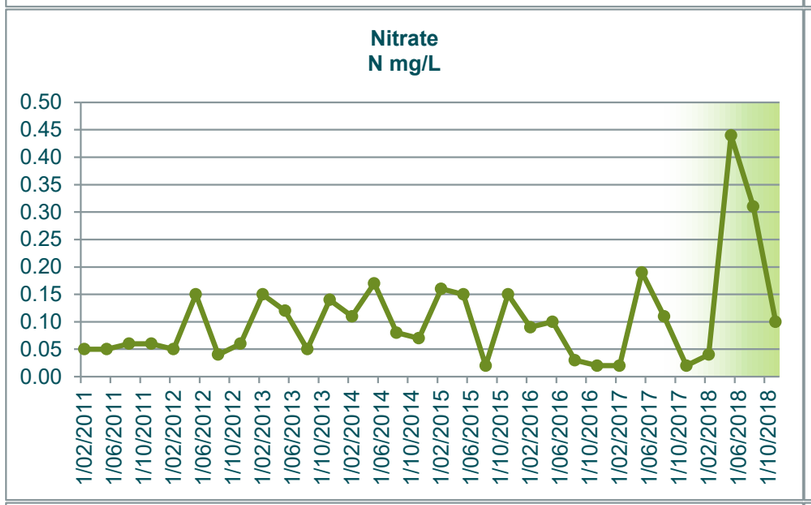

Iron Total
mg/L
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

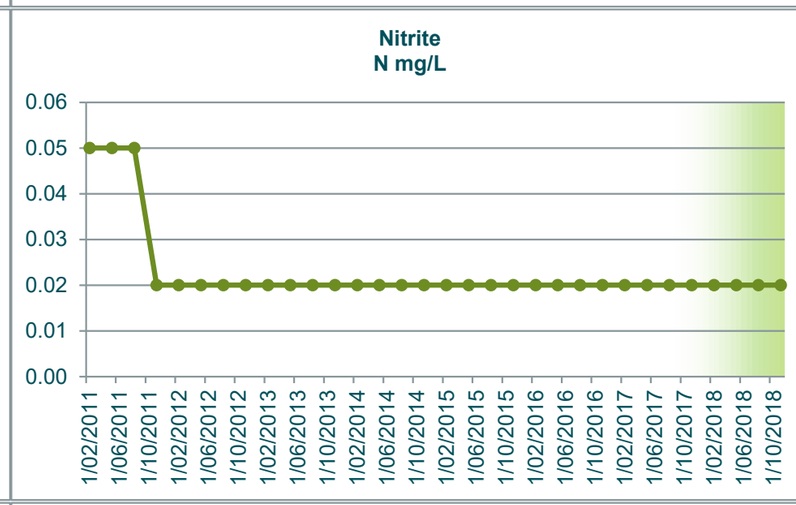

Lead (Total)
mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

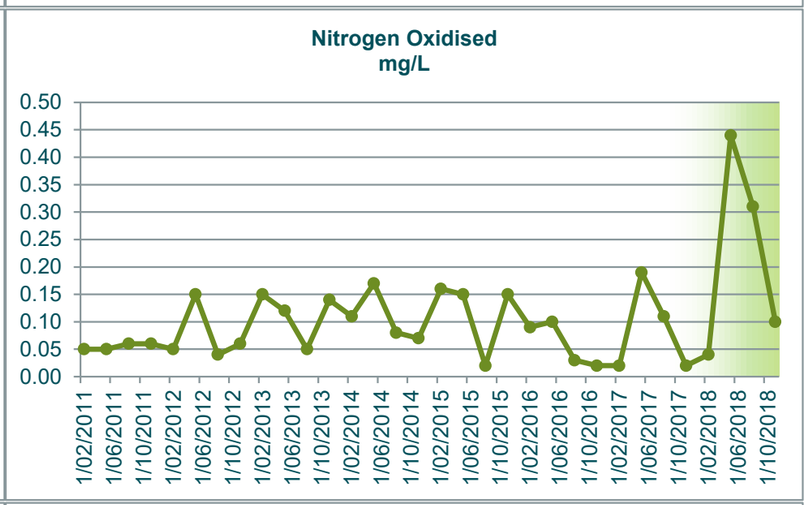

Magnesium (Total)
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

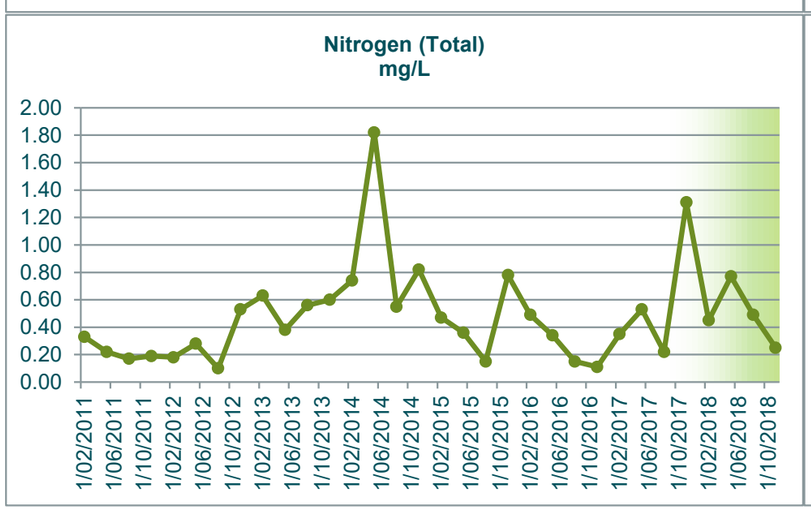

Manganese (Total)
mg/L
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

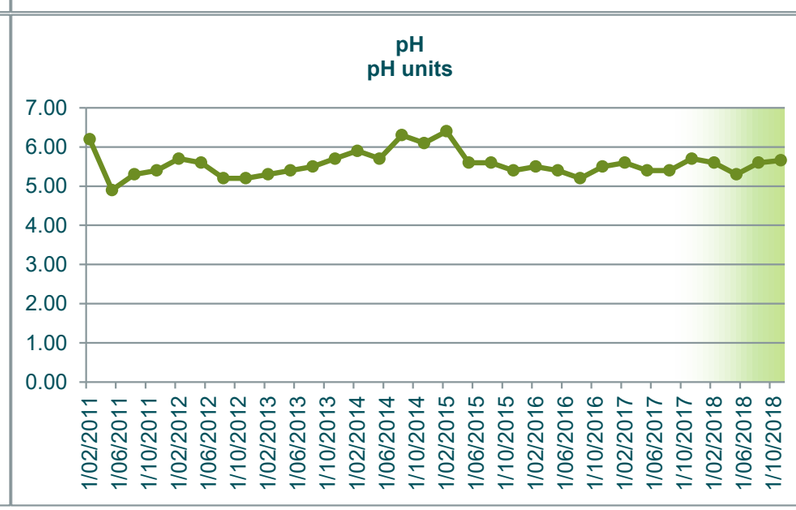

Nickel (Total)
mg/L
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

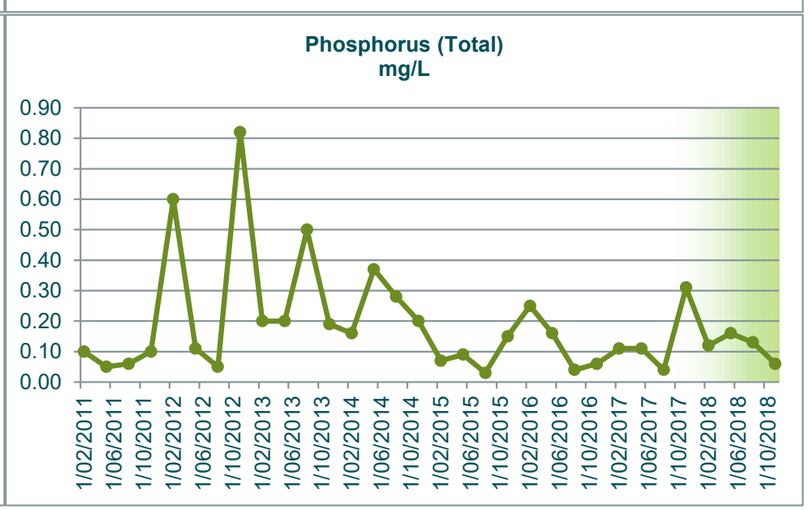

Nitrate
N mg/L
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

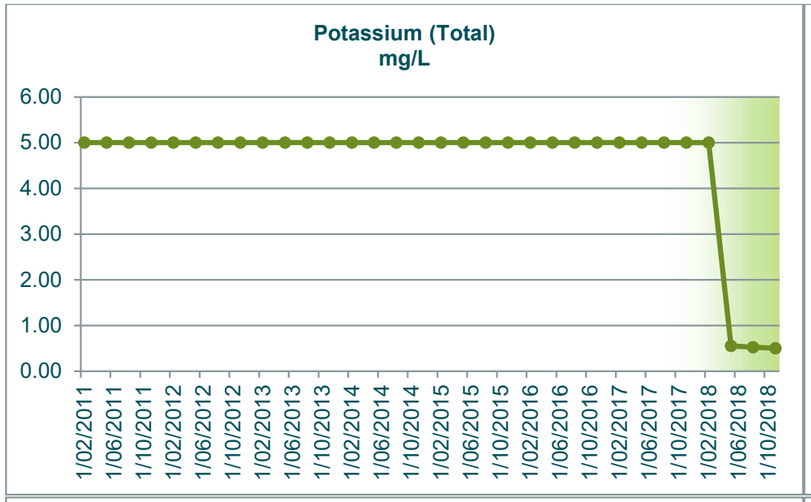

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

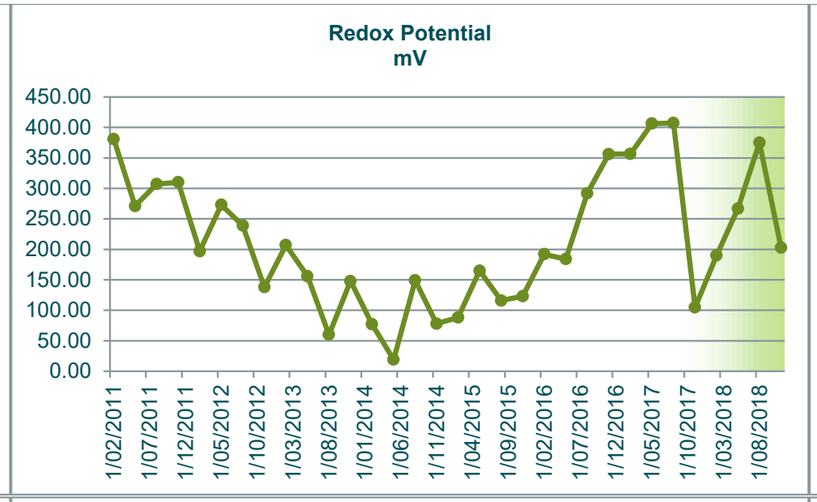

Nitrogen Oxidised
mg/L
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

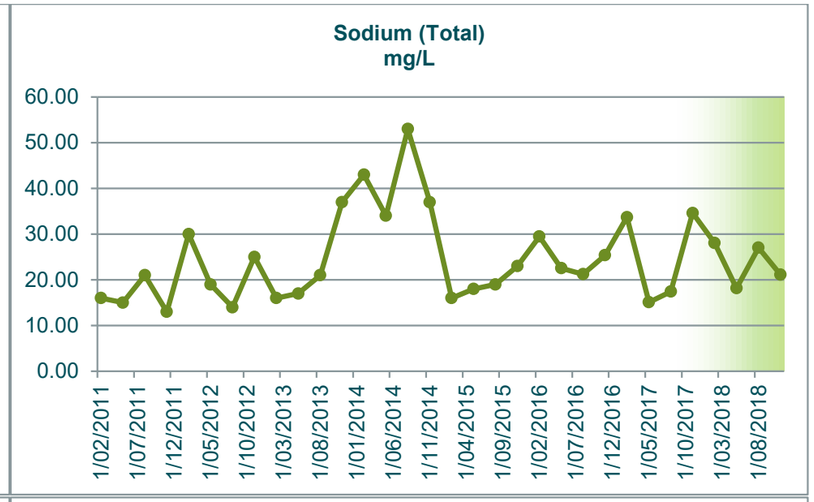

Nitrogen (Total)
mg/L
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

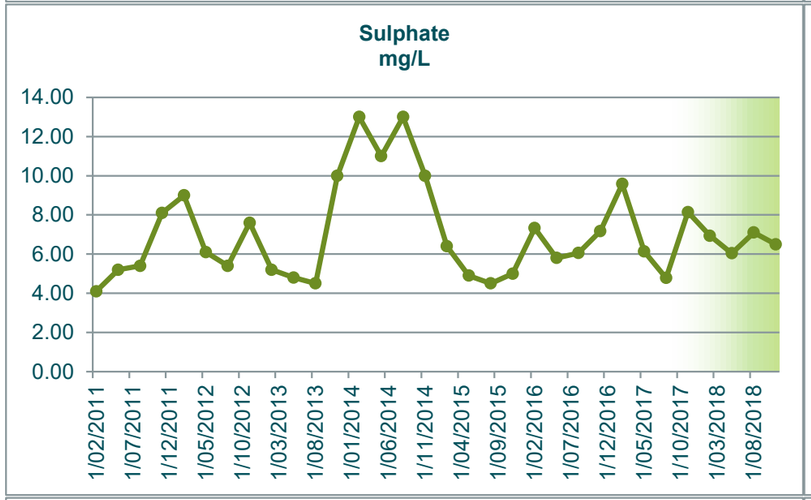

pH
pH units
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

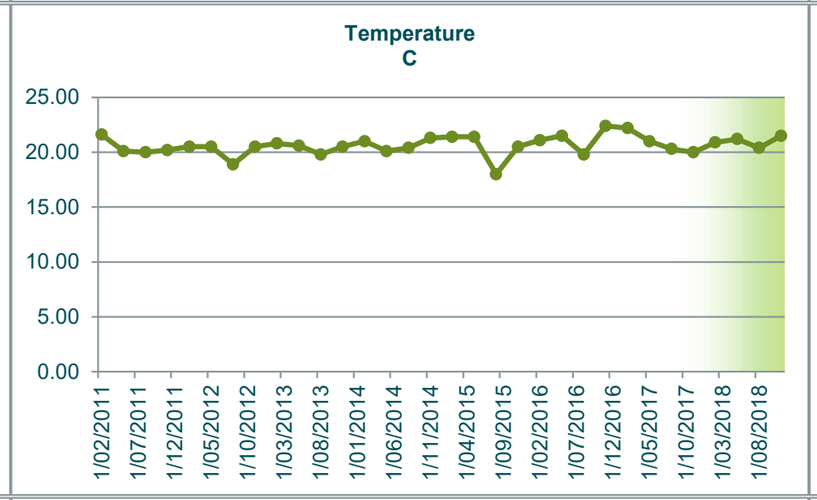

Phosphorus (Total)
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

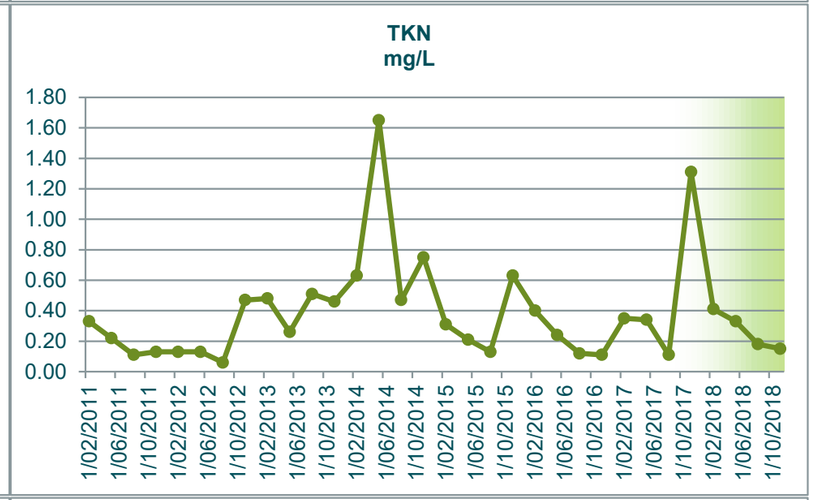

Potassium (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

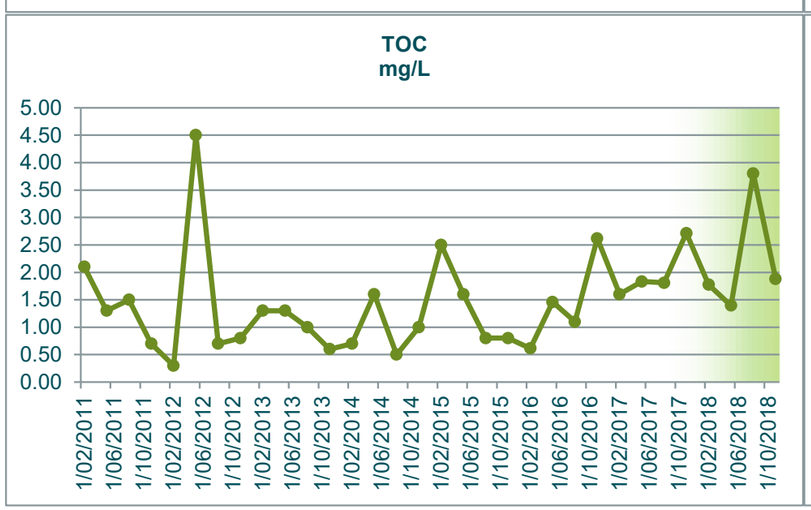

Redox Potential
mV
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

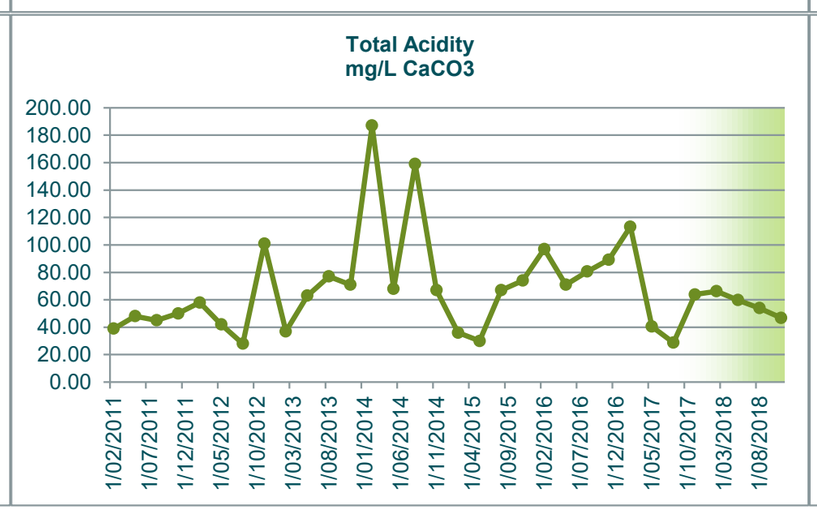

Sodium (Total)
mg/L
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

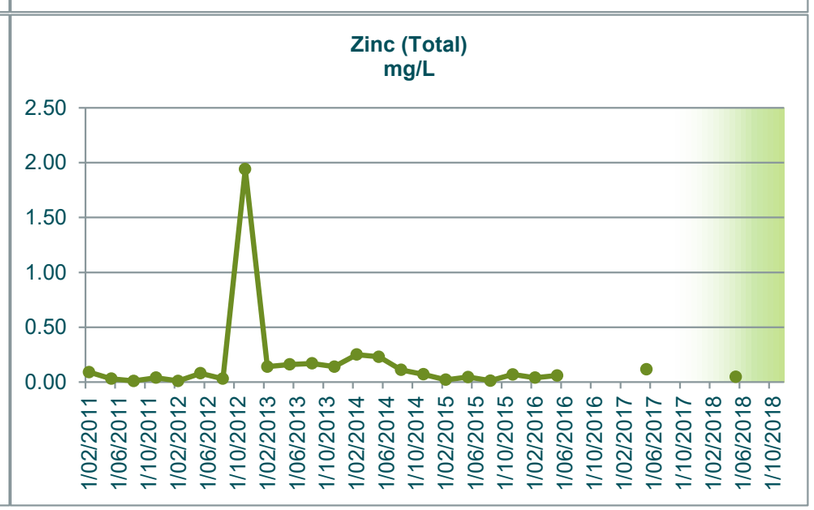

Sulphate
mg/L
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Temperature
C
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

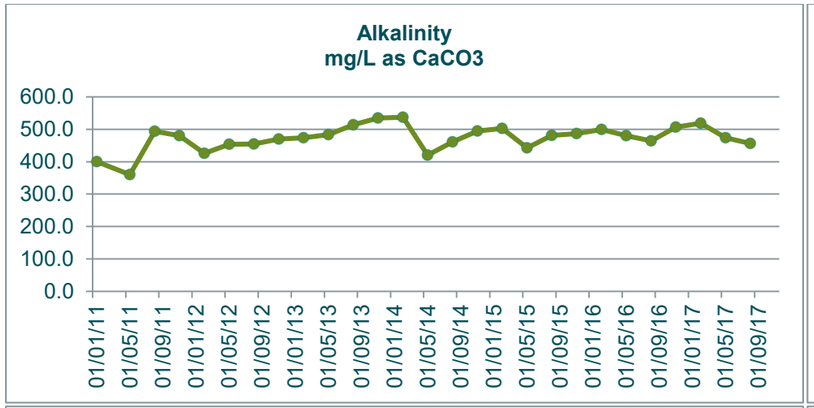

TKN
mg/L
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


TOC
mg/L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Total Acidity
mg/L CaCO3
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Zinc (Total)
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

GW2	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phenol Alkalinity mg/L as CaCO3	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/11	400.0	32.0	0.7	0.0	244.0	8.0	0.0	156.0	560.0	0.0	0.0	0.0	3141.0	0.0	1.8	0.5	55.0	0.0	155.0	4.2	0.0	0.1	0.1	0.1	1.5	6.9		0.5	18.0	-120.0	376.0	709.0	22.3	1.5	9.8	40.0	0.2
10/05/11	360.0	15.0	0.1	0.0	220.0	10.0	0.0	125.0	437.0	0.0	0.0	0.0	2671.0	0.1	2.9	0.5	34.0	0.0	130.0	4.2	0.0	0.4	0.1	0.4	1.1	7.0		0.4	21.0	177.0	331.0	536.0	20.7	0.8	6.2	35.0	0.1
9/08/11	494.0	33.0	0.2	0.0	300.0	8.4	0.0	144.0	650.0	0.0	0.0	0.0	3410.0	0.0	1.4	0.5	49.0	0.0	136.0	3.8	0.0	0.3	0.1	0.3	1.0	7.0		0.7	15.0	158.0	405.0	622.0	19.3	0.7	5.4	54.0	0.1
8/11/11	480.0	65.0	0.2	0.0	293.0	8.1	0.0	198.0	705.0	0.1	0.1	0.0	3842.0	0.1	1.6	0.6	93.0	0.0	209.0	5.3	0.0	0.1	0.0	0.1	0.8	6.9		0.8	85.0	-13.8	426.0	800.0	20.5	0.7	4.6	71.0	0.2
6/02/12	426.0	54.0	0.2	0.1	260.0	11.0	0.0	160.0	715.0	0.0	0.0	0.0	3100.0	0.0	1.8	0.4	82.0	0.0	145.0	3.7	0.0	0.4	0.0	0.4	1.2	6.9		0.6	17.0	141.0	520.0	770.0	22.1	0.8	4.6	62.0	0.4
8/05/12	454.0	0.0	0.2	0.0	277.0	1.8	0.0	139.0	460.0	0.0	0.0	0.0	3225.0	0.0	3.8	0.6	0.0	0.0	144.0	0.0	0.0	0.2	0.0	0.2	0.8	6.7		0.3	19.0	209.0	375.0	560.0	21.4	0.6	5.9	46.0	0.0
6/08/12	455.0	9.7	0.0	0.0	278.0	1.2	0.0	135.0	530.0	0.0	0.0	0.0	3510.0	0.0	2.8	0.5	18.0	0.0	127.0	3.1	0.0	0.1	0.0	0.1	0.6	6.9		0.5	18.0	-22.0	336.0	559.0	19.7	0.5	5.4	36.0	0.1
13/11/12	470.0	19.0	0.3	0.0	287.0	2.7	0.0	140.0	600.0	0.0	0.0	0.0	3750.0	0.0	4.4	0.4	27.0	0.0	142.0	3.0	0.0	0.2	0.0	0.2	0.9	7.1		0.4	16.0	-47.0	384.0	529.0	21.1	0.7	4.0	54.0	0.1
13/02/13	474.0	22.0	0.2	0.0	289.0	1.0	0.0	144.0	550.0	0.0	0.0	0.0	3500.0	0.0	1.6	0.4	41.0	0.0	138.0	4.0	0.0	0.1	0.0	0.1	1.1	6.9		0.6	18.0	93.0	384.0	717.0	22.6	1.0	5.0	64.0	0.6
14/05/13	484.0	23.0	1.0	0.0	295.0	7.2	0.0	144.0	620.0	0.0	0.0	0.0	3510.0	0.0	1.9	0.5	29.0	0.0	127.0	2.7	0.0	0.2	0.0	0.2	1.9	7.0		1.0	15.0	-113.0	412.0	531.0	21.2	1.6	7.1	132.0	0.2
6/08/13	514.0	35.0	0.2	0.0	314.0	8.7	0.0	150.0	580.0	0.0	0.0	0.0	3400.0	0.0	2.8	0.5	50.0	0.0	138.0	3.5	0.0	0.1	0.0	0.1	1.2	7.0		1.0	16.0	-6.0	412.0	648.0	20.3	1.1	5.1	109.0	0.3
12/11/13	535.0	44.0	0.8	0.0	326.0	9.9	0.0	168.0	655.0	0.0	0.0	0.0	3858.0	0.0	2.2	0.5	49.0	0.0	156.0	3.9	0.0	0.1	0.0	0.1	1.6	6.8		0.8	18.0	-103.0	480.0	638.0	20.4	1.4	5.4	28.0	0.4
11/02/14	537.0	32.0	0.6	0.0	328.0	8.1	0.0	170.0	740.0	0.0	0.0	0.0	4052.0	0.0	2.6	0.4	44.0	0.0	156.0	3.4	0.0	0.2	0.0	0.2	1.6	6.9		0.0	17.0	-92.0	493.0	625.0	21.3	1.4	7.1	148.0	0.3
13/05/14	420.0	20.0	0.3	0.0	256.0	2.1	0.0	158.0	635.0	0.0	0.0	0.0	3790.0	0.0	3.1	0.5	28.0	0.0	147.0	3.6	0.0	0.2	0.0	0.2	1.2	7.0		0.1	17.0	-61.0	432.0	848.0	21.2	1.0	4.7	62.0	0.1
12/08/14	461.0	44.0	0.3	0.0	281.0	4.8	0.0	173.0	720.0	0.0	0.0	0.0	4080.0	0.0	3.2	0.5	76.0	0.0	159.0	4.1	0.0	0.2	0.0	0.2	1.3	7.1		0.6	16.0	-63.0	491.0	653.0	20.0	1.1	5.1	96.0	0.3
10/11/14	495.0	26.0	0.3	0.0	302.0	3.6	0.0	180.0	890.0	0.0	0.0	0.0	4520.0	0.0	2.8	0.4	38.0	0.0	170.0	3.1	0.0	0.1	0.0	0.1	1.4	7.0		0.7	17.0	-64.0	563.0	754.0	20.1	1.3	43.0	171.0	0.2
9/02/15	503.0	35.1	3.2	0.0	307.0	21.0	0.0	159.0	820.0	0.0	0.0	0.0	4360.0	0.0	1.6	0.5	48.1	0.0	155.0	3.5	0.0	0.1	0.0	0.1	5.8	7.0		0.7	16.0	-100.0	504.0	704.0	21.6	5.7	8.1	94.0	0.2
11/05/15	443.0	28.8	0.2	0.0	270.0	4.2	0.0	156.0	610.0	0.0	0.0	0.0	3590.0	0.0	4.0	0.5	45.6	0.0	148.0	4.1	0.0	0.2	0.0	0.2	1.3	7.1		0.6	16.0	-62.0	431.0	645.0	21.1	1.1	5.1	58.0	0.3
11/08/15	481.0	31.4	0.2	0.0	481.0	10.0	0.0	178.0	780.0	0.0	0.0	0.0	4140.0	0.0	3.6	0.5	45.3	0.0	164.0	3.2	0.0	0.1	0.0	0.1	1.1	7.1		0.7	16.0	-37.0	520.0	617.0	20.2	1.0	3.7	73.0	0.3
10/11/15	487.0	19.1	0.4	0.0	487.0	5.7	0.0	173.0	770.0	0.0	0.0	0.0	4020.0	0.0	1.5	0.5	37.0	0.0	161.0	3.8	0.0	0.0	0.0	0.0	1.2	7.0		0.7	16.0	-73.0	481.0	628.0	20.2	1.2	4.4	71.0	0.0
8/02/16	500.0	49.1	0.3	0.0	500.0	6.0	0.0	167.4	750.0	0.0	0.1	0.0	4000.0	0.0	2.5	0.5	86.2	0.0	154.8	4.4	0.0	0.0	0.0	0.0	1.2	7.0		0.7	16.0	-68.0	472.9	621.5	21.4	1.2	4.5	100.0	0.6
9/05/16	480.0	21.5	0.3	0.0	480.0	4.8	0.0	168.2	805.0	0.0	0.0	0.0	4190.0	0.0	2.3	0.5	38.2	0.0	151.5	3.3	0.0	0.0	0.0	0.0	1.0	6.9		0.6	15.9	-61.0	501.7	566.5	21.4	1.0	4.3	99.0	0.3
9/08/16	464.0		0.0		464.0	2.1		154.7	650.0				3743.6		3.7	0.5			143.3			0.1	0.0	0.1	0.8	7.0		0.2	15.7	28.0	436.5	598.8	19.9	0.7	3.8	106.1	
7/11/16	507.0		0.2		507.0	4.2		191.6	965.0				4565.1		2.2	0.4			173.3			0.0	0.0	0.0	1.0	6.8		0.9	17.3	50.0	603.6	641.8	20.6	1.0	4.4	83.9	
7/02/17	519.0		0.3		519.0	3.3		183.6	930.0				4624.0		2.0	0.4			171.4			0.0	0.1	0.0	1.0	6.8		0.5	16.8	11.9	553.0	648.1	21.6	1.0	4.3	135.5	
8/05/17	474.0	19.5	0.2	0.0	474.0	1.8	0.0	174.2	930.0	0.0	0.0	0.0	4531.5	0.0	3.2	0.5	28.3	0.0	160.4	3.5	0.0	0.1	0.0	0.1	0.9	6.9		0.4	16.5	-29.7	510.6	723.3	21.2	0.8	4.1	74.4	0.2
8/08/17	456.4		0.0		456.0	2.1		169.1	1025.0				4255.2		4.3	0.4			150.4			0.2	0.0	0.2	0.7	7.0		0.1	15.8	289.7	490.6	577.9	19.5	0.5	3.4	60.8	
7/11/17														0.0																						
2017 Min	**456.4**	**19.5**	**0.0**	**0.0**	**456.0**	**1.8**	**0.0**	**169.1**	**930.0**	**0.0**	**0.0**	**0.0**	**4255.2**	**0.0**	**2.0**	**0.4**	**28.3**	**0.0**	**150.4**	**3.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.7**	**6.8**		**0.1**	**15.8**	**-29.7**	**490.6**	**577.9**	**19.5**	**0.5**	**3.4**	**60.8**	**0.2**
2017 Max	**519.0**	**19.5**	**0.3**	**0.0**	**519.0**	**3.3**	**0.0**	**183.6**	**1025.0**	**0.0**	**0.0**	**0.0**	**4624.0**	**0.0**	**4.3**	**0.5**	**28.3**	**0.0**	**171.4**	**3.5**	**0.0**	**0.2**	**0.1**	**0.2**	**1.0**	**7.0**		**0.5**	**16.8**	**289.7**	**553.0**	**723.3**	**21.6**	**1.0**	**4.3**	**135.5**	**0.2**
2017 Mean	**483.1**	**19.5**	**0.2**	**0.0**	**483.0**	**2.4**	**0.0**	**175.7**	**961.7**	**0.0**	**0.0**	**0.0**	**4470.2**	**0.0**	**3.2**	**0.4**	**28.3**	**0.0**	**160.7**	**3.5**	**0.0**	**0.1**	**0.0**	**0.1**	**0.9**	**6.9**		**0.3**	**16.4**	**90.6**	**518.1**	**649.7**	**20.8**	**0.7**	**3.9**	**90.2**	**0.2**


Alkalinity
mg/L as CaCO3
600.0
500.0
400.0
300.0
200.0
100.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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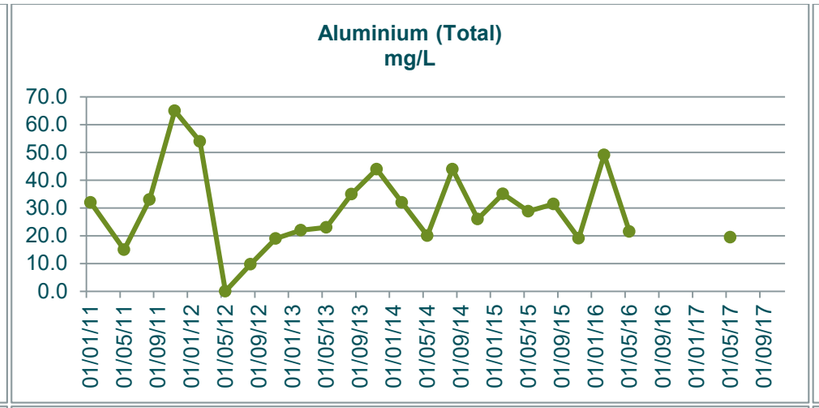
01/09/16
01/01/17
01/05/17
01/09/17


Aluminium (Total)
mg/L
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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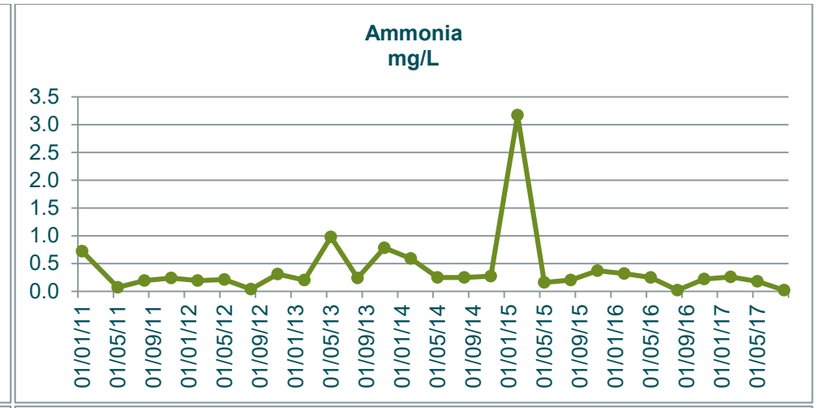
01/09/16
01/01/17
01/05/17
01/09/17


Ammonia
mg/L
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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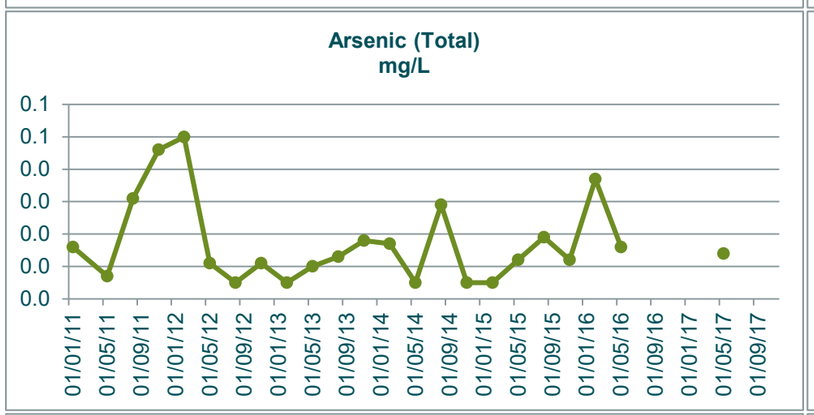
01/05/16
01/09/16
01/01/17
01/05/17


Arsenic (Total)
mg/L
0.1
0.1
0.0
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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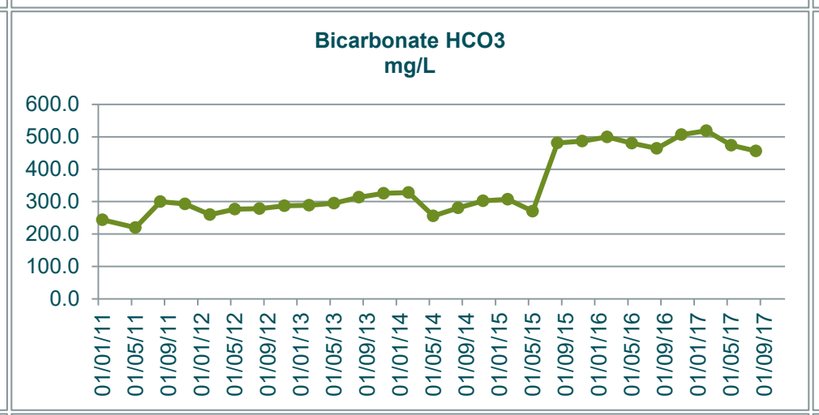
01/09/16
01/01/17
01/05/17
01/09/17


Bicarbonate HCO3
mg/L
600.0
500.0
400.0
300.0
200.0
100.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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01/09/15
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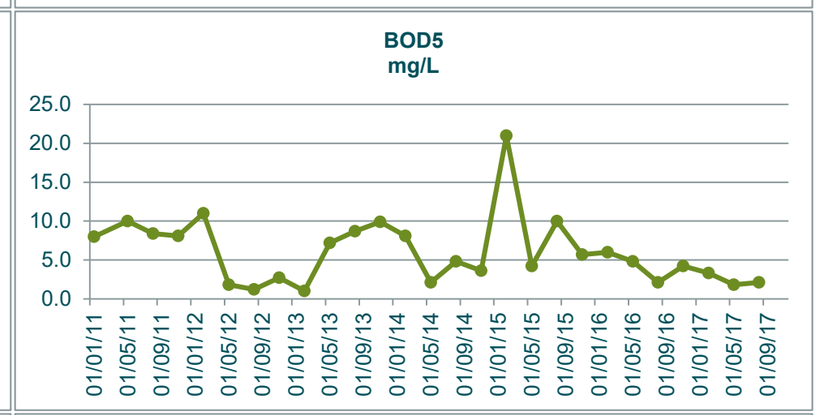
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


BOD5
mg/L
25.0
20.0
15.0
10.0
5.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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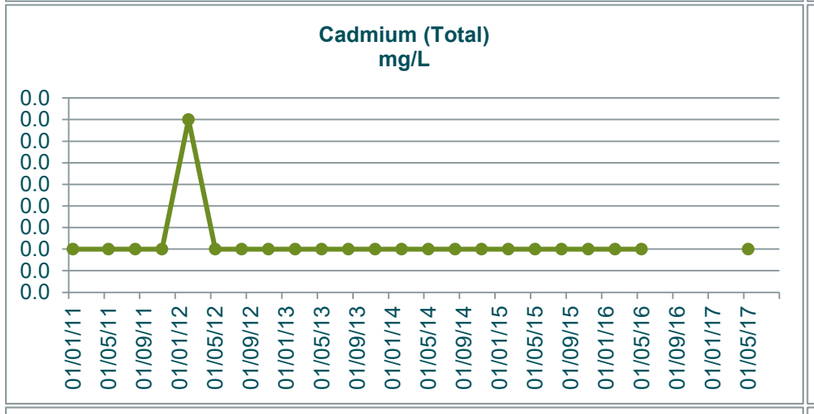
01/09/16
01/01/17
01/05/17
01/09/17


Cadmium (Total)
mg/L
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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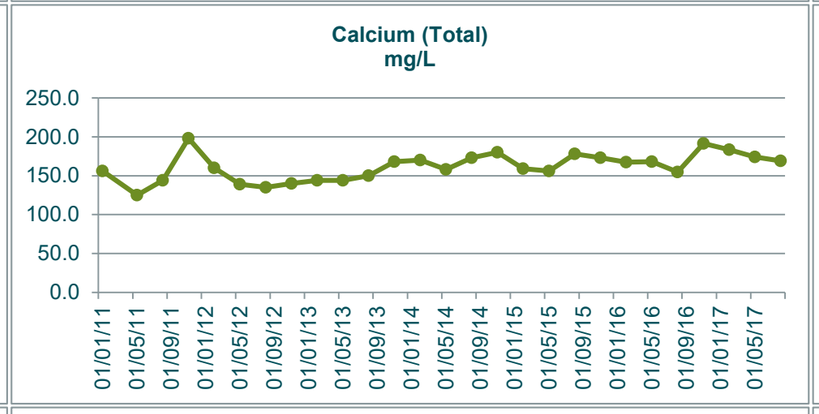
01/05/16
01/09/16
01/01/17
01/05/17


Calcium (Total)
mg/L
250.0
200.0
150.0
100.0
50.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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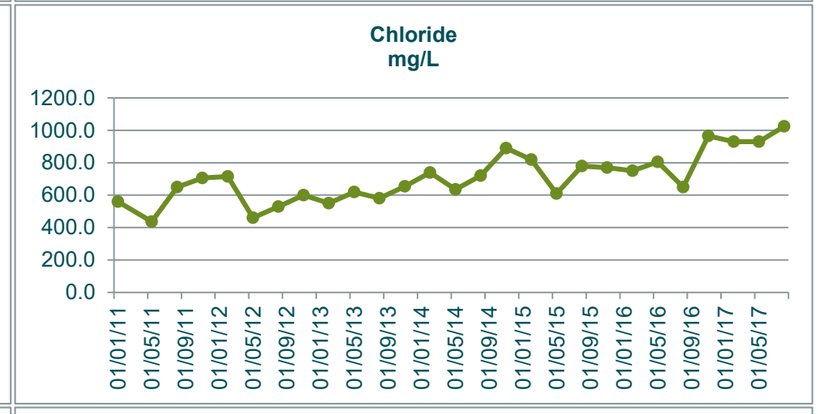
01/05/16
01/09/16
01/01/17
01/05/17


Chloride
mg/L
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
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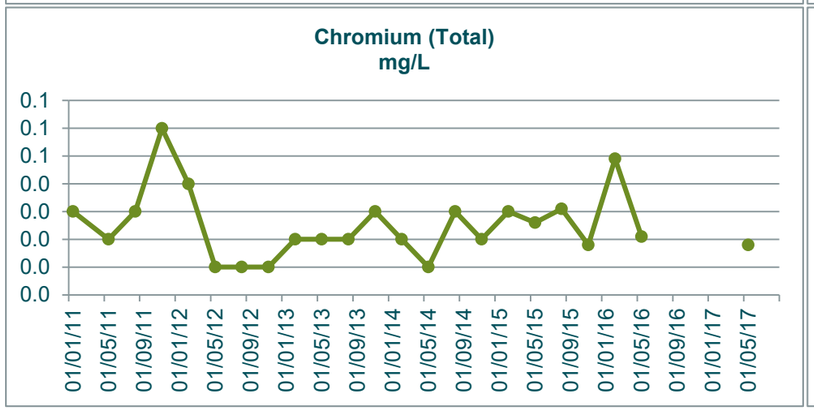
01/05/16
01/09/16
01/01/17
01/05/17


Chromium (Total)
mg/L
0.1
0.1
0.1
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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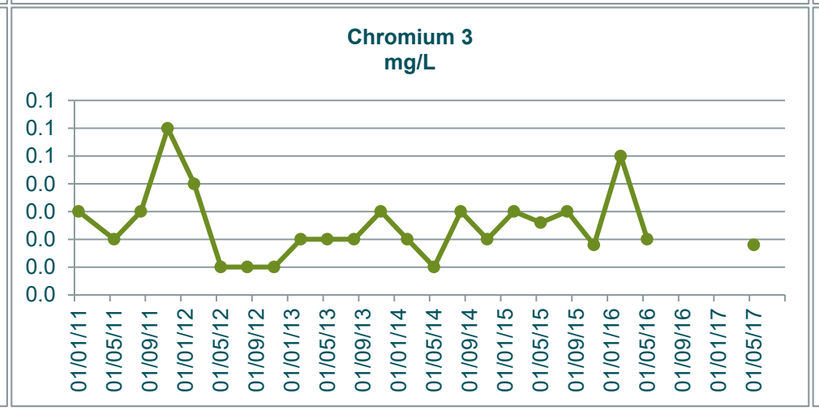
01/05/16
01/09/16
01/01/17
01/05/17


Chromium 3
mg/L
0.1
0.1
0.1
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
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01/09/15
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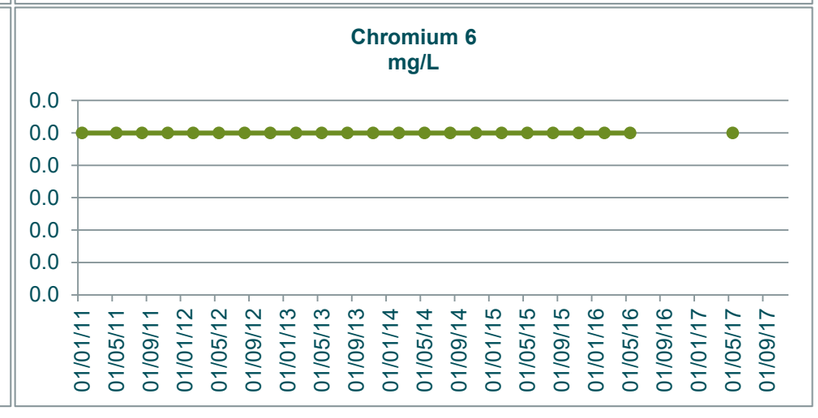
01/05/16
01/09/16
01/01/17
01/05/17


Chromium 6
mg/L
0.0
0.0
0.0
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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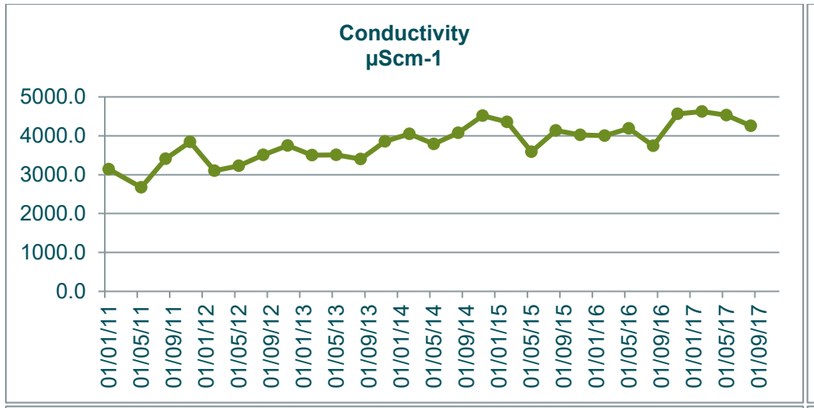
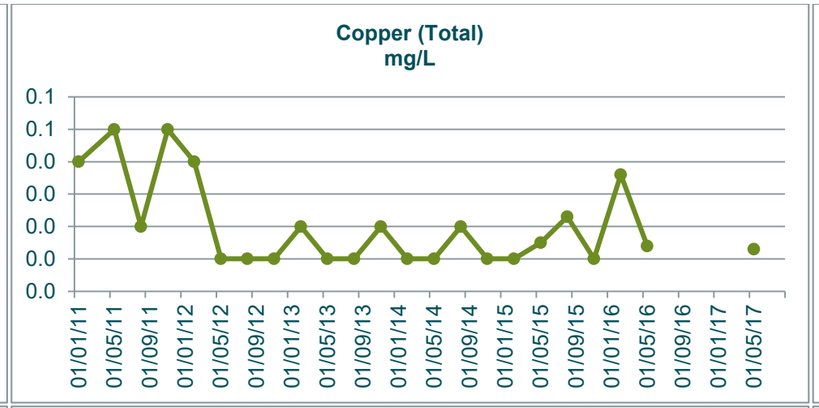
01/09/16
01/01/17
01/05/17
01/09/17


Conductivity
µScm-1
5000.0
4000.0
3000.0
2000.0
1000.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
01/05/15
01/09/15
01/01/16
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


Copper (Total)
mg/L
0.1
0.1
0.0
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
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01/09/15
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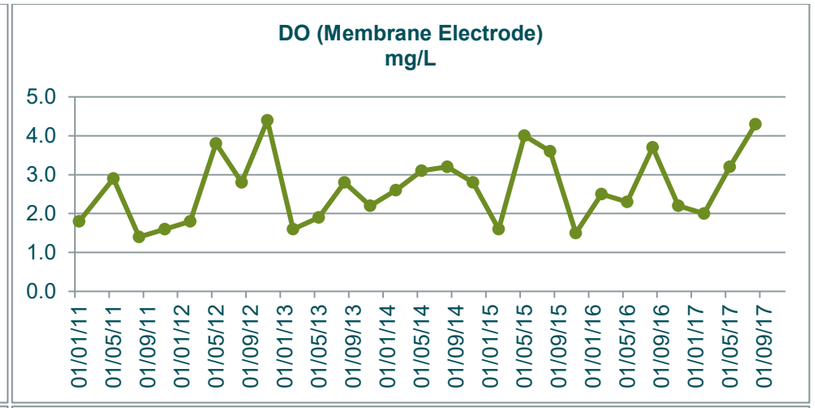
01/05/16
01/09/16
01/01/17
01/05/17


DO (Membrane Electrode)
mg/L
5.0
4.0
3.0
2.0
1.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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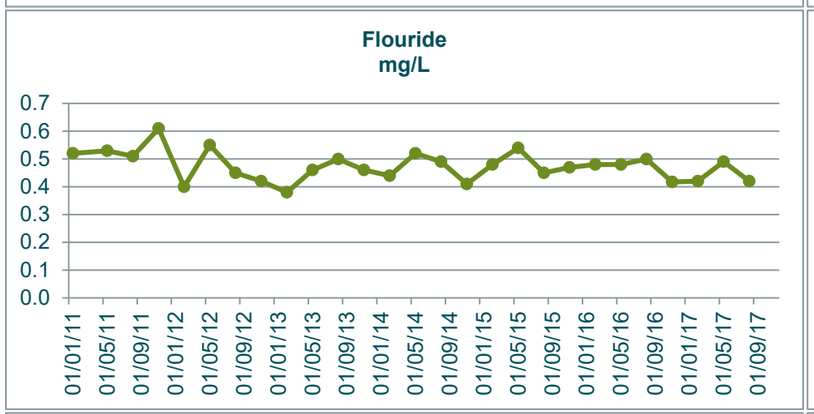
01/09/16
01/01/17
01/05/17
01/09/17


Flouride
mg/L
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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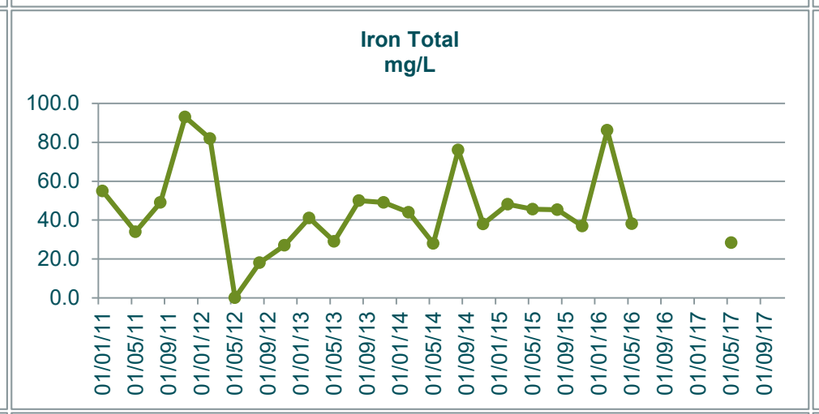
01/09/16
01/01/17
01/05/17
01/09/17


Iron Total
mg/L
100.0
80.0
60.0
40.0
20.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
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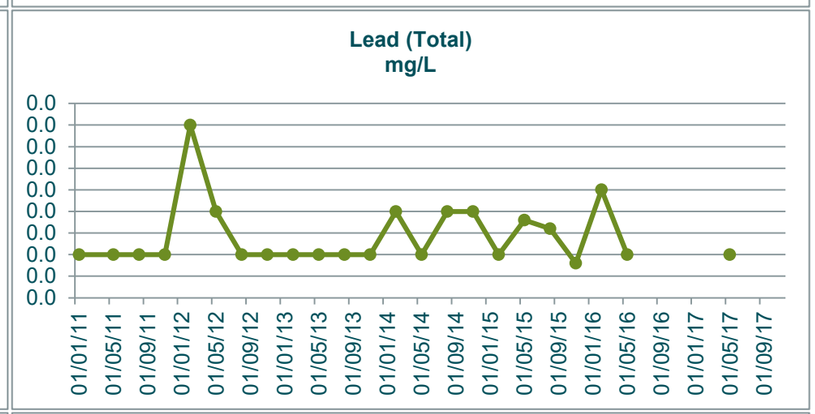
01/09/16
01/01/17
01/05/17
01/09/17


Lead (Total)
mg/L
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
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01/09/14
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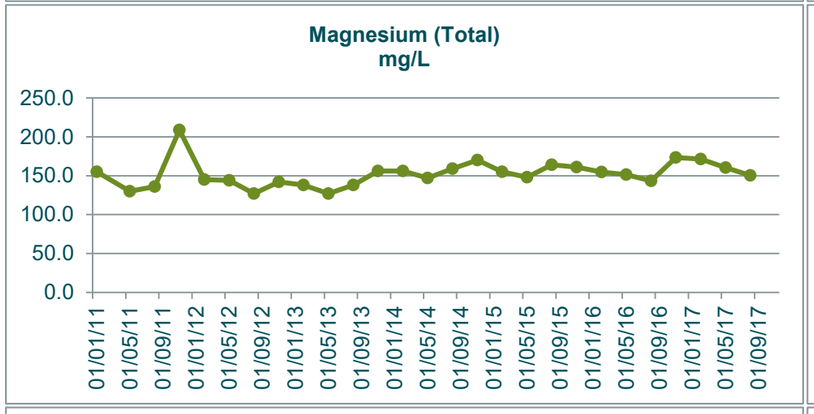
01/09/16
01/01/17
01/05/17
01/09/17


Magnesium (Total)
mg/L
250.0
200.0
150.0
100.0
50.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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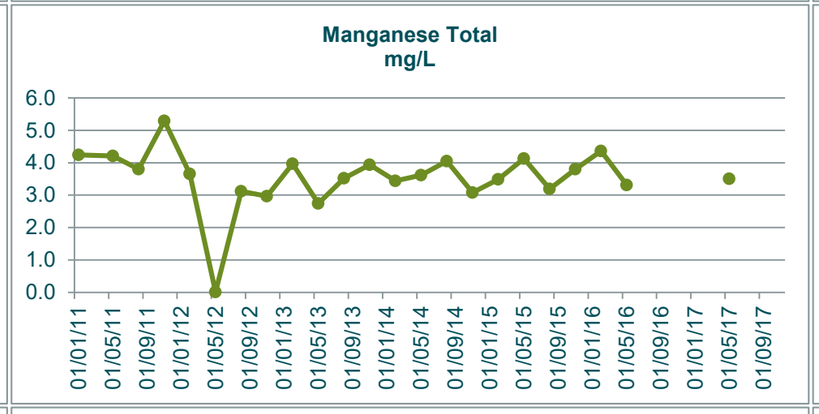
01/09/16
01/01/17
01/05/17
01/09/17


Manganese Total
mg/L
6.0
5.0
4.0
3.0
2.0
1.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
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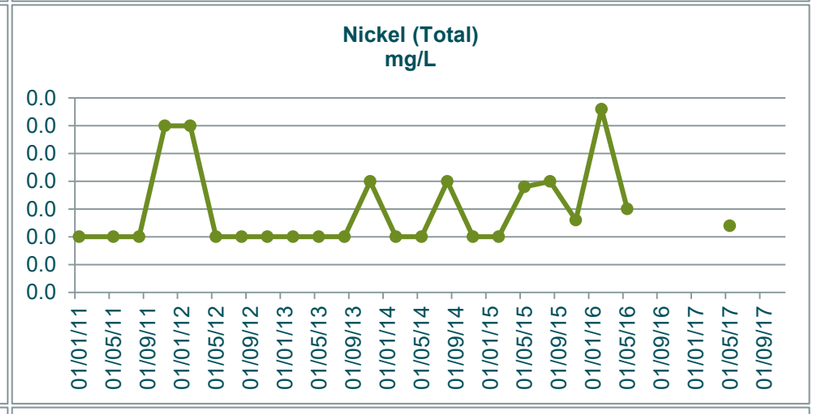
01/09/16
01/01/17
01/05/17
01/09/17


Nickel (Total)
mg/L
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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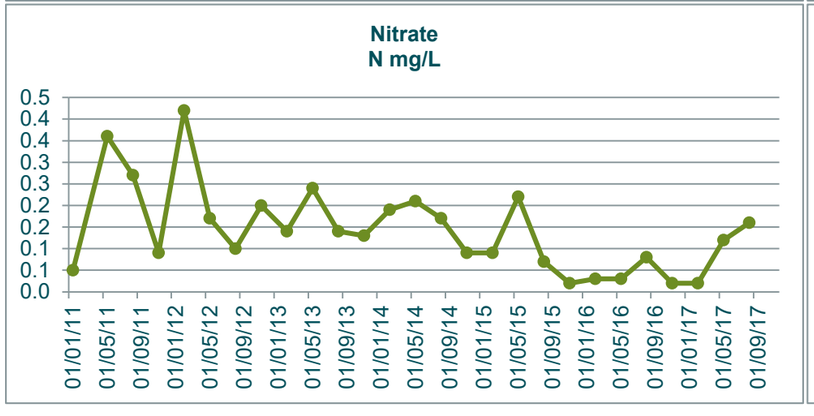
01/09/16
01/01/17
01/05/17
01/09/17


Nitrate
N mg/L
0.5
0.4
0.4
0.3
0.3
0.2
0.2
0.1
0.1
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
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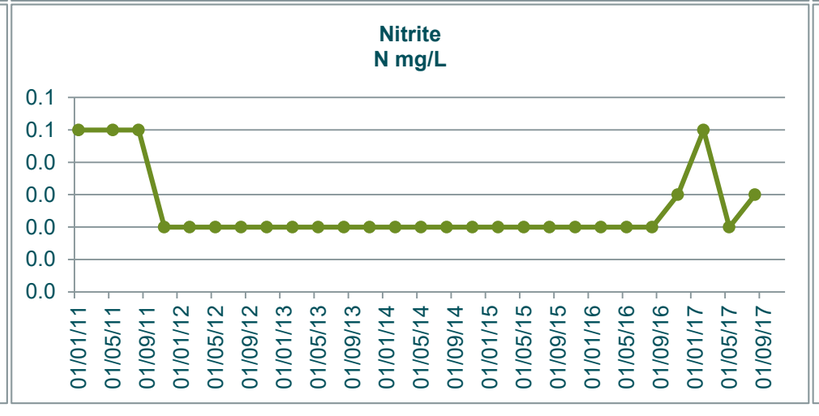
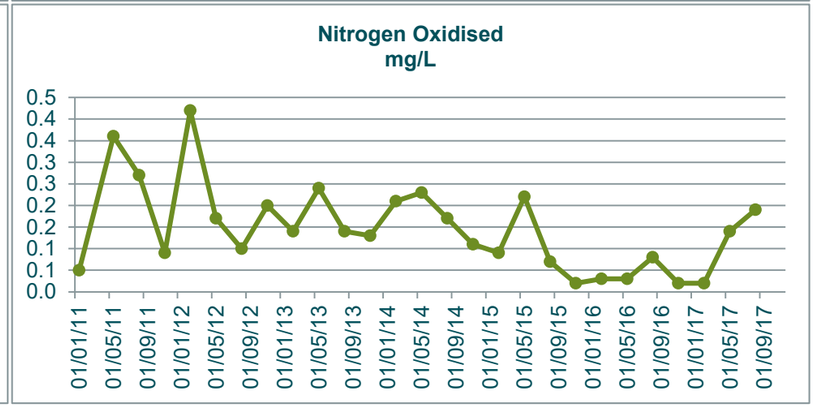
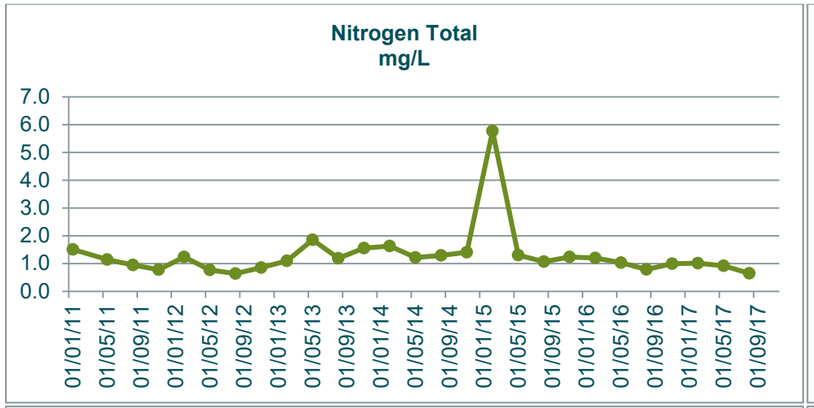
01/09/16
01/01/17
01/05/17
01/09/17


Nitrite
N mg/L
0.1
0.1
0.0
0.0
0.0
0.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
01/05/15
01/09/15
01/01/16
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


Nitrogen Oxidised
mg/L
0.5
0.4
0.4
0.3
0.3
0.2
0.2
0.1
0.1
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
01/05/15
01/09/15
01/01/16
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


Nitrogen Total
mg/L
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
01/05/15
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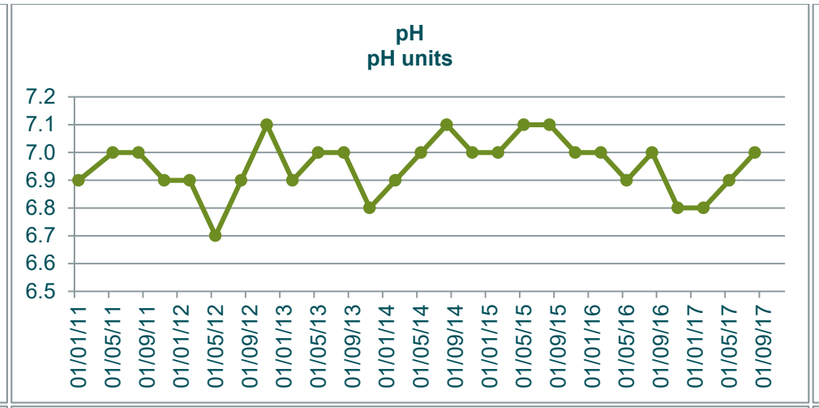
01/09/16
01/01/17
01/05/17
01/09/17


pH
pH units
7.2
7.1
7.0
6.9
6.8
6.7
6.6
6.5
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
01/05/15
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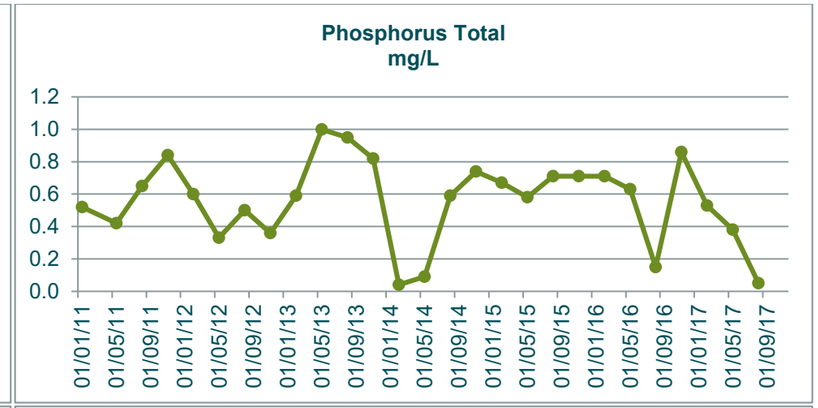
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


Phosphorus Total
mg/L
1.2
1.0
0.8
0.6
0.4
0.2
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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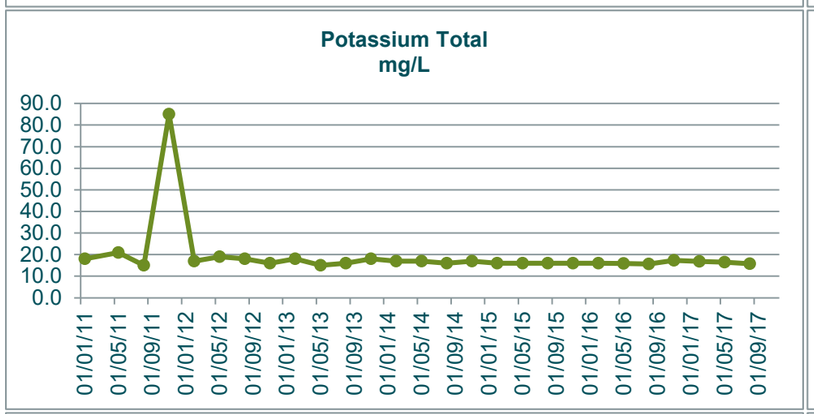
01/09/16
01/01/17
01/05/17
01/09/17


Potassium Total
mg/L
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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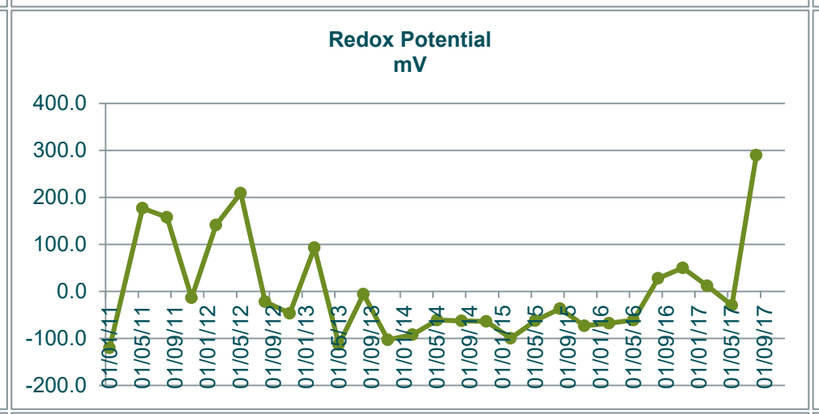
01/09/16
01/01/17
01/05/17
01/09/17


Redox Potential
mV
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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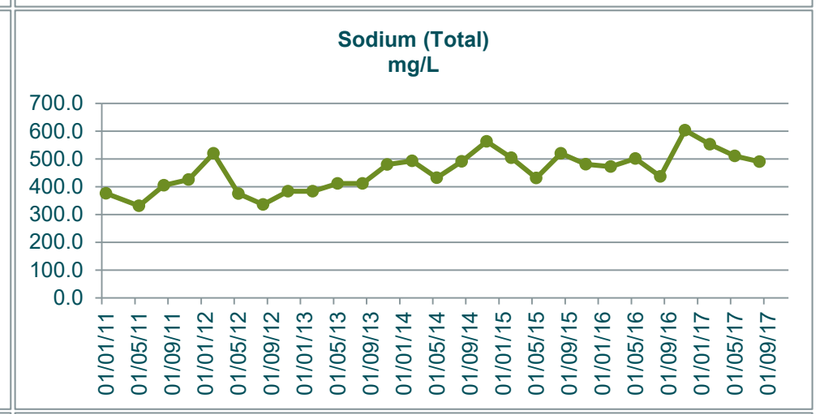
01/09/16
01/01/17
01/05/17
01/09/17


Sodium (Total)
mg/L
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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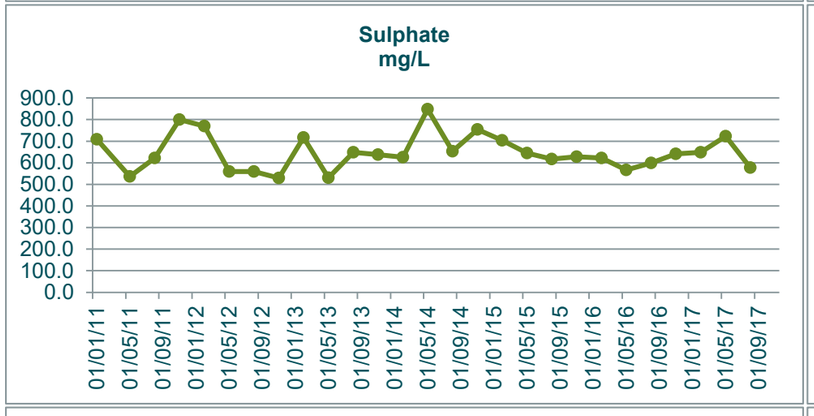
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


Sulphate
mg/L
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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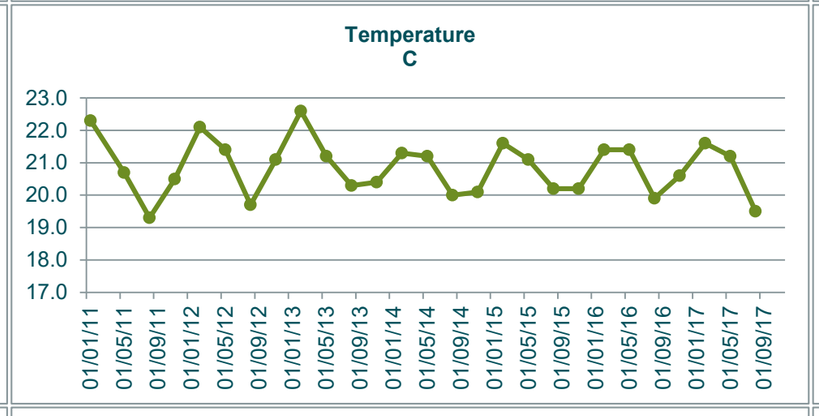
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


Temperature
C
23.0
22.0
21.0
20.0
19.0
18.0
17.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
01/05/15
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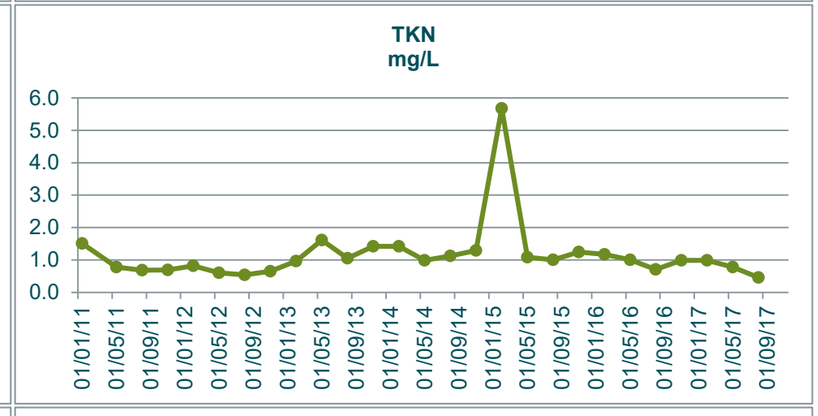
01/01/16
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


TKN
mg/L
6.0
5.0
4.0
3.0
2.0
1.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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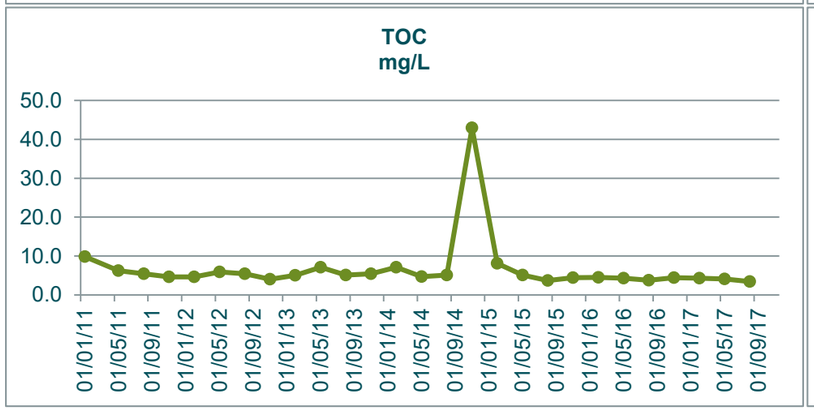
01/09/16
01/01/17
01/05/17
01/09/17


TOC
mg/L
50.0
40.0
30.0
20.0
10.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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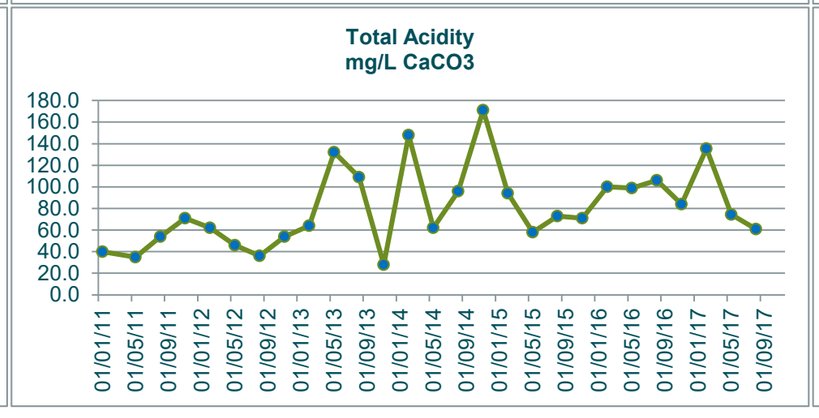
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17


Total Acidity
mg/L CaCO3
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
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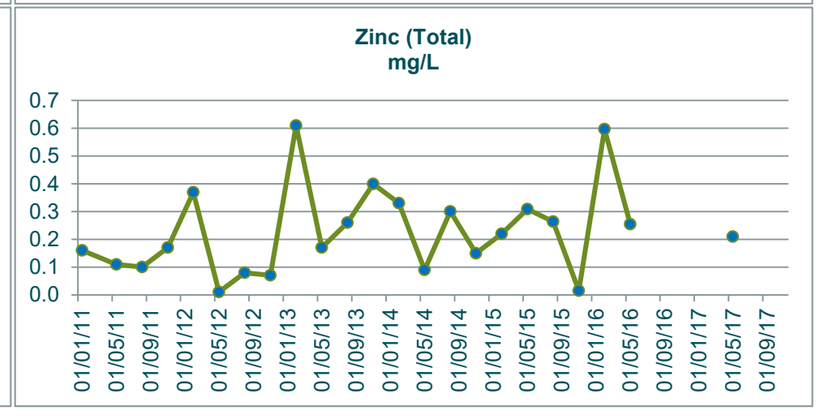
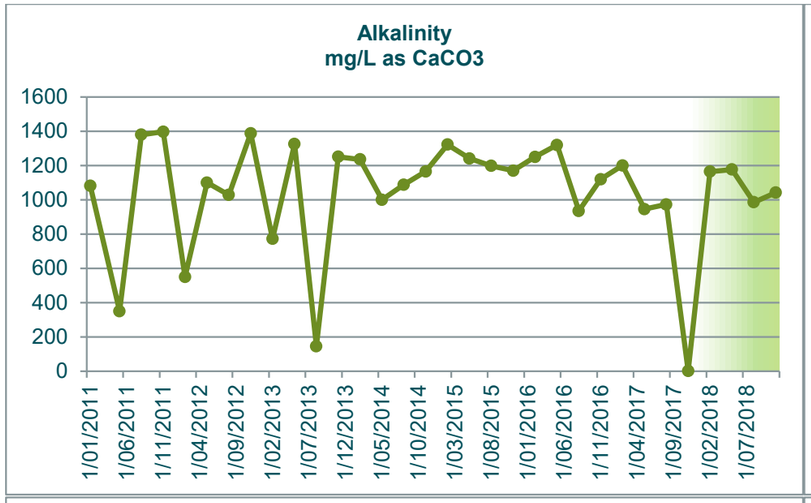
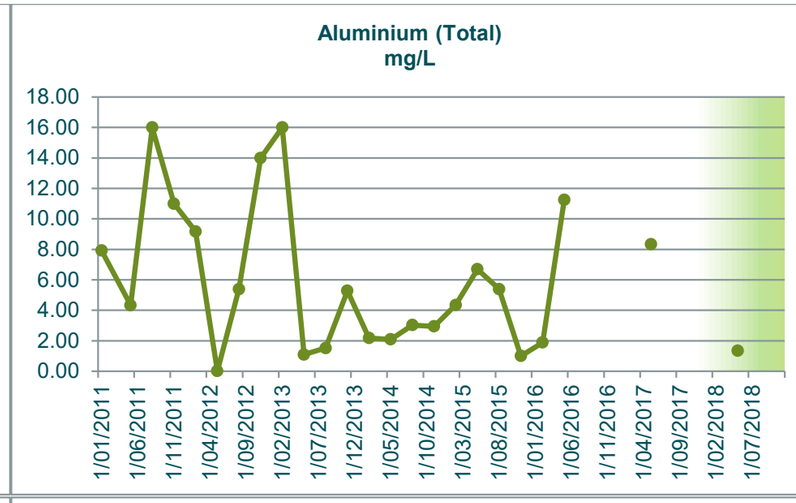
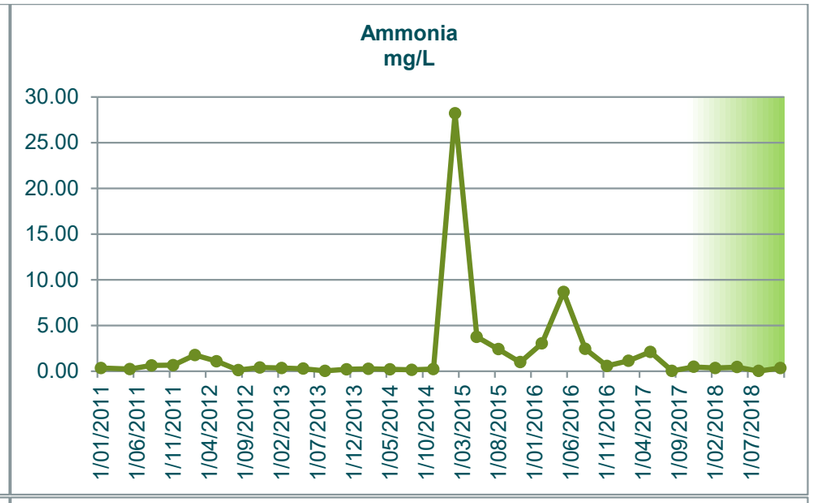
01/09/16
01/01/17
01/05/17
01/09/17

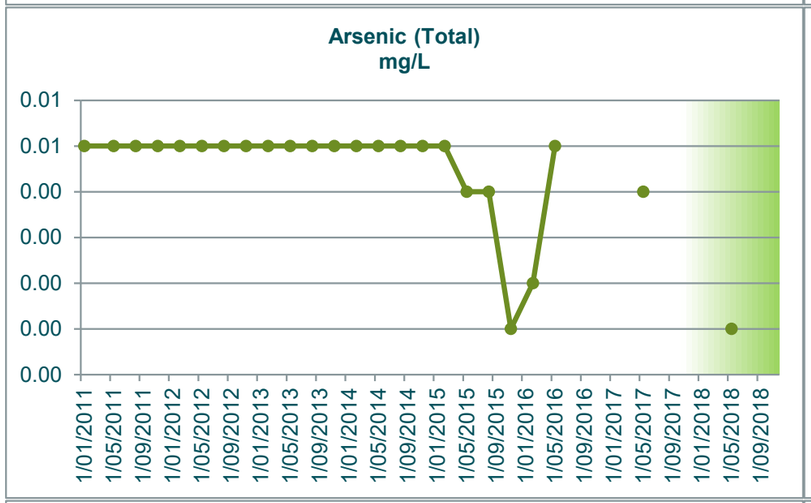

Zinc (Total)
mg/L
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
01/01/11
01/05/11
01/09/11
01/01/12
01/05/12
01/09/12
01/01/13
01/05/13
01/09/13
01/01/14
01/05/14
01/09/14
01/01/15
01/05/15
01/09/15
01/01/16
01/05/16
01/09/16
01/01/17
01/05/17
01/09/17

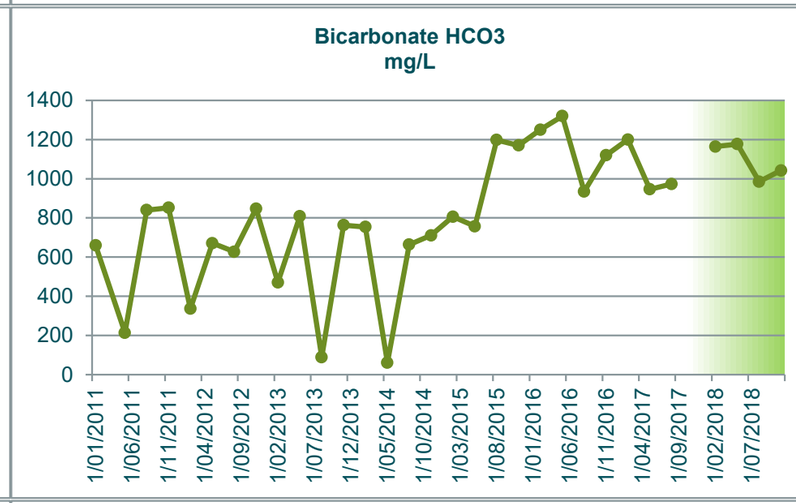
GW4	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	1082	7.92	0.34	0.01	660	7.00	0.00	64.00	1850	0.01	0.01	0.01	6843	0.01	1.20	0.79	13.00	0.01	253	3.18	0.01	0.05	0.05	0.05	2.49	6.90	6.26	65.00	-107	1054	324.00	22.50	2.49	196.0	81.0	0.24
10/05/2011	350	4.33	0.23	0.01	214	1.80	0.00	53.00	1490	0.01	0.01	0.01	6080	0.02	1.70	0.71	7.69	0.01	229	3.28	0.01	0.06	0.05	0.06	1.90	7.30	4.75	66.00	68	1092	318.00	21.20	1.84	17.0	92.0	0.04
9/08/2011	1380	16.00	0.63	0.01	840	12.00	0.00	51.00	2000	0.01	0.01	0.01	6680	0.02	1.20	0.73	19.00	0.01	200	3.09	0.01	0.19	0.05	0.19	2.97	7.20	5.53	42.00	57	1058	266.00	19.70	2.78	37.0	91.0	0.31
8/11/2011	1397	11.00	0.66	0.01	852	10.00	0.00	68.00	1845	0.01	0.01	0.01	7715	0.02	1.70	0.95	17.00	0.01	307	3.82	0.01	0.03	0.02	0.03	2.80	7.20	6.88	297.00	-103	1059	310.00	21.10	2.77	36.0	90.0	0.36
6/02/2012	550	9.17	1.77	0.01	336	14.00	0.00	26.00	855	0.01	0.01	0.01	3770	0.01	1.00	0.40	18.00	0.01	102	1.77	0.01	0.60	0.30	0.90	4.42	7.10	2.94	34.00	114	566	150.00	22.10	3.52	17.0	52.0	5.55
8/05/2012	1100	0.01	1.09	0.01	671	6.60	0.00	52.00	1630	0.01	0.01	0.01	7151	0.01	3.60	0.71	0.33	0.01	223	3.71	0.01	0.09	0.09	0.18	3.20	7.30	5.75	50.00	181	1148	256.00	21.30	3.02	33.0	59.0	0.02
6/08/2012	1028	5.39	0.12	0.01	627	3.60	0.00	47.00	1500	0.01	0.01	0.01	6750	0.01	2.60	0.69	6.67	0.01	177	2.72	0.01	0.18	0.02	0.18	1.84	7.30	4.73	52.00	-80	835	275.00	19.40	1.66	29.0	65.0	0.58
13/11/2012	1388	14.00	0.40	0.01	847	9.90	0.00	49.00	1870	0.01	0.01	0.01	7760	0.01	1.70	0.66	21.00	0.01	203	2.64	0.01	0.13	0.02	0.13	2.40	7.20	5.47	49.00	-65	998	198.00	20.90	2.27	36.5	110.0	2.60
13/02/2013	772	16.00	0.35	0.01	471	8.70	0.00	34.00	1240	0.01	0.01	0.01	5140	0.02	5.00	0.40	19.00	0.01	133	2.01	0.01	0.94	0.02	0.94	2.89	7.30	2.38	31.00	21	940	154.00	21.90	1.95	22.0	41.0	3.39
14/05/2013	1326	1.09	0.27	0.01	809	1.80	0.00	48.00	1800	0.01	0.01	0.01	7200	0.01	4.10	0.72	2.33	0.01	191	2.60	0.01	0.11	0.02	0.11	1.81	7.30	6.02	48.00	-40	1103	252.00	21.50	1.70	35.0	117.0	0.14
6/08/2013	146	1.52	0.04	0.01	89	1.00	0.00	51.00	1290	0.01	0.01	0.01	6000	0.01	4.90	0.74	2.23	0.01	180	2.99	0.01	0.09	0.02	0.09	1.54	7.50	4.66	42.00	115	954	383.00	19.50	1.45	26.9	93.0	0.10
12/11/2013	1251	5.28	0.21	0.01	763	3.30	0.00	57.00	1680	0.01	0.01	0.01	7430	0.01	3.10	0.76	6.84	0.01	220	3.15	0.01	0.12	0.02	0.12	2.22	7.30	5.51	49.00	-80	1212	316.00	20.70	2.10	36.0	37.0	0.40
11/02/2014	1236	2.18	0.26	0.01	754	3.00	0.00	53.00	1730	0.01	0.01	0.01	7298	0.01	3.50	0.63	3.45	0.01	205	2.99	0.01	0.14	0.02	0.14	1.99	7.20	1.94	44.00	-51	1334	269.00	21.90	1.85	34.0	186.0	0.24
13/05/2014	1000	2.09	0.21	0.01	61	2.10	0.00	52.00	1440	0.01	0.01	0.01	7050	0.01	3.40	0.81	2.67	0.01	190	2.41	0.01	0.30	0.02	0.30	1.95	7.30	5.88	47.00	48	1219	272.00	22.50	1.65	31.3	76.0	0.14
12/08/2014	1088	3.03	0.15	0.01	664	2.70	0.00	52.00	1650	0.01	0.01	0.01	6950	0.01	4.50	0.78	4.85	0.01	193	2.75	0.01	0.07	0.02	0.07	1.97	7.40	5.40	44.00	-16	1126	293.00	20.40	1.90	211.0	116.0	0.29
10/11/2014	1165	2.94	0.23	0.01	711	1.50	0.00	50.00	1690	0.01	0.01	0.01	7	0.01	3.90	0.82	3.78	0.01	195	2.47	0.01	0.11	0.02	0.11	1.97	7.30	5.25	44.00	59	1247	300.00	20.90	1.86	226.0	165.0	0.16
9/02/2015	1322	4.35	28.20	0.01	806	190.00	0.00	46.00	1600	0.01	0.01	0.01	7050	0.02	1.00	0.80	13.40	0.01	211	2.92	0.01	0.02	0.03	0.05	46.60	7.20	15.00	52.00	-216	1220	788.00	22.90	46.55	144.0	180.0	1.63
11/05/2015	1241	6.69	3.76	0.00	757	36.00	0.00	52.00	1700	0.01	0.01	0.01	7100	0.01	1.30	0.79	11.60	0.01	206	2.96	0.01	0.11	0.02	0.13	9.32	7.30	8.96	43.00	-81	1232	183.00	22.40	9.19	207.0	104.0	1.30
11/08/2015	1198	5.39	2.41	0.00	1198	14.00	0.00	58.00	1620	0.01	0.01	0.01	6940	0.01	2.20	0.82	11.10	0.01	224	2.64	0.01	0.11	0.02	0.11	6.61	7.40	5.75	46.00	-78	1270	237.00	20.40	6.50	188.0	92.0	1.07
10/11/2015	1170	1.00	0.99	0.00	1170	4.50	0.00	53.00	1400	0.00	0.01	0.01	6020	0.00	1.30	0.76	4.27	0.00	194	2.96	0.00	0.03	0.02	0.03	2.80	7.30	7.03	38.00	-62	990	307.00	20.50	2.77	193.0	76.0	0.18
8/02/2016	1250	1.89	3.05	0.00	1250	10.20	0.00	52.40	1550	0.00	0.01	0.01	6920	0.00	2.20	0.73	5.45	0.01	202	2.81	0.01	0.09	0.02	0.09	6.90	7.20	5.96	43.26	-86	1165	219.67	22.00	6.81	41.3	114.0	1.00
9/05/2016	1320	11.24	8.66	0.01	1320	69.00	0.00	49.58	1535	0.01	0.01	0.01	6680	0.01	0.10	0.80	32.70	0.03	194	3.02	0.01	0.22	0.02	0.24	14.99	7.20	6.54	45.09	-144	1119	255.94	23.30	14.75	49.3	120.0	3.63
9/08/2016	935		2.43		935	12.00		40.26	1275				5728		1.30	0.65			154			0.05	0.02	0.05	5.99	7.20	4.09	37.23	-67	954	211.58	19.90	5.94	23.9	114.7	
7/11/2016	1120		0.57		1120	2.00		50.93	1650				6321		2.90	0.78			193			0.02	0.03	0.03	2.26	7.20	6.70	41.69	183	1083	281.56	20.50	2.23	29.7	76.5	
7/02/2017	1200		1.14		1200	8.50		45.79	1550				6965		1.60	0.73			184			0.05	0.02	0.05	3.40	7.20	5.18	37.10	33	1041	211.49	22.20	3.35	32.9	133.6	
8/05/2017	946	8.34	2.11	0.00	946	8.50	0.00	36.67	1290	0.01	0.01	0.01	5581	0.01	2.20	0.65	27.03	0.03	149	2.14	0.01	0.07	0.02	0.07	4.32	7.20	3.90	35.50	-15	881	194.42	22.00	4.25	26.7	78.3	4.86
8/08/2017	973		0.03		973	2.00		46.88	1225				5962		4.20	0.74			172			0.55	0.02	0.55	2.38	7.40	5.56	37.83	281	942	304.27	19.90	1.83	29.4	49.6	
7/11/2017	1		0.47			4.20		54.29	1850				7777		1.80	0.07			220			0.10	0.02	0.10	3.43	7.20	4.65	46.02	-44	1278	254.53	21.10	3.33	36.7	113.3	
13/02/2018	1164		0.35		1164	2.10		50.85	1540				6535		2.70	0.78			189			0.24	0.02	0.24	2.46	7.20	6.07	40.10	-19	1064	281.32	22.40	2.22	34.2	54.8	
8/05/2018	1177	1.34	0.45	0.00	1177	3.00	0.00	53.24	1600	0.00	0.01	0.01	6730	0.00	2.70	0.88	2.86	0.00	206	2.91	0.00	0.33	0.02	0.33	2.34	7.20	5.94	43.59	31	1160	291.91	22.00	2.01	35.7	38.5	0.23
14/08/2018	985		0.02		985	2.10		51.63	1400				5801		4.40	0.74			185			0.19	0.02	0.19	0.79	7.40	2.73	40.73	314	1030	344.51	19.70	0.60	34.0	19.4	
13/11/2018	1042		0.35		1042	1.80		50.66	1370				6150		2.93	0.80			188			0.07	0.02	0.07	2.00	7.37	5.25	41.09	48	1040	328.40	21.00	1.93	32.4	49.0	
2018 Min	**985**	**1.34**	**0.02**	**0.00**	**985**	**1.80**	**0.00**	**50.66**	**1370**	**0.00**	**0.01**	**0.01**	**5801**	**0.00**	**2.70**	**0.74**	**2.86**	**0.00**	**185**	**2.91**	**0.00**	**0.07**	**0.02**	**0.07**	**0.79**	**7.20**	**2.73**	**40.10**	**-19**	**1030**	**281.32**	**19.70**	**0.60**	**32.4**	**19.4**	**0.23**
2018 Max	**1177**	**1.34**	**0.45**	**0.00**	**1177**	**3.00**	**0.00**	**53.24**	**1600**	**0.00**	**0.01**	**0.01**	**6730**	**0.00**	**4.40**	**0.88**	**2.86**	**0.00**	**206**	**2.91**	**0.00**	**0.33**	**0.02**	**0.33**	**2.46**	**7.40**	**6.07**	**43.59**	**314**	**1160**	**344.51**	**22.40**	**2.22**	**35.7**	**54.8**	**0.23**
2018 Mean	**1092**	**1.34**	**0.29**	**0.00**	**1092**	**2.25**	**0.00**	**51.59**	**1478**	**0.00**	**0.01**	**0.01**	**6304**	**0.00**	**3.18**	**0.80**	**2.86**	**0.00**	**192**	**2.91**	**0.00**	**0.21**	**0.02**	**0.21**	**1.90**	**7.29**	**5.00**	**41.38**	**93**	**1073**	**311.53**	**21.28**	**1.69**	**34.1**	**40.4**	**0.23**
Long-term Average	**1041**	**5.92**	**1.94**	**0.00**	**820**	**14.34**	**0.00**	**49.97**	**1554**	**0.01**	**0.01**	**0.01**	**6378**	**0.01**	**2.56**	**0.71**	**10.68**	**0.01**	**196**	**2.83**	**0.01**	**0.17**	**0.03**	**0.19**	**4.84**	**7.26**	**5.58**	**52.26**	**6**	**1075**	**282.21**	**21.24**	**4.66**	**67.6**	**90.1**	**1.19**

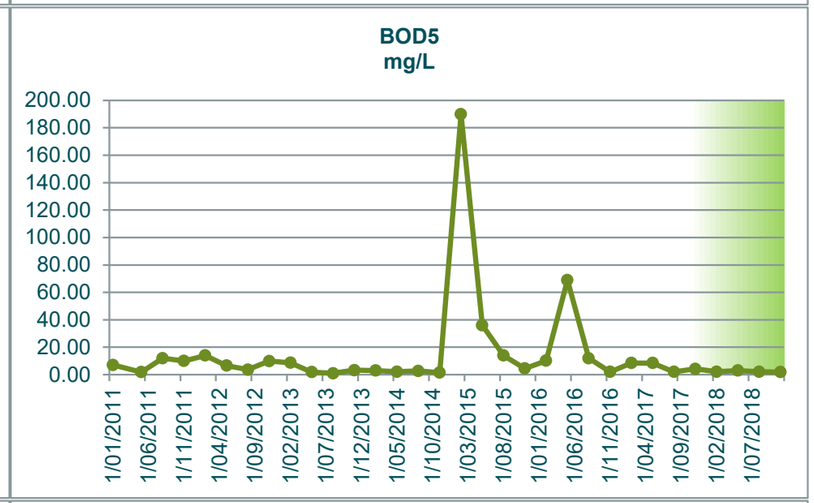

Alkalinity
mg/L as CaCO3
1600
1400
1200
1000
800
600
400
200
0
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

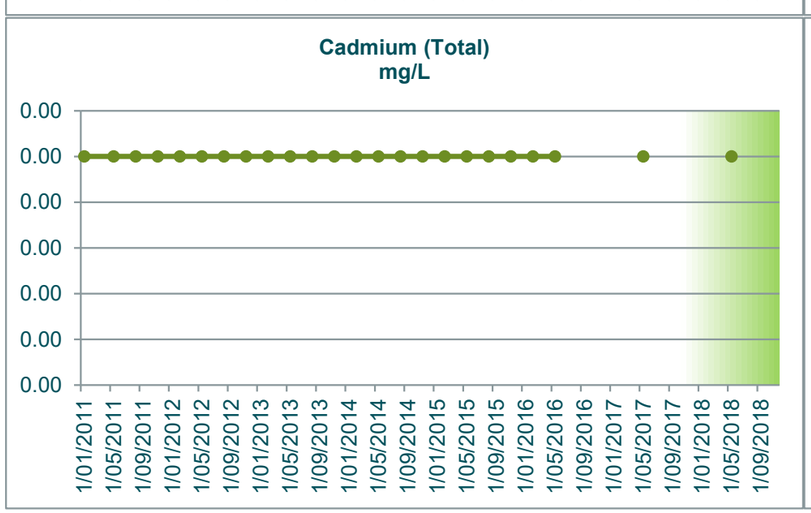

Aluminium (Total)
mg/L
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

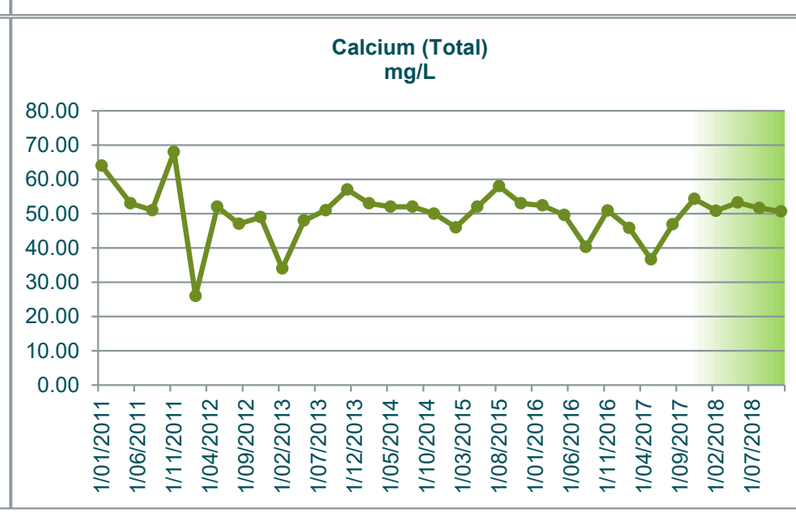

Ammonia
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

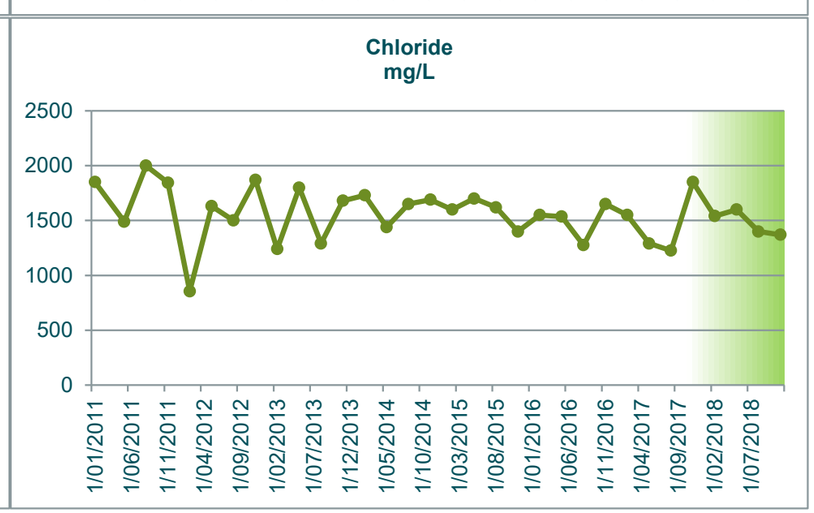

Arsenic (Total)
mg/L
0.01
0.01
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

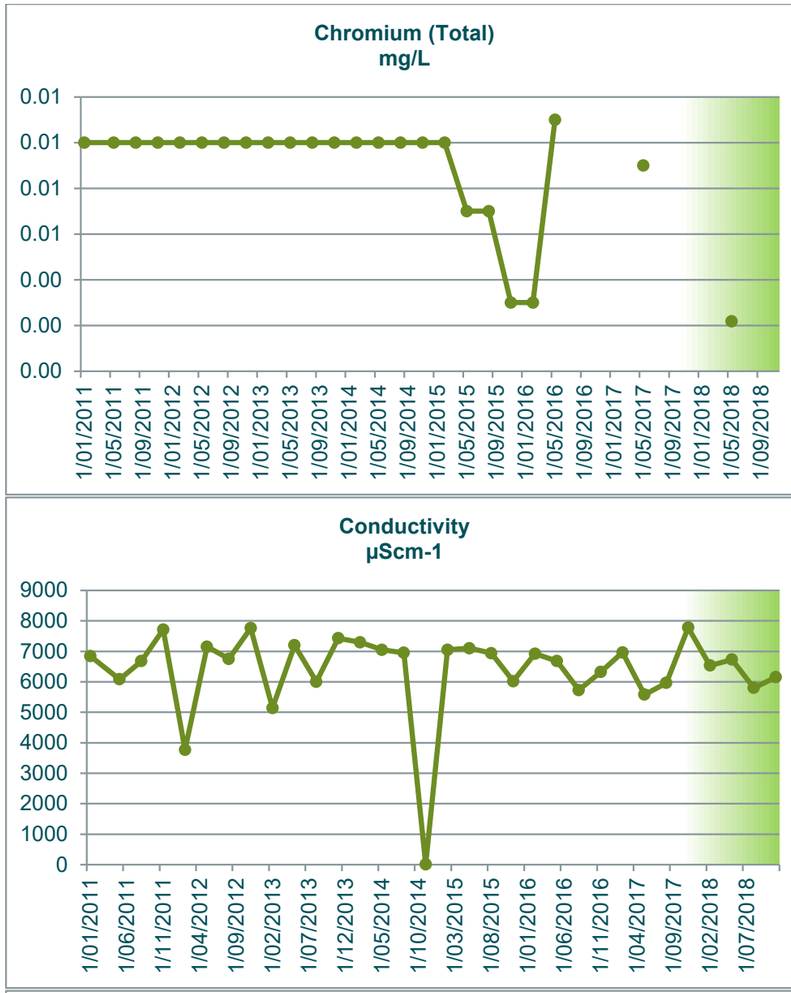

Bicarbonate HCO3
mg/L
1400
1200
1000
800
600
400
200
0
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

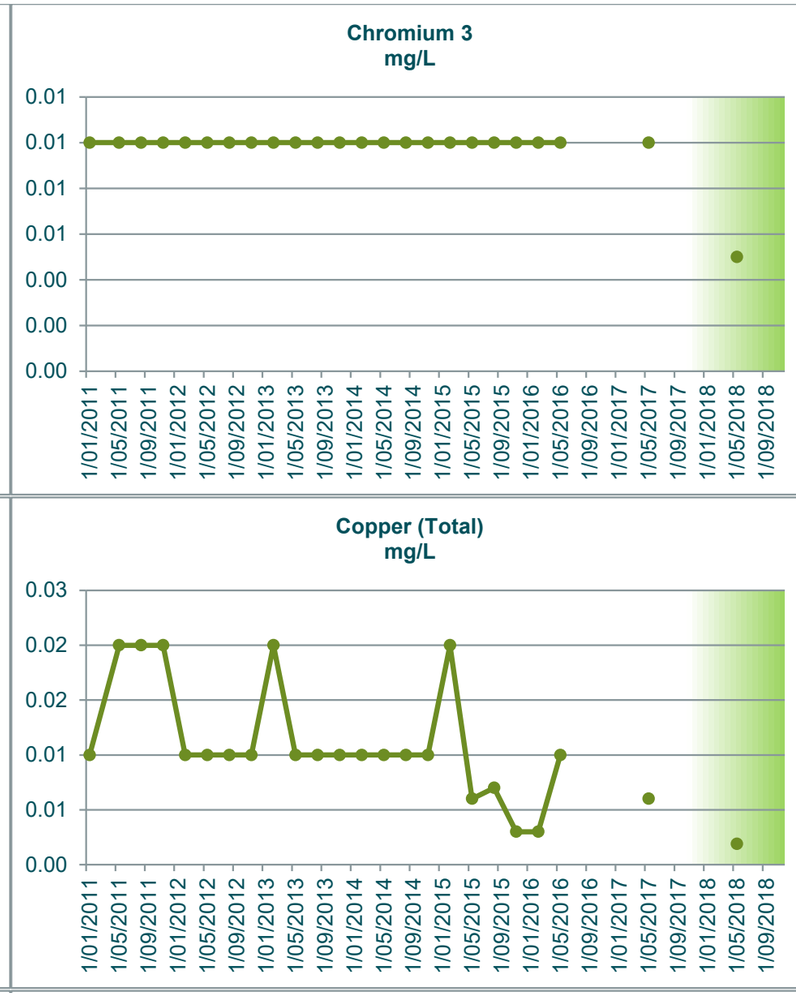

BOD5
mg/L
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

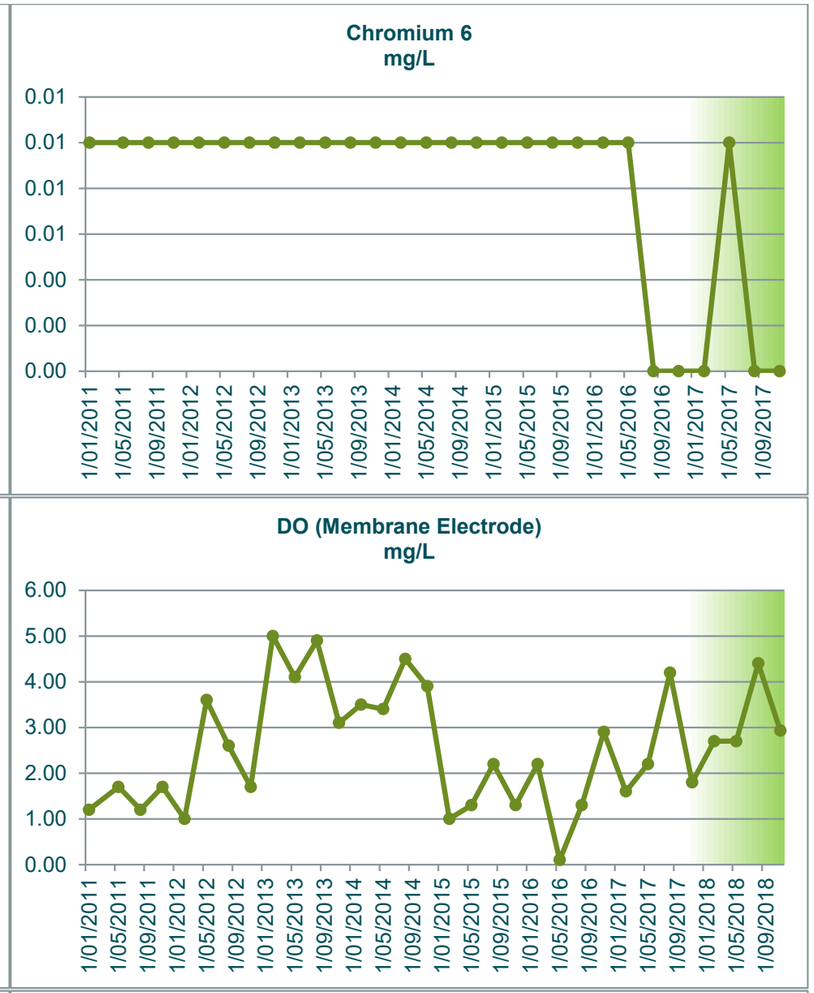

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Calcium (Total)
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chloride
mg/L
2500
2000
1500
1000
500
0
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chromium (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

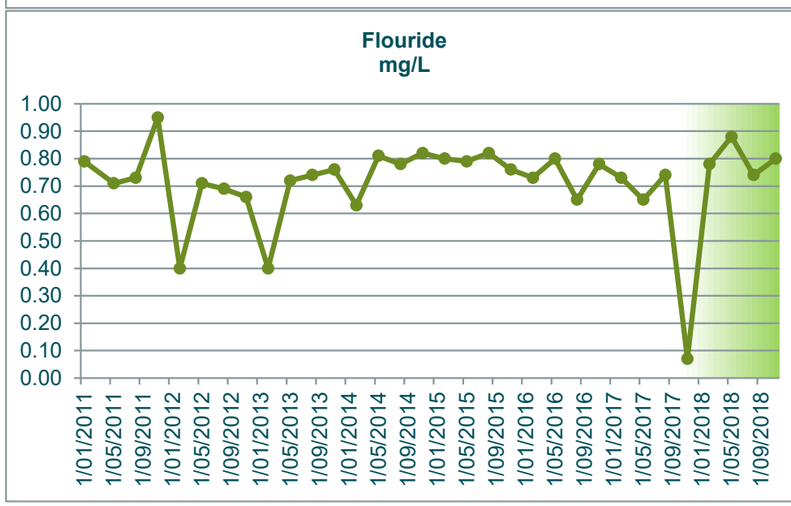

Chromium 3
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

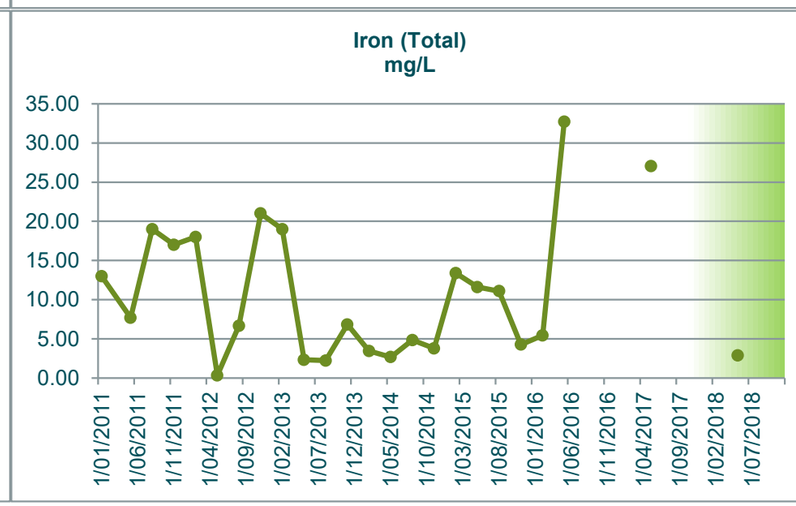

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017

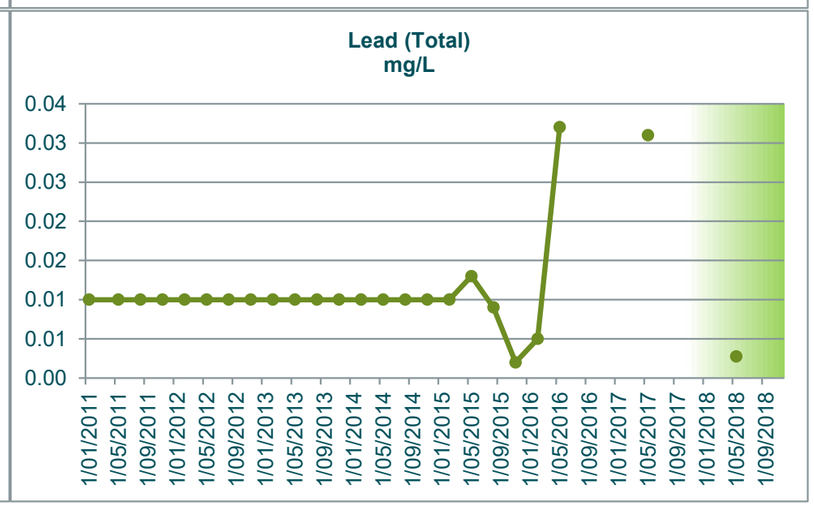
Conductivity
µScm-1
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

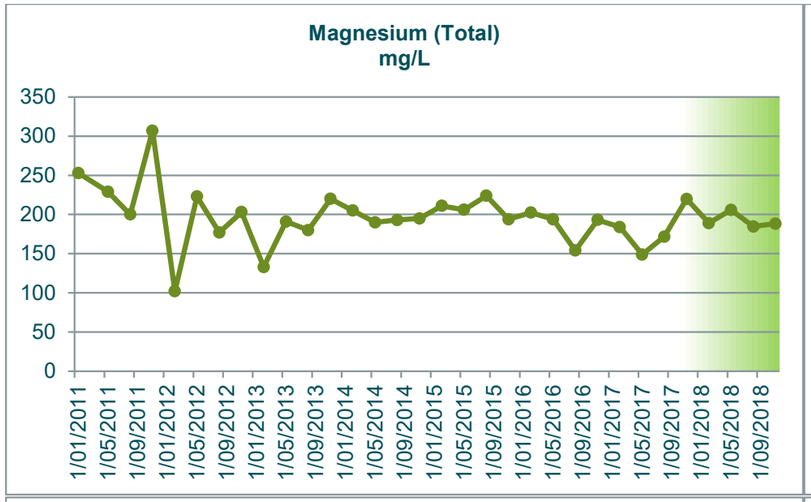
Copper (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

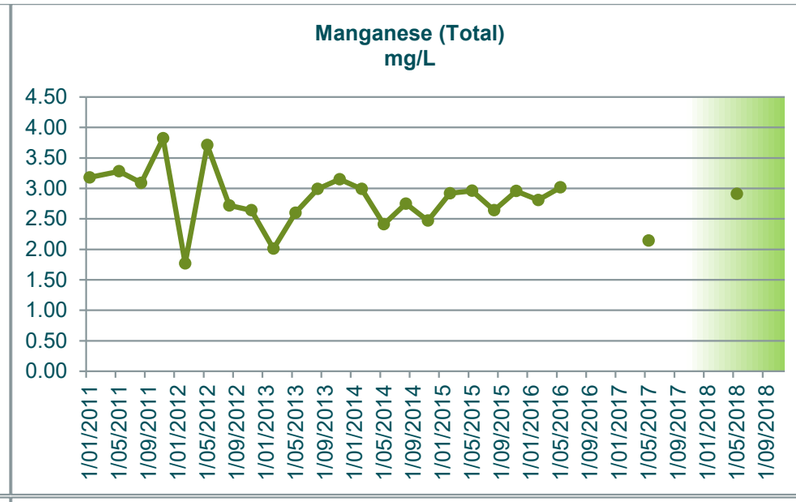
DO (Membrane Electrode)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

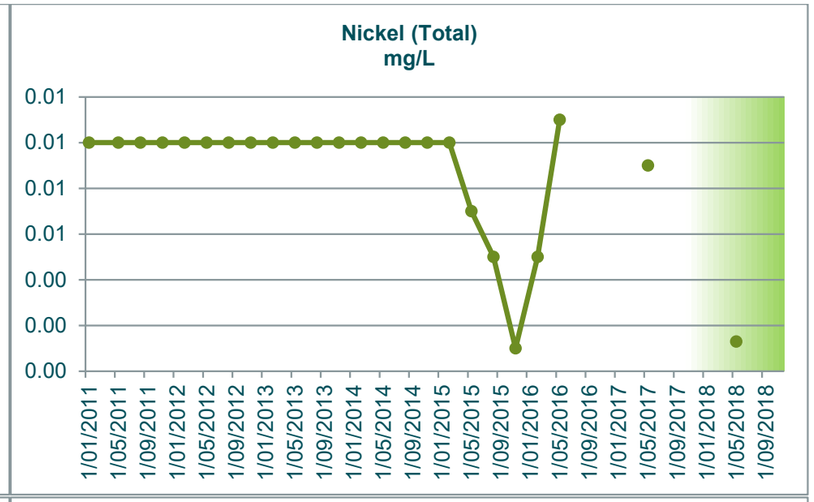

Flouride
mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

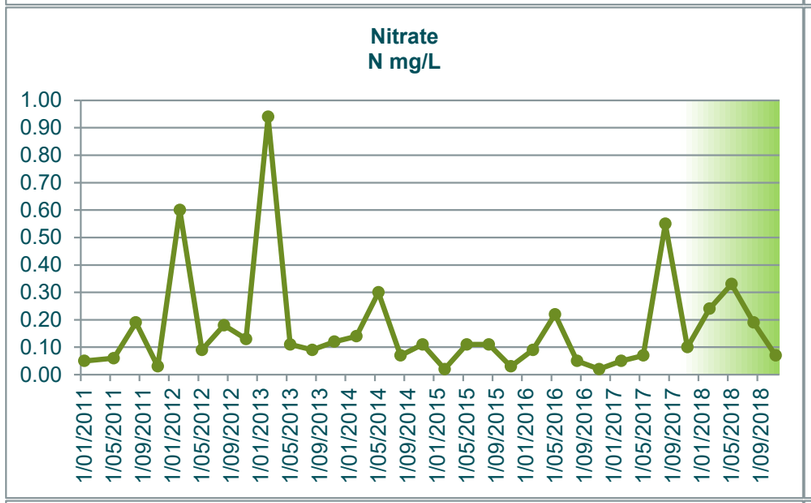

Iron (Total)
mg/L
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

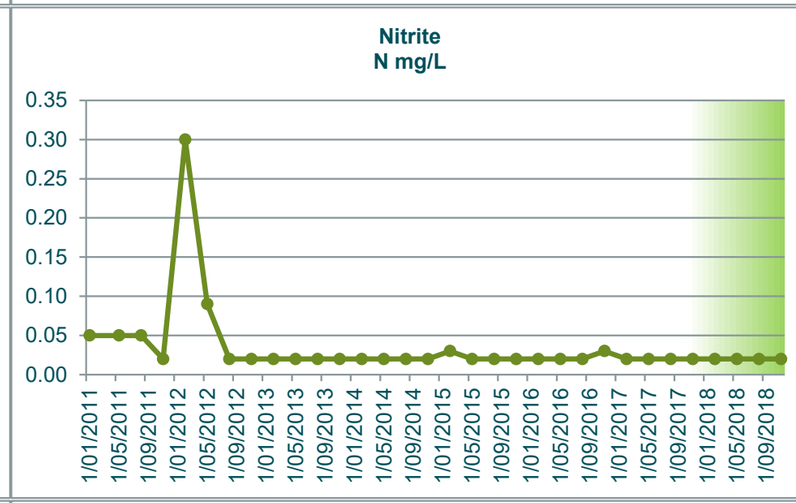

Lead (Total)
mg/L
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

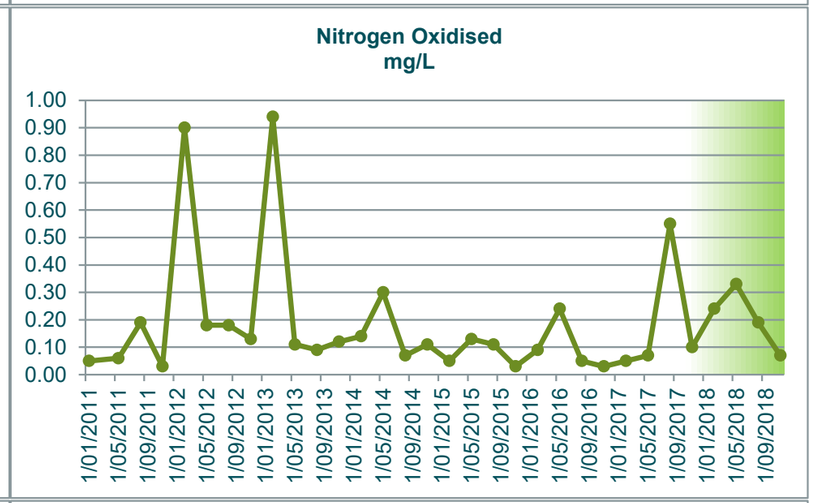

Magnesium (Total)
mg/L
350
300
250
200
150
100
50
0
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

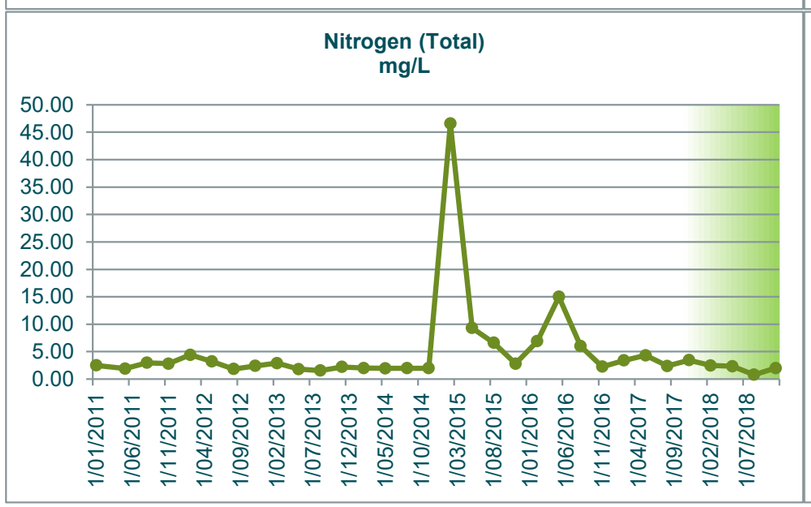

Manganese (Total)
mg/L
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

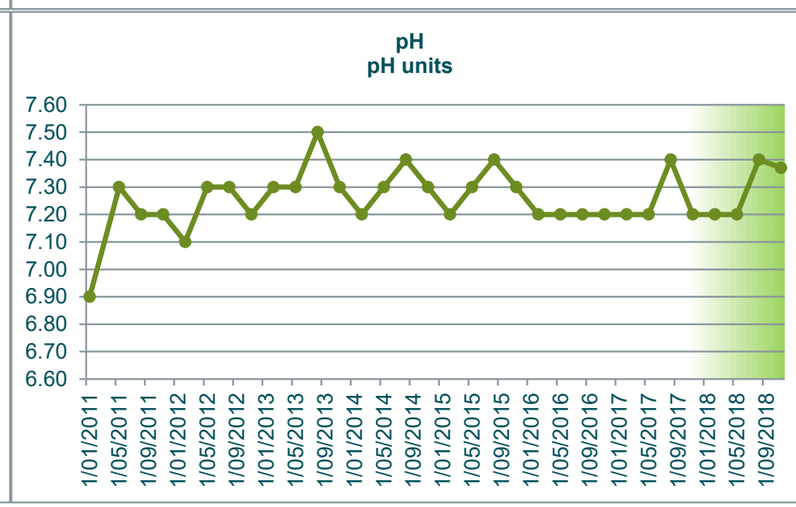

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

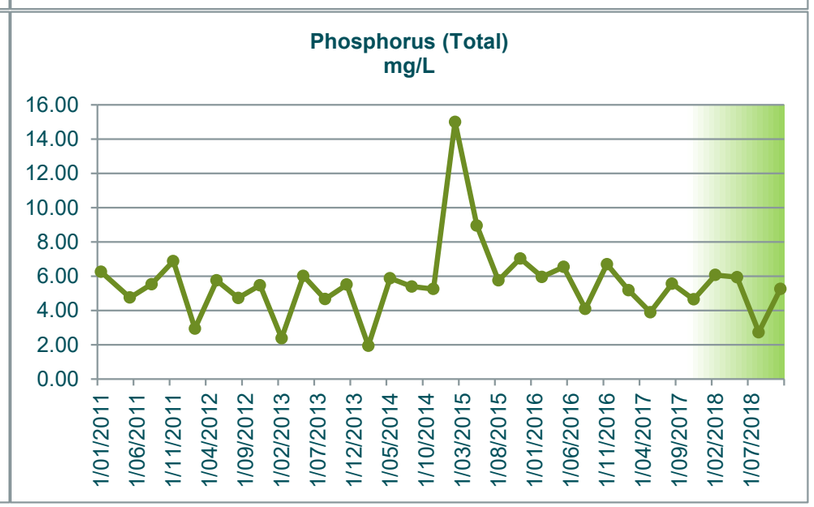

Nitrate
N mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

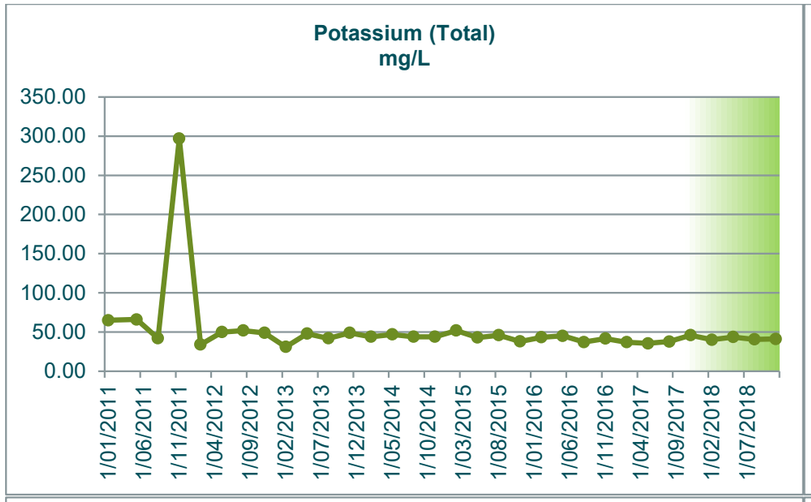

Nitrite
N mg/L
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

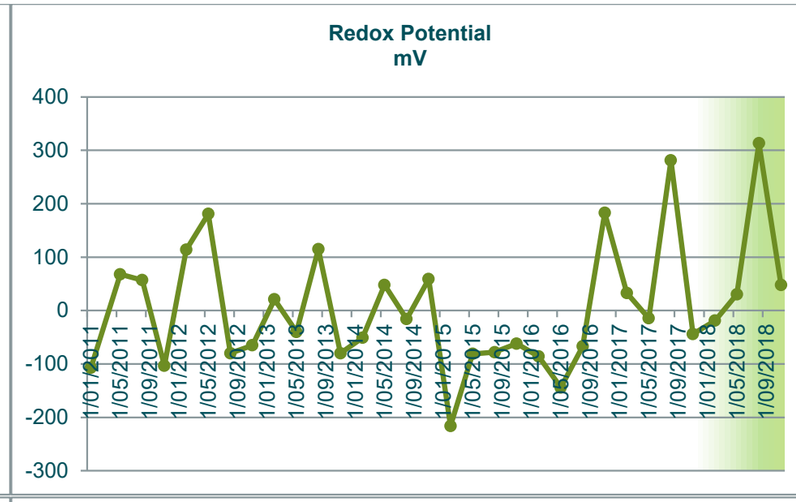

Nitrogen Oxidised
mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

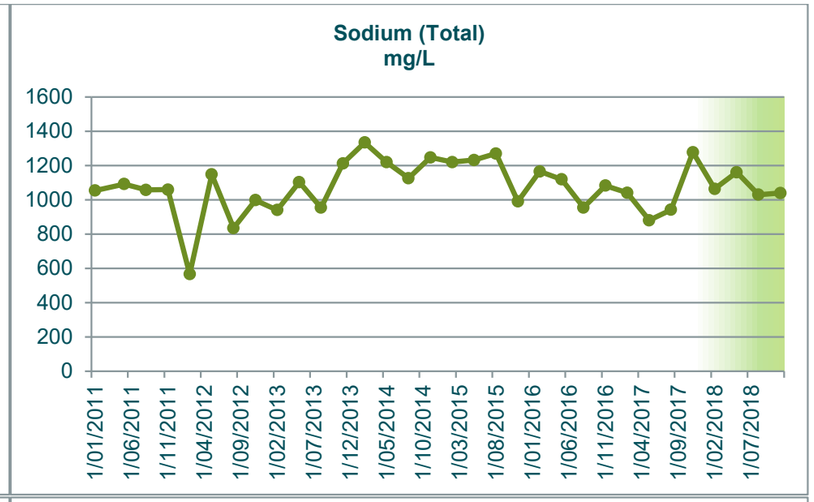

Nitrogen (Total)
mg/L
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

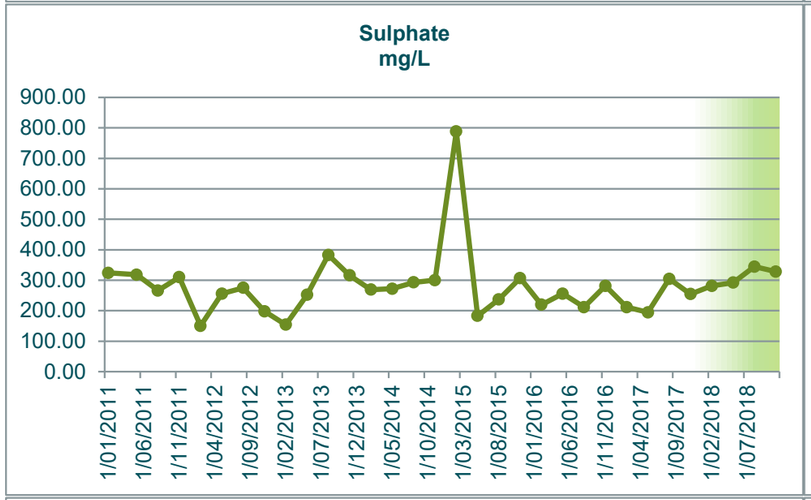

pH
pH units
7.60
7.50
7.40
7.30
7.20
7.10
7.00
6.90
6.80
6.70
6.60
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

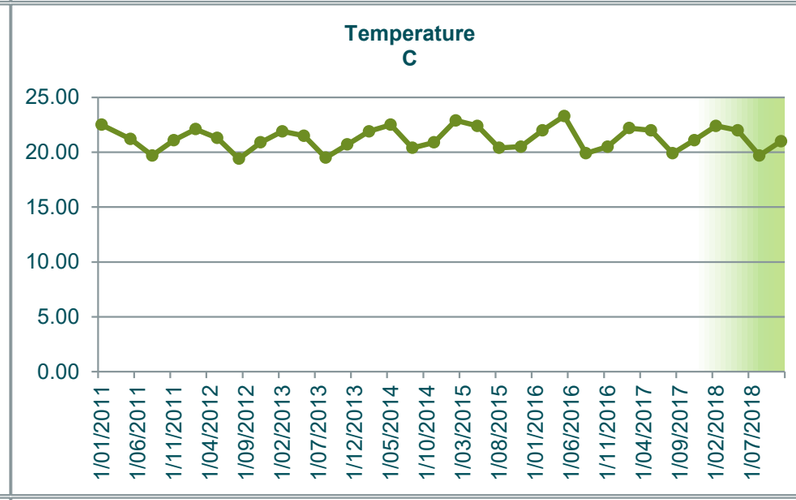

Phosphorus (Total)
mg/L
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

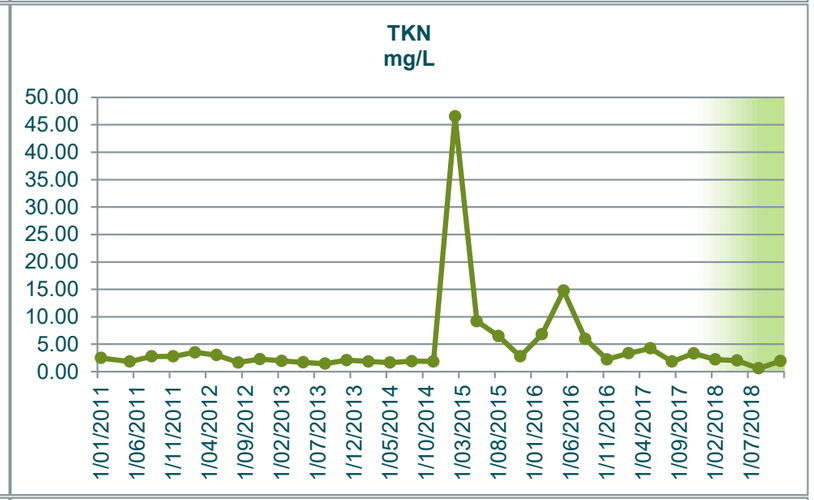

Potassium (Total)
mg/L
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

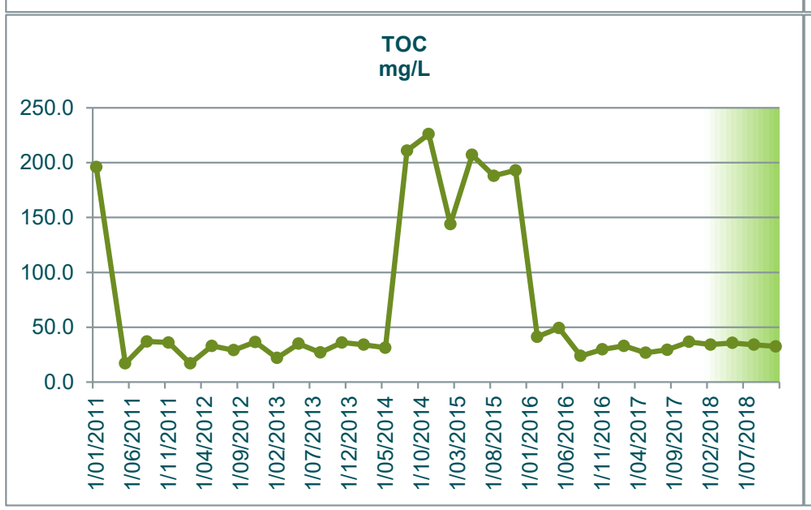

Redox Potential
mV
400
300
200
100
0
-100
-200
-300
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

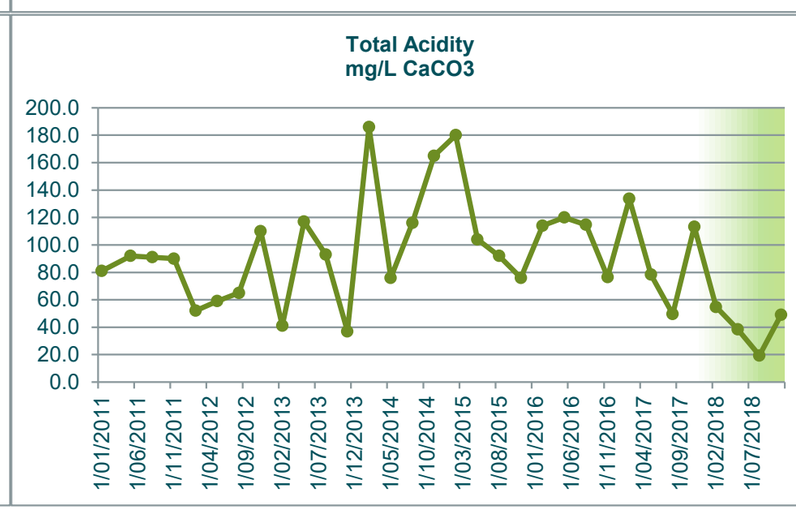

Sodium (Total)
mg/L
1600
1400
1200
1000
800
600
400
200
0
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

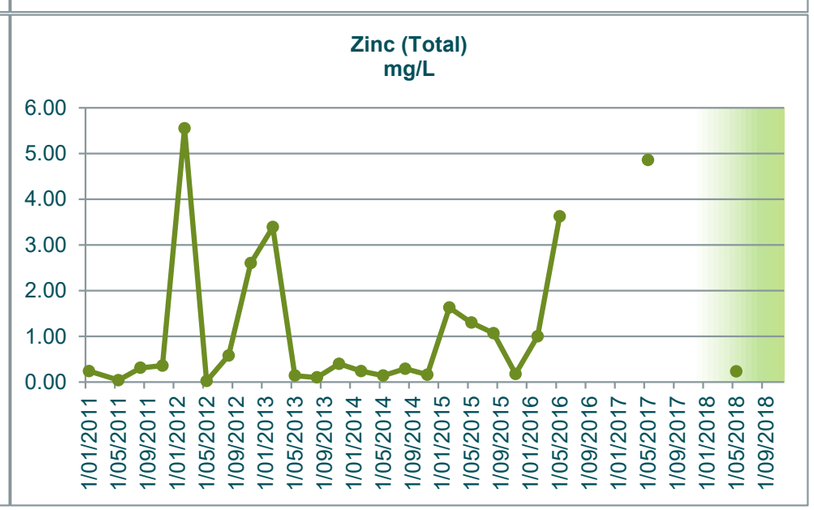

Sulphate
mg/L
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

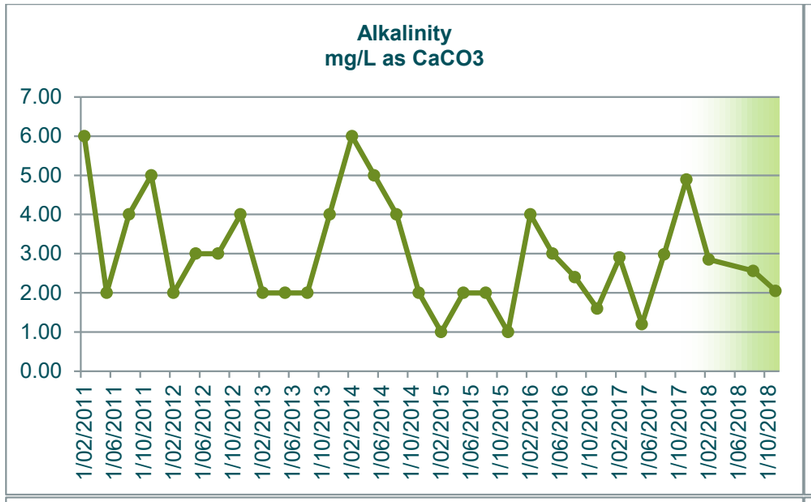

TKN
mg/L
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

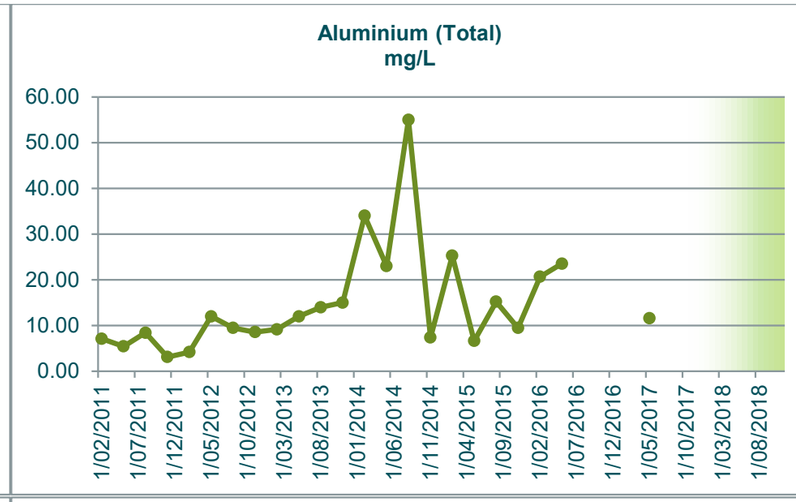

TOC
mg/L
250.0
200.0
150.0
100.0
50.0
0.0
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

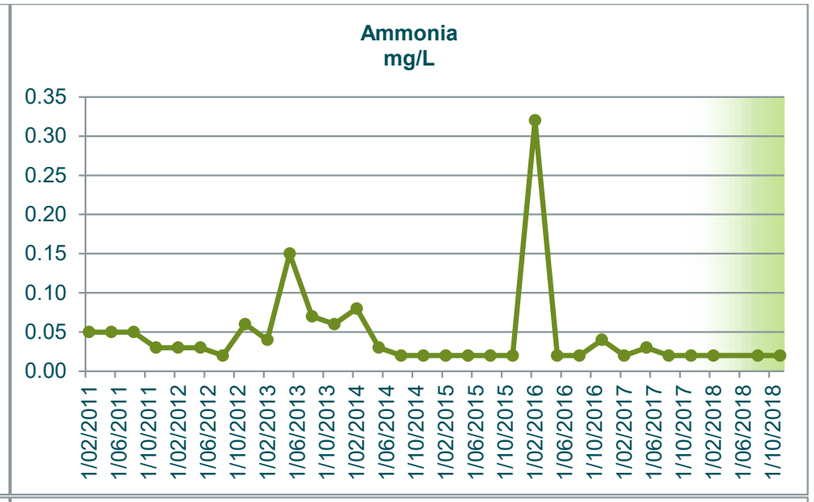

Total Acidity
mg/L CaCO3
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

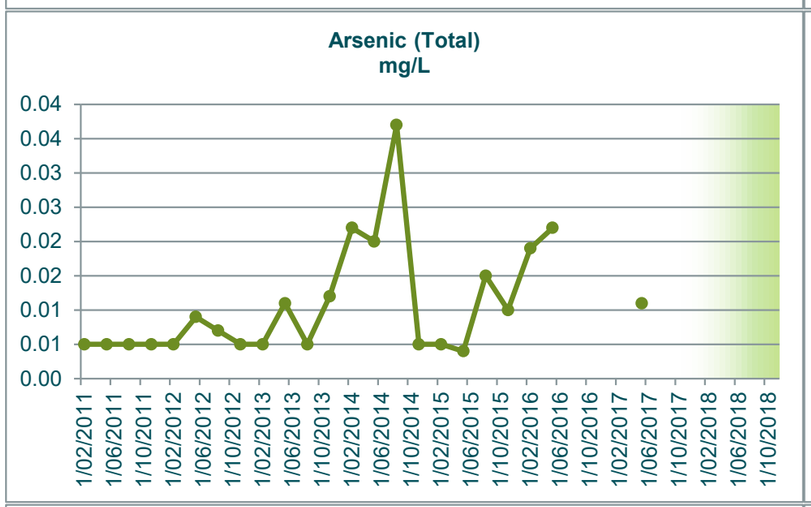

Zinc (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

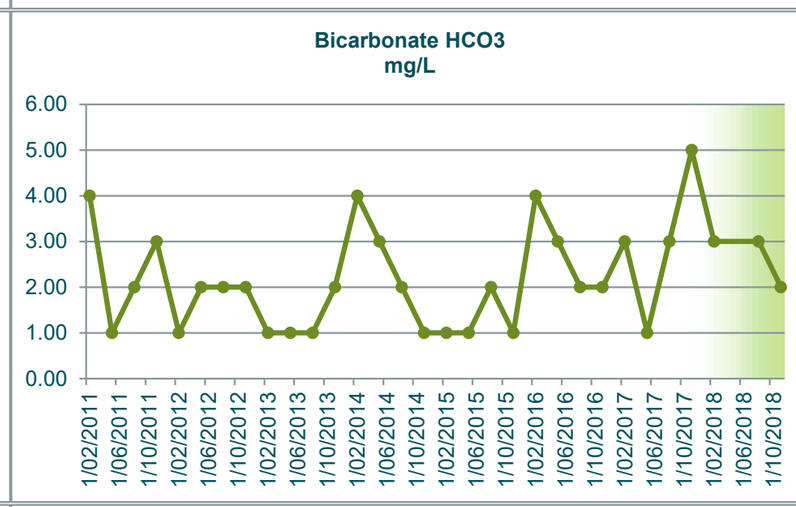
GW5	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
1/02/2011	6.00	7.10	0.05	0.01	4.00	1.00	0.00	1.20	22.00	0.01	0.01	0.01	99.00	0.03	4.90	0.06	12.00	0.01	1.00	3.14	0.01	0.16	0.05	0.16	0.25	5.40	0.23	5.00	216.00	9.40	7.50	22.30	0.09	3.40	50.00	0.03
11/05/2011	2.00	5.44	0.05	0.01	1.00	1.00	0.00	2.20	19.00	0.01	0.01	0.01	111.00	0.03	5.80	0.04	8.09	0.01	1.40	2.76	0.01	0.54	0.05	0.54	0.68	3.80	0.26	5.00	317.00	11.00	6.80	21.00	0.14	1.00	47.00	0.05
10/08/2011	4.00	8.43	0.05	0.01	2.00	2.40	0.00	0.70	19.00	0.01	0.01	0.01	106.00	0.02	4.70	0.04	12.00	0.01	1.20	2.74	0.01	0.29	0.05	0.29	0.46	4.80	0.16	5.00	303.00	13.00	5.20	20.60	0.17	1.00	48.00	0.04
9/11/2011	5.00	3.10	0.03	0.01	3.00	6.00	0.00	0.70	18.00	0.01	0.01	0.01	90.00	0.01	4.70	0.10	3.68	0.01	2.20	0.86	0.01	0.31	0.02	0.31	0.39	5.10	0.20	5.00	310.00	7.30	7.40	21.80	0.08	0.60	48.00	0.02
7/02/2012	2.00	4.20	0.03	0.01	1.00	2.10	0.00	0.50	20.00	0.01	0.01	0.01	97.00	0.02	4.40	0.03	7.53	0.01	1.30	2.18	0.01	0.33	0.02	0.33	0.36	4.70	0.10	5.00	282.00	14.00	7.50	21.60	0.05	0.10	46.00	0.04
9/05/2012	3.00	12.00	0.03	0.01	2.00	1.00	0.00	0.40	21.00	0.01	0.01	0.01	96.00	0.04	5.40	0.03	19.00	0.01	1.20	5.30	0.01	0.30	0.02	0.30	0.37	4.90	0.12	5.00	298.00	11.00	6.50	21.30	0.07	0.70	56.00	0.30
7/08/2012	3.00	9.47	0.02	0.01	2.00	1.00	0.00	1.20	16.00	0.01	0.01	0.01	91.00	0.02	5.10	0.03	8.33	0.01	1.50	1.67	0.01	0.37	0.02	0.37	0.43	4.60	0.06	5.00	289.00	8.70	6.30	20.70	0.06	0.20	37.00	0.16
14/11/2012	4.00	8.55	0.06	0.01	2.00	1.00	0.00	0.61	18.00	0.01	0.01	0.01	95.40	0.02	4.90	0.09	10.00	0.01	0.80	3.06	0.01	0.27	0.02	0.27	0.72	5.00	0.70	5.00	226.00	10.00	5.30	22.50	0.45	7.30	56.00	0.43
14/02/2013	2.00	9.15	0.04	0.01	1.00	1.00	0.00	0.40	20.00	0.01	0.01	0.01	95.00	0.01	4.90	0.06	8.57	0.01	1.20	1.01	0.01	0.29	0.02	0.29	0.32	4.60	0.10	5.00	256.00	12.00	6.00	21.50	0.05	0.60	43.00	0.07
15/05/2013	2.00	12.00	0.15	0.01	1.00	1.80	0.00	0.50	15.00	0.01	0.01	0.01	88.00	0.02	5.10	0.03	13.00	0.01	1.00	2.65	0.01	0.31	0.02	0.31	0.51	4.50	0.08	5.00	209.00	11.00	6.10	21.40	0.20	0.60	113.00	0.09
7/08/2013	2.00	14.00	0.07	0.01	1.00	1.00	0.00	0.40	16.00	0.01	0.01	0.01	84.00	0.02	5.20	0.03	17.00	0.01	1.00	4.07	0.01	0.27	0.02	0.27	0.61	4.70	0.53	5.00	236.00	12.00	7.40	21.10	0.34	0.30	107.00	0.06
13/11/2013	4.00	15.00	0.06	0.01	2.00	1.50	0.00	0.50	18.00	0.01	0.01	0.01	101.00	0.04	4.10	0.03	21.00	0.01	1.00	6.06	0.02	0.30	0.02	0.30	0.74	4.80	0.35	5.00	196.00	13.00	7.30	22.50	0.44	0.30	67.00	0.14
12/02/2014	6.00	34.00	0.08	0.02	4.00	2.70	0.00	0.50	17.00	0.02	0.02	0.01	83.00	0.13	5.30	0.04	61.00	0.06	0.70	20.00	0.06	0.26	0.02	0.26	0.94	5.20	0.57	5.00	148.00	11.00	6.00	22.20	0.68	0.40	108.00	0.73
14/05/2014	5.00	23.00	0.03	0.02	3.00	1.50	0.00	0.50	25.00	0.01	0.01	0.01	100.00	0.06	6.10	0.04	50.00	0.03	0.80	9.38	0.03	0.96	0.02	0.96	1.05	4.80	0.19	5.00	139.00	12.00	5.30	20.50	0.09	0.50	58.00	0.35
13/08/2014	4.00	55.00	0.02	0.04	2.00	2.40	0.00	0.40	20.00	0.03	0.03	0.01	109.00	0.12	6.10	0.04	68.20	0.05	1.20	14.00	0.05	0.65	0.02	0.65	0.87	5.30	0.40	5.00	147.00	15.00	7.40	20.90	0.22	0.50	101.00	0.73
11/11/2014	2.00	7.37	0.02	0.01	1.00	3.00	0.00	0.50	17.00	0.01	0.01	0.01	109.00	0.02	5.70	0.03	10.00	0.01	1.50	1.85	0.01	0.54	0.02	0.54	0.84	4.80	0.15	5.00	178.00	15.00	7.60	21.40	0.30	0.40	70.00	0.20
10/02/2015	1.00	25.30	0.02	0.01	1.00	1.80	0.00	0.80	18.00	0.02	0.02	0.01	86.00	0.01	6.20	0.02	10.50	0.01	1.10	1.75	0.01	0.67	0.02	0.67	1.06	4.80	0.09	5.00	191.00	9.90	6.60	21.60	0.39	0.50	65.00	0.03
12/05/2015	2.00	6.64	0.02	0.00	1.00	3.00	0.00	0.90	16.00	0.01	0.01	0.01	85.00	0.01	6.30	0.03	6.30	0.01	1.40	1.25	0.01	0.92	0.02	0.92	1.27	4.90	0.09	5.00	219.00	11.00	5.50	21.50	0.35	2.40	50.00	0.11
12/08/2015	2.00	15.20	0.02	0.02	2.00	1.80	0.00	0.90	16.00	0.03	0.03	0.01	89.00	0.04	6.30	0.02	20.90	0.01	1.60	4.06	0.02	0.63	0.02	0.63	1.21	4.70	0.20	5.00	235.00	12.00	5.30	21.00	0.58	0.90	65.00	0.10
11/11/2015	1.00	9.46	0.02	0.01	1.00	1.00	0.00	1.30	13.00	0.01	0.01	0.01	85.00	0.02	6.00	0.02	12.14	0.01	1.60	2.73	0.01	1.49	0.02	1.49	1.75	4.60	0.11	5.00	227.00	9.70	4.70	21.40	0.26	1.00	63.00	0.12
9/02/2016	4.00	20.65	0.32	0.02	4.00	1.80	0.00	1.35	26.00	0.02	0.02	0.01	120.00	0.06	4.80	0.02	26.96	0.02	2.00	5.82	0.03	0.33	0.02	0.33	1.29	5.10	0.19	5.00	234.00	15.82	6.21	22.60	0.96	1.31	94.00	0.09
10/05/2016	3.00	23.53	0.02	0.02	3.00	1.00	0.00	0.47	20.00	0.02	0.02	0.01	94.00	0.06	4.80	0.04	32.09	0.02	1.24	5.66	0.02	0.33	0.02	0.33	1.13	4.80	0.38	5.00	247.00	11.96	5.95	21.50	0.80	0.41	83.00	0.14
10/08/2016	2.40		0.02		2.00	2.10		1.00	16.00				91.70		4.70	0.04			1.53			0.44	0.02	0.44	0.70	4.60	0.14	5.00	329.00	12.85	5.48	21.00	0.26	0.78	74.00	
8/11/2016	1.60		0.04		2.00	1.00		0.49					92.40		4.50	0.03			1.43			0.42	0.02	0.42	0.74	4.50	0.17	5.00	377.30	12.93	6.58	21.70	0.32	0.60	87.50	
8/02/2017	2.90		0.02		3.00	1.00		0.46	20.00				96.30		5.20	0.03			1.27			0.45	0.02	0.45	1.04	4.40	0.36	5.00	417.90	12.29	6.22	21.60	0.59	0.54	122.80	
9/05/2017	1.20	11.58	0.03	0.01	1.00	1.20	0.00	2.00	17.00	0.01	0.01	0.01	104.30	0.03	5.50	0.04	15.56	0.01	2.32	3.04	0.01	3.66	0.02	3.66	4.12	4.40	0.22	5.00	414.80	10.39	4.90	20.90	0.46	0.97	85.30	0.10
9/08/2017	2.98		0.02		3.00	1.20		1.03	20.00				102.30		5.60	0.03			1.54			1.18	0.02	1.18	1.87	4.50	0.31	5.00	459.10	12.36	6.49	20.70	0.69	0.99	70.10	
8/11/2017	4.89		0.02		5.00	1.50		1.13	16.00				73.80		4.90	0.04			1.34			0.63	0.02	0.63	1.13	4.70	0.29	5.00	423.80	9.01	4.38	21.10	0.50	1.31	71.00	
14/02/2018	2.85		0.02		3.00	3.90		0.75	17.00				94.20		5.10	0.04			1.39			0.72	0.02	0.72	1.12	4.70	0.27	5.00	454.30	12.27	6.52	21.70	0.40	2.83	68.90	
15/08/2018	2.56		0.02		3.00	1.50		0.61	19.00				94.00		5.60	0.04			1.49			0.56	0.02	0.56	1.02	4.70	0.28	0.52	455.60	13.38	6.93	20.90	0.46	7.50	60.30	
14/11/2018	2.05		0.02		2.00	1.80		0.60	15.00				94.00		5.60	0.03			1.42			0.61	0.02	0.61	1.07	4.68	0.33	0.54	341.00	12.77	7.14	21.60	0.46	0.69	69.70	
2018 Min	**2.05**		**0.02**		**2.00**	**1.50**		**0.60**	**15.00**				**94.00**		**5.10**	**0.03**			**1.39**			**0.56**	**0.02**	**0.56**	**1.02**	**4.68**	**0.27**	**0.52**	**341.00**	**12.27**	**6.52**	**20.90**	**0.40**	**0.69**	**60.30**	
2018 Max	**2.85**		**0.02**		**3.00**	**3.90**		**0.75**	**19.00**				**94.20**		**5.60**	**0.04**			**1.49**			**0.72**	**0.02**	**0.72**	**1.12**	**4.70**	**0.33**	**5.00**	**455.60**	**13.38**	**7.14**	**21.70**	**0.46**	**7.50**	**69.70**	
2018 Mean	**2.49**		**0.02**		**2.67**	**2.40**		**0.65**	**17.00**				**94.07**		**5.43**	**0.04**			**1.43**			**0.63**	**0.02**	**0.63**	**1.07**	**4.69**	**0.29**	**2.02**	**416.97**	**12.81**	**6.87**	**21.40**	**0.44**	**3.67**	**66.30**	
Long-term Average	**2.98**	**14.79**	**0.05**	**0.01**	**2.19**	**1.81**	**0.00**	**0.81**	**18.33**	**0.01**	**0.01**	**0.01**	**95.37**	**0.04**	**5.27**	**0.04**	**19.73**	**0.02**	**1.34**	**4.57**	**0.02**	**0.62**	**0.02**	**0.62**	**0.97**	**4.74**	**0.25**	**4.71**	**283.09**	**11.74**	**6.27**	**21.42**	**0.35**	**1.31**	**70.47**	**0.18**

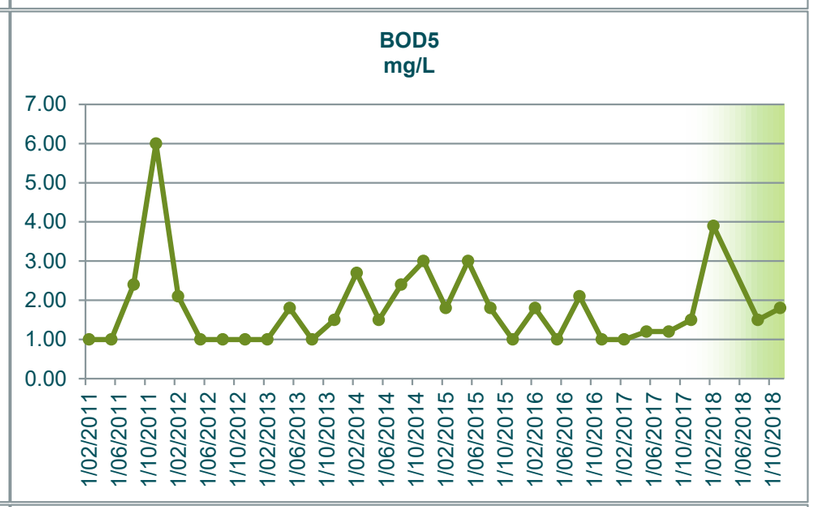

Alkalinity
mg/L as CaCO3
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

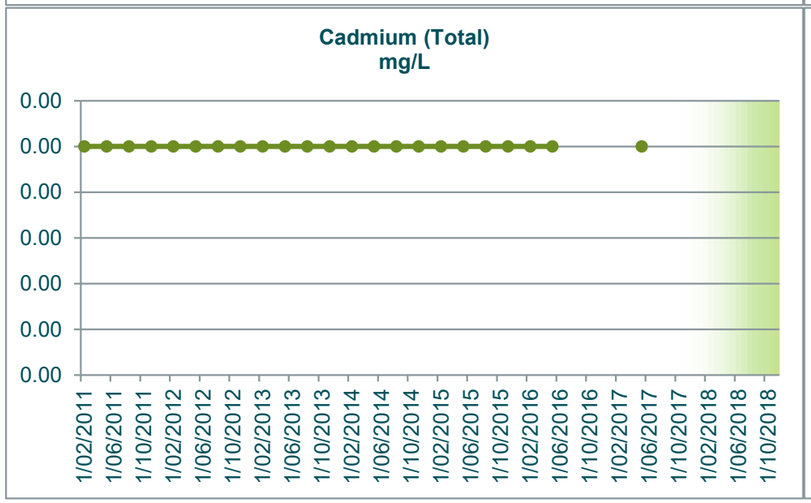

Aluminium (Total)
mg/L
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

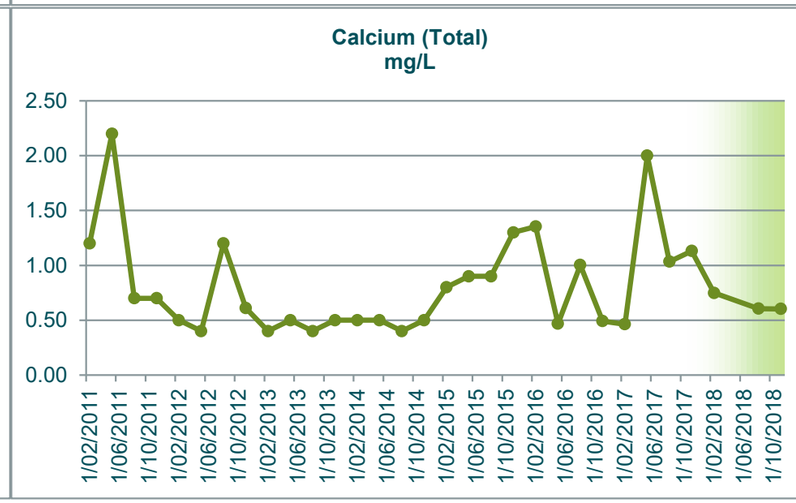

Ammonia
mg/L
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

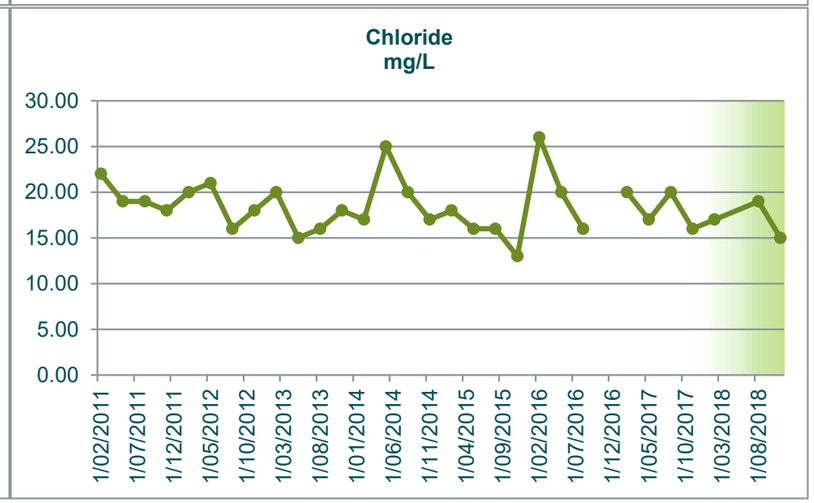

Arsenic (Total)
mg/L
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

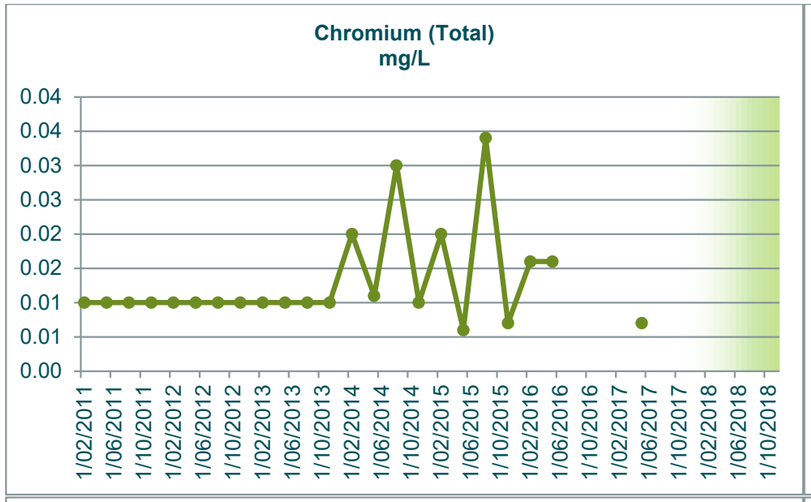

Bicarbonate HCO3
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

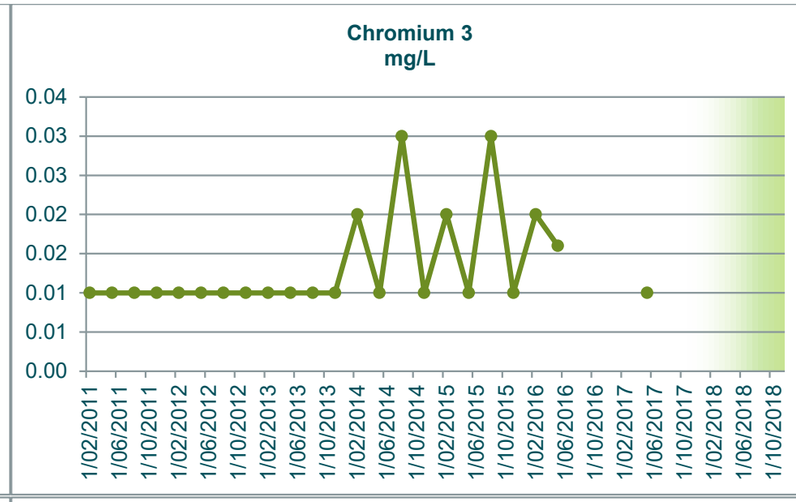

BOD5
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

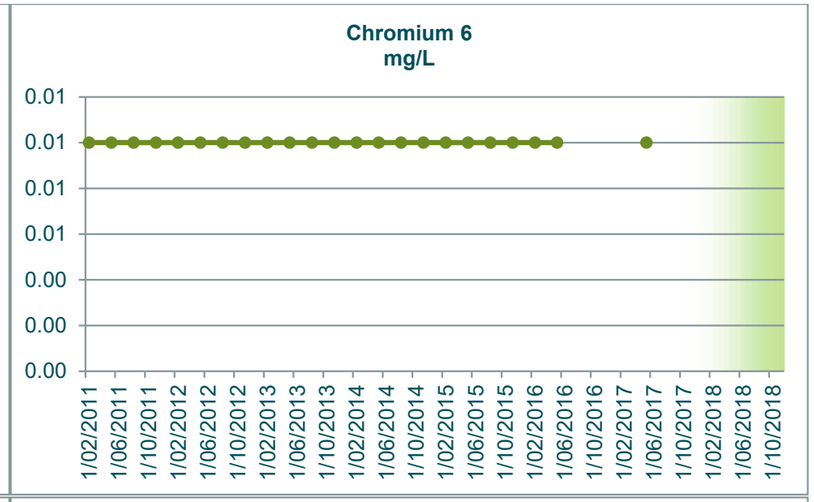

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

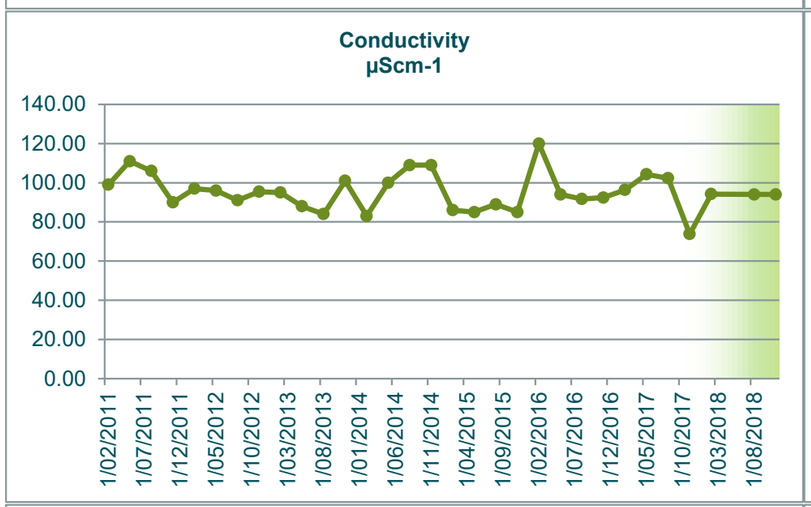

Calcium (Total)
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

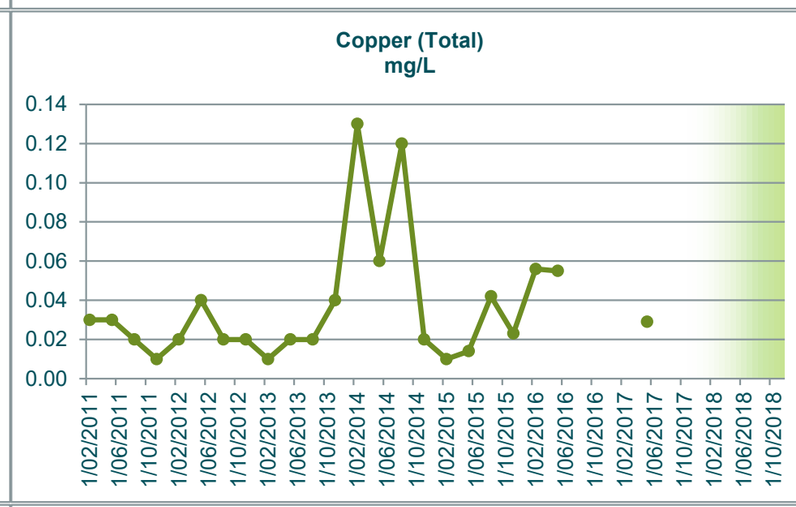

Chloride
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

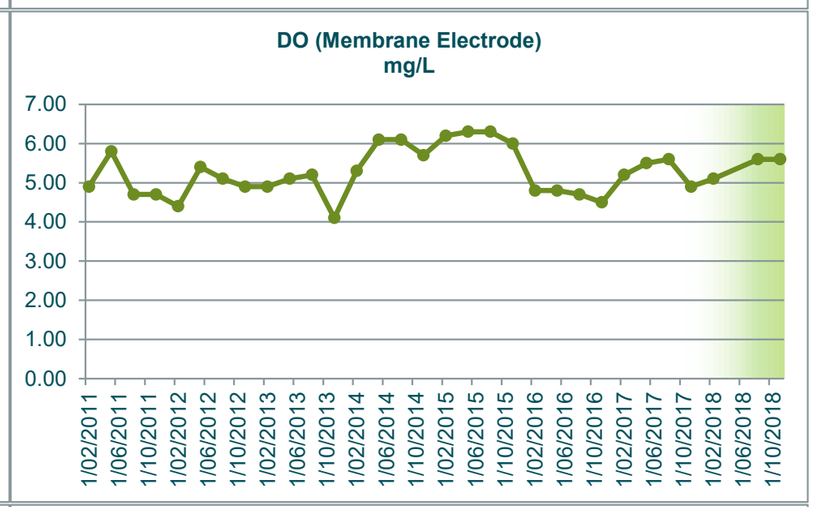

Chromium (Total)
mg/L
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

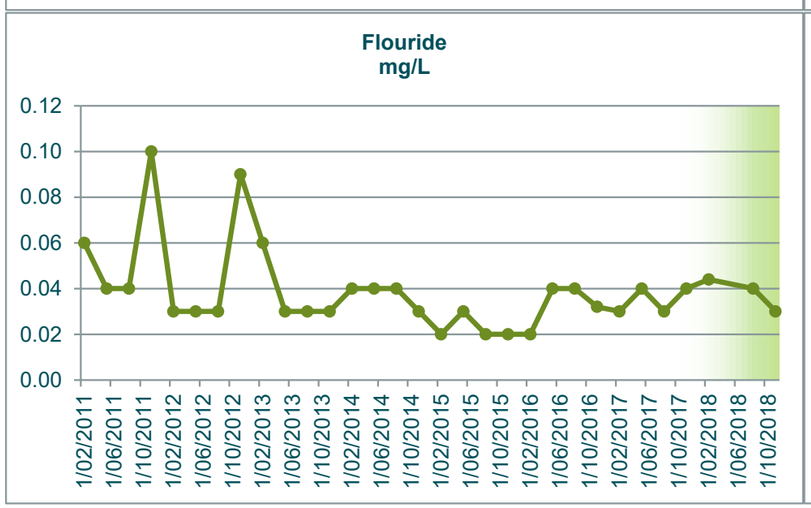

Chromium 3
mg/L
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

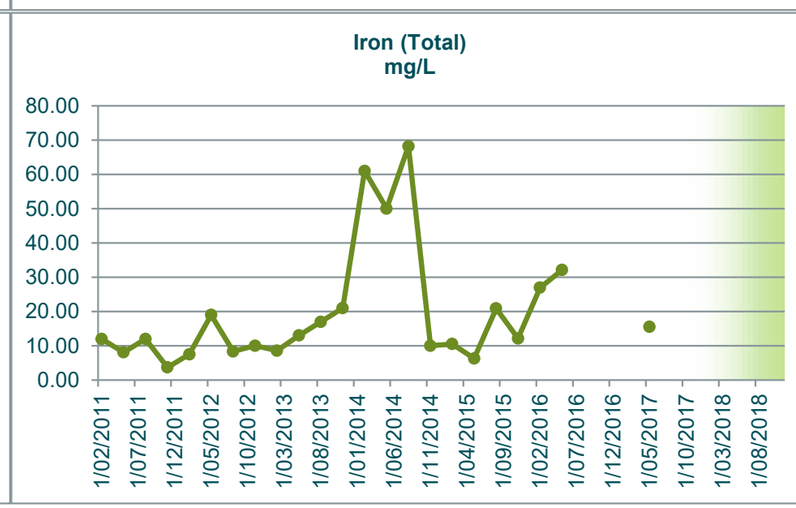

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

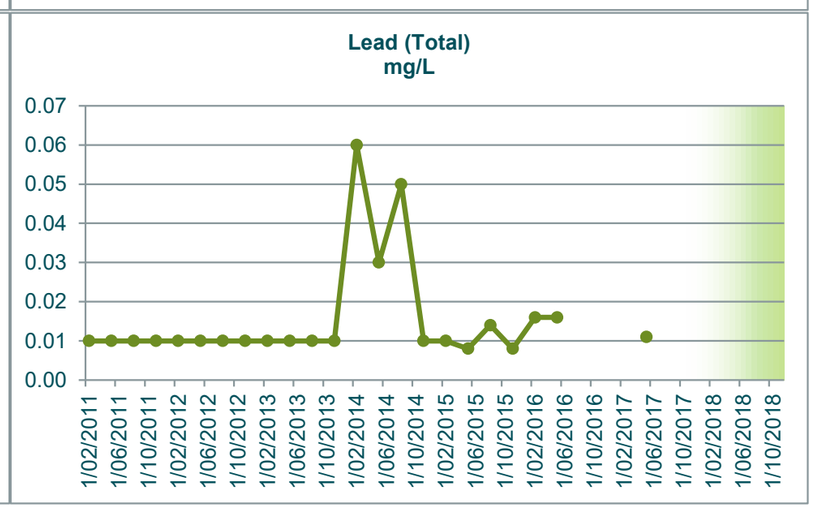

Conductivity
µScm-1
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

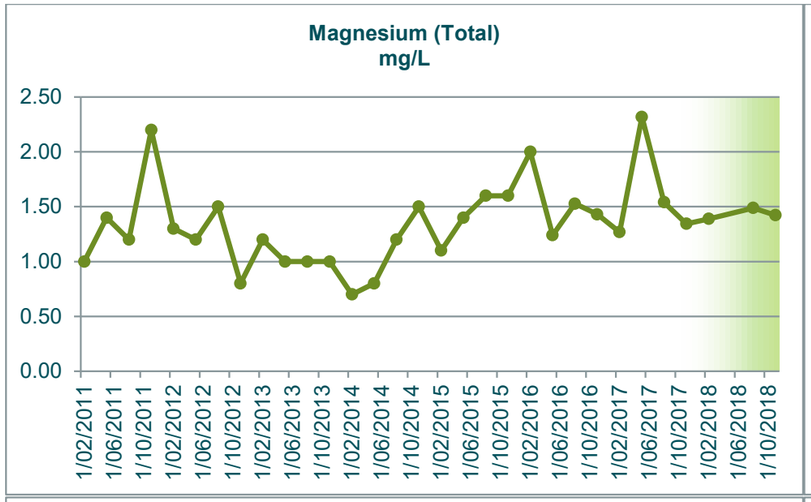

Copper (Total)
mg/L
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

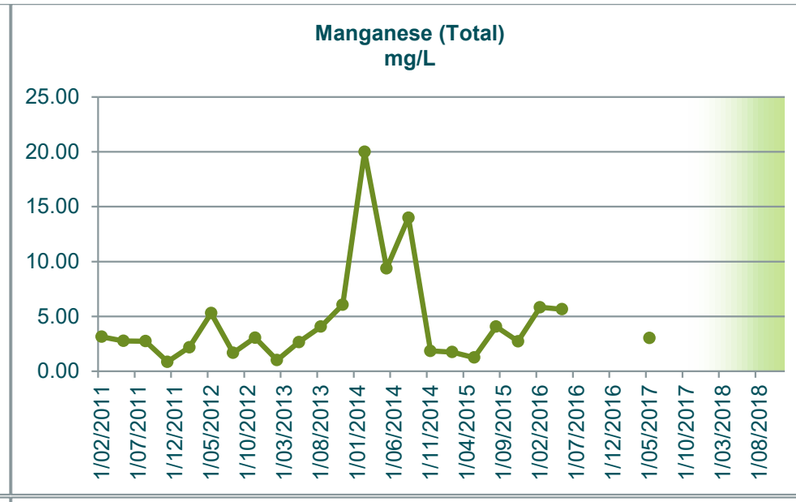

DO (Membrane Electrode)
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

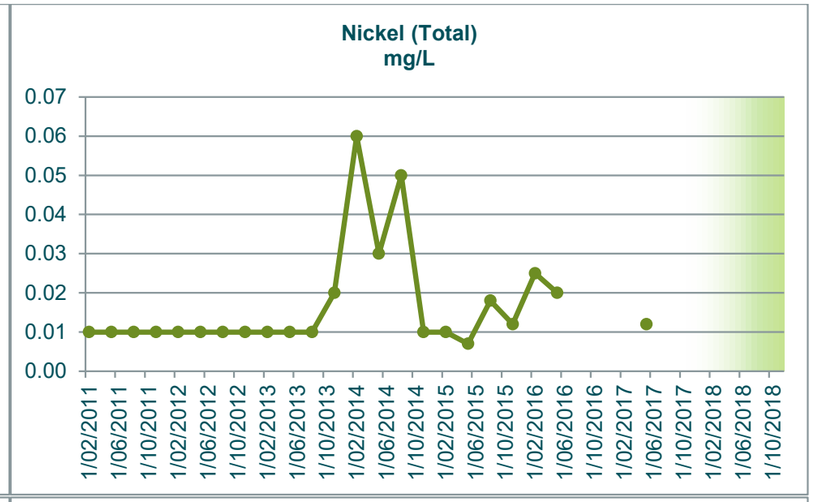

Flouride
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

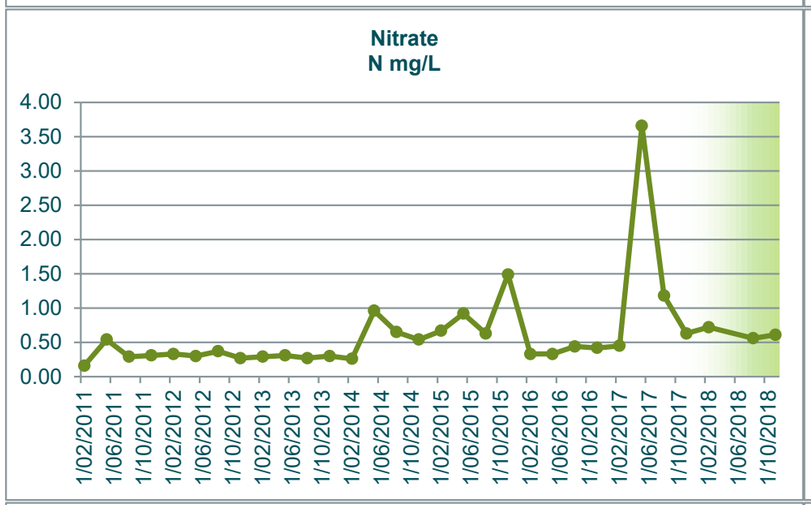

Iron (Total)
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

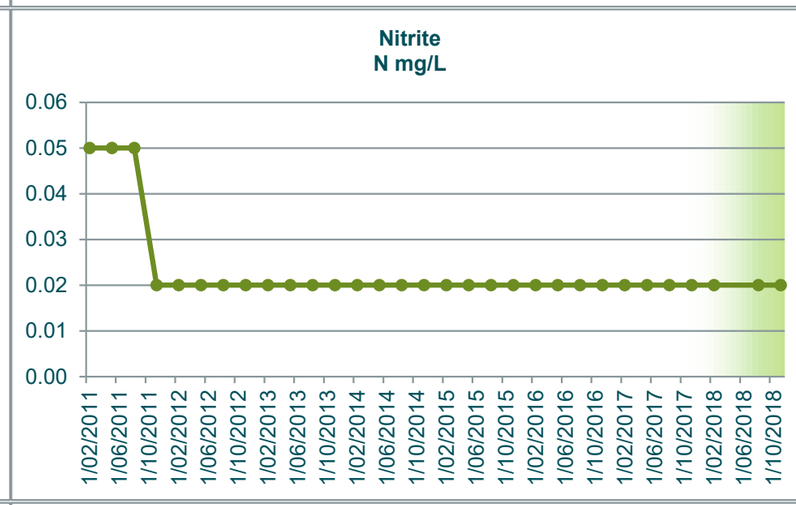

Lead (Total)
mg/L
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

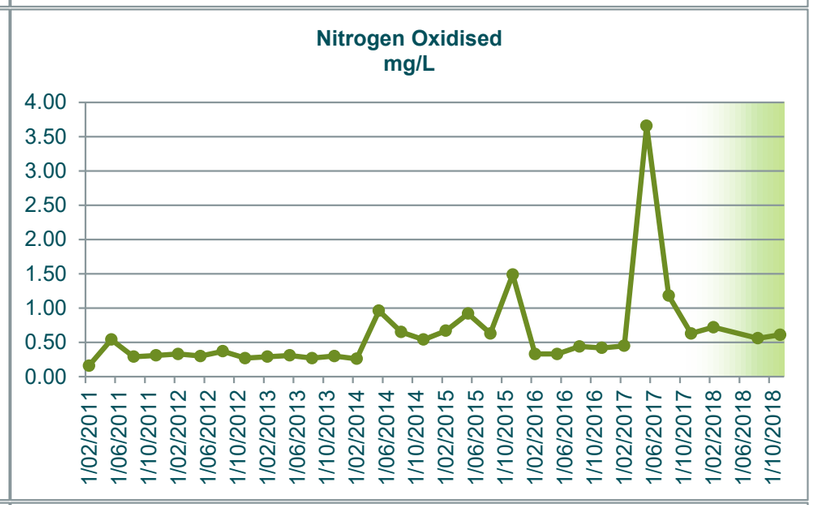

Magnesium (Total)
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

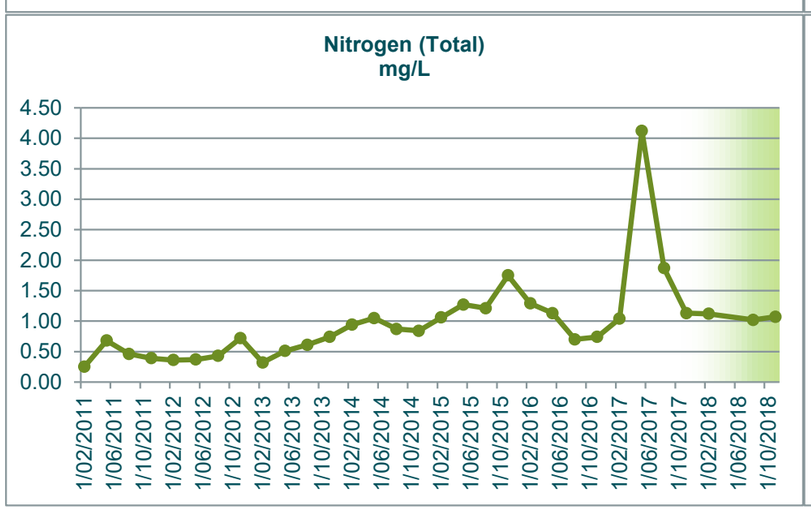

Manganese (Total)
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

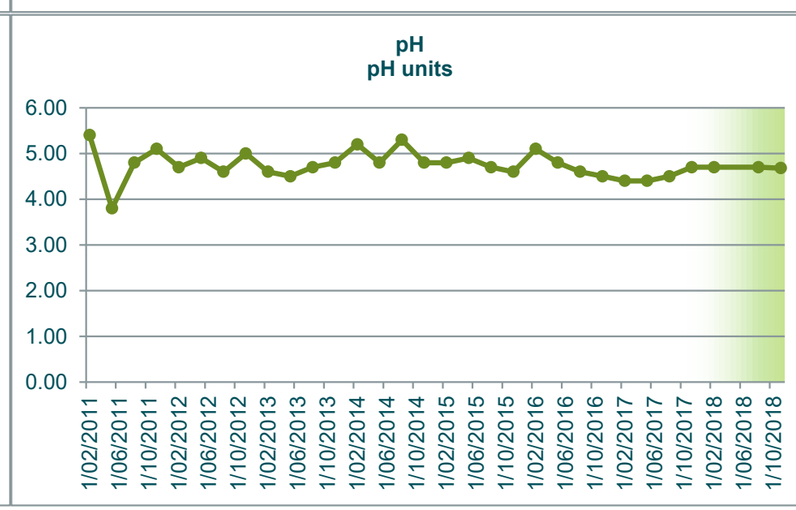

Nickel (Total)
mg/L
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

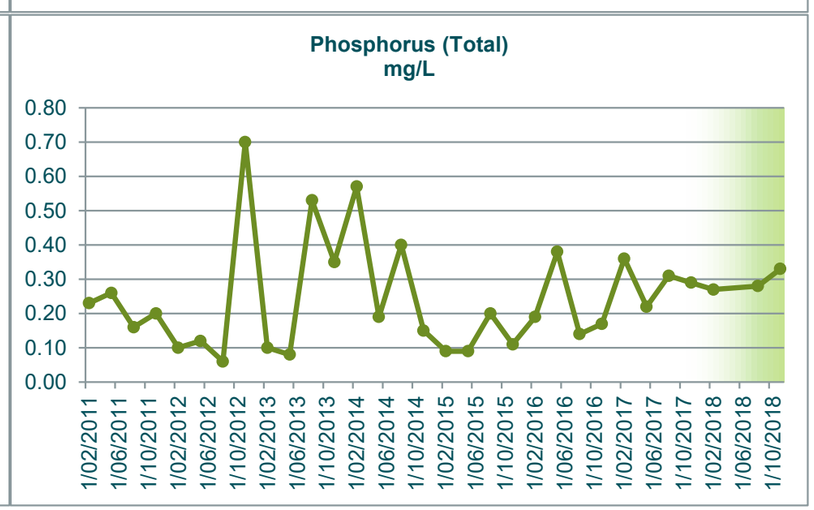

Nitrate
N mg/L
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

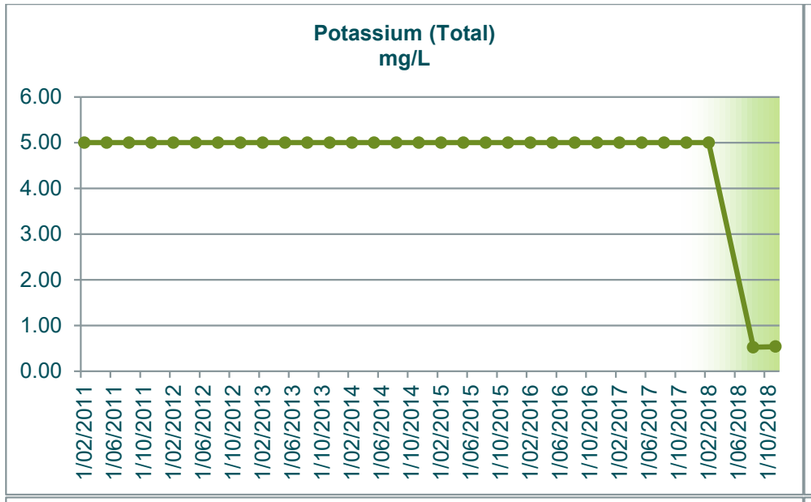

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

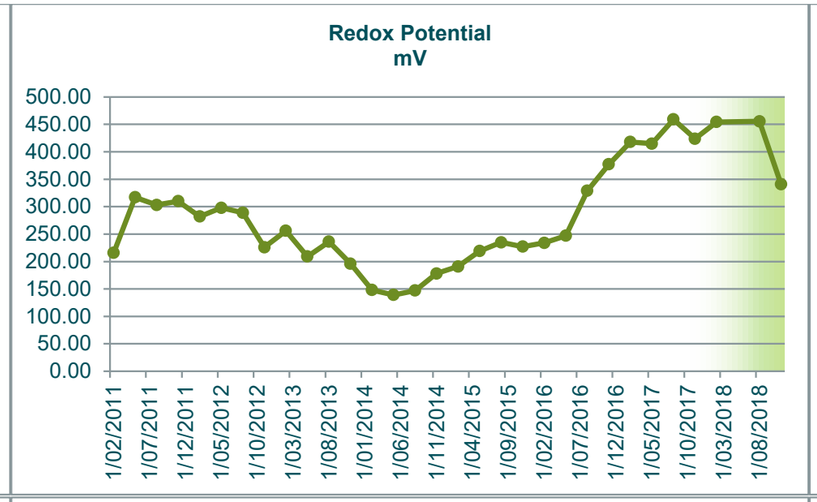

Nitrogen Oxidised
mg/L
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

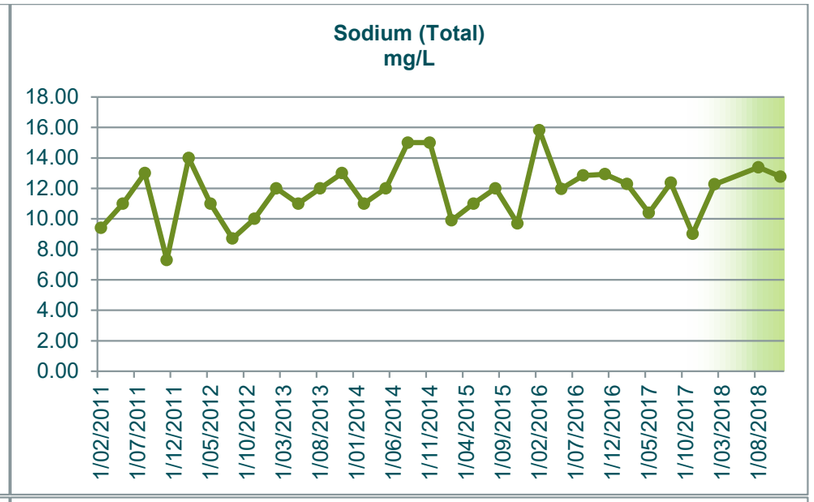

Nitrogen (Total)
mg/L
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

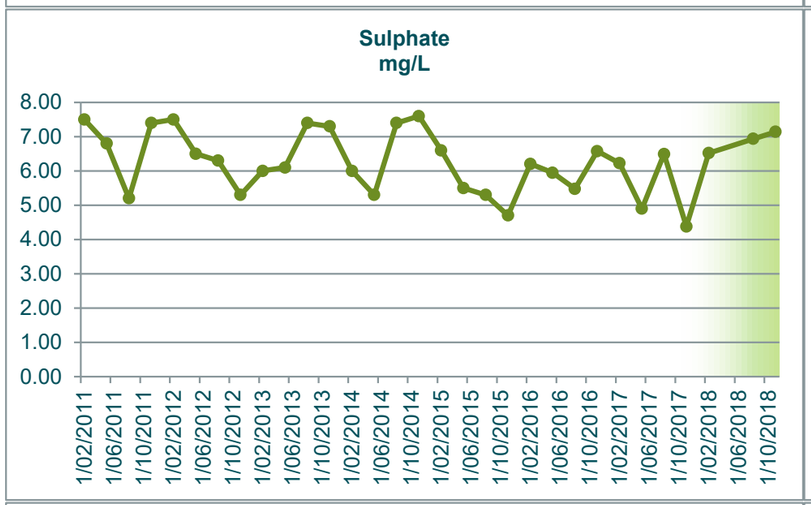

pH
pH units
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

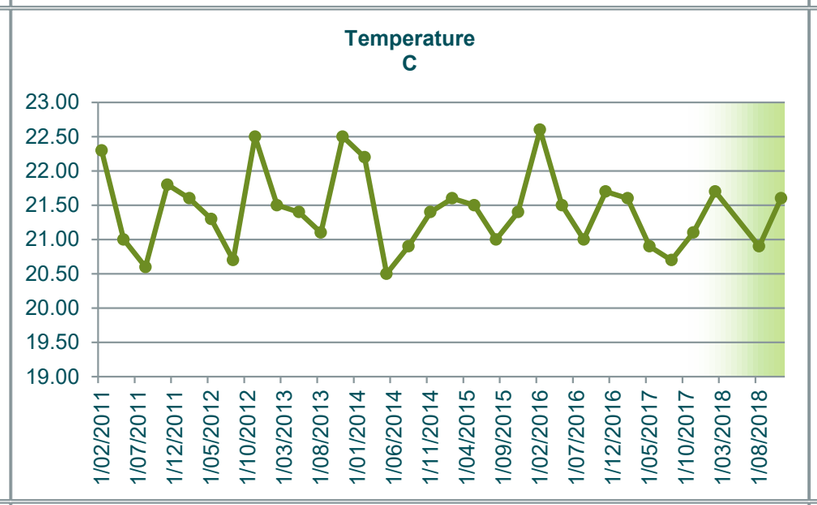

Phosphorus (Total)
mg/L
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

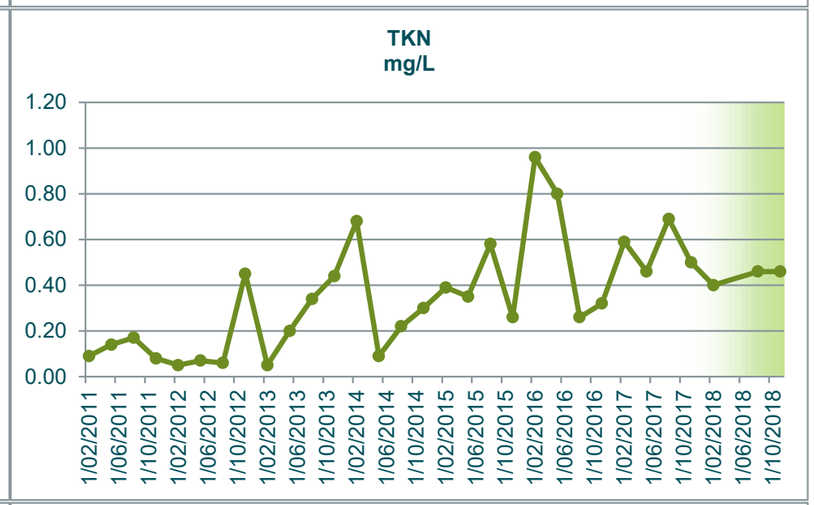

Potassium (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

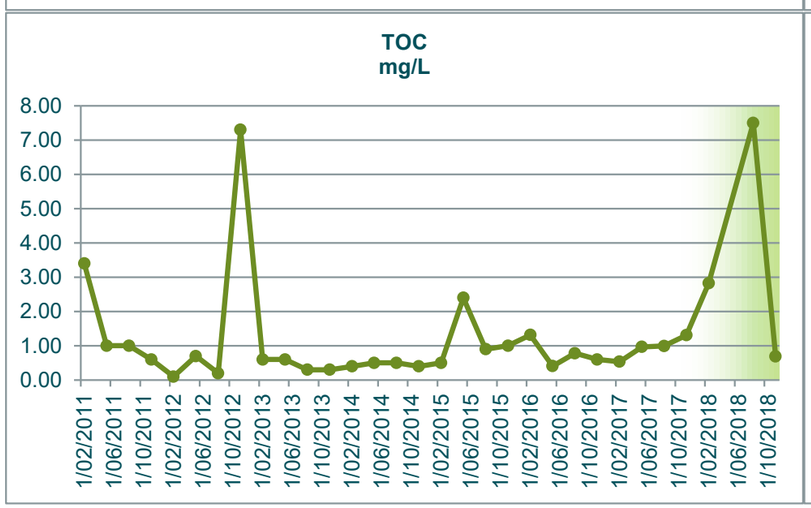

Redox Potential
mV
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

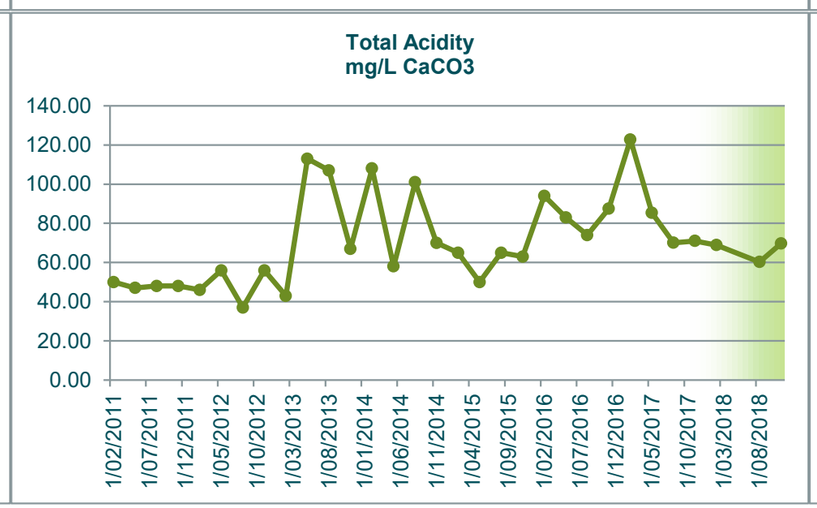

Sodium (Total)
mg/L
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

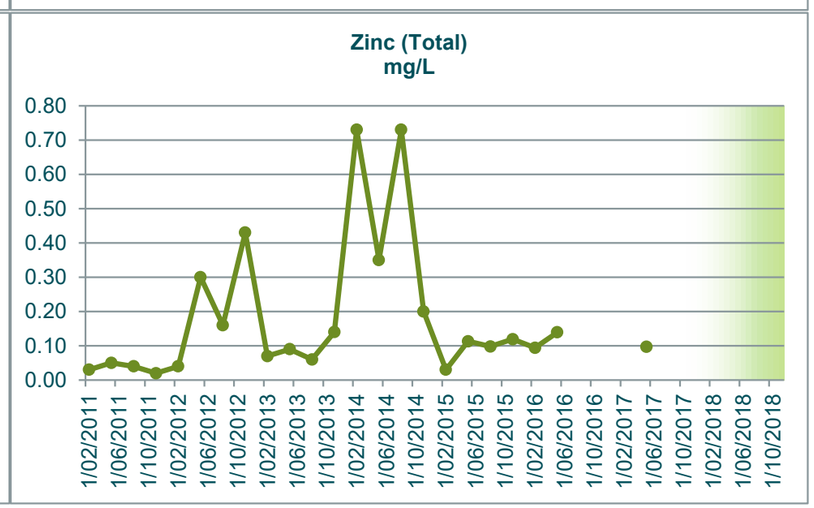

Sulphate
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Temperature
C
23.00
22.50
22.00
21.50
21.00
20.50
20.00
19.50
19.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

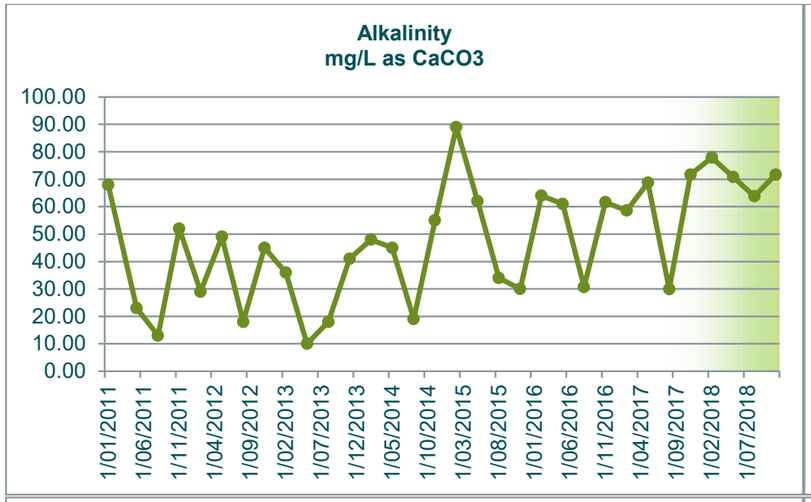

TKN
mg/L
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

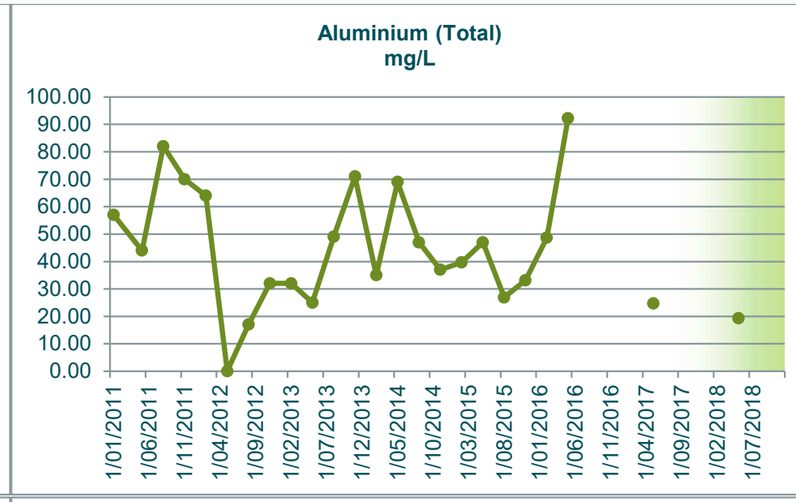

TOC
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

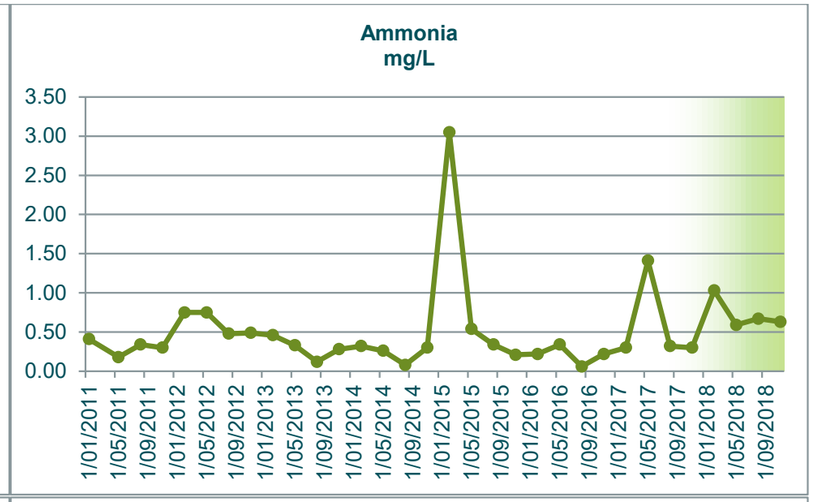

Total Acidity
mg/L CaCO3
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

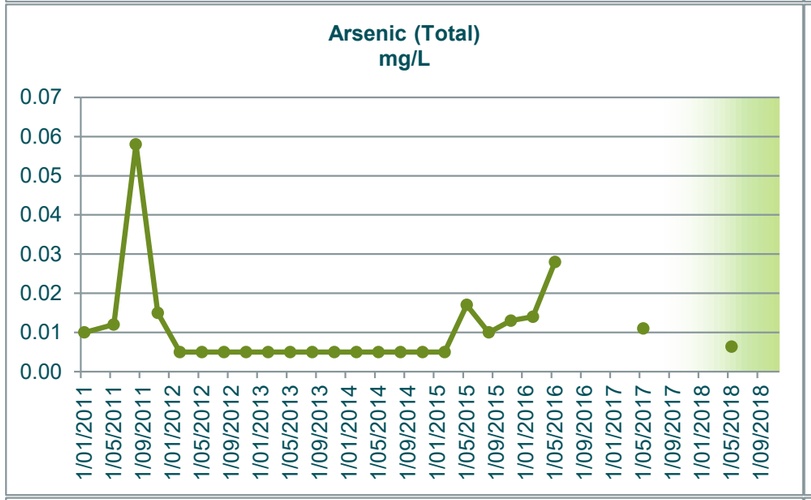

Zinc (Total)
mg/L
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

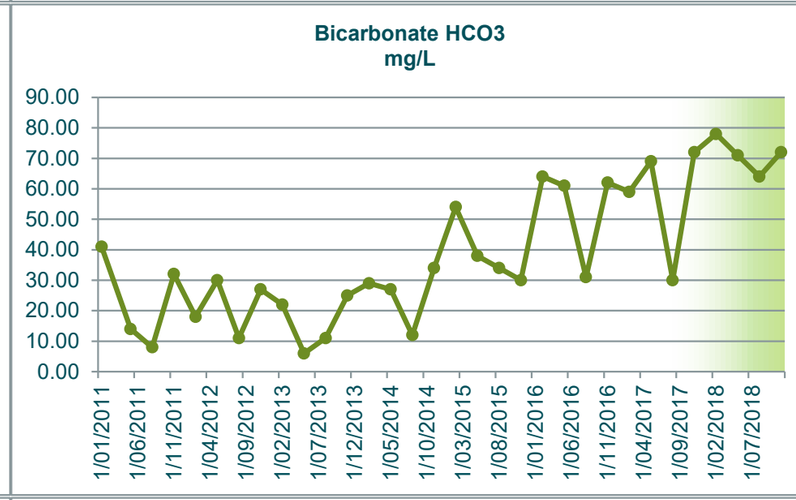
GW6	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	68.00	57.00	0.41	0.01	41.00	14.00	0.00	19.00	500.00	0.06	0.06	0.01	546.00	0.07	1.00	0.13	96.00	0.03	20.00	1.91	0.05	0.05	0.05	0.05	1.32	6.00	0.30	5.00	-10.00	29.00	127.00	23.00	1.32	6.80	120.00	0.67
10/05/2011	23.00	44.00	0.18	0.01	14.00	3.50	0.00	17.00	44.00	0.05	0.05	0.01	399.00	0.08	1.10	0.11	70.00	0.01	10.00	0.95	0.03	0.05	0.05	0.05	1.59	5.10	0.36	5.00	203.00	20.00	84.00	21.00	1.59	2.80	66.00	0.58
9/08/2011	13.00	82.00	0.34	0.06	8.00	10.00	0.00	20.00	88.00	0.08	0.08	0.01	567.00	0.10	1.50	0.09	174.00	0.01	22.00	2.37	0.08	0.09	0.05	0.09	1.59	5.40	0.45	5.00	254.00	33.00	159.00	18.30	1.50	4.70	178.00	0.71
8/11/2011	52.00	70.00	0.30	0.02	32.00	7.80	0.00	20.00	140.00	0.07	0.07	0.01	530.00	0.09	1.30	0.16	157.00	0.01	27.00	1.81	0.05	0.06	0.02	0.06	1.08	6.00	0.52	17.00	36.00	26.00	103.00	20.50	1.02	2.30	110.00	0.50
6/02/2012	29.00	64.00	0.75	0.01	18.00	35.00	0.00	30.00	86.00	0.07	0.07	0.01	532.00	0.07	1.10	0.10	94.00	0.05	18.00	1.64	0.08	0.06	0.02	0.06	2.21	5.40	0.31	5.00	161.00	38.00	126.00	23.20	2.15	6.80	120.00	1.32
8/05/2012	49.00	0.01	0.75	0.01	30.00	14.00	0.00	20.00	70.00	0.01	0.01	0.01	559.00	0.01	3.00	0.20	0.02	0.03	25.00	2.48	0.01	0.23	0.02	0.23	1.55	5.90	0.42	8.00	74.00	39.00	110.00	21.50	1.32	3.60	80.00	0.01
6/08/2012	18.00	17.00	0.48	0.01	11.00	6.90	0.00	17.00	84.00	0.02	0.02	0.01	578.00	0.02	2.00	0.13	52.00	0.01	19.00	1.06	0.02	0.08	0.02	0.08	1.43	5.20	0.39	5.00	102.00	29.00	85.00	18.30	1.35	3.80	35.00	0.28
13/11/2012	45.00	32.00	0.49	0.01	27.00	8.40	0.00	20.00	290.00	0.03	0.03	0.01	630.00	0.04	1.30	0.69	92.00	0.01	22.00	1.38	0.04	0.08	0.02	0.08	1.44	6.00	0.49	5.00	39.00	44.00	88.00	20.90	1.36	3.70	130.00	0.55
13/02/2013	36.00	32.00	0.46	0.01	22.00	5.70	0.00	18.00	92.00	0.03	0.03	0.01	586.00	0.03	1.50	0.15	67.00	0.01	20.00	1.24	0.03	0.06	0.02	0.08	1.44	5.80	0.10	5.00	-21.00	45.00	77.00	23.40	1.36	2.50	94.00	0.43
14/05/2013	10.00	25.00	0.33	0.01	6.00	3.90	0.00	21.00	91.00	0.02	0.02	0.01	521.00	0.02	2.40	0.11	34.00	0.02	17.00	0.94	0.02	0.13	0.02	0.13	1.39	5.70	0.39	5.00	45.00	44.00	72.00	20.60	1.26	2.60	215.00	0.31
6/08/2013	18.00	49.00	0.12	0.01	11.00	3.00	0.00	18.00	91.00	0.04	0.04	0.01	573.00	0.02	2.00	0.13	235.00	0.02	20.00	1.41	0.04	0.09	0.02	0.09	1.05	5.60	0.38	5.00	106.00	45.00	84.00	19.10	0.96	2.20	143.00	0.44
12/11/2013	41.00	71.00	0.28	0.01	25.00	4.50	0.00	17.00	102.00	0.05	0.05	0.01	565.00	0.03	4.60	0.16	84.00	0.02	21.00	1.41	0.04	0.17	0.02	0.17	1.31	5.80	0.79	5.00	-2.00	49.00	64.00	20.70	1.14	1.50	59.00	0.27
11/02/2014	48.00	35.00	0.32	0.01	29.00	2.70	0.00	16.00	101.00	0.03	0.03	0.01	548.00	0.02	2.60	0.21	49.00	0.02	21.00	1.14	0.02	0.13	0.02	0.13	1.04	6.10	0.17	5.00	-10.00	46.00	52.00	21.70	0.91	1.60	213.00	0.20
13/05/2014	45.00	69.00	0.26	0.01	27.00	2.70	0.00	15.00	107.00	0.03	0.03	0.01	567.00	0.02	3.00	0.16	84.00	0.02	19.00	0.99	0.02	0.09	0.02	0.11	0.93	6.00	0.29	5.00	35.00	49.00	44.00	21.50	0.82	1.50	74.00	0.22
12/08/2014	19.00	47.00	0.08	0.01	12.00	1.20	0.00	16.00	106.00	0.04	0.04	0.01	522.00	0.02	3.20	0.12	129.00	0.02	20.00	1.32	0.03	0.07	0.02	0.07	1.15	5.90	0.54	5.00	77.00	48.00	58.00	18.50	1.08	0.80	150.00	0.27
10/11/2014	55.00	37.00	0.30	0.01	34.00	6.30	0.00	15.00	115.00	0.03	0.03	0.01	544.00	0.02	3.20	0.21	59.00	0.03	20.00	1.03	0.02	0.16	0.02	0.18	1.36	6.20	0.40	5.00	10.00	49.00	41.00	20.70	1.18	1.50	190.00	0.24
9/02/2015	89.00	39.70	3.05	0.01	54.00	15.00	0.00	19.00	120.00	0.03	0.03	0.01	643.00	0.02	2.00	0.21	63.50	0.01	22.00	1.18	0.02	0.04	0.02	0.06	6.57	6.30	0.72	7.00	-25.00	55.00	38.00	24.30	6.51	6.80	134.00	1.31
11/05/2015	62.00	47.00	0.54	0.02	38.00	17.00	0.00	18.00	105.00	0.04	0.04	0.01	532.00	0.04	2.30	0.17	58.80	0.03	20.00	1.09	0.04	0.02	0.03	0.03	1.93	6.20	0.65	6.00	11.00	53.00	35.00	21.10	1.90	1.90	97.00	2.94
11/08/2015	34.00	26.90	0.34	0.01	34.00	5.40	0.00	17.00	100.00	0.03	0.03	0.01	533.00	0.02	2.70	0.14	68.00	0.01	20.00	1.04	0.03	0.02	0.02	0.04	1.42	6.00	0.67	5.50	87.00	48.00	46.00	18.60	1.38	1.50	114.00	0.98
10/11/2015	30.00	33.18	0.21	0.01	30.00	6.00	0.00	31.00	34.00	0.03	0.03	0.01	753.00	0.02	1.90	0.18	93.77	0.02	24.00	1.37	0.04	0.03	0.02	0.03	1.25	5.70	0.56	5.00	2.00	61.00	93.00	20.50	1.22	2.20	106.00	0.95
8/02/2016	64.00	48.66	0.22	0.01	64.00	6.00	0.00	16.96	111.00	0.05	0.05	0.01	564.00	0.04	2.60	0.14	75.19	0.03	20.35	1.23	0.06	0.02	0.02	0.03	1.41	6.00	0.74	5.79	37.00	49.32	40.14	22.80	1.38	1.76	154.00	1.31
9/05/2016	61.00	92.25	0.34	0.03	61.00	9.60	0.00	16.29	112.00	0.09	0.09	0.01	571.00	0.07	2.40	0.17	104.30	0.05	19.74	1.64	0.11	0.07	0.02	0.07	1.62	6.10	0.84	7.24	31.00	49.19	32.91	22.00	1.55	3.98	120.00	3.27
9/08/2016	30.70		0.06		31.00	3.30		19.67	120.00				609.20		2.60	0.19			21.34			0.03	0.02	0.03	0.67	5.50	0.53	5.26	118.00	56.13	60.27	18.70	0.64	1.08	151.60	
7/11/2016	61.60		0.22		62.00	3.00		14.57	125.00				549.70		2.60	0.15			18.88			0.02	0.02	0.02	1.00	6.00	0.89	5.42	155.00	49.30	29.02	20.60	1.00	0.95	133.40	
7/02/2017	58.60		0.30		59.00	3.60		13.86	85.00				556.80		3.00	0.15			17.97			0.02	0.02	0.02	1.14	6.00	0.30	5.36	101.00	46.69	21.33	23.40	1.12	1.72	128.10	
8/05/2017	68.70	24.70	1.41	0.01	69.00	16.50	0.00	21.30	141.00	0.02	0.02	0.01	693.90	0.02	1.90	0.20	39.47	0.01	23.08	1.10	0.03	0.06	0.02	0.08	2.47	5.90	0.35	5.92	71.00	59.49	52.95	21.40	2.39	3.19	117.80	2.22
8/08/2017	29.96		0.32		30.00	4.50		15.86	100.00				586.90		2.60	0.15			18.94			0.04	0.02	0.04	1.31	5.80	0.36	5.00	217.00	51.11	45.30	18.50	1.27	1.56	86.00	
7/11/2017	71.71		0.30		72.00	3.60		18.12	115.00				609.90		2.50	0.16			21.81			0.02	0.02	0.02	1.46	6.00	0.63	6.19	65.70	55.42	37.91	20.30	1.44	1.49	112.70	
13/02/2018	77.89		1.03		78.00	11.10		15.26	115.00				589.80		2.30	0.17			19.55			0.02	0.03	0.03	2.22	6.10	0.42	5.52	-58.70	49.74	25.88	23.70	2.19	4.07	110.30	
8/05/2018	70.84	19.28	0.59	0.01	71.00	11.10	0.00	15.87	122.00	0.02	0.02	0.01	572.80	0.01	2.30	0.20	30.39	0.01	19.26	0.94	0.02	0.15	0.02	0.15	1.96	6.00	0.72	5.74	37.50	48.12	33.99	21.70	1.81	3.23	91.70	0.68
14/08/2018	63.81		0.67		64.00	19.50		15.75	115.00				556.50		2.40	0.23			19.19			0.06	0.02	0.08	2.92	6.00	0.67	5.57	100.10	53.01	26.54	18.50	2.84	26.00	100.30	
13/11/2018	71.71		0.63		72.00	13.20		15.19	117.00				554.00		2.33	0.17			19.13			0.03	0.02	0.05	2.11	6.22	0.66	5.35	3.00	49.17	23.96	20.20	2.06	3.34	90.70	
2018 Min	**63.81**	**19.28**	**0.59**	**0.01**	**64.00**	**11.10**	**0.00**	**15.19**	**115.00**	**0.02**	**0.02**	**0.01**	**554.00**	**0.01**	**2.30**	**0.17**	**30.39**	**0.01**	**19.13**	**0.94**	**0.02**	**0.02**	**0.02**	**0.03**	**1.96**	**6.00**	**0.42**	**5.35**	**-58.70**	**48.12**	**23.96**	**18.50**	**1.81**	**3.23**	**90.70**	**0.68**
2018 Max	**77.89**	**19.28**	**1.03**	**0.01**	**78.00**	**19.50**	**0.00**	**15.87**	**122.00**	**0.02**	**0.02**	**0.01**	**589.80**	**0.01**	**2.40**	**0.23**	**30.39**	**0.01**	**19.55**	**0.94**	**0.02**	**0.15**	**0.03**	**0.15**	**2.92**	**6.22**	**0.72**	**5.74**	**100.10**	**53.01**	**33.99**	**23.70**	**2.84**	**26.00**	**110.30**	**0.68**
2018 Mean	**71.06**	**19.28**	**0.73**	**0.01**	**71.25**	**13.73**	**0.00**	**15.52**	**117.25**	**0.02**	**0.02**	**0.01**	**568.28**	**0.01**	**2.33**	**0.19**	**30.39**	**0.01**	**19.28**	**0.94**	**0.02**	**0.07**	**0.02**	**0.08**	**2.30**	**6.08**	**0.62**	**5.55**	**20.48**	**50.01**	**27.59**	**21.03**	**2.23**	**9.16**	**98.25**	**0.68**
Long-term Average	**47.33**	**44.28**	**0.50**	**0.01**	**38.63**	**8.69**	**0.00**	**18.21**	**120.13**	**0.04**	**0.04**	**0.01**	**570.08**	**0.04**	**2.29**	**0.18**	**83.73**	**0.02**	**20.20**	**1.36**	**0.04**	**0.07**	**0.02**	**0.08**	**1.67**	**5.87**	**0.50**	**5.84**	**64.11**	**45.83**	**63.01**	**20.91**	**1.59**	**3.55**	**119.52**	**0.86**

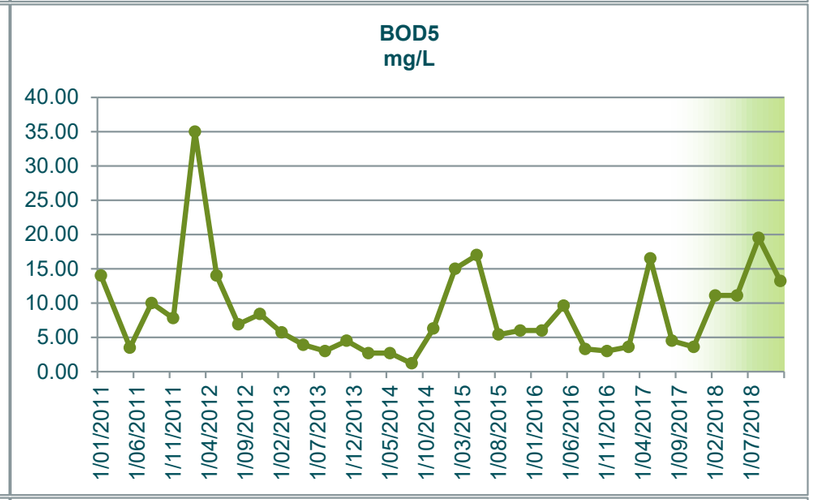

Alkalinity
mg/L as CaCO3
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

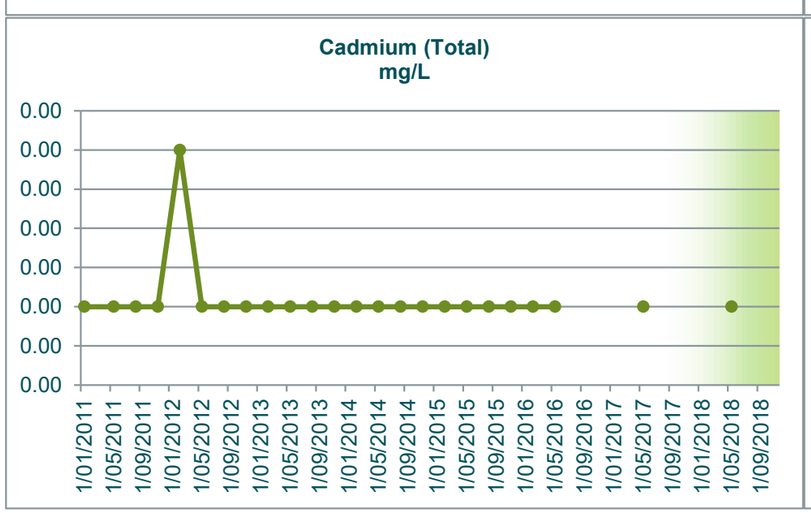

Aluminium (Total)
mg/L
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

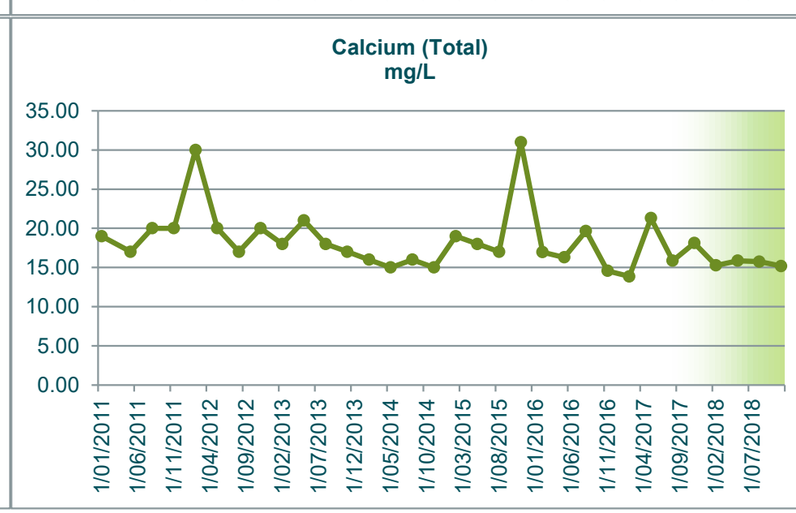

Ammonia
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Arsenic (Total)
mg/L
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Bicarbonate HCO3
mg/L
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


BOD5
mg/L
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Calcium (Total)
mg/L
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
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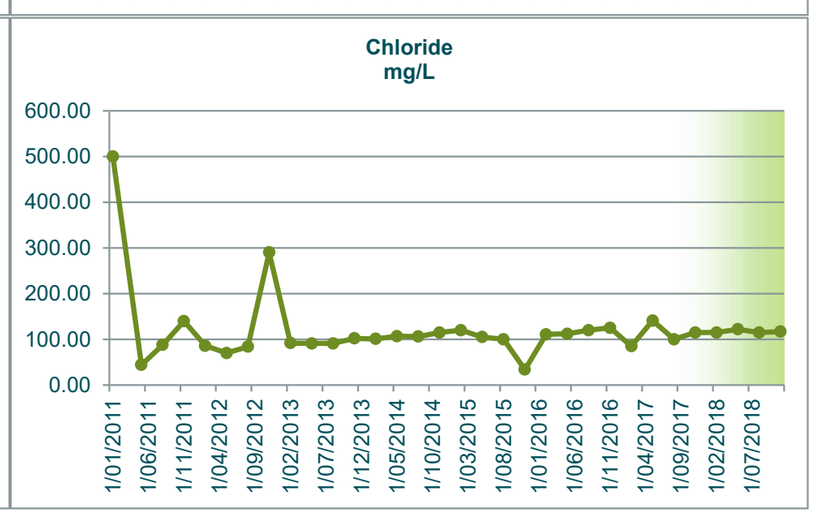
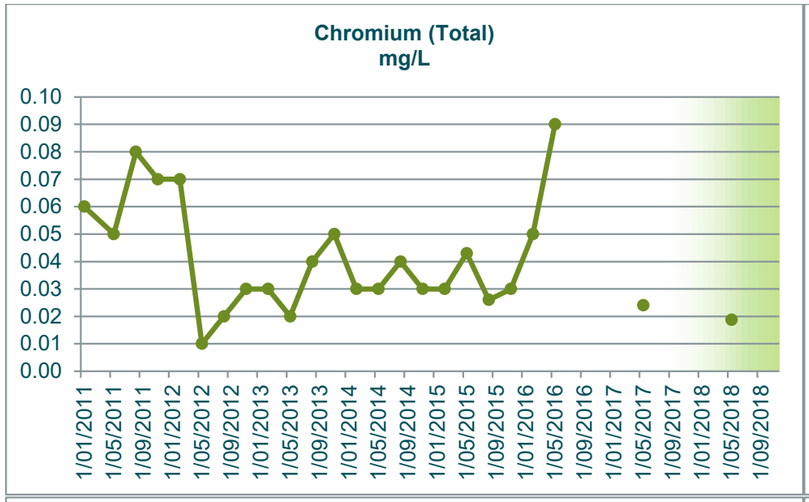
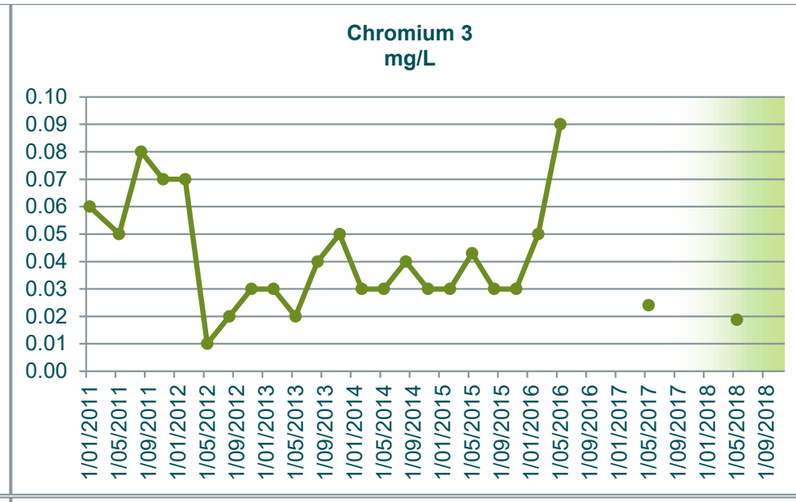
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chloride
mg/L
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chromium (Total)
mg/L
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Chromium 3
mg/L
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
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1/09/2015
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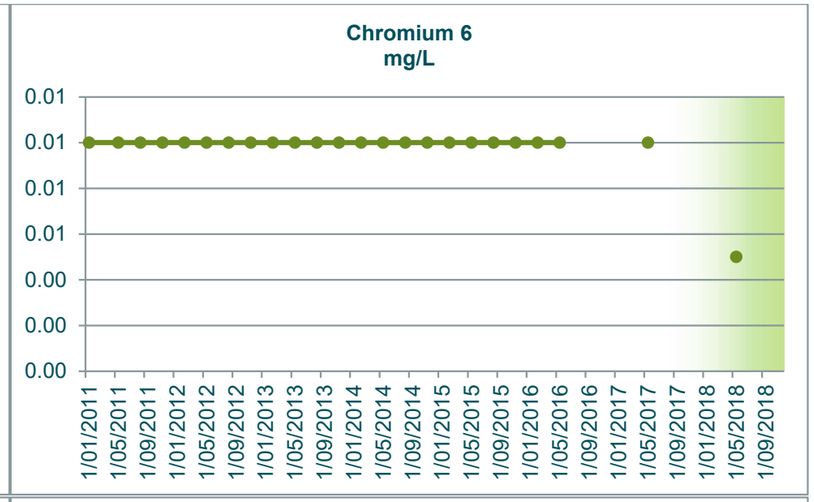
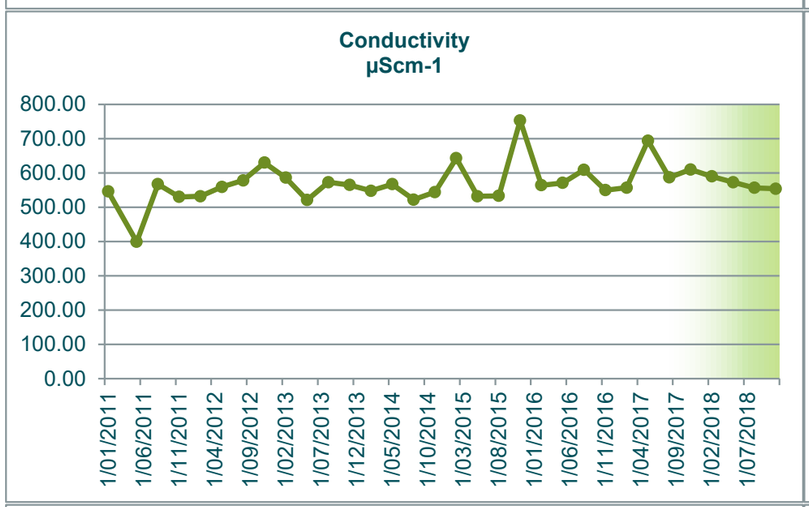
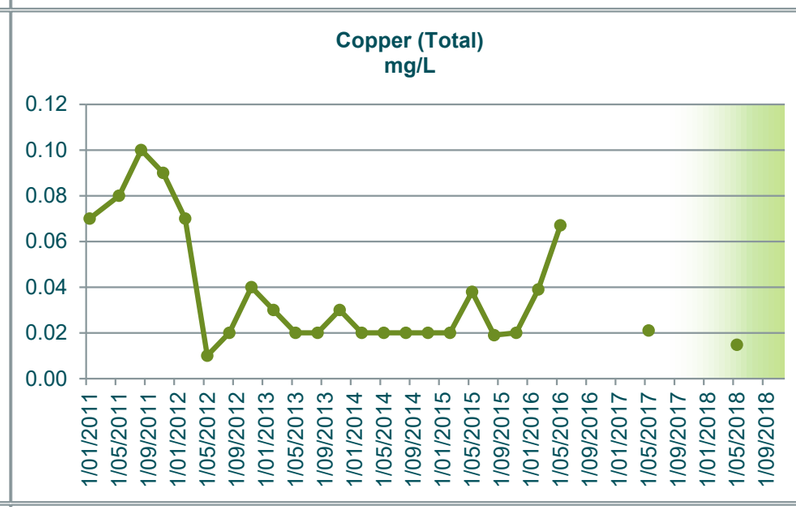
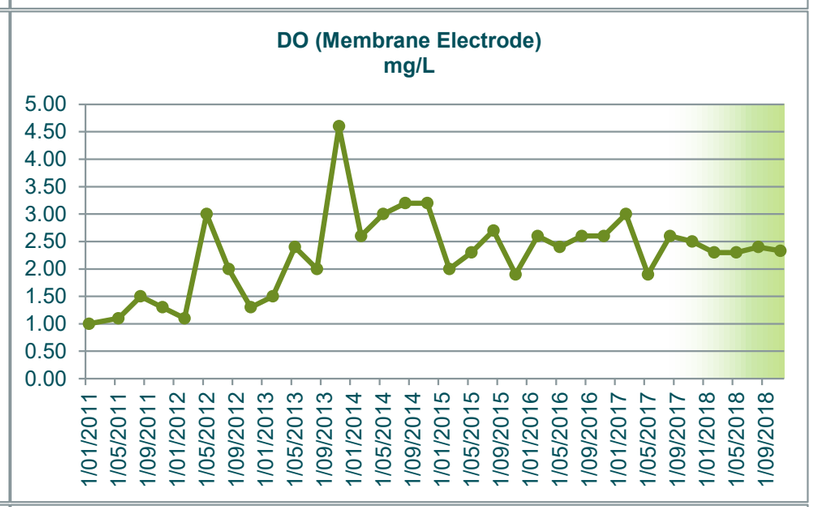
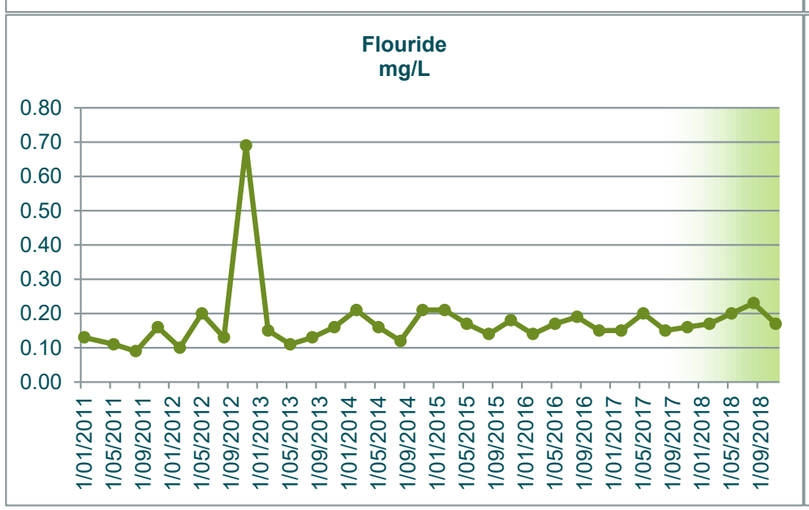
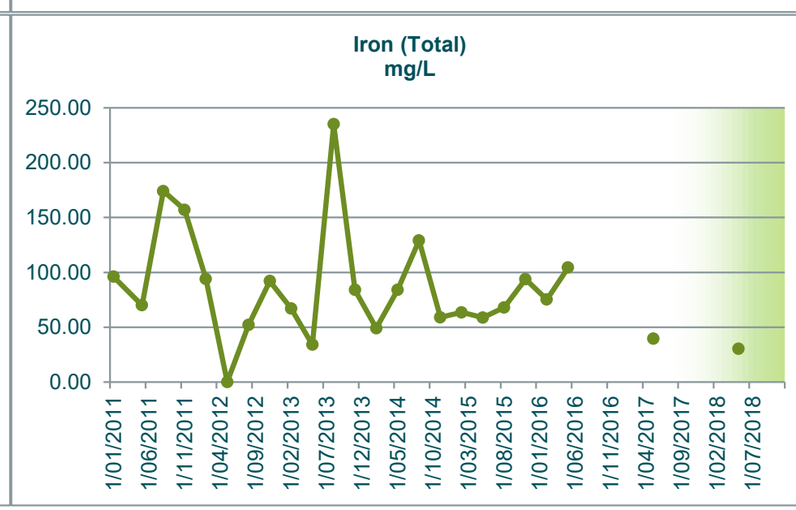

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

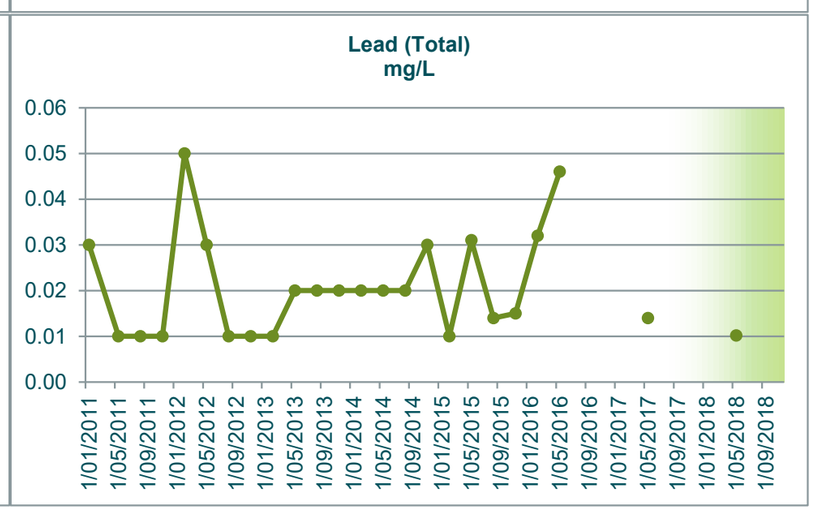

Conductivity
µScm-1
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Copper (Total)
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

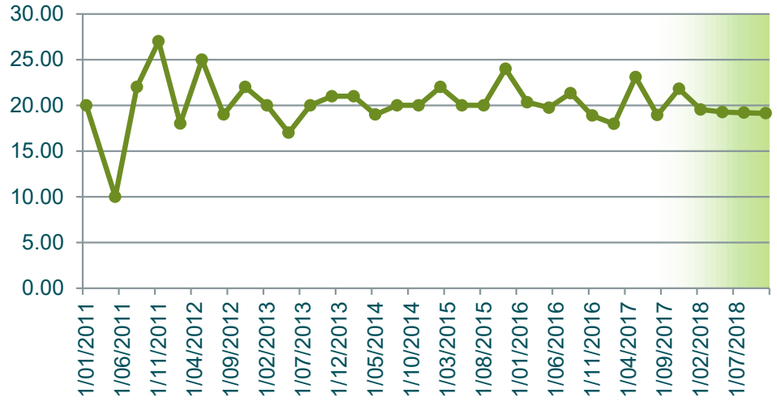

DO (Membrane Electrode)
mg/L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Flouride
mg/L
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

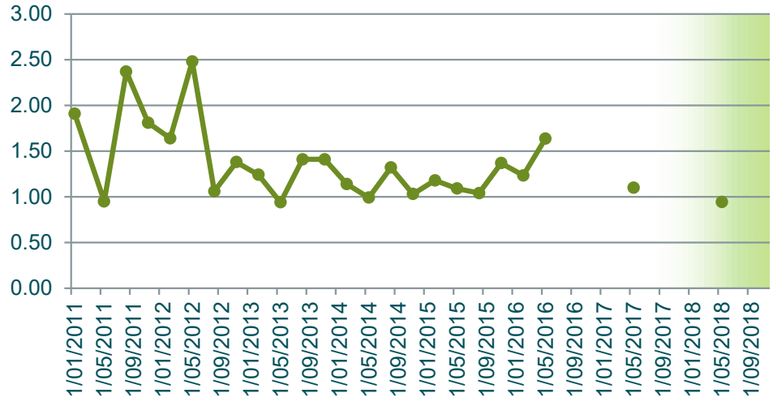

Iron (Total)
mg/L
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Lead (Total)
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

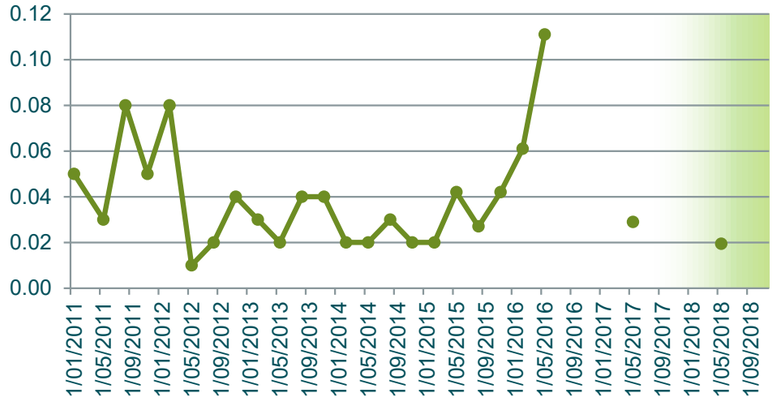
Magnesium (Total)
mg/L



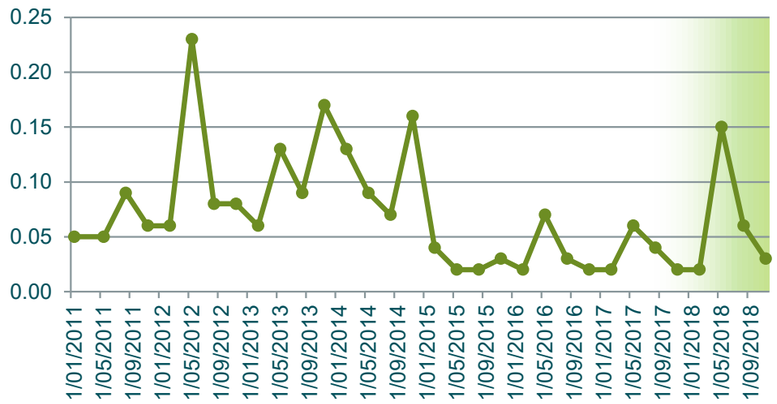
Manganese (Total)
mg/L



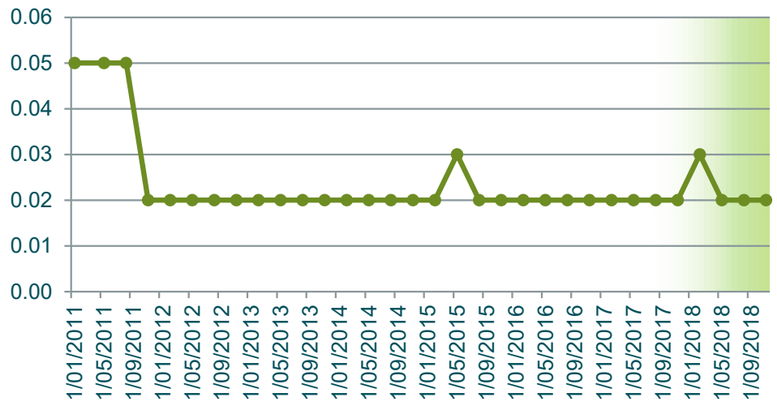
Nickel (Total)
mg/L



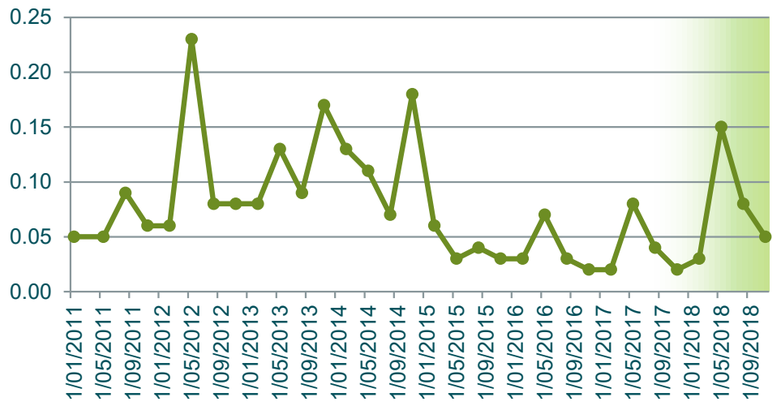
Nitrate
N mg/L



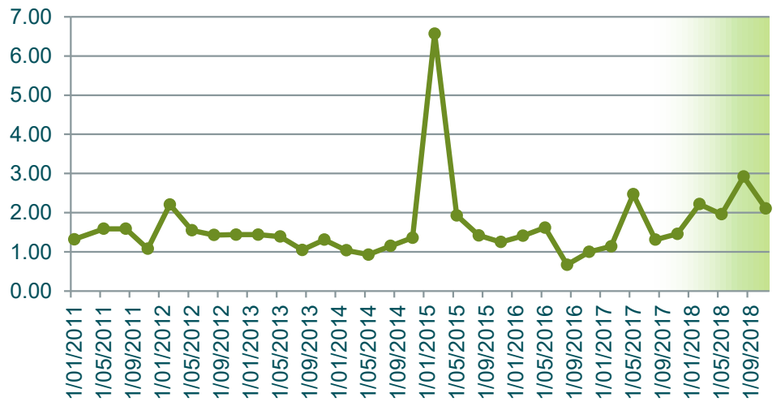
Nitrite
N mg/L



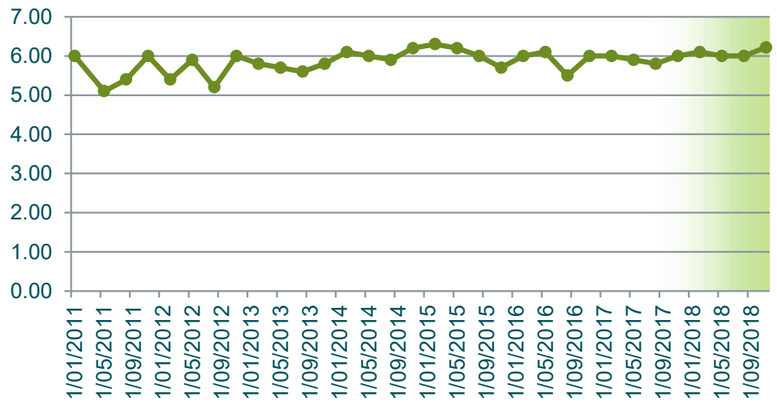
Nitrogen Oxidised
mg/L



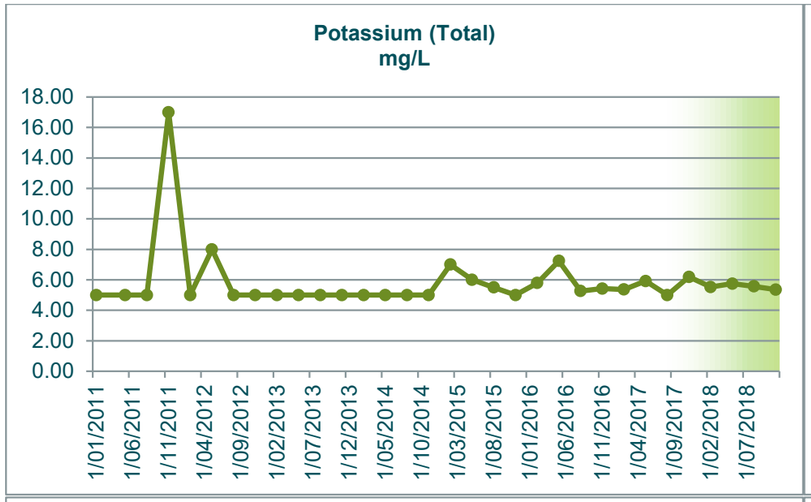
Nitrogen (Total)
mg/L

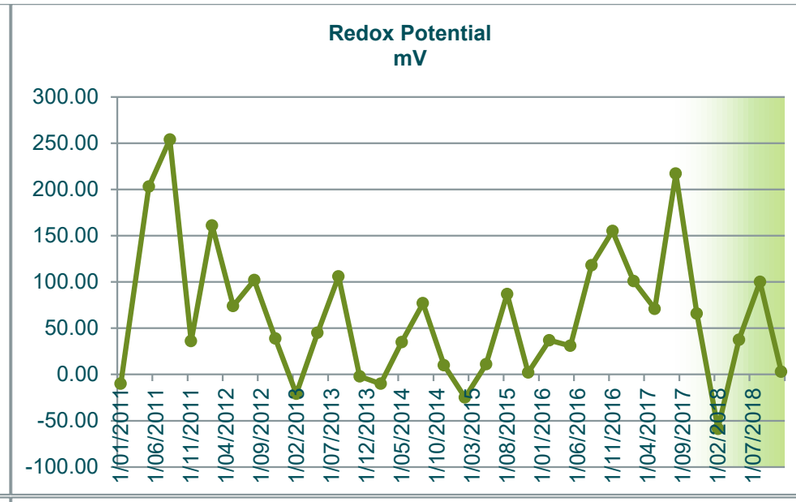


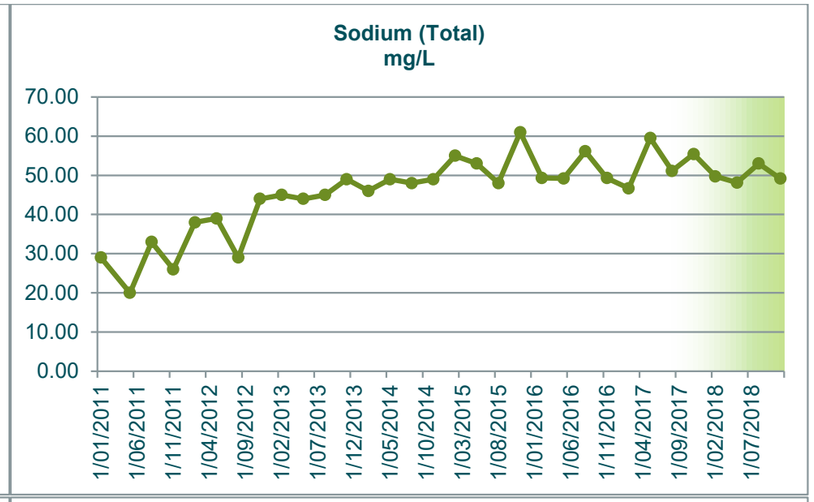
pH
pH units

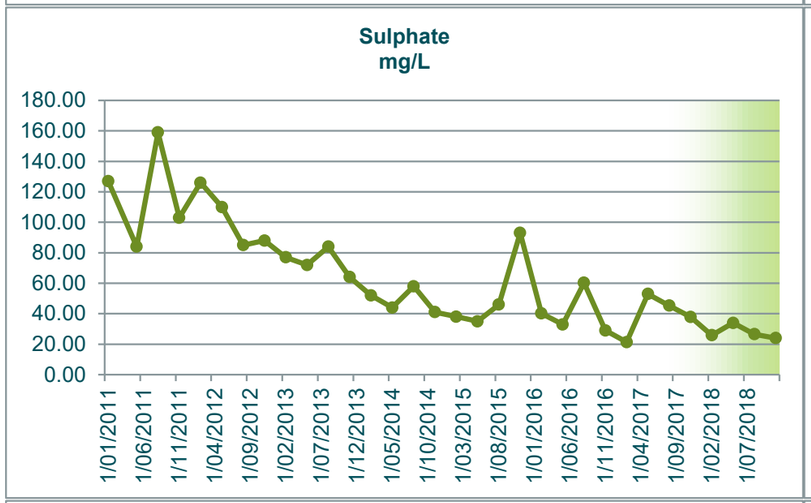


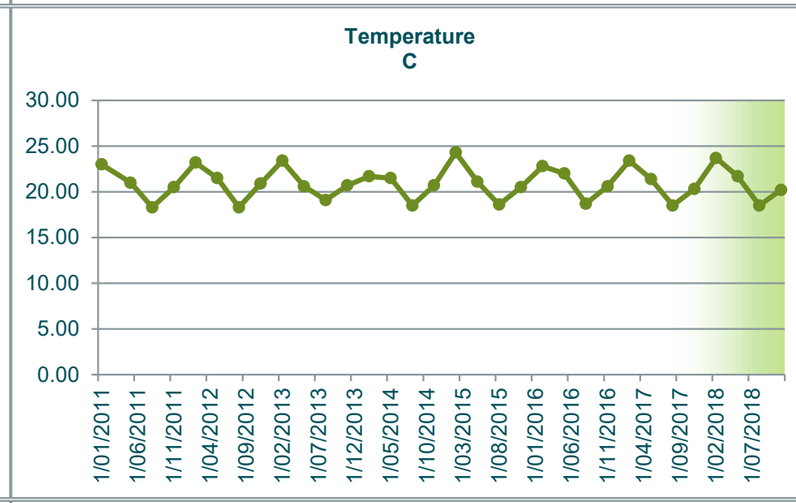
Phosphorus (Total)
mg/L

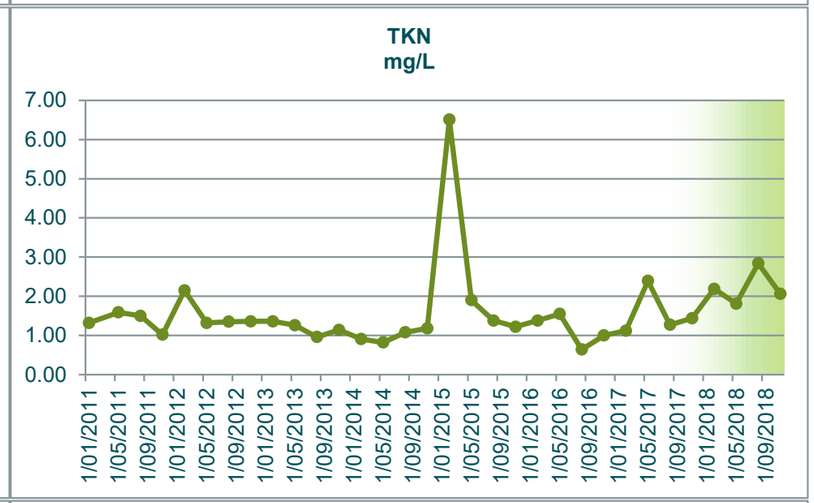

Potassium (Total)
mg/L
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

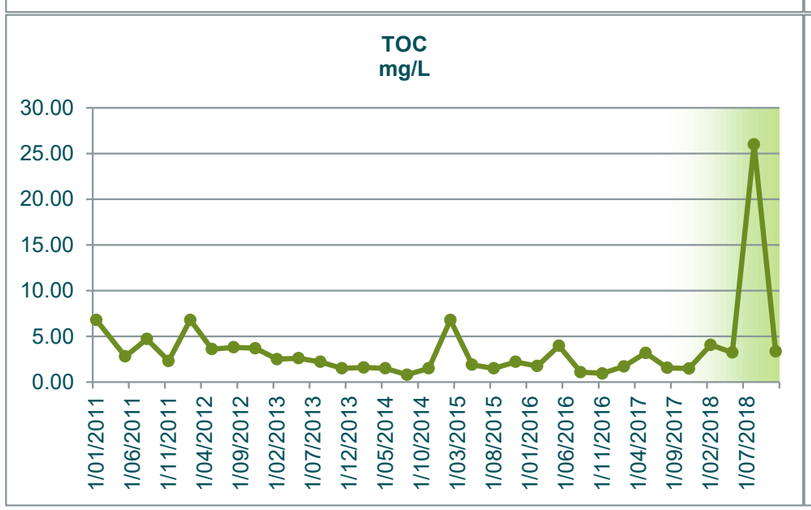

Redox Potential
mV
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

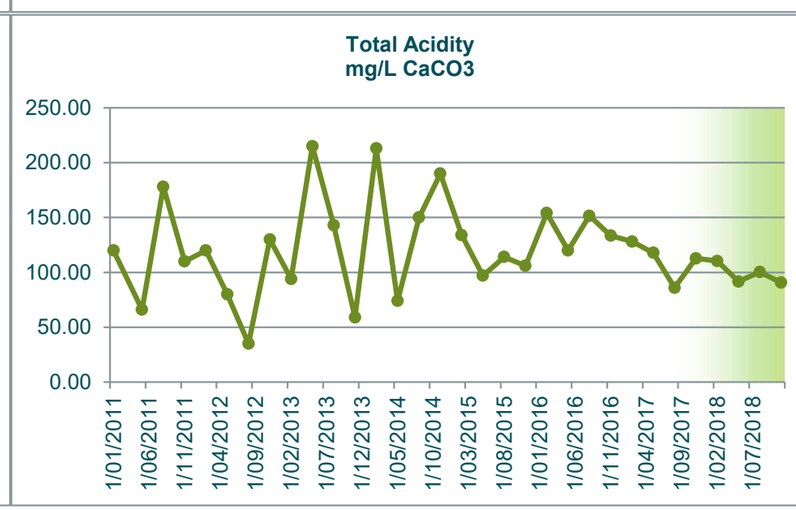

Sodium (Total)
mg/L
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

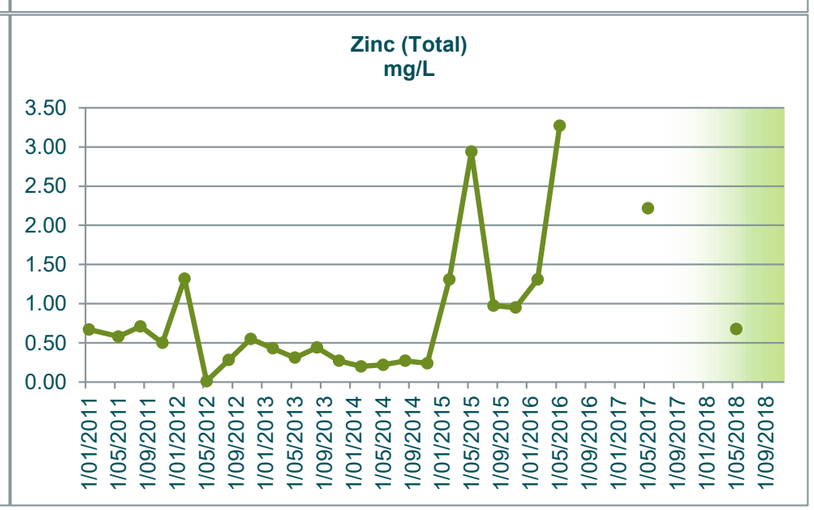

Sulphate
mg/L
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

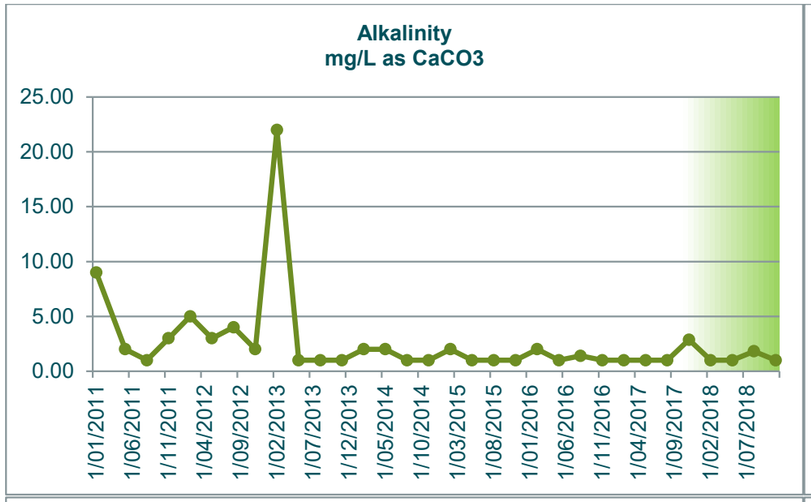

TKN
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

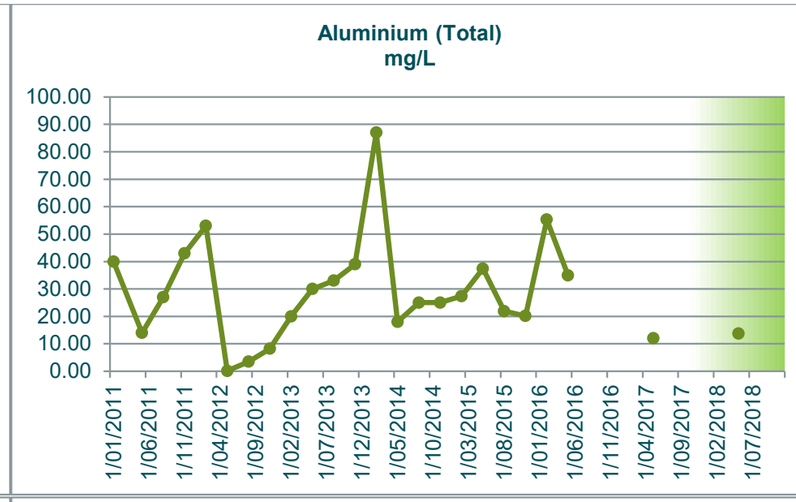

TOC
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

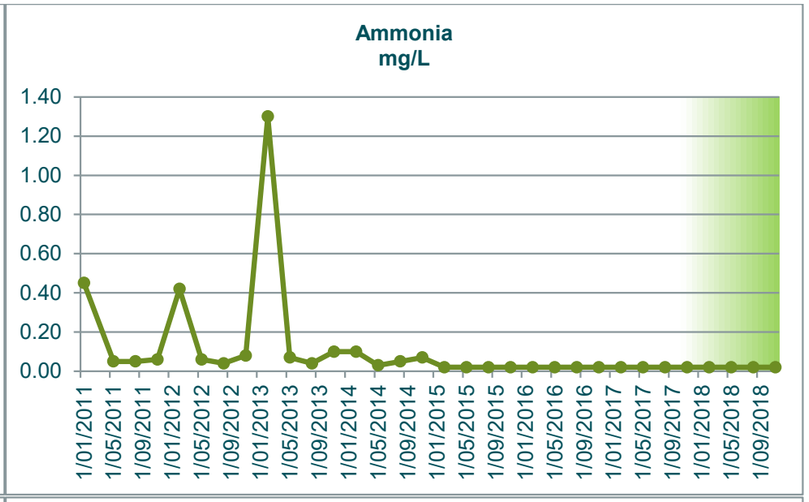

Total Acidity
mg/L CaCO3
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

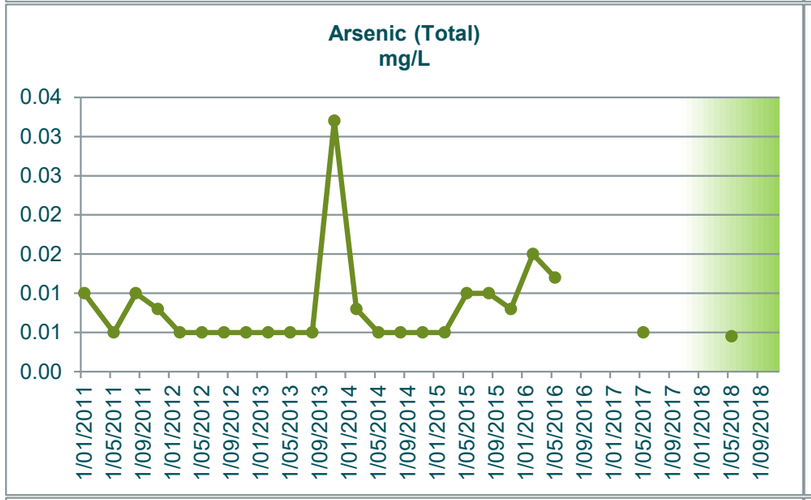

Zinc (Total)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

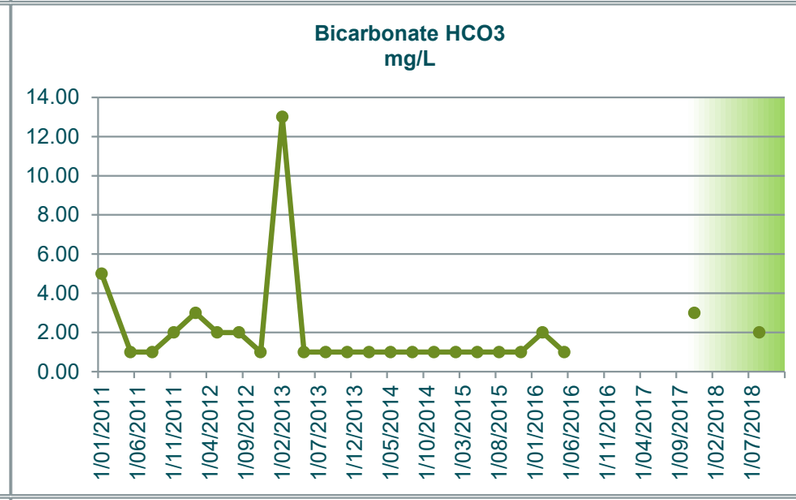
GW7	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	9.00	40.00	0.45	0.01	5.00	6.00	0.00	1.70	112.00	0.05	0.05	0.01	379.00	0.07	0.80	0.04	59.00	0.06	3.60	0.16	0.01	0.05	0.05	0.05	2.19	5.50	0.49	5.00	46.00	51.00	3.60	22.40	2.19	10.00	99.00	0.20
10/05/2011	2.00	14.00	0.05	0.01	1.00	1.50	0.00	2.60	118.00	0.02	0.02	0.01	458.00	0.03	1.90	0.04	17.00	0.01	4.30	0.13	0.01	0.05	0.05	0.05	0.81	4.20	0.22	5.00	210.00	64.00	3.90	20.90	0.81	1.40	68.00	0.10
9/08/2011	1.00	27.00	0.05	0.01	1.00	2.10	0.00	2.20	120.00	0.02	0.02	0.01	428.00	0.04	2.10	0.07	56.00	0.02	4.10	0.17	0.01	0.10	0.05	0.10	1.46	4.60	0.29	5.00	229.00	55.00	3.90	17.90	1.36	1.60	108.00	0.20
8/11/2011	3.00	43.00	0.06	0.01	2.00	1.50	0.00	2.60	140.00	0.04	0.04	0.01	387.00	0.06	2.70	0.10	96.00	0.03	5.90	0.22	0.01	0.06	0.02	0.06	1.31	5.00	0.33	7.00	173.20	44.00	4.70	19.90	1.25	0.80	92.00	0.16
6/02/2012	5.00	53.00	0.42	0.01	3.00	5.70	0.00	2.20	108.00	0.06	0.06	0.01	420.00	0.06	1.00	0.03	76.00	0.04	5.30	0.17	0.01	0.17	0.02	0.17	2.13	5.20	0.42	5.00	135.00	66.00	4.10	22.70	1.96	1.00	110.00	0.20
8/05/2012	3.00	0.09	0.06	0.01	2.00	1.00	0.00	2.90	110.00	0.01	0.01	0.01	411.00	0.01	3.80	0.05	20.00	0.01	5.20	1.09	0.01	0.05	0.02	0.05	0.44	4.90	0.16	5.00	302.00	63.00	3.90	21.30	0.39	0.90	70.00	0.04
6/08/2012	4.00	3.47	0.04	0.01	2.00	3.00	0.00	3.20	114.00	0.01	0.01	0.01	449.00	0.01	1.40	0.03	18.00	0.01	4.70	0.12	0.01	0.10	0.02	0.10	0.42	4.60	0.15	5.00	246.00	46.00	4.00	18.00	0.32	0.40	64.00	0.08
13/11/2012	2.00	8.20	0.08	0.01	1.00	1.80	0.00	2.90	96.00	0.01	0.01	0.01	394.00	0.01	2.80	0.09	15.00	0.01	5.10	0.09	0.01	2.97	0.02	2.97	3.30	4.70	0.19	5.00	198.00	48.00	5.30	21.10	0.33	0.70	86.00	0.11
13/02/2013	22.00	20.00	1.30	0.01	13.00	15.00	0.00	1.90	110.00	0.02	0.02	0.01	483.00	0.03	1.40	0.04	38.00	0.01	4.60	0.09	0.01	0.08	0.02	0.08	3.07	5.40	0.36	5.00	-12.00	59.00	8.30	22.00	2.99	20.00	97.00	0.26
14/05/2013	1.00	30.00	0.07	0.01	1.00	2.70	0.00	2.10	120.00	0.03	0.03	0.01	432.00	0.03	2.40	0.04	32.00	0.02	4.30	0.08	0.01	0.07	0.02	0.07	1.92	4.80	0.36	5.00	140.00	59.00	4.40	20.50	1.85	0.70	160.00	0.17
6/08/2013	1.00	33.00	0.04	0.01	1.00	1.00	0.00	2.20	110.00	0.03	0.03	0.01	445.00	0.02	1.70	0.03	73.00	0.02	5.20	0.10	0.01	0.09	0.02	0.09	1.04	4.70	0.31	5.00	128.00	61.00	4.30	18.40	0.95	0.70	162.00	0.13
12/11/2013	1.00	39.00	0.10	0.03	1.00	1.00	0.00	2.30	119.00	0.03	0.03	0.01	42.00	0.03	3.00	0.04	102.00	0.02	5.10	0.14	0.01	0.10	0.02	0.10	1.07	4.70	0.25	5.00	155.00	69.00	6.00	19.50	0.97	0.40	51.00	0.14
11/02/2014	2.00	87.00	0.10	0.01	1.00	2.40	0.00	2.10	111.00	0.08	0.08	0.01	405.00	0.07	3.10	0.03	249.00	0.06	5.60	0.16	0.02	0.14	0.02	0.14	0.81	4.80	0.47	5.00	143.00	65.00	5.20	21.70	0.67	0.48	251.00	0.20
13/05/2014	2.00	18.00	0.03	0.01	1.00	1.00	0.00	2.00	117.00	0.01	0.01	0.01	425.00	0.01	2.80	0.02	27.00	0.01	4.90	0.06	0.01	0.10	0.02	0.10	0.51	4.50	0.24	5.00	118.00	62.00	3.60	20.80	0.41	0.30	77.00	0.06
12/08/2014	1.00	25.00	0.05	0.01	1.00	1.00	0.00	2.60	118.00	0.02	0.02	0.01	409.00	0.01	4.90	0.03	62.00	0.02	5.40	0.10	0.01	0.14	0.02	0.14	0.81	5.20	0.12	5.00	119.00	63.00	4.80	17.30	0.67	0.40	124.00	0.09
10/11/2014	1.00	25.00	0.07	0.01	1.00	1.20	0.00	2.20	114.00	0.03	0.02	0.01	402.00	0.02	2.90	0.02	44.00	0.03	5.50	0.12	0.01	0.10	0.02	0.10	1.31	4.80	0.21	5.00	138.00	64.00	5.60	19.90	1.21	0.40	198.00	0.07
9/02/2015	2.00	27.40	0.02	0.01	1.00	1.20	0.00	2.30	110.00	0.02	0.02	0.01	395.00	0.02	2.20	0.03	50.00	0.01	5.30	0.13	0.01	0.51	0.02	0.51	1.58	5.00	0.14	5.00	135.00	58.00	4.60	23.10	1.07	1.40	100.00	0.06
11/05/2015	1.00	37.40	0.02	0.01	1.00	1.50	0.00	2.60	116.00	0.03	0.02	0.01	423.00	0.01	2.90	0.05	60.40	0.02	6.20	0.14	0.01	0.08	0.02	0.08	1.23	4.70	0.23	5.00	146.00	68.00	3.30	21.10	1.15	0.30	86.00	0.10
11/08/2015	1.00	21.90	0.02	0.01	1.00	1.00	0.00	2.90	110.00	0.03	0.02	0.01	389.00	0.02	2.90	0.02	47.90	0.02	5.90	0.13	0.01	0.07	0.02	0.07	1.07	4.70	0.18	5.00	185.00	62.00	6.20	18.30	1.00	0.40	116.00	0.13
10/11/2015	1.00	20.14	0.02	0.01	1.00	1.00	0.00	2.30	100.00	0.02	0.02	0.01	301.00	0.01	2.80	0.05	57.92	0.01	4.90	0.13	0.01	0.65	0.02	0.65	1.17	4.60	0.12	5.00	101.00	50.00	6.20	19.70	0.52	0.60	79.00	0.08
8/02/2016	2.00	55.26	0.02	0.02	2.00	1.00	0.00	2.27	107.00	0.06	0.06	0.01	391.00	0.05	3.20	0.02	144.46	0.04	5.61	0.18	0.02	0.42	0.02	0.42	1.79	4.70	0.25	5.00	194.00	59.78	4.38	21.90	1.37	0.58	134.00	0.12
9/05/2016	1.00	34.92	0.02	0.01	1.00	1.50	0.00	2.03	114.00	0.03	0.03	0.01	406.00	0.03	2.60	0.02	67.78	0.02	4.91	0.14	0.01	0.03	0.02	0.03	1.12	4.80	0.22	5.00	196.00	60.17	3.40	21.60	1.09	0.43	120.00	0.08
9/08/2016	1.40		0.02			1.00		2.29	92.00				353.90		2.60	0.06			4.93			0.20	0.02	0.20	1.46	4.40	0.22	5.00	238.00	55.03	9.59	18.50	1.26	0.52	193.70	
7/11/2016	1.00		0.02			1.80		2.32	120.00				405.10		2.70	0.03			5.62			0.02	0.02	0.02	1.56	4.60	0.29	5.00	318.00	67.24	5.28	19.20	1.54	1.51	132.40	
7/02/2017	1.00		0.02			1.00		1.77	92.00				406.80		2.70	0.04			4.67			0.04	0.02	0.04	1.47	4.60	0.30	5.00	273.30	58.25	3.30	22.40	1.43	0.74	176.10	
8/05/2017	1.00	11.98	0.02	0.01		1.00	0.00	2.14	113.00	0.01	0.01	0.01	397.70	0.01	2.80	0.03	15.72	0.01	5.33	0.10	0.01	0.07	0.02	0.07	1.05	4.40	0.28	5.00	371.60	60.01	4.47	21.20	0.98	0.98	100.70	0.08
8/08/2017	1.00		0.02			1.00		2.57	95.00				400.90		4.30	0.03			5.24			0.06	0.02	0.06	0.71	4.40	0.15	5.00	462.90	55.57	5.84	18.70	0.65	0.52	83.70	
7/11/2017	2.87		0.02		3.00	1.80		2.47	113.00				408.00		2.50	0.02			5.73			0.08	0.02	0.08	1.45	4.30	0.33	5.00	344.80	67.08	6.91	20.10	1.37	0.49	101.30	
13/02/2018	1.00		0.02			1.80		2.25	107.00				411.50		2.90	0.02			5.82			0.05	0.02	0.05	0.38	4.50	0.07	5.00	293.20	59.74	2.97	22.30	0.33	1.29	80.60	
8/05/2018	1.00	13.71	0.02	0.00		1.00	0.00	2.23	123.00	0.01	0.01	0.01	407.10	0.01	3.00	0.03	29.30	0.01	5.45	0.12	0.01	0.02	0.06	0.06	0.61	4.50	0.12	1.86	332.80	60.86	3.32	21.60	0.55	0.36	83.00	0.04
14/08/2018	1.81		0.02		2.00	1.50		2.54	102.50				395.20		4.10	0.07			5.62			0.06	0.02	0.06	0.99	4.40	0.20	1.77	429.20	62.14	4.78	18.40	0.93	18.00	81.20	
13/11/2018	1.00		0.02			1.20		2.50	113.00				404.00		3.43	0.04			5.80			0.06	0.02	0.06	0.48	4.55	0.11	1.82	223.00	59.82	4.19	20.10	0.42	0.38	86.80	
2018 Min	**1.00**	**13.71**	**0.02**	**0.00**	**2.00**	**1.00**	**0.00**	**2.23**	**102.50**	**0.01**	**0.01**	**0.01**	**395.20**	**0.01**	**2.90**	**0.02**	**29.30**	**0.01**	**5.45**	**0.12**	**0.01**	**0.02**	**0.02**	**0.05**	**0.38**	**4.40**	**0.07**	**1.77**	**223.00**	**59.74**	**2.97**	**18.40**	**0.33**	**0.36**	**80.60**	**0.04**
2018 Max	**1.81**	**13.71**	**0.02**	**0.00**	**2.00**	**1.80**	**0.00**	**2.54**	**123.00**	**0.01**	**0.01**	**0.01**	**411.50**	**0.01**	**4.10**	**0.07**	**29.30**	**0.01**	**5.82**	**0.12**	**0.01**	**0.06**	**0.06**	**0.06**	**0.99**	**4.55**	**0.20**	**5.00**	**429.20**	**62.14**	**4.78**	**22.30**	**0.93**	**18.00**	**86.80**	**0.04**
2018 Mean	**1.20**	**13.71**	**0.02**	**0.00**	**2.00**	**1.38**	**0.00**	**2.38**	**111.38**	**0.01**	**0.01**	**0.01**	**404.45**	**0.01**	**3.36**	**0.04**	**29.30**	**0.01**	**5.67**	**0.12**	**0.01**	**0.05**	**0.03**	**0.06**	**0.62**	**4.49**	**0.13**	**2.61**	**319.55**	**60.64**	**3.81**	**20.60**	**0.56**	**5.01**	**82.90**	**0.04**
Long-term Average	**2.53**	**28.69**	**0.10**	**0.01**	**2.04**	**2.13**	**0.00**	**2.35**	**111.39**	**0.03**	**0.03**	**0.01**	**395.76**	**0.03**	**2.70**	**0.04**	**60.73**	**0.02**	**5.18**	**0.17**	**0.01**	**0.21**	**0.02**	**0.21**	**1.27**	**4.71**	**0.24**	**4.76**	**209.75**	**59.46**	**4.82**	**20.39**	**1.06**	**2.15**	**111.61**	**3.45**

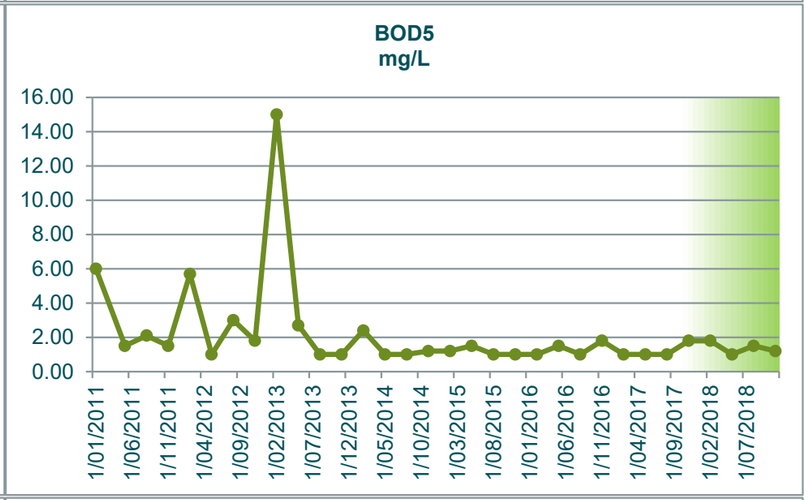

Alkalinity
mg/L as CaCO3
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

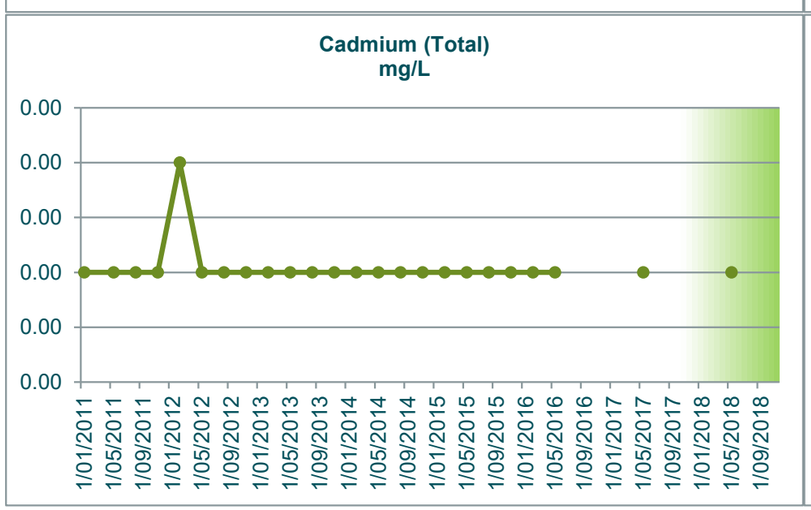

Aluminium (Total)
mg/L
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

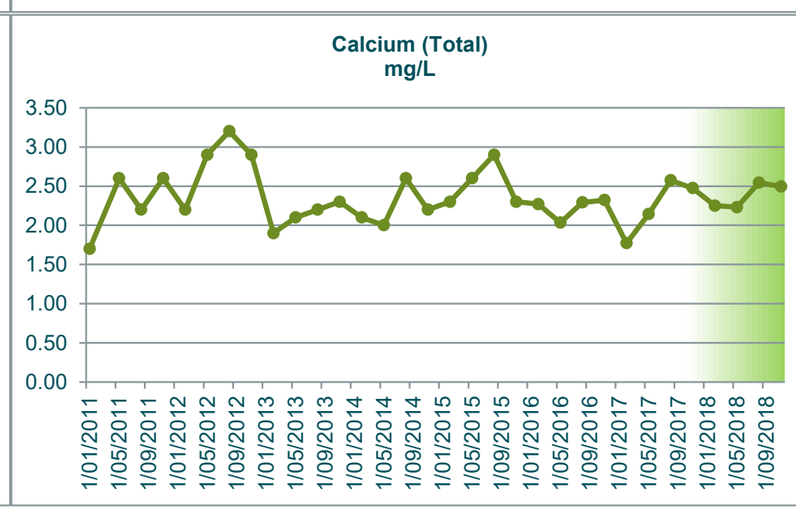

Ammonia
mg/L
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

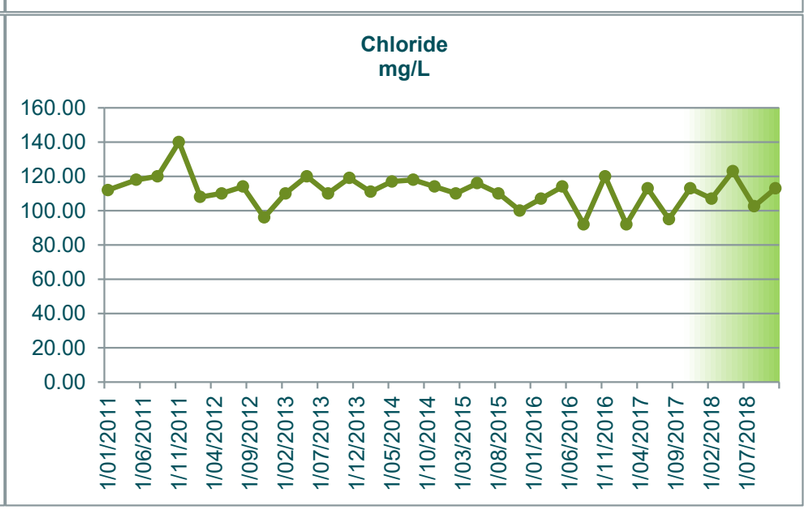

Arsenic (Total)
mg/L
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

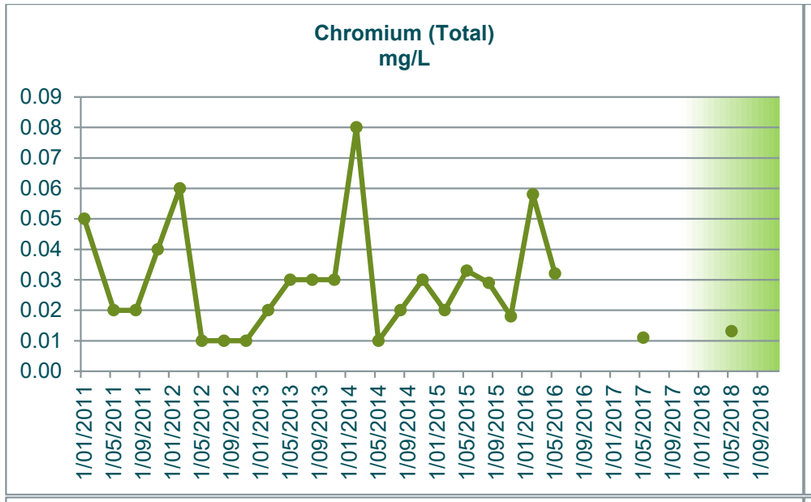

Bicarbonate HCO3
mg/L
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

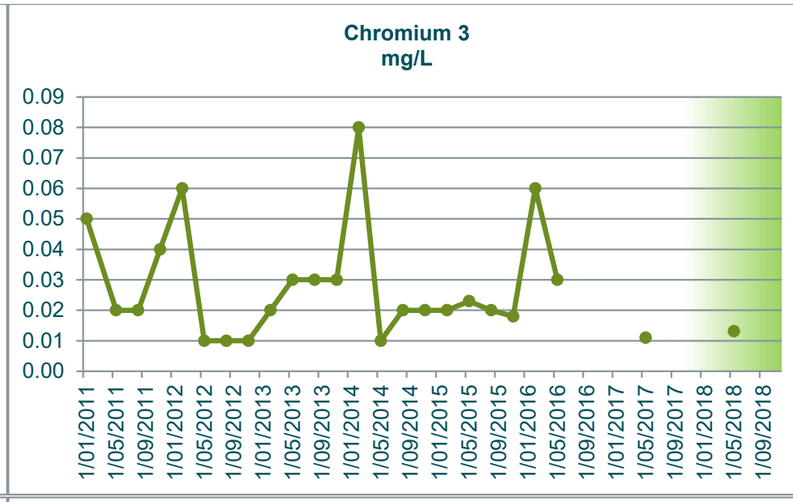

BOD5
mg/L
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Calcium (Total)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Chloride
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chromium (Total)
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Chromium 3
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
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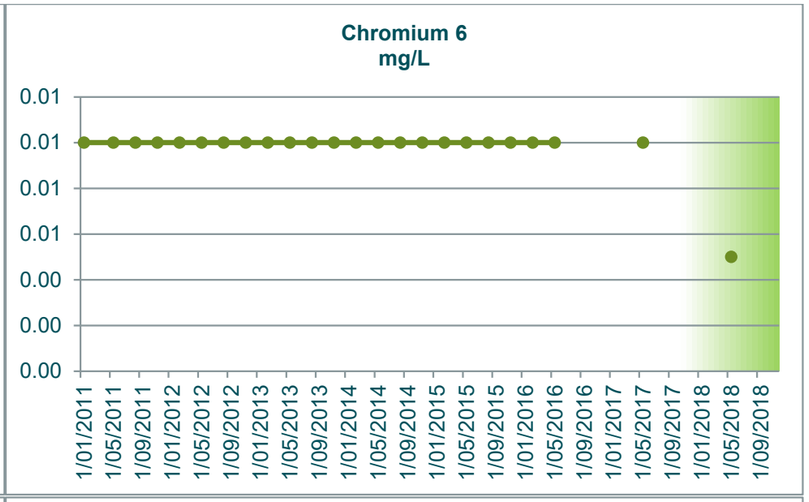
Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
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1/09/2015
1/01/2016
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1/01/2018
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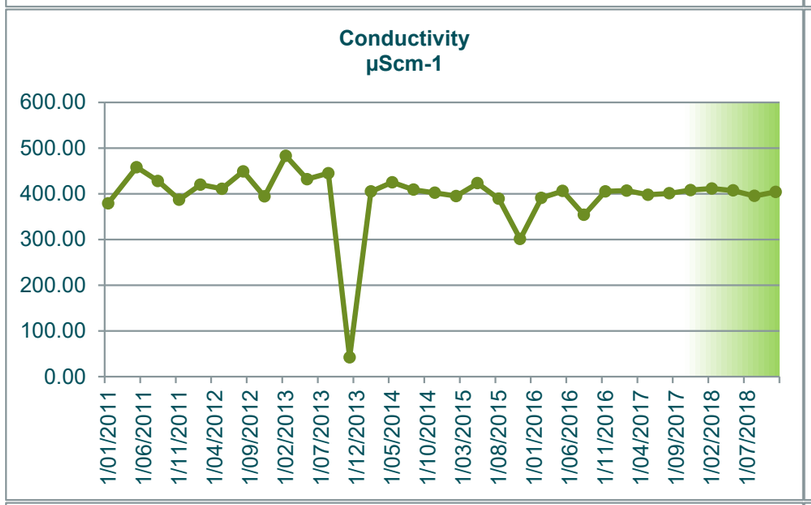
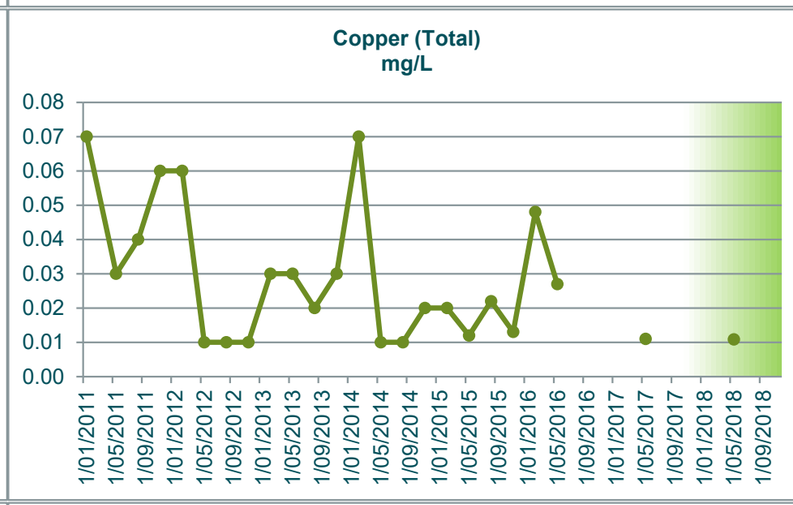
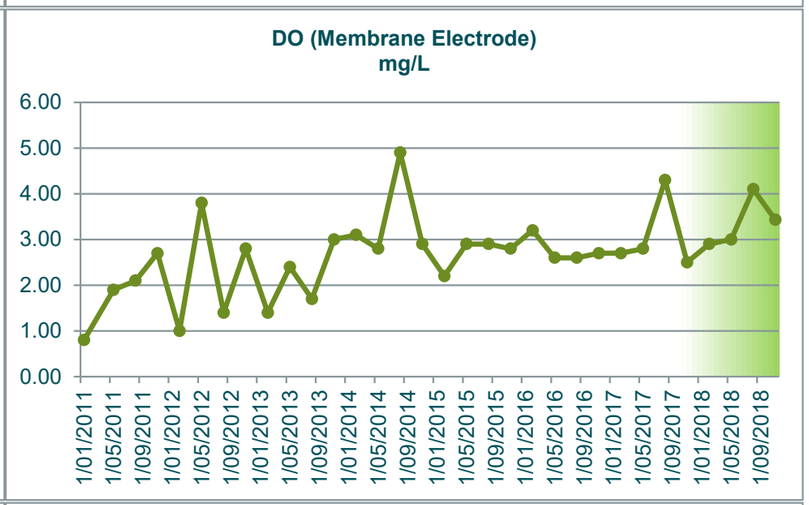
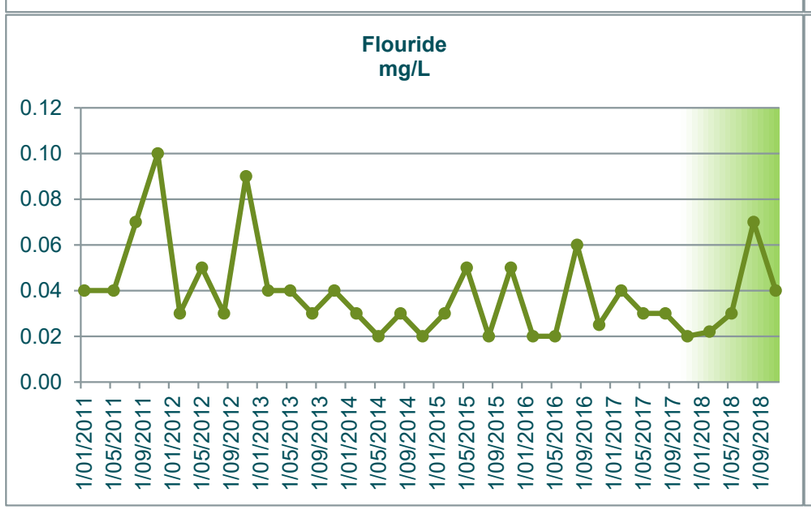
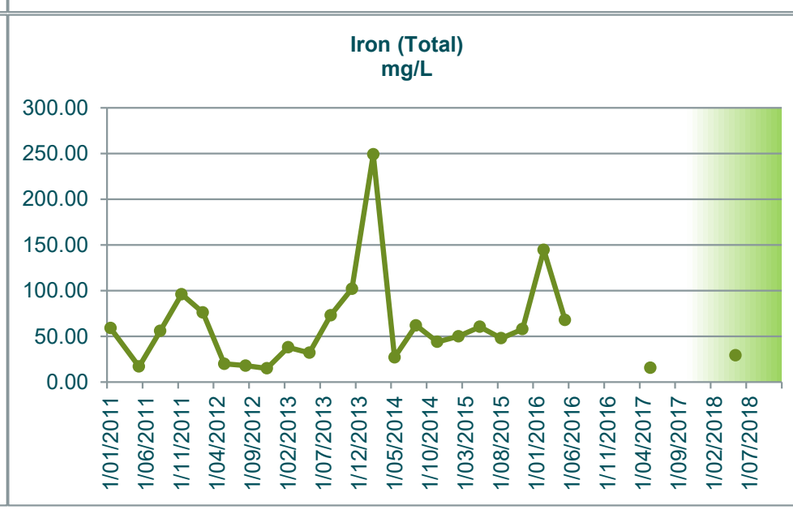
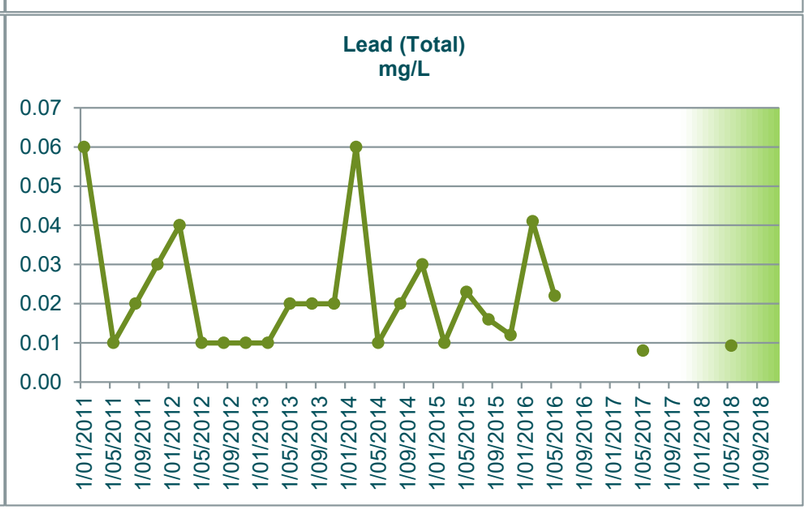

Conductivity
µScm-1
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

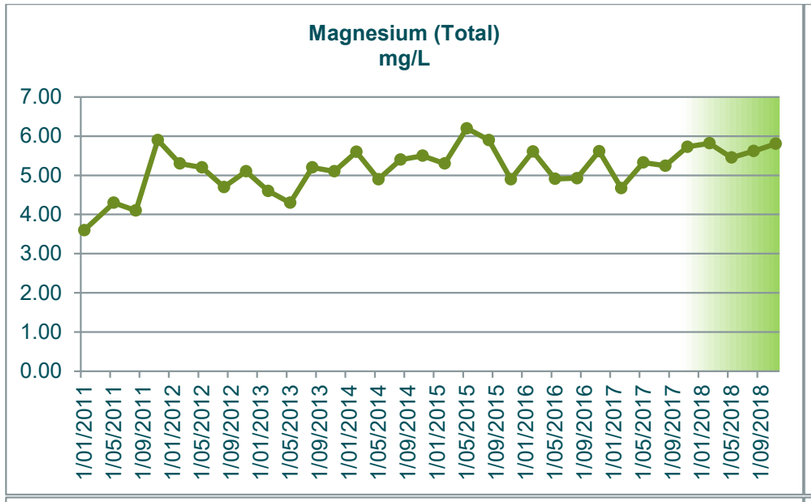

Copper (Total)
mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

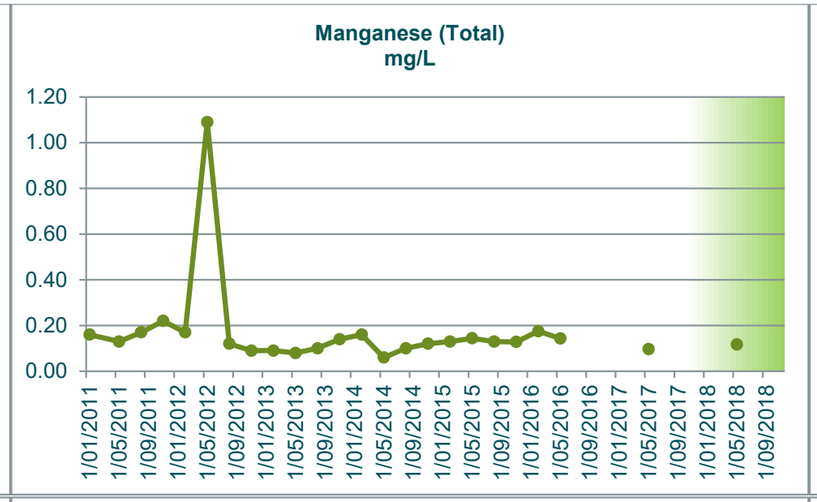

DO (Membrane Electrode)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

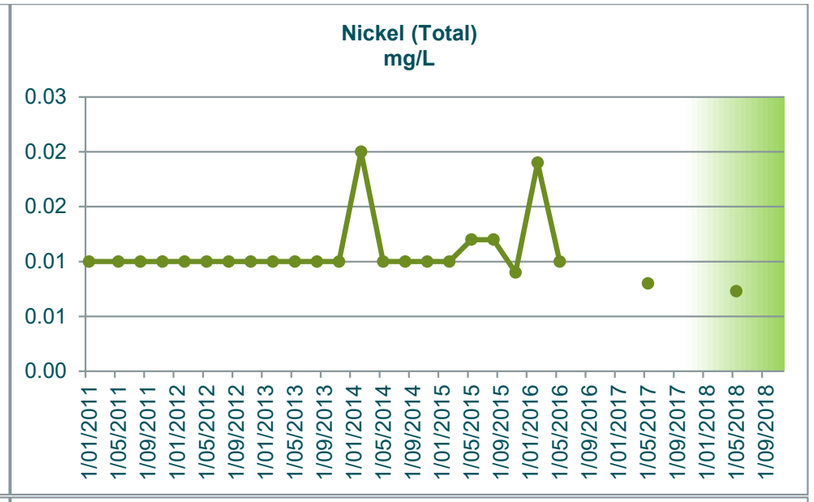

Flouride
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

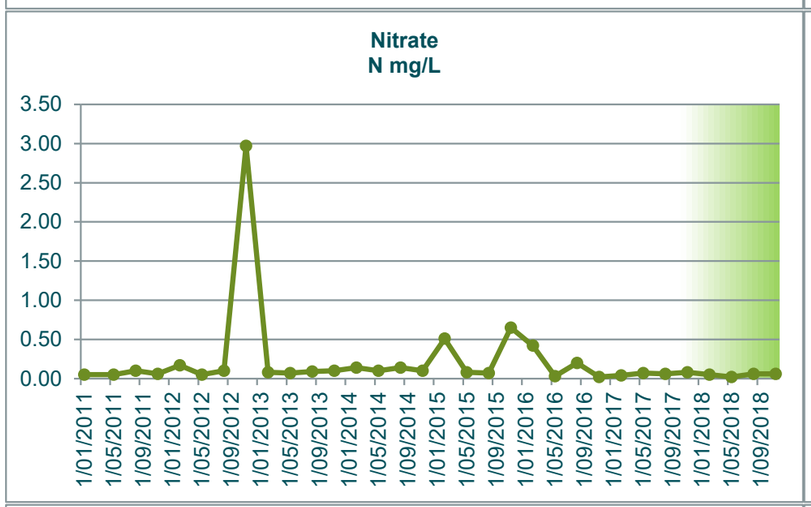

Iron (Total)
mg/L
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

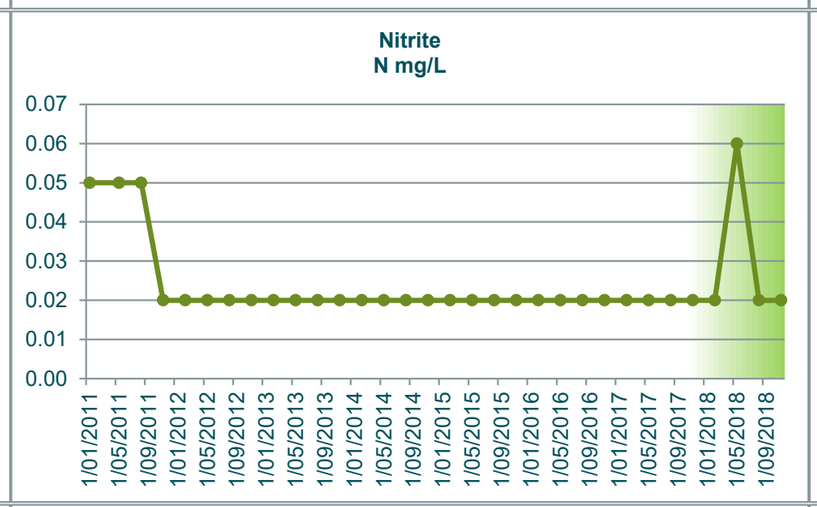

Lead (Total)
mg/L
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

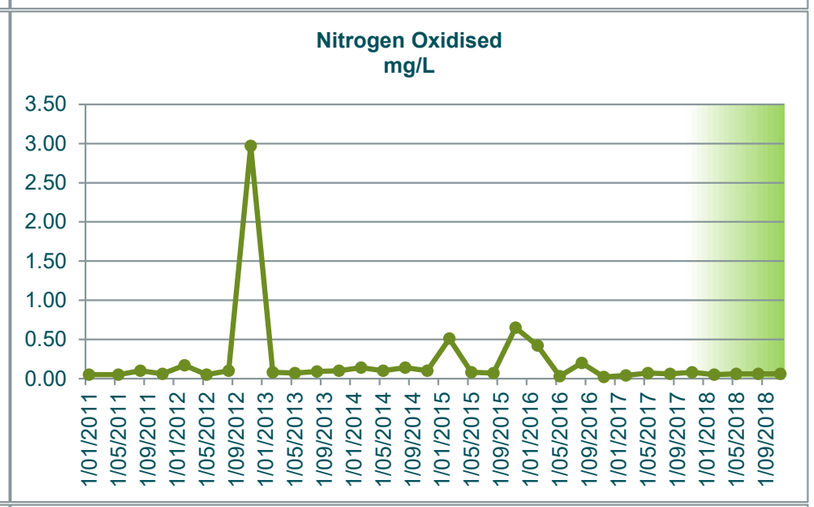

Magnesium (Total)
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

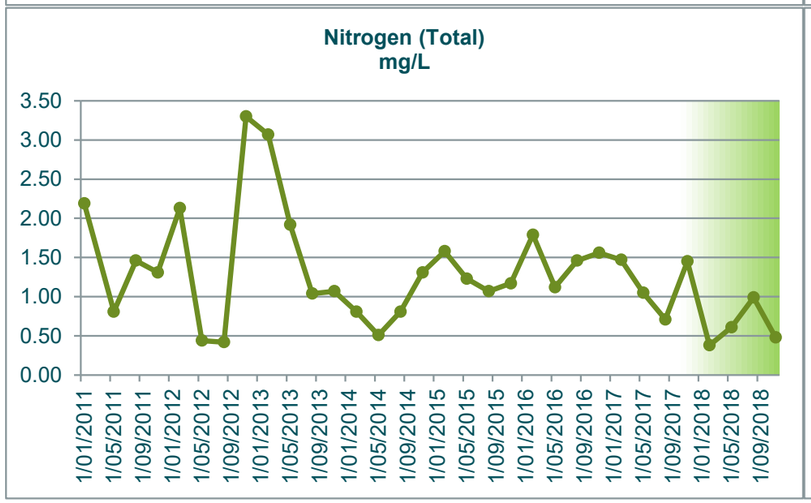

Manganese (Total)
mg/L
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

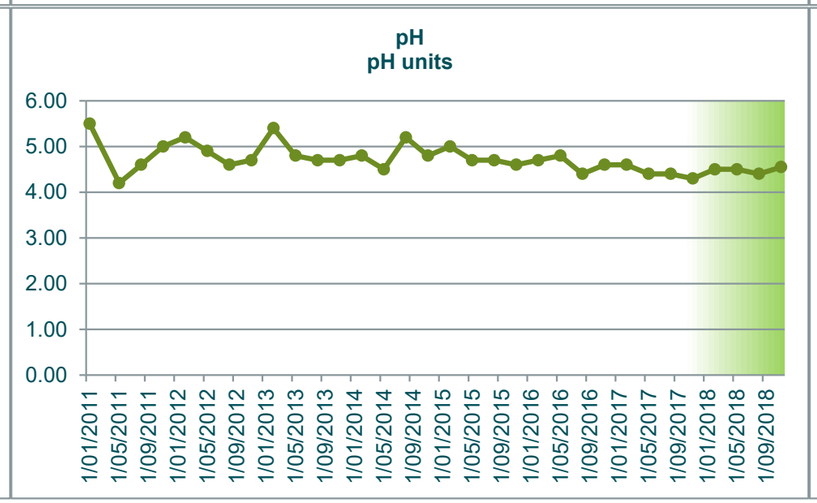

Nickel (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

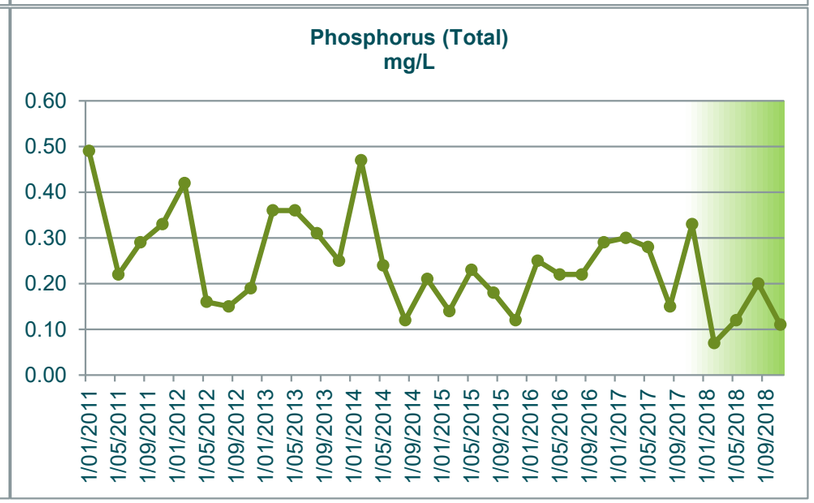

Nitrate
N mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

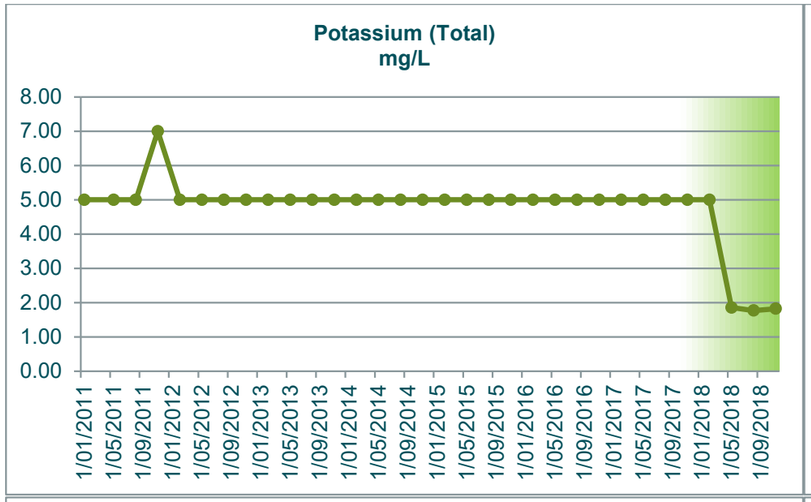

Nitrite
N mg/L
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

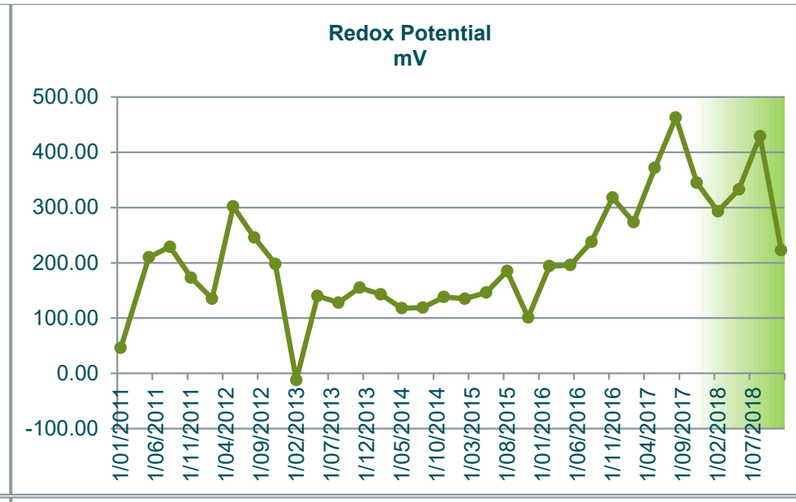

Nitrogen Oxidised
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

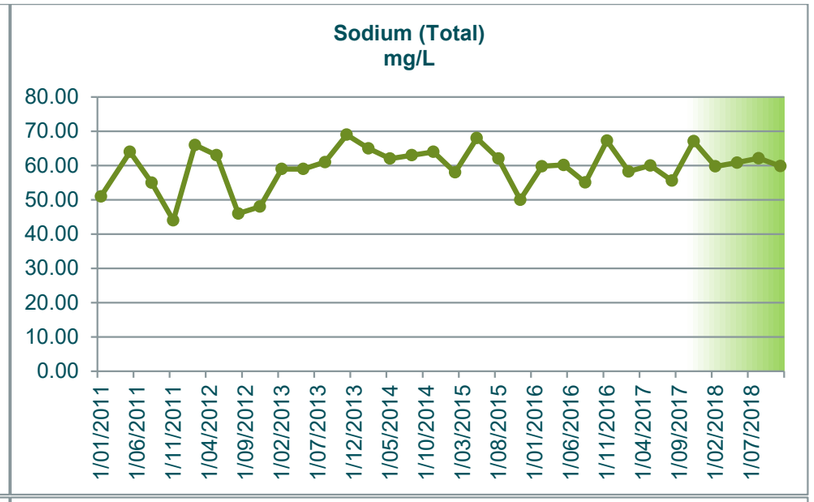

Nitrogen (Total)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

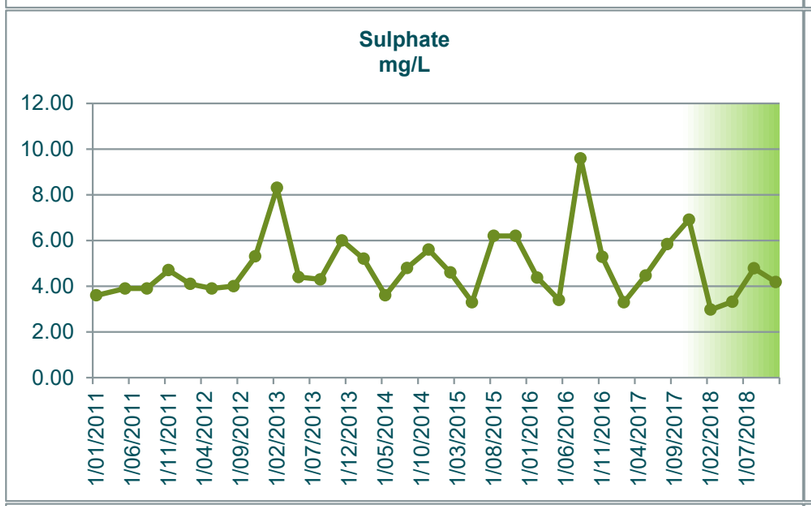

pH
pH units
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

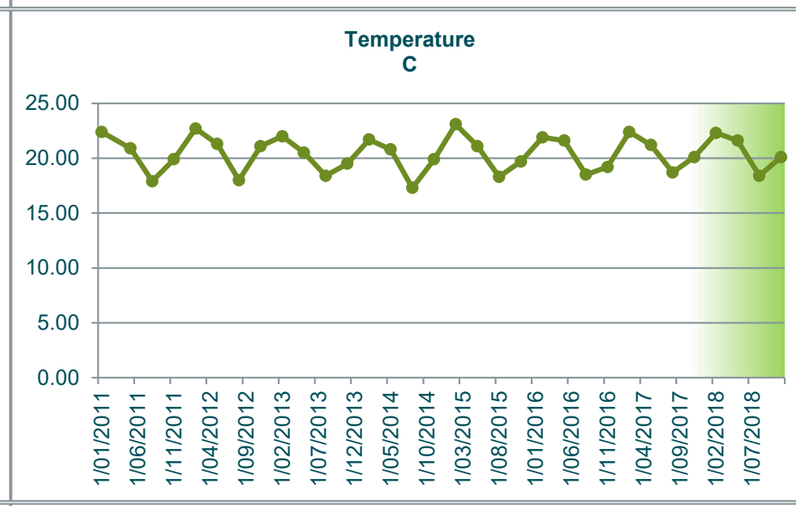

Phosphorus (Total)
mg/L
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

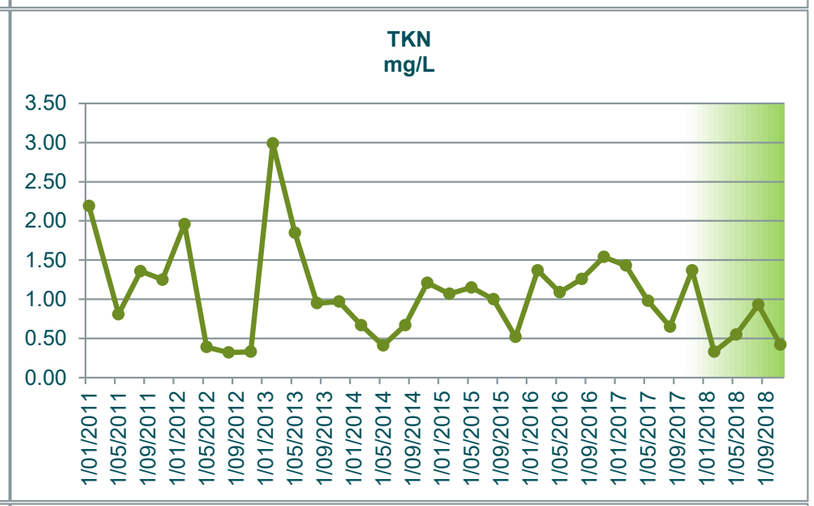

Potassium (Total)
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

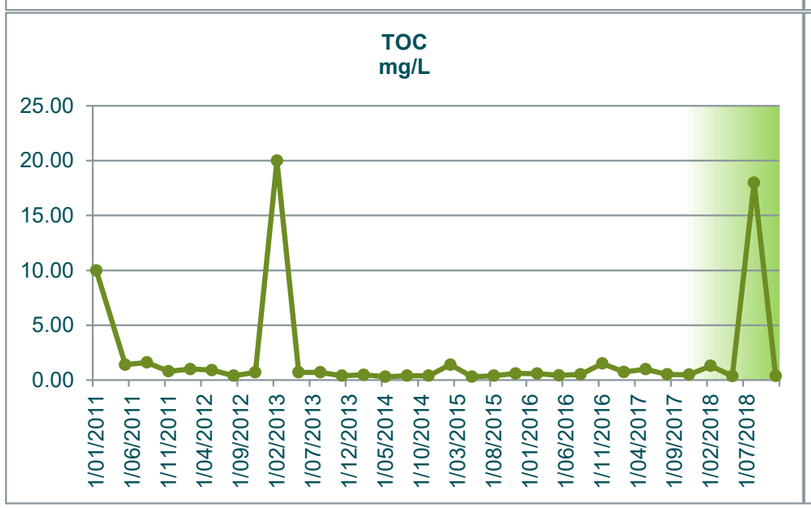

Redox Potential
mV
500.00
400.00
300.00
200.00
100.00
0.00
-100.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

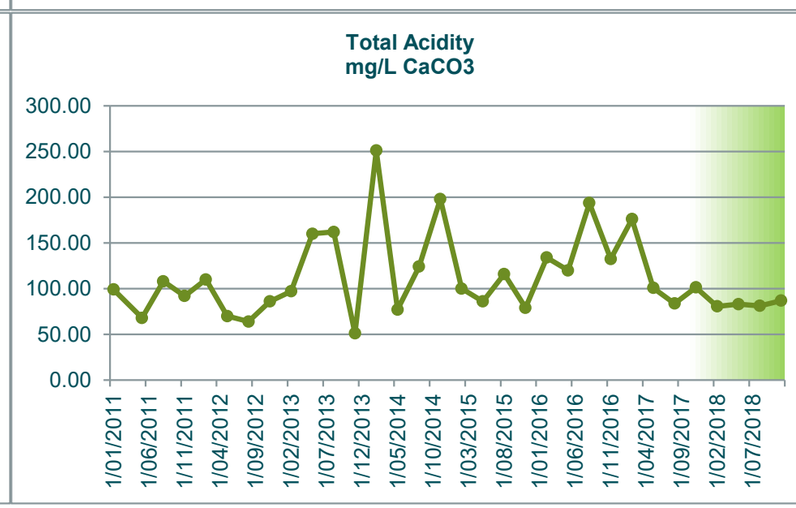

Sodium (Total)
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

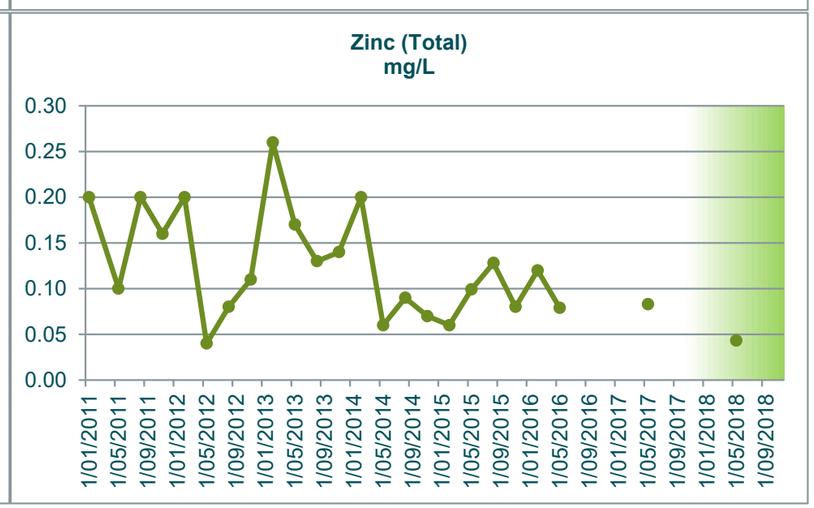

Sulphate
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

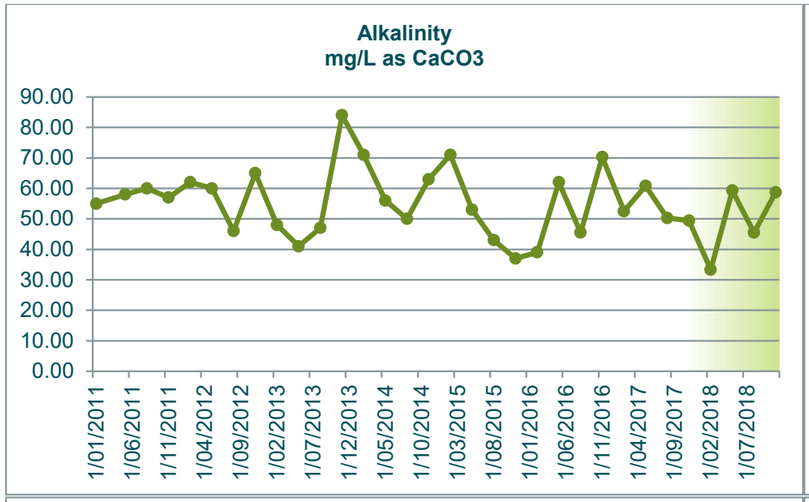

TKN
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


TOC
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Total Acidity
mg/L CaCO3
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Zinc (Total)
mg/L
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

GW8	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	55.00	35.00	0.08	0.02	34.00	1.60	0.00	5.70	99.00	0.04	0.04	0.01	438.00	0.05	2.10	0.19	80.00	0.04	5.00	0.60	0.02	0.05	0.05	0.05	0.72	6.40	0.19	5.00	-17.00	62.00	18.00	23.30	0.72	5.30	44.00	0.14
10/05/2011	58.00	58.00	0.05	0.04	35.00	1.20	0.00	5.60	106.00	0.06	0.06	0.01	539.00	0.08	0.90	0.18	108.00	0.01	5.80	0.84	0.02	0.05	0.05	0.05	1.14	5.70	0.26	5.00	101.00	77.00	15.00	20.30	1.14	1.90	76.00	0.20
9/08/2011	60.00	70.00	0.12	0.15	37.00	2.70	0.00	6.00	120.00	0.07	0.07	0.01	543.00	0.06	1.00	0.14	163.00	0.02	5.80	0.95	0.03	0.11	0.05	0.11	1.17	6.20	0.32	5.00	211.00	72.00	11.00	18.50	1.06	2.00	101.00	0.25
8/11/2011	57.00	105.00	0.32	0.07	35.00	4.80	0.00	7.60	132.00	0.12	0.12	0.01	546.00	0.11	0.90	0.17	203.00	0.04	8.30	1.43	0.05	0.24	0.02	0.24	1.35	6.40	0.46	9.00	-34.60	57.00	16.00	20.50	1.11	1.50	95.00	0.39
6/02/2012	62.00	37.00	0.15	0.03	38.00	1.80	0.00	6.70	109.00	0.04	0.04	0.01	520.00	0.04	1.90	0.19	70.00	0.02	7.20	0.67	0.02	0.12	0.02	0.12	0.86	6.30	0.20	5.00	102.00	87.00	12.00	22.50	0.74	1.30	65.00	0.26
8/05/2012	60.00	0.03	0.21	0.01	37.00	3.30	0.00	11.00	110.00	0.01	0.01	0.01	541.00	0.01	3.30	0.14	0.10	0.04	13.00	0.09	0.01	0.18	0.02	0.18	0.76	6.30	0.21	7.00	219.00	86.00	26.00	21.00	0.58	1.10	60.00	0.05
6/08/2012	46.00	27.00	0.09	0.24	28.00	1.00	0.00	6.30	109.00	0.03	0.03	0.01	544.00	0.02	3.40	0.17	46.00	0.01	6.20	0.54	0.01	0.12	0.02	0.12	0.63	6.00	0.26	5.00	70.00	61.00	13.00	18.40	0.51	0.50	44.00	0.10
13/11/2012	65.00	140.00	0.21	0.09	40.00	3.30	0.00	6.40	93.00	0.19	0.19	0.01	557.00	0.21	0.80	0.14	368.00	0.07	6.50	2.32	0.11	0.45	0.02	0.45	1.47	6.20	0.32	5.00	4.00	72.00	15.00	20.50	1.02	1.40	94.00	0.90
13/02/2013	48.00	59.00	0.26	0.02	29.00	1.20	0.00	7.00	100.00	0.06	0.06	0.01	529.00	0.05	3.60	0.11	92.00	0.03	7.00	0.69	0.02	0.22	0.02	0.22	3.08	6.30	0.36	5.00	-30.00	77.00	12.00	218.00	2.86	0.70	50.00	0.20
14/05/2013	41.00	81.00	0.23	0.03	25.00	1.80	0.00	5.20	88.00	0.08	0.08	0.01	463.00	0.05	2.70	0.14	106.00	0.05	4.90	0.65	0.03	0.24	0.02	0.24	1.27	6.10	0.23	5.00	17.00	69.00	19.00	20.40	1.03	1.20	140.00	0.22
6/08/2013	47.00	71.00	0.04	0.07	29.00	1.20	0.00	6.20	110.00	0.06	0.06	0.01	552.00	0.04	3.40	0.18	155.00	0.02	6.30	0.74	0.02	0.03	0.02	0.03	1.02	6.20	0.23	5.00	21.00	83.00	16.00	18.80	0.99	0.50	110.00	0.20
12/11/2013	84.00	106.00	0.59	0.09	51.00	5.40	0.00	8.70	113.00	0.09	0.09	0.01	587.00	0.06	2.10	0.20	163.00	0.04	8.50	0.94	0.04	0.15	0.02	0.15	1.72	6.30	0.32	5.00	44.00	92.00	14.00	19.60	1.57	1.30	52.00	0.28
11/02/2014	71.00	43.00	0.33	0.03	43.00	3.90	0.00	7.30	106.00	0.04	0.04	0.01	545.00	0.02	2.60	0.19	0.16	0.02	7.60	0.01	0.02	0.12	0.02	0.14	1.34	6.50	0.12	5.00	-68.00	84.00	13.00	21.30	1.20	1.60	175.00	0.16
13/05/2014	56.00	30.00	0.19	0.02	34.00	3.60	0.00	5.50	107.00	0.02	0.02	0.01	547.00	0.02	3.00	0.21	77.00	0.02	5.90	0.40	0.01	0.10	0.02	0.12	0.88	6.30	0.19	5.00	-77.00	70.00	12.00	21.00	0.76	1.00	64.00	0.09
12/08/2014	50.00	24.00	0.07	0.10	30.00	1.80	0.00	6.20	105.00	0.02	0.02	0.01	490.00	0.01	3.80	0.18	107.00	0.02	6.70	0.62	0.01	0.08	0.02	0.08	0.56	6.50	0.19	5.00	-7.00	77.00	15.00	18.20	0.48	0.50	101.00	0.09
10/11/2014	63.00	27.00	0.10	0.09	38.00	1.50	0.00	6.90	106.00	0.02	0.01	0.01	512.00	0.02	3.00	0.19	95.00	0.04	7.40	0.45	0.01	0.03	0.03	0.06	1.18	6.50	0.15	5.00	-18.00	83.00	14.00	19.70	1.12	0.40	147.00	0.10
9/02/2015	71.00	36.10	0.04	0.04	43.00	2.10	0.00	7.90	110.00	0.02	0.02	0.01	533.00	0.01	1.90	0.21	54.60	0.01	7.40	0.51	0.01	0.02	0.02	0.02	0.92	6.60	0.15	5.00	-31.00	84.00	10.00	22.40	0.92	0.60	64.00	0.08
11/05/2015	53.00	55.00	0.04	0.05	32.00	1.50	0.00	7.80	104.00	0.05	0.05	0.01	522.00	0.02	3.20	0.17	66.20	0.03	7.60	0.62	0.03	0.02	0.02	0.02	0.79	6.50	0.16	5.00	19.00	88.00	12.00	21.40	0.77	0.70	73.00	0.17
11/08/2015	43.00	31.30	0.02	0.13	43.00	1.00	0.00	6.70	110.00	0.04	0.04	0.01	476.00	0.03	4.70	0.17	97.60	0.02	6.60	0.69	0.02	0.02	0.02	0.02	0.85	6.20	0.12	5.00	48.00	78.00	15.00	18.80	0.83	0.70	72.00	0.13
10/11/2015	37.00	26.21	0.02	0.04	37.00	1.00	0.00	4.80	79.00	0.02	0.01	0.01	303.00	0.01	2.40	0.04	46.69	0.01	4.70	0.36	0.01	0.41	0.02	0.41	1.18	6.00	0.13	5.00	-10.00	52.00	17.00	20.20	0.77	1.40	71.00	0.08
8/02/2016	39.00	55.67	0.02	0.08	39.00	2.10	0.00	5.67	73.00	0.06	0.06	0.01	377.00	0.04	3.60	0.13	92.12	0.04	5.41	0.59	0.03	0.26	0.02	0.26	1.63	6.30	0.26	5.00	38.00	63.15	14.64	22.30	1.37	2.55	88.00	0.27
9/05/2016	62.00	29.20	0.05	0.04	62.00	1.50	0.00	6.79	92.00	0.03	0.03	0.01	490.00	0.02	3.80	0.21	47.08	0.02	6.61	0.51	0.02	0.02	0.02	0.03	0.72	6.30	0.17	5.00	22.00	76.98	11.39	22.00	0.69	0.81	74.00	0.13
9/08/2016	45.50		0.02		46.00	1.20		5.61	85.00				425.30		3.50	0.18			5.64			0.11	0.02	0.11	0.88	6.00	0.15	5.00	103.00	66.73	15.63	18.80	0.77	0.57	103.60	
7/11/2016	70.30		0.07		70.00	2.10		6.90	110.00				513.60		2.60	0.20			6.80			0.02	0.02	0.02	1.20	6.20	0.19	5.00	128.00	80.43	12.38	19.90	1.20	1.92	94.00	
7/02/2017	52.50		0.06		52.00	1.80		5.51	78.00				435.00		2.60	0.17			5.44			0.02	0.02	0.02	1.13	6.10	0.18	5.00	109.50	65.84	16.87	22.50	1.13	1.59	110.20	
8/05/2017	60.80	28.06	0.04	0.05	61.00	2.10	0.00	6.31	93.00	0.03	0.03	0.01	459.30	0.02	3.00	0.14	53.66	0.02	6.14	0.49	0.02	0.02	0.02	0.02	0.70	6.10	0.15	5.00	153.90	72.92	14.43	21.20	0.68	0.66	65.60	0.15
8/08/2017	50.25		0.02		50.00	1.50		5.76	90.00				481.90		3.80	0.16			5.73			0.03	0.02	0.03	0.94	5.80	0.16	5.00	216.50	73.20	12.79	18.80	0.91	0.59	48.10	
7/11/2017	49.45		0.04		49.00	1.50		6.66	86.00				442.10		2.90	0.15			6.40			1.44	0.02	1.44	2.09	6.00	0.11	5.00	116.00	70.67	14.94	20.30	0.65	1.48	59.20	
13/02/2018	33.33		0.03		33.00	2.40		4.74	80.00				386.40		2.70	0.14			4.61			0.06	0.02	0.06	0.67	6.00	0.12	5.00	101.30	59.94	24.96	21.80	0.61	2.89	73.00	
8/05/2018	59.28	14.04	0.06	0.02	59.00	2.40	0.00	6.20	97.00	0.02	0.02	0.01	471.40	0.01	3.30	0.22	26.33	0.01	6.16	0.36	0.01	0.26	0.02	0.28	0.28	6.20	0.02	2.21	62.90	70.77	15.02	21.30	0.05	0.97	51.70	0.07
14/08/2018	45.50		0.02		46.00	1.00		5.55	87.50				430.50		5.20	0.07			5.57			0.04	0.02	0.04	0.49	6.10	0.14	2.17	223.70	71.45	17.19	18.80	0.45	5.90	44.60	
13/11/2018	58.73		0.03		59.00	1.00		6.28	100.00				472.00		3.07	0.20			6.20			0.02	0.02	0.02	0.56	6.23	0.14	2.22	57.00	73.60	13.61	20.30	0.54	0.83	65.00	
2018 Min	**33.33**	**14.04**	**0.02**	**0.02**	**33.00**	**1.00**	**0.00**	**4.74**	**80.00**	**0.02**	**0.02**	**0.01**	**386.40**	**0.01**	**2.70**	**0.07**	**26.33**	**0.01**	**4.61**	**0.36**	**0.01**	**0.02**	**0.02**	**0.02**	**0.28**	**6.00**	**0.02**	**2.17**	**57.00**	**59.94**	**13.61**	**18.80**	**0.05**	**0.83**	**44.60**	**0.07**
2018 Max	**59.28**	**14.04**	**0.06**	**0.02**	**59.00**	**2.40**	**0.00**	**6.28**	**100.00**	**0.02**	**0.02**	**0.01**	**472.00**	**0.01**	**5.20**	**0.22**	**26.33**	**0.01**	**6.20**	**0.36**	**0.01**	**0.26**	**0.02**	**0.28**	**0.67**	**6.23**	**0.14**	**5.00**	**223.70**	**73.60**	**24.96**	**21.80**	**0.61**	**5.90**	**73.00**	**0.07**
2018 Mean	**49.21**	**14.04**	**0.04**	**0.02**	**49.25**	**1.70**	**0.00**	**5.69**	**91.13**	**0.02**	**0.02**	**0.01**	**440.08**	**0.01**	**3.57**	**0.16**	**26.33**	**0.01**	**5.63**	**0.36**	**0.01**	**0.10**	**0.02**	**0.10**	**0.50**	**6.13**	**0.11**	**2.90**	**111.23**	**68.94**	**17.69**	**20.55**	**0.41**	**2.65**	**58.58**	**0.07**
Long-term Average	**54.80**	**49.53**	**0.11**	**0.06**	**42.00**	**2.07**	**0.00**	**6.48**	**99.61**	**0.05**	**0.05**	**0.01**	**489.73**	**0.04**	**2.84**	**0.17**	**96.56**	**0.03**	**6.53**	**0.67**	**0.02**	**0.16**	**0.02**	**0.16**	**1.07**	**6.21**	**0.20**	**4.93**	**59.23**	**73.65**	**14.96**	**26.65**	**0.91**	**1.45**	**80.47**	**0.20**


Alkalinity
mg/L as CaCO3
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
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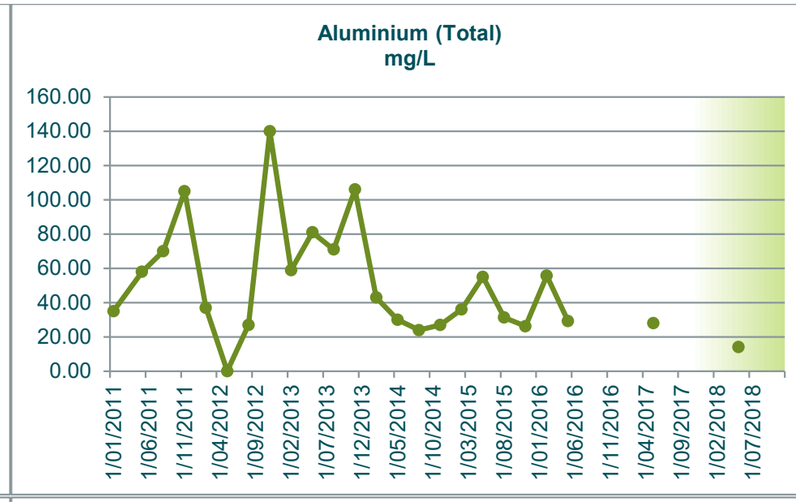
1/07/2018


Aluminium (Total)
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
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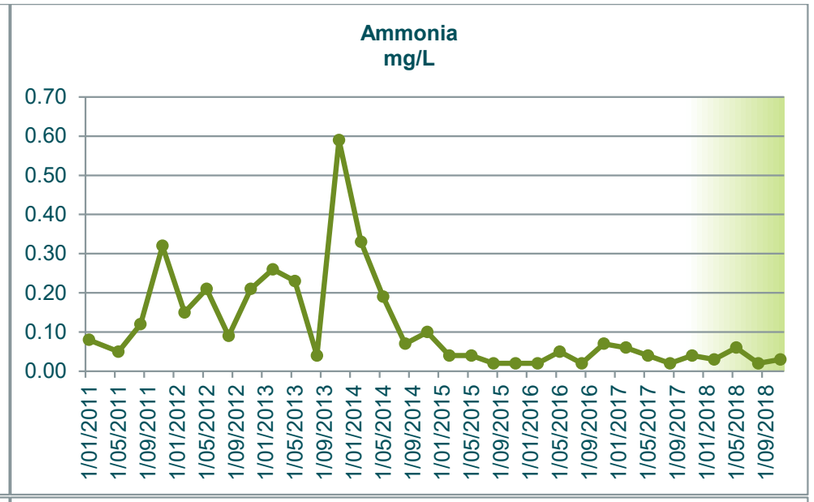
Ammonia
mg/L
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
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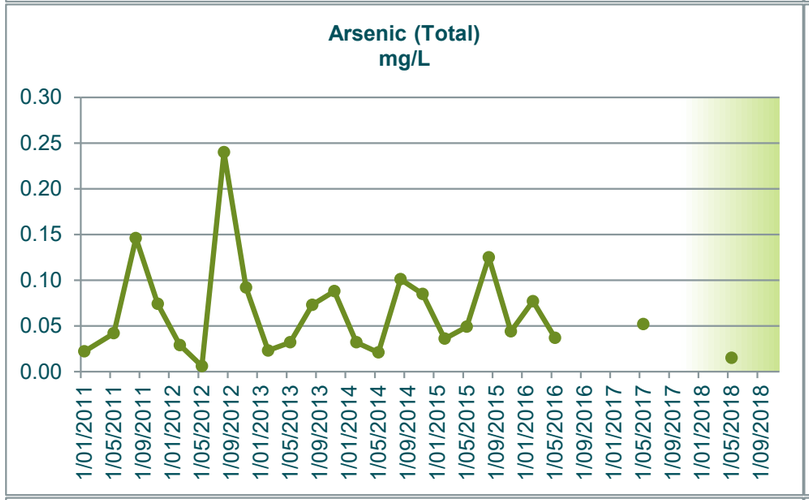
Arsenic (Total)
mg/L
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
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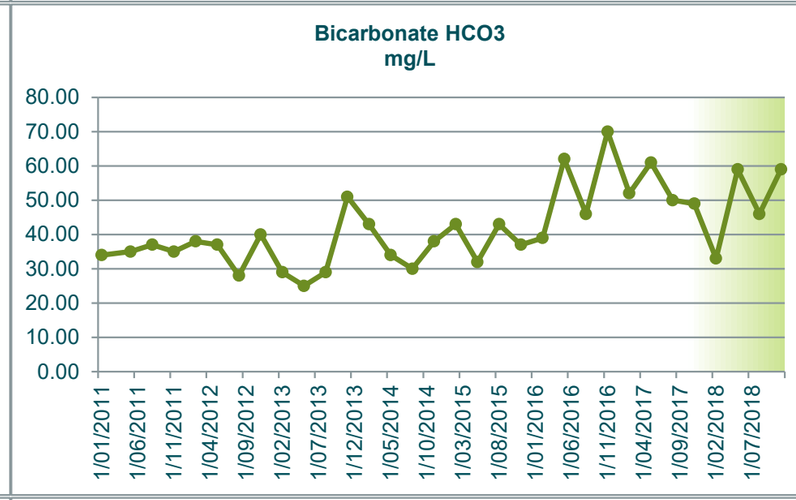
Bicarbonate HCO3
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
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1/11/2016
1/04/2017
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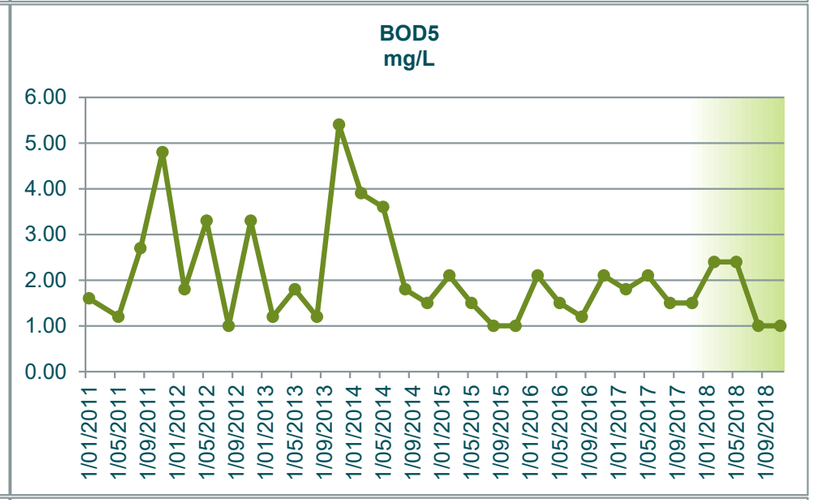
BOD5
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
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1/09/2015
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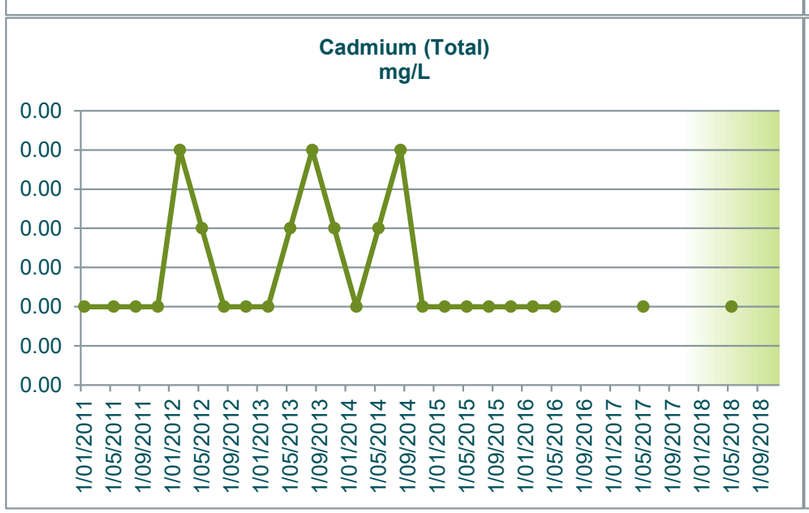
Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
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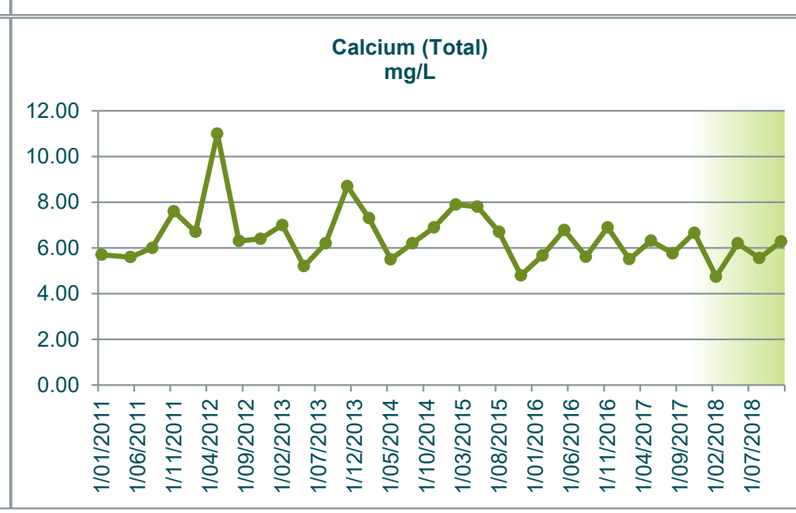
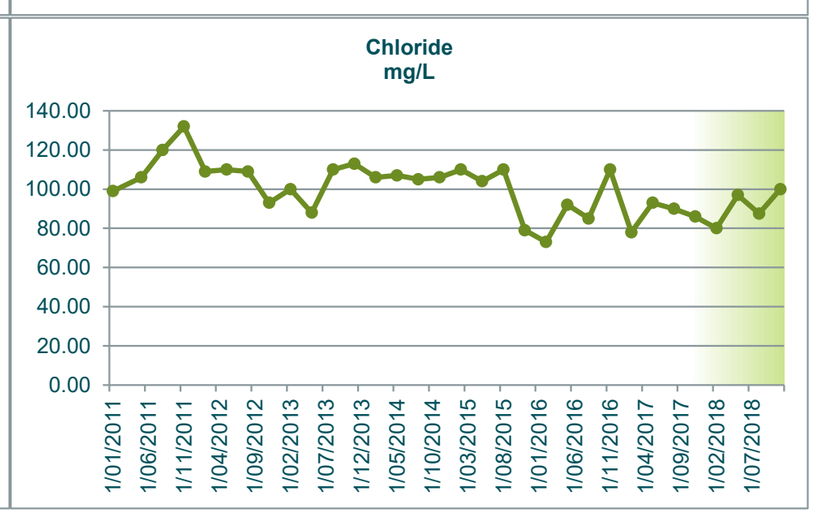
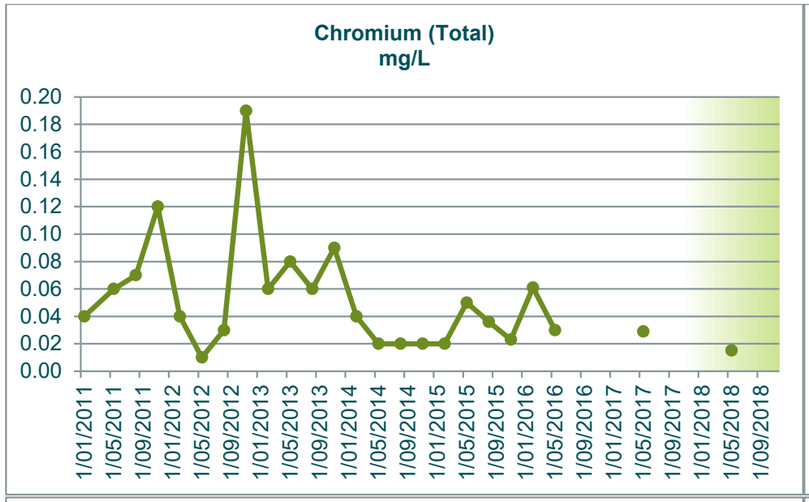
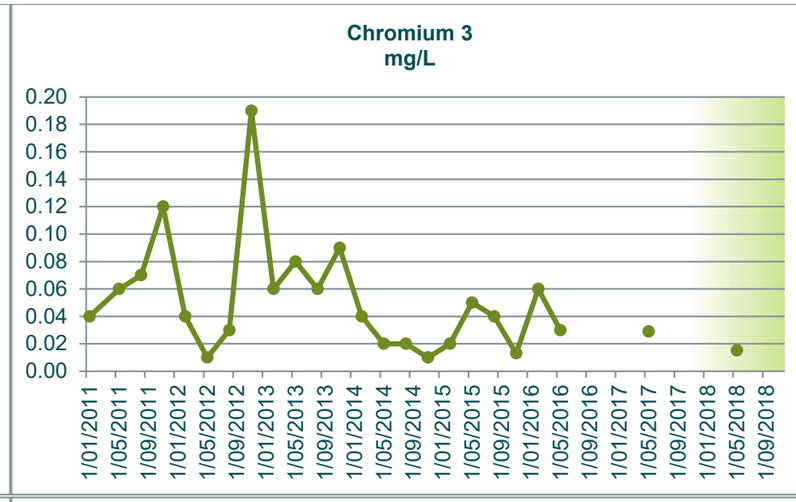
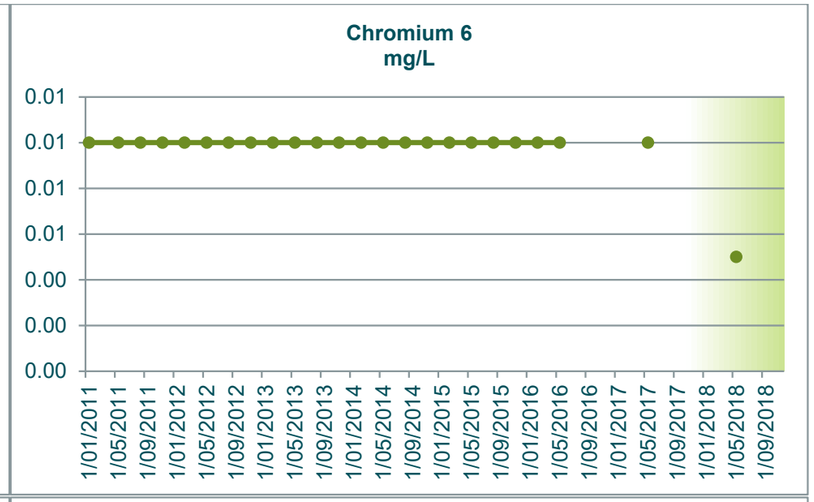
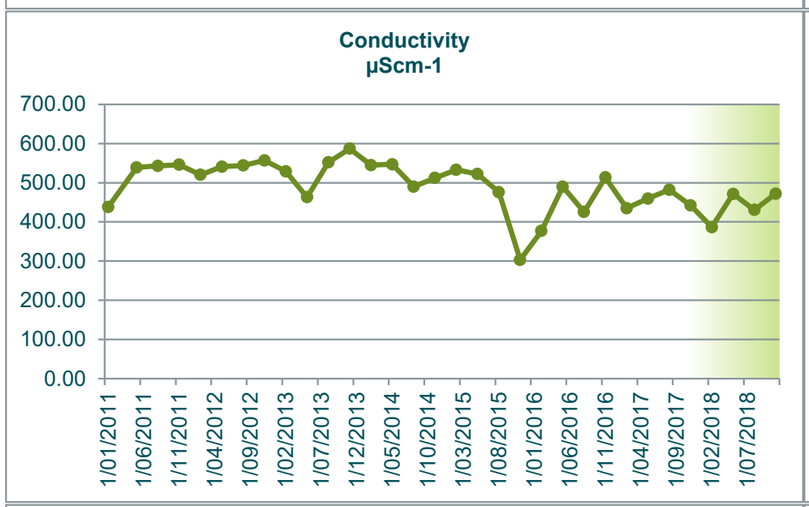

Calcium (Total)
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

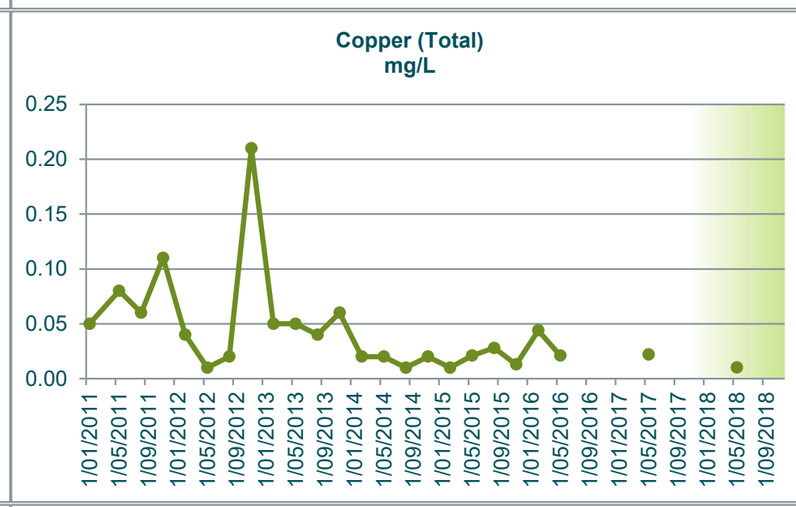

Chloride
mg/L
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

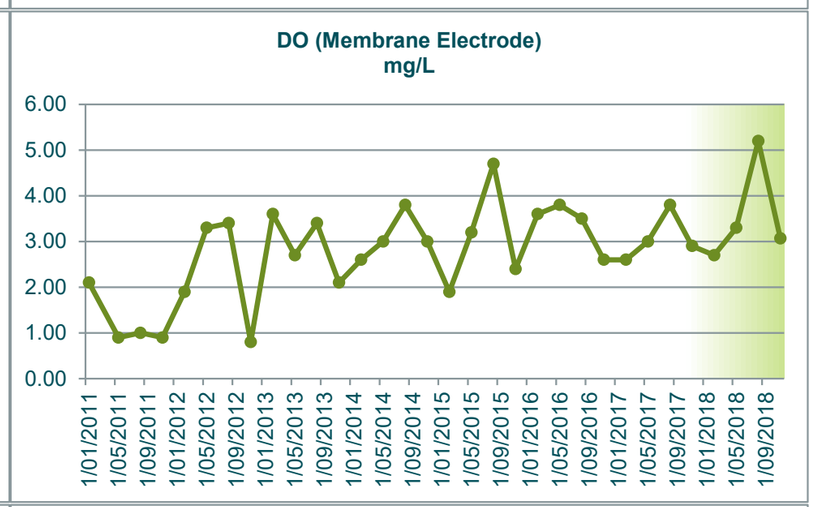

Chromium (Total)
mg/L
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

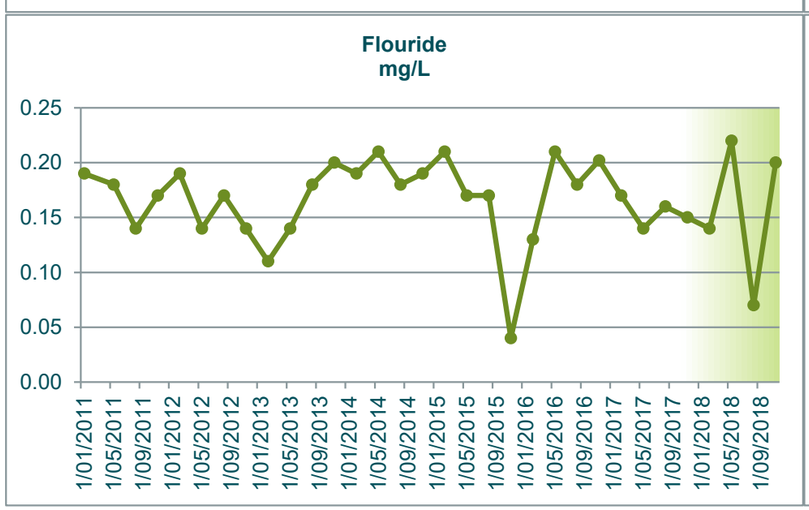

Chromium 3
mg/L
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

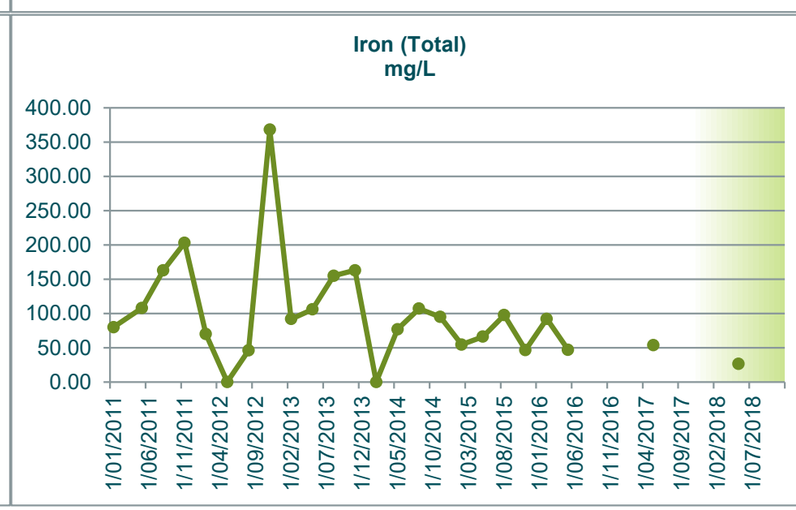

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

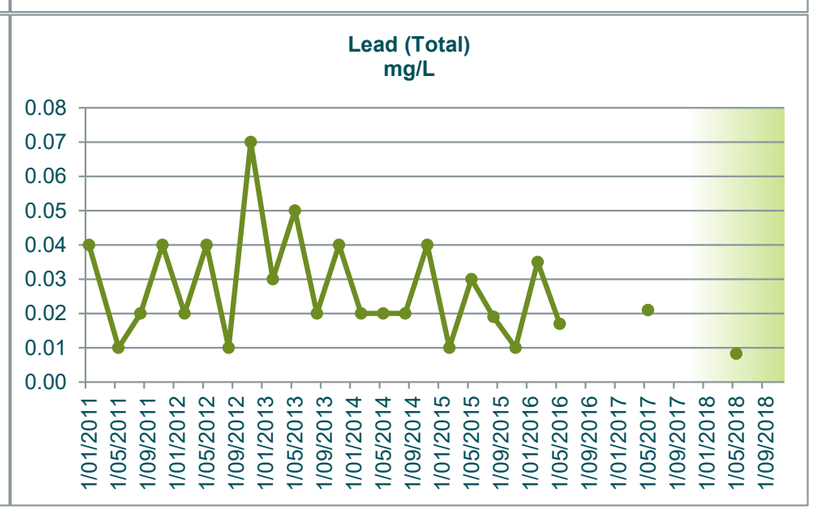

Conductivity
µScm-1
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

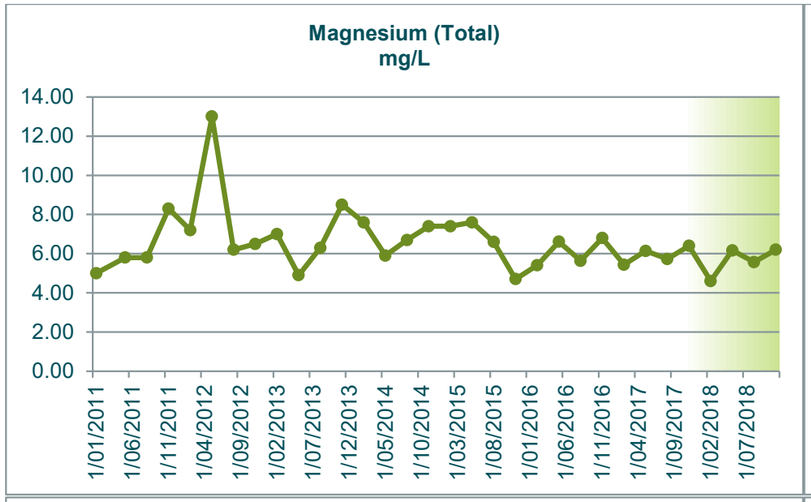

Copper (Total)
mg/L
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

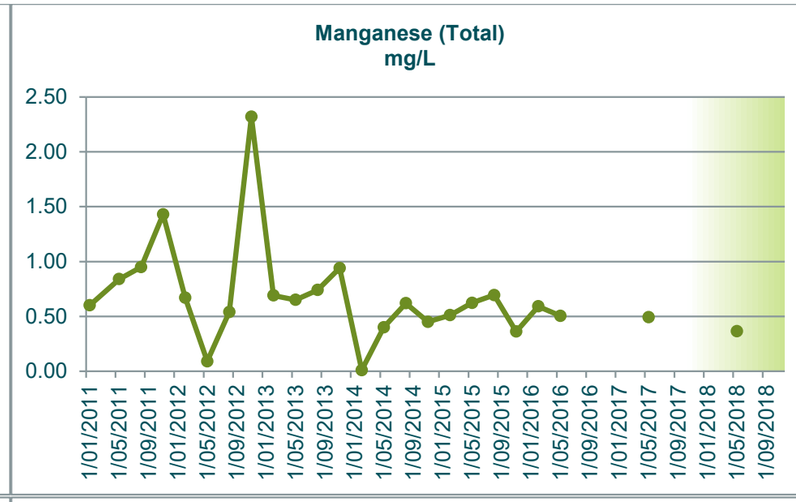

DO (Membrane Electrode)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

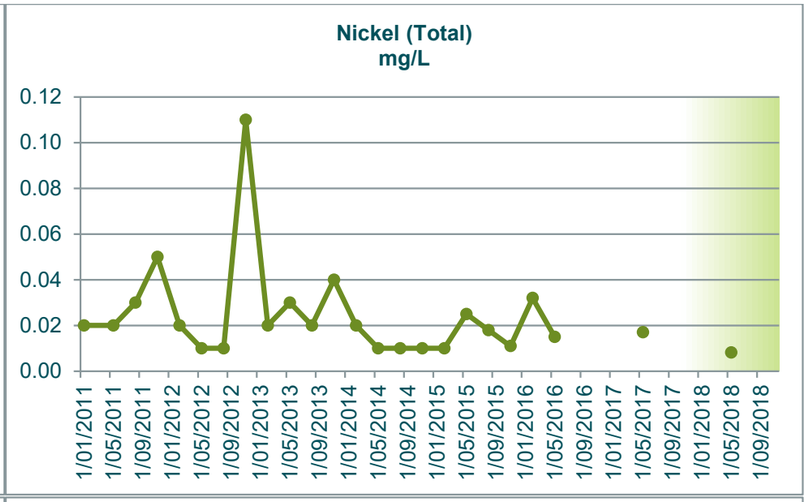

Flouride
mg/L
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

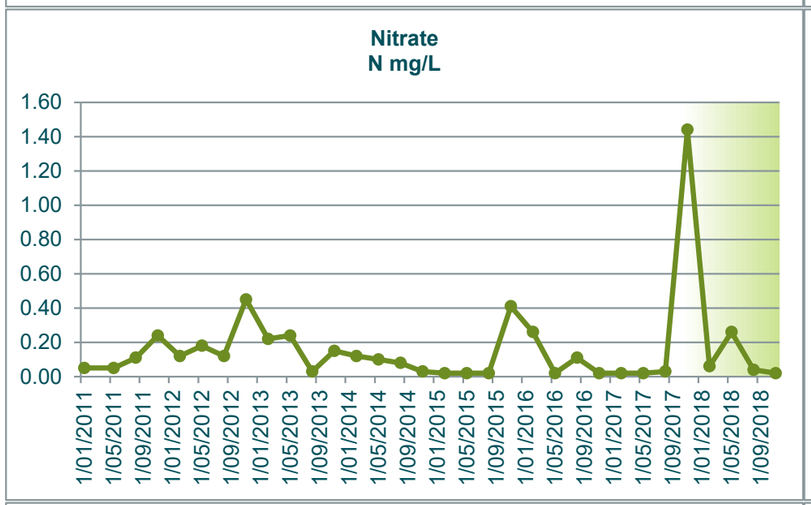

Iron (Total)
mg/L
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

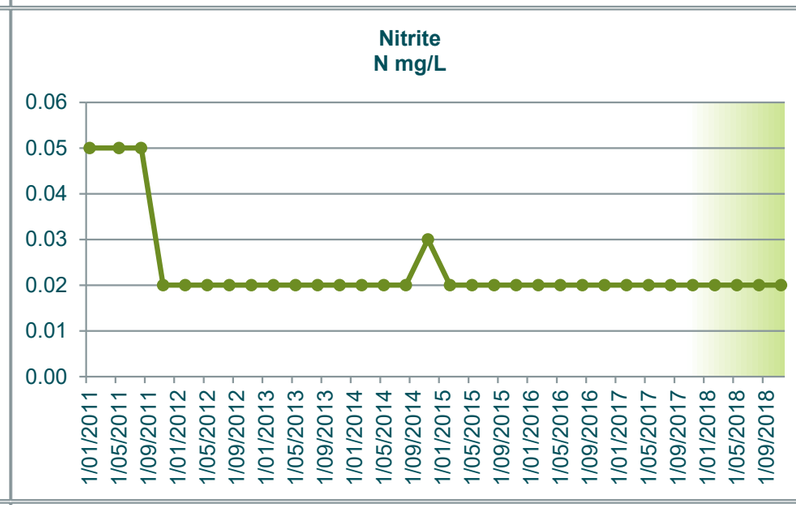

Lead (Total)
mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

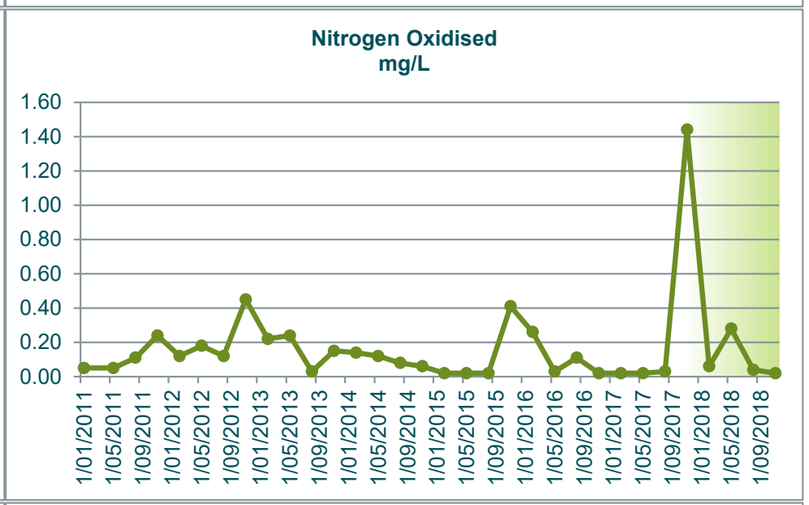

Magnesium (Total)
mg/L
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

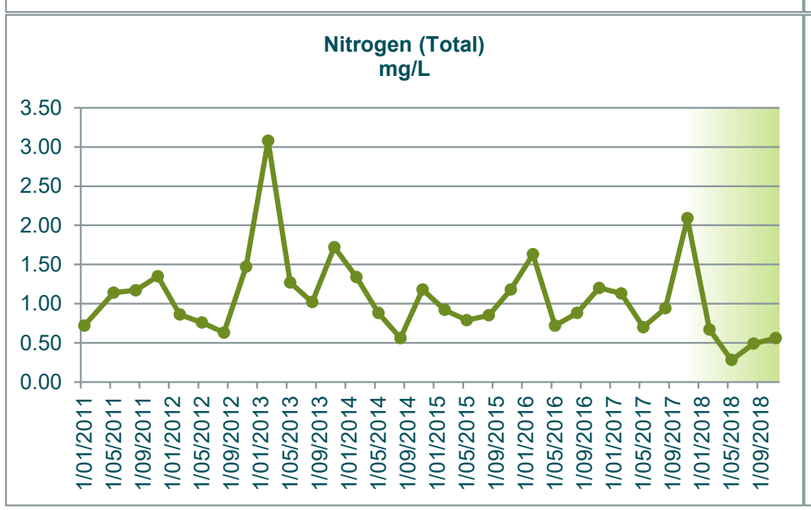

Manganese (Total)
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

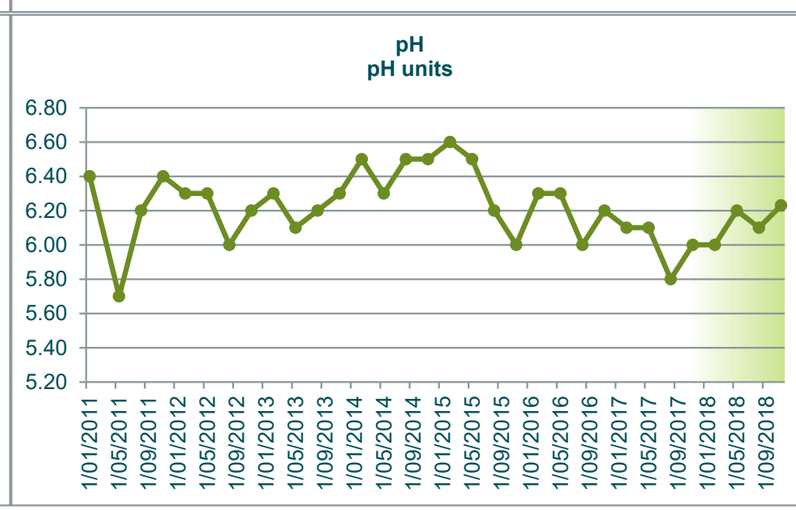

Nickel (Total)
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

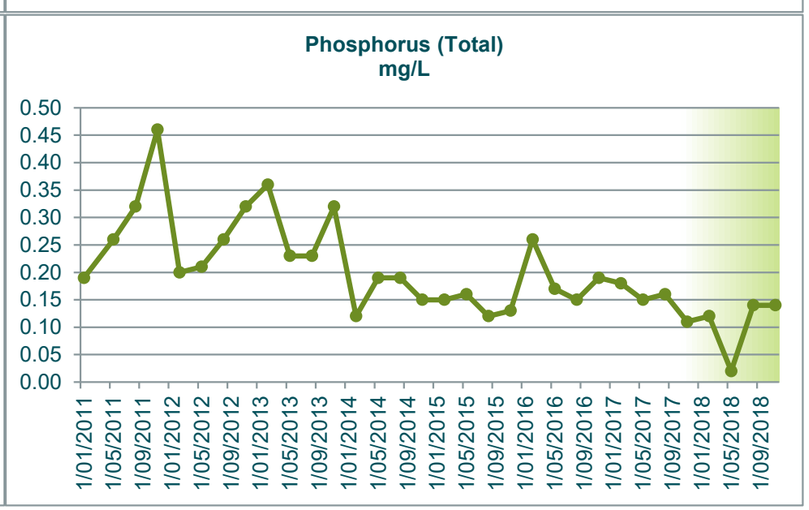

Nitrate
N mg/L
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

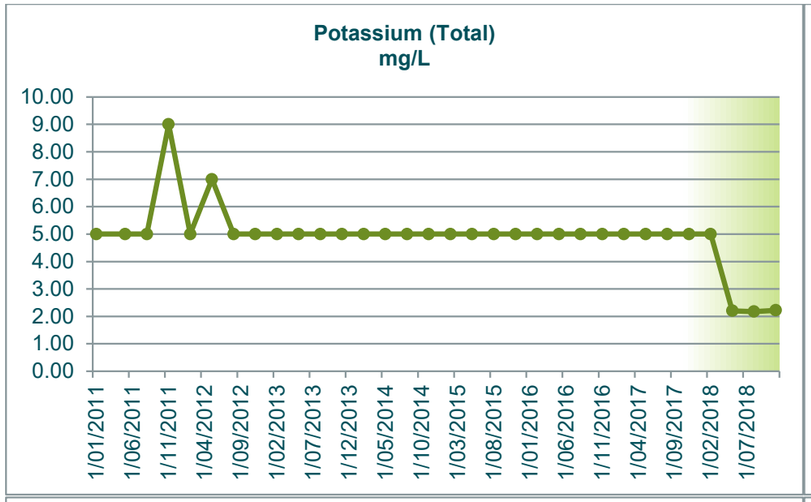

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

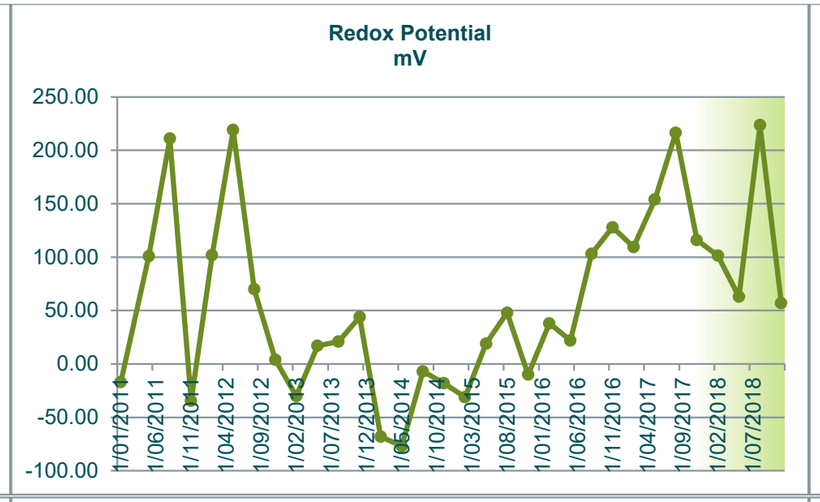

Nitrogen Oxidised
mg/L
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

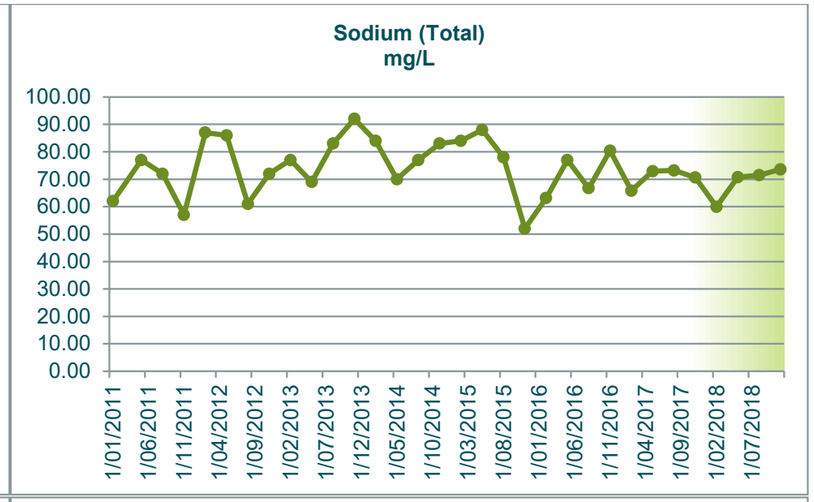

Nitrogen (Total)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

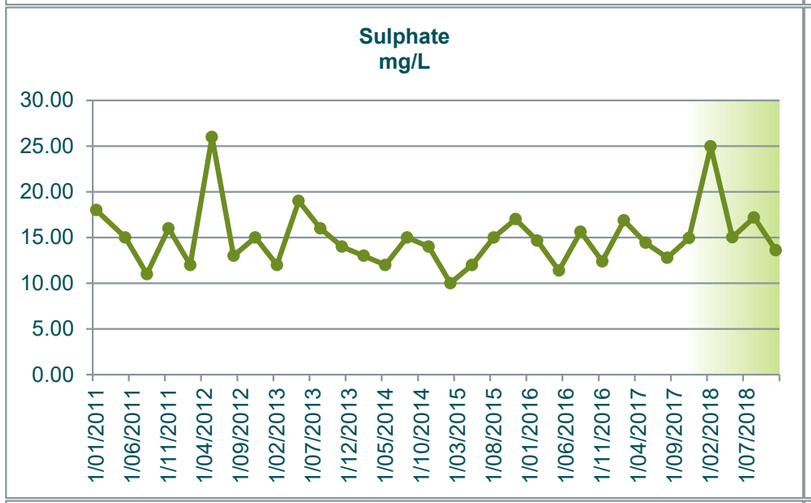

pH
pH units
6.80
6.60
6.40
6.20
6.00
5.80
5.60
5.40
5.20
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

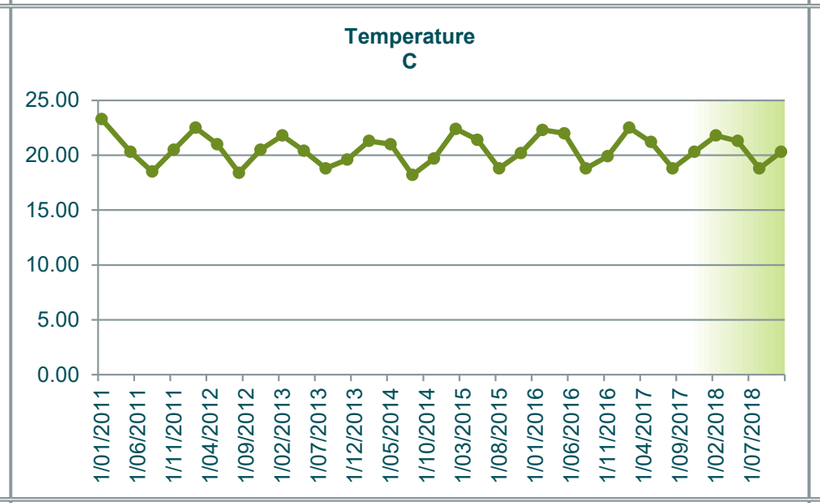

Phosphorus (Total)
mg/L
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

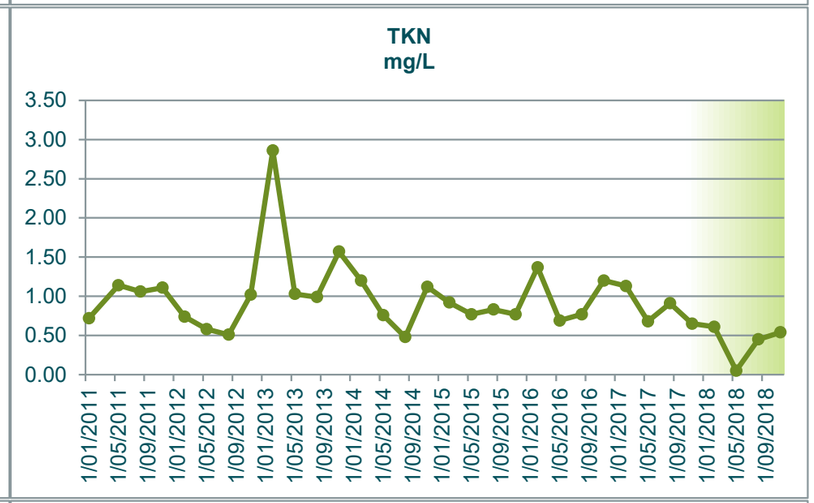

Potassium (Total)
mg/L
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Redox Potential
mV
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Sodium (Total)
mg/L
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Sulphate
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


TKN
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
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1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
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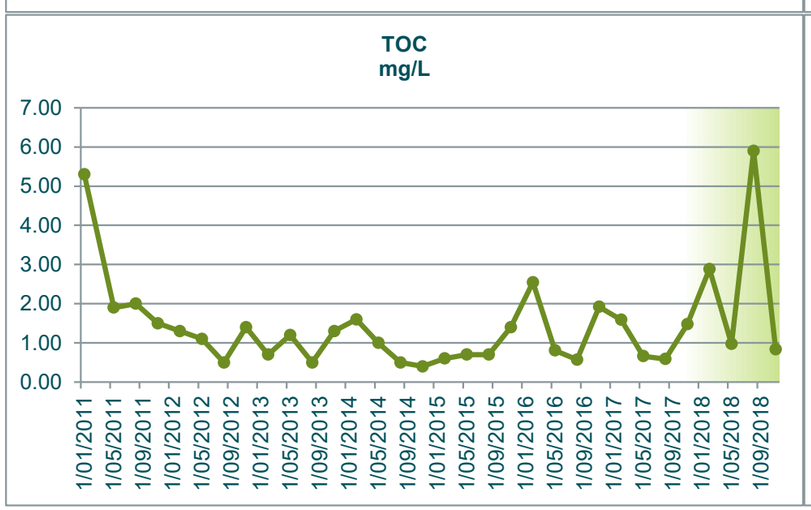
1/09/2018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mg/L
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6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
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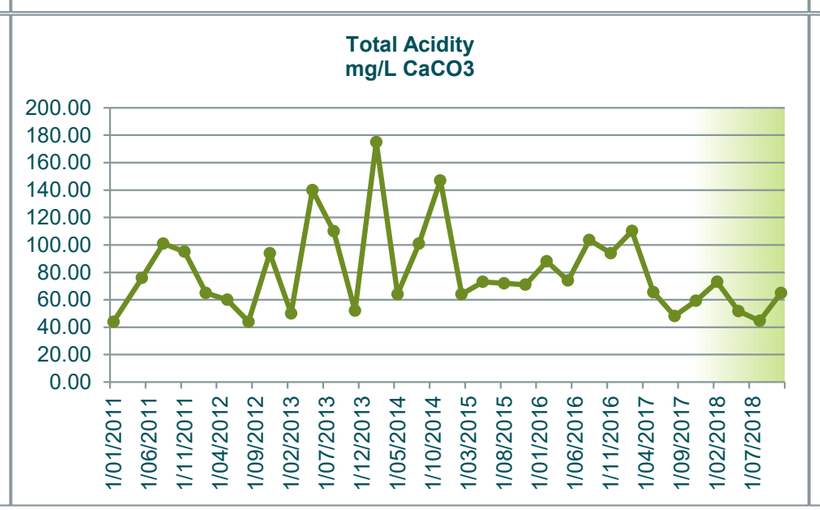
1/09/2018


Total Acidity
mg/L CaCO3
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180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
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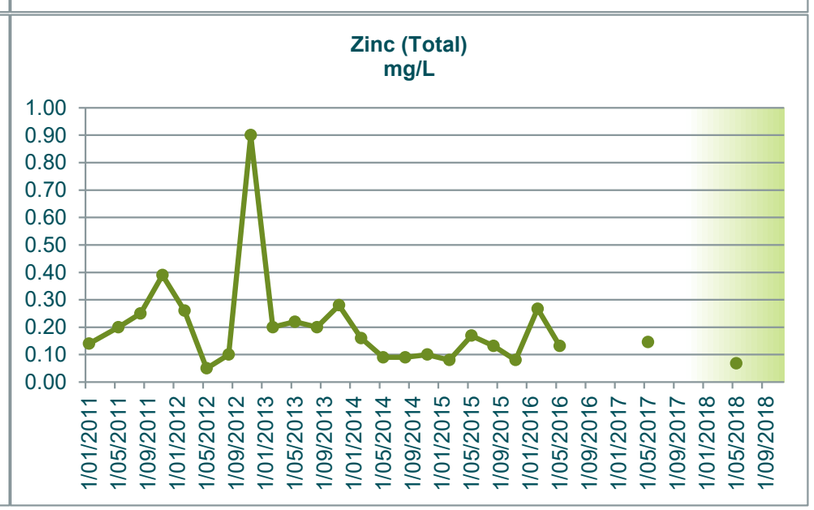
1/09/2017
1/02/2018
1/07/2018


Zinc (Total)
mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
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1/09/2014
1/01/2015
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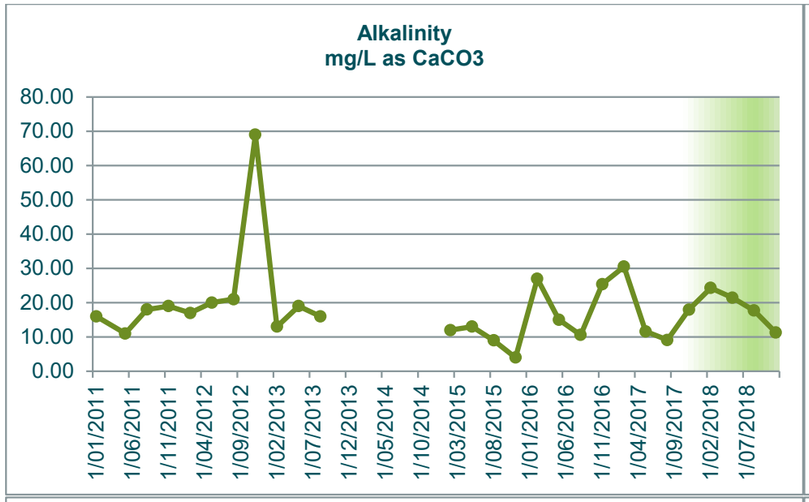
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

GW9	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	16.00	10.00	0.05	0.01	10.00	6.60	0.00	11.00	185.00	0.01	0.01	0.01	639.00	0.02	2.40	0.04	13.00	0.03	8.80	0.35	0.01	0.05	0.05	0.05	0.36	5.50	0.23	5.00	103.00	67.00	38.00	23.00	0.36	6.10	56.00	0.08
10/05/2011	11.00	29.00	0.05	0.01	7.00	2.10	0.00	20.00	324.00	0.03	0.03	0.01	1216.00	0.06	3.00	0.04	25.00	0.06	21.00	0.79	0.01	0.05	0.05	0.05	0.96	5.00	0.19	5.00	100.00	155.00	42.00	21.10	0.96	3.70	52.00	0.07
9/08/2011	18.00	66.00	0.05	0.05	11.00	3.30	0.00	11.00	140.00	0.04	0.04	0.01	680.00	0.08	3.00	0.06	51.00	0.09	10.00	0.41	0.01	0.05	0.05	0.05	0.92	5.80	0.19	5.00	240.00	82.00	50.00	18.90	0.87	7.60	108.00	0.14
8/11/2011	19.00	6.39	0.03	0.01	12.00	5.70	0.00	13.00	150.00	0.01	0.01	0.01	576.00	0.02	2.70	0.10	13.00	0.01	11.00	0.30	0.01	0.03	0.02	0.03	0.19	5.60	0.12	7.00	95.30	59.00	65.00	21.90	0.16	3.70	81.00	0.06
6/02/2012	17.00	5.30	0.03	0.01	10.00	3.00	0.00	13.00	159.00	0.01	0.01	0.01	679.00	0.01	2.20	0.03	5.86	0.01	12.00	0.44	0.01	0.02	0.02	0.05	0.33	5.30	0.11	5.00	146.00	98.00	54.00	22.40	0.33	2.70	68.00	0.08
8/05/2012	20.00	0.11	0.06	0.01	12.00	2.70	0.00	20.00	270.00	0.01	0.01	0.01	1101.00	0.01	3.80	0.06	4.18	0.02	23.00	0.35	0.01	0.05	0.02	0.05	0.56	6.00	0.07	5.00	256.00	154.00	45.00	21.40	0.51	5.90	68.00	0.01
6/08/2012	21.00	5.70	0.02	0.01	13.00	2.10	0.00	18.00	252.00	0.01	0.01	0.01	990.00	0.01	2.60	0.04	14.00	0.01	18.00	0.67	0.01	0.02	0.02	0.02	0.39	5.40	0.18	5.00	186.00	108.00	49.00	19.50	0.39	3.50	64.00	0.04
13/11/2012	69.00	35.00	0.12	0.02	42.00	2.10	0.00	11.00	160.00	0.03	0.03	0.01	854.00	0.07	4.00	0.12	37.00	0.08	16.00	0.88	0.01	0.13	0.02	0.13	0.92	6.20	0.36	5.00	19.00	112.00	48.00	20.90	0.79	4.10	94.00	0.18
13/02/2013	13.00	15.00	0.04	0.01	8.00	1.20	0.00	35.00	450.00	0.01	0.01	0.01	1705.00	0.02	2.90	0.05	14.00	0.02	34.00	1.65	0.01	0.31	0.02	0.31	0.80	5.30	0.10	5.00	65.00	206.00	60.00	21.50	0.49	6.30	71.00	0.08
14/05/2013	19.00	12.00	0.05	0.01	12.00	3.00	0.00	26.00	320.00	0.01	0.01	0.01	1218.00	0.02	2.80	0.03	11.00	0.02	23.00	1.14	0.01	0.06	0.02	0.06	0.59	5.50	0.04	5.00	4.00	159.00	60.00	21.20	0.53	4.10	149.00	0.05
6/08/2013	16.00	9.25	0.02	0.01	10.00	2.10	0.00	28.00	340.00	0.01	0.01	0.01	1226.00	0.01	3.40	0.03	14.00	0.02	25.00	0.96	0.01	0.03	0.02	0.03	0.49	5.40	0.16	5.00	59.00	171.00	74.00	18.70	0.46	3.80	143.00	0.04
12/11/2013																																				
11/02/2014																																				
13/05/2014																																				
12/08/2014																																				
10/11/2014																																				
9/02/2015	12.00	5.58	0.03	0.01	7.00	3.30	0.00	30.00	520.00	0.01	0.01	0.01	1754.00	0.01	1.70	0.04	6.65	0.01	30.00	1.30	0.01	0.02	0.02	0.02	1.00	5.40	0.10	5.00	46.00	216.00	64.00	23.30	1.00	5.30	94.00	0.05
11/05/2015	13.00	6.56	0.02	0.01	8.00	4.50	0.00	28.00	375.00	0.01	0.01	0.01	1363.00	0.01	3.50	0.05	6.22	0.02	27.00	1.08	0.00	0.02	0.02	0.02	0.74	5.30	0.07	5.00	66.00	203.00	62.00	21.70	0.72	5.50	91.00	0.07
11/08/2015	9.00	9.24	0.02	0.01	9.00	3.00	0.00	45.00	610.00	0.01	0.01	0.01	2090.00	0.02	3.70	0.03	11.70	0.02	43.00	1.66	0.01	0.06	0.02	0.06	1.09	5.20	0.08	5.00	124.00	296.00	94.00	18.80	1.03	7.00	128.00	0.07
10/11/2015	4.00	6.33	0.02	0.00	4.00	1.00	0.00	57.00	820.00	0.00	0.01	0.01	2620.00	0.01	4.10	0.05	4.24	0.01	58.00	0.91	0.01	0.02	0.02	0.02	0.60	4.80	0.05	5.00	132.00	346.00	83.00	19.90	0.58	9.40	72.00	0.06
8/02/2016	27.00	3.68	0.02	0.00	27.00	1.00	0.00	14.29	190.00	0.00	0.01	0.01	826.00	0.01	3.30	0.03	5.37	0.01	13.30	0.61	0.00	0.13	0.02	0.13	0.64	5.70	0.24	5.00	98.00	120.06	63.18	22.10	0.51	4.80	128.00	0.08
9/05/2016	15.00	3.72	0.02	0.01	15.00	7.80	0.00	38.44	530.00	0.00	0.01	0.01	1868.00	0.01	3.10	0.03	7.39	0.02	37.58	1.64	0.01	0.08	0.02	0.08	0.83	5.40	0.08	5.00	102.00	255.65	72.08	22.70	0.75	9.51	120.00	0.08
9/08/2016	10.60		0.02		11.00	1.20		48.18	660.00				2325.30		3.30	0.06			49.28			0.05	0.02	0.05	0.47	5.00	0.03	5.00	43.00	314.68	90.95	19.30	0.42	5.48	168.00	
7/11/2016	25.40		0.02		25.00	1.80		14.47	194.00				826.70		3.20	0.02			13.20			0.02	0.02	0.02	0.48	5.50	0.08	5.00	335.00	131.50	68.90	20.30	0.48	3.64	108.20	
7/02/2017	30.50		0.02		30.00	1.00		6.33	80.00				493.10		3.50	0.04			5.86			0.04	0.02	0.04	0.37	5.60	0.06	5.00	193.00	76.81	63.41	22.10	0.33	2.43	142.80	
8/05/2017	11.60	0.29	0.05	0.00	12.00	1.20	0.00	60.78	860.00	0.01	0.01	0.00	2886.10	0.00	3.40	0.04	0.84	0.00	62.09	0.35	0.00	0.03	0.02	0.03	0.68	5.00	0.04	5.00	194.40	362.04	100.69	21.70	0.65	7.70	100.50	0.02
8/08/2017	9.10		0.02		9.00	1.50		50.24	675.00				2447.20		3.40	0.03			49.44			0.05	0.02	0.05	0.96	5.00	0.05	5.00	269.70	322.79	79.16	19.40	0.91	7.56	91.30	
7/11/2017	17.97		0.02		18.00	4.20		28.23	425.00				1523.70		3.90	0.03			26.15			0.08	0.02	0.08	0.57	5.30	0.05	5.00	290.40	203.18	67.78	20.60	0.49	4.04	78.10	
13/02/2018	24.30		0.02		24.00	2.10		13.48	198.00				884.00		3.80	0.03			12.73			0.02	0.02	0.02	0.42	5.60	0.05	5.00	137.60	132.93	73.32	22.30	0.40	4.03	94.70	
8/05/2018	21.46	3.03	0.11	0.01	21.00	2.10	0.00	75.31	1070.00	0.00	0.01	0.01	3512.70	0.01	3.30	0.05	13.06	0.02	77.06	3.12	0.01	0.03	0.02	0.03	0.05	5.30	0.02	2.67	93.90	478.11	109.31	21.90	0.05	10.66	132.00	0.05
14/08/2018	17.71		0.02		18.00	1.80		33.37	450.00				1671.30		4.30	0.06			31.02			0.07	0.02	0.07	0.62	5.30	0.10	2.27	405.70	267.26	82.31	19.50	0.55	10.00	82.80	
13/11/2018	11.30		0.02		11.00	1.20		122.91	910.00				3080.00		3.22	0.05			117.73			0.04	0.02	0.04	0.50	5.15	0.02	4.41	177.00	721.00	221.60	20.30	0.46	8.23	89.40	
2018 Min	**11.30**	**3.03**	**0.02**	**0.01**	**11.00**	**1.20**	**0.00**	**13.48**	**198.00**	**0.00**	**0.01**	**0.01**	**884.00**	**0.01**	**3.22**	**0.03**	**13.06**	**0.02**	**12.73**	**3.12**	**0.01**	**0.02**	**0.02**	**0.02**	**0.05**	**5.15**	**0.02**	**2.27**	**93.90**	**132.93**	**73.32**	**19.50**	**0.05**	**4.03**	**82.80**	**0.05**
2018 Max	**24.30**	**3.03**	**0.11**	**0.01**	**24.00**	**2.10**	**0.00**	**122.91**	**1070.00**	**0.00**	**0.01**	**0.01**	**3512.70**	**0.01**	**4.30**	**0.06**	**13.06**	**0.02**	**117.73**	**3.12**	**0.01**	**0.07**	**0.02**	**0.07**	**0.62**	**5.60**	**0.10**	**5.00**	**405.70**	**721.00**	**221.60**	**22.30**	**0.55**	**10.66**	**132.00**	**0.05**
2018 Mean	**18.69**	**3.03**	**0.04**	**0.01**	**18.50**	**1.80**	**0.00**	**61.27**	**657.00**	**0.00**	**0.01**	**0.01**	**2287.00**	**0.01**	**3.66**	**0.05**	**13.06**	**0.02**	**59.64**	**3.12**	**0.01**	**0.04**	**0.02**	**0.04**	**0.40**	**5.34**	**0.05**	**3.59**	**203.55**	**399.82**	**121.64**	**21.00**	**0.37**	**8.23**	**99.73**	**0.05**
Long-term Average	**18.48**	**12.22**	**0.04**	**0.01**	**14.67**	**2.69**	**0.00**	**32.30**	**419.15**	**0.01**	**0.01**	**0.01**	**1520.56**	**0.02**	**3.24**	**0.05**	**13.55**	**0.03**	**31.68**	**0.98**	**0.01**	**0.06**	**0.02**	**0.06**	**0.61**	**5.39**	**0.11**	**4.87**	**147.44**	**215.48**	**73.36**	**20.98**	**0.56**	**5.81**	**99.07**	**0.07**


Alkalinity
mg/L as CaCO3
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
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1/06/2016
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1/02/2018
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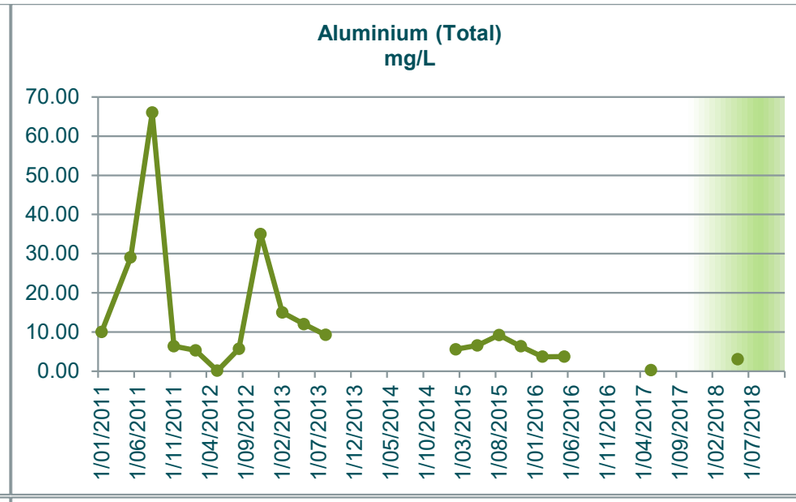
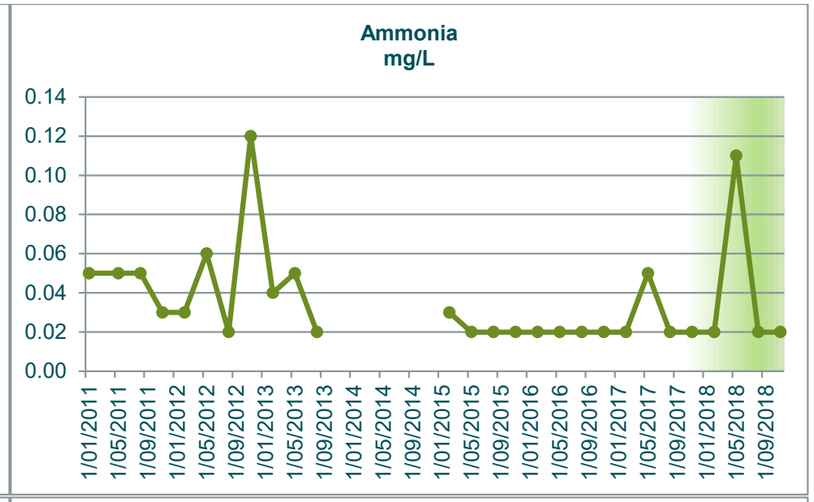

Aluminium (Total)
mg/L
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Ammonia
mg/L
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
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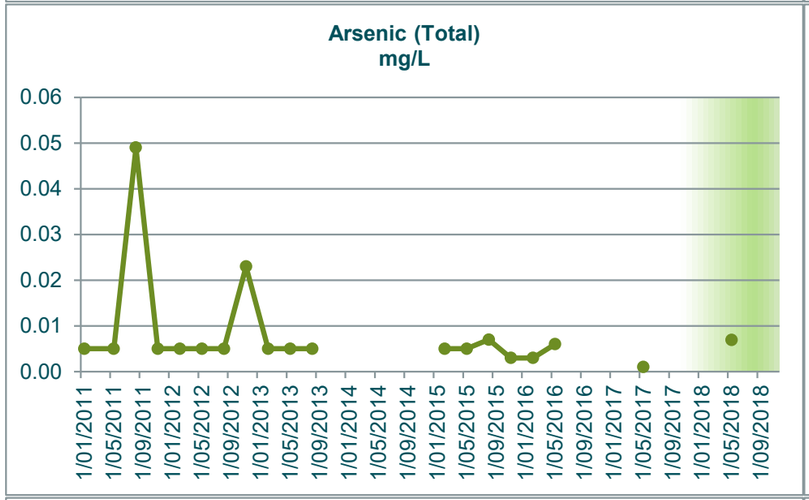
Arsenic (Total)
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
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1/09/2015
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1/05/2016
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1/01/2018
1/05/2018
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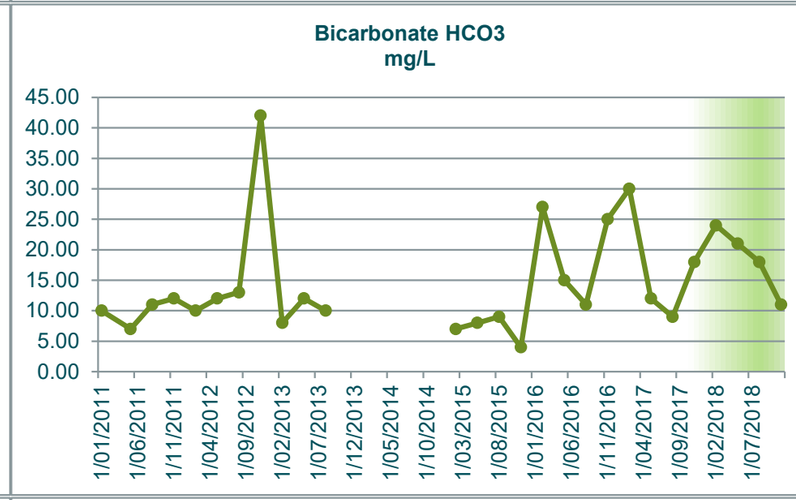
Bicarbonate HCO3
mg/L
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
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1/06/2016
1/11/2016
1/04/2017
1/09/2017
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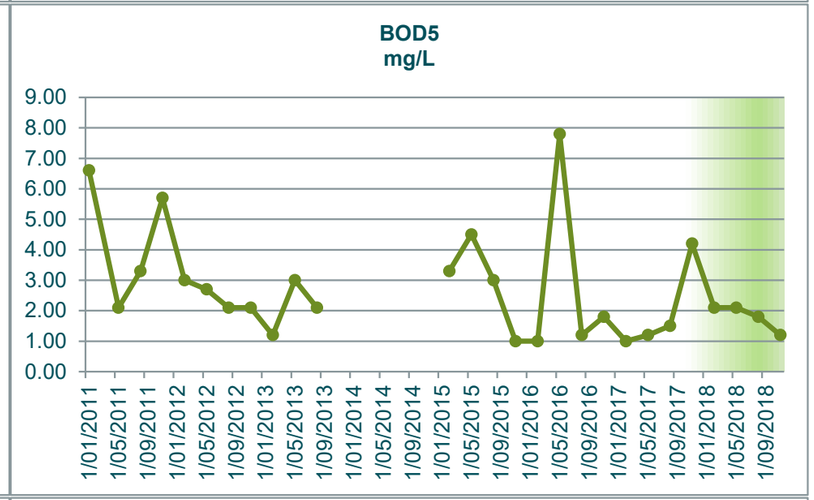
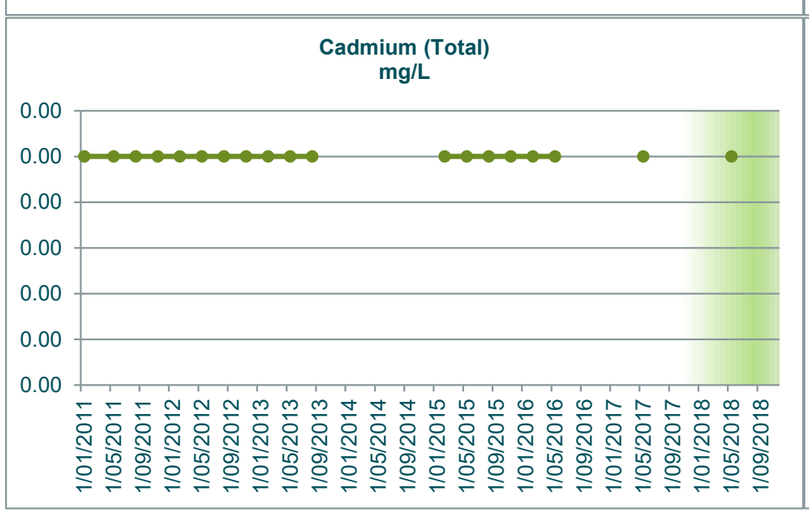
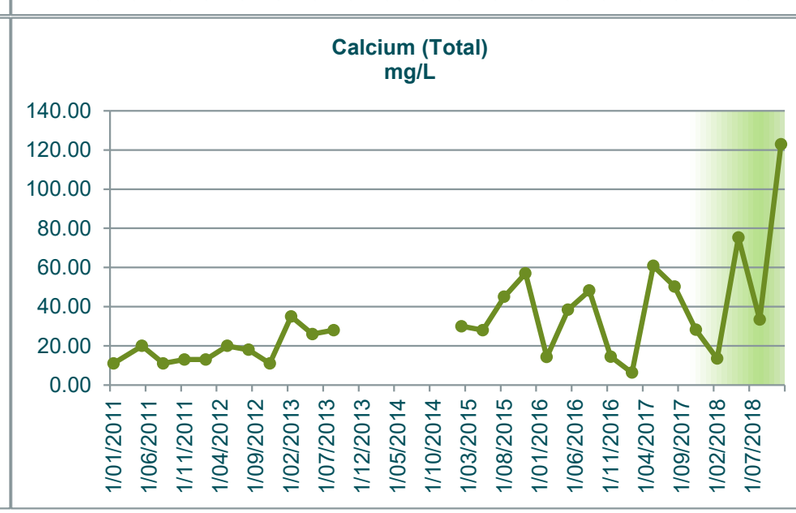
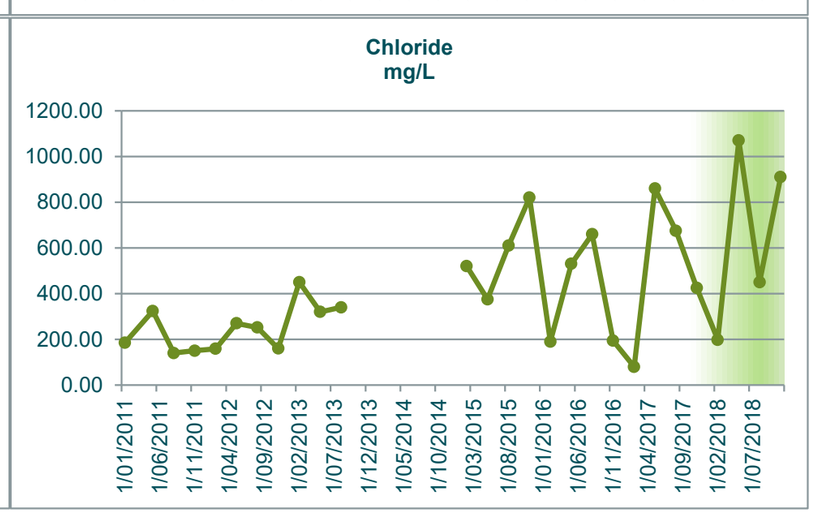
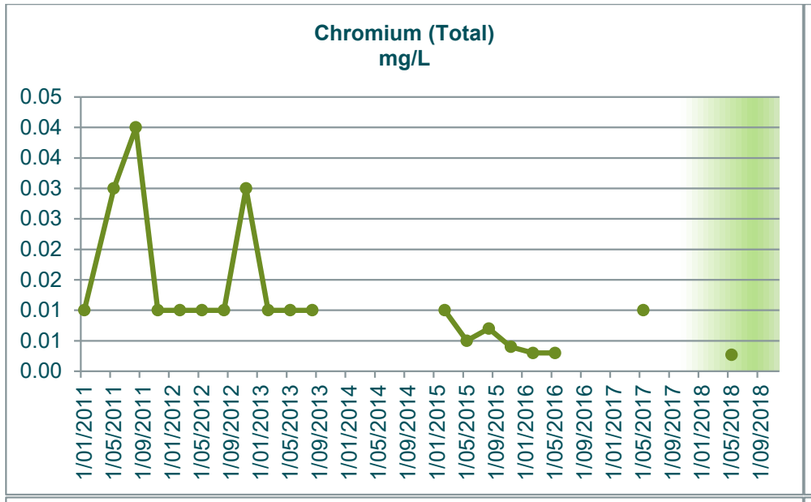
1/07/2018

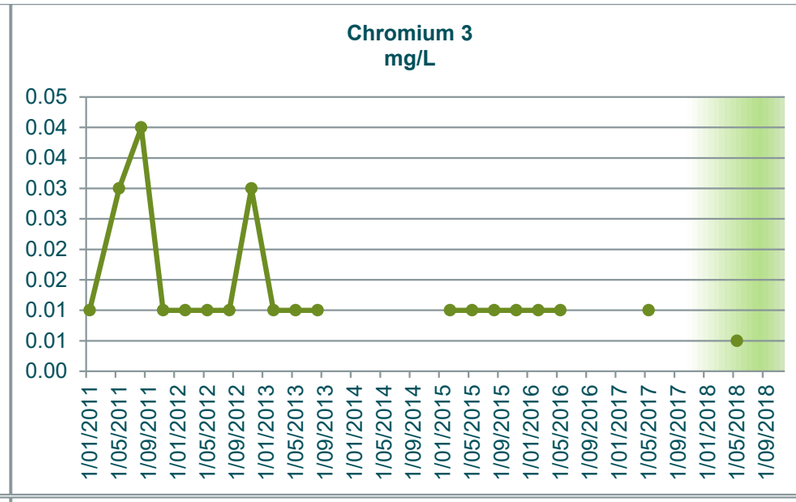

BOD5
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

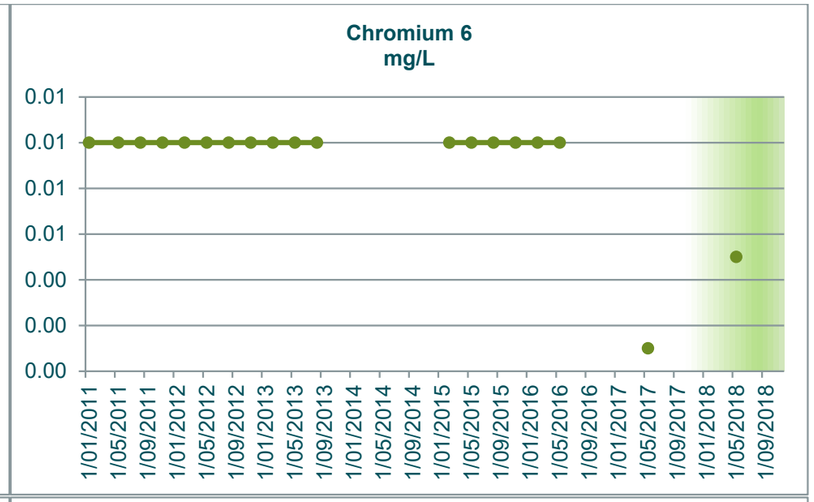

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

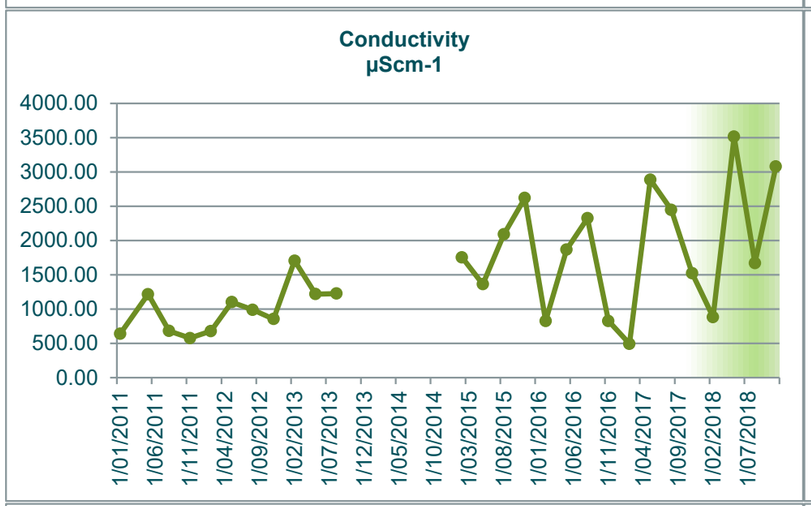

Calcium (Total)
mg/L
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

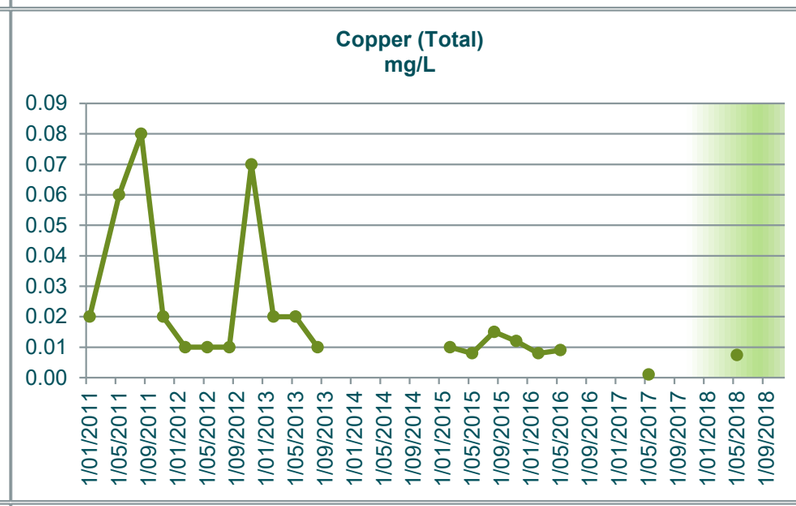

Chloride
mg/L
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

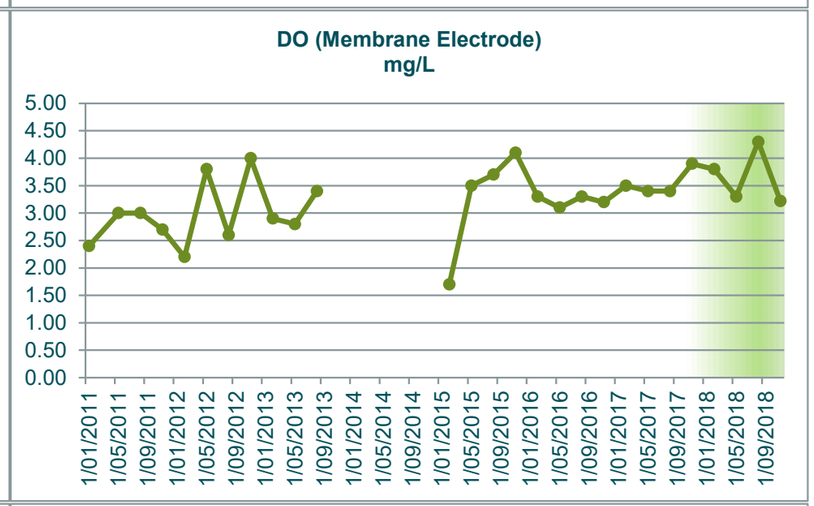

Chromium (Total)
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

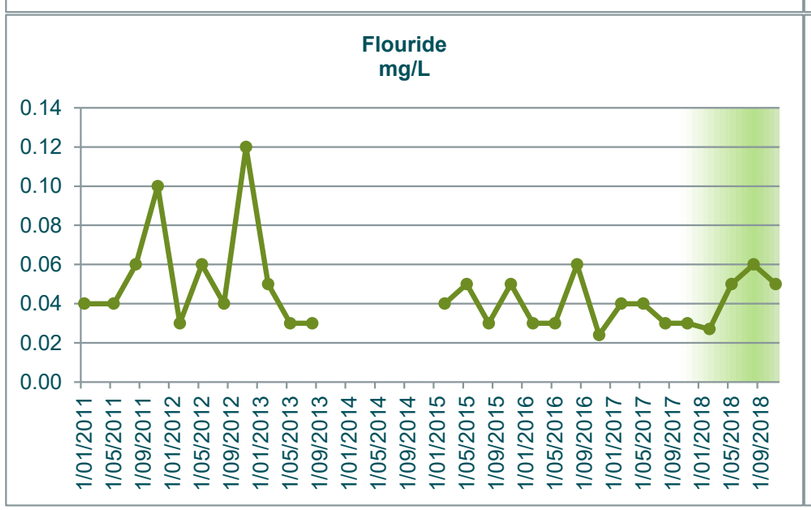

Chromium 3
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

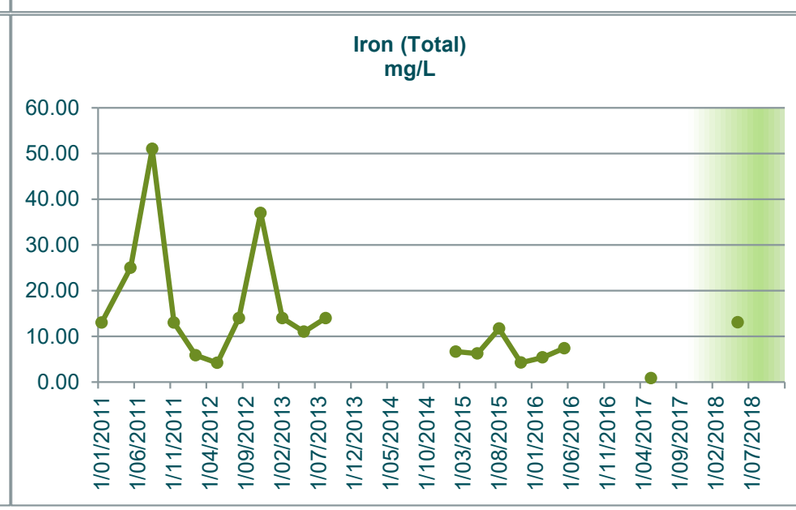

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

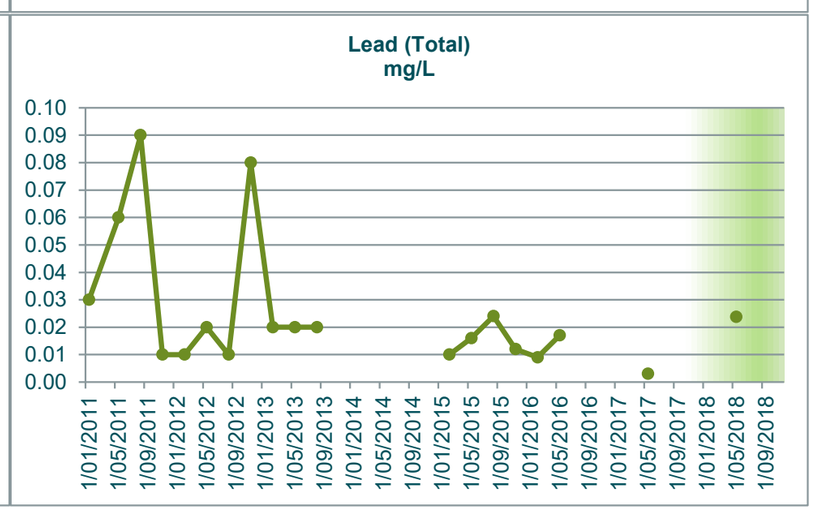

Conductivity
µScm-1
4000.00
3500.00
3000.00
2500.00
2000.00
1500.00
1000.00
500.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

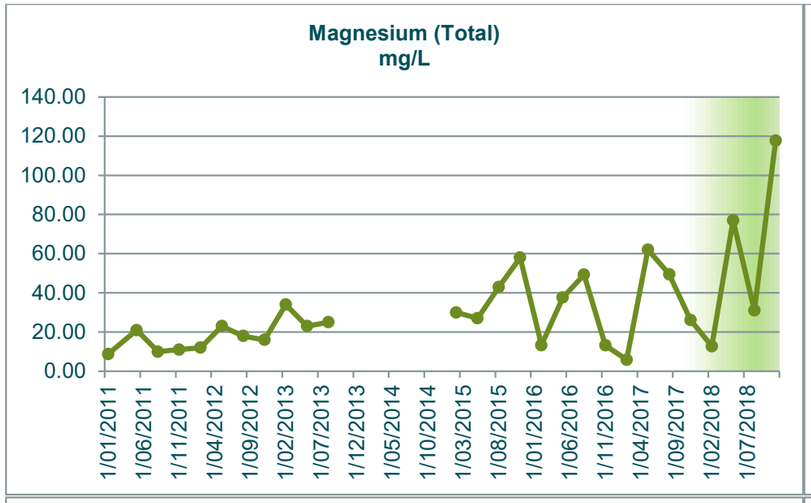

Copper (Total)
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

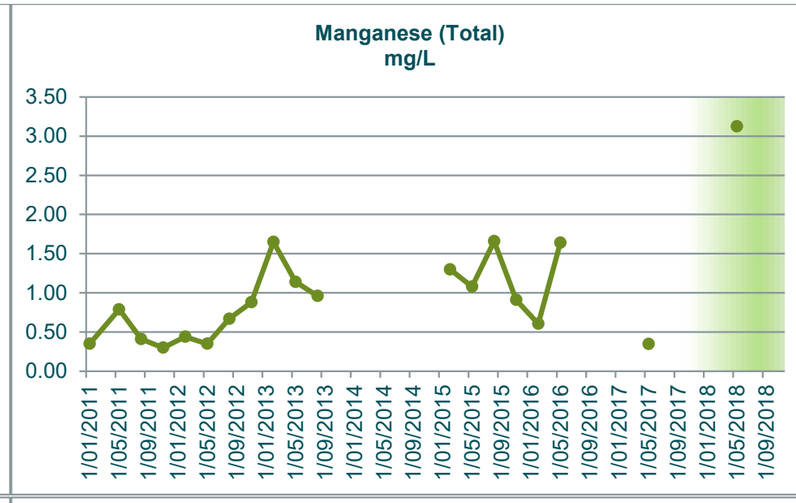

DO (Membrane Electrode)
mg/L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

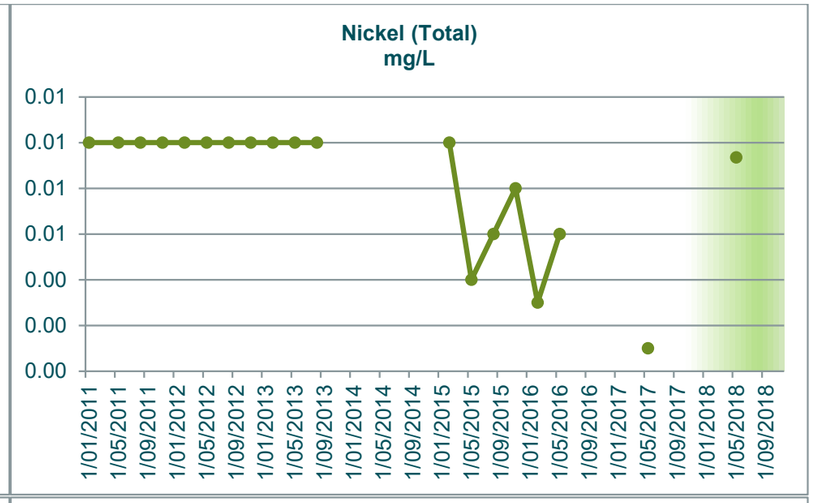

Flouride
mg/L
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

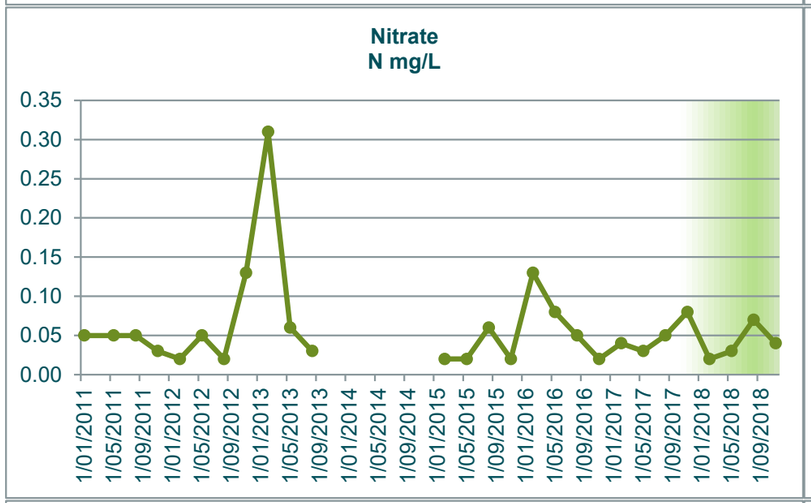

Iron (Total)
mg/L
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

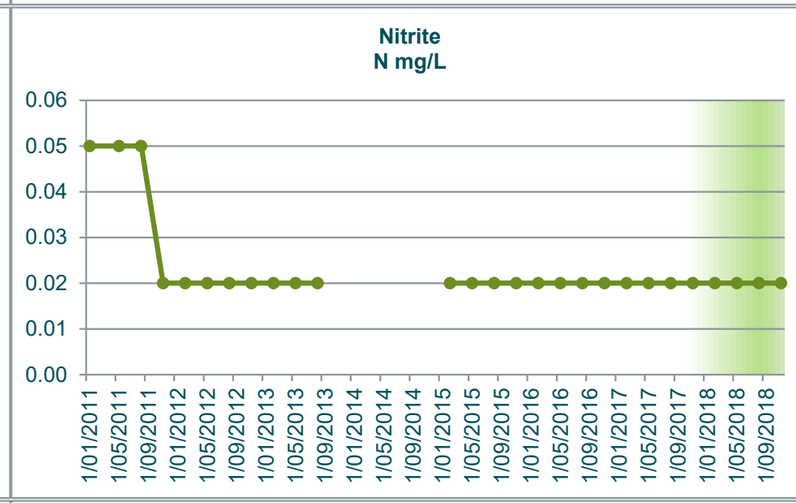

Lead (Total)
mg/L
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

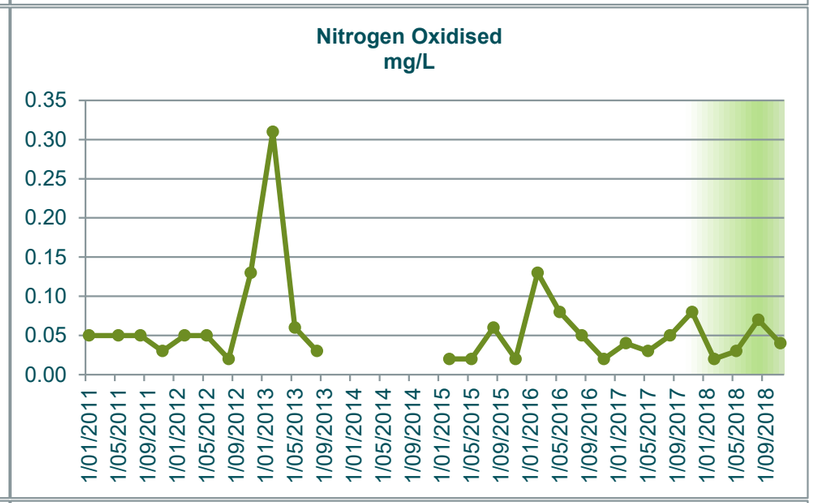

Magnesium (Total)
mg/L
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

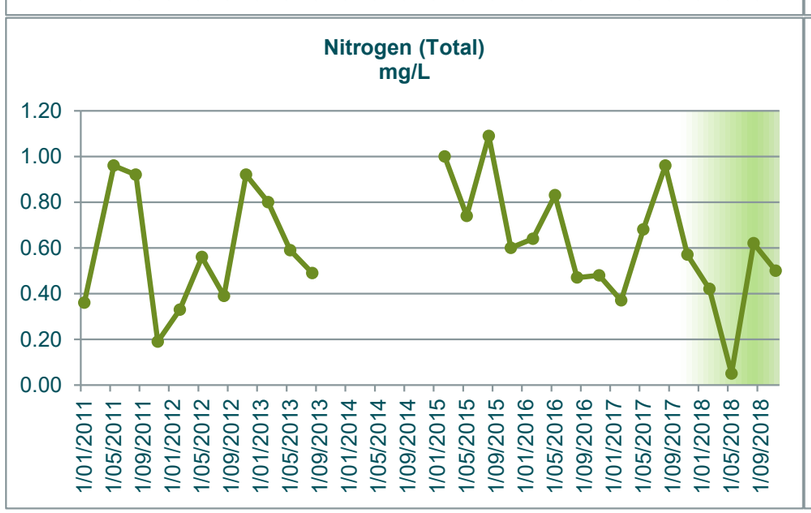

Manganese (Total)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

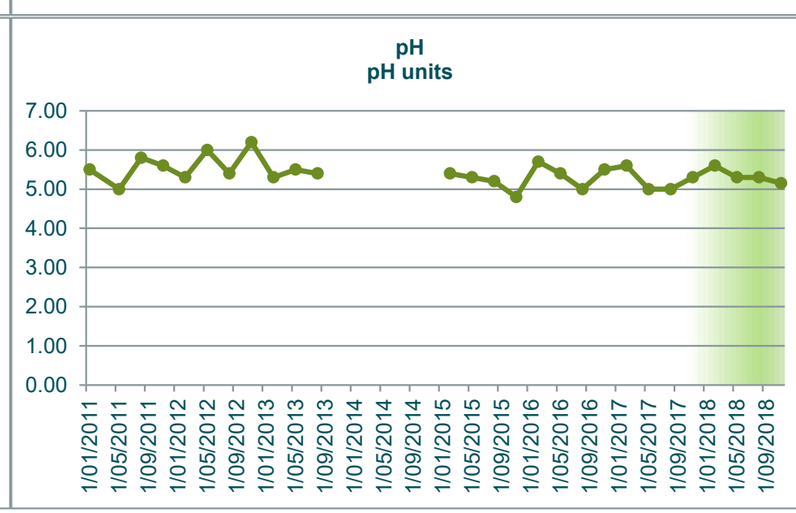

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

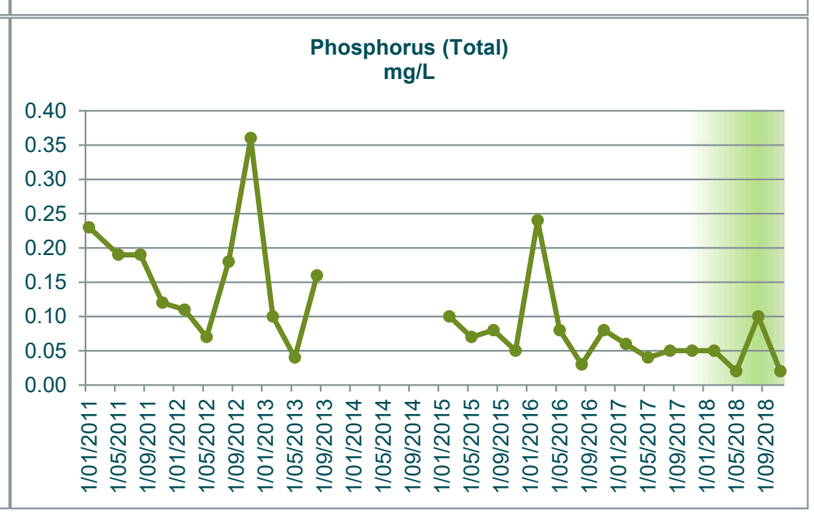

Nitrate
N mg/L
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

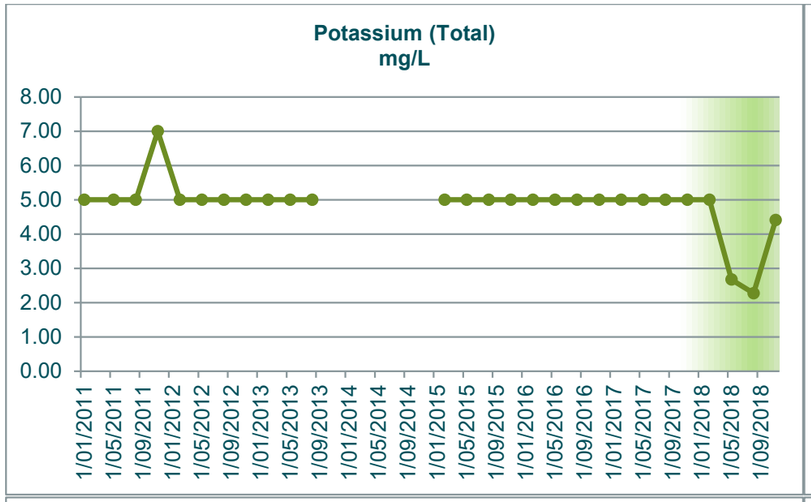

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

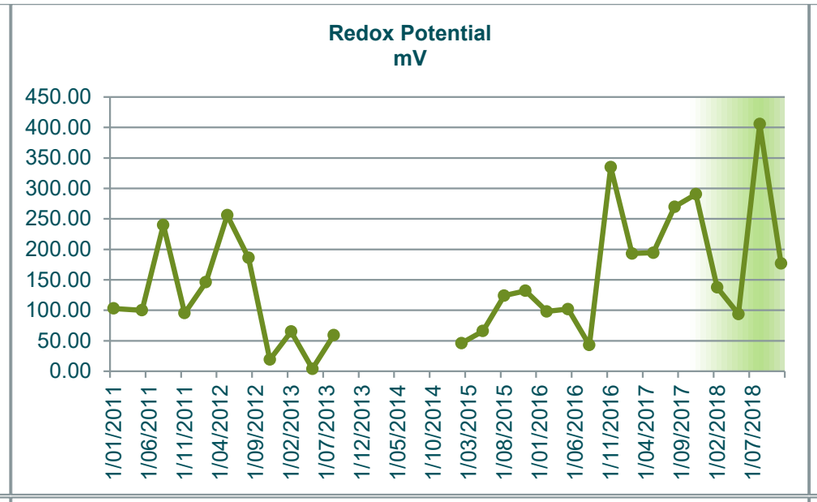

Nitrogen Oxidised
mg/L
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

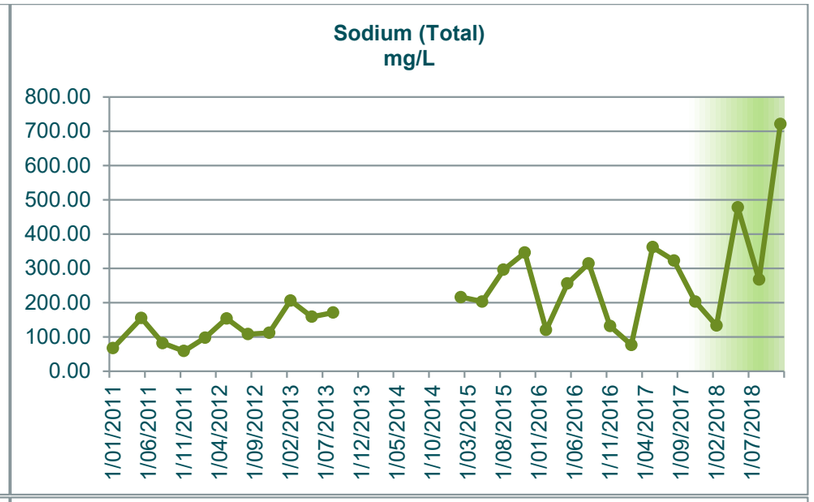

Nitrogen (Total)
mg/L
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


pH
pH units
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Phosphorus (Total)
mg/L
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Potassium (Total)
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Redox Potential
mV
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Sodium (Total)
mg/L
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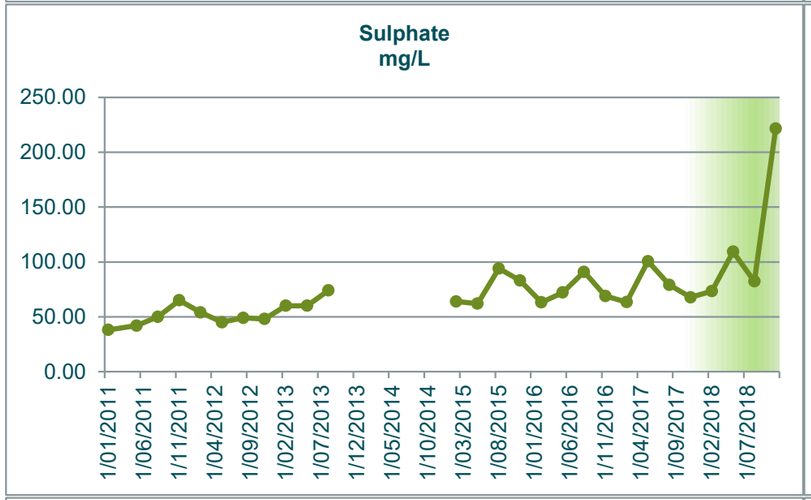
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Sulphate
mg/L
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200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
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1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
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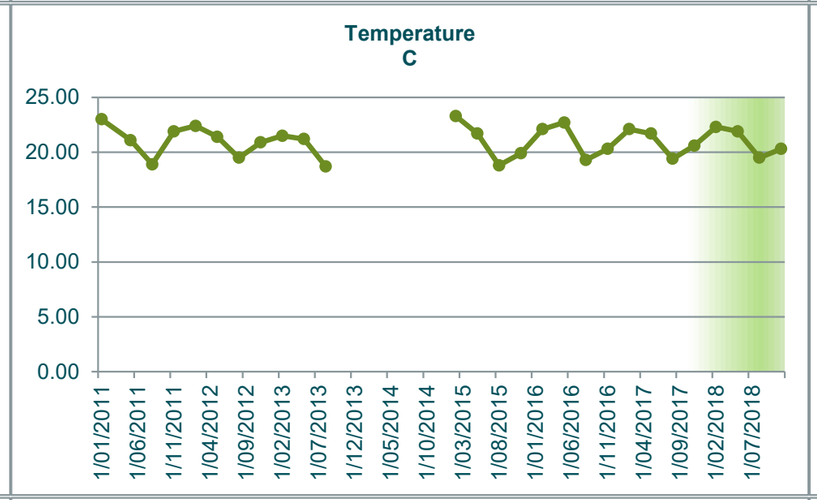
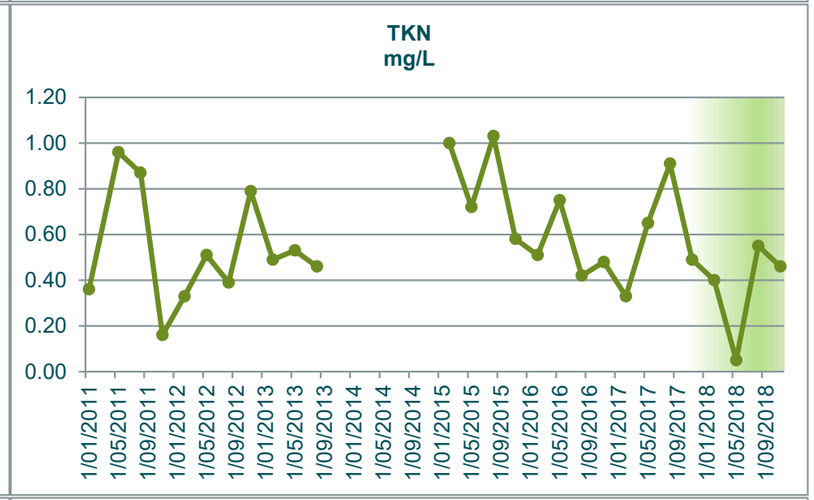
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


TKN
mg/L
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
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1/09/2015
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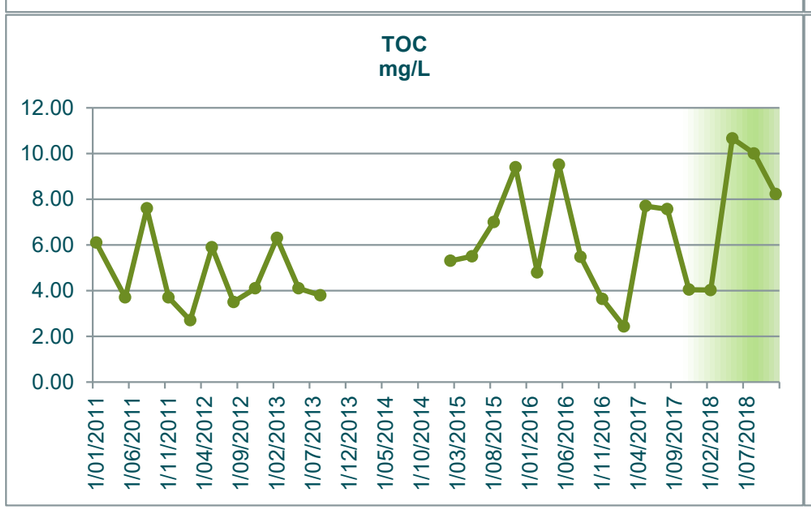
1/01/2018
1/05/2018
1/09/2018


TOC
mg/L
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10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
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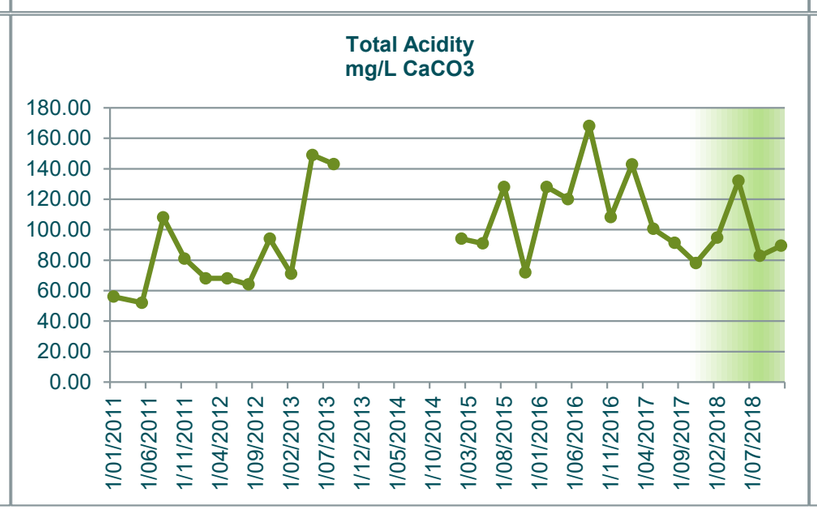
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Total Acidity
mg/L CaCO3
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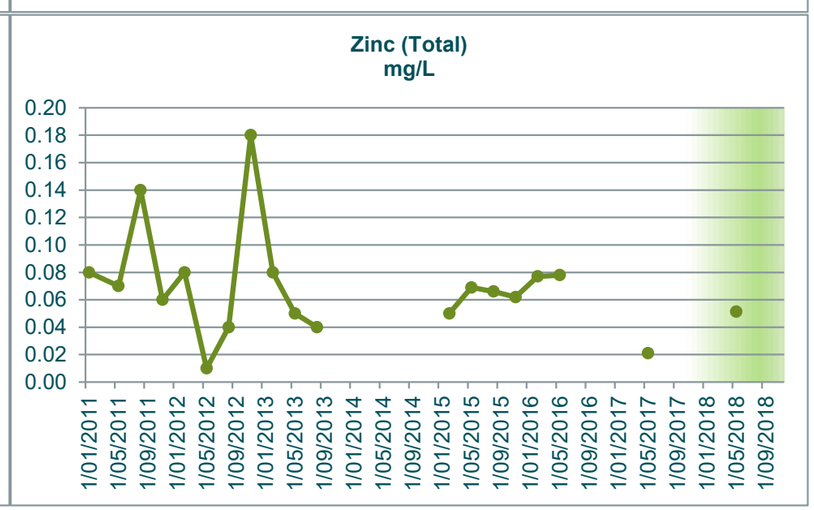
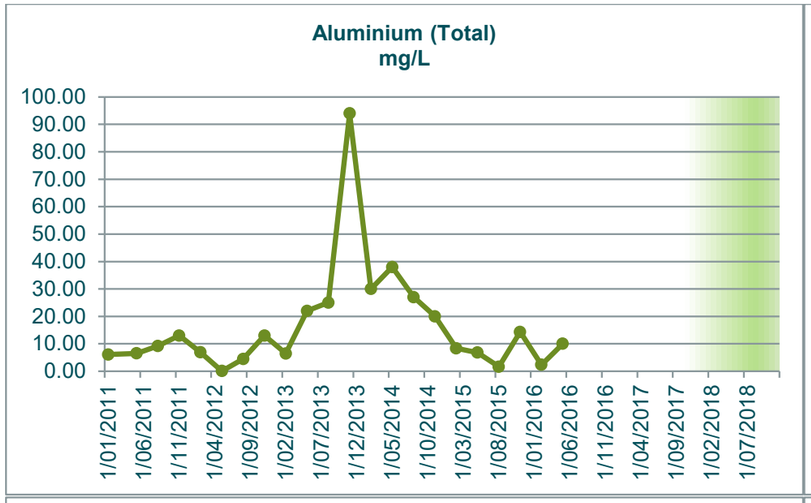
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Zinc (Total)
mg/L
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

GW10	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	17.00	6.06	0.05	0.01	10.00	1.00	0.00	4.70	33.00	0.01	0.01	0.01	212.00	0.04	2.30	0.03	13.00	0.01	3.20	0.56	0.01	0.64	0.05	0.64	1.40	5.80	0.24	5.00	72.00	21.00	8.20	21.30	0.76	2.80	52.00	0.03
10/05/2011	17.00	6.49	0.05	0.01	10.00	1.20	0.00	8.60	97.00	0.01	0.01	0.01	419.00	0.04	1.00	0.04	17.00	0.01	6.40	0.78	0.01	0.05	0.05	0.05	1.07	5.10	0.17	5.00	118.00	47.00	12.00	20.70	1.07	4.00	10.00	0.01
9/08/2011	11.00	9.20	0.05	0.01	7.00	5.70	0.00	4.20	50.00	0.01	0.01	0.01	261.00	0.03	3.30	0.05	23.00	0.01	4.30	0.71	0.01	1.39	0.05	1.39	2.28	5.50	0.18	5.00	258.00	27.00	8.10	18.40	0.89	5.40	74.00	0.05
8/11/2011	9.00	13.00	0.06	0.01	5.00	1.00	0.00	4.90	54.00	0.01	0.01	0.01	182.00	0.05	2.80	0.10	23.00	0.01	5.80	0.63	0.01	1.56	0.02	1.56	2.81	5.40	0.28	7.00	172.30	19.00	9.50	19.50	1.25	2.90	60.00	0.07
6/02/2012	17.00	6.86	0.16	0.01	10.00	9.00	0.00	4.30	38.00	0.01	0.01	0.01	181.00	0.03	1.30	0.01	9.48	0.01	3.40	0.59	0.01	0.02	0.02	0.05	2.16	5.70	0.43	5.00	86.00	25.00	5.80	21.20	2.16	7.20	55.00	0.04
8/05/2012	16.00	0.08	0.07	0.01	10.00	3.00	0.00	4.60	38.00	0.01	0.01	0.01	185.00	0.01	2.90	0.05	0.44	0.01	3.90	0.63	0.01	0.04	0.02	0.04	0.17	6.00	0.13	5.00	262.00	23.00	6.50	20.90	0.13	11.00	52.00	0.02
6/08/2012	15.00	4.47	0.03	0.01	9.00	3.00	0.00	4.40	50.00	0.01	0.01	0.01	241.00	0.02	2.00	0.03	17.00	0.01	4.70	0.40	0.01	0.09	0.02	0.09	0.75	5.30	0.15	5.00	200.00	20.00	9.50	18.90	0.66	3.80	52.00	0.04
13/11/2012	10.00	13.00	0.12	0.01	6.00	4.80	0.00	5.50	47.00	0.02	0.02	0.01	228.00	0.06	5.50	0.10	26.00	0.02	3.50	0.37	0.01	0.12	0.02	0.12	1.94	5.90	0.52	5.00	68.00	23.00	8.90	20.30	1.82	8.00	36.00	0.09
13/02/2013	14.00	6.44	0.09	0.01	8.00	6.90	0.00	8.60	70.00	0.01	0.01	0.01	292.00	0.03	6.20	0.04	13.00	0.01	3.90	0.43	0.01	0.06	0.02	0.06	1.90	5.90	0.34	5.00	13.00	29.00	9.30	21.20	1.84	17.00	43.00	0.06
14/05/2013	25.00	22.00	0.37	0.01	15.00	9.60	0.00	6.10	40.00	0.02	0.02	0.01	229.00	0.05	3.70	0.06	32.00	0.02	4.00	0.80	0.01	0.08	0.02	0.10	2.88	6.00	0.34	5.00	-35.00	21.00	5.70	20.90	2.78	9.90	105.00	0.05
6/08/2013	26.00	25.00	0.35	0.01	16.00	5.70	0.00	5.80	39.00	0.02	0.02	0.01	251.00	0.05	3.00	0.03	42.00	0.02	4.90	0.85	0.01	0.04	0.02	0.06	2.71	6.10	0.44	5.00	-17.00	25.00	8.20	18.80	2.65	11.00	100.00	0.06
12/11/2013	10.00	94.00	0.30	0.04	6.00	7.20	0.00	4.70	47.00	0.08	0.08	0.01	216.00	0.24	3.30	0.03	131.00	0.08	3.70	0.99	0.04	0.21	0.02	0.21	4.37	6.30	0.77	5.00	45.00	29.00	8.90	20.20	4.16	3.90	51.00	0.27
11/02/2014	10.00	30.00	0.16	0.02	6.00	6.30	0.00	4.10	42.00	0.03	0.03	0.01	195.00	0.08	3.40	0.03	46.00	0.03	3.50	0.39	0.01	0.20	0.02	0.20	2.29	5.70	0.41	5.00	49.00	25.00	8.00	22.00	2.09	6.50	132.00	0.10
13/05/2014	8.00	38.00	0.08	0.01	5.00	3.30	0.00	3.20	48.00	0.02	0.02	0.01	219.00	0.07	4.20	0.02	70.00	0.03	3.50	0.48	0.01	1.52	0.02	1.52	3.43	5.30	0.67	5.00	71.00	25.00	5.50	21.10	1.91	2.70	63.00	0.06
12/08/2014	7.00	27.00	0.07	0.01	4.00	3.90	0.00	3.80	60.00	0.02	0.02	0.01	262.00	0.06	4.60	0.02	39.00	0.02	5.30	0.52	0.01	1.92	0.02	1.92	3.80	5.40	0.49	5.00	59.00	34.00	9.40	19.20	1.88	2.90	112.00	0.11
10/11/2014	8.00	20.00	0.07	0.01	5.00	4.20	0.00	3.80	60.00	0.02	0.02	0.01	253.00	0.05	3.80	0.03	32.00	0.03	5.40	0.52	0.01	2.47	0.02	2.49	4.19	5.30	0.29	5.00	99.00	34.00	9.00	20.10	1.70	3.10	144.00	0.10
9/02/2015	22.00	8.34	0.19	0.01	13.00	3.90	0.00	7.00	60.00	0.01	0.01	0.01	275.00	0.02	1.70	0.03	13.80	0.01	4.90	0.56	0.01	0.03	0.03	0.06	2.43	6.20	0.34	5.00	2.00	28.00	7.20	22.00	2.37	16.00	60.00	0.01
11/05/2015	12.00	6.78	0.65	0.01	7.00	8.10	0.00	10.00	148.00	0.01	0.01	0.01	551.00	0.02	1.90	0.02	13.30	0.01	10.00	0.96	0.01	0.02	0.02	0.02	1.71	5.50	0.21	5.00	62.00	66.00	12.00	21.30	1.71	6.30	100.00	0.04
11/08/2015	1.00	1.64	0.19	0.01	1.00	5.10	0.00	23.00	410.00	0.00	0.01	0.01	1438.00	0.02	2.20	0.03	20.60	0.00	29.00	2.49	0.05	0.06	0.02	0.06	1.64	4.80	0.24	5.00	147.00	192.00	24.00	19.00	1.58	4.80	147.00	0.08
10/11/2015	8.00	14.31	0.12	0.02	8.00	3.00	0.00	3.60	51.00	0.01	0.01	0.01	164.00	0.03	3.40	0.03	48.46	0.01	3.50	0.35	0.01	0.12	0.02	0.14	2.00	5.60	0.37	5.00	10.00	26.00	5.90	19.30	1.86	5.90	57.00	0.05
8/02/2016	12.00	2.32	1.15	0.00	12.00	4.20	0.00	2.18	21.00	0.00	0.01	0.01	106.00	0.02	5.40	0.02	3.57	0.00	1.79	0.14	0.01	0.14	0.02	0.14	2.18	5.90	0.30	5.00	153.00	10.83	3.65	23.50	2.04	4.55	25.00	0.01
9/05/2016	22.00	10.00	0.83	0.01	22.00	13.20	0.00	3.63	52.00	0.01	0.01	0.01	248.00	0.03	3.70	0.02	20.09	0.01	4.73	0.46	0.01	0.07	0.02	0.09	2.88	5.90	0.44	5.00	38.00	28.93	6.61	22.00	2.79	4.60	75.00	0.07
9/08/2016	6.40		0.03		6.00	1.00		3.15	30.00				129.40		2.30	0.03			2.26			0.14	0.02	0.14	1.49	5.30	0.31	5.00	139.00	15.43	4.88	19.40	1.35	5.93	58.00	
7/11/2016																																				
7/02/2017	8.00		0.17		8.00	2.70		2.71	44.00				194.20		3.20	0.03			3.46			0.43	0.02	0.43	3.12	5.30	0.57	5.00	187.70	22.48	6.32	21.40	2.69	2.89	115.70	
8/05/2017																																				
8/08/2017	18.64		0.21		19.00	4.20		3.69	45.00				231.40		4.20	0.03			4.35			0.06	0.02	0.06	2.78	5.40	0.47	5.00	161.30	24.69	8.84	19.10	2.72	5.52	59.60	
7/11/2017	28.44		1.51		28.00	5.70		3.24	42.00				230.70		2.50	0.03			3.87			0.04	0.02	0.04	2.44	5.40	0.23	5.00	50.80	22.98	8.09	19.50	2.40	5.58	65.50	
13/11/2018	25.86		0.67		26.00	3.30		4.49	49.00				256.00		3.73	0.03			4.47			<0.02	0.02	0.02	1.53	5.96	0.19	1.44	42.00	28.78	9.69	19.70	1.51	10.84	74.40	
2018 Min	**25.86**		**0.67**		**26.00**	**3.30**		**4.49**	**49.00**				**256.00**		**3.73**	**0.03**			**4.47**			**0.00**	**0.02**	**0.02**	**1.53**	**5.96**	**0.19**	**1.44**	**42.00**	**28.78**	**9.69**	**19.70**	**1.51**	**10.84**	**74.40**	
2018 Max	**25.86**		**0.67**		**26.00**	**3.30**		**4.49**	**49.00**				**256.00**		**3.73**	**0.03**			**4.47**			**0.00**	**0.02**	**0.02**	**1.53**	**5.96**	**0.19**	**1.44**	**42.00**	**28.78**	**9.69**	**19.70**	**1.51**	**10.84**	**74.40**	
2018 Mean	**24.93**		**0.75**		**25.00**	**3.96**		**4.08**	**46.80**				**246.02**		**3.58**	**0.03**			**4.33**			**0.03**	**0.02**	**0.03**	**1.96**	**5.74**	**0.25**	**2.86**	**67.62**	**26.80**	**9.20**	**19.54**	**1.93**	**8.72**	**69.66**	
Long-term Average	**14.23**	**16.59**	**0.29**	**0.01**	**10.44**	**4.82**	**0.00**	**5.48**	**65.37**	**0.02**	**0.02**	**0.01**	**283.32**	**0.05**	**3.24**	**0.04**	**29.72**	**0.02**	**5.25**	**0.66**	**0.01**	**0.44**	**0.02**	**0.43**	**2.31**	**5.63**	**0.35**	**4.94**	**93.08**	**33.08**	**8.51**	**20.40**	**1.88**	**6.48**	**73.27**	**0.06**


Aluminium (Total)
mg/L
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
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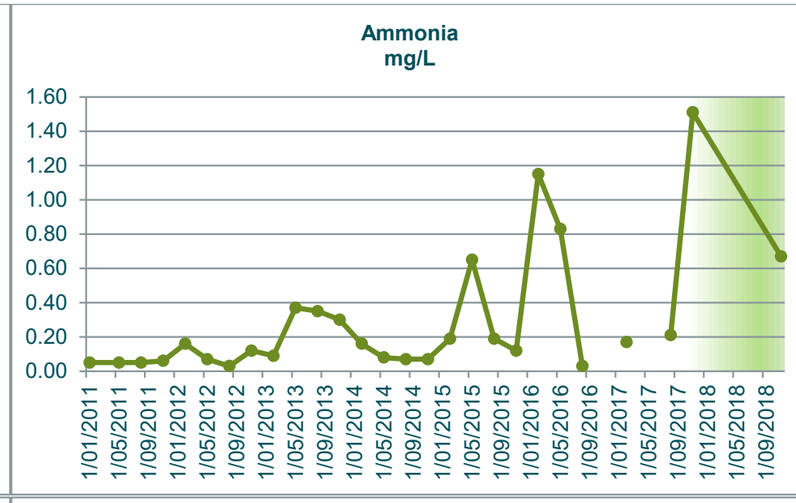
Ammonia
mg/L
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
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1/09/2013
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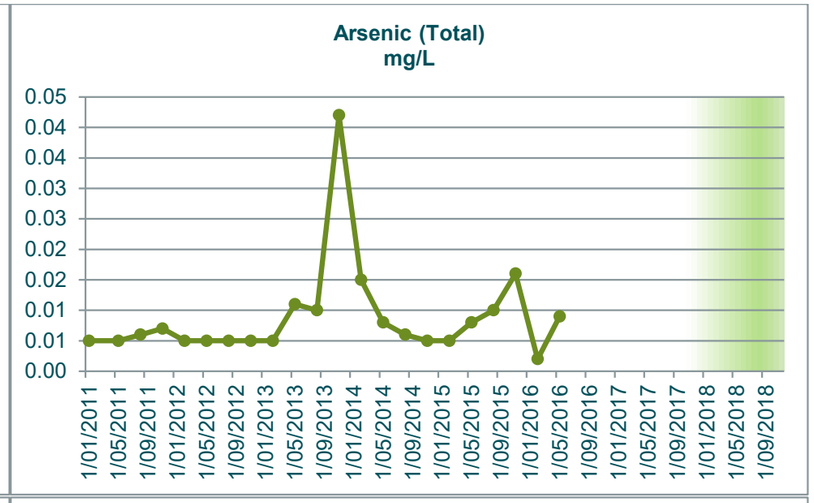
1/05/2018
1/09/2018


Arsenic (Total)
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
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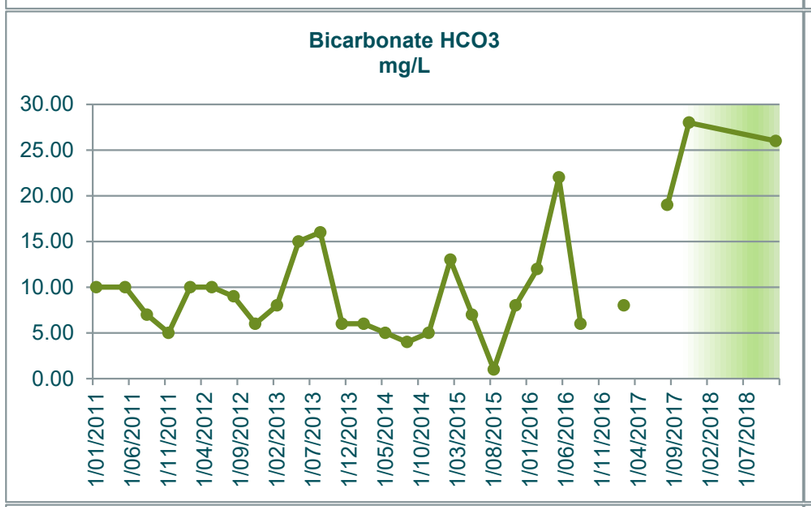
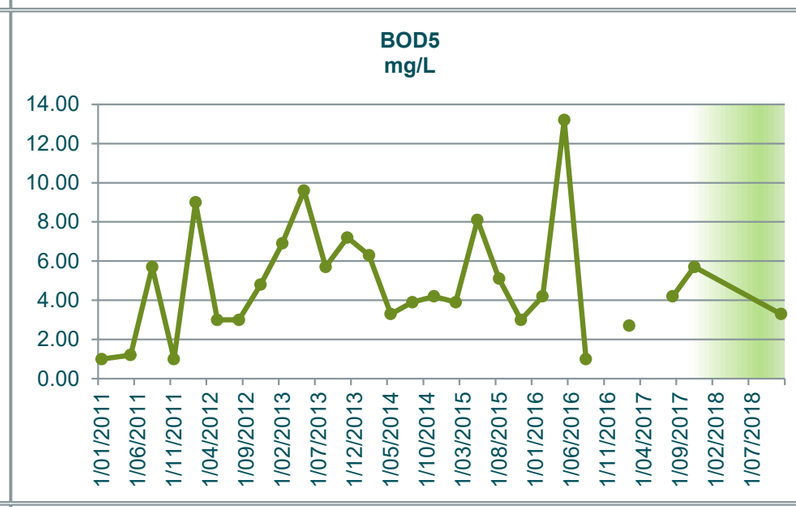
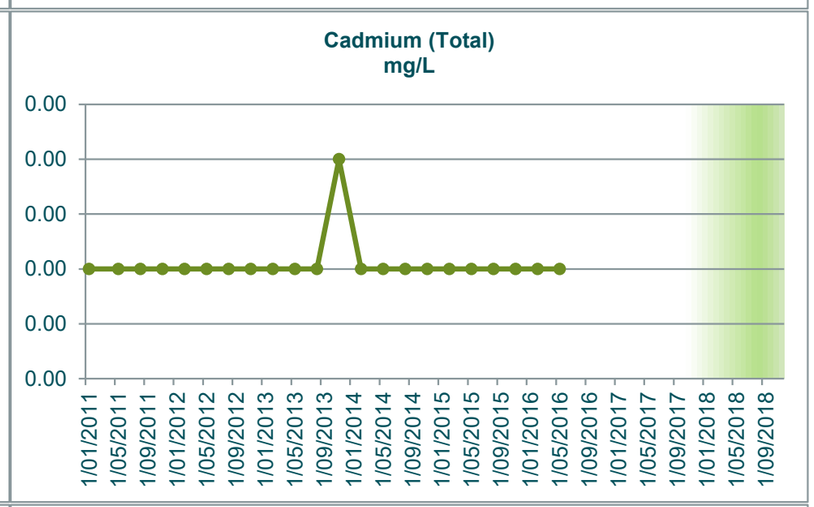
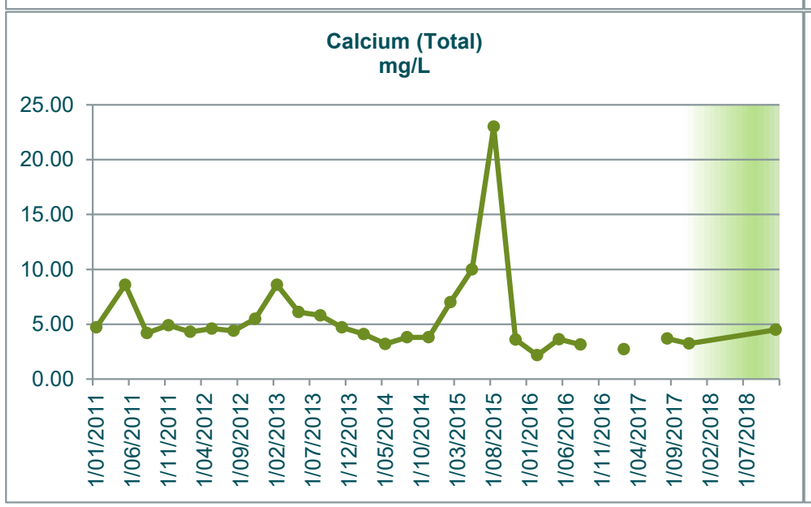
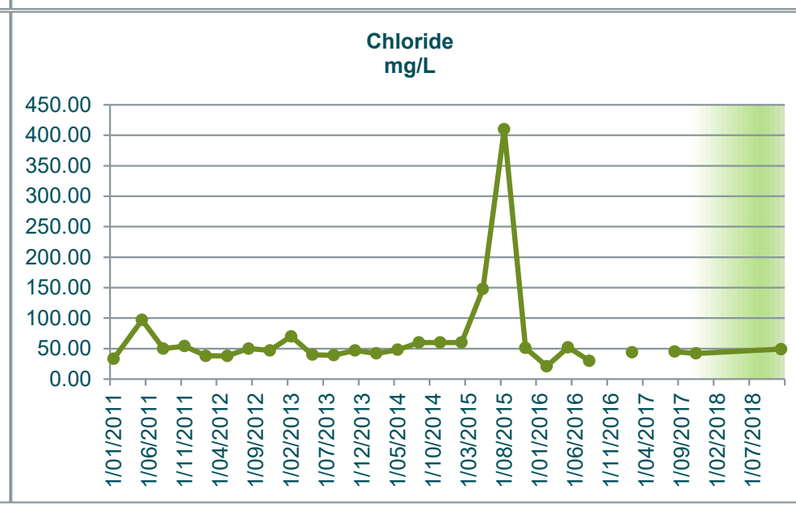
1/01/2018
1/05/2018
1/09/2018

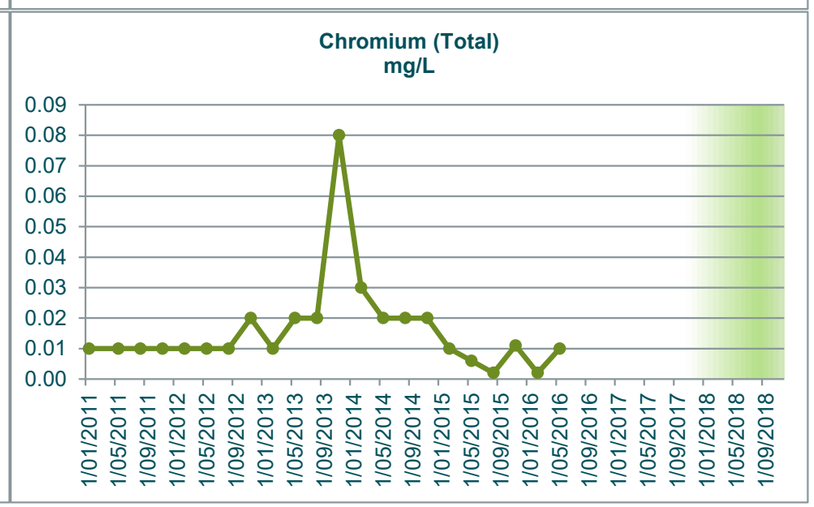

Bicarbonate HCO3
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

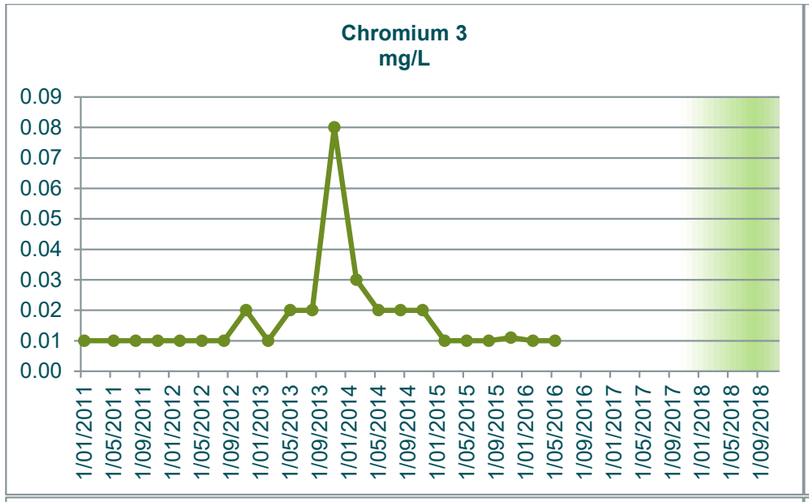

BOD5
mg/L
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

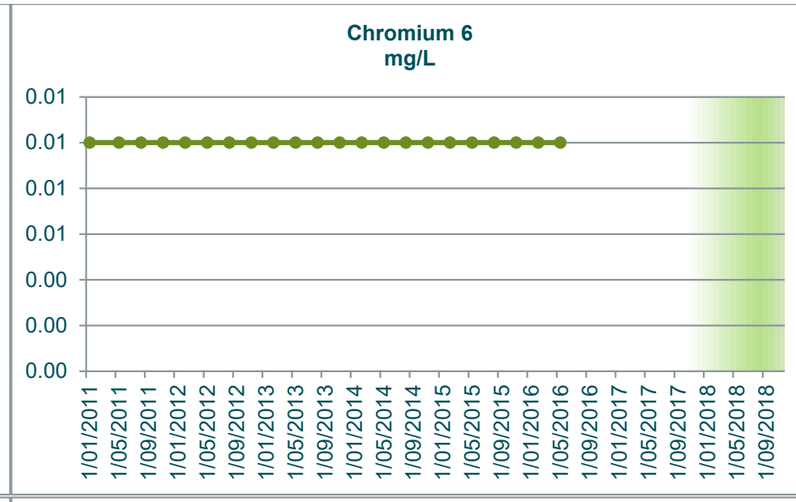

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

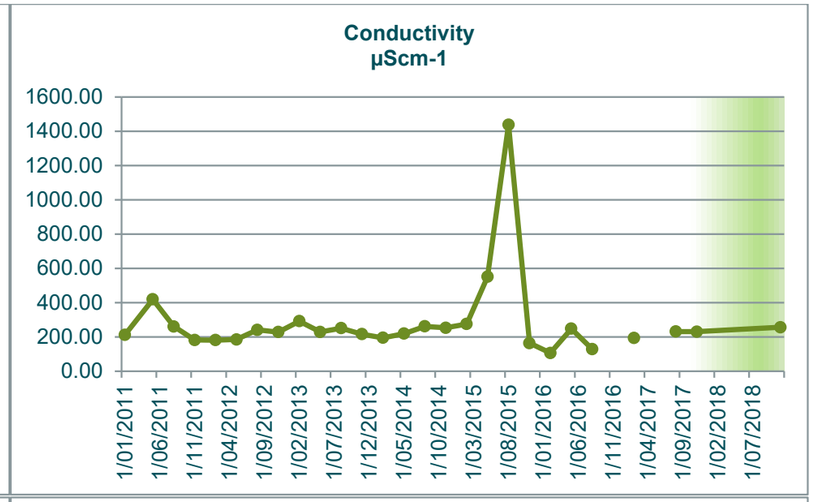

Calcium (Total)
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

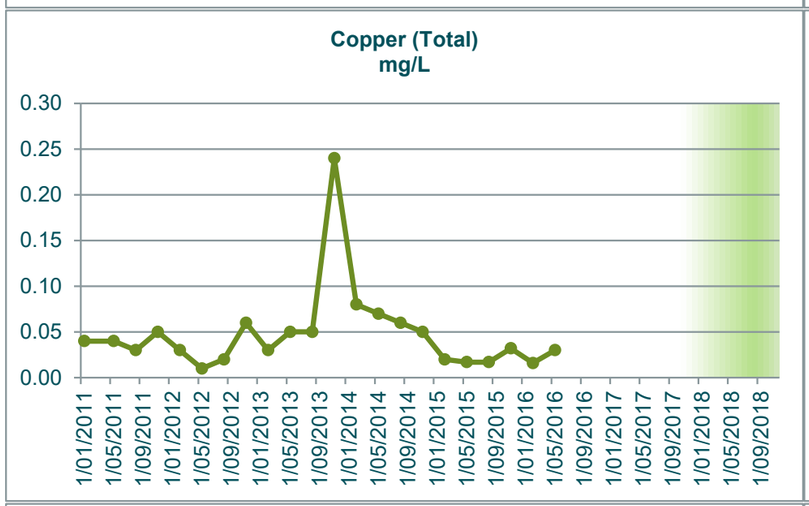

Chloride
mg/L
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

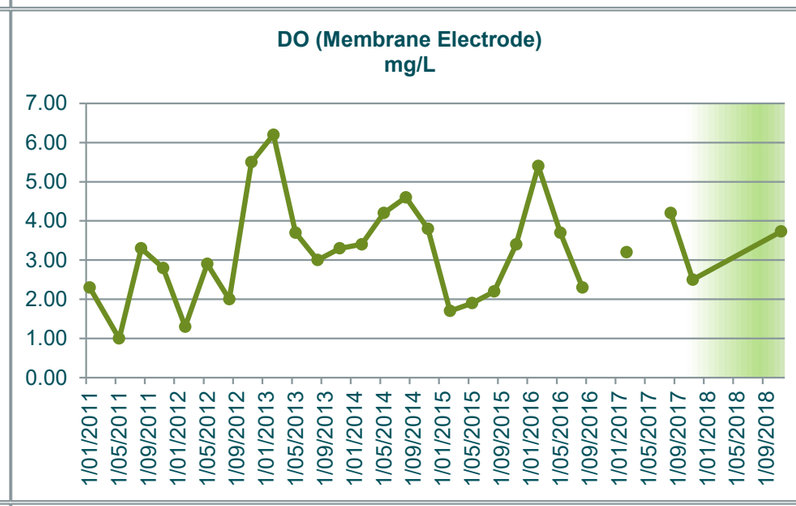

Chromium (Total)
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

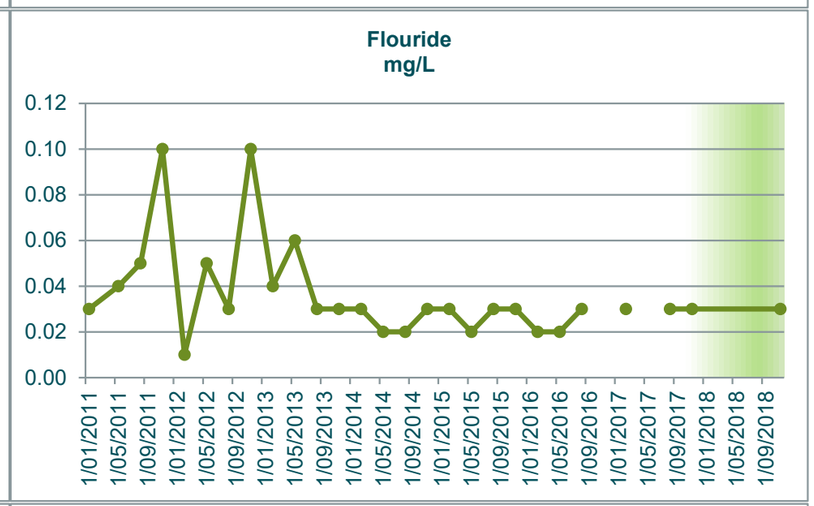

Chromium 3
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

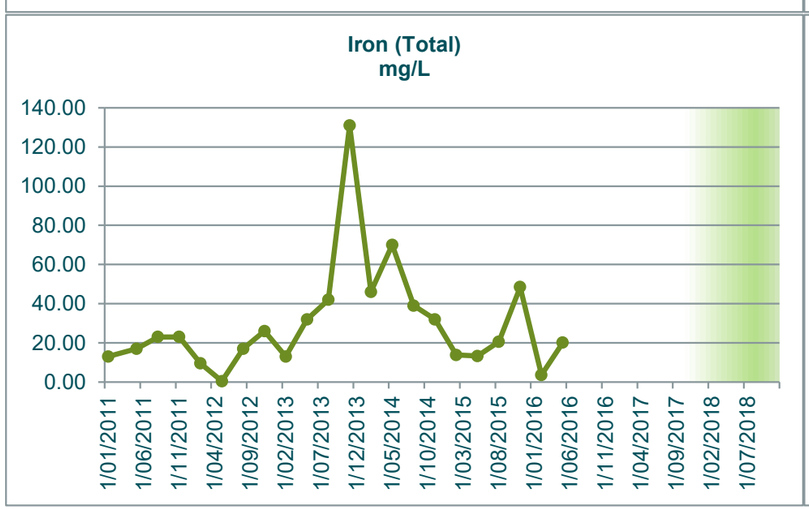

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

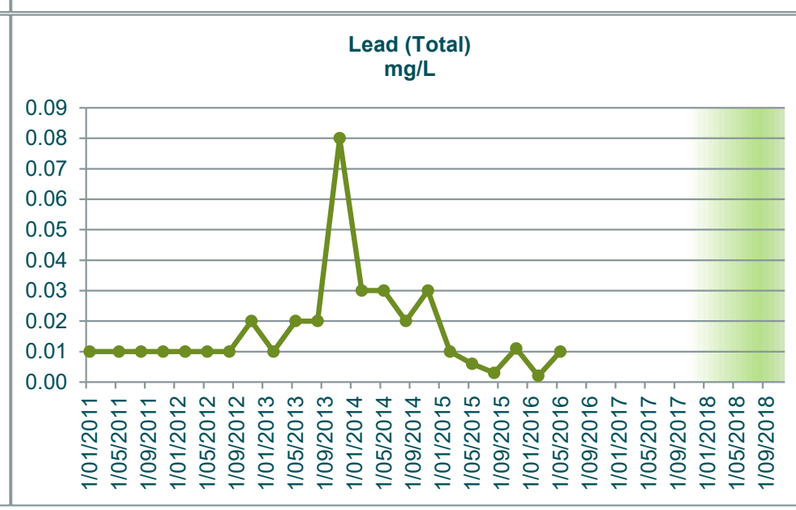

Conductivity
µScm-1
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

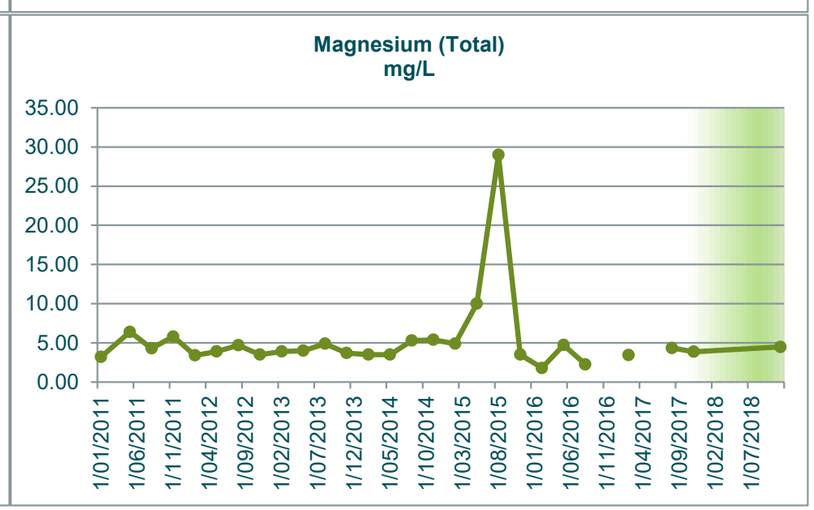

Copper (Total)
mg/L
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

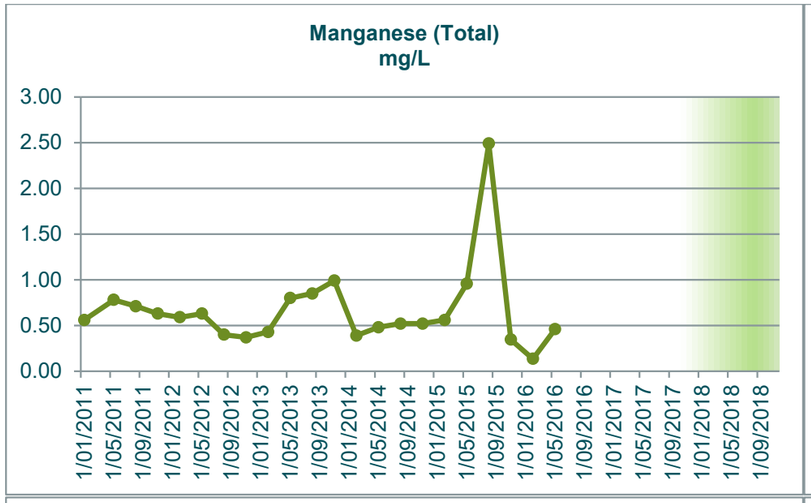

DO (Membrane Electrode)
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

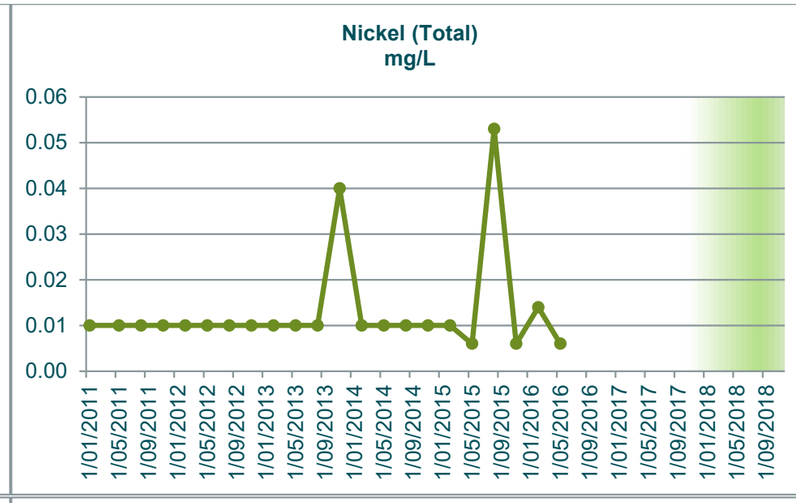

Flouride
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

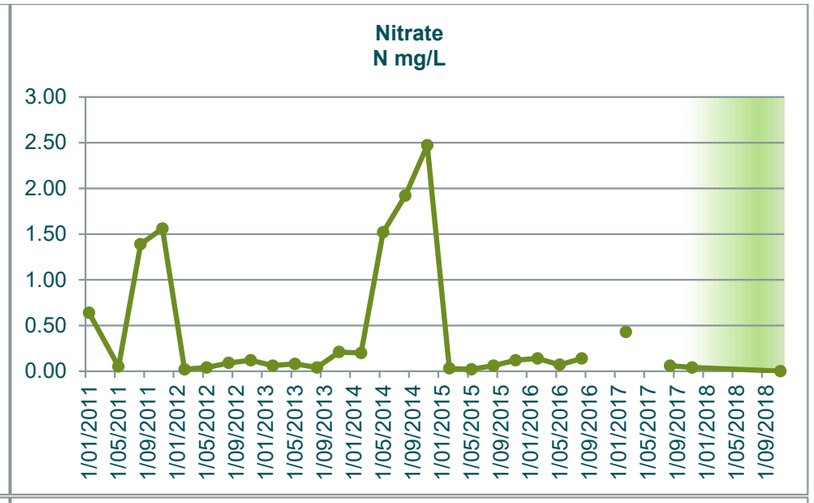

Iron (Total)
mg/L
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

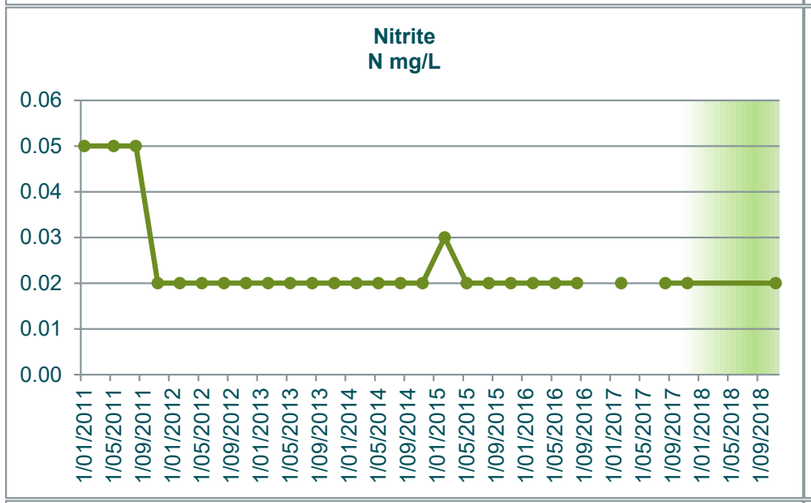

Lead (Total)
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

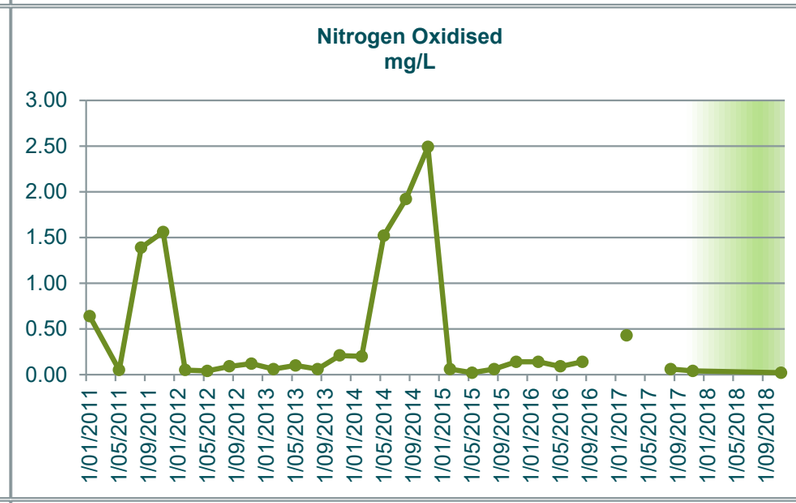

Magnesium (Total)
mg/L
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

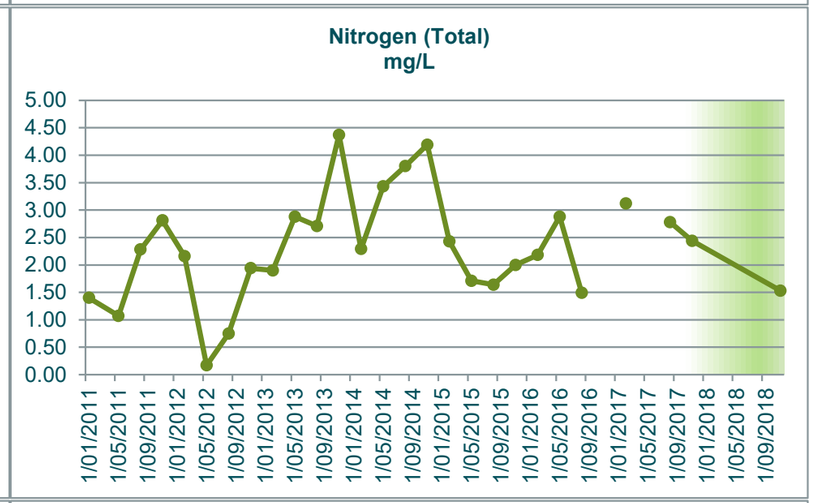

Manganese (Total)
mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

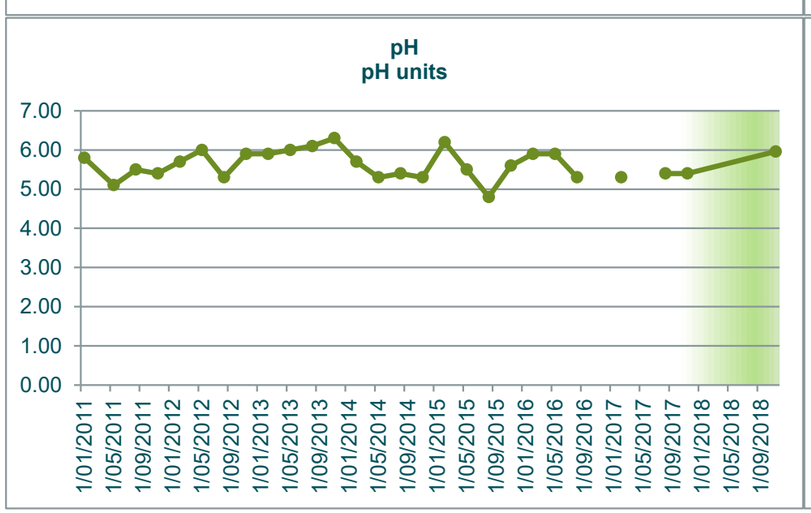

Nickel (Total)
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

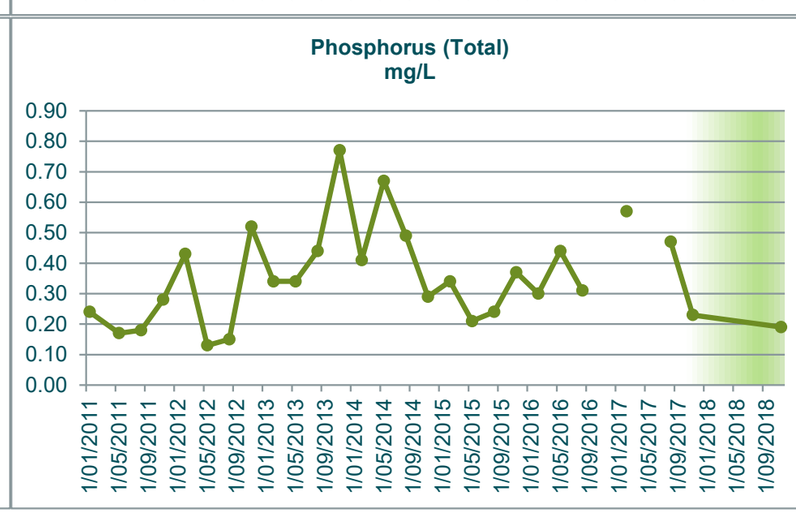

Nitrate
N mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

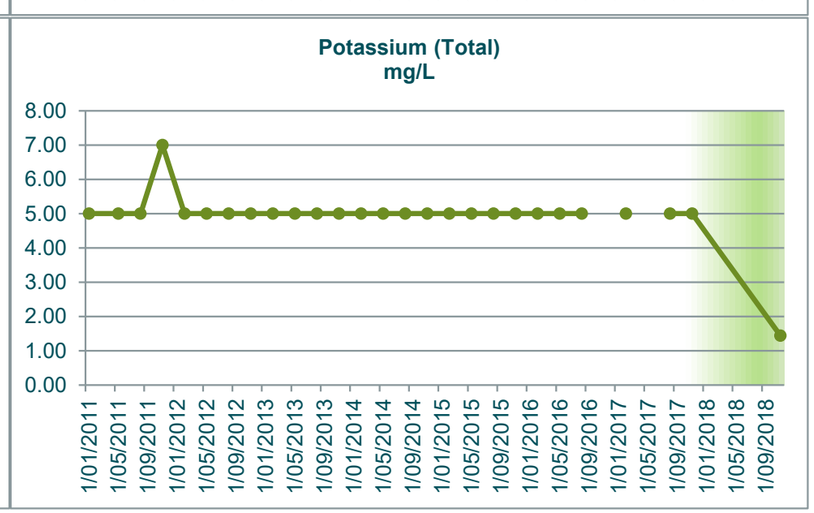

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

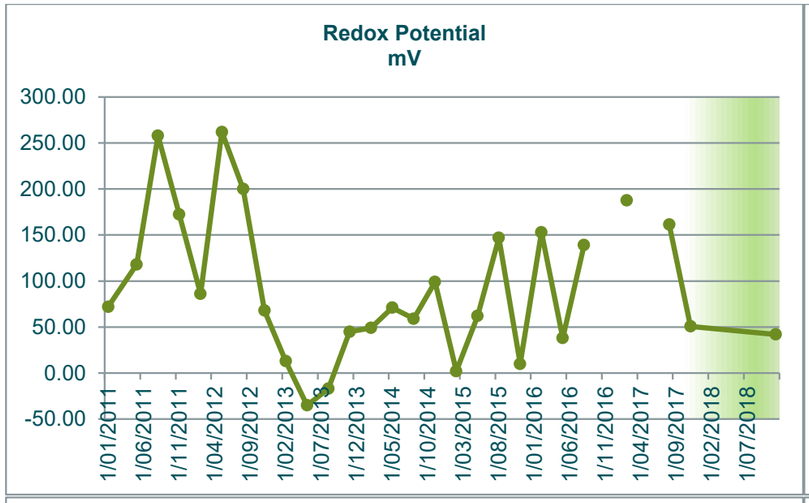

Nitrogen Oxidised
mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

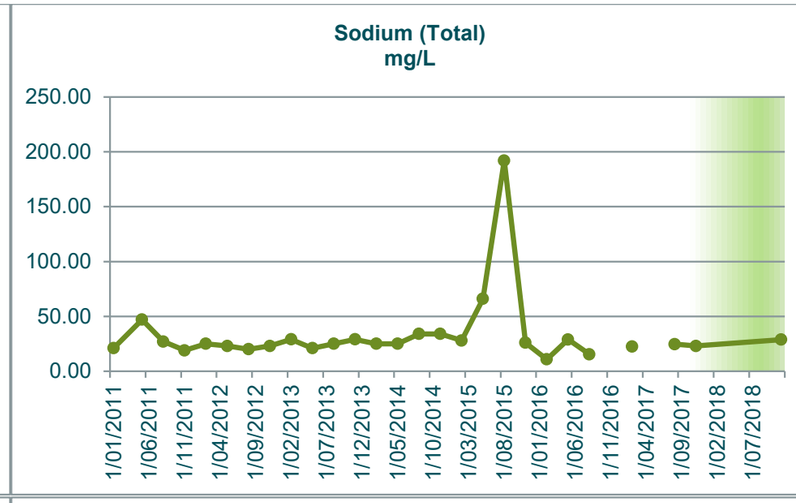

Nitrogen (Total)
mg/L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

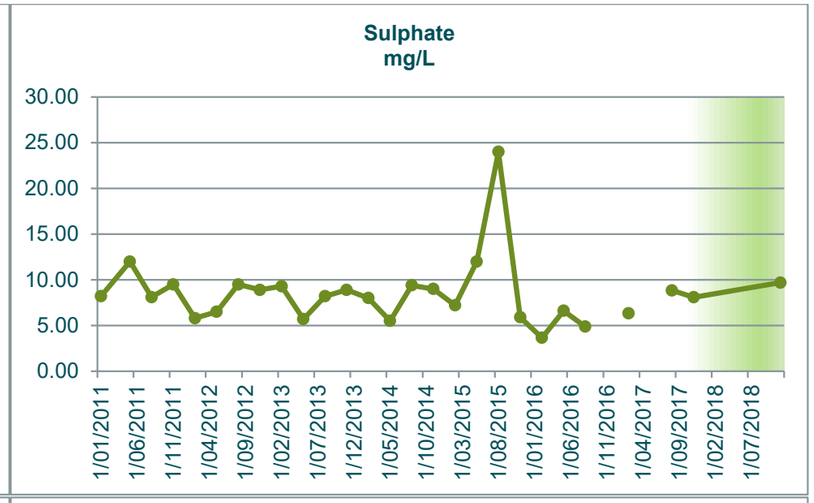

pH
pH units
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

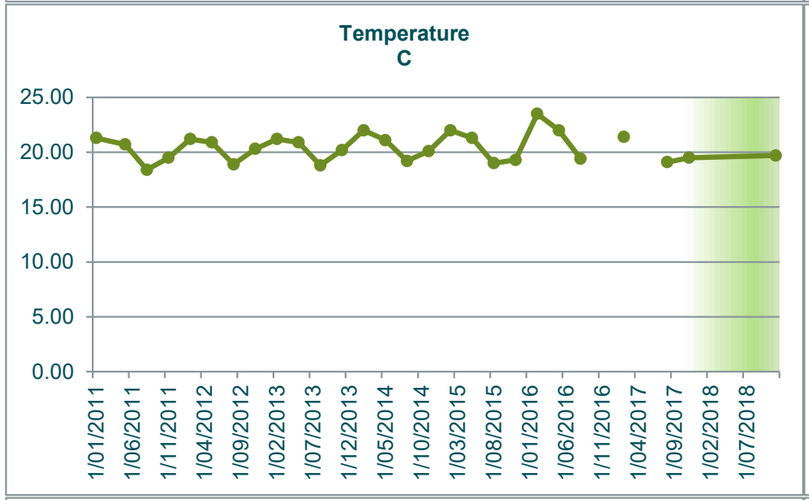

Phosphorus (Total)
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

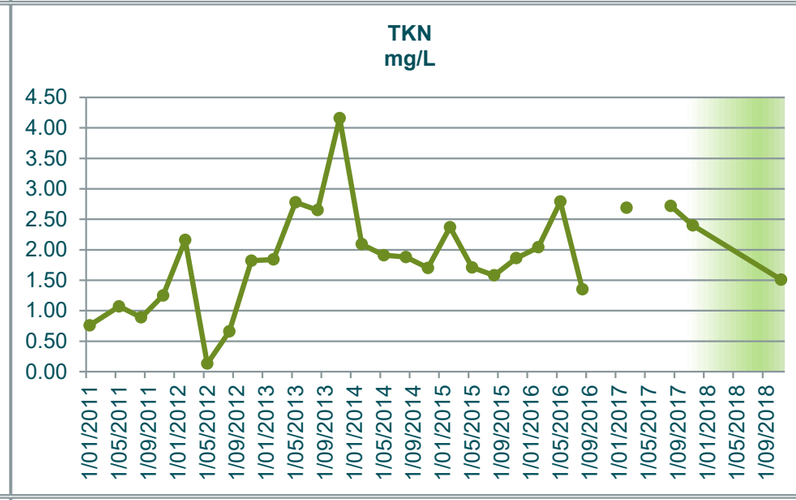

Potassium (Total)
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

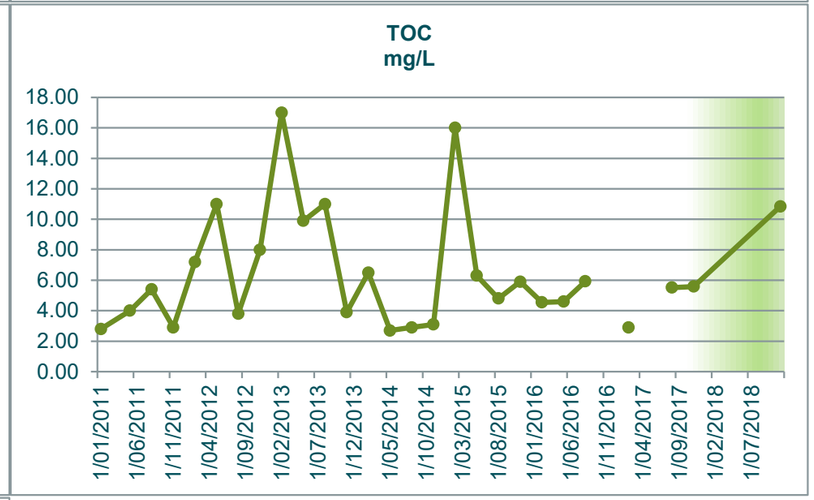

Redox Potential
mV
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

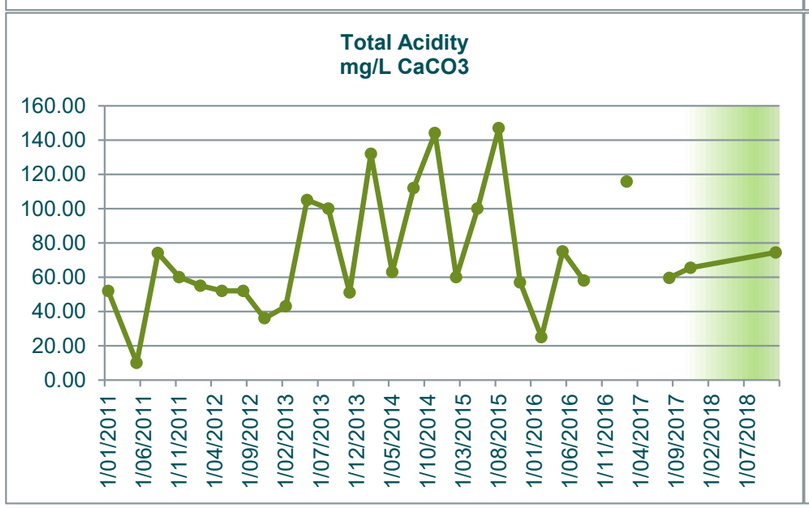

Sodium (Total)
mg/L
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

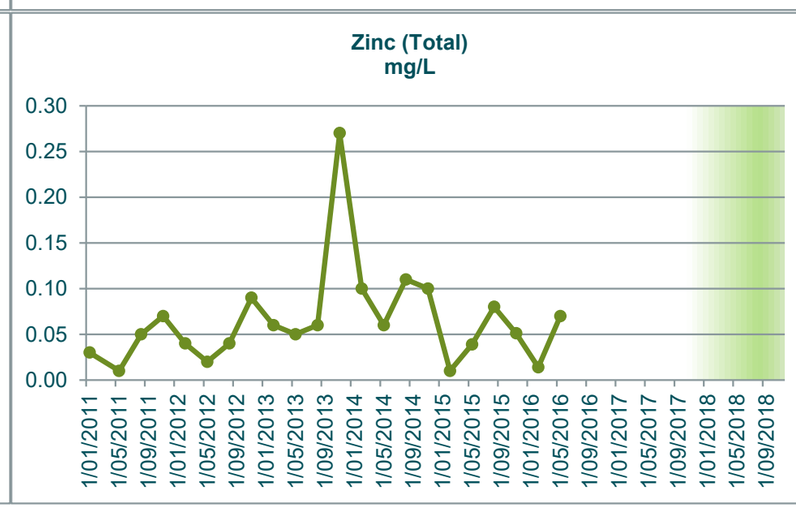

Sulphate
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

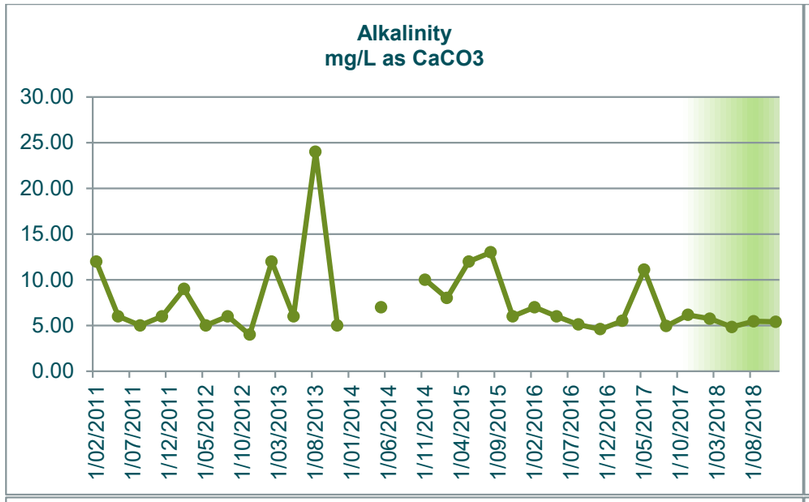

TKN
mg/L
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

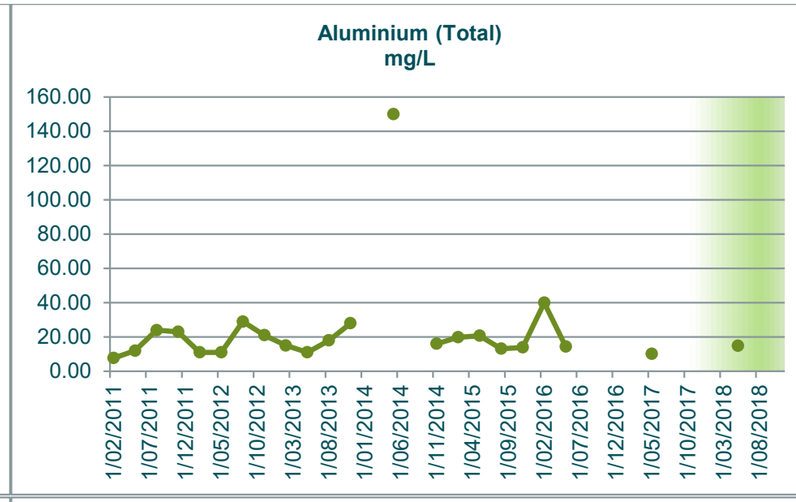

TOC
mg/L
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

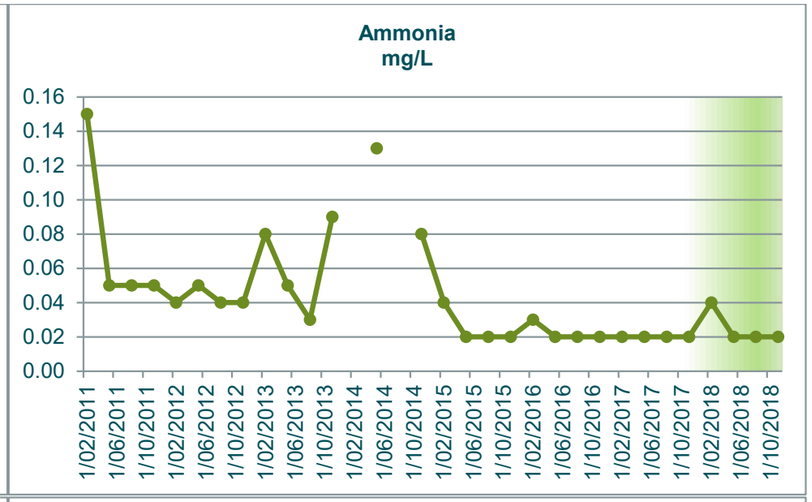

Total Acidity
mg/L CaCO3
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

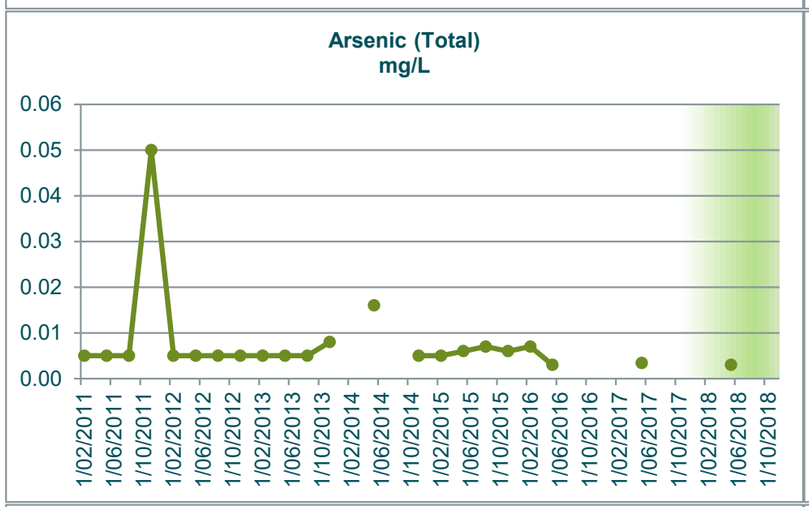

Zinc (Total)
mg/L
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

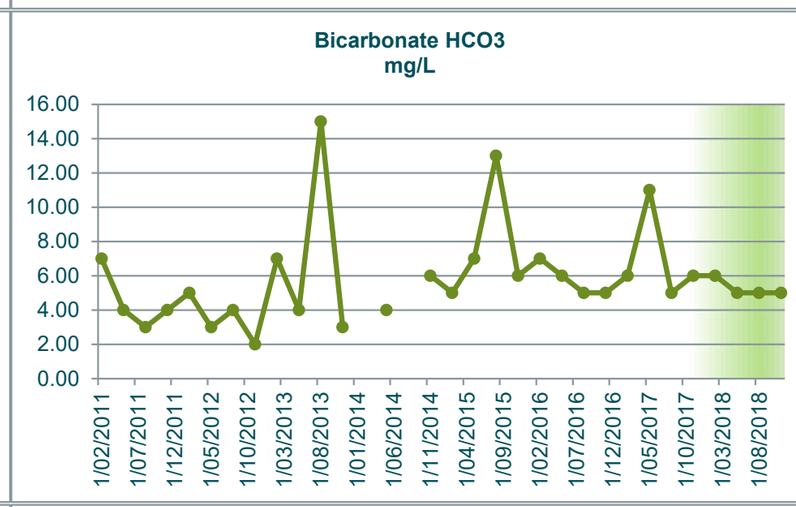
GW11	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
1/02/2011	12.00	7.67	0.15	0.01	7.00	1.80	0.00	1.70	18.00	0.01	0.01	0.01	109.00	0.02	1.30	0.03	8.19	0.01	1.50	0.62	0.01	0.65	0.05	0.65	1.09	5.40	0.08	5.00	173.00	9.60	7.80	23.00	0.44	1.90	55.00	0.03
11/05/2011	6.00	12.00	0.05	0.01	4.00	1.00	0.00	1.00	21.00	0.01	0.01	0.01	131.00	0.04	1.80	0.04	11.00	0.01	2.00	0.40	0.01	1.34	0.05	1.34	1.67	4.10	0.11	5.00	314.00	12.00	7.50	22.20	0.33	1.20	54.00	0.04
10/08/2011	5.00	24.00	0.05	0.01	3.00	1.80	0.00	0.60	20.00	0.01	0.01	0.01	114.00	0.03	3.30	0.03	19.00	0.01	1.70	0.61	0.01	0.48	0.05	0.48	0.77	4.90	0.05	5.00	328.00	14.00	7.20	20.70	0.29	1.30	52.00	0.05
9/11/2011	6.00	23.00	0.05	0.05	4.00	2.40	0.00	0.70	19.00	0.01	0.01	0.01	101.00	0.04	1.80	0.10	18.00	0.01	2.50	0.49	0.01	0.60	0.02	0.60	0.94	5.10	0.19	5.00	345.00	8.60	12.00	21.50	0.34	0.80	62.00	0.06
7/02/2012	9.00	11.00	0.04	0.01	5.00	1.80	0.00	1.30	13.00	0.01	0.01	0.01	97.00	0.02	2.20	0.02	10.00	0.01	1.90	0.63	0.01	0.72	0.02	0.72	0.99	5.10	0.51	5.00	323.00	14.00	9.70	23.50	0.27	1.40	66.00	0.04
9/05/2012	5.00	11.00	0.05	0.01	3.00	1.00	0.00	0.70	16.00	0.01	0.01	0.01	104.00	0.02	3.00	0.03	9.79	0.01	1.40	0.31	0.01	0.61	0.02	0.61	0.83	5.40	0.04	5.00	221.00	11.00	8.80	22.60	0.22	1.20	52.00	0.04
7/08/2012	6.00	29.00	0.04	0.01	4.00	1.00	0.00	0.80	15.00	0.01	0.01	0.01	98.00	0.05	1.60	0.04	24.00	0.02	1.70	0.74	0.01	0.06	0.02	0.06	0.60	4.90	0.08	5.00	279.00	9.60	9.60	20.70	0.54	0.40	49.00	0.13
14/11/2012	4.00	21.00	0.04	0.01	2.00	1.20	0.00	2.20	20.00	0.01	0.01	0.01	135.00	0.03	5.70	0.05	15.00	0.01	3.60	0.60	0.01	2.73	0.02	2.73	3.06	4.90	0.12	5.00	247.00	12.00	7.20	21.70	0.33	1.30	40.00	0.14
14/02/2013	12.00	15.00	0.08	0.01	7.00	1.00	0.00	1.40	20.00	0.01	0.01	0.01	111.00	0.02	2.10	0.02	13.00	0.01	1.90	1.12	0.01	0.08	0.02	0.08	0.44	5.40	0.06	5.00	100.00	12.00	6.70	23.50	0.36	1.40	70.00	0.09
15/05/2013	6.00	11.00	0.05	0.01	4.00	1.50	0.00	0.80	12.00	0.01	0.01	0.01	68.00	0.02	4.30	0.03	9.23	0.02	0.80	0.43	0.01	0.11	0.02	0.11	0.37	5.10	0.04	5.00	146.00	8.90	6.00	21.60	0.26	1.10	87.00	0.03
7/08/2013	24.00	18.00	0.03	0.01	15.00	1.00	0.00	0.60	14.00	0.01	0.01	0.01	88.00	0.02	3.00	0.02	13.00	0.01	1.30	0.69	0.01	0.18	0.02	0.18	0.49	5.10	0.11	5.00	203.00	14.00	11.00	19.80	0.31	0.70	100.00	0.06
13/11/2013	5.00	28.00	0.09	0.01	3.00	1.80	0.00	0.60	11.00	0.01	0.01	0.01	74.00	0.04	3.80	0.03	21.00	0.01	1.20	0.59	0.01	0.17	0.02	0.17	0.61	5.10	0.08	5.00	187.00	9.20	6.90	23.40	0.44	0.90	53.00	0.10
11/02/2014																																				
14/05/2014	7.00	150.00	0.13	0.02	4.00	1.50	0.00	0.40	9.00	0.04	0.04	0.01	100.00	0.16	3.40	0.03	160.00	0.08	1.10	2.99	0.03	0.35	0.02	0.35	2.02	5.10	0.29	5.00	117.00	15.00	8.20	22.40	1.67	1.40	80.00	0.32
12/08/2014																																				
11/11/2014	10.00	16.00	0.08	0.01	6.00	3.60	0.00	0.30	13.00	0.01	0.01	0.01	100.00	0.02	3.40	0.02	11.00	0.01	1.70	1.54	0.01	0.10	0.02	0.10	1.10	5.70	0.12	5.00	136.00	15.00	9.40	21.90	1.00	1.00	77.00	0.08
10/02/2015	8.00	19.80	0.04	0.01	5.00	3.90	0.00	0.70	18.00	0.01	0.01	0.01	94.00	0.02	2.00	0.02	9.37	0.01	1.50	0.95	0.01	0.12	0.02	0.12	1.01	5.30	0.12	5.00	119.00	12.00	7.30	24.20	0.89	1.50	84.00	0.04
12/05/2015	12.00	20.70	0.02	0.01	7.00	3.60	0.00	0.80	14.00	0.01	0.01	0.01	93.00	0.03	3.10	0.02	16.10	0.02	1.80	1.82	0.01	0.02	0.02	0.02	0.96	5.40	0.29	5.00	104.00	13.00	5.80	23.40	0.96	1.10	66.00	0.09
12/08/2015	13.00	13.10	0.02	0.01	13.00	3.30	0.00	0.30	15.00	0.01	0.01	0.01	101.00	0.02	2.60	0.02	21.00	0.01	2.00	1.84	0.00	0.02	0.02	0.02	1.28	5.70	0.14	5.00	141.00	15.00	5.30	21.00	1.28	0.90	69.00	0.05
11/11/2015	6.00	13.90	0.02	0.01	6.00	1.00	0.00	1.10	14.00	0.01	0.01	0.01	82.00	0.02	3.80	0.02	16.83	0.01	1.80	0.69	0.01	0.03	0.02	0.03	0.87	5.10	0.11	5.00	201.00	11.00	6.10	21.60	0.84	1.60	65.00	0.07
9/02/2016	7.00	39.97	0.03	0.01	7.00	1.00	0.00	0.39	16.00	0.01	0.01	0.01	98.00	0.06	2.40	0.02	26.48	0.03	1.69	1.48	0.01	0.03	0.02	0.03	1.03	5.50	0.14	5.00	187.00	13.38	7.94	23.10	1.00	1.44	103.00	0.10
10/05/2016	6.00	14.35	0.02	0.00	6.00	1.50	0.00	0.32	18.00	0.01	0.01	0.01	96.00	0.03	1.50	0.02	7.83	0.01	1.74	0.92	0.01	0.02	0.02	0.02	0.36	5.10	0.07	5.00	195.00	13.54	7.02	23.50	0.36	1.22	86.00	0.05
10/08/2016	5.10		0.02		5.00	1.00		0.58	16.00				90.80		3.50	0.03			1.81			0.04	0.02	0.04	0.82	4.90	0.12	5.00	228.00	13.70	6.71	21.00	0.78	1.00	62.60	
8/11/2016	4.60		0.02		5.00	1.00		0.27	22.00				87.30		2.70	0.03			1.49			0.02	0.02	0.02	1.14	4.80	0.21	5.00	342.00	14.58	7.94	22.10	1.12	0.83	92.80	
8/02/2017	5.50		0.02		6.00	1.00		0.25	17.00				88.60		3.20	0.03			1.30			0.08	0.02	0.08	1.36	4.90	0.20	5.00	299.40	11.78	7.48	23.20	1.28	1.34	119.90	
9/05/2017	11.10	10.10	0.02	0.00	11.00	1.50	0.00	0.94	18.00	0.00	0.01	0.01	82.30	0.01	4.10	0.05	5.87	0.01	1.56	0.75	0.00	0.10	0.02	0.10	0.65	5.00	0.09	5.00	352.30	10.26	5.83	22.80	0.55	1.66	48.80	0.06
9/08/2017	4.94		0.02		5.00	1.50		0.37	30.00				90.20		3.10	0.03			1.58			0.04	0.02	0.04	0.60	4.60	0.12	5.00	360.00	12.19	7.47	20.70	0.56	0.96	57.60	
8/11/2017	6.15		0.02		6.00	1.50		0.73	17.50				98.60		3.30	0.03			1.86			0.92	0.02	0.92	1.40	4.90	0.08	5.00	392.80	13.43	7.32	21.70	0.48	1.32	63.40	
14/02/2018	5.75		0.04		6.00	2.10		0.28	16.00				92.20		3.50	0.03			1.39			0.20	0.02	0.20	2.07	5.10	0.33	5.00	261.30	12.88	8.22	24.10	1.87	1.95	71.00	
9/05/2018	4.84	14.86	0.02	0.00	5.00	1.00	0.00	0.75	28.50	0.00	0.00	0.01	97.10	0.02	3.50	0.03	7.52	0.01	1.92	0.84	0.00	0.68	0.02	0.68	1.20	5.10	0.09	0.50	291.50	13.00	6.42	23.30	0.52	1.19	59.50	0.04
15/08/2018	5.46		0.02		5.00	2.70		0.29	16.00				90.20		4.10	0.03			1.55			0.32	0.02	0.32	1.86	5.10	0.28	0.50	376.80	14.04	9.03	20.90	1.54	31.00	53.40	
14/11/2018	5.40		0.02		5.00	1.80		0.50	12.00				86.00		2.64	0.02			1.75			0.07	0.02	0.07	0.83	5.00	0.14	0.50	178.00	12.40	8.34	21.00	0.76	1.46	68.80	
2018 Min	**4.84**	**14.86**	**0.02**	**0.00**	**5.00**	**1.00**	**0.00**	**0.28**	**12.00**	**0.00**	**0.00**	**0.01**	**86.00**	**0.02**	**2.64**	**0.02**	**7.52**	**0.01**	**1.39**	**0.84**	**0.00**	**0.07**	**0.02**	**0.07**	**0.83**	**5.00**	**0.09**	**0.50**	**178.00**	**12.40**	**6.42**	**20.90**	**0.52**	**1.19**	**53.40**	**0.04**
2018 Max	**5.75**	**14.86**	**0.04**	**0.00**	**6.00**	**2.70**	**0.00**	**0.75**	**28.50**	**0.00**	**0.00**	**0.01**	**97.10**	**0.02**	**4.10**	**0.03**	**7.52**	**0.01**	**1.92**	**0.84**	**0.00**	**0.68**	**0.02**	**0.68**	**2.07**	**5.10**	**0.33**	**5.00**	**376.80**	**14.04**	**9.03**	**24.10**	**1.87**	**31.00**	**71.00**	**0.04**
2018 Mean	**5.36**	**14.86**	**0.03**	**0.00**	**5.25**	**1.90**	**0.00**	**0.46**	**18.13**	**0.00**	**0.00**	**0.01**	**91.38**	**0.02**	**3.44**	**0.03**	**7.52**	**0.01**	**1.65**	**0.84**	**0.00**	**0.32**	**0.02**	**0.32**	**1.49**	**5.08**	**0.21**	**1.63**	**276.90**	**13.08**	**8.00**	**22.33**	**1.17**	**8.90**	**63.18**	**0.04**
Long-term Average	**7.59**	**23.79**	**0.04**	**0.01**	**5.80**	**1.73**	**0.00**	**0.72**	**16.97**	**0.01**	**0.01**	**0.01**	**96.58**	**0.03**	**2.99**	**0.03**	**20.60**	**0.02**	**1.70**	**0.96**	**0.01**	**0.36**	**0.02**	**0.36**	**1.08**	**5.09**	**0.15**	**4.55**	**238.27**	**12.37**	**7.74**	**22.20**	**0.72**	**2.21**	**68.93**	**0.08**

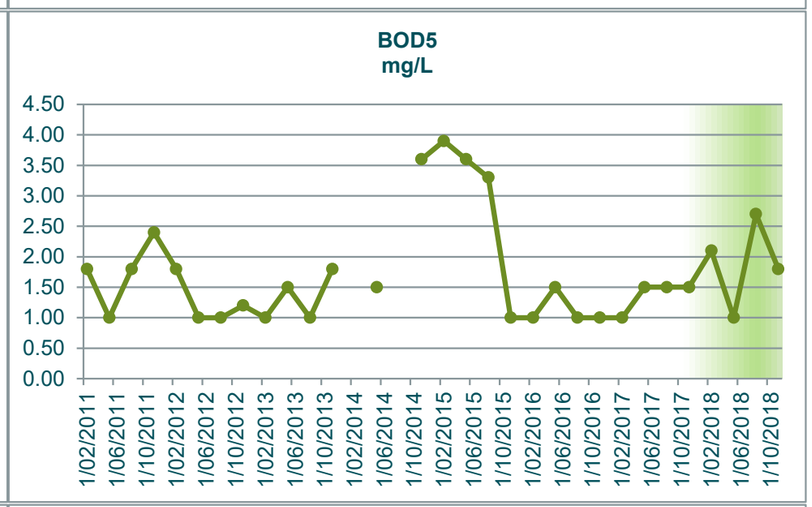

Alkalinity
mg/L as CaCO3
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

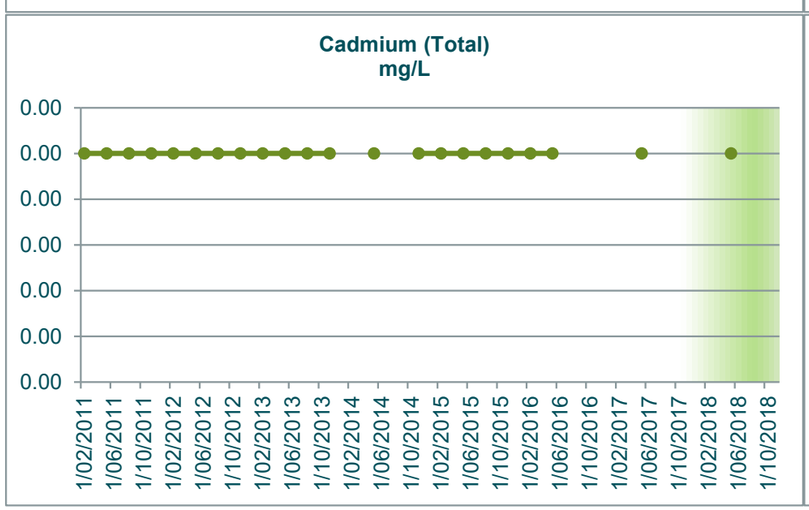

Aluminium (Total)
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

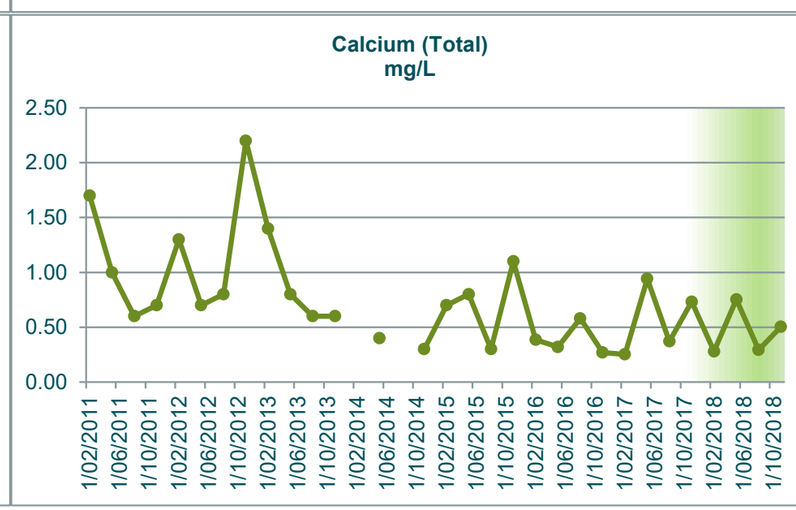

Ammonia
mg/L
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

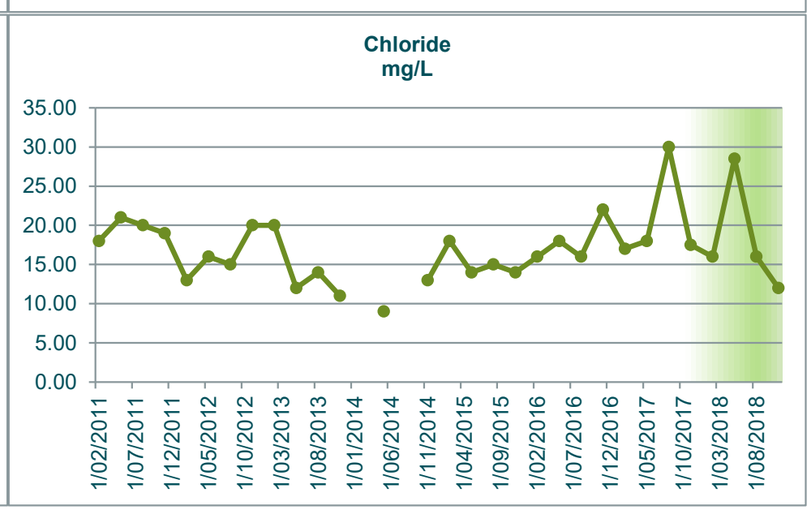

Arsenic (Total)
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

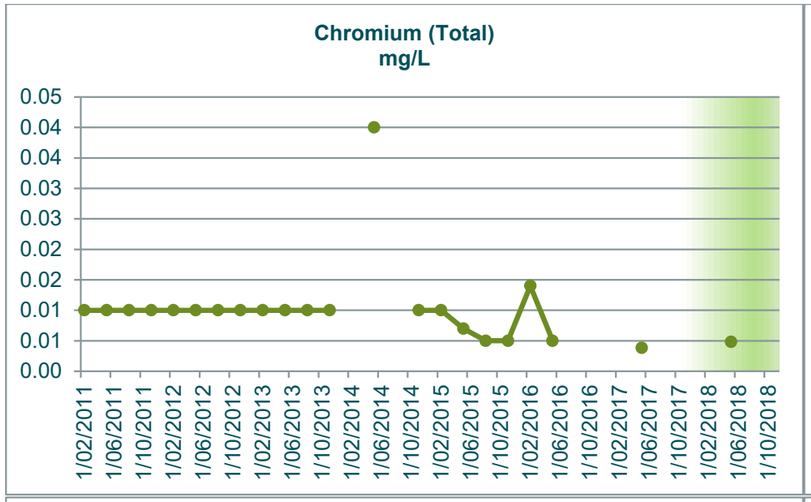

Bicarbonate HCO3
mg/L
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

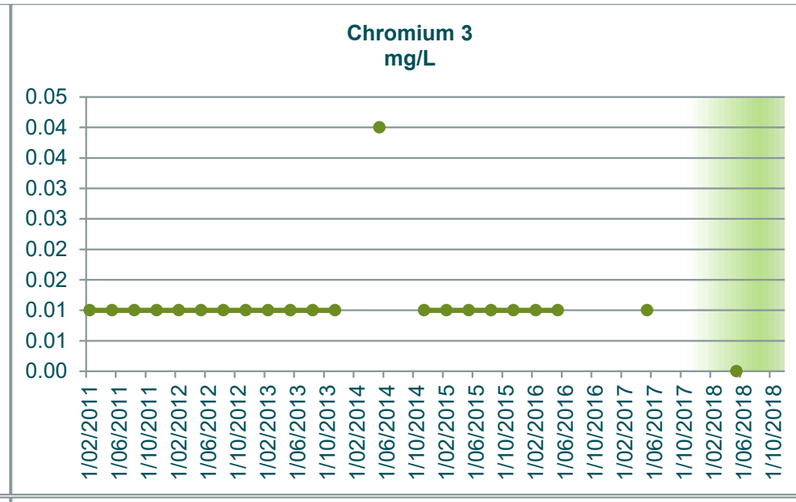

BOD5
mg/L
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

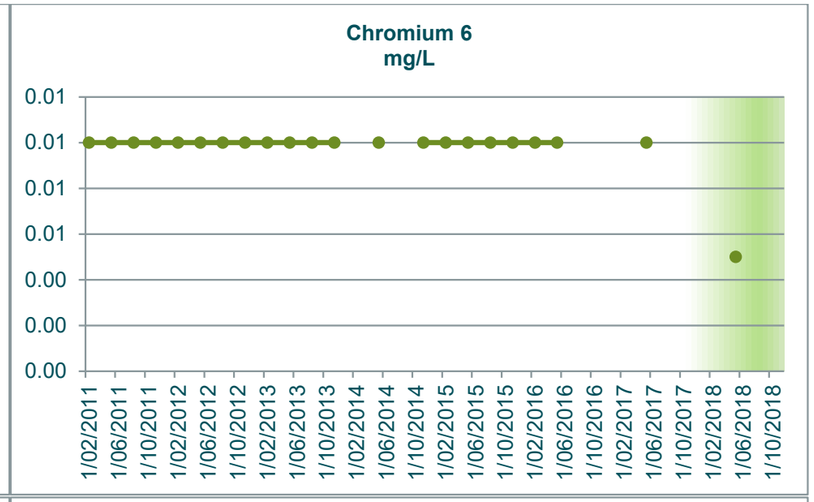

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

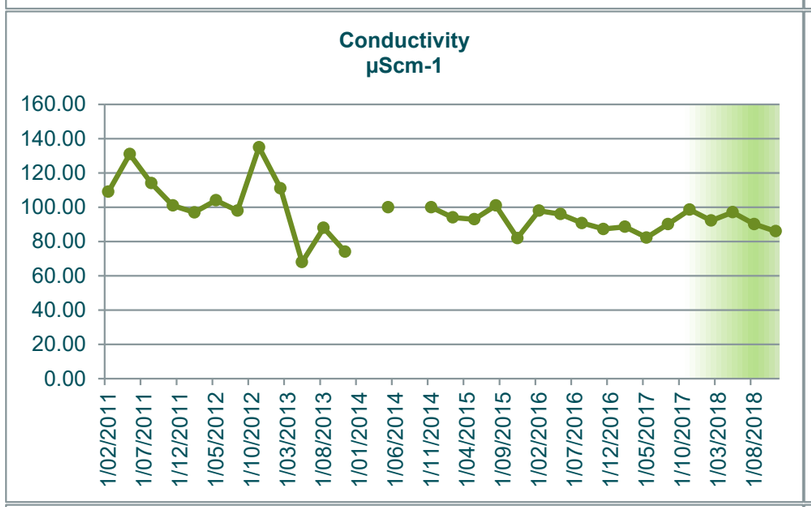

Calcium (Total)
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

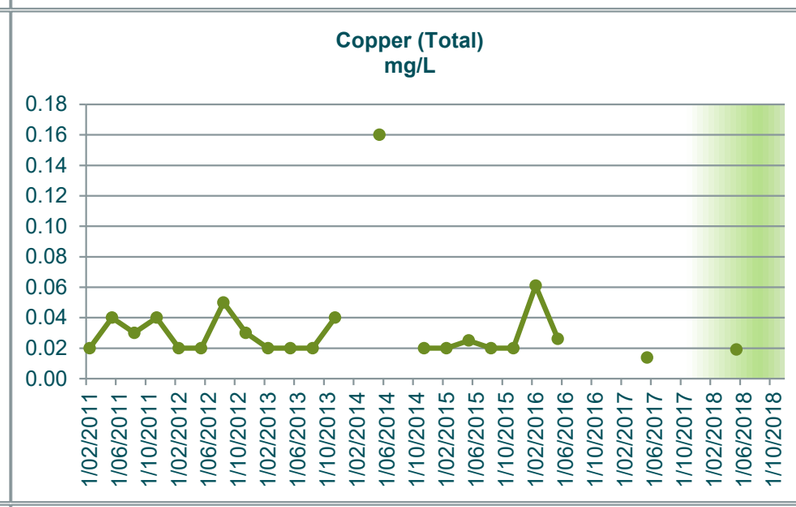

Chloride
mg/L
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

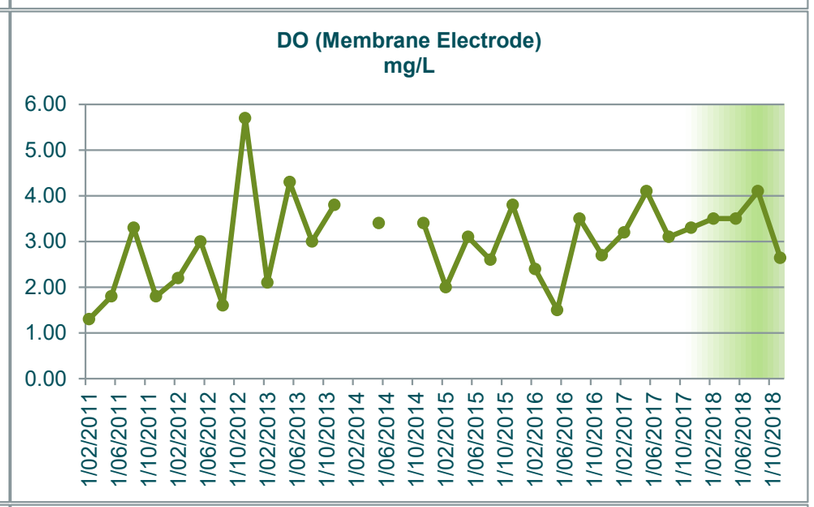

Chromium (Total)
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

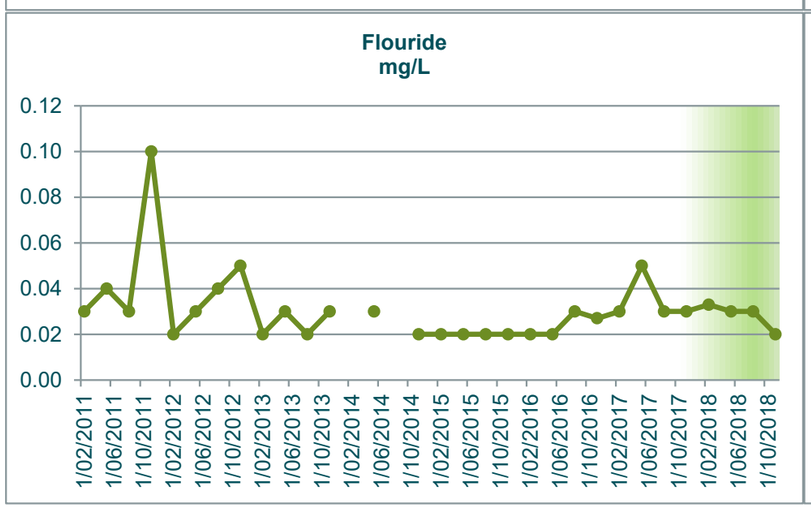

Chromium 3
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

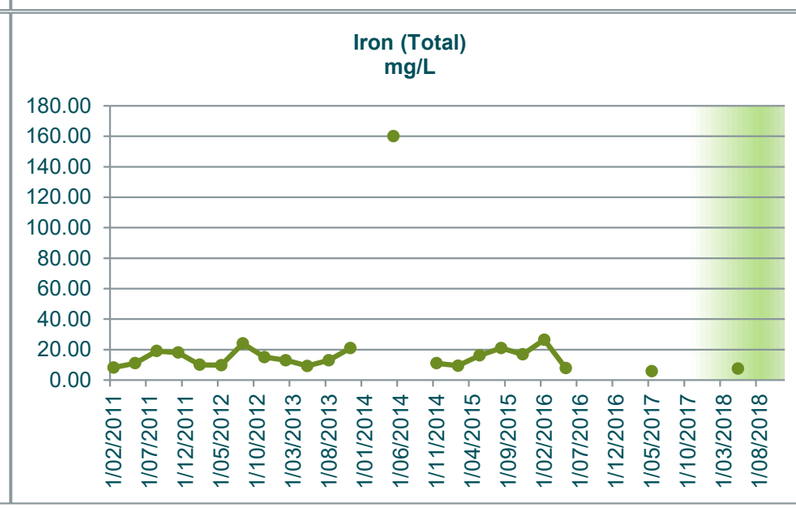

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

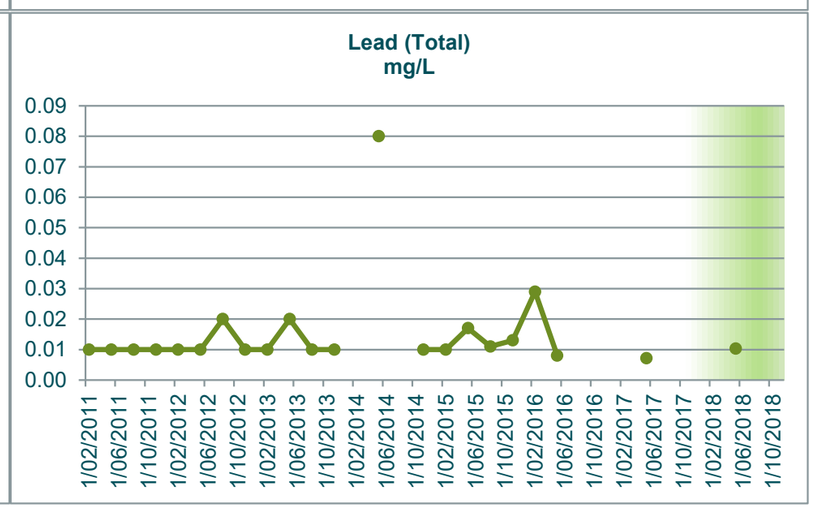

Conductivity
µScm-1
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

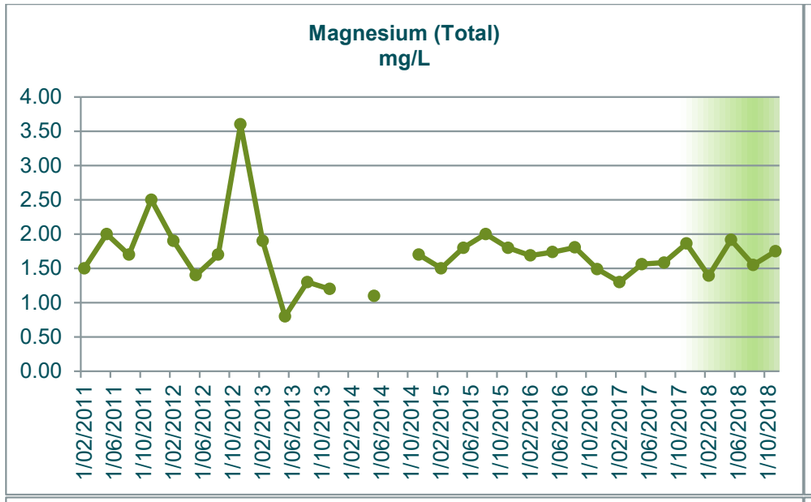

Copper (Total)
mg/L
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

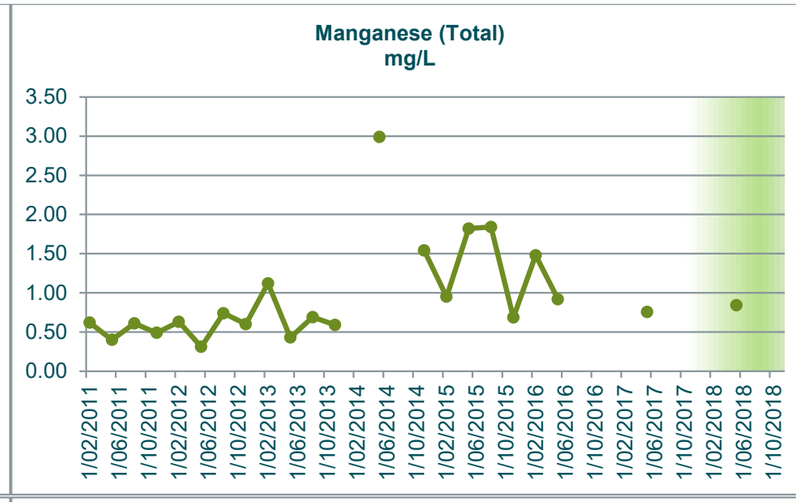

DO (Membrane Electrode)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

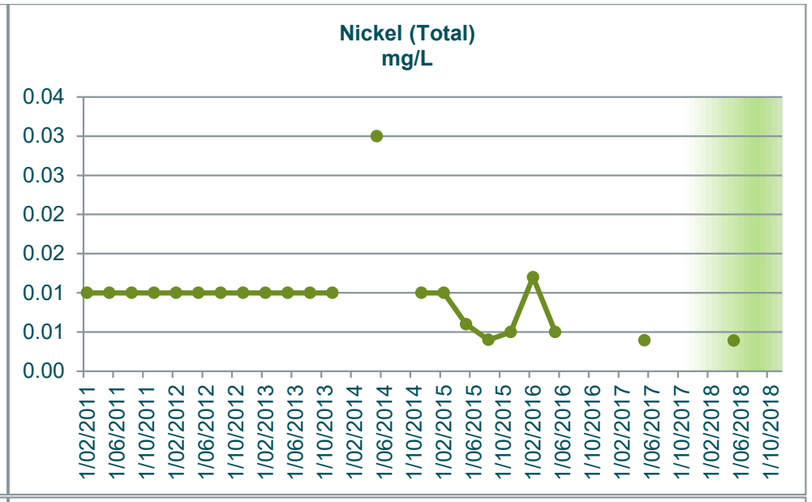

Flouride
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

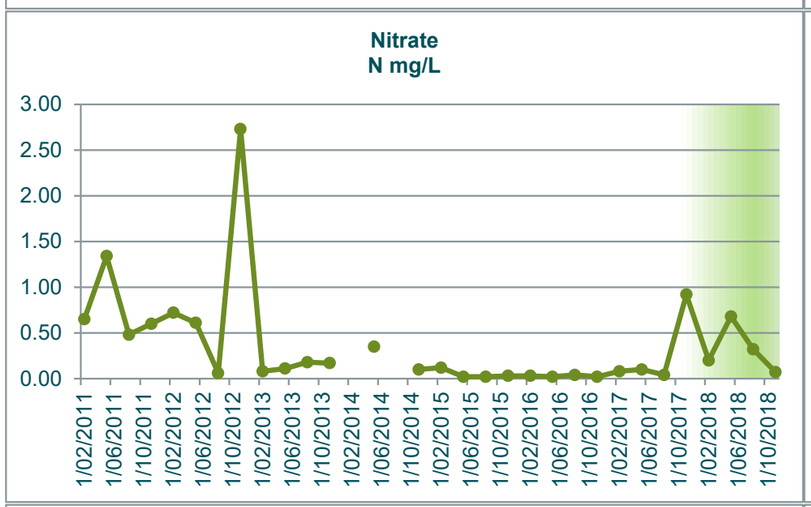

Iron (Total)
mg/L
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

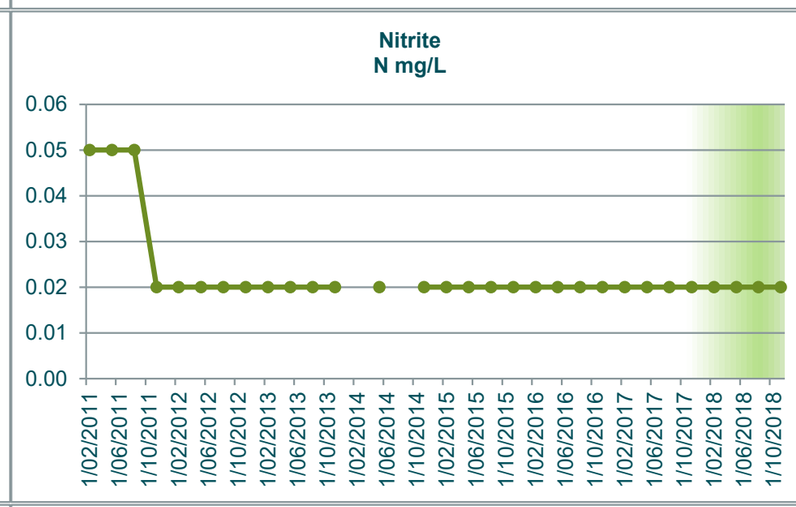

Lead (Total)
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

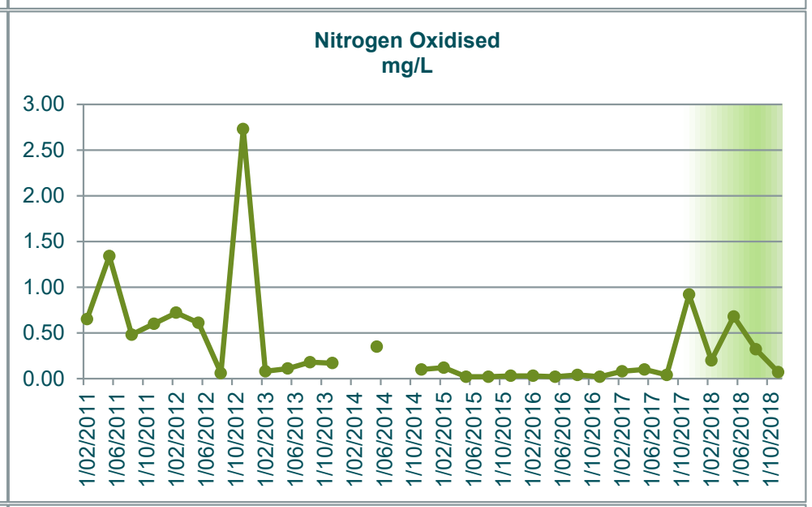

Magnesium (Total)
mg/L
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

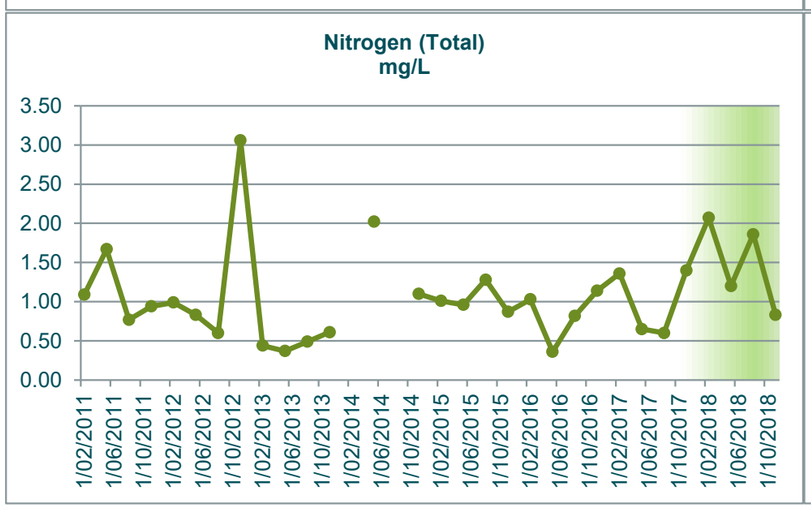

Manganese (Total)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Nickel (Total)
mg/L
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Nitrate
N mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Nitrogen Oxidised
mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Nitrogen (Total)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
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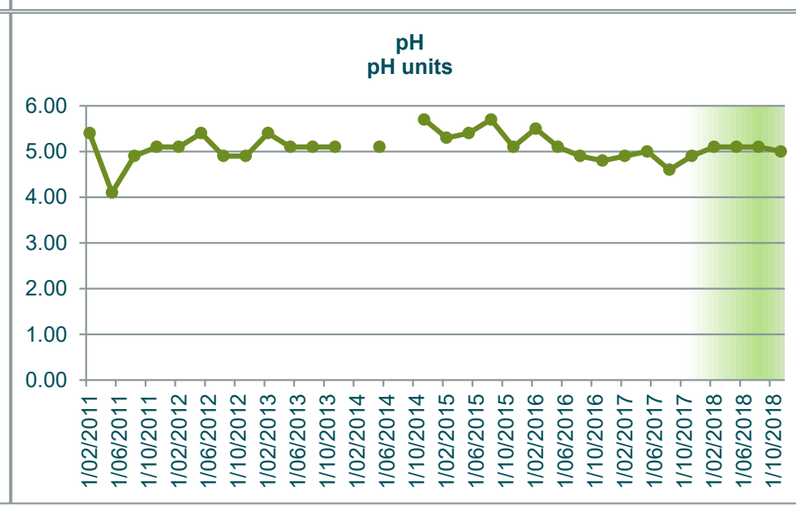
pH
pH units
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5.00
4.00
3.00
2.00
1.00
0.00
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1/06/2011
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1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
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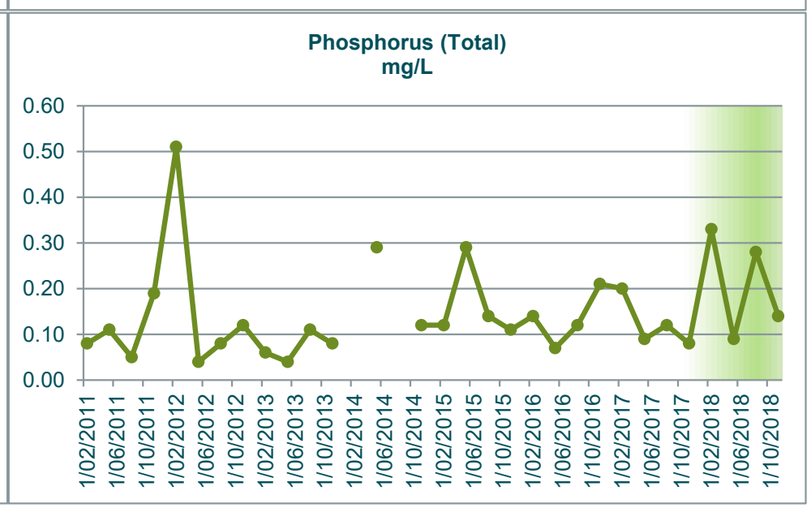
Phosphorus (Total)
mg/L
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0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
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1/06/2016
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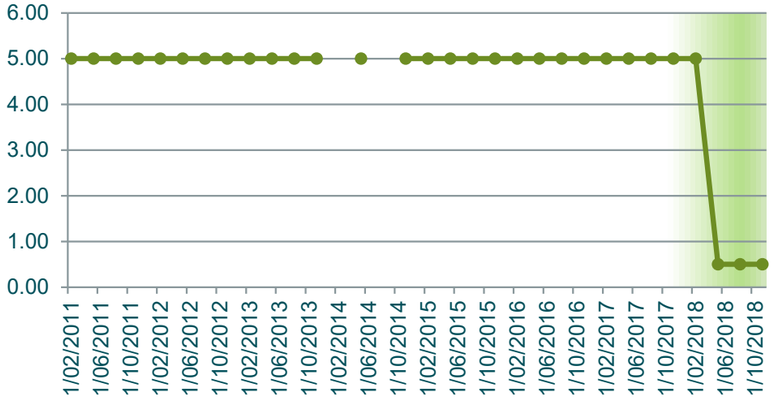
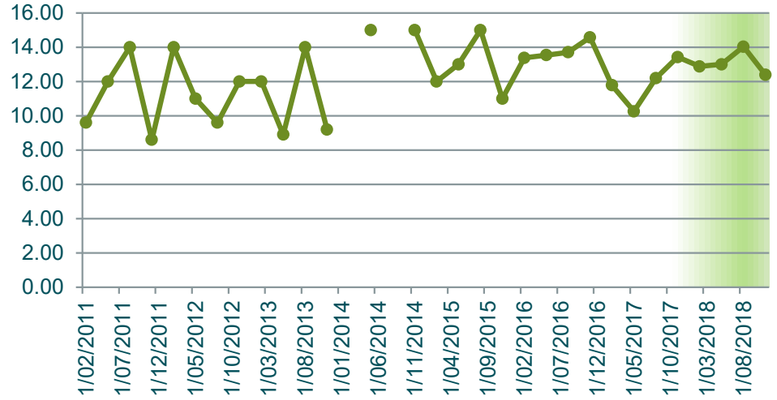
1/02/2018
1/06/2018
1/10/2018

Potassium (Total)
mg/L

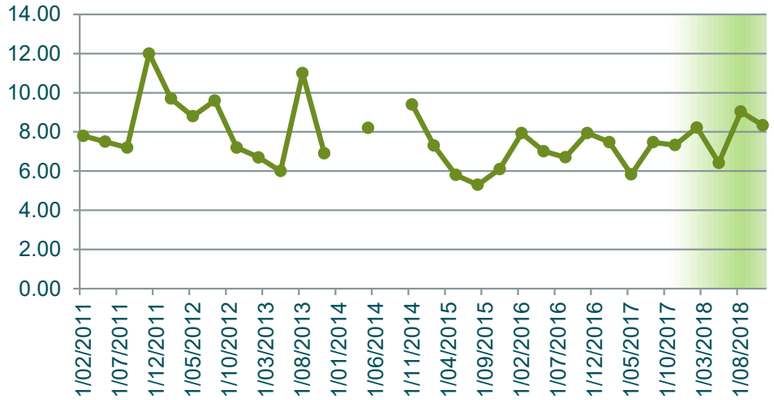


Redox Potential
mV

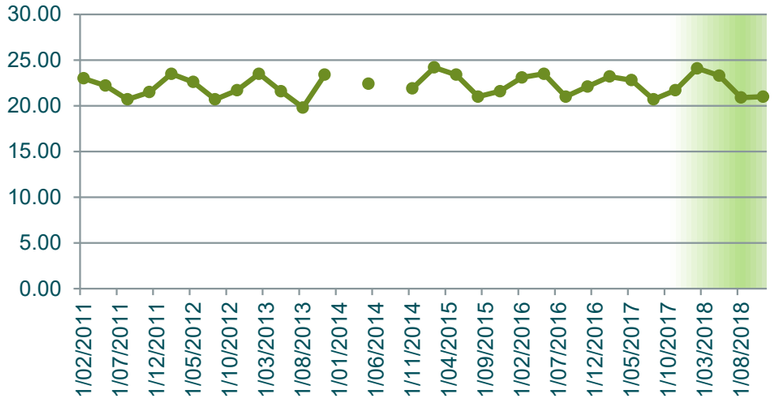
Sodium (Total)
mg/L



Sulphate
mg/L

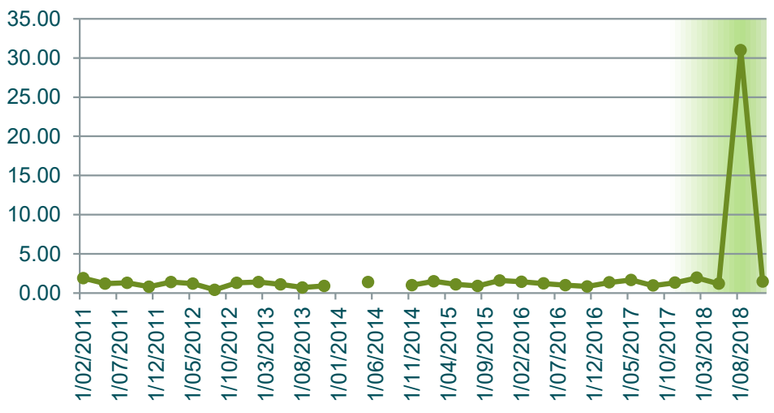


Temperature
C

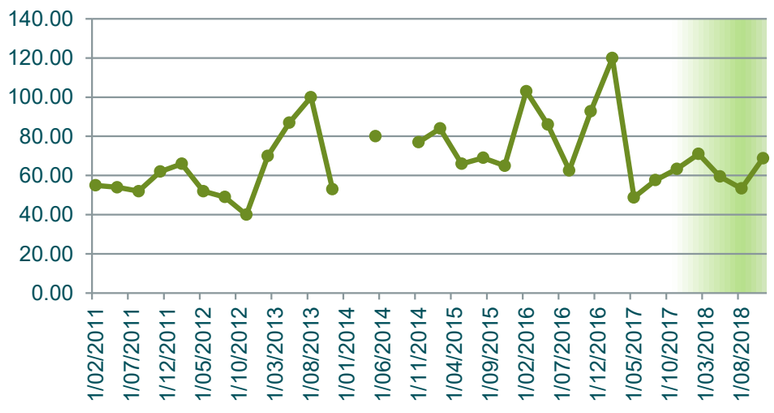


TKN
mg/L

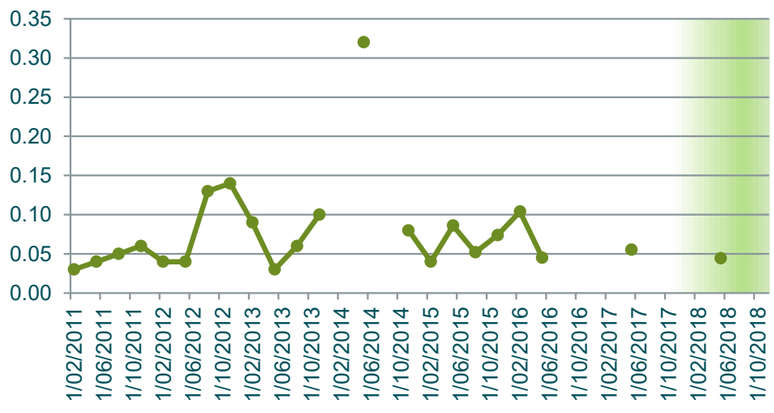
TOC
mg/L



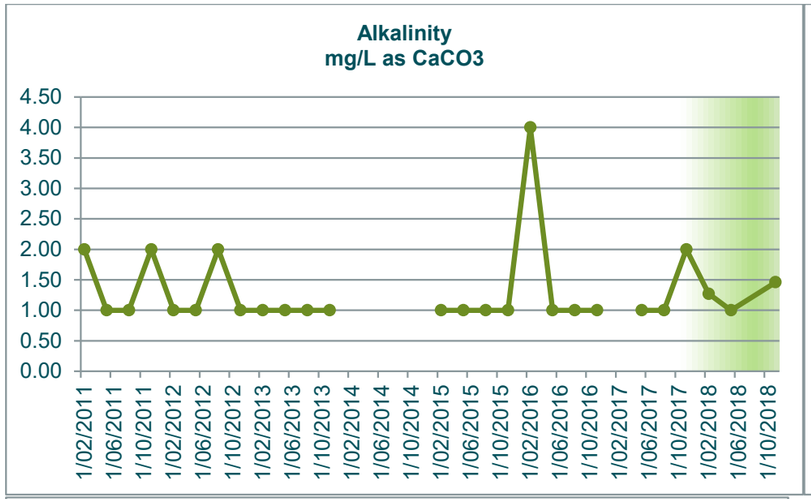
Total Acidity
mg/L CaCO3



Zinc (Total)
mg/L



GW14	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
1/02/2011	2.00	37.00	0.09	0.01	1.00	1.00	0.00	0.80	35.00	0.02	0.02	0.01	137.00	0.03	3.90	0.03	45.00	0.05	0.90	0.13	0.01	0.30	0.05	0.30	0.54	4.90	0.18	5.00	202.00	13.00	7.10	24.10	0.24	2.70	45.00	0.03
11/05/2011	1.00	12.00	0.05	0.01	NT	1.00	0.00	0.60	36.00	0.01	0.01	0.01	171.00	0.03	3.10	0.03	14.00	0.01	1.60	0.04	0.01	0.45	0.05	0.45	0.76	3.70	0.20	5.00	341.00	19.00	6.60	22.00	0.31	1.00	73.00	0.02
10/08/2011	1.00	28.00	0.05	0.01	1.00	2.70	0.00	0.50	32.00	0.01	0.01	0.01	156.00	0.02	3.30	0.03	29.00	0.02	1.40	0.03	0.01	0.45	0.05	0.45	0.62	4.40	0.05	5.00	357.00	20.00	6.20	20.00	0.17	1.60	77.00	0.03
9/11/2011	2.00	15.00	0.06	0.01	1.00	5.40	0.00	21.00	34.00	0.01	0.01	0.01	133.00	0.02	3.00	0.10	19.00	0.01	20.00	0.10	0.01	0.42	0.02	0.42	0.84	4.60	0.28	8.00	380.00	96.00	44.00	22.10	0.42	0.70	72.00	0.02
7/02/2012	1.00	9.51	0.04	0.01	1.00	1.80	0.00	0.70	33.00	0.01	0.01	0.01	144.00	0.01	3.80	0.01	11.00	0.01	1.70	0.05	0.01	0.45	0.02	0.45	0.72	4.50	0.55	5.00	347.00	23.00	8.80	23.30	0.27	0.10	58.00	0.01
9/05/2012	1.00	35.00	0.04	0.01	1.00	1.00	0.00	0.60	30.00	0.01	0.01	0.01	153.00	0.03	4.50	0.04	40.00	0.02	1.50	0.08	0.01	0.45	0.02	0.45	0.71	4.50	0.05	5.00	328.00	17.00	6.80	22.30	0.26	1.10	71.00	0.09
7/08/2012	2.00	59.00	0.04	0.02	1.00	1.00	0.00	1.00	30.00	0.03	0.03	0.01	146.00	0.06	3.00	0.05	70.00	0.06	1.80	0.17	0.01	0.46	0.02	0.46	0.65	4.30	0.05	5.00	304.00	15.00	6.60	20.00	0.19	0.60	76.00	0.08
14/11/2012	1.00	96.00	0.05	0.02	1.00	1.00	0.00	0.60	28.00	0.04	0.04	0.01	131.00	0.08	3.20	0.05	94.00	0.10	1.40	0.21	0.01	0.23	0.02	0.23	0.75	4.50	0.29	5.00	280.00	14.00	6.20	22.10	0.52	0.50	269.00	0.07
14/02/2013	1.00	3.50	0.08	0.01		1.00	0.00	0.60	25.00	0.01	0.01	0.01	140.00	0.01	3.60	0.02	3.41	0.01	1.30	0.03	0.01	0.91	0.02	0.91	1.13	4.40	0.19	5.00	278.00	19.00	8.00	24.10	0.22	1.10	58.00	0.04
15/05/2013	1.00	19.00	0.03	0.01	1.00	1.00	0.00	0.60	30.00	0.01	0.01	0.01	139.00	0.02	4.60	0.03	19.00	0.02	1.10	0.09	0.01	0.46	0.02	0.46	0.73	4.50	0.06	5.00	192.00	19.00	6.60	22.20	0.27	0.40	111.00	0.03
7/08/2013	1.00	19.00	0.03	0.01	1.00	1.00	0.00	0.60	38.00	0.01	0.01	0.01	139.00	0.01	4.50	0.04	16.00	0.01	1.30	0.03	0.01	0.51	0.02	0.51	0.74	4.50	0.27	5.00	250.00	21.00	8.30	19.90	0.23	0.60	120.00	0.03
13/11/2013	1.00	19.00	0.07	0.01	1.00	1.80	0.00	0.50	30.00	0.01	0.01	0.01	145.00	0.02	4.00	0.03	20.00	0.01	1.50	0.08	0.01	0.43	0.02	0.43	0.95	4.60	0.09	5.00	243.00	20.00	7.60	21.30	0.52	0.90	67.00	0.10
11/02/2014																																				
13/05/2014																																				
12/08/2014																																				
10/11/2014																																				
10/02/2015	1.00	18.90	0.02	0.01	1.00	1.20	0.00	0.60	31.00	0.01	0.01	0.01	130.00	0.01	4.30	0.02	17.30	0.01	1.30	0.08	0.01	0.55	0.02	0.55	1.35	4.60	0.10	5.00	213.00	17.00	8.10	23.30	0.80	0.70	66.00	0.06
12/05/2015	1.00	33.30	0.02	0.01	1.00	2.10	0.00	0.60	29.00	0.01	0.01	0.01	129.00	0.03	5.30	0.02	25.40	0.03	1.50	0.11	0.01	0.47	0.02	0.47	1.20	4.50	0.12	5.00	226.00	21.00	6.00	22.10	0.73	0.30	68.00	0.07
12/08/2015	1.00	18.30	0.02	0.01	1.00	1.00	0.00	0.60	30.00	0.01	0.01	0.01	129.00	0.02	4.90	0.02	15.10	0.01	1.50	0.08	0.01	0.44	0.02	0.44	0.79	4.60	0.06	5.00	232.00	20.00	5.80	19.80	0.35	0.40	74.00	0.03
11/11/2015	1.00	14.12	0.02	0.00	1.00	1.00	0.00	0.80	23.00	0.01	0.01	0.01	121.00	0.01	4.80	0.01	10.06	0.01	1.40	0.07	0.00	1.38	0.02	1.38	1.63	4.50	0.05	5.00	222.00	16.00	6.20	20.80	0.25	0.60	64.00	0.03
9/02/2016	4.00	53.20	0.02	0.01	4.00	1.00	0.00	0.51	26.00	0.02	0.02	0.01	122.00	0.03	3.90	0.02	44.20	0.04	1.37	0.13	0.00	0.72	0.02	0.72	1.71	4.50	0.13	5.00	245.00	17.54	6.49	22.40	0.99	0.66	145.00	0.04
10/05/2016	1.00	25.95	0.02	0.01	1.00	1.00	0.00	0.47	28.00	0.01	0.01	0.01	127.00	0.02	2.00	0.02	25.03	0.02	1.34	0.10	0.00	0.49	0.02	0.49	0.82	4.50	0.08	5.00	242.00	17.14	6.00	22.60	0.33	0.39	86.00	0.03
10/08/2016	1.00		0.02		1.00	1.00		0.57	26.00				125.50		4.20	0.03			1.29			0.70	0.02	0.70	1.57	4.40	0.12	5.00	250.00	18.70	6.46	20.00	0.87	0.46	102.50	
8/11/2016	1.00		0.02		1.00	1.00		0.58	13.00				124.40		2.80	0.03			1.58			0.38	0.02	0.38	0.99	4.40	0.14	5.00	444.90	19.47	6.32	21.20	0.61	0.95	118.80	
7/02/2017																																				
9/05/2017	1.00	31.06	0.02	0.01		1.00	0.00	1.56	17.00	0.01	0.01	0.01	108.80	0.03	6.80	0.03	31.98	0.03	1.66	0.15	0.00	2.98	0.02	2.98	3.59	4.40	0.11	5.00	434.80	12.63	4.70	22.10	0.61	1.00	53.90	0.04
9/08/2017	1.00		0.02			1.00		0.58	80.00				126.10		4.20	0.02			1.21			0.46	0.02	0.46	1.24	4.30	0.17	5.00	344.60	16.86	6.61	20.40	0.78	0.85	89.10	
8/11/2017	2.00		0.02		2.00	1.00		0.54	27.50				125.30		4.00	0.03			1.51			0.60	0.02	0.60	1.01	4.30	0.14	5.00	468.10	18.63	6.01	21.00	0.41	1.20	81.90	
14/02/2018	1.27		0.13		1.00	3.30		0.19	26.00				121.90		4.60	0.03			0.63			0.49	0.02	0.49	2.68	5.00	0.27	5.00	242.20	17.33	7.86	23.70	2.19	0.75	228.90	
9/05/2018	1.00	26.74	0.03	0.01		1.20	0.00	0.48	28.50	0.01	0.01	0.01	121.40	0.02	3.90	0.03	24.49	0.02	1.28	0.11	0.00	0.83	0.02	0.83	1.38	4.60	0.13	0.53	321.70	16.89	6.78	22.90	0.55	1.13	71.50	0.02
14/11/2018	1.46		0.02		1.00	1.20		0.85	20.00				118.00		5.67	0.02			1.47			0.85	0.02	0.85	1.75	4.75	0.25	0.53	121.00	17.99	7.18	21.40	0.90	1.06	69.10	
2018 Min	**1.00**	**26.74**	**0.02**	**0.01**	**1.00**	**1.20**	**0.00**	**0.19**	**20.00**	**0.01**	**0.01**	**0.01**	**118.00**	**0.02**	**3.90**	**0.02**	**24.49**	**0.02**	**0.63**	**0.11**	**0.00**	**0.49**	**0.02**	**0.49**	**1.38**	**4.60**	**0.13**	**0.53**	**121.00**	**16.89**	**6.78**	**21.40**	**0.55**	**0.75**	**69.10**	**0.02**
2018 Max	**1.46**	**26.74**	**0.13**	**0.01**	**1.00**	**3.30**	**0.00**	**0.85**	**28.50**	**0.01**	**0.01**	**0.01**	**121.90**	**0.02**	**5.67**	**0.03**	**24.49**	**0.02**	**1.47**	**0.11**	**0.00**	**0.85**	**0.02**	**0.85**	**2.68**	**5.00**	**0.27**	**5.00**	**321.70**	**17.99**	**7.86**	**23.70**	**2.19**	**1.13**	**228.90**	**0.02**
2018 Mean	**1.24**	**26.74**	**0.06**	**0.01**	**1.00**	**1.90**	**0.00**	**0.51**	**24.83**	**0.01**	**0.01**	**0.01**	**120.43**	**0.02**	**4.72**	**0.03**	**24.49**	**0.02**	**1.13**	**0.11**	**0.00**	**0.72**	**0.02**	**0.72**	**1.94**	**4.78**	**0.22**	**2.02**	**228.30**	**17.40**	**7.27**	**22.67**	**1.21**	**0.98**	**123.17**	**0.02**
Long-term Average	**1.30**	**28.68**	**0.04**	**0.01**	**1.19**	**1.45**	**0.00**	**1.42**	**30.23**	**0.01**	**0.01**	**0.01**	**133.21**	**0.02**	**4.07**	**0.03**	**28.70**	**0.02**	**2.10**	**0.09**	**0.01**	**0.65**	**0.02**	**0.65**	**1.19**	**4.49**	**0.16**	**4.77**	**288.82**	**20.89**	**8.20**	**21.81**	**0.54**	**0.84**	**92.91**	**0.04**


Alkalinity
mg/L as CaCO3
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
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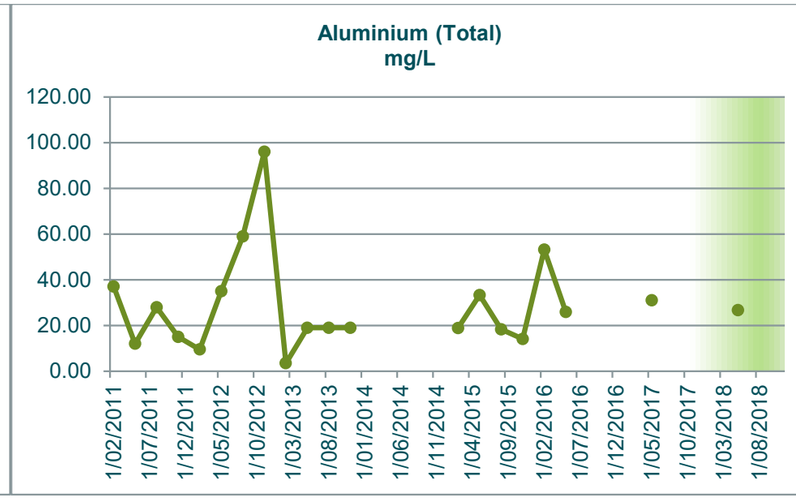
Aluminium (Total)
mg/L
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
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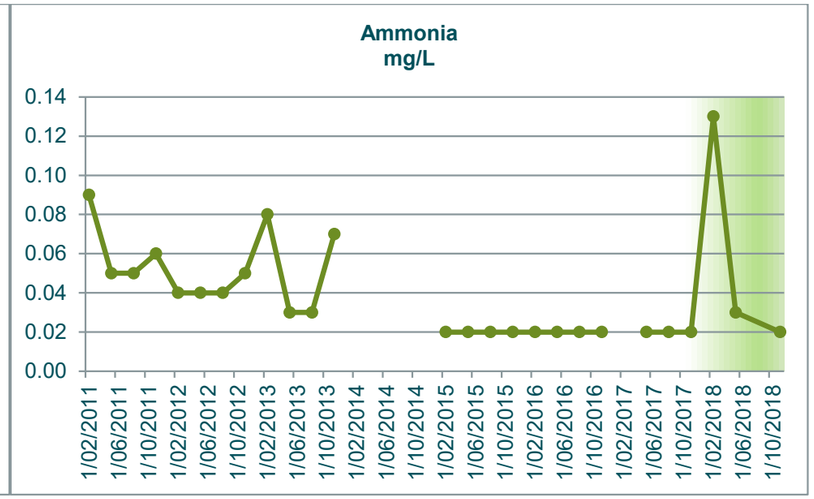
1/03/2018
1/08/2018


Ammonia
mg/L
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
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1/10/2013
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1/10/2015
1/02/2016
1/06/2016
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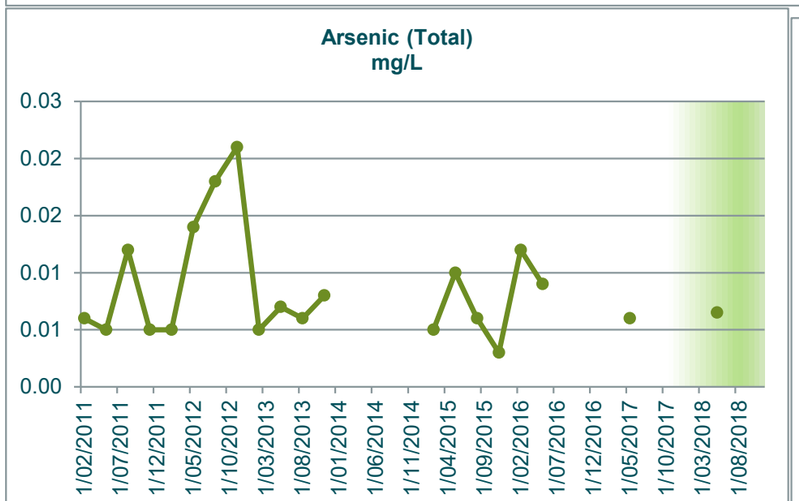
1/02/2018
1/06/2018
1/10/2018


Arsenic (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
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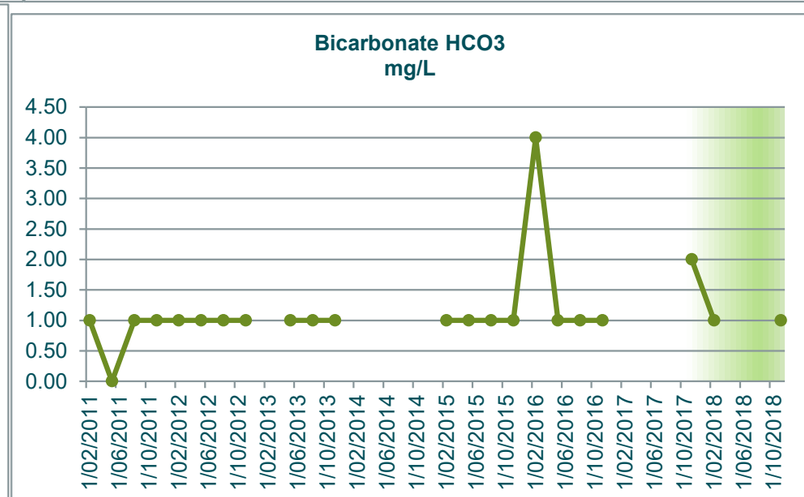
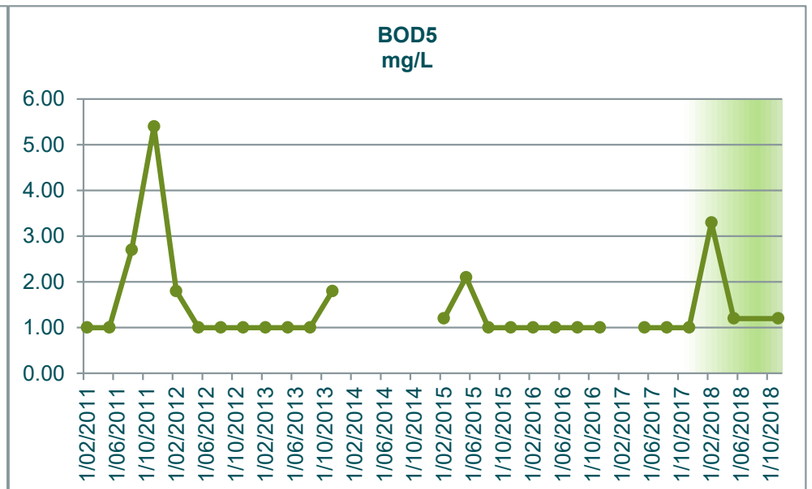
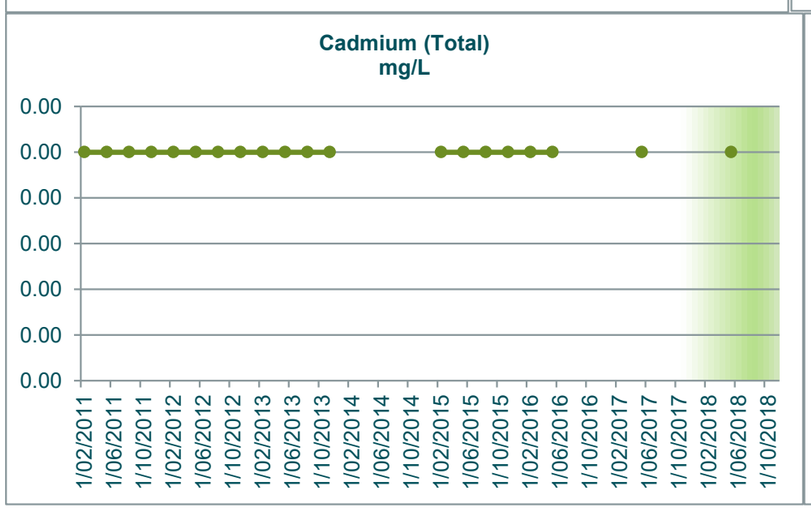
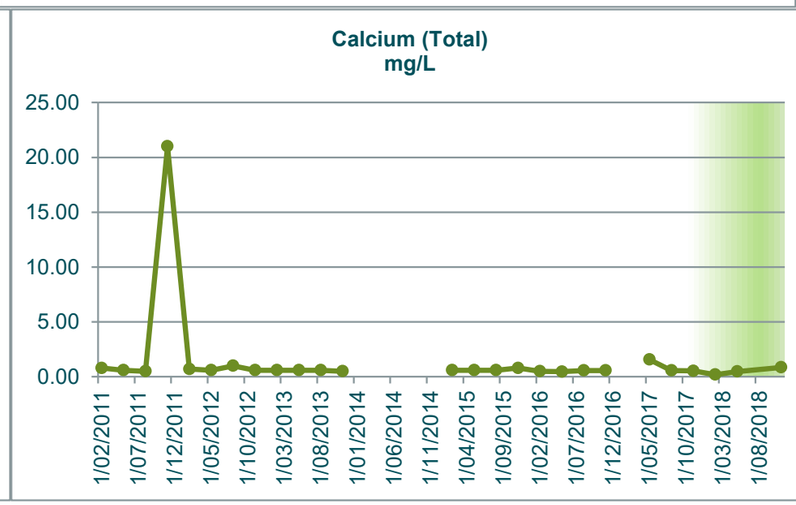
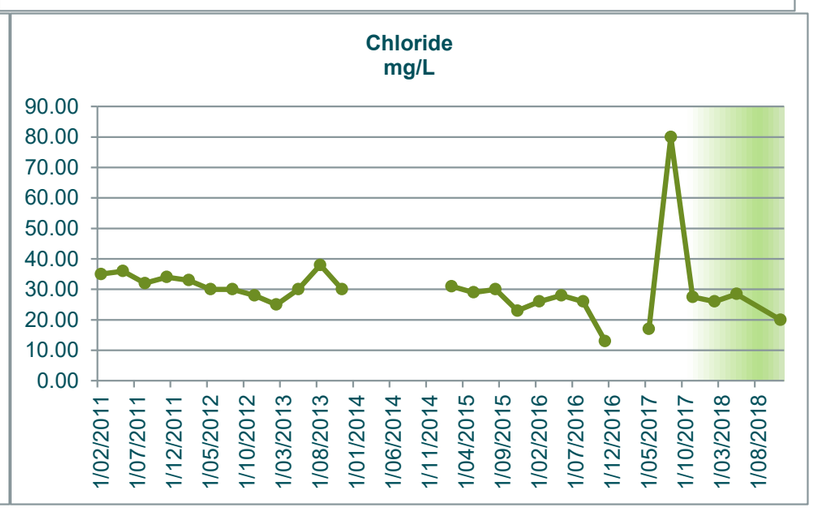
1/10/2017
1/03/2018
1/08/2018

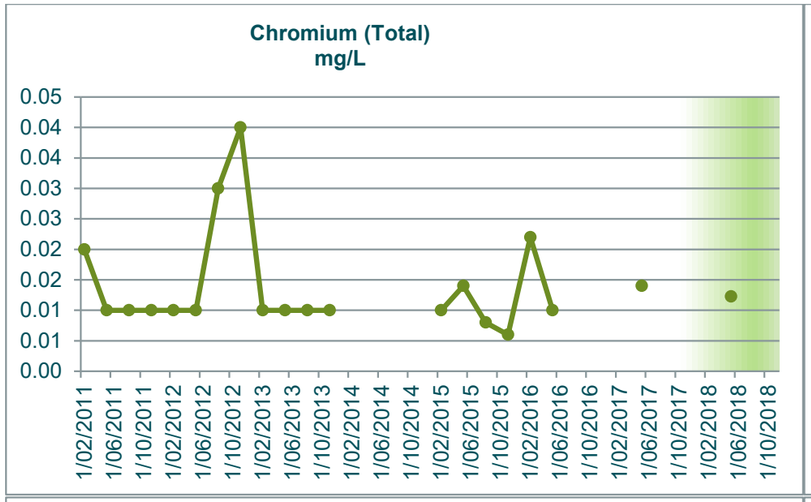

Bicarbonate HCO3
mg/L
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

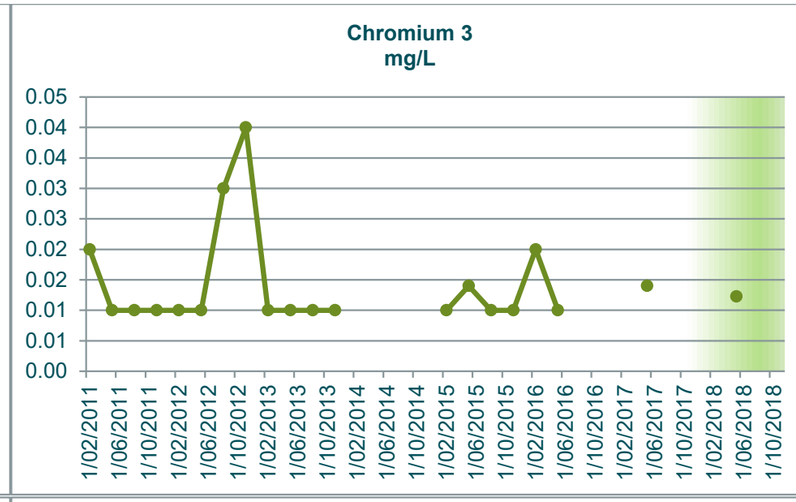

BOD5
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

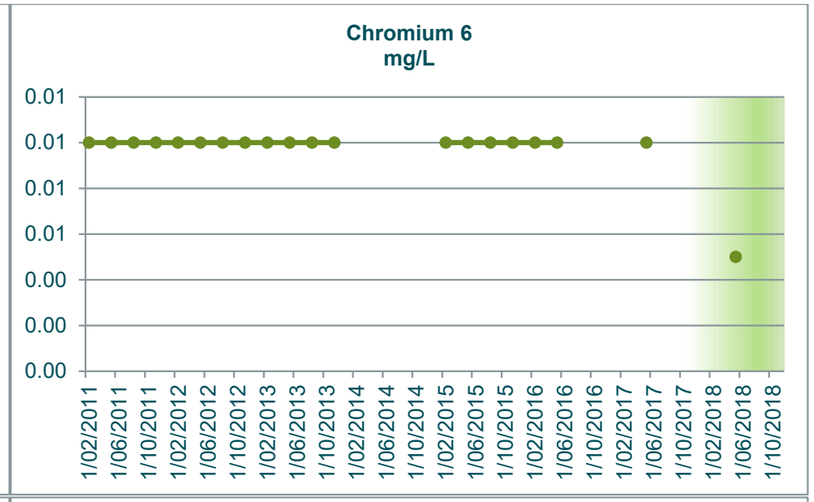

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

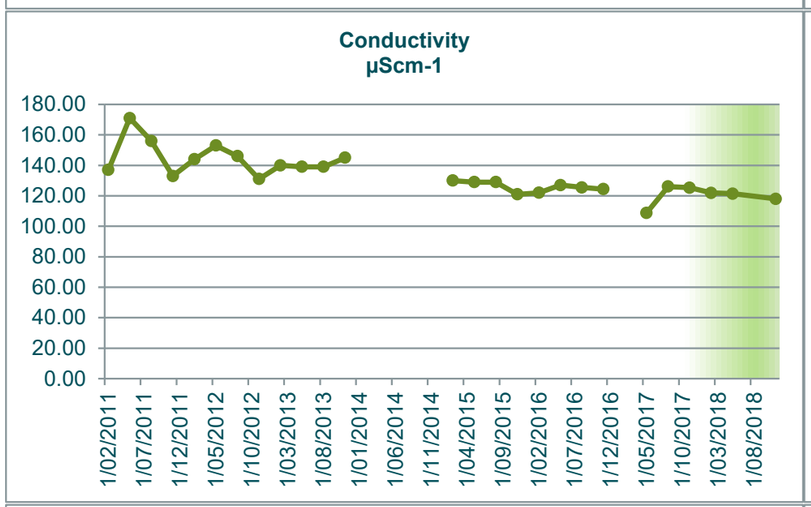

Calcium (Total)
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

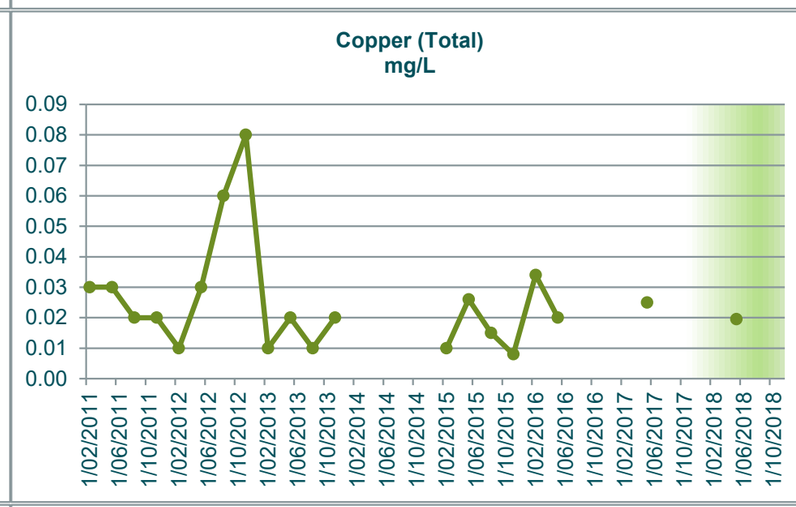

Chloride
mg/L
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

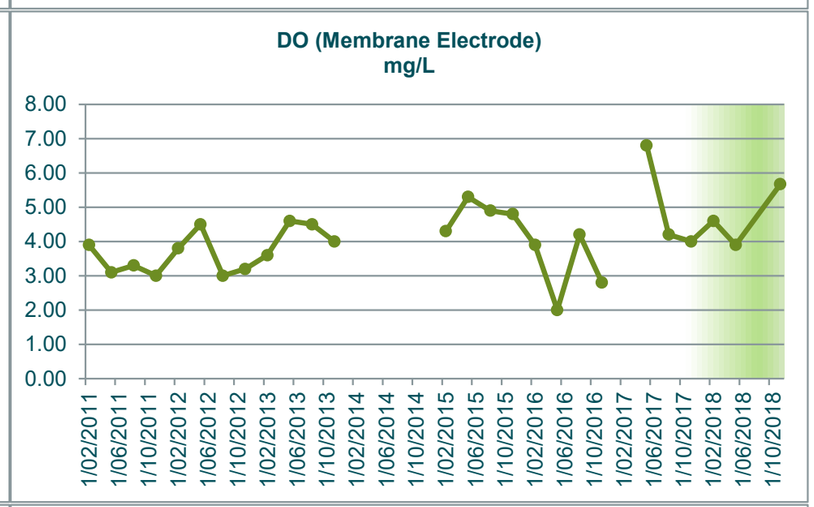

Chromium (Total)
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

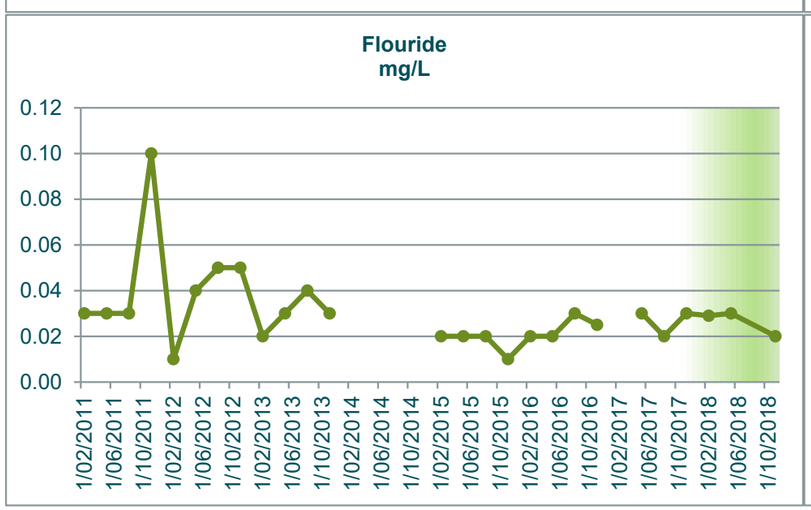

Chromium 3
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

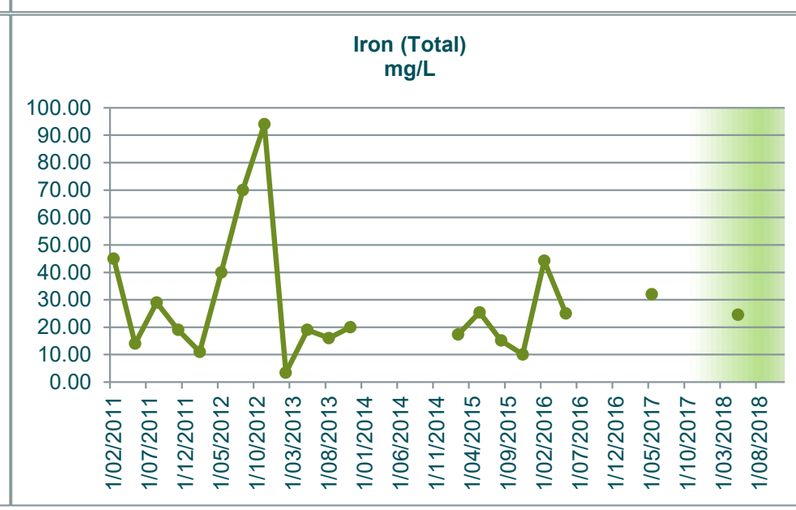

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

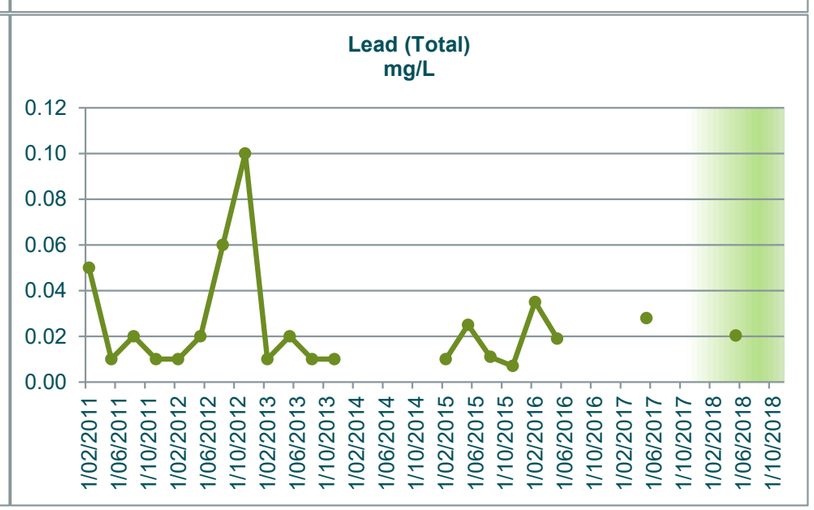

Conductivity
µScm-1
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

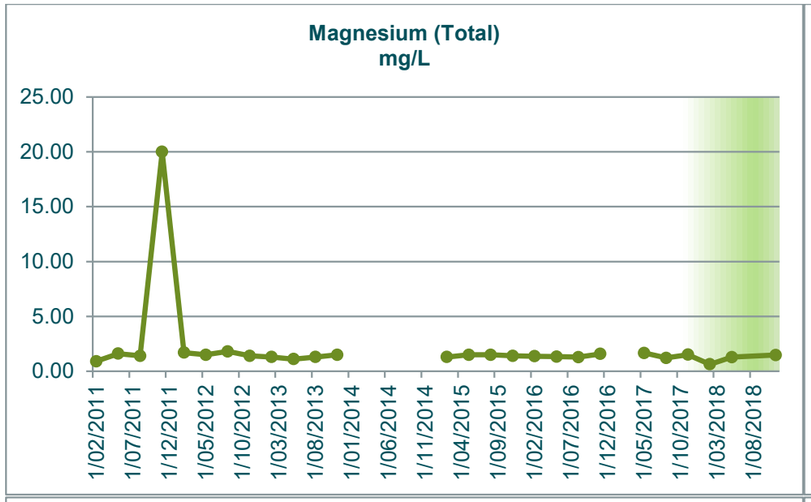

Copper (Total)
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

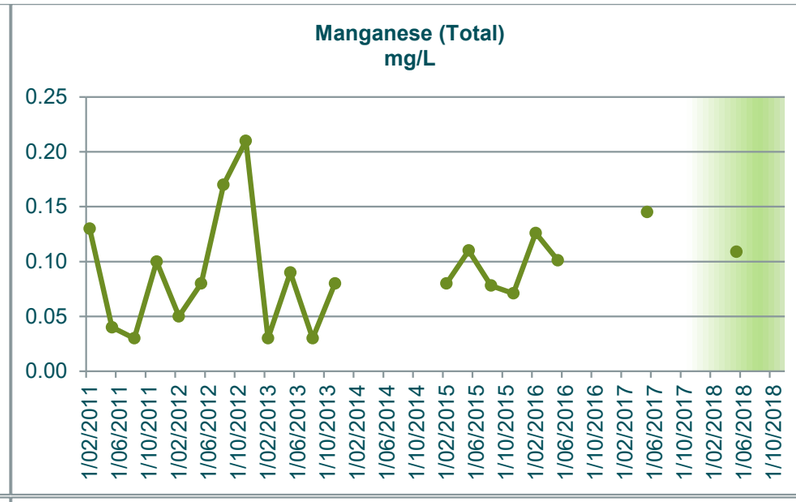

DO (Membrane Electrode)
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

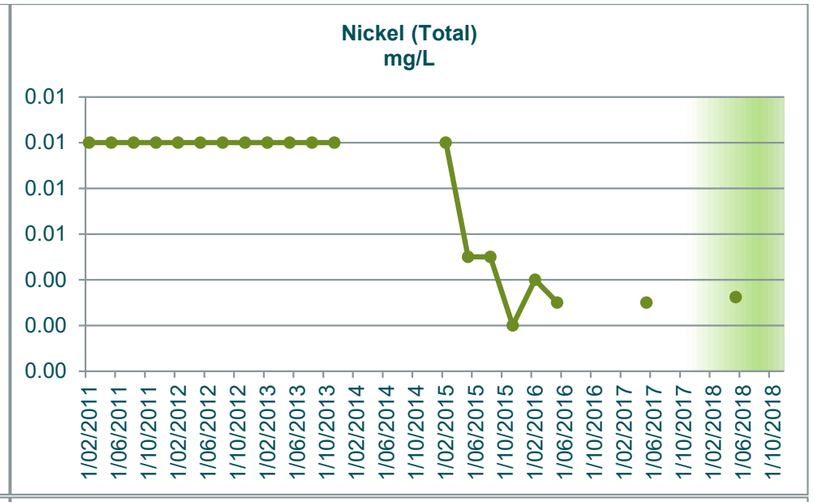

Flouride
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

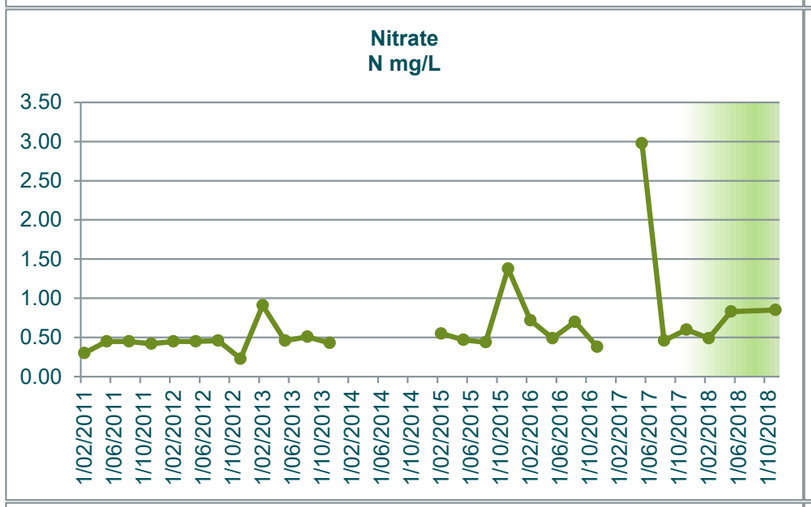

Iron (Total)
mg/L
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

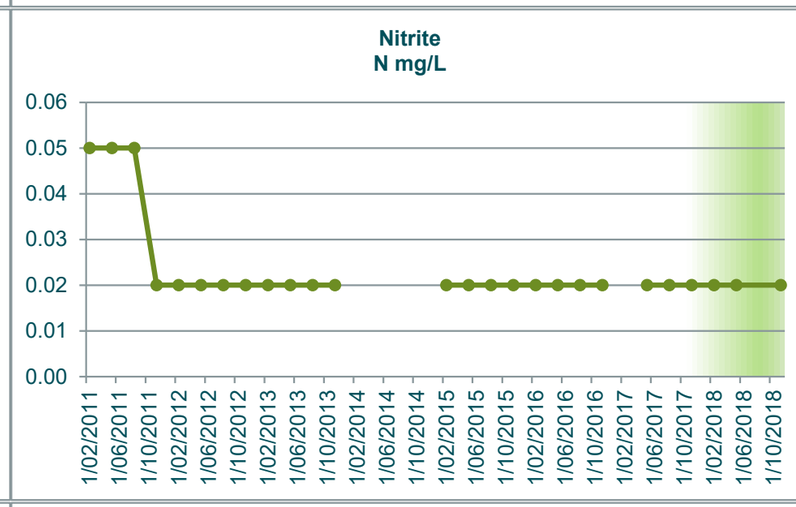

Lead (Total)
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

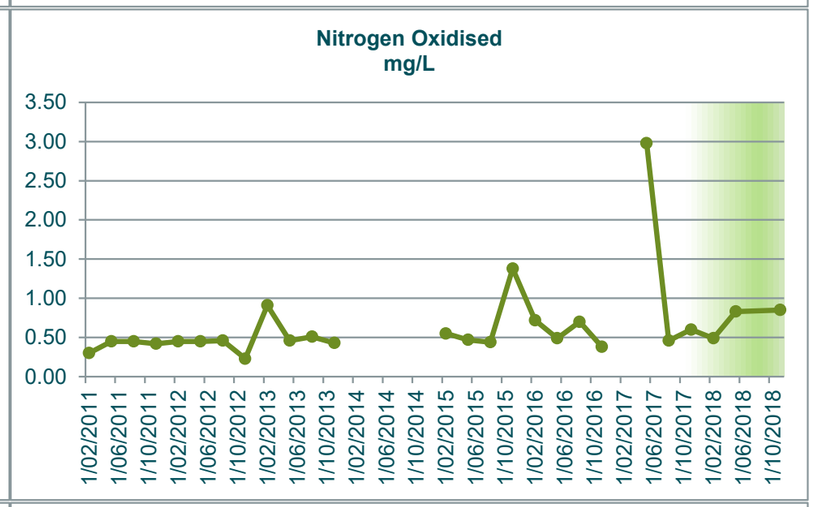

Magnesium (Total)
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

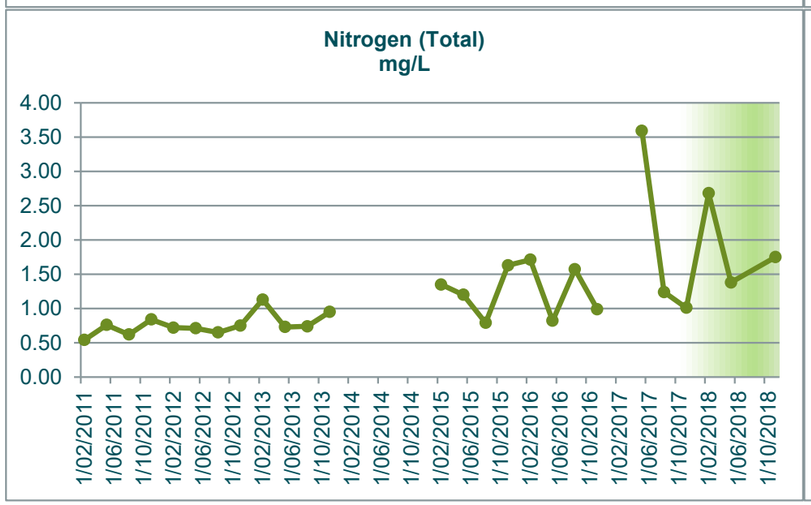

Manganese (Total)
mg/L
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

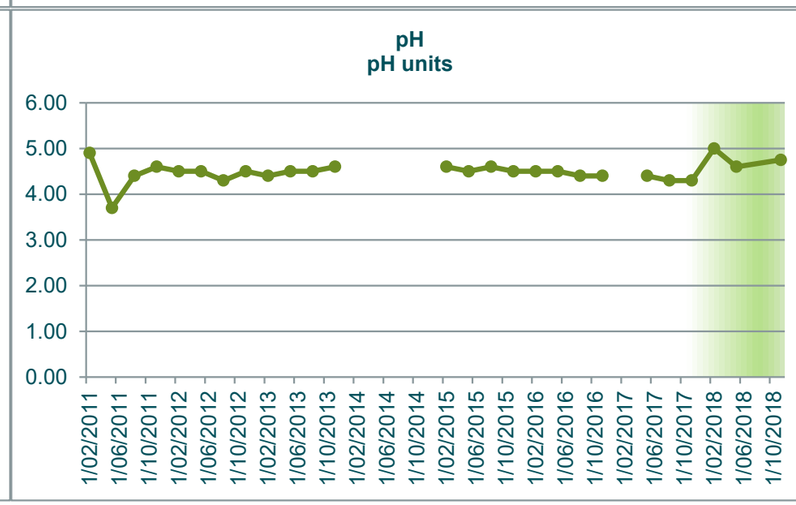

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

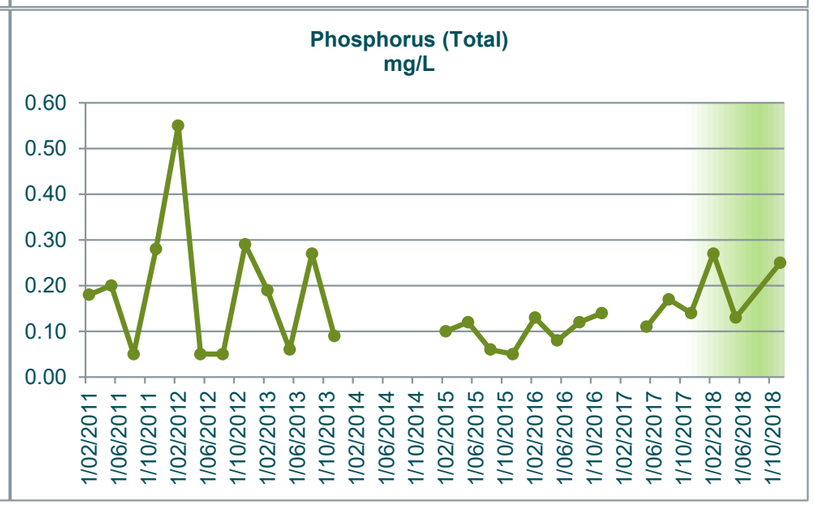

Nitrate
N mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

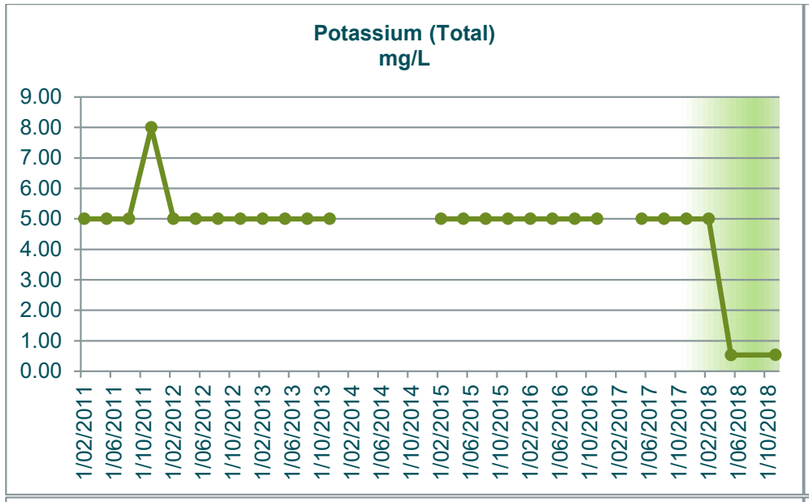

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

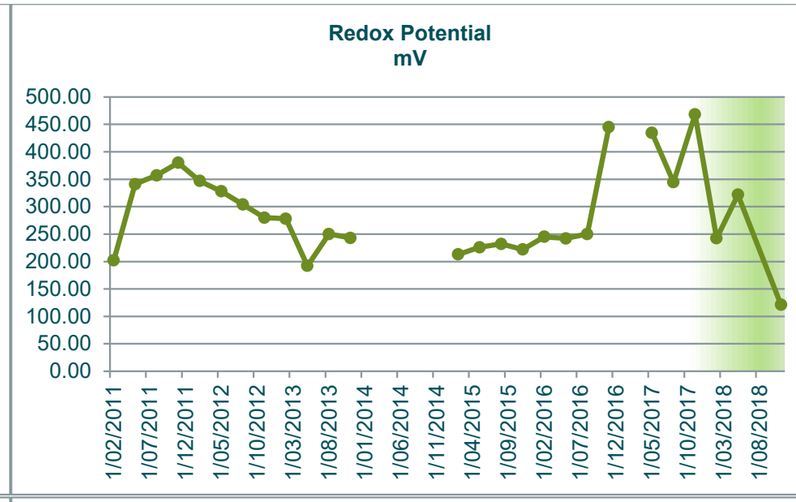

Nitrogen Oxidised
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Nitrogen (Total)
mg/L
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


pH
pH units
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Phosphorus (Total)
mg/L
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Potassium (Total)
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Redox Potential
mV
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
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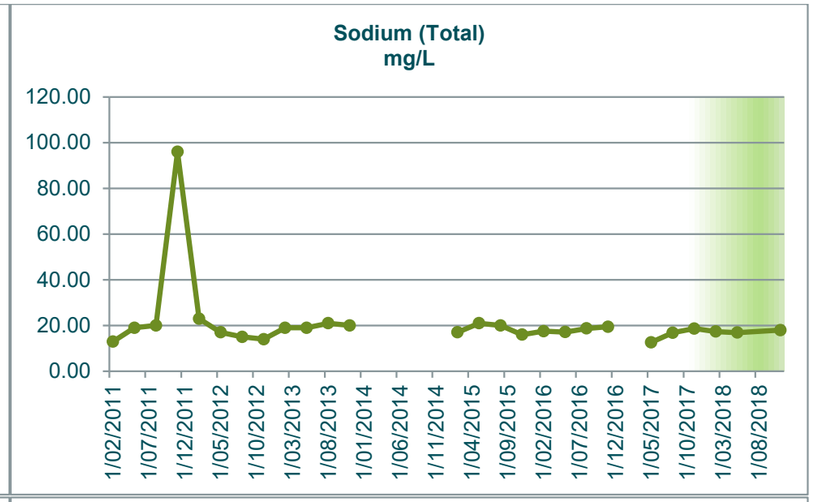
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Sodium (Total)
mg/L
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100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
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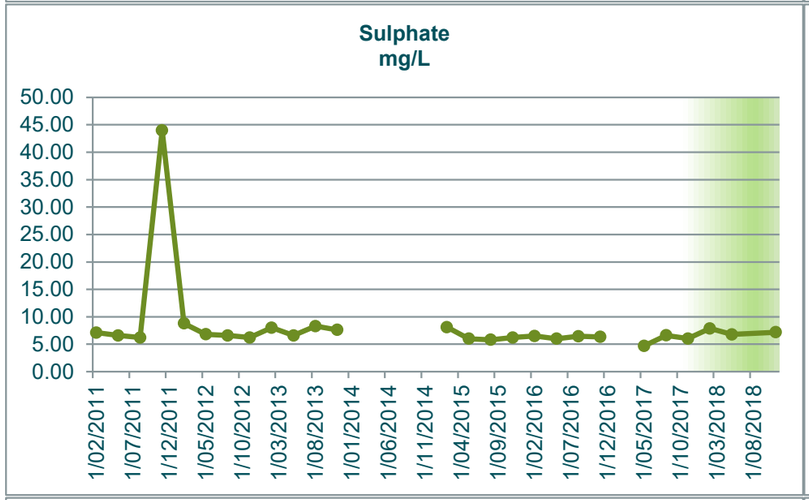
1/10/2017
1/03/2018
1/08/2018


Sulphate
mg/L
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
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0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
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1/06/2014
1/11/2014
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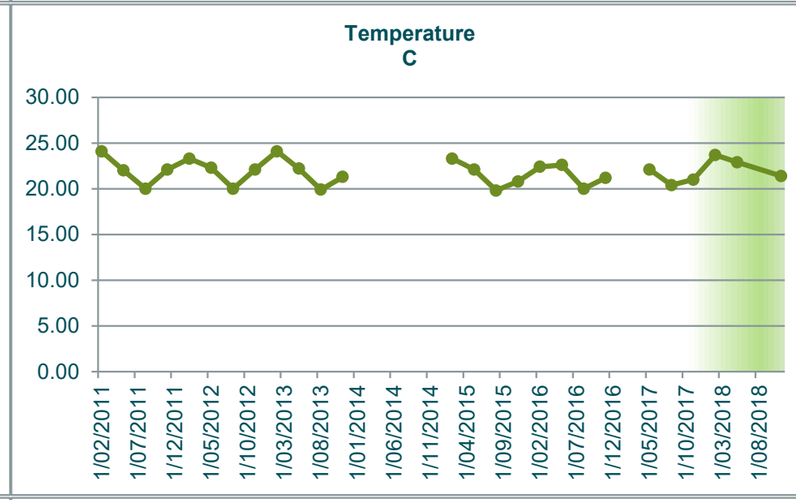
1/10/2017
1/03/2018
1/08/2018


Temperature
C
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25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
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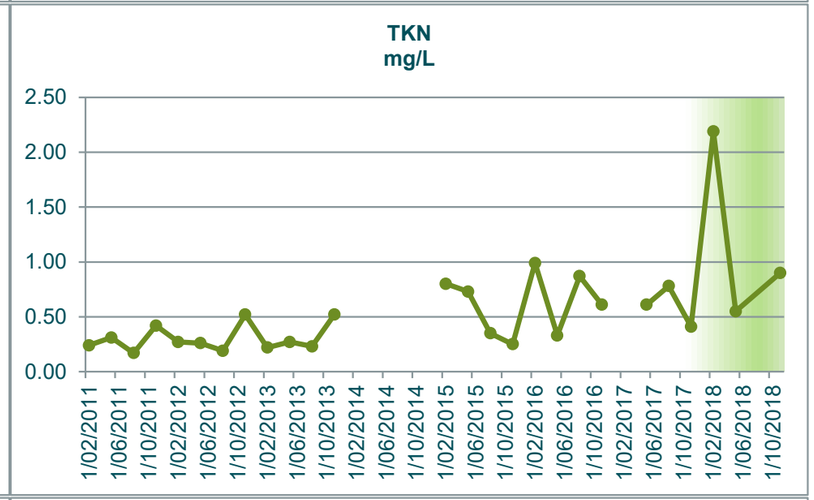
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018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mg/L
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2.00
1.50
1.00
0.50
0.00
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1/06/2011
1/10/2011
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1/06/2012
1/10/2012
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1/06/2013
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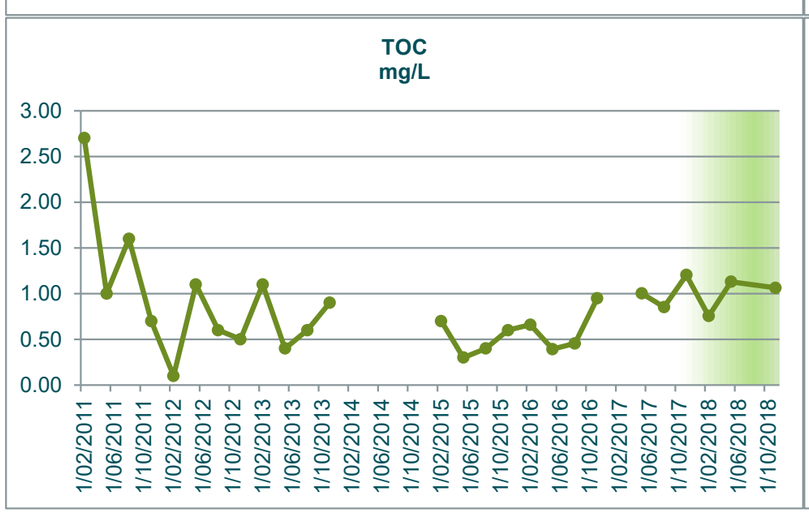
1/02/2018
1/06/2018
1/10/2018


TOC
mg/L
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2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
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1/10/2015
1/02/2016
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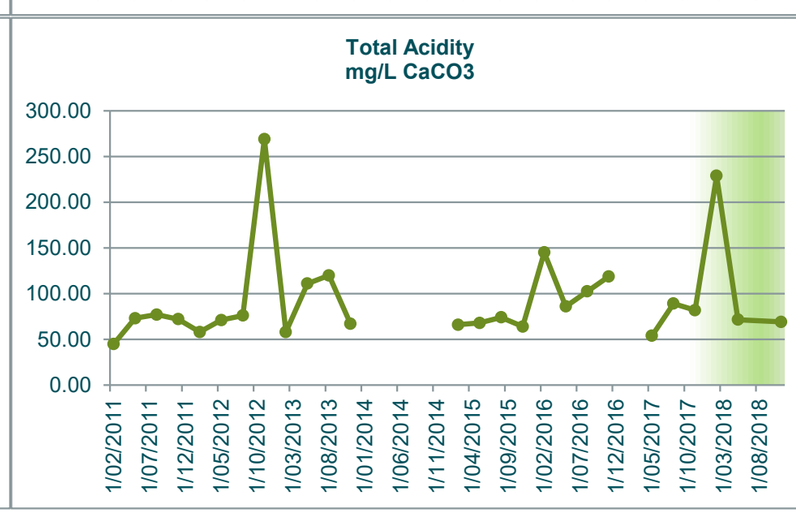
1/02/2018
1/06/2018
1/10/2018


Total Acidity
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0.00
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1/07/2011
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1/03/2013
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1/06/2014
1/11/2014
1/04/2015
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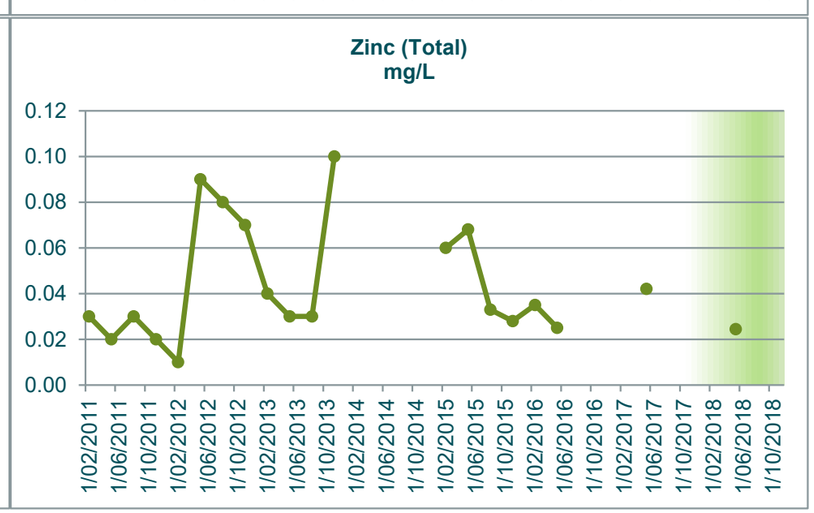
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Zinc (Total)
mg/L
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0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
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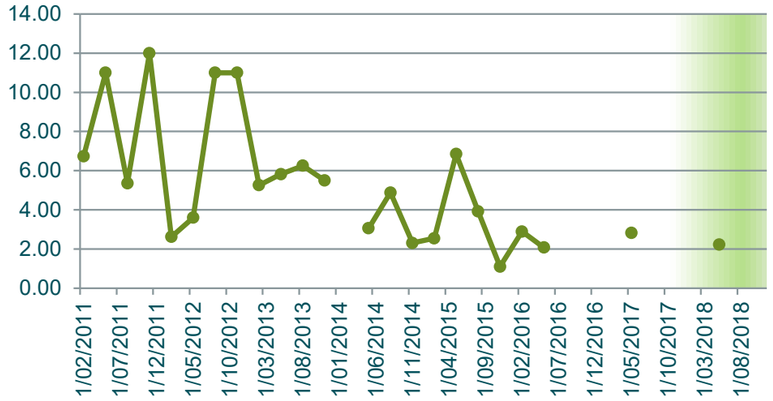
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

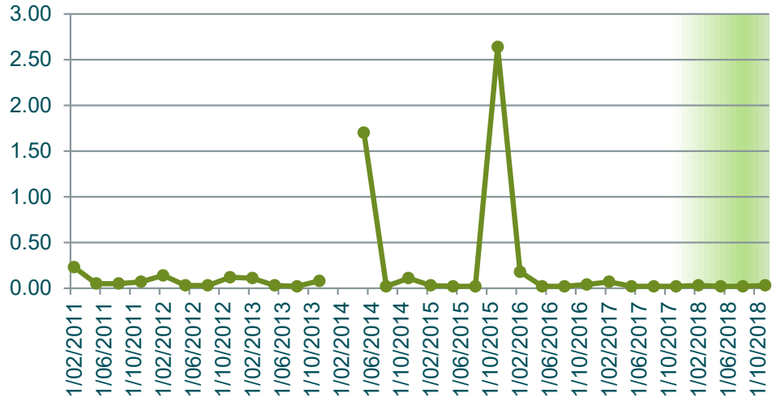
GW15	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
1/02/2011	79.00	6.73	0.23	0.01	48.00	1.20	0.00	24.00	270.00	0.01	0.01	0.01	958.00	0.02	3.50	0.22	12.00	0.02	16.00	0.34	0.01	0.05	0.05	0.05	0.65	6.10	0.07	5.00	45.00	95.00	54.00	23.10	0.60	2.00	85.00	0.05
11/05/2011	86.00	11.00	0.05	0.01	52.00	2.40	0.00	24.00	258.00	0.01	0.01	0.01	1086.00	0.03	4.00	0.23	23.00	0.01	19.00	0.49	0.01	0.05	0.05	0.05	0.58	5.60	0.14	5.00	260.00	128.00	42.00	20.00	0.58	2.20	30.00	0.06
10/08/2011	77.00	5.36	0.05	0.01	47.00	2.40	0.00	21.00	22.50	0.01	0.01	0.01	975.00	0.01	4.70	0.19	15.00	0.01	18.00	0.42	0.01	0.08	0.05	0.08	0.38	6.00	0.08	5.00	270.00	138.00	38.00	17.00	0.30	3.60	76.00	0.03
9/11/2011	69.00	12.00	0.07	0.01	42.00	6.30	0.00	1.10	208.00	0.01	0.01	0.01	837.00	0.02	3.00	0.16	22.00	0.01	2.40	0.90	0.01	0.06	0.02	0.06	0.23	5.90	0.22	5.00	240.00	22.00	31.00	22.00	0.17	1.70	92.00	0.03
7/02/2012	91.00	2.62	0.14	0.01	56.00	1.00	0.00	21.00	187.00	0.01	0.01	0.01	867.00	0.01	2.20	0.22	13.00	0.01	17.00	0.34	0.01	0.10	0.02	0.10	0.48	5.90	0.05	5.00	242.00	147.00	40.00	23.30	0.38	2.20	100.00	0.03
9/05/2012	78.00	3.60	0.03	0.01	48.00	1.00	0.00	20.00	200.00	0.01	0.01	0.01	953.00	0.01	4.50	0.19	22.00	0.01	16.00	0.38	0.01	0.08	0.02	0.08	0.26	5.80	0.18	5.00	249.00	110.00	35.00	21.10	0.18	1.20	68.00	0.08
7/08/2012	79.00	11.00	0.03	0.01	48.00	1.00	0.00	19.00	205.00	0.01	0.01	0.01	923.00	0.02	5.80	0.22	24.00	0.01	15.00	0.46	0.01	0.08	0.02	0.08	0.54	6.10	0.02	5.00	222.00	102.00	35.00	16.30	0.46	1.30	59.00	0.07
14/11/2012	68.00	11.00	0.12	0.01	41.00	1.00	0.00	26.00	178.00	0.01	0.01	0.01	838.00	0.01	3.60	0.16	22.00	0.01	18.00	0.36	0.01	0.13	0.02	0.13	0.82	5.70	0.28	5.00	93.00	92.00	47.00	20.90	0.69	7.40	96.00	0.06
14/02/2013	86.00	5.26	0.11	0.01	52.00	1.00	0.00	21.00	150.00	0.01	0.01	0.01	769.00	0.01	4.20	0.11	14.00	0.01	15.00	0.31	0.01	0.13	0.02	0.13	0.58	6.10	0.04	5.00	15.00	107.00	40.00	23.10	0.45	6.70	73.00	0.05
15/05/2013	83.00	5.82	0.03	0.02	51.00	1.00	0.00	21.00	196.00	0.01	0.01	0.01	880.00	0.01	5.20	0.21	26.00	0.01	15.00	0.43	0.01	0.08	0.02	0.08	0.46	6.10	0.03	5.00	134.00	115.00	36.00	20.30	0.38	2.20	89.00	0.03
7/08/2013	83.00	6.25	0.02	0.01	51.00	1.00	0.00	23.00	208.00	0.01	0.01	0.01	926.00	0.01	4.40	0.22	16.00	0.01	19.00	0.45	0.01	0.11	0.02	0.11	0.42	6.00	0.07	5.00	160.00	131.00	46.00	17.30	0.31	2.30	189.00	0.04
13/11/2013	76.00	5.50	0.08	0.01	46.00	1.20	0.00	26.00	185.00	0.01	0.01	0.01	919.00	0.01	2.90	0.26	16.00	0.01	18.00	0.41	0.01	1.15	0.03	1.18	1.48	6.00	0.08	5.00	89.00	125.00	55.00	21.50	0.30	5.00	105.00	0.05
11/02/2014																																				
14/05/2014	135.00	3.06	1.70	0.02	82.00	14.00	0.00	20.00	112.00	0.01	0.01	0.01	687.00	0.01	2.60	0.25	27.00	0.01	12.00	0.33	0.01	0.20	0.04	0.24	4.18	6.30	0.17	5.00	-27.00	76.00	23.00	21.10	3.94	16.30	112.00	0.06
13/08/2014	61.00	4.88	0.02	0.01	37.00	1.80	0.00	18.00	125.00	0.01	0.01	0.01	634.00	0.01	5.50	0.20	13.00	0.01	13.00	0.19	0.01	0.10	0.02	0.10	1.12	6.90	0.13	5.00	156.00	92.00	46.00	17.60	1.02	8.80	84.00	0.08
11/11/2014	70.00	2.31	0.11	0.01	43.00	2.10	0.00	17.00	137.00	0.01	0.01	0.01	671.00	0.01	3.10	0.21	6.12	0.01	13.00	0.48	0.01	0.06	0.02	0.06	0.70	6.10	0.05	5.00	83.00	98.00	52.00	20.90	0.64	6.70	117.00	0.06
10/02/2015	69.00	2.55	0.03	0.01	42.00	1.50	0.00	17.00	120.00	0.01	0.01	0.01	651.00	0.01	4.00	0.18	7.02	0.01	11.00	0.22	0.01	0.63	0.02	0.63	1.52	6.20	0.09	5.00	48.00	81.00	58.00	23.50	0.89	9.20	87.00	0.04
12/05/2015	84.00	6.85	0.02	0.01	51.00	1.00	0.00	21.00	160.00	0.00	0.01	0.01	762.00	0.00	4.70	0.24	9.32	0.01	16.00	0.22	0.01	0.06	0.02	0.06	0.48	6.00	0.08	5.00	155.00	110.00	44.00	19.80	0.42	4.00	115.00	0.05
12/08/2015	91.00	3.92	0.02	0.01	91.00	1.00	0.00	25.00	178.00	0.00	0.01	0.01	829.00	0.00	5.00	0.23	11.10	0.01	18.00	0.51	0.01	0.05	0.02	0.05	0.37	6.10	0.03	5.00	203.00	124.00	36.00	16.90	0.32	3.60	122.00	0.03
11/11/2015	106.00	1.10	2.64	0.01	106.00	18.00	0.00	19.00	142.00	0.00	0.01	0.01	754.00	0.01	1.80	0.23	11.28	0.00	14.00	1.19	0.02	0.02	0.02	0.02	6.43	6.10	0.43	5.00	29.00	96.00	39.00	20.80	6.41	31.00	147.00	0.05
9/02/2016	103.00	2.89	0.18	0.01	103.00	3.30	0.00	17.69	118.00	0.00	0.01	0.01	651.00	0.01	3.70	0.21	8.62	0.00	12.88	0.27	0.01	0.16	0.02	0.16	1.45	6.20	0.26	5.00	21.00	92.67	27.74	23.10	1.29	13.12	125.00	0.03
10/05/2016	98.00	2.08	0.02	0.01	98.00	1.80	0.00	19.26	145.00	0.00	0.01	0.01	759.00	0.00	3.60	0.29	5.13	0.00	14.10	0.12	0.01	0.11	0.02	0.11	0.58	6.20	0.15	5.00	173.00	105.77	33.11	21.70	0.47	7.70	98.00	0.03
10/08/2016	94.40		0.02		94.00	2.70		20.77	168.00				809.70		6.00	0.22			15.30			0.04	0.02	0.04	0.44	6.10	0.07	5.00	246.00	117.54	40.71	17.30	0.40	4.86	85.90	
8/11/2016	99.70		0.04		100.00	1.00		21.17	176.00				816.20		2.80	0.24			15.76			0.02	0.02	0.02	0.39	5.90	0.05	5.00	333.50	119.34	41.10	20.90	0.39	4.49	143.10	
8/02/2017	105.00		0.07		105.00	1.00		19.44	160.00				804.30		3.60	0.21			14.62			0.12	0.02	0.12	0.78	5.90	0.06	5.00	260.50	110.10	38.45	23.70	0.66	9.03	188.50	
9/05/2017	94.20	2.83	0.02	0.01	94.00	1.00	0.00	18.92	155.00	0.00	0.01	0.01	755.40	0.01	5.20	0.21	5.71	0.00	13.88	0.13	0.01	0.09	0.02	0.09	0.66	6.10	0.06	5.00	408.60	109.18	42.87	20.50	0.57	9.59	96.40	0.03
9/08/2017	97.95		0.02		98.00	2.10		18.96	150.00				786.60		6.10	0.23			14.22			0.03	0.02	0.03	0.56	6.20	0.07	5.00	402.40	110.07	38.94	17.30	0.53	5.90	69.30	
8/11/2017	95.74		0.02		96.00	1.50		18.79	22.50				786.20		4.60	0.21			13.93			0.46	0.02	0.46	1.07	5.70	0.05	5.00	357.70	109.35	39.30	20.60	0.61	6.84	104.80	
14/02/2018	95.37		0.03		95.00	1.80		16.87	122.00				710.10		3.70	0.27			12.26			0.11	0.02	0.11	0.64	6.00	0.06	5.00	182.00	101.58	50.15	23.90	0.53	8.56	100.60	
9/05/2018	92.03	2.23	0.02	0.00	92.00	1.00	0.00	17.44	148.50	0.00	0.01	0.01	764.00	0.00	5.60	0.31	5.47	0.00	13.12	0.11	0.01	0.04	0.02	0.04	0.39	6.30	0.06	1.58	339.20	109.34	43.64	21.00	0.35	6.24	59.00	0.02
15/08/2018	80.27		0.02		80.00	2.70		18.39	160.00				748.40		6.20	0.23			13.44			0.03	0.02	0.03	0.43	6.40	0.07	1.62	388.70	116.56	46.32	17.80	0.40	11.00	38.20	
14/11/2018	104.77		0.03		105.00	1.50		17.98	143.00				744.00		4.26	0.25			13.31			0.03	0.02	0.03	0.53	6.23	0.06	1.57	73.00	111.33	44.38	20.40	0.50	7.93	68.80	
2018 Min	**80.27**	**2.23**	**0.02**	**0.00**	**80.00**	**1.00**	**0.00**	**16.87**	**122.00**	**0.00**	**0.01**	**0.01**	**710.10**	**0.00**	**3.70**	**0.23**	**5.47**	**0.00**	**12.26**	**0.11**	**0.01**	**0.03**	**0.02**	**0.03**	**0.39**	**6.00**	**0.06**	**1.57**	**73.00**	**101.58**	**43.64**	**17.80**	**0.35**	**6.24**	**38.20**	**0.02**
2018 Max	**104.77**	**2.23**	**0.03**	**0.00**	**105.00**	**2.70**	**0.00**	**18.39**	**160.00**	**0.00**	**0.01**	**0.01**	**764.00**	**0.00**	**6.20**	**0.31**	**5.47**	**0.00**	**13.44**	**0.11**	**0.01**	**0.11**	**0.02**	**0.11**	**0.64**	**6.40**	**0.07**	**5.00**	**388.70**	**116.56**	**50.15**	**23.90**	**0.53**	**11.00**	**100.60**	**0.02**
2018 Mean	**93.11**	**2.23**	**0.03**	**0.00**	**93.00**	**1.75**	**0.00**	**17.67**	**143.38**	**0.00**	**0.01**	**0.01**	**741.63**	**0.00**	**4.94**	**0.27**	**5.47**	**0.00**	**13.03**	**0.11**	**0.01**	**0.05**	**0.02**	**0.05**	**0.50**	**6.23**	**0.06**	**2.44**	**245.73**	**109.70**	**46.12**	**20.78**	**0.45**	**8.43**	**66.65**	**0.02**
Long-term Average	**88.11**	**5.25**	**0.19**	**0.01**	**70.77**	**2.62**	**0.00**	**19.67**	**158.37**	**0.01**	**0.01**	**0.01**	**808.19**	**0.01**	**4.20**	**0.22**	**14.56**	**0.01**	**14.59**	**0.39**	**0.01**	**0.14**	**0.02**	**0.15**	**0.95**	**6.07**	**0.11**	**4.67**	**188.76**	**106.51**	**41.41**	**20.47**	**0.81**	**6.86**	**97.54**	**0.05**

Alkalinity
mg/L as CaCO3

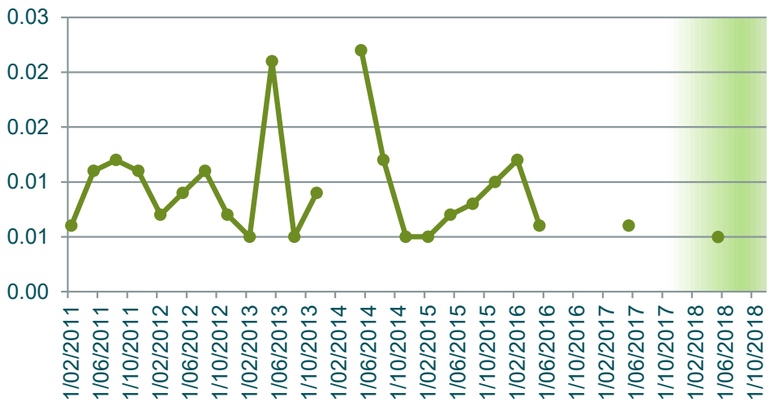
Aluminium (Total)
mg/L



Ammonia
mg/L

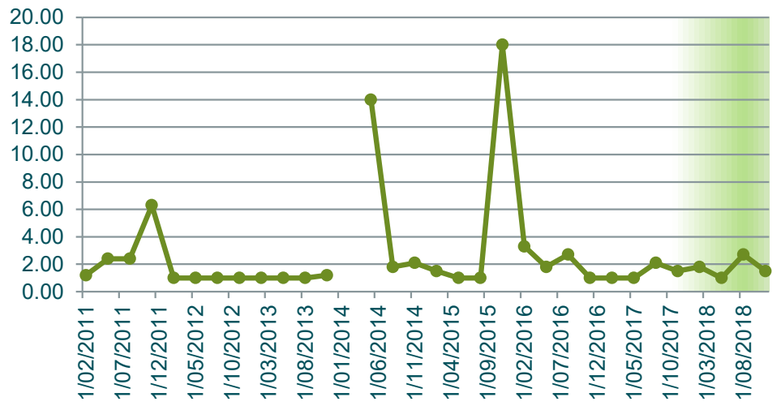


Arsenic (Total)
mg/L

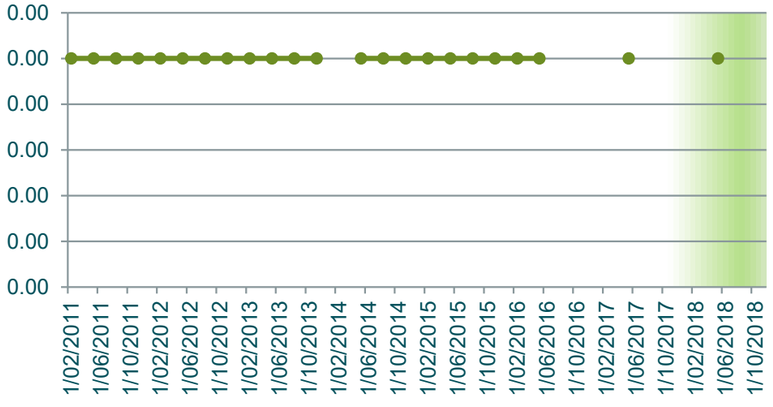


Bicarbonate HCO3
mg/L

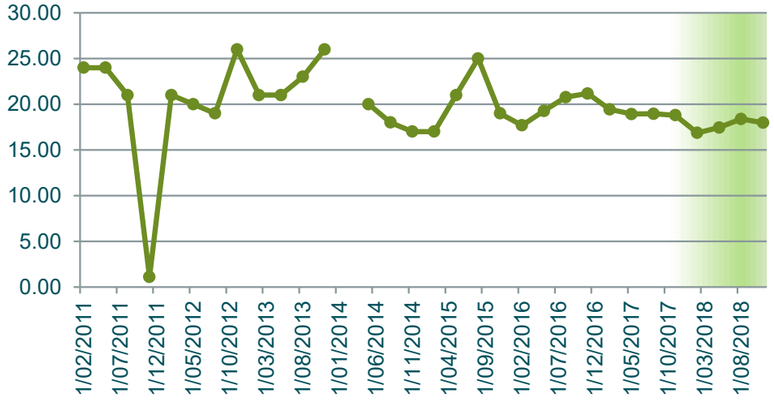
BOD5
mg/L



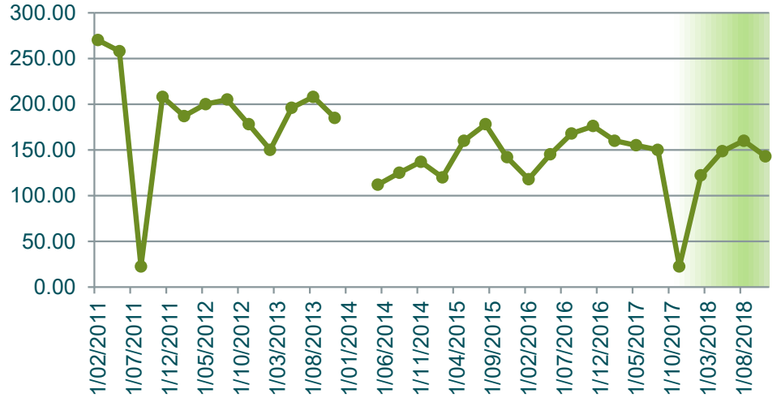
Cadmium (Total)
mg/L

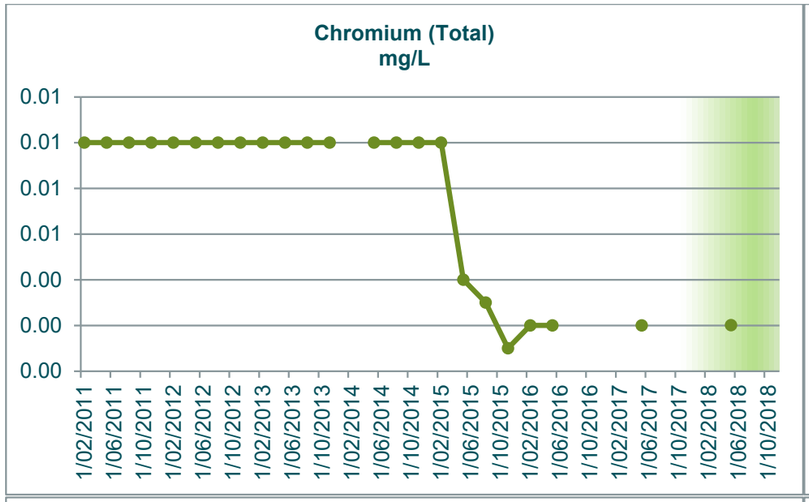


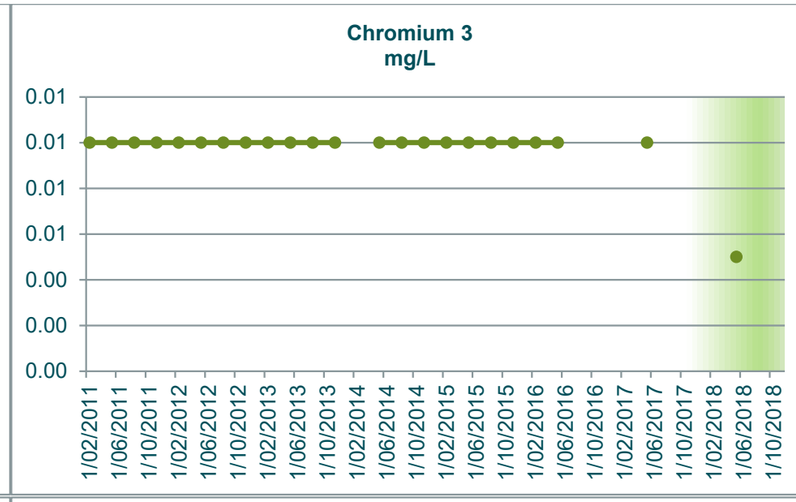
Calcium (Total)
mg/L

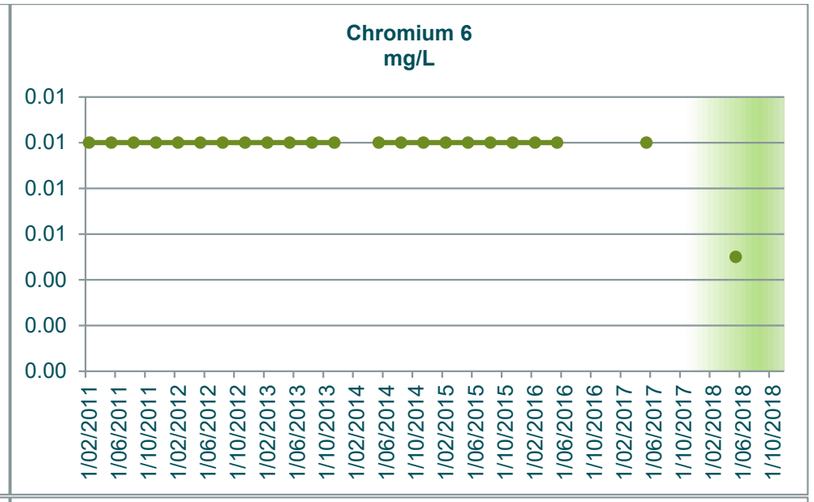


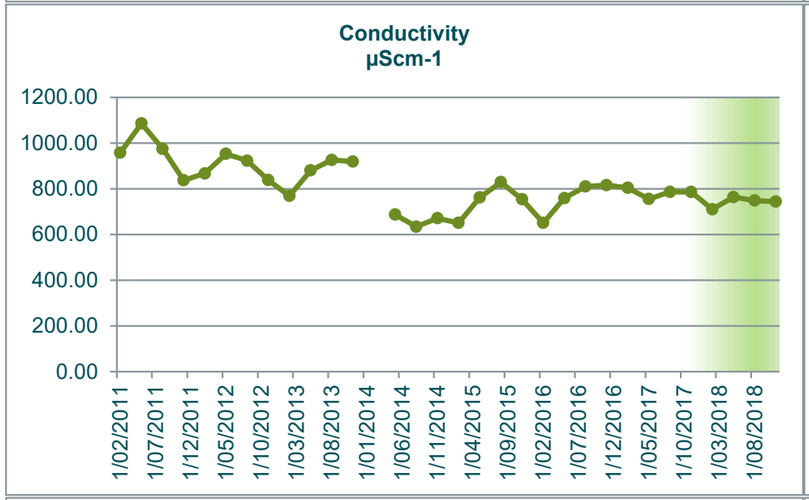
Chloride
mg/L

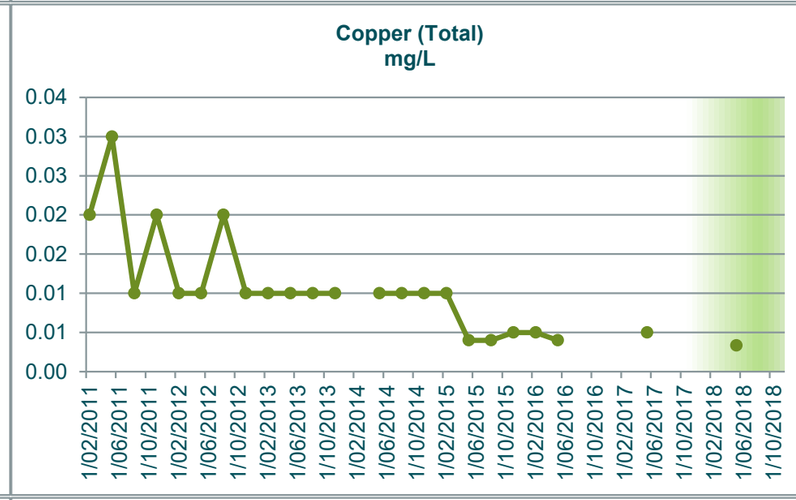


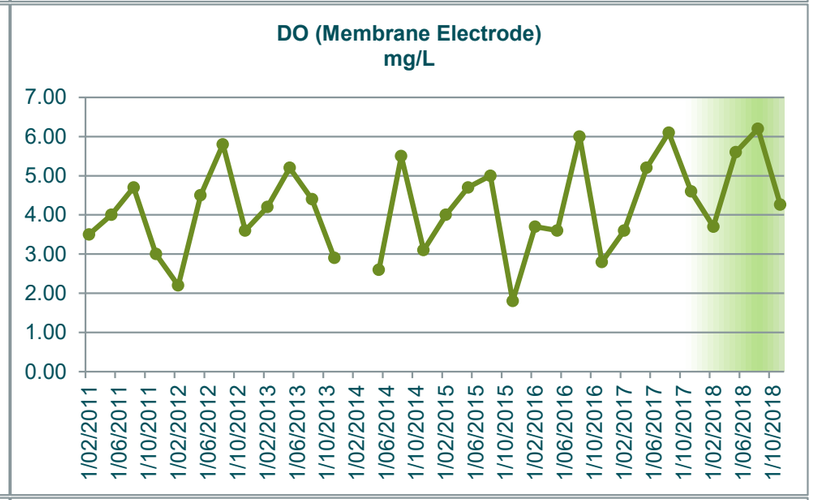

Chromium (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

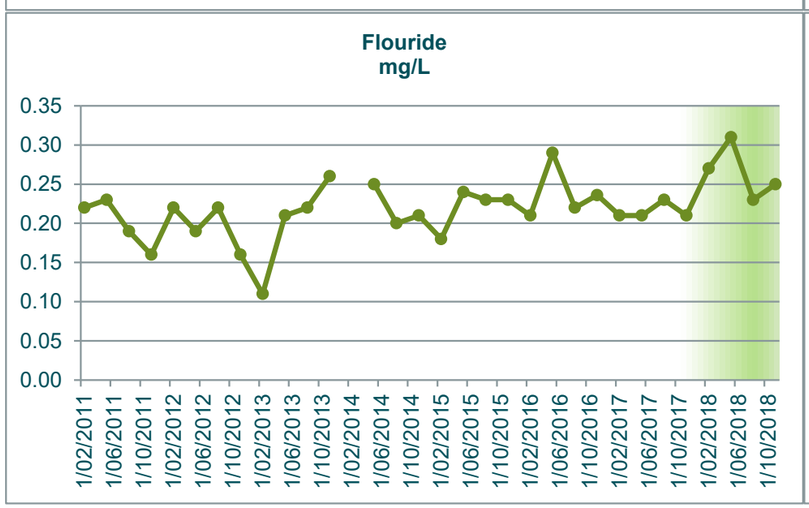

Chromium 3
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

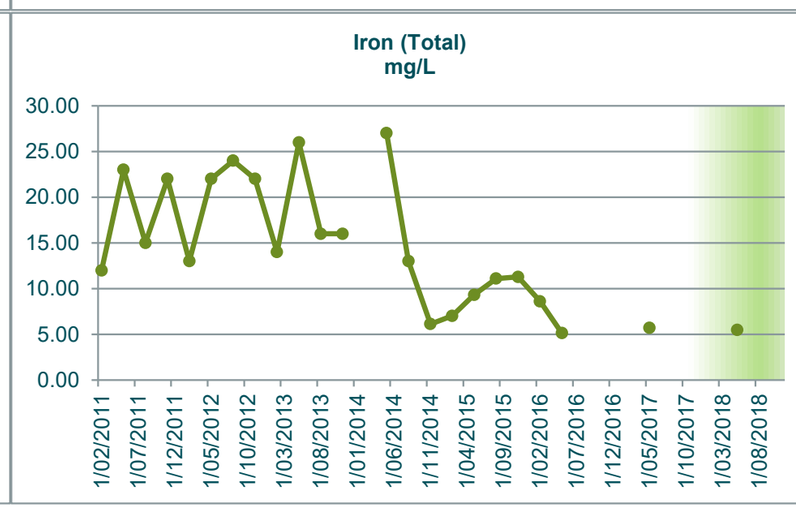

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

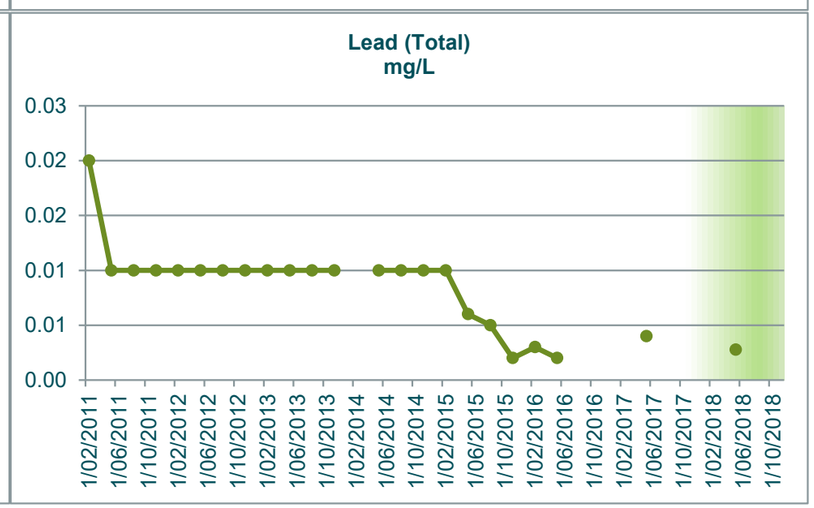

Conductivity
µScm-1
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Copper (Total)
mg/L
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


DO (Membrane Electrode)
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

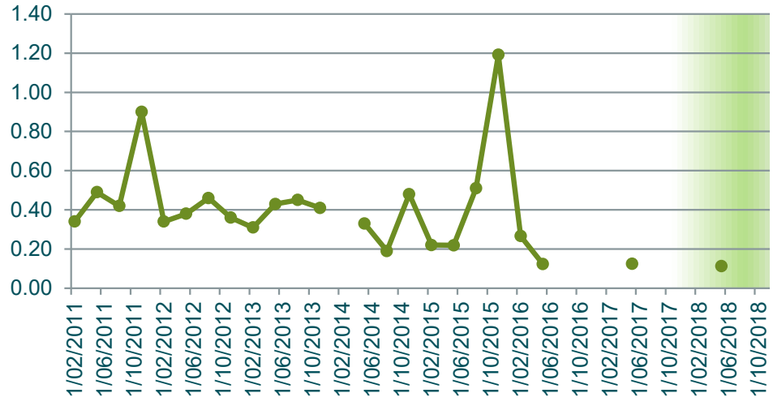

Flouride
mg/L
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Iron (Total)
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

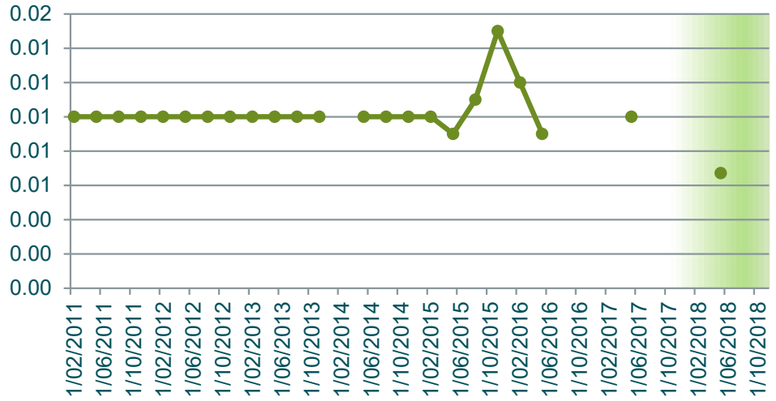

Lead (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

Magnesium (Total)
mg/L

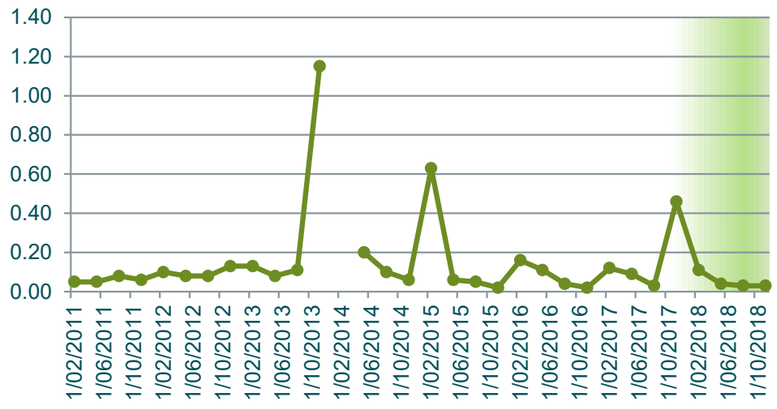
Manganese (Total)
mg/L



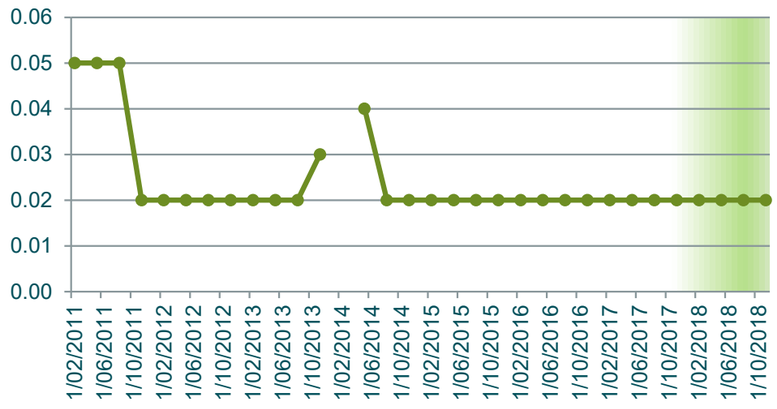
Nickel (Total)
mg/L



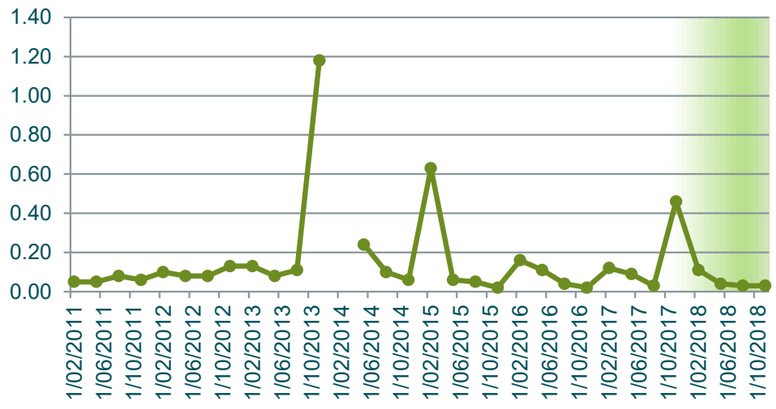
Nitrate
N mg/L



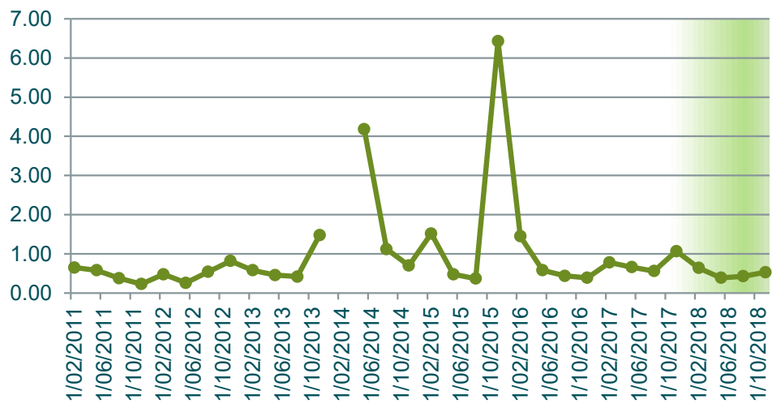
Nitrite
N mg/L



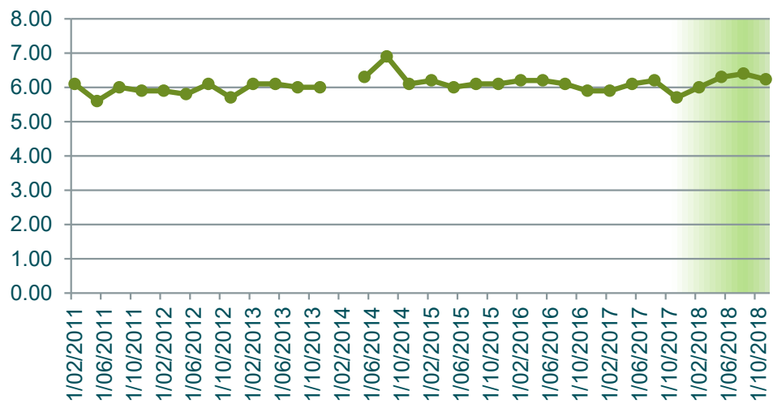
Nitrogen Oxidised
mg/L



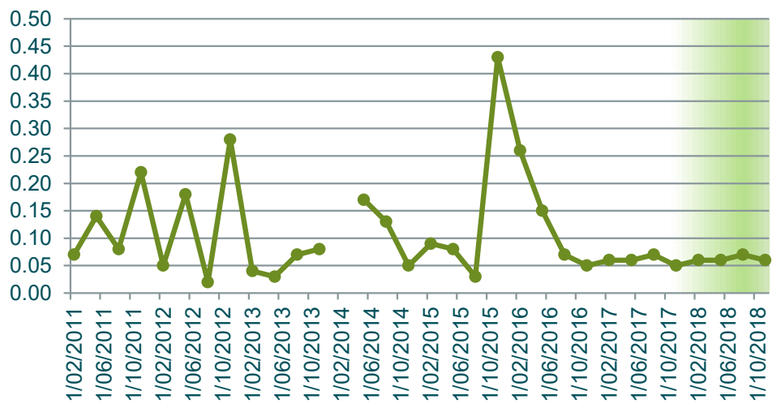
Nitrogen (Total)
mg/L

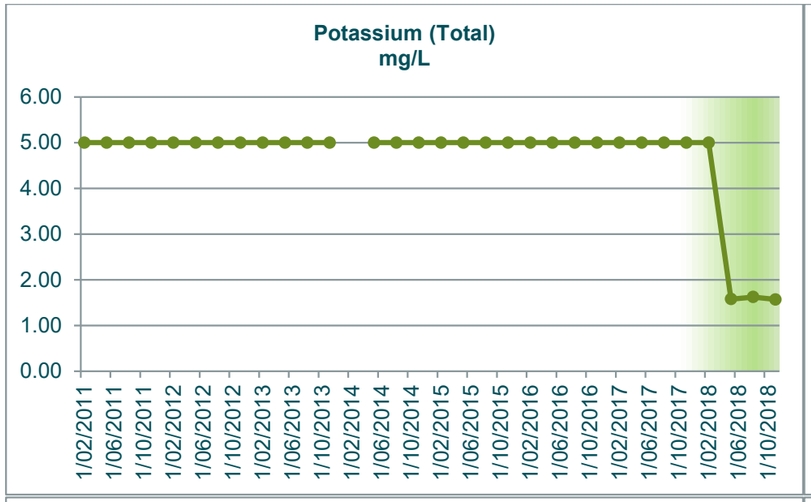


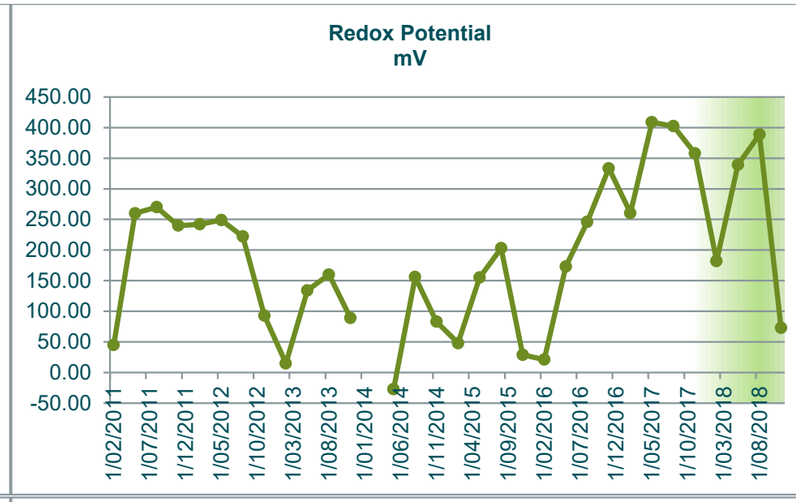
pH
pH units

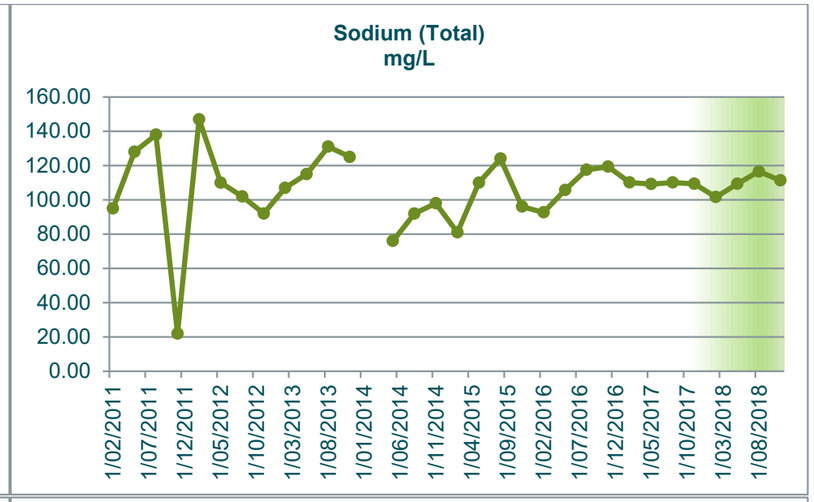


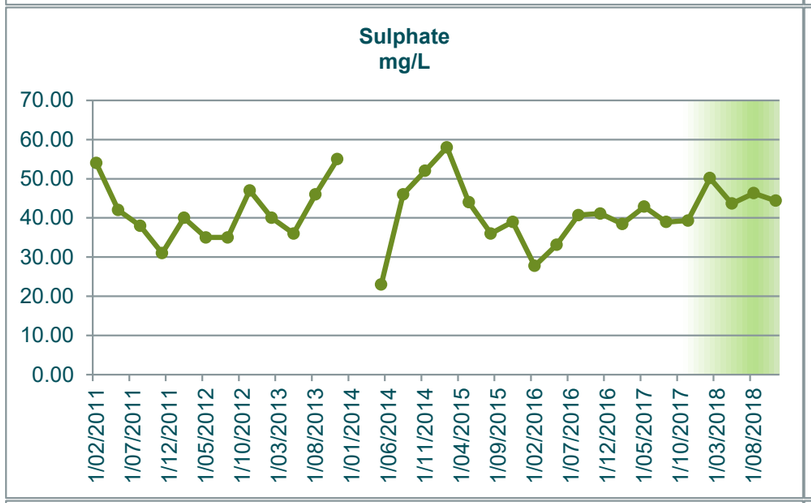
Phosphorus (Total)
mg/L

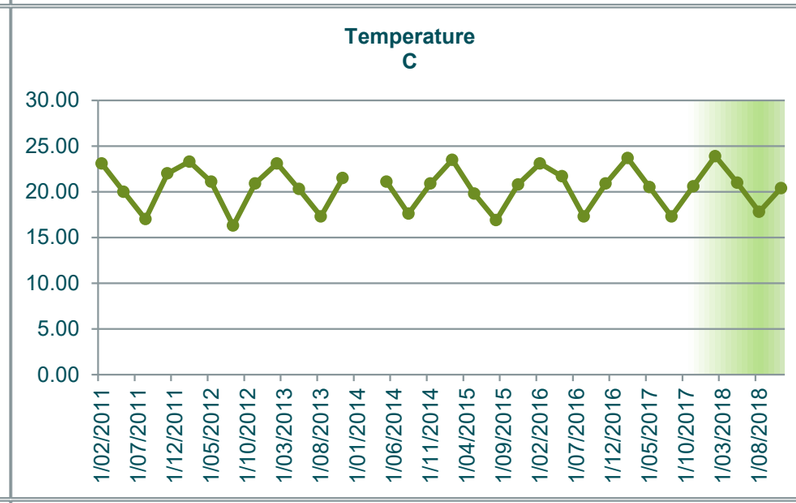


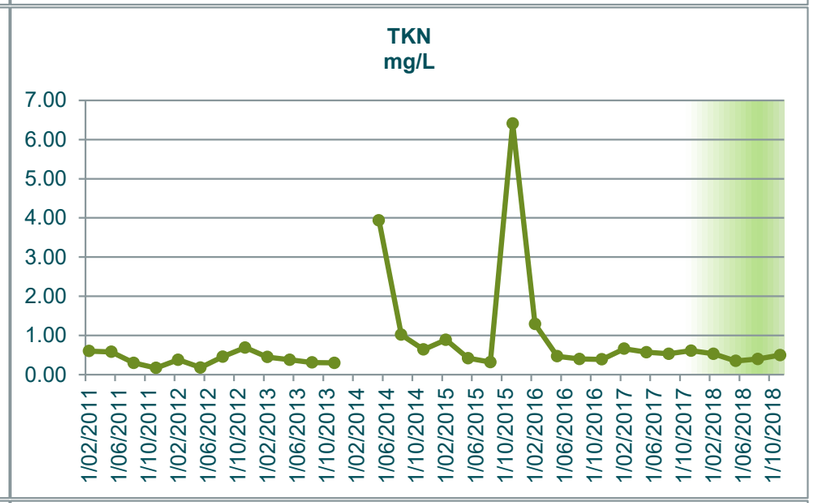

Potassium (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

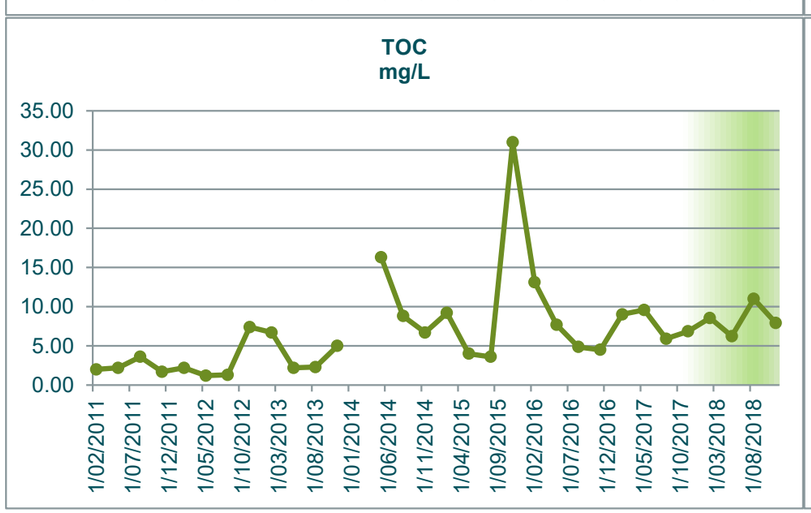

Redox Potential
mV
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

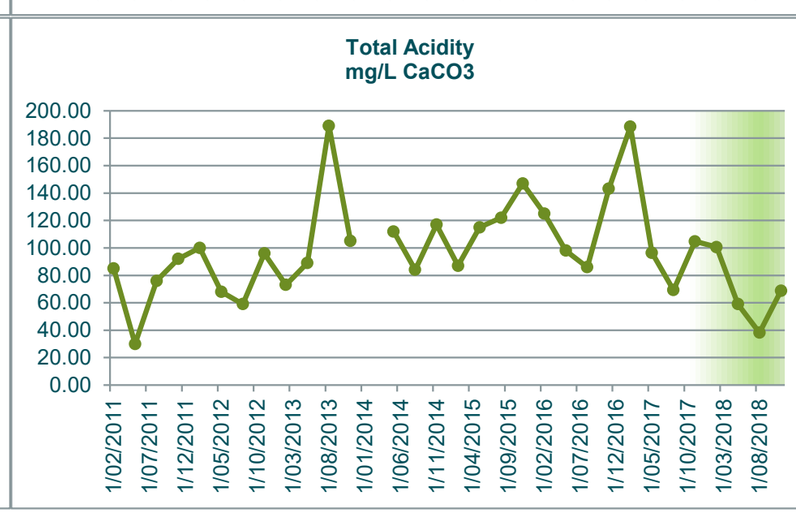

Sodium (Total)
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

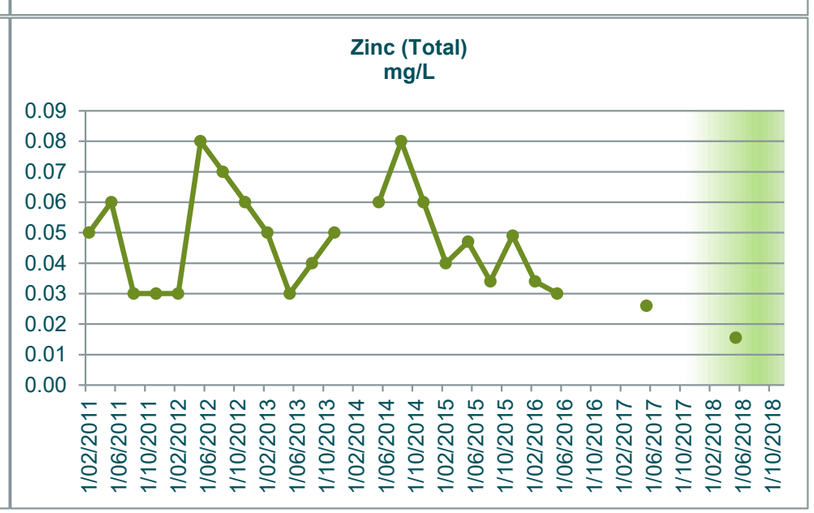

Sulphate
mg/L
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Temperature
C
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

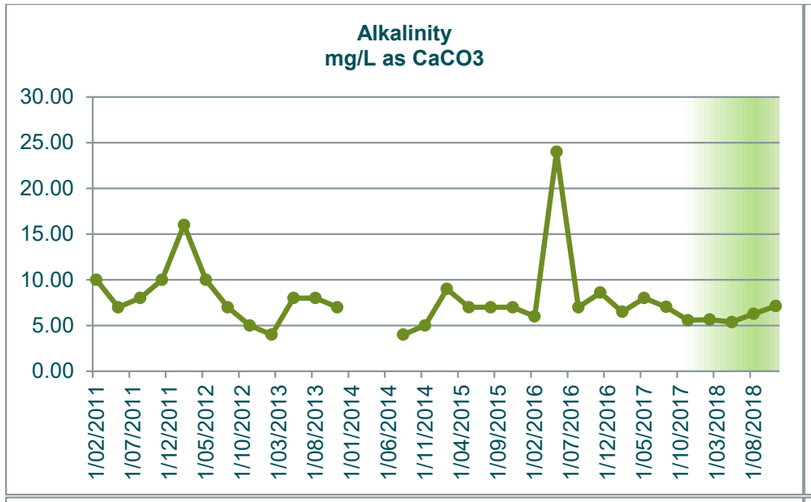

TKN
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


TOC
mg/L
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Total Acidity
mg/L CaCO3
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Zinc (Total)
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

GW16	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
1/02/2011	10.00	11.00	0.11	0.01	6.00	1.00	0.00	0.50	27.00	0.01	0.01	0.01	165.00	0.01	2.30	0.04	6.77	0.01	0.60	0.09	0.01	0.05	0.05	0.05	0.53	5.60	0.13	5.00	109.00	20.00	22.00	23.40	0.53	4.90	31.00	0.02
11/05/2011	7.00	5.76	0.05	0.01	4.00	1.00	0.00	0.10	31.00	0.01	0.01	0.01	212.00	0.02	3.40	0.03	3.19	0.01	1.20	0.04	0.01	0.41	0.05	0.41	0.75	4.60	0.12	5.00	282.00	27.00	22.00	21.60	0.34	1.60	54.00	0.02
10/08/2011	8.00	10.00	0.05	0.01	5.00	1.00	0.00	0.20	23.00	0.01	0.01	0.01	205.00	0.01	3.40	0.06	5.90	0.01	1.10	0.11	0.01	0.20	0.05	0.20	0.43	5.20	0.14	5.00	317.00	32.00	24.00	19.20	0.23	1.70	54.00	0.02
9/11/2011	10.00	8.98	0.04	0.01	6.00	1.00	0.00	119.00	36.00	0.01	0.01	0.01	196.00	0.01	2.30	0.10	6.04	0.01	21.00	0.11	0.01	0.12	0.02	0.12	0.31	5.30	0.12	15.00	310.00	100.00	101.00	21.40	0.19	1.20	62.00	0.02
7/02/2012	16.00	34.00	0.47	0.01	10.00	3.90	0.00	0.50	30.00	0.01	0.01	0.01	185.00	0.02	1.70	0.03	27.00	0.02	1.60	0.15	0.01	0.17	0.02	0.17	1.34	5.30	0.22	5.00	119.00	37.00	29.00	23.10	1.17	2.60	84.00	0.02
9/05/2012	10.00	4.08	0.03	0.01	6.00	1.00	0.00	0.50	26.00	0.01	0.01	0.01	191.00	0.01	4.80	0.05	2.49	0.01	1.40	0.02	0.01	0.02	0.02	0.05	0.16	5.40	0.08	5.00	277.00	25.00	25.00	22.10	0.16	0.90	50.00	0.02
7/08/2012	7.00	20.00	0.07	0.01	4.00	1.00	0.00	0.50	24.00	0.01	0.01	0.01	192.00	0.01	4.30	0.02	15.00	0.01	1.30	0.12	0.01	0.12	0.02	0.12	0.50	5.10	0.06	5.00	197.00	22.00	26.00	19.40	0.38	0.90	42.00	0.05
14/11/2012	5.00	41.00	0.04	0.01	3.00	1.00	0.00	0.40	29.00	0.01	0.01	0.01	200.00	0.02	5.80	0.06	26.00	0.02	1.10	0.17	0.01	0.27	0.02	0.27	0.98	5.10	0.16	5.00	193.00	29.00	22.00	22.30	0.71	2.70	48.00	0.10
14/02/2013	4.00	19.00	0.07	0.01	2.00	1.00	0.00	0.70	26.00	0.01	0.01	0.01	183.00	0.02	3.30	0.05	11.00	0.01	2.00	0.08	0.01	3.16	0.02	3.16	3.18	5.00	0.10	5.00	211.00	27.00	16.00	24.50	0.05	1.20	46.00	0.04
15/05/2013	8.00	12.00	0.04	0.01	5.00	1.20	0.00	0.70	25.00	0.01	0.01	0.01	162.00	0.01	3.90	0.02	6.99	0.01	1.30	0.06	0.01	1.82	0.02	1.82	2.04	5.30	0.04	5.00	159.00	24.00	20.00	21.80	0.22	1.00	62.00	0.02
7/08/2013	8.00	17.00	0.05	0.01	5.00	1.00	0.00	0.40	24.00	0.01	0.01	0.01	144.00	0.01	5.00	0.03	9.56	0.01	1.10	0.08	0.01	0.37	0.02	0.37	0.77	5.50	0.16	5.00	162.00	26.00	23.00	19.00	0.40	1.00	65.00	0.03
13/11/2013	7.00	42.00	0.15	0.01	4.00	1.00	0.00	0.30	28.00	0.01	0.01	0.01	198.00	0.02	2.80	0.03	28.00	0.02	1.10	0.30	0.01	0.65	0.02	0.65	1.72	5.20	0.12	5.00	147.00	37.00	30.00	21.40	1.07	1.10	68.00	0.10
11/02/2014																																				
13/05/2014																																				
13/08/2014	4.00	20.00	0.05	0.01	2.00	3.00	0.00	0.20	29.00	0.01	0.01	0.01	191.00	0.01	5.40	0.03	9.20	0.01	1.40	0.10	0.01	4.69	0.02	4.69	5.49	6.80	0.22	5.00	158.00	35.00	19.00	19.00	0.80	1.00	56.00	0.08
11/11/2014	5.00	7.97	0.04	0.01	3.00	1.80	0.00	0.30	31.00	0.01	0.01	0.01	187.00	0.01	3.80	0.03	3.64	0.01	1.40	0.06	0.01	2.97	0.02	2.97	3.38	6.00	0.16	5.00	147.00	33.40	21.00	20.90	0.41	0.80	51.00	0.04
10/02/2015	9.00	8.94	0.16	0.01	5.00	3.60	0.00	0.90	28.00	0.01	0.01	0.01	168.00	0.01	2.80	0.20	3.30	0.01	1.80	0.08	0.01	4.21	0.02	4.23	4.98	5.90	0.15	5.00	107.00	25.00	14.00	23.70	0.75	1.30	44.00	0.02
12/05/2015	7.00	21.80	0.02	0.00	4.00	3.90	0.00	0.70	34.00	0.01	0.01	0.01	179.00	0.01	4.50	0.01	10.20	0.01	1.60	0.14	0.00	1.26	0.02	1.26	2.31	5.20	0.18	5.00	159.00	32.00	16.00	21.80	1.05	0.90	47.00	0.05
12/08/2015	7.00	16.20	0.02	0.00	7.00	3.00	0.00	0.30	34.00	0.01	0.01	0.01	189.00	0.01	4.70	0.01	9.48	0.01	1.50	0.13	0.00	0.51	0.02	0.51	1.35	5.40	0.14	5.00	210.00	34.00	18.00	18.50	0.84	1.10	47.00	0.04
11/11/2015	7.00	5.76	0.02	0.00	7.00	2.40	0.00	0.70	20.00	0.00	0.01	0.01	156.00	0.00	5.40	0.03	2.52	0.00	2.10	0.07	0.00	5.11	0.02	5.11	5.17	5.20	0.05	5.00	147.00	24.00	12.00	20.70	0.06	0.90	37.00	0.04
9/02/2016	6.00	30.76	0.02	0.01	6.00	2.10	0.00	0.43	27.00	0.01	0.01	0.01	176.00	0.01	4.10	0.02	15.53	0.02	1.60	0.14	0.01	3.42	0.02	3.42	4.44	5.30	0.17	5.00	195.00	30.72	14.59	22.90	1.02	1.73	81.00	0.05
10/05/2016	24.00	5.62	1.55	0.00	24.00	10.50	0.00	0.73	28.00	0.00	0.01	0.01	193.00	0.00	1.50	0.01	3.35	0.00	1.82	0.14	0.00	0.19	0.02	0.19	4.05	5.70	0.57	5.00	109.00	31.10	36.72	22.80	3.86	4.64	77.00	0.03
10/08/2016	7.00		0.02		7.00	4.20		0.48	24.00				178.70		4.20	0.03			1.69			3.77	0.02	3.77	4.27	5.20	0.18	5.00	233.00	30.35	18.21	19.20	0.50	0.78	53.90	
8/11/2016	8.60		0.02		9.00	1.00		0.32	32.50				188.80		2.10	0.02			1.51			0.54	0.02	0.54	0.80	5.10	0.06	5.00	411.30	35.12	23.91	20.70	0.26	0.87	92.80	
8/02/2017	6.50		0.12		6.00	1.20		0.18	33.00				201.50		3.80	0.04			1.04			1.94	0.02	1.94	3.06	5.00	0.25	5.00	296.90	32.85	21.19	23.20	1.12	1.26	95.80	
9/05/2017	8.00	11.95	0.02	0.00	8.00	1.80	0.00	0.40	24.00	0.00	0.01	0.01	136.10	0.01	4.00	0.04	6.21	0.01	1.18	0.14	0.00	1.69	0.02	1.69	2.29	5.30	0.09	5.00	402.30	23.08	14.61	21.60	0.60	1.72	40.30	0.04
9/08/2017	7.04		0.02		7.00	1.50		0.30	45.00				159.10		4.90	0.04			0.99			0.70	0.02	0.70	1.39	5.30	0.18	5.00	392.40	27.29	16.21	19.00	0.69	1.16	37.30	
8/11/2017	5.57		0.02		6.00	1.00		0.55	23.50				142.30		4.20	0.04			1.52			2.29	0.02	2.29	2.68	4.60	0.07	5.00	436.20	22.51	11.70	21.10	0.39	0.99	32.80	
14/02/2018	5.64		0.02		6.00	1.00		0.19	28.00				165.50		3.90	0.02			1.20			1.57	0.02	1.57	1.71	5.10	0.11	5.00	371.30	29.32	18.02	24.00	0.14	1.03	37.60	
9/05/2018	5.38	10.71	0.02	0.00	5.00	1.00	0.00	0.78	27.50	0.00	0.01	0.01	182.50	0.00	4.60	0.03	4.43	0.01	1.87	0.10	0.00	5.22	0.02	5.22	5.47	5.20	0.07	0.50	385.40	30.05	16.41	22.10	0.25	0.88	40.10	0.02
15/08/2018	6.28		0.02		6.00	1.50		0.29	28.50				177.70		4.30	0.04			1.49			1.76	0.02	1.76	2.15	5.20	0.08	0.50	438.20	32.35	21.07	18.60	0.39	5.30	38.90	
14/11/2018	7.12		0.02		7.00	1.50		0.45	27.00				173.00		3.51	0.02			1.68			1.75	0.02	1.75	2.44	5.31	0.15	0.50	155.00	30.35	20.88	20.30	0.69	2.04	105.50	
2018 Min	**5.38**	**10.71**	**0.02**	**0.00**	**5.00**	**1.00**	**0.00**	**0.19**	**27.00**	**0.00**	**0.01**	**0.01**	**165.50**	**0.00**	**3.51**	**0.02**	**4.43**	**0.01**	**1.20**	**0.10**	**0.00**	**1.57**	**0.02**	**1.57**	**1.71**	**5.10**	**0.07**	**0.50**	**155.00**	**29.32**	**16.41**	**18.60**	**0.14**	**0.88**	**37.60**	**0.02**
2018 Max	**7.12**	**10.71**	**0.02**	**0.00**	**7.00**	**1.50**	**0.00**	**0.78**	**28.50**	**0.00**	**0.01**	**0.01**	**182.50**	**0.00**	**4.60**	**0.04**	**4.43**	**0.01**	**1.87**	**0.10**	**0.00**	**5.22**	**0.02**	**5.22**	**5.47**	**5.31**	**0.15**	**5.00**	**438.20**	**32.35**	**21.07**	**24.00**	**0.69**	**5.30**	**105.50**	**0.02**
2018 Mean	**6.11**	**10.71**	**0.02**	**0.00**	**6.00**	**1.25**	**0.00**	**0.43**	**27.75**	**0.00**	**0.01**	**0.01**	**174.68**	**0.00**	**4.08**	**0.03**	**4.43**	**0.01**	**1.56**	**0.10**	**0.00**	**2.58**	**0.02**	**2.58**	**2.94**	**5.20**	**0.10**	**1.63**	**337.48**	**30.52**	**19.09**	**21.25**	**0.37**	**2.31**	**55.53**	**0.02**
Long-term Average	**7.87**	**16.57**	**0.11**	**0.00**	**6.17**	**2.04**	**0.00**	**4.40**	**28.43**	**0.01**	**0.01**	**0.01**	**179.24**	**0.01**	**3.82**	**0.04**	**9.81**	**0.01**	**2.07**	**0.11**	**0.01**	**1.70**	**0.02**	**1.70**	**2.34**	**5.31**	**0.14**	**4.88**	**241.23**	**31.48**	**23.12**	**21.31**	**0.64**	**1.64**	**56.03**	**0.04**


Alkalinity
mg/L as CaCO3
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
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1/05/2017
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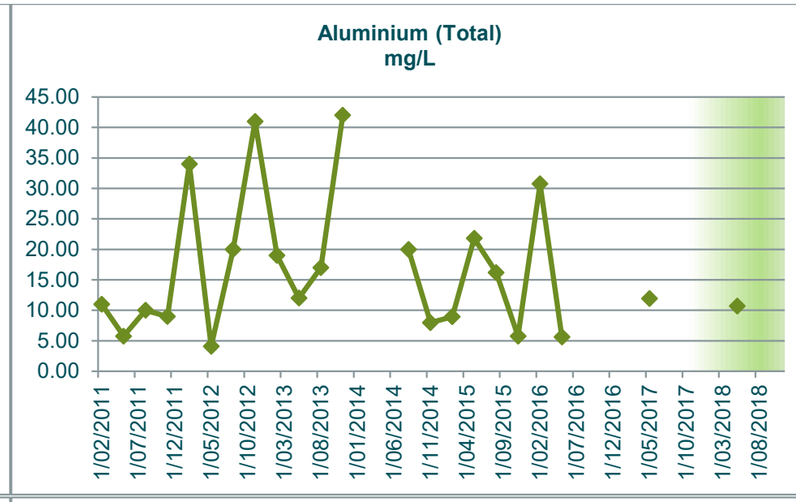
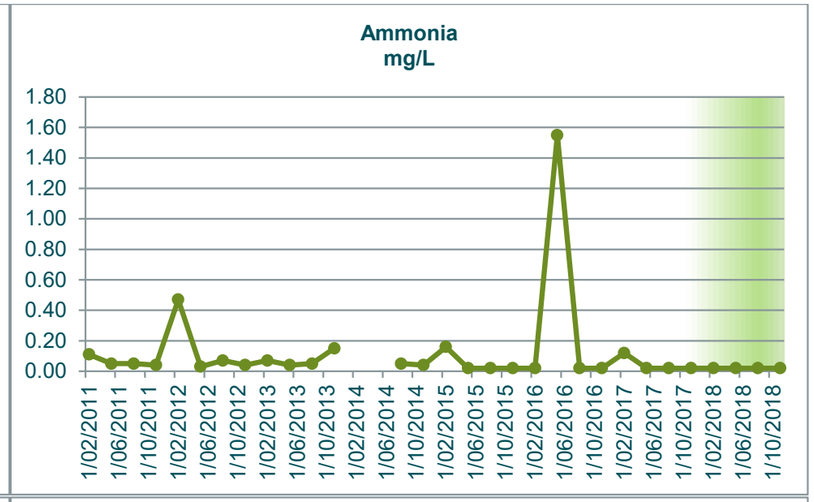
1/08/2018


Aluminium (Total)
mg/L
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Ammonia
mg/L
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
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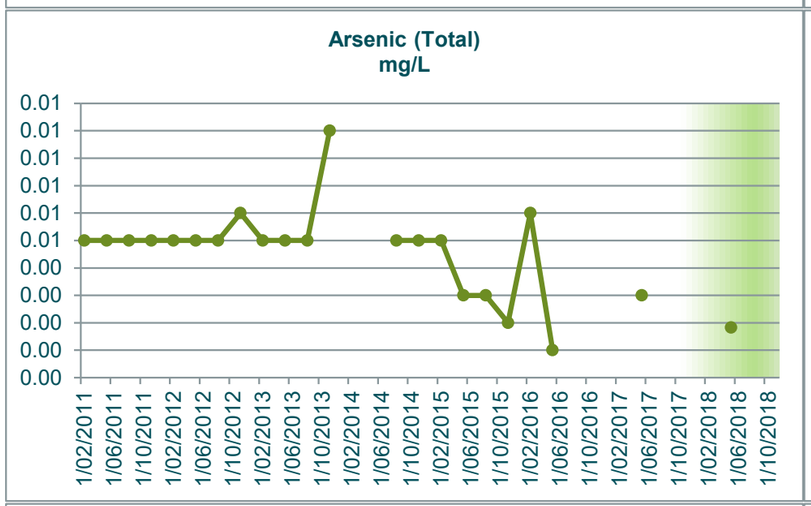
1/10/2018


Arsenic (Total)
mg/L
0.01
0.01
0.01
0.01
0.01
0.01
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
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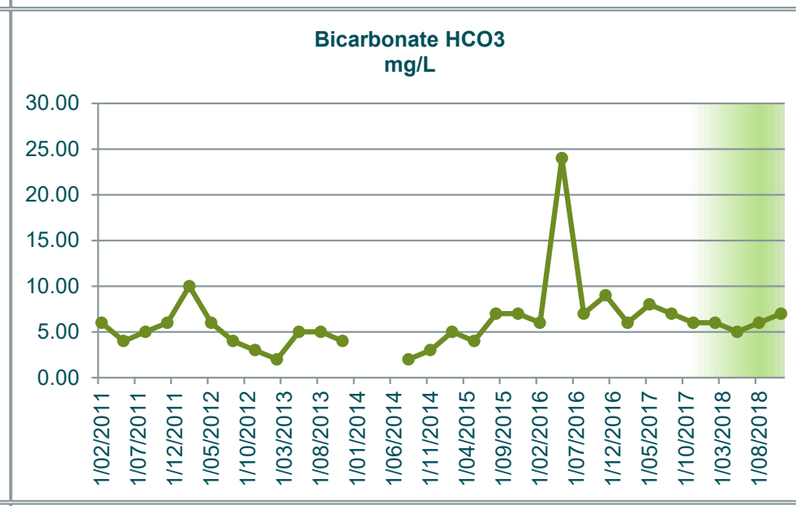
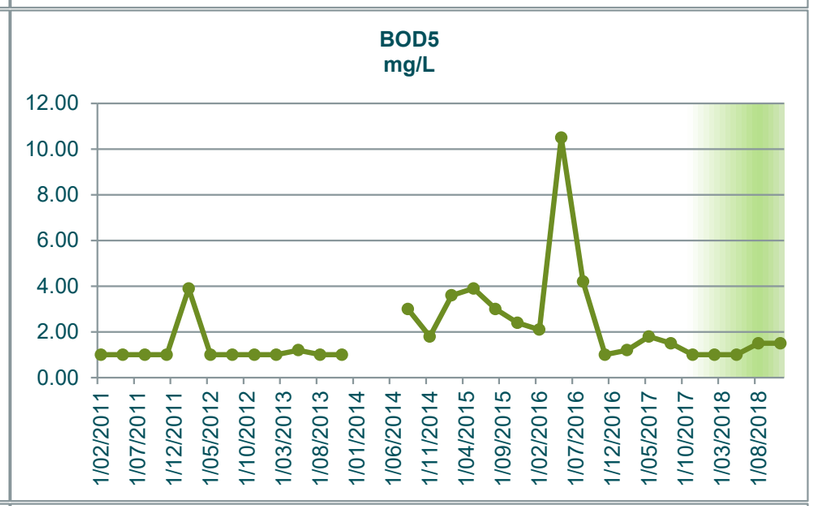
1/10/2018


Bicarbonate HCO3
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


BOD5
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
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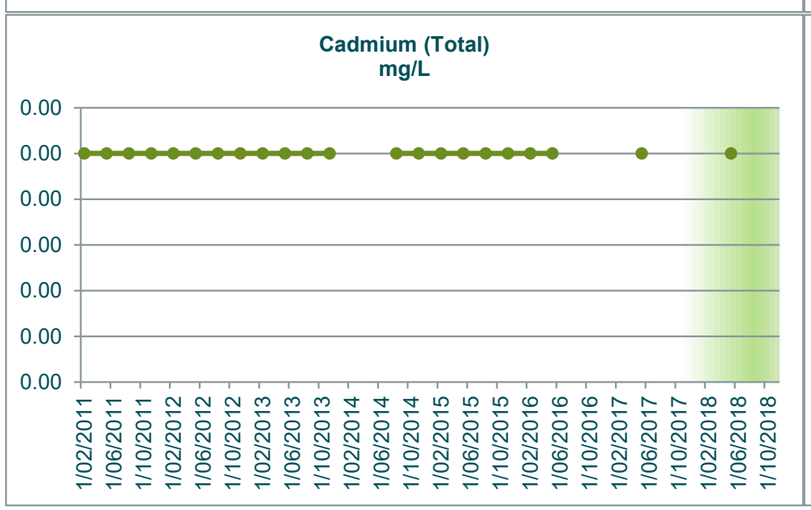
Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
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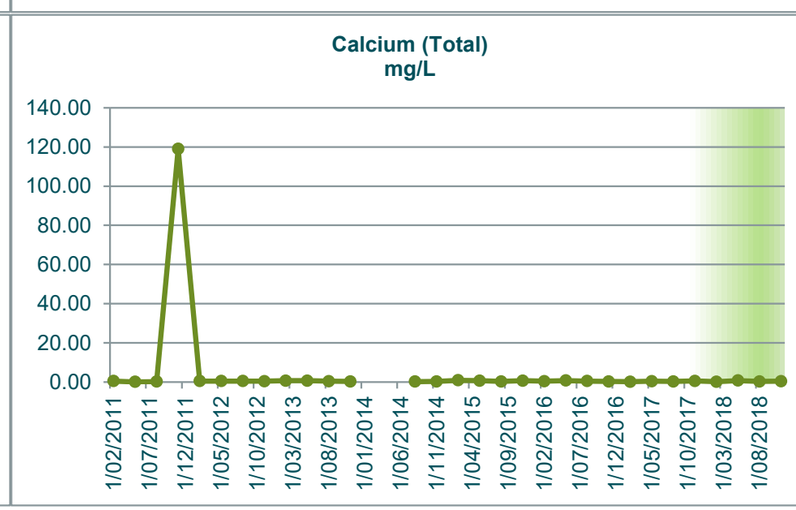
1/06/2018
1/10/2018


Calcium (Total)
mg/L
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
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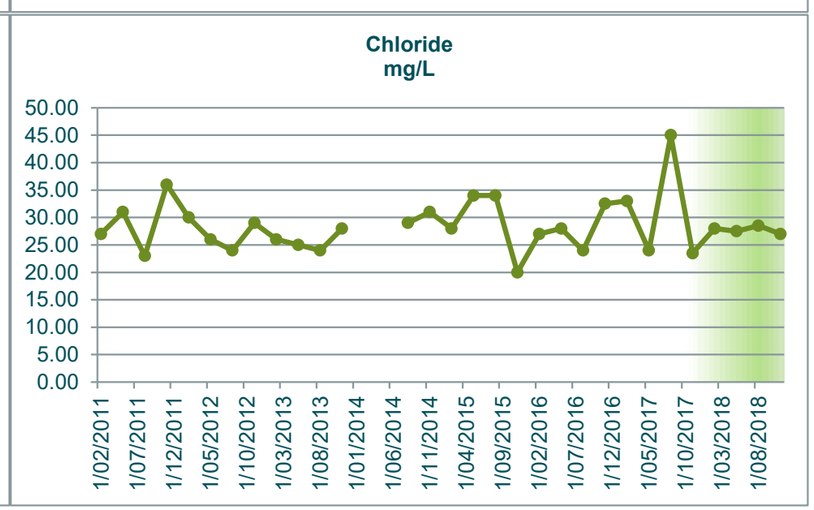
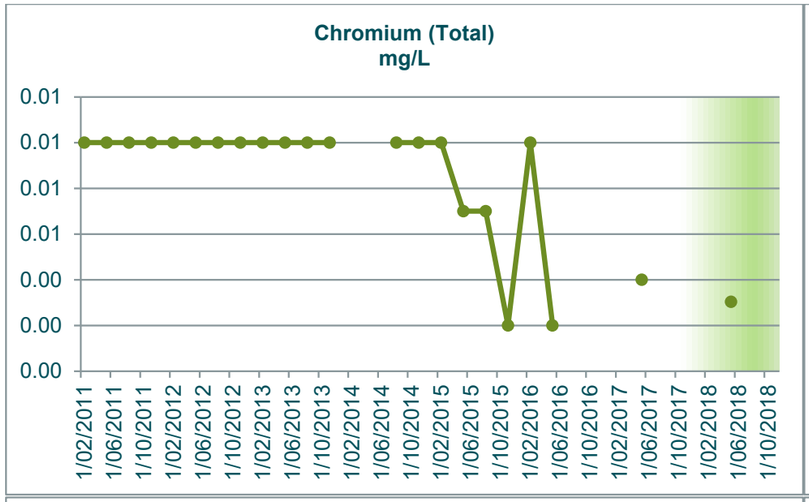
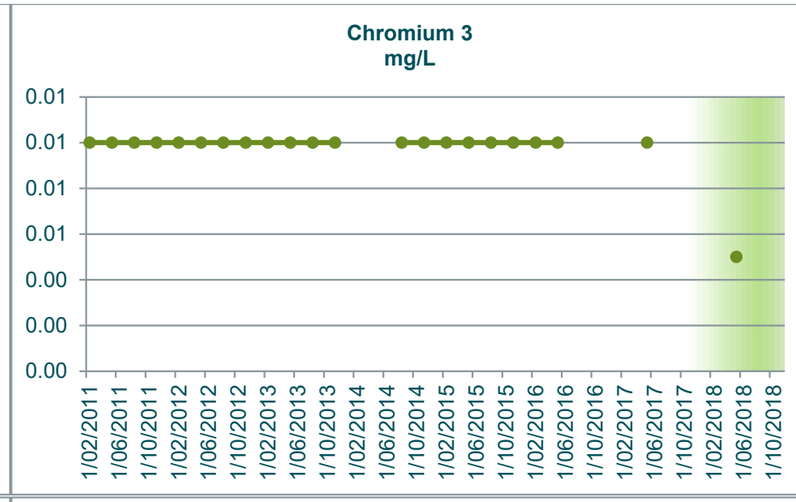
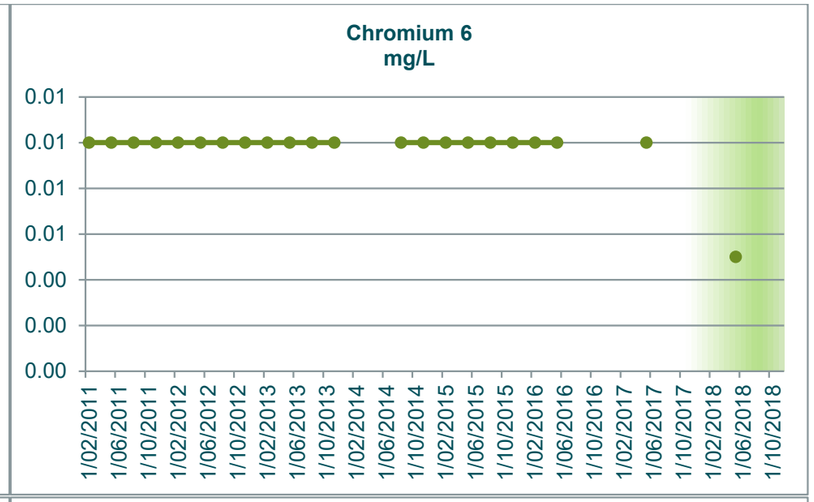
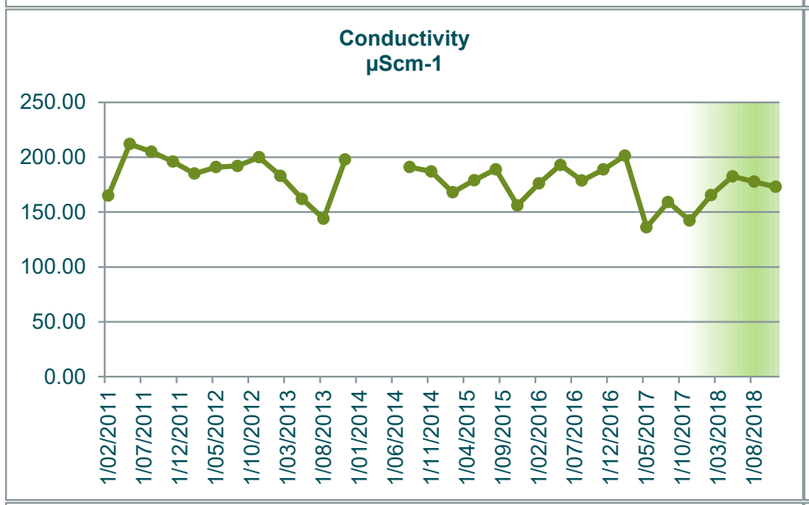
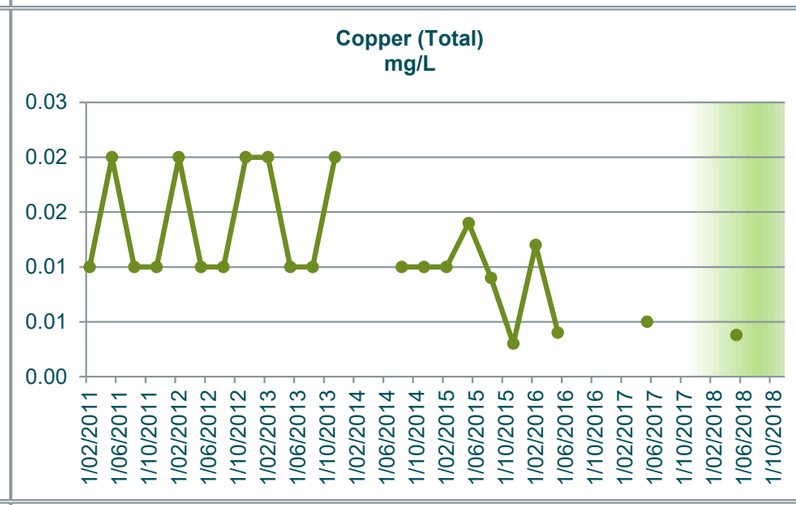

Chloride
mg/L
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

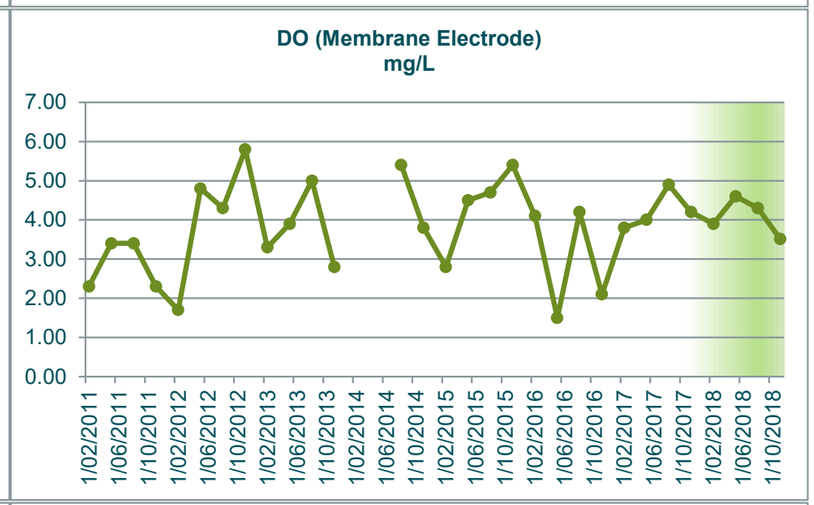

Chromium (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

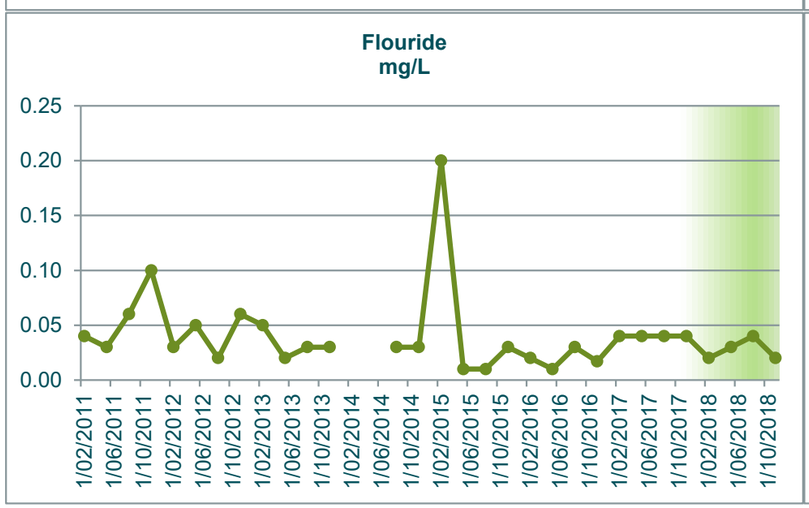

Chromium 3
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

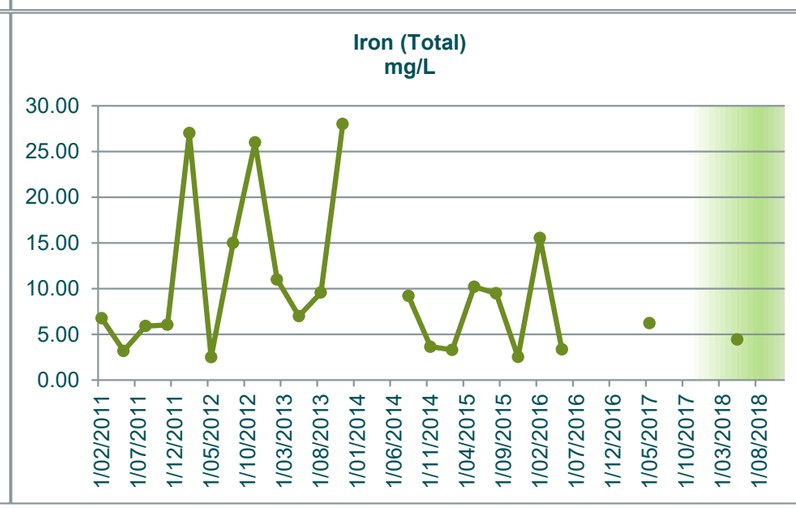

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

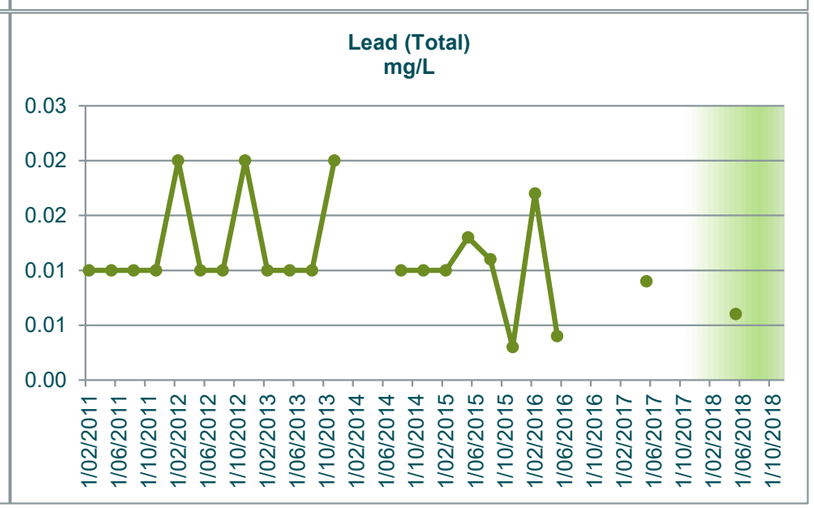

Conductivity
µScm-1
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

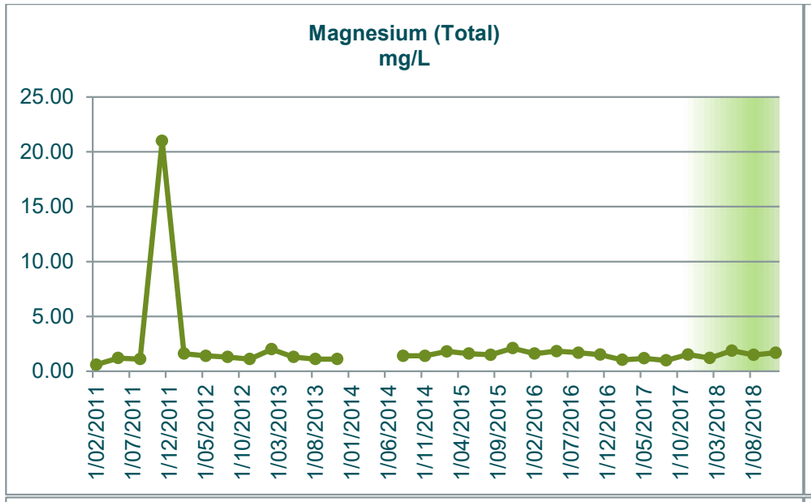

Copper (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

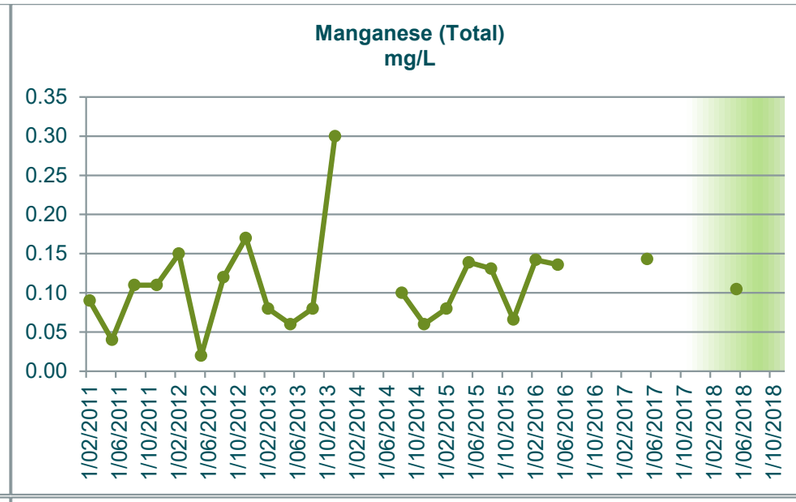

DO (Membrane Electrode)
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

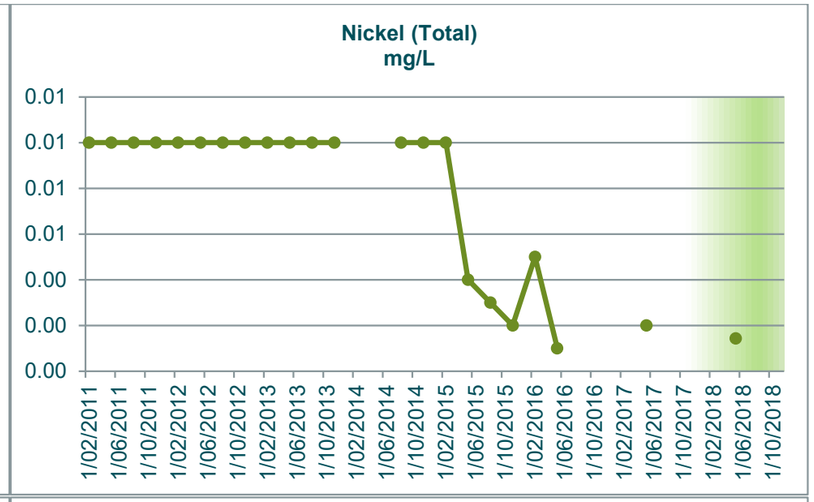

Flouride
mg/L
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

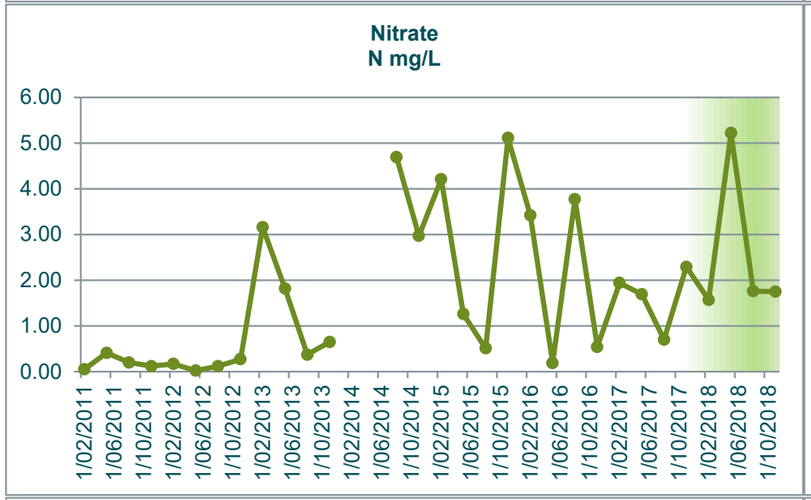

Iron (Total)
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

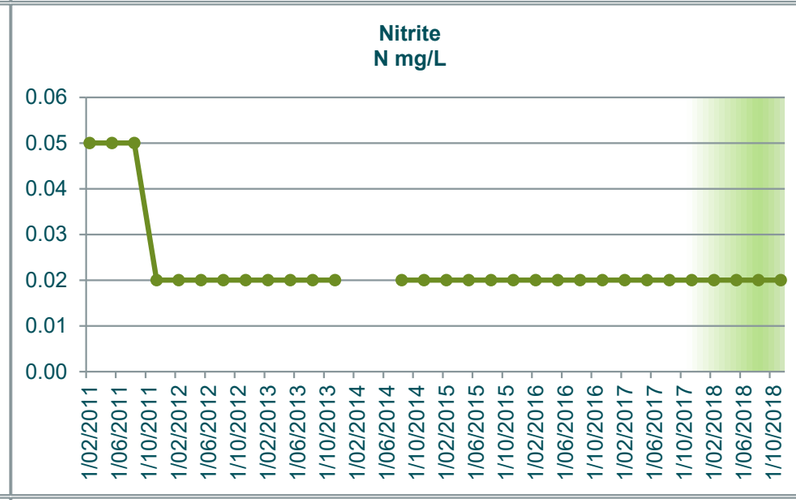

Lead (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

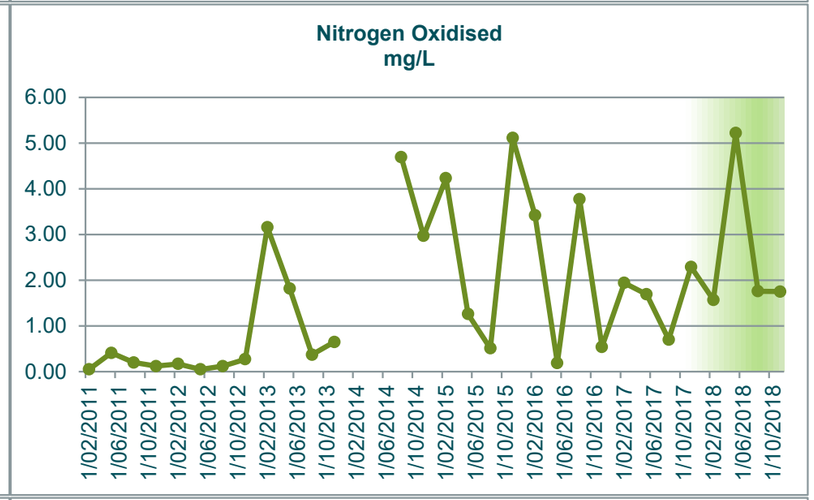

Magnesium (Total)
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

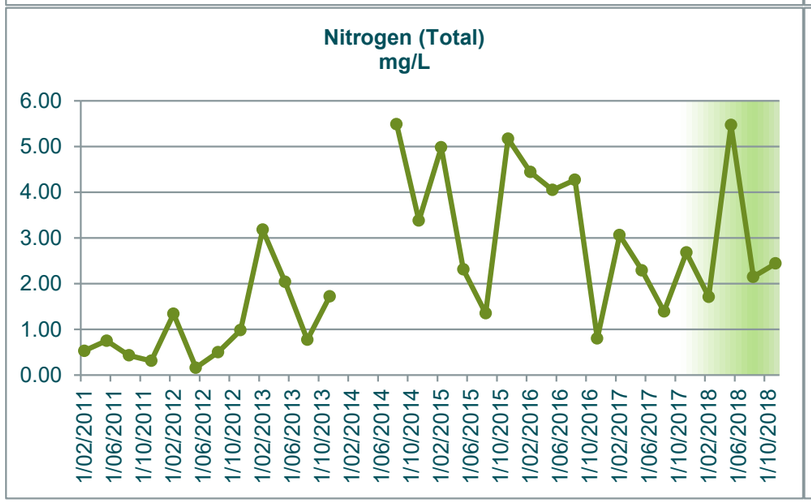

Manganese (Total)
mg/L
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

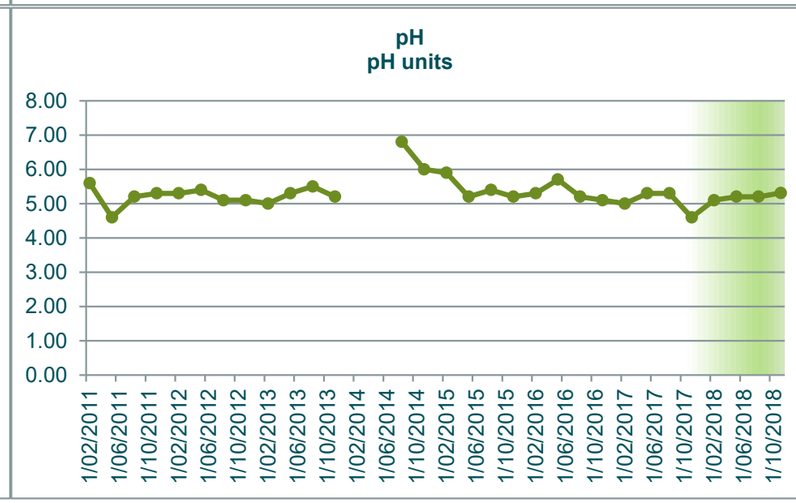

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

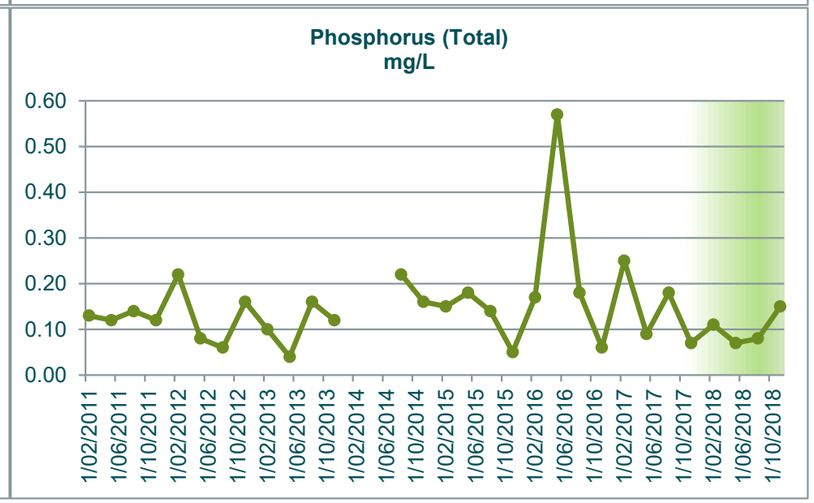

Nitrate
N mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

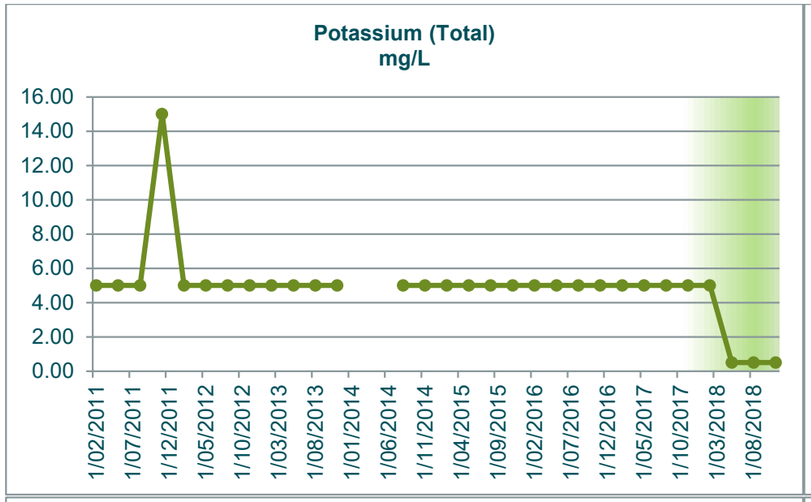

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

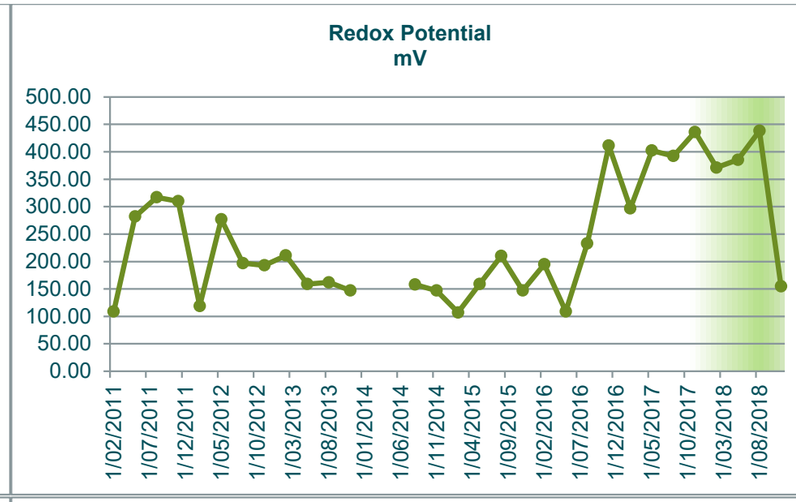

Nitrogen Oxidised
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

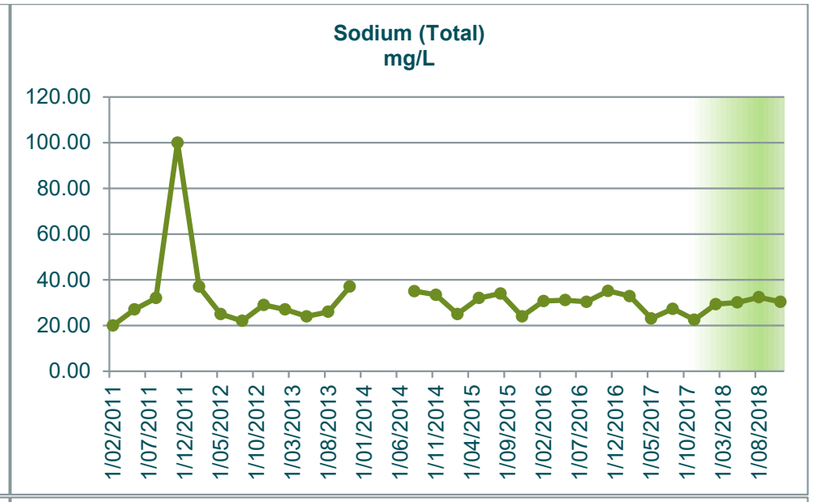

Nitrogen (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

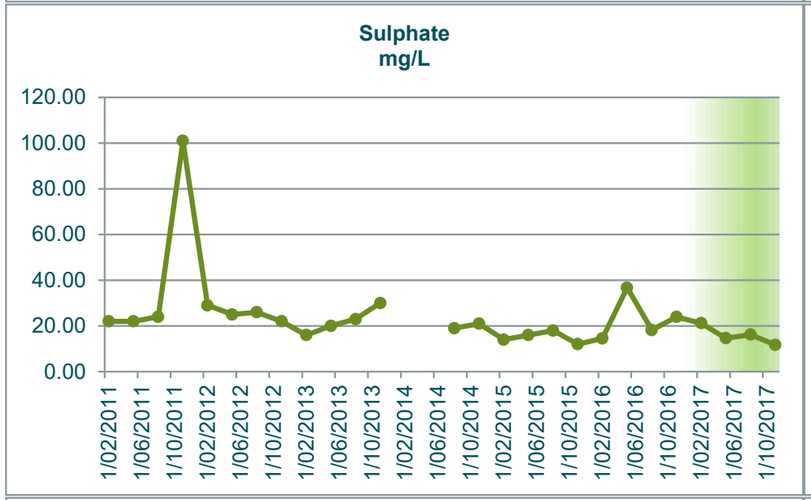

pH
pH units
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

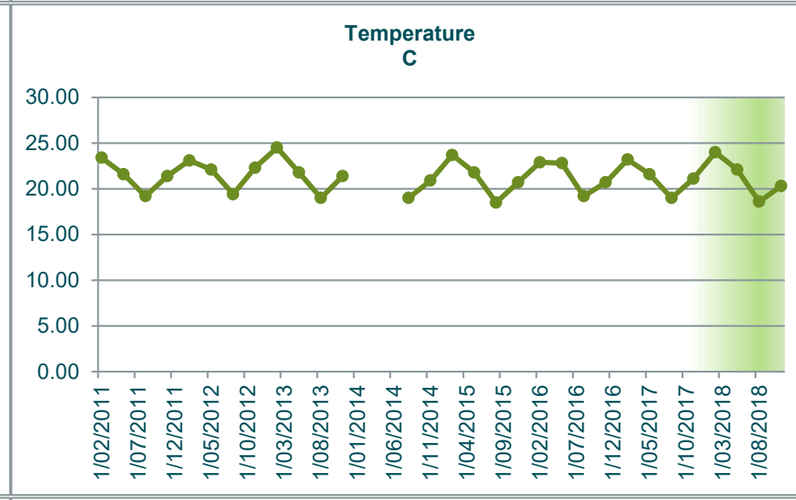

Phosphorus (Total)
mg/L
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

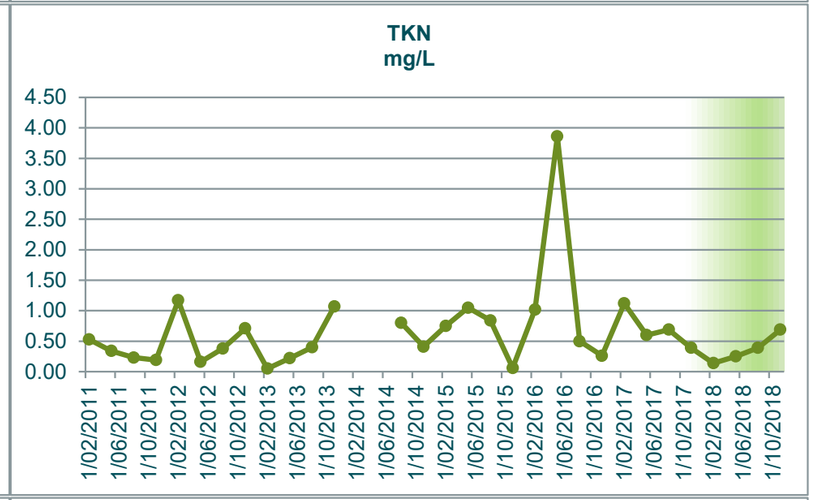

Potassium (Total)
mg/L
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

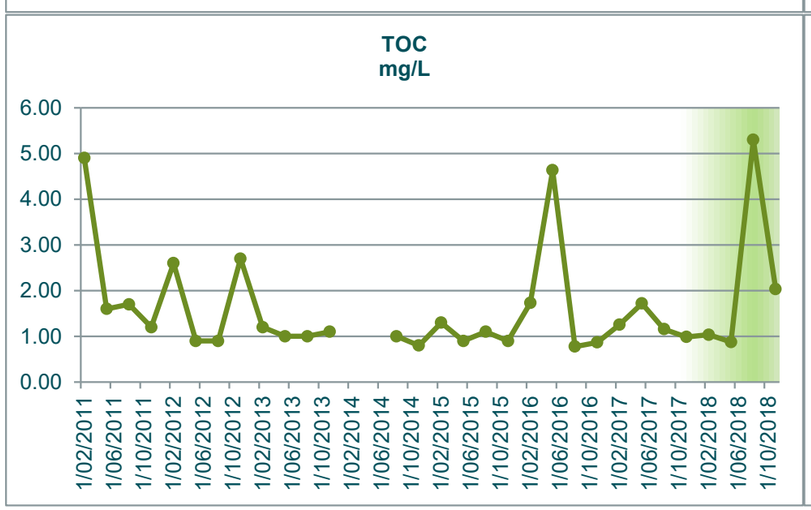

Redox Potential
mV
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

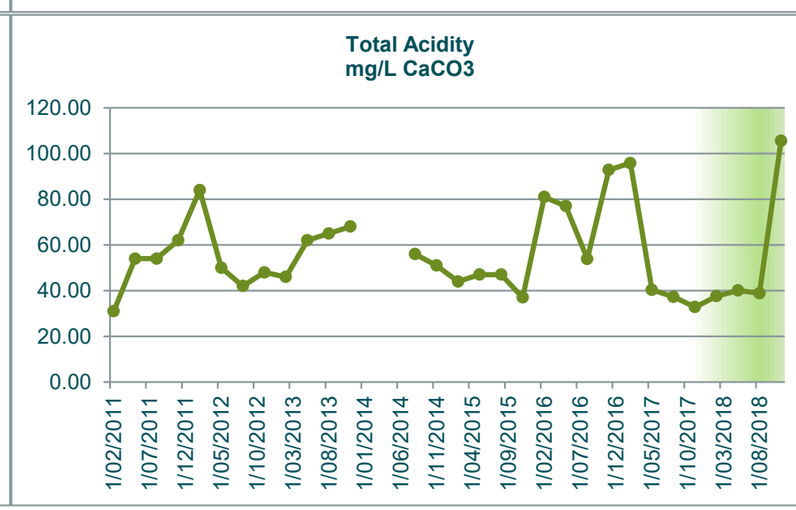

Sodium (Total)
mg/L
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

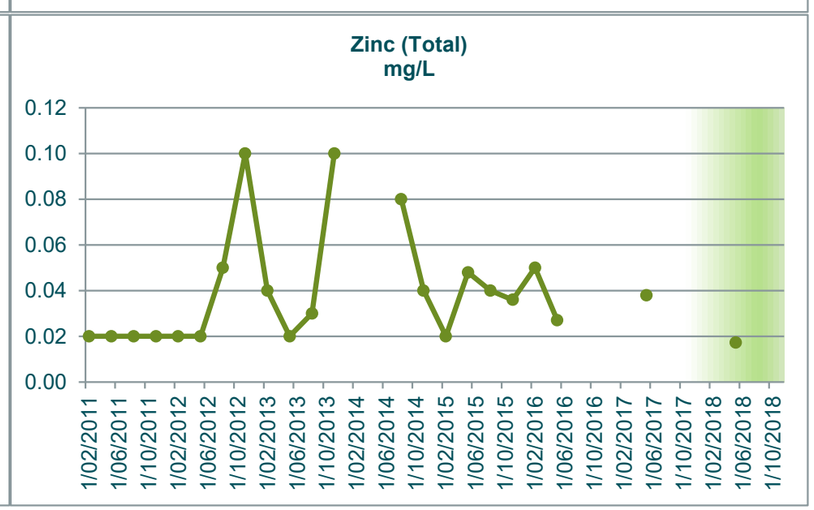

Sulphate
mg/L
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017


Temperature
C
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

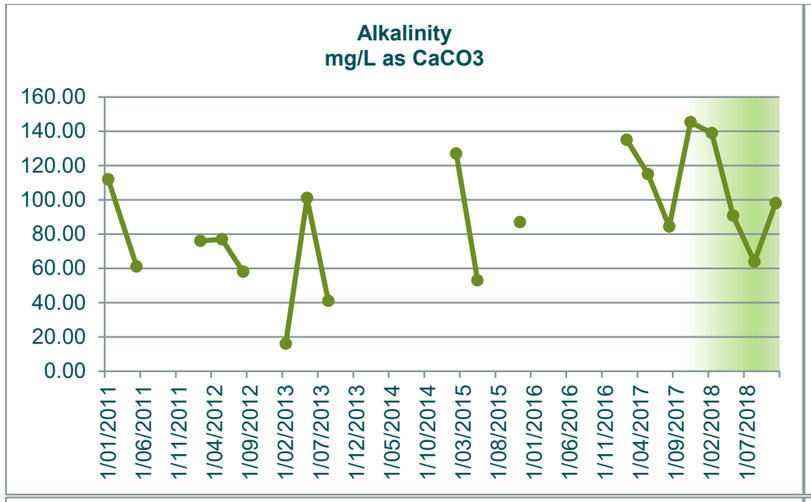

TKN
mg/L
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

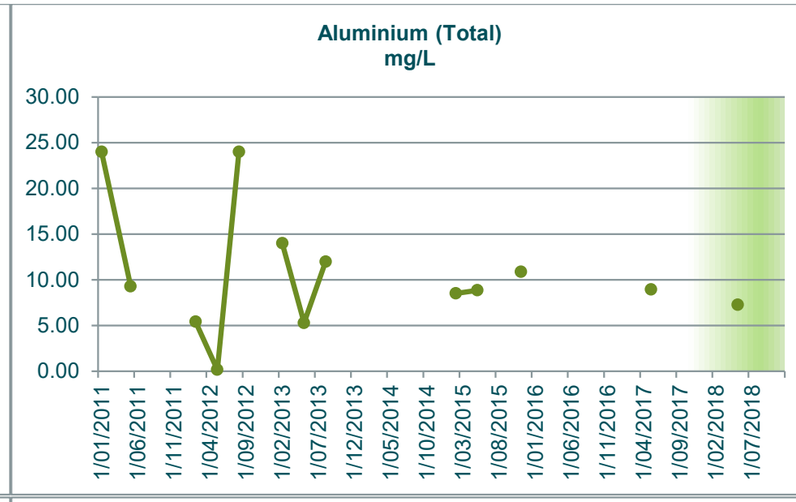

TOC
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

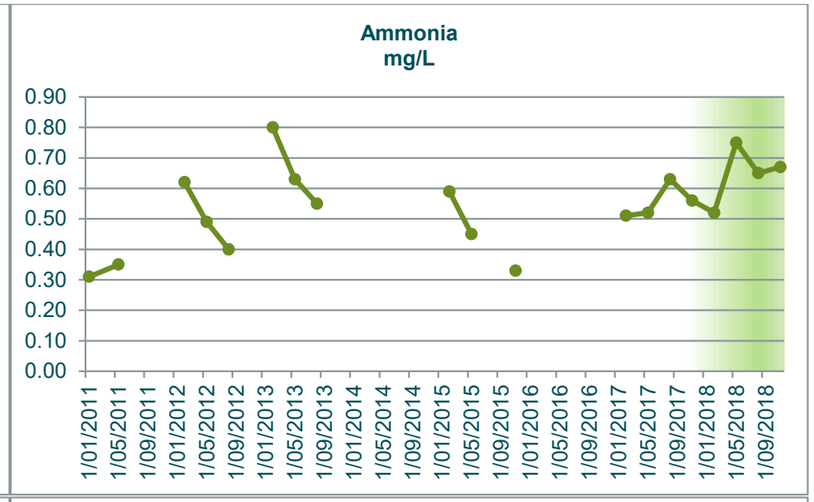

Total Acidity
mg/L CaCO3
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

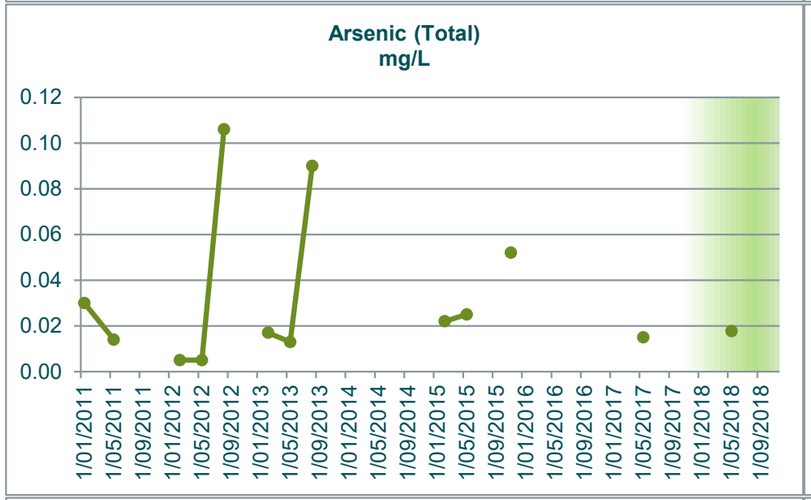

Zinc (Total)
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

GW17	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	112.00	24.00	0.31	0.03	68.00	3.40	0.00	51.00	45.00	0.04	0.04	0.01	677.00	0.10	3.40	0.39	52.00	0.03	17.00	0.78	0.04	0.05	0.05	0.05	1.09	6.20	0.76	5.00	-30.00	45.00	174.00	25.60	1.09	3.10	85.00	0.14
10/05/2011	61.00	9.30	0.35	0.01	37.00	5.40	0.00	26.00	36.00	0.02	0.02	0.01	514.00	0.04	3.60	0.15	26.00	0.01	9.30	0.29	0.01	0.05	0.05	0.05	1.22	5.30	0.28	5.00	118.00	35.00	96.00	21.30	1.22	6.30	37.00	0.03
9/08/2011																																				
8/11/2011																																				
6/02/2012	76.00	5.42	0.62	0.01	46.00	10.00	0.00	30.00	36.00	0.01	0.01	0.01	481.00	0.04	3.10	0.14	21.00	0.01	9.70	0.20	0.01	0.05	0.02	0.05	2.14	5.50	0.35	5.00	31.00	45.00	99.00	24.90	2.09	25.00	208.00	0.02
8/05/2012	77.00	0.16	0.49	0.01	47.00	14.00	0.00	14.00	35.00	0.01	0.01	0.01	406.00	0.01	4.70	0.06	1.40	0.01	4.90	0.28	0.01	0.04	0.05	0.09	1.97	6.00	0.07	5.00	127.00	24.00	43.00	22.00	1.88	38.00	338.00	0.01
6/08/2012	58.00	24.00	0.40	0.11	35.00	11.00	0.00	19.00	41.00	0.05	0.05	0.01	504.00	0.18	3.40	0.07	80.00	0.02	6.00	0.37	0.02	0.08	0.07	0.15	2.34	5.60	0.44	5.00	29.00	22.00	19.00	19.30	2.19	19.00	260.00	0.16
13/11/2012																																				
13/02/2013	16.00	14.00	0.80	0.02	10.00	6.60	0.00	26.00	35.00	0.02	0.02	0.01	462.00	0.04	4.40	0.03	28.00	0.02	7.60	0.30	0.01	0.03	0.02	0.05	2.11	5.60	0.20	5.00	-21.00	30.00	69.00	25.00	2.06	14.00	223.00	0.10
14/05/2013	101.00	5.29	0.63	0.01	62.00	8.70	0.00	19.00	50.00	0.02	0.02	0.01	469.00	0.02	3.00	0.08	51.00	0.01	5.50	0.17	0.01	0.14	0.02	0.14	2.10	5.80	0.10	5.00	-35.00	26.00	44.00	21.50	1.96	28.00	182.00	0.06
6/08/2013	41.00	12.00	0.55	0.09	25.00	12.00	0.00	16.00	90.00	0.02	0.02	0.01	430.00	0.02	4.20	0.07	77.00	0.01	4.30	0.23	0.01	0.02	0.04	0.06	1.99	5.80	0.16	5.00	6.00	28.00	44.00	18.90	1.93	22.00	395.00	0.08
12/11/2013																																				
11/02/2014																																				
13/05/2014																																				
12/08/2014																																				
10/11/2014																																				
9/02/2015	127.00	8.52	0.59	0.02	77.00	4.80	0.00	39.00	40.00	0.01	0.01	0.01	510.00	0.02	3.60	0.29	23.20	0.01	9.40	0.28	0.01	0.05	0.02	0.05	2.26	6.20	0.78	5.00	-22.00	32.00	64.00	24.70	2.21	12.00	147.00	0.08
11/05/2015	53.00	8.86	0.45	0.03	32.00	6.60	0.00	20.00	30.00	0.02	0.02	0.01	320.00	0.02	3.90	0.12	24.20	0.01	4.80	0.22	0.01	0.02	0.02	0.02	1.72	5.80	0.39	5.00	37.00	25.00	39.00	21.90	1.70	15.00	212.00	0.08
11/08/2015																																				
10/11/2015	87.00	10.88	0.33	0.05	87.00	3.30	0.00	24.00	33.00	0.02	0.02	0.01	334.00	0.02	2.80	0.17	35.93	0.01	7.40	0.27	0.01	0.02	0.03	0.04	1.70	5.90	0.42	5.00	-15.00	28.00	48.00	22.00	1.66	10.50	191.00	0.06
9/05/2016																																				
7/11/2016																																				
7/02/2017	135.00		0.51		135.00	3.60		44.43	35.00				518.60		4.60	0.25			9.53			0.02	0.03	0.02	1.54	6.20	0.31	5.00	48.80	33.74	50.55	26.90	1.54	9.78	211.80	
8/05/2017	115.00	8.94	0.52	0.02	115.00	3.60	0.00	35.68	36.00	0.02	0.02	0.01	455.10	0.02	3.80	0.19	24.41	0.01	8.23	0.26	0.01	0.03	0.02	0.05	1.44	5.90	0.30	5.00	83.70	34.79	58.64	22.50	1.39	11.24	155.90	0.05
8/08/2017	84.32		0.63		84.00	3.00		27.11	42.50				372.60		3.60	0.13			5.74			0.04	0.02	0.04	1.78	5.80	0.42	5.00	169.50	28.77	32.79	19.80	1.74	16.64	199.70	
7/11/2017	145.24		0.56		145.00	2.70		50.13	40.00				580.10		2.90	0.24			12.41			0.02	0.02	0.02	1.25	6.00	0.32	5.02	60.20	45.88	70.88	22.20	1.25	9.99	162.60	
13/02/2018	138.97		0.52		139.00	1.20		49.23	41.00				548.10		3.90	0.31			10.75			0.02	0.03	0.04	1.24	6.20	0.28	5.00	5.40	40.62	68.47	25.80	1.20	10.59	137.90	
8/05/2018	90.72	7.28	0.75	0.02	91.00	3.00	0.00	33.06	37.00	0.01	0.01	0.01	429.70	0.02	3.40	0.23	24.21	0.01	7.48	0.29	0.01	0.02	0.02	0.02	1.76	5.90	0.39	3.43	75.50	34.79	59.41	22.50	1.74	15.83	167.30	0.03
14/08/2018	63.92		0.65		64.00	7.80		39.58	34.00				430.70		3.80	0.08			7.51			0.02	0.02	0.02	1.81	5.80	0.48	3.58	235.60	33.47	92.30	20.00	1.79	34.00	130.80	
13/11/2018	98.05		0.67		98.00	3.60		48.48	31.00				558.00		3.71	0.20			9.43			0.02	0.02	0.02	1.61	5.84	0.53	3.75	54.00	34.97	131.91	22.10	1.61	12.65	219.40	
2018 Min	**63.92**	**7.28**	**0.52**	**0.02**	**64.00**	**1.20**	**0.00**	**33.06**	**31.00**	**0.01**	**0.01**	**0.01**	**429.70**	**0.02**	**3.40**	**0.08**	**24.21**	**0.01**	**7.48**	**0.29**	**0.01**	**0.02**	**0.02**	**0.02**	**1.24**	**5.80**	**0.28**	**3.43**	**5.40**	**33.47**	**59.41**	**20.00**	**1.20**	**10.59**	**130.80**	**0.03**
2018 Max	**138.97**	**7.28**	**0.75**	**0.02**	**139.00**	**7.80**	**0.00**	**49.23**	**41.00**	**0.01**	**0.01**	**0.01**	**558.00**	**0.02**	**3.90**	**0.31**	**24.21**	**0.01**	**10.75**	**0.29**	**0.01**	**0.02**	**0.03**	**0.04**	**1.81**	**6.20**	**0.53**	**5.00**	**235.60**	**40.62**	**131.91**	**25.80**	**1.79**	**34.00**	**219.40**	**0.03**
2018 Mean	**97.92**	**7.28**	**0.65**	**0.02**	**98.00**	**3.90**	**0.00**	**42.59**	**35.75**	**0.01**	**0.01**	**0.01**	**491.63**	**0.02**	**3.70**	**0.21**	**24.21**	**0.01**	**8.79**	**0.29**	**0.01**	**0.02**	**0.02**	**0.03**	**1.61**	**5.94**	**0.42**	**3.94**	**92.63**	**35.96**	**88.02**	**22.60**	**1.59**	**18.27**	**163.85**	**0.03**
Long-term Average	**90.56**	**10.34**	**0.53**	**0.03**	**76.40**	**5.82**	**0.00**	**32.75**	**40.08**	**0.02**	**0.02**	**0.01**	**473.50**	**0.04**	**3.65**	**0.17**	**34.68**	**0.01**	**8.29**	**0.30**	**0.01**	**0.04**	**0.03**	**0.05**	**1.73**	**5.87**	**0.38**	**4.79**	**49.09**	**32.85**	**67.42**	**22.69**	**1.69**	**16.29**	**195.17**	**0.07**


Alkalinity
mg/L as CaCO3
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Aluminium (Total)
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Ammonia
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Arsenic (Total)
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
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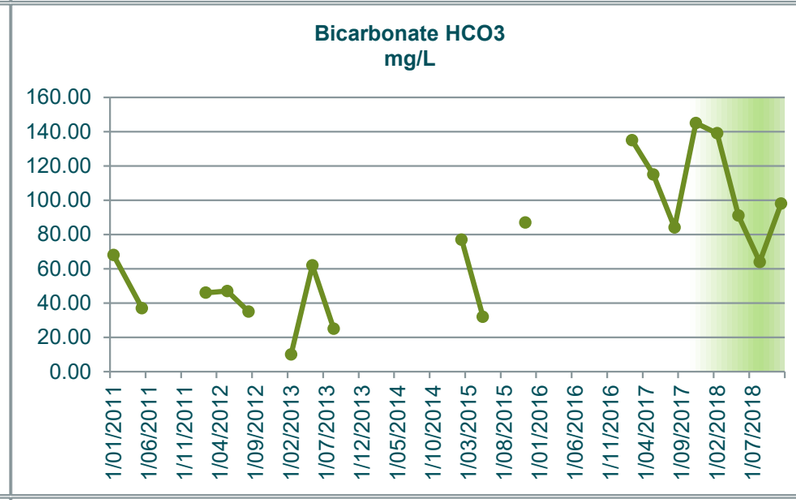
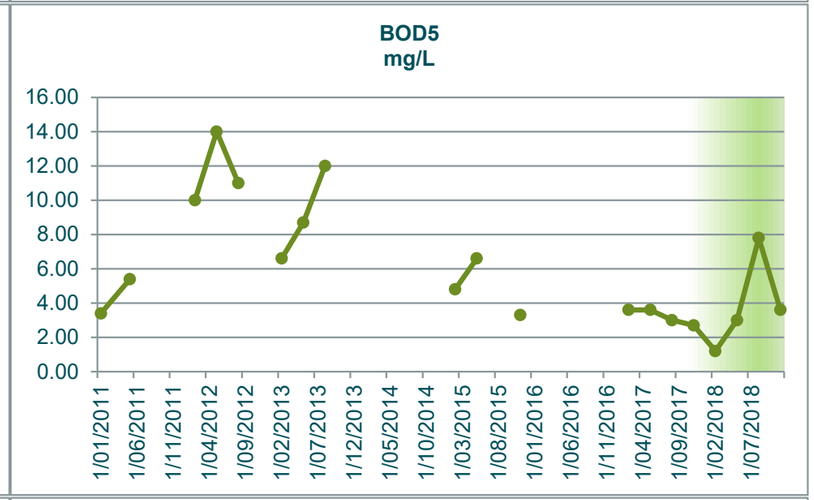
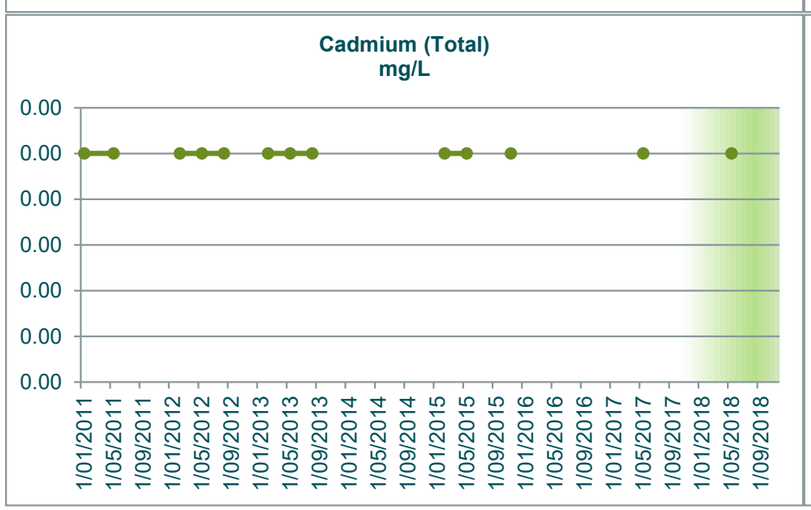
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Bicarbonate HCO3
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


BOD5
mg/L
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
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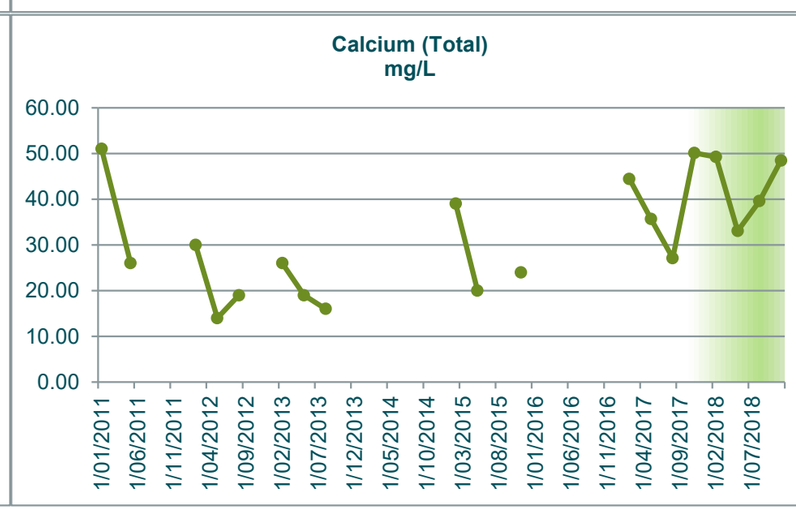
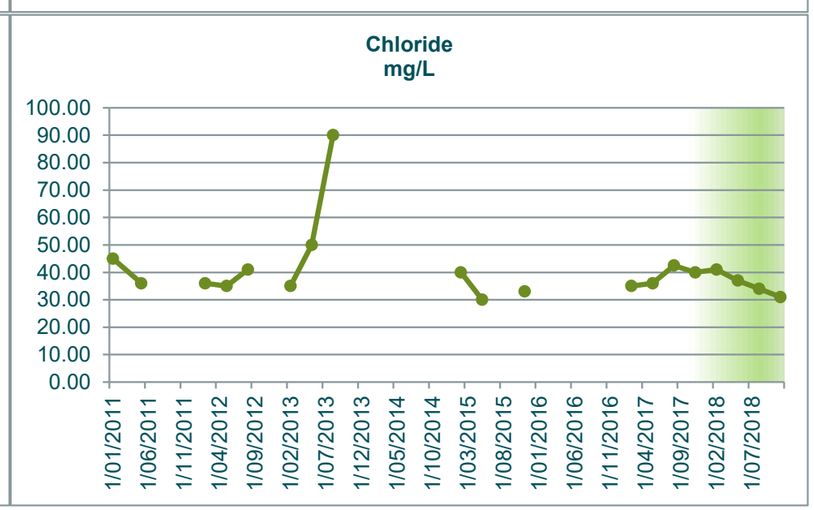
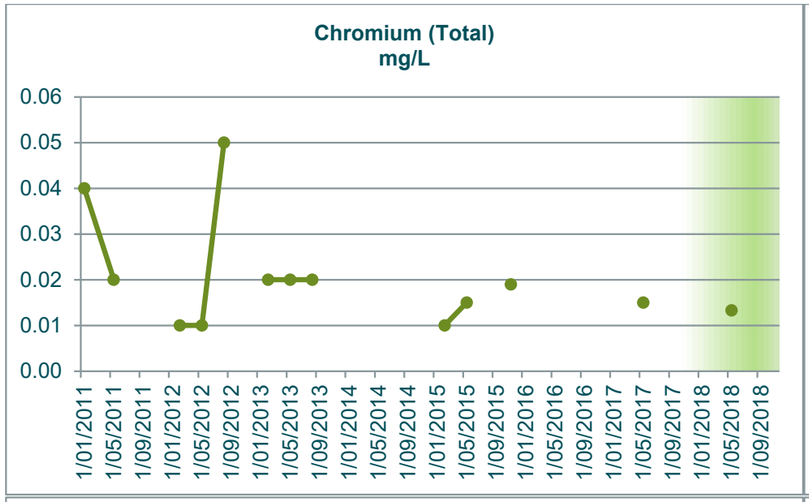
1/05/2018
1/09/2018


Calcium (Total)
mg/L
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chloride
mg/L
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chromium (Total)
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
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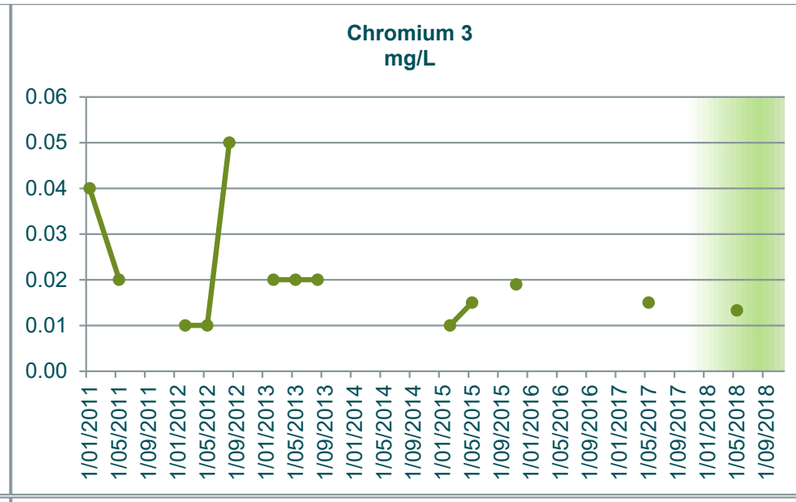
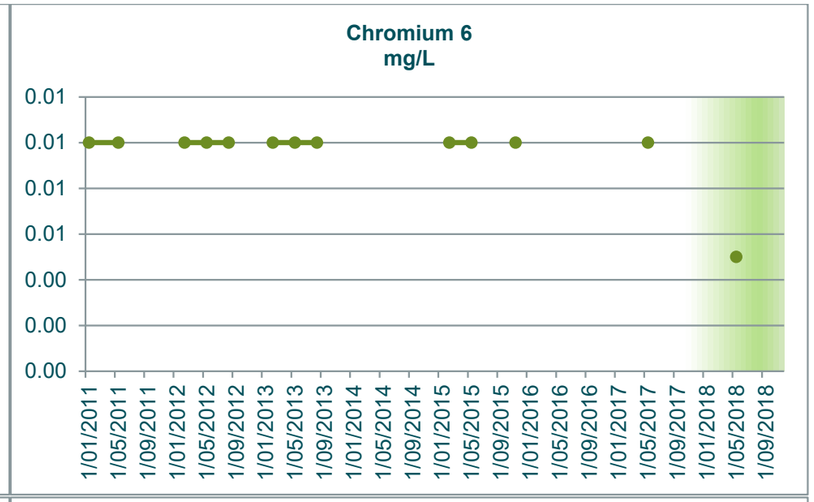
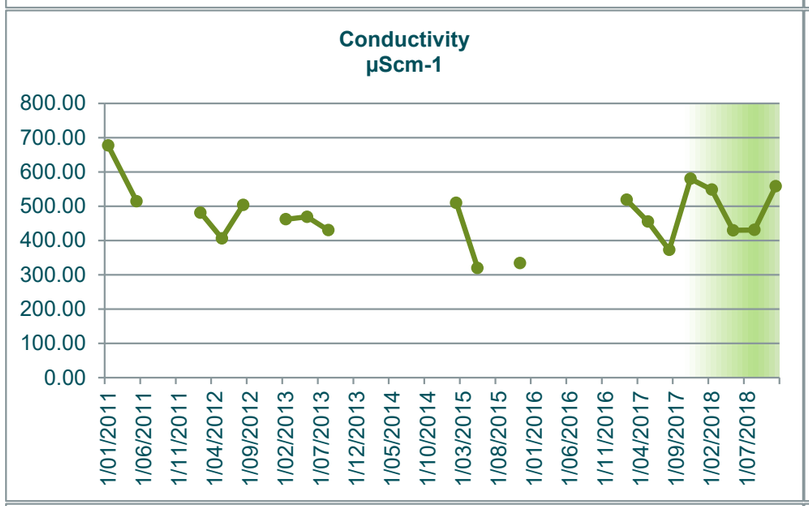
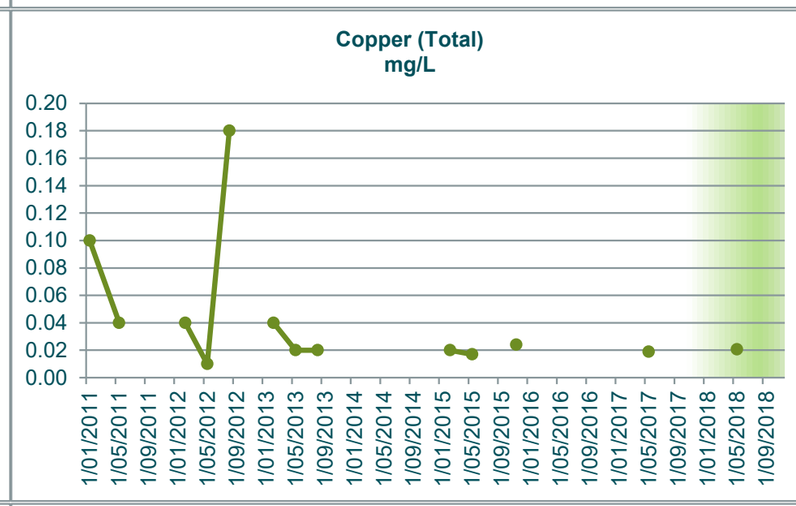
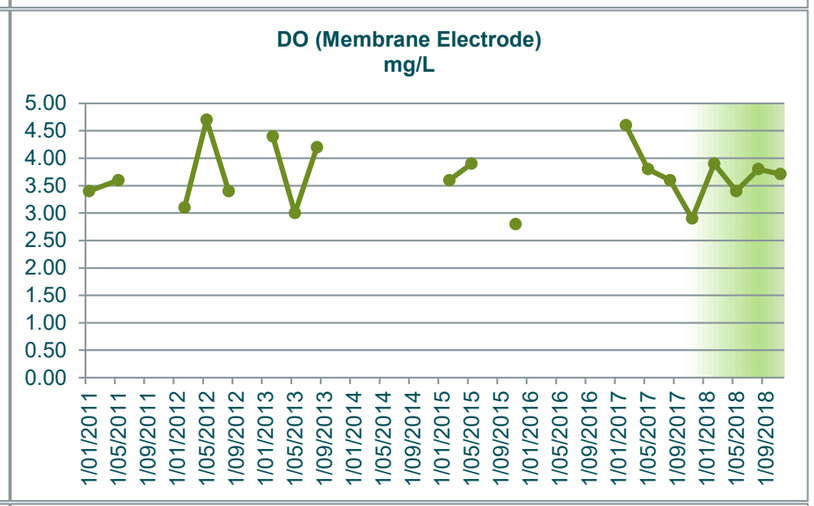
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

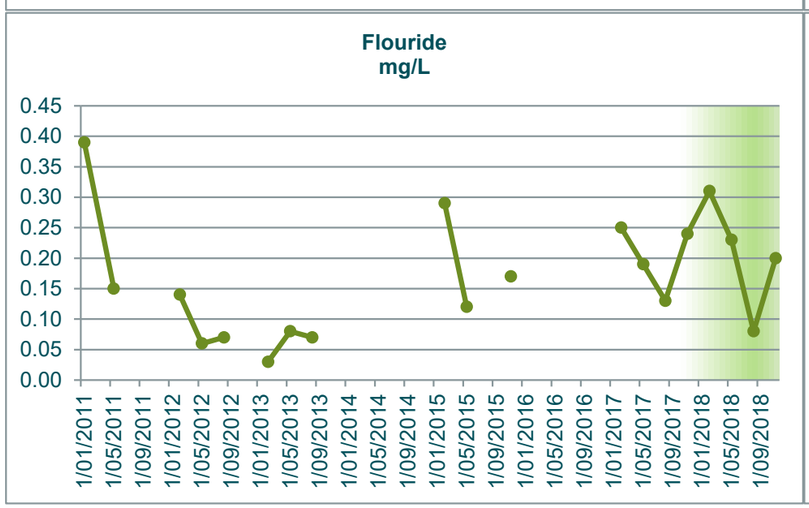

Chromium 3
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

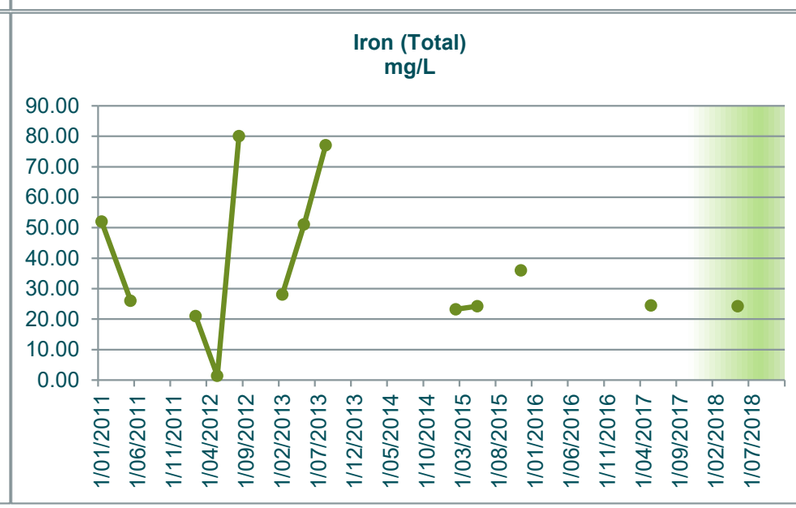

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

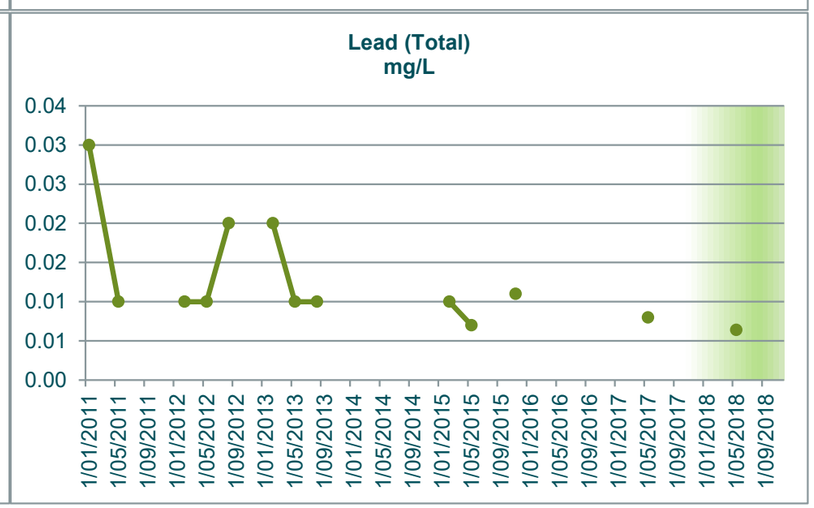

Conductivity
µScm-1
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

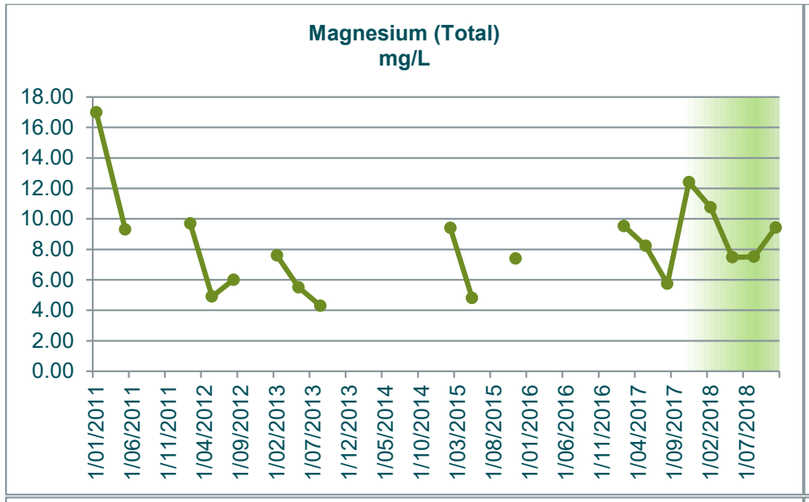

Copper (Total)
mg/L
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

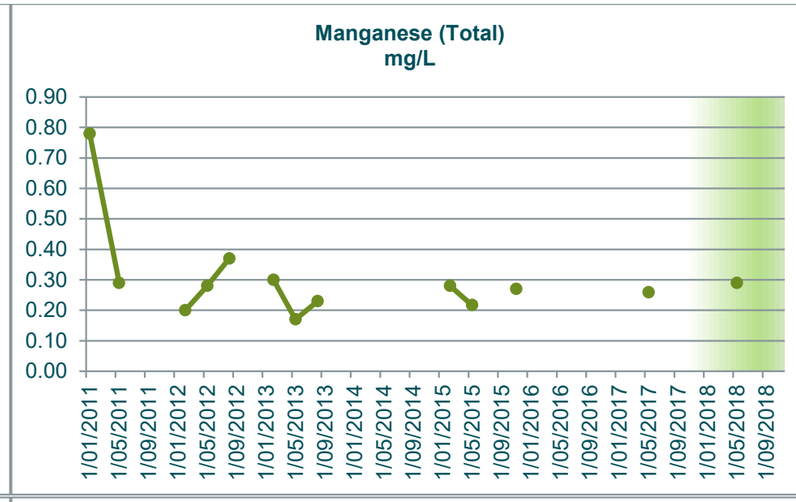

DO (Membrane Electrode)
mg/L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

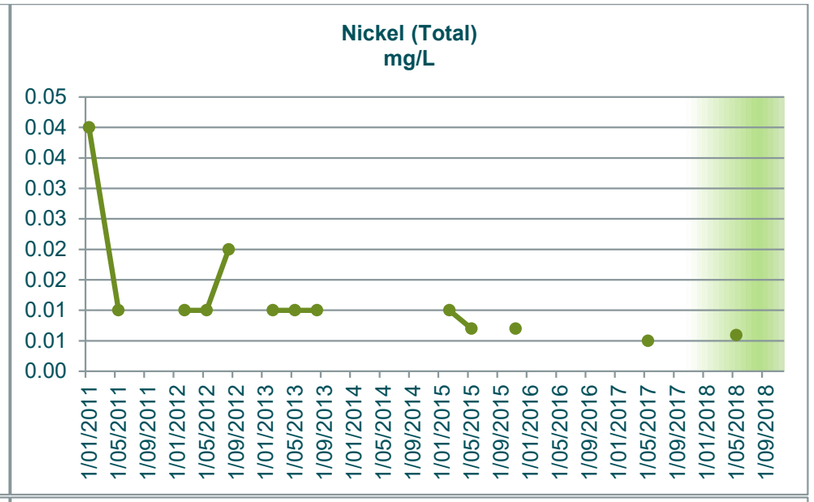

Flouride
mg/L
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

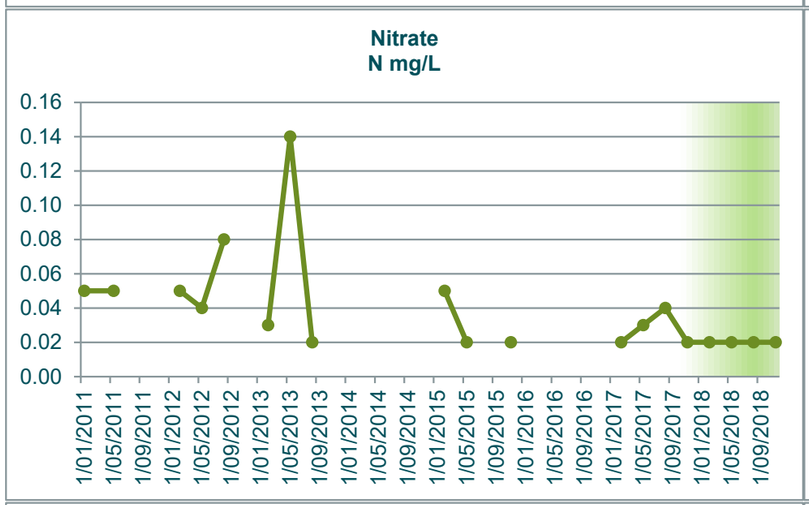

Iron (Total)
mg/L
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

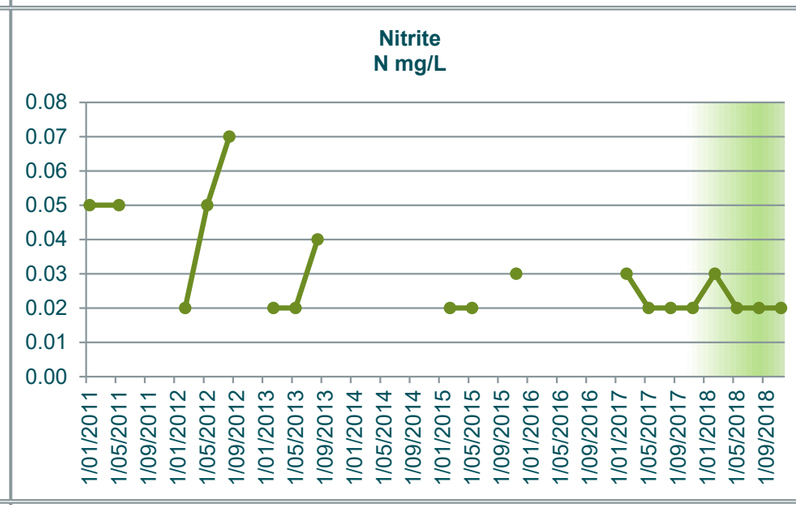

Lead (Total)
mg/L
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

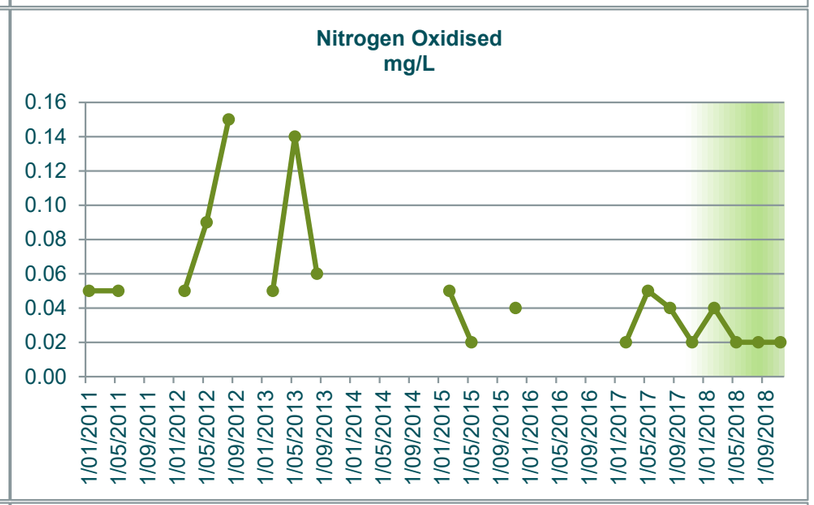

Magnesium (Total)
mg/L
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

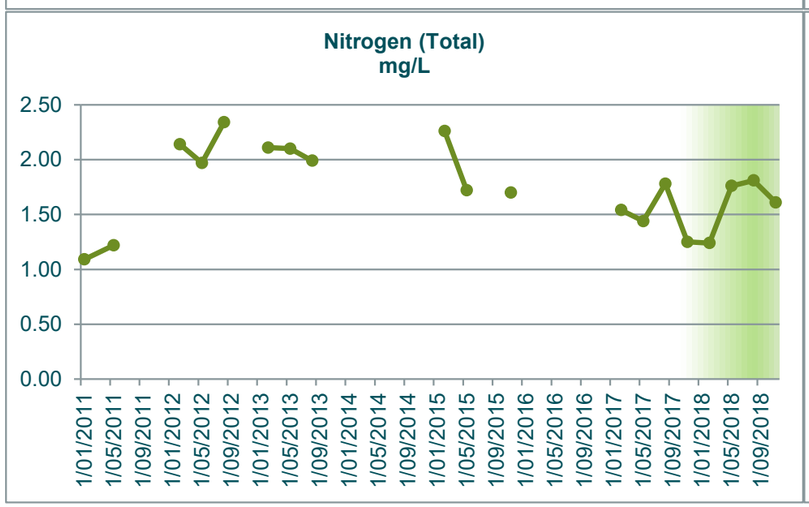

Manganese (Total)
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

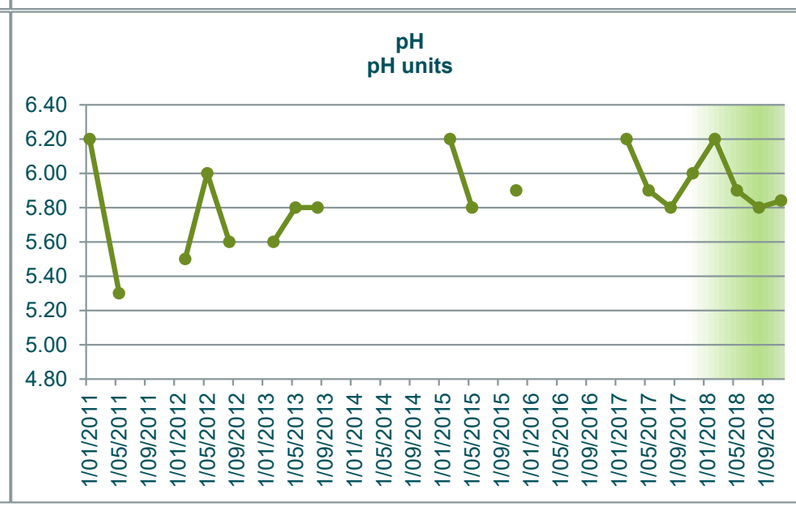

Nickel (Total)
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

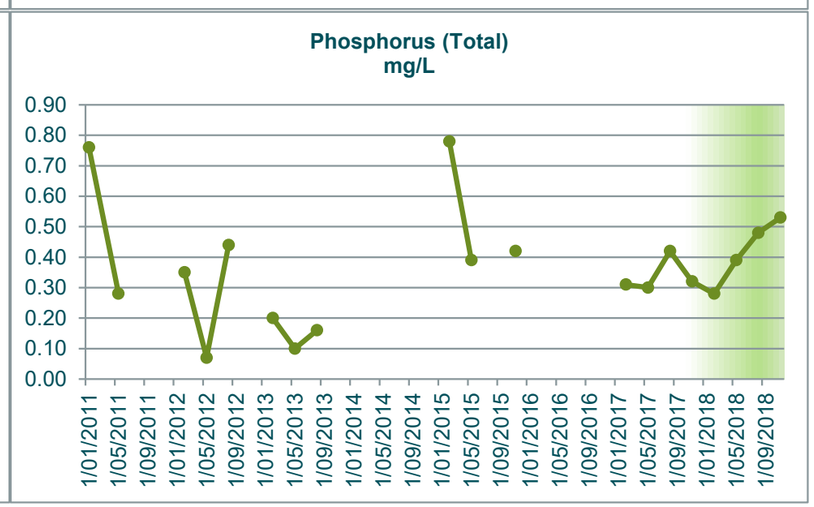

Nitrate
N mg/L
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

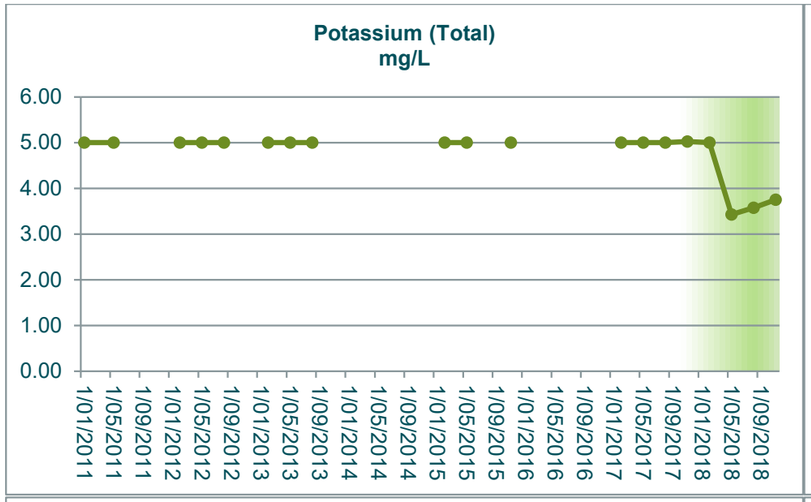

Nitrite
N mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

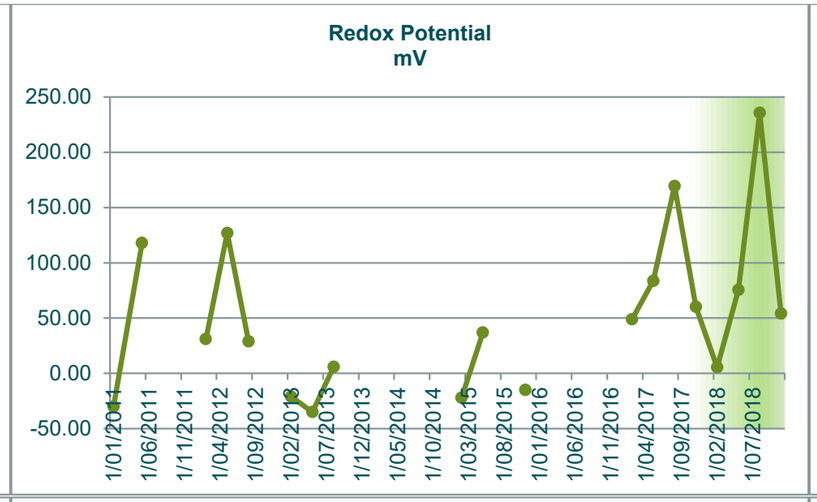

Nitrogen Oxidised
mg/L
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

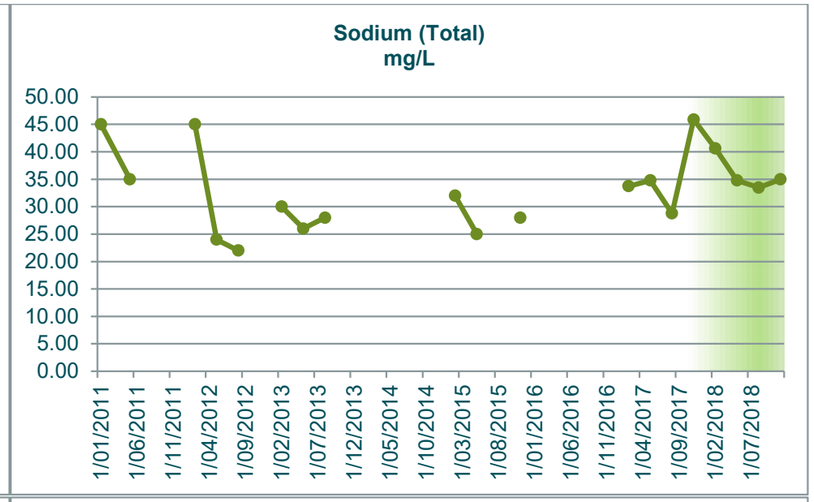

Nitrogen (Total)
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

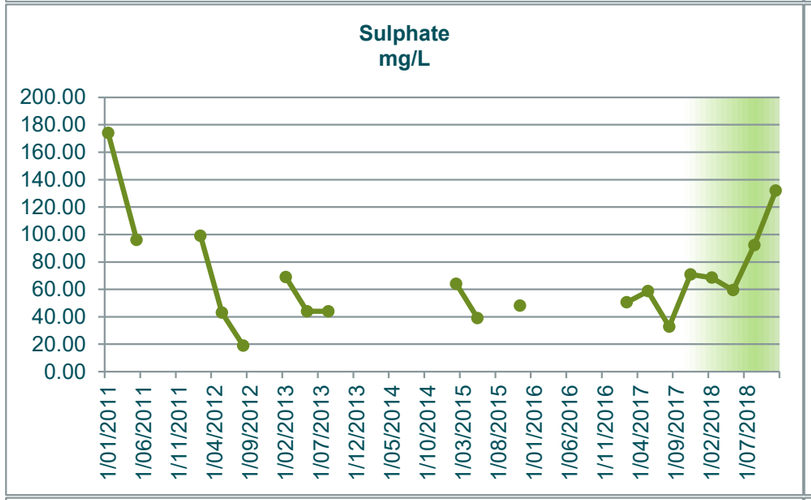

pH
pH units
6.40
6.20
6.00
5.80
5.60
5.40
5.20
5.00
4.80
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

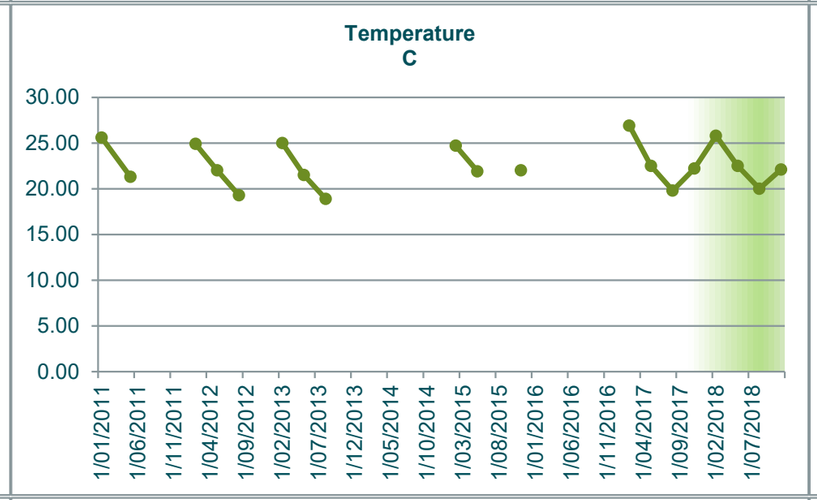

Phosphorus (Total)
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

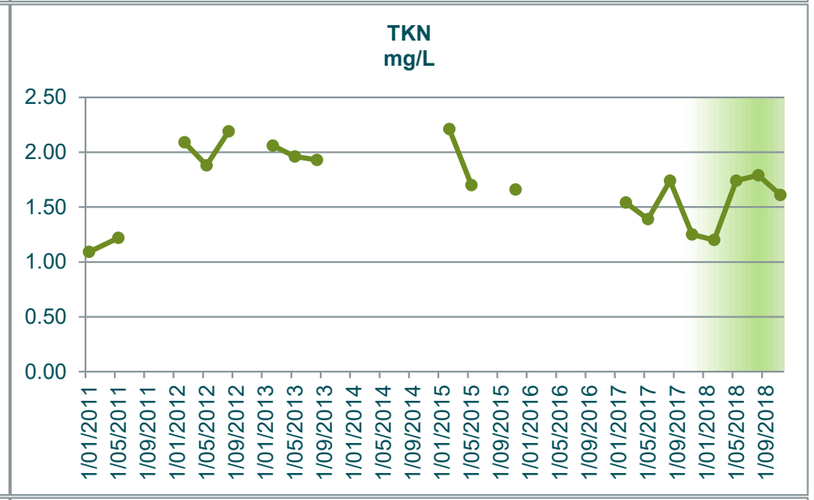

Potassium (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

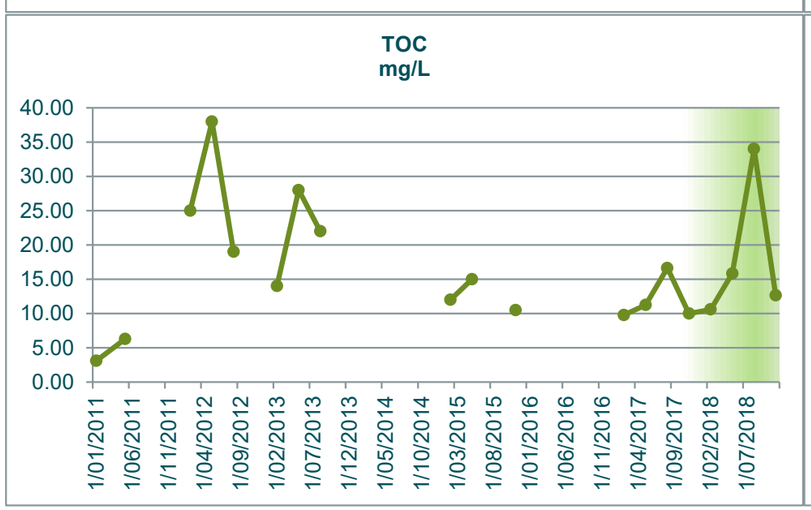

Redox Potential
mV
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

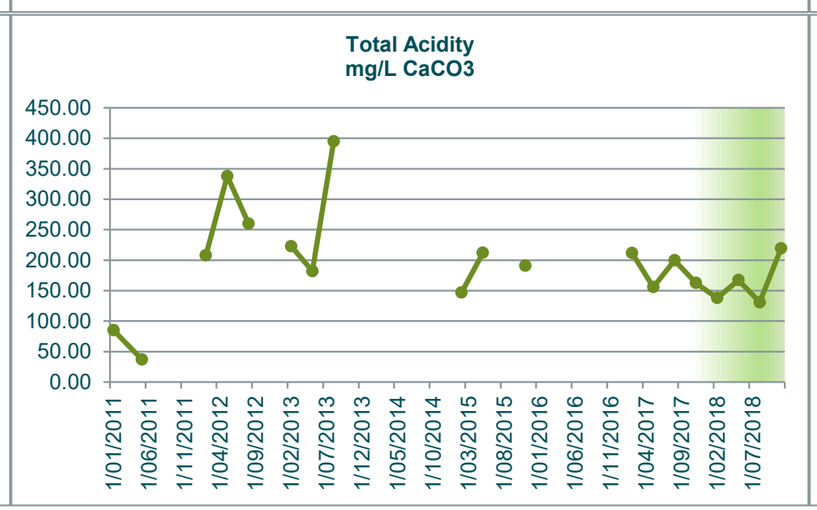

Sodium (Total)
mg/L
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Sulphate
mg/L
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


TKN
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


TOC
mg/L
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018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mg/L CaCO3
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350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
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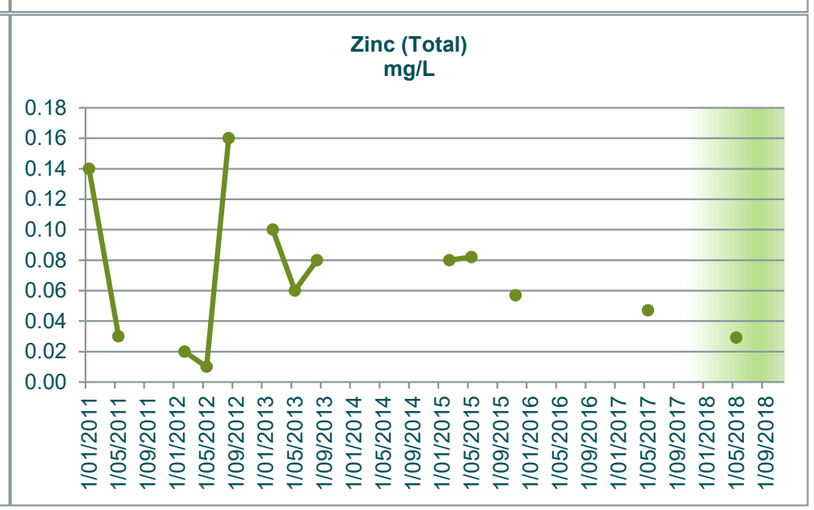
1/09/2017
1/02/2018
1/07/2018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0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
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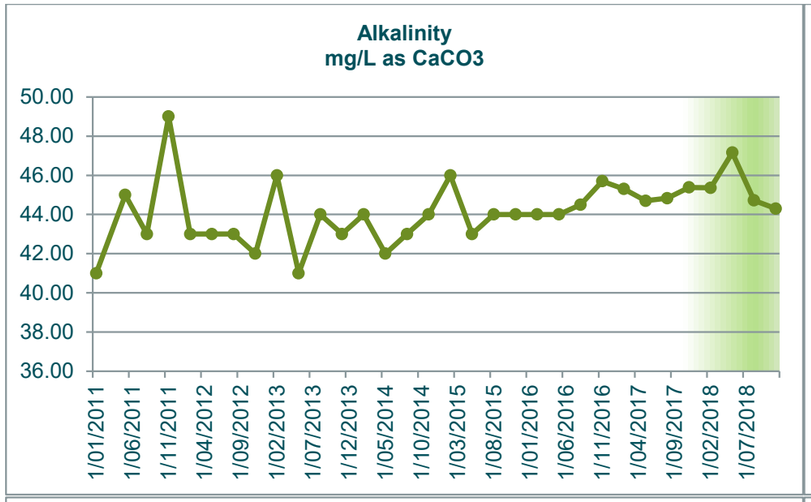
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

GW19	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	41.00	0.08	0.05	0.01	25.00	1.00	0.00	1.00	42.00	0.01	0.01	0.01	292.00	0.01	2.00	0.18	0.25	0.01	0.70	0.02	0.01	0.39	0.05	0.39	0.37	6.50	0.07	5.00	69.00	46.00	29.00	21.60	0.05	8.40	29.00	0.01
10/05/2011	45.00	0.14	0.05	0.01	27.00	1.20	0.00	1.10	65.00	0.01	0.01	0.01	365.00	0.02	2.40	0.16	0.23	0.01	1.10	0.01	0.01	0.48	0.05	0.48	0.53	6.00	0.06	5.00	126.00	60.00	31.00	21.10	0.05	1.00	27.00	0.01
9/08/2011	43.00	0.15	0.05	0.01	26.00	1.00	0.00	1.30	42.00	0.01	0.01	0.01	350.00	0.01	3.70	0.15	0.19	0.01	1.20	0.01	0.01	0.54	0.05	0.54	0.54	6.50	0.06	5.00	164.00	57.00	30.00	20.90	0.05	1.00	35.00	0.01
8/11/2011	49.00	0.30	0.02	0.01	30.00	1.00	0.00	1.60	50.00	0.01	0.01	0.01	311.40	0.01	4.90	0.20	0.42	0.01	1.40	0.01	0.01	0.51	0.02	0.51	0.51	6.40	0.06	6.00	111.20	45.00	39.00	21.10	0.05	1.20	26.00	0.02
6/02/2012	43.00	0.16	0.03	0.01	26.00	1.00	0.00	1.30	42.00	0.01	0.01	0.01	311.00	0.01	1.80	0.10	0.24	0.01	1.10	0.01	0.01	0.47	0.02	0.47	0.50	6.10	0.05	5.00	138.00	71.00	38.00	21.70	0.05	0.10	36.00	0.01
8/05/2012	43.00	0.61	0.03	0.01	26.00	1.80	0.00	1.30	42.00	0.01	0.01	0.01	325.00	0.01	4.90	0.13	48.00	0.01	1.10	0.14	0.01	0.49	0.02	0.49	0.51	7.50	0.07	5.00	102.00	62.00	30.00	21.90	0.05	0.80	30.00	0.02
6/08/2012	43.00	0.15	0.03	0.01	26.00	2.10	0.00	1.40	40.00	0.01	0.01	0.01	339.00	0.01	4.30	0.14	0.37	0.01	1.00	0.05	0.01	0.52	0.02	0.52	0.47	6.00	0.06	5.00	84.00	46.00	29.00	20.80	0.05	0.70	34.00	0.02
13/11/2012	42.00	0.29	0.02	0.01	26.00	1.00	0.00	1.20	42.00	0.01	0.01	0.01	324.00	0.01	2.60	0.16	0.44	0.01	1.00	0.01	0.01	0.48	0.02	0.48	0.48	6.30	0.07	5.00	88.00	54.00	27.00	21.30	0.05	0.20	36.00	0.02
13/02/2013	46.00	0.46	0.02	0.01	28.00	1.00	0.00	1.30	44.00	0.01	0.01	0.01	353.00	0.01	1.50	0.10	0.58	0.01	1.00	0.01	0.01	0.42	0.02	0.42	0.39	6.10	0.06	5.00	78.00	59.00	31.00	23.30	0.05	0.20	27.00	0.03
14/05/2013	41.00	0.11	0.03	0.01	25.00	1.00	0.00	1.00	40.00	0.01	0.01	0.01	321.00	0.01	3.50	0.05	0.30	0.01	0.60	0.01	0.01	0.47	0.02	0.47	0.42	6.30	0.06	5.00	28.00	56.00	30.00	22.00	0.05	0.40	46.00	0.01
6/08/2013	44.00	0.11	0.02	0.01	27.00	1.00	0.00	1.00	42.00	0.01	0.01	0.01	331.00	0.01	3.60	0.15	0.26	0.01	0.60	0.01	0.01	0.45	0.02	0.45	0.49	6.30	0.06	5.00	43.00	61.00	34.00	20.90	0.05	0.40	57.00	0.03
12/11/2013	43.00	0.31	0.02	0.01	26.00	1.00	0.00	1.20	44.00	0.01	0.01	0.01	325.00	0.01	3.90	0.16	0.46	0.01	0.80	0.02	0.01	0.48	0.02	0.48	0.51	6.60	0.07	5.00	68.00	65.00	34.00	21.20	0.05	0.30	17.00	0.07
11/02/2014	44.00	0.17	0.07	0.01	27.00	1.00	0.00	1.00	43.00	0.01	0.01	0.01	309.00	0.01	1.30	0.10	0.24	0.01	0.70	0.01	0.01	0.54	0.02	0.54	0.69	6.50	0.06	5.00	48.00	61.00	33.00	21.80	0.15	0.50	105.00	0.03
13/05/2014	42.00	0.20	0.03	0.01	26.00	1.00	0.00	0.90	45.00	0.01	0.01	0.01	326.00	0.01	2.30	0.17	0.26	0.01	0.60	0.01	0.01	0.55	0.02	0.55	0.58	6.20	0.07	5.00	18.00	59.00	30.00	22.20	0.05	0.40	35.00	0.01
12/08/2014	43.00	0.08	0.02	0.01	26.00	1.80	0.00	1.10	43.00	0.01	0.01	0.01	316.00	0.01	5.80	0.18	0.14	0.01	0.70	0.01	0.01	0.42	0.02	0.42	0.42	7.00	0.06	5.00	26.00	63.00	32.00	21.20	0.05	0.20	42.00	0.01
10/11/2014	44.00	0.09	0.03	0.01	27.00	1.00	0.00	1.00	45.00	0.01	0.01	0.01	314.00	0.01	3.80	0.16	0.14	0.01	0.80	0.01	0.01	0.39	0.02	0.39	0.42	6.80	0.05	5.00	38.00	64.00	35.00	21.70	0.05	0.20	76.00	0.01
9/02/2015	46.00	0.14	0.02	0.01	28.00	1.00	0.00	1.00	44.00	0.01	0.01	0.01	321.00	0.01	2.10	0.18	0.19	0.01	0.80	0.01	0.01	0.35	0.02	0.35	0.37	6.60	0.09	5.00	31.00	59.00	34.00	23.60	0.05	0.20	39.00	0.01
11/05/2015	43.00	0.08	0.02	0.00	26.00	1.00	0.00	1.10	41.00	0.00	0.01	0.01	315.00	0.00	3.10	0.17	0.15	0.00	0.90	0.01	0.00	0.40	0.02	0.40	0.40	6.40	0.08	5.00	47.00	61.00	30.00	22.30	0.05	0.90	42.00	0.01
11/08/2015	44.00	0.04	0.02	0.00	44.00	1.00	0.00	1.10	40.00	0.00	0.01	0.01	304.00	0.00	7.50	0.17	0.10	0.00	0.80	0.01	0.00	0.45	0.02	0.45	0.45	6.70	0.07	5.00	64.00	61.00	29.00	21.10	0.05	0.60	21.00	0.01
10/11/2015	44.00	0.06	0.02	0.00	44.00	1.00	0.00	1.00	44.00	0.00	0.01	0.01	252.00	0.00	4.80	0.17	0.11	0.00	0.80	0.01	0.00	0.46	0.02	0.46	0.44	6.50	0.08	5.00	-11.00	58.00	31.00	21.40	0.05	0.20	31.00	0.01
8/02/2016	44.00	0.05	0.02	0.00	44.00	1.00	0.00	1.06	41.00	0.00	0.01	0.01	306.00	0.00	3.00	0.25	0.12	0.00	0.79	0.01	0.00	0.47	0.02	0.47	0.54	6.70	0.08	5.00	99.00	59.98	29.76	22.60	0.07	0.57	50.00	0.01
9/05/2016	44.00	0.05	0.02	0.00	44.00	1.00	0.00	0.97	42.00	0.00	0.01	0.01	311.00	0.00	3.40	0.17	0.09	0.00	0.71	0.01	0.00	0.48	0.02	0.48	0.52	6.30	0.09	5.00	69.00	56.84	29.32	22.40	0.05	1.01	44.00	0.02
9/08/2016	44.50		0.02		44.00	1.00		1.10	41.00				304.40		7.00	0.17			0.77			0.49	0.02	0.49	0.57	6.40	0.09	5.00	139.00	60.02	31.62	20.80	0.08	0.20	31.50	
7/11/2016	45.70		0.02		46.00	1.00		1.08	42.00				302.20		5.10	0.18			0.78			0.43	0.02	0.43	0.45	6.40	0.08	5.00	285.00	63.11	30.69	21.60	0.05	0.36	31.60	
7/02/2017	45.30		0.02		45.00	1.00		0.99	42.00				304.80		3.30	0.28			0.74			0.44	0.02	0.44	0.44	6.10	0.08	5.00	266.70	57.25	28.62	22.70	0.05	0.40	59.70	
8/05/2017	44.70	0.05	0.02	0.00	45.00	1.00	0.00	1.17	42.00	0.00	0.01	0.01	308.10	0.00	3.60	0.16	0.07	0.00	0.88	0.01	0.00	0.37	0.02	0.37	0.38	6.20	0.06	5.00	321.40	57.85	33.37	22.20	0.05	0.38	30.90	0.01
8/08/2017	44.83		0.02		45.00	1.00		1.03	35.00				305.70		6.60	0.16			0.80			0.46	0.02	0.46	0.49	6.20	0.10	5.00	330.90	57.04	30.41	21.30	0.05	0.79	24.00	
7/11/2017	45.38		0.02		45.00	1.00		1.15	41.50				312.20		5.10	0.16			0.79			0.53	0.02	0.53	0.70	5.90	0.11	5.00	355.40	59.17	31.43	21.30	0.17	0.58	23.80	
13/02/2018	45.36		0.02		45.00	1.00		1.26	42.00				313.40		4.00	0.19			0.78			0.73	0.02	0.73	0.88	6.40	0.12	5.00	122.80	59.91	33.84	24.80	0.15	1.56	21.40	
8/05/2018	47.16	0.37	0.03	0.00	47.00	1.50	0.00	1.02	1050.00	0.00	0.01	0.01	306.10	0.00	5.20	0.21	0.69	0.00	0.72	0.02	0.00	0.57	0.02	0.57	0.76	6.50	0.13	1.07	307.30	59.87	32.58	22.60	0.19	0.63	20.10	0.04
14/08/2018	44.72		0.02		45.00	3.30		1.20	45.00				303.10		7.80	0.14			0.77			0.65	0.02	0.65	0.96	6.70	0.17	1.25	293.10	63.41	35.24	20.10	0.31	2.60	11.50	
13/11/2018	44.30		0.02		44.00	6.90		1.01	42.00				300.00		6.30	0.17			0.69			0.59	0.02	0.59	0.66	6.50	0.11	1.02	79.00	59.83	34.75	21.30	0.07	0.51	19.00	
2018 Min	**44.30**	**0.37**	**0.02**	**0.00**	**44.00**	**1.00**	**0.00**	**1.01**	**42.00**	**0.00**	**0.01**	**0.01**	**300.00**	**0.00**	**4.00**	**0.14**	**0.69**	**0.00**	**0.69**	**0.02**	**0.00**	**0.57**	**0.02**	**0.57**	**0.66**	**6.40**	**0.11**	**1.02**	**79.00**	**59.83**	**32.58**	**20.10**	**0.07**	**0.51**	**11.50**	**0.04**
2018 Max	**47.16**	**0.37**	**0.03**	**0.00**	**47.00**	**6.90**	**0.00**	**1.26**	**1050.00**	**0.00**	**0.01**	**0.01**	**313.40**	**0.00**	**7.80**	**0.21**	**0.69**	**0.00**	**0.78**	**0.02**	**0.00**	**0.73**	**0.02**	**0.73**	**0.96**	**6.70**	**0.17**	**5.00**	**307.30**	**63.41**	**35.24**	**24.80**	**0.31**	**2.60**	**21.40**	**0.04**
2018 Mean	**45.39**	**0.37**	**0.02**	**0.00**	**45.25**	**3.18**	**0.00**	**1.12**	**294.75**	**0.00**	**0.01**	**0.01**	**305.65**	**0.00**	**5.83**	**0.18**	**0.69**	**0.00**	**0.74**	**0.02**	**0.00**	**0.64**	**0.02**	**0.64**	**0.82**	**6.53**	**0.13**	**2.08**	**200.55**	**60.76**	**34.10**	**22.20**	**0.18**	**1.32**	**18.00**	**0.04**
Long-term Average	**44.15**	**0.18**	**0.03**	**0.00**	**34.53**	**1.36**	**0.00**	**1.12**	**74.55**	**0.01**	**0.01**	**0.01**	**315.04**	**0.01**	**4.07**	**0.16**	**2.25**	**0.01**	**0.84**	**0.02**	**0.01**	**0.48**	**0.02**	**0.48**	**0.53**	**6.43**	**0.08**	**4.67**	**125.90**	**58.82**	**31.80**	**21.78**	**0.07**	**0.86**	**36.20**	**0.02**


Alkalinity
mg/L as CaCO3
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48.00
46.00
44.00
42.00
40.00
38.00
36.00
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1/11/2011
1/04/2012
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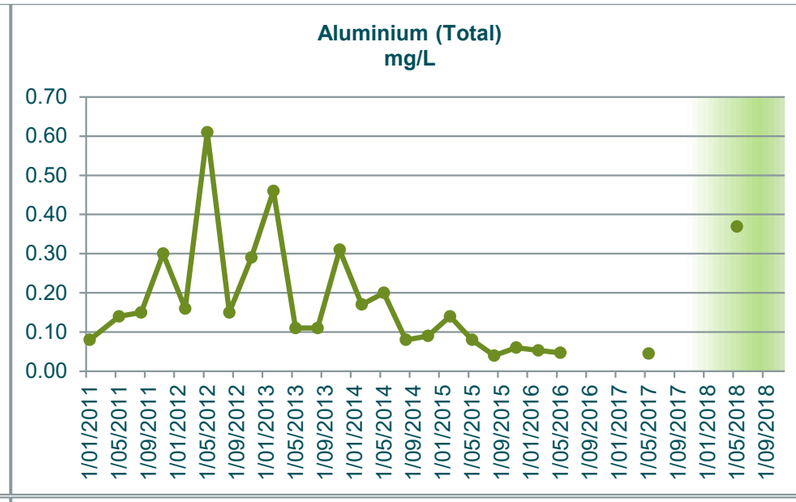
Aluminium (Total)
mg/L
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
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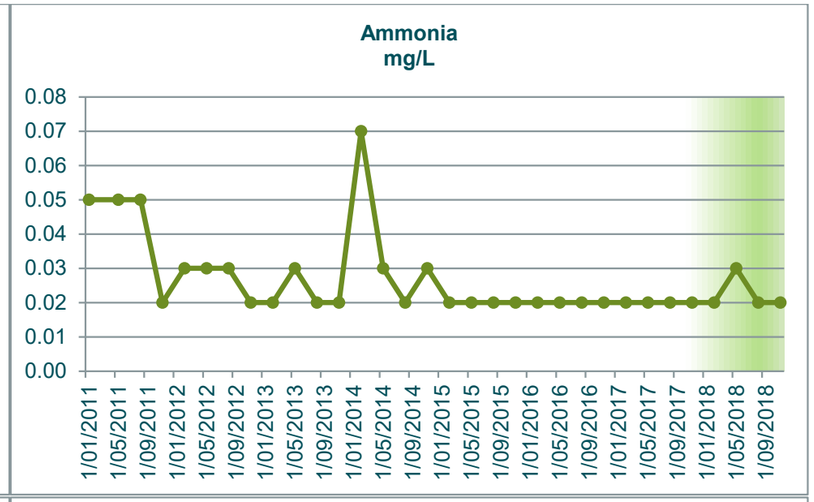
1/09/2018


Ammonia
mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
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1/09/2011
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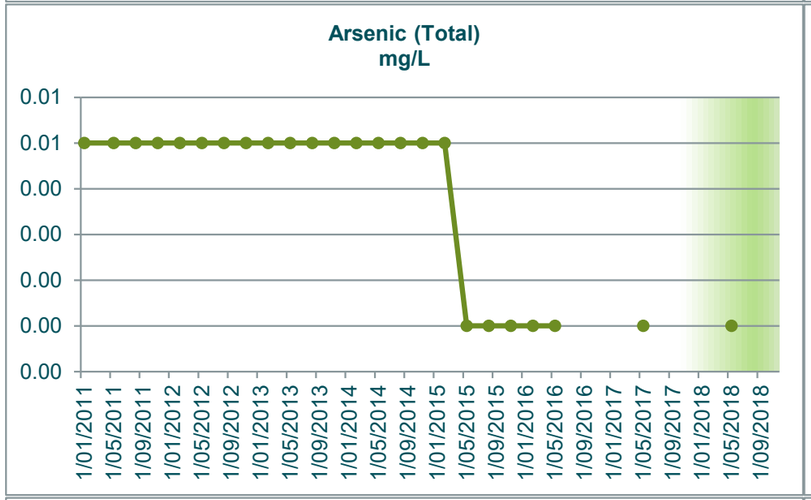
Arsenic (Total)
mg/L
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0.00
0.00
0.00
0.00
1/01/2011
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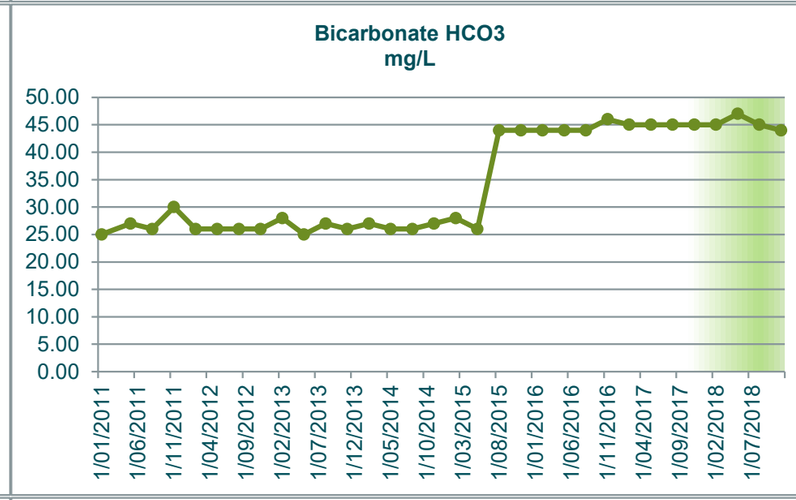
Bicarbonate HCO3
mg/L
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
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1/03/2015
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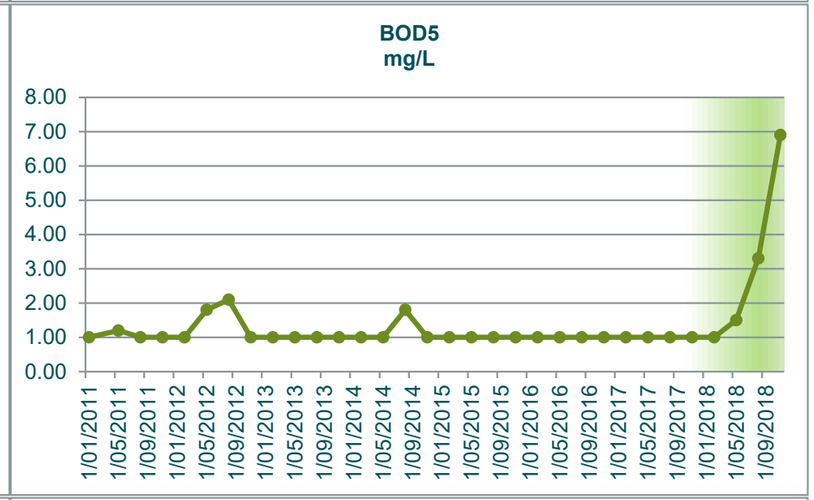
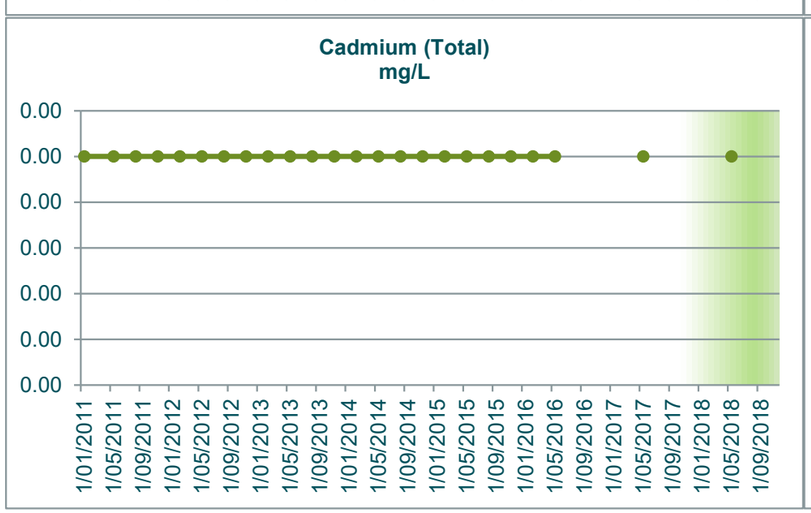
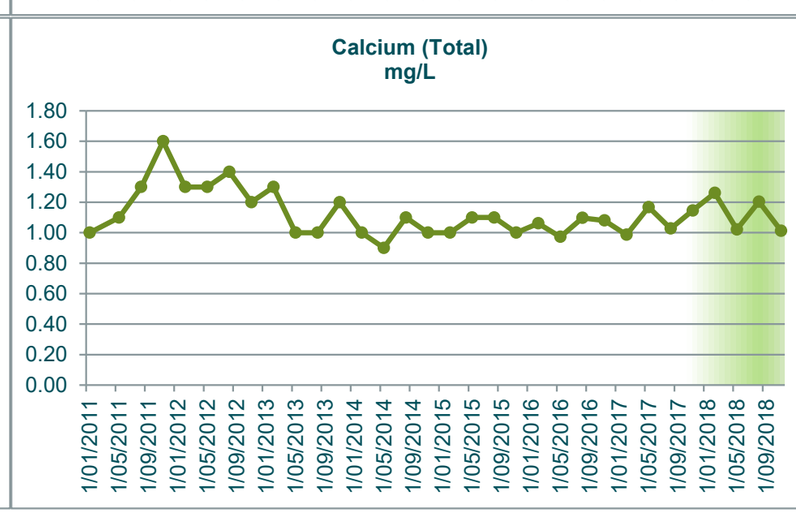
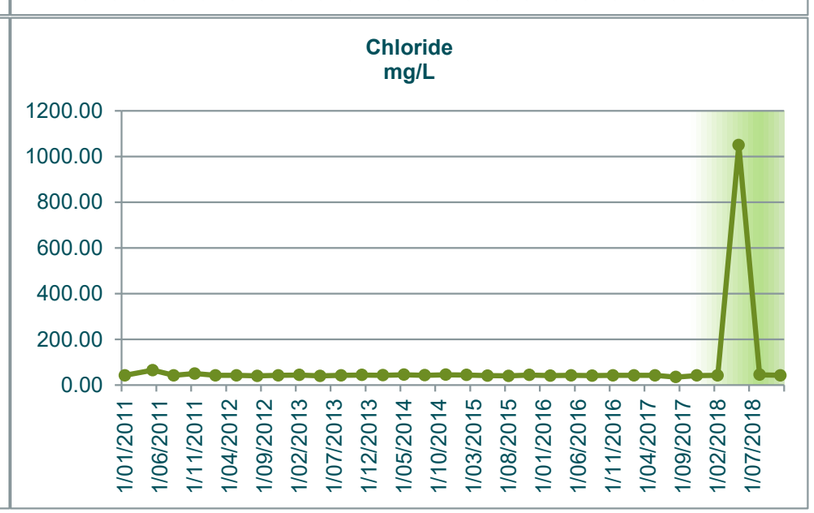
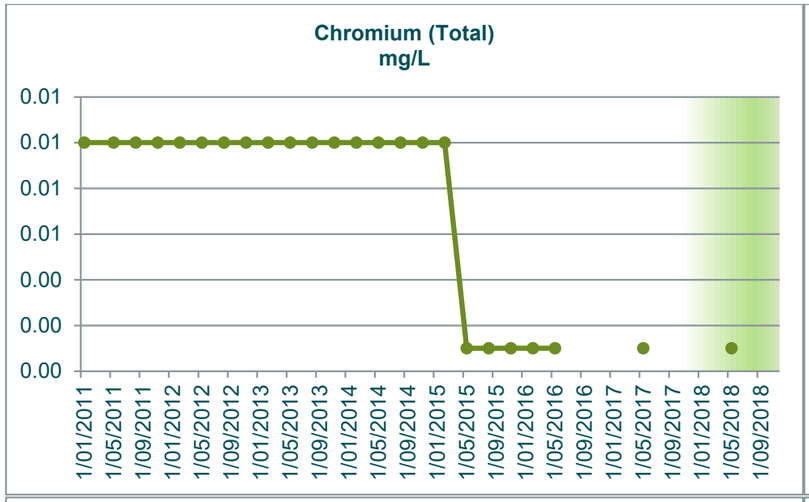
1/02/2018
1/07/2018

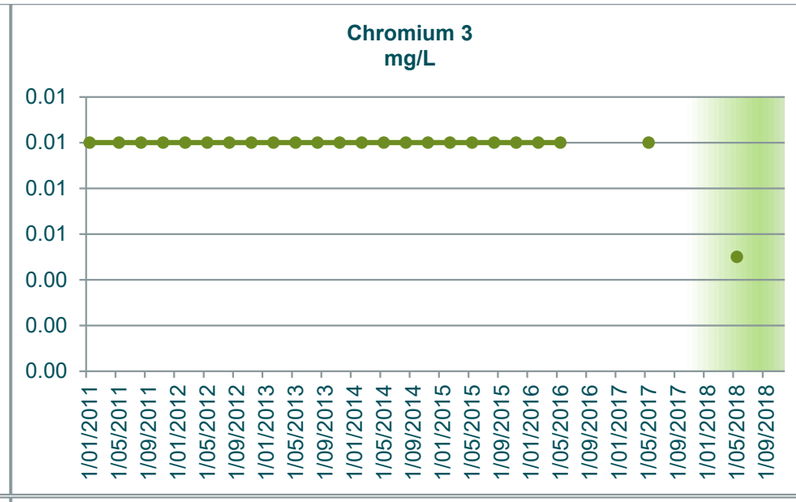

BOD5
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

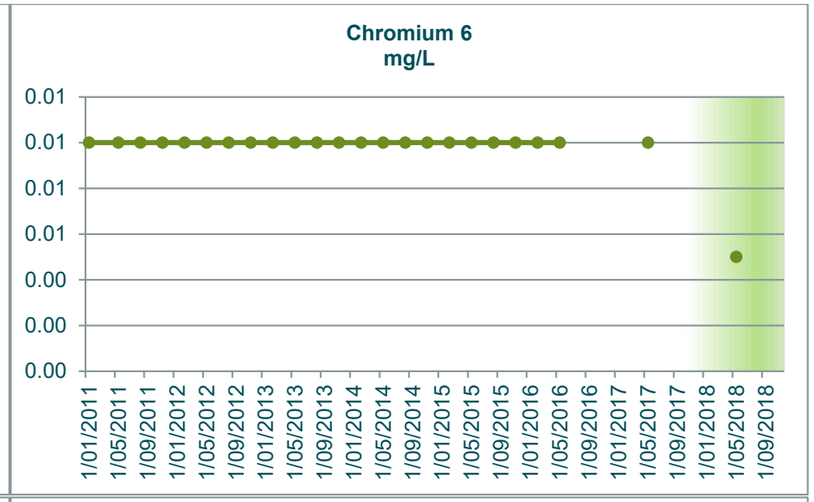

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

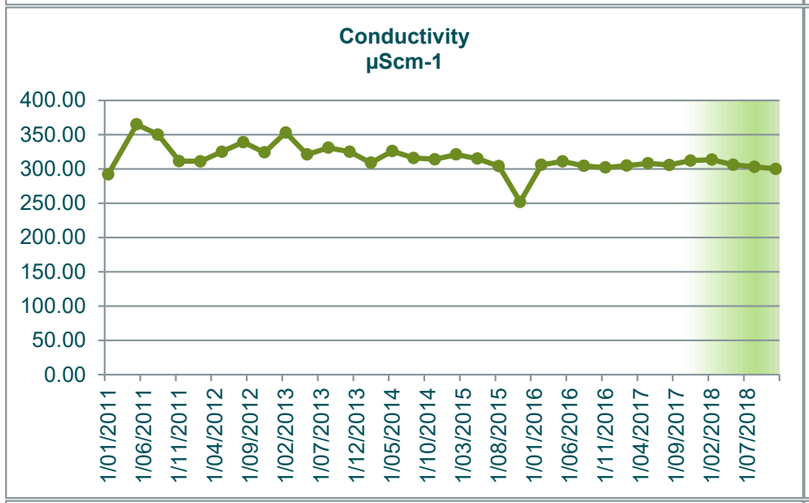

Calcium (Total)
mg/L
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

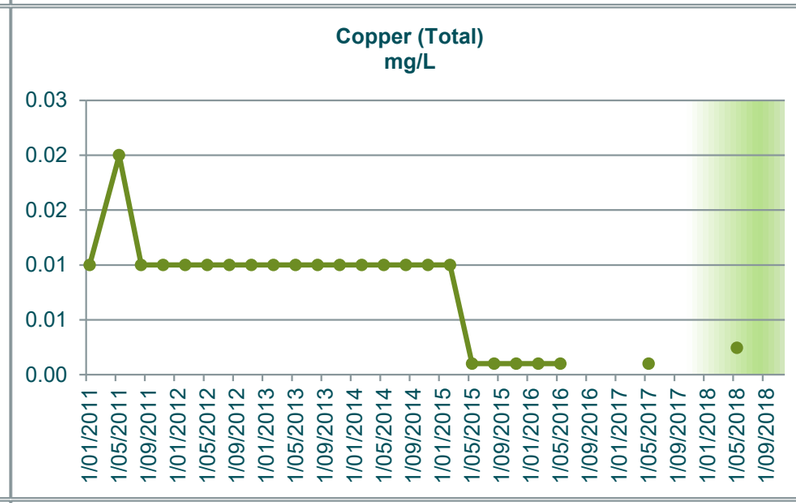

Chloride
mg/L
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

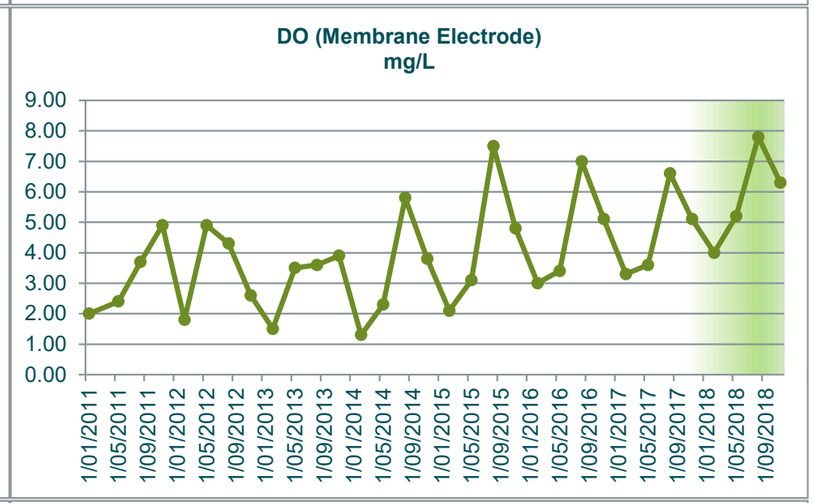

Chromium (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

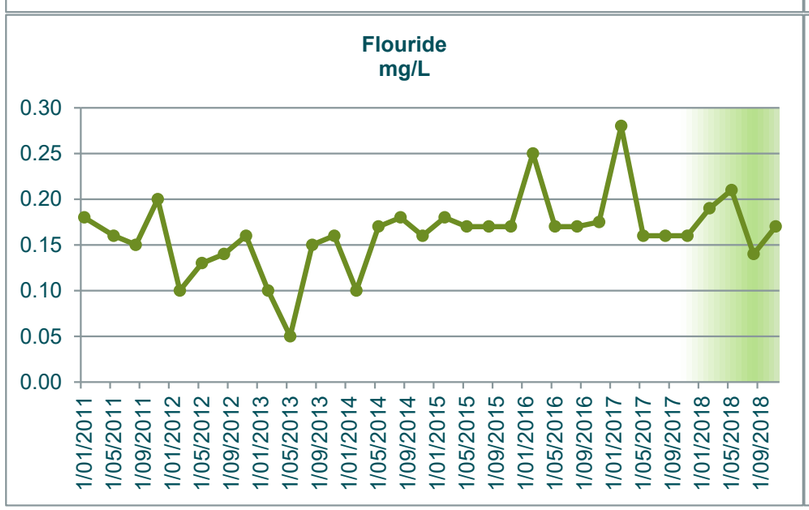

Chromium 3
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

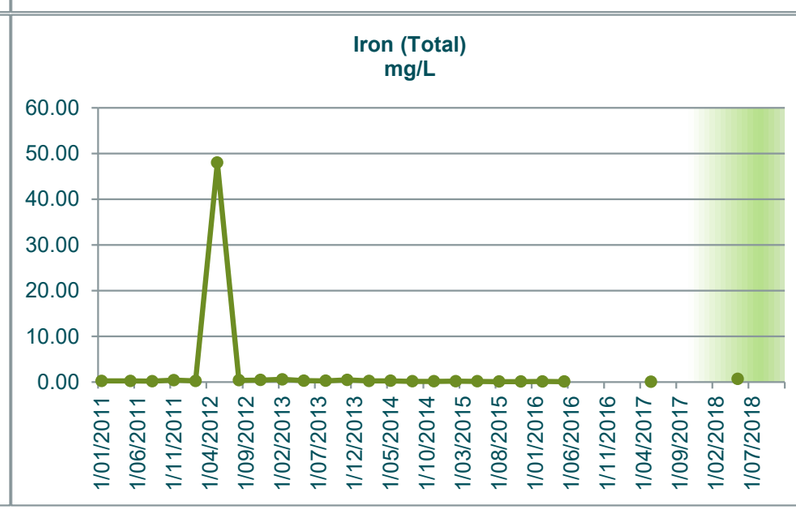

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

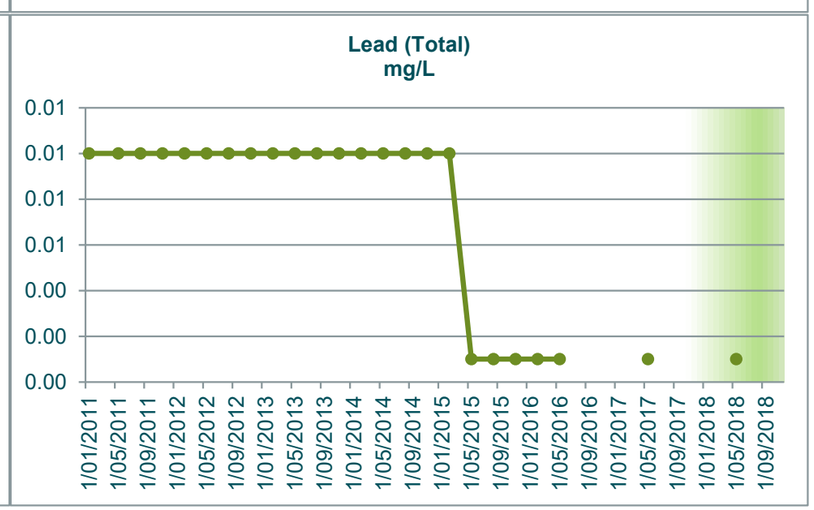

Conductivity
µScm-1
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

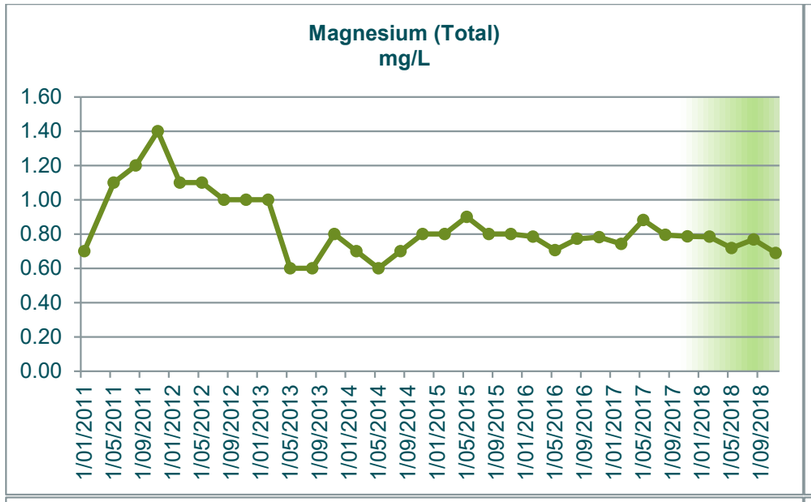

Copper (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

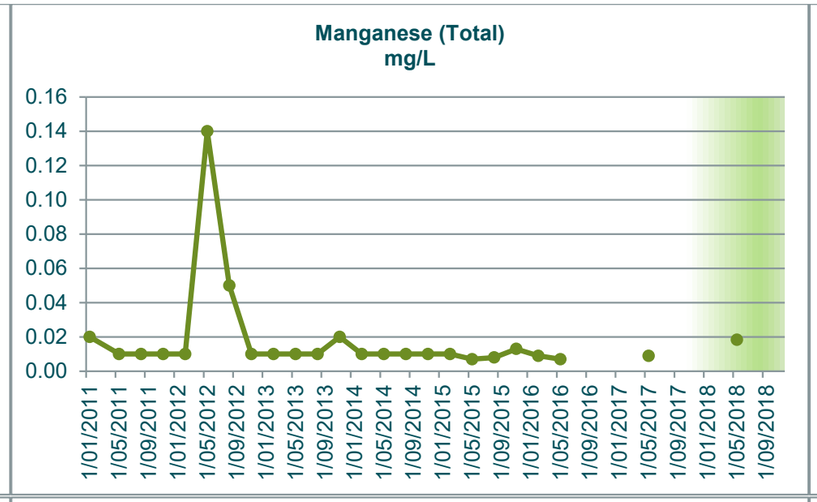

DO (Membrane Electrode)
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

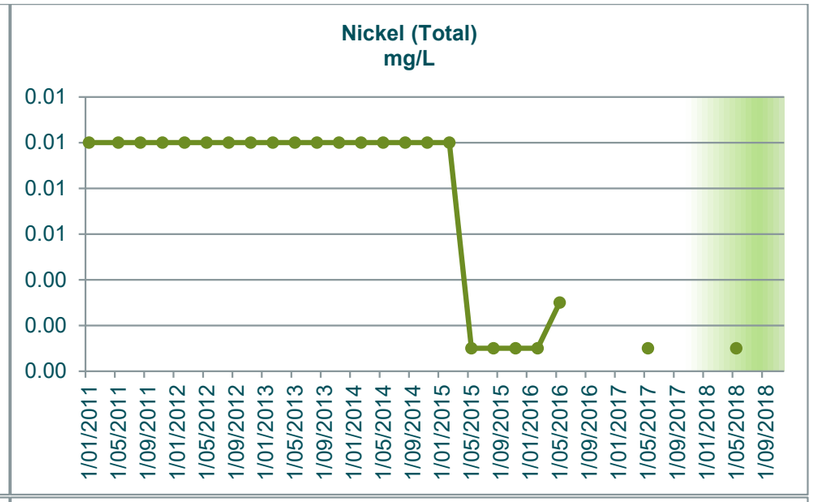

Flouride
mg/L
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

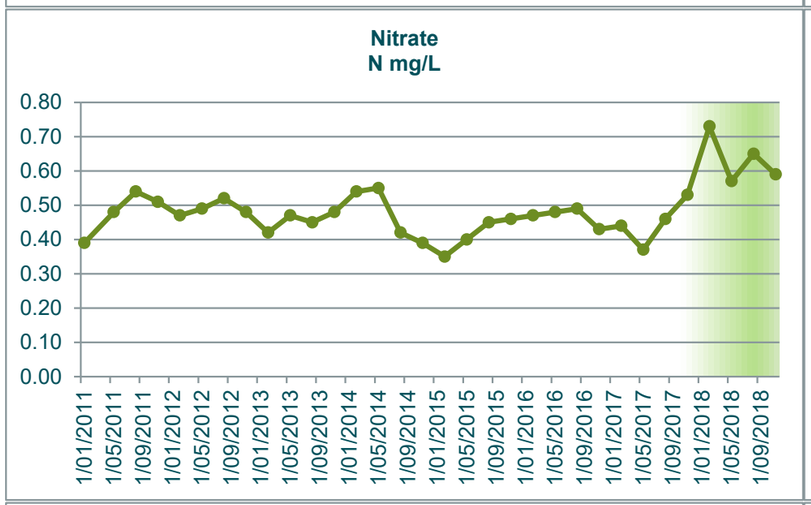

Iron (Total)
mg/L
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

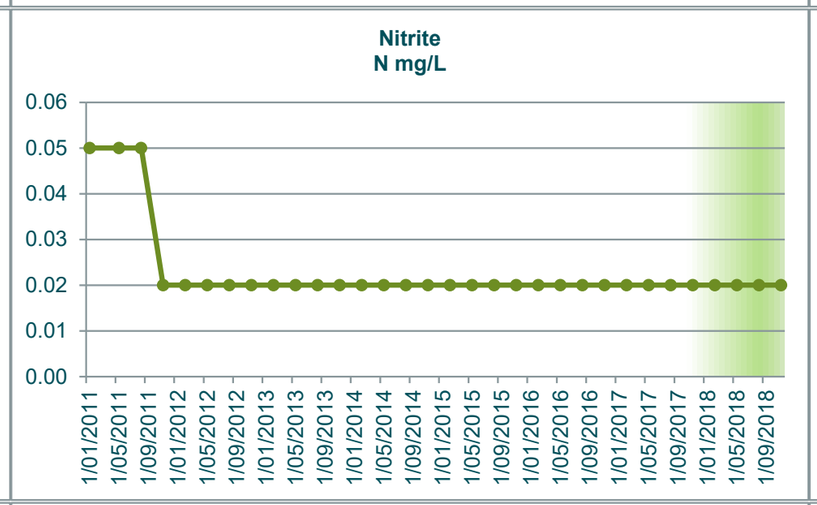

Lead (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

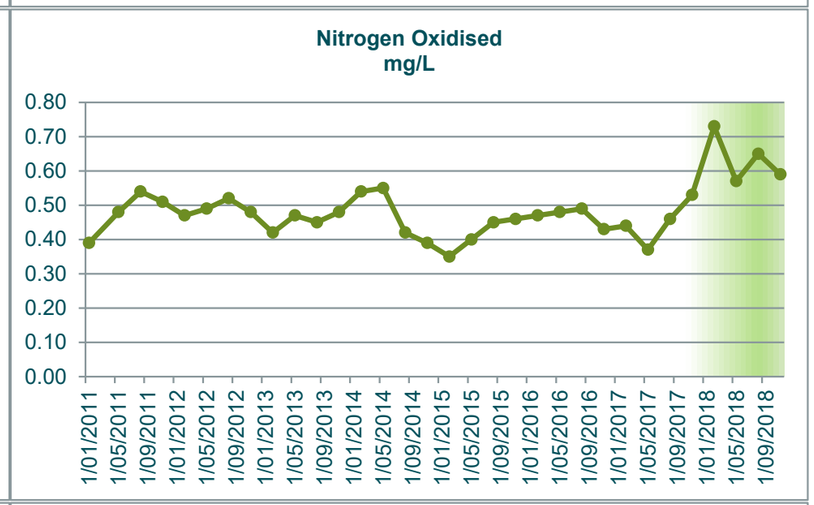

Magnesium (Total)
mg/L
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

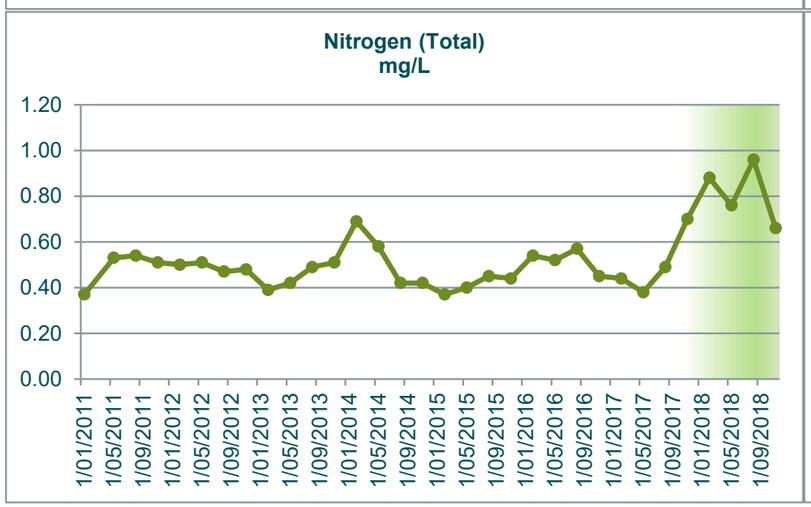

Manganese (Total)
mg/L
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

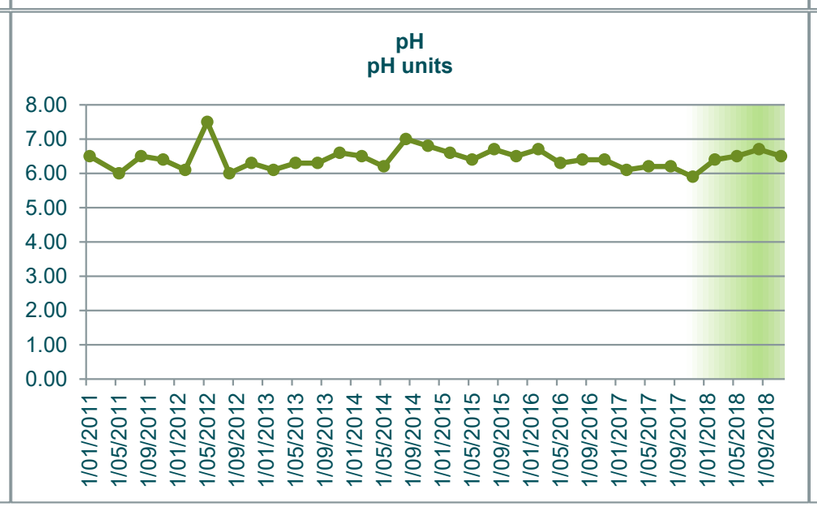

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

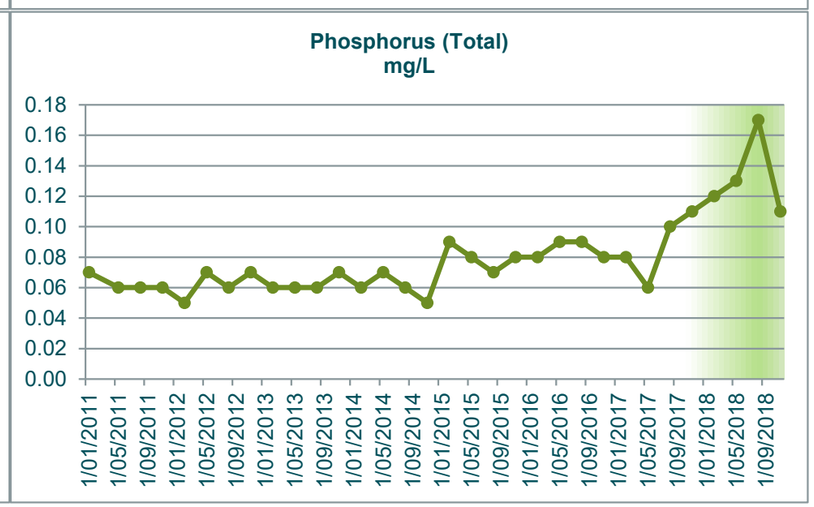

Nitrate
N mg/L
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

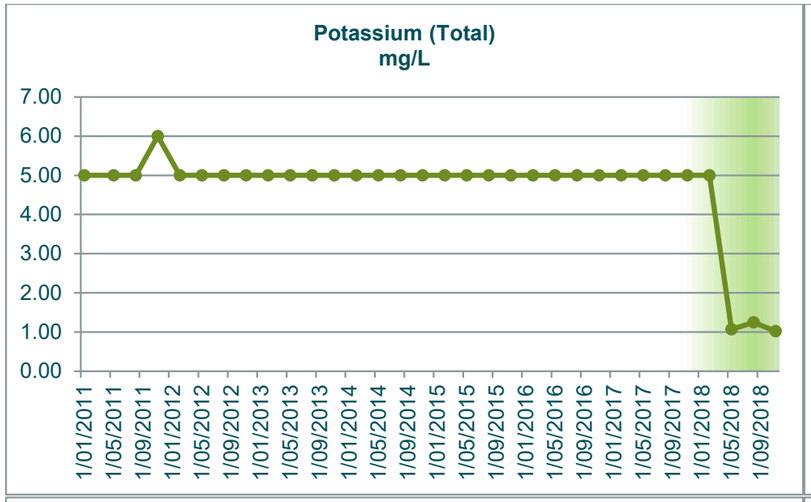

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

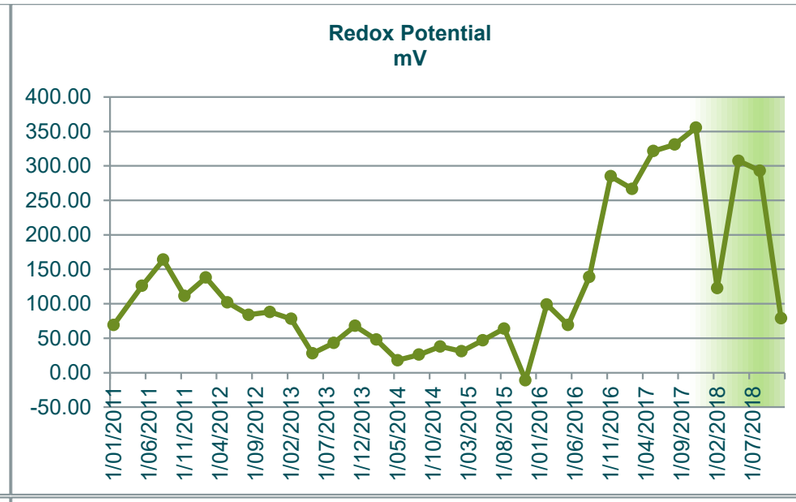

Nitrogen Oxidised
mg/L
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

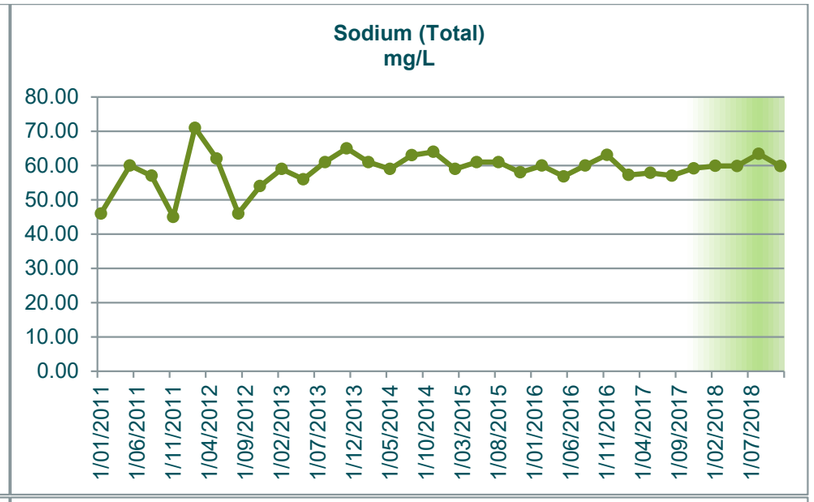

Nitrogen (Total)
mg/L
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


pH
pH units
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Phosphorus (Total)
mg/L
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Potassium (Total)
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Redox Potential
mV
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Sodium (Total)
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
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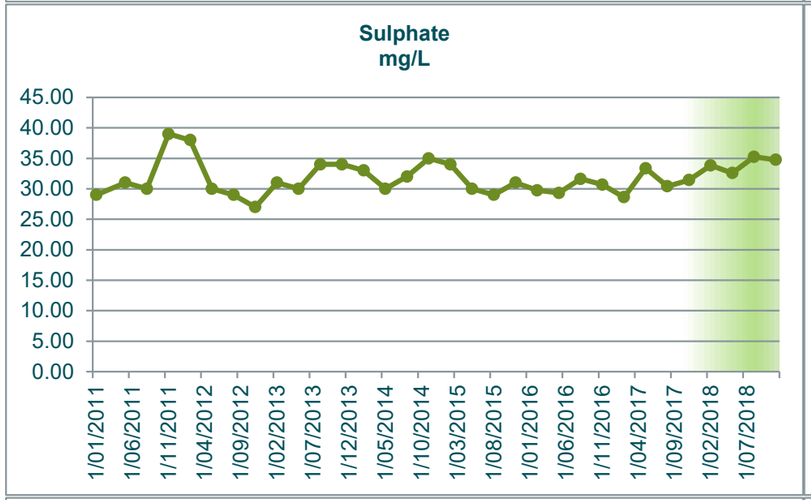
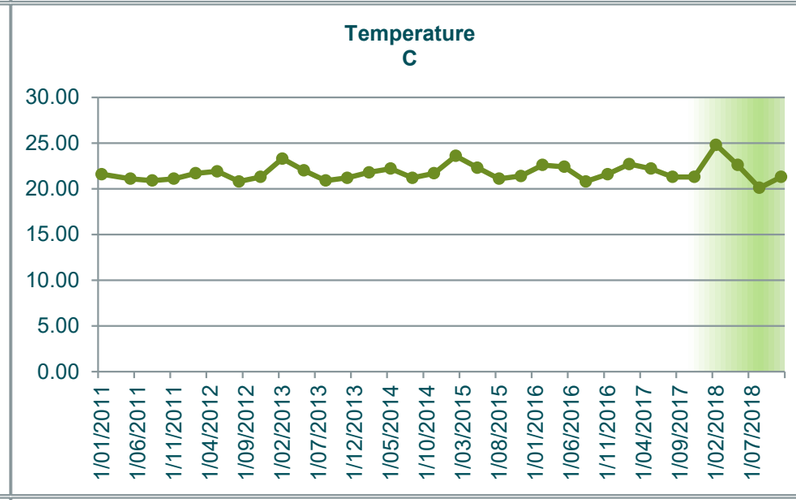
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Sulphate
mg/L
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
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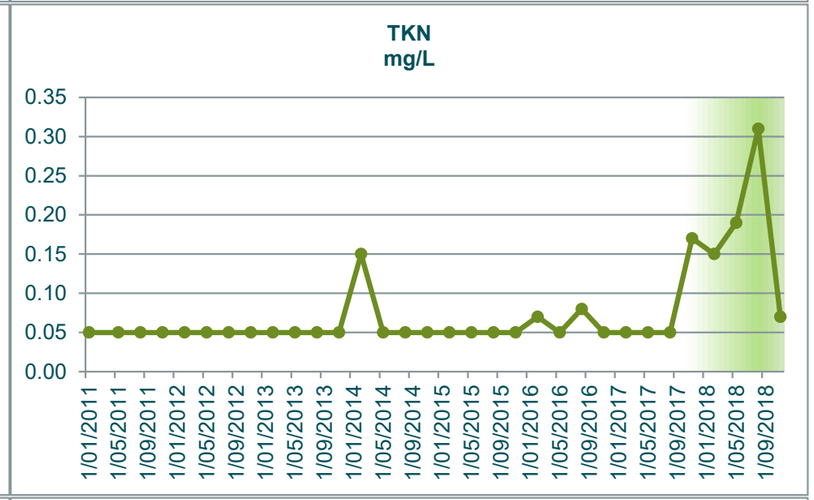
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


TKN
mg/L
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
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1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
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1/09/2015
1/01/2016
1/05/2016
1/09/2016
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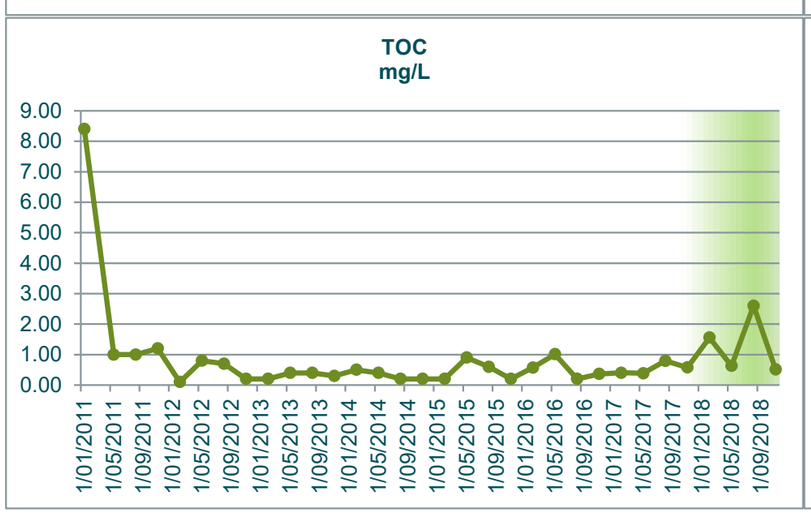
1/09/2017
1/01/2018
1/05/2018
1/09/2018


TOC
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
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1/09/2014
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1/09/2015
1/01/2016
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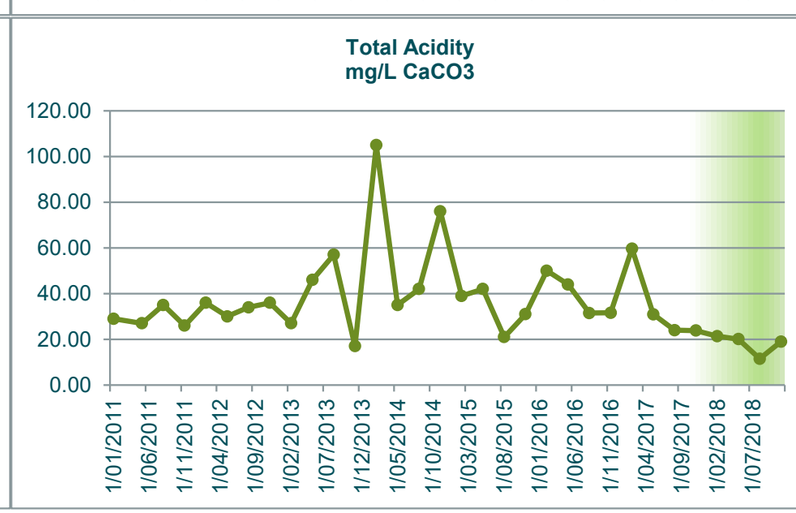
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Total Acidity
mg/L CaCO3
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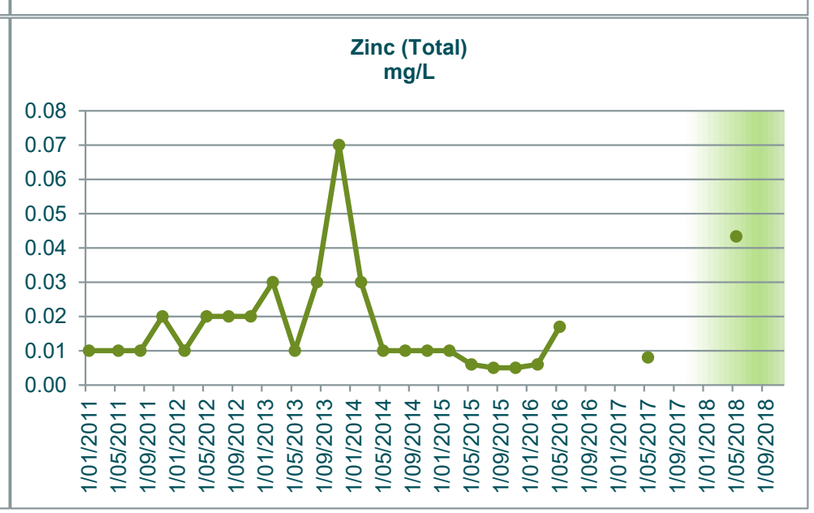
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Zinc (Total)
mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
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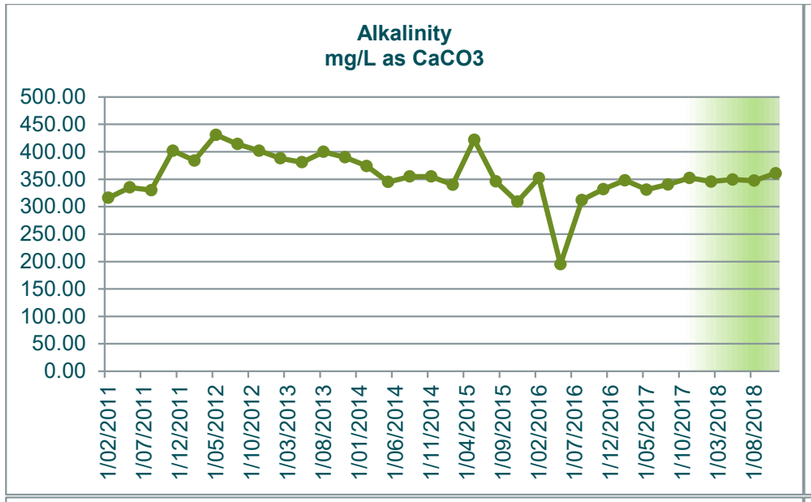
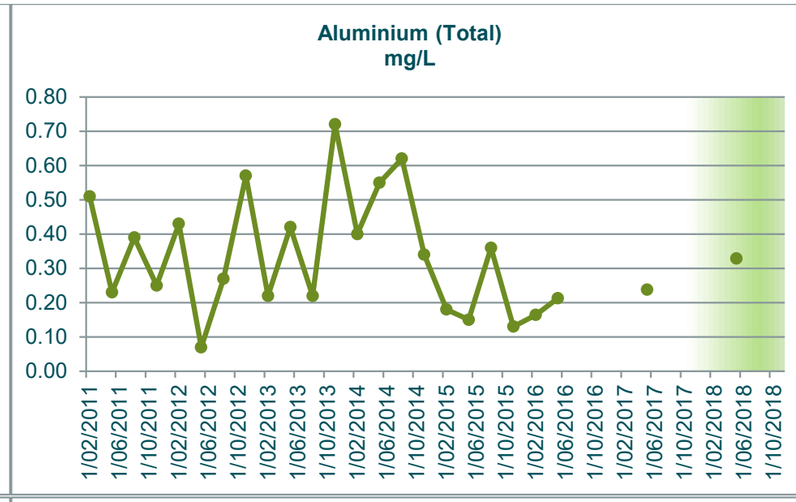
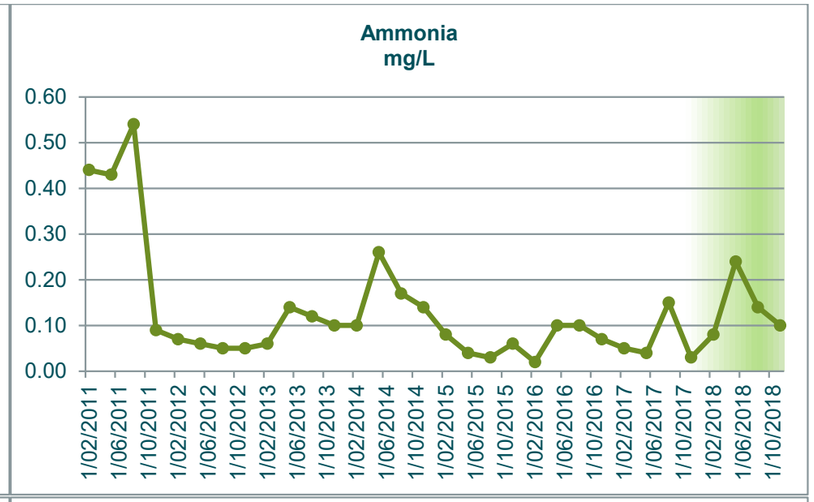
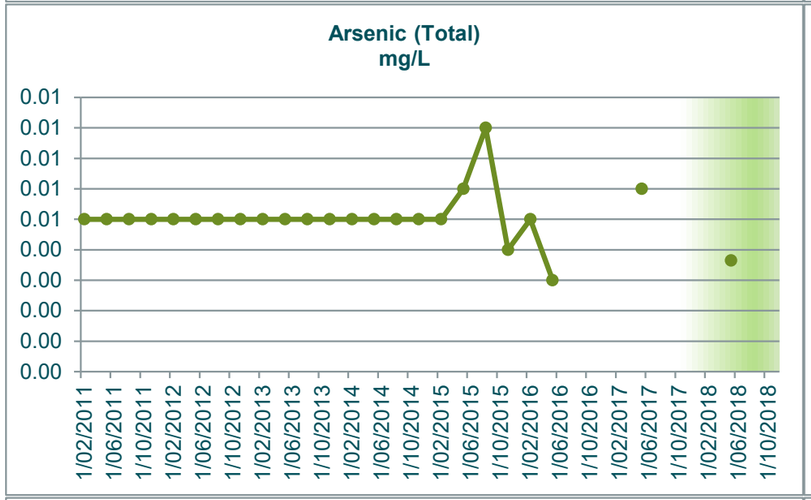
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

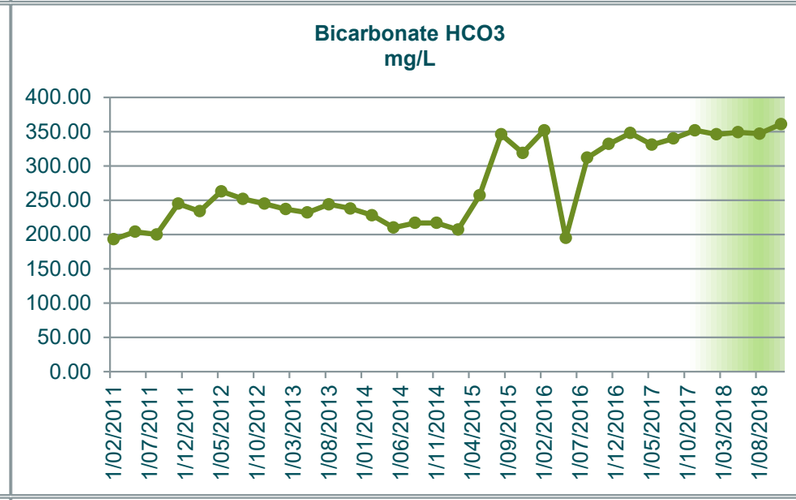
GW20	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
1/02/2011	316.00	0.51	0.44	0.01	193.00	2.40	0.00	86.00	100.00	0.01	0.01	0.01	1045.00	0.01	2.40	0.10	0.99	0.01	13.00	0.56	0.01	0.05	0.05	0.05	0.57	7.60	0.05	5.00	-95.00	74.00	91.00	21.80	0.57	6.80	89.00	0.04
11/05/2011	335.00	0.23	0.43	0.01	204.00	2.20	0.00	103.00	100.00	0.01	0.01	0.01	1201.00	0.01	2.60	0.10	0.89	0.01	18.00	0.70	0.01	0.05	0.05	0.05	0.72	7.20	0.05	10.00	52.00	99.00	102.00	20.20	0.72	3.60	23.00	0.04
10/08/2011	330.00	0.39	0.54	0.01	200.00	4.50	0.00	94.00	125.00	0.01	0.01	0.01	1123.00	0.01	2.60	0.11	1.03	0.01	17.00	0.64	0.01	0.05	0.05	0.05	0.86	7.20	0.05	6.00	48.00	110.00	92.00	20.40	0.86	8.10	22.00	0.04
9/11/2011	402.00	0.25	0.09	0.01	245.00	1.00	0.00	152.00	101.00	0.01	0.01	0.01	1092.00	0.01	0.90	0.18	1.12	0.01	18.00	1.14	0.01	0.02	0.02	0.02	0.16	7.00	0.03	34.00	-10.00	154.00	102.00	21.60	0.14	5.90	42.00	0.02
7/02/2012	384.00	0.43	0.07	0.01	234.00	1.00	0.00	95.00	70.00	0.01	0.01	0.01	1038.00	0.01	1.60	0.20	1.05	0.01	14.00	0.90	0.01	0.02	0.02	0.05	0.14	7.00	0.03	5.00	59.00	147.00	75.00	22.40	0.14	4.70	45.00	0.01
9/05/2012	431.00	0.07	0.06	0.01	263.00	1.00	0.00	79.00	60.00	0.01	0.01	0.01	1040.00	0.01	3.20	0.18	0.79	0.01	12.00	0.88	0.01	0.02	0.02	0.05	0.08	6.80	0.02	5.00	227.00	100.00	48.00	21.00	0.08	1.90	34.00	0.02
7/08/2012	414.00	0.27	0.05	0.01	252.00	2.40	0.00	76.00	62.00	0.01	0.01	0.01	981.00	0.01	2.30	0.26	1.12	0.01	11.00	0.87	0.01	0.02	0.02	0.02	0.23	7.00	0.02	5.00	-83.00	95.00	36.00	20.10	0.21	4.60	38.00	0.05
14/11/2012	402.00	0.57	0.05	0.01	245.00	1.20	0.00	79.00	64.00	0.01	0.01	0.01	934.00	0.01	3.20	0.24	1.48	0.01	13.00	0.84	0.01	0.02	0.02	0.02	0.28	7.10	0.03	5.00	-109.00	95.00	24.00	20.90	0.26	3.70	33.00	0.09
14/02/2013	388.00	0.22	0.06	0.01	237.00	1.00	0.00	84.00	60.00	0.01	0.01	0.01	919.00	0.01	3.30	0.20	1.43	0.01	12.00	0.94	0.01	0.04	0.02	0.04	0.15	7.00	0.02	5.00	-60.00	107.00	22.00	20.70	0.11	3.40	28.00	0.04
15/05/2013	381.00	0.42	0.14	0.01	232.00	2.40	0.00	79.00	63.00	0.01	0.01	0.01	902.00	0.01	2.60	0.33	1.73	0.01	11.00	0.85	0.01	0.08	0.02	0.08	0.56	6.90	0.05	5.00	-81.00	96.00	17.00	20.50	0.48	3.60	66.00	0.09
7/08/2013	400.00	0.22	0.12	0.01	244.00	1.00	0.00	86.00	62.00	0.01	0.01	0.01	884.00	0.01	3.10	0.33	1.36	0.01	12.00	0.98	0.01	0.06	0.02	0.06	0.32	7.10	0.03	5.00	-89.00	102.00	18.00	20.10	0.26	3.20	70.00	0.05
13/11/2013	390.00	0.72	0.10	0.01	238.00	2.10	0.00	88.00	62.00	0.01	0.01	0.01	924.00	0.01	2.90	0.41	2.15	0.01	13.00	1.05	0.01	0.04	0.02	0.04	0.38	7.50	0.05	5.00	-72.00	108.00	14.00	21.00	0.34	3.20	34.00	0.09
12/02/2014	374.00	0.40	0.10	0.01	228.00	2.10	0.00	78.00	66.00	0.01	0.01	0.01	825.00	0.01	3.20	0.35	1.66	0.01	11.00	0.98	0.01	0.05	0.02	0.05	0.52	7.00	0.02	5.00	-73.00	92.00	13.00	21.10	0.47	3.00	85.00	0.07
14/05/2014	345.00	0.55	0.26	0.01	210.00	4.20	0.00	76.00	67.00	0.01	0.01	0.01	882.00	0.01	2.60	0.44	2.11	0.01	11.00	0.94	0.01	0.14	0.02	0.14	0.68	7.00	0.09	5.00	-48.00	87.00	13.00	20.10	0.54	3.00	40.00	0.07
13/08/2014	355.00	0.62	0.17	0.01	217.00	1.80	0.00	89.00	75.00	0.01	0.01	0.01	899.00	0.01	3.30	0.43	1.84	0.01	13.00	1.03	0.01	0.05	0.02	0.05	0.49	7.20	0.07	5.00	-34.00	97.00	14.00	20.00	0.44	2.70	75.00	0.071
11/11/2014	355.00	0.34	0.14	0.01	217.00	1.80	0.00	87.00	81.00	0.01	0.01	0.01	887.00	0.01	3.10	0.43	1.65	0.01	13.00	0.92	0.01	0.03	0.02	0.03	0.35	7.20	0.05	5.00	-68.00	92.00	12.00	20.80	0.32	2.20	44.00	0.04
10/02/2015	340.00	0.18	0.08	0.01	207.00	1.00	0.00	74.00	72.00	0.01	0.01	0.01	886.00	0.01	1.30	0.39	1.45	0.01	11.00	0.97	0.01	0.05	0.02	0.05	0.26	7.10	0.03	5.00	-38.00	78.00	9.20	21.70	0.21	2.10	49.00	0.03
12/05/2015	422.00	0.15	0.04	0.01	257.00	1.00	0.00	92.00	77.00	0.00	0.01	0.01	869.00	0.00	1.20	0.42	1.30	0.00	13.00	0.94	0.00	0.02	0.02	0.02	0.07	6.80	0.03	5.00	-20.00	85.00	11.00	20.60	0.07	1.70	50.00	0.01
12/08/2015	346.00	0.36	0.03	0.01	346.00	1.00	0.00	92.00	74.00	0.00	0.01	0.01	875.00	0.00	1.90	0.48	1.61	0.00	13.00	0.85	0.00	0.02	0.02	0.02	0.13	7.10	0.05	5.00	-28.00	80.00	10.00	20.40	0.13	1.90	40.00	0.06
11/11/2015	309.00	0.13	0.06	0.00	319.00	1.00	0.00	82.00	73.00	0.00	0.01	0.01	838.00	0.00	1.80	0.48	0.94	0.00	12.00	0.69	0.00	0.02	0.02	0.02	0.15	7.10	0.04	5.00	4.00	75.00	10.00	21.40	0.15	1.50	42.00	0.03
9/02/2016	352.00	0.16	0.02	0.01	352.00	1.00	0.00	87.78	78.00	0.00	0.01	0.01	869.00	0.00	1.10	0.42	1.33	0.00	12.42	0.86	0.00	0.02	0.02	0.02	0.09	7.10	0.03	5.00	-43.00	78.64	9.87	21.40	0.09	1.53	55.00	0.01
10/05/2016	195.00	0.21	0.10	0.00	195.00	1.00	0.00	51.53	38.00	0.00	0.01	0.01	521.00	0.00	2.30	0.27	0.77	0.00	6.94	0.47	0.00	0.07	0.02	0.07	0.31	7.20	0.06	5.00	34.00	43.92	6.03	20.70	0.24	1.02	22.00	0.03
10/08/2016	312.00		0.10		312.00	2.70		76.75	65.00				791.30		1.90	0.37			11.19			0.04	0.02	0.04	0.26	7.00	0.05	5.00	-40.00	70.84	11.17	20.70	0.22	1.27	40.40	
8/11/2016	332.00		0.07		332.00	1.00		88.24	76.00				844.10		1.70	0.44			12.26			0.05	0.02	0.05	0.27	7.10	0.04	5.00	39.90	79.84	13.30	21.70	0.22	2.17	49.00	
8/02/2017	348.00		0.05		348.00	1.00		86.11	75.00				882.50		1.30	0.41			12.51			0.02	0.02	0.02	0.17	7.00	0.03	5.00	82.70	77.57	10.80	23.00	0.17	2.14	68.10	
9/05/2017	331.00	0.24	0.04	0.01	331.00	1.00	0.00	90.23	85.00	0.00	0.01	0.01	861.60	0.00	1.00	0.41	1.36	0.00	12.99	0.72	0.00	0.02	0.02	0.02	0.12	7.00	0.04	5.00	-20.00	77.02	14.16	20.40	0.12	1.63	52.70	0.03
9/08/2017	340.44		0.15		340.00	2.10		85.80	90.00				867.20		0.80	0.46			12.41			0.02	0.02	0.02	0.25	6.90	0.04	5.00	-26.70	76.40	5.26	20.30	0.25	2.32	48.60	
8/11/2017	352.31		0.03		352.00	1.00		91.14	72.00				884.20		1.20	0.46			13.01			0.02	0.02	0.02	0.09	6.80	0.03	5.00	-27.10	76.42	6.35	20.10	0.09	1.64	53.50	
14/02/2018	345.62		0.08		346.00	1.00		85.01	70.00				867.70		3.20	0.47			12.38			0.02	0.02	0.02	0.17	7.20	0.04	5.00	-62.70	74.75	4.86	25.20	0.17	2.15	18.40	
9/05/2018	349.39	0.33	0.24	0.00	349.00	1.50	0.00	84.86	71.00	0.00	0.01	0.01	856.00	0.00	3.10	0.53	1.55	0.00	12.35	0.87	0.00	0.04	0.02	0.04	0.53	7.20	0.08	2.21	-67.20	77.02	4.26	20.60	0.49	2.11	25.10	0.04
15/08/2018	347.47		0.14		347.00	3.60		93.16	62.50				854.20		3.20	0.52			12.96			0.06	0.02	0.06	0.47	7.20	0.08	2.35	-21.90	81.75	4.80	20.50	0.41	<0.2	20.20	
14/11/2018	360.92		0.10		361.00	1.50		88.49	63.00				833.00		3.31	0.57			12.41			0.03	0.02	0.03	0.31	7.30	0.05	2.04	-38.00	75.07	5.04	21.30	0.28	2.06	32.40	
2018 Min	**345.62**	**0.33**	**0.08**	**0.00**	**346.00**	**1.00**	**0.00**	**84.86**	**62.50**	**0.00**	**0.01**	**0.01**	**833.00**	**0.00**	**3.10**	**0.47**	**1.55**	**0.00**	**12.35**	**0.87**	**0.00**	**0.02**	**0.02**	**0.02**	**0.17**	**7.20**	**0.04**	**2.04**	**-67.20**	**74.75**	**4.26**	**20.50**	**0.17**	**2.06**	**18.40**	**0.04**
2018 Max	**360.92**	**0.33**	**0.24**	**0.00**	**361.00**	**3.60**	**0.00**	**93.16**	**71.00**	**0.00**	**0.01**	**0.01**	**867.70**	**0.00**	**3.31**	**0.57**	**1.55**	**0.00**	**12.96**	**0.87**	**0.00**	**0.06**	**0.02**	**0.06**	**0.53**	**7.30**	**0.08**	**5.00**	**-21.90**	**81.75**	**5.04**	**25.20**	**0.49**	**2.15**	**32.40**	**0.04**
2018 Mean	**350.85**	**0.33**	**0.14**	**0.00**	**350.75**	**1.90**	**0.00**	**87.88**	**66.63**	**0.00**	**0.01**	**0.01**	**852.73**	**0.00**	**3.20**	**0.52**	**1.55**	**0.00**	**12.52**	**0.87**	**0.00**	**0.04**	**0.02**	**0.04**	**0.37**	**7.23**	**0.06**	**2.90**	**-47.45**	**77.15**	**4.74**	**21.90**	**0.34**	**2.11**	**24.03**	**0.04**
Long-term Average	**355.79**	**0.33**	**0.13**	**0.01**	**273.53**	**1.70**	**0.00**	**86.88**	**73.73**	**0.01**	**0.01**	**0.01**	**905.49**	**0.01**	**2.29**	**0.36**	**1.36**	**0.01**	**12.65**	**0.86**	**0.01**	**0.04**	**0.02**	**0.04**	**0.32**	**7.09**	**0.04**	**5.83**	**-22.13**	**89.44**	**25.91**	**21.02**	**0.29**	**2.93**	**44.83**	**0.58**

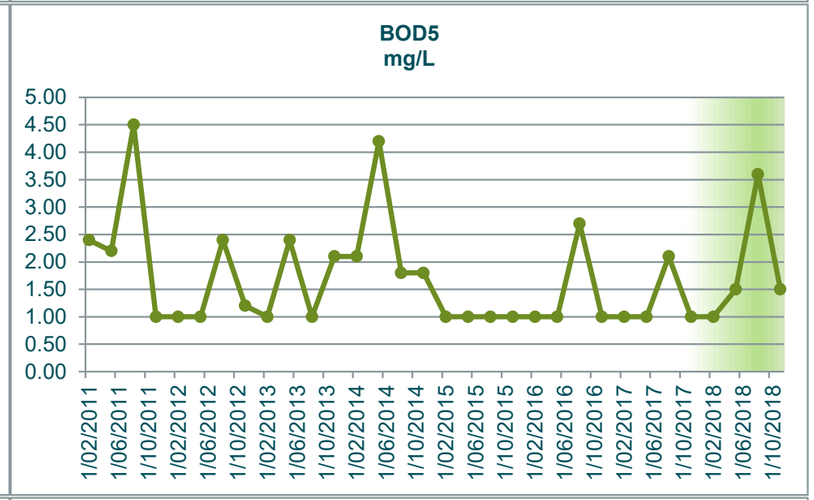

Alkalinity
mg/L as CaCO3
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

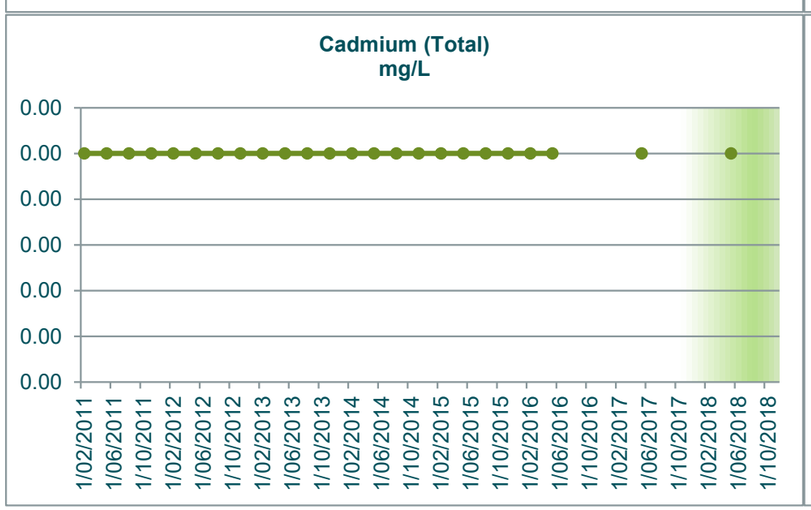

Aluminium (Total)
mg/L
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

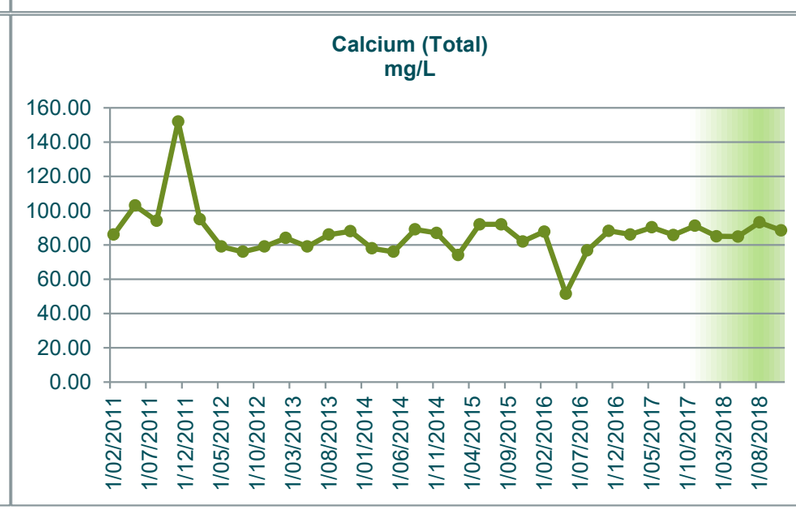

Ammonia
mg/L
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

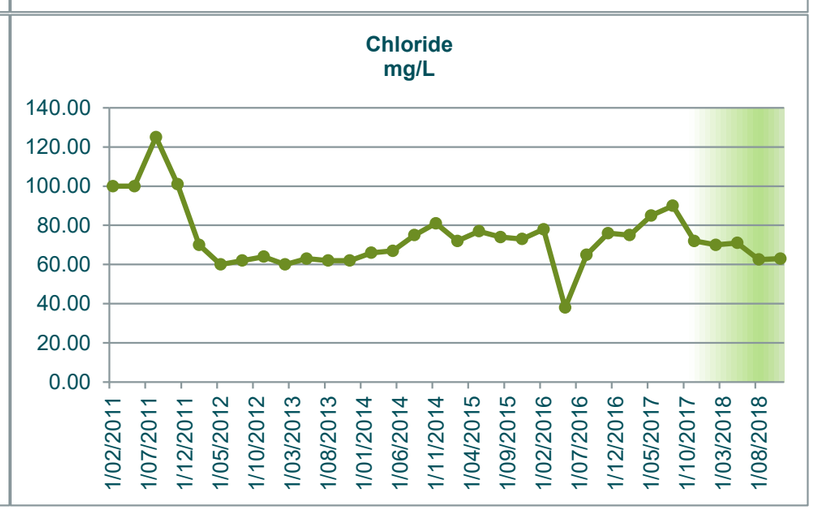

Arsenic (Total)
mg/L
0.01
0.01
0.01
0.01
0.01
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

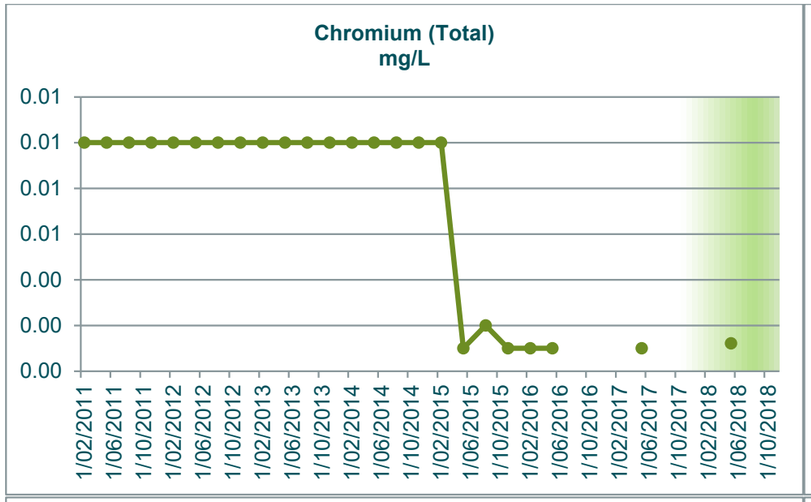

Bicarbonate HCO3
mg/L
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

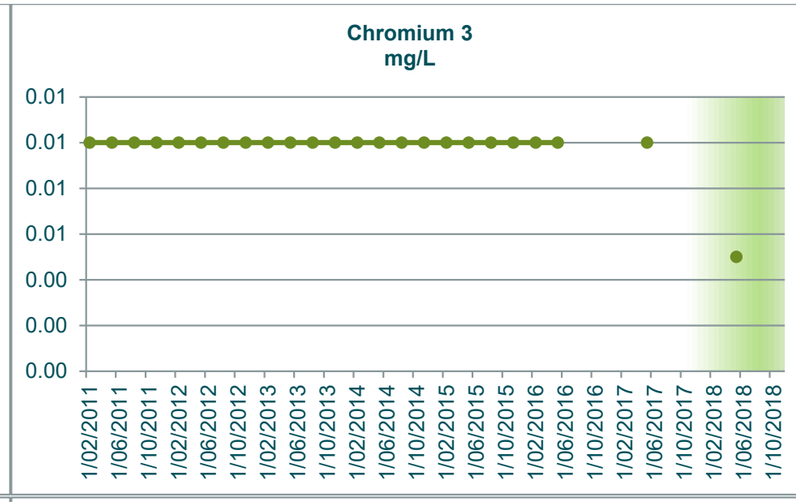

BOD5
mg/L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

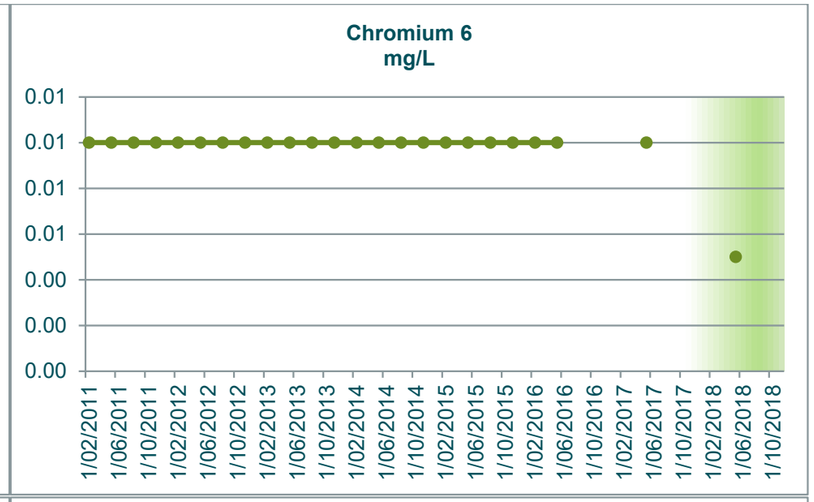

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

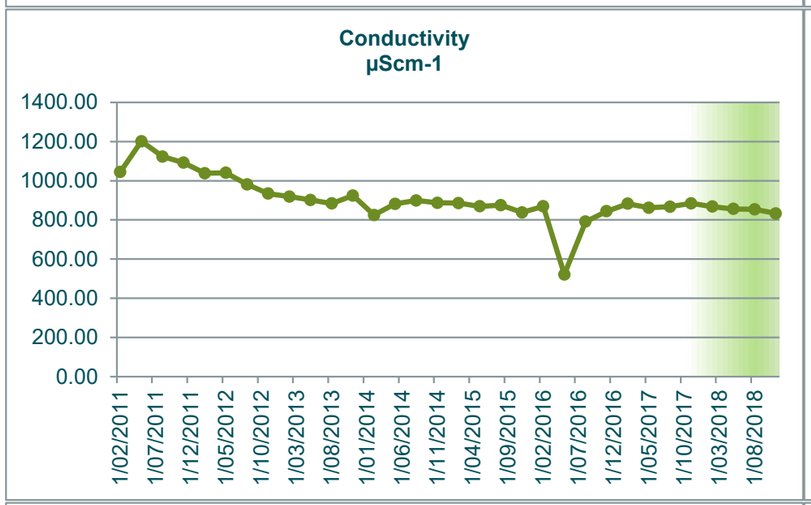

Calcium (Total)
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

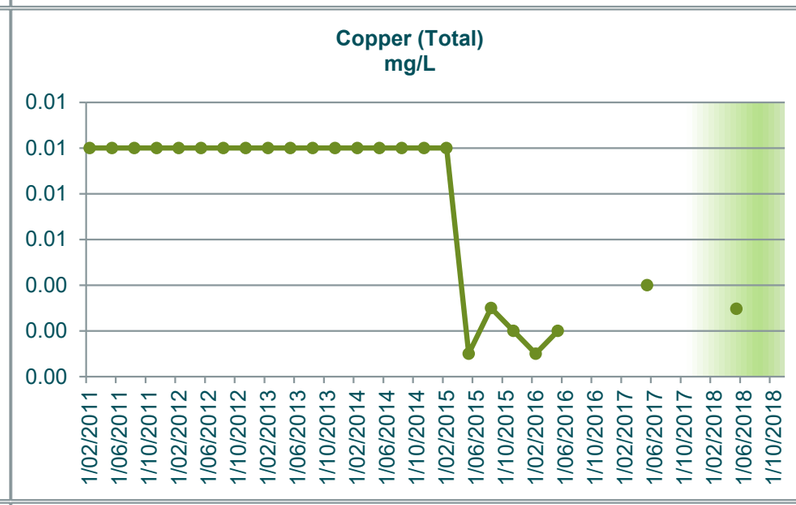

Chloride
mg/L
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

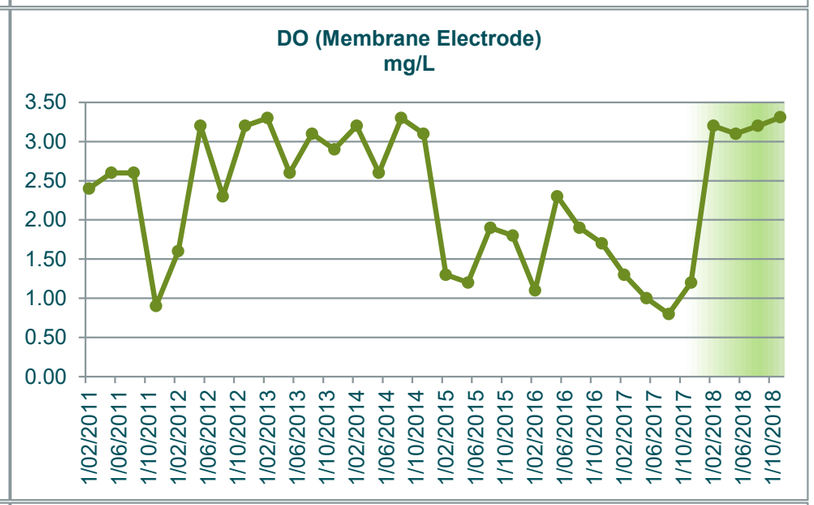

Chromium (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

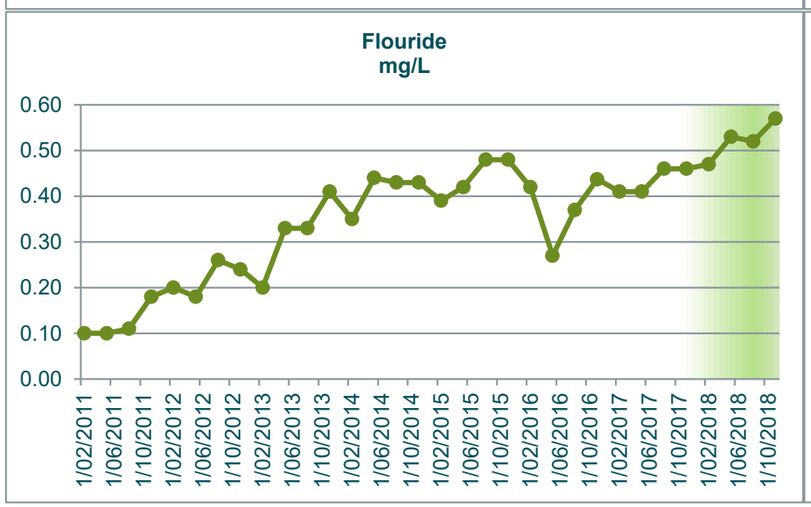

Chromium 3
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

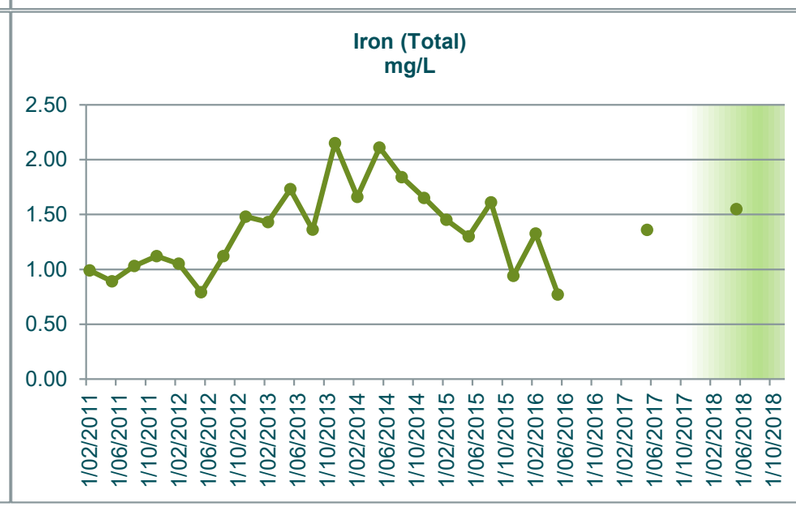

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

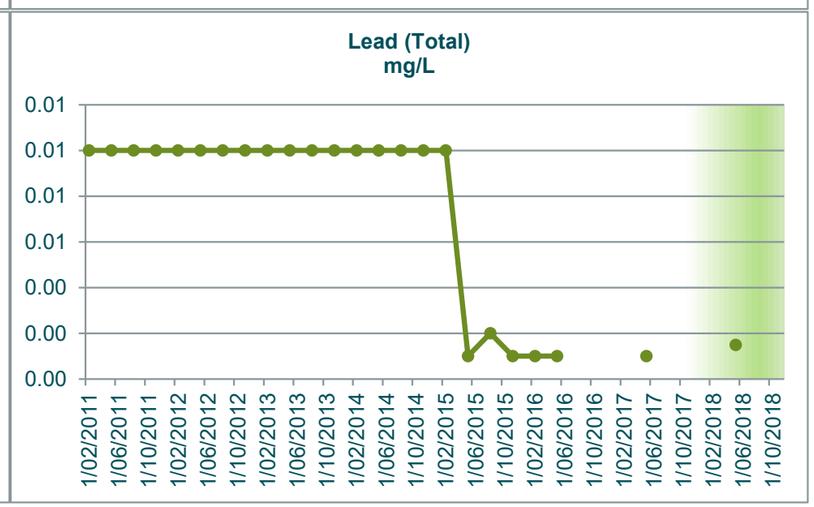

Conductivity
µScm-1
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

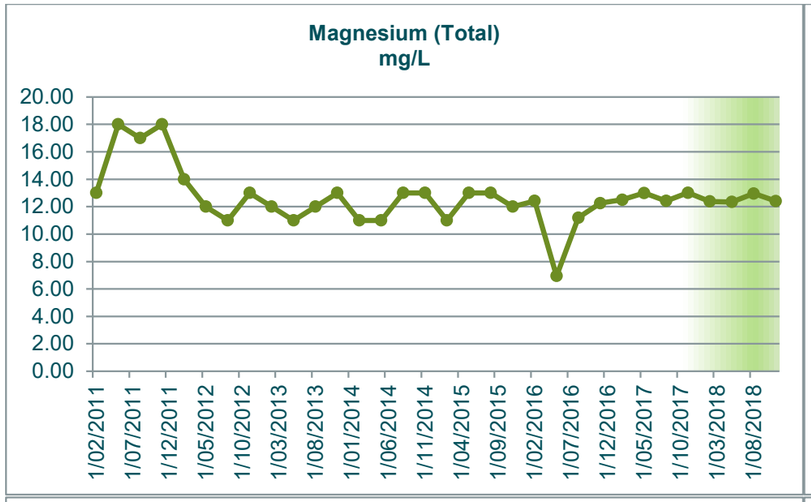

Copper (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

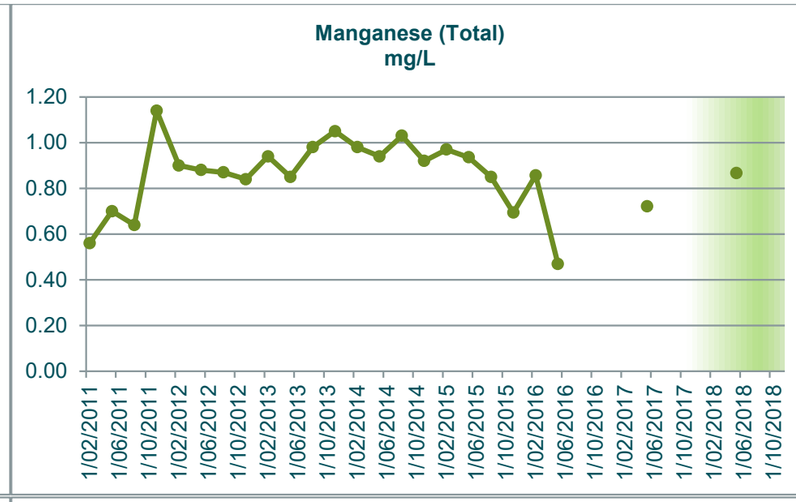

DO (Membrane Electrode)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

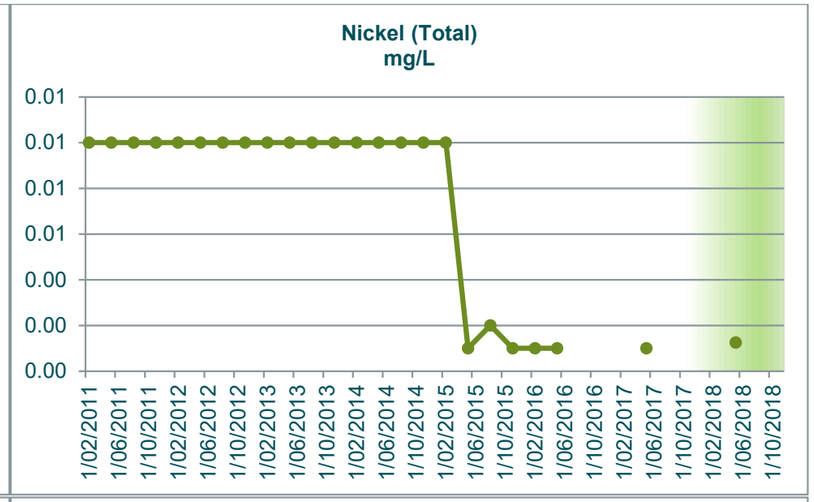

Flouride
mg/L
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

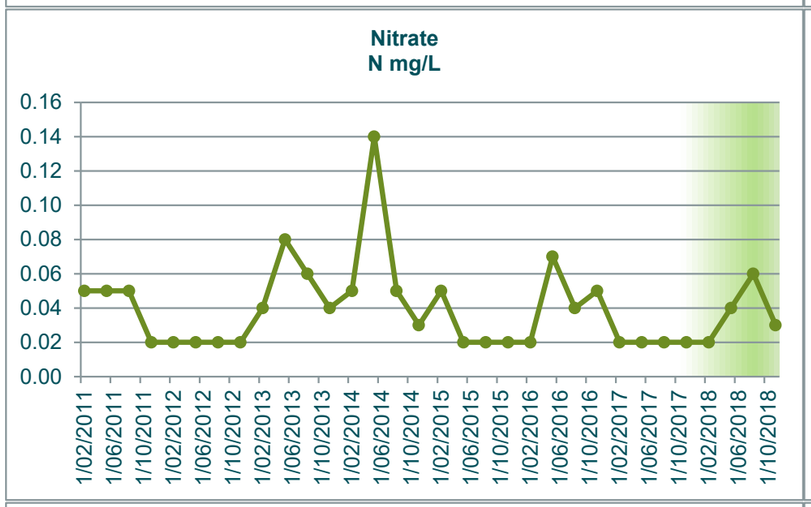

Iron (Total)
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

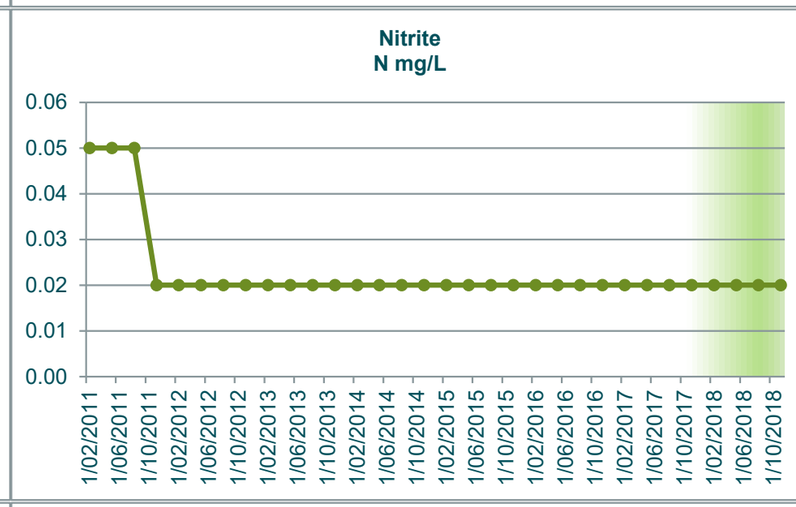

Lead (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

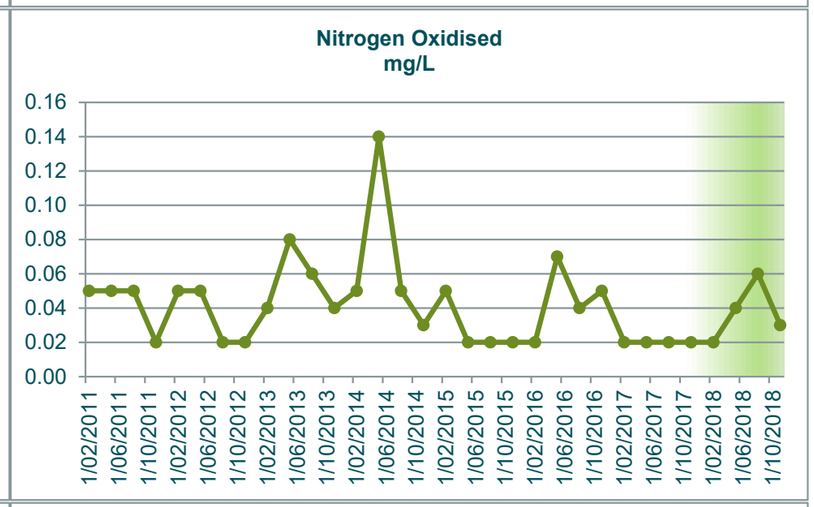

Magnesium (Total)
mg/L
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

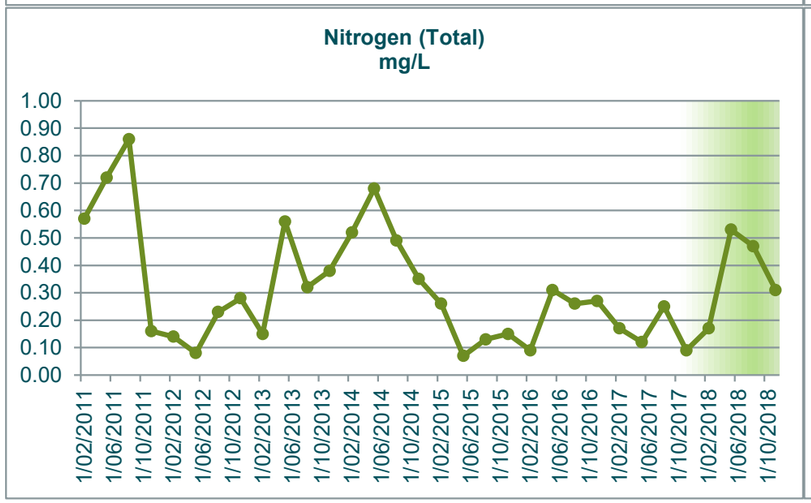

Manganese (Total)
mg/L
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

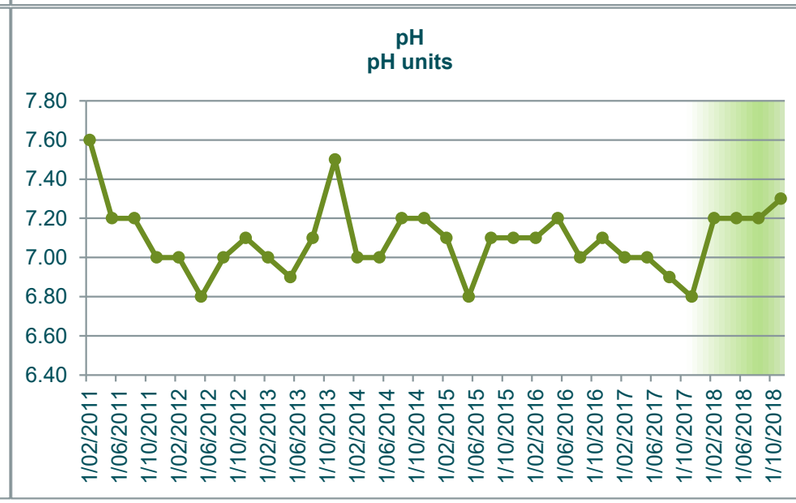

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

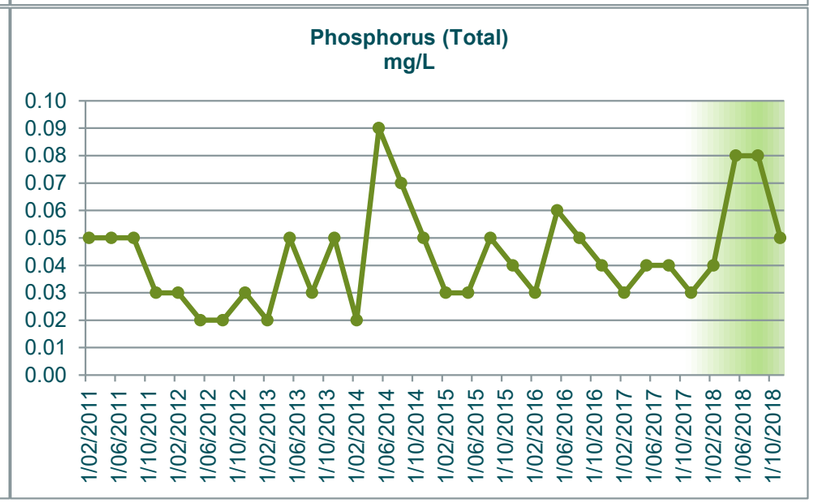

Nitrate
N mg/L
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

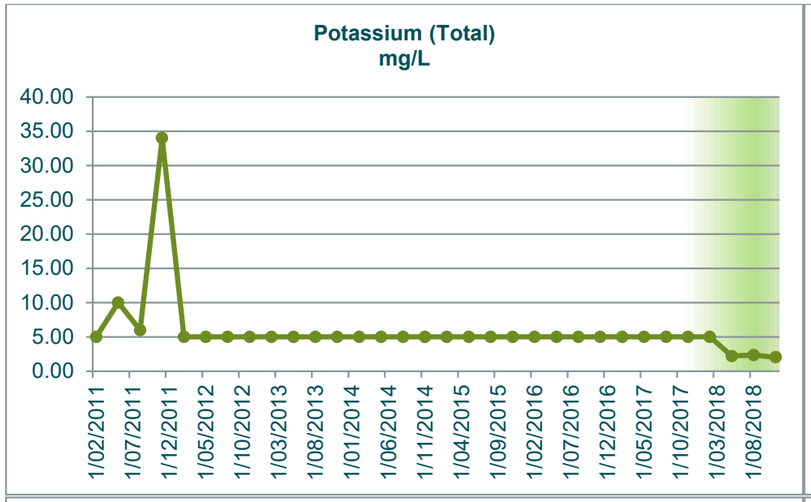

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

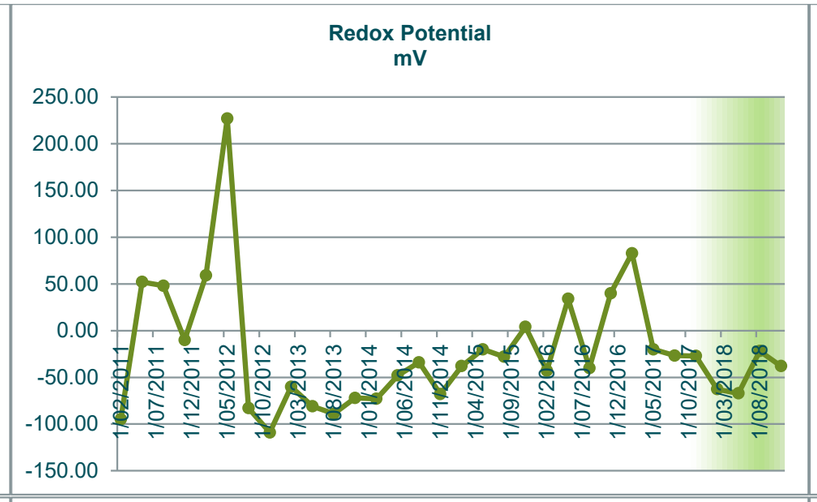

Nitrogen Oxidised
mg/L
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

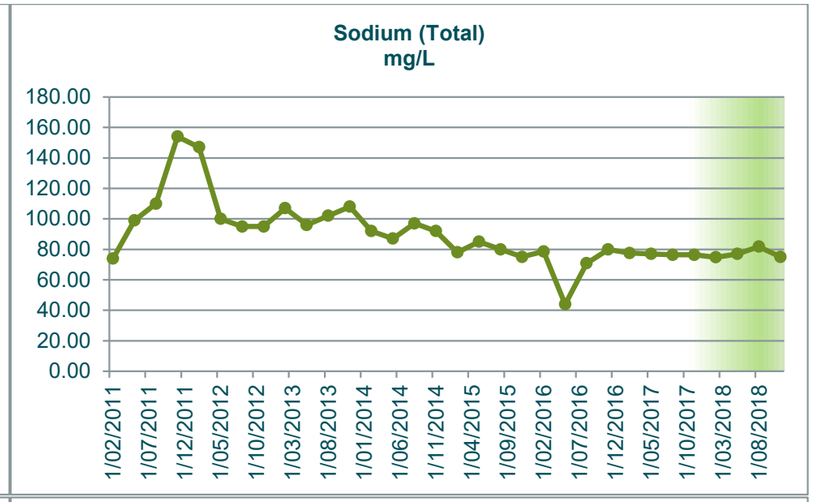

Nitrogen (Total)
mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

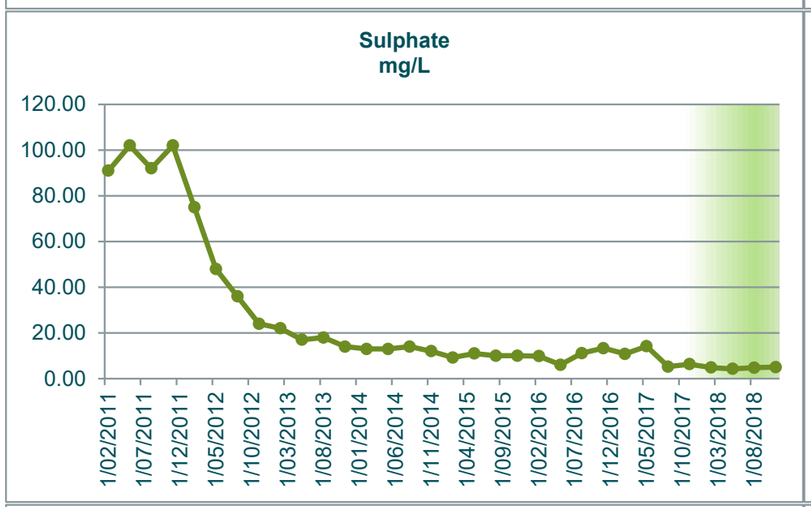

pH
pH units
7.80
7.60
7.40
7.20
7.00
6.80
6.60
6.40
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

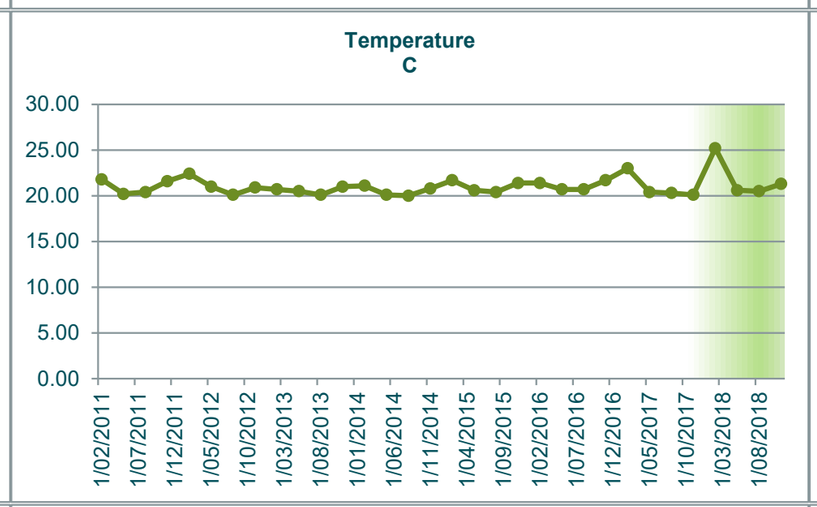

Phosphorus (Total)
mg/L
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

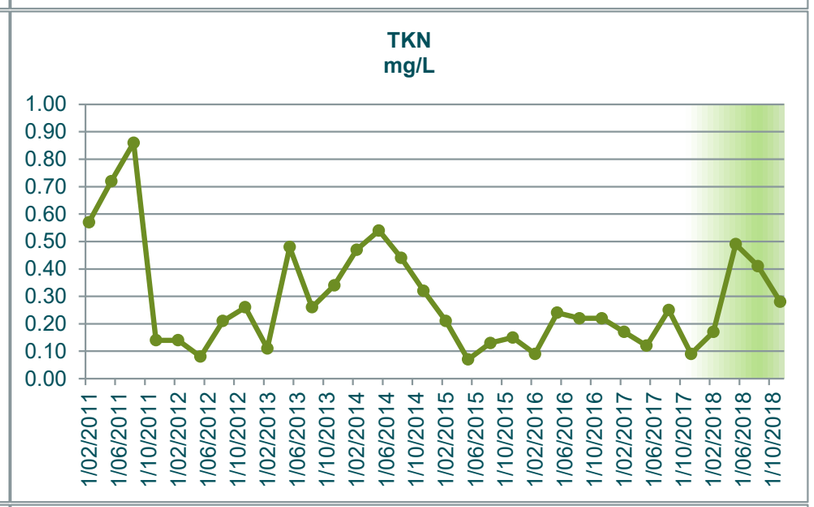

Potassium (Total)
mg/L
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

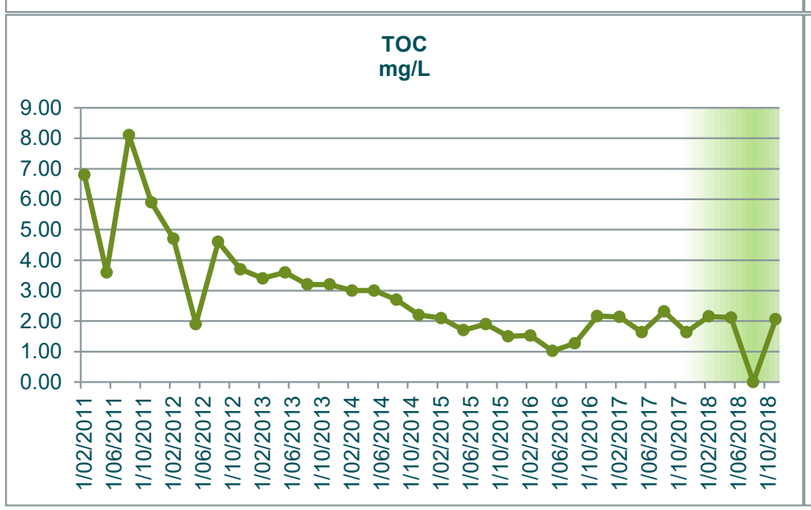

Redox Potential
mV
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

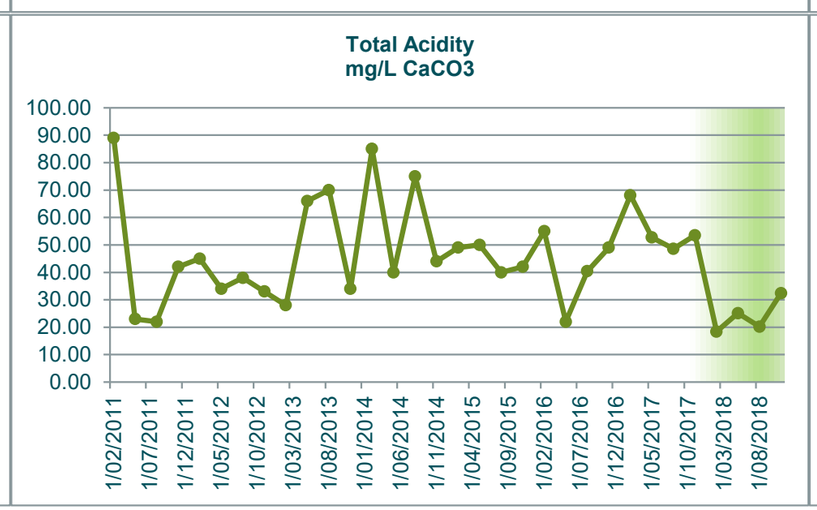

Sodium (Total)
mg/L
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

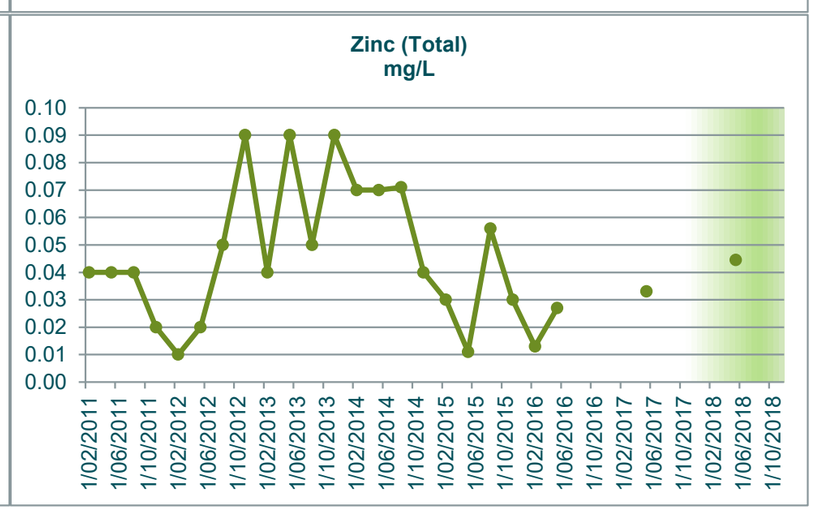

Sulphate
mg/L
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Temperature
C
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

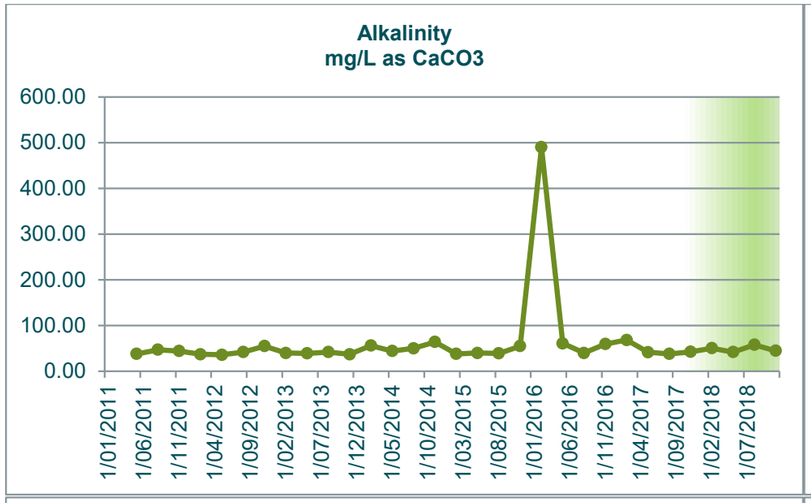

TKN
mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

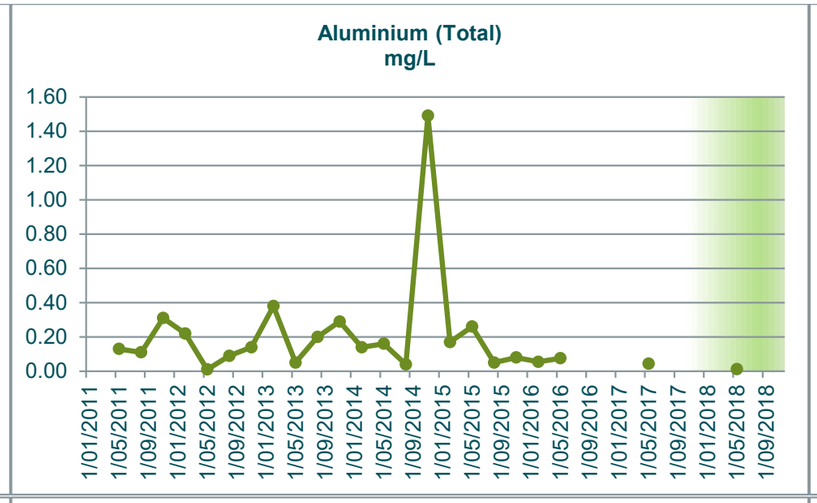

TOC
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

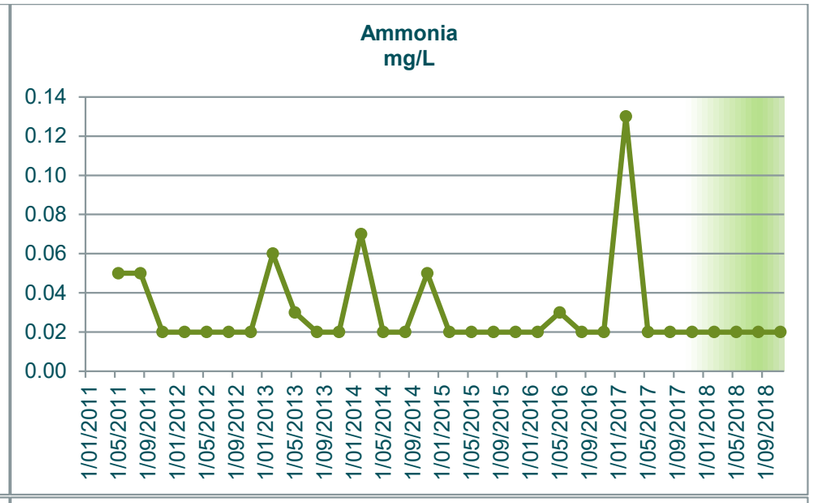

Total Acidity
mg/L CaCO3
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

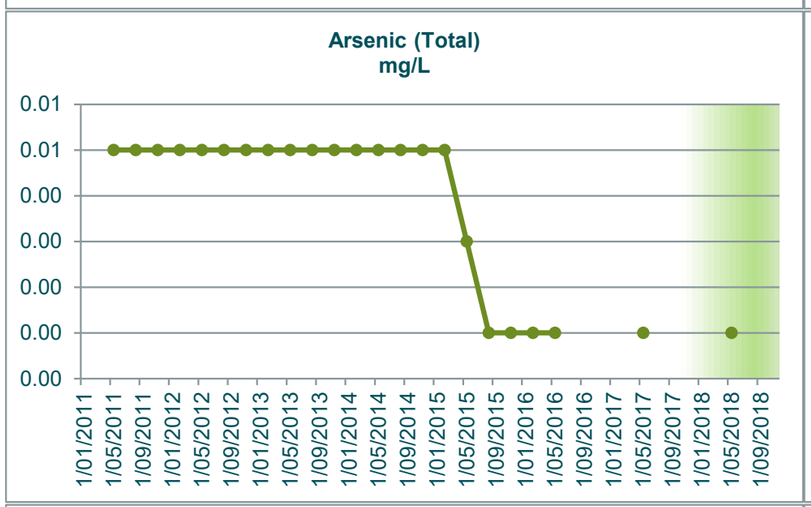

Zinc (Total)
mg/L
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

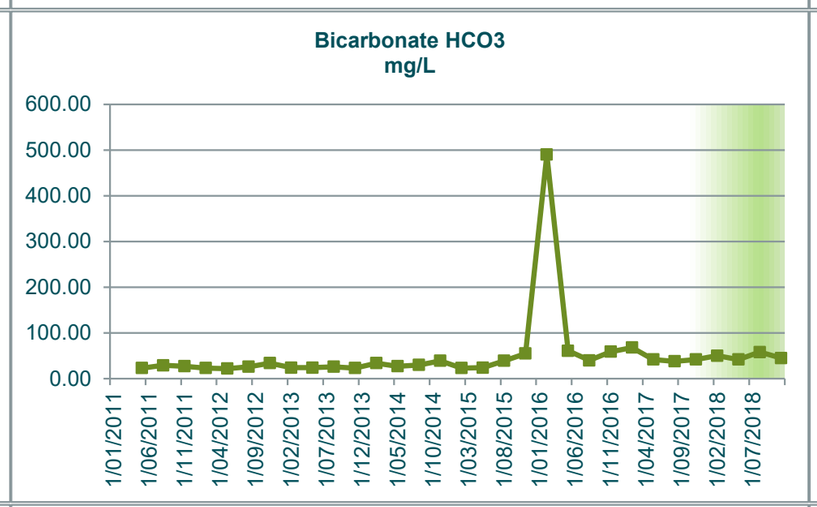
GW21	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011																																				
10/05/2011	38.00	0.13	0.05	0.01	23.00	1.80	0.00	12.00	273.00	0.01	0.01	0.01	556.00	0.01	1.30	0.10	2.73	0.01	12.00	0.01	0.01	0.05	0.05	0.05	0.15	5.30	0.05	5.00	178.00	57.00	8.00	19.90	0.10	1.00	23.00	0.01
9/08/2011	47.00	0.11	0.05	0.01	29.00	1.00	0.00	12.00	120.00	0.01	0.01	0.01	524.00	0.01	6.70	0.14	1.76	0.01	12.00	0.01	0.01	0.11	0.05	0.11	0.13	6.50	0.06	5.00	237.00	54.00	7.60	19.30	0.05	1.00	20.00	0.01
8/11/2011	44.00	0.31	0.02	0.01	27.00	2.10	0.00	15.00	146.00	0.01	0.01	0.01	487.00	0.01	2.10	0.13	11.00	0.01	16.00	0.04	0.01	0.03	0.02	0.03	0.06	6.00	0.12	8.00	96.20	43.00	9.00	20.50	0.05	1.80	64.00	0.03
6/02/2012	37.00	0.22	0.02	0.01	23.00	1.50	0.00	13.00	122.00	0.01	0.01	0.01	527.00	0.01	2.30	0.12	3.49	0.01	12.00	0.01	0.01	0.09	0.02	0.09	0.11	5.80	0.08	5.00	160.00	65.00	7.90	20.80	0.05	0.10	66.00	0.02
8/05/2012	36.00	0.01	0.02	0.01	22.00	1.00	0.00	13.00	120.00	0.01	0.01	0.01	511.00	0.01	3.20	0.12	0.13	0.01	13.00	1.59	0.01	0.09	0.02	0.09	0.11	5.90	0.16	5.00	193.00	62.00	10.00	20.30	0.05	0.50	63.00	0.01
6/08/2012	42.00	0.09	0.02	0.01	26.00	1.80	0.00	12.00	128.00	0.01	0.01	0.01	580.00	0.01	2.90	0.11	9.05	0.01	12.00	0.05	0.01	0.02	0.02	0.02	0.07	5.80	0.15	5.00	86.00	44.00	7.40	19.90	0.07	0.20	39.00	0.02
13/11/2012	55.00	0.14	0.02	0.01	34.00	2.80	0.00	13.00	120.00	0.01	0.01	0.01	533.00	0.01	1.90	0.14	6.65	0.01	13.00	0.05	0.01	0.02	0.02	0.02	0.05	6.10	0.03	5.00	39.00	53.00	5.90	20.40	0.05	0.30	69.00	0.02
13/02/2013	40.00	0.38	0.06	0.01	24.00	1.50	0.00	14.00	130.00	0.01	0.01	0.01	582.00	0.01	0.50	0.09	1.25	0.01	13.00	0.01	0.01	0.11	0.02	0.11	0.05	5.70	0.02	5.00	83.00	58.00	7.60	20.20	0.05	0.20	46.00	0.02
14/05/2013	39.00	0.05	0.03	0.01	24.00	1.00	0.00	14.00	130.00	0.01	0.01	0.01	551.00	0.01	3.10	0.10	1.22	0.01	12.00	0.01	0.01	0.06	0.02	0.06	0.09	5.90	0.04	5.00	68.00	55.00	7.30	20.60	0.05	0.20	78.00	0.01
6/08/2013	42.00	0.20	0.02	0.01	26.00	4.50	0.00	16.00	120.00	0.01	0.01	0.01	578.00	0.01	0.60	0.12	3.57	0.01	15.00	0.01	0.01	0.04	0.02	0.04	0.08	5.80	0.04	5.00	98.00	63.00	8.80	19.90	0.05	0.20	130.00	0.02
12/11/2013	37.00	0.29	0.02	0.01	23.00	1.00	0.00	15.00	132.00	0.01	0.01	0.01	543.00	0.01	5.20	0.12	1.86	0.01	15.00	0.02	0.01	0.11	0.02	0.11	0.15	6.00	0.05	5.00	787.00	64.00	9.40	20.40	0.05	0.20	21.00	0.08
11/02/2014	56.00	0.14	0.07	0.01	34.00	2.70	0.00	19.00	128.00	0.01	0.01	0.01	536.00	0.01	1.00	0.13	6.84	0.01	15.00	0.05	0.01	0.09	0.02	0.09	0.21	6.10	0.02	5.00	11.00	75.00	13.00	20.50	0.12	0.20	193.00	0.03
13/05/2014	44.00	0.16	0.02	0.01	27.00	1.20	0.00	12.00	132.00	0.01	0.01	0.01	561.00	0.01	2.20	0.13	2.76	0.01	13.00	0.01	0.01	0.09	0.02	0.09	0.12	5.90	0.06	5.00	52.00	55.00	6.60	20.80	0.05	0.20	64.00	0.01
12/08/2014	50.00	0.04	0.02	0.01	30.00	1.50	0.00	16.00	130.00	0.01	0.01	0.01	548.00	0.01	3.20	0.14	2.91	0.01	15.00	0.01	0.01	0.05	0.02	0.05	0.05	6.20	0.03	5.00	48.00	63.00	7.00	19.90	0.05	0.20	120.00	0.01
10/11/2014	64.00	1.49	0.05	0.01	39.00	3.00	0.00	16.00	132.00	0.01	0.01	0.01	562.00	0.01	1.80	0.14	8.80	0.01	16.00	0.10	0.01	0.06	0.02	0.08	0.19	6.30	0.03	5.00	3.00	64.00	5.80	20.70	0.11	0.20	148.00	0.01
9/02/2015	38.00	0.17	0.02	0.01	23.00	1.00	0.00	13.00	130.00	0.01	0.01	0.01	526.00	0.01	1.80	0.12	2.22	0.01	12.00	0.03	0.01	0.02	0.02	0.02	0.23	6.00	0.09	5.00	56.00	56.00	7.90	21.40	0.23	0.20	75.00	0.01
11/05/2015	40.00	0.26	0.02	0.00	24.00	1.00	0.00	15.00	132.00	0.00	0.01	0.01	568.00	0.00	2.40	0.12	6.64	0.00	14.00	0.04	0.00	0.02	0.02	0.02	0.08	6.00	0.19	5.00	61.00	62.00	8.00	20.50	0.08	0.20	79.00	0.01
11/08/2015	39.00	0.05	0.02	0.00	39.00	1.00	0.00	15.00	38.00	0.00	0.01	0.01	528.00	0.00	8.20	0.12	1.73	0.00	14.00	0.03	0.00	0.05	0.02	0.05	0.07	6.60	0.07	5.00	83.00	60.00	7.70	19.80	0.05	0.20	22.00	0.01
10/11/2015	55.00	0.08	0.02	0.00	55.00	1.00	0.00	16.00	128.00	0.00	0.01	0.01	471.00	0.00	1.50	0.11	4.02	0.00	14.00	0.08	0.00	0.02	0.02	0.02	0.05	6.10	0.03	5.00	-45.00	59.00	6.70	20.40	0.05	0.20	75.00	0.03
8/02/2016	490.00	0.06	0.02	0.00	490.00	1.20	0.00	15.11	131.00	0.00	0.01	0.01	552.00	0.00	1.00	0.12	3.49	0.00	13.87	0.06	0.00	0.02	0.02	0.02	0.07	6.10	0.04	5.00	57.00	59.30	6.53	20.60	0.07	0.21	107.00	0.01
9/05/2016	61.00	0.08	0.03	0.00	61.00	2.20	0.00	15.86	128.00	0.00	0.01	0.01	567.00	0.00	2.10	0.14	6.01	0.00	14.14	0.09	0.00	0.02	0.02	0.02	0.08	6.20	0.05	5.00	42.00	60.35	5.62	20.70	0.08	0.38	92.00	0.01
9/08/2016	40.00		0.02		40.00	1.00		14.23	132.00				530.30		3.90	0.11			13.53			0.07	0.02	0.07	0.11	5.80	0.06	5.00	140.00	59.96	8.44	20.10	0.05	0.32	91.50	
7/11/2016	59.40		0.02		59.00	1.80		17.06	135.00				561.80		1.60	0.13			14.96			0.02	0.02	0.02	0.05	6.00	0.03	5.00	163.00	62.82	6.65	20.40	0.05	0.49	86.70	
7/02/2017	68.20		0.13		68.00	3.60		15.81	135.00				582.80		1.60	0.14			14.31			0.02	0.02	0.02	0.34	6.00	0.06	5.00	102.20	60.83	5.13	20.60	0.34	1.97	129.00	
8/05/2017	41.50	0.04	0.02	0.00	42.00	1.00	0.00	14.45	132.00	0.00	0.01	0.01	540.50	0.00	2.00	0.11	1.58	0.00	13.60	0.05	0.00	0.03	0.02	0.03	0.08	5.70	0.05	5.00	202.30	58.04	9.06	20.60	0.05	0.29	63.50	0.02
8/08/2017	37.77		0.02		38.00	1.00		14.23	115.00				539.50		5.30	0.10			13.53			0.05	0.02	0.05	0.10	5.90	0.04	5.00	346.20	59.21	7.67	20.10	0.05	0.51	36.10	
7/11/2017	42.40		0.02		42.00	1.00		16.01	136.00				557.50		4.00	0.11			14.50			0.17	0.02	0.17	0.27	5.90	0.07	5.00	324.60	61.47	6.69	20.60	0.10	0.48	32.20	
13/02/2018	50.48		0.02		50.00	1.00		15.29	133.00				552.50		2.00	0.13			13.69			0.02	0.02	0.02	0.05	6.00	0.02	5.00	104.70	59.57	5.60	21.60	0.05	0.71	68.30	
8/05/2018	41.81	0.01	0.02	0.00	42.00	1.80	0.00	15.26	157.50	0.00	0.01	0.01	551.10	0.00	2.40	0.13	1.29	0.00	14.48	0.06	0.00	0.02	0.02	0.02	0.05	5.80	0.03	2.15	160.80	63.24	7.13	20.60	0.05	0.20	69.60	0.01
14/08/2018	57.76		0.02		58.00	3.60		17.22	135.00				564.60		3.20	0.14			15.34			0.02	0.02	0.02	0.07	6.00	0.04	2.14	168.70	66.54	4.27	20.10	0.05	0.80	59.40	
13/11/2018	44.64		0.02		45.00	1.00		15.89	142.00				553.00		5.01	0.11			14.42			0.07	0.02	0.07	0.11	6.32	0.05	2.09	93.00	61.19	6.49	20.50	0.05	0.48	34.40	
2018 Min	**41.81**	**0.01**	**0.02**	**0.00**	**42.00**	**1.00**	**0.00**	**15.26**	**133.00**	**0.00**	**0.01**	**0.01**	**551.10**	**0.00**	**2.00**	**0.11**	**1.29**	**0.00**	**13.69**	**0.06**	**0.00**	**0.02**	**0.02**	**0.02**	**0.05**	**5.80**	**0.02**	**2.09**	**93.00**	**59.57**	**4.27**	**20.10**	**0.05**	**0.20**	**34.40**	**0.01**
2018 Max	**57.76**	**0.01**	**0.02**	**0.00**	**58.00**	**3.60**	**0.00**	**17.22**	**157.50**	**0.00**	**0.01**	**0.01**	**564.60**	**0.00**	**5.01**	**0.14**	**1.29**	**0.00**	**15.34**	**0.06**	**0.00**	**0.07**	**0.02**	**0.07**	**0.11**	**6.32**	**0.05**	**5.00**	**168.70**	**66.54**	**7.13**	**21.60**	**0.05**	**0.80**	**69.60**	**0.01**
2018 Mean	**48.67**	**0.01**	**0.02**	**0.00**	**48.75**	**1.85**	**0.00**	**15.91**	**141.88**	**0.00**	**0.01**	**0.01**	**555.30**	**0.00**	**3.15**	**0.13**	**1.29**	**0.00**	**14.48**	**0.06**	**0.00**	**0.03**	**0.02**	**0.03**	**0.07**	**6.03**	**0.04**	**2.85**	**131.80**	**62.64**	**5.87**	**20.70**	**0.05**	**0.55**	**57.93**	**0.01**
Long-term Average	**60.58**	**0.20**	**0.03**	**0.00**	**51.19**	**1.70**	**0.00**	**14.76**	**132.34**	**0.01**	**0.01**	**0.01**	**545.95**	**0.01**	**2.77**	**0.12**	**3.96**	**0.01**	**13.82**	**0.10**	**0.01**	**0.05**	**0.02**	**0.05**	**0.11**	**5.99**	**0.06**	**4.82**	**135.44**	**59.50**	**7.45**	**20.41**	**0.08**	**0.46**	**73.05**	**0.02**

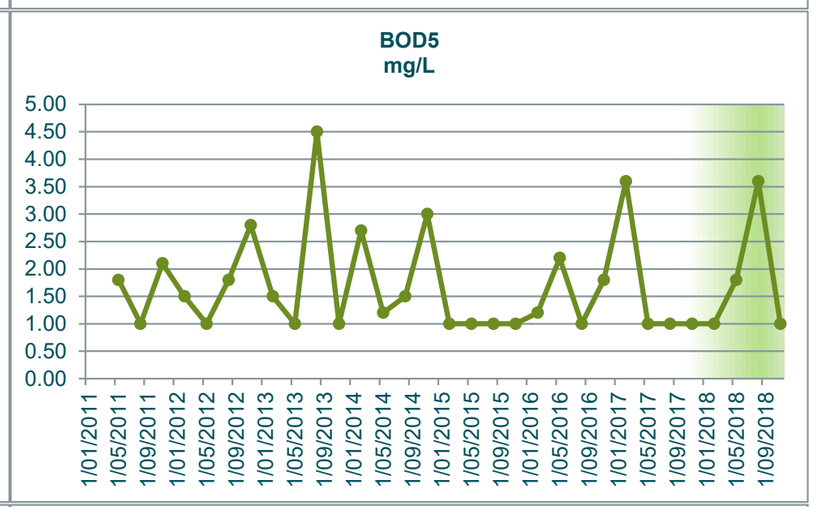

Alkalinity
mg/L as CaCO3
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

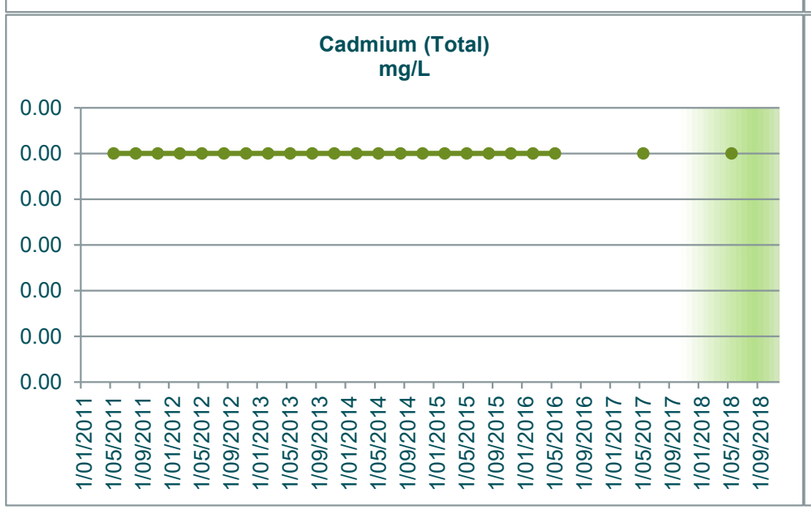

Aluminium (Total)
mg/L
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

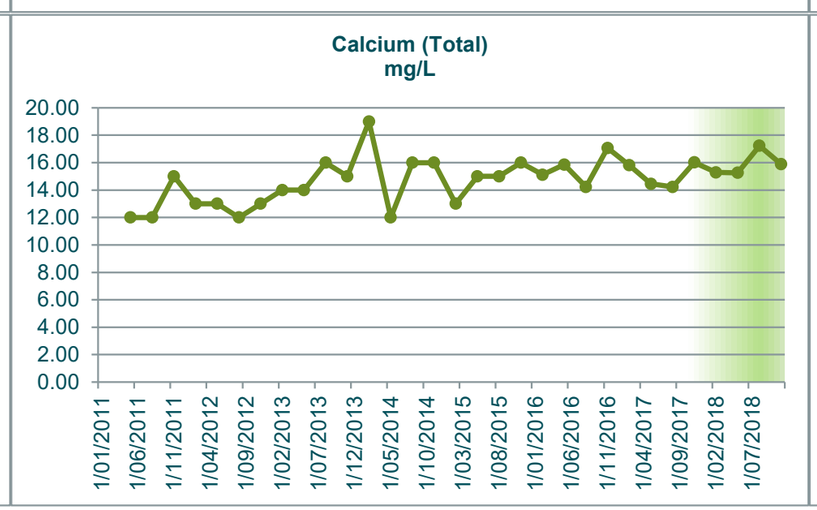

Ammonia
mg/L
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

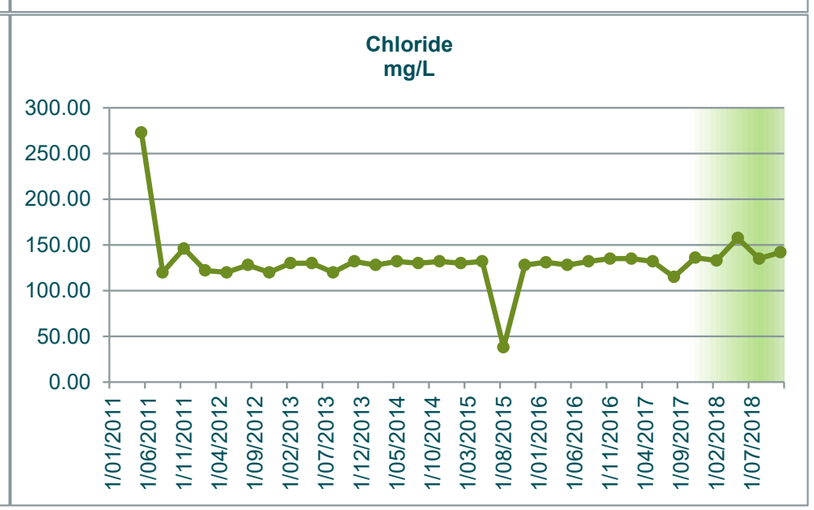

Arsenic (Total)
mg/L
0.01
0.01
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

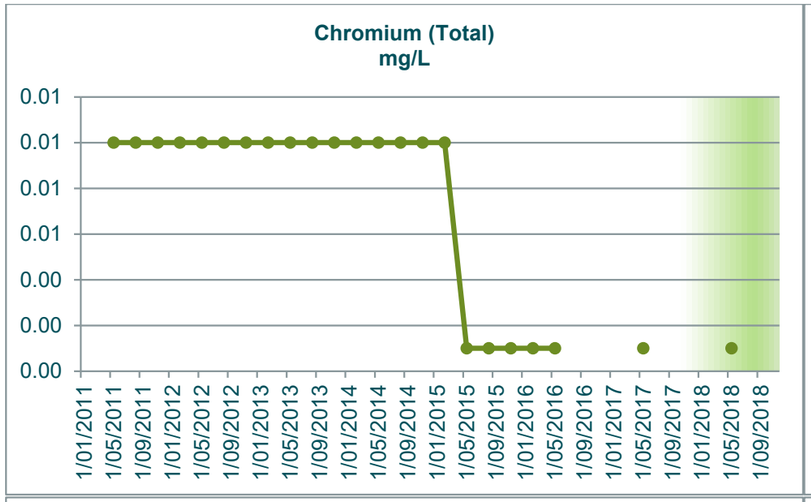

Bicarbonate HCO3
mg/L
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

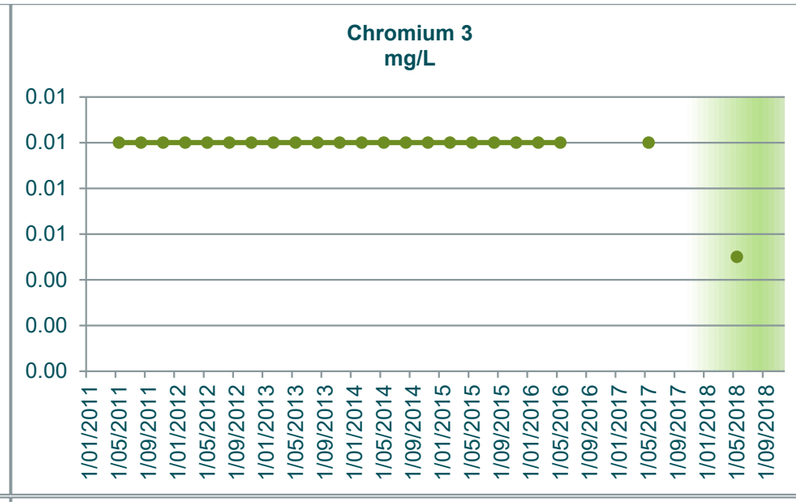

BOD5
mg/L
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

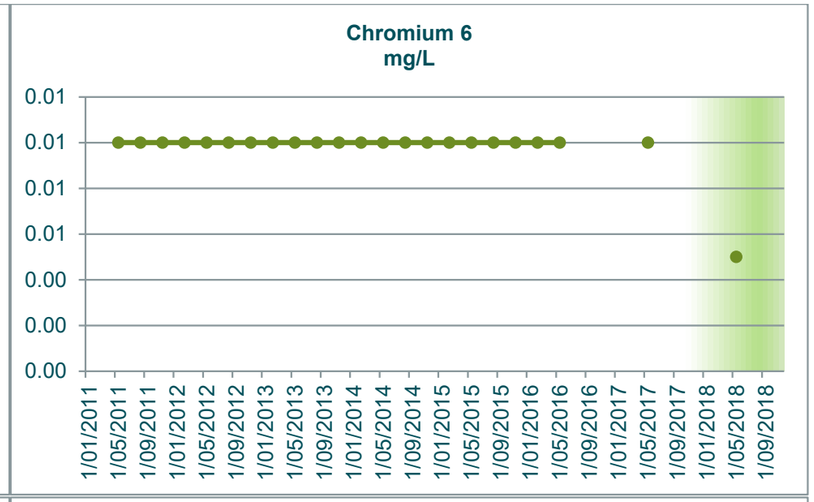

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

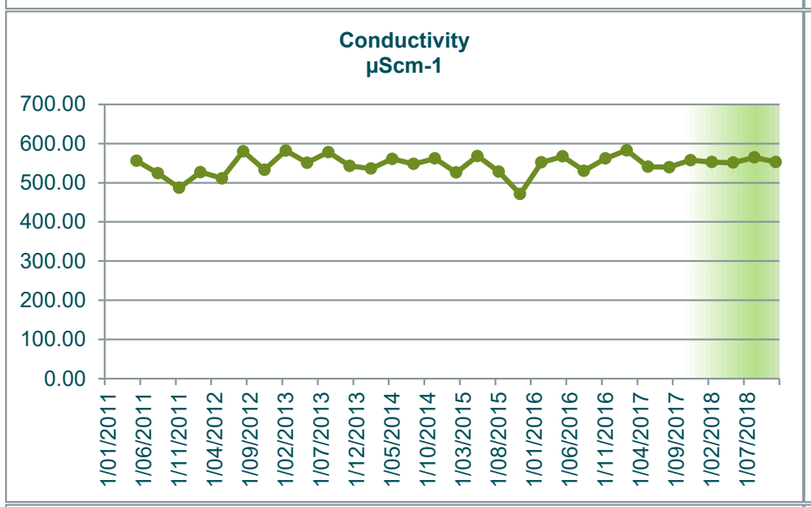

Calcium (Total)
mg/L
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

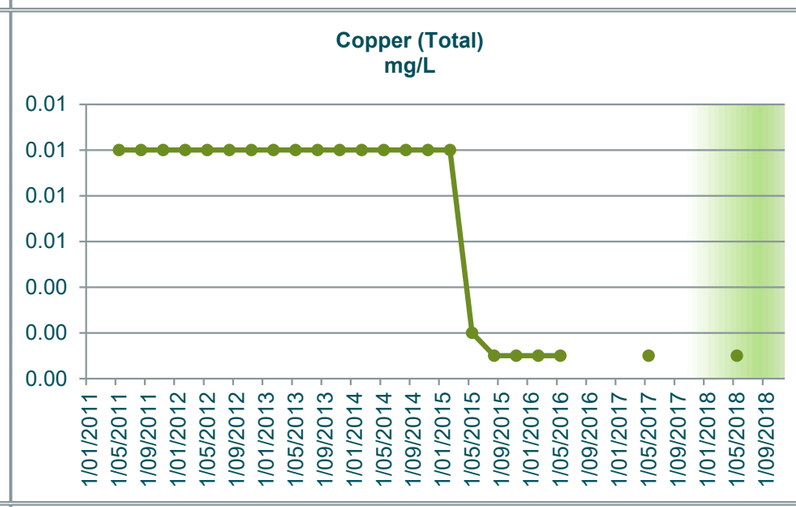

Chloride
mg/L
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

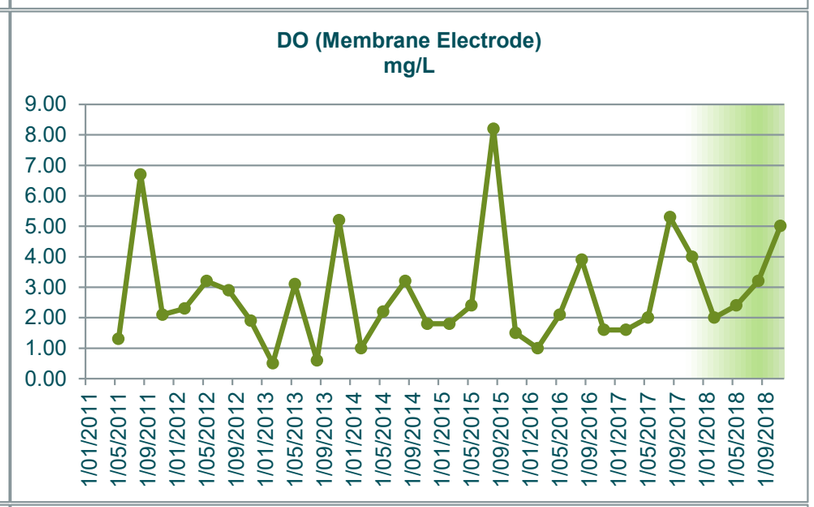

Chromium (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

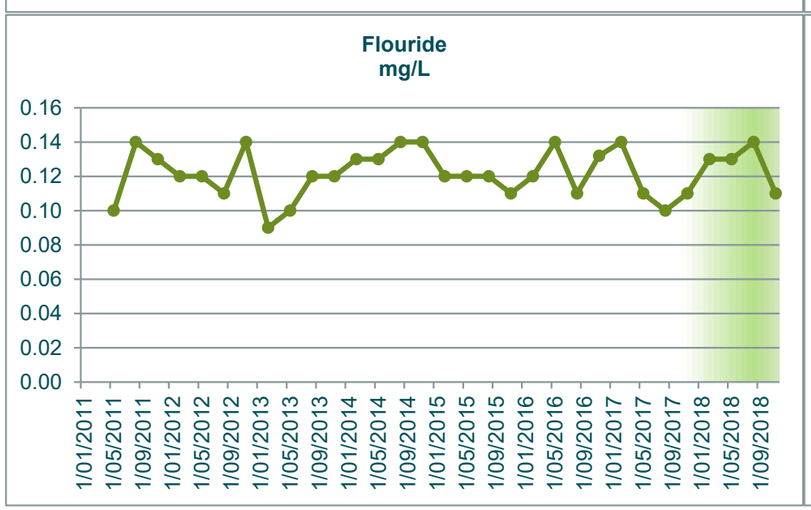

Chromium 3
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

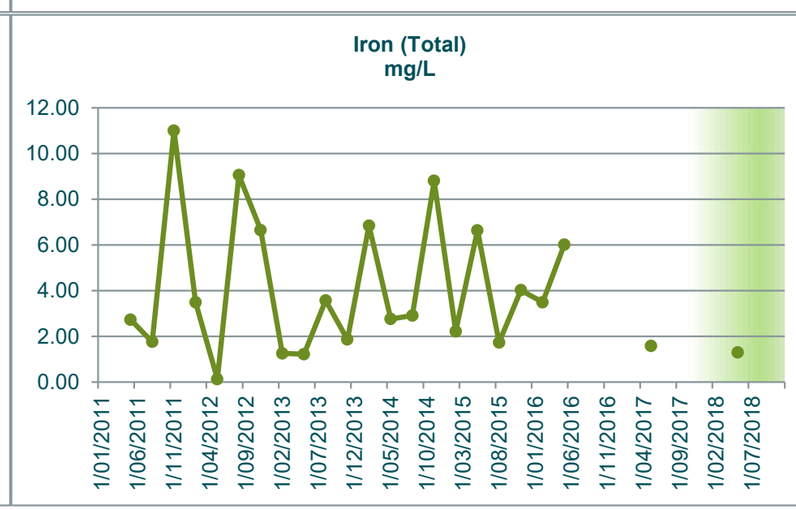

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

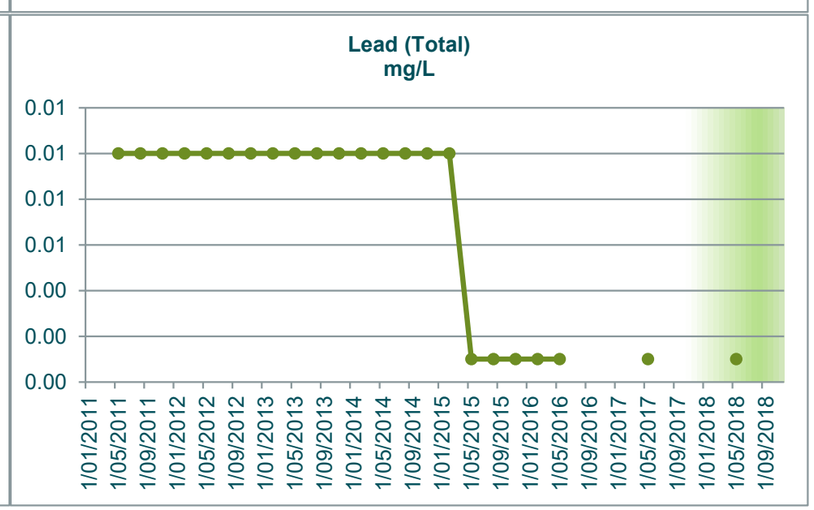

Conductivity
µScm-1
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

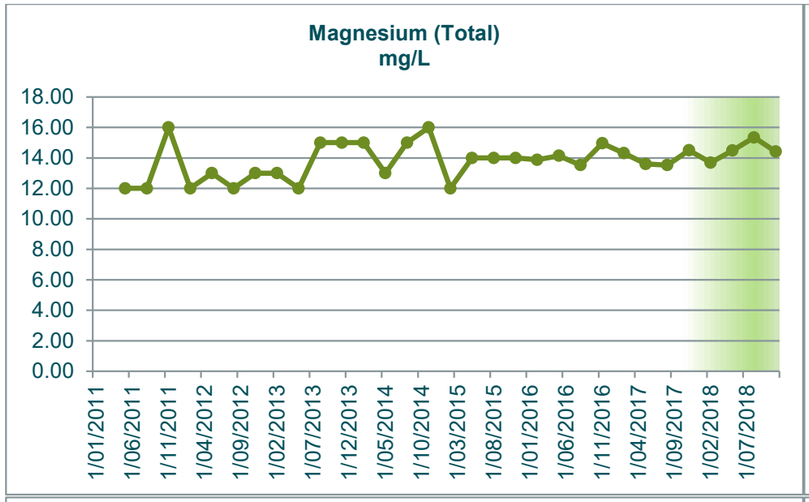

Copper (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

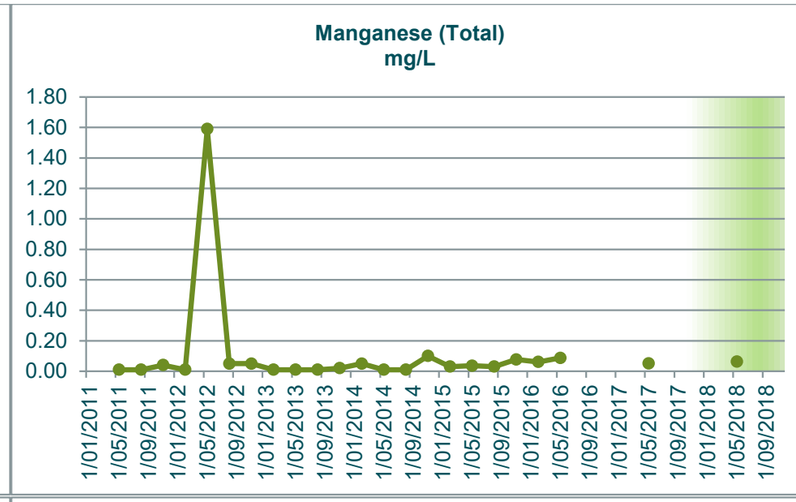

DO (Membrane Electrode)
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

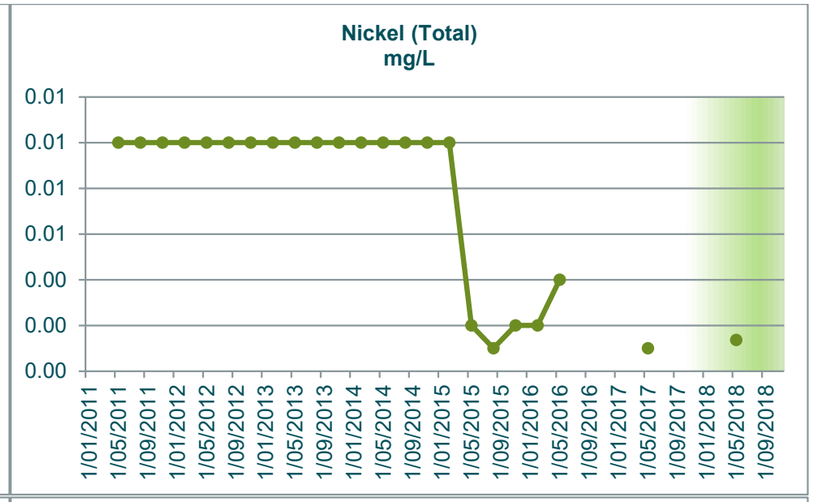

Flouride
mg/L
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

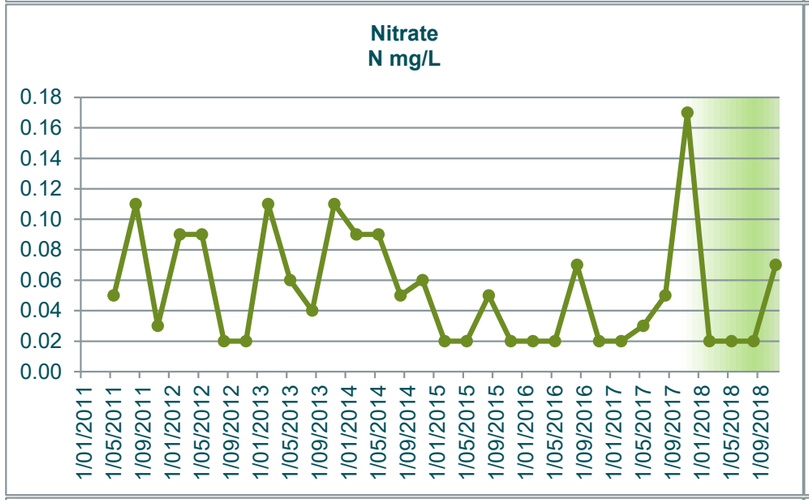

Iron (Total)
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

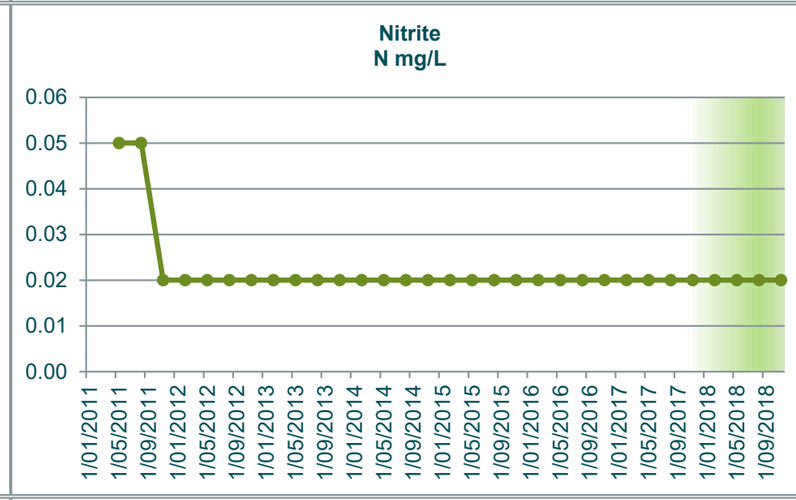

Lead (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

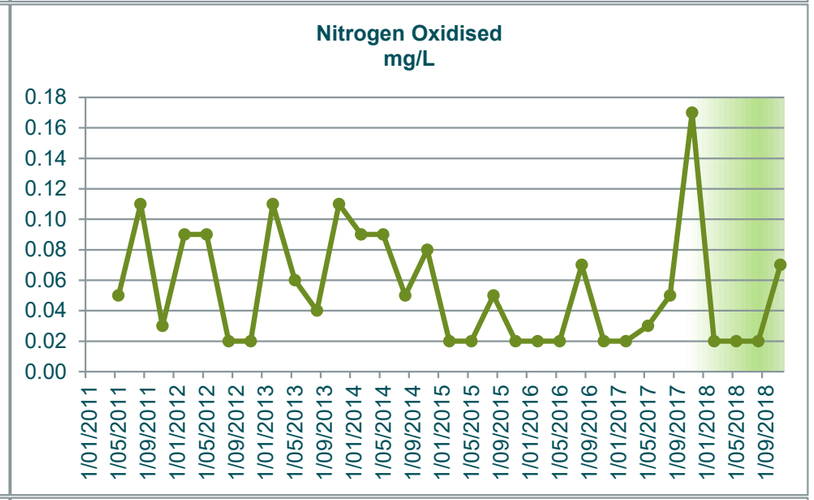

Magnesium (Total)
mg/L
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

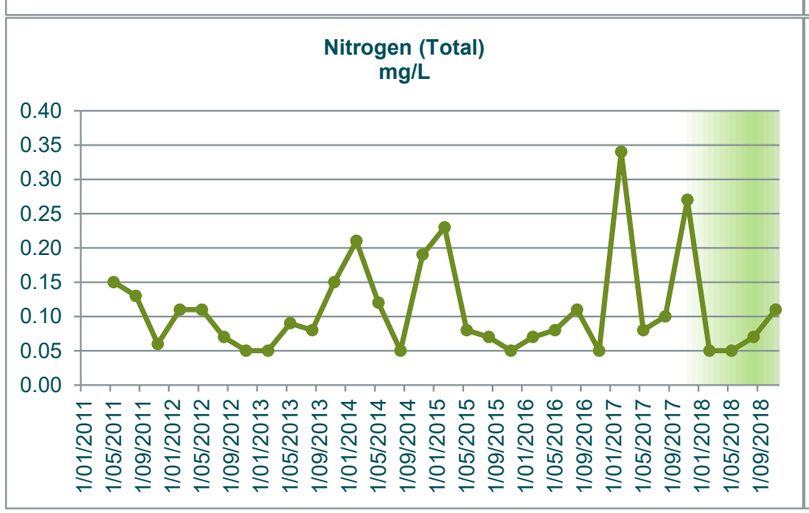

Manganese (Total)
mg/L
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

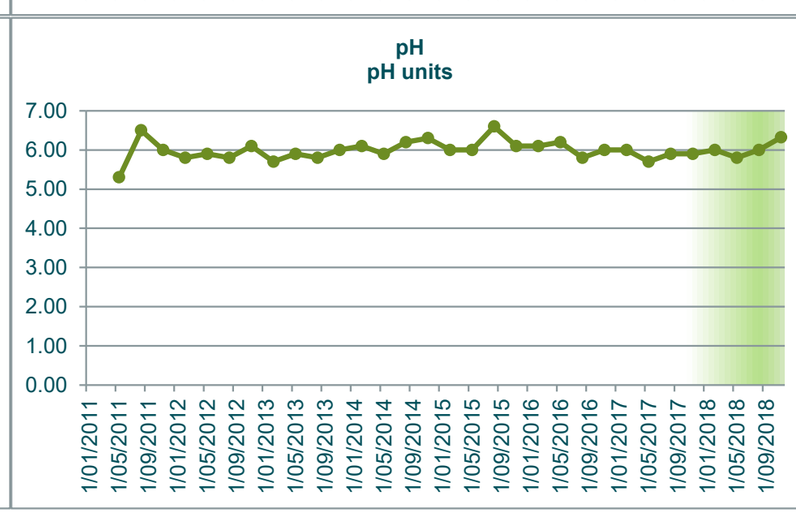

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

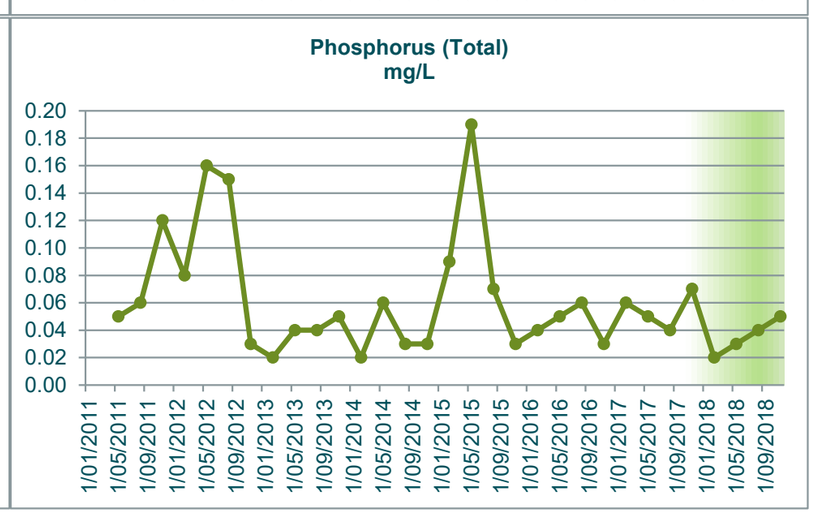

Nitrate
N mg/L
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

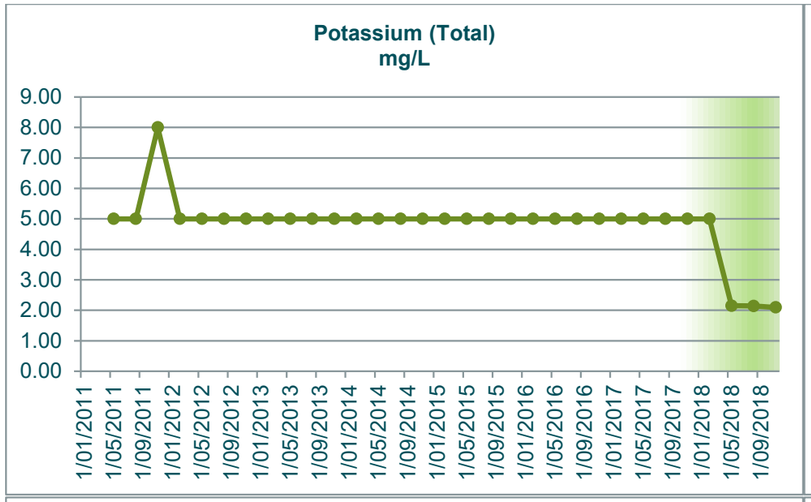

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

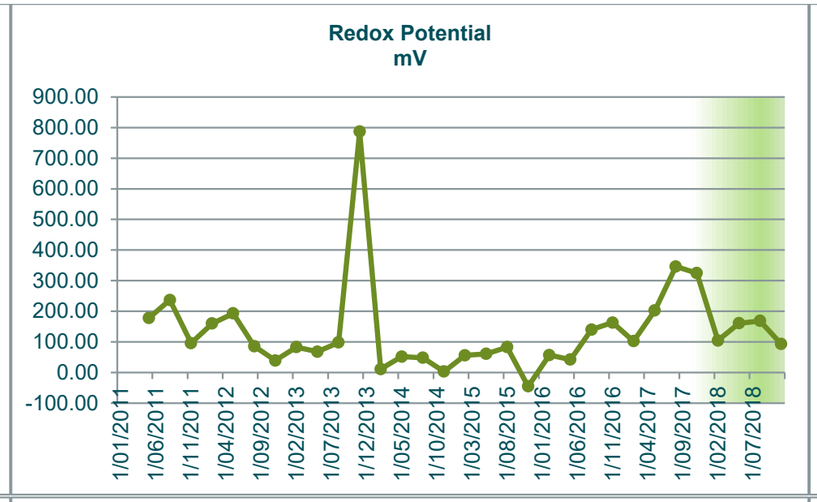

Nitrogen Oxidised
mg/L
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

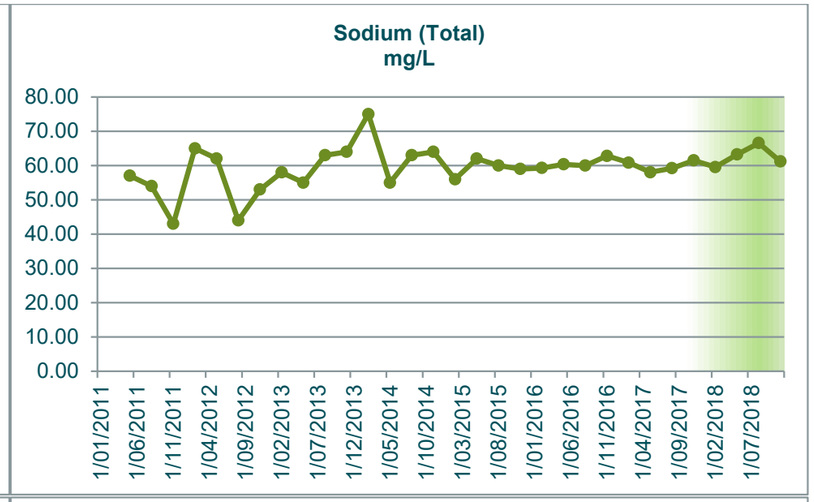

Nitrogen (Total)
mg/L
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

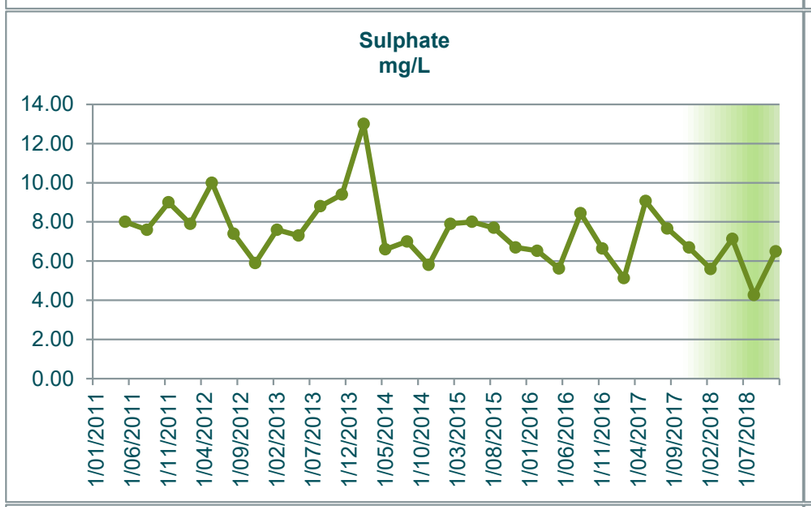

pH
pH units
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

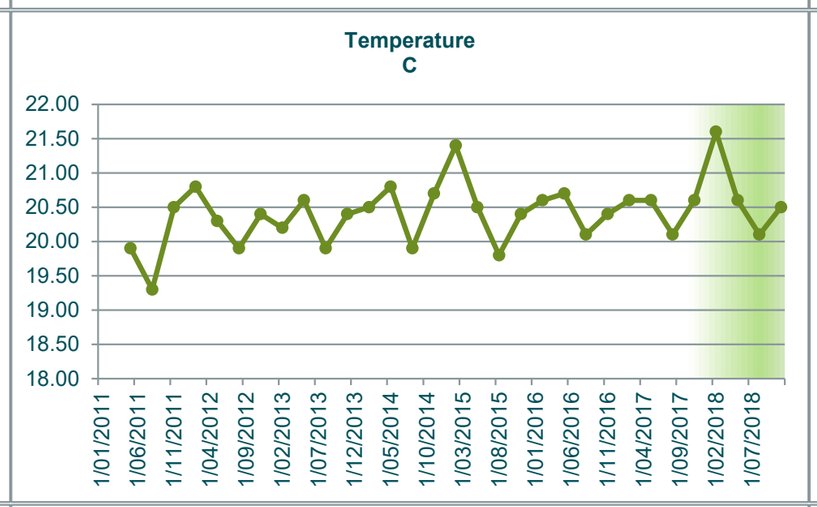

Phosphorus (Total)
mg/L
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

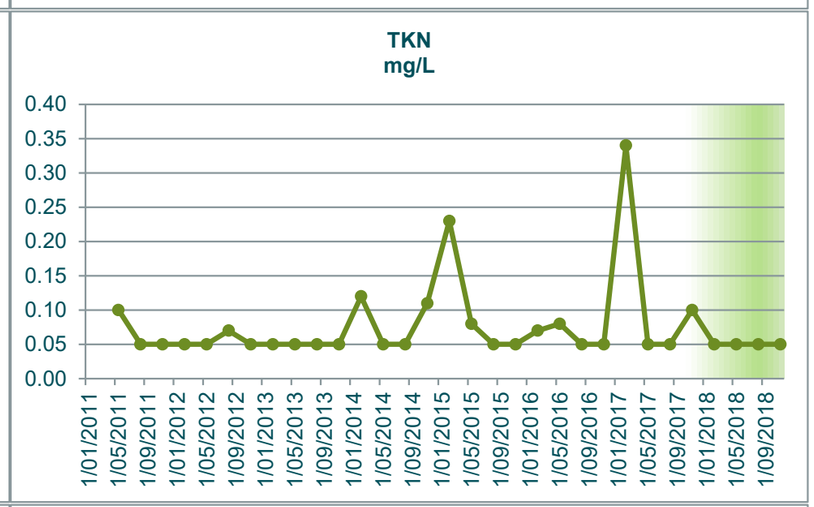

Potassium (Total)
mg/L
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

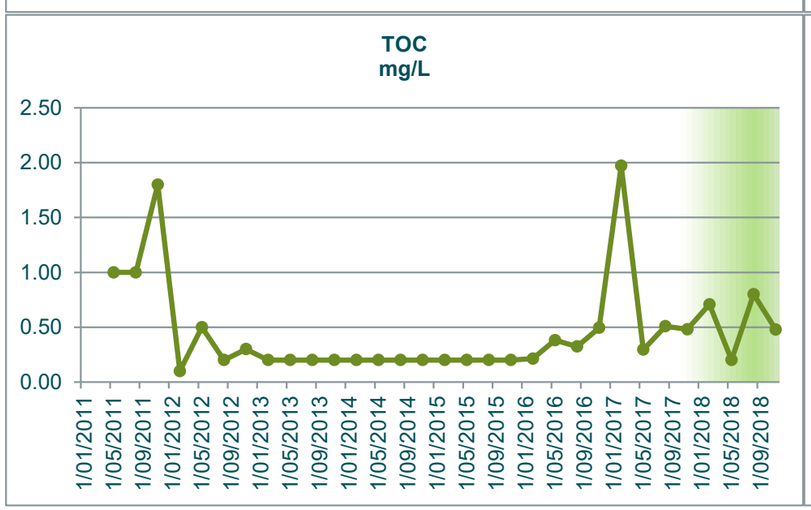

Redox Potential
mV
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
-100.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

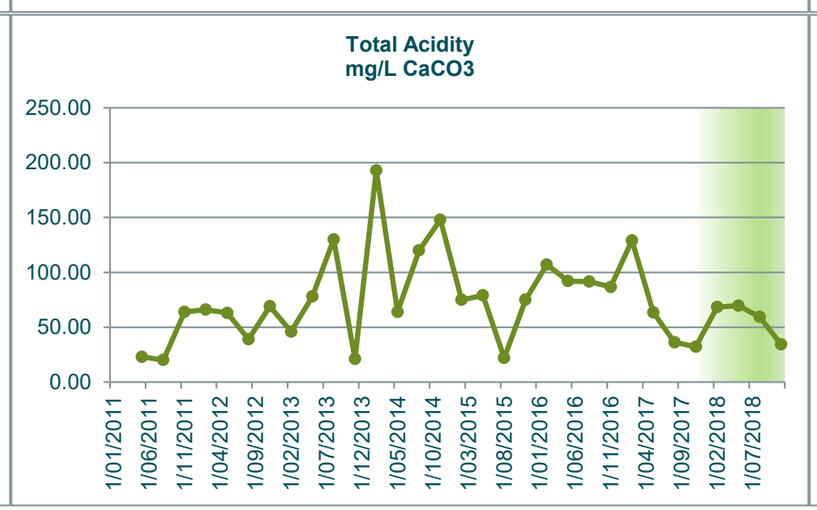

Sodium (Total)
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

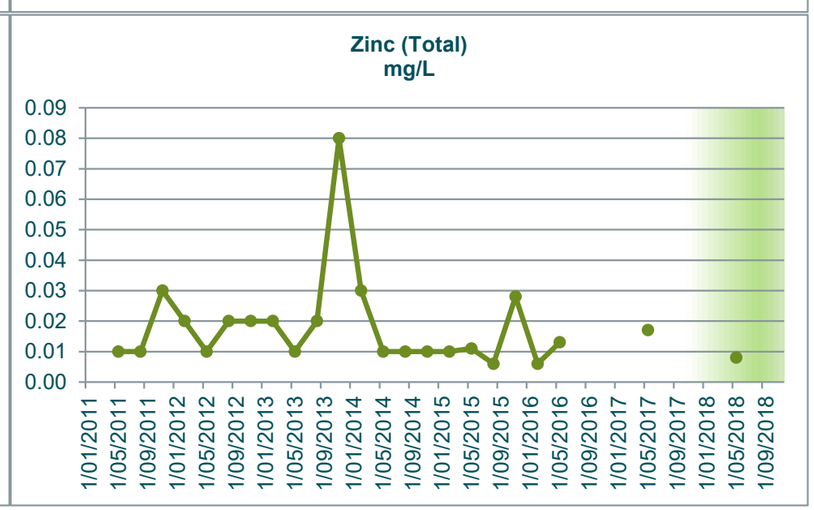

Sulphate
mg/L
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
22.00
21.50
21.00
20.50
20.00
19.50
19.00
18.50
18.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

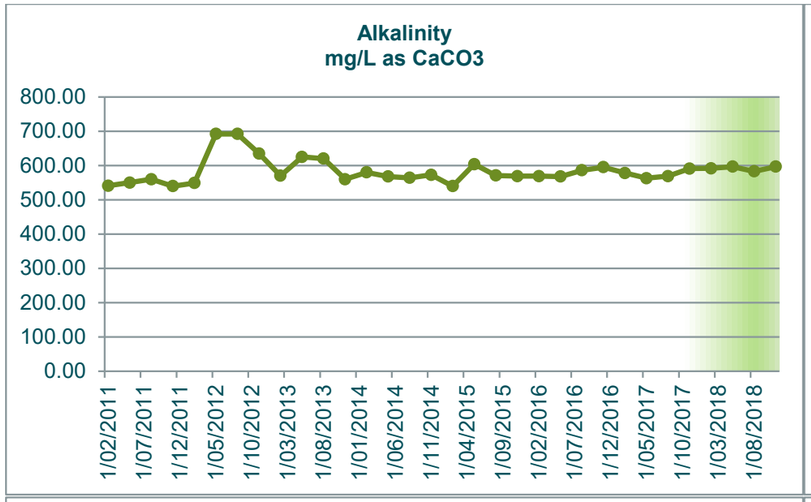

TKN
mg/L
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

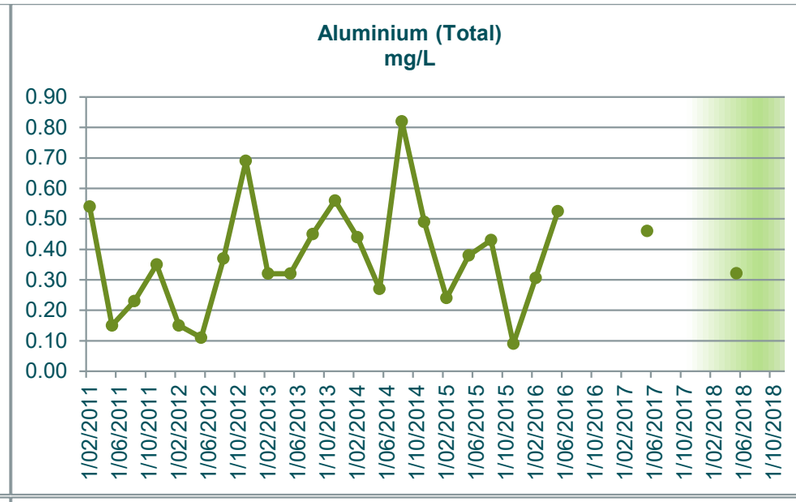

TOC
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

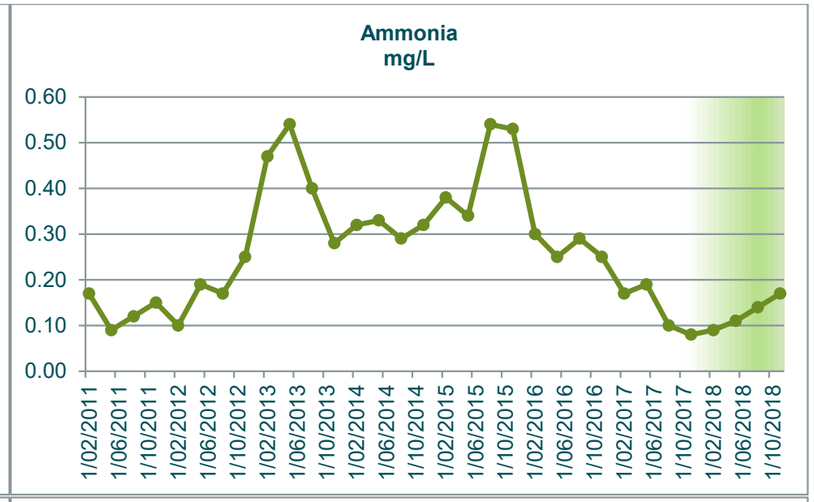

Total Acidity
mg/L CaCO3
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

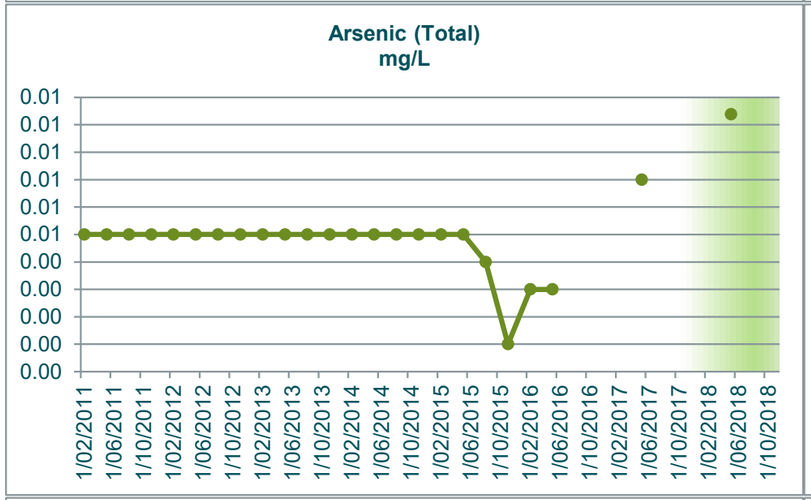

Zinc (Total)
mg/L
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

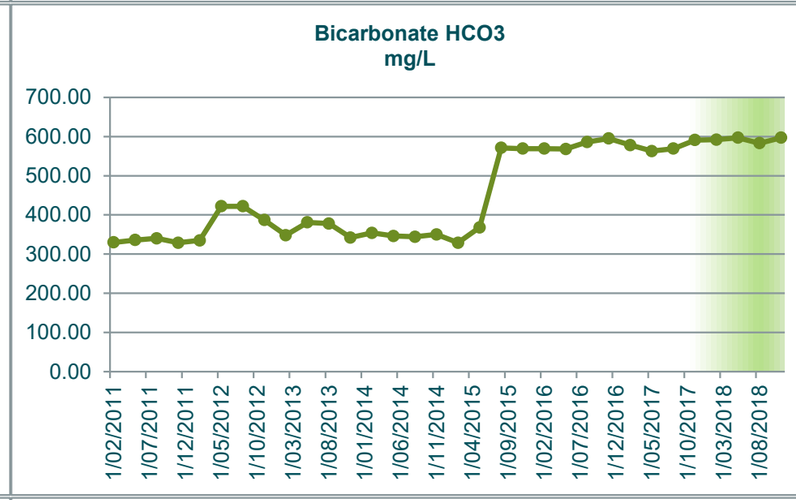
GW22	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
1/02/2011	541.00	0.54	0.17	0.01	330.00	1.00	0.00	118.00	105.00	0.01	0.01	0.01	1346.00	0.01	3.00	0.13	0.98	0.01	11.00	0.88	0.01	0.05	0.05	0.05	0.22	6.90	0.05	5.00	-12.00	123.00	80.00	21.60	0.17	1.90	124.00	0.01
11/05/2011	550.00	0.15	0.09	0.01	336.00	1.00	0.00	136.00	98.00	0.01	0.01	0.01	1498.00	0.02	1.00	0.12	1.11	0.01	14.00	1.15	0.01	0.05	0.05	0.05	0.17	6.80	0.05	11.00	103.00	159.00	91.00	19.80	0.17	1.90	74.00	0.01
10/08/2011	560.00	0.23	0.12	0.01	340.00	1.50	0.00	127.00	98.00	0.01	0.01	0.01	1343.00	0.01	1.10	0.12	1.09	0.01	13.00	1.04	0.01	0.05	0.05	0.05	0.18	6.80	0.05	6.00	19.00	170.00	80.00	20.40	0.18	2.20	105.00	0.01
9/11/2011	540.00	0.35	0.15	0.01	329.00	1.00	0.00	0.80	110.00	0.01	0.01	0.01	1416.00	0.01	1.00	0.15	1.14	0.01	2.10	1.20	0.01	0.09	0.02	0.09	0.29	6.90	0.04	25.00	20.00	12.00	8.20	21.70	0.20	1.70	70.00	0.03
7/02/2012	549.00	0.15	0.10	0.01	335.00	1.20	0.00	138.00	91.00	0.01	0.01	0.01	1425.00	0.01	1.00	0.14	0.99	0.01	13.00	1.15	0.01	0.02	0.02	0.02	0.19	6.90	0.03	7.00	77.00	185.00	89.00	21.30	0.19	1.20	92.00	0.01
9/05/2012	692.00	0.11	0.19	0.01	422.00	1.00	0.00	131.00	85.00	0.01	0.01	0.01	1488.00	0.01	2.70	0.15	1.18	0.01	12.00	1.14	0.01	0.05	0.02	0.05	0.27	6.70	0.04	6.00	218.00	146.00	78.00	20.50	0.22	1.50	42.00	0.02
7/08/2012	692.00	0.37	0.17	0.01	422.00	1.50	0.00	126.00	68.00	0.01	0.01	0.01	1447.00	0.01	3.00	0.15	1.61	0.01	12.00	1.16	0.01	0.15	0.02	0.15	0.50	6.90	0.06	6.00	-88.00	141.00	76.00	20.00	0.35	1.60	51.00	0.05
14/11/2012	635.00	0.69	0.25	0.01	387.00	1.00	0.00	131.00	96.00	0.01	0.01	0.01	1418.00	0.01	2.90	0.16	1.98	0.01	14.00	1.16	0.01	0.05	0.02	0.05	0.55	6.90	0.06	6.00	-110.00	144.00	68.00	20.60	0.50	1.40	74.00	0.09
14/02/2013	570.00	0.32	0.47	0.01	348.00	1.20	0.00	142.00	95.00	0.01	0.01	0.01	1444.00	0.01	2.90	0.12	2.36	0.01	14.00	1.46	0.01	0.05	0.03	0.08	0.76	6.90	0.03	6.00	-81.00	173.00	81.00	20.50	0.68	1.50	60.00	0.05
15/05/2013	625.00	0.32	0.54	0.01	381.00	1.20	0.00	137.00	110.00	0.01	0.01	0.01	1453.00	0.01	2.70	0.14	2.76	0.01	13.00	1.45	0.01	0.12	0.02	0.12	0.93	6.90	0.07	5.00	-80.00	160.00	80.00	20.30	0.81	1.70	104.00	0.04
7/08/2013	620.00	0.45	0.40	0.01	378.00	1.00	0.00	141.00	96.00	0.01	0.01	0.01	1451.00	0.01	2.60	0.15	4.97	0.01	14.00	1.76	0.01	0.14	0.02	0.14	0.76	6.90	0.07	6.00	-94.00	175.00	95.00	20.30	0.62	2.00	176.00	0.08
13/11/2013	560.00	0.56	0.28	0.01	342.00	1.20	0.00	145.00	97.00	0.01	0.01	0.01	1535.00	0.01	2.80	0.17	6.26	0.01	16.00	2.02	0.01	0.08	0.02	0.08	0.58	6.90	0.05	6.00	-76.00	190.00	100.00	20.70	0.50	2.00	99.00	0.10
12/02/2014	580.00	0.44	0.32	0.01	354.00	1.20	0.00	127.00	99.00	0.01	0.01	0.01	1391.00	0.01	2.80	0.15	5.73	0.01	14.00	1.88	0.01	0.12	0.02	0.12	0.79	6.90	0.02	5.00	-85.00	171.00	90.00	20.90	0.67	2.40	196.00	0.09
14/05/2014	568.00	0.27	0.33	0.01	346.00	1.00	0.00	122.00	110.00	0.01	0.01	0.01	1534.00	0.01	2.90	0.16	5.40	0.01	14.00	1.89	0.01	0.06	0.02	0.08	0.57	6.80	0.02	5.00	-69.00	169.00	87.00	20.20	0.49	2.40	103.00	0.04
13/08/2014	564.00	0.82	0.29	0.01	344.00	1.80	0.00	146.00	115.00	0.01	0.01	0.01	1524.00	0.01	4.20	0.16	7.13	0.01	16.00	2.19	0.01	0.11	0.02	0.11	0.67	6.90	0.03	6.00	-70.00	193.00	105.00	20.00	0.56	144.00	203.00	0.08
11/11/2014	573.00	0.49	0.32	0.01	350.00	1.80	0.00	138.00	120.00	0.01	0.01	0.01	1537.00	0.01	2.90	0.17	7.35	0.01	16.00	2.10	0.01	0.04	0.05	0.09	0.70	6.90	0.04	6.00	-48.00	196.00	18.00	20.90	0.61	1.40	141.00	0.06
10/02/2015	540.00	0.24	0.38	0.01	329.00	1.00	0.00	115.00	130.00	0.01	0.01	0.01	1606.00	0.01	2.90	0.16	7.11	0.01	14.00	2.14	0.01	0.08	0.02	0.10	0.75	6.90	0.03	6.00	-48.00	183.00	115.00	20.70	0.65	2.80	122.00	0.06
12/05/2015	604.00	0.38	0.34	0.01	368.00	1.50	0.00	144.00	121.00	0.00	0.01	0.01	1588.00	0.00	2.80	0.17	9.96	0.00	16.00	2.56	0.00	0.02	0.05	0.05	0.74	6.80	0.08	6.00	-63.00	210.00	127.00	20.40	0.69	2.80	128.00	0.06
12/08/2015	571.00	0.43	0.54	0.00	571.00	1.80	0.00	139.00	132.00	0.00	0.01	0.01	1643.00	0.00	3.00	0.17	8.25	0.00	16.00	2.26	0.00	0.04	0.03	0.07	1.05	7.00	0.05	6.40	-63.00	207.00	115.00	20.40	0.98	2.50	102.00	0.11
11/11/2015	569.00	0.09	0.53	0.00	569.00	1.00	0.00	133.00	142.00	0.00	0.01	0.01	1653.00	0.00	2.10	0.20	4.51	0.00	17.00	2.14	0.00	0.04	0.03	0.07	0.85	6.90	0.04	6.30	-45.00	201.00	120.00	20.70	0.78	3.00	103.00	0.03
9/02/2016	569.00	0.31	0.30	0.00	569.00	1.20	0.00	135.21	120.00	0.00	0.01	0.01	1606.00	0.00	2.70	0.16	10.83	0.00	14.35	2.60	0.00	0.02	0.04	0.05	0.77	6.90	0.10	5.38	-75.00	195.40	127.49	20.80	0.72	2.03	134.00	0.03
10/05/2016	568.00	0.53	0.25	0.00	568.00	2.40	0.00	140.65	115.00	0.00	0.01	0.01	1607.00	0.00	1.50	0.18	10.85	0.00	13.89	2.55	0.00	0.05	0.02	0.05	0.79	6.80	0.08	5.30	-45.00	198.04	115.32	20.70	0.74	2.94	159.00	0.07
10/08/2016	586.00		0.29		586.00	2.40		137.08	105.00				1637.50		2.70	0.18			13.45			0.02	0.09	0.07	0.68	6.70	0.04	5.16	-45.00	200.05	147.48	20.40	0.61	10.65	143.20	
8/11/2016	595.00		0.25		595.00	1.20		140.43	105.00				1582.70		1.70	0.17			13.12			0.02	0.10	0.06	0.55	6.70	0.03	5.00	-14.80	203.37	134.73	21.50	0.49	2.90	192.60	
8/02/2017	578.00		0.17		578.00	1.00		136.28	110.00				1590.50		2.30	0.08			12.44			0.02	0.08	0.05	0.46	6.50	0.02	5.00	40.00	195.87	128.55	21.10	0.41	2.65	234.30	
9/05/2017	563.00	0.46	0.19	0.01	563.00	1.20	0.00	136.10	115.00	0.00	0.01	0.01	1555.10	0.00	3.00	0.19	8.10	0.00	12.25	2.15	0.00	0.02	0.08	0.07	0.49	6.60	0.02	5.00	-39.30	193.88	145.91	20.30	0.42	2.35	152.00	0.04
9/08/2017	569.07		0.10		569.00	2.40		138.28	325.00				1564.60		3.00	0.18			11.85			0.12	0.07	0.19	0.42	6.50	0.02	5.00	4.10	201.19	117.97	20.30	0.23	3.51	160.80	
8/11/2017	591.11		0.08		591.00	1.20		138.21	96.00				1560.70		2.80	0.18			11.66			0.04	0.06	0.10	0.51	6.60	0.06	5.00	-28.10	194.04	118.41	20.40	0.41	2.05	175.00	
14/02/2018	591.57		0.09		592.00	3.00		134.93	95.00				1537.10		2.70	0.21			11.21			0.09	0.08	0.17	0.46	6.70	0.03	<5	-4.80	192.33	120.33	21.40	0.29	3.42	119.10	
9/05/2018	596.74	0.32	0.11	0.01	597.00	1.50	0.00	134.92	87.50	0.00	0.01	0.01	1509.50	0.00	2.20	0.22	8.11	0.00	11.28	1.82	0.00	0.02	0.06	0.02	0.33	6.60	0.03	3.86	-43.60	193.85	113.84	20.50	0.33	2.15	164.50	0.02
15/08/2018	583.08		0.14		583.00	3.30		143.35	87.50				1496.00		2.50	0.20			11.57			0.02	0.08	0.03	0.39	6.70	0.04	4.16	-7.00	205.86	117.78	20.30	0.36	3.80	126.90	
14/11/2018	596.63		0.17		597.00	1.20		138.66	90.00				1477.00		3.43	0.21			11.46			0.02	0.05	0.05	0.54	6.81	0.05	4.17	-52.00	196.79	116.34	20.90	0.49	2.26	136.00	
2018 Min	**583.08**	**0.32**	**0.09**	**0.01**	**583.00**	**1.20**	**0.00**	**134.92**	**87.50**	**0.00**	**0.01**	**0.01**	**1477.00**	**0.00**	**2.20**	**0.20**	**8.11**	**0.00**	**11.21**	**1.82**	**0.00**	**0.02**	**0.05**	**0.02**	**0.33**	**6.60**	**0.03**	**3.86**	**-52.00**	**192.33**	**113.84**	**20.30**	**0.29**	**2.15**	**119.10**	**0.02**
2018 Max	**596.74**	**0.32**	**0.17**	**0.01**	**597.00**	**3.30**	**0.00**	**143.35**	**95.00**	**0.00**	**0.01**	**0.01**	**1537.10**	**0.00**	**3.43**	**0.22**	**8.11**	**0.00**	**11.57**	**1.82**	**0.00**	**0.09**	**0.08**	**0.17**	**0.54**	**6.81**	**0.05**	**4.17**	**-4.80**	**205.86**	**120.33**	**21.40**	**0.49**	**3.80**	**164.50**	**0.02**
2018 Mean	**592.01**	**0.32**	**0.13**	**0.01**	**592.25**	**2.25**	**0.00**	**137.96**	**90.00**	**0.00**	**0.01**	**0.01**	**1504.90**	**0.00**	**2.71**	**0.21**	**8.11**	**0.00**	**11.38**	**1.82**	**0.00**	**0.04**	**0.07**	**0.07**	**0.43**	**6.70**	**0.04**	**4.06**	**-26.85**	**197.21**	**117.07**	**20.78**	**0.37**	**2.91**	**136.63**	**0.02**
Long-term Average	**584.07**	**0.38**	**0.25**	**0.00**	**455.28**	**1.47**	**0.00**	**130.97**	**111.53**	**0.01**	**0.01**	**0.01**	**1514.49**	**0.01**	**2.53**	**0.16**	**4.99**	**0.01**	**13.11**	**1.74**	**0.01**	**0.06**	**0.04**	**0.08**	**0.56**	**6.80**	**0.04**	**6.28**	**-28.30**	**177.46**	**100.23**	**20.64**	**0.49**	**6.96**	**127.08**	**0.05**

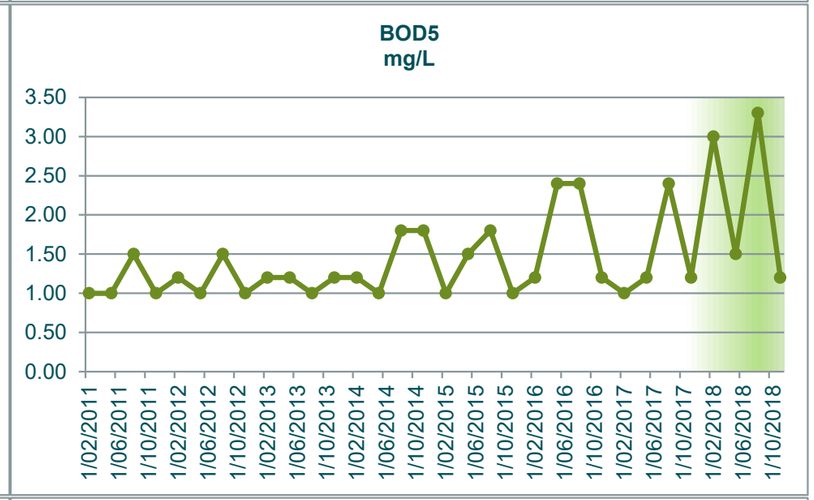

Alkalinity
mg/L as CaCO3
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

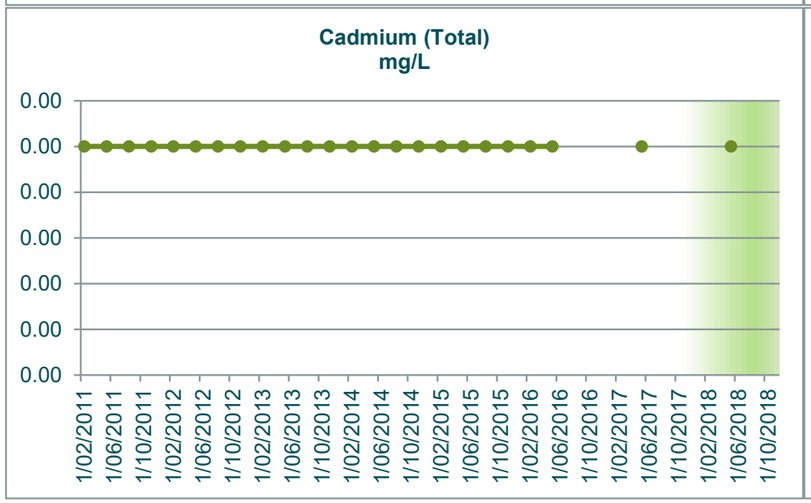

Aluminium (Total)
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

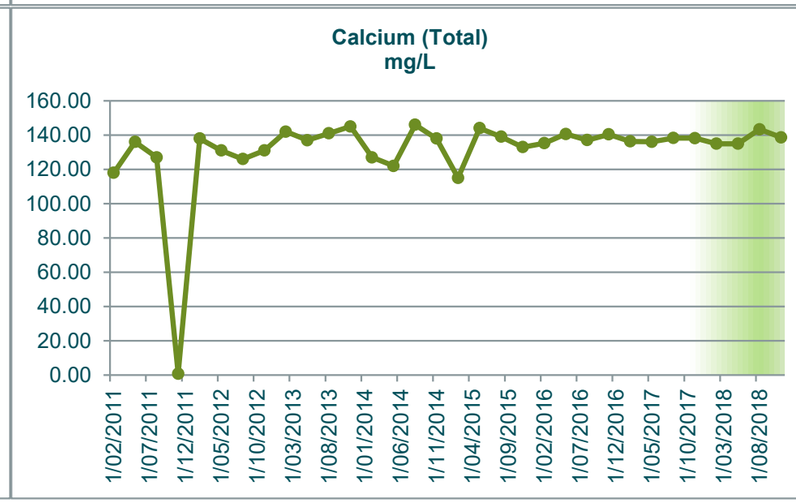

Ammonia
mg/L
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

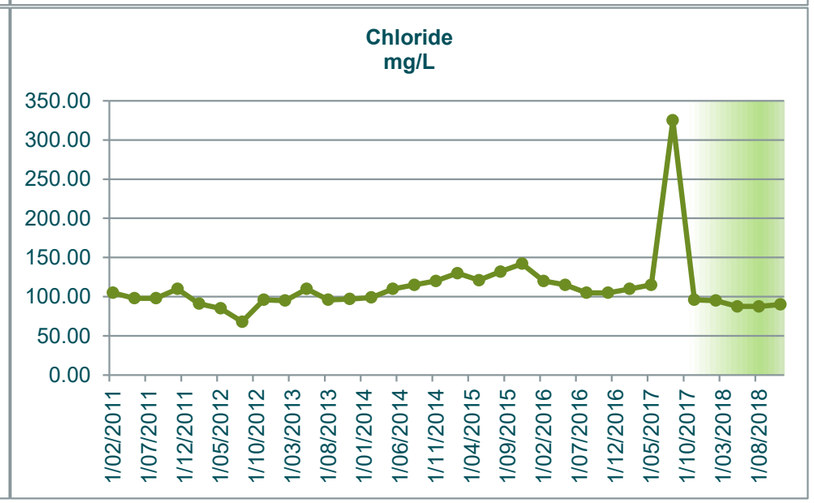

Arsenic (Total)
mg/L
0.01
0.01
0.01
0.01
0.01
0.01
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

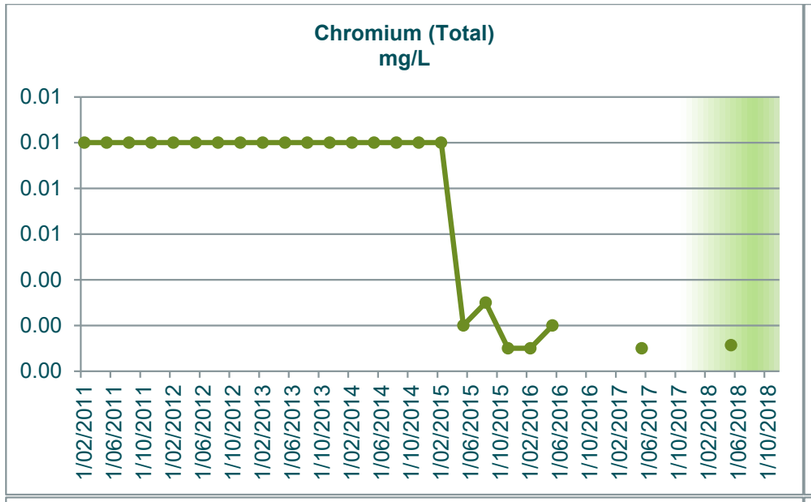

Bicarbonate HCO3
mg/L
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

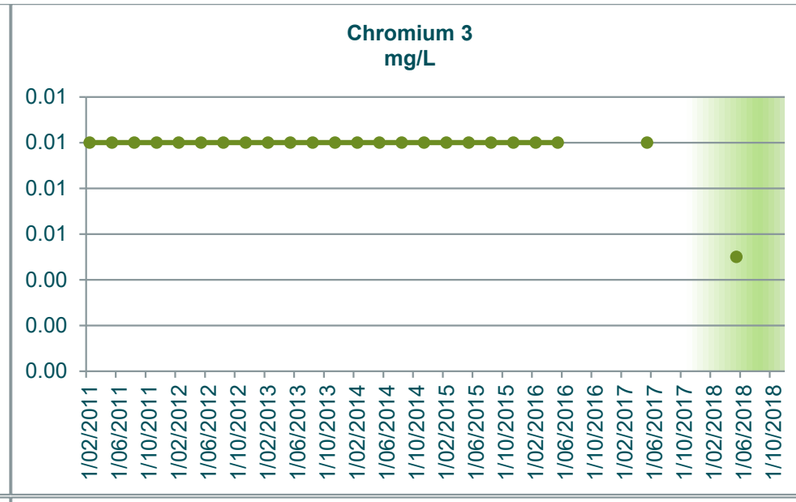

BOD5
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

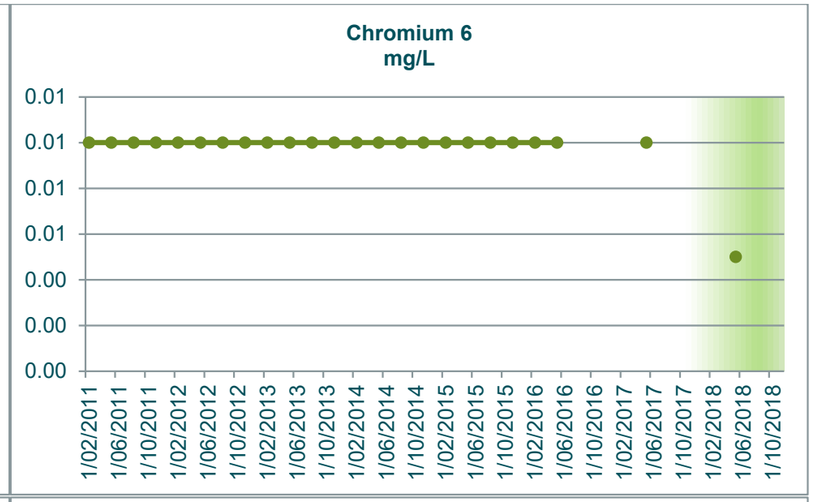

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

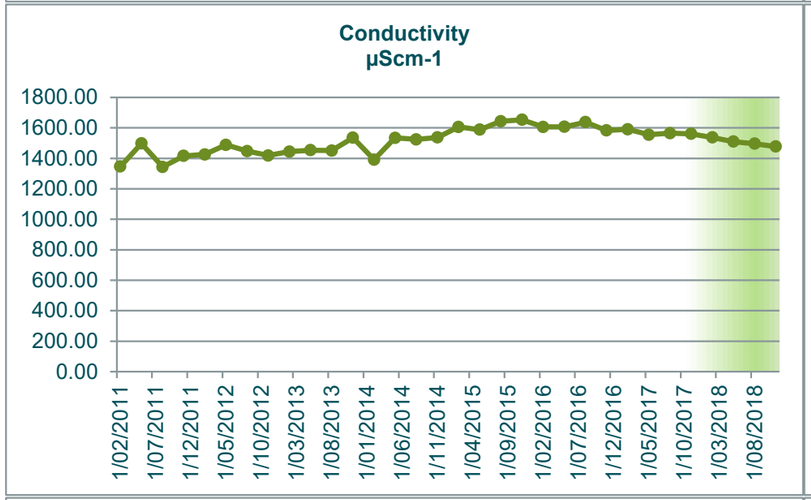

Calcium (Total)
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

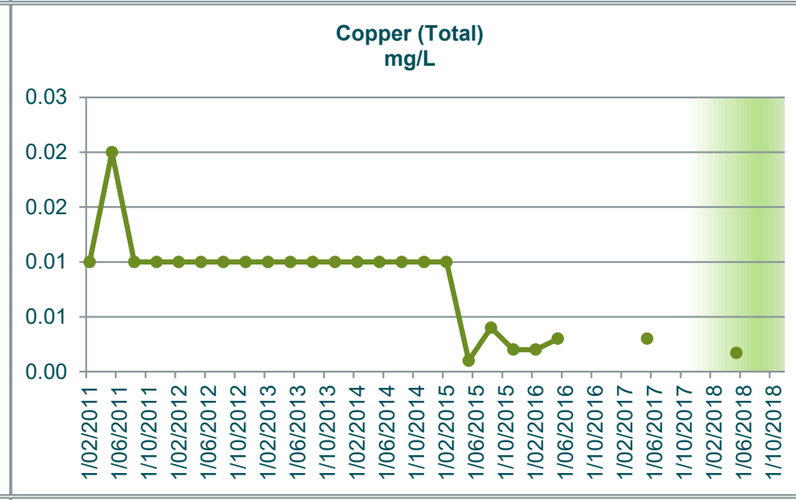

Chloride
mg/L
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

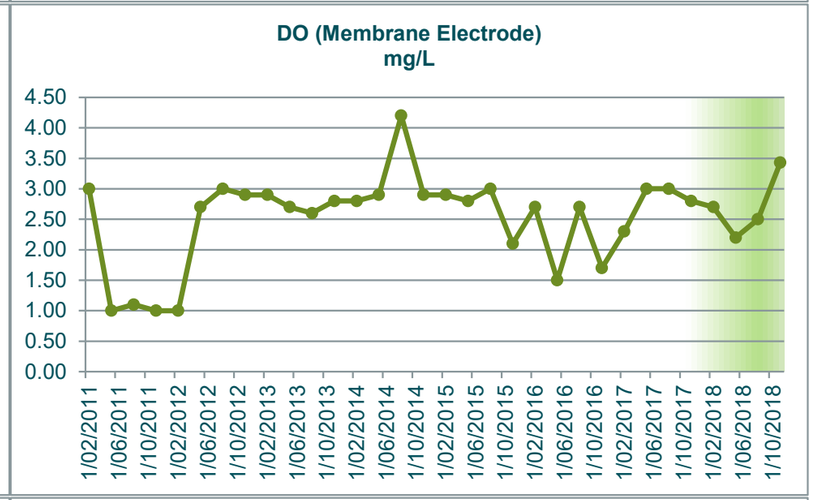

Chromium (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

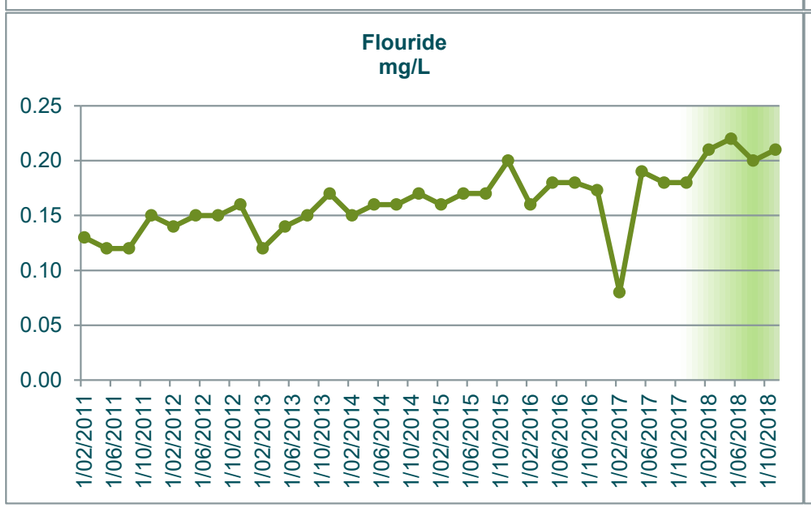

Chromium 3
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

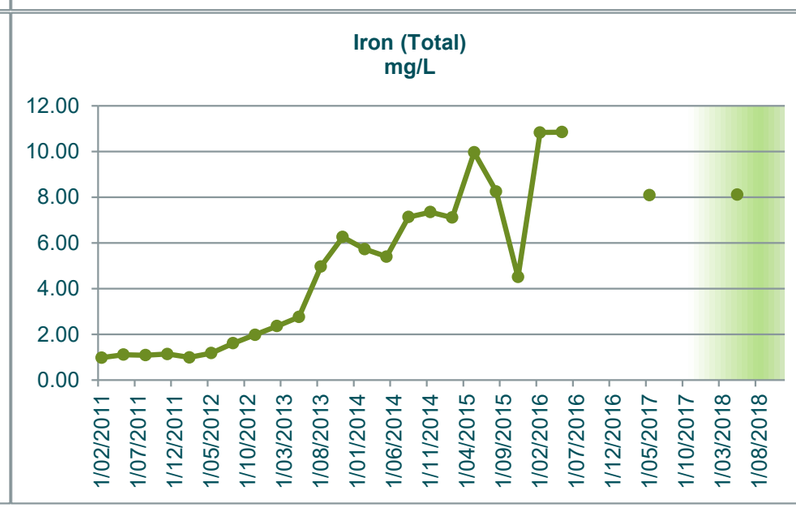

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

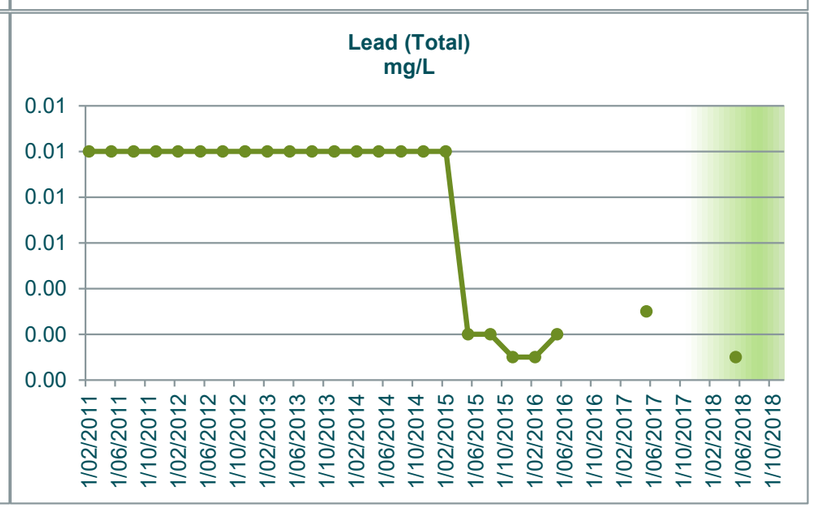

Conductivity
µScm-1
1800.00
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Copper (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

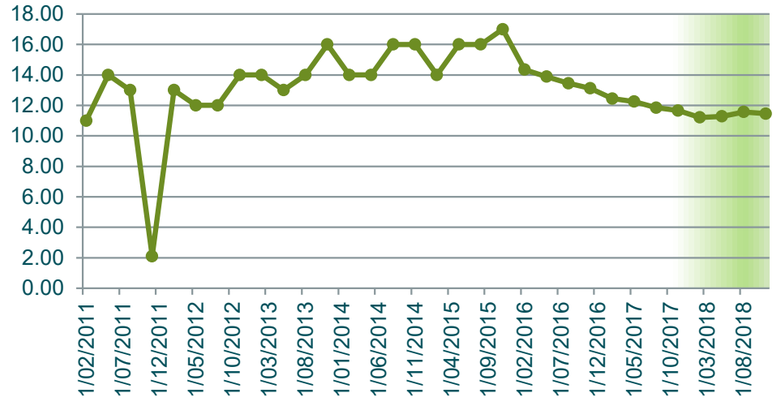

DO (Membrane Electrode)
mg/L
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Flouride
mg/L
0.25
0.20
0.15
0.10
0.05
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


Iron (Total)
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

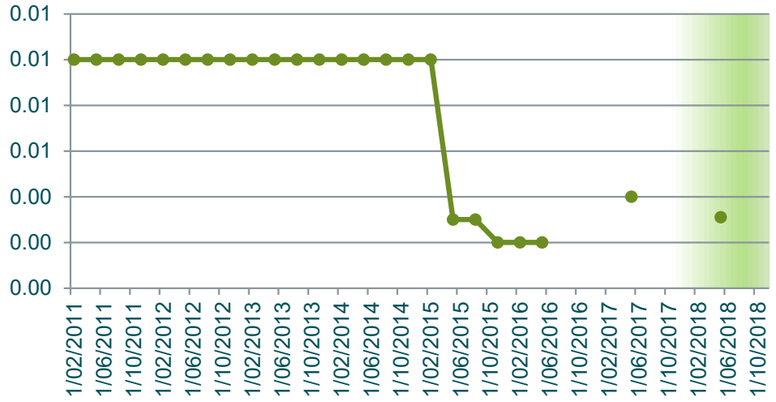

Lead (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

Magnesium (Total)
mg/L



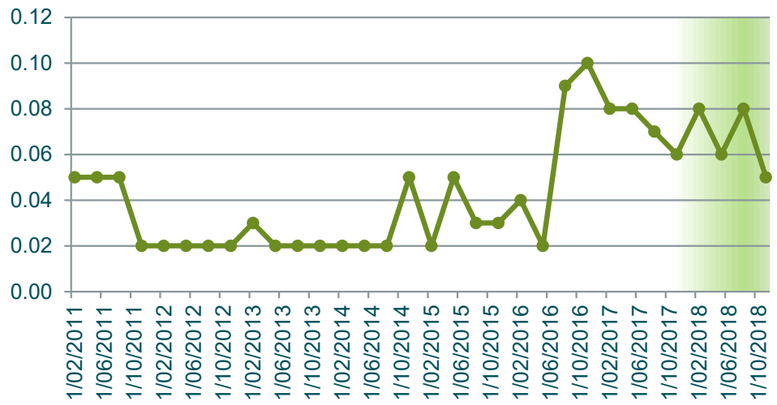
Manganese (Total)
mg/L

Nickel (Total)
mg/L

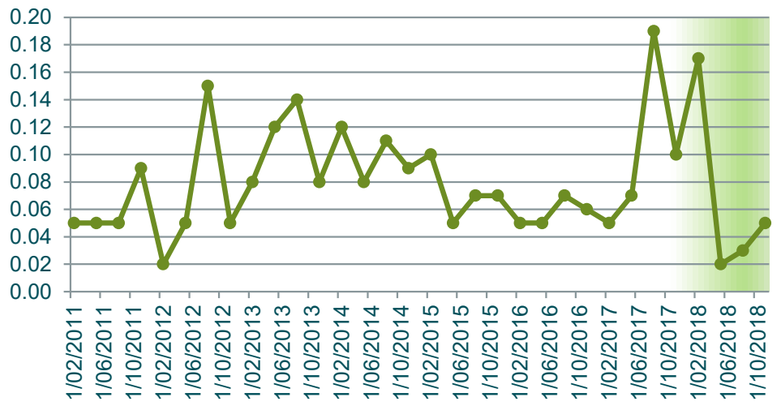


Nitrate
N mg/L

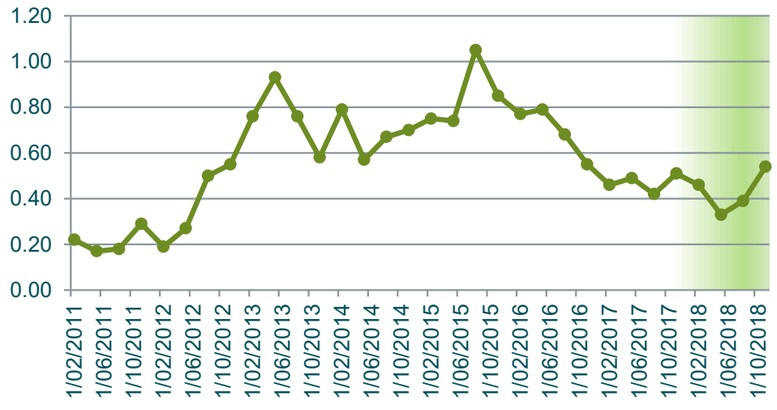
Nitrite
N mg/L



Nitrogen Oxidised
mg/L

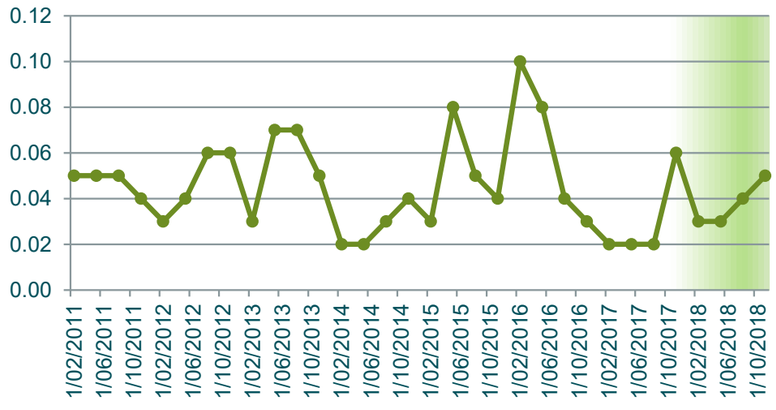


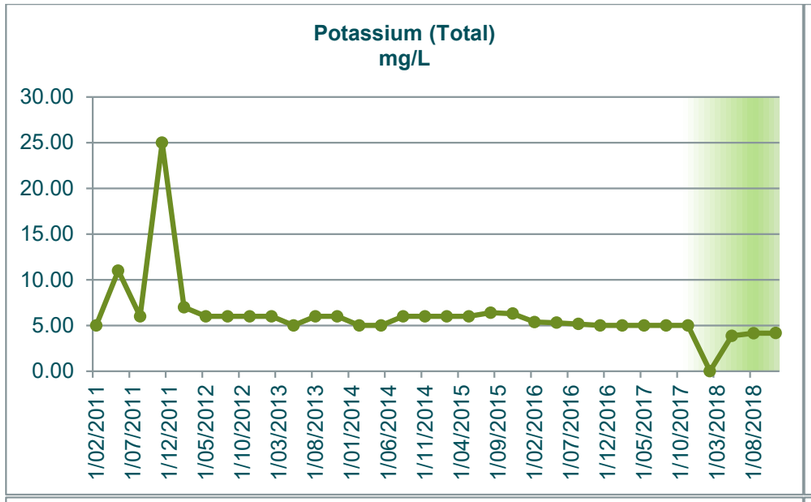
Nitrogen (Total)
mg/L

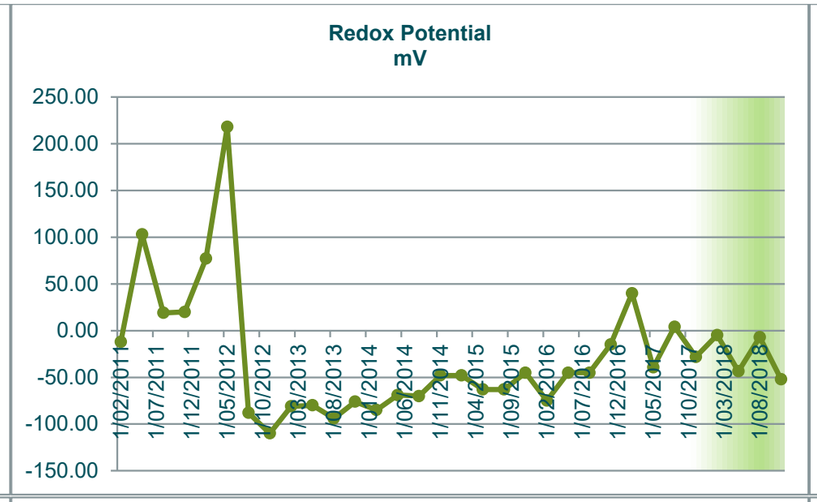


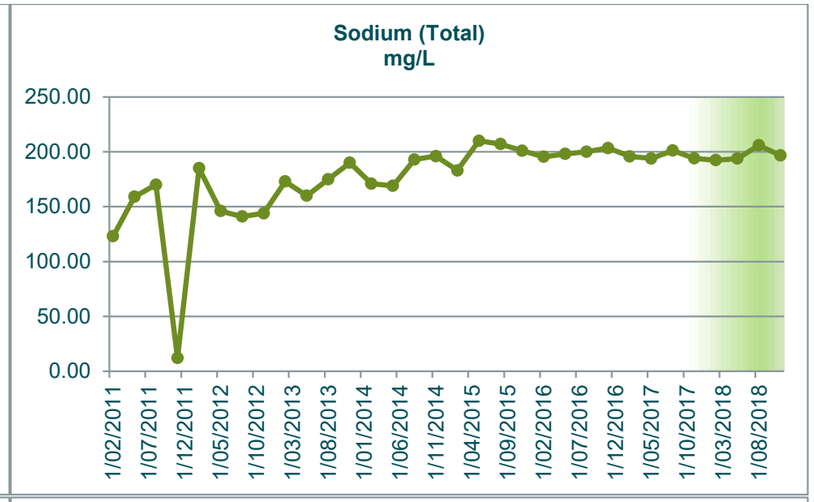
pH
pH units

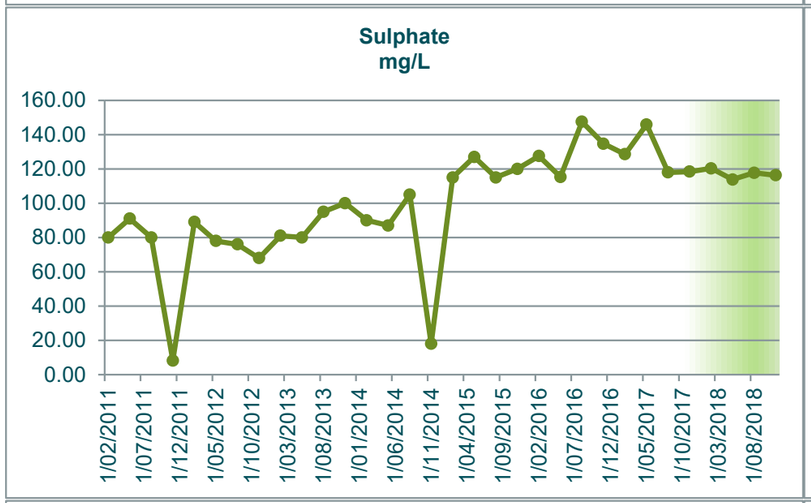
Phosphorus (Total)
mg/L

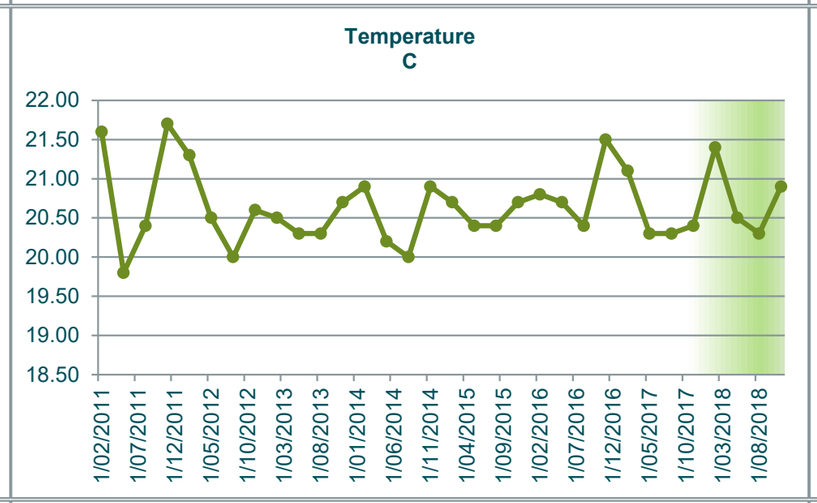


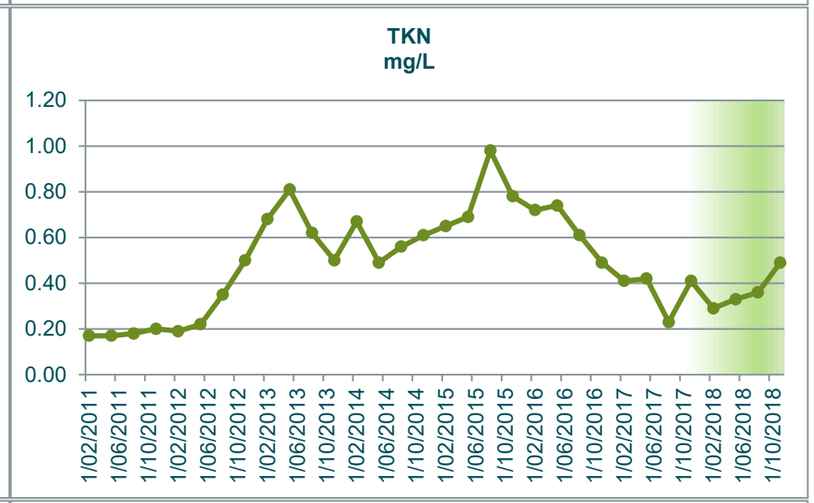

Potassium (Total)
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

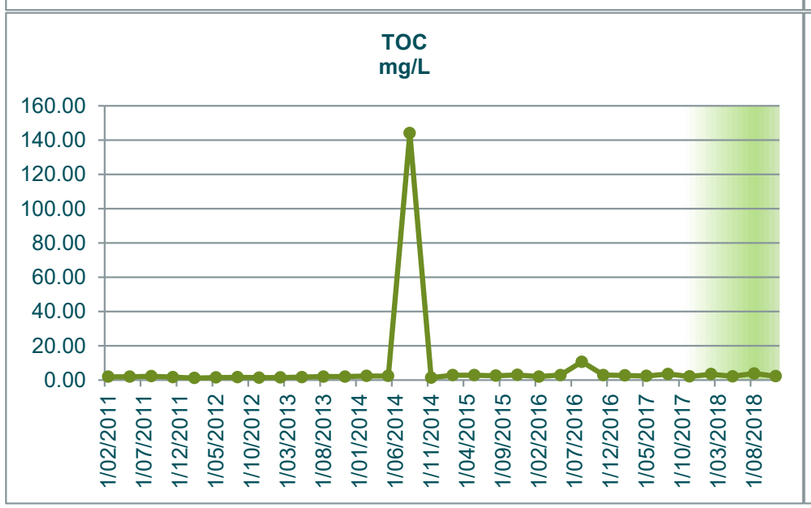

Redox Potential
mV
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

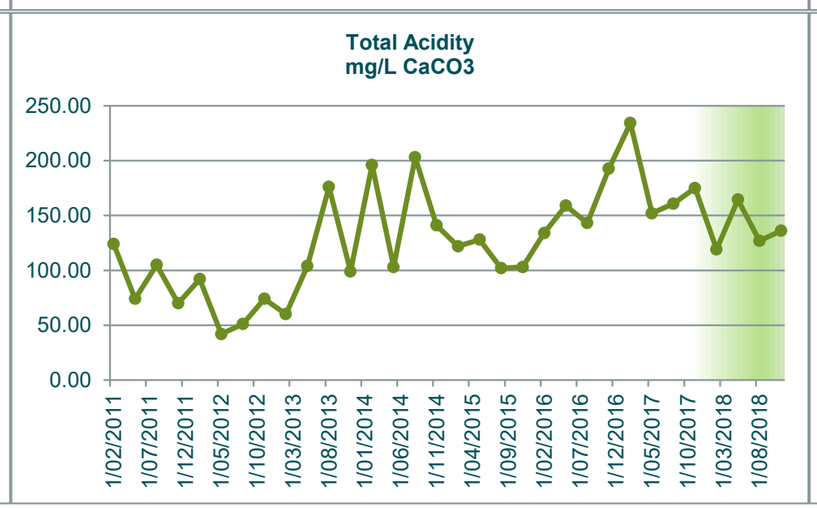

Sodium (Total)
mg/L
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

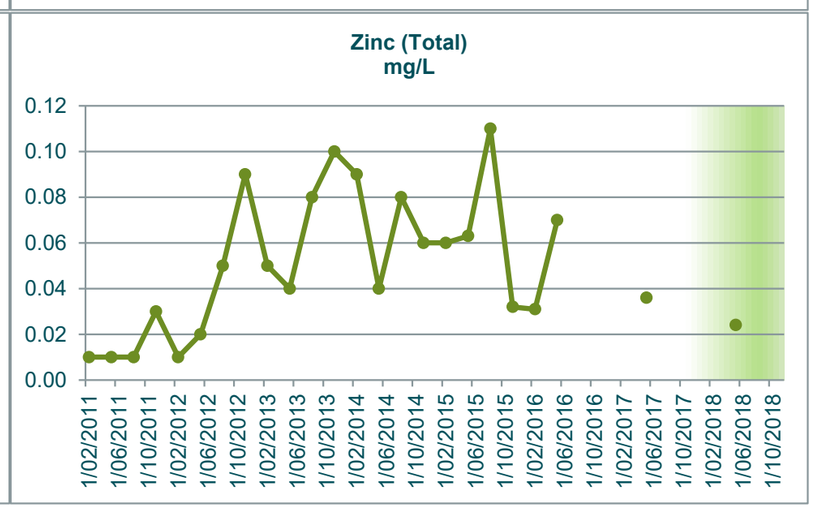

Sulphate
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Temperature
C
22.00
21.50
21.00
20.50
20.00
19.50
19.00
18.50
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


TKN
mg/L
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018


TOC
mg/L
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018

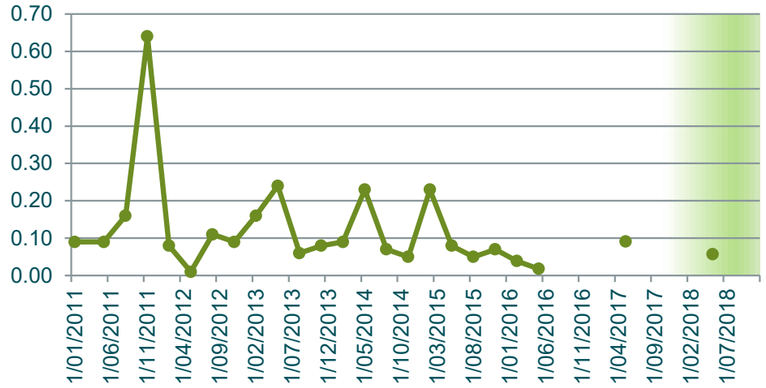

Total Acidity
mg/L CaCO3
250.00
200.00
150.00
100.00
50.00
0.00
1/02/2011
1/07/2011
1/12/2011
1/05/2012
1/10/2012
1/03/2013
1/08/2013
1/01/2014
1/06/2014
1/11/2014
1/04/2015
1/09/2015
1/02/2016
1/07/2016
1/12/2016
1/05/2017
1/10/2017
1/03/2018
1/08/2018


Zinc (Total)
mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/02/2011
1/06/2011
1/10/2011
1/02/2012
1/06/2012
1/10/2012
1/02/2013
1/06/2013
1/10/2013
1/02/2014
1/06/2014
1/10/2014
1/02/2015
1/06/2015
1/10/2015
1/02/2016
1/06/2016
1/10/2016
1/02/2017
1/06/2017
1/10/2017
1/02/2018
1/06/2018
1/10/2018

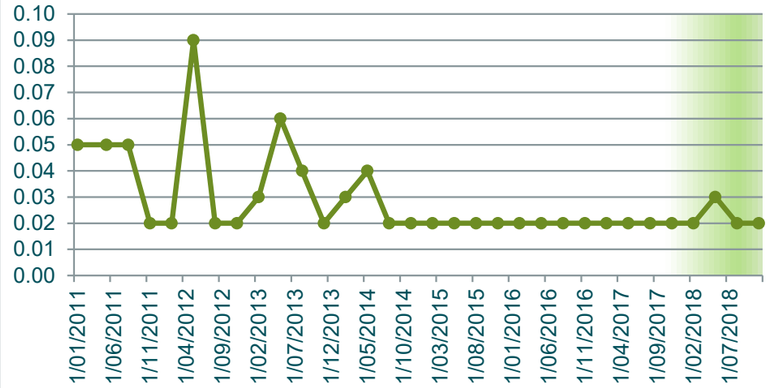
GW23	Alkalinity mg/L as CaCO3	Aluminium (Total) mg/L	Ammonia mg/L	Arsenic (Total) mg/L	Bicarbonate HCO3 mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Chromium 3 mg/L	Chromium 6 mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Flouride mg/L	Iron Total mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Sulphate mg/L	Temperature C	TKN mg/L	TOC mg/L	Total Acidity mg/L CaCO3	Zinc (Total) mg/L
31/01/2011	147.00	0.09	0.05	0.01	90.00	9.00	0.00	19.00	120.00	0.01	0.01	0.01	732.00	0.01	3.20	0.15	1.73	0.01	11.00	1.63	0.01	0.05	0.05	0.05	0.08	6.60	0.05	5.00	-41.00	99.00	36.00	20.80	0.08	6.30	38.00	0.06
10/05/2011	130.00	0.09	0.05	0.01	79.00	11.00	0.00	20.00	140.00	0.01	0.01	0.01	872.00	0.01	1.80	0.13	2.96	0.01	14.00	1.57	0.01	0.05	0.05	0.05	0.17	6.00	0.06	5.00	104.00	120.00	37.00	20.10	0.17	3.90	79.00	0.01
9/08/2011	121.00	0.16	0.05	0.01	74.00	4.50	0.00	19.00	160.00	0.01	0.01	0.01	822.00	0.01	1.30	0.12	2.63	0.01	13.00	0.96	0.01	0.05	0.05	0.05	0.16	6.50	0.05	5.00	214.00	109.00	34.00	19.70	0.16	3.80	70.00	0.03
8/11/2011	105.00	0.64	0.02	0.01	64.00	3.60	0.00	26.00	210.00	0.01	0.01	0.01	803.00	0.01	1.40	0.13	15.00	0.01	19.00	1.88	0.01	0.02	0.02	0.02	0.18	6.50	0.05	14.00	93.60	95.00	49.00	20.10	0.16	3.60	56.00	0.28
6/02/2012	106.00	0.08	0.02	0.01	65.00	5.40	0.00	22.00	154.00	0.01	0.01	0.01	777.00	0.01	1.00	0.13	3.35	0.01	14.00	1.62	0.01	0.02	0.02	0.05	0.09	6.30	0.04	5.00	68.00	130.00	42.00	20.80	0.09	2.90	58.00	0.10
8/05/2012	100.00	0.01	0.09	0.01	61.00	2.70	0.00	23.00	185.00	0.01	0.01	0.01	911.00	0.01	2.70	0.12	3.44	0.01	16.00	1.59	0.01	0.07	0.02	0.07	0.16	6.60	0.05	5.00	137.00	133.00	40.00	20.60	0.09	2.20	72.00	0.01
6/08/2012	88.00	0.11	0.02	0.01	54.00	1.20	0.00	21.00	3.00	0.01	0.01	0.01	841.00	0.01	1.00	0.08	2.87	0.01	14.00	0.88	0.01	0.02	0.02	0.02	0.12	6.20	0.05	5.00	192.00	92.00	38.00	19.80	0.12	0.80	55.00	0.11
13/11/2012	88.00	0.09	0.02	0.01	54.00	1.20	0.00	19.00	140.00	0.01	0.01	0.01	757.00	0.01	1.40	0.12	3.81	0.01	13.00	0.91	0.01	0.02	0.02	0.02	0.07	6.40	0.03	5.00	100.00	91.00	32.00	20.00	0.07	0.70	50.00	0.01
13/02/2013	77.00	0.16	0.03	0.01	47.00	2.00	0.00	30.00	320.00	0.01	0.01	0.01	1233.00	0.01	0.60	0.09	7.66	0.01	20.00	2.37	0.01	0.02	0.02	0.02	0.05	6.10	0.04	5.00	-13.00	158.00	63.00	20.20	0.05	1.00	61.00	0.06
14/05/2013	186.00	0.24	0.06	0.01	113.00	12.00	0.00	24.00	150.00	0.01	0.01	0.01	824.00	0.01	1.70	0.21	4.18	0.01	14.00	1.53	0.01	0.04	0.02	0.04	0.16	6.60	0.04	5.00	-74.00	118.00	22.00	20.40	0.12	5.10	73.00	0.02
6/08/2013	94.00	0.06	0.04	0.01	57.00	1.80	0.00	37.00	320.00	0.01	0.01	0.01	1344.00	0.01	0.70	0.18	7.94	0.01	24.00	2.44	0.01	0.02	0.02	0.02	0.10	6.20	0.08	5.00	3.00	190.00	75.00	20.20	0.08	1.20	133.00	0.04
12/11/2013	150.00	0.08	0.02	0.01	92.00	1.00	0.00	26.00	155.00	0.01	0.01	0.01	847.00	0.01	2.00	0.21	1.06	0.01	16.00	1.29	0.01	0.02	0.02	0.02	0.09	6.50	0.03	5.00	3.00	122.00	30.00	20.30	0.09	1.30	18.00	0.07
11/02/2014	170.00	0.09	0.03	0.01	104.00	3.90	0.00	24.00	127.00	0.01	0.01	0.01	718.00	0.01	1.00	0.15	2.81	0.01	14.00	1.48	0.01	0.02	0.02	0.02	0.27	6.60	0.03	5.00	-41.00	101.00	23.00	20.50	0.25	1.80	154.00	0.03
13/05/2014	144.00	0.23	0.04	0.01	88.00	3.90	0.00	27.00	118.00	0.01	0.01	0.01	692.00	0.01	2.00	0.18	2.22	0.01	14.00	1.19	0.01	0.04	0.02	0.04	0.10	6.60	0.03	5.00	-61.00	95.00	22.00	21.00	0.06	1.40	59.00	0.01
12/08/2014	142.00	0.07	0.02	0.01	87.00	2.10	0.00	27.00	111.00	0.01	0.01	0.01	668.00	0.01	3.40	0.18	1.30	0.01	14.00	0.59	0.01	0.02	0.02	0.02	0.06	6.70	0.03	5.00	-21.00	89.00	18.00	20.20	0.06	0.90	84.00	0.03
10/11/2014	146.00	0.05	0.02	0.01	89.00	1.00	0.00	26.00	106.00	0.01	0.01	0.01	647.00	0.01	1.10	0.18	1.23	0.01	14.00	0.51	0.01	0.02	0.02	0.02	0.09	6.70	0.03	5.00	1.00	88.00	20.00	20.70	0.09	0.80	93.00	0.03
9/02/2015	122.00	0.23	0.02	0.01	74.00	2.10	0.00	23.00	140.00	0.01	0.01	0.01	753.00	0.01	1.40	0.15	4.62	0.01	13.00	1.93	0.01	0.02	0.02	0.02	0.80	6.50	0.08	5.00	-27.00	88.00	28.00	21.70	0.80	1.20	80.00	0.04
11/05/2015	136.00	0.08	0.02	0.00	83.00	1.50	0.00	26.00	121.00	0.00	0.01	0.01	681.00	0.00	2.20	0.15	3.24	0.00	14.00	1.59	0.00	0.02	0.02	0.02	0.08	6.70	0.07	5.00	-30.00	90.00	22.00	21.10	0.08	1.30	57.00	0.01
11/08/2015	103.00	0.05	0.02	0.00	103.00	17.00	0.00	23.00	98.00	0.00	0.01	0.01	569.00	0.00	5.60	0.13	1.85	0.00	12.00	0.15	0.00	0.02	0.02	0.02	0.18	6.80	0.08	5.00	25.00	73.00	19.00	19.90	0.16	2.90	35.00	0.02
10/11/2015	123.00	0.07	0.02	0.00	123.00	3.30	0.00	24.00	110.00	0.00	0.01	0.01	542.00	0.00	1.30	0.16	2.50	0.00	13.00	0.93	0.00	0.02	0.02	0.02	0.09	6.60	0.08	5.00	-12.00	78.00	21.00	20.10	0.09	2.60	49.00	0.01
8/02/2016	120.00	0.04	0.02	0.00	120.00	7.20	0.00	21.97	100.00	0.00	0.01	0.01	616.00	0.00	1.80	0.12	3.21	0.00	11.99	1.34	0.00	0.02	0.02	0.02	0.09	6.60	0.08	5.00	-18.00	75.49	19.76	21.30	0.09	3.64	72.00	0.01
9/05/2016	122.00	0.02	0.02	0.00	122.00	3.60	0.00	23.92	115.00	0.00	0.01	0.01	663.00	0.00	1.50	0.14	3.04	0.00	12.87	1.38	0.00	0.02	0.02	0.02	0.06	6.50	0.07	5.00	-20.00	81.27	22.23	21.20	0.06	1.09	85.00	0.01
9/08/2016	115.00		0.02		115.00	1.00		24.24	115.00				655.30		4.40	0.12			13.14			0.02	0.02	0.02	0.09	6.50	0.05	5.00	64.00	83.43	26.31	20.10	0.07	2.06	57.90	
7/11/2016	120.00		0.02		120.00	1.00		25.38	110.00				632.10		1.20	0.14			13.42			0.02	0.02	0.02	0.07	6.40	0.04	5.00	211.00	81.49	24.01	20.60	0.07	2.48	51.20	
7/02/2017	114.00		0.02		114.00	1.60		23.48	110.00				640.60		1.20	0.16			12.66			0.02	0.02	0.02	0.08	6.20	0.06	5.00	95.80	76.18	23.30	21.30	0.08	1.73	105.10	
8/05/2017	113.00	0.09	0.02	0.00	113.00	10.20	0.00	24.89	98.00	0.00	0.01	0.01	579.20	0.00	1.00	0.16	3.17	0.00	12.10	1.31	0.00	0.02	0.02	0.02	0.09	6.20	0.06	5.00	53.20	67.95	23.84	20.90	0.09	4.27	54.60	0.02
8/08/2017	102.58		0.02		103.00	1.80		22.98	95.00				619.40		4.80	0.11			12.16			0.02	0.02	0.02	0.08	6.20	0.05	5.00	172.70	75.25	23.24	19.80	0.08	2.52	46.00	
7/11/2017	114.00		0.02		114.00	1.50		25.17	115.00				645.70		1.40	0.11			13.46			0.02	0.02	0.02	0.13	6.30	0.04	5.00	172.60	75.48	22.92	20.10	0.13	1.44	50.20	
13/02/2018	115.47		0.02		115.00	2.70		23.05	109.00				625.10		1.50	0.13			12.62			0.02	0.02	0.02	0.10	6.40	0.05	5.00	35.80	75.57	22.95	21.70	0.10	1.99	59.80	
8/05/2018	109.89	0.06	0.03	0.00	110.00	17.10	0.00	22.72	99.00	0.00	0.01	0.01	555.00	0.00	2.00	0.13	3.77	0.00	11.73	1.25	0.00	0.02	0.02	0.02	0.11	6.40	0.12	2.44	22.00	67.25	19.40	21.20	0.11	9.50	52.70	0.02
14/08/2018	107.25		0.02		107.00	1.20		24.37	102.50				567.00		1.60	0.12			12.71			0.02	0.02	0.02	0.21	6.50	0.07	2.94	325.30	72.53	20.50	20.10	0.19	1.50	39.40	
13/11/2018	89.88		0.02		90.00	24.00		21.64	82.00				488.00		2.38	0.09			10.75			0.03	0.02	0.03	0.19	6.54	0.09	2.51	49.00	61.04	17.97	21.20	0.16	14.19	38.30	
2018 Min	**89.88**	**0.06**	**0.02**	**0.00**	**90.00**	**1.20**	**0.00**	**21.64**	**82.00**	**0.00**	**0.01**	**0.01**	**488.00**	**0.00**	**1.50**	**0.09**	**3.77**	**0.00**	**10.75**	**1.25**	**0.00**	**0.02**	**0.02**	**0.02**	**0.10**	**6.40**	**0.05**	**2.44**	**22.00**	**61.04**	**17.97**	**20.10**	**0.10**	**1.50**	**38.30**	**0.02**
2018 Max	**115.47**	**0.06**	**0.03**	**0.00**	**115.00**	**24.00**	**0.00**	**24.37**	**109.00**	**0.00**	**0.01**	**0.01**	**625.10**	**0.00**	**2.38**	**0.13**	**3.77**	**0.00**	**12.71**	**1.25**	**0.00**	**0.03**	**0.02**	**0.03**	**0.21**	**6.54**	**0.12**	**5.00**	**325.30**	**75.57**	**22.95**	**21.70**	**0.19**	**14.19**	**59.80**	**0.02**
2018 Mean	**105.62**	**0.06**	**0.02**	**0.00**	**105.50**	**11.25**	**0.00**	**22.94**	**98.13**	**0.00**	**0.01**	**0.01**	**558.78**	**0.00**	**1.87**	**0.12**	**3.77**	**0.00**	**11.95**	**1.25**	**0.00**	**0.02**	**0.02**	**0.02**	**0.15**	**6.46**	**0.08**	**3.22**	**108.03**	**69.10**	**20.20**	**21.05**	**0.14**	**6.80**	**47.55**	**0.02**
Long-term Average	**119.41**	**0.12**	**0.03**	**0.00**	**92.00**	**5.10**	**0.00**	**24.06**	**132.45**	**0.01**	**0.01**	**0.01**	**728.73**	**0.01**	**1.92**	**0.14**	**3.73**	**0.01**	**13.93**	**1.35**	**0.01**	**0.03**	**0.02**	**0.03**	**0.14**	**6.45**	**0.06**	**5.06**	**55.75**	**95.37**	**29.29**	**20.55**	**0.13**	**2.88**	**65.19**	**0.04**

Alkalinity
mg/L as CaCO3

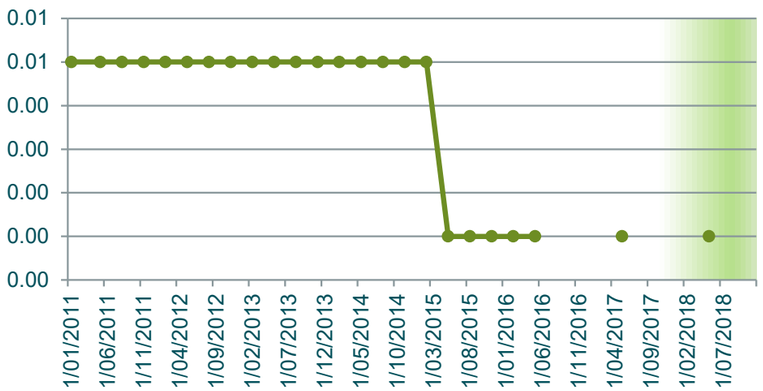
Aluminium (Total)
mg/L



Ammonia
mg/L

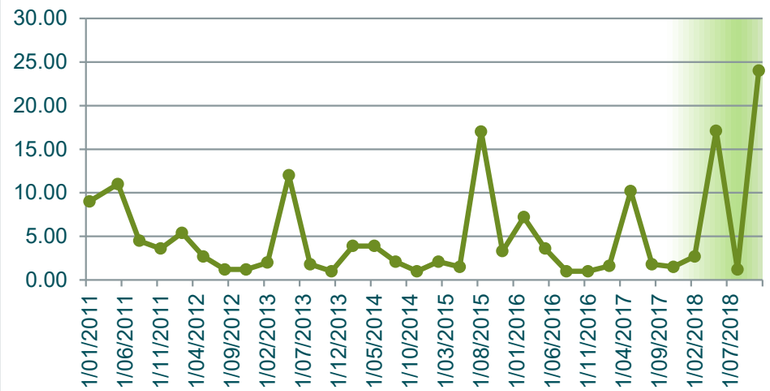


Arsenic (Total)
mg/L

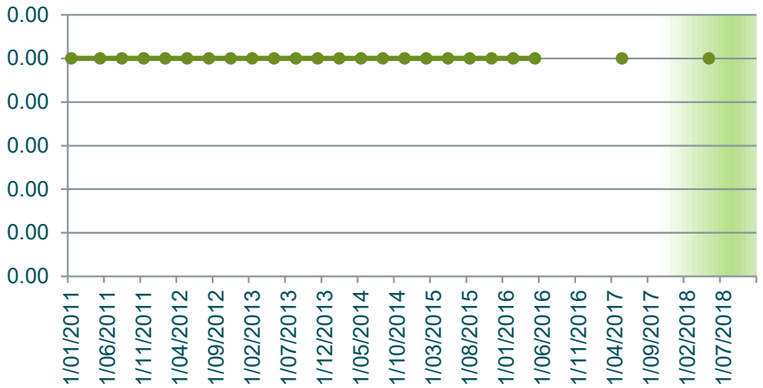


Bicarbonate HCO3
mg/L

BOD5
mg/L

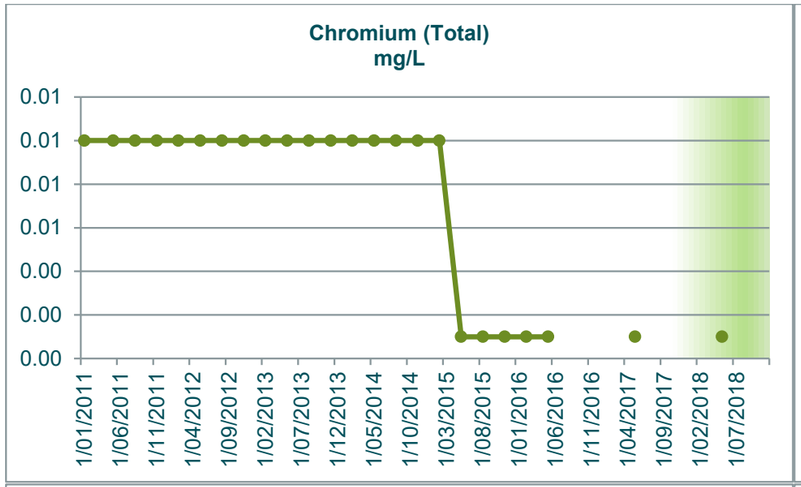


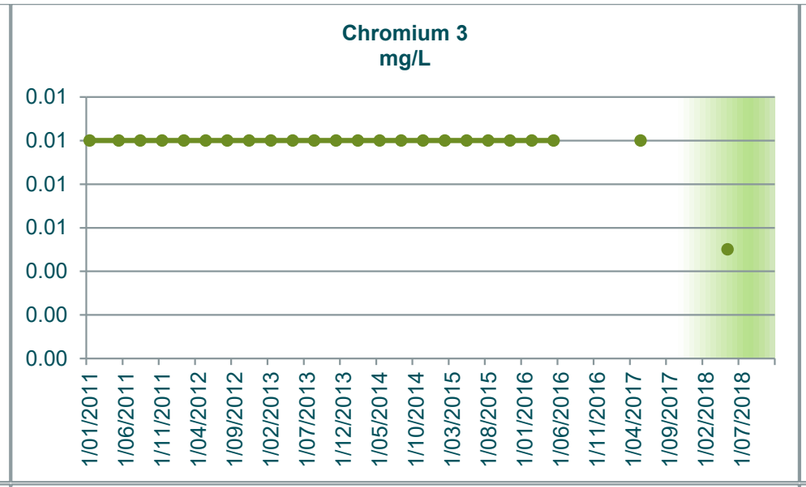
Cadmium (Total)
mg/L

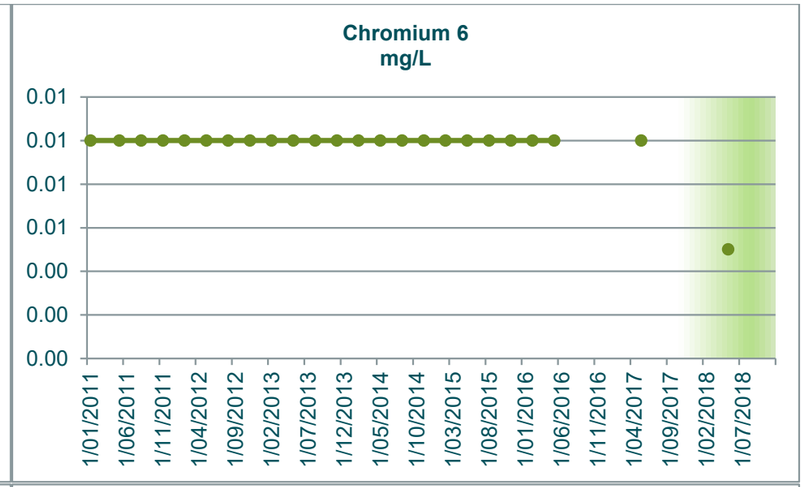


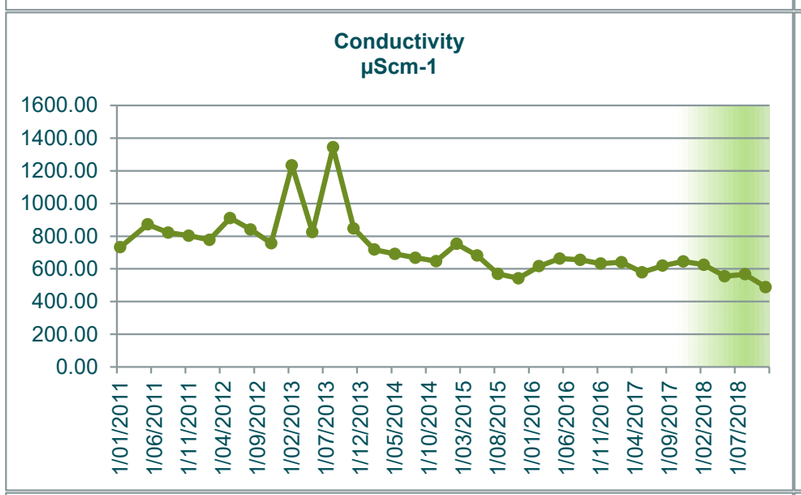
Calcium (Total)
mg/L

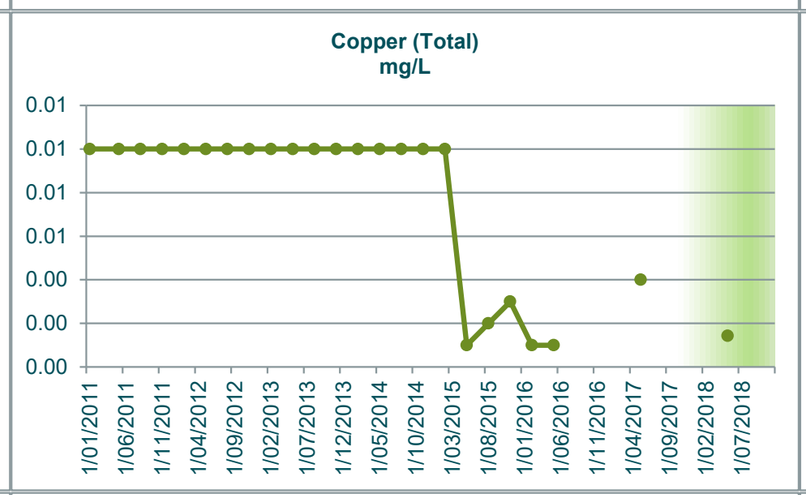
Chloride
mg/L

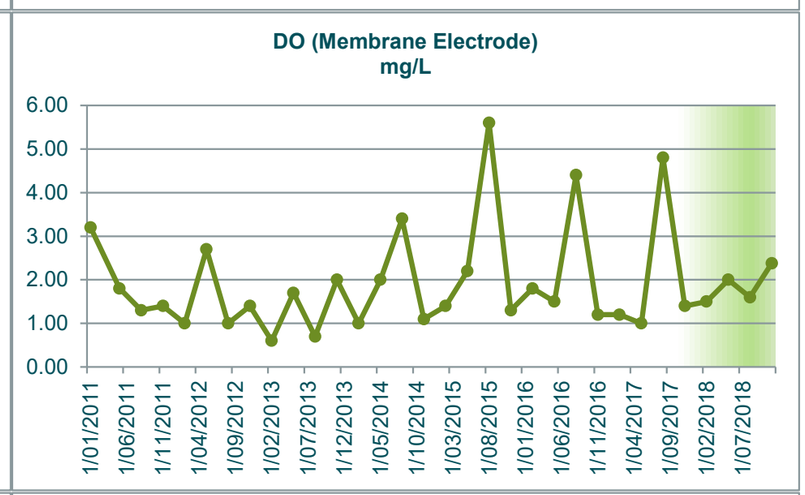

Chromium (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

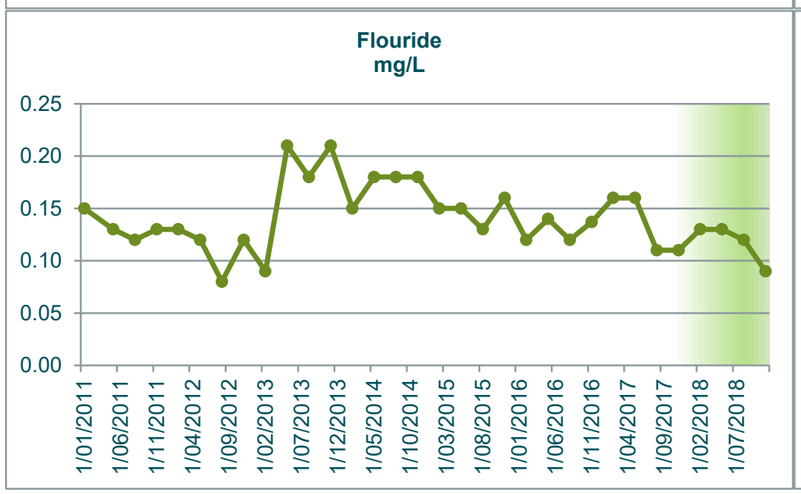

Chromium 3
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

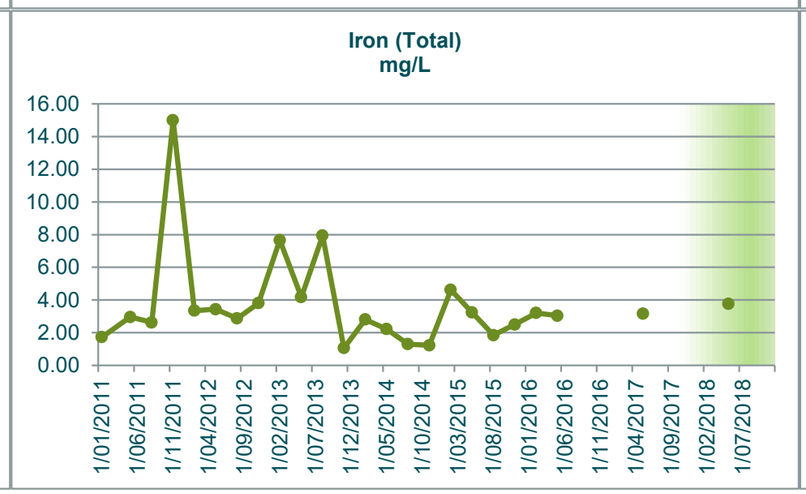

Chromium 6
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

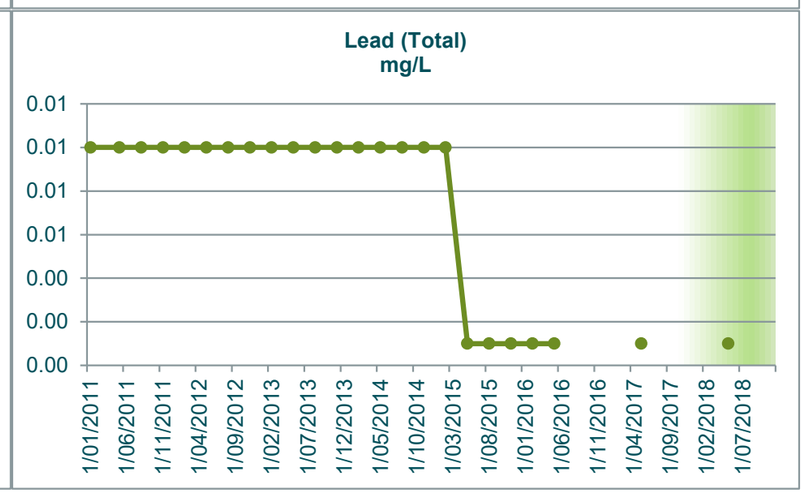

Conductivity
µScm-1
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

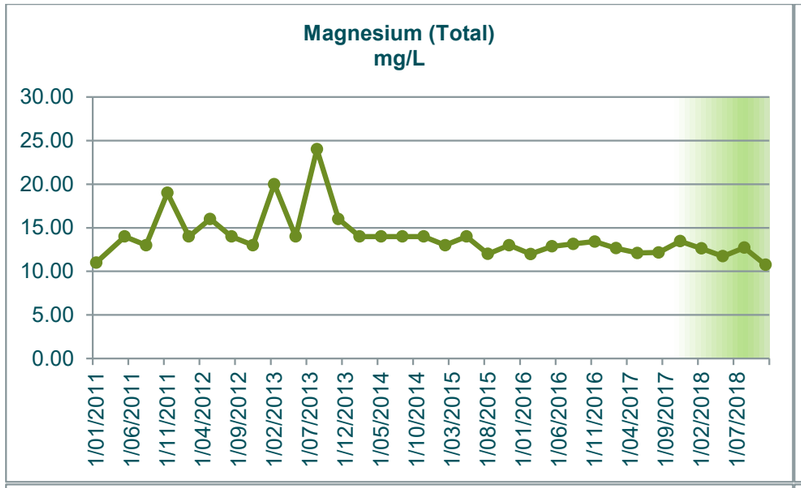

Copper (Total)
mg/L
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

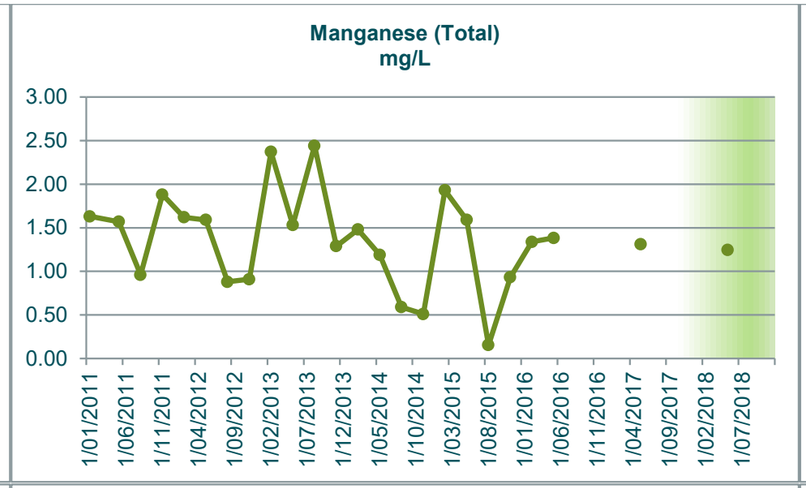

DO (Membrane Electrode)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Flouride
mg/L
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Iron (Total)
mg/L
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Lead (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Magnesium (Total)
mg/L
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Manganese (Total)
mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
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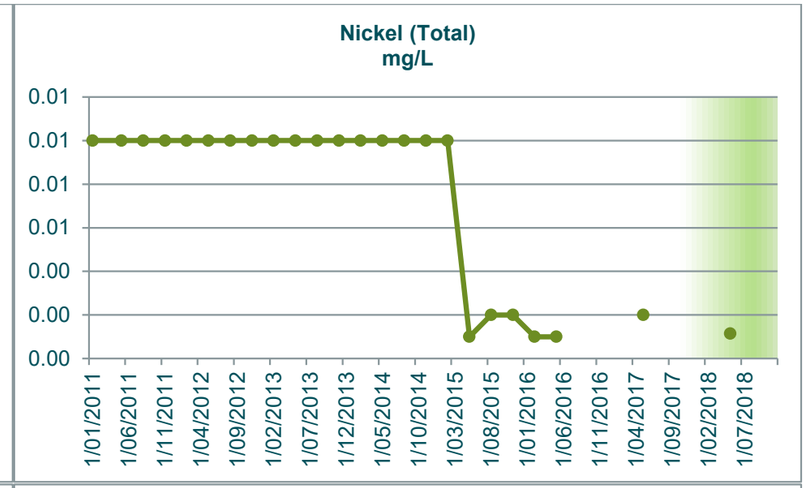
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
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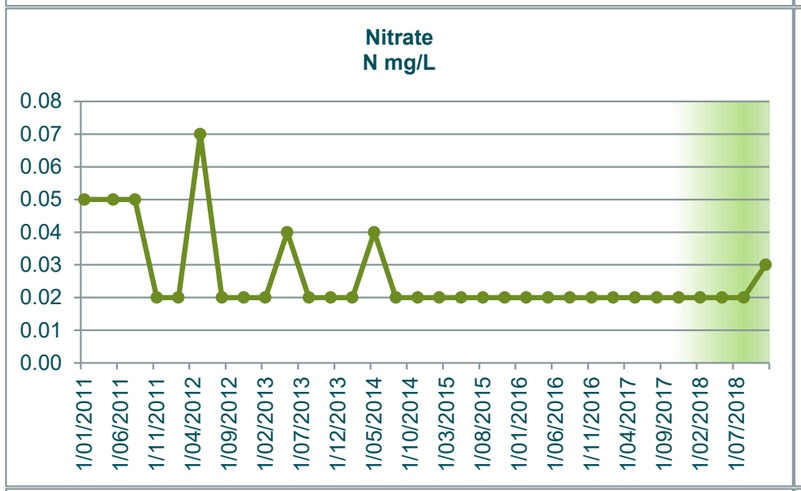
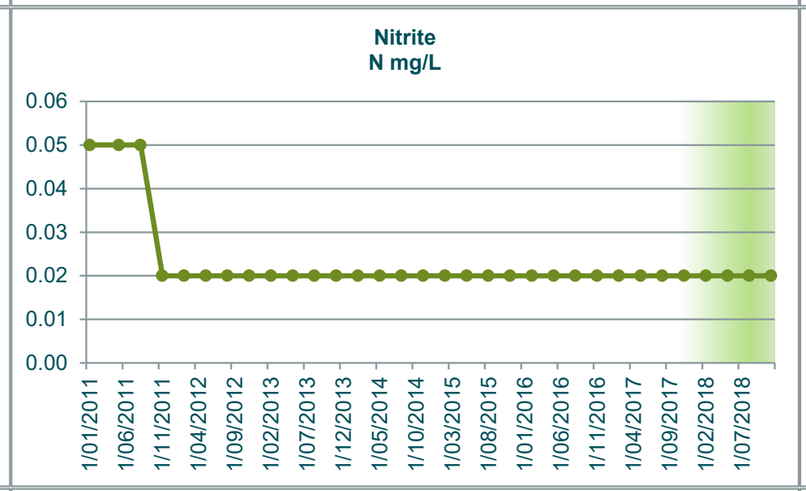
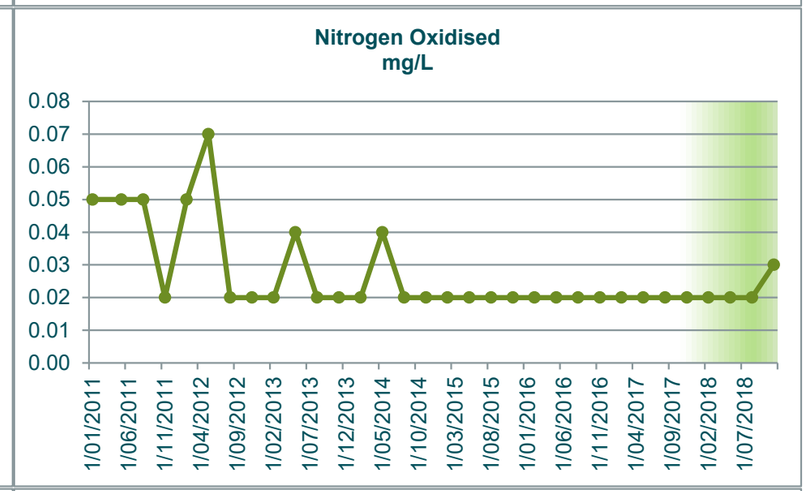
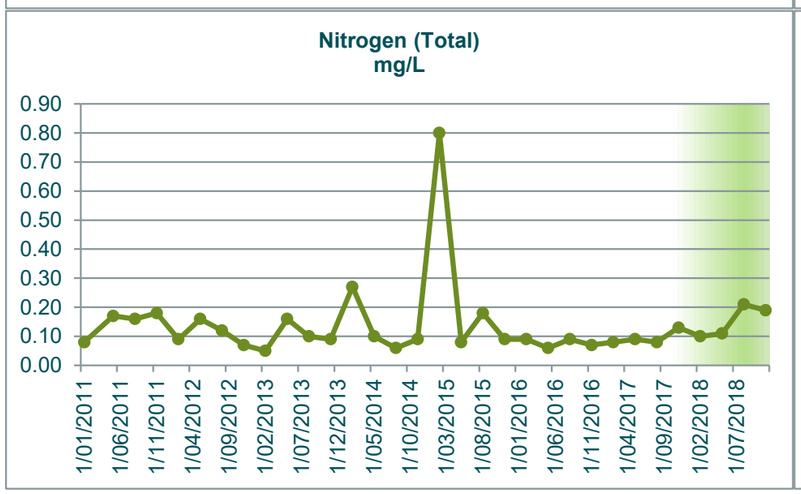
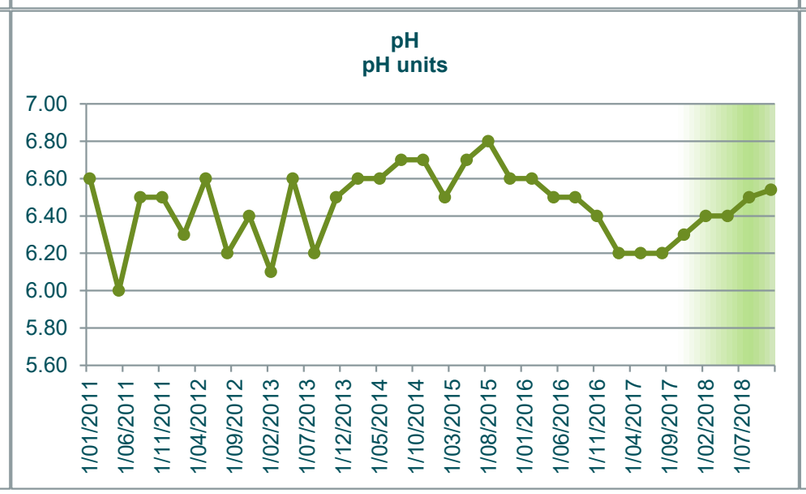
1/04/2017
1/09/2017
1/02/2018
1/07/2018

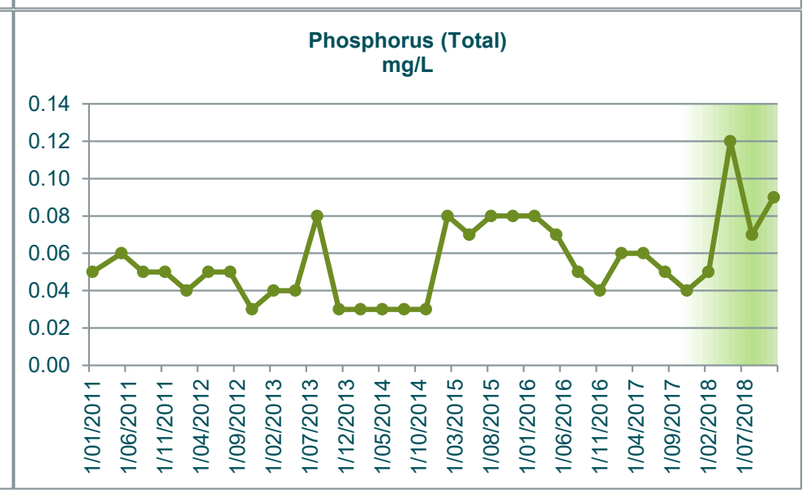

Nitrate
N mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

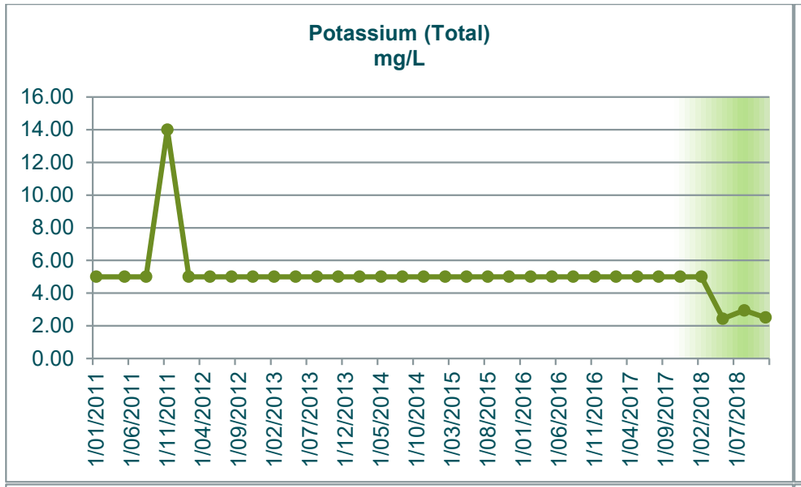

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

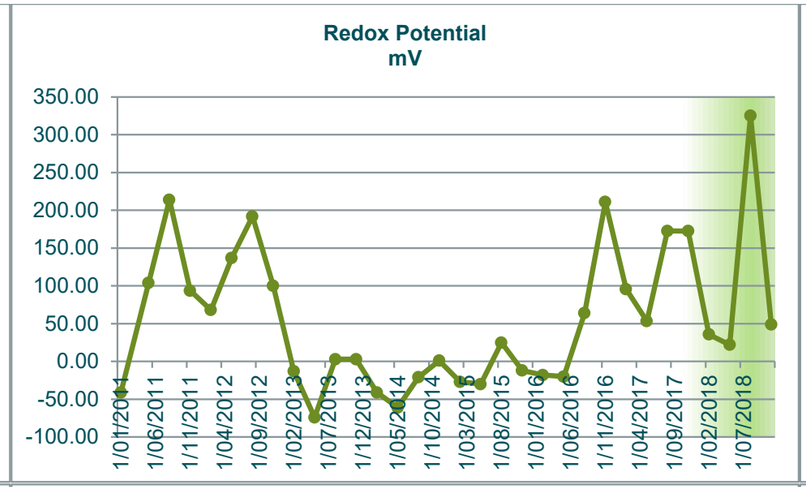

Nitrogen Oxidised
mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

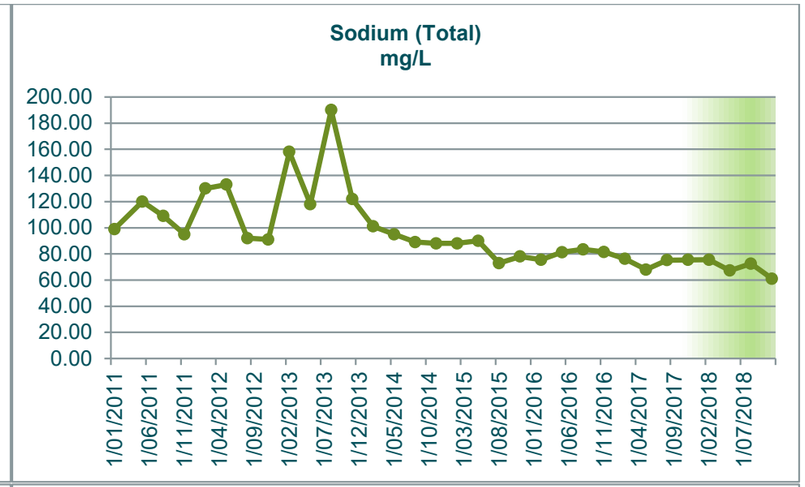

Nitrogen (Total)
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

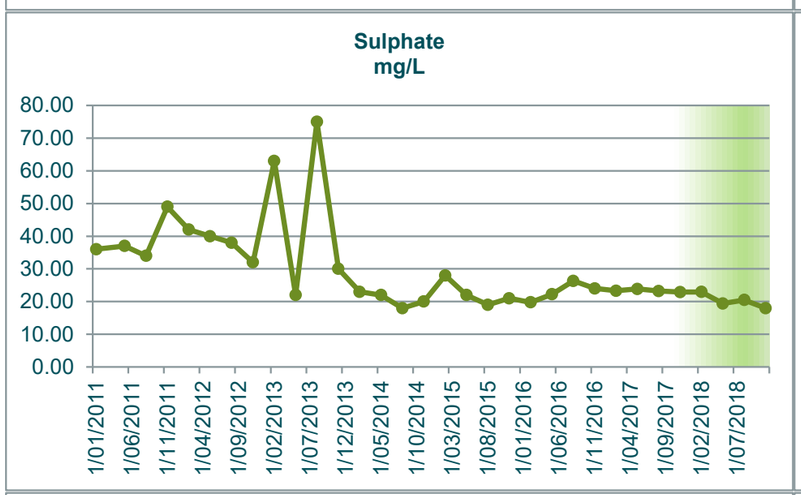

pH
pH units
7.00
6.80
6.60
6.40
6.20
6.00
5.80
5.60
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

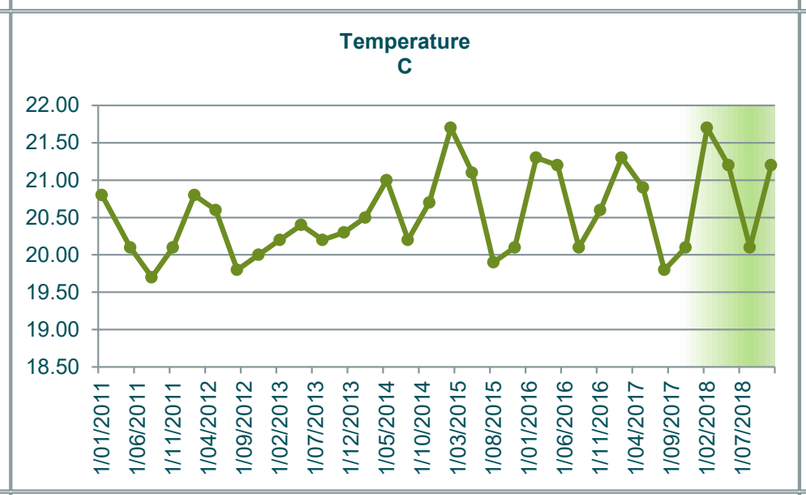

Phosphorus (Total)
mg/L
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

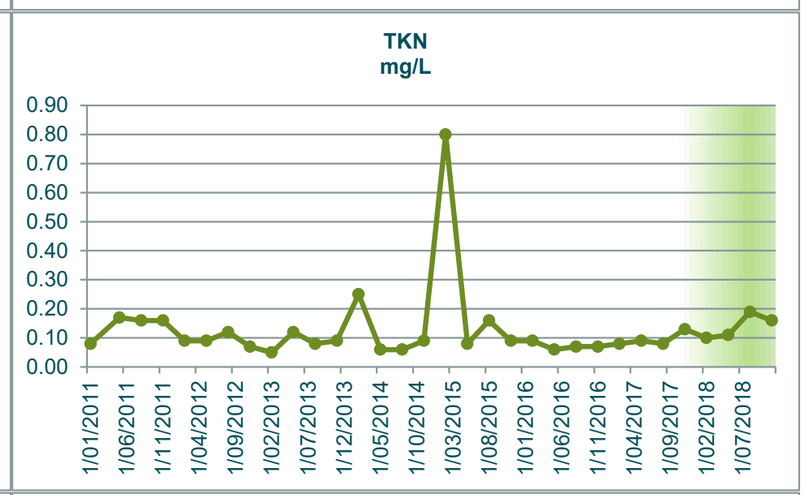

Potassium (Total)
mg/L
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

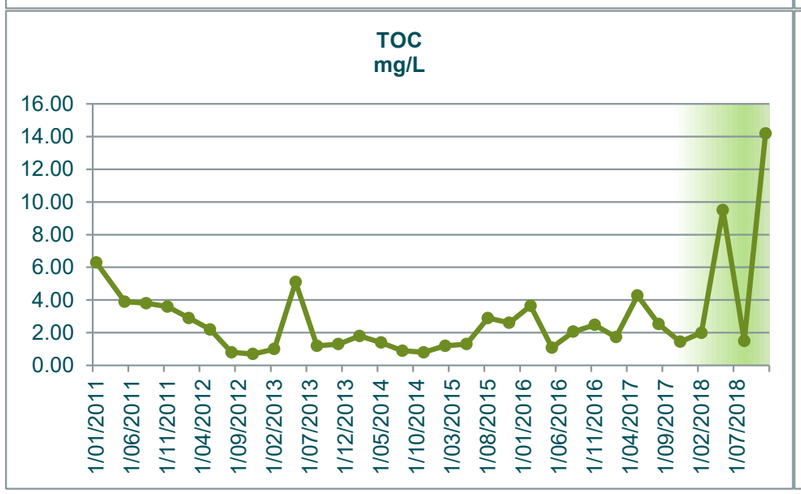

Redox Potential
mV
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

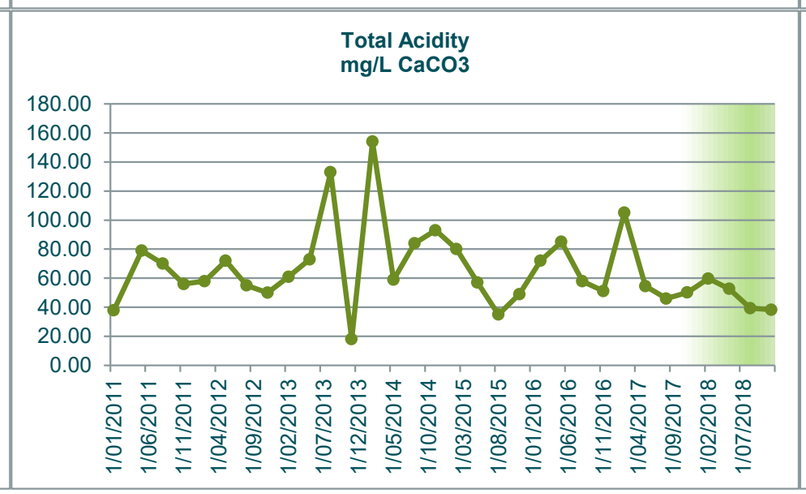

Sodium (Total)
mg/L
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

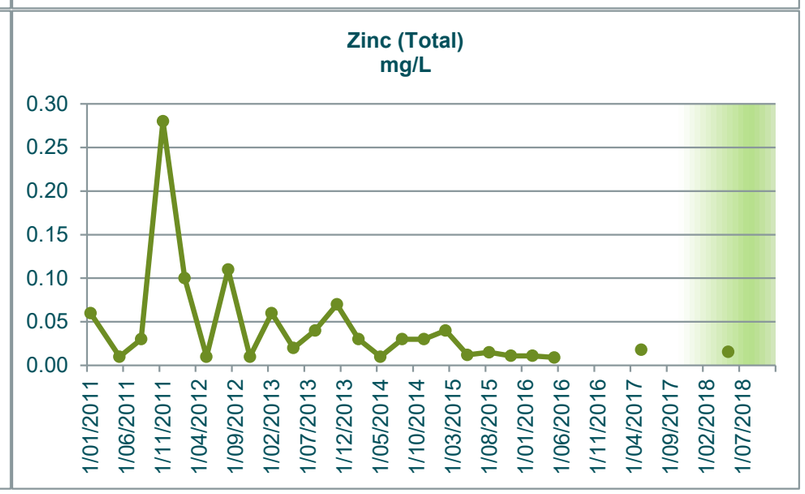

Sulphate
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Temperature
C
22.00
21.50
21.00
20.50
20.00
19.50
19.00
18.50
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

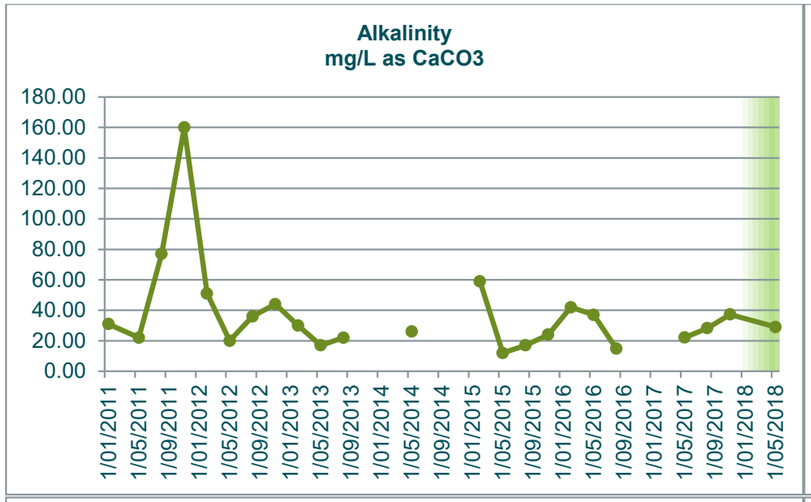

TKN
mg/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

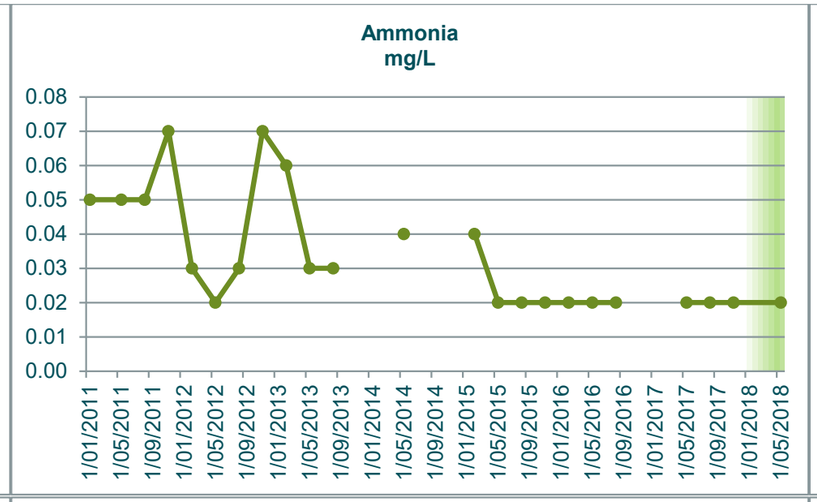

TOC
mg/L
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

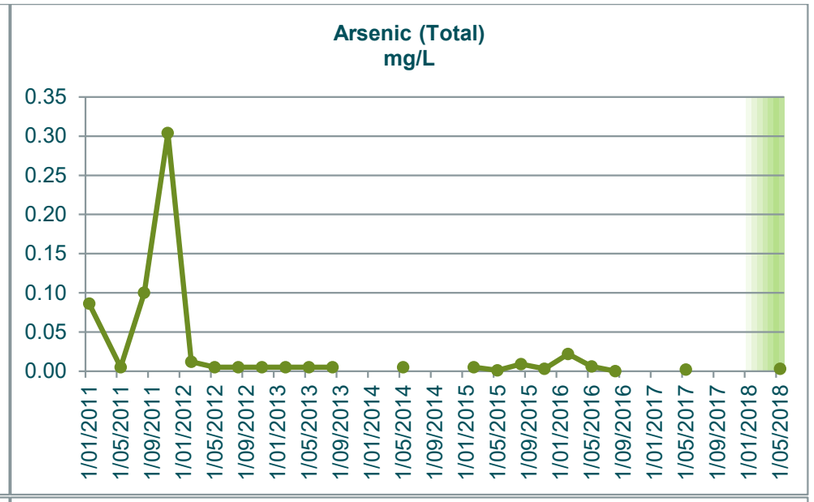

Total Acidity
mg/L CaCO3
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

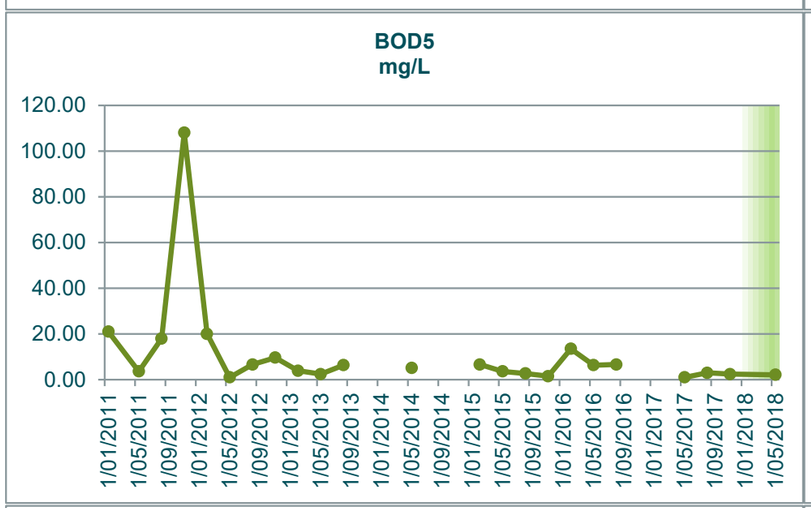

Zinc (Total)
mg/L
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

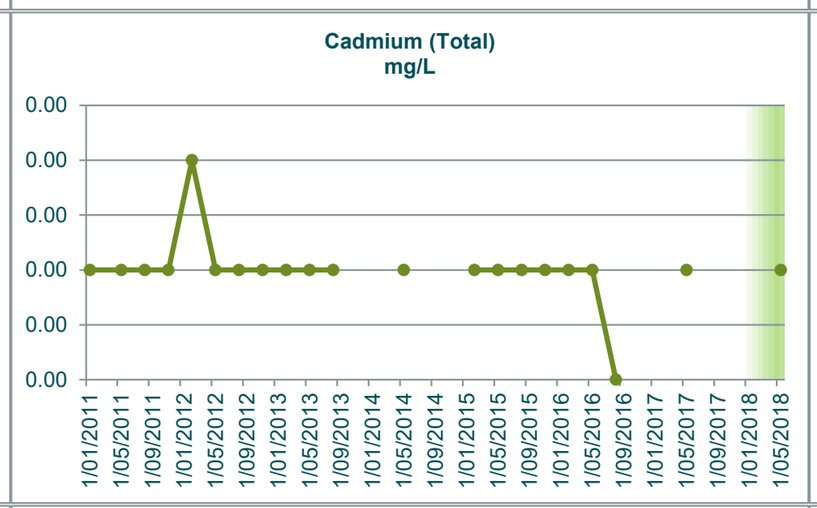
SW1	Alkalinity mg/L as CaCO3	Ammonia mg/L	Arsenic (Total) mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	Orthophosphate mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Solids Suspended mg/L	Sulphate mg/L	TKN mg/L	TOC mg/L	Zinc (Total) mg/L
31/01/2011	31.00	0.05	0.09	21.00	0.00	3.40	44.00	0.01	120.00	0.01	1.00	0.01	1.60	3.30	0.01	0.05	0.05	0.05	0.82	0.05	6.40	0.07	5.00	-13.00	13.00	1237.00	1.70	0.82	5.30	0.01
10/05/2011	22.00	0.05	0.01	3.60	0.00	4.50	25.00	0.01	150.00	0.01	5.60	0.01	1.90	4.01	0.01	0.05	0.05	0.05	0.94	0.05	6.40	0.10	5.00	196.00	16.00	89.00	2.50	0.94	2.70	0.01
9/08/2011	77.00	0.05	0.10	18.00	0.00	13.00	44.00	0.02	265.00	0.07	3.60	0.01	4.00	74.00	0.02	0.05	0.05	0.05	9.98	0.05	6.70	0.58	5.00	218.00	24.00	2970.00	4.80	9.98	5.10	0.12
8/11/2011	160.00	0.07	0.30	108.00	0.00	19.00	35.00	0.01	309.00	0.18	0.10	0.03	5.30	67.00	0.04	0.06	0.02	0.06	11.00	0.02	6.50	0.80	5.00	-56.00	18.00	6820.00	2.60	10.94	3.20	0.34
6/02/2012	51.00	0.03	0.01	20.00	0.00	7.40	22.00	0.01	193.00	0.01	1.00	0.04	4.80	4.10	0.01	0.02	0.02	0.05	5.12	0.02	6.40	0.17	5.00	53.00	16.00	764.00	1.80	5.12	6.10	0.08
8/05/2012	20.00	0.02	0.01	1.00	0.00	3.50	22.00	0.01	108.00	0.14	4.80	0.01	2.00	0.01	0.01	0.02	0.02	0.02	0.49	0.02	6.30	0.07	5.00	226.00	15.00	38.00	1.40	0.47	0.60	0.04
7/08/2012	36.00	0.03	0.01	6.60	0.00	6.60	30.00	0.01	188.00	0.01	1.20	0.01	2.60	1.55	0.01	0.03	0.02	0.03	0.36	0.02	6.30	0.02	5.00	-1.00	13.00	334.00	2.10	0.33	3.70	0.01
14/11/2012	44.00	0.07	0.01	9.60	0.00	16.00	34.00	0.01	301.00	0.01	0.40	0.01	4.90	1.29	0.01	0.06	0.02	0.06	1.18	0.02	6.60	0.15	5.00	-44.00	18.00	263.00	21.00	1.12	8.40	0.02
14/02/2013	30.00	0.06	0.01	3.90	0.00	6.50	24.00	0.01	203.00	0.01	1.00	0.01	3.20	0.88	0.01	0.03	0.02	0.05	1.79	0.02	6.20	0.18	5.00	-38.00	17.00	58.00	2.60	1.74	11.00	0.02
15/05/2013	17.00	0.03	0.01	2.40	0.00	5.00	25.00	0.01	138.00	0.01	1.50	0.01	1.50	0.37	0.01	0.03	0.02	0.03	1.08	0.02	6.00	0.18	5.00	30.00	15.00	74.00	4.10	1.05	3.40	0.01
7/08/2013	22.00	0.03	0.01	6.30	0.00	4.40	24.00	0.01	124.00	0.01	4.20	0.01	1.80	0.07	0.01	0.03	0.02	0.03	0.54	0.02	6.10	0.10	5.00	148.00	17.00	414.00	3.20	0.51	2.70	0.01
12/11/2013																														
11/02/2014																														
14/05/2014	26.00	0.04	0.01	5.10	0.00	9.70	58.00	0.01	326.00	0.01	1.00	0.01	4.30	0.41	0.01	0.04	0.02	0.04	0.72	0.03	5.80	0.10	5.00	-2.00	40.00	28.00	28.00	0.68	7.70	0.02
12/08/2014																														
10/11/2014																														
10/02/2015	59.00	0.04	0.01	6.60	0.00	11.00	24.00	0.01	230.00	0.01	0.10	0.01	4.40	1.71	0.01	0.03	0.02	0.05	1.33	0.02	6.60	0.06	5.00	-63.00	14.00	12.00	2.70	1.28	22.00	0.05
12/05/2015	12.00	0.02	0.00	3.60	0.00	3.10	20.00	0.00	103.00	0.00	3.90	0.00	1.40	0.15	0.00	0.02	0.02	0.02	0.23	0.02	5.60	0.04	5.00	105.00	14.00	13.00	2.60	0.23	3.00	0.03
12/08/2015	17.00	0.02	0.01	2.70	0.00	3.90	24.00	0.00	125.00	0.00	3.40	0.00	1.80	0.60	0.00	0.02	0.02	0.02	1.35	0.02	6.60	0.34	5.00	97.00	16.00	165.00	2.80	1.35	4.20	0.01
11/11/2015	24.00	0.02	0.00	1.50	0.00	7.20	20.00	0.00	146.00	0.00	2.10	0.00	2.30	0.64	0.00	0.02	0.02	0.02	1.49	0.02	6.30	0.23	5.00	48.00	14.00	50.00	6.90	1.47	7.30	0.01
9/02/2016	42.00	0.02	0.02	13.50	0.00	10.26	28.00	0.00	196.00	0.01	0.60	0.00	3.25	1.16	0.00	0.02	0.03	0.02	4.07	0.02	6.50	0.72	5.00	8.00	17.01	402.00	2.96	4.07	8.73	0.02
10/05/2016	37.00	0.02	0.01	6.30	0.00	8.27	30.00	0.00	203.00	0.00	1.60	0.00	3.11	0.77	0.00	0.02	0.02	0.02	0.68	0.02	6.20	0.14	5.00	88.00	19.15	40.00	2.62	0.68	6.00	0.01
10/08/2016	14.90	0.02	NT	6.60	NT	3.80	23.00		120.60		3.70		1.60			0.02	0.02	0.02	2.89	0.02	5.80	0.55	5.00	174.00	16.89	178.00	3.44	2.89	4.27	NT
8/11/2016																														
7/02/2017																														
9/05/2017	22.10	0.02	0.00	1.00	0.00	8.20	20.00	0.00	139.00	0.00	2.40	0.00	2.39	0.19	0.00	0.02	0.02	0.02	0.36	0.02	5.90	0.04	5.00	256.30	12.76	8.50	11.45	0.36	5.16	0.01
9/08/2017	28.28	0.02		3.00		5.49	50.00		158.50		0.90		2.46			0.02	0.02	0.02	4.64	0.02	6.00	0.91	5.00	135.30	17.26	119.00	1.55	4.64	5.16	
8/11/2017	37.27	0.02		2.40		12.34	27.50		198.80		1.20		3.14			0.02	0.02	0.02	0.40	0.02	5.60	0.05	5.00	114.90	16.83	9.70	12.31	0.40	5.62	
9/05/2018	28.98	0.02	0.00	2.10	0.00	7.97	22.50	0.00	146.40	0.00	1.60	0.00	2.46	0.39	0.00	0.02	0.02	0.02	0.62	0.02	6.20	0.11	1.53	111.80	14.70	30.00	3.77	0.62	5.67	0.01
2018 Min	**28.98**	**0.02**	**0.00**	**2.10**	**0.00**	**7.97**	**22.50**	**0.00**	**146.40**	**0.00**	**1.60**	**0.00**	**2.46**	**0.39**	**0.00**	**0.02**	**0.02**	**0.02**	**0.62**	**0.02**	**6.20**	**0.11**	**1.53**	**111.80**	**14.70**	**30.00**	**3.77**	**0.62**	**5.67**	**0.01**
2018 Max	**28.98**	**0.02**	**0.00**	**2.10**	**0.00**	**7.97**	**22.50**	**0.00**	**146.40**	**0.00**	**1.60**	**0.00**	**2.46**	**0.39**	**0.00**	**0.02**	**0.02**	**0.02**	**0.62**	**0.02**	**6.20**	**0.11**	**1.53**	**111.80**	**14.70**	**30.00**	**3.77**	**0.62**	**5.67**	**0.01**
2018 Mean	**28.98**	**0.02**	**0.00**	**2.10**	**0.00**	**7.97**	**22.50**	**0.00**	**146.40**	**0.00**	**1.60**	**0.00**	**2.46**	**0.39**	**0.00**	**0.02**	**0.02**	**0.02**	**0.62**	**0.02**	**6.20**	**0.11**	**1.53**	**111.80**	**14.70**	**30.00**	**3.77**	**0.62**	**5.67**	**0.01**
Long-term Average	**37.33**	**0.03**	**0.03**	**11.08**	**0.00**	**7.85**	**29.39**	**0.01**	**182.23**	**0.03**	**2.04**	**0.01**	**2.88**	**8.13**	**0.01**	**0.03**	**0.02**	**0.03**	**2.26**	**0.02**	**6.22**	**0.25**	**4.85**	**77.93**	**17.16**	**613.75**	**5.60**	**2.25**	**5.96**	**0.04**

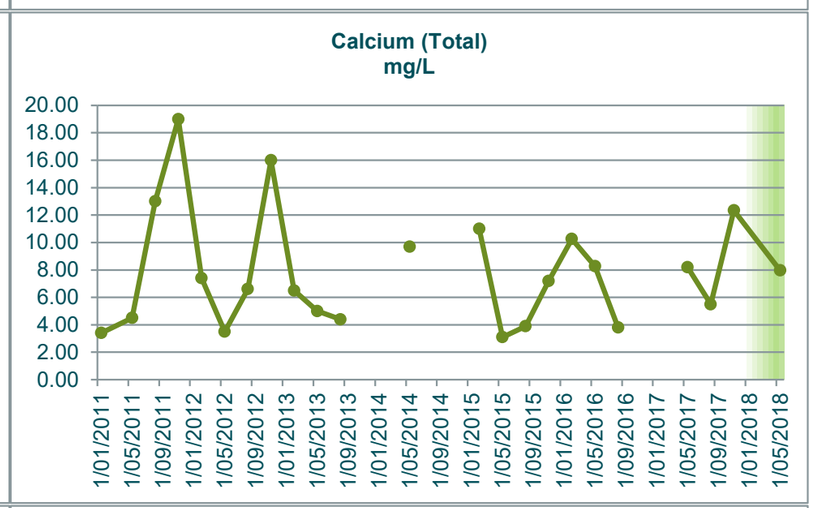

Alkalinity
mg/L as CaCO3
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

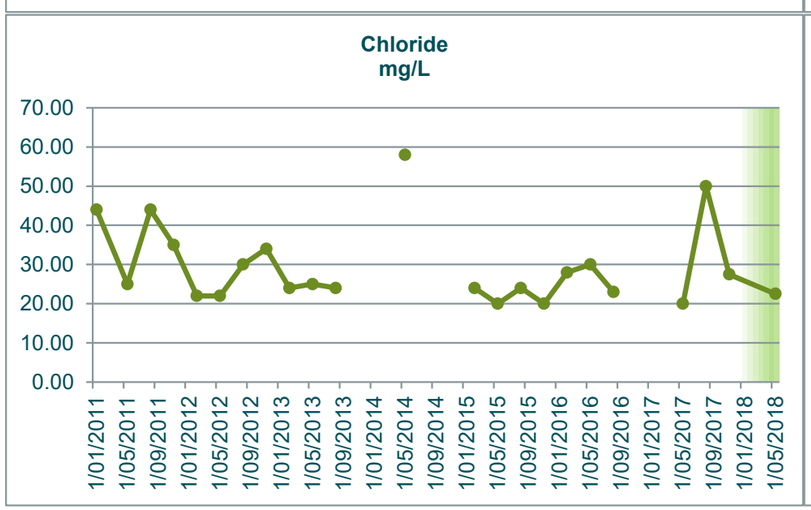

Ammonia
mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

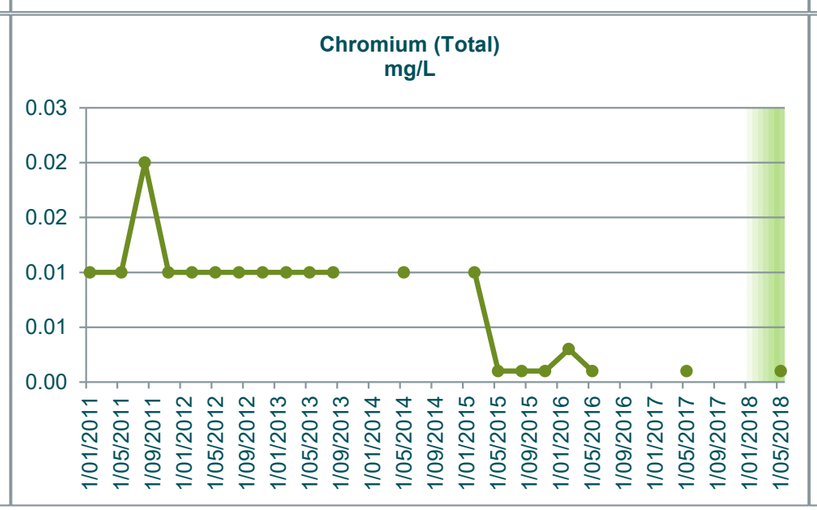

Arsenic (Total)
mg/L
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

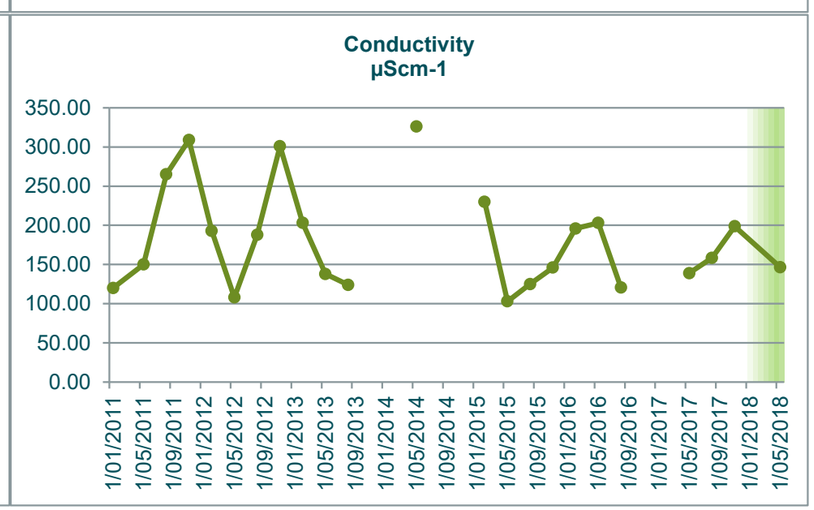

BOD5
mg/L
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

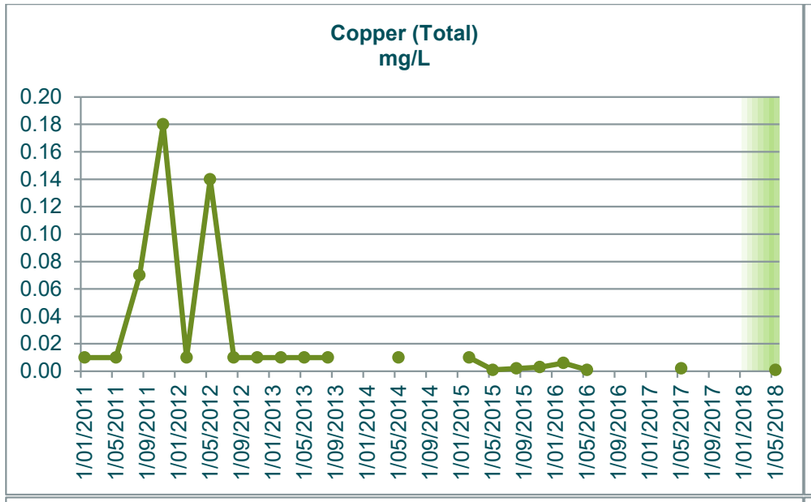

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

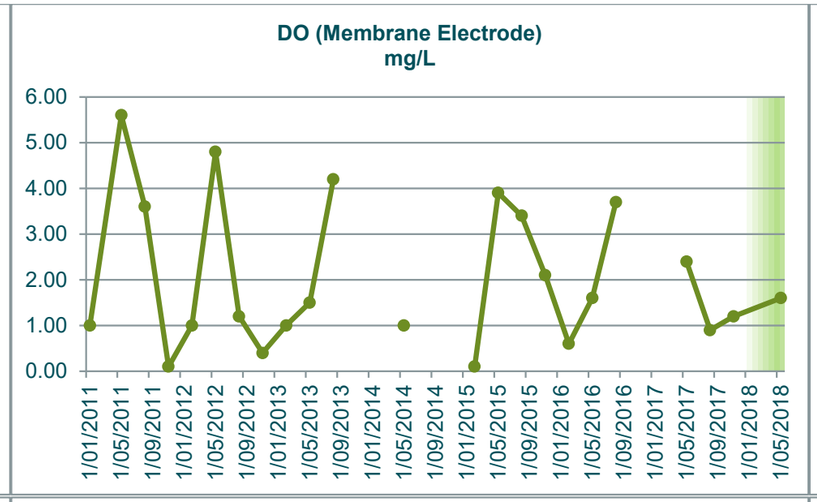

Calcium (Total)
mg/L
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

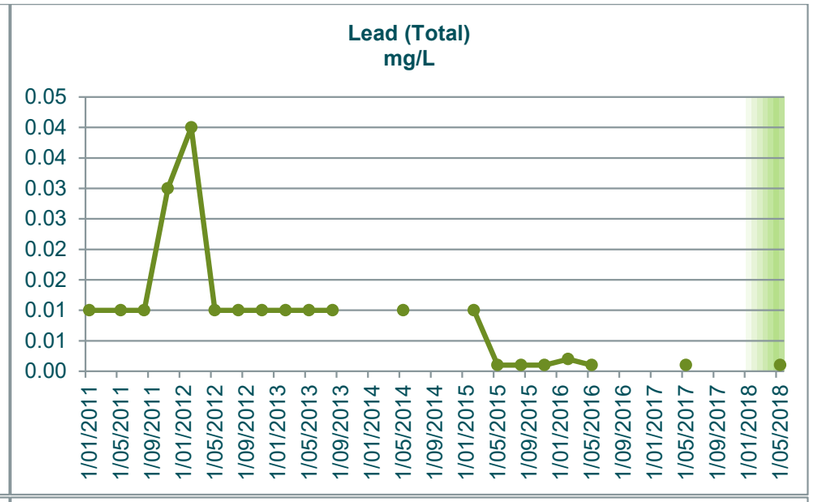

Chloride
mg/L
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

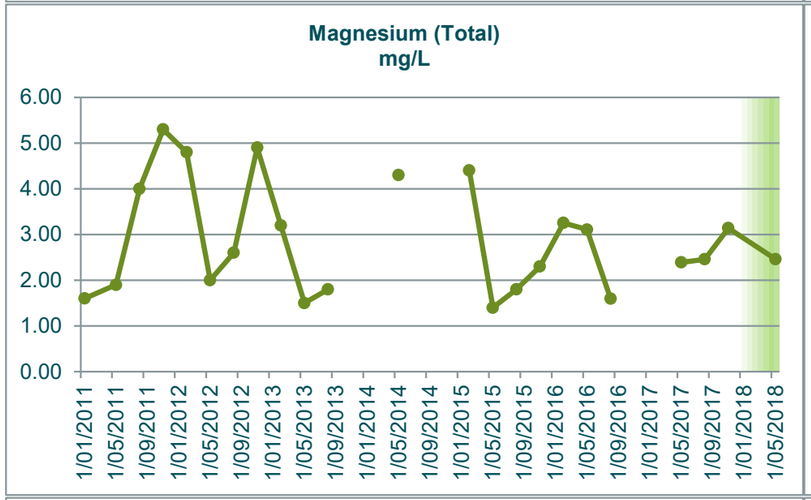

Chromium (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

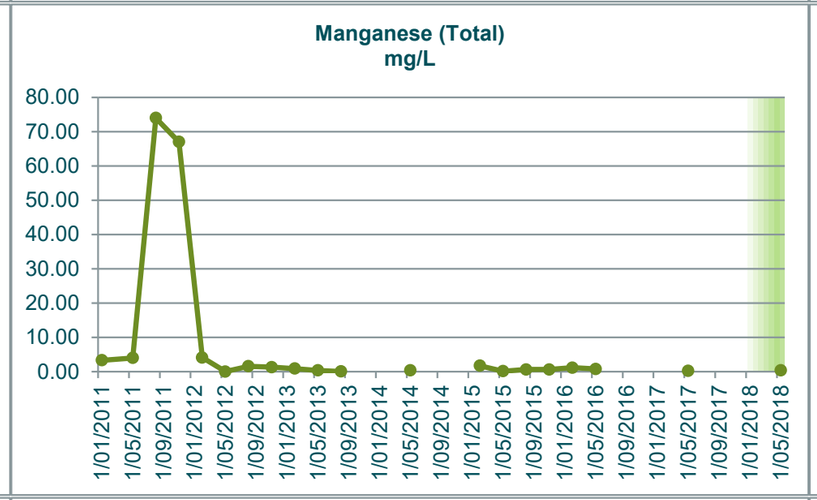

Conductivity
µScm-1
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

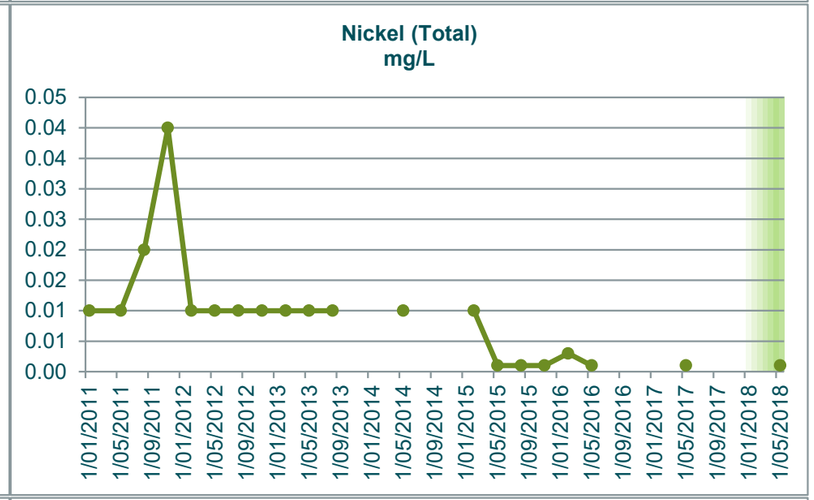

Copper (Total)
mg/L
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

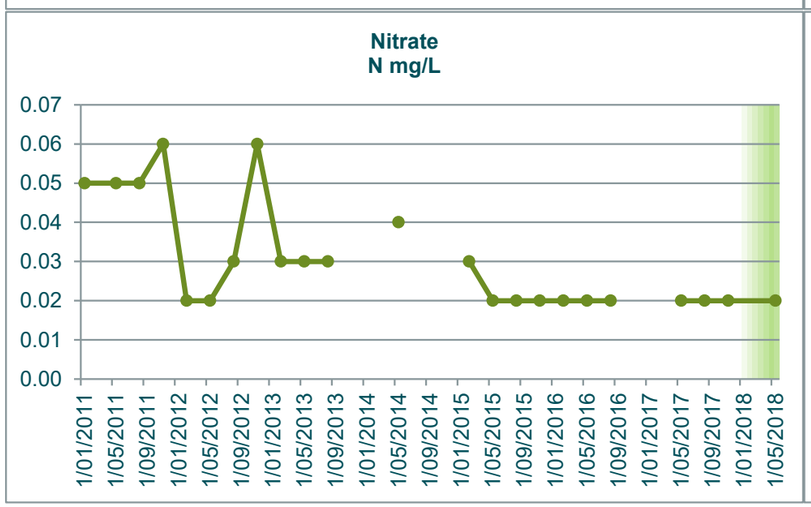

DO (Membrane Electrode)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

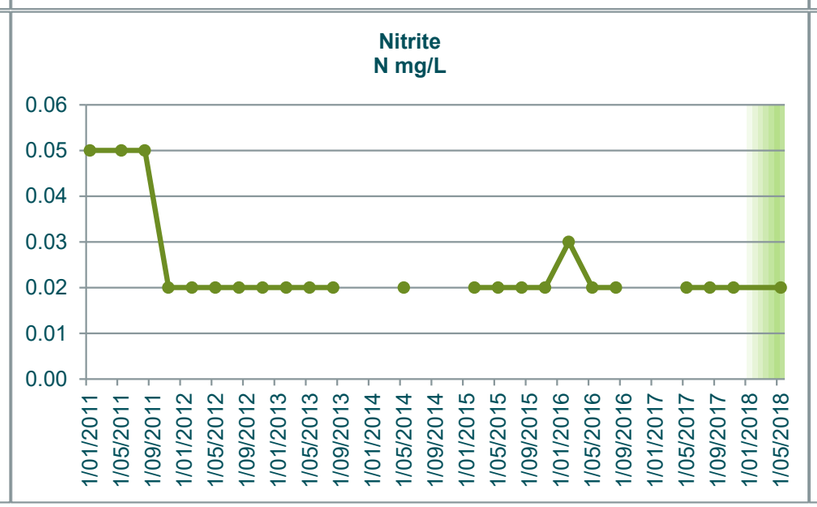

Lead (Total)
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

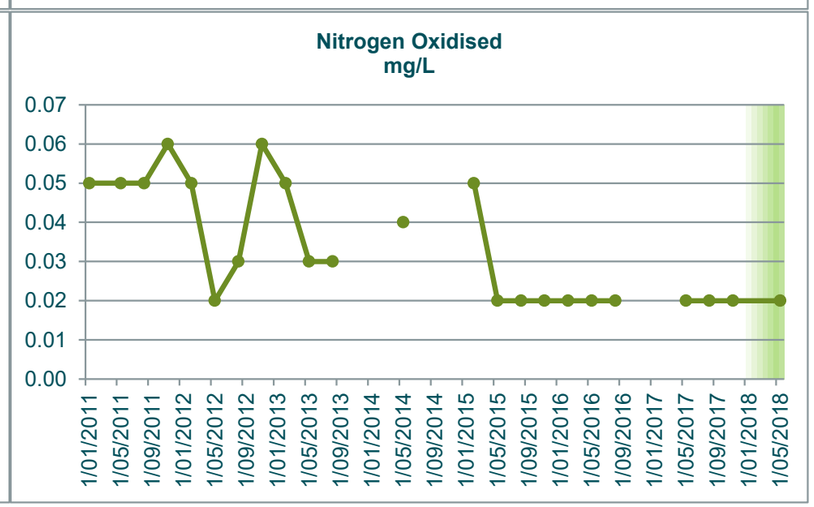

Magnesium (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

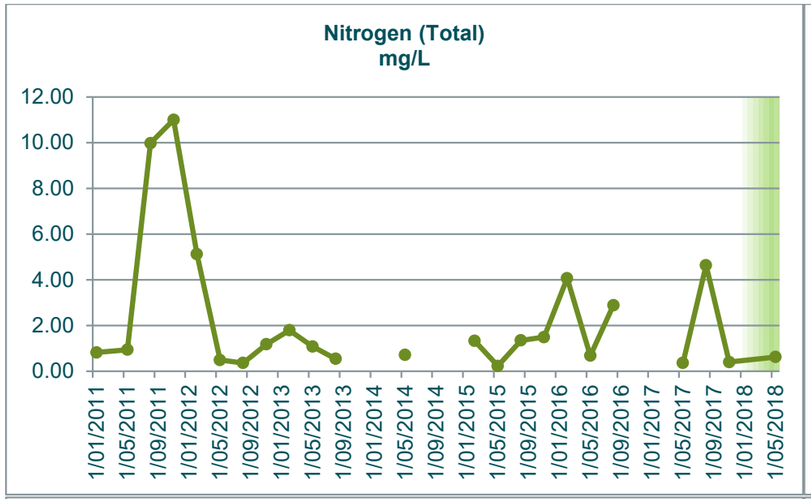

Manganese (Total)
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

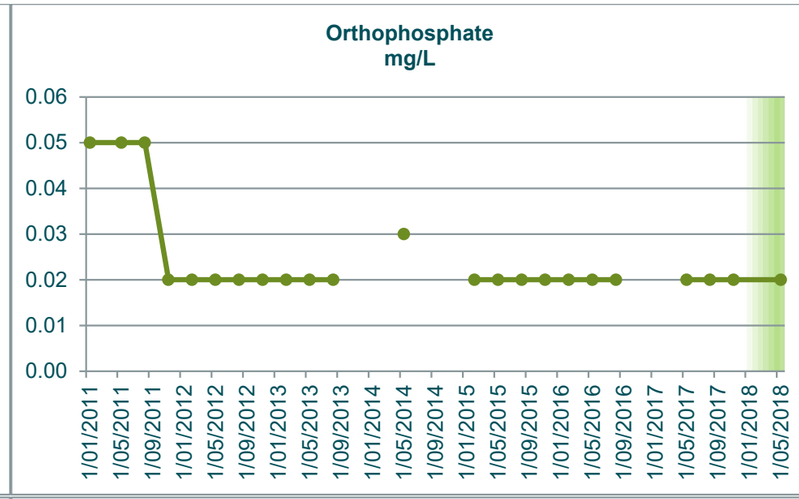

Nickel (Total)
mg/L
0.05
0.04
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

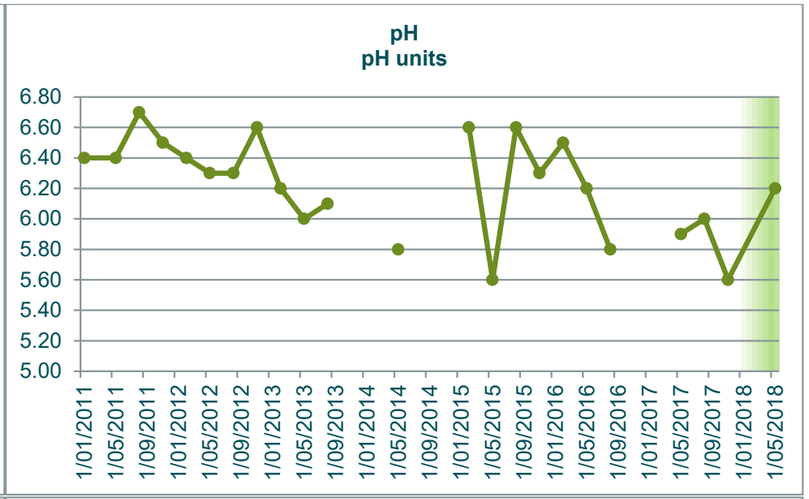

Nitrate
N mg/L
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

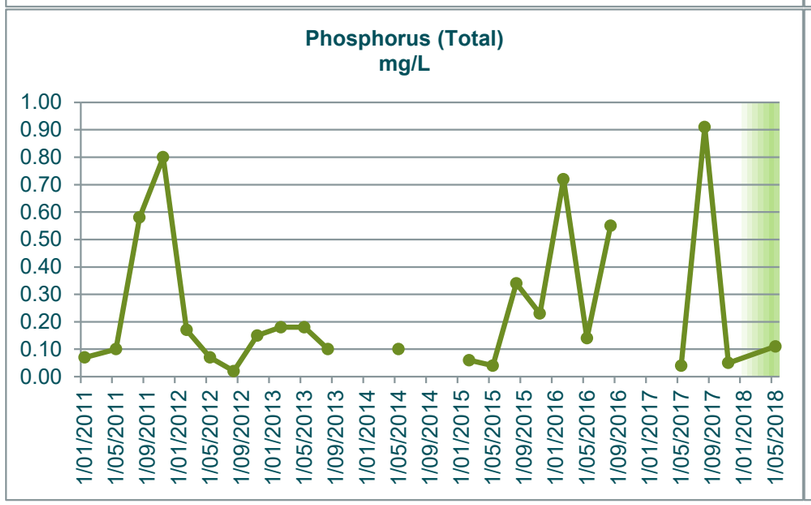

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

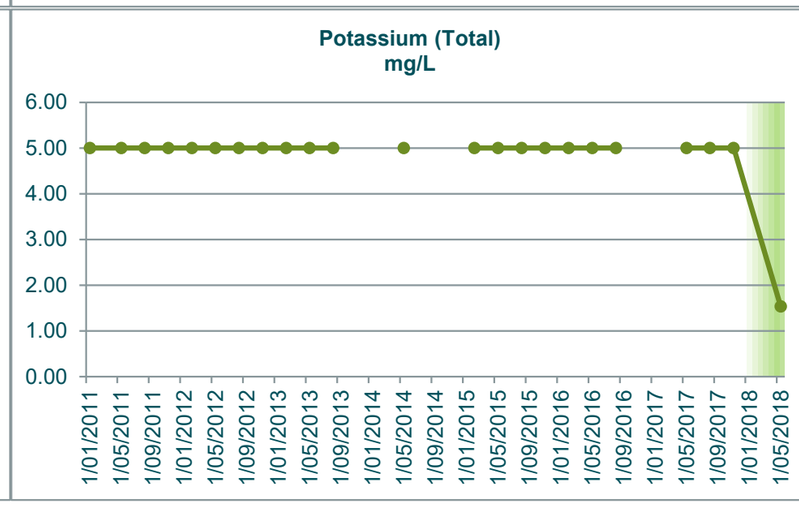

Nitrogen Oxidised
mg/L
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

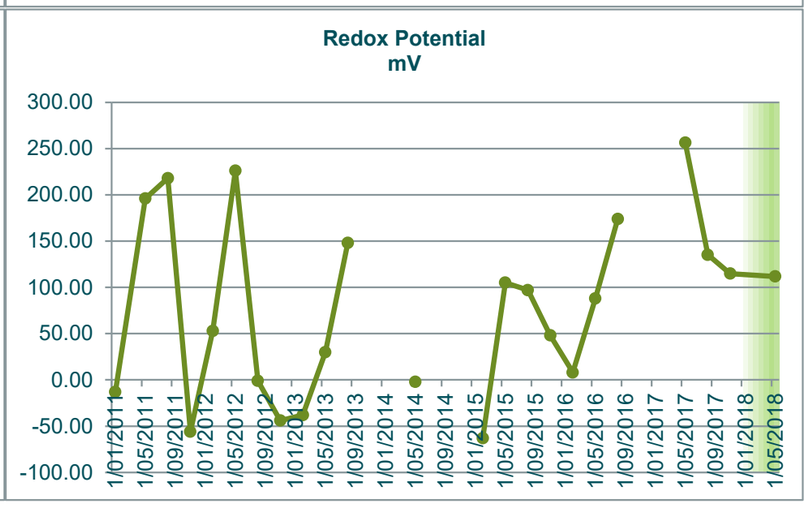

Nitrogen (Total)
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018


Orthophosphate
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018


pH
pH units
6.80
6.60
6.40
6.20
6.00
5.80
5.60
5.40
5.20
5.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018


Phosphorus (Total)
mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00


Potassium (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00


Redox Potential
mV
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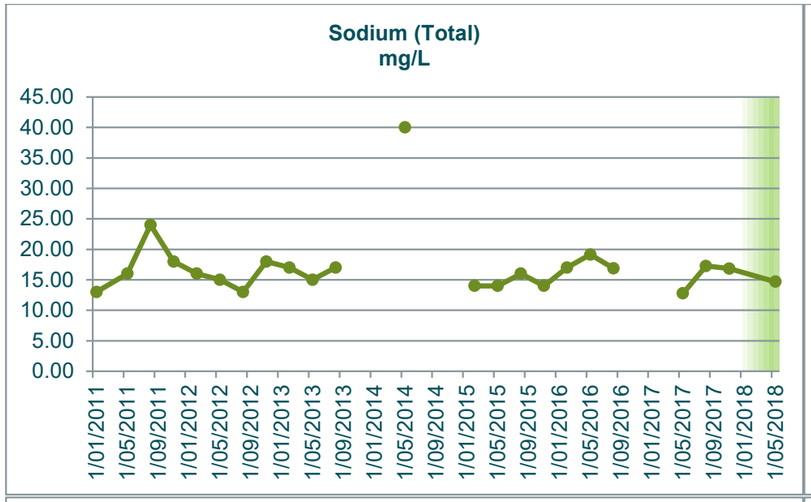
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00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mg/L
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35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
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1/05/2015
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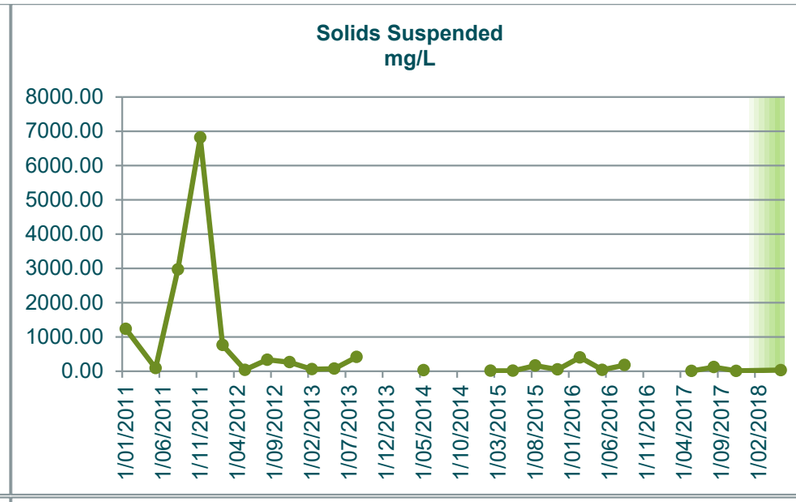
1/09/2017
1/01/2018
1/05/2018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mg/L
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6000.00
5000.00
4000.00
3000.00
2000.00
1000.00
0.00
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1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
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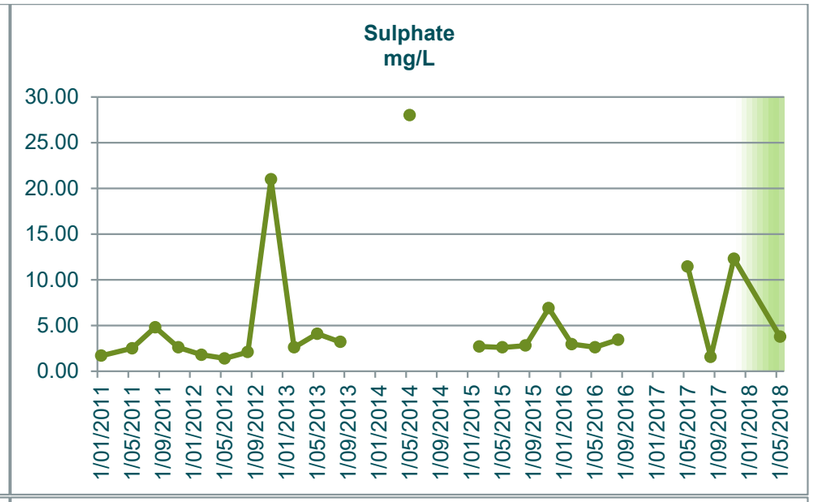
Sulphate
mg/L
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25.00
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15.00
10.00
5.00
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1/05/2011
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1/01/2012
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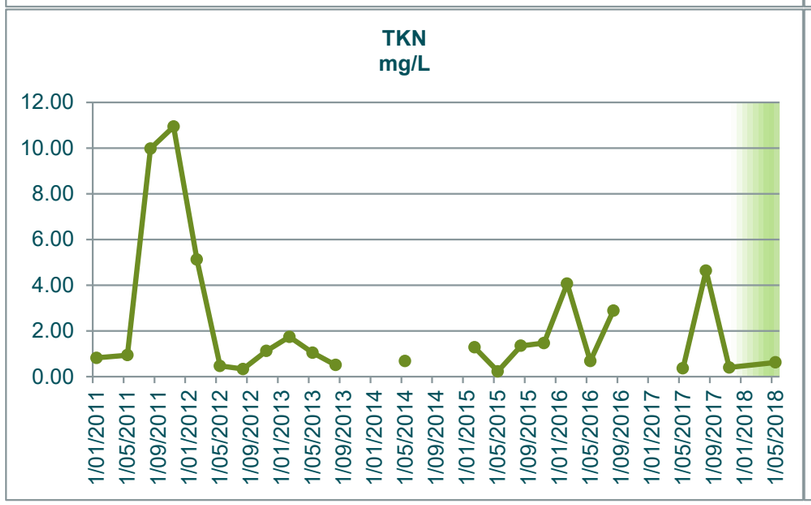
1/05/2018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mg/L
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10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/05/2011
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1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
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1/05/2015
1/09/2015
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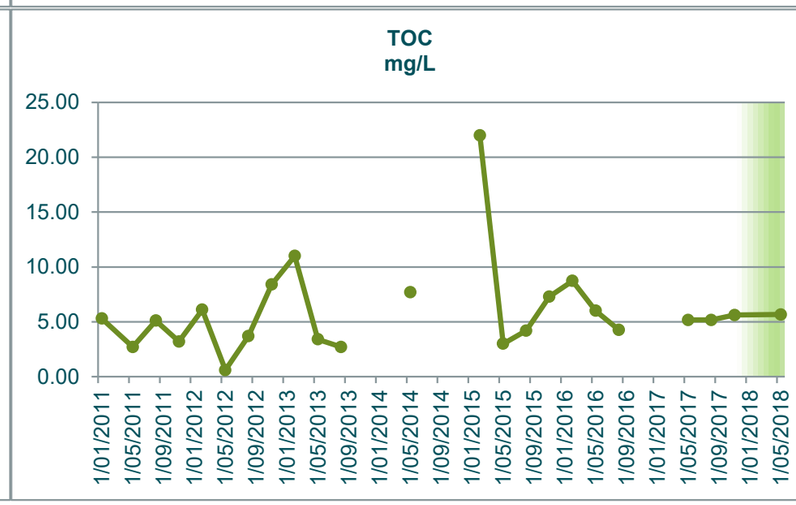
1/05/2017
1/09/2017
1/01/2018
1/05/2018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mg/L
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20.00
15.00
10.00
5.00
0.00
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1/09/2011
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1/05/2012
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1/09/2015
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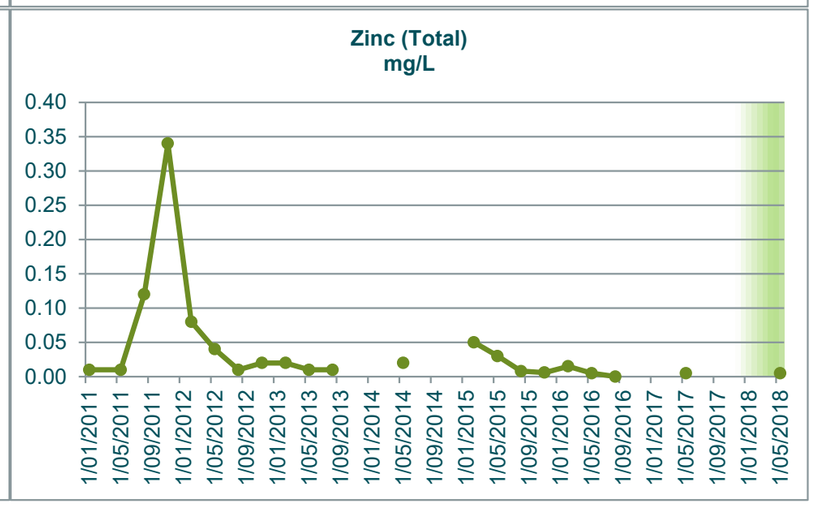
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018


Zinc (Total)
mg/L
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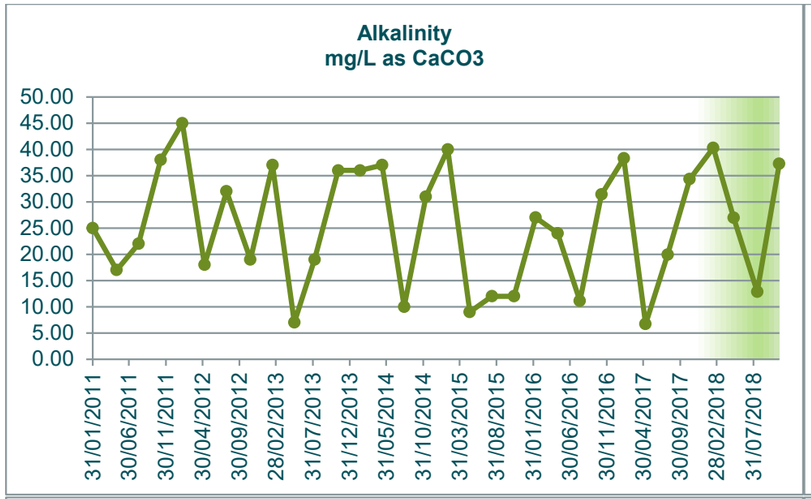
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018

SW2	Alkalinity mg/L as CaCO3	Ammonia mg/L	Arsenic (Total) mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	Orthophosphate mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Solids Suspended mg/L	Sulphate mg/L	TKN mg/L	TOC mg/L	Zinc (Total) mg/L
31/01/2011	25.00	0.05	0.01	7.80	0.00	3.90	20.00	0.01	142.00	0.01	1.10	0.01	2.10	1.42	0.01	0.05	0.05	0.05	0.95	0.05	6.20	0.08	5.00	-18.00	13.00	82.00	1.00	0.95	5.60	0.01
10/05/2011	17.00	0.05	0.01	2.40	0.00	3.60	28.00	0.01	163.00	0.01	3.10	0.01	2.20	0.01	0.01	0.05	0.05	0.05	0.38	0.05	5.50	0.05	5.00	186.00	19.00	6.00	3.20	0.38	2.90	0.01
9/08/2011	22.00	0.05	0.01	18.00	0.00	5.90	44.00	0.01	224.00	0.01	6.90	0.01	3.10	0.73	0.01	0.05	0.05	0.05	0.71	0.05	6.00	0.07	5.00	244.00	23.00	167.00	4.70	0.71	7.60	0.01
8/11/2011	38.00	0.03	0.01	6.00	0.00	9.90	40.00	0.01	229.00	0.02	2.40	0.01	4.30	1.53	0.01	0.02	0.02	0.02	0.77	0.02	6.30	0.07	5.00	107.30	13.00	52.00	1.80	0.75	5.40	0.03
6/02/2012	45.00	0.04	0.01	6.00	0.00	9.00	24.00	0.01	205.00	0.01	1.00	0.01	5.40	2.93	0.01	0.05	0.02	0.05	1.19	0.02	6.40	0.46	5.00	34.00	17.00	44.00	2.30	1.14	4.80	0.02
8/05/2012	18.00	0.03	0.01	7.80	0.00	3.30	26.00	0.01	123.00	0.01	5.10	0.01	2.20	0.27	0.01	0.03	0.02	0.03	0.75	0.02	5.90	0.07	5.00	228.00	17.00	68.00	1.90	0.72	0.70	0.01
7/08/2012	32.00	0.02	0.01	1.00	0.00	5.30	32.00	0.01	192.00	0.01	3.10	0.01	4.20	0.05	0.01	0.02	0.02	0.02	0.31	0.02	6.10	0.02	5.00	114.00	15.00	3.70	1.80	0.29	4.40	0.01
14/11/2012	19.00	0.04	0.01	2.70	0.00	7.50	56.00	0.01	325.00	0.01	1.50	0.01	5.20	1.64	0.01	0.04	0.02	0.04	0.80	0.02	6.20	0.05	5.00	41.00	27.00	52.00	20.00	0.76	7.00	0.03
14/02/2013	37.00	0.07	0.01	14.00	0.00	8.30	38.00	0.01	272.00	0.01	1.00	0.01	4.40	1.59	0.01	0.02	0.03	0.04	1.02	0.02	6.20	0.06	5.00	-47.00	22.00	39.00	2.60	0.98	15.00	0.02
15/05/2013	7.00	0.05	0.01	3.90	0.00	3.30	35.00	0.01	149.00	0.01	2.10	0.01	1.70	0.41	0.01	0.04	0.02	0.04	0.22	0.02	5.70	0.03	5.00	78.00	18.00	20.00	4.00	0.18	2.70	0.01
7/08/2013	19.00	0.04	0.01	4.50	0.00	4.00	31.00	0.01	144.00	0.01	3.60	0.01	2.60	0.27	0.01	0.04	0.02	0.04	0.78	0.02	6.00	0.07	5.00	146.00	20.00	90.00	1.50	0.74	4.30	0.02
13/11/2013	36.00	0.04	0.01	7.20	0.00	8.40	51.00	0.01	257.00	0.01	4.50	0.01	4.90	1.00	0.01	0.03	0.02	0.03	1.23	0.02	6.50	0.14	5.00	90.00	29.00	35.00	2.20	1.20	6.80	0.05
12/02/2014	36.00	0.08	0.01	22.00	0.00	9.00	56.00	0.01	260.00	0.01	3.60	0.01	5.20	0.74	0.01	0.09	0.02	0.09	2.67	0.02	6.40	0.16	5.00	145.00	34.00	64.00	2.40	2.58	9.30	0.05
14/05/2014	37.00	0.02	0.01	5.70	0.00	7.10	67.00	0.01	321.00	0.01	4.20	0.01	4.90	0.43	0.01	0.02	0.03	0.02	1.64	0.02	6.30	0.17	5.00	34.00	38.00	34.00	4.40	1.62	12.10	0.01
13/08/2014	10.00	0.03	0.01	2.70	0.00	6.20	59.00	0.01	269.00	0.01	3.80	0.01	4.00	0.12	0.01	0.03	0.02	0.03	0.43	0.02	5.80	0.05	5.00	153.00	37.00	10.00	18.00	0.40	5.00	0.03
11/11/2014	31.00	0.05	0.01	5.40	0.00	7.50	60.00	0.01	248.00	0.01	3.90	0.01	4.60	0.44	0.01	0.04	0.02	0.04	1.23	0.02	7.10	0.15	5.00	79.00	33.00	23.00	3.30	1.19	11.00	0.03
10/02/2015	40.00	0.03	0.01	5.70	0.00	8.30	29.00	0.01	196.00	0.01	0.10	0.01	4.80	2.02	0.01	0.02	0.02	0.04	1.45	0.02	6.50	0.05	5.00	-1.00	16.00	22.00	2.60	1.41	20.00	0.01
12/05/2015	9.00	0.02	0.00	4.80	0.00	2.30	24.00	0.00	111.00	0.00	1.50	0.00	1.50	0.18	0.00	0.02	0.02	0.02	0.44	0.02	5.40	0.06	5.00	124.00	16.00	21.00	2.70	0.44	3.80	0.04
12/08/2015	12.00	0.02	0.00	1.20	0.00	3.10	31.00	0.00	140.00	0.00	4.80	0.00	2.10	0.11	0.00	0.02	0.02	0.02	0.28	0.02	6.30	0.03	5.00	139.00	20.00	3.00	3.10	0.28	4.20	0.01
11/11/2015	12.00	0.02	0.00	1.80	0.00	4.00	29.00	0.00	148.00	0.00	2.50	0.00	2.40	0.36	0.00	0.02	0.02	0.02	0.53	0.02	5.90	0.04	5.00	80.00	18.00	17.00	9.80	0.51	6.50	0.01
9/02/2016	27.00	0.02	0.00	6.30	0.00	6.08	39.00	0.00	182.00	0.00	1.10	0.00	3.01	0.54	0.00	0.02	0.02	0.02	0.66	0.02	6.40	0.07	5.00	84.00	20.62	28.00	3.03	0.66	8.57	0.01
10/05/2016	24.00	0.02	0.00	6.30	0.00	5.81	37.00	0.00	176.00	0.00	2.50	0.00	3.15	0.64	0.00	0.02	0.02	0.02	1.10	0.02	6.20	0.14	5.00	116.00	20.68	34.00	1.89	1.10	6.17	0.01
10/08/2016	11.10	0.02		3.90		4.10	41.00		181.20		2.00		2.71			0.02	0.02	0.02	0.51	0.02	5.60	0.07	5.00	134.00	22.30	15.50	6.42	0.51	4.32	
8/11/2016	31.40	0.02		3.60		7.22	39.50		191.00		2.00		3.75			0.02	0.02	0.02	0.94	0.02	6.30	0.10	5.00	408.40	25.38	16.00	2.48	0.94	7.94	
8/02/2017	38.30	0.16		3.00		6.86	38.00		215.10		1.50		4.15			0.02	0.02	0.02	1.16	0.02	6.40	0.10	5.00	330.70	24.47	16.00	3.70	1.16	12.77	
9/05/2017	6.70	0.02	0.00	1.00	0.00	3.46	32.00	0.00	142.00	0.00	2.00	0.00	2.16	0.15	0.00	0.02	0.02	0.02	0.38	0.02	5.40	0.03	5.00	345.80	17.73	5.70	10.37	0.38	5.32	0.01
9/08/2017	19.94	0.02		3.90		3.62	27.50		139.70		2.30		2.30			0.02	0.02	0.02	0.54	0.02	6.00	0.06	5.00	358.80	18.57	15.50	1.09	0.54	5.35	
8/11/2017	34.32	0.06		4.80		8.29	40.00		216.30		1.20		4.15			0.02	0.02	0.02	0.71	0.02	5.60	0.08	5.00	121.30	23.63	18.00	2.91	0.71	9.32	
14/02/2018	40.31	0.03		9.60		8.19	35.00		202.20		1.40		3.73			0.02	0.02	0.02	1.13	0.02	6.40	0.13	5.00	165.10	23.95	31.00	1.95	1.13	11.30	
9/05/2018	26.99	0.02	0.00	4.80	0.00	6.51	28.50	0.00	160.60	0.00	1.90	0.00	3.36	0.57	0.00	0.02	0.02	0.02	0.61	0.02	6.10	0.04	1.15	275.20	18.68	9.20	2.48	0.61	9.32	0.01
15/08/2018	12.86	0.02		6.60		3.99	34.50		148.40		2.30		2.10			0.02	0.02	0.02	0.39	0.02	6.00	0.06	0.98	433.70	21.49	14.00	1.42	0.39	4.40	
14/11/2018	37.28	0.20		9.30		9.16	44.00		227.00		1.20		4.59			0.02	0.02	0.02	1.12	0.02	6.30	0.09	2.67	57.00	27.38	22.00	2.87	1.12	18.31	
2018 Min	**12.86**	**0.02**	**0.00**	**4.80**	**0.00**	**3.99**	**28.50**	**0.00**	**148.40**	**0.00**	**1.20**	**0.00**	**2.10**	**0.57**	**0.00**	**0.02**	**0.02**	**0.02**	**0.39**	**0.02**	**6.00**	**0.04**	**0.98**	**57.00**	**18.68**	**9.20**	**1.42**	**0.39**	**4.40**	**0.01**
2018 Max	**40.31**	**0.20**	**0.00**	**9.60**	**0.00**	**9.16**	**44.00**	**0.00**	**227.00**	**0.00**	**2.30**	**0.00**	**4.59**	**0.57**	**0.00**	**0.02**	**0.02**	**0.02**	**1.13**	**0.02**	**6.40**	**0.13**	**5.00**	**433.70**	**27.38**	**31.00**	**2.87**	**1.13**	**18.31**	**0.01**
2018 Mean	**29.36**	**0.07**	**0.00**	**7.58**	**0.00**	**6.96**	**35.50**	**0.00**	**184.55**	**0.00**	**1.70**	**0.00**	**3.45**	**0.57**	**0.00**	**0.02**	**0.02**	**0.02**	**0.81**	**0.02**	**6.20**	**0.08**	**2.45**	**232.75**	**22.88**	**19.05**	**2.18**	**0.81**	**10.83**	**0.01**
Long-term Average	**25.38**	**0.04**	**0.00**	**6.05**	**0.00**	**6.04**	**38.00**	**0.01**	**196.86**	**0.01**	**2.54**	**0.01**	**3.47**	**0.76**	**0.01**	**0.03**	**0.02**	**0.03**	**0.84**	**0.02**	**6.11**	**0.09**	**4.68**	**149.57**	**22.18**	**33.68**	**4.19**	**0.83**	**7.57**	**0.02**


Alkalinity
mg/L as CaCO3
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
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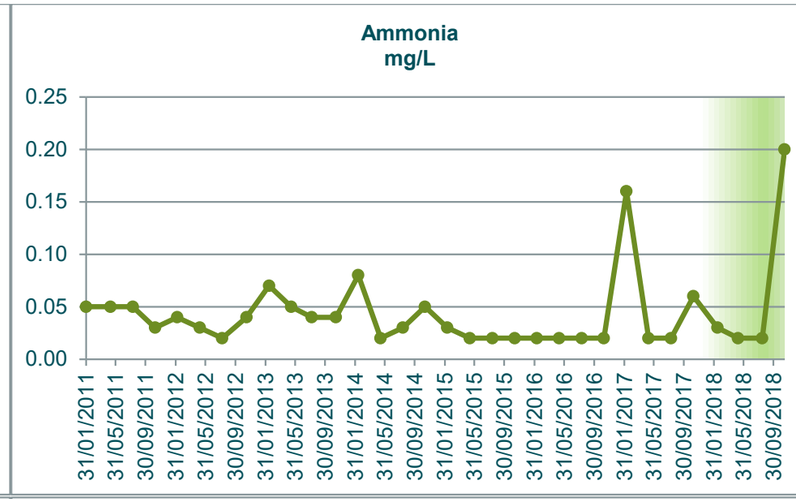
30/09/2017
28/02/2018
31/07/2018


Ammonia
mg/L
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0.20
0.15
0.10
0.05
0.00
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31/01/2018
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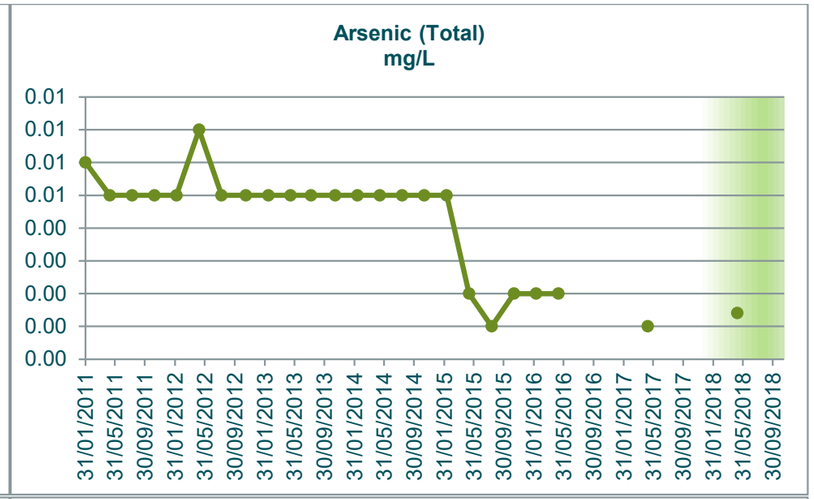
30/09/2018


Arsenic (Total)
mg/L
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0.01
0.01
0.01
0.00
0.00
0.00
0.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
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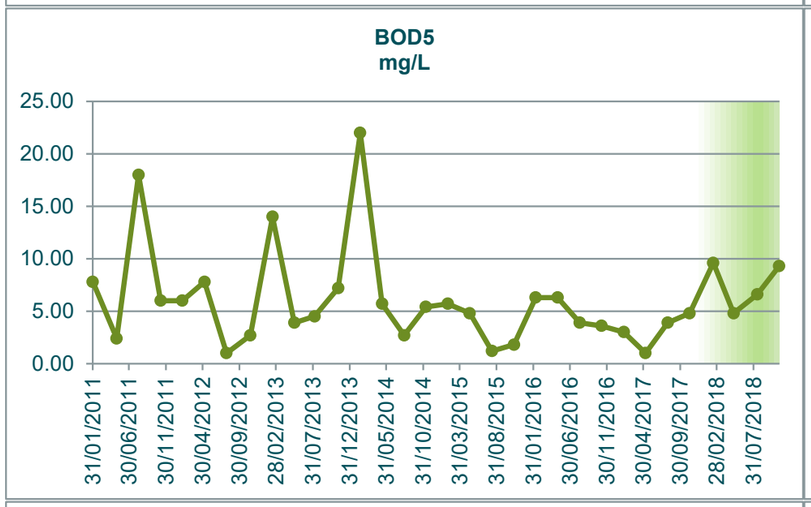
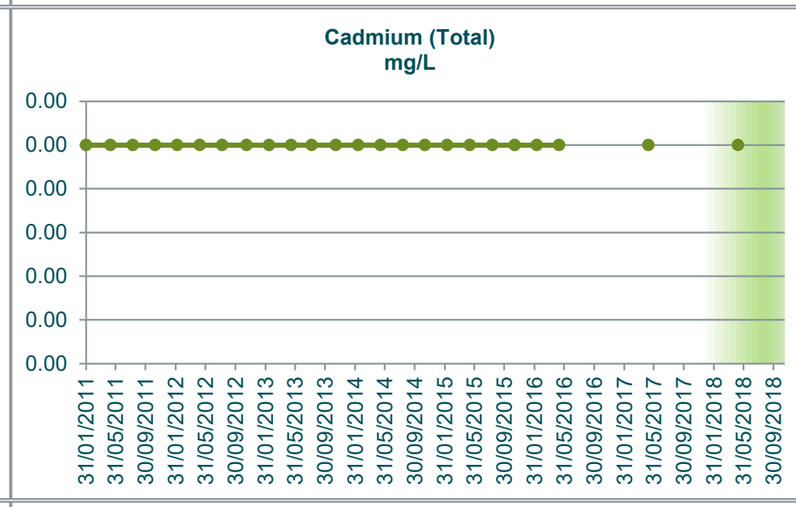
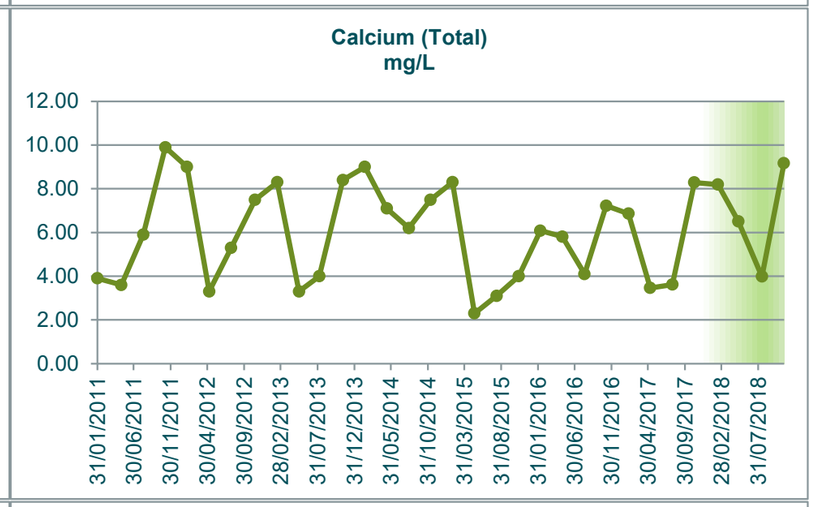
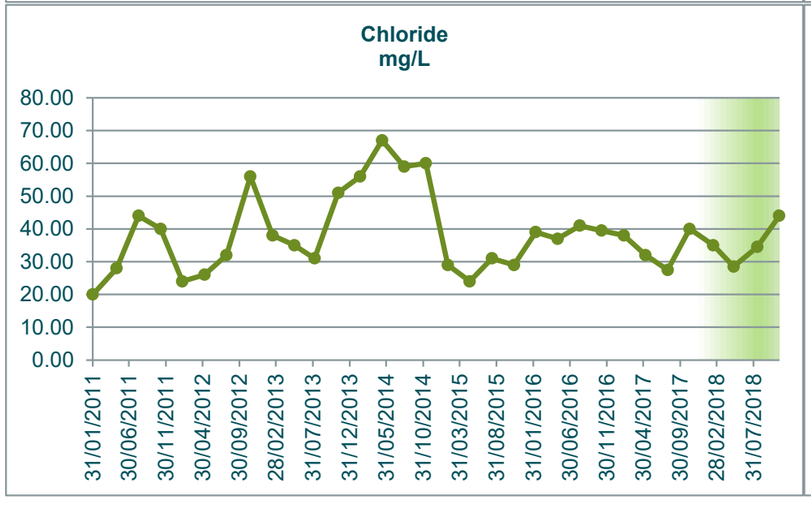
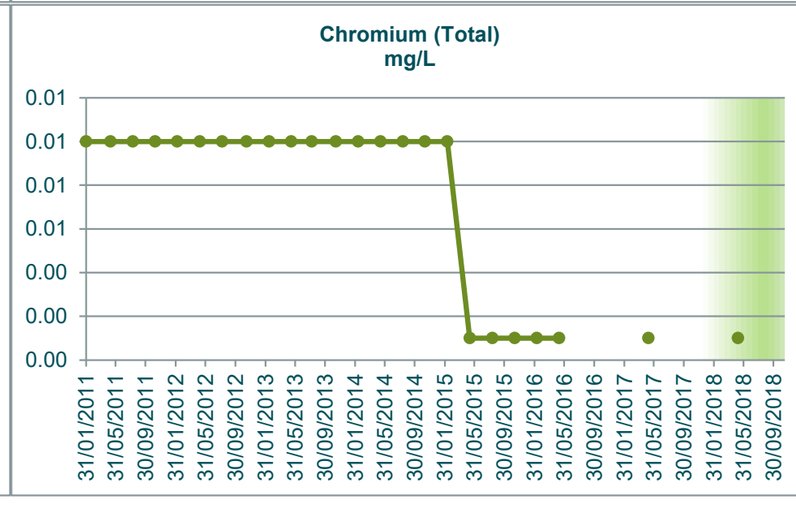
30/09/2018

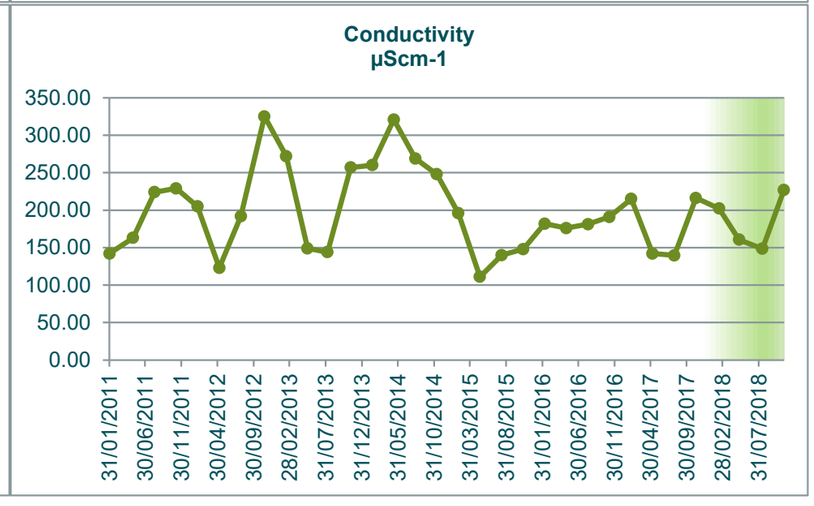

BOD5
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
31/01/2016
30/06/2016
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018

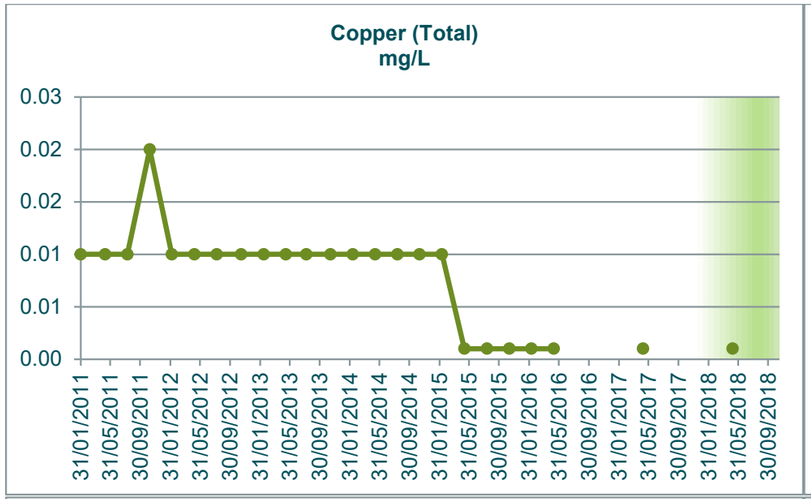

Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

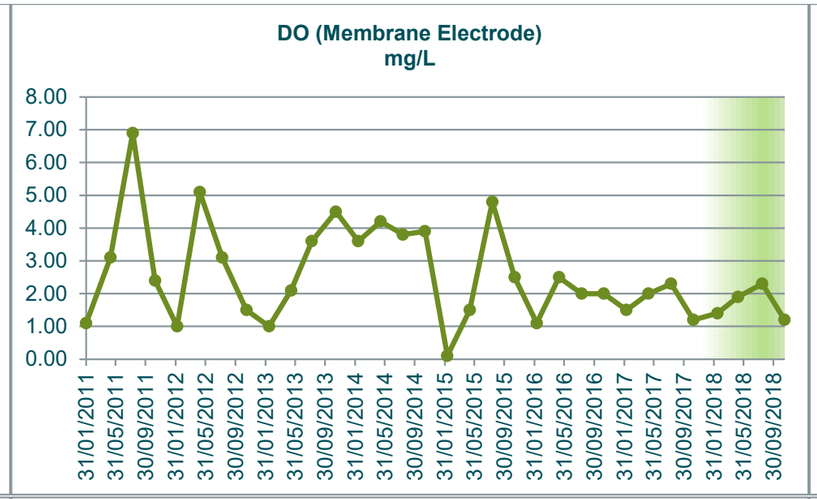

Calcium (Total)
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
31/01/2016
30/06/2016
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018

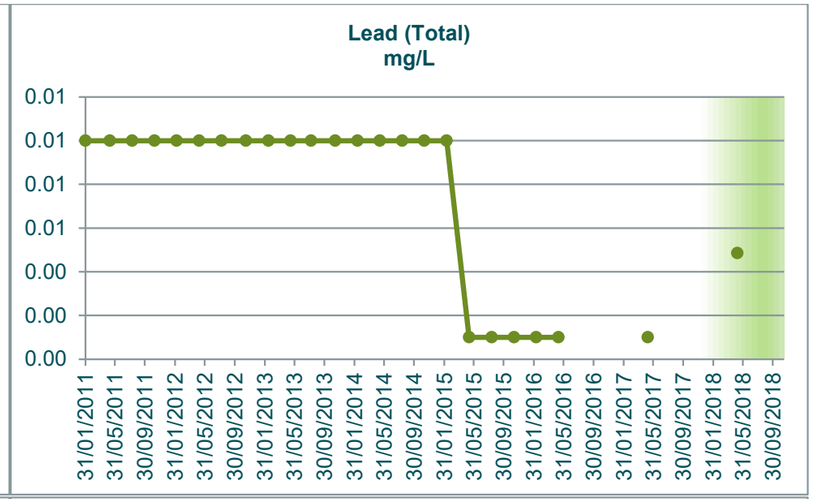

Chloride
mg/L
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
31/01/2016
30/06/2016
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018

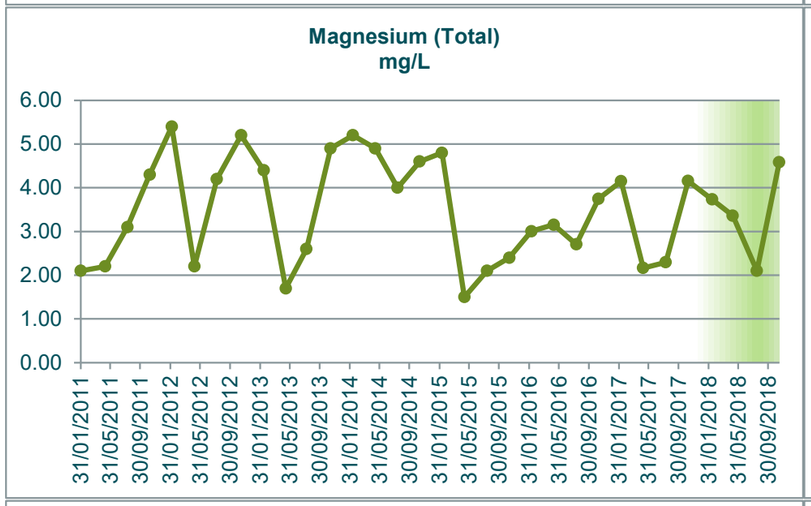

Chromium (Total)
mg/L
0.01
0.01
0.01
0.00
0.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

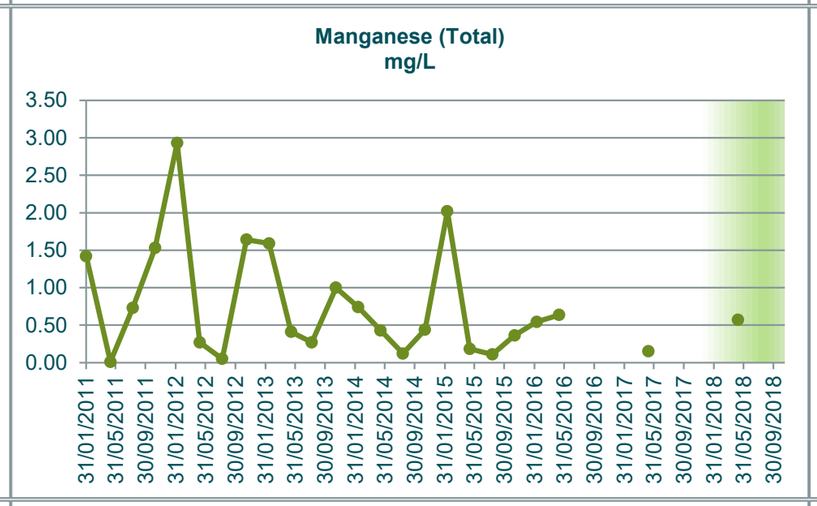

Conductivity
µScm-1
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
31/01/2016
30/06/2016
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018

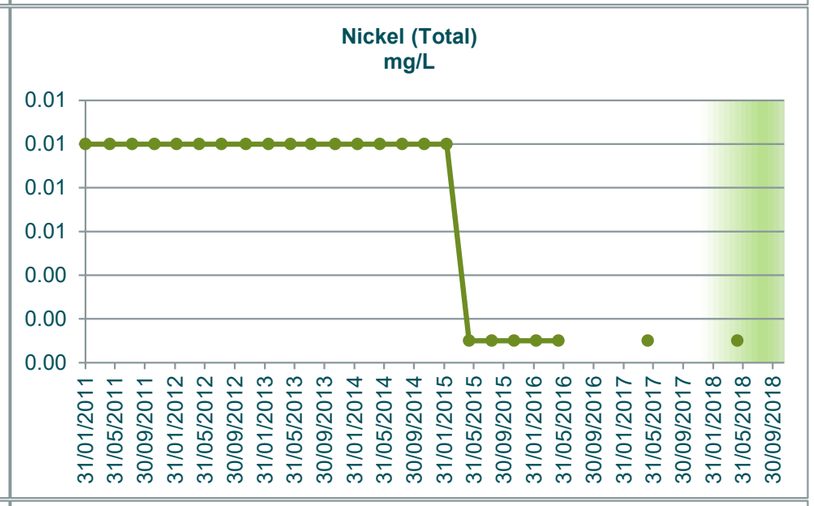

Copper (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

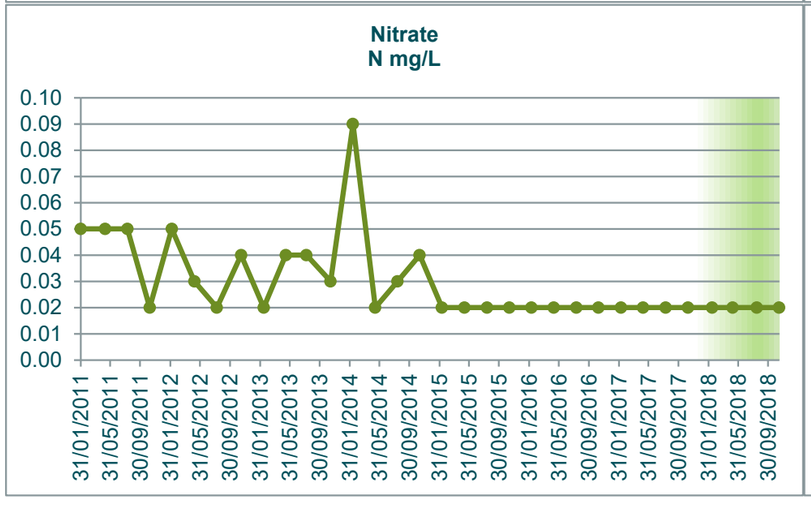

DO (Membrane Electrode)
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

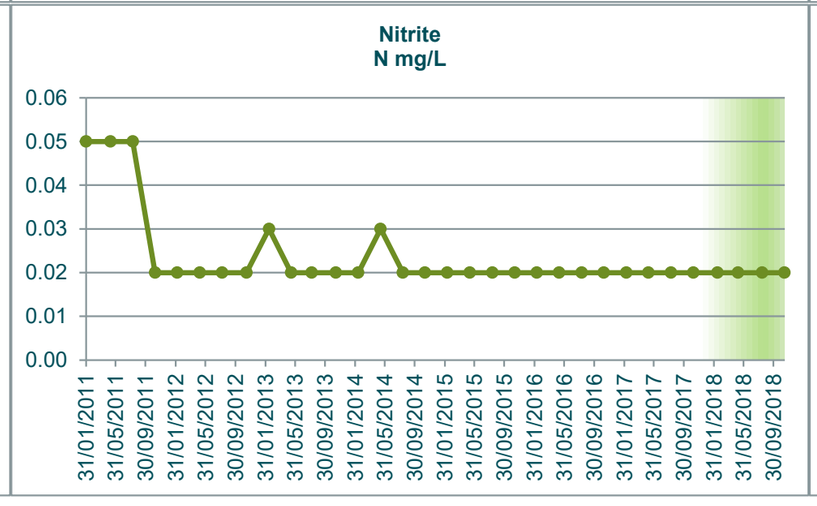

Lead (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

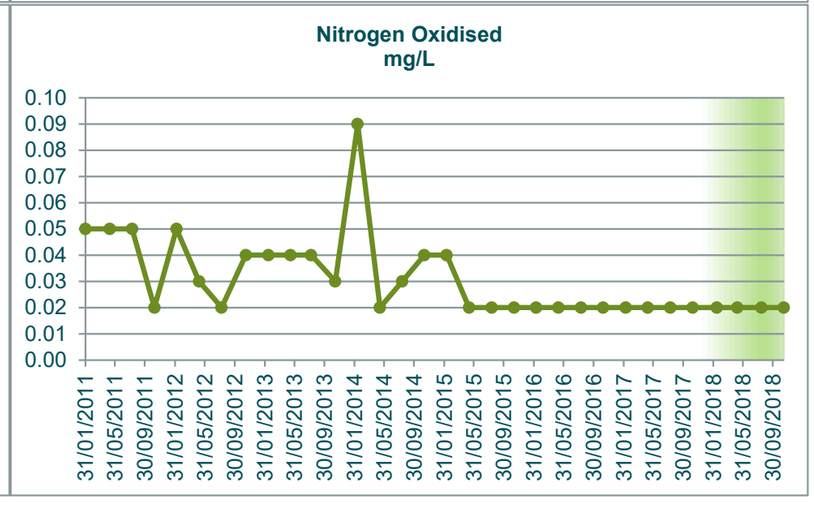

Magnesium (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

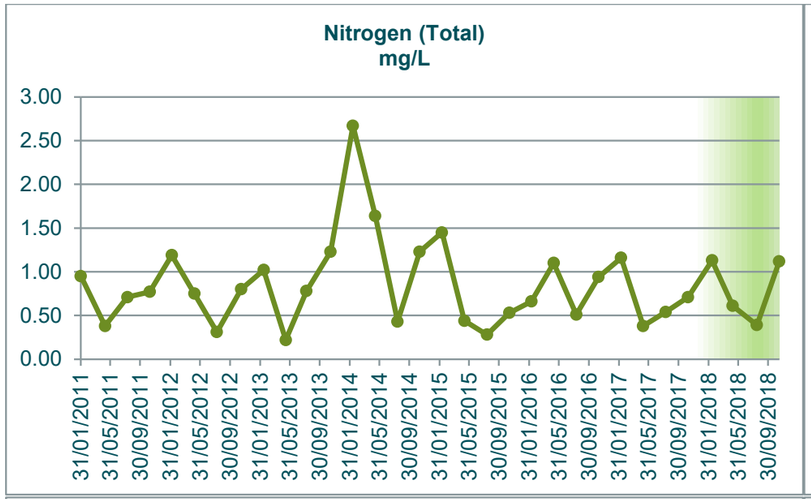

Manganese (Total)
mg/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

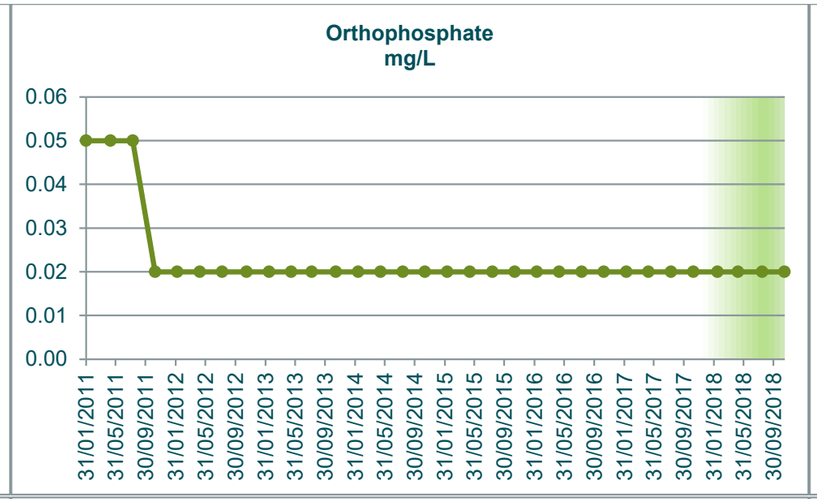

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

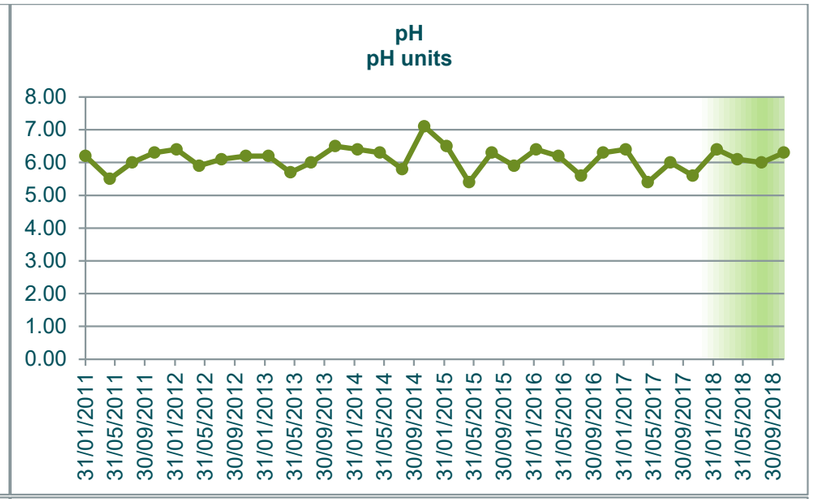

Nitrate
N mg/L
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

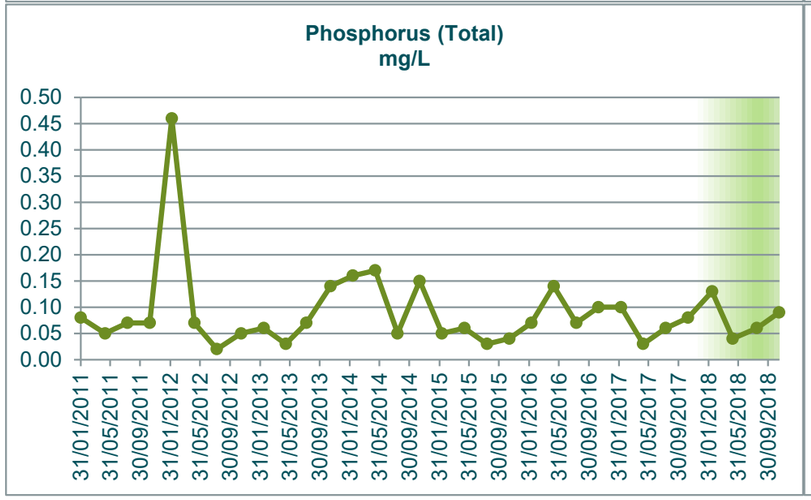

Nitrite
N mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

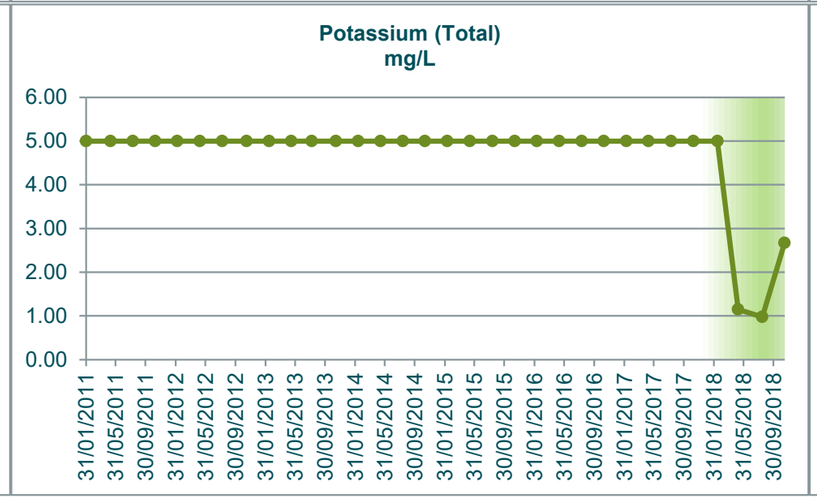

Nitrogen Oxidised
mg/L
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

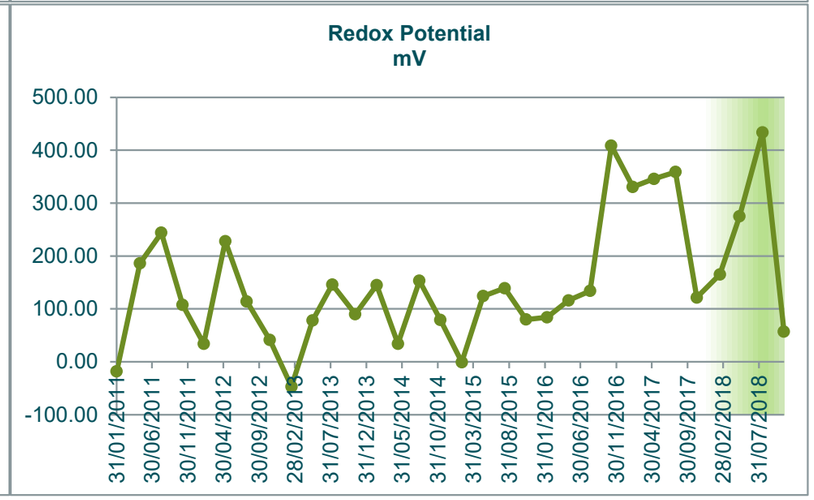

Nitrogen (Total)
mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

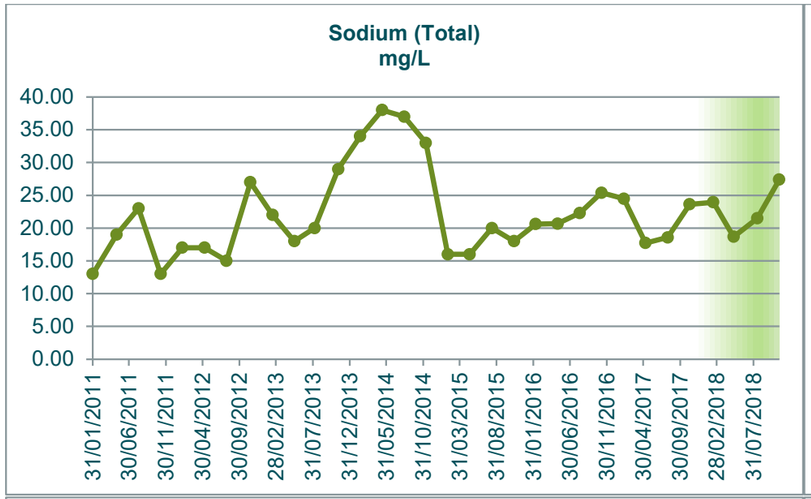

Orthophosphate
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

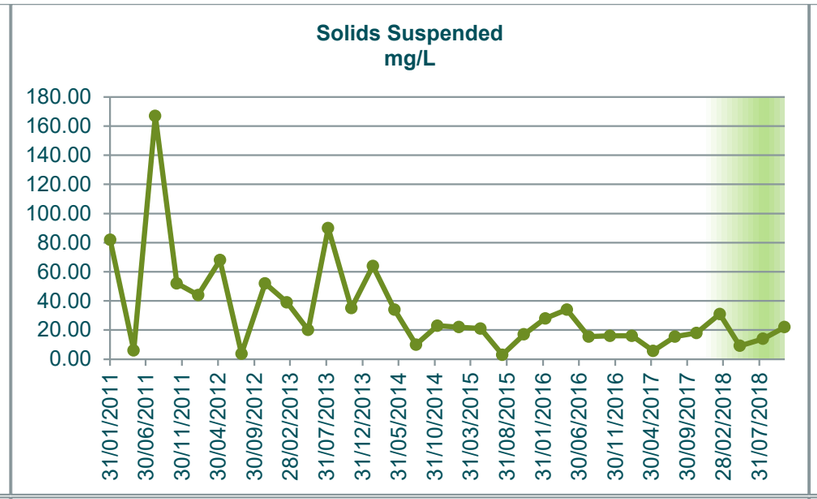

pH
pH units
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

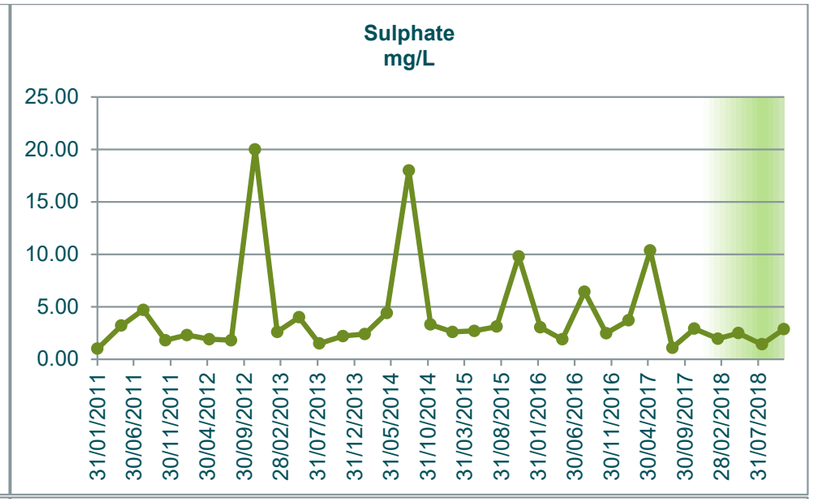

Phosphorus (Total)
mg/L
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

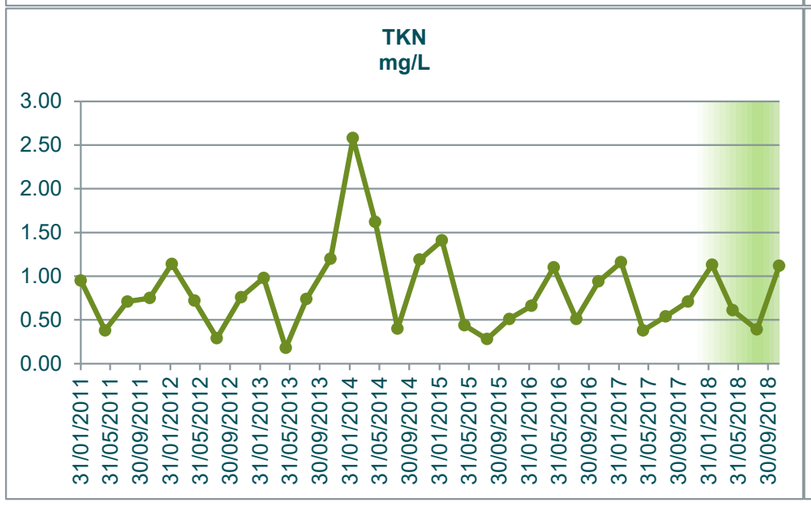

Potassium (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

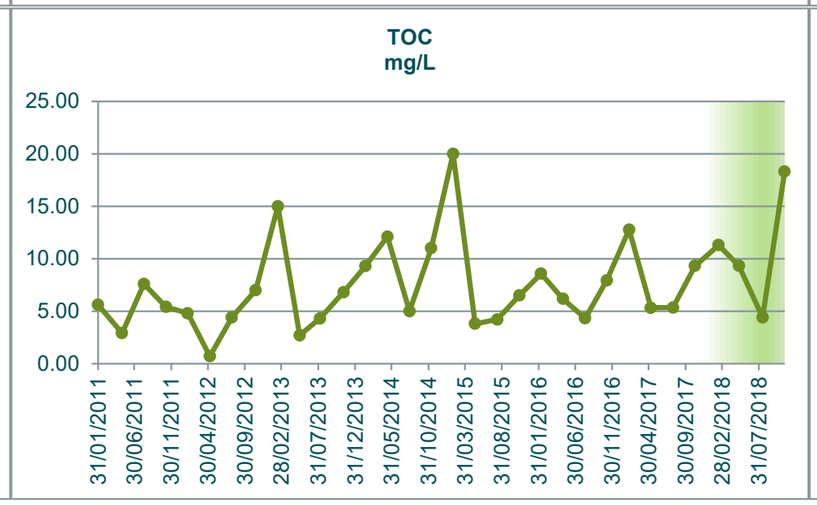

Redox Potential
mV
500.00
400.00
300.00
200.00
100.00
0.00
-100.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
31/01/2016
30/06/2016
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018


Sodium (Total)
mg/L
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
31/01/2016
30/06/2016
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018


Solids Suspended
mg/L
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
31/01/2016
30/06/2016
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018


Sulphate
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
31/01/2016
30/06/2016
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018


TKN
mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018


TOC
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
31/01/2011
30/06/2011
30/11/2011
30/04/2012
30/09/2012
28/02/2013
31/07/2013
31/12/2013
31/05/2014
31/10/2014
31/03/2015
31/08/2015
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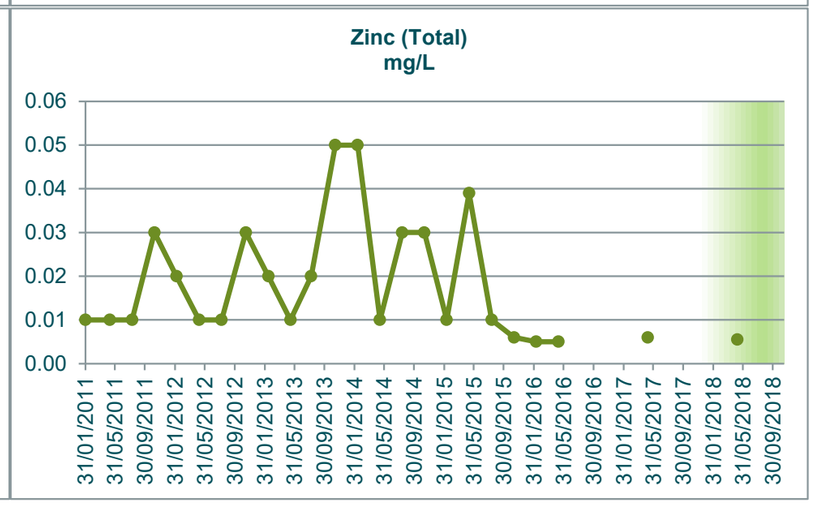
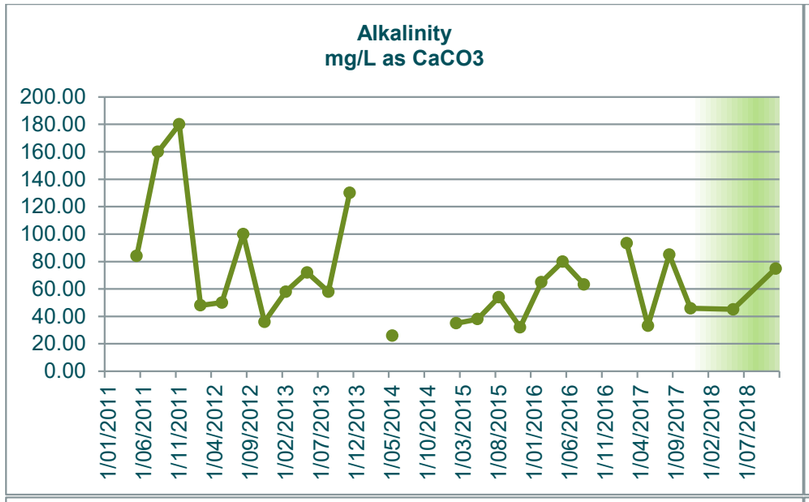
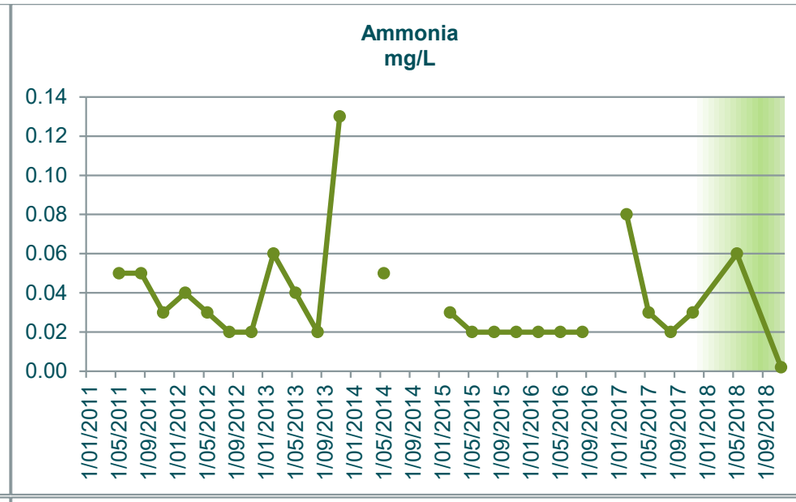
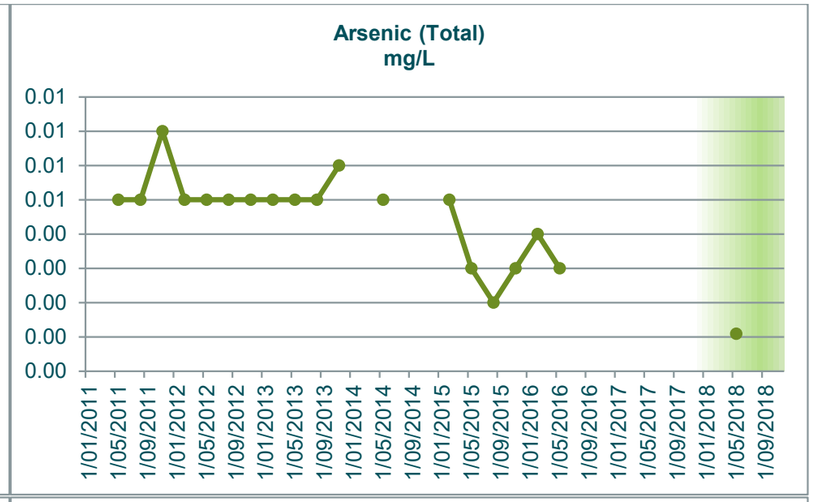
30/11/2016
30/04/2017
30/09/2017
28/02/2018
31/07/2018

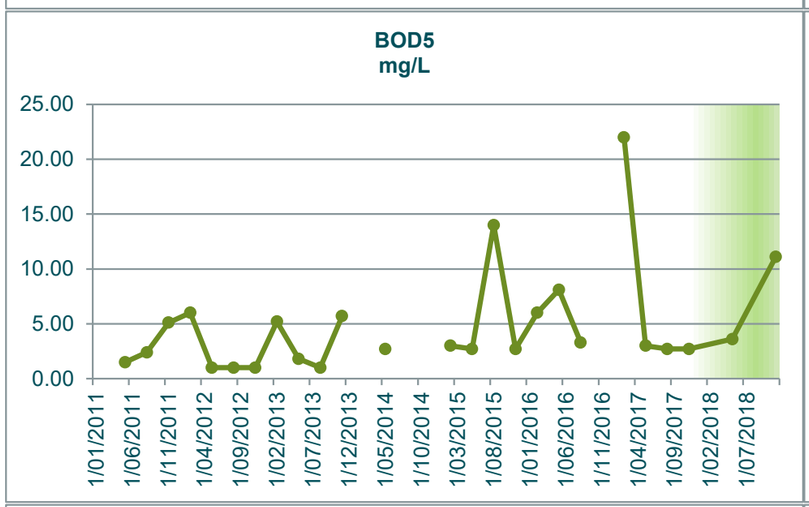

Zinc (Total)
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
31/01/2011
31/05/2011
30/09/2011
31/01/2012
31/05/2012
30/09/2012
31/01/2013
31/05/2013
30/09/2013
31/01/2014
31/05/2014
30/09/2014
31/01/2015
31/05/2015
30/09/2015
31/01/2016
31/05/2016
30/09/2016
31/01/2017
31/05/2017
30/09/2017
31/01/2018
31/05/2018
30/09/2018

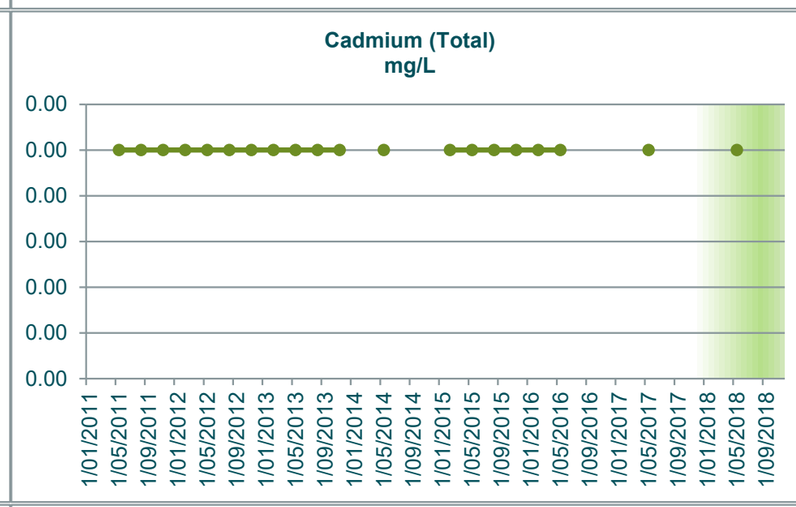
SW4	Alkalinity mg/L as CaCO3	Ammonia mg/L	Arsenic (Total) mg/L	BOD5 mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Conductivity µScm-1	Copper (Total) mg/L	DO (Membrane Electrode) mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese Total mg/L	Nickel (Total) mg/L	Nitrate N mg/L	Nitrite N mg/L	Nitrogen Oxidised mg/L	Nitrogen Total mg/L	Orthophosphate mg/L	pH pH units	Phosphorus Total mg/L	Potassium Total mg/L	Redox Potential mV	Sodium (Total) mg/L	Solids Suspended mg/L	Sulphate mg/L	TKN mg/L	TOC mg/L	Zinc (Total) mg/L
31/01/2011																														
10/05/2011	84.00	0.05	0.01	1.50	0.00	24.00	15.00	0.01	260.00	0.01	1.70	0.01	3.90	1.45	0.01	0.05	0.05	0.05	0.37	0.05	6.10	0.05	5.00	148.00	12.00	12.00	3.70	0.37	3.20	0.01
9/08/2011	160.00	0.05	0.01	2.40	0.00	40.00	25.00	0.01	395.00	0.01	2.60	0.01	6.90	0.84	0.01	0.05	0.05	0.05	0.44	0.05	6.70	0.05	5.00	208.00	18.00	11.00	7.40	0.44	8.50	0.01
8/11/2011	180.00	0.03	0.01	5.10	0.00	58.00	30.00	0.01	439.00	0.06	1.90	0.02	9.80	3.29	0.01	0.03	0.02	0.03	0.81	0.02	6.80	0.08	6.00	69.40	14.00	609.00	5.10	0.78	12.00	0.03
6/02/2012	48.00	0.04	0.01	6.00	0.00	12.00	11.00	0.01	142.00	0.01	1.00	0.01	3.40	2.31	0.01	0.02	0.02	0.05	0.67	0.02	6.40	0.06	5.00	137.00	9.20	29.00	1.00	0.67	4.60	0.01
8/05/2012	50.00	0.03	0.01	1.00	0.00	11.00	11.00	0.01	118.00	0.01	4.30	0.01	2.50	1.08	0.01	0.03	0.02	0.03	0.38	0.02	6.30	0.04	5.00	207.00	7.60	18.00	2.80	0.35	3.80	0.01
7/08/2012	100.00	0.02	0.01	1.00	0.00	23.00	17.00	0.01	255.00	0.01	3.30	0.01	4.30	0.12	0.01	0.02	0.02	0.02	0.24	0.02	6.70	0.02	5.00	176.00	9.30	5.00	7.20	0.22	4.30	0.01
14/11/2012	36.00	0.02	0.01	1.00	0.00	19.00	23.00	0.01	257.00	0.01	2.30	0.01	4.10	0.45	0.01	0.03	0.02	0.03	0.40	0.02	6.50	0.06	5.00	161.00	12.00	15.00	31.00	0.37	4.30	0.02
14/02/2013	58.00	0.06	0.01	5.20	0.00	17.00	25.00	0.01	224.00	0.01	1.00	0.01	4.00	1.96	0.01	0.04	0.02	0.04	0.65	0.02	6.20	0.06	5.00	146.00	14.00	37.00	6.90	0.61	6.60	0.02
15/05/2013	72.00	0.04	0.01	1.80	0.00	24.00	20.00	0.01	242.00	0.01	1.30	0.01	3.80	1.64	0.01	0.03	0.02	0.03	0.36	0.02	6.30	0.03	5.00	137.00	12.00	20.00	9.40	0.33	4.50	0.01
7/08/2013	58.00	0.02	0.01	1.00	0.00	19.00	12.00	0.01	158.00	0.01	2.10	0.01	3.10	0.17	0.01	0.03	0.02	0.03	0.40	0.02	6.40	0.05	5.00	143.00	10.00	12.00	5.00	0.37	3.40	0.01
13/11/2013	130.00	0.13	0.01	5.70	0.00	40.00	50.00	0.01	510.00	0.03	4.20	0.01	7.40	5.70	0.01	0.11	0.02	0.11	0.91	0.02	6.10	0.03	5.00	-9.00	35.00	445.00	39.00	0.80	6.60	0.07
11/02/2014																														
14/05/2014	26.00	0.05	0.01	2.70	0.00	14.00	28.00	0.01	214.00	0.01	7.10	0.01	2.40	0.72	0.01	1.23	0.03	1.26	1.97	0.02	6.10	0.17	5.00	33.00	14.00	127.00	16.00	0.71	4.50	0.02
12/08/2014																														
10/11/2014																														
10/02/2015	35.00	0.03	0.01	3.00	0.00	10.00	17.00	0.01	118.00	0.01	2.70	0.01	2.20	0.32	0.01	0.04	0.02	0.04	0.94	0.02	7.00	0.10	5.00	153.00	7.10	14.00	2.70	0.90	7.20	0.01
12/05/2015	38.00	0.02	0.00	2.70	0.00	12.00	10.00	0.00	116.00	0.00	3.40	0.00	2.50	0.51	0.00	0.02	0.02	0.02	0.84	0.02	6.00	0.11	5.00	186.00	8.00	26.00	2.00	0.84	5.00	0.05
12/08/2015	54.00	0.02	0.00	14.00	0.00	18.00	12.00	0.00	152.00	0.00	5.30	0.00	3.40	0.66	0.00	0.02	0.02	0.02	0.96	0.02	7.00	0.11	5.00	135.00	9.60	52.00	3.20	0.96	6.00	0.03
11/11/2015	32.00	0.02	0.00	2.70	0.00	11.00	11.00	0.00	124.00	0.01	1.70	0.00	2.50	0.65	0.00	0.02	0.02	0.02	0.76	0.02	6.40	0.13	5.00	148.00	8.00	73.00	8.60	0.76	5.90	0.01
9/02/2016	65.00	0.02	0.00	6.00	0.00	20.87	26.00	0.00	215.00	0.00	3.80	0.00	3.71	0.71	0.00	0.02	0.02	0.02	2.18	0.02	6.80	0.31	5.00	131.00	12.81	28.00	6.06	2.18	8.97	0.01
10/05/2016	80.00	0.02	0.00	8.10	0.00	23.67	26.00	0.00	257.00	0.00	5.50	0.00	4.30	0.82	0.00	0.02	0.02	0.02	1.29	0.02	6.70	0.16	5.48	104.00	15.27	18.00	3.04	1.29	11.33	0.01
10/08/2016	63.30	0.02		3.30		19.79	14.00		193.50		3.10		4.20			0.02	0.02	0.02	0.48	0.02	6.40	0.08	5.00	240.00	11.23	11.00	8.74	0.48	6.00	
8/11/2016																														
8/02/2017	93.40	0.08		22.00		26.39	24.00		286.50		1.10		5.18			0.02	0.05	0.02	2.80	0.02	6.50	0.49	6.42	84.40	16.66	109.00	5.54	2.80	15.78	
9/05/2017	33.20	0.03		3.00	0.00	13.31	16.00	0.00	158.70	0.00	2.00	0.00	3.03	0.37	0.00	0.22	0.02	0.24	0.66	0.02	6.00	0.07	5.00	361.90	9.61	13.00	16.60	0.42	4.89	0.01
9/08/2017	85.05	0.02		2.70		24.73	20.00		224.10		2.00		4.47			0.02	0.02	0.02	0.53	0.02	6.00	0.08	5.00	334.00	11.89	18.00	4.33	0.53	7.66	
8/11/2017	45.84	0.03		2.70		16.32	22.50		189.50		1.90		3.03			0.02	0.11	0.11	0.74	0.02	6.10	0.15	5.00	391.60	12.22	19.00	10.48	0.63	6.97	
9/05/2018	45.10	0.06	0.00	3.60	0.00	15.98	20.00	0.00	161.80	0.00	4.40	0.00	2.79	0.32	0.00	0.02	0.02	0.02	0.86	0.02	6.50	0.11	2.20	254.10	10.60	8.00	5.89	0.86	6.81	0.01
14/11/2018	74.83	0.00		11.10		23.88	24.50		235.00		2.24		4.29			0.02	0.02	0.02	1.40	0.02	6.49	0.23	4.02	9.00	14.50	32.00	3.00	1.40	14.29	
2017 Min	**45.10**	**0.00**	**0.00**	**3.60**	**0.00**	**15.98**	**20.00**	**0.00**	**161.80**	**0.00**	**2.24**	**0.00**	**2.79**	**0.32**	**0.00**	**0.02**	**0.02**	**0.02**	**0.86**	**0.02**	**6.49**	**0.11**	**2.20**	**9.00**	**10.60**	**8.00**	**3.00**	**0.86**	**6.81**	**0.01**
2017 Max	**74.83**	**0.06**	**0.00**	**11.10**	**0.00**	**23.88**	**24.50**	**0.00**	**235.00**	**0.00**	**4.40**	**0.00**	**4.29**	**0.32**	**0.00**	**0.02**	**0.02**	**0.02**	**1.40**	**0.02**	**6.50**	**0.23**	**4.02**	**254.10**	**14.50**	**32.00**	**5.89**	**1.40**	**14.29**	**0.01**
2017 Mean	**59.97**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**
Long-term Average	**69.87**	**0.04**	**0.00**	**4.77**	**0.00**	**21.48**	**20.40**	**0.01**	**225.80**	**0.01**	**2.88**	**0.01**	**4.05**	**1.21**	**0.01**	**0.09**	**0.03**	**0.09**	**0.88**	**0.02**	**6.42**	**0.11**	**4.96**	**163.54**	**12.58**	**70.44**	**8.59**	**0.80**	**6.92**	**0.02**

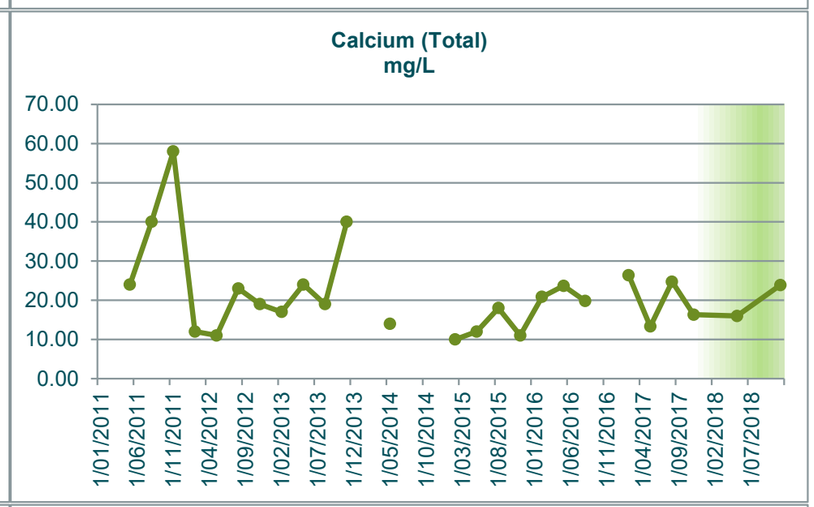

Alkalinity
mg/L as CaCO3
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

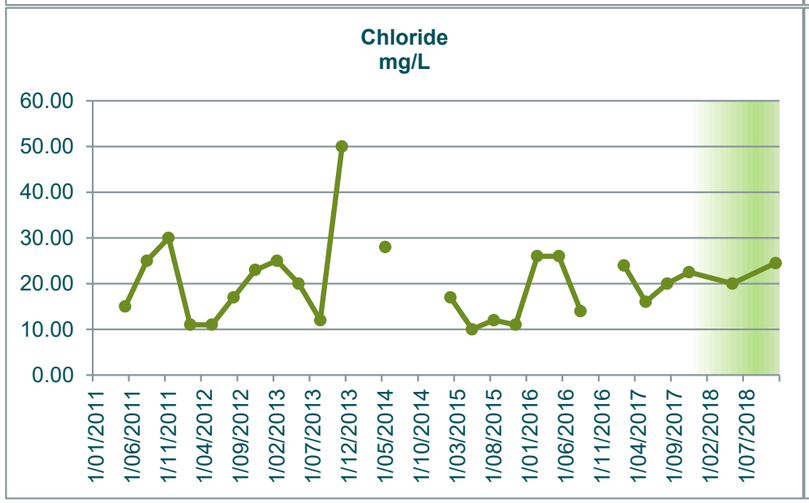

Ammonia
mg/L
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

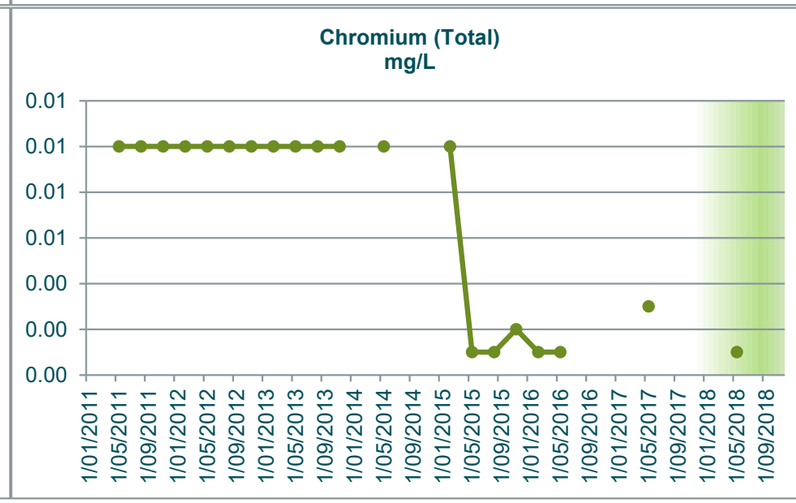

Arsenic (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


BOD5
mg/L
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Cadmium (Total)
mg/L
0.00
0.00
0.00
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Calcium (Total)
mg/L
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chloride
mg/L
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Chromium (Total)
mg/L
0.01
0.01
0.01
0.00
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
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1/05/2015
1/09/2015
1/01/2016
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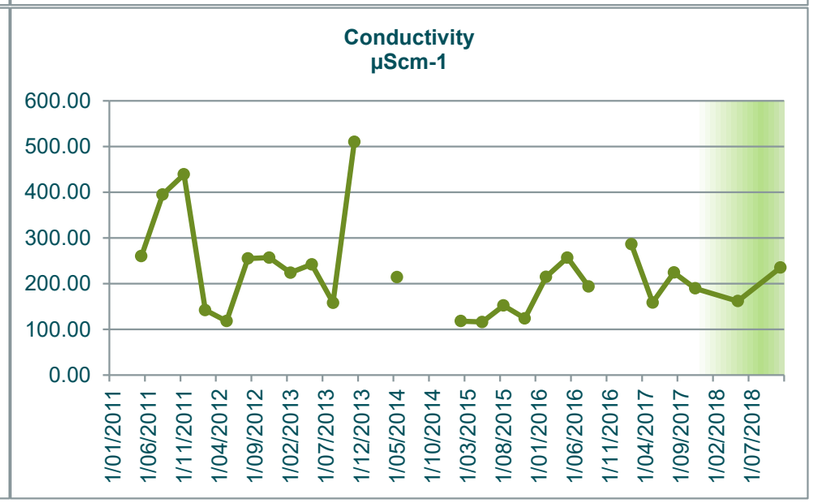
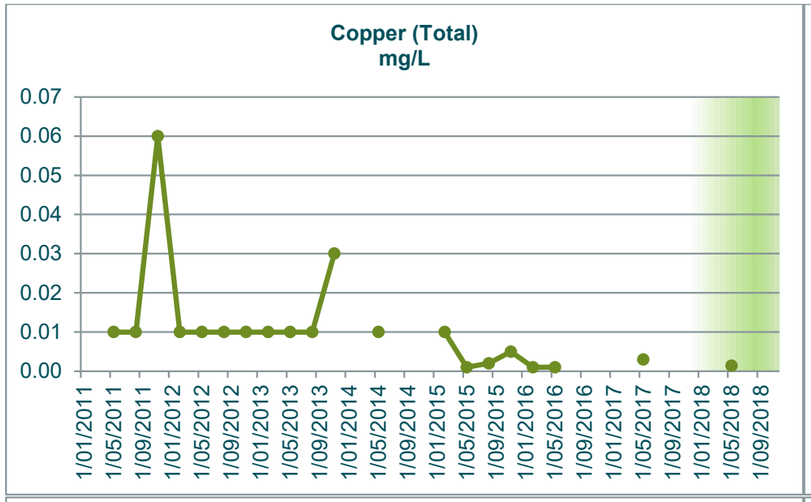
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


Conductivity
µScm-1
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Copper (Total)
mg/L
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
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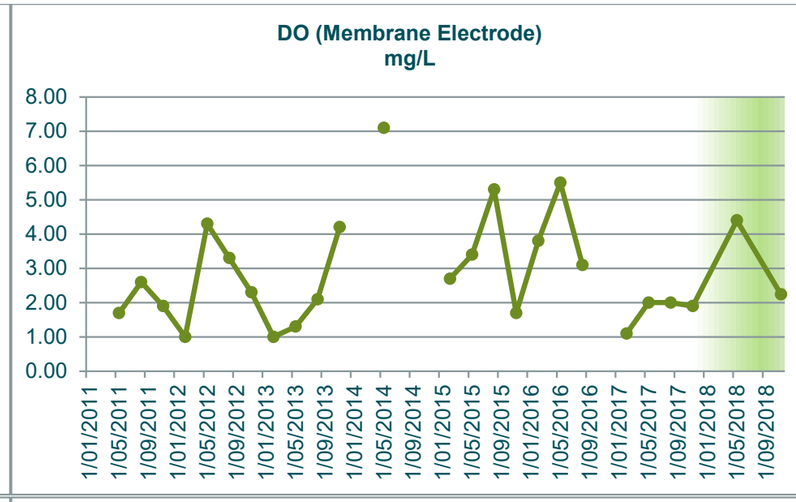
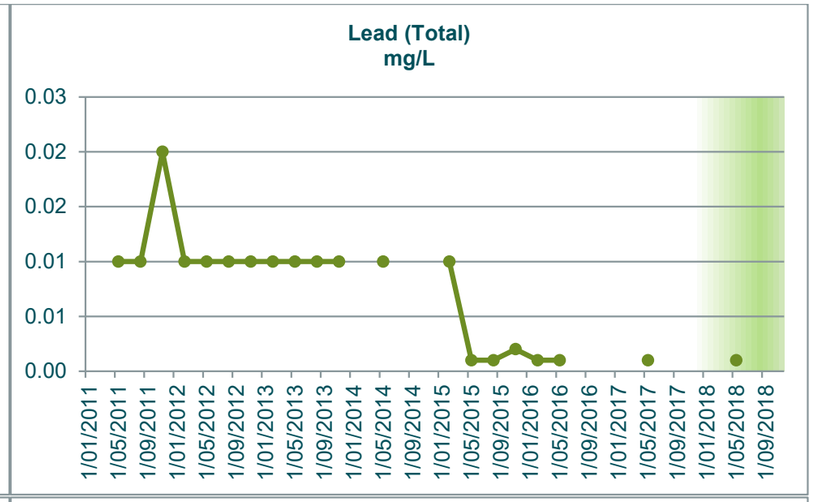
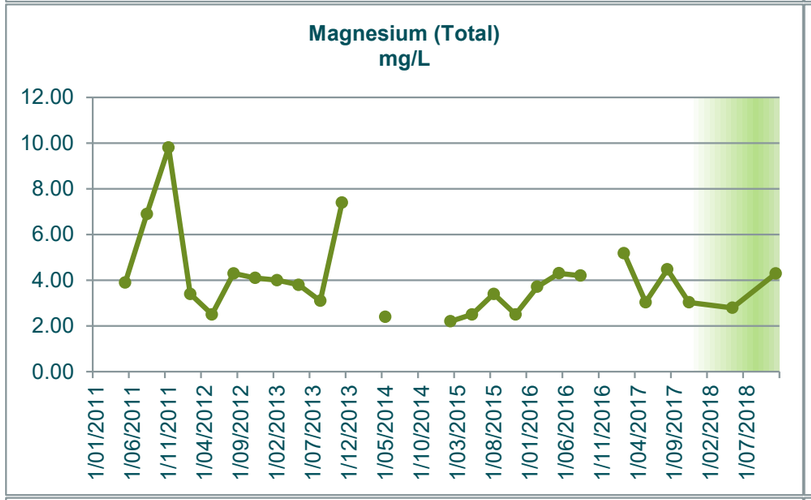
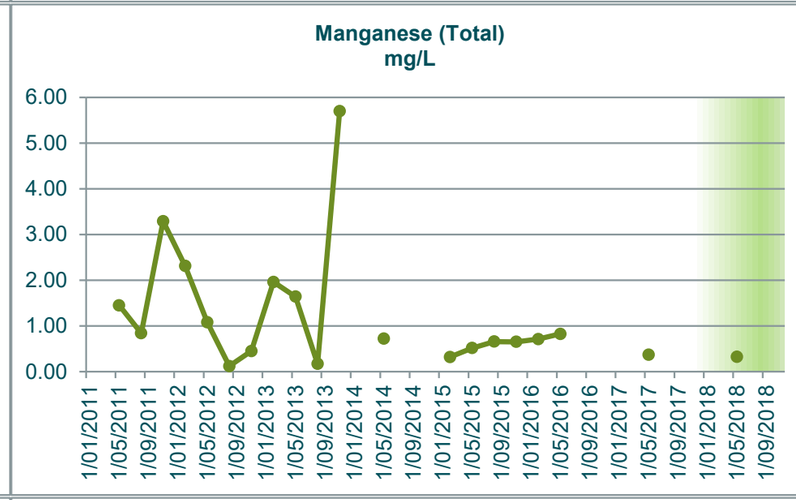
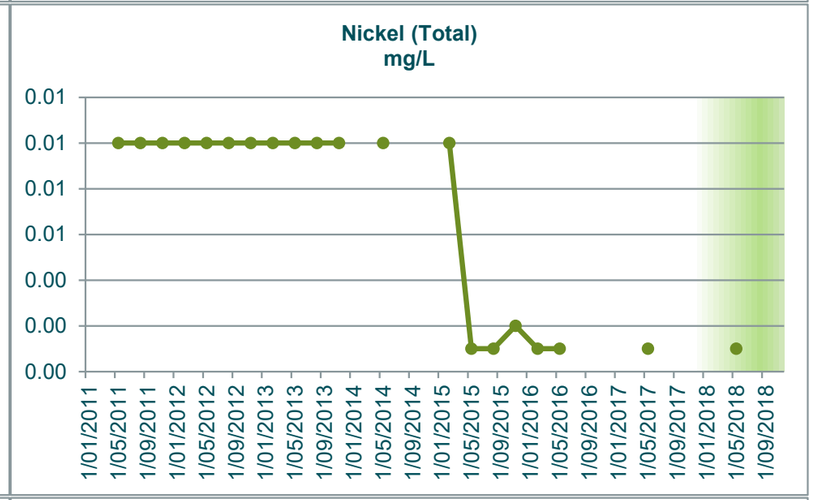
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

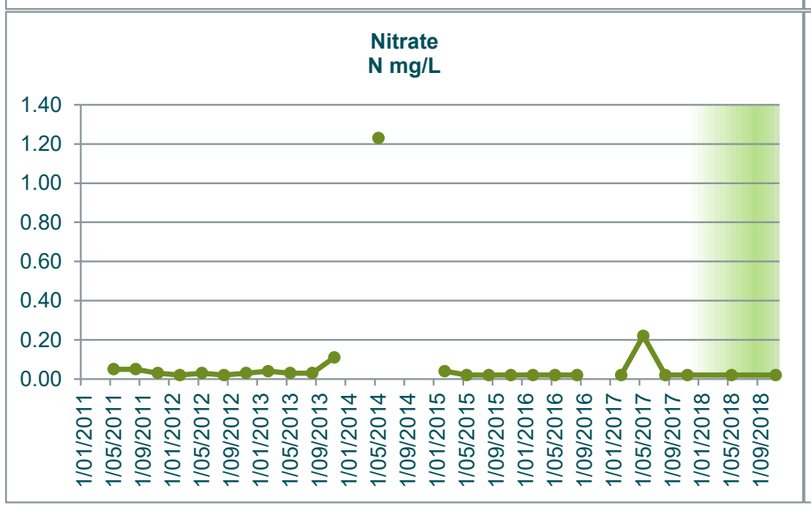

DO (Membrane Electrode)
mg/L
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

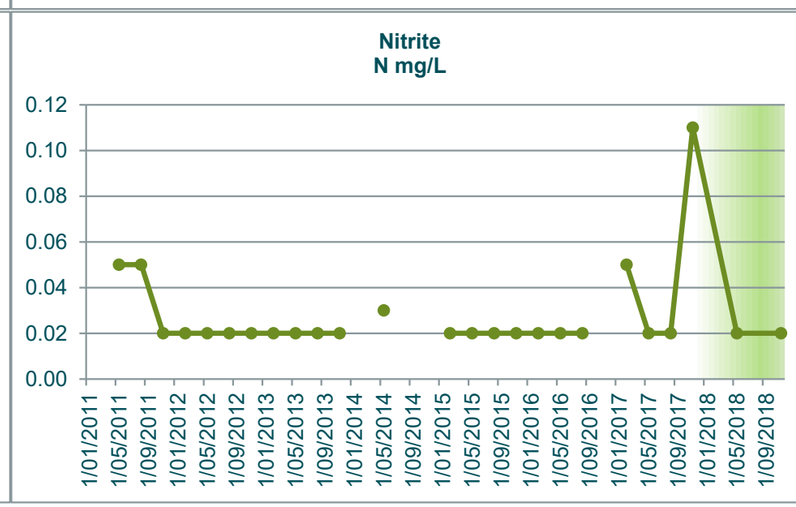

Lead (Total)
mg/L
0.03
0.02
0.02
0.01
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

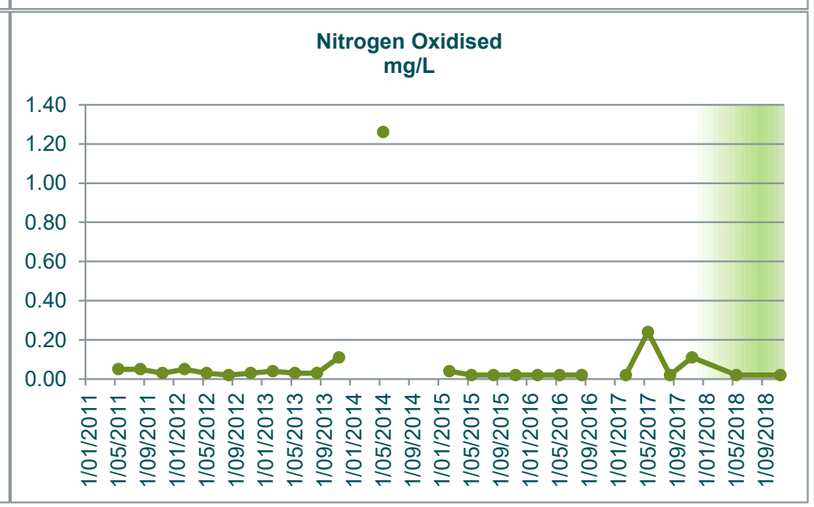

Magnesium (Total)
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

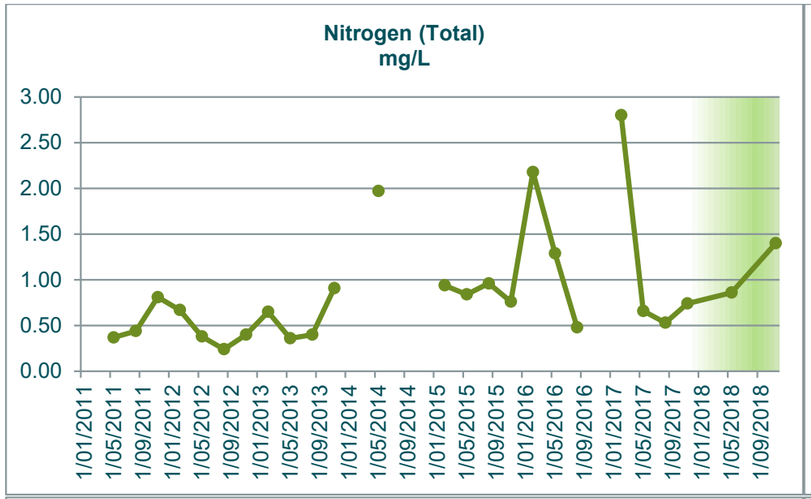

Manganese (Total)
mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

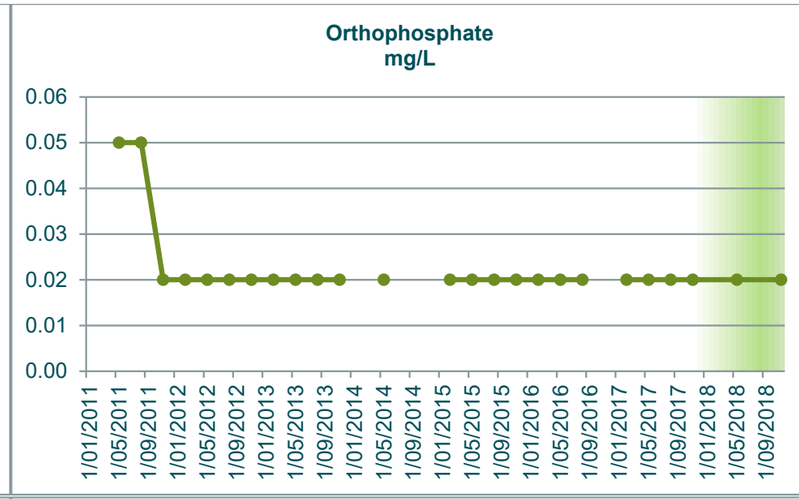

Nickel (Total)
mg/L
0.01
0.01
0.01
0.01
0.00
0.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

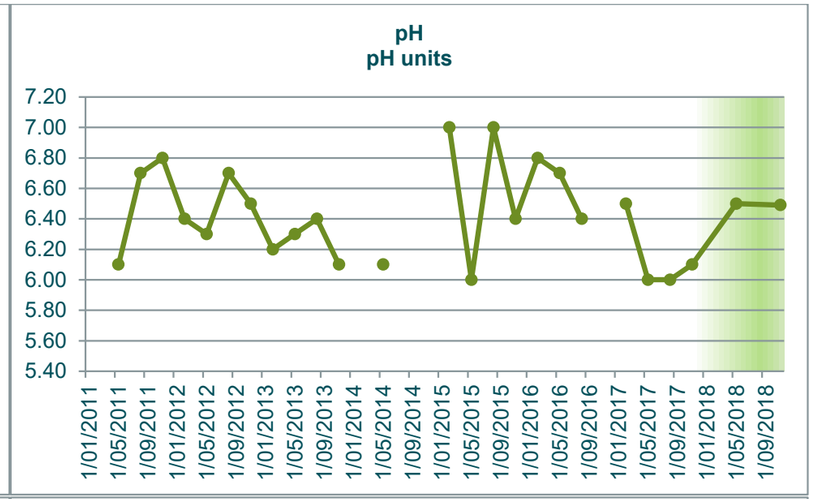

Nitrate
N mg/L
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

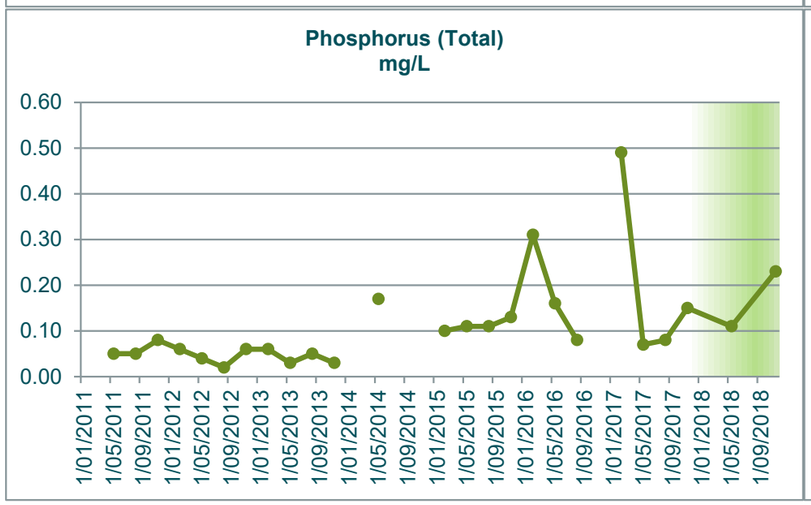

Nitrite
N mg/L
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

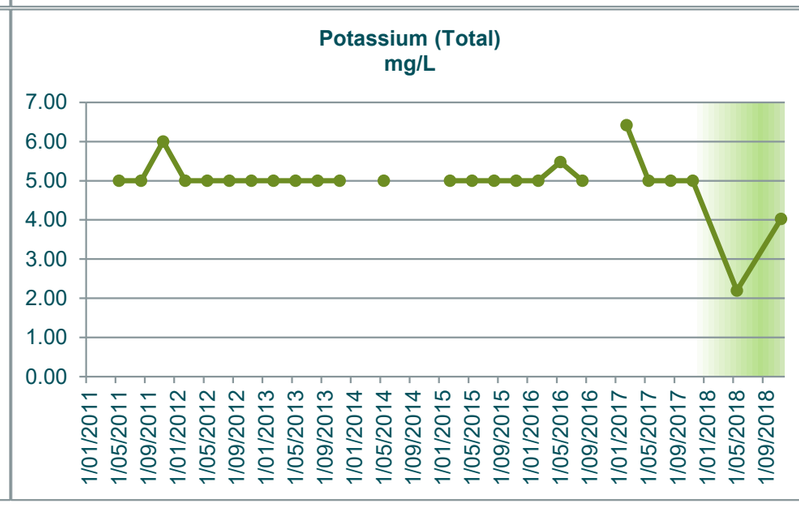

Nitrogen Oxidised
mg/L
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

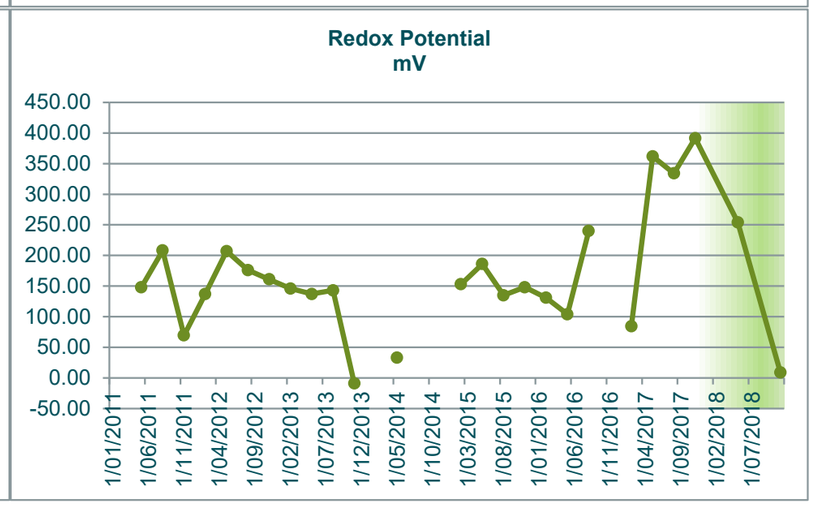

Nitrogen (Total)
mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

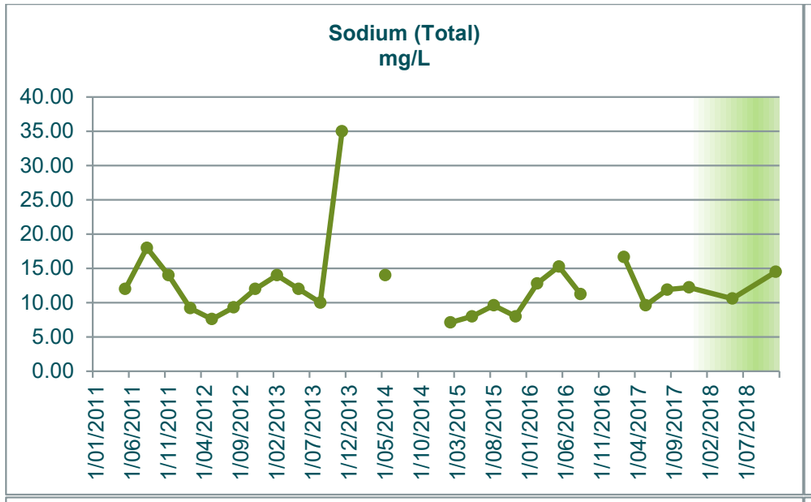

Orthophosphate
mg/L
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

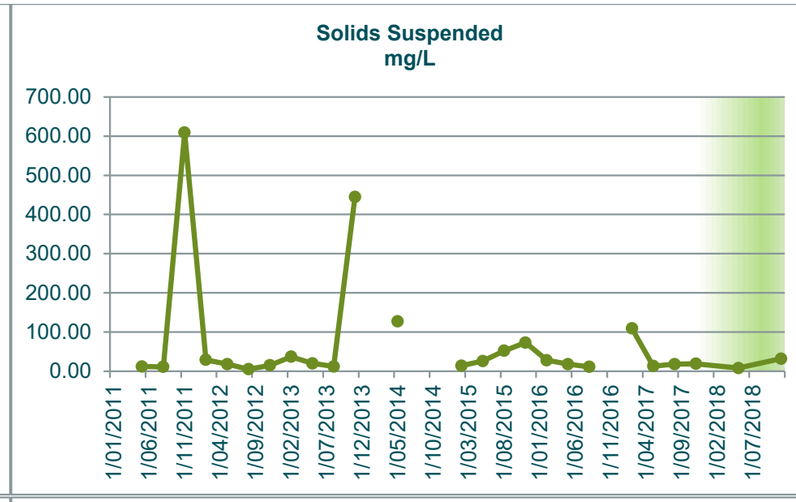

pH
pH units
7.20
7.00
6.80
6.60
6.40
6.20
6.00
5.80
5.60
5.40
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

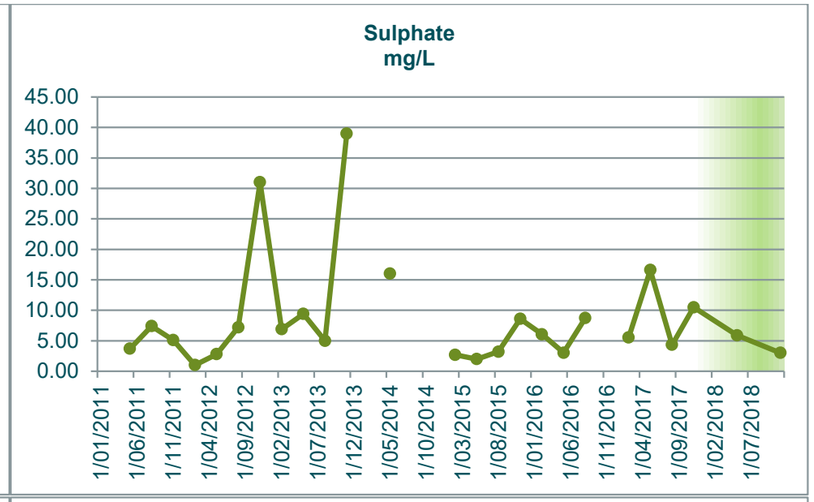

Phosphorus (Total)
mg/L
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

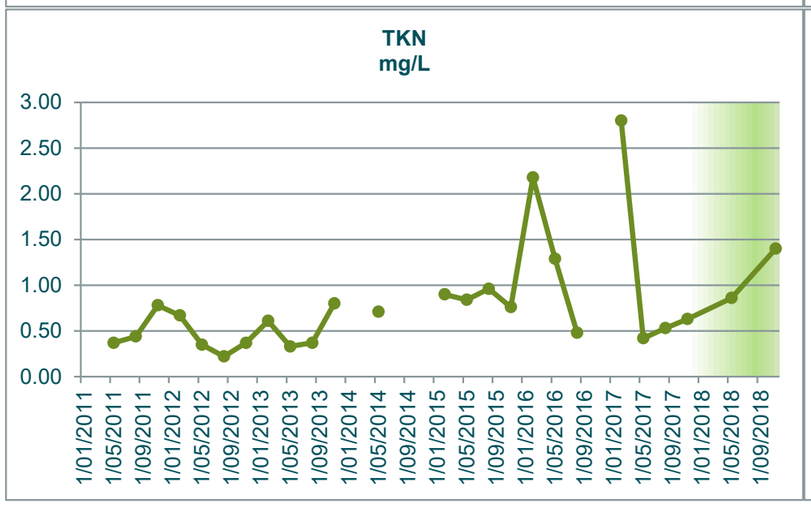

Potassium (Total)
mg/L
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

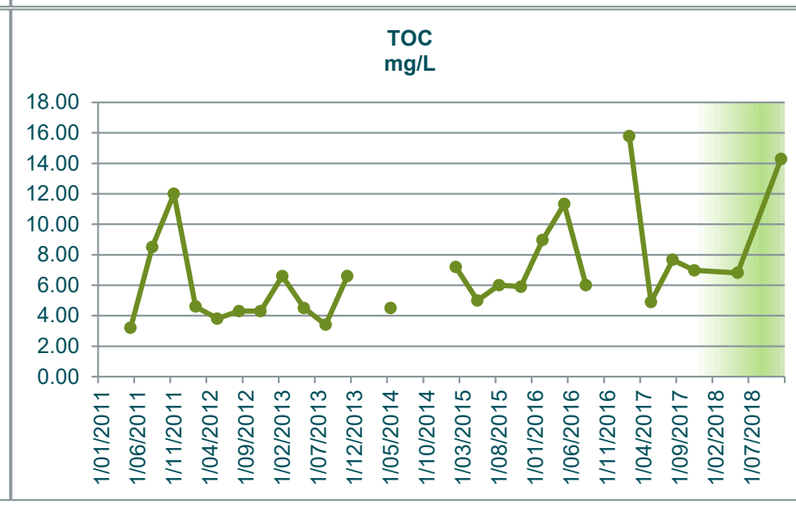

Redox Potential
mV
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

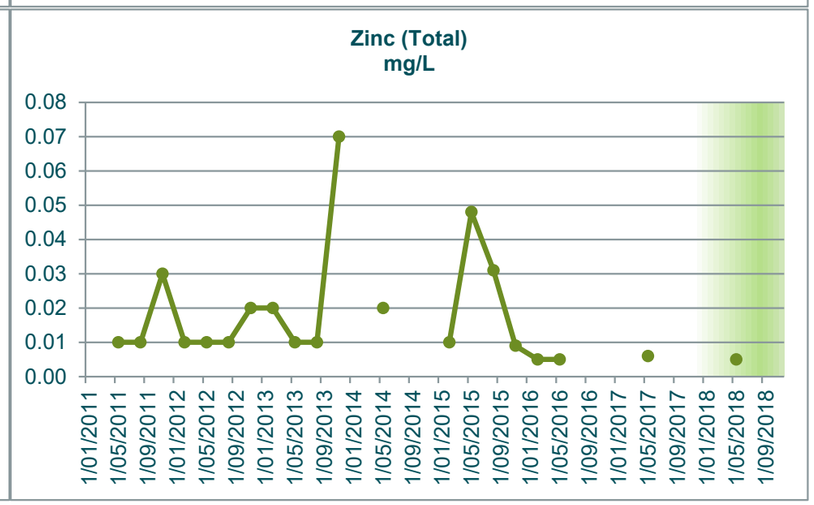

Sodium (Total)
mg/L
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Solids Suspended
mg/L
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


Sulphate
mg/L
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018


TKN
mg/L
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018


TOC
mg/L
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
1/06/2011
1/11/2011
1/04/2012
1/09/2012
1/02/2013
1/07/2013
1/12/2013
1/05/2014
1/10/2014
1/03/2015
1/08/2015
1/01/2016
1/06/2016
1/11/2016
1/04/2017
1/09/2017
1/02/2018
1/07/2018

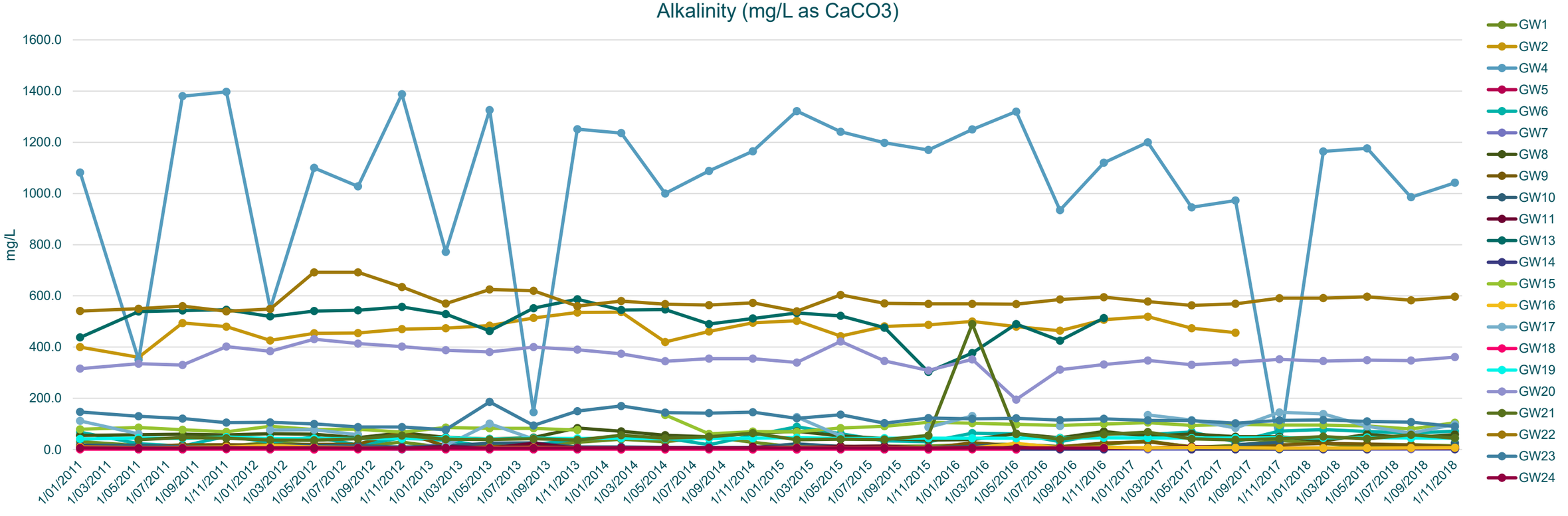

Zinc (Total)
mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1/01/2011
1/05/2011
1/09/2011
1/01/2012
1/05/2012
1/09/2012
1/01/2013
1/05/2013
1/09/2013
1/01/2014
1/05/2014
1/09/2014
1/01/2015
1/05/2015
1/09/2015
1/01/2016
1/05/2016
1/09/2016
1/01/2017
1/05/2017
1/09/2017
1/01/2018
1/05/2018
1/09/2018

Appendix C – Monitoring Graphs of each Parameter

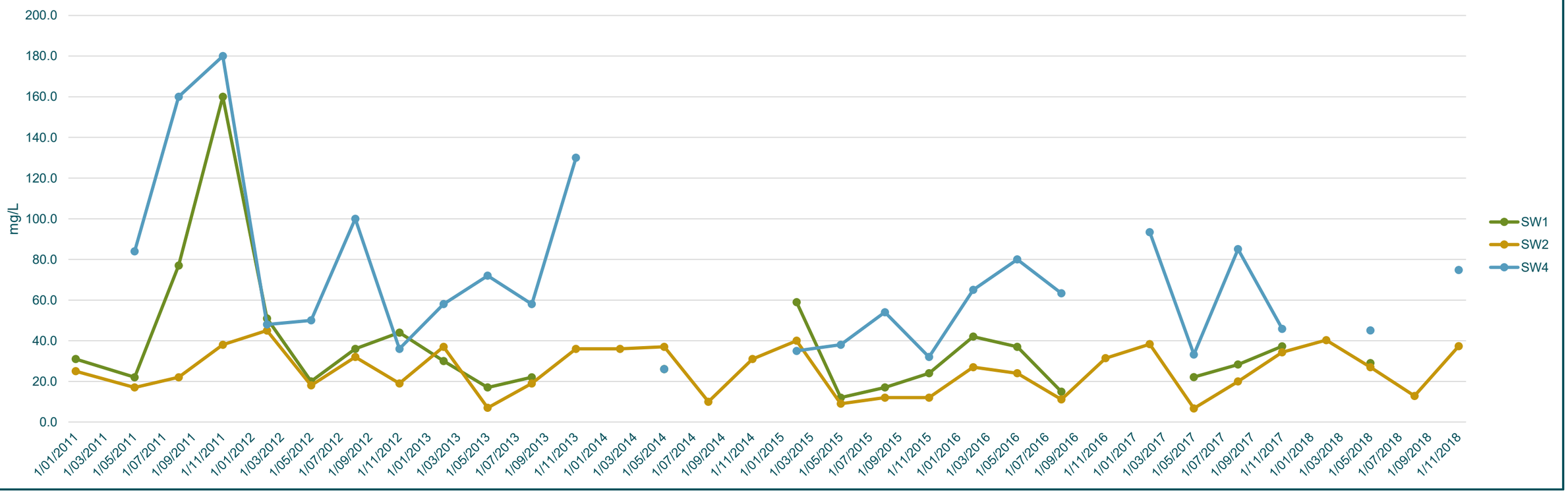
Alkalinity	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW13	GW14	GW15	GW16	GW17	GW18	GW19	GW20	GW21	GW22	GW23	GW24
31/01/2011	31.0	400.0	1082.0	6.0	68.0	9.0	55.0	16.0	17.0	12.0	438.0	2.0	79.0	10.0	112.0	0.6	41.0	316.0		541.0	147.0	6.4
10/05/2011	16.0	360.0	350.0	2.0	23.0	2.0	58.0	11.0	17.0	6.0	539.0	1.0	86.0	7.0	61.0	0.8	45.0	335.0	38.0	550.0	130.0	5.7
9/08/2011	12.0	494.0	1380.0	4.0	13.0	1.0	60.0	18.0	11.0	5.0	543.0	1.0	77.0	8.0		1.0	43.0	330.0	47.0	560.0	121.0	6.2
8/11/2011	13.0	480.0	1397.0	5.0	52.0	3.0	57.0	19.0	9.0	6.0	546.0	2.0	69.0	10.0		1.4	49.0	402.0	44.0	540.0	105.0	6.4
6/02/2012	27.0	426.0	550.0	2.0	29.0	5.0	62.0	17.0	17.0	9.0	520.0	1.0	91.0	16.0	76.0	0.7	43.0	384.0	37.0	549.0	106.0	6.3
8/05/2012	18.0	454.0	1100.0	3.0	49.0	3.0	60.0	20.0	16.0	5.0	541.0	1.0	78.0	10.0	77.0	0.1	43.0	431.0	36.0	692.0	100.0	6.3
6/08/2012	12.0	455.0	1028.0	3.0	18.0	4.0	46.0	21.0	15.0	6.0	544.0	2.0	79.0	7.0	58.0	0.5	43.0	414.0	42.0	692.0	88.0	6.0
13/11/2012	29.0	470.0	1388.0	4.0	45.0	2.0	65.0	69.0	10.0	4.0	557.0	1.0	68.0	5.0		2.3	42.0	402.0	55.0	635.0	88.0	6.2
13/02/2013	7.0	474.0	772.0	2.0	36.0	22.0	48.0	13.0	14.0	12.0	529.0	1.0	86.0	4.0	16.0	0.7	46.0	388.0	40.0	570.0	77.0	6.3
14/05/2013	9.0	484.0	1326.0	2.0	10.0	1.0	41.0	19.0	25.0	6.0	463.0	1.0	83.0	8.0	101.0	0.7	41.0	381.0	39.0	625.0	186.0	6.1
6/08/2013	11.0	514.0	146.0	2.0	18.0	1.0	47.0	16.0	26.0	24.0	552.0	1.0	83.0	8.0	41.0	0.7	44.0	400.0	42.0	620.0	94.0	6.2
12/11/2013	28.0	535.0	1251.0	4.0	41.0	1.0	84.0		10.0	5.0	587.0	1.0	76.0	7.0		0.9	43.0	390.0	37.0	560.0	150.0	6.3
11/02/2014	40.0	537.0	1236.0	6.0	48.0	2.0	71.0		10.0		545.0					0.0	44.0	374.0	56.0	580.0	170.0	6.5
13/05/2014	30.0	420.0	1000.0	5.0	45.0	2.0	56.0		8.0	7.0	547.0		135.0			0.4	42.0	345.0	44.0	568.0	144.0	6.3
12/08/2014	50.0	461.0	1088.0	4.0	19.0	1.0	50.0		7.0		490.0		61.0			0.6	43.0	355.0	50.0	564.0	142.0	6.5
10/11/2014	28.0	495.0	1165.0	2.0	55.0	1.0	63.0		8.0	10.0	512.0		70.0	5.0		0.5	44.0	355.0	64.0	573.0	146.0	6.5
9/02/2015	9.0	503.0	1322.0	1.0	89.0	2.0	71.0	12.0	22.0	8.0	533.0	1.0	69.0	9.0	127.0	0.5	46.0	340.0	38.0	540.0	122.0	6.6
11/05/2015	12.0	443.0	1241.0	2.0	62.0	1.0	53.0	13.0	12.0	12.0	522.0	1.0	84.0	7.0	53.0	0.6	43.0	422.0	40.0	604.0	136.0	6.5
11/08/2015	13.0	481.0	1198.0	2.0	34.0	1.0	43.0	9.0	1.0	13.0	476.0	1.0	91.0	7.0		0.7	44.0	346.0	39.0	571.0	103.0	6.2
10/11/2015	13.0	487.0	1170.0	1.0	30.0	1.0	37.0	4.0	8.0	6.0	303.0	1.0	106.0	7.0	87.0	0.4	44.0	309.0	55.0	569.0	123.0	6.0
8/02/2016	20.0	500.0	1250.0	4.0	64.0	2.0	39.0	27.0	12.0	7.0	377.0	4.0	103.0	6.0	131.0	0.6	44.0	352.0	490.0	569.0	120.0	6.3
9/05/2016	21.0	480.0	1320.0	3.0	61.0	1.0	62.0	15.0	22.0	6.0	490.0	1.0	98.0	24.0		0.5	44.0	195.0	61.0	568.0	122.0	6.3
9/08/2016	12.0	464.0	935.0	2.4	30.7	1.4	45.5	10.6	6.4	5.1	425.3	1.0	94.4	7.0	91.8		44.5	312.0	40.0	586.0	115.0	6.0
7/11/2016	20.2	507.0	1120.0	1.6	61.6	1.0	70.3	25.4		4.6	513.6	1.0	99.7	8.6			45.7	332.0	59.4	595.0	120.0	6.2
7/02/2017	34.1	519.0	1200.0	2.9	58.6	1.0	52.5	30.5	8.0	5.5			105.0	6.5	135.0		45.3	348.0	68.2	578.0	114.0	
8/05/2017	8.9	474.0	946.0	1.2	68.7	1.0	60.8	11.6		11.1		1.0	94.2	8.0	115.0		44.7	331.0	41.5	563.0	113.0	
8/08/2017	16.4	456.4	972.7	3.0	30.0	1.0	50.3	9.1	18.6	4.9		1.0	98.0	7.0	84.3		44.8	340.4	37.8	569.1	102.6	
7/11/2017	35.6		1.0	4.9	71.7	2.9	49.5	18.0	28.4	6.2		2.0	95.7	5.6	145.2		45.4	352.3	42.4	591.1	114.0	
14/02/2018	23.54		1164	2.85	77.89	1.00	33.33	24.30		5.75		1.27	95.37	5.64	138.97		45.36	345.62	50.48	591.57	115.47	
9/05/2018	10.40		1177		70.84	1.00	59.28	21.46		4.84		1.00	92.03	5.38	90.72		47.16	349.39	41.81	596.74	109.89	
15/08/2018	18.98		985	2.56	63.81	1.81	45.50	17.71		5.46			80.27	6.28	63.92		44.72	347.47	57.76	583.08	107.25	
14/11/2018	14.64		1042	2.05	71.71	1.00	58.73	11.30	25.86	5.40		1.46	104.77	7.12	98.05		44.30	360.92	44.64	596.63	89.88	

Alkalinity	SW1	SW2	SW4
31/01/2011	31.0	25.0	
10/05/2011	22.0	17.0	84.0
9/08/2011	77.0	22.0	160.0
8/11/2011	160.0	38.0	180.0
6/02/2012	51.0	45.0	48.0
8/05/2012	20.0	18.0	50.0
6/08/2012	36.0	32.0	100.0
13/11/2012	44.0	19.0	36.0
13/02/2013	30.0	37.0	58.0
14/05/2013	17.0	7.0	72.0
6/08/2013	22.0	19.0	58.0
12/11/2013		36.0	130.0
11/02/2014		36.0	
13/05/2014	26.0	37.0	26.0
12/08/2014		10.0	
10/11/2014		31.0	
9/02/2015	59.0	40.0	35.0
11/05/2015	12.0	9.0	38.0
11/08/2015	17.0	12.0	54.0
10/11/2015	24.0	12.0	32.0
8/02/2016	42.0	27.0	65.0
9/05/2016	37.0	24.0	80.0
9/08/2016	14.9	11.1	63.3
7/11/2016		31.4	
7/02/2017		38.3	93.4
8/05/2017	22.1	6.7	33.2
8/08/2017	28.3	19.9	85.1
7/11/2017	37.3	34.3	45.8
14/02/2018		40.3	
9/05/2018	29.0	27.0	45.1
15/08/2018		12.9	
14/11/2018		37.3	74.8

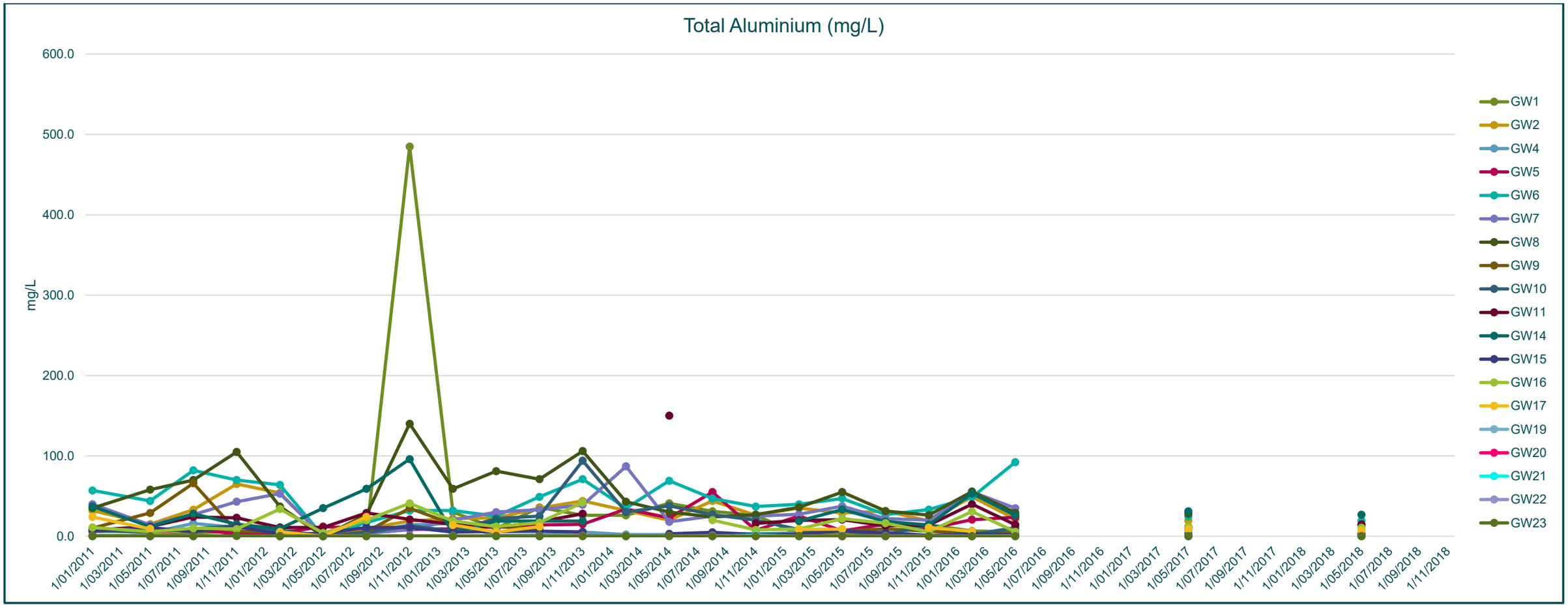
Alkalinity (mg/L as CaCO3)



Alkalinity (mg/L as CaCO3)



Al	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	1.1	32.0	7.9	7.1	57.0	40.0	35.0	10.0	6.1	7.7	37.0	6.7	11.0	24.0	0.1	0.5		0.5	0.1
10/05/2011	1.1	15.0	4.3	5.4	44.0	14.0	58.0	29.0	6.5	12.0	12.0	11.0	5.8	9.3	0.1	0.2	0.1	0.2	0.1
9/08/2011	3.9	33.0	16.0	8.4	82.0	27.0	70.0	66.0	9.2	24.0	28.0	5.4	10.0		0.2	0.4	0.1	0.2	0.2
8/11/2011	6.6	65.0	11.0	3.1	70.0	43.0	105.0	6.4	13.0	23.0	15.0	12.0	9.0		0.3	0.3	0.3	0.4	0.6
6/02/2012	3.0	54.0	9.2	4.2	64.0	53.0	37.0	5.3	6.9	11.0	9.5	2.6	34.0	5.4	0.2	0.4	0.2	0.2	0.1
8/05/2012	2.1	0.0	0.0	12.0	0.0	0.1	0.0	0.1	0.1	11.0	35.0	3.6	4.1	0.2	0.6	0.1	0.0	0.1	0.0
6/08/2012	1.7	9.7	5.4	9.5	17.0	3.5	27.0	5.7	4.5	29.0	59.0	11.0	20.0	24.0	0.2	0.3	0.1	0.4	0.1
13/11/2012	485.0	19.0	14.0	8.6	32.0	8.2	140.0	35.0	13.0	21.0	96.0	11.0	41.0		0.3	0.6	0.1	0.7	0.1
13/02/2013	30.0	22.0	16.0	9.2	32.0	20.0	59.0	15.0	6.4	15.0	3.5	5.3	19.0	14.0	0.5	0.2	0.4	0.3	0.2
14/05/2013	9.7	23.0	1.1	12.0	25.0	30.0	81.0	12.0	22.0	11.0	19.0	5.8	12.0	5.3	0.1	0.4	0.1	0.3	0.2
6/08/2013	36.0	35.0	1.5	14.0	49.0	33.0	71.0	9.3	25.0	18.0	19.0	6.3	17.0	12.0	0.1	0.2	0.2	0.5	0.1
12/11/2013	26.0	44.0	5.3	15.0	71.0	39.0	106.0		94.0	28.0	19.0	5.5	42.0		0.3	0.7	0.3	0.6	0.1
11/02/2014	26.0	32.0	2.2	34.0	35.0	87.0	43.0		30.0						0.2	0.4	0.1	0.4	0.1
13/05/2014	41.0	20.0	2.1	23.0	69.0	18.0	30.0		38.0	150.0		3.1			0.2	0.6	0.2	0.3	0.2
12/08/2014	31.0	44.0	3.0	55.0	47.0	25.0	24.0		27.0			4.9	20.0		0.1	0.6	0.0	0.8	0.1
10/11/2014	26.0	26.0	2.9	7.4	37.0	25.0	27.0		20.0	16.0		2.3	8.0		0.1	0.3	1.5	0.5	0.1
9/02/2015	2.2	35.1	4.4	25.3	39.7	27.4	36.1	5.6	8.3	19.8	18.9	2.6	8.9	8.5	0.1	0.2	0.2	0.2	0.2
11/05/2015	2.4	28.8	6.7	6.6	47.0	37.4	55.0	6.6	6.8	20.7	33.3	6.9	21.8	8.9	0.1	0.2	0.3	0.4	0.1
11/08/2015	0.5	31.4	5.4	15.2	26.9	21.9	31.3	9.2	1.6	13.1	18.3	3.9	16.2		0.0	0.4	0.1	0.4	0.1
10/11/2015	14.3	19.1	1.0	9.5	33.2	20.1	26.2	6.3	14.3	13.9	14.1	1.1	5.8	10.9	0.1	0.1	0.1	0.1	0.1
8/02/2016	6.6	49.1	1.9	20.7	48.7	55.3	55.7	3.7	2.3	40.0	53.2	2.9	30.8	6.2	0.1	0.2	0.1	0.3	0.0
9/05/2016	5.7	21.5	11.2	23.5	92.2	34.9	29.2	3.7	10.0	14.3	25.9	2.1	5.6		0.0	0.2	0.1	0.5	0.0
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.9	19.5	8.3	11.6	24.7	12.0	28.1	0.3		10.1	31.1	2.8	11.9	8.9	0.0	0.2	0.0	0.5	0.1
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	3.2		1.3		19.3	13.7	14.0	3.0		14.9	26.7	2.2	10.7	7.3	0.4	0.3	0.0	0.3	0.1
15/08/2018																			
14/11/2018																			


Total Aluminium (mg/L)
mg/L
600.0
500.0
400.0
300.0
200.0
100.0
0.0
1/01/2011
1/03/2011
1/05/2011
1/07/2011
1/09/2011
1/11/2011
1/01/2012
1/03/2012
1/05/2012
1/07/2012
1/09/2012
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GW1
GW2
GW4
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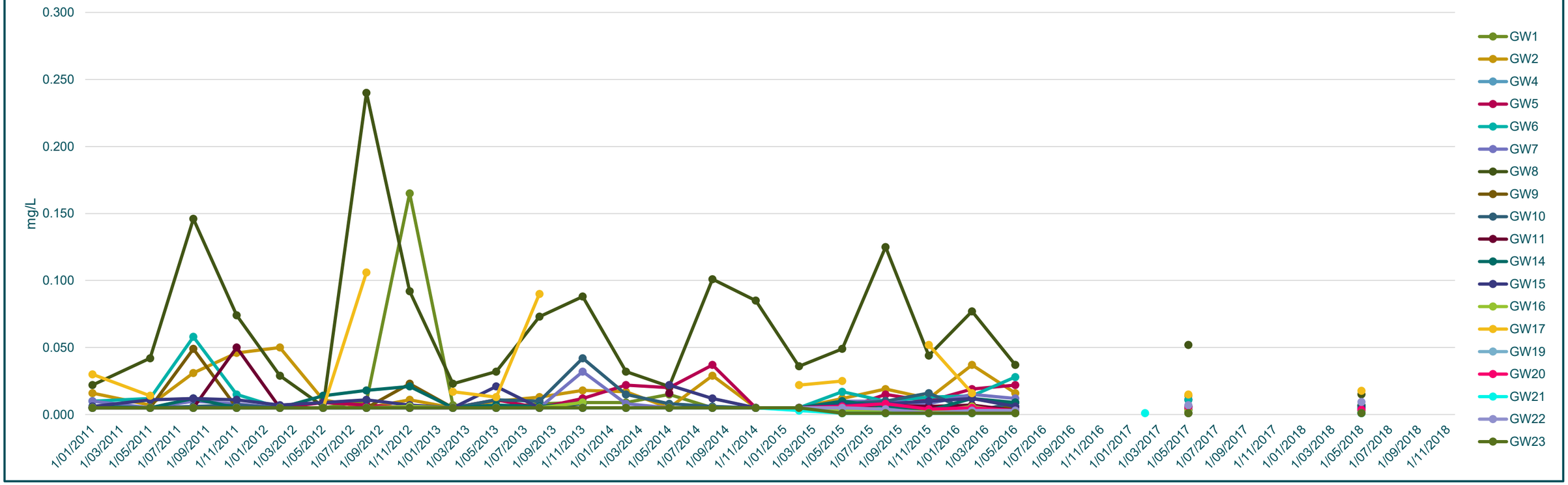
GW7
GW8
GW9
GW10
GW11
GW14
GW15
GW16
GW17
GW19
GW20
GW21
GW22
GW23

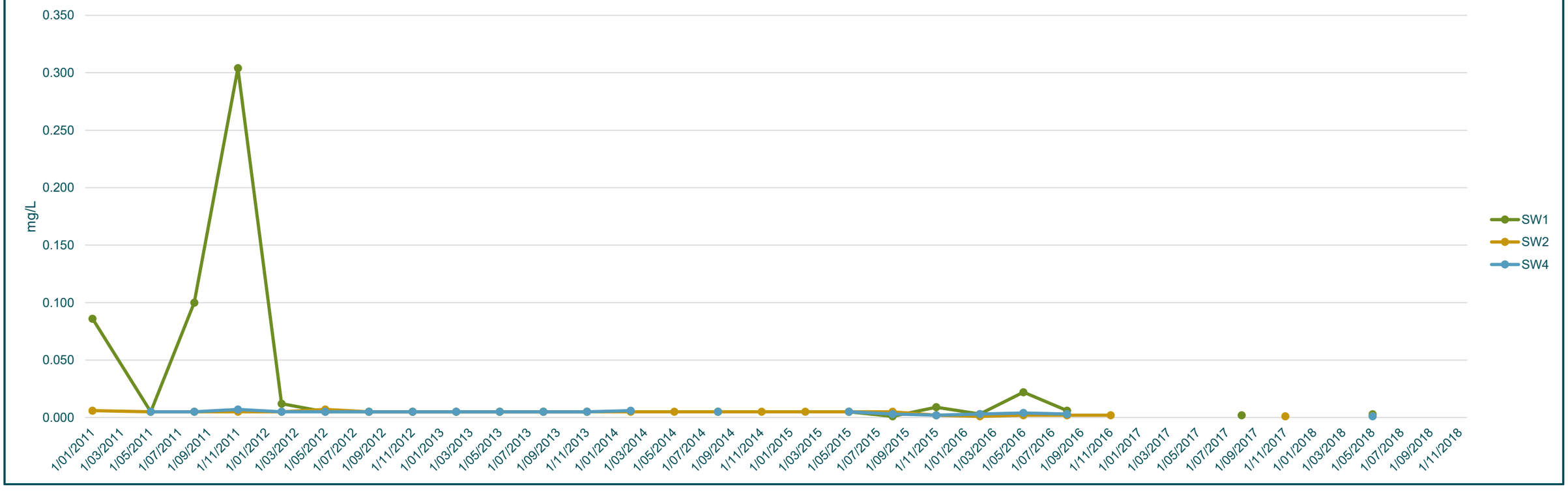
As	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.005	0.016	0.005	0.005	0.010	0.010	0.022	0.005	0.005	0.005	0.006	0.006	0.005	0.030	0.005	0.005	0.005	0.005	0.005
10/05/2011	0.005	0.007	0.005	0.005	0.012	0.005	0.042	0.005	0.005	0.005	0.005	0.011	0.005	0.014	0.005	0.005	0.005	0.005	0.005
9/08/2011	0.005	0.031	0.005	0.005	0.058	0.010	0.146	0.049	0.006	0.005	0.012	0.012	0.005		0.005	0.005	0.005	0.005	0.005
8/11/2011	0.005	0.046	0.005	0.005	0.015	0.008	0.074	0.005	0.007	0.050	0.005	0.011	0.005		0.005	0.005	0.005	0.005	0.005
6/02/2012	0.005	0.050	0.005	0.005	0.005	0.005	0.029	0.005	0.005	0.005	0.005	0.007	0.005	0.005	0.005	0.005	0.005	0.005	0.005
8/05/2012	0.005	0.011	0.005	0.009	0.005	0.005	0.006	0.005	0.005	0.005	0.014	0.009	0.005	0.005	0.005	0.005	0.005	0.005	0.005
6/08/2012	0.010	0.005	0.005	0.007	0.005	0.005	0.240	0.005	0.005	0.005	0.018	0.011	0.005	0.106	0.005	0.005	0.005	0.005	0.005
13/11/2012	0.165	0.011	0.005	0.005	0.005	0.005	0.092	0.023	0.005	0.005	0.021	0.007	0.006		0.005	0.005	0.005	0.005	0.005
13/02/2013	0.007	0.005	0.005	0.005	0.005	0.005	0.023	0.005	0.005	0.005	0.005	0.005	0.005	0.017	0.005	0.005	0.005	0.005	0.005
14/05/2013	0.005	0.010	0.005	0.011	0.005	0.005	0.032	0.005	0.011	0.005	0.007	0.021	0.005	0.013	0.005	0.005	0.005	0.005	0.005
6/08/2013	0.008	0.013	0.005	0.005	0.005	0.005	0.073	0.005	0.010	0.005	0.006	0.005	0.005	0.090	0.005	0.005	0.005	0.005	0.005
12/11/2013	0.009	0.018	0.005	0.012	0.005	0.032	0.088		0.042	0.008	0.008	0.009	0.009		0.005	0.005	0.005	0.005	0.005
11/02/2014	0.009	0.017	0.005	0.022	0.005	0.008	0.032		0.015						0.005	0.005	0.005	0.005	0.005
13/05/2014	0.015	0.005	0.005	0.020	0.005	0.005	0.021		0.008	0.016		0.022			0.005	0.005	0.005	0.005	0.005
12/08/2014	0.005	0.029	0.005	0.037	0.005	0.005	0.101		0.006			0.012			0.005	0.005	0.005	0.005	0.005
10/11/2014	0.005	0.005	0.005	0.005	0.005	0.005	0.085		0.005	0.005		0.005	0.005		0.005	0.005	0.005	0.005	0.005
9/02/2015	0.005	0.005	0.005	0.005	0.005	0.005	0.036	0.005	0.005	0.005	0.005	0.005	0.005	0.022	0.005	0.005	0.003	0.005	0.005
11/05/2015	0.001	0.012	0.004	0.004	0.017	0.010	0.049	0.005	0.008	0.006	0.010	0.007	0.003	0.025	0.001	0.006	0.001	0.005	0.001
11/08/2015	0.001	0.019	0.004	0.015	0.010	0.010	0.125	0.007	0.010	0.007	0.006	0.008	0.003		0.001	0.008	0.001	0.004	0.001
10/11/2015	0.005	0.012	0.001	0.010	0.013	0.008	0.044	0.003	0.016	0.006	0.003	0.010	0.002	0.052	0.001	0.004	0.001	0.001	0.001
8/02/2016	0.002	0.037	0.002	0.019	0.014	0.015	0.077	0.003	0.002	0.007	0.012	0.012	0.006	0.016	0.001	0.005	0.001	0.003	0.001
9/05/2016	0.002	0.016	0.005	0.022	0.028	0.012	0.037	0.006	0.009	0.003	0.009	0.006	0.001		0.001	0.003		0.003	0.001
9/08/2016																			
7/11/2016																			
7/02/2017																	0.001		
8/05/2017	0.001	0.014	0.004	0.011	0.011	0.005	0.052	0.001		0.003	0.006	0.006	0.003	0.015	0.001	0.006		0.007	0.001
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	0.001		0.001		0.006	0.005	0.015	0.007		0.003	0.007	0.005	0.002	0.018	0.001	0.004	0.001	0.009	0.001
15/08/2018																			
14/11/2018																			

As	SW1	SW2	SW4
31/01/2011	0.086	0.006	
10/05/2011	0.005	0.005	0.005
9/08/2011	0.100	0.005	0.005
8/11/2011	0.304	0.005	0.007
6/02/2012	0.012	0.005	0.005
8/05/2012	0.005	0.007	0.005
6/08/2012	0.005	0.005	0.005
13/11/2012	0.005	0.005	0.005
13/02/2013	0.005	0.005	0.005
14/05/2013	0.005	0.005	0.005
6/08/2013	0.005	0.005	0.005
12/11/2013	0.005	0.005	0.005
11/02/2014		0.005	0.006
13/05/2014		0.005	
12/08/2014	0.005	0.005	0.005
10/11/2014		0.005	
9/02/2015		0.005	
11/05/2015	0.005	0.005	0.005
11/08/2015	0.001	0.005	0.003
10/11/2015	0.009	0.002	0.002
8/02/2016	0.003	0.001	0.003
9/05/2016	0.022	0.002	0.004
9/08/2016	0.006	0.002	0.003
7/11/2016		0.002	
7/02/2017			
8/05/2017			
8/08/2017	0.002		
7/11/2017		0.001	
14/02/2018			
9/05/2018	0.003	0.001	0.001
15/08/2018			
14/11/2018			

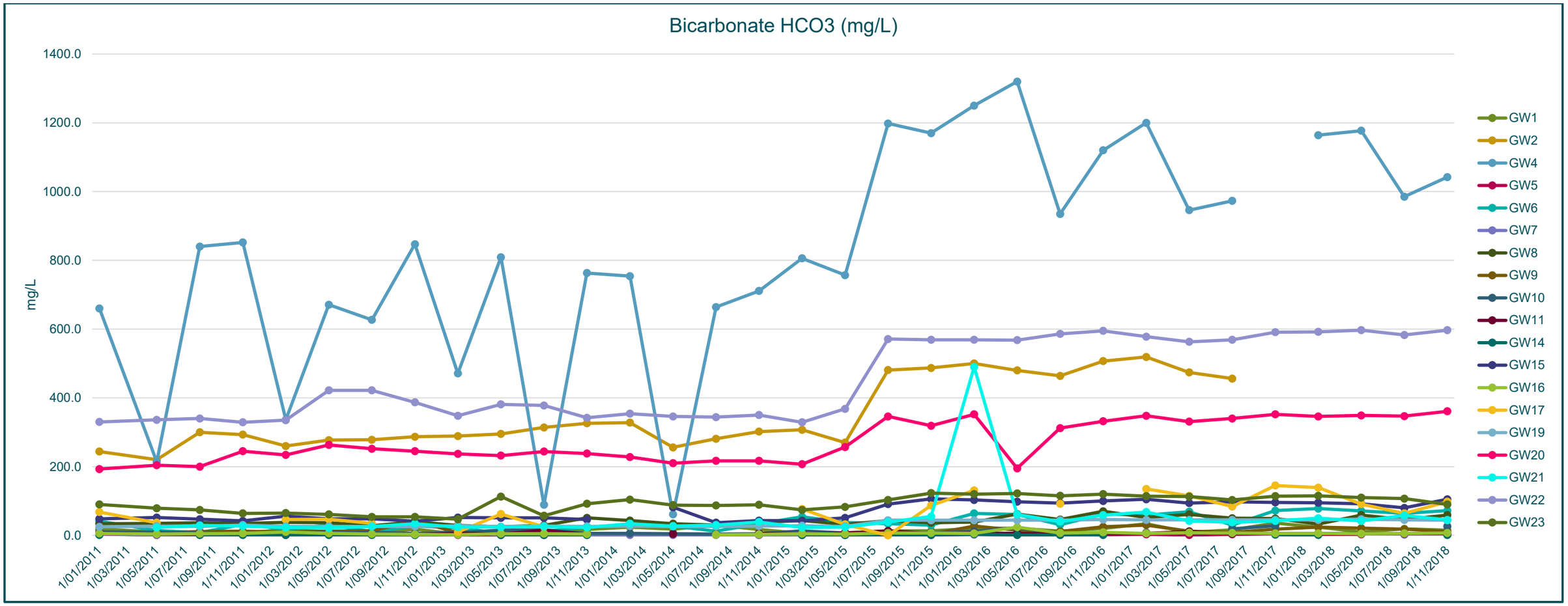
Total Arsenic (mg/L)



Total Arsenic (mg/L)



Bicarbonate	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	19.0	244.0	660.0	4.0	41.0	5.0	34.0	10.0	10.0	7.0	1.0	48.0	6.0	68.0	25.0	193.0		330.0	90.0
10/05/2011	10.0	220.0	214.0	1.0	14.0	1.0	35.0	7.0	10.0	4.0		52.0	4.0	37.0	27.0	204.0	23.0	336.0	79.0
9/08/2011	7.0	300.0	840.0	2.0	8.0	1.0	37.0	11.0	7.0	3.0	1.0	47.0	5.0		26.0	200.0	29.0	340.0	74.0
8/11/2011	8.0	293.0	852.0	3.0	32.0	2.0	35.0	12.0	5.0	4.0	1.0	42.0	6.0		30.0	245.0	27.0	329.0	64.0
6/02/2012	16.0	260.0	336.0	1.0	18.0	3.0	38.0	10.0	10.0	5.0	1.0	56.0	10.0	46.0	26.0	234.0	23.0	335.0	65.0
8/05/2012	11.0	277.0	671.0	2.0	30.0	2.0	37.0	12.0	10.0	3.0	1.0	48.0	6.0	47.0	26.0	263.0	22.0	422.0	61.0
6/08/2012	7.0	278.0	627.0	2.0	11.0	2.0	28.0	13.0	9.0	4.0	1.0	48.0	4.0	35.0	26.0	252.0	26.0	422.0	54.0
13/11/2012	18.0	287.0	847.0	2.0	27.0	1.0	40.0	42.0	6.0	2.0	1.0	41.0	3.0		26.0	245.0	34.0	387.0	54.0
13/02/2013	4.0	289.0	471.0	1.0	22.0	13.0	29.0	8.0	8.0	7.0		52.0	2.0	10.0	28.0	237.0	24.0	348.0	47.0
14/05/2013	5.0	295.0	809.0	1.0	6.0	1.0	25.0	12.0	15.0	4.0	1.0	51.0	5.0	62.0	25.0	232.0	24.0	381.0	113.0
6/08/2013	7.0	314.0	89.0	1.0	11.0	1.0	29.0	10.0	16.0	15.0	1.0	51.0	5.0	25.0	27.0	244.0	26.0	378.0	57.0
12/11/2013	17.0	326.0	763.0	2.0	25.0	1.0	51.0		6.0	3.0	1.0	46.0	4.0		26.0	238.0	23.0	342.0	92.0
11/02/2014	24.0	328.0	754.0	4.0	29.0	1.0	43.0		6.0						27.0	228.0	34.0	354.0	104.0
13/05/2014	18.0	256.0	61.0	3.0	27.0	1.0	34.0		5.0	4.0		82.0			26.0	210.0	27.0	346.0	88.0
12/08/2014	30.0	281.0	664.0	2.0	12.0	1.0	30.0		4.0			37.0	2.0		26.0	217.0	30.0	344.0	87.0
10/11/2014	17.0	302.0	711.0	1.0	34.0	1.0	38.0		5.0	6.0		43.0	3.0		27.0	217.0	39.0	350.0	89.0
9/02/2015	6.0	307.0	806.0	1.0	54.0	1.0	43.0	7.0	13.0	5.0	1.0	42.0	5.0	77.0	28.0	207.0	23.0	329.0	74.0
11/05/2015	7.0	270.0	757.0	1.0	38.0	1.0	32.0	8.0	7.0	7.0	1.0	51.0	4.0	32.0	26.0	257.0	24.0	368.0	83.0
11/08/2015	13.0	481.0	1198.0	2.0	34.0	1.0	43.0	9.0	1.0	13.0	1.0	91.0	7.0	NT	44.0	346.0	39.0	571.0	103.0
10/11/2015	13.0	487.0	1170.0	1.0	30.0	1.0	37.0	4.0	8.0	6.0	1.0	106.0	7.0	87.0	44.0	319.0	55.0	569.0	123.0
8/02/2016	20.0	500.0	1250.0	4.0	64.0	2.0	39.0	27.0	12.0	7.0	4.0	103.0	6.0	131.0	44.0	352.0	490.0	569.0	120.0
9/05/2016	21.0	480.0	1320.0	3.0	61.0	1.0	62.0	15.0	22.0	6.0	1.0	98.0	24.0		44.0	195.0	61.0	568.0	122.0
9/08/2016	12.0	464.0	935.0	2.0	31.0	1.0	46.0	11.0	6.0	5.0	1.0	94.0	7.0	92.0	44.0	312.0	40.0	586.0	115.0
7/11/2016	20.0	507.0	1120.0	2.0	62.0		70.0	25.0		5.0	1.0	100.0	9.0		46.0	332.0	59.0	595.0	120.0
8/02/2017	34.0	519.0	1200.0	3.0	59.0		52.0	30.0	8.0	6.0		105.0	6.0	135.0	45.0	348.0	68.0	578.0	114.0
9/05/2017	9.0	474.0	946.0	1.0	69.0		61.0	12.0		11.0		94.0	8.0	115.0	45.0	331.0	42.0	563.0	113.0
9/08/2017	16.0	456.0	973.0	3.0	30.0		50.0	9.0	19.0	5.0		98.0	7.0	84.0	45.0	340.0	38.0	569.0	103.0
8/11/2017	36.0			5.0	72.0	3.0	49.0	18.0	28.0	6.0	2.0	96.0	6.0	145.0	45.0	352.0	42.0	591.0	114.0
14/02/2018	24.00		1164	3.00	78.00		33.00	24.00		6.00	1.00	95.00	6.00	139.00	45.00	346.00	50.00	592.00	115.00
9/05/2018	10.00		1177	3.00	71.00		59.00	21.00		5.00		92.00	5.00	91.00	47.00	349.00	42.00	597.00	110.00
15/08/2018	19.00		985		64.00	2.00	46.00	18.00		5.00		80.00	6.00	64.00	45.00	347.00	58.00	583.00	107.00
14/11/2018	15.00		1042	2.00	72.00		59.00	11.00	26.00	5.00	1.00	105.00	7.00	98.00	44.00	361.00	45.00	597.00	90.00


Bicarbonate HCO3 (mg/L)
mg/L
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
1/01/2011
1/03/2011
1/05/2011
1/07/2011
1/09/2011
1/11/2011
1/01/2012
1/03/2012
1/05/2012
1/07/2012
1/09/2012
1/11/2012
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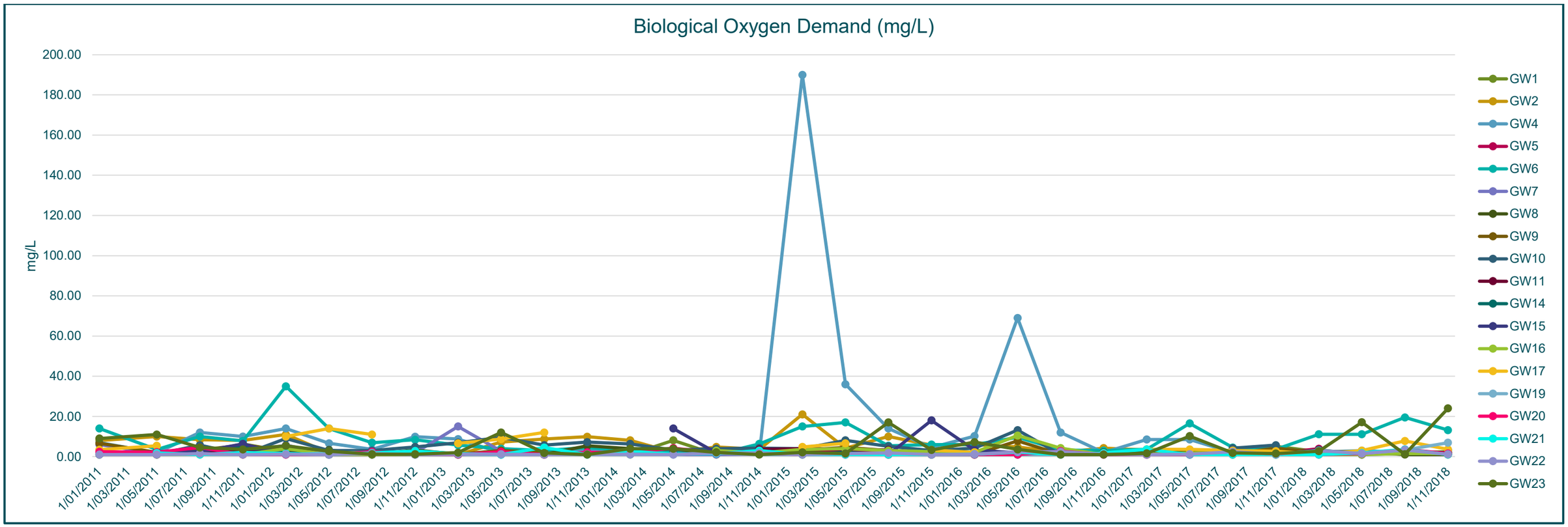
1/07/2018
1/09/2018
1/11/2018
GW1
GW2
GW4
GW5
GW6
GW7
GW8
GW9
GW10
GW11
GW14
GW15
GW16
GW17
GW19
GW20
GW21
GW22
GW23

BOD	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	1.00	8.00	7.00	1.00	14.00	6.00	1.60	6.60	1.00	1.80	1.00	1.20	1.00	3.40	1.00	2.40		1.00	9.00
10/05/2011	1.60	10.00	1.80	1.00	3.50	1.50	1.20	2.10	1.20	1.00	1.00	2.40	1.00	5.40	1.20	2.20	1.80	1.00	11.00
9/08/2011	1.80	8.40	12.00	2.40	10.00	2.10	2.70	3.30	5.70	1.80	2.70	2.40	1.00		1.00	4.50	1.00	1.50	4.50
8/11/2011	6.30	8.10	10.00	6.00	7.80	1.50	4.80	5.70	1.00	2.40	5.40	6.30	1.00		1.00	1.00	2.10	1.00	3.60
6/02/2012	2.40	11.00	14.00	2.10	35.00	5.70	1.80	3.00	9.00	1.80	1.80	1.00	3.90	10.00	1.00	1.00	1.50	1.20	5.40
8/05/2012	2.10	1.80	6.60	1.00	14.00	1.00	3.30	2.70	3.00	1.00	1.00	1.00	1.00	14.00	1.80	1.00	1.00	1.00	2.70
6/08/2012	1.50	1.20	3.60	1.00	6.90	3.00	1.00	2.10	3.00	1.00	1.00	1.00	1.00	11.00	2.10	2.40	1.80	1.50	1.20
13/11/2012	1.80	2.70	9.90	1.00	8.40	1.80	3.30	2.10	4.80	1.20	1.00	1.00	1.00		1.00	1.20	2.80	1.00	1.20
13/02/2013	1.00	1.00	8.70	1.00	5.70	15.00	1.20	1.20	6.90	1.00	1.00	1.00	1.00	6.60	1.00	1.00	1.50	1.20	2.00
14/05/2013	1.50	7.20	1.80	1.80	3.90	2.70	1.80	3.00	9.60	1.50	1.00	1.00	1.20	8.70	1.00	2.40	1.00	1.20	12.00
6/08/2013	1.00	8.70	1.00	1.00	3.00	1.00	1.20	2.10	5.70	1.00	1.00	1.00	1.00	12.00	1.00	1.00	4.50	1.00	1.80
12/11/2013	1.00	9.90	3.30	1.50	4.50	1.00	5.40		7.20	1.80	1.80	1.20	1.00		1.00	2.10	1.00	1.20	1.00
11/02/2014	1.00	8.10	3.00	2.70	2.70	2.40	3.90		6.30						1.00	2.10	2.70	1.20	3.90
13/05/2014	8.10	2.10	2.10	1.50	2.70	1.00	3.60		3.30	1.50		14.00			1.00	4.20	1.20	1.00	3.90
12/08/2014	1.00	4.80	2.70	2.40	1.20	1.00	1.80		3.90			1.80	3.00		1.80	1.80	1.50	1.80	2.10
10/11/2014	2.10	3.60	1.50	3.00	6.30	1.20	1.50		4.20	3.60		2.10	1.80		1.00	1.80	3.00	1.80	1.00
9/02/2015	1.00	21.00	190.00	1.80	15.00	1.20	2.10	3.30	3.90	3.90	1.20	1.50	3.60	4.80	1.00	1.00	1.00	1.00	2.10
11/05/2015	2.70	4.20	36.00	3.00	17.00	1.50	1.50	4.50	8.10	3.60	2.10	1.00	3.90	6.60	1.00	1.00	1.00	1.50	1.50
11/08/2015	2.10	10.00	14.00	1.80	5.40	1.00	1.00	3.00	5.10	3.30	1.00	1.00	3.00		1.00	1.00	1.00	1.80	17.00
10/11/2015	1.50	5.70	4.50	1.00	6.00	1.00	1.00	1.00	3.00	1.00	1.00	18.00	2.40	3.30	1.00	1.00	1.00	1.00	3.30
8/02/2016	1.00	6.00	10.20	1.80	6.00	1.00	2.10	1.00	4.20	1.00	1.00	3.30	2.10	2.10	1.00	1.00	1.20	1.20	7.20
9/05/2016	1.00	4.80	69.00	1.00	9.60	1.50	1.50	7.80	13.20	1.50	1.00	1.80	10.50		1.00	1.00	2.20	2.40	3.60
9/08/2016	1.00	2.10	12.00	2.10	3.30	1.00	1.20	1.20	1.00	1.00	1.00	2.70	4.20	1.00	1.00	2.70	1.00	2.40	1.00
7/11/2016	1.80	4.20	2.00	1.00	3.00	1.80	2.10	1.80		1.00	1.00	1.00	1.00		1.00	1.00	1.80	1.20	1.00
7/02/2017	1.50	3.30	8.50	1.00	3.60	1.00	1.80	1.00	2.70	1.00		1.00	1.20	3.60	1.00	1.00	3.60	1.00	1.60
8/05/2017	1.20	1.80	8.50	1.20	16.50	1.00	2.10	1.20		1.50	1.00	1.00	1.80	3.60	1.00	1.00	1.00	1.20	10.20
8/08/2017	1.00	2.10	2.00	1.20	4.50	1.00	1.50	1.50	4.20	1.50	1.00	2.10	1.50	3.00	1.00	2.10	1.00	2.40	1.80
7/11/2017	5.10		4.20	1.50	3.60	1.80	1.50	4.20	5.70	1.50	1.00	1.50	1.00	2.70	1.00	1.00	1.00	1.20	1.50
14/02/2018	2.40		2.10	3.90	11.10	1.80	2.40	2.10		2.10	3.30	1.80	1.00	1.20	1.00	1.00	1.00	3.00	2.70
9/05/2018	2.10		3.00		11.10	1.00	2.40	2.10		1.00	1.20	1.00	1.00	3.00	1.50	1.50	1.80	1.50	17.10
15/08/2018	1.80		2.10	1.50	19.50	1.50	1.00	1.80		2.70		2.70	1.50	7.80	3.30	3.60	3.60	3.30	1.20
14/11/2018	2.40		1.80	1.80	13.20	1.20	1.00	1.20	3.30	1.80	1.20	1.50	1.50	3.60	6.90	1.50	1.00	1.20	24.00

BOD	SW1	SW2	SW4
31/01/2011	21.00	7.80	
10/05/2011	3.60	2.40	1.50
9/08/2011	18.00	18.00	2.40
8/11/2011	108.00	6.00	5.10
6/02/2012	20.00	6.00	6.00
8/05/2012	1.00	7.80	1.00
6/08/2012	6.60	1.00	1.00
13/11/2012	9.60	2.70	1.00
13/02/2013	3.90	14.00	5.20
14/05/2013	2.40	3.90	1.80
6/08/2013	1.00	1.00	1.00
12/11/2013	6.30	4.50	1.00
11/02/2014		7.20	5.70
13/05/2014		22.00	
12/08/2014	5.10	5.70	2.70
10/11/2014		2.70	
9/02/2015		5.40	
11/05/2015	6.60	4.00	3.00
11/08/2015	3.60	5.70	2.70
10/11/2015	2.70	4.80	14.00
8/02/2016	1.50	1.20	2.70
9/05/2016	13.50	1.80	6.00
9/08/2016	6.30	6.30	8.10
7/11/2016	6.60	6.30	3.30
7/02/2017		3.90	
8/05/2017		3.60	22.00
8/08/2017	1.00	3.00	3.00
7/11/2017	3.00	1.00	2.70
14/02/2018		9.60	
9/05/2018	2.10	4.80	3.60
15/08/2018		6.60	
14/11/2018		9.30	11.10


Biological Oxygen Demand (mg/L)
mg/L
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/03/2011
1/05/2011
1/07/2011
1/09/2011
1/11/2011
1/01/2012
1/03/2012
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1/07/2012
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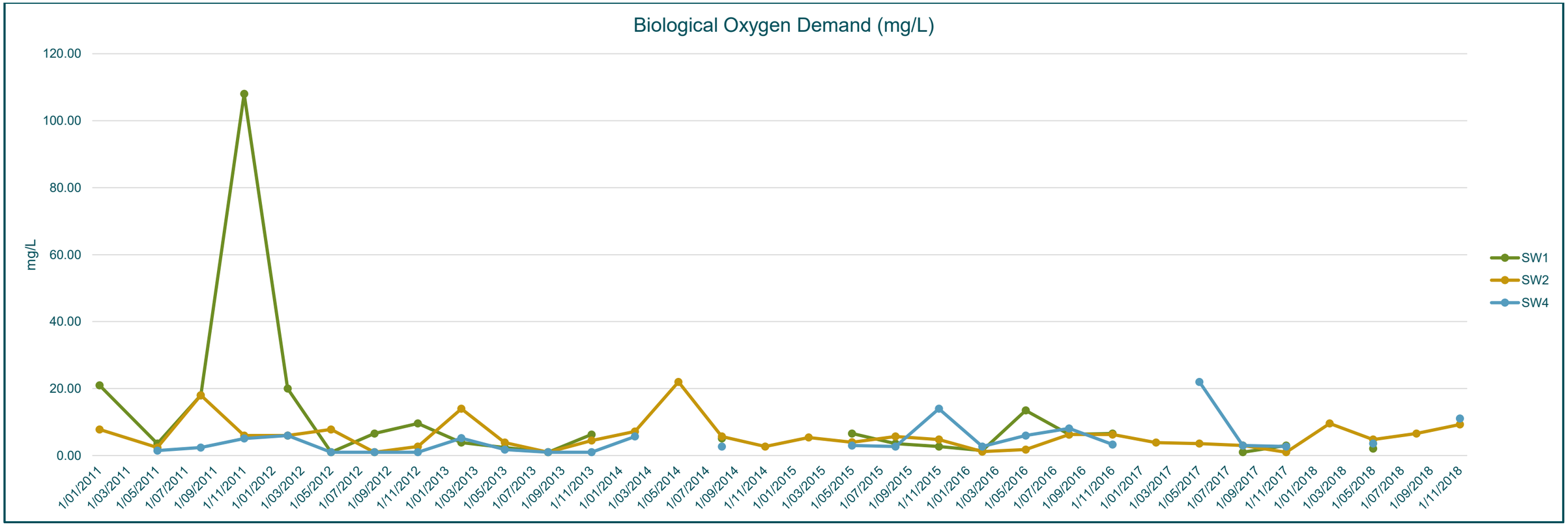
1/11/2018
GW1
GW2
GW4
GW5
GW6
GW7
GW8
GW9
GW10
GW11
GW14
GW15
GW16
GW17
GW19
GW20
GW21
GW22
GW23


Biological Oxygen Demand (mg/L)
mg/L
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1/01/2011
1/03/2011
1/05/2011
1/07/2011
1/09/2011
1/11/2011
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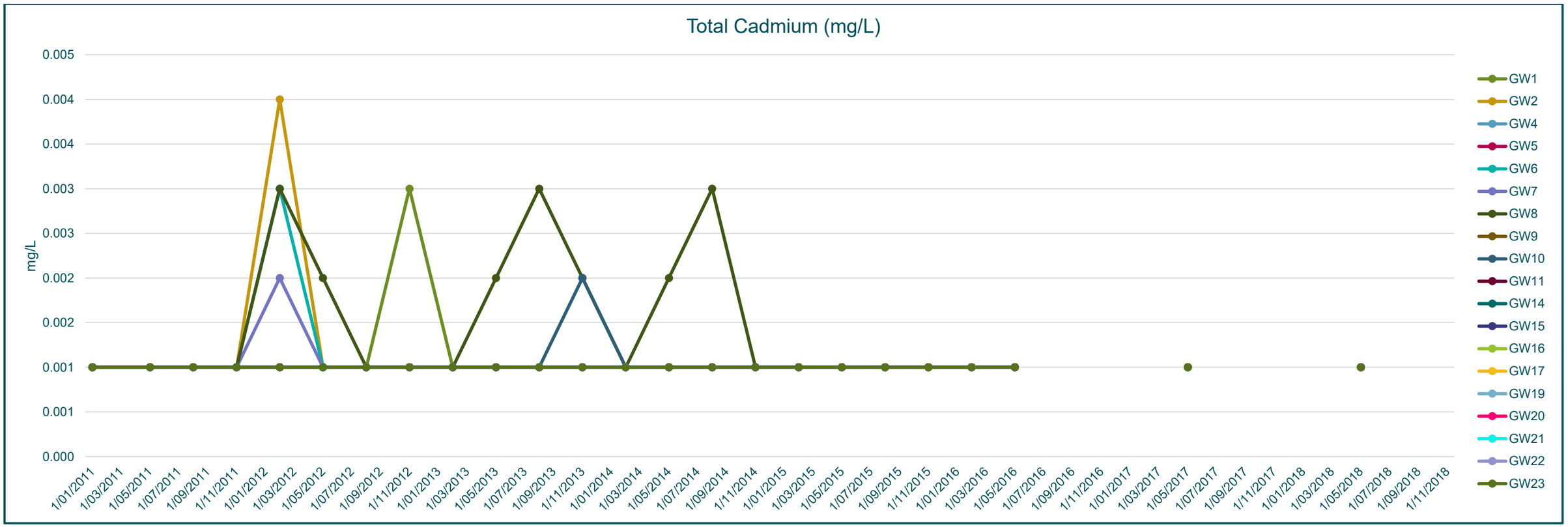
1/09/2017
1/11/2017
1/01/2018
1/03/2018
1/05/2018
1/07/2018
1/09/2018
1/11/2018
SW1
SW2
SW4

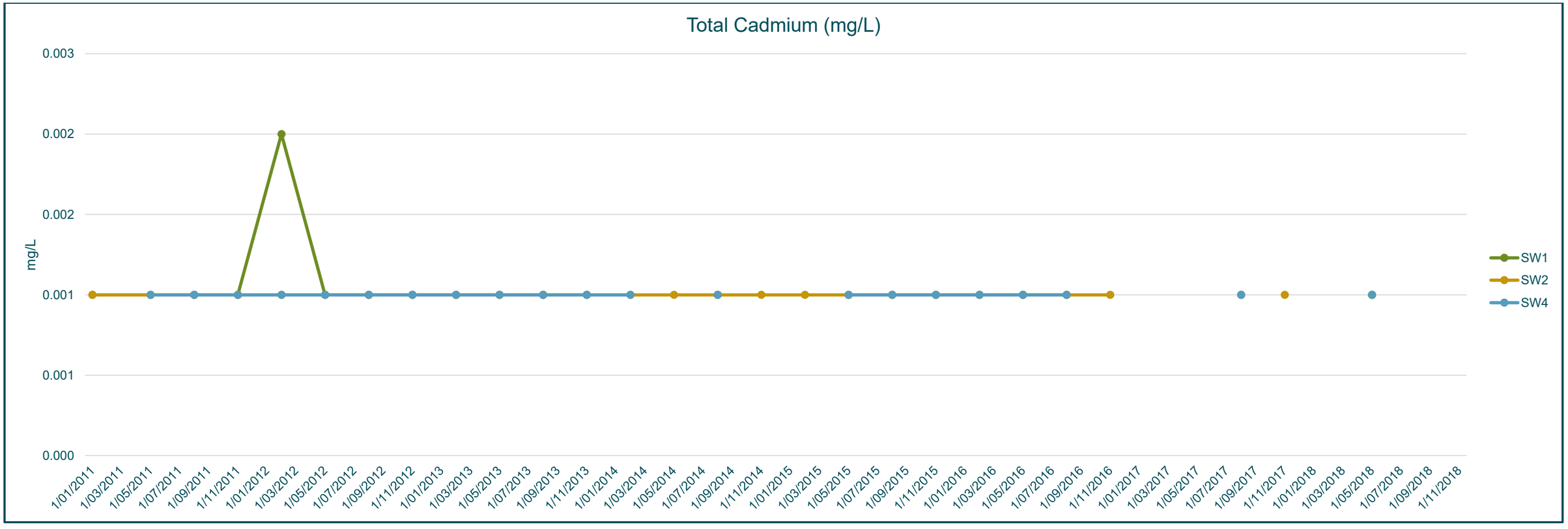
Cd	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001
10/05/2011	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
9/08/2011	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001
8/11/2011	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001
6/02/2012	0.001	0.004	0.001	0.001	0.003	0.002	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
8/05/2012	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
6/08/2012	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
13/11/2012	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001
13/02/2013	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
14/05/2013	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
6/08/2013	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
12/11/2013	0.001	0.001	0.001	0.001	0.001	0.001	0.002		0.002	0.001	0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001
11/02/2014	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001						0.001	0.001	0.001	0.001	0.001
13/05/2014	0.001	0.001	0.001	0.001	0.001	0.001	0.002		0.001	0.001		0.001			0.001	0.001	0.001	0.001	0.001
12/08/2014	0.001	0.001	0.001	0.001	0.001	0.001	0.003		0.001			0.001	0.001		0.001	0.001	0.001	0.001	0.001
10/11/2014	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001		0.001	0.001		0.001	0.001	0.001	0.001	0.001
9/02/2015	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
11/05/2015	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
11/08/2015	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001
10/11/2015	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
8/02/2016	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
9/05/2016	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	0.001		0.001		0.001	0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
15/08/2018																			
14/11/2018																			

Cd	SW1	SW2	SW4
31/01/2011	0.001	0.001	
10/05/2011	0.001	0.001	0.001
9/08/2011	0.001	0.001	0.001
8/11/2011	0.001	0.001	0.001
6/02/2012	0.002	0.001	0.001
8/05/2012	0.001	0.001	0.001
6/08/2012	0.001	0.001	0.001
13/11/2012	0.001	0.001	0.001
13/02/2013	0.001	0.001	0.001
14/05/2013	0.001	0.001	0.001
6/08/2013	0.001	0.001	0.001
12/11/2013	0.001	0.001	0.001
11/02/2014		0.001	0.001
13/05/2014		0.001	
12/08/2014	0.001	0.001	0.001
10/11/2014		0.001	
9/02/2015		0.001	
11/05/2015	0.001	0.001	0.001
11/08/2015	0.001	0.001	0.001
10/11/2015	0.001	0.001	0.001
8/02/2016	0.001	0.001	0.001
9/05/2016	0.001	0.001	0.001
9/08/2016	0.001	0.001	0.001
7/11/2016		0.001	
7/02/2017			
8/05/2017			
8/08/2017	0.001		0.001
7/11/2017		0.001	
14/02/2018			
9/05/2018	0.001	0.001	0.001
15/08/2018			
14/11/2018			

Total Cadmium (mg/L)



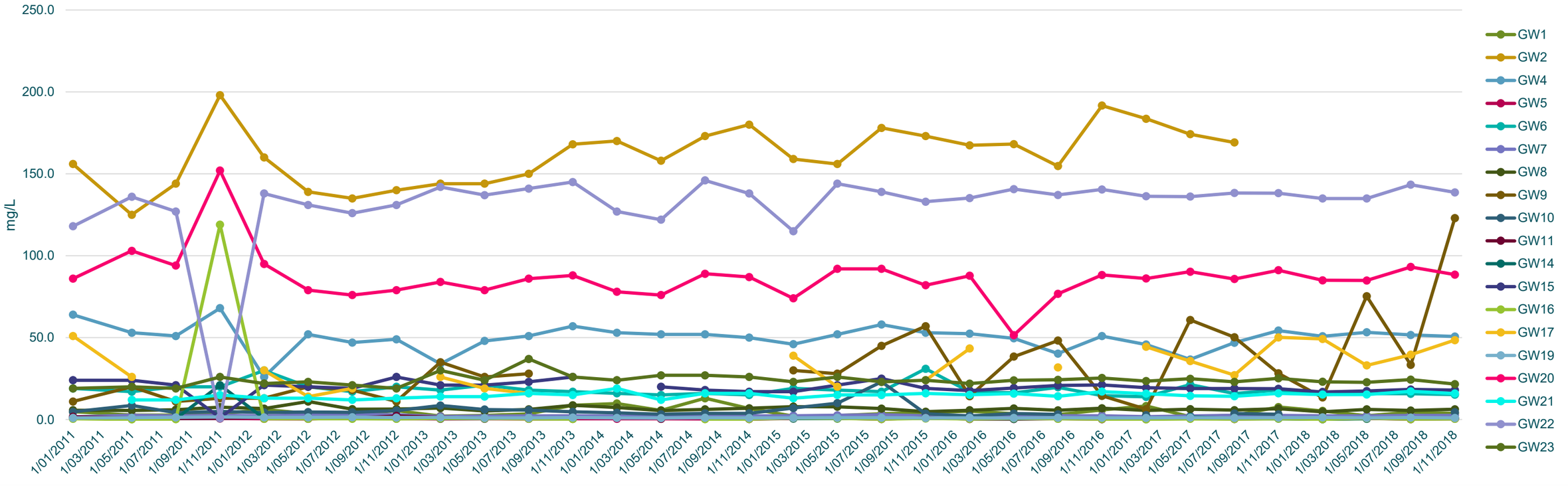
Total Cadmium (mg/L)



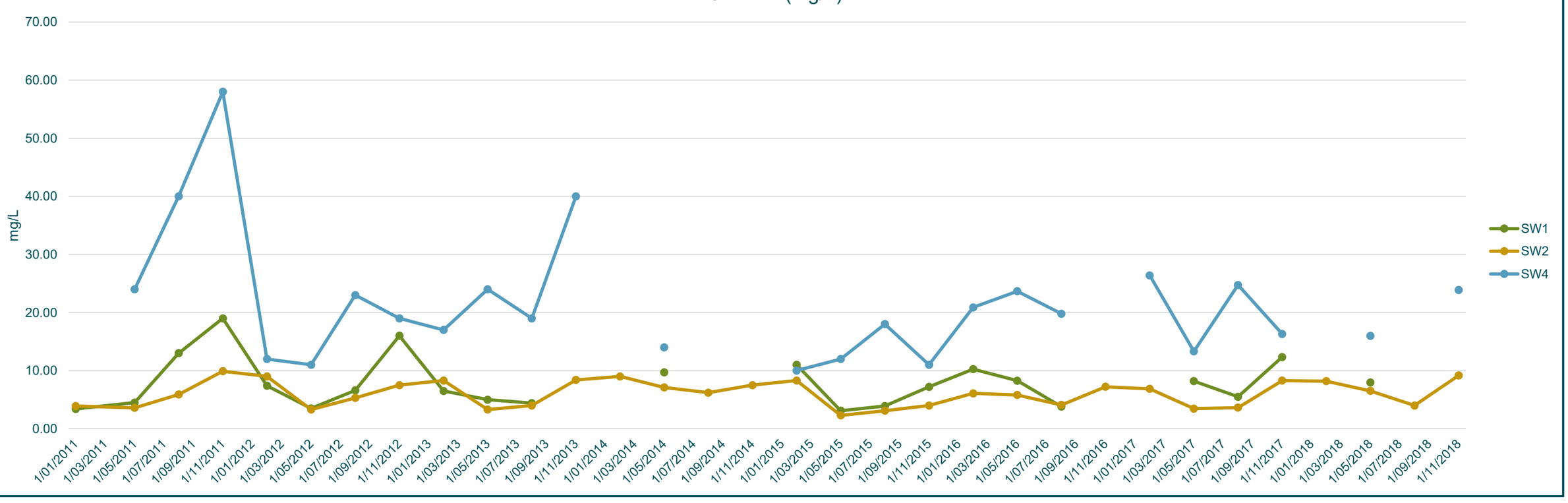
Ca	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	4.8	156.0	64.0	1.2	19.0	1.7	5.7	11.0	4.7	1.7	0.8	24.0	0.5	51.0	1.0	86.0		118.0	19.0
10/05/2011	2.7	125.0	53.0	2.2	17.0	2.6	5.6	20.0	8.6	1.0	0.6	24.0	0.1	26.0	1.1	103.0	12.0	136.0	20.0
9/08/2011	2.7	144.0	51.0	0.7	20.0	2.2	6.0	11.0	4.2	0.6	0.5	21.0	0.2		1.3	94.0	12.0	127.0	19.0
8/11/2011	3.6	198.0	68.0	0.7	20.0	2.6	7.6	13.0	4.9	0.7	21.0	1.1	119.0		1.6	152.0	15.0	0.8	26.0
6/02/2012	6.1	160.0	26.0	0.5	30.0	2.2	6.7	13.0	4.3	1.3	0.7	21.0	0.5	30.0	1.3	95.0	13.0	138.0	22.0
8/05/2012	3.8	139.0	52.0	0.4	20.0	2.9	11.0	20.0	4.6	0.7	0.6	20.0	0.5	14.0	1.3	79.0	13.0	131.0	23.0
6/08/2012	2.8	135.0	47.0	1.2	17.0	3.2	6.3	18.0	4.4	0.8	1.0	19.0	0.5	19.0	1.4	76.0	12.0	126.0	21.0
13/11/2012	5.5	140.0	49.0	0.6	20.0	2.9	6.4	11.0	5.5	2.2	0.6	26.0	0.4		1.2	79.0	13.0	131.0	19.0
13/02/2013	2.1	144.0	34.0	0.4	18.0	1.9	7.0	35.0	8.6	1.4	0.6	21.0	0.7	26.0	1.3	84.0	14.0	142.0	30.0
14/05/2013	2.5	144.0	48.0	0.5	21.0	2.1	5.2	26.0	6.1	0.8	0.6	21.0	0.7	19.0	1.0	79.0	14.0	137.0	24.0
6/08/2013	3.5	150.0	51.0	0.4	18.0	2.2	6.2	28.0	5.8	0.6	0.6	23.0	0.4	16.0	1.0	86.0	16.0	141.0	37.0
12/11/2013	8.7	168.0	57.0	0.5	17.0	2.3	8.7		4.7	0.6	0.5	26.0	0.3		1.2	88.0	15.0	145.0	26.0
11/02/2014	9.8	170.0	53.0	0.5	16.0	2.1	7.3		4.1						1.0	78.0	19.0	127.0	24.0
13/05/2014	5.6	158.0	52.0	0.5	15.0	2.0	5.5		3.2	0.4		20.0			0.9	76.0	12.0	122.0	27.0
12/08/2014	13.0	173.0	52.0	0.4	16.0	2.6	6.2		3.8			18.0	0.2		1.1	89.0	16.0	146.0	27.0
10/11/2014	6.7	180.0	50.0	0.5	15.0	2.2	6.9		3.8	0.3		17.0	0.3		1.0	87.0	16.0	138.0	26.0
9/02/2015	2.1	159.0	46.0	0.8	19.0	2.3	7.9	30.0	7.0	0.7	0.6	17.0	0.9	39.0	1.0	74.0	13.0	115.0	23.0
11/05/2015	2.4	156.0	52.0	0.9	18.0	2.6	7.8	28.0	10.0	0.8	0.6	21.0	0.7	20.0	1.1	92.0	15.0	144.0	26.0
11/08/2015	3.6	178.0	58.0	0.9	17.0	2.9	6.7	45.0	23.0	0.3	0.6	25.0	0.3		1.1	92.0	15.0	139.0	23.0
10/11/2015	4.2	173.0	53.0	1.3	31.0	2.3	4.8	57.0	3.6	1.1	0.8	19.0	0.7	24.0	1.0	82.0	16.0	133.0	24.0
8/02/2016	5.1	167.4	52.4	1.4	17.0	2.3	5.7	14.3	2.2	0.4	0.5	17.7	0.4	43.4	1.1	87.8	15.1	135.2	22.0
9/05/2016	3.5	168.2	49.6	0.5	16.3	2.0	6.8	38.4	3.6	0.3	0.5	19.3	0.7		1.0	51.5	15.9	140.7	23.9
9/08/2016	3.1	154.7	40.3	1.0	19.7	2.3	5.6	48.2	3.1	0.6	0.6	20.8	0.5	31.8	1.1	76.8	14.2	137.1	24.2
7/11/2016	5.9	191.6	50.9	0.5	14.6	2.3	6.9	14.5		0.3	0.6	21.2	0.3		1.1	88.2	17.1	140.4	25.4
7/02/2017	8.3	183.6	45.8	0.5	13.9	1.8	5.5	6.3	2.7	0.3		19.4	0.2	44.4	1.0	86.1	15.8	136.3	23.5
8/05/2017	1.8	174.2	36.7	2.0	21.3	2.1	6.3	60.8		0.9	1.6	18.9	0.4	35.7	1.2	90.2	14.5	136.1	24.9
8/08/2017	2.5	169.1	46.9	1.0	15.9	2.6	5.8	50.2	3.7	0.4	0.6	19.0	0.3	27.1	1.0	85.8	14.2	138.3	23.0
7/11/2017	7.6		54.3	1.1	18.1	2.5	6.7	28.2	3.2	0.7	0.5	18.8	0.5	50.1	1.1	91.1	16.0	138.2	25.2
14/02/2018	5.3		50.9	0.7	15.3	2.3	4.7	13.5		0.3	0.2	16.9	0.2	49.2	1.3	85.0	15.3	134.9	23.0
9/05/2018	2.3		53.2	0.6	15.9	2.2	6.2	75.3		0.8	0.5	17.4	0.8	33.1	1.0	84.9	15.3	134.9	22.7
15/08/2018	4.6		51.6		15.8	2.5	5.6	33.4		0.3		18.4	0.3	39.6	1.2	93.2	17.2	143.4	24.4
14/11/2018	3.7		50.7	0.6	15.2	2.5	6.3	122.9	4.5	0.5	0.9	18.0	0.4	48.5	1.0	88.5	15.9	138.7	21.6

Ca	SW1	SW2	SW4
31/01/2011	3.40	3.90	
10/05/2011	4.50	3.60	24.00
9/08/2011	13.00	5.90	40.00
8/11/2011	19.00	9.90	58.00
6/02/2012	7.40	9.00	12.00
8/05/2012	3.50	3.30	11.00
6/08/2012	6.60	5.30	23.00
13/11/2012	16.00	7.50	19.00
13/02/2013	6.50	8.30	17.00
14/05/2013	5.00	3.30	24.00
6/08/2013	4.40	4.00	19.00
12/11/2013		8.40	40.00
11/02/2014		9.00	
13/05/2014	9.70	7.10	14.00
12/08/2014		6.20	
10/11/2014		7.50	
9/02/2015	11.00	8.30	10.00
11/05/2015	3.10	2.30	12.00
11/08/2015	3.90	3.10	18.00
10/11/2015	7.20	4.00	11.00
8/02/2016	10.26	6.08	20.87
9/05/2016	8.27	5.81	23.67
9/08/2016	3.80	4.10	19.79
7/11/2016		7.22	
7/02/2017		6.86	26.39
8/05/2017	8.20	3.46	13.31
8/08/2017	5.49	3.62	24.73
7/11/2017	12.34	8.29	16.32
14/02/2018		8.19	
9/05/2018	7.97	6.51	15.98
15/08/2018		3.99	
14/11/2018		9.16	23.88

Calcium (mg/L)



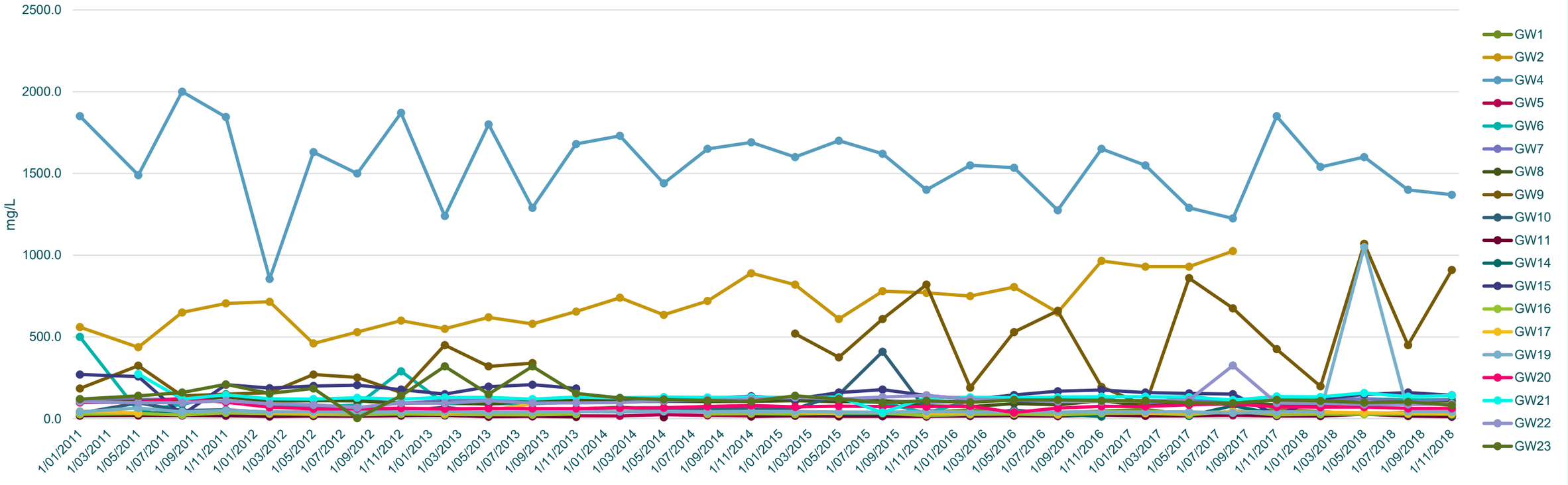
Calcium (mg/L)



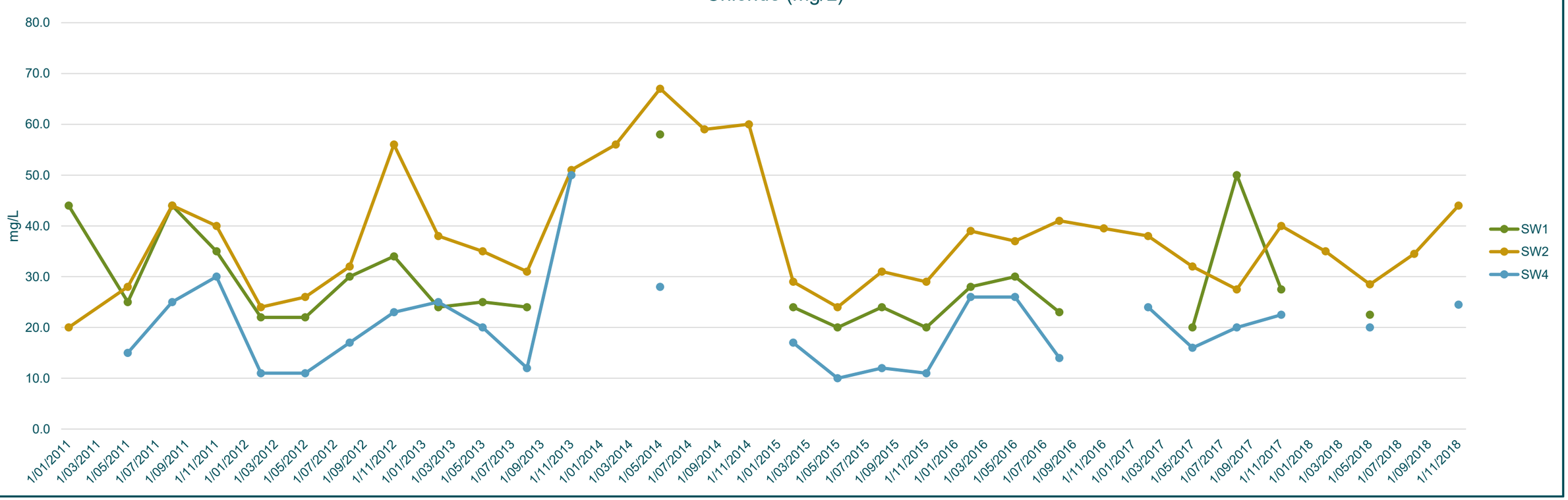
Chloride	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	34.0	560.0	1850.0	22.0	500.0	112.0	99.0	185.0	33.0	18.0	35.0	270.0	27.0	45.0	42.0	100.0		105.0	120.0
10/05/2011	35.0	437.0	1490.0	19.0	44.0	118.0	106.0	324.0	97.0	21.0	36.0	258.0	31.0	36.0	65.0	100.0	273.0	98.0	140.0
9/08/2011	34.0	650.0	2000.0	19.0	88.0	120.0	120.0	140.0	50.0	20.0	32.0	22.5	23.0		42.0	125.0	120.0	98.0	160.0
8/11/2011	36.0	705.0	1845.0	18.0	140.0	140.0	132.0	150.0	54.0	19.0	34.0	208.0	36.0		50.0	101.0	146.0	110.0	210.0
6/02/2012	39.0	715.0	855.0	20.0	86.0	108.0	109.0	159.0	38.0	13.0	33.0	187.0	30.0	36.0	42.0	70.0	122.0	91.0	154.0
8/05/2012	34.0	460.0	1630.0	21.0	70.0	110.0	110.0	270.0	38.0	16.0	30.0	200.0	26.0	35.0	42.0	60.0	120.0	85.0	185.0
6/08/2012	31.0	530.0	1500.0	16.0	84.0	114.0	109.0	252.0	50.0	15.0	30.0	205.0	24.0	41.0	40.0	62.0	128.0	68.0	3.0
13/11/2012	56.0	600.0	1870.0	18.0	290.0	96.0	93.0	160.0	47.0	20.0	28.0	178.0	29.0		42.0	64.0	120.0	96.0	140.0
13/02/2013	27.0	550.0	1240.0	20.0	92.0	110.0	100.0	450.0	70.0	20.0	25.0	150.0	26.0	35.0	44.0	60.0	130.0	95.0	320.0
14/05/2013	32.0	620.0	1800.0	15.0	91.0	120.0	88.0	320.0	40.0	12.0	30.0	196.0	25.0	50.0	40.0	63.0	130.0	110.0	150.0
6/08/2013	40.0	580.0	1290.0	16.0	91.0	110.0	110.0	340.0	39.0	14.0	38.0	208.0	24.0	90.0	42.0	62.0	120.0	96.0	320.0
12/11/2013	59.0	655.0	1680.0	18.0	102.0	119.0	113.0		47.0	11.0	30.0	185.0	28.0		44.0	62.0	132.0	97.0	155.0
11/02/2014	70.0	740.0	1730.0	17.0	101.0	111.0	106.0		42.0						43.0	66.0	128.0	99.0	127.0
13/05/2014	54.0	635.0	1440.0	25.0	107.0	117.0	107.0		48.0	9.0		112.0			45.0	67.0	132.0	110.0	118.0
12/08/2014	77.0	720.0	1650.0	20.0	106.0	118.0	105.0		60.0			125.0	29.0		43.0	75.0	130.0	115.0	111.0
10/11/2014	60.0	890.0	1690.0	17.0	115.0	114.0	106.0		60.0	13.0		137.0	31.0		45.0	81.0	132.0	120.0	106.0
9/02/2015	28.0	820.0	1600.0	18.0	120.0	110.0	110.0	520.0	60.0	18.0	31.0	120.0	28.0	40.0	44.0	72.0	130.0	130.0	140.0
11/05/2015	27.0	610.0	1700.0	16.0	105.0	116.0	104.0	375.0	148.0	14.0	29.0	160.0	34.0	30.0	41.0	77.0	132.0	121.0	121.0
11/08/2015	32.0	780.0	1620.0	16.0	100.0	110.0	110.0	610.0	410.0	15.0	30.0	178.0	34.0		40.0	74.0	38.0	132.0	98.0
10/11/2015	40.0	770.0	1400.0	13.0	34.0	100.0	79.0	820.0	51.0	14.0	23.0	142.0	20.0	33.0	44.0	73.0	128.0	142.0	110.0
8/02/2016	53.0	750.0	1550.0	26.0	111.0	107.0	73.0	190.0	21.0	16.0	26.0	118.0	27.0	34.0	41.0	78.0	131.0	120.0	100.0
9/05/2016	40.0	805.0	1535.0	20.0	112.0	114.0	92.0	530.0	52.0	18.0	28.0	145.0	28.0		42.0	38.0	128.0	115.0	115.0
9/08/2016	36.0	650.0	1275.0	16.0	120.0	92.0	85.0	660.0	30.0	16.0	26.0	168.0	24.0	30.0	41.0	65.0	132.0	105.0	115.0
7/11/2016	46.0	965.0	1650.0		125.0	120.0	110.0	194.0		22.0	13.0	176.0	32.5		42.0	76.0	135.0	105.0	110.0
7/02/2017	58.0	930.0	1550.0	20.0	85.0	92.0	78.0	80.0	44.0	17.0		160.0	33.0	35.0	42.0	75.0	135.0	110.0	110.0
8/05/2017	23.0	930.0	1290.0	17.0	141.0	113.0	93.0	860.0		18.0	17.0	155.0	24.0	36.0	42.0	85.0	132.0	115.0	98.0
8/08/2017	35.0	1025.0	1225.0	20.0	100.0	95.0	90.0	675.0	45.0	30.0	80.0	150.0	45.0	42.5	35.0	90.0	115.0	325.0	95.0
7/11/2017	58.0		1850.0	16.0	115.0	113.0	86.0	425.0	42.0	17.5	27.5	22.5	23.5	40.0	41.5	72.0	136.0	96.0	115.0
14/02/2018	43.0		1540.0	17.0	115.0	107.0	80.0	198.0		16.0	26.0	122.0	28.0	41.0	42.0	70.0	133.0	95.0	109.0
9/05/2018	28.5		1600.0		122.0	123.0	97.0	1070.0		28.5	28.5	148.5	27.5	37.0	1050.0	71.0	157.5	87.5	99.0
15/08/2018	40.0		1400.0	19.0	115.0	102.5	87.5	450.0		16.0		160.0	28.5	34.0	45.0	62.5	135.0	87.5	102.5
14/11/2018	30.0		1370.0	15.0	117.0	113.0	100.0	910.0	49.0	12.0	20.0	143.0	27.0	31.0	42.0	63.0	142.0	90.0	82.0

Chloride	SW1	SW2	SW4
31/01/2011	44.0	20.0	
10/05/2011	25.0	28.0	15.0
9/08/2011	44.0	44.0	25.0
8/11/2011	35.0	40.0	30.0
6/02/2012	22.0	24.0	11.0
8/05/2012	22.0	26.0	11.0
6/08/2012	30.0	32.0	17.0
13/11/2012	34.0	56.0	23.0
13/02/2013	24.0	38.0	25.0
14/05/2013	25.0	35.0	20.0
6/08/2013	24.0	31.0	12.0
12/11/2013		51.0	50.0
11/02/2014		56.0	
13/05/2014	58.0	67.0	28.0
12/08/2014		59.0	
10/11/2014		60.0	
9/02/2015	24.0	29.0	17.0
11/05/2015	20.0	24.0	10.0
11/08/2015	24.0	31.0	12.0
10/11/2015	20.0	29.0	11.0
8/02/2016	28.0	39.0	26.0
9/05/2016	30.0	37.0	26.0
9/08/2016	23.0	41.0	14.0
7/11/2016		39.5	
7/02/2017		38.0	24.0
8/05/2017	20.0	32.0	16.0
8/08/2017	50.0	27.5	20.0
7/11/2017	27.5	40.0	22.5
14/02/2018		35.0	
9/05/2018	22.5	28.5	20.0
15/08/2018		34.5	
14/11/2018		44.0	24.5

Chloride (mg/L)



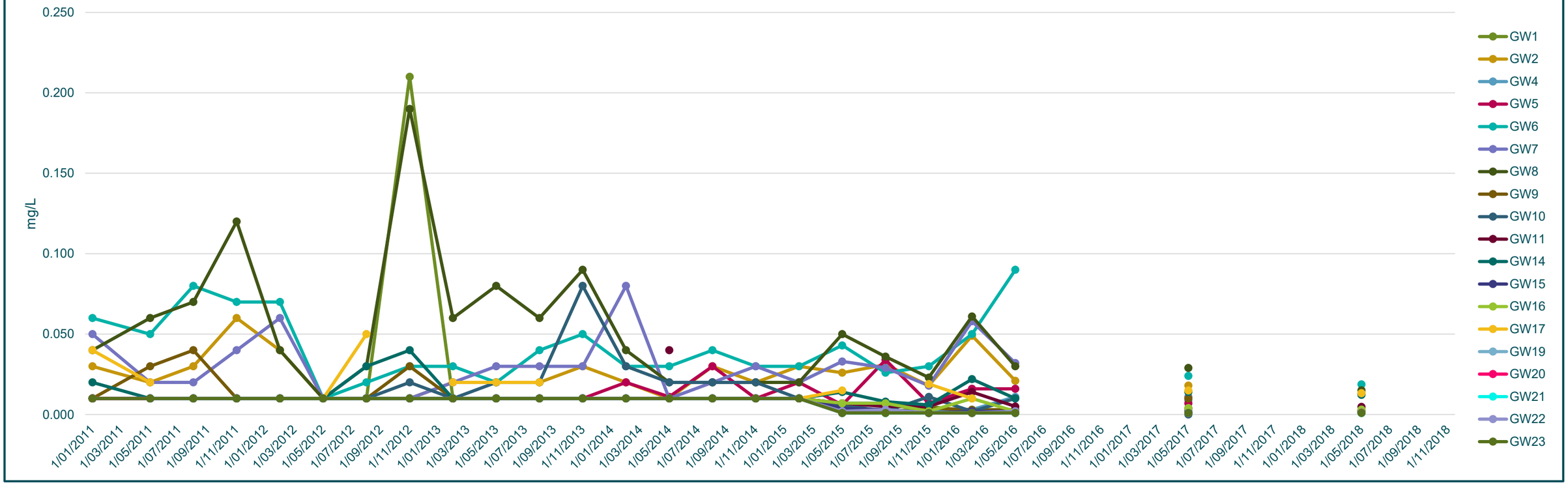
Chloride (mg/L)



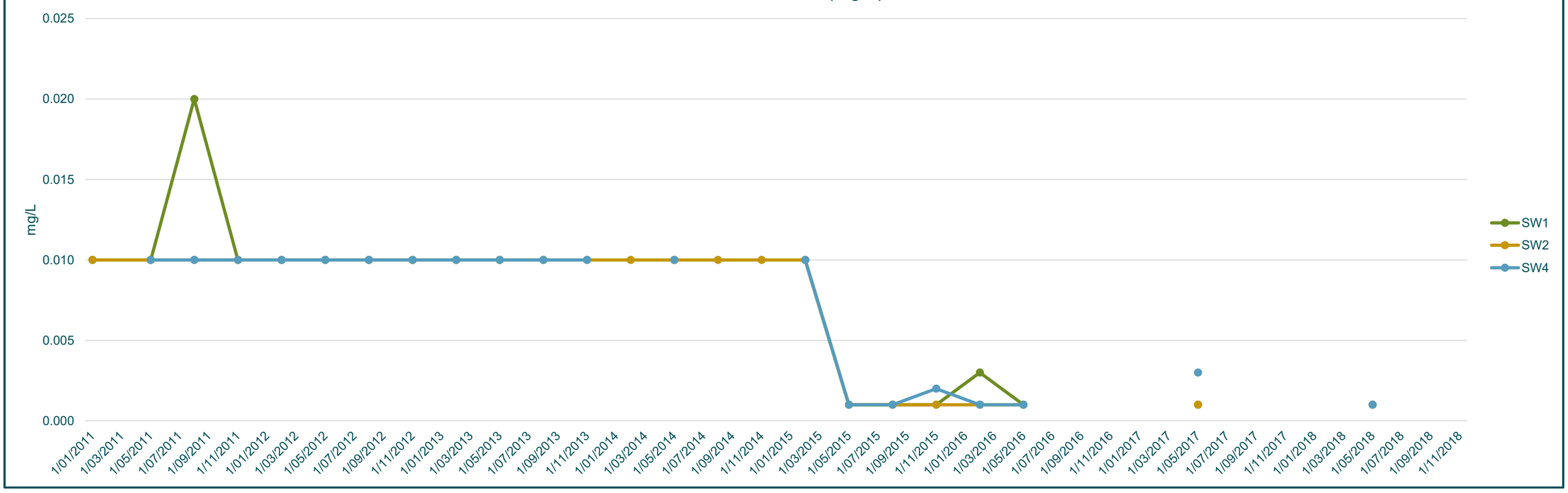
Chromium	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.010	0.030	0.010	0.010	0.060	0.050	0.040	0.010	0.010	0.010	0.020	0.010	0.010	0.040	0.010	0.010		0.010	0.010
10/05/2011	0.010	0.020	0.010	0.010	0.050	0.020	0.060	0.030	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
9/08/2011	0.010	0.030	0.010	0.010	0.080	0.020	0.070	0.040	0.010	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.010	0.010
8/11/2011	0.010	0.060	0.010	0.010	0.070	0.040	0.120	0.010	0.010	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.010	0.010
6/02/2012	0.010	0.040	0.010	0.010	0.070	0.060	0.040	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
8/05/2012	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
6/08/2012	0.010	0.010	0.010	0.010	0.020	0.010	0.030	0.010	0.010	0.010	0.030	0.010	0.010	0.050	0.010	0.010	0.010	0.010	0.010
13/11/2012	0.210	0.010	0.010	0.010	0.030	0.010	0.190	0.030	0.020	0.010	0.040	0.010	0.010		0.010	0.010	0.010	0.010	0.010
13/02/2013	0.010	0.020	0.010	0.010	0.030	0.020	0.060	0.010	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
14/05/2013	0.010	0.020	0.010	0.010	0.020	0.030	0.080	0.010	0.020	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
6/08/2013	0.010	0.020	0.010	0.010	0.040	0.030	0.060	0.010	0.020	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
12/11/2013	0.010	0.030	0.010	0.010	0.050	0.030	0.090		0.080	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.010	0.010
11/02/2014	0.010	0.020	0.010	0.020	0.030	0.080	0.040		0.030						0.010	0.010	0.010	0.010	0.010
13/05/2014	0.010	0.010	0.010	0.011	0.030	0.010	0.020		0.020	0.040		0.010			0.010	0.010	0.010	0.010	0.010
12/08/2014	0.010	0.030	0.010	0.030	0.040	0.020	0.020		0.020			0.010	0.010		0.010	0.010	0.010	0.010	0.010
10/11/2014	0.010	0.020	0.010	0.010	0.030	0.030	0.020		0.020	0.010		0.010	0.010		0.010	0.010	0.010	0.010	0.010
9/02/2015	0.010	0.030	0.010	0.020	0.030	0.020	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
11/05/2015	0.001	0.026	0.007	0.006	0.043	0.033	0.050	0.005	0.006	0.007	0.014	0.004	0.007	0.015	0.001	0.001	0.001	0.002	0.001
11/08/2015	0.001	0.031	0.007	0.034	0.026	0.029	0.036	0.007	0.002	0.005	0.008	0.003	0.007		0.001	0.002	0.001	0.003	0.001
10/11/2015	0.005	0.018	0.003	0.007	0.030	0.018	0.023	0.004	0.011	0.005	0.006	0.001	0.002	0.019	0.001	0.001	0.001	0.001	0.001
8/02/2016	0.002	0.049	0.003	0.016	0.050	0.058	0.061	0.003	0.002	0.014	0.022	0.002	0.010	0.010	0.001	0.001	0.001	0.001	0.001
9/05/2016	0.002	0.021	0.011	0.016	0.090	0.032	0.030	0.003	0.010	0.005	0.010	0.002	0.002		0.001	0.001	0.001	0.002	0.001
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.001	0.018	0.009	0.007	0.024	0.011	0.029	0.010	NT	0.004	0.014	0.002	0.004	0.015	0.001	0.001	0.001	0.001	0.001
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	0.001	0.002			0.019	0.013	0.015	0.003		0.005	0.012	0.002	0.003	0.013	0.001	0.001	0.001	0.001	0.001
15/08/2018																			
14/11/2018																			

Chromium	SW1	SW2	SW4
31/01/2011	0.010	0.010	
10/05/2011	0.010	0.010	0.010
9/08/2011	0.020	0.010	0.010
8/11/2011	0.010	0.010	0.010
6/02/2012	0.010	0.010	0.010
8/05/2012	0.010	0.010	0.010
6/08/2012	0.010	0.010	0.010
13/11/2012	0.010	0.010	0.010
13/02/2013	0.010	0.010	0.010
14/05/2013	0.010	0.010	0.010
6/08/2013	0.010	0.010	0.010
12/11/2013		0.010	0.010
11/02/2014		0.010	
13/05/2014	0.010	0.010	0.010
12/08/2014		0.010	
10/11/2014		0.010	
9/02/2015	0.010	0.010	0.010
11/05/2015	0.001	0.001	0.001
11/08/2015	0.001	0.001	0.001
10/11/2015	0.001	0.001	0.002
8/02/2016	0.003	0.001	0.001
9/05/2016	0.001	0.001	0.001
9/08/2016			
7/11/2016			
7/02/2017			
8/05/2017	0.001	0.001	0.003
8/08/2017			
7/11/2017			
14/02/2018			
9/05/2018	0.001	0.001	0.001
15/08/2018			
14/11/2018			

Total Chromium (mg/L)



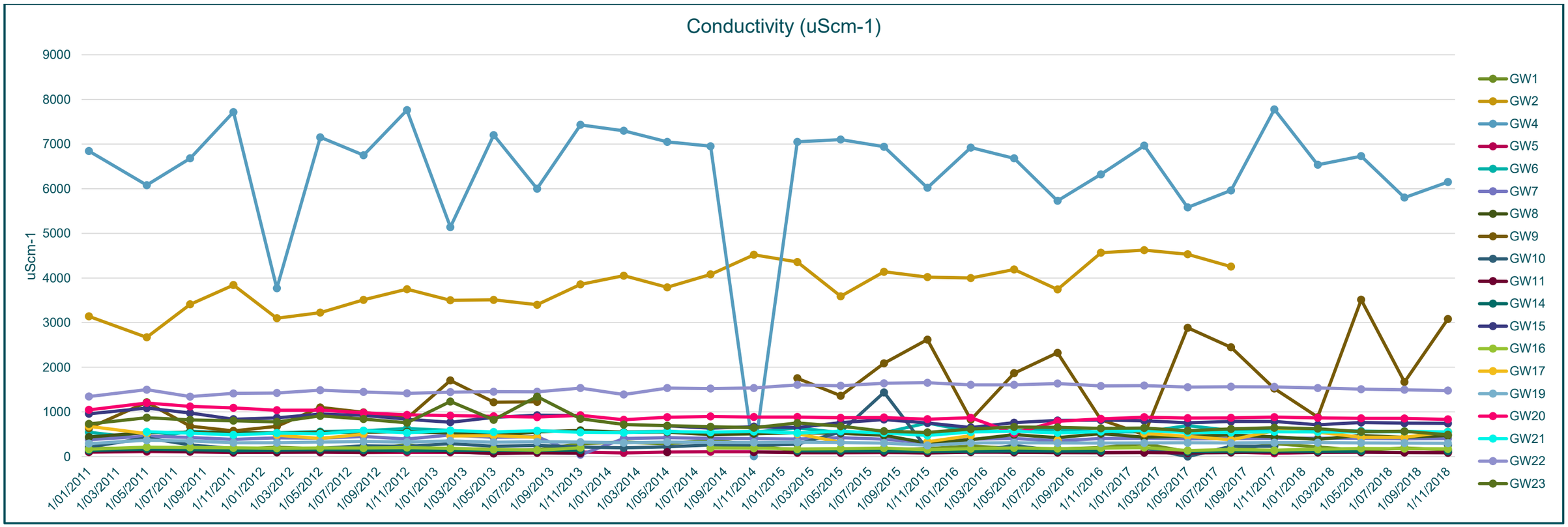
Total Chromium (mg/L)



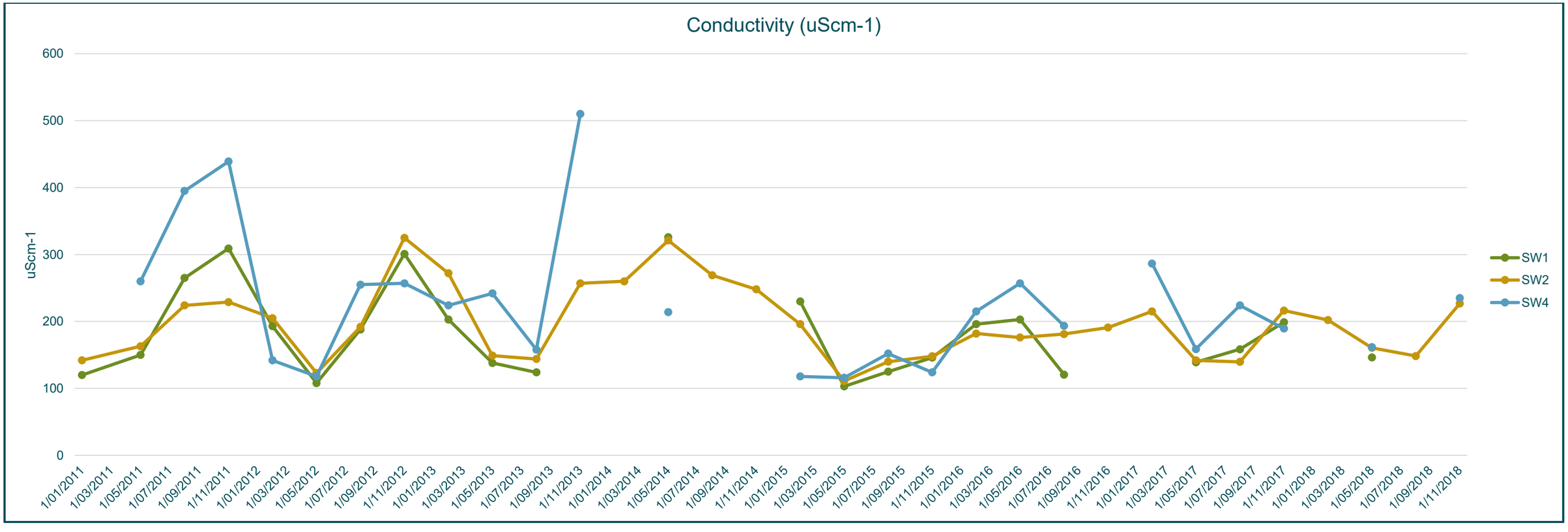
Cond	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	184	3141	6843	99	546	379	438	639	212	109	137	958	165	677	292	1045		1346	732
10/05/2011	181	2671	6080	111	399	458	539	1216	419	131	171	1086	212	514	365	1201	556	1498	872
9/08/2011	179	3410	6680	106	567	428	543	680	261	114	156	975	205		350	1123	524	1343	822
8/11/2011	154	3842	7715	90	530	387	546	576	182	101	133	837	196		311	1092	487	1416	803
6/02/2012	211	3100	3770	97	532	420	520	679	181	97	144	867	185	481	311	1038	527	1425	777
8/05/2012	171	3225	7151	96	559	411	541	1101	185	104	153	953	191	406	325	1040	511	1488	911
6/08/2012	160	3510	6750	91	578	449	544	990	241	98	146	923	192	504	339	981	580	1447	841
13/11/2012	266	3750	7760	95	630	394	557	854	228	135	131	838	200		324	934	533	1418	757
13/02/2013	130	3500	5140	95	586	483	529	1705	292	111	140	769	183	462	353	919	582	1444	1233
14/05/2013	136	3510	7200	88	521	432	463	1218	229	68	139	880	162	469	321	902	551	1453	824
6/08/2013	150	3400	6000	84	573	445	552	1226	251	88	139	926	144	430	331	884	578	1451	1344
12/11/2013	289	3858	7430	101	565	42	587		216	74	145	919	198		325	924	543	1535	847
11/02/2014	328	4052	7298	83	548	405	545		195						309	825	536	1391	718
13/05/2014	282	3790	7050	100	567	425	547		219	100		687			326	882	561	1534	692
12/08/2014	375	4080	6950	109	522	409	490		262			634	191		316	899	548	1524	668
10/11/2014	262	4520	7	109	544	402	512		253	100		671	187		314	887	562	1537	647
9/02/2015	122	4360	7050	86	643	395	533	1754	275	94	130	651	168	510	321	886	526	1606	753
11/05/2015	130	3590	7100	85	532	423	522	1363	551	93	129	762	179	320	315	869	568	1588	681
11/08/2015	149	4140	6940	89	533	389	476	2090	1438	101	129	829	189		304	875	528	1643	569
10/11/2015	177	4020	6020	85	753	301	303	2620	164	82	121	754	156	334	252	838	471	1653	542
8/02/2016	238	4000	6920	120	564	391	377	826	106	98	122	651	176	470	306	869	552	1606	616
9/05/2016	180	4190	6680	94	571	406	490	1868	248	96	127	759	193		311	521	567	1607	663
9/08/2016	166	3744	5728	92	609	354	425	2325	129	91	126	810	179	366	304	791	530	1638	655
7/11/2016	202	4565	6321	92	550	405	514	827		87	124	816	189		302	844	562	1583	632
7/02/2017	288	4624	6965	96	557	407	435	493	194	89		804	202	519	305	883	583	1591	641
8/05/2017	110	4532	5581	104	694	398	459	2886	NT	82	109	755	136	455	308	862	541	1555	579
8/08/2017	135	4255	5962	102	587	401	482	2447	231	90	126	787	159	373	306	867	540	1565	619
7/11/2017	289		7777	74	610	408	442	1524	231	99	125	786	142	580	312	884	558	1561	646
14/02/2018	216		6535	94	590	412	386	884		92	122	710	166	548	313	868	553	1537	625
9/05/2018	138		6730		573	407	471	3513		97	121	764	183	430	306	856	551	1510	555
15/08/2018	194		5801	94	557	395	431	1671		90		748	178	431	303	854	565	1496	567
14/11/2018	153		6150	94	554	404	472	3080	256	86	118	744	173	558	300	833	553	1477	488

Cond	SW1	SW2	SW4
31/01/2011	120	142	
10/05/2011	150	163	260
9/08/2011	265	224	395
8/11/2011	309	229	439
6/02/2012	193	205	142
8/05/2012	108	123	118
6/08/2012	188	192	255
13/11/2012	301	325	257
13/02/2013	203	272	224
14/05/2013	138	149	242
6/08/2013	124	144	158
12/11/2013		257	510
11/02/2014		260	
13/05/2014	326	321	214
12/08/2014		269	
10/11/2014		248	
9/02/2015	230	196	118
11/05/2015	103	111	116
11/08/2015	125	140	152
10/11/2015	146	148	124
8/02/2016	196	182	215
9/05/2016	203	176	257
9/08/2016	121	181	194
7/11/2016		191	
7/02/2017		215	287
8/05/2017	139	142	159
8/08/2017	159	140	224
7/11/2017	199	216	190
14/02/2018		202	
9/05/2018	146	161	162
15/08/2018		148	
14/11/2018		227	235

Conductivity (uScm-1)



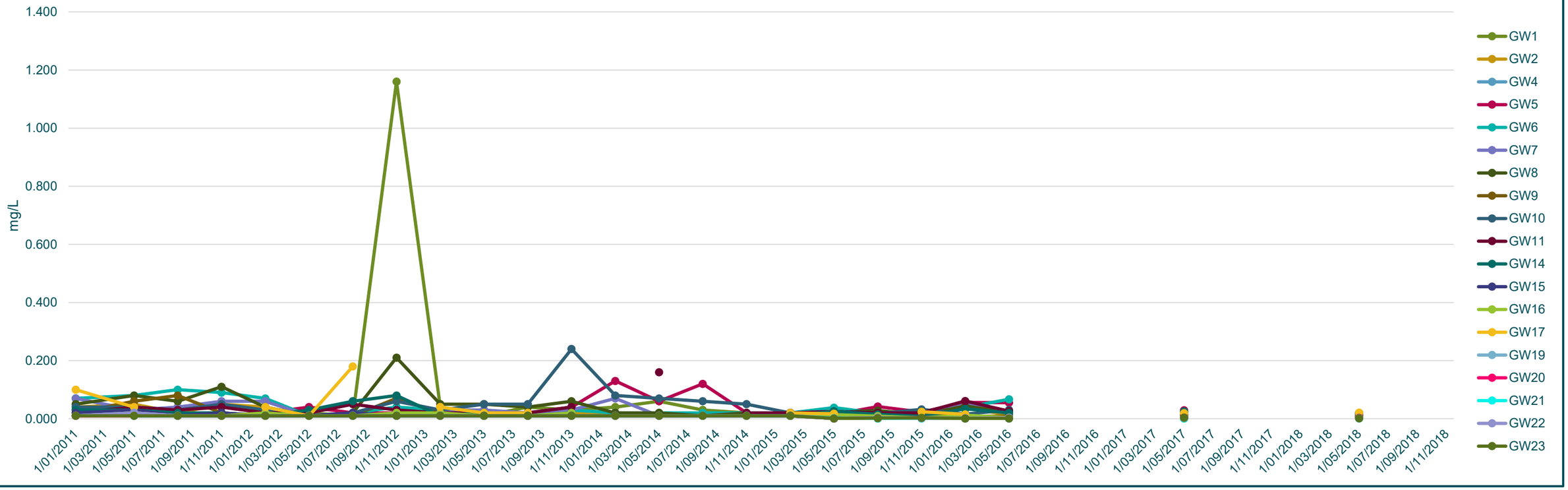
Conductivity (uScm-1)



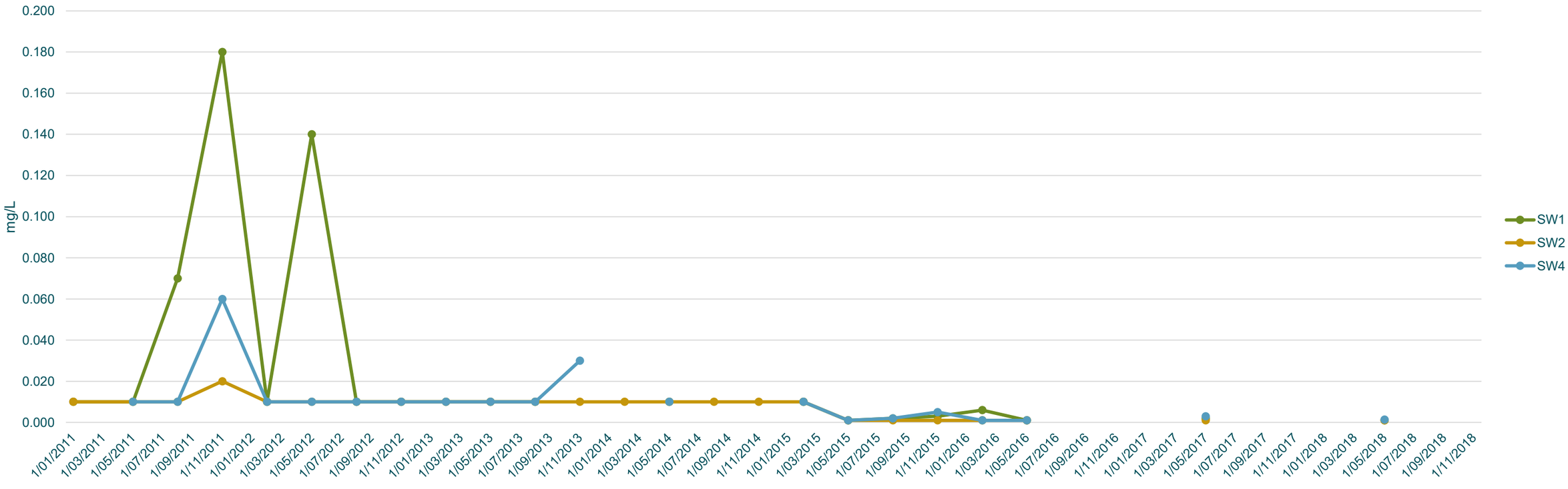
Cu	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.010	0.040	0.010	0.030	0.070	0.070	0.050	0.020	0.040	0.020	0.030	0.020	0.010	0.100	0.010	0.010		0.010	0.010
10/05/2011	0.040	0.050	0.020	0.030	0.080	0.030	0.080	0.060	0.040	0.040	0.030	0.030	0.020	0.040	0.020	0.010	0.010	0.020	0.010
9/08/2011	0.010	0.020	0.020	0.020	0.100	0.040	0.060	0.080	0.030	0.030	0.020	0.010	0.010		0.010	0.010	0.010	0.010	0.010
8/11/2011	0.010	0.050	0.020	0.010	0.090	0.060	0.110	0.020	0.050	0.040	0.020	0.020	0.010		0.010	0.010	0.010	0.010	0.010
6/02/2012	0.010	0.040	0.010	0.020	0.070	0.060	0.040	0.010	0.030	0.020	0.010	0.010	0.020	0.040	0.010	0.010	0.010	0.010	0.010
8/05/2012	0.020	0.010	0.010	0.040	0.010	0.010	0.010	0.010	0.010	0.020	0.030	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
6/08/2012	0.010	0.010	0.010	0.020	0.020	0.010	0.020	0.010	0.020	0.050	0.060	0.020	0.010	0.180	0.010	0.010	0.010	0.010	0.010
13/11/2012	1.16	0.010	0.010	0.020	0.040	0.010	0.210	0.070	0.060	0.030	0.080	0.010	0.020		0.010	0.010	0.010	0.010	0.010
13/02/2013	0.040	0.020	0.020	0.010	0.030	0.030	0.050	0.020	0.030	0.020	0.010	0.010	0.020	0.040	0.010	0.010	0.010	0.010	0.010
14/05/2013	0.010	0.010	0.010	0.020	0.020	0.030	0.050	0.020	0.050	0.020	0.020	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
6/08/2013	0.040	0.010	0.010	0.020	0.020	0.020	0.040	0.010	0.050	0.020	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
12/11/2013	0.030	0.020	0.010	0.040	0.030	0.030	0.060		0.240	0.040	0.020	0.010	0.020		0.010	0.010	0.010	0.010	0.010
11/02/2014	0.040	0.010	0.010	0.130	0.020	0.070	0.020		0.080						0.010	0.010	0.010	0.010	0.010
13/05/2014	0.060	0.010	0.010	0.060	0.020	0.010	0.020		0.070	0.160		0.010			0.010	0.010	0.010	0.010	0.010
12/08/2014	0.030	0.020	0.010	0.120	0.020	0.010	0.010		0.060			0.010	0.010		0.010	0.010	0.010	0.010	0.010
10/11/2014	0.020	0.010	0.010	0.020	0.020	0.020	0.020		0.050	0.020		0.010	0.010		0.010	0.010	0.010	0.010	0.010
9/02/2015	0.010	0.010	0.020	0.010	0.020	0.020	0.010	0.010	0.020	0.020	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
11/05/2015	0.001	0.015	0.006	0.014	0.038	0.012	0.021	0.008	0.017	0.025	0.026	0.004	0.014	0.017	0.001	0.001	0.002	0.001	0.001
11/08/2015	0.001	0.023	0.007	0.042	0.019	0.022	0.028	0.015	0.017	0.020	0.015	0.004	0.009		0.001	0.003	0.001	0.004	0.002
10/11/2015	0.015	0.010	0.003	0.023	0.020	0.013	0.013	0.012	0.032	0.020	0.008	0.005	0.003	0.024	0.001	0.002	0.001	0.002	0.003
8/02/2016	0.005	0.036	0.003	0.056	0.039	0.048	0.044	0.008	0.016	0.061	0.034	0.005	0.012	0.015	0.001	0.001	0.001	0.002	0.001
9/05/2016	0.006	0.014	0.010	0.055	0.067	0.027	0.021	0.009	0.030	0.026	0.020	0.004	0.004		0.001	0.002	0.001	0.003	0.001
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.002	0.013	0.006	0.029	0.021	0.011	0.022	0.001		0.014	0.025	0.005	0.005	0.019	0.001	0.004	0.001	0.003	0.004
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	0.003		0.002		0.015	0.011	0.010	0.007		0.019	0.020	0.003	0.004	0.021	0.002	0.003	0.001	0.002	0.001
15/08/2018																			
14/11/2018																			

Cu	SW1	SW2	SW4
31/01/2011	0.010	0.010	
10/05/2011	0.010	0.010	0.010
9/08/2011	0.070	0.010	0.010
8/11/2011	0.180	0.020	0.060
6/02/2012	0.010	0.010	0.010
8/05/2012	0.140	0.010	0.010
6/08/2012	0.010	0.010	0.010
13/11/2012	0.010	0.010	0.010
13/02/2013	0.010	0.010	0.010
14/05/2013	0.010	0.010	0.010
6/08/2013	0.010	0.010	0.010
12/11/2013		0.010	0.030
11/02/2014		0.010	
13/05/2014	0.010	0.010	0.010
12/08/2014		0.010	
10/11/2014		0.010	
9/02/2015	0.010	0.010	0.010
11/05/2015	0.001	0.001	0.001
11/08/2015	0.002	0.001	0.002
10/11/2015	0.003	0.001	0.005
8/02/2016	0.006	0.001	0.001
9/05/2016	0.001	0.001	0.001
9/08/2016			
7/11/2016			
7/02/2017			
8/05/2017	0.002	0.001	0.003
8/08/2017			
7/11/2017			
14/02/2018			
9/05/2018	0.001	0.001	0.001
15/08/2018			
14/11/2018			

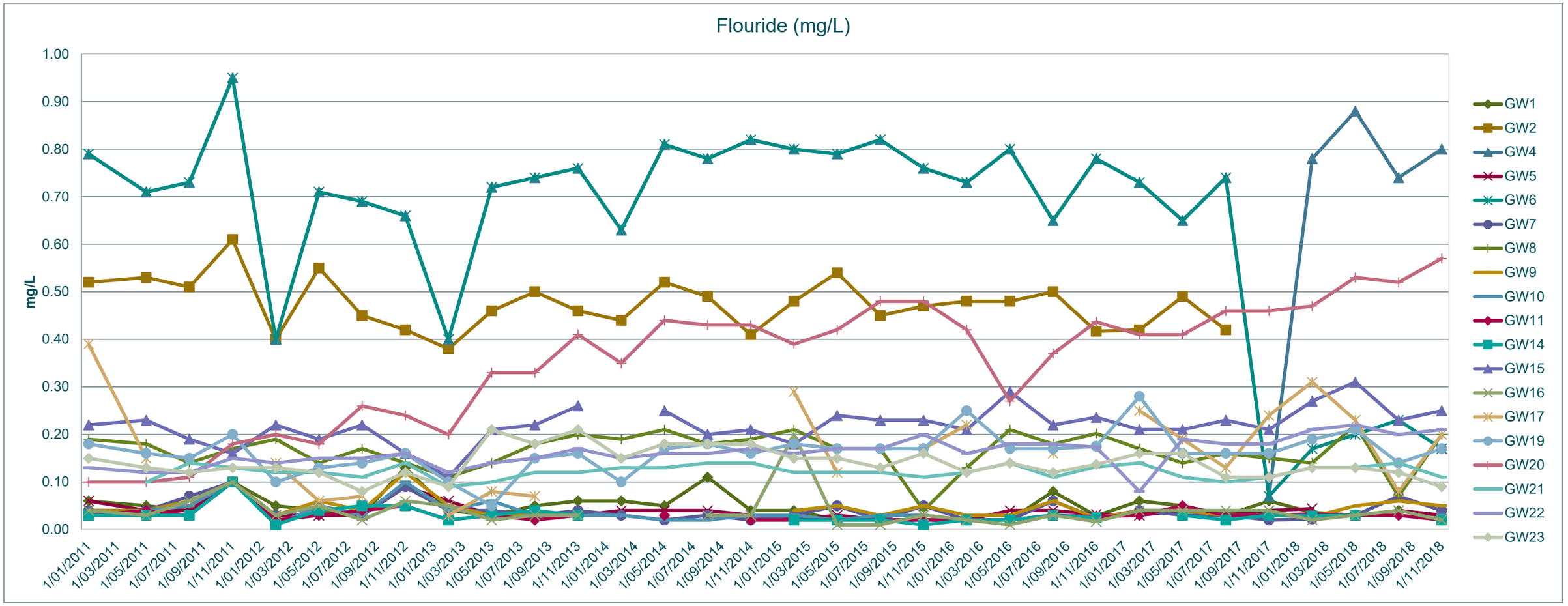
Total Copper (mg/L)



Total Copper (mg/L)



Flouride	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.06	0.52	0.79	0.06	0.79	0.04	0.19	0.04	0.03	0.03	0.03	0.22	0.04	0.39	0.18	0.10		0.13	0.15
10/05/2011	0.05	0.53	0.71	0.04	0.71	0.04	0.18	0.04	0.04	0.04	0.03	0.23	0.03	0.15	0.16	0.10	0.10	0.12	0.13
9/08/2011	0.04	0.51	0.73	0.04	0.73	0.07	0.14	0.06	0.05	0.03	0.03	0.19	0.06		0.15	0.11	0.14	0.12	0.12
8/11/2011	0.10	0.61	0.95	0.10	0.95	0.10	0.17	0.10	0.10	0.10	0.10	0.16	0.10		0.20	0.18	0.13	0.15	0.13
6/02/2012	0.05	0.40	0.40	0.03	0.40	0.03	0.19	0.03	0.01	0.02	0.01	0.22	0.03	0.14	0.10	0.20	0.12	0.14	0.13
8/05/2012	0.04	0.55	0.71	0.03	0.71	0.05	0.14	0.06	0.05	0.03	0.04	0.19	0.05	0.06	0.13	0.18	0.12	0.15	0.12
6/08/2012	0.03	0.45	0.69	0.03	0.69	0.03	0.17	0.04	0.03	0.04	0.05	0.22	0.02	0.07	0.14	0.26	0.11	0.15	0.08
13/11/2012	0.13	0.42	0.66	0.09	0.66	0.09	0.14	0.12	0.10	0.05	0.05	0.16	0.06		0.16	0.24	0.14	0.16	0.12
13/02/2013	0.04	0.38	0.40	0.06	0.40	0.04	0.11	0.05	0.04	0.02	0.02	0.11	0.05	0.03	0.10	0.20	0.09	0.12	0.09
14/05/2013	0.03	0.46	0.72	0.03	0.72	0.04	0.14	0.03	0.06	0.03	0.03	0.21	0.02	0.08	0.05	0.33	0.10	0.14	0.21
6/08/2013	0.05	0.50	0.74	0.03	0.74	0.03	0.18	0.03	0.03	0.02	0.04	0.22	0.03	0.07	0.15	0.33	0.12	0.15	0.18
12/11/2013	0.06	0.46	0.76	0.03	0.76	0.04	0.20		0.03	0.03	0.03	0.26	0.03		0.16	0.41	0.12	0.17	0.21
11/02/2014	0.06	0.44	0.63	0.04	0.63	0.03	0.19		0.03						0.10	0.35	0.13	0.15	0.15
13/05/2014	0.05	0.52	0.81	0.04	0.81	0.02	0.21		0.02	0.03		0.25			0.17	0.44	0.13	0.16	0.18
12/08/2014	0.11	0.49	0.78	0.04	0.78	0.03	0.18		0.02			0.20	0.03		0.18	0.43	0.14	0.16	0.18
10/11/2014	0.04	0.41	0.82	0.03	0.82	0.02	0.19		0.03	0.02		0.21	0.03		0.16	0.43	0.14	0.17	0.18
9/02/2015	0.04	0.48	0.80	0.02	0.80	0.03	0.21	0.04	0.03	0.02	0.02	0.18	0.20	0.29	0.18	0.39	0.12	0.16	0.15
11/05/2015	0.02	0.54	0.79	0.03	0.79	0.05	0.17	0.05	0.02	0.02	0.02	0.24	0.01	0.12	0.17	0.42	0.12	0.17	0.15
11/08/2015	0.02	0.45	0.82	0.02	0.82	0.02	0.17	0.03	0.03	0.02	0.02	0.23	0.01		0.17	0.48	0.12	0.17	0.13
10/11/2015	0.02	0.47	0.76	0.02	0.76	0.05	0.04	0.05	0.03	0.02	0.01	0.23	0.03	0.17	0.17	0.48	0.11	0.20	0.16
8/02/2016	0.02	0.48	0.73	0.02	0.73	0.02	0.13	0.03	0.02	0.02	0.02	0.21	0.02	0.22	0.25	0.42	0.12	0.16	0.12
9/05/2016	0.02	0.48	0.80	0.04	0.80	0.02	0.21	0.03	0.02	0.02	0.02	0.29	0.01		0.17	0.27	0.14	0.18	0.14
9/08/2016	0.08	0.50	0.65	0.04	0.65	0.06	0.18	0.06	0.03	0.03	0.03	0.22	0.03	0.16	0.17	0.37	0.11	0.18	0.12
7/11/2016	0.03	0.42	0.78	0.03	0.78	0.03	0.20	0.02		0.03	0.03	0.24	0.02		0.18	0.44	0.13	0.17	0.14
7/02/2017	0.06	0.42	0.73	0.03	0.73	0.04	0.17	0.04	0.03	0.03		0.21	0.04	0.25	0.28	0.41	0.14	0.08	0.16
8/05/2017	0.05	0.49	0.65	0.04	0.65	0.03	0.14	0.04		0.05	0.03	0.21	0.04	0.19	0.16	0.41	0.11	0.19	0.16
8/08/2017	0.03	0.42	0.74	0.03	0.74	0.03	0.16	0.03	0.03	0.03	0.02	0.23	0.04	0.13	0.16	0.46	0.10	0.18	0.11
7/11/2017	0.06		0.07	0.04	0.07	0.02	0.15	0.03	0.03	0.03	0.03	0.21	0.04	0.24	0.16	0.46	0.11	0.18	0.11
14/02/2018	0.04		0.78	0.04	0.17	0.02	0.14	0.03		0.03	0.03	0.27	0.02	0.31	0.19	0.47	0.13	0.21	0.13
9/05/2018	0.03		0.88		0.20	0.03	0.22	0.05		0.03	0.03	0.31	0.03	0.23	0.21	0.53	0.13	0.22	0.13
15/08/2018	0.04		0.74	0.04	0.23	0.07	0.07	0.06		0.03		0.23	0.04	0.08	0.14	0.52	0.14	0.20	0.12
14/11/2018	0.03		0.80	0.03	0.17	0.04	0.20	0.05	0.03	0.02	0.02	0.25	0.02	0.20	0.17	0.57	0.11	0.21	0.09


Flouride (mg/L)
mg/L
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/01/2011
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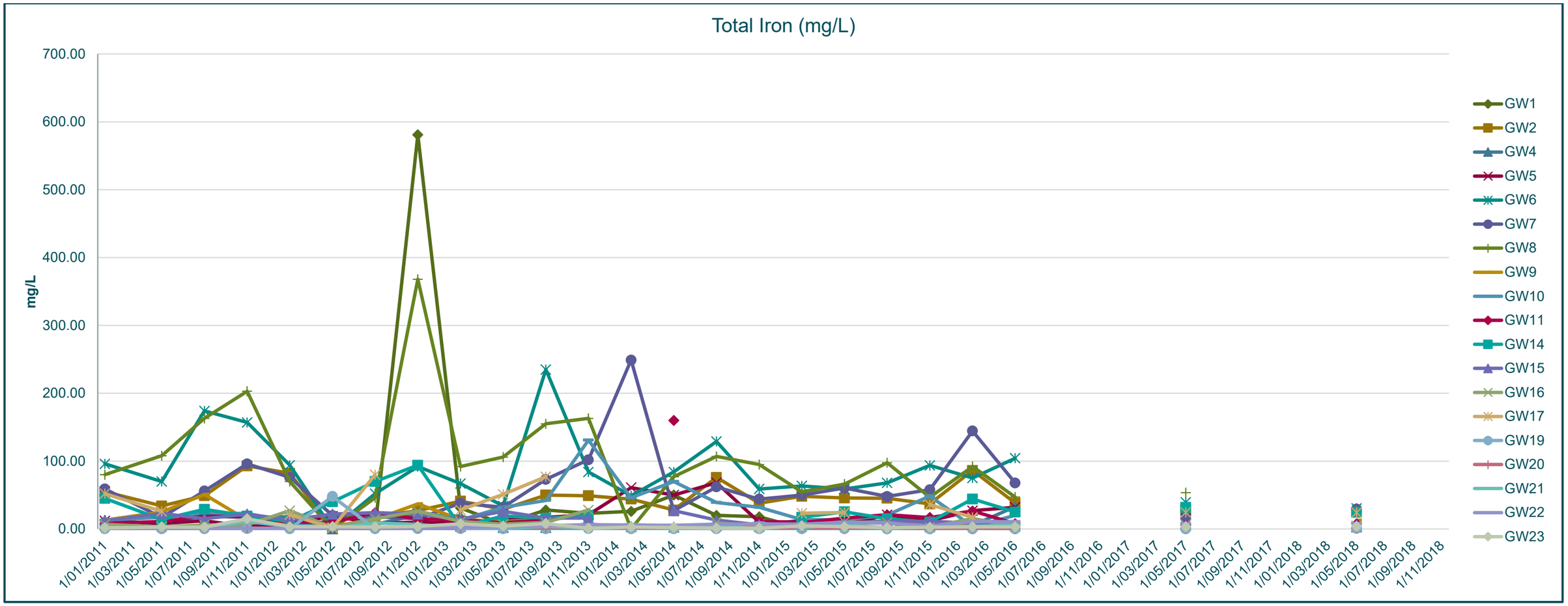
GW23

Fe	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	1.03	55.00	13.00	12.00	96.00	59.00	80.00	13.00	13.00	8.19	45.00	12.00	6.77	52.00	0.25	0.99		0.98	1.73
10/05/2011	0.78	34.00	7.69	8.09	70.00	17.00	108.00	25.00	17.00	11.00	14.00	23.00	3.19	26.00	0.23	0.89	2.73	1.11	2.96
9/08/2011	2.53	49.00	19.00	12.00	174.00	56.00	163.00	51.00	23.00	19.00	29.00	15.00	5.90		0.19	1.03	1.76	1.09	2.63
8/11/2011	4.97	93.00	17.00	3.68	157.00	96.00	203.00	13.00	23.00	18.00	19.00	22.00	6.04		0.42	1.12	11.00	1.14	15.00
6/02/2012	2.55	82.00	18.00	7.53	94.00	76.00	70.00	5.86	9.48	10.00	11.00	13.00	27.00	21.00	0.24	1.05	3.49	0.99	3.35
8/05/2012	1.48	0.01	0.33	19.00	0.02	20.00	0.10	4.18	0.44	9.79	40.00	22.00	2.49	1.40	48.00	0.79	0.13	1.18	3.44
6/08/2012	0.99	18.00	6.67	8.33	52.00	18.00	46.00	14.00	17.00	24.00	70.00	24.00	15.00	80.00	0.37	1.12	9.05	1.61	2.87
13/11/2012	581.00	27.00	21.00	10.00	92.00	15.00	368.00	37.00	26.00	15.00	94.00	22.00	26.00		0.44	1.48	6.65	1.98	3.81
13/02/2013	31.00	41.00	19.00	8.57	67.00	38.00	92.00	14.00	13.00	13.00	3.41	14.00	11.00	28.00	0.58	1.43	1.25	2.36	7.66
14/05/2013	7.10	29.00	2.33	13.00	34.00	32.00	106.00	11.00	32.00	9.23	19.00	26.00	6.99	51.00	0.30	1.73	1.22	2.76	4.18
6/08/2013	28.00	50.00	2.23	17.00	235.00	73.00	155.00	14.00	42.00	13.00	16.00	16.00	9.56	77.00	0.26	1.36	3.57	4.97	7.94
12/11/2013	23.00	49.00	6.84	21.00	84.00	102.00	163.00		131.00	21.00	20.00	16.00	28.00		0.46	2.15	1.86	6.26	1.06
11/02/2014	26.00	44.00	3.45	61.00	49.00	249.00	0.16		46.00						0.24	1.66	6.84	5.73	2.81
13/05/2014	50.00	28.00	2.67	50.00	84.00	27.00	77.00		70.00	160.00		27.00			0.26	2.11	2.76	5.40	2.22
12/08/2014	20.00	76.00	4.85	68.20	129.00	62.00	107.00		39.00			13.00	9.20		0.14	1.84	2.91	7.13	1.30
10/11/2014	18.00	38.00	3.78	10.00	59.00	44.00	95.00		32.00	11.00		6.12	3.64		0.14	1.65	8.80	7.35	1.23
9/02/2015	0.82	48.10	13.40	10.50	63.50	50.00	54.60	6.65	13.80	9.37	17.30	7.02	3.30	23.20	0.19	1.45	2.22	7.11	4.62
11/05/2015	1.22	45.60	11.60	6.30	58.80	60.40	66.20	6.22	13.30	16.10	25.40	9.32	10.20	24.20	0.15	1.30	6.64	9.96	3.24
11/08/2015	0.32	45.30	11.10	20.90	68.00	47.90	97.60	11.70	20.60	21.00	15.10	11.10	9.48		0.10	1.61	1.73	8.25	1.85
10/11/2015	10.63	36.96	4.27	12.14	93.77	57.92	46.69	4.24	48.46	16.83	10.06	11.28	2.52	35.93	0.11	0.94	4.02	4.51	2.50
8/02/2016	3.82	86.21	5.45	26.96	75.19	144.46	92.12	5.37	3.57	26.48	44.20	8.62	15.53	17.15	0.12	1.33	3.49	10.83	3.21
9/05/2016	3.05	38.15	32.70	32.09	104.30	67.78	47.08	7.39	20.09	7.83	25.03	5.13	3.35		0.09	0.77	6.01	10.85	3.04
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.69	28.34	27.03	15.56	39.47	15.72	53.66	0.84		5.87	31.98	5.71	6.21	24.41	0.07	1.36	1.58	8.10	3.17
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	1.42		2.86		30.39	29.30	26.33	13.06		7.52	24.49	5.47	4.43	24.21	0.69	1.55	1.29	8.11	3.77
15/08/2018																			
14/11/2018																			


Total Iron (mg/L)
mg/L
700.00
600.00
500.00
400.00
300.00
200.00
100.00
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1/01/2011
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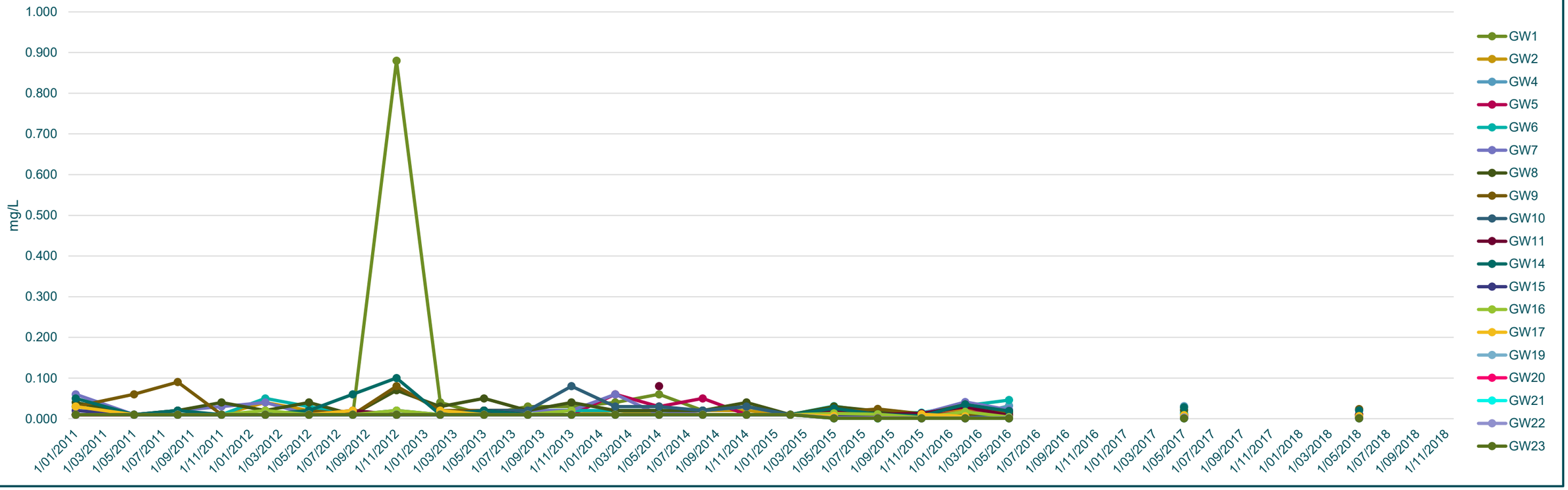
GW15
GW16
GW17
GW19
GW20
GW21
GW22
GW23

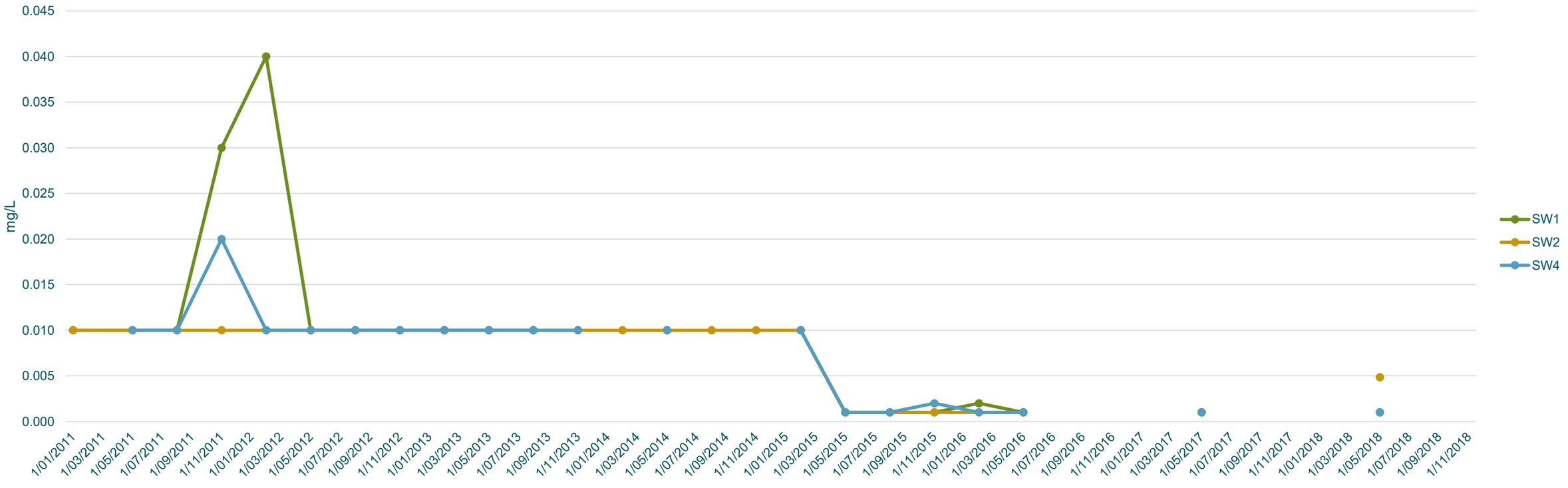
Pb	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.010	0.010	0.010	0.010	0.030	0.060	0.040	0.030	0.010	0.010	0.050	0.020	0.010	0.030	0.010	0.010		0.010	0.010
10/05/2011	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.060	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
9/08/2011	0.010	0.010	0.010	0.010	0.010	0.020	0.020	0.090	0.010	0.010	0.020	0.010	0.010		0.010	0.010	0.010	0.010	0.010
8/11/2011	0.010	0.010	0.010	0.010	0.010	0.030	0.040	0.010	0.010	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.010	0.010
6/02/2012	0.010	0.040	0.010	0.010	0.050	0.040	0.020	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010
8/05/2012	0.010	0.020	0.010	0.010	0.030	0.010	0.040	0.020	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
6/08/2012	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.020	0.060	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
13/11/2012	0.88	0.010	0.010	0.010	0.010	0.010	0.070	0.080	0.020	0.010	0.100	0.010	0.020		0.010	0.010	0.010	0.010	0.010
13/02/2013	0.040	0.010	0.010	0.010	0.010	0.010	0.030	0.020	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
14/05/2013	0.010	0.010	0.010	0.010	0.020	0.020	0.050	0.020	0.020	0.020	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
6/08/2013	0.030	0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
12/11/2013	0.030	0.010	0.010	0.010	0.020	0.020	0.040		0.080	0.010	0.010	0.010	0.020		0.010	0.010	0.010	0.010	0.010
11/02/2014	0.040	0.020	0.010	0.060	0.020	0.060	0.020		0.030						0.010	0.010	0.010	0.010	0.010
13/05/2014	0.060	0.010	0.010	0.030	0.020	0.010	0.020		0.030	0.080		0.010			0.010	0.010	0.010	0.010	0.010
12/08/2014	0.020	0.020	0.010	0.050	0.020	0.020	0.020		0.020			0.010	0.010		0.010	0.010	0.010	0.010	0.010
10/11/2014	0.030	0.020	0.010	0.010	0.030	0.030	0.040		0.030	0.010		0.010	0.010		0.010	0.010	0.010	0.010	0.010
9/02/2015	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
11/05/2015	0.002	0.018	0.013	0.008	0.031	0.023	0.030	0.016	0.006	0.017	0.025	0.006	0.013	0.007	0.001	0.001	0.001	0.002	0.001
11/08/2015	0.001	0.016	0.009	0.014	0.014	0.016	0.019	0.024	0.003	0.011	0.011	0.005	0.011		0.001	0.002	0.001	0.002	0.001
10/11/2015	0.010	0.008	0.002	0.008	0.015	0.012	0.010	0.012	0.011	0.013	0.007	0.002	0.003	0.011	0.001	0.001	0.001	0.001	0.001
8/02/2016	0.004	0.025	0.005	0.016	0.032	0.041	0.035	0.009	0.002	0.029	0.035	0.003	0.017	0.006	0.001	0.001	0.001	0.001	0.001
9/05/2016	0.003	0.010	0.032	0.016	0.046	0.022	0.017	0.017	0.010	0.008	0.019	0.002	0.004		0.001	0.001	0.001	0.002	0.001
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.002	0.010	0.031	0.011	0.014	0.008	0.021	0.003		0.007	0.028	0.004	0.009	0.008	0.001	0.001	0.001	0.003	0.001
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	0.002		0.003		0.010	0.009	0.008	0.024		0.010	0.020	0.003	0.006	0.006	0.001	0.001	0.001	0.001	0.001
15/08/2018																			
14/11/2018																			

Pb	SW1	SW2	SW4
31/01/2011	0.010	0.010	
10/05/2011	0.010	0.010	0.010
9/08/2011	0.010	0.010	0.010
8/11/2011	0.030	0.010	0.020
6/02/2012	0.040	0.010	0.010
8/05/2012	0.010	0.010	0.010
6/08/2012	0.010	0.010	0.010
13/11/2012	0.010	0.010	0.010
13/02/2013	0.010	0.010	0.010
14/05/2013	0.010	0.010	0.010
6/08/2013	0.010	0.010	0.010
12/11/2013		0.010	0.010
11/02/2014		0.010	
13/05/2014	0.010	0.010	0.010
12/08/2014		0.010	
10/11/2014		0.010	
9/02/2015	0.010	0.010	0.010
11/05/2015	0.001	0.001	0.001
11/08/2015	0.001	0.001	0.001
10/11/2015	0.001	0.001	0.002
8/02/2016	0.002	0.001	0.001
9/05/2016	0.001	0.001	0.001
9/08/2016			
7/11/2016			
7/02/2017			
8/05/2017	0.001	0.001	0.001
8/08/2017			
7/11/2017			
14/02/2018			
9/05/2018	0.001	0.005	0.001
15/08/2018			
14/11/2018			

Total Lead (mg/L)



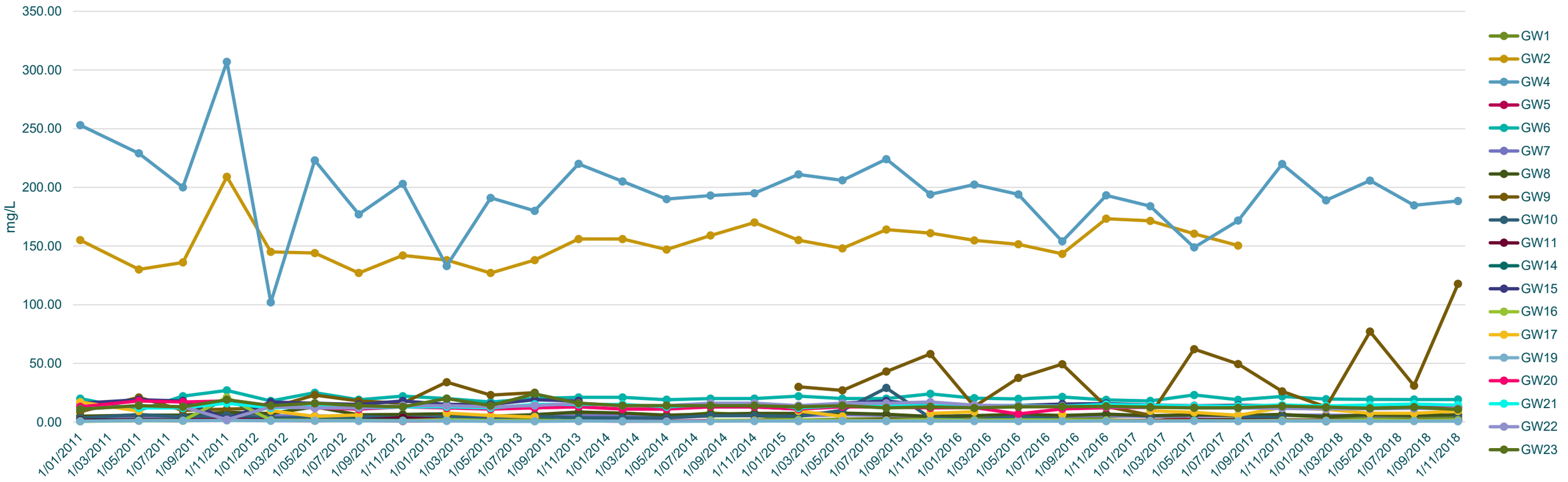
Total Lead (mg/L)



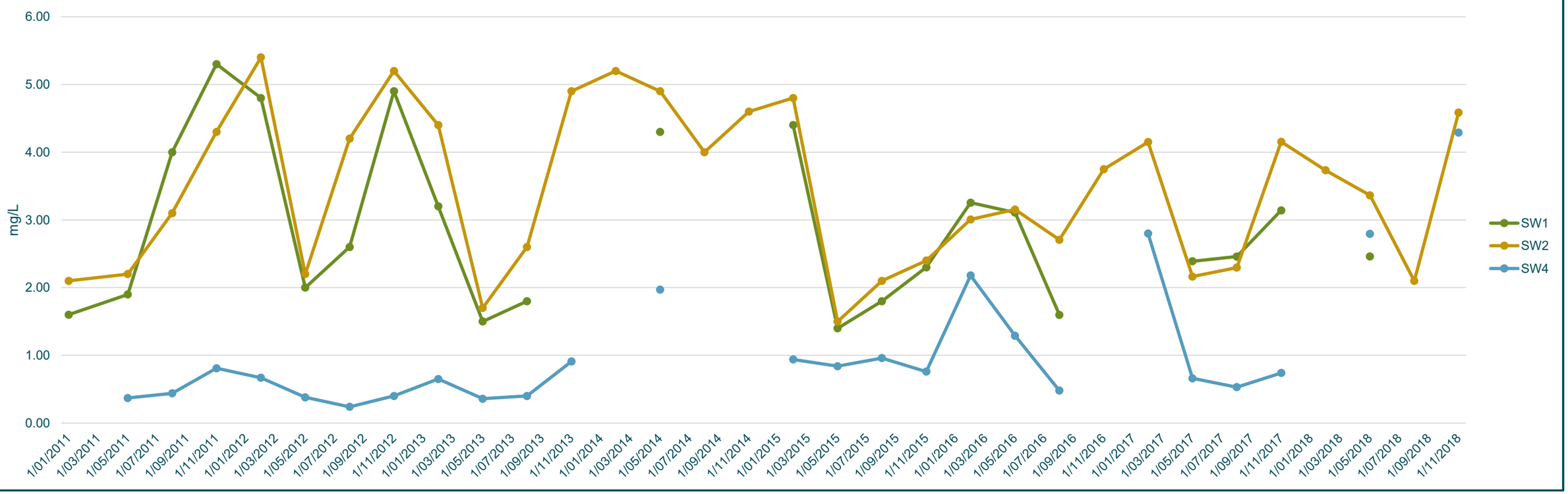
Mg	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	2.50	155.00	253.00	1.00	20.00	3.60	5.00	8.80	3.20	1.50	0.90	16.00	0.60	17.00	0.70	13.00		11.00	11.00
10/05/2011	2.60	130.00	229.00	1.40	10.00	4.30	5.80	21.00	6.40	2.00	1.60	19.00	1.20	9.30	1.10	18.00	12.00	14.00	14.00
9/08/2011	3.40	136.00	200.00	1.20	22.00	4.10	5.80	10.00	4.30	1.70	1.40	18.00	1.10		1.20	17.00	12.00	13.00	13.00
8/11/2011	4.20	209.00	307.00	2.20	27.00	5.90	8.30	11.00	5.80	2.50	20.00	2.40	21.00		1.40	18.00	16.00	2.10	19.00
6/02/2012	4.20	145.00	102.00	1.30	18.00	5.30	7.20	12.00	3.40	1.90	1.70	17.00	1.60	9.70	1.10	14.00	12.00	13.00	14.00
8/05/2012	3.30	144.00	223.00	1.20	25.00	5.20	13.00	23.00	3.90	1.40	1.50	16.00	1.40	4.90	1.10	12.00	13.00	12.00	16.00
6/08/2012	3.20	127.00	177.00	1.50	19.00	4.70	6.20	18.00	4.70	1.70	1.80	15.00	1.30	6.00	1.00	11.00	12.00	12.00	14.00
13/11/2012	4.90	142.00	203.00	0.80	22.00	5.10	6.50	16.00	3.50	3.60	1.40	18.00	1.10		1.00	13.00	13.00	14.00	13.00
13/02/2013	2.20	138.00	133.00	1.20	20.00	4.60	7.00	34.00	3.90	1.90	1.30	15.00	2.00	7.60	1.00	12.00	13.00	14.00	20.00
14/05/2013	2.20	127.00	191.00	1.00	17.00	4.30	4.90	23.00	4.00	0.80	1.10	15.00	1.30	5.50	0.60	11.00	12.00	13.00	14.00
6/08/2013	2.50	138.00	180.00	1.00	20.00	5.20	6.30	25.00	4.90	1.30	1.30	19.00	1.10	4.30	0.60	12.00	15.00	14.00	24.00
12/11/2013	6.30	156.00	220.00	1.00	21.00	5.10	8.50		3.70	1.20	1.50	18.00	1.10		0.80	13.00	15.00	16.00	16.00
11/02/2014	6.50	156.00	205.00	0.70	21.00	5.60	7.60		3.50						0.70	11.00	15.00	14.00	14.00
13/05/2014	4.50	147.00	190.00	0.80	19.00	4.90	5.90		3.50	1.10		12.00			0.60	11.00	13.00	14.00	14.00
12/08/2014	7.80	159.00	193.00	1.20	20.00	5.40	6.70		5.30			13.00	1.40		0.70	13.00	15.00	16.00	14.00
10/11/2014	5.50	170.00	195.00	1.50	20.00	5.50	7.40		5.40	1.70		13.00	1.40		0.80	13.00	16.00	16.00	14.00
9/02/2015	1.80	155.00	211.00	1.10	22.00	5.30	7.40	30.00	4.90	1.50	1.30	11.00	1.80	9.40	0.80	11.00	12.00	14.00	13.00
11/05/2015	2.40	148.00	206.00	1.40	20.00	6.20	7.60	27.00	10.00	1.80	1.50	16.00	1.60	4.80	0.90	13.00	14.00	16.00	14.00
11/08/2015	3.10	164.00	224.00	1.60	20.00	5.90	6.60	43.00	29.00	2.00	1.50	18.00	1.50		0.80	13.00	14.00	16.00	12.00
10/11/2015	4.00	161.00	194.00	1.60	24.00	4.90	4.70	58.00	3.50	1.80	1.40	14.00	2.10	7.40	0.80	12.00	14.00	17.00	13.00
8/02/2016	4.91	154.80	202.41	2.00	20.35	5.61	5.41	13.30	1.79	1.69	1.37	12.88	1.60	8.75	0.79	12.42	13.87	14.35	11.99
9/05/2016	3.41	151.48	193.99	1.24	19.74	4.91	6.61	37.58	4.73	1.74	1.34	14.10	1.82		0.71	6.94	14.14	13.89	12.87
9/08/2016	3.52	143.28	153.94	1.53	21.34	4.93	5.64	49.28	2.26	1.81	1.29	15.30	1.69	6.55	0.77	11.19	13.53	13.45	13.14
7/11/2016	4.67	173.28	193.15	1.43	18.88	5.62	6.80	13.20		1.49	1.58	15.76	1.51		0.78	12.26	14.96	13.12	13.42
7/02/2017	5.86	171.42	183.96	1.27	17.97	4.67	5.44	5.86	3.46	1.30		14.62	1.04	9.53	0.74	12.51	14.31	12.44	12.66
8/05/2017	1.81	160.42	148.84	2.32	23.08	5.33	6.14	62.09		1.56	1.66	13.88	1.18	8.23	0.88	12.99	13.60	12.25	12.10
8/08/2017	2.61	150.38	171.68	1.54	18.94	5.24	5.73	49.44	4.35	1.58	1.21	14.22	0.99	5.74	0.80	12.41	13.53	11.85	12.16
7/11/2017	5.69		219.81	1.34	21.81	5.73	6.40	26.15	3.87	1.86	1.51	13.93	1.52	12.41	0.79	13.01	14.50	11.66	13.46
14/02/2018	4.18		188.93	1.39	19.55	5.82	4.61	12.73		1.39	0.63	12.26	1.20	10.75	0.78	12.38	13.69	11.21	12.62
9/05/2018	2.47		205.80		19.26	5.45	6.16	77.06		1.92	1.28	13.12	1.87	7.48	0.72	12.35	14.48	11.28	11.73
15/08/2018	4.18		184.68	1.49	19.19	5.62	5.57	31.02		1.55		13.44	1.49	7.51	0.77	12.96	15.34	11.57	12.71
14/11/2018	3.02		188.39	1.42	19.13	5.80	6.20	117.73	4.47	1.75	1.47	13.31	1.68	9.43	0.69	12.41	14.42	11.46	10.75

Mg	SW1	SW2	SW4
31/01/2011	1.60	2.10	
10/05/2011	1.90	2.20	0.37
9/08/2011	4.00	3.10	0.44
8/11/2011	5.30	4.30	0.81
6/02/2012	4.80	5.40	0.67
8/05/2012	2.00	2.20	0.38
6/08/2012	2.60	4.20	0.24
13/11/2012	4.90	5.20	0.40
13/02/2013	3.20	4.40	0.65
14/05/2013	1.50	1.70	0.36
6/08/2013	1.80	2.60	0.40
12/11/2013		4.90	0.91
11/02/2014		5.20	
13/05/2014	4.30	4.90	1.97
12/08/2014		4.00	
10/11/2014		4.60	
9/02/2015	4.40	4.80	0.94
11/05/2015	1.40	1.50	0.84
11/08/2015	1.80	2.10	0.96
10/11/2015	2.30	2.40	0.76
8/02/2016	3.25	3.01	2.18
9/05/2016	3.11	3.15	1.29
9/08/2016	1.60	2.71	0.48
7/11/2016		3.75	
7/02/2017		4.15	2.80
8/05/2017	2.39	2.16	0.66
8/08/2017	2.46	2.30	0.53
7/11/2017	3.14	4.15	0.74
14/02/2018		3.73	
9/05/2018	2.46	3.36	2.79
15/08/2018		2.10	
14/11/2018		4.59	4.29

Total Magnesium (mg/L)



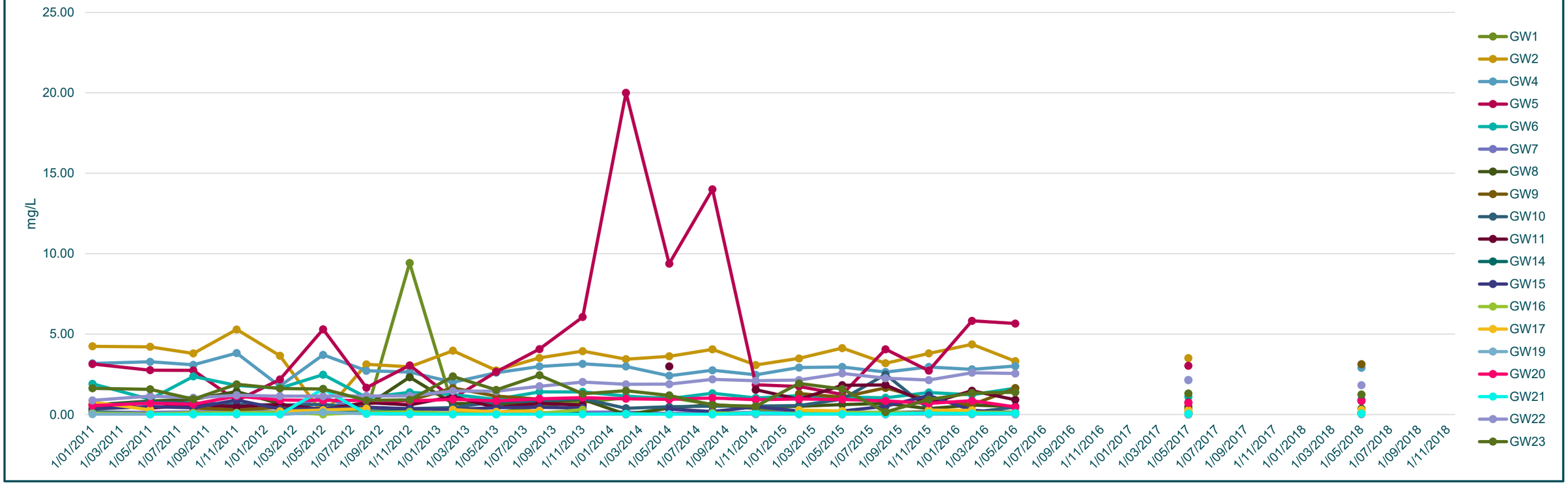
Total Magnesium (mg/L)



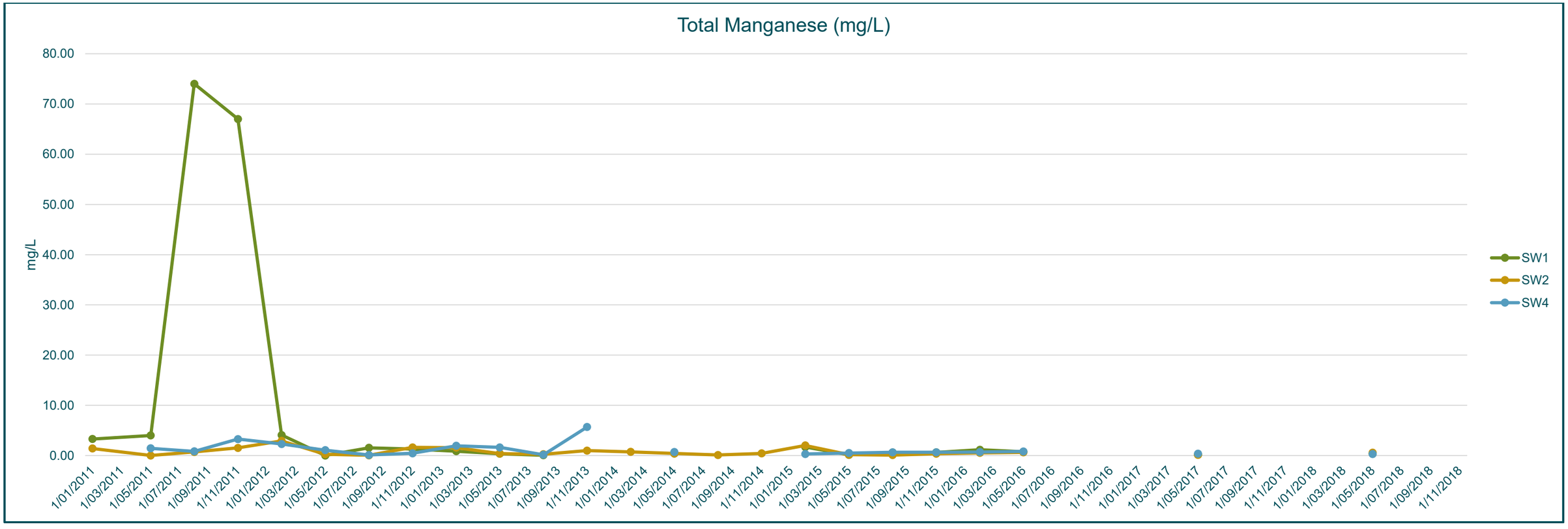
Mn	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.19	4.24	3.18	3.14	1.91	0.16	0.60	0.35	0.56	0.62	0.13	0.34	0.09	0.78	0.02	0.56		0.88	1.63
10/05/2011	0.08	4.21	3.28	2.76	0.95	0.13	0.84	0.79	0.78	0.40	0.04	0.49	0.04	0.29	0.01	0.70	0.01	1.15	1.57
9/08/2011	0.17	3.80	3.09	2.74	2.37	0.17	0.95	0.41	0.71	0.61	0.03	0.42	0.11		0.01	0.64	0.01	1.04	0.96
8/11/2011	0.15	5.29	3.82	0.86	1.81	0.22	1.43	0.30	0.63	0.49	0.10	0.90	0.11		0.01	1.14	0.04	1.20	1.88
6/02/2012	0.16	3.66	1.77	2.18	1.64	0.17	0.67	0.44	0.59	0.63	0.05	0.34	0.15	0.20	0.01	0.90	0.01	1.15	1.62
8/05/2012	0.12	0.01	3.71	5.30	2.48	1.09	0.09	0.35	0.63	0.31	0.08	0.38	0.02	0.28	0.14	0.88	1.59	1.14	1.59
6/08/2012	0.14	3.12	2.72	1.67	1.06	0.12	0.54	0.67	0.40	0.74	0.17	0.46	0.12	0.37	0.05	0.87	0.05	1.16	0.88
13/11/2012	9.42	2.97	2.64	3.06	1.38	0.09	2.32	0.88	0.37	0.60	0.21	0.36	0.17		0.01	0.84	0.05	1.16	0.91
13/02/2013	0.50	3.97	2.01	1.01	1.24	0.09	0.69	1.65	0.43	1.12	0.03	0.31	0.08	0.30	0.01	0.94	0.01	1.46	2.37
14/05/2013	0.09	2.74	2.60	2.65	0.94	0.08	0.65	1.14	0.80	0.43	0.09	0.43	0.06	0.17	0.01	0.85	0.01	1.45	1.53
6/08/2013	0.52	3.52	2.99	4.07	1.41	0.10	0.74	0.96	0.85	0.69	0.03	0.45	0.08	0.23	0.01	0.98	0.01	1.76	2.44
12/11/2013	0.77	3.94	3.15	6.06	1.41	0.14	0.94		0.99	0.59	0.08	0.41	0.30		0.02	1.05	0.02	2.02	1.29
11/02/2014	1.04	3.44	2.99	20.00	1.14	0.16	0.01		0.39						0.01	0.98	0.05	1.88	1.48
13/05/2014	1.06	3.62	2.41	9.38	0.99	0.06	0.40		0.48	2.99		0.33			0.01	0.94	0.01	1.89	1.19
12/08/2014	0.63	4.05	2.75	14.00	1.32	0.10	0.62		0.52			0.19	0.10		0.01	1.03	0.01	2.19	0.59
10/11/2014	0.36	3.08	2.47	1.85	1.03	0.12	0.45		0.52	1.54		0.48	0.06		0.01	0.92	0.10	2.10	0.51
9/02/2015	0.03	3.49	2.92	1.75	1.18	0.13	0.51	1.30	0.56	0.95	0.08	0.22	0.08	0.28	0.01	0.97	0.03	2.14	1.93
11/05/2015	0.07	4.13	2.96	1.25	1.09	0.14	0.62	1.08	0.96	1.82	0.11	0.22	0.14	0.22	0.01	0.94	0.04	2.56	1.59
11/08/2015	0.11	3.19	2.64	4.06	1.04	0.13	0.69	1.66	2.49	1.84	0.08	0.51	0.13		0.01	0.85	0.03	2.26	0.15
10/11/2015	0.19	3.80	2.96	2.73	1.37	0.13	0.36	0.91	0.35	0.69	0.07	1.19	0.07	0.27	0.01	0.69	0.08	2.14	0.93
8/02/2016	0.14	4.36	2.81	5.82	1.23	0.18	0.59	0.61	0.14	1.48	0.13	0.27	0.14	0.26	0.01	0.86	0.06	2.60	1.34
9/05/2016	0.09	3.32	3.02	5.66	1.64	0.14	0.51	1.64	0.46	0.92	0.10	0.12	0.14		0.01	0.47	0.09	2.55	1.38
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.05	3.51	2.14	3.04	1.10	0.10	0.49	0.35	NT	0.75	0.15	0.13	0.14	0.26	0.01	0.72	0.05	2.15	1.31
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	0.04		2.91		0.94	0.12	0.36	3.12		0.84	0.11	0.11	0.10	0.29	0.02	0.87	0.06	1.82	1.25
15/08/2018																			
14/11/2018																			

Mn	SW1	SW2	SW4
31/01/2011	3.30	1.42	
10/05/2011	4.01	0.01	1.45
9/08/2011	74.00	0.73	0.84
8/11/2011	67.00	1.53	3.29
6/02/2012	4.10	2.93	2.31
8/05/2012	0.01	0.27	1.08
6/08/2012	1.55	0.05	0.12
13/11/2012	1.29	1.64	0.45
13/02/2013	0.88	1.59	1.96
14/05/2013	0.37	0.41	1.64
6/08/2013	0.07	0.27	0.17
12/11/2013		1.00	5.70
11/02/2014		0.74	
13/05/2014	0.41	0.43	0.72
12/08/2014		0.12	
10/11/2014		0.44	
9/02/2015	1.71	2.02	0.32
11/05/2015	0.15	0.18	0.51
11/08/2015	0.60	0.11	0.66
10/11/2015	0.64	0.36	0.65
8/02/2016	1.16	0.54	0.71
9/05/2016	0.77	0.64	0.82
9/08/2016			
7/11/2016			
7/02/2017			
8/05/2017	0.19	0.15	0.37
8/08/2017			
7/11/2017			
14/02/2018			
9/05/2018	0.39	0.57	0.32
15/08/2018			
14/11/2018			

Total Manganese (mg/L)



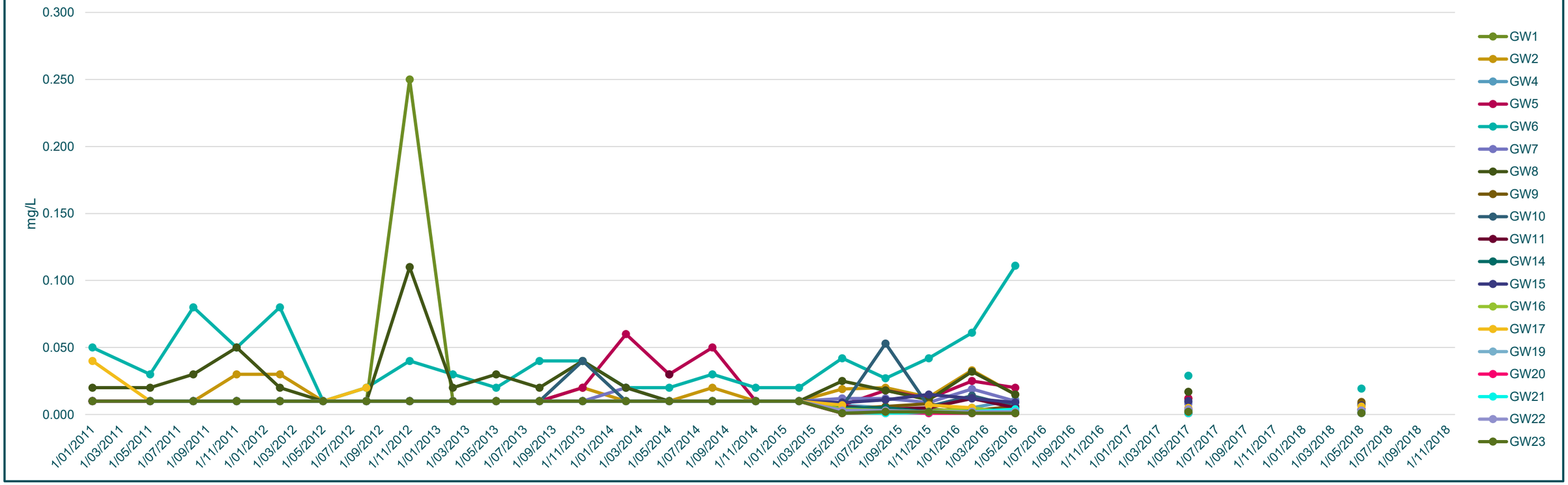
Total Manganese (mg/L)



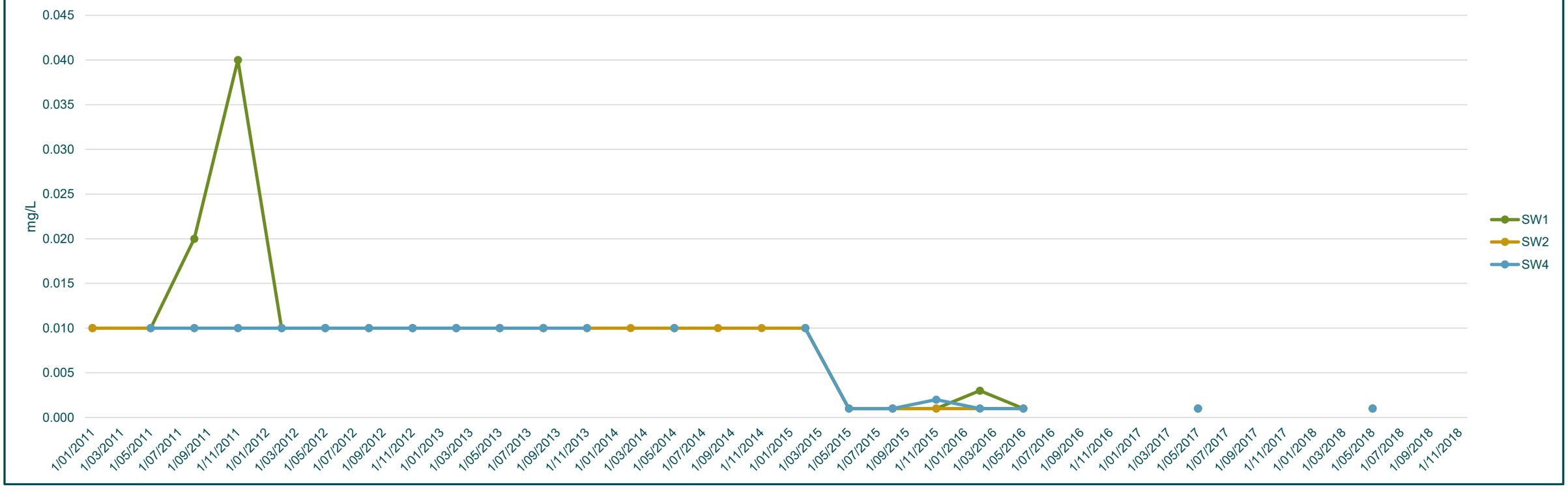
Ni	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.010	0.010	0.010	0.010	0.050	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.040	0.010	0.010		0.010	0.010
10/05/2011	0.010	0.010	0.010	0.010	0.030	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
9/08/2011	0.010	0.010	0.010	0.010	0.080	0.010	0.030	0.010	0.010	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.010	0.010
8/11/2011	0.010	0.030	0.010	0.010	0.050	0.010	0.050	0.010	0.010	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.010	0.010
6/02/2012	0.010	0.030	0.010	0.010	0.080	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
8/05/2012	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
6/08/2012	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010
13/11/2012	0.250	0.010	0.010	0.010	0.040	0.010	0.110	0.010	0.010	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.010	0.010
13/02/2013	0.010	0.010	0.010	0.010	0.030	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
14/05/2013	0.010	0.010	0.010	0.010	0.020	0.010	0.030	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
6/08/2013	0.010	0.010	0.010	0.010	0.040	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
12/11/2013	0.010	0.020	0.010	0.020	0.040	0.010	0.040		0.040	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.010	0.010
11/02/2014	0.010	0.010	0.010	0.060	0.020	0.020	0.020		0.010						0.010	0.010	0.010	0.010	0.010
13/05/2014	0.010	0.010	0.010	0.030	0.020	0.010	0.010		0.010	0.030		0.010			0.010	0.010	0.010	0.010	0.010
12/08/2014	0.010	0.020	0.010	0.050	0.030	0.010	0.010		0.010			0.010	0.010		0.010	0.010	0.010	0.010	0.010
10/11/2014	0.010	0.010	0.010	0.010	0.020	0.010	0.010		0.010	0.010		0.010	0.010		0.010	0.010	0.010	0.010	0.010
9/02/2015	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
11/05/2015	0.001	0.019	0.007	0.007	0.042	0.012	0.025	0.004	0.006	0.006	0.005	0.009	0.004	0.007	0.001	0.001	0.002	0.003	0.001
11/08/2015	0.001	0.020	0.005	0.018	0.027	0.012	0.018	0.006	0.053	0.004	0.005	0.011	0.003		0.001	0.002	0.001	0.003	0.002
10/11/2015	0.004	0.013	0.001	0.012	0.042	0.009	0.011	0.008	0.006	0.005	0.002	0.015	0.002	0.007	0.001	0.001	0.002	0.002	0.002
8/02/2016	0.002	0.033	0.005	0.025	0.061	0.019	0.032	0.003	0.014	0.012	0.004	0.012	0.005	0.005	0.001	0.001	0.002	0.002	0.001
9/05/2016	0.002	0.015	0.011	0.020	0.111	0.010	0.015	0.006	0.006	0.005	0.003	0.009	0.001		0.003	0.001	0.004	0.002	0.001
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.001	0.012	0.009	0.012	0.029	0.008	0.017	0.001		0.004	0.003	0.010	0.002	0.005	0.001	0.001	0.001	0.004	0.002
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	0.001		0.001		0.019	0.007	0.008	0.009		0.004	0.003	0.007	0.001	0.006	0.001	0.001	0.001	0.003	0.001
15/08/2018																			
14/11/2018																			

Ni	SW1	SW2	SW4
31/01/2011	0.010	0.010	
10/05/2011	0.010	0.010	0.010
9/08/2011	0.020	0.010	0.010
8/11/2011	0.040	0.010	0.010
6/02/2012	0.010	0.010	0.010
8/05/2012	0.010	0.010	0.010
6/08/2012	0.010	0.010	0.010
13/11/2012	0.010	0.010	0.010
13/02/2013	0.010	0.010	0.010
14/05/2013	0.010	0.010	0.010
6/08/2013	0.010	0.010	0.010
12/11/2013		0.010	0.010
11/02/2014		0.010	
13/05/2014	0.010	0.010	0.010
12/08/2014		0.010	
10/11/2014		0.010	
9/02/2015	0.010	0.010	0.010
11/05/2015	0.001	0.001	0.001
11/08/2015	0.001	0.001	0.001
10/11/2015	0.001	0.001	0.002
8/02/2016	0.003	0.001	0.001
9/05/2016	0.001	0.001	0.001
9/08/2016			
7/11/2016			
7/02/2017			
8/05/2017	0.001	0.001	0.001
8/08/2017			
7/11/2017			
14/02/2018			
9/05/2018	0.001	0.001	0.001
15/08/2018			
14/11/2018			

Total Nickel (mg/L)

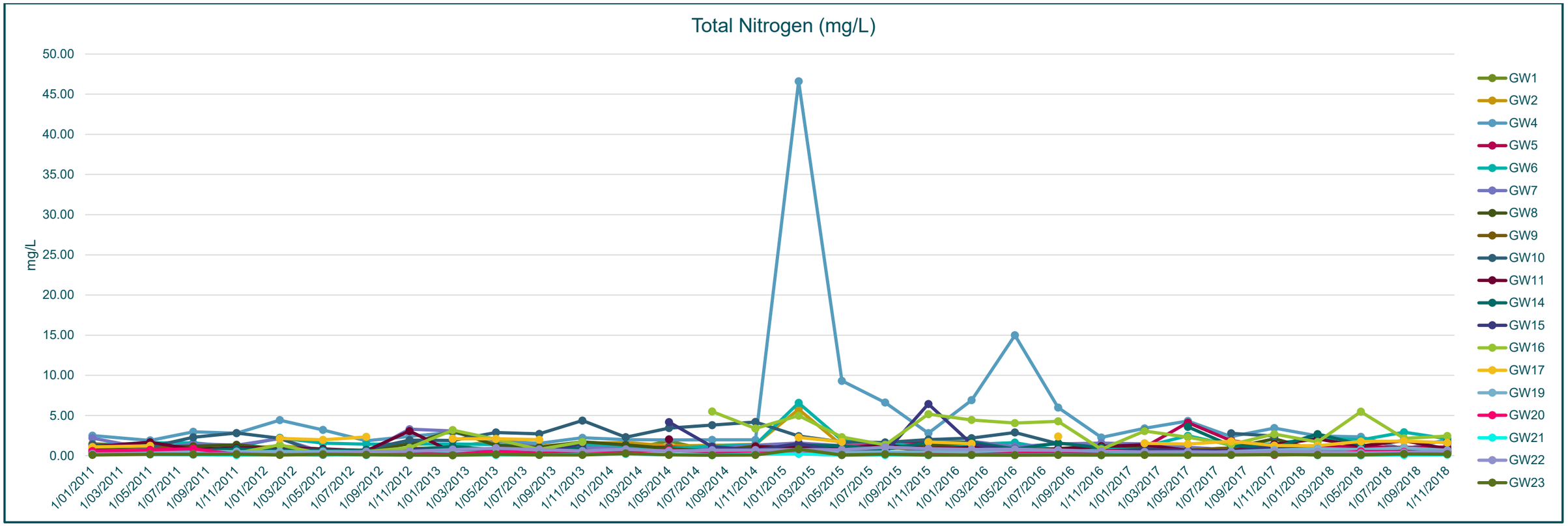


Total Nickel (mg/L)



Total Nitrogen	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.33	1.51	2.49	0.25	1.32	2.19	0.72	0.36	1.40	1.09	0.54	0.65	0.53	1.09	0.37	0.57		0.22	0.08
10/05/2011	0.22	1.14	1.90	0.68	1.59	0.81	1.14	0.96	1.07	1.67	0.76	0.58	0.75	1.22	0.53	0.72	0.15	0.17	0.17
9/08/2011	0.17	0.95	2.97	0.46	1.59	1.46	1.17	0.92	2.28	0.77	0.62	0.38	0.43		0.54	0.86	0.13	0.18	0.16
8/11/2011	0.19	0.78	2.80	0.39	1.08	1.31	1.35	0.19	2.81	0.94	0.84	0.23	0.31		0.51	0.16	0.06	0.29	0.18
6/02/2012	0.18	1.24	4.42	0.36	2.21	2.13	0.86	0.33	2.16	0.99	0.72	0.48	1.34	2.14	0.50	0.14	0.11	0.19	0.09
8/05/2012	0.28	0.77	3.20	0.37	1.55	0.44	0.76	0.56	0.17	0.83	0.71	0.26	0.16	1.97	0.51	0.08	0.11	0.27	0.16
6/08/2012	0.10	0.64	1.84	0.43	1.43	0.42	0.63	0.39	0.75	0.60	0.65	0.54	0.50	2.34	0.47	0.23	0.07	0.50	0.12
13/11/2012	0.53	0.85	2.40	0.72	1.44	3.30	1.47	0.92	1.94	3.06	0.75	0.82	0.98		0.48	0.28	0.05	0.55	0.07
13/02/2013	0.63	1.10	2.89	0.32	1.44	3.07	3.08	0.80	1.90	0.44	1.13	0.58	3.18	2.11	0.39	0.15	0.05	0.76	0.05
14/05/2013	0.38	1.85	1.81	0.51	1.39	1.92	1.27	0.59	2.88	0.37	0.73	0.46	2.04	2.10	0.42	0.56	0.09	0.93	0.16
6/08/2013	0.56	1.19	1.54	0.61	1.05	1.04	1.02	0.49	2.71	0.49	0.74	0.42	0.77	1.99	0.49	0.32	0.08	0.76	0.10
12/11/2013	0.60	1.55	2.22	0.74	1.31	1.07	1.72		4.37	0.61	0.95	1.48	1.72		0.51	0.38	0.15	0.58	0.09
11/02/2014	0.74	1.63	1.99	0.94	1.04	0.81	1.34		2.29						0.69	0.52	0.21	0.79	0.27
13/05/2014	1.82	1.22	1.95	1.05	0.93	0.51	0.88		3.43	2.02		4.18			0.58	0.68	0.12	0.57	0.10
12/08/2014	0.55	1.29	1.97	0.87	1.15	0.81	0.56		3.80			1.12	5.49		0.42	0.49	0.05	0.67	0.06
10/11/2014	0.82	1.40	1.97	0.84	1.36	1.31	1.18		4.19	1.10		0.70	3.38		0.42	0.35	0.19	0.70	0.09
9/02/2015	0.47	5.77	46.60	1.06	6.57	1.58	0.92	1.00	2.43	1.01	1.35	1.52	4.98	2.26	0.37	0.26	0.23	0.75	0.80
11/05/2015	0.36	1.30	9.32	1.27	1.93	1.23	0.79	0.74	1.71	0.96	1.20	0.48	2.31	1.72	0.40	0.07	0.08	0.74	0.08
11/08/2015	0.15	1.07	6.61	1.21	1.42	1.07	0.85	1.09	1.64	1.28	0.79	0.37	1.35		0.45	0.13	0.07	1.05	0.18
10/11/2015	0.78	1.24	2.80	1.75	1.25	1.17	1.18	0.60	2.00	0.87	1.63	6.43	5.17	1.70	0.44	0.15	0.05	0.85	0.09
8/02/2016	0.49	1.20	6.90	1.29	1.41	1.79	1.63	0.64	2.18	1.03	1.71	1.45	4.44	1.48	0.54	0.09	0.07	0.77	0.09
9/05/2016	0.34	1.03	14.99	1.13	1.62	1.12	0.72	0.83	2.88	0.36	0.82	0.58	4.05		0.52	0.31	0.08	0.79	0.06
9/08/2016	0.15	0.79	5.99	0.70	0.67	1.46	0.88	0.47	1.49	0.82	1.57	0.44	4.27	2.38	0.57	0.26	0.11	0.68	0.09
7/11/2016	0.11	0.99	2.26	0.74	1.00	1.56	1.20	0.48		1.14	0.99	0.39	0.80		0.45	0.27	0.05	0.55	0.07
7/02/2017	0.35	1.01	3.40	1.04	1.14	1.47	1.13	0.37	3.12	1.36		0.78	3.06	1.54	0.44	0.17	0.34	0.46	0.08
8/05/2017	0.53	0.92	4.32	4.12	2.47	1.05	0.70	0.68		0.65	3.59	0.66	2.29	1.44	0.38	0.12	0.08	0.49	0.09
8/08/2017	0.22	0.65	2.38	1.87	1.31	0.71	0.94	0.96	2.78	0.60	1.24	0.56	1.39	1.78	0.49	0.25	0.10	0.42	0.08
7/11/2017	1.31		3.43	1.13	1.46	1.45	2.09	0.57	2.44	1.40	1.01	1.07	2.68	1.25	0.70	0.09	0.27	0.51	0.13
14/02/2018	0.45		2.46	1.13	2.22	0.38	0.67	0.42		2.07	2.68	0.64	1.71	1.24	0.88	0.17	0.05	0.46	0.10
9/05/2018	0.77		2.34	1.12	1.96	0.61	0.28	0.05		1.20	1.38	0.39	5.47	1.76	0.76	0.53	0.05	0.33	0.11
15/08/2018	0.49		0.79	1.02	2.92	0.99	0.49	0.62		1.86		0.43	2.15	1.81	0.96	0.47	0.07	0.39	0.21
14/11/2018	0.25		2.00	1.07	2.11	0.48	0.56	0.50	1.53	0.83	1.75	0.53	2.44	1.61	0.66	0.31	0.11	0.54	0.19

Total Nitrogen	SW1	SW2	SW4
31/01/2011	0.82	0.95	
10/05/2011	0.94	0.38	0.37
9/08/2011	9.98	0.71	0.44
8/11/2011	11.00	0.77	0.81
6/02/2012	5.12	1.19	0.67
8/05/2012	0.49	0.75	0.38
6/08/2012	0.36	0.31	0.24
13/11/2012	1.18	0.80	0.40
13/02/2013	1.79	1.02	0.65
14/05/2013	1.08	0.22	0.36
6/08/2013	0.54	0.78	0.40
12/11/2013		1.23	0.91
11/02/2014		2.67	
13/05/2014	0.72	1.64	1.97
12/08/2014		0.43	
10/11/2014		1.23	
9/02/2015	1.33	1.45	0.94
11/05/2015	0.23	0.44	0.84
11/08/2015	1.35	0.28	0.96
10/11/2015	1.49	0.53	0.76
8/02/2016	4.07	0.66	2.18
9/05/2016	0.68	1.10	1.29
9/08/2016	2.89	0.51	0.48
7/11/2016		0.94	
7/02/2017		1.16	2.80
8/05/2017	0.36	0.38	0.66
8/08/2017	4.64	0.54	0.53
7/11/2017	0.40	0.71	0.74
14/02/2018		1.13	
9/05/2018	0.62	0.61	0.86
15/08/2018		0.39	
14/11/2018		1.12	1.40


Total Nitrogen (mg/L)
mg/L
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40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1/01/2011
1/03/2011
1/05/2011
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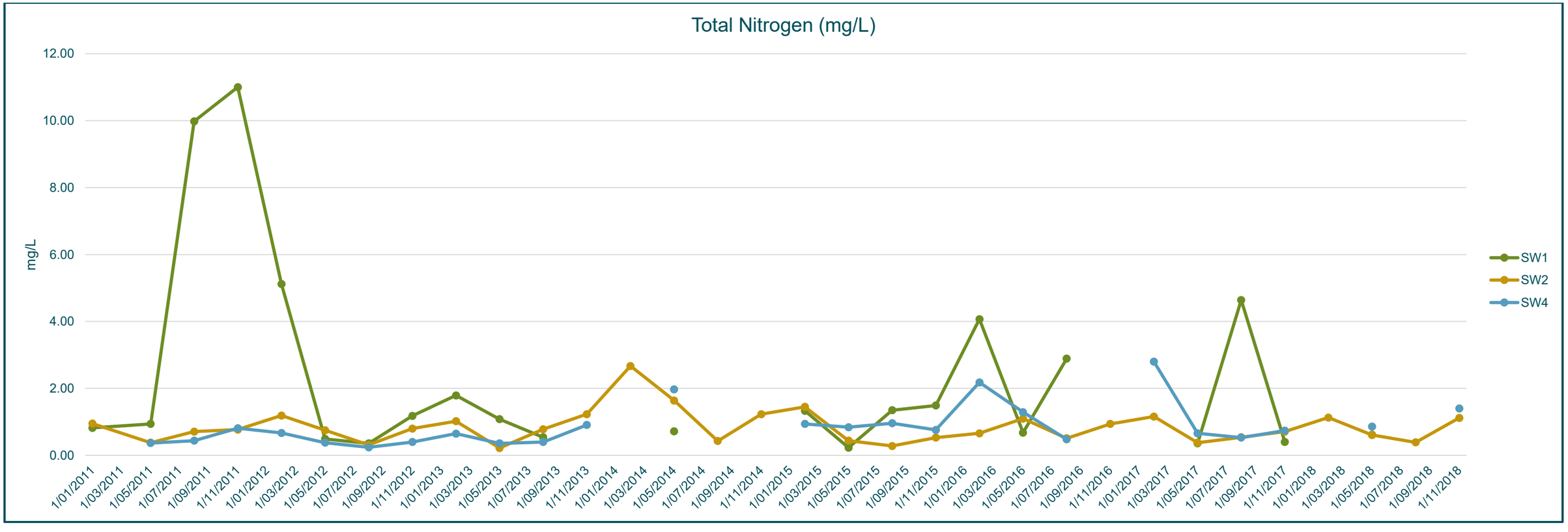
GW17
GW19
GW20
GW21
GW22
GW23


Total Nitrogen (mg/L)
mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1/01/2011
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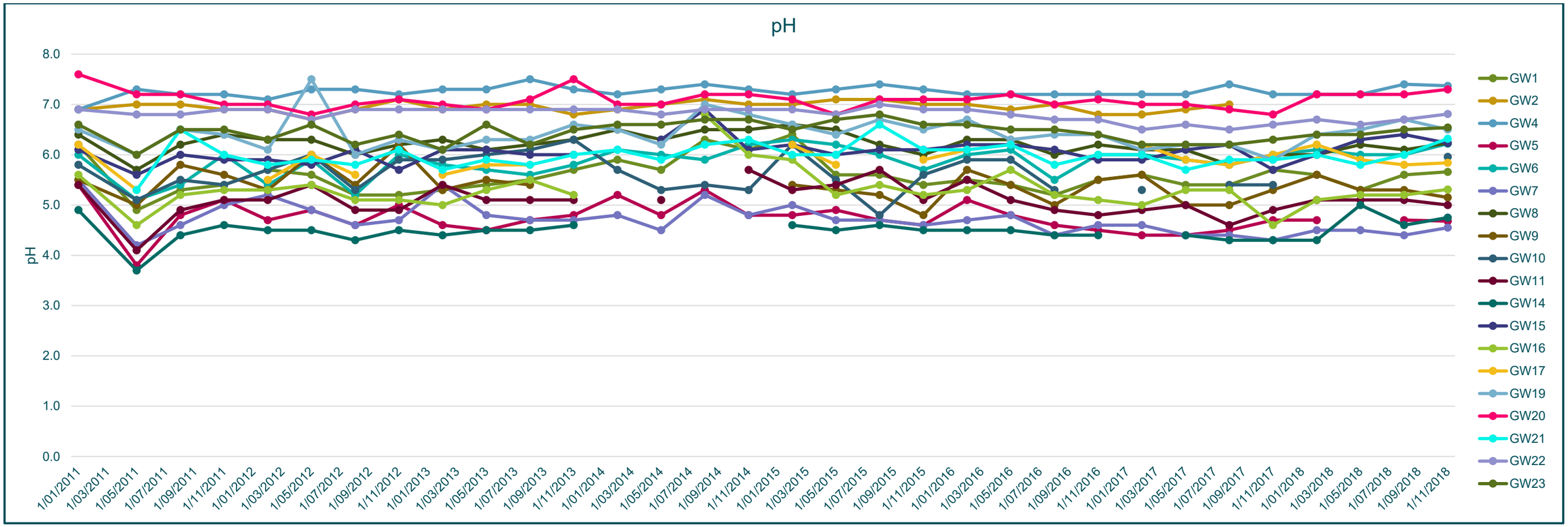
1/03/2018
1/05/2018
1/07/2018
1/09/2018
1/11/2018
SW1
SW2
SW4

pH	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	6.2	6.9	6.9	5.4	6.0	5.5	6.4	5.5	5.8	5.4	4.9	6.1	5.6	6.2	6.5	7.6		6.9	6.6
10/05/2011	4.9	7.0	7.3	3.8	5.1	4.2	5.7	5.0	5.1	4.1	3.7	5.6	4.6	5.3	6.0	7.2	5.3	6.8	6.0
9/08/2011	5.3	7.0	7.2	4.8	5.4	4.6	6.2	5.8	5.5	4.9	4.4	6.0	5.2		6.5	7.2	6.5	6.8	6.5
8/11/2011	5.4	6.9	7.2	5.1	6.0	5.0	6.4	5.6	5.4	5.1	4.6	5.9	5.3		6.4	7.0	6.0	6.9	6.5
6/02/2012	5.7	6.9	7.1	4.7	5.4	5.2	6.3	5.3	5.7	5.1	4.5	5.9	5.3	5.5	6.1	7.0	5.8	6.9	6.3
8/05/2012	5.6	6.7	7.3	4.9	5.9	4.9	6.3	6.0	6.0	5.4	4.5	5.8	5.4	6.0	7.5	6.8	5.9	6.7	6.6
6/08/2012	5.2	6.9	7.3	4.6	5.2	4.6	6.0	5.4	5.3	4.9	4.3	6.1	5.1	5.6	6.0	7.0	5.8	6.9	6.2
13/11/2012	5.2	7.1	7.2	5.0	6.0	4.7	6.2	6.2	5.9	4.9	4.5	5.7	5.1		6.3	7.1	6.1	6.9	6.4
13/02/2013	5.3	6.9	7.3	4.6	5.8	5.4	6.3	5.3	5.9	5.4	4.4	6.1	5.0	5.6	6.1	7.0	5.7	6.9	6.1
14/05/2013	5.4	7.0	7.3	4.5	5.7	4.8	6.1	5.5	6.0	5.1	4.5	6.1	5.3	5.8	6.3	6.9	5.9	6.9	6.6
6/08/2013	5.5	7.0	7.5	4.7	5.6	4.7	6.2	5.4	6.1	5.1	4.5	6.0	5.5	5.8	6.3	7.1	5.8	6.9	6.2
12/11/2013	5.7	6.8	7.3	4.8	5.8	4.7	6.3		6.3	5.1	4.6	6.0	5.2		6.6	7.5	6.0	6.9	6.5
11/02/2014	5.9	6.9	7.2	5.2	6.1	4.8	6.5		5.7						6.5	7.0	6.1	6.9	6.6
13/05/2014	5.7	7.0	7.3	4.8	6.0	4.5	6.3		5.3	5.1		6.3			6.2	7.0	5.9	6.8	6.6
12/08/2014	6.3	7.1	7.4	5.3	5.9	5.2	6.5		5.4			6.9	6.8		7.0	7.2	6.2	6.9	6.7
10/11/2014	6.1	7.0	7.3	4.8	6.2	4.8	6.5		5.3	5.7		6.1	6.0		6.8	7.2	6.3	6.9	6.7
9/02/2015	6.4	7.0	7.2	4.8	6.3	5.0	6.6	5.4	6.2	5.3	4.6	6.2	5.9	6.2	6.6	7.1	6.0	6.9	6.5
11/05/2015	5.6	7.1	7.3	4.9	6.2	4.7	6.5	5.3	5.5	5.4	4.5	6.0	5.2	5.8	6.4	6.8	6.0	6.8	6.7
11/08/2015	5.6	7.1	7.4	4.7	6.0	4.7	6.2	5.2	4.8	5.7	4.6	6.1	5.4		6.7	7.1	6.6	7.0	6.8
10/11/2015	5.4	7.0	7.3	4.6	5.7	4.6	6.0	4.8	5.6	5.1	4.5	6.1	5.2	5.9	6.5	7.1	6.1	6.9	6.6
8/02/2016	5.5	7.0	7.2	5.1	6.0	4.7	6.3	5.7	5.9	5.5	4.5	6.2	5.3	6.1	6.7	7.1	6.1	6.9	6.6
9/05/2016	5.4	6.9	7.2	4.8	6.1	4.8	6.3	5.4	5.9	5.1	4.5	6.2	5.7		6.3	7.2	6.2	6.8	6.5
9/08/2016	5.2	7.0	7.2	4.6	5.5	4.4	6.0	5.0	5.3	4.9	4.4	6.1	5.2	5.8	6.4	7.0	5.8	6.7	6.5
7/11/2016	5.5	6.8	7.2	4.5	6.0	4.6	6.2	5.5		4.8	4.4	5.9	5.1		6.4	7.1	6.0	6.7	6.4
7/02/2017	5.6	6.8	7.2	4.4	6.0	4.6	6.1	5.6	5.3	4.9		5.9	5.0	6.2	6.1	7.0	6.0	6.5	6.2
8/05/2017	5.4	6.9	7.2	4.4	5.9	4.4	6.1	5.0		5.0	4.4	6.1	5.3	5.9	6.2	7.0	5.7	6.6	6.2
8/08/2017	5.4	7.0	7.4	4.5	5.8	4.4	5.8	5.0	5.4	4.6	4.3	6.2	5.3	5.8	6.2	6.9	5.9	6.5	6.2
7/11/2017	5.7		7.2	4.7	6.0	4.3	6.0	5.3	5.4	4.9	4.3	5.7	4.6	6.0	5.9	6.8	5.9	6.6	6.3
14/02/2018	5.6		7.2	4.7	6.1	4.5	6.0	5.6		5.1	4.3	6.0	5.1	6.2	6.4	7.2	6.0	6.7	6.4
9/05/2018	5.3		7.2		6.0	4.5	6.2	5.3		5.1	5.0	6.3	5.2	5.9	6.5	7.2	5.8	6.6	6.4
15/08/2018	5.6		7.4	4.7	6.0	4.4	6.1	5.3		5.1	4.6	6.4	5.2	5.8	6.7	7.2	6.0	6.7	6.5
14/11/2018	5.7		7.4	4.7	6.2	4.6	6.2	5.2	6.0	5.0	4.8	6.2	5.3	5.8	6.5	7.3	6.3	6.8	6.5

pH	SW1	SW2	SW4
31/01/2011	6.4	6.2	
10/05/2011	6.4	5.5	6.1
9/08/2011	6.7	6.0	6.7
8/11/2011	6.5	6.3	6.8
6/02/2012	6.4	6.4	6.4
8/05/2012	6.3	5.9	6.3
6/08/2012	6.3	6.1	6.7
13/11/2012	6.6	6.2	6.5
13/02/2013	6.2	6.2	6.2
14/05/2013	6.0	5.7	6.3
6/08/2013	6.1	6.0	6.4
12/11/2013		6.5	6.1
11/02/2014		6.4	
13/05/2014	5.8	6.3	6.1
12/08/2014		5.8	
10/11/2014		7.1	
9/02/2015	6.6	6.5	7.0
11/05/2015	5.6	5.4	6.0
11/08/2015	6.6	6.3	7.0
10/11/2015	6.3	5.9	6.4
8/02/2016	6.5	6.4	6.8
9/05/2016	6.2	6.2	6.7
9/08/2016	5.8	5.6	6.4
7/11/2016		6.3	
7/02/2017		6.4	6.5
8/05/2017	5.9	5.4	6.0
8/08/2017	6.0	6.0	6.0
7/11/2017	5.6	5.6	6.1
14/02/2018		6.4	
9/05/2018	6.2	6.1	6.5
15/08/2018		6.0	
14/11/2018		6.3	6.5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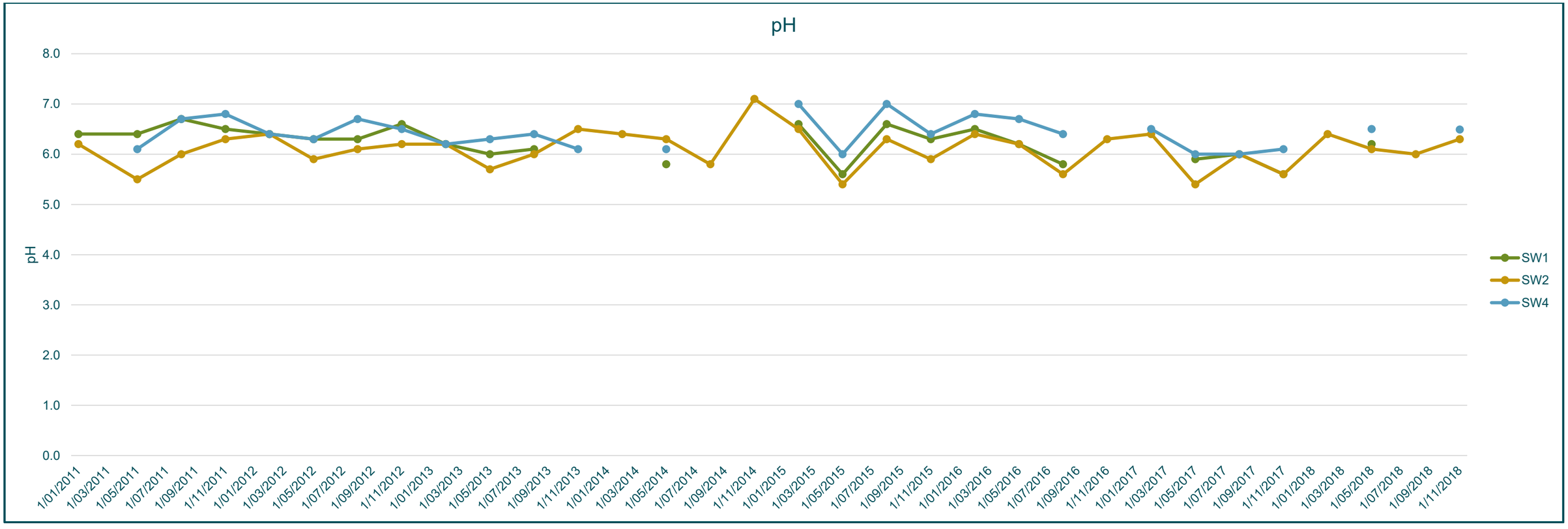
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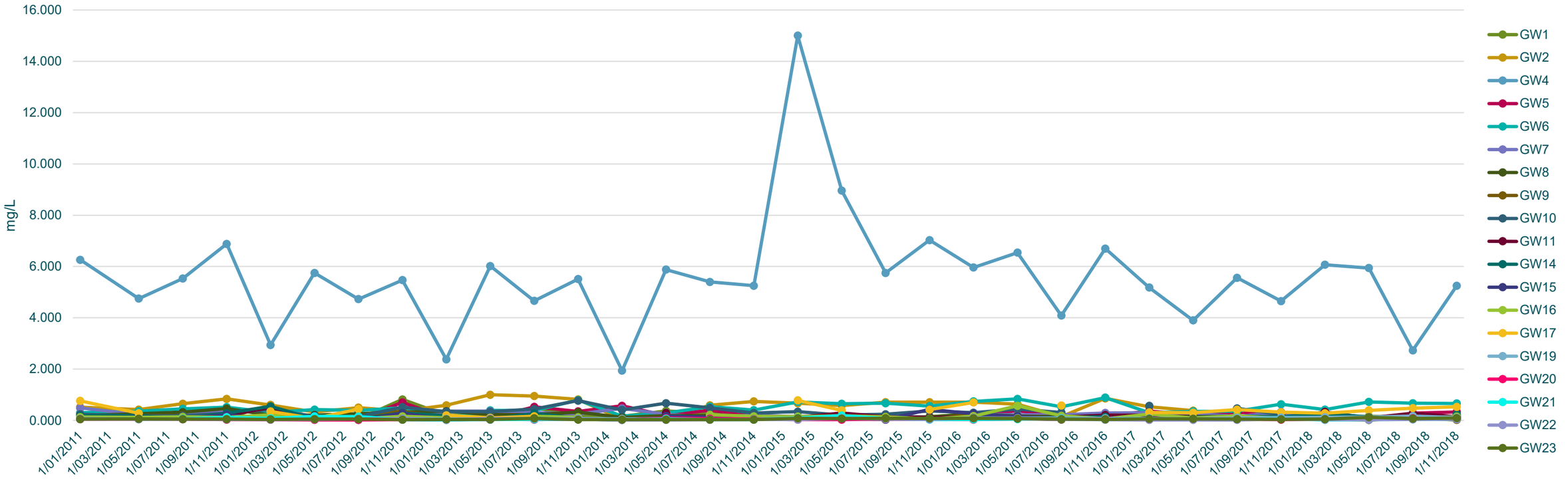
SW1
SW2
SW4

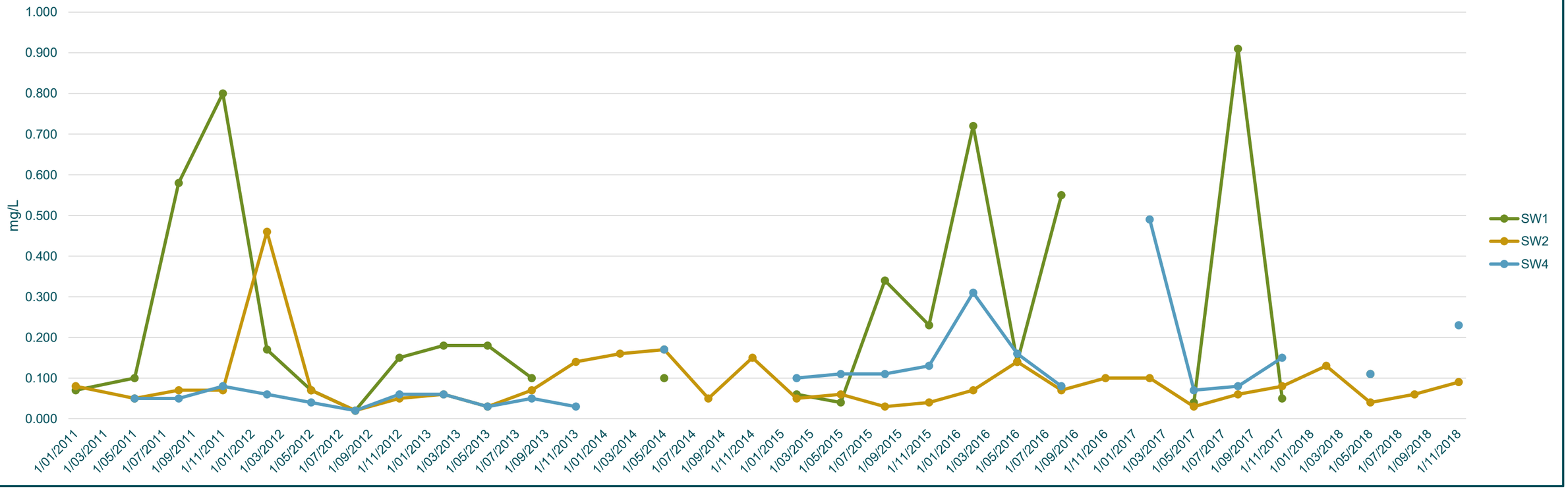
Phosphorus	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.100	0.520	6.260	0.230	0.300	0.490	0.190	0.230	0.240	0.080	0.180	0.070	0.130	0.760	0.070	0.050		0.050	0.050
10/05/2011	0.050	0.420	4.750	0.260	0.360	0.220	0.260	0.190	0.170	0.110	0.200	0.140	0.120	0.280	0.060	0.050	0.050	0.050	0.060
9/08/2011	0.060	0.650	5.530	0.160	0.450	0.290	0.320	0.190	0.180	0.050	0.050	0.080	0.140		0.060	0.050	0.060	0.050	0.050
8/11/2011	0.100	0.840	6.880	0.200	0.520	0.330	0.460	0.120	0.280	0.190	0.280	0.220	0.120		0.060	0.030	0.120	0.040	0.050
6/02/2012	0.600	0.600	2.940	0.100	0.310	0.420	0.200	0.110	0.430	0.510	0.550	0.050	0.220	0.350	0.050	0.030	0.080	0.030	0.040
8/05/2012	0.110	0.330	5.750	0.120	0.420	0.160	0.210	0.070	0.130	0.040	0.050	0.180	0.080	0.070	0.070	0.020	0.160	0.040	0.050
6/08/2012	0.050	0.500	4.730	0.060	0.390	0.150	0.260	0.180	0.150	0.080	0.050	0.020	0.060	0.440	0.060	0.020	0.150	0.060	0.050
13/11/2012	0.820	0.360	5.470	0.700	0.490	0.190	0.320	0.360	0.520	0.120	0.290	0.280	0.160		0.070	0.030	0.030	0.060	0.030
13/02/2013	0.200	0.590	2.380	0.100	0.100	0.360	0.360	0.100	0.340	0.060	0.190	0.040	0.100	0.200	0.060	0.020	0.020	0.030	0.040
14/05/2013	0.200	1.000	6.020	0.080	0.390	0.360	0.230	0.040	0.340	0.040	0.060	0.030	0.040	0.100	0.060	0.050	0.040	0.070	0.040
6/08/2013	0.500	0.950	4.660	0.530	0.380	0.310	0.230	0.160	0.440	0.110	0.270	0.070	0.160	0.160	0.060	0.030	0.040	0.070	0.080
12/11/2013	0.190	0.820	5.510	0.350	0.790	0.250	0.320		0.770	0.080	0.090	0.080	0.120		0.070	0.050	0.050	0.050	0.030
11/02/2014	0.160	0.040	1.940	0.570	0.170	0.470	0.120		0.410						0.060	0.020	0.020	0.020	0.030
13/05/2014	0.370	0.090	5.880	0.190	0.290	0.240	0.190		0.670	0.290		0.170			0.070	0.090	0.060	0.020	0.030
12/08/2014	0.280	0.590	5.400	0.400	0.540	0.120	0.190		0.490			0.130	0.220		0.060	0.070	0.030	0.030	0.030
10/11/2014	0.200	0.740	5.250	0.150	0.400	0.210	0.150		0.290	0.120		0.050	0.160		0.050	0.050	0.030	0.040	0.030
9/02/2015	0.070	0.670	15.000	0.090	0.720	0.140	0.150	0.100	0.340	0.120	0.100	0.090	0.150	0.780	0.090	0.030	0.090	0.030	0.080
11/05/2015	0.090	0.580	8.960	0.090	0.650	0.230	0.160	0.070	0.210	0.290	0.120	0.080	0.180	0.390	0.080	0.030	0.190	0.080	0.070
11/08/2015	0.030	0.710	5.750	0.200	0.670	0.180	0.120	0.080	0.240	0.140	0.060	0.030	0.140		0.070	0.050	0.070	0.050	0.080
10/11/2015	0.150	0.710	7.030	0.110	0.560	0.120	0.130	0.050	0.370	0.110	0.050	0.430	0.050	0.420	0.080	0.040	0.030	0.040	0.080
8/02/2016	0.250	0.710	5.960	0.190	0.740	0.250	0.260	0.240	0.300	0.140	0.130	0.260	0.170	0.700	0.080	0.030	0.040	0.100	0.080
9/05/2016	0.160	0.630	6.540	0.380	0.840	0.220	0.170	0.080	0.440	0.070	0.080	0.150	0.570		0.090	0.060	0.050	0.080	0.070
9/08/2016	0.040	0.150	4.090	0.140	0.530	0.220	0.150	0.030	0.310	0.120	0.120	0.070	0.180	0.580	0.090	0.050	0.060	0.040	0.050
7/11/2016	0.060	0.860	6.700	0.170	0.890	0.290	0.190	0.080		0.210	0.140	0.050	0.060		0.080	0.040	0.030	0.030	0.040
7/02/2017	0.110	0.530	5.180	0.360	0.300	0.300	0.180	0.060	0.570	0.200		0.060	0.250	0.310	0.080	0.030	0.060	0.020	0.060
8/05/2017	0.110	0.380	3.900	0.220	0.350	0.280	0.150	0.040		0.090	0.110	0.060	0.090	0.300	0.060	0.040	0.050	0.020	0.060
8/08/2017	0.040	0.050	5.560	0.310	0.360	0.150	0.160	0.050	0.470	0.120	0.170	0.070	0.180	0.420	0.100	0.040	0.040	0.020	0.050
7/11/2017	0.310		4.650	0.290	0.630	0.330	0.110	0.050	0.230	0.080	0.140	0.050	0.070	0.320	0.110	0.030	0.070	0.060	0.040
14/02/2018	0.120		6.070	0.270	0.420	0.070	0.120	0.050		0.330	0.270	0.060	0.110	0.280	0.120	0.040	0.020	0.030	0.050
9/05/2018	0.160		5.940		0.720	0.120	0.020	0.020		0.090	0.130	0.060	0.070	0.390	0.130	0.080	0.030	0.030	0.120
15/08/2018	0.130		2.730	0.280	0.670	0.200	0.140	0.100		0.280		0.070	0.080	0.480	0.170	0.080	0.040	0.040	0.070
14/11/2018	0.060		5.250	0.330	0.660	0.110	0.140	0.020	0.190	0.140	0.250	0.060	0.150	0.530	0.110	0.050	0.050	0.050	0.090

Phosphorus	SW1	SW2	SW4
31/01/2011	0.070	0.080	
10/05/2011	0.100	0.050	0.050
9/08/2011	0.580	0.070	0.050
8/11/2011	0.800	0.070	0.080
6/02/2012	0.170	0.460	0.060
8/05/2012	0.070	0.070	0.040
6/08/2012	0.020	0.020	0.020
13/11/2012	0.150	0.050	0.060
13/02/2013	0.180	0.060	0.060
14/05/2013	0.180	0.030	0.030
6/08/2013	0.100	0.070	0.050
12/11/2013		0.140	0.030
11/02/2014		0.160	
13/05/2014	0.100	0.170	0.170
12/08/2014		0.050	
10/11/2014		0.150	
9/02/2015	0.060	0.050	0.100
11/05/2015	0.040	0.060	0.110
11/08/2015	0.340	0.030	0.110
10/11/2015	0.230	0.040	0.130
8/02/2016	0.720	0.070	0.310
9/05/2016	0.140	0.140	0.160
9/08/2016	0.550	0.070	0.080
7/11/2016		0.100	
7/02/2017		0.100	0.490
8/05/2017	0.040	0.030	0.070
8/08/2017	0.910	0.060	0.080
7/11/2017	0.050	0.080	0.150
14/02/2018		0.130	
9/05/2018	0.110	0.040	0.110
15/08/2018		0.060	
14/11/2018		0.090	0.230

Phosphorus (mg/L)



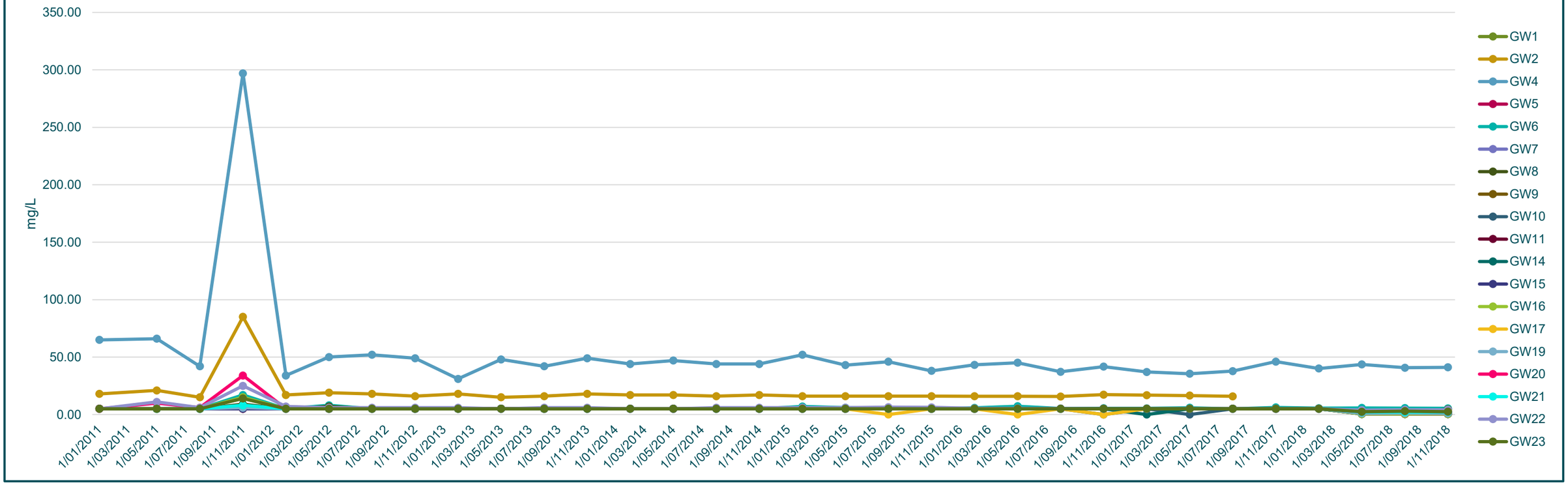
Phosphorus (mg/L)



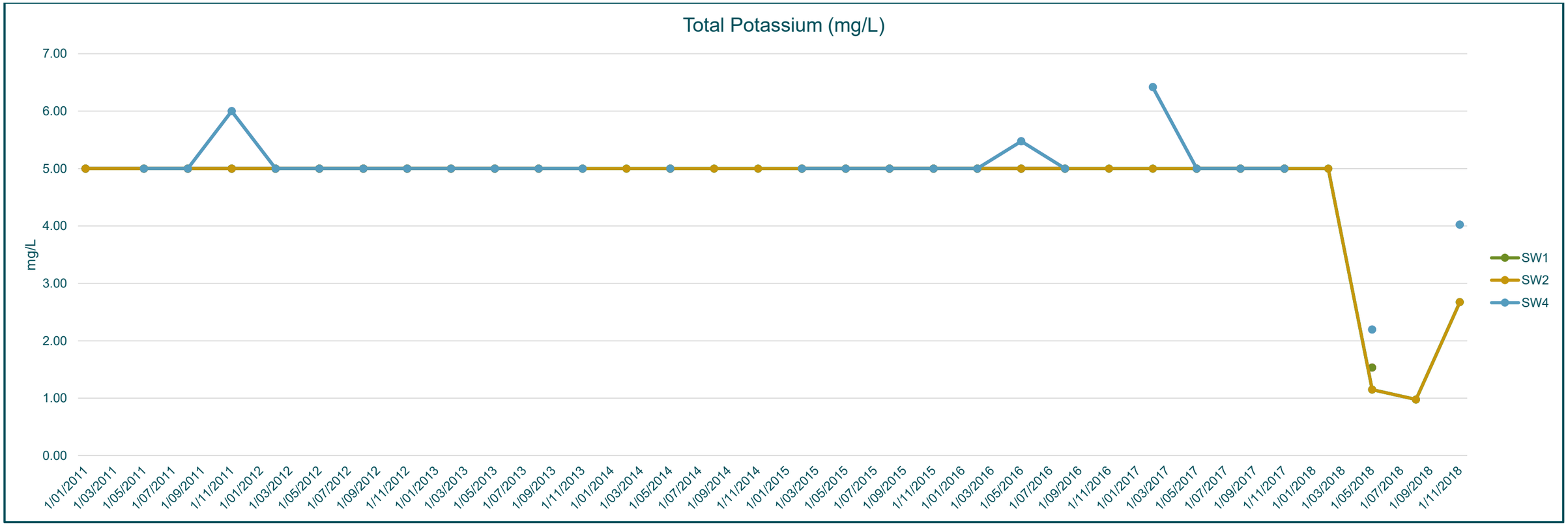
K	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	5.00	18.00	65.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00		5.00	5.00
10/05/2011	5.00	21.00	66.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	10.00	5.00	11.00	5.00
9/08/2011	5.00	15.00	42.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00		5.00	6.00	5.00	6.00	5.00
8/11/2011	5.00	85.00	297.00	5.00	17.00	7.00	9.00	7.00	7.00	5.00	8.00	5.00	15.00		6.00	34.00	8.00	25.00	14.00
6/02/2012	5.00	17.00	34.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	7.00	5.00
8/05/2012	5.00	19.00	50.00	5.00	8.00	5.00	7.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	5.00
6/08/2012	5.00	18.00	52.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	5.00
13/11/2012	5.00	16.00	49.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00		5.00	5.00	5.00	6.00	5.00
13/02/2013	5.00	18.00	31.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	5.00
14/05/2013	5.00	15.00	48.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
6/08/2013	5.00	16.00	42.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	5.00
12/11/2013	5.00	18.00	49.00	5.00	5.00	5.00	5.00		5.00	5.00	5.00	5.00	5.00		5.00	5.00	5.00	6.00	5.00
11/02/2014	5.00	17.00	44.00	5.00	5.00	5.00	5.00		5.00						5.00	5.00	5.00	5.00	5.00
13/05/2014	5.00	17.00	47.00	5.00	5.00	5.00	5.00		5.00	5.00		5.00			5.00	5.00	5.00	5.00	5.00
12/08/2014	5.00	16.00	44.00	5.00	5.00	5.00	5.00		5.00			5.00	5.00		5.00	5.00	5.00	6.00	5.00
10/11/2014	5.00	17.00	44.00	5.00	5.00	5.00	5.00		5.00	5.00		5.00	5.00		5.00	5.00	5.00	6.00	5.00
9/02/2015	5.00	16.00	52.00	5.00	7.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	5.00
11/05/2015	5.00	16.00	43.00	5.00	6.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	5.00
11/08/2015	5.00	16.00	46.00	5.00	5.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	NT	5.00	5.00	5.00	6.40	5.00
10/11/2015	5.00	16.00	38.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.30	5.00
8/02/2016	5.00	15.96	43.26	5.00	5.79	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.38	5.00
9/05/2016	5.00	15.89	45.09	5.00	7.24	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	NT	5.00	5.00	5.00	5.30	5.00
9/08/2016	5.00	15.66	37.23	5.00	5.26	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.16	5.00
7/11/2016	5.00	17.29	41.69	5.00	5.42	5.00	5.00	5.00	NT	5.00	5.00	5.00	5.00	NT	5.00	5.00	5.00	5.00	5.00
7/02/2017	5.00	16.85	37.10	5.00	5.36	5.00	5.00	5.00	5.00	5.00	NT	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
8/05/2017	5.00	16.51	35.50	5.00	5.92	5.00	5.00	5.00	NT	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
8/08/2017	5.00	15.82	37.83	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
7/11/2017	5.00		46.02	5.00	6.19	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.02	5.00	5.00	5.00	5.00	5.00
14/02/2018	5.00		40.10	5.00	5.52	5.00	5.00	5.00		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
9/05/2018	0.55		43.59		5.74	1.86	2.21	2.67		0.50	0.53	1.58	0.50	3.43	1.07	2.21	2.15	3.86	2.44
15/08/2018	0.52		40.73	0.52	5.57	1.77	2.17	2.27		0.50		1.62	0.50	3.58	1.25	2.35	2.14	4.16	2.94
14/11/2018	0.50		41.09	0.54	5.35	1.82	2.22	4.41	1.44	0.50	0.53	1.57	0.50	3.75	1.02	2.04	2.09	4.17	2.51

K	SW1	SW2	SW4
31/01/2011	5.00	5.00	
10/05/2011	5.00	5.00	5.00
9/08/2011	5.00	5.00	5.00
8/11/2011	5.00	5.00	6.00
6/02/2012	5.00	5.00	5.00
8/05/2012	5.00	5.00	5.00
6/08/2012	5.00	5.00	5.00
13/11/2012	5.00	5.00	5.00
13/02/2013	5.00	5.00	5.00
14/05/2013	5.00	5.00	5.00
6/08/2013	5.00	5.00	5.00
12/11/2013		5.00	5.00
11/02/2014		5.00	
13/05/2014	5.00	5.00	5.00
12/08/2014		5.00	
10/11/2014		5.00	
9/02/2015	5.00	5.00	5.00
11/05/2015	5.00	5.00	5.00
11/08/2015	5.00	5.00	5.00
10/11/2015	5.00	5.00	5.00
8/02/2016	5.00	5.00	5.00
9/05/2016	5.00	5.00	5.48
9/08/2016	5.00	5.00	5.00
7/11/2016		5.00	
7/02/2017		5.00	6.42
8/05/2017	5.00	5.00	5.00
8/08/2017	5.00	5.00	5.00
7/11/2017	5.00	5.00	5.00
14/02/2018		5.00	
9/05/2018	1.53	1.15	2.20
15/08/2018		0.98	
14/11/2018		2.67	4.02

Total Potassium (mg/L)



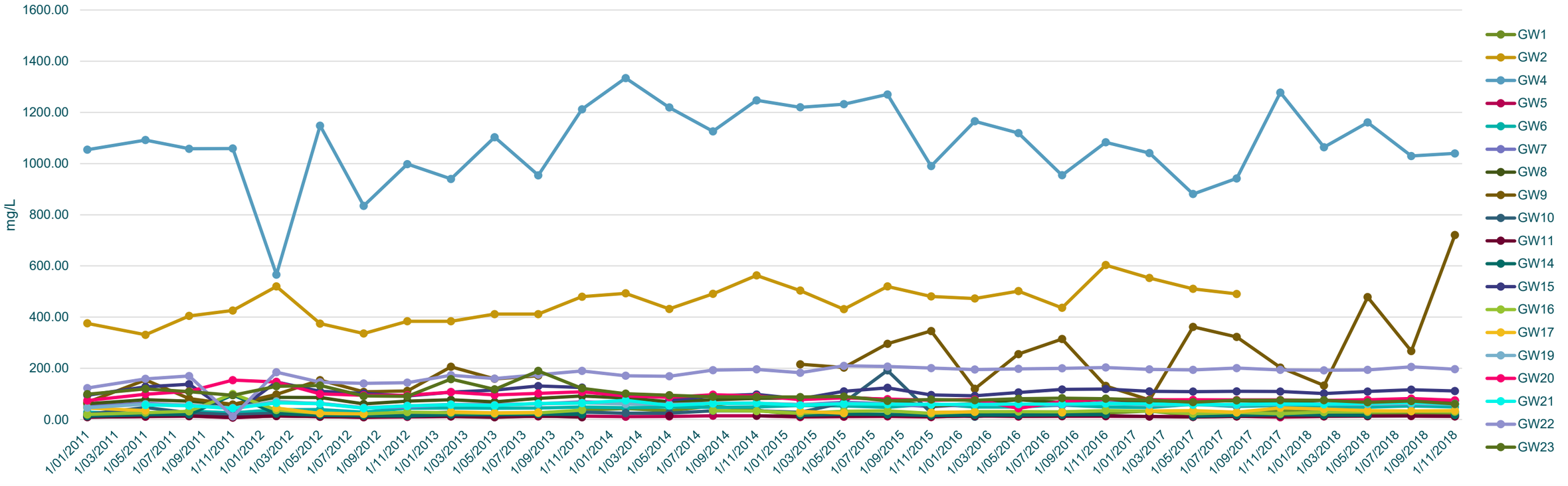
Total Potassium (mg/L)



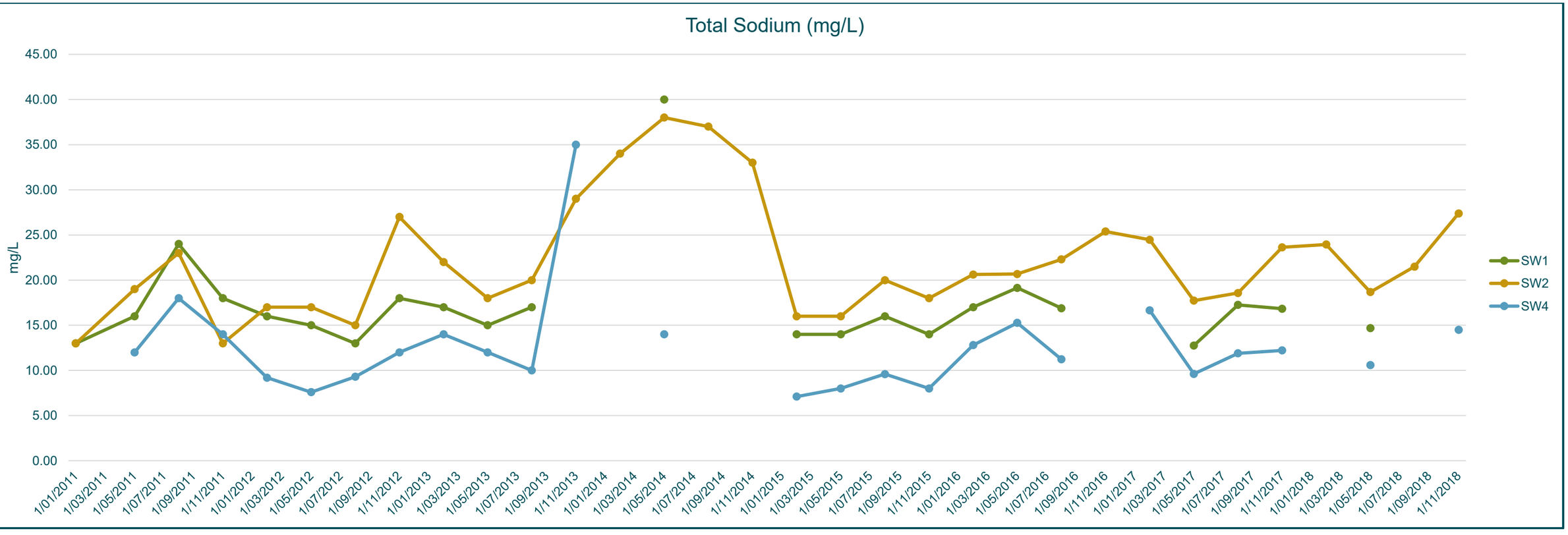
Na	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	16.00	376.00	1054.00	9.40	29.00	51.00	62.00	67.00	21.00	9.60	13.00	95.00	20.00	45.00	46.00	74.00		123.00	99.00
10/05/2011	15.00	331.00	1092.00	11.00	20.00	64.00	77.00	155.00	47.00	12.00	19.00	128.00	27.00	35.00	60.00	99.00	57.00	159.00	120.00
9/08/2011	21.00	405.00	1058.00	13.00	33.00	55.00	72.00	82.00	27.00	14.00	20.00	138.00	32.00		57.00	110.00	54.00	170.00	109.00
8/11/2011	13.00	426.00	1059.00	7.30	26.00	44.00	57.00	59.00	19.00	8.60	96.00	22.00	100.00		45.00	154.00	43.00	12.00	95.00
6/02/2012	30.00	520.00	566.00	14.00	38.00	66.00	87.00	98.00	25.00	14.00	23.00	147.00	37.00	45.00	71.00	147.00	65.00	185.00	130.00
8/05/2012	19.00	375.00	1148.00	11.00	39.00	63.00	86.00	154.00	23.00	11.00	17.00	110.00	25.00	24.00	62.00	100.00	62.00	146.00	133.00
6/08/2012	14.00	336.00	835.00	8.70	29.00	46.00	61.00	108.00	20.00	9.60	15.00	102.00	22.00	22.00	46.00	95.00	44.00	141.00	92.00
13/11/2012	25.00	384.00	998.00	10.00	44.00	48.00	72.00	112.00	23.00	12.00	14.00	92.00	29.00		54.00	95.00	53.00	144.00	91.00
13/02/2013	16.00	384.00	940.00	12.00	45.00	59.00	77.00	206.00	29.00	12.00	19.00	107.00	27.00	30.00	59.00	107.00	58.00	173.00	158.00
14/05/2013	17.00	412.00	1103.00	11.00	44.00	59.00	69.00	159.00	21.00	8.90	19.00	115.00	24.00	26.00	56.00	96.00	55.00	160.00	118.00
6/08/2013	21.00	412.00	954.00	12.00	45.00	61.00	83.00	171.00	25.00	14.00	21.00	131.00	26.00	28.00	61.00	102.00	63.00	175.00	190.00
12/11/2013	37.00	480.00	1212.00	13.00	49.00	69.00	92.00		29.00	9.20	20.00	125.00	37.00		65.00	108.00	64.00	190.00	122.00
11/02/2014	43.00	493.00	1334.00	11.00	46.00	65.00	84.00		25.00						61.00	92.00	75.00	171.00	101.00
13/05/2014	34.00	432.00	1219.00	12.00	49.00	62.00	70.00		25.00	15.00		76.00			59.00	87.00	55.00	169.00	95.00
12/08/2014	53.00	491.00	1126.00	15.00	48.00	63.00	77.00		34.00			92.00	35.00		63.00	97.00	63.00	193.00	89.00
10/11/2014	37.00	563.00	1247.00	15.00	49.00	64.00	83.00		34.00	15.00		98.00	33.40		64.00	92.00	64.00	196.00	88.00
9/02/2015	16.00	504.00	1220.00	9.90	55.00	58.00	84.00	216.00	28.00	12.00	17.00	81.00	25.00	32.00	59.00	78.00	56.00	183.00	88.00
11/05/2015	18.00	431.00	1232.00	11.00	53.00	68.00	88.00	203.00	66.00	13.00	21.00	110.00	32.00	25.00	61.00	85.00	62.00	210.00	90.00
11/08/2015	19.00	520.00	1270.00	12.00	48.00	62.00	78.00	296.00	192.00	15.00	20.00	124.00	34.00		61.00	80.00	60.00	207.00	73.00
10/11/2015	23.00	481.00	990.00	9.70	61.00	50.00	52.00	346.00	26.00	11.00	16.00	96.00	24.00	28.00	58.00	75.00	59.00	201.00	78.00
8/02/2016	29.47	472.92	1165.20	15.82	49.32	59.78	63.15	120.06	10.83	13.38	17.54	92.67	30.72	29.99	59.98	78.64	59.30	195.40	75.49
9/05/2016	22.54	501.68	1119.15	11.96	49.19	60.17	76.98	255.65	28.93	13.54	17.14	105.77	31.10		56.84	43.92	60.35	198.04	81.27
9/08/2016	21.22	436.53	954.44	12.85	56.13	55.03	66.73	314.68	15.43	13.70	18.70	117.54	30.35	28.03	60.02	70.84	59.96	200.05	83.43
7/11/2016	25.37	603.61	1082.99	12.93	49.30	67.24	80.43	131.50		14.58	19.47	119.34	35.12		63.11	79.84	62.82	203.37	81.49
7/02/2017	33.70	553.03	1041.14	12.29	46.69	58.25	65.84	76.81	22.48	11.78		110.10	32.85	33.74	57.25	77.57	60.83	195.87	76.18
8/05/2017	15.10	510.61	880.88	10.39	59.49	60.01	72.92	362.04		10.26	12.63	109.18	23.08	34.79	57.85	77.02	58.04	193.88	67.95
8/08/2017	17.41	490.61	941.95	12.36	51.11	55.57	73.20	322.79	24.69	12.19	16.86	110.07	27.29	28.77	57.04	76.40	59.21	201.19	75.25
7/11/2017	34.62		1277.58	9.01	55.42	67.08	70.67	203.18	22.98	13.43	18.63	109.35	22.51	45.88	59.17	76.42	61.47	194.04	75.48
14/02/2018	28.03		1063.90	12.27	49.74	59.74	59.94	132.93		12.88	17.33	101.58	29.32	40.62	59.91	74.75	59.57	192.33	75.57
9/05/2018	18.15		1160.42		48.12	60.86	70.77	478.11		13.00	16.89	109.34	30.05	34.79	59.87	77.02	63.24	193.85	67.25
15/08/2018	27.02		1029.59	13.38	53.01	62.14	71.45	267.26		14.04		116.56	32.35	33.47	63.41	81.75	66.54	205.86	72.53
14/11/2018	21.15		1039.53	12.77	49.17	59.82	73.60	721.00	28.78	12.40	17.99	111.33	30.35	34.97	59.83	75.07	61.19	196.79	61.04

Na	SW1	SW2	SW4
31/01/2011	13.00	13.00	
10/05/2011	16.00	19.00	12.00
9/08/2011	24.00	23.00	18.00
8/11/2011	18.00	13.00	14.00
6/02/2012	16.00	17.00	9.20
8/05/2012	15.00	17.00	7.60
6/08/2012	13.00	15.00	9.30
13/11/2012	18.00	27.00	12.00
13/02/2013	17.00	22.00	14.00
14/05/2013	15.00	18.00	12.00
6/08/2013	17.00	20.00	10.00
12/11/2013		29.00	35.00
11/02/2014		34.00	
13/05/2014	40.00	38.00	14.00
12/08/2014		37.00	
10/11/2014		33.00	
9/02/2015	14.00	16.00	7.10
11/05/2015	14.00	16.00	8.00
11/08/2015	16.00	20.00	9.60
10/11/2015	14.00	18.00	8.00
8/02/2016	17.01	20.62	12.81
9/05/2016	19.15	20.68	15.27
9/08/2016	16.89	22.30	11.23
7/11/2016		25.38	
7/02/2017		24.47	16.66
8/05/2017	12.76	17.73	9.61
8/08/2017	17.26	18.57	11.89
7/11/2017	16.83	23.63	12.22
14/02/2018		23.95	
9/05/2018	14.70	18.68	10.60
15/08/2018		21.49	
14/11/2018		27.38	14.50

Total Sodium (mg/L)



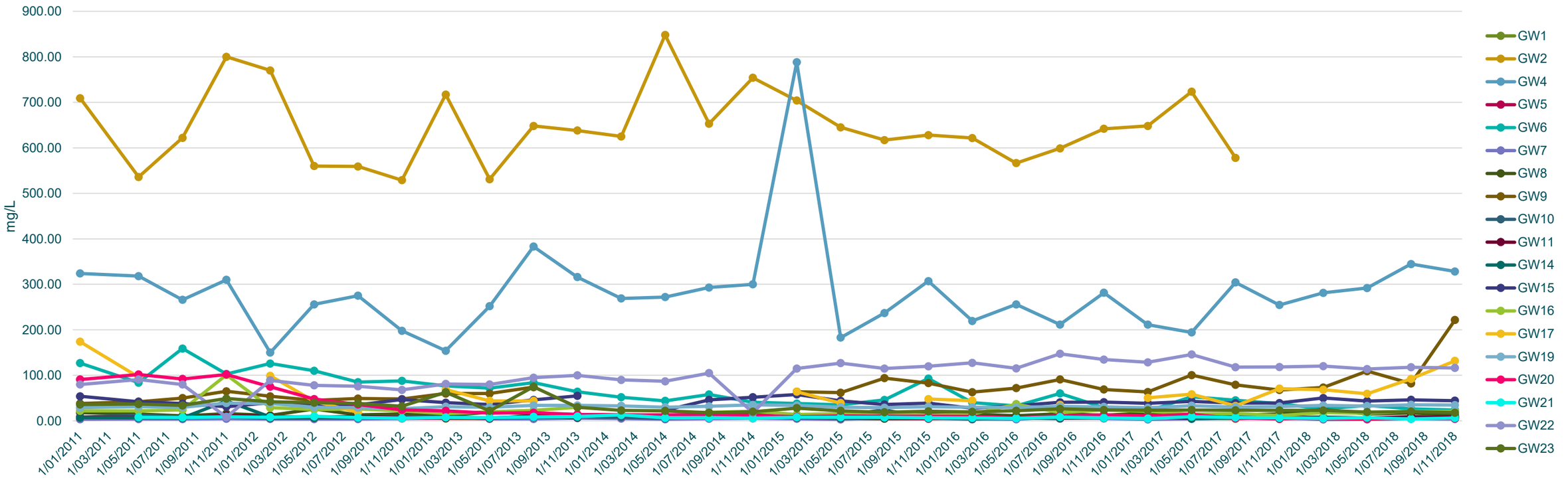
Total Sodium (mg/L)



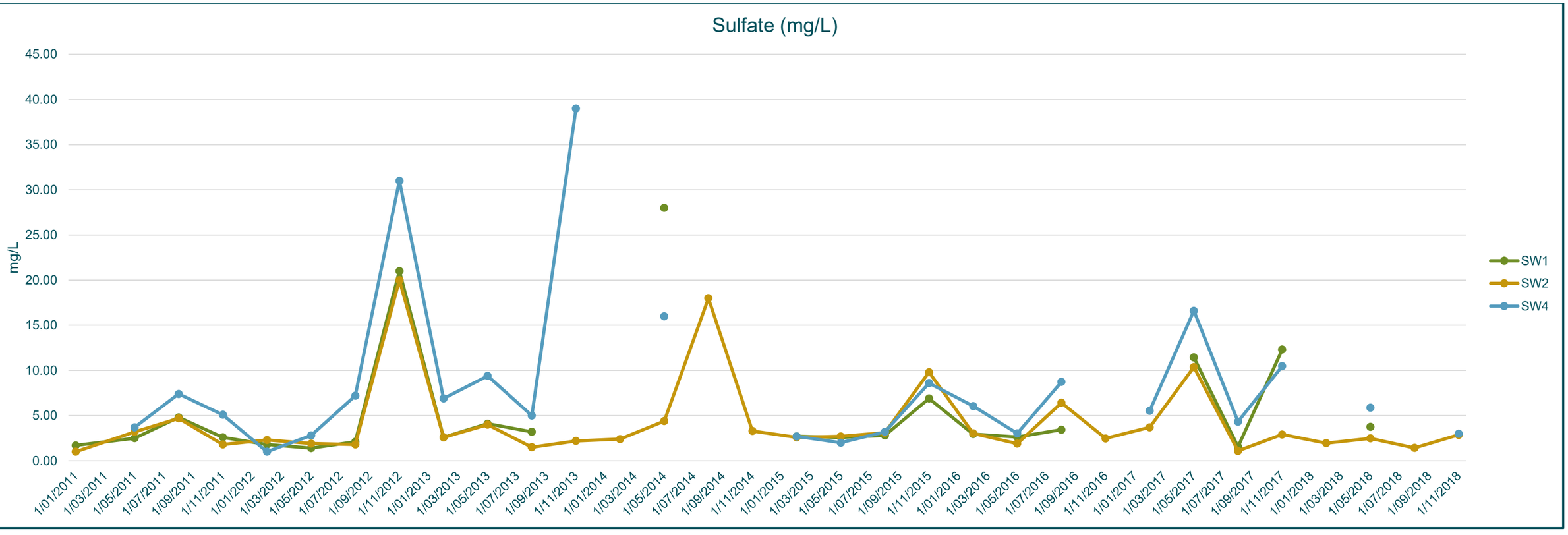
Sulfate	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	4.10	709.00	324.00	7.50	127.00	3.60	18.00	38.00	8.20	7.80	7.10	54.00	22.00	174.00	29.00	91.00		80.00	36.00
10/05/2011	5.20	536.00	318.00	6.80	84.00	3.90	15.00	42.00	12.00	7.50	6.60	42.00	22.00	96.00	31.00	102.00	8.00	91.00	37.00
9/08/2011	5.40	622.00	266.00	5.20	159.00	3.90	11.00	50.00	8.10	7.20	6.20	38.00	24.00		30.00	92.00	7.60	80.00	34.00
8/11/2011	8.10	800.00	310.00	7.40	103.00	4.70	16.00	65.00	9.50	12.00	44.00	31.00	101.00		39.00	102.00	9.00	8.20	49.00
6/02/2012	9.00	770.00	150.00	7.50	126.00	4.10	12.00	54.00	5.80	9.70	8.80	40.00	29.00	99.00	38.00	75.00	7.90	89.00	42.00
8/05/2012	6.10	560.00	256.00	6.50	110.00	3.90	26.00	45.00	6.50	8.80	6.80	35.00	25.00	43.00	30.00	48.00	10.00	78.00	40.00
6/08/2012	5.40	559.00	275.00	6.30	85.00	4.00	13.00	49.00	9.50	9.60	6.60	35.00	26.00	19.00	29.00	36.00	7.40	76.00	38.00
13/11/2012	7.60	529.00	198.00	5.30	88.00	5.30	15.00	48.00	8.90	7.20	6.20	47.00	22.00		27.00	24.00	5.90	68.00	32.00
13/02/2013	5.20	717.00	154.00	6.00	77.00	8.30	12.00	60.00	9.30	6.70	8.00	40.00	16.00	69.00	31.00	22.00	7.60	81.00	63.00
14/05/2013	4.80	531.00	252.00	6.10	72.00	4.40	19.00	60.00	5.70	6.00	6.60	36.00	20.00	44.00	30.00	17.00	7.30	80.00	22.00
6/08/2013	4.50	648.00	383.00	7.40	84.00	4.30	16.00	74.00	8.20	11.00	8.30	46.00	23.00	44.00	34.00	18.00	8.80	95.00	75.00
12/11/2013	10.00	638.00	316.00	7.30	64.00	6.00	14.00		8.90	6.90	7.60	55.00	30.00		34.00	14.00	9.40	100.00	30.00
11/02/2014	13.00	625.00	269.00	6.00	52.00	5.20	13.00		8.00						33.00	13.00	13.00	90.00	23.00
13/05/2014	11.00	848.00	272.00	5.30	44.00	3.60	12.00		5.50	8.20		23.00			30.00	13.00	6.60	87.00	22.00
12/08/2014	13.00	653.00	293.00	7.40	58.00	4.80	15.00		9.40			46.00	19.00		32.00	14.00	7.00	105.00	18.00
10/11/2014	10.00	754.00	300.00	7.60	41.00	5.60	14.00		9.00	9.40		52.00	21.00		35.00	12.00	5.80	18.00	20.00
9/02/2015	6.40	704.00	788.00	6.60	38.00	4.60	10.00	64.00	7.20	7.30	8.10	58.00	14.00	64.00	34.00	9.20	7.90	115.00	28.00
11/05/2015	4.90	645.00	183.00	5.50	35.00	3.30	12.00	62.00	12.00	5.80	6.00	44.00	16.00	39.00	30.00	11.00	8.00	127.00	22.00
11/08/2015	4.50	617.00	237.00	5.30	46.00	6.20	15.00	94.00	24.00	5.30	5.80	36.00	18.00		29.00	10.00	7.70	115.00	19.00
10/11/2015	5.00	628.00	307.00	4.70	93.00	6.20	17.00	83.00	5.90	6.10	6.20	39.00	12.00	48.00	31.00	10.00	6.70	120.00	21.00
8/02/2016	7.33	621.51	219.67	6.21	40.14	4.38	14.64	63.18	3.65	7.94	6.49	27.74	14.59	44.34	29.76	9.87	6.53	127.49	19.76
9/05/2016	5.80	566.50	255.94	5.95	32.91	3.40	11.39	72.08	6.61	7.02	6.00	33.11	36.72		29.32	6.03	5.62	115.32	22.23
9/08/2016	6.05	598.78	211.58	5.48	60.27	9.59	15.63	90.95	4.88	6.71	6.46	40.71	18.21	35.04	31.62	11.17	8.44	147.48	26.31
7/11/2016	7.18	641.77	281.56	6.58	29.02	5.28	12.38	68.90		7.94	6.32	41.10	23.91		30.69	13.30	6.65	134.73	24.01
7/02/2017	9.58	648.05	211.49	6.22	21.33	3.30	16.87	63.41	6.32	7.48		38.45	21.19	50.55	28.62	10.80	5.13	128.55	23.30
8/05/2017	6.14	723.28	194.42	4.90	52.95	4.47	14.43	100.69		5.83	4.70	42.87	14.61	58.64	33.37	14.16	9.06	145.91	23.84
8/08/2017	4.78	577.91	304.27	6.49	45.30	5.84	12.79	79.16	8.84	7.47	6.61	38.94	16.21	32.79	30.41	5.26	7.67	117.97	23.24
7/11/2017	8.14		254.53	4.38	37.91	6.91	14.94	67.78	8.09	7.32	6.01	39.30	11.70	70.88	31.43	6.35	6.69	118.41	22.92
14/02/2018	6.94		281.32	6.52	25.88	2.97	24.96	73.32		8.22	7.86	50.15	18.02	68.47	33.84	4.86	5.60	120.33	22.95
9/05/2018	6.04		291.91		33.99	3.32	15.02	109.31		6.42	6.78	43.64	16.41	59.41	32.58	4.26	7.13	113.84	19.40
15/08/2018	7.10		344.51	6.93	26.54	4.78	17.19	82.31		9.03		46.32	21.07	92.30	35.24	4.80	4.27	117.78	20.50
14/11/2018	6.50		328.40	7.14	23.96	4.19	13.61	221.60	9.69	8.34	7.18	44.38	20.88	131.91	34.75	5.04	6.49	116.34	17.97

Sulfate	SW1	SW2	SW4
31/01/2011	1.70	1.00	
10/05/2011	2.50	3.20	3.70
9/08/2011	4.80	4.70	7.40
8/11/2011	2.60	1.80	5.10
6/02/2012	1.80	2.30	1.00
8/05/2012	1.40	1.90	2.80
6/08/2012	2.10	1.80	7.20
13/11/2012	21.00	20.00	31.00
13/02/2013	2.60	2.60	6.90
14/05/2013	4.10	4.00	9.40
6/08/2013	3.20	1.50	5.00
12/11/2013		2.20	39.00
11/02/2014		2.40	
13/05/2014	28.00	4.40	16.00
12/08/2014		18.00	
10/11/2014		3.30	
9/02/2015	2.70	2.60	2.70
11/05/2015	2.60	2.70	2.00
11/08/2015	2.80	3.10	3.20
10/11/2015	6.90	9.80	8.60
8/02/2016	2.96	3.03	6.06
9/05/2016	2.62	1.89	3.04
9/08/2016	3.44	6.42	8.74
7/11/2016		2.48	
7/02/2017		3.70	5.54
8/05/2017	11.45	10.37	16.60
8/08/2017	1.55	1.09	4.33
7/11/2017	12.31	2.91	10.48
14/02/2018		1.95	
9/05/2018	3.77	2.48	5.89
15/08/2018		1.42	
14/11/2018		2.87	3.00

Sulfate (mg/L)



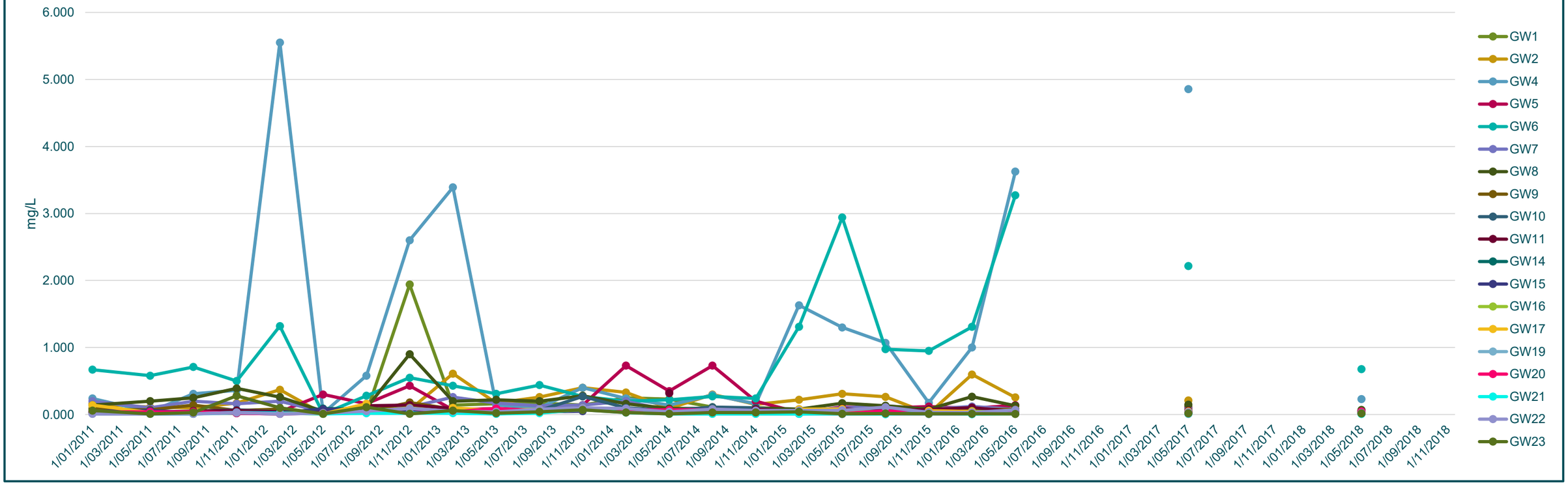
Sulfate (mg/L)



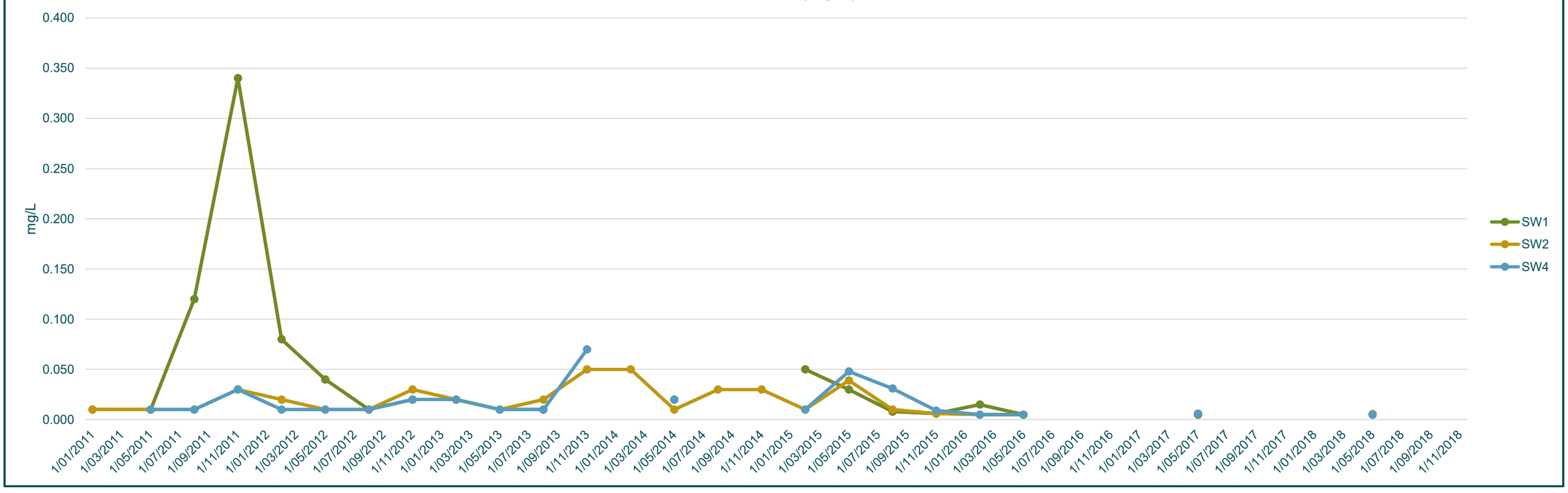
Zn	GW1	GW2	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW14	GW15	GW16	GW17	GW19	GW20	GW21	GW22	GW23
31/01/2011	0.090	0.160	0.240	0.030	0.670	0.200	0.140	0.080	0.030	0.030	0.030	0.050	0.020	0.140	0.010	0.040		0.010	0.060
10/05/2011	0.030	0.110	0.040	0.050	0.580	0.100	0.200	0.070	0.010	0.040	0.020	0.060	0.020	0.030	0.010	0.040	0.010	0.010	0.010
9/08/2011	0.010	0.100	0.310	0.040	0.710	0.200	0.250	0.140	0.050	0.050	0.030	0.030	0.020		0.010	0.040	0.010	0.010	0.030
8/11/2011	0.040	0.170	0.360	0.020	0.500	0.160	0.390	0.060	0.070	0.060	0.020	0.030	0.020		0.020	0.020	0.030	0.030	0.280
6/02/2012	0.010	0.370	5.550	0.040	1.320	0.200	0.260	0.080	0.040	0.040	0.010	0.030	0.020	0.020	0.010	0.010	0.020	0.010	0.100
8/05/2012	0.080	0.010	0.020	0.300	0.010	0.040	0.050	0.010	0.020	0.040	0.090	0.080	0.020	0.010	0.020	0.020	0.010	0.020	0.010
6/08/2012	0.030	0.080	0.580	0.160	0.280	0.080	0.100	0.040	0.040	0.130	0.080	0.070	0.050	0.160	0.020	0.050	0.020	0.050	0.110
13/11/2012	1.940	0.070	2.600	0.430	0.550	0.110	0.900	0.180	0.090	0.140	0.070	0.060	0.100		0.020	0.090	0.020	0.090	0.010
13/02/2013	0.140	0.610	3.390	0.070	0.430	0.260	0.200	0.080	0.060	0.090	0.040	0.050	0.040	0.100	0.030	0.040	0.020	0.050	0.060
14/05/2013	0.160	0.170	0.140	0.090	0.310	0.170	0.220	0.050	0.050	0.030	0.030	0.030	0.020	0.060	0.010	0.090	0.010	0.040	0.020
6/08/2013	0.170	0.260	0.100	0.060	0.440	0.130	0.200	0.040	0.060	0.060	0.030	0.040	0.030	0.080	0.030	0.050	0.020	0.080	0.040
12/11/2013	0.140	0.400	0.400	0.140	0.270	0.140	0.280		0.270	0.100	0.100	0.050	0.100		0.070	0.090	0.080	0.100	0.070
11/02/2014	0.250	0.330	0.240	0.730	0.200	0.200	0.160		0.100						0.030	0.070	0.030	0.090	0.030
13/05/2014	0.230	0.090	0.140	0.350	0.220	0.060	0.090		0.060	0.320		0.060			0.010	0.070	0.010	0.040	0.010
12/08/2014	0.110	0.300	0.290	0.730	0.270	0.090	0.090		0.110			0.080	0.080		0.010	0.071	0.010	0.080	0.030
10/11/2014	0.070	0.150	0.160	0.200	0.240	0.070	0.100		0.100	0.080		0.060	0.040		0.010	0.040	0.010	0.060	0.030
9/02/2015	0.020	0.220	1.630	0.030	1.310	0.060	0.080	0.050	0.010	0.040	0.060	0.040	0.020	0.080	0.010	0.030	0.010	0.060	0.040
11/05/2015	0.045	0.309	1.300	0.113	2.940	0.099	0.169	0.069	0.039	0.086	0.068	0.047	0.048	0.082	0.006	0.011	0.011	0.063	0.012
11/08/2015	0.012	0.264	1.070	0.098	0.975	0.128	0.132	0.066	0.080	0.052	0.033	0.034	0.040		0.005	0.056	0.006	0.110	0.015
10/11/2015	0.069	0.015	0.176	0.119	0.950	80.000	0.080	0.062	0.051	0.074	0.028	0.049	0.036	0.057	0.005	0.030	0.028	0.032	0.011
8/02/2016	0.039	0.597	1.001	0.094	1.309	0.120	0.267	0.077	0.014	0.104	0.035	0.034	0.050	0.044	0.006	0.013	0.006	0.031	0.011
9/05/2016	0.060	0.255	3.625	0.139	3.271	0.079	0.132	0.078	0.070	0.045	0.025	0.030	0.027		0.017	0.027	0.013	0.070	0.009
9/08/2016																			
7/11/2016																			
7/02/2017																			
8/05/2017	0.116	0.210	4.855	0.097	2.216	0.083	0.146	0.021		0.055	0.042	0.026	0.038	0.047	0.008	0.033	0.017	0.036	0.018
8/08/2017																			
7/11/2017																			
14/02/2018																			
9/05/2018	0.046		0.231		0.677	0.043	0.068	0.051		0.044	0.024	0.016	0.017	0.029	0.043	0.044	0.008	0.024	0.015
15/08/2018																			
14/11/2018																			

Zn	SW1	SW2	SW4
31/01/2011	0.010	0.010	
10/05/2011	0.010	0.010	0.010
9/08/2011	0.120	0.010	0.010
8/11/2011	0.340	0.030	0.030
6/02/2012	0.080	0.020	0.010
8/05/2012	0.040	0.010	0.010
6/08/2012	0.010	0.010	0.010
13/11/2012	0.020	0.030	0.020
13/02/2013	0.020	0.020	0.020
14/05/2013	0.010	0.010	0.010
6/08/2013	0.010	0.020	0.010
12/11/2013		0.050	0.070
11/02/2014		0.050	
13/05/2014	0.020	0.010	0.020
12/08/2014		0.030	
10/11/2014		0.030	
9/02/2015	0.050	0.010	0.010
11/05/2015	0.030	0.039	0.048
11/08/2015	0.008	0.010	0.031
10/11/2015	0.006	0.006	0.009
8/02/2016	0.015	0.005	0.005
9/05/2016	0.005	0.005	0.005
9/08/2016			
7/11/2016			
7/02/2017			
8/05/2017	0.005	0.006	0.006
8/08/2017			
7/11/2017			
14/02/2018			
9/05/2018	0.005	0.006	0.005
15/08/2018			
14/11/2018			

Total Zinc (mg/L)



Total Zinc (mg/L)



Appendix D – 2018 Meteorological Data

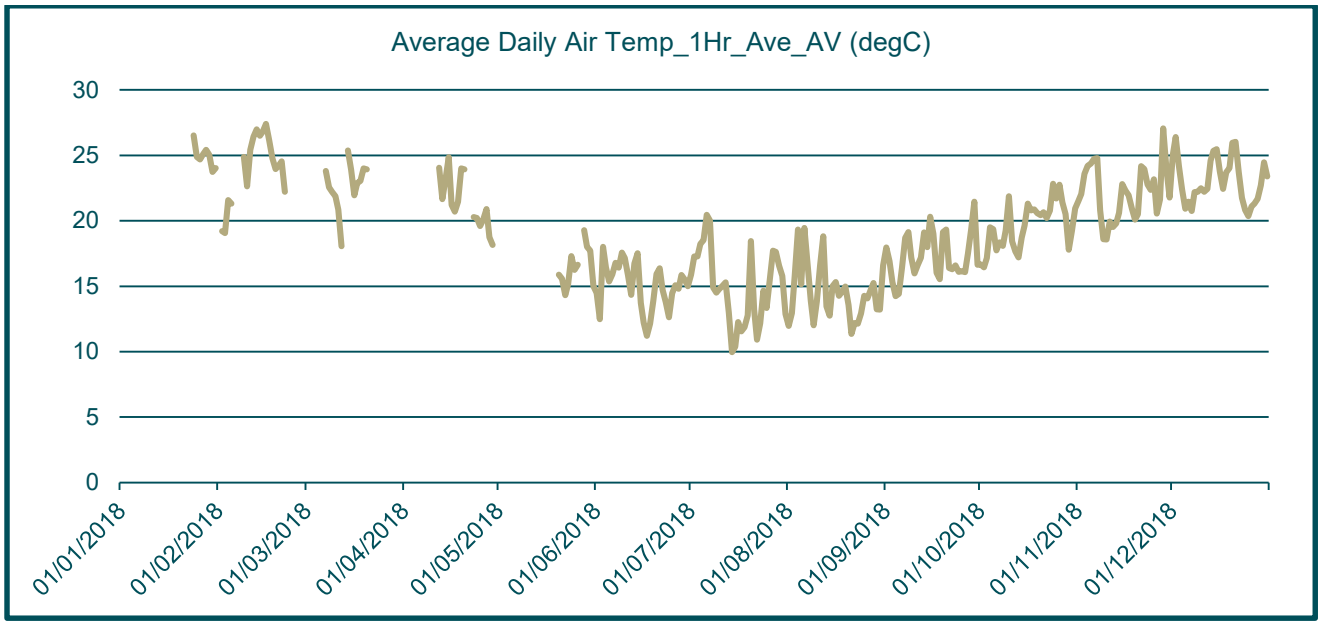


Figure D.1 – Eviron average air temperature from January 2018 to December 2018.

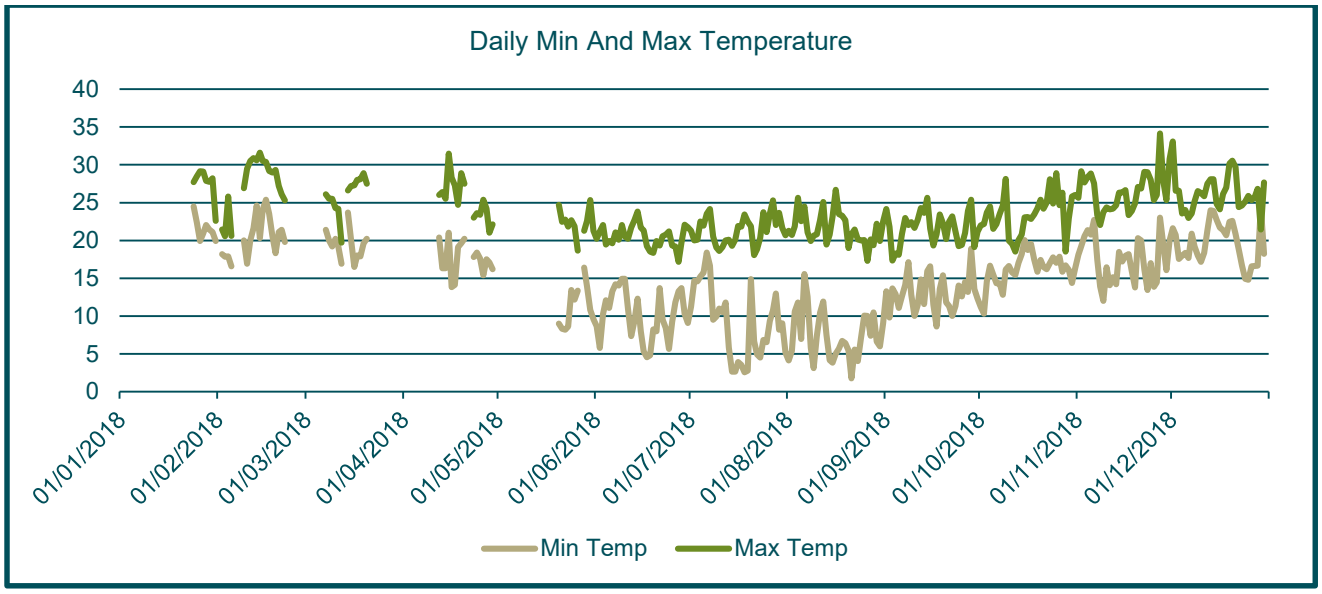


Figure D.2 – Eviron daily maximum and minimum air temperatures from January 2018 to December 2018.

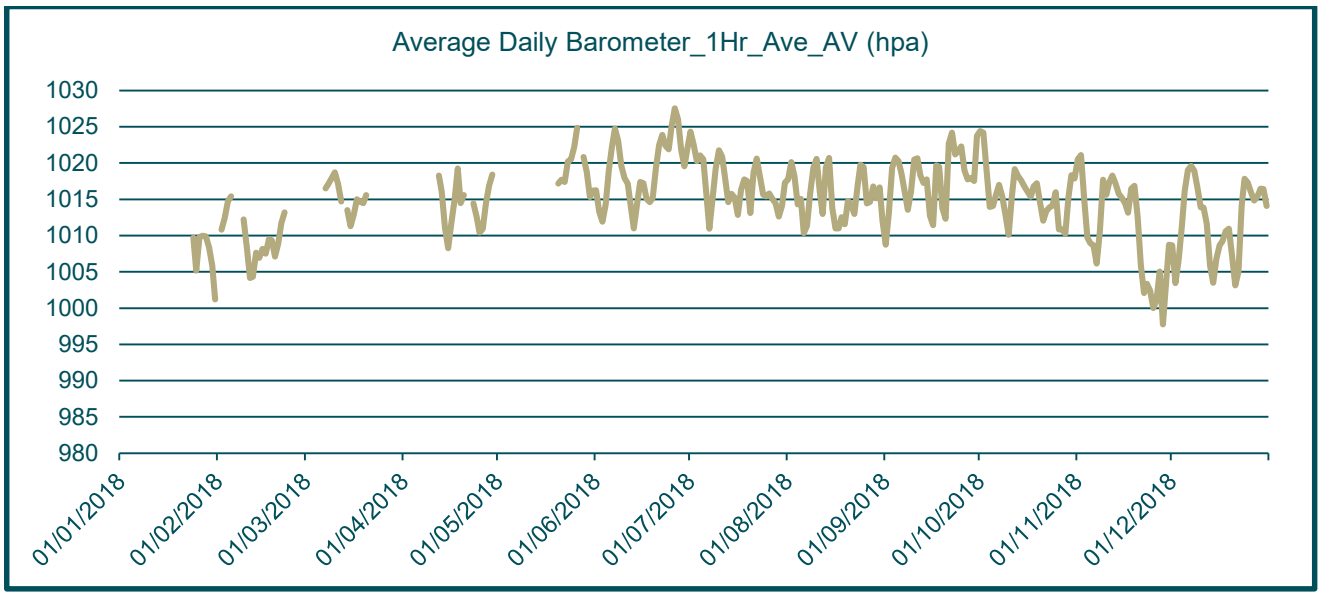


Figure D.3 – Eviron average barometer readings from January 2018 to December 2018.

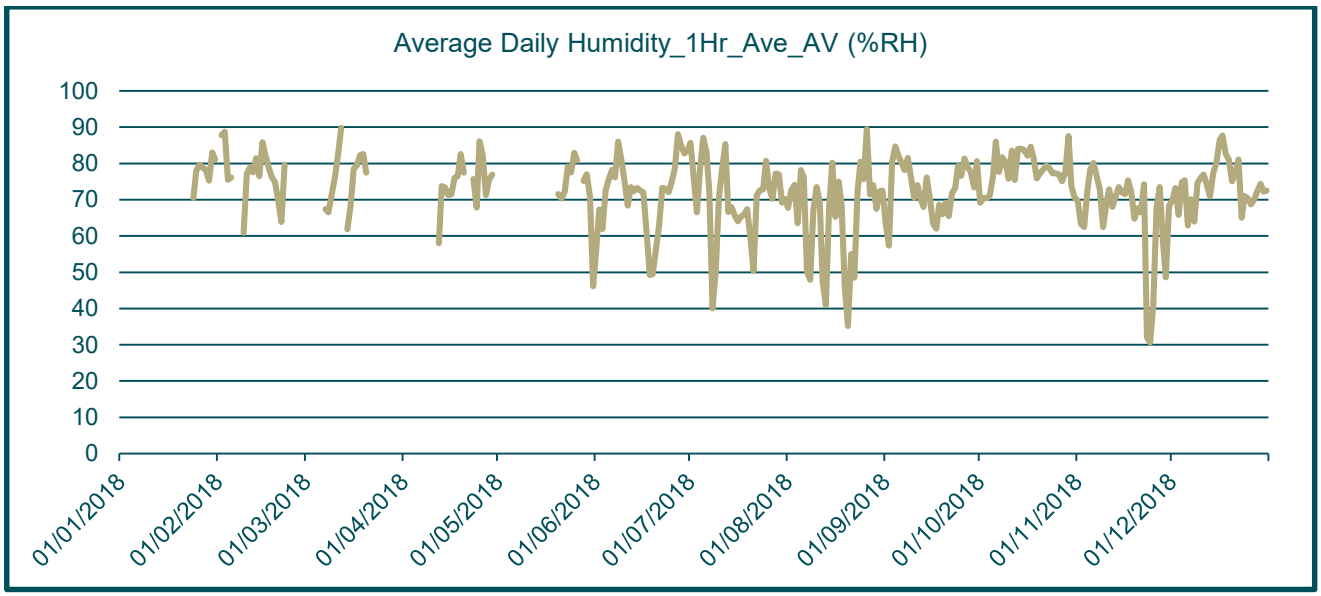


Figure D.4 – Eviron average humidity readings from January 2018 to December 2018.

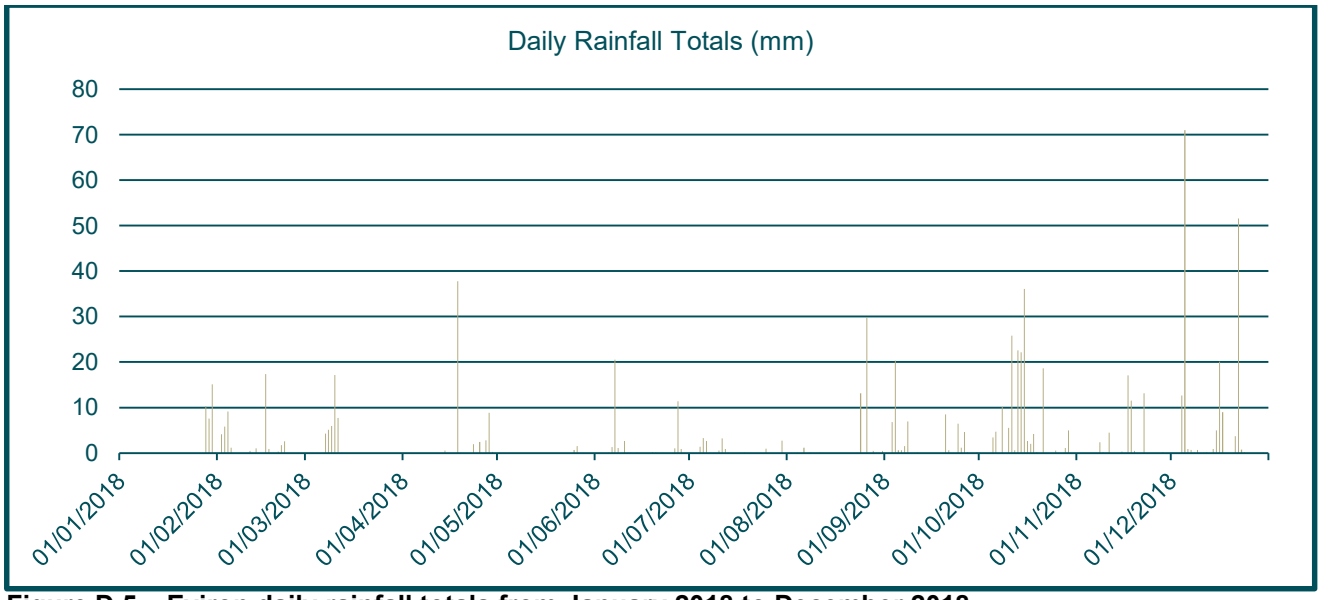


Figure D.5 – Eviron daily rainfall totals from January 2018 to December 2018.

Appendix E – 2018 Restoration and Biodiversity Offset Annual Progress Report.

Eviron Road Quarry & Landfill Restoration & Biodiversity Offset

Annual Progress Report 2- 2018

EnviTE Environment

1 Introduction

1.1 Background

This report is the first of five annual reports that will document the progress of EnviTE's implementation Eviron Road Quarry and Landfill Restoration Plan V3, under contract with the Tweed Shire Council.

The implemented works concentrate on improving the quality of corridor vegetation composition and connectivity through enhancement plantings, bush regeneration and weed control through two defined corridor alignments; the Northern Riparian Corridor (NRC) and the Southern Ridgeline Corridor (SCR). The habitat improvements are intended to facilitate wildlife movement across the site and contribute to the Biodiversity Offset Strategy.

2 Discussion of works and recommendations

A total of 547.2 hours of follow up bush regeneration occurred on the site between January and December 2018. A large gap in management occurred between July and November which allowed environmental weeds to re-establish (see Figure 5). Woody weeds such as Giant Devils Fig and Tobacco required hand work and extensive preparation work pushing environmental weeds away from native vegetation prior to spraying was required.

Due to the advanced growth of exotics when sprayed minimal native ground covers could be retained. Many planted groundcovers are no longer present on site and open areas without advanced trees are common. Trees that have persisted are generally thriving with some in excess of 5 metres in height.

To ensure the success of the project the level of visitation will need to be significantly increased and the site worked consistently with no more than 2 months between visits for any part of the site. Higher visitation levels will allow for the promotion of natural regeneration of both native ground covers and trees. With increased native cover it is expected that exotic regeneration will be reduced.

Areas surrounding the site are heavily infested with serious environmental weeds such as Giant Devils Fig, Singapore Daisy and Lantana which continually move into the site. A buffer area should be worked to reduce the seed burden on the site and give naturally regenerating trees a chance to grow unhindered.

Mature camphor laurels have been retained in the NRC and in comparison to other threats to the site are a low priority. They are reducing the light levels in some areas and being used as a perch by native birds which can potentially bring native seed into the site.

Results of monitoring shows (see section 3) that the majority of the site is lower than prescribed KPI's and a significant increase in effort will be required to reach them. This will require further planting and significantly more effort in maintaining to ensure the integrity of the native vegetation.

3 Monitoring

Monitoring of the site occurred on the 18/12/2018 approximately 5 weeks after the last weed control work occurred. Four 25m x 2m transects were sampled across the site with stem densities and % covers of native and exotic species noted. The figures 1 – 5 below display the before and after photopoint monitoring. Monitoring data has been summarised in table 1 and compared to KPI. Planting mortalities were estimated based on the assumption that there was 1 plant every 1.5m^2 and therefore should have ~33 plants per 50m^2 transect.

	
NRC T1 photo point - Initial 20.02.17	NRC T1 photo point - 18.12.18
	
NRC T2 photo point - Initial 01.03.17	NRC T2 photo point - 18.12.18

Figure 1 Comparison of monitoring points at T1 and T2 Northern Riparian Corridor

Weed growth in the NRC ~5 weeds post treatment

Giant Devils Fig seedlings in NRC

Figure 2 Aspects of Northern Riparian Corridor December 2018

SRC T1 photo point - Initial 20.02.17

SRC T1 photo point - 18.12.18

SRC T2 photo point - Initial 20.02.17

SRC T2 photo point - 18.12.18

Figure 3 Comparison of monitoring points at T1 and T2 Southern Ridge Corridor

	
Lomandra longifolia seeding in SRC	Poison Peach in fruit in SRC

Figure 4 Aspects of Southern Ridge Corridor throughout 2018

Site conditions in November 2018 prior to treatment

Figure 5. NRC weed conditions

Table 1 : Key Performance Indicators Assessment Proforma (based on monitoring transects)

KPI	Description (av per 50m2 monitoring plot)	Target	Annual performance achieved				
			Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021
Revegetation							
Tubestock survival	Proportion of planted tubestock survived	80%	86%	67%			
Floristic diversity and species composition	Number of surviving future tree canopy species	>5	NRC = 9 SRC = 8	NRC = 12.5 SRC = 8			
	Number of surviving future small trees/shrubs species	>10 in NRC >5 in SRC	NRC = 23 SRC = 7	NRC = 6 SRC = 16			
	Number of surviving future groundcover species	>2	NRC = 5 SRC = 3	NRC = 1.5 SRC = 1			
Structural diversity	Proportion of surviving plant which are future tree species (emergent and canopy species)	=/>50%	42%	46%			
	Proportion of surviving plant which are future shrub species	=/>25%	34%	48%			
	Proportion of surviving plant which are future ground cover species (concentrated along verge of drainage line)	=/>10%	24%	6%			
Weed control							
Representation of weeds in revegetation and assisted regeneration areas	% cover of weeds in tree stratum	<1%	NRC = 10% SRC = 1 %	NRC = 0% SRC = 0 %			
	% cover of weeds in shrub stratum	<1%	NRC = 15% SRC = 1 %	NRC = 10% SRC = 6%			
	% cover of weeds in ground stratum	<5%	NRC = 45 % SRC = 35%	NRC = 34.5% SRC = 7%			
Assisted regeneration							
Recruitment of native species	Number of stems of native species within nominated assisted regeneration areas	Greater than previous year	~ 250	~300			

Appendix F – 2018 Nest Box Monitoring Report.

TWEED SHIRE COUNCIL

NEST BOX MONITORING REPORT - EVIRON ROAD QUARRY & LANDFILL PROJECT

TWEED SHIRE COUNCIL DESIGN UNIT

MARCH 2018

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1.0 INTRODUCTION

1.1 Eviron Quarry and Landfill

Tweed Shire Council (TSC) has concept plan approval (Approval Reference #08_0067) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to establish two new quarries, three landfills and a haul road at Eviron, in the far North Coast of NSW (Eviron Rd Q&L). Project approval has also been attained for Stage 1 of the project, which involves landfilling within the existing Quirks Quarry and development of the new West Valley Quarry and associated infrastructure (Approval Reference #08_0068).

One of the Biodiversity offset conditions listed under Schedule 4 (Specific environmental conditions for West Valley Quarry), requires implementation of a Landscape Management Plan, which includes a requirement to install nest boxes within Conservation Area 1 to offset a reduction in hollow recruitment resulting from future clearing.

A nest box plan was developed for the project to guide nest box installation, monitoring and maintenance (TSC, 2016a). The proposed nest box program includes five years of maintenance and monitoring. Beyond the five year maintenance/monitoring period, management of the nest boxes will be incorporated into general site management in accordance with a site-wide Environmental Management Plan (EMP).

This report documents the first round of nest box monitoring including details on the performance of boxes and recommendations for ongoing monitoring and maintenance.

2.0 BACKGROUND

2.1 Likely hollow dependent fauna on site

As noted in the Eviron project nest box plan (TSC 2016a), based on past fauna and habitat surveys at the site, the following hollow-dependent fauna are known and/or considered likely to use hollows at the site:

- Small scansorial mammals such as Antechinus
- Microchiropteran bats
- Small gliding marsupials including the Feather-tail Glider (*Acrobates pygmaeus*) and Sugar Glider (*Petaurus breviceps*). Note: The Squirrel Glider (*P. norfolcensis*) is not considered to occur within the study area based on past surveys and NSW Wildlife Atlas records.
- Arboreal herpetofauna including Eulamprus skinks along with most of the hylid tree frogs known from the area
- Possums
- Medium sized parrots and lorikeets
- Smaller owls such as the Southern Boobook (*Ninox novaehollandiae*) and Barn Owl (*Tyto alba*)
- Black cockatoos and Australian King Parrot (*Alisterus scapularis*).

As a result, nest boxes were installed that catered for a range of species. Notwithstanding this, the EIS for the project (GHD, 2010) recommended nest boxes specifically target petaurid gliders.

A total of nine nest boxes were subsequently installed to address the loss of potential tree hollow resources to be impacted at the site. It is noted that no actual hollow bearing trees were proposed to be impacted by the Eviron Quarry and landfill project. It is also noted that another nest box program is being run in the same locality to mitigate the clearing of habitat trees in the adjoining Stott's Creek Resource Recovery Centre (RRC) as part of a landfill cell expansion (TSC 2016b). A total of 10 nest boxes were installed for that project. These sites are adjoining and as a result, nest boxes were installed along a connecting ridge line between the Eviron project site and the Stott's RRC site. The results of monitoring nest boxes for both projects are presented here.

2.2 Nest box installation

Nest boxes were installed by Lewis Ecological Surveys on the 29 July 2016. Boxes were installed on average about between 4 to 8 metres above the ground and attached to trees using wire covered with a protective sleeve of polyurethane tubing (to protect trees from tissue damage). The attachment wire was pleated in sections to allow for expansion with tree growth. In some instances, two boxes targeting different species (e.g. small glider and insectivorous bats) were installed on the same tree. This is consistent with approaches for other projects in the region (e.g. the Pacific Highway Upgrade, pers. comm. Lewis Ecological Surveys).

2.3 Nest box monitoring requirements

The nest box plan proposed the following monitoring requirements:

- Year 1: at the end of the first year after installation
- Year 2: during spring of the second year of installation
- Year 5: during spring of the fifth year of installation.

During monitoring of nest boxes, information on box condition and subsequent maintenance requirements, evidence of fauna occupation, and pest activity (e.g. Indian Myna's, termites, bees etc) is to be recorded. Records of fauna activity and/or occupation of boxes would involve recording species and any associated life history parameters, and evidence of fauna use such as nesting material, scats, hair/feathers etc. In the event that pest activity is precluding occupation of the box by native fauna, then the box would be modified or relocated to an appropriate site.

Maintenance of boxes, if required, would be undertaken at the time of inspection. Irreparable boxes would be replaced with a new box in the same tree or as close to the host tree as possible. Replacement of any damaged boxes would be undertaken during the same monitoring event.

3.0 NEST BOX INSPECTION RESULTS

This report documents the first round of monitoring post installation. Monitoring was completed on the 16 March 2017 by Lewis Ecological Surveys with the assistance of a Tweed Shire Council ecologist (David Hannah). Due to project delays, the boxes were not monitored until late summer/autumn 2017. Despite this, nest box inspections recorded 17 sugar gliders (*Petaurus breviceps*) occurring within a range of nest box types (see Table 1 below). Petaurid gliders was the target species for nest box installation associated with the proposal (TSC 2016a).

Five nest boxes had nesting material (eucalypt and/or eucalypt leaves and camphor leaves combined) present within boxes. Based on the type of nest construction observed, a further three species may be using boxes and includes Antechinus spp., the Feather-tail Glider and Possum (most likely Mountain Brushtail Possum based on previous site records). Three boxes were colonised by arboreal ants. Ants were not removed at this stage. As discussed by Sandpiper Ecological (2016), little is known about the potential competitive interactions between ants and native vertebrates although Dobson (2002, cited in Sandpiper Ecological 2016) reported that squirrel gliders were not deterred by the presence of ants and feathertail gliders have been observed in bat boxes containing ants. No fauna species, or evidence of fauna nesting, was observed within nest boxes with ants.

In regards to the condition and functionality of nest boxes, all boxes were in good condition and functioning as designed. Consequently, no maintenance is required on boxes at this stage.

A summary of nest box monitoring results is provided in Table 1 below.

3.1 Recommendations

The nest box plan requires monitoring in the first, second and fifth year following box installation. As a result, the next monitoring event is recommended to occur spring 2018. No maintenance of boxes is proposed as a result of this monitoring event

Table 1: Eviron and Stott's Creek RRC nest box monitoring results (#all boxes installed 29 July 2016)

Location	Id.	Box type	Height above Gnd. (m)	Aspect	Tree species	GPS coordinate	Fauna use	Box condition	Notes
Conservation Area 5 (Southern end of north valley)	Tree 1	Small Glider (silver top)	6.0	SSE	Blackbutt	23.30066, 153.50279	Nest material only (2-3mths old)	Good	
as above	Tree 1	Bat Box wedge	7.0	E	Blackbutt	23.30066, 153.50279	No evidence of use	Good	
as above	Tree 2	Small Glider (silver top)	8.0	SSE	Blackbutt	28.30062, 153.50279	Ants present in box	Good	
as above	Tree 2	Bat Box Wedge	7.0	W	Blackbutt	28.30062, 153.50279	Ants present in box	Good	
as above	Tree 3	Bat Box Wedge	7.0	SSW	Blackbutt	28.30096, 153.50299	No evidence of use	Good	
as above	Tree 3	Small Glider (silver top)	5.0	ESE	Blackbutt	28.30096, 153.50299	3 x Sugar Gliders	Good	
Conservation Area 1 (boxes along ridgeline road to Hawkins house)	Tree 4	Bat Box (HLH)	5.5	N	Brushbox	28.29826, 153.49902	No evidence of use	Good	
as above	Tree 4	Parrot (HLH)	7.0	ESE	Brushbox	28.29826, 153.49902	4 x Sugar Gliders	Good	
as above	Tree 5	Small Glider Wedge	5.0	NW	Bloodwood	28.29798, 153.49881	Ants present in box	Good	
as above	Tree 5	Parrot (HLH)	6.5	SE	Bloodwood	28.29798, 153.49881	3 x Sugar Gliders	Good	

Location	Id.	Box type	Height above Gnd. (m)	Aspect	Tree species	GPS coordinate	Fauna use	Box condition	Notes
as above	Tree 6	Large Parrot	7.0	W	Blackbutt	28.29774, 153.49855	1 x Sugar Gliders	Good	
as above	Tree 6	Small Glider wedge	8.0	S	Blackbutt	28.29774, 153.49855	No evidence of use	Good	
Stott's Landfill southern boundary road	Tree 7	Small Owl	6.0	NE	Blackbutt	28.29693, 153.49693	Nest material (2-3mths old)	Good	Possible use by antechinus / feather tail glider
Stott's Landfill southern boundary road	Tree 7	Small glider wedge	6.0	W	Blackbutt	28.29693, 153.49693	Nest material (2-3mths old)	Good	Possible use by possum / sugar glider
Stott's Landfill southern boundary road	Tree 8	Possum	6.0	N	Blackbutt	28.29698, 153.49707	2 x Sugar Gliders	Good	
Stott's Landfill southern boundary road	Tree 9	Bat box	6.0	N	Blackbutt	28.29701, 153.49719	No evidence of use	Good	
Stott's Landfill southern boundary road	Tree 10	Small Owl	8.0	NNE	Blackbutt	28.29710, 153.49731	Nest material (2-3mths old)	Good	Possible use by possum / sugar glider
Stott's Landfill southern boundary road	Tree 11	Parrot	6.0	SSE	Blackbutt	28.29671, 153.49678	Nest material (2-3mths old)	Good	Possible use by possum / sugar glider
Stott's Landfill southern boundary road	Tree 12	Possum	6.0	NNE	Blackbutt	28.29680, 153.49670	4 x Sugar Gliders	Good	

Note – Hollow Log Homes (HLH) boxes were constructed of recycled plastic and Cypress Pine (30yr structural life) with timber shavings in box. All other boxes (except silver tops) were hardwood construction (approx. 8yr structural life). Boxes referred to as ‘silver tops’ had pine lids and therefore, aluminium flashing was tech screwed to lids for weather proofing. HLH boxes were secured to trees using the HLH provided Habisure system. All other boxes were secured to trees using 8 gauge wire with protective plastic tubing (garden hose).

REFERENCES

GHD (2010). *Ecological Assessment Appendix J of the Part 3A Environmental Assessment for Eviron Road Quarry and Landfill*. November 2010.

Sandpiper Ecological (2016). Pacific Highway Upgrade: Woolgoolga to Halfway Creek. Nest Box Monitoring – Year 1, Winter 2016. Report prepared for NSW RMS.

TSC (2016a). Eviron Quarry and Landfill Nest Box Plan. Report prepared by the Tweed Shire Council Design Unit. July 2016.

TSC (2016b). Stott's Creek Resource Recovery Centre Cell Expansion – Nest Box Plan. Report prepared by the Tweed Shire Council Design Unit, July 2016.l

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Appendix G – 2018 Environmental Audit Report.

Eviron Road Quarry and Landfill Project: Environmental Audit

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Prepared for: Tweed Shire Council

UPR	Description	Date Issued	Issued By
3116-1003	First issue	11/10/2018	Simon Williams
3116-1003	Second Issue	30/10/2018	Simon Williams

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1. Audit Outline

1.1 Introduction

GeoLINK was engaged by Tweed Shire Council (TSC) to carry out an Independent Environmental Audit (Audit) of its Eviron Road Quarry and Landfill Project (Eviron Quarry and Landfill), located at Leddays Creek Road, Stotts Creek, NSW.

The Audit was undertaken pursuant to the Minister's Conditions of Approval (MCoA) (Application No. 08-0068) to undertake an independent environmental audit at the quarry and landfill operation against inter alia, the project approval conditions issued by Department of Planning and Environment (DPE).

1.2 Eviron Road Quarry and Landfill Project

In 2012, Council sought an approval from the DPE to develop new waste infrastructure at Eviron Road, Eviron. On 21 November 2012, approval was granted (Project Approval 08_0068) following an environmental assessment prepared in accordance with the requirements of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This approval includes:

- A landfill within the void space created by Quirks Quarry;
- Development of two further quarries to be used as landfills after exhaustion of quarry resources (West Valley and North Valley quarries); and
- Operational infrastructure such as haul roads, an acid sulphate soil treatment area and other service buildings/ storage facilities as required.

In June 2014, the NSW Department of Planning and Environment agreed to stage the project in three phases as shown below:

Phase 1 Early Works (geotechnical testing and investigation, survey, electricity supply works and relocations and road design and construction)
Phase 2 Quirks Quarry Landfill (development of a new landfill within the quarry void)
Phase 3 West Valley Quarry (development of a new quarry within the west valley quarry footprint).

Works carried out at the site relate only to Phase 1 and have been minimal. As reported in the 2017 Annual Environmental Management Report the following general works activities were carried out at the site:

- Placement of settlement fill on Stage 1 of the Haul Road (Phase 1)
- Environmental baseline monitoring of groundwater and surface water continues to be undertaken as per the Environmental Assessment recommendations
- Environmental and cultural heritage site inductions have continued for site personnel
- Vegetation protection areas have been signposted and taped off restricting access (refer Appendix G) with monitoring and maintenance undertaken as required
- Environmental controls installed at the site continue to be maintained and rectification works are undertaken as required.

1.3 Audit Type

This audit is an Independent Environmental Audit of the Eviron Quarry and Landfill project conducted by GeoLINK. The audit was limited to the operations being undertaken pursuant to the DPE approval for development of waste and landfill facilities as per approval 08-0068 (2012) pursuant to the MCoA.

1.4 Previous Environmental Audit

There are no previous audits undertaken for this project.

1.5 Reasons for Audit

Pursuant to Minister's Conditions of Approval, Schedule 6, Condition 10, Independent Environmental Audit states:

> *Within a year of the date of this approval, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:*
>
> *(a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;*
>
> *(b) include consultation with the relevant agencies;*
>
> *(c) assess the environmental performance of the project and whether it is complying with the relevant requirements in this approval and any relevant EPL and/or Water License (including any assessment, plan or program required under these approvals);*
>
> *(d) review the adequacy of any approved strategy, plan or program required under these approvals; and*
>
> *(e) recommend measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under these approvals.*
>
> *Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Director-General.*

The audit has been prepared to satisfy this requirement.

1.6 Auditee and Representatives

Tweed Shire Council representatives for the audit were:

Name	*Position*	*Role*
Mitchell Cambridge	Environmental Scientist	Audit Project Manager
Wes Knight	Waste Operations Manager	Primary responsibility for existing and proposed landfill.
David Hannah	Senior Planning and Application Officer	Responsible for ecological offsets, resource recovery exemption and has been heavily involved in the project overall.
Greg Jones	Environmental Scientist	Responsible for Auditing Erosion and Sediment Controls.

Name	Position	Role
Sally Cooper	Environmental Scientist	Responsible for managing restoration works.
Tim Mackney	Manager Infrastructure Delivery	Overall responsibility for construction side of project and heavily involved in project overall.
Scott Buckleton	Construction Supervisor	Responsible for overseeing construction of the project.
Athol Kiem	Technical Officer Quarry Operations and Quality Control	Responsible for overseeing operational side of the site.

1.7 Audit Team

The GeoLINK Audit Team for the 2018 audit comprised of:

Mr Simon Williams Lead Environmental Auditor

Mr Duncan Thomson Environmental Audit Reviewer

Simon was the Lead Auditor for the project, and coordinated the Environmental Audit, reviewed the available records and documents, attended project meetings and the site visit and reviewed the final audit findings. He was approved by the Department of Planning and Environment to undertake this audit pursuant to MCoA, Schedule 6, Condition 10, clause (a). DPE approval correspondence is provided in **Appendix B**.

Duncan reviewed the environmental audit, provided advice and ensured Quality Assurance requirements were satisfied.

The audit team has been selected on their specialist skills in environmental management, environmental compliance, environmental law and auditing.

2. Audit Plan

2.1 Objectives

The primary objective of the audit was to assess compliance of the Eviron Quarry and Landfill with the Minister's Conditions of the Approval issued by the Department of Planning and Environment, and other compliance requirements. The secondary objectives of the Audit were to:

- Verify legislative and regulatory compliance
- Assess conformance with internal policy and procedures
- Establish the status of current practices
- Identify opportunities for improvement.

The audit focussed on the landfill and quarry operations since commencement of the project in 2013 until the date of the audit on 12 September 2018. The work that has taken place has predominantly been preparation of management plans, environmental works (offsetting and revegetation) and placement of settlement fill for a part of the Haul Road.

2.2 Confidentiality

As an Environmental Auditing organisation, GeoLINK are given access to documents and information that are considered to be highly confidential. We also work closely with clients that are in direct commercial competition. For these reasons it is important to our business that we maintain a strict high level of confidentiality for all of our clients.

Whilst our client's information remains confidential, information is made available to the NSW Department of Planning and Environment through our work. This information includes this Audit Report, and we accept no responsibility for third-party handling.

The nature of an audit also presents a risk for maintaining confidentiality, as our auditors have client files on their laptops and there is also a potential for client information to be released during conversation. In order to control these risks, all auditors' as employees of GeoLINK are required to complete a Confidentiality Statement as part of their employment contract. Furthermore, all auditors' laptops are password protected and when left unattended are locked.

2.3 Distribution

The audit would be approved and distributed as per below.

Delegated Client Audit Contact	Mitchell Cambridge	Tweed Shire Council
External Audit Approval (DPE)	James Epstein/Craig Dunk	Compliance, DPE
Internal Audit Distribution	Wes Knight	Tweed Shire Council

2.4 Audit Scope

The scope of the Independent Environmental Audit was developed with consideration of the nature of the operation, its environmental aspects and potential impacts, the various site activities, and following a review of the project Conditions of Approval.

The scope of the Audit included:

- General requirements of the Approval (08-0068)
- Statement of Commitments
- Preparation of pre-construction Environmental documentation
- Operations, limits, monitoring and reporting
- Public enquiry and complaints responses.

The physical scope of the Audit included quarry operations and facilities within the Eviron Quarry and Landfill project, including:

- Quirks Quarry (approved landfill area)
- Stage 1 of Phase 1 of the works (Haul Road)
- Project area including the revegetation and offsetting areas.

2.5 Consultation

Contact was made with stakeholders prior to the site inspection to obtain feedback and draw the auditors attention to any key issues within the agreed scope of the audit. The stakeholders contacted are in the table below:

Agency	*Contact*	*Email/s*	*Correspondence*	*Comments*	*Reminder Correspondence*
DPE Compliance	James Epstein	compliance@planning.nsw.gov.au James.Epstein@planning.nsw.gov.au Craig.Dunk@planning.nsw.gov.au	20/8/2018	Craig Dunk 22/8/2018	N/A
DPE – Approvals	Nicolas Hall	nicholas.hall@planning.nsw.gov.au information@planning.nsw.gov.au	20/8/2018	N/A	10/9/18
NSW Environmental Protection Authority	Scott Hunter	scott.hunter@epa.nsw.gov.au info@epa.nsw.gov.au	20/8/2018	N/A	10/9/18
Office of Environment and Heritage		No involvement			
Department of Resources and Energy		No involvement			
NSW Office of Water		No involvement			

Department of Planning and Environment (DPE) comments can be categorised as follows:

- Water Quality triggers and Monitoring
- Community Engagement Activities
- Councils Compliance management system
- Councils website (Condition 12(b), Schedule 6)
- Completion of Annual Reviews in accordance with the Departments AR Guideline (Condition 4, Schedule 2 and Condition 6, Schedule 6)
- Consultation with agencies (this section).

DPE requirements are integrated into the audit report.

2.6 Audit Criteria

The content of the audit is provided by the Minister's Condition of Approval Schedule 6, Condition 10 whereby the proponent must undertake an independent audit every three years following the first year and must:

- Be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General
- Include consultation with the relevant agencies
- Assess the environmental performance of the project and whether it is complying with the relevant requirements in this approval and any relevant EPL and/or Water License
- Review the adequacy of any approved strategy, plan or program required under these approvals
- Recommend measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under these approvals.

2.7 Audit Approach and Methodology

The DPE released an *Independent Audit Guideline, Post approval requirements for State Significant Developments October 2015*. The guideline was developed to ensure audits of State Significant Developments are undertaken in a consistent manner and meet minimum quality standards.

The Audit approach followed the standardised procedures for environmental management systems auditing established under ISO 19011:2002 Guidelines for Quality and/or Environmental Management Systems Auditing and the Independent Audit Guideline, October 2015. Details of the methodology are provided in **Appendix A**. In summary, the methodology consisted of an Implementation Stage followed by the Pre-Audit, Audit and Post-Audit stages as follows:

Initiation Stage

- Organisational review
- Review of available background information
- Review of previous audit findings from the 2013 environmental audit.

Pre-Audit Stage

- Development of an audit plan
- Development of audit protocol and checklist.

Audit Stage

- Opening meeting
- Review of documentation
- Detailed site inspection
- Interviews with relevant personnel
- Review of audit evidence
- Closing meeting.

Post-Audit Stage

- Review of audit data
- Preparation of audit report.

The checklist provided in **Section 3** documents the specifics of the audit and the responses of the TSC's team in relation to these requirements.

2.8 Interview and Site Inspection

Staff interviews and document review was undertaken on 12 September 2018 at the offices of TSC in Murwillumbah with:

- Mitchell Cambridge
- Wes Knight
- John McIntosh
- Greg Jones.

A site inspection also occurred with Mitchell Cambridge, Wes Knight, Scott Buckleton and Athol Kiem, Tweed Shire Council on 12 September 2018.

3. Audit Findings

The 2018 audit findings and observations are presented and discussed in **Section 3.2**. The 2018 audit findings are provided within the completed Audit Protocol Checklist, provided in **Appendix B**.

Findings within the Protocol are listed as Compliant, Not verified, Non-compliant, Administrative non-compliance, Not triggered, Observation or Note and are included in the following sections. They are described (where applicable) as follows:

- *Compliant*: Where the auditor has collected sufficient verifiable evidence to demonstrate that the intent and all elements of the requirements of the regulatory approval have been complied with within the scope of the audit.
- *Not verified*: Where the auditor has not been able to collect sufficient verifiable evidence to demonstrate that the intent and all elements of the requirement of the regulatory approval have been complied with within the scope of the audit.
- *Non-compliant*: An apparent systematic breakdown observed during the Audit. This would require a review of the below **Table 3.1** to identify a risk level rating for the non-compliance and subsequent corrective and preventative action.
- *Administrative non-compliance*: A technical non-compliance with a regulatory approval that would not impact on performance and that is considered minor in nature.
- *Not triggered*: A regulatory requirement has an activation or timing trigger that had not been met at the time of the audit inspection, therefore a determination of compliance could not be made.
- *Observation*: Are recorded where the audit identified issues of concern which do not strictly relate to the scope of the audit or assessment of compliance.

Table 3.1 Risk levels for non-compliances

Risk level	Colour code	Description
High		Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium		Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Low		Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative non-compliance		Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Source: Independent Audit Guideline, Post-approval requirements for State Significant Developments, October 2015.

Overall, the level of compliance with good environmental management practices is satisfactory. Management and staff at the facility are fully committed to implementing and complying with the project approval requirements. Examples of good environmental management practices observed during the Audit included the following practices:

- The TSC quarry management has often exceeded approval requirements in some cases, such as early commencement of offsetting requirements
- Comprehensive Soil and Water Management Plan.

3.1 Summary of Environmental Audit Findings

The following issues of non-compliance with the relevant requirements were identified during the 2018 Audit. The complete audit protocol checklist provides a detailed analysis of the audit and is provided in **Appendix B**.

3.1.1 Administrative Non-Compliance

Requirement
Minister's Condition of Approval: Schedule 4, Condition 29
By 31 December 2013, unless the Director-General agrees otherwise, the Proponent shall:
(a) implement the biodiversity offset strategy as described in the EA, summarised in Table 9, and described and depicted in the figure in Appendix 4; and
(b) make suitable arrangements, in consultation with OEH, to provide appropriate long-term conservation security for Area 1, to the satisfaction of the Director-General.

Table 9: Biodiversity Offset Strategy

Area	Summary of Offset	Minimum Size
Area 1	Retention and management of existing vegetation to be designated as natural area of bushland	6.5 hectares
Area 2	Revegetation of drainage line using locally sourced swamp sclerophyll/koala feed trees and provide alternative corridor for connectivity across cleared area	1.9 hectares
Area 3	Revegetation of ridgeline using koala feed trees and other fauna resources to enhance connectivity along ridgeline	0.4 hectares
Area 5	Retention and management of native vegetation including potential koala feed trees	1.1 hectares
Area 6	Retention of vegetated corridor along ridgeline and connectivity to native vegetation	2.2 hectares

Findings
TSC prepared and sent a Biodiversity Offset Strategy (BOS) to the DPE on 18 December 2013. DPE responded on 4 June 2014 stating they were reviewing the adequacy of the BOS in consultation with other government agencies. No further correspondence has occurred relating to the BOS.

TSC have commenced a number of actions as outlined in the BOS including revegetation and weed management.

Discussion
In light of TSC commencement of works as set out in the BOS which are technically unapproved, it is recommended TSC engage with DPE with the aim of obtaining approval from the DPE for the BOS to ensure consistency.

3.1.2 Administrative Non-Compliance

Requirement
Minister's Condition of Approval: Schedule 4, Condition 30
The Proponent shall prepare and implement a Translocation Plan for the White Lace Flower to the satisfaction of the Director-General. This plan must:
(a) be prepared by suitably qualified and experienced persons whose appointment has been approved by the Director-General;
(b) be prepared in consultation with OEH;
(c) be submitted to the Director-General for approval by the end of July 2013 or as otherwise agreed to in writing by the Director-General;
(d) describe the measures that will be implemented to:
• translocate and manage the orchids;
• monitor and report on the success of the translocation; and
• ensure suitable contingency measures are implemented if the monitoring suggests the translocation is not working as well as intended; and
(e) provide for the findings of the translocation process to be published in a suitable scientific publication.

Findings
The White Lace Flower Translocation Plan (WLFTP) appears to satisfy the condition and was submitted to DPE on 28 August 2013 and approved on 4 June 2014. However, it was noted by the TSC ecologist that Council has been unable to satisfy the condition of the WLFTP relating to sourcing local WLF seed with several attempts to survey and extract seeds.

Discussion
The WLFTC was prepared by the TSC ecologist in the best interest of maintaining localised WLF genetics. Given the attempts that have been made to source seed without success, it is recommended that the WLFTP be amended to discuss and justify the opportunity to source seed other than local seed.

3.1.3 Administrative Non-Compliance

Requirement
Minister's Condition of Approval: Schedule 6, Condition 3
The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must:
(a) be submitted to the Director-General for approval prior to any development being carried out on the site under this approval;
(b) provide the strategic framework for environmental management of the project;
(c) identify the statutory approvals that apply to the project;
(d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
(e) describe the procedures that will be implemented to:
• keep the local community and relevant agencies informed about the operation and environmental performance of the project;
• receive, handle, respond to, and record complaints;
• resolve any disputes that may arise during the course of the project;
• respond to any non-compliance; and
• respond to emergencies; and
(f) include:
• copies of any strategies, plans and programs approved under the conditions of this approval; and
• a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.

Findings
The Environmental Management Strategy appears to be consistent with the requirements set out in the condition and was approved by DPE on 4 June 2014. DPE also stated the document is a dynamic document to be reviewed quarterly. TSC has not reviewed the EMS quarterly.

Discussion
The works onsite have been minimal and restricted to placing settlement material on Stage 1 of Phase 1 of the Haul Road. Other works include offsetting works, weed management and revegetation. It is considered given the minor nature of the works that the failing to review the EMS quarterly is negligible. It is considered this could be amended to a more appropriate review timeframe which would appear to be annually.

3.1.4 Administrative Non-Compliance

Requirement
Minister's Condition of Approval: Schedule 6, Condition 12
The Proponent shall:
(a) make the following information publicly available on its website:
• the EA;
• current statutory approvals for the project;
• approved strategies, plans or programs;
• a summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval;
• a complaints register, updated on a quarterly basis;
• copies of any annual reviews (over the last 5 years);
• any independent environmental audit, and the Proponent's response to the recommendations in any audit; and
• any other matter required by the Director-General; and
(b) keep this information up-to-date, to the satisfaction of the Director-General.

Findings
The TSC website was reviewed to ensure the above documents were listed on the website https://www.tweed.nsw.gov.au/EvironRoadLandfill

The following document were not listed:

- Restoration Plan (Preliminary)
- Haul Road S&WMP
- Nest Box Plan.

Discussion
Ensure these documents are uploaded to the website.

3.1.5 Observation

Requirement
Statement of Commitments – Biodiversity
Activities prohibited in the vegetation protection areas would include: use of or parking of vehicles and equipment (unless associated with a permitted activity), placement of construction materials, refuse, excavated spoils and stockpiling, use of tree trunks as a winch support.

Findings
During the site inspection is was noted that the vegetation protection areas were fenced off using flicker tape. However, the flicker tape had deteriorated and was missing the reflective tabs and was missing/ down in some areas.

Discussion
Fencing off sensitive areas is important to ensure compliance with the above requirements. Ensure that the flicker tape is in good working order and the fencing is in place.

3.1.6 Observation

Requirement
Statement of Commitments – Community (DPE Compliance - Requirement)
Council will undertake consultation with relevant community stakeholders including during the site establishment period and will proactively engage with the community during operations. This will as a minimum include residents whose properties directly adjoin Council's landholding.

Findings
It is anticipated that community consultation will commence when major Haul Road construction commences. Although, site establishment works have commenced, they are relatively minor and do not affect the local community.

Discussion
Although technically the site establishment has commenced, major works have not. Works include placing settlement material on Stage 1 of Haul Road plus environmental works. It is recommended that before significant works commence on the Haul Road, community consultation occurs.

3.1.7 Administrative Non-Compliance

Requirement
Environmental Management Strategy – NB3 Nest Boxes
Monitoring of nest boxes, once per year for the first two years, skip the third year and check nest boxes on the fourth year. The need for future monitoring will be reviewed at this stage.

Findings
The monitoring requirements for next boxes state the monitoring must occur 12 months following installation. The monitoring occurred 18 months following installation.

Discussion
Although this is technically not consistent with the monitoring report, there was no effect or harm to the environment. It is recommended that the nest box monitoring requirements be re-assessed based on the timing of the first monitoring round.

3.1.8 Observation

Requirement
Environmental Management Strategy – NB9 Weeds
Haul Road Corridor
As haul road construction commences effective weed control will be implemented in disturbed areas for early works for the weeds identified onsite in Appendix B of the Restoration Plan.
Noxious Weeds
Groundsel Bush (*Baccharis halimifolia*)- Class 3

Camphor Laurel (*Cinnamomum camphora*) Class 4
Lantana- Class 4
Weeds associated with a TSC Act Key Threatening Process listed under TSC Act
Exotic vines or scramblers (*Ipomoea cairica*)
Exotic perennial grasses (i.e. *Paspalum urvillei* and *Setaria sphacelata*.

Findings
Weed control has occurred in the two revegetation areas which were sighted on the inspection. However, weed control has not occurred in the Haul Road construction area as material is currently being placed on Stage 1 of the Haul Road for settlement. No weed inspections were being undertaken.

Discussion
Recommend that periodic weed inspections are carried out and the results recorded. The EMS is to be updated to exclude the exotic perennial grasses which cover the entire site where is no canopy and the remaining trees and shrubs are to be added to the weed maintenance program.

3.1.9 Administrative Non-Compliance

Requirement
Environmental Management Strategy – T1 - Movement of Heavy Vehicles
Traffic Management Plan
Contractors to prepare progressive traffic control plans for the movement of vehicles into and around the site for clearing and road construction. Traffic control plans are to be prepared in consultation with the operators of the existing landfill to ensure construction traffic does not impact on the operation of the landfill and vice versa.

Findings
There has not been a Traffic Management Plan prepared for the construction at this point.

Discussion
On the basis of the small amount of truck movements (<50 per annum) and the ease of access, it appears unnecessary to prepare a TMP at this stage of the construction. Recommend revisiting this requirement when more intense construction commences.

3.1.10 Administrative Non-Compliance

Requirement
Preliminary Restoration Plan (May 2011) – Section 5.1
Records will be kept for each sample of propagation material and maintained from the time of collection, to the raising of seed/cuttings, planting out of tubestock and maintenance and monitoring period. The following information will be collected for each sample:

- *Sample id code (unique code to be created for each sample – e.g. 'EP_1', which represents Eucalyptus pilularis, plant 1);*
- *Source plant location (GPS coordinates and description);*
- *Date of collection;*
- *Type of material collected (e.g. seed, cutting);*
- *Amount of material collected;*
- *Seed treatment technique;*
- *Date of sowing;*
- *Date of germination;*

- *Date of out-planting;*
- *Location of out-planting (GPS coordinates and description);*
- *Monitoring results (refer to Section 5.6.2 for proposed monitoring method).*

Each sample will be tagged with its Sample id code for the duration of its life cycle.

Findings
For various technical (genetic) and lead-time reasons, seed collection and propagation were unable to occur. Comments and justification have been provided by the ecologist. Instead, tube stock was sourced from local nurseries and used for revegetation.

Discussion
Given the PRP is quite specific regarding the need to source local seed, propagate and include details of propagation, it is recommended that the PRP is amended (with justification) and re-issued.

3.1.11 Observation

Requirement
Haul Road - Eviron Quarry & Road Soil Water Management Plan
Section 4.2
Installation of erosion and sediment control measures will take place prior to commencement of site works. Reference to standard drawings (SD) relates to SD and designs from the Blue Book (Landcom, 2004). Common standard drawings proposed in this SWMP are listed in Appendix C.

Findings
The erosion and sediment control measures were inspected during the site inspection. It was noted that the Haul Road sediment fence required maintenance and repairs in some sections and also installation at the end of the Haul Road settlement area.

Discussion
Ensure erosion and sediment controls are repaired and installed and inspected from time to time.

3.1.12 Observation

Requirement
Haul Road - Eviron Quarry & Road Soil Water Management Plan
Section 4.3
Construction water generated from within the haul road corridor would be directed via controls (diversion bunds or windrows, batter chutes, dissipaters, check dams, low flow drains) to a Type D sediment basin, designed and sized for each identified catchment e.g. SBW2 for catchment area ch.810 to ch 725

Findings
The erosion and sediment control measures were inspected during the site inspection. It was noted that the Haul Road sediment fence required maintenance and repairs in some sections and also installation at the end of the Haul Road settlement area.

Discussion
Ensure erosion and sediment controls are repaired and installed and inspected from time to time.

3.1.13 Administrative Non-Compliance

Requirement
Haul Road - Eviron Quarry & Road Soil Water Management Plan
Section 6.1
Inspections would be documented with the weekly or detailed inspection sheet (refer to templates in appendix G)

Findings
Currently due to the limited construction works occurring there is no process in place to hold weekly inspections.

Discussion
Although construction is minimal, it is recommended that inspection of erosion and sediment control are undertaken, perhaps quarterly.

3.2 Level of Awareness

The level of awareness of good environmental management practices within management and operations staff was assessed through discussions with management and observation of environmental practices during the site inspection.

3.3 Status of Environmental Compliance

At the time of the Audit, Eviron Quarry and Landfill was generally compliant with the requirements of Eviron Quarry and Landfill Project Approval, Statement of Commitments, relevant regulations and good management practice. In summary, there were 13 matters highlighted which included eight Administrative Non-compliance and five Observations.

4. Recommendation and Conclusions

4.1 Recommendations

A number of recommendations are provided in **Section 3** above. The following section summarises these recommendations.

- *Section 3.1.1*: In light of TSC commencement of works as set out in the BOS which are technically unapproved, it is recommended TSC engage with DPE with the aim of obtaining approval from DPE for the BOS to ensure consistency.
- *Section 3.1.2*: The WLFTC was prepared by the TSC ecologist in the best interest of ensuring maintaining localised WLF genetics. Given the attempts that have been made to source seed without success, it is recommended that the WLFTP be amended to discuss and justify the opportunity to source seed other than local seed.
- *Section 3.1.3*: The works on-site have been minimal and restricted to placing settlement material on Stage 1 of Phase 1 of the Haul Road. Other works include offsetting works, weed management and revegetation. It is considered given the minor nature of the works that the failing to review the EMS quarterly is negligible. It is recommended this be annually.
- *Section 3.1.4*: Ensure these documents are uploaded to the website.

    - Restoration Plan (Preliminary)
    - Haul Road S&WMP
    - Nest Box Plan.

- *Section 3.1.5*: Fencing off sensitive areas is important to ensure compliance with the above requirements. Ensure that the flicker tape is in good working order and the fencing is in place.
- *Section 3.1.6*: Although technically the site establishment has commenced, major works have not. Works include placing settlement material on Stage 1 of Haul Road plus environmental works. It is recommended that before significant works commence on the Haul Road, community consultation occurs.
- *Section 3.1.7*: It is recommended that the nest box monitoring requirements be re-assessed based on the timing of the first monitoring round.
- *Section 3.1.8*: Recommend that periodic weed inspections are carried out and that the EMS is updated to reflect more accurate plant species.
- *Section 3.1.9*: On the basis of the small amount of truck movement (<50 per annum) and the ease of access, it appears unnecessary to prepare a TMP at this stage of the construction. Recommend revisiting this requirement when more intense construction commences.
- *Section 3.1.10*: Given the PRP is quite specific regarding the need to source local seed, propagate and include details of propagation, it is recommended that the PRP is amended (with justification) and re-issued.
- *Section 3.1.11 and 3.1.12*: Ensure erosion and sediment controls are repaired and installed and inspected from time to time.
- *Section 3.1.13:* Although construction is minimal, it is recommended that inspection of erosion and sediment controls are undertaken, perhaps quarterly.

4.2 Conclusions

The commitment of Eviron Road Quarry and Landfill and its staff to the quarry's environmental management was apparent, and site operations, work practices and documentary records were found to be generally in compliance with the Conditions of Approval, Statement of Commitments and relevant legislation, and consistent with good Environmental practices.

There were eight Administrative Non-compliances and five Observations made that may improve environmental management on this site.

The eight Administrative Non-compliances related to:

- Finalising DPE approval of strategies
- Changes in offsetting techniques which require changes to management plans
- Website information
- Nest box monitoring
- Periodic site inspections.

The five Observations were noted regarding:

- Flicker tape
- Erosion and sediment controls
- Consultation
- Weed inspections
- Traffic Management Plan.

Each of the Non-compliances should be addressed prior to the next scheduled audit. The Observations require more immediate action, and a timeframe for the recommendations above should be developed and implemented by the Tweed Shire Council management team. The findings of this audit will be auditable within forthcoming audits.

The level of awareness among staff of good environmental practice was generally satisfactory. Several examples of good environmental practices were observed during the site inspection. The findings obtained during this Audit shows that, except where noted above, Eviron Road Quarry and Landfill is generally compliant with the Conditions of Approval, Statement of Commitments, and with relevant environmental legislation.

References

Independent Audit Guideline, Post approval requirements for State Significant Developments October 2015; [Online]. Available: http://www.planning.nsw.gov.au/~/media/Files/DPE/Guidelines/independent-audit-guideline-2015-10-23.ashx

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Appendix A

Audit Methodology

Project	Eviron Quarry and Landfill Project Audit	**Date**	7 August 2018
To	Mitchell Cambridge	**Email**	MCambridge@tweed.nsw.gov.au
Of	Tweed Shire Council	**Page 1 of**	3
From	Simon Williams	**Ref No**	3116-1004
Subject	Audit Methodology		

Meeting Notes		File Notes		Facsimile		Transmittal	X	Telephone Notes	

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Initiation Stage

Project Start-up

A project start-up teleconference will be held prior to conducting the site audit. The teleconference is to be attended by representatives of Tweed Shire Council and GeoLINK audit team to discuss the project, introduce members of each team, and to establish communications protocols. The start-up teleconference provides a forum for Council to identify and provide handover of relevant documentation that may be required during the forthcoming audit stages. Details to be discussed include:

- The quarry site and facility boundaries;
- The scope and objectives of the audit;
- The proposed audit activities, such as document reviews, personnel interviews and site inspections, communication protocols, logistics and administrative arrangements;
- Identification of the audit team and site facilitation arrangements; and
- The audit schedule and milestones.

Organisational Review

GeoLINK will review Council's current management plans and approvals in order to gain an understanding of the organisational structure of Eviron Landfill and Quarry and the environmental management required of the operation.

Review of Background Information

Council are to provide all background information prepared for the project. The background information will then be reviewed, and any questions will be raised with Tweed Shire Council.

Pre-Audit Stage

A number of pre-audit activities are to be undertaken in consultation with Council staff. These activities include development of an audit plan for the on-site activities and making the necessary preparation and arrangements for the site visit by the GeoLINK audit team.

Audit Protocol

A site-specific audit protocol (checklist) is being developed for the site. The audit protocol details a step by step series of questions and evaluation criteria designed to assess:

- Compliance with the approval requirements of the Eviron Landfill and Quarry Project;
- Compliance with management and monitoring plans;
- Compliance with and performance against EPL 12777 (if required);
- Current environmental management practices and their status; and
- Staff awareness.

Audit Stage

The audit is a systems performance assessment that every staff member can take part in contributing towards an overall performance improvement.

Opening Meeting

GeoLINK will conduct an audit Opening Meeting prior to the commencement of the site audit. The Opening Meeting is to be attended by GeoLINK audit team and Eviron Quarry and Landfill management team and nominated Council staff. The purpose of the Opening Meeting is to:

- Introduce the audit team members to quarry staff;
- Present the audit scope and explain the objectives;
- Outline the audit approach and methodology;
- Address any questions or concerns that site personnel may have at this early stage; and
- Gain the support and assistance of management and operations staff in conducting the audit.

Document Review

During the audit we will review available key compliance documentation including:

- RFO2018034 Eviron Road Stage One Project Approval V3
- TSC07286_Environmental_Assessment_Eviron_Road_Quarry_and_Landfill_Proposal
- RFO2018034 Restoration Plan Preliminary
- RFO2018034 LandscapeMP_March2014
- RFO2018034 Landscape Management Measures Fig 51
- RFO2018034 HeritageManagementPlan_Eviron_final_V1_07012014
- RFO2018034 ESCP draft 5 august 2016 v4
- RFO2018034 EQ and L_white_lace_flower_translocation_plan_June13
- RFO2018034 EMS_May14 v_final
- TSC07288_Biodiversity_Offset_Strategy_Letter
- TSC07289_Environmental_Management_Strategy
- TSC07290_Greenhouse_Gas_and_Energy_Management_Strategy (1)
- TSC07291_Heritage_Management_Plan
- TSC07292_Landscape_Management_Plan
- TSC07293_White_Laceflow_Translocation_Plan
- TSC07294_Complaints_Register_and_Monitoring_Data
- Any notices or amendments issued against the EPL.

Detailed Site Inspection

As part of the site audit the GeoLINK audit team will undertake a detailed, but efficient and practical, site inspection. During the site inspection we will observe the existing conditions at the site and adjoining land, including management measures for mitigation of potential environmental impacts, including: air, biodiversity, water, wastewater, noise and waste materials, and look for evidence of:

- Compliance with legislative and regulatory requirements;
- Conformance with the approval and with management plans and programs;
- Actual operational practices; and
- Staff participation in environmental management at the Quarry.

Interview/s with Key Staff

During the site audit the GeoLINK audit team will hold one or more interviews with appropriate staff in order to obtain information on:

- Actual past and present work practices;
- The level of compliance with approval and statutory requirements; and
- The level of awareness of those requirements.

Review Audit Evidence

GeoLINK will review the adequacy and completeness of the audit evidence at the conclusion of the site audit. GeoLINK will:

- Review the information gathered and seek additional information where needed;
- Attempt to substantiate the findings of the audit;
- Summarise and document the audit findings and observations;
- Identify issues that require immediate attention;
- Note any outstanding issues that require a follow-up; and
- Prepare for the closing meeting.

Closing Teleconference

At the conclusion of the audit a closing teleconference to debrief will be undertaken with the Eviron Quarry and Landfill management. If possible the attendees at this teleconference should be the same people who were in attendance at the Opening Meeting. Areas covered in this teleconference would include:

- Summarise the audit activities and findings;
- Highlight compliance strengths and weaknesses at the quarry;
- Discuss the preliminary findings and recommended corrective actions, and in particular, any findings that will require immediate attention; and
- Clarify outstanding issues and address staff questions or concerns.

Post-Audit Stage

The outcome of the post-audit stage, and the purpose of the project, is to produce an Environmental Audit Report that addresses all of the audit findings and recommendations.

Review of Audit Data

At the completion of the audit Council will review the Environmental Audit Report and provide any comments to the GeoLINK audit team for review and where supported for inclusion in the final audit report.

Do not hesitate to contact me on 02 6772 0454 or 0488 677 666 should you have any queries.

Simon Williams
Director
Principal Environmental Auditor

Appendix B

Audit Protocol Checklist

Reference	Condition / Requirement	Compliance		Evidence Source	Comment / Finding	Compliance Status and Recommendation	REF
		Assessment	Risk Rating				
Minister's Condition of Approval (MCoA) - 08-0068							
MCoA Sch 3, Condition 24	The Proponent shall ensure that the internal haul road from the Site Access to Quirks Quarry Landfill is constructed generally in accordance with the concept design in the EA and applicable Australian Standards to the satisfaction of the Director-General.	Compliant	Medium	John McIntosh - Interview: developed plans based on concept design. Alex Doyle - plan on file	John McIntosh - Supervisor - Civil Engineering Design. Internally designed the preload. Road will be designed to Council standards and Austroad standard. There is no AS for haul road. AS relates more to the materials, signs, curves, kurbs, etc. Haul Road is designed consistent with the concept plan.	Compliant	
MCoA Sch 4, Condition 28	The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH and Aboriginal stakeholders; (b) be submitted to the Director-General for approval prior to commencement of surface disturbance; (c) include an Aboriginal Cultural Heritage Induction Program for all personnel and contractors involved in construction and operational activities on the site; (d) describe the measures that will be implemented to: · monitor all new surface disturbance on site for unidentified heritage objects; · manage the discovery of any human remains or previously unidentified heritage objects on site; and · ensure ongoing consultation with Aboriginal stakeholders in the conservation and management of any Aboriginal cultural heritage values on site.	Compliant	Low	Letter from DPE to TSC on file	DPE wrote to TSC approving the HMP.	Compliant	
MCoA Sch 4, Condition 29	By 31 December 2013, unless the Director-General agrees otherwise, the Proponent shall: (a) implement the biodiversity offset strategy as described in the EA, summarised in Table 9, and described and depicted in the figure in Appendix 4; and (b) make suitable arrangements, in consultation with OEH, to provide appropriate long term conservation security for Area 1, to the satisfaction of the Director-General. *Table 9: Biodiversity Offset Strategy* Area 1 — Retention and management of existing vegetation to be designated as natural area of bushland — 6.5 hectares Area 2 — Revegetation of drainage line using locally sourced swamp sclerophyll/koala feed trees and provide alternative corridor for connectivity across cleared area — 1.9 hectares Area 3 — Revegetation of ridgeline using koala feed trees and other fauna resources to enhance connectivity along ridgeline — 0.4 hectares Area 5 — Retention and management of native vegetation including potential koala feed trees — 1.1 hectares Area 6 — Retention of vegetated corridor along ridgeline and connectivity to native vegetation — 2.2 hectares	Administrative non-compliant	Medium	TSC letter to DPE (18 December 2013) outlining the Biobank Offset Strategy - in file.	Annual Review (2017) - States "*reply from DoPE dated 4 June 2014 stated they would review its adequacy in consultation with relevant agencies.*" DPE have not responded. TSC has commenced the Works related to the Biodiversity Strategy.	TSC should to follow up with DPE.	1
MCoA Sch 4, Condition 30	The Proponent shall prepare and implement a Translocation Plan for the White Lace Flower to the satisfaction of the Director-General. This plan must: (a) be prepared by suitably qualified and experienced persons whose appointment has been approved by the Director-General; (b) be prepared in consultation with OEH; (c) be submitted to the Director-General for approval by the end of July 2013 or as otherwise agreed to in writing by the Director-General; (d) describe the measures that will be implemented to: · translocate and manage the orchids; · monitor and report on the success of the translocation; and · ensure suitable contingency measures are implemented if the monitoring suggests the translocation is not working as well as intended; and (e) provide for the findings of the translocation process to be published in a suitable scientific publication.	Administrative non-compliant	Low	WLF Translocation Plan - in file. DPE Letter has been provided by TSC.	WLF Translocation Plan submitted to DPE on the 28 August 2013 and DPE approved on the 4 June 2014. Unable to source local seed for the WLF and hence Ecologist is in favour of purchasing local seed.	WLF TP needs to be updated to reflect the inability to gain local seed.	2
MCoA Sch 6, Condition 1 (From DPE-Compliance)	The Proponent shall prepare and implement a Community Education Program for the project to the satisfaction of the Director-General. This program must be submitted to the Director-General for approval prior to the commencement of landfilling operations, and shall at a minimum focus on: (a) promoting the: · resource recovery activities provided at the site; · community benefits of composting food and garden waste; and · importance of food waste recovery from all waste streams, but particularly the commercial and industrial waste stream.	Compliant	Low	DPE Letter.	Letter from DPE allows staging hence this condition is not required at this stage. DPE have agreed to three phases: 1. Haul Road 2. Landfill 3. Quarry	Compliant	
MCoA Sch 6, Condition 3	The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must: (a) be submitted to the Director-General for approval prior to any development being carried out on the site under this approval; (b) provide the strategic framework for environmental management of the project; (c) identify the statutory approvals that apply to the project; (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project; (e) describe the procedures that will be implemented to: • keep the local community and relevant agencies informed about the operation and environmental performance of the project; • receive, handle, respond to, and record complaints; • resolve any disputes that may arise during the course of the project; • respond to any non-compliance; and • respond to emergencies; and (f) include: • copies of any strategies, plans and programs approved under the conditions of this approval; and • a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.	Administrative non-compliant	Administrative non-compliance	Sighted and DPE approval letter on file.	EMS has been approved by DPE (4.6.18). DPE stated the EMS was a dynamic document which was to be reviewed quarterly. The works on site have been minimal and hence TSC have not needed to review the EMS. This will be required as the project matures.	Not compliant. Negligable.	3

MCoA Sch 6, Condition 5	The Proponent shall ensure that the Management Plans required under this approval are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: · the relevant statutory requirements (including any relevant approval, licence or lease conditions); · any relevant limits or performance measures/criteria; and · the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; (c) a description of the measures that will be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: · impacts and environmental performance of the project; and · effectiveness of any management measures (see (c) above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the project over time; (g) a protocol for managing and reporting any: · incidents; · complaints; · non-compliances with statutory requirements; and · exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.	Compliant	Medium	* Environmental Management Strategy * Landscape Management Plan * WLF Translocation Plan * Restoration Plan (Prelim) * S&W MP (Haul Road) * Next Box Plan * Haul Road Excavated Road Materials Management Plan * Biodiversity Offset Strategy * Greenhouse Gas an Energy Management Strategy * Complaints Register	A number of plans have been prepared (see adjcent cell) and sent to the DPE for approval. All plans (as are listed adjacent) have been approved by DPE except the Biodiversity Offset Plan and the Landscape Management Plan. The BOP and LMP appear to be consistent with this condition.	TSC to follow up with DPE on the BOP and LMP.	
MCoA Sch 6, Condition 6 & Sch 4, Condittion 2 (From DPE - Compliance)	By the end of March each year, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must: (a) describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year; (b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against: • the relevant statutory requirements, limits or performance measures/criteria; • the monitoring results of previous years; and • the relevant predictions in the EA; (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the project; (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.	Compliant	Medium	Annual Reviews have been prepared for 2014, 2015, 2016 and 2017, 2016 and 2017. These are all available on the website.	The 2017 AR was compared against the required elements as set out in the Condition 2. Monitoring data is still considered background as no major works have commenced. Hence it is considered the results and commentary in the AR are considered adequate. DPE comment that the AR should be consitent with DPE guideline. the only guideline found was the DPE AR guideline relating to mining projects.	Compliant	
MCoA Sch 6, Condition 12 (From DPE-Compliance)	The Proponent shall: (a) make the following information publicly available on its website: • the EA; • current statutory approvals for the project; • approved strategies, plans or programs; • a summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval; • a complaints register, updated on a quarterly basis; • copies of any annual reviews (over the last 5 years); • any independent environmental audit, and the Proponent's response to the recommendations in any audit; and • any other matter required by the Director-General; and (b) keep this information up-to-date, to the satisfaction of the Director-General.	Administrative non-compliant	Administrative non-compliance	https://www.tweed.nsw.gov.au/EvironRoadLandfill	When audited the 2017 ER was not on the website. As of 19/9/18 it is not on website. Restoration Plan (Preliminary) is not on website Haul Road S&WMP is not on website. Nest Box Plan is not on website.	Upload these documents to the website.	4
Statement of Commitments (MCoA Appendix 1)							
Surface Water	The haul road from Stotts Creek has been designed to provide flood immunity to activities in the North and West Valley areas in 100 yr ARI regional flood event.	Compliant	High	Verbal from design engineer.	Haul Road is designed to withstand a 1:100 year flood event.	Compliant	
Groundwater	Council would continue to undertake a groundwater monitoring program including groundwater level and quality monitoring both for continued baseline data collection prior to commissioning of site activities and will continue the program in accordance with the eventual EPL's for the proposed activities.	Compliant	Medium	Annual Review and discussion with TSC staff.	GW monitoring being undertaken. Is in the AR which is released annually.	Compliant	
Acid Sulfate Soils and Pyrtic Materials	If required, the design of a management system for pyritic materials site will follow detailed drilling, testing and delineation of PAF material to be conducted as part of the detailed design for the quarry. The key management measure for pyritic materials will be to avoid disturbance or drainage of PAF. Where this is not feasible, typical management options will be based on: - Maintaining saturated conditions to exclude oxygen and prevent oxidisation; - Excluding air to prevent oxidisation; - Capping to exclude water, to prevent leachate generation, by separate cell construction or storage in or beneath post-quarry landfill; - Carbonate-rich capping, to develop alkaline infiltration to neutralise leachate and coat sulfide grains to reduce oxidisation (passivation); - Direct neutralisation of potential acidity of excavated PAF material; or - A combination of the above.	Not triggered	High	N/A	Required for Quarry operation. Not relevant now.	Compliant	
Soils and Land Capability	Subsoil and topsoil stockpiles would be located within the footprint of the landfill, quarry or on the upper surface of completed landfill stages.	Not triggered	Medium	N/A	Required for Quarry operaiton. Not relevant now.	Compliant	
Biodiversity	Develop an east-west movement corridor - To provide future potential habitat and an alternate route for connectivity across the site, planting of suitable riparian / floodplain vegetation will be undertaken adjacent to the watercourse in Lot 1 DP1159352. This will create a vegetated corridor that connects the lowland areas to the ridgeline and effectively connect vegetation adjacent to the eastern side of Quirks Quarry to retained eucalypt open forest in the central western area of the site and link to the ridgeline.	Compliant	Medium	Inspected and sighted during site inspection.	* The riparian / floodplain vegetation corridor has been planted out and was inspected. * Ridge line replanting has been undertaken by Envite and is in the AR - Appendix E - Restoration and Biodiversity Offset Annual Progress Report.	Compliant	
Biodiversity	Contractor awareness – all contractors (construction and operation) to be made aware of the potential presence of fauna species.	Compliant	Low	Induction Pack.	TSC has prepared Induction Pack. Information included regarding fauna is included in the pack.	Compliant	

Biodiversity	Maintain habitat - nest boxes will be installed in vegetation to be retained and managed on Lot 1 DP 1159532 in order to offset a reduction in hollow recruitment.	Compliant	Low	Sighted and is in the nest box monitoring report.	Next boxes have been installed.	Compliant	
Biodiversity	Activities prohibited in the vegetation protection areas would include: use of or parking of vehicles and equipment (unless associated with a permitted activity), placement of construction materials, refuse, excavated spoils and stockpiling, use of tree trunks as a winch support.	Observation	Medium	Sighted during site inspection.	Flicker tape has been used to fence off the vegetation. Fence has deteriorated with time and needs to be replaced.	Replace fencing/bunting.	5
Cultural Heritage	A program of site monitoring by representatives of the Aboriginal Party during activities causing ground disturbance for the recognised areas with a higher potential for the presence of unidentified cultural heritage. In the event that additional Aboriginal objects are uncovered during the monitoring program, the objects are to be recorded and managed in accordance with the requirements of the National Parks and Wildlife Act 1974.	Not triggered	Medium	TSC has mapping of high risk areas which has been agreed by the LALC. Monitoring will only occur in these areas.	No ground disturbance hence no consultation required.	Compliant	
Cultural Heritage	An Aboriginal Cultural Education Program will be developed in collaboration with the local Aboriginal community for the induction of all personnel and contractors involved in the construction activities.	Compliant	Medium	Induction Pack.	ACEP has not been prepared for Stage 1 of Phase 1. However, an induction pack has been prepared which includes Aboriginal Cultural Heitage Information. This was prepared with input from Ian Fox (Consultant - Converge) and he also worked for the LALC. It is TSC intention to prepare a ACEP Stage 2 of Phase 1 (i.e.: haul road) for the high risk areas (i.e.: ridge lines)	Compliant	
Air Quality and Odour	Installation of a meteorological station onsite.	Compliant	Low	Sighted and is in AR.	Weather station set up onsite. This condition has been complied with.	Compliant	
Traffic and Transport	Design of the haul road in accordance with good practice for heavy vehicle traffic.	Compliant	Medium	Refer to above - MCoA Sch 3, Condition 24	Refer to MCoA Sch 3, Condition 24 response.	Compliant	
Hazards	All chemicals, fuels and oils stored onsite will be contained within an appropriately designed impervious bunded area capable of containing 110% of the largest container stored within the bund. Bunds shall be design and installed in accordance with the requirements of relevant Australian Standards and/or the EPA Environment Protection Manual Technical Bulletin Bunding and Spill Management.	Not triggered	High	N/A	No chemical or oils stored onsite.	Compliant	
Community (DPE Compliance - Requirement)	Council will undertake consultation with relevant community stakeholders including during the site establishment period and will proactively engage with the community during operations. This will as a minimum include residents whose properties directly adjoining Council's landholding.	Observation	Medium	Discussion with Council staff.	Site establishment (major haul road construction) will commence in 2020. Consultation should commence soon.	Consultation should commence as the site establishment has commenced.	6
Environmental Management Strategy (May 2014) - [MCoA Sch 6, C.3 Requirement]							
V2 - Vegetation Clearing	Consult with ecologist to determine the location of suitable nearby habitat for the release of fauna that may be encountered during the pre-clearing process or habitat removal. Mark the pre-determined habitat identified for fauna release on a map.	Not triggered	Low	Discussion with Council staff.	No habitat has been removed yet. Stage 2 relevant to this.	Complaint	
V3 - Vegtation Clearing	The extent of vegetation required for clearing is to be pegged by a surveyor, approved by the Project Ecologist, and then demarcated with flagging rope or similar. No clearing is to occur outside of this delineation.	Not triggered	Medium	N/A	Not relevant until Stage 2.	Compliant	
V4 - Vegetation Clearing	Identify tree protection zones on treed areas to be excluded from clearing. The tree protection zone (TPZ) represents the area around the tree that should not be disturbed. Exclusion fencing and tree protection in accordance with the AS 4970-2009 Protection of trees on development sites shall be implemented. Tree dripline zones to be protected in retained vegetation.	Not triggered	Medium	N/A	Not relevant until Stage 2.	Compliant	
F1 - Fauna	Project site induction should ensure that all personnel do not feed the wildlife that may be encountered on construction sites (especially birds or lizards)	Compliant	Low	Induction Pack	Included in the induction Pack- presentation.	Compliant	
NB1 - Nest Boxes	Install 6 Nest boxes in Area 1 in order to offset a reduction in hollow recruitment in Eucalypts. Further nest boxes to be installed should any hollow bearing trees be impacted by the proposed works. Tweed Shire Council Project Ecologist will advise on nest box installation onsite. Taking into consideration the aspect, proximity to food resources and presence of Common Mynas.	Compliant	Medium	Nest Box Monitoring Report and	TSC have 2 ecologists and 1 botanist and they have been involved in the nest box design, installation and monitorig.	Compliant	
NB2 - Nest Boxes	Nest box design to be for use of petaurid gliders. Dimensions of nest boxes to be 400mm in height with internal dimensions 250mm x 300mm. The entrance diameter to be 450mm. The nest box lid will have at least 4cm overlap at sides and 8-10cm at the front. The nest boxes will be placed approximately 6m height above ground and be attached to trees by the Habisure method if possible. Nest boxes to be installed approximately 100m apart.	Compliant	Low	Discussion with Council staff.	Next box design has been consistent with the design as specified by the particular species identified for habitat mitigation.	Compliant	
NB3 - Nest Boxes	Monitoring of nest boxes, once per year for the first two years, skip the third year and check nest boxes on the fourth year. The need for future monitoring will be reviewed at this stage.	Administrative non-compliant	Low	Monitoring Report.	Monitoring report has been completed (6 months overdue) and was included Annual Review. Seek adviced ecologists as to best time for 2nd round of monitoring given the 1st round was delayed.	Ensure monitoring is undertaken as described in the nest box MP. Seek updated advise as to the next rounds of monitoring.	7
B4 - Vegetation Protection Area	Establish the vegetation protection area prior to construction	Compliant	Low	Sighted during site inspeciton.	Vegetation Protection Areas have been etablished and have neen fenced off.	Compliant	
B8 - Weeds	Ecologist or person trained in weed identification and management should undertake a site weed assessment to identify and describe weed infested areas to be disturbed by the proposed Early Works.	Compliant	Medium	Discussion with Council staff.	Identification of weeds has been undertalken by council staff.	Compliant	

B9 - Weeds	Haul Road Corridor As haul road construction commences effective weed control will be implemented in disturbed areas for early works for the weeds identified onsite in Appendix B of the Restoration Plan. Noxious Weeds Groundsel Bush (Baccharis halimifolia)- Class 3 Camphor Laurel (Cinnamomum camphora) Class 4 Lantana- Class 4 Weeds associated with a TSC Act Key Threatening Process listed under TSC Act Exotic vines or scramblers (Ipomoea cairica) Exotic perennial grasses (i.e. Paspalum urvillei and Setariasphacelata.	Observation	Low	Discussion with Council staff.	Weed control has occurred in the two revevegtation areas. Weed control has not occurred in the haul road construction area. Not really relevant as the disturbed areas have settlment fill on them. Some areas are being used as stockpile areas for culvents and headwalls. Opportunity to recommend weed inspection periodically.	Suggest implementing a regulary weed control activities to ensure weeds do not become problematic.	**8**
T1 - Movement of Heavy Vehicles	Traffic Management Plan. Contractors to prepare progressive traffic control plans for the movement of vehicles into and around the site for clearing and road construction. Traffic control plans are to be prepared in consultation with the operators of the existing landfill to ensure construction traffic does not impact on the operation of the landfill and vice versa.	Administrative non-compliant	Low	Discussion with Council staff.	TMP not relevant given the low volume of trucks. For instance 50 trucks have deposited materials over 52 weeks. Ie: 1 movement per week.	TMP appear to be over complicated for this point in the construction.	**9**
I1 - Induction and Training	All construction team members, contractors and sub-contractors are to be inducted in relation to environmental management issues prior to commencing work on the project. Induction package to be developed by contractor and Project Manager to induct minor contractors. The induction program is to address environmental issues relevant to the project.	Compliant	Medium	Induction Pack	Induction package has been prepared and is in operation.	Compliant	
I2 - Induction and Training	An induction procedure will be developed for all visitors to the site. The visitor induction is to address all environmental issues relevant to the activities that could be undertaken by the visitors. Visitors are not to be allowed to enter the site prior to completing the induction.	Compliant	Medium	Sign on sheet	Induction package has been prepared and is in operation and consultants/visitor are required to sign on. Sign on sheet sighted.	Compliant	
WQ3 - Water Quality	NOW officers will be consulted to determine licensing issues during detailed design in the event that any onsite infrastructure intercepts the water table, or if dewatering is required.	Not triggered	Medium	Discussion with Council saff.	This is required for detailed design of the quarry which has not occurred.	Complaint	
WQ4 - Water Quality	Groundwater licenses and associated approvals will be obtained prior to works commencing where required.	Compliant	Low	Discussion with Council staff.	Groundwater wells have been in place for over 10 years and do not require a license as they extract less than 3ML per year.		
Landscape Management Plan (March 2014) - [MCoA Sch 4, C.31 Requirement]							
No items to audit - relevant items in LMP are in EMS audit above							
Heritage Management Plan (January 2014) - [MCoA Sch 4, C.28 Requirement]					Include a general comment regarding re-wording some of the parts in the table 2 to say it only relates to high risk areas.		
1 (Item 1 In Table 6.1)	On-going consultation with the local Aboriginal community - Aboriginal Advisory Committee (hereafter referred to as AAC) Monthly meetings updates	Compliant	Medium	Discussion with Council Staff	Stage 1 of the Haul road is outside the high risk aboriginal predictive areas (Figure 2) of the plan and hence no consultaiton needed.	Compliant	
2 (Item 2 In Table 6.1)	Cultural Heritage Induction to be provided to contractors as part of the Contractor Inductions. Tweed Shire Council Representative to provide inductions to small groups of contractors and cultural heritage professional (currently Ian Fox and Associates) to provide larger contractor inductions. Inductions for large groups to be undertaken in collaboration with a representative of the Tweed Aboriginal community (ie nominee of AAC).	Compliant	Medium	See above	See above regarding cultural heritage inductions.	Compliant	
3 (Item 3 In Table 6.1)	Induction package to be developed based on collaborative approach between TSC and Ian Fox & Associates. Updated Cultural mapping from the Tweed Shire Council to be referred to. AAC to review and approve cultural content of the induction package.	Not triggered	Medium	Discussion with Council Staff	AAC not required to be involved in Induction Package for Stage 1. Stage 2 of Haul road Induction Pack would need to consult with the AAC.	Condition difficult to satiafy if project cannot get Converge/Fox. Recommend removing Converge/Fox from requirement or replace with LALC.	
4 (Item 4 In Table 6.1)	TBLALC to be contacted to book Sites Officers for removal of the first 20cm (nominal depth) of topsoil during the process of vegetation clearing and geotechnical test pitting on the high risk areas-ridgelines nominated in the EIS. Trainee sites officers to be accompanied by qualified sites officer with field kit.	Not triggered	Medium	Aboriginal High Risk Mapping	Stage 1 of the Haul road is outside the high risk aboriginal predictive areas (Figure 2) of the plan and hence not applicable plus no excavation is proposed.	Compliant	
5a (Item 5(a) Table 6.1)	Site Monitoring - Early Works TBLALC to be contacted to book Sites Officers for early works including: >geotechnical test pitting (not boring via drill rig) and clearing for survey. >Ridgeline Test pitting for the first 20cm (nominal depth) of soil removed. - Time allocated is 2 days. >Vegetation clearing for design survey on ridgelines. - Time allocated is 2 days. >For clearance of first 20cm (nominal depth) of topsoil on high risk areas as nominated in the EA and Cultural Mapping.	Not triggered	Medium	Aboriginal High Risk Mapping	Stage 1 of the Haul road is outside the high risk aboriginal predictive areas (Figure 2) of the plan and hence not applicable.	Compliant	
5b (Item 5(b) Table 6.1)	Site Monitoring - Road Construction TBLALC to be contacted to book Sites Officers during road construction for the removal of the first 20cm (nominal depth) of topsoil on ridges.	Not triggered	Medium	Aboriginal High Risk Mapping	Stage 1 of the Haul road is outside the high risk aboriginal predictive areas (Figure 2) of the plan and hence not applicable.	Compliant	
White Lace Flower Translocation Plan (June 2013) - [MCoA Sch 4, C.30 Requirement]							
3.3.1 - Pre-clearing targeted threatened plant survey (1st Paragraph)	Targeted threatened plant surveys are required. These will be undertaken as early as possible to allow for incorporation of additional information into the translocation plan. The need for targeted threatened plant species surveys was identified in the environmental assessment report for the Eviron Rd Q&L (GHD, 2010). This report suggested targeted surveys be undertaken once the final development footprint is determined..	Not triggered	High	Discussion with Council Staff	Sally Cooper (TSC Botanist). Final Development footprint has been determined. Clearing works have not started and hence this is not relavent yet.	Compliant	

3.3.1 - Pre-clearing targeted threatened plant survey (2nd Paragraph)	The development footprint would be surveyed and marked in the field to clearly demarcate the vegetation subject to disturbance and allow environmental scientists/botanists to accurately target their surveys. All threatened plant species identified during targeted surveys will be flagged and relevant information including species name, number of stems, height of each stem, condition and general observations recorded.		Medium	Sighted spreadsheet from botanist marked as none located and an email from the ecologist during follow up.	Survey of the areas was undertaken as part of the works for Phase 1 (Haul Road) which was included in the EIS FF report. No further surveys have been undertaken as the haul road design has not been finalised in the areas where the WLF is located.	Compliant	
3.3.1 - Basineline Data	Prior to out-planting, baseline data is to be collected from the out planting site. This will provide data on habitat traits at a micro level that can be compared between sites and over time to provide a better understanding on the species most preferable micro-habitat traits. Data to be collected includes: ¨ GPS location; ¨ Altitude; ¨ Slope; ¨ Aspect; ¨ Canopy coverage; ¨ Vegetation community association; ¨ Soil type; ¨ Landform morphology; ¨ Disturbances and overall ecological condition.	Not triggered	Medium	N/A	Not required yet - to be undertaken.		
Preliminary Restoration Plan (May 2011) - [MCoA Appendix 1 Biodiversity - Maintain and Enhance or Restore Habitat Connectivity]							
5.1	Records will be kept for each sample of propagation material and maintained from the time of collection, to the raising of seed/cuttings, planting out of tubestock and maintenance and monitoring period. The following information will be collected for each sample: ¨ Sample id code (unique code to be created for each sample – eg. 'EP_1', which represents Eucalyptus pilularis, plant 1); ¨ Source plant location (GPS coordinates and description); ¨ Date of collection; ¨ Type of material collected (eg. seed, cutting); ¨ Amount of material collected; ¨ Seed treatment technique; ¨ Date of sowing; ¨ Date of germination; ¨ Date of out-planting; ¨ Location of out-planting (GPS coordinates and description); ¨ Monitoring results (refer to Section 5.6.2 for proposed monitoring method). Each sample will be tagged with its Sample id code for the duration of its life cycle.	Administrative non-compliant	Low	Discussion with TSC staff.	Seed collection unable to occur. Propogation unable to occurr. Revegetation has commenced but the stock was not propogated, rather it was purchased and planted by local nurseries. It was decided by ecologist that using locally sourced seed for propogation was not nessesary.	Recommend amending the PRP using the justificiton provided by the ecologist.	**10**
5.2	Northern Riparian Corridor - Access by cattle to the restoration area will need to be controlled, either through destocking or fencing. Temporary fencing, such as electric tape, could be employed around revegetation clusters; however, would require maintenance to remain effective.	Compliant	Low	Sighted.	Cattle have been removed from the site and the fences have been checked and repaired where required.	Compliant	
5.3	The areas to be revegetated include: > Northern Riparian Corridor: a single row of trees along the entire length of the corridor (approximately 956m) with six additional revegetation clusters of approximately 50 x 20 m, focussed on open areas with minimal to no native canopy cover. This amounts to a total revegetation area of approximately 0.7ha of the total 1.9ha restoration area (the remainder will be treated with assisted regeneration). > Southern Ridgeline Corridor: focussed on gap in existing ridgeline vegetation centred around the existing residence on Lot 1 on DP34555. A 220m x 20m strip (an estimated 0.44ha will be revegetated) (refer to Figure 4).		Low	Discussion with TSC staff and the EnviTE Report (Annual Progress Report 1 - 2017).	20m corridor planted out along waterway/drain. Both the Northern Riparian Corridor and the Southern Ridgeline Corridor have been planted and subsequently maintained for the past 18 months.	Compliant	
Haul Road - Eviron Quarry & Road Soil Water Managament Plan (Sept 2016)							
1.1	For the purpose of this SWMP the term fill includes suitable material as classified within the NSW Waste Classification Guidelines (2014) and NSW Resource Recovery Exemptions and Orders. Prior to acceptance at site, material would be classified to determine if it meets any of the following criteria and therefore be suitable for importing to site. ¨ Virgin Excavated Natural Material or VENM ¨ Excavated Natural Material or ENM (refer to ENM exemption and order 2014) ¨ Excavated Public Road Material or EPRM (refer to TSC EPRM exemption and order 2016) Only material that meets the above listed criteria can legally be imported to site for the construction of the haul road. All material that is imported to site.	Compliant	Medium	EPRM Order and Exemption.	EPRM exemption ends in May 2018 but an extension has been issued on the 1 June 2018 which runs to 31 May 2020. Logged in database, kept on site with quarterly reports (internal). Quaterly report with volumes provided. WK.	Compliant	
3.2	Erosion and sediment control measures would be progressively staged and relocated as material is imported to the haul road site.	Compliant	Medium	Sighted during site inspection.	This condition has been complied with.	Compliant	
3.2	As works and stages progress, plans are to be updated, taking into consideration how to minimise areas of disturbance at any one time, characteristics of imported soils in relation to control measures and stabilising disturbed areas ASAP.	Compliant	Medium	Drawing file inspected.	Drawing No. INF7-29+ shows the ESCP for the site which is also contained in the SWMP.	Compliant	
3.2	A water quality (WQ) monitoring program would be undertaken to ensure stormwater that is discharged from the subject site is within discharge WQ discharge criteria. Refer to section 6.2 for discharge water quality objectives (WQO). The monitoring programme would include; o reporting procedures, o the frequency and triggers of site compliance audits, o discharge quality standards ,and o response to any non-compliances	Compliant	Medium	Discussion with Council staff and site inspection.	No water has been discharged from the site. Athol Wein has been using floculant on site water for moving water within the site including keeping records and is aware of the need.	Compliant	
4.2	Installation of erosion and sediment control measures will take place prior to commencement of site works. Reference to standard drawings (SD) relates to SD and designs from the Blue Book (Landcom, 2004). Common standard drawings proposed in this SWMP are listed in Appendix C.	Observation	Medium	Sighted during site inspection.	Some of the ERSED controls require maintanance and the end of the haul road requires a sediment fence to be installed.	ERSED controls require maintenance. Specifcially the sediment fence requires reparing and installation at the end of the stage 1 Haul road (near old tyres).	**11**
4.2	Due to the intermittent nature of importing material and the likely scenario of an intermittent site presence, it is likely that material would be stockpiled until a minimum volume is reached for spreading, rolling and compaction etc,, that is considered cost effective. All stockpiles will be managed with any runoff water directed to a sediment basin for management prior to discharging. Where stockpiles would be idle for > 10 days they would be stabilised to achieve a suitable C Factor of 0.1. Refer to section 5.2 for stabilisation measures.	Compliant	Low	Inspected during site inspection.	Topsoil stockpile is located on site which is protected by a sediment fence and is vegetated. No stockpiles of materials for compaction were on site.	Compliant	

4.3	The single site access point via Eviron Road would be a dedicated constructed entry and exit point. All vehicles would be directed over the following prior to leaving the site and entering public roads. Exit Point would consist of a vibration shaker grid installed into a stabilised rock pad (refer to SD6-14)	Compliant	Medium	Inspected during site inspection.	There is a single entry / exit point with a boom gate.	Compliant	
4.3	Construction water generated from within the haul road corridor would be directed via controls (diversion bunds or windrows, batter chutes, dissipaters, check dams, low flow drains) to a Type D sediment basin, designed and sized for each identified catchment eg SBW2 for catchment area ch.810 to ch. 725	Observation	Medium	Inspected during site inspection.	Sediment and basins are in place.	Sediment controls needs reparling and installation at the end of the Haul road.	**12**
6.1	A rain gauge will be installed and monitored on a daily basis to ensure rainfall at the haul road site is recorded. It would be the responsibility of the site supervisor to maintain a daily diary to record daily rainfall and observations. If an automated weather station (tipping bucket gauge) was installed any storm event could be classified with data used to assess the construction sites performance against such storm eg x year storm event, capacity of sediment basin.	Compliant	Low	Inspected during site inspection.	Weather station on site.	Compliant	
6.1	Inspections would be documented with the weekly or detailed inspection sheet (refer to templates in appendix G)	Administrative non-compliant	Low	Discussion with Council staff.	No formal inspection. Perhaps this needs to be relaxed due to the low level of construction.	Recommend relaxing due to the mimimal amount of work onsite.	**13**
6.1	All inspection reports and non-conformances would be acted upon quickly and a written response provided within 7 working days detailing the action taken or proposed actions. Amendment to on-site controls will also be update in this ESCP.	Not triggered	Low	Discussion with Council staff.	Not enough construction to justify the need for this requirement.	Compliant	
6.2	Once initial sampling rounds have been undertaken it is proposed to correlate turbidity results in NTU and total suspended solids (TSS) in mg/L for the purpose of determining compliance as turbidity can be assessed immediately on-site. Laboratory analysis for TSS will be undertaken every 2 months (when possible) to enable the ongoing verification of the relationship between turbidity and TSS. Table 9: Adopted Water Quality Objectives for Discharge Parameter / Water Quality Objectives (adopted discharge criteria) pH: 6.5 to 8.5 pH units [1,4] TSS (mg/L): <50mg/L [1,2] Turbidity: 6-50 NTU [2] Oil and Grease: Not Visible [1] Table Notes: * Frequency of monitoring listed in Table 3 [1] Tweed Shire Council Development Design Specification D7 – Stormwater Quality. [2] Aquatic ecosystem criteria from Australian and New Zealand Environment and Conservation Council (ANZECC)(2000), Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (Table 3.3.3 – Lowland rivers, and Table 3.4.1 – Freshwater criteria	Not triggered	Medium	Discussion with Council staff.	No Applicable - see above.	Compliant	
Nest Box Plan (within the Lanscape Management Plan MCoA Sch 4, C31(f)) July 2016							
3.2 Nest Box Locations	Nest boxes are to be installed within the Blackbutt Open Forest of Conservation Area 1 and Conservation Area 5. The majority of the nest boxes (six) are to be installed in Conservation Area 1 and the remainder (three) are to be installed in Conservation Area 5.	Compliant	Low	Nest boxes have been insalled and were sighted during site inspection.	This condition is compliant.	Compliant	
3.2 Nest Box Locations	Actual nest box locations and corresponding details on box type, aspect and location coordinates are to be recorded and included in Appendix A of this plan, post-installation.	Compliant	Low	Sighted nest box monitoring report.	This condition is complaint.	Compliant	
3.4 Nest Box Installation	Nest boxes are proposed to be monitored at the following times: ¨ Year 1: at the end of the first year after installation ¨ Year 2: during spring of the second year of installation ¨ Year 5: during spring of the fifth year of installation. Nest box monitoring would be undertaken by a qualified ecologist and would include recording details on the box type and location, an assessment of box condition and subsequent maintenance requirements, evidence of fauna occupation, and pest activity (e.g. Indian Myna's, termites, bees etc). Records of fauna activity and/or occupation of boxes would involve recording species, age class, number, sex, and fauna evidence such as nesting material, scats, hair/feathers etc. In the event that pest activity is precluding occupation of the box by native fauna, then the box would be modified or relocated to an appropriate site.	Compliant	Low	Nest Box Monitoring Report.	Nest box monitorig report in AR2017	Compliant	
Environ Haul Road Excavated Road Material Management Plan Ver 2.0 (Sep 2017)							
App A Resource Recovery Waste Order 4.1	The generator must keep a written record of the following for a period of six years: * the quantity and source location of any Tweed Shire Council excavated road material supplied; and * the name and address of each person to whom the generator supplied the Tweed Shire Council excavated road material.	Compliant	Medium	Discussion with Council staff.	* Athol Kiem (Tech Officer Quarry Operations and Quality Control). Trucks have a waste number and log there entry on site, TSC have a copy of the truck load and material to ensure compliance with the materials permitted onsite. * copy of name and address of the person is kept on the sub-contractor / supplier list.	Compliant	

Appendix C

Audit Team Curriculum Vitae

Simon WILLIAMS

BEnvP, MEnvLaw, CEnvP, RABQSA

Director
Environmental Auditor

Qualifications

Master of Environment Law, University of Sydney
Bachelor of Environmental Planning, University of Western Sydney

Professional Affiliations

Certified Environmental Practitioner (CEnvP)
Member of the Environment Institute of Australia and New Zealand (MEIANZ)
RABQSA Registered Auditor (Certification No. 114849)

Experience

Simon is an Environmental Planning and Environmental Law specialist with over 15 years' experience in environmental planning, approvals, land use and auditing within the development industry. Simon's qualifications and experience have enabled him to gain professional expertise in the key areas of environmental impact assessment, master-planning, community consultation, and environmental and planning licensing, permitting and approvals.

Simon's environmental impact assessment experience includes project-managing large multidisciplinary Environmental Impact Assessments, and preparation of expert witness statements for the NSW Land and Environment Court. His experience in project management has included preparing and undertaking detailed community and government consultation strategies and negotiating approvals, licenses, permits and conditions with consent authorities.

In addition to Simon's statutory specialist experience, he has also prepared several natural resource management and environmental auditing projects for the primary industry and mining sectors.

Key Experience

Simon has a diverse range of skills within the environment and planning industry drawing on his formal qualifications and experience with various environmental and planning firms. His statutory planning experience has largely been in urban planning and environmental impact assessment assisting clients with technical knowledge of development controls, and providing advice on specific development procedures and approvals.

A summary of skills and reports within the statutory planning framework include:

- Expert evidence and witness for the NSW Land and Environment Court and Commonwealth Administrative Appeals Tribunal.
- Preparation of Environmental Impact Assessment reports, including Statements of Environmental Effects, Environmental Impact Statements and Reviews of Environmental Factors.
- Environmental Project Management of large multidisciplinary projects.
- Preparation of environmental and planning advice, including specialist advice on NSW and Commonwealth environmental legislation.
- Community Consultation.
- Environmental auditing of construction, industrial and mining operations.
- Natural resource management.

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curriculum vitae

Duncan THOMSON

BE(Env)(Hons)

Director | Environmental Engineer

Qualifications

Bachelor of Environmental Engineering (1st Class Hons), University of Queensland, [1999]
Certified Environmental Management Systems Lead Auditor, Auditor Training Centre, [2016]

Experience

Duncan is an Environmental Engineer with a broad range of skills and experience. He has worked on a variety of infrastructure, development and environmental management projects and his experience covers the fields of water, wastewater, soils, noise, air quality, waste and energy. Aside from his technical skills and knowledge, he has substantial experience in project management, team collaboration, strategy development and stakeholder consultation.

Duncan has provided on-site environmental management services at infrastructure construction sites and industrial facilities. He has the ability to quickly understand the key priorities, opportunities and constraints of specific sites and develop strong working relationships with the broader team.

Key Experience and Skills

On-site Environmental Management

Working on site at construction projects and industrial facilities in the role of Environmental Manager or Environmental Advisor. Typical responsibilities include:

- Ensure compliance with approvals, permits and licences.
- Advise management team on environmental risks, constraints and opportunities.
- Undertake environmental reporting to regulatory authorities and management.
- Liaise with regulatory authorities and host site inspections and audits.
- Plan and coordinate environmental monitoring.
- Review and update environmental management documentation.
- Prepare environmental assessments and approval applications for operational changes.
- Manage environmental team.

Environmental Impact Assessment

- Coordinate the preparation of environmental assessment documents (e.g. EIS, SEE and REF).
- Manage consultants to undertake specialist studies (e.g. air quality, noise, contamination).

Environmental Monitoring

- Prepare monitoring plans (e.g. surface water, groundwater, soils, contaminated land and dust).
- Coordinate monitoring programs, including long term (5 yrs+) and large scale ($1M+) programs.

Options Assessment and Strategy Development

- Identify options to address specific environmental issues or challenges.
- Undertake systematic assessment of options to determine optimal strategy.

Environmental Auditing

- General environmental audits.
- Energy/ water audits of sites with high usage, including commercial buildings and factories.

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Appendix D

Compliance Table

08_0068 Schedule 2

Reference	Envirnmental Aspect	Item	Action Required	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of Project	Specific date required by	Status - Haul Road	Status - Quirks Landfill	Status - West Valley Quarry	Comment	Reference / Evidence
08_00068 - Schedule 2 - Administrative Conditions													
Condition 1	Obligation to Minimise Harm to the Environment	The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the project.	Ensure that all mitigation and management actions proposed as part of the project are implemented and maintained	Yes	Yes	Yes	During construction and operation	N/A	Ongoing				
Condition 2	Terms of Approval	The Proponent shall carry out the project generally in accordance with the: (a) EA; (b) statement of commitments (see Appendix 1); and (c) conditions of this approval.	Ensure that all conditions of approval and proposed commitments are implemented and complied with throughout the project	Yes	Yes	Yes	During construction and operation	N/A	Ongoing				
Condition 3	Terms of Approval	If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of any inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Ensure that the development complies with any conditions of approval.	Yes	Yes	Yes	During construction and operation	N/A	Ongoing				
Condition 4	Terms of Approval	The Proponent shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of: (a) any reports, plans, strategies, programs or correspondence that are submitted in accordance with this approval; and (b) the implementation of any actions or measures contained in these reports, plans, strategies, programs or correspondence.	Ensure that the development complies with any conditions of approval and mitigation measures identified in any supporting management plans.	Yes	Yes	Yes	During construction and operation	N/A	Ongoing				
	Limits on Approval - Quirks Quarry Landfill	**Landfilling Operations**											
Condition 5	Limits on Approval - Quirks Quarry Landfill	The Proponent is only permitted to commence landfilling operations at Quirks Quarry once: (a) the leachate management and collection system has been installed to the satisfaction of the EPA (see Condition 4 of Schedule 3); and (b) quarrying operations have been substantially completed and the internal haul road has been constructed and sealed to the satisfaction of the Director-General (see Condition 24 of Schedule 3).	Ensure landfilling of Quirks Quarry does not commence until quarrying operations and the internal haul road have been substantially completed and the leachate management and collection system has been installed.	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Limits on Approval - Quirks Quarry Landfill	**Waste Material Volume**											
Condition 6	Limits on Approval - Quirks Quarry Landfill	The Proponent shall not receive more than 75,000 tonnes of General Solid Waste on the site in any calendar year.	Install weigh bridge and implement management system to ensure compliance	No	Yes	No	During operations	N/A	Not Applicable				
	Limits on Approval - West Valley Quarry	**Quarrying Operations**											
Condition 7	Limits on Approval - West Valley Quarry	The Proponent must not commence operations at West Valley Quarry until it has received written approval to do so from the Director-General. Note: In seeking the Director-General's written approval, the Proponent must demonstrate that quarrying operations will have negligible groundwater impacts and that the relevant requirements of Conditions 20 and 21 of Schedule 4 have been addressed.	Seek written approval from the Director General prior to the commencement of quarrying operations at West Valley Quarry	No	No	Yes	Prior to commencement of works	N/A	Not Applicable				
Condition 8	Limits on Approval - West Valley Quarry	Once quarrying operations commence, the Proponent may operate West Valley Quarry for a period of no more than 11 years. Note: Under this approval, the Proponent is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Director-General. Consequently, this approval will continue to apply in all other respects other than the right to conduct quarrying operations until the rehabilitation of West Valley Quarry and those undertakings have been carried out to a satisfactory standard.	Note and record the date in which quarrying operations commenced.	No	No	Yes	During operations	11 Years after commencement of operations	Not Applicable				
	Limits on Approval - West Valley Quarry	**Extractive Material Extraction**											
Condition 9	Limits on Approval - West Valley Quarry	The Proponent must not extract more than 200,000 tonnes of extractive materials from the West Valley Quarry in any calendar year.	Develop and implement a regular survey regime to ensure compliance.	No	No	Yes	During operations	N/A	Not Applicable				
Condition 10	Limits on Approval - West Valley Quarry	Unless the Director-General agrees otherwise, the Proponent must not carry out quarrying operations below a pit base level of RL 4 metres. Note: This condition does not apply to the construction of any bores approved by NOW or pollution and sediment control structures described in the EA.	Develop and implement a regular survey regime to ensure compliance.	No	No	Yes	During operations	N/A	Not Applicable				
	Limits on Approval - West Valley Quarry	**Extractive Material Transport**					During operations						
Condition 11	Limits on Approval - West Valley Quarry	The Proponent shall not transport more than 200,000 tonnes of extractive material from the site in any calendar year.	Install weigh bridge and implement management system to ensure compliance	No	No	Yes	During operations	N/A	Not Applicable				
Condition 12	Production Data	The Proponent shall: (a) provide annual quarry production data to DRE using the standard form for that purpose; and (b) include a copy of this data in the Annual Review (see Condition 6 of Schedule 6).	Develop record keeping procedures and provide data annually as required	No	No	Yes	During operations	31st March annually during operation	Not Applicable				
Condition 13	Structural Adequacy	The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures are constructed in accordance with the relevant requirements of the BCA. Notes: · Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works. · Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.	Ensure compliance with condition	No	Yes	Yes	During construction	N/A	Not Applicable				
Condition 14	Protection of Public Infrastructure	The Proponent shall: (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.	Undertake dial-before-you-dig and locate services prior to commencement of works	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing				
Condition 15	Demolition	The Proponent shall ensure that all demolition work is carried out in accordance with Australian Standard AS 2601:2001: The Demolition of Structures, or its latest version.	Ensure compliance with condition	Yes	Yes	Yes	During construction	N/A	Ongoing				
Condition 16	Operation of Plant and Equipment	The Proponent shall ensure that all plant and equipment used for the project is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Ensure compliance with condition	Yes	Yes	Yes	During construction and operation	N/A	Ongoing				
Condition 17	Submission of Plans or Programs	With the approval of the Director-General, the Proponent may: (a) submit any strategy, plan or program required by this approval on a progressive basis; and/or (b) combine any strategy, plan or program required by this approval.	Note	Yes	Yes	Yes	Throughout entire project	N/A	Ongoing				
Condition 18	Submission of Plans or Programs	Until they are replaced by an equivalent strategy, plan or program approved under this approval, the Proponent shall continue to implement existing strategies, plans or programs for operations on site that have been approved by previous consents or approvals. Notes: · If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages and the trigger for updating the strategy, plan or program. · There must be a clear relationship between the strategy, plan or program that are to be combined.	Ensure compliance with condition	Yes	Yes	Yes	Throughout entire project	N/A	Ongoing				

08_0068 Schedule 3

Reference	Envirnmental Aspect	Item	Action Required	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of Project	Specific date required by	Status - Haul Road	Status - Quirks Landfill	Status - West Valley Quarry	Comment	Reference / Evidence
08_00068 - Schedule 3 - Specific Environmental Conditions - Quirks Quarry Landfill													
	Waste	**Restrictions on Receipt, Storage and Handling and Disposal of Waste**											
Condition 1	Waste	The Proponent shall only receive, store, handle or dispose of General Solid Waste or other classes of waste that are authorised for receipt on site by an EPL.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Waste	**Landfill Operations**											
Condition 2	Waste	Unless otherwise authorised by an EPL, the Proponent shall: (a) minimise the exposed or cleared areas at the landfill; (b) progressively revegetate all completed areas of the landfill and stabilise any exposed areas that are not required for operational purposes for a period greater than 90 days; (c) minimise the tracking of mud and waste from the site on public roads; (d) fill the landfill cells in a systematic manner; (e) maximise landfill compaction rates; (f) cover the active landfill area with at least 0.15 metres of VENM soil (or an alternative material approved by the EPA) at the end of daily waste disposal and compaction activities; (g) progressively cap the landfill cells with a capping layer approved by the EPA; (h) revegetate the covered landfill cells following the capping of each cell and once they reach their final design height. (i) rehabilitate all areas in accordance with the rehabilitation objectives in Condition 35 of this schedule. Note: There is an accompanying requirement to prepare and implement a Landfill Management Plan under condition 2 of Schedule 6 of this approval.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Soil, Water and Leachate	**Leachate Management and Collection System**											
Condition 3	Soil, Water and Leachate	No waste is permitted to be disposed of in the landfill until the Proponent has constructed the leachate management and collection system to the satisfaction of the EPA.	Construct leachate management and collection system	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Soil, Water and Leachate	**Leachate Management**											
Condition 4	Soil, Water and Leachate	The Proponent shall: (a) design and install the leachate management and collection system generally in accordance with the conceptual design in the EA and applicable Australian Standards or unless otherwise approved by the EPA; (b) ensure that leachate generated in the landfill is minimised and appropriately contained, collected and disposed of; (c) collect and store all leachate generated by the landfill within the landfill itself, until it is transferred to the leachate treatment plant for processing; (d) install a leachate barrier to be used for the direct impoundment of leachate (see Condition 5 of this schedule); (e) design and operate the leachate management system to prevent leachate from escaping to surface water, groundwater or the surrounding subsoils; (f) direct all surface water from areas not subject to waste disposal or leachate disposal away from the leachate management system; and (g) treat all water that has entered areas filled with waste, or been contaminated by leachate, as leachate; to the satisfaction of the Director-General.	Construct leachate management and collection system and operate in accordance with conditions	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Soil, Water and Leachate	**Stormwater Management**											
Condition 5	Soil, Water and Leachate	The Proponent shall: (a) design and install the stormwater management and collection system generally in accordance with the conceptual design in the EA and applicable Australian Standards; (b) ensure that the system capacity has been designed in accordance with the Blue Book Volumes 1 and 2B; (c) divert existing clean surface water around operational areas of the site; (d) direct all sediment laden water in overland flow away from the leachate management system; and (e) prevent cross-contamination of clean and sediment or leachate laden water, to the satisfaction of the Director-General.	Construct stormwater management and collection system and operate in accordance with conditions	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Soil, Water and Leachate	**Soil, Water and Leachate Management Plan**											
Condition 6	Soil, Water and Leachate	The Proponent shall prepare and implement a Soil, Water and Leachate Management Plan for landfilling operations in consultation with NOW and the EPA and to the satisfaction of the Director-General. This plan must be prepared and implemented by a suitably qualified and experienced person and be submitted for approval prior to commencement of landfilling operations. The plan must include: (a) a site water balance that: · identifies the source of all water collected or stored on site, including rainfall, stormwater and groundwater; · includes details of all water use on site and any discharges; and · describes the measures that will be implemented to minimise water use on site. (b) an erosion and sediment control plan that: · is consistent with the requirements in the latest version of the Blue Book Volume 1 and Volume 2B; · identifies the activities on site that could cause soil erosion and generate sediment; and · describe the measures that will be implemented to: > minimise soil erosion and the transport of sediment to downstream waters, including the location, function and capacity of any erosion and sediment control structures and maintain these structures over time; > ensure that any topsoil stockpiles on site are suitably managed to ensure that the topsoil in these stockpiles can be beneficially used in the proposed revegetation and rehabilitation of the site. (c) a leachate management plan that: · includes final detailed design specifications of the leachate management and collection system on site; and · demonstrates how the requirements of Conditions 3 and 4 of this schedule have been addressed; (d) a stormwater management plan that:	Prepare a Soil, Water and Leachate Management Plan and implement throughout the operational phase	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Soil, Water and Leachate	**Surface Water Discharges**											
Condition 7	Soil, Water and Leachate	The Proponent shall ensure that all surface water discharges from the site comply with the discharge limits (both volume and quality) set for the project in the EPL or with Section 120 of the POEO Act.	Develop and implement a water quality monitoring program in accordance with the EPL	No	Yes	No	During operation	N/A	Not Applicable				
	Soil, Water and Leachate	**Bunding**											
Condition 8	Soil, Water and Leachate	The Proponent shall store all liquid chemicals, fuels and oils used on the site in appropriately bunded areas that have been designed and installed in accordance with the requirements of all relevant Australian Standards and DECCW's Storing and Handling Liquids: Environmental Protection manual.	Construct suitably sized and bunded storage facility at the site	No	Yes	No	During operation	N/A	Not Applicable				
	Air Quality	**Meteorological Monitoring**											

Condition 9	Air Quality	During the life of the project, the Proponent shall ensure that there is a suitable meteorological station on the site that complies with the requirements in the latest version of the Approved Methods for Sampling of Air Pollutants in New South Wales guideline. The meteorological station must be maintained so as to be capable of continuously monitoring the following parameters: air temperature, wind direction, wind speed, rainfall and relative humidity.	Purchase, install and maintain a meteorological station at the site	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Air Quality	**Operating Conditions**											
Condition 10	Air Quality	The Proponent shall: (a) implement best management practice, including all reasonable and feasible dust and odour mitigation measures to prevent and minimise dust emissions from landfilling operations; (b) prevent and minimise the air quality impacts of landfilling operations during adverse meteorological conditions and extraordinary events (see Note d to Tables 3 to 5 in Schedule 4); (c) regularly assess air quality monitoring data and relocate, modify, and/or stop landfilling operations to ensure compliance with the relevant conditions of this approval; (d) minimise any visible off-site air pollution; and (e) minimise surface disturbance of the site, other than as permitted under this approval.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Air Quality	Air Quality Management Plan											
Condition 11	Air Quality	The Proponent shall prepare and implement an Air Quality Management Plan for landfilling operations in consultation with the EPA and to the satisfaction of the Director-General. The plan must: (a) be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General; (b) be submitted for approval by the Director-General prior to commencement of landfilling operations; (c) describe the measures that will be implemented to ensure: · best management practice is employed; · the air quality impacts from landfilling are minimised during adverse meteorological conditions and extraordinary events; and · compliance with the relevant conditions of this approval. (d) describes the air quality management system; (e) includes an air quality monitoring program that: · is capable of evaluating the performance of the landfill; · includes a protocol for determining any exceedances of the relevant conditions of approval and responding to complaints; · adequately supports the air quality management system; and · evaluates and reports on the effectiveness of the air quality management system.	Develop and implement an air quality management plan for landfilling operations to the satisfaction of the Director General	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Air Quality	**Greenhouse Gas**											
Condition 12	Air Quality	The Proponent shall implement all reasonable and feasible measures to minimise: (a) energy use from landfilling operations; and (b) greenhouse gas emissions from landfilling operations, to the satisfaction of the Director-General.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Air Quality	Greenhouse Gas Abatement Strategy											
Condition 13	Air Quality	The Proponent shall prepare and implement a Greenhouse Gas Abatement Investigation Report to the satisfaction of the Director-General. The report must: (a) be submitted to the Director-General by 31 December 2013; and (b) examine opportunities to flare or reuse greenhouse gas emissions from landfilling operations.	Develop and implement a Greenhouse Gas Abatement Investigation Report	No	Yes	No	Prior to commencement of works and ongoing throughout the project	31-December-2013	Complete	Complete	Complete		
	Air Quality	Energy Savings Action Plan											
Condition 14	Air Quality	The Proponent shall prepare and implement an Energy Savings Action Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in accordance with the Guidelines for Energy Savings Action Plans (DEUS 2005, or its latest version); (b) be submitted to the Director-General for approval by 31 December 2013; and (c) include a program to monitor the effectiveness of measures to reduce energy use on site.	Develop and implement an Energy Savings Action Plan	No	Yes	No	Prior to commencement of works and ongoing throughout the project	31-December-2013	Complete	Complete	Complete		
	Air Quality	**Odour**											
Condition 15	Air Quality	The Proponent shall not cause or permit the emission of offensive odours from the site, as defined under Section 129 of the POEO Act.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Noise	**Landfill Operating Hours**											
Condition 16	Noise	The Proponent must comply with the hours of operation in Table 1, unless agreed to in writing by the Director-General. *Table 1. Landfill Hours of Operation* **Activity** / **Days** / **Hours** Landfilling and associated activities / Monday to Friday / 7am to 4pm Saturday and Sunday / 9am to 4pm Public Holidays / 9am to 4pm Note: Operational activities are permitted to take place outside of these hours provided they are inaudible from surrounding receivers.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Noise	**Operating Conditions**											
Condition 17	Noise	The Proponent shall: (a) implement best management practice, including all reasonable and feasible noise management and mitigation measures to prevent and minimise operational, low frequency and traffic noise generated by landfilling operations; (b) minimise the noise impacts of landfilling operations during adverse meteorological conditions when noise criteria do not apply; (c) maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not used operationally until fully repaired; and (d) regularly assess noise monitoring data and relocate, modify and/or stop landfilling operations to ensure compliance with the relevant conditions of this approval.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Noise	**Noise Management Plan**											

Condition 18	Noise	The Proponent shall prepare and implement a Noise Management Plan for landfilling operations in consultation with the EPA and to the satisfaction of the Director-General. The plan must: (a) be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General; (b) be submitted for approval by the Director-General prior to commencement of landfilling operations; (c) describe the measures that will be implemented to ensure: · best management practice is being employed on site; and · the noise impacts of landfilling operations are minimised during any meteorological conditions when the noise criteria in this approval do not apply; · compliance with the relevant conditions of this approval. (d) describe the noise management system; (e) includes a noise monitoring program that: · is capable of evaluating the performance of the landfill; · includes a protocol for determining exceedances of the relevant conditions of this approval and responding to complaints; and · adequately supports the noise management system; and · evaluates and reports on the effectiveness of the noise management system.	Develop and implement a noise management plan to the satisfaction of the Director General	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Transport	**Traffic Monitoring**											
Condition 19	Transport	The Proponent shall: (a) keep accurate records of the volume of waste transported to the site; (b) nominate a haulage route to be used by heavy vehicles accessing the landfill; and (c) make these records available in its Annual Report.	Develop and implement waste tracking and record keeping procedure	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Transport	**Road Signage**											
Condition 20	Transport	Prior to carrying out landfilling operations under this approval, the Proponent shall: (a) clear roadside vegetation and install intersection distance advisory sign on the approach to the Leddays Creek Road/Site Access intersection to improve driver awareness of the intersection; (b) install hinged "Trucks entering" warning signs 200 metres either side of the Site Access, and ensure that these signs are open during hours in which the landfill is operating (see Condition 17 of this schedule); and (c) install Koala crossing signs on either side of the landfill entrance, to the satisfaction of the Director-General.	Ensure compliance with condition	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Transport	**Operating Conditions**											
Condition 21	Transport	The Proponent shall ensure that: (a) landfill vehicles on site do not exceed a speed limit of 30 kilometres per hour; (b) all loaded landfill vehicles entering or leaving the site have their loads covered; and (c) all loaded landfill vehicles leaving the site are cleaned of dirt, sand and other materials before they leave the site, to avoid tracking these materials on public roads.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
Condition 22	Transport	The Proponent shall implement all reasonable and feasible measures to minimise project-related heavy vehicle traffic on the landfill haulage routes during hours in which school buses are operating these routes to the satisfaction of the Director-General.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Transport	**Traffic Management Plan**											
Condition 23	Transport	The Proponent shall prepare and implement a Transport Management Plan for landfilling operations in consultation with RMS and to the satisfaction of the Director-General. The plan must: (a) be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General; (b) be submitted for approval by the Director-General prior to commencement of landfilling operations; (c) include a plan showing the landfill haulage route to be used by heavy vehicles; (d) include a drivers code of conduct; (e) describe the measures that will be implemented to ensure: · the nominated haulage route in used; · haulage is minimised or routes altered to avoid school buses; · a CB radio communication protocol is established with local bus companies, to improve driver awareness of landfill truck and school bus locations along haulage routes; · drivers adhere to the code of conduct; and · compliance with the relevant conditions of this approval. (f) include a program to monitor the effectiveness of these measures.	Develop and implement a traffic management plan to the satisfaction of the Director General	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Transport	**Internal Haul Road**											
Condition 24	Transport	The Proponent shall ensure that the internal haul road from the Site Access to Quirks Quarry Landfill is constructed generally in accordance with the concept design in the EA and applicable Australian Standards to the satisfaction of the Director-General.	Ensure compliance with condition	Yes	Yes	No	Prior to commencement of works	N/A	Ongoing				
	Fire Management	**Bushfire**											
Condition 25	Fire Management	The Proponent shall prepare and implement a Bushfire Assessment for the site to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with NSW RFS; (b) be submitted to the Director-General for approval prior to commencement of landfilling operations; (c) be prepared in accordance with Planning for Bush Fire Protection 2006 and any other relevant guidelines.	Develop and implement a bushfire assessment for the site to the satisfaction of the Director General	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Fire Management	**Fire Management**											
Condition 26	Fire Management	The Proponent shall: (a) implement suitable measures to prevent and minimise the risk of fire on site; (b) extinguish any fires on site promptly; and (c) maintain adequate fire-fighting capacity on site, including a fire fighting tanker.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Infrastructure and Services	**Infrastructure and Services**											
Condition 27	Infrastructure and Services	The Proponent shall prepare and implement an Infrastructure and Services Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with relevant utility and service providers; (b) include an implementation schedule which shows how all essential infrastructure and services are to be provided on site, including: · water supply, sewer, gas, electricity, telecommunications services; · fire-fighting services, including the location of fire brigade access; · external lighting; · stormwater management, including the provision of any rainwater harvesting infrastructure; and · parking and access. (c) provide a copy of all necessary approvals from relevant utility and service providers showing that access to these utilities and services is available and secured.	Develop and implement an infrastructure and services plan to the satisfaction of the Director General	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Visual	**Lighting**											

Condition 28	Visual	The Proponent shall ensure that the lighting associated with the project: (a) complies with the latest version of AS 4282(INT) – Control of Obtrusive Effects of Outdoor Lighting; and (b) is mounted, screened and directed in such a manner that it does not create a nuisance to surrounding properties or the public road network.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Visual	**Signing and Fencing**											
Condition 29	Visual	The Proponent shall not install any signage or fencing on site without the written approval of the Director- General. In seeking this approval, the Proponent shall: (a) submit detailed plans of the proposed signage or fencing; and (b) demonstrate that the proposed signage or fencing is consistent with the relevant requirements of Council's DCP.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
	Security and Pest Control	**Site Security**											
Condition 30	Security and Pest Control	The Proponent shall: (a) install and maintain a perimeter stock fence and security gates on the site; and (b) ensure that the security gates on site are locked whenever the site is unattended.	Ensure compliance with condition	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Security and Pest Control	**Litter Control**											
Condition 31	Security and Pest Control	31. The Proponent shall: (a) implement suitable measures to prevent the proliferation of litter both on and off site, including the installation and maintenance of a mesh fence of not less than 1.8 metres high around the proposed landfill area; and (b) inspect daily and clear the site (and the surrounding area) of litter on at least a weekly basis.	Develop and implement a litter management procedure for the site	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Security and Pest Control	**Pest, Vermin and Noxious Weed Management**											
Condition 32	Security and Pest Control	The Proponent shall: (a) implement suitable measures to manage pests, vermin and declared noxious weeds on site; and (b) inspect the site on a regular basis to ensure that these measures are working effectively, and that pests, vermin or noxious weeds are not present on site in sufficient numbers to pose an environmental hazard, or cause the loss of amenity in surrounding area. Note: For the purposes of this condition, noxious weeds are those species subject to an order declared under the Noxious Weed Act 1993.	Develop and implement a pest, vermin and weed management procedure for the site	No	Yes	No	During operation	N/A	Not Applicable				
Condition 33	Waste	The Proponent shall (a) minimise the waste generated by the project; and (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of, to the satisfaction of the Director-General.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				
Condition 34	Waste	The Proponent shall prepare and implement a Waste Management Plan for the project in consultation with the EPA and to the satisfaction of the Director-General. This plan must: (a) be submitted for approval prior to commencement of landfilling operations; (b) identify the waste streams of the project; and (c) monitor the volumes of waste material being generated by the project.	Develop and implement a waste management plan for the site to the satisfaction of the Director General	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Rehabilitation	**Rehabilitation Objectives**											
Condition 35	Rehabilitation	The Proponent shall rehabilitate the site to the satisfaction of the Director-General. This rehabilitation must be generally consistent with the proposed rehabilitation strategy in the EA and depicted in Appendix 5, and comply with the objectives in Table 2. *Table 2: Rehabilitation Objectives* **Feature** / **Objective** Site (as a whole) / Safe, stable & non-polluting Quirks Quarry Landfill / Suitable for grazing Benched Quarry Walls / Landscaped with native endemic flora species Quarry Pit Floors / Suitable for grazing Other land affected by the project / Restore ecosystem function, including maintaining or self sustaining eco-systems comprising of native endemic species Surface Infrastructure / To be decommissioned and removed, unless the Director-General agrees otherwise	Ensure compliance with condition	No	Yes	No	Following completion of operations	N/A	Not Applicable				
	Rehabilitation	**Progressive Rehabilitation**											
Condition 36	Rehabilitation	The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.	Ensure compliance with condition	No	Yes	No	During operation	N/A	Not Applicable				

08_0068 Schedule 4

Reference	Envirnmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of Project	Specific date required by	Status - Haul Road	Status - Quirks Landfill	Status - West Valley Quarry	Comment	Reference / Evidence
08_00068 - Schedule 4 - Specific Environmental Conditions - West Valley Quarry													
Condition 1	Identification of Approved Limits of Extraction	Prior to carrying out quarrying operations under this approval, the Proponent shall: (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction; and (b) submit a survey plan of these boundaries to the Director-General.	Engage a surveyor to identify and mark out the quary boundaries and submit a plan to the Director General	No	No	Yes	Prior to commencement of works	N/A	Not Applicable				
Condition 2	Identification of Approved Limits of Extraction	Whenever quarrying operations are being carried out, the Proponent shall ensure that these boundaries are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify the limits of extraction.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
	Air Quality	**Air Quality Criteria**											
Condition 3	Air Quality	The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated on site do not exceed the criteria in Tables 3 to 5 at any residence on privately-owned land, or on more than 25% of any privately-owned land. *Table 3: Long-Term Impact Assessment Criteria for Particulate Matter* **Pollutant** / **Averaging Period** / **[d] Criterion** Total Suspended particulates (TSP) / Annual / # 90 µg/m³ Particulate matter < 10 µg (PM10) / Annual / # 30 µg/m³ *Table 4: Short Term Impact Assessment Criteria for Particulate Matter* **Pollutant** / **Averaging Period** / **d Criterion** Particulate matter < 10 µg (PM10) / 24 hour / # 50 µg/m³ *Table 5: Long-Term Impact Assessment Criteria for Deposited Dust* **Pollutant** / **Averaging Period** / **Maximum increase in deposited dust level** / **Maximum total deposited dust level** [c] Deposited dust / Annual / # 2 g/m²/month / # 4 g/m²/month	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
	Air Quality	**Operating Conditions**											
Condition 4	Air Quality	The Proponent shall: (a) implement best management practice, including all reasonable and feasible dust mitigation measures to prevent and minimise dust emissions from quarrying operations; (b) minimise the air quality impacts of quarrying operations during adverse meteorological conditions and extraordinary events (see Note d to Tables 3 to 5 in this schedule); (c) regularly assess air quality monitoring data and relocate, modify, and/or stop quarrying operations at to ensure compliance with the relevant conditions of this approval; (d) minimise any visible off-site air pollution; and (e) minimise surface disturbance of the site, other than as permitted under this approval.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
	Air Quality	**Air Quality Management Plan**											
Condition 5		The Proponent shall prepare and implement an Air Quality Management Plan for quarrying operations in consultation with the EPA and to the satisfaction of the Director-General. The plan must: (a) be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General; (b) be submitted for approval by the Director-General prior to commencement of quarrying operations; (c) describe the measures that will be implemented to ensure: · best management practice is employed; · the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events; and · compliance with the relevant conditions of this approval. (d) describes the air quality management system; (e) includes an air quality monitoring program that: · is capable of evaluating the performance of the quarry; · includes a protocol for determining any exceedances of the relevant conditions of approval; · adequately supports the air quality management system; and · evaluates and reports on the effectiveness of the air quality management system.	Develop and implement an air quality management plan for quarrying operations to the satisfaction of the Director General	No	No	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
Condition 6	Greenhouse Gas	The Proponent shall implement all reasonable and feasible measures to minimise: (a) energy use from quarrying operations; and (b) the greenhouse gas emissions produced from quarrying operations, to the satisfaction of the Director-General.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
	Noise	**Noise Criteria**											
Condition 7	Noise	The Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 6 at any residence on privately-owned land. *Table 6: Noise Criteria* **Receivers** / **LAeq (15 minute) dB(A)** 1, 2, 4, 5, 6, 7 / 47 All other privately owned land / 35 Notes: · To identify the receivers referred to in Table 6, see the plan in Appendix 3. · Noise generated by the site is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy. These criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
	Noise	**Hours of Operation**											
Condition 8	Noise	The Proponent must comply with the hours of operation in Table 7, unless agreed to in writing by the Director-General. *Table 7: Quarry Hours of Operation* **Activity** / **Days** / **Hours** Quarrying / Monday to Friday / 7am to 5pm Saturday / 7am to 12pm Blasting / Monday to Friday / 9am to 3pm Saturday / Nil Hauling / Monday to Friday / 7am to 5pm Saturday / 7am to 12pm Sundays and Public Holidays / Nil Note: Operational activities are permitted to take place outside of these hours provided they are inaudible from surrounding receivers.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
	Noise	**Operating Conditions**											

Condition 9	Noise	The Proponent shall: (a) implement best management practice, including all reasonable and feasible noise management and mitigation measures to minimise operational, low frequency and traffic noise generated by quarrying operations; (b) minimise the noise impacts of quarrying operations during adverse meteorological conditions when noise criteria do not apply; (c) maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not used operationally until fully repaired; and (d) regularly assess the monitoring data and relocate, modify and/or stop quarrying operations to ensure compliance with the relevant conditions of this approval.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
	Noise	**Noise Management Plan**											
Condition 10	Noise	The Proponent shall prepare and implement a Noise Management Plan for quarrying operations in consultation with the EPA and to the satisfaction of the Director-General. The plan must: (a) be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General; (b) be submitted for approval by the Director-General prior to commencement of quarrying operations; (c) describe the measures that will be implemented to ensure: · best management practice is being employed on site; · the noise impacts of quarrying operations are minimised during any meteorological conditions when the noise criteria in this approval do not apply; and · compliance with the relevant conditions of this approval. (d) describe the noise management system; (e) includes a noise monitoring program that: · is capable of evaluating the performance of the quarry, including individual items of plant such the hard rock drill and the quarry processing plant; · includes a protocol for determining exceedances of the relevant conditions of this approval; and · evaluates and reports on the effectiveness of the noise management system.	Develop and implement a noise management plan to the satisfaction of the Director General	No	No	Yes	During operation	N/A	Not Applicable				
	Blasting	**Blasting Criteria**											
Condition 11	Blasting	The Proponent shall ensure that blasting on site does not cause exceedances of the criteria in Tab *Table 8: Blasting Criteria* **Receiver** / **Airblast Overpressure (dB(Lin Peak))** / **Ground Vibration (ppv(mm/s))** / **Allowable Exceedance** Residence on privately-owned land: 115 / 5 / 5% of the total number of blasts over a period of 12 months 120 / 10 / 0% All public infrastructure: -- / 50, or alternatively a specific limit determined to the satisfaction of the Director-General by the structural design methodology in AS 2187.2-2006, or its latest version / 0% Note: These criteria do not apply if the Proponent has a written agreement with the relevant owner, and has advised the Department in writing of the terms of this agreement.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
		Blasting Hours											
Condition 12	Blasting	The Proponent shall only carry out blasting on site between 9am and 3pm Monday to Friday inclusive. No blasting is permitted on Saturdays, Sundays, public holidays, or at any other time without the written approval of the Director-General.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
		Blasting Frequency											
Condition 13	Blasting	The Proponent shall not carry out more than 1 blast a day unless an additional blast is required following a blast misfire.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
		Property Investigations											
Condition 14	Blasting	If the owner of any of the receivers shown on the plan in Appendix 3 claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and (b) give the landowner a copy of the property investigation report. If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damage to the satisfaction of the Director-General. If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
		Operating Conditions											
Condition 15	Blasting	During quarrying operations on site, the Proponent shall: (a) implement best management practice to: · protect the safety of people and livestock in the surrounding area; · protect public or private infrastructure/property in the surrounding area from any damage; and · minimise the dust and fume emissions of any blasting; (b) minimise the frequency and duration of any road closures, and avoid road closures during peak traffic periods; and (c) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site, to the satisfaction of the Director-General.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
Condition 16	Blasting	The Proponent shall not undertake blasting on site within 500 metres of: (a) any public road without the approval of the appropriate road authority; or (b) any land outside the site that is not owned by the Proponent, unless: · the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent has advised the Department in writing of the terms of this agreement, or · the Proponent has: > demonstrated to the satisfaction of the Director-General that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and > updated the Blast Management Plan to include the specific measures that will be implemented while blasting is being carried out within 500 metres of the land.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
		Blast Management Plan											

Condition 17	Blasting	The Proponent shall prepare and implement a Blast Management Plan for quarrying operations in consultation with the EPA and to the satisfaction of the Director-General. The plan must: (a) be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General; (b) be submitted for approval by the Director-General prior to commencement of quarrying operations; (c) describe the blast management and mitigation measures that will be implemented to ensure compliance with the relevant conditions of this approval; (d) describe the measures that will be implemented to ensure that the public can get up to date information on the proposed blasting schedule on the site; and (e) including a blast monitoring program to evaluate the performance of the project.	Develop and implement a blast management plan for the site to the satisfaction of the Director General	No	No	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Soil and Water	**Licencing**											
Condition 18	Soil and Water	Prior to commencement of quarry construction, the Proponent is required to obtain the necessary water licences for the project under the Water Act 1912 and/or the Water Management Act 2000. Note: Licenses are required for groundwater bores, dams, excavations that may intercept groundwater, dewatering activities and extraction or interception of surface water.	Apply for and obtain necessary water licences for the project under the Water Act 1912 and/or the Water Management Act 2000.	No	No	Yes	Prior to commencement of works	N/A	Not Applicable				
	Soil and Water	**Water Supply**											
Condition 19	Soil and Water	The Proponent shall ensure that it has sufficient water during all stages of the project and, if necessary, adjust the scale of quarrying operations to match its available supply.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
	Soil and Water	**Groundwater Assessment**											
Condition 20	Soil and Water	The Proponent shall prepare a groundwater assessment for quarrying operations in consultation with NOW and to the satisfaction of the Director-General. The plan must: (a) be prepared by a suitably qualified and experienced person whose appointment has been approved by the Director-General; (b) be submitted for approval by the Director-General prior to commencement of quarrying operations; (c) include a monitoring program including: · installation and monitoring of groundwater bores to determine groundwater levels, flow direction and quality within the alluvium of the Tweed River flood plain and adjacent hard rock aquifers; · provision of bore logs showing construction details and geological units; · 6 hourly data logging of groundwater levels and fortnightly sampling data of groundwater quality to establish temporal trends for a minimum period of 12 months; and · pump testing to determine hydraulic properties and yield for the alluvium and hard rock aquifers; (d) a groundwater model that identifies: · the extent of depressurisation resulting from the project; · the predicted drawdown or loss of supply to any water courses or groundwater users; and · the predicted impacts on any groundwater dependent ecosystems.	Prepare a groundwater assessment for quarrying operations to the satisfaction of the Director General	No	No	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Soil and Water	**Water Management Plan**											
Condition 21	Soil and Water	The Proponent shall prepare and implement a Water Management Plan for quarrying operations in consultation with the EPA and NOW and to the satisfaction of the Director-General. The plan must be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General and be submitted for approval by the Director-General prior to commencement of quarrying operations. The plan must be consistent with the latest version of the Blue Book Volume 2E. The plan must include a: (a) Site Water Balance that: · includes details of: > sources and security of water supply, including contingency planning for future reporting periods; > water use on site; > any off-site water transfers; > water management on site; > reporting procedures, including comparisons of the site water balance each calendar year; and · the measures that will be implemented to minimise clean water use on site. (b) Surface Water Management Plan that includes: · detailed baseline data on surface water flows and quality in the creeks and water-bodies that could be affected by the project; · a detailed description of the surface water management system on site, including the: > clean water diversion systems; > erosion and sediment controls; and > water storages. · a plan for extracting, handling, and emplacing any long term potentially acid-forming material identified on the site; · detailed plans, including design objectives and performance criteria, for:	Develop and implement a water management plan for the site to the satisfaction of the Director General	No	No	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
Condition 22	Acid Sulfate Soils	The Proponent shall: (a) carry out Acid Sulfate Soil (ASS) testing for areas of the site to be disturbed in accordance the NSW State Government's Acid Sulfate Soils Manual (ASSMAC 1998); (b) provide all results of this testing to OEH; and (c) should testing indicate that any potential or actual ASS may be disturbed during the life of the project, the Proponent shall prepare and implement an ASS Management Plan in accordance with Condition 23 of this schedule.	Undertake ASS investigations for the site	No	No	Yes	Prior to commencement of works	N/A	Not Applicable				
Condition 23	Acid Sulfate Soils	If potential or actual ASS are identified on the site (refer to Condition 22 of this schedule), the Proponent shall prepare and implement an ASS Management Plan for the project to the satisfaction of the Director- General. This Plan must: (a) be prepared in consultation with OEH and NOW by a suitably qualified and experienced expert; (b) be submitted for approval by the Director-General prior to disturbing areas of the site where potential or actual ASS is present; (c) outline the preliminary investigations that have been undertaken to test for the presence of ASS; (d) detail the protocols to be put in place and followed in the event that ASS is encountered; (e) detail how the ASS will be tested, handled and stockpiled; (f) detail measures to prevent erosion and sedimentation of ASS; and, if necessary (g) outline how the ASS will be disposed of off-site (e.g. at a licensed facility).	If investigations indicate the presence of ASS, develop and implement an ASS management plan for the site	No	No	Yes	Prior to commencement of works	N/A	Not Applicable				
		Traffic Monitoring											

Condition 24	Transport	The Proponent shall: (a) keep accurate records of amount of the volume of quarry products transported from the site; (b) nominate a haulage route to be used by heavy vehicles accessing the quarry; and (c) make these records available in its Annual Report.	Develop and implement a material tracking and record keeping procedure	No	No	Yes	During operation	N/A	Not Applicable				
	Transport	**Operating Conditions**											
Condition 25	Transport	The Proponent shall ensure that: (a) quarry vehicles on site do not exceed a speed limit of 30 kilometres per hour; (b) all loaded quarry vehicles entering or leaving the site have their loads covered; and (c) all loaded quarry vehicles leaving the site are cleaned of dirt, sand and other materials before they leave the site, to avoid tracking these materials on public roads.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
Condition 26	Transport	The Proponent shall implement all reasonable and feasible measures to minimise project-related heavy vehicle traffic on the nominated quarry haulage routes during hours in which school buses are operating these routes to the satisfaction of the Director-General.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable				
		Traffic Management Plan											
Condition 27	Transport	The Proponent shall prepare and implement a Transport Management Plan for quarrying operations in consultation with RMS and to the satisfaction of the Director-General. The plan must: (a) be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General; (b) be submitted for approval prior to commencement of quarrying operations; (c) include a plan showing the quarry haulage route to be used by heavy vehicles; (d) include a drivers code of conduct; (e) describe the measures that will be implemented to ensure: · the nominated haulage route in used; · haulage is minimised or routes altered to avoid school buses; · a CB radio communication protocol is established with local bus companies, to improve driver awareness of quarry truck and school bus locations along haulage routes; · drivers adhere to the code of conduct; and · compliance with the relevant conditions of this approval. (f) include a program to monitor the effectiveness of these measures.	Develop and implement a transport management plan to the satisfaction of the Director General	No	No	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Heritage	**Heritage Management Plan**											
Condition 28	Heritage	The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH and Aboriginal stakeholders; (b) be submitted to the Director-General for approval prior to commencement of surface disturbance; (c) include an Aboriginal Cultural Heritage Induction Program for all personnel and contractors involved in construction and operational activities on the site; (d) describe the measures that will be implemented to: · monitor all new surface disturbance on site for unidentified heritage objects; · manage the discovery of any human remains or previously unidentified heritage objects on site; and · ensure ongoing consultation with Aboriginal stakeholders in the conservation and management of any Aboriginal cultural heritage values on site.	Develop and implement a heritage management plan for the site to the satisfaction of the Director General	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Complete	Complete	Complete		
	Landscape	**Biodiversity Offset**											
Condition 29	Landscape	By 31 December 2013, unless the Director-General agrees otherwise, the Proponent shall: (a) implement the biodiversity offset strategy as described in the EA, summarised in Table 9, and described and depicted in the figure in Appendix 4; and (b) make suitable arrangements, in consultation with OEH, to provide appropriate long term conservation security for Area 1, to the satisfaction of the Director-General. *Table 9: Biodiversity Offset Strategy* **Area** / **Summary of Offset** / **Minimum Size** Area 1 — Retention and management of existing vegetation to be designated as natural area of bushland — 6.5 hectares Area 2 — Revegetation of drainage line using locally sourced swamp sclerophyll/koala feed trees and provide alternative corridor for connectivity across cleared area — 1.9 hectares Area 3 — Revegetation of ridgeline using koala feed trees and other fauna resources to enhance connectivity along ridgeline — 0.4 hectares Area 5 — Retention and management of native vegetation including potential koala feed trees — 1.1 hectares Area 6 — Retention of vegetated corridor along ridgeline and connectivity to native vegetation — 2.2 hectares	Implement the biodiversity offset strategy for the site	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	31st December 2013					
		White Lace Flower Translocation Plan											
Condition 30	Landscape	The Proponent shall prepare and implement a Translocation Plan for the White Lace Flower to the satisfaction of the Director-General. This plan must: (a) be prepared by suitably qualified and experienced persons whose appointment has been approved by the Director-General; (b) be prepared in consultation with OEH; (c) be submitted to the Director-General for approval by the end of July 2013 or as otherwise agreed to in writing by the Director-General; (d) describe the measures that will be implemented to: · translocate and manage the orchids; · monitor and report on the success of the translocation; and · ensure suitable contingency measures are implemented if the monitoring suggests the translocation is not working as well as intended; and (e) provide for the findings of the translocation process to be published in a suitable scientific publication.	Develop and implement a White Lace Flower Translocation Plan to the satisfaction of the Director General	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	31st July 2013	Complete	Complete	Complete		
		Landscape Management Plan											

Condition 31	Landscape	The Proponent shall prepare and implement a Landscape Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH, DRE and DPI (Agriculture); (b) be submitted to the Director-General for approval prior to commencement of quarrying operations; (c) describe how the implementation of the Biodiversity Offset Strategy will be integrated with the overall rehabilitation of the site and the proposed Tweed Regional Botanical Gardens Project; (d) describe the short, medium and long term measures that will be implemented to: · manage remnant vegetation and habitat on site; · minimise the visual impacts of the project on surrounding receivers; · implement the Biodiversity Offset Strategy; and · ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval; (e) include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and the rehabilitation of the site, including triggering remedial action (if necessary); (f) include a detailed description of the measures that will be implemented over the next 3 years, including the procedures to be implemented for: · ensuring compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval; · enhancing the quality of remnant vegetation and fauna habitat with a focus on restoring Lowland Forest EEC and providing Koala feed trees; · restoring native endemic vegetation and fauna habitat within the biodiversity offset areas and rehabilitation area; · maximising the salvage of environmental resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse in the enhancement of the	Develop and implement a Landscape Management Plan for the site to the satisfaction of the Director General.	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Complete	Complete	Complete		
	Landscape	**Conservation and Rehabilitation Bond**										
Condition 32	Landscape	Within 6 months of the approval of the Landscape Management Plan, the Proponent shall lodge a Conservation and Rehabilitation Bond with the Department to ensure that the Biodiversity Offset Strategy and the rehabilitation of the site is implemented in accordance with the performance and completion criteria set out in the Landscape Management Plan. The sum of the bond shall be determined by: (a) calculating the full future cost of implementing the Biodiversity Offset Strategy; (b) calculating the cost of rehabilitating the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and (c) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs; to the satisfaction of the Director-General. Notes: · If capital and other expenditure required by the Landscape Management Plan is largely complete, the Director- General may waive the requirement for lodgement of a bond in respect of the remaining expenditure. · If the Biodiversity Offset Strategy and rehabilitation of the site area are completed to the satisfaction of the Director-General, the Director-General will release the bond. If the Biodiversity Offset Strategy and rehabilitation of the site are not completed to the satisfaction of the Director-General, the Director-General will call in all or part of the bond, and arrange for the completion of the relevant works.	Lodge a Conservation and Rehabilitation Bond with the Department	Yes	Yes	Yes	Prior to commencement of works	Within 6 months of approval of the Landscape Management Plan					
Condition 33	Landscape	Within 3 months of each Independent Environmental Audit (see Condition 10 of Schedule 6), the Proponent shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Director-General. This review must consider the: (a) effects of inflation; (b) likely cost of implementing the Biodiversity Offset Strategy and rehabilitating the site (taking into account the likely surface disturbance over the next 3 years of the project); and (c) performance of the implementation of the Biodiversity Offset Strategy and rehabilitation of the site to date.	Review, and if necessary, revise the sum of the Conservation and Rehabilitation Bond	Yes	Yes	Yes	During operation	Within 3 months of each independent environmental audit.					

08_0068 Schedule 5

Reference	Envirnmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of Project	Specific date required by	Status - Haul Road	Comment	Reference / Evidence
08_00068 - Schedule 5 - Additional Procedures											
Condition 1	Notification of Landowners	As soon as practicable after obtaining monitoring results showing an: (a) exceedance of any relevant criteria in Schedule 4, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each of affected landowner until the project is again complying with the relevant criteria; and (b) an exceedance of the relevant air quality criteria in Schedule 4, the proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable		
Condition 2	Independent Review	If an owner of privately-owned land considers the project to be exceeding the relevant criteria in Schedule 4, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land. If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-General's decision the Proponent shall: (a) commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the Director-General, to: · consult with the landowner to determine his/her concerns; · conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 4; and · if the project is not complying with these criteria, then identify the measures that could be implemented to ensure compliance with the relevant criteria; and (b) give the Director-General and landowner a copy of the independent review.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable		
Condition 3	Environmental Management Strategy	If the independent review determines that the project is complying with the relevant criteria in Schedule 4, then the Proponent may discontinue the independent review with the approval of the Director-General. If the independent review determines that the project is not complying with the relevant criteria in Schedule 4, then the Proponent shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until the project complies with the relevant criteria; or (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Director-General.	Ensure compliance with condition	No	No	Yes	During operation	N/A	Not Applicable		

08_0068 Schedule 6

Reference	Envirnmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of Project	Specific date required by	Status - Haul Road	Status - Quirks Landfill	Status - West Valley Quarry	Comment	Reference / Evidence
08_00068 - Schedule 6 - Environmental management, reporting and auditing													
Condition 1	Community Education	The Proponent shall prepare and implement a Community Education Program for the project to the satisfaction of the Director-General. This program must be submitted to the Director-General for approval prior to the commencement of landfilling operations, and shall at a	Develop a community education program for the project. To be approved by Director General.	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
Condition 2	Landfill Environmental Management Plan	The Proponent shall prepare and implement a Landfill Environmental Management Plan for the landfill in consultation with the EPA and NOW and to the satisfaction of the Director-General. This plan must: (a) be prepared by suitably qualified and experienced experts whose appointment has been endorsed by the Director-General;	Prepare and develop a Landfill Environmental Management Plan for the project. To be approved by Director General.	No	Yes	No	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
Condition 3	Environmental Management Strategy	The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must: (a) be submitted to the Director-General for approval prior to any development being carried out on the site under this approval; (b) provide the strategic framework for environmental management of the project; (c) identify the statutory approvals that apply to the project; (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;	Develop and implement an Environmental Management Strategy for the project. To be approved by Director General.	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Complete	Complete	Complete		
Condition 4	Adaptive Management	The Proponent shall assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4. Any exceedances of these criteria and/or performance measures constitute a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Proponent shall, at the earliest opportunity: (a) take all reasonable and feasible measures to ensure that the exceedance ceases and does	Ensure compliance with condition Undertaken environmental risk assessment and ensure compliance with criteria and/or performance measures in Schedules 3 and 4.	No	Yes	Yes	During operation	N/A	Not Applicable				
Condition 5	Management Plan Requirements	The Proponent shall ensure that the Management Plans required under this approval are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: · the relevant statutory requirements (including any relevant approval, licence or lease conditions); · any relevant limits or performance measures/criteria; and · the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; (c) a description of the measures that will be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: · impacts and environmental performance of the project; and · effectiveness of any management measures (see (c) above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the project over time; (g) a protocol for managing and reporting any: · incidents; · complaints; · non-compliances with statutory requirements; and · exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.	Develop all required management plans in accordance with conditions of approval	Yes	Yes	Yes	Prior to commencement of works	N/A					
Condition 6	Annual Review	By the end of March each year, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must: (a) describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year; (b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against: • the relevant statutory requirements, limits or performance measures/criteria; • the monitoring results of previous years; and • the relevant predictions in the EA; (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the project; (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.	Undertake annual review of the environmental performance of the project.	Yes	Yes	Yes	During operation	31st March each year	Ongoing				
Condition 7	Revision of Strategies, Plans and Programs	Within 3 months of the submission of an: (a) annual review under Condition 6 of this schedule; (b) incident report under Condition 9 of this schedule; (c) audit report under Condition 11 of this schedule; and (d) any modifications to this approval, the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.	Undertake annual review of strategies, plans and programs required under the approval.	Yes	Yes	Yes	During operation	30th June each year	Ongoing				
Condition 8	Incident Reporting	The Proponent shall notify the Director-General and any other relevant agencies of any incident or potential incident with actual or potential significant off-site impacts on people or the biophysical environment associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of this incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.	Ensure compliance with condition	Yes	Yes	Yes	During operation	N/A	Ongoing				
Condition 9	Regular Reporting	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.	Develop an environmental reporting program and procedure for uploading results onto website	Yes	Yes	Yes	During operation	N/A					

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Condition 10	Independent Environmental Audit	Within a year of the date of this approval, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must: (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the project and whether it is complying with the relevant requirements in this approval and any relevant EPL and/or Water License (including	Engage suitably qualified auditor to undertake an independent environmental audit of the project	Yes	Yes	Yes	During operation	1st August 2018	Complete				
Condition 11	Independent Environmental Audit	Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.	Provide a copy of the environmental audit report and Council's response to any recommendations to the Director General	Yes	Yes	Yes	During operation	1st November 2018	Not Complete				
Condition 12	Access to Information	The Proponent shall: (a) make the following information publicly available on its website: • the EA; • current statutory approvals for the project; • approved strategies, plans or programs; • a summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval; • a complaints register, updated on a quarterly basis; • copies of any annual reviews (over the last 5 years); • any independent environmental audit, and the Proponent's response to the recommendations in any audit; and • any other matter required by the Director-General; and (b) keep this information up-to-date, to the satisfaction of the Director-General.	Update Council's website to include all the required in the condition	Yes	Yes	Yes	During operation	N/A					

Reference	Environmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of the project	Specific date required by	Status - Haul Road	Status - Quirks Landfill	Status - West Valley Quarry	Comment	Reference / Evidence
08_0068 - Appendix 1 - Schedule of Commitments													
	Environmental Management Plans	Environmental management plans would be prepared and implemented to guide environmental management and monitoring activities during establishment and operation of all landfills and quarries. This will take the form of an LEMP for Quirks Quarry Landfill and a Plan of Management for West Valley Quarry. Council is committed to best practice environmental management for both the quarry and landfill activities.	Develop a LEMP for Quirks Quarry landfill and Plan of Management for the West Valley Quarry.	No	Yes	Yes	Prior to commencement of works	N/A	Not Applicable				
	Environmental Management Plans	A draft LEMP has already been prepared for the Quirks Quarry Landfill which outlines environmental management requirements for the waste disposal activities, including conceptual leachate management. The final LEMP will be developed in conjunction with the detail design of the landfill and will include a Soil, Water and Leachate Management Plan. It will address the EPA's requirements outlined in the recommended conditions of approval provided on 19 January 2012, and will include a surface water, groundwater and leachate response plan providing protocols to investigate and respond to potential surface or groundwater contamination associated with the development. The Office of Water and EPA will be consulted in the development of the LEMP which will be undertaken in conjunction with the detailed landfill design, particularly regarding the monitoring and management of stormwater, groundwater, leachate and landfill gas.	Finalise the LEMP for Quirks Quarry Landfill	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Environmental Management Plans	The quarry plan of management will include the following sub-plans: > Surface Water management and response plan – The plan would include a site water balance, the measures to retain and re-use the maximum amount of water on-site and ensure the surface run-off water is maintained at acceptable levels. The plan would also include erosion and sediment mitigation measures. > Groundwater management and response plan – the plan would include baseline groundwater data, impact assessment criteria, trigger levels, a program to monitor, assess and report on groundwater inflows and impacts on regional aquifers and surrounding watercourses. > Air quality management plan – The plan would include mitigation measures for control of odours, dust and particles and monitoring undertaken. > Noise management plan – The noise management plan will include noise and vibration control measures and the required monitoring activities. > Traffic management plan – The plan will include parking and access requirements, safety signage and training of personnel in traffic management. > Fire management plan – The plan would include details of sources of water for firefighting, the need for fire extinguishers on all mobile equipment and suitable training for site-based personnel as well as a fire response plan.	Develop and implment a Quarry Plan of Management for the West Valley Quarry incorporating the relevant sub-plans	No	No	Yes	Prior to commencement of works	N/A	Not Applicable				
	Surface Water	Specific measures to maintain the quality of onsite and downstream surface water quality for the Stage 1 Project Application have been outlined in the Quirks Quarry Landfill Concept Design Report and draft LEMP. General concepts for the West Valley Quarry have been provided in the Preliminary Quarry Study and include the following (note that a Soil, Water and Leachate Management Plan will accompany the application for an Environmental Protection Licence which will include further detail):	Ensure measures outlined in the Quirks Quarry Landfill Concept Design Report and draft LEMP are implemented during the construction and operational phase of the development.	No	Yes	Yes	During construction and operation	N/A	Not Applicable				
	Surface Water	A site water balance for quarrying and landfilling activities will be undertaken which will provide details of water sources and security of water supply, site water use and water management, off site water transfers, measure to minimise reuse of contaminated water	Develop and implement a site water balance plan for quarrying and landfilling activities.	No	Yes	Yes	Prior to commencement of works	N/A	Not Applicable				
	Surface Water	Clean stormwater runoff from undisturbed or areas upstream of the quarry and landfill activities will be diverted around the activities to minimise the quantity of stormwater required to be stored (and potentially treated) onsite.	Construct upstream diversion drains around quarry and landfill activity areas.	No	Yes	Yes	During construction and operation	N/A	Not Applicable				
	Surface Water	Stormwater runoff generated from active areas of the quarry and landfill will be captured in sediment basins and reused onsite wherever possible (for example for dust suppression). Concept designs for sediment basins associated with the Stage 1 Project Application have been developed and devices have been sized to minimise the opportunity for uncontrolled discharge from the site. Sizing and location of the stormwater management devices will be further refined during detail design.	Ensure the stormwater management plan for the quarry and landfill satisfies this commitment	No	Yes	Yes	During construction and operation	N/A	Not Applicable				
	Surface Water	A perimeter bund will be established around the northern end of the Quirks Quarry Landfill to a minimum RL of 6.5m AHD to address flooding in a 100 yr ARI regional flood event. In addition, the base of the landfill in Stage 3 will be raised by between 1m and 3m (based on the finished quarrying levels) such that the base of the landfill will fall towards the eastern end of the cell to reduce the impacts of potential overflowing of the perimeter bund.	Ensure construction of perimeter bund around northern end of Quirks Quarry Landfill in accordance with commitment	No	Yes	No	During construction	N/A	Not Applicable				
	Surface Water	The haul road from Stotts Creek has been designed to provide flood immunity to activities in the North and West Valley areas in 100 yr ARI regional flood event.	Ensure haul road is constructed in accordance with design	Yes	No	No	During construction	N/A	Complete				
	Surface Water	Any works within 40 m of a watercourse will be undertaken in a manner consistent with the NOW (2008) Guidelines for Controlled Activity Approvals.	Ensure compliance with commitment	Yes	Yes	Yes	During construction	N/A	Ongoing				
	Surface Water	Leachate generated by the landfill activities and any stormwater which comes into contact with waste will initially be stored within the waste cell and once characteristics such as quantity, quality and generation rates are determined a leachate treatment process will be established. Prior to the establishment of a leachate treatment process, leachate levels within the landfill will be closely monitored to ensure that the storage capacity of the waste is not exceeded and if necessary leachate can be pumped out and appropriately disposed of to avoid impacts on surface water quality.	Ensure compliance with commitment	No	Yes	No	During operation	N/A	Not Applicable				
	Surface Water	Should any of the sediment basins proposed, be classified as dams under SEPP 52 Farm Dams, they will be constructed and operated in accordance with this policy and with any Harvestable Right Order published under section 54 of the Water Management Act 2000.	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation	N/A	Ongoing				
	Surface Water	The baseline surface water monitoring program will continue in the lead up to the establishment of the landfill and quarry such that site specific water quality objectives/trigger values can be established. During quarry and landfill operations surface water monitoring will be conducted in accordance with the conditions of the Environmental Protection Licence (including specified frequencies and analytical suite).	Undertake baseline surface water quality monitiroring	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing				
	Surface Water	Following completion of landfilling, sediment basins used for stormwater detention will be converted to wetlands.	Convert sediment basins into wetlands	No	Yes	No	Following completion of operations	N/A	Not Applicable				
	Groundwater	Preparation of a Soil, Water and Leachate Management Plan including details of planned responses and proposed measures to investigate potential groundwater contamination associated with the development.	Develop a Soil, Water and Leachate Management Plan	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Groundwater	Further geotechnical and hydrogeological investigations will be undertaken during detail design of the landfills and quarries to address potential issues associated groundwater management such as dewatering during quarrying and hydraulic conductivity and connectivity between alluvial deposits and bedrock.	Undertake further geotechnical and hydrogeological investigations to address potential issues associated with groundwater management	No	Yes	Yes	Prior to commencement of works	N/A	Not Applicable				

	Groundwater	The additional groundwater investigations for West Valley Quarry will be undertaken in consultation with the Office of Water and will include installation and monitoring of groundwater bores to determine groundwater levels, flow direction and quality within the alluvium and hard rock aquifers, bore logs, data logging of groundwater levels and fortnightly sampling data of groundwater quality to establish temporal trends for a minimum period of 12 months, and pump testing to determine hydraulic properties and yield for the alluvium and hard rock aquifers.	Undertake further groundwater investigations and develop a groundwater monitoring program in consultation with the Office of Water	No	No	Yes	Prior to commencement of works	A minimum of 12 months prior to the commencement of quarrying activities at West Valley Quarry	Not Applicable				
	Groundwater	A groundwater model for the West Valley Quarry will be prepared that identifies the extent of depressurisation resulting from the project, predicted drawdown or loss of supply to any water courses or groundwater users, and the predicted impacts on any groundwater dependent ecosystems	Undertake groundwater modelling and develop a groundwater model of the West Valley Quarry	No	No	Yes	Prior to commencement of works		Not Applicable				
	Groundwater	No further excavation below the final quarry floor levels will be undertaken for the establishment of the waste cells for Quirks Quarry (and future North and West Valley) landfills.	Ensure compliance with commitment	No	Yes	No	During construction and operation		Not Applicable				
	Groundwater	Council will ensure the proper compaction of the floor of each landfill cell to achieve a uniform low permeability equivalent to less than 1 x 10-9 m/s for a depth of at least 0.9 m. The in situ permeability of compacted material would be tested by sampling and laboratory testing to ensure the required permeability level has been achieved in accordance with a construction quality assurance (CQA) plan. In addition a high density polyethylene liner will be installed across the base of the landfill to further prevent migration of leachate to the local groundwater environment.	Ensure compliance with commitment	No	Yes	No	During construction		Not Applicable				
	Groundwater	The base of the Stage 3 cell of the Quirks Quarry Landfill will also be raised by between 1m and 3m (based on the finished quarrying levels) to further reduce potential impacts to the local groundwater environment.	Ensure compliance with commitment	No	Yes	No	During construction		Not Applicable				
	Groundwater	Council would continue to undertake a groundwater monitoring program including groundwater level and quality monitoring both for continued baseline data collection prior to commissioning of site activities and will continue the program in accordance with the eventual EPL's for the proposed activities.	Undertake baseline groundwater monitiroring	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Groundwater	In the event that any onsite infrastructure intercepts the water table, or if dewatering is required consultation will be undertaken with NOW officers during detail design to determine licencing issues.	Ensure compliance with commitment	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Groundwater	Any required groundwater licenses will be obtained and associated works appropriately authorised prior to works commencing.	Ensure compliance with commitment	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Acid Sulfate Soils and Pyritic Materials	Additional acid sulfate soils investigations along the haul road during detail design to better characterise potential issues and identify management requirements for construction of the road;	Undertake additional ASS investigations along the haul road alignment	Yes	No	No	Prior to commencement of works	N/A					
	Acid Sulfate Soils and Pyritic Materials	Development of a revised Acid Sulfate Soils Management Plan following completion of additional investigations;	Update the ASS management plan to incorporate the results of the additional investigations	Yes	No	No	Prior to commencement of works	N/A					
	Acid Sulfate Soils and Pyritic Materials	Ongoing groundwater monitoring as described in the groundwater commitments to monitoring acid sulfate soil indicators; and	Undertake groundwater monitoring and include indicators for ASS within the suite of parameters	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A					
	Acid Sulfate Soils and Pyritic Materials	Vigilant monitoring of any clay imported from offsite sources for the construction of landfill liners.	Ensure compliance with commitment	No	Yes	No	During construction		Not Applicable				
	Acid Sulfate Soils and Pyritic Materials	If required, the design of a management system for pyritic materials site will follow detailed drilling, testing and delineation of PAF material to be conducted as part of the detailed design for the quarry. The key management measure for pyritic materials will be to avoid disturbance or drainage of PAF. Where this is not feasible, typical management options will be based on: - Maintaining saturated conditions to exclude oxygen and prevent oxidisation; - Excluding air to prevent oxidisation; - Capping to exclude water, to prevent leachate generation, by separate cell construction or storage in or beneath post-quarry landfill; - Carbonate-rich capping, to develop alkaline infiltration to neutralise leachate and coat sulfide grains to reduce oxidisation (passivation); - Direct neutralisation of potential acidity of excavated PAF material; or - A combination of the above.	Develop an ASS management plan for the works if required following further investigations	Yes	Yes	Yes	Prior to commencement of works	N/A					
	Acid Sulfate Soils and Pyritic Materials	Additional soil and rock testing for net acid generation (NAG) and net acid potential (NAPP) and metallic elements will be undertaken during detail design together with geotechnical investigations.	Undertake additional soil and rock testing at the site	No	No	Yes	Prior to commencement of works		Not Applicable				
	Acid Sulfate Soils and Pyritic Materials	Additional hydrogeological assessment will also be performed, based on water level data from all existing monitoring bores and core holes, to assess the final post-operation water table, to determine if significant quantities of PAF will be drained in-situ, leading to additional risk of AMD generation.	Undertake additional hydrogeolocal assessment of the site	No	No	Yes	Prior to commencement of works		Not Applicable				
	Soils and Land Capability	A Soil, Water and Leachate Management Plan will be prepared to the satisfaction of the EPA as part of the application for an Environmental Protection Licence and will include all detailed measures for managing soils and land capability. As a minimum Council will implement the following measures:	Develop and implement a soil, water and leachate management plan	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Soils and Land Capability	Minimise soil erosion and sediment mobilisation to the downstream receiving environment identification of high risk activities and areas, and development of appropriate mitigation and control measures.	Ensure compliance with commitment	Yes	Yes	Yes	During construction		Ongoing				
	Soils and Land Capability	Topsoil removed for quarrying would be stockpiled and used later for revegetation and rehabilitation of the final landfill cover.	Ensure compliance with commitment	Yes	Yes	Yes	During construction		Ongoing				
	Soils and Land Capability	Care would be taken to ensure that topsoils and subsoils are not stripped when they are too moist.	Ensure compliance with commitment	Yes	Yes	Yes	During construction		Ongoing				
	Soils and Land Capability	Topsoil stockpiles would be up to 1 m high and subsoil/overburden stockpiles would not exceed 3 m in height.	Ensure compliance with commitment	Yes	Yes	Yes	During construction		Ongoing				
	Soils and Land Capability	Subsoil and topsoil stockpiles would be located within the footprint of the landfill, quarry or on the upper surface of completed landfill stages.	Ensure compliance with commitment	Yes	Yes	Yes	During construction		Ongoing				
	Soils and Land Capability	Stabilisation measures would be used until vegetation is established on the stockpiled soil.	Ensure compliance with commitment	Yes	Yes	Yes	During construction		Ongoing				
	Biodiversity	**Substantially avoid clearing of areas of higher ecological significance.**											
	Biodiversity	The quarry footprint and haul road have been designed such that they minimise clearing of native vegetation and predominantly avoid areas of higher ecological value vegetation.	Implement mitigation measures to minimise clearing of native vegetation and exclude works within areas of higher ecological value	Yes	No	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Complete				
	Biodiversity	Council has realigned the haul road concept to avoid clearing of vegetation type 7, and commits to the avoidance of clearing of an area of this vegetation type that falls within the eastern section of the quarry footprint currently shown. The quarry footprint would be revised to reflect this during detailed design.	Implement mitigation measures to minimise clearing of native vegetation and exclude works within areas of higher ecological value	Yes	No	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Complete				
	Biodiversity	Retain and Manage Higher Ecological Value Areas – Council commits to a restriction on use on a portion of Lot 1 DP 1159532 registered on the title imposing a legal obligation in perpetuity to abide by the management actions of a Habitat Management Plan (to be developed by Council). A plan showing the habitat areas on the lot would be registered with the s88B instrument to identify the area burdened by the restriction.	Commence procedings to place a restriction of use on the title of Lot 1 DP 1159532 for the purpose of habitat management.	No	No	Yes	Prior to commencement of works		Not Applicable				
	Biodiversity	Areas of higher ecological value will be clearly marked by fencing with high visibility fauna permeable fencing or similar. Include these areas as 'vegetation protection areas' in an approved Environmental Management Plan.	Erect high visibility fencing and signage around areas of higher ecological value	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete				
	Biodiversity	**Maintain and enhance or restore habitat connectivity.**											
	Biodiversity	Retain a vegetated corridor along the ridgeline - the quarry footprints have been designed such that they retain a vegetated corridor along the western ridgeline.	Ensure compliance with commitment	No	No	Yes	During construction		Not Applicable				

	Biodiversity	Develop an east-west movement corridor - To provide future potential habitat and an alternate route for connectivity across the site, planting of suitable riparian / floodplain vegetation will be undertaken adjacent to the watercourse in Lot 1 DP1159352. This will create a vegetated corridor that connects the lowland areas to the ridgeline and effectively connect vegetation adjacent to the eastern side of Quirks Quarry to retained eucalypt open forest in the central western area of the site and link to the ridgeline.	Undertake vegetation planting in the location described	Yes	Yes	Yes	During construction		Complete	Complete	Complete		
	Biodiversity	Restore connectivity along the southern boundary – a vegetated corridor would be developed along the southern boundary of Lot 1 DP 34555 along Eviron Road that would contain species consistent with existing remnant vegetation along the ridgeline.	Undertake vegetation planting in the location described	Yes	Yes	Yes	During construction		Complete	Complete	Complete		
	Biodiversity	Undertake works as per a finalised Restoration Plan. A Preliminary Restoration Plan (refer Appendix L) has been prepared by Council to guide works in the abovementioned corridors.	Undertake vegetation planting as Restoration Plan	Yes	Yes	Yes	During construction		Complete	Complete	Complete		
	Biodiversity	**Minimise impact to conservation significant fauna species.**											
	Biodiversity	Manage Clearing - all clearing of vegetation will be undertaken in the presence of an experienced fauna spotter-catcher.	Engage the services of an experienced fauna spotter-catcher	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Biodiversity	Contractor awareness – all contractors (construction and operation) to be made aware of the potential presence of fauna species.	Incorporate flora and fauna awarness training as part of the site induction process	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Biodiversity	Heavy vehicle movements - restricted speed limits to be implemented near to vegetated areas.	Install appropriate speed limit signage adjacent vegetated areas	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing				
	Biodiversity	Environmental Management Plans - management plans will include actions for management of potential direct and indirect impacts to fauna species.		Yes	Yes	Yes	Prior to commencement of works	N/A	Complete	Complete	Complete		
	Biodiversity	**Locate and translocate threatened plant species.**											
	Biodiversity	Target surveys for threatened plant species will be undertaken once the final development footprint has been confirmed.	Undertake survey of the development footprint followed by threatened plant species searches	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete				
	Biodiversity	A 'Preliminary Translocation Plan for Threatened Plants' has been prepared by Council in accordance with the Guidelines for the Translocation of Threatened Plants in Australia (Appendix L).	Ensure any translocation of threatened species is undertaken in accordance with the Preliminary Translocation Plan for Threatened Plants	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Biodiversity	In the event that any additional threatened species are located in the development footprint, the Preliminary Translocation Plan would be revised to incorporate additional individuals or species.	Update the Preliminary Translocation Plan if additional threatened species are located within the development footprint.	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Biodiversity	**Maintain habitat values.**											
	Biodiversity	Environmental Management - implement measures detailed in the approved EMP and undertake site works in general accordance with AS 4970-2009.	Implement tree protection measures adjacent vegetation in accordance with AS4970-2009	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Biodiversity	Maintain habitat - nest boxes will be installed in vegetation to be retained and managed on Lot 1 DP 1159532 in order to offset a reduction in hollow recruitment.	Install and maintain nest boxes in accordance with the Nest Box Plan prepared for the project	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete	Complete	Complete		
	Biodiversity	Establish vegetation protection areas prior to construction.	Erect high visibility fencing and signage around vegetation protection areas	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete				
	Biodiversity	Activities permitted in the vegetation protection area would include weed management, habitat management, and restoration / translocation activities.	Ensure that only permitted activities occur within the vegetation protection areas	Yes	Yes	Yes	During construction and operation		Ongoing				
	Biodiversity	Activities prohibited in the vegetation protection areas would include: use of or parking of vehicles and equipment (unless associated with a permitted activity), placement of construction materials, refuse, excavated spoils and stockpiling, use of tree trunks as a winch support.	Ensure that only permitted activities occur within the vegetation protection areas	Yes	Yes	Yes	During construction and operation		Ongoing				
	Cultural Heritage	On-going consultation with all registered local Aboriginal representatives to develop a Cultural Heritage Management Plan for the site;	Undertake consultation with all registered local Aboriginal representatives to develop a Cultrual Heritage Management Plan	Yes	Yes	Yes	Prior to commencement of works	N/A					
	Cultural Heritage	All reasonable efforts will be made to avoid items of Aboriginal and European Cultural Heritage. If impacts are unavoidable, mitigation measures will be negotiated with the EPA and local community.	Avoid items of Aboriginal and European Cultural Heritage	Yes	Yes	Yes	During construction and operation		Ongoing				
	Cultural Heritage	The Cultural Heritage Management Plan will include as a minimum: - Procedures for ongoing Aboriginal consultation and involvement. - Management of any recorded sites of higher archaeological potential within project footprint. - Responsibilities of all stakeholders. - Details of proposed mitigation and management strategies of all sites. - Procedures for the identification and management of previous unrecorded sites (excluding human remains). - Details of an Aboriginal cultural heritage education program for contractors and personnel associated with construction activities. - Corrective procedures in the unlikely event that a non compliance with the CHMP is identified.	Develop a Cultural Heritage Management Plan for the project incorporating the identified items	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete	Complete	Complete		
	Cultural Heritage	A program of site monitoring by representatives of the Aboriginal Party during activities causing ground disturbance for the recognised areas with a higher potential for the presence of unidentified cultural heritage. In the event that additional Aboriginal objects are uncovered during the monitoring program, the objects are to be recorded and managed in accordance with the requirements of the National Parks and Wildlife Act 1974.	Implement a program of site monitoring for ground disturbing activities in areas recognised as having a higher potential for the presence of unidentified cultural heritage.	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Cultural Heritage	If human remains are located, all works must halt in the immediate area and the NSW Police must be immediately contacted. No action is to be undertaken until police provide written notification.	Contact NSW Police if human remains are located	Yes	Yes	Yes	During construction and operation		Ongoing				
	Cultural Heritage	An Aboriginal Cultural Education Program will be developed in collaboration with the local Aboriginal community for the induction of all personnel and contractors involved in the construction activities.	Aboriginal Cultural awarness training to be developed in collaboratoin with the local Aboriginal community as part of the site induction process	Yes	Yes	Yes	Prior to commencement of works	N/A					
	Cultural Heritage	The five springboard trees will be retained in situ wherever possible and relocated to an appropriate location where they can be preserved and displayed along with appropriate interpretation where they cannot be retained in situ.	Identify, isolate and preserve the five springboard trees during construction and operational works	Yes	Yes	Yes	Prior to commencement of works	N/A					
	Cultural Heritage	Cultural heritage inductions will be undertaken so that work crews are aware of specific obligations to look for cultural heritage material aiming at informing workers what archaeological materials may look like and give them clear instructions on procedures for inadvertent discoveries	Incorporate Aboriginal Cultural awareness training as part of site induction process	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
	Noise and Vibration	Council will design and operate the facilities to ensure that there are no adverse noise and vibration impacts at sensitive receivers.	Ensure compliance with commitment through the implementation of best management practices	No	Yes	Yes	During construction and operation		Not Applicable				
	Noise and Vibration	Follow up noise monitoring will be undertaken at the commencement of the Stage 1 activities.	Undertake noise monitoring at the site	Yes	Yes	Yes	During construction						
	Noise and Vibration	**Specific Control Measures**											
	Noise and Vibration	Hard rock drill: Although its operation is expected to be limited, it has potential to cause short-term noise impacts at the nearest receivers. Therefore, the use of other quarry equipment, such as the processing plant and dozer will be limited (or ceased) during times when drilling is occurring.	Ensure compliance with commitment	No	No	Yes	During operation		Not Applicable				
	Noise and Vibration	Quarry processing plant: Specific noise mitigation measures will be implemented at West Valley Quarry to reduce the impacts of noise from the processing plant. Potential options include the following, however the feasibility will be reviewed during detail design when the quarry layout is developed, such that the most practical option can be adopted: - Locating the processing plant in locations on site which are naturally shielded by the existing topography will also assist in minimising noise impacts.	Ensure compliance with commitment	No	No	Yes	During operation		Not Applicable				
	Noise and Vibration	As a last resort, treating the building facades of affected receivers will assist in minimising internal noise. Building treatments should generally be considered only when other measures, such as noise barriers are impractical or not cost-effective. Approaches to the acoustic treatment of buildings include improved window glazing and insulation to external walls.		No	No	Yes	During operation		Not Applicable				

	Noise and Vibration	**Blasting Controls**											
	Noise and Vibration	Blasting will be limited to times when condition are suitable and avoided at times, as outlined below:	Ensure compliance with commitment	No	No	Yes	During operation		Not Applicable				
	Noise and Vibration	Avoid at times of adverse wind condition, as this may promote the impact of blast over pressure.	Ensure compliance with commitment	No	No	Yes	During operation		Not Applicable				
	Noise and Vibration	Avoid at times of temperature inversion.	Ensure compliance with commitment	No	No	Yes	During operation		Not Applicable				
	Noise and Vibration	Avoid overfilling holes with blasting agent.	Ensure compliance with commitment	No	No	Yes	During operation		Not Applicable				
	Noise and Vibration	Avoid firing holes in the front row which have insufficient burden. - All blasting designs should contain considerations to minimise factors such as ground vibration and air blast. The blast design should include an assessment of noise and vibration impacts based on blast specific parameters.	Ensure compliance with commitment	No	No	Yes	During operation		Not Applicable				
	Noise and Vibration	**General Management Controls**											
	Noise and Vibration	General noise management controls that would be implemented during operation of the quarries and landfills are as follows.											
	Noise and Vibration	All activities would be undertaken during the approved operating hours only: Monday to Friday 7am – 5pm, Saturday 7am to 12pm noting that blasting can only occur Monday to Friday 9am – 3pm and Saturday 9am – 12pm.	Ensure compliance with commitment	No	Yes	Yes	During construction and operation		Not Applicable				
	Noise and Vibration	Review available fixed and mobile equipment fleet and prefer more recent and silenced equipment whenever possible.	Ensure compliance with commitment	No	Yes	Yes	During construction and operation		Not Applicable				
	Noise and Vibration	All equipment, particularly the quarry fleet and waste delivery trucks, will be maintained to a high standard to ensure there are no unnecessary noise emissions.	Ensure compliance with commitment	No	Yes	Yes	During construction and operation		Not Applicable				
	Noise and Vibration	All vehicles accessing the site will use the designated haul routes and approved access points only.	Ensure compliance with commitment	No	Yes	Yes	During construction and operation		Not Applicable				
	Noise and Vibration	Neighbouring properties shall be notified of the date and time of blasting activities in advance.	Ensure compliance with commitment	No	No	Yes	During operation		Not Applicable				
	Air Quality and Odour	Council will design and operate the facilities to maintain the existing rural air quality. A dust management plan will be included for both the landfill and quarry activities with the LEMP and Quarry Plan of Management, respectively. The following will be implemented:	Develop a dust management plan and implement management actions	No	Yes	Yes	Prior to commencement of works	N/A	Not Applicable				
	Air Quality and Odour	Installation of a meteorological station onsite.	Ensure compliance with commitment	Yes	Yes	Yes	Prior to commencement of works	N/A					
	Air Quality and Odour	High dust-generating activities would be avoided during adverse wind conditions when blowing directly towards the nearest residences.	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Air Quality and Odour	Cease or reduce operations when prevailing winds are in the direction of sensitive receptors, particularly to the south and south-west of the quarry (northerly or northeasterly winds).	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Air Quality and Odour	The use of a real-time reactive dust monitoring at locations representative of the nearest sensitive receptors to alert the quarry manager when dust levels exceed the nominated criteria.	Identify sensitive receptors and develop a real-time dust monitoring program	No	Yes	Yes	During operation		Not Applicable				
	Air Quality and Odour	Specific dust control measures to increase the moisture content of quarried material.	Develop a dust management plan and implement management actions	No	No	Yes	During operation		Not Applicable				
	Air Quality and Odour	Use of water sprays/trucks and sprays to wet down access and haul roads. Clean sealed roads at access and egress points regularly to minimise the re-suspension of dust on sealed roads.	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Air Quality and Odour	Ensure materials are appropriately stored and contained to prevent windborne releases to the atmosphere.	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Air Quality and Odour	Where material is removed from the site or fill brought to the site, trucks will be covered whenever conditions are such that dust nuisance is occurring.	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Air Quality and Odour	To address dust generated by crushing and screening, install spray systems on equipment and stabilise working surfaces around the work area.	Install spray systems for dust supression	No	No	Yes	During operation		Not Applicable				
	Air Quality and Odour	Exposed surfaces, including stockpiles unless revegetated or have a stable surface, would be watered.	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Air Quality and Odour	Completed areas of the landfill would be progressively rehabilitated and revegetated to minimise dust emissions.	Progressively rehabilitate completed areas of the landfill	No	Yes	No	During operation		Not Applicable				
	Air Quality and Odour	Odour emissions from the landfill will be minimised by limiting the working face of disposal areas, covering all exposed waste at the end of each day, limiting the disposal of malodorous wastes, planning for receival of malodourous waste to minimise the time such wastes would be exposed and minimising the disturbance of previously filled areas.	Ensure compliance with commitment	No	Yes	No	During operation		Not Applicable				
	Air Quality and Odour	Records of any complaints would be kept with respect to odour and dust and correlating with weather conditions and deliveries of particularly odorous wastes.	Develop and implement complaint record keeping procedure	Yes	Yes	Yes	During construction and operation						
	Traffic and Transport	Council will commit to the following measures:											
	Traffic and Transport	Cessation of access to the site via Eviron Road;	Ensure compliance with commitment	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Traffic and Transport	Design of the haul road in accordance with good practice for heavy vehicle traffic.	Ensure compliance with commitment	Yes	No	No	Prior to commencement of works	N/A	Complete				
	Traffic and Transport	Safety audit for the Tweed Valley Way and Leddays Creek Road intersection to ensure safe access to and from the major arterial, especially for heavy quarry traffic.	Undertake a safety audit of the Tweed Valley Way and Leddays Creek Road intersection	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Traffic and Transport	Maintenance of the Leddays Creek Road access intersection and provision of maintenance for the duration of the operation of the quarry and landfill activities.	Undertake maintenance of the Leddays Creek Road access intersection	No	Yes	Yes	During operation		Not Applicable				
	Traffic and Transport	Preparation of traffic management plans (as part of the environmental management plans) to ensure safe movement of vehicles into and around each the site.	Develop and implement a traffic management plan for the quarry and landfill site	No	Yes	Yes	Prior to commencement of works	N/A	Not Applicable				
	Traffic and Transport	Requirement that each driver would sign a Code of Conduct (during their first visit to the operational site).	Develop a driver code of conduct and implement a signing procedure as part of site induction process	No	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Not Applicable				
	Visual	Review the vantage point analysis conducted in the Environmental Assessment to include the property at 355 Farrants Hill Road. If necessary, undertake additional screening planting where feasible or consider other alternatives.	Undertake a review of the vantage point analysis and include 355 Farrants Hill Road	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Visual	Council will undertake strategic tree planting for screening purposes, including along a drainage line across Lot 1 DP1159352, which will in the longer term facilitate sheltered movement of species such as koalas across the presently cleared lowland area of the site.	Undertake vegetation screen planting in locations identified	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete				
	Visual	Progressive rehabilitation and revegetation of all landfill sites would be undertaken to visually blend the landfill capping with the surrounding landscape.	Undertake progressive rehabilitation and revegetation of the landfill site	No	Yes	No	During operation		Not Applicable				
	Visual	The site will be kept clean and tidy at all times as per the LEMP and Quarry Plan of Management (or other site operations plans as relevant).	Ensure compliance with commitment	No	Yes	Yes	During operation		Not Applicable				
	Greenhouse Gas	Greenhouse gas emissions from landfilling activities will be minimised through active landfill gas management (as per the LEMP). Depending on the quantity of landfill gas generated and captured infrastructure such as a flare will be installed as a minimum, and investigations into the viability and feasibility of tapping into or replicating the Stotts Creek Renewable Energy Facility.	Implement landfill gas management measures	No	Yes	No	During operation		Not Applicable				
	Greenhouse Gas	As and when appropriate Council will consider alternative fuels for the onsite plant and equipment as well as more fuel efficient equipment (where cost competitive).	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Hazards	Council will implement the following measures to address potential hazards:											
	Hazards	Hazard and risk associated with the proposed activities would be managed through development and implementation of a site operations plan which will address safety hazards and develop occupational health and safety procedures and emergency management procedures.	Develop and impelment a site operations plan, occupational health and safety procedure and emergency management procedure	Yes	Yes	Yes	Prior to commencement of works	N/A					

	Hazards	The siltstone present at the site is likely to contain silica, which could potentially be released as respirable crystalline silica in rock dust released during crushing operations. Site-specific data on the mineral composition of the rock resource and the particle size distribution of the rock dust released during crushing operations will be analysed during detail design to facilitate an assessment of potential RCS exposure.	Undertake assessment of the mineral composition of the rock resource and the particle distribution of the rock dust released during crushing operations.	No	No	Yes	Prior to commencement of works		Not Applicable				
	Hazards	A preliminary assessment of the hazard to building infrastructure and other assets within the lands under the care and control of Council will be undertaken as a priority when the initial activities on site begin as potential sources of ignition may become evident or will be reduced in some areas.	Undertake a preliminary assessment of the hazard to building infrastructure and other assets	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Hazards	A fire management plan will be included in the site management plans for fires caused by onsite and offsite activities. As part of the management plan, Council will identify risk reduction measures.	Develop and implement a fire management plan for both onsite and offsite fires.	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Hazards	Occupational health and safety procedures and appropriate personal protective equipment would be followed during use of plant and equipment as relevant to the particular activity.	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Hazards	Residents would not be permitted to deliver waste to or access any of the landfills. All public access to waste management facilities will be conducted at Stotts Creek RRC.	Ensure compliance with commitment	No	Yes	No	During operation		Not Applicable				
	Hazards	All landfills will be lined to prevent off-site migration of landfill gas, and a gas management system would be designed in the detailed design phase to prevent methane from being discharged to the atmosphere from closed areas of the landfill.	Develop and implement a gas management system for the Quirks Quarry landfill	No	Yes	No	During construction and operation		Not Applicable				
	Hazards	No dangerous goods would be stored on site, apart from small quantities primarily used for equipment maintenance, and herbicides used for controlling weeds on site.	Ensure compliance with commitment	Yes	Yes	Yes	During construction and operation		Ongoing				
	Hazards	All chemicals, fuels and oils stored onsite will be contained within an appropriately designed impervious bunded area capable of containing 110% of the largest container stored within the bund. Bunds shall be design and installed in accordance with the requirements of relevant Australian Standards and/or the EPA Environment Protection Manual Technical Bulletin Bunding and Spill Management.	Construct suitably sized and bunded storage facility at the site	Yes	Yes	Yes	During construction and operation		Ongoing				
	Hazards	Implement suitable measures to manage pests, vermin and declared noxious weeds including regular inspections, monitoring and management.	Develop and implement appropriate management plans to manage pests, vermin and declared noxious weeds	No	Yes	No	During construction and operation		Not Applicable				
	Revegetation, rehabilitation and post closure management	Council commits to the following:											
	Revegetation, rehabilitation and post closure management	Preparation and implementation of a Rehabilitation and Closure Plan prepared by a suitably qualified and experience expert in consultation with EPA.	Develop and implement a rehabilitation and closure plan in consultation with EPA	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
	Revegetation, rehabilitation and post closure management	Undertake a program of progressive revegetation in those areas disturbed by the operations taking account of the intended future Botanic Gardens.	Undertake progressive rehabilitation and revegetation of the landfill site	No	Yes	No	During operation		Not Applicable				
	Revegetation, rehabilitation and post closure management	Conversion of stormwater detention areas to wetlands following cessation of landfilling activities.	Convert sediment basins into wetlands	No	Yes	No	Following completion of operations		Not Applicable				
	Revegetation, rehabilitation and post closure management	Continue to manage the site following closure of the landfill facility, in accordance with the commitments and procedures to be documented within the Site Closure plan. This includes long term monitoring of groundwater, leachate, surface water, landfill gas, revegetation success and capping integrity	Manage site in accordance with landfill closure plan	No	Yes	No	Following completion of operations		Not Applicable				
	Community	Council will undertake consultation with relevant community stakeholders including during the site establishment period and will proactively engage with the community during operations. This will as a minimum include residents whose properties directly adjoining Council's landholding.	Undertake consultation with relevant community stakeholders during site establishment and operations.	Yes	Yes	Yes	During construction and operation						
	Community	The waste education facility at Kingscliff Wastewater Treatment Plant – adjacent to the Stotts Creek RRC will continue to be utilised.	???				???						
	Community	Areas not required for project-related activities will be maintained in a manner that enhances their ecological values as described in the Biodiversity and Rehabilitation section.	Ensure compliance with condition	Yes	Yes	Yes	During construction and operation		Ongoing				
	Community	The site will ultimately be returned as a community asset in the form of the Tweed Shire Botanic Gardens in accordance with the existing Master Plan.	Manage site in accordance with landfill closure plan	No	Yes	No	Following completion of operations		Not Applicable				
	Community	Council will implement a complaints management system that includes: - A hotline for receiving complaints about the development; - A commitment to investigate the source of all complaints and take the required immediate action to reduce the impact where valid, and to communicate this to the complainant; - A record of complaints and responses/actions which is readily accessible to the community and regulatory authorities; - A system for providing feedback to the community	Develop and implement complaints management and record keeping procedure	Yes	Yes	Yes	During construction and operation						

Env Man Strategy

Reference	Environmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of the project	Specific date required by	Status - Haul Road	Status - Quirks Landfill	Status - West Valley	Comment	Reference / Evidence
V1	Vegetation Clearing	Review the environmental assessment maps and associated documentation for the project to identify features.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
V2	Vegetation Clearing	Consult with ecologist to determine the location of suitable nearby habitat for the release of fauna that may be encountered during the pre-clearing process or habitat removal. Mark the pre-determined habitat identified for fauna release on a map.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
V3	Vegetation Clearing	The extent of vegetation required for clearing is to be pegged by a surveyor, approved by the Project Ecologist, and then demarcated with flagging rope or similar. No clearing is to occur outside of this delineation.	Undertake survey of the development footprint and erect high visibility fencing and signage around vegetation protection areas	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
V4	Vegetation Clearing	Identify tree protection zones on treed areas to be excluded from clearing. The tree protection zone (TPZ) represents the area around the tree that should not be disturbed. Exclusion fencing and tree protection in accordance with the AS 4970-2009 Protection of trees on development sites shall be implemented. Tree dripline zones to be protected in retained vegetation.	Implement tree protection measures adjacent vegetation in accordance with AS4970-2009	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete			Conservation zones adjacent the haul road have been fenced.	
V5	Vegetation Clearing	Confirm the locations of biodiversity features	Identify the location of habitat features and erect high visibility fencing to ensure their protection.	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete			Conservation zones adjacent the haul road have been fenced.	
V6	Vegetation Clearing	Identify fauna that may have the potential to be disturbed as a result of clearing activities.	Review flora and fuana assessment for project to identify fauna likely to occur at the site.	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete				
V7	Vegetation Clearing	Ensure an ecologist checks for the presence of threatened flora and fauna species that were identified in the Environmental Assessment as likely to occur. Undertake these checks during optimal conditions for the target species where possible.	Undertake pre-clearing flora and fauna surveys to ensure that no threatened species are present within the disturbance footprint	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing			Conservation zones adjacent the haul road have been fenced.	
V8	Vegetation Clearing	Record the details of any hollow bearing trees/trees containing threatened fauna or threatened flora.	Identify the location of habitat features and erect high visibility fencing to ensure their protection.	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete			Conservation zones adjacent the haul road have been fenced.	
V9	Vegetation Clearing	Mark habitat features to be protected during construction.	Identify the location of habitat features and erect high visibility fencing to ensure their protection.	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete			Conservation zones adjacent the haul road have been fenced.	
V10	Vegetation Clearing	Confirm the location of pre-determined habitat identified for the release of any fauna encountered on site.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete				
V11	Vegetation Clearing	Licensed wildlife carers and/or ecologists should capture and /or remove fauna that have the potential to be disturbed as a result of clearing activities.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
V12	Vegetation Clearing	Relocate fauna into pre-determined habitat identified for fauna release.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
V13	Vegetation Clearing	All fauna handling to be carried out by licensed wildlife carers and/ or ecologists.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
V14	Vegetation Clearing	Inform clearing contractors of any changes to the sequence of clearing if required.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
V15	Vegetation Clearing	Contact vets and wildlife carers before works start to ensure they are willing to assist in treating injured animals if necessary. Provide their contact details to the site manager and clearly display them at the site office. Record all fauna fatalities or injuries and details of any relocated fauna.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
B1	Biodiversity Offset Security	Area 1 to be secured.	Identify the extent of Area 1 and erect high visibility fencing to ensure its protection.	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A					
B2	Restoration/Rehabilitation	Implement Plan of Management including Habitat Management Sub plan and Rehabilitation and Closure Plan	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A					
B3	Translocation	White Lace Flower Translocation Plan	Implement the measures identified in the translocation plan	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing				
B4	Establish vegetation protection areas	Establish prior to construction	Identify vegetation protection areas and erect high visibility fencing to ensure its protection.	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Complete				
B8	Weeds	Ecologist or person trained in weed identification and management should undertake a site weed assessment to identify and describe weed infested areas to be disturbed by the proposed Early Works.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
B9	Weeds	Haul Road Corridor As haul road construction commences effective weed control will be implemented in disturbed areas for early works for the weeds identified onsite in Appendix B of the Restoration Plan. <u>Noxious Weeds</u> Groundsel Bush (Baccharis halimifolia)- Class 3 Camphor Laurel (Cinnamomum camphora) Class 4 Lantana- Class 4 <u>Weeds associated with a TSC Act Key Threatening Process listed under TSC Act</u> Exotic vines or scramblers (Ipomoea cairica) Exotic perennial grasses (i.e. Paspalum urvillei and Setariasphacelata.	Ensure compliance with management measure	Yes	No	No	Prior to commencement of works	N/A	Ongoing				
B10	Weeds	Clean machinery, vehicles, and footwear before entering site and/or moving to a new work location.	Ensure compliance with management measure and incorporate into induction process	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing				
B22	Biodiversity	Council has realigned the haul road to avoid clearing of vegetation type 7. Council commits to the avoidance of clearing of vegetation type 7, and to avoiding the clearing of this vegetation type that falls within the eastern section of the quarry footprint currently shown. The quarry footprint will be revised to reflect this during detailed design.	Design the quarry footprint to avoid vegetation type 7	Yes	No	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing				
B23	Biodiversity	Restricted speed limits will be implemented near vegetated areas for all vehicles.	Install appropriate speed limit signage adjacent vegetated areas	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing				
BF1	Fire Management	Schedule 3 Conditions of Approval 25 and 26.	Prepare and implement a bushfire assessment for the site	No	Yes	No	Prior to commencement of works	N/A	Not Applicable				
T1	Movement of Heavy Vehicles	Traffic Management Plan. Contractors to prepare progressive traffic control plans for the movement of vehicles into and around the site for clearing and road construction. Traffic control plans are to be prepared in consultation with the operators of the existing landfill to ensure construction traffic does not impact on the operation of the landfill and vice versa.	Develop and implement a progressive traffic control plan for the site	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A					
T3	Traffic	Design of haul road will be in accordance with good practice for heavy vehicle traffic.	Ensure compliance with management measure	Yes	No	No	Prior to commencement of works	N/A	Complete				
I1	Induction and training	All construction team members, contractors and sub-contractors are to be inducted in relation to environmental management issues prior to commencing work on the project. Induction package to be developed by contractor and Project Manager to induct minor contractors. The induction program is to address environmental issues relevant to the project.	Develop and implement a construction site induction procedure	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing				
I2	Induction and training	An induction procedure will be developed for all visitors to the site. The visitor induction is to address all environmental issues relevant to the activities that could be undertaken by the visitors. Visitors are not to be allowed to enter the site prior to completing the induction.	Develop and implement a visitor site induction procedure	Yes	Yes	Yes	Prior to commencement of works	N/A					
WQ3	Water Quality	NOW officers will be consulted to determine licensing issues during detailed design in the event that any onsite infrastructure intercepts the water table, or if dewatering is required.	Consult with NOW officers during detailed design	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
WQ4	Water Quality	Groundwater licenses and associated approvals will be obtained prior to works commencing where required.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing				
H2	Heritage	If the 5 springboard trees are to be impacted in early works they will be relocated to an appropriate location where they can be preserved and displayed along with some appropriate signage. Otherwise they will be retained in situ.	Identify, isolate and preserve the five springboard trees during construction and operational works	Yes	Yes	Yes	Prior to the commencement of any works	N/A	Ongoing				
AQ1	Air Quality	Council will Install a meteorological station onsite.	Ensure compliance with management measure	No	Yes	Yes	Prior to commencement of works	N/A	Not Applicable				

Landscape Man Plan

Reference	Environmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of the project	Specific date required by	Status - Haul Road	Comment	Reference / Evidence
Stage 1 - Early Works Landscape Management Plan											
V1	Vegetation	Review the environmental assessment maps and associated documentation for the project to identify features.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V2	Vegetation	Consult with ecologist to determine the location of suitable nearby habitat for the release of fauna that may be encountered during the pre-clearing process or habitat removal. Mark the pre-determined habitat identified for fauna release on a map.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V3	Vegetation	The extent of vegetation required for clearing is to be pegged by a surveyor, approved by the Project Ecologist, and then demarcated with flagging rope or similar. No clearing is to occur outside of this delineation.	Undertake survey of the development footprint and erect high visibility fencing and signage around vegetation protection areas	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V4	Vegetation	Identify tree protection zones on treed areas to be excluded from clearing. The tree protection zone (TPZ) represents the area around the tree that should not be disturbed. Exclusion fencing and tree protection in accordance with the AS 4970-2009 Protection of trees on development sites shall be implemented. Tree dripline zones to be protected in retained vegetation.	Implement tree protection measures adjacent vegetation in accordance with AS4970-2009	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete		
V5	Vegetation	Confirm the locations of biodiversity features	Identify the location of habitat features and erect high visibility fencing to ensure their protection.	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete		
V6	Vegetation	Identify fauna that may have the potential to be disturbed as a result of clearing activities.	Review flora and fuana assessment for project to identify fauna likely to occur at the site.	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete		
V7	Vegetation	Ensure an ecologist checks for the presence of threatened flora and fauna species that were identified in the Environmental Assessment as likely to occur. Undertake these checks during optimal conditions for the target species where possible.	Undertake pre-clearing flora and fauna surveys to ensure that no threatened species are present within the disturbance footprint	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V8	Vegetation	Record the details of any hollow bearing trees/trees containing threatened fauna or threatened flora.	Identify the location of habitat features and erect high visibility fencing to ensure their protection.	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete		
V9	Vegetation	Mark habitat features to be protected during construction.	Identify the location of habitat features and erect high visibility fencing to ensure their protection.	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete		
V10	Vegetation	Confirm the location of pre-determined habitat identified for the release of any fauna encountered on site.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Complete		
V11	Vegetation	Licensed wildlife carers and/or ecologists should capture and /or remove fauna that have the potential to be disturbed as a result of clearing activities.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V12	Vegetation	Relocate fauna into pre-determined habitat identified for fauna release.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V13	Vegetation	All fauna handling to be carried out by licensed wildlife carers and/ or ecologists.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V14	Vegetation	Inform clearing contractors of any changes to the sequence of clearing if required.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V15	Vegetation	Contact vets and wildlife carers before works start to ensure they are willing to assist in treating injured animals if necessary. Provide their contact details to the site manager and clearly display them at the site office. Record all fauna fatalities or injuries and details of any relocated fauna.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
V16	Vegetation	A licensed wildlife carer and/or ecologist should be onsite during habitat removal.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	During construction	N/A	Ongoing		
V17	Vegetation	Carry out staged habitat removal –(for example clearing non-habitat trees followed by any habitat trees) so as to allow respite between the initial disturbance of the clearing process and the final removal of habitat.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
V18	Vegetation	Identified habitat should be left for at least 24 hours after removing the non-habitat vegetation to allow fauna to escape. A licensed wildlife carer and/or ecologist should check trees for fauna before felling. If necessary, fauna may need to be trapped and relocated to pre-determined habitat identified for fauna release.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	During construction	N/A	Ongoing		
V19	Vegetation	Fell potential habitat trees carefully to avoid injury to any fauna remaining in the trees. Where possible use equipment that would allow for any habitat trees to be lowered to the ground with minimal impact (i.e. claw extension). Do not fell trees towards exclusion zones.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
V20	Vegetation	Native woody vegetation including hollows and dead trees and bush rock is to be salvaged where possible for reuse in habitat areas. Carry out removal, stockpiling, transportation and relocation of coarse woody debris (CWD) and/or bush rock in a manner that minimises disturbance to native vegetation (including the canopy, shrubs, dead trees, and fallen timber and groundcover species) and avoids the spread of weeds.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
V21	Vegetation	An experience and licensed wildlife carer and/or ecologist should inspect the habitat once it is removed (eg. After the tree has been felled). Animals that emerge should be captured, inspected for injury then relocated to pre-determined habitat identified for fauna release.	Engage the services of an experienced fauna spotter-catcher during clearing works	Yes	Yes	Yes	During construction	N/A	Ongoing		
V22	Vegetation	Reporting – The outcomes of the clearing process are to be recorded. Reports are to be submitted to the Project Manager and Environmental Advisor.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
V23	Vegetation	Vegetative clearing waste to be taken to green waste landfill. Camphor Laurel may be mulched providing the seeds and foliage are not mulched.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
F1	Fauna	Project site induction should ensure that all personnel do not feed the wildlife that may be encountered on construction sites (especially birds or lizards)	Ensure compliance with management measure and incorporate into induction process	Yes	Yes	Yes	During construction	N/A	Ongoing		
F2	Fauna	In the event that a Koala is detected in vegetation approved for clearing, the following procedure is to be followed: -An exclusion zone with a 30m radius is to be established around the tree that the Koala inhabits -No clearing is permitted in this exclusion zone, including no clearing of the understorey. -No site staff are to enter the exclusion zone, unless under the supervision of the Project Ecologist. -Clearing of this vegetation cannot occur until the Koala has left the tree of its own volition.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		

F3	Fauna	Threatened flora or fauna species unexpectedly encountered. Procedure us as follows: - STOP WORK - Notify the Project Manager. - Project Manager would arrange for an ecologist to conduct an assessment of significance of the likely impact, develop a management options and notify OEH, DPI and DSEWPC as appropriate. - If an impact is not likely to occur, work can recommence and regular inspections will be maintained. - If an impact is likely to occur, consultation will be had with OEH, DPI or DSEWPC as appropriate. Licences, approvals or permits will be then obtained as required. Works will recommence once advice is sought and necessary approvals, licences and permits are obtained. - The species will be included in subsequent inductions, toolbox talks and the environmental plans will be updated.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
N1	Nest Boxes	6 Nest boxes in Area 1 in order to offset a reduction in hollow recruitment in Eucalypts. Further nest boxes to be installed should any hollow bearing trees be impacted by the proposed works. Tweed Shire Council Project Ecologist will advise on nest box installation onsite. Taking into consideration the aspect, proximity to food resources and presence of Common Mynas.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Complete		
N2	Nest Boxes	Nest box design to be for use of petaurid gliders. Dimensions of nest boxes to be 400mm in height with internal dimensions 250mm x 300mm. The entrance diameter to be 450mm. The nest box lid will have at least 4cm overlap at sides and 8-10cm at the front. The nest boxes will be placed approximately 6m height above ground and be attached to trees by the Habisure method if possible. Nest boxes to be installed approximately100m apart.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Complete		
N3	Nest Boxes	Monitoring of nest boxes, once per year for the first two years, skip the third year and check nest boxes on the fourth year. The need for future monitoring will be reviewed at this stage.	Develop and implement nestbox monitoirng program in accordance with management measure	Yes	Yes	Yes	During operation	N/A	Ongoing	1st year monitoirng complete	
B1	Biodiversity	Area 1 to be secured as per Table6.2	Identify the extent of Area 1 and erect high visibility fencing to ensure its protection.	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A			
B2	Biodiversity	Implement Plan of Management including Habitat Management Subplan. and Rehabilitation and Closure Plan	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A			
B3	Biodiversity	White Lace Flower Translocation Plan	Implement the measures identified in the translocation plan	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing		
B4	Biodiversity	Establish vegetation protection areas prior to construction	Identify vegetation protection areas and erect high visibility fencing to ensure its protection.	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Complete		
B5	Biodiversity	Activities permitted in the vegetation protection areas would include: - Weed management - Habitat management - Restoration/translocation activities.	Ensure compliance with management measure and incorporate into induction process	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
B6	Biodiversity	Activities prohibited in vegetation protection areas include: - -use of or parking of vehicles and equipment (unless associated with a permitted activity), - Placement of construction materials, refuse, excavated spoils and stockpiling. - Use of tree trunks as a winch support.	Ensure compliance with management measure and incorporate into induction process	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
B7	Biodiversity	Implementation of Restoration Plan the Northern and Southern Ridgeline Corridor.	Ensure implementation of restoration plan	Yes	Yes	Yes	During construction and operation	N/A	Complete		
B8	Biodiversity	Ecologist or person trained in weed identification and management should undertake a site weed assessment to identify and describe weed infested areas to be disturbed by the proposed Early Works.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works	N/A	Ongoing		
B9	Biodiversity	Haul Road Corridor As haul road construction commences effective weed control will be implemented in disturbed areas for early works for the weeds identified onsite in Appendix B of the Restoration Plan. Noxious Weeds Groundsel Bush (Baccharishalimifolia)- Class 3 Camphor Laurel (Cinnamomumcamphora) Class 4 Lantana- Class 4 Weeds associated with a TSC Act Key Threatening Process listed under TSC Act Exotic vines or scramblers (Ipomoea cairica) Exotic perennial grasses (i.e. Paspalum urvillei and Setariasphacelata.	Ensure compliance with management measure	Yes	No	No	Prior to commencement of works	N/A	Ongoing		
B10	Biodiversity	Clean machinery, vehicles, and footwear before entering site and/or moving to a new work location.	Ensure compliance with management measure and incorporate into induction process	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing		
B11	Biodiversity	Securely cover loads of weed-contaminated material to prevent weed plant material falling or blowing off vehicles.	Ensure compliance with management measure and incorporate into induction process	Yes	Yes	Yes	During construction	N/A	Ongoing		
B12	Biodiversity	Dispose of weed contaminated soil at an appropriately licensed waste management facility or topsoil recovered from areas of low weed infestation can be reused onsite with treatment but should be stockpiled separately.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
B13	Biodiversity	Remove weeds immediately onto suitable trucks and dispose without stockpiling.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
B14	Biodiversity	Separate weeds from native vegetation where native vegetation is to be used for mulch.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
B15	Biodiversity	Dispose of weeds to an appropriate waste management facility; do not use weeds for mulch.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
B16	Biodiversity	Removal of Camphor Laurel in Haul Road access will require monitoring and treatment for weed infestation post clearing.	Develop and implement an annual monitoring program	Yes	No	No	During construction and operation	N/A			
B17	Biodiversity	Send samples of topsoil being imported onto site to a National Association of Testing Authorities (NATA) approved soil laboratory to ensure it contains no weed seeds or propagules (vegetative parts of plants such as buds or offshoots that can grow into new individuals).	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		

B18	Biodiversity	Site to be kept clean and tidy at all times with no uncontrolled solid waste.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
B19	Biodiversity	Domestic food scraps and waste not to be left onsite.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
B20	Biodiversity	Waste receptacles are to be provided at any site compound facilities and amenities. These waste receptacles to be maintained and waste removed from site lawfully in accordance with legislation.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
B21	Biodiversity	Management of Cattle entering site from adjacent properties will be undertaken, either by removal or fencing barriers around revegetation clusters.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Complete		
BF1	Bushfire	Schedule 3 Conditions of Approval 25 and 26.	Prepare and implement a bushfire assessment for the site	No	Yes	No	Prior to commencement of works	N/A	Not Applicable		
BF2	Bushfire	Water source for fire fighting is via existing water tanker on Stotts Creek Landfill.	Noted				noted	N/A			
BF3	Bushfire	No hot work without hot works fire permit onsite	Ensure hot works fire permit is obtained prior to any hot works	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
BF4	Bushfire	Fire extinguishers to be located on all mobile plant	Ensure all mobile plant and equipment are provided with fire extinguishers	Yes	Yes	Yes	During construction and operation	N/A			
BF5	Bushfire	Refer to Emergency Response Plan in Section 5.6 of the Environmental Management Strategy.	Noted				Noted	N/A			
T1	Traffic	Traffic Management Plan.	Develop and implement a progressive traffic control plan for the site	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A			
T2	Traffic	Heavy vehicle movements to occur only during designated working hours, therefore avoiding many species foraging hours.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
I1	Induction	Induction package to be developed by contractor and Project Manager to induct minor contractors.	Develop and implement a construction site induction procedure	Yes	Yes	Yes	Prior to commencement of works	N/A			
S1	Soils and Erosion	Erosion and sediment control measures to be implemented as per the 'Blue book'.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S2	Soils and Erosion	Dust suppression to be undertaken to avoid earth works degrading adjacent habitat by dust.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S3	Soils and Erosion	Install, operate and maintain all erosion and sediment control measures	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S4	Soils and Erosion	Minimise extent and duration of soil disturbance	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S5	Soils and Erosion	Control the location and velocity of drainage flow	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S6	Soils and Erosion	Promptly revegetate/stabilise all exposed and/or unstable soil surfaces.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S7	Soils and Erosion	Maintain undisturbed and rehabilitated/revegetated area as filters for sediment from disturbance above.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S8	Soils and Erosion	Stage operations with a view to minimise disturbed/active areas onsite at any given time to minimise the volume of runoff to be managed from the contributing catchment area that is active at any particular time.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S9	Soils and Erosion	Maintain all stormwater runoff from disturbed areas as diffuse as possible to minimise sediment loads and maximise the opportunities for vegetation to strip sediment from the runoff.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S10	Soils and Erosion	Keep sources of different quality water separate from each other namely: -'leachate' drainage from the base of the landfill and the active landfill area; - 'dirty' runoff containing sediment from quarrying and landfill active areas; and - 'clean' runoff from vegetated areas with no waste or quarry related activities.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S11	Soils and Erosion	Provide adequate stormwater detention volume and ensure that sufficient water is available for construction requirements.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S12	Soils and Erosion	Re-use or dispose of water on site: -re-use of 'dirty' runoff for dust suppression and - divert 'clean' runoff into dams for supplementary water supply or overflow off site.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S13	Soils and Erosion	Employ strategic placement of bunds in the quarry and landfill working areas to ensure that water falling in active areas is managed appropriately	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S14	Soils and Erosion	Topsoil stockpiles would be up to 1m high and subsoil/overburden stockpiles would not exceed 3 m in height.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S15	Soils and Erosion	Subsoil and topsoil stockpiles would be located within the footprint of the landfill, quarry or on the upper surface of the completed landfill stages.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S16	Soils and Erosion	Stabilisation measures would be used until vegetation is established on the stockpiled soil.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
S17	Soils and Erosion	Stockpiling out of the drip line of trees.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
A1	Access	Access to and from the site will be controlled as both entrances are gated and locked.No unauthorised access would be permissible	Develop and implement access protocols to the site	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
Visual1	Visual	The impact of the works will progressively become screened over time by detailed design and implementation of the Biodiversity Offset Strategy and Restoration Plan.	Ensure implementation of biodiversity offset strategy and restoration plan	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		

Heritage Management Plan

Reference	Envirionmenatl Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of the project	Specific date required by	Status - Haul Road	Comment	Reference / Evidence
Heritage Management Plan											
Item 1 Table 6.1	Cultural Heritage	On-going consultation with the local Aboriginal community - Aboriginal Advisory Committee (hereafter referred to as AAC) Monthly meetings updates	Provide the AAC with montly updates regarding the progress of the works	Yes	Yes	Yes	During construction	Monthly during construction			
Item 2 Table 6.1	Cultural Heritage	Cultural Heritage Induction to be provided to contractors as part of the Contractor Inductions. Tweed Shire Council Representative to provide inductions to small groups of contractors and cultural heritage professional (currently Ian Fox and Associates) to provide larger contractor inductions. Inductions for large groups to be undertaken in collaboration with a representative of the Tweed Aboriginal community (ie nominee of AAC).	Incorporate Aboriginal Cultural awareness training as part of site induction process and deliver in accordance with management measure	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing		
Item 3 Table 6.1	Cultural Heritage	Induction package to be developed based on collaborative approach between TSC and Ian Fox& Associates. Updated Cultural mapping from the Tweed Shire Council to be referred to. AAC to review and approve cultural content of the induction package.	Ensure compliance with management measure	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A			
Item 4 Table 6.1	Cultural Heritage	TBLALC to be contacted to book Sites Officers for removal of the first 20cm (nominal depth) of topsoil during the process of vegetation clearing and geotechnical test pitting on the high risk areas-ridgelines nominated in the EIS. Trainee sites officers to be accompanied by qualified sites officer with field kit.	Implement a program of site monitoring for ground disturbing activities in areas recognised as having a higher potential for the presence of unidentified cultural heritage.	Yes	Yes	Yes	Prior to the commencement of any works	N/A	Ongoing		
Item 5(a) Table 6.1	Cultural Heritage	Site Monitoring - Early Works TBLALC to be contacted to book Sites Officers for early works including: >geotechnical test pitting (not boring via drill rig) and clearing for survey. >Ridgeline Test pitting for the first 20cm (nominal depth) of soil removed. - Time allocated is 2 days. >Vegetation clearing for design survey on ridgelines. - Time allocated is 2 days. >For clearance of first 20cm (nominal depth) of topsoil on high risk areas as nominated in the EA and Cultural Mapping.	Implement a program of site monitoring for ground disturbing activities in areas recognised as having a higher potential for the presence of unidentified cultural heritage.	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 5(b) Table 6.1	Cultural Heritage	Site Monitoring - Road Construction TBLALC to be contacted to book Sites Officers during road construction for the removal of the first 20cm (nominal depth) of topsoil on ridges.	Implement a program of site monitoring for ground disturbing activities in areas recognised as having a higher potential for the presence of unidentified cultural heritage.	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 6 Table 6.1	Cultural Heritage	Discovering artefacts during site monitoring- Site monitors will be required to record objects and manage in accordance with the requirements of the National Parks and Wildlife Act 1974	Implement a program of site monitoring for ground disturbing activities in areas recognised as having a higher potential for the presence of unidentified cultural heritage.	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 7(a) Table 6.1	Cultural Heritage	Collect and Care and Control- Should Community wish to collect and keep artefacts found as either unexpected finds or through site monitoring, a care and control permit in consultation with OEH will need to be obtained.	In the event that any artefacts are found a care and control permit will be obtained	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 7(b) Table 6.1	Cultural Heritage	In the event that artefacts are found temporary storage of Artefacts for cataloguing purposes will be at Tweed Byron LALC(referred to hereafter as TBLALC)	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 7(c) Table 6.1	Cultural Heritage	Should Community wish to relocate and/or rebury artefacts collected, location of reburial shall be Area 1 (Appendix 4 of the CoA) unless otherwise determined by AAC in consultation with TSC and OEH.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 8 Table 6.1	Cultural Heritage	Reburial of Artefacts will require a new Aboriginal Heritage Information Management System (AHIMS) site card	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 9(a) Table 6.1	Cultural Heritage	If unexpected finds of archaeological material occur on the Project in the low cultural heritage risk areas (not ridgelines), works potentially affecting the find will cease and Sites Monitors will be contacted to undertake record and possible collect as per site monitoring provisions above(Table 6.1 Items 5-9).	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 9(b) Table 6.1	Cultural Heritage	If unexpected finds of significant archaeological material (e.g. hearths) occur on the Project in low risk areas, works potentially affecting the find will cease and Site Monitors and Cultural Heritage Professional will be contacted to assess the site and identify and flag a 30m buffer zone, and advise.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 9(c) Table 6.1	Cultural Heritage	If it is found that further management actions such as monitoring are required to mitigate the impact of the project activities on cultural heritage then the Sites officers to liaise with Project Manager/TSC Representative on the nature and location of the identified or potential cultural heritage and appropriate management options, including the location of any monitoring areas.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 10 Table 6.1	Cultural Heritage	If suspected human skeletal remains are encountered, works potentially affecting the find would cease immediately and the police will be contacted to attend site. OEH and TBLALC (Sites Officers) and will be contacted if the remains are found to be Aboriginal remains.	Contact NSW Police if human remains are located	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 11 Table 6.1	Cultural Heritage	If any unexpected historic heritage items are encountered across the Project site, works potentially affecting the area would cease immediately, Project Manager, and Tweed Shire Council Representative, and archaeologist (if required) to be contacted to attend site and assess impact.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
Item 12 Table 6.1	Cultural Heritage	Springboard Trees- Relocation to appropriate location, if required, where they can be preserved and displayed along with appropriate interpretation where reasonable and feasible.	Identify, isolate and preserve the five springboard trees during construction and operational works	Yes	Yes	Yes	Prior to commencement of works	N/A			
Section 7	Cultural Heritage	All employees, contractors and utility staff working on site will undergo site induction training relating to Aboriginal and non-Aboriginal heritage management issues. The induction training will address elements related to heritage management including: • Existence and requirements of this sub-plan. • Role of the Aboriginal Advisory Committee and TBLALC. • Relevant legislation. • Roles and responsibilities for heritage management. • Location of any identified heritage sites. • Proposed heritage management and protection measures. • Procedure to follow in the event of an unexpected heritage item find during construction works. • Procedure to follow in the event of discovery of human remains during construction works. The Heritage Education and Training Package for the project is included in Appendix C.	Incorporate Aboriginal Cultural awareness training as part of site induction process	Yes	Yes	Yes	Prior to commencement of works	N/A			
Section 7	Cultural Heritage	Inspections of activities with the potential to impact Aboriginal and non-Aboriginal heritage will occur for the duration of the project by internal and external Auditors.	Implement a program of site monitoring for ground disturbing activities in areas recognised as having a higher potential for the presence of unidentified cultural heritage.	Yes	Yes	Yes	During construction	N/A			
Section 7	Cultural Heritage	Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, Ministers Conditions of Approval and other relevant approvals, licenses and guidelines.	Engage suitably qualified auditor to undertake an independent environmental audit of the project	Yes	Yes	Yes	During construction	1st August 2018	Ongoing		
Section 7	Cultural Heritage	Reporting on the mitigation measures in this plan shall be actioned via monthly meetings with the Aboriginal Advisory Committee and through the Reporting of Incidents, Regular Reporting Independent Environmental Audit as required by Schedule 6 of the CoA Clauses 8, 9 and 10 respectively.	Provide the AAC with montly updates regarding the progress of the works	Yes	Yes	Yes	During construction	N/A			
Section 7	Cultural Heritage	Non Compliances with the Heritage Management Plan will be dealt with through Contract Non-Conformance Process and classed as an incident, and will require reporting to OEH, TBLALC and the Aboriginal Advisory Committee accordingly.	Ensure compliance with management measure and that non-conformane penalities are written into any applicable contract	Yes	Yes	Yes	During construction	N/A	Ongoing		

White Laceflower Translocation

Reference	Environmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of the project	Specific date required by	Status - Haul Road	Comment	Reference / Evidence
White Lace Flower Translocation Plan											
3.3.1	Pre-clearing targeted threatened plant survey	targeted threatened plant surveys are required prior to vegetation clearing. These will be undertaken as early as possible to allow for incorporation of additional information into the translocation plan.	Undertake survey of the development footprint followed by targeted threatened plant species searches	Yes	No	Yes	Prior to commencement of works	N/A	Complete	Completed for Stage 1	
	Pre-clearing targeted threatened plant survey	the development footprint would be surveyed and marked in the field to clearly demarcate the vegetation subject to disturbance and allow environmental scientists/botanists to accurately target their surveys.	Undertake survey of the development footprint followed by targeted threatened plant species searches	Yes	No	Yes	Prior to commencement of works	N/A	Complete	Completed for Stage 1	
	Pre-clearing targeted threatened plant survey	All threatened plant species identified during targeted surveys will be flagged and relevant information including species name, number of stems, height of each stem, condition and general observations recorded.	Undertake survey of the development footprint followed by targeted threatened plant species searches. Identify all threatened species as required	Yes	No	Yes	Prior to commencement of works	N/A	Complete	None located within haul road footprint	
	Pre-clearing targeted threatened plant survey	Each stem will be given a plant identification number. Clusters of stems seemingly from the same rootball will be considered ramets. The plant code will identify both the plant and stem number (eg. 'AH_1_1', which represents Archidendron hendersonii, plant 1, stem 1).	Undertake survey of the development footprint followed by targeted threatened plant species searches. Identify and record all threatened species as required	Yes	No	Yes	During translocation program	N/A	Complete	None located within haul road footprint	
	Pre-clearing targeted threatened plant survey	Records will be kept for each sample of propagation material and maintained from the time of collection, to the raising of seed/cuttings, planting out of tubestock and maintenance and monitoring period. The following information will be collected for each sample: > Sample id code (unique code to be created for each sample – eg. 'AH_1_1_1', which represents Archidendron hendersonii, plant 1, stem 1, seed 1); > Source plant location (GPS coordinates and description); > Date of collection; > Type of material collected (eg. seed, cutting); > Amount of material collected; > Seed treatment technique; > Date of sowing; > Date of germination; > Date of out-planting; > Location of out-planting (GPS coordinates and description); > Monitoring results (refer to Section 3.3.3 for proposed monitoring method). Each sample will be tagged with its Sample id code for the duration of its life cycle.	Undertake survey of the development footprint followed by targeted threatened plant species searches. Identify and record all threatened species as required	Yes	No	Yes	During translocation program	N/A	Complete	None located within haul road footprint	
	Baseline Data	Prior to out-planting, baseline data is to be collected from the out planting site. This will provide data on habitat traits at a micro level that can be compared between sites and over time to provide a better understanding on the species most preferable micro-habitat traits. Data to be collected includes: > GPS location; > Altitude; > Slope; > Aspect; > Canopy coverage; > Vegetation community association; > Soil type; > Landform morphology; > Disturbances and overall ecological condition.	Record and detail baseline data of the translocation program	Yes	No	Yes	During translocation program	N/A	Not Complete		
	Recipient Site Preparation	Weed control works within the recipient site will be undertaken as early as possible in the translocation program, preferably well ahead of out-planting. This is to minimise the risk of habitat modification and competition by exotic species.	Develop and implement a weed control program as required.	Yes	No	Yes	During translocation program	N/A	Not Complete		
	Recipient Site Preparation	The habitat management plan for the conservation area is to incorporate fire management measures to protect the wet sclerophyll habitat of the recipient site.	Develop a habitat management plan for the conservation area and incorporate fire management measures	Yes	No	Yes	During translocation program	N/A	Not Complete		
	Staff Training	The staff involved in the translocation program will be provided with an induction into the translocation program and a copy of the translocation plan. This includes seed collectors, nursery staff propagating stock, bush regeneration contractors undertaking weed control and out-planting and relevant site managers including the quarry and landfill supervisors and waste management coordinator. The program will be coordinated by TSC Botanist/Environmental Scientists.	Develop and implement a translocation program induction plan in accordance with management measure	Yes	No	Yes	Prior to commencement of works	N/A	Not Complete		
	Staff Training	The translocation plan will be integrated with the habitat management plan and restoration plan as well as the site EMP. This is to ensure that site personnel are familiar with the translocation program and its management requirements are incorporated into daily site management practices.	Integrate the translocation plan with the habitat management plan, restoration plan and EMP	Yes	No	Yes	Prior to commencement of works	N/A	Not Complete		
3.3.2	Translocation	Seed is to be collected from the source plant during the fruiting period between June and January.	Ensure compliance with management measure	Yes	No	Yes	During translocation program	N/A	Ongoing	Surveyed both on and off site have not been found to be fruiting or flowering.	
	Translocation	In accordance with the florabank Model Code of Practice, it is recommended that no more than 20% of fruit is removed from any one plant (in any one season), unless clearing is imminent. If no fruit is borne prior to clearing, cuttings are to be taken from young growing tips.	Ensure compliance with management measure	Yes	No	Yes	During translocation program	N/A	Ongoing	Surveyed both on and off site have not been found to be fruiting or flowering.	
	Translocation	Collected seed is to be stored in accordance with the florabank Guidelines for Native Seed Storage for Revegetation.	Ensure compliance with management measure	Yes	No	Yes	During translocation program	N/A	Ongoing	Surveyed both on and off site have not been found to be fruiting or flowering.	
	Translocation	Collected seed is to be delivered to TSC Nursery or contracted private nursery for propagation. Sample id codes are to be kept with the sample at all times on a label that is not going to deteriorate with water and sun exposure.	Ensure compliance with management measure	Yes	No	Yes	During translocation program	N/A	Ongoing	Surveyed both on and off site have not been found to be fruiting or flowering.	
	Propogation	The seed is to be categorised, in equal numbers, into one of four treatment groups: 1 Group 1: control group that is sown fresh without any treatment. 2 Group 2: group that is soaked in room-temperature water overnight prior to sowing. 3 Group 3: group that is briefly soaked in boiling water prior to sowing. 4 Group 4: group that is scarified prior to sowing (either nicked with knife or abraded with sandpaper). The different treatment groups provide an opportunity to experiment with seed treatment methods and ultimately determine the most successful method for this species. This information can guide future propagation and translocation programs for White Lace Flower.	Ensure compliance with management measure	Yes	No	Yes	During translocation program	N/A	Not Complete	Attempted two round of cutting propogation - both unsuccessfull.	
	Propogation	In the event that seed production is insufficient, propagation would be undertaken using cuttings in accordance with the Australian Native Plant Society (Australia) (ANPSA) recommendations,	Ensure compliance with management measure	Yes	No	Yes	During translocation program	N/A	Not Complete	Attempted two round of cutting propogation - both unsuccessfull.	

White Laceflower Translocation

<table>
<tr><td></td><td>Propogation</td><td>To minimise risk of introducing diseased stock to the site, the following practices are to be adhered to:
> Only clean, healthy and disease free material is to be collected.
> When collecting propagation material, new, clean, tagged and separate bags/containers are to be used for each source plant (if more than one is located within the development footprint).
> Any cuttings are to be taken using clean secateurs which are to be disinfected between plants (eg. sprayed with a 70% methylated spirits solution).
> Propagation and growing benches are to be kept clean and sterilised.
> Fungicide treatment to be used on seed, as required.
> Growing medium is to be fresh and prepared and stored hygienically, such as from an accredited growing media supplier.
> Trays/pots or tubes are to be new or if re-used, sterilised.
> Over-wetting propagating material is to be avoided and air-circulatation is to be maintained around the pots/trays/tubes.
> The propagation and hardening off areas are to be kept free from weeds, liverwort and moss (NGIA, 2004).</td><td>Ensure compliance with management measure</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>N/A</td><td>Not Complete</td><td>Attempted two round of cutting propogation - both unsuccessfull.</td><td></td></tr>
<tr><td></td><td>Out-planting</td><td>Tubestock is to be ‘hardened off’ prior to out-planting to assist in their adaptation to natural conditions.</td><td>Ensure compliance with management measure</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>N/A</td><td>Not Complete</td><td></td><td></td></tr>
<tr><td></td><td>Out-planting</td><td>Out-planting should preferably be undertaken during spring to take advantage of good growing conditions (warming temperatures, more sunlight hours). This will ensure the most intensive period of maintenance (watering and weeding) occurs during the first spring and summer when hot and sometimes dry conditions may otherwise cause heat stress and rapid weed growth.</td><td>Ensure compliance with management measure</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>N/A</td><td>Not Complete</td><td></td><td></td></tr>
<tr><td></td><td>Out-planting</td><td>The recommended planting arrangement is clusters of tubestock throughout the recipient site. This mimics the natural occurrence of this species in low density isolated clusters. Successfully propagated stock would be arranged in 5-10 clusters, with the number of individuals within each cluster dependent upon propagation success. Indicative locations of out-planting clusters are depicted in Figure 2. During out-planting each plant will remain tagged with its plant id code. A GPS coordinate will be taken for each plant planted into the ground and a mud map of the location of each plant, labelled with its plant id code, will be prepared.</td><td>Ensure compliance with management measure</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>N/A</td><td>Not Complete</td><td></td><td></td></tr>
<tr><td></td><td>Out-planting</td><td>A minimum of 10 healthy tubestock is to be retained at the nursery as insurance in the event of mass losses of the planted stock. The insurance stock could be out-planted as replacement stock but only after the initial five year monitoring period to allow adequate time
to assess the suitability of the recipient site and gain a better understanding of the microhabitat
preferences.</td><td>Ensure compliance with management measure</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>N/A</td><td>Not Complete</td><td></td><td></td></tr>
<tr><td>3.3.3</td><td>Post Translocation</td><td>The translocated plants are to be maintained in accordance with the maintenance program below.
<table><tr><th>Task</th><th>Frequency and method</th></tr><tr><td>Watering</td><td>The plants would initially be watered in during out-planting.
For the first month post-planting, watering would be undertaken weekly.
For the subsequent five months of the first year, watering would be undertaken fortnightly.
For the remaining five months of the first year, watering would be undertaken once a month.
Watering events may be skipped in the event of adequate rainfall.</td></tr><tr><td>Weed control</td><td>Primary weed control would be undertaken prior to out-planting as part of site preparations.
For the six months post-planting, weed control would be undertaken once a month. All weeding within 10 m of the transplanted stock would be hand-weeded to minimise risk of spray drift damage.
For the remaining five months of the first year, weed control would be undertaken every second month.
For the subsequent four years, weed control events would be undertaken quarterly (four times a year).
Beyond the five year period, weed control would be addressed in the overall weed management of the conservation area as directed by the habitat management plan.</td></tr></table></td><td>Develop and implement a translocation maintenance program in accordance with the requirements</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>N/A</td><td>Not Complete</td><td></td><td></td></tr>
<tr><td></td><td>Monitoring</td><td>The proposed monitoring program is to run over a five year period. The proposed monitoring schedule is:
> Within the first six months post-planting, monitoring would be undertaken every second month post-planting.
> For the remaining five months of the first year, monitoring would be undertaken once at the end of the year.
> For the subsequent four years of the monitoring program, monitoring would be undertaken annually.</td><td>Develop and implement a translocation monitoring program</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>Provide date following planting</td><td>Not Complete</td><td></td><td></td></tr>
<tr><td></td><td>Monitoring</td><td>The following key performance indicators would be assessed during each monitoring event:
> Translocated stock survival – proportion of tubestock planted survived;
> Likely cause of any translocated stock mortalities;
> Height of translocated stock;
> Dust deposition on leaves of translocated stock (qualitative visual observation);
> Qualitative assessment of translocated stock health (eg. visual observations on the presence of fungi or insect infestations and dieback or discolouration of foliage);
> Evidence of any damage to surrounding native vegetation (eg. dieback from possible root damage, trampling, spray drift damage);
> The presence of flowers or fruit on translocated stock;
> The presence of any natural recruitment (seedlings);
> Presence of threatening processes (eg. weed encroachment, fire, evidence of herbivore grazing).</td><td>Incorporate key performance indicators into translocation monitoring program</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>N/A</td><td>Not Complete</td><td></td><td></td></tr>
<tr><td></td><td>Adaptive Management</td><td>The data collected during monitoring will be analysed to attempt to recognise any patterns or potential causal relationships between transplant success and micro-habitat traits and environmental management practices (eg. weed management, dust suppression).
This information will guide maintenance practices and frequency, inform which sites are most suitable for replacement plantings (if required) and guide site management practices. The findings can be disseminated to assist future conservation of this species.</td><td>Ensure compliance with management measure</td><td>Yes</td><td>No</td><td>Yes</td><td>During translocation program</td><td>N/A</td><td>Not Complete</td><td></td><td></td></tr>
</table>

White Laceflower Translocation

	Reporting	Progress reports will be produced annually during the five year monitoring program. The annual progress report will be a brief document (1-2 pages) including the following: > a brief discussion of works completed since commencement/last progress report > a description of outstanding works planned for the subsequent year, highlighting priority tasks > presentation of monitoring results > any recommendations for adapting works to suit changing conditions, shifting priorities (eg. new threatening processes).	Prepare an annual progress report detailing the items listed in the management measure	Yes	No	Yes	During translocation program	One year following the completion of translocation planting and annually for a period of 5 years	Not Complete		
	Reporting	In addition to progress reports, an evaluation report is to be prepared at the end of the five year program. The evaluation report will summarise the monitoring data over the five year period, discuss findings and provide recommendations for future translocation plans.	Prepare an overall evaluation report detailing the items listed in the management measure	Yes	No	Yes	During translocation program	Five years following the completion of translocation planting	Not Complete		
	Reporting	The reports will be submitted to the TSC Waste Management Coordinator or as directed by DoP/OEH.	Ensure compliance with management measure	Yes	No	Yes	During translocation program	One year following the completion of translocation planting and annually for a period of 5 years	Not Complete		

Restoration Plan

Reference	Environmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of the project	Specific date required by	Status - Haul Road	Comment	Reference / Evidence
Restoration Plan											
5.1	Seed collection and propogation	Seed is to be collected from native species within and adjoining the existing Swamp Sclerophyll Forest and Blackbutt wet sclerophyll forest communities of the Northern Riparian Corridor and southern ridgeline, respectively.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Complete	Most sourced from nurseries. Some seed opportunistically collected from site.	
	Seed collection and propogation	Seed is to be collected from species listed in the revegetation species lists for each restoration area (Appendix A).	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Complete	Most sourced from nurseries. Some seed opportunistically collected from site.	
	Seed collection and propogation	it is recommended that no more than 20% of fruit is removed from any one plant (in any one season).	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Complete	Most sourced from nurseries. Some seed opportunistically collected from site.	
	Seed collection and propogation	Records will be kept for each sample of propagation material and maintained from the time of collection, to the raising of seed/cuttings, planting out of tubestock and maintenance and monitoring period. The following information will be collected for each sample: > Sample id code (unique code to be created for each sample – eg. 'EP_1', which represents Eucalyptus pilularis, plant 1); > Source plant location (GPS coordinates and description); > Date of collection; > Type of material collected (eg. seed, cutting); > Amount of material collected; > Seed treatment technique; > Date of sowing; > Date of germination; > Date of out-planting; > Location of out-planting (GPS coordinates and description); > Monitoring results (refer to Section 5.6.2 for proposed monitoring method). Each sample will be tagged with its Sample id code for the duration of its life cycle.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Not Complete		
	Seed collection and propogation	Collected seed is to be stored in accordance with the florabank Guidelines for Native Seed Storage for Revegetation.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Not Complete		
5.2	Control of grazing	Access by cattle to the northern restoration area will need to be controlled, either through destocking or fencing. Temporary fencing, such as electric tape, could be employed around revegetation clusters; however, would require maintenance to remain effective.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Complete	Cattle have been removed from the site	
5.3	Revegetation	The areas to be revegetated include: > Northern Riparian Corridor: a single row of trees along the entire length of the corridor (approximately 956m) with six additional revegetation clusters of approximately 50 x 20 m, focussed on open areas with minimal to no native canopy cover. This amounts to a total revegetation area of approximately 0.7ha of the total 1.9ha restoration area (the remainder will be treated with assisted regeneration). > Southern Ridgeline Corridor: focussed on gap in existing ridgeline vegetation centred around the existing residence on Lot 1 on DP34555. A 220m x 20m strip (an estimated 0.44ha will be revegetated) (refer to Figure 4).	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Complete	Comprehensive plantation planting across an approx 20m wide corridor	
	Revegetation	The Northern Riparian Corridor is to be revegetated with species characteristic of SSF. The Southern Ridgeline Corridor is to be revegetated with species characteristic of Blackbutt wet sclerophyll forest. A species list for revegetation works is provided in Appendix A, it has been developed with consideration for the list of flora species recorded at site, characteristic species for each community, site conditions and suitable pioneer species. No threatened species are to be included in the plantings.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Complete		
	Revegetation	Within the Northern Riparian Corridor, the revegetation screen will be planted out with a single row of trees, spaced approximately 1m apart. The revegetation cluster areas will be planted out with tubestock at a density of 1 plant per 1m2 with a ratio of 3 trees/shrubs to 1 groundcover.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Complete	Comprehensive plantation planting across an approx 20m wide corridor	
	Revegetation	The Southern Ridgeline Corridor will be planted out with tubestock at a density of 1 plant per 1m2 with a ratio 4 trees/shrubs to 1 groundcover.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Complete		
	Revegetation	At least a 90% survival rate of planted stock is expected throughout the duration of the program. Any plant losses experienced above this will be replaced through supplementary planting events.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Complete	KPI has been modified to 80% survival	
5.4	Weed Control	Weed control is to take place throughout the restoration areas, in both the revegetation and assisted regeneration areas.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Ongoing		
	Weed Control	A primary weed control event is required as part of site preparations for revegetation works. This is to remove any existing weeds to allow for out-planting and mulching. Follow-up weed control works are to be undertaken as required to achieve the Key Performance Indicators (refer to Appendix C). Follow-up weed control would be undertaken as revegetation maintenance works (Section 5.6) and assisted regeneration works (Section 5.5).	Develop and implement a weed control program as required.	Yes	Yes	Yes	During restoration program	N/A	Ongoing	Primary event completed. Follow-up maintenance ongoing.	
	Weed Control	The priority weed species to be targeted in control works are: > Weeds of National Significance (WoNS) > noxious weeds listed under the Noxious Weeds Act 1993 > weeds associated with a Key Threatening Process listed under the TSC Act > environmental weeds which have been identified by NSW North Coast Weed Advisory Committee (NCWAC) as one of 187 species considered to have the greatest potential impact on native vegetation.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Ongoing		
	Weed Control	Weed removal techniques and herbicide application is to be conducted according to current best practice methods in bushland restoration. Specifically, works are to be undertaken in accordance with the following guidelines: > The Department of Industry and Investment (I&I) (2009) Noxious and environmental weed control handbook a guide to weed control in non-crop, aquatic and bushland situations and > The Department of Environment and Conservation's Guidelines for bush regeneration in threatened species habitat and endangered ecological communities.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Ongoing		
	Weed Control	Throughout herbicide application, weather conditions are to be assessed and monitored to reduce the risk of drift and subsequent off-target damage (I&I, 2009) as heavy rains following herbicide application can reduce the effectiveness of a treatment and may cause contamination through run-off (I&I, 2009).	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Ongoing	Daily records sheets submitted with progress report	

	Weed Control	All herbicide applications are to be undertaken in accordance with the requirements of the Pesticides Act 1999. Under this Act all pesticide users must: > use only pesticides registered by the Australian Pesticides & Veterinary Medicines Authority (APVMA) that are approved for the intended situation of use > read the registered label on the pesticide container (or have them read to the user) and strictly follow the label directions > not risk injury to persons, property and non-target plants and animals through the use of the pesticide > obtain an AVPMA permit if the user wishes to vary the label directions or use pattern > make a record of pesticide applications > be trained (WorkCover, 2006).	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Ongoing	Daily records sheets submitted with progress report	
5.5	Assisted Regeneration	Assisted regeneration is to occur within nominated areas of the Northern Riparian Corridor as depicted in Figure 3. These areas are focussed around areas of existing native vegetation where native soil and canopy seed banks exist or are otherwise inter-dispersed between revegetation clusters and adjacent to the revegetation screen. The idea is to expand on areas of existing native vegetation and establish seed sources along the corridor (through revegetation works) which will promote natural regeneration. Weed control works within these areas is to employ targeted spot applications around regenerating natives growing amongst the weeds to reduce competition from weeds and promote the establishment of native recruits.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Ongoing	Assisted regeneration applied throughout NRC and SRC areas.	
5.6	Maintenacne	The works are to be maintained and monitored over a five year period. To measure progress of the works programs, KPI's have been developed (Appendix C). The KPIs would be applied to each restoration area separately. The bush regeneration contractor will be required to undertake the level of maintenance and monitoring necessary to achieve the KPIs; however, the minimum requirements are described below **Task** / **Frequency and method** Watering: The plants would initially be watered in during out-planting. For the first three months post-planting, watering would be undertaken weekly. For the subsequent three months of the first year, watering would be undertaken monthly. Watering events may be skipped in the event of adequate rainfall. Weed control: Primary weed control would be undertaken prior to out-planting as part of site preparations. For the duration of the five-year program, weed control would be undertaken once every second month. Regular weed control is considered important due to the significant assisted regeneration component of the program, which relies on targeted weed control.	Develop and implement a restoration maintenance program in accordance with the requirements	Yes	Yes	Yes	During restoration program	N/A	Ongoing		
	Monitoring	The proposed monitoring schedule is bi-annual monitoring events for the duration of the five-year program.	Develop and implement a restoration monitoring program	Yes	Yes	Yes	During restoration program		Ongoing	Monitoring changed to annual. 1st progress report received	
	Adaptive Management	In line with the principles of adaptive management, the frequency of maintenance and monitoring is subject to change with achievement of the project objectives the primary requirement. The KPIs are provided in Appendix C is in the form of an assessment checklist which is intended to be used and submitted by the bush regeneration contractor as part of the annual self-assessment and reporting requirement. The methodology for measuring the KPIs would be negotiated between TSC and the bush regeneration contractor. An annual on-site meeting would be held with attendance of TSC Environmental Scientists and the bush regeneration contractor.	Establish a routine annual on-site meeting	Yes	Yes	Yes	During restoration program	One year following the completion of restoration planting / works and annually for a period of 5 years	Ongoing	Weed control events moved forward to deal with favourable growing conditions.	
5.7	Handling and Application of herbicides	Bush regenerators handling pesticides are to do so in accordance with the WorkCover NSW Code of practice for the safe use of pesticides in non-agricultural workplaces (2006). This code of practice provides guidance on the safe use of pesticides, to protect the health and safety of workers using pesticides and is intended to assist with achieving compliance with the Occupational Health and Safety Act 2000 and Occupational Health and Safety Regulation 2001. All personnel handling pesticides are to be familiar with the most current Material Safety Data Sheet (MSDS) available for the product.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Ongoing		
	Managing against the introduction of harmful pathogens	The bush regenerator should take precautions to avoid the introduction of pathogens into the site. In particular, the bush regeneration contractor should ensure no infected nursery stock is planted at the site.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	N/A	Ongoing		
5.8	Reporting	The bush regeneration contractor commissioned for the subject works will be required to provide annual progress reporting at the completion of each year of the five year program. The annual report will be a brief document (1-2 pages) including the following: > a brief discussion of works completed to date, including an update on revegetation, weed control and assisted regeneration works. Indicative photos may be included were deemed appropriate > a description of outstanding works planned for the subsequent year, highlighting priority tasks > a self-assessment against the KPIs (provided in Appendix C) > any recommendations for adapting works to suit changing conditions, shifting priorities (eg. new listing of noxious weed species, or outbreak of particular weed species at site) > copies of Daily Work Sheets.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	One year following the completion of restoration planting / works and annually for a period of 5 years	Ongoing	1st progress report has been received.	
	Reporting	In addition to progress reports, an evaluation report is to be prepared at the end of the five year program. The evaluation report will summarise the monitoring data over the five year period, discuss findings and provide recommendations for future management of the restoration areas.	Prepare an overall evaluation report detailing the items listed in the management measure	Yes	Yes	Yes	During restoration program	Five years following the completion of restoration planting / works	Ongoing		
	Reporting	The reports will be submitted to the TSC Waste Management Coordinator.	Ensure compliance with management measure	Yes	Yes	Yes	During restoration program	One year following the completion of restoration planting / works and annually for a period of 5 years	Ongoing		

Eviron Quarry & Road SWMP

Reference	Environmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of the project	Specific date required by	Status - Haul Road	Comment	Reference / Evidence
Soil and Water Management Plan											
3.2	General Requirements	Erosion and sediment control measures would be progressively staged and relocated as material is imported to the subject site.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
	General Requirements	Ensure all workers/contractors undertake soil and water management works as instructed in this document and following the guidelines in the Blue Book (Landcom, 2004).	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
	General Requirements	Inform all workers/contractors of their responsibility in minimising the potential for soil erosion and pollution to downstream areas.	Incorporate into construction site induction procedure	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing		
	General Requirements	As works and stages progress, plans are to be updated, taking into consideration how to minimise areas of disturbance at any one time, characteristics of imported soils in relation to control measures, and stabilising disturbed areas ASAP. Refer to Section 5.6, Review and Improvement of SWMP.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
	General Requirements	Surface flows and runoff generated from the undisturbed areas located upstream or west of the haul footprint will be clean water. This clean water can be diverted into local watercourses located on the eastern side of the haul road via existing and proposed new larger piped culverts within the base of the raised haul road. Construction water (sediment laden runoff) will be segregated from clean run-on water and would be diverted into sediment basins for treatment prior to release or discharge.	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	General Requirements	As imported material for the purposes of road construction would potentially be dispersive in nature, contained construction water within the Type D sediment basins would potentially require floccing to ensure water quality release criteria is achieved. Treated water within the sediment basins would then be pumped or drawn down within five days, prior to next rain event taking place.	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	General Requirements	Where imported material differs in characteristics from adopted values listed in Table 3, control measures shall be reassessed to ensure they are suitable for the imported material (eg sediment basin sizing may need to be amended dependant on characteristics of sourced material).	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	General Requirements	Ensure erosion and sediment controls remain in place until filled or disturbed areas are rehabilitated and successfully stabilised eg establishment of >50% cover grass/turf.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
	General Requirements	Land disturbance across the subject site will be kept as low as possible with no works to be undertaken within defined no go areas.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
	General Requirements	A water quality (WQ) monitoring program would be undertaken to ensure stormwater that is discharged from the subject site is within WQ discharge criteria. Refer to Section 5.2 for discharge water quality objectives (WQO). The monitoring programme would include; > reporting procedures, > the frequency and triggers of site compliance audits, > discharge quality standards ,and > response to any non-compliances	Develop and implement a water quality monitoring program	Yes	Yes	Yes	Prior to commencement of works and ongoing throughout the project	N/A	Not Complete		
3.3	Schedule of Works	Access to the subject site would be restricted to one location, being the existing entry point to the former Quirks Quarry via Eviron Road, Eviron. Once within the operational land all vehicle movements will keep to the existing formed internal access roads to minimise additional areas of disturbance. Internal access roads would be maintained and repaired as necessary to ensure road is stable and operational.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Schedule of Works	Works would commence from approximately chainage (ch) 1010 the northern most end of the haul road and continue south decreasing in ch. values to Ch. 0000. The maximum length or chainage of the haul road footprint that would be disturbed at any one time would be inline with identified catchments and sediment basins. All construction water would be captured by a sediment basin; therefore the construction of each sediment basin will define the staging of works. Works would continue in that section or length of haul road until design levels are achieved, or to a stage that stabilisation works can be undertaken to that individual section or catchment.	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	Schedule of Works	Due to the intermittent nature of importing material and the likely scenario of an intermittent site presence, it is likely that material would be stockpiled until a minimum volume is reached for spreading, rolling and compaction (application to land) that is considered cost effective. All stockpiles would be managed with any runoff water directed to a sediment basin for management prior to discharging. Where stockpiles would be idle for > 10 days they would be stabilised. Refer to Section 4.2 for stabilisation measures.	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	Schedule of Works	Where stabilisation of individual catchments is achieved, sediment basins would be decommissioned with additional erosion control measures installed until disturbed areas (former sediment basin footprint) is stabilised.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Schedule of Works	Works would continue along the length of the haul road until ch. 0000 is reached. Once complete the road pavement would be constructed in defined sections or lengths along the completed elevated haul road until completion.	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
3.4	Sequence of site controls	The single site access point via Eviron Road would be a dedicated constructed entry and exit point. All vehicles would be directed over a vibration shaker grid prior to leaving the subject site and entering public roads.	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	Sequence of site controls	No go areas, or out of bounds areas would be flagged as NO GO AREAS by fencing or high visibility tape. Tape or flagging shall be assessed and replaced as per manufacturer's timelines/recommendations or as identified by a site audit or inspection.	Identify no go areas and erect high visibility fencing to ensure its protection.	Yes	Yes	Yes	During construction and operation	N/A	Ongoing	Complete for Stage 1 of Haul Road	
	Sequence of site controls	Surveyors will identify the haul road corridor consisting of the pavement width and external toe of batter at design RL. Surveyors will progressively identify the road corridor as works progress.	Undertake survey of the development footprint	Yes	No	No	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing	Complete for Stage 1 of Haul Road	
	Sequence of site controls	Prior to works commencing the identified section, or works within the haul road footprint would be cleared and grubbed and topsoil where feasible removed and stockpiled for future use (eg to establish batter stabilising vegetation).	Ensure compliance with management measure	Yes	No	No	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing	Complete for Stage 1 of Haul Road	
	Sequence of site controls	In regards to ESC's, surveyors would additionally identify the footprint and placement of sediment basins for the relevant stage under construction, and progressively locate additional basins as works continue. Refer to Appendix D for sediment basin designs.	Undertake survey of the development footprint and placement of sediment basins	Yes	No	No	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing	Complete for Stage 1 of Haul Road	

	Sequence of site controls	A perimeter bund or earth bank (SD5-6) would be constructed to act as the perimeter catchment boundary to isolate clean upslope water from (sediment laden) construction water generated within the confines of the haul road corridor.	Ensure compliance with management measure	Yes	No	No	Prior to commencement of works and ongoing throughout the project	N/A	Ongoing	Complete for Stage 1 of Haul Road	
	Sequence of site controls	Construction water generated from within the haul road corridor would be directed via controls (diversion bunds or windrows, batter chutes, dissipaters, check dams, low flow drains) to a Type D sediment basin, designed and sized for each identified catchment (eg SBW2 for catchment area ch.810 to ch. 725).	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing	Complete for Stage 1 of Haul Road	
	Sequence of site controls	Once perimeter diversion bunds, catchment drains and relevant sediment basins are constructed, stabilised and approved as operational, construction works for the haul road may commence. Refer to sediment basin operations for water management in Appendix E.	Ensure compliance with management measure	Yes	No	No	Prior to commencement of works	N/A	Ongoing	Complete for Stage 1 of Haul Road	
	Sequence of site controls	As suitable imported material is imported to subject site it will be placed within surveyed haul road footprint ready for spreading and compacting. If however an excess of fill is supplied ahead of spreading and compacting works it would be placed within a dedicated stockpile area with erosion controls as per (SD4-1).	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	Sequence of site controls	Stabilise surfaces disturbed by construction works as soon as final design levels are established. Refer to Appendix E for stabilising vegetation guidance.	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	Sequence of site controls	Conduct regular monitoring of erosion and sediment control measures to identify problems or maintain various measures as required. Refer to Section 5 for maintenance and monitoring schedules.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
	Sequence of site controls	If conditions deteriorate due to inclement weather, high rainfall events or failure of site controls, the subject site would be closed until such time as favourable site conditions return or site control measures are repaired, or improved, and reassessed as operational.	Ensure compliance with management measure	Yes	Yes	Yes	During construction	N/A	Ongoing		
4.1	Erosion Controls	The soil erosion hazard across the subject site would be kept as low as practical by staging works and minimising the overall area of disturbance at any time. Management measures would include: > Staging of works eg working in an orderly sequence from ch. 1010 and decreasing to ch. 0000. > Access within the subject site would be limited to the confines of the haul road footprint/corridor and existing formed access roads within the greater site area. > Establishing barrier fencing for no go areas	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Erosion Controls	Stockpiles are to be sited at least five metres from areas of likely concentrated or high-velocity surface water flows, especially diversion drains and internal access roads (including road drains).	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Erosion Controls	During windy weather, unprotected areas (including haul roads) would be kept moist (not wet) by spraying with water (eg water tanker) to reduce wind erosion, or use an alternative spray-applied wind-erosion control measure.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
4.2	Stabilisation Measures	When rehabilitating surfaces whether temporarily or permanently, soils would be left with a loose surface to encourage water infiltration and the establishment of a stabilising groundcover.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Stabilisation Measures	Once land shaping is completed for each stage, stabilisation would be undertaken as soon as possible in line with adopted measures of Table 4. Table 4 states maximum acceptable C-Factors (cover factor) for both the construction and post construction stage	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Stabilisation Measures	During times when the subject site is closed, such as times where no suitable material is available, disturbed areas would be stabilised as soon as possible in line with guidance material listed in Appendix F.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Stabilisation Measures	Native Vegetation cleared from the subject site would be coarsely mulched and stockpiled for later re-use as a protective ground cover during rehabilitation works or as a temporary ground cover for cleared areas until they are ready for stripping.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Stabilisation Measures	Revegetation areas would be watered regularly until an effective vegetation cover has established and areas are growing vigorously.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Stabilisation Measures	To achieve successful stabilisation and revegetation of disturbed land requires consideration of the following factors is required: > correct site preparation > selection of the most suitable establishment technique > appropriate soils such topsoils to establish grass, and annual crops > selection of appropriate plant species, fertiliser(s) and ameliorant(s) > application of sufficient water for germination and to sustain plant growth if rainfall is insufficient eg use of water truck > an adequate maintenance programme.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Stabilisation Measures	Lands that are subject to sheet flows such as steep constructed batters would typically stage the establishment of stabilising vegetation via: > Primary revegetation which is designed to reduce the erosion hazard to an acceptable level rapidly. Vegetation includes use of annuals where a quick, temporary cover is required (for up to about six months), and perennials for long term protection; and > Secondary revegetation follows primary vegetation with the establishment of permanent endemic/native species; however species can be established at the same time. Establishment can be from seed, tube stock or invasion from the surrounding native bushland species.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
4.3	Sediment Controls	Sediment fencing (or a similar alternative control) would be installed at the toe of the constructed batters. The purpose of the sediment fence is twofold (i) to form the external perimeter or toe of the constructed batter, and prevent imported material spilling down slope into low flow perimeter drains, and (ii) manage and trap sediment from the action of sheet flow down the constructed road batters. The constructed batters would progressively become steeper (up to 66% grade) as construction works reach design levels. Sediment fencing would be installed in-line with SD6-8 and Figure 3.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing	Complete for Stage 1 of Haul Road	
	Sediment Controls	Cross-fall of the constructed road surface would be to the south from approx. ch 0-400 and west from approx. ch. 400-1010. As construction works progress an earthen windrow or earthen bund would be constructed along the top of the batter/outside edge of road. The purpose of the bund is to divert stormwater to constructed batter drop down chutes that would divert sheet and concentrated flows off the batter face.	Ensure compliance with management measure	Yes	No	No	During construction and operation	N/A			
	Sediment Controls	Due to the length of haul road, the haul road project has been split into multiple catchments to manage both sediment and rainfall. At identified locations catchment boundaries would be installed prior to rain events via the use of diversion controls such of sandbag strips, filled geo-fabric sausages (socks) or by cutting or ripping a cross-fall diversion drain.	Ensure compliance with management measure	Yes	No	No	During construction and operation	N/A	Ongoing	Complete for Stage 1 of Haul Road	

	Sediment Controls	Prior to rainfall the length of road surface slopes shall be reduced to a maximum distance of 40m to reduce sheet flow velocity and capture sediment. Slopes can be easily reduced prior to rainfall via cutting or ripping contour lines within the surface, or by installing sand bags strips, filled geo-fabric filter sausages (socks) or other similar products.	Ensure compliance with management measure	Yes	No	No	During construction and operation	N/A	Ongoing		
	Sediment Controls	Where windrows or low earth bunds direct flows down batter chutes, rock dissipaters (or similar) would be installed to reduce concentrated flow velocities discharged from the chute. Flows would then be directed along the lined low flow drain (trapezoid or parabolic shaped) to the catchments dedicated sediment basin.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Sediment Controls	Sediment trapped as a result of installed controls (eg sediment fences or sediment basins), and within drains, would be regularly removed as part of ongoing monitoring and maintenance. Sediment would be removed and reused where possible. Refer to Section 5 for monitoring and maintenance.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
4.4	Sediment Basins	As soils imported to the subject site will be variable in characteristics eg course sediment to fine dispersible clay soils, sediment basins would be constructed based on the likelihood of managing dispersible (Type D) soils,(ie where 10 % or more of the soil materials are dispersible).	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Sediment Basins	Where it can be demonstrated that a large volume of imported material with type C (course sediment) or type F (fine sediment) characteristics, with a reduced erosivity factor ie <0.055, the sediment basin for that catchment could be resized (reduced in volume) to reflect such characteristics. Alternately, if soils with a very high erosivity were considered for haul road construction, its characteristics should be assessed to determine if material is suitable for construction purposes, and if the sediment basin for that catchment should be increased in volume to cater for soil variability. Additionally, if catchment areas increase or decrease, the basin capacity can be adjusted to adapt to such changes.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Sediment Basins	The sediment basin would have any accumulated sediment removed when its design capacity is reached. Design capacity is the calculated sediment storage zone for each sediment basin (refer to appendix D for sediment basin sizing and calculations). A vertical stake or depth marker would be installed within each sediment basin to identify the upper limit of the sediment storage zone to provide a visual indicator of when sediment capacity is reached.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
4.5	Water Management	All stormwater runoff (construction water) generated from within the haul road footprint would be directed to a sediment basin for that specific sub catchment of the haul road.	Ensure compliance with management measure	Yes	No	No	During construction and operation	N/A	Ongoing		
	Water Management	Each individual basin would be treated and then drained or pumped out within the adopted five day management period following rainfall (ie rainfall of sufficient depth to result in surface runoff entering the basin). This rainfall depth will vary depending on the site conditions at the time of the event, the extent of any impervious surfaces (e.g. road surface or batters) and the extent of preceding rainfall.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Water Management	Basins that capture runoff from Type D soils would be drained or pumped out within the time period adopted in the design of the basin (5 days, as site conditions allow) following rainfall if the nominated water quality targets can be achieved. Flocculation would be employed where extended settling of fine clay particles is unlikely to meet the adopted WQO's	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Water Management	Floccing of the captured construction water would typically be undertaken with a chemical agent to reduce the settling time of clay fines within the stormwater. Refer to Appendix E for water management.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Water Management	Release of treated stormwater would only be undertaken where the captured and treated water meets the required discharge criteria of 50mg/L for total suspended solids (TSS) and a pH within the range of 6.5 to 8.5.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Water Management	An alternative to discharging treated stormwater to the receiving environment (eg local drainage lines feeding to cane drains and creek) is use of water for construction purposes such as a water truck for dust suppression or compaction requirements. Additionally, treated water could be used for watering of seeded batters, or general landscape irrigation to establish grass and other vegetation. Prior to use of water for irrigation the water quality should be assessed to ensure it is fit for purpose (eg consideration of water salinity and pH).	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
4.6	Monitoirng of Weather Conditions	Where no rain or strong winds are expected: > If favourable dry weather conditions are forecast (eg based on the 24 to 48 hour weather forecast) , avoid unnecessary expenditure of time on excessive ESC's; however ensure the subject site is prepared (action plan and controls ready) for unseasonable weather conditions. > Sediment controls at the subject site entry/exit are always required (eg stabilised entry)	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Monitoirng of Weather Conditions	Where light rain is expected: > ESC's measures are used to maximise filtration of sediment laden water especially during times of light rain rather than high surges/flows during heaving rain. > Discharges of construction water to local waterways have a higher potential to create pollution during low rainfall as water quality will be high in creeks, in contrast to high flow events where water quality is typically poor. Therefore, it is critical that ESC's are effective at all times with stormwater directed to sediment basins.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Monitoirng of Weather Conditions	Where moderate to Heavy Rain is expected: > Cease work and close site > Ensure effective control measures are in place to prevent formation of rills or gullies. > Ensure controls are operational (eg sediment removed and structurally sound) > Ensure monitoring of controls during extended rainfall events to mitigate offsite impacts > Undertake additional inspections during and/or immediately following significant rainfall events to monitor the functioning of controls.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Monitoirng of Weather Conditions	Where strong winds are expected: > Ensure ESC's are appropriately anchored > Maintain soil surfaces in roughened condition to reduce dust > Use water truck where necessary or alternatively soil stabilisers	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		

5.1	Site Inspection and Monitoring	In an effort to ensure erosion and control measures are in place and functional prior to any rain events, constant monitoring of weather forecasts, especially local weather radar (eg Australian Bureau of Meteorology website) would be undertaken. With adequate warning of impending rainfall or windy conditions control measures can be implemented and reviewed as per the examples of Table 7.	Develop and implement a procedure for undertaking regular weather checks	Yes	Yes	Yes	During construction and operation	N/A	Not Complete		
	Site Inspection and Monitoring	A rain gauge would be installed and monitored on a daily basis to ensure rainfall at the haul road site is recorded. It would be the responsibility of the site supervisor to maintain a daily diary to record daily rainfall and observations. If an automated weather station (tipping bucket gauge) was installed any storm event could be classified with data used to assess the construction sites performance against such storm (eg 5 year storm event, compared to the capacity of individual sediment basins).	Install a rainfall gauge and develop and implement a procedure for undertaking daily rainfall readings	Yes	No	No	During construction and operation	N/A	Not Complete		
	Site Inspection and Monitoring	It shall be the responsibility of the site supervisor to inspect the sites erosion and sediment controls: > After each rainfall event > Before the end of the days shift with rainfall forecast > And at a minimum, on a weekly basis. However as staging of works progress vigilance for the efficacy of all controls shall be continuously monitored.	Develop and implement a procedure for undertaking regular inspections of erosion and sediment controls	Yes	Yes	Yes	During construction and operation	N/A	Not Complete		
	Site Inspection and Monitoring	Ongoing inspections and maintenance of the haul road construction site would include the following typical items to ensure that: > Barrier fencing and no go areas are taped off and maintained as out of bound areas with no infringements into these areas. > Disturbed areas are rehabilitated and stabilized ASAP as works progress. Stabilisation of areas may be at the completion of works (eg where final design levels achieved), or where staging is proposed and works will cease in an area due to no available fill material. > No tracking of mud off-site onto public roads is taking place > Erosion and sediment control measures are maintained and functioning as per their intent. > Trapped sediment is removed from operational sediment controls and disposed of to a suitable area. > Stockpiles have control measures in place, are stabilized (if not used for >10 days), are protected from run-on storm-water and not sited within retained vegetation or within concentrated flow paths. > Perimeter drains, batter chutes and diversion drains are unobstructed and not experiencing scouring of base or side walls > Drainage structures such as sediment basins and spillways are structurally sound and operational.	Develop and implement a procedure for undertaking regular inspections of erosion and sediment controls	Yes	No	No	During construction	N/A	Not Complete		
	Site Inspection and Monitoring	Inspections would be documented in the weekly or detailed inspection sheet. Refer to templates in Appendix G.	Ensure compliance with management measure	Yes	No	No	During construction	N/A	Ongoing		
	Site Inspection and Monitoring	At the completion of each stage, defined as the completion of each individual catchment, regularly inspect revegetation areas, investigate failures and replant problem areas as necessary. Additionally, ensure that adequate watering, and where necessary fertilizer, is applied to establish a stabilised ground cover such as grass or turf.	Develop and implement a procedure for undertaking regular inspections as detailed	Yes	No	No	During construction and operation	N/A	Not Complete		
	Site Inspection and Monitoring	Site inspections/audits would take place on a regular basis (at the frequency outlined below in Table 8) to ensure appropriate mitigation measures and controls are being provided and that they remain effective. **Table 8: Site Inspection Frequency for Haul Road control measures** **Interval** / **Action** **Event Based** — Site Inspections following rainfall resulting in runoff or discharge from site. Inspections to be undertaken by site supervisor or delegate • Inspection to assess whether sediment basins have received runoff and report findings to supervisor. Dependant on rainfall volume and preceding rain, directions would be provided in writing to treat contained stormwater and discharge or pump down clean water to local drainage line if conditional WQ criteria have been achieved. Refer to Appendix E for water management procedures of sediment basins. • Inspection as per site checklist (refer to template in Appendix G) • Inspections to inform the update of ESCPs and to identify where new controls are required as per the progressive nature of the haul road construction site. **At end of days shift when rain is forecast** (when site is operational) — Informal visual assessments of erosion and sedimentation controls by the site supervisor or delegate prior to the end of the days shift when rain is forecast overnight or prior to non-work days (eg Sundays) • Monitor 7 day forecast, especially 24-48 hour rain forecast to ensure controls are in place and operational prior to any forecast rain and at end of shift. • Inspection as per site ESC daily inspection record sheet when rain is forecast. **Non Operational** (when site is not operational, eg fill material not available site closed) — During times when the site is closed due to no suitable fill material available a site presence is required to ensure erosion and sediment controls are maintained and functional, and that the management of sediment basins continues to meet WQO's. Ongoing site inspections by site supervisor or delegate would continue to be undertaken as per event based monitoring. Inspections would: • Assess whether sediment basins have received runoff and report findings to supervisor. Dependant on rainfall volume and preceding rain, directions would be provided in writing to treat contained stormwater and discharge or pump down clean water to local drainage line if conditional WQ criteria have been achieved. • Inspection as per site checklist. • Inspections to inform the update of ESCPs and to identify where new controls are required as per the progressive nature of the haul road construction site.	Develop and implement a procedure for undertaking regular inspections as detailed	Yes	No	Noi	During construction	N/A N/A N/A N/A N/A N/A N/A	Not Complete		
	Site Inspection and Monitoring	All inspection reports and non-conformances would be acted upon quickly and a written response provided within 7 working days detailing the action taken or proposed actions. Amendment to on-site controls will also be updated in this SWMP.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		

5.2	Discharge Water Quality Objectives	Construction water discharged from the haul road site would meet the adopted criteria as listed below in Table 9. This accounts for any construction water whether intentionally discharged from a sediment basin, or as a result of sheet flows from standard erosion and sediment control measures such as sediment fences or turf filter strips. **Table 9: Adopted Water Quality Objectives for Discharge** Parameter: Water Quality Objectives (adopted discharge criteria) pH: 6.5 to 8.5 pH units [1,4] TSS (mg/L): <50mg/L [1,2] Turbidity: 6-50 NTU [2] Oil and Grease: Not Visible [1]	Ensure compliance with management measure	Yes	No	No	Ongoing during construction	N/A	Ongoing		
	Discharge Water Quality Objectives	Prior to release WQ shall be tested and documented as per protocols in Appendix E. It is noted that as soil characteristics have the potential to be variable the resultant WQ would reflect this variability from catchment to catchment along the haul road alignment. A water sample would be collected with the listed parameters (refer to Table 9 above) analysed, with either a handheld meter on-site, or forwarded to the Tweed Laboratory for analysis (where required).	Develop and implement a water quality monitoring program	Yes	Yes	Yes	During construction and operation	N/A	Not Complete		
	Discharge Water Quality Objectives	Once initial sampling rounds have been undertaken it is proposed to correlate turbidity results in NTU and total suspended solids (TSS) in mg/L for the purpose of determining compliance as turbidity can be assessed immediately on-site. Laboratory analysis for TSS will be undertaken every 2 months (when possible) to enable the ongoing verification of the relationship between turbidity and TSS.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
5.3	Auditing and Record Keeping	Records of site inspections would be maintained and kept on file in a central location such as site office or TSC Project Management System. Items of inspections will include: > Date of inspection > Location of control measure or area of concern > Defect > Comments > Action required > Action completed Refer to Appendix G for inspection templates. Any items of non-conformance will be actioned via the process set out in Section 5.4 (Non Compliance).	Develop and implement a site inspection record keeping procedure	Yes	Yes	Yes	During construction and operation	N/A	Not Complete		
	Auditing and Record Keeping	Typical considerations that would be undertaken during the course of an inspection would include: > Are installed sediment fences adequate? o Are fences full of sediment (>60% full)? Do they need emptying of trapped sediment? o Do fences need restaking? o Are fences ripped, do they need replacing? > Are additional control measures required for the catchment? > Does the site need slashing? > Is discharge water within release criteria?	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
5.4	Non Conformance	Where a non-conformance is noted either by the site supervisor (or delegate), environmental scientist, or as reported by a member of the public, actions to remedy the non-conformance may involve: > providing additional environmental controls > obtaining specialist advice and refining the SWMP > reviewing site management practices or work methods, and > providing further training to personnel and subcontractors. Issues or matters that do not have an off-site impact do not require a non-conformance report to be completed.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Non Conformance	In the event of a notifiable incident as pollution under the NSW Protection of Environment Operations Act 1997 (POEO Act), the NSW Environment Protection Authority (EPA) would be notified as soon as practicable and other relevant NSW regulatory agencies, together with internal departments of TSC (where relevant) within 24 hours after the occurrence of the incident.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
5.5	Reporting a Pollution Event	Notification must be given immediately, i.e. promptly and without delay, after the person becomes aware of the incident. Refer to Section 5.7 for Responsibility's and Contacts List for reporting purposes.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
5.6	Review and Improvement of the SWMP	The outcomes of inspections, monitoring, audits and the completion of checklists will identify recurring issues or areas that require improvement. Where identified, the effectiveness of the ESC measures will be reviewed and assessed for improvement as required.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
		A formal review of the SWMP would be undertaken annually to ensure industry best practice is continually achieved. Annual reviews would consider items such as: < Inspection/audit findings < Minutes of site meetings < Environmental monitoring records < Details of corrective and preventative actions taken < Environmental non-conformances < Incident reports & non-conformance < Changes in responsibilities and contacts < Industry best practice	Undertake an annual review of the SWMP addressing each of the items identified	Yes	Yes	Yes	During construction and operation	N/A	Not Complete		
Appendix E	Sediment Basin Water Management	Where possible the minimum calculated soil/sediment settling volume should be increased where construction space is available, however the depth of the pond should be designed to be shallow rather than deep. A shallow sediment basin will reduce the settling time of fines especially where floccing of dispersed clay fines is required.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		

	Sediment Basin Water Management	The sediment basin walls, embankment and discharge or outlet system on a Type F and Type D basin would be designed and constructed such that the 5 day, 80 percentile event is contained within the basin to undergo settling of fines (treatment). Management of the sediment basin would ensure that treated construction water has drained or been pumped down prior to the next rainfall event.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Sediment Basin Water Management	If a pump is used to draw down construction stormwater, pumping would cease prior to settled sediments being drawn into the intake pipe. This can be achieved by use of a floating intake pipe.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Sediment Basin Water Management	Each sediment basin would have a marker peg installed within the basin to clearly identify upper limit or maximum sediment storage level. When the basin has reached the maximum storage level sediment would be extracted from the basin (when empty of construction water) and be suitably disposed of in sediment dumps, or mixed with on- site soils in a manner that will not result in unnecessary soil erosion or sediment runoff from the site, eg within the imported material for the construction of the haul road.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Sediment Basin Water Management	Where dispersible fines will not settle out by gravity a floccing agent would be required to treat construction water to a level in in-line with the adopted WQ criteria prior to release. A variety of floccing agents are available, including gypsum (hydrated calcium sulphate), and polyelectrolytes, (eg floc blocks).	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		
	Sediment Basin Water Management	Care should be taken with the choice off floccing agent, prescribed dosing rates, and any manufacturer's instructions. Overdosing or improper use may cause or contribute to offsite pollution or damage to the local ecology. The pH of receiving waters shall be assessed prior to the determination of floccing agent to mitigate offsite or downstream impacts.	Ensure compliance with management measure	Yes	Yes	Yes	During construction and operation	N/A	Ongoing		

Appenidx B?

Nest Box Plan

Environmental Aspect	Item	Action	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of the project	Specific date required by	Status - Haul Road	Comment	Reference / Evidence
Nest Box Locations	Nest boxes are to be installed within the Blackbutt Open Forest of Conservation Area 1 and Conservation Area 5. The majority of the nest boxes (six) are to be installed in Conservation Area 1 and the remainder (three) are to be installed in Conservation Area 5.	Ensure compliance with management measure	No	No	Yes	Prior to commencement of works	N/A	Complete		
Nest Box Locations	Actual nest box locations and corresponding details on box type, aspect and location coordinates are to be recorded and included in Appendix A of this plan, post-installation.	Ensure compliance with management measure	No	No	Yes	Prior to commencement of works	N/A	Complete		
Nest Box Installation	Nest boxes are to be installed by an experienced contractor.	Ensure compliance with management measure	No	No	Yes	Prior to commencement of works	N/A	Complete		
Nest Box Installation	Boxes are to be installed >3 <6 meters above ground level and attached to trees using wire covered with a protective sleeve of polyurethane tubing (to protect trees from tissue damage). The attachment wire is to be pleated in sections to allow for expansion with tree growth.	Ensure compliance with management measure	No	No	Yes	Prior to commencement of works	N/A	Complete		
Nest Box Installation	All nine nest boxes are to be installed prior to clearing of the West Valley Quarry footprint.	Ensure compliance with management measure	No	No	Yes	Prior to commencement of works	N/A	Complete		
Nest Box Monitoring and Maintenance	Nest boxes are proposed to be monitored at the following times: > Year 1: at the end of the first year after installation > Year 2: during spring of the second year of installation > Year 5: during spring of the fifth year of installation.	Develop and implement a nest box monitoring program in accordance with management measure	No	No	Yes	During operation	annually following the installation of nest boxes	Ongoing	1st year monitoirng complete	
	Nest box monitoring would be undertaken by a qualified ecologist and would include recording details on the box type and location, an assessment of box condition and subsequent maintenance requirements, evidence of fauna occupation, and pest activity (e.g. Indian Myna's, termites, bees etc). Records of fauna activity and/or occupation of boxes would involve recording species, age class, number, sex, and fauna evidence such as nesting material, scats, hair/feathers etc.	Ensure compliance with management measure	No	No	Yes	During operation	annually following the installation of nest boxes	Ongoing		
	In the event that pest activity is precluding occupation of the box by native fauna, then the box would be modified or relocated to an appropriate site.	Ensure compliance with management measure	No	No	Yes	During operation	annually following the installation of nest boxes	Ongoing		
	Maintenance of boxes, if required, would be undertaken at the time of inspection. Irreparable boxes would be replaced with a new box in the same tree or as close to the host tree as possible. Replacement of any damaged boxes would be undertaken during the same monitoring event.	Ensure compliance with management measure	No	No	Yes	During operation	annually following the installation of nest boxes	Ongoing		

Excavated Road Material MP

Reference	Envirnmental Aspect	Item	Action Required	Applicable to Haul Road	Applicable to Quirks Landfill	Applicable to West Valley Quarry	Phase of Project	Specific date required by	Status - Haul Road	Comment	Reference / Evidence
6.2	Classification of waste material	Undertake planning approval and environmental assessment to confirm reuse at Eviron Haul Road	Ensure compliance with condition	Yes	No	No	During construction	N/A	Ongoing		
6.2	Record keeping and repoorting	Record waste classification and tracking information prior to delivery Eviron Haul Road Project	Ensure compliance with condition	Yes	No	No	During construction	N/A			
6.2	Recording of waste tracking	Establish database to record source site details, waste soil assessment details and soils classification details, and volumes	Ensure compliance with condition	Yes	No	No	During construction	N/A			
6.2	Monitoring of waste tracking database	Undertake periodic review of waste tracking database	Undertake review weekly during haulage and placement, and monthly during other times	Yes	No	No	During construction	Weekly following commencement of works	Ongoing		
6.2	Auditing of excavated road material suitabillity	Undertake onsite inspection of suitability of EPRM during haulage period.	Undertake review weekly during haulage and placement, and 3 monthly during other times	Yes	No	No	During construction	Weekly following commencement of works	Ongoing		
6.2	Audit reporting	Undertake reconciliation of database entries against site volumes	Undertake review monthly during haulage and placement and 3 monthly during other times	Yes	No	No	During construction	Monthly following commencement of works	Ongoing		
6.2	Survey	Undertake survey of haul road surface every 12 months	Ensure compliance with condition	Yes	No	No	During construction	Annually following commencment of works	Ongoing		
6.2	Project reporting	Records of material quantities and source location to be kept available for a period of six years	Ensure compliance with condition	Yes	No	No	During construction and operation	N/A	Ongoing		
Appendix A - Generator Requirements	Acid Sulfate Soil and Potential ASS identification and management	The generator must identify and manage excavated materials containing acid sulphate or potential acid sulphate soils in acordance with the procedures implemented by Tweed Shire Council. This is to include a preliminary land use risk assessment, and an acid sulphate soils management plan where required.	Ensure compliance with condition	Yes	No	No	During construction	N/A	Ongoing		
Appendix A - Generator Requirements	Record keeping and repoorting	The generator must keep a written record of the following for a period of six years: > the quantity and source location of any Tweed Shire Council excavated road material supplied; and > the name and address of each person to whom the generator supplied with Tweed Shire Council excavated road material	Ensure compliance with condition	Yes	No	No	During construction and operation	N/A	Ongoing		
Appendix A - Conditions of Exemption	Operation	The Tweed Shire Council excavated road material can only be applied to land for the purposes of pre-loading and haul road construction between Quirks Quarry and Stotts Landfill, Eviron, NSW.	Ensure compliance with condition	Yes	No	No	During construction	N/A	Ongoing		
Appendix A - Conditions of Exemption	Operation	The consumer must ensure that any application of Tweed Shire Council excavated road material to land must occur within a reasonable period of time after its receipt.	Ensure compliance with condition	Yes	No	No	During construction	N/A	Ongoing		

Appendix E

DPE Auditor Approval

NSW GOVERNMENT | Planning & Environment

Contact: James Epstein
Phone: 02 6670 8650
Email: compliance@planning.nsw.gov.au
Our ref: 06_0068

Mr Wes Knight
Waste Operations Officer
Community and Natural Resources
Tweed Shire Council
PO Box 816
Murwillumbah NSW 2484

Email: WKnight@tweed.nsw.gov.au

Dear Mr Knight

Eviron Road Quarry/Landfill Project (06_0068)
Independent Environmental Audit (Schedule 6 Condition 10)

I refer to your email dated 29 May 2018 seeking the Secretary's endorsement for an audit team to undertake the Independent Environmental Audit (audit) under Development Consent 06_0068 (the consent) for the Eviron Road Quarry/Landfill Project (the site).

Having considered the qualifications and experience of the GeoLINK audit team, namely;

- Simon Williams; and
- Duncan Thomson

the Secretary endorses the appointment of this team to undertake the audit in accordance with Schedule 6 Condition 10 of the consent. This approval is conditional on the audit team being independent of the development.

The audit is to be conducted in accordance with AS/NZS ISO 19011 Australian/New Zealand Standard: Guidelines for quality and/or environmental management systems auditing and the *Post-approval requirements for State significant developments – Independent Audit Guideline* dated October 2015.

The audit report is to:

- include a compliance table indicating the compliance status of each condition of consent and any relevant EPL;
- not use the term "partial compliance";
- recommend actions in response to non-compliances;
- review the adequacy of plans and programs required under this consent; and
- identify opportunities for improved environmental management and performance.

Within two (2) months of commissioning the audit, the Applicant is to submit a copy of the audit report to the Secretary together with its response to any recommendations contained in the audit report and a timetable to implement the recommendations.

Prior to submitting the audit report to the Secretary, it is recommended that Tweed Shire Council review the report to ensure it complies with the relevant consent condition.

Should you wish to discuss this matter please contact James Epstein on the details above.

Yours sincerely,

Shelley McPhee
Team Leader - Compliance
as nominee for the Secretary
8 June, 2018

Appendix F

Independent Audit Certification Form

Independent Audit Certification Form	
Development Name	Eviron Road Quarry and Landfill Project – Stage 1
Development Consent No.	08_0068
Description of Development	■ A landfill within the void space created by Quirks Quarry; ■ Development of two further quarries to be used as landfills after exhaustion of quarry resources (West Valley and North Valley quarries); and ■ Operational infrastructure such as haul roads, an acid sulphate soil treatment area and other service buildings/storage facilities as required.
Development Address	Leddays Creek Road, Stotts Creek, NSW.
Operator	Tweed Shire Council
Operator Address	Murwillumbah Administration Office Civic and Cultural Centre 10-14 Tumbulgum Road Murwillumbah NSW 2484
Independent Audit	
Title of Audit	

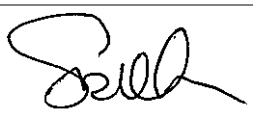
I certify that I have undertaken the independent audit and prepared the contents of the attached independent audit report and to the best of my knowledge:

- *The audit has been undertaken in accordance with relevant approval condition(s) and in accordance with the auditing standard AS/NZS ISO 19011:2014 and Post Approval Guidelines – Independent Audits*
- *The findings of the audit are reported truthfully, accurately and completely;*
- *I have exercised due diligence and professional judgement in conducting the audit;*
- *I have acted professionally, in an unbiased manner and did not allow undue influence to limit or over-ride objectivity in conducting the audit;*
- *I am not related to any owner or operator of the development as an employer, business partner, employee, sharing a common employer, having a contractual arrangement outside the audit, spouse, partner, sibling, parent, or child;*
- *I do not have any pecuniary interest in the audited development, including where there is a reasonable likelihood or expectation of financial gain or loss to me or to a person to whom I am closely related (i.e. immediate family);*
- *Neither I nor my employer have provided consultancy services for the audited development that were subject to this audit except as otherwise declared to the lead regulator prior to the audit; and*
- *I have not accepted, nor intend to accept any inducement, commission, gift or any other benefit (apart from fair payment) from any owner or operator of the development, their employees or any interested party. I have not knowingly allowed, nor intend to allow my colleagues to do so.*

Note.

a) The Independent Audit is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty five years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty two years imprisonment or $22,000, or both).

Signature	
Name of Lead/ Principal Auditor	Simon Williams

Company	GeoLINK
Position	Director, Principal Environmental Auditor
Address	146 Beardy Street, Armidale
Email Address	swilliams@geolink.net.au
Date	29/10/2018

Appendix G

Photographs

Photograph 1: Boundary Flicker Tape

Photograph 2: Existing Haul Road and start of settlement section

Photograph 3: Haul Road Settlement

Photograph 4: Haul Road ERSED controls No. 1

Photograph 5: Haul Road ERSED controls No. 2

Photograph 6: Haul Road ErSED controls No. 3

TWEED
SHIRE COUNCIL

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