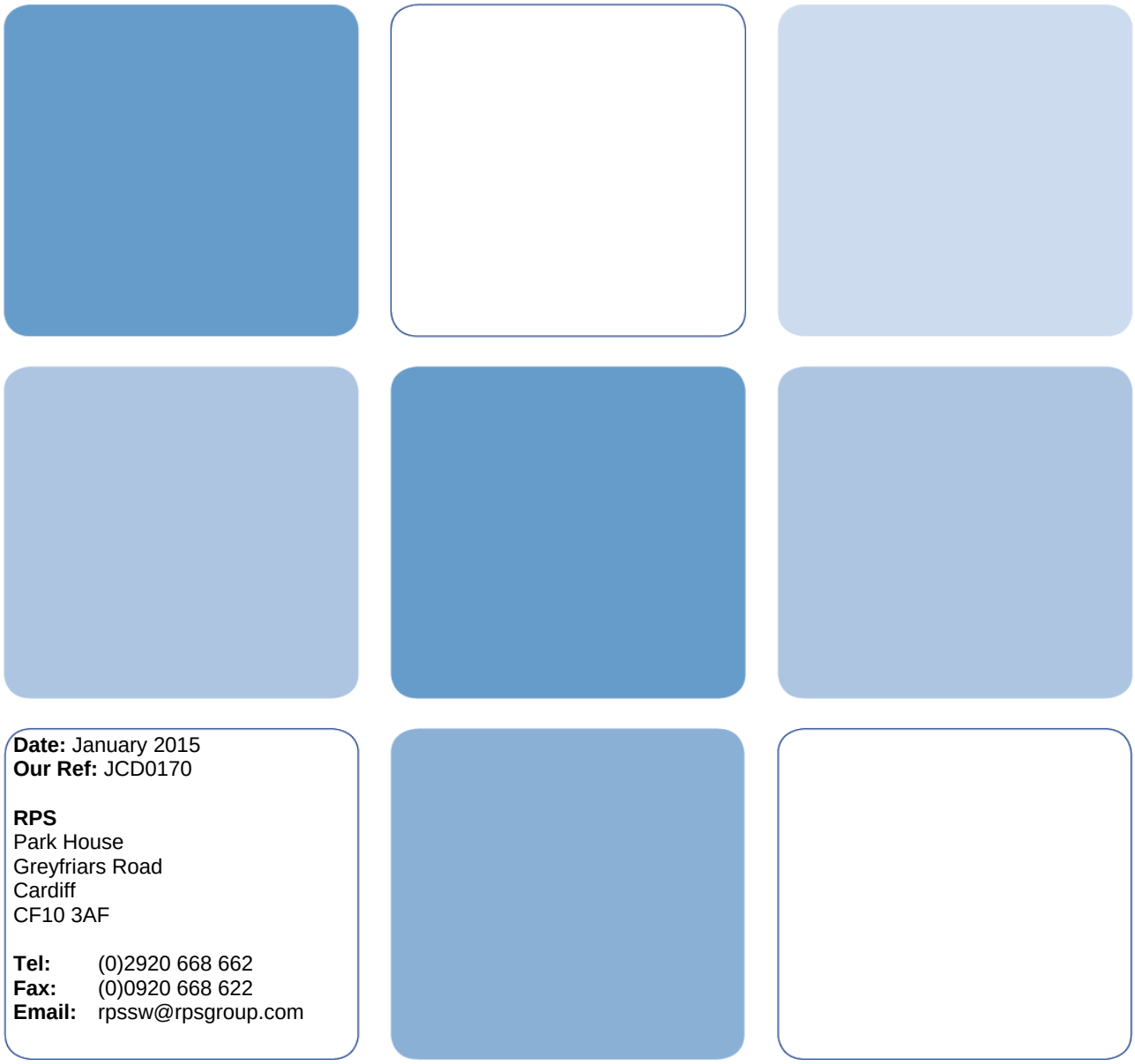
Performance Report to Cover the Period from January 2014 to January 2015

To satisfy EPR/VP3095FS

For Neal Soils Suppliers Ltd



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1 Introduction

1.1.1 NRW in pursuance of Part II of the Environment Protection Act 1990 granted a Waste Management Licence to Neal Soil Suppliers Limited (Company Registration Number 3368495) in May 2006. Eight variations of this permit have been issued in September 2009, March 2011, May 2011, March 2012, May 2012, March 2013, November 2013 and January 2014.

1.1.2 The first three variations authorised an increase to the list of waste codes for acceptance at the site. The fourth variation (permit V5) included the modernisation of the facility and the inclusion of a washing plant for treatment for hazardous and non-hazardous wastes. The fifth application (V6) was to accept asbestos materials at the wash plant, this was withdrawn. The sixth variation (V7) was a variation issued by the environment Agency (now NRW) to implements the changes introduced by IED. The seventh variation (V8) was an admin variation relating to the treatment of glass in the washing plant. The eighth (V9) was an application for a normal variation to few elements of the permit and included an application for a new wash plant, remove the limits on storage, remove the limits on storage height, etc. but, to the advice of NRW was withdrawn in January 2014. A ninth application was submitted for an admin variation to remove one of the activities and change a number of phrases of the permit. The latter application has not been determined yet.

1.1.3 The applicable permit number is EPR/VP3095FS (previously WML30348) and the area covered by the permit is shown on *Drawing JER5040-002a*. Hereinafter this area will be called the site.

1.1.4 This report is issued to satisfy the Permit Condition 4.2.3 that sets out the following:

"For the following activities referenced in Schedule1, Table S1.1 A1 and A2. A report or reports on the performance of the activities over the previous year shall be submitted to NRW by 31 January (or other date agreed in writing by NRW) each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data; and

(b) the performance parameters set out in Schedule 4 Table S4.2 using the forms specified in Table S4.3 of that schedule."

1.1.5 With respect to part "a" of the condition, Table S4.1 of the permit requires that the monitoring data are submitted on a six monthly and quarterly basis for the groundwater and surface water respectively. Table S4.3 of the permit requires the use of the groundwater and surface water specific forms provided with the permit documents for reporting of the data. Accordingly, six monthly and quarterly reports were submitted in the required format to NRW.

1.1.6 Additionally, quarterly interpretive reports for the surface water quality were submitted to NRW. This report, as requested by NRW provides an overview on any potential impacts from the site activities during the calendar year 2014.

1.1.7 Although the permit condition above specifically referred to the washing plant activities (S1.1A1 and S1.1A2), the data presented and assessed in this report extend beyond the boundaries of the installation (washing plant) and covers the whole site covered by permit EPR/VP3095FS.

1.2 Background

1.2.1 The surface water and ground water monitoring requirements and trigger levels are detailed within Tables S3.1 and S3.2 of Schedule 3 of the permit and included in *Appendix B.*

1.2.2 The next two chapters of this report will detail any exceedances identified within surface water and ground water in comparison to their trigger levels within the last year.

1.2.3 Graphs of the monitoring results from the year 2006 onward to allow a comparison of the site performance over the years are provided in *Appendix A*.

2 Surface Water

2.1 Determinands without exceedances

2.1.1 All soil related contaminants such as metals including Cd, Ni, Pb, TPH and BTEX (Benzene, Toluene, Ethylbenzene and Xylenes) were well below the permit specifications (these were based on the trigger levels provided by the CCW for the Gwent Levels) within the last year.

2.1.2 Calcium, chloride, conductivity, nitrite and pH were also below their trigger levels at all locations within the last year.

2.2 Determinands with exceedances

Sulphate

2.2.1 *Table 2.1* below presents all exceedances identified within the last year.

Table 2.1: Sulphate Exceedances

Location	Number of exceedances in the last year	Comments
SW18	1	1 in Nov 2014 (332 mg/l)
SW24	1	1 in Nov 2014 (415 mg/l)

2.2.2 Slightly elevated concentrations of 332 mg/l (“no impact level”) and 415 mg/l (“minor”) were identified at SW18 and SW24, both in November.

2.2.3 The ditch within which monitoring location SW24 is located has regularly witnessed slight elevation in the level of sulphates, especially during the November months. Concentrations of up to 407 mg/l of sulphate were also recorded within the baseline period before the start of the site operations. The concentration reduced over the years but remain to be above the criteria in November including last year and this year. The ditch was described in the site observation to have shallow clear to slightly cloudy water with no flow. The exact source of this level of sulphate cannot be identified with any certainty. However two possible sources were identified in the past.

2.2.4 As discussed in previously submitted report in 2012 “ Water Quality Assessment-Neal Soils- February 2012”, SW24 is located in field ditch that runs parallel to a haul road that was constructed some years ago by the water company to facilitate the maintenance of a deep sewer runs under the Neal Soils site. This haul road was constructed using steel slag. Sulphur is reported to be one of the components of steel slag (typically 0.8-0.21% of the weight). The WRAP technical report “Blast Furnace Slag- A technical report on the manufacturing of blast furnace slag and material status in the UK- 2007” stated that sulphate can be elevated in the steel slag and that release of sulphate could arise when steel slag aggregates are placed in contact with water.

2.2.5 This haul road was therefore considered to be a possible source of elevated sulphate in this location in the past. Although the concentration declined over time, the repeated appearance in November in the last two year despite its absence in other months may indicate washing off the remaining sulphate from the haul road during episodes of heavy rain that may not occur during the drier parts of the year. Due to the heavy geology in the area, such washing will not be able to migrate vertically through the ground and will move horizontally and end in the closest ditch.

2.2.6 Also the operational area to the east of this field ditch is used for storage of soils including some construction wastes and aggregates. These should not be significant sources for sulphate. However the use of recycled aggregates and the potential presence of small inclusions of plaster board (gypsum) in construction products may contribute to increased leachability/run off with elevated sulphate concentration from such materials. Some soils may also have naturally elevated levels of sulphate. The concentrations in the ID01 were elevated in the interceptor ditch in comparison to the field ditch at SW24 with an apparent decline in the concentration in the field ditch. This suggests that if there was any contribution from the site, the interceptor ditch is providing a control mechanism to reduce the level of sulphate in this location. It is possible that either aerial disposition or overflow from the operational areas is the cause of the minor exceedence at SW24. The slightly elevated concentration at SW18 (no impact category" could be the result of the minor exceedence at SW24.

2.2.7 Based on the pattern historically observed in this field ditch, the concentration will decline again.

2.2.8 To assess the significance of the observed exceedence, available UK water quality standards were reviewed. It was found that there is no statutory standard for sulphate for surface water except waters abstracted for human consumption (250 mg/l). There is currently no EQS for sulphate, however a non-statutory annual average concentration of 400 mg/l is proposed for fresh waters.

2.2.9 Based on the results of all metals being found at very low concentrations and the nature of the waste, it is likely that the sulphate is associated with earth metals such as calcium. The Euro Gypsum (the voice of the European Gypsum Industry) concluded that gypsum (calcium sulphate) is a non-dangerous substance. They stated that calcium sulphate is not labelled according to the hazard symbol for nature polluting substances according to directive 67/548/EEC as amended of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances; and does not bear any warning signs. They states that calcium sulphate is registered under code E 516 as a food additive. They reported that there is no evidence of toxicity caused by calcium sulphate in living organisms. An LC0 (LC0 is tolerable concentration) of 2000 mg/l (2000 mg/l of calcium sulphate is equivalent to 1450 mg/l of sulphate) was identified. They stated that calcium sulphate has been tested as non-ecotoxic in such biological tests as Daphnia magnia (DIN 38412 Teil 30), in fish tests with leusicus idus (DIN 38412 Teil 31) and with photobacterium phosphoreum.

2.2.10 They reported that calcium sulphate is the least soluble among the family of sulphates. The ion sulphate has no adverse effect on health even at concentrations corresponding to a saturation of calcium sulphate (app 1500 mg/l). Several studies failed to find any association between exposure to high level of sulphates (i.e. sodium and/or magnesium sulphates in concentrations mostly up to 1200 mg/l, sometimes up to 2000 and more mg/l).

2.2.11 Therefore and based on the available scientific evidence, we suggest that the trigger level for sulphate is revised to reflect the current UK requirement. We propose that this matter is considered and a way forward is agreed to resolve the matter.

BOD

2.2.12 *Table 2.2* below presents all exceedances identified within the last year.

Table 2.2: BOD Exceedances

Location	Number of exceedances in the last year	Comments
SW23	1	1 in Aug 2014 (58.7 mg/l)
SW27	1	1 in May 2014 (30.3 mg/l)

2.2.13 Only one elevated level of BOD at a concentration of 58.7 mg/l was identified at SW23 in August 2014. Inspection of the ditch where SW23 is located revealed very low level of water and shows the filed ditch to be overgrown with vegetation including tall reeds making it difficult to see and sample the water. Also this location reported to have 90% duckweed coverage. Therefore the likely source of this elevated BOD is considered to be natural causes.

2.2.14 Elevated BOD was also identified at SW27 in May 2014. SW27 is a control site located outside the site boundaries and used not to assess the site potential impact but as a clean comparison location. There are no activities in the location of this monitoring point but it was observed that the ditch has 90% duckweed coverage. Therefore the likely source of this elevated BOD is considered to be natural causes. Being in a control site, this exceedence is not considered further but could be used to indicate that exceedences in other locations within the site could occur as results of natural causes.

Ammoniacal Nitrogen

2.2.15 *Table 2.3* below presents all exceedances identified within the last year.

Table 2.3: Ammoniacal Nitrogen Exceedances

Location	Number of exceedances in the last year	Comments
SW18	1	1 in Feb 2014 (1.1 mg/l) (within 10% of TL)
SW23	1	1 in Aug 2014 (1.1 mg/l) (within 10% of TL)

2.2.16 Two marginal exceedance of ammoniacal nitrogen were identified in the locations of SW18 and SW23 during the last year, within approximately 10% of the CCW recommended values. Such marginal exceedances are considered insignificant and indicating no impact (the CCS guidance suggests that emission exceedance within approximately 20% of any permitted emission limit can be considered as category 4 (No impact) while up to twice the permitted emission limit is considered to be category 3 minor (as a guide only). Notwithstanding that the above is not an exceedance of "emission limits" but what described in the permit as "other specifications", they are not considered of significance based on the above guidance.

Nitrate as N

2.2.17 *Table 2.4* below presents all exceedances identified within the last year.

Table 2.4: Nitrate Exceedances

Location	Number of exceedances in the last year	Comments
SW18	1	Feb 2014 (2.0 mg/l)
SW20	1	Feb 2014 (2.87 mg/l)
SW21	1	Feb 2014 (2.47 mg/l)
SW24	1	Feb 2014 (1.31 mg/l)
SW25	1	Feb 2014 (2.02 mg/l)

2.2.18 Exceedences of the CCW trigger level of 1 mg/l of nitrate were found at concentrations of 2 mg/l, 2.87mg/l, 2.47mg/l, 1.31mg/l and 2.02mg/l at SW18, SW20, SW21, SW24 and SW25 respectively.

2.2.19 As previously discussed, occasional exceedances of nitrate have taken place in different areas of the site over the years with the majority of these exceedances being at the locations of SW24, SW20 and down gradient at SW18, both of the formers located down gradient of farms and/or food processing sites.

2.2.20 It is always considered that these off site sources are the most likely cause of these marginal exceedences. Also as noted in the "Long Term Water Quality" report submitted 2013, elevated concentrations of nitrate are always observed in the February monitoring round.

2.2.21 Within the last 6 years, elevated nitrate was never observed at SW21 while was only found once in February 2011 at SW25

2.2.22 It can be seen from the results and the drawing that all the elevated nitrate concentration are in locations adjacent to each other and can be down gradient of each other considering the variable direction of the flow. The highest concentration is at SW20 and SW21 at 2.87mg/l and 2.48 mg/l respectively. SW21 is close to the site eastern boundaries where the reen enters the site. SW25 is to its east and down gradient of it.

2.2.23 Monitoring was carried out in two locations up gradient of SW20 outside the site boundaries between the site and the adjacent site in locations FP1 and FP2. The monitoring data, although shows low level of nitrate in the sample collected in FP1, the ammoniacal nitrogen was elevated at a concentration of 6.07 mg/l. It is very likely that a contributor to the elevated nitrate at WS20 and down gradient at SW18 is the oxidised ammoniacal nitrogen from this site.

2.2.24 Similarly, the concentration of ammoniacal nitrogen at HP1, up gradient of SW24, was at a concentration of 1.24 mg/l a likely cause of the slightly elevated nitrate at SW24. It is of note that the TPH concentration (a possible cause for elevated ammoniacal nitrogen and its products) was also identified at HP1.

2.2.25 The site observation reported the water in all of these locations to be clouded with sediments, common during seasons of heavy rain where land erosion can take place as experienced this winter. Sediments in the water brought on site from on site or other outside sources could be the cause of the nitrate level. No other explanation can be provided. It is expected that, as in previous years the level of nitrate will reduce in the next monitoring round. In the vent that such a reduction is not realised, the remaining elevated concentrations will be further investigated.

2.2.26 As expected with the exceedences of nitrate, the TON (being the total oxidised nitrogen) is also exceeded in the same locations.

TON

2.2.27 *Table 2.5* below presents all exceedances identified within the last year.

Table 2.5: TON Exceedances

Location	Number of exceedances in the last year	Comments
SW18	1	1 in Feb 2014 (2.14 mg/l) (within 10% of TL)
SW20	1	1 in Feb 2014 (2.98 mg/l)
SW21	1	1 in Feb 2014 (2.66 mg/l)
SW25	1	1 in Feb 2014 (2.28 mg/l)

2.2.28 Within the last year there was one exceedance at SW18, SW20, SW21 and SW25 respectively. The concentrations of TON are related to the concentrations of nitrate discussed above.

DO

2.2.29 *Table 2.6* below presents all exceedances identified within the last year.

Table 2.6: DO Exceedances

Location	Number of exceedances in the last year	Comments
SW18	1	1 in Aug 2014 (0.37 mg/l)
SW19	3	1 in Feb 2014 (<0.3 mg/l)

		1 in Aug 2014 (<0.3 mg/l) 1 in Nov 2014 (1.82 mg/l)
SW20	1	1 in Aug 2014 (0.41 mg/l)
SW21	2	1 in Aug 2014 (1.24 mg/l) 1 in Nov 2014 (1.81 mg/l)
SW22	2	1 in May 2014 (1.82 mg/l) 1 in Nov 2014 (1.46 mg/l)
SW23	1	1 in Nov 2014 (1.23 mg/l)
SW25	1	1 in Aug 2014 (0.99 mg/l)
SW26	3	1 in May 2014 (0.32 mg/l) 1 in Aug 2014 (0.74 mg/l) 1 in Nov 2014 (0.72 mg/l)
SW27	2	1 in May 2014 (1.53 mg/l) 1 in Aug 2014 (1.53 mg/l)

2.2.30 Low dissolved oxygen levels were reported at the majority of locations on at least one occasion over the course of the year. This included the control site SW27, where two exceedances were encountered, which is located outside the site boundary.

2.2.31 The presence of duckweed (typically 40% to 100% surface cover) and other natural causes such as the dry weather and low levels of water in all the reens and filed ditches were considered to be the likely sources of these low oxygen levels. Further clarification on factors can cause low level of oxygen in surface water is provided in Appendix C.

Orthophosphate

2.2.32 *Table 2.7* below presents all exceedances identified within the last year.

Table 2.7: Orthophosphate Exceedances

Location	Number of exceedances in the last year	Comments
SW26	1	1 in May 2014 (1.2 mg/l)
SW27	1	1 in May 2014 (1.21 mg/l)

2.2.33 Slightly elevated level of phosphate was identified at SW27 and SW26 at concentrations of 1.21 and 1.2 mg/l respectively. SW27 is the control site outside the site boundaries while SW26 is locate at the site boundaries with the Maerdy Farm. None of these are considered to be significant or caused by the site activities. As identified in previous annual and long term water quality reports, slightly elevated concentrations of phosphate have been observed during August in most years and occasionally May. An additional monitoring was carried out at locations HP1 and HP2 (marked on Drawing JCD0170:03 Rev 8) between the site and the Maerdy Farm. The monitoring results in these locations show the concentration of phosphate to be 5.21 mg/l and 2.34 mg/l respectively indicating the likely source to be the Maerdy Farm.

2.2.34 It is of note that HP1 has also elevated ammoniacal nitrogen at a concentration of 4.44 mg/l.

2.2.35 It is also of note that elevated concentrations of a number of determinands including BOD, chloride, and phosphate were observed at FP1 while elevated concentrations of TSS, calcium, sulphate, nitrite, nitrate and ammoniacal nitrogen were encountered at FP2 (drawing JCD0170:03 Rev 8) and ammoniacal nitrogen.

2.2.36 We have, in our May remediation report recommend that the relevant authority investigate the cause of the elevated concentrations emanating from this site to prevent further migration and potential future impact on the water quality with the NSS site caused by migration from this source.

Total Suspended Solids

2.2.4 *Table 2.8* below presents all exceedances identified within the last year.

Table 2.8: Total Suspended Solids

Location	Number of exceedances in the last year	Comments
SW25	1	1 in Feb 2014 (444 mg/l)
SW27	1	1 in Aug 2014 (497 mg/l)

2.2.37 An elevated concentration of TTS at a concentration of 497 mg/l was reported at SW27 in August. This is a control site located outside the site boundaries and used not to assess the site potential impact but as a clean comparison location. The cause of the elevated concentration cannot be established due to the absence of any activities in the area. However the low water level in this location is considered to be the most likely cause of this exceedence

2.2.38 Also one elevated concentration of TSS was reported at SW25 in February. The exact cause of the elevated concentration is not known but attributed to the unusual very wet weather conditions and the washing off soils/sediments into the field ditches from the already filled interceptor ditches. Elevated suspended solids were not reported in this location for 6 years. Therefore, it is considered that the cause is the freak weather condition. Should elevated concentration be identified in the next monitoring run, further investigation will be carried out. .

Conclusion

2.2.39 The water quality results suggest that only occasional exceedances occurred within the last year of monitoring for most of the monitored pollutants mostly associated with organic pollutants that are not related to the site soil storage and treatment operations. Potential external sources include the farms/food processing activity up gradient of the site. All contaminants associated with the soil storage activities on site are well below their trigger levels indicating the absence of any impact from the site activity.

3 Ground Water

3.1 Determinands without exceedances

3.1.1 All the metals including Ni, zinc and Pb with the exception of Cd were well below the permit specifications in Table S3.2 of Schedule 3 of the permit.

3.1.2 Conductivity, nitrite, nitrate and TON were also below their trigger levels.

3.1.3 The results show that the concentrations of the above determinands are not only below the groundwater specifications in the permit but also below the CCW trigger levels for protection of the reens.

3.2 Determinands with exceedances

Total Cadmium

3.2.1 Table 3-2 below presents the exceedance identified within the last year for Cadmium.

Table 3-1: Cadmium Exceedances

Location	Number of exceedances in the last year	Comments
WS13	1	1 in Nov 2014 (12.7 µg/l)

3.2.2 Due to the limited amount of water in this ditch (nearly dry) only a small sample was possible to collect from the bottom of the borehole. The collected sample was murky with the disturbed sediments from the bottom of the borehole. The sample was reported to have an “organic smell”. Considering that the laboratory analysis is for total Cd and as such the sample is not filtered, the results are not considered to be representative of a ground water quality. The concentration of Cd in the nearest surface water samples at SW25 and SW23 in the locality of this borehole were at <0.5 µg /l in both samples, significantly lower than the required criteria of 3.45 µg/l. In the absence of other than perched groundwater which is surface water, it is apparent that the analysis results are not representative of the site conditions in the area.

Chloride

3.2.3 *Table 3-2* below presents all exceedances identified within the last year.

Table 3-2: Chloride Exceedances

Location	Number of exceedances in the last year	Comments
WS06	2	1 in May 2014 (820 mg/l) 1 in Nov 2014 (898 mg/l)

WS07	2	1 in May 2014 (642 mg/l) 1 in Nov 2014 (667 mg/l)

3.2.4 As can be seen from the above monitoring results, there are exceedances at both boreholes WS06 and WS07 ranging from 642 – 898 mg/l in comparison to the selected trigger level of 595 mg/l, based on the DWS.

3.2.5 The historical data of the site, presented in *Appendix A*, show that WS06, WS07 had regular elevated levels of chloride since the start of the monitoring with a general decline in the last few years. The baseline data also show elevated concentrations in these locations. The elevated concentrations in these locations continued to be seen during the six monthly monitoring from November 2006 to date with the concentration showing a slight decline over the recent years although the concentration at borehole WS07 has slightly increased again within the last years but appears to be fluctuating.

3.2.6 It is considered that the cause of these elevated concentrations is the saline intrusion from the estuary. There seems to be an annual cycle of variation in the concentration.

3.2.7 It is of note that the chloride concentrations in the reens close to these boreholes have substantially lower concentrations. The reens are much shallower than the boreholes with depths varying between 1.5-2m while the boreholes installations depths are below 2.7m. Therefore the saline intrusion seems to occur at greater than the reens depths.

The concentrations in all the remaining locations, except WS06 and WS07 are below the trigger level of 595 mg/l chloride in the reens. The difference in concentrations between the boreholes and the reens in the above discussed locations is considered an indicator of non-continuity between groundwater and the reens.

Total Sulphate

3.2.8 *Table 3-1* below presents all exceedances identified within the last year.

Table 3-1: Sulphate Exceedances

Location	Number of exceedances in the last year	Comments
WS07	1	1 in Nov 2014 (301 mg/l)
WS13	1	1 in Nov 2014 (366 mg/l)
WS14	1	1 in Nov 2014 (460 mg/l)

3.2.9 As can be seen from the data presented in *Appendix A*, this is the first exceedence of sulphate at SW13, very likely for the same reason explained under the Cadmium section above. The concentration of sulphate in the nearest surface water locations to WS13, namely SW25 and

SW23 are significantly below the levels found in the boreholes at concentrations of 129 mg/l and 35.5 mg/l respectively.

3.2.10 A gradual but fluctuating increase was observed at SW14 in the last couple of years. SW14 is located at the edge of the car park behind the offices. It is very likely that run offs from the car parks are the cause of any exceedences in this location. The concentration of sulphate in the nearest surface water locations to WS14, namely SW21 and SW25 are significantly below the levels found in the boreholes at concentrations of 235mg/l and 129 mg/l respectively. With this location being quite a distance from the protected field ditches and reens and the apparent absence of any impact on these evidenced by their presented data, this exceedence is not considered to be of significance

3.2.11 A general slight gradual increase is observed in the location of WS07 within the last couple of years. Borehole SW10 which is close to WS7 has significantly lower sulphate concentration at 138 mg/l. However the concentration of sulphate in surface water SW24, the closest, but on the other side of the reen is regularly high. The source of the elevated concentration of sulphate in this borehole could be the elevated concentration in the field ditch SW24.

3.2.12 Considering that the identified level is at the required concentration in the filed ditches, the exceedence is not considered to be of significance. However if future monitoring shows a trend of increase, further investigation of the cause of this elevated sulphate concentration will be recommended.

Total Calcium

3.2.13 *Table 3-2* below presents all exceedances identified within the last year.

Table 3-2: Calcium Exceedances

Location	Number of exceedances in the last year	Comments
WS06	2	1 in May 2014 (414 mg/l) 1 in November 2014 (749 mg/l)
WS07	2	1 in May 2014 (2,070 mg/l) 1 in November 2014 (450 mg/l)
WS10	1	1 in Nov 2014 (719 mg/l)
WS11	1	1 in May 2014 (1,430 mg/l)
WS13	1	1 in Nov 2014 (1,170 mg/l)
WS14	1	1 in Nov 2014 (374 mg/l) (within 10% of TL)

3.2.14 A concentration of 354 mg/l was selected as the trigger level for calcium based on the average concentrations from the baseline monitoring survey conducted during the period between June and July 2006.

3.2.15 A number of exceedances were encountered during the past year, with the highest concentrations encountered at WS07 and WS11 respectively.

3.2.16 This is the first exceedence in SW14 since the start of monitoring and being marginal, it is not considered to be a cause of concern. Similarly the exceedence at SW13 is not regular and though elevated is not considered of concern for the reasons explained in the Cadmium section discussed above.

3.2.17 With regards to the remaining locations, total calcium has occasionally been shown to be elevated in the past. The elevated concentrations may be due to the natural levels in the Flat Deposits. It should be noted that no elevated concentrations were ever identified above trigger levels in the reens despite he identified exceedences in the boreholes.

Ammoniacal Nitrogen

3.2.18 The site Environmental Permit sets a trigger value of >0.0614 mg/l of unionised ammonia for WS06, WS07 and WS12 based on the average concentrations of the 6 months baseline monitoring data. A second trigger level of >0.0148 mg/l was set for the remaining boreholes (WS08-WS15, excluding WS06, WS07 and WS12). This value represents the EQS at the time unionised ammonia (unionised).

3.2.19 *Table 3-3* below presents all exceedances identified within the last year.

Table 3-3: Ammoniacal Nitrogen Data (converted to unionised ammonia)

Location	Number of exceedances in the last year	Comments
WS06	2	1 in May 2014 (0.179 mg/l) 1 in November 2014 (0.0755 mg/l)
WS07	2	1 in May 2014 (0.422 mg/l) 1 in Nov 2014 (2.668 mg/l)
WS10	2	1 in May 2014 (0.0294 mg/l) 1 in Nov 2014 (0.0292 mg/l)
WS11	2	1 in May 2014 (0.0357 mg/l) 1 in Nov 2014 (0.0254 mg/l)

3.2.20 As can be seen from the above presented results the highest concentrations of ammoniacal nitrogen are found in locations WS07 and WS06 followed by WS11 and WS10, all located within the southern parts of the site.

3.2.21 Based on the regularity of these elevated concentrations in these locations, it was previously considered feasible that the source of the elevated ammoniacal nitrogen within these boreholes is the organic clay and peat strata/pockets identified within the area.

3.2.22 However WS07 had a noticeably increase in ammoniacal nitrogen during November 2014 in comparison to previous times indicating a potential additional source. The closest surface water monitoring locations are SW24 and SW20 which show much lower ammoniacal nitrogen results than in the borehole indicating localised effect. It is therefore recommended that if such elevated concentration remained to be high in future monitoring rounds, the cause of this elevated concentration is further investigated.

TPH and PAHs

3.2.23 *Table 3-4 and 3.6* below present all exceedances identified within the last year.

Table 3-4: EPH Exceedances

Location	Number of exceedances in the last year	Comments
WS06	1	1 in Nov 2014 (0.335 mg/l)
WS07	1	1 in Nov 2014 (6.92 mg/l)
WS10	1	1 in Nov 2014 (9.17 mg/l)
WS11	2	1 in May 2014 (1.79 mg/l) 1 in Nov 2014 (0.438 mg/l)
WS13	1	1 in Nov 2014 (3.47 mg/l)
WS14	2	1 in May 2014 (0.219 mg/l) 1 in Nov 2014 (0.396 mg/l)

Table 3-5 PAH Exceedances

Location	Number of exceedances in the last year	Comments
WS10	1	1 in November 2014 (25.2 µg/l)
WS13	1	1 in November 2014 (73.5 µg/l)
WS14	1	1 in November 2014 (1,130 µg/l)

3.2.24 It can be seen from the graphs presented in *Appendix A* that the concentrations of TPH and PAH peaked in the location of WS14 in November 2010 and had started to decline thereafter. The November 2014 concentration is still however greater than trigger levels of 100 µg/l and 20 µg/l at 219 µg/l and 396 µg/l for TPH in May and November respectively and 1130 µg/l of PAHs in November.

3.2.25 In the absence of any underground storage tanks/pipes, it is likely that these elevated concentrations are the results of spillages/leakages in TPH from surface sources that have been washed down by the rain and migrated through porous made ground. WS14 is located at the back of an uncovered lorry parking area of the site. The concentrations are all still below the criteria for the protection of the field ditches and reens. In the absence on other groundwater resources in the area, these exceedences are not considered to be of potential significance.

3.2.26 WS13 is located on the southern edge of Field 13 and for the first time elevated concentration of 0.58 mg/l were reported in November last year. Higher concentration was observed this year in the same location only in November. However as explained earlier the collected sample was a compromised sample where sediments from the bottom of the boreholes were disturbed due to the low water level in the borehole. It is considered that this elevated reading is the results of the previous contamination. As before the concentration of TPH in the closest surface waters in the vicinity of this borehole are not affected and remained below the required criteria.

3.2.27 It can also be seen from the graphs presented in *Appendix A* that elevated concentrations of TPH and PAH were observed for the first time in a number of boreholes including WS06, WS07, WS10 and WS11 this year, especially in November. However, none of the surface water samples collected in the closest reens had any signs of TPH contamination and remained within the required criteria for protection of the reens. WS7 and WS10 being the most affected in terms of the TPH level are located in the same area with WS07 have other elevated concentrations including sulphate and ammoniacal nitrogen.

3.2.28 It is of note that it was reported that the borehole cover on borehole WS07 was missing and was replaced on the day of monitoring. Due to the extremely slow recharge of the boreholes, they ae no commonly purged and therefore the water quality is significantly affected by the surface water quality in the immediate vicinity of the borehole.

3.2.29 It is recommended that if such exceedences remained to be seen in future monitoring round that the source/cause of the exceedences is investigated.

Review of trigger levels and monitoring frequency

3.2.30 Review of the current groundwater trigger levels to identify more suitable and relevant values is considered necessary. The current values were derived based on limited understanding of the water regime in the area. It was proposed then that these trigger values are reviewed and revised when a better understanding of the site conditions are developed.

3.2.31 Given the absence of drinking water resources and relevant receptors, the reens are considered to be the only receptors that can be affected by the groundwater (perched water) quality. Considering the absence of any evidence to the continuity between ground and surface water, and the current quarterly monitoring of surface water, we do not see the benefit of continuing the monitoring of this perched water.

3.2.32 We propose that the frequency of groundwater monitoring is reduced to 5 yearly in line with likely changes following the 2013 EPR amendments. Based on these amendments it is likely that 5 yearly groundwater monitoring will become a standard permit condition.

4 Resources Efficiency

4.1 Pollution Inventory

4.1.1 Neal Soils Suppliers Limited were required to report under the Pollution Inventory for the period January – December 2014. The following resource efficiency information is taken from the REPI response also submitted.

4.2 Water Usage

4.2.1 The washing plant is topped up with surface water from interceptor ditches on the site and as such has not needed refreshing from the mains. The washing plant water system is a closed loop system and therefore disposal of waters since first operational is not required.

4.3 Energy Usage

4.3.1 The washing plant is currently run via diesel oil generators on site.

4.3.2 A total of 299,417 litres of Diesel Oil was used on site during the reporting period. When multiplied by NRW conversion value of 10.58 (EPR Intensive Farming – Helping you to do your four yearly reviews, January 2012) this converts to 3,167,831.86 kWh or 3167MWh.

4.4 Raw Materials

4.4.1 The raw materials reported as part of the REPI include both the waste materials accepted into the facility throughout the year and those virgin raw materials used on site as part of the process. A total of 305,804 tonnes of waste material was accepted into the facility during 2014, 156,800 tonnes of which were treated at the wash plant. The total tonnage of hazardous waste treated at the wash plant was 5456 tonnes.

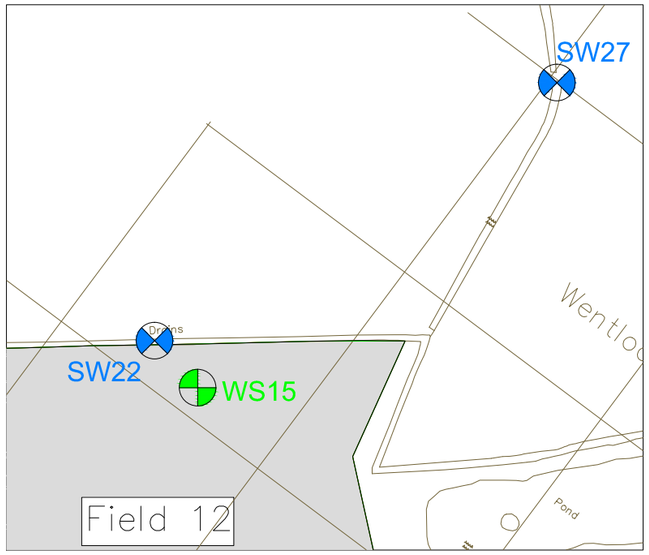
4.4.2 The washing plant currently uses three virgin raw materials. These are:-

- Powder Flock AP40, 5,525 kg
- Sulphuric Acid 50%, 1,050 ltrs
- Trufloc 3400 antifoam, 2,900 ltr

4.4.3 For the Pollution Inventory the above were reported as a total of 3950 litres or 3.93m^3. Without knowing the specific density of these products a density of water was assumed and therefore 9.475 tonnes of non waste raw materials were reported for 2014.

Drawings

For Continuation
See Inset



Key:

- Environmental Permit Installation Boundary
- Field boundary
- Location of Washing Plan
- WS1 Window Sample Hole Location
- SW1 Surface Water Sampling Location
- Surface Water Drainage Discharge Monitoring Poi

RPS

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Fax: 01291 627827
email: rpssw@rpsplc.co.uk

Approved:

Revisions:

Date:
30.11.11

Drawn by:
K Edwards

Scale:
1:2500 @ A3

Client:
Neal Soil

Job:
Environmental Permit Variation

Drawing Title:
Environmental Permit Installatic Boundary

Drawing Number:
JER5040-002a

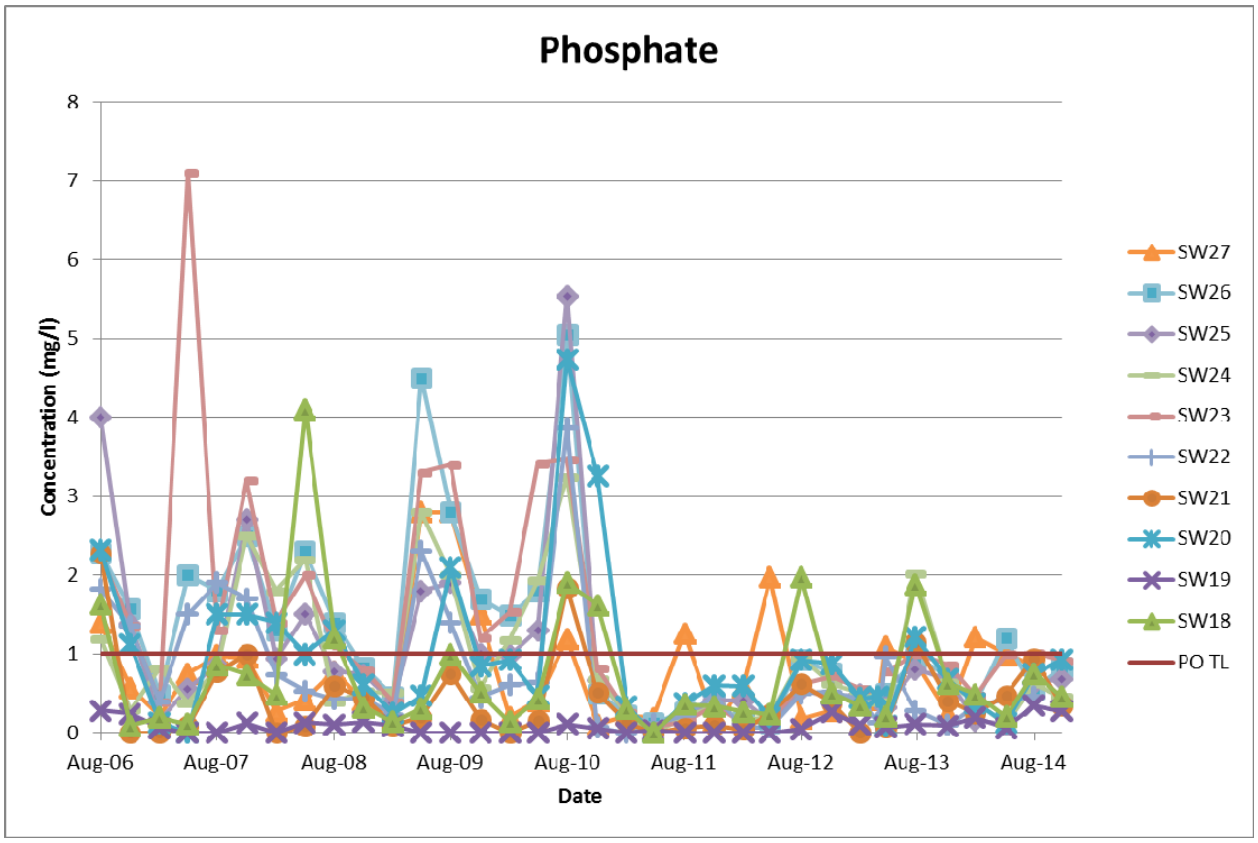
Appendices

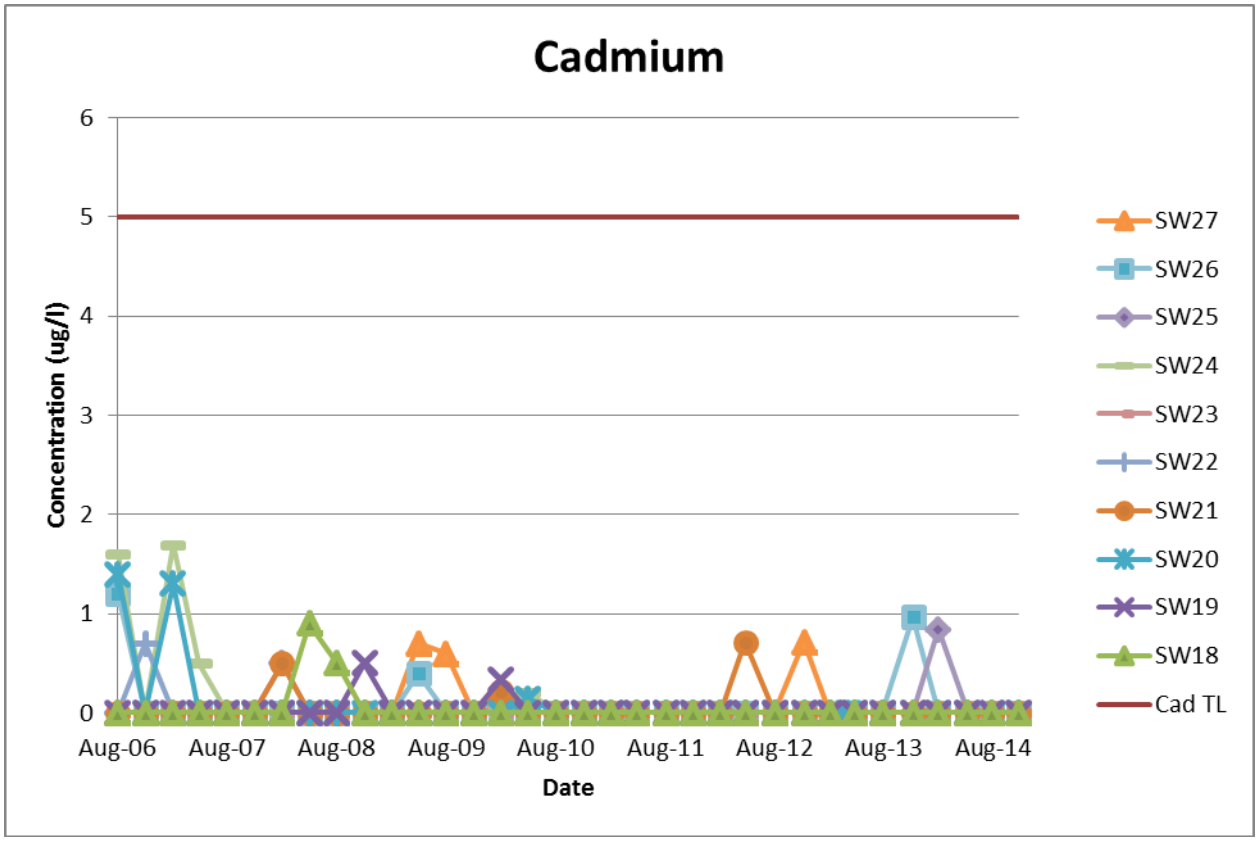
=

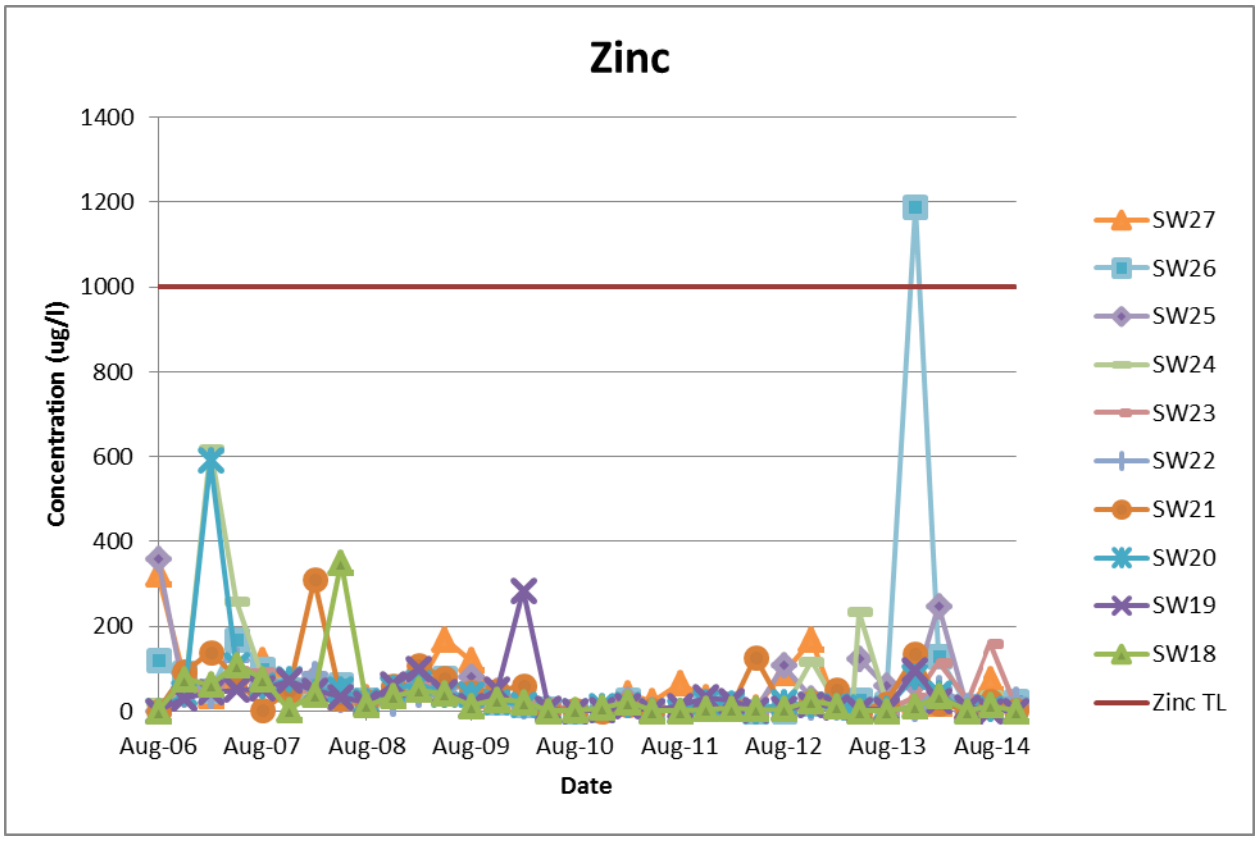
Appendix A

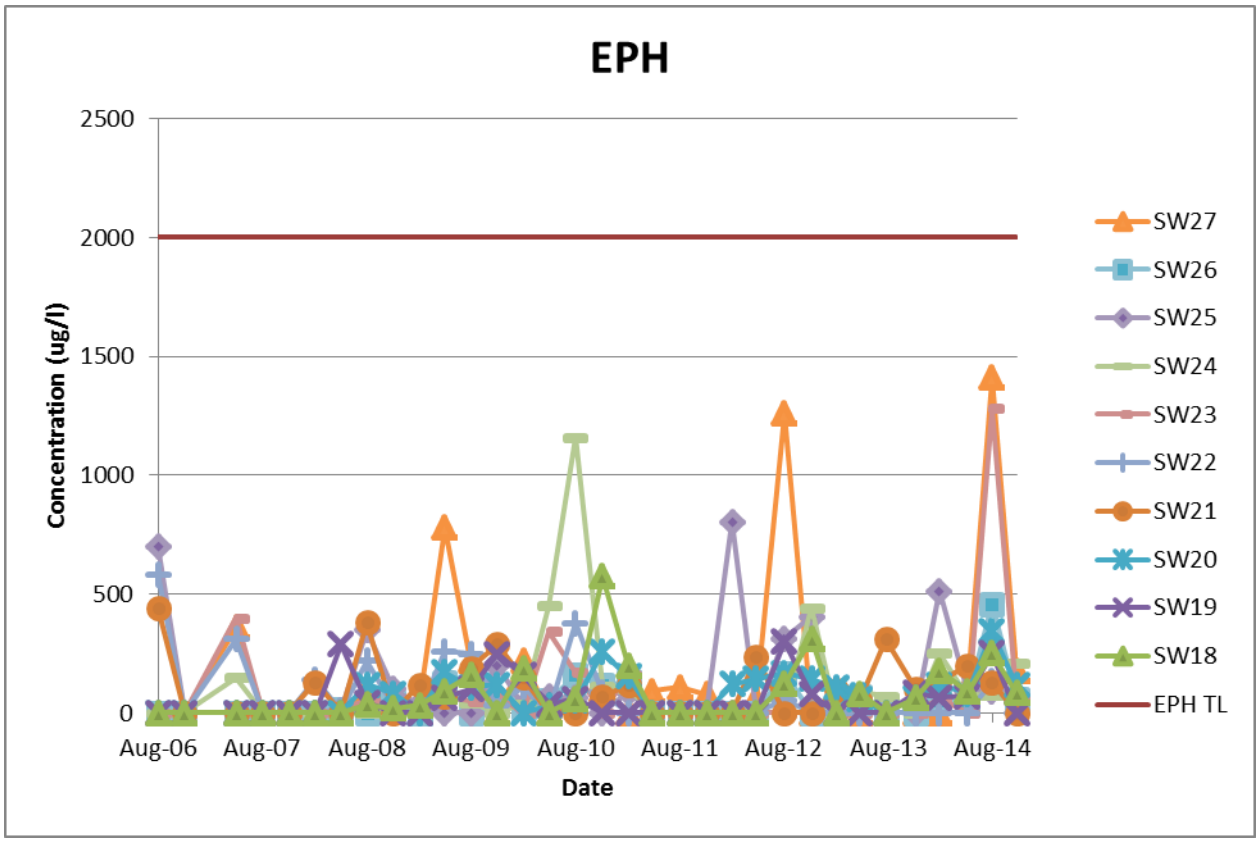
The Site Water Quality Data

Surface Water

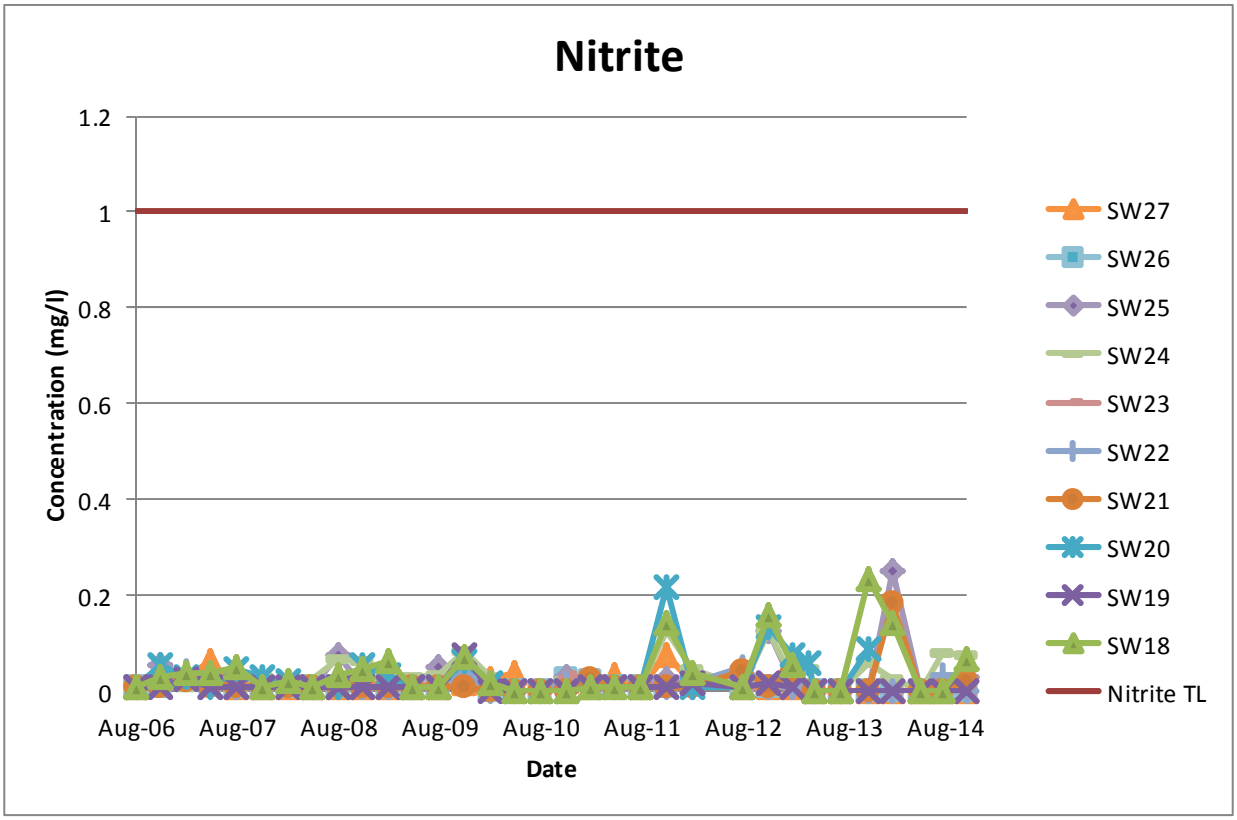


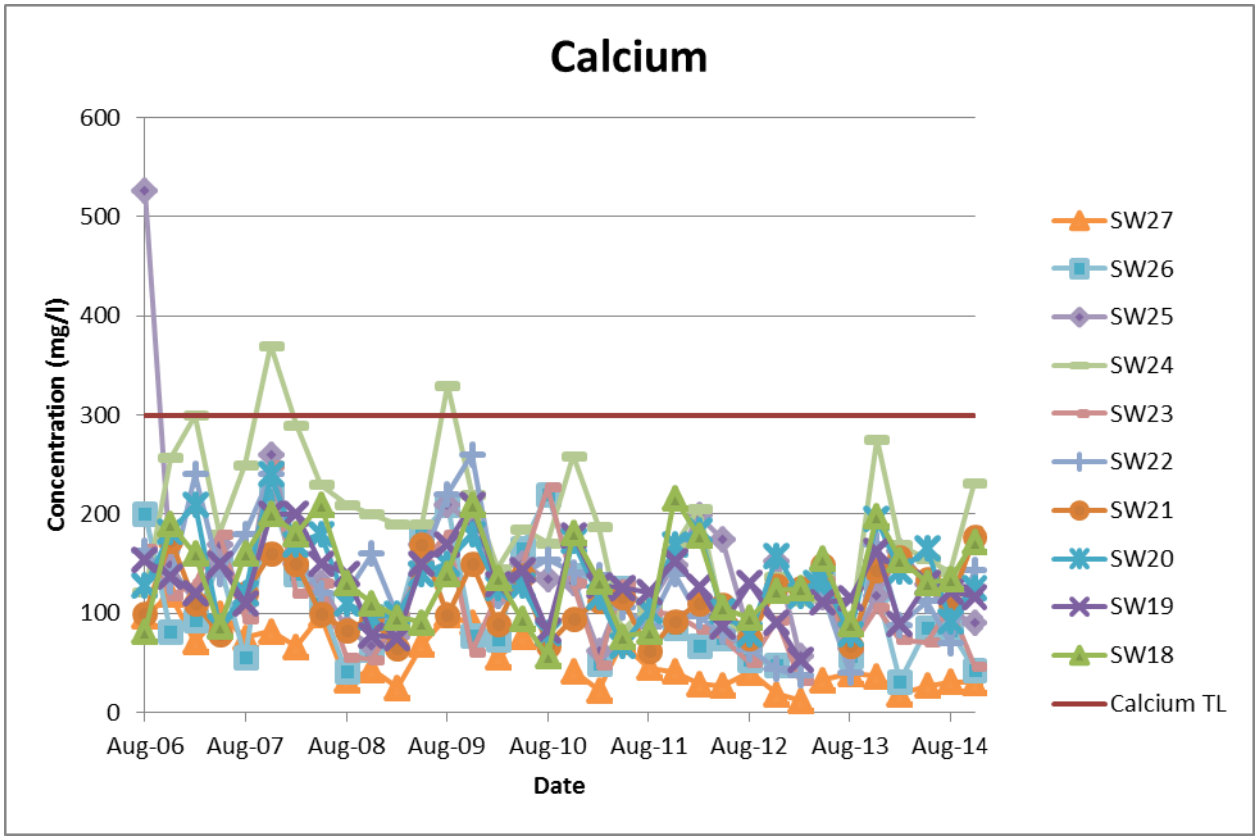


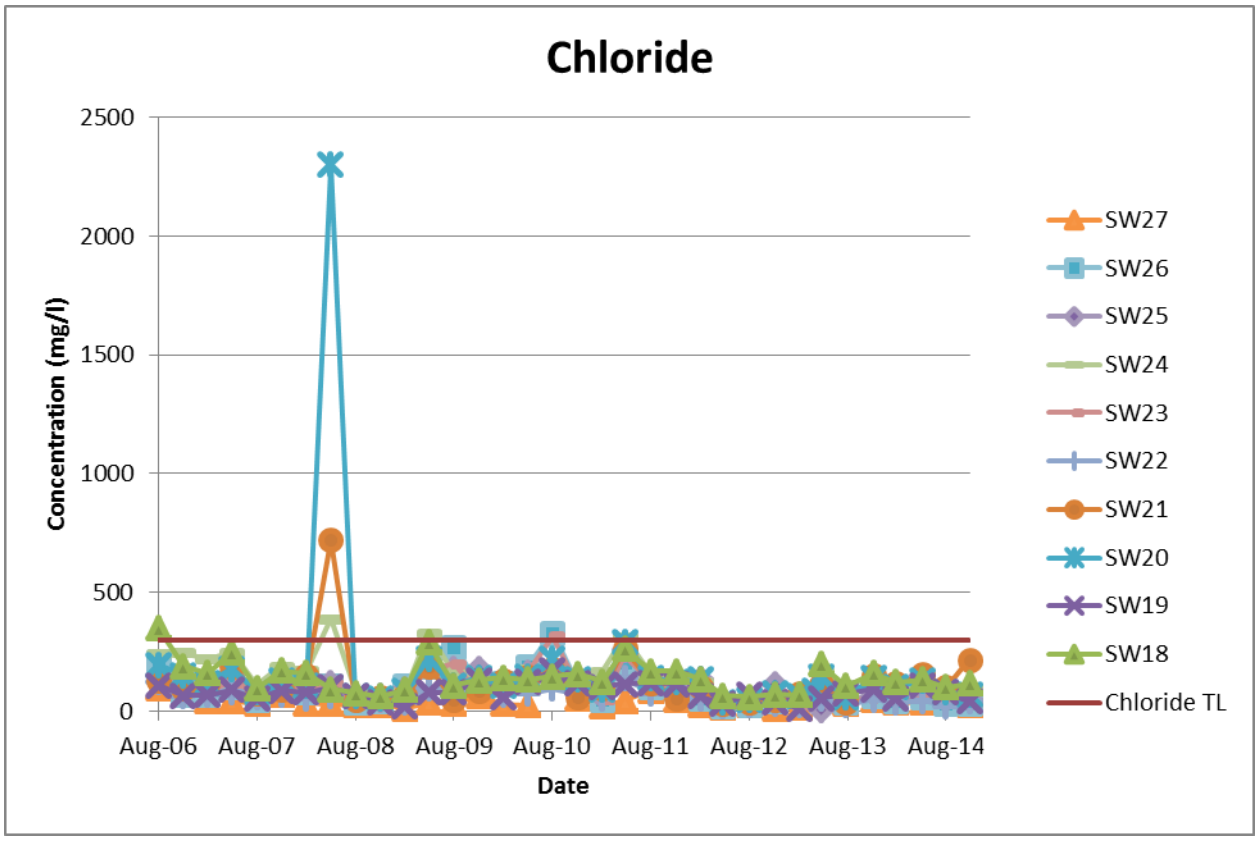

Zinc
1400
1200
1000
800
600
400
200
0
Concentration (ug/l)
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
Zinc TL

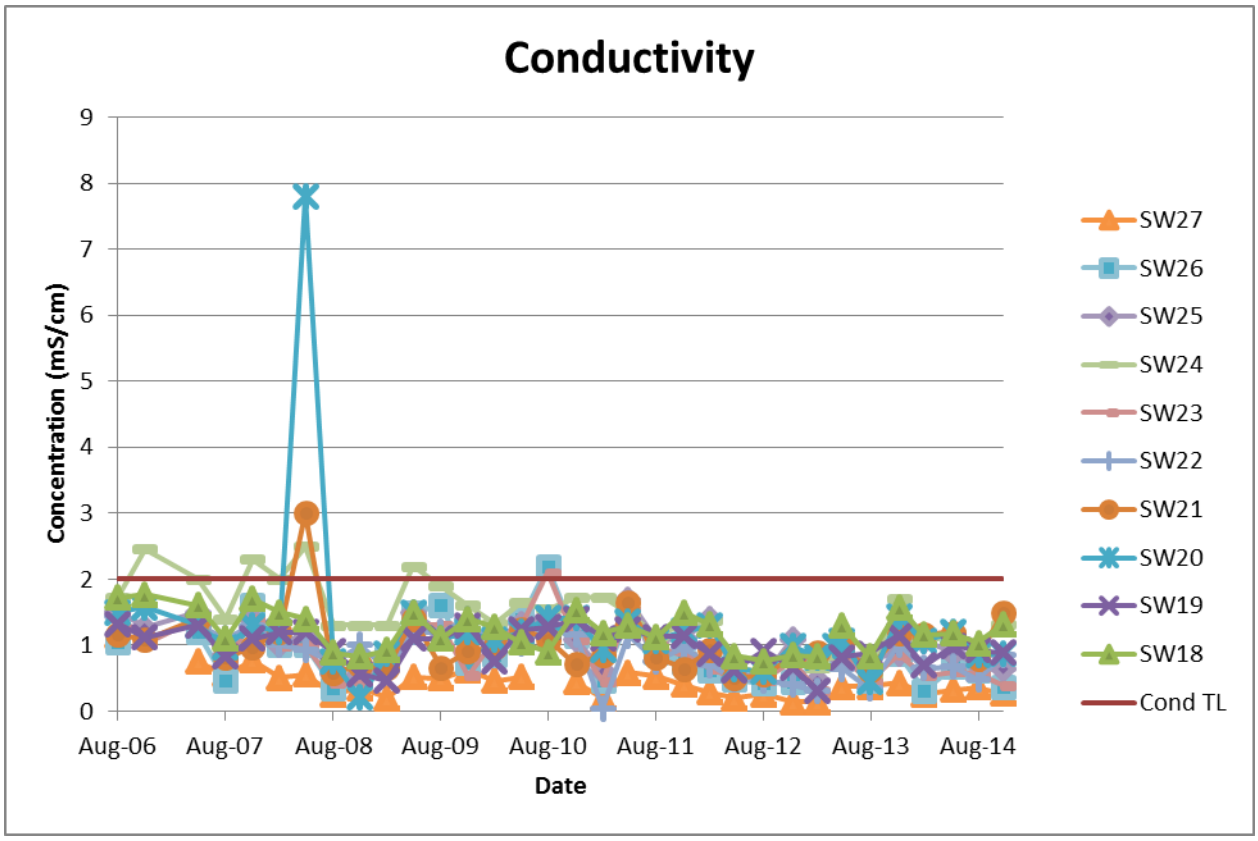

EPH
2500
2000
1500
1000
500
0
Concentration (ug/l)
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
EPH TL

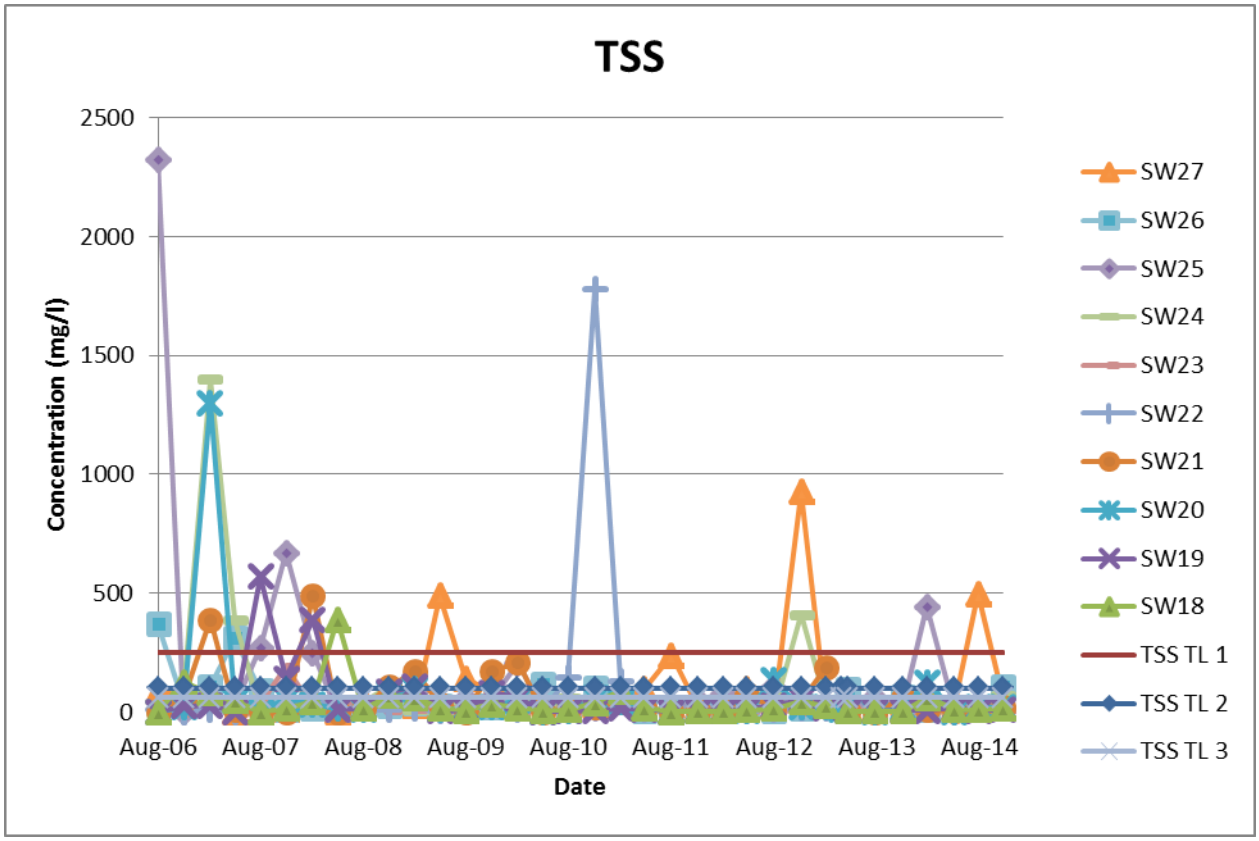
Nitrite as N

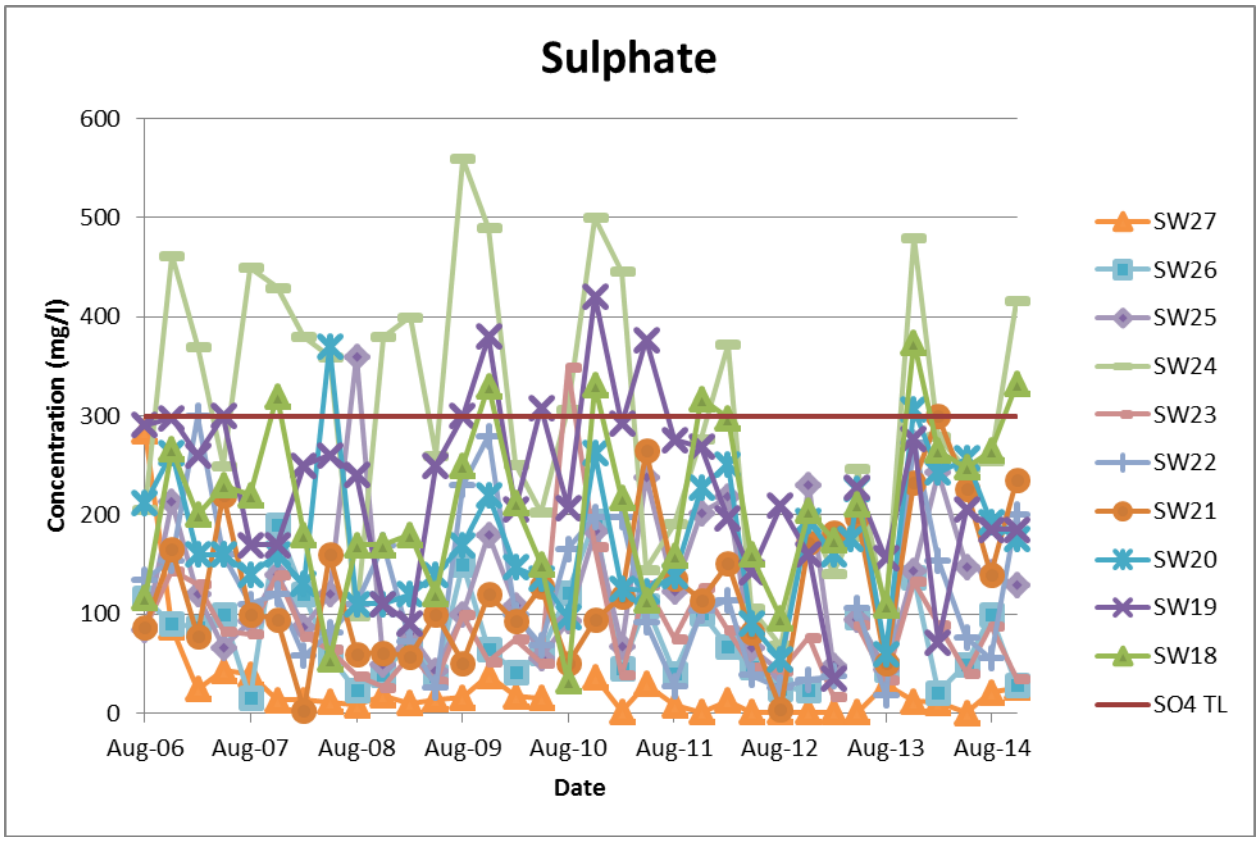

Nitrite
1.2
1
0.8
0.6
0.4
0.2
0
Concentration (mg/l)
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
Nitrite TL

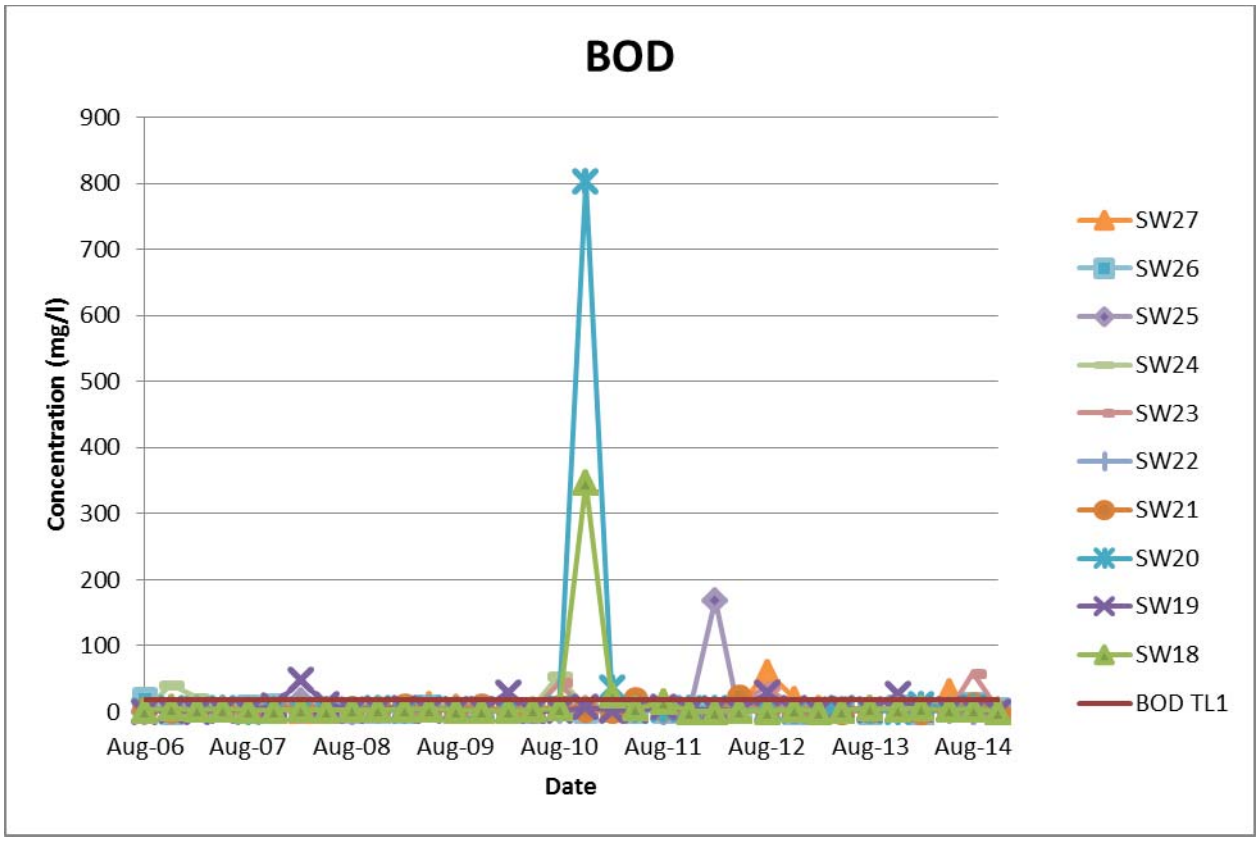

Calcium
600
500
400
300
200
100
0
Concentration (mg/l)
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
Calcium TL

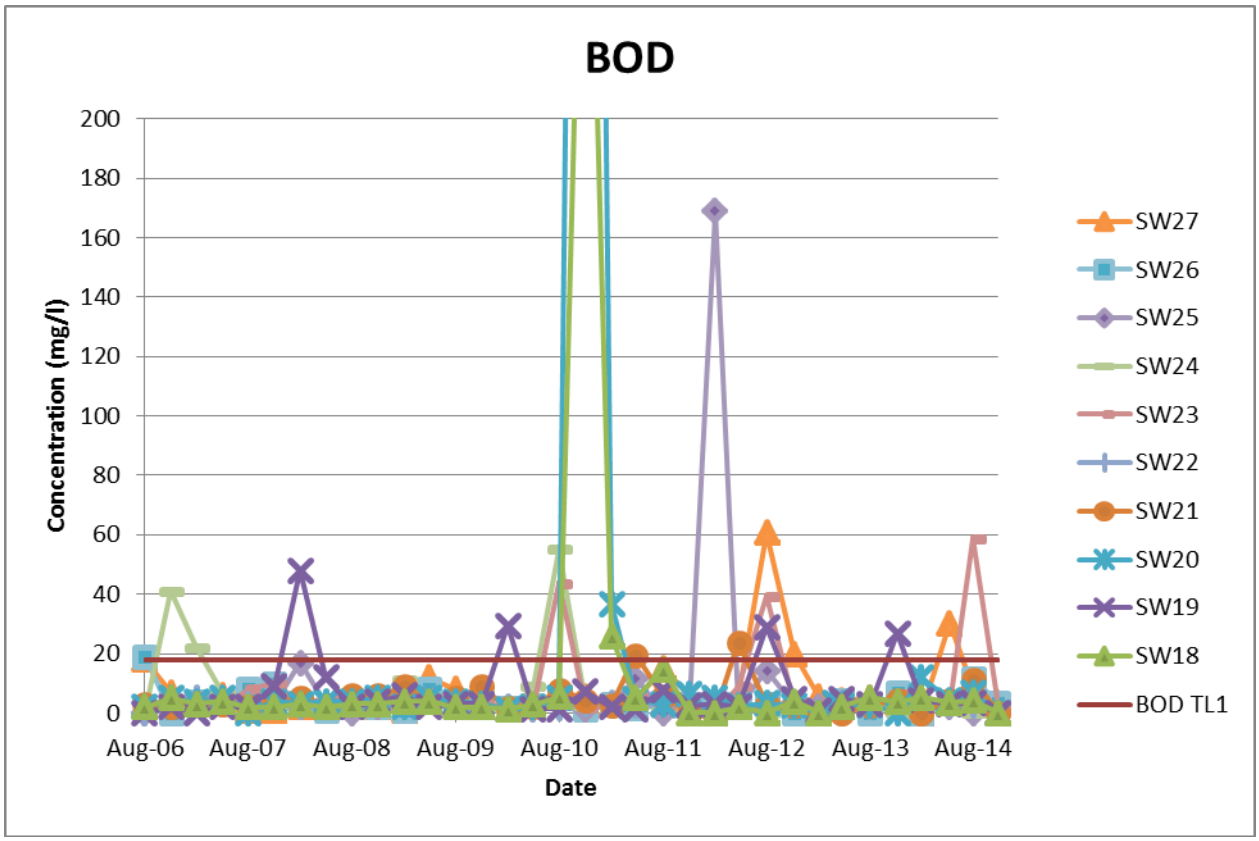

Chloride
2500
2000
1500
1000
500
0
Concentration (mg/l)
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
Chloride TL

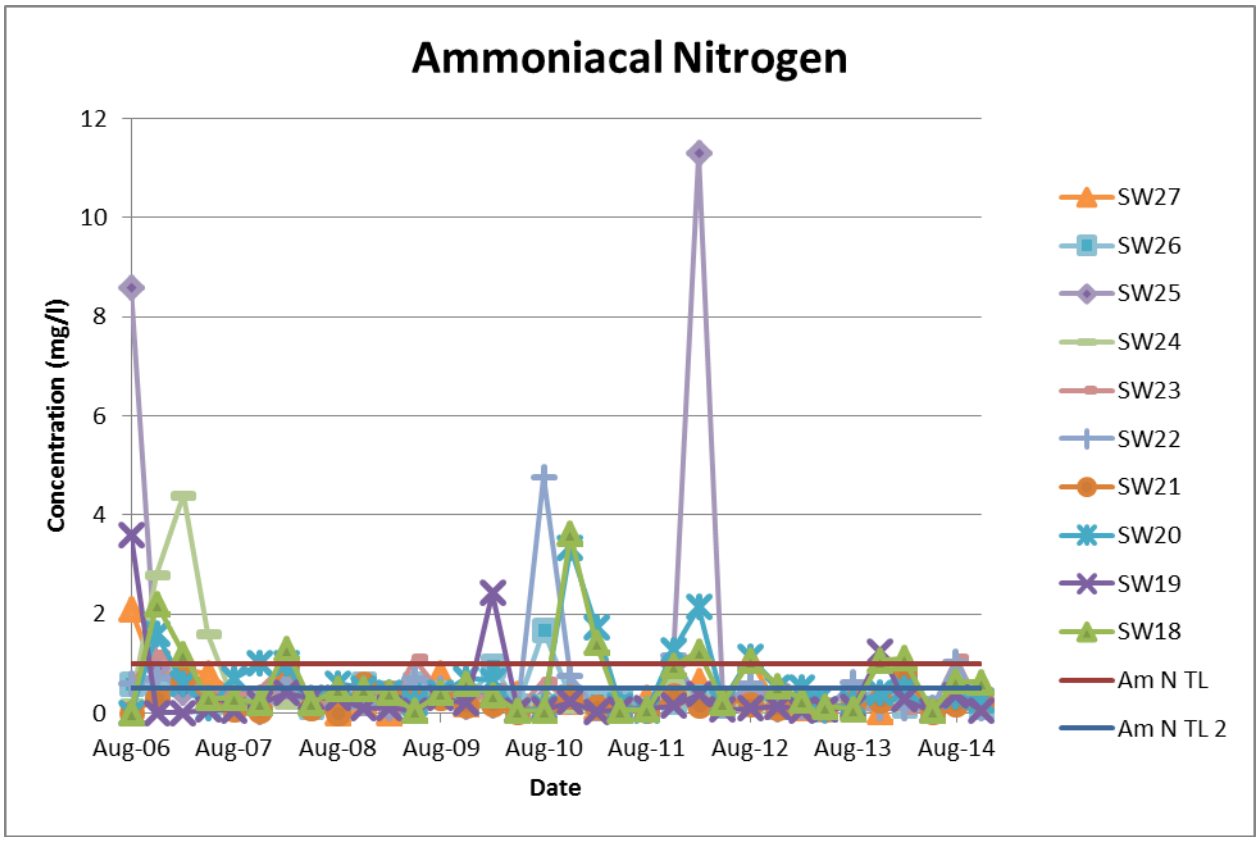

Conductivity
Concentration (mS/cm)
9
8
7
6
5
4
3
2
1
0
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
Cond TL

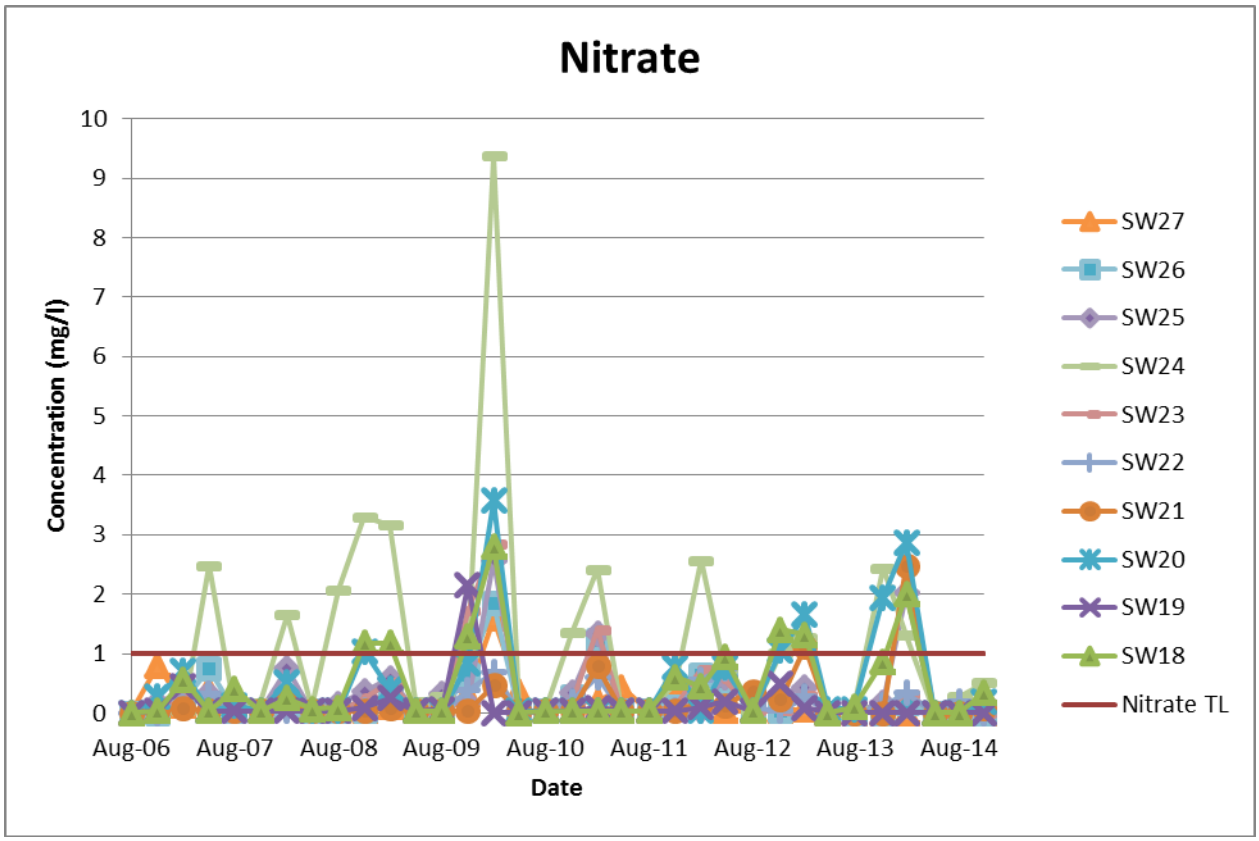

TSS
Concentration (mg/l)
2500
2000
1500
1000
500
0
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
TSS TL 1
TSS TL 2
TSS TL 3

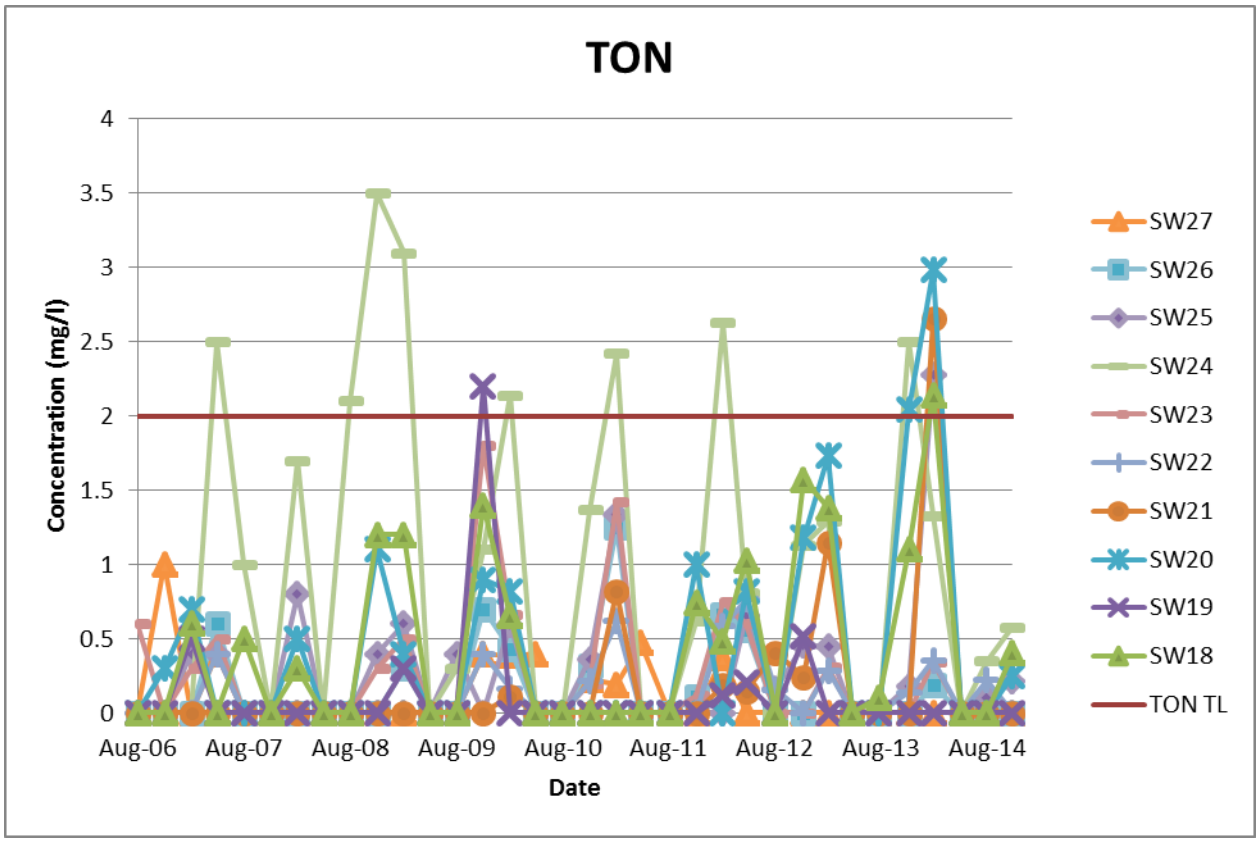

Sulphate
600
500
400
300
200
100
0
Concentration (mg/l)
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
SO4 TL

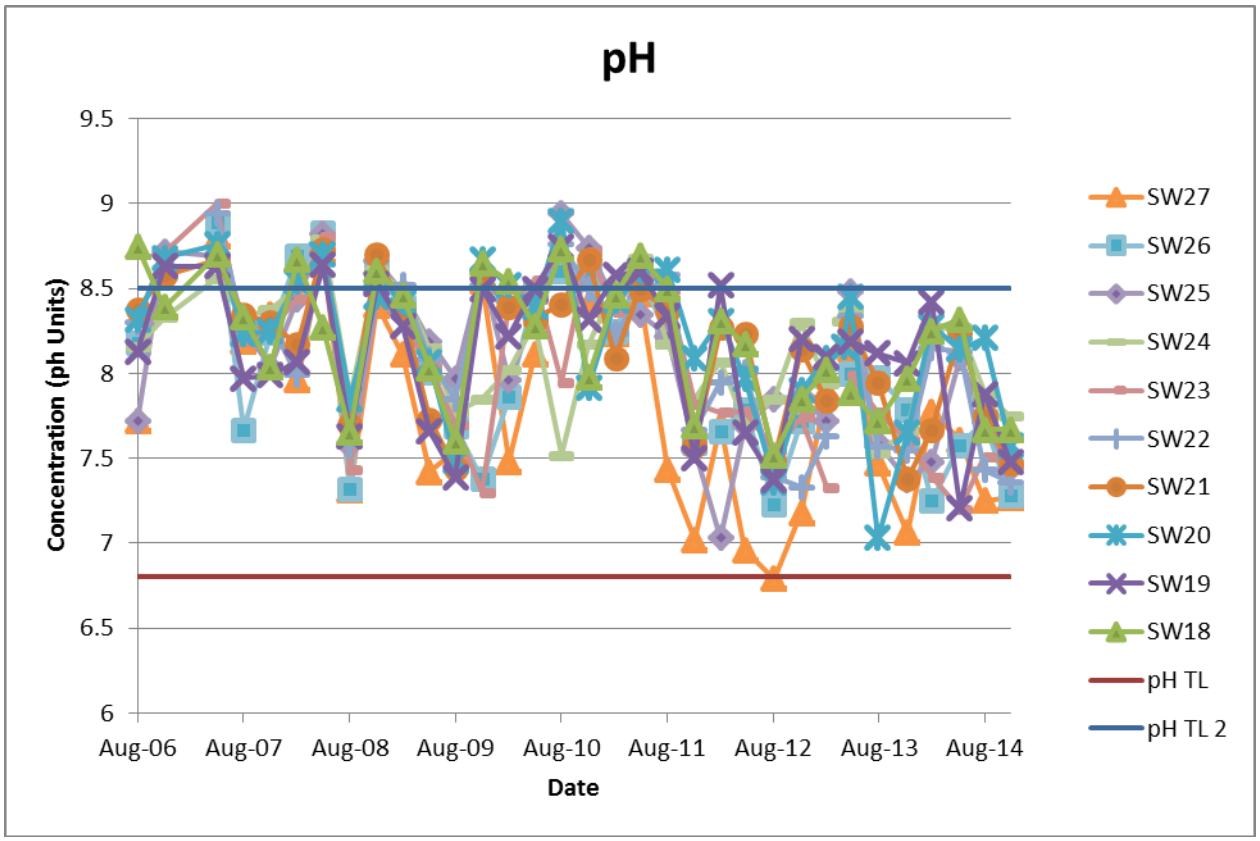

BOD
900
800
700
600
500
400
300
200
100
0
Concentration (mg/l)
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
BOD TL1


BOD
Concentration (mg/l)
200
180
160
140
120
100
80
60
40
20
0
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
BOD TL1

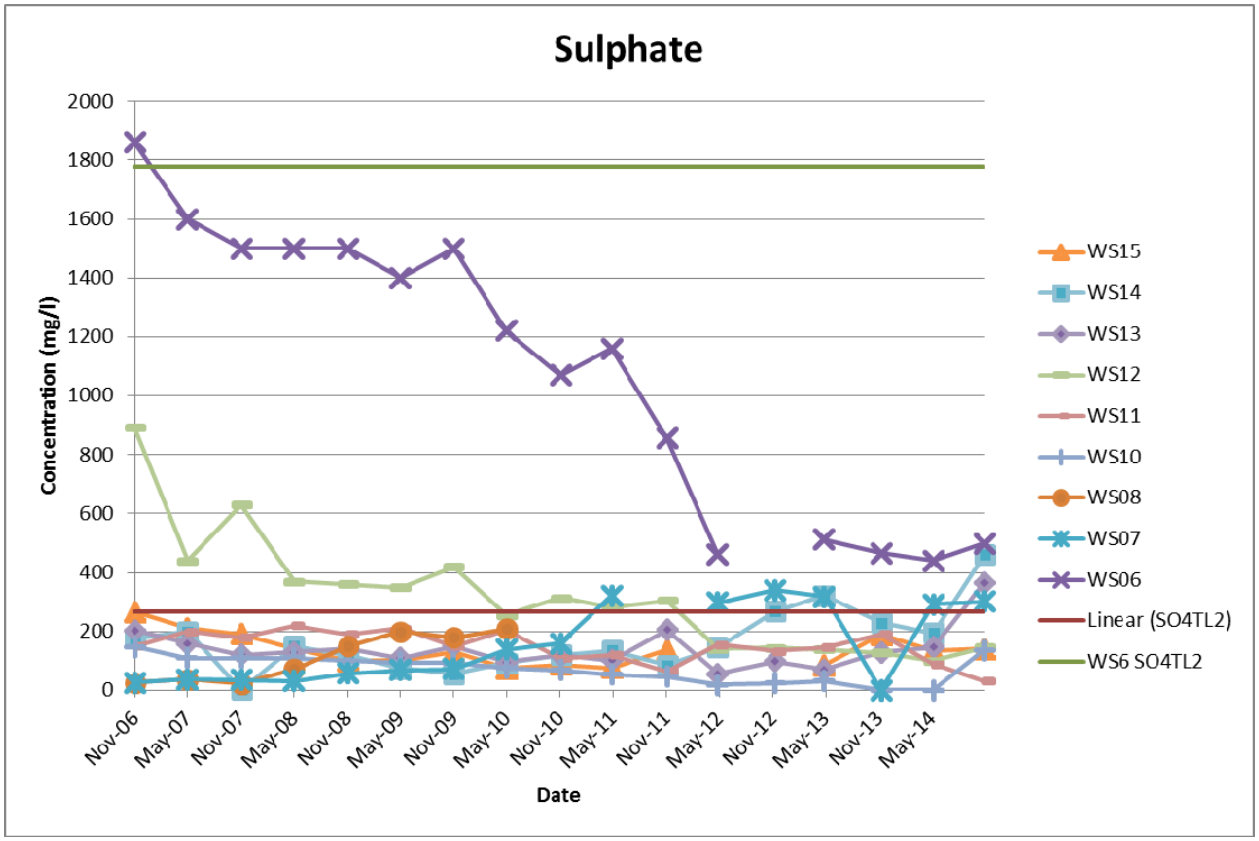

Ammoniacal Nitrogen
Concentration (mg/l)
12
10
8
6
4
2
0
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
Am N TL
Am N TL 2

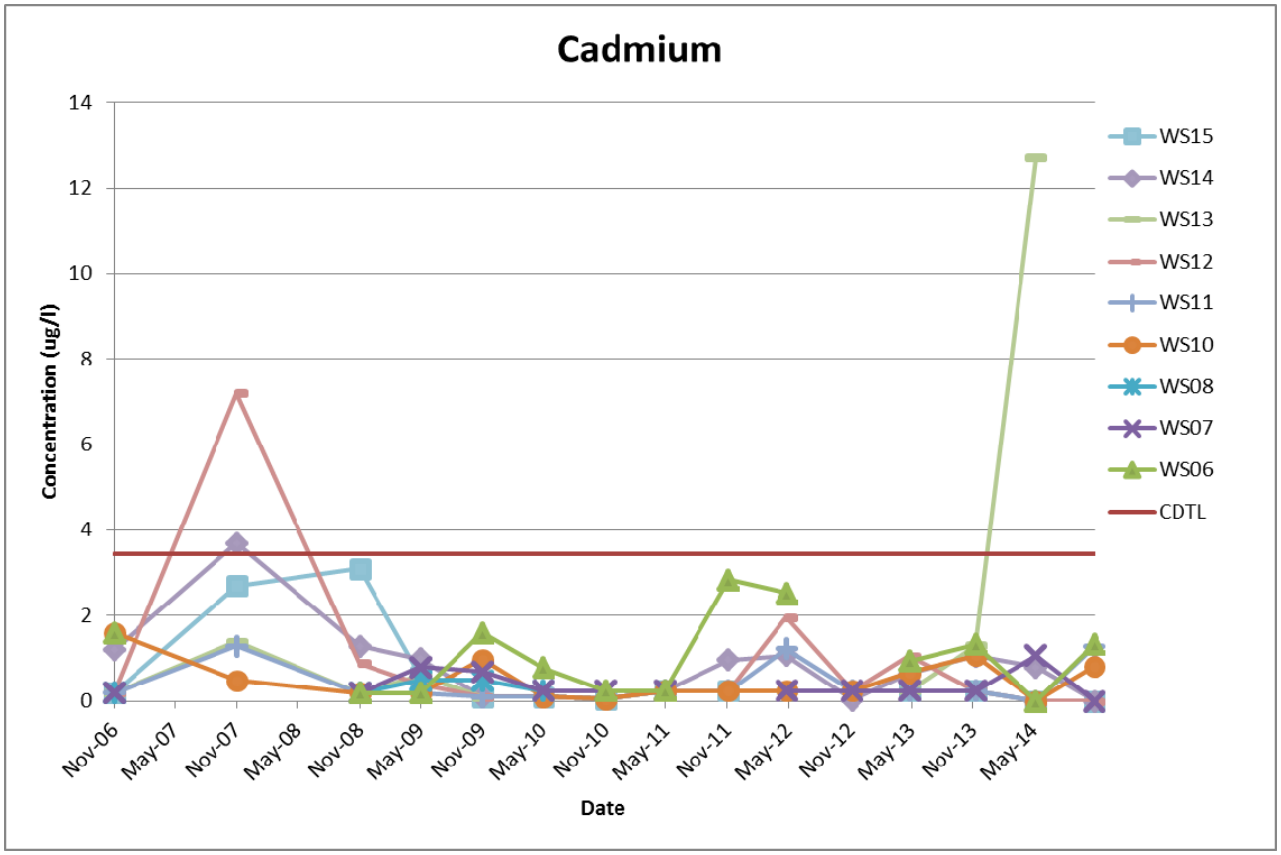

Nitrate
Concentration (mg/l)
10
9
8
7
6
5
4
3
2
1
0
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
Nitrate TL

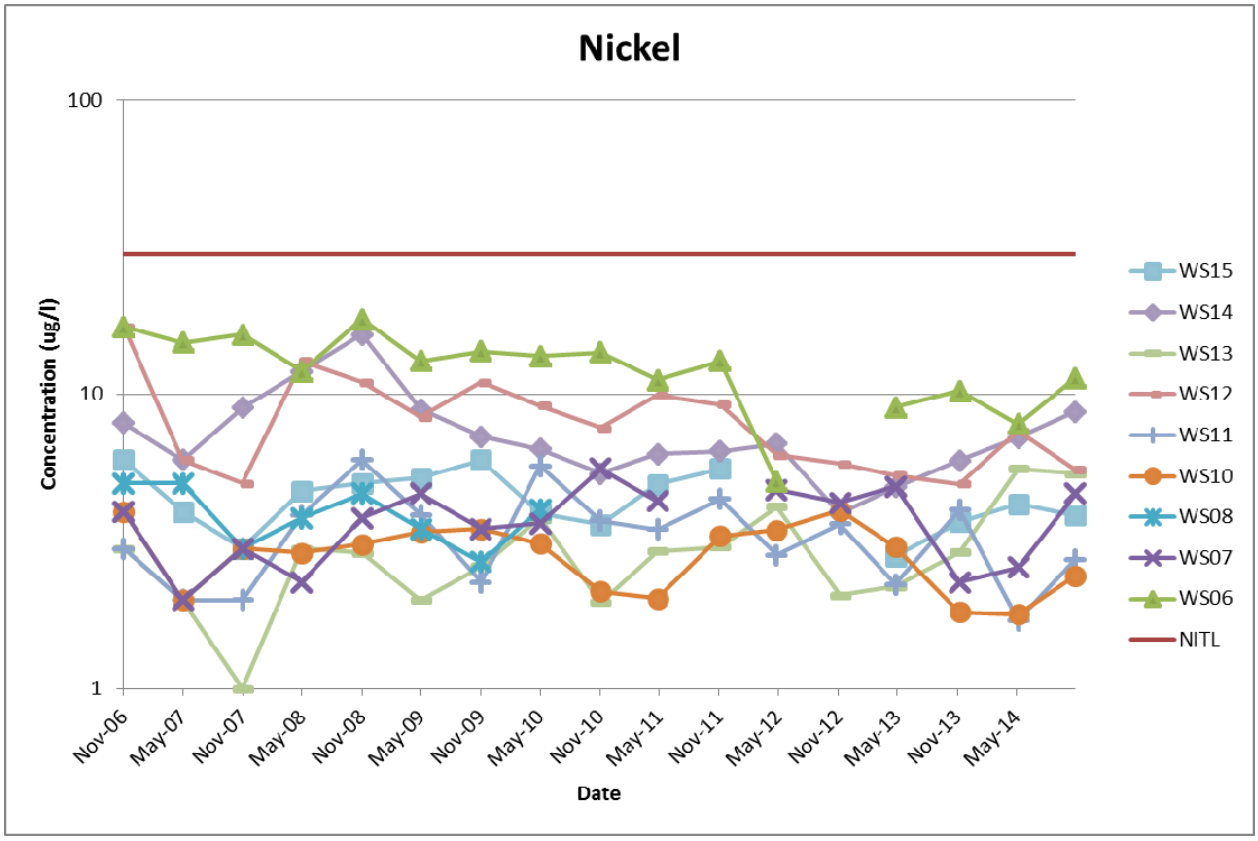

TON
Concentration (mg/l)
4
3.5
3
2.5
2
1.5
1
0.5
0
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
TON TL

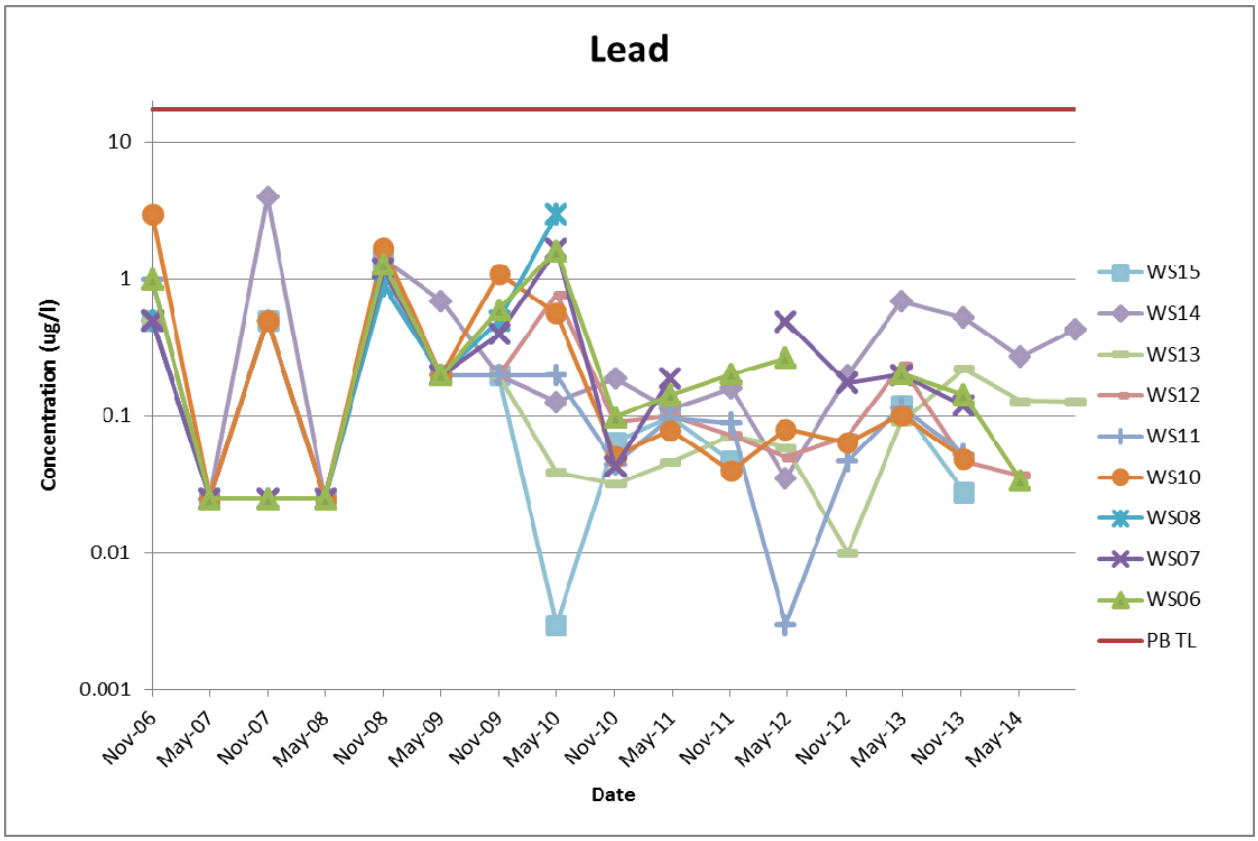

pH
9.5
9
8.5
8
7.5
7
6.5
6
Concentration (ph Units)
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Date
SW27
SW26
SW25
SW24
SW23
SW22
SW21
SW20
SW19
SW18
pH TL
pH TL 2

Groundwater






Nickel
100
10
1
Concentration (ug/l)
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06
NITL


Lead
10
1
0.1
0.01
0.001
Concentration (ug/l)
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
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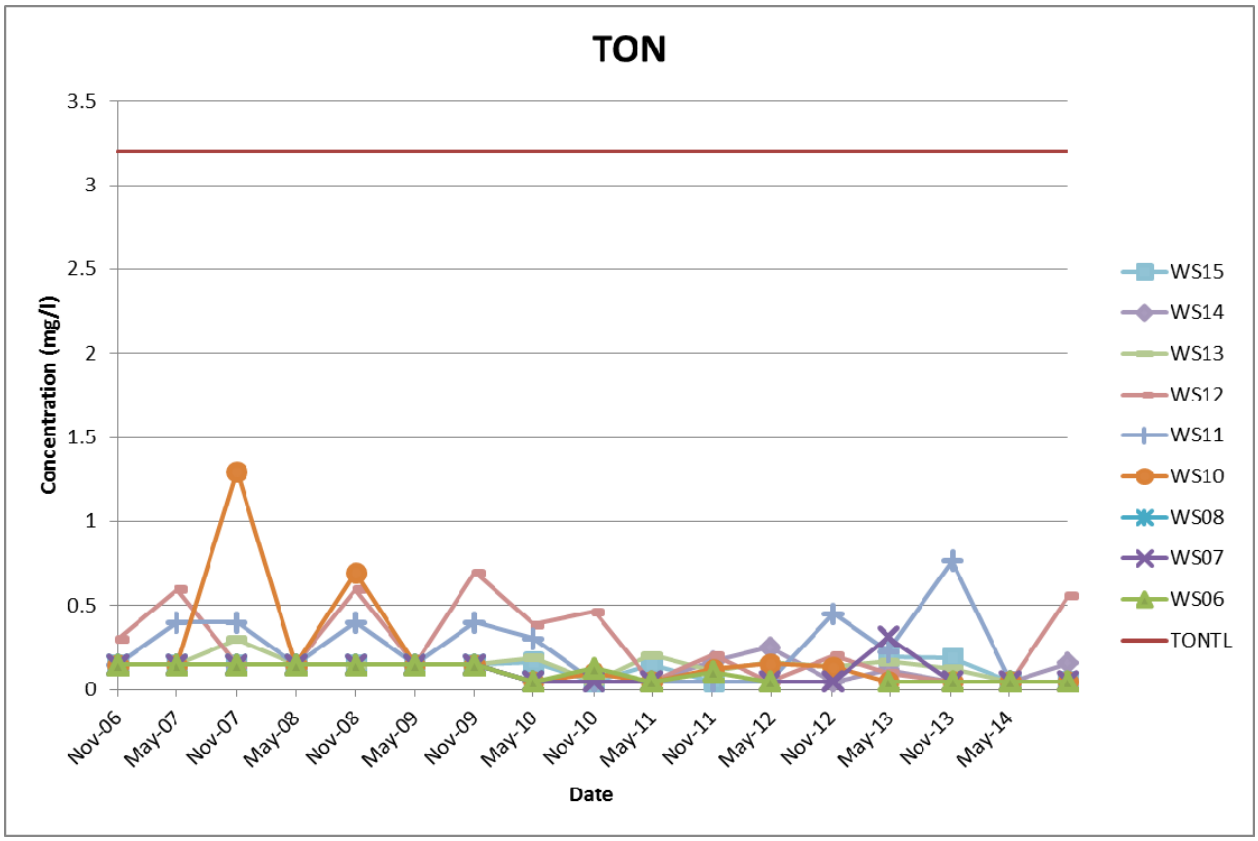
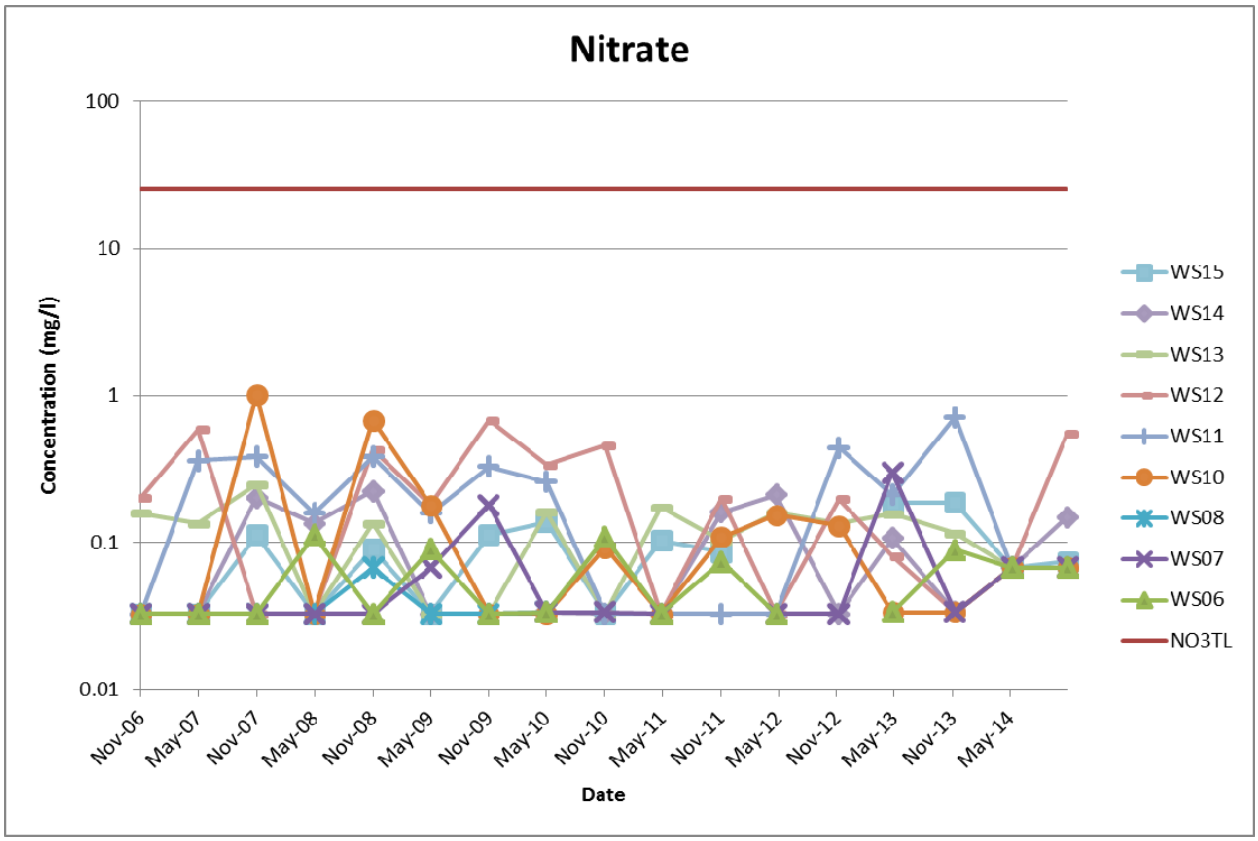
WS12
WS11
WS10
WS08
WS07
WS06
PB TL


TON
3.5
3
2.5
2
1.5
1
0.5
0
Concentration (mg/l)
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06
TONTL


Nitrate
100
10
1
0.1
0.01
Concentration (mg/l)
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
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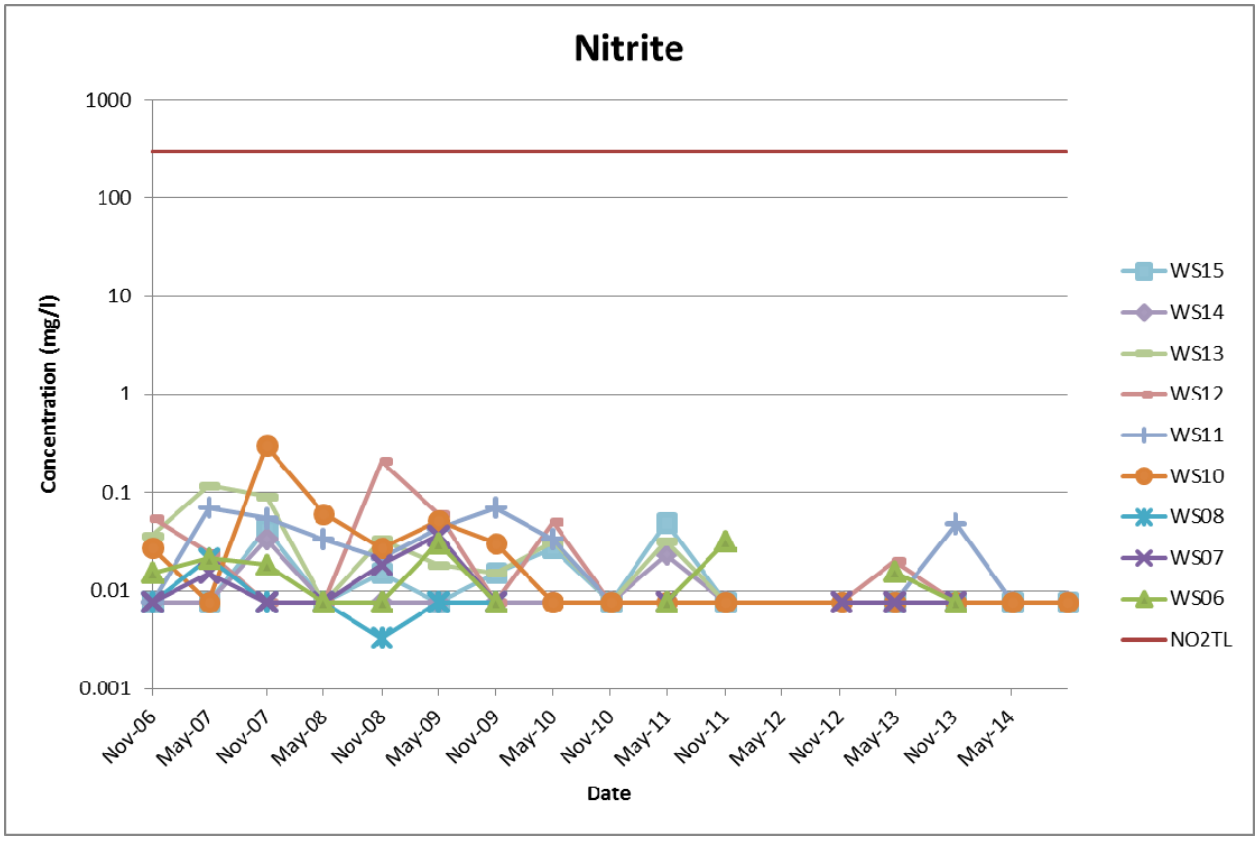
WS12
WS11
WS10
WS08
WS07
WS06
NO3TL


Nitrite
Concentration (mg/l)
1000
100
10
1
0.1
0.01
0.001
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
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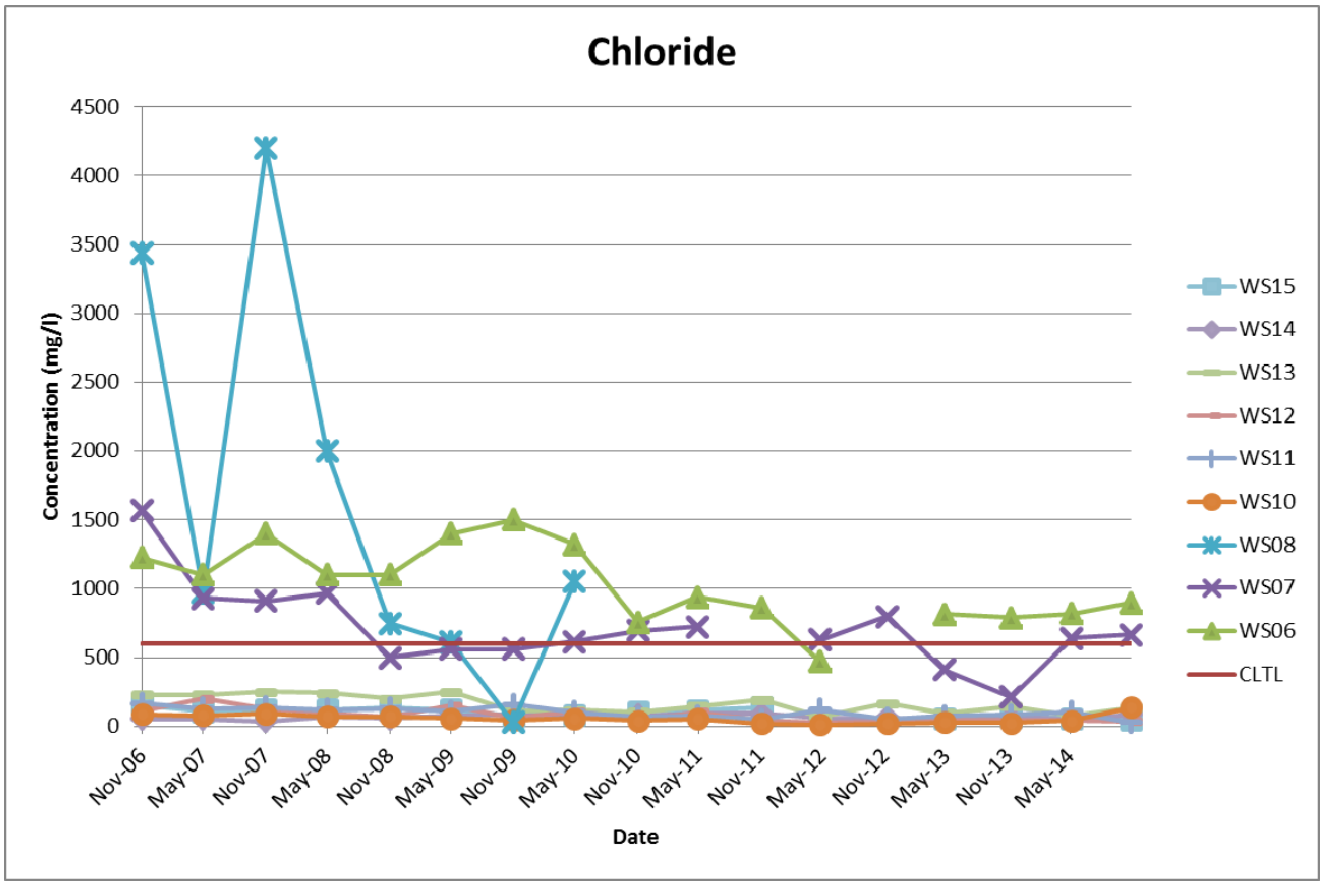
WS12
WS11
WS10
WS08
WS07
WS06
NO2TL


Chloride
Concentration (mg/l)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
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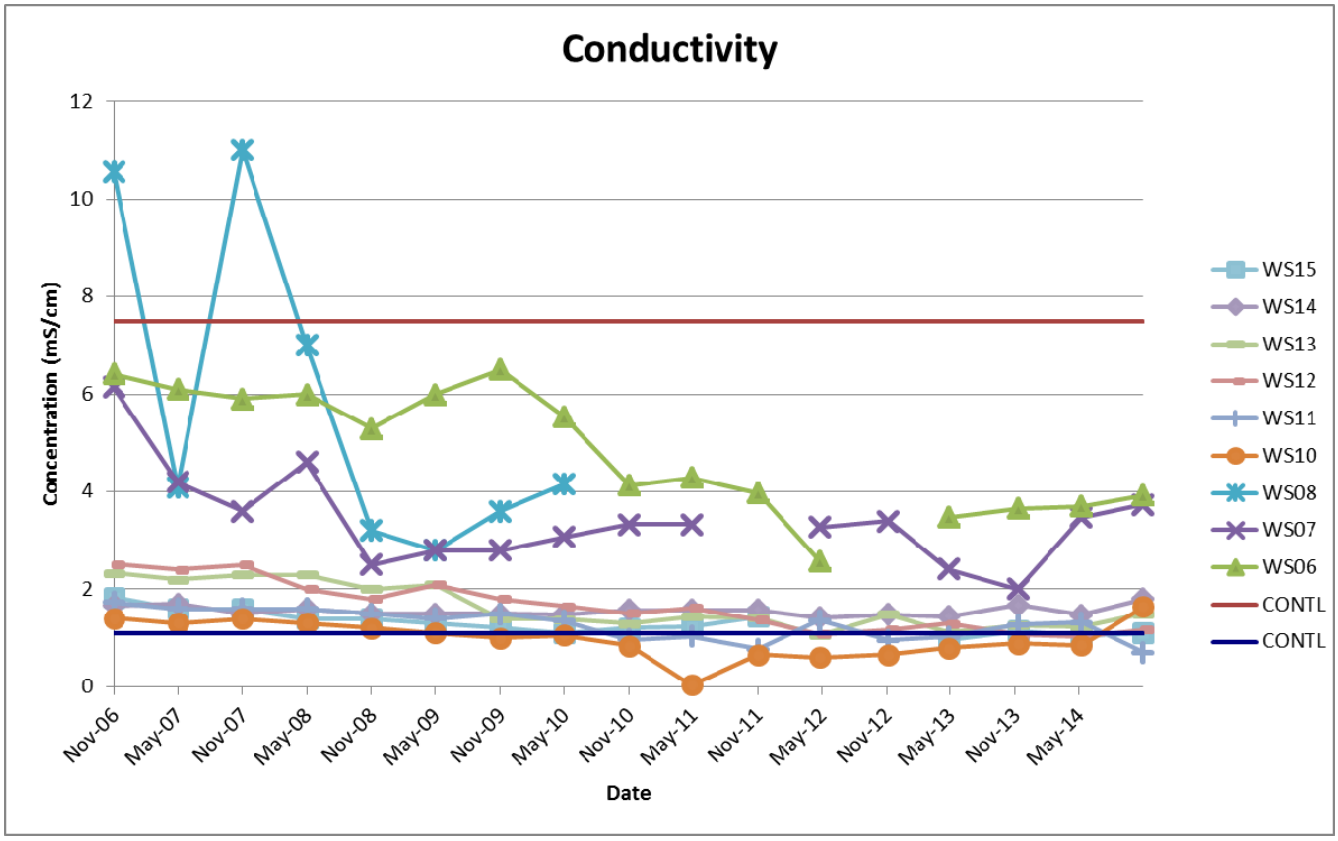
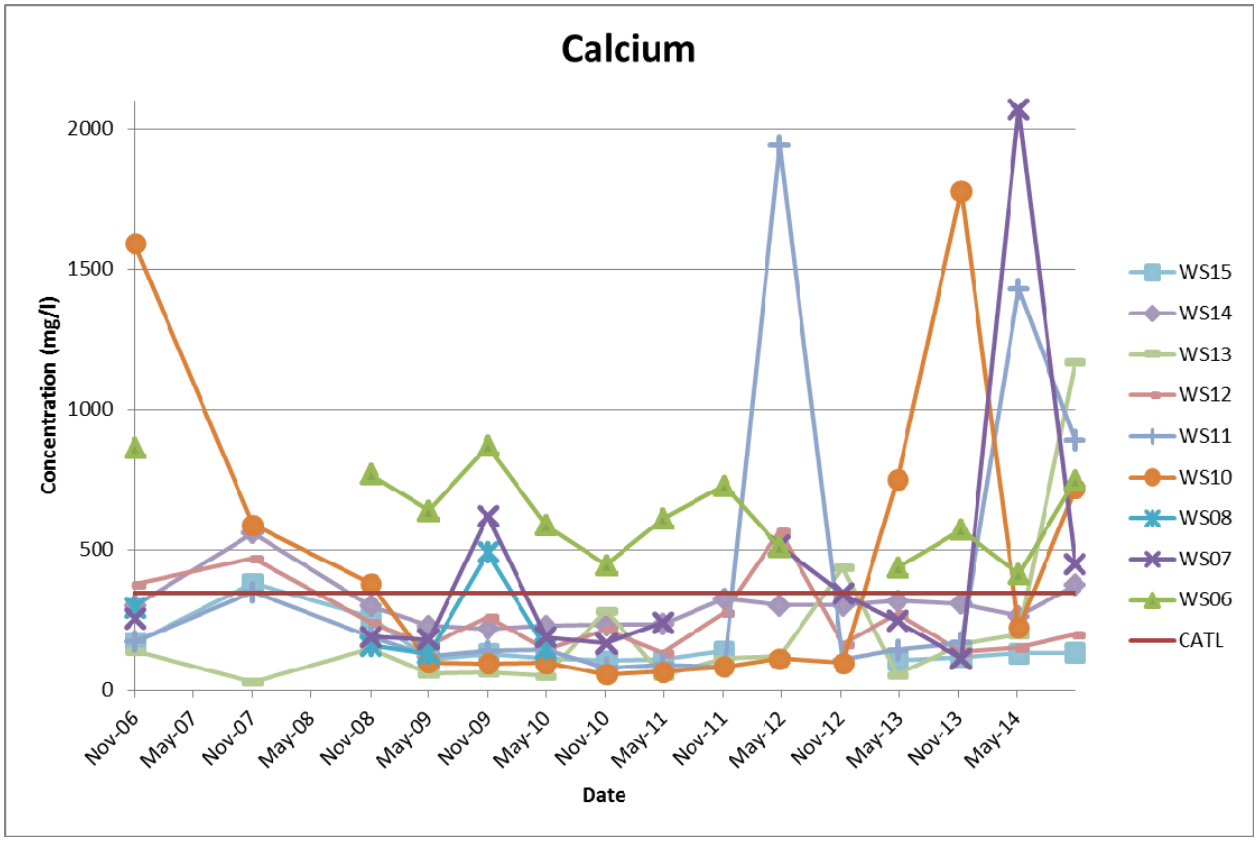
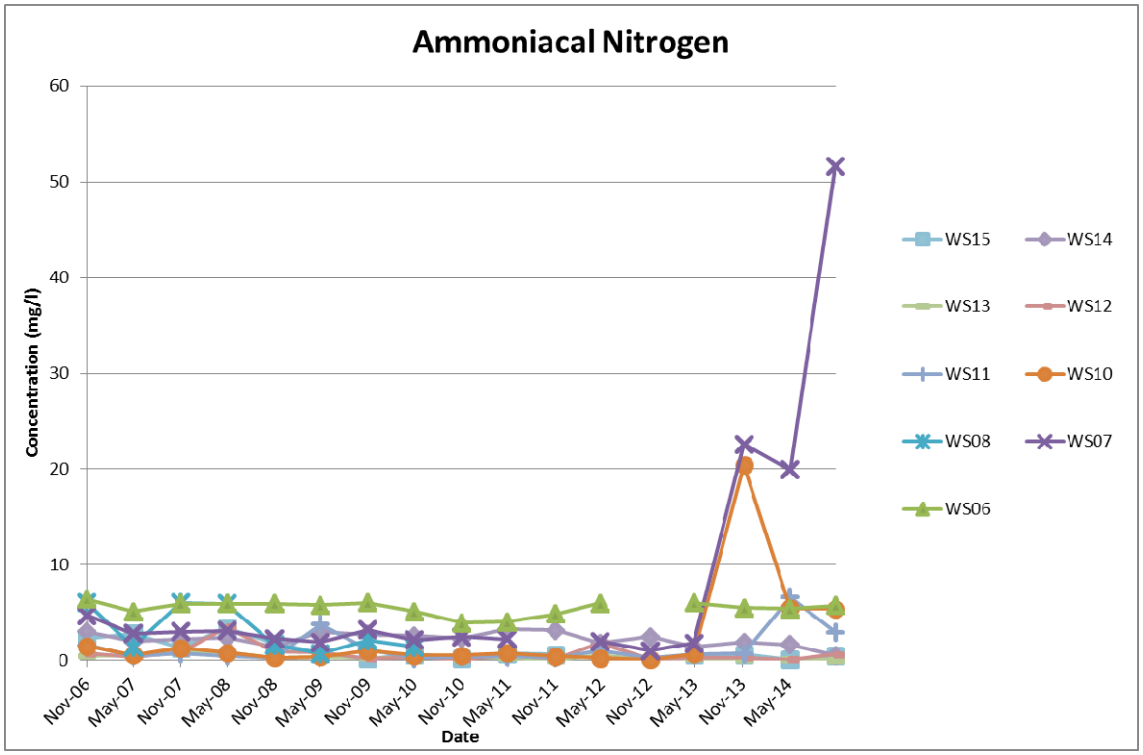
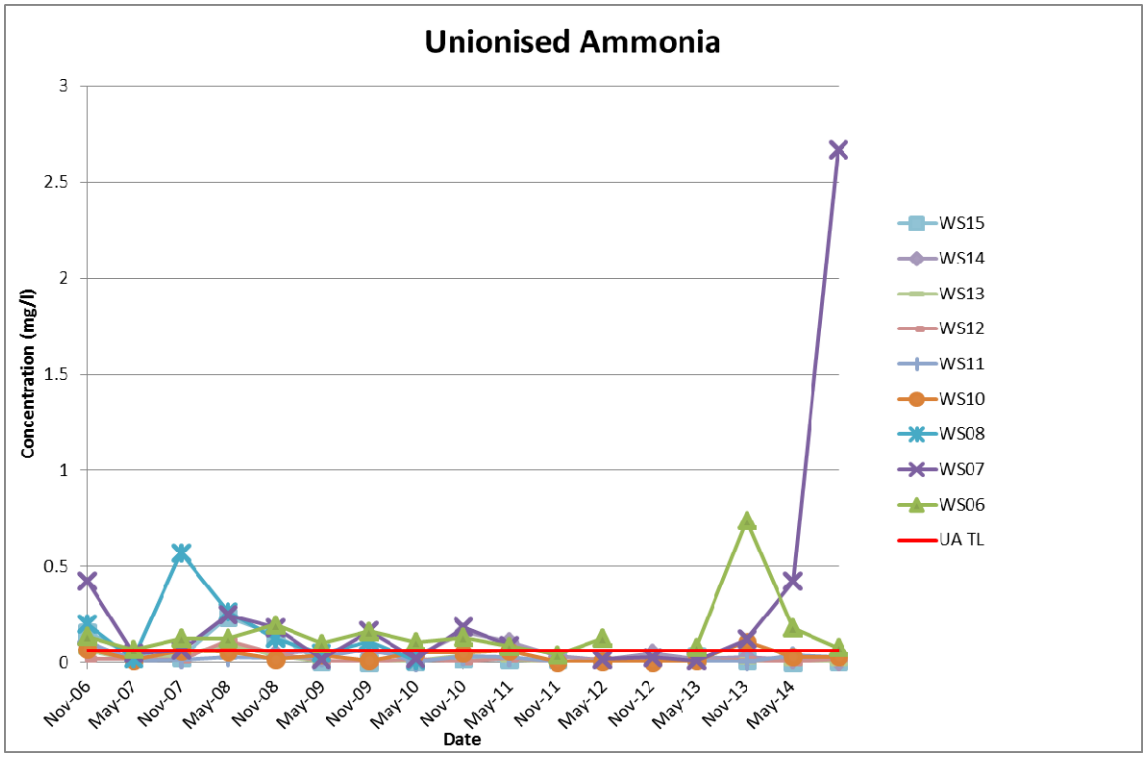
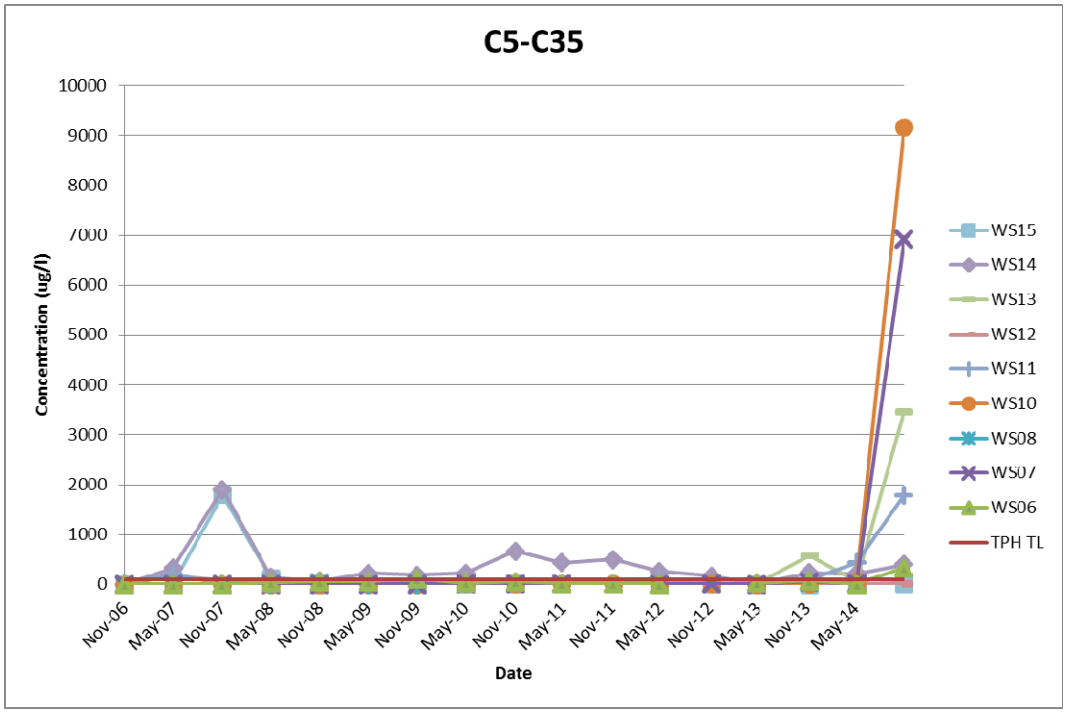
WS12
WS11
WS10
WS08
WS07
WS06
CLTL

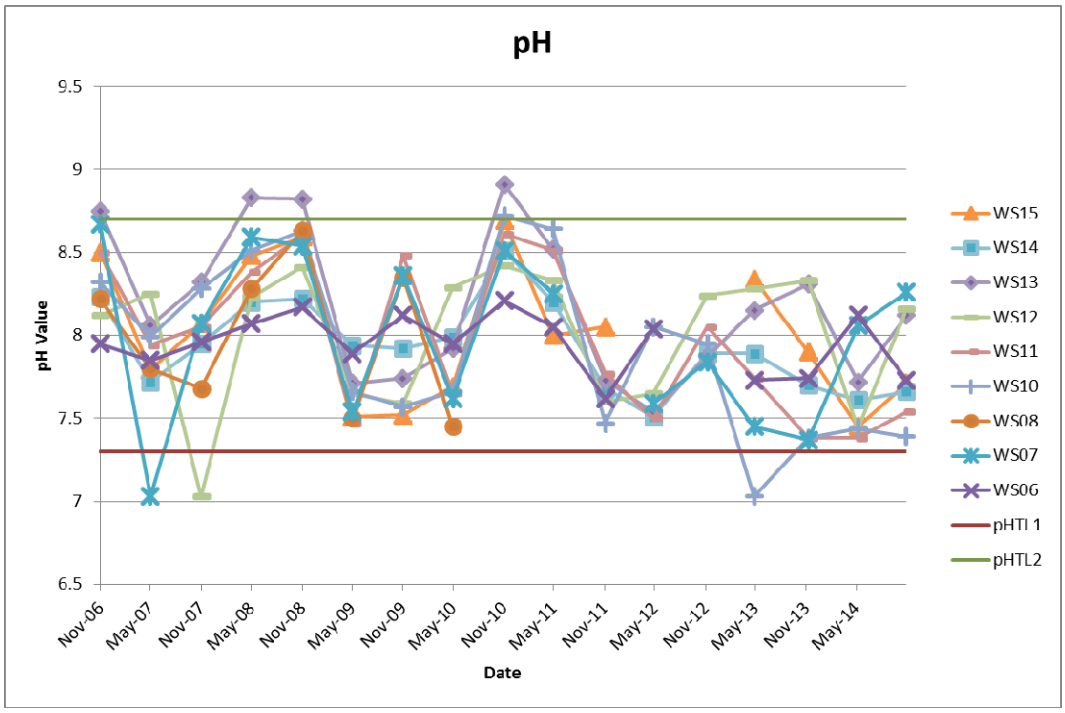

Conductivity
Concentration (mS/cm)
12
10
8
6
4
2
0
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06
CONTL
CONTL

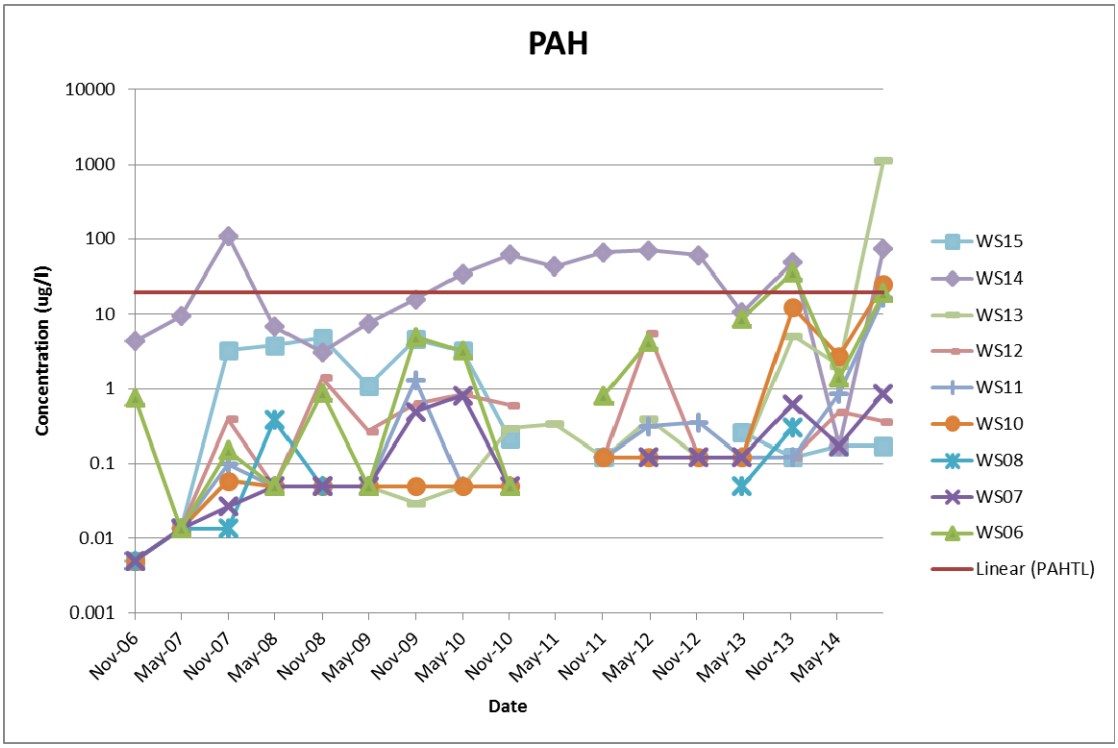

Calcium
Concentration (mg/l)
2000
1500
1000
500
0
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06
CATL


Ammoniacal Nitrogen
Concentration (mg/l)
60
50
40
30
20
10
0
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06


Unionised Ammonia
Concentration (mg/l)
3
2.5
2
1.5
1
0.5
0
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06
UA TL


C5-C35
Concentration (ug/l)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06
TPH TL


pH
pH Value
9.5
9
8.5
8
7.5
7
6.5
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06
pHTL1
pHTL2


PAH
10000
1000
100
10
1
0.1
0.01
0.001
Concentration (ug/l)
Nov-06
May-07
Nov-07
May-08
Nov-08
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
May-14
Date
WS15
WS14
WS13
WS12
WS11
WS10
WS08
WS07
WS06
Linear (PAHTL)

Appendix B

The Trigger Levels

The Surface Water Quality Trigger Levels

Determinant	Trigger Levels
pH	6.8 - 8.5
Conductivity	>2000 µS/cm
Total Suspended Solids (TSS)	>250 mg/l on one occasion >100 mg/l in 3 consecutive samples >60 mg/l in 4 consecutive samples
Biological Oxygen Demand (BOD)	>18 mg/l on one occasion >10 mg/l on three consecutive occasions
Nitrite (NO_2)	>1 mg/l
Nitrate (NO_3)	>1 mg/l
Ammoniacal Nitrogen	>1 mg/l on one occasion >0.5 mg/l on 4 consecutive occasions
Total Oxidised Nitrogen (TON)	>2 mg/l
Sulphates	>300 mg/l
Chloride	>300 mg/l
Calcium	>300 mg/l
Zinc	>1 mg/l
Lead	>0.25 mg/l
Cadmium	>0.005 mg/l
Nickel	>0.1mg/l
Petrochemicals;	>2 mg/l
Total oils and greases.	>2 mg/l
Dissolved Oxygen (DO)	Less than 2 mg/l on one occasion Less than 5 mg/l in 3 consecutive samples

The Groundwater Water Quality Trigger Levels

Determinand	Location	Trigger Level	Expected Range
pH	All (except SW12)	-	7.30 – 8.70
	SW12	-	8.60 – 9.20
TON	All	-	0 – 3.20mg/l
Nitrite	All	300 mg/l*	-
Nitrate	All	25.35mg/l	-
Ammoniacal N as ionised NH_3	All (except WS6, WS7 and WS12)	0.0148mg/l	-
	WS6, WS7 and WS12	0.0614	
Chloride	All	595mg/l	-
Electrical Conductivity	All	-	1100 – 7500us/cm
TPH	All	100µg/l	-
PAH	All	20µg/l	-
Total Sulphate	All (except WS6)	269mg/l	-
	WS6	1779mgl	-
Cadmium	All	3.45µg/l	-
Calcium	All	354mg/l	-
Nickel	All	30µg/l	-
Lead	All	17.5µg/l	-
Zinc	All	2645mg/l	-

Appendix C

Dissolved Oxygen

Factors Affecting Dissolved Oxygen:

The Environment Agency Guidance document "De-oxygenation, Practical self-help for fishery owners and managers-"discusses the level of oxygen in surface water and identify the most important factors that can affect its level. It states that the quantity of oxygen held in solution depends on several factors, the most important of which is temperature. As water becomes warmer the maximum amount of oxygen it can hold reduces. The guidance discussed the several mechanisms for entry and loss of oxygen into water. These included

- Physical factors such as:
    1. Wind and wave action
    2. Direct rainfall
    3. Surface or sub-surface drainage
    4. Riffles, waterfalls and weirs
    5. Ice-cover- When water become completely covered with ice, interchange of oxygen at the water/air interface is prevented
- Biological
    1. Bacteria that occur in every type of habitat and on most living and dead matter. In water bodies, the bacteria that most influence oxygen concentration are those responsible for the process of decomposition (rotting). The demand for oxygen by bacteria in water is the Biochemical Oxygen Demand (BOD)
    2. Organic loading and pollution- Ordinarily, this process will cause only slight changes to the amount of dissolved oxygen in the water, though this may be more pronounced in autumn when leaf-fall and dieback of water plants contribute towards the organic load, and photosynthesis is reduced. Organic matter can enter the water in many forms. Considerable quantities of leaves (leaf litter) can enter the water from deciduous trees and shrubs growing around the banks. Leaves can also be blown in from the adjoining land or swept in through a feeder stream
    3. Sewage
    4. Agricultural wastes
    5. Industrial pollutants- Of particular note are oils, which float on the water surface and thereby prevent air interchange.
    6. Aquatic plant management- including the effects of weed, excessive growth of aquatic plants, Natural die-back of algae or of rooted water plants

As can be see the most likely factor that can be the cause for the low concentrations in DO are natural factors.

In addition we note the high level of uncertainty associated with measurement of dissolved oxygen. The laboratory cannot identify the level of uncertainty with the measurement of DO. Factors that can contribute to the uncertainty of the DO results include oxidation of organic matter, temporal changes on ionic (redox) inorganic equilibrium in bottled samples, temperature effects, effects of biological oxygen demand (BOD) in bottled samples.

The field measurement of DO was also carried out with results that are very different from that acquired in the laboratory and show higher level of oxygen in all locations at concentrations The field measurements were provided in the factual report.