



Nambucca Heads to Urunga – Pacific Highway Upgrade

NH2U Construction
Surface Water
Quality Report -
Rev 1

Schubert, Sam





Document history and status

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Contents

Document history and status	1
1 Introduction	3
1.1 Project Overview.....	3
1.2 Regulatory Context.....	3
1.2.1 Condition of Approval B17 – Water Quality.....	3
1.2.2 Statement of Commitments.....	4
1.3 Objective of the Monitoring Program	4
2 Background	5
2.1 Pre-construction Surface Water Monitoring	5
2.2 Catchment Overview	5
2.3 Waterways.....	5
2.3 Monitoring Results from Environmental Assessment.....	11
2.3.1 Boggy Creek	11
2.3.2 Cow Creek	11
2.3.3 Deep Creek.....	11
2.3.4 Tributary of Oyster Creek.....	11
2.3.5 Kalang River.....	12
2.3.6 SEPP No. 351	12
2.4.1 Surface Water and Groundwater interactions.....	12
3 Risks to Surface Water during Construction.....	13
3.1 Construction Stage Risks	13
3.2.1 Management of Surface Water for Construction	13
3.2.2 Acid Sulfate Soil Management	13
4 Monitoring Requirements	14
4.1 Locations of Monitoring.....	14
4.1.1 Selection of Monitoring Locations	14
4.2 Monitoring Parameters	19
4.3 Sampling Frequency.....	19
4.4 Field Measurements and Observations	20
4.4.1 Field Measurements.....	20
4.4.2 Field Observations	20
4.5 Sampling Protocol.....	21
4.5.1 Sample Collection	21
5 Results and Discussion	22
5.1 Boggy Creek.....	22



5.2 Cow Creek..... 23

5.3 Deep Creek..... 24

5.4 Oyster Creek..... 24

5.5 McGraths Creek..... 25

5.6 Dalhousie Creek 25

5.7 Kalang River 25

5.8 SEPP14 - 353 & CH77900 25

5.9 SEPP14-351 & CH38000 26

5.9 Discussion of Results 26

Reference List..... 27

Appendix A – Boggy Creek Field Parameter Graphs 28

Appendix B – Cow Creek Field Parameter Graphs 31

Appendix C – Deep Creek Field Parameter Graphs 34

Appendix D – Oyster Creek Field Parameter Graphs 37

Appendix E – McGraths Creek Field Parameter Graphs..... 40

Appendix F – Dalhousie Creek Field Parameter Graphs..... 43

Appendix G – Kalang River Field Parameter Graphs 46

Appendix H – SEPP14–353 & Ch77,900 49

Appendix I – SEPP14–351 & Ch79,900..... 52

Appendix J – Boggy Creek Field Data Raw i

Appendix K – Cow Creek Field Data Raw.....ii

Appendix L – Deep Creek Field Data Raw.....iii

Appendix M – Oyster Creek Field Data Raw.....iv

Appendix N – McGraths Creek Field Data Raw v

Appendix O – Dalhousie Creek Field Data Raw.....vi

Appendix P – Kalang River Field Data Rawvii

Appendix Q – SEPP14-353.....viii

Appendix R – Ch77,900ix

Appendix S – SEPP14-351 x

Appendix T – Ch79,900.....xi

1 Introduction

This document presents the Surface Water Monitoring undertaken for the construction staging of the NH2U section of the Warrell Creek to Urunga (WC2U) Pacific Highway Upgrade. This section of highway upgrades consists of 22 kilometres from Nambucca Heads to Urunga (NH2U), which runs from design chainage 61,265 m to 83,682 m.

The purpose of this document is to present the surface water monitoring results obtained as part of the construction stage of the NH2U Project for January 2014 to August 2016.

1.1 Project Overview

The Warrell Creek to Urunga Pacific Highway Upgrade involves an upgrade of the existing highway to four lane divided highway from the existing Allgoamera deviation, south of Warrell Creek, to Waterfall Way at Raleigh north of Urunga. The upgrade extends over approximately 42 kilometres.

The Warrell Creek to Urunga (WC2U) project was identified as a critical infrastructure project by the NSW Government, designed to improve safety, traffic efficiency and increase capacity along the Pacific Highway. It forms part of the overall program for upgrading the Pacific Highway. Planning commenced on the WC2U project in 2003 and project approval was granted on 19 July 2011, under Part 3A of the Environmental Planning and Assessment Act 1979.

The 22 kilometre section of the highway upgrade from Nambucca Heads to Urunga has been agreed between the Australian and NSW Governments with major construction commencing in 2014. Therefore the Water Quality Monitoring Program for the Warrell Creek to Urunga Pacific Highway Upgrade has been divided into the two highway upgrade sections: Warrell Creek to Nambucca Heads (WC2NH) and Nambucca Heads to Urunga (NH2U).

As part of the Proposal's approval, preparation and implementation of a Water Quality Monitoring Program is required to address the Minister for Planning and Infrastructure's Condition of Approval (CoA) B17, and Sections 2.15.4, and Commitments W3, W6, W7 of the "Warrell Creek to Urunga Submissions and preferred project report" (hereafter referred to as the 'Submissions Report').

1.2 Regulatory Context

1.2.1 Condition of Approval B17 – Water Quality

Condition of Approval (CoA) B17 addresses the requirements of the establishment of a Water Monitoring Program for the duration of the project and three years following the completion of construction as well as reporting of monitoring results to the EPA, the Department of Planning and Environment and DPI. The Program shall be developed in consultation with OEH and DPI and shall include but not necessarily be limited to:

- Identification of surface water and groundwater quality monitoring locations which are representative of the potential extent of impacts from the project;
- identification of works and activities during construction and operation of the project, including emergencies and spill events, that have the potential to impact on surface water quality and risks to oyster farming in the Nambucca, Bellinger, and Kalang rivers;

- Representative background monitoring of surface water and groundwater quality parameters for a minimum of six (6) months (considering seasonality) prior to the commencement of construction to establish baseline water conditions;
- Development and presentation of indicators or standards against which any changes to surface water quality will be assessed, having regard to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC (2000), 2000);
- Contingency and ameliorative measures in the event that adverse impacts to surface water quality are identified;
- A minimum monitoring period of three years following the completion of construction or until any disturbed waterways/ groundwater resources are certified by an independent expert as being rehabilitated to an acceptable condition. The monitoring shall also confirm the establishment of operational water control measures (such as sedimentation basins and vegetation swales); and
- Reporting of the monitoring results to the Department of Planning and Environment, OEH and DPI.

1.2.2 Statement of Commitments

Commitment W3 of the Submissions Report requires monitoring of upstream and downstream of significant waterways identified in the Surface Water Monitoring Program.

1.3 Objective of the Monitoring Program

The primary objective of the Monitoring program is to evaluate, monitor, manage and minimise the impacts of the highway upgrade on the surface water quality of the identified waterways in the area of the NH2U project footprint. This report summaries and presents the monitoring undertaken and discusses the results from sampling undertaken.

2 Background

This section provides the information regarding the implementation of the Surface Water Monitoring Program. Background information regarding the location, catchment characteristics and identified risks present once construction completion is achieved.

2.1 Pre-construction Surface Water Monitoring

GeoLink was engaged by RMS for the NH2U Project to undertake the pre-construction surface water monitoring and formulate the Surface Water Quality Monitoring Program. The following background information is taken from the environmental assessment stage of the Project and incorporated in the Surface Water Quality Monitoring Program. Summaries of the results from the environmental assessment will be provided below in Section 2.3. For full results, please see the Surface Water Quality Monitoring Program.

2.2 Catchment Overview

Of the three (3) catchments identified in the GeoLink Surface Water Monitoring Program, two (2) are located within the NH2U Project. The Bellinger and Kalang Rivers flow within the same river basin and have a common ocean entrance at Urunga. The confluence of these rivers occurs about 750 m before discharge to the ocean. They comprise a total catchment area of approximately 1,110km², (770km² for the Bellinger and 340km² for the Kalang). The catchment area of Deep Creek is 93km².

The Stressed Rivers Assessment Report summary for NSW (DLWC, 1998) classified streams in the study area based on an index of hydrological stress (proportion of water extraction to streamflow estimate) and environmental stress (stream health, conservation value and future risk):

- The Bellinger catchment (both Coastal Bellinger and Coastal Kalang sub-catchments) were classified as medium priority sub-catchments, with a low hydrological stress but high environmental stress;
- The Lower Deep Creek sub-catchment was classified as high priority due to high hydrological stress and medium environmental stress.

2.3 Waterways

The NH2U highway upgrade crosses a number of waterways along its length. These include freshwater and estuarine systems, and tributaries of an intermittently closed and open lakes and lagoon (ICOLL) at Oyster Creek. Additionally, a number of wetlands including SEPP 14 wetlands located to the east of the highway upgrade. Table 2.1 summarises the main waterways and wetlands identified by the Surface Water Monitoring Program for Pre-construction monitoring.

Table 2.1 Watercourses and Wetlands in the NH2U Project

<i>Chainage</i>	<i>Waterway Name</i>	<i>Freshwater/Estuarine</i>	<i>Fisheries Classification¹</i>
62,700	Boggy Creek	Freshwater/ Estuarine	Class 2 – moderate fish habitat
63,600	Cow Creek	Freshwater/ Estuarine	Class 2 – moderate fish habitat
64,900	Deep Creek	Freshwater/Estuarine	Class 1 – major fish habitat

¹ classification with respect to the Policy and Guidelines for Bridges, Roads, Causeways and Similar Structures (NSW Fisheries, 1999)



68,100	<i>Tributary of Oyster Creek</i>	<i>Freshwater</i>	<i>Class 2 – moderate fish habitat</i>
72,000	<i>McGraths Creek</i>	<i>Estuarine</i>	<i>Class 2 – moderate fish habitat</i>
77,700	<i>Kalang River</i>	<i>Estuarine</i>	<i>Class 1 – major fish habitat</i>
77,900	<i>SEPP 14 Wetland No 353</i>	<i>Freshwater</i>	<i>n/a</i>
81,000	<i>SEPP 14 Wetland No 351</i>	<i>Freshwater</i>	<i>n/a</i>

The Surface Water Monitoring Program has identified that Boggy Creek, Cow Creek, Deep Creek and the unnamed tributary of Oyster Creek have poor water quality. Additionally, the Kalang River has been assessed to have moderate water quality and the SEPP 14 wetlands had poor water quality when wet weather is experienced.

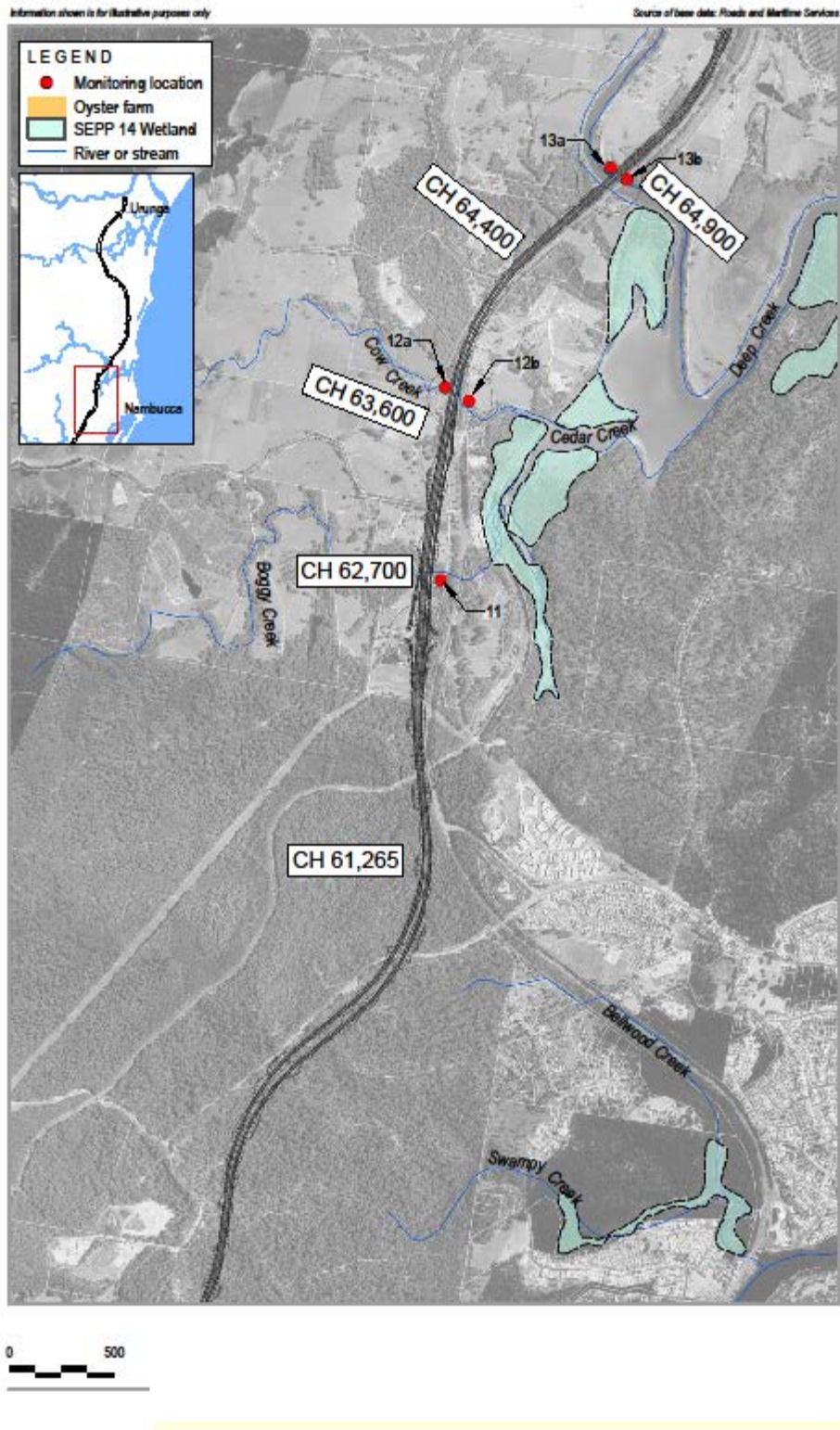


Image 2.1 Background Monitoring Locations Ch 61,265 to 64,400

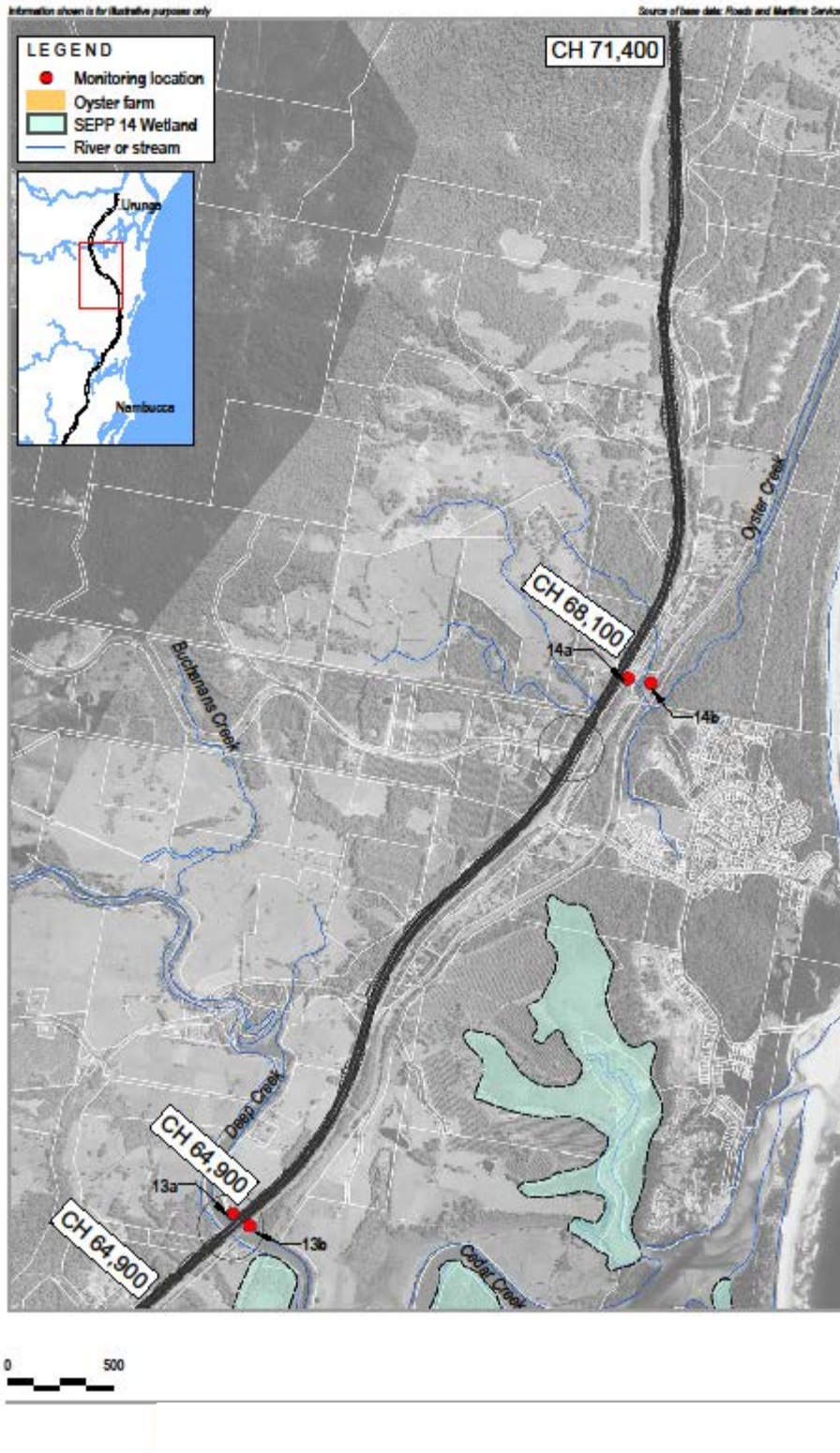


Image 2.2 Background Monitoring Locations Ch 64,900 to 71,400

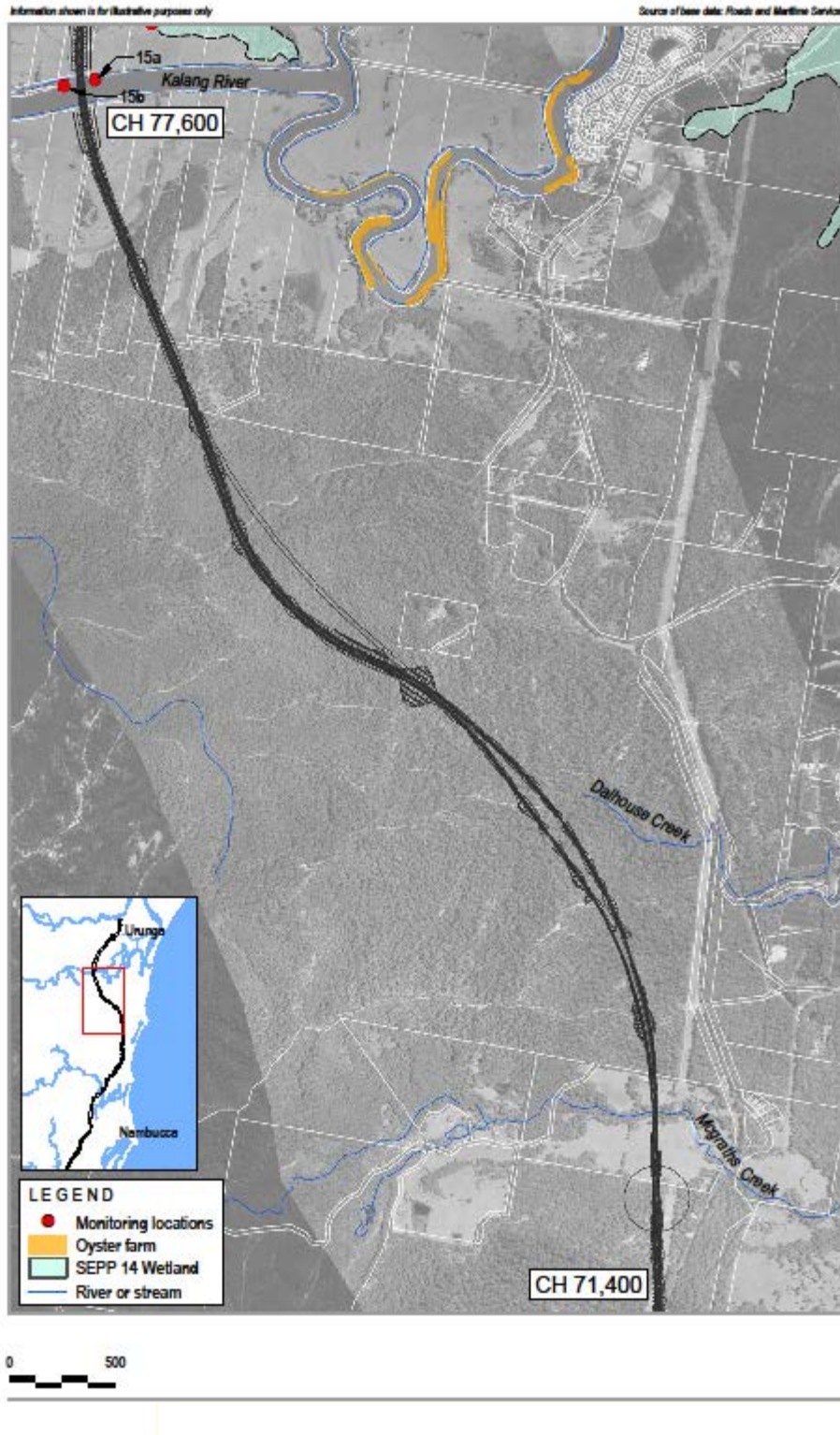


Image 2.3 Background Monitoring Locations Ch 71,400 to 77,600

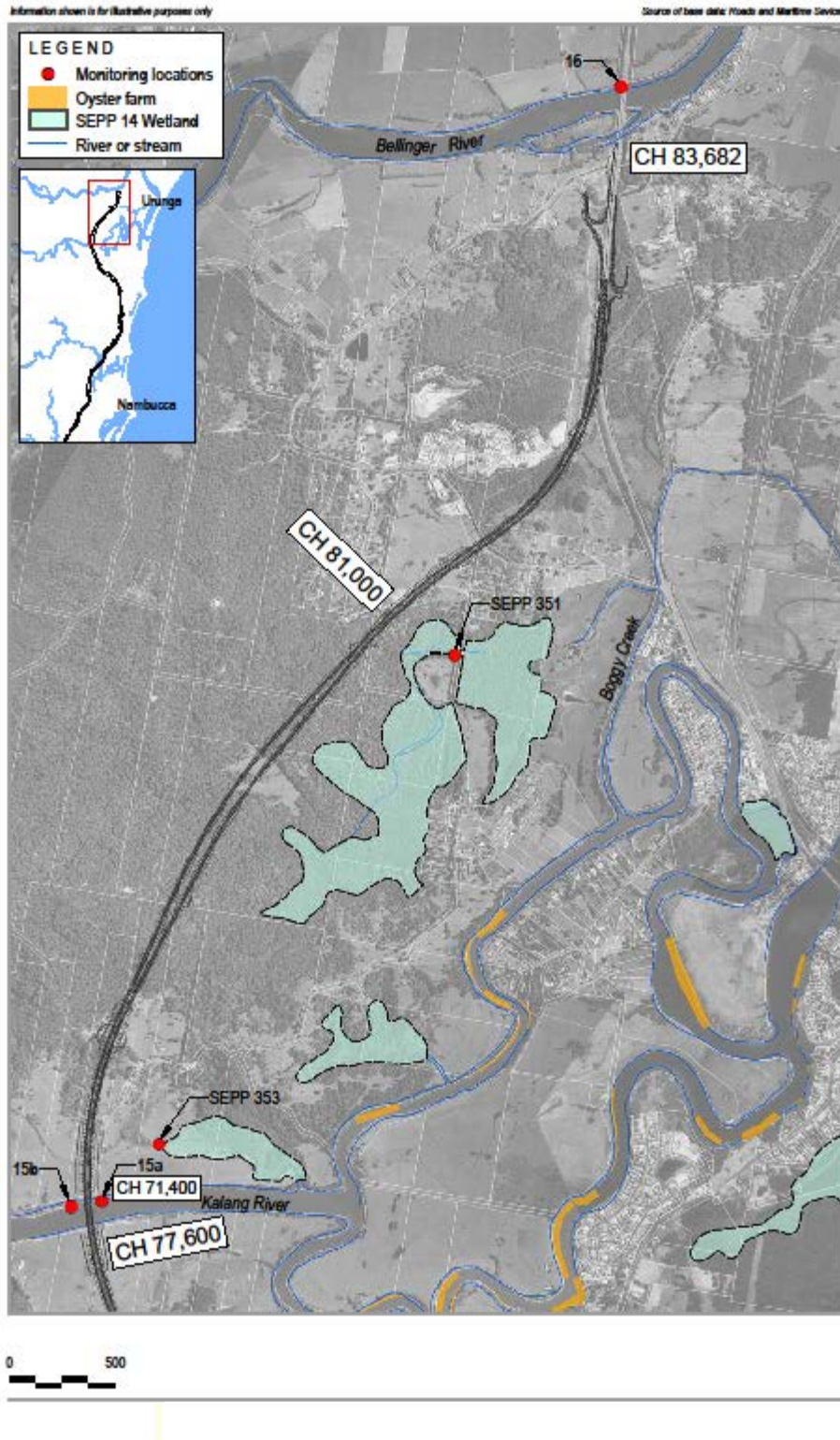


Image 2.4 Background Monitoring Locations Ch 77,600 to 83,682

2.3 Monitoring Results from Environmental Assessment

Geolink has undertaken the surface monitoring as part of the preparation of the Surface Water Quality Monitoring Program. The following is a summary of the results recorded and characteristics of the catchment. The results are compared with default trigger values for chemical and physical stressors for the protection of aquatic ecosystems for south-east Australia for slightly disturbed estuarine and lowland river ecosystems (ANZECC (2000)/ARMCANZ2000). There are no default trigger values recommended for wetlands in south-eastern Australia.

2.3.1 Boggy Creek

Boggy Creek is classified as an intermittently closed and open lakes or lagoon (ICOLL) and known to fluctuate between saline and freshwater conditions. On three sampling occasions conductivities were indicative of a fresh water system and consequently the water quality of Boggy Creek has been compared with the ANZECC (2000)/ARMCANZ (2000) guidelines for lowland river ecosystems. On 30th October 2007 conductivities indicated a more estuarine system (mean 2.9mS/cm) and the ANZECC (2000)/ARMCANZ (2000) guidelines for protection of estuarine aquatic ecosystems have been applied.

Overall this site generally had poor water quality. To the east of this monitoring site are high risk ASS. If disturbed, the water quality of Boggy Creek, particularly with respect to pH, could be further exacerbated and become more acidic. The site is generally well vegetated and it is anticipated that this vegetation, together with appropriate mitigation and control measures, would ensure the water quality does not further deteriorate with the construction and operation of the highway upgrade.

2.3.2 Cow Creek

Similar to Boggy Creek, Cow Creek fluctuates between fresh and estuarine waters at the monitoring site. The water quality of Cow Creek upstream and downstream of the highway upgrade was similar, except that the downstream site failed to comply with relevant guidelines more frequently due to the more stringent guidelines imposed on estuarine ecosystems particularly with respect to turbidity.

The most likely impact of the highway upgrade on waterways during construction is increased sedimentation due to the disturbance of soils and potential for rainfall to wash sediments into the creek. These sites are already highly turbid, low in dissolved oxygen and bordered by agricultural land uses that provide little buffer.

2.3.3 Deep Creek

Deep Creek is classified as estuarine. The site is generally well vegetated although banks become exposed during low tide. Results indicate that despite being located in 'high risk' ASS the pH does not currently appear impacted upon, however should soil become exposed during construction, pH could be reduced significantly and should therefore be monitored and managed carefully.

Dissolved oxygen levels were below ANZECC (2000) trigger values following wet weather which is not uncommon as runoff containing organic matter and sediments enter waterways which subsequently decreases dissolved oxygen concentrations.

2.3.4 Tributary of Oyster Creek

This tributary would already be impacted by the existing highway which traverses the creek. This tributary had conductivity indicative of a freshwater system and complied with the default trigger value for protection of lowland river aquatic ecosystems (ANZECC (2000)/ARMCANZ, 2000).

This site is heavily impacted by lack of flow and the presence of macrophytes, both of which have the potential to reduce dissolved oxygen concentrations and increase the turbidity of the waterways. Dissolved oxygen results were consistently low and turbidity was also high failing to comply.

2.3.5 Kalang River

The pH of the Kalang River was consistent with little change following wet weather and complied with the ANZECC (2000)/ARMCANZ (2000) guideline. Dissolved oxygen and turbidity levels indicate slightly poorer water quality failing to comply with relevant guidelines during one dry weather event and both wet weather sampling events. The greatest risk to water quality of the Kalang River is the potential exposure of high risk ASS during construction of the highway upgrade and increased runoff and sedimentation with the operational stage.

2.3.6 SEPP No. 351

SEPP14 No. 351 generally had poor water quality with low dissolved oxygen and high turbidity. The low dissolved oxygen concentrations during dry weather are most likely due to low flow in the wetland and increased runoff during wet weather. The wetland receives runoff from an adjacent road and from a pipe that discharges into the wetland. These factors would contribute to the high turbidity and overall poor water quality of the wetland.

The highway upgrade passes through an area of high risk ASS adjacent to SEPP No 351 which has the potential to cause significant impacts including low pH and dissolved oxygen if exposed and not appropriately managed.

2.4.1 Surface Water and Groundwater interactions

Two main types of groundwater systems were identified within the NH2U Project based on geological types and groundwater levels observed as part of the Pre-construction groundwater monitoring. These include foothills and alluvial floodplains.

For majority of the Project, groundwater levels were observed at greater than 10m in depth, limiting the possibility of interaction in these areas. The only potential for interaction identified consisted of the either the following

- In close vicinity to waterways where base flows are provided largely by relatively shallow local and intermediate groundwater flow systems;
- In wetlands;
- And, on alluvial floodplains.

For more information regarding the interaction of surface and ground water, please see the Surface Water Quality Monitoring Program.

3 Risks to Surface Water during Construction

3.1 Construction Stage Risks

During the construction stage of the Project, risks to the surface water quality and oyster farming (in the Bellinger and Kalang Rivers) have been identified. The following risks were identified:

- Exposure of soils during earthworks with the potential for erosion and sediment pollution;
- Disturbance of acid sulfate-soils (ASS) generating acidic runoff. The systems of the Nambucca River, Deep Creek, Kalang River all SEPP wetlands and other low-lying creeks and wetlands hold the highest possibility to contain acid sulfate-soils;
- Off-site discharges;
- Alteration of surface and subsurface flows which could cause disturbances to hydrology and hydraulics;
- And, accidental spills or leaks of oil, grease or fuel from machinery and vehicles or from construction sites or compounds, and accidental spills of chemicals that may be used during the course of construction.

The main risks to the creek and river systems on the NH2U are associated with an increase in sedimentation and the corresponding reduction in dissolved oxygen. The risk of water quality impacts within the systems is exacerbated by existing poor water quality and the shallow degrading creek banks.

3.2.1 Management of Surface Water for Construction

To mitigate the potential risks to surface water during construction, a number of mitigation measures were implemented. These mitigation measures have been incorporated in the NH2U Soil and Water Management Plan (SWMP) as per the CoA B30, B31 (d) and C17. The SWMP was developed with consultation from the EPA, DPI (Fisheries and NOW) and approved by the Director General of Department of Planning and Infrastructure.

The key mitigation measures implemented for the construction stage of the Project were sediment basins and additional erosion and sediment controls to intercept run-off and retain the associated sediments and pollutants. For further details of mitigation measures implemented, please see the SWMP.

3.2.2 Acid Sulfate Soil Management

As the potential for ASS was identified, the management of ASS and potential acid sulfate soils (PASS) was developed as part of the SWMP per CoA B31 (d). These mitigation measures included the following items:

- Avoidance or minimising the disturbance of ASS by minimising excavation or lowering the water table in ASS area;
- Monitoring of water quality downstream of ASS risk areas to allow early identification of ASS leachate to ensure that mitigation measures are implemented in a timely manner;
- And, treatment of acid generation where ASS is disturbed.

4 Monitoring Requirements

This section will identify the monitoring requirements for the construction stage of the Project, outlining the locations of sampling, frequency of sampling and the parameters for testing.

4.1 Locations of Monitoring

The monitoring for the waterways required to be undertaken for the Project consisted of the following systems:

- Boggy Creek (Site 11 in EA): Chainage 62,700;
- Cow Creek (Site 12 in EA): Chainage 63,600;
- Deep Creek (Site 13 in EA): Chainage 64,900;
- The unnamed tributary of Oyster Creek (Site 14 in EA): Chainage 68,000 and 68,100;
- McGraths Creek: Chainage 72,000;
- Dalhousie Creek: Chainage 73,400;
- Kalang River (Site 15 in EA): Chainage 77,700;
- Tributary of SEPP 14 No. 353: approximate Chainage 77,900;
- SEPP 14 No. 353: approximate Chainage 77,900;
- Tributary of SEPP 14 No. 351: approximate chainage 79,800 and 79,900;
- And, SEPP 14 No. 351: approximate chainage 81,000.

Locations of monitoring locations can be seen in Images 4.1 to 4.4. Sampling was undertaken upstream and downstream of Project construction activities within the project boundaries unless proposed changes are agreed by the Environmental Review Group for safety, access or other reasons.

4.1.1 Selection of Monitoring Locations

The monitoring locations were selected with consideration of:

- Coverage of the various geographical terrains and waterway types along the project length;
- Selection of generally permanent watercourses as opposed to intermittent or low-flow watercourses (Cow Creek);
- Representation of waterways in different catchments;
- Waterways draining to significant dams used for horticultural irrigation (Dalhousie Creek);
- And, monitoring of waterways associated with high value or sensitive ecological communities and estuaries (eg. SEPP 14 wetlands and Oyster Creek estuary).

Monitoring of the two SEPP 14 wetlands (No. 351 and 353) includes sampling points on the wetland tributaries on the upstream and downstream side of the highway alignment to enable detection of any potential impacts of the highway upgrade. Cow Creek was added as a surface water monitoring location after agency consultation in the environmental assessment stage of the Project.

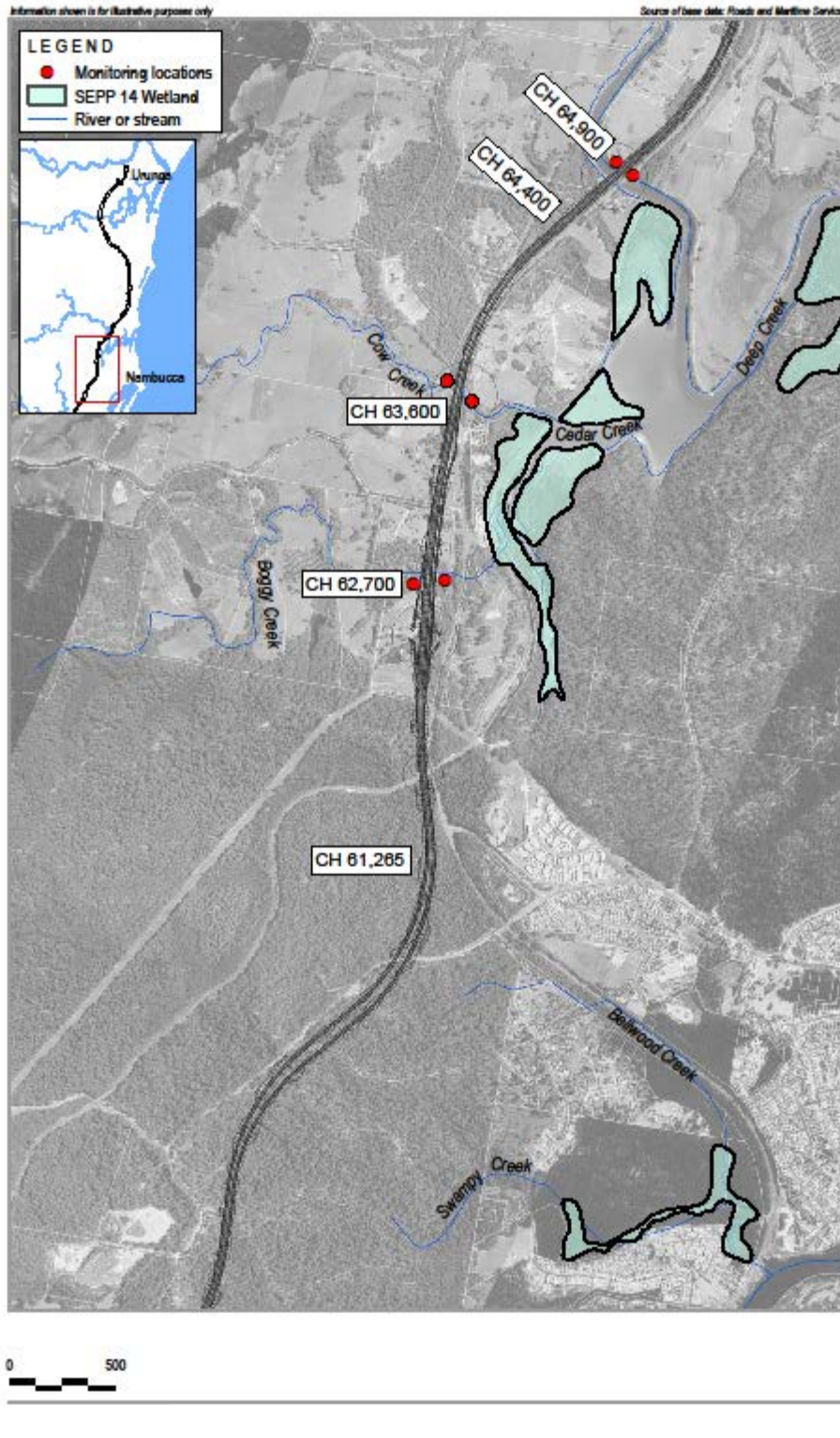


Image 4.1 Construction Monitoring Locations Ch 61,265 to 64,400

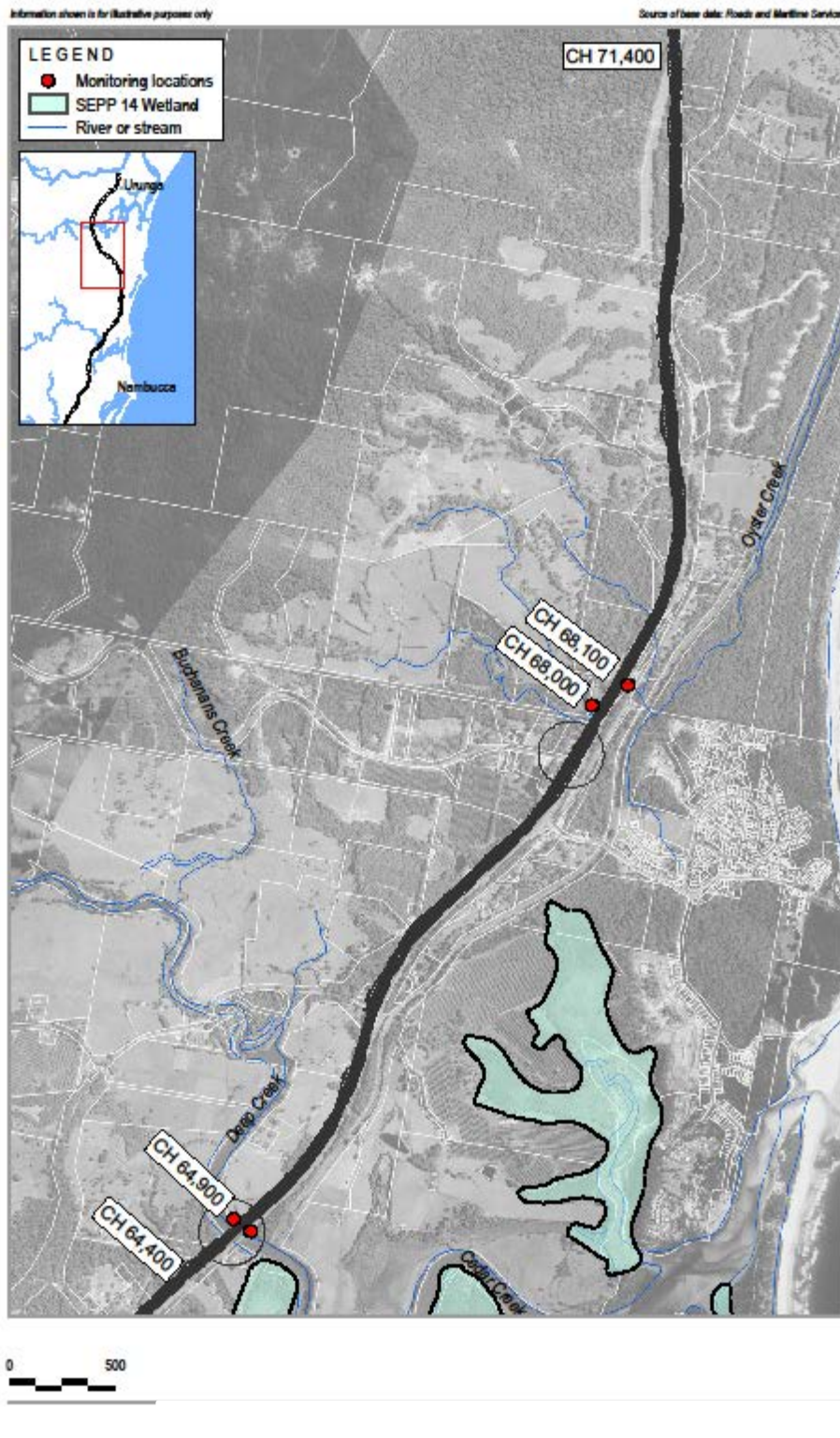


Image 4.2 Construction Monitoring Locations Ch 64,400 to 71,400

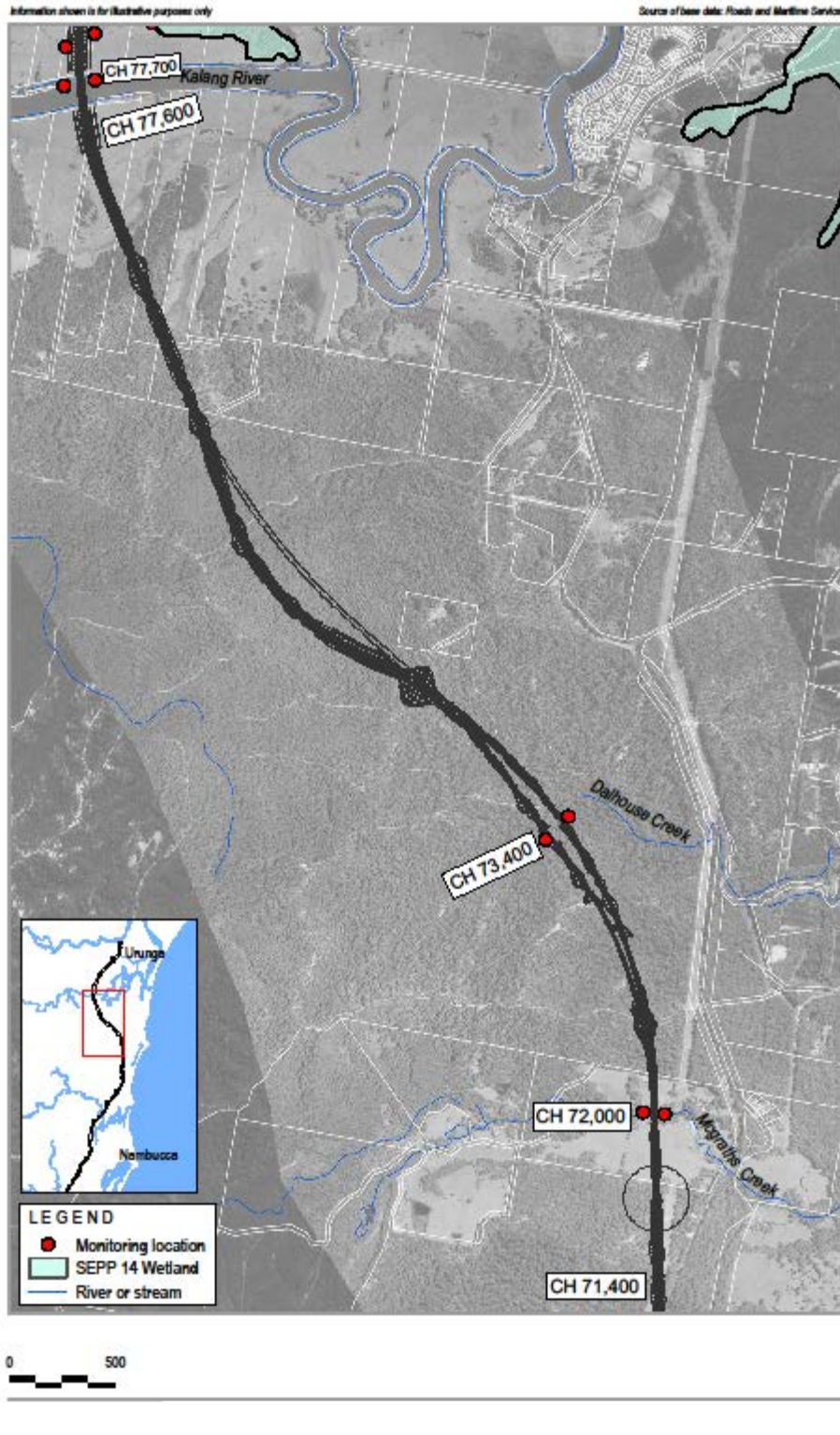


Image 4.3 Construction Monitoring Locations Ch 71,400 to 77,600

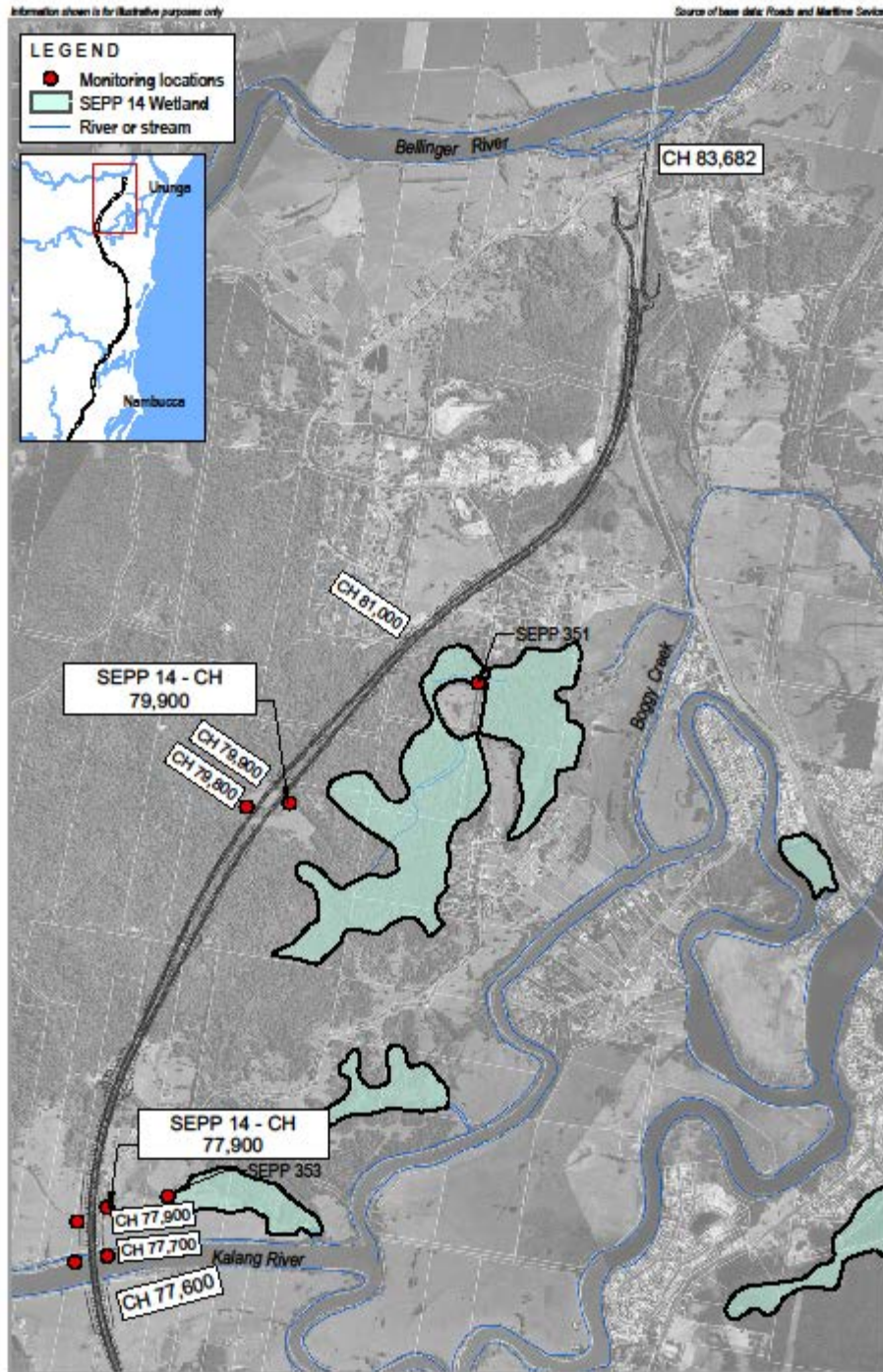


Image 4.4 Construction Monitoring Locations Ch 71,400 to 83,682

4.2 Monitoring Parameters

The monitoring parameters set for the Surface Water Monitoring Program has been based on the RMS *Guideline for Construction Water Quality Monitoring* (RTA, undated) and the *Australian guidelines for water quality monitoring and reporting* (ANZECC (2000) ARMCANZ, 2000b).

The following parameters were monitored at each site:

- Physical properties: Electrical Conductivity, Turbidity, Total suspended solids (TSS), Temperature;
- Chemical properties: pH, Dissolved Oxygen;
- Hydrocarbons: visual assessments for oils and grease. If oils and greases are visible, a sample is to be taken for TPH analysis;
- Nutrients: Total Nitrogen and Total Phosphorus;
- And, heavy metals.

Additionally, daily rainfall figures have been recorded from the Project site and nearest Bureau of Meteorology sites as part of the monitoring program for practical correlation with surface water monitoring results.

4.3 Sampling Frequency

As identified in the GeoLink Potential water quality impacts from the highway upgrade, particularly the construction activities will most likely result from erosion and sediment loss during rainfall events in the construction stage and from runoff in the operational stage. Therefore, monitoring should include water quality samples during rainfall events.

The following monitoring frequency is required for the construction stage (note: the following frequency is consistent with the RMS *Guideline for Construction Water Quality Monitoring*):

- For physical properties (excluding TSS), chemical properties, and hydrocarbons (monitoring for hydrocarbons involves visual assessments for oils and grease and sampling for TPH if oil and grease is visible):
 - Two wet events per month (a wet event is defined as a rainfall event of 10 mm or greater in a 24 hour period);
 - And, one dry event per month;
- For TSS, nutrients and heavy metals:
 - One wet event per month;
 - And, one dry event every second month.

Detailed parameters and the frequencies at which they will be undertaken are identified in Table 4.1.

Table 4.1 Surface Water Quality Parameters and Frequencies

Frequency	Analytical Group	Analytes	Analysis Method	
Monthly (one dry sampling event and two wet sampling events)	Physical Properties	Electrical Conductivity (EC)	Field measurement	
		Turbidity (NTU)	Field measurement	
		Temperature	Field measurement	
	Chemical properties	pH	Field measurement	
		Dissolved Oxygen (DO)	Field measurement	
	Hydrocarbons	Visual inspection of oil/grease. Sampling of TPH if oil/ grease is visible	Field measurement	
		Hydrocarbons	TPH	Laboratory analysis
	Monthly to Bi-Monthly (one wet event every month and one dry event every second month)	Heavy Metals	Copper (Cu)	Laboratory analysis
			Lead (Pb)	Laboratory analysis
			Cadmium (Cd)	Laboratory analysis
Zinc (Zn)			Laboratory analysis	
Arsenic (As)			Laboratory analysis	
Selenium (Se)			Laboratory analysis	
Iron (Fe)			Laboratory analysis	
Manganese (Mn)			Laboratory analysis	
Silver (Ag)			Laboratory analysis	
Chromium (Cr)			Laboratory analysis	
Physical Properties	Total suspended solids (TSS)	Laboratory analysis		
	Nutrients	Total Nitrogen	Laboratory analysis	
Nitrate		Laboratory analysis		
Nitrite		Laboratory analysis		
Ammonia		Laboratory analysis		
Total Phosphorus		Laboratory analysis		
Phosphate		Laboratory analysis		

4.4 Field Measurements and Observations

4.4.1 Field Measurements

Certain parameters can only be measured in the field. Other parameters such as dissolved oxygen, field measurements were desirable due to the value of parameter might change in the sample after collection ANZECC (2000) ARMCANZ. The following parameters are to be measured in the field:

- Electrical Conductivity (EC);
- Turbidity (NTU);
- Temperature;
- pH;
- And, dissolved oxygen (DO).

To avoid any contamination, the field measurements will be made from a sub-sample to the sample for laboratory analysis.

4.4.2 Field Observations

At each visit, the following information is to be recorded on a field-record sheet (based on information in ANZECC (2000) ARMCANZ, 2000b):

- The exact locations of sampling sites (if sites need to be refined during the construction phase due to safety, access or other reasons, these proposed changes will be discussed at the Environment Review Group meetings);
- Accurate description of where samples were collected;
- Weather conditions and general observations on the condition of the waterbody because these factors may influence the variables being measured;
- The date and time when samples are taken (standard or daylight-saving time);
- Tidal cycle (ebb or flood tide and time of nearest low tide at the sampling site) for the monitoring sites at: Boggy Creek: Chainage 62,700; Deep Creek: Chainage 64,900; and Kalang River: Chainage 77,700;
- Visual observations of oil/grease on the water surface and gross pollutants such as litter in the waterway, on the banks or within the adjacent water quality measures (eg. sediment basins);
- Any other observations or information on the conditions at the time of sampling that may assist in interpretation of the data; and
- And, photographic records are also highly desirable for future reference.

4.5 Sampling Protocol

Sampling protocol to follow standard procedures as outlined in documents such as Australian Standard AS/NZS 5667 and Australian guidelines for water quality monitoring and reporting (ANZECC (2000) ARMCANZ, 2000b).

4.5.1 Sample Collection

Protocols to include the following basic precautions for avoiding contamination during sample collection:

- Field measurements to be made on separate sub-samples of water;
- New or reused sample containers must be appropriately cleaned (use of containers supplied by the analytical laboratory is recommended);
- All field equipment is pre-cleaned to the same standard as the containers;
- Sample bottles suitable for each parameter to be used;
- Containers are uncapped or removed from their transport bags for minimum amounts of time;
- Containers that were filled with water as part of the preparation protocol are emptied well away from and downstream of the sampling location before being rinsed with sample and refilled;
- And, sampling staff should use standard techniques to avoid contamination when handling sample containers (eg. avoid touching the sample and the insides of caps or containers) (ANZECC (2000) ARMCANZ, 2000b:4-11, 4-14).

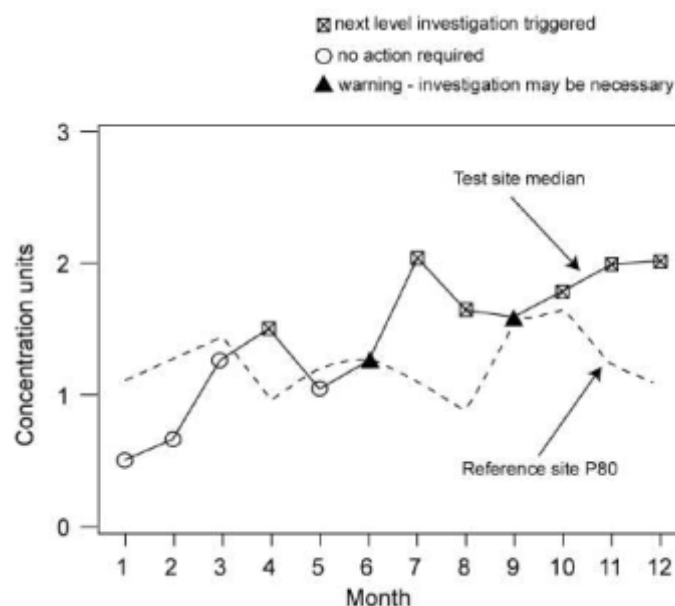
5 Results and Discussion

This section will present and discuss the results of the monitoring data collected during the construction phase of the project for each of the identified waterways. The subsequent results from the parameters listed in Table 4.1 will be presented as in the form of Figure 5.1.

It should be noted that for the nutrients and heavy metals tested for each sampling location that minimal changes in concentration of these parameters has been found throughout the course of the pre-construction monitoring and construction stages of the Project. Majority of these parameters have been too small to register any significant concentrations in the laboratory analysis. These have been reported as the following for these parameters:

- Phosphate to < 0.005 mg/L;
- Nitrate to < 0.001 mg/L
- Ammonia to < 0.005 mg/L;
- And, heavy metals to < 0.001 mg/L (except Hg < 0.0005 mg/L)

The parameters measured in the field consisting of pH, electrical conductivity (EC), turbidity (NTU) and dissolved oxygen (DO) will be presented for each of the waterways. All other parameters including nutrients and heavy metals will be included in Appendix J to S. The results for the field parameters (except for temperature and salinity to be presented in Appendix J to S) will be presented as the following:



Source: Figure 6.7 in ANZECC ARMCANZ, 2000b:6-19

Figure 5.1 – Example presentation of data

From this, the sample data will be plotted to show compliance with the 80th percentile values and/ or whether the downstream median values have triggered the 80th percentile. Graphs of the pH, electrical conductivity, turbidity, dissolved oxygen, total dissolved solids and total suspended solids are presented in Appendixes A to I. The raw data collected during the course of the Project is presented in Appendixes J to S.

5.1 Boggy Creek

As identified in the pre-construction monitoring, Boggy Creek site generally has poor water quality. The median downstream results generally are close to that of the upstream 80th percentile with only a few minor exceedances in these values.

The Boggy Creek eastern catchment has also been identified at risk of PASS and ASS. pH values from site monitoring identified two downstream events where the pH dropped below the ANZECC (2000) criteria of 6.5 and less than the upstream values (6.48 and 5.29). Two other downstream events were observed below the ANZECC (2000) criteria with the upstream values lower than the downstream values. Investigations undertaken showed that no construction activities were found to be responsible for the exceedance. Given this, all other values are compliant with the ANZECC (2000) criteria.

The metals results presented in Appendix J indicate that the majority of results from the samples sent for laboratory testing are compliant, with only minor exceedances in the parameters tested. Of these exceedances, the majority of these results were compliant as the upstream values were greater than the downstream values monitored.

Nutrient levels have remained relatively stable in Boggy Creek with only a small number of exceedances from phosphate and nitrate observed. These exceedances are within the 80th percentile range from pre-construction values. Of the heavy metals observed, manganese was observed to have minor exceedances on small number of occasions. Despite this, heavy metal levels remained stable for the majority of the project with no notable fluctuations evident.

Along with the monitoring listed above, it should be noted that Boggy Creek has run dry or has experienced no surface water flow during the monitoring period. Whilst it is noted that certain parameters has been “triggered” during the course of construction, the values still are compliant with the ANZECC (2000) criteria and upon investigation no construction activities were found to be of fault. Field sampling parameter graphs are presented in Appendix A.

5.2 Cow Creek

It can be seen from the monitoring results at Cow Creek that the Creek fluctuates between estuarine and fresh waters. The majority of results are compliant with the 80th percentile values. Additionally, it should be noted that the electrical conductivity has been influenced by the tidal nature of the Creek giving some of the downstream values for electrical conductivity higher than the corresponding upstream values. The pH observed over the duration of the monitoring period shows a gradual increase. Given this, the corresponding upstream and downstream values show compliance with the ANZECC (2000) criteria.

The dissolved oxygen content for Cow Creek generally has been compliant and consistent with the pre-construction undertaken, but it can be noted due to the dry conditions experienced for 2016 is the root cause of this elevated levels with a gradual increase in the dissolved oxygen levels over the course of the Project. No specific construction activities have been found to impact on the dissolved oxygen for Cox Creek.

For the nutrient levels observed in Cow Creek, some sampling events showed minor increases in Nitrate and Nitrite levels. Despite this, the increases were relatively insignificant as the increases are of the order of 0.001 to .02 mg/L and didn't pose a significant threat to the water quality of Cow Creek. Heavy metals were stable through the course of the Project, with only minor increases in Iron and Manganese. As with the increase in nutrient levels, these were only minor increases and posed no significant threat to the water quality.

It should be noted that on a number of sampling events, Cow Creek could not be sampled due to the lack of flow and/or has pools of ponds. No specific construction activities have had any effect on the water quality of Cow Creek. Raw data for sampling at Cow Creek is presented in Appendix K with field sampling graphs presented in Appendix B.

5.3 Deep Creek

The estuary of Deep Creek was identified as an area of high risk to PASS and ASS due to the disturbance of soil during construction. It was noted in the pre-construction Monitoring Report stating that the pH hadn't been impacted on at the time. Give this, a number of sampling events showed the pH below the ANZECC (2000) lower limit of 6.5. Investigation at the time of the sampling event found no construction activities to have caused this increase with the upstream values either lower or recording a similar reading.

The electrical conductivity stayed relatively stable for the course of the Project with declines in the EC being attributed to rain events. Turbidity again was stable through the course of the Project with a small number of elevated sampling events attributed to wet weather events. The majority of events where parameter levels have fluctuated have been due to the tidal nature of Deep Creek and irregular weather. Higher levels for the TDS and TSS were observed during wet weather events. Despite these fluctuations, the difference between the upstream and downstream values was minimal for the majority of results.

All other nutrient levels and heavy metals concentrations were generally compliant with only minor fluctuations observed. In most cases, the downstream value was below the corresponding upstream values tested. In cases of increased levels of nutrients and heavy metal concentrations, these increases would have minimal impact on the water quality of Deep Creek.

No construction activities were observed to have any impact on the surface water quality for Deep Creek. Raw data for Deep Creek is presented in Appendix L and field sampling parameter graphs are presented in Appendix C.

5.4 Oyster Creek

As stated in the pre-construction result, Oyster Creek has relatively poor water quality. The monitoring of Oyster Creek showed a variety of results, but generally showed compliance with the ANZECC (2000) criteria. As with the sampling undertaken at Boggy Creek, Cow Creek and Deep Creek the pH has shown a gradual increase along with the majority of field testing parameters. The dissolved oxygen content recorded for the Creek is consistent with the pre-construction values. Electrical conductivity remained consistent as well, with only the fluctuations as the result of rain events.

For the pH measured, there were a number of events in which the lower limit for ANZECC (2000) was triggered. Investigation as to the cause of this lowering in pH found no construction activities to be fault as the corresponding upstream and downstream values in close proximity to each other.

Nutrient and metal levels have also generally been compliant with only minor parameter fluctuations observed, majority of which have been under the corresponding upstream values. Two notable increases in heavy metal concentrations was Aluminium but was still within acceptable limits and Manganese for one wet event in which the downstream concentration was above the ANZECC (2000) concentration limits. No construction activities at time were found to be responsible for this significant increase in concentration.

It should also be noted that the Oyster Creek Tributary has been susceptible to low water levels and running dry on a number of occasions. Raw data for Oyster Creek is presented in Appendix M and field sampling parameter graphs are presented in Appendix D.

5.5 McGraths Creek

No monitoring of McGraths Creek was undertaken as part of the pre-construction background monitoring to compare the construction monitoring values. Despite this, the results from the monitoring undertaken it can be said that they are generally compliant, with only minor parameter fluctuations.

The pH for McGraths Creek has dropped below the ANZECC (2000) criteria of 6.5 on four occasions in which no construction activities were found to impact on the Creek. Minor parameter fluctuations have been observed for the field parameters.

Nutrient and heavy metal concentrations were compliant with only minor triggered events. Give this; the parameters were still compliant and not significant to pose any treat to water quality of McGraths Creek. McGraths Creek has also experienced events of no flow for sampling and monitoring. Raw data for McGraths Creek is presented in Appendix N and field sampling parameter graphs are presented in Appendix E.

5.6 Dalhousie Creek

For the majority of the construction staging of the Project, Dalhousie Creek has experienced no flow to be able to sample for monitoring. Given this, majority of results from monitoring are compliant with the 80th percentile values with only minor parameter fluctuations.

Nutrient and heavy metal concentrations are generally compliant with the 80th percentile. No construction activities have been observed to have impacted on the water quality of Dalhousie Creek.

Note that the dry events for 2014 and 2016 have not been included as no sampling events could be undertaken as there was no sufficient flow to sample. Raw data for Dalhousie Creek is presented in Appendix O and field sampling parameter graphs are presented in Appendix F.

5.7 Kalang River

Monitoring of the Kalang River has shown that the water quality has been consistent through the course of the construction stage of the project. The majority of the parameters measured are compliant with the ANZECC (2000) with only minor fluctuations observed.

Despite the large catchment and potential affects from nutrients from runoff of farmland, the nutrient levels have been compliant. Metals levels have also been compliant with only minor fluctuations noted. No construction activities have been observed to have impacted on the water quality of the Kalang River. Raw data for the Kalang River is presented in Appendix P and field sampling parameter graphs are presented in Appendix G.

5.8 SEPP14 - 353 & CH77900

Monitoring for the SEPP 353 wetlands has been undertaken upstream and downstream at chainage 77900. The results for upstream and downstream show general compliance with only a few minor fluctuations in the parameters observed. It should be noted that for the wet events for 2015, no testing was undertaken due to the lack of rain for the period to produce any flow.

When there was no flow in the creek at CH77900 construction could not be affecting the wetland therefore no monitoring was undertaken.

Additionally, no testing was undertaken for the 2016 dry events as no flow was observed due to the lack of rain recorded. Majority of results are compliant with the ANZECC (2000)

guidelines, except for pH on a number of occasions. Raw data for SEPP14-353 and Ch77900 is presented in Appendix Q and Appendix R. Field sampling parameter graphs for both SEPP14-353 and Ch77900 are presented in Appendix H.

5.9 SEPP14-351 & CH38000

The monitoring for the SEPP 351 wetlands was undertaken at CH79900 as identified in Image 4.4. During the course of the project, dryer than normal conditions were experienced and as a result, the majority of observations of the CH79900 monitoring locations experienced limited to no flow.

When there was no flow in the creek at CH79900 construction could not be affecting the wetland therefore no monitoring was undertaken

Raw data for SEPP14-351 and Ch79900 is presented in Appendix S and Appendix T. Field sampling parameter graphs for both SEPP14-351 and Ch79900 are presented in Appendix I.

5.9 Discussion of Results

From the results observed on the NH2U Project during construction, it can be said that except for external influences minimal impacts from construction activities have been felt. Natural influences from the irregular weather and adjacent land uses in close proximity to the Project are possible sources in to affect the water quality.

It should be noted that there has been an increase in the pH for all of the sampling locations except for the Kalang River, SEPP14-351 and Ch79900 locations. This minimal increase in pH has not affected the waterways. Furthermore, the increase is not attributed to construction activities as the corresponding upstream control values are either higher or in close proximity to the downstream values.

It should be noted that the weather for the duration of the Project is similar to that experienced during the pre-construction monitoring for the Project. Below average rainfall was experienced for the majority of the project with only the irregular high rainfall events providing any sufficient to the waterways.

Given this, the waterways such as Boggy Creek, McGraths Creek, Oyster Creek, Dalhousie Creek, Site 77900, SEPP 14 – 353, Site 79900 and SEPP 14 – 351 have experienced fluctuations in certain parameters and flows through the waterways in which many have run dry for a period of time.

The other systems of the Kalang River, Deep Creek and Cow Creek have still been affected by these dryer conditions. Whilst these systems haven't run dry or ponded, there is evidence of parameter fluctuations. These again are due to the high rainfall events and prolonged periods of dry weather leading to concentrated levels of nutrients. This is supported by the pre-construction values show a similar trend in the fluctuation between wet and dry event sampling.

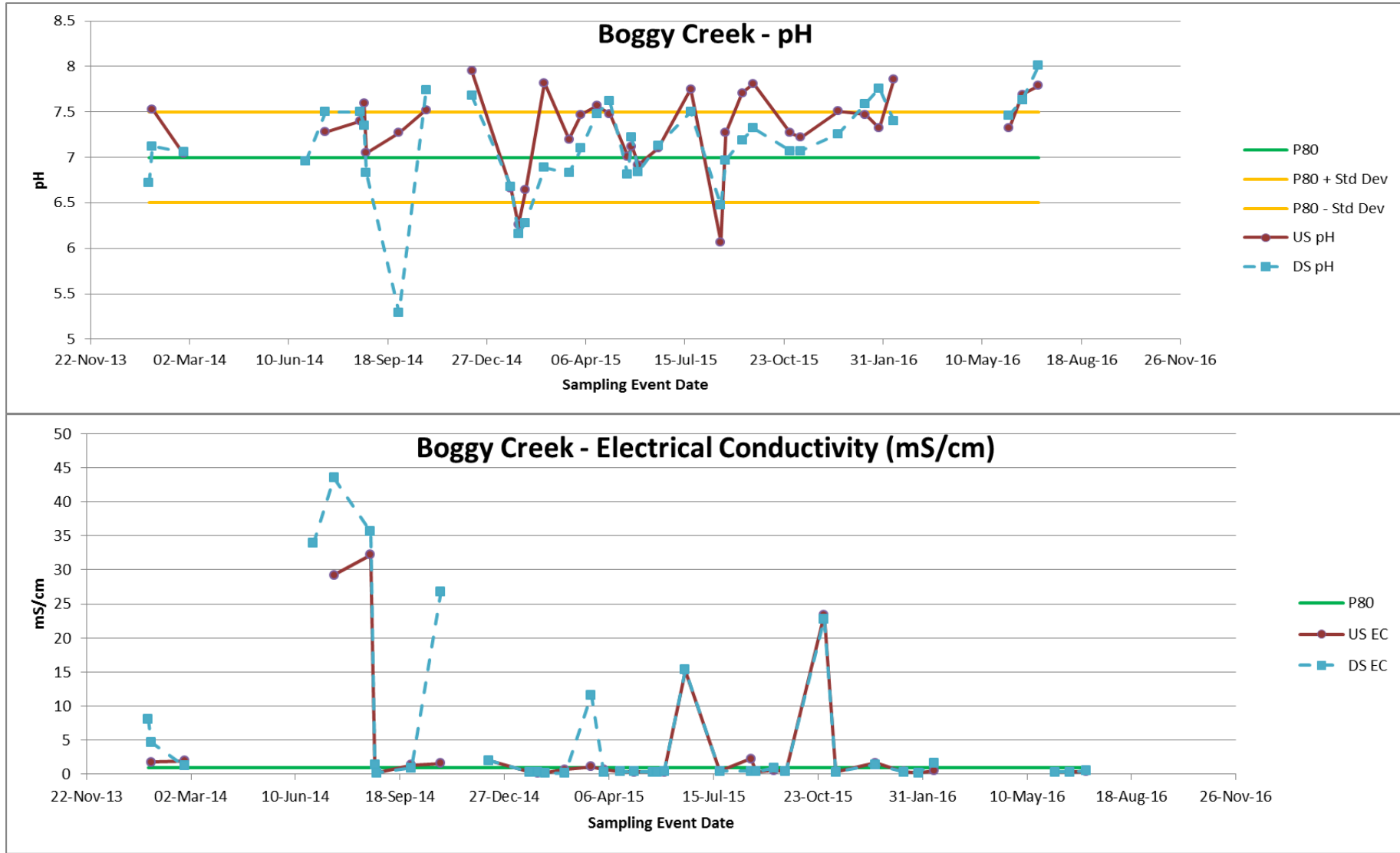


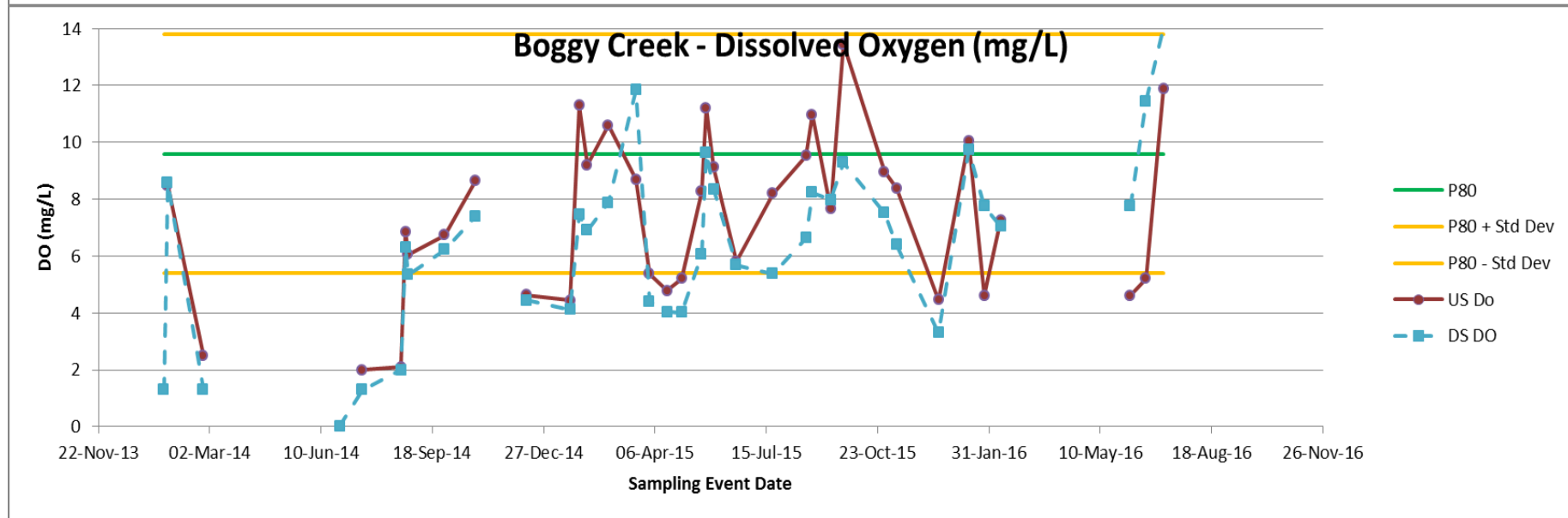
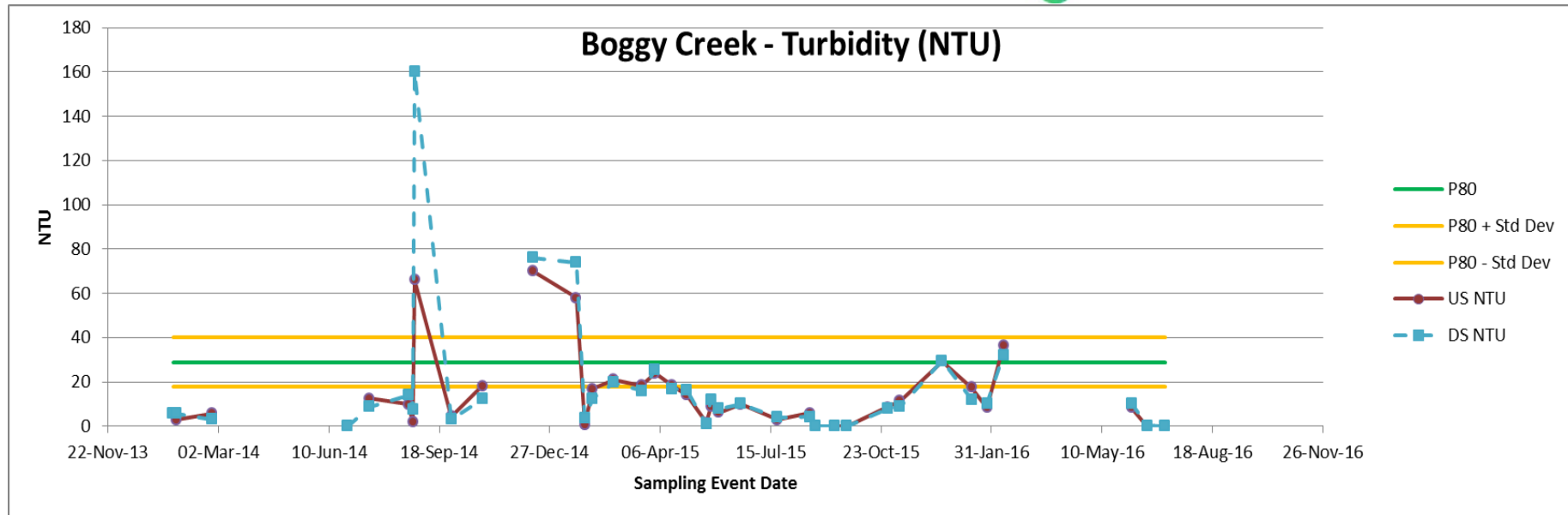
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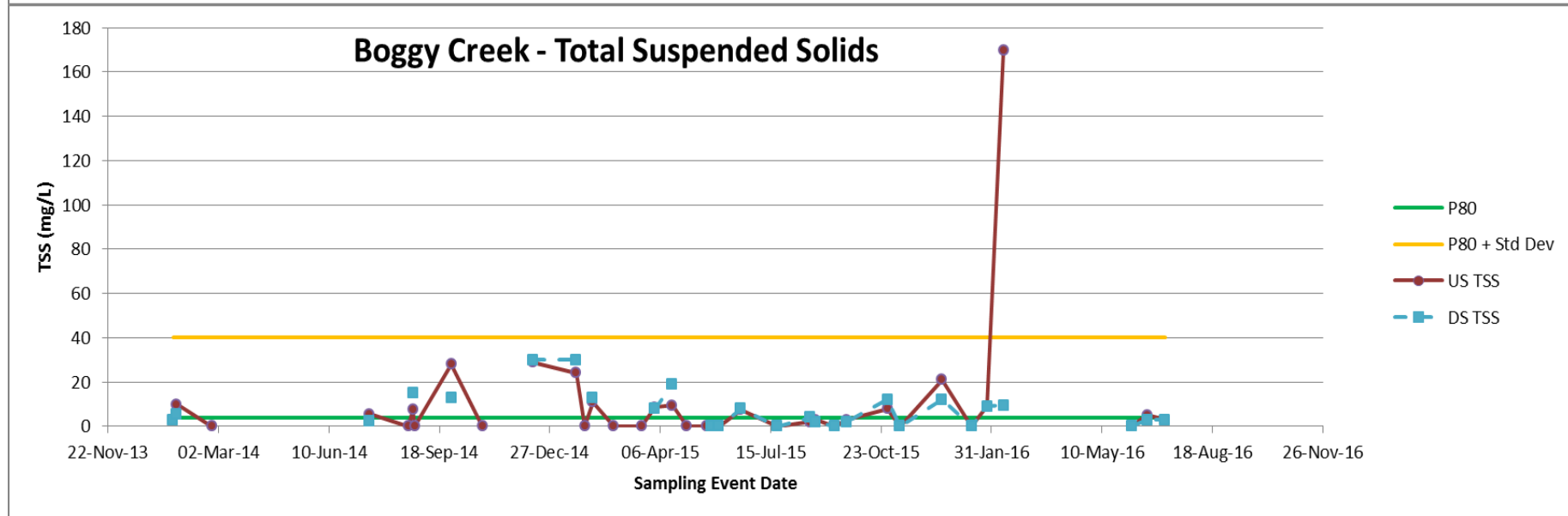
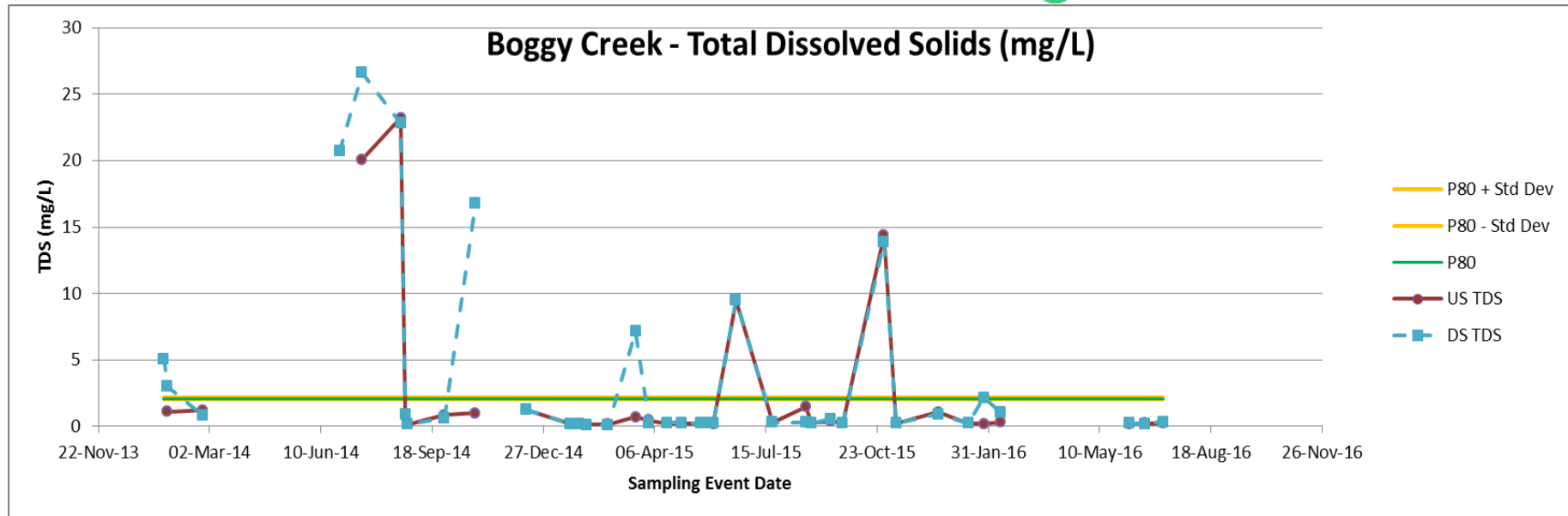
- Australian and New Zealand Environment and Conservation Council, Agriculture and Resource Management Council of Australia and New Zealand. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality Volume 1*. Artarmom: Australian Water Association.
- Lendlease. (2015). *Nambucca Heads to Urunga Pacific Highway Upgrade Soil and Water Management Plan*. Valla Beach: Lendlease.
- Ruge, T. (2013). *Surface Water Monitoring Program Nambucca Heads to Urunga Pacific Highway Upgrade*. Coffs Harbour: GeoLink.



Appendix A – Boggy Creek Field Parameter Graphs

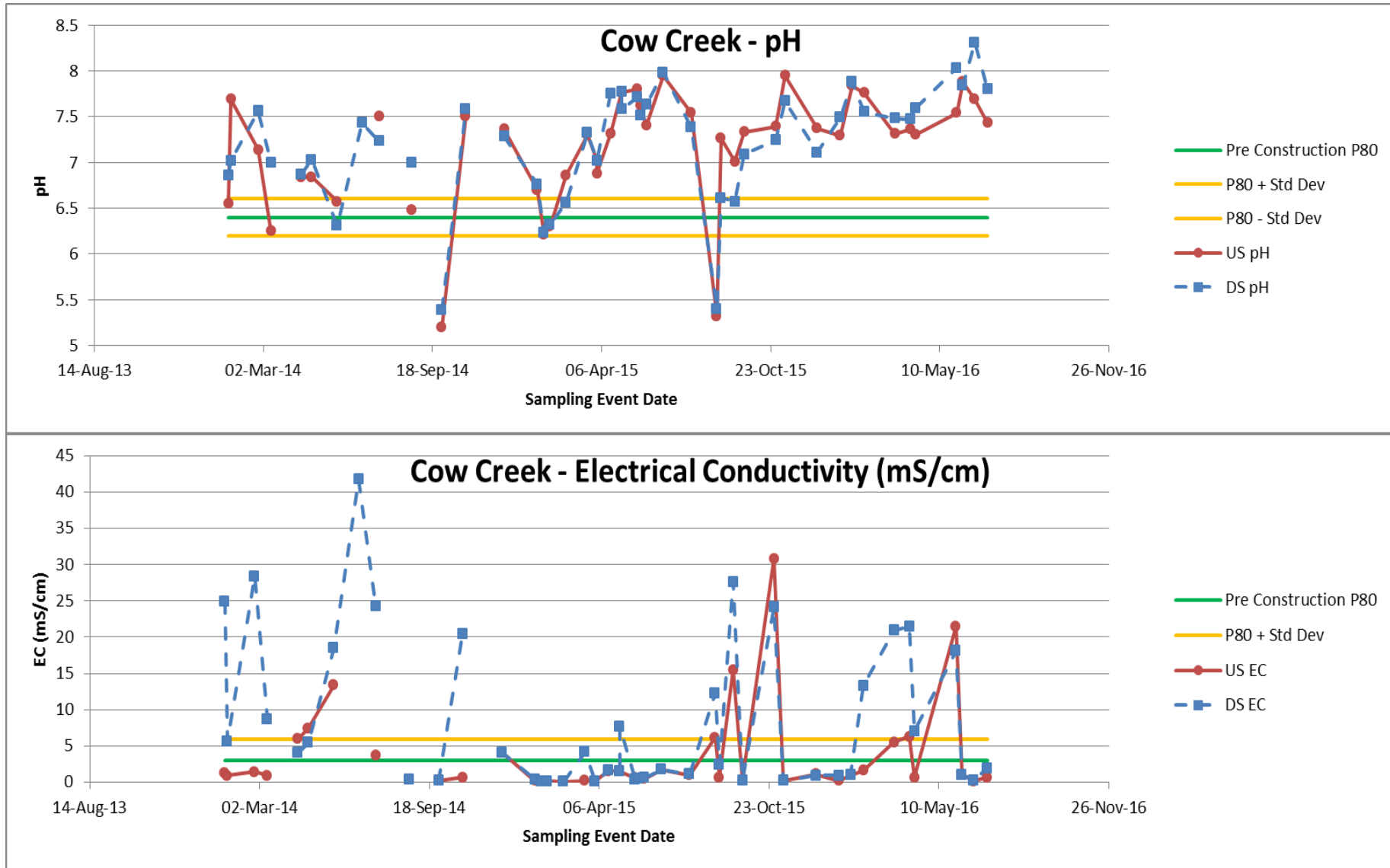


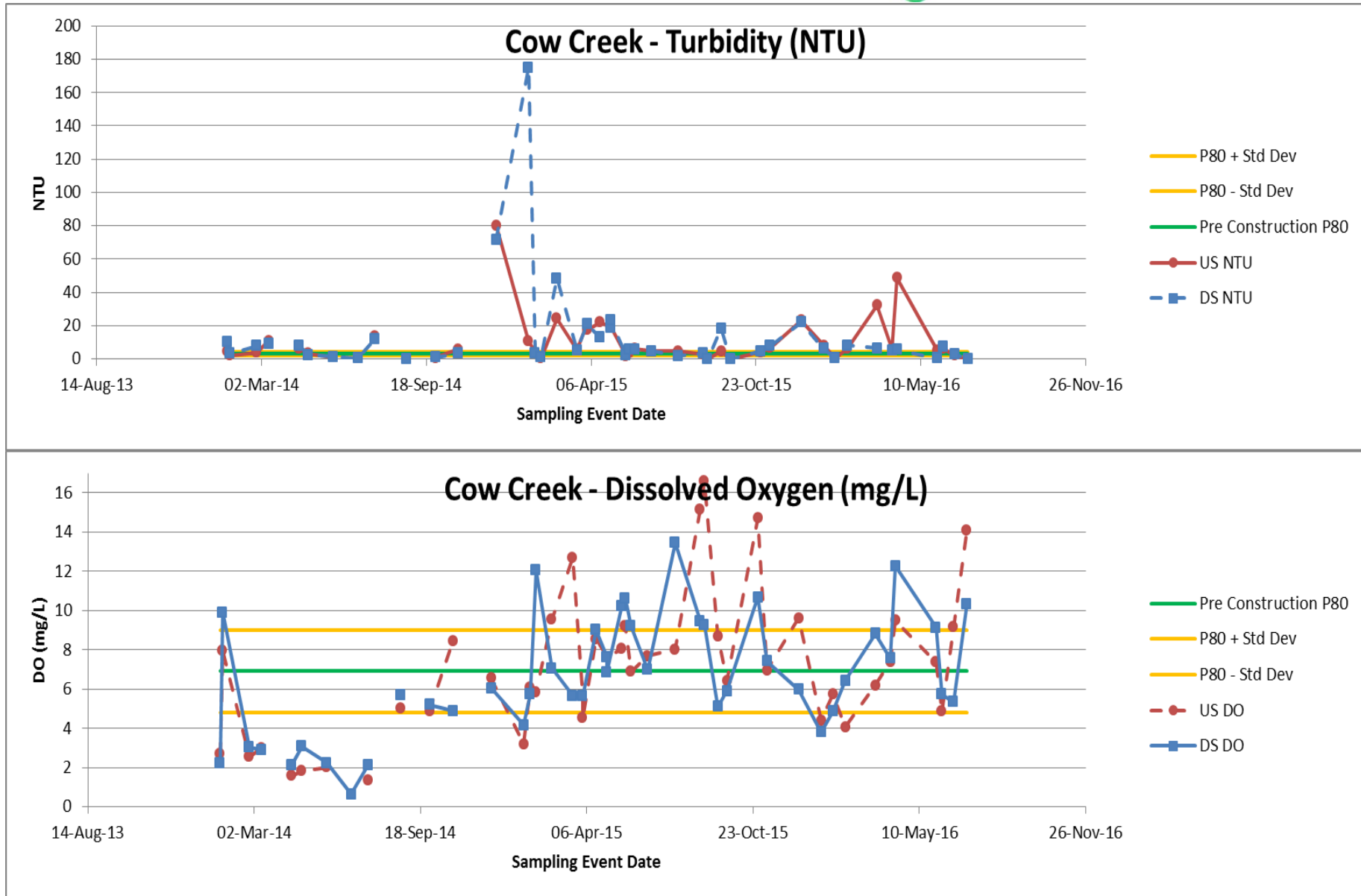


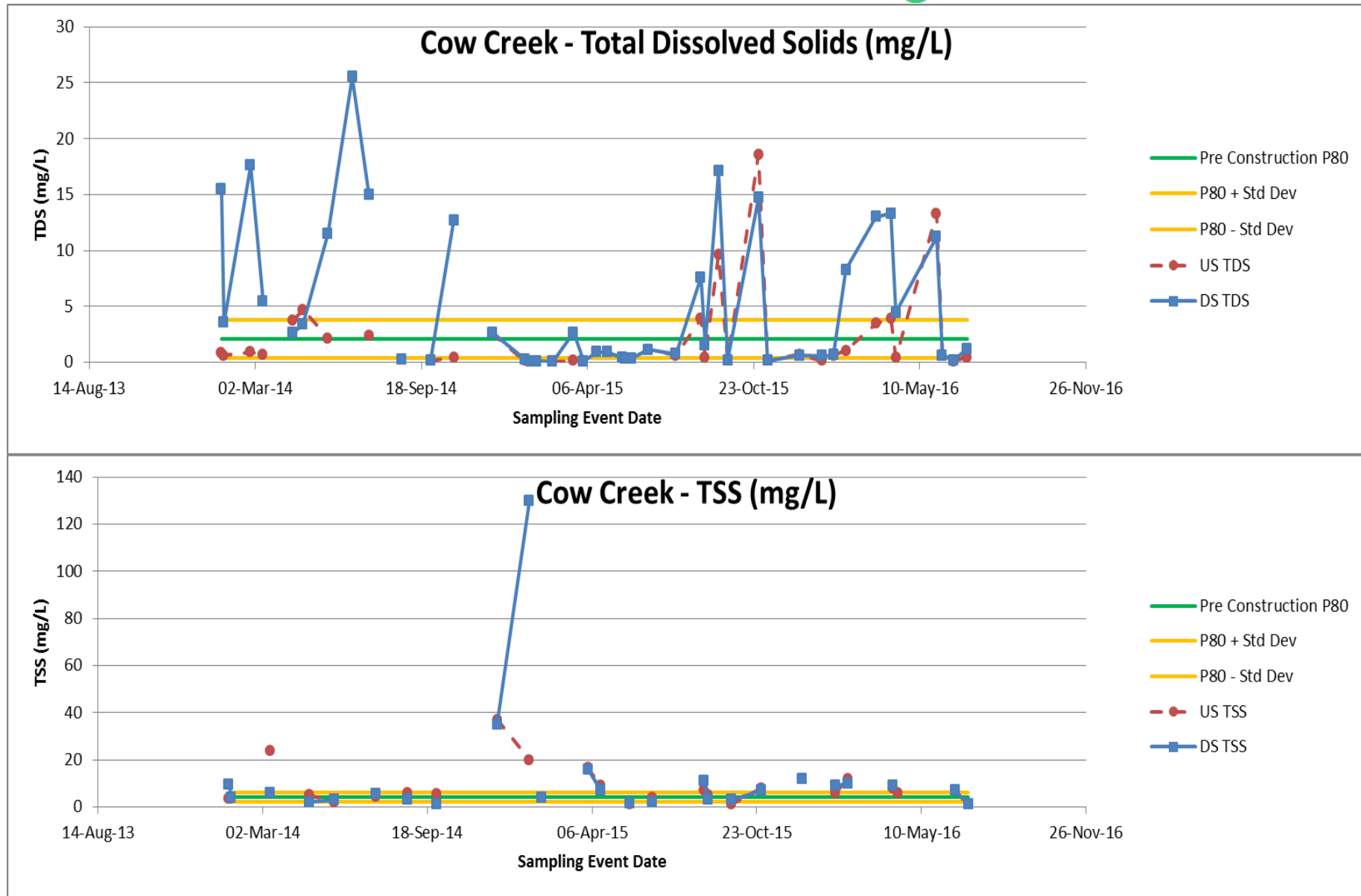




Appendix B – Cow Creek Field Parameter Graphs

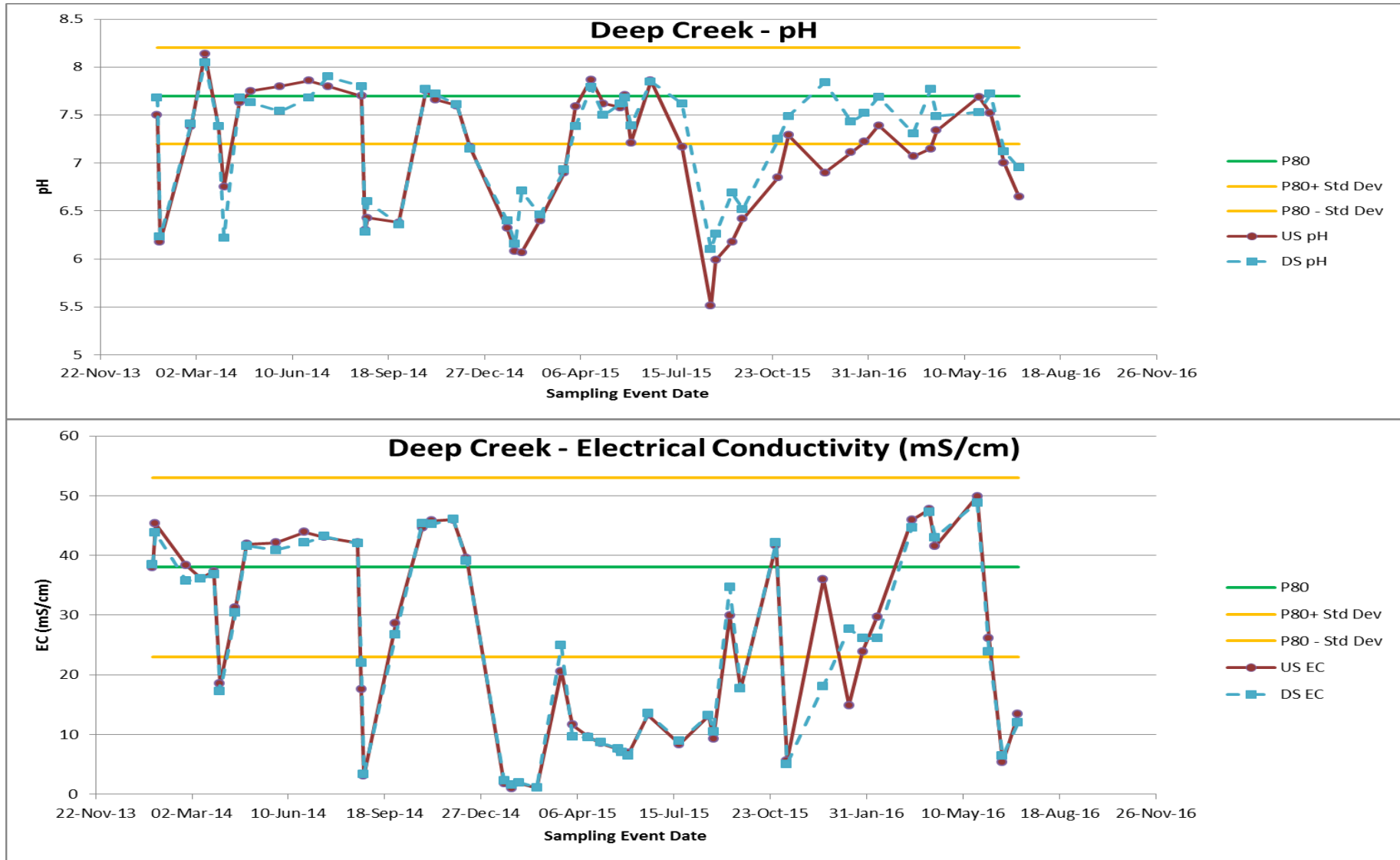


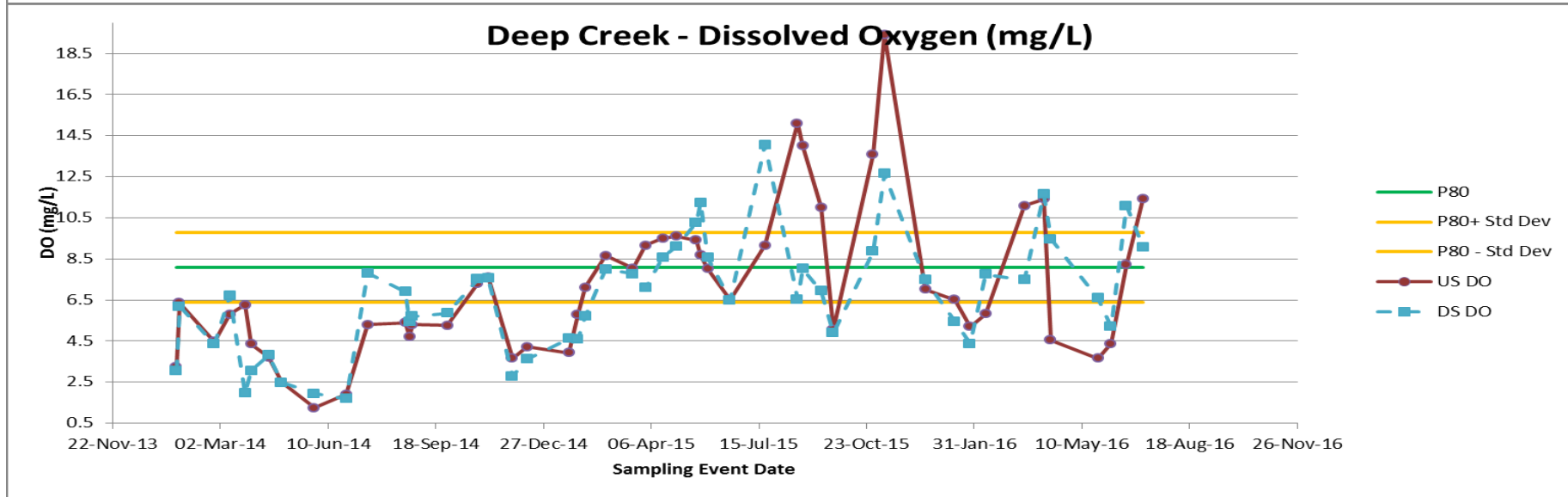
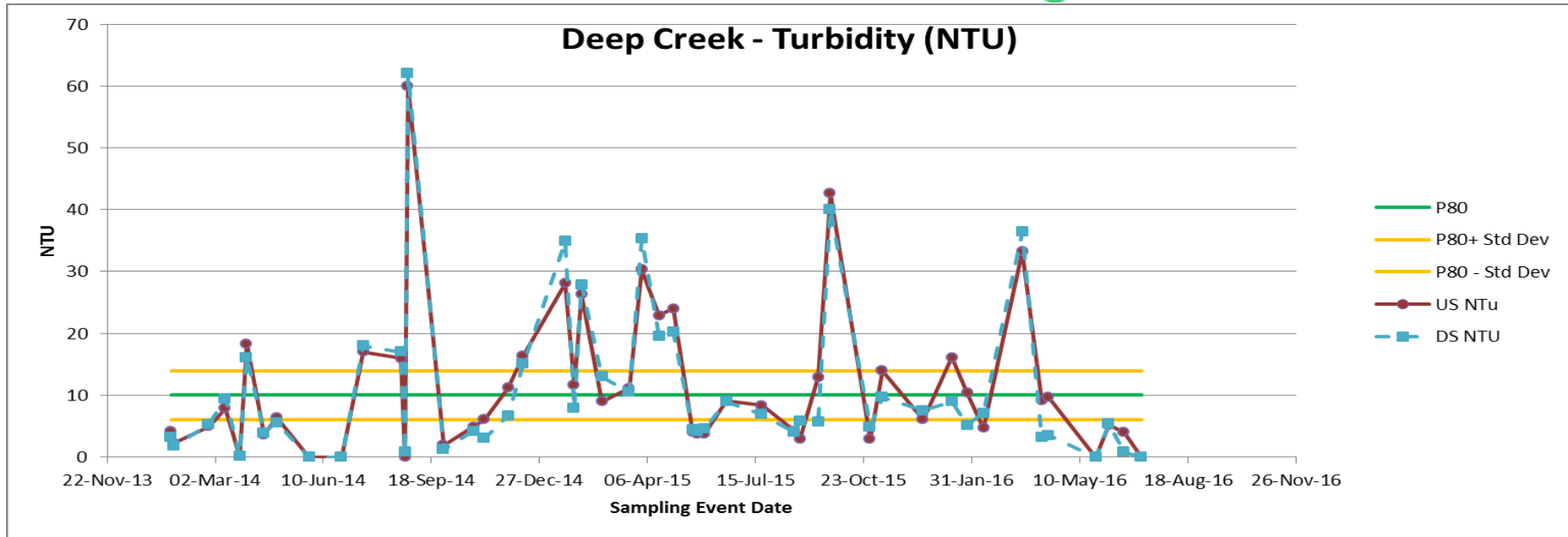


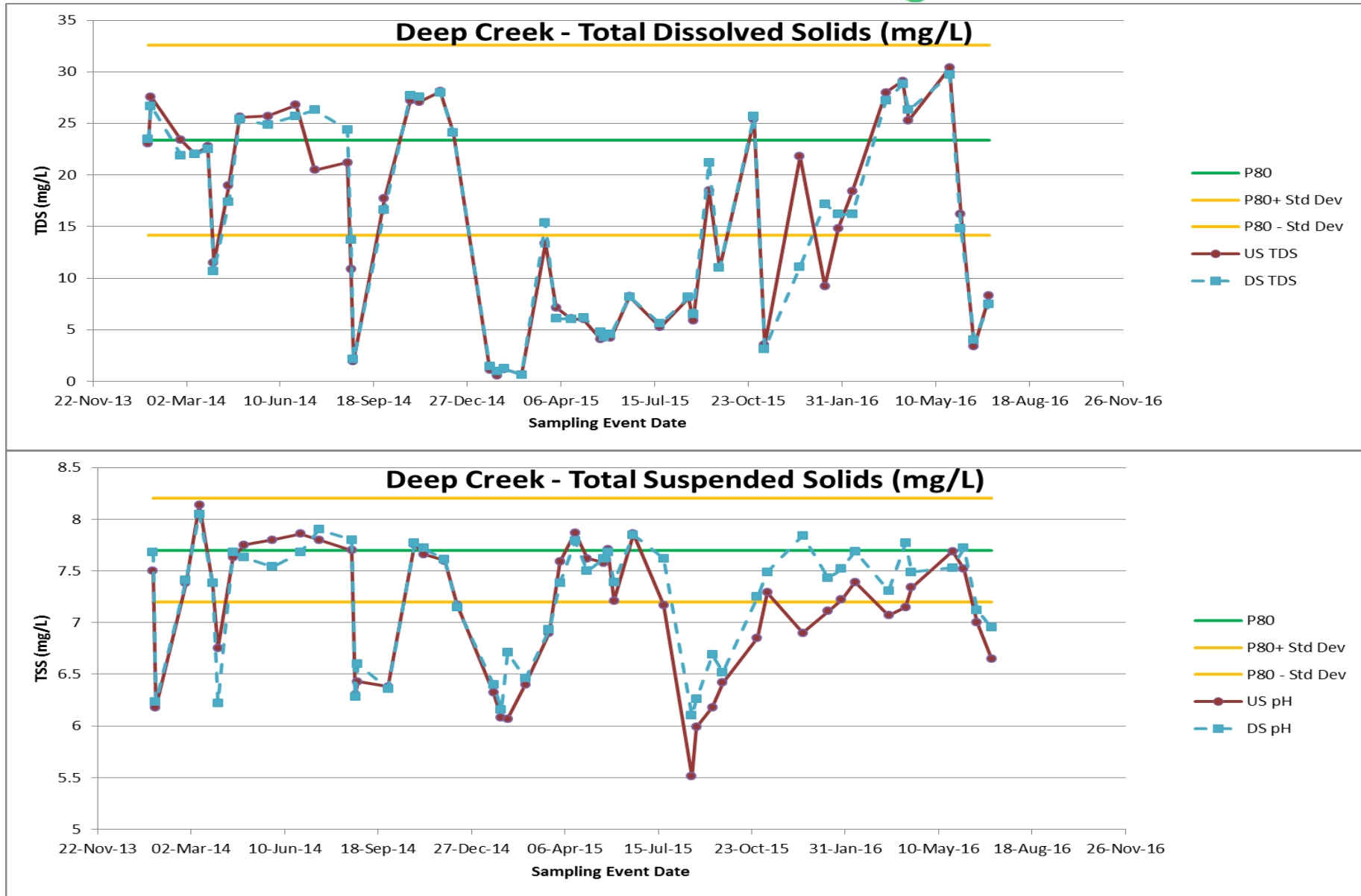




Appendix C – Deep Creek Field Parameter Graphs

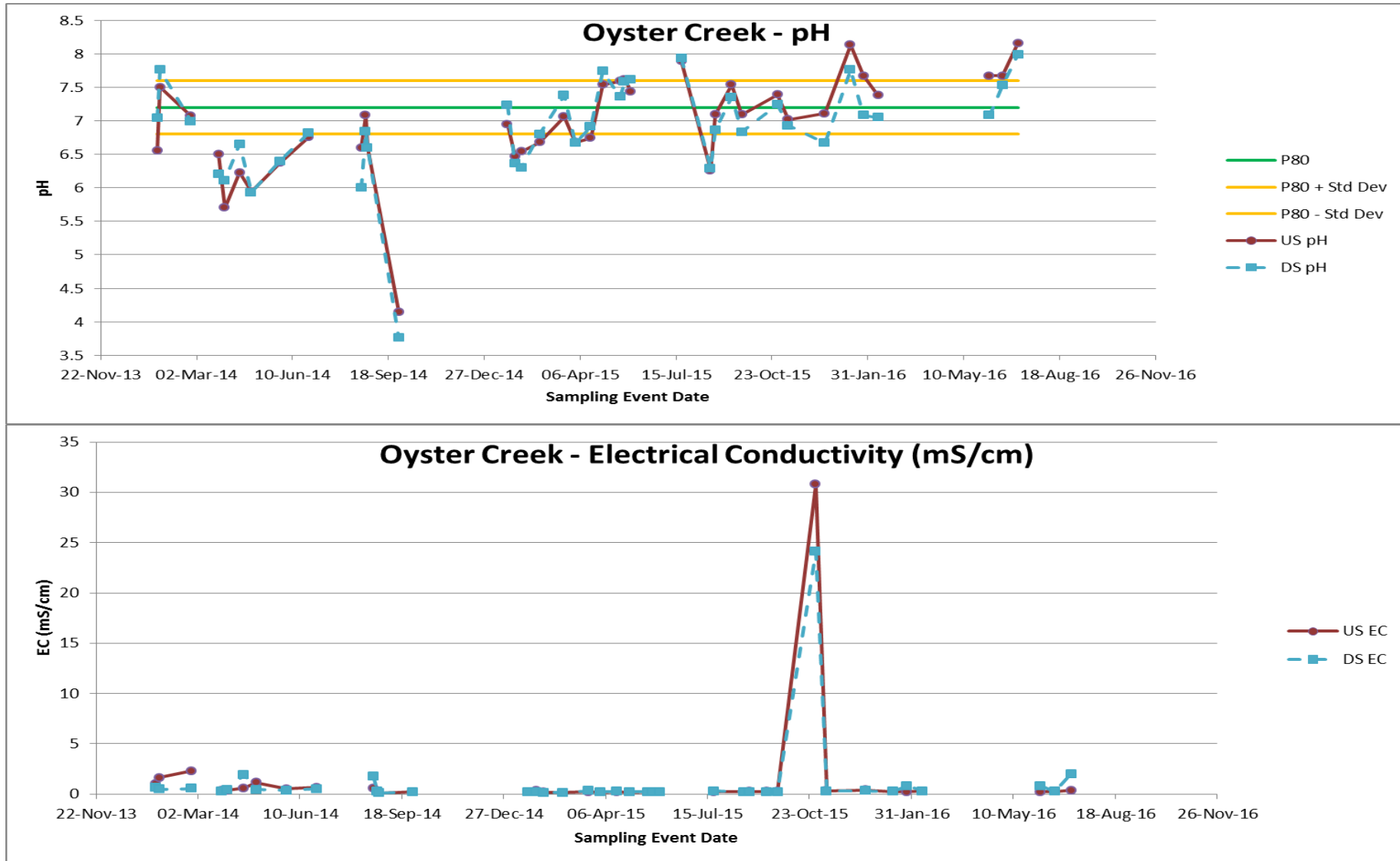


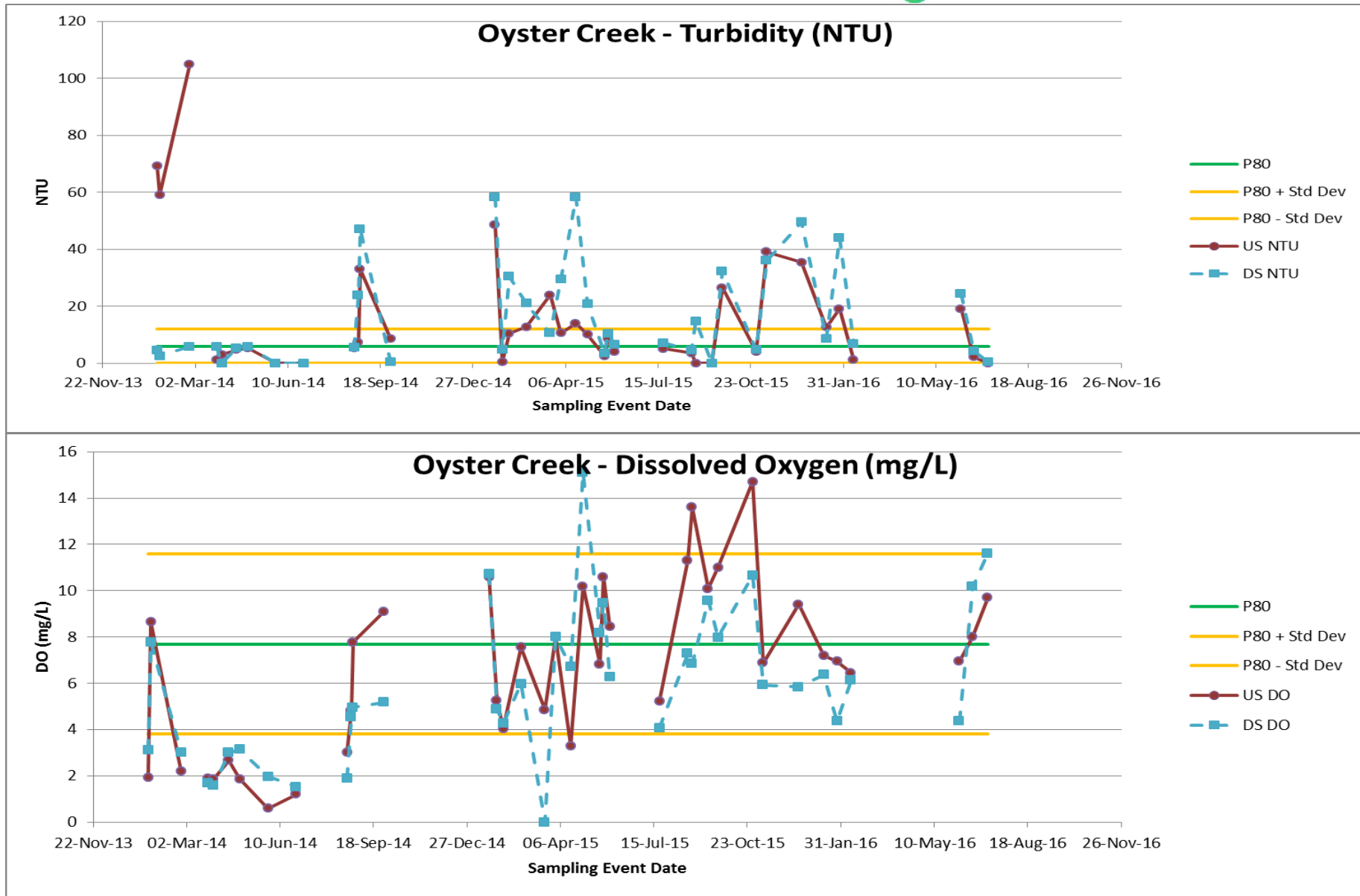


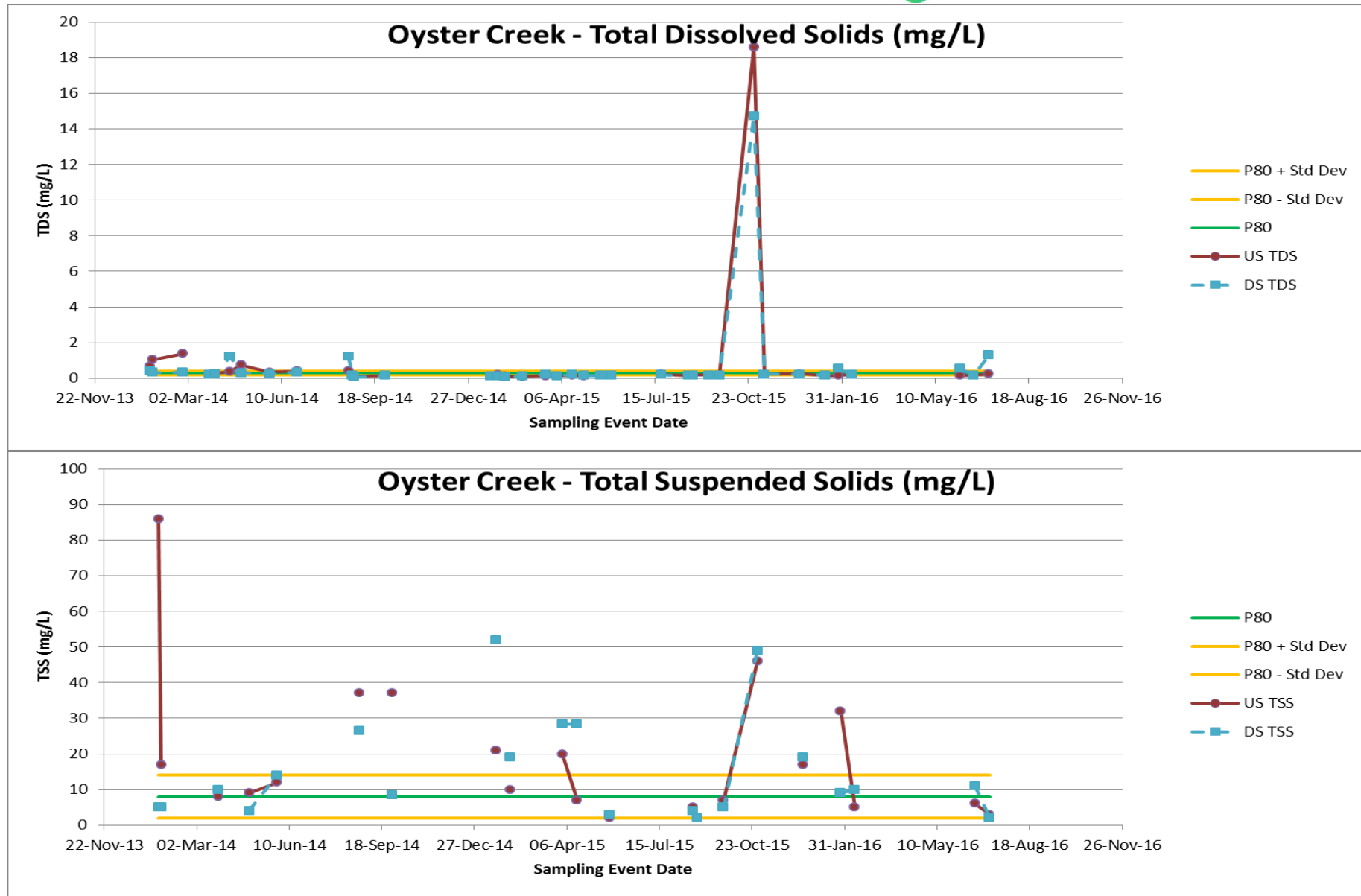




Appendix D – Oyster Creek Field Parameter Graphs

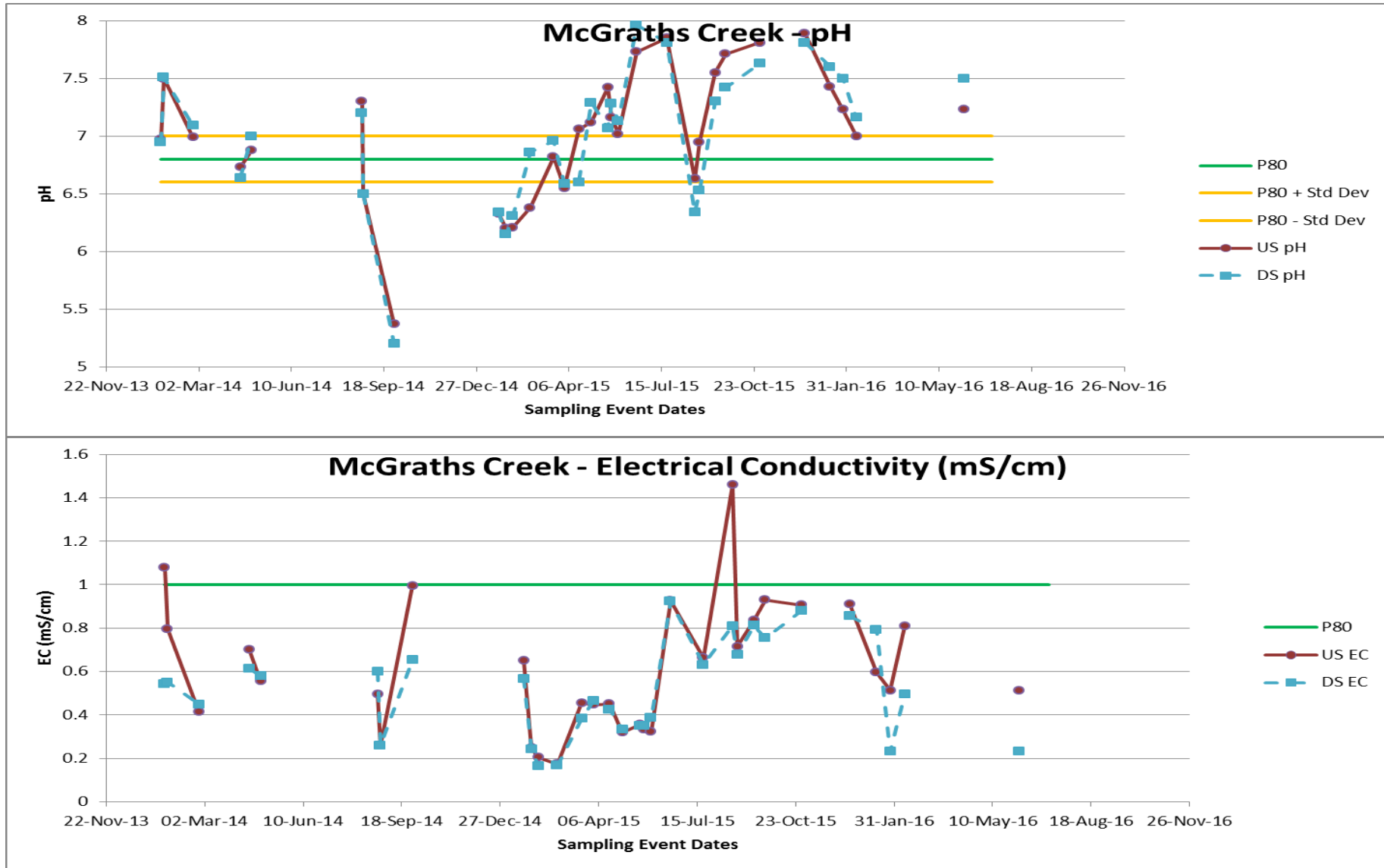


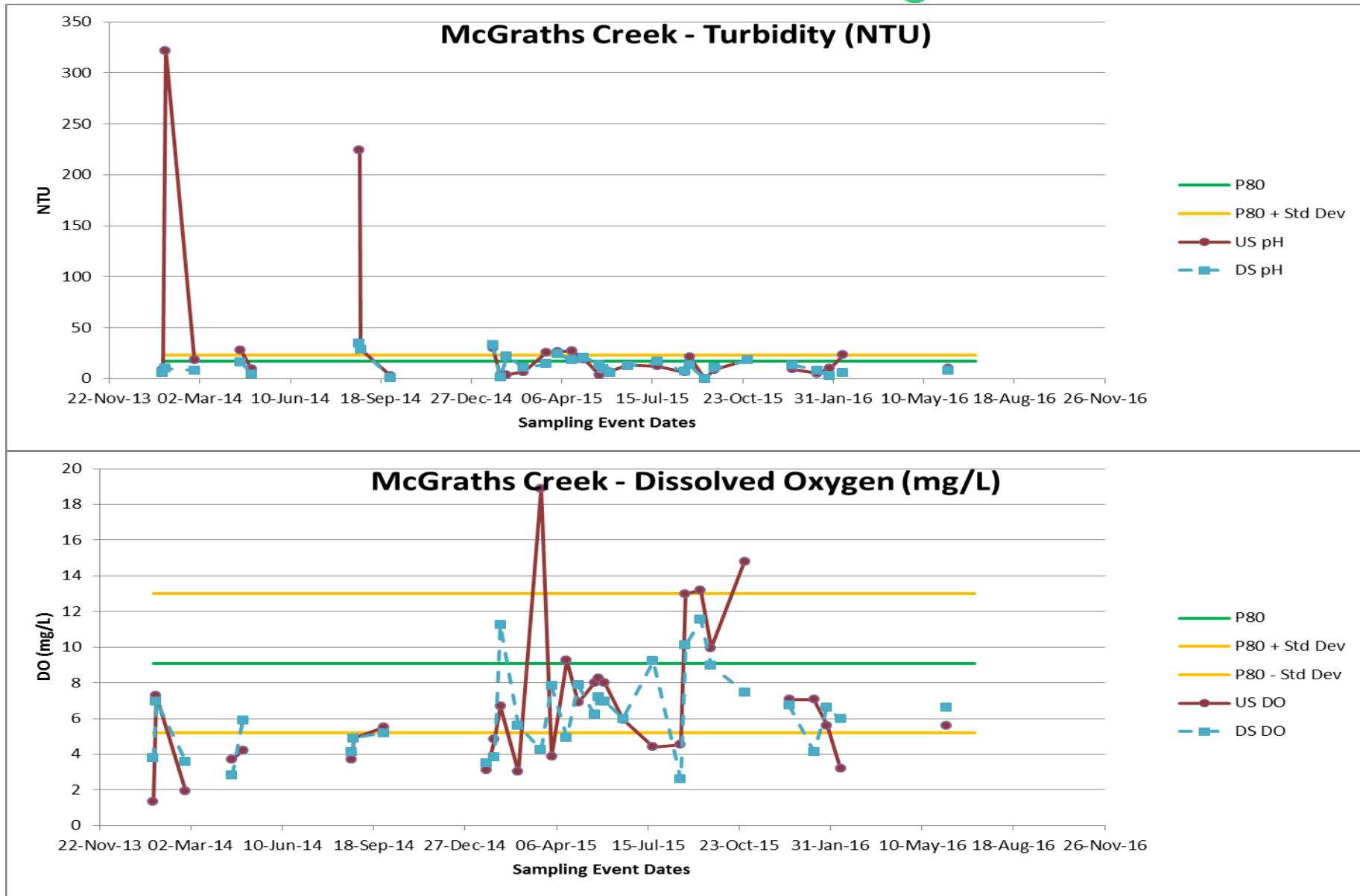


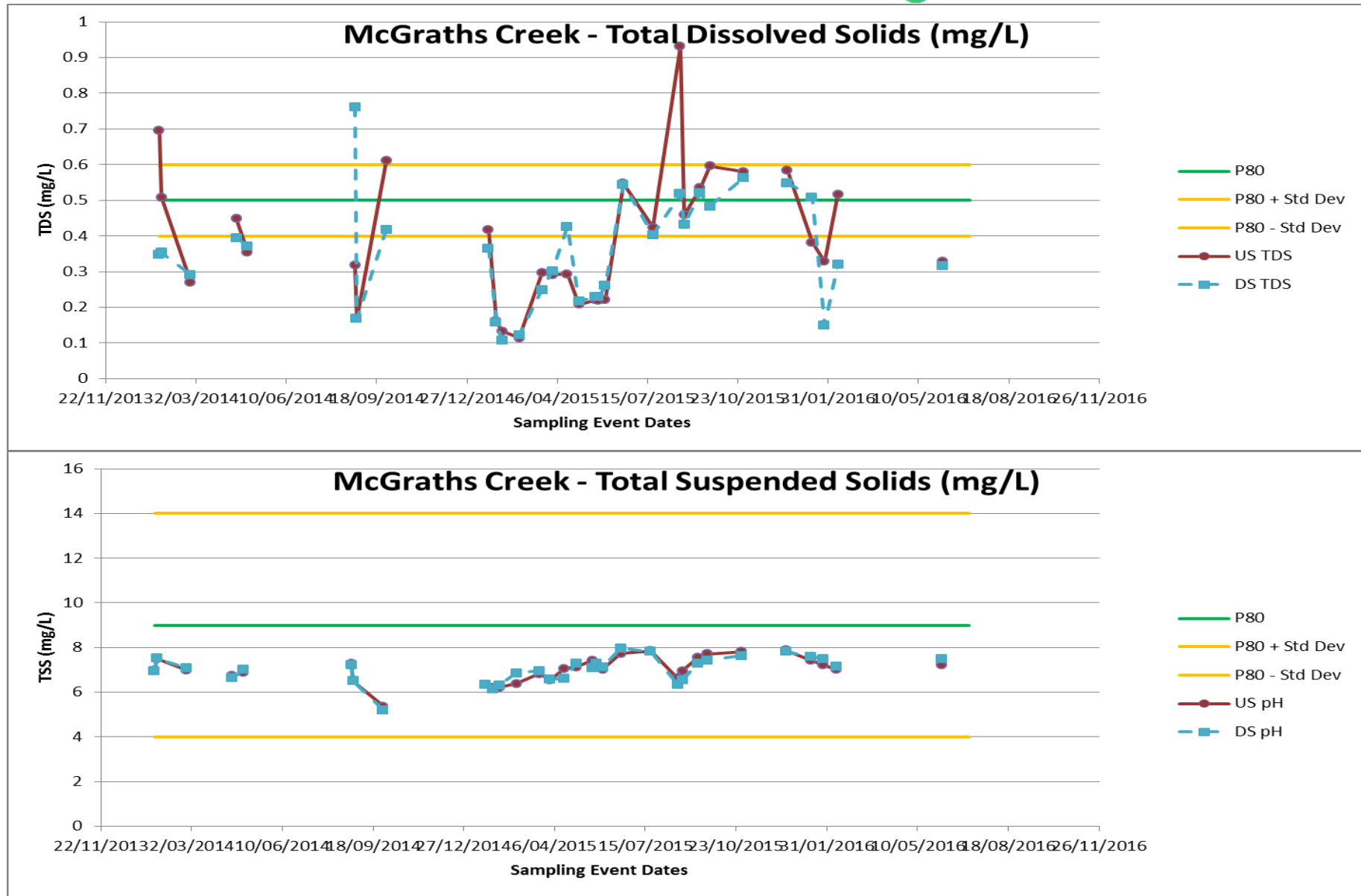




Appendix E – McGraths Creek Field Parameter Graphs

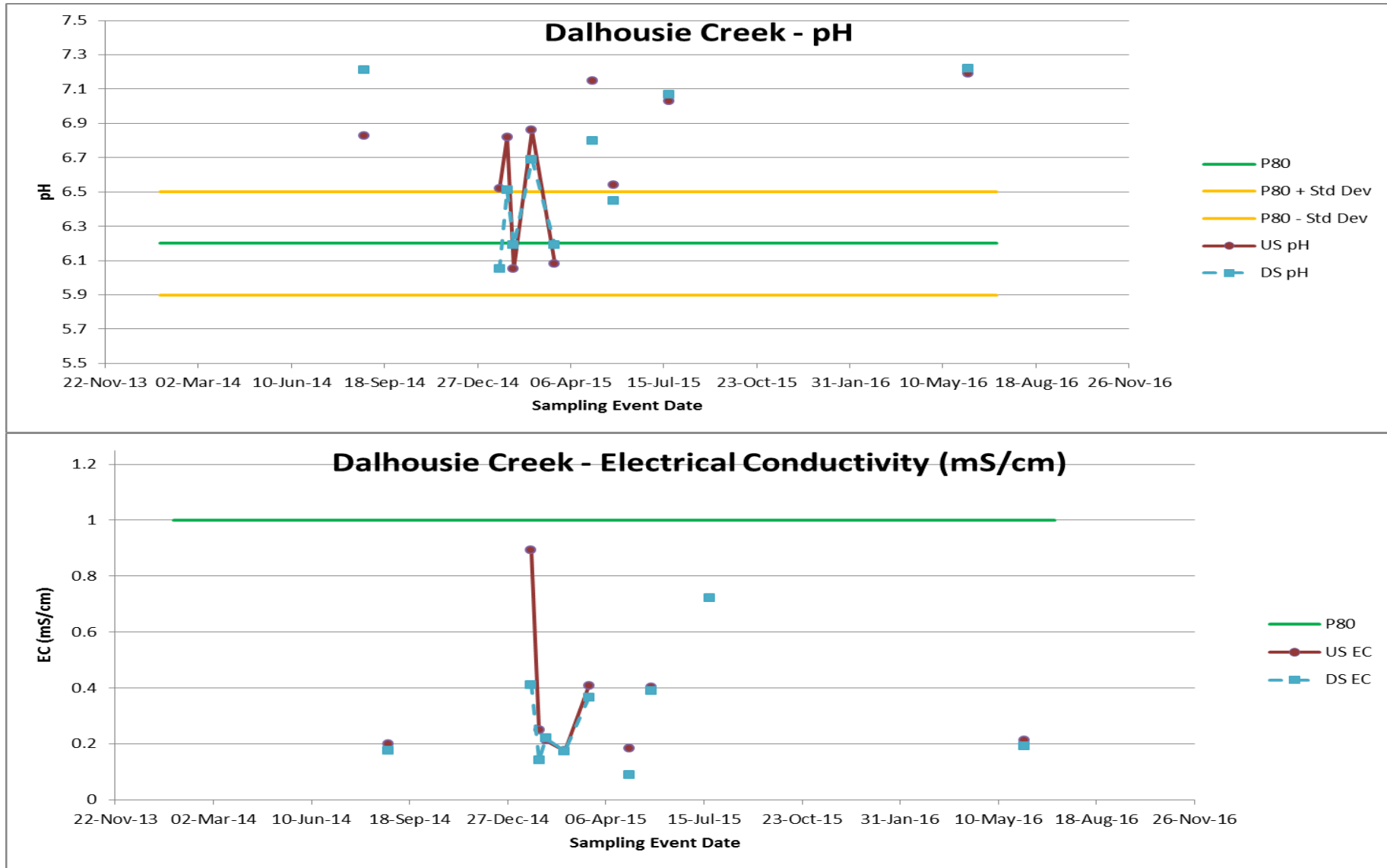


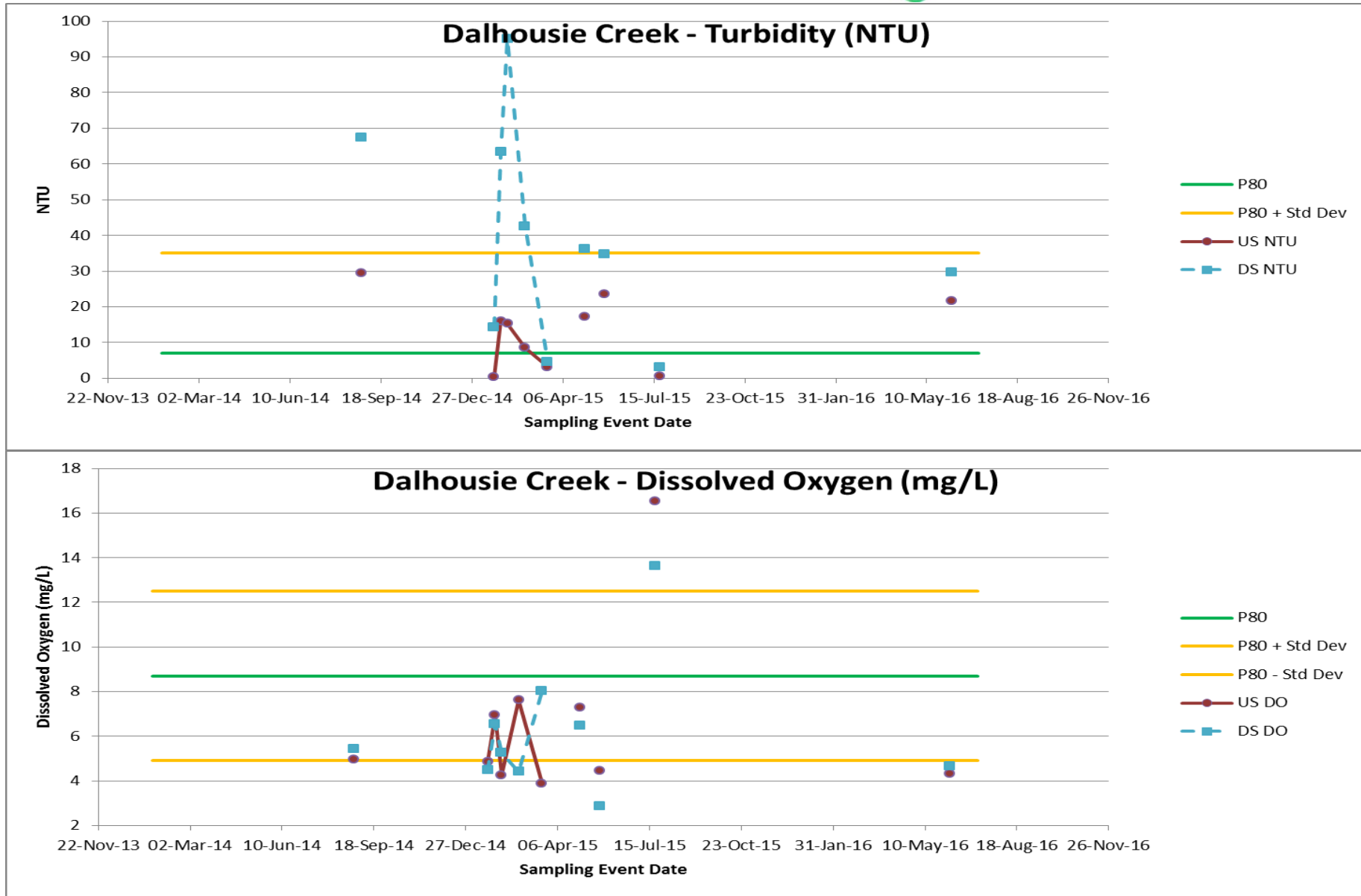


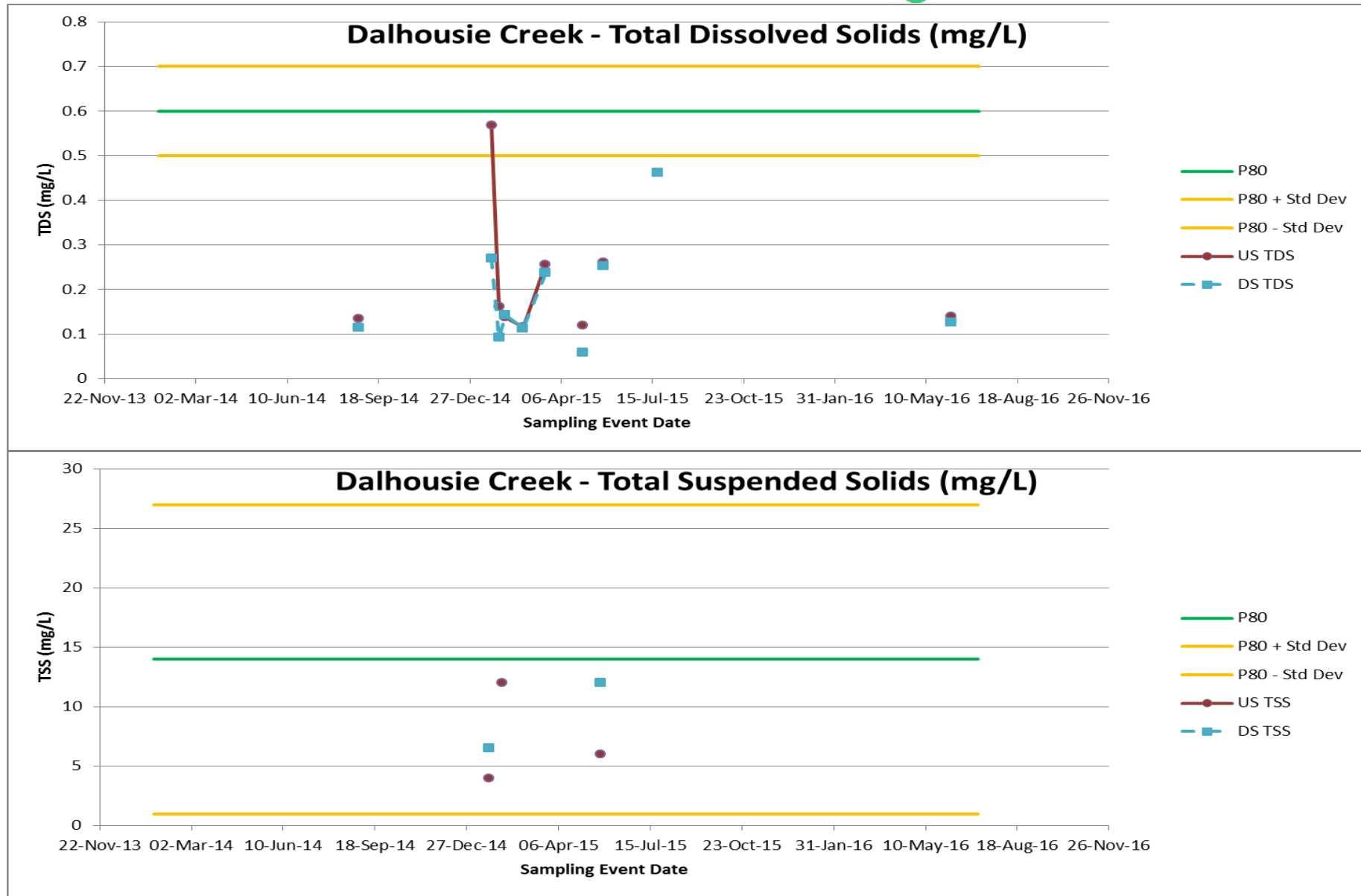




Appendix F – Dalhousie Creek Field Parameter Graphs

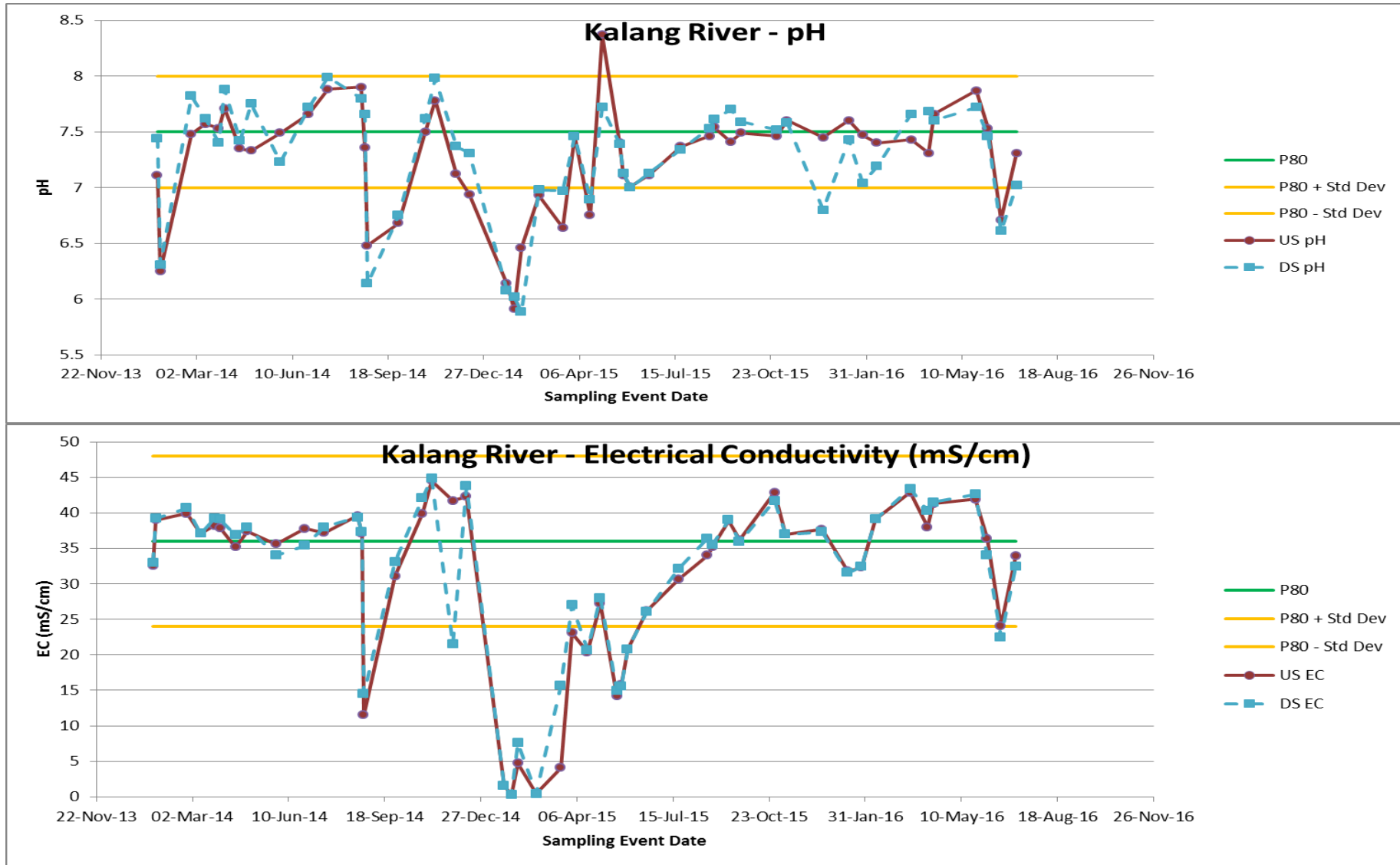


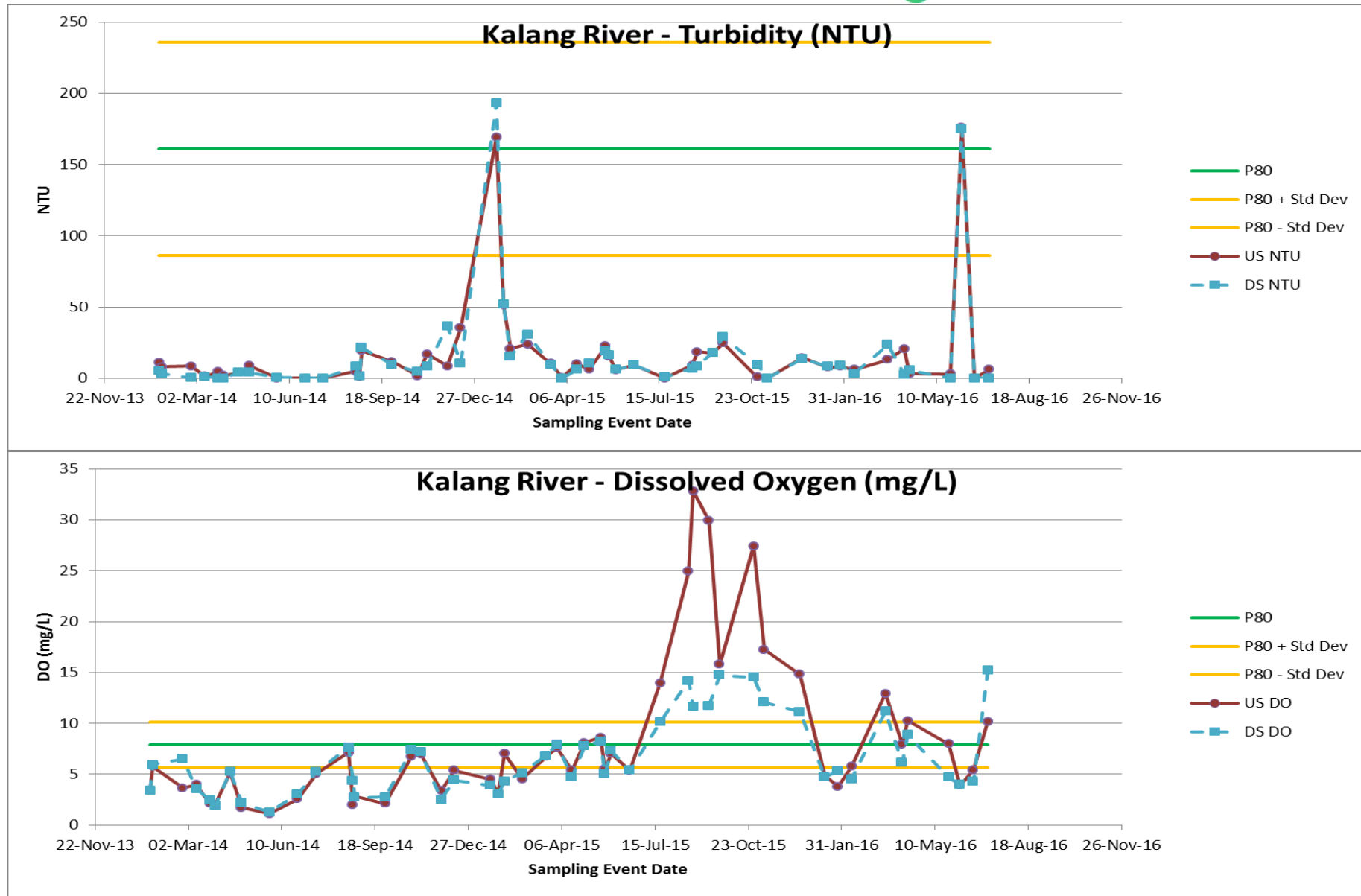


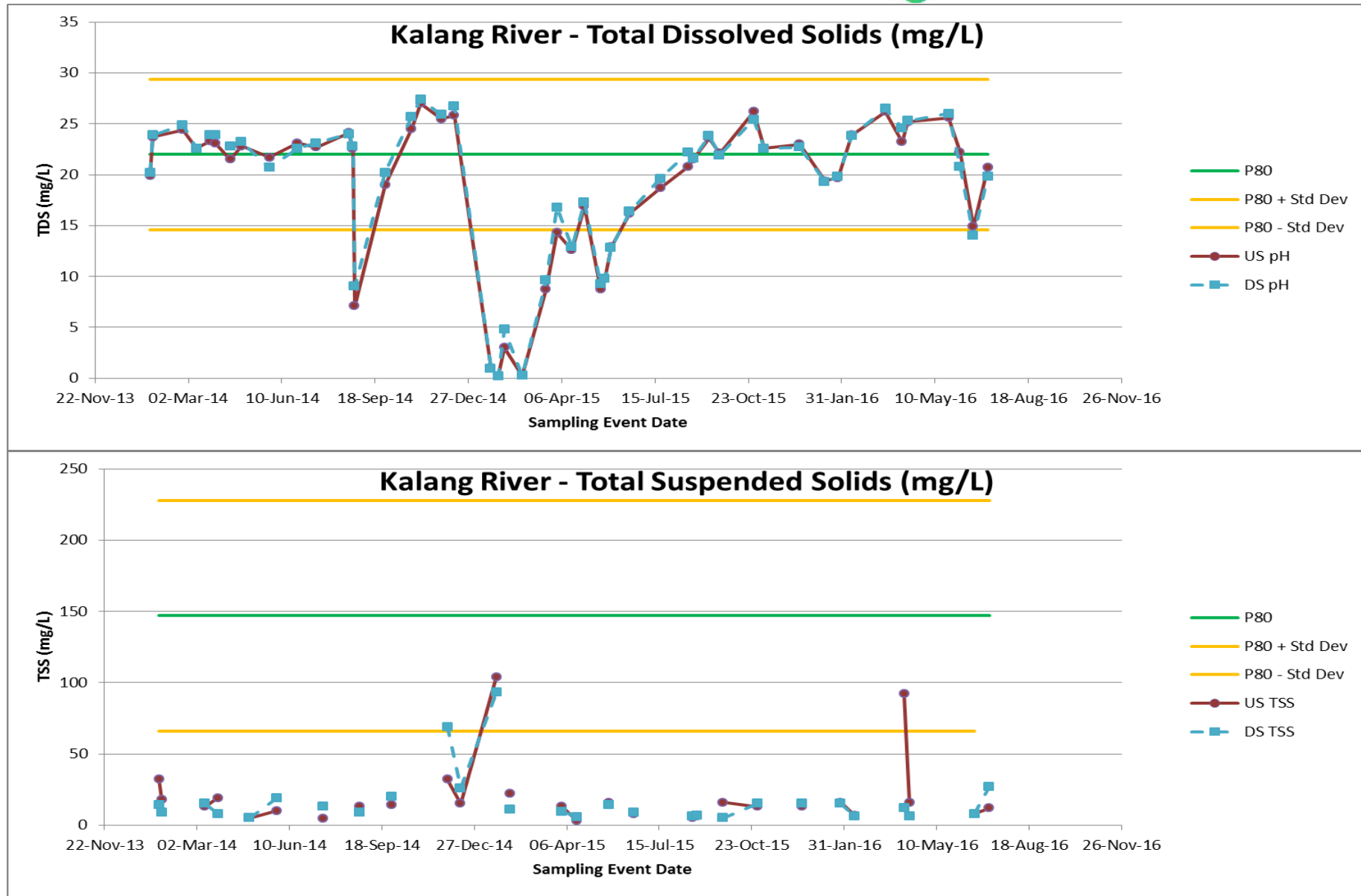




Appendix G – Kalang River Field Parameter Graphs

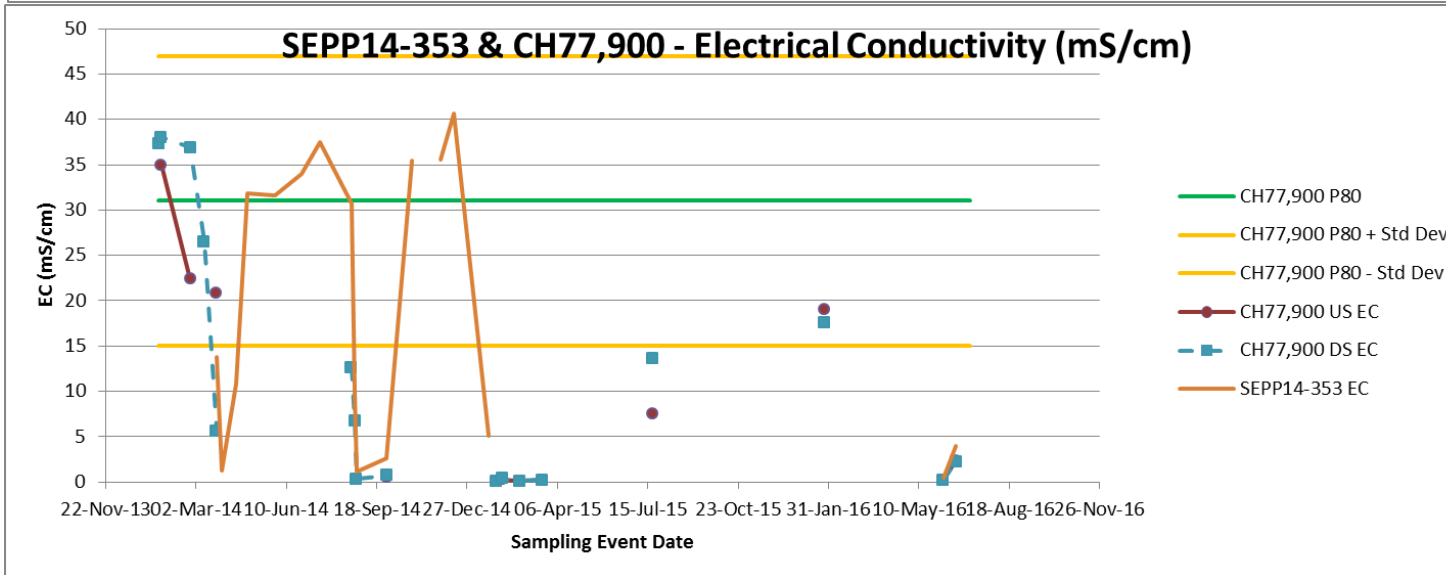
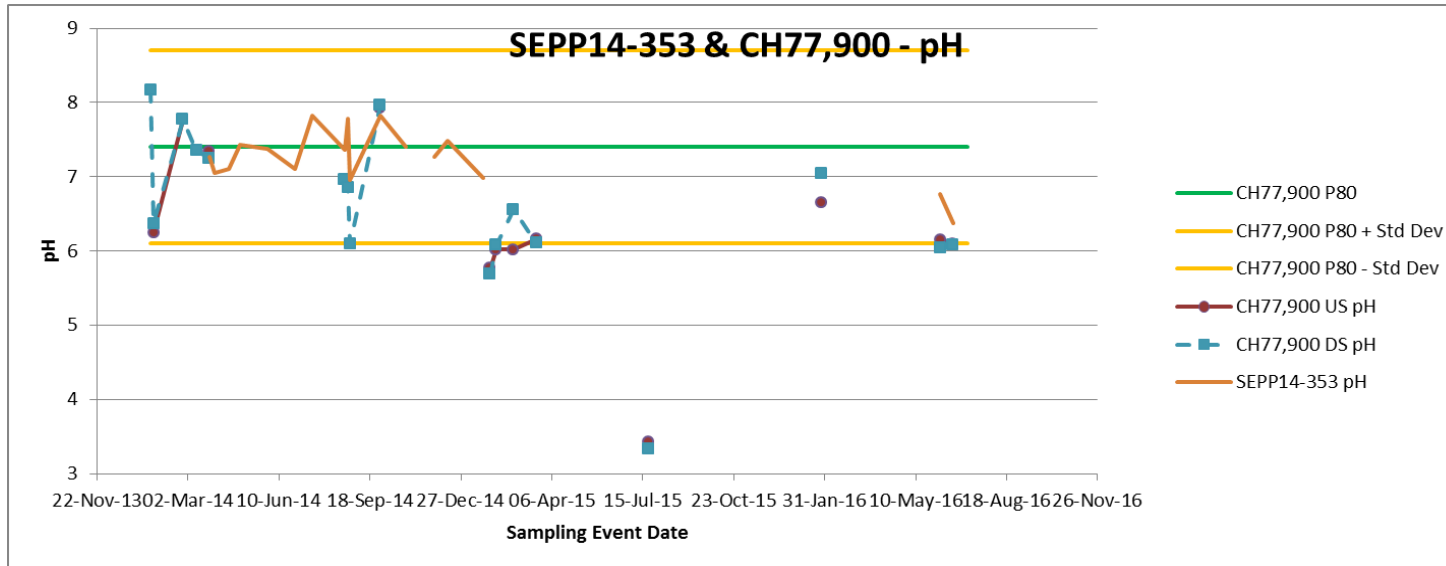


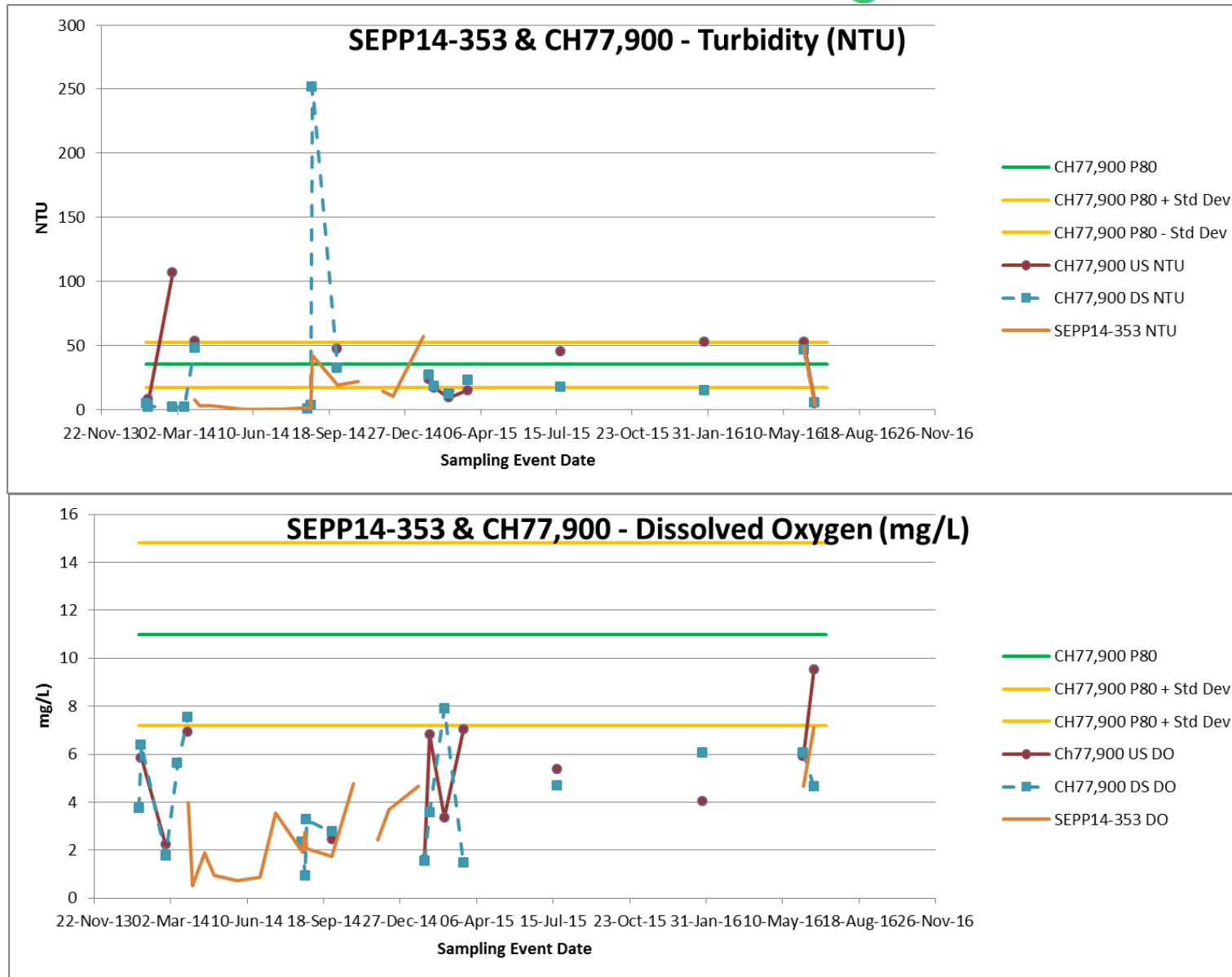


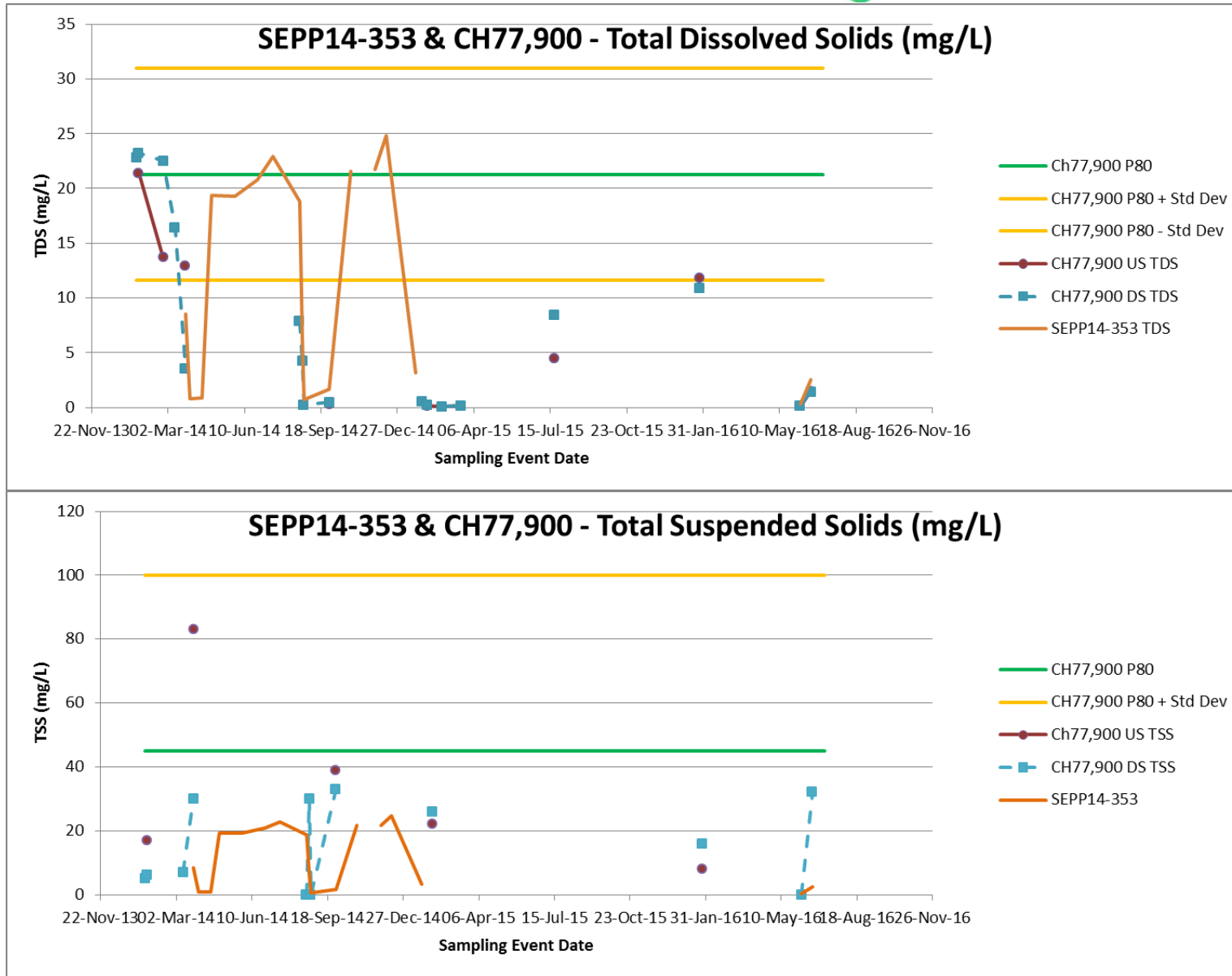




Appendix H – SEPP14–353 & Ch77,900

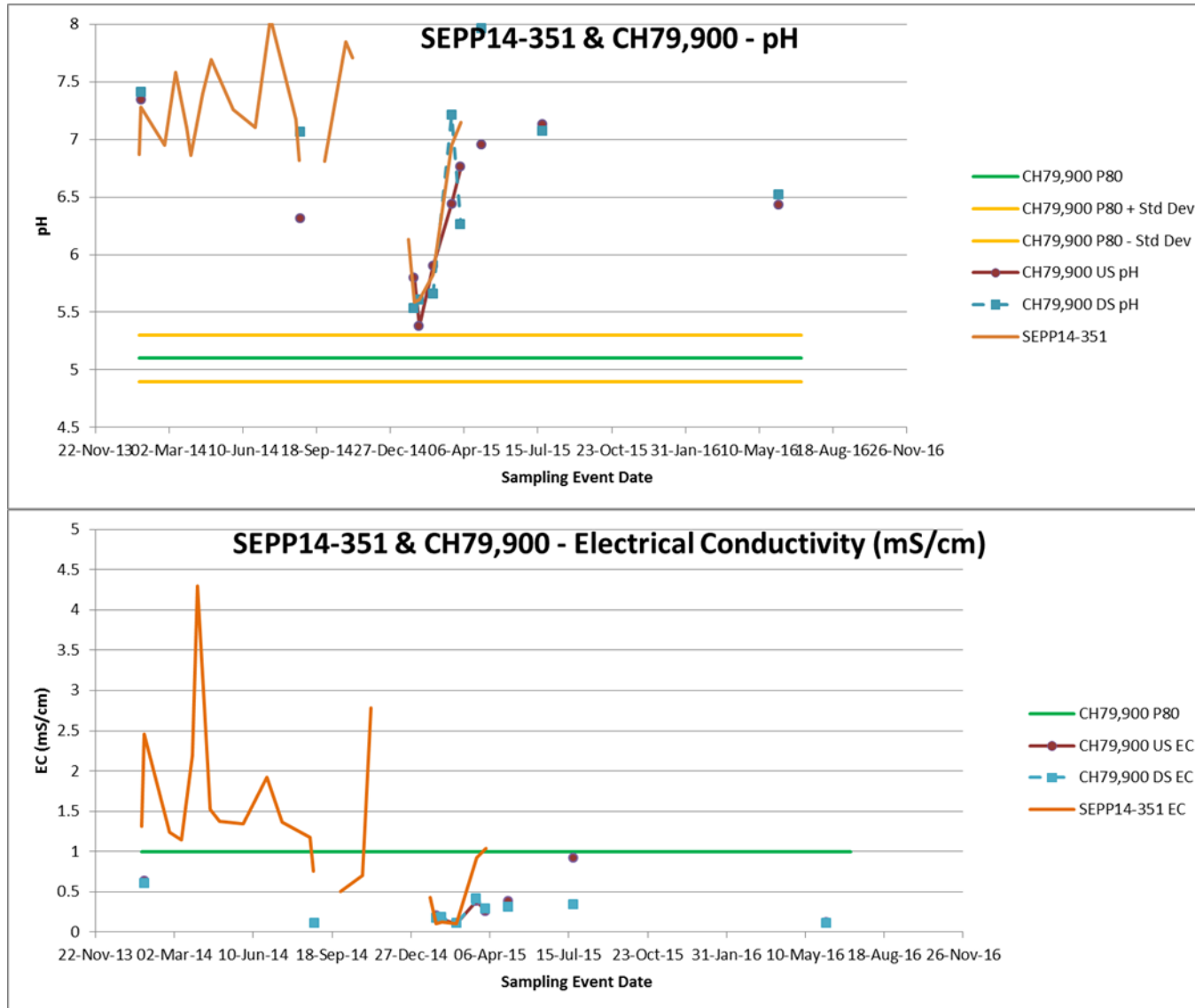


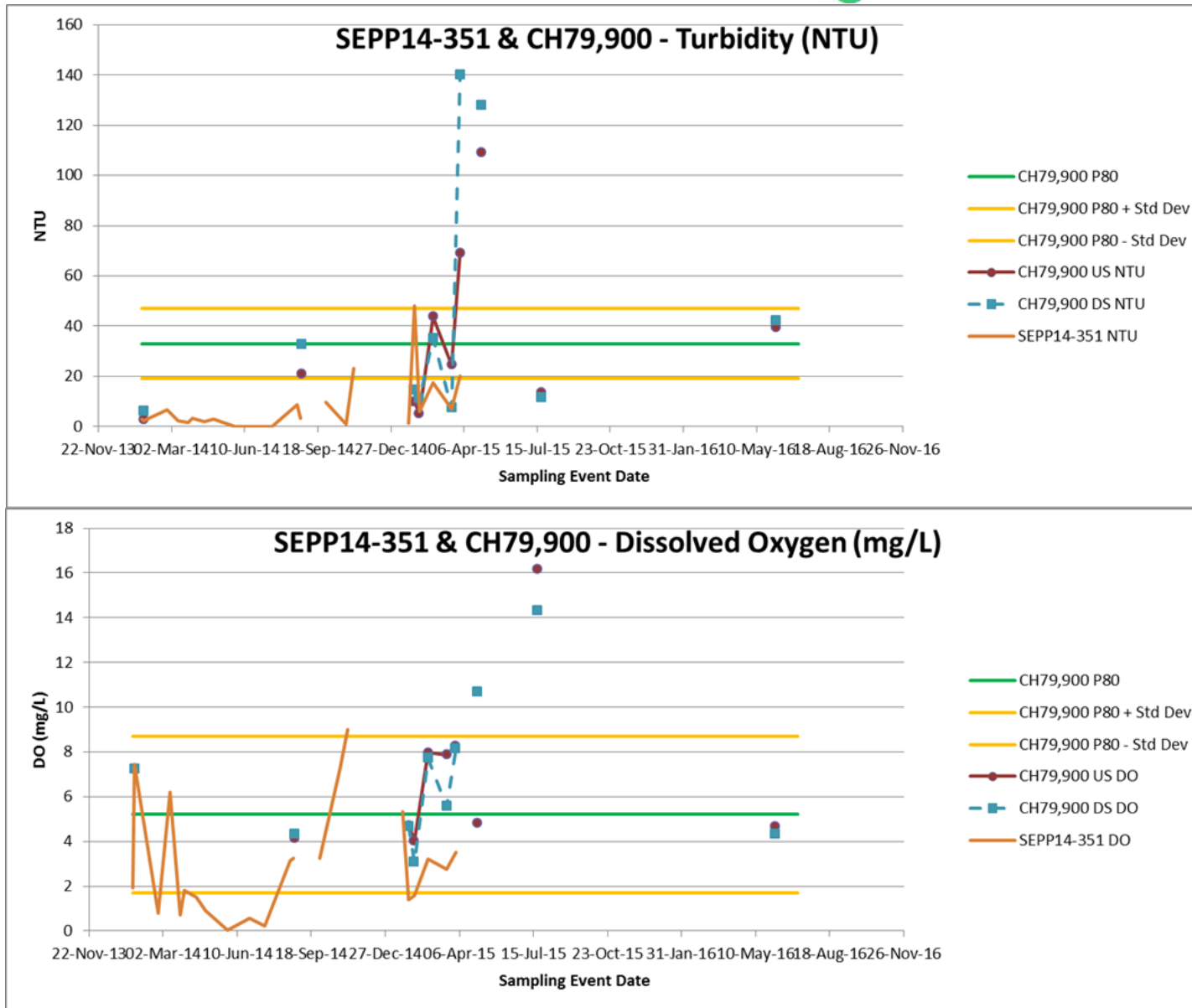


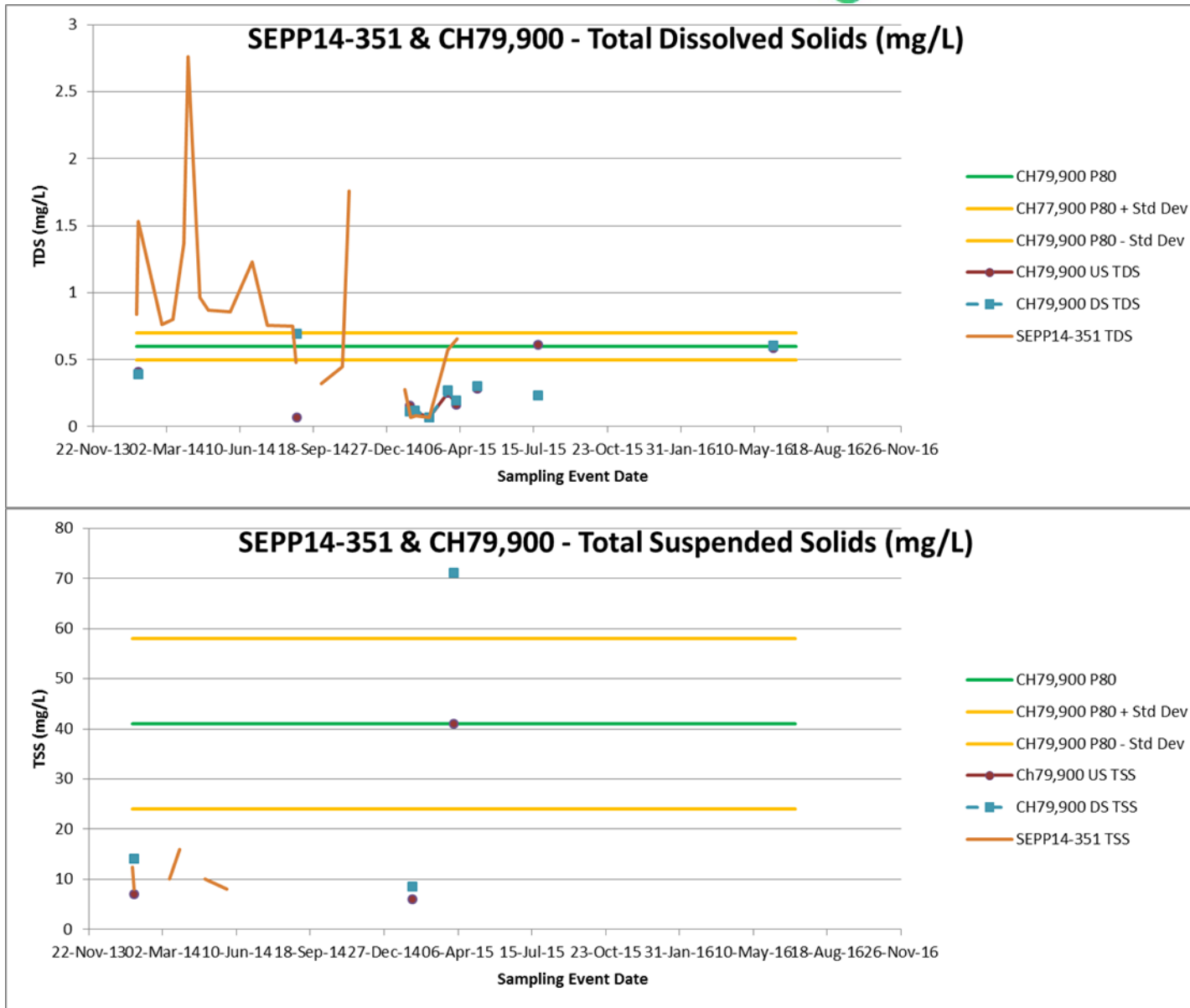




Appendix I – SEPP14–351 & Ch79,900









Appendix J – Boggy Creek Field Data Raw

Site ID	Sampling Date	Sampling Event	Sampling Time	Compliance Comments	Temp. (°C)	pH	EC (mS/cm)	Turbidity (NTU)	DO (mg/L)	TDS (mg/L)	Salinity (ppt)	TSS (mg/L)	Oil and Grease
Location : Boggy Creek													
62700 US	20.01.14	Dry		Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	20.01.14	Dry	1.25pm	Construction works yet to commence at this location. Results due to natural fluctuation.	29.22	6.72	8.08	5.7	1.29	5.09	4.5	3	Nil
62700 US	23.01.14	Wet	1.26pm	n/a - upstream location	22.19	7.53	1.76	2.8	8.48	1.12	0.9	10	Nil
62700 DS	23.01.14	Wet	1.14pm	Construction works yet to commence at this location. Results due to natural fluctuation.	22.69	7.12	4.67	5.7	8.57	2.99	2.5	6	Nil
62700 US	24.02.14	Dry	12.32pm	n/a - upstream location	22.71	7.04	1.93	5.8	2.5	1.21	1	-	Nil
62700 DS	24.02.14	Dry	12.47pm	Construction works yet to commence at this location. Results due to natural fluctuation.	22.89	7.06	1.25	3.1	1.31	0.797	0.6	-	Nil
62700 US	11.03.14	Dry		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	11.03.14	Dry		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 US	25.03.14	Wet		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	25.03.14	Wet		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 US	25.03.14	Wet	3.28pm	n/a - upstream location	24.49	7.38	37.3	0.1	6.26	22.8	23.6	8	nil
62700 US	31.03.14	Wet		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	31.03.14	Wet		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 US	16.04.14	Dry		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	16.04.14	Dry		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 US	28.04.14	Wet		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	28.04.14	Wet		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 US	28.05.14	Dry		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	28.05.14	Dry		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 US	27.06.14	Dry		Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	27.06.14	Dry	10:38am	No flow from upstream. No construction impacts observed.	14.89	6.96	33.9	0	0.02	20.7	21	-	Nil
62700 US	17.07.14	Dry	12.15pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	15.7	7.28	29.2	12.5	2	20.1	1.9	5.5	Nil
62700 DS	17.07.14	Dry	11.20am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	14.7	7.5	43.5	8.9	1.3	26.6	27.7	2.5	Nil
62700 US	21.08.14	Dry	8.00am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	16.2	7.4	32.2	10	2.1	23.2	22	-	Nil
62700 DS	21.08.14	Dry	8.15am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	16.5	7.5	35.6	14	2	22.8	23	-	Nil
62700 US	25.08.14	Wet	1.15pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.2	7.6	1.22	1.9	6.85	0.78	0.6	8	Nil
62700 DS	25.08.14	Wet	1.25pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.3	7.35	1.37	7.6	6.3	0.876	0.7	15	Nil
62700 US	27.8.14	Wet	4.15pm	Elevated turbidity levels recorded. Significant rain event of up to 271mm was recorded. All construction water went through control measures. Rain event was above the design criteria of 55.4mm. Some areas of improvement and maintenance were identified and addressed.	21.0	7.05	0.216	66	6.05	0.141	0.1	-	Nil
62700 DS	27.8.14	Wet	4.20pm	Elevated turbidity levels recorded. Significant rain event of up to 271mm was recorded. All construction water went through control measures. Rain event was above the design criteria of 55.4mm. Some areas of improvement and maintenance were identified and addressed.	21.0	6.83	0.218	160	5.35	0.142	0.1	-	Nil
62700 US	29.9.14	Dry	3.10pm	Overall compliant. Drop in pH level, cause unknown. No construction impacts observed.	23.9	7.27	1.38	4.5	6.73	0.863	0.7	28	Nil
62700 DS	29.9.14	Dry	3.30pm	Overall compliant. Drop in pH level, cause unknown. No construction impacts observed.	23.2	5.29	0.957	3.1	6.23	0.612	0.5	13	Nil
62700 US	27.10.14	Dry	08.00am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed. Tidal influence at downstream site.	19.6	7.52	1.57	18.2	8.65	0.976	0.8	-	Nil
62700 DS	27.10.14	Dry	08.15am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed. Tidal influence at downstream site.	21.0	7.74	26.8	12.2	7.4	16.8	16.5	-	Nil
62700 US	6.11.14	wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	6.11.14	wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 US	28.11.14	wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 DS	28.11.14	wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
62700 US	12.12.14	wet	1.35pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	24.73	7.95	2	70.1	4.63	1.25	1	29	Nil
62700 DS	12.12.14	wet	1.40pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	24.68	7.68	1.99	76.2	4.44	1.26	9.2	30	Nil
62700 US	20.1.15	wet	2.00pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.49	6.66	0.319	57.9	4.44	0.207	0.2	24	Nil
62700 DS	20.1.15	wet	2.20pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.62	6.68	0.307	74	4.12	0.2	0.1	30	Nil
62700 US	28.1.15	wet	9.00am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	24.17	6.26	0.217	0.7	11.3	0.141	0.1	-	Nil
62700 DS	28.1.15	wet	9.10am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.69	6.16	0.246	3.6	7.45	0.16	0.1	-	Nil
62700 US	4.2.15	wet	2.25pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	23.3	6.64	0.189	16.8	9.2	0.123	0.1	11	Nil
62700 DS	4.2.15	wet	2.35pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	23.5	6.28	0.171	12.6	6.9	0.111	0.1	13	Nil
62700 US	23.2.15	wet	1.53pm	Compliant	23.19	7.82	0.713	21	10.59	0.139	0.1	-	Nil
62700 DS	23.2.15	wet	3:39	Compliant	23.24	6.89	0.141	19.8	7.87	0.092	0.1	-	Nil
62700 US	20.3.15	dry	9.20am	Some results higher than preconstruction criteria however only marginal variations between D/S and U/S values with the exception of TDS possibly influenced by incoming tide. No construction impacts observed.	22.22	7.2	1.11	18.4	8.7	0.708	0.5	-	Nil
62700 DS	20.3.15	dry	9.30am	Some results higher than preconstruction criteria however only marginal variations between D/S and U/S values with the exception of TDS possibly influenced by incoming tide. No construction impacts observed.	22.35	6.83	11.6	16.1	11.84	7.16	6.6	-	Nil
62700 US	01.04.15	wet	12.00pm	DO below preconstruction and marginally below upstream values possibly due to natural fluctuations within the system	22	7.47	0.704	23.8	5.38	0.43	0.3	9	Nil
62700 DS	01.04.15	wet	12.15pm	DO below preconstruction and marginally below upstream values possibly due to natural fluctuations within the system	22.2	7.1	0.344	25.5	4.41	0.224	0.2	8	Nil
62700 US	17.04.15	Dry	3.00pm	DO lower than preconstruction criteria however only marginal variations between D/S and U/S values	24	7.57	0.352	18.5	4.78	0.229	0.2	10	Nil
62700 DS	17.04.15	Dry	2.30pm	DO lower than preconstruction criteria however only marginal variations between D/S and U/S values	23.7	7.48	0.399	16.9	4.03	0.259	0.2	19	Nil
62700 US	30.04.15	wet	8.10am	DO below preconstruction and marginally below upstream values possibly due to natural fluctuations within the system. pH and turbidity results higher than preconstruction, however was marginally higher than upstream. All required controls are in place.	23.1	7.48	0.321	14	5.21	0.221	0.2	-	Nil
62700 DS	30.04.15	wet	8.40am	DO below preconstruction and marginally below upstream values possibly due to natural fluctuations within the system. pH and turbidity results higher than preconstruction, however was marginally higher than upstream. All required controls are in place.	23.2	7.62	0.401	16.2	4.02	0.26	0.2	-	Nil
62700 US	18.05.15	wet	2.35pm	Compliant.	18.69	7.01	0.329	1.5	8.27	0.222	0.2	-	Nil
62700 DS	18.05.15	wet	2.30pm	Compliant.	18.7	6.81	0.331	1	6.05	0.215	0.2	-	Nil
62700 US	22.05.15	wet	8.30am	Compliant. Marginal increase in EC	19.2	7.12	0.318	8.9	11.21	0.237	0.2	<1	Nil
62700 DS	22.05.15	wet	8.30am	Compliant. Marginal increase in EC	19.11	7.22	0.328	12	9.62	0.221	0.2	<1	Nil
62700 US	29.05.15	Dry	8.00am	Compliant. Marginal increase in EC	19.5	6.92	0.31	6.2	9.12	0.201	0.1	-	Nil
62700 DS	29.05.15	Dry	8.00am	Compliant. Marginal increase in EC	19.7	6.84	0.363	7.9	8.36	0.242	0.1	-	Nil
62700 US	18.06.15	Dry	8.00am	Compliant. Elevated EC/TDS both upstream and downstream.	14.23	7.1	15.2	9.8	5.81	9.49	8.8	7.5	Nil
62700 DS	18.06.15	Dry	8.20am	Compliant. Elevated EC/TDS both upstream and downstream.	14.21	7.13	15.3	10.1	5.68	9.5	8.8	8	Nil
62700 US	21.07.15	Dry	8.30am	Compliant	13.43	7.75	0.439	3	8.2	0.285	0.2	-	Nil
62700 DS	21.07.15	Dry	8.40am	Compliant	12.82	7.5	0.453	4.1	5.38	0.295	0.2	-	Nil
62700 US	20.08.15	Dry	9:36 AM	Generally Compliant. Minor fluctuation for manganese	13.44	6.07	2.27	5.93	9.52	1.45	1.2	2	Nil
62700 DS	20.08.15	Dry	9:39 AM	Generally Compliant. Minor fluctuation for manganese	13.09	6.47	0.44	4.21	6.64	0.286	0.2	4	Nil
62700 US	25.08.15	wet	1:06 PM	Compliant	18.08	7.27	0.402	0	10.97	0.261	0.2	3	Nil
62700 DS	25.08.15	wet	1:07 PM	Compliant	17.37	6.97	0.365	0	8.24	0.237	0.2	2	Nil
62700 US	11.09.15	Dry	12:53 PM	Generally Compliant. Minor fluctuation for TDS	18.08	7.71	0.57	0	7.65	0.366	0.3	-	Nil

62700 DS	11.09.15	Dry	12:54 PM	Generally Compliant, minor fluctuation for TDS.	17.61	7.19	0.9	0	7.98	0.561	0.4	-	Nil
62700 US	22.09.15	wet	12:04 PM	Compliant	17.1	7.81	0.405	0	13.46	0.263	0.2	3	Nil
62700 DS	22.09.15	wet	12:06 PM		16.64	7.32	0.375	0	9.29	0.244	0.2	2	Nil
62700 US	29.10.15	Dry	12:10 PM	Compliant. Noted high salinity upstream	19.75	7.27	23.4	8.5	8.96	14.4	14.1	8	Nil
62700 DS	29.10.15	Dry	12:12 PM		19.39	7.07	22.8	8	7.52	13.9	13.7	12	Nil
62700 US	09.11.15	wet	2:48 PM	Compliant.	25.65	7.22	0.355	11.4	8.38	0.231	0.2	-	Nil
62700 DS	09.11.15	wet	2:50 PM		25.51	7.07	0.341	8.9	6.39	0.221	0.2	-	Nil
62700 US	17.12.15	Wet	4:11 PM	Compliant.	22.62	7.51	1.64	29.3	4.46	1.05	0.8	21	Nil
62700 DS	17.12.15	Wet	4:12 PM		22.63	7.26	1.43	29.6	3.31	0.919	0.7	12	Nil
62700 US	14.01.16	Dry	10:26 AM	Compliant	25.13	7.47	0.376	17.6	10.05	0.244	0.2	-	Nil
62700 DS	14.01.16	Dry	10:42 AM		25.81	7.59	0.339	12	9.73	0.221	0.2	-	Nil
62700 US	27.01.16	Wet	2:11 PM	Compliant	24.61	7.32	0.191	8.4	4.61	0.191	0.1	9	Nil
62700 DS	27.01.16	Wet	1:58 PM		26.16	7.76	0.217	10.4	7.75	2.17	0.2	9	Nil
62700 US	11.02.16	Dry	9:00 AM	Compliant	25.94	7.86	0.488	36.5	7.26	0.317	0.2	170	Nil
62700 DS	11.02.16	Dry	9:15 AM		26.42	7.4	1.66	32.1	7.04	1.06	0.8	9.5	Nil
62700 US	18.03.16	Dry	-	Insufficient water flow available to sample	-	-	-	-	-	-	-	-	-
62700 DS	18.03.16	Dry	-		-	-	-	-	-	-	-	-	-
62700 US	5.04.16	Dry	-	Insufficient water flow available to sample	-	-	-	-	-	-	-	-	-
62700 DS	5.04.16	Dry	-		-	-	-	-	-	-	-	-	-
62700 US	11.04.16	Wet	2:11 PM	Insufficient water flow available to sample	-	-	-	-	-	-	-	-	-
62700 DS	11.04.16	Wet	-		-	-	-	-	-	-	-	-	-
62700 US	25.05.16	Dry	-	Insufficient water flow available to sample	-	-	-	-	-	-	-	-	-
62700 DS	25.05.16	Dry	-		-	-	-	-	-	-	-	-	-
62700 US	6.06.16	Wet	2.11pm	Compliant	14.61	7.32	0.293	8.4	4.61	0.191	0.1	-	Nil
62700 DS	6.06.16	Wet	1.58pm		16.16	7.46	0.334	10.4	7.75	0.217	0.2	-	Nil
62700 US	20.06.16	Wet	12.32 pm	Compliant	17.42	7.69	0.331	0	5.21	0.215	0.2	5	Nil
62700 DS	20.06.16	Wet	12.37 pm		17.06	7.63	0.317	0.3	11.44	0.206	0.2	3	Nil
62700 US	06.07.16	Wet	11.26 am	Compliant	12.89	7.79	0.35	0	11.89	0.228	0.2	3	Nil
62700 DS	06.07.16	Wet	11.21 am		13.26	8.01	0.494	0	14.05	0.321	0.2	3	Nil
62700 US	26.07.16	Dry	12.26 pm	Compliant	15.54	8.04	1.86	0	7.42	1.19	0.9	-	Nil
62700 DS	26.07.16	Dry	12.31 pm		15.4	8.14	0.426	0	14.42	0.277	0.2	-	Nil
62700 US	16.09.16	Wet	11.00pm	Compliant	15.9	7.29	0.33	0	12.1	0.213	0.3	6.3	Nil
62700 DS	16.09.16	Wet	11.45pm		17.2	7.33	0.31	0	13.6	0.237	0.4	6.1	Nil

Site ID	Sampling Date	Sampling Event	Sampling Time	Total Phosphorus (mg/L)	Phosphate (mg/L)	Total Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	NOK	Nitrate (mg/L N)	Nitrite (mg/L N)	Ammonia (mg/L N)	Silver (mg/L)	Aluminum (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)	Mercury (mg/L)
Location : Boggy Creek																								
62700 US	20.01.14	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	20.01.14	Dry	1.25pm	0.01	<0.005	0.23	0.23	<0.005	<0.005	0.004	<0.005	<0.001	0.004	0.003	<0.001	<0.001	0.001	0.078	1.064	<0.001	<0.001	<0.002	<0.001	<0.0005
62700 US	23.01.14	Wet	1.26pm	0.05	<0.005	1.38	1.38	<0.005	<0.005	0.006	0.596	<0.001	0.382	0.003	0.001	<0.001	0.003	0.622	2.95	0.038	<0.001	<0.002	0.275	<0.0005
62700 DS	23.01.14	Wet	1.14pm	0.03	0.008	0.42	0.37	0.044	0.030	0.014	0.085	<0.001	0.024	0.003	<0.001	<0.001	<0.001	0.563	1.176	0.001	<0.001	<0.002	0.002	<0.0005
62700 US	24.02.14	Dry	12.32pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	24.02.14	Dry	12.47pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	11.03.14	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	11.03.14	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	25.03.14	Wet		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	25.03.14	Wet		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	25.03.14	Wet	3.28pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	25.03.14	Wet		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	16.04.14	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	16.04.14	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	28.04.14	Wet		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	28.04.14	Wet		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	28.05.14	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	28.05.14	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	27.06.14	Dry		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	27.06.14	Dry	10:38am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	17.07.14	Dry	12.15pm	0.025	<0.005	0.309	0.277	0.032	0.029	0.003	0.131	<0.001	0.015	0.005	<0.001	0.001	<0.001	0.121	1.074	0.002	<0.001	<0.010	0.005	<0.005
62700 DS	17.07.14	Dry	11.20am	0.015	<0.005	0.148	0.124	0.024	0.024	<0.001	0.041	<0.001	0.013	0.004	<0.001	0.001	<0.001	0.052	0.115	0.001	0.002	<0.010	0.003	<0.005
62700 US	21.08.14	Dry	8.00am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	21.08.14	Dry	8.15am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	25.08.14	Wet	1.15pm	0.03	0.013	0.27	0.26	0.012	0.012	<0.001	0.101	<0.001	0.078	0.001	<0.001	<0.001	0.001	0.408	0.317	0.002	<0.001	<0.002	0.012	<0.0005
62700 DS	25.08.14	Wet	1.25pm	0.025	0.019	0.30	0.28	0.024	0.022	0.002	0.035	<0.001	0.076	0.001	<0.001	<0.001	0.001	0.451	0.329	0.002	<0.001	<0.002	0.008	<0.0005
62700 US	27.8.14	Wet	4.15pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	27.8.14	Wet	4.20pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	29.9.14	Dry	3.10pm	0.04	0.013	0.32	0.31	0.010	0.007	0.003	0.029	0.001	0.055	0.002	0.001	<0.001	0.001	0.248	0.009	0.001	0.001	<0.002	0.002	<0.0005
62700 DS	29.9.14	Dry	3.30pm	0.033	0.008	0.276	0.27	0.005	<0.005	0.003	0.020	<0.001	0.044	0.002	<0.001	<0.001	0.001	0.24	0.005	0.001	<0.001	<0.002	0.002	<0.0005
62700 US	27.10.14	Dry	08.00am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	27.10.14	Dry	08.15am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	6.11.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	6.11.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	28.11.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	28.11.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	12.12.14	wet	1.35pm	0.200	0.149	0.58	0.52	0.058	0.052	0.006	0.124	-	-	<0.001	0.154	0.003	<0.001	0.013	-	0.759	0.006	0.003	<0.001	<0.002
62700 DS	12.12.14	wet	1.40pm	0.148	0.1	0.61	0.51	0.104	0.097	0.007	0.12	-	-	<0.001	0.146	0.003	<0.001	0.013	-	0.751	0.006	0.003	<0.001	0.003
62700 US	20.1.15	wet	2.00pm	0.05	0.007	0.36	0.32	0.034	0.031	0.003	0.056	<0.001	0.117	0.003	<0.001	<0.001	0.003	0.792	0.004	0.001	<0.001	<0.001	0.001	<0.0005
62700 DS	20.1.15	wet	2.20pm	0.05	0.006	0.379	0.34	0.039	0.035	0.004	0.071	<0.001	0.141	0.003	<0.001	<0.001	0.004	0.806	0.004	0.002	<0.001	<0.001	0.001	<0.0005
62700 US	28.1.15	wet	9.00am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	28.1.15	wet	9.10am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	4.2.15	wet	2.25pm	0.07	0.021	0.47	0.46	0.017	0.011	0.006	0.069	<0.001	0.471	0.004	<0.001	0.001	0.002	0.934	0.013	0.002	<0.001	0.001	0.003	<0.0005
62700 DS	4.2.15	wet	2.35pm	0.216	0.122	0.625	0.59	0.032	0.023	0.009	0.154	<0.001	0.597	0.005	<0.001	0.001	0.003	1.017	0.011	0.002	<0.001	<0.001	0.006	<0.0005
62700 US	23.2.15	wet	1.53pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	23.2.15	wet	3:38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	20.3.15	dry	9.20am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	20.3.15	dry	9.30am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	01.04.15	wet	12.00pm	0.32	0.237	0.26	0.24	0.020	0.013	0.007	0.074	<0.001	0.042	0.003	<0.001	<0.001	0.001	0.639	0.080	0.002	<0.001	<0.005	0.002	<0.0005
62700 DS	01.04.15	wet	12.15pm	0.07	0.029	0.25	0.24	0.012	0.007	0.005	0.029	<0.001	0.053	0.003	<0.001	<0.001	0.001	0.644	0.020	0.001	<0.001	<0.005	0.002	<0.0005
62700 US	17.04.15	Dry	3.00pm	0.03	0.010	0.37	0.36	0.012	0.006	0.006	0.063	<0.001	0.051	0.002	<0.001	<0.001	0.001	0.719	0.023	0.001	<0.001	<0.001	0.002	<0.0005
62700 DS	17.04.15	Dry	2.30pm	0.04	0.012	0.53	0.52	0.006	0.000	0.006	0.080	<0.001	0.048	0.003	<0.001	<0.001	0.001	0.642	0.008	0.002	<0.001	<0.001	0.003	<0.0005
62700 US	30.04.15	wet	8.10am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	30.04.15	wet	8.40am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	18.05.15	wet	2.35pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 DS	18.05.15	wet	2.30pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62700 US	22.05.15	wet	8.30am	0.02	0.010																			



Appendix K – Cow Creek Field Data Raw

Site ID	Sampling Date	Sampling Event	Sampling Time	Compliance Comments	Temp. (°C)	pH	EC (mS/cm)	Turbidity (NTU)	DO (mg/L)	TDS (mg/L)	Salinity (ppt)	TSS (mg/L)	Oil and Grease	
Location : Cow Creek														
63600 US	20.01.14	Dry	1.44pm	n/a - upstream location	27.36	6.55	1.31	4.3	2.7	0.843	0.7	4	Nil	
63600 DS	20.01.14	Dry	1.01pm	Construction works yet to commence at this location. Results due to natural fluctuation.	29.53	6.86	24.9	10.1	2.24	15.5	15.2	10	Nil	
63600 US	23.01.14	Wet	1.36pm	n/a - upstream location	22.91	7.69	0.95	2.2	7.96	0.607	0.5	4	Nil	
63600 DS	23.01.14	Wet	12.45pm	Construction works yet to commence at this location. Results due to natural fluctuation.	23.22	7.02	5.62	3.2	9.91	3.54	3	4	Nil	
63600 US	24.02.14	Dry	1.00pm	n/a - upstream location	23.29	7.14	1.43	3.9	2.54	0.913	0.7	-	Nil	
63600 DS	24.02.14	Dry	12.17pm	Construction works yet to commence at this location. Results due to natural fluctuation.	24.79	7.56	28.4	7.9	3.03	17.6	17.5	-	Nil	
63600 US	11.03.14	Dry	1.55pm	n/a - upstream location	23.78	6.25	0.9	11	3	0.697	0.5	24	Nil	
63600 DS	11.03.14	Dry	2.05pm	Construction works yet to commence at this location. Results due to natural fluctuation.	24.8	7	8.67	9.35	2.9	5.46	4.8	6	Nil	
63600 US	31.03.14	Wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
63600 DS	31.03.14	Wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
63600 US	16.04.14	Dry	11:47pm	n/a - upstream location	20.82	6.84	5.94	6.4	1.59	3.74	2.2	-	Nil	
63600 DS	16.04.14	Dry	11:36pm	Construction works yet to commence at this location. Results due to natural fluctuation.	20.63	6.87	4.04	8.2	2.14	2.6	2.1	-	Nil	
63600 US	28.04.14	Wet	8:42am	n/a - upstream location	19.25	6.84	7.46	3.2	1.82	4.7	4.1	5	Nil	
63600 DS	28.04.14	Wet	8:18am	Construction works yet to commence at this location. Results due to natural fluctuation.	19.39	7.03	5.44	2.3	3.08	3.43	2.9	2	Nil	
63600 US	28.05.14	Dry	8:41am	Construction works yet to commence at this location. Results due to natural fluctuation.	19.39	6.57	13.4	0.9	2.01	2.17	1.8	2	Nil	
63600 DS	28.05.14	Dry	8:29am	Construction works yet to commence at this location. Results due to natural fluctuation.	18.65	6.31	18.5	1.2	2.24	11.5	10.9	3	Nil	
63600 US	27.06.14	Dry	-	No flow from upstream. No construction impacts observed.	-	-	-	-	-	-	-	-	-	
63600 DS	27.06.14	Dry	10:18am	No flow from upstream. No construction impacts observed.	16.03	7.43	41.7	0.3	0.64	25.5	26.5	-	Nil	
63600 US	17.07.14	Dry	12:30pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	15.11	7.5	3.7	13.8	1.34	2.38	1.9	4.5	Nil	
63600 DS	17.07.14	Dry	10:55am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	14.6	7.23	24.3	11.8	2.1	15	14.6	5.5	Nil	
63600 US	21.08.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
63600 DS	21.08.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
63600 US	25.08.14	Wet	1:35pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.6	6.48	0.388	0	5.04	0.252	0.2	6	Nil	
63600 DS	25.08.14	Wet	1:40pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.5	7	0.349	0	5.7	0.227	0.2	3	Nil	
63600 US	27.08.14	Wet	-	Site inaccessible.	-	-	-	-	-	-	-	-	-	
63600 DS	27.08.14	Wet	-	Site inaccessible.	-	-	-	-	-	-	-	-	-	
63600 US	29.9.14	Dry	2:15pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	24.2	5.2	0.256	0.6	4.88	0.166	0.1	6	Nil	
63600 DS	29.9.14	Dry	2:25pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	25.6	5.39	0.229	0.9	5.2	0.149	0.1	1	Nil	
63600 US	27.10.14	Dry	9:00am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed. Tidal influence at downstream site.	21.64	7.5	0.676	5.8	8.43	0.44	0.3	-	Nil	
63600 DS	27.10.14	Dry	9:15am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed. Tidal influence at downstream site.	21.94	7.58	20.4	3.3	4.89	12.7	12.2	-	Nil	
63600 US	6.11.14	wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
63600 DS	6.11.14	wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
63600 US	28.11.14	wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
63600 DS	28.11.14	wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
63600 US	12.12.14	wet	2:00pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	22.77	7.36	4.11	80.1	6.54	2.63	1.1	37	Nil	
63600 DS	12.12.14	wet	2:15pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	22.5	7.28	4.12	71.7	6.04	2.64	2.2	35	Nil	
63600 US	20.1.15	wet	7:15am	Elevated NTU/TSS due to discharge from sediment basin from above design rain event. Other parameters only marginal variations between downstream and upstream values.	23.47	6.7	0.197	10.7	3.19	0.13	0.1	20	Nil	
63600 DS	20.1.15	wet	7:30am	Elevated NTU/TSS due to discharge from sediment basin from above design rain event. Other parameters only marginal variations between downstream and upstream values.	24.1	6.76	0.41	175	4.16	0.266	0.2	130	Nil	
63600 US	28.1.15	wet	9:20am	Compliant.	23.5	6.21	0.157	4.2	6.1	0.102	0.1	-	Nil	
63600 DS	28.1.15	wet	8:20am	Compliant.	23.48	6.23	0.149	3.6	5.73	0.097	0.1	-	Nil	
63600 US	4.2.15	wet	3:45pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	25.0	6.3	0.142	0.4	5.85	0.092	0.1	4	Nil	
63600 DS	4.2.15	wet	3:40pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	24.8	6.32	0.144	1.3	12.05	0.093	0.1	4	Nil	
63600 US	23.2.15	wet	2:15pm	Elevated NTU due to discharge from sediment basin from above design rain event.	24.8	6.86	0.113	24.4	9.53	0.075	0.1	-	Nil	
63600 DS	23.2.15	wet	2:38pm	Elevated NTU due to discharge from sediment basin from above design rain event.	25	6.56	0.105	48.4	7.06	0.069	0.1	-	Nil	
63600 US	20.3.15	dry	9:40am	Compliant.	22.54	7.3	0.229	5.6	12.7	0.149	0.1	-	Nil	
63600 DS	20.3.15	dry	7:40am	Compliant.	21.9	7.32	4.17	5.2	5.66	2.67	2.2	-	Nil	
63600 US	01.04.15	wet	12:20pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	22.4	7.02	0.169	20.8	5.64	0.127	0.1	16	Nil	
63600 DS	01.04.15	wet	12:30pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	22.5	6.88	0.189	17.5	4.52	0.123	0.1	16.5	Nil	
63600 US	17.04.15	Dry	1:45pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values and within EPL criteria. All required controls are in place.	24.31	7.75	1.61	13	9.01	0.932	0.6	7	Nil	
63600 DS	17.04.15	Dry	2:00pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values and within EPL criteria. All required controls are in place.	24.21	7.31	1.58	22	8.56	0.903	0.7	9	Nil	
63600 US	30.04.15	wet	8:55am	Some results higher than preconstruction. All required controls are in place. No construction impacts observed.	24	7.77	1.5	19	7.63	0.916	0.4	-	Nil	
63600 DS	30.04.15	wet	9:15am	Some results higher than preconstruction. All required controls are in place. No construction impacts observed.	23.9	7.58	7.63	23	6.86	0.921	0.5	-	Nil	
63600 US	18.05.15	wet	3:30pm	Compliant.	20.1	7.8	0.599	1.9	8.05	0.376	0.3	-	Nil	
63600 DS	18.05.15	wet	3:42pm	Compliant.	20.16	7.71	0.427	2.2	10.23	0.399	0.3	-	Nil	
63600 US	22.05.15	wet	10:15am	Compliant. Turbidity triggered only marginally above background	20.18	7.62	0.486	3.6	9.23	0.331	0.3	1	Nil	
63600 DS	22.05.15	wet	10:15am	Compliant. Turbidity triggered only marginally above background	20.12	7.51	0.512	5.9	10.62	0.31	0.3	2	Nil	
63600 US	29.05.15	Dry	9:30am	Compliant.	20.18	7.4	0.501	6.2	6.88	0.319	0.2	-	Nil	
63600 DS	29.05.15	Dry	9:30am	Compliant.	20.22	7.63	0.587	5.4	9.21	0.348	0.2	-	Nil	
63600 US	18.06.15	Dry	7:20am	Generally Compliant. Minor parameter fluctuation.	13.79	7.95	1.77	4.8	7.68	1.11	0.9	4	Nil	
63600 DS	18.06.15	Dry	7:25am	Generally Compliant. Minor parameter fluctuation.	13.82	7.98	1.77	4.8	6.98	1.11	0.9	2	Nil	
63600 US	21.07.15	Dry	8:55am	Compliant	13.58	7.54	0.966	4.7	8.02	0.618	0.5	-	Nil	
63600 DS	21.07.15	Dry	8:52am	Compliant	13.75	7.38	1.15	1.8	13.46	0.737	0.6	-	Nil	
63600 US	20.08.15	Dry	9:21 AM	pH level low but slightly better than upstream. Elevated EC/TDS. Tidal influence and dry conditions attributing to results. Minor parameter fluctuation. No construction impacts noted	13.54	5.32	6.18	2.83	15.17	3.9	3.3	7	Nil	
63600 DS	20.08.15	Dry	9:23 AM	pH level low but slightly better than upstream. Elevated EC/TDS. Tidal influence and dry conditions attributing to results. Minor parameter fluctuation. No construction impacts noted	14.06	5.4	12.3	3.15	9.48	7.62	7	11	Nil	
63600 US	25.08.15	wet	12:46 PM	Compliant. Note pH levels have risen to within compliance.	19.97	7.26	0.681	0	16.58	0.438	0.3	5	Nil	
63600 DS	25.08.15	wet	12:47 PM	Compliant. Note pH levels have risen to within compliance.	19.64	6.61	2.41	0	9.28	1.54	1.2	3	Nil	
63600 US	11.09.15	Dry	11:15 AM	Elevated EC/TDS. Tidal influence and dry conditions attributing to results. Turbidity level slightly elevated. All required controls are in place.	18.47	7.01	15.5	4.6	8.7	9.64	9	-	Nil	
63600 DS	11.09.15	Dry	11:15 AM	Elevated EC/TDS. Tidal influence and dry conditions attributing to results. Turbidity level slightly elevated. All required controls are in place.	19.8	6.57	27.6	18.4	5.11	17.1	16.9	-	Nil	

63600 US	22.09.15	wet	12:21 PM	Compliant	18.11	7.33	0.289	0	6.42	0.188	0.1	1	Nil
63600 DS	22.09.15	wet	12:21 PM		18.21	7.09	0.292	0	5.89	0.19	0.1	3	Nil
63600 US	29.10.15	Dry	11:58 AM	Noted high salinity upstream. Minor parameter fluctuation. Turbidity slightly higher downstream compared to upstream. No construction impacts noted	20.38	7.39	30.8	4.1	14.71	18.6	18.9	8	Nil
63600 DS	29.10.15	Dry	11:59 AM		20.21	7.24	24.1	4.7	10.67	14.7	14.6	7	Nil
63600 US	09.11.15	wet	12:56 PM	Turbidity slightly higher downstream compared to upstream.	20.69	7.95	0.199	6.8	6.95	0.13	0.1	-	Nil
63600 DS	09.11.15	wet	12:56 PM		20.7	7.67	0.2	7.7	7.41	0.13	0.1	-	Nil
63600 US	17.12.15	Wet	4:36 PM	Compliant	24.55	7.37	1.09	23	9.62	0.695	0.5	12	Nil
63600 DS	17.12.15	Wet	4:39 PM		24.34	7.11	0.958	21.9	5.98	0.614	0.5	12	Nil
63600 US	13.01.16	Dry	9:20 AM	Compliant	24.16	7.29	0.245	8	4.41	0.159	0.1	-	Nil
63600 DS	13.01.16	Dry	10:00 AM		24.94	7.49	0.928	6.1	3.79	0.594	0.5	-	Nil
63600 US	27.01.16	Wet	3:11 PM	Compliant	25.14	7.84	0.979	0.5	5.72	0.627	0.5	6	Nil
63600 DS	27.01.16	Wet	1:45 PM		26.24	7.88	1.06	0.4	4.86	0.676	0.5	9	Nil
63600 US	11.02.16	Dry	8:30 AM	Minor Fluctuations in EC and TDS	25.76	7.76	1.65	6.3	4.06	1.06	0.8	12	Nil
63600 DS	11.02.16	Dry	8:00 AM		22	7.55	13.3	8.2	6.44	8.27	7.7	10	Nil
63600 US	18.03.16	Dry	10:00 AM	Minor Fluctuations in EC and TDS	25.78	7.31	5.51	32.1	6.18	3.47	3	-	Nil
63600 DS	18.03.16	Dry	10:20 AM		26.95	7.48	20.9	6.5	8.81	13	12.5	-	Nil
63600 US	5.04.16	Dry	11:12 AM	Minor Fluctuations in EC and TDS	23.26	7.36	6.28	5.8	7.39	3.95	3.4	8	Nil
63600 DS	5.04.16	Dry	10:59 AM		23.37	7.47	21.5	5.3	7.57	13.3	7.3	9	Nil
63600 US	11.04.16	Wet	1:52 pm	Minor Fluctuations in EC and TDS	27.02	7.3	0.656	48.6	9.5	0.42	0	6	Nil
63600 DS	11.04.16	Wet	1:34 pm		23.48	7.59	7.03	5.4	12.26	4.43	0.5	-	Nil
63600 US	30.05.16	Dry	11:00 am	Minor Fluctuations in EC and TDS	14.14	7.54	21.5	5.2	7.38	13.3	9.1	-	Nil
63600 DS	30.05.16	Dry	11:15 am		12.23	8.03	18.1	0.5	9.13	11.2	7.7	-	Nil
63600 US	6.06.16	Wet	1:45pm	Compliant	16.24	7.88	1.06	6.4	4.86	0.676	0.5	-	Nil
63600 DS	6.06.16	Wet	3:11pm		15.14	7.84	0.979	7.5	5.72	0.627	0.5	-	Nil
63600 US	20.06.16	Wet	12:49 pm	Compliant	17.76	7.69	0.173	2.2	9.15	0.112	0.1	7	Nil
63600 DS	20.06.16	Wet	12:13 pm		18.41	8.31	0.314	3	5.35	0.204	0.1	7	Nil
63600 US	06.07.16	Wet	11:36 am	Compliant	12.7	7.43	0.702	0	14.1	0.449	0.3	1	Nil
63600 DS	06.07.16	Wet	11:03 am		12.41	7.8	1.93	0	10.34	1.23	1	1	Nil
63600 US	29.07.16	Wet	10:15 am	Compliant	11.39	7.92	0.255	0	12.09	0.165	0.1	-	Nil
63600 DS	29.07.16	Wet	10:32 am		11.44	7.28	2.05	0	8.54	1.31	1	-	Nil
63600 US	16.09.16	Wet	14:50pm	Compliant	16.59	7.60	0.250	5.4	6.39	0.162	0.6	-	Nil
63600 DS	16.09.16	Wet	14:30pm		17.64	7.86	3.120	10.1	6.36	1.26	0.2	-	Nil

Site ID	Sampling Date	Sampling Event	Sampling Time	Total Phosphorus (mg/L)	Phosphate (mg/L)	Total Nitrogen (mg/L)	Total Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	NOx	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Silver (mg/L)	Aluminum (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)	Mercury (mg/L)	
Location : Cow Creek																										
63600 US	20.10.14	Dry	1.44pm	0.01	<0.005	0.11	0.10	0.006	<0.005	0.005	0.044	<0.001	0.003	0.003	<0.001	<0.001	0.001	0.196	0.303	<0.001	<0.001	<0.002	0.001	<0.0005		
63600 DS	20.10.14	Dry	1.01pm	0.02	<0.005	0.313	0.31	<0.005	<0.005	0.002	0.007	<0.001	0.018	0.005	<0.001	<0.001	0.001	0.008	0.107	<0.001	<0.001	<0.002	<0.001	<0.0005		
63600 US	23.01.14	Wet	1.36pm	0.04	0.005	0.19	0.18	0.007	<0.005	0.005	0.048	<0.001	0.008	0.004	<0.001	<0.001	0.001	0.510	0.560	<0.001	<0.001	<0.002	0.001	<0.0005		
63600 DS	23.01.14	Wet	12.45pm	0.033	<0.005	0.254	0.24	0.018	0.013	0.005	0.030	<0.001	0.006	0.003	<0.001	<0.001	0.002	0.210	0.867	<0.001	<0.001	<0.002	<0.001	<0.0005		
63600 US	24.02.14	Dry	1.00pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	24.02.14	Dry	12.17pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	11.03.14	Dry	1.55pm	0.03	<0.005	0.25	0.25	-	<0.005	0.002	0.019	<0.001	0.012	0.004	<0.001	<0.001	<0.001	0.38	0.229	<0.001	<0.001	<0.002	0.002	<0.0005		
63600 DS	11.03.14	Dry	2.05pm	0.03	<0.005	0.32	0.31	-	0.012	<0.001	0.022	<0.001	0.009	0.004	<0.001	<0.001	0.131	0.151	<0.001	<0.001	<0.002	0.001	<0.0005			
63600 US	31.03.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	31.03.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	16.04.14	Dry	11:47pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	16.04.14	Dry	11:36pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	28.04.14	Wet	8:42am	0.03	<0.005	0.26	0.25	0.013	0.011	0.002	0.052	<0.001	0.007	0.003	<0.001	<0.001	0.001	0.203	0.489	0.001	<0.001	<0.002	0.032	0.005		
63600 DS	28.04.14	Wet	8:18am	0.03	<0.005	0.261	0.25	0.011	0.010	0.001	0.044	<0.001	0.012	0.002	<0.001	<0.001	<0.001	0.125	0.344	0.001	<0.001	<0.002	0.004	<0.0005		
63600 US	28.05.14	Dry	8:41am	0.02	<0.005	#REF!	#REF!	-	0.025	0.001	0.069	<0.001	0.005	0.002	<0.001	<0.001	<0.001	0.134	0.220	<0.001	<0.001	<0.005	<0.01	<0.0005		
63600 DS	28.05.14	Dry	8:29am	0.03	<0.005	0.34	0.34	-	0.046	0.001	0.075	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.025	0.291	<0.001	<0.001	<0.001	<0.001	<0.0005		
63600 US	27.06.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	27.06.14	Dry	10:18am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	17.07.14	Dry	12:30pm	0.014	0.005	0.155	0.143	0.012	0.012	<0.001	0.07	<0.001	0.02	0.003	<0.001	<0.001	<0.001	1.209	0.521	<0.001	<0.001	<0.010	0.002	<0.005		
63600 DS	17.07.14	Dry	10:55am	0.017	<0.005	0.147	0.115	0.032	0.03	0.002	0.064	<0.001	0.041	0.005	<0.001	0.001	0.001	0.439	0.322	0.002	<0.001	<0.010	0.005	<0.005		
63600 US	21.08.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	21.08.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	25.08.14	Wet	1:35pm	0.02	0.016	0.33	0.31	0.022	0.020	0.002	0.026	<0.001	0.033	0.002	<0.001	<0.001	0.001	0.253	0.027	0.001	<0.001	<0.002	0.002	<0.0005		
63600 DS	25.08.14	Wet	1:40pm	0.019	0.013	0.39	0.37	0.016	0.016	<0.001	<0.005	<0.001	0.036	0.002	<0.001	<0.001	0.001	0.257	0.026	0.001	<0.001	<0.002	0.002	<0.0005		
63600 US	27.08.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	27.08.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	29.9.14	Dry	2:15pm	0.04	0.020	0.24	0.23	0.007	0.005	0.002	0.023	<0.001	0.019	0.003	<0.001	<0.001	<0.001	0.471	0.071	<0.001	<0.001	<0.002	0.002	<0.0005		
63600 DS	29.9.14	Dry	2:25pm	0.033	0.008	0.232	0.23	0.005	0.005	<0.001	0.005	<0.001	0.017	0.002	<0.001	<0.001	0.001	0.416	0.005	<0.001	<0.001	<0.002	0.002	<0.0005		
63600 US	27.10.14	Dry	9:00am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	27.10.14	Dry	9:15am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	6.11.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	6.11.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	28.11.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	28.11.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	12.12.14	wet	2:00pm	0.081	0.012	0.31	0.27	0.046	0.044	0.002	0.145	-	-	<0.001	0.012	0.002	<0.001	0.001	-	0.269	0.340	<0.001	<0.001	<0.002		
63600 DS	12.12.14	wet	2:15pm	0.085	0.021	0.321	0.22	0.097	0.096	0.001	0.102	-	-	<0.001	0.009	0.002	<0.001	0.001	-	0.198	0.328	<0.001	<0.001	<0.002		
63600 US	20.1.15	wet	7:15am	0.13	0.048	0.53	0.40	0.130	0.128	0.002	0.058	<0.001	0.142	0.007	<0.001	0.001	0.001	0.809	0.003	<0.001	<0.001	<0.001	0.001	<0.0005		
63600 DS	20.1.15	wet	7:30am	0.099	0.03	0.498	0.49	0.012	0.009	0.003	0.072	<0.001	0.119	0.005	<0.001	<0.001	0.002	0.713	0.004	0.001	<0.001	<0.001	0.001	<0.0005		
63600 US	28.1.15	wet	9:20am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	28.1.15	wet	8:20am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	4.2.15	wet	3:45pm	0.05	0.020	0.31	0.30	0.014	0.011	0.003	0.029	<0.001	0.405	0.007	<0.001	<0.001	0.001	0.804	0.004	0.001	<0.001	<0.001	0.001	<0.0005		
63600 DS	4.2.15	wet	3:40pm	0.067	0.035	0.309	0.30	0.005	0.002	0.003	0.009	<0.001	0.413	0.007	<0.001	<0.001	0.001	0.831	0.005	0.001	<0.001	<0.001	0.001	<0.0005		
63600 US	23.2.15	wet	2:15pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	23.2.15	wet	2:38pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	20.3.15	dry	9:40am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	20.3.15	dry	7:40am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 US	01.04.15	wet	12:20pm	0.05	0.013	0.24	0.22	0.019	0.016	0.003	0.046	<0.001	0.037	0.004	<0.001	<0.001	0.001	0.475	0.002	<0.001	<0.001	<0.005	0.002	<0.0005		
63600 DS	01.04.15	wet	12:30pm	0.049	0.010	0.24	0.21	0.025	0.021	0.004	0.024	<0.001	0.025	0.003	<0.001	<0.001	0.001	0.404	0.002	<0.001	<0.001	<0.005	0.005	<0.0005		
63600 US	17.04.15	Dry	1:45pm	0.03	0.008	0.25	0.24	0.014	0.012	0.002	0.028	<0.001	0.016	0.002	<0.001	<0.001	<0.001	0.350	0.045	<0.001	<0.001	<0.001	0.001	<0.0005		
63600 DS	17.04.15	Dry	2:00pm	0.051	0.021	0.30	0.29	0.010	0.007	0.003	0.026	<0.001	0.009	0.002	<0.001	<0.001	0.001	0.123	0.045	0.001	<0.001	<0.001	0.002	<0.0005		
63600 US	30.04.15	wet	8:55am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
63600 DS	30.04.15	wet	9:15am	-																						



Appendix L – Deep Creek Field Data Raw

Site ID	Sampling Date	Sampling Event	Sampling Time	Compliance Comments	Temp. (°C)	pH	EC (mS/cm)	Turbidity (NTU)	DO (mg/L)	TDS (mg/L)	Salinity (ppt)	TSS (mg/L)	Oil and Grease
Location : Deep Creek													
64900 US	20.01.14	Dry	2.04pm	compliant	30.15	7.5	38	4.2	3.25	23.1	24.1	8	Nil
64900 DS	20.01.14	Dry	2.10pm	compliant	29.95	7.68	38.5	3.2	3.06	23.5	24.4	3	Nil
64900 US	23.01.14	Wet	1.51pm	compliant	25.95	6.18	45.3	2.3	6.36	27.6	29.3	8	Nil
64900 DS	23.01.14	Wet	1.46pm	compliant	25.08	6.23	43.8	1.8	6.18	26.7	28.2	6	Nil
64900 US	24.02.14	Dry	1.27pm	compliant	26.65	7.38	38.3	5	4.46	23.4	24.3	-	Nil
64900 DS	24.02.14	Dry	1.22pm	compliant	25.51	7.41	35.7	5.3	4.36	21.9	22.6	-	Nil
64900 US	11.03.14	Dry	2.56pm	compliant	27	8.14	36.1	7.9	5.8	22	22.8	<1	Nil
64900 DS	11.03.14	Dry	2.53pm	compliant	26.5	8.05	36.1	9.44	6.7	22	22.8	5	Nil
64900 US	25.03.14	Wet	3.28pm	compliant	24.49	7.38	37.3	0.1	6.26	22.8	23.6	8	Nil
64900 DS	25.03.14	Wet	3.10pm	No construction impacts observed. Results likely to be due to natural fluctuation.	24.52	7.38	36.8	0.2	1.96	22.5	23.3	8	Nil
64900 US	31.03.14	Wet	4.46pm	compliant	27.2	6.75	18.5	18.3	4.36	11.5	10.9	-	Nil
64900 DS	31.03.14	Wet	4.53pm	compliant	27.57	6.22	17.2	16.1	3.06	10.7	10.1	-	Nil
64900 US	16.04.14	Dry	12:34pm	compliant	23.1	7.63	31.2	3.6	3.71	19	19.4	-	Nil
64900 DS	16.04.14	Dry	12:39pm	compliant	23.4	7.68	30.4	3.9	3.81	17.4	19.5	-	Nil
64900 US	28.04.14	Wet	9:20am	compliant	21.6	7.75	41.9	6.4	2.48	25.6	26.8	5	Nil
64900 DS	28.04.14	Wet	9:12am	compliant	21.12	7.63	41.6	5.6	2.49	25.4	26.6	4	Nil
64900 US	28.05.14	Dry	12:09pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed. Results within EPL criteria.	21.64	7.8	42.1	0	1.25	25.7	27	13	Nil
64900 DS	28.05.14	Dry	12:04pm		21.26	7.54	40.9	0	1.94	24.9	26.1	14	Nil
64900 US	27.06.14	Dry	10:04am	compliant	15.81	7.86	43.9	0	1.91	26.8	28	-	Nil
64900 DS	27.06.14	Dry	9:53am	compliant	14.75	7.68	42.1	0	1.7	25.7	26.7	-	Nil
64900 US	17.7.14	Dry	10:45am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	14.9	7.8	43.1	17	5.3	20.5	27.6	5.5	Nil
64900 DS	17.7.14	Dry	10:40am		15.6	7.9	43.2	18	7.8	26.3	27.4	23.5	Nil
64900 US	21.08.14	Dry	8.45am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	14.5	7.7	42.1	16	5.4	21.2	25.5	-	Nil
64900 DS	21.08.14	Dry	9:00am		14.9	7.8	42	17	6.9	24.4	23.5	-	Nil
64900 US	25.08.14	Wet	2:00pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.3	6.3	17.6	0	4.72	10.9	10.4	8	Nil
64900 DS	25.08.14	Wet	2:10pm		17.34	6.28	22	0.8	5.43	13.7	13.3	12	Nil
64900 US	27.8.14	Wet	4:35pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	20.0	6.43	3.07	60	5.3	1.98	1.6	-	Nil
64900 DS	27.8.14	Wet	4:40pm		20.0	6.6	3.34	62	5.7	2.14	1.7	-	Nil
64900 US	29.9.14	Dry	2:50pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	27.58	6.38	28.6	1.9	5.25	17.7	17.5	9	Nil
64900 DS	29.9.14	Dry	2:41pm		29.88	6.36	26.7	1.2	5.85	16.6	8.1	9	Nil
64900 US	27.10.14	Dry	7:00am	Compliant	20.18	7.76	44.6	4.9	7.3	27.2	28.7	-	Nil
64900 DS	27.10.14	Dry	7:15am		20.7	7.77	45.4	4.2	7.51	27.7	29.3	-	Nil
64900 US	6.11.14	wet	1:30pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	21	7.66	45.8	6.1	7.61	27.1	28.8	-	Nil
64900 DS	6.11.14	wet	1:44pm		21.2	7.72	45.2	3	7.56	27.6	28.1	-	Nil
64900 US	28.11.14	wet	1:30pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	23.6	7.6	46	11.2	3.66	28.1	29.9	23	Nil
64900 DS	28.11.14	wet	1:45pm		23.5	7.61	46.1	6.7	2.8	28	29.7	18	Nil
64900 US	12.12.14	wet	1:15pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	24.25	7.17	39.5	16.4	4.21	24.1	25.1	18	Nil
64900 DS	12.12.14	wet	1:30pm		24.26	7.15	39.1	15.1	3.62	24.1	25.3	19	Nil
64900 US	20.1.15	wet	10:00am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	22.63	6.32	1.75	28.1	3.93	1.12	0.9	17	Nil
64900 DS	20.1.15	wet	10:30am		21.99	6.4	2.28	34.9	4.63	1.46	1.2	22	Nil
64900 US	28.1.15	wet	8:10am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. No construction impacts observed.	23.6	6.08	0.927	11.6	5.79	0.593	0.5	-	Nil
64900 DS	28.1.15	wet	8:05am		23.62	6.16	1.57	7.9	4.6	0.969	0.8	-	Nil
64900 US	4.2.15	wet	4:19pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	25.19	6.07	1.86	26.3	7.11	1.2	0.9	19	Nil
64900 DS	4.2.15	wet	4:25pm		25.2	6.71	1.95	27.9	5.71	1.25	1	20	Nil
64900 US	23.2.15	wet	5:15pm	Compliant. pH better than upstream	24.3	6.4	1.07	9	8.66	0.666	0.5	-	Nil
64900 DS	23.2.15	wet	5:25pm		24.1	6.46	1.09	13	7.99	0.646	0.5	-	Nil
64900 US	20.3.15	dry	7:35am	Compliant. pH better than upstream	23.15	6.9	20.6	11.1	8.04	13.4	11.6	-	Nil
64900 DS	20.3.15	dry	7:30am		23.25	6.93	24.9	10.5	7.77	15.4	15	-	Nil
64900 US	01.04.15	wet	11:30am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	22.1	7.59	11.6	30.3	9.16	7.16	6.6	20	Nil
64900 DS	01.04.15	wet	11:40am		22.6	7.38	9.64	35.3	7.09	6.07	5.4	20	Nil
64900 US	17.04.15	Dry	1:15am	Nitrate results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All other parameters compliant.	25.4	7.87	9.63	22.9	9.5	6.08	5.4	7	Nil
64900 DS	17.04.15	Dry	1:20am		25.3	7.79	9.51	19.6	8.57	6.05	5.4	4	Nil
64900 US	30.04.15	wet	10:20am	Compliant.	24.3	7.62	8.54	24	9.6	6	4.8	-	Nil
64900 DS	30.04.15	wet	11:00am		24.3	7.5	8.66	20.2	9.12	6.18	4.9	-	Nil
64900 US	18.05.15	wet	4:12pm	Compliant.	21.5	7.58	7.55	4	9.41	4.11	4.1	-	Nil
64900 DS	18.05.15	wet	4:10pm		21.46	7.62	7.65	4.4	10.27	4.81	4.2	-	Nil
64900 US	22.05.15	wet	12:00pm	Compliant.	20.9	7.71	6.96	3.7	8.68	4.24	3.8	6	Nil
64900 DS	22.05.15	wet	12:00pm		20.62	7.68	7.01	4.2	11.23	4.31	3.8	13	Nil
64900 US	29.05.15	Dry	9:50pm	Compliant.	20.92	7.21	6.86	3.8	8.01	4.22	4	-	Nil
64900 DS	29.05.15	Dry	9:50pm		20.81	7.39	6.42	4.6	8.55	4.55	3.95	-	Nil
64900 US	18.06.15	Dry	7:05am	Generally Compliant. Minor parameter fluctuations	13.25	7.86	13.3	9.1	6.52	8.22	7.6	6	Nil
64900 DS	18.06.15	Dry	7:15am		13.24	7.85	13.5	9	6.5	8.2	7.6	8	Nil
64900 US	21.07.15	Dry	9:15am	Compliant.	14.76	7.17	8.37	8.33	9.16	5.26	4.6	-	Nil
64900 DS	21.07.15	Dry	9:10am		15.07	7.62	8.9	6.9	14.06	5.61	4.9	-	Nil
64900 US	20.08.15	Dry	12:07 PM	pH level low but slightly better than upstream. Elevated EC/TDS. Tidal influence and dry conditions attributing to results. No construction impacts noted	16.25	5.51	13.1	4.23	15.1	8.11	7.5	19	Nil
64900 DS	20.08.15	Dry	12:09 PM		16.28	6.1	13.2	4	6.53	8.17	7.5	10	Nil
64900 US	25.08.15	wet	11:50 AM	pH level low but slightly better than upstream. Elevated EC/TDS. Tidal influence and dry conditions attributing to results. Minor parameter fluctuation. No construction impacts noted	18.53	5.99	9.32	2.9	14	5.87	5.2	14	Nil
64900 DS	25.08.15	wet	11:51 AM		19.09	6.26	10.5	5.9	8.02	6.54	6	14	Nil
64900 US	11.09.15	Dry	12:13 PM	Compliant.	19.58	6.18	29.9	12.9	11.01	18.5	18.4	-	Nil
64900 DS	11.09.15	Dry	12:14 PM		20.21	6.69	34.7	5.7	6.93	21.2	21.7	-	Nil
64900 US	22.09.15	wet	12:55 PM	DO level slightly lower than upstream. No construction impacts noted. Metals monitoring omitted	21.34	6.42	17.7	42.6	5.07	11	10.4	-	Nil
64900 DS	22.09.15	wet	12:56 PM		21.39	6.52	17.7	40.1	4.9	11	10.4	-	Nil

64900 US	29.10.15	Dry	11:16 AM	Generally Compliant. Minor parameter fluctuation. No construction impacts noted	20.7	6.85	41.7	2.9	13.59	25.4	26.7	9	Nil
64900 DS	29.10.15	Dry	11:58 AM		21.25	7.25	42.1	4.9	8.86	25.7	26.9	10	Nil
64900 US	09.11.15	wet	12:47 PM	Compliant.	22.26	7.29	5.59	14	19.42	3.52	3	-	Nil
64900 DS	09.11.15	wet	12:48 PM		22.07	7.49	5.01	9.7	12.65	3.15	2.7	-	Nil
64900 US	17.12.15	wet	3:49 PM	Minor parameter fluctuation. No construction impacts noted	27.7	6.9	36	6.1	7.01	21.8	22.6	14	Nil
64900 DS	17.12.15	wet	3:56 PM		20.48	7.84	18.1	7.5	7.48	11.1	10.8	11	Nil
64900 US	14.01.16	Dry	9:41 AM	Compliant	26.87	7.11	14.9	16.1	6.52	9.23	9.23	-	Nil
64900 DS	14.01.16	Dry	12:13 PM		30.42	7.43	27.7	9	5.45	17.2	17.2	-	Nil
64900 US	27.01.16	Wet	2:53 PM	Compliant	27.55	7.22	23.9	10.4	5.2	14.8	14.4	14	Nil
64900 DS	27.01.16	Wet	1:30 PM		29.32	7.52	26.1	5.2	4.37	16.2	15.9	11	Nil
64900 US	11.02.16	Dry	9:30 AM	Compliant	25.33	7.39	29.7	4.7	5.82	18.4	18.4	3	Nil
64900 DS	11.02.16	Dry	9:50 AM		21.31	7.69	26.1	7.1	7.75	16.2	15.9	26.5	Nil
64900 US	18.03.16	Dry	11:00 AM	Compliant	28.44	7.07	45.9	33.2	11.08	28	29.7	-	Nil
64900 DS	18.03.16	Dry	11:20 AM		28.03	7.31	44.6	36.4	7.47	27.2	28.9	-	Nil
64900 US	5.04.16	Dry	11:26 AM	Compliant	26.66	7.15	47.7	9.2	11.41	29.1	20	4	Nil
64900 DS	5.04.16	Dry	10:43 AM		23.25	7.77	47.3	3.2	11.64	28.8	20.7	12	Nil
64900 US	11.04.16	Wet	2:22 pm	Compliant	26.24	7.34	41.5	9.7	4.54	25.3	16.8	17	Nil
64900 DS	11.04.16	Wet	2:25 pm		26	7.49	43	3.5	9.46	26.3	17.7	-	Nil
64900 US	30.05.16	Dry	3:00 pm	Compliant	20.05	7.69	49.9	0	3.66	30.4	22.9	-	Nil
64900 DS	30.05.16	Dry	3:15 pm		19.06	7.53	48.8	0	6.59	29.7	22.6	-	Nil
64900 US	6.06.16	Wet	1:30pm	Compliant	19.32	7.52	26.1	5.2	4.37	16.2	5.9	-	Nil
64900 DS	6.06.16	Wet	2:53pm		17.55	7.72	23.9	5.4	5.2	14.8	4.4	-	Nil
64900 US	20.06.16	Wet	4:07 pm	Compliant	19.46	7.00	5.34	4	8.21	3.37	2.9	8	Nil
64900 DS	20.06.16	Wet	4:11 pm		18.9	7.12	6.39	0.8	11.09	4.03	3.5	7	Nil
64900 US	06.07.16	Wet	11:47 am	Compliant	13.61	6.65	13.4	0	11.42	8.29	7.6	6	Nil
64900 DS	06.07.16	Wet	11:52 am		13.49	6.95	12	0	9.08	7.47	6.8	5	Nil
64900 US	26.07.16	Dry	1:45 pm	Compliant	15.83	6.88	18.7	0	7.06	11.6	11	-	Nil
64900 DS	26.07.16	Dry	1:44 pm		16.64	6.87	15.4	0	6.54	9.55	8.9	-	Nil
64900 US	16.09.16	Wet	12:10pm	Compliant	17.23	6.81	13.4	2.3	6.66	10.9	7.9	-	Nil
64900 DS	16.09.16	Wet	12:25pm		17.65	6.83	13.9	2.9	6.73	9.4	7.3	-	Nil



Appendix M – Oyster Creek Field Data Raw

Site ID	Sampling Date	Sampling Event	Sampling Time	Compliance Comments	Temp. (°C)	pH	EC (mS/cm)	Turbidity (NTU)	DO (mg/L)	TDS (mg/L)	Salinity (ppt)	TSS (mg/L)	Oil and Grease	
Location : Oyster Creek														
68100 US	20.01.14	Dry	2.33pm	n/a - upstream location	28.14	6.55	1.05	69.3	1.94	0.669	0.5	86	Nil	
68100 DS	20.01.14	Dry	2.52pm	Construction works yet to commence at this location. Results due to natural fluctuation.	26.5	7.04	0.636	4.4	3.12	0.406	0.3	5	Nil	
68100 US	23.01.14	Wet	2.03pm	n/a - upstream location	23.04	7.5	1.63	59.1	8.65	1.04	0.8	17	Nil	
68100 DS	23.01.14	Wet	2.23pm	Construction works yet to commence at this location. Results due to natural fluctuation.	22.89	7.76	0.483	2.5	7.77	0.314	0.2	5	Nil	
68100 US	24.02.14	Dry	1.41pm	n/a - upstream location	24.88	7.07	2.29	105	2.21	1.37	1.1	-	Nil	
68100 DS	24.02.14	Dry	1.52pm	Construction works yet to commence at this location. Results due to natural fluctuation.	23.92	6.99	0.543	5.9	3.03	0.347	0.3	-	Nil	
68100 US	11.03.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
68100 DS	11.03.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
68100 US	25.03.14	Wet	4.24pm	n/a - upstream location	22.5	6.5	0.32	1.1	1.9	0.209	0.2	8	Nil	
68100 DS	25.03.14	Wet	4.33pm	Compliant	22.5	6.2	0.29	5.7	1.7	0.191	0.1	10	Nil	
68100 US	31.03.14	Wet	4.26pm	n/a - upstream location	24.44	5.7	0.388	3	1.87	0.252	0.2	-	Nil	
68100 DS	31.03.14	Wet	3.36pm	No construction impacts observed. Results likely to be due to natural fluctuation.	23.8	6.11	0.394	0	1.58	0.256	0.2	-	Nil	
68100 US	16.04.14	Dry	12:59pm	n/a - upstream location	22.73	6.23	0.591	4.7	2.66	0.377	0.3	-	Nil	
68100 DS	16.04.14	Dry	12:56pm	No construction impacts observed. Results likely to be due to natural fluctuation.	23.43	6.65	1.95	5.3	3.01	1.22	1	-	Nil	
68100 US	28.04.14	Wet	9:40am	n/a - upstream location	19.27	5.94	1.16	5.4	1.87	0.743	0.6	9	Nil	
68100 DS	28.04.14	Wet	9:49am	Compliant	19.65	5.93	0.46	5.8	3.15	0.293	0.2	4	Nil	
68100 US	28.05.14	Dry	9:15am	Compliant	18.54	6.37	0.539	0	0.6	0.345	0.3	12	Nil	
68100 DS	28.05.14	Dry	9:29am	Compliant	18.55	6.4	0.381	0	1.97	0.247	0.2	14	Nil	
68100 US	27.06.14	Dry	11:00am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	14.99	6.76	0.653	0	1.21	0.412	3.6	-	Nil	
68100 DS	27.06.14	Dry	11:16am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	14.04	6.82	0.521	0	1.52	0.334	0.3	-	Nil	
68100 US	17.7.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
68100 DS	17.7.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
68100 US	21.08.14	Dry	10.30am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	21	6.6	0.6	5.4	3.02	0.401	0.4	-	Nil	
68100 DS	21.08.14	Dry	10.40am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	22	6	1.8	5.6	1.9	1.2	1	-	Nil	
68100 US	25.08.14	Wet	2.50pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18	7.08	0.253	7.3	4.8	0.164	0.1	37	Nil	
68100 DS	25.08.14	Wet	2.40pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	17.8	6.84	0.264	24	4.53	0.172	0.1	26.5	Nil	
68100 US	27.8.14	Wet	7.15am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	21.2	6.6	0.121	33	7.78	0.077	0.1	-	Nil	
68100 DS	27.8.14	Wet	7.30am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	21.2	6.6	0.109	47	4.96	0.071	0.1	-	Nil	
68100 US	29.9.14	Dry	5.15pm	Low pH levels recorded upstream and downstream. Investigation occurred. No construction influence identified. Low flows in creek maybe a contributing factor.	20.63	4.15	0.228	8.6	9.1	0.148	0.1	37	Nil	
68100 DS	29.9.14	Dry	5.25pm	Low pH levels recorded upstream and downstream. Investigation occurred. No construction influence identified. Low flows in creek maybe a contributing factor.	21.33	3.76	0.227	0.5	5.18	0.148	0.1	8.5	Nil	
68100 US	27.10.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
68100 DS	27.10.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-	
68100 US	06.11.14	Wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-	
68100 DS	06.11.14	Wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-	
68100 US	28.11.14	Wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-	
68100 DS	28.11.14	Wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-	
68100 US	12.12.14	wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-	
68100 DS	12.12.14	wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-	
68100 US	20.1.15	wet	4.30pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.89	6.95	0.185	48.5	10.59	0.12	0.1	21	Nil	
68100 DS	20.1.15	wet	4.15pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.98	7.23	0.19	58.2	10.72	0.124	0.1	52	Nil	
68100 US	28.1.15	wet	8.40am	pH slightly lower than preconstruction and upstream values.	23.64	6.47	0.318	0.5	5.27	0.206	0.2	-	Nil	
68100 DS	28.1.15	wet	7.20am	pH slightly lower than preconstruction and upstream values.	23.65	6.36	0.186	4.8	4.89	0.121	0.1	-	Nil	
68100 US	4.2.15	wet	7.30am	Elevated NTU/TSS due to discharge from sediment basin from above design rain event. All required controls are in place. Other parameters only marginal variations between downstream and upstream values.	20.8	6.54	0.173	10.5	4.05	0.11	0.1	10	Nil	
68100 DS	4.2.15	wet	7.43am	Elevated NTU/TSS due to discharge from sediment basin from above design rain event. All required controls are in place. Other parameters only marginal variations between downstream and upstream values.	21.06	6.3	0.144	30.5	4.26	0.093	0.1	19	Nil	
68100 US	23.2.15	wet	3.10pm	Elevated NTU due to discharge from sediment basin from above design rain event. All required controls are in place.	25	6.68	0.149	12.7	7.55	0.092	0.1	-	Nil	
68100 DS	23.2.15	wet	3.31pm	Elevated NTU due to discharge from sediment basin from above design rain event. All required controls are in place.	24.9	6.8	0.141	21	5.98	0.099	0.1	-	Nil	
68100 US	20.3.15	dry	10.15am	EC marginal difference between upstream and downstream. DO reading anomalous	22.32	7.06	0.209	23.9	4.86	0.136	0.1	-	Nil	
68100 DS	20.3.15	dry	7.20am	EC marginal difference between upstream and downstream. DO reading anomalous	21.22	7.38	0.33	10.6	-	0.215	0.2	-	Nil	
68100 US	01.04.15	wet	10.15am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.37	6.68	0.203	10.6	8	0.132	0.1	20	Nil	
68100 DS	01.04.15	wet	10.00am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.27	6.67	0.205	29.6	8	0.133	0.1	28.3	Nil	
68100 US	17.04.15	Dry	4.15pm	Elevated Turbidity/TSS. Low flow in downstream pool maybe contributing factor to turbidity difference. No particular construction impacts noted. Only marginal variations between downstream and upstream values for other parameters.	24.51	6.74	0.223	14	3.29	0.145	0.1	7	Nil	
68100 DS	17.04.15	Dry	4.00pm	Elevated Turbidity/TSS. Low flow in downstream pool maybe contributing factor to turbidity difference. No particular construction impacts noted. Only marginal variations between downstream and upstream values for other parameters.	24.9	6.91	0.258	58.2	6.72	0.183	0.1	28.3	Nil	
68100 US	30.04.15	wet	3.15pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	21.74	7.54	0.2	10	10.19	0.137	0.1	-	Nil	
68100 DS	30.04.15	wet	3.20pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	22.00	7.74	0.241	20.7	15.1	0.152	0.1	-	Nil	
68100 US	18.05.15	wet	3.00pm	Compliant.	19.8	7.59	0.233	2.5	6.83	0.152	0.1	-	Nil	
68100 DS	18.05.15	wet	3.10pm	Compliant.	20.1	7.36	0.221	3.6	8.19	0.155	0.1	-	Nil	
68100 US	22.05.15	wet	3.25pm	Compliant.	19.82	7.62	0.226	8.7	10.6	0.148	0.1	2	Nil	
68100 DS	22.05.15	wet	3.25pm	Compliant.	19.79	7.58	0.219	10.3	9.47	0.156	0.1	3	Nil	
68100 US	29.05.15	Dry	2.50pm	Compliant. Marginal increase in EC above background	19.66	7.44	0.212	4	8.46	0.144	0.1	-	Nil	
68100 DS	29.05.15	Dry	2.50pm	Compliant. Marginal increase in EC above background	19.82	7.62	0.234	6.61	6.29	0.161	0.1	-	Nil	
68100 US	18.06.15	Dry	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-	
68100 DS	18.06.15	Dry	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-	
68100 US	21.07.15	Dry	9.25am	pH & EC slightly higher than preconstruction and upstream values. All required controls are in place.	13.71	7.89	0.223	5.1	5.23	0.233	0.1	-	Nil	
68100 DS	21.07.15	Dry	9.18am	pH & EC slightly higher than preconstruction and upstream values. All required controls are in place.	13.68	7.93	0.305	7.1	4.08	0.198	0.1	-	Nil	
68100 US	20.08.15	Dry	10:30 AM	pH slightly low but comparable to upstream levels. No construction impacts observed	14.31	6.26	0.24	3.55	11.31	0.156	0.1	5	Nil	
68100 DS	20.08.15	Dry	10:33 AM	pH slightly low but comparable to upstream levels. No construction impacts observed	14.21	6.29	0.226	4.54	7.29	0.147	0.1	4	Nil	
68100 US	25.08.15	wet	1:24 PM	Downstream turbidity slightly higher than preconstruction and upstream values. All required controls are in place. Minor phosphate fluctuation.	20.87	7.09	0.26	0	13.6	0.169	0.1	2	Nil	
68100 DS	25.08.15	wet	1:26 PM	Downstream turbidity slightly higher than preconstruction and upstream values. All required controls are in place. Minor phosphate fluctuation.	21.59	6.86	0.24	14.8	6.85	0.156	0.1	2	Nil	
68100 US	11.09.15	Dry	11:36 AM	Compliant.	17.56	7.54	0.256	0	10.08	0.166	0.1	-	Nil	
68100 DS	11.09.15	Dry	11:37 AM	Compliant.	18.03	7.35	0.234	0	9.57	0.152	0.1	-	Nil	
68100 US	22.09.15	wet	12:38 PM	Turbidity level slightly elevated but within EPL criteria. All required controls are in place.	21.4	7.09	0.244	26.5	11	0.159	0.1	7	Nil	
68100 DS	22.09.15	wet	12:40 PM	Turbidity level slightly elevated but within EPL criteria. All required controls are in place.	21.81	6.83	0.241	32.3	7.98	0.157	0.1	5	Nil	



Appendix N – McGraths Creek Field Data Raw

Site ID	Sampling Date	Sampling Event	Sampling Time	Compliance Comments	Temp. (°C)	pH	EC (mS/cm)	Turbidity (NTU)	DO (mg/L)	TDS (mg/L)	Salinity (ppt)	TSS (mg/L)	Oil and Grease
Location : McGraths Creek													
72000 US	20.01.14	Dry	3.42pm	n/a - upstream location	25.68	6.97	1.08	8.8	1.36	0.695	0.5	29	Nil
72000 DS	20.01.14	Dry	3.55pm	Compliant	27.53	6.95	0.542	6.1	3.8	0.347	0.3	6	Nil
72000 US	23.01.14	Wet	5.36pm	n/a - upstream location	22.4	7.5	0.795	322	7.29	0.508	0.4	158	Nil
72000 DS	23.01.14	Wet	5.44pm	No construction impacts observed. Trigger values within ANZECC criteria.	22.94	7.51	0.551	10.1	6.97	0.353	0.3	9	Nil
72000 US	24.02.14	Dry	2.12pm	n/a - upstream location	23.66	6.99	0.416	18.5	1.92	0.27	0.2	-	Nil
72000 DS	24.02.14	Dry	2.14pm	No construction impacts observed. Trigger values within ANZECC criteria.	23.68	7.09	0.449	8.1	3.6	0.291	0.2	-	Nil
72000 US	11.03.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	11.03.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	25.03.14	Wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	25.03.14	Wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	31.03.14	Wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	31.03.14	Wet	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	16.04.14	Dry	11:03am	n/a - upstream location	19.78	6.73	0.702	28.3	3.71	0.448	0.3	-	Nil
72000 DS	16.04.14	Dry	11:13pm	Compliant	19.67	6.64	0.614	16.5	2.84	0.395	0.3	-	Nil
72000 US	28.04.14	Wet	11:56am	n/a - upstream location	18.46	6.88	0.556	9.5	4.2	0.355	0.3	7	Nil
72000 DS	28.04.14	Wet	11:49am	Compliant	18.16	7	0.579	4.5	5.91	0.371	0.3	6	Nil
72000 US	28.05.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	28.05.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	27.06.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	27.06.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	17.7.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	17.7.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	21.08.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	21.08.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	25.08.14	Wet	3.05pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	19	7.3	0.494	224	3.7	0.318	0.2	163	Nil
72000 DS	25.08.14	Wet	3.15pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.9	7.2	0.6	34.7	4.11	0.762	0.6	40	Nil
72000 US	27.8.14	Wet	4.55pm	Compliant	21.9	6.5	0.261	29	4.9	0.168	0.1	-	Nil
72000 DS	27.8.14	Wet	-	Compliant	21.0	6.5	0.261	29	4.9	0.168	0.1	-	Nil
72000 US	29.9.14	Dry	-	Compliant	24.6	5.37	0.995	2.5	5.51	0.611	0.5	7	Nil
72000 DS	29.9.14	Dry	-	Compliant	23.7	5.2	0.653	0.8	5.2	0.418	0.3	4	Nil
72000 US	27.10.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	27.10.14	Dry	-	Pooled water / no flow - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	06.11.14	Wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	06.11.14	Wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	28.11.14	Wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	28.11.14	Wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	12.12.14	wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	12.12.14	wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	20.1.15	wet	4.30pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.89	6.33	0.652	30.5	3.12	0.417	0.3	5	Nil
72000 DS	20.1.15	wet	4.20pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	24.22	6.34	0.567	33.2	3.5	0.365	0.3	7.3	Nil
72000 US	28.1.15	wet	10.30am	pH slightly lower than preconstruction and upstream values. DO discrepancy may be the result of natural fluctuations within the system. No construction impacts observed.	22.23	6.2	0.249	3.6	4.84	0.162	0.1	-	Nil
72000 DS	28.1.15	wet	10.15am	pH slightly lower than preconstruction and upstream values. DO discrepancy may be the result of natural fluctuations within the system. No construction impacts observed.	22.58	6.15	0.244	1.1	3.85	0.158	0.1	-	Nil
72000 US	4.2.15	wet	4.34pm	Elevated NTU/TSS due to discharge from sediment basin from above design rain event. All required controls are in place. Other parameters only marginal variations between downstream and upstream values.	23.73	6.21	0.204	3.9	6.68	0.133	0.1	10	Nil
72000 DS	4.2.15	wet	4.24pm	Elevated NTU/TSS due to discharge from sediment basin from above design rain event. All required controls are in place. Other parameters only marginal variations between downstream and upstream values.	23.85	6.31	0.166	22.3	11.24	0.108	0.1	15	Nil
72000 US	23.2.15	wet	5.40pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	22.99	6.38	0.175	6.7	3.02	0.114	0.1	-	Nil
72000 DS	23.2.15	wet	5.55pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.46	6.86	0.168	10.9	5.62	0.121	0.1	-	Nil
72000 US	20.3.15	dry	10.50am	DO discrepancy may be the result of natural fluctuations within the system. No construction impacts observed.	22.42	6.82	0.456	26.1	18.89	0.297	0.2	-	Nil
72000 DS	20.3.15	dry	10.40am	DO discrepancy may be the result of natural fluctuations within the system. No construction impacts observed.	23.16	6.96	0.383	14.4	4.25	0.249	0.2	-	Nil
72000 US	01.04.15	wet	11.00am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.57	6.55	0.448	26.4	3.88	0.291	0.2	11	Nil
72000 DS	01.04.15	wet	11.15am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	23.68	6.59	0.464	24.3	7.82	0.302	0.2	15	Nil
72000 US	17.04.15	Dry	3.30pm	DO and nitrite discrepancy may be the result of natural fluctuations within the system. No construction impacts observed.	24.57	7.06	0.45	27.5	9.27	0.293	0.2	10	Nil
72000 DS	17.04.15	Dry	3.45pm	DO and nitrite discrepancy may be the result of natural fluctuations within the system. No construction impacts observed.	24.6	6.6	0.426	18.3	4.93	0.426	0.2	6	Nil
72000 US	30.04.15	wet	2.30pm	EC only slightly lower than upstream value. No construction impacts observed.	22.14	7.12	0.32	19.4	6.9	0.208	0.2	-	Nil
72000 DS	30.04.15	wet	3.00pm	EC only slightly lower than upstream value. No construction impacts observed.	22.19	7.29	0.333	20.8	7.87	0.217	0.2	-	Nil
72000 US	18.05.15	wet	4.50pm	Compliant	18.78	7.42	0.356	3.5	8	0.221	0.2	-	Nil
72000 DS	18.05.15	wet	5.00pm	Compliant	18.29	7.07	0.352	14.1	6.23	0.229	0.2	-	Nil
72000 US	22.05.15	wet	1.30pm	Compliant	19.1	7.16	0.333	8.2	8.26	0.218	0.1	6	Nil
72000 DS	22.05.15	wet	1.30pm	Compliant	19.12	7.28	0.349	9.5	7.21	0.229	0.1	3	Nil
72000 US	29.05.15	Dry	11.35am	Compliant	19.9	7.02	0.322	6.6	8	0.222	0.1	-	Nil
72000 DS	29.05.15	Dry	11.35am	Compliant	19.7	7.13	0.386	5.9	6.96	0.262	0.1	-	Nil
72000 US	18.06.15	Dry	9.00am	Downstream pH slightly higher than upstream but still within EPL limits. Minor parameter fluctuation.	13.96	7.73	0.926	13.4	5.95	0.547	0.4	3	Nil
72000 DS	18.06.15	Dry	8.45am	Downstream pH slightly higher than upstream but still within EPL limits. Minor parameter fluctuation.	13.92	7.96	0.924	12.7	5.99	0.544	0.2	4	Nil
72000 US	21.07.15	Dry	7.55am	Compliant	13.75	7.85	0.663	12.4	4.42	0.424	0.3	-	Nil
72000 DS	21.07.15	Dry	8.05am	Compliant	14.03	7.81	0.631	16.6	9.22	0.403	0.3	-	Nil
72000 US	20.08.15	Dry	1:16 PM	Downstream pH and DO slightly lower than upstream. Minor parameter fluctuation. No construction impacts observed. Levels due to dry conditions	15.45	6.63	1.46	6.55	4.54	0.932	0.7	3	Nil
72000 DS	20.08.15	Dry	1:19 PM	Downstream pH and DO slightly lower than upstream. Minor parameter fluctuation. No construction impacts observed. Levels due to dry conditions	16.28	6.34	0.81	7.08	2.6	0.518	0.4	<1	Nil
72000 US	25.08.15	wet	11:33 AM	Downstream pH slightly lower than upstream, but still compliant	15.98	6.95	0.716	21.6	12.99	0.459	0.3	9	Nil
72000 DS	25.08.15	wet	11:34 AM	Downstream pH slightly lower than upstream, but still compliant	15.57	6.53	0.677	13.1	10.1	0.433	0.3	8	Nil
72000 US	11.09.15	Dry	11:15 AM	Compliant	14.48	7.55	0.835	0	13.19	0.535	0.4	-	Nil
72000 DS	11.09.15	Dry	11:15 AM	Compliant	14.4	7.3	0.812	0	11.53	0.52	0.4	-	Nil
72000 US	22.09.15	wet	8:34 AM	Minor elevation in Nitrate. All other results compliant	14.32	7.71	0.93	9	9.95	0.596	0.5	3	Nil
72000 DS	22.09.15	wet	8:35 AM	Minor elevation in Nitrate. All other results compliant	14.43	7.42	0.754	10.8	8.96	0.483	0.4	5	Nil
72000 US	29.10.15	Dry	9:38 AM	Minor parameter fluctuation. No construction impacts noted	17.34	7.81	0.906	18.5	14.81	0.58	0.4	12	Nil
72000 DS	29.10.15	Dry	9:39 AM	Minor parameter fluctuation. No construction impacts noted	17.13	7.63	0.879	18.2	7.47	0.562	0.4	8	Nil
72000 US	09.11.15	wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
72000 DS	09.11.15	wet	-	Waterway dry - no sample taken	-	-	-	-	-	-	-	-	-
72000 US	17.12.15	wet	3:34 PM	Compliant	25.1	7.89	0.911	9.2	7.07	0.583	0.5	19	Nil

Site ID	Sampling Date	Sampling Event	Sampling Time	Total Phosphorus (mg/L)	Phosphate (mg/L)	Total Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	NOK	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Silver (mg/L)	Aluminum (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)	Mercury (mg/L)	
Location : McGraths Creek																									
72000 US	20.10.14	Dry	3.42pm	0.05	0.008	0.54	0.54	0.006	<0.005	0.006	0.329	<0.001	0.016	0.004	<0.001	<0.001	0.001	1.303	0.002	<0.001	<0.001	<0.002	0.002	<0.0005	
72000 DS	20.10.14	Dry	3.55pm	0.01	<0.005	0.20	0.20	<0.005	<0.005	0.004	0.076	<0.001	0.004	0.002	<0.001	<0.001	0.001	0.428	0.001	<0.001	<0.001	<0.002	0.001	<0.0005	
72000 US	23.10.14	Wet	5.36pm	0.25	0.092	0.49	0.48	0.005	<0.005	0.005	0.022	<0.001	0.117	0.006	<0.001	<0.001	0.008	0.509	0.190	0.003	<0.001	<0.002	0.005	<0.0005	
72000 DS	23.01.14	Wet	5.44pm	0.02	0.007	0.25	0.22	0.024	0.016	0.008	0.124	<0.001	0.011	0.002	<0.001	<0.001	0.001	0.570	0.040	0.001	<0.001	<0.002	0.001	<0.0005	
72000 US	24.02.14	Dry	2.12pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	24.02.14	Dry	2.14pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	11.03.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	11.03.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	25.03.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	25.03.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	31.03.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	31.03.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	16.04.14	Dry	11:03am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	16.04.14	Dry	11:13pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	28.04.14	Wet	11:56am	0.04	0.007	0.29	0.29	0.004	0.001	0.003	0.086	<0.001	0.012	0.001	<0.001	<0.001	<0.001	0.220	0.243	0.001	<0.001	<0.002	0.001	<0.0005	
72000 DS	28.04.14	Wet	11:49am	0.03	0.007	0.31	0.30	0.006	0.003	0.003	0.047	<0.001	0.014	0.001	<0.001	<0.001	0.001	0.397	0.388	0.005	<0.001	<0.002	0.006	<0.0005	
72000 US	28.05.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	28.05.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	27.06.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	27.06.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	17.7.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	17.7.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	21.08.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	21.08.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	25.08.14	Wet	3:05pm	0.06	<0.005	0.68	0.65	0.030	0.027	0.003	0.060	<0.001	1.028	0.002	<0.001	<0.001	0.005	1.393	0.139	0.002	0.001	0.002	0.040	<0.0005	
72000 DS	25.08.14	Wet	3:15pm	0.021	0.008	0.267	0.20	0.066	0.066	<0.001	0.04	<0.001	0.049	<0.001	<0.001	<0.001	0.006	0.113	0.168	0.004	<0.001	<0.002	0.007	<0.0005	
72000 US	27.8.14	Wet	4:55pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	27.8.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	29.9.14	Dry	-	0.04	0.014	0.34	0.34	<0.005	<0.005	0.001	0.079	<0.001	0.008	0.001	<0.001	<0.001	<0.001	0.332	0.463	0.001	<0.001	<0.002	0.007	<0.0005	
72000 DS	29.9.14	Dry	-	0.038	0.011	0.216	0.22	<0.005	<0.005	0.001	0.028	<0.001	0.008	0.001	<0.001	<0.001	<0.001	0.224	0.205	0.001	<0.001	<0.002	0.003	<0.0005	
72000 US	27.10.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	27.10.14	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	06.11.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	06.11.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	28.11.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	28.11.14	Wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	12.12.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	12.12.14	wet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	20.1.15	wet	4:30pm	0.03	0.010	0.30	0.28	0.016	0.013	0.003	0.008	<0.001	0.062	0.001	<0.001	<0.001	0.001	0.501	0.001	0.001	<0.001	<0.001	0.003	<0.0005	
72000 DS	20.1.15	wet	4:20pm	0.027	0.007	0.226	0.22	0.005	<0.005	<0.001	0.005	<0.001	0.077	0.001	<0.001	<0.001	0.002	0.318	0.001	0.002	<0.001	<0.001	0.004	<0.0005	
72000 US	28.1.15	wet	10:30am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	28.1.15	wet	10:15am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	4.2.15	wet	4:34pm	0.04	0.008	0.37	0.35	0.022	0.015	0.007	0.044	<0.001	0.407	0.002	<0.001	0.001	0.003	0.793	0.018	0.002	<0.001	<0.001	0.006	<0.0005	
72000 DS	4.2.15	wet	4:24pm	0.034	0.019	0.223	0.21	0.016	0.013	0.003	0.027	<0.001	0.345	0.001	<0.001	0.001	0.003	0.632	0.046	0.005	<0.001	<0.001	0.008	<0.0005	
72000 US	23.2.15	wet	5:40pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	23.2.15	wet	5:55pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	20.3.15	dry	10:50am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	20.3.15	dry	10:40am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	01.04.15	wet	11:00am	0.04	0.014	0.30	0.26	0.045	0.032	0.013	0.116	<0.001	0.152	0.002	<0.001	<0.001	0.001	1.208	0.015	0.001	<0.001	<0.005	0.003	<0.0005	
72000 DS	01.04.15	wet	11:15am	0.04	0.013	0.271	0.23	0.038	0.03	0.008	0.068	<0.001	0.037	0.001	<0.001	<0.001	0.002	0.688	0.01	0.002	<0.001	<0.005	0.006	<0.0005	
72000 US	17.04.15	Dry	3:30pm	0.04	0.013	0.44	0.40	0.039	0.033	0.006	0.085	<0.001	0.048	0.001	<0.001	<0.001	0.001	0.957	0.047	0.001	<0.001	<0.001	0.005	<0.0005	
72000 DS	17.04.15	Dry	3:45pm	0.032	0.011	0.397	0.35	0.045	0.036	0.009	0.068	<0.001	0.044	0.001	<0.001	<0.001	0.001	0.920	0.018	0.001	<0.001	<0.001	0.003	<0.0005	
72000 US	30.04.15	wet	2:30pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	30.04.15	wet	3:00pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	18.05.15	wet	4:50pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 DS	18.05.15	wet	5:00pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
72000 US	22.05.15	wet	1:30pm	0.02	0.014	0.27	0.18	0.087	0.074	0.013	0.057	<0.001	0.0												



Appendix O – Dalhousie Creek Field Data Raw



Appendix P – Kalang River Field Data Raw

Site ID	Sampling Date	Sampling Event	Sampling Time	Compliance Comments	Temp. (°C)	pH	EC (mS/cm)	Turbidity (NTU)	DO (mg/L)	TDS (mg/L)	Salinity (ppt)	TSS (mg/L)	Oil and Grease
Location : Kalang River													
77700 US	20.01.14	Dry	10.36am	Compliant	28.61	7.11	32.6	11.03	3.43	19.9	20.3	32	Nil
77700 DS	20.01.14	Dry	11.00am	Compliant	30.22	7.44	33	5	3.41	20.2	20.6	14	Nil
77700 US	23.01.14	Wet	4.48pm	Compliant	25.47	6.25	39	7.9	5.74	23.7	24.7	18	Nil
77700 DS	23.01.14	Wet	5.01pm	Compliant	25.52	6.31	39.2	3.2	5.94	23.9	25	9	Nil
77700 US	25.02.14	Dry	7.52am	Compliant	23.22	7.48	39.9	8.4	3.64	24.4	25.5	-	Nil
77700 DS	25.02.14	Dry	9.01am	Compliant	24.56	7.82	40.7	0.3	6.51	24.9	26.1	-	Nil
77700 US	11.03.14	Dry	11.21am	Compliant	25.36	7.57	37.1	1.2	3.96	22.6	23.5	13	Nil
77700 DS	11.03.14	Dry	11.54am	Compliant	27.18	7.62	37.1	1.1	3.56	22.6	23.4	15	Nil
77700 US	25.03.14	Wet	10.27pm	Compliant	23.8	7.53	38.2	4.6	2.1	23.3	24.3	19	Nil
77700 DS	25.03.14	Wet	10.54pm	Compliant	24.48	7.4	39.2	0.1	2.44	23.9	24.9	8	Nil
77700 US	31.03.14	Wet	1.25pm	Compliant	25.65	7.71	37.9	1.8	2	23.1	24	-	Nil
77700 DS	31.03.14	Wet	1.45pm	Compliant	25.69	7.88	39.1	0.1	1.9	23.9	24.9	-	Nil
77700 US	16.04.14	Dry	1.31pm	Compliant	23.25	7.35	35.2	4.1	5.14	21.5	22.2	-	Nil
77700 DS	16.04.14	Dry	1.43pm	Compliant	23.67	7.42	36.9	4	5.26	22.8	22.4	-	Nil
77700 US	28.04.14	Wet	10:23am	Compliant	20.05	7.33	37.4	8.8	1.7	22.8	23.6	5	Nil
77700 DS	28.04.14	Wet	11:10am	Compliant	20.84	7.75	38	4.1	2.21	23.2	24.1	5	Nil
77700 US	28.05.14	Dry	10:39am	Compliant	20.16	7.49	35.6	0	1.12	21.7	22.3	10	Nil
77700 DS	28.05.14	Dry	10:25am	Compliant	20.08	7.23	34	0.6	1.28	20.7	21.3	19	Nil
77700 US	27.06.14	Dry	8.23am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	13.44	7.66	37.8	0	2.56	23.1	23.7	-	Nil
77700 DS	27.06.14	Dry	8.42am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	13.99	7.72	35.4	0	3.05	22.6	23.6	-	Nil
77700 US	17.07.14	Dry	3.47pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	16.13	7.88	37.2	0	5.07	22.7	23.3	4,500	Nil
77700 DS	17.07.14	Dry	3.21pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	17.23	7.99	38	0	5.23	23.1	23.9	13	Nil
77700 US	21.08.14	Dry	8.20am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	15.96	7.9	39.6	4.79	7.15	24.1	25	-	Nil
77700 DS	21.08.14	Dry	8.30am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	16.4	7.8	39.4	8.33	7.66	24	24.8	-	Nil
77700 US	25.08.14	Wet	2.21pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.35	7.36	37.1	0.9	2.02	22.6	23.4	13	Nil
77700 DS	25.08.14	Wet	2.42pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.52	7.66	37.3	1.2	4.33	22.8	23.5	9	Nil
77700 US	27.8.14	Wet	4.15pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	17.07	6.48	11.5	19.36	2.82	7.1	6.5	-	Nil
77700 DS	27.8.14	Wet	4.20pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	16.6	6.14	14.5	21.5	2.71	9.02	8.4	-	Nil
77700 US	24.9.14	Dry	1.20pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.16	6.68	31.1	11.7	2.1	19	19.2	14	Nil
77700 DS	24.9.14	Dry	1.42pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	18.59	6.75	33.1	9.6	2.74	20.2	20.6	20	Nil
77700 US	27.10.14	Dry	4.55pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	26.04	7.5	39.9	1.7	6.75	24.5	25.6	-	Nil
77700 DS	27.10.14	Dry	5.05pm	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	25.94	7.62	42.1	4.5	7.41	25.7	27.0	-	Nil
77700 US	06.11.14	Wet	11.50am	Compliant	23.96	7.78	44.5	17.1	7	27	28.5	-	Nil
77700 DS	06.11.14	Wet	12.05pm	Compliant	25.09	7.98	44.9	8.1	7.16	27.4	29.0	-	Nil
77700 US	28.11.14	Wet	9.28am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	25.96	7.12	41.7	8.56	3.37	25.5	26.8	32	Nil
77700 DS	28.11.14	Wet	9.45am	Some results higher than preconstruction criteria however only marginally above upstream values. No construction impacts observed.	26.44	7.37	21.5	36.7	2.52	25.9	27.3	69	Nil
77700 US	12.12.14	wet	2.15pm	DO discrepancy may be the result of natural fluctuations within the system. No construction impacts observed.	24.88	6.94	42.3	35.4	5.37	25.8	27.2	15	Nil
77700 DS	12.12.14	wet	2.43pm	DO discrepancy may be the result of natural fluctuations within the system. No construction impacts observed.	24.72	7.31	43.8	10.5	4.42	26.7	28.2	26	Nil
77700 US	20.1.15	wet	5.00pm	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values.	25.84	6.14	1.59	169	4.49	1.02	0.5	104	Nil
77700 DS	20.1.15	wet	4.45pm	Major rain event in catchment 130-250mm. All required controls are in place.	25.95	6.08	1.53	193	3.91	0.984	0.8	93	Nil
77700 US	28.1.15	wet	10.30am	Minor DO discrepancy compared to upstream value.	21.11	5.91	0.289	51.4	3.04	0.188	0.1	-	Nil
77700 DS	28.1.15	wet	10.45am	Minor DO discrepancy compared to upstream value.	21.24	6.02	0.279	52.1	3.02	0.181	0.1	-	Nil
77700 US	4.2.15	wet	9.30am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	20.97	6.46	4.73	20.8	7.01	3.02	2.5	22	Nil
77700 DS	4.2.15	wet	10.03am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	22.59	5.89	7.59	15.4	4.31	4.78	4.2	11	Nil
77700 US	23.2.15	wet	8.50am	Compliant. River in flood ebb.	21.87	6.93	0.404	23.9	4.55	0.263	0.2	-	Nil
77700 DS	23.2.15	wet	9.02am	Compliant. River in flood ebb.	21.91	6.98	0.402	30.9	5.12	0.261	0.2	-	Nil
77700 US	12.3.15	dry	8.45am	Compliant	23.35	6.64	4.1	10.4	6.71	8.77	8.2	-	Nil
77700 DS	12.3.15	dry	8.50am	Compliant	24.03	6.97	15.7	9.5	6.85	9.61	9.1	-	Nil
77700 US	01.04.15	wet	08.30am	Compliant	23.18	7.46	23.1	0.5	7.63	14.3	13.9	13	Nil
77700 DS	01.04.15	wet	8.45am	Compliant	23.38	7.46	27	0	7.96	16.8	16.6	9.5	Nil
77700 US	17.04.15	Dry	9.30am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	21.49	6.75	20.4	10	5.37	12.6	12.1	3	Nil
77700 DS	17.04.15	Dry	9.42am	Some results higher than preconstruction criteria however only marginal variations between downstream and upstream values. All required controls are in place.	22.92	6.89	20.7	6	4.7	12.9	12.4	5.5	Nil
77700 US	30.04.15	wet	10.43am	Compliant	19.49	8.37	27.2	6.2	8.09	16.9	16.6	-	Nil
77700 DS	30.04.15	wet	11.00am	Compliant	19.69	7.72	28	10.7	7.78	17.3	17.1	-	Nil
77700 US	18.05.15	wet	4.48pm	Compliant. Marginal increase in EC above upstream value	20.47	7.4	14.2	22.6	8.63	8.78	8.2	-	Nil
77700 DS	18.05.15	wet	5.05pm	Compliant. Marginal increase in EC above upstream value	19.67	7.39	14.9	18.9	8.23	9.26	8.7	-	Nil
77700 US	22.05.15	wet	11.15am	DO results lower than preconstruction criteria however only marginal variations between downstream and upstream values.	17.92	7.11	15.8	15.2	5.51	9.81	9.2	16	Nil
77700 DS	22.05.15	wet	11.30am	DO results lower than preconstruction criteria however only marginal variations between downstream and upstream values.	17.86	7.13	15.6	16.3	5.03	9.76	9.2	14	Nil
77700 US	29.05.15	Dry	9.45am	Compliant	16.85	7.01	20.8	5.9	7.03	12.9	12.4	-	Nil
77700 DS	29.05.15	Dry	10.00am	Compliant	16.87	7	20.8	6	7.31	12.8	12.4	-	Nil
77700 US	18.06.15	Dry	10.15am	Compliant	16.01	7.11	26.2	9.3	5.35	16.2	15.9	8	Nil
77700 DS	18.06.15	Dry	10.25am	Compliant	15.99	7.13	26.1	9.3	5.37	16.4	16	9	Nil
77700 US	21.07.15	Dry	10.48am	Compliant	15.31	7.37	30.6	0	13.95	18.7	19	-	Nil
77700 DS	21.07.15	Dry	10.54am	Compliant	15.31	7.34	32.1	0.7	10.15	19.6	19.8	-	Nil
77700 US	21.08.15	Dry	7:24am	Generally Compliant. Minor fluctuation in aluminium	14.99	7.46	34	9	24.92	20.8	21.1	5	Nil
77700 DS	20.08.15	Dry	7:31am	Generally Compliant. Minor fluctuation in aluminium	14.58	7.53	36.4	7	14.18	22.2	22.8	6	Nil
77700 US	25.08.15	wet	3:09pm	Compliant	20.36	7.54	35.2	18.7	32.85	21.5	22.1	6	Nil
77700 DS	25.08.15	wet	3:13pm	Compliant	19.56	7.61	35.5	8.5	11.64	21.6	22.3	7	Nil
77700 US	11.09.15	Dry	7:47	Compliant	18.39	7.41	38.9	17.7	29.9	23.6	24.4	-	Nil
77700 DS	11.09.15	Dry	7:59	Compliant	18.35	7.7	39	18.1	11.75	23.8	24.7	-	Nil
77700 US	22.09.15	wet	7:15	Compliant	18.97	7.49	36.2	24.8	15.79	22.1	22.8	16	Nil
77700 DS	22.09.15	wet	7:20	Compliant	17.51	7.59	35.9	28.8	14.73	21.9	22.6	5	Nil
77700 US	29.10.15	Dry	12:25	Generally Compliant. Minor parameter fluctuation. No construction impacts noted	22.11	7.46	42.9	0.8	27.4	26.2	27.1	13	Nil
77700 DS	29.10.15	Dry	12:26	Generally Compliant. Minor parameter fluctuation. No construction impacts noted	22.41	7.52	41.7	9.6	14.51	25.4	26.6	15	Nil
77700 US	09.11.15	Wet	12:18	Compliant	24.32	7.6	37	0	17.25	22.6	23.4	-	Nil
77700 DS	09.11.15	Wet	12:21	Compliant	24.26	7.58	37	0	12.06	22.6	23.3	-	Nil
77700 US	17.12.15	Wet	13:44	Generally Compliant. Minor parameter fluctuation. No construction impacts noted	26.54	7.45	37.7	14.3	14.83	23	23.8	13	Nil
77700 DS	17.12.15	Wet	13:53	Generally Compliant. Minor parameter fluctuation. No construction impacts noted	25.84	6.8	37.3	13.9	11.13	22.7	23.6	15	Nil
77700 US	14.01.16	Dry	3.40 PM	Compliant	29.27	7.43	31.6	8.3	4.71	19.3	19.6	-	Nil
77700 DS	14.01.16	Dry	3.52 PM	Compliant	29.67	7.6	31.8	7.7	4.82	19.4	19.8	-	Nil
77700 US	27.01.16	Wet	5.12 PM	Compliant	26.22	7.04	32.4	8.8	5.36	19.8	12.2	15	Nil
77700 DS	27.01.16	Wet	5.23 PM	Compliant	26.04	7.47							

77700 US	11.02.16	Dry	12.15 PM	Compliant	31.97	7.19	39.1	3.1	4.55	23.8	24.9	6.5	Nil
77700 DS	11.02.16	Dry	12.35 PM		31.62	7.4	39.1	6.1	5.75	23.9	24.9	6.8	Nil
77700 US	23.03.16	Dry	11.00 AM	Compliant	23.3	7.66	43.4	23.7	11.18	26.5	28	-	Nil
77700 DS	23.03.16	Dry	11.15 AM		22.53	7.43	42.9	12.9	12.94	26.2	27.6	-	Nil
77700 US	5.04.16	Dry	4.54 PM	Minor NTU fluctuation. Sample taken at low tide limiting the sample available.	26.32	7.68	40.3	2.7	6.13	24.6	16.1	12	Nil
77700 DS	5.04.16	Dry	4.49 PM		26.34	7.31	38	20.8	7.94	23.2	14.9	92	Nil
77700 US	11.04.16	Wet	3.53 pm	Compliant	24.27	7.6	41.5	5.6	8.88	25.3	17.3	6	Nil
77700 DS	11.04.16	Wet	3.59 pm		24.65	7.66	41.3	3.1	10.24	25.2	17.1	16	Nil
77700 US	25.05.16	Dry	3.20 pm	Compliant	20.46	7.72	42.6	0	4.73	26	18.9	-	Nil
77700 DS	25.05.16	Dry	3.45 pm		19.48	7.87	41.9	2.9	7.99	25.6	18.7	-	Nil
77700 US	6.06.16	Wet	4.23pm	Compliant	14.99	7.46	34	175	3.96	20.8	6.1	-	Nil
77700 DS	6.06.16	Wet	4.17pm		14.58	7.53	36.4	176	3.89	22.2	6.8	-	Nil
77700 US	20.06.16	Wet	5.25 pm	Compliant	18.01	6.61	22.5	0	4.28	14	13.5	8	Nil
77700 DS	20.06.16	Wet	5.27 pm		17.89	6.71	24.1	0	5.42	14.9	14.6	8	Nil
77700 US	06.07.16	Wet	12.47 pm	Compliant	14.52	7.02	32.4	0	15.21	19.8	20	27	Nil
77700 DS	06.07.16	Wet	12.53 pm		15.15	7.31	33.9	6.1	10.16	20.7	21.1	12	Nil
77700 US	26.07.16	Dry	11.48 am	Compliant	15.2	7.51	35.4	4.2	14.18	21.6	22.1	-	Nil
77700 DS	26.07.16	Dry	11.41 am		14.96	7.7	34.8	10.7	8.34	21.3	21.7	-	Nil
77700 US	16.09.16	Wet	7.45am	Compliant	27.62	7.09	32.9	6.8	3.36	19.1	17.2	14	Nil
77700 DS	16.09.16	Wet	7.30am		27.34	7.31	32.7	6.9	3.49	19.2	17.9	15	Nil

Site ID	Sampling Date	Sampling Event	Sampling Time	Total Phosphorus (mg/L)	Phosphate (mg/L)	Total Nitrogen (mg/L)	Total Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	NOx	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Silver (mg/L)	Aluminum (mg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)	Mercury (mg/L)	
Location : Kalang River																										
77700 US	20.10.14	Dry	10.36am	0.01	<0.005	0.19	0.19	<0.005	<0.005	0.002	0.006	<0.001	0.015	0.002	<0.001	<0.001	0.027	0.001	0.014	<0.001	<0.001	<0.002	<0.001	<0.001	<0.005	
77700 DS	20.10.14	Dry	11.00am	<0.01	<0.005	0.15	0.18	<0.005	<0.005	<0.001	<0.005	<0.001	0.009	0.001	<0.001	<0.001	<0.001	0.014	0.001	0.054	<0.001	<0.001	<0.002	<0.001	<0.005	
77700 US	23.10.14	Wet	4.48pm	<0.01	<0.005	0.20	0.20	0.006	<0.005	0.003	0.007	<0.001	0.014	0.002	<0.001	<0.001	<0.001	0.001	0.026	0.002	<0.001	<0.001	<0.002	<0.001	<0.005	
77700 DS	23.10.14	Wet	5.01pm	<0.01	<0.005	0.18	0.18	<0.005	<0.005	0.003	0.005	<0.001	0.010	0.001	<0.001	<0.001	<0.001	0.001	0.026	0.002	<0.001	<0.001	<0.002	<0.001	<0.005	
77700 US	25.02.14	Dry	7.52am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	25.02.14	Dry	9.01am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	11.03.14	Dry	11.21am	0.01	<0.005	0.26	0.26	-	<0.005	<0.001	0.014	<0.001	0.015	0.001	<0.001	<0.001	0.001	0.022	0.01	<0.001	<0.001	0.002	0.003	<0.005		
77700 DS	11.03.14	Dry	11.54am	0.01	<0.005	0.27	0.27	-	<0.005	<0.001	0.012	<0.001	0.015	0.002	<0.001	<0.001	0.001	0.017	0.01	<0.001	<0.001	0.002	0.001	<0.005		
77700 US	25.03.14	Wet	10.27pm	0.03	<0.005	0.38	0.38	-	0.005	0.001	0.044	0.001	0.017	0.001	<0.001	<0.001	0.001	0.032	0.019	0.001	0.001	0.001	0.002	0.005		
77700 DS	25.03.14	Wet	10.54pm	0.02	<0.005	0.35	0.35	-	0.005	0.001	0.02	0.001	0.012	0.001	<0.001	<0.001	0.001	0.022	0.015	0.001	0.001	<0.002	0.003	0.005		
77700 US	31.03.14	Wet	1.25pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	31.03.14	Wet	1.45pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	16.04.14	Dry	1.31pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	16.04.14	Dry	1.43pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	28.04.14	Wet	10.23am	0.01	<0.005	0.20	0.20	<0.005	<0.005	<0.001	0.019	<0.001	0.010	0.001	<0.001	0.001	0.028	0.025	<0.001	<0.001	<0.001	<0.002	<0.001	<0.005		
77700 DS	28.04.14	Wet	11.10am	0.04	<0.005	0.22	0.22	0.006	0.006	0.001	0.012	<0.001	0.011	0.001	<0.001	<0.001	0.001	0.018	0.022	0.001	<0.001	<0.002	<0.001	<0.005		
77700 US	28.05.14	Dry	10.39am	0.02	<0.005	0.27	0.26	-	0.012	0.001	0.025	<0.001	0.014	0.002	<0.001	<0.001	0.002	0.013	0.028	0.001	<0.001	<0.005	<0.01	<0.005		
77700 DS	28.05.14	Dry	10.25am	0.02	<0.005	0.31	0.29	-	0.020	<0.001	0.023	<0.001	0.014	0.002	<0.001	<0.001	0.001	0.010	0.084	0.001	<0.001	<0.005	<0.01	<0.005		
77700 US	27.06.14	Dry	8.23am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	27.06.14	Dry	8.42am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	17.07.14	Dry	3.47pm	0.014	<0.005	0.101	0.093	0.008	0.005	0.003	0.009	<0.001	0.021	0.005	0.001	0.001	<0.001	0.062	0.015	0.001	<0.001	<0.010	0.070	<0.005		
77700 DS	17.07.14	Dry	3.21pm	0.012	<0.005	0.055	0.055	<0.005	<0.005	0.003	0.006	<0.001	0.022	0.004	<0.001	0.003	0.037	0.015	<0.001	<0.001	<0.010	0.003	<0.005	<0.005		
77700 US	21.08.14	Dry	8.20am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	21.08.14	Dry	8.30am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	25.08.14	Wet	2.21pm	<0.01	<0.005	0.22	0.21	0.014	0.014	<0.001	<0.005	<0.001	0.022	<0.001	<0.001	<0.001	<0.001	<0.005	0.016	0.003	<0.001	<0.002	0.009	<0.005		
77700 DS	25.08.14	Wet	2.42pm	0.011	0.009	0.297	0.29	0.006	0.006	<0.001	<0.005	<0.001	0.026	<0.001	<0.001	<0.001	<0.001	<0.005	0.012	0.003	<0.001	<0.002	0.011	<0.005		
77700 US	27.8.14	Wet	4.15pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	27.8.14	Wet	4.20pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	24.9.14	Dry	1.20pm	0.02	<0.005	0.24	0.22	0.021	0.017	0.004	0.007	<0.001	0.010	0.002	<0.001	<0.001	0.001	0.007	<0.001	<0.001	<0.001	<0.002	0.001	<0.005		
77700 DS	24.9.14	Dry	1.42pm	0.022	<0.005	0.247	0.23	0.022	0.018	0.004	0.007	<0.001	0.008	0.001	<0.001	<0.001	0.001	0.002	0.001	<0.001	<0.001	0.003	<0.001	<0.005		
77700 US	27.10.14	Dry	4.55pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	27.10.14	Dry	5.05pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	06.11.14	Wet	11.50am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	06.11.14	Wet	12.05pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	28.11.14	Wet	9.28am	0.03	0.019	0.43	0.41	0.024	0.019	0.005	0.017	<0.001	0.008	0.002	<0.001	<0.001	0.001	0.017	0.018	0.001	<0.001	<0.005	0.003	<0.001		
77700 DS	28.11.14	Wet	9.45am	0.05	<0.005	0.49	0.45	0.047	0.043	0.004	0.009	<0.001	0.01	0.001	<0.001	<0.001	0.001	0.018	0.007	0.001	<0.001	<0.005	0.001	<0.001		
77700 US	12.12.14	wet	2.15pm	0.046	0.016	0.42	0.37	0.056	0.053	0.003	0.117	<0.001	0.002	0.001	<0.001	0.001	<0.001	0.009	0.006	0.001	<0.001	<0.002	0.010	<0.001		
77700 DS	12.12.14	wet	2.43pm	0.047	0.006	0.427	0.39	0.042	0.04	0.002	0.167	<0.001	0.011	0.002	<0.001	0.002	0.001	0.004	0.001	0.002	<0.001	0.005	0.001	<0.001		
77700 US	20.1.15	wet	5.00pm	0.07	0.018	0.64	0.37	0.268	0.264	0.004	0.148	<0.001	0.280	<0.001	<0.001	<0.001	0.002	0.374	0.023	0.001	<0.001	<0.001	0.003	<0.005		
77700 DS	20.1.15	wet	4.45pm	0.07	0.005	0.609	0.39	0.217	0.215	0.002	0.118	<0.001	0.249	0.001	<0.001	<0.001	0.001	0.379	0.028	<0.001	<0.001	<0.001	0.003	<0.005		
77700 US	28.1.15	wet	10.30am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	28.1.15	wet	10.45am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	4.2.15	wet	9.30am	0.03	<0.005	0.39	0.31	0.079	0.072	0.007	0.053	<0.001	0.153	<0.001	<0.001	<0.001	0.001	0.581	0.114	0.001	<0.001	0.001	0.003	<0.005		
77700 DS	4.2.15	wet	10.03am	0.023	0.006	0.373	0.35	0.028	0.027	0.001	0.015	<0.001	0.123	0.002	<0.001	<0.001	0.001	0.467	0.118	0.001	<0.001	0.001	0.001	<0.005		
77700 US	23.2.15	wet	8.50am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	23.2.15	wet	9.02am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	12.3.15	dry	8.45am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 DS	12.3.15	dry	8.50am	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
77700 US	01.04.15	wet	08.30am	0.02	<0.005	0.41	0.39	0.022	0.020	0.002	0.112	<0.001	0.011	<0.010	<0.001	<0.001	0.002	0.023	0.049	<0.001	<0.001	<0.005	0.006	&		



Appendix Q – SEPP14-353



Appendix R – Ch77,900



Appendix S – SEPP14-351



Appendix T – Ch79,900

